

CI224519-L

The 123's and ABC's of Corridor Model setup, planning, and execution

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Learning Objectives

- Setup a model file
- Learn to plan for the unexpected
- Build flexibility into your assemblies to allow for quick changes in design
- Document your corridor designs files quickly with fields

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Description

This hands on lab will take you from start to finish on a corridor design using the latest tools available. You will be given several tips to help start your design right. This class will give you some tools to bring back the office to share with other users, help them document their designs, and help you save time and money on your projects.

Speaker

Jeff Frye is a cadd professional with over 28 years of design and drafting experience. He has worked for small and large firms and is always eager to share ideas, tips, tricks, and time to help make civil 3D and users more productive. His design background includes many miles of roadway, urban corridor, and rural highways. He is always looking for faster and more productive ways of getting from cad to paper. This is his 15th year attending AU and he is looking forward to continuing to share with you this year.

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Setting up your model file

Organization of data is a normal part of our work and life right? Simple things like your silverware drawer for example; forks, knives, and spoons each go in their respective compartment. Every house has a silverware drawer. And every house has a “junk” drawer. EVERYTHING is in the junk drawer, but you cannot find it easily... This section will help you keep your models from looking like the junk drawer and more like an organized and professional model.

Template

Our class started with the out of the box **_AutoCAD Civil 3D (Imperial) NCS.dwt** file.

This file contains all of the layers, styles, and settings we need to start.

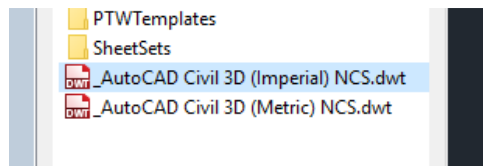


Figure 1

STEP 1: Drawing Settings

Units and Zone

I set the units and zone tab up as follows I set the scale to 1'=20', USA, Washington, and coordinate system to State Planes, North Zone, US Foot as shown below.

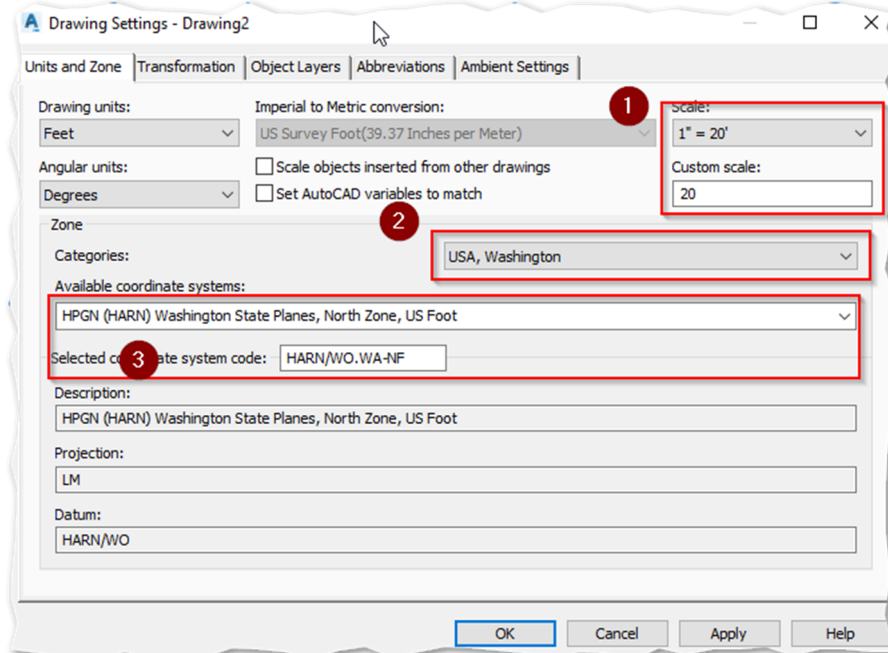


Figure 2

NOTE: Setting these settings up front will save time later when referencing your 2D data in. Especially if you are in a rotated UCS.

Object Layers

When working in a complex corridor file, you will constantly want to turn off layers to de-clutter your workspace. Having objects on unique layers helps to sort them in the dialog better. I used PREFIX for the name of the object to make sorting easier, you can put these as a SUFFIX if you prefer.

Units and Zone Transformation Object Layers Abbreviations Ambient Settings					
Object	Layer	Modifier	Value	Locked	
Alignment	C-ROAD	Prefix	*_		
Alignment-Labeling	C-ROAD-TEXT	Prefix	*_		
Alignment Table	C-ROAD-TABL	Prefix	*_		
Appurtenance	C-WATR-APPT	None			
Appurtenance-Labeling	C-WATR-TEXT	None			
Assembly	C-ROAD-ASSM	None			
Building Site	0	None			
Cant View	0	None			
Catchment	C-HYDR-CTCH	None			
Catchment-Labeling	0	None			
Corridor	C-ROAD-CORR	Prefix	*_		
Corridor Section	C-ROAD-CORR-SCTN	None	*_		
Feature Line	C-TOPO-FEAT	None			
Profile	C-ROAD-PROF	Prefix	*_		
Profile-Labeling	C-ROAD-PROF-TEXT	Prefix	*_		
Profile View	C-ROAD-PROF-VIEW	Prefix	*_		
Profile View-Labeling	C-ROAD-PROF-TEXT	Prefix	*_		
Sample Line	C-ROAD-SAMP	Prefix	*_		
Sample Line-Labeling	C-ROAD-SCTN-TEXT	Prefix	*_		
Section	C-ROAD-SCTN	Prefix	*_		
Section-Labeling	C-ROAD-SCTN-TEXT	Prefix	*_		
Section View	C-ROAD-SCTN-VIEW	Prefix	*_		
Section View-Labeling	C-ROAD-SCTN-TEXT	Prefix	*_		
Section View Quantities	C-ROAD-SCTN-TABL	Prefix	*_		
Survey Network	V-SURV-NTWK	None			
Tin Surface	C-TOPO	Prefix	*_		
Tin Surface-Labeling	C-TOPO-TEXT	Prefix	*_		

Figure 3

NOTE: You can set these settings to be your default settings in a company DWT file by saving this file as a TEMPLATE.

VPORTS

These are not paperspace view ports, but rather modelspace vports. They are setup to allow you quick access to the different parts of your model that you are working on. We will setup our drawing to show three active vports. To set these up in your own drawing:

Type VPORTS, and select **“Three: Above”**, select **OK**

We will use these later to setup a plan view, cross section view and a view of the assembly we are using.

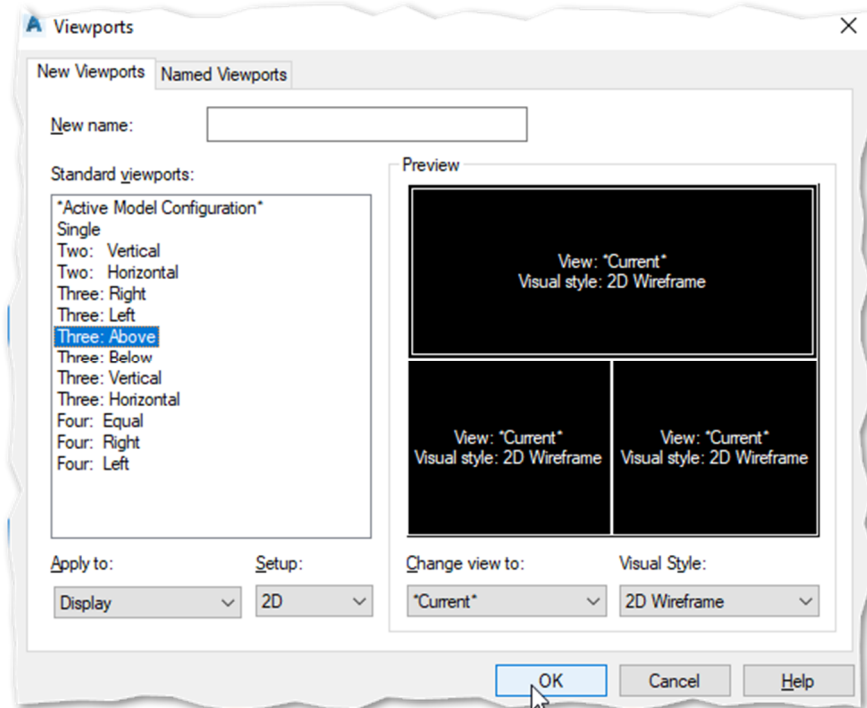
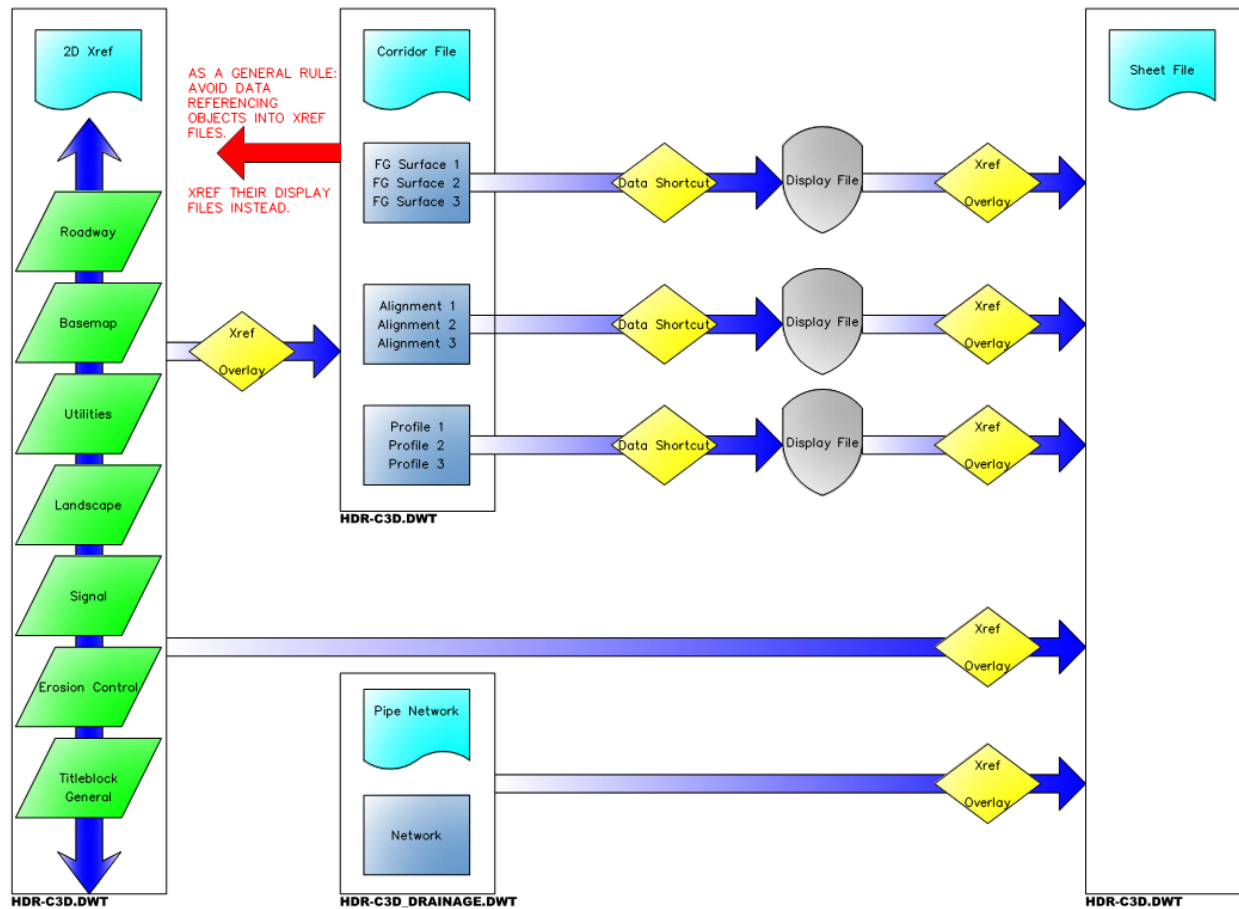


Figure 4

NOTE: You can grab the grips and resize these as your need changes. To return to a single view, type VPORTS and select “Single”.

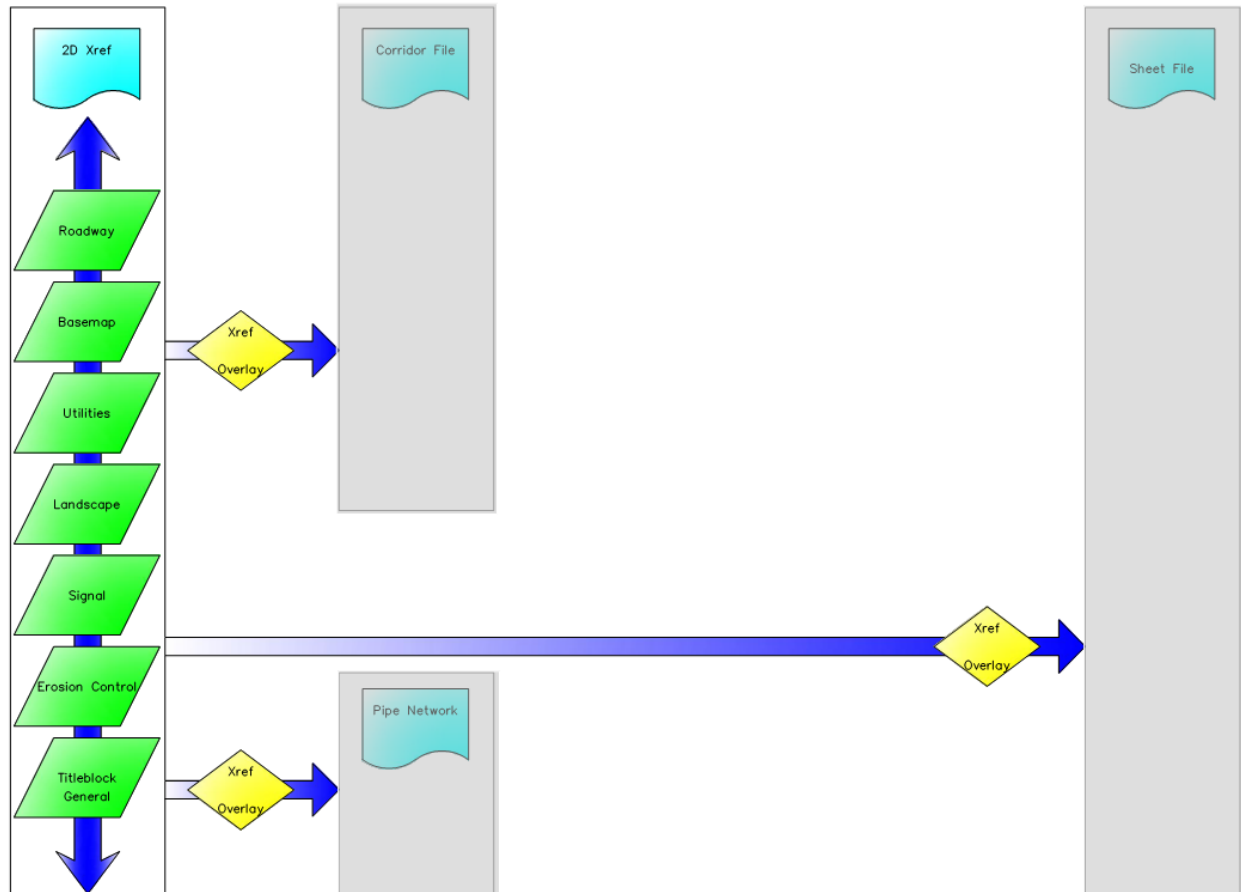
STREAMLINING WORKFLOW

Workflow Diagram



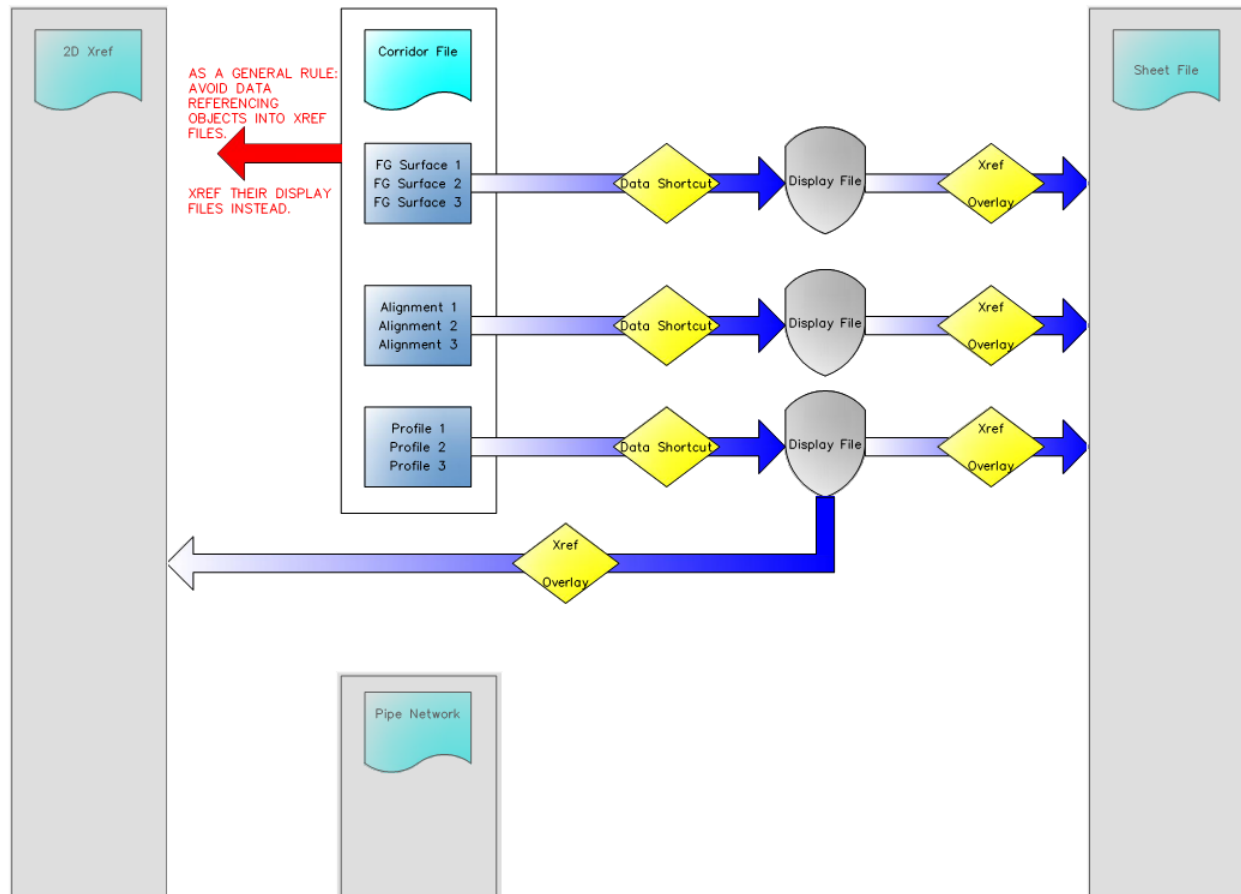
STREAMLINING WORKFLOW

Workflow – 2D xref file



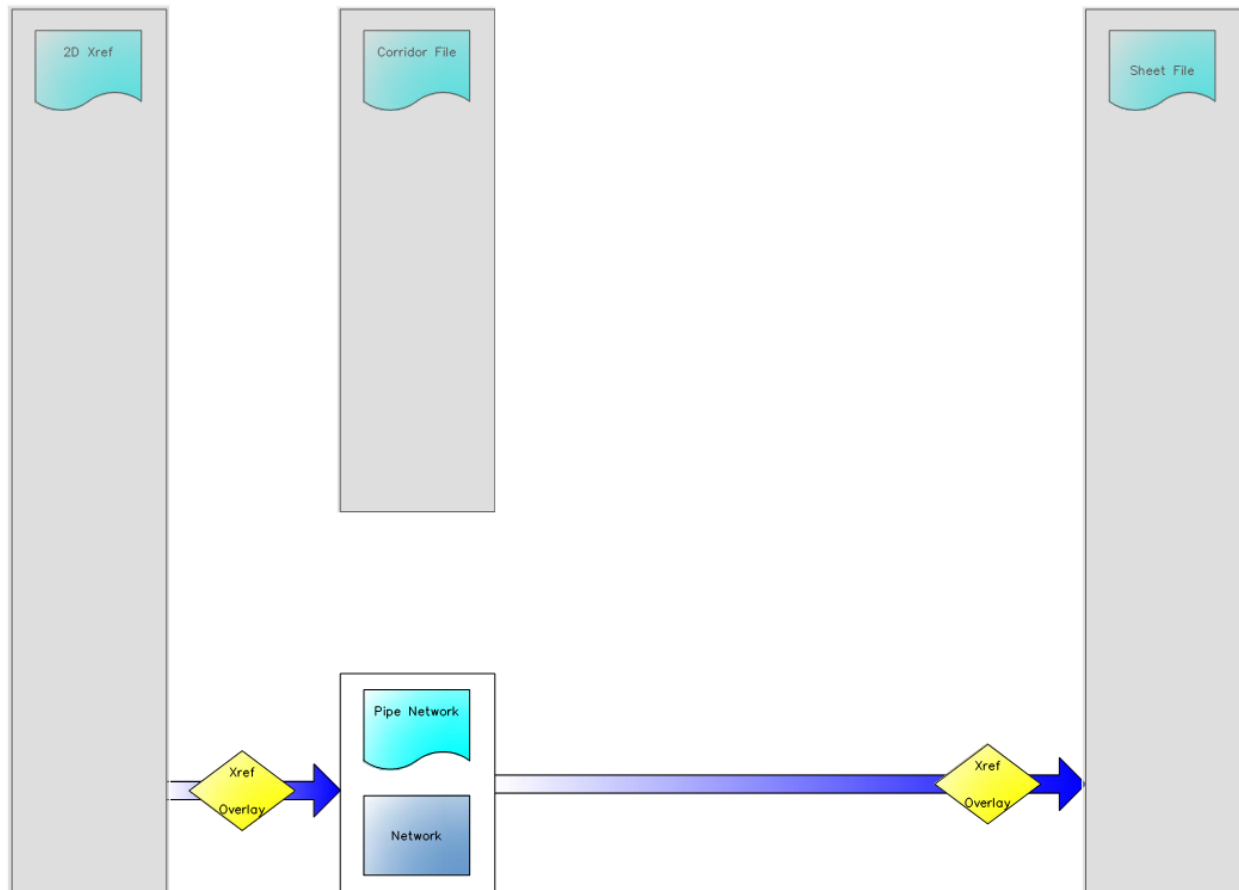
STREAMLINING WORKFLOW

Workflow – Corridor file



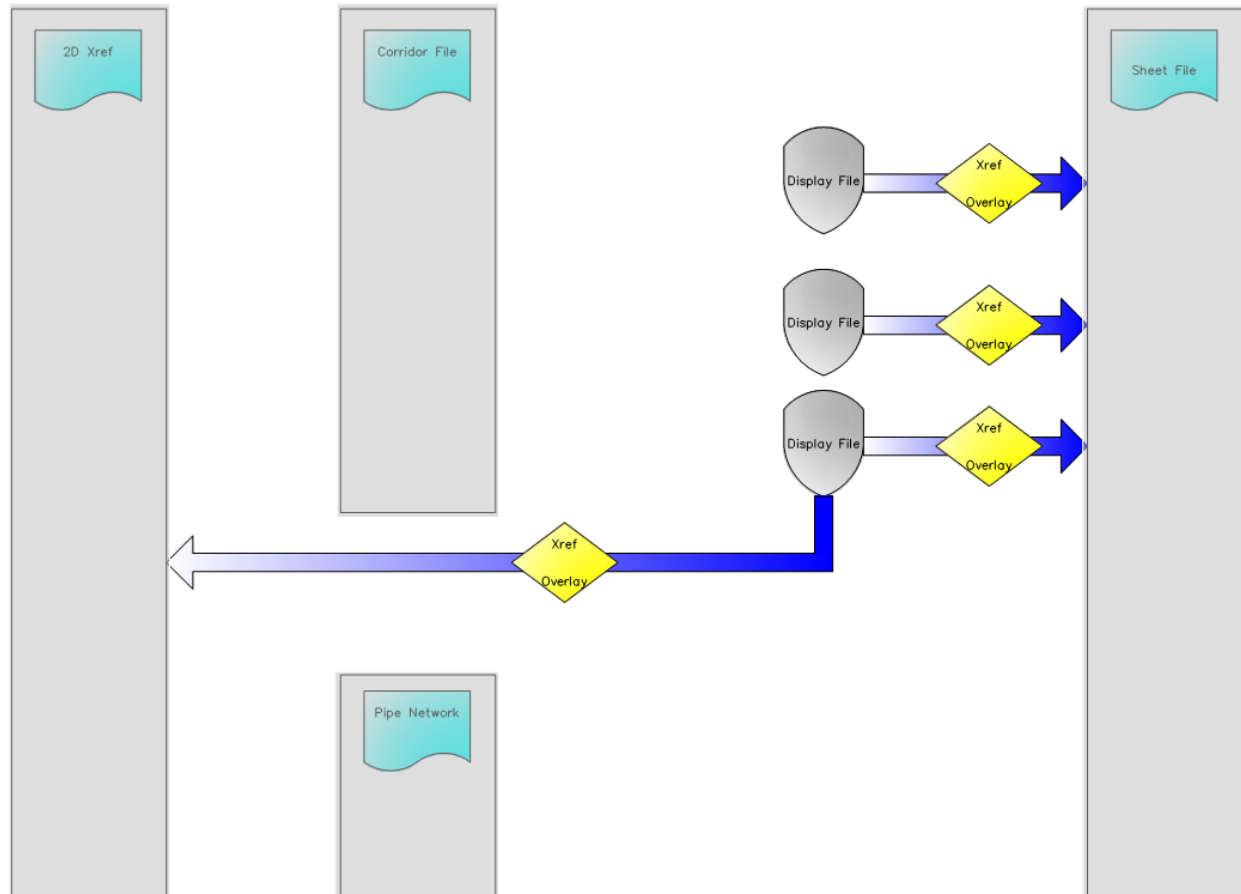
STREAMLINING WORKFLOW

Workflow – Pipe Network file



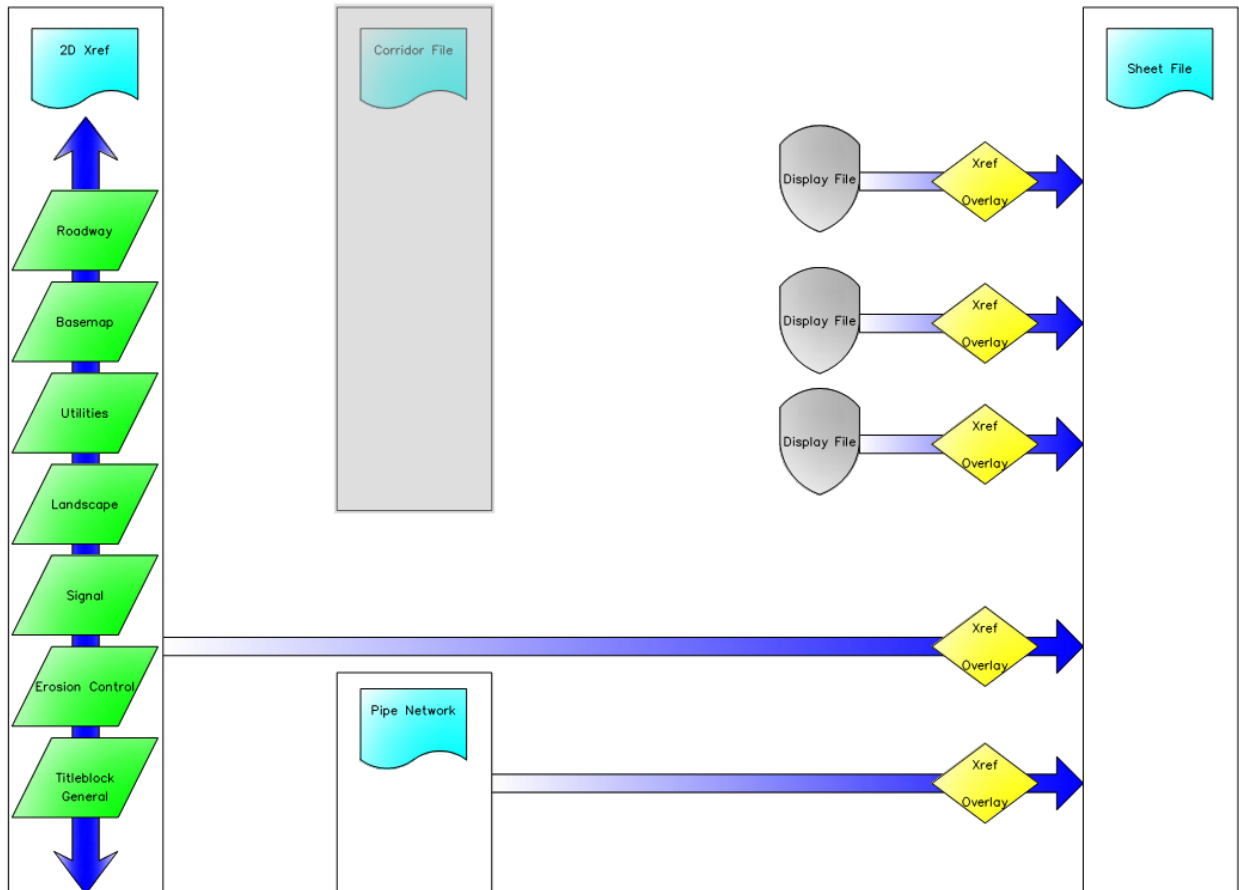
STREAMLINING WORKFLOW

Workflow – Display file



STREAMLINING WORKFLOW

Workflow – Sheet file



GATHERING YOUR PROJECT DATA

Open **1-Corridor_CI224519-L.dwg** to begin the next steps. We all need to start at the same place.

Step 1: Xref the following files into your drawing at 0,0 with no rotation and no scaling: **CI224519-L_BASEMAP.dwg** and **CI224519-L_ROW.dwg**. SAVE the drawing.

DATA SHORTCUT SETUP

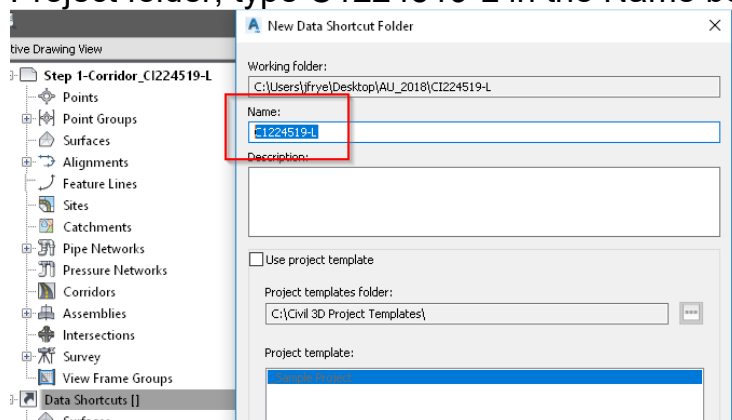
Next we need to create our data shortcut project to be able to share data with others users.

In the same session of Civil 3D...

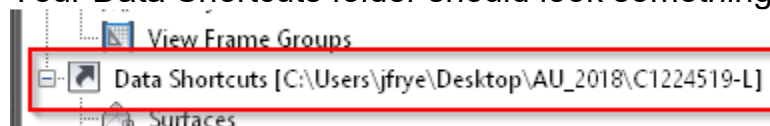
Step 2: Open **CI224519-L_SURFACE.dwg**

Step 3:

- Expand toolspace
- Right click on Data Shortcuts [], and choose Set Working Folder
- Browse to your desktop, select Make New Folder in the bottom left corner, type "AU_2018" in the box. Hit OK.
- Right click again on Data Shortcuts [] and choose New Data Shortcut Project folder, type C1224519-L in the Name box. Hit OK.



- Your Data Shortcuts folder should look something like this:

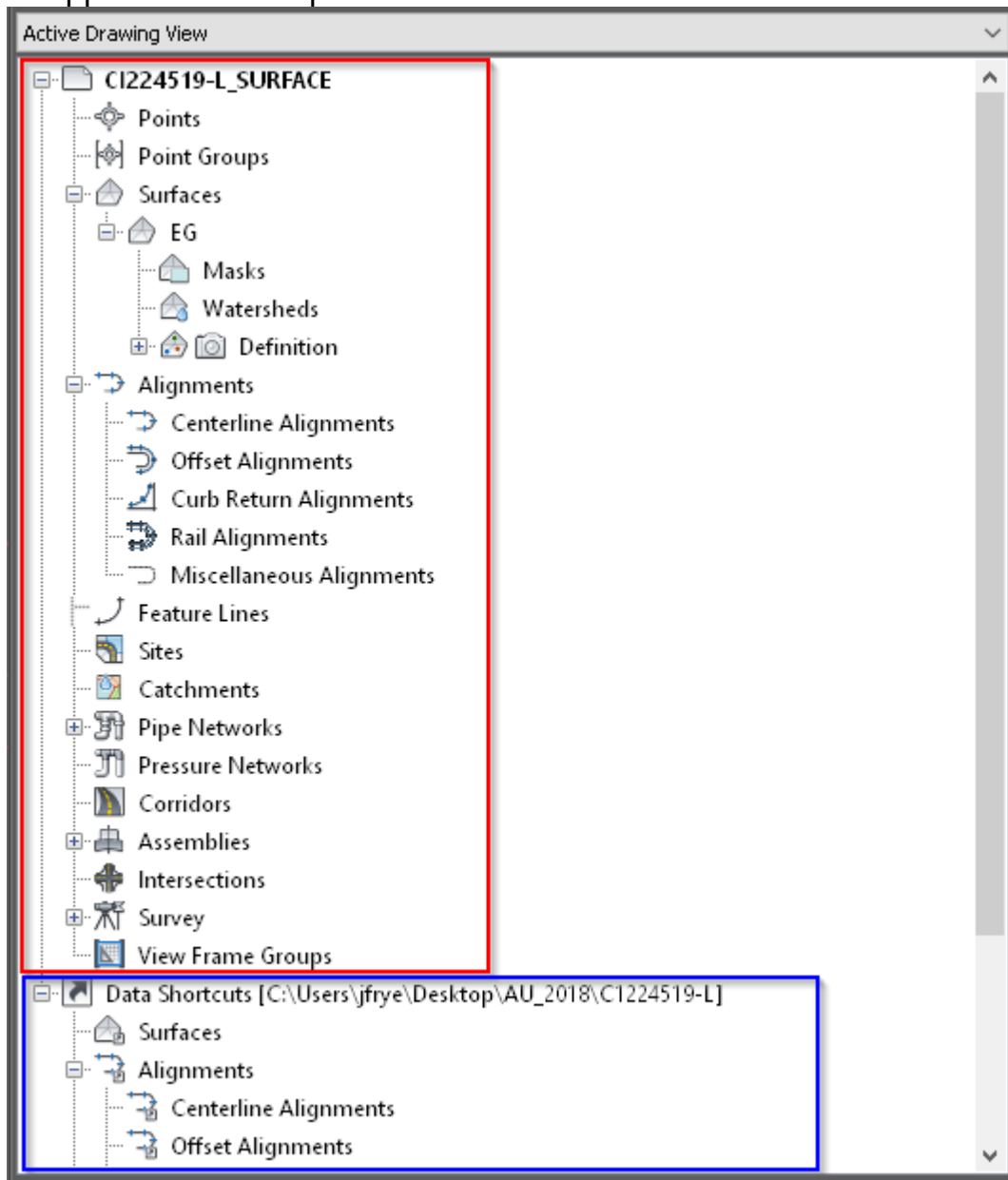


SAVE YOUR DRAWING

TOOLSPACE EXPLAINED

Toolspace is the heart of your project data. All of your project data resides here in two separate spaces. The upper part (RED outline in image below) is what is in your current file, and the bottom part (BLUE outline in image below) is what data is available to you and your team.

Notice our surface “EG” only shows in the top area, this means only you can see it now. In the next steps we will make it available for others and it will show up in both the upper and lower spaces.



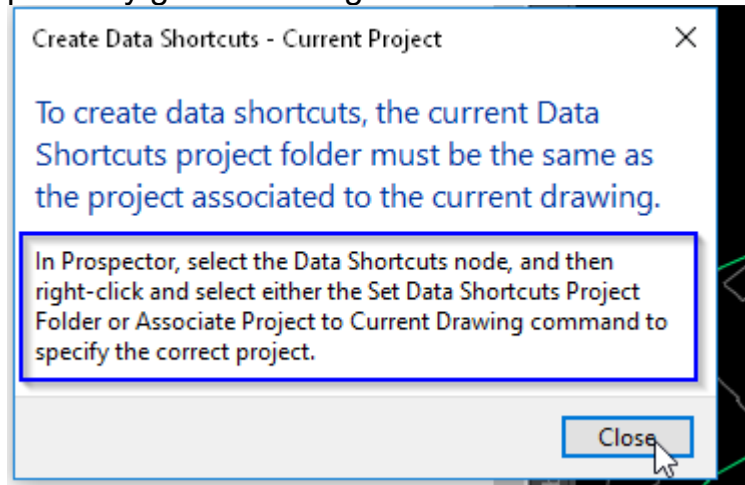
SHARING DATA

We now need to make this surface available to you and others on your team by making a data shortcut of the surface data.

Still in C1224519-L_Surface.dwg

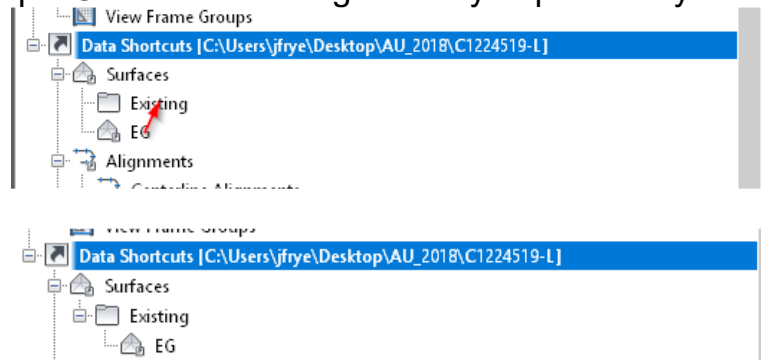
Step 1: Right click Surfaces in the bottom half of toolspace, and choose Create Folder, type Existing in the name and hit OK. This will allow us to organize our data better.

Step 2: You will probably get this dialog box... follow the instructions to fix



Step 3:

- Right click on Data Shortcuts and choose Create Data Shortcuts
- Check EG. (*note you can hit the "pick in drawing" button in lower left to select the surface manually*)
- Hit OK
- Drag and drop EG into the Existing Folder you previously created.



- CLOSE the **C12245190-L_Surface** file, save changes.

CONGRATULATIONS – Your surface EG is now available for all members of your team to reference into their drawings.

DATA REFERENCING

In this class, the only object that we will data reference is the surface. But note that you can do the same steps for Alignments, Profiles, Pipe Networks, Corridors, and View Frame groups.

SHARING DATA

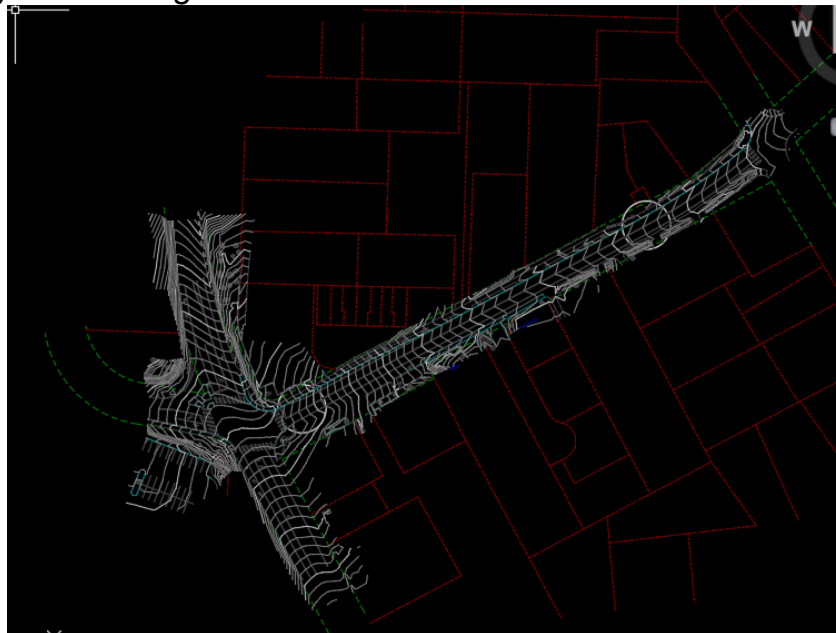
Step 1: Open **2-Corridor_C1224519-L.dwg**

When we look at Toolspace now, we only see the surface in the lower half. Let's make a data reference of the EG surface so it shows in both the upper AND the lower area. This will make it available in our current file. It will create the Existing folder and put a data reference of the surface in your current file.

- In the lower area, right click on EG and choose Create Reference. Hit OK.

You can now stylize your surface any way you want to see it. Spend a minute looking at the different styles available and how they allow you to see the surface in different ways.

At this point your drawing should look similar to this:



CREATING ALIGNMENT

Step 1: Open **3-Corridor_C1224519-L.dwg**

Step 2: Alignment

- From the Create Design ribbon, choose Alignment ->Alignment Creation Tools
- Name the alignment C1224519-L
- Set stationing at 10+00 for the start station
- Set labels and style to anything you want.
- Choose the circle on the LEFT as the starting point and the circle on the RIGHT as your ending point.

CREATING A SURFACE PROFILE

Step 1: Surface Profile (Existing Ground)

Click Home tab->Create Design panel->Profile drop-down->Create Surface Profile

In the Create Profile from Surface dialog box, in the Alignment list, select the horizontal alignment to use for the profile (C1224519-L).

Ensure that the surface you want to use is listed in the Select Surfaces list. If multiple surfaces are listed, use Ctrl + click to select one or more of them from which to create profiles.

Optionally, in the Station Range area, specify start and end stations if you want the profile to cover a distance less than the entire length of the horizontal alignment.

Click Add to add the centerline profile to the Profile List.

Optionally, select the Sample Offsets check box. Enter the offset distances in the field if you want the profile to include one or more offsets from the centerline of the horizontal alignment. Use positive numbers to specify right offsets, and negative numbers for left offsets. Use commas to separate the values. Example: 20,-20,30,40

Optionally, click Add to add the offset profiles to the Profile List.

In the table, review the data for each profile line and make corrections as required. Optionally, add or delete profiles in the Profile list.

Do one of the following:

If you want to draw the profile in a profile view, click Draw In Profile View, and then go to the create profile view procedure.

Click OK. The profiles you created are saved. If the alignment has one or more profile views associated with it, the profiles you created are added to the views.

Create a single profile view to display a surface profile and to design a layout profile. Each profile view displays new or existing profiles and offsets for one horizontal alignment.

Click Home tab >Profile & Section Views panel>Profile View drop-down>Create Profile View.

In the Create Profile View wizard, navigate through the pages by using the links at the left or clicking Back or Next.

Note: Click Create Profile View at any time to accept the current settings.

The wizard pages contain the following controls:

General page - Specify the alignment name and profile view name and description.

Note: The Show Offset Profiles By Vertically Stacking Profile Views is only applicable when creating stacked profile views.

Station Range page - Specify the starting and ending stations.

Profile View Height page - Specify the profile view height and any split profile options, including split stations and styles for individual stations.

Profile Display Options page - Specify the profiles to be drawn as well as their styles, labels, and layers.

Pipe/Pressure Network page - Specify the pipe networks or parts to be drawn.

Data Bands page - Specify the data band sets and their properties.

Hatch Options page - Specify how to mark areas between two profiles on the profile view, such as where terrain must be cut or filled to create the design profile.

Click Create Profile View.

In the drawing window, click a location for the lower left corner (origin) of the profile view grid. The profile view is drawn.

Step 4: Layout Profile (FG,DESIGN)

- Create layout profiles to represent designed elevations along an alignment.
- You typically draw a layout profile on the grid of a profile view, using the surface profile as a guide.
- A profile view grid must exist in the drawing to draw layout profiles. Create curves and tangents by freehand sketching or by entering numeric values.
- You can create a layout profile with tangents, and then optionally add curves at the points of vertical intersection (PVI).
- You can create a profile from an external ASCII file that contains a series of stations along an alignment, the elevation of each station, and optionally, the length of curve at the station.
- Curve attributes are set by the Curve Settings command. These curves maintain tangency when edited.
- Several methods are available for drawing a layout profile:
- Use the Draw Tangents command to specify points of vertical intersection (PVIs) for a series of straight tangents. Later you can add free curves with specific parameters between the tangents.
- Use the Draw Tangents With Curves command to specify PVIs for the tangents, automatically creating curves between the tangents using the parameters you specify in the Vertical Curve Settings dialog box.
- Use the constraint-based profile design commands to create a profile one sub-entity at a time.
- When you are prompted for point locations, you can use the Transparent Commands to specify points in the profile.
- To create a more detailed design using a specific parameter or other constraints, or to create curves without first creating tangents, use the constraint-based tools included on the Profile Layout Tools toolbar.
- The criteria-based design feature allows a layout profile to be validated against local design standards. You can select a design criteria file and/or a design check set using either the Create Profile - Draw New dialog box when you create the layout profile, or the Design Criteria tab of the Profile Properties dialog box after it has been created.

Step 5: Create Assembly

[\(Autodesk Help\)](#)

1. Open **4-Corridor_CI224519-L.dwg**.
2. Click Home tab ➤ Create Design panel ➤ Assembly drop-down ➤ Create Assembly.
3. In the Create Assembly dialog box, for name, enter **C1224519-L**. Click OK.
4. When the 'Specify assembly baseline location' prompt is displayed on the command line, click on the vertical line under the profiles in the lower left vport.

The viewport zooms to the assembly baseline, which looks similar to this:




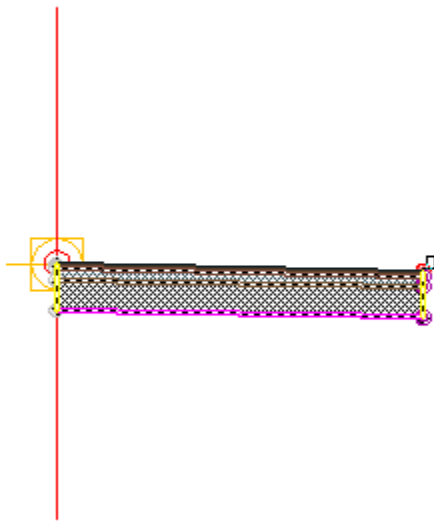
Add a lane subassembly

1. If the Tool Palette containing the subassemblies is not visible, click Home tab ➤ Palettes panel ➤ Tool Palettes
2. Click the Basic tab.
3. Click GenericPavementStructure. [\(Appendix Help\)](#)
4. In the Properties palette, under ADVANCED, specify the following parameters:
 - Side: **Right**
 - Width: **12**
 - Shift Width: **0**
 - Default Cross Slope: **-2**
 - Slope Direction: **Away from Crown**
 - Depth: **0.67**
 - DeflectOuterVerticalFace: **No**
 - TopLinkcodes: **Pave,Top**
 - Shape Codes: **Pave**
5. In the drawing, click the marker point on the assembly baseline.

The right lane subassembly is now attached to the assembly baseline.

Add a curb subassembly

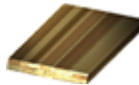
1. In the Tool Palettes window, on the Curbs tab, click  UrbanCurbGutterGeneral.
2. In the drawing, click the marker point at the top-right edge of the travel lane.

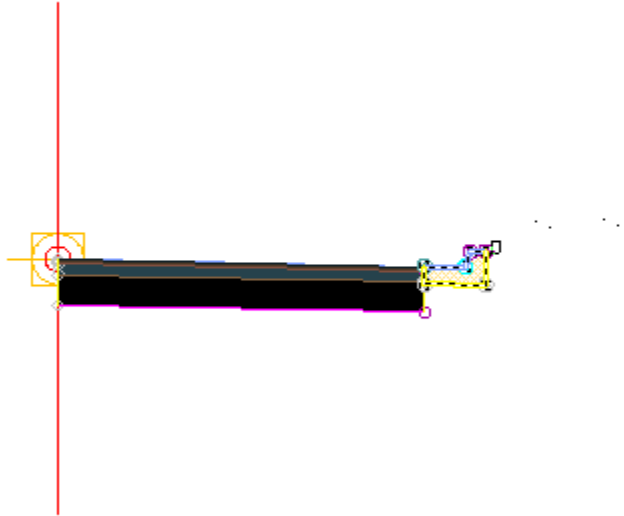


Note:

If you attach the subassembly to the wrong marker, you can move it to the correct location. Press Esc to exit subassembly placement mode. Select the subassembly you wish to move. A blue grip is displayed when the subassembly is selected. Select the grip, and then click the correct marker point.

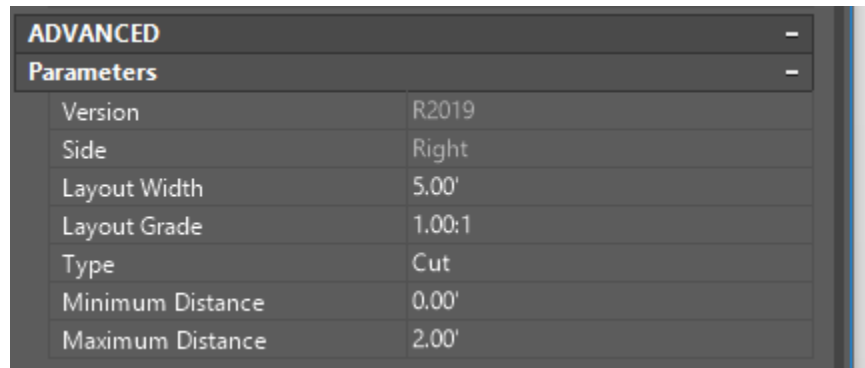
Add a sidewalk subassembly

1. In the Tool Palettes window, on the Basic tab, click  Basic Sidewalk.
2. In the Properties palette, under ADVANCED, specify the following parameters:
 - Side: **Right**
 - Width: **6**
 - Depth: **.5**
 - Buffer Width 1: **0**
 - Buffer Width 2: **1**
3. In the drawing, click the marker point at the top, back of the curb.



Add a series of conditional CUT Scenario subassemblies

1. If the Tool Palette containing the subassemblies is not visible, click Home tab ► Palettes panel ► Tool Palettes
2. Click the Conditional tab.
3. Click ConditionalCutOrFill.
4. In the Properties palette, under ADVANCED, specify the following parameters:
 - Side: **Right**
 - Layout Width: **5**
 - Layout Grade: **1:1**
 - Type: **Cut**
 - Min. Distance: **0**
 - Max. Distance: **2**



ADVANCED	
Parameters	
Version	R2019
Side	Right
Layout Width	5.00'
Layout Grade	1.00:1
Type	Cut
Minimum Distance	0.00'
Maximum Distance	2.00'

1. If the Tool Palette containing the subassemblies is not visible, click Home tab ► Palettes panel ► Tool Palettes
2. Click the Generic tab.
3. Click LinkWidthToSurface.
4. In the Properties palette, under ADVANCED, specify the following parameters:
 - Side: **Right**
 - Use Superelevation AOR: **No**
 - Slope Direction: **Away from Crown**
 - Slope: **2:1 (50%)**
 - Add Link in: **Cut Only**
 - Codes: **Defaults are fine**
5. Select the end of the previous conditional sub assembly to placement.

Add a second conditional subassembly and wall scenario.

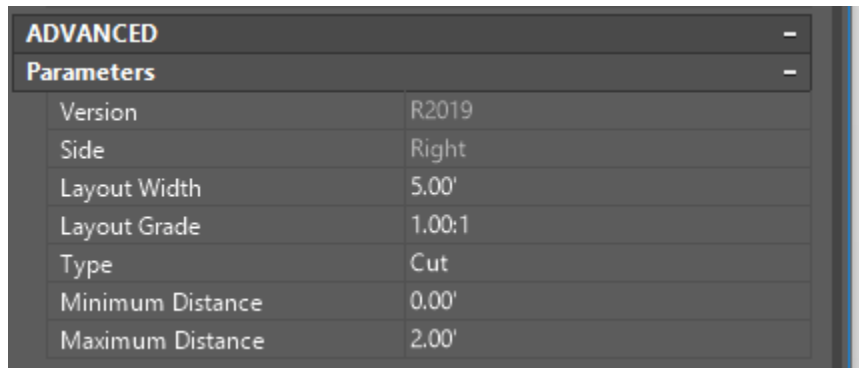
1. If the Tool Palette containing the subassemblies is not visible, click Home tab ► Palettes panel ► Tool Palettes
2. Click the Conditional tab.
3. Click ConditionalCutOrFill.
4. In the Properties palette, under ADVANCED, specify the following parameters:
 - Side: **Right**
 - Layout Width: **12**
 - Layout Grade: **2:1**
 - Type: **Cut**
 - Min. Distance: **2**
 - Max. Distance: **9999**

ADVANCED		—
Parameters		—
Version	R2019	
Side	Right	
Layout Width	12.00'	
Layout Grade	2.00:1	
Type	Cut	
Minimum Distance	2.00'	
Maximum Distance	9999.00'	

5. If the Tool Palette containing the subassemblies is not visible, click Home tab ► Palettes panel ► Tool Palettes
6. Click the Generic tab.
7. Click LinkWidthToSurface.
8. In the Properties palette, under ADVANCED, specify the following parameters:
 - Side: **Right**
 - Use Superelevation AOR: **No**
 - Slope Direction: **Away from Crown**
 - Slope: **0.05:1** (wall simulation)
 - Add Link in: **Cut**
 - Codes: **Defaults are fine**
9. Select the end of the previous conditional sub assembly to placement.

Add a series of conditional FILL Scenario subassemblies

1. If the Tool Palette containing the subassemblies is not visible, click Home tab ► Palettes panel ► Tool Palettes
2. Click the Conditional tab.
3. Click ConditionalCutOrFill.
4. In the Properties palette, under ADVANCED, specify the following parameters:
 - Side: **Right**
 - Layout Width: **5**
 - Layout Grade: **1:1**
 - Type: **Fill**
 - Min. Distance: **0**
 - Max. Distance: **2**



ADVANCED	
Parameters	
Version	R2019
Side	Right
Layout Width	5.00'
Layout Grade	1.00:1
Type	Cut
Minimum Distance	0.00'
Maximum Distance	2.00'

- 5.
6. If the Tool Palette containing the subassemblies is not visible, click Home tab ► Palettes panel ► Tool Palettes
7. Click the Generic tab.
8. Click LinkWidthToSurface.
9. In the Properties palette, under ADVANCED, specify the following parameters:
 - Side: **Right**
 - Use Superelevation AOR: **No**
 - Slope Direction: **Away from Crown**
 - Slope: **2:1 (50%)**
 - Add Link in: **Fill Only**
 - Codes: **Defaults are fine**
10. Select the end of the previous conditional sub assembly to placement.

Add a second conditional subassembly for the wall scenario.

1. If the Tool Palette containing the subassemblies is not visible, click Home tab ► Palettes panel ► Tool Palettes
2. Click the Conditional tab.
3. Click ConditionalCutOrFill.
4. In the Properties palette, under ADVANCED, specify the following parameters:
 - Side: **Right**
 - Layout Width: **12**
 - Layout Grade: **2:1**
 - Type: **Fill**
 - Min. Distance: **2**
 - Max. Distance: **9999**

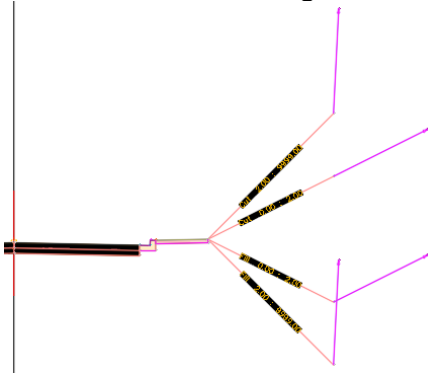
ADVANCED		-
Parameters		-
Version	R2019	
Side	Right	
Layout Width	12.00'	
Layout Grade	2.00:1	
Type	Cut	
Minimum Distance	2.00'	
Maximum Distance	9999.00'	

- 5.
6. If the Tool Palette containing the subassemblies is not visible, click Home tab ► Palettes panel ► Tool Palettes
7. Click the Generic tab.
8. Click LinkWidthToSurface.
9. In the Properties palette, under ADVANCED, specify the following parameters:
 - Side: **Right**
 - Use Superelevation AOR: **No**
 - Slope Direction: **Away from Crown**
 - Slope: **0.05:1** (wall simulation)
 - Add Link in: **Fill**
 - Codes: **Defaults are fine**
10. Select the end of the previous conditional sub assembly to placement.

This action ends the subassembly placement command.

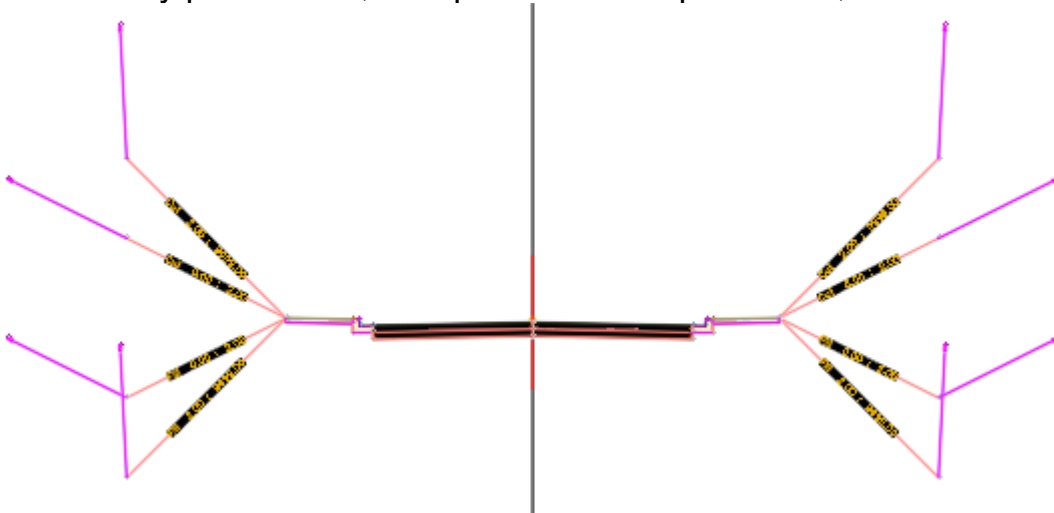
Mirror the subassemblies to the left of the baseline

1. In the drawing, select the four subassemblies you added.



2. Right click. Click Mirror.
3. Click the marker point on the assembly baseline.


The subassemblies are displayed on the left side of the assembly marker. The Mirror command creates a mirror image of the selected subassemblies. All the subassembly parameters, except for the Side parameter, are retained.

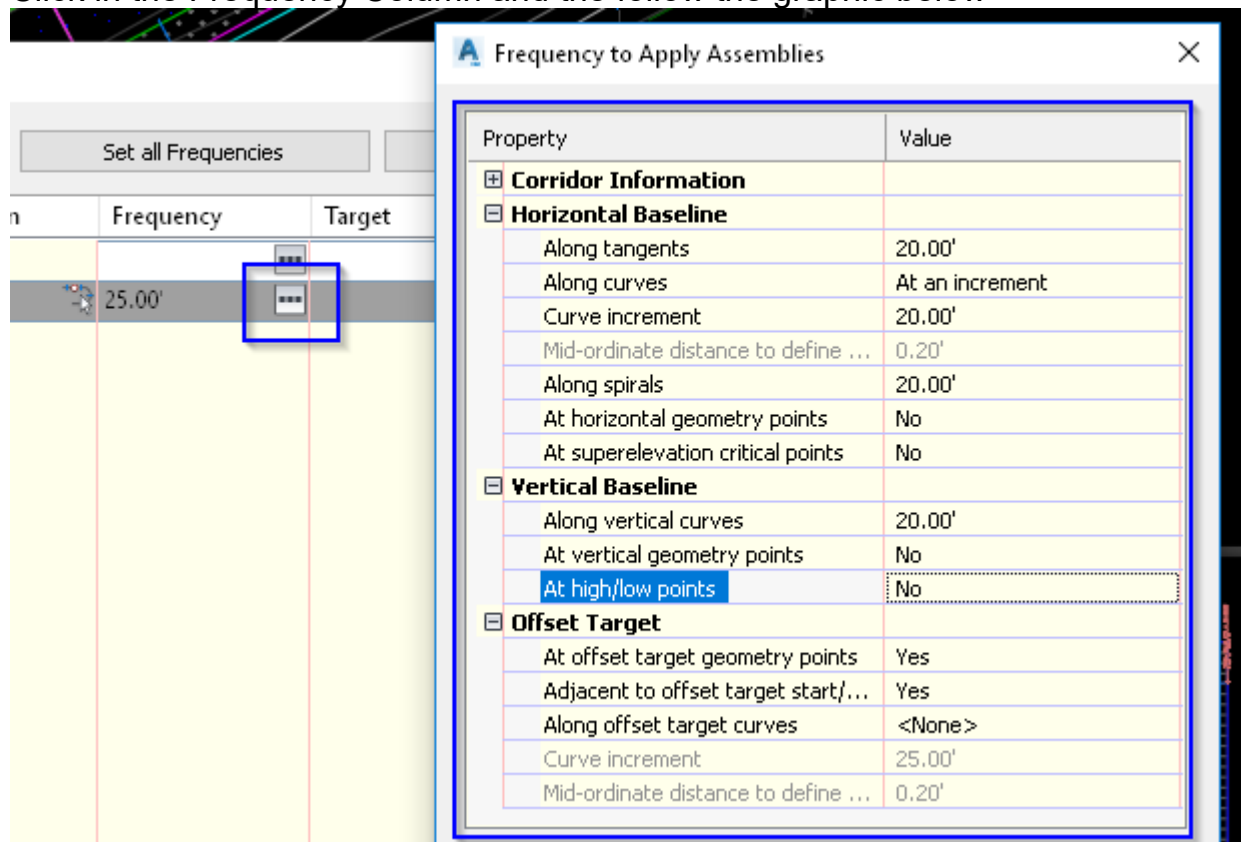


Note:

The parameters of the mirrored subassemblies are not dynamically linked. If you change a parameter value for a subassembly on one side of the assembly baseline, the change will not be applied to the opposite side.

Step 6: Create Corridor

- Click Home tab ► Create Design panel ► Corridor  Find.
- In the [Create Corridor](#) dialog box, specify the following parameters:
- Name: **C1224519-L**
- Description: **AU 2018**
- Corridor Style: **Basic**
- Corridor Layer : **C-ROAD-CORR**
- Baseline Type: **Alignment and profile**
- Assembly: **C1224519-L**
- Target Surface: **EG**
- Select Set Baseline and Region Parameters to add multiple baselines and regions, or modify the default frequencies or start and end stations.
- Click OK.
- In the [Baseline and Region Parameters](#) dialog box, you can assign assembly frequencies and targets, edit the parameters in the properties table, and add additional controlling baselines and regions.
- Click in the Frequency Column and the follow the graphic below



Property	Value
Corridor Information	
Horizontal Baseline	
Along tangents	20.00'
Along curves	At an increment
Curve increment	20.00'
Mid-ordinate distance to define ...	0.20'
Along spirals	20.00'
At horizontal geometry points	No
At superelevation critical points	No
Vertical Baseline	
Along vertical curves	20.00'
At vertical geometry points	No
At high/low points	No
Offset Target	
At offset target geometry points	Yes
Adjacent to offset target start/...	Yes
Along offset target curves	<None>
Curve increment	25.00'
Mid-ordinate distance to define ...	0.20'

- Click OK
- Click in the Target column:
 - NOTE: Surface targets all set to EG
 - No other targets are set
- Set as follows:
- ASPHALT_RT -> Select from drawing and choose the RIGHT edge of gutter line.
- ASPHALT_LT -> Select from drawing and choose the LEFT edge of gutter line. (see graphic below)

Width or Offset Targets			
Width Target	Polyline- 2	ASHPALT_RT	Right
Width Target	<None>	GRAVEL	Right
Offset Target of Inside Boulevard Width	<None>	UrbanSidewalk	Right
Offset Target of Sidewalk Width	<None>	UrbanSidewalk	Right
Offset Target of Outside Boulevard Width	<None>	UrbanSidewalk	Right
Width Target	Polyline- 1	ASPHALT_LT	Left
Width Target	<None>	GRAVEL	Left
Offset Target of Inside Boulevard Width	<None>	UrbanSidewalk	Left
Offset Target of Sidewalk Width	<None>	UrbanSidewalk	Left
Offset Target of Outside Boulevard Width	<None>	UrbanSidewalk	Left
Slope or Elevation Targets			

- Click OK twice to create the corridor.
- The corridor name is displayed in the Corridors collection on the Prospector tab.

CODE SET STYLE

- In plan view currently the corridor looks pretty plain and hard to see what is Asphalt vs what is Concrete or Grass.
- Lets change the code set style to All Codes with Hatching
- Right click on the corridor, and go to corridor properties
- Select the Codes tab and change the Basic code set style to All Codes with Hatching. Notice the hatch patterns now are a little more descriptive and representative.

Step 7: Create Sample lines and Section Views

- Choose Sample Lines in the Profiles & Section Views panel on the Home ribbon.
- Press Enter to select the alignment from a list if you have a complex corridor.
- In the Create Sample Line Group dialog box, select the data sources to sample.
- The command line request for picking a station is not a recommended method. Instead, make a selection from the Sample Line Tools dialog box. The example in the video uses the most common selection, By Station Range.
- Set values in the Create Sample Lines dialog and click OK to draw the sample lines. Press Enter to complete the command and create the sections.
- Set our sections to be 25' apart, and 100' wide (50' each side)

Step 8: Creating multiple section views

- Choose Create Multiple Views in the Profile & Section Views panel on the Home tab.
- In the Create Multiple Section Views dialog box, adjust the settings as needed. In the Section Placement tab, you can select a production template and allow Civil 3D to determine how many cross sections will fit in a set viewport. The example uses a Civil 3D Imperial Section.
- Make any additional adjustments for Offset Range, Elevation Range, Section Display Options, and Data Bands. Click Create Section Views. The views are laid out on the sheet according to the settings stored in the Group Plot Style.

Step 9: Corridor Shape Volume Quantities (*Video is 8 minutes long*)

- Open: **5-Corridor_CI224519-L - quantity.dwg**
- Watch Video