OpenRoads Designer:
Cross-Section Sheet Exercise

## Exercise 1: S.R. 185 Cross Sections

Part A: Design Files

Take the following steps to create the design file for the cross-section sheets:

- ✓ Open **ProjectWise Explorer**

- ✓ Browse to the folder containing the training data. The folder location will be provided by the instructor for each class.
- ✓ Browse to the **400-Engineering\Roadway\Basemaps** folder.
- ✓ Open the file **123456_BK000.dgn**
- ✓ Select the **Ohio DOT** Workflow
- ✓ Select the **OHDOT Create Design Files** application
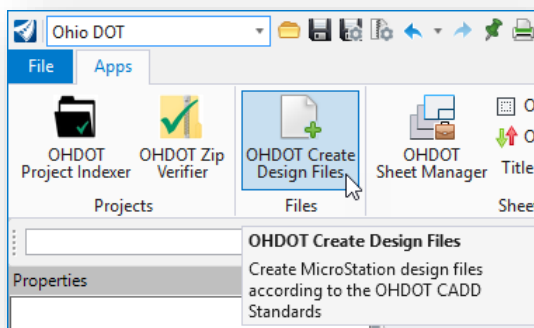
- ✓ Create the cross-section sheet design file for S.R. 185 using the settings below:
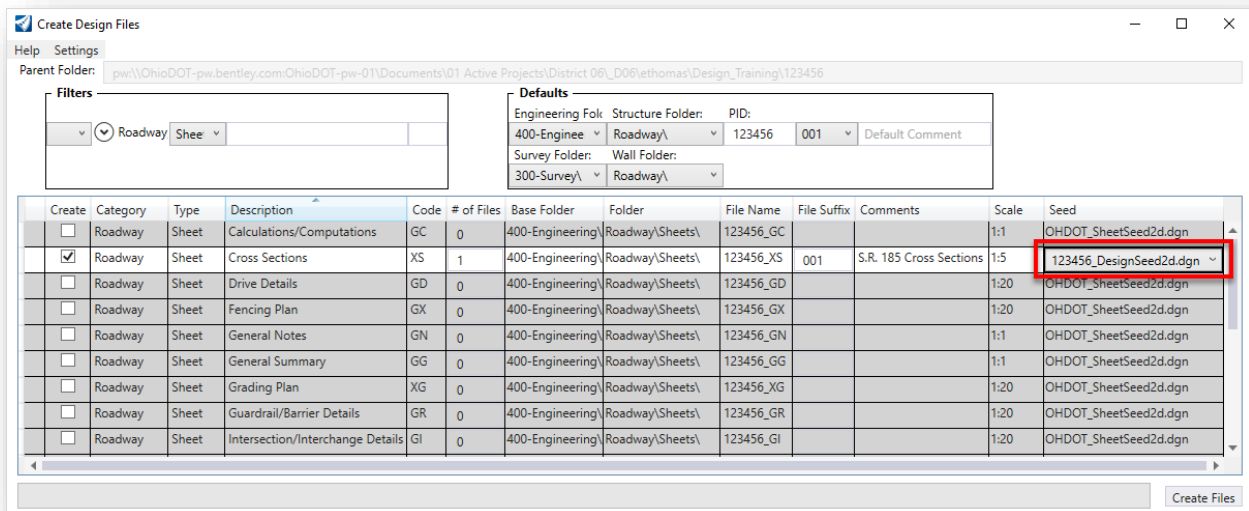
- Be sure to change the **Seed** file option to use the **123456_DesignSeed2d.dgn** file.
- Select **Settings > Open Last Created File**
- Select the **Create Files** option
   The new file is created in the **400-Engineering\Roadway\Sheets** folder

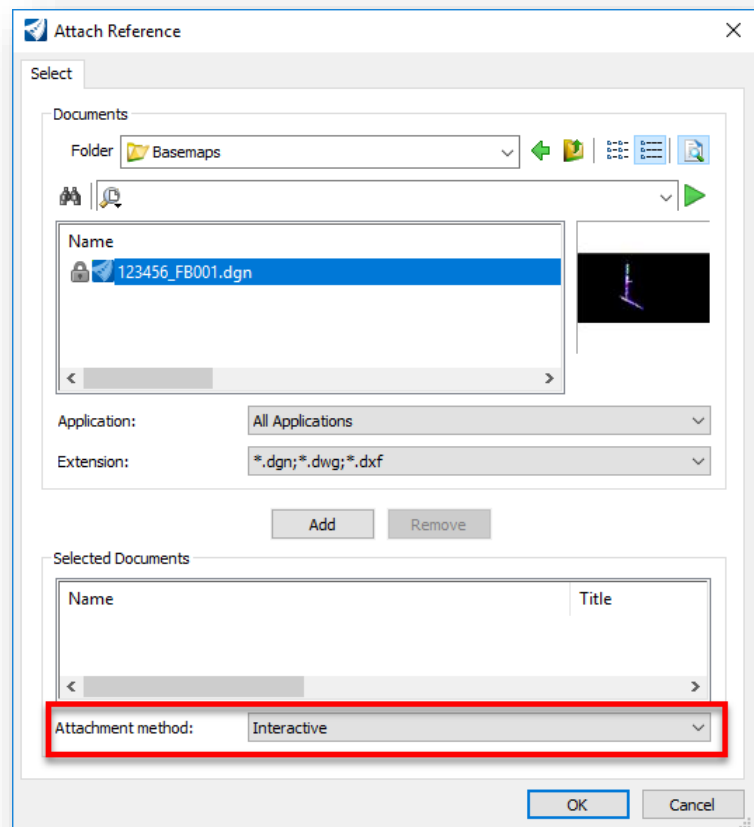✓ When prompted, check the current file back into ProjectWise
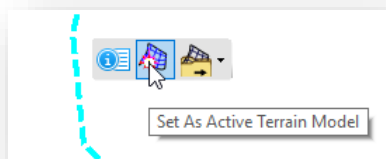
Part B: Plan View References

✓ From the **OpenRoads Modeling** WorkFlow, select **Home > Attach Tools > References** to attach the files with the plan view information. Start by attaching the Survey Field Book (FB) design file from the following folder:

300-Survey\Basemaps\123456_FB001.dgn

✓ When selecting the references, set the **Attachment Method** to **Interactive**. This will open the *Reference Attachment* dialog for each file as it is attached. This is necessary to review and set the **Nested Attachments** parameter for each file.

✓ From the *Reference Attachment* dialog, set the **Nested Attachments** parameter to **No Nesting**.

✓ After attaching the Survey Field Book design file (FB) set the terrain model as the active terrain by selecting the terrain model element and choosing the **Set As Active Terrain Model** icon from the pop-up menu.

The cross sections are extracted from the 3D model.

- ✓ Open a 3D view by holding down the right-mouse button in the view window and choosing **View Control > 2 Views Plan/3D**

Attach the files that contain the 3D information that will be displayed on the cross-sections. Set the **Nested Attachments** setting to **Live Nesting** with a depth value of **0** unless otherwise stated.

- o 400-Engineering\Roadway\Basemaps\123456_BK000.dgn, using a to **Live Nesting** with a depth value of **1**.
- o 400-Engineering\Roadway\Basemaps\123456_KM001.dgn
- o 400-Engineering\Roadway\Basemaps\123456_KM002.dgn
- o 400-Engineering\Roadway\Basemaps\123456_KM003.dgn
- o 400-Engineering\RW\Basemaps\123456_BR001.dgn

- ✓ After the references are attached, select the 3D view so that it is the active view. From the **Home** tab, select the **Level Display** icon to turn on/off the levels that you wish to display in the cross-section sheets.
  - o Select each reference file to turn on/off the desired levels
  - o The only thing that is needed from the survey basemap (FB) design file is the terrain model. Turn off all the levels in the FB design file except the following
    - ▪ DT_X_TIN_Hull
    - ▪ XS_X_Ground_Line

- ✓ Select **File > Save Settings** after you have completed the task of turning on/off the levels

Part C: Placing Named Boundaries

MicroStation Named Boundaries are placed to define the limits of each cross-section.

Take the following steps to define the cross-section named boundaries for S.R. 185:

- ✓ From the **Drawing Production** tab, select the **Place Named Boundaries** command

- ✓ From the *Place Named Boundary* command, take the following steps:
    - o Select the **Civil Cross Section** command (4th icon)
    - o Set the **Drawing Seed** parameter to **Cross Sections 5-Scale**
    - o Toggle off the **Create Drawing** option at the bottom of the dialog.
    - o Click inside the **Start Location** key-in field
    - o Left-click on the plan view alignment graphic for S.R. 185. The dialog will track the start location station value relative to the cursor location
    - o Key in a **Start Location** value of **386+00**
    - o Key in a **Stop Location** value of **428+00**
    - o Key in a value of **50** for the **Interval** parameter
    - o Enter a data point (left-click) in the plan view to initiate the process to create the named boundaries for the cross-sections. It takes three clicks to place the boundary elements.
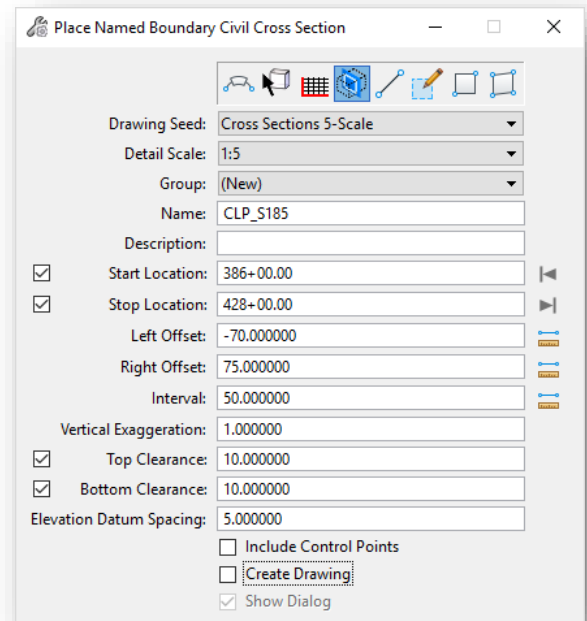
The boundaries are drawn for the cross sections and the *Placed Named Boundary* dialog is closed.

Additional cross sections at specific locations, such as at a driveway or culvert, can be specified by selecting the **Named Boundary** command and entering a single location by setting the **Start Location** and **End Location** to the same value. Set the **Group** parameter to use the same group as the previously placed named boundaries rather than **(New)** as shown above.

Cross section named boundaries can also be placed at a single location by using the **Civil Cross Section 2 Points** option as shown at right.
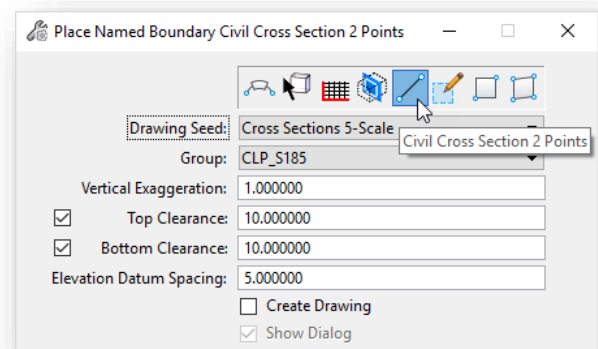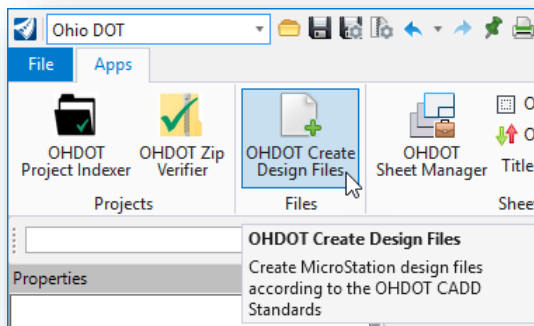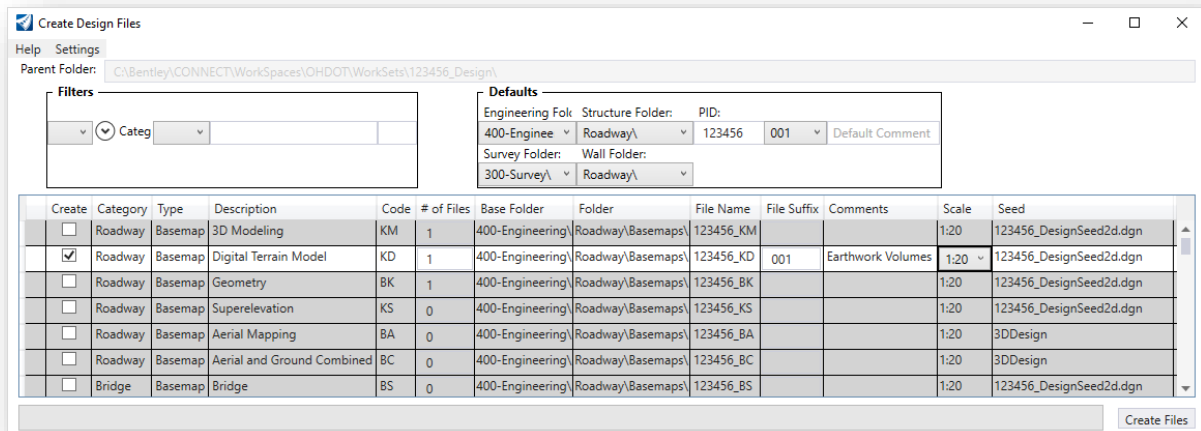
Part D: End Area Quantities

Quantities can be extracted from the 3D mesh elements using the location of a previously placed set of cross section named boundaries. The named boundaries are tagged with the quantity values, which can then be used for cross section sheet annotation.

Take the following steps to create a new design file to generate 3D mesh elements from the corridor model graphics.

- ✓ Select the **Ohio DOT** Workflow
- ✓ Select the **OHDOT Create Design Files** application

- ✓ Create the design file for 3D mesh elements using the settings below:

- o Be sure to change the **Seed** file option to use the **123456_DesignSeed2d.dgn** file.
- o Select **Settings > Open Last Created File**
- o Select the **Create Files** option

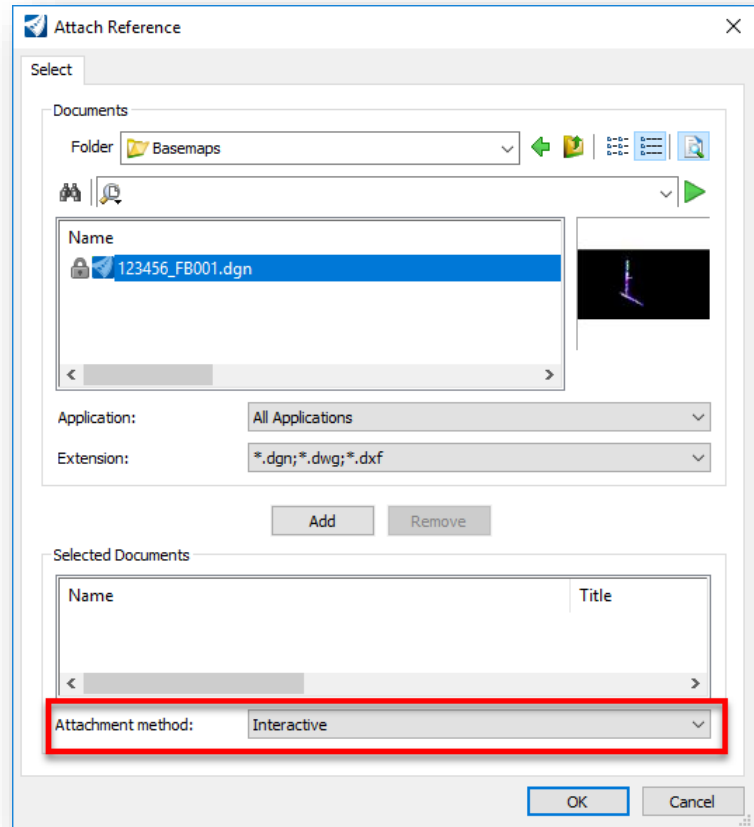   The new file is created in the **400-Engineering\Roadway\Basemaps** folder

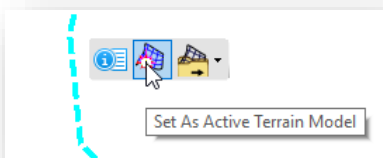- ✓ When prompted, check the current file back into ProjectWise

✓ From the **OpenRoads Modeling** WorkFlow, select **Home > Attach Tools > References** to attach the files with the plan view information. Start by attaching the Survey Field Book (FB) design file from the following folder:

300-Survey\Basemaps\123456_FB001.dgn

✓ When selecting the references, set the **Attachment Method** to **Interactive**. This will open the **_Reference Attachment_** dialog for each file as it is attached. This is necessary to review and set the **Nested Attachments** parameter for each file.

✓ From the **_Reference Attachment_** dialog, set the **Nested Attachments** parameter to **No Nesting**.

✓ After attaching the Survey Field Book design file (FB) set the terrain model as the active terrain by selecting the terrain model element and choosing the **Set As Active Terrain Model** icon from the pop-up menu.

The 3D mesh elements are created from the 3D model.

✓ Open a 3D view by holding down the right-mouse button in the view window and choosing **View Control > 2 Views Plan/3D**

Attach the files that contain the 3D information that will be used to extract the volume elements. Set the **Nested Attachments** setting to **Live Nesting** with a depth value of **1**.

- o 400-Engineering\Roadway\Basemaps\123456_BK000.dgn
- o 400-Engineering\Roadway\Basemaps\123456_KM001.dgn
- o 400-Engineering\Roadway\Basemaps\123456_KM002.dgn
- o 400-Engineering\Roadway\Basemaps\123456_KM003.dgn

✓ From the **Home** tab, select **Civil Analysis > Create Cut Fill Volumes**
- o Issue a data-point (left-click) to accept each of the parameters.
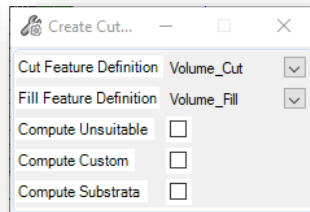
The 3D meshes are placed in the 3d Model on the following levels:

- o VL_Cut_Volume
- o VL_Fill_Volume

Part E: Cross Section Sheets

After placing the named boundaries and generating the 3D meshes for the cut and fill quantities, take the following steps to attach the design file containing the cut and fill 3D mesh elements to generate the end area quantities.

- ✓ Open the cross-section sheet design file. Be sure to check the current file back into ProjectWise.
  - o **400-Engineering\Roadway\Sheets\123456_XS001.dgn**
- ✓ Attach the file containing the 3D mesh elements as a reference to the 2D plan view.
  - o From the **Home** tab, select **Attach Tools > References**
  - o Attach the following file with **No Nesting**:
    400-Engineering\Roadway\Basemaps\123456_KD001.dgn
- ✓ Turn off the display of the 3D mesh elements in the 3D view
  - o Click the 3D view window to make it active
  - o From the **Home** tab, select **Level Display**
  - o Turn off the following levels:
    - ▪ VL_Cut_Volume
    - ▪ VL_Fill_Volume
- ✓ From the **Home** tab, select **Civil Analysis > End Area Volume Report**
  - o When prompted, choose the **CLP_S185 Named Boundary Group**
  - o Left-click to accept the selection. Follow the prompts to generate the end area volume report
- ✓ The report is displayed in the *Civil Report Browser* dialog. Select **Tools > Format Options** to adjust the output format of the report. The settings shown below are recommended for ODOT projects.
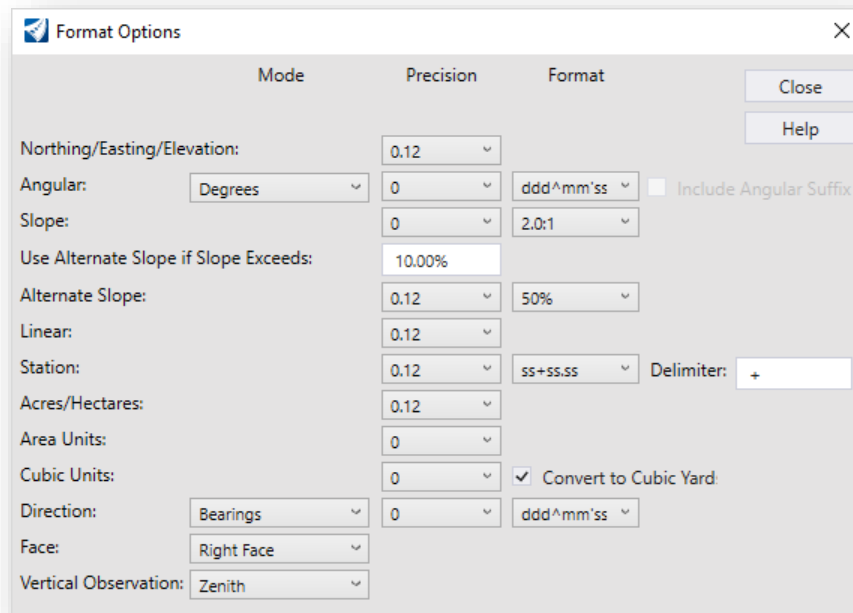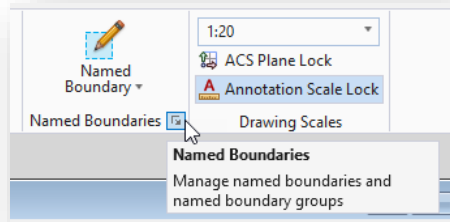

Changes to the **Format Options** are applied to the active report when the dialog is closed.

Close the report when complete.

Create the cross-section sheets.

✓ From the **Drawing Production** tab, select the **Manage Named Boundaries** icon in the lower right corner of the **Named Boundaries** group.

✓ From the ***Named Boundaries*** dialog, take the following steps:
  o Toggle on the **Show the Create Drawing Dialog** option
  o Select the **Cross Section Group** name from the list
  o Select the **Create cross section drawing** icon.
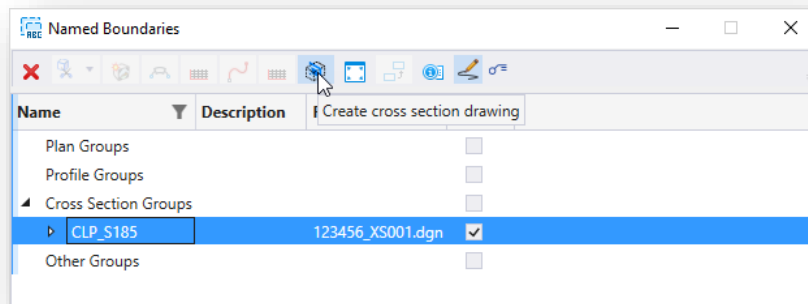
The ***Create Cross Sections*** dialog is opened as shown below.

The settings on this dialog have been preconfigured for ODOT projects.

✓ Select **OK** to initiate the sheet creation process.

A drawing model is created for each named boundary.

The sheets are composed by referencing the drawing models.

Earthwork quantities are annotated on each cross section in the drawing model. If the **End Area Volume Report** is processed again, the quantity values are updated for each named boundary. The value shown in the drawing model is updated when each drawing model is opened. All the drawing models can be updated at once by removing the annotations from all drawing models and the re-annotating all of the drawing models (**Drawing Production > Model Annotation > Remove Model Anntations/Annotate Model**)

Annotation is typically placed in the drawing models, not in the sheet models.
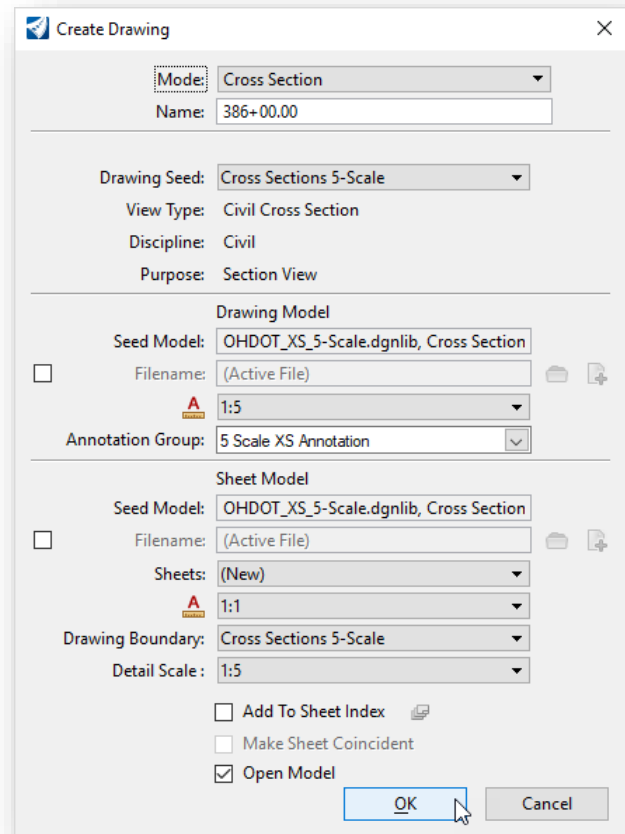
✓ Take some time to review the cross-section model and sheets.

This completes this exercise.

✓ Exit OpenRoads Designer, checking the file back in to ProjectWise

OpenRoads Software Version

This document was prepared using the following software version:

OpenRoads Designer CONNECT Edition – 2019 Release 1 Update 7 – Version 10.07.00.56

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