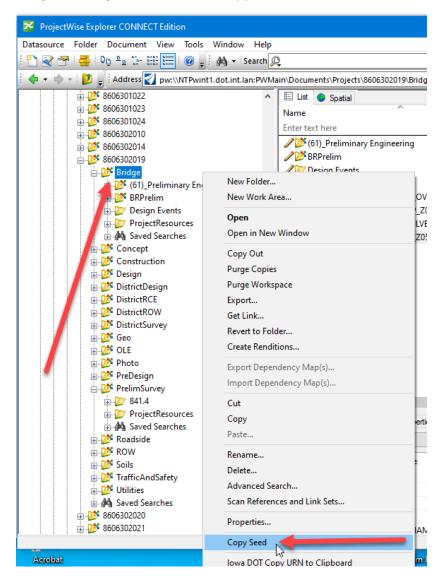
## Setting up the OpenRoads Designer File for Drainage Design.

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



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



## The Copy Seed utility will open.

ppy Seed v .08		2	Name of file to create (CCRRRPPP) : C=County, R=Route, P=Parenthesis		
Location of file to cr Choose file type:	eate: Projects\7703504015\Bridge ORD PIPE CULVERTS Seed			~	Create File
Extension of file to	create : dgn	Scale of file to cre	ate: Z08 V		Exit

Next, name the file. For culverts, the naming convention for this file is ORD\_CCRRRPPP\_DOT\_STR\_CIP\_SPN.

where

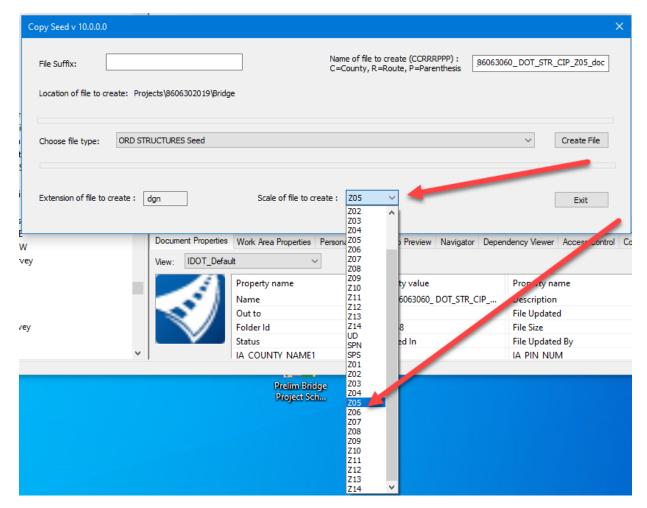
**ORD**=the application the work is done in **CC**=County **RRR**=Route **PPP**=Parenthesis **DOT**=company and/or source of the file **STR\_CIP**=type of work **SPN**=coordinate projection of this project

For this example, the file will be ORD\_86063060\_ DOT\_STR\_CIP\_Z05.dgn. Please refer to the <u>Seed File</u> document on Iowa Department of Transportation Bridge Connect Documentation page for further instructions on naming the files.

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

С	opy Seed v 10.0.0.0				×
	File Suffix:		Name of file to create (CCRRRPPP) : C=County, R=Route, P=Parenthesis	RD_86063060_DC	DT_STR_CIP_Z05
r	Location of file to crea	ate: Projects\8606302019\Bridge			
i	Choose file type:	ORD STRUCTURES Seed		~	Create File
t		ORD 2D Seed ORD 3D Seed			
		ORD Title Sheet (A) ORD Detail Sheet Seed (B,J,U) ORD Legend Sheet Seed			
1	Extension of file to cre	ORD Legend Sneet Seed ORD Mitigation Design Sheet Seed ORD Template library			Exit
5		ORD STRUCTURES OVER VIEW Seed ORD PIPE CULVERTS Seed			
w		ORD STRUCTURES Seed		iev	ver Access Control Co
vey		OBM 3D Seed ORD Prelim Bridge Design Seed		~	
,		Bridge Plan Production Seed			
		Master Common Details		rty	/ name
		M Sheet Stormsewer Calc File (*.xlsm) T Sheet Earthwork Calc File (*.xlsm)		1	
		C Sheet Bridge Approach Calc File (*.xlsx)			ion
		Project Documentation File (*.xlsm)		-	ated
1001		Falderid	2001650	Ella Cina	

Then select the correct coordinate projection for this file. For this example, select Z05 for IaRCS Zone 05.



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

Copy Seed v 10.0.0.0			×
File Suffix:		Name of file to create (CCRRRPPP) : C=County, R=Route, P=Parenthesis	86063060_DOT_STR_CIP_Z05_doc
Location of file to cr	eate: Projects\8606302019\Bridge		
Choose file type:	ORD STRUCTURES Seed		Create File
Extension of file to a	create : dgn	Scale of file to create : Z05 V	Exit

This creates the correct dgn file in the project directory.

Copy Seed v 10.0.0.0		×
File Suffix:	Name of file to create (CCRRRPPP) : C=County, R=Route, P=Parenthesis 86063060_DOT_STR_CIP_Z05_doc	
Location of file to create: Projects\8606302019	CopySeed ×	
Choose file type: ORD STRUCTURES Seed	New document created successfully.     Create File	
Extension of file to create : dgn	OK 1 Exit	

A message saying New document created successfully displays.

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

Once the file is created, select the file and right click to rename and add the Description. For this file it will be CIP RCB model.

ProjectWise Explorer CONNECT Edition		Open With	
Datasource Folder Document View Tools Window Help		Markup	
I 🔁 😪 😤 I 🚔 I 🗛 ≗₂ 🕾 🎬 🔚 I @ 📮 🗛 ▼ Search		PDF Markup	10
		View	
💠 🗣 🔹 🖄 🚽 🚺 🚽 Address 🏹 pw:\\NTPwint1.dot.int.lan:PWI	Main\Documents\Projects\86063(	Get Link	Ŧ
⊕-2 <sup>56</sup> 8606301022     ⊕-2 <sup>56</sup> 8606301023     ⊕-2 <sup>56</sup> 8606301023     ⊕-2 <sup>56</sup> 8606301024     ⊕-2 <sup>56</sup> 8606302010	Name Enter text here	Check Out Check In Free	
	<ul> <li>✓ № (61)_Preliminary Engi</li> <li>✓ № BRPrelim</li> <li>✓ 座 Design Events</li> </ul>	Copy Out	
- 2 <sup>56</sup> Bridge - 2 <sup>56</sup> (61)_Preliminary Engineering - 2 <sup>56</sup> BRPrelim - 2 <sup>57</sup> Design Events	ProjectResources     TojectResources     TojectResources	Export Import Create Renditions	w
⊕ <u></u>		Export Dependency Map(s) Import Dependency Map(s) Update Server Copy	
		Refresh Local Copy Purge Local Copy Purge WorkSpace	l
e 25 DistrictSurvey e 25 Geo e 25 OLE e 25 Photo		Cut Copy Paste	
PreDesign     PrelimSurvey     PrelimSurvey     ProjectResources	<	Copy To Move To Rename	
Saved Searches	Document Properties Work A	Delete	Dep

🔀 Rename Doci	ument X
Rename	
Document	
Name:	RD_86063060_DOT_STR_CIP_Z05.dgn 🔒 🗹
Description:	CIP RCB model
File Name:	ORD_86063060_DOT_STR_CIP_Z05.dgn
	OK Cancel

Next, make a copy of the file just created and rename it to make it the precast file.

🔀 Rename Docu	iment	×
Rename		
Document		
Name:	ORD_86063060_DOT_STR_FC_205.dgn	
Description:	Precat RCB Moel	]
File Name:	ORD_86063060_DOT_STR_PC_Z05.dgn	]
	OK Cancel	

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

	✓ Search	
7	me Send/Receive Folder View Help Acrobat	New > Open Open as Read-Only
ProjectWise Explorer CONNECT Edition		OpenWith
	ain\Documents\Projects\8606302019\Bridge\ORD_86063060_DOT_STR_CIP_Z 🗸 🕨 💂 Go 💂	Marküp PDF Mark up View Get Link
• 10*       8603002006           • 10*       8603002096             • 10*       8603002092           • 10*       860301014             • 10*       8606301014           • 10*       8606301018             • 10*       8606301019           • 10*       8606301020             • 10*       8606301020           • 10*       8606301021             • 10*       8606301021           • 10*       8606301022	List Spatial  Name  Description  Enter text here  Control C	Check Out Check In Free Copy Out Export Import Create Renditions
	이다. Pipe model.dgn 이다.good of the second of	Export Dependency Map(s) Import Dependency Map(s) Update Server Copy Refresh Local Copy Purge Local Copy Purge WorkSpace Cut

2	Open document with			×
s	elect			
	Program			
	Name	Description	Application	Enable L
	OpenRoads Designer CE 2022 Release 3	Bentley MicroStation Design	"C: \Program Files \Bentley \OpenRoads Designer CE 10. 12\OpenRoadsDesigner \OpenRoadsDesigner.exe" "%1" -ws_PWEXPLORER=1 "-wsPWDIR=C:/PROGRA~1/Bentley/PROJEC~1/"	No
	<			
	Always use this program			Browse
	Open document as read-only			
			ок	Cancel

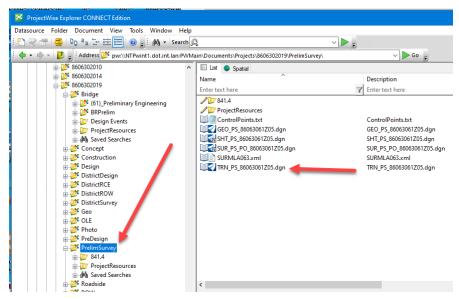
Select the OpenRoads Designer CONNECT Edition program. Then click on OK.

With the file open, rename the Default model to CIP RCB for the ORD\_CCRRRPPP\_DOT\_STR\_CIP\_SPN file and rename the Default model to PC RCB for the ORD\_CCRRRPPP\_DOT\_STR\_PC\_SPN file.

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

D Models			×
📮 🗅 🞯 台 🔲 🌄 🗙			
Type 2D/3D Name	Description 🔆	Design File	She
Offault	Master Model	c:\pw_work\pwma\ORD_86063060_DOT_STR_CIP_Z05_doc.dg	yn 🛛
👣 🕜 STR info	Culvert info 3D	c:\pw_work\pwma\ORD_86063060_DOT_STR_CIP_Z05_doc.dc	ŋn
< <u> </u>			≫⊲
Models			$\times$
📮 🗗 💷 🚰 🔲 🌄 🗙			
Type 2D/3D Name	Description 🔆	Design File	She
🎴 🔲 CIP RCB 🔫	Master Model	c:\pw_work\pwma\ORD_86063060_DOT_STR_CIP_Z05_doc.d	gn
ि ा STR info	Culvert info 3D	c:\pw_work\pwma\ORD_86063060_DOT_STR_CIP_Z05_doc.d	gn

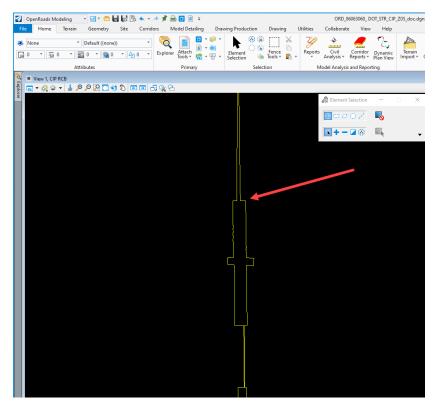
Next, set the file up to use the muti-model workflow. Use the existing ground TRN file to create the 3D managed model. Reference in the existing ground TRN file to the now renamed CIP RCB model in the file that was just created.



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

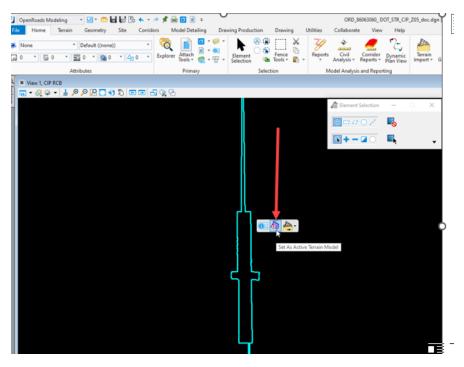
Reference in the TRN file from the survey or Photo location. For this example, it is in the Photo folder and is called TRN\_EX\_86063061Z05.dgn.

The content of the file should look like this:

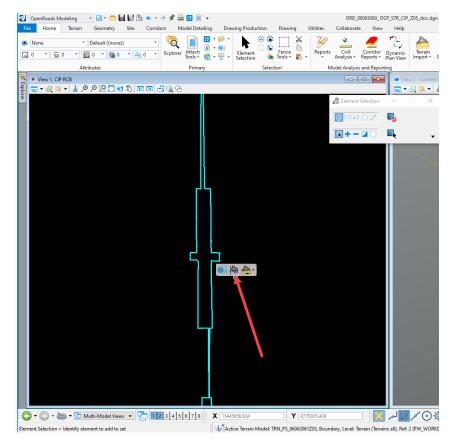


Next, using the Element Selection tool select the boundary of the TRN file.

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

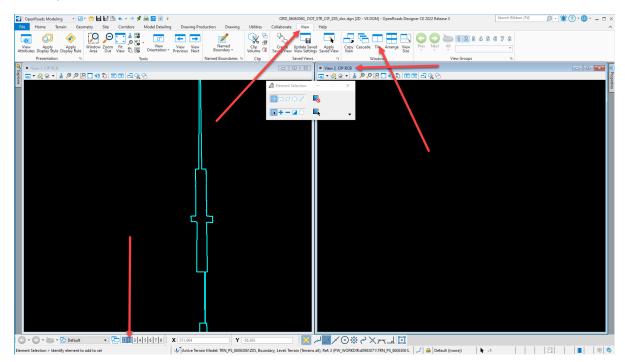


Select the middle tool, Set As Active Terrain Model. Once selected it will change the icon.



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

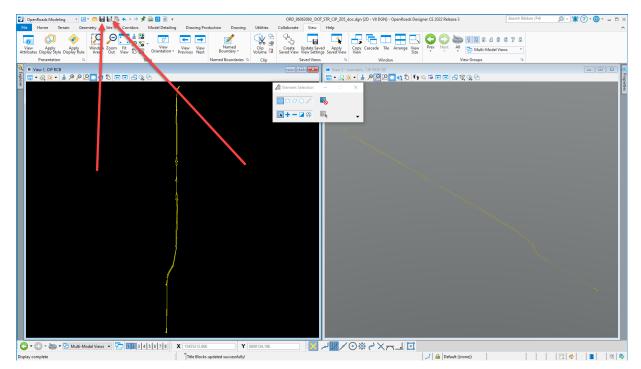
Next, open a second view window. Then select the Tile windows tool in the Window ribbon.



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

View Number: 2 - V 🖳 🔩					
😚 Presentation		#≡ ^			
Display Style: (Wireframe	Display)	~			
🛵 ACS Triad	🔆 Fast Cells				
E Background	🖹 Fill				
Boundary Display	III Grid				
📷 Camera	宿 Level Overrides				
💭 Clip Back	E Line Styles				
😪 Clip Front	Line Weights				
😪 Clip Volume	Markers	•			
Constructions	Patterns				
🔆 Default Lighting	Tags				
Dimensions	A Text				
📼 🛙 Data Fields	1 <sub>+</sub> Text Nodes				
🐻 Displayset	Transparency				
Named Presentation	સ Height Field				
🔅 Placement Point	🛋 Item Types Text				
💯 Text Field background	_				
Global Brightness: 🔶 <		> Q			
🛃 View Setup		*			
Saved Views: Select	v 🔁 •				
Models: CIP RCB	v <b>4</b>				
Model Na					
Backgrout CIP RCE					
Background Ma					
Transparency:			~		

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



The content of the file should look like this.

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

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

Open the precast file ORD\_CCRRRPPP\_DOT\_STR\_PC\_SPN and repeat the same steps to this file.

Once the precast model file is set up, copy the ORD\_CCRRRPPP\_DOT\_STR\_CIP\_SPN file and the ORD\_CCRRRPPP\_DOT\_STR\_PC\_SPN file to the (Paren)\_Work Description folder then rename the files for the designs that are needed.

Files should be like this:

SHT\_CCRRRPPP\_DS#\_001425\_CIP\_SPN.dgn with a description = Twin 10x10 RCB Culvert Design #

SHT\_CCRRRPPP\_DS#\_001425\_PC\_SPN.dgn with a description = Twin 10x10 RCB Culvert Design #

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

For this example, there are two locations that will need to have new designs created for new RCB culverts:

ProjectWise Explorer CONNECT Edition			—
tasource Folder Document View Tools Window			
) 😪 🐨 📑 🕒 🖕 🦢 🕼 🏭 🕢 Sea	irch 與	✓ ▶	
Þ 👻 🚽 🚺 🖉 Address 📴 pw:\\NTPwint1.dot.int.lan:	PWMain\Documents\Projects\8606302019\Bridge\(61)_Preli	iminary Engineering\ 🛛 🗸 🕞 Go چ	
· · · · · · · · · · · · · · · · · · ·	∧ E List		
· 25 8603002016	Name	Description	Out to
■ 25 8603002092	Enter text here	There text here	The set of
B606301014	CC-RRRS-PPP Review	<u>.</u>	
÷-25 8606301015	CC-RRRS-PPP_Shop Drawings		
B606301018	DOT		
Bei 200 1019			
	ProjectResources		
	Sketches		
	VZ-CORP		
	✓ is SHT_86063060_ 0127_900640_CIP_Z05.dgn	12X8 RCB extend outlet CIP	
Bei 200 1024	SHT_86063060_0127_900640_PC_Z05.dgn	12X8 RCB extend outlet Precast	
B606302010	SHT_86063060_0327_900645_CIP_Z05.dgn	8X5 RCB extend inlet CIP	
Belle 2000	Image: March 10 Ma	8X5 RCB extend inlet Precast	
e 📴 8606302019	SHT_86063060_DOT_PIPE_CULVERTS_Z05.dc	gn Pipe X Section sheets	
🖻 🍱 Bridge			
🕀 💯 BRPrelim			
😠 💯 Design Events			
ProjectResources			
😥 🊧 Saved Searches			
Concept			
Construction			
🕀 💯 Design			
🕀 🌽 DistrictDesign	<		
DistrictRCE	Work Area Properties Personal Portal Dependency	Viewer Access Control	
🗈 💇 DistrictROW	Properties (Work Area Type - IDOT_Bridge		
DistrictSurvey	BRG PIN NUM		
⊕	BRG_PROJ_NUM		
DLE	BRG_PROJ_TYPE		
🗈 💆 Photo	BRG_TYPE_OF_PLANS		
🖶 💆 PreDesign	IA GROUP	CONNECT	
		CONNECT	
🗈 💯 PrelimSurvey			
e - 25 Roadside 	BRG_FILE_NUMBER BRG_PRELIM_ENGINEER		

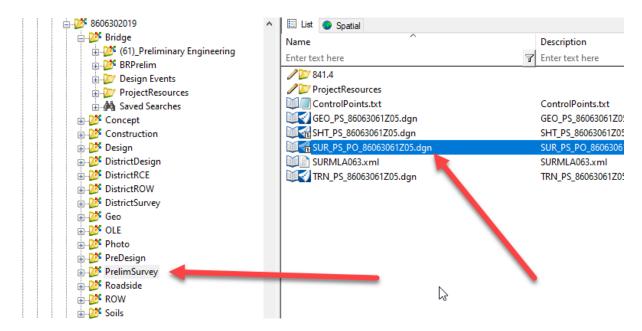
Next, open each of the SHT files. Then, detach the TRN file reference.

References (3 of 3 unique, 3 displayed)							
Tools Properties							
🗄 - 陰 🕵 🗅 🛒 🗇 🆃 한 🎦 🔂 🐉 🛱 🖤	🔰 🧏 📶 lite Mode: Boundaries 🔻						
Slot 🏴 🚺 File Name	Model	Description	Logical	Orientation			
3	CIP RCB-3D		Ref	Coincident - Wor			
2 PW_WORKDIR:d0983071\TRN_PS_86063061Z05.dgn	Attach	Master Mode		Coincident - Wor			
1	Detach p Reload E <u>x</u> change Open in New Session Activate	Culvert inf		Coincident - Wor			
<u>&lt;</u>	Deactivate						
Scale 1.000000000 : 1.000000000 <u>R</u> otation 00	Move	<u>Y</u> 0.000					
💽 🗾 🐂 🔁 🛄 🎞 💭 🥋 🏢 🚳 💡 🚇 🖾 🚎 🖳 <u>N</u> ested Attachme	Copy Nesting Depth: 1	Display Overr	ides: Allow	v <b>-</b>			
New Level Display: Config Variable 🔻 Georeferenced: No 🔻	Scale						
	Rotate						

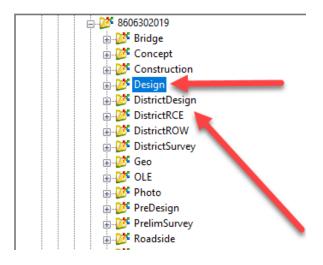
Then attach the correct model file from under the bridge folder using live Nesting Depth of 2. Do this for each sheet file.

For the CIP sheets, attach ORD\_CCRRRPPP\_DOT\_STR\_CIP\_Z01.dgn For the precast sheets, attach ORD\_CCRRRPPP\_DOT\_STR\_PC\_Z01.dgn Save settings and exit the file.

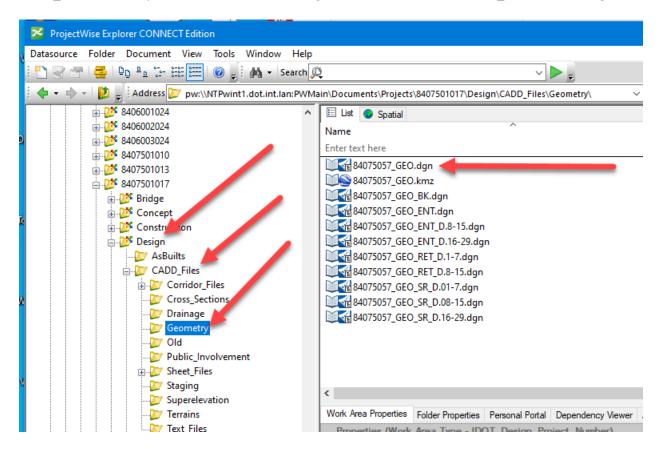
In the Bridge folder and open the ORD\_CCRRRPPP\_DOT\_STR\_CIP\_Z01.dgn. Attach the survey file that contains the existing 3D culvert and surrounding topo features that will be needed to do an effective design.



Next reference in the Design alignment that has an active profile. This file should be located in the Design or the District Design folder (depending what group is doing the road design portion of this project).

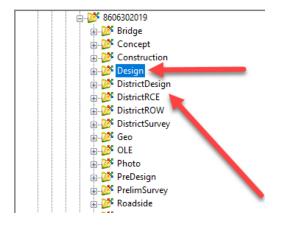


For this example, it is being done by the Design group. So, the alignment is under the CADD\_Files\Geometry\ folder. Select the GEO Alignment file that is named GEO\_CCRRRPPPZZZ.dgn.

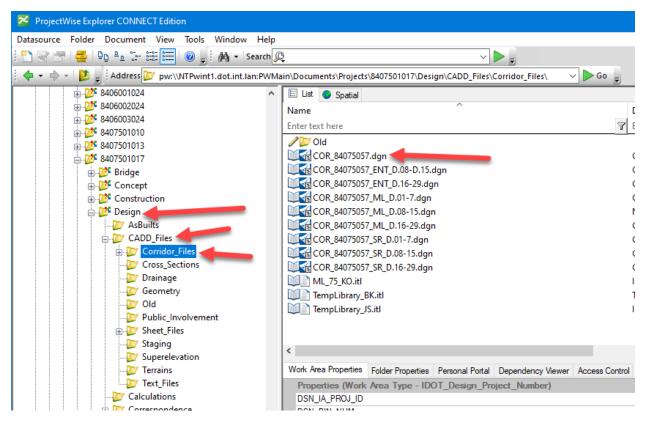


This is the container GEO file that will contain all the Alignments for this project. Attach it using the orientation of Coincident World. Turn on the live nesting and set its depth to 1.

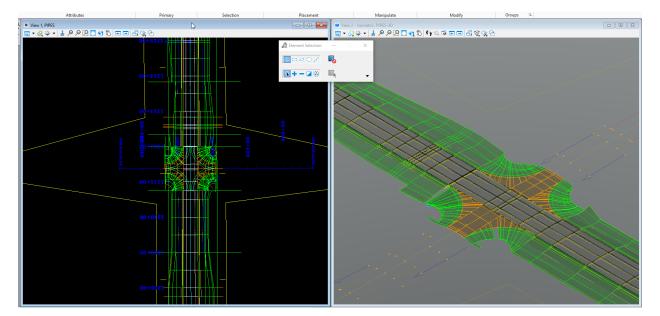
Next, reference the proposed corridor container file. This file should be in the Design or the District Design folder depending on what group is doing the road design portion of this project.



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

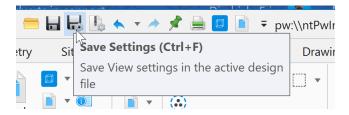


This is the container COR file that will contain all the Corridor for this project. Attach it using the orientation of Coincident World. Turn on the live nesting and set its depth to 1.



The file contents should look something like this:

Next, click Save Settings.



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

Copy Seed v 10.0.0.0			×
File Suffix:		Name of file to create (CCRRRPPP) : C=County, R=Route, P=Parenthe	075057_DOT_PIPE_CULVERTS_Z01
Location of file to cre	ate: Projects\8407501017\Bridge		
Choose file type:	ORD PIPE CULVERTS Seed		<ul> <li>Create File</li> </ul>
Extension of file to a	ORD 2D Seed ORD 3D Seed ORD Title Sheet (A) ORD Detail Sheet Seed (B, J, U) ORD Legend Sheet Seed ORD Mitigation Design Sheet Seed ORD Template library ORD STRUCTURES OVER VIEW Seed ORD PTPE CULVERTS Seed		Exit
	ORD STRUCTURES Seed ORD Prelim Bridge Design Seed Bridge Plan Production Seed Master Common Details M Sheet Stormsewer Calc File (*.xlsm) T Sheet Earthwork Calc File (*.xlsm) C Sheet Bridge Approach Calc File (*.xlsm) Project Documentation File (*.xlsm)		μζ

The Structures Overview file will only contain the 3D information from the model files under the Bridge folder. Make sure only the 3D model is referenced from the ORD\_CCRRRPPP\_DOT\_STR\_CIP\_Z01.dgn and the ORD\_CCRRRPPP\_DOT\_STR\_PC\_Z01.dgn into the overview file.

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

Now that the file is set up, start designing and calculating the culvert inverts from the project information.

CW02 Laying out Culverts in Connect