OpenRoads Designer: Plan and Profile Sheets

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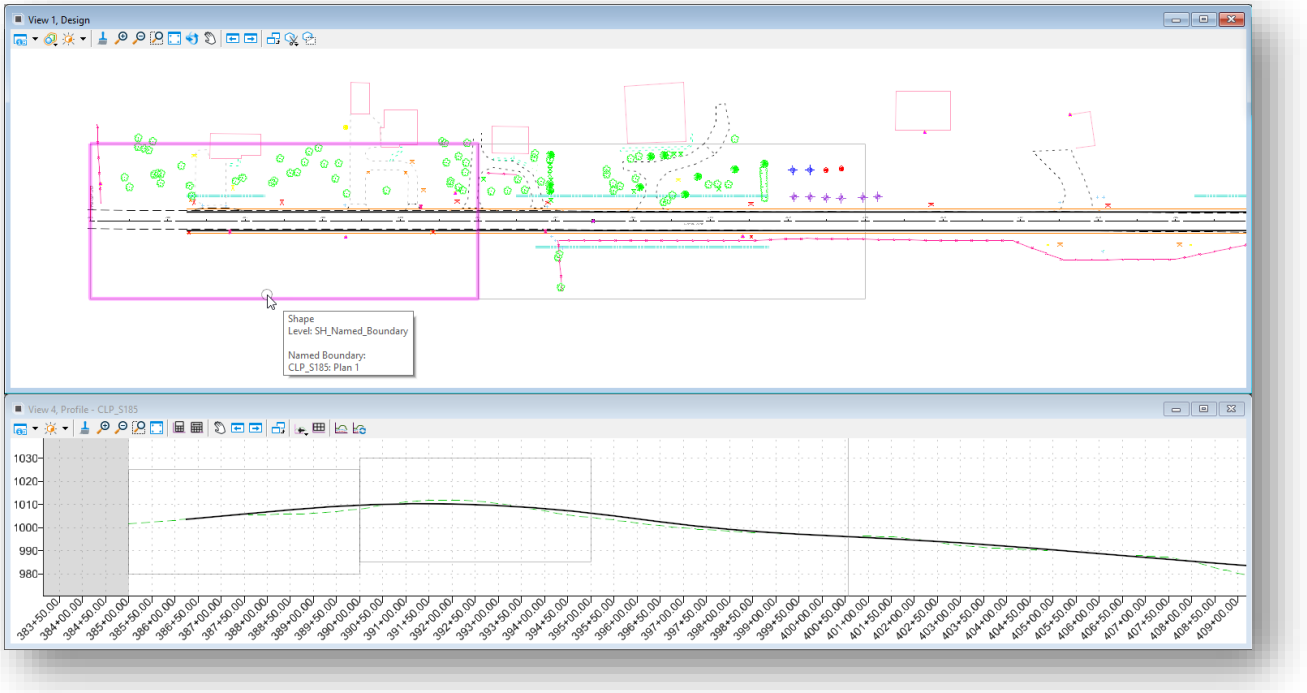
Process Overview

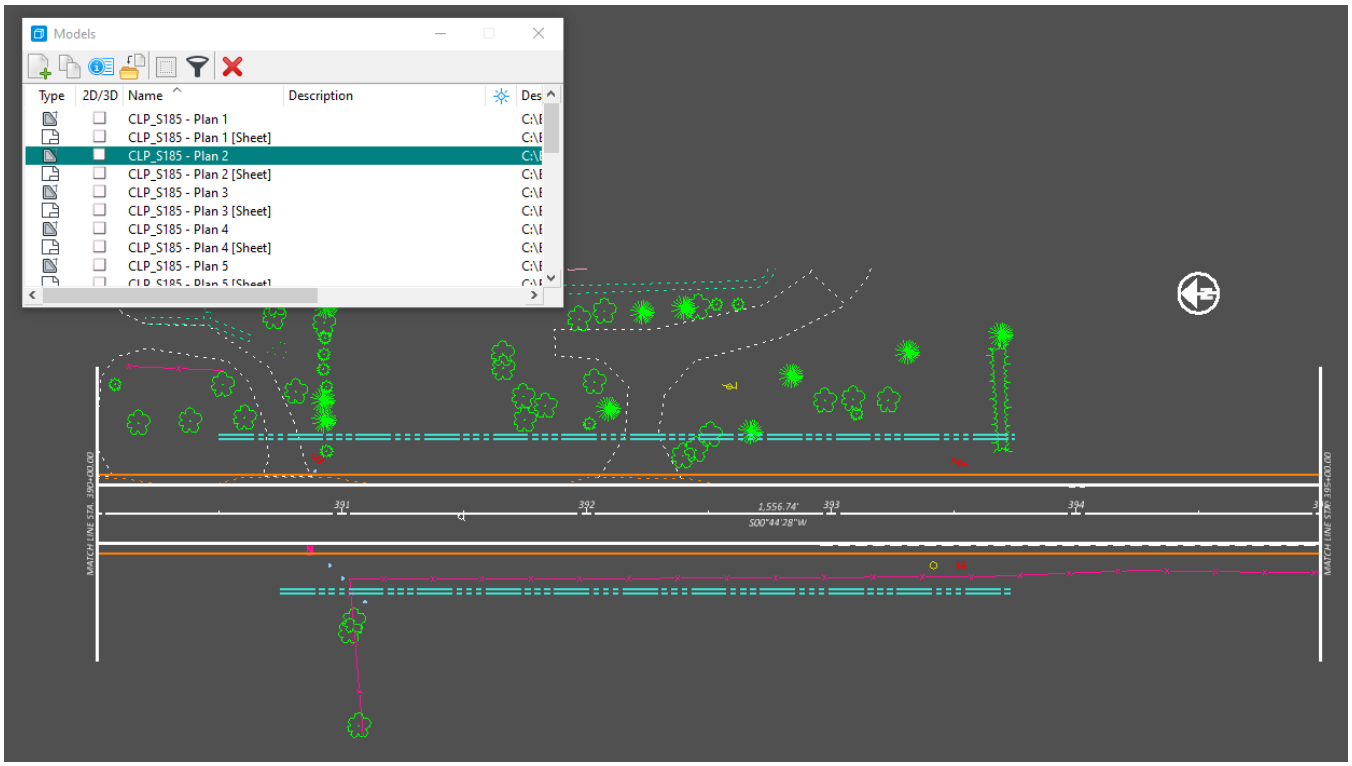
OpenRoads designer provides tools to easily create plan sheets in various formats such as plan only, plan and profile, or profile only. MicroStation **Named Boundaries** are used to define the clipping areas for the plan and profile portions of the sheets. In the example below, two named boundaries have been placed in the plan and profile views.



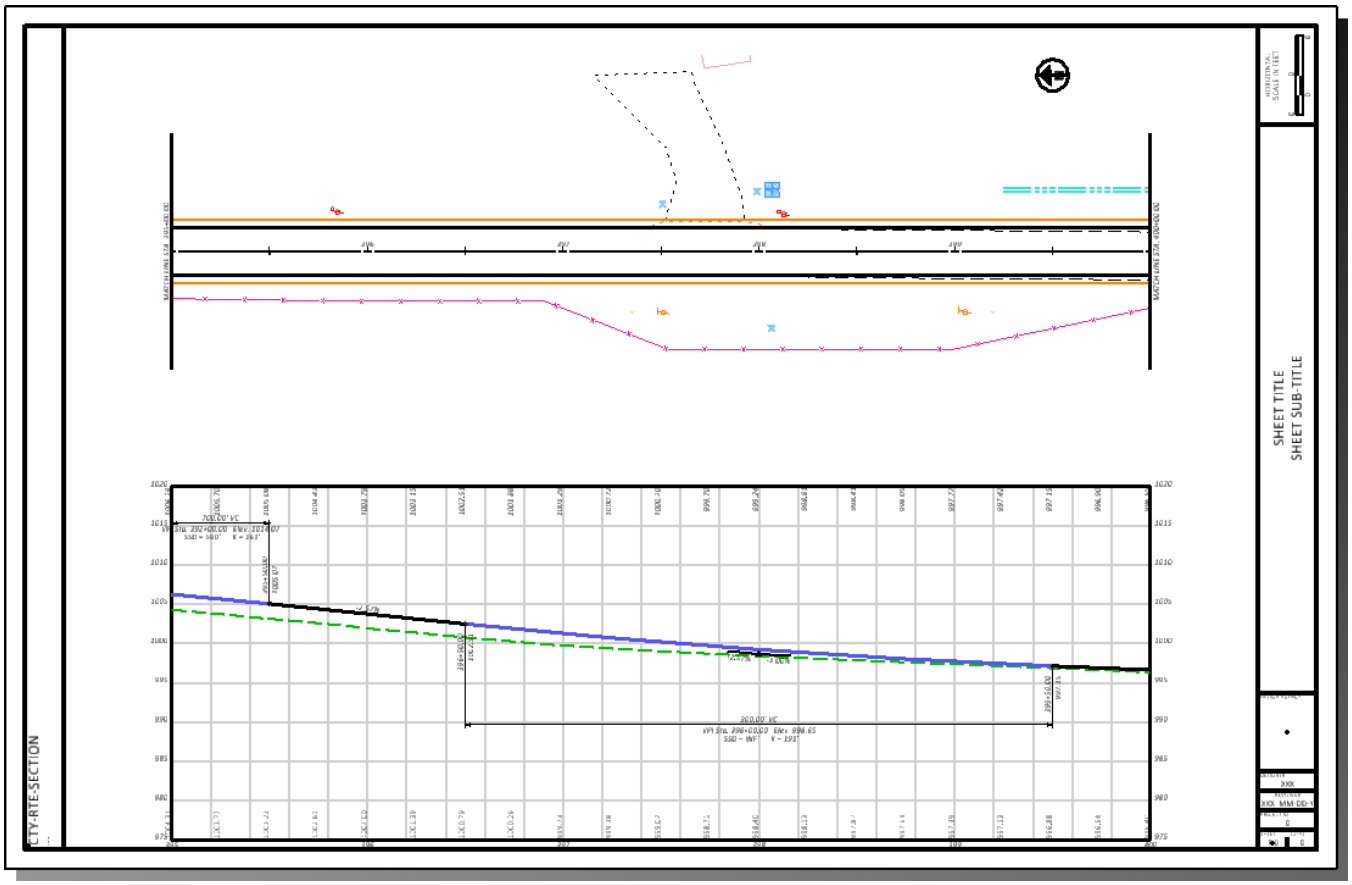
The various basemap design files required to assemble the sheets are attached as reference files to the **Design** Model in the sheet design file. In the example above, the geometry and survey basemaps are attached to the plan view with a profile window displayed.

Sheets can be clipped into the active design file, or separate design files.

When the sheets are generated, the software creates a MicroStation **Drawing Model** for each named boundary. An example of the drawing model for a plan view named boundary is shown below.



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



The sheet model is intended for plotting or PDF generation. Annotations should be placed in the drawing models, not in the sheet models.

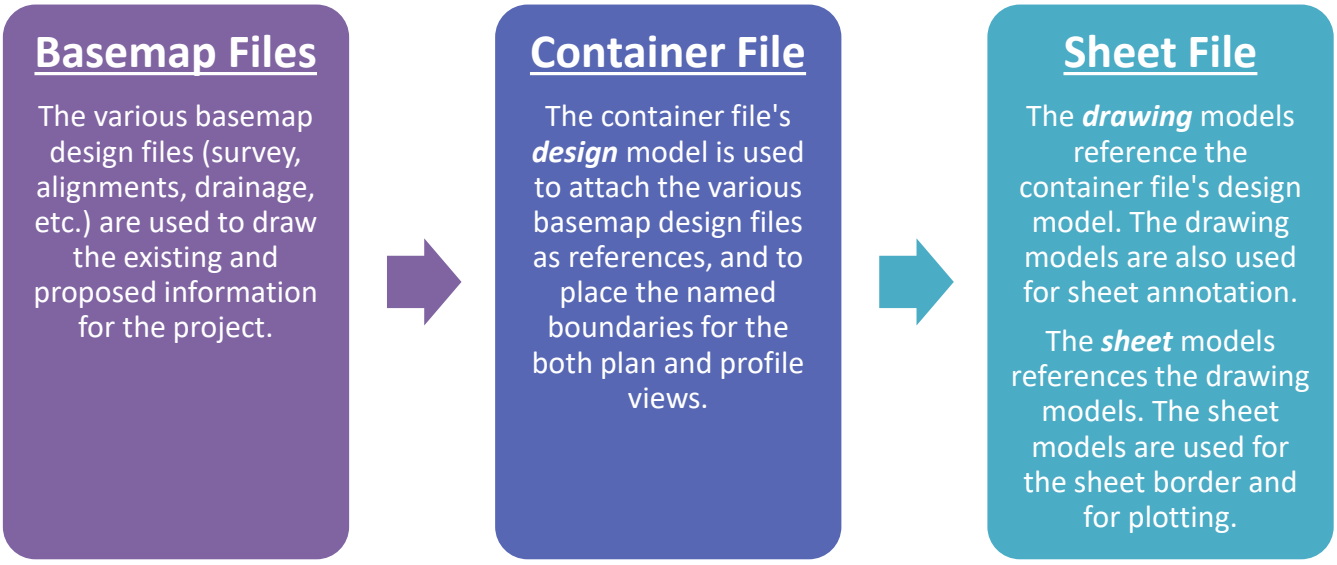
File Types and Usage

Sheets can be clipped into a single file, or into multiple design files, one sheet per file. In either case, ODOT recommends using the fist file of a sheet series, the 000, 100, 200, etc. file, as the ***container*** file to attach references and place the named boundaries.

Each container file is used to generate the sheets for a single alignment. For example, a project with three alignments using the option to clip the sheets into separate files (one sheet per file) would typically use three container files as detailed below:

Design File	Usage	Models Used
GP000	Container file for S.R. 185	Design
GP001, GP002, GP003…	Plan and profile sheets for S.R. 185	Drawing and Sheet
GP100	Container file for St. Peter Road	Design
GP101, GP102, GP103…	Plan and profile sheets for St. Peter Road	Drawing and Sheet
GP200	Container file for Jameson Road	Design
GP201, GP202, GP203…	Plan and profile sheets for Jameson Road	Drawing and Sheet

The references are attached as illustrated below:



If all the sheets for a single alignment are to be clipped into one file, the container file is used for the sheets as follows:

Design File	Usage	Models Used
GP000	Container file and sheets for S.R. 185	Design, Drawing, and Sheet
GP100	Container file and sheets for St. Peter Road	Design, Drawing, and Sheet
GP200	Container file and sheets for Jameson Road	Design, Drawing, and Sheet

The references are attached as illustrated below:

Basemap Files

The various basemap design files (survey, alignments, drainage, etc.) are used to draw the existing and proposed information for the project.

Container File Design Model

The container file's ***design*** model is used to attach the various basemap design files as references, and to place the named boundaries for the both plan and profile views.

Container File Drawing Model

The ***drawing*** models reference the container file's design model. The drawing models are also used for sheet annotation.

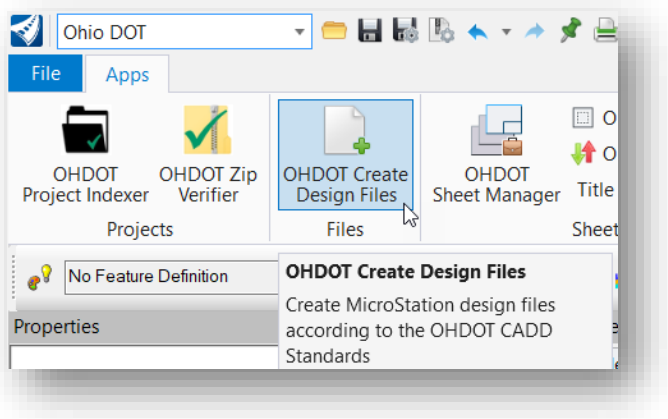
Container File Sheet Model

The ***sheet*** models reference the container file's drawing models. The sheet models are used for the sheet border and for plotting.

The container file is also used to control the reference attachment and level display settings for all the sheets from one location. More information on level display can be found in the Level Management section of this document.

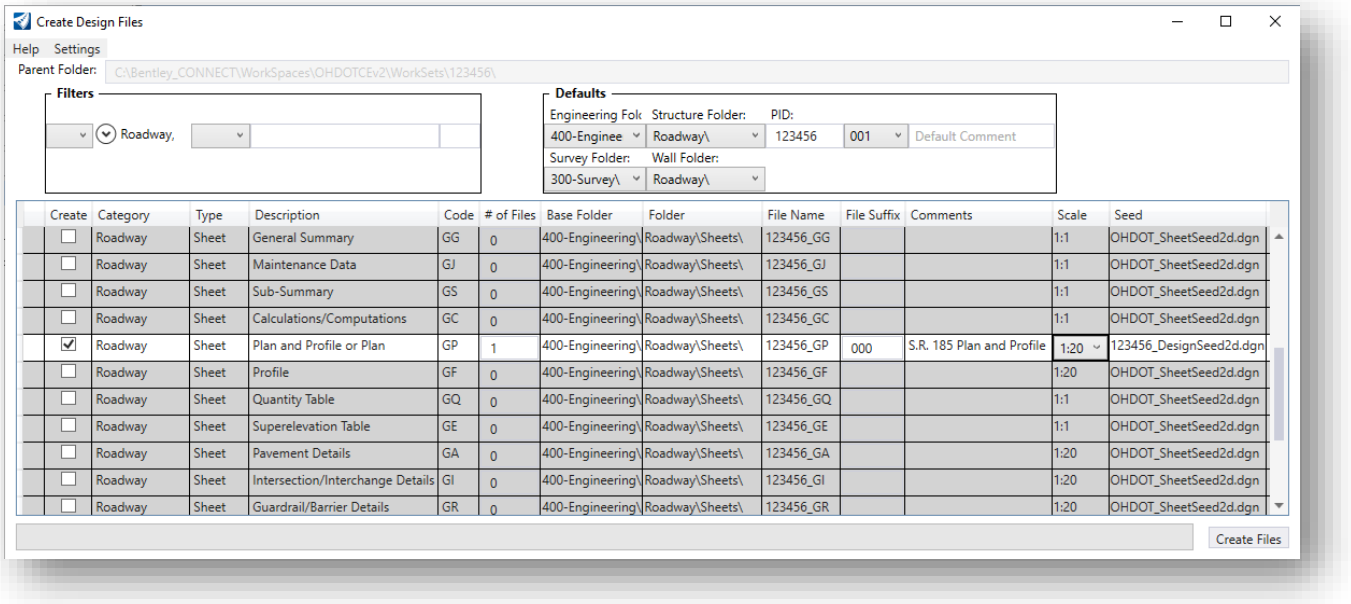
Creating the Sheet Container File

Sheet design files can be created using the **OHDOT Create Files** application. The application is accessed from the Ohio DOT WorkFlow by selecting the **New Design File** icon.



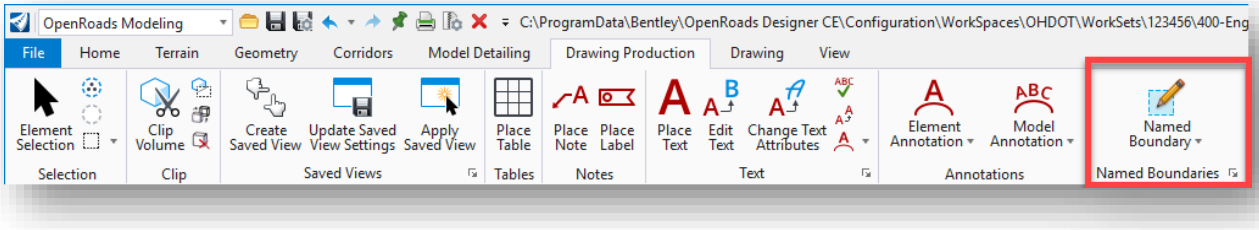
When creating sheet design files, it is important to consider the seed file that will be used to create the new file. Normally, a sheet design file is created using the **Sheet Seed** as defined by the OHDOT WorkSpace configuration. When creating design files for OpenRoads sheet clipping, it is important to use the **Design Seed**.

When the **File Suffix** value is entered, the Create Design Files application will automatically select the Design Seed if a suffix of 000, 100, 200, 300… is entered as shown below. This will ensure that the file is created with a design model instead of a sheet model. The design model is necessary for attaching the references that will be displayed in the sheets as well as laying out the named boundaries.

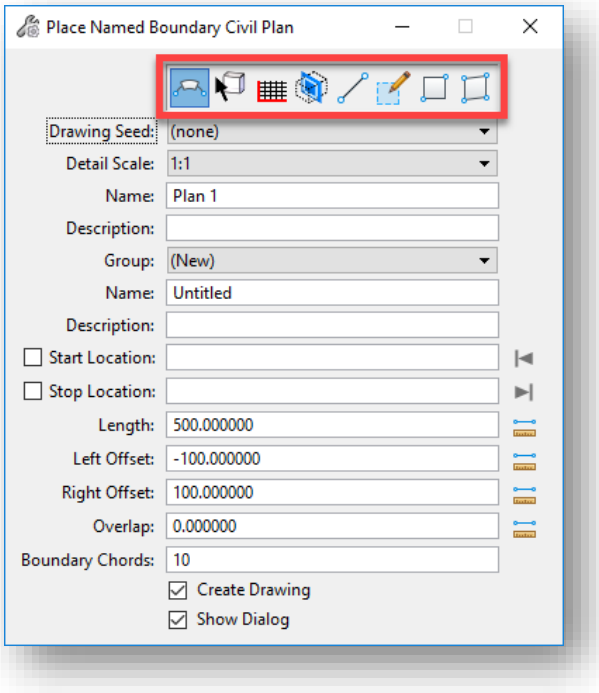


Named Boundaries

Sheets are clipped using **Named Boundary** tool. From the **OpenRoads Modeling** workflow, select the **Drawing Production** tab to access the **Named Boundary** tool as shown below.



The *Place Named Boundary Civil Plan* dialog is opened as shown below.



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

The following icons will be discussed in this document:

Civil Plan

Civil Profile

Civil Cross Section

Civil Cross Section 2 Points

ODOT has configured several sheet clipping options for plan, profile, and cross section sheets. These configurations are stored in a MicroStation DGN Library. The Configuration files are defined in the OHDOT_WorkSpace.cfg file as follows:

MS_DGNLIBLIST > $(_USTN_WORKSPACESTANDARDS)Dgnlib/Sheet Seeds/*.dgnlib

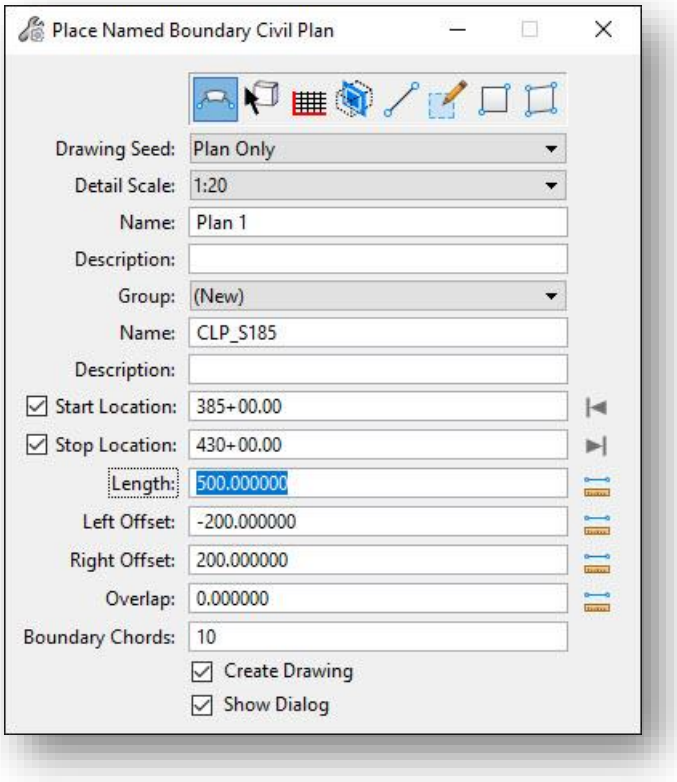
Named Boundary Level

The named boundaries are placed on the active level. Set the active level to **SH_Named_Boundaries** before placing the named boundaries in the design,

Sheet Clipping

Plan Only Sheets

From the OpenRoads Modeling WorkFlow, select **Drawing Production > Named Boundaries**. On the *Place Named Boundary Civil Plan* dialog, select the **Civil Plan** icon.



The **Drawing Seed** item is used to select the configuration for the named boundaries to be placed. Several options are available as defined by the OHDOT DGN Libraries.

For clipping Plan-Only sheets, select the **Plan Only** option for the **Drawing Seed** parameter as shown at left.

When one of the **Drawing Seed** options is selected, several parameters in the dialog are automatically populated with default values according to the configured settings.

The **Detail Scale** parameter is used to select the sheet scale. In the example at left, 20-scale plan sheets will be generated.

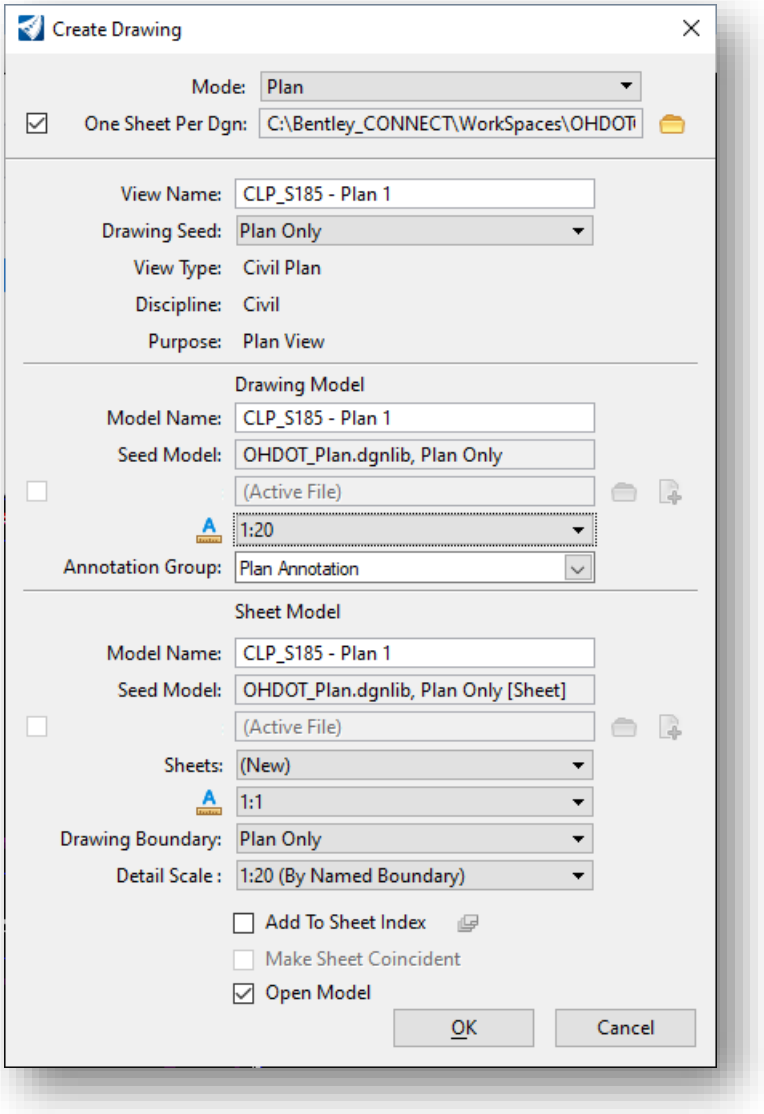
The **Length**, **Left Offset**, and **Right Offset** parameters are set according to the selected **Detail Scale** value.

Take the following steps to select the alignment and define the **Start Location** and **Stop Location** values:

- Issue a left mouse-click in the **Start Location** Field.
- Select the desired alignment that will be used as the centerline for the sheet clipping. The **Start Location** value will dynamically change as the cursor is moved within the view window.
- Identify the desired **Start Location** by issuing a data-point (left-click) within the view, by keying in a station value, or by selecting the icon to the right of the **Start Location** field to lock the starting location to the beginning of the selected alignment.
- After the **Start Location** has been established, identify the desired **Stop Location**. As the cursor is moved, the **Stop Location** will track the station value relative to the cursor position. clipping borders are dynamically displayed as the cursor is moved. The stop location can be entered by issuing a right-mouse click in the view, keying in the desired station, or by selecting the icon to the right of the **Stop Location** field to lock the ending location to the end of the selected alignment. Note that the last sheet will always assume the value of the **Length** field even if the stop location is not equal to the **Length** value.

The **Overlap**, and **Boundary Chords** items are set according to the selected **Drawing Seed** item. These items should typically be left to their default values.

After defining the parameters, issue a data point (left click) in the plan view to accept the **Start Location** value. A second data point accepts the **Stop Location** value. A third data point accepts the placement of the named boundaries. If the **Create Drawing** and **Show Dialog** options are toggled on, as shown on the preceding page, the ***Create Drawing*** dialog is opened as shown below.



Some of the parameters for the *Create Drawing* dialog have been predefined in the DGN Library for the selected **Drawing Seed**.

If you wish to create a separate design file for each sheet, toggle the **One Sheet Per DGN** option on and set the path for the sheet file location.

The **View Name** parameter is used for the named views that will be created in the container file as part of the clipping process. This parameter is not normally changed by the user.

Drawing Model parameters

The **Model Name** is used as the seed name for each of the drawing models that will be created. This name is incremented by the software. In most cases, the default name is used.

Set the **Annotation Scale** value for the **Drawing Model** to the desired value. This parameter should default to the same value used for the **Detail Scale** in the ***Place Named Boundary*** dialog, but it is good practice to review the value to ensure it is set correctly.

Sheet Model parameters

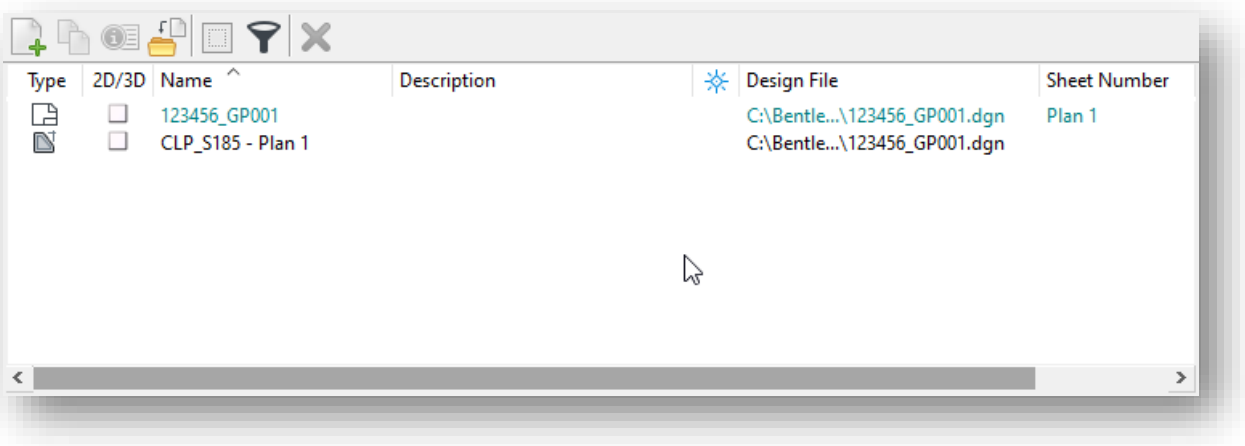
The **Model Name** entered for the sheet model is also the name that is used for the created design files when the **One Sheet Per Design** option is selected.

Do not change the **Annotation Scale** value for the **Sheet Model**. Leave this value at 1:1, as shown at above.

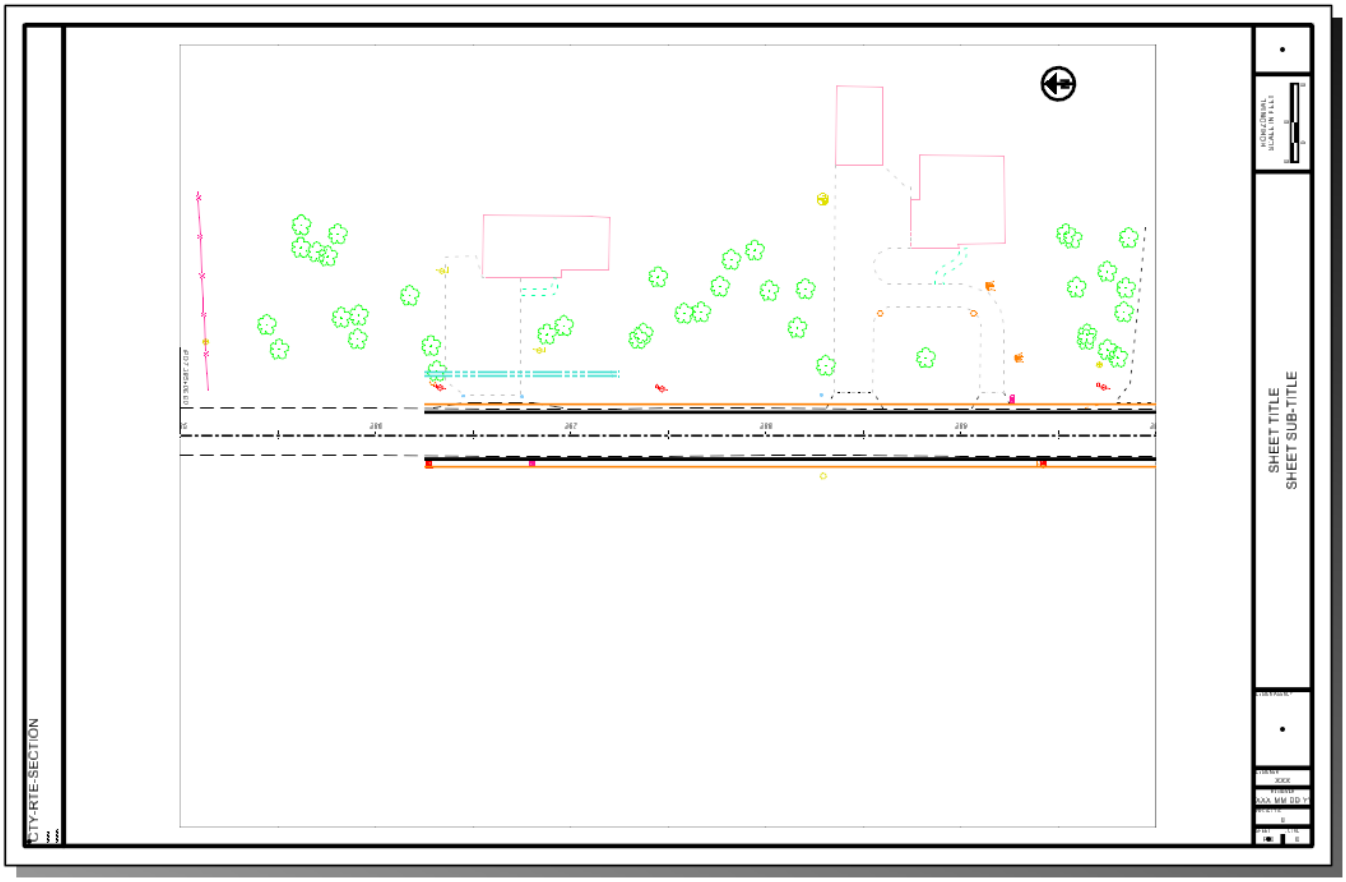
Set the **Detail Scale** value for the **Sheet Model** to the desired value. This parameter should default to the same value used for the **Detail Scale** in the ***Place Named Boundary*** dialog, but it is good practice to review the value to ensure it is set correctly.

After reviewing the dialog settings, select **OK** to continue the sheet clipping process. If **Open Model** is toggled on, the application will open the last created file upon completion.

An example of the models generated for a **Plan Only** sheet configuration when using the **One Sheet per DGN** option is shown below. Note the sheet model name is the same as the design file name.



An example of a completed sheet is shown below.



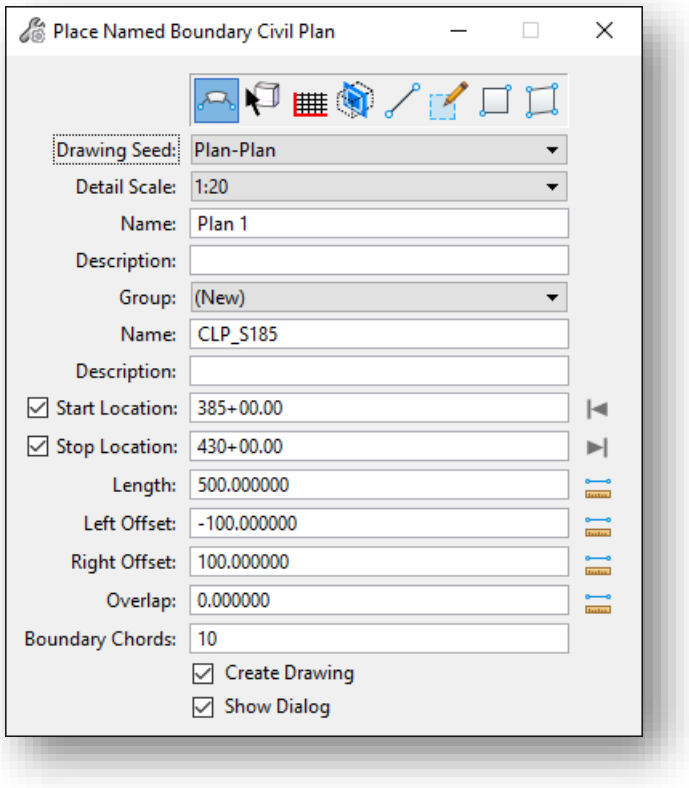
Notes:

- Each sheet design file contains a **Drawing** model corresponding to the plan view named boundary
- The **Drawing** models reference the original **Container** file
- The **Sheet** model references the **Drawing** model

Plan-Plan Sheets

The process to create dual-plan sheets is like the process to create plan-only sheets, as described above. The differences are detailed below.

From the OpenRoads Modeling WorkFlow, select **Drawing Production > Named Boundaries**. On the *Place Named Boundary Civil Plan* dialog, select the **Civil Plan** icon.

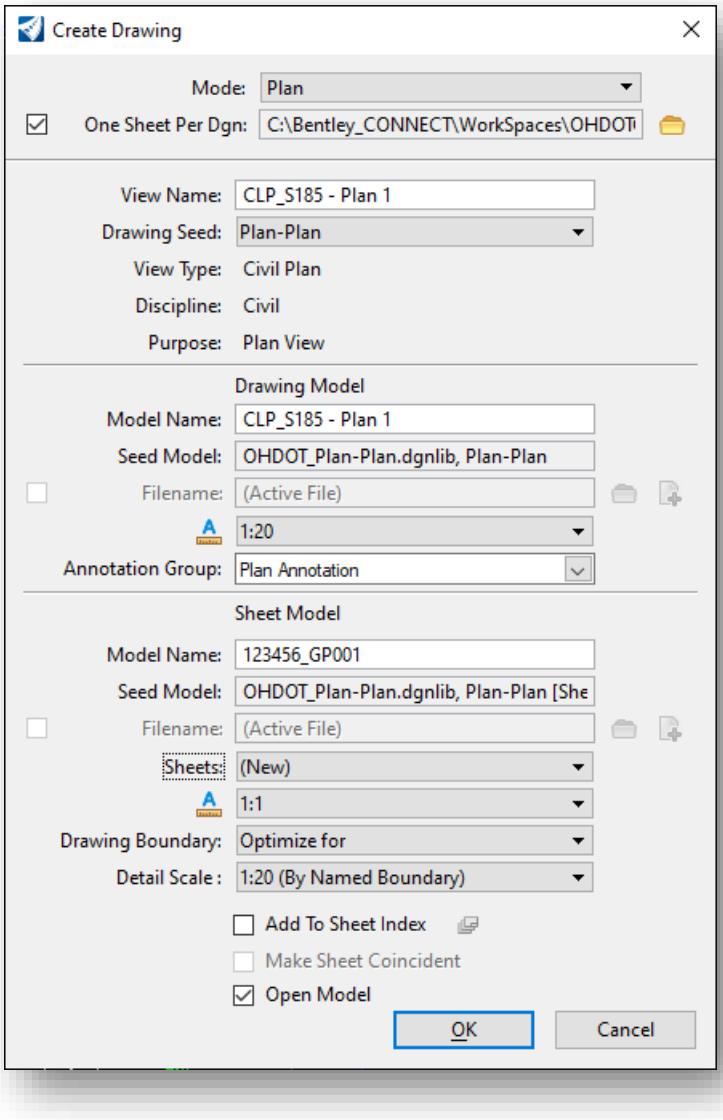


Select the **Drawing Seed** option **Plan-Plan** to generate sheets with two plan views.

The **Detail Scale** parameter defaults to 1:1. Set the parameter to the desired value. The **Length**, **Left Offset**, and **Right Offset** values are adjusted accordingly.

The process to define the alignment **Start Location** and **Stop Location** values is the same as described for the Plan-Only option above.

After defining the parameters, issue a data point (left click) in the plan view to accept the **Start Location** value. A second data point accepts the **Stop Location** value. A third data point accepts the placement of the named boundaries and opens the ***Create Drawing*** dialog, shown on the following page.



Some of the parameters for the *Create Drawing* dialog have been predefined in the DGN Library for the selected **Drawing Seed**.

If you wish to create a separate design file for each sheet, toggle the **One Sheet Per DGN** option on and set the path for the sheet file location.

The **View Name** parameter is used for the named views that will be created in the container file as part of the clipping process. This parameter is not normally changed by the user.

Drawing Model parameters

The Drawing **Model Name** is used as the seed name for each of the drawing models that will be created. This name is incremented by the software. In most cases, the default name is used.

Set the **Annotation Scale** value for the **Drawing Model** to the desired value. This parameter should default to the same value used for the **Detail Scale** in the ***Place Named Boundary*** dialog, but it is good practice to review the value to ensure it is set correctly.

Sheet Model parameters

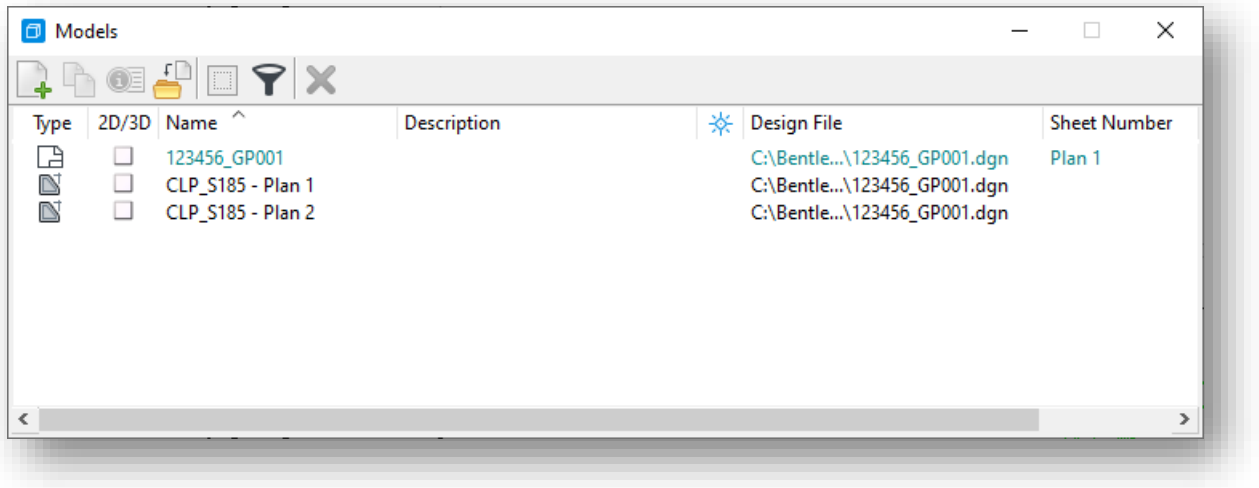
The Sheet **Model Name** entered for the sheet model is also the name that is used for the created design files when the **One Sheet Per Design** option is selected.

Do not change the **Annotation Scale** value for the **Sheet Model**. Leave this value at 1:1, as shown at above.

Set the **Detail Scale** value for the **Sheet Model** to the desired value. This parameter should default to the same value used for the **Detail Scale** in the ***Place Named Boundary*** dialog, but it is good practice to review the value to ensure it is set correctly.

After reviewing the dialog settings, select **OK** to continue the sheet clipping process. If **Open Model** is toggled on, the application will open the last created file upon completion.

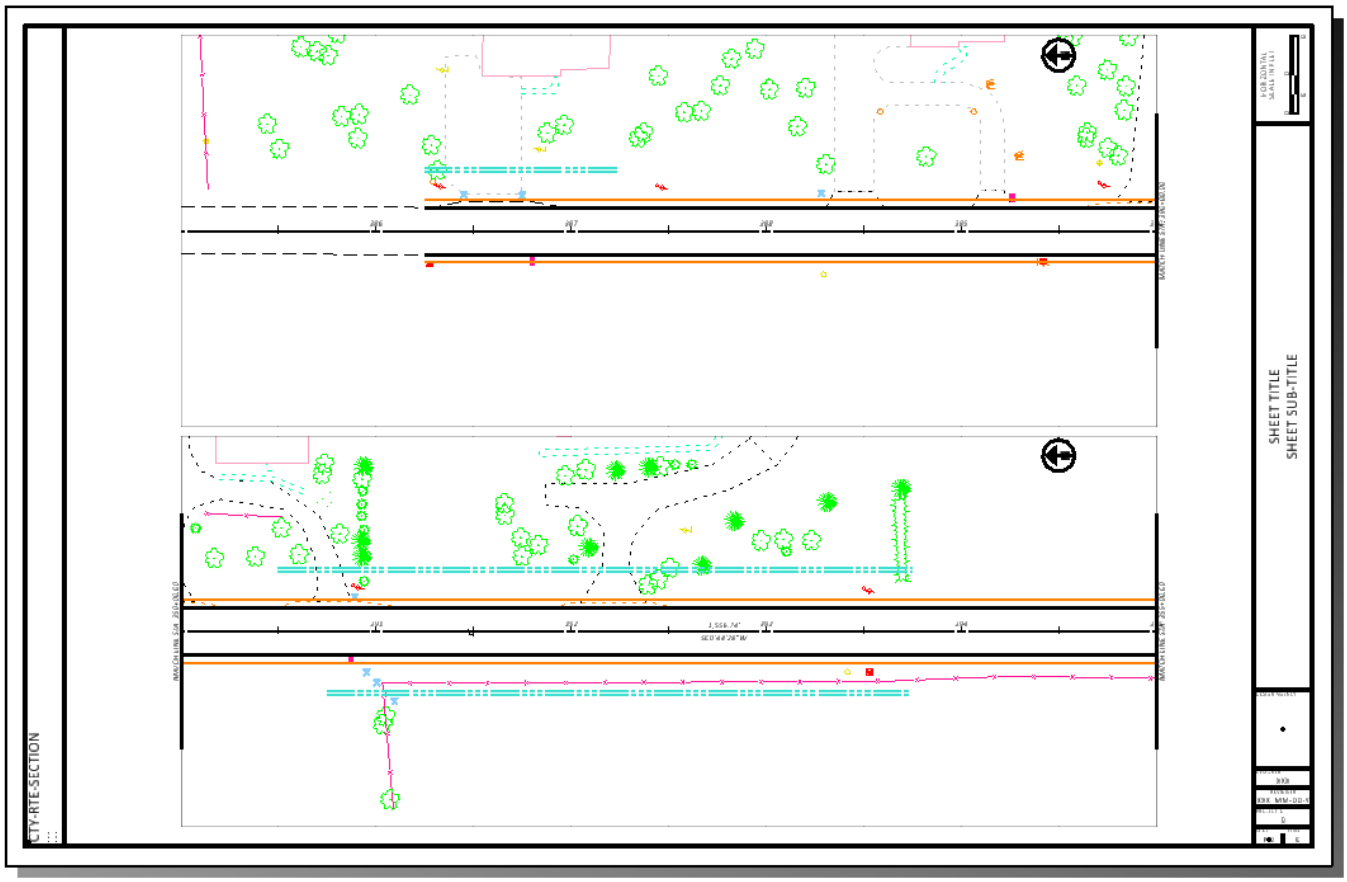
An example of the models generated for a **Plan Only** sheet configuration when using the **One Sheet per DGN** option is shown below. Note the sheet model name is the same as the design file name.



Select **OK** to continue the sheet clipping process.

After selecting **OK**, the software generates a drawing model for each named boundary. The drawing models are attached as references to a sheet model to generate the sheets.

An example of a Plan-Plan sheet is shown on the following page.

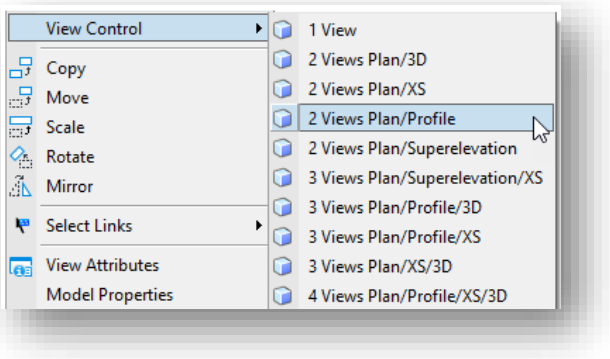

SHEET TITLE
SHEET SUB-TITLE
CTY-RTE-SECTION

Plan-Profile Sheets

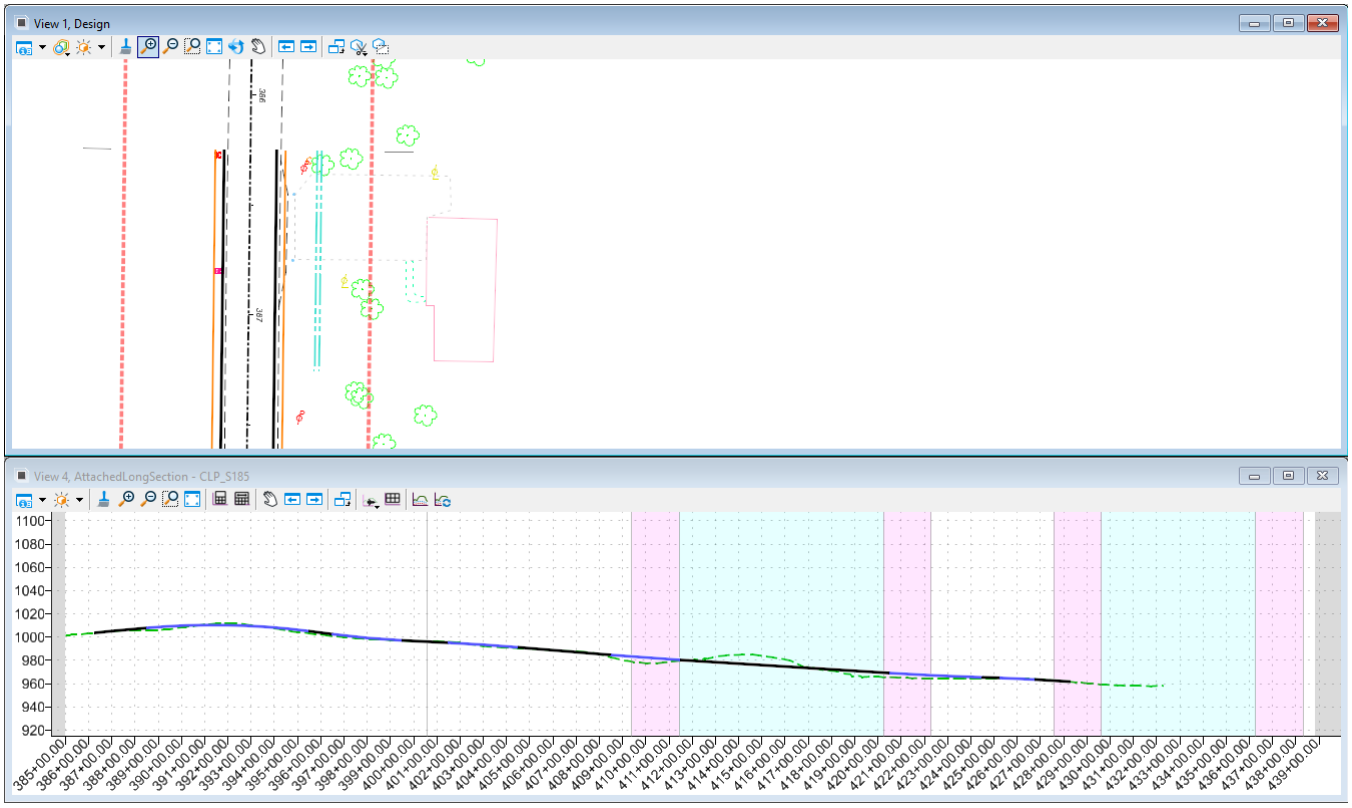
Plan and profile sheet clipping starts by configuring the MicroStation view windows to display both plan and profile information. This is facliltated using the right-mouse button menu. Hold down the right mouse button with the cursor positioned in a MicroStation view window until the pop-up menu appears. Select the **2 Views Plan/Profile** option as shown at right below.

Follow the prompts to open a profile window.

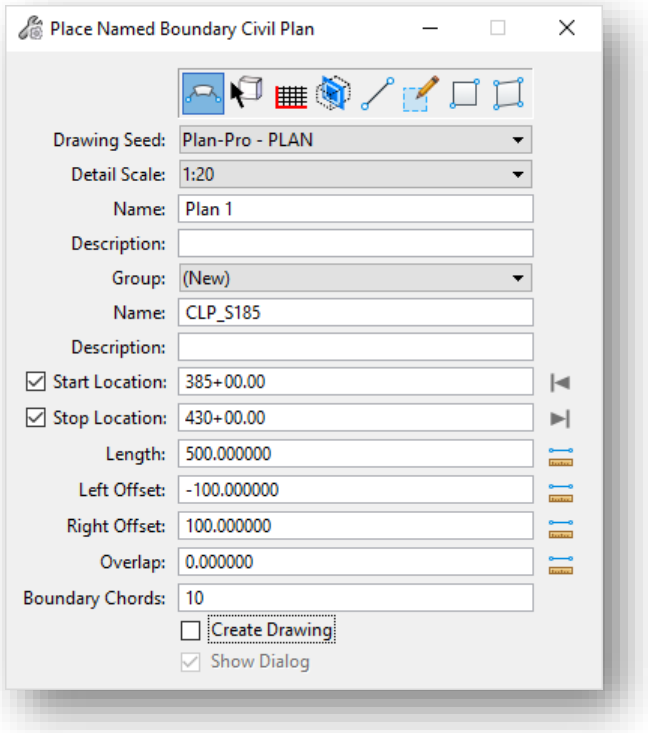
- Select **OK** when prompted to **Create a Dynamic Profile View**
- Locate the plan element
- Issue a left-click in the newly opened profile view to display the profile information for the selected alignment



When complete two view windows displaying the plan and profile are opened like the example below.



The named boundaries for plan and profile sheet clipping will be placed as two separate actions. From the **OpenRoads Modeling** WorkFlow, select **Drawing Production > Named Boundary** to initiate the process. The *Place Named Boundary Civil Plan* dialog is opened.



Select the first icon, **Civil Plan** to begin the process of placing the plan view named boundaries.

The **Drawing Seed** is used to select the configuration for various plan view named boundaries. Select the **Plan-Pro – PLAN** option.

The process to create the named boundaries for the plan view is the same as described previously in this document, with one significant difference:

Be sure to toggle ***off*** the **Create Drawing** option before placing the named boundaries as shown at left. It is necessary to generate the profile named boundaries before creating the drawings.

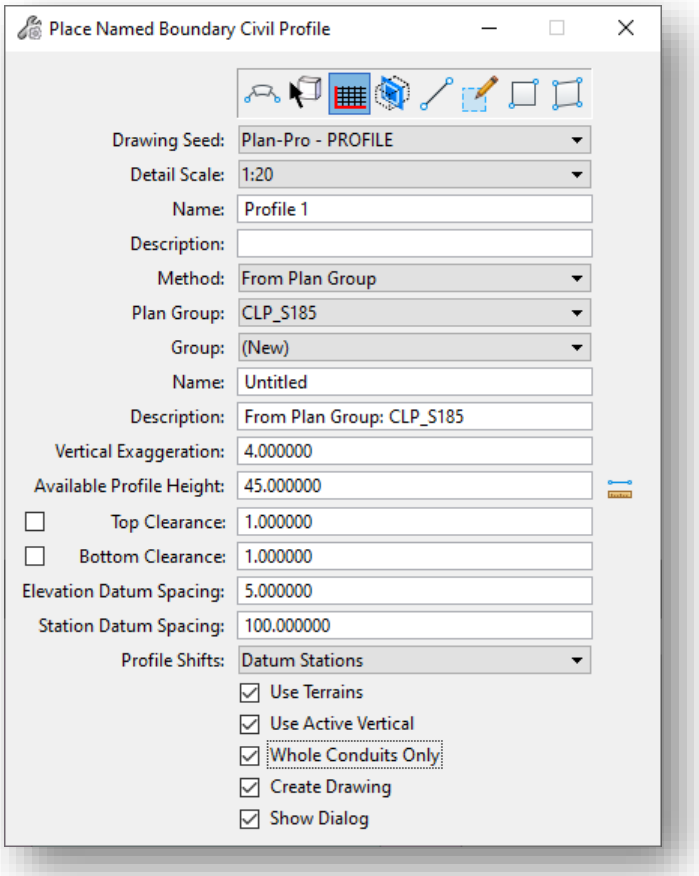
After the named boundaries for the plan view have been placed, take the following steps to create the named boundaries for the profile view:

- From the **OpenRoads Modeling** WorkFlow, select **Drawing Production > Named Boundary** to initiate the process. The *Place Named Boundary Civil Plan* dialog is opened.

- Select the third icon, **Civil Profile** to begin the process of placing the plan view named boundaries

- Select the **Drawing Seed** that corresponds to the previously selected plan view drawing seed. In this case, select **Plan-Pro – PROFILE** as shown at left.

- Set the **Detail Scale** to the desired horizontal plan scale, typically 1:20 or 1:50 for most ODOT plan and profile sheets



- Set the placement **Method** parameter to **From Plan Group**

- Key in the desired **Vertical Exaggeration** value

  The **Detail Scale** and **Vertical Exaggeration** parameters work together to determine the **Available Profile Height** parameter.

  The **Available Profile Height** value, as defined in the ODOT standards, is based on a profile grid that will measure 9" in height on the printed 22"x34" sheet. Typically, the **Available Profile Height** parameter is not changed by the user. It is best to allow the software to set this value as the **Detail Scale** and **Vertical Exaggeration** parameters are adjusted.

  For a typical ODOT project, 1:20 or 1:50 **Detail Scale** settings are the most often used values. The **Vertical Exaggeration** is then set to the desired value, typically a value of 4 for 1:20 scale plans, or a value of 5 for 1:50 scale plans.

  The **Available Profile Height** is computed as follows:

  Available Profile Height = Detail Scale * 9 / Vertical Exaggeration

  Example: A 20 scale plan with a 4:1 vertical exaggeration

  Available Profile Height = 20 * 9 / 4

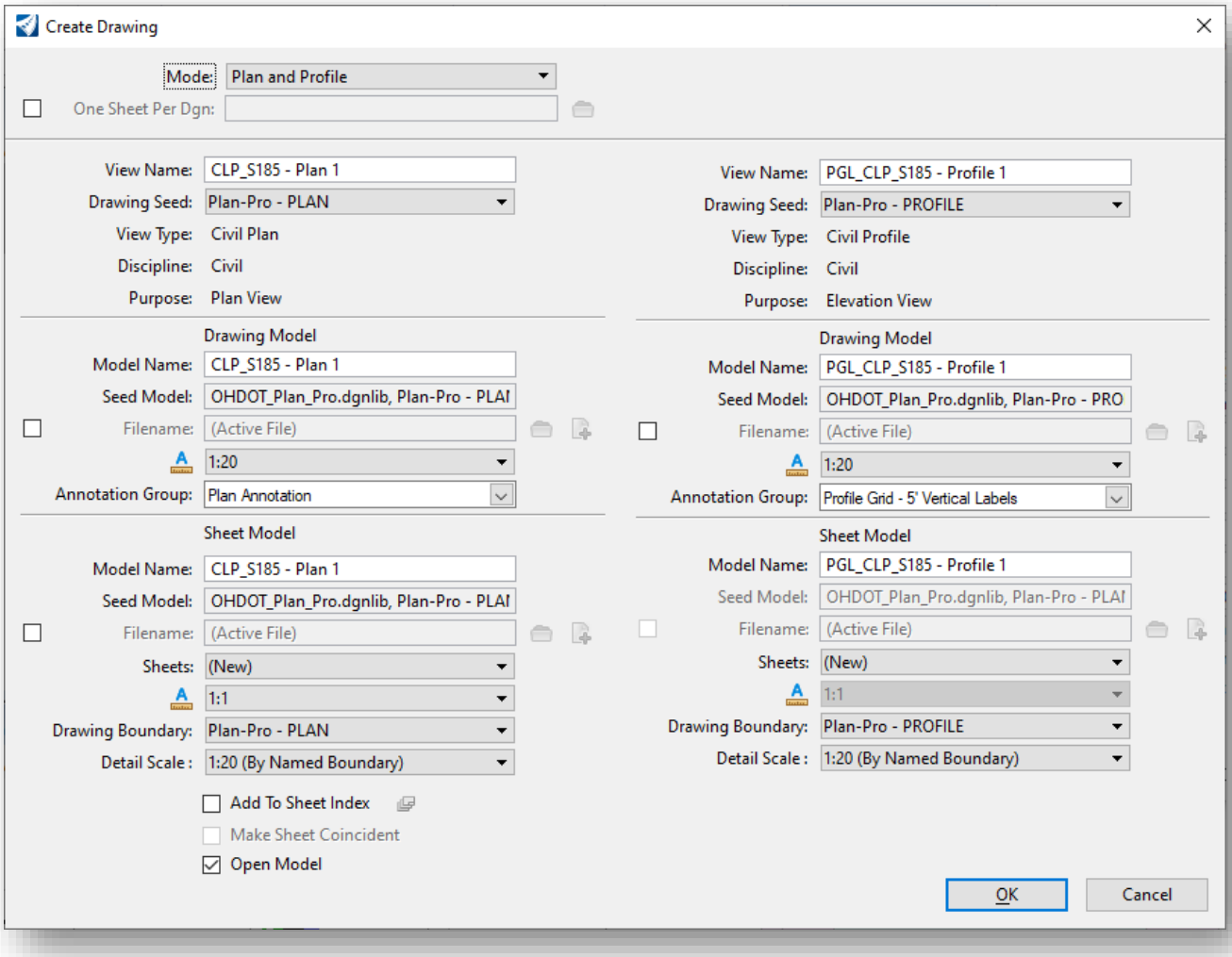
  Available Profile Height = 45

  Occasionally other horizontal scale values are used, such as 1:5, 1:10, 1:25, 1:40, etc... In each case, the user must set the **Vertical Exaggeration** to the desired value. The **Available Profile Height** is adjusted by the software corresponding to the **Detail Scale** and **Vertical Exaggeration** values entered.

For 5:1 Vertical Scale			For 10:1 Vertical Scale	
Horizontal Sheet Scale	**Vertical Exaggeration**		**Horizontal Sheet Scale**	**Vertical Exaggeration**
5	1		5	0.5
10	2		10	1
20	4		20	2
25	5		25	2.5
40	8		40	4
50	10		50	5

- Toggle on the **Create Drawing** option.

- Issue a data point (left click) in the profile view. The named boundaries for are displayed in the view. Issue a second data point to accept the named boundary placement. The boundaries are drawn in the profile view and the **Create Drawing** dialog is opened.



The left side of the *Create Drawing* dialog lists parameters related to the plan view named boundaries. The right side corresponds to the profile named boundaries. Most of the parameters for the *Create Drawing* dialog have been predefined in the DGN Library for the selected **Drawing Seed**.

If you wish to create sheets in multiple files, toggle the **One Sheet Per DGN** option on and set the path for the sheet file location.

The **View Name** parameters are used for the named views that will be created in the container file as part of the clipping process. These parameters are not normally changed by the user.

Drawing Model parameters

The **Drawing Model Name** is used as the seed name for each of the drawing models that will be created, plan and profile. The name is incremented by the software. In most cases, the default name is used.

Set the **Annotation Scale** value for the **Drawing Model** to the desired value. This parameter should default to the same value used for the **Detail Scale** in the ***Place Named Boundary*** dialog, but it is good practice to review the value to ensure it is set correctly.

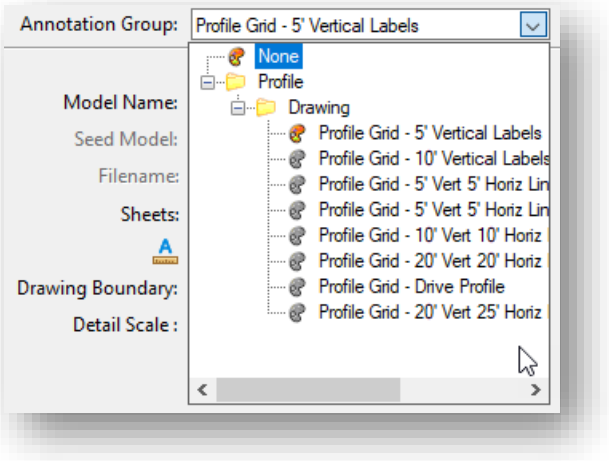
Sheet Model parameters

The **Sheet Model Name** entered for the Plan sheet model (left side of the dialog) is also the name that is used for the created design files when the **One Sheet Per Design** option is selected.

Do not change the **Annotation Scale** value for the **Sheet Model**. Leave this value at 1:1 for both plan and profile, as shown above.

The **Profile Annotation Group** setting (shown at right) will default to an appropriate annotation group for a 4:1 vertical exaggeration. If a different vertical exaggeration value was used when placing the profile named boundaries, different annotation options are available as shown at left.

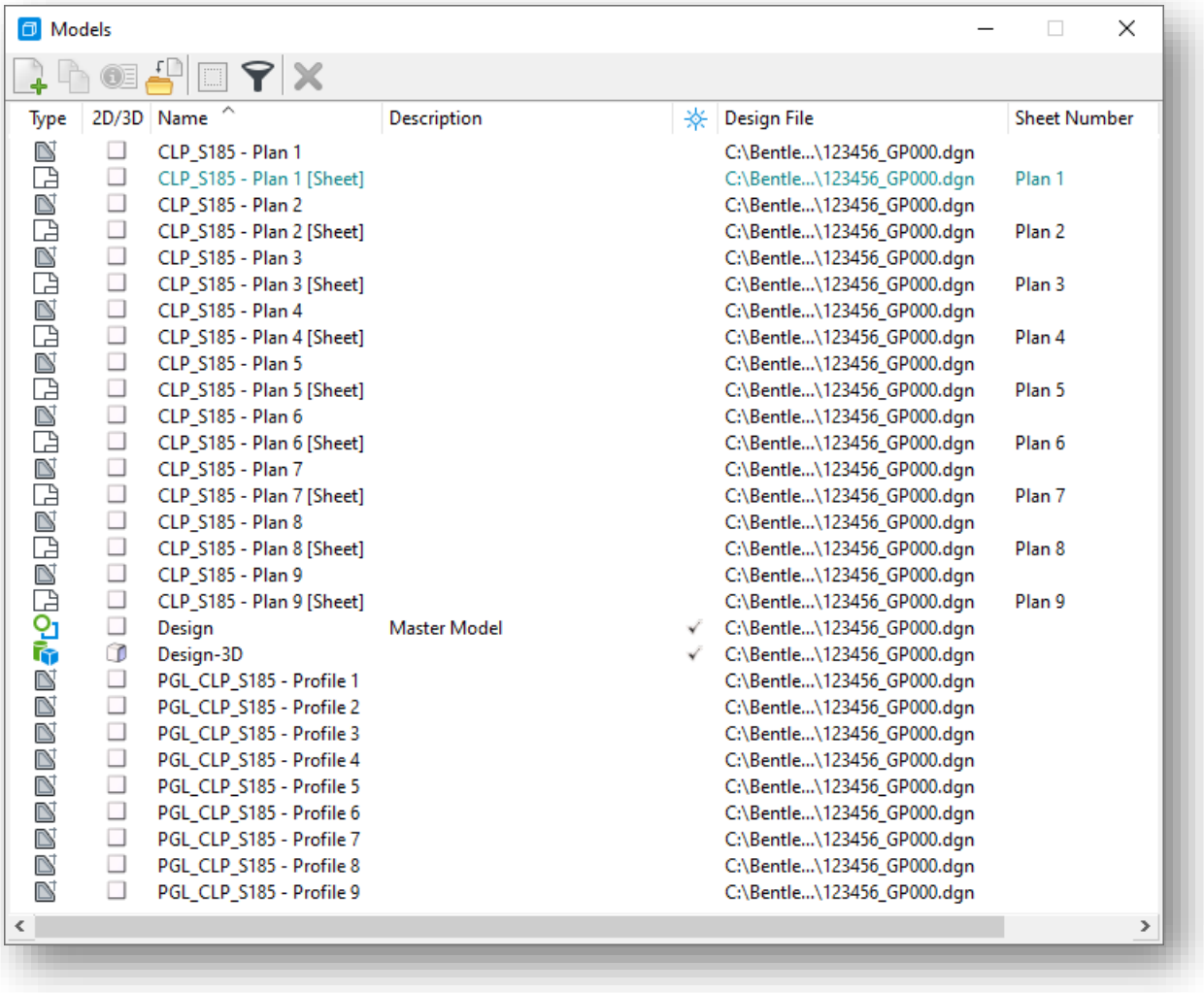
For sheets with a 5:1 Vertical Exaggeration, select the Profile Grid – 10' Vertical Labels option from the drop-down menu.



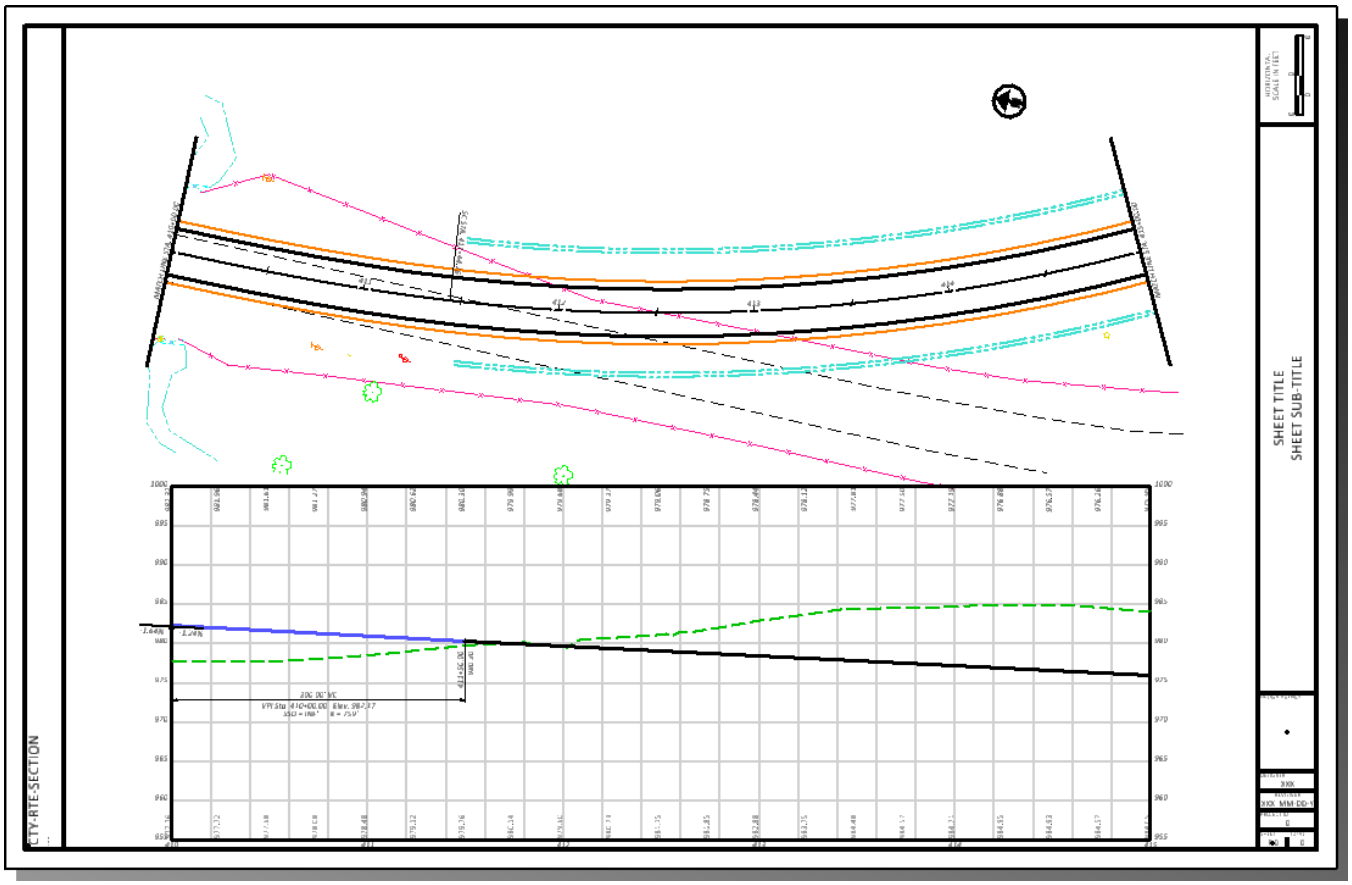
Set the **Detail Scale** value for the **Sheet Model** to the desired value for both the plan and profile. This parameter should default to the same value used for the **Detail Scale** in the ***Place Named Boundary*** dialog, but it is good practice to review the value to ensure it is set correctly.

After reviewing the dialog settings, select **OK** to continue the sheet clipping process. If **Open Model** is toggled on, the application will open the last created file upon completion.

An example of the models generated for a **Plan Only** sheet configuration with all the sheets in one file is shown below.

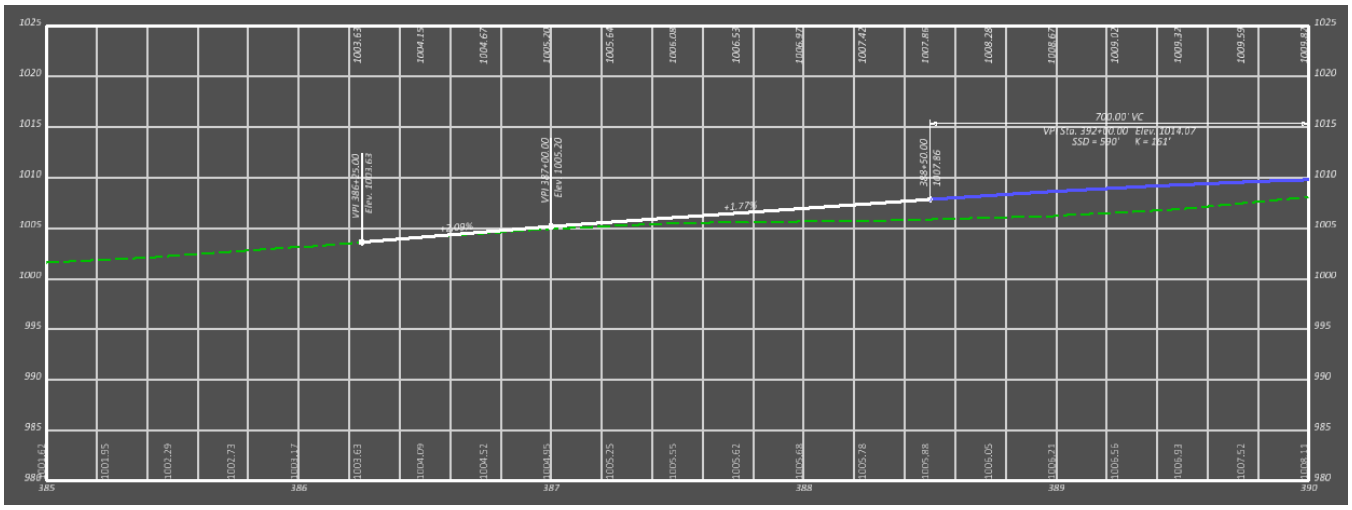


An example of a plan and profile sheet is shown below.


SHEET TITLE
SHEET SUB-TITLE
CTY-RTE-SECTION

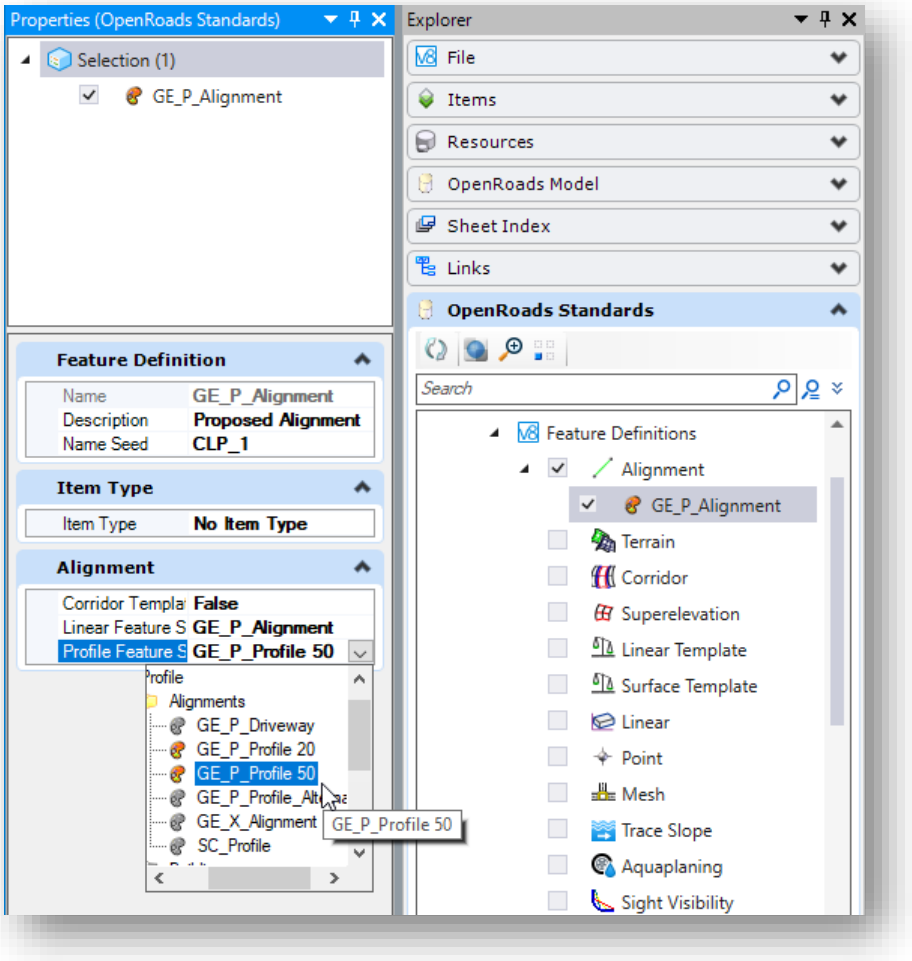
Profile Annotations

The drawing model for the profile contains the grid lines and annotation, like the example below.



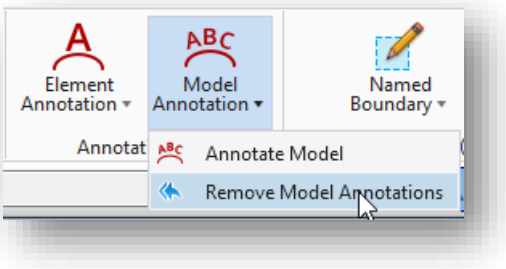
The annotation for the proposed profile elevations (shown across the top of the profile grid) is controlled by the Feature Definition assigned to profile itself in the BK design file. This feature definition defaults to 25' increments as shown above. This may not be desirable for 50-Scale plan and profile sheets and can be changed by the user. In the BK file, take the following steps to change the **Annotation Group** parameter:

- Open the BK file containing the profile
- Open the *Project Explorer* dialog
- From the *Project Explorer*, select the **OpenRoads Standards** tab.
- Expand the active design file to select the **Feature Definitions > Alignment > GE_P_Alignment** option as shown below
- In the *Properties* dialog, change the **Profile Feature** to the **GE_P_Profile 50** option as shown below

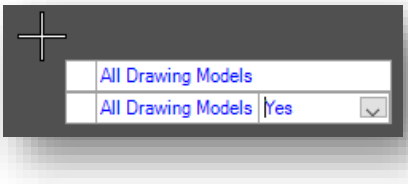


After making this change, it is necessary to redraw the annotation for the profile Drawing Models. Take the following steps in the sheet design file:

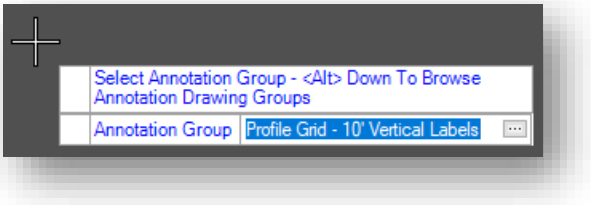
- Open the drawing model for the first profile
- From the **Drawing Production** tab, select **Model Annotation > Remove Model Annotations** as shown below



- When prompted, on the cursor menu, select **Yes** to remove the annotations from all the profile drawing models.



- After removing the annotations, redraw the annotation by selecting the **Model Annotation > Annotate Model** command from the **Drawing Production** tab
- When prompted to annotate all the drawing models, choose **Yes**
- Use the **Profile Grid – 10' Vertical Labels** annotation group



The annotation is redrawn according to the select annotation group and the profile feature.

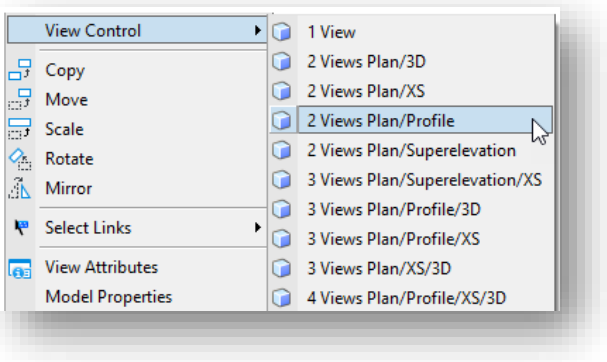
Single or Dual Profile Sheets

OpenRoads provides options to clip a sheet containing a single profile grid on the sheet, or two continuous profile grids across the top and bottom of a sheet. The following options are available:

- Pro-Pro
- Profile Only

The process is like creating named boundaries for the profile view detailed above. A profile view must be displayed to place the named boundaries. Take the following steps to open a profile window:

- Hold down the right mouse button with the cursor positioned in a MicroStation view window until the pop-up menu appears. Select the **2 Views Plan/Profile** option as shown below.

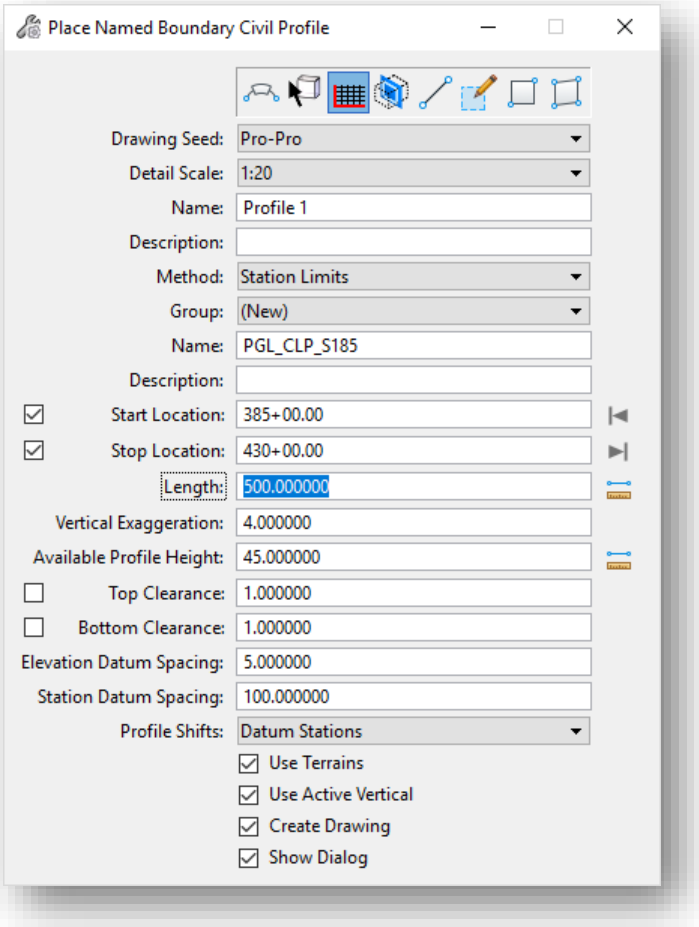


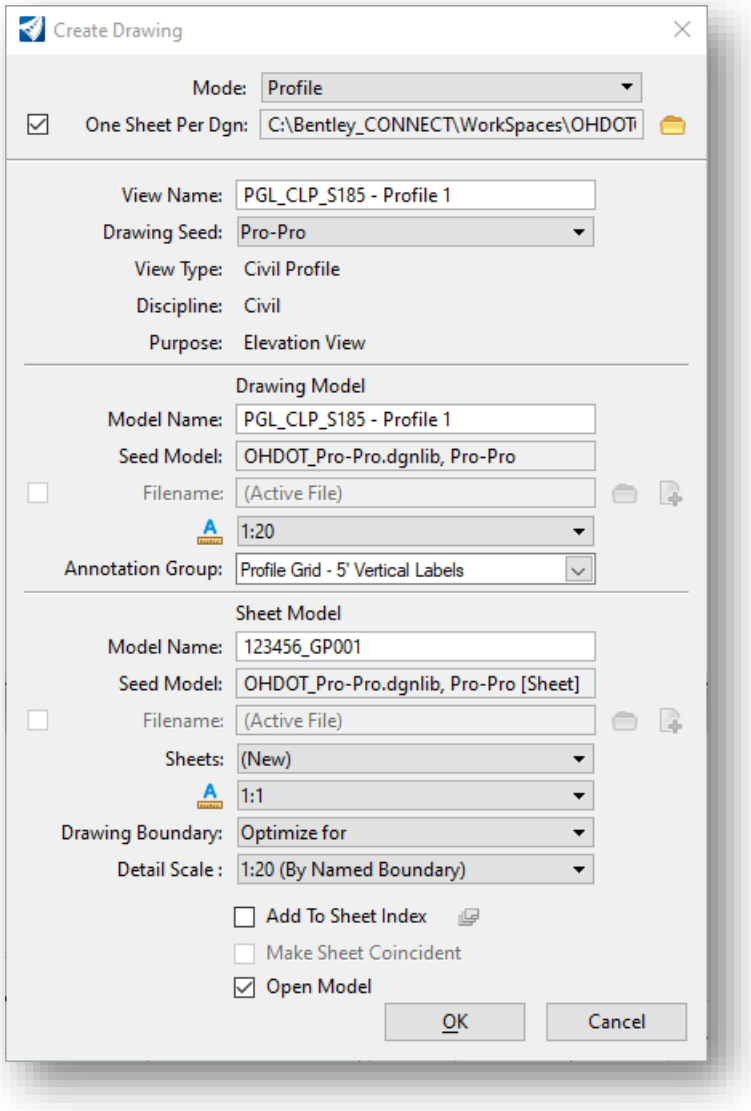
- Follow the prompts to open a profile window.
  - Select **OK** when prompted to **Create a Dynamic Profile View**
  - Locate the plan element
  - Issue a left-click in the newly opened profile view to display the profile information for the selected alignment

From the OpenRoads Modeling WorkFlow, select **Drawing Production > Named Boundaries**. On the *Place Named Boundary Civil Plan* dialog, select the **Civil Profile** icon.

From the **Place Named Boundary Civil Profile** dialog, take the following steps:

- Select the **Drawing Seed** (Pro-Pro or Profile Only)
- Select the **Detail Scale**
- Set the **Method** to **Station Limits**
- Left click in the **Start Location** dialog item
- Identify the profile view by issuing a left mouse-click in the profile view
- Define the **Start Location** and **Stop Location** parameters
- Set the **Vertical Exaggeration** value to **4** for 20-scale sheets, **5** for 50-scale sheets. The **Available Profile Height** parameter is adjusted automatically. See the Plan and Profile sheet section for more information.
- Issue another left mouse-click in the profile view to place the named boundaries and initiate the process. The *Create Drawing* dialog is opened as shown on the following page.





If you wish to create sheets in multiple files, toggle the **One Sheet Per DGN** option on and set the path for the sheet file location.

The **View Name** parameter is used for the named views that will be created in the container file as part of the clipping process. This parameter is not normally changed by the user.

Drawing Model parameters

The **Drawing Model Name** is used as the seed name for each of the drawing models that will be created. The name is incremented by the software. In most cases, the default name is used.

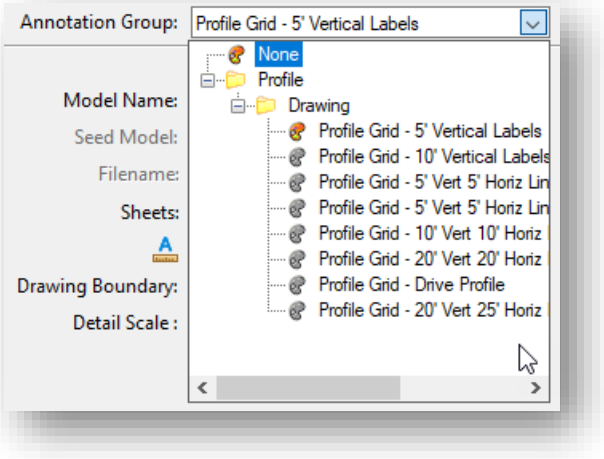
Set the **Annotation Scale** value for the **Drawing Model** to the desired value. This parameter should default to the same value used for the **Detail Scale** in the ***Place Named Boundary*** dialog, but it is good practice to review the value to ensure it is set correctly.

Sheet Model parameters

The **Sheet Model Name** is also the name that is used for the created design files when the **One Sheet Per Design** option is selected.

Do not change the **Annotation Scale** value for the **Sheet Model**. Leave this value at 1:1 as shown above.

The **Profile Annotation Group** setting (shown at right) will default to an appropriate annotation group for a 4:1 vertical exaggeration. If a different vertical exaggeration value was used when placing the profile named boundaries, different annotation options are available as shown at left.



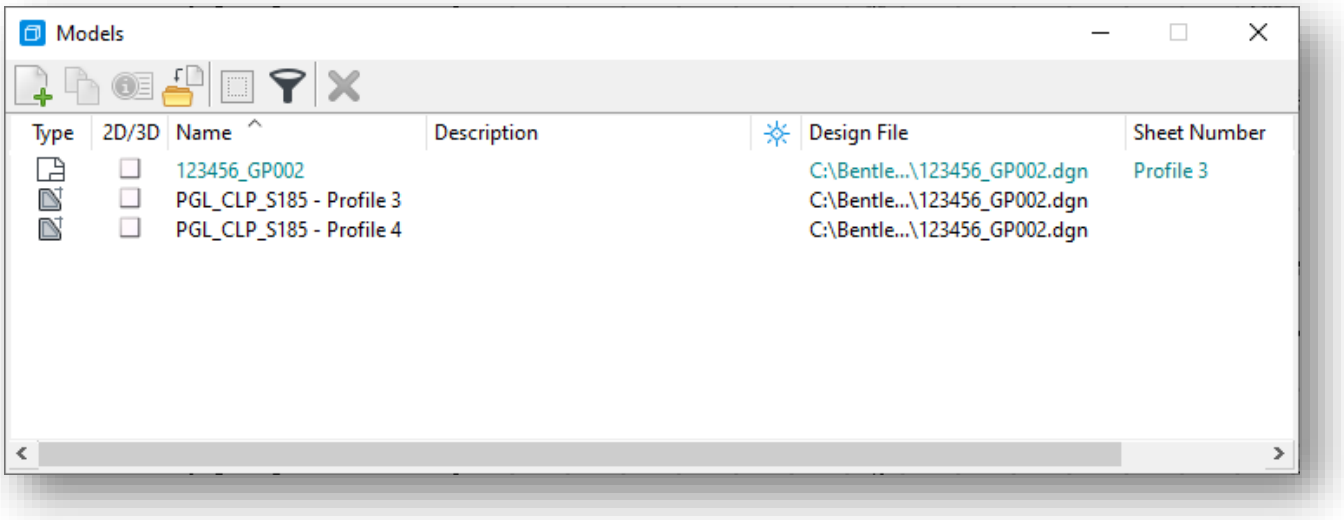
For sheets with a 5:1 Vertical Exaggeration, select the Profile Grid – 10' Vertical Labels option from the drop-down menu.

Set the **Detail Scale** value for the **Sheet Model** to the desired value. This parameter should default to the same value used for the **Detail Scale** in the ***Place Named Boundary*** dialog, but it is good practice to review the value to ensure it is set correctly.

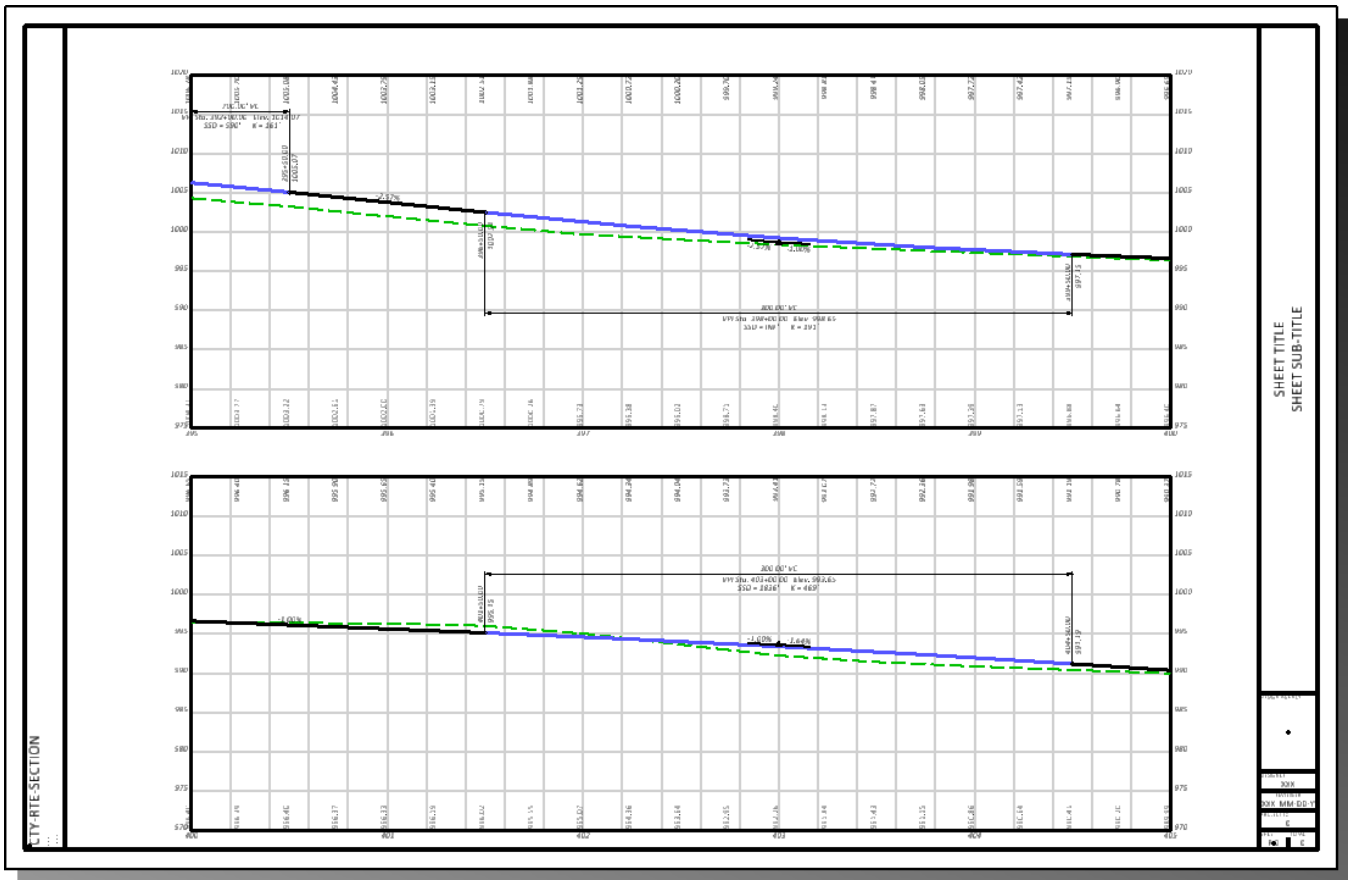
After reviewing the dialog settings, select **OK** to continue the sheet clipping process. If **Open Model** is toggled on, the application will open the last created file upon completion.

A drawing model is created for each of the named boundaries. The drawing models are referenced to the sheet model to generate the completed sheets. The drawing models contain the annotations for the profile. See the Profile Annotations section for details.

An example of the models generated for a Pro-Pro sheet configuration when using the **One Sheet per DGN** option is shown below. Note the sheet model name is the same as the design file name.



An example of a pro-pro sheet is shown on the following page.

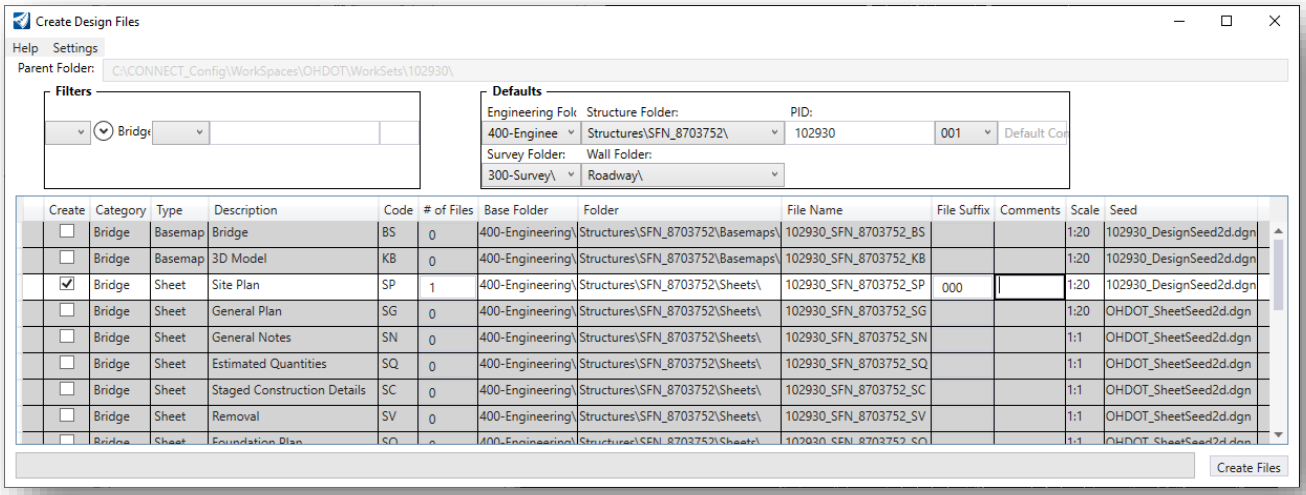

SHEET TITLE
SHEET SUB-TITLE
CTY-RTE SECTION

Bridge Site Plan

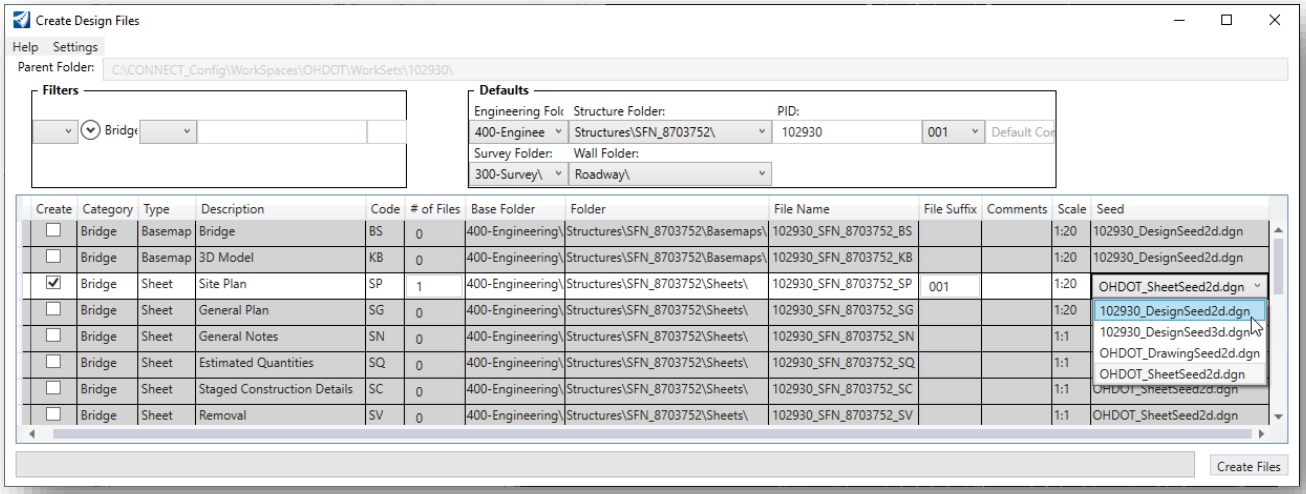
Bridge site plans can be generated using a container file or directly in the SP file. When the bridge site plan will consist of more than one sheet, the preferred process is to use a container file. See the *File Types and Usage* section of this document for more information on container files.

The **OHDOT Create Design Files** application is used to create the design file as shown below.

If a container file is used to generate multiple sheets, key in the appropriate 000, 100, 200, etc. **File Suffix**. The application will automatically set the **Seed** file to the Design Seed as shown below.



If a container file is not used, the **File Suffix** is set to the appropriate number for the site plan design file, **001** in the example below. The application will default to the Sheet Seed. Be sure to change the **Seed** file to the Design Seed as shown below.

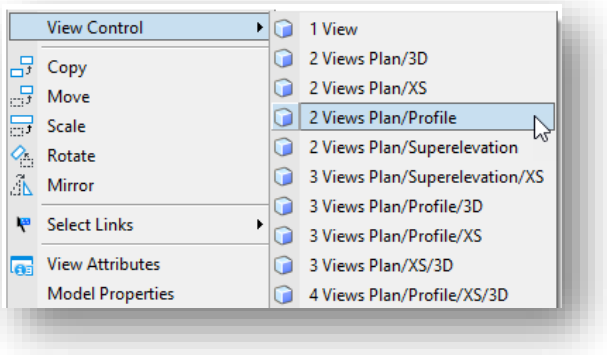


After creating the file, the next step is to attach the necessary design file references for the site plan.

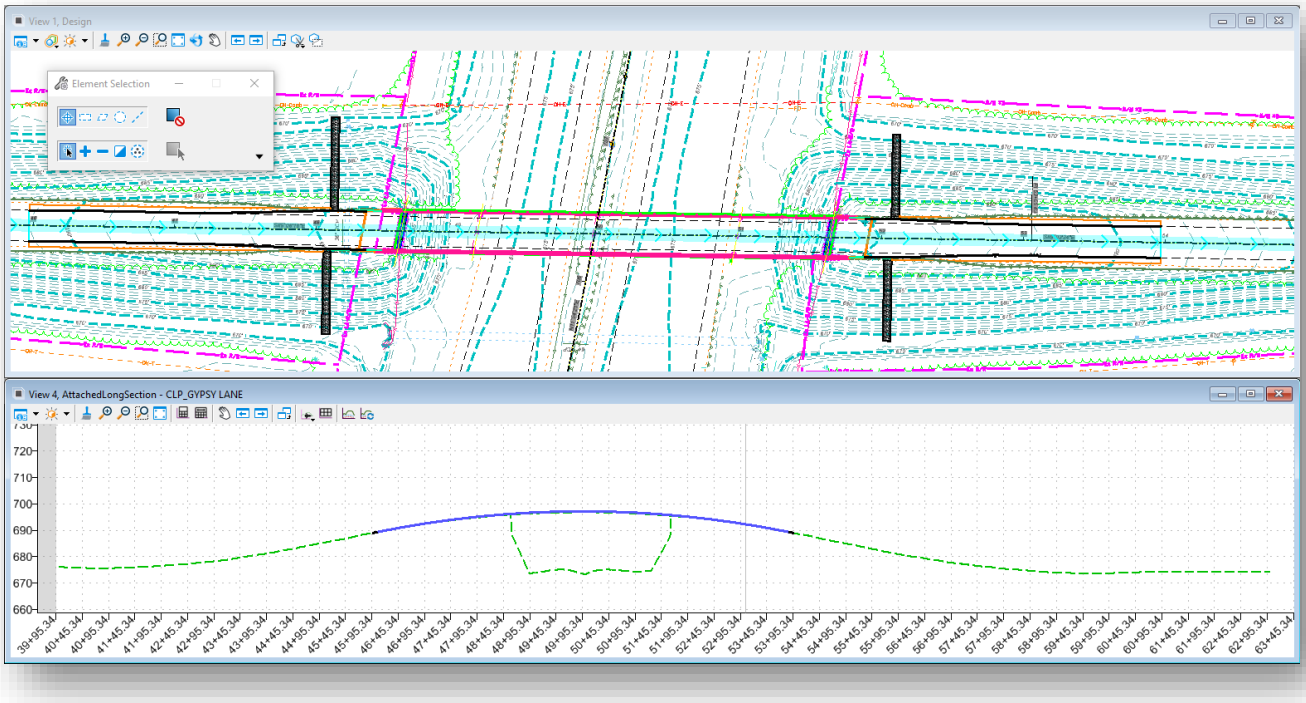
Like the plan and profile sheet clipping process, configure the MicroStation view windows to display both plan and profile information. This is facliltated using the right-mouse button menu. Hold down the right mouse button with the cursor positioned in a MicroStation view window until the pop-up menu appears. Select the **2 Views Plan/Profile** option as shown below.

Follow the prompts to open a profile window.

- Select **OK** when prompted to **Create a Dynamic Profile View**
- Locate the plan element
- Issue a left-click in the newly opened profile view to display the profile information for the selected alignment

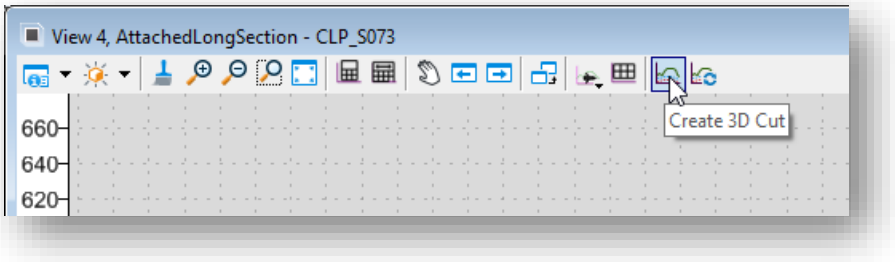


When complete two view windows displaying the plan and profile are opened like the example below.

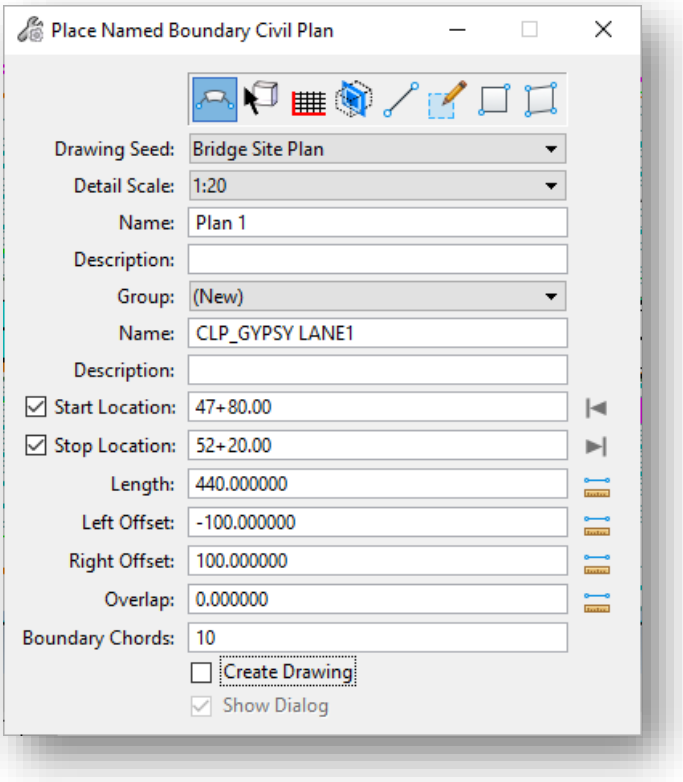


In this example, the horizontal geometry is defined in the \roadway\basemaps\102930_BK001.dgn file. Graphics that have been drawn in the profile window of the BK file will also be displayed here.

This example will make no attempt to define the bridge profile graphics or recommend a best practice for generating these graphics. The graphics can be drawn in the profile view in the SP design file. The **Create 3D Cut** command may also be used to read the Design-3D model and will display and 3d graphics encountered in the model.



The named boundaries for plan and profile sheet clipping will be placed as two separate actions. From the **OpenRoads Modeling** WorkFlow, select **Drawing Production > Named Boundary** to initiate the process. The *Place Named Boundary Civil Plan* dialog is opened.



Select the first icon, **Civil Plan** to begin the process of placing the plan view named boundaries.

The **Drawing Seed** is used to select the configuration for various plan view named boundaries. Select the **Bridge Site Plan** option.

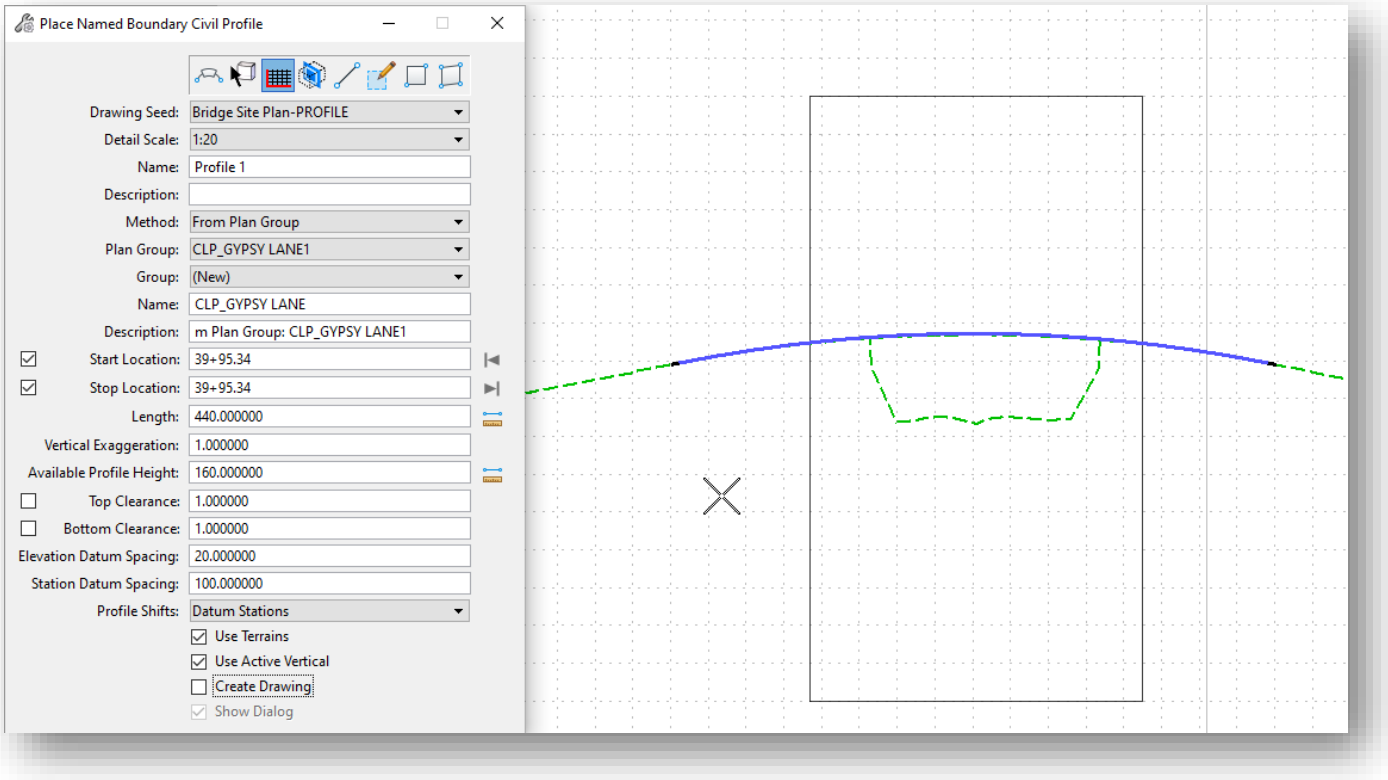
The process to create the named boundaries for the plan view is the same as described previously in this document.

Be sure to toggle ***off*** the **Create Drawing** option before placing the named boundaries as shown at left. It is necessary to generate the profile named boundaries before creating the drawings.

After the named boundaries for the plan view have been placed, take the following steps to create the named boundaries for the profile view:

- From the **OpenRoads Modeling** WorkFlow, select **Drawing Production > Named Boundary** to initiate the process. The *Place Named Boundary* dialog is opened.

- Select the third icon, **Civil Profile** to begin the process of placing the plan view named boundaries



- Select the **Drawing Seed** that corresponds to the previously selected plan view drawing seed. In this case, select **Bridge Site Plan – PROFILE** as shown at left.

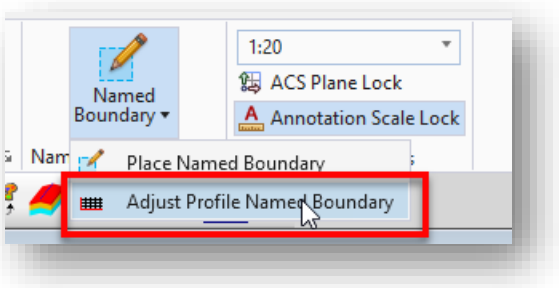
- Set the **Detail Scale** as desired. The **Vertical Exaggeration** and **Available Profile Height** parameters are automatically defined based on the selected **Detail Scale**. See the Plan and Profile Sheet section for more information.

- Set the placement **Method** parameter to **From Plan Group**.

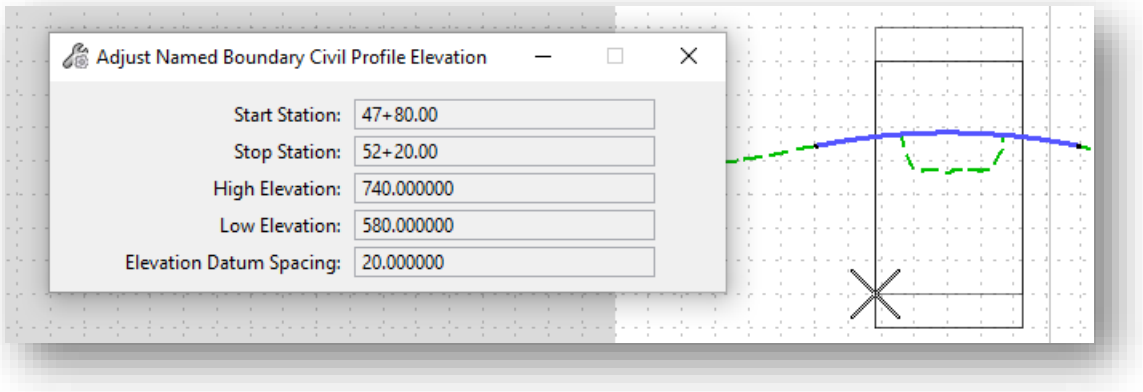
  The boundary is displayed as shown in the example above. The software determines the vertical location of the profile named boundary. Depending on the vertical extent of the profile graphics, the default placement location may need to be adjusted.

  - If the displayed boundary location is acceptable, toggle on the **Create Drawing** option before placing the boundary to proceed to the next step.
  - If the profile vertical location needs to be adjusted, toggle off the **Create Drawing** option before placing the named boundary. After placing the boundary, the **Adjust Profile Named Boundary** tool is used to adjust the vertical location of the boundary element as described below.

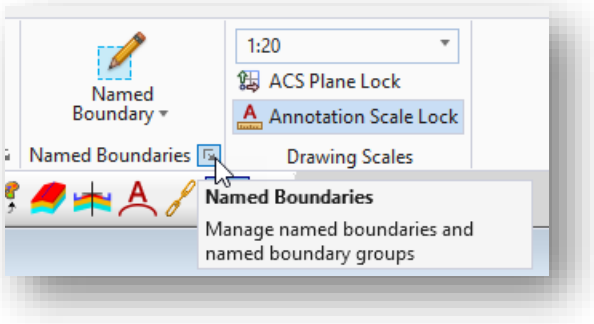
To adjust the named boundary vertically, select the **Adjust Profile Named Boundary** command from the **Drawing Production** tab as shown below.



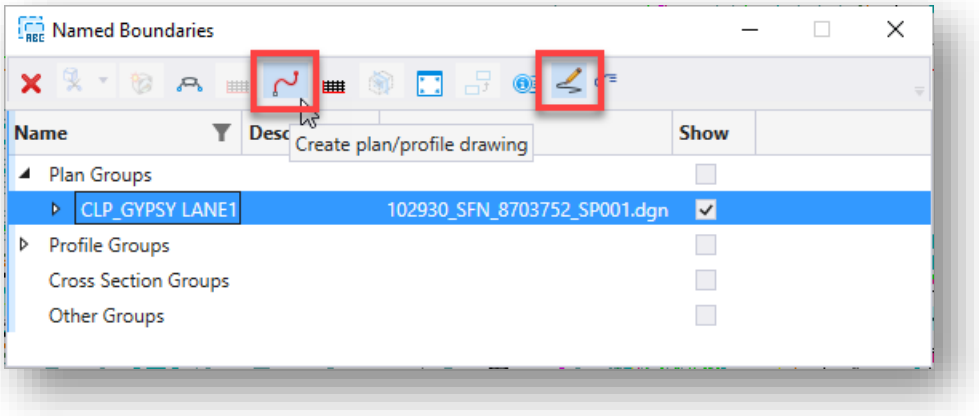
Select the named boundary element to adjust. The named boundary floats on the cursor and can be adjusted vertically based on the **Elevation Datum Spacing** parameter. Issue a left click (data point) to move the named boundary to the desired location.



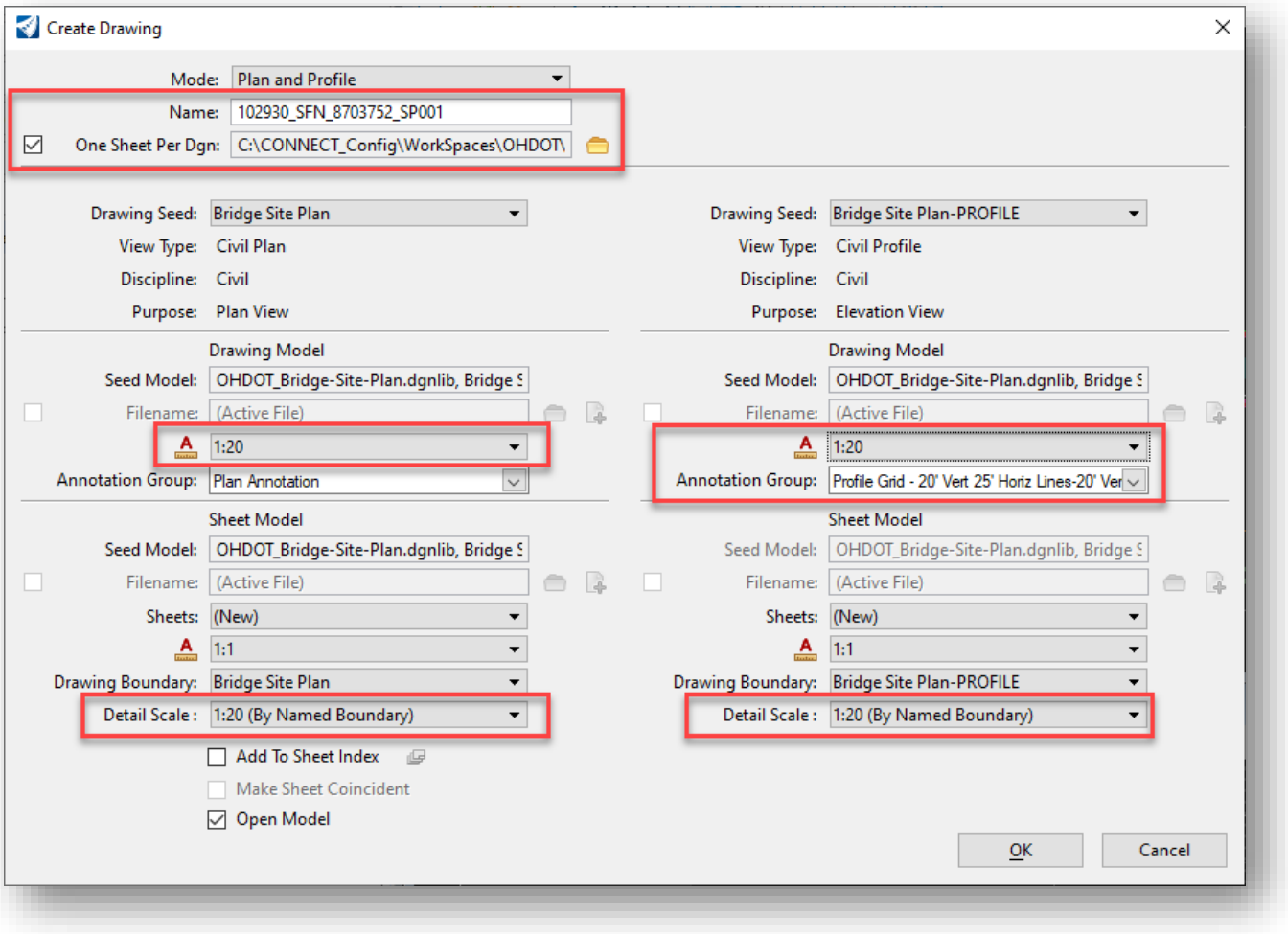
After adjusting the named boundary, the **Manage Named Boundaries** command is used to resume the sheet clipping process. Select the small icon in the lower right corner of the Named Boundaries group as shown below.



From the *Named Boundaries* dialog, select the **Plan Group** to process. Toggle on the **Show the Create Drawing** icon and then select the **Create plan/profile drawing** icon.



The *Create Drawing* dialog is opened as shown below.



The parameters, highlighted above, must be adjusted before selecting the **OK** button.

- If you are using a container file to place the named boundaries and will be generating separate SP files:

- Enter a **Name** according to the OHDOT Standard File names for the sheet type you wish to create. See the **OHDOT CADD Engineering Standards Manual** for more information.
- Toggle on the **One Sheet Per Design** option and select the discipline\sheets\ folder where the sheet design files are to be created.

- Set the **Drawing Model Annotation Scale** parameters, and the **Sheet Model Detail Scale** parameters to the intended scale for both the plan and profile settings as shown in the example above.

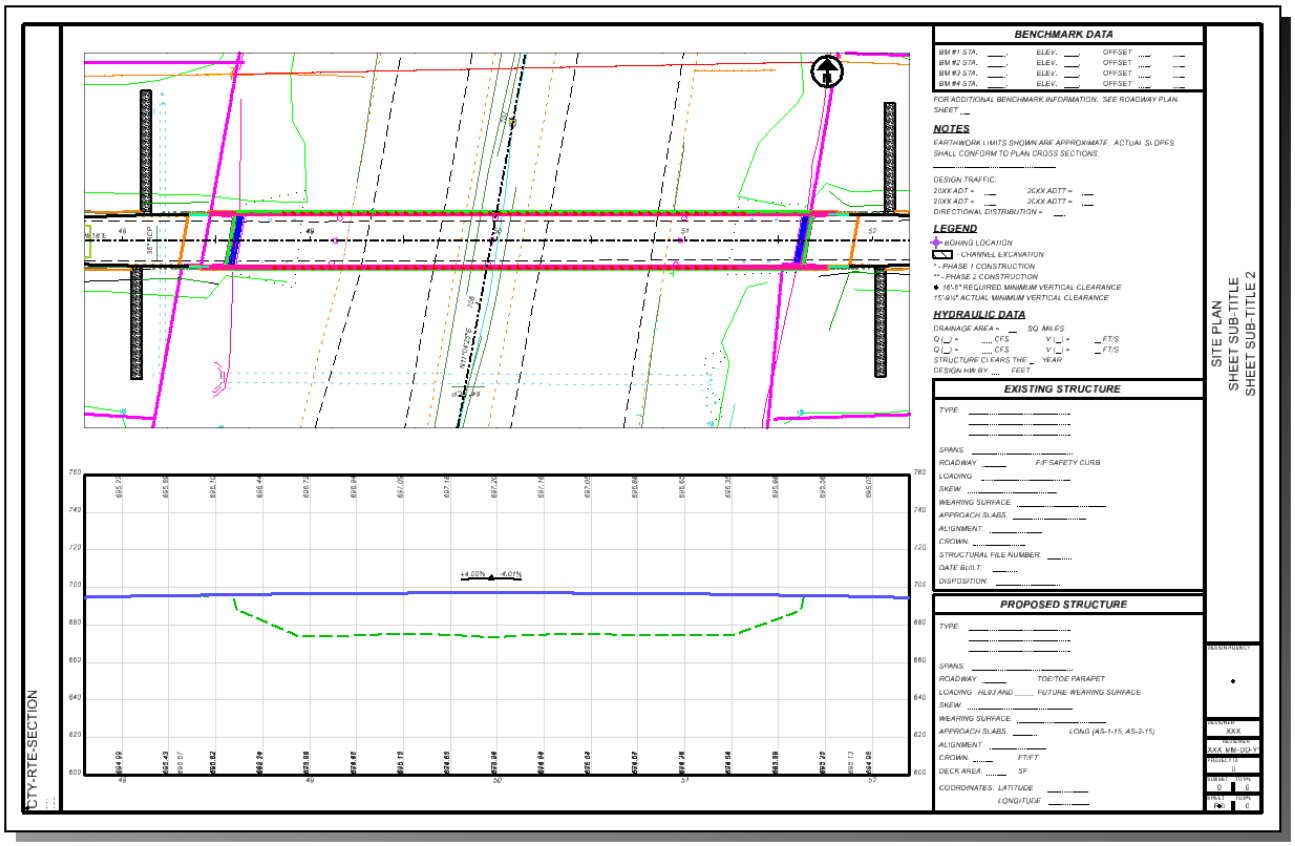
- The profile **Annotation Group** parameter is defaulted to the appropriate value for 20 Scale sheets with a 4:1 vertical exaggeration.

  For 20-Scale bridge site plans with a 1:1 vertical exaggeration, select the **Profile Grid – 20' Vert 25' Horiz Lines-20' Vert 100' Horiz Labels** option from the drop-down menu.

  For 10-Scale bridge site plans, select the **Profile Grid - 10' Vert 10' Horiz Lines-10'Vert 50'Horiz Label** option from the drop-down menu.

- Select **OK** to initiate the process.

The bridge site plan sheet is generated like the example below.



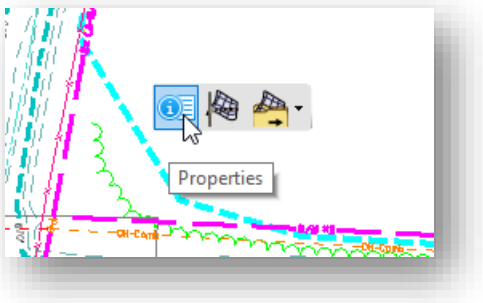
Notes:

- If using a **Container** file for the named boundaries and the references:
  - Each sheet design file contains a **Drawing** model for each of the named boundaries, one for the plan and one for the profile
  - The **Drawing** models reference the original **Container** file
  - The **Sheet** model references the **Drawing** models
- If the named boundaries and the references are defined in the **SP** file:
  - Each **SP** design file contains a **Drawing** model for each of the named boundaries, one for the plan and one for the profile
  - The **Drawing** models reference the design model in the **SP** file
  - The **Sheet** model references the **Drawing** models
- In either case, the profile drawing model includes both the grid lines and the annotation for the profile

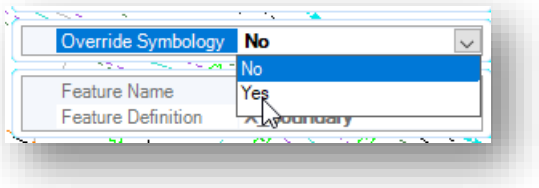
Terrain Model Contour Interval

If the existing ground terrain model contours will be show on the site plan, it is possible that the interval for the contour lines as saved in the survey "FB" design file may be set to display the contour interval that is required for the bridge site plan. Changing the contour interval display can be accomplished by using the terrain model **Override Symbology** setting.

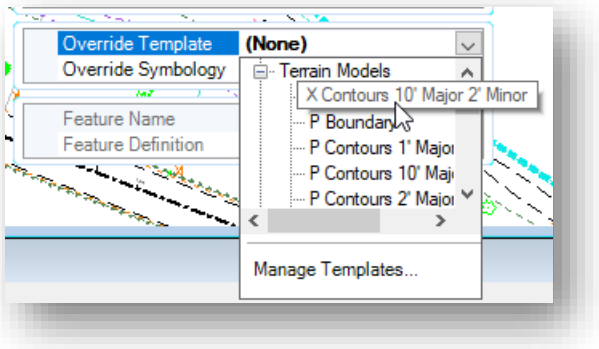
Select the terrain model boundary and choose the **Properties** command from the pop-up menu.



Change the **Override Symbology** setting to **Yes**.



The **Override Template** option is used to choose the Element Template with the contour interval that will be used to override the current settings as saved in the "FB" design file.

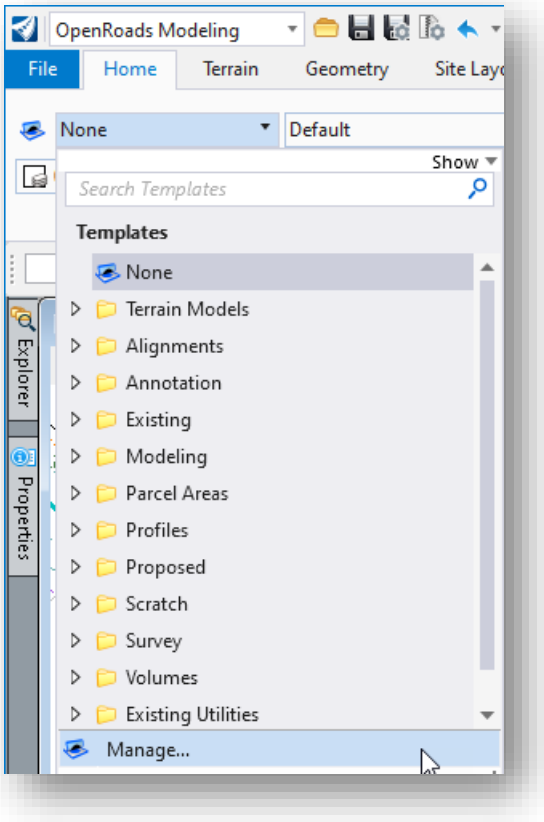


After selecting the element template the changes are applied in the active design file. Note that the triangles may also be turned on when changing this setting and can be turned off using the MicroStation *Level Display* dialog.

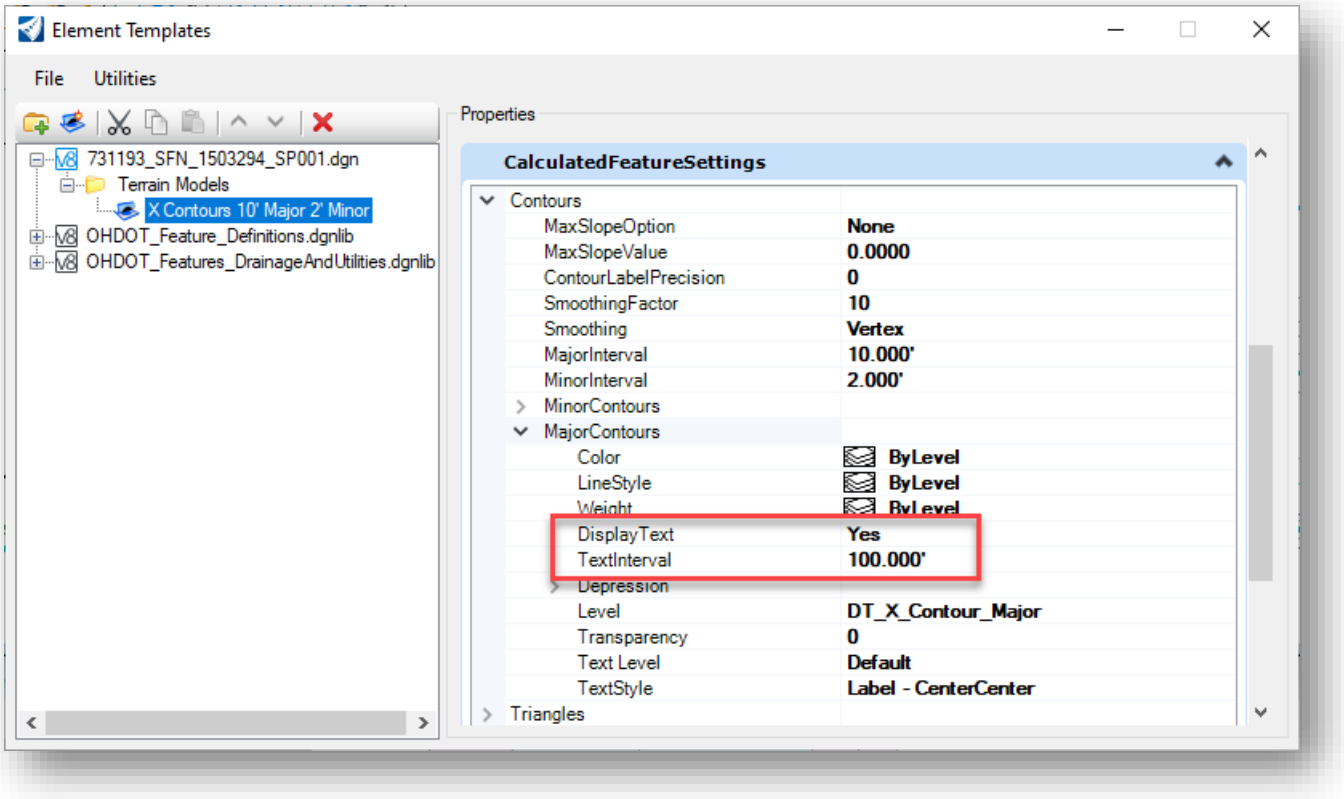
Note that OpenRoads adjusts the major contour text annotation location dynamically based on the view extents. This may result in text falling into locations that are undesirable. Unfortunately, there is no way to know where the text is going to fall on the printed sheet until the sheet is printed. There are two options to address this issue, both of which are accomplished by editing the element template that has ben copied into the active design file when the override template was selected.

1. Adjust the major contour text spacing. This option may of may not solve the problem as all it does is move the text to a different spacing interval.
2. Turn off the display of the major contour text and then manually annotate the major contour lines by placing the text at the desired location

In either case, the first step is to edit the element template that has been copied into the local file. From the **Home** tab, select the **Manage** command from the **Element Template** drop-down menu as shown at below.



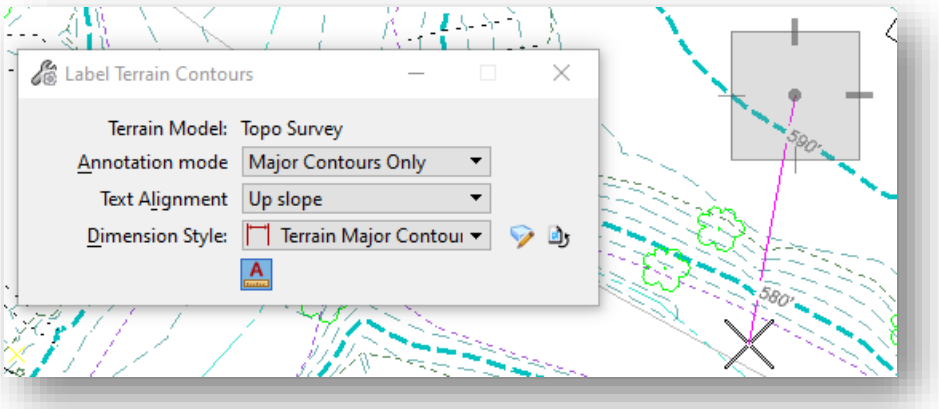
The *Element Templates* dialog is opened. Browse to the **Terrain Models** group to edit the template that had been copied into the design file as shown below.



- Change the **TextInterval** option to a different value to adjust the text spacing.

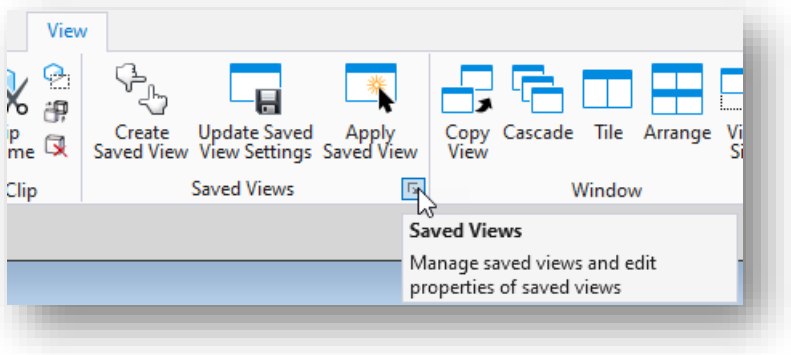
- To turn off the text, toggle the **Display Text** option to **No**. Note: You may also have to change the **TextInterval** value for this change to take effect.

If you elect to turn off the text display, the **Terrain > Labeling > Label Terrain Contours** command is used to place contour labels at the desired locations by dragging a line through the contour(s) that are to be labeled. An example is shown below.

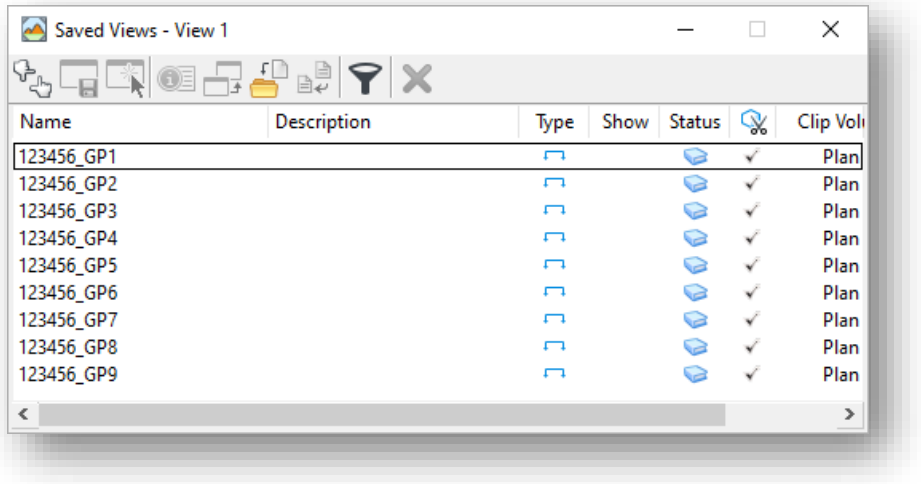


Named Boundaries and Saved Views

When the named boundaries are processed to generate the sheets, the software also creates a MicroStation saved view for each named boundary. The saved views can be reviewed by selecting **OpenRoads Modeling > View > Saved Views** as shown below.



The *Saved Views* dialog is opened, as shown below.



The saved views are named according to the name that is entered in the sheet generation process on the *Create Drawing* dialog.

Reprocessing Sheets

Occasionally it may be necessary to reprocess a set of sheets. The previously placed named boundaries can be reused, however, if the same name is used for the sheet files the software does not overwrite the previously created saved views, models, or design files. The user must delete the previously generated saved views, models, and design files before reprocessing the named boundaries.

If the sheets are all in one file, take the following steps before reprocessing the named boundaries:

- Open the *Saved Views* dialog. Delete the saved views corresponding to the sheets to be reprocessed
- Open the *Models* dialog. Delete all the drawing and sheet models corresponding to the sheets to be reprocessed

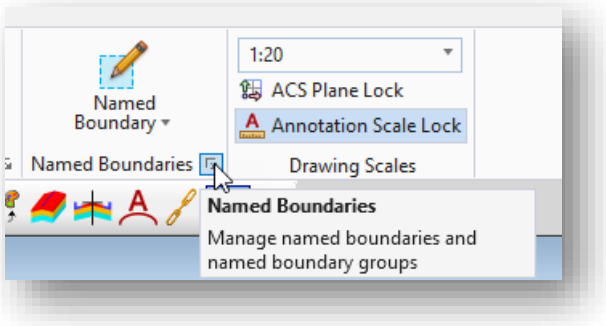
If the sheets are in separate design files, take the following steps before reprocessing the named boundaries:

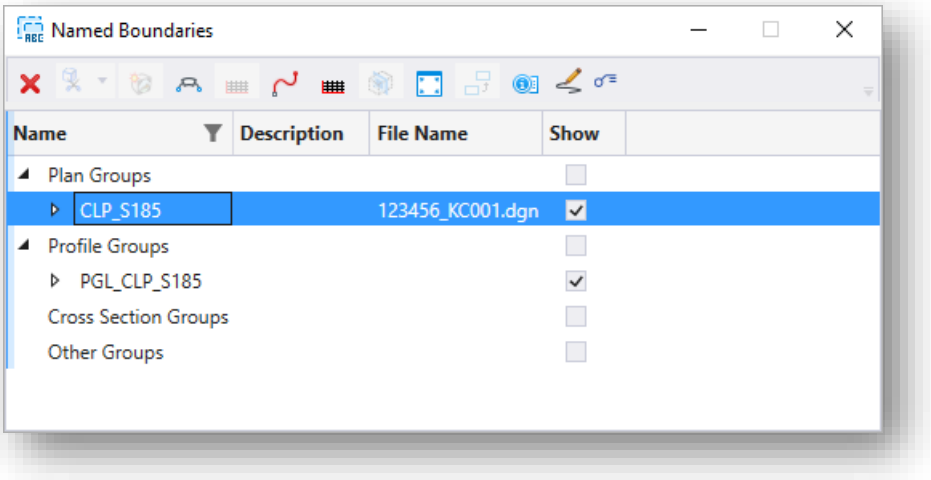
- In the KC design file, open the *Saved Views* dialog. Delete the saved views corresponding to the sheets to be reprocessed
- Delete all the sheet design files in the \discipline\sheets\ folder that are to be reprocessed

  Tip for ProjectWise users: Before deleting files, in ProjectWise Explorer right-click on the file name and choose the **Purge Local Copies** option.

The *Named Boundaries* dialog is used to reprocess the sheets from the previously placed named boundaries.

- From the **OpenRoads Modeling** WorkFlow, select **Drawing Production > Named Boundaries** as shown below. The *Named Boundaries* dialog is opened.





- Select the **Plan Group** to be processed.
- Toggle on the option to **Show the Create Drawing Dialog**
- Select the appropriate icon to open the *Create Drawing* dialog (**Create plan drawing**, **Create Profile drawing**, **Create plan/profile drawing**). The *Create Drawing* dialog is opened and can be processed as previously detailed in this document.

Level Management

Managing Sheet Design File Levels from the Container File

Managing levels across multiple drawing and sheet models with multiple references (both direct and nested) can be confusing. When sheets are assembled, the reference files are attached as follows:

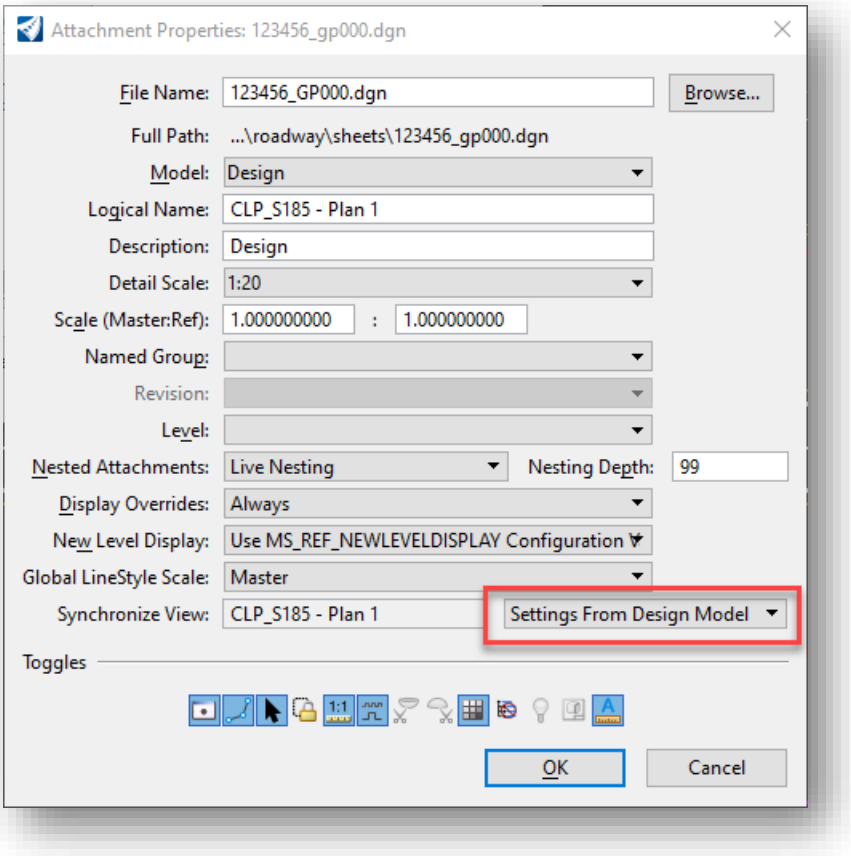
Basemaps > Container File (Design Model) > Sheet File (Drawing Model) > Sheet File (Sheet Model)

By default, the ODOT sheet clipping DGN Libraries are configured to allow users to manage the levels displayed on the completed sheets from the container file. This allows users to configure the levels displayed in the final sheets from a single location, the container file, with the changes reflected in every plan or profile sheet.

The 2021 Release 1 version of OpenRoads enhances this functionality with significant improvements:

- A new option has been added for reference attachments to synchronize the view settings from the attached file. The parameter is found in the ***Attachment Properties*** dialog for the selected reference file. Double-click the reference file name in the ***References*** dialog to access the ***Attachment Properties*** dialog shown below.

  The **Settings From Design Model** parameter has been configured as the default setting in the OHDOT Standards.



- The **Settings From Design Model** parameter also allows the view attributes settings in the container file to be reflected in the sheets. This allows turning off the display of construction class elements (Constructions) container file's View Attribute settings to carried through to all the sheets.
- Adding or removing reference attachments is reflected in the completed sheets

Tip: Use **View 1** when turning on or off plan view levels in the container file for the level changes to carry through to the drawing and sheet models.

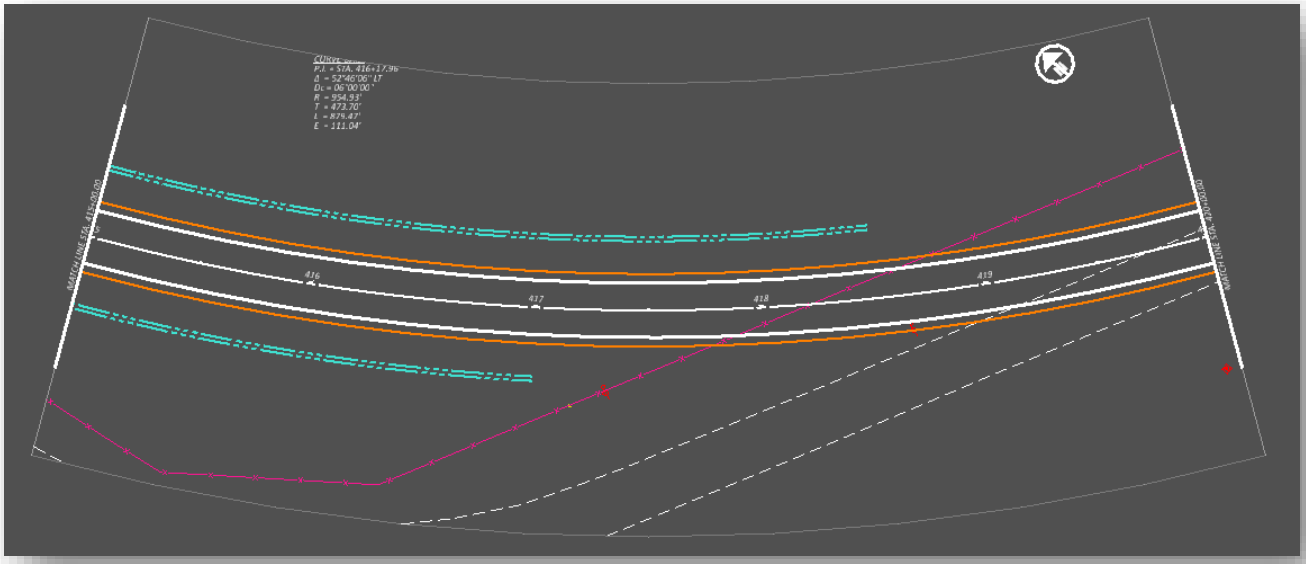
Sheet Annotation

Bentley's recommended workflow is for sheet annotations to be placed in the drawing models, not in the sheet models.

Plan View Alignment Annotation

Alignments are often annotated in the geometry basemap (BK) design file. These annotations can be shown on the completed sheets, however, editing the annotation in the BK file may impact other sheets in the WorkSet.

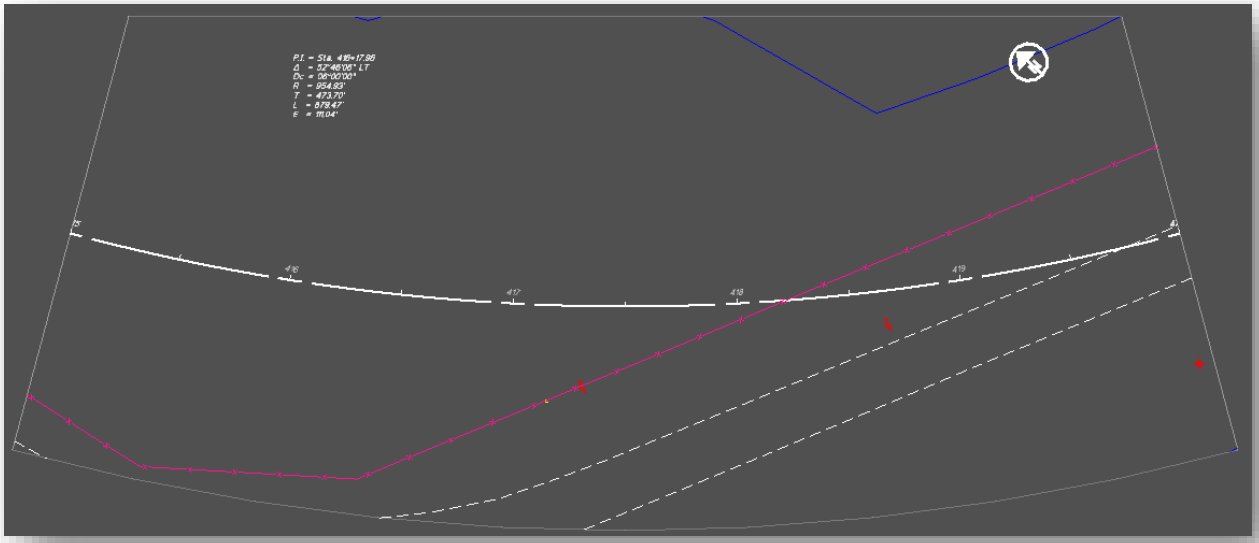
The example below shows the drawing model containing the plan view portion of a plan and profile sheet. The alignment annotation is referenced from the BK design file.



In this example, the curve data is partially clipped due to the named boundary limits. This can be resolved as follows:

Option 1 – Edit the Named Boundary.

Named boundaries can be edited, but there are limits to how much editing can be done. The boundary is chorded around a curve. In the example below, the vertices were deleted using the MicroStation Delete Vertex command. In this example, the named boundary was deleted so that the referenced curve data annotation is not clipped.



Option 2 – Place the Alignment annotation in the container file's Design Model

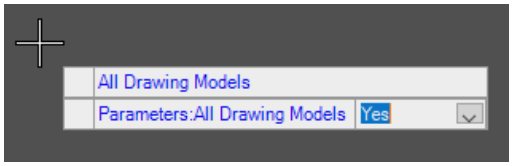
While this is not significantly different that alignment data placed in the geometry basemap, it does allow the user to move or delete unnecessary annotations without impacting other sheets.

Option 3 – Place the Alignment Annotation in the various Drawing Models

Using this option, the alignment is annotated in the drawing models for the limits of the named boundary. This method is advantageous because the annotation for each sheet is controlled by the drawing model for the sheet.

Take the following steps to use this option:

- From the container design file, turn off the alignment annotation levels from the attached BK file(s).
- In the drawing model for one of the sheets, from the *Drawing Production* tab, select the **Annotate Element** command. Select the alignment element to be annotated. OpenRoads version 10.10 adds the ability to annotate the element in multiple drawing models, as shown below.



Follow the prompts to annotate the selected alignment(s).

- Edit the annotation in the drawing models as necessary for each sheet

- Annotations added to the drawing models are not automatically visible in the sheet models. The attachment of the design model to the sheet is a “direct reference”, not a “nested reference”. As such, the level display is not automatically synchronized as nested references are. It is necessary to turn the annotation levels on for the drawing model attachment in each sheet model

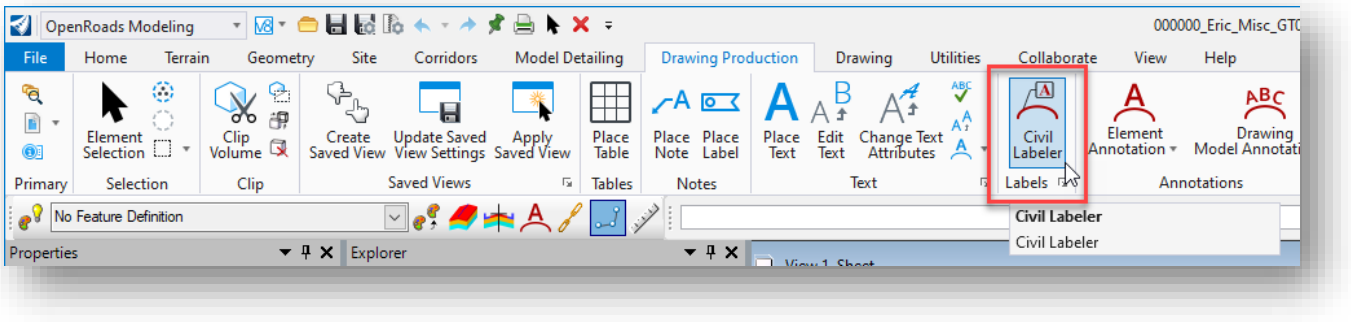
Plan View North Arrow Annotation

The north arrow symbol is placed in the plan view as part of the drawing model annotation. The location of the north arrow is defined in relation to the alignment.

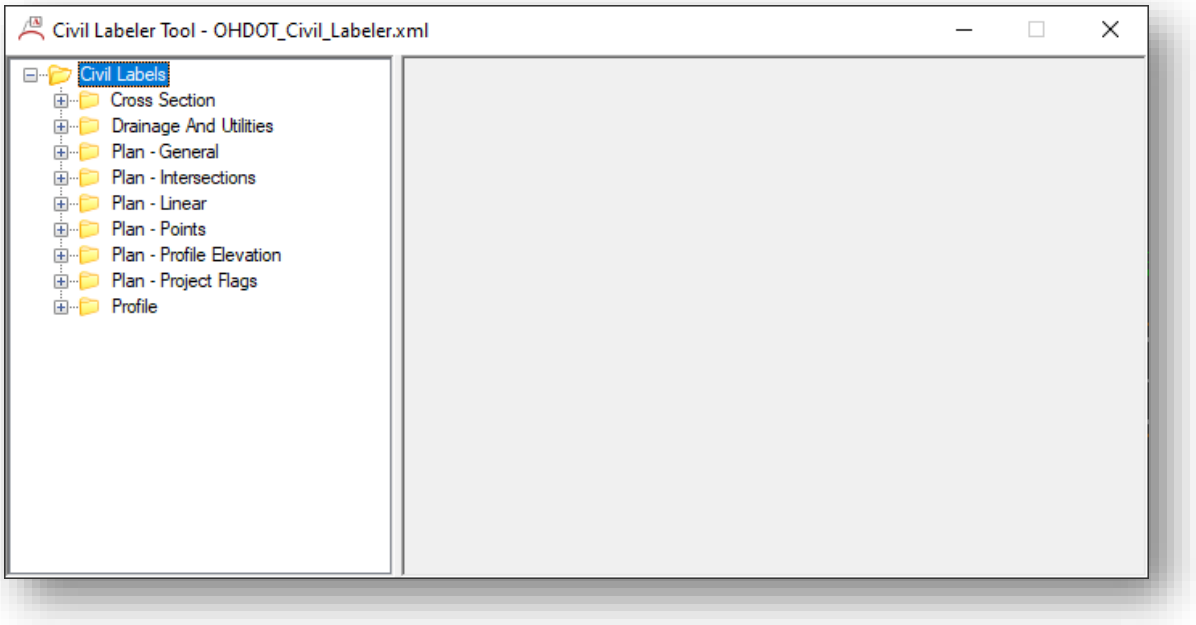
The May 1, 2020 release of the OHDOT CADD Standards removed the north arrow placement block from the upper right corner of the sheet borders. It is no longer necessary to move the north arrow cell from the default location as defined in ODOT’s CADD Standards to the upper right corner of the sheet border.

Civil Labeler

A new annotation tool, **Civil Labeler**, has been added to the 2021 Release 1 version of ORD. As of this writing, the function is in a “tech preview” status as the tool is refined. The Civil Labeler can be accessed from the **OpenRoads Modeling** WorkFlow by selecting **Drawing Production > Labels > Civil Labeler** from the ORD Ribbon menu.



When the command is selected, the ***Civil Labeler Tool*** dialog is opened with the **OHDOT_Civil_Labeler.xml** file loaded as shown below.

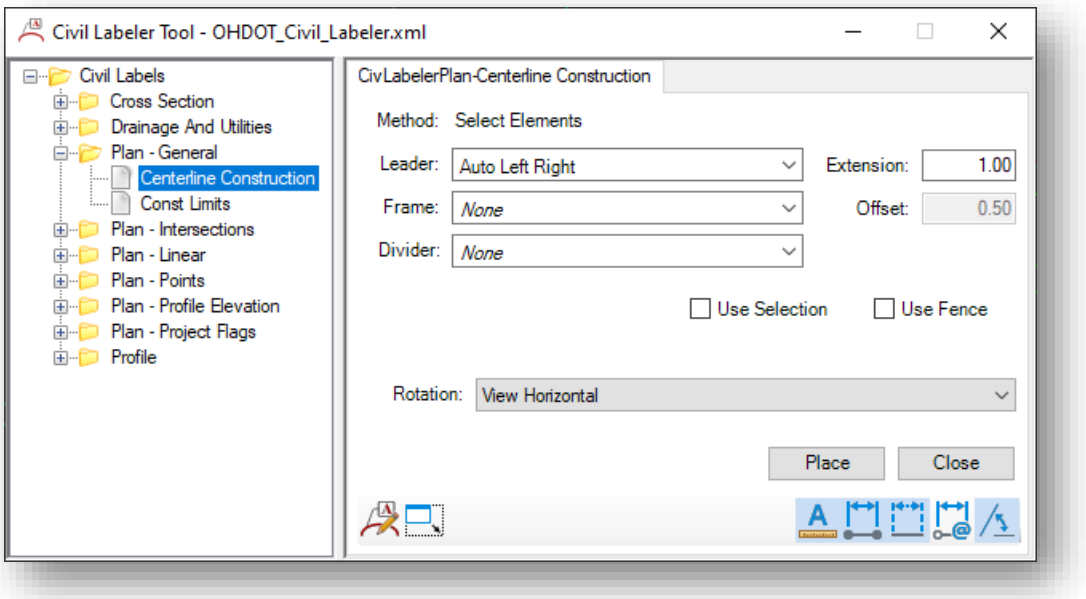


The xml file is configured with multiple folders containing multiple label definitions as shown above. Each folder contains multiple labels. It is beyond the scope of this training guide to document each label option. A few of the common labels will be documented below. Contact the CADD and Mapping Support team with questions or requests to add additional labeling options.

Cross Section and Drainage and Utilities labels will not be covered in this document.

ODOT recommends placing most labels in the various Drawing models for the sheets. Labels should not be placed in the sheet model.

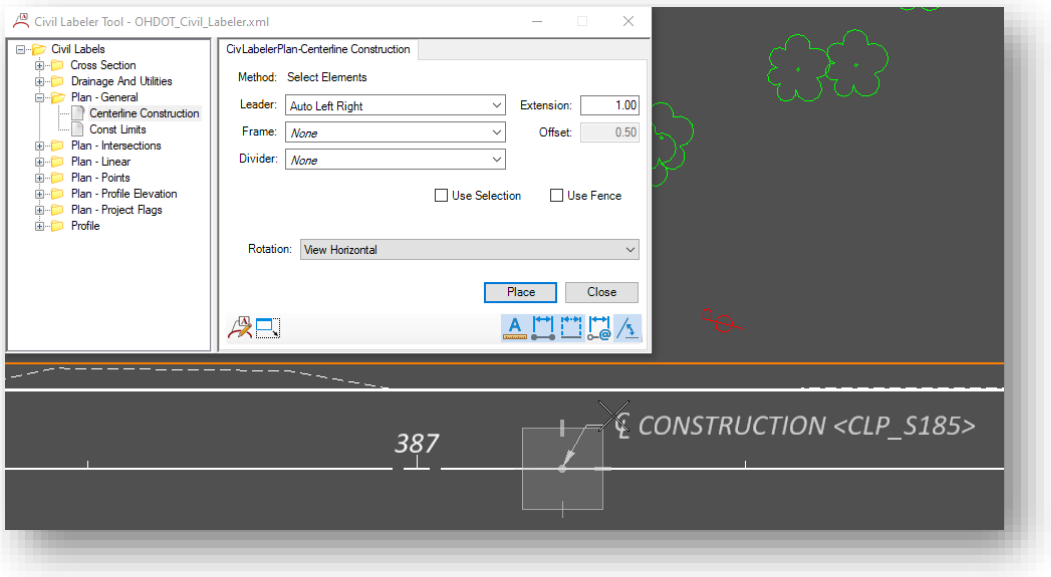
When a label is selected, the dialog presents several options to the user like the example below.



It is beyond the scope of this manual to document every option. The ODOT labels have been configured with the default options most used for each label type. Examples of commonly used labels are included below.

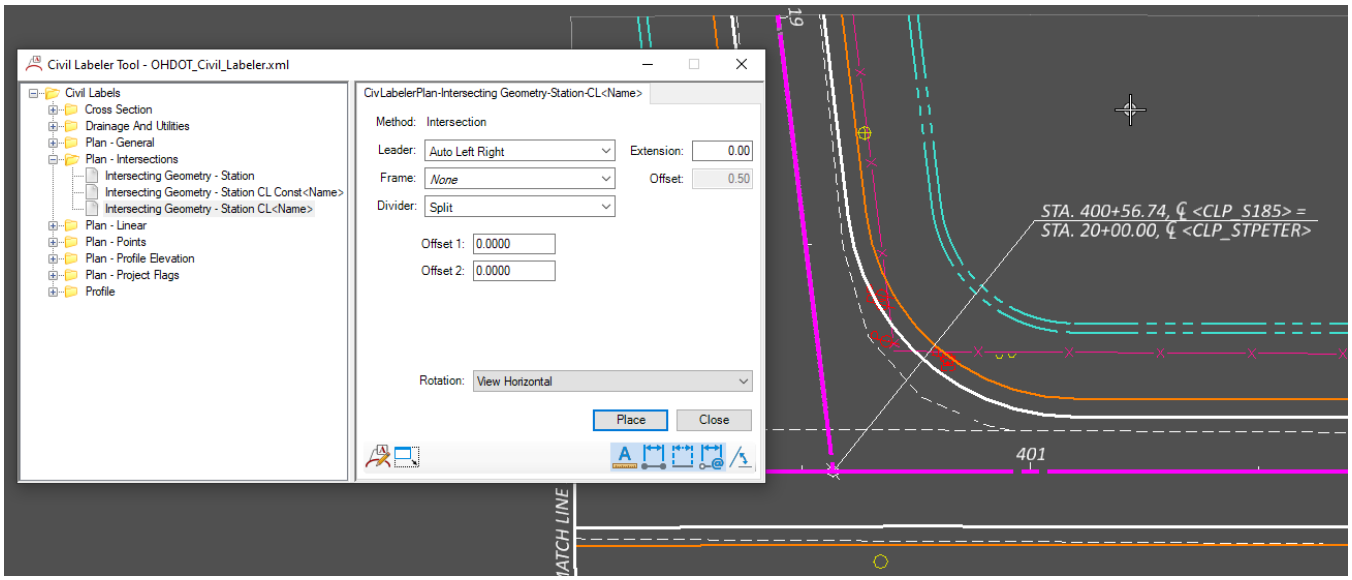
Plan – General Labels

This group of labels provides label options for annotating the centerline or construction limits. An example is shown below.



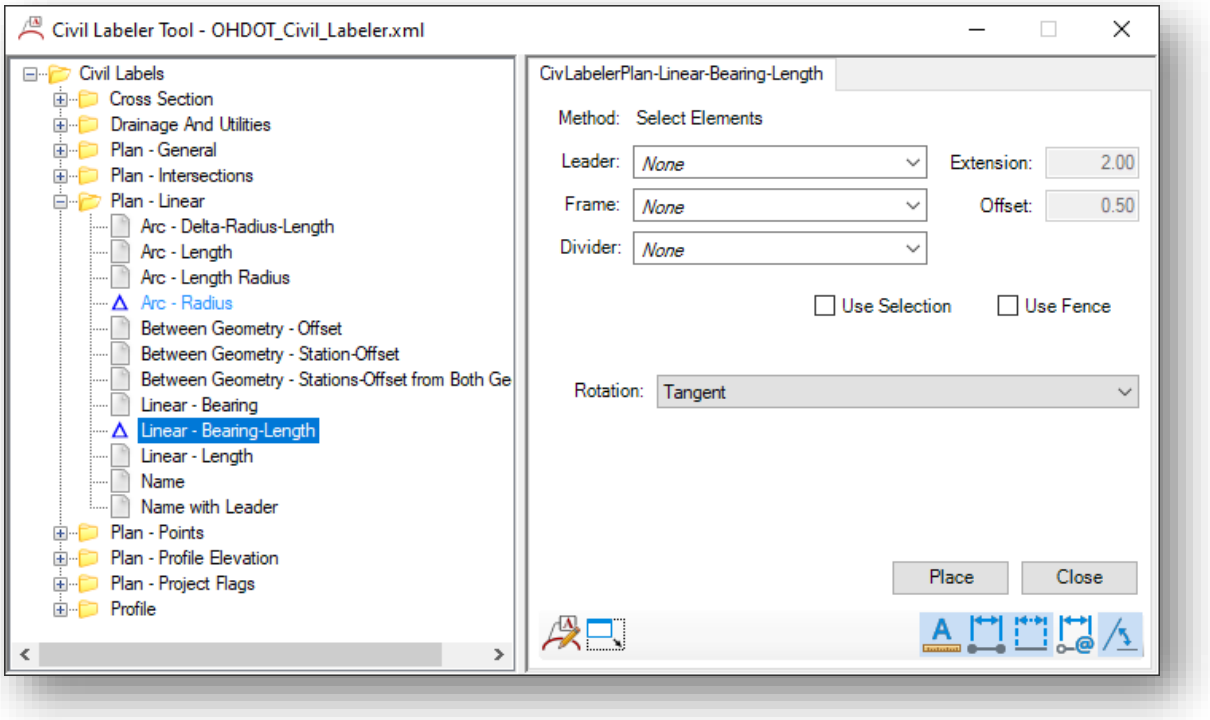
Plan – Intersection Labels

The Plan – Intersection group includes options to label the station of a point at the intersection of two alignments. In the example below, the user is prompted to select each alignment. The annotation is placed at the location defined by the user.



Plan – Linear Labels

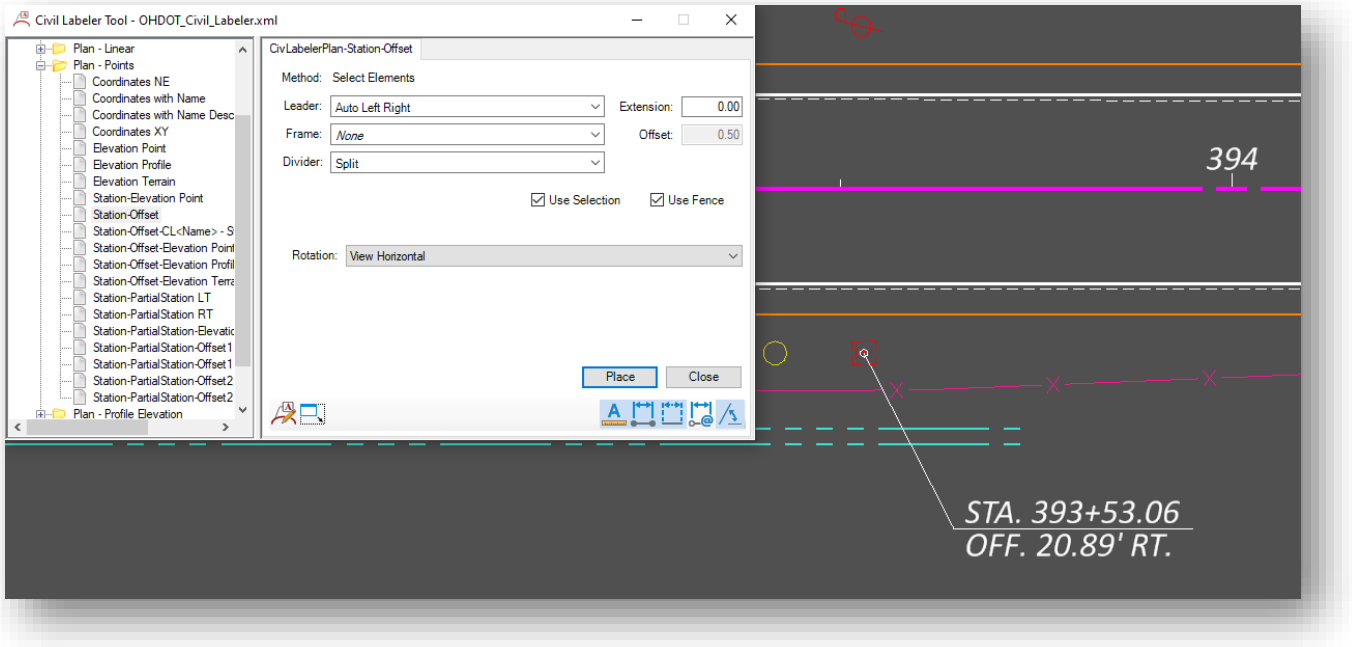
Various labels are available to annotate curvilinear elements as shown below



Plan – Points Labels

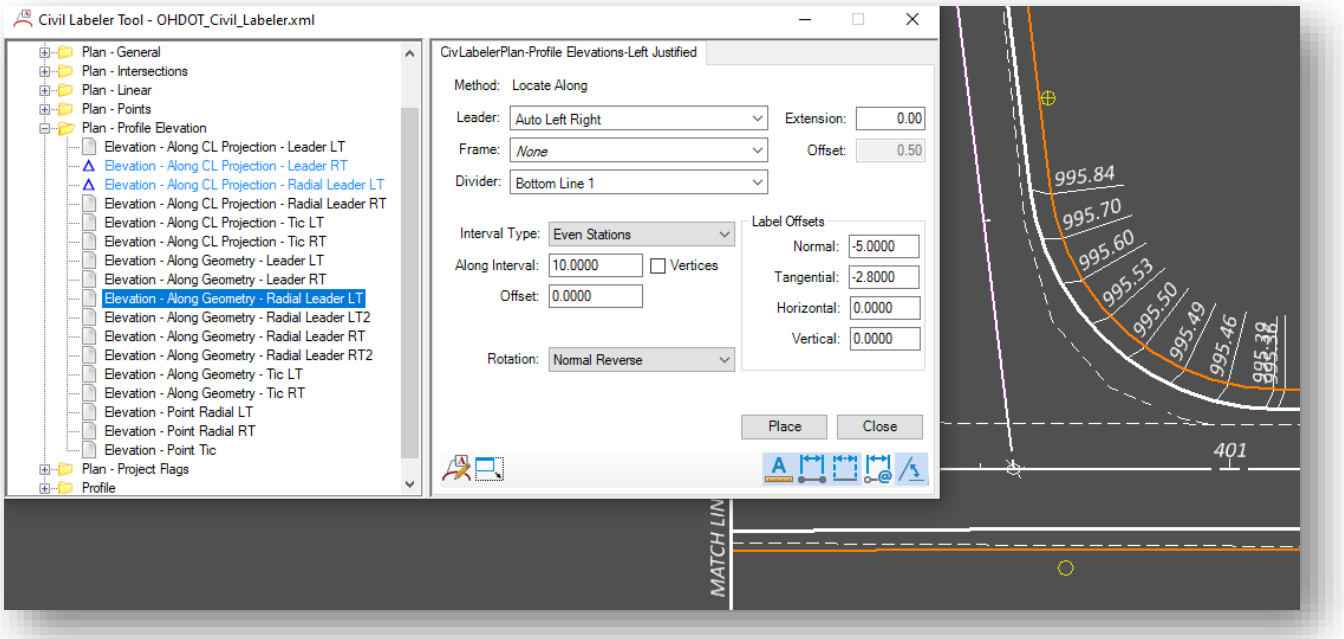
Various label options are provided for the annotation of points. In cases where a station and offset is to be annotated, after selecting the Place command it is required that you select the geometry element to be used as the station and offset reference.

An example using the **Station-Offset** label is shown below.



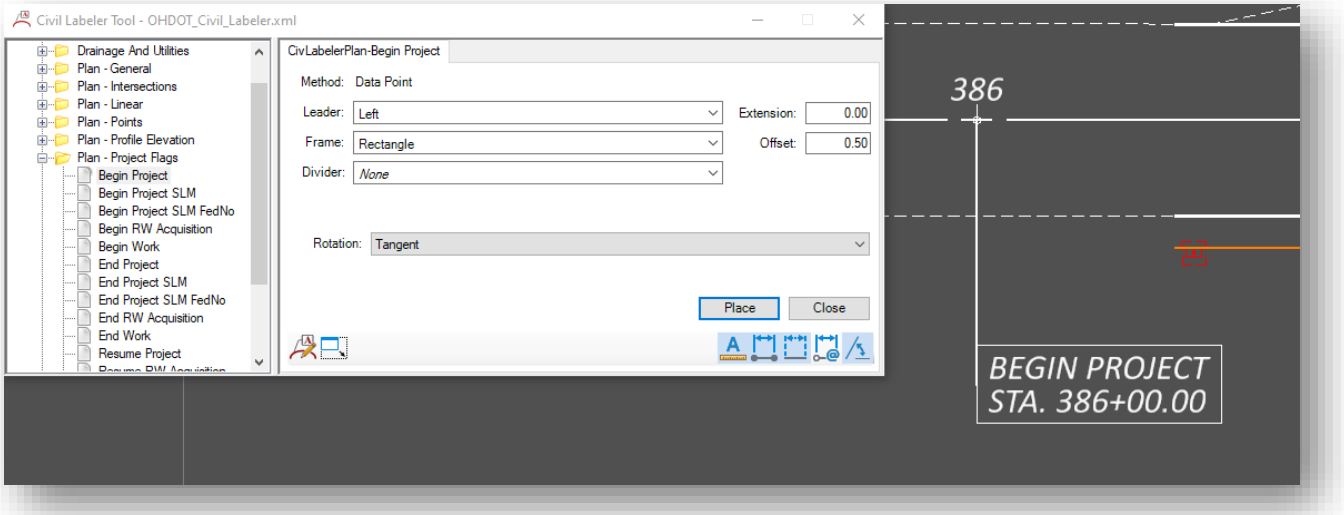
Plan – Profile Elevation Labels

Several labels have been constructed to annotate profile elevations in the plan view. The **Elevation – Along Geometry – Radial Leader LT** option is shown below.



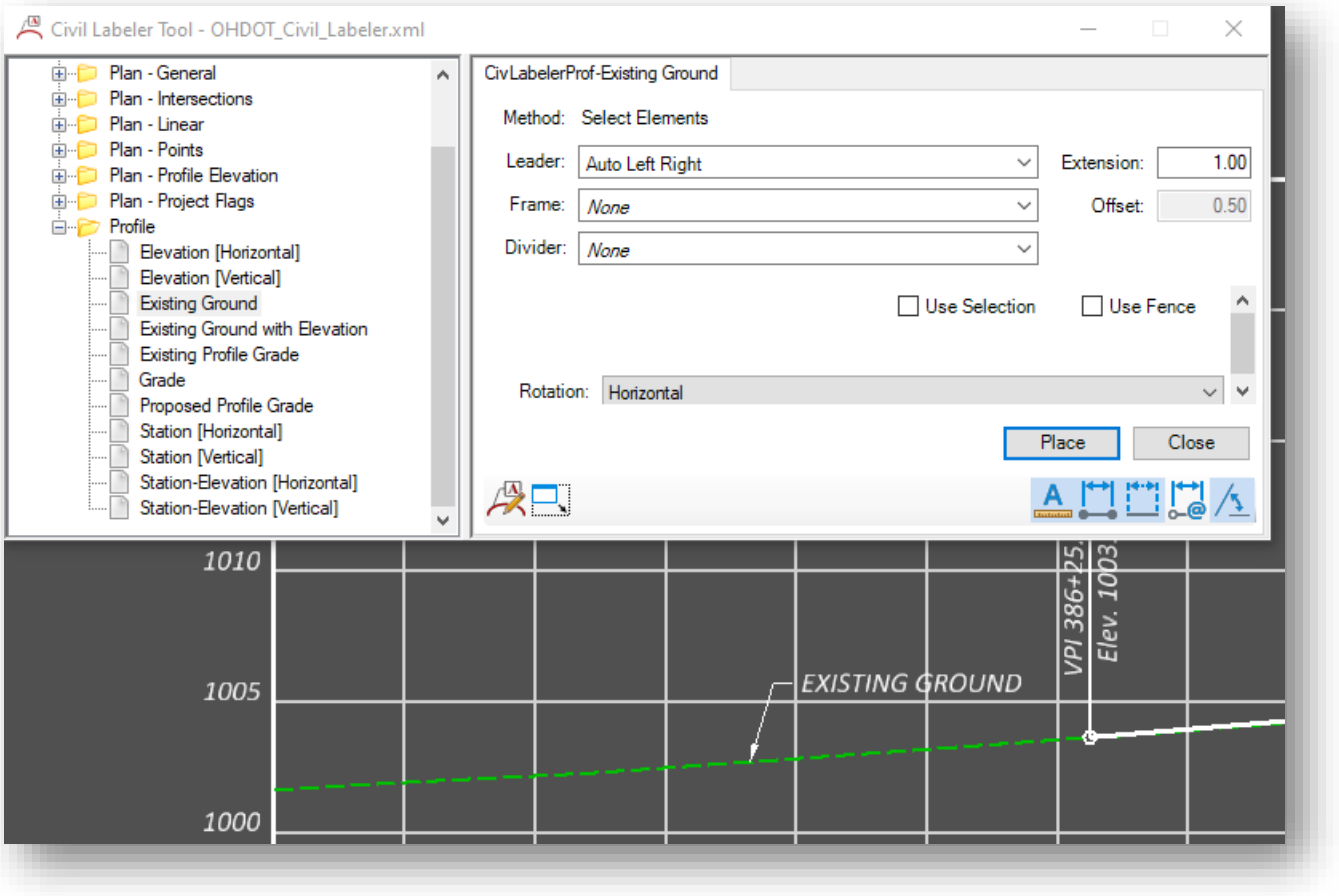
Plan – Project Flags Labels

The Plan – Project Flags group includes several labels as shown below.



Profile Labels

The Profile labels are configured for the profile drawing model. Various labels are provided as shown below.

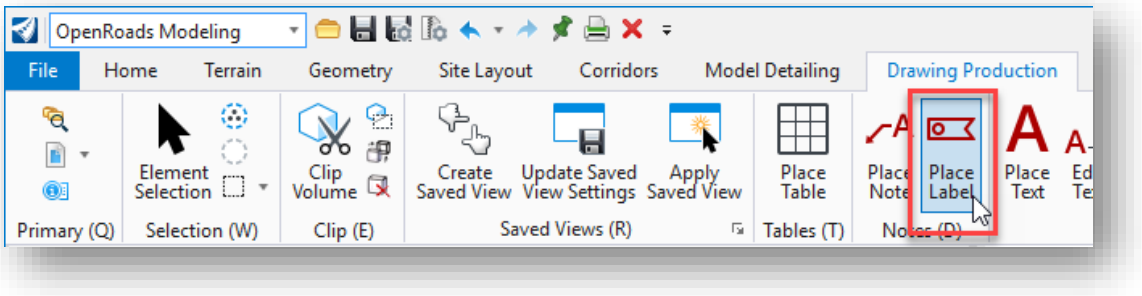


Computed Labels

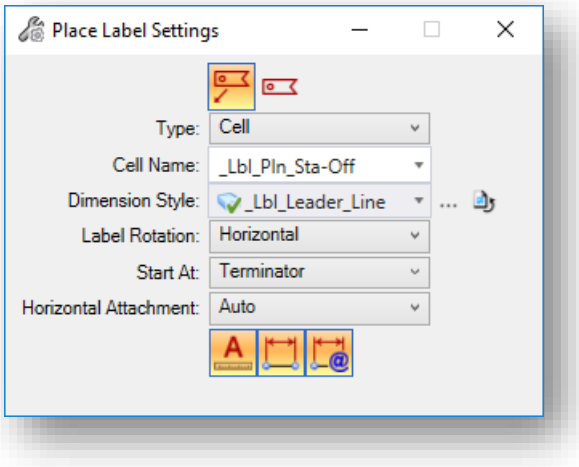
With the 2021 Release 1 version of OpenRoads Designer, ODOT recommends using the new **Civil Labeler** tools. This section is retained in the document for reference.

The **Place Label** command, located in the **Drawing Production** tab as shown below, is used to place various labels for plan production.

The labels contain Text Favorites which compute the value of the label based on selected geometry.



When the command is selected, the **Place Label Settings** dialog is opened as shown below.



Two icons are provided to place labels with or without a leader line.

The **Type** option is used to select placing either a label composed of a Text Favorite, or a label composed of a cell. An example placing a cell is shown in this document.

The **Cell Name** parameter is used to select the label type. Several labels have been configured for ODOT users. The process to create labels is not documented in this manual.

Cells that have been configured as labels are named with an "**_Lbl**" prefix. Additional labels can be configured as requested.

The **Dimension Style** parameter is used to define the leader line for labels placed using the **Place Label with Leader** option. Two leader line dimension styles have been configured as shown below:

- _Lbl_Leader_Line
- _Lbl_Leader_Line_With_Terminator

The **Label Rotation** parameter is used to set the rotation of the label relative to the leader line: **Horizontal**, **Vertical**, or **Inline**.

Start At defines whether the label placement starts from the terminator of from the cell.

The **Horizontal Attachment** parameter sets the leader attachment side: **Auto**, **Left** or **Right**.

The three icons at the bottom of the dialog are as follows:

Annotation Scale
Turns on annotation scale. When this lock is on, the annotation scale is applied to the label.

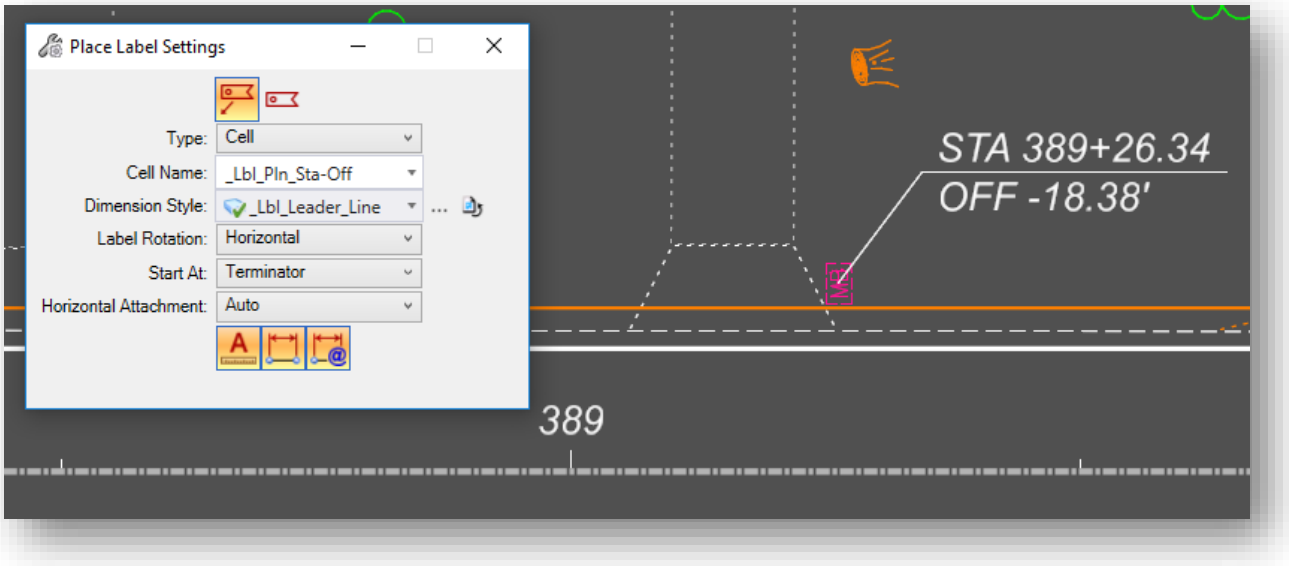
Place Label With Regular Association
Sets regular association with the element. If you place a label with this setting turned on and the **Place Label With Relative Association** turned off, the label is placed with regular association. In this case, if you move the element, the label remains at the same place, only the leader line moves along with the element.

Place Label With Relative Association
(Enabled only when **Place Label With Association** is enabled) Sets relative association with the element. If a label is placed with relative association with an element, the label will stay at the same location relative to the original snap point. That is, if you move the element the label will also move with it.

To Place a Station and Offset Label with a Leader

- Select the **Place Label With Leader** icon.

- Select the **Type** value **Cell** with the **Cell Name** of **_Lbl_Pln_Sta-Off**
- Set the **Dimension Style**, **Label Rotation** method, and **Horizontal Attachment** method.
- (Optional) **Select Place Label With Regular Association** and then select **Place Label With Relative Association** .
- Enter a data point to select the alignment element that will be used to compute the station and offset values.
- Enter a data point to place the label with leader line.



Several label types have been configured in the OHDOT standards. Additional labels can be configured upon request.

OpenRoads Software Version

This document was prepared using the following software version:

OpenRoads Designer CONNECT Edition – 2021 Release 1 Update 10 – Version 10.10.01.03

Contacts

For any questions, suggestions, or problems with this document please contact the ODOT Office of CADD and Mapping Services by use of the following form on the ODOT website:

https://odot.formstack.com/forms/cadd_servicerequest