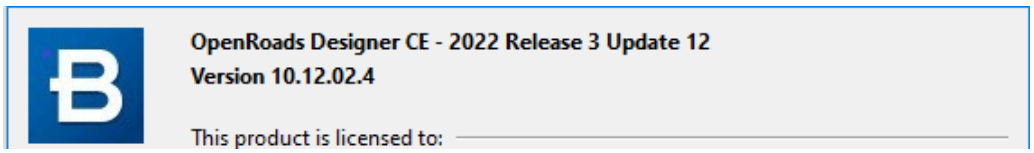
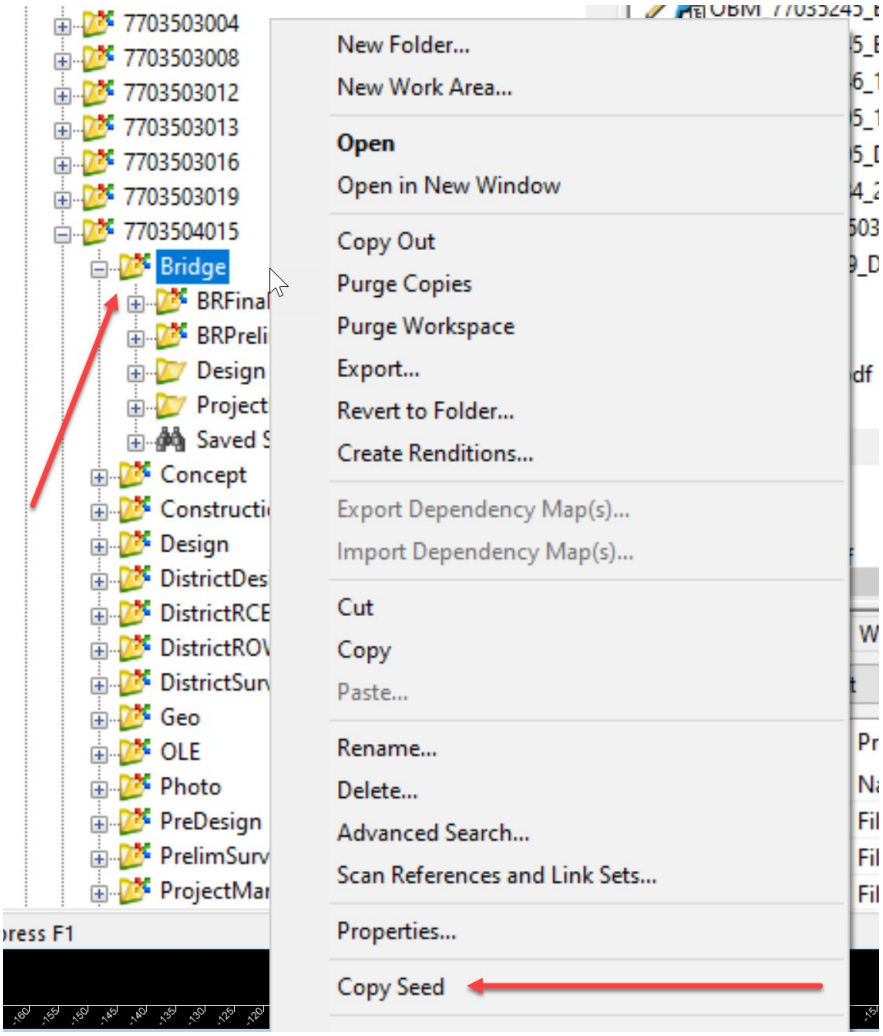
Setting up the OpenRoads Designer File for Pipe Design

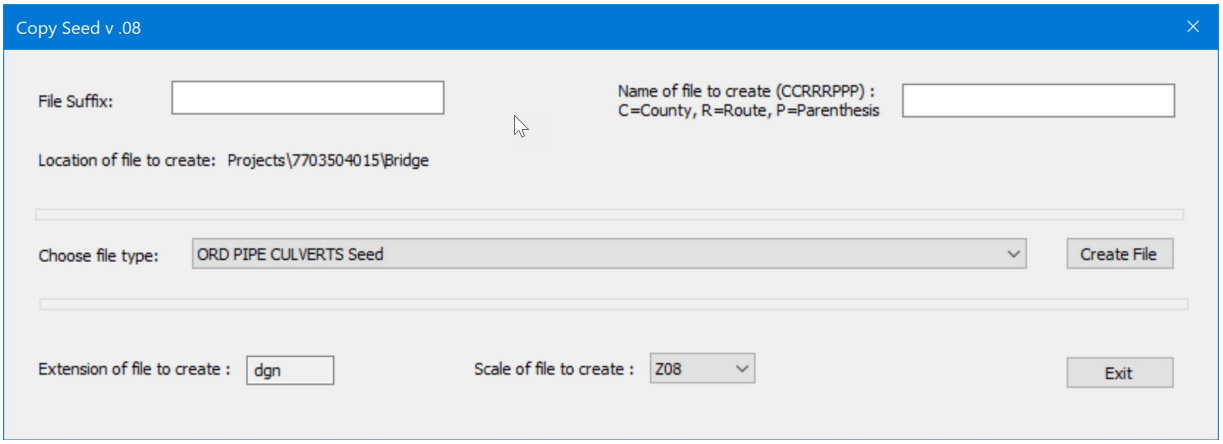
These instructions were created February 2024. These instructions were created with:



The first step to a pipe design, is to create the OpenRoads Designer files that are needed. In ProjectWise, use the Copy Seed tool. Navigate to the correct project directory for the project. In the Bridge folder right click on the folder and select the Copy Seed command.



The Copy Seed utility will open.



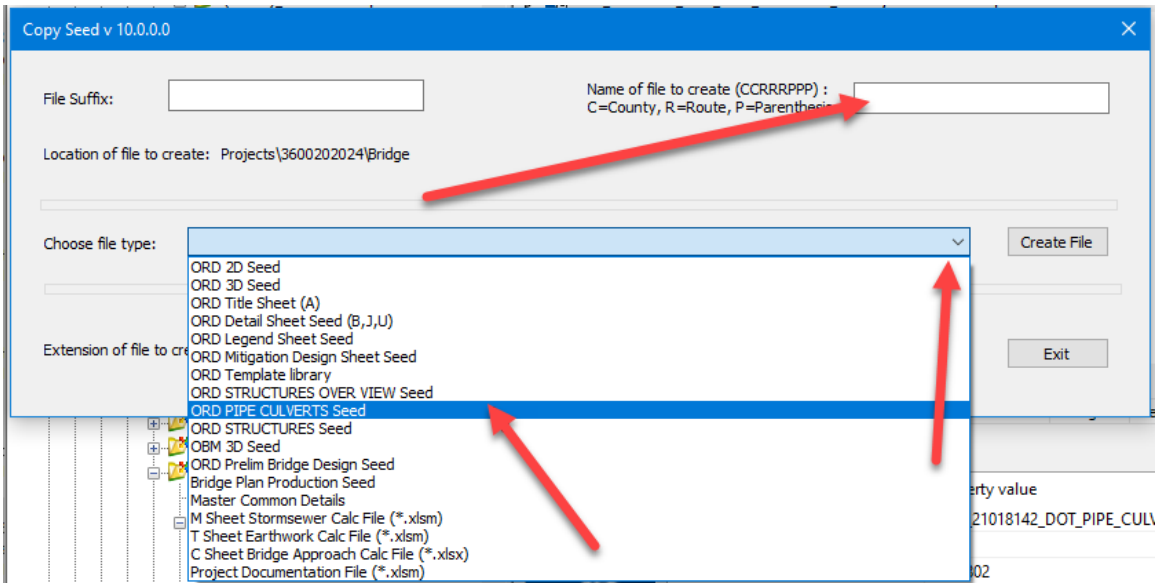
Next, name the file. For pipes, the naming convention for the file is ORD_CCRRRPPP_DOT_PIPE_CULVERTS_SPN

where

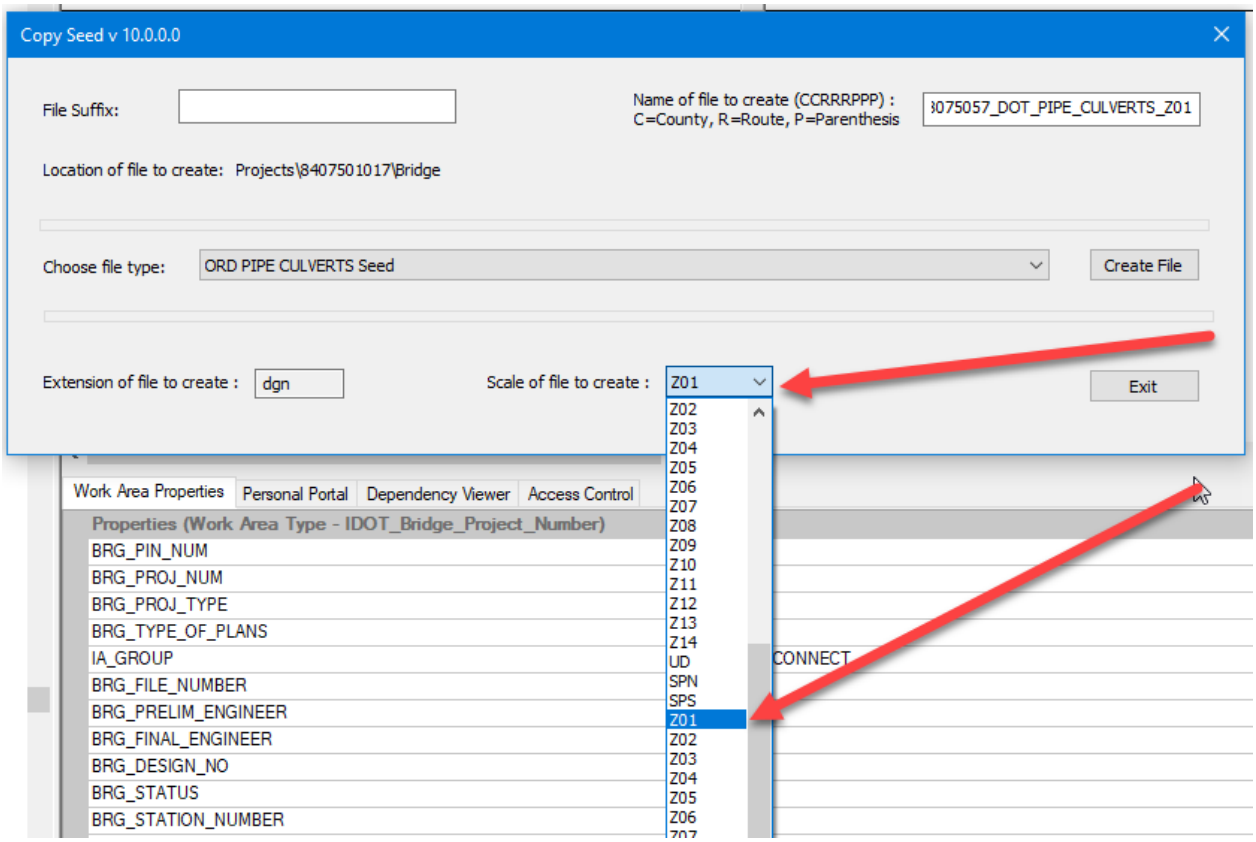
ORD = the application the work is done in
CC = County
RRR = Route
PPP = Parenthesis
DOT = company and or source of the file
PIPE_CULVERTS = type of work
SPN = coordinate projection of this project.

For this example, the file will be ORD_8075057_DOT_PIPE_CULVERTS_Z01.dgn. Please refer to the Seed File document on Iowa Department of Transportation Bridge Connect Documentation page for further instructions on naming the files.

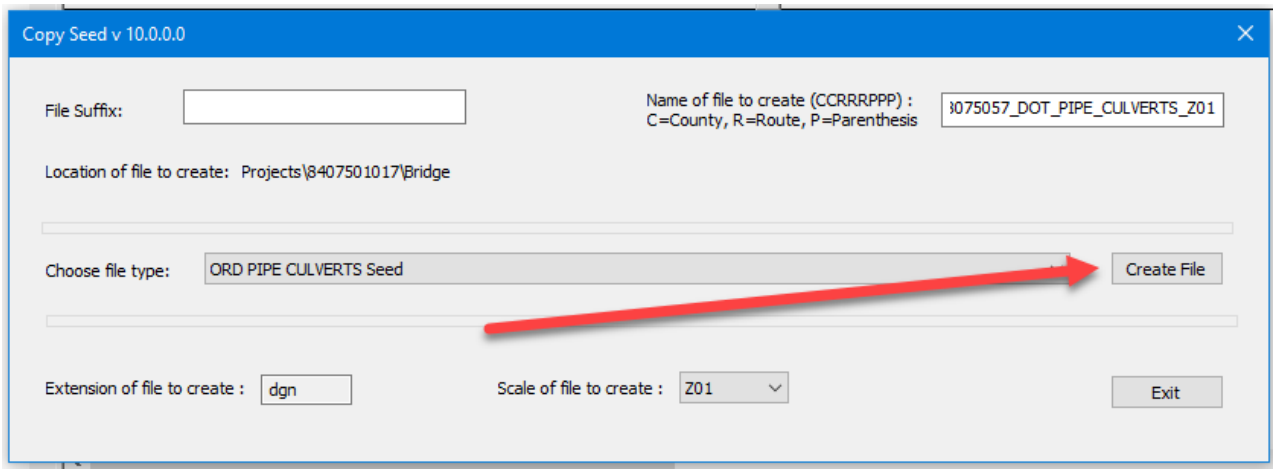
Next select the correct file type. For this work, choose the ORD PIPE CULVERTS Seed.



Then select the correct coordinate projection for the file. For this example, select Z08 for IaRCS Zone 08.

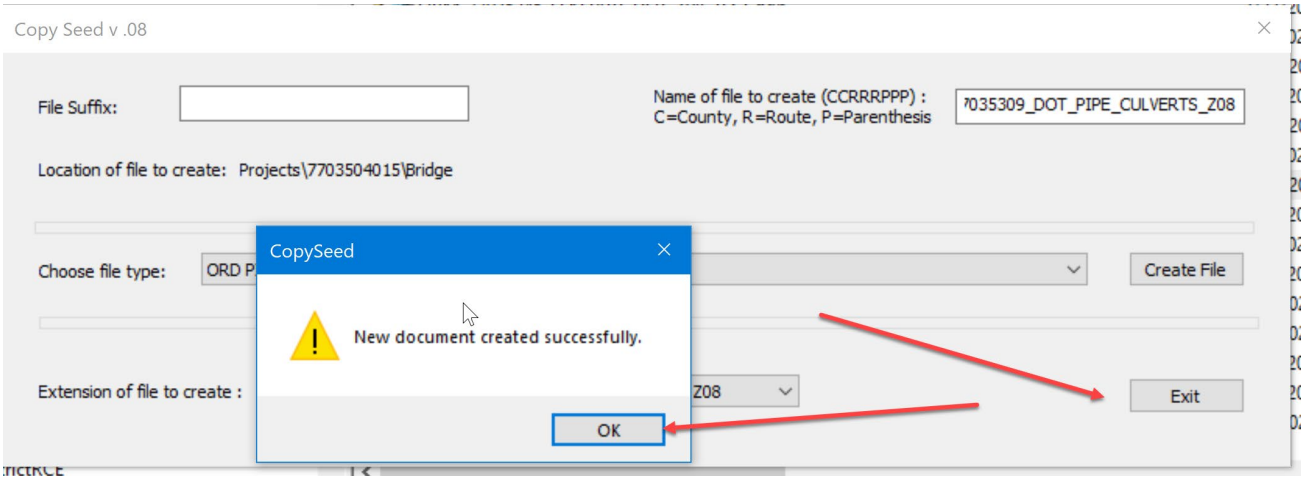


Once everything is set, click on the Create File button.



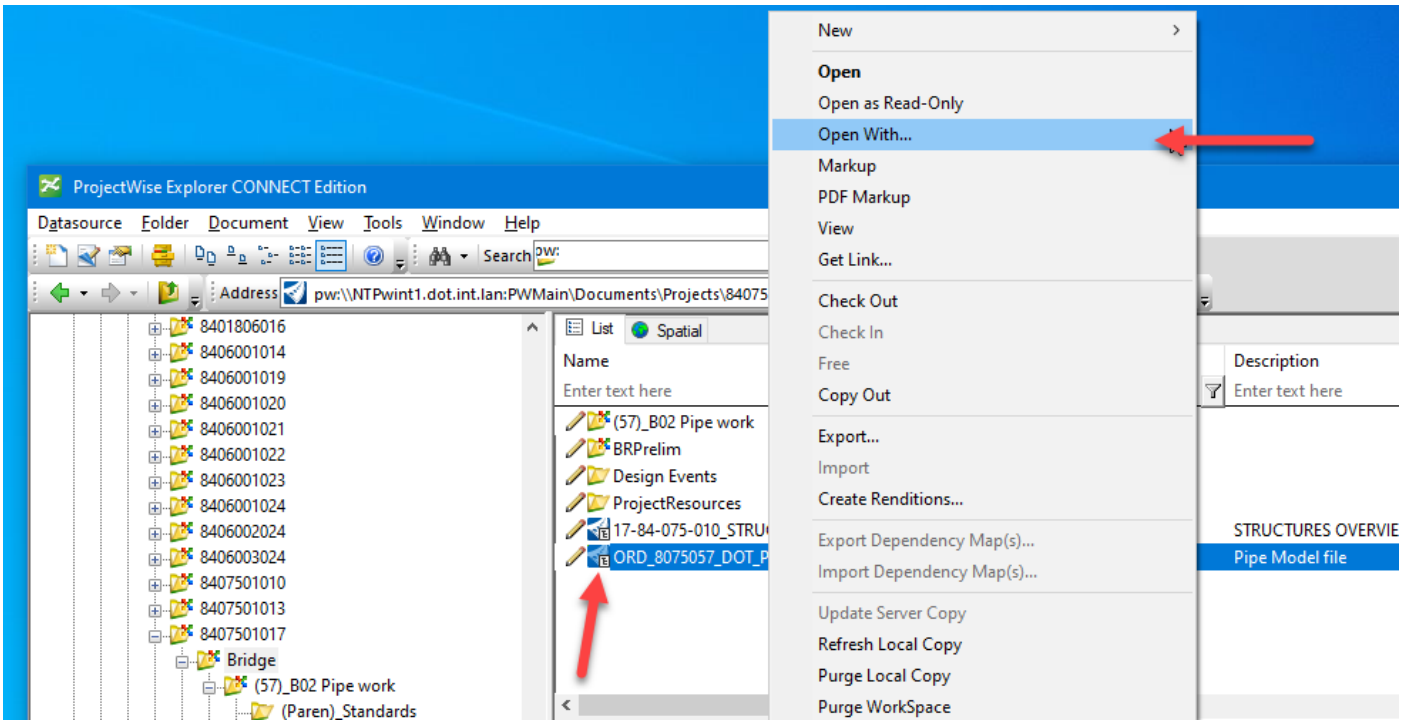
This creates the correct dgn file in the project directory.

A message saying New document created successfully displays. Click OK button on the message.

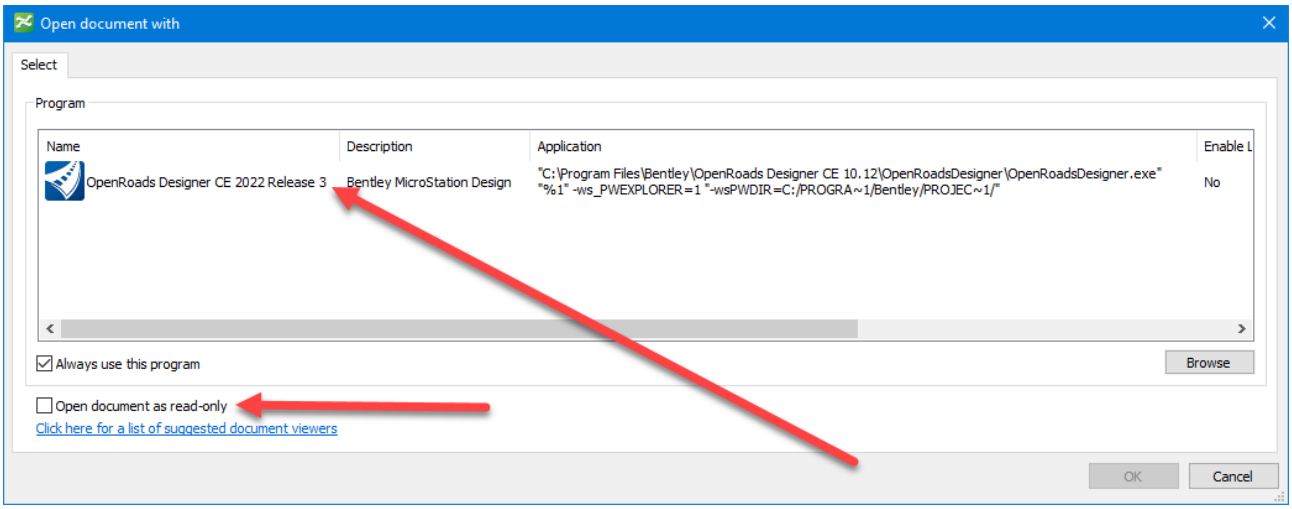


Then, click on the Exit button to close the Copy Seed tool.

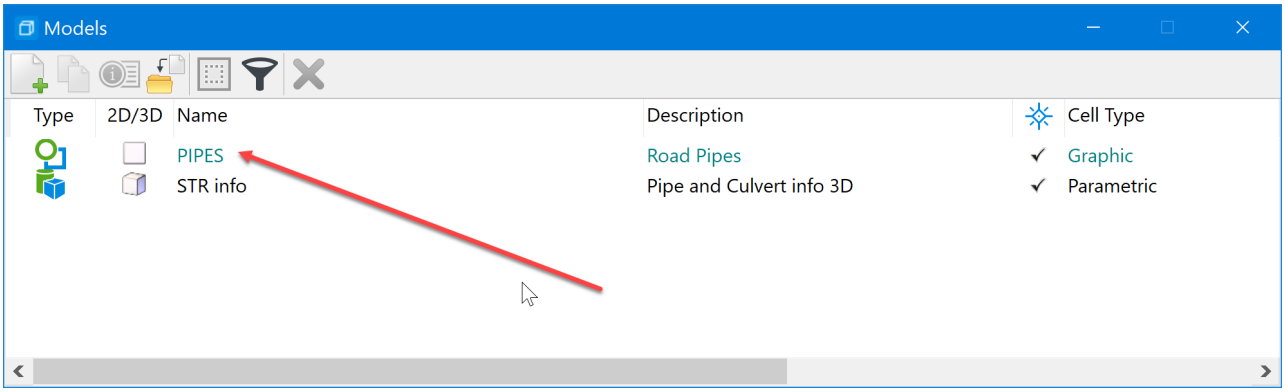
Once the file is created, open it in the project directory. To do this, select the file, then right click and select Open with…



Select the OpenRoads Designer CONNECT Edition program. Then click on OK.



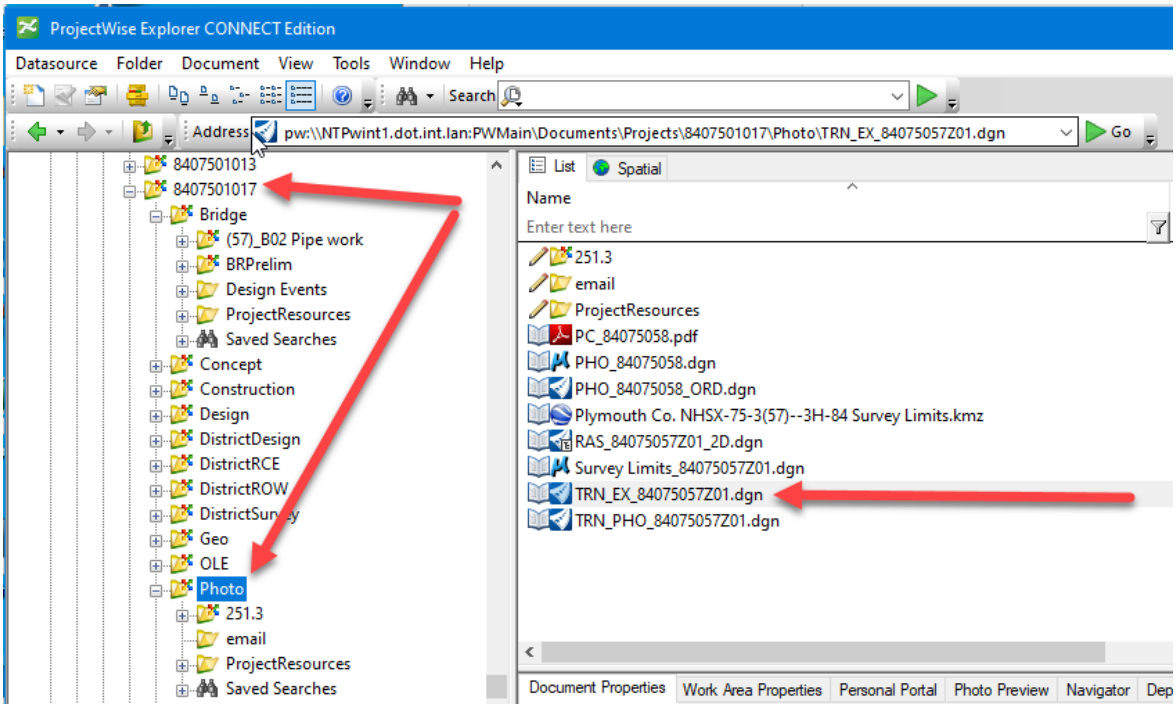
Now that the file is open, set the file up to allow the use of the muti-model workflow and make a 3D cut of the proposed corridor.



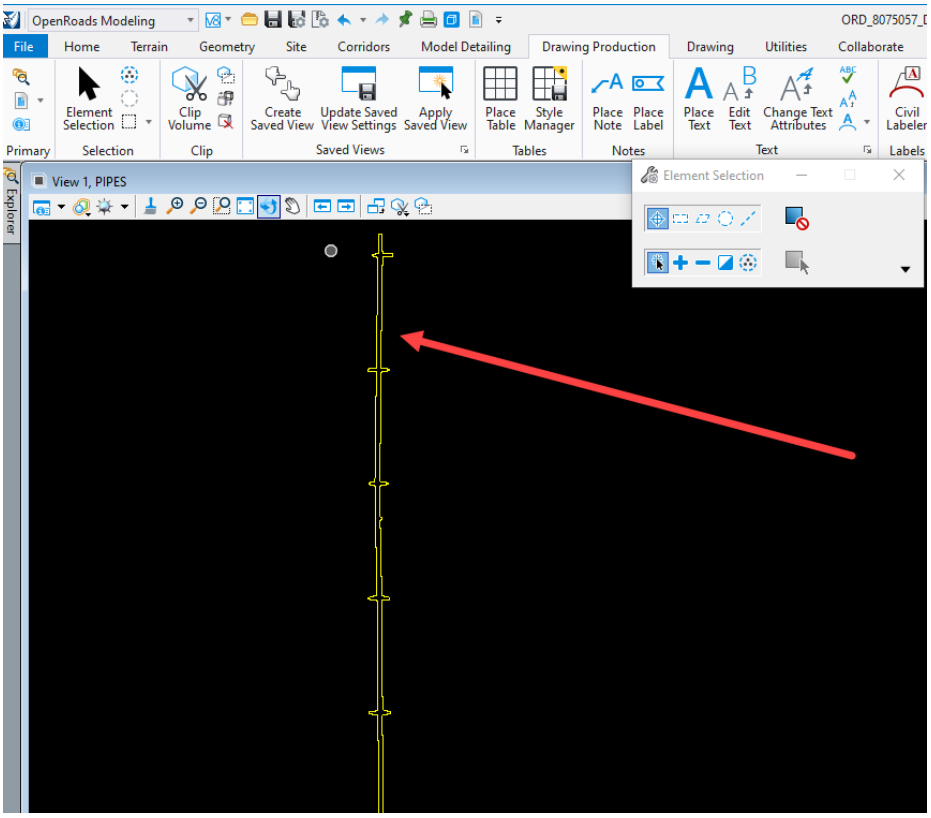
Next, use the existing ground TRN file to create the 3D managed model. Reference in the existing ground TRN file to the PIPES 2D model in the file that was just created.

In ORD when 3D information is leveraged in a 2D file it will automatically create the 3D managed model.

For this example, 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_84075057Z01.dgn.

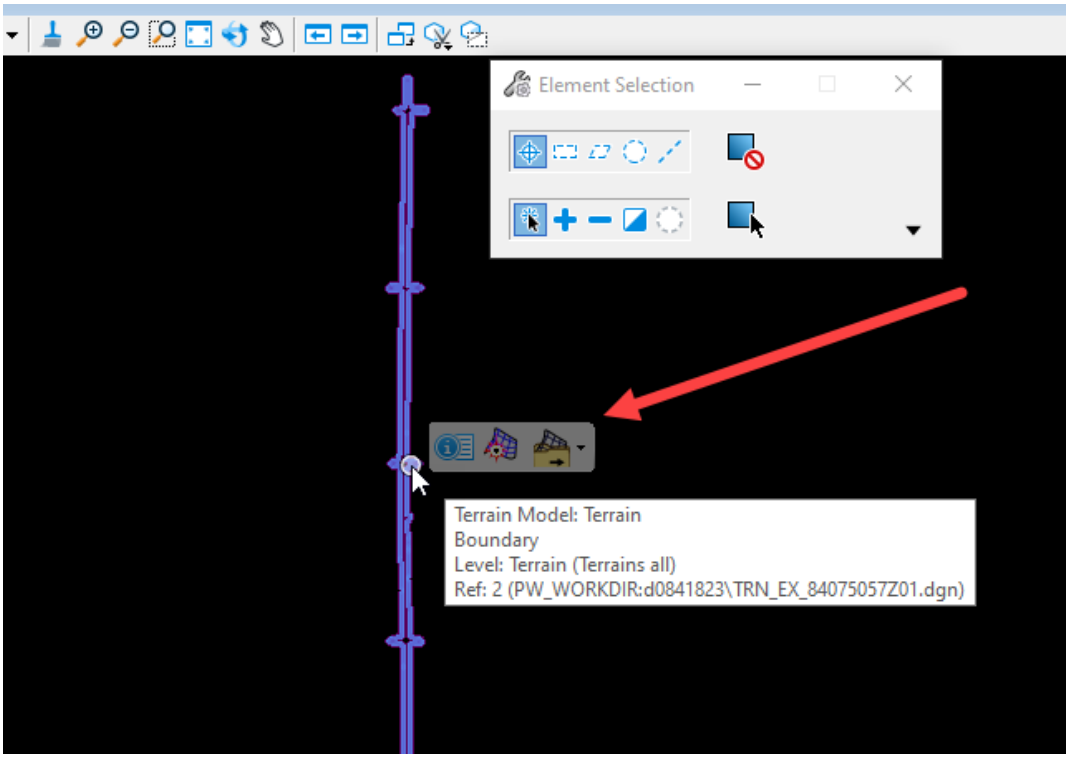


The content of the file should look like this:

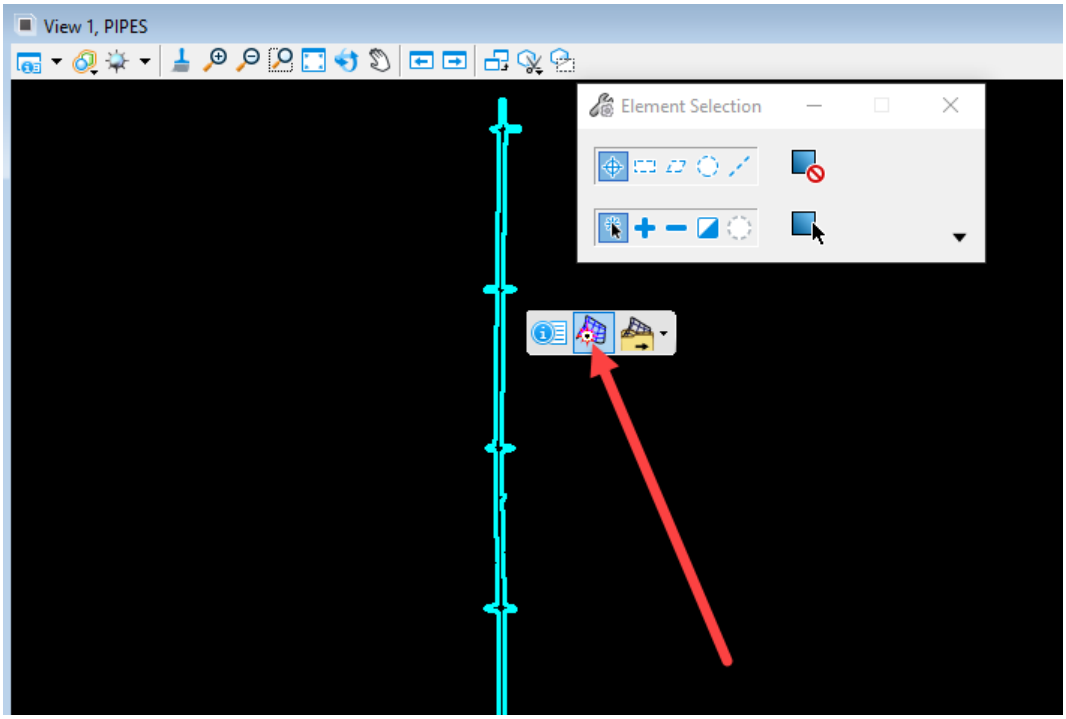


Next, using the Element Selection tool select the boundary of the TRN file.

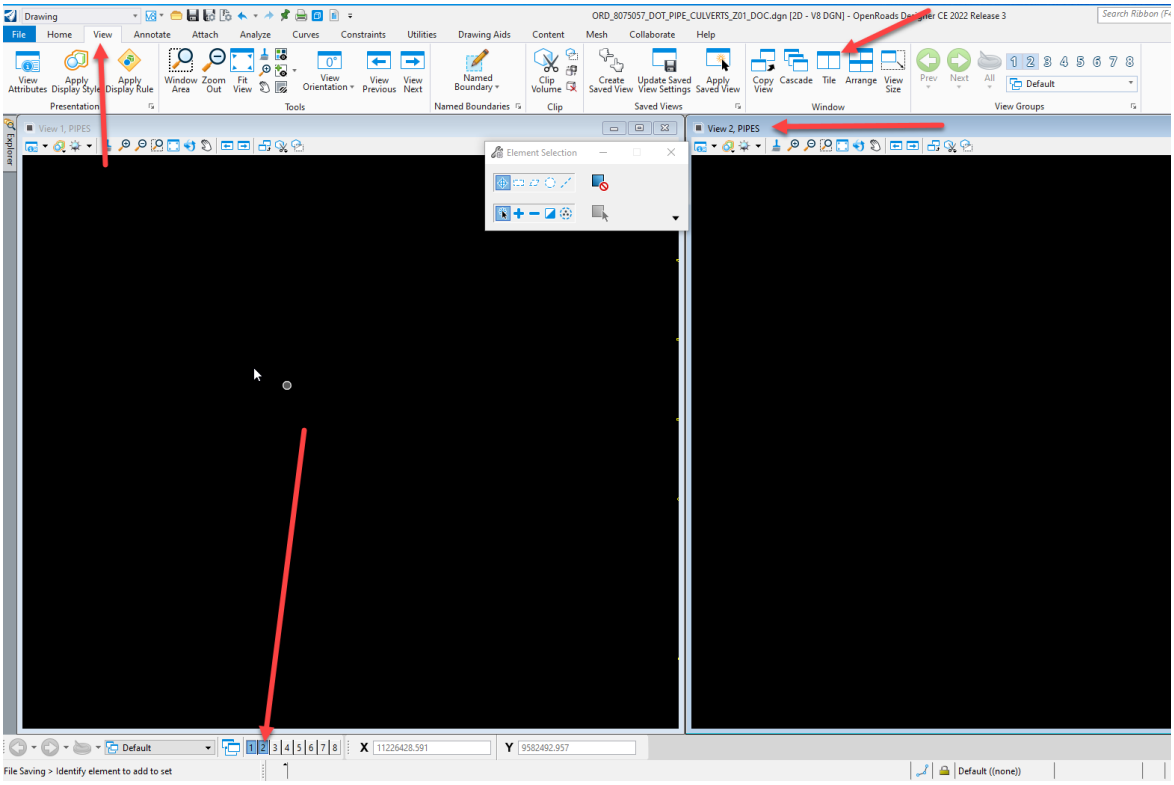
It should turn blue. Then hover over it to activate the heads-up toolbox.



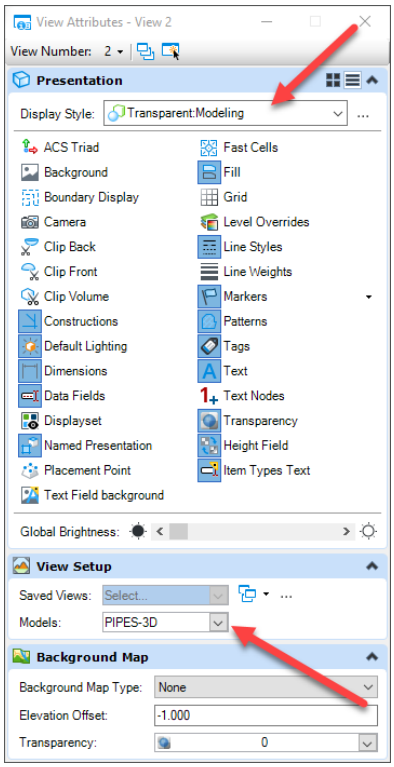
Select the middle tool, Set As Active Terrain Model. Once selected, it will change the icon.



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

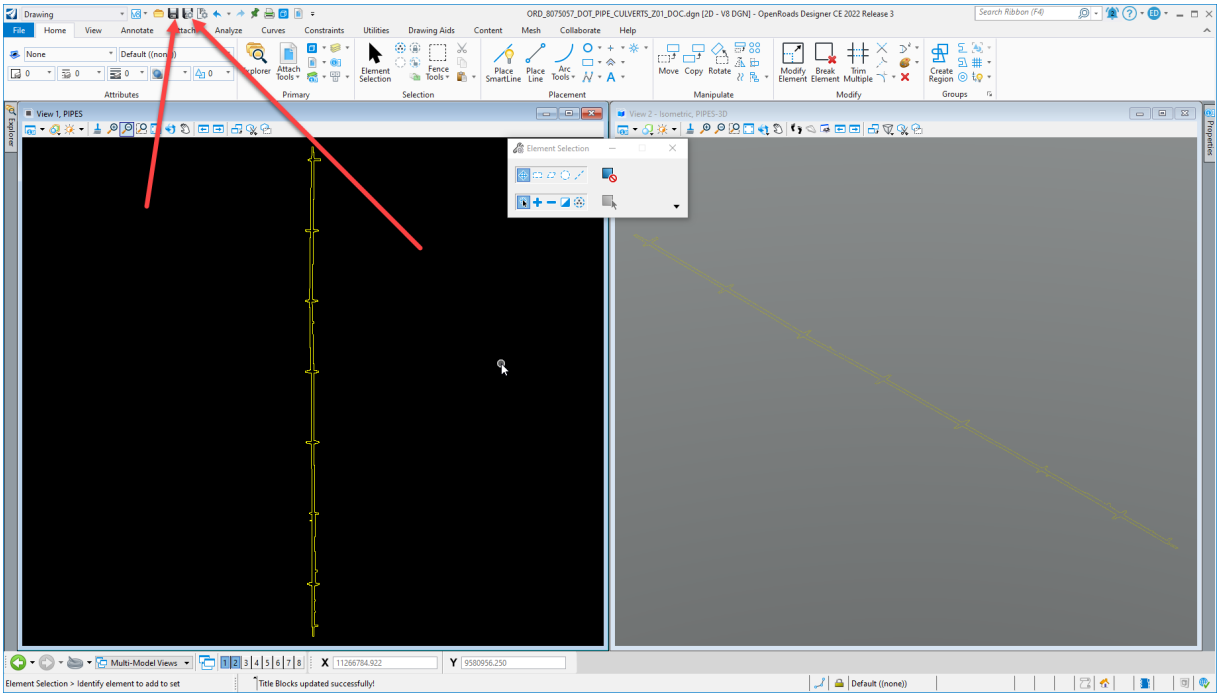


Open the View Attributes tool in view 2. Select the PIPES-3D model in the View Setup section of the View Attributes tool.

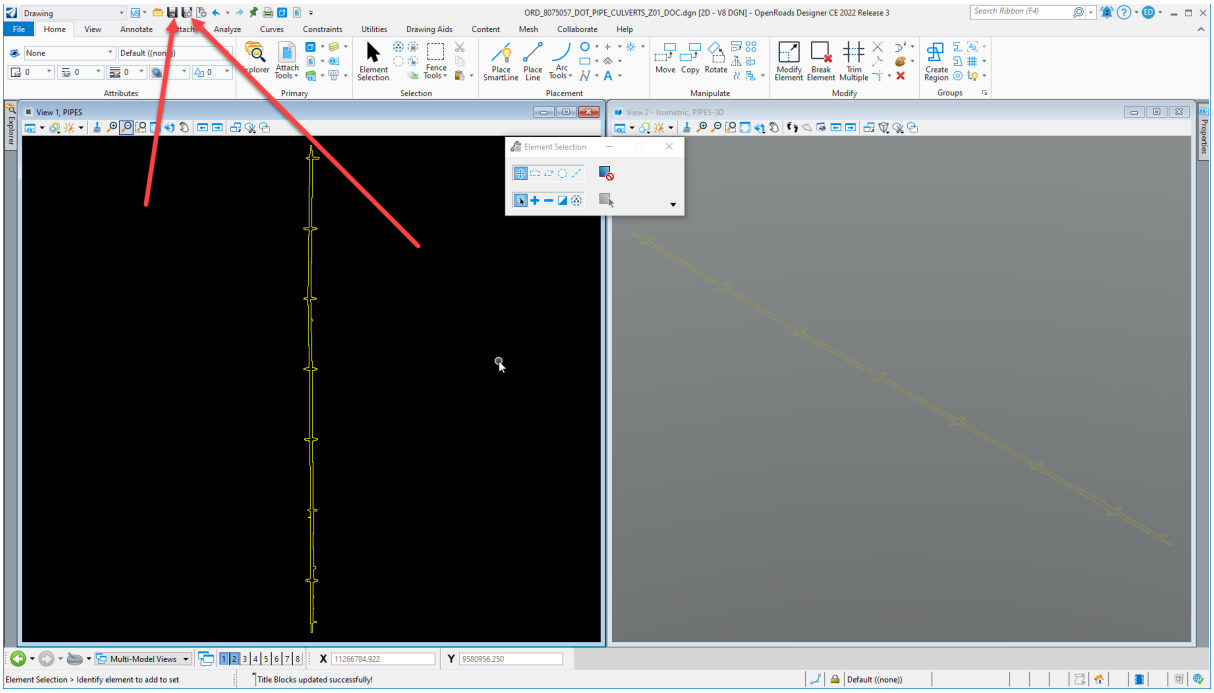


Note: It is preferred to change the Display Style in this view to Transparent Modeling to make it obvious when working in 2D or 3D.

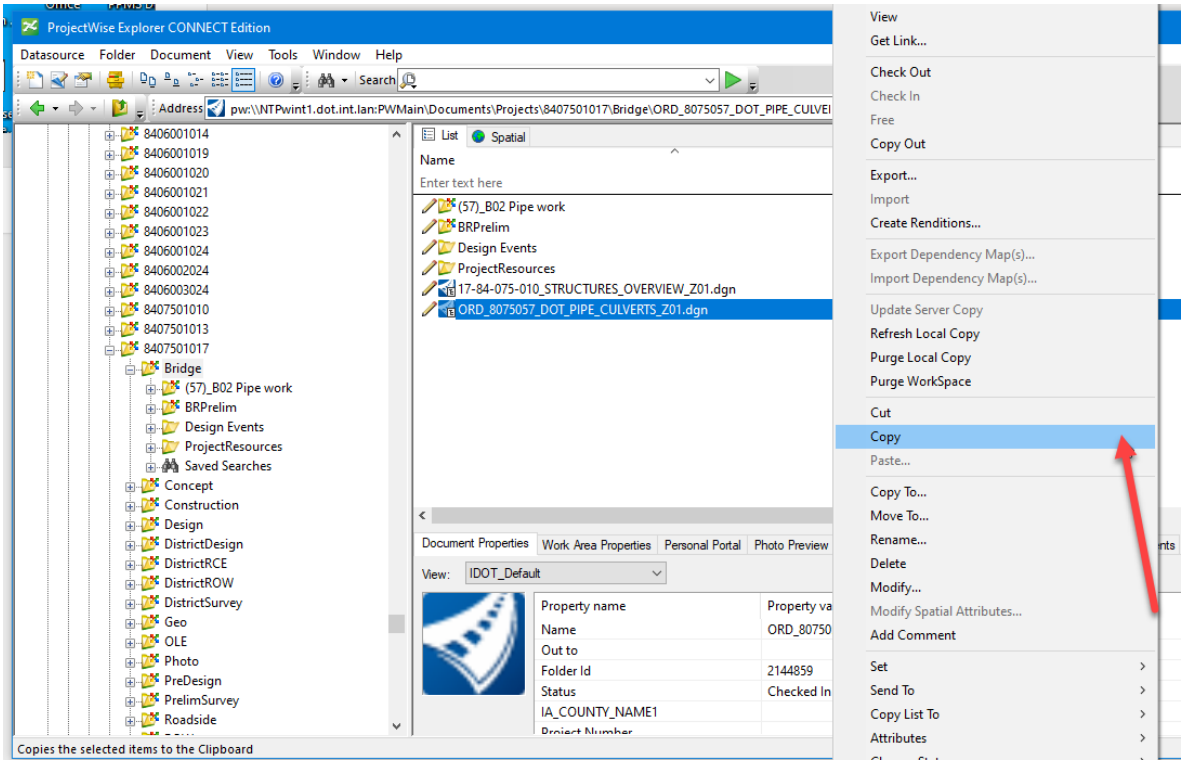
The content of the file should look like this:



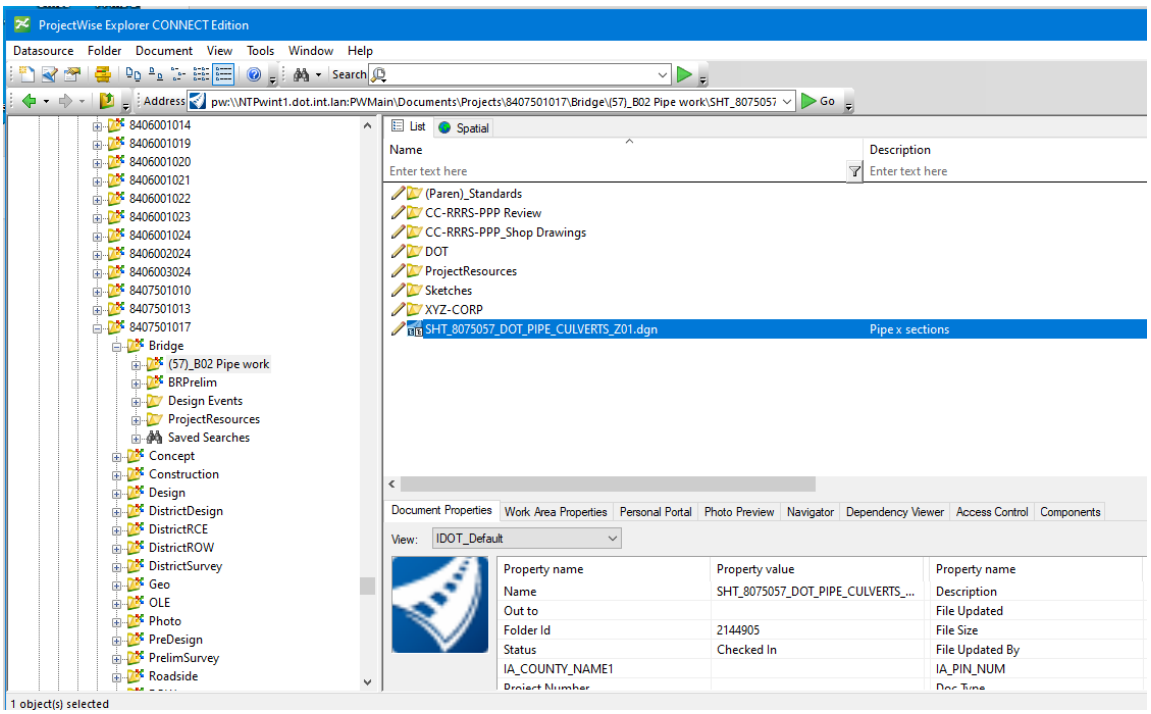
Save the file and save the settings so that the next time the file is opened it will be set to these view settings.



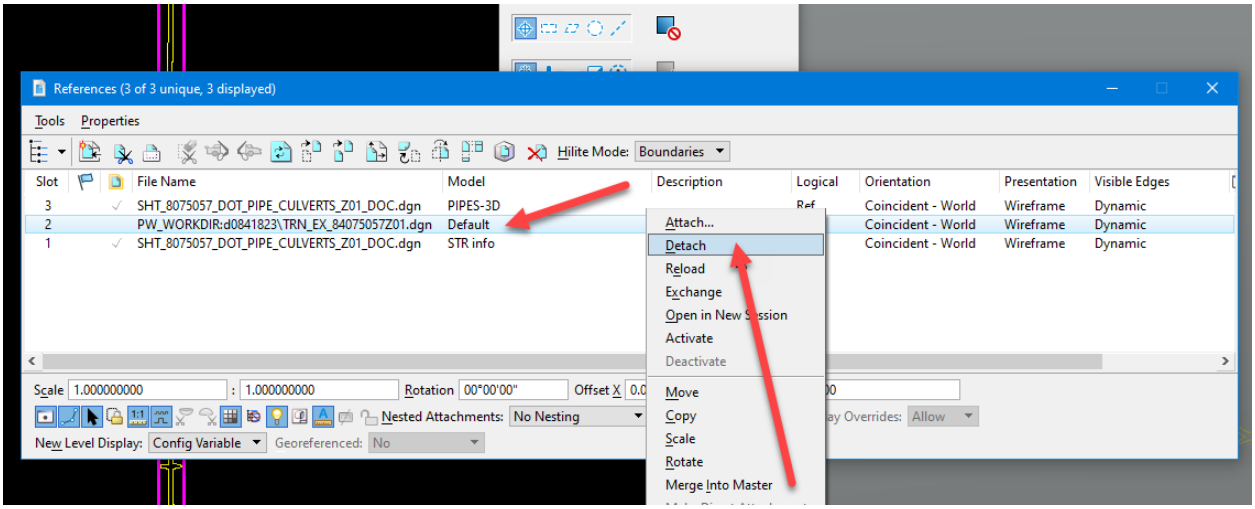
Next, close the file and check it into ProjectWise. Then, select this file and right click to select Copy.



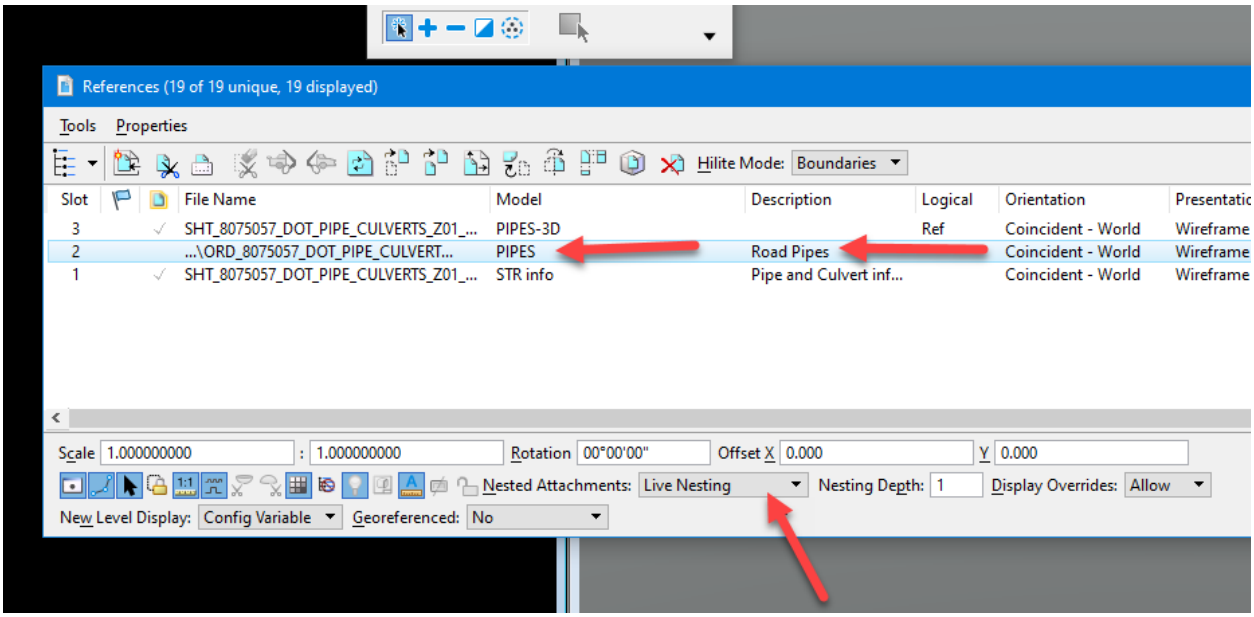
Paste the copied file in the parenthesis folder for making sheets. Rename the file to SHT_8075057_DOT_PIPE_CULVERTS_Z01.dgn. Please refer to the Seed File document on Iowa Department of Transportation Bridge Connect Documentation page for further instructions on naming the files.



Next, open the SHT file. Then, detach the TRN file reference.



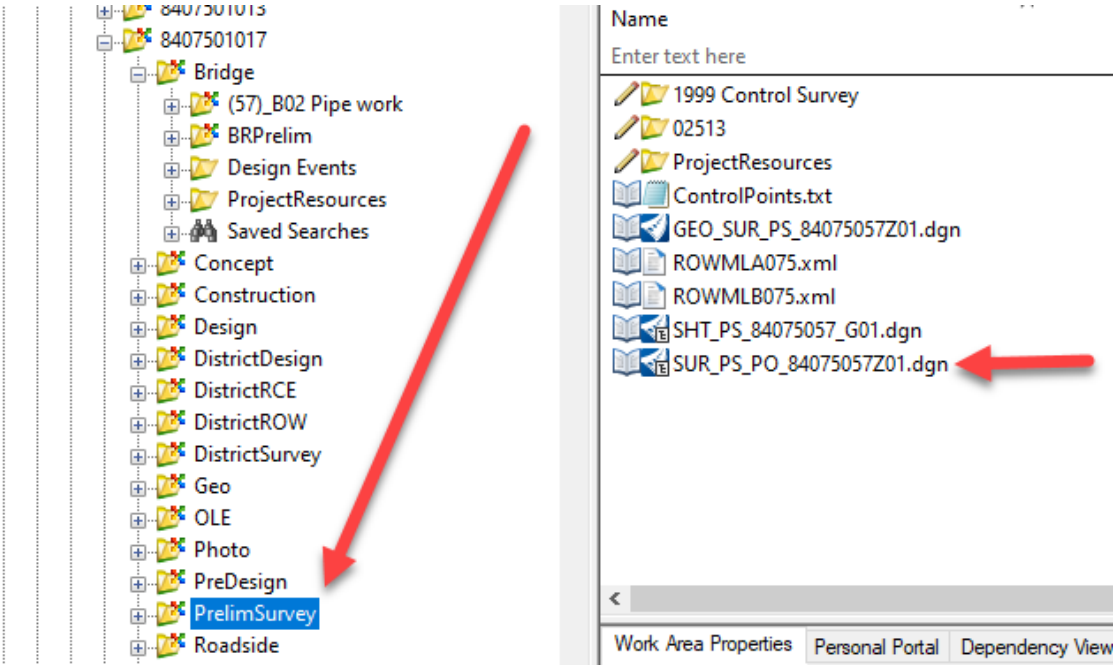
Then attach the model file ORD_CCRRRPPP_DOT_PIPE_CULVERTS_Z01.dgn from under the Bridge folder using live Nesting Depth of 2.



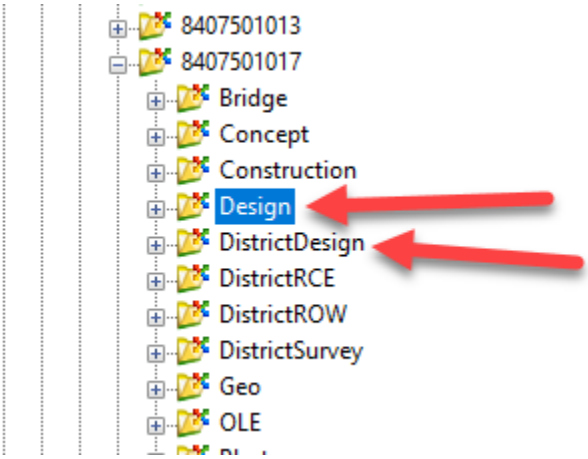
Save settings and exit the file.

The sheet file and model file are now created for the pipe design.

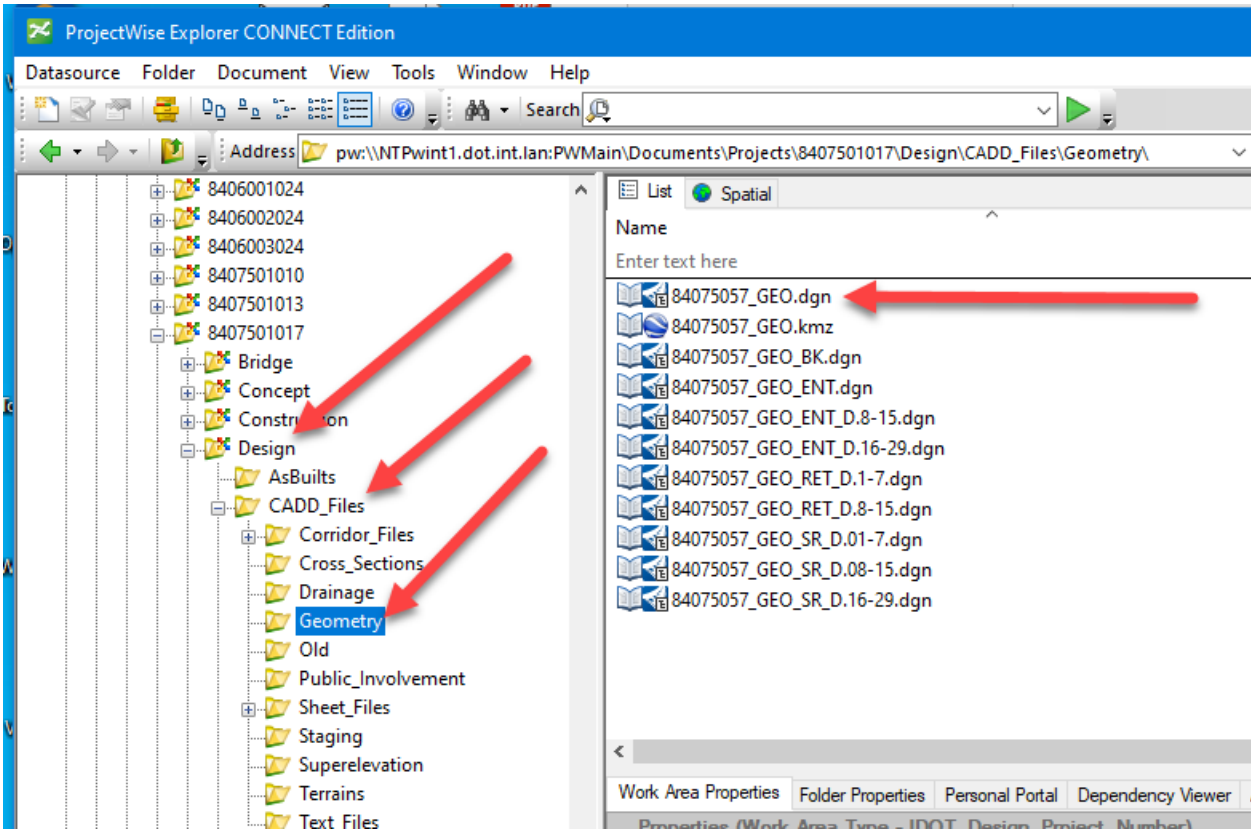
In the Bridge folder open the ORD_CCRRRPPP_DOT_PIPE_CULVERTS_Z01.dgn. Attach the survey file that contains the existing 3D pipes and surrounding topo features that are needed to do an effective design.



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 on what group is doing the road design portion of this project.

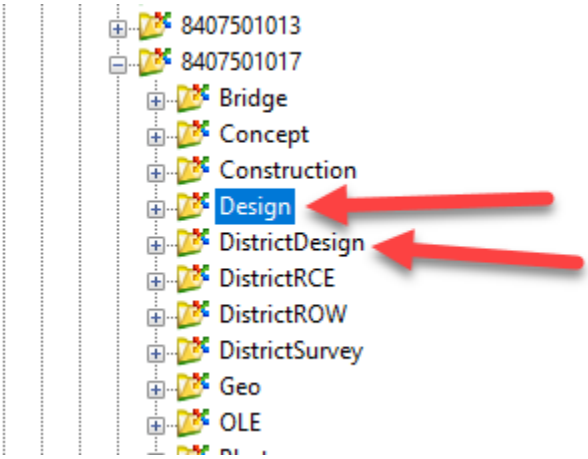


For this example, it is being done by the design group. So the alignment is under the CADD_Files\Geometry\ folder. Select the GEO Alignment file that is named GEO_CCRRRPPPZZZ.dgn.

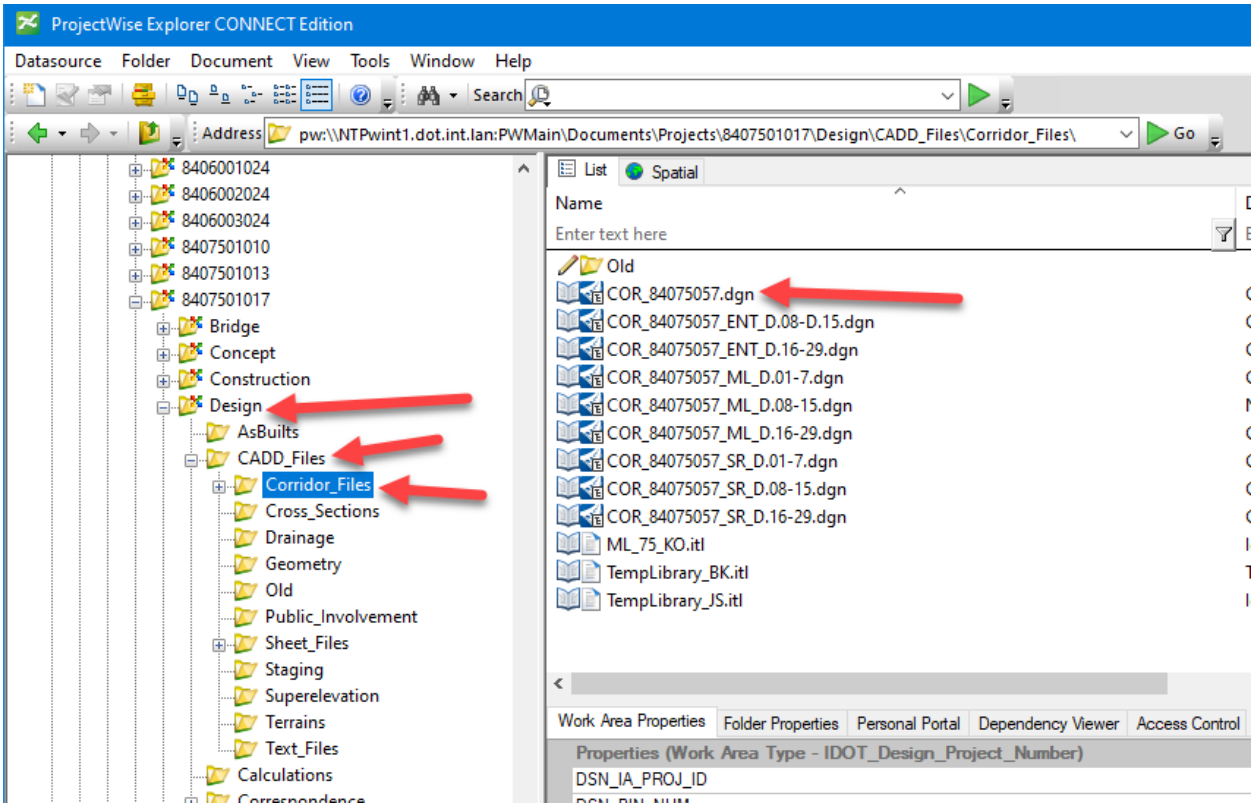


This is the container GEO file that will contain all the Alignments for this project. Attach it using the orientation of Coincident World. Turn on the live nesting and set its depth to 1.

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

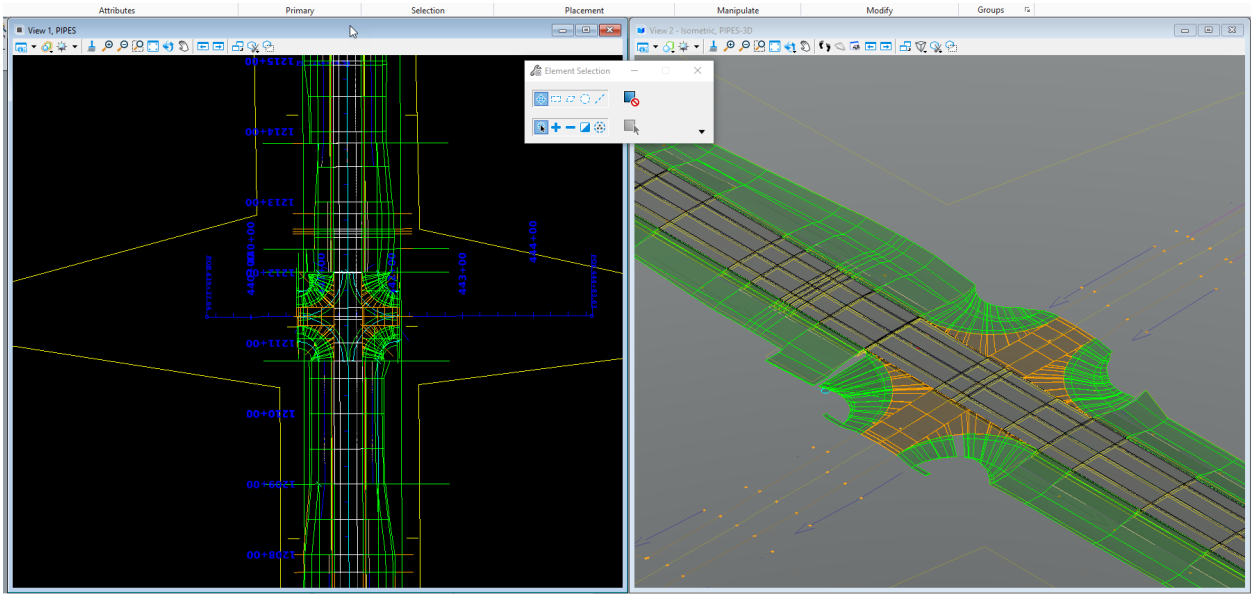


For this example, it is being done by the design group. So the corridor file is under the CADD_Files\ Corridor_Files\folder. Select the COR Corridor file that is named COR_CCRRRPPPZZZ.dgn.



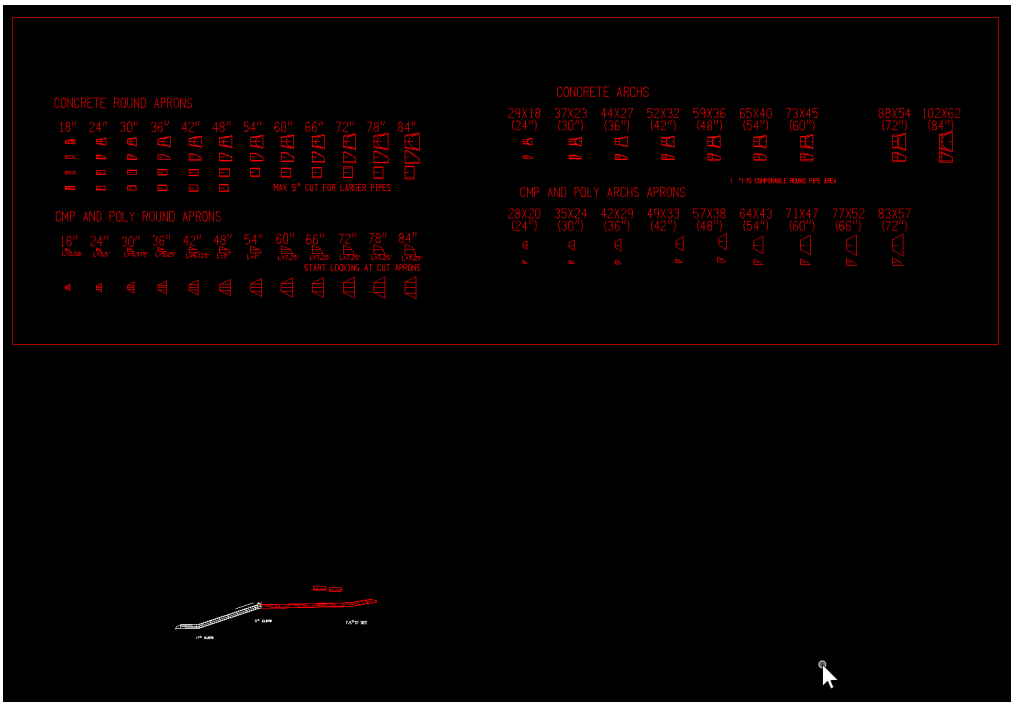
This is the container COR file that will contain all the Corridor for this project. Attach it using the orientation of Coincident World. Turn on the live nesting and set its depth to 1.

The file content should look like this:



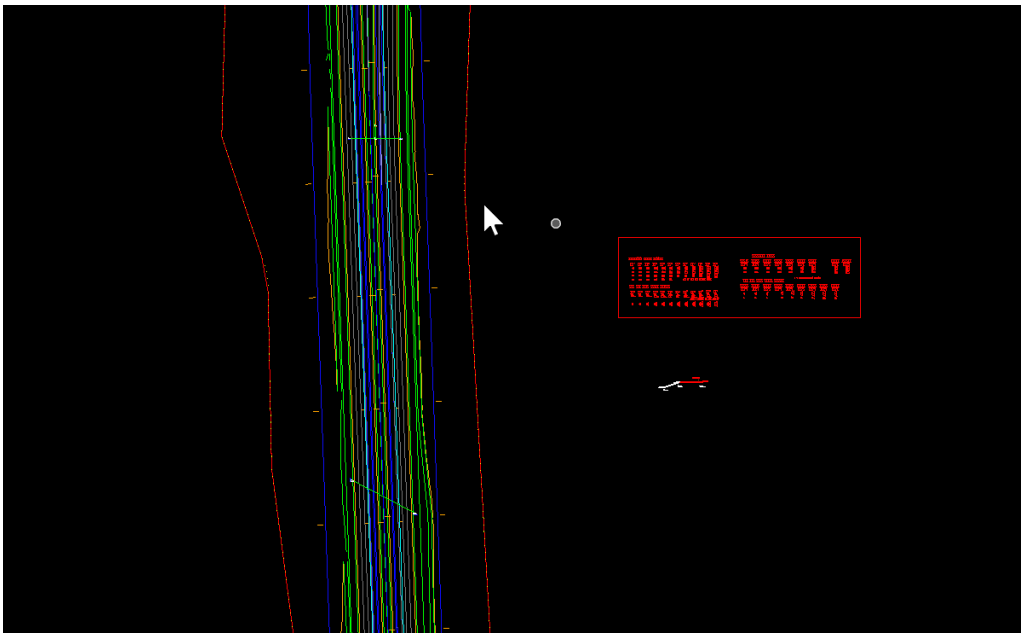
Next, reference in a file that contains a selection of Iowa DOT pipe aprons 2D cells. This file is located in pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Resources\ClientWorkspaces\IowaDOT\IowaDOTProduction\Organization-Civil\IowaDOT_Standards\Cell\BridgeDesignDetails\ ApronsConnect.dgn

Then find this refenced content. It should look like this:



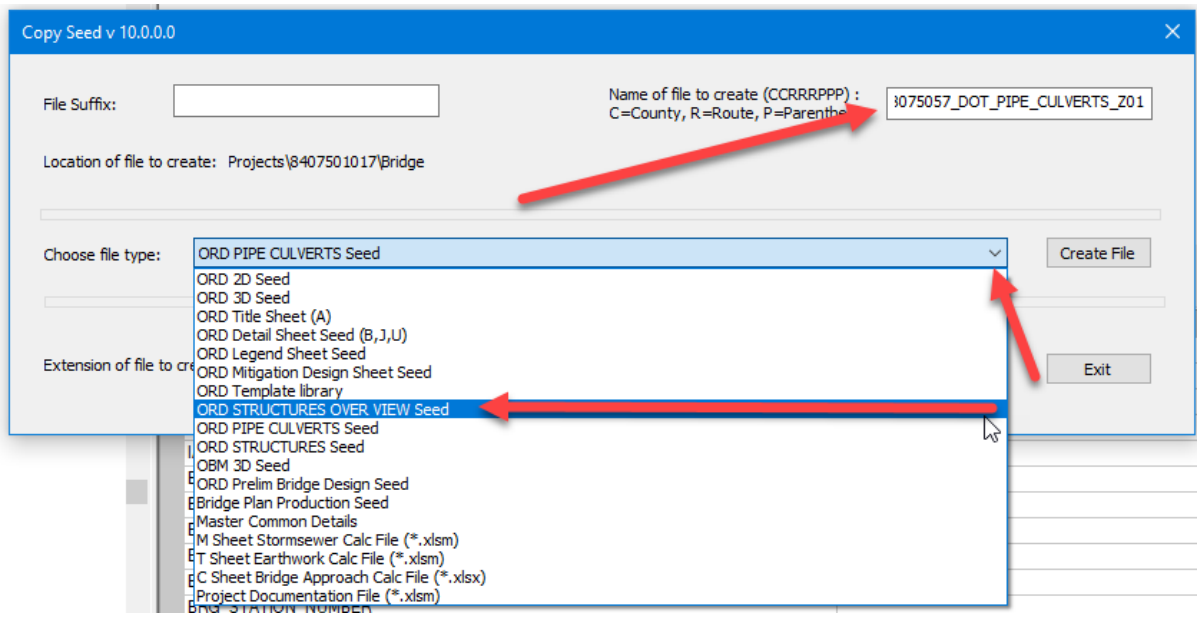
Select it with the Element Selection tool.

With the Copy tool make a copy of it and place it close to the design corridor.



Then, detach the reference file and save the settings.

The last step to setting up the CADD files for pipe design is to make sure the pipe3D model is 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.



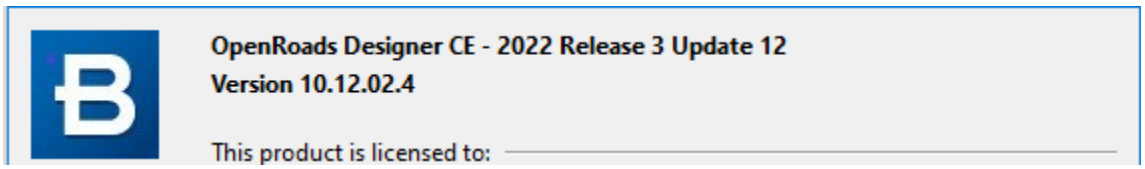
The Structures overview file will only contain the 3D information from the model files under the Bridge folder. Make sure only the 3D model is referenced from the ORD_CCRRRPPP_DOT_PIPE_CULVERTS_SPN.dgn into the overview file.

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 pipe inverts from the project information. PW02_Laying out Pipes in Connect

Laying out Pipes and Drainage Design in Connect

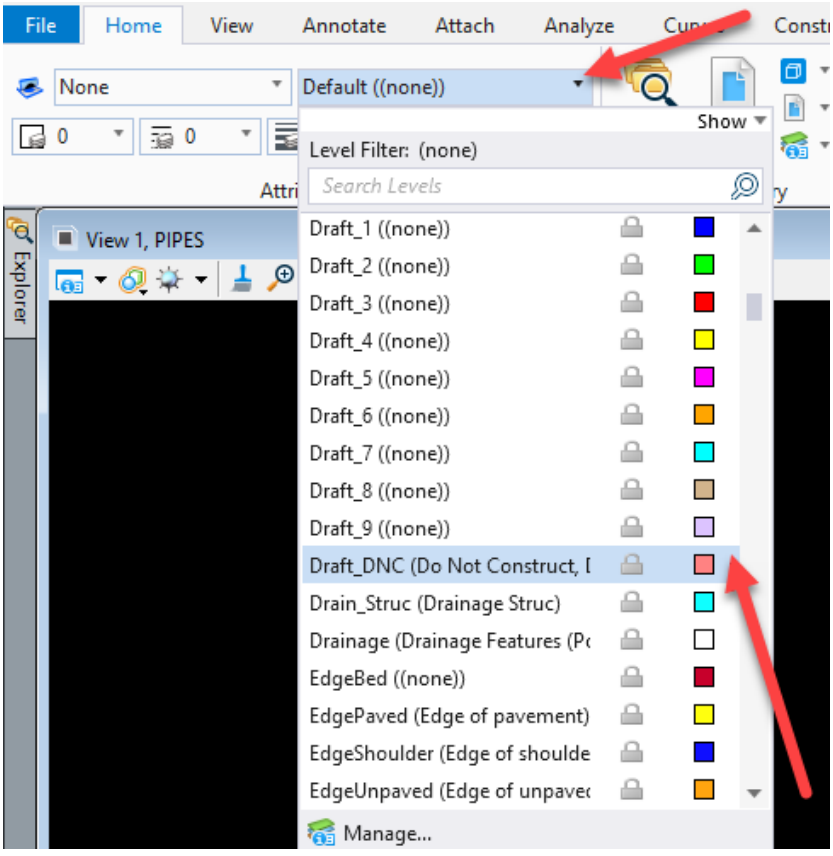
These instructions were created March 2024. These instructions were created with:



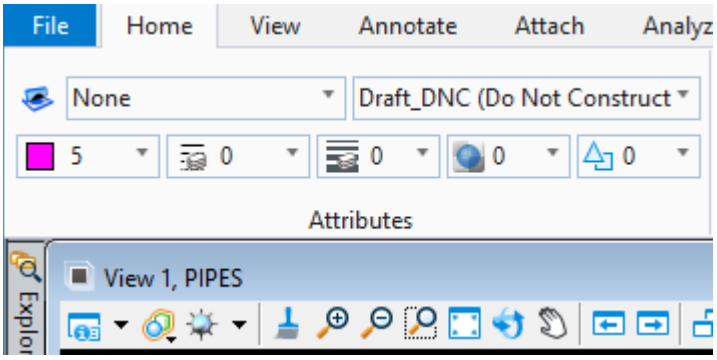
First, review the project information and determine where a pipe is needed. Once a location is determined, calculate the correct size. Refer to the BDM Chapter 4 https://iowadot.gov/bridge/policy/04-01-00Prelim.pdf. When the correct type, size and location are determined, design the new pipe for that location.

Open the ORD_CCRRRPPP_DOT_PIPE_CULVERTS_SPN.dgn file under the Bridge folder in the project directory for this project in ProjectWise. For this example, use the ORD_8075057_DOT_PIPE_CULVERTS_Z01.dgn file.

Once the file is open, place a pattern line at the location of each pipe needing to be designed. Set the attributes to the correct symbiology. Use the level Draft_DNC that indicates draft lines to not be constructed and is also set to not print on the final plans.

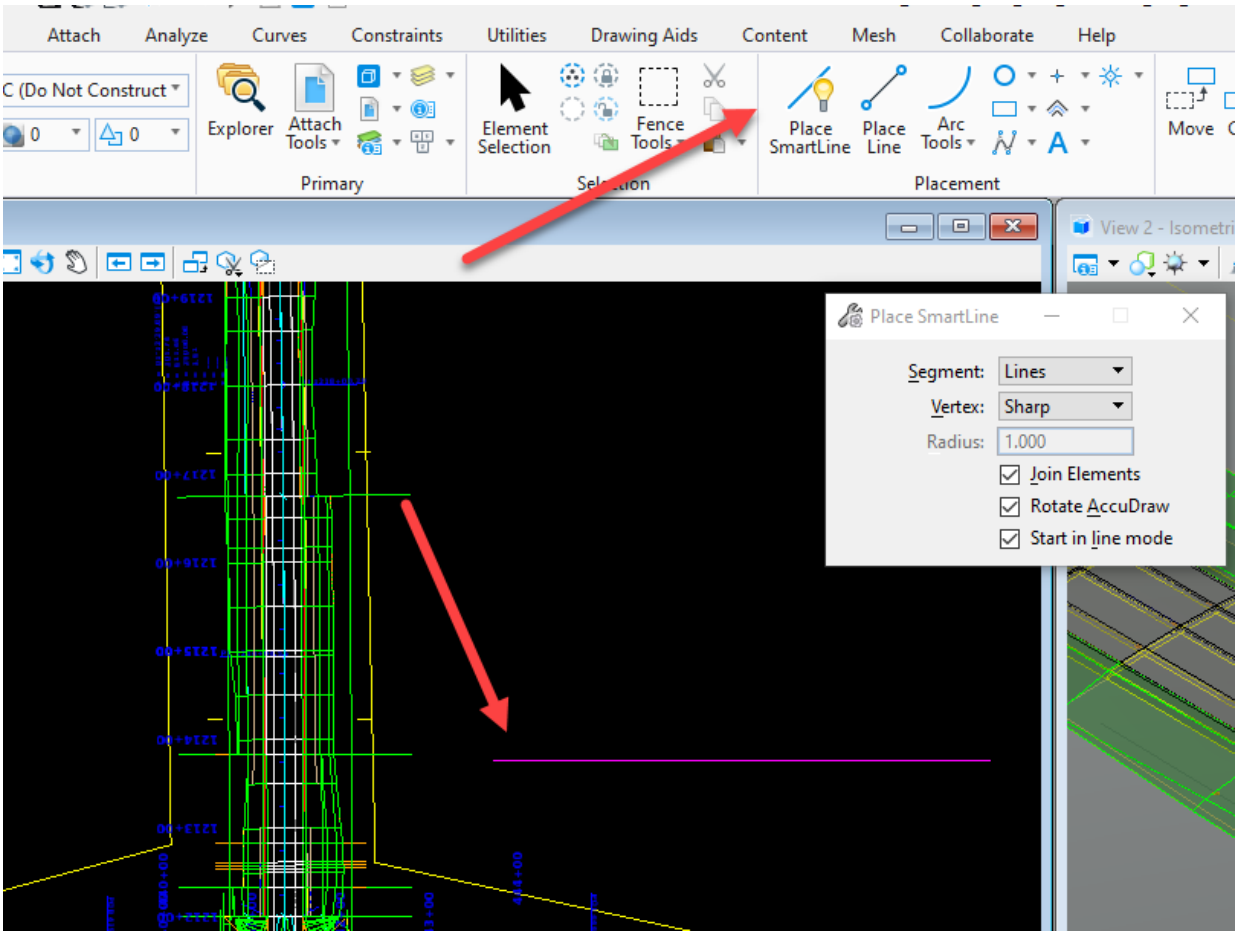


It is preferred to also change the color to something that will stand out and make it easier to find in the file. Color 5 is recommended.



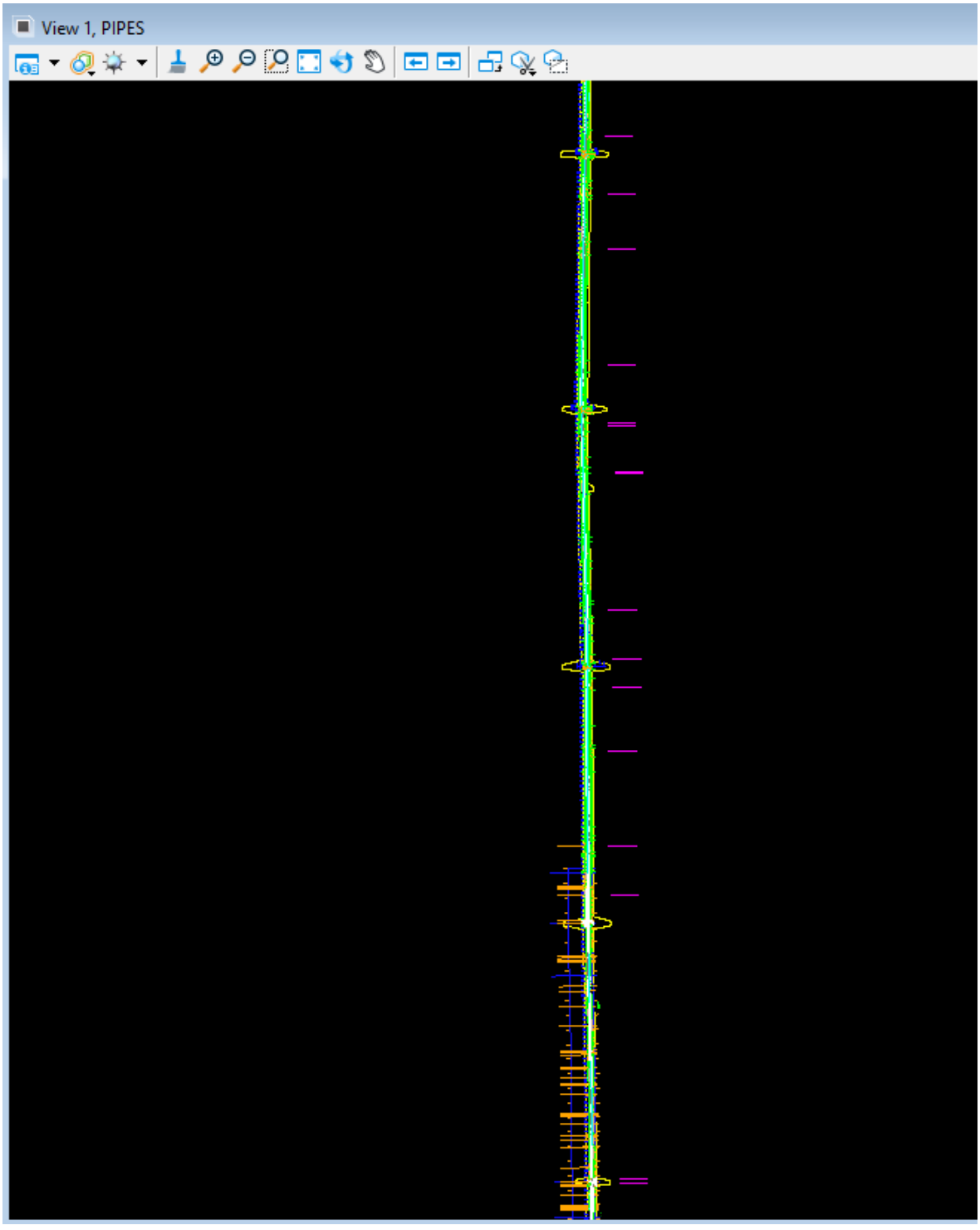
Next, use the Place Smart Line tool and place a line of 560’.

It should look similar to this:



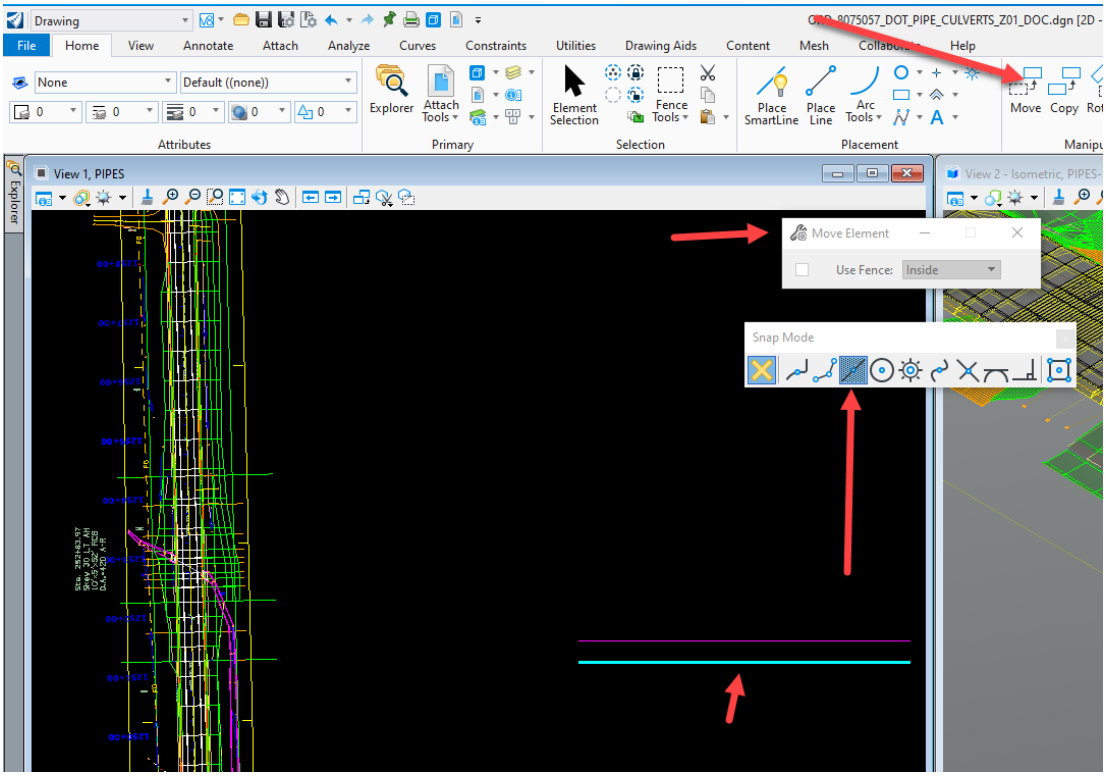
Use the copy tool to copy the line just created and place a copy at each pipe location needed.

It should look like this:



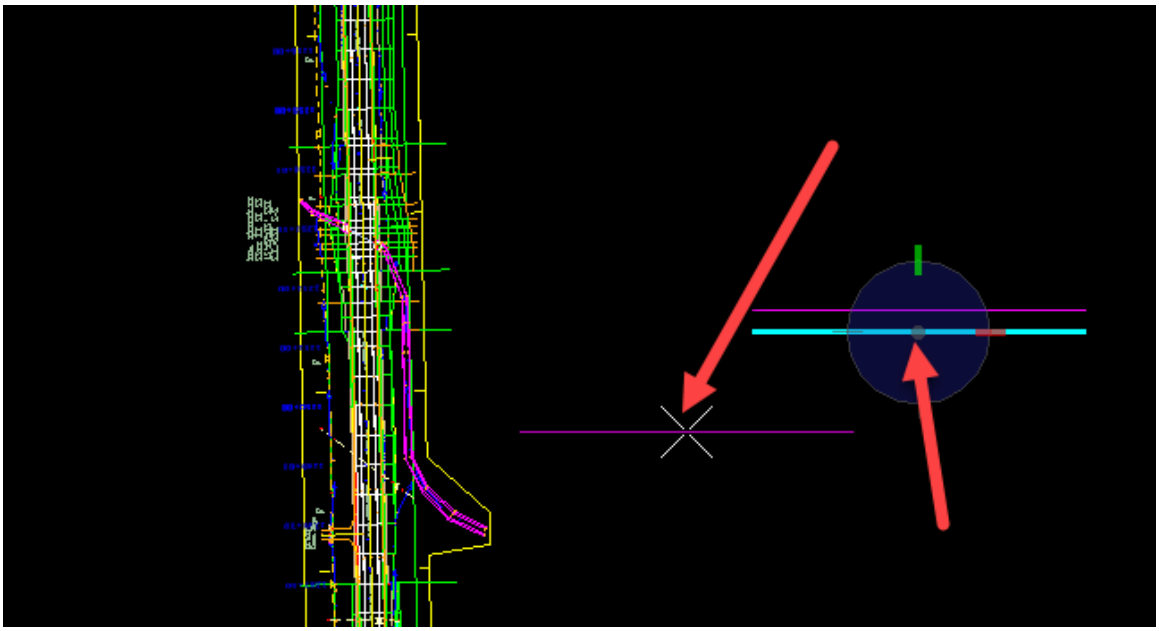
Next, move the pattern line to the location needed to place the pipe. Rotate the pattern line to the skew of the pipe also. The midpoint of the pattern line should intersect the horizonal design alignment for the project. The purpose of the pattern line is to ensure that all the pipe cross sections are the same width and that the centerline or offset in the cross section is in the center of the cross section.

To do this, use the Element Selection tool to select the pattern line. Then click on the move tool and select the midpoint snap.



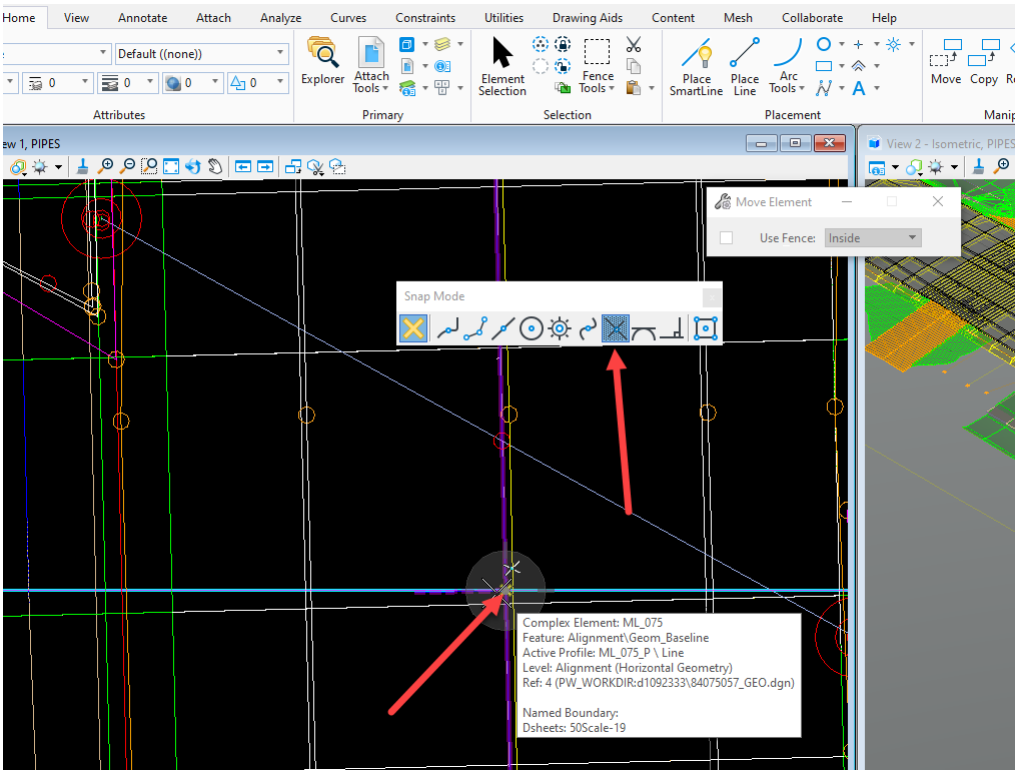
Let the tool find the midpoint on the selected line and datapoint to accept it. Then move the line to the location needed to place the pipe.

It should look like this:

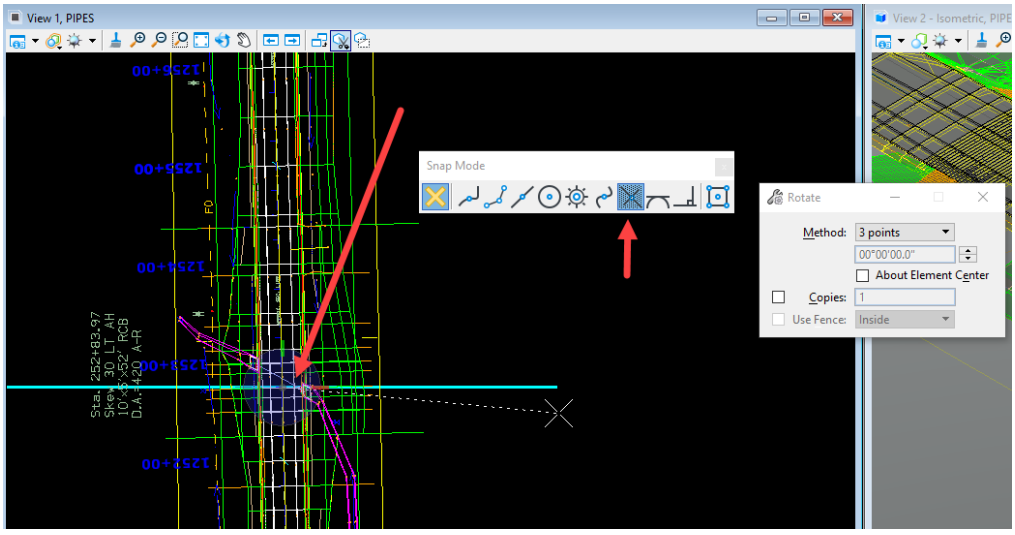


Select the intersection snap and select the location to place it on the alignment.

It should look like this:

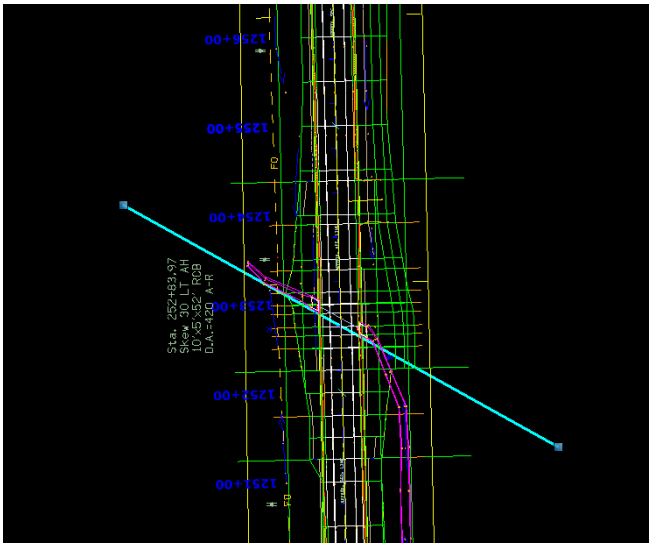


Next click the reset on the mouse once so that the pattern line is still selected with the Element Selection tool and select the rotate tool. Set the method to 3 points and with the intersection snap set, select the point where the pattern line and the alignment intersect for the first point.



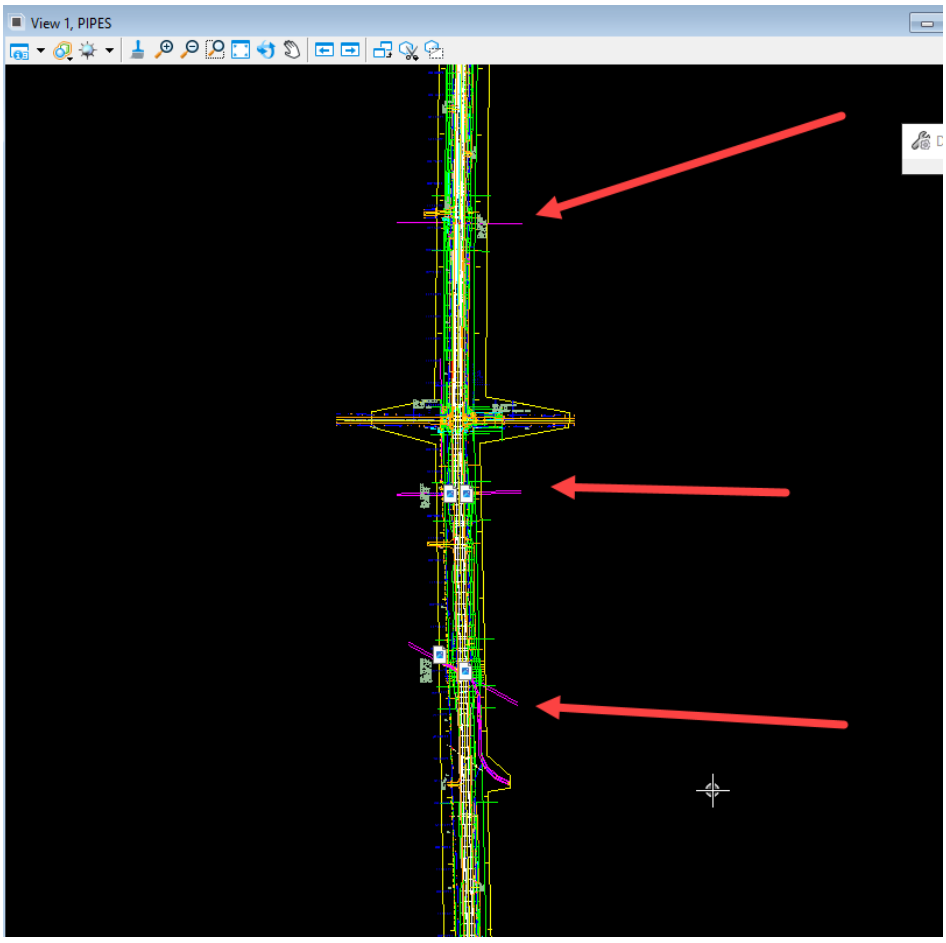
For the second point, select the end of the pattern line then select the point to rotate it to.

It should look like this:



Unselect the line with the Element Selection tool. Repeat the process for all the locations of the pipes.

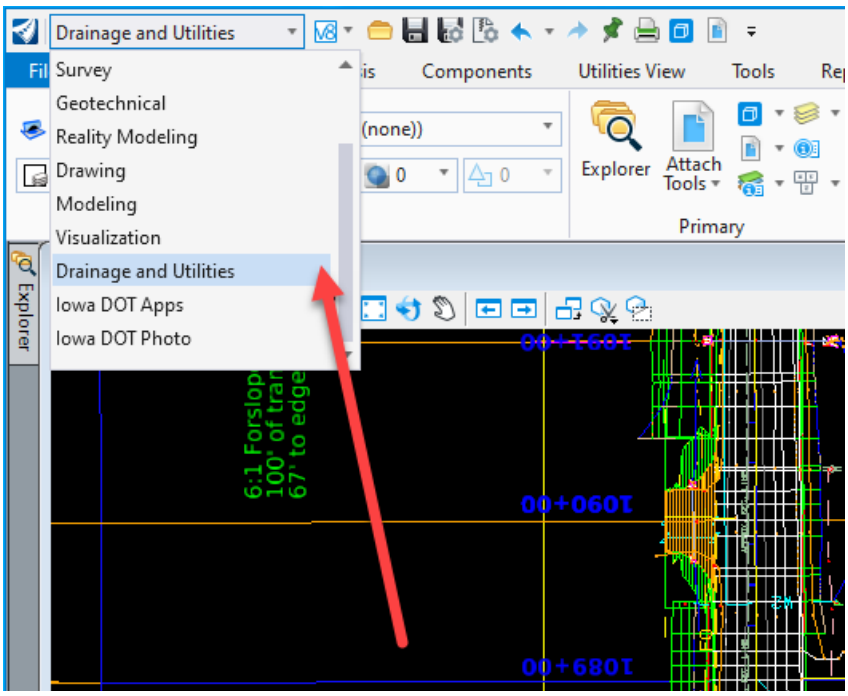
When finished, the file content should look like this:



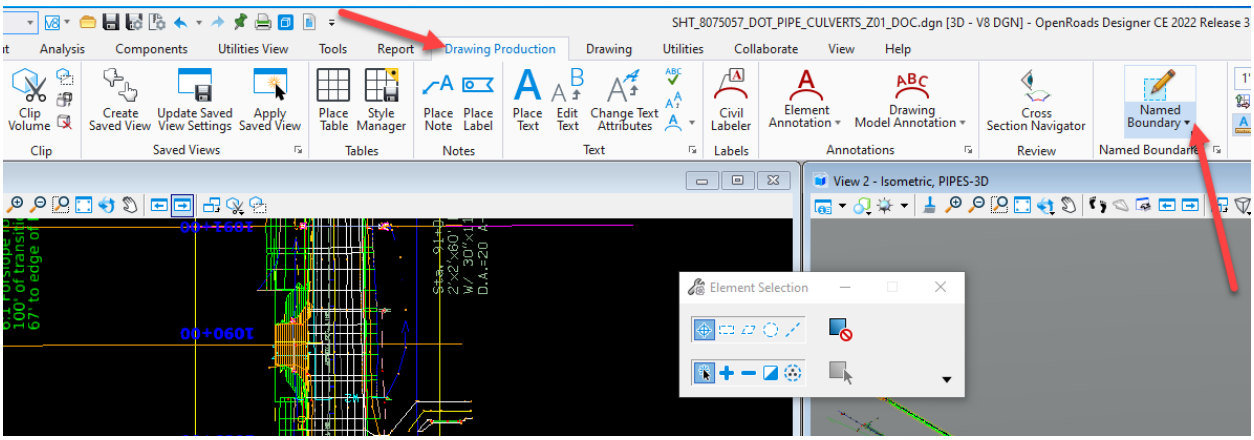
Once identifying the pipe locations is completed, switch to the pipe cross section file SHT_CCRRRPPP_DOT_PIPE_CULVERTS_SPN.dgn under the (Paren)_Work Description folder. For this example, use the SHT_8075057_DOT_PIPE_CULVERTS_Z01.dgn file.

Now that the pattern lines are in place and are in the SHT file, the files are ready to cut the cross sections.

To do this, set the workflow to Drainage and Utilities.

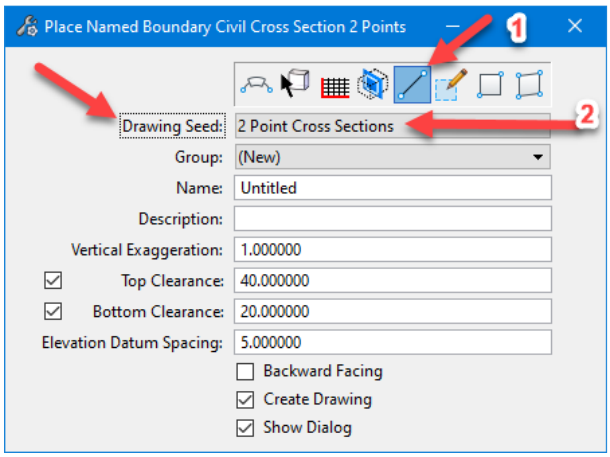


Next, use the place Named Boundary tool on the Drawing Production ribbon tab.



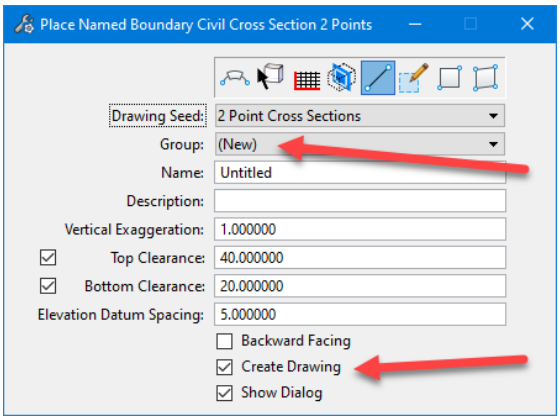
Complete the following steps for the Place Named Boundary dialog box.

1. Select the Place Named Boundary Civil Cross Section 2 Points tool.
2. Select the 2 Point Cross Section Drawing Seed:

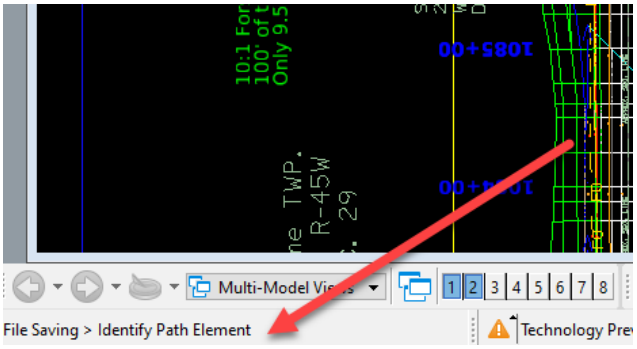


Note: For the first section cut from an alignment set the Group to (New).

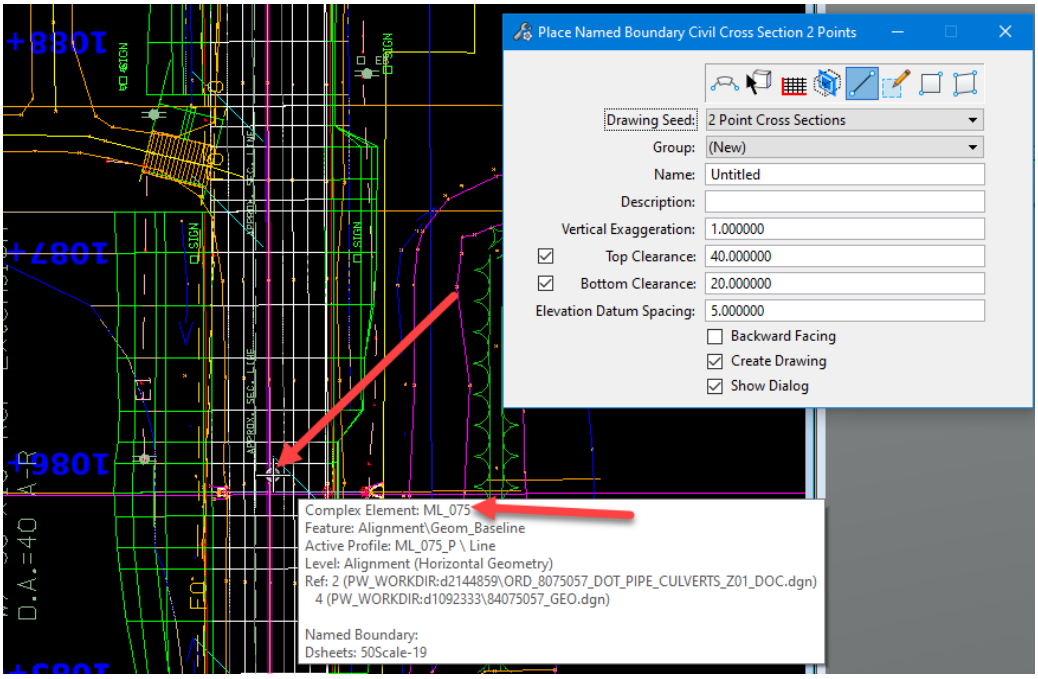
Toggle on Create Drawing.



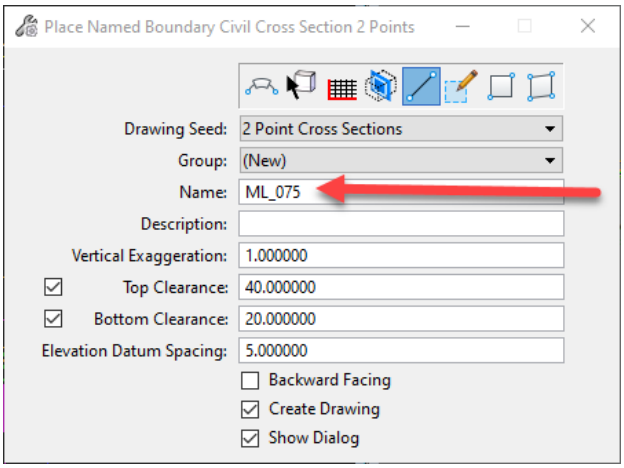
Follow the prompts in the lower left corner of the application window.
The first prompt is Identify Path Element.



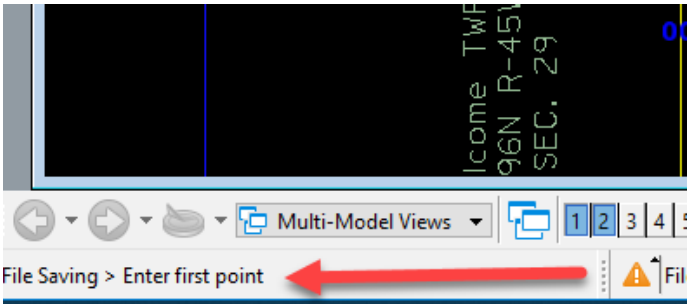
Select the design alignment that the pattern line intersects. For this example, it will be ML_075.



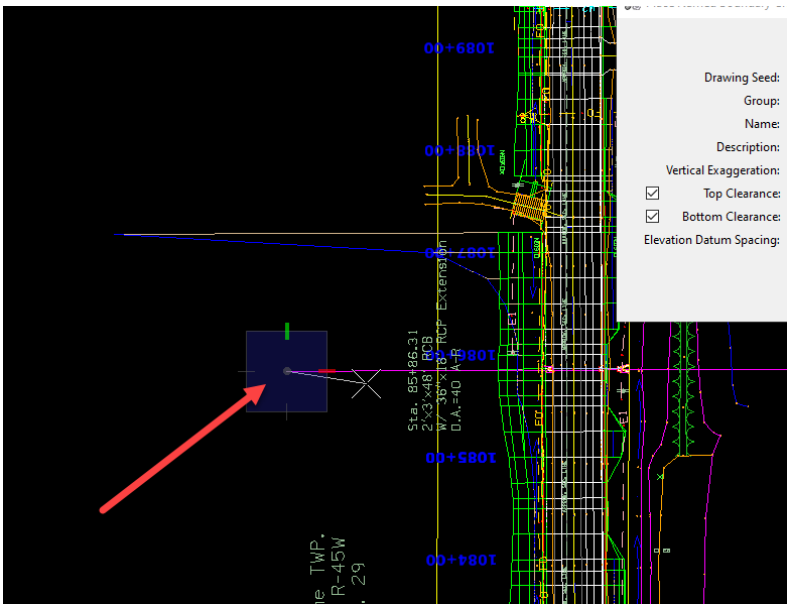
Once the alignment is selected, the name of the Group will populate with the alignment name.



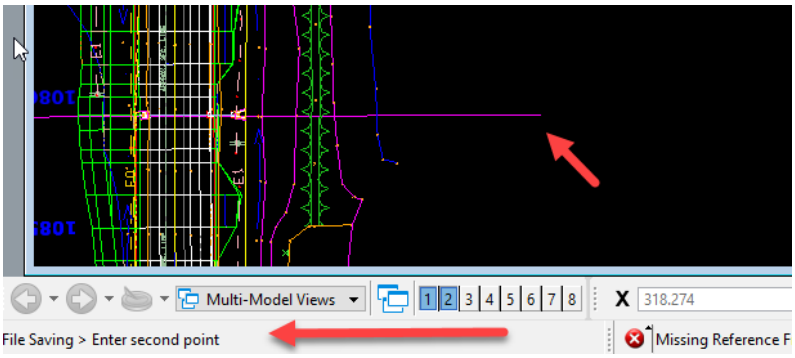
The next prompt is Enter first point.



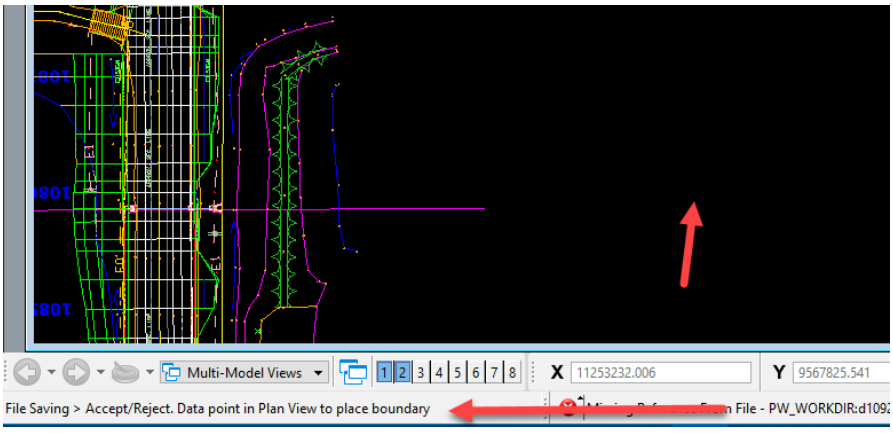
Find the pattern line and select one end of the pattern line.



The next prompt is Enter second point. Select the other end of the pattern line.



The next prompt is Accept/Reject. Data point in Plan View to place boundary.

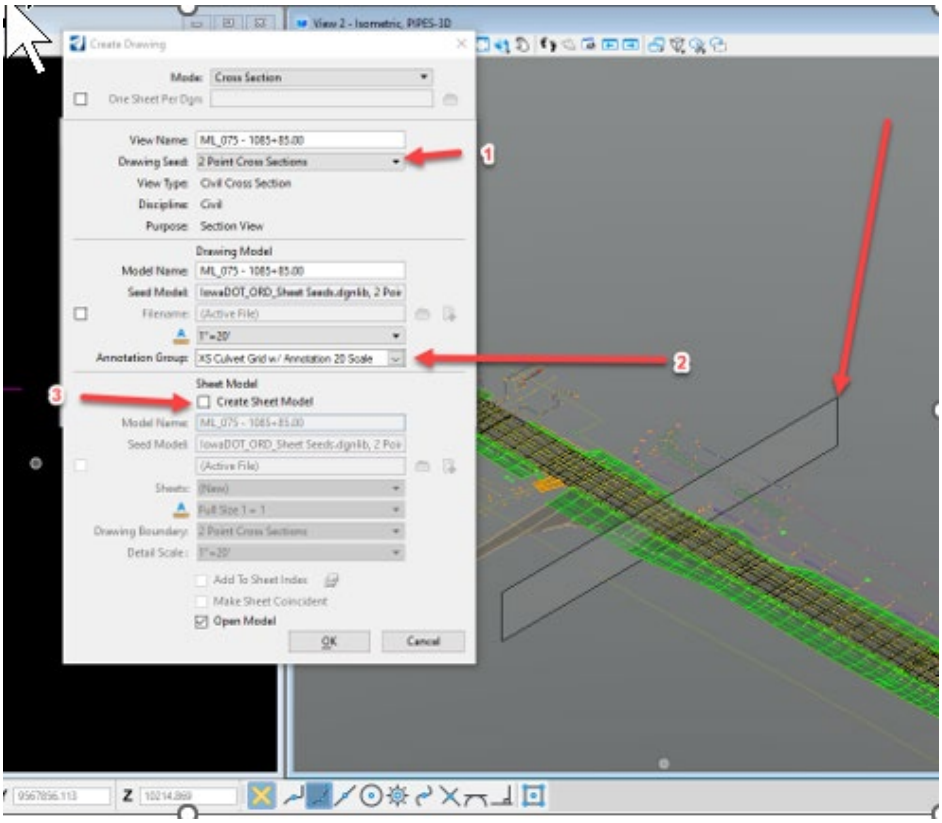


Then the boundary will be placed. Move the cursor to black space and datapoint to accept.

The Create Drawing dialog box opens.

Set the following settings.

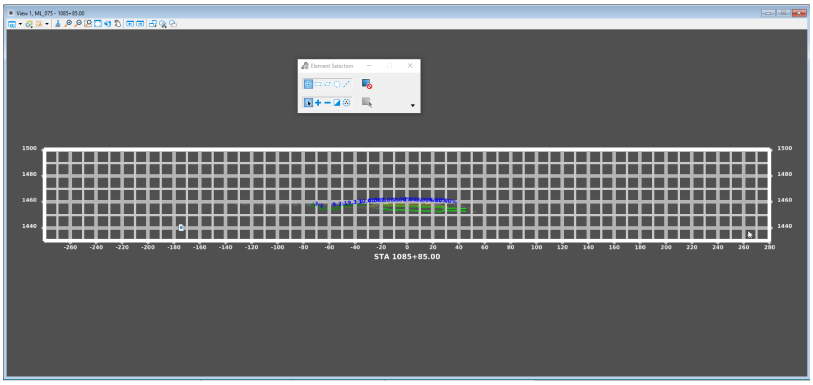
1. Drawing Seed to 2 Point Cross Section
2. Annotation Group to XS Culvert Grid w/Annotation 20 Scale
3. Uncheck the Create Sheet Model.



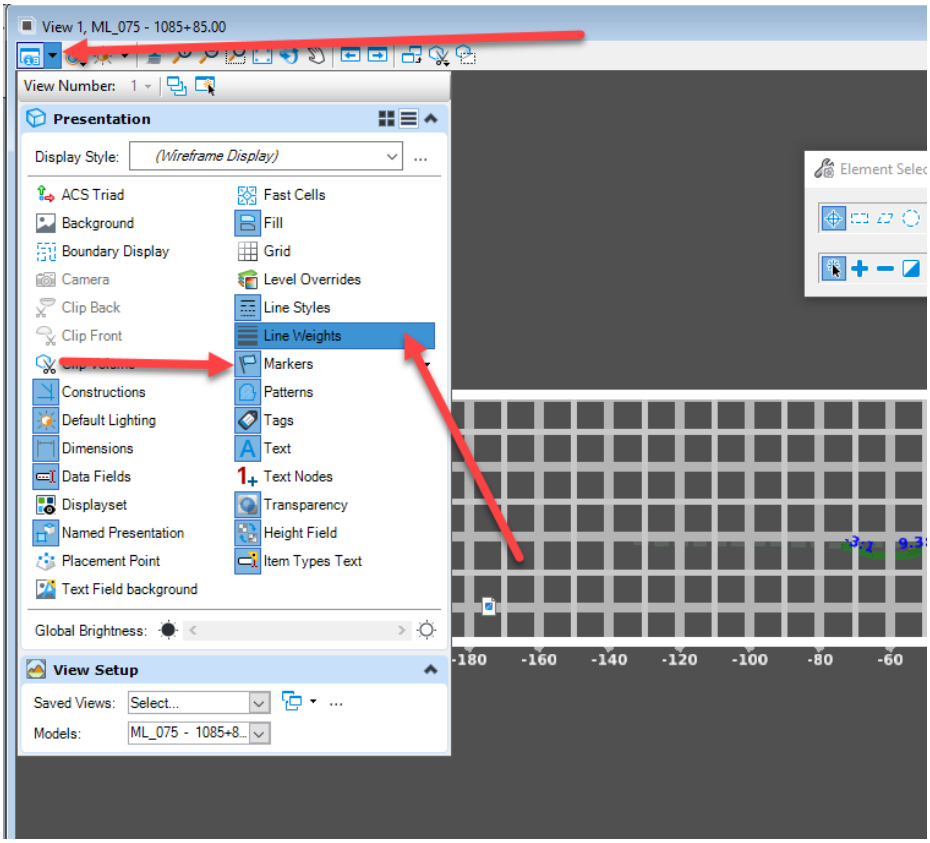
Also, notice that the boundary has been placed in the 3D model.

Once everything is set correctly, click OK. This will create and open the drawing model.

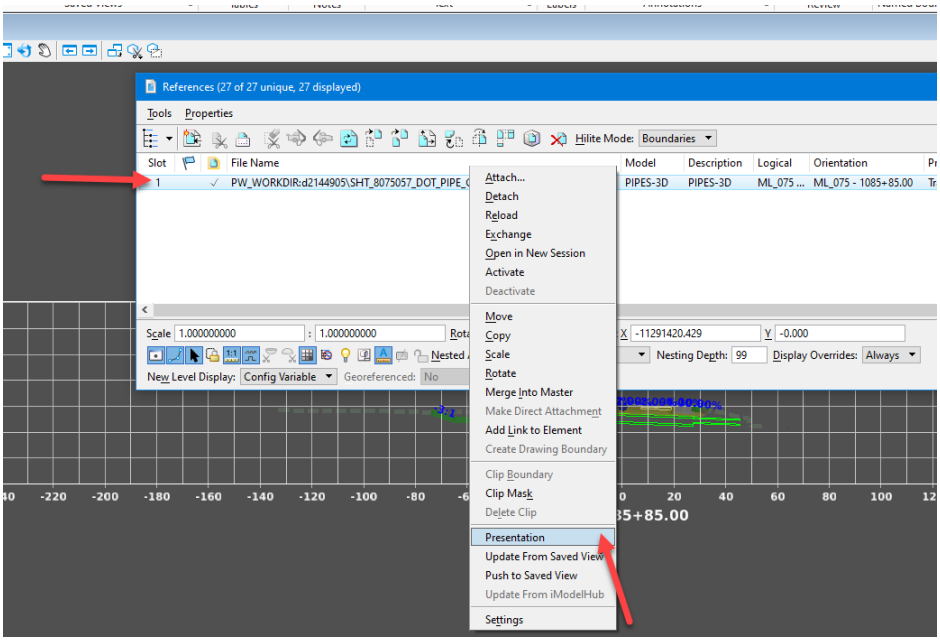
It should look like this:



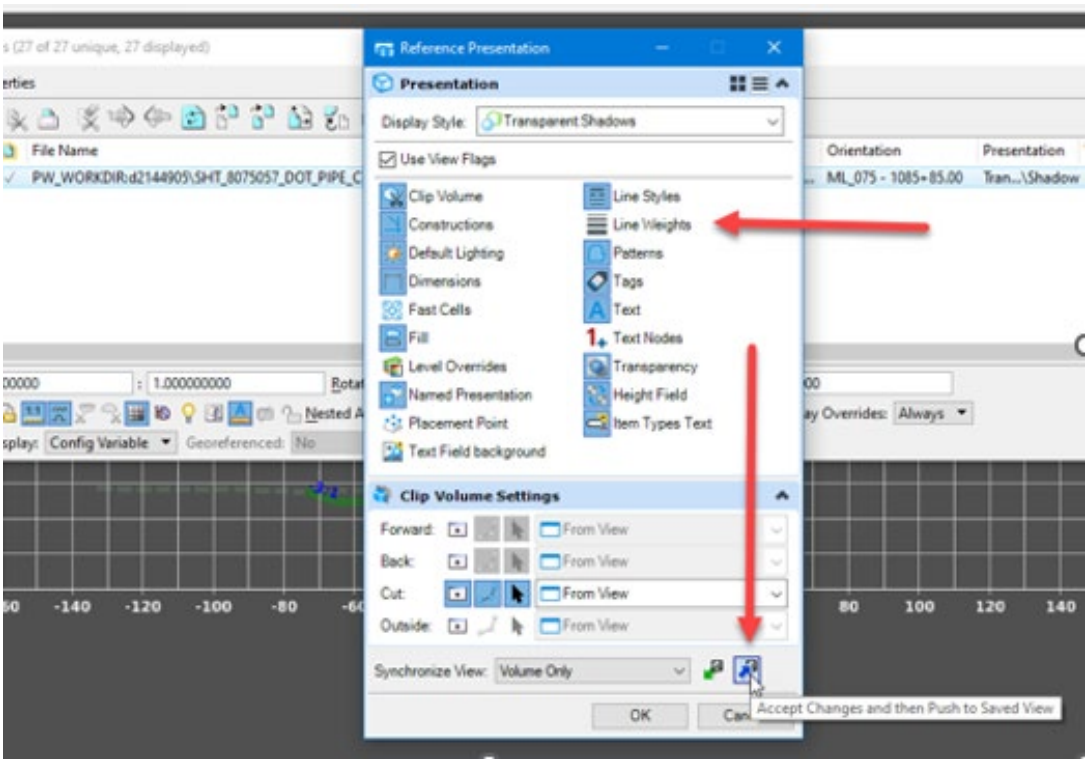
It is recommended to work in the drawing model with the line weights turned off. Open the View Attributes dialog box and turn off the Line Weights and Markers.



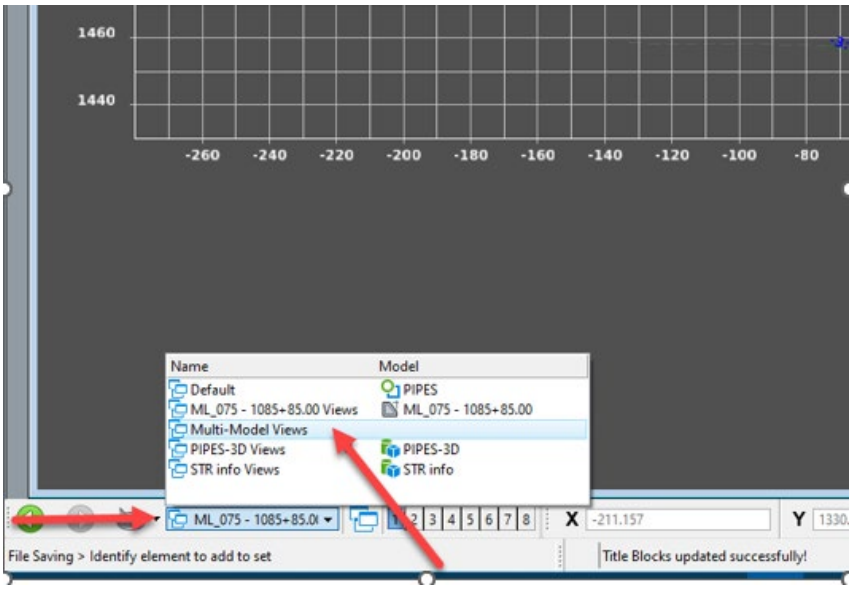
Next, turn off the Line Weights in the Saved View. Open the Reference dialog box and select the saved view in the list. Right click and select Presentation.



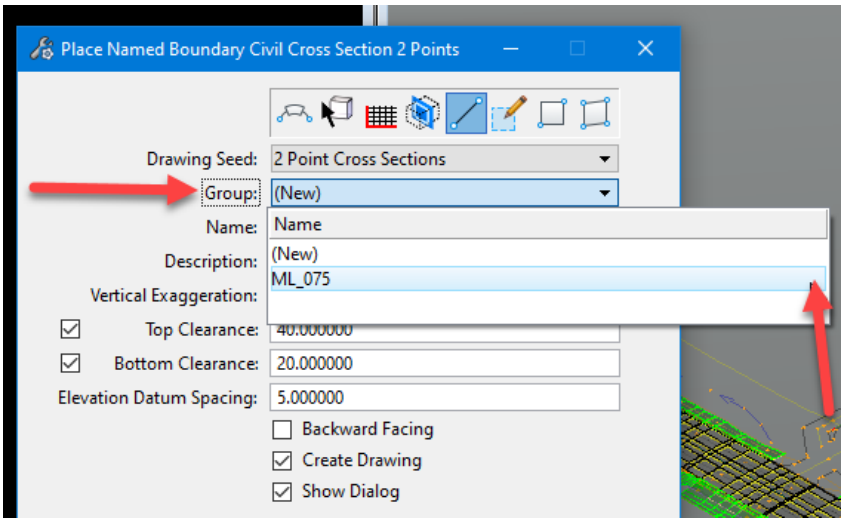
Next, turn off the Line Weights then click on the blue arow icon to Accept Changes and then Push to Saved View:



Now cut the next section. Go back to the Multi Model View by selecting the Multi Model View from the View Group at the lower left of the application window.



Cutting the next section on this alignment is done with the same steps as before except for one change. When a section is cut from an alignment, it will create a group. The group is used to help organize and orient the sections to each alignment. When cutting another section from the same alignment, choose the correct group for the correct alignment. In this example, the group was ML_075. Change the group from New to ML_075 by selecting from the drop-down list.

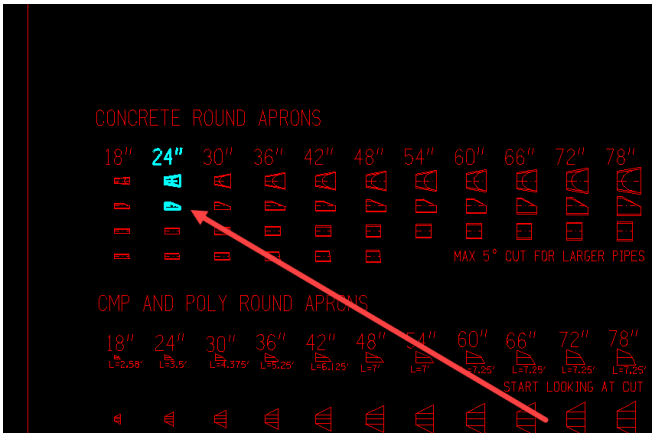


This may seem like a small detail but setting this correctly here avoids major issues later. Remember only use the New group the first time a section is cut from an alignment, then always select the correct group from then on.

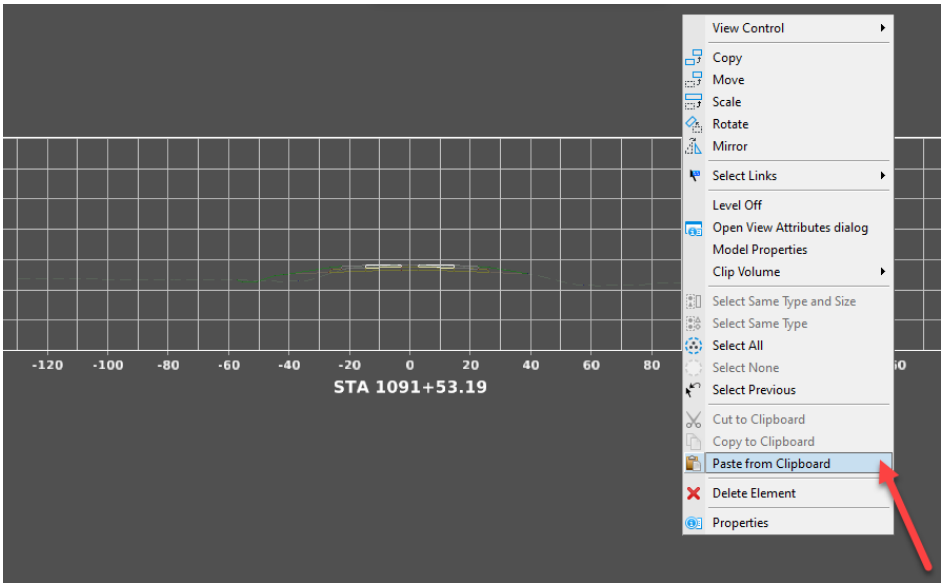
Note: It is suggested to cut all the sections on a project at the same time. Change the locations of the pattern lines whenever needed throughout the design. However, removing the cross section boundary if it has been cut and recutting the section at the new location will be necessary. Make sure the correct cross section group is chosen. This helps when making the plan sheets.

Now move onto the designing of the pipe. Start in the Multi-Model View and use the Element Selection tool to select the pipe apron template that is appropriate for the design.

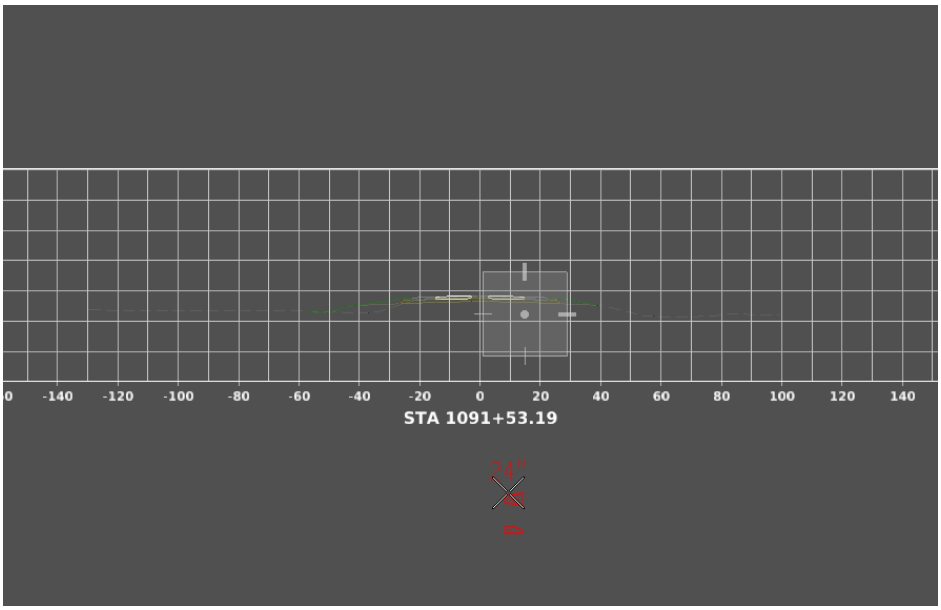
For this example, use a 24” DR-201. It should look like this:



Once it is selected, press Ctrl + C on the keyboard at the same time copying the selection to the clipboard. Then open the drawing model of the cross section for the pipe design. Once in that model, right click and hold. The right click context menu displays. Select the Paste from Clipboard option.

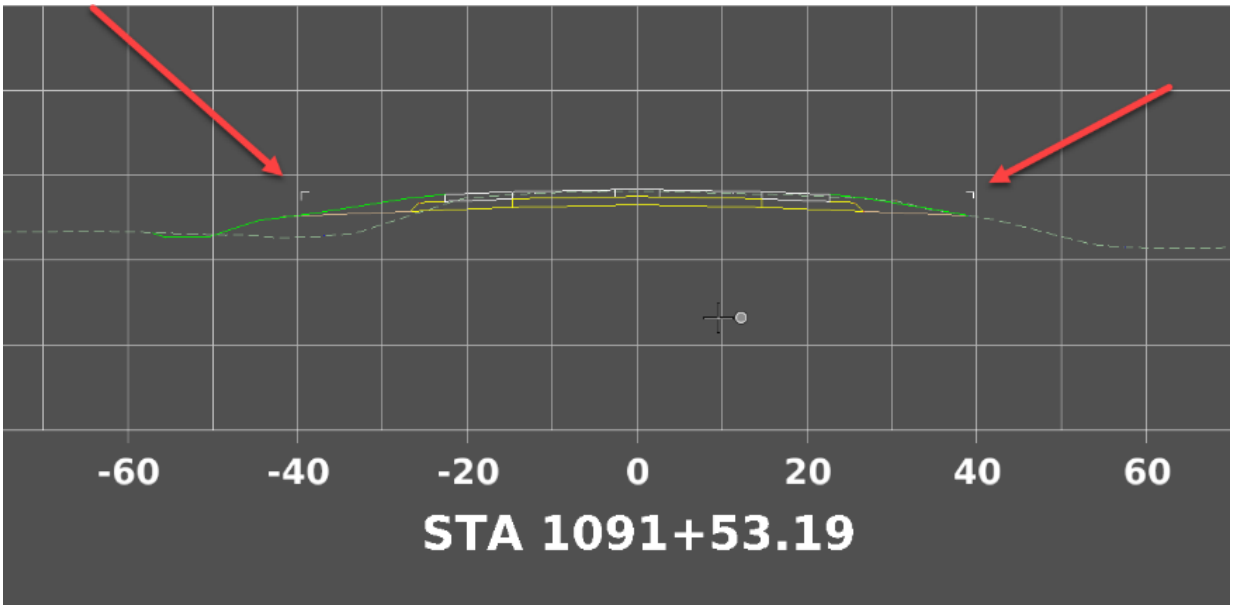


The pipe apron template placed in the clipboard will appear on the end of the cursor.



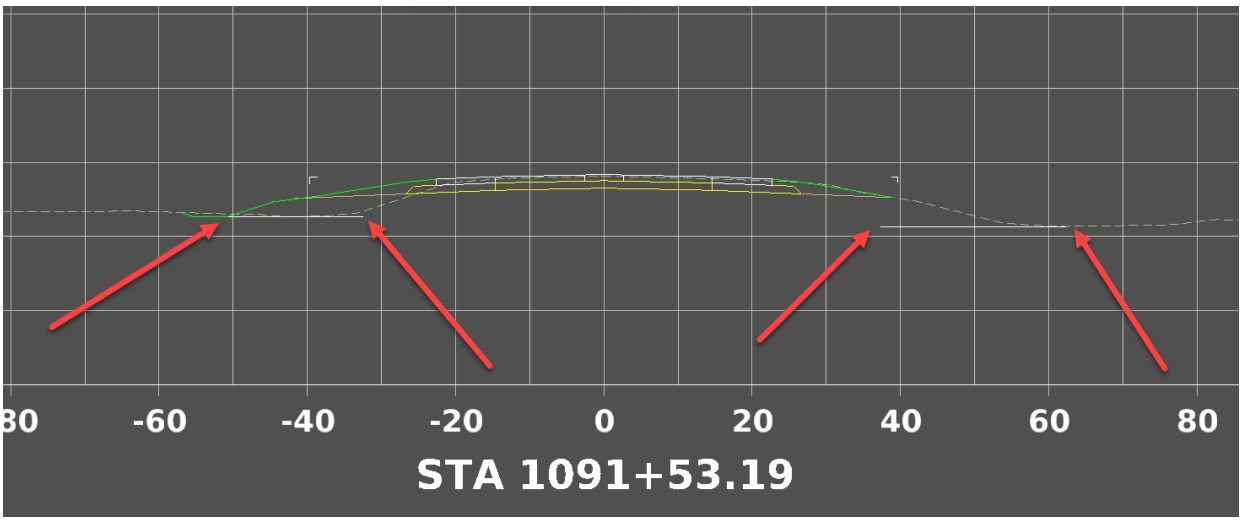
Once confident of the correct location of the new pipe and the hydraulic calculations determined the correct size, determine the clear zone at this location to meet compliance. Use AccuDraw to draw a line from the edge of travel way in the cross section to clear zone distance which marks the clear zone used to help determine the minimum length of the pipe.

It should look something like this:



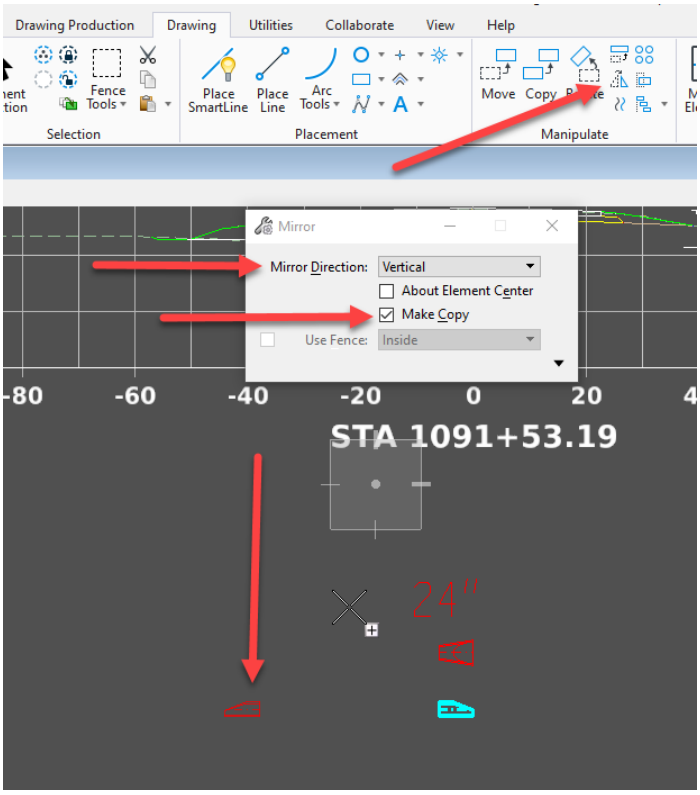
Next, set the flow lines of the pipe. This can be done in many ways depending on the location and design. For a typical crossroad pipe, it would be from one ditch grade to the other ditch grade. Use this approach for this example. Use the place line tool with the aid of AccuDraw and select the low point in each ditch to place the line.

It should look something like this:



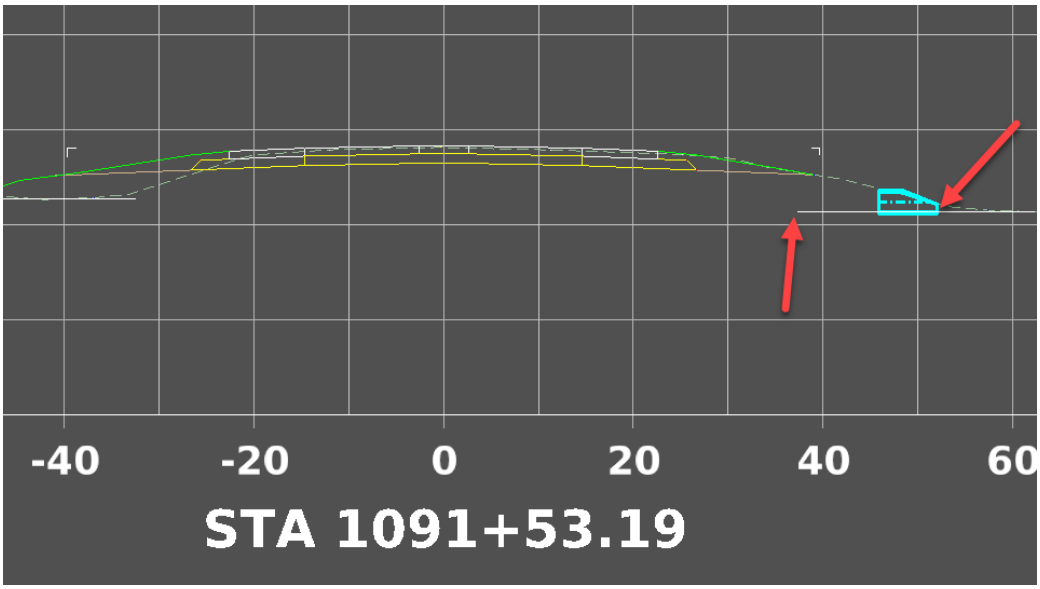
Next, select the apron template copied to this section and make a Mirror copy to use on the other end. Select the Mirror tool, set the Mirror Direction to Vertical and toggle on the Make Copy option.

It should look something like this:

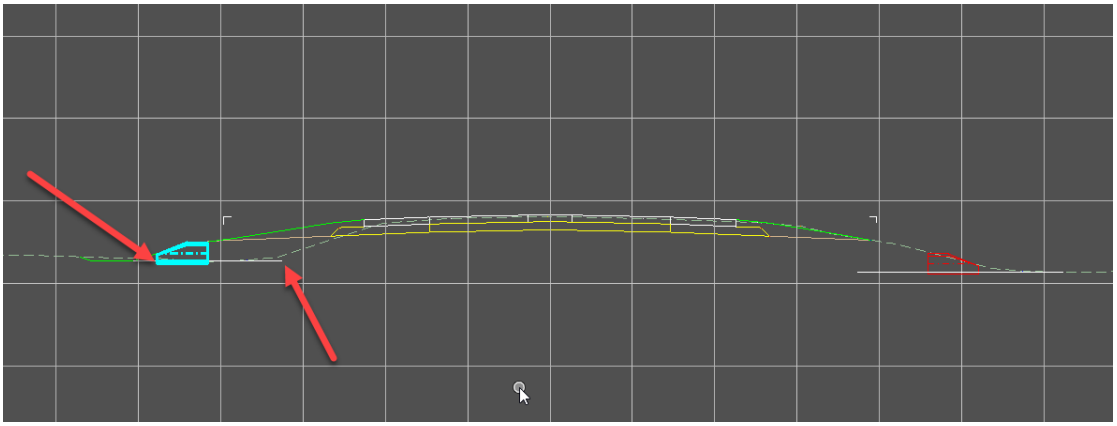


Next, select the apron template for the end of the apron and place it on the line representing the low point in the ditch grade. Make sure it is placed at the intersection of the fore slope or the clear zone marker.

It should look something like this:

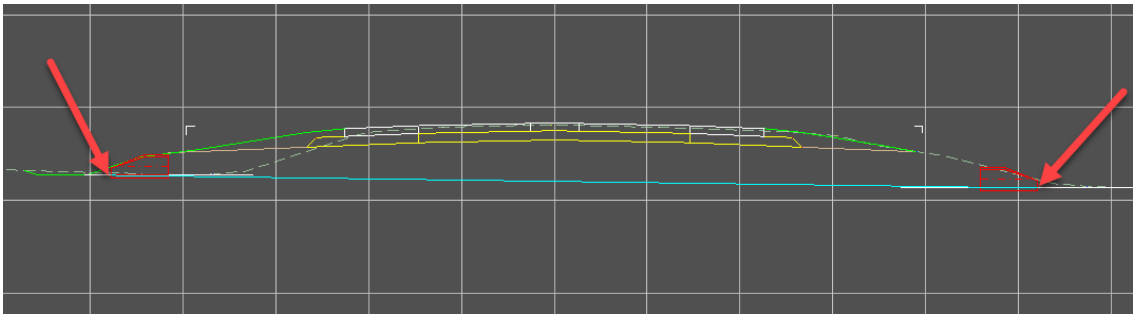


Next place the other apron the same way on the other end.



Next, place a line from the end of each apron that will represent the flow line of the proposed pipe. Change the color to blue to make it show up better.

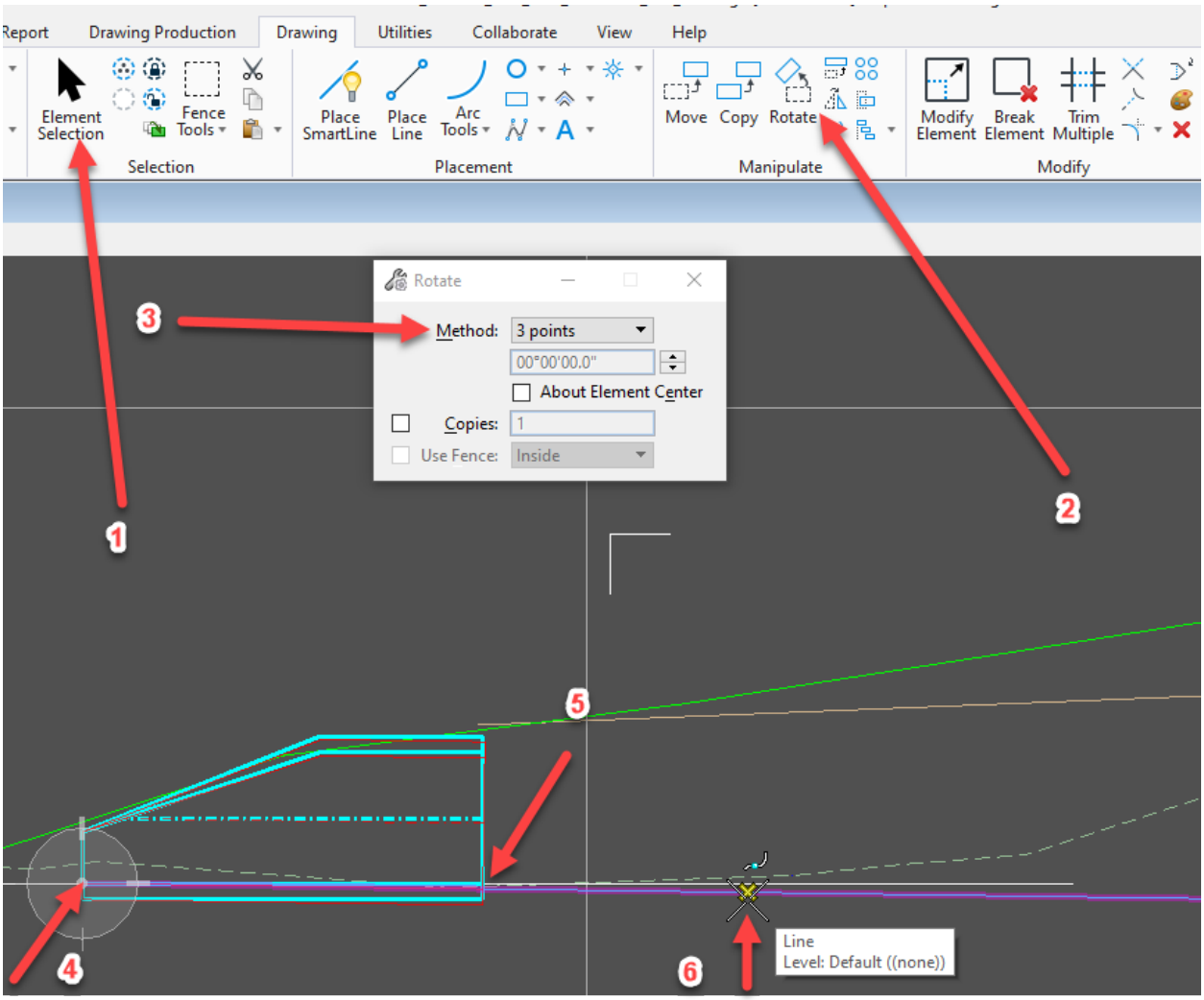
It should look something like this:



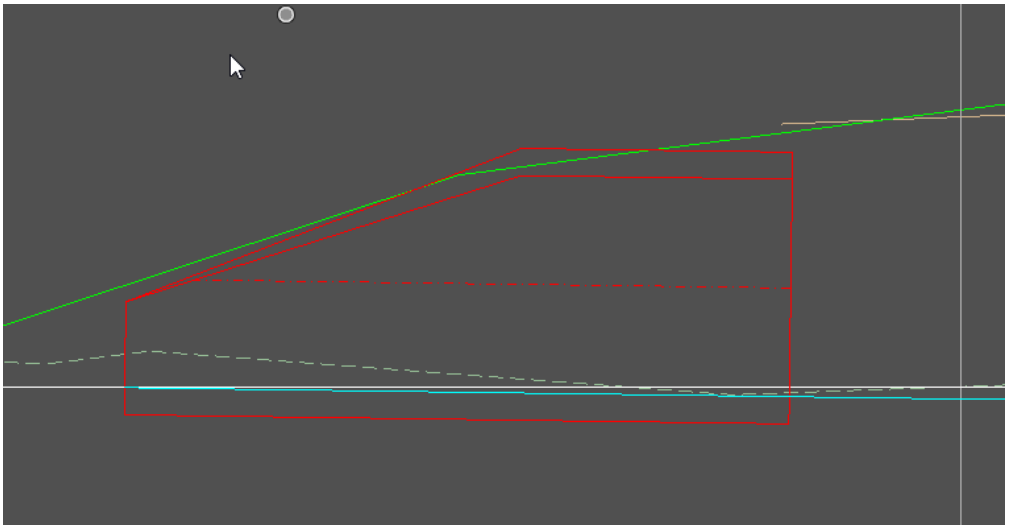
Next select the apron template at one end. Rotate the template to match the blue line that was just placed.

Follow these steps to complete.

1. Use the Element Selection tool to select the apron template.
2. Select the Rotate tool.
3. Select the rotate Method as 3 points.
4. Using an intersection snap, select the flow line of the end of the apron from the template.
5. Using an intersection snap, select the point of the flow line on the template that would join with the pipe.
6. Using a near snap, select the blue line that represents the proposed flow line of the pipe.



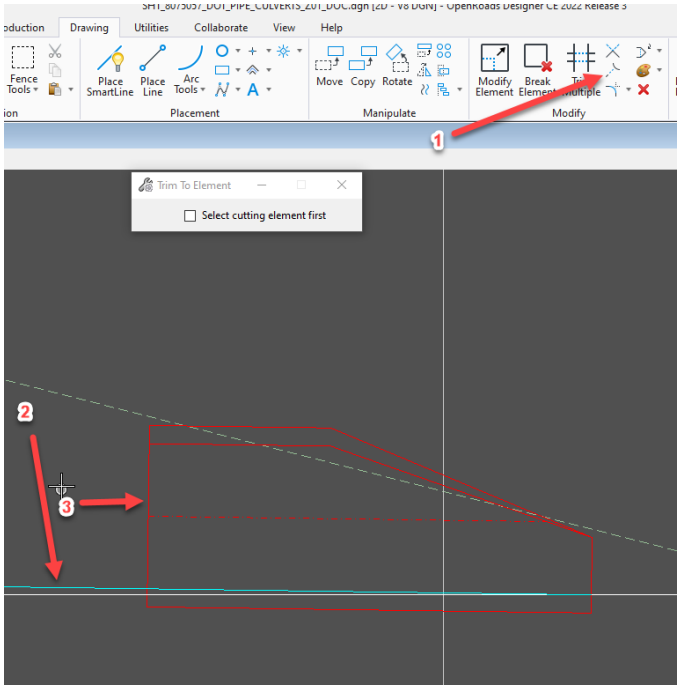
It should look something like this:



Repeat the same process on the other end of the pipe.

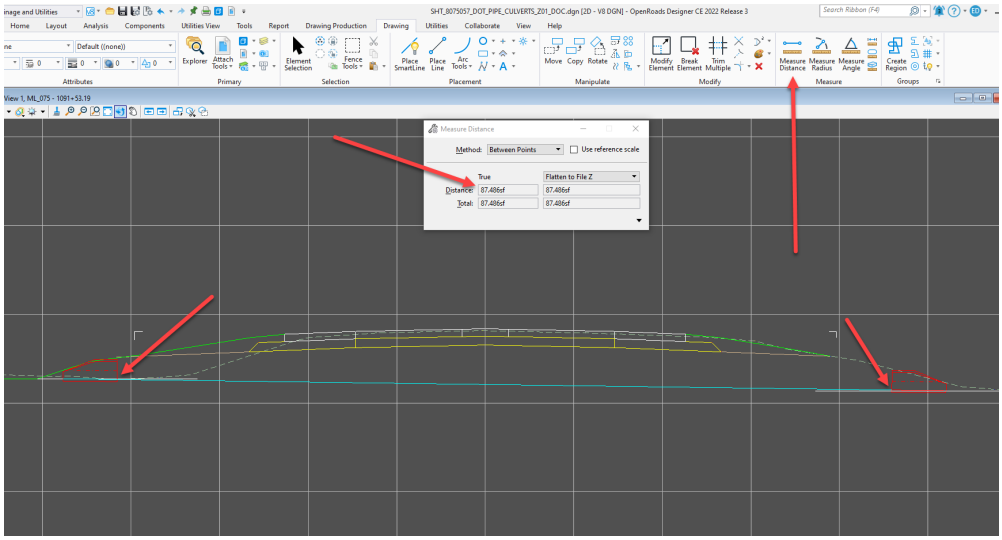
Then, use the Trim To Element tool to trim the blue line representing the proposed flow line of the pipe.

1. Select the Trim To Element tool.
2. Select the blue line.
3. Select the pipe apron template.



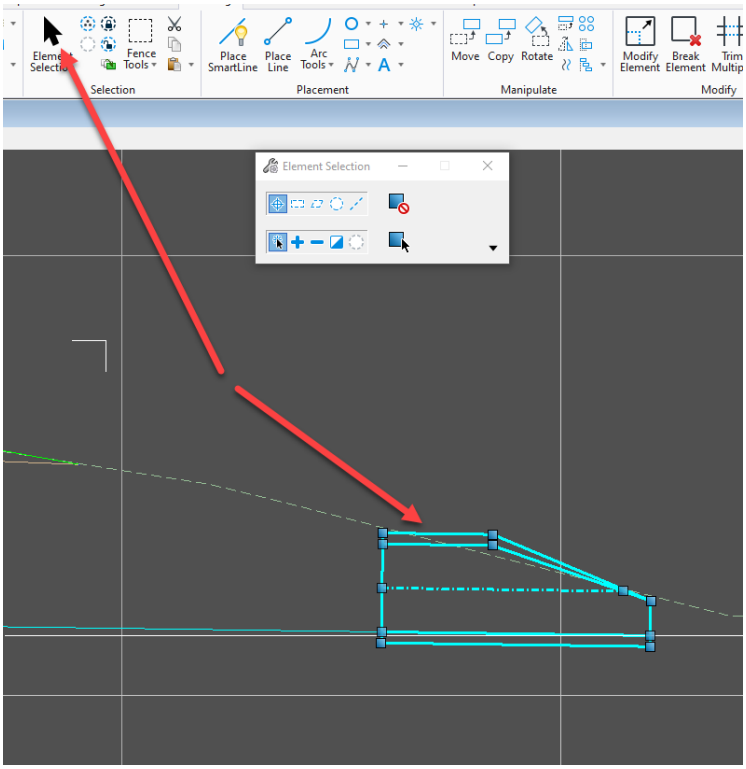
Repeat this at the other end of the pipe.

Next, use the measure distance tool to measure the blue line representing the proposed flow line of the pipe.

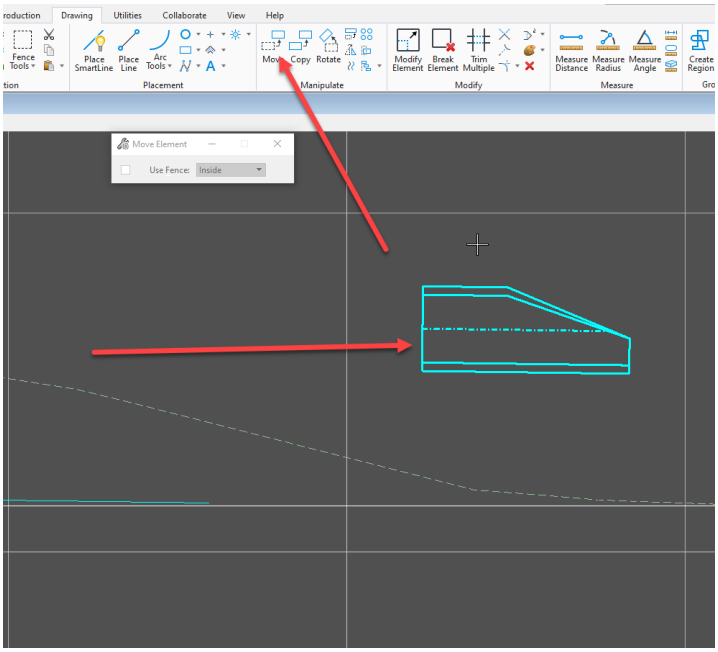


Notice the distance of the line after trimming, it is 87.486’ Add 0.514’ to the outlet end of the blue line representing the proposed flow line of the pipe to make it an even 88.00’. Pipe design length is constrained to even 2’ intervals due to how the pipes are bid and manufactured.

Use the Element Selection tool and select the outlet apron template.

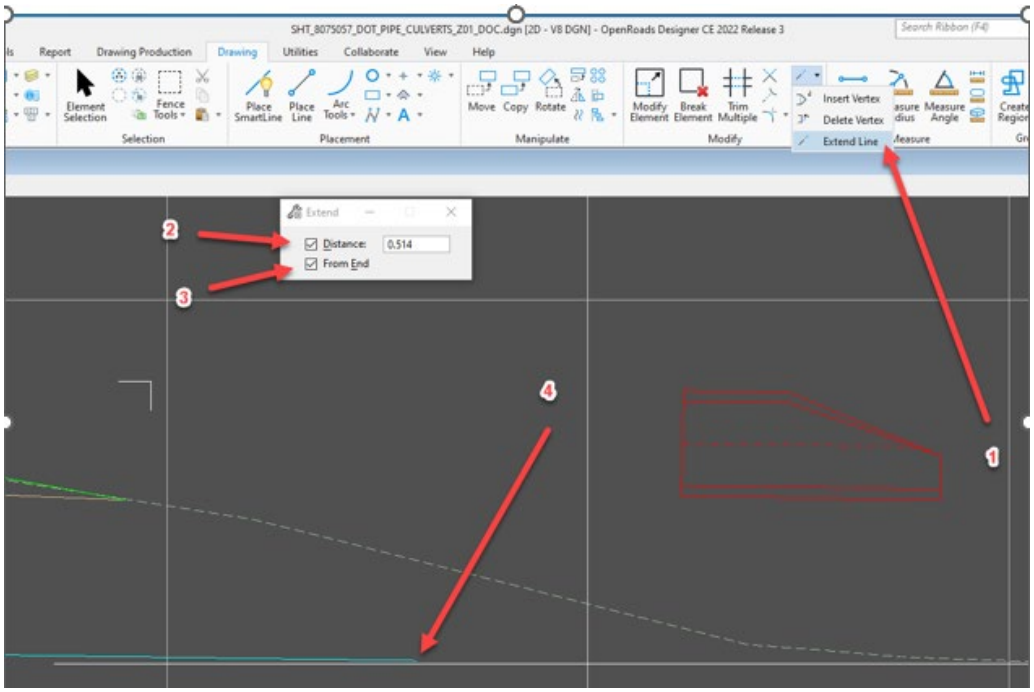


Select the move tool and move it out of the way.

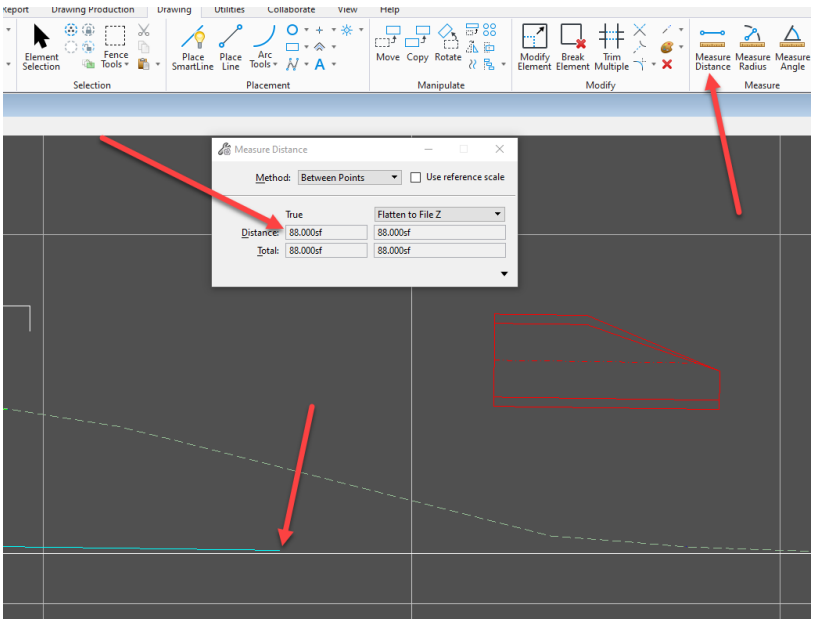


Next follow these steps to achieve the correct length.

1. Select the Extend line tool.
2. Toggle on the distance
3. Toggle on the From End.
4. Select the outlet end of the blue line representing the proposed flow line of the pipe.

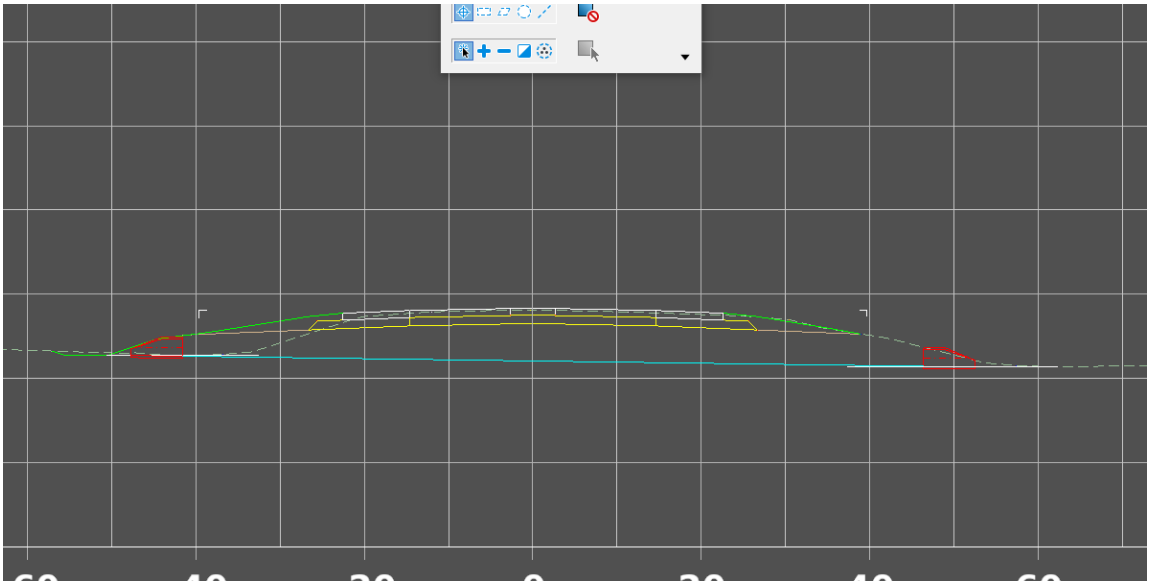


This will make the line exactly 88’. Use the measure distance tool to confirm.

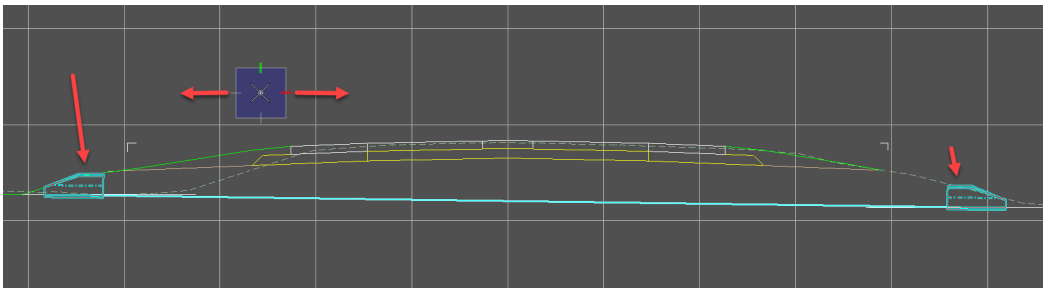


Then use the Element Selection tool to select the outlet pipe apron template and replace it to the end of the outlet end of the blue line.

It should look like this:



Next, use the Element Selection tool and select the blue line and both pipe apron templates. Then, use the move command to move it left or right to best fit the fore slopes.

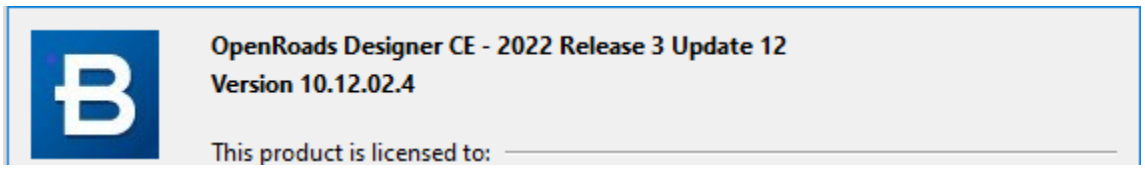


Now the invert information needed to model the 3D pipes is completed. Continue to the modeling of the pipes.

PW03_Modeling Pipes in Connect

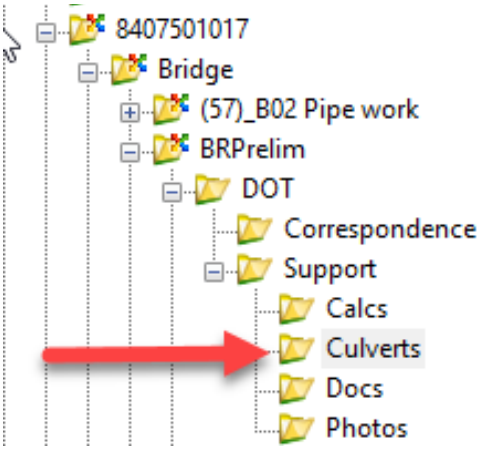
Modeling Pipes in CONNECT

These instructions were created April 2024. These instructions were created with:



Once the invert coordinates of the pipes to be modeled are determined, then place them into the ASCII input file. To do this, copy the PIPE SEED.txt file from the PWMain\Documents\Resources\ClientWorkspaces\IowaDOT\IowaDOTProduction\Organization-Civil\IowaDOT_Standards\Cell\BridgeDesignDetails\ folder to the project folder.

Iowa DOT personnel should create a Culverts folder under the \Bridge\BRPrelim\DOT\Support\ subfolder for the project and copy the text file there.

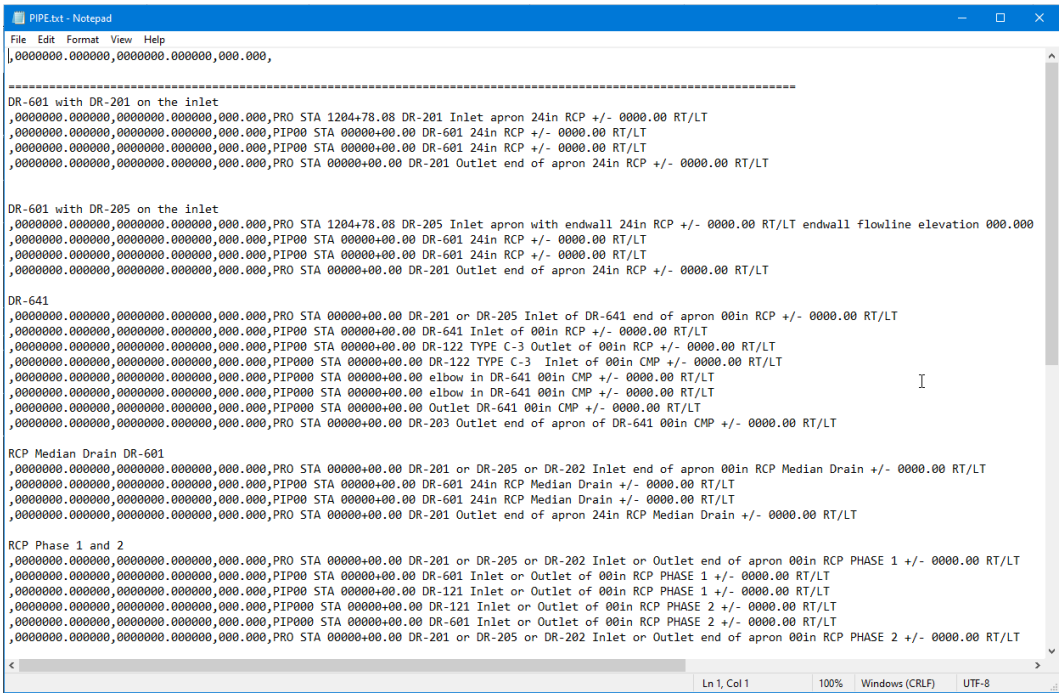


Consultant designers should create a Culverts folder under the \Bridge\BRPrelim\XYZ-CORP\Support\ subfolder for the project and copy the text file there. The XYZ-CORP folder will be renamed for the consultant contracted for the design project.

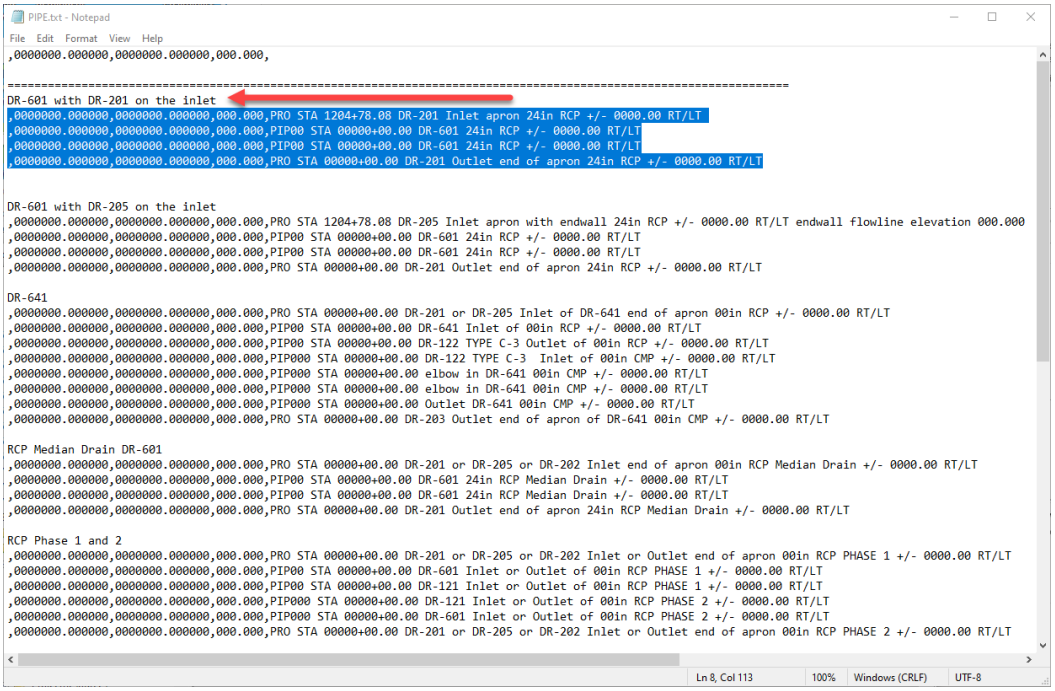
For more information refer to : Consultant ProjectWise CONNECT Bridge Project Folder Structure

Once the seed file is copied, rename it to Pipes.txt. Then open it in Notepad or other similar text editor.

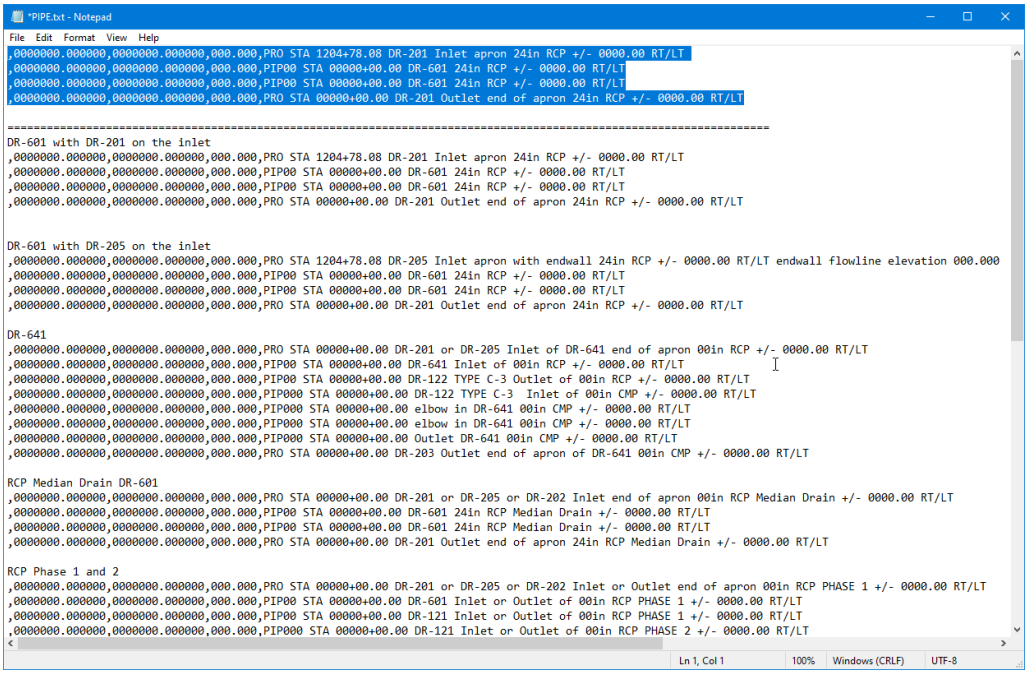
It should look something like this:



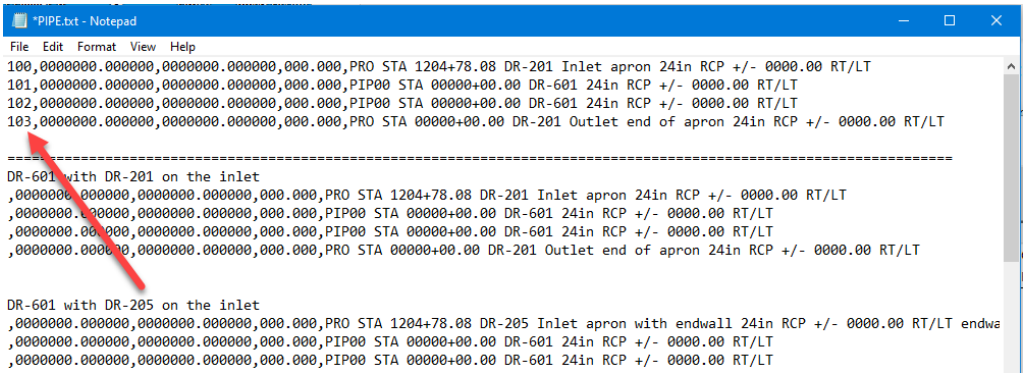
This file was made to provide some of the templates of the data that will be stored and saves some of the typing that is needed to create the ASCII input file. Now, find the template that best suits the pipe design and highlight it in the lower portion of the file and make a copy of it. For this example, the design is for a typical crossroad pipe that would be a DR-601.



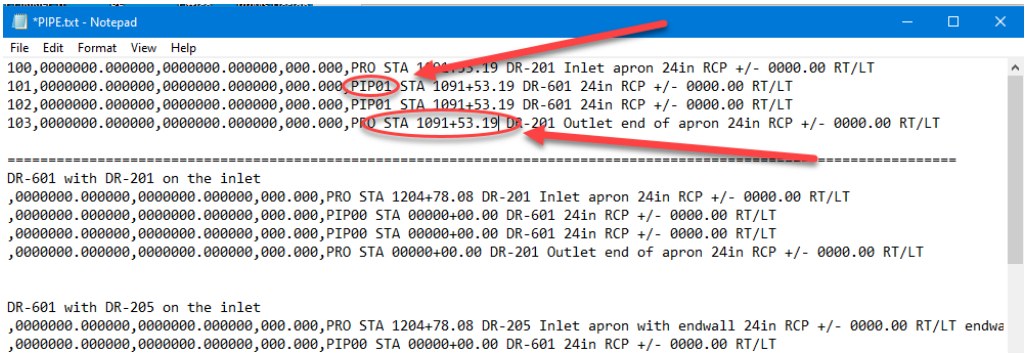
Then paste it at the top of the file like this:



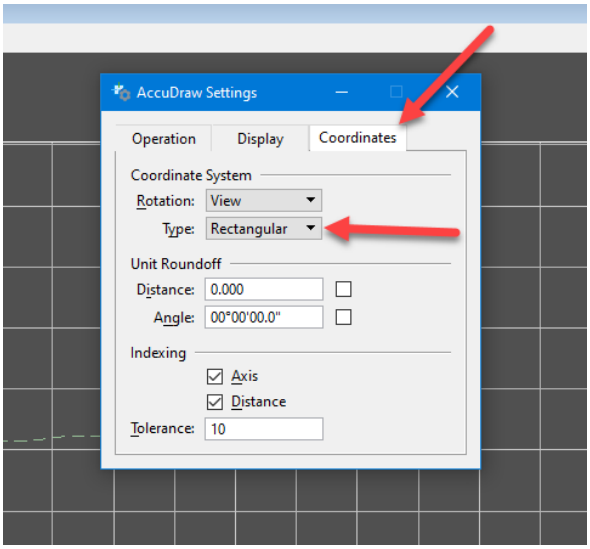
Next, add the point number to each line. It is suggested to start with 100.



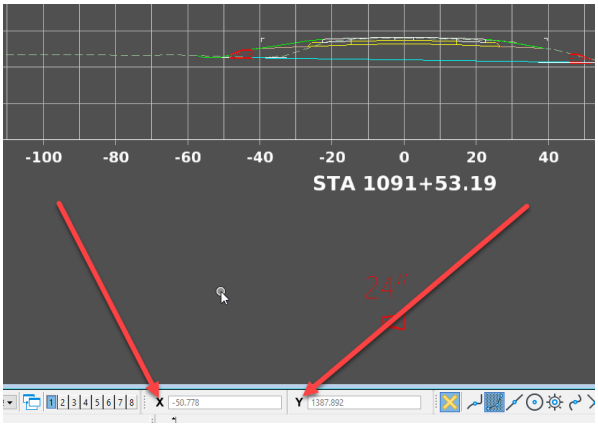
Next fill out the station and set the first feature number like this.



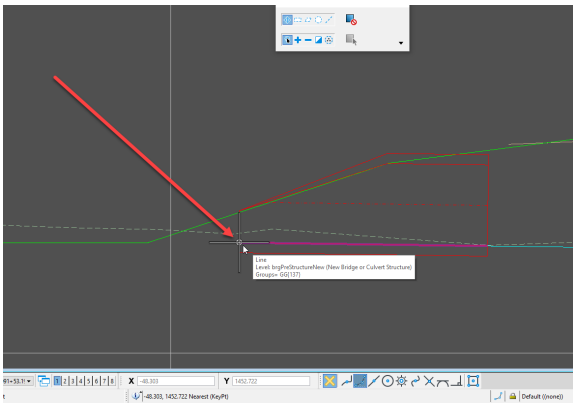
Go back to the cross section used to design the pipe. Open the AccuDraw settings and make sure it is set to Rectangular under the Coordinates tab.



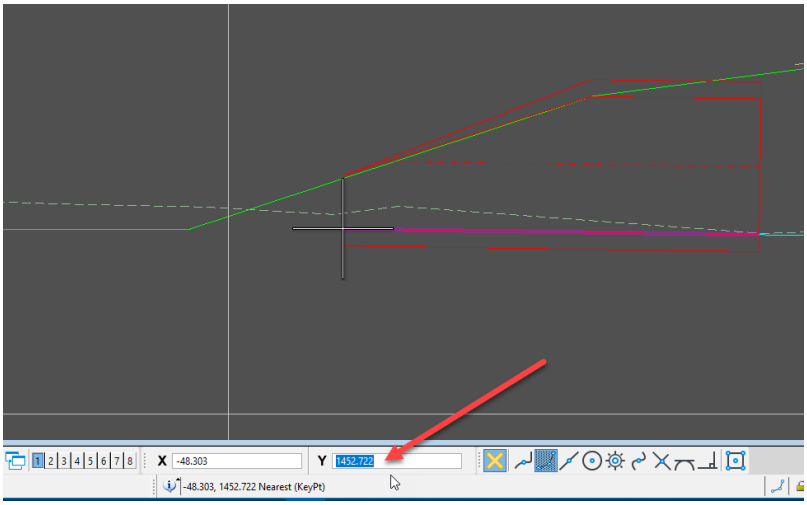
This will provide the Coordinates read out at the bottom of the application window.



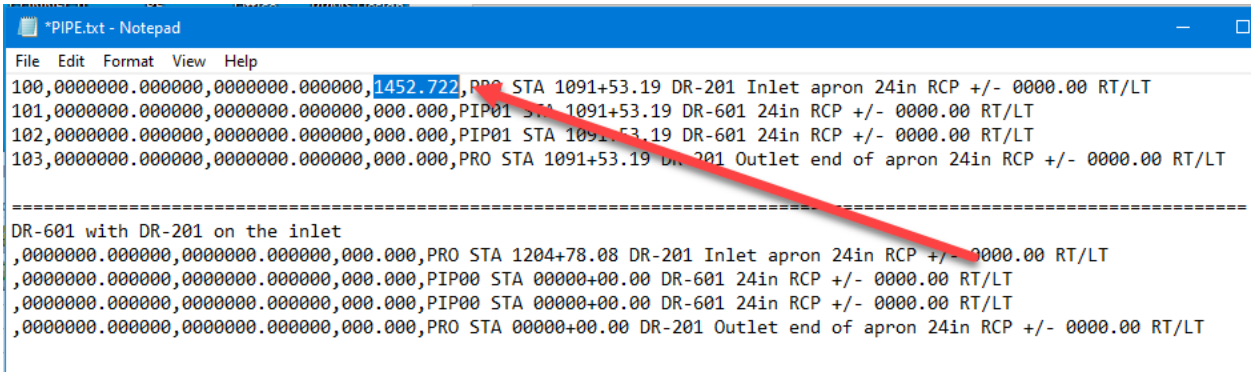
Then in the cross section, select the Element Selection tool and make a tentative snap to the end of the inlet apron in the design.



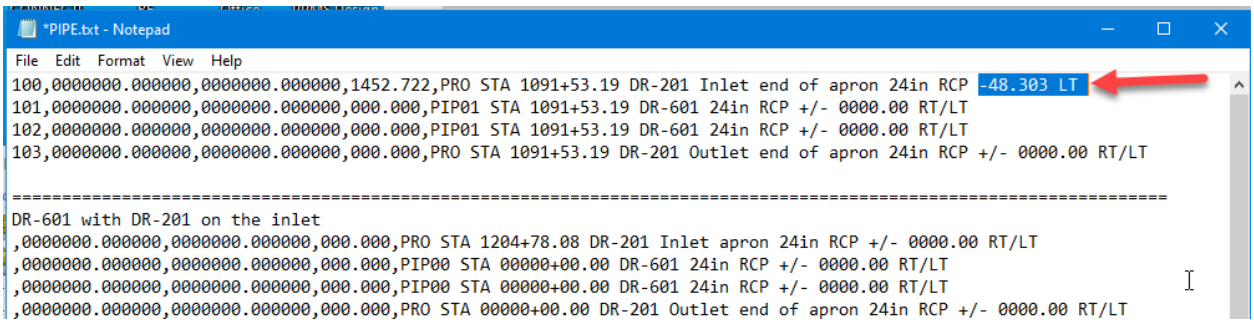
The AccuDraw Coordinates readout is displaying the Elevation in the Y window and the offset in the X window. Highlight the number in the Y window and use the Ctrl + C keys on the keyboard to copy that number.



Then go to the ASCII input file and paste the inlet elevation in the correct location.

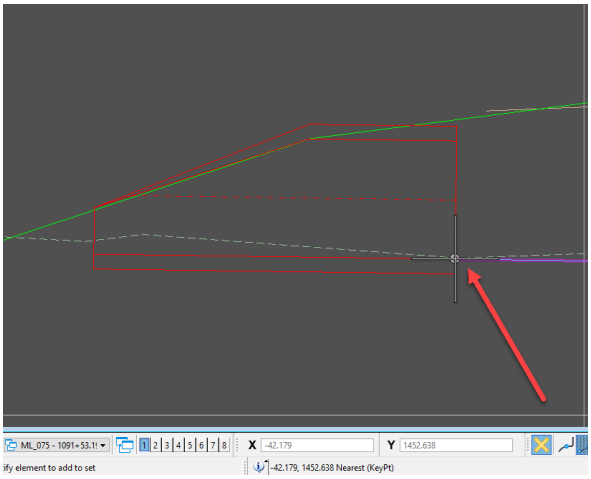


Next, copy the offset from the X window of the AccuDraw Coordinates readout display and paste it in the correct location in the ASCII input file.



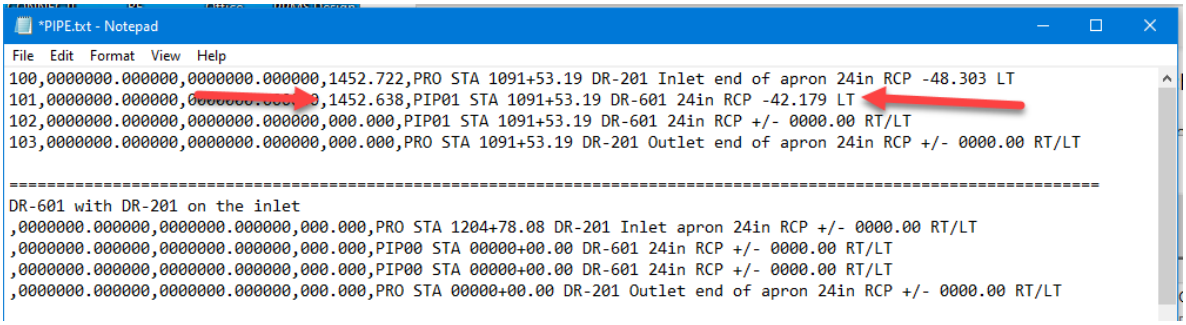
Then in the cross section, select the Element Selection tool and make another tentative snap to the junction of the pipe apron and the first pipe section at the flowline.

It should look something like this:



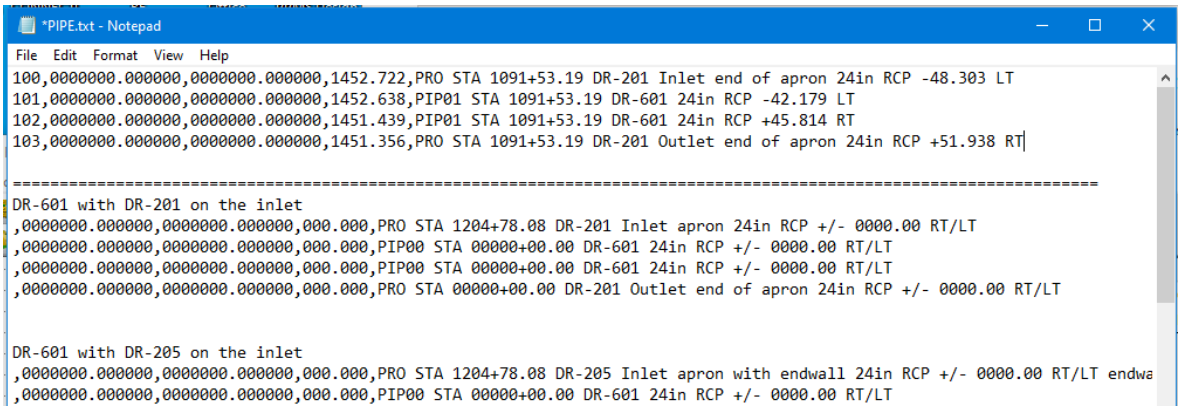
Then copy and paste the elevation and offset from the AccuDraw Coordinates readout and paste it in the correct location in the ASCII input file.

it should look something like this.



Repeat the process at the other end of the pipe starting at the junction of the pipe apron (the last section of the pipe at the flowline of the outlet) and the point at the end of the outlet apron and paste them in the ASCII input file.

When done it should look like this:



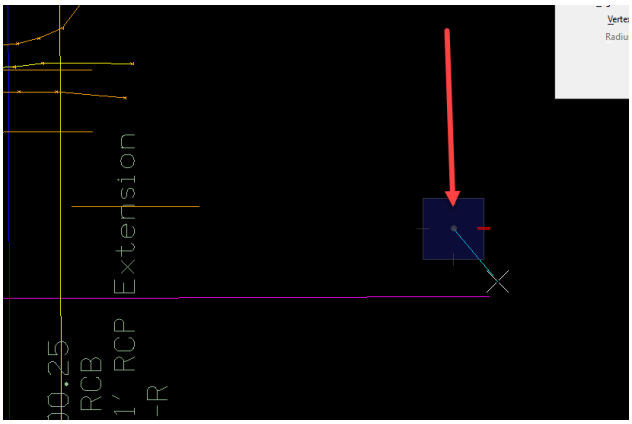
Keep in mind that up to 256 characters can be used to describe the point that will be mapped. On the outlet it is suggested to include the comment that will become the notes on the schedule sheet. This will make it easier to input the information into the database by copying and pasting and not retyping it. This note can consist of any information appropriate to convey to the contractor building the pipe. For example, “Jack new 24" RCP. Remove Existing pipe at Sur Sta. 1090+68.1 or will be plugged and abandoned with flowable mortar.” For this example, use “Culvert is designed to be cut and cover. Lay 88' of 24" 2000D RCP with two DR-201 Aprons.”

Next, calculate the X and Y Coordinates of the four points in the ASCII input file. To do this, close and check in the SHT file and open the ORD model file under the Bridge folder. Once the file is open, find the pattern line used to cut the cross section from. For this example, it was the line at STA 1091+53.19.

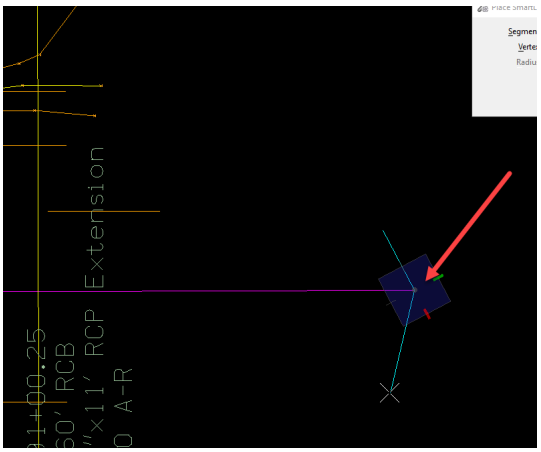
Hint: If uncertain where to look in the file for the pattern line, using the Open Cross Section View tool is helpful in locating the pattern line.

Next, place construction lines to locate the x and Y Coordinates. With the Place Smart Line command and AccuDraw on, locate the left off set points. Start on the right side of the pattern line making the first point just above or below the pattern line.

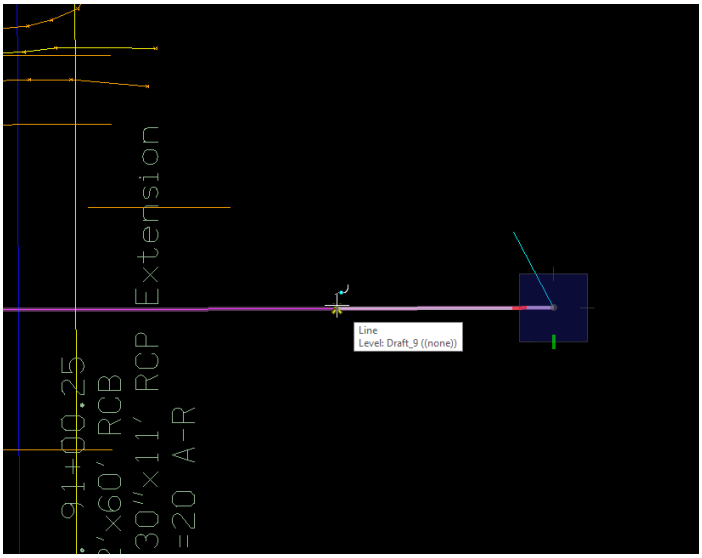
It should look like this:



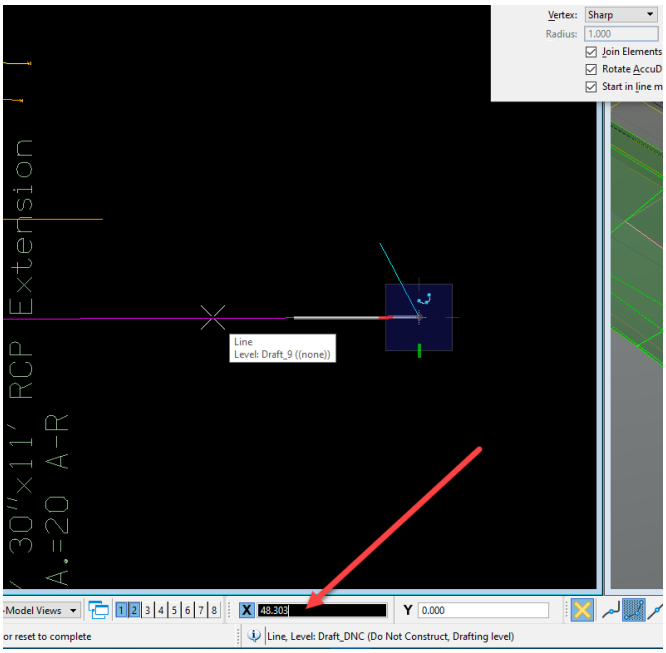
Next snap to the end of the pattern line.



Now, on the keyboard type Q then R. This is the command in AccuDraw to quick rotate. This will make the AccuDraw compass rotate. Then, select the near snap and snap on the pattern line. This assures the line will be drawn exactly along the pattern line.

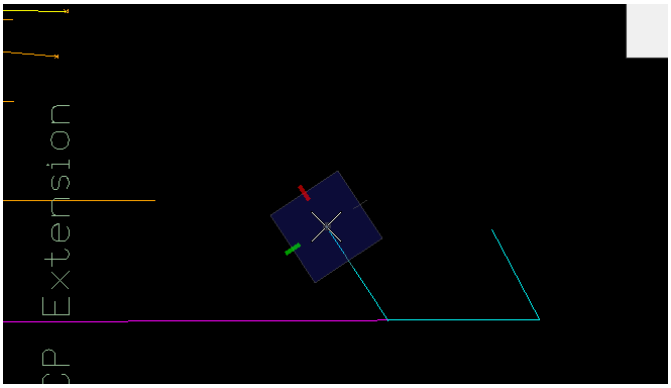


Next, type in the left offset distance to the end of the left apron stored in the ASCII input file. For this example, it is -48.303.

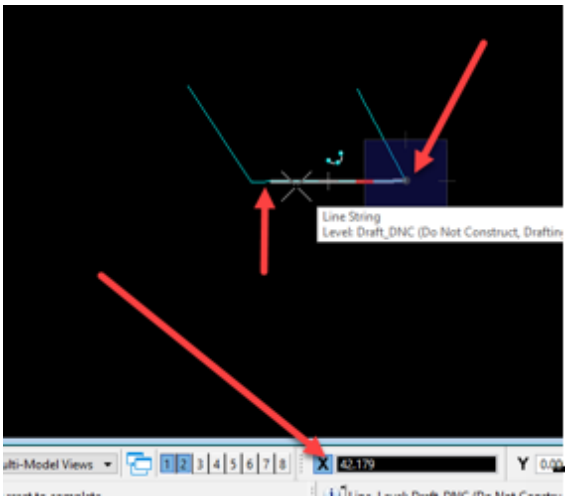


Then draw a line off that point to make it easier to find.

It should look something like this:

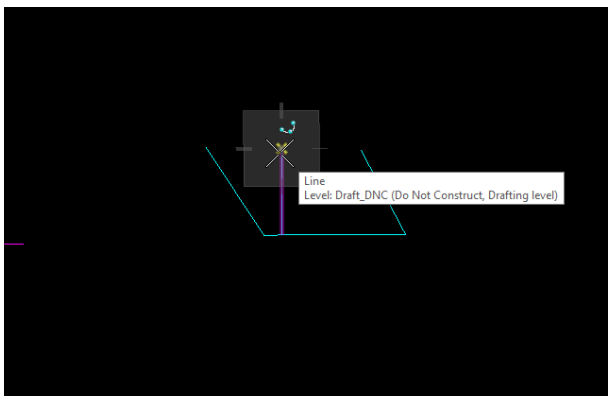


Next, select the smart line just created and move it off the pattern line to make it easier to define the other points. Next, define the next point that is left of the centerline. To do this, snap to the smart line from the measured point and rotate the compass to match the last distance point and type in the next offset distance (like before). For this example, it will be 42.179.



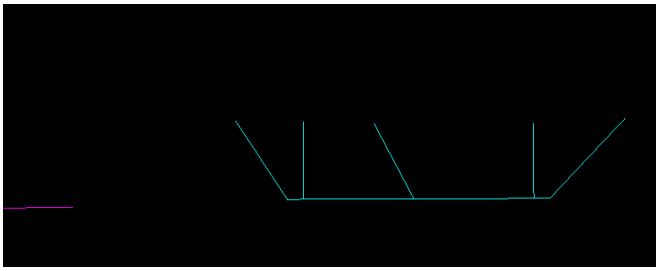
Then draw a line to make it easier to snap.

It should look something like this:

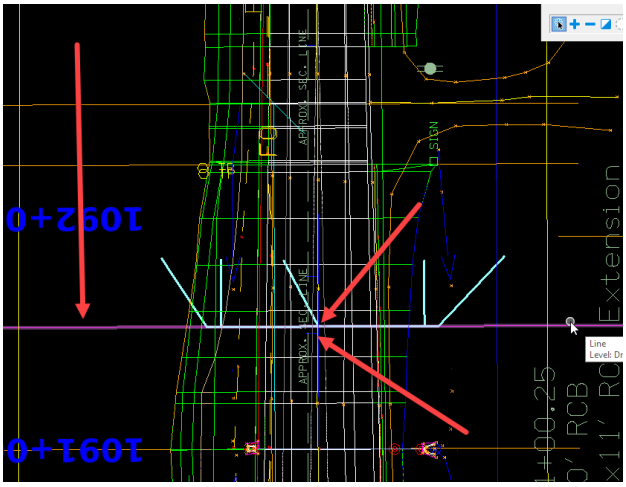


Next, draw lines for the right off set points (same way as the left points).

It should look something like this:

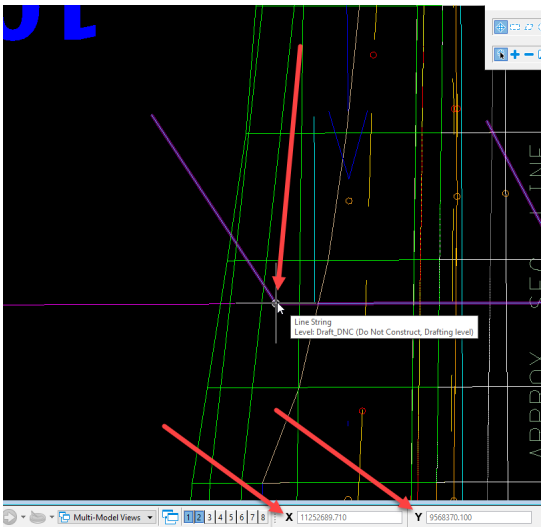


Now with the Element Selection tool, select the smart lines just created. Move them to the location to do this snap to the centerline point and place it at the intersection of the alignment and the pattern line.



Once it is moved, then unselect the smart lines that were moved into place.

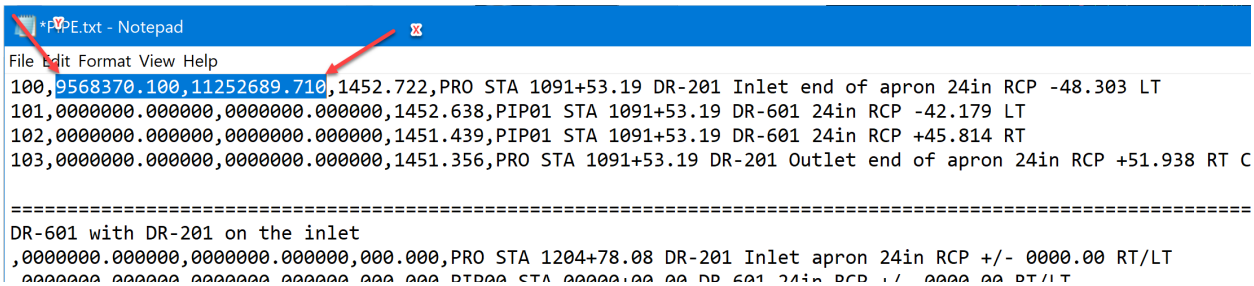
Next, make a tentative snap to the first point to define the X and Y coordinates in the ASCII input file.



Next, copy the Y and X coordinates and paste them into the ASCII input file in the correct locations.

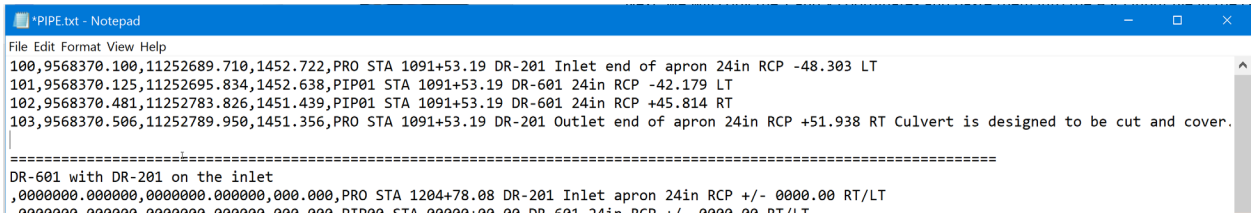
Hint: Remember that ASCII input file stores the coordinates as Y – X – Z in that order.

It should look something like this:



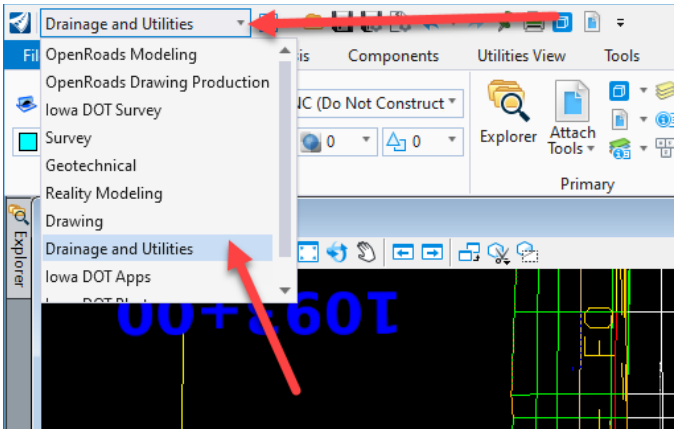
Repeat on the other points and finish the structure in the ASCII input file.

It should look like this once completed:

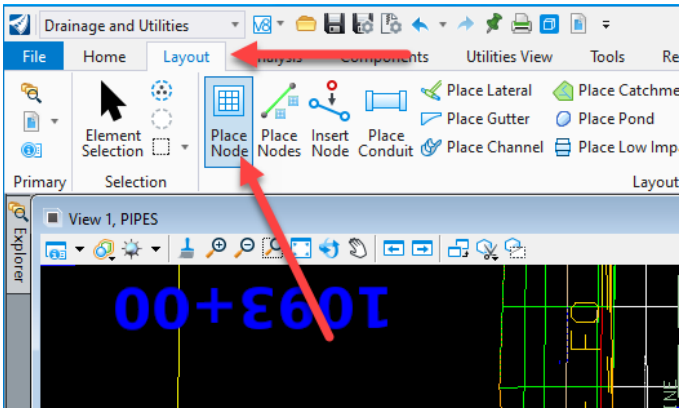


Now, the file is ready to model the pipe in the model file.

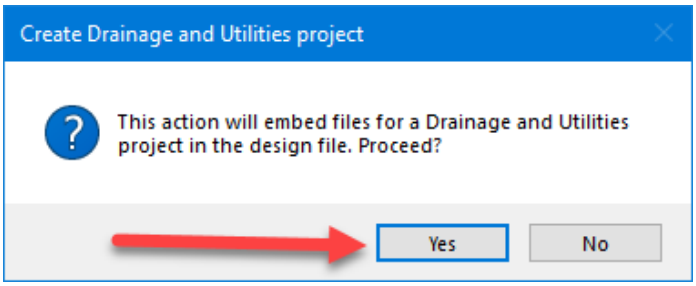
First change the workflow to Drainage and Utilities.



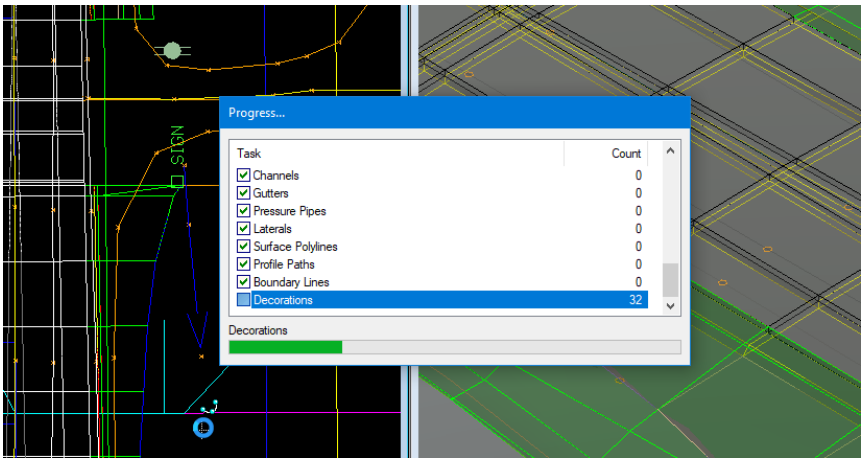
Then select the Place Node tool in the Layout tab.



A prompt to proceed will display. Click Yes. This only displays the first time the DU tools are leveraged.



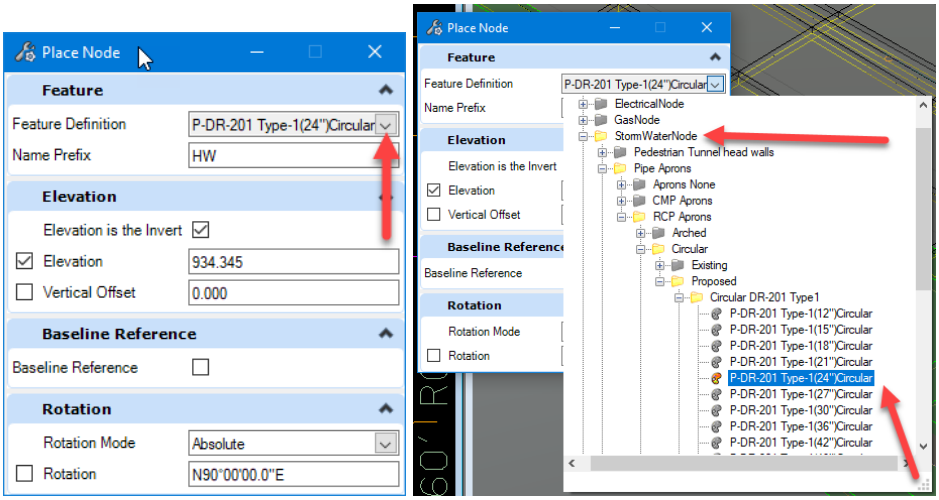
Next, set the file up to use the Drainage and Utilities tools.



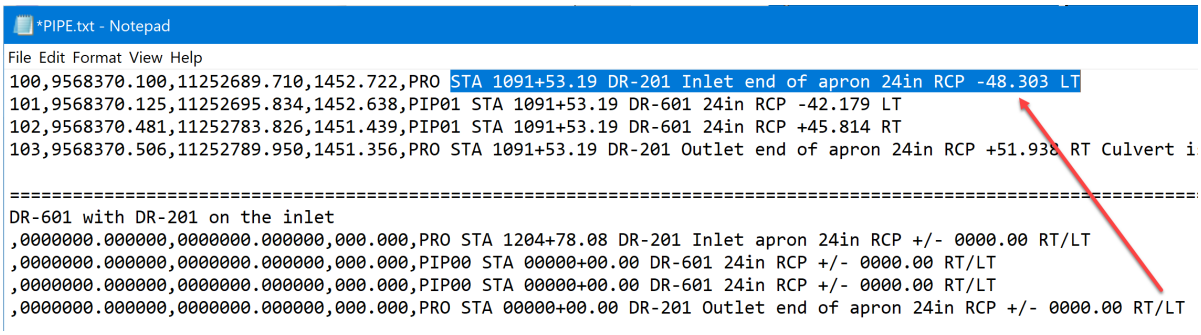
Make sure to work in view 1, the 2D model. Select the Place Node tool again. It will open the dialog box needed to define the Feature Definition, the Name Prefix and the Elevation constraints.

First, set the Feature.

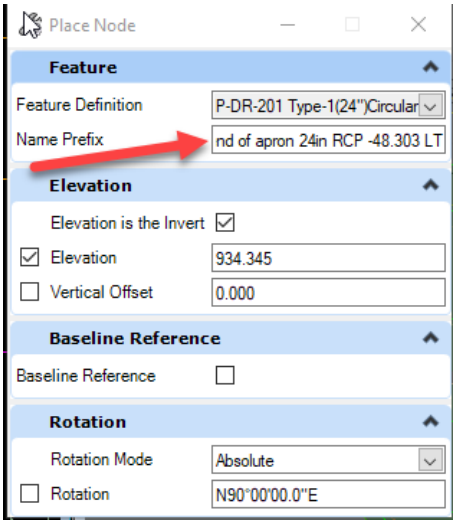
For this example, it will be 24 in DR-201.



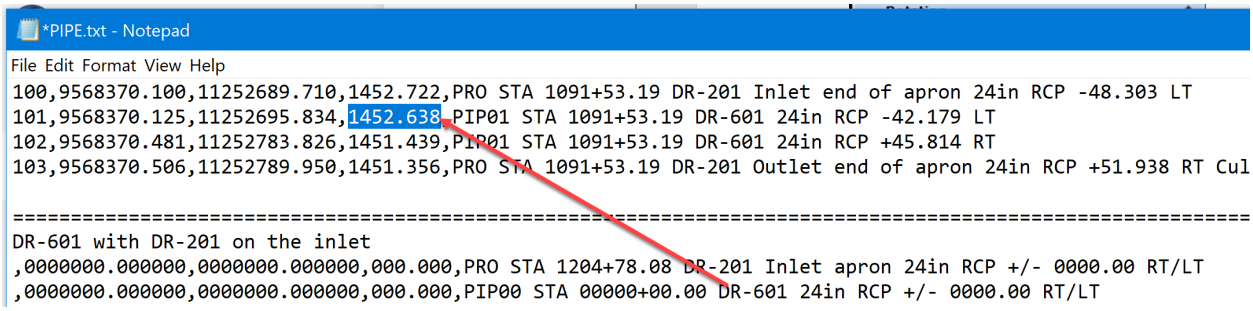
Next, place the Name Prefix. This will be a part of the description from the ASCII input file. It will consist of the Station, standard, description and offset.



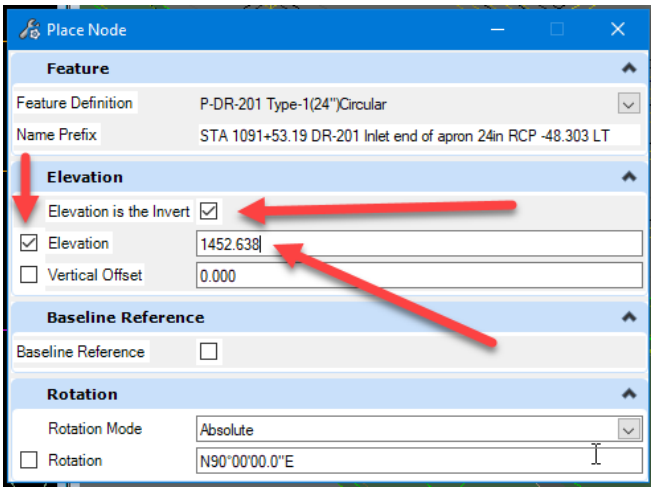
This is why it is easier to type it in the ASCII input file and then copy and paste it in the Name Prefix field instead of typing it in the Name Prefix each time. This also maintains consistency in the naming of the descriptions.



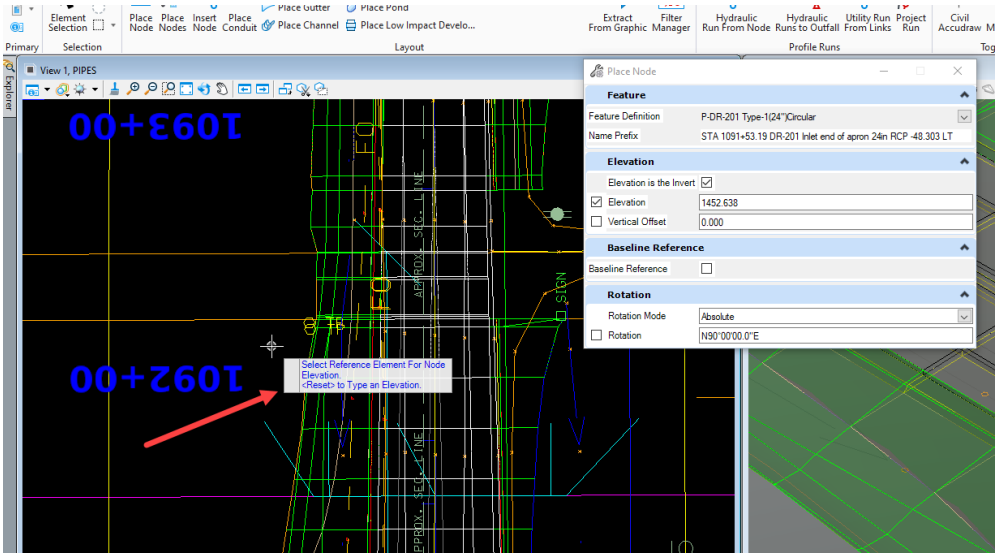
Last, define the invert elevation. The invert elevation is the elevation at the connection of the pipe apron and the first pipe section. For this example, it will be 1452.638



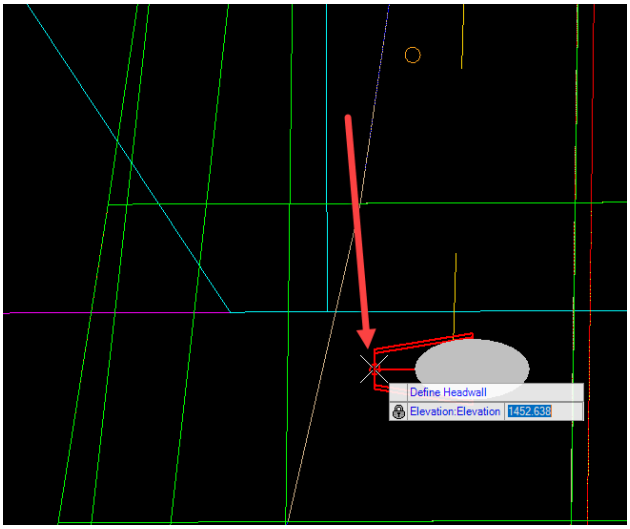
This can be copied from the ASCII input file then pasted into the field. Toggle on the Elevation is the Invert and the Elevation options.



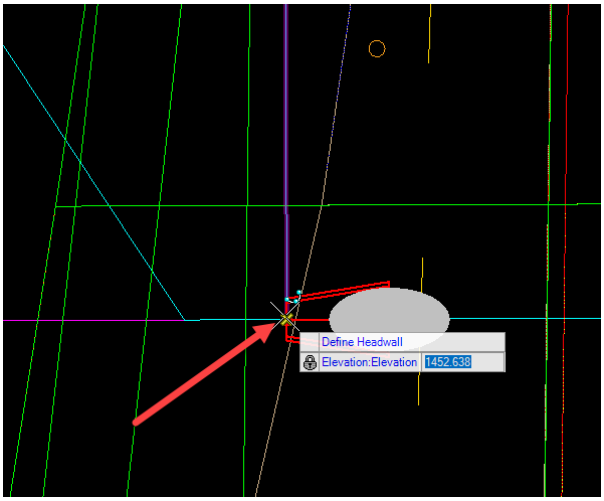
Once the settings are completed, it will prompt to select Reference for Node Elevation or <Reset> to type an Elevation.



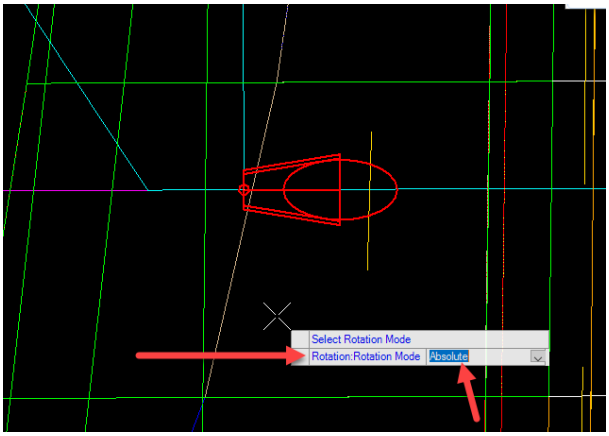
Reset with the mouse. Then the apron appears at the end of the cursor.



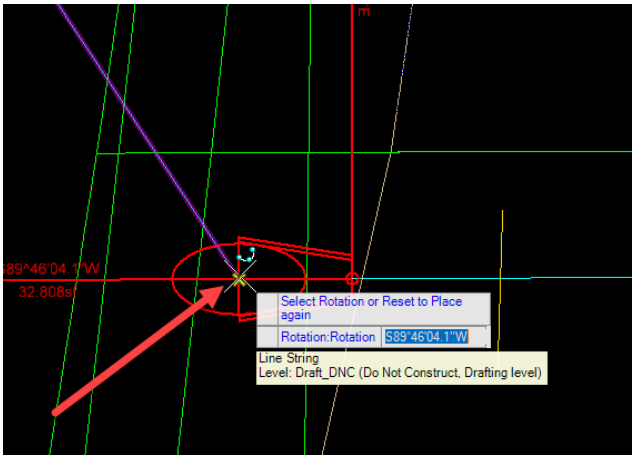
Next, snap to invert location that was mapped with the smart lines.



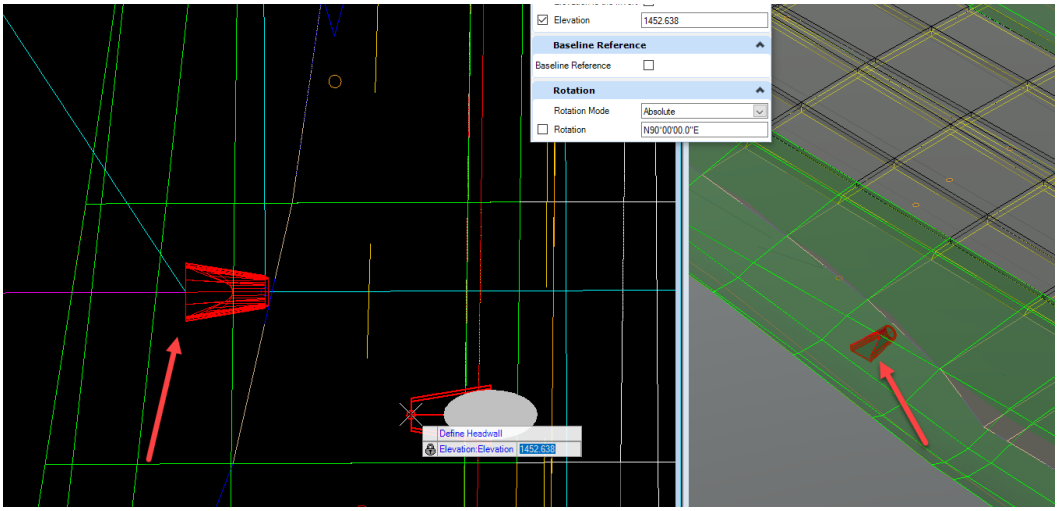
Then, it will prompt for the method to use to rotate. Select Absolute.



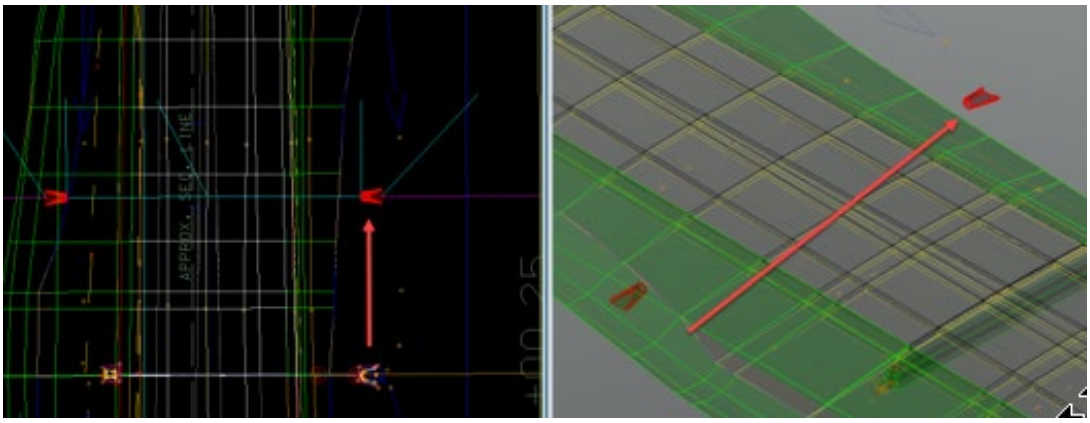
Next, rotate the apron to the smart line that represents the end of the apron.



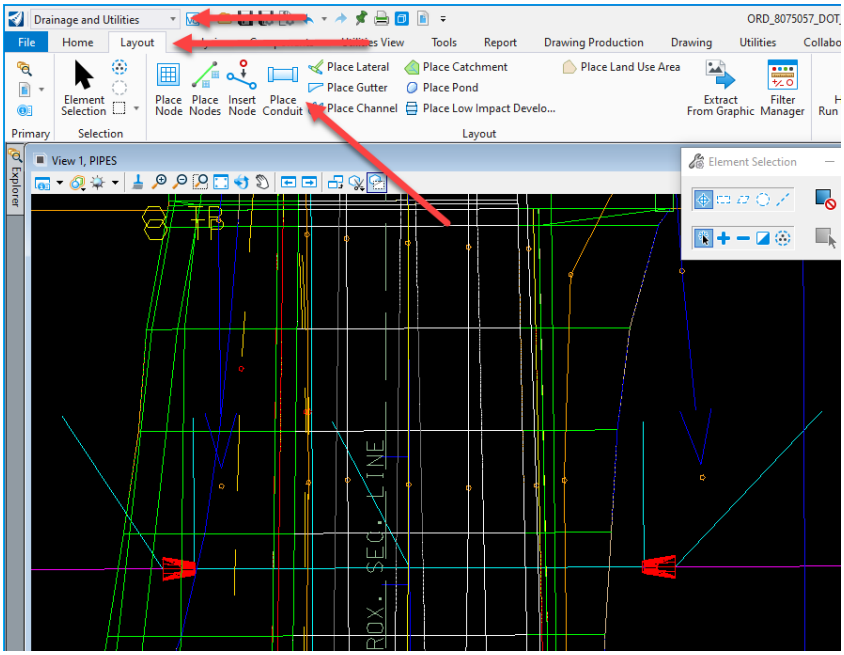
Data point to accept the rotation then DU will place the apron in the 2D and 3D model. It should look something like this:



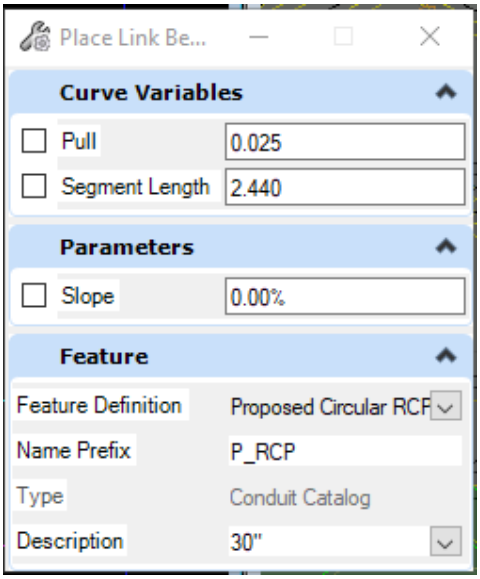
Hit the Esc key to exit the command. Next, repeat the process on the other end of the pipe to place the other apron.



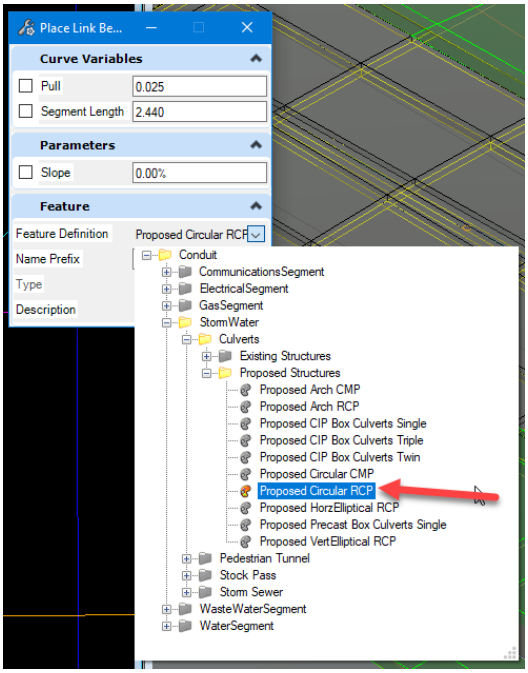
Once both aprons are placed, the pipe can be placed. To do this, use the Place Conduit tool located on the Layout tab.



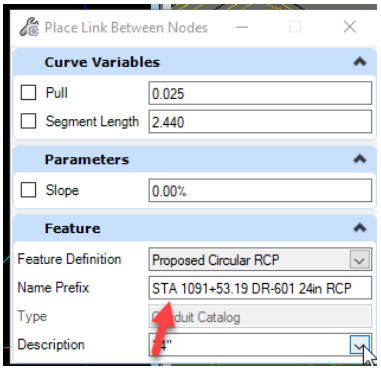
It will open the Place Link Between dialog box. Set the Feature Definition and Name Prefix and Description as Size of pipe.



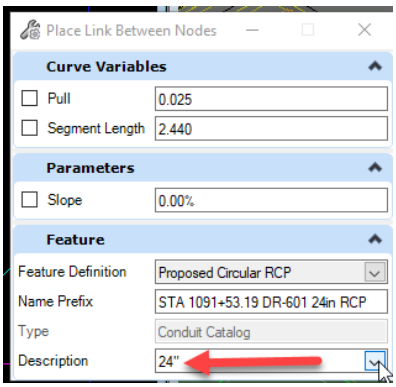
For this example, place a 24” DR-601 RCP by picking the Proposed Circular RCP feature.



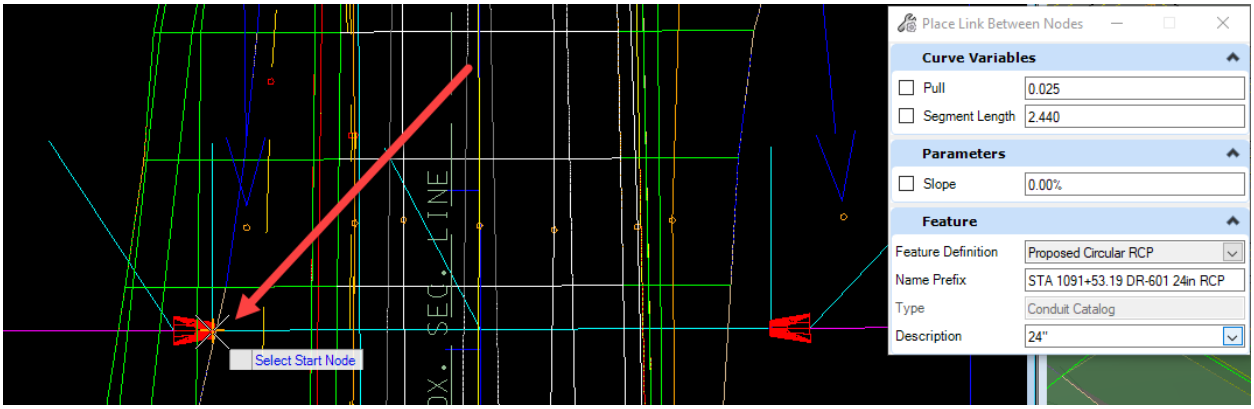
Next, place the Name Prefix. This will be a part of the description from the ASCII input file. It will consist of the Station, standard and description.



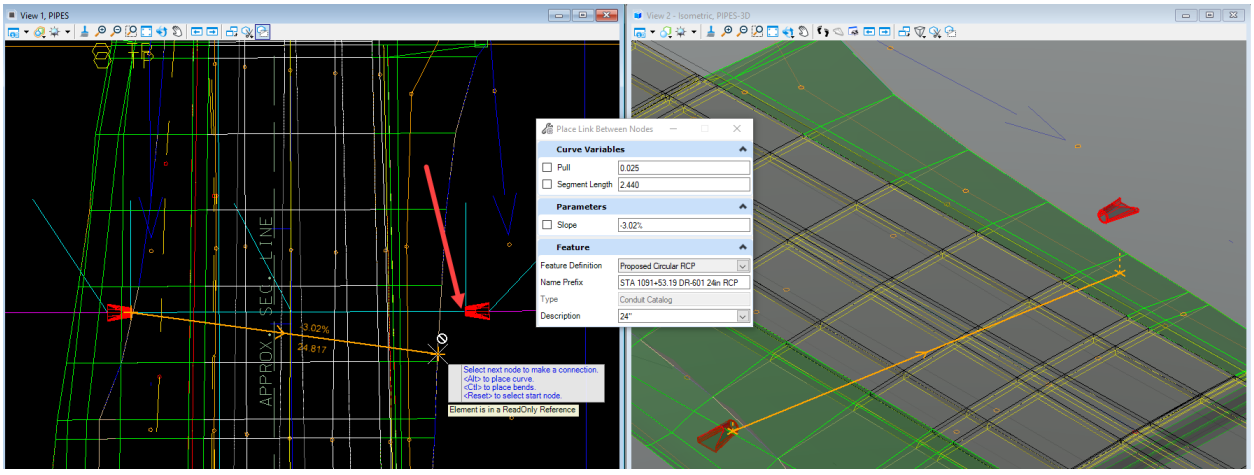
Next, Set Description as Size of pipe.



Then in the 2D window, find the inlet apron and select it as the Start Node.

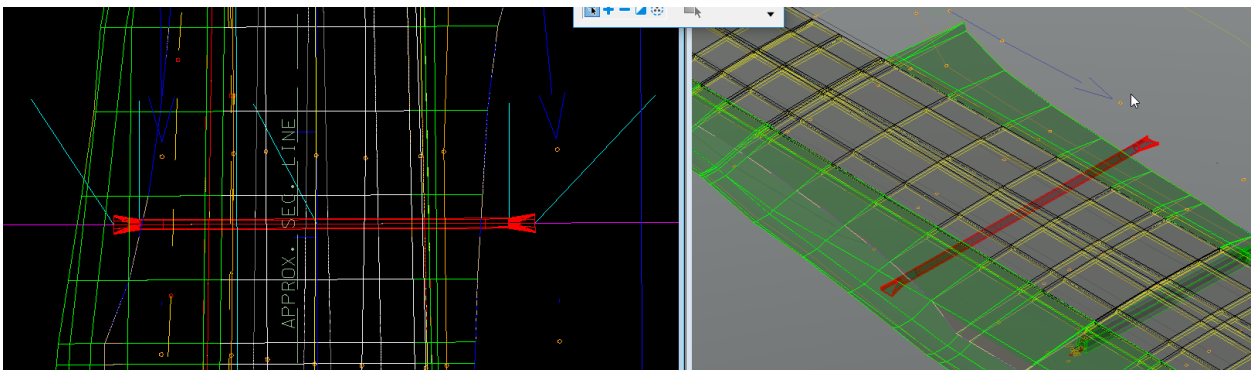


Then select the outlet to complete the pipe.



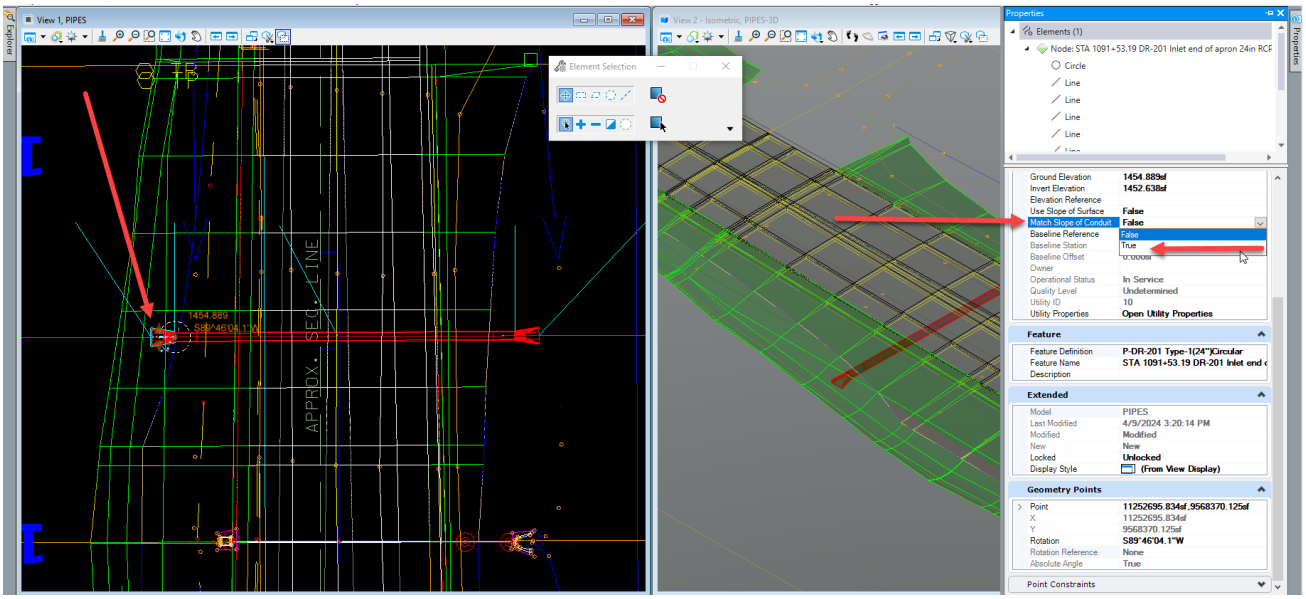
It will model the pipe in the 2D and 3d model at the same time.

When done, it should look something like this:



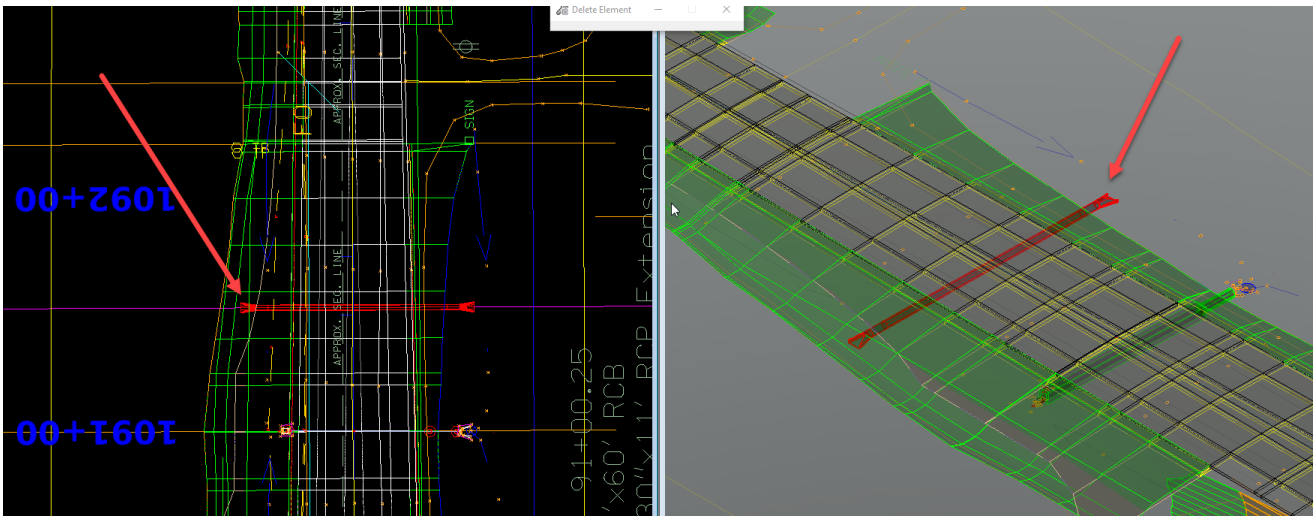
The last step in modeling the pipe is to set the aprons to Match Slope of Conduit. To do this, select the 2D apron node in the 2D model and open the Properties window. Then set the Match Slope of Conduit

field to True. Complete for each end of the pipe. This will rotate the apron to match the pipe in elevation.

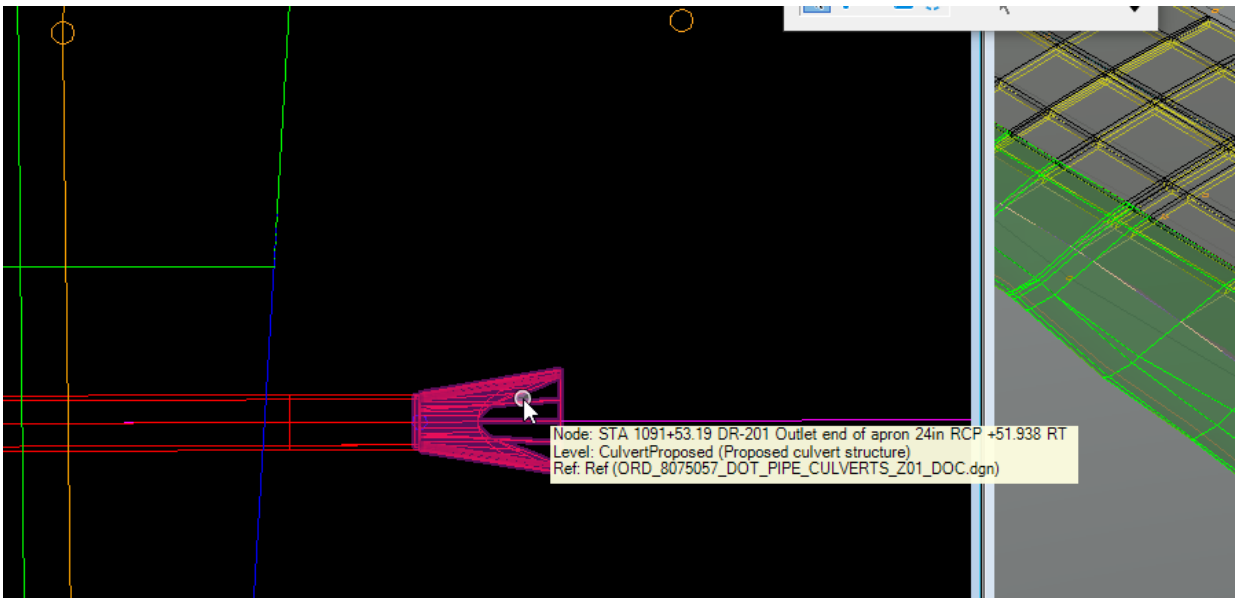


Once the pipe is modeled correctly, delete the smart line created to model the pipe.

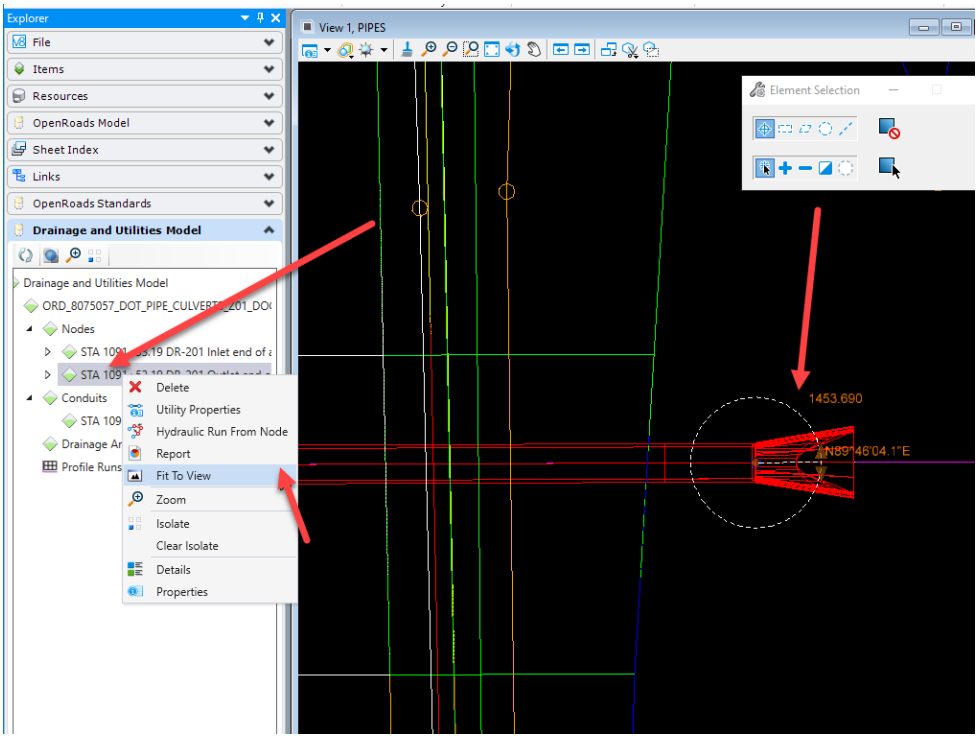
It should look like this:



The advantage of entering the proper Name Prefix is that when hovered over the pipe or aprons will display the Name Prefix making it easier to use the file.



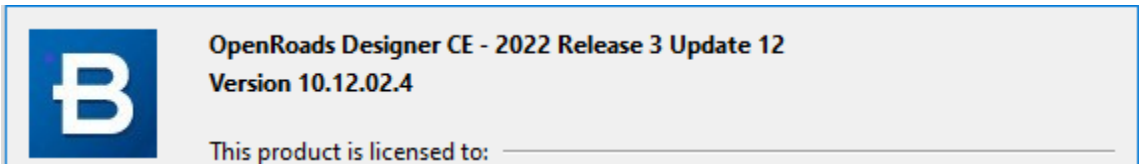
Also, when changes to any of the pipes are required, access the pipe information thru the Explorer tool. It is more efficient to find pipes in large corridor projects by selecting the item in Explorer then right clicking and selecting Fit To View. This will zoom the view to that item.



Continue to the cross section creation.
[PW04 Making Pipe X-section Sheets]

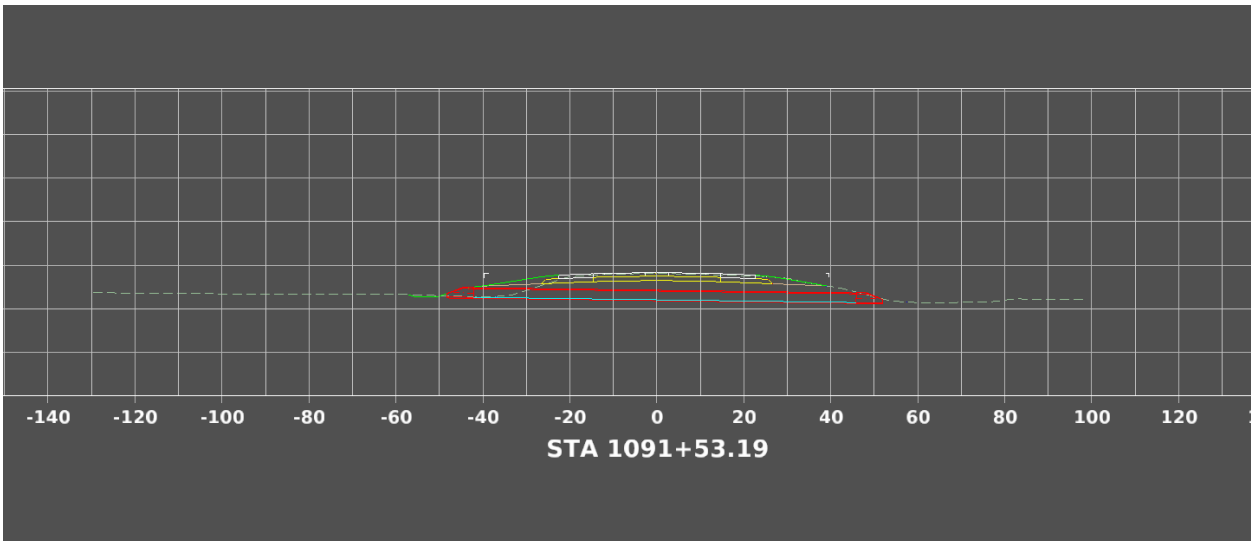
Making Pipe X-Section Sheets

These instructions were created April 2024. These instructions were created with:



Now that the pipes are modeled in the pipe model file (as covered in the PW03_ Modeling Pipes in connect), open the SHT file under the parenthesis folder that applies to this design. For this example, it will be SHT_8075057_DOT_PIPE_CULVERTS_Z01.dgn. Open the drawing model that was used to design the pipe in. The 3D pipe from the model file should be visible in the cross section now.

It should look something like this:



The next step is to annotate the cross section. This is where the ASCII input file is very helpful. Use the information in this file to copy and paste for labeling the key parts of the pipe that need to be annotated.

The key annotations are:

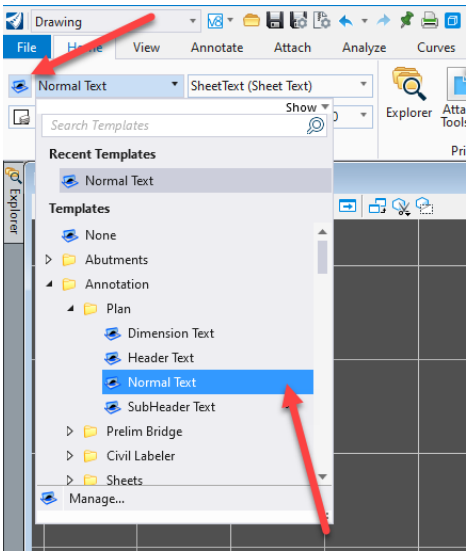
1. Design Cover.
2. Profile Grade Elevation.
3. Distance from centerline right.
4. Distance from centerline left.
5. Total length of new construction
6. Flowline Elevation at each critical point in the pipe.
7. Clear zone (if it is needed).
8. Structure description and any other unique items that need to be called out.

Hint: Anything that is needed to be input into the database for the pipe design should be annotated.

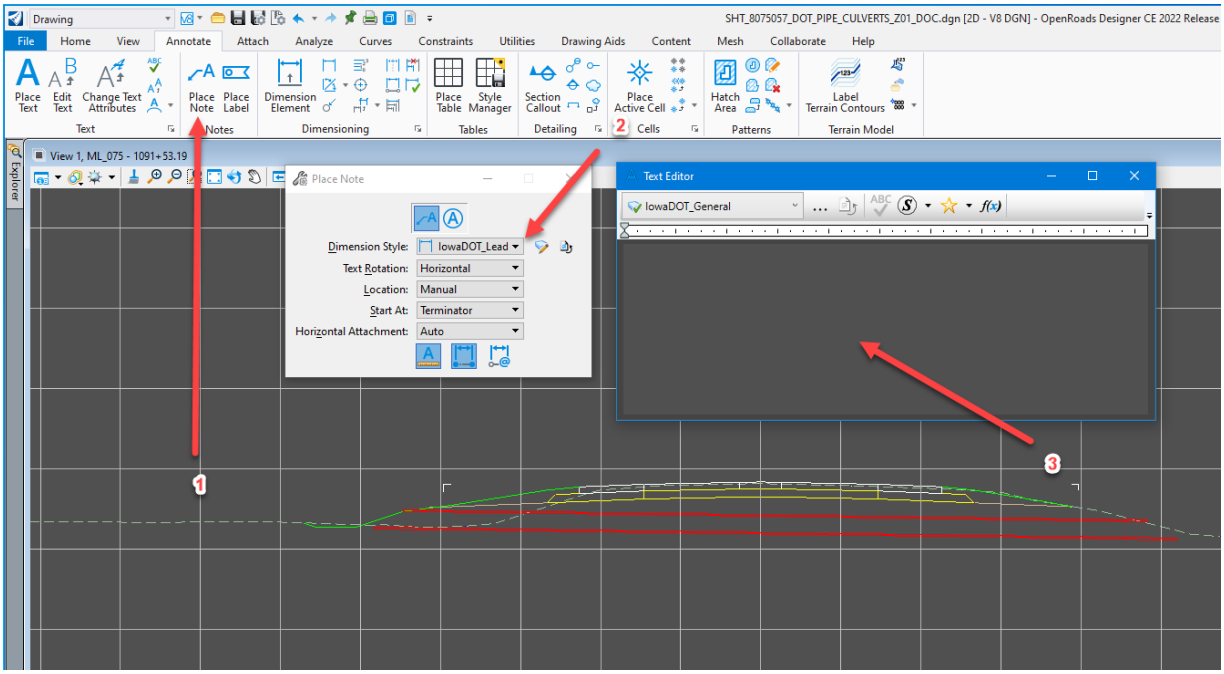
The first thing to do is to delete the pipe apron templates that were used to determine the elevations and offsets of the key points in the design. These are no longer needed since the pipe is modeled.

Hint: It is recommended to leave them in place until the pipe is modeled to verify that the pipe model matches the design. For this example they match.

Next, select the correct element template to place the annotations on. Use the Normal Text template.

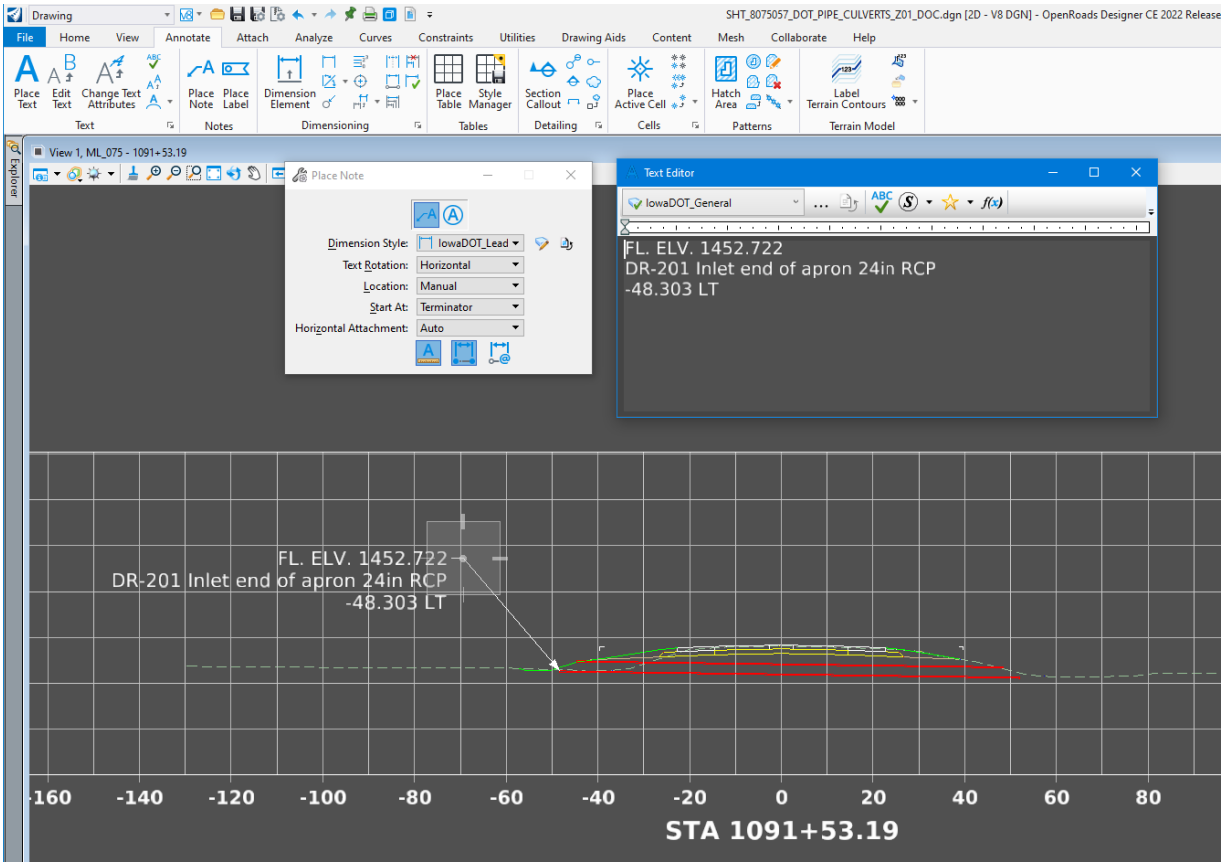


1. Select the Place Note tool.
2. Set the Dimension Style to IowaDOT_Leader_Note.
3. Type the note that needs placed. This is where the ASCII input file is very helpful using copy and paste for the note.

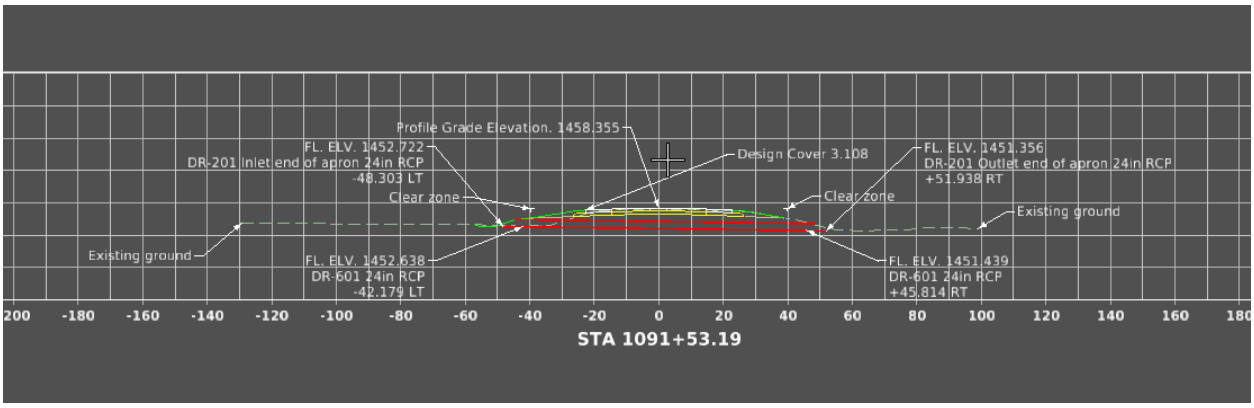


Place the notes in the proper locations.

The annotation should look something like this:

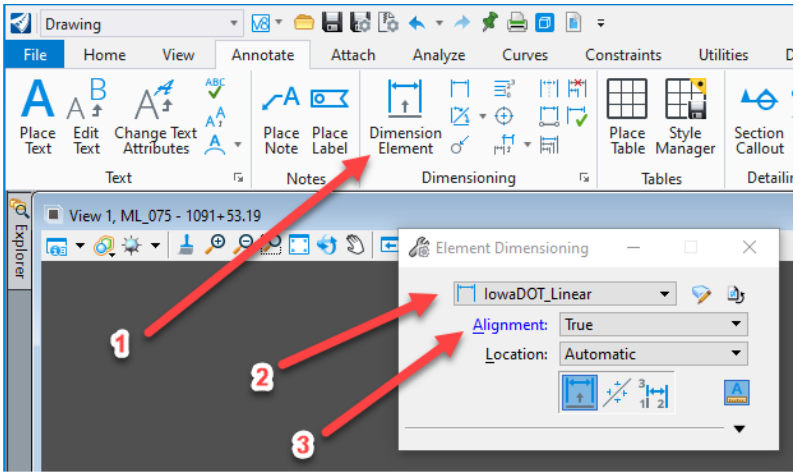


Once all the notes have been placed it should look something like this:



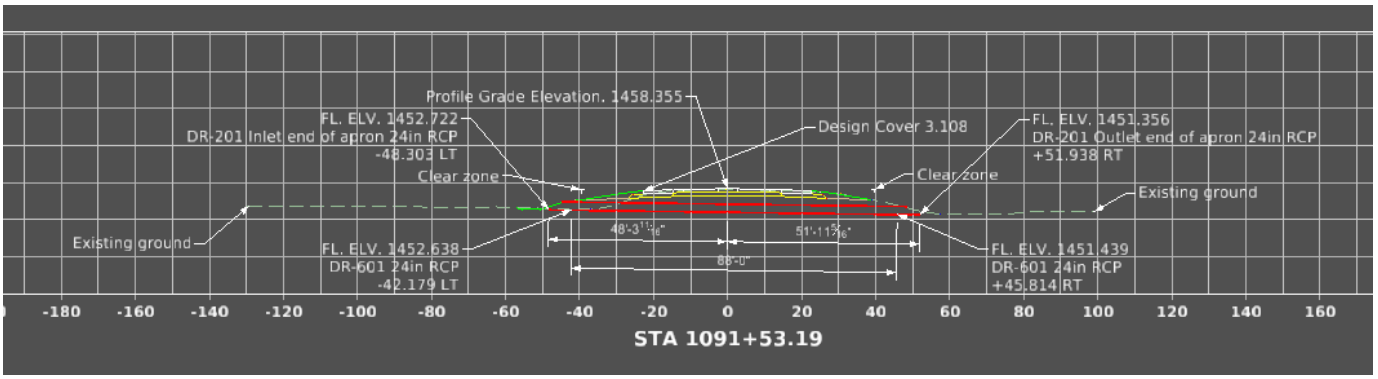
Next, place additional distance annotations.

1. Select the Dimension Element tool.
2. Set the Dimension Style to IowaDOT_Linear.
3. Set Alignment to True



Then place the Distance from centerline right, Distance from centerline left, and Total length of new construction.

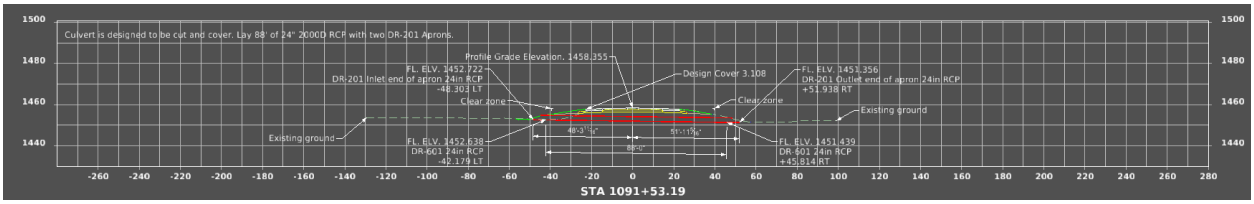
It should look something like this:



Last is to place the structure description and any other unique items that need to be called out. It is recommended to use the same note that is placed in the database that was typed earlier in the ASCII input file. For this example, it is “Culvert is designed to be cut and cover. Lay 88' of 24" 2000D RCP with two DR-201 Aprons.”

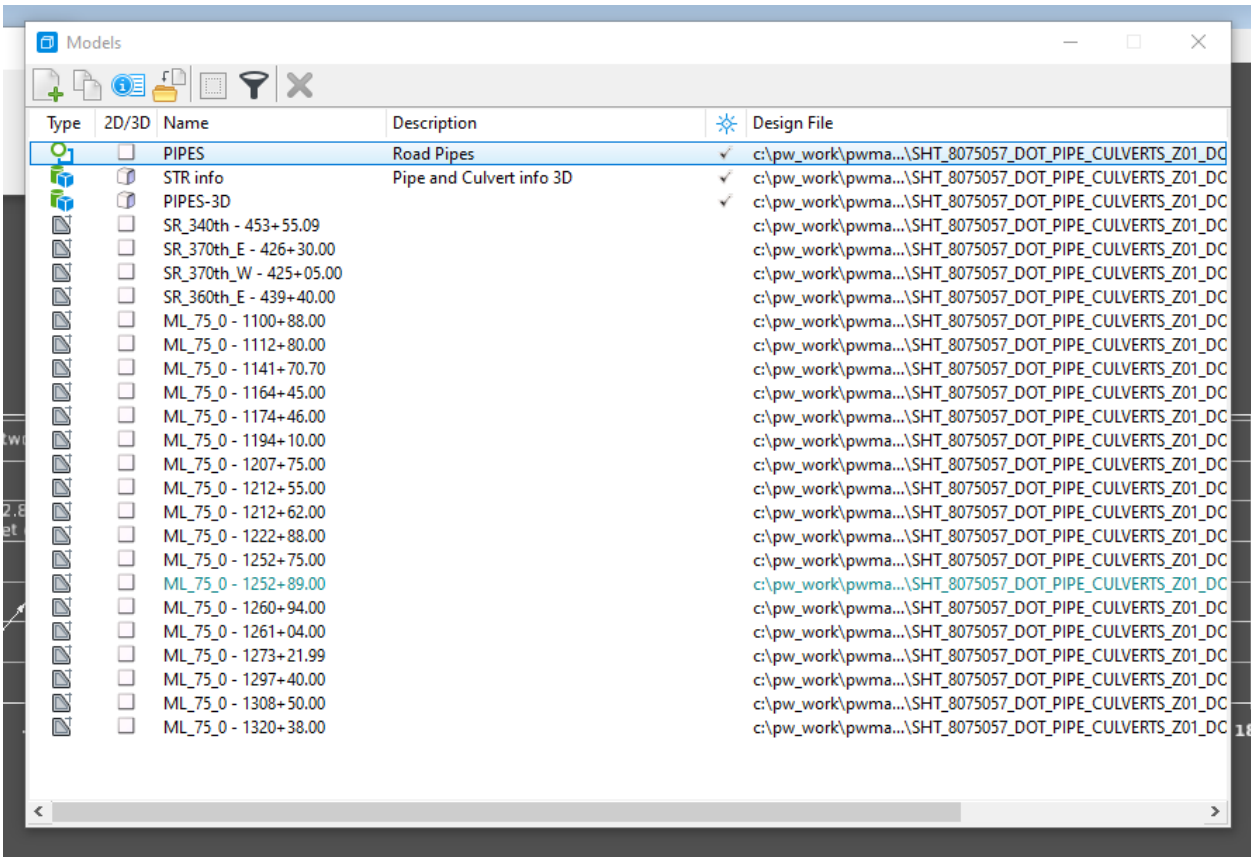
To place this, use the Place Text tool.

It will look something like this:



Once all the pipes are modeled in the ORD file and annotated in the SHT file, the files are finally ready to make sheets in the SHT file.

The model dialog box should look something like this:

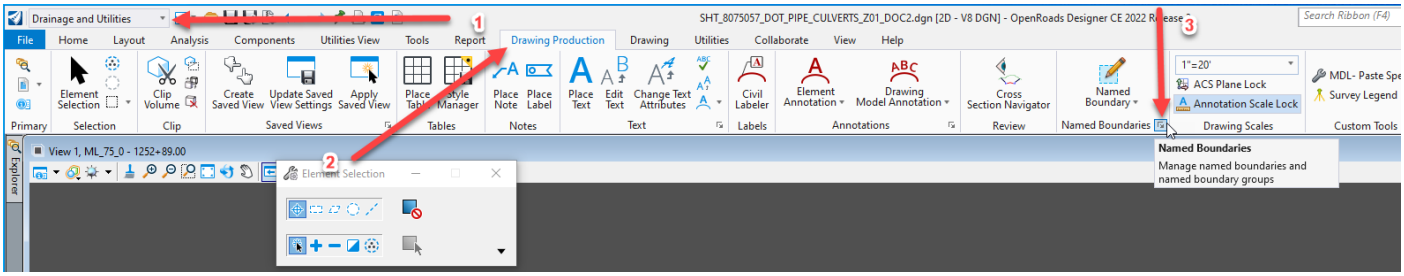


There should be a drawing model for each cross section that represents each pipe location.

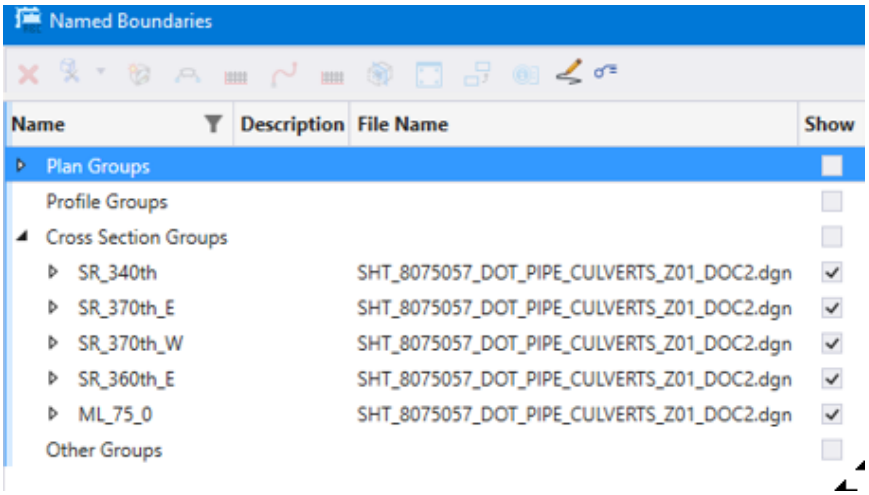
Note: Suggestion to not complete this step until confident that the pipe designs are complete.

Now, make some sheets.

1. Set the workflow to Drainage and Utilities.
2. Click on the Drawing Production tab .
3. Click on the Manage named boundaries and name boundary groups.

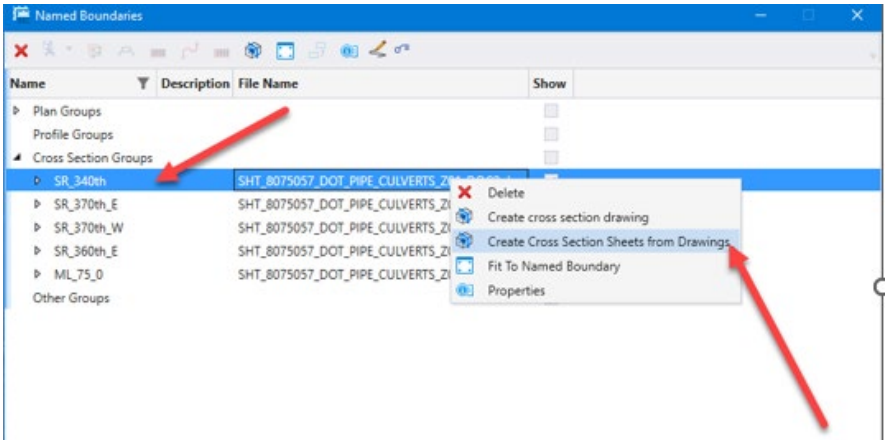


These steps will open the Named Boundaries list:



Note: This is where making the cross sections from the correct alignments and having used the correct cross section groups really pays off.

Select one of the groups and right click and select the Create Cross Sections Sheets from Drawings option.

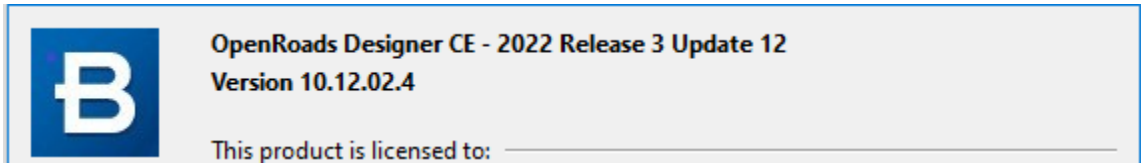


This will make the cross-section sheets for each alignment and stack then in order of the station value. The reason to make the sheets at the end is if there is a need to remove, add or cut new sections in the design process, it will still stack the cross sections correctly based on alignment and station.

The last step to finish the sheets will be covered in the next chapter.
PW05_ Placing Pipe X-section Sheets into Sheet Index File

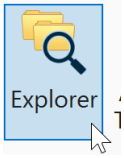
Placing Pipe X-section Sheets into Sheet Index File

These instructions were created April 2024. These instructions were created with:

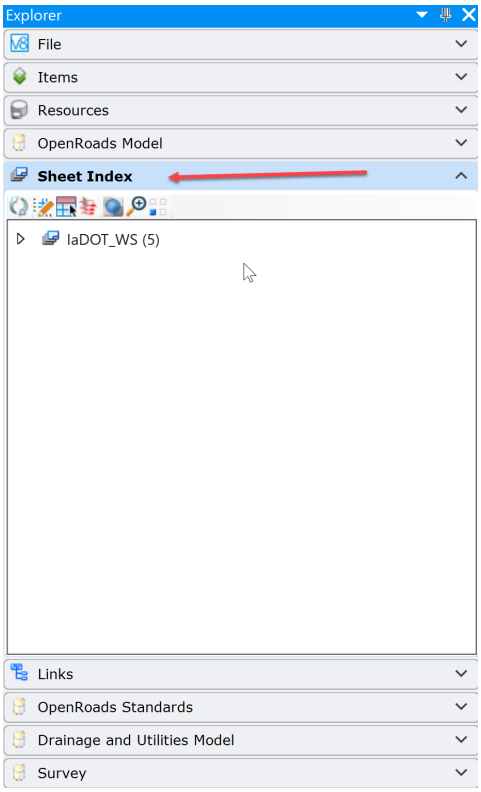


When creating sheet files, the sheet border information will have text fields that are set up to work with the **IaDOT_WS.dgnws** Sheet Index file. This file is in the **ProjectResources\Workset** folder of every Bridge Project Directory. The IaDOT_WS.dgnws Sheet Index file is specific to each WorkArea that it resides in. The Sheet Models are added to the Sheet Index to autofill the text fields. To do this, access the Sheet Index thru the Project Explorer.

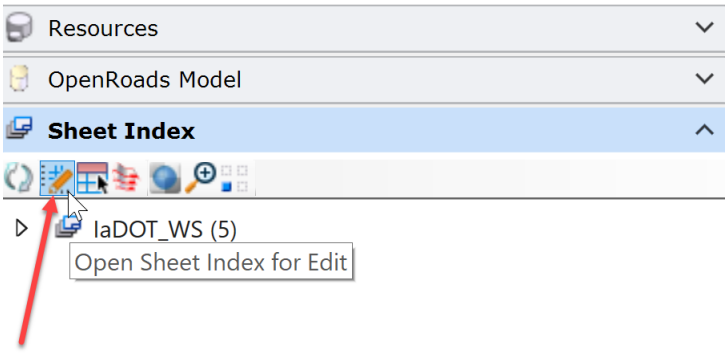
Note: The Sheet Index can only be edited by one User at a time. Also keep in mind, that the index file will be used by anyone making sheets in that directory.



Project Explorer displays the Sheet Index as shown below:

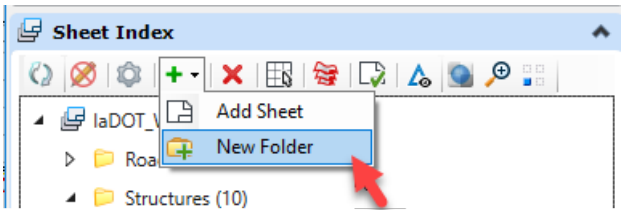


Open the Sheet Index for editing, click on the Open Sheet Index for Edit button.

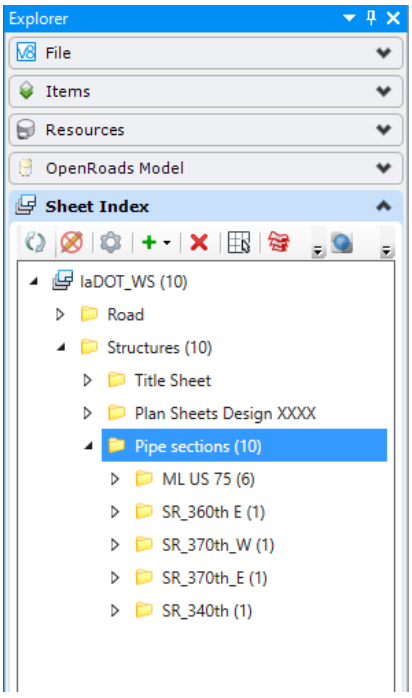


Next, add the folders that the sheets will reside in. Typically, the process is to create a folder for the Pipe sections. Then make subfolders for each cross-section group, alignment.

To add a folder, click on the Structures folder to highlight then click on the create folder button. Select New Folder.



Once all the folders needed are added it should look something like this:

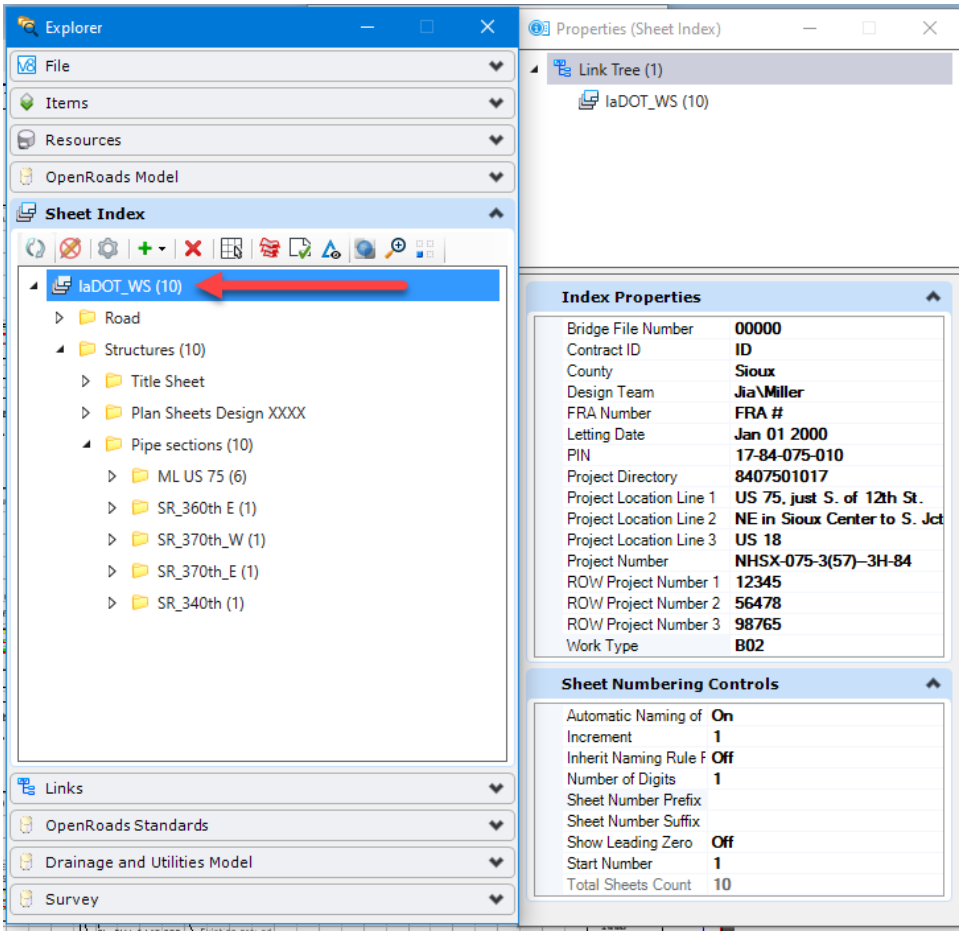


Next, set the Index Properties at the index level. Click on the **IaDOT_WS** in the Sheet Index Explorer to highlight and open the Properties window.

Edit the following text fields:

- Bridge File Number
- County
- Design Team (e.g., Iowa DOT or Consultant Name)
- PIN#
- Project Directory
- Project Location line 1,2,3
- Project Number
- Work Type
-

Completing these values will fill out the corresponding text fields in the Border.

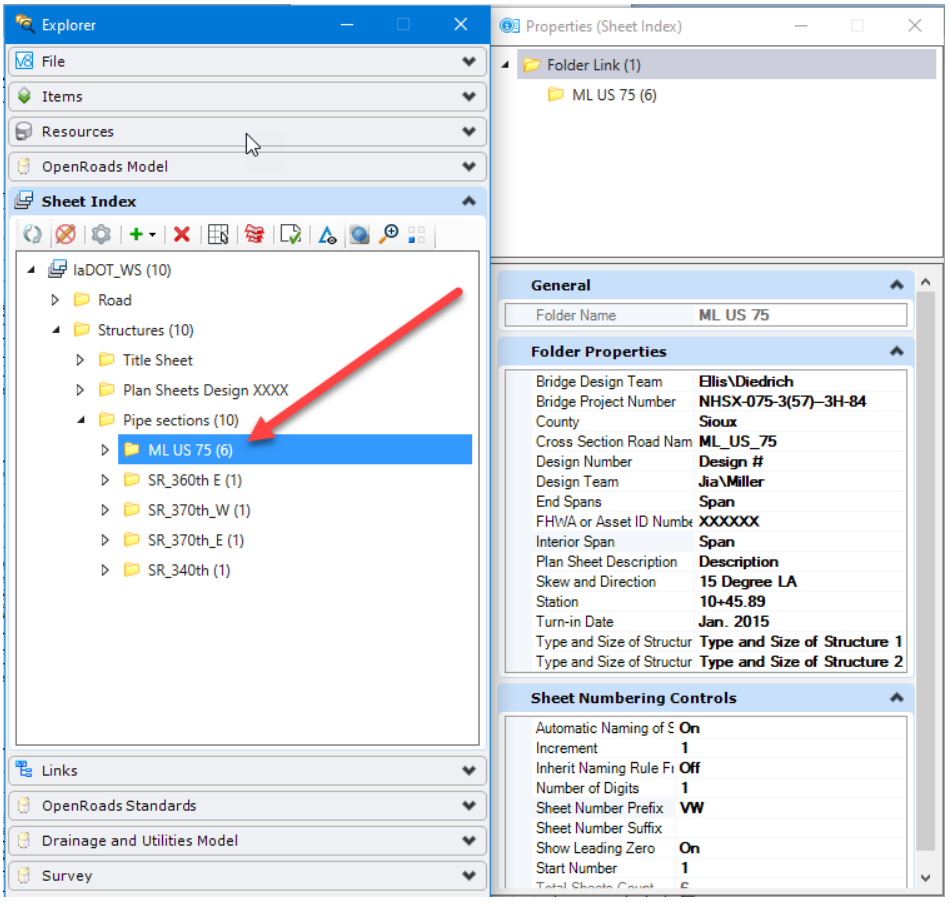


Next, set the text fields that are cross section specific for each cross-section group. To do this, select the folder created earlier for each cross section group in Project Explorer to highlight and open the Folder Properties.

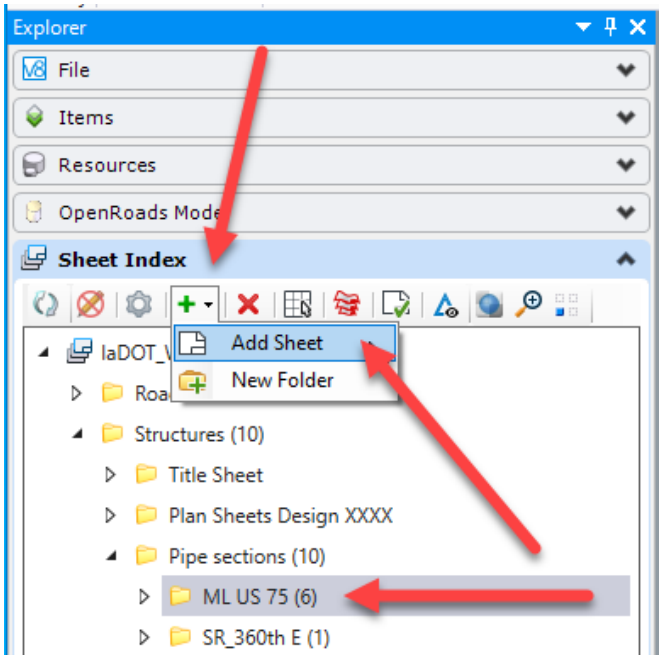
Edit the following text fields:

- Bridge Design Team
- Bridge Project Number
- County
- Cross Section Road Name
- Design Team (e.g., Iowa DOT or Consultant Name)
- Sheet Number Prefix

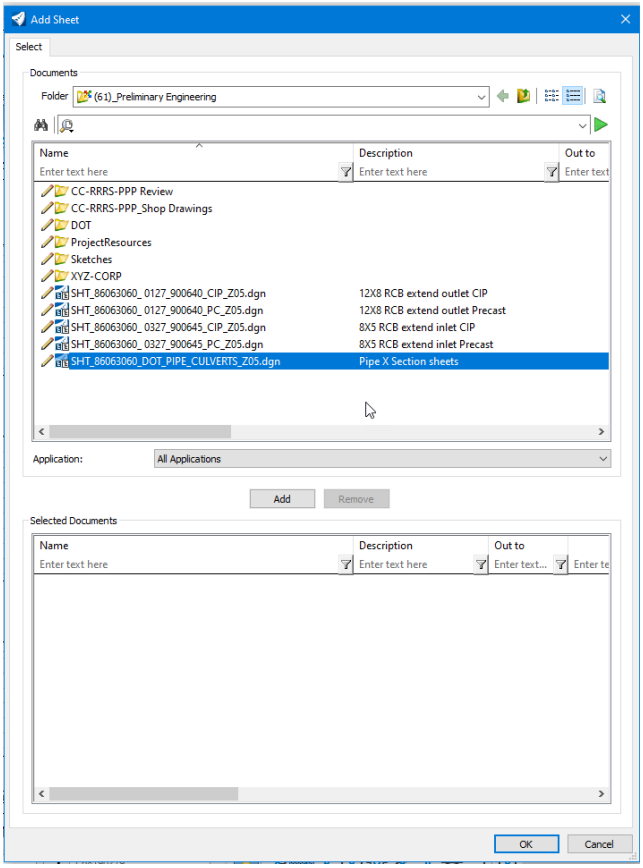
Note: The Mainline sheets number prefix are set as VW sheet number prefix. Sideroads sheets are set as VX sheet number prefix only if one sideroad is in the project. If multiple sideroads are in a project, then the first sideroad of the project will have a sheet number prefix VX1, then VX2 and so on thru the project. If interchange ramp sheets are made the sheet number prefix for them are VY.



Once the folders are created for the cross-section groups, then add the sheets to the correct folders. Select the folder that the sheet will reside in and click on the Add Sheet button.

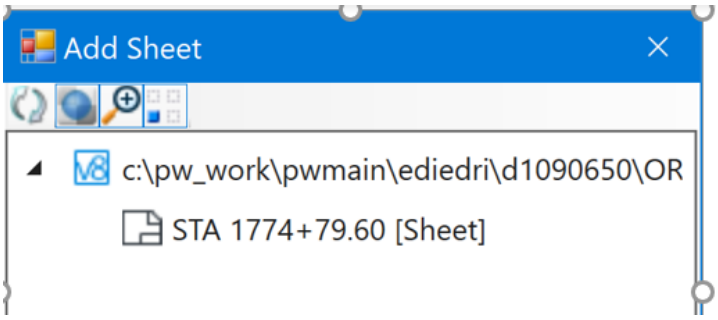


The Add Sheet dialog box will open. Browse to select the DGN file that the sheet is in.



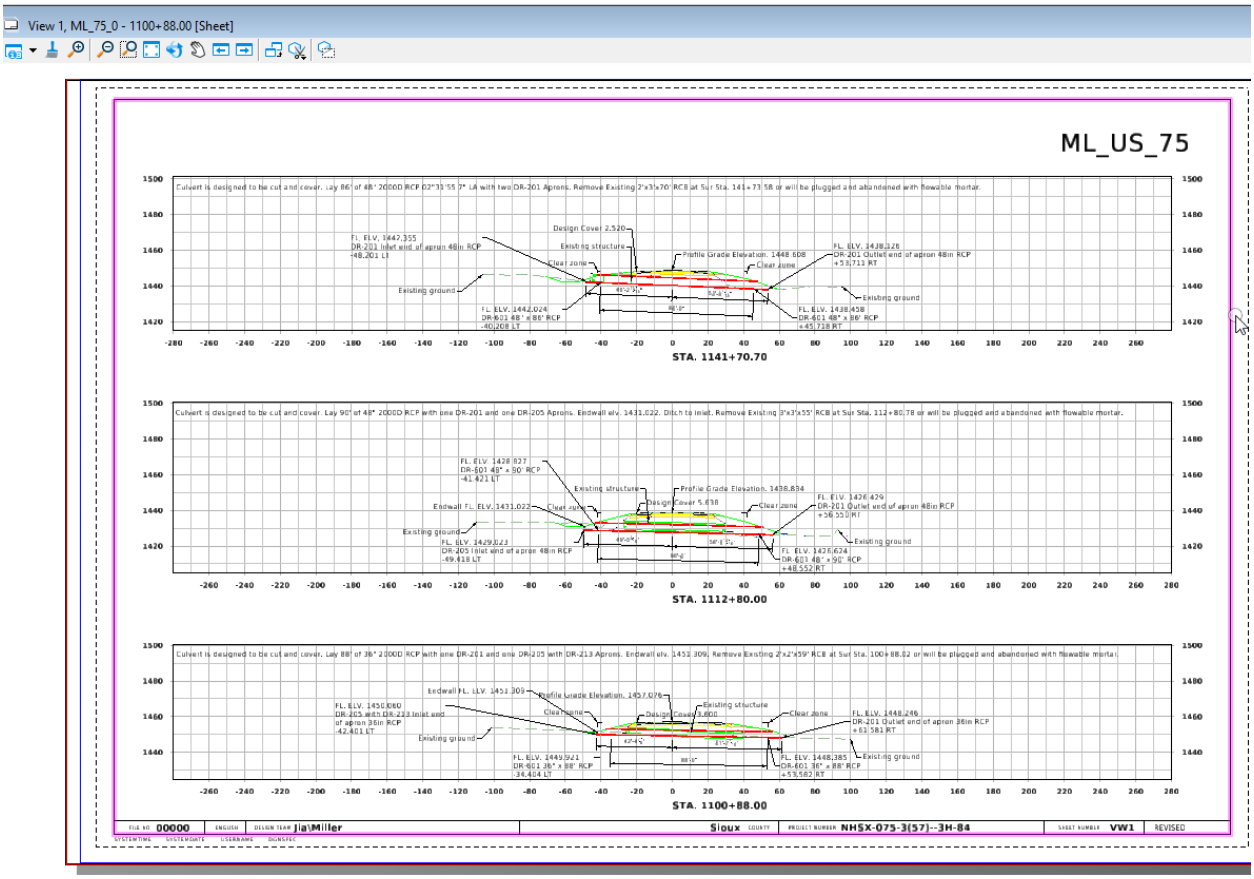
Click the Add button. Then click the OK button.

A list of available sheets will display. Select the sheet that will reside in the cross section folder selected.
Note: The Add Sheet list will only show Sheet Models that are not part of any Sheet Index. A Sheet Model is only allowed to be assigned to one Sheet Index, not multiple indexes. If the sheet needed is not listed make sure it is not allready in another index.

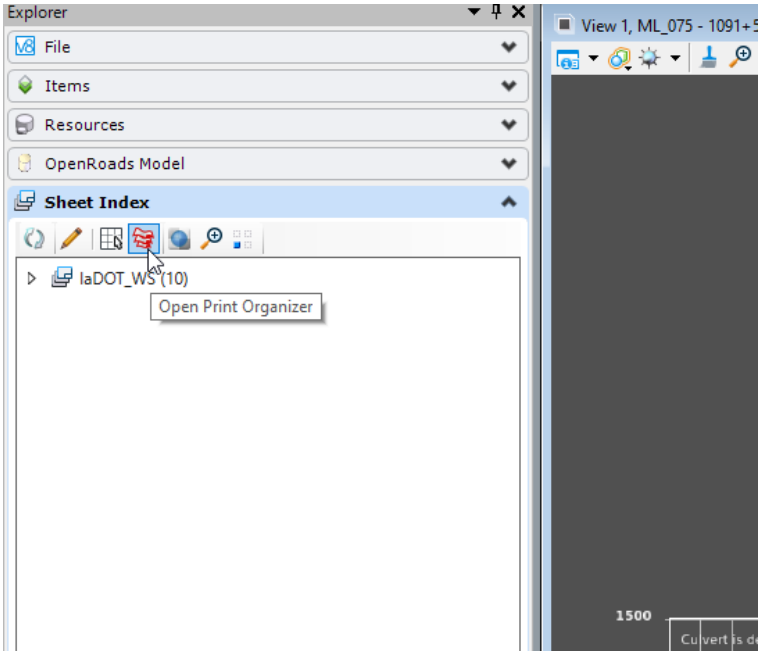


Once the sheet models have been added to each of the folders, then check the sheets for any errors. If all text fields and sheets look good, then check in the sheet index and print.

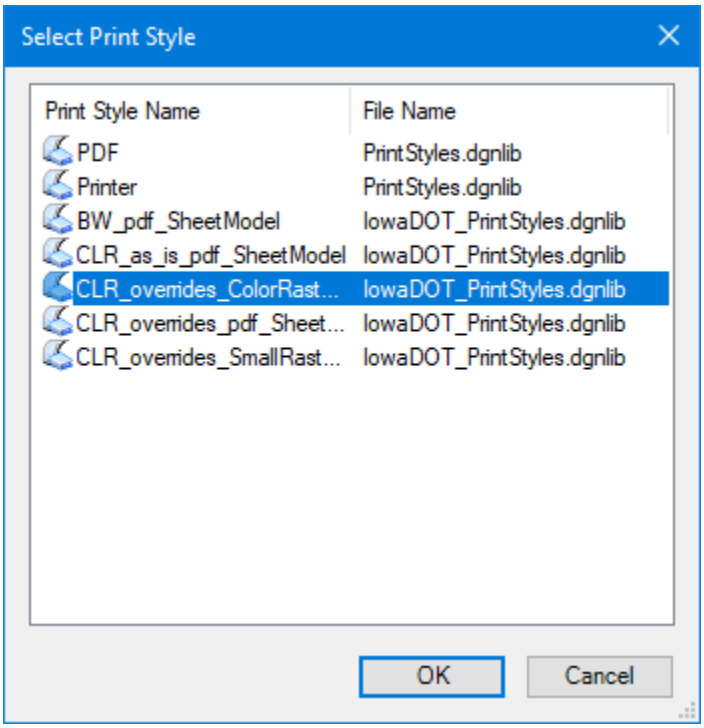
It sould look something like this:



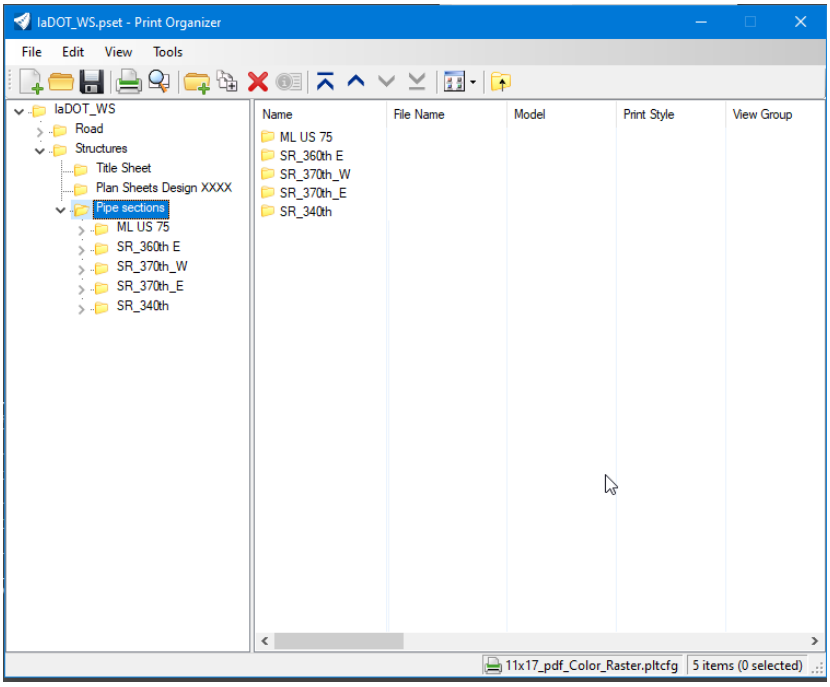
To print the cross-section sheets, click on the Open Print Organizer tool located at the top of the Sheet Index.



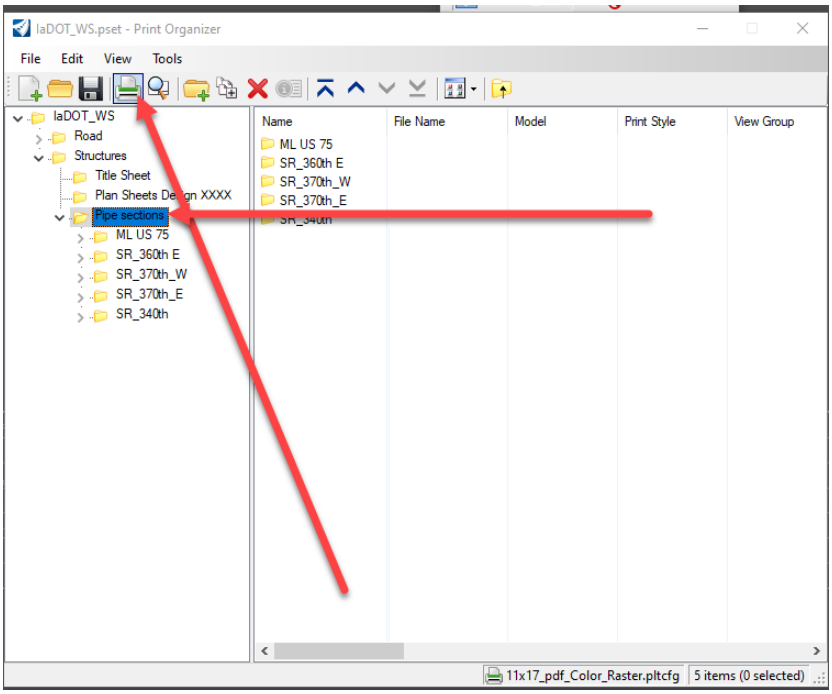
It will open this Select Print Style dialog box. Select the CLR_overrides_ColorRaster print style. Then click OK.



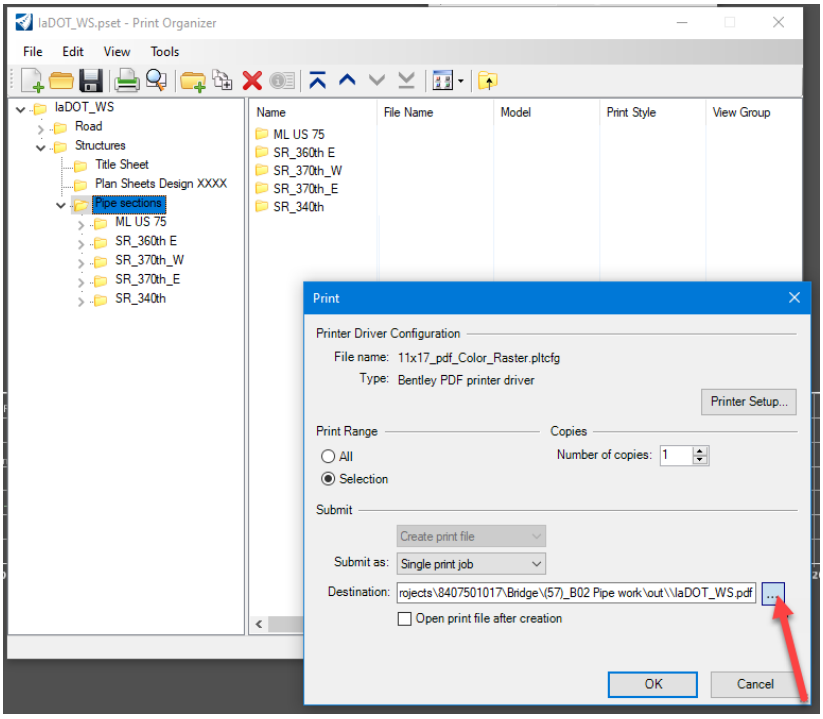
Next, it will open the Print Organizer. Select the parent folder to the sheets that are needed to print. For this example, it is the Pipe sections folder.



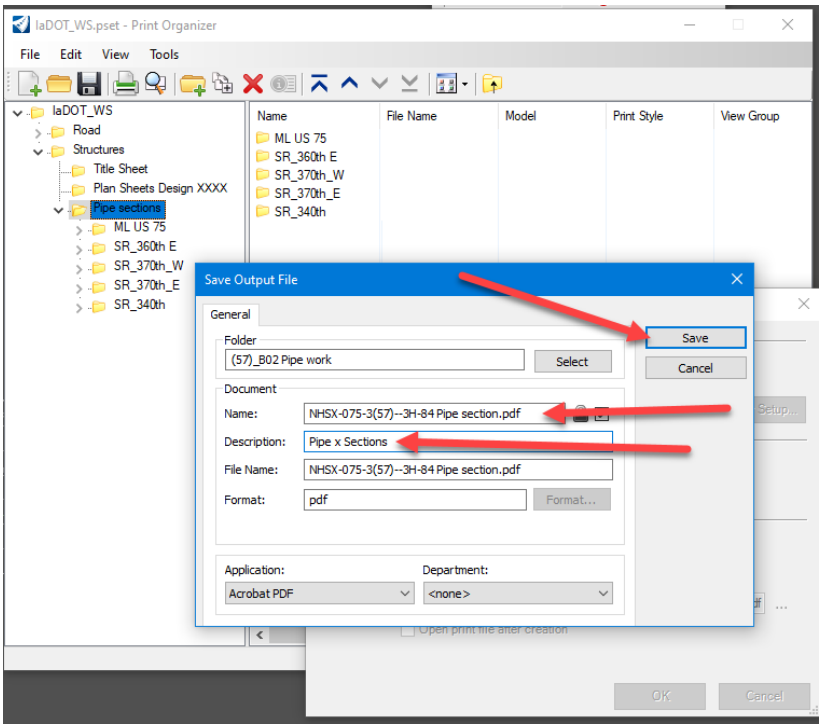
Click on the print tool at the top of the Print Organizer.



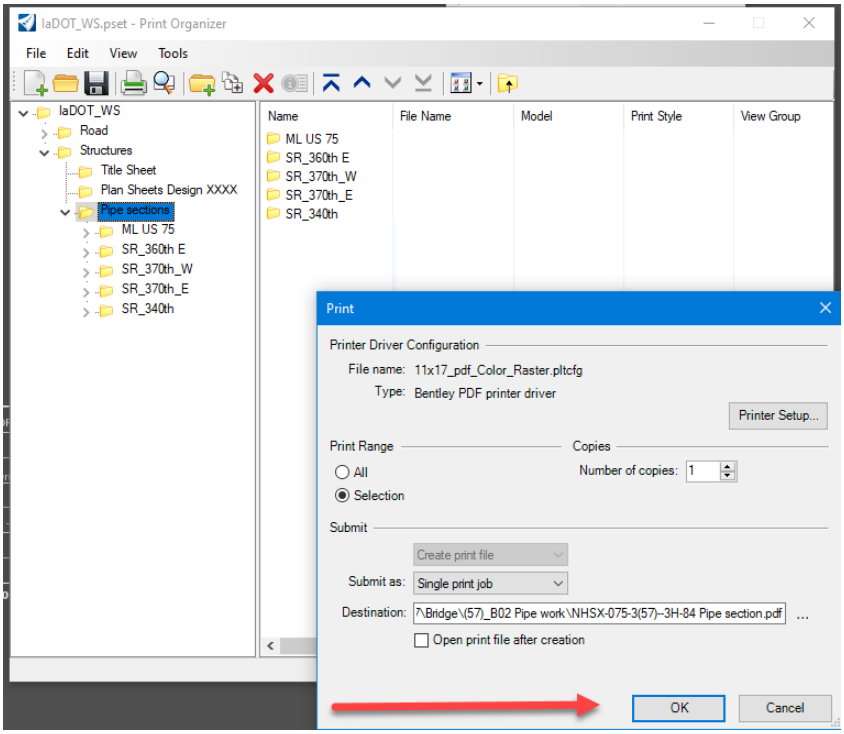
It will open the print dialog box. Click on the three dots at the end of the Destination.



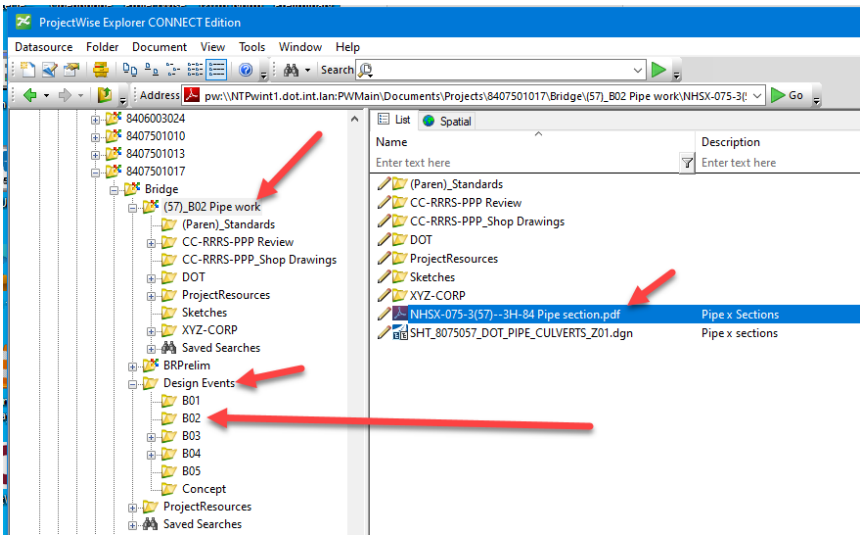
It will open the Save Output File dialog box. Name it with the project number and pipe sections Complete the description as Pipe x sections and set the format to pdf. Then click Save.



This will display the print dialog box again. Then click OK.

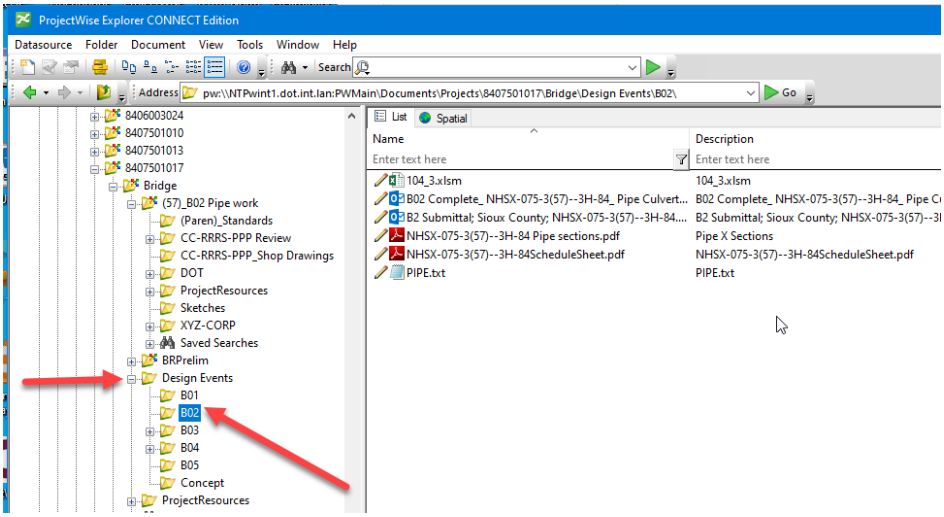


Once it is done making the pdf, it should appear in the same directory that the SHT file resides in.



Review the file to make sure it is correct.

Move it to the Design Events subfolder under B02.



This is the subfolder location for the finished ASCII input file and Schedule Sheet that will be created from the pipe database. This will be covered in PW06_Entering Pipe and Structure Information into the Access Database

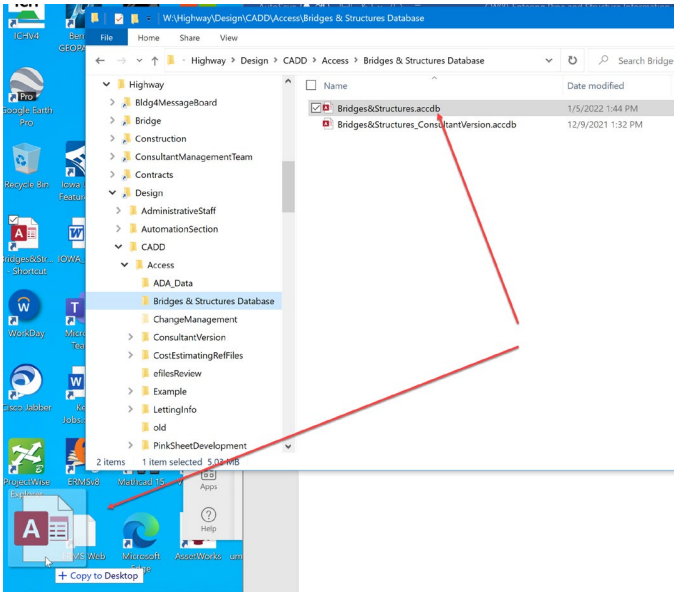
Entering Pipe and Structure Information into Database

Once the cross sections are cut on each pipe culvert and have been annotated as described in PW04_Making Pipe X-section Sheets or *CW06_How to Create Culvert TSL Sheet and Annotate the Structures*, then input the annotated information in the Bridges&Structures.accdb.

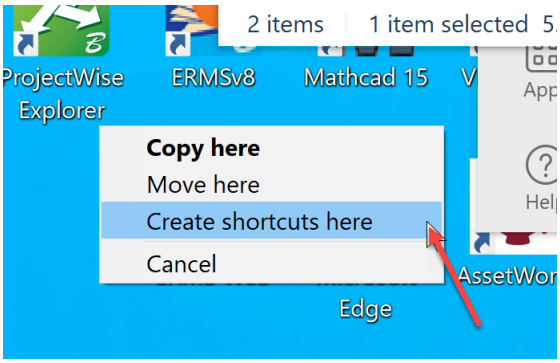
There are two ways this can be done. The first way is intended for internal Iowa DOT employees and the other way is for outside employees or consultant projects.

How to get started for internal Iowa DOT employees is covered first.

First place a short cut of the Bridges&Structures.accdb database on to the desktop. Open a Windows file explorer and browse to W:\Highway\Design\CADD\Access\Bridges & Structures Database. Select the Bridges&Structures.accdb and right click and drag to the desktop.



Then select Create shortcuts here.



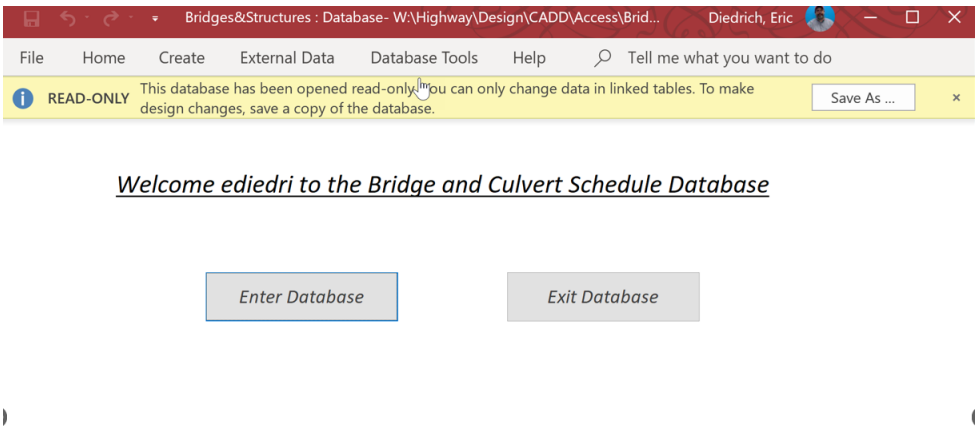
Note: By making a short cut, the system administrators can make changes to the database, and it will always open the latest version.

The second way to use the Bridges&Structures.accdb is intended for outside employees or consultant projects. A different consultant version of the database is located in ProjectWise at: pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Resources\ClientWorkspaces\IowaDOT\IowaDOTProduction\Organization-Civil\IowaDOT_Standards\Seed\Access\Bridges&Structures_ConsultantVersion.accdb.

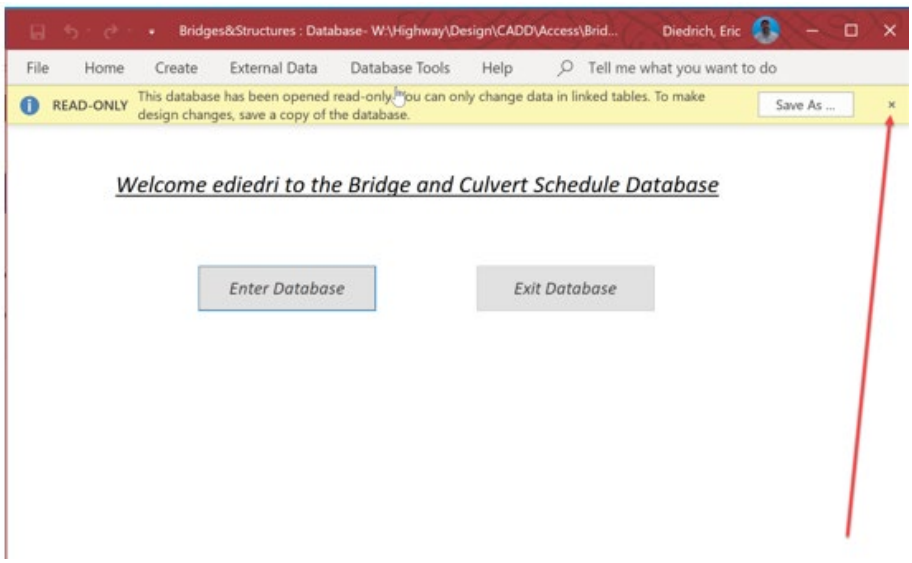
This file should be copied to a local work directory then renamed to Bridges&Structures_CCRRRPPP.accdb. This is because Access does not work properly in ProjectWise.

Once the data entry is completed in this database, it should be placed in the project directory that it corresponds with.

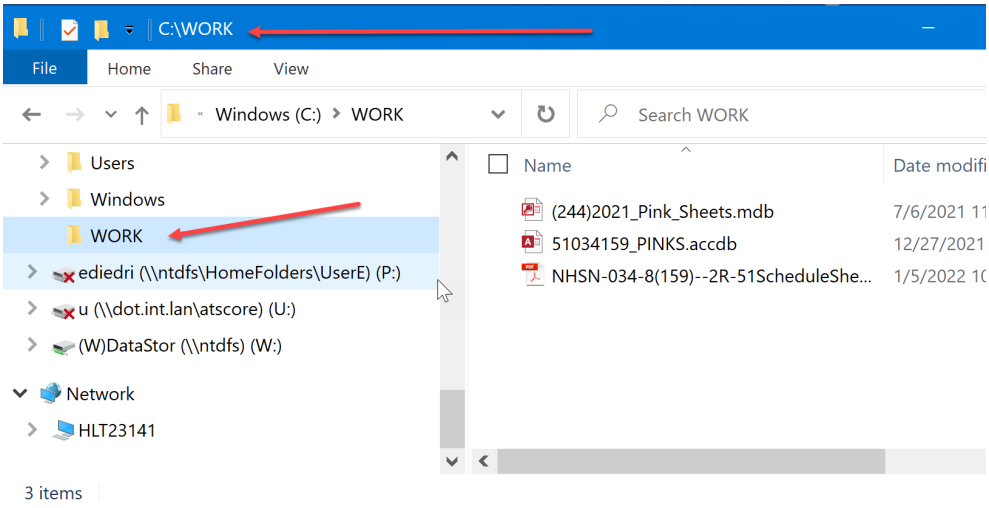
Now that the correct database for both internal and external users has been explained, open it and get started with data entry. The welcome screen appears as shown below.



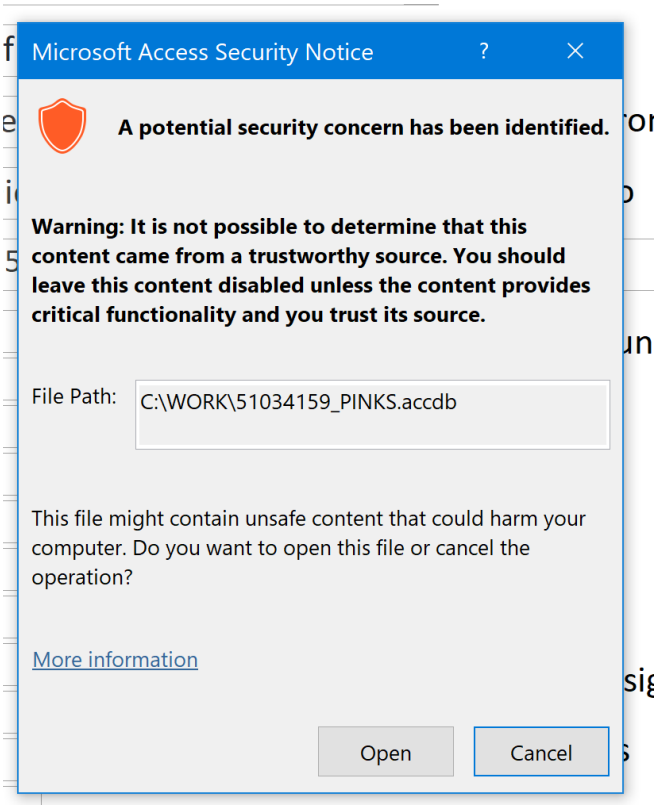
It will display a warning that it is READ-ONLY. Don't be concerned, this is normal. This is indicating that the database design can't be changed. However, the data entry will be stored in a table that is read by this database. Click on the X to close the warning.



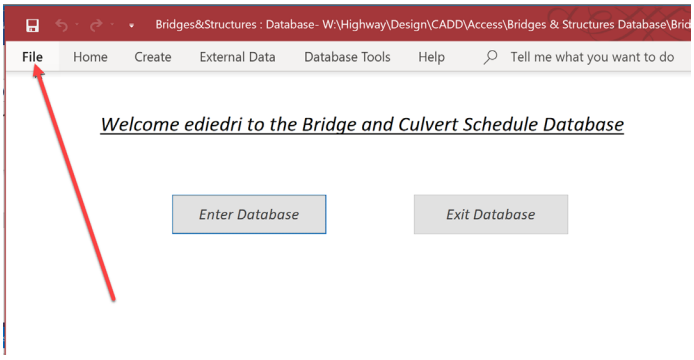
The next step is to make a working directory on the local C:\ drive. For this example, a folder named WORK was created.



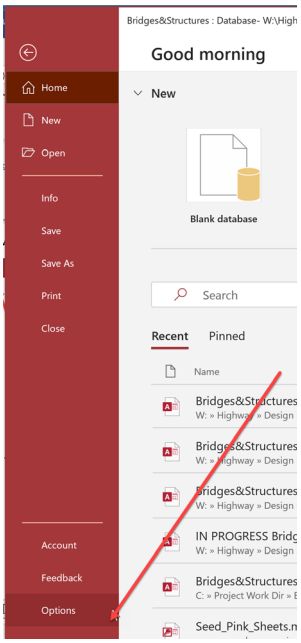
Next, change a few security settings in Access to avoid seeing the warning shown below when the survey information is imported.

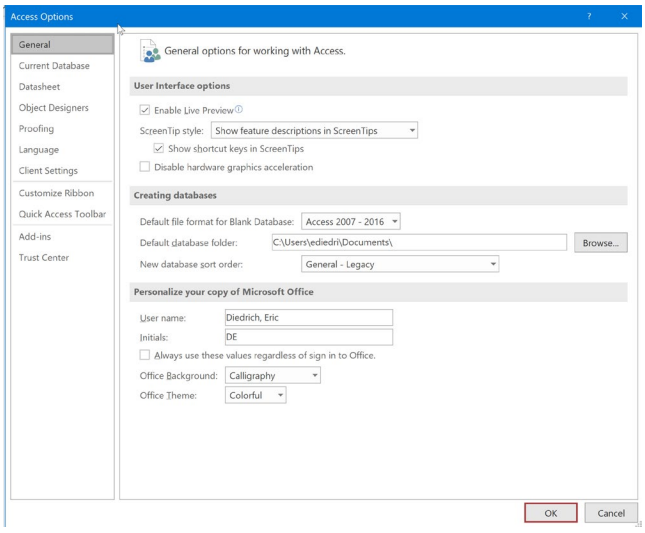


Click on the File menu at the top of the database.

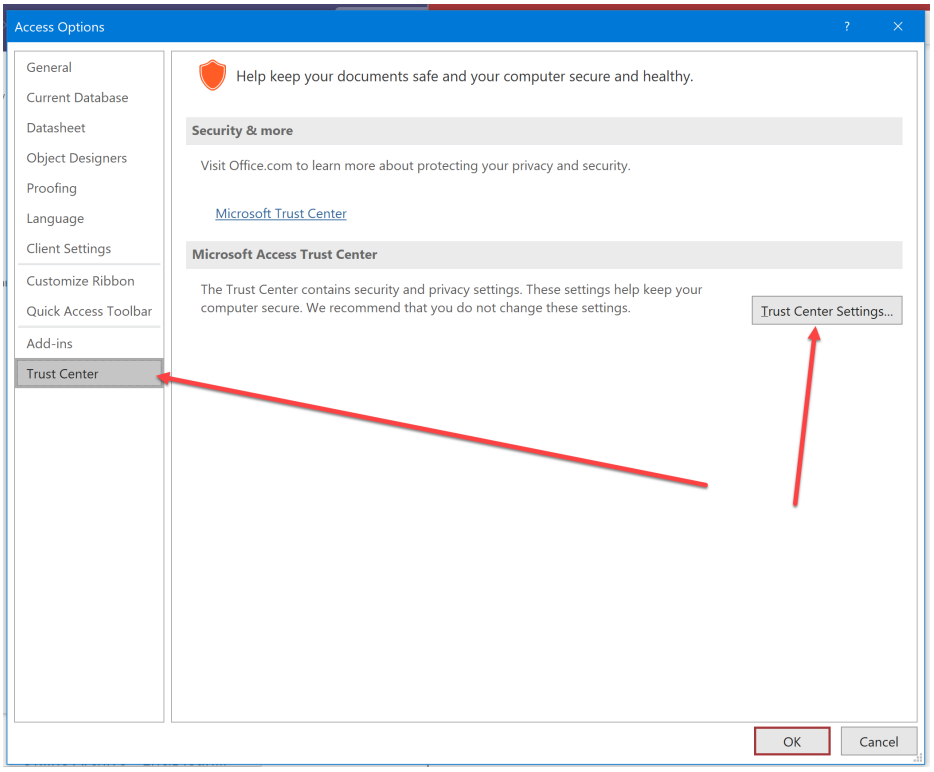


This will open the backstage to access Options. Click on Options to open the Access Options dialog box.

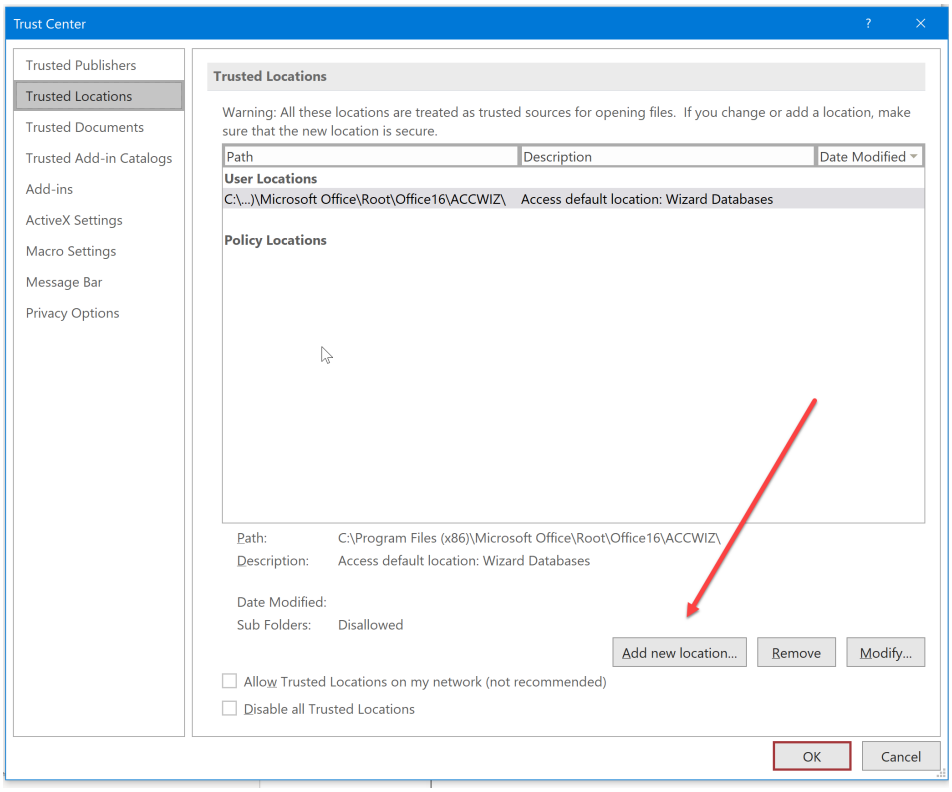




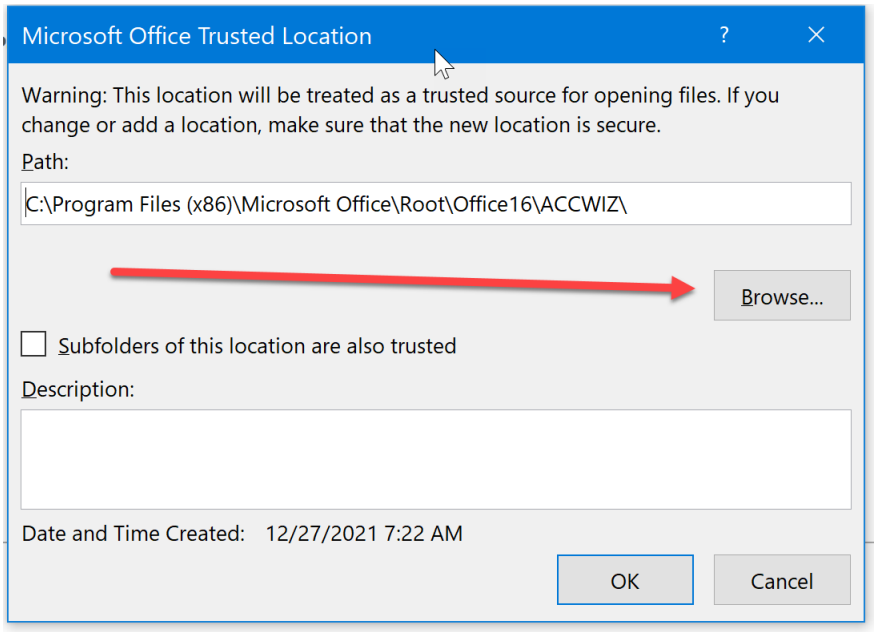
Next, click on the Trust Center option and then click on the Trust Center Settings button.



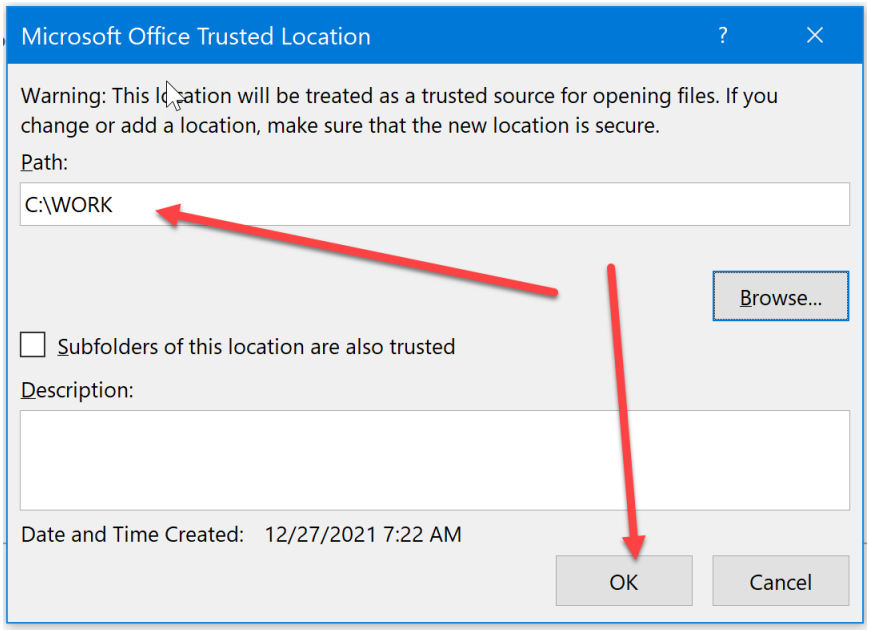
That will open the Trust Center dialog box. Click on the Add new location button.



This will open the Trusted Location dialog box. Click the Browse button to navigate to the temporary work directory created to place the survey information in.



For this example, select the WORK folder that was created.

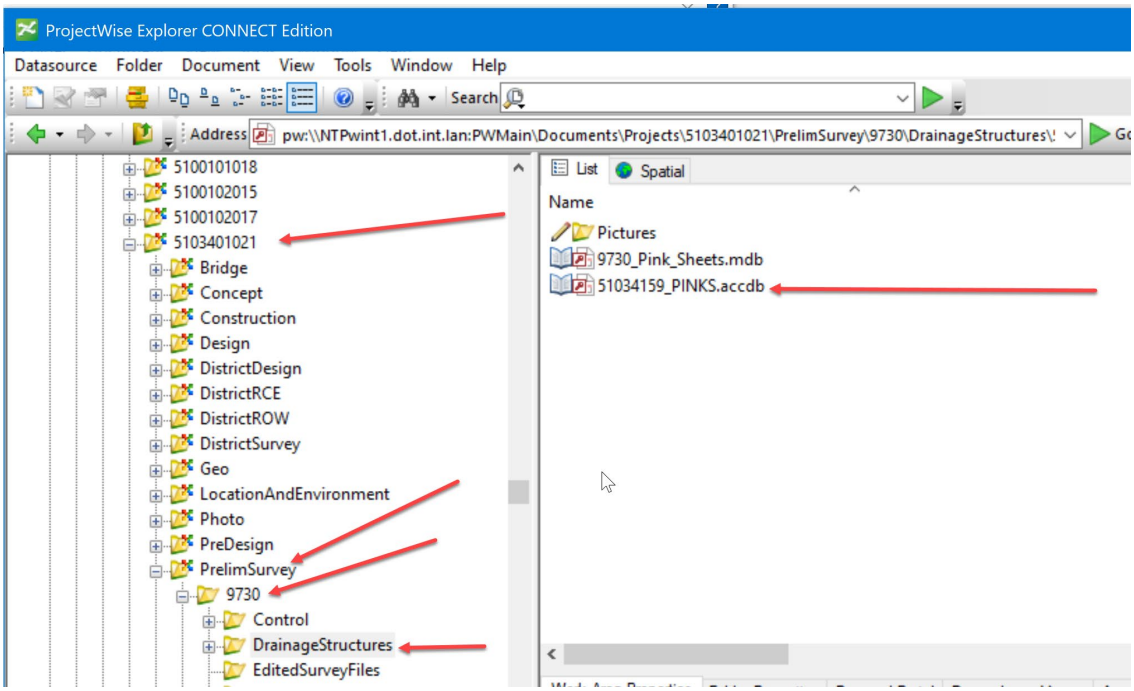


Then click OK.

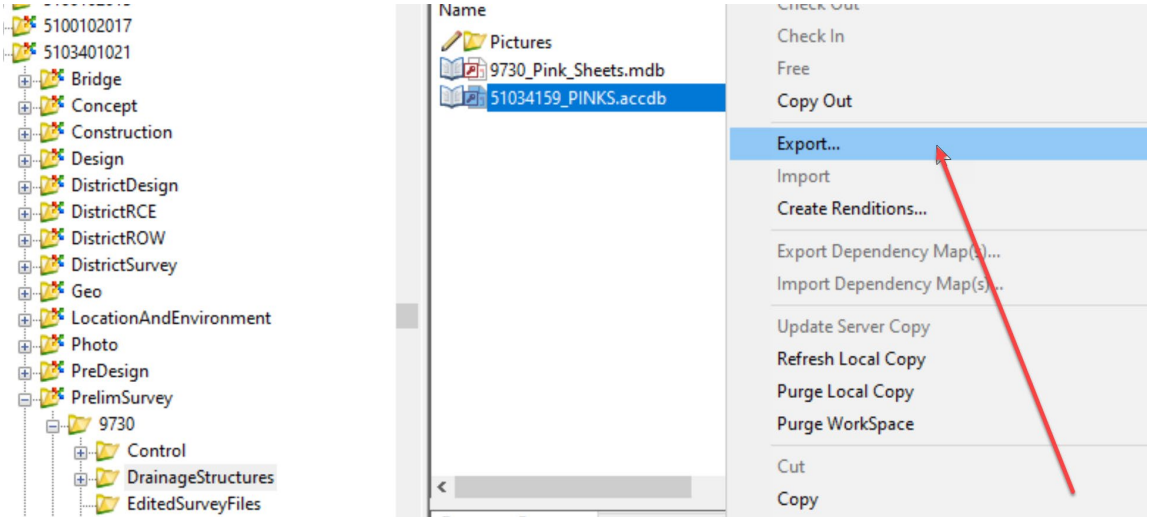
Note: if the same working directory is available and used for all projects, this will only need set once.

The next step is to check for the file to import the survey records for the project. The file is also a database that should be located in the project directory in the PrelimSurvey subfolder under the unique id number SAP folder in the DrainageStructures subfolder.

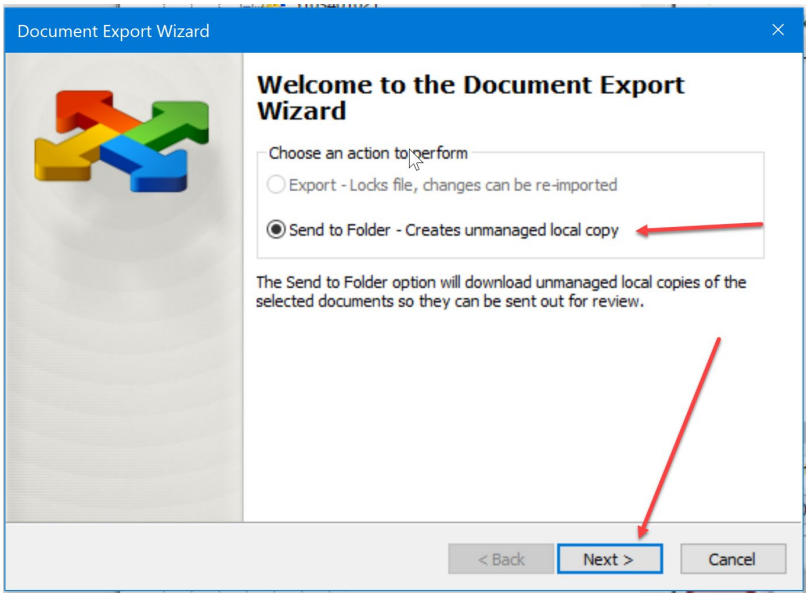
For example: PWMain\Documents\Projects\5103401021\PrelimSurvey\9730\DrainageStructures\
The file will be named CCRRRPPP_PINKS.accdb or for this example it will be 51034159_PINKS.accdb



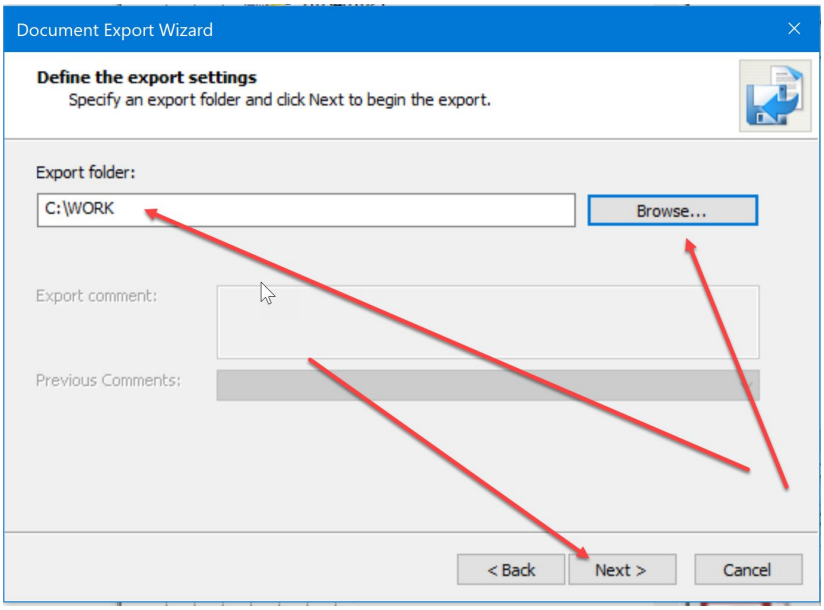
Once the Survey Records are located, export to a local work directory. Select the file, right click and select the Export option.



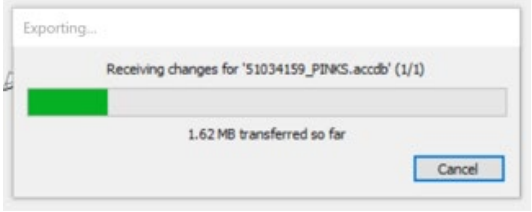
When the Document Export Wizard opens, select the Send to Folder with unmanaged local copy option. Then click the Next button.



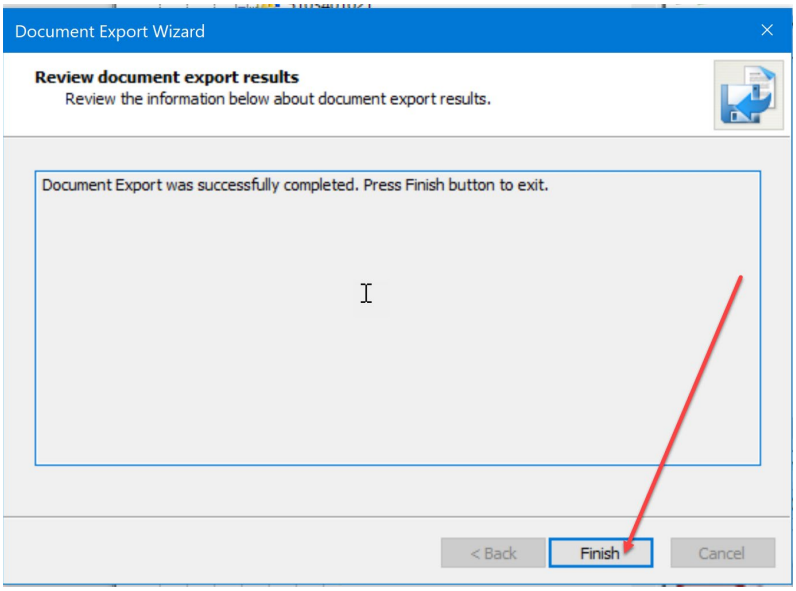
Browse to the local WORK folder created earlier. Then click the Next button.



A progress bar for exporting will display.

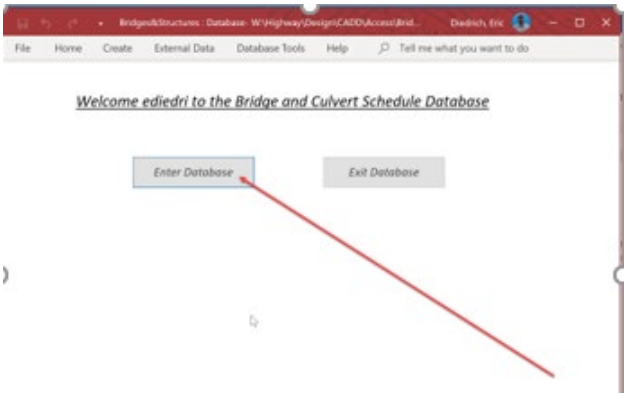


When it is finished, it will display a message indicating a successful export. Click on the Finish button.

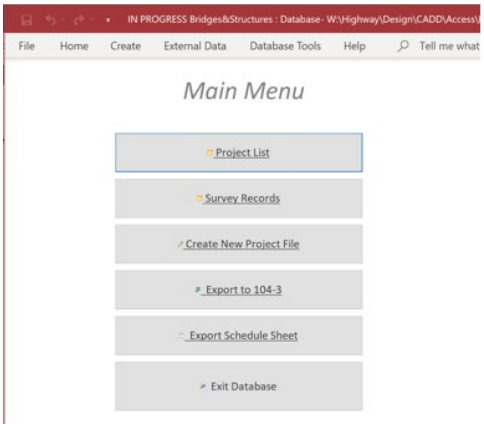


Now return to the Bridges&Structures.accdb database.

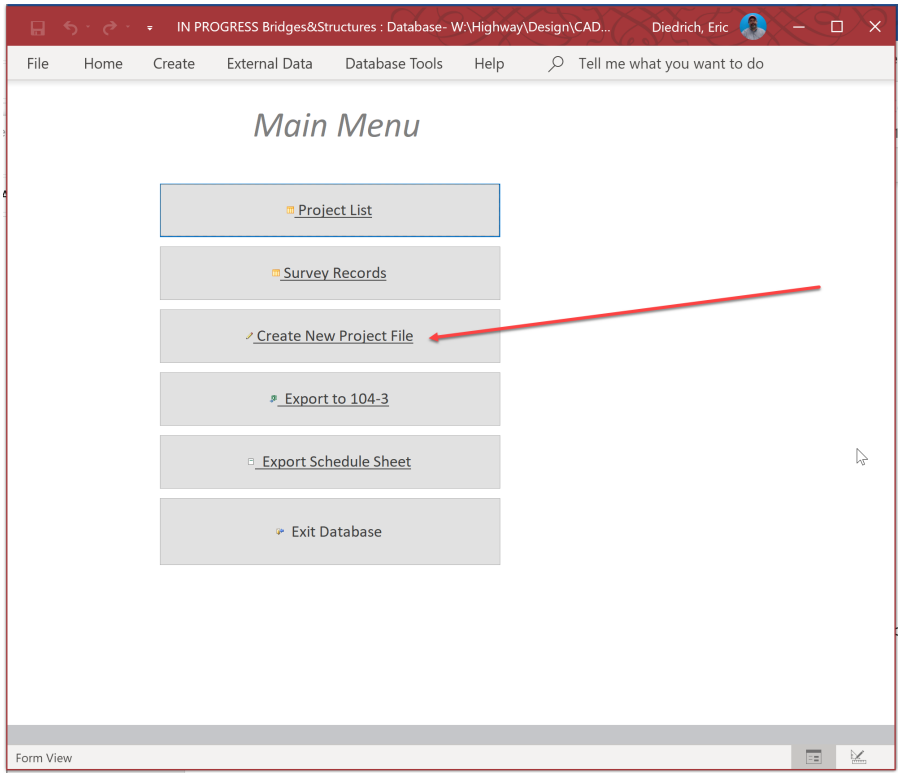
The next step is to Create New Project File. Click on the Enter Database button.



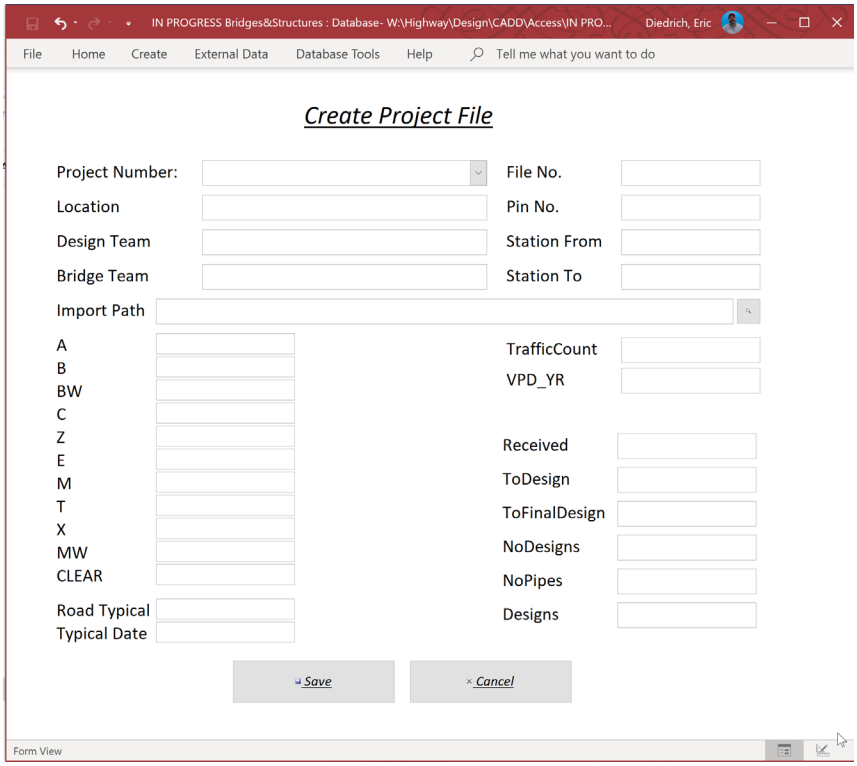
The Main Menu will display.



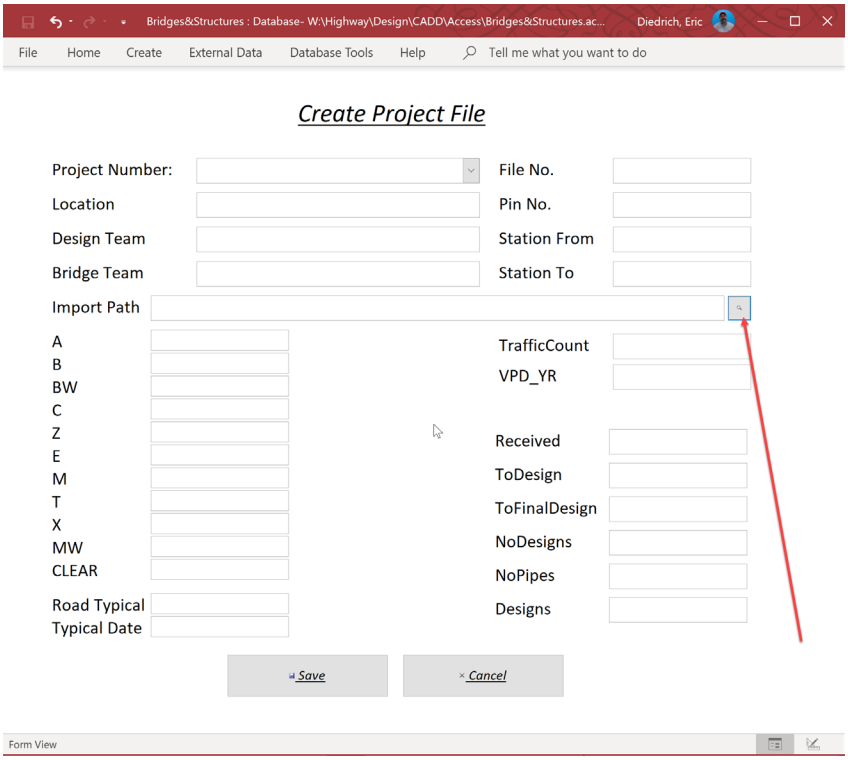
Next, click on the Create New Project File button.



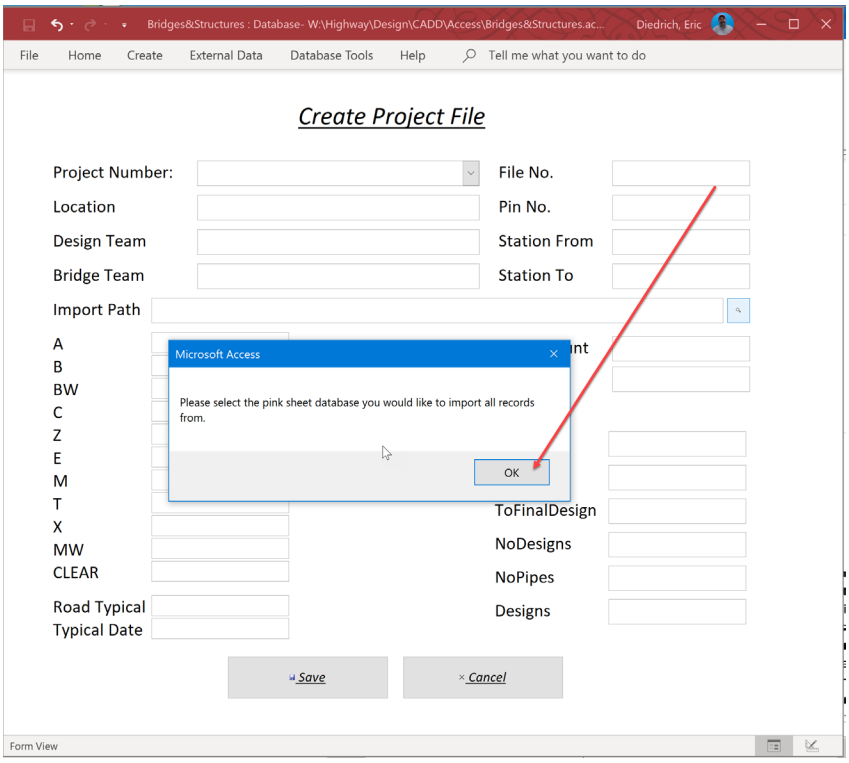
The data entry form will display as shown below.



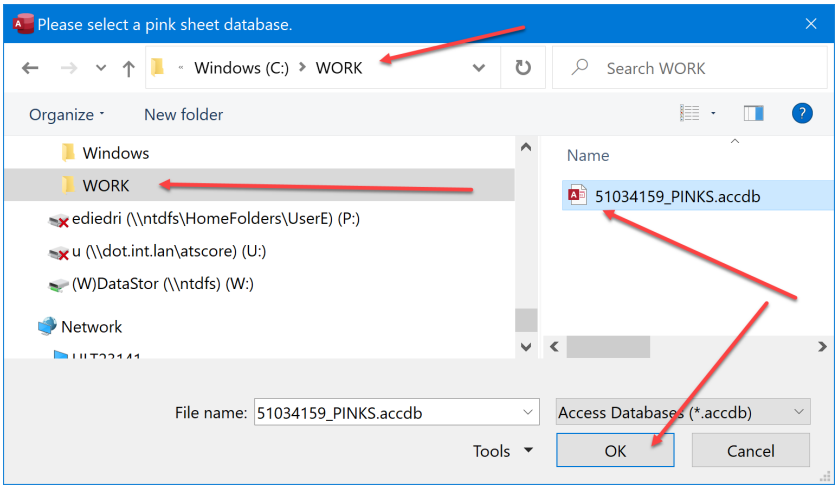
The first step to start a new project is to import the Survey Records into the new project. Click on the magnifying glass next to the Import Path field.



It will open a message to select the database. Click on the OK button.



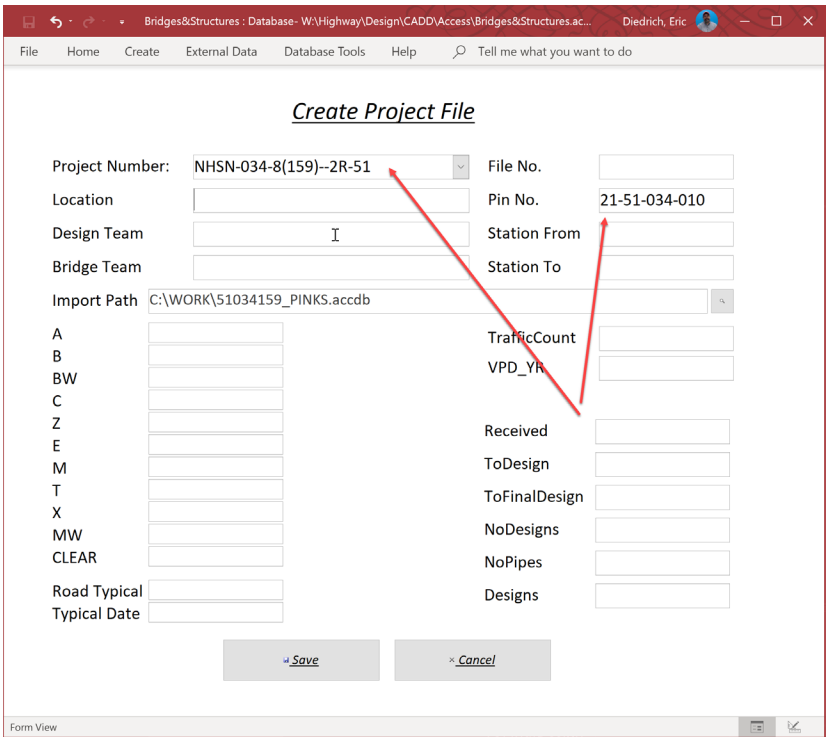
Next, browse to the location that was used to export the Survey Records to and select the CCRRRPPP_PINKS.sccdb file that corresponds with the project. For this example, it will be 51034159_PINKS.accdb in the C:\WORK folder.



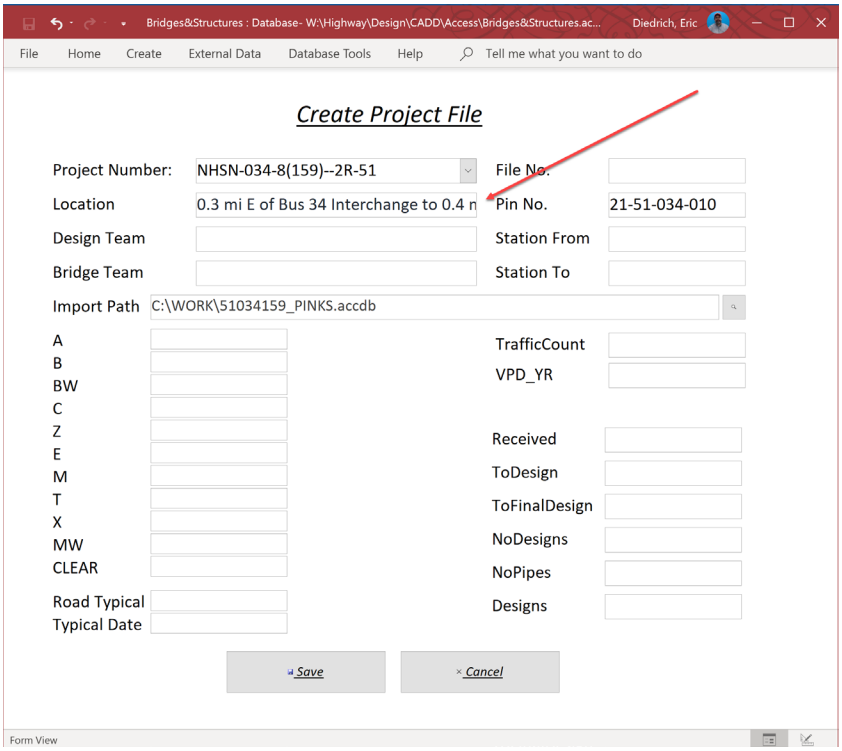
Then click the OK button.

Next, set the project number.

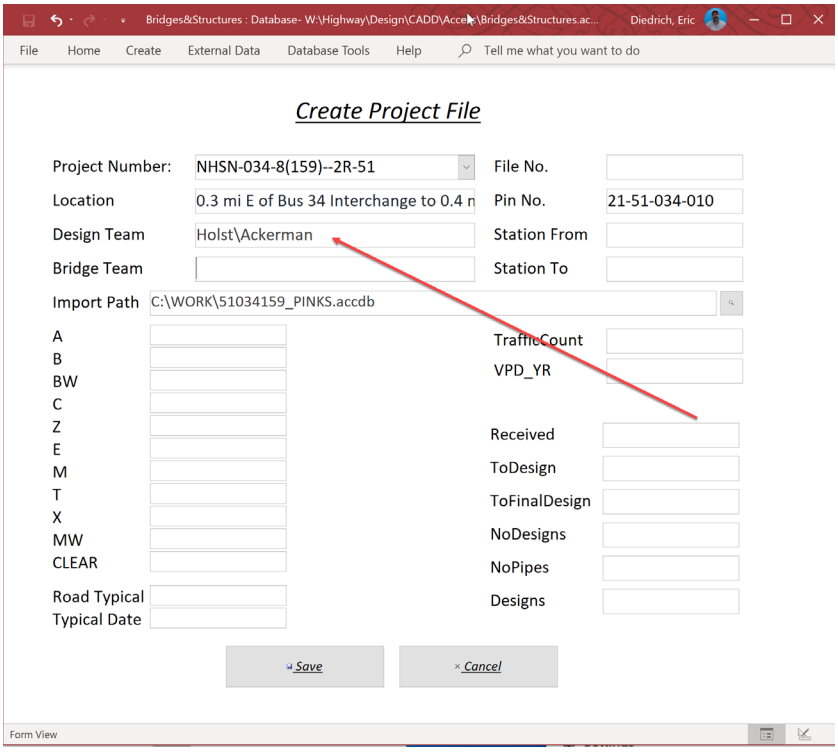
Click on the pulldown in the Project Number field and find the project number from the list and select it. Otherwise, start typing the project number in the Project Number field and the number should autofill as it is typed. Select the correct number. For this example, the project number is NHSN-034-8(159)—2R-51. This will also autofill the PIN No. field once selected since these numbers are tied to each other. It should fill in as shown below.



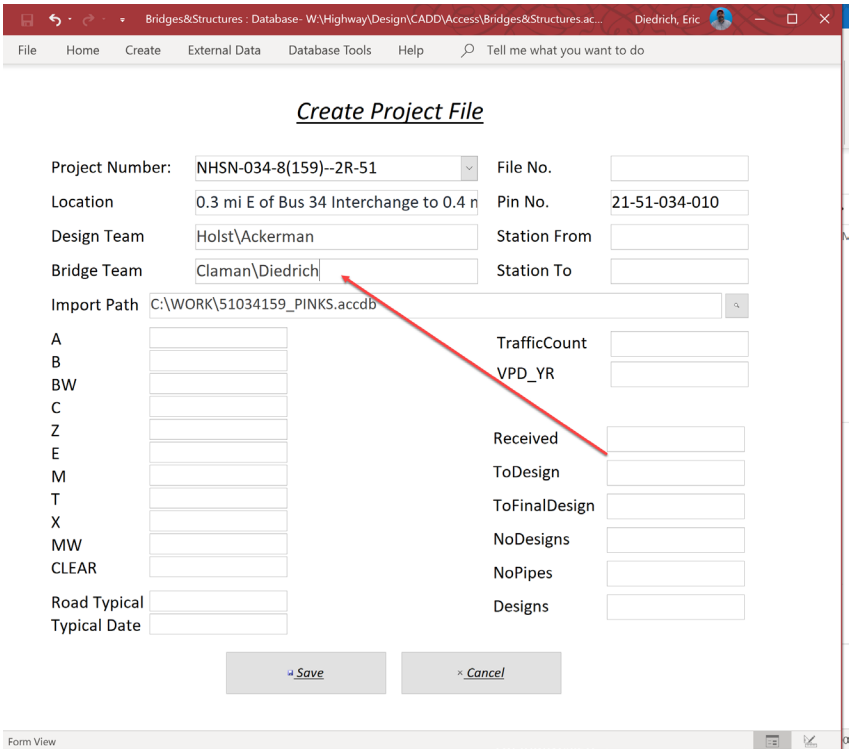
Next, fill out the Location field with the project description. For this example, it will be 0.3 mi E of Bus 34 Interchange to 0.4 mi E of Umber Ave (5 Locations).



Next, fill out the Design Team. For this example, it will be Holst\Ackerman.



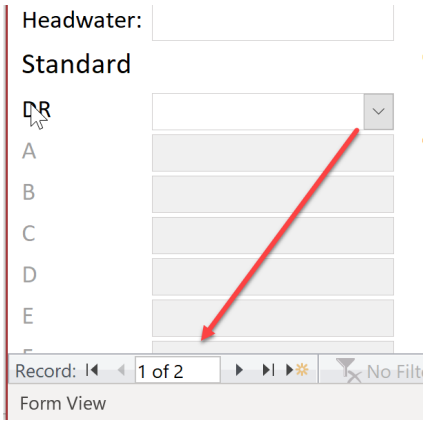
Next, add the Bridge Team. For this example, it will be Claman\Diedrich.



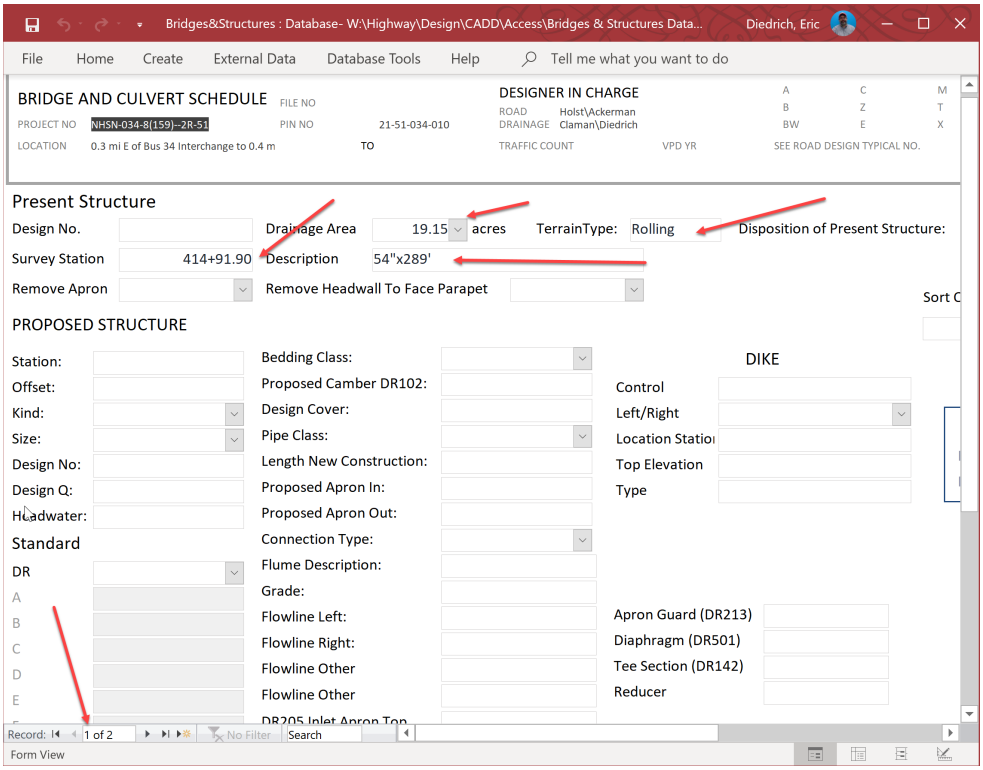
Next, fill out the File No. and Station From and Station To.

Note: If the File No. and Station From and Station To are not known at the time of the project creation, leave it blank and fill it in later. Also, creation of the project as a new project is only needed once. It will be accessed from the list button from then on.

Click the save button. The New Project will open at the first record. If the Survey Records (CCRRRPPP_PINKS.sccdb) was imported, it will open at the first record that was imported. For this example, the imported Survey Records (CCRRRPPP_PINKS.sccdb) contained two structures so it will show record 1 of 2 as shown at the bottom left.

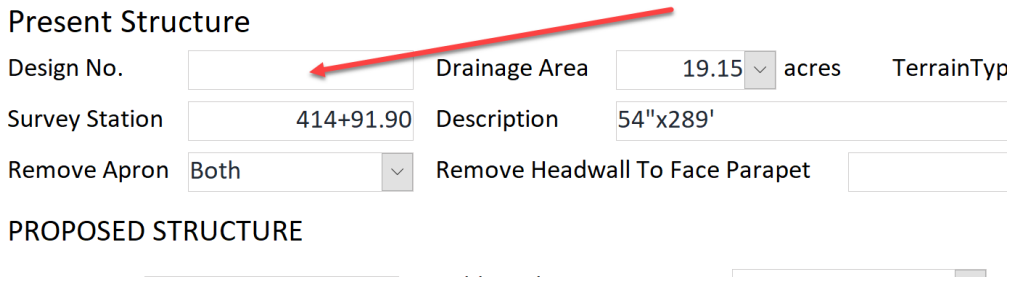


If survey records were not imported, it will show 1 of 1 records. Since the survey records were imported, the Survey Station, the Drainage Area, Terrain Type and Description of the existing structure are shown.



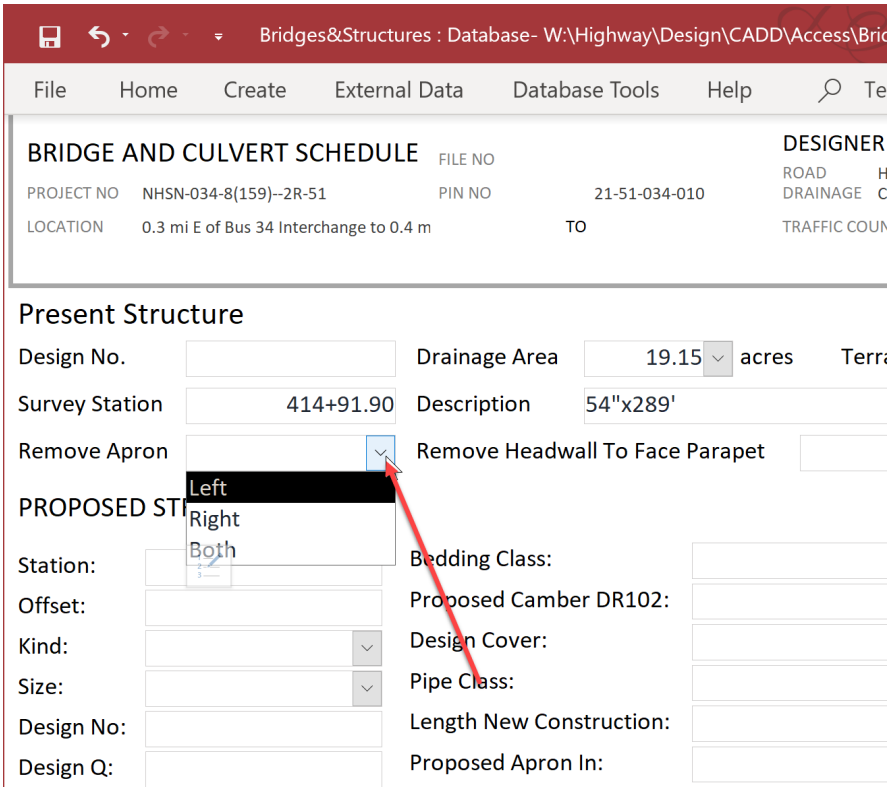
This is the form that will need to be filled out for each structure in the new drainage design. If the existing structure is being replaced with a new one, fill out the proposed structure information on the record of the existing structure that will be replaced. If the existing structure will be left in place and used as constructed in the new drainage design, leave the proposed structure portion of this record blank. For this example, the existing structure (54" pipe) is being replaced with a new 54" pipe and the Proposed Structure information needs filled out on this record.

The first thing to fill out is the Design number of the existing structure if it is an RCB. This information can be acquired from the as-builts and entered here.

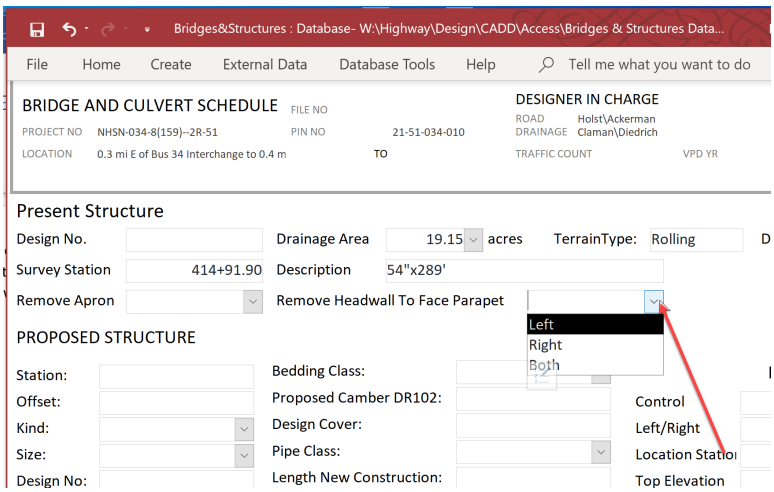


This example is a pipe, so there is not a design number. Leave it blank.

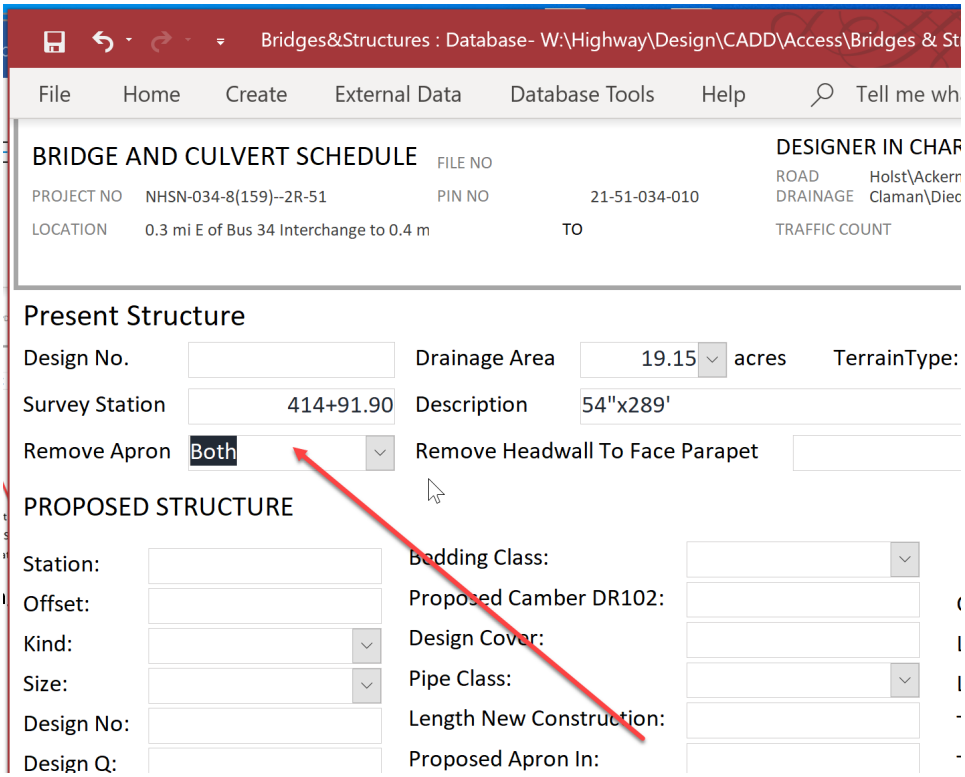
The next thing to do is decide what will be done with the existing structure. If the structure is a pipe, click on the pulldown on the Remove Apron field. This will provide 3 options, Left, Right and Both. If the pipe is being extended, select the end that is being extended. However, if the pipe is being replaced select Both.



If the structure is an RCB, click on the pulldown on the Remove Headwall field. This will provide 3 options, Left, Right and Both. If the RCB is being extended, select the end that is being extended. However, if the RCB is being replaced select Both.

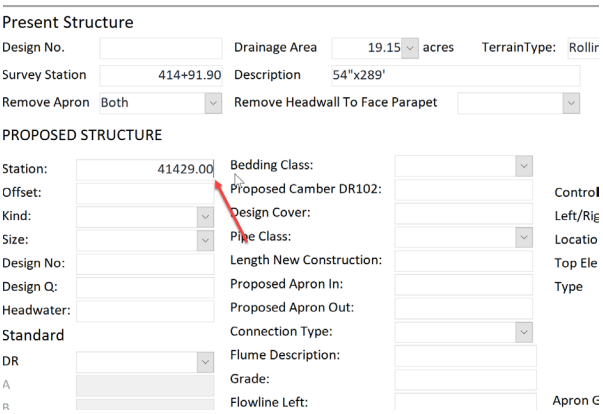


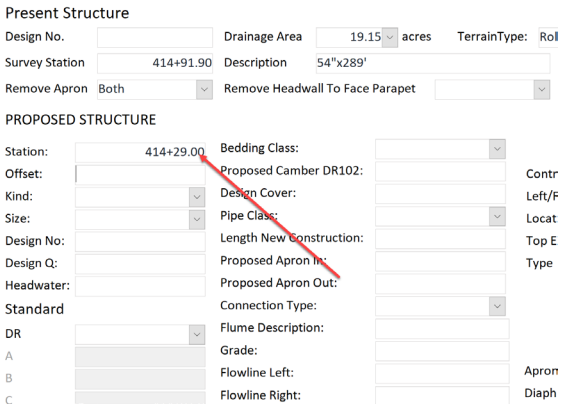
For this example, it is a 54-inch pipe and is being replaced with a new structure so select Both.



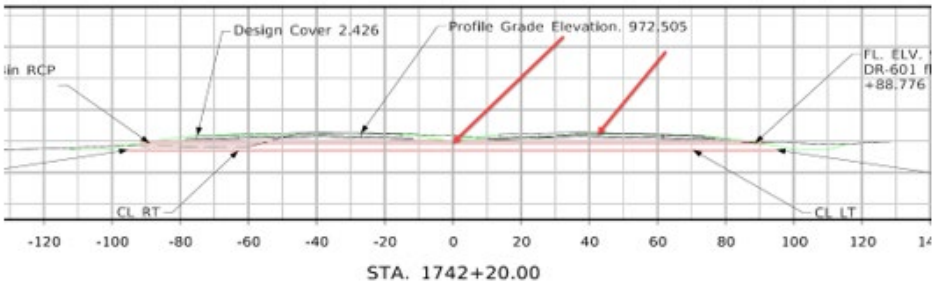
Next, fill out the Station of the Proposed Structure. This is the station value that is the intersection point at the centerline of the Proposed Structure and the centerline of the design alignment. For this example, it will be 414+29.00.

Note: When entering this station value, do not place the plus+ just the numeric value and then click in the next field. The database will put in the plus+ as shown below.



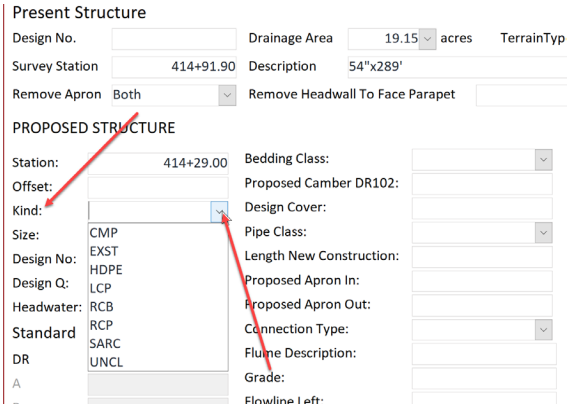


The next field is Offset field. This is used if the structure is on a divided highway. This will be the distance from the mainline centerline to the Base Line as described in the standards.



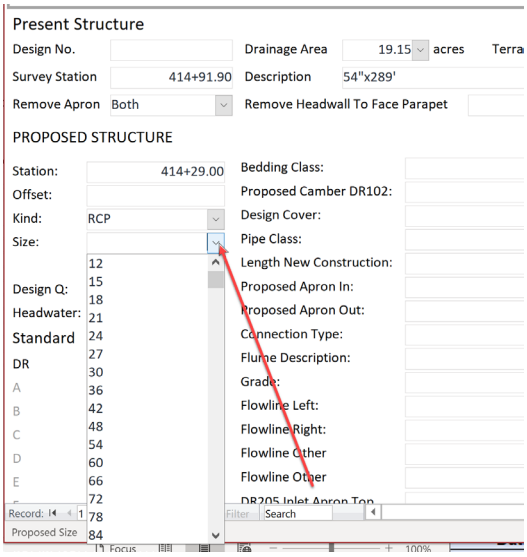
If designing a two-lane highway like in this example, leave this blank.

The next field is the Kind of structure. This refers to what kind of structure is the proposed structure.

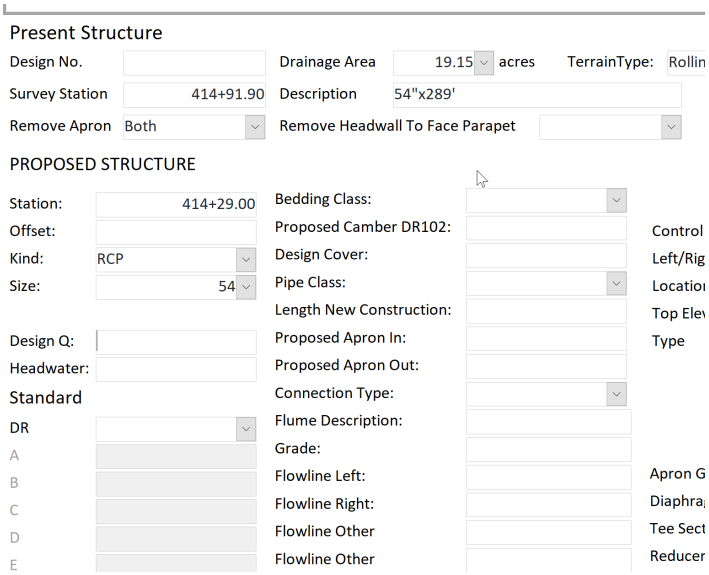


For this example, select RCP.

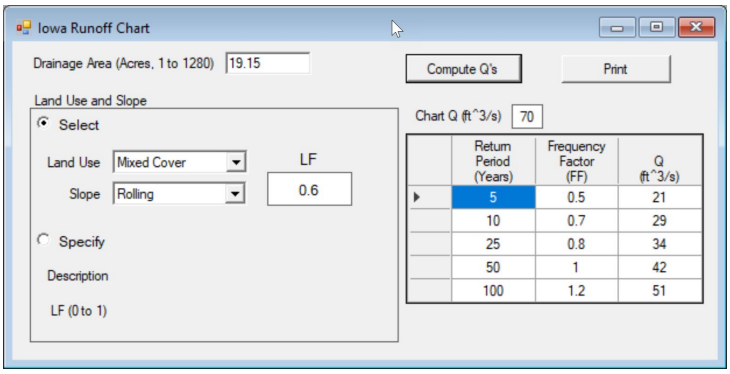
Next, select the size.



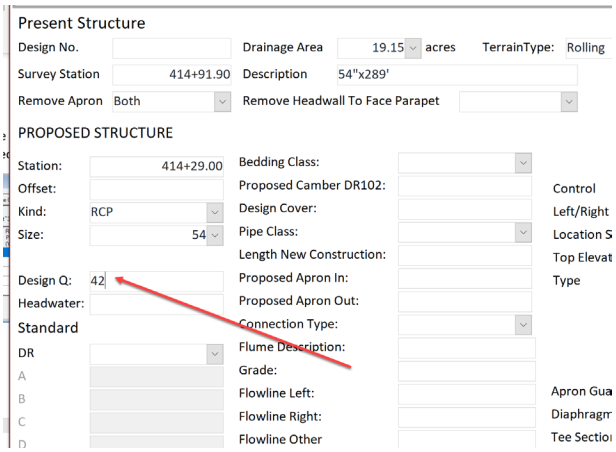
For this example, it will be 54”



The Next field is the Design Q. Obtain the value from the ICH program that is used to determine the size of the proposed structure. This comes from the Iowa Runoff Chart.

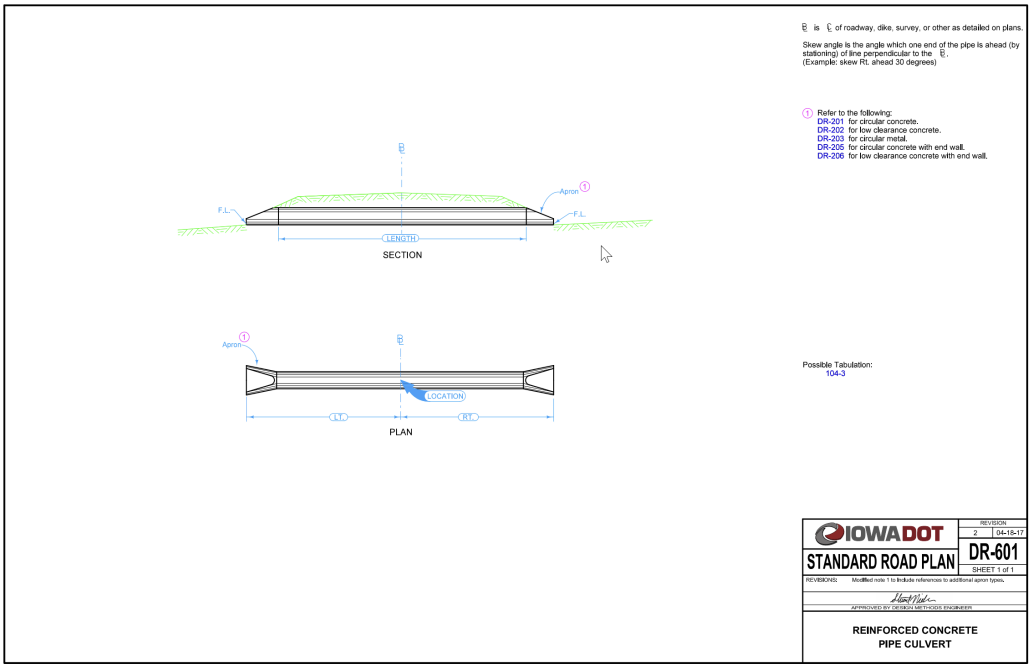


For this example, it will have a Design Q of 42 because it is designed for the 50-year flood event.

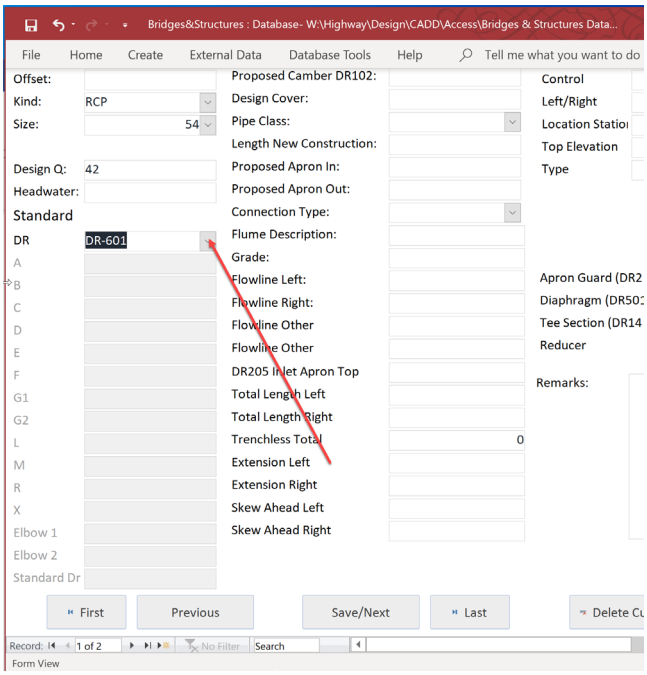


The Next field is the Headwater. This will need to be calculated for the larger structures. However, the example is small enough it is left blank.

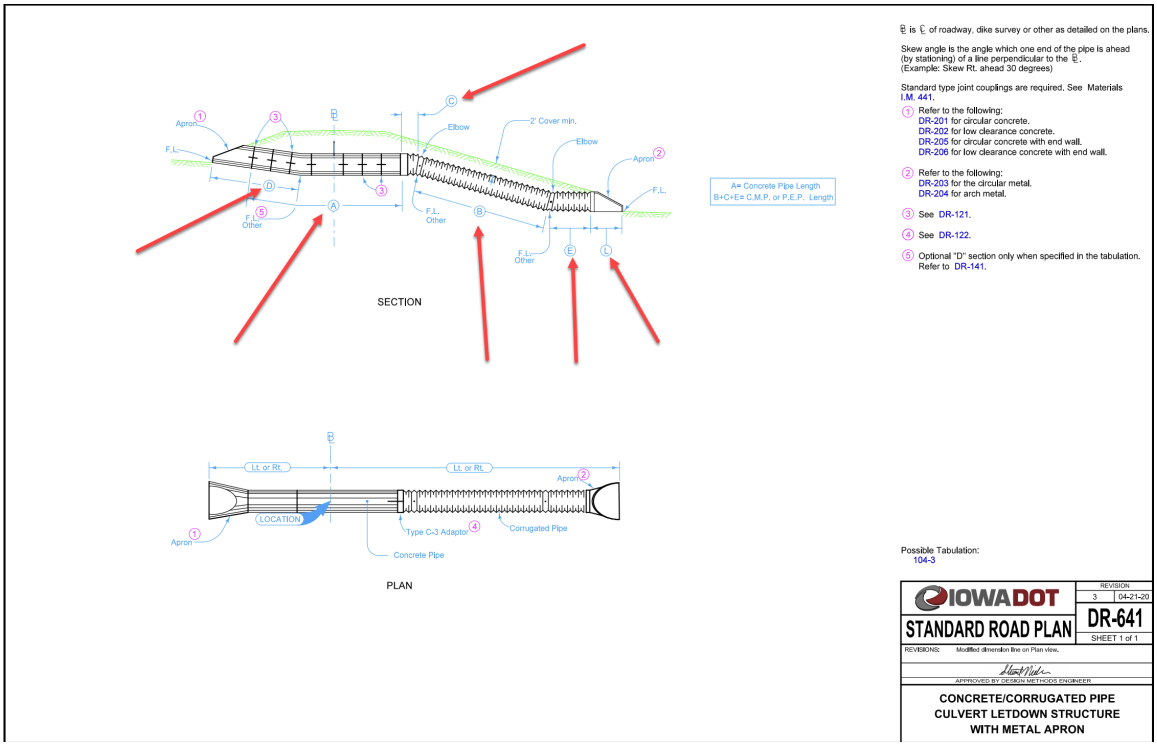
The next field is the design Standard of the proposed structure. Select the correct Standard from the Proposed Structure field by clicking on the pulldown in the DR field. For the example it will be a DR-601.



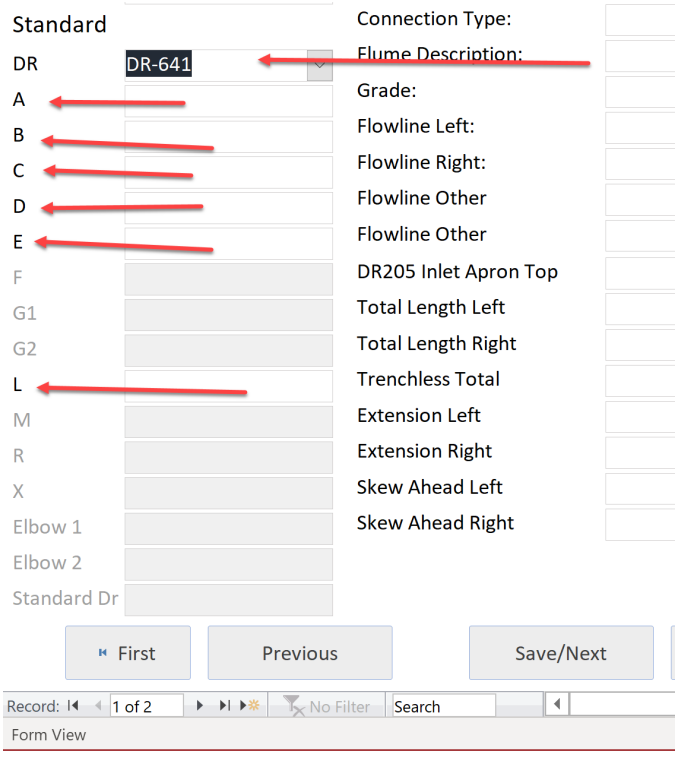
Note: For more information on the Iowa Department of Transportation drainage standards see the web page at this link. https://iowadot.gov/design/stdplne_dr



Depending on the DR Standard that is selected the appropriate information fields will become active. For this example, assume the standard used is DR-641



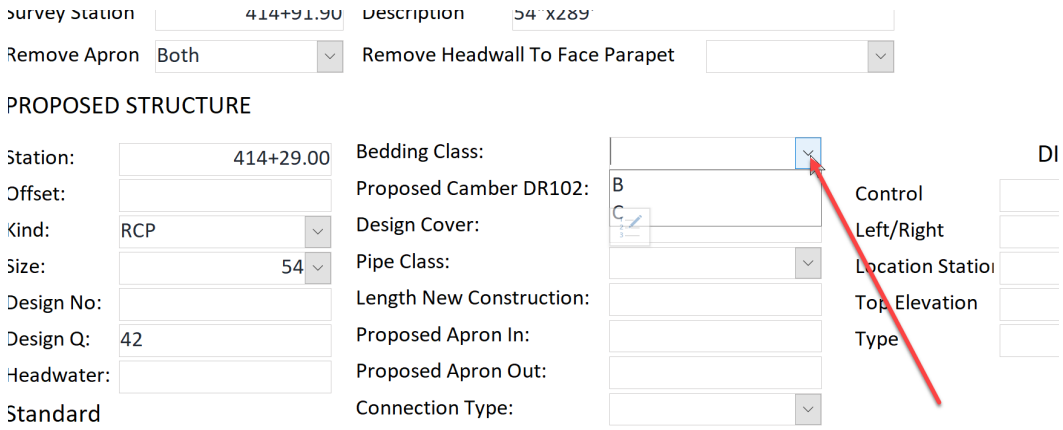
The information fields A,B,C,D,E and L are now active and the corresponding information will be filled in.



Note: When entering a DR-641 use two records in the database. One for the concrete or RCP portion of the structure and one for the CMP or plastic letdown section of the structure. Enter RCP portion on the first record with all special dimensions. Then just the letdown dimensions on the second record. This will allow the structure to be tabulated correctly.

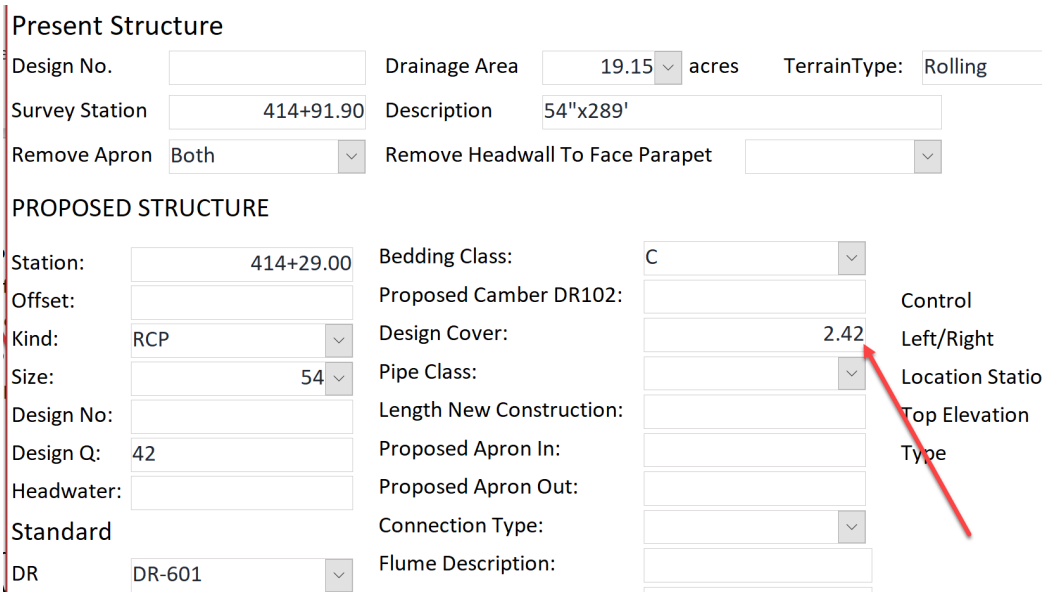
For this design example, use a DR-601.

Next, select the Bedding Class:

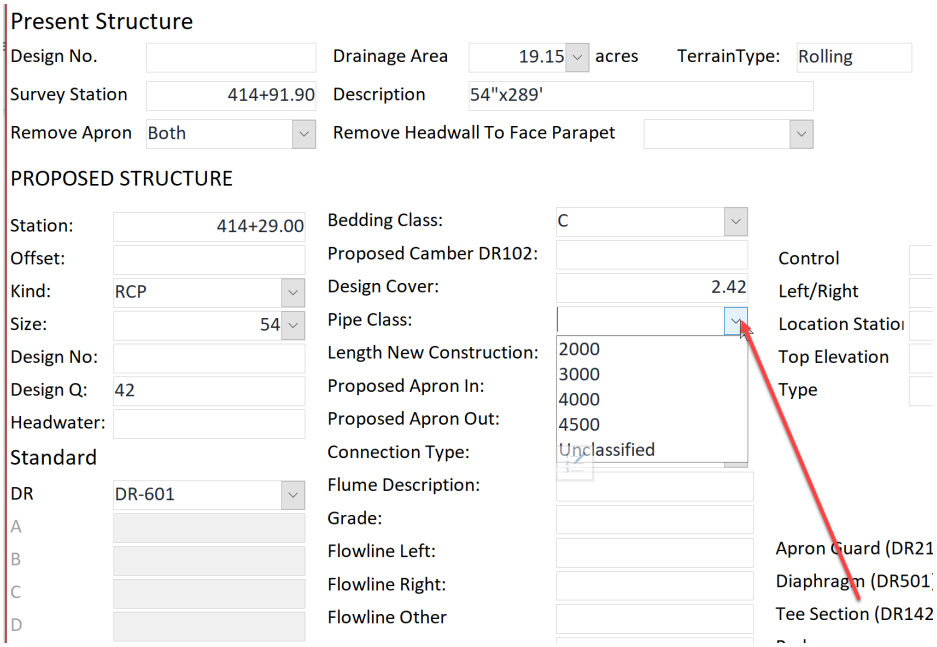


For pipes it will usually be Class C. However, refer to the DR-101 to verify.

Next, enter the Design Cover for the pipe design. This is the distance from the top of the pipe to the shoulder of the roadway. Refer to the DR-102 to verify. For this example, it will be 2.42

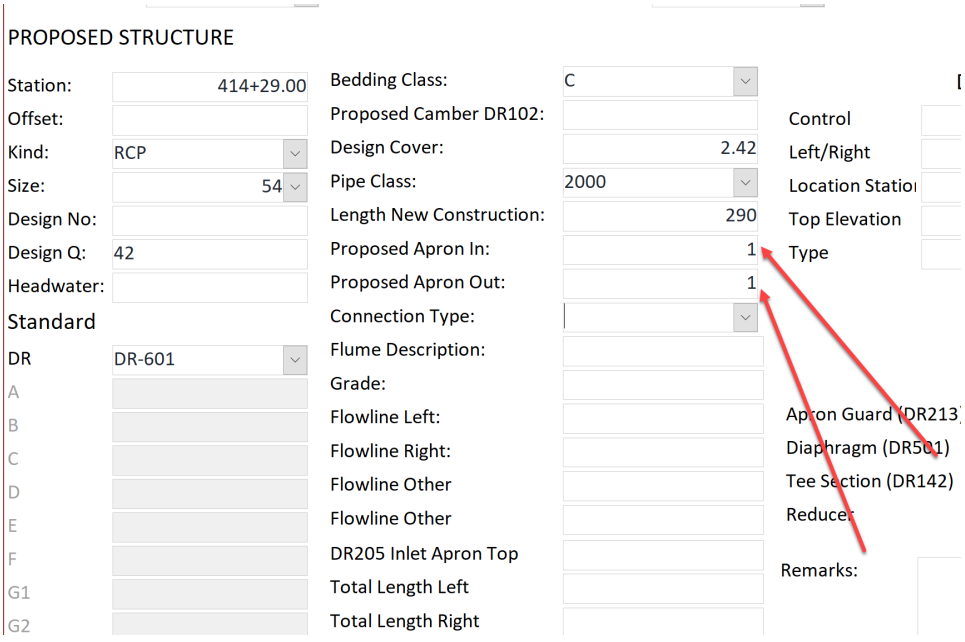


Next, decide what class of pipe is used for this design. This is determined by the design cover and Bedding Class. Refer to the DR-104 to verify. Use 2000 for this example.



Next, enter the Length New Construction value. This is the total length from connection point of inlet apron to connection point of outlet apron. For the example it will be 290'.

The next two fields are Proposed Apron In and Proposed Apron Out. This is used to determine how many aprons will be needed to construct the new pipe. So, for the example place a (1) in each field so that there are two 54" pipe aprons on the 104-3 tab sheet. If the design was to only extend the pipe, place a (1) in the field of the end of the pipe that was being extended, Inlet or outlet.

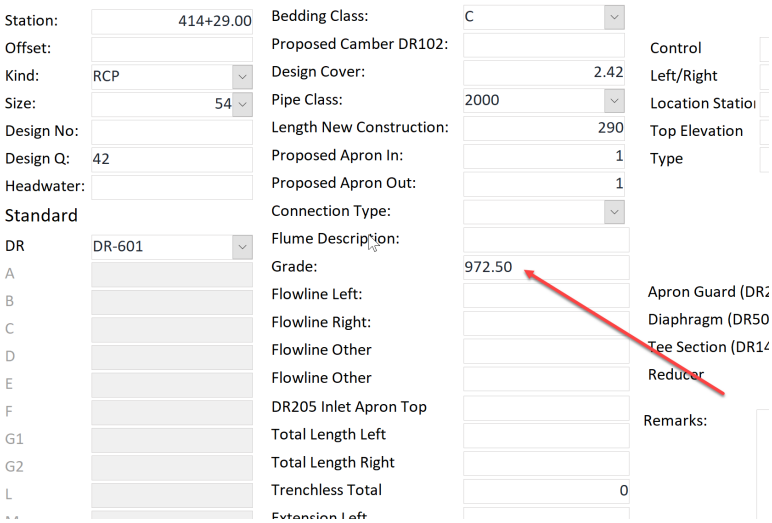


The next field, Connection Type, is for indicating if the design requires a connection type, either a DR-122 or DR-141. Select the correct standard and the additional field will appear for the corresponding information for that standard. This will not be used for this design.

The next field is if the design uses a flume. Enter the size and type of flume in this field. This will not be used for this design.

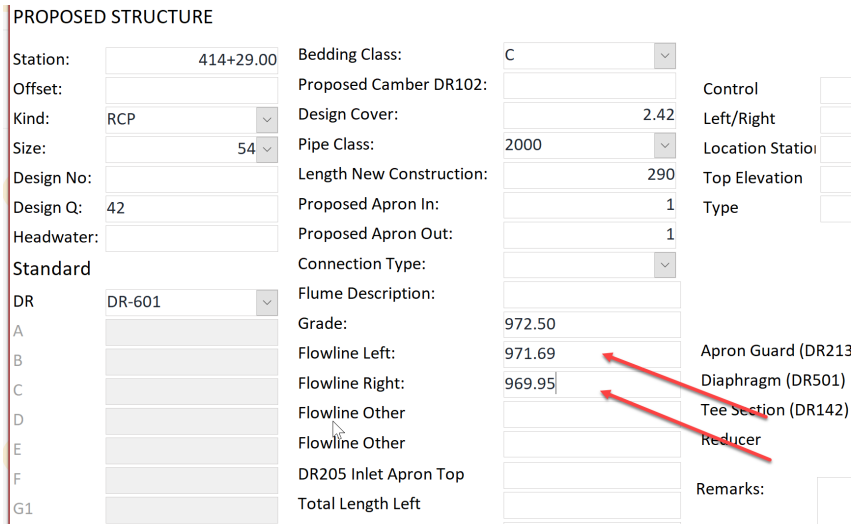
The next field is for the Grade. This is going to be the Profile Grade Elevation that was determined while designing the structure and annotated on the cross section. For this example, it will be 972.50.

Note: The cross section is a great source to use to fill out the following data.

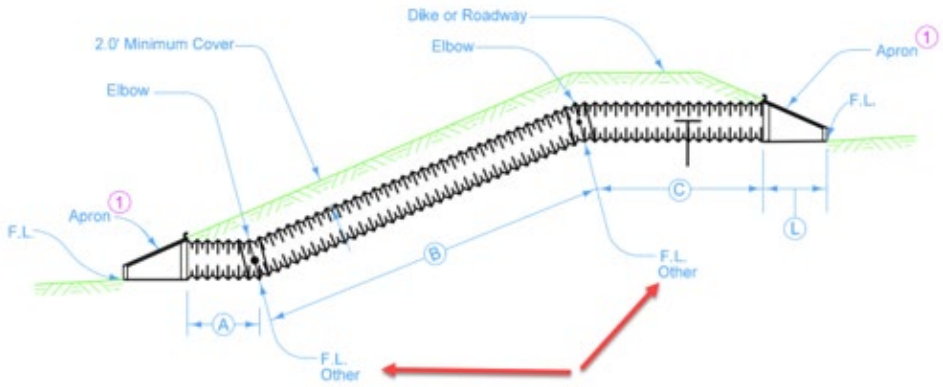


The next 2 fields will be Flowline Left and Flowline Right. This is the elevation of the flowline at the end of the pipe apron.

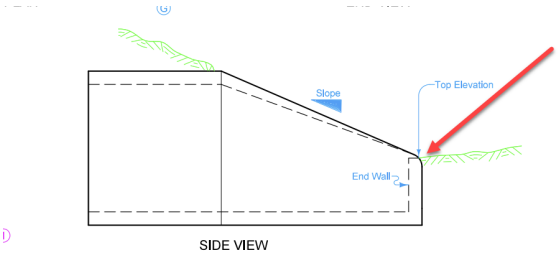
Note: The information was determined during the design process and annotated on the cross section for the next several fields. The cross section is a great source to use to fill out the following data.



The next fields are used if the standard requires other flowline elevations to be reported, for example a DR-632.

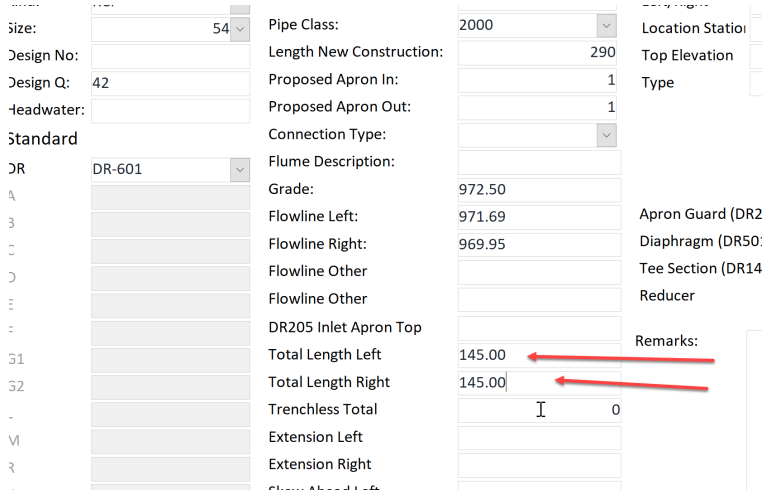


The next field , DR205 Inlet Apron Top, is for the elevation at the top of the end wall of a DR-205. If this apron is used in the design, enter the elevation here.

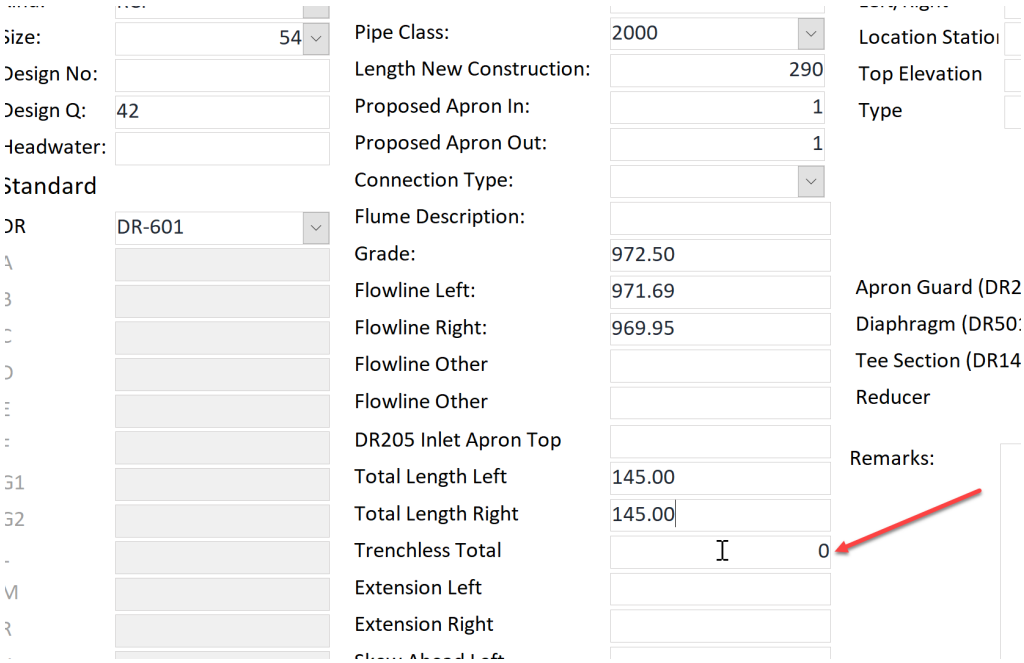


The next two fields are to report on the Total Length Left and the Total Length Right. This is the distance from center line to end of the apron.

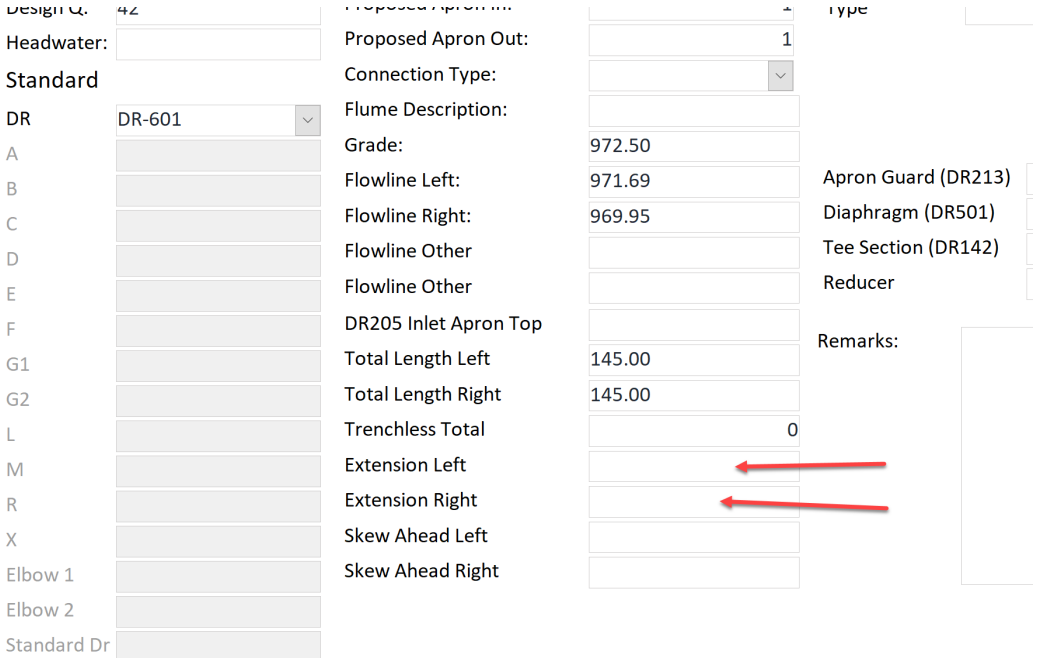
Note: If there is not an offset base line, this will be the offset of the point at the end of the apron.



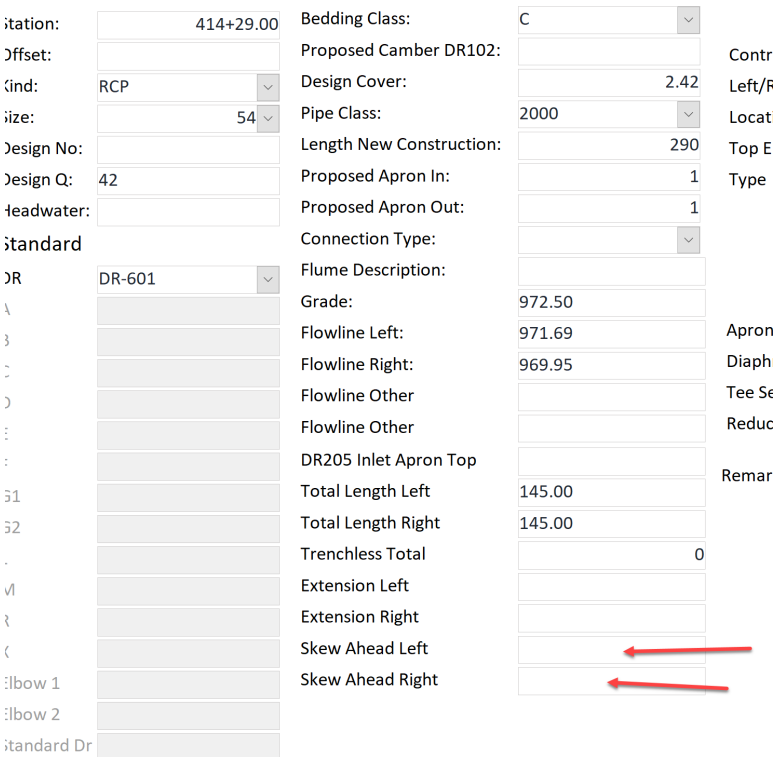
The next field is for reporting the Trenchless Total. This will refer to a pipe that requires to be jacked in place during installation as opposed to being replaced by cut and cover. This field is to enter the total distance of that pipe that is to be jacked.



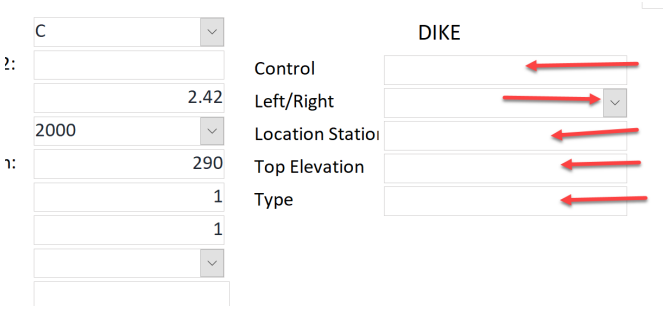
The next two fields are for if the design is to extend the existing structure. Enter the total distance in the direction of the extension that is to be constructed.



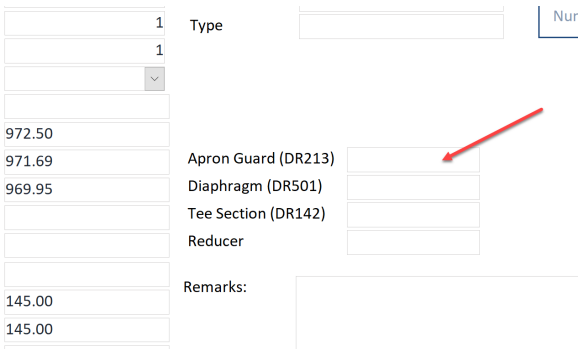
The next two fields are for if the structure is skewed, enter the degree of the angle of the skew in the appropriate field Right or Left.



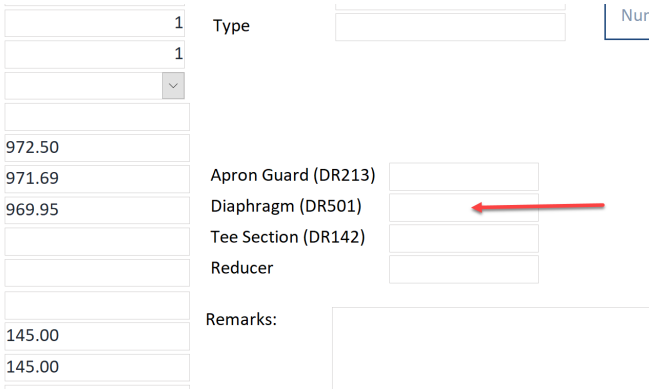
The next five fields are for when a dike is included in the drainage design.



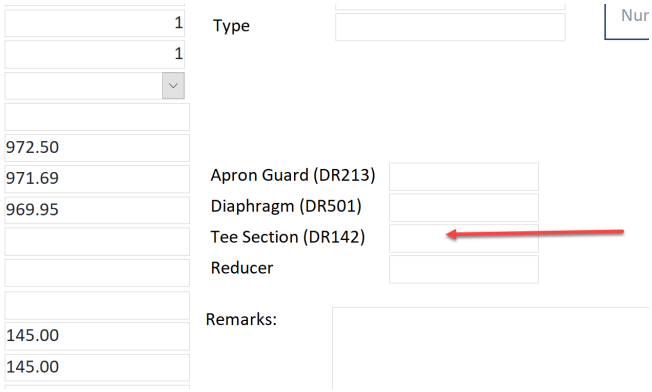
The next field is for if the design has an DR-213. Enter the number that is needed for that structure.



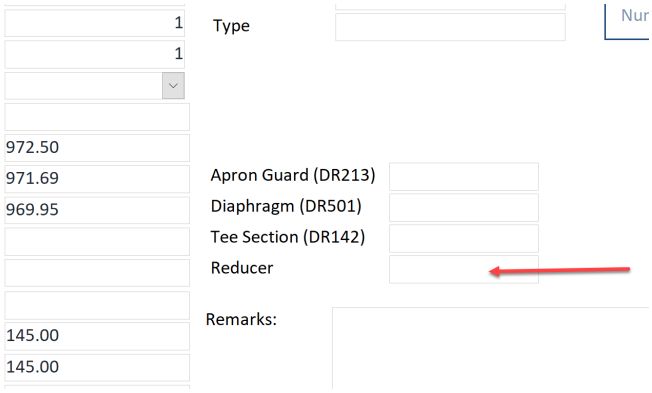
The next field is for when the design has an DR-501. Enter the number that is needed for that structure.



The next field is for when the design has an DR-142. Enter the number that is needed for that structure.



The next field is for when the design has a Reducer. Enter the number and size that is needed for that structure.

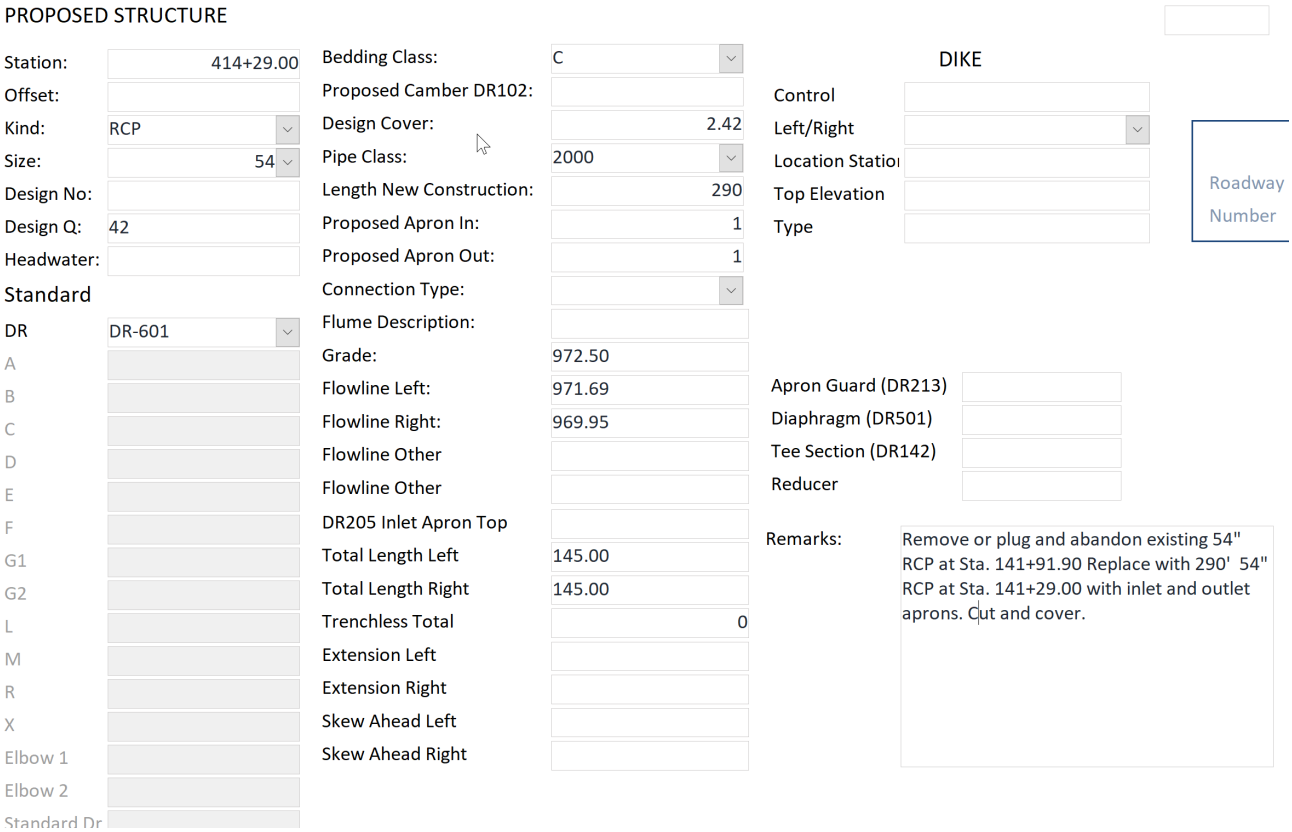


The next field is for Remarks. This is intended for the designer to include the design intent and direction on the staging of the replacement for the proposed structure.

Examples of typical remarks:

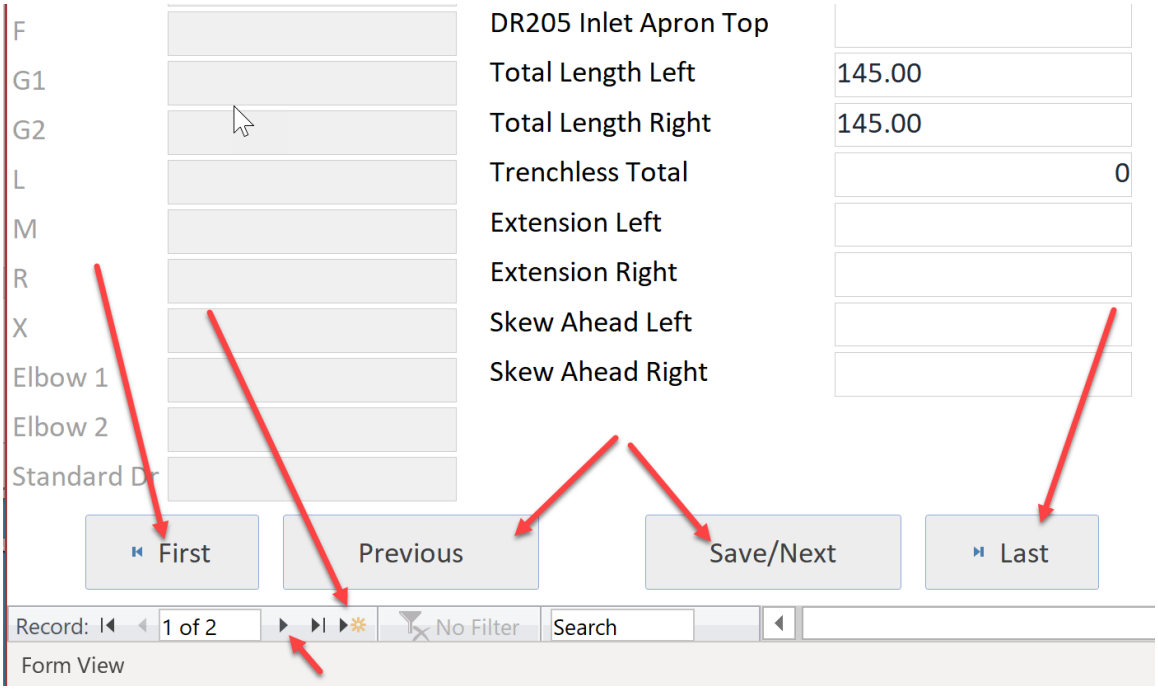
Plug and abandon exist median drain at Sta 1451+26. Jack 78’ of 24” RCP then lay one 6’ DR141 Type “D” double bevel section + apron on inlet end at Sta. 1452+25 – 51’ Lt
or
Remove 30 ft of existing 36 in RCP. Replace with 42 ft of 36in RCP with one DR-141 7.5-degree D section beveled end to the RT. Tie new pipe to old pipe with longitude tie bars.

The purpose of the remarks is to eliminate questions during the construction phase of the project.

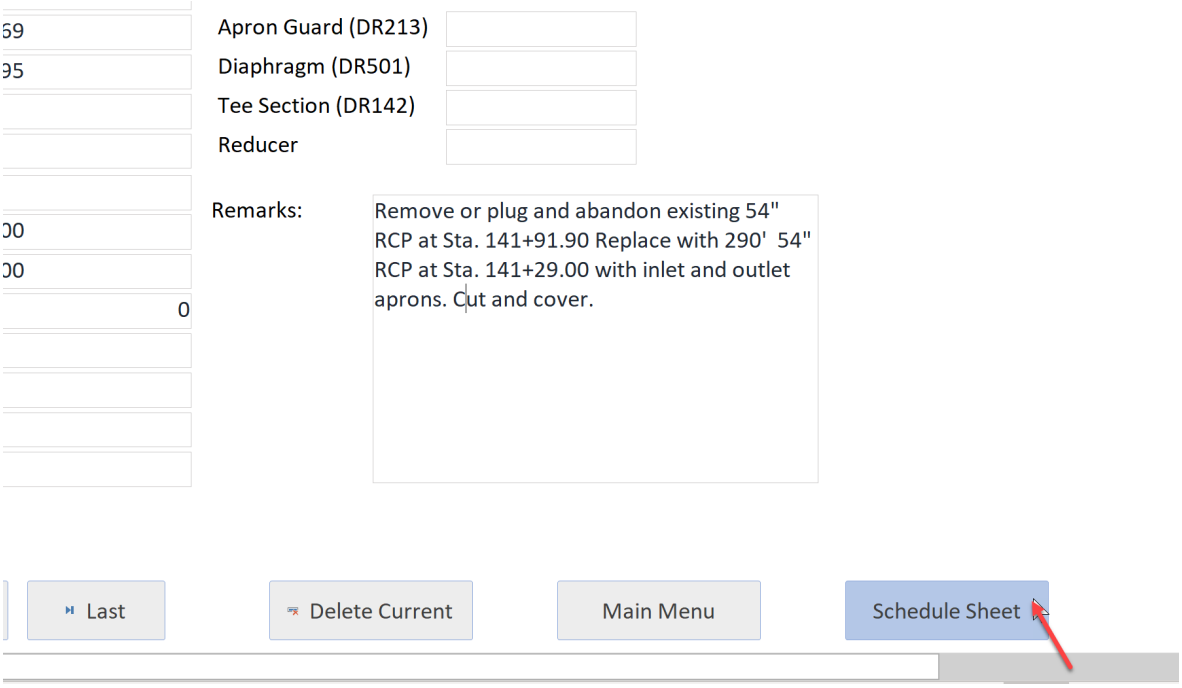


Once all the correct fields that corresponds with that structure standard are entered in the record, move to the next record and repeat the process. If the next structure is to be replacing an existing structure, find the records that were imported from the CCRRRPPP_PINKS.sccdb that corresponds with that structure. If the next structure does not replace an existing structure, make a new record.

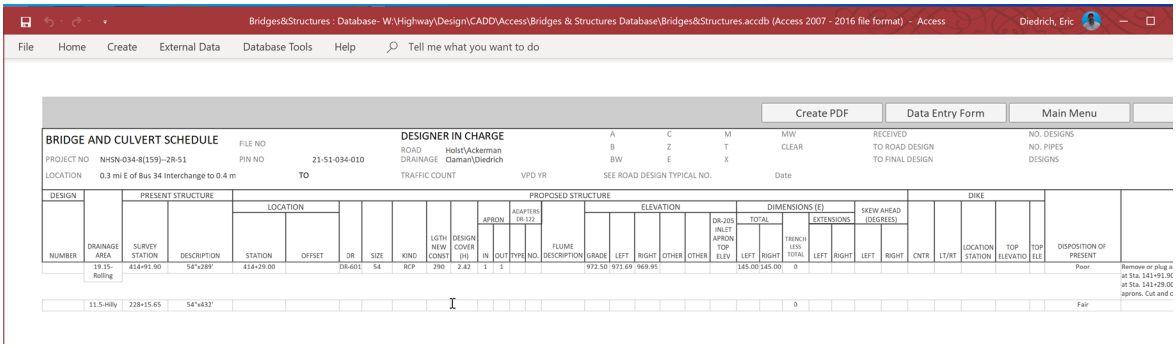
Click the buttons at the bottom of the record or the arrow buttons in the access database task bar to navigate to the desired record.



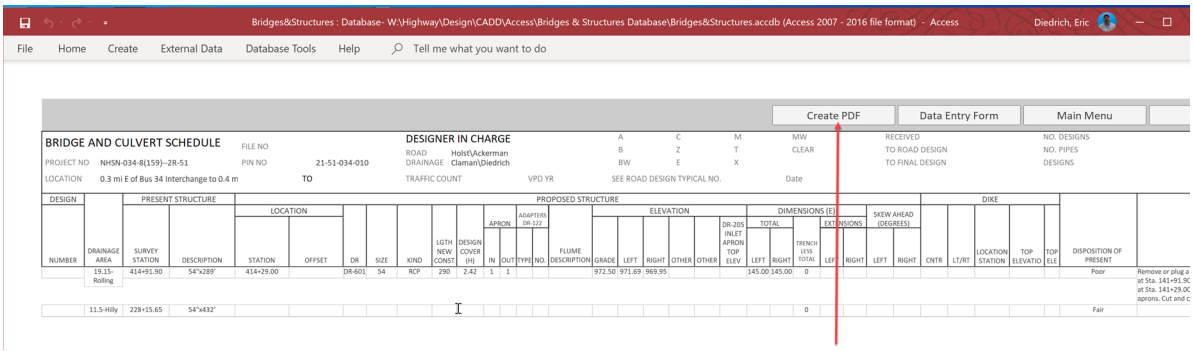
Once a record for each structure in the drainage design is finished, create the Schedule Sheet. Click on the Schedule Sheet button at the bottom of the record.



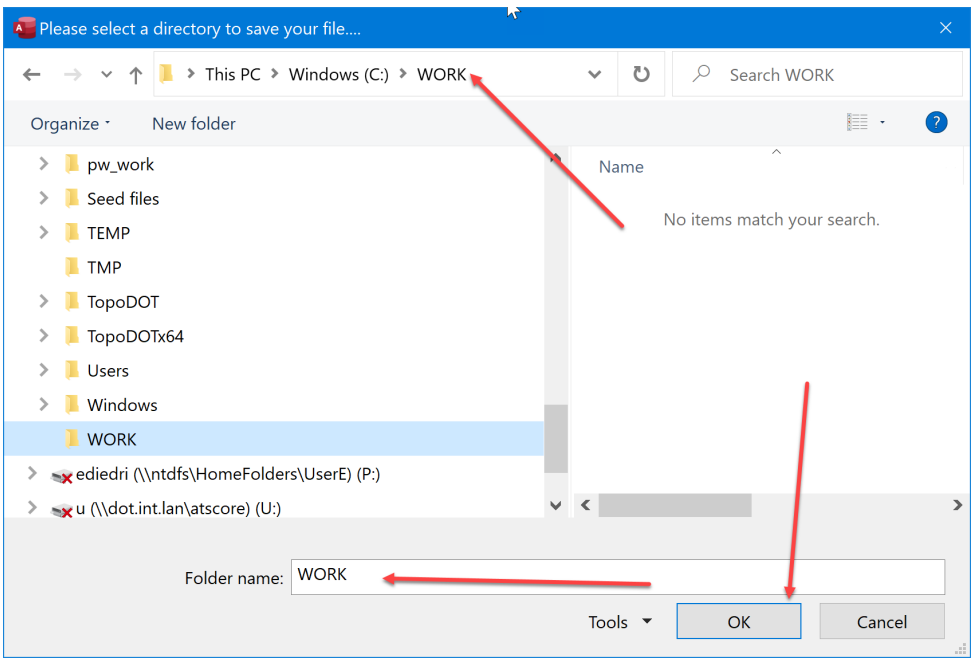
All the records in the project are compiled onto a Schedule Sheet.



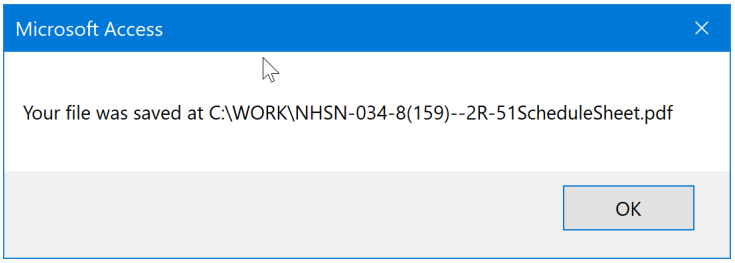
The next step, will be to create a PDF of the Schedule Sheet. Click on the Create PDF button at the top of the Schedule Sheet.



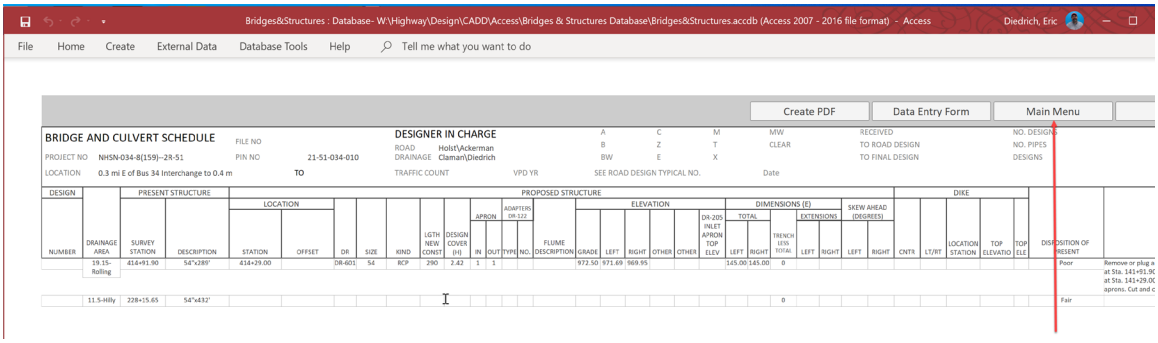
It will open the dialog box asking to select a directory to save the PDF file. For this example, use the C:\WORK directory that was created to download the CCRRRPPP_PINKS.sccdb to. Once the directory is selected, click the OK button.



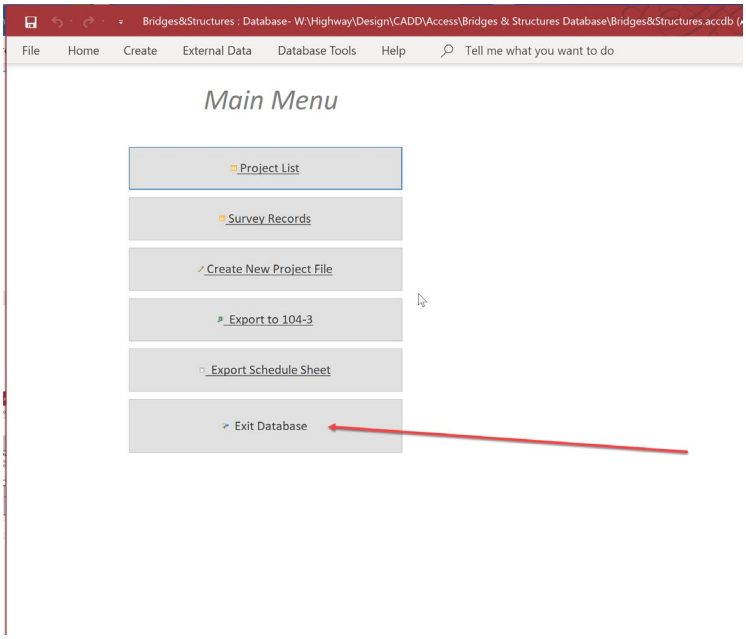
It will create the PDF of the Schedule Sheet in that directory and name the file Project NumberScheduleSheet.PDF. For this example it would be named NHSN-034-8(159)—2R-51ScheduleSheet.pdf. It will display a message to indicate when it is done. Click the OK button to dismiss.



Next, exit the database. Ciick on the Main Menu button at the top of the Schedule Sheet.



Once in the Main Menu, click on the Exit Database button.

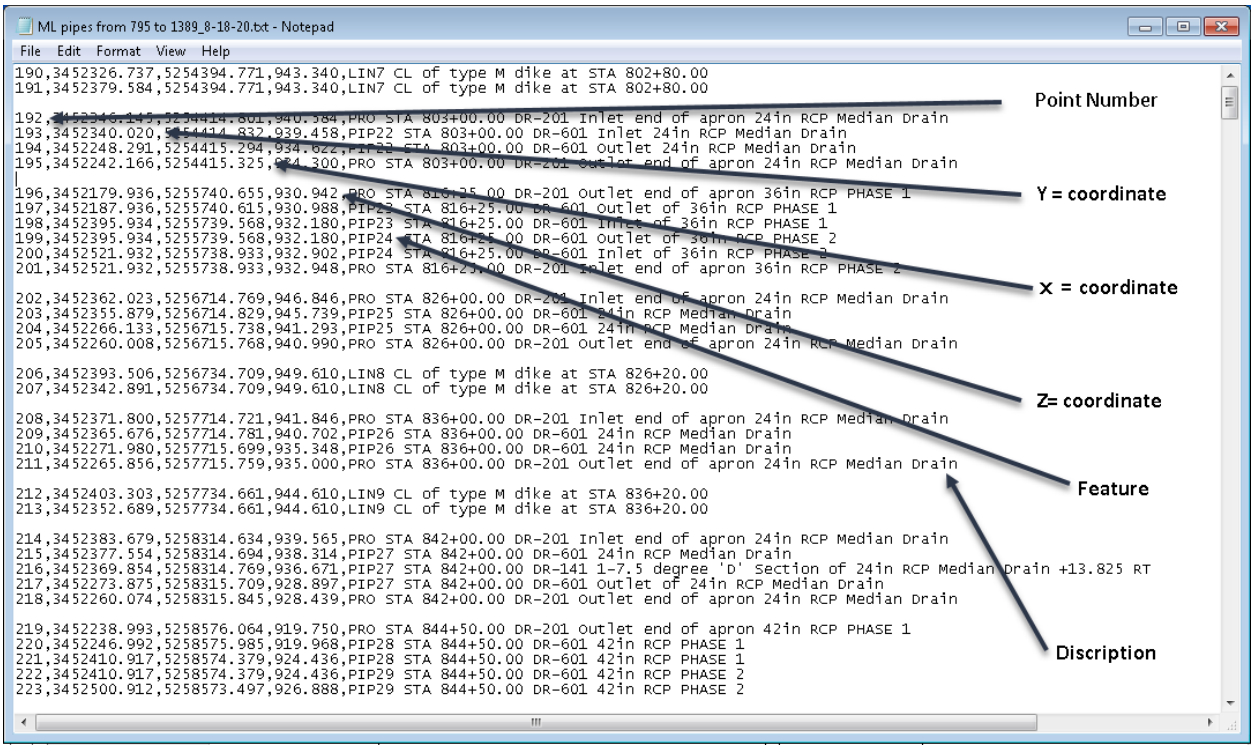


Place the Project NumberScheduleSheet.pdf file in the Bridge\Design Events\B01\ folder of the project directory in ProjectWise.

ASCII Graphics Import Input File

The format of the ASCII input file is the same format that is utilized by the Iowa Department of Transportation Survey crews. The best way to look at this information is to open the file in Notepad or a similar text editor. The file format is a comma delimited file. This consists of the point number, Y coordinate, X coordinate, Z coordinate, feature and description.

It should look something like this:



The first number is the point number. This number can start as any number but cannot be repeated in the ASCII file. It is a good idea not to repeat it per project either. This number needs to increase as the file grows.

The Second number is the Y coordinate of the invert.

The third number is the X coordinate of the invert.

The fourth number is the Z coordinate of the invert.

The fifth value is the feature. The feature can map or draw many different lines and/or cells. For this process, the two features to use are PIP and PRO. The first is a linear feature that will make a line between points. This feature is the PIP feature which is the survey feature for pipes. To make each linear feature unique, add a number to the feature so that the application knows what feature points should be connected.

The first feature will be PIP1, the next one will be PIP2 and so on.

The second feature is a point feature that will place a cell. The PRO feature which is the survey feature for profile shot will place a red circle with the center of it being the origin. There needs to be one for each end of the pipe apron flow line.

The sixth value is the point description of each point. This value is a little different than the previous values because it is not separated from the other values by a comma. A space between it and the feature is used instead. Also, up to 256 characters can be used to describe the point that will be mapped. For this process describe the point by design station, design standard, indicate inlet or outlet, include size and last the type of structure. It is suggested to include the comment that will become the notes on the schedule sheet. This will make it easier to input the information into the data base by copying and pasting it into the database and not retyping it.

This is an example for a 24 inch RCP median drain at station 803+00.00

193,3452340.020,5254414.832,939.458,PIP22 STA 803+00.00 DR-601 Inlet 24in RCP Median Drain

Once all the invert coordinates are recorded in the ASCII graphics import input file, it should look something like this:

```
190,3452326.737,5254394.771,943.340,LIN7 CL of type M dike at STA 802+80.00
191,3452379.584,5254394.771,943.340,LIN7 CL of type M dike at STA 802+80.00
192,3452346.145,5254414.801,940.584,PRO STA 803+00.00 DR-201 Inlet end of apron 24in RCP Median Drain
193,3452340.020,5254414.832,939.458,PIP22 STA 803+00.00 DR-601 Inlet 24in RCP Median Drain
194,3452248.291,5254415.294,934.622,PIP22 STA 803+00.00 DR-601 Outlet 24in RCP Median Drain
195,3452242.166,5254415.325,934.300,PRO STA 803+00.00 DR-201 Outlet end of apron 24in RCP Median Drain
196,3452179.936,5255740.655,930.942,PRO STA 816+25.00 DR-201 Outlet end of apron 36in RCP PHASE 1
197,3452187.936,5255740.615,930.988,PIP23 STA 816+25.00 DR-601 Outlet of 36in RCP PHASE 1
198,3452395.934,5255739.568,932.180,PIP23 STA 816+25.00 DR-601 Inlet of 36in RCP PHASE 1
199,3452395.934,5255739.568,932.180,PIP24 STA 816+25.00 DR-601 Outlet of 36in RCP PHASE 2
200,3452521.932,5255738.933,932.902,PIP24 STA 816+25.00 DR-601 Inlet of 36in RCP PHASE 2
201,3452521.932,5255738.933,932.948,PRO STA 816+25.00 DR-201 Inlet end of apron 36in RCP PHASE 2
202,3452362.023,5256714.769,946.846,PRO STA 826+00.00 DR-201 Inlet end of apron 24in RCP Median Drain
203,3452355.879,5256714.829,945.739,PIP25 STA 826+00.00 DR-601 24in RCP Median Drain
204,3452266.133,5256715.738,941.293,PIP25 STA 826+00.00 DR-601 24in RCP Median Drain
205,3452260.008,5256715.768,940.990,PRO STA 826+00.00 DR-201 Outlet end of apron 24in RCP Median Drain
206,3452393.506,5256734.709,949.610,LIN8 CL of type M dike at STA 826+20.00
207,3452342.891,5256734.709,949.610,LIN8 CL of type M dike at STA 826+20.00
208,3452371.800,5257714.721,941.846,PRO STA 836+00.00 DR-201 Inlet end of apron 24in RCP Median Drain
209,3452365.676,5257714.781,940.702,PIP26 STA 836+00.00 DR-601 24in RCP Median Drain
210,3452271.980,5257715.699,935.348,PIP26 STA 836+00.00 DR-601 24in RCP Median Drain
211,3452265.856,5257715.759,935.000,PRO STA 836+00.00 DR-201 Outlet end of apron 24in RCP Median Drain
212,3452403.303,5257734.661,944.610,LIN9 CL of type M dike at STA 836+20.00
213,3452352.689,5257734.661,944.610,LIN9 CL of type M dike at STA 836+20.00
214,3452383.679,5258314.634,939.565,PRO STA 842+00.00 DR-201 Inlet end of apron 24in RCP Median Drain
215,3452377.554,5258314.694,938.314,PIP27 STA 842+00.00 DR-601 24in RCP Median Drain
216,3452369.854,5258314.769,936.671,PIP27 STA 842+00.00 DR-141 1-7.5 degree 'D' Section of 24in RCP Median Drain +13.825
217,3452273.875,5258315.709,928.897,PIP27 STA 842+00.00 DR-601 Outlet of 24in RCP Median Drain
218,3452260.074,5258315.845,928.439,PRO STA 842+00.00 DR-201 Outlet end of apron 24in RCP Median Drain
219,3452238.993,5258576.064,919.750,PRO STA 844+50.00 DR-201 Outlet end of apron 42in RCP PHASE 1
220,3452246.992,5258575.985,919.968,PIP28 STA 844+50.00 DR-601 42in RCP PHASE 1
221,3452410.917,5258574.379,924.436,PIP28 STA 844+50.00 DR-601 42in RCP PHASE 1
222,3452410.917,5258574.379,924.436,PIP29 STA 844+50.00 DR-601 42in RCP PHASE 2
223,3452500.912,5258573.497,926.888,PIP29 STA 844+50.00 DR-601 42in RCP PHASE 2
224,3452508.912,5258573.419,927.106,PRO STA 844+50.00 DR-201 Inlet end of apron 42in RCP PHASE 2
225,3452391.414,5259714.625,923.846,PRO STA 856+00.00 DR-201 Inlet end of apron 24in RCP Median Drain
226,3452385.270,5259714.685,922.924,PIP30 STA 856+00.00 DR-601 Inlet of 24in RCP Median Drain
227,3452307.394,5259715.448,921.465,PIP30 STA 856+00.00 DR-601 Outlet of 24in RCP Median Drain
228,3452301.269,5259715.508,921.350,PRO STA 856+00.00 DR-201 Outlet end of apron 24in RCP Median Drain
229,3452372.283,5259734.565,926.610,LIN10 CL of type M dike at STA 856+20.00
230,3452422.898,5259734.565,926.610,LIN10 CL of type M dike at STA 856+20.00
1000,3452403.131,5261014.573,906.596,PRO STA 869+00.00 DR-201 Inlet of DR-641 end of apron 24in RCP
```

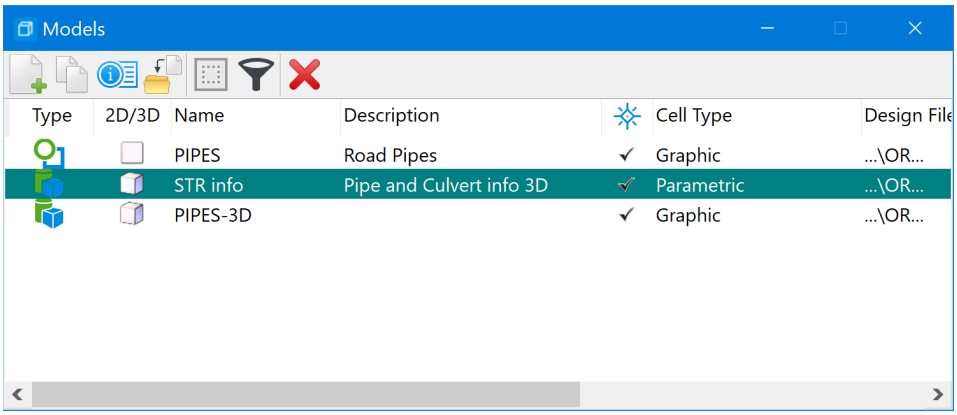
Once the input file is complete then it can be loaded in the application file.
PW08_Loading the ASCII graphics input file

Loading the ASCII Graphics Input File

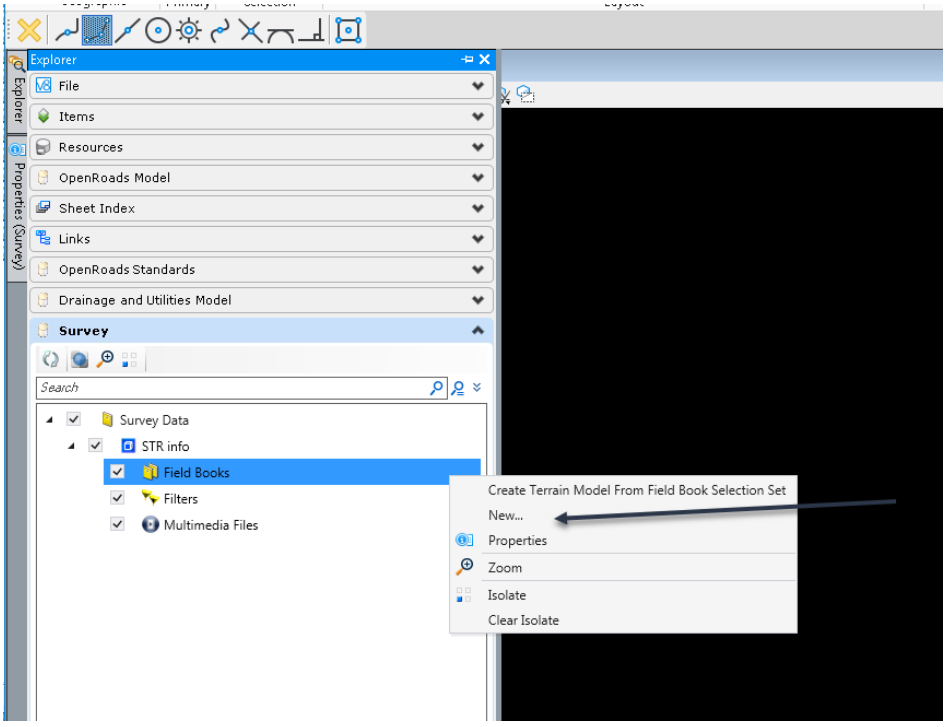
These instructions were created on 3/23/2021. These instructions were created with:

OpenRoads Designer CONNECT Edition - 2020 Release 3 Update 9 - Version 10.09.00.91

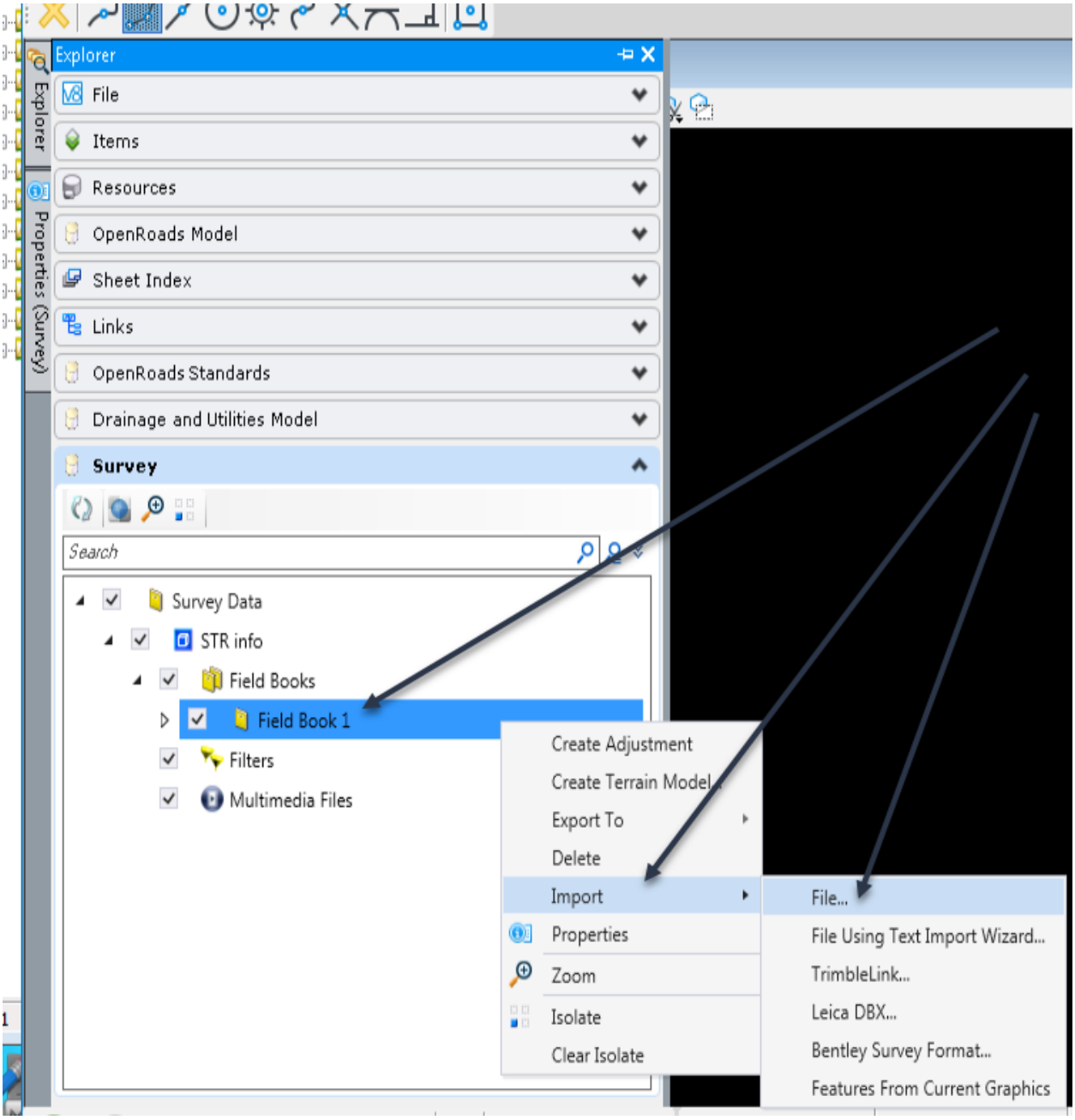
Once the ASCII graphics input file is done then the file is ready to load in the OpenRoads Deisgner file. With the file open, go to the Models dialog box and select the STR info to make it the active model.



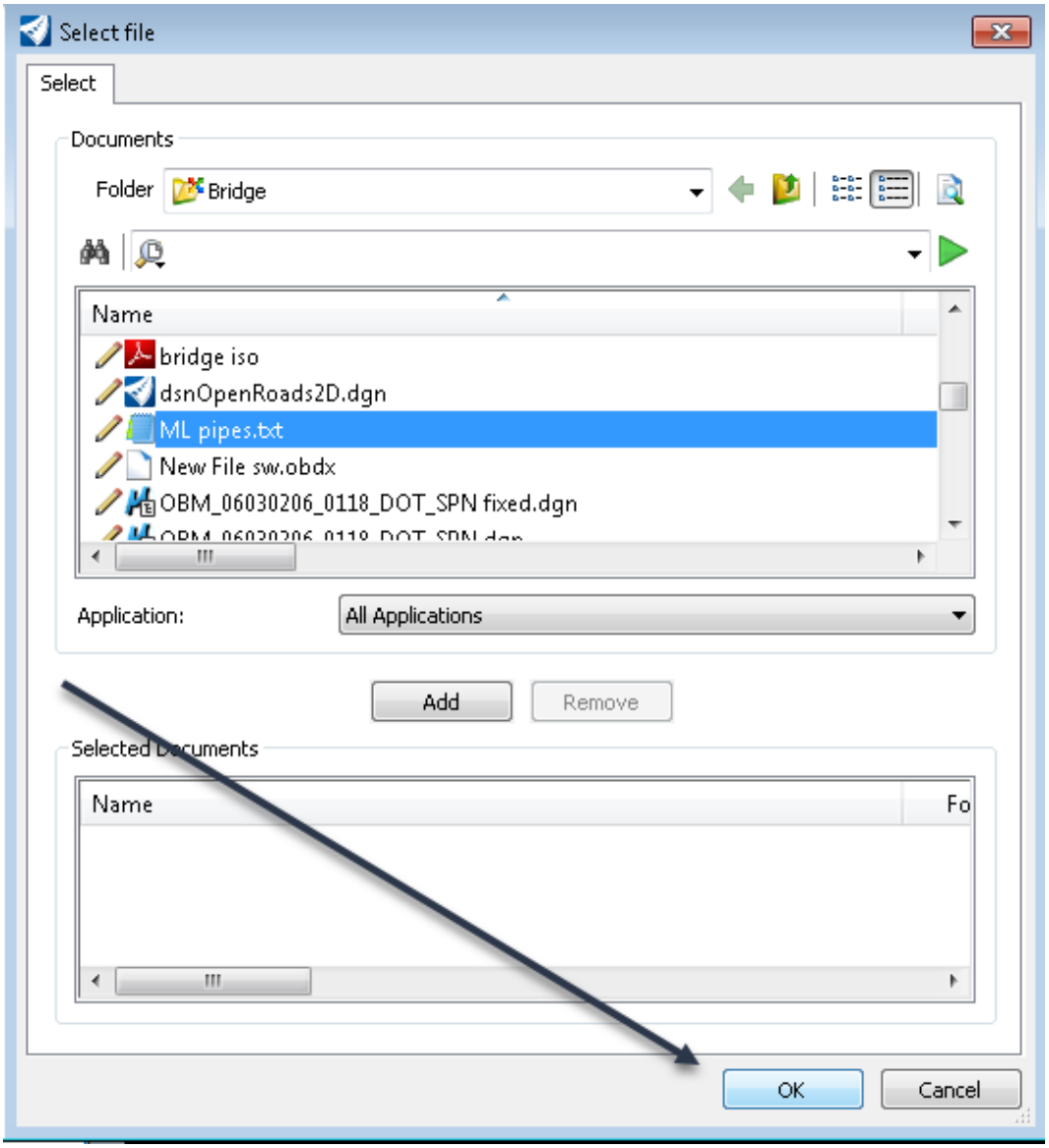
In Project Explorer under the Survey tab select Field Books under STR info, then right click and select New. The name of the Field Book is automatic using a sequential number starting with 1. This will make a new field book that will be used to load the ASCII graphics input file that contains the invert coordinates.



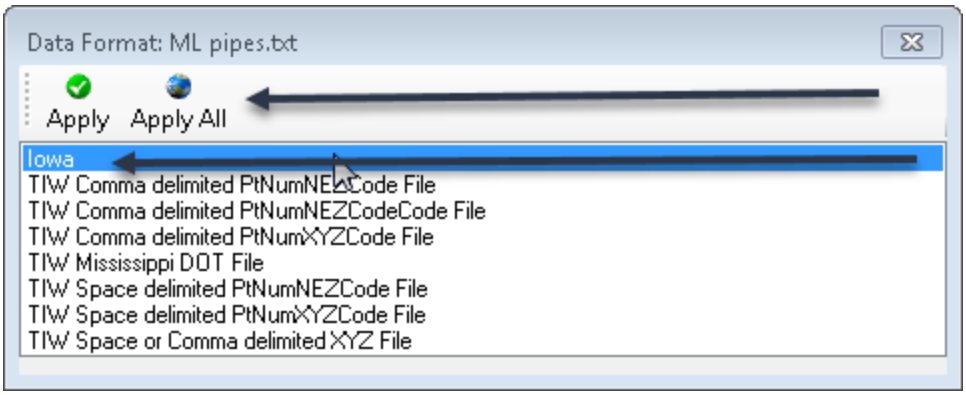
Next select the new field book, then right click and select import. Select the ASCII graphics input file that was created.



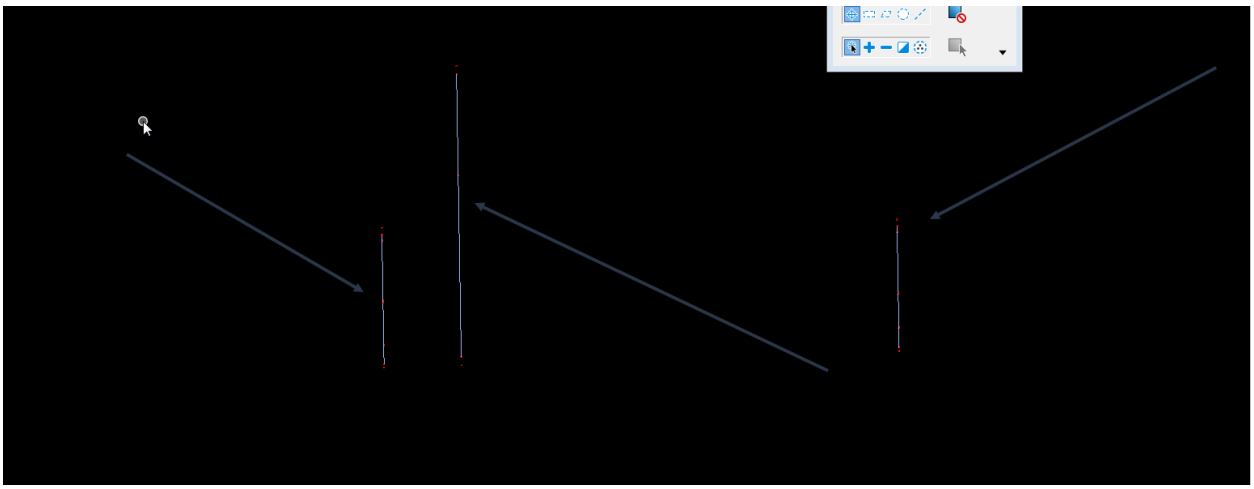
Then browse to where the Survey input file that contains the invert coordinates is stored. Click OK.



It will prompt for the data format. Select the Iowa format and then click Apply All.



This will map all the points and lines in the survey input file.



Once the points and lines from the ASCII graphics input file are loaded and the correct location is verified, then start creating the structures.