Setting up the OpenRoads Designer File for Drainage Design.
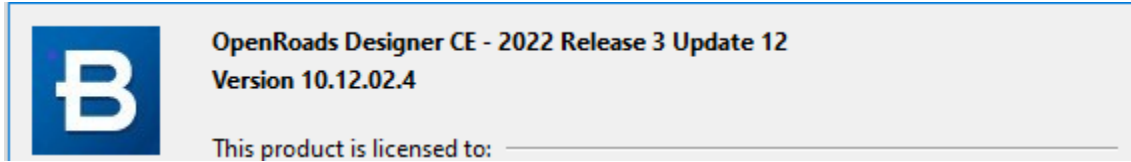
These instructions were created April 2024. These instructions were created with:

OpenRoads Designer CE - 2022 Release 3 Update 12
Version 10.12.02.4

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The first step to a culvert design, is to create the OpenRoads Designer files that will be needed. In ProjectWise, use the Copy Seed tool. Navigate to the correct project directory for the project. In the Bridge folder right click and select Copy Seed command.
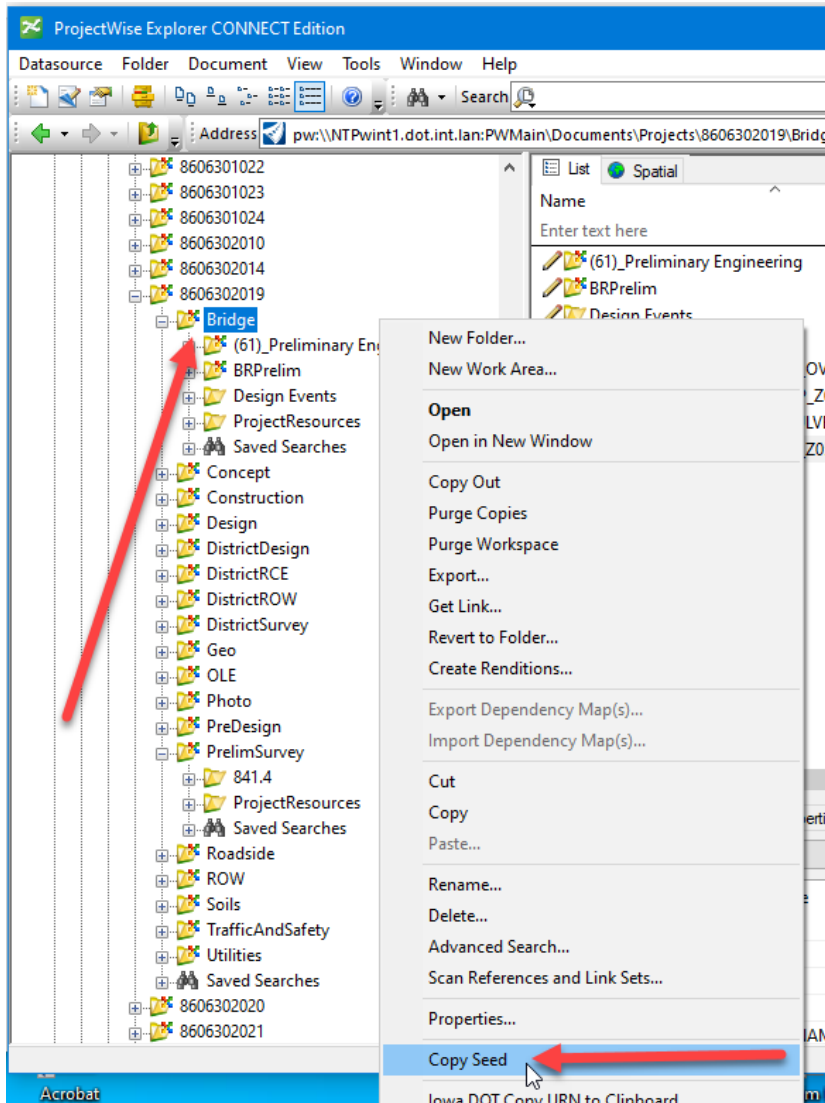
The Copy Seed utility will open.
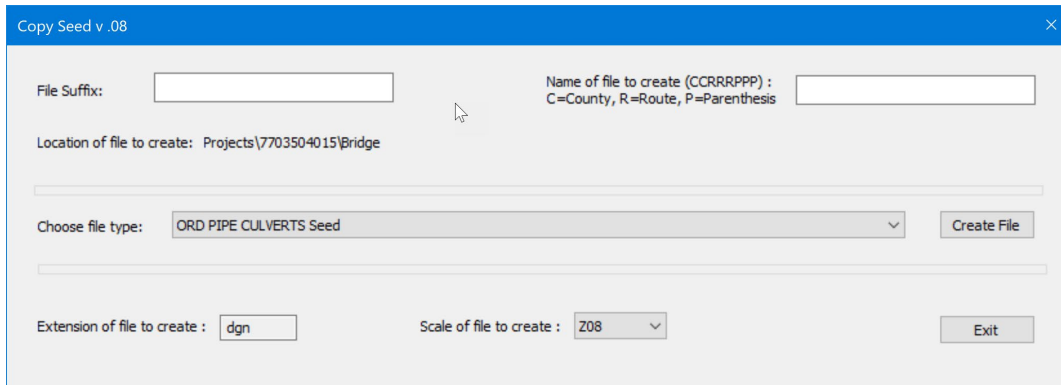
Next, name the file. For culverts, the naming convention for this file is
ORD_CCRRRPPP_DOT_STR_CIP_SPN.

where

> **ORD**=the application the work is done in
> **CC**=County
> **RRR**=Route
> **PPP**=Parenthesis
> **DOT**=company and/or source of the file
> **STR_CIP** =type of work
> **SPN**=coordinate projection of this project

For this example, the file will be ORD_86063060_ DOT_STR_CIP_Z05.dgn. Please refer to the Seed File
document on Iowa Department of Transportation Bridge Connect Documentation page for further
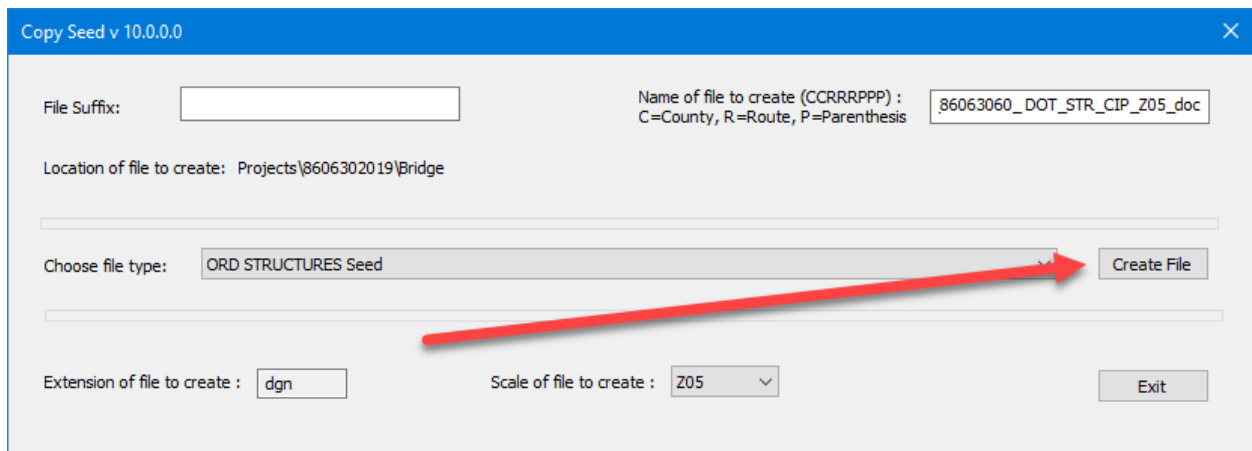instructions on naming the files.

Next select the correct file type. For this work, choose the ORD STRUCTURES Seed.
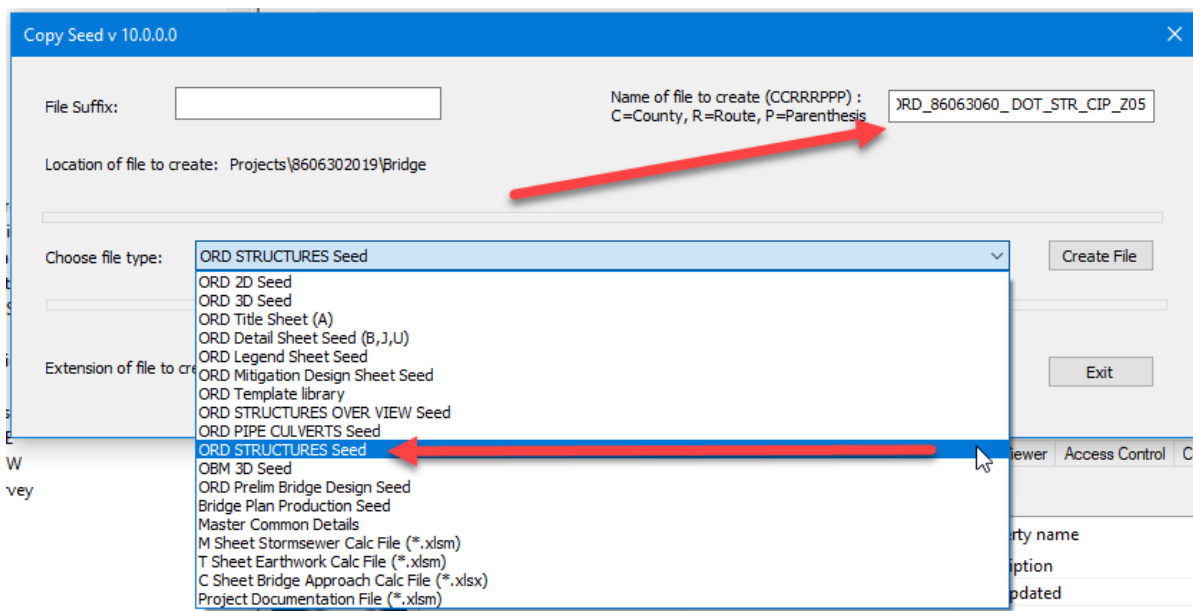
Then select the correct coordinate projection for this file. For this example, select Z05 for IaRCS Zone 05.
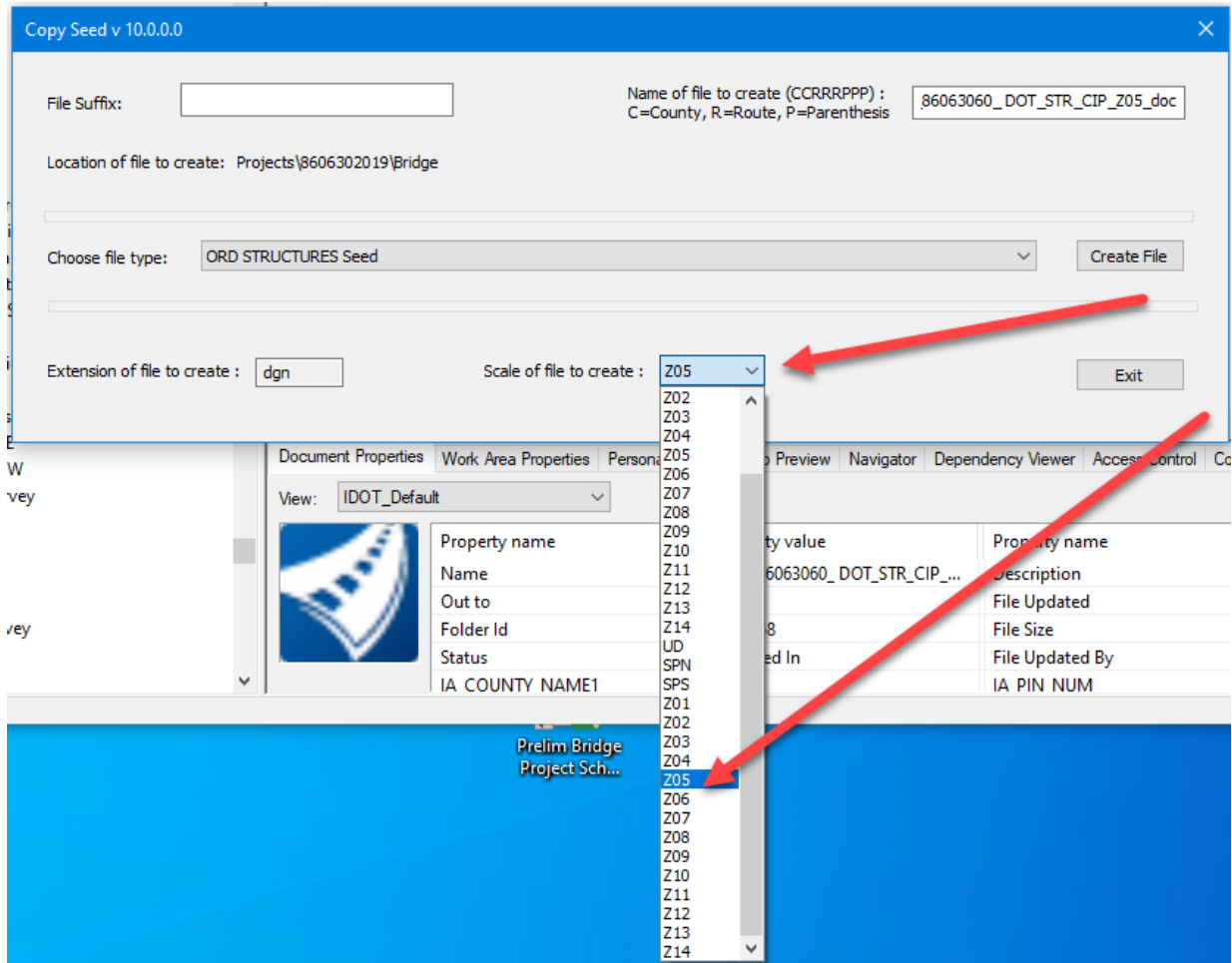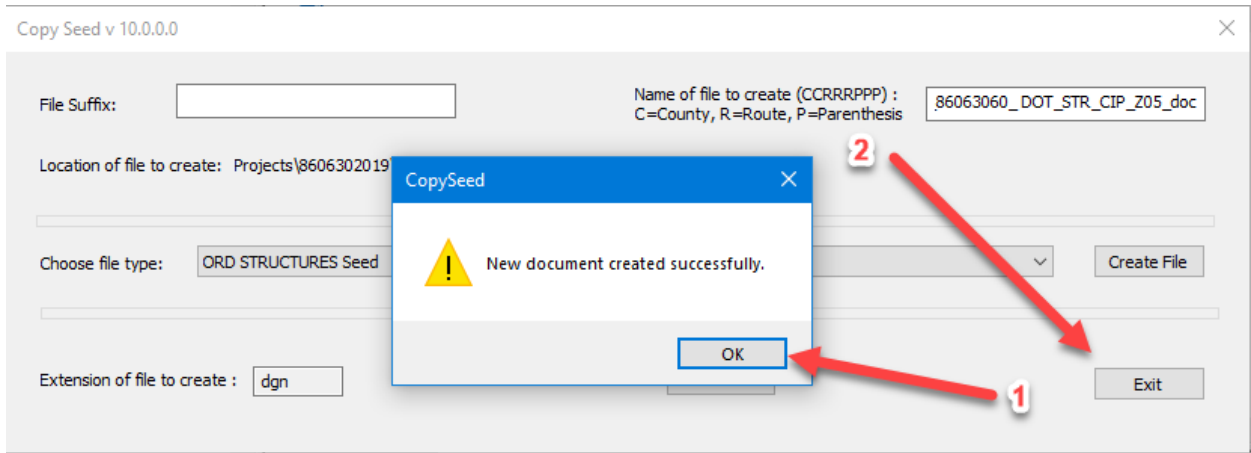

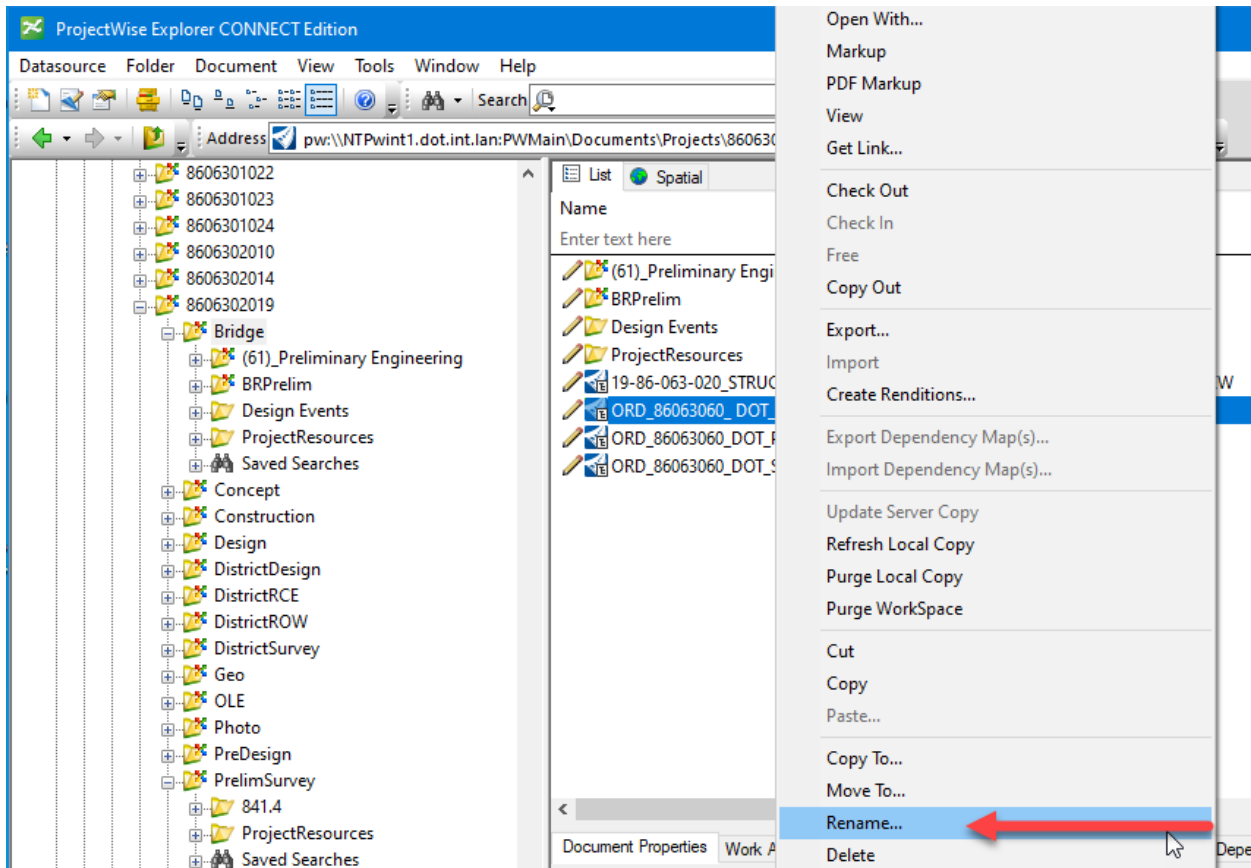Once everything is set, click on the Create File button.

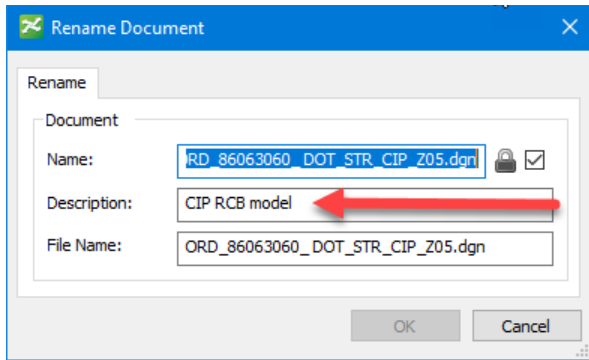This creates the correct dgn file in the project directory.

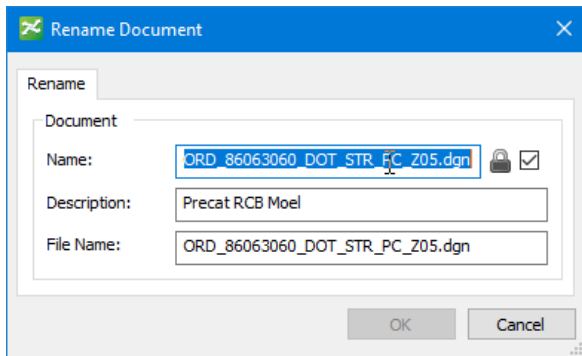A message saying New document created successfully displays.

Then, click on the Exit button to close the Copy Seed tool.

Once the file is created, select the file and right click to rename and add the Description. For this file it will be CIP RCB model.
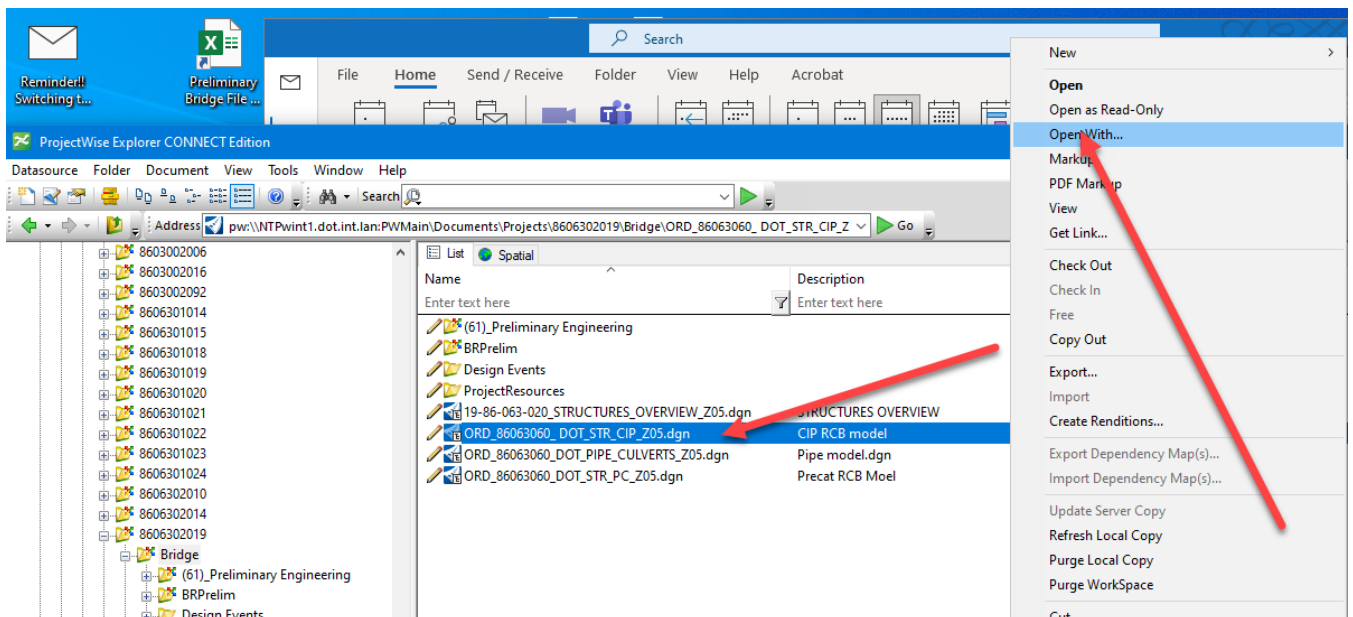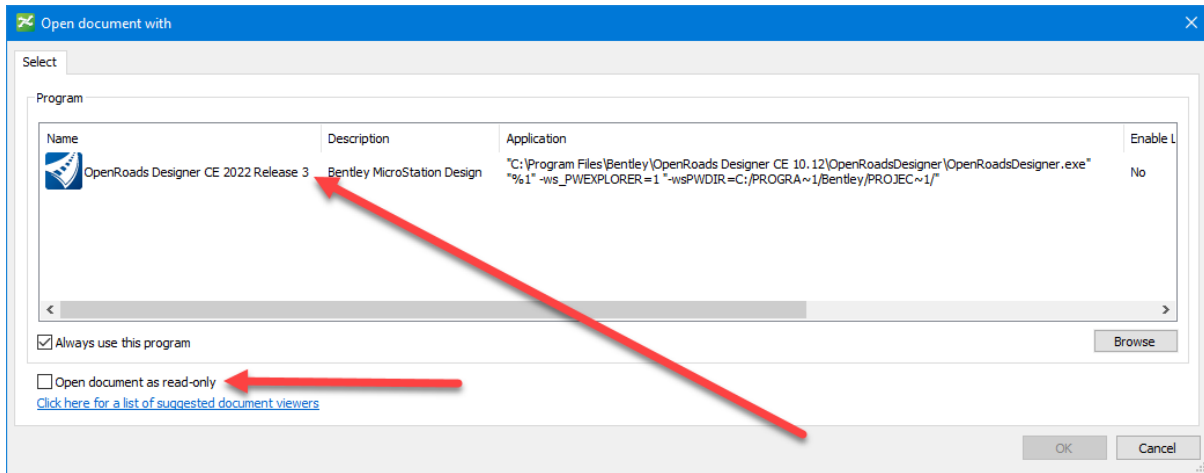
Next, make a copy of the file just created and rename it to make it the precast file.

Once the file is created, open it in the project directory. To do this, select the file, then right click and select Open with …
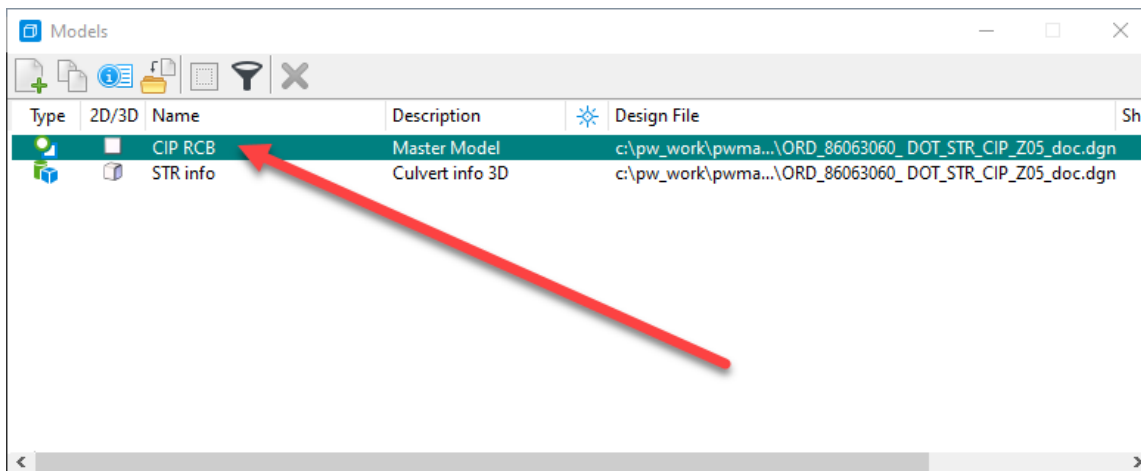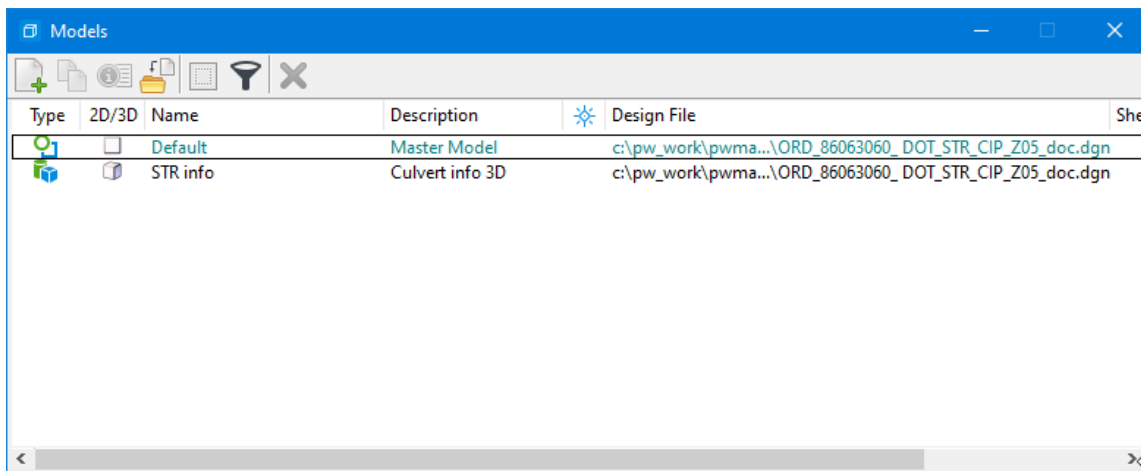
Select the OpenRoads Designer CONNECT Edition program. Then click on OK.

With the file open, rename the Default model to CIP RCB for the ORD_CCRRRPPP_DOT_STR_CIP_SPN file and rename the Default model to PC RCB for the ORD_CCRRRPPP_DOT_STR_PC_SPN file.

For more information on the model naming refer to https://iowadot.gov/bridge/tools/CONNECT%20Models.pdf

Next, set the file up to use the muti-model workflow. Use the existing ground TRN file to create the 3D managed model. Reference in the existing ground TRN file to the now renamed CIP RCB model in the file that was just created.

In ORD when 3D information is leveraged in a 2D file it will automatically create the 3D managed model.
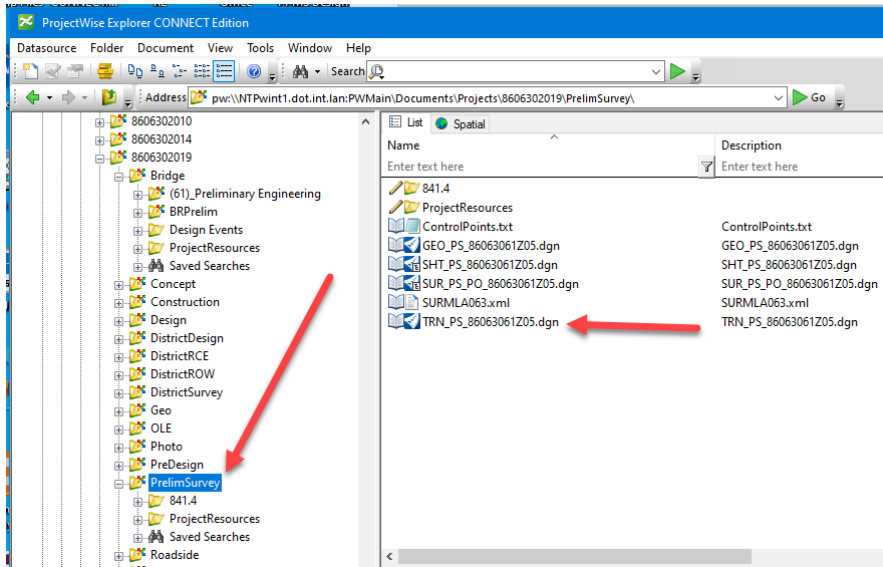
Reference in the TRN file from the survey or Photo location. For this example, it is in the Photo folder and is called TRN_EX_86063061Z05.dgn.
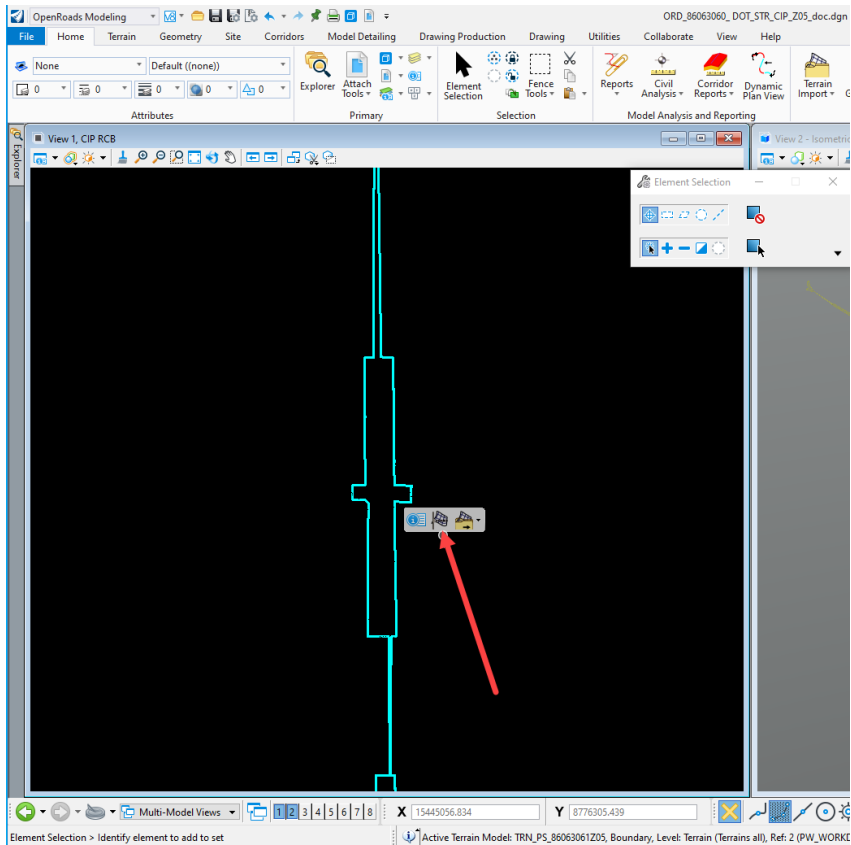
The content of the file should look like this:
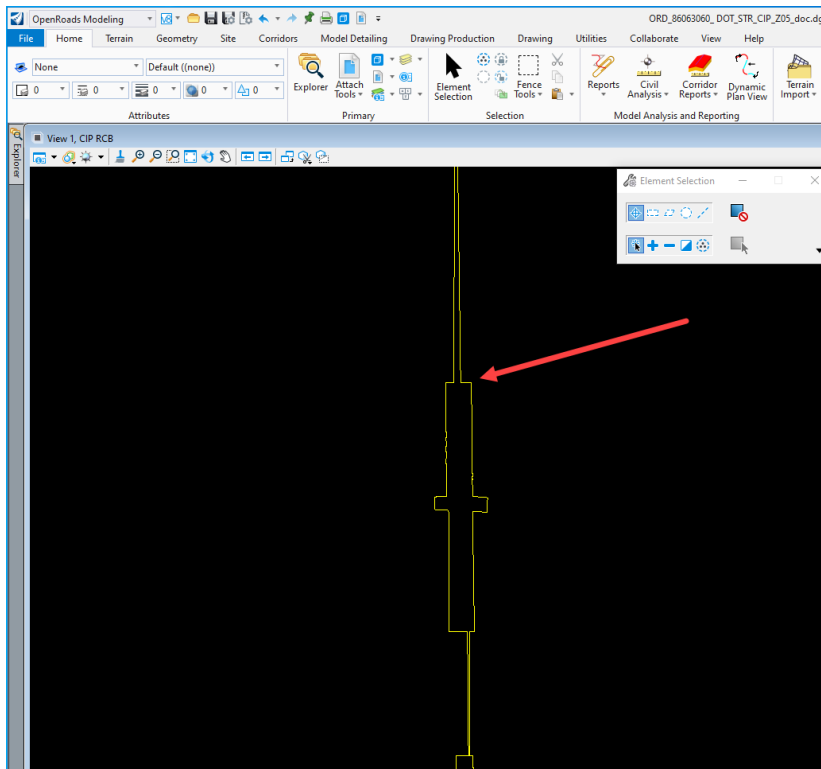
Next, using the Element Selection tool select the boundary of the TRN file.

It should turn blue. Then hover over it to activate the heads-up toolbox.
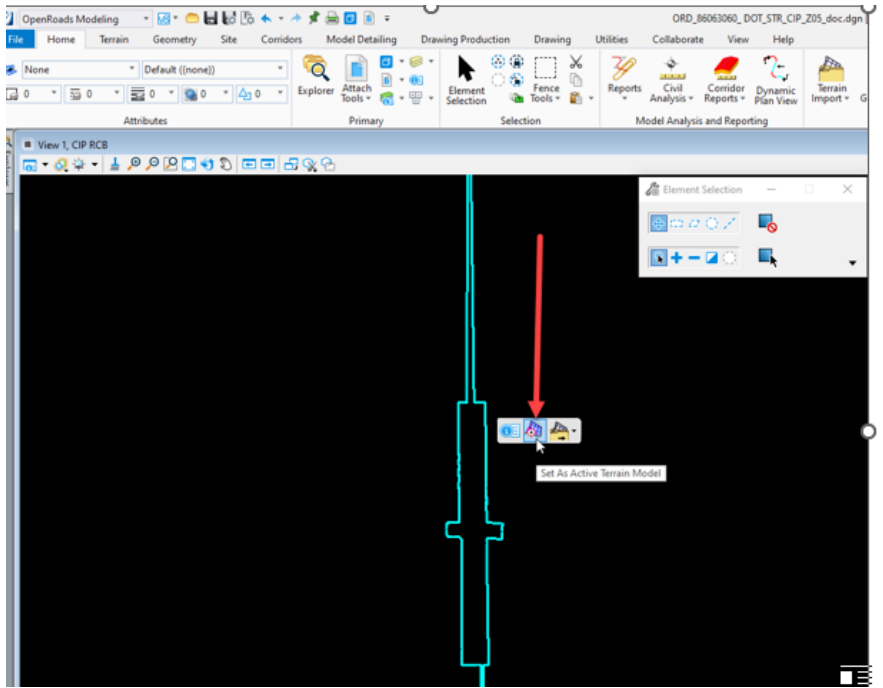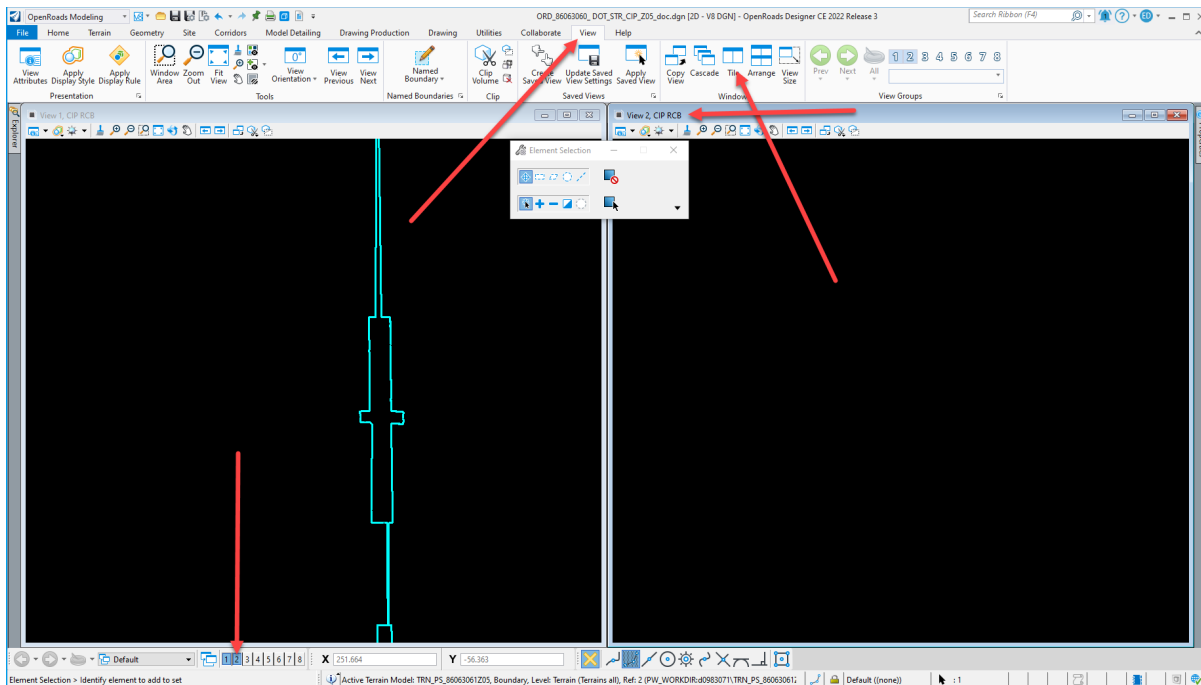

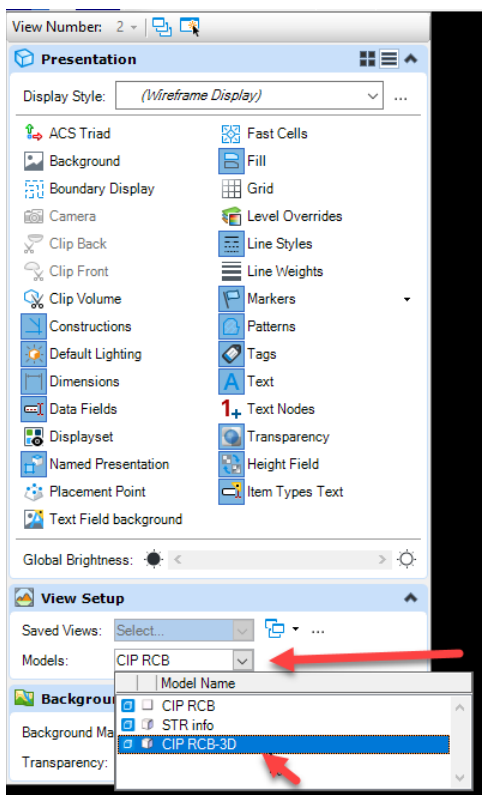Select the middle tool, Set As Active Terrain Model. Once selected it will change the icon.

Next, set up multi-model view to be able to use the muti-model workflow.

Next, open a second view window. Then select the Tile windows tool in the Window ribbon.

Open the View Attributes tool in view 2. Select the CIP RCB-3D model in the View Setup section of the View Attributes tool.

Note: It is preferred to change the Display Style in this view to Transparent Modeling to make it obvious when working in 2D or 3D.

The content of the file should look like this.
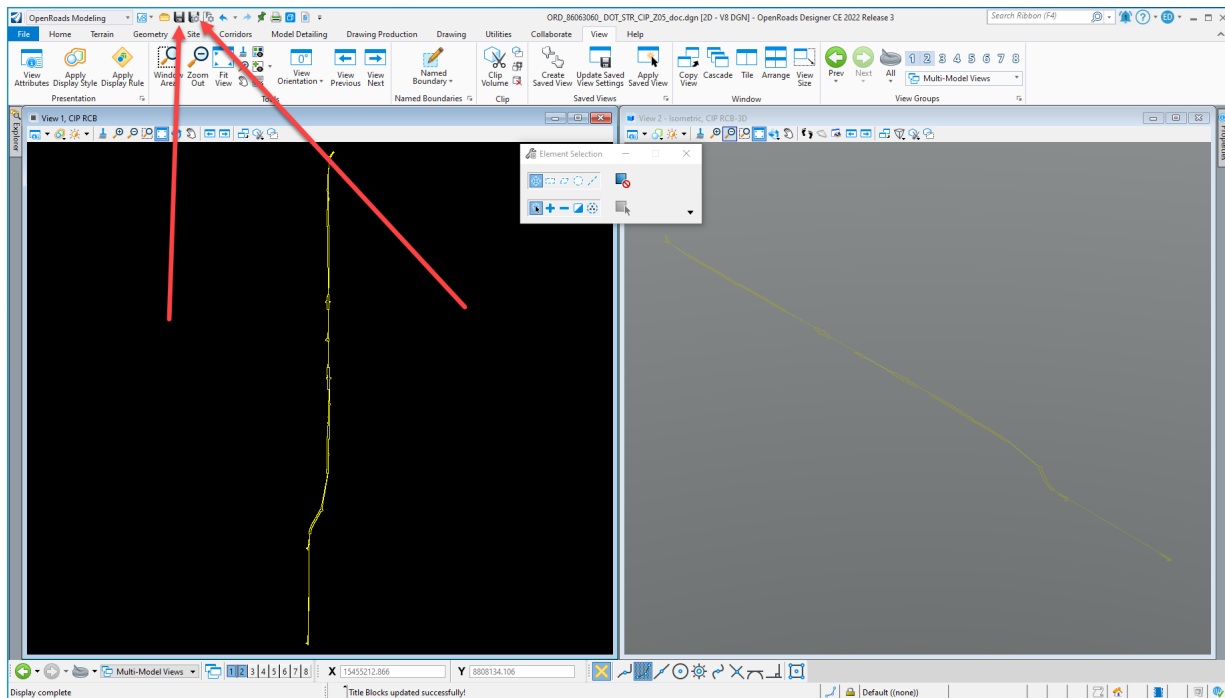
Save the file and save the settings so that the next time the file is opened it will be set to these view settings.

Next, close the file just created and check it into ProjectWise.

Open the precast file ORD_CCRRRPPP_DOT_STR_PC_SPN and repeat the same steps to this file.

Once the precast model file is set up, copy the ORD_CCRRRPPP_DOT_STR_CIP_SPN file and the ORD_CCRRRPPP_DOT_STR_PC_SPN file to the (Paren)_Work Description folder then rename the files for the designs that are needed.

Files should be like this:

SHT_CCRRRPPP_DS#_001425_CIP_SPN.dgn with a description = Twin 10x10 RCB Culvert Design #

SHT_CCRRRPPP_ DS#_001425_PC_SPN.dgn with a description = Twin 10x10 RCB Culvert Design #

Keep in mind, if the precast is an option; then two SHT files are needed for each location, one for CIP and one for precast. Each location will have a design number along with a FHWA number or Asset ID number. Please refer to the Seed File document on Iowa Department of Transportation Bridge Connect Documentation page for further instructions on naming the files.

For this example, there are two locations that will need to have new designs created for new RCB culverts:
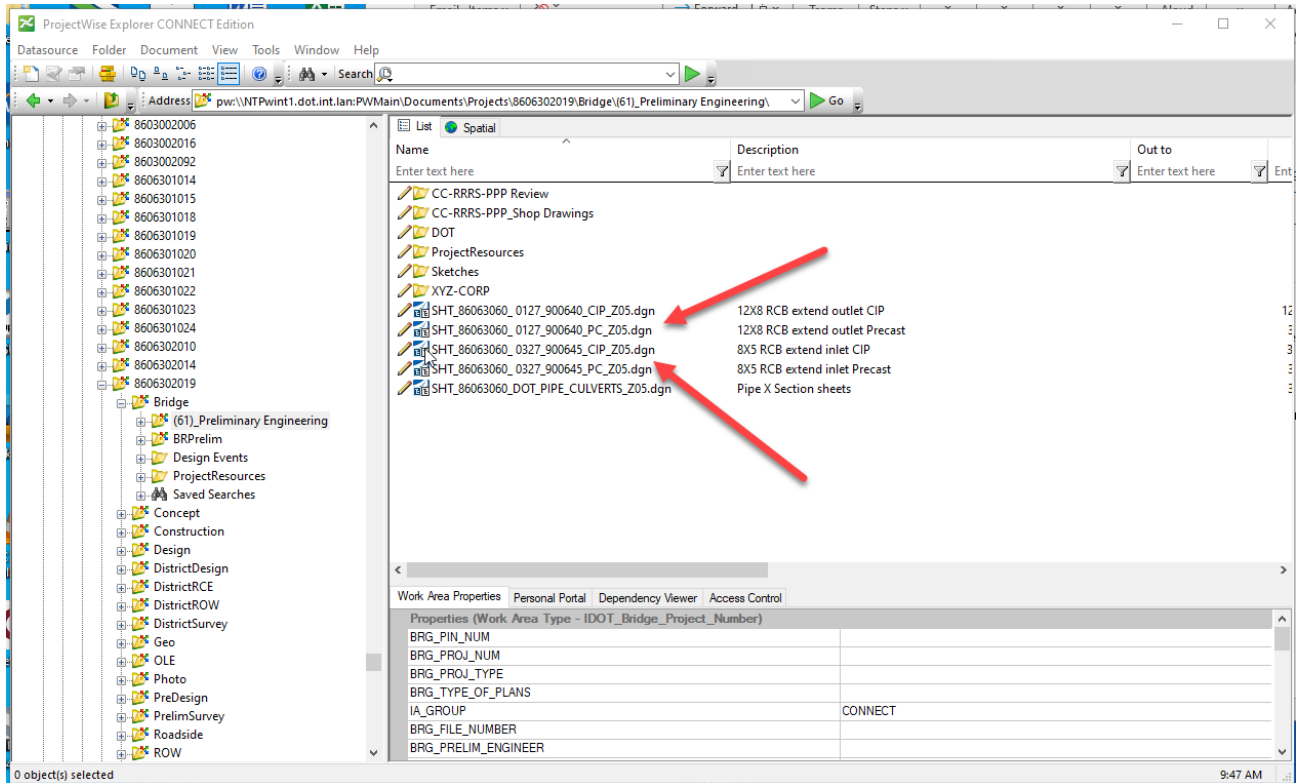
Next, open each of the SHT files. Then, detach the TRN file reference.
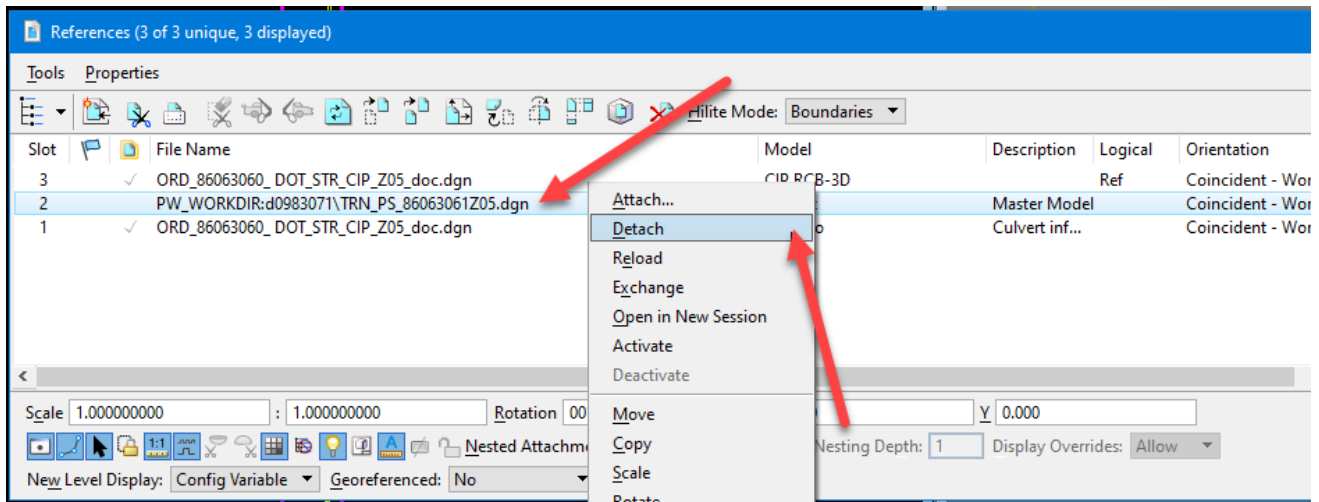

Then attach the correct model file from under the bridge folder using live Nesting Depth of 2. Do this for each sheet file.

For the CIP sheets, attach ORD_CCRRRPPP_DOT_STR_CIP_Z01.dgn
For the precast sheets, attach ORD_CCRRRPPP_DOT_STR_PC_Z01.dgn

Save settings and exit the file.

In the Bridge folder and open the ORD_CCRRRPPP_DOT_STR_CIP_Z01.dgn. Attach the survey file that contains the existing 3D culvert and surrounding topo features that will be needed to do an effective design.
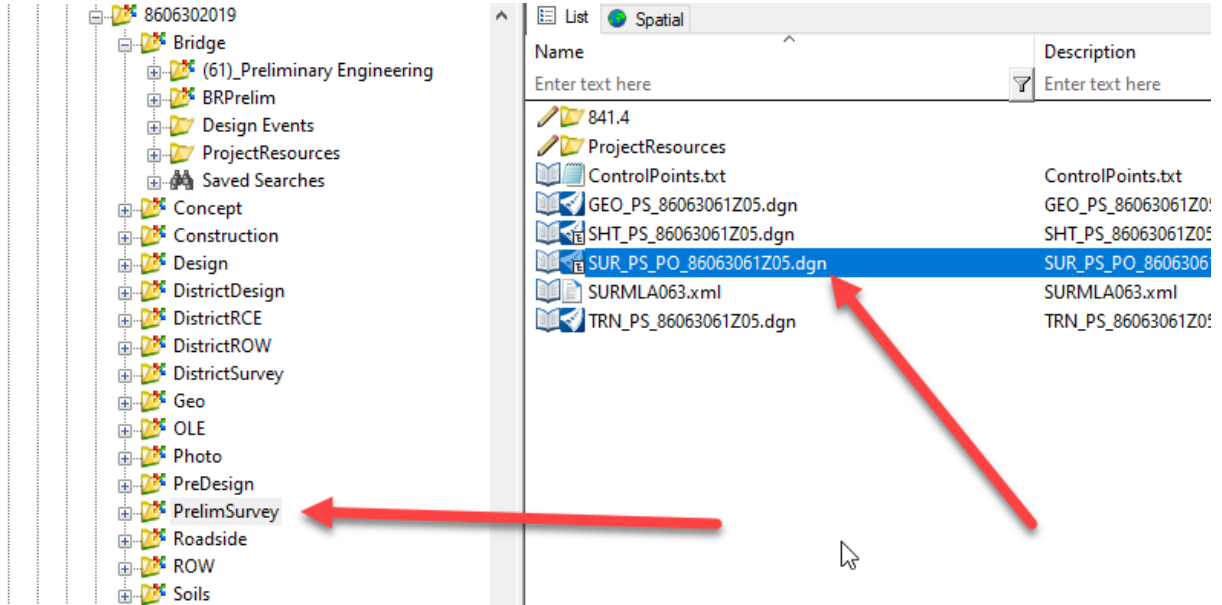
Next reference in the Design alignment that has an active profile. This file should be located in the Design or the District Design folder (depending what group is doing the road design portion of this project).
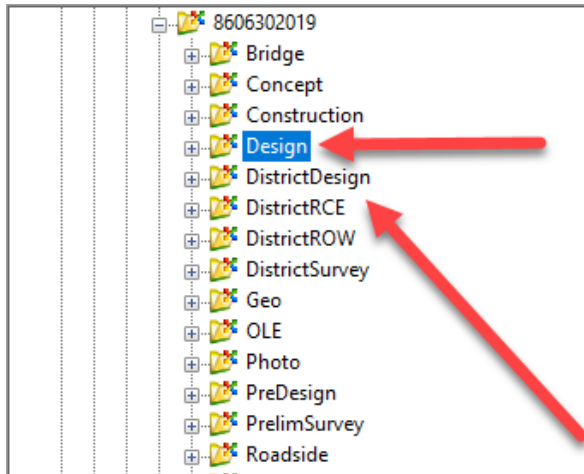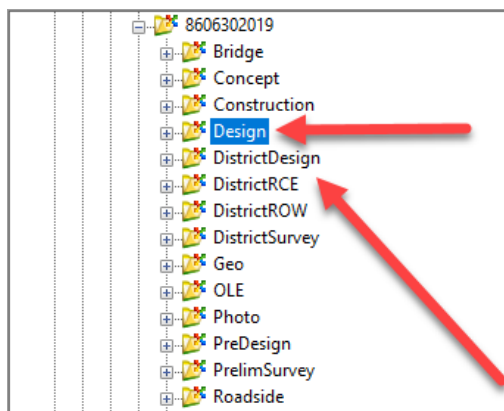
For this example, it is being done by the Design group. So, the alignment is under the CADD_Files\Geometry\ folder. Select the GEO Alignment file that is named GEO_CCRRRPPPZZZ.dgn.
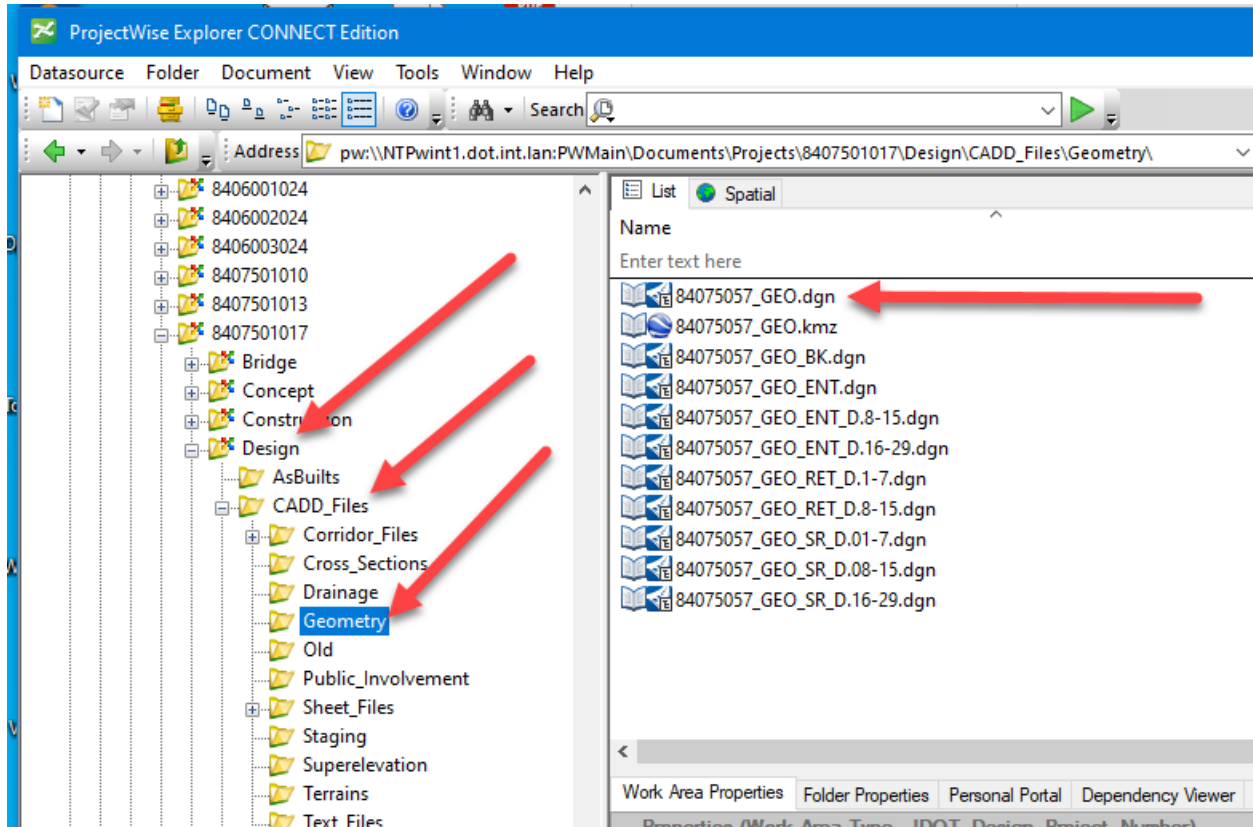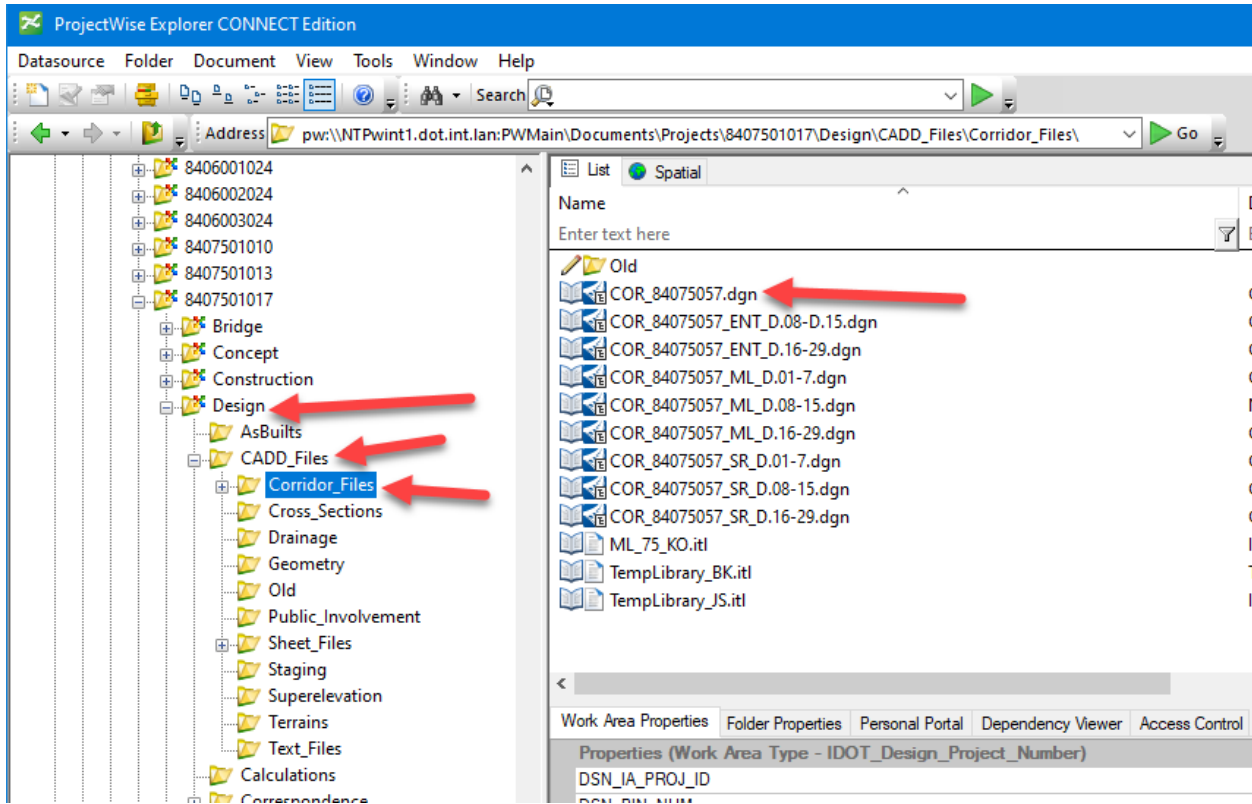

This is the container GEO file that will contain all the Alignments for this project. Attach it using the orientation of Coincident World. Turn on the live nesting and set its depth to 1.

Next, reference the proposed corridor container file. This file should be in the Design or the District Design folder depending on what group is doing the road design portion of this project.

For this example, it is being done by the Design group. So the corridor file is under the CADD_Files\ Corridor_Files\folder. Select the COR Corridor file that is named COR_CCRRRPPPZZZ.dgn.
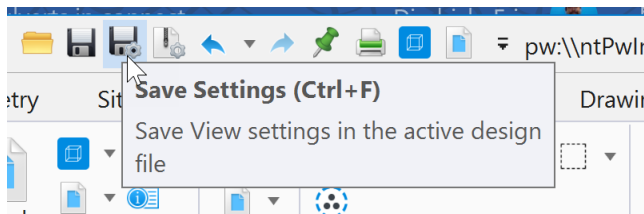

This is the container COR file that will contain all the Corridor for this project. Attach it using the orientation of Coincident World. Turn on the live nesting and set its depth to 1.
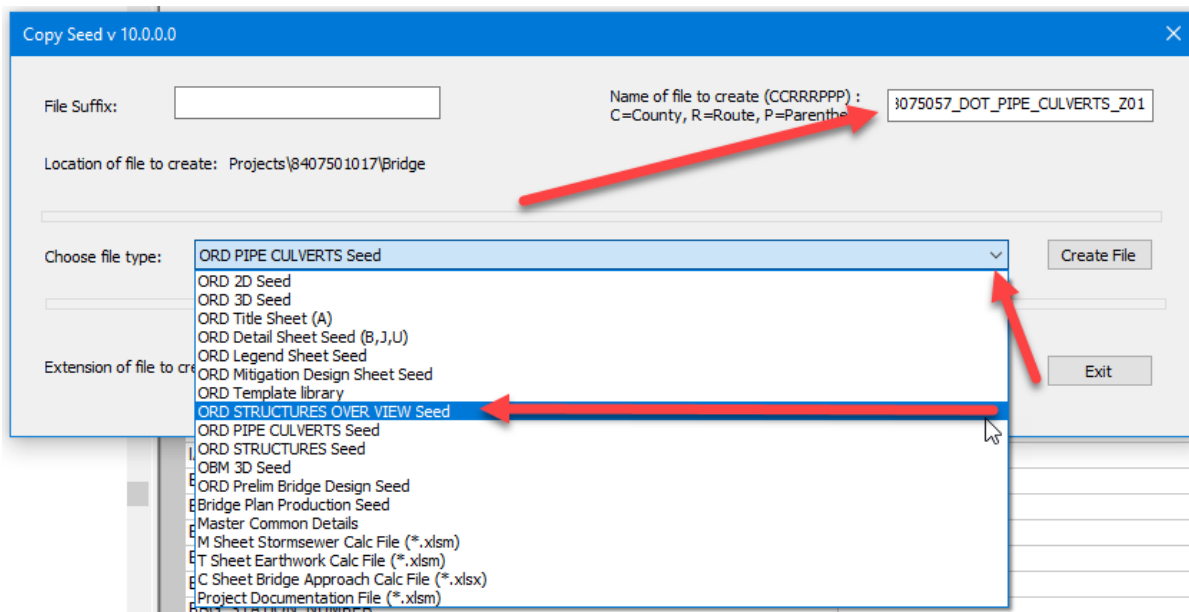
The file contents should look something like this:
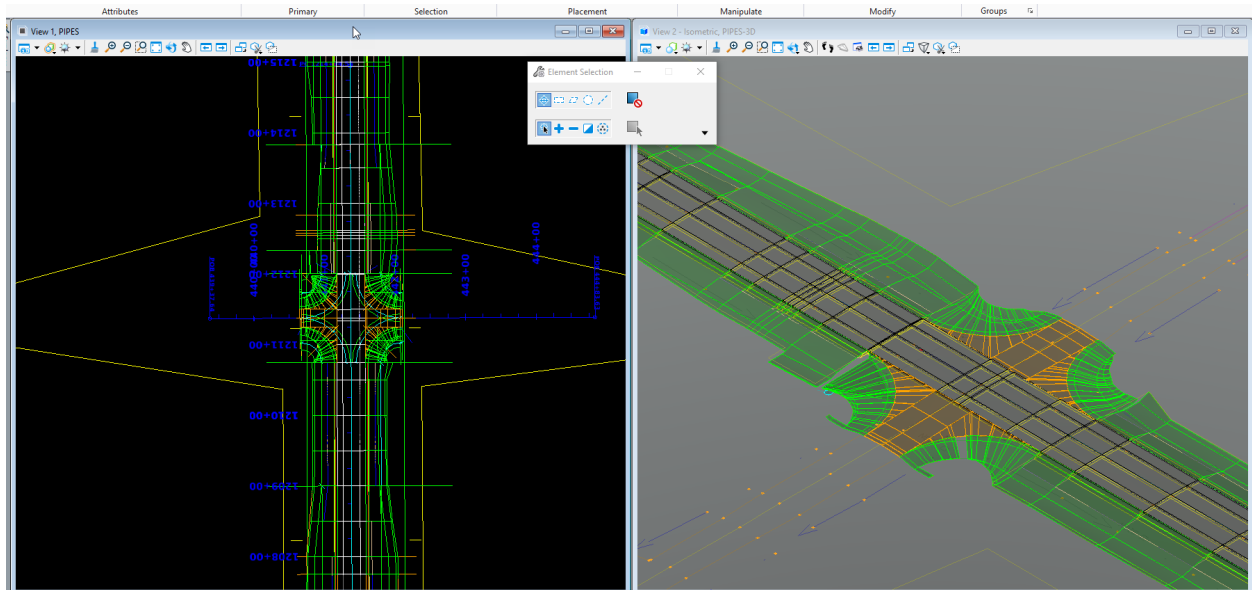
Next, click Save Settings.

The last step to setting up the CADD files for culvert design is to make sure the CIP RCB-3D and the PC RCB-3D models are referenced into the Structures Overview file. If there is not a Structures Overview file in the project directory, create it with the Copy Seed tool.

The Structures Overview file will only contain the 3D information from the model files under the Bridge folder. Make sure only the 3D model is referenced from the ORD_CCRRRPPP_DOT_STR_CIP_Z01.dgn and the ORD_CCRRRPPP_DOT_STR_PC_Z01.dgn into the overview file.

Other designers will be referencing this file nested and don't need to be pulling in any information, but the models that were just created. Make sure all references to the overview file are not nested.

Now that the file is set up, start designing and calculating the culvert inverts from the project information.
CW02 Laying out Culverts in Connect