



Autodesk Civil 3D

Software Instructions

Version #				1
Created by	Logan	Date		13/10/20
Reviewed by	James T	Date		13/10/20

Software Instructions: Autodesk Civil 3D

Acknowledgments

We would like to acknowledge the following references used to compile these instructions for students:

1. https://www.youtube.com/watch?v=u8XbzSKtNA4&ab_channel=O%27Reilly-VideoTraining
2. https://www.youtube.com/watch?v=mMwS_XykgvY&ab_channel=A2KTechnologies

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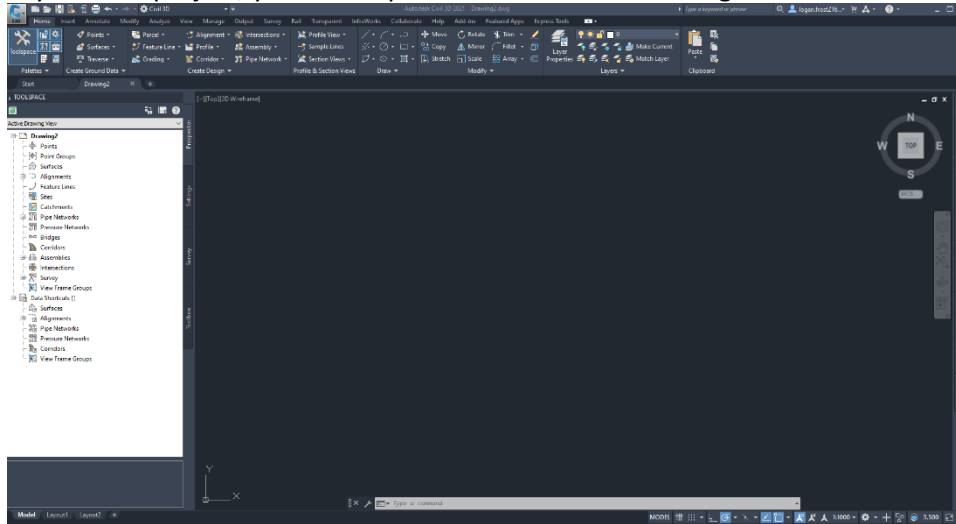
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Software Instructions for Autodesk Civil 3D

Intro:

Starting your project

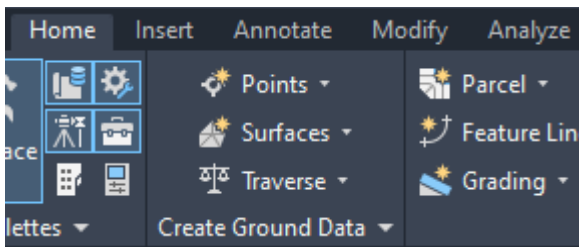
When you open your new project, you will be presented with the following screen.



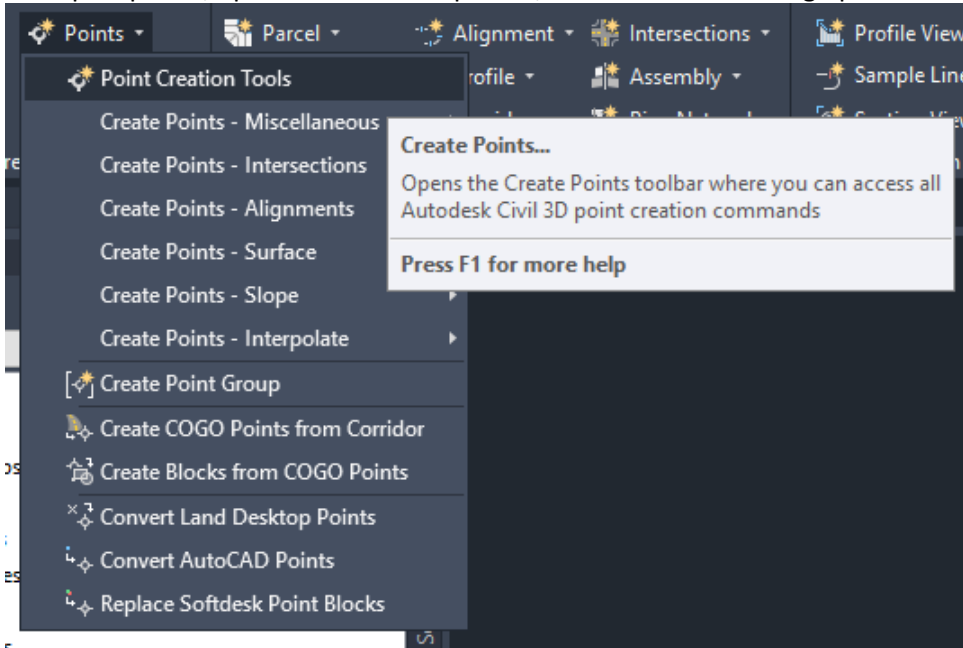
Importing data:

Importing points

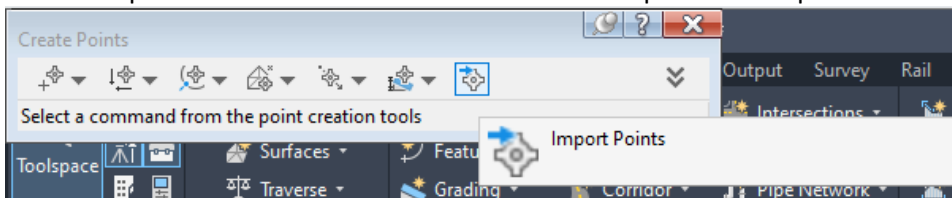
The first thing you'll want to do when starting your civil projects is probably going to be importing survey data to base your project on. Points are a major part of Civil3D and here is how to go about importing them. This section of the toolbar allows the creation of different types of ground data.



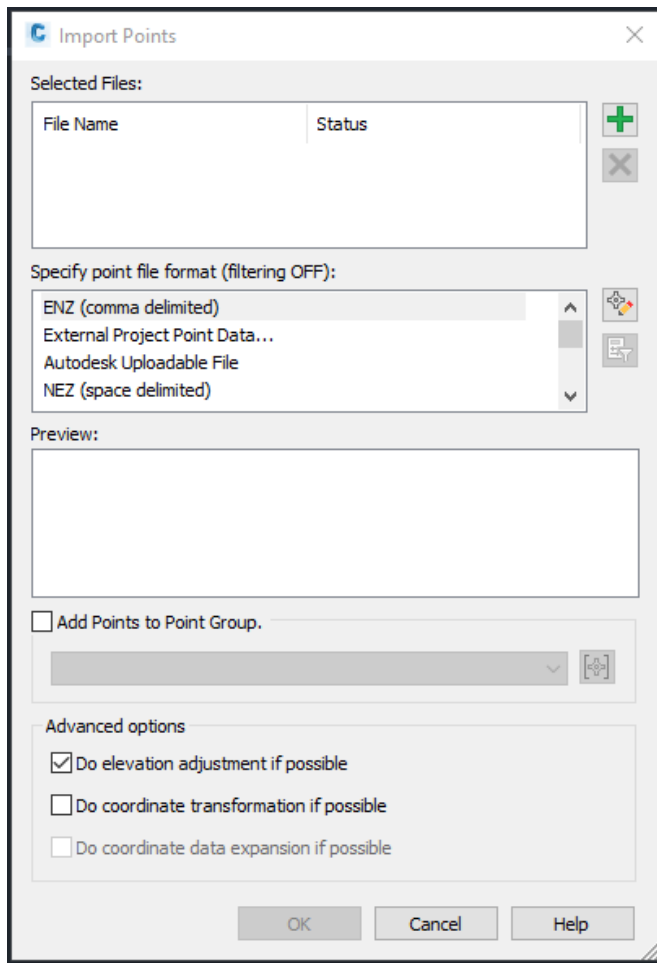
To import points, open the Points dropdown, and click the following option.



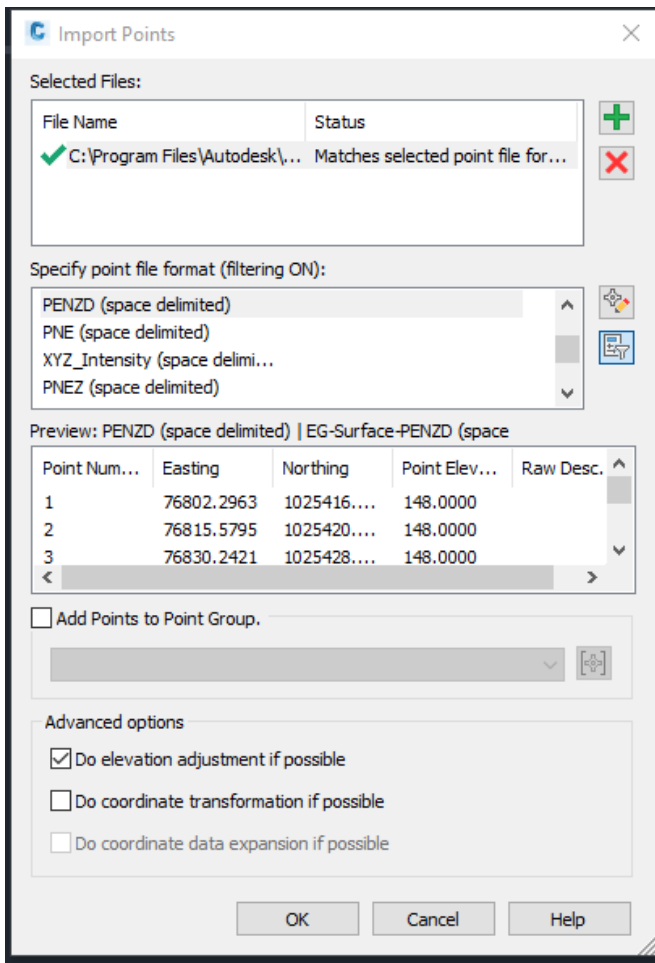
That will open this Create Points menu. Follow the Import Points option



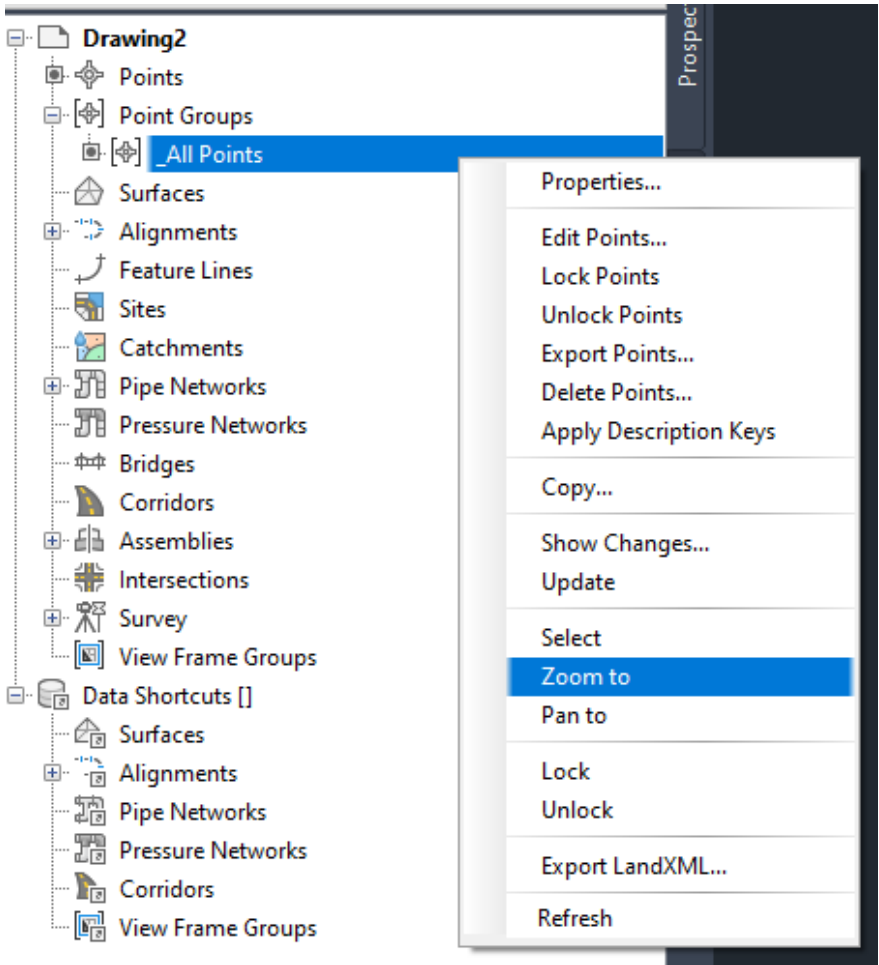
The following is the Import Points menu. This is where you select the file containing your points data, and tell Civil3D what format the points data is in.



Press the plus button to add your points data file, and in the second part of the menu, find the correct points format for your points data. You can check that the format lines up with your point data in the preview box at the bottom.



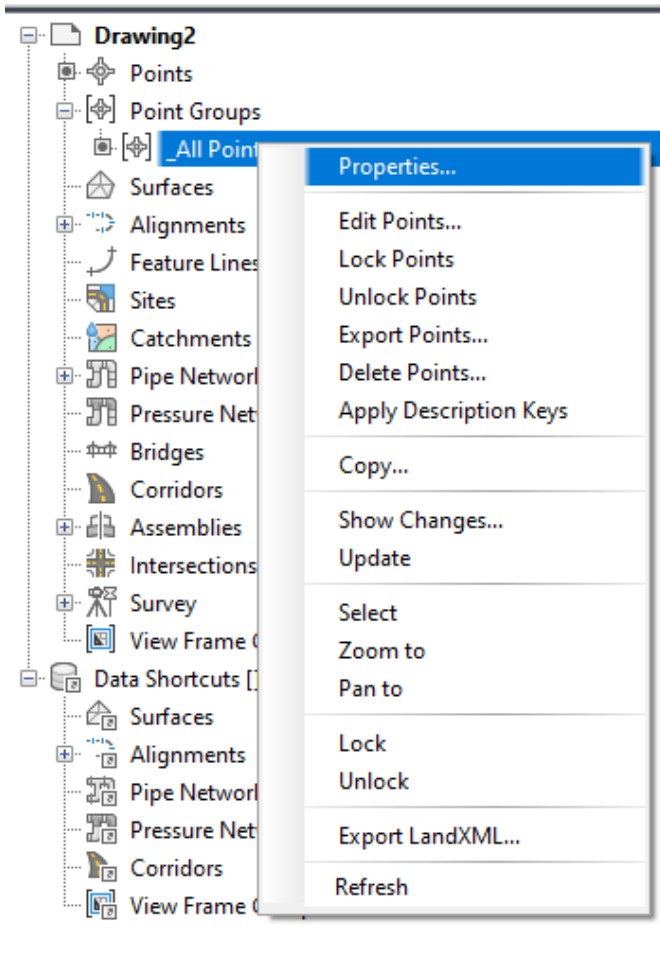
Once you have selected your appropriate points data, click OK and check that you can see the imported points. If you can't see the points, find the new points group in the prospector menu, right click it, and press to zoom to option.



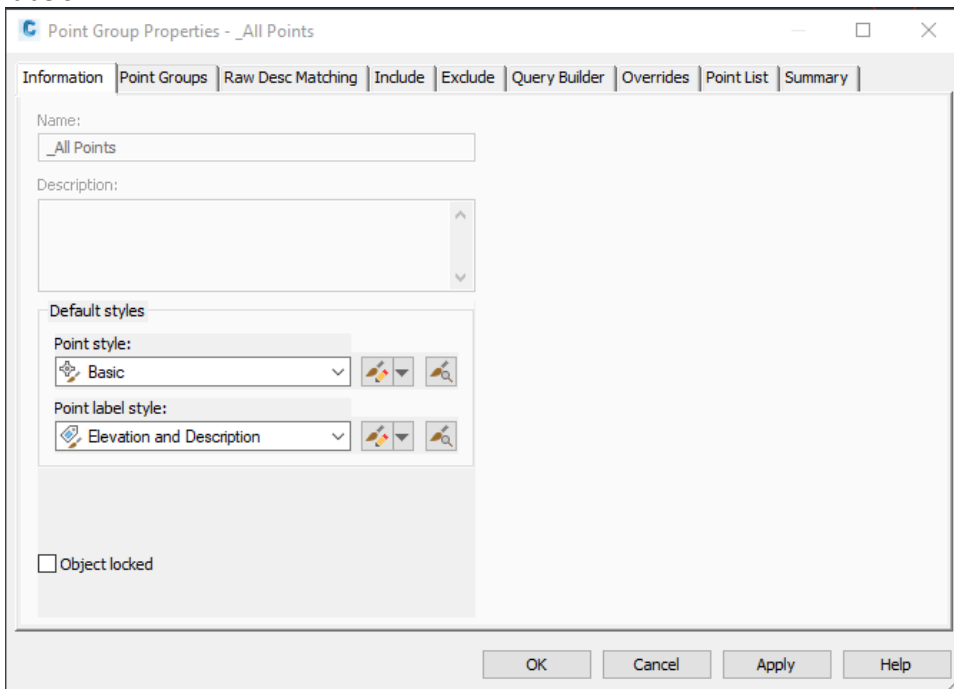
This is what you should see:



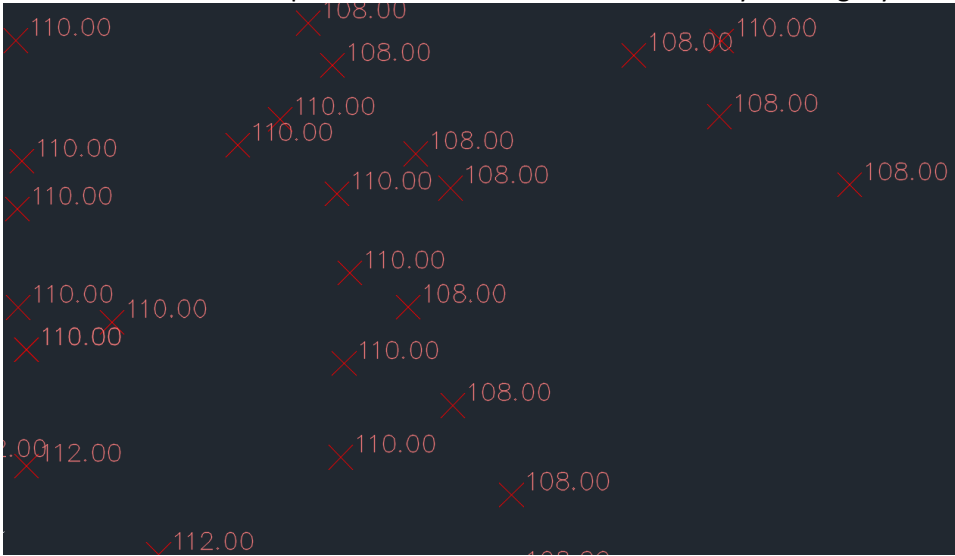
If you want to edit anything about your added points or the ways they are displayed, you can right click -> properties to open the properties menu.



This menu allows you to change the labels applied to the points in the point group, and the style of these labels.



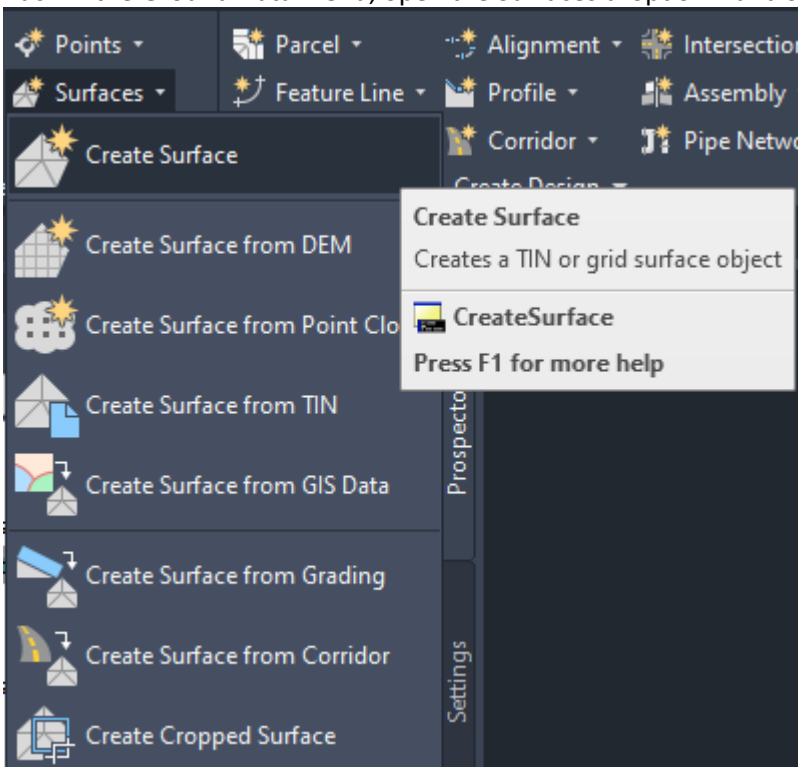
This is what the labeled points look like with the elevation only labeling style.



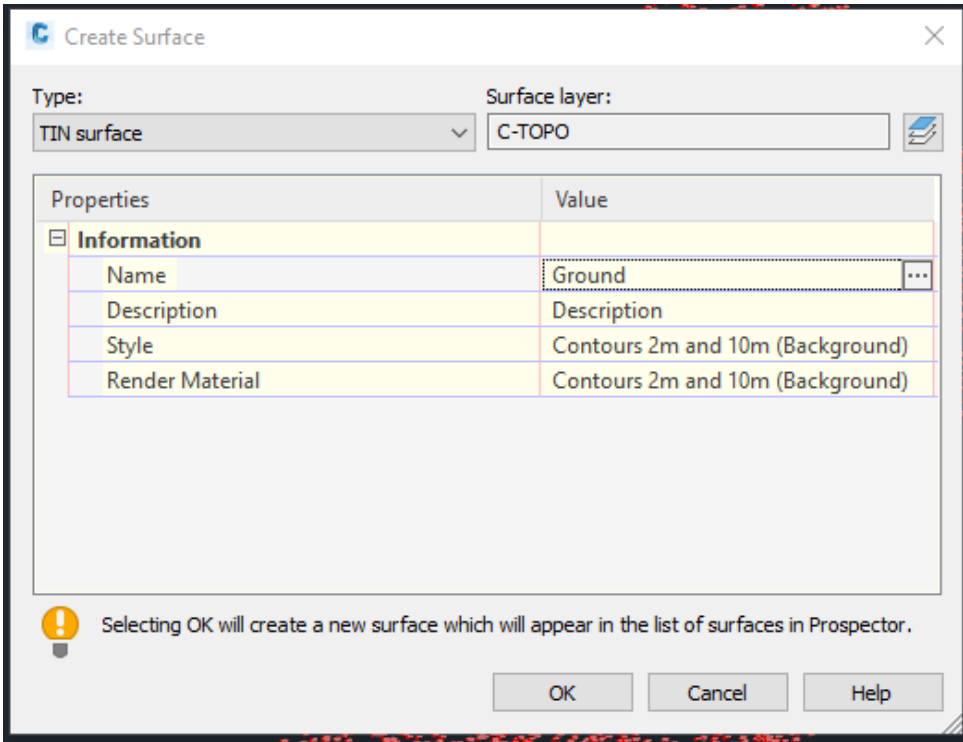
Creating a surface

Once you have your imported points, you can use that point group to create a surface. This surface will allow you to see a topographical representation of the area the points are surveyed from, as well as interpolating data between points.

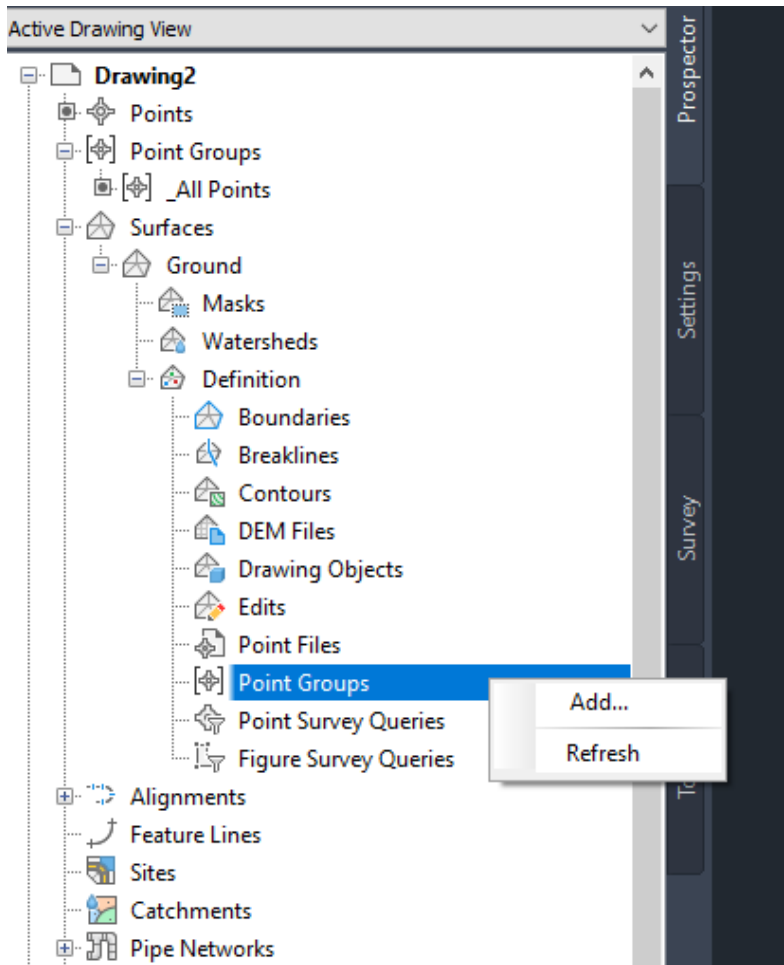
Back in the Ground Data menu, open the Surfaces dropdown and select Create Surface



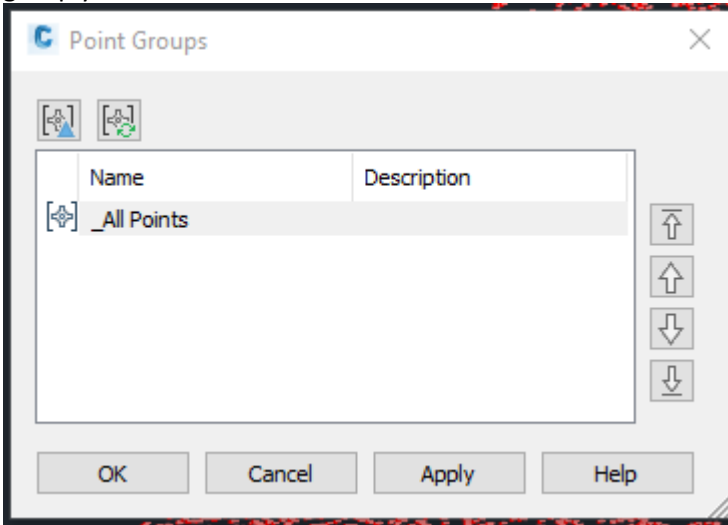
This will open the Create Surface menu. Adjust the settings appropriate to your needs and give the surface a name.



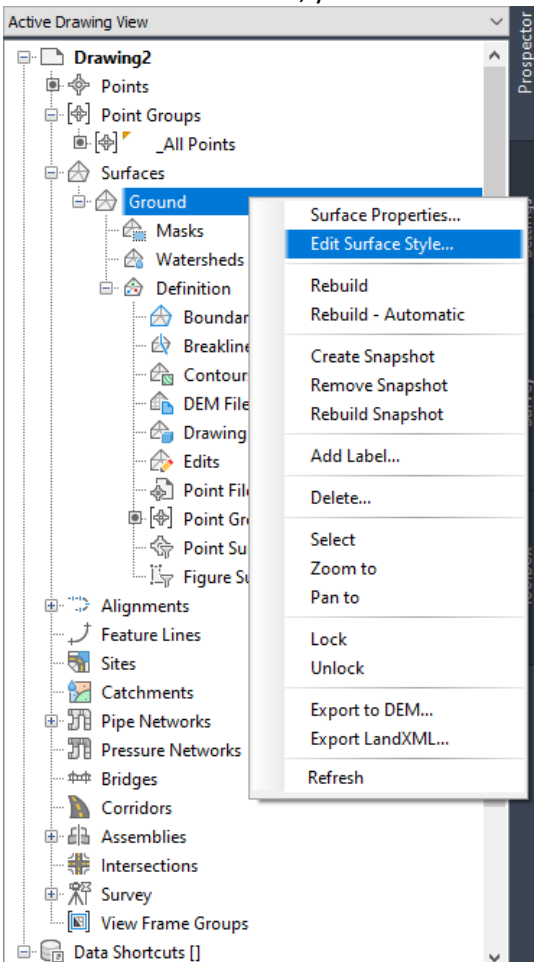
Once the surface is created, you will have to give it a definition. To do this, go to the prospector menu and expand the Surfaces -> whatever you named your surface -> Definition -> Point Groups -> Add...



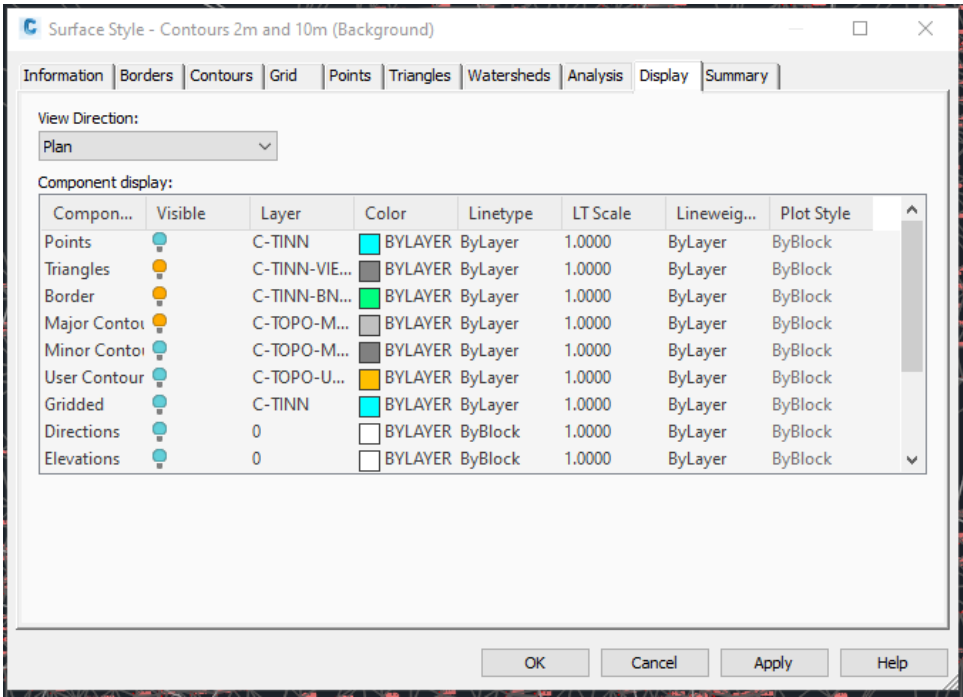
This will open a menu to select the point group to use as the definition for the surface. Select the point group you want to use and click OK.



With the surface defined, you can edit the surface style to change how it is displayed.



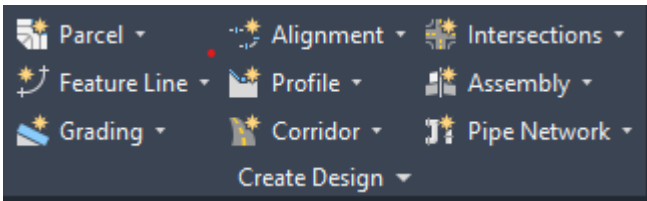
This menu allows you to select the display styles you would like to see. The light on means it's visible, the light off means it is not.



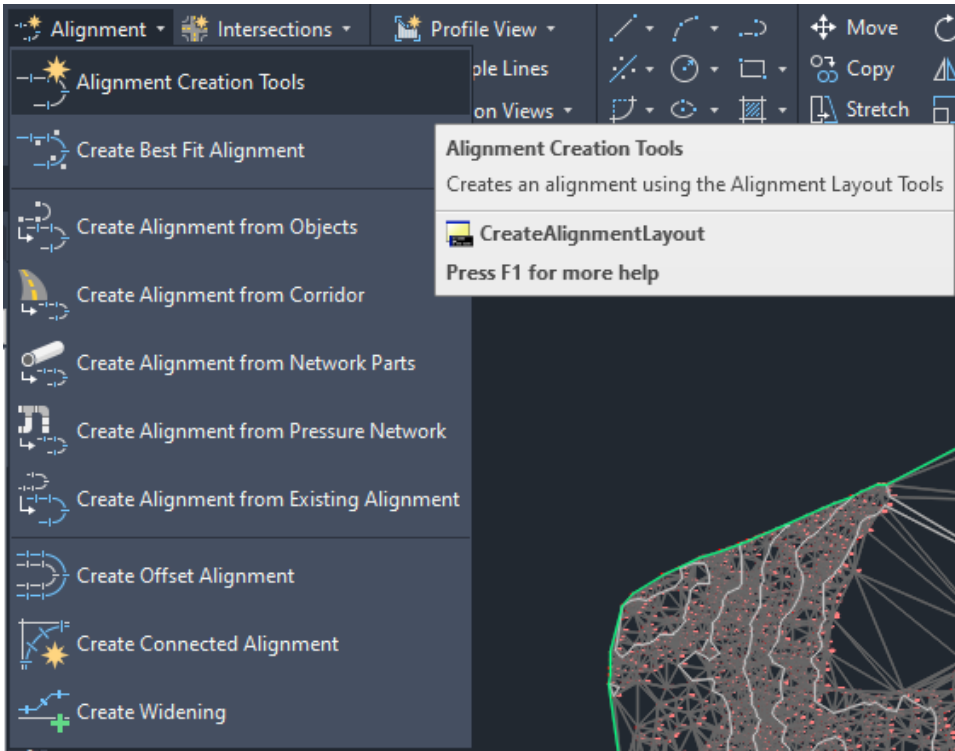
Road Infrastructure:

Creating an alignment

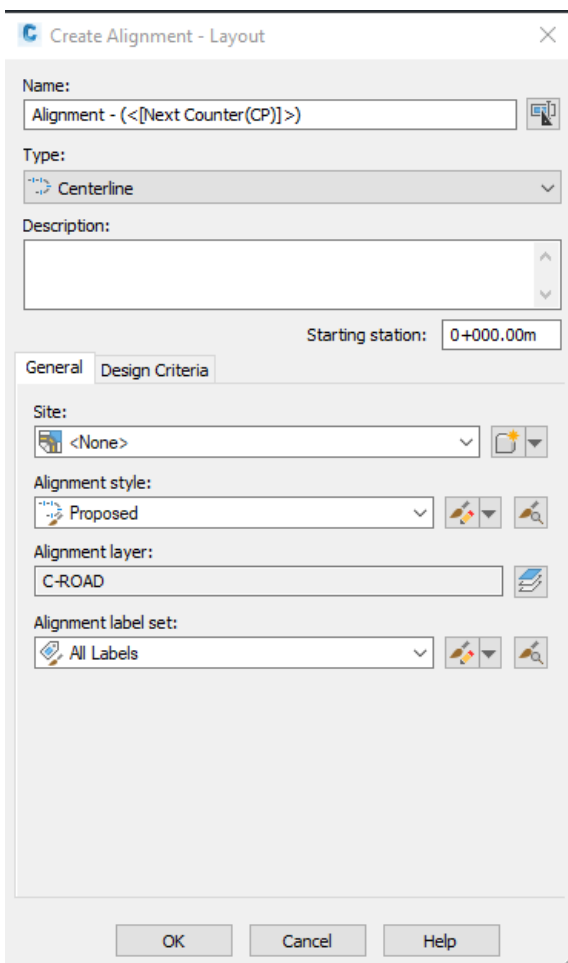
Once you have a defined surface, you can begin creating additions to the surface. In order to place a road into the surface, we must first make an alignment. To do this, go to the Create Design section of the menu and open the alignment dropdown.



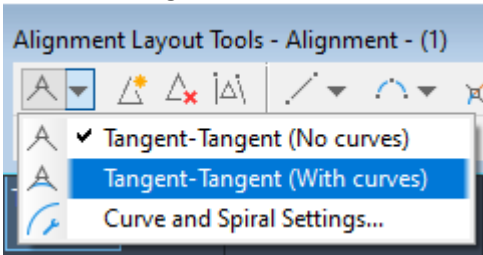
Select alignment creation tools to open the alignments menu.



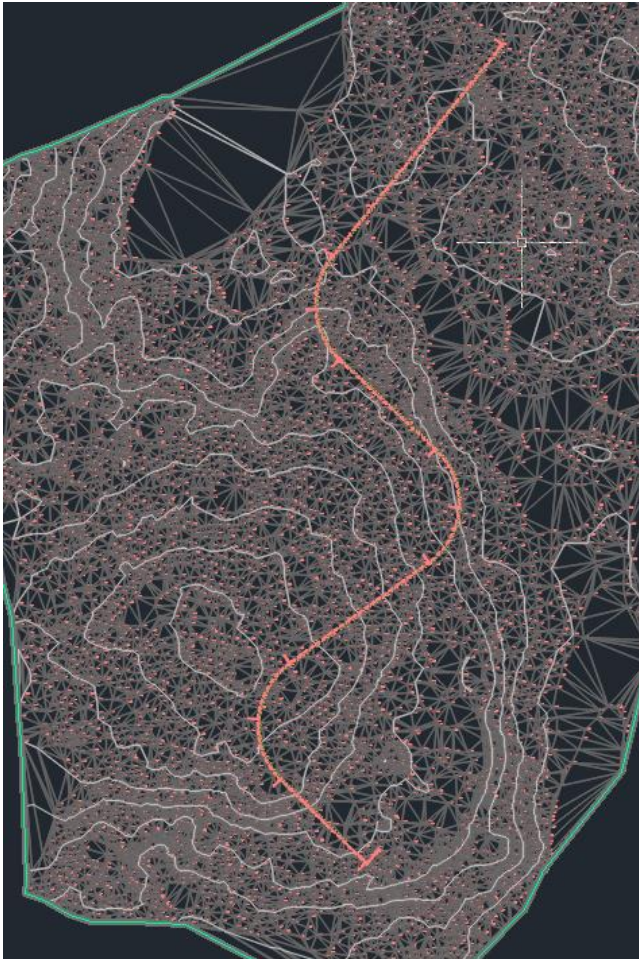
This menu gives all of the settings to create your alignment. Feel free to give the alignment a name. Once you have, click OK.



In the new alignments toolbar, select the alignment tool you want and begin drawing your alignment.

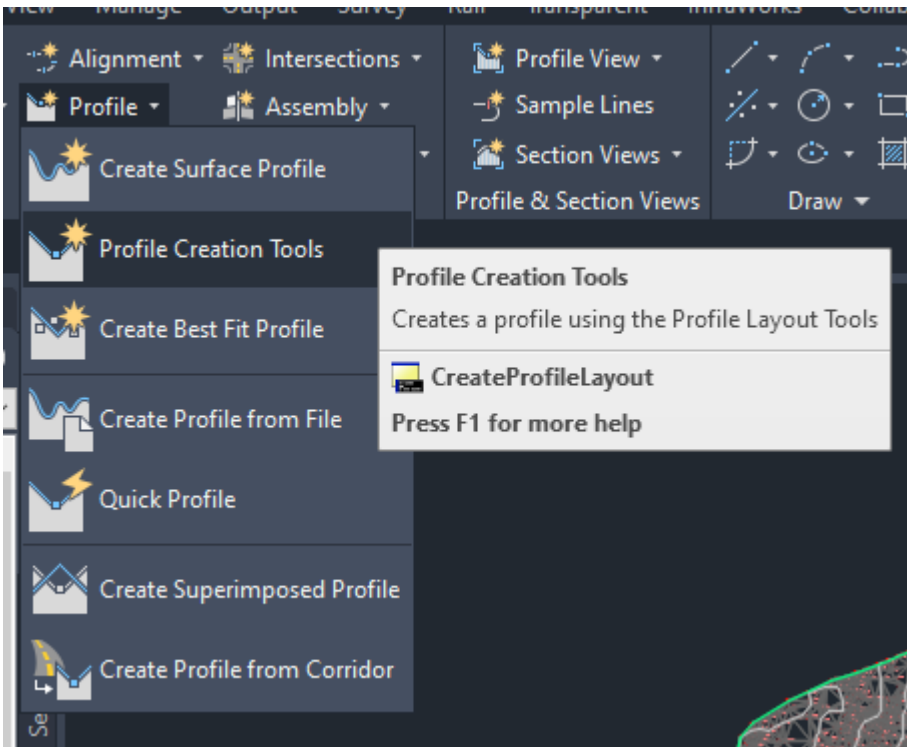


Here is what the alignment will look like on your surface.

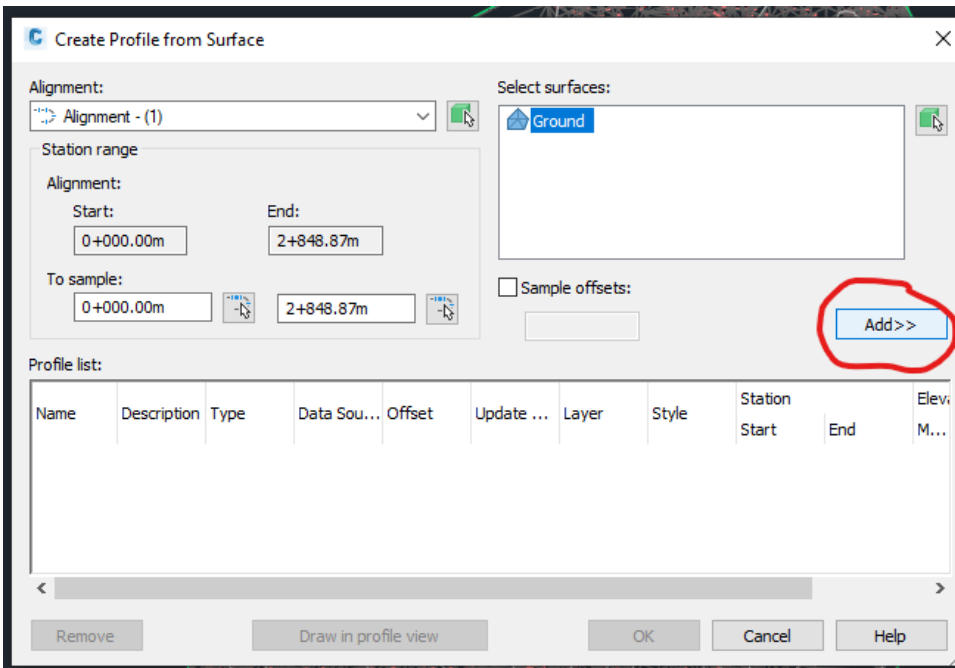


Creating a profile

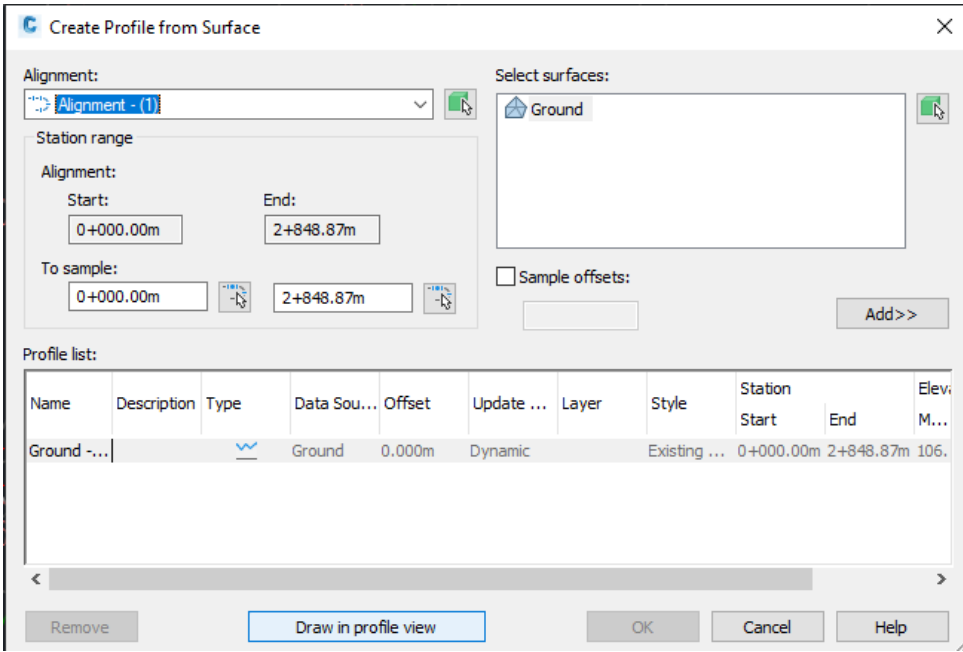
Once the alignment is created, you can create a profile. Open the Profile dropdown menu, and select the Profile Creation Tools option.



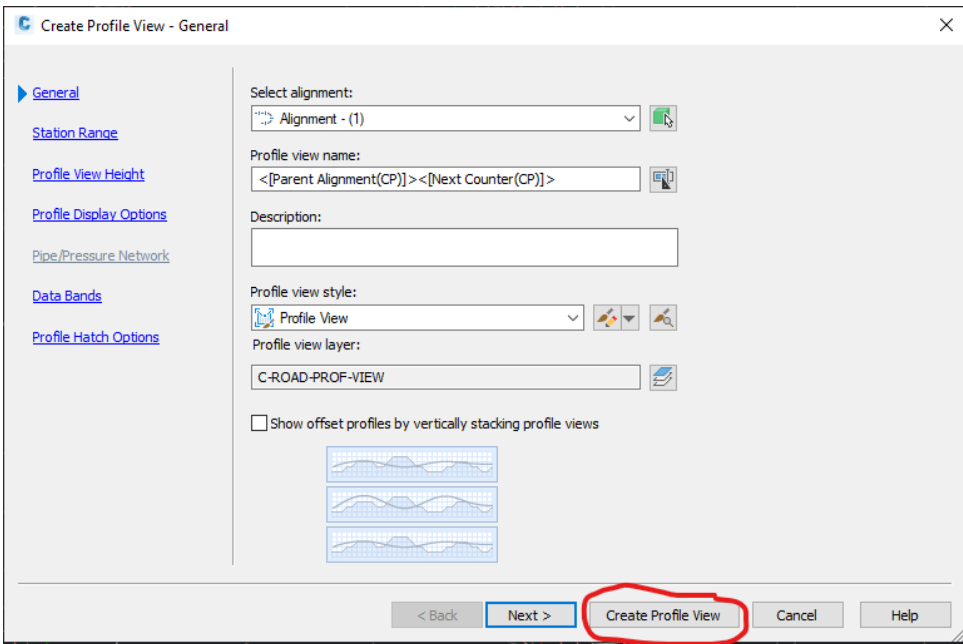
In the Profile creation menu, select the alignment you created, as well as the surface you want to add it to. Click the add button to add the selected surface to the list of surfaces applied to the profile.



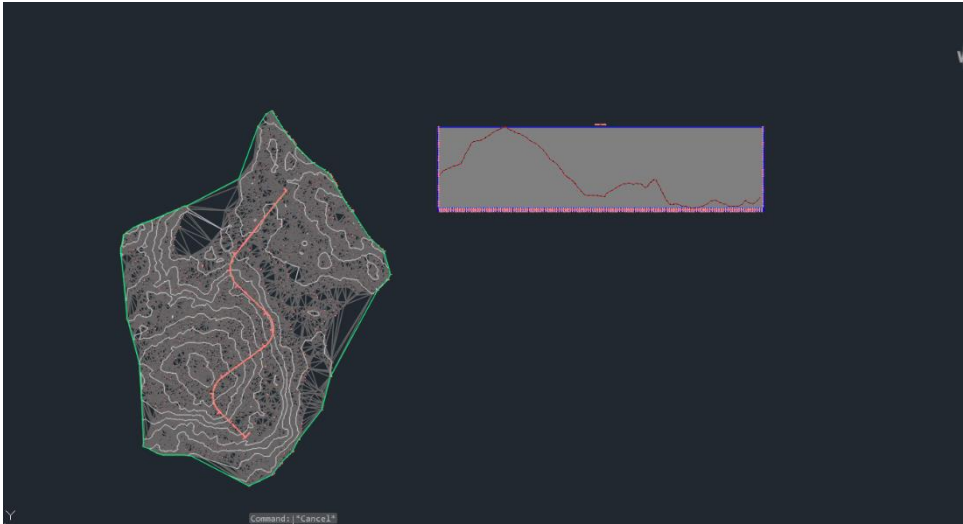
Once it has been added, click the Draw in profile view button.



This will open a new menu. Make sure all of the settings are corect and click Create Profile View.



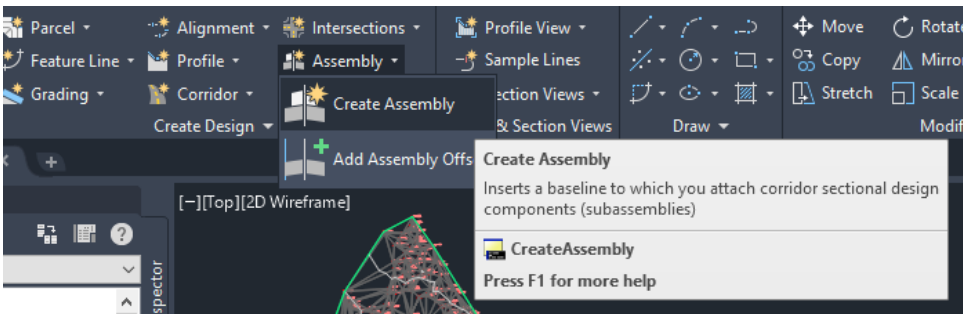
Select somewhere in the project to place the profile, and the profile will be created. This shows a profile of the altitude of the surface along the alignment you created.



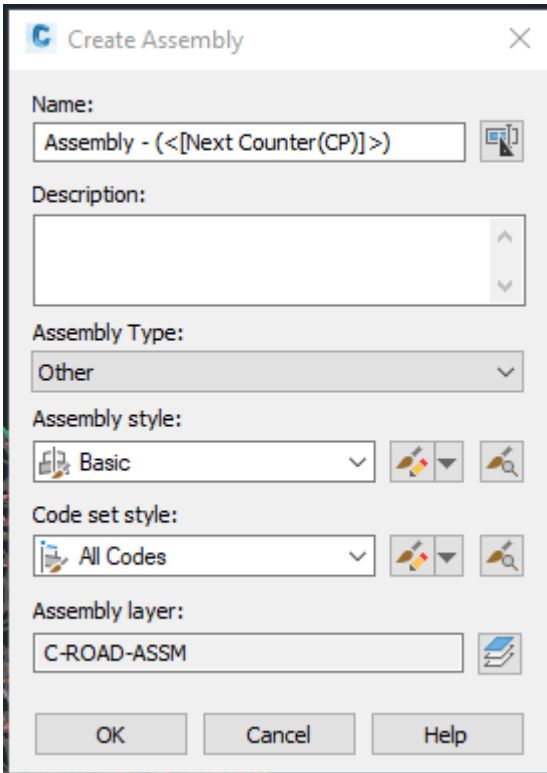
Once this profile is created, you can create another alignment in the same way as you did previously. Make sure to snap the start and end of the alignment to the start and end points of the profile line. This alignment will determine how much your road will cut into or protrude above the surface.

Creating an assembly

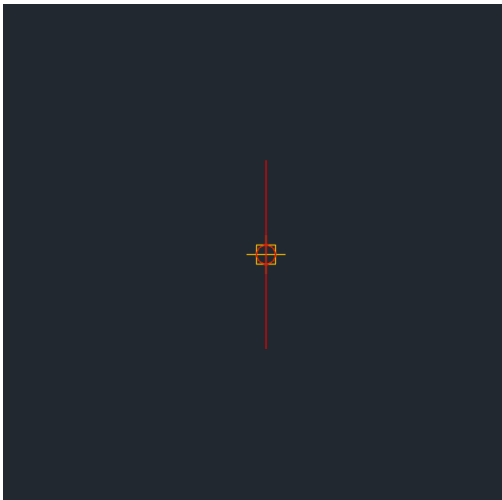
Before the corridor can be created, it's a good idea to prepare an assembly for the road being created. This acts as a cross section of the road depending on whether it is below or above the surface.



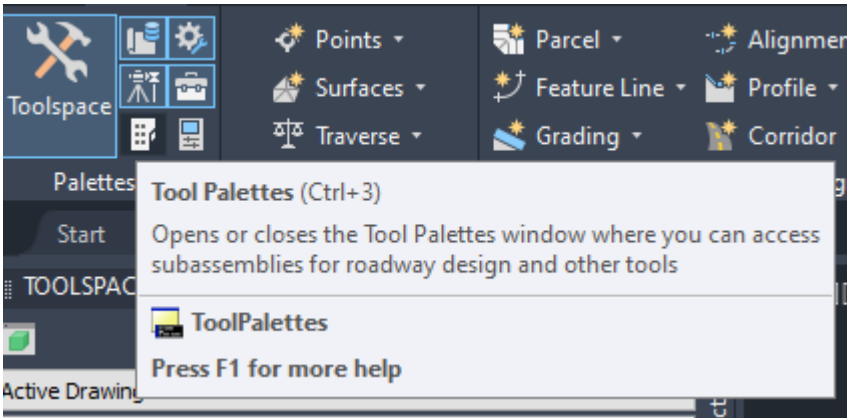
Once you open the menu, feel free to name the assembly and ensure all of the settings are how you need them.



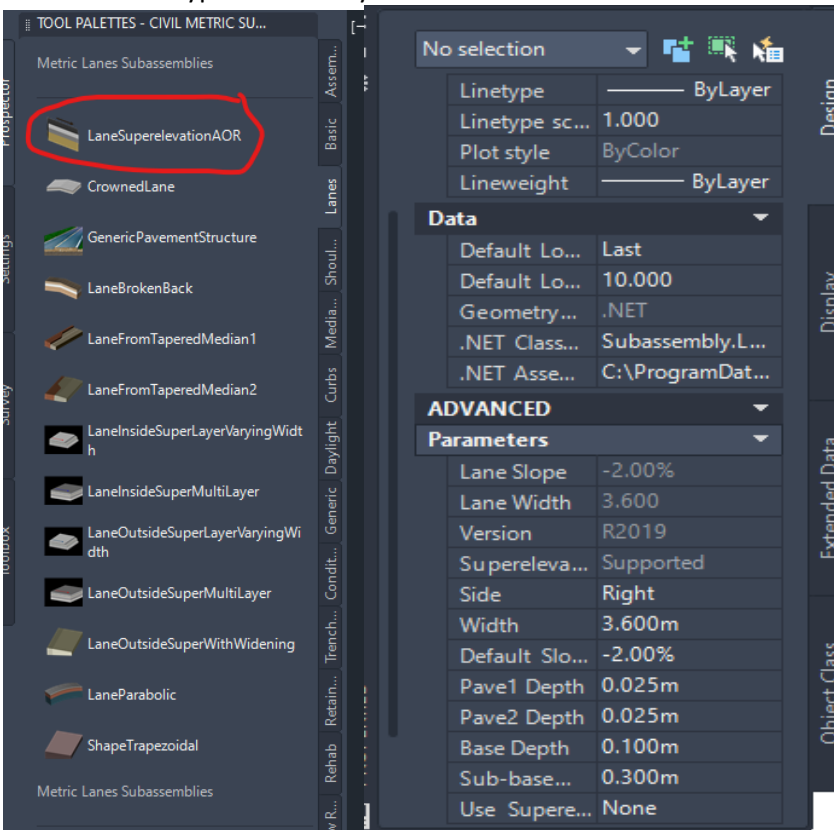
When you click OK, it will create the following assembly base on which you can create your road.



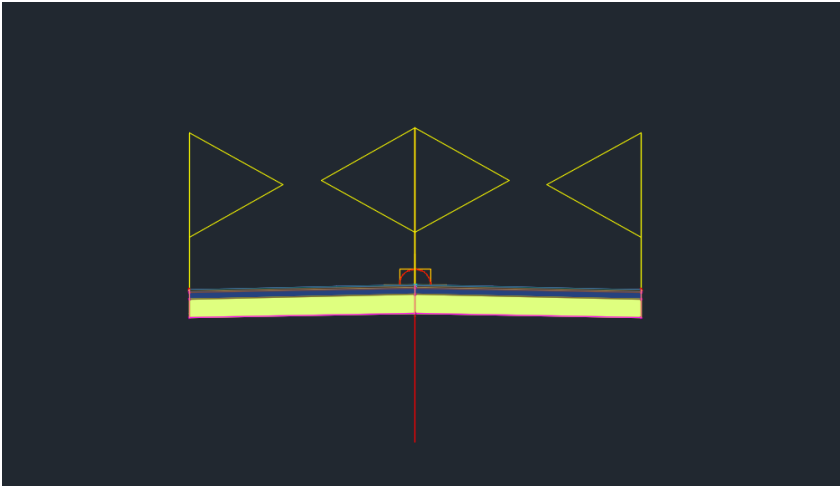
Next to the toolpace button is the Tool Palettes menu. Open that to see all of the options for what to add to your assembly.



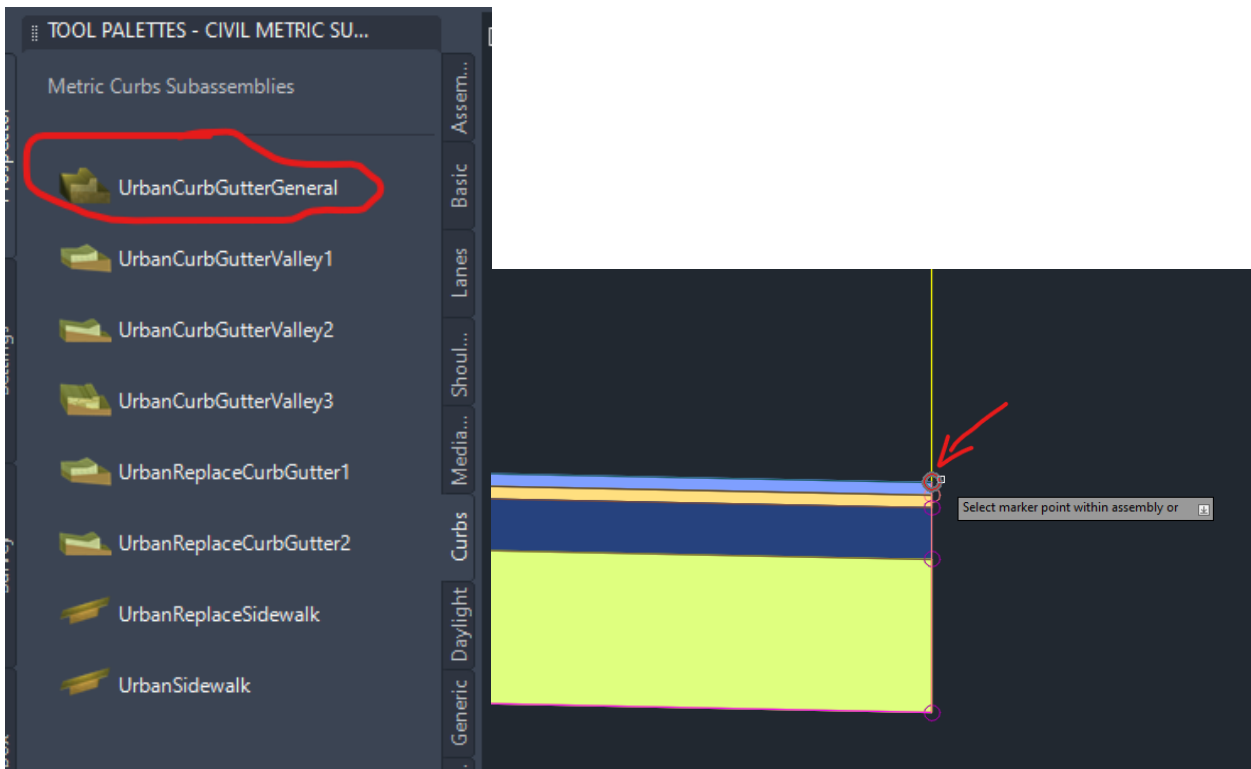
Choose a lane type to use for your road from the lanes menu.

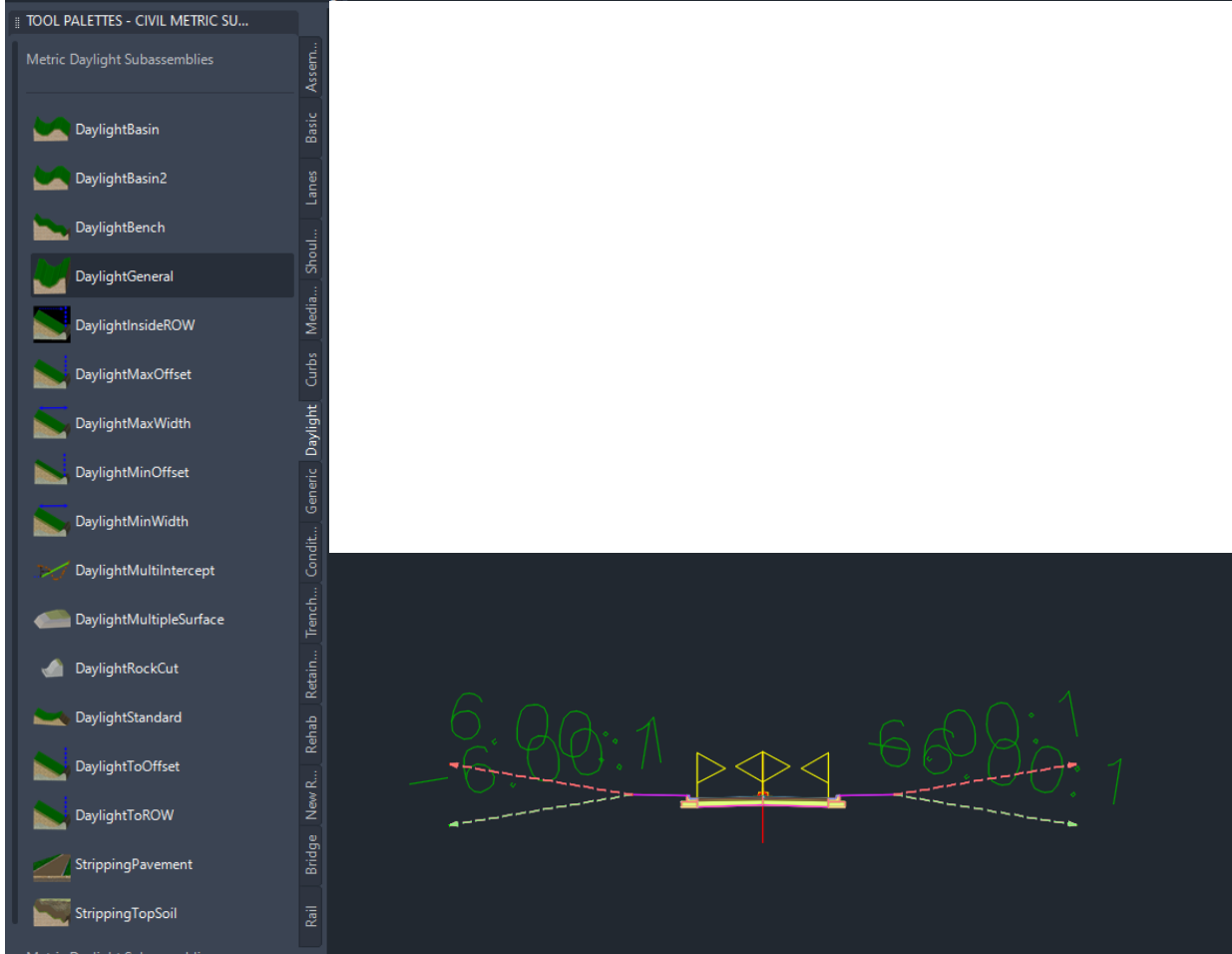
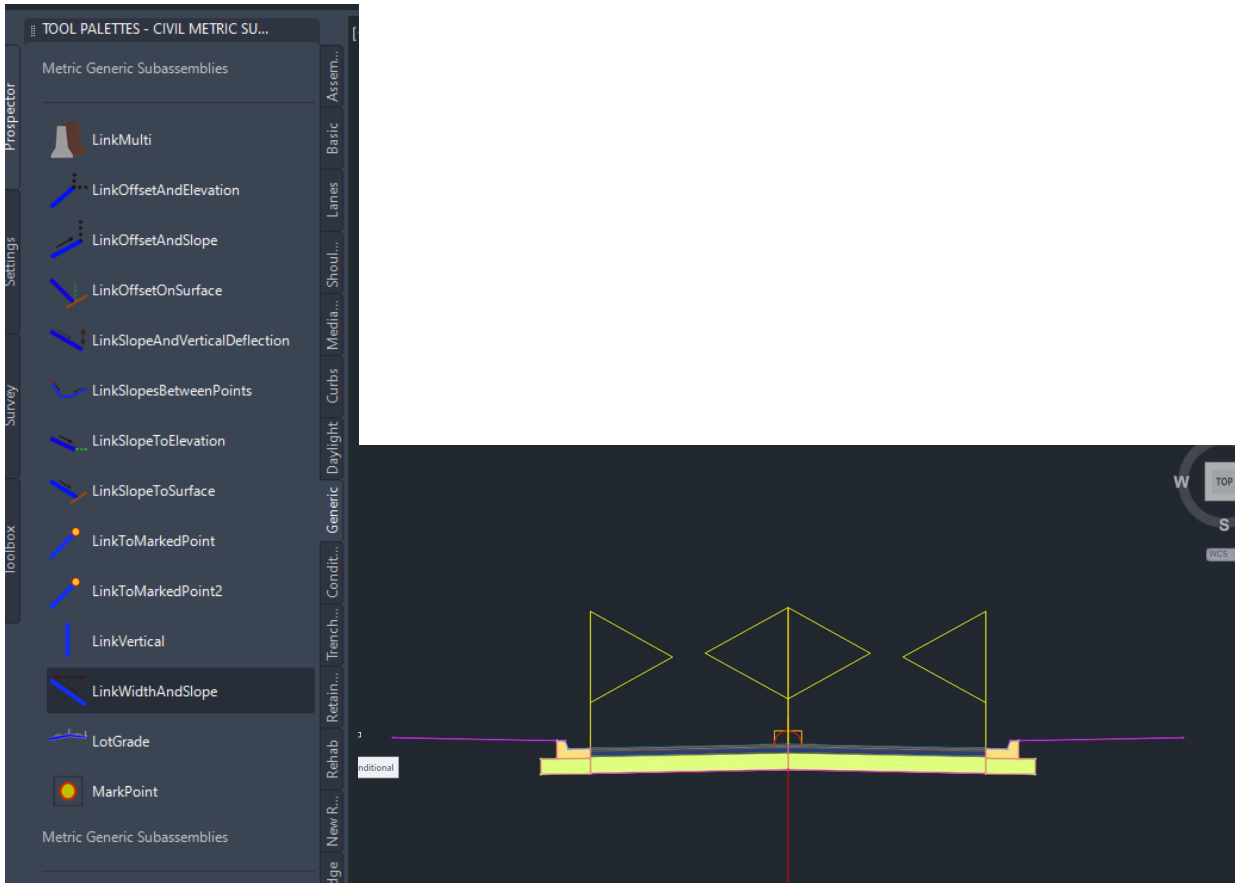


Make sure when you place the lanes on the assembly, that the side option in the Design menu is correct for the side you are trying to add.

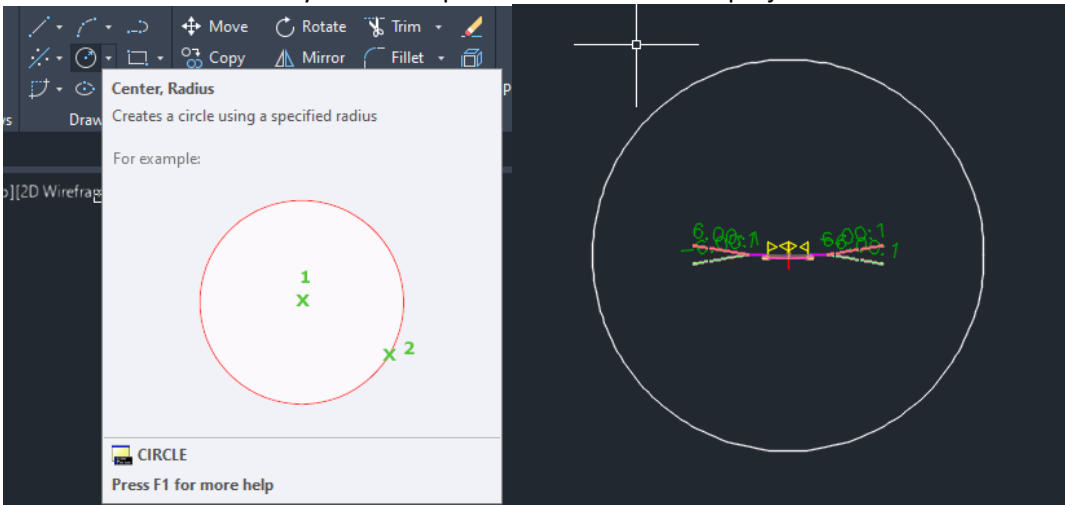


Once the lanes are added, add the curbs, separators and daylight in the same way.

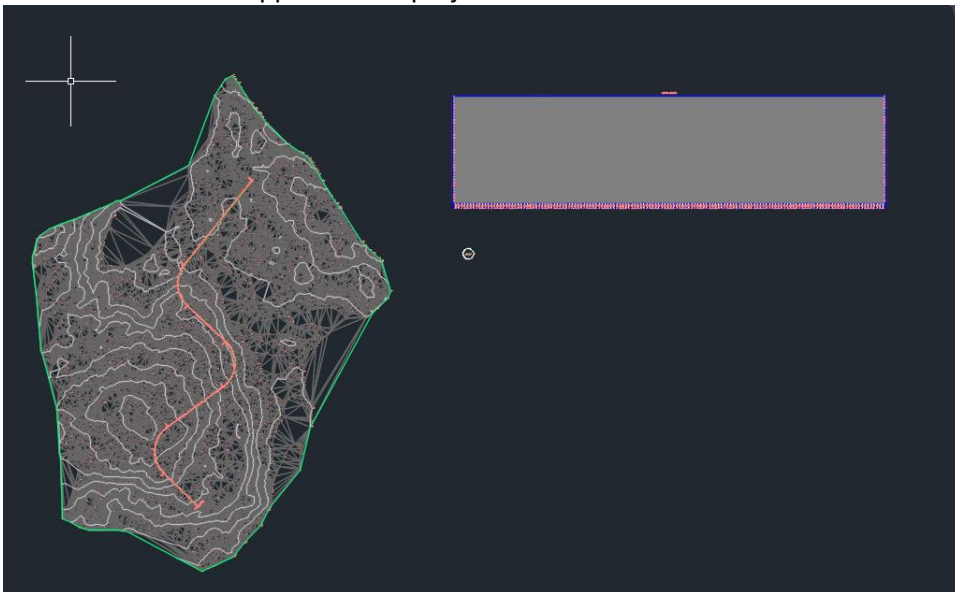




Now that you have a completed assembly, it's a good idea to draw a circle around it to make it easy to find, as the assemblies are very small compared to the rest of the project.

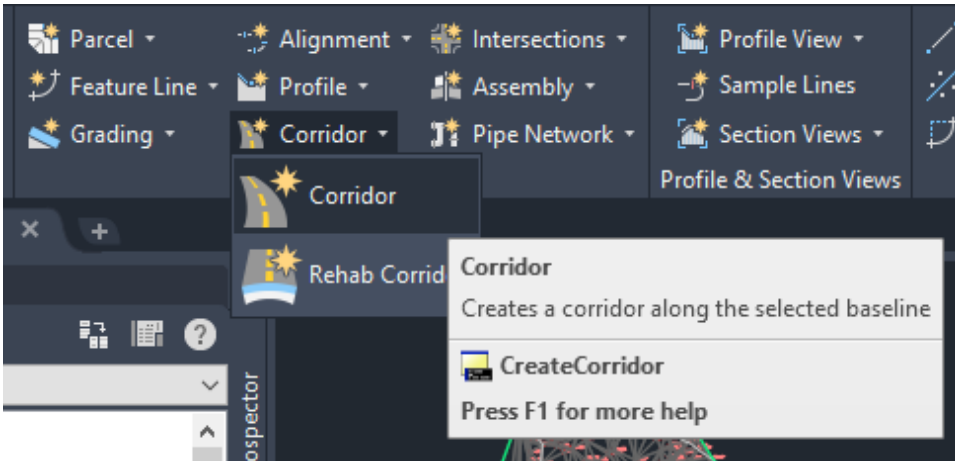


This is how it would appear in the project.

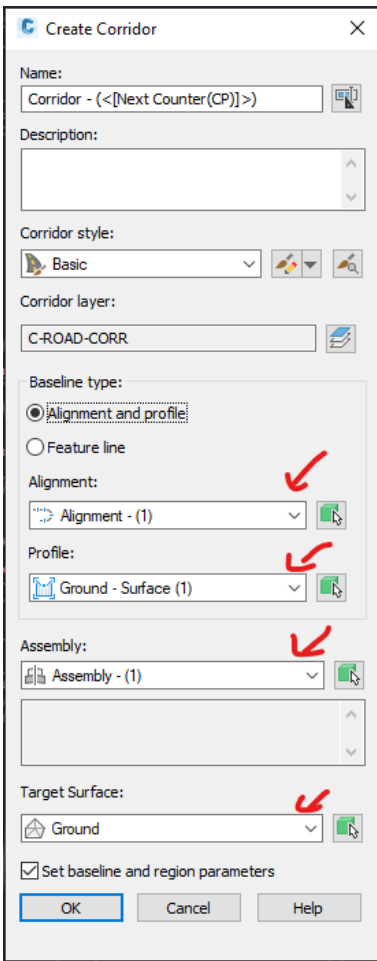


Creating a corridor

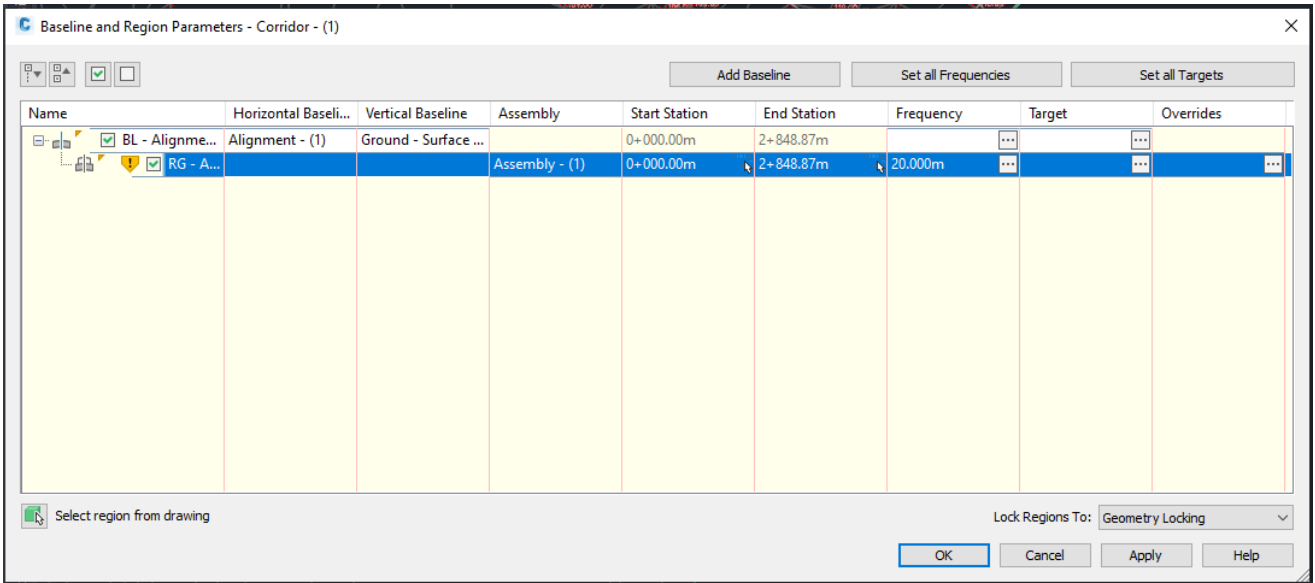
Now that you have a surface, an alignment, and an assembly, you can create your corridor. Open the Corridor dropdown and select the Corridor menu.



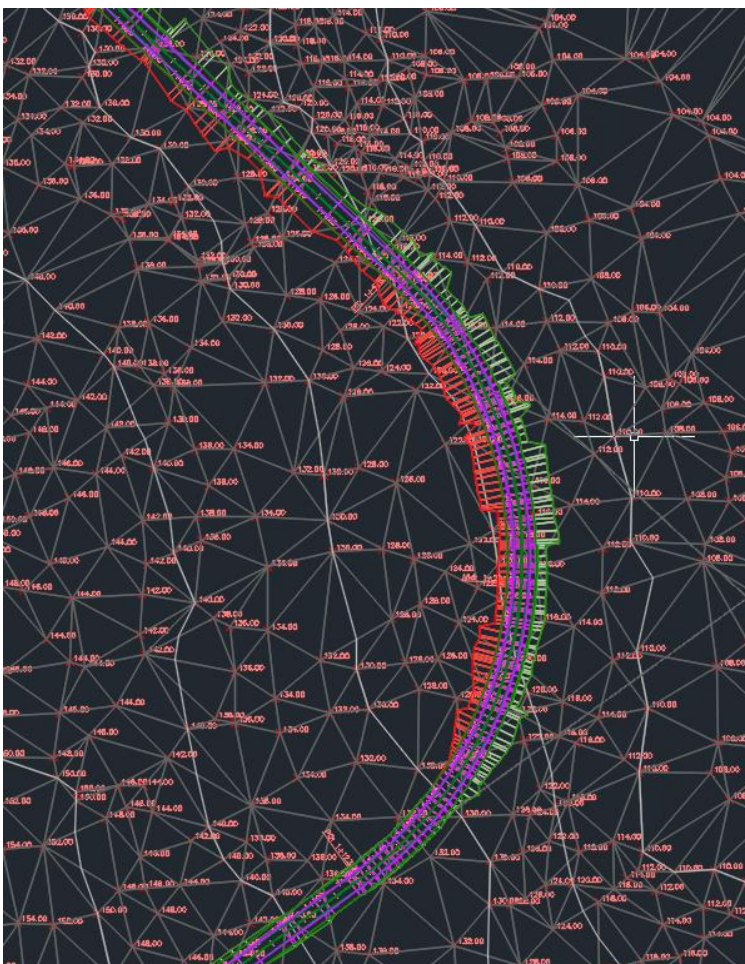
In the corridor menu, you can name your corridor. Once that is done, make sure to add th Alignment, the Profile, the Assembly and the Surface in the menu before clicking OK.



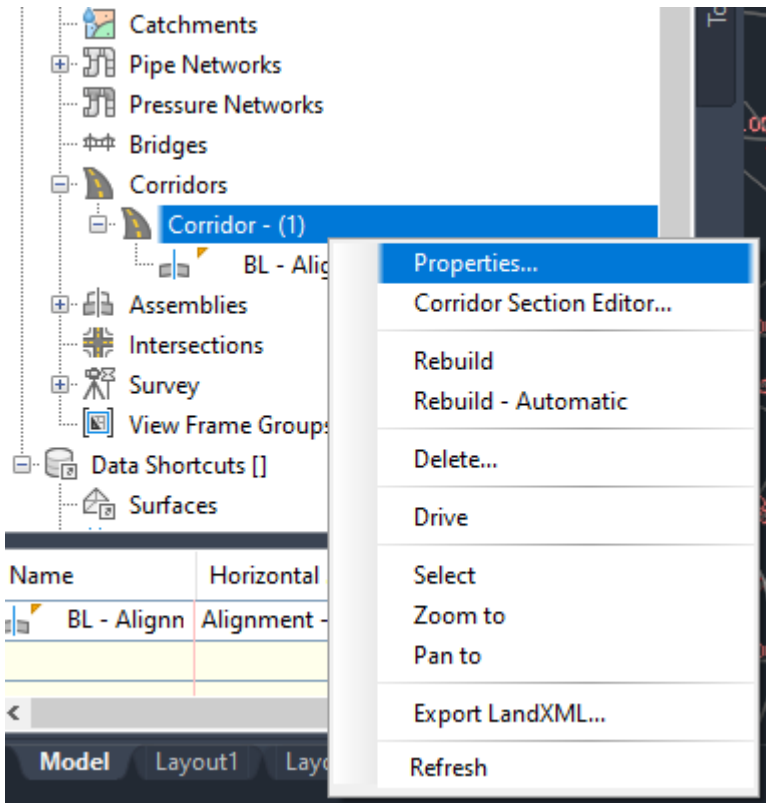
After clicking ok, you will see the parameters menu. Click OK on this menu.



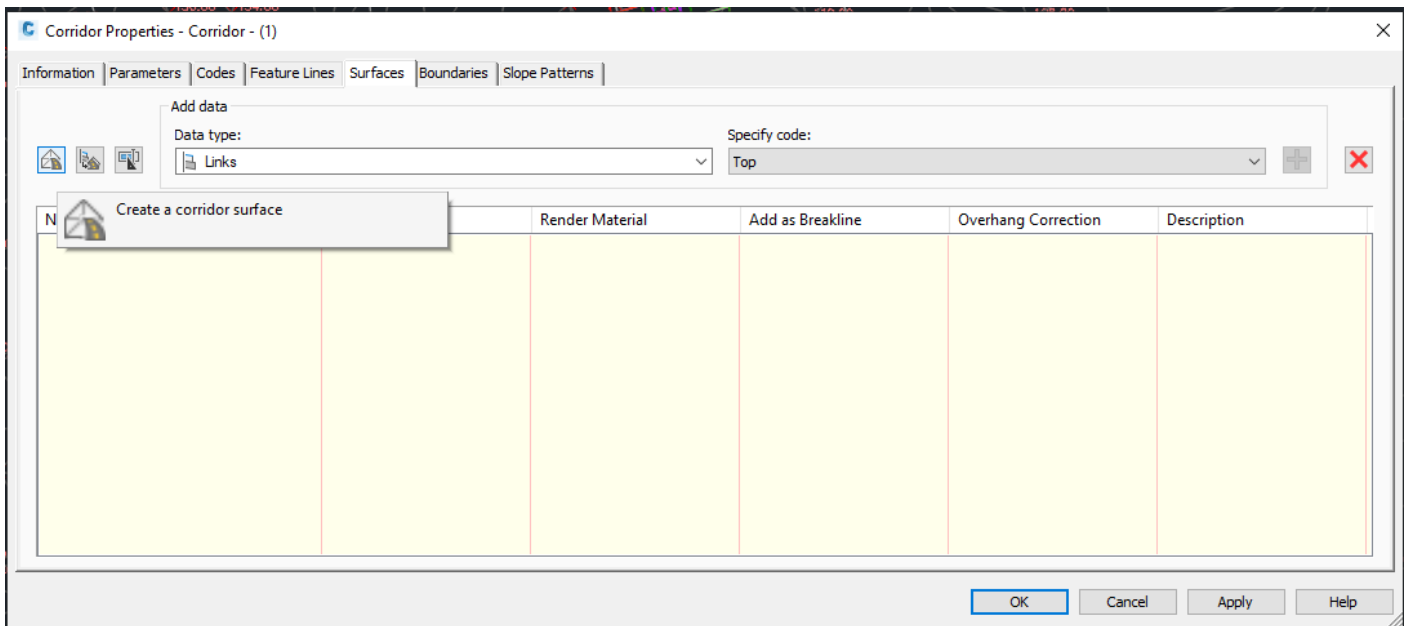
Here is the corridor created. The green area denotes the daylighting that are above the surface. The red areas denote where the corridor is below the surface.



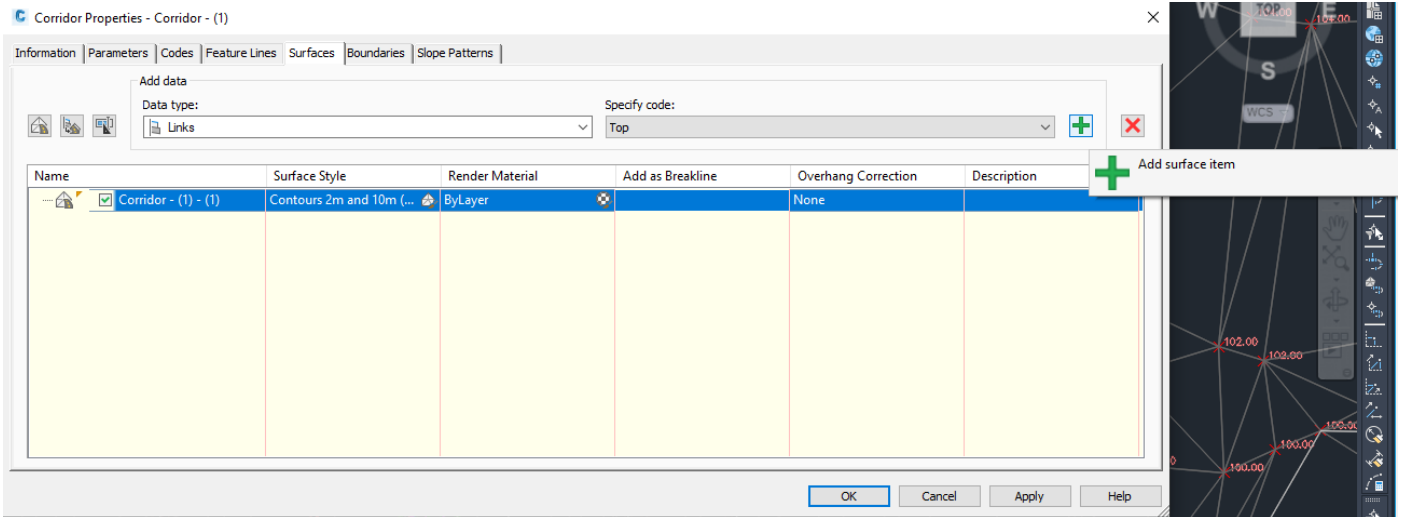
Once you have your corridor, you can create a surface of it. Right click the corridor you created in the prospector menu and open the properties menu.



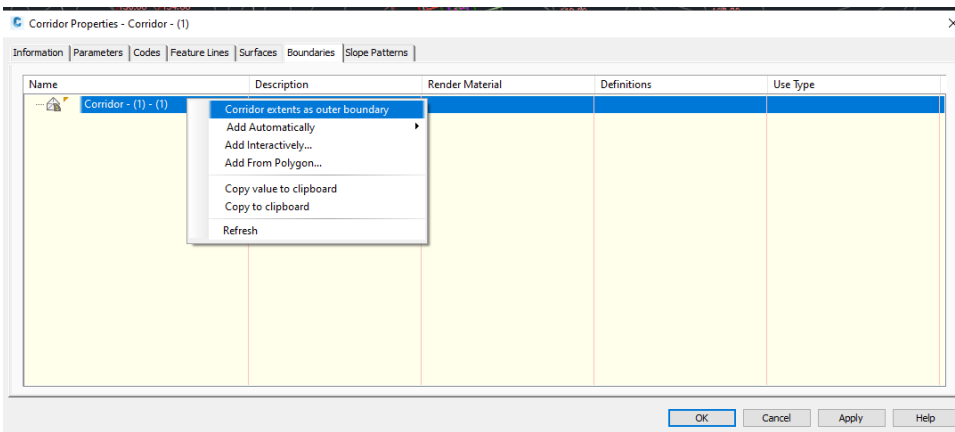
Click the create corridor surface to begin the surface creation.



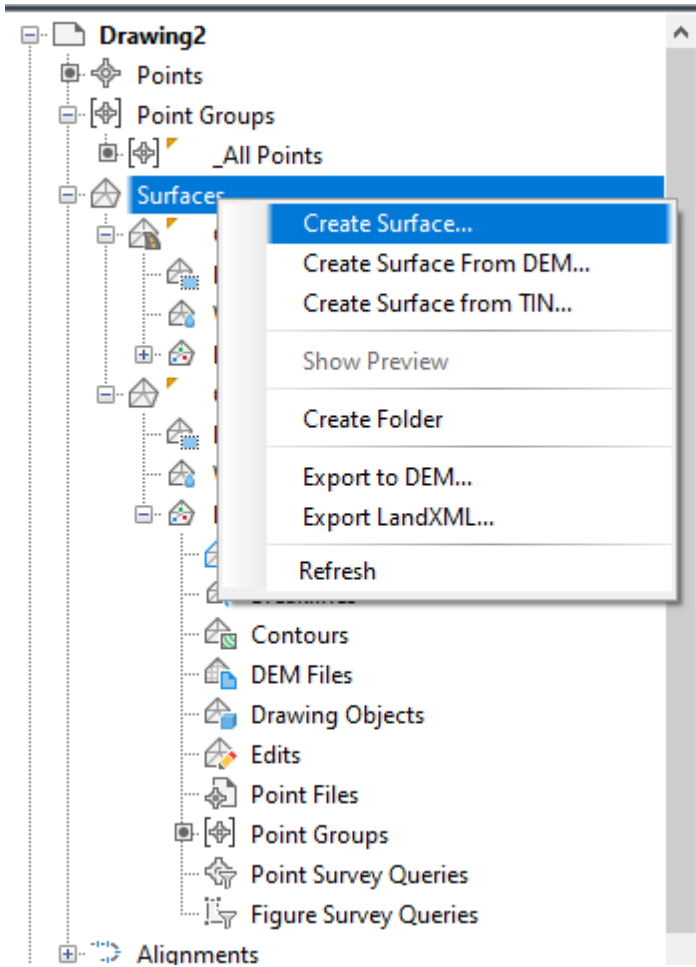
Click the plus button to add a surface item.



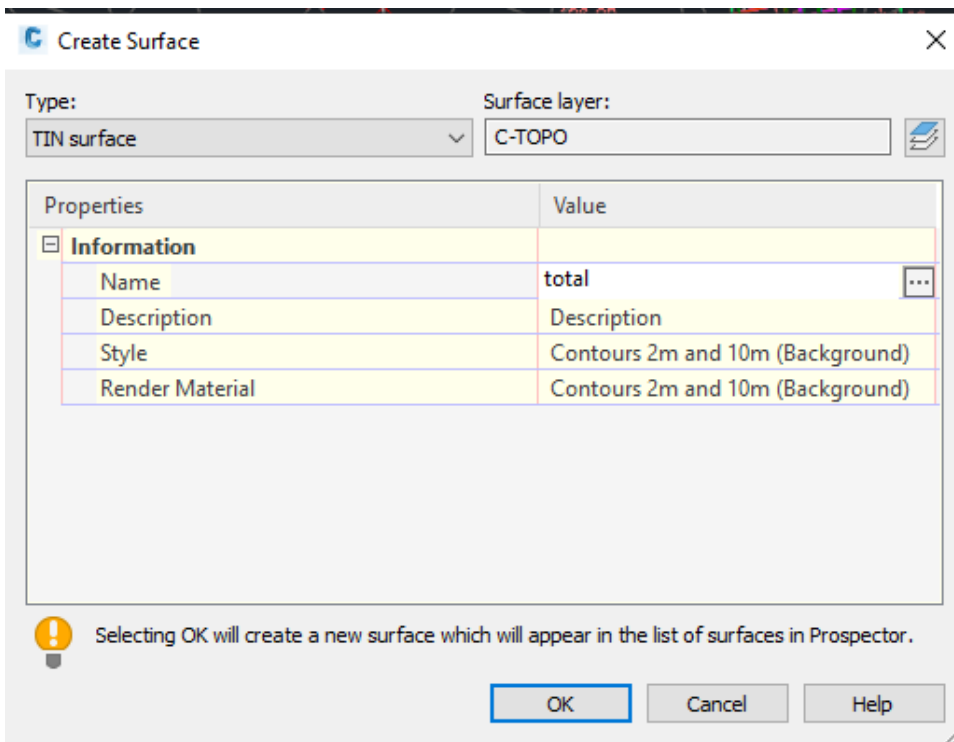
To make sure the surface is bounded by the extent of the corridor, go to the boundaries tab. Right click the corridor and select Corridor extents as outer boundary.



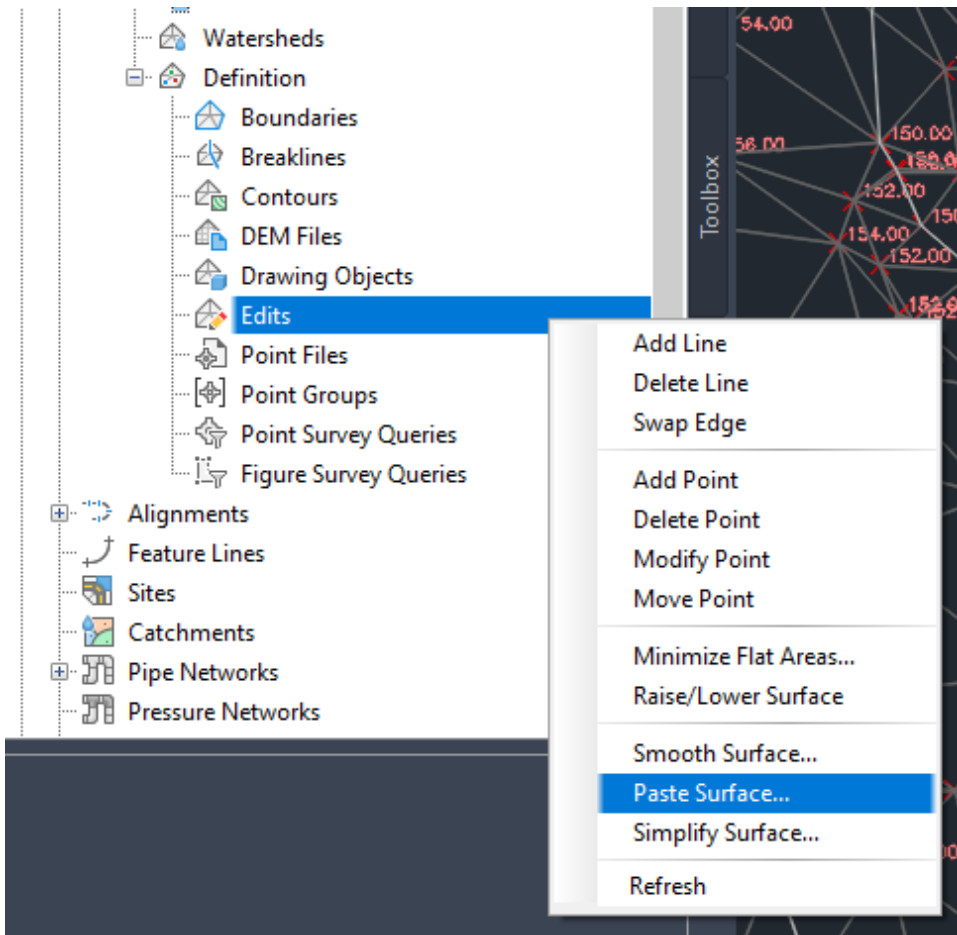
Now that you have a surface of the corridor created, you can create a surface that combines the ground and the corridor surface together. Create a new surface to store that combination in.



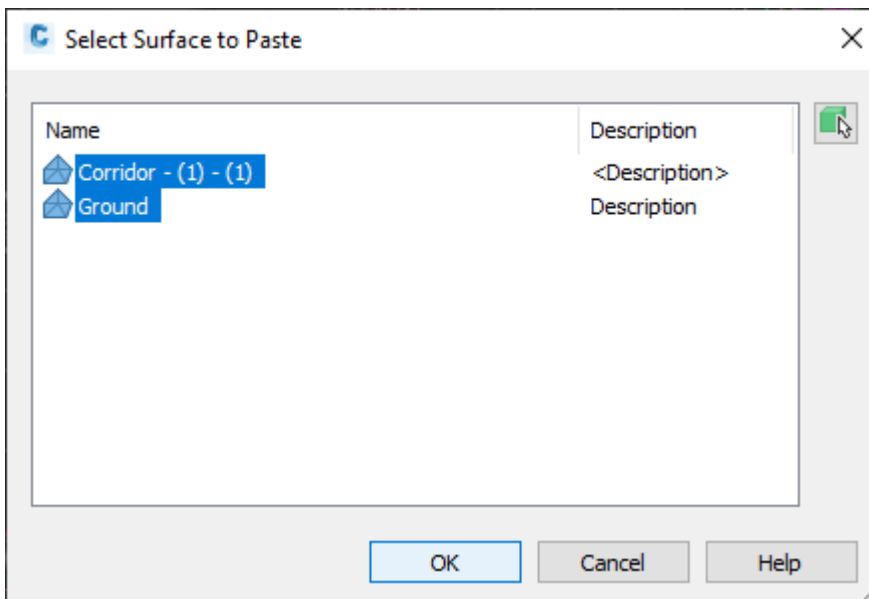
Name the surface and click OK



Open the new surface in the prospector menu. Under definition, right click and select Paste Surface.

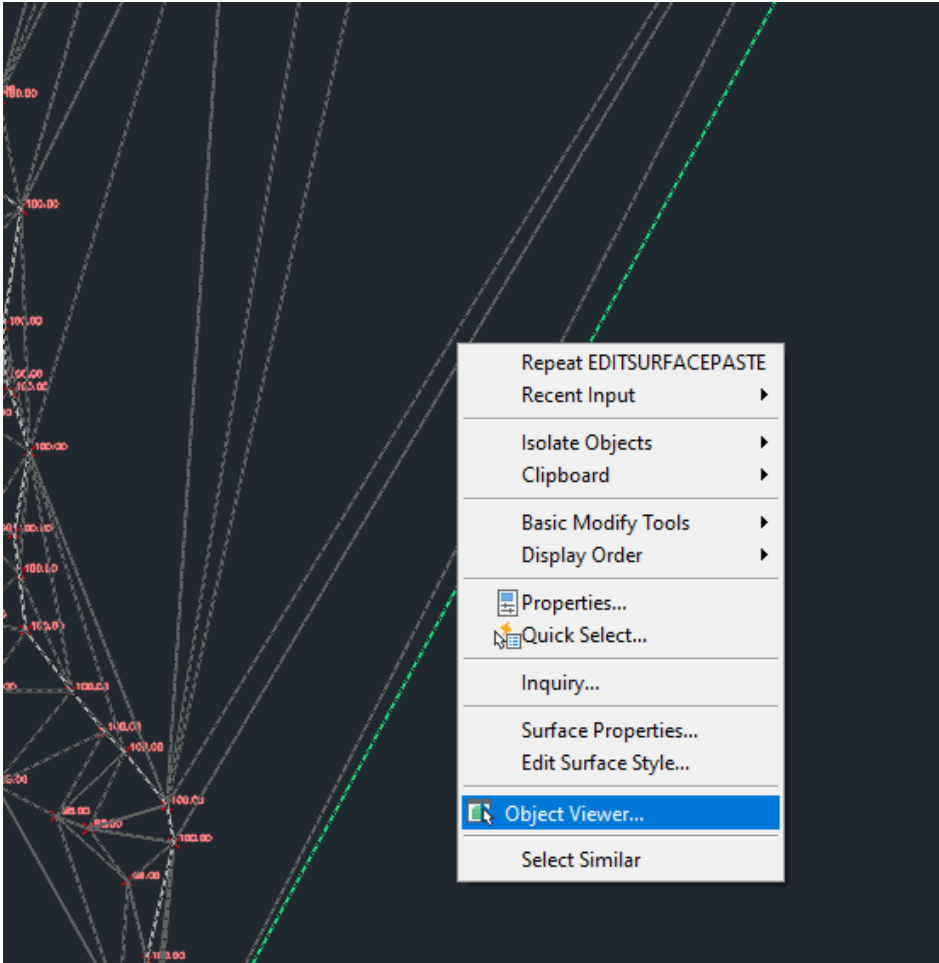


In the menu that pops up, select the surfaces to paste one at a time and click OK after each.

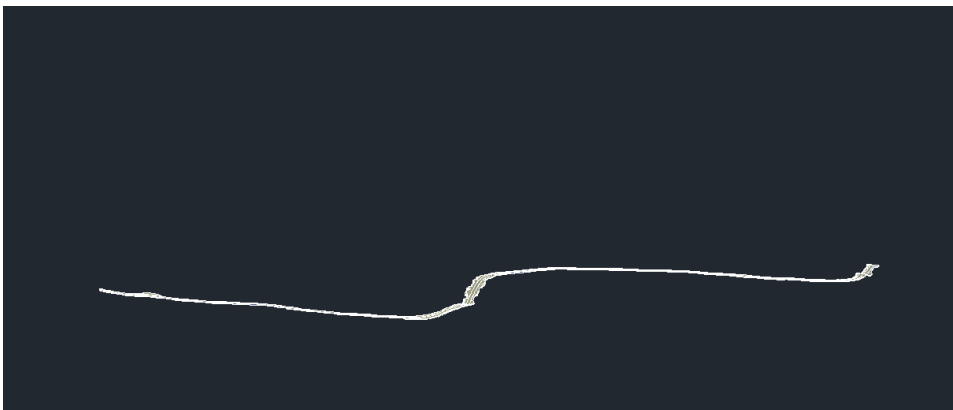


Once the combined surface has been created, use the object viewer option to look at the created surface. This is done by selecting the object you want to view, and right clicking it. Once you've done that, select the

object viewer.



This is what the corridor surface looks like on its own.

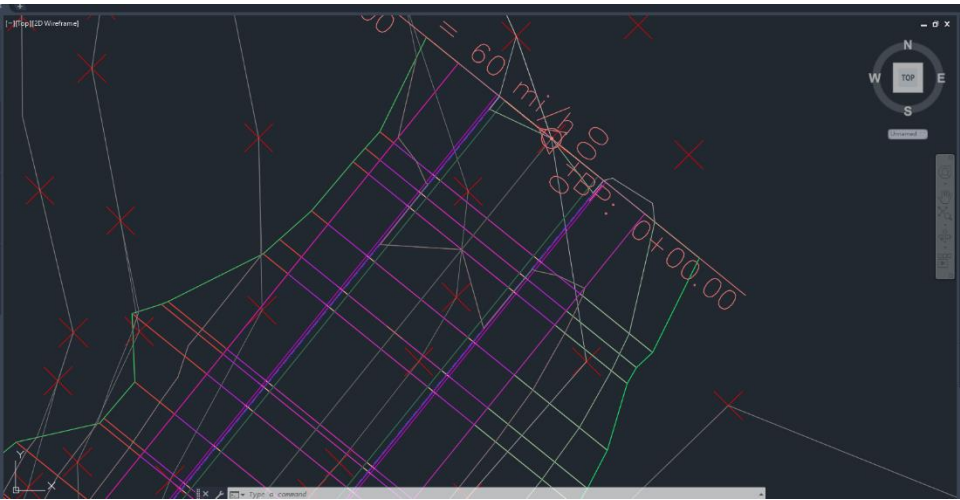


And this is the combined surface

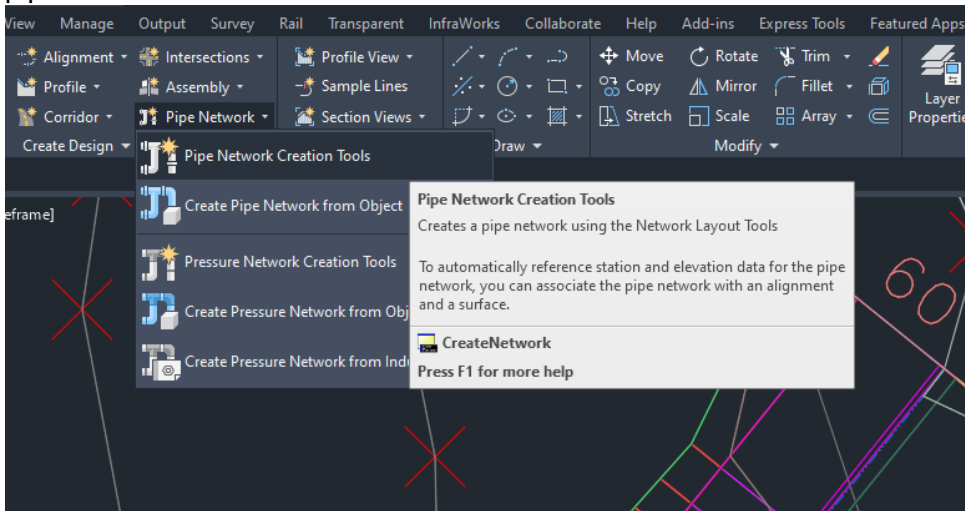


Pipe Networks and Sanitation

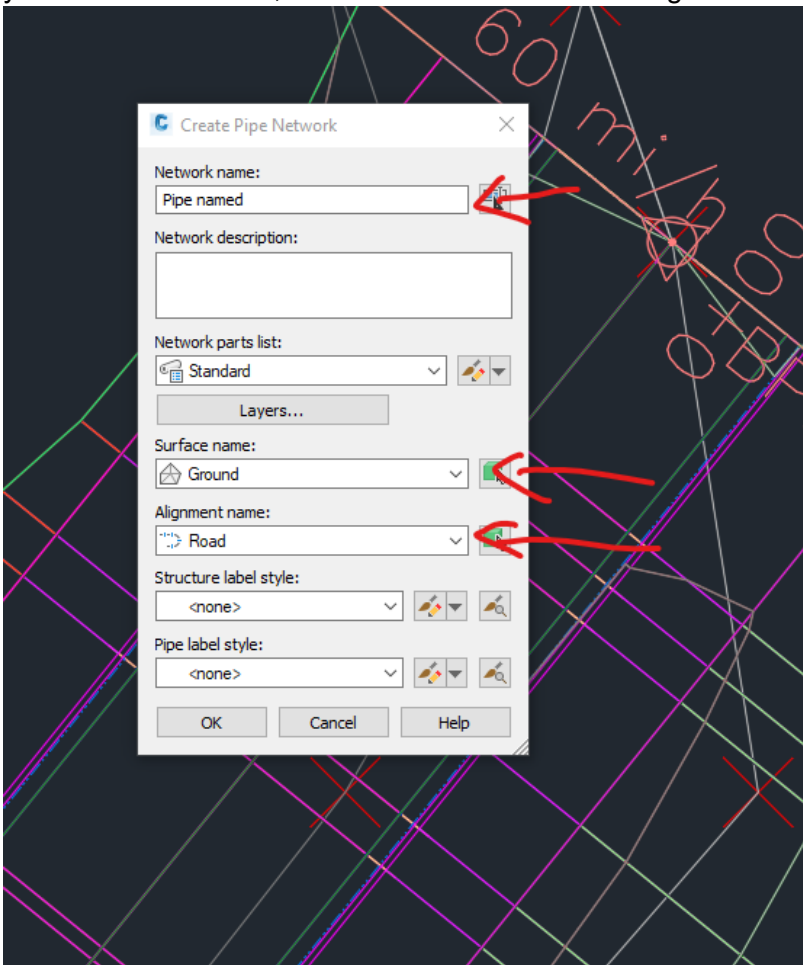
Find the point in the drawing you would like to start the pipe network at. Here we have the beginning of the road corridor we created.



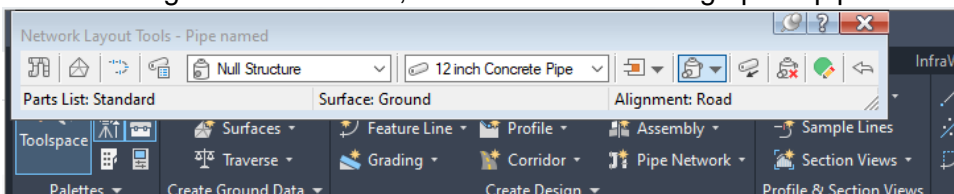
Go to the toolbar and select the pipe networks option, opening the dropdown menu and selecting pipe network creation tools.



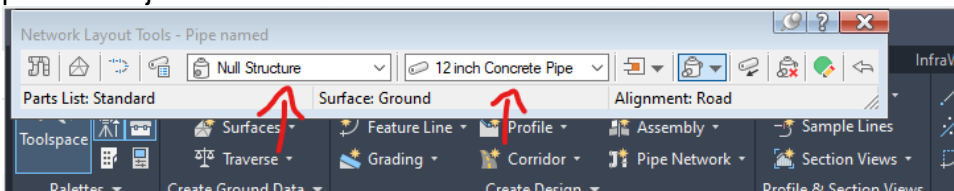
This will open a menu allowing you to select the properties for your pipe network. You can select your network's name, as well as the surface and alignment the pipe network will follow.



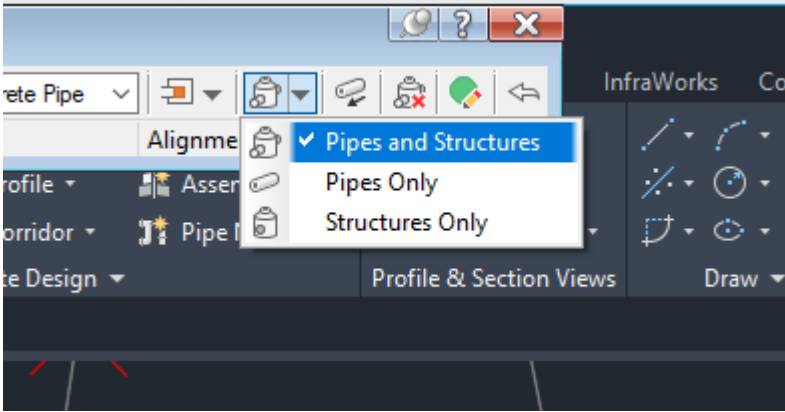
After finishing those selections, click OK. This will bring up the pipe creation menu.



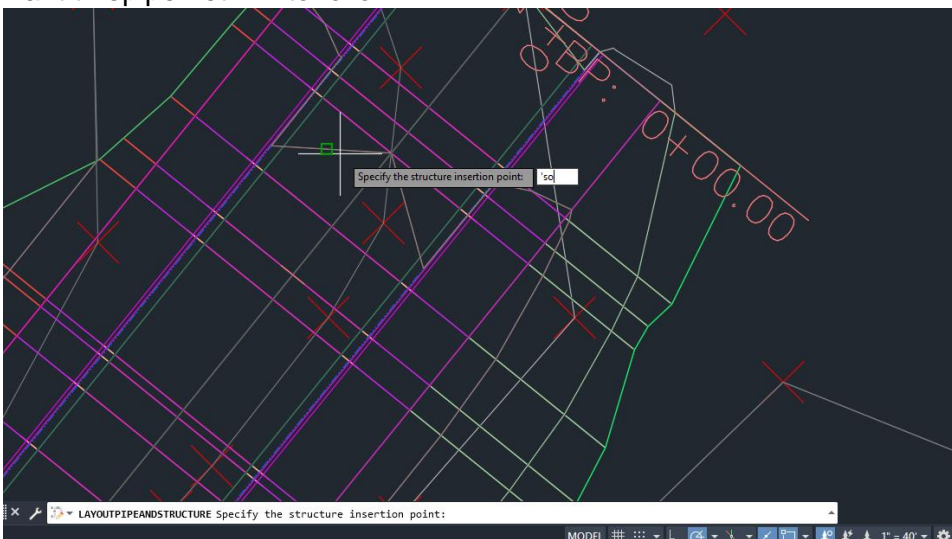
The dropdown menus can be used to select the pipe materials and structures to be used at end points and junctions.



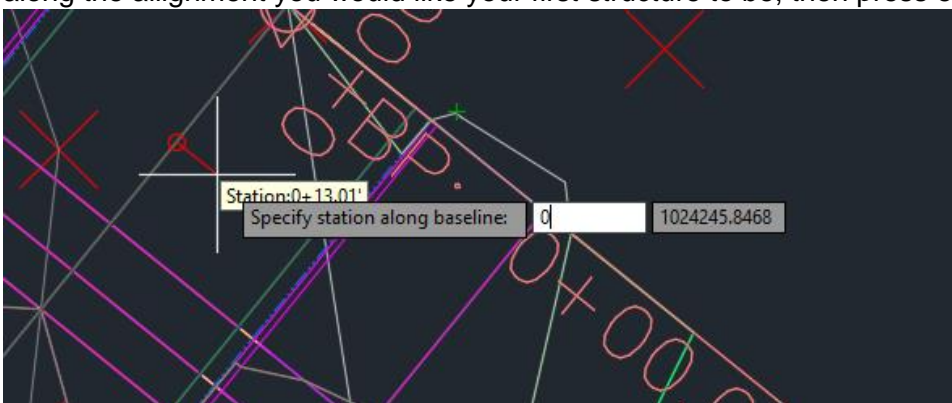
The following drop down allows you to select whether you are placing pipes, structures, or both. Click the pipes and structures and you will open the pipe placement tool.



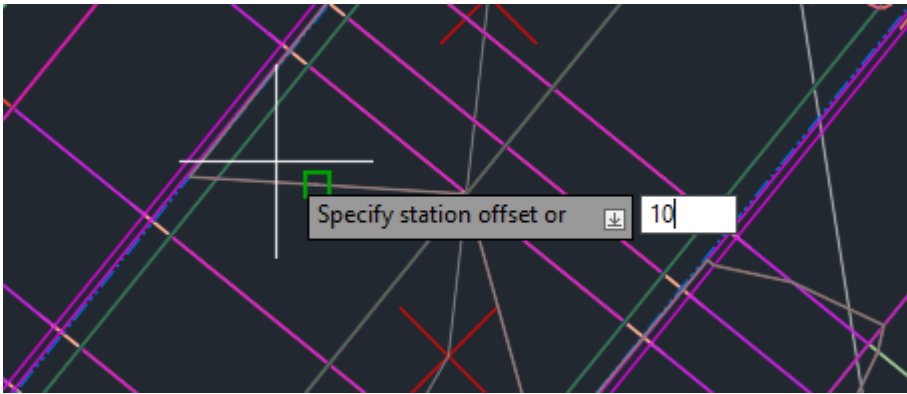
Once you have opened the tool, type 'so and press enter. This will allow you to choose an alignment or corridor to follow for the placement of pipes. Select the corridor or alignment you want th epipe network to follow.



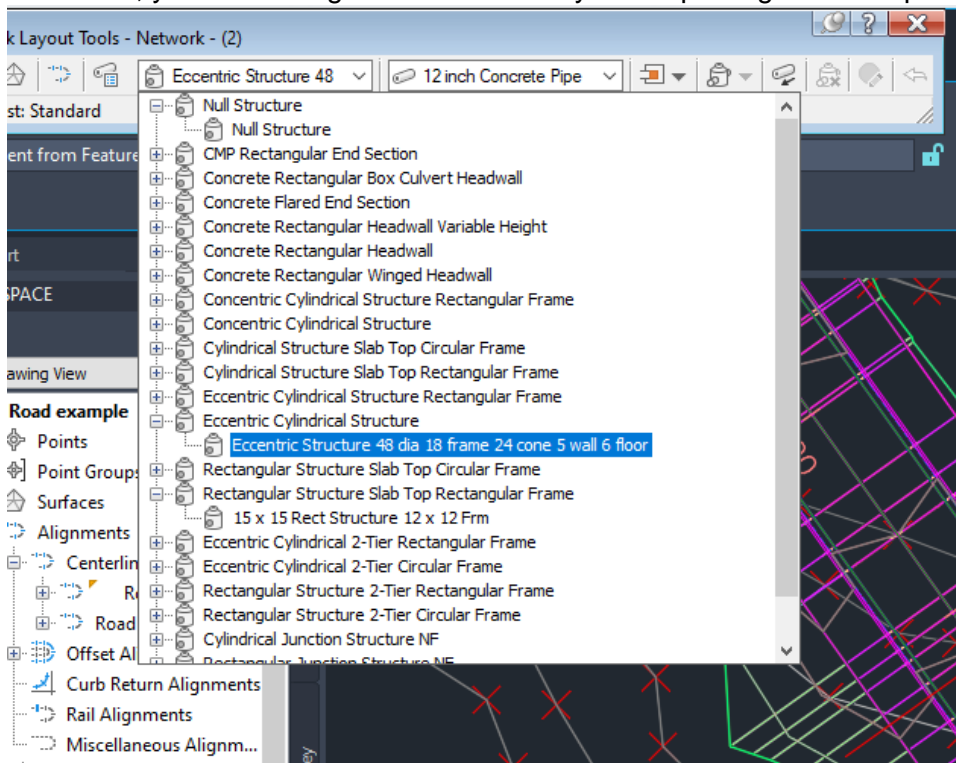
Once you have selected the alignment, you can select how far along the alignment your structures are placed. Each section of the alignment or corridor translates to 100 in the text box. Type how far along the alignment you would like your first structure to be, then press enter.



Once you've chosen how far along the alignment to place the structure, you'll have to type in the offset. This determines how far from the center point the structure will be placed. Then press enter.

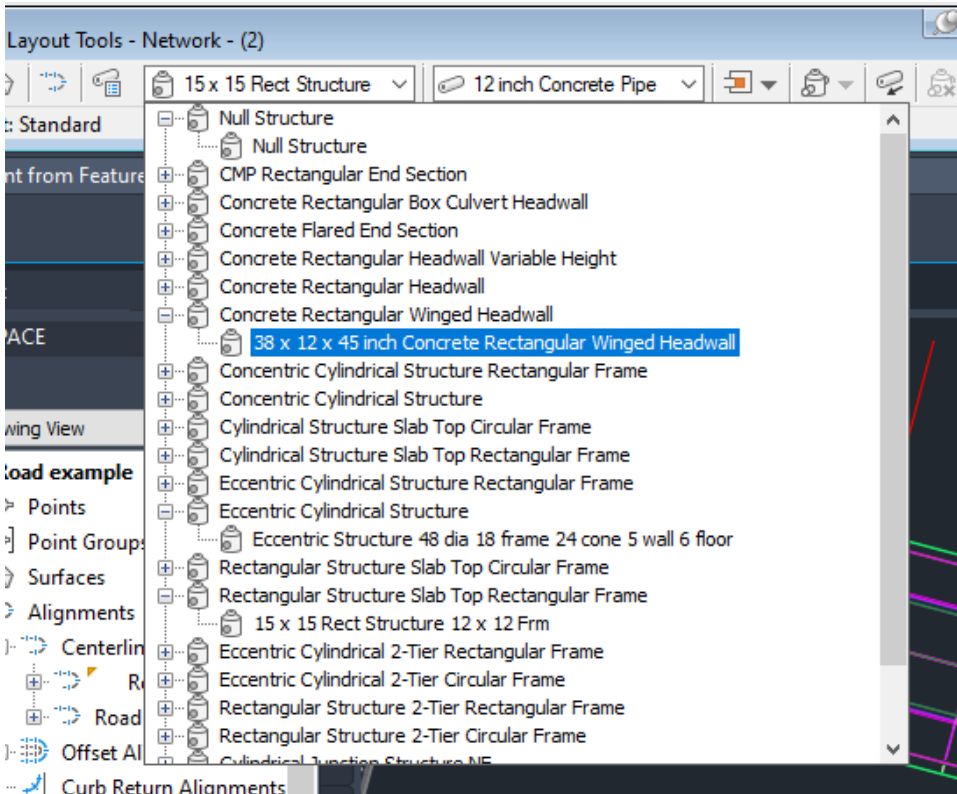


Continue repeating this action of placing structures along your alignment. Between placing structures, you can change what structures you are placing in the dropdown menu.

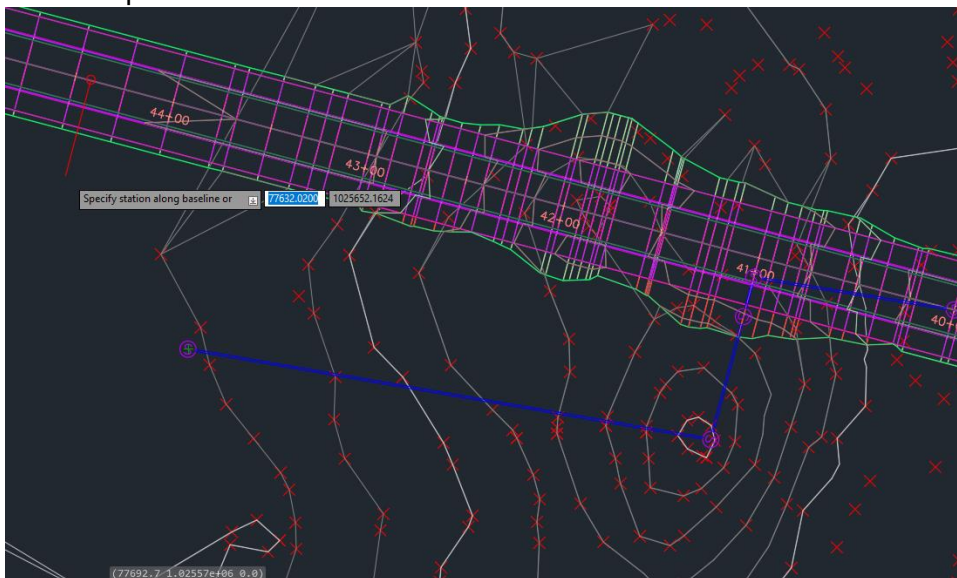


In this example, we have alternated between a rectangular structure at a distance of 10 units from the center point, and every 5 sections a cylindrical structure is placed on the center line.

At the end of the pipe network, you can also place a headwall to act as the outflow point.



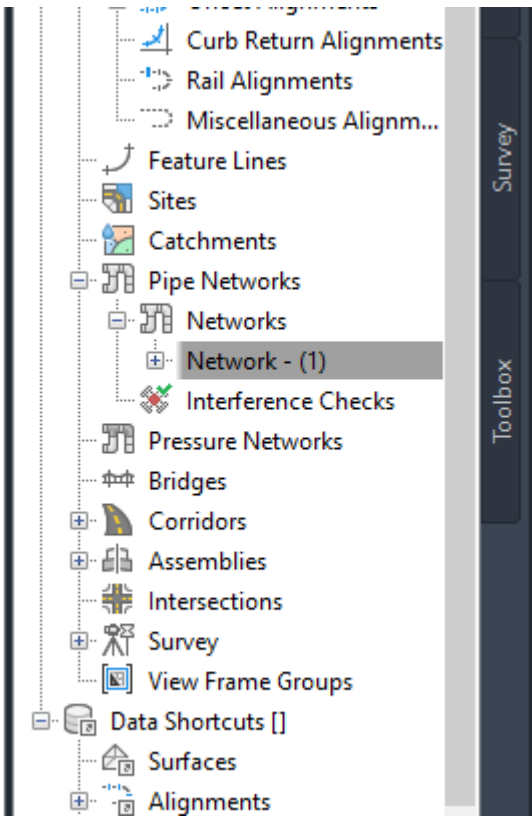
Once you have completed the pipe network along the alignment, you can press escape to stop following the alignment. Once this is done, you can place structures anywhere. This will make it easier to place a headwall.



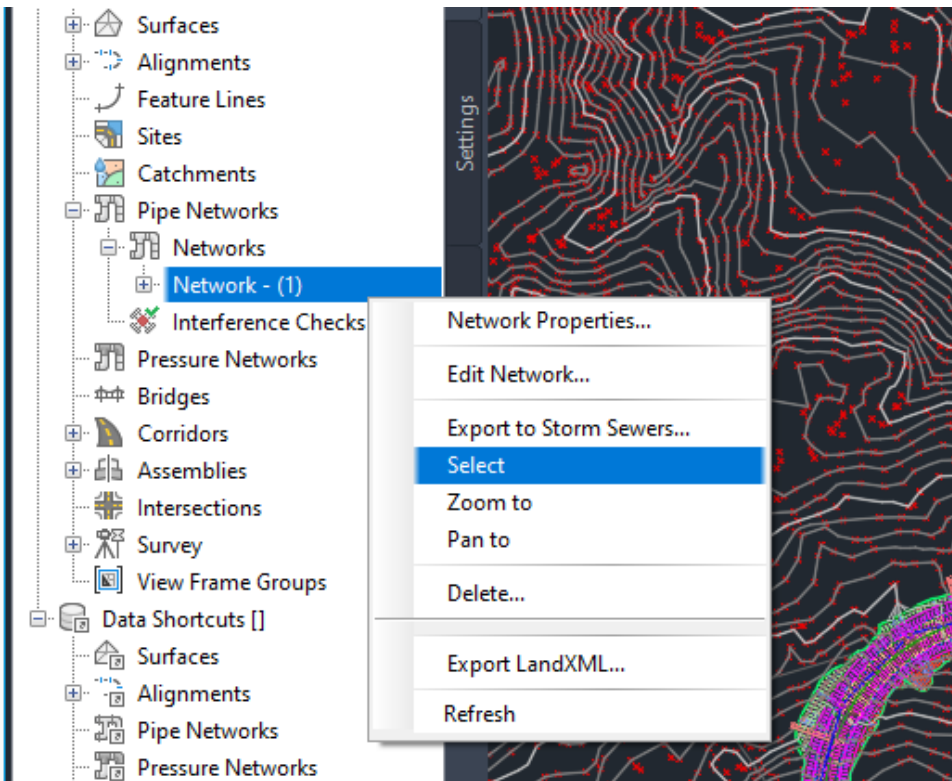
Here is what our drawing looks like now with the pipe network placed.



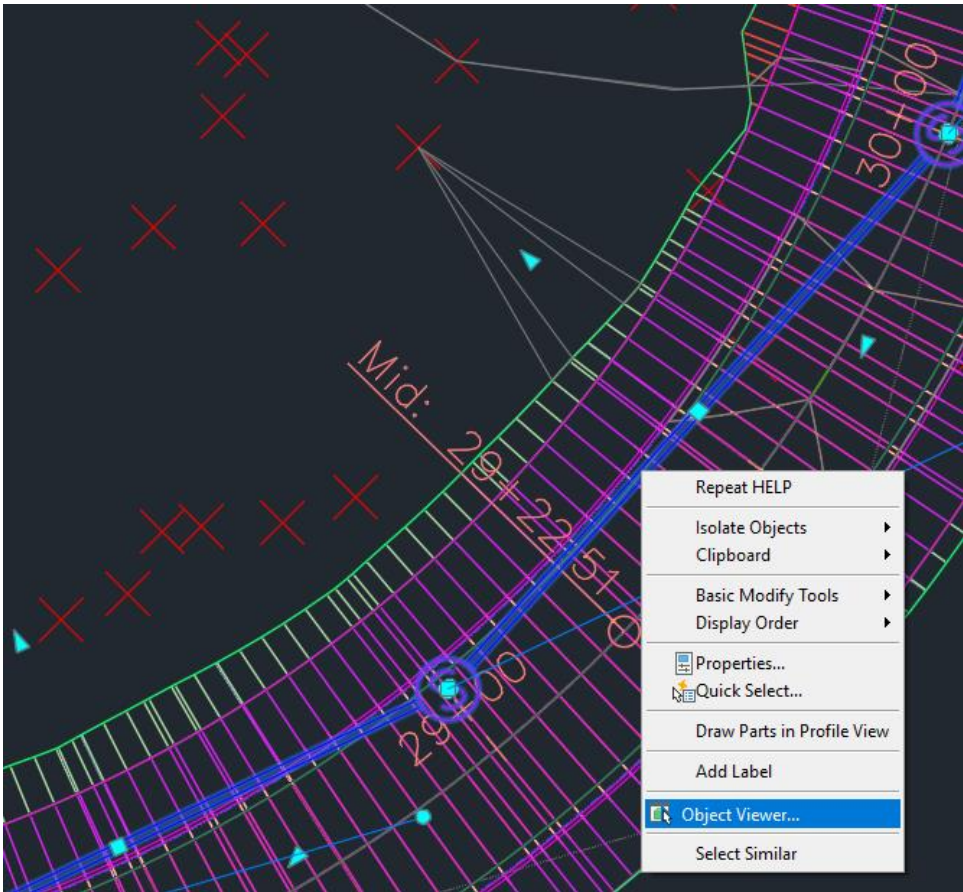
To find the pipe network in the prospector, open the Pipe Networks dropdown, followed by the Networks dropdown. This will allow you to select the pipe network by name.



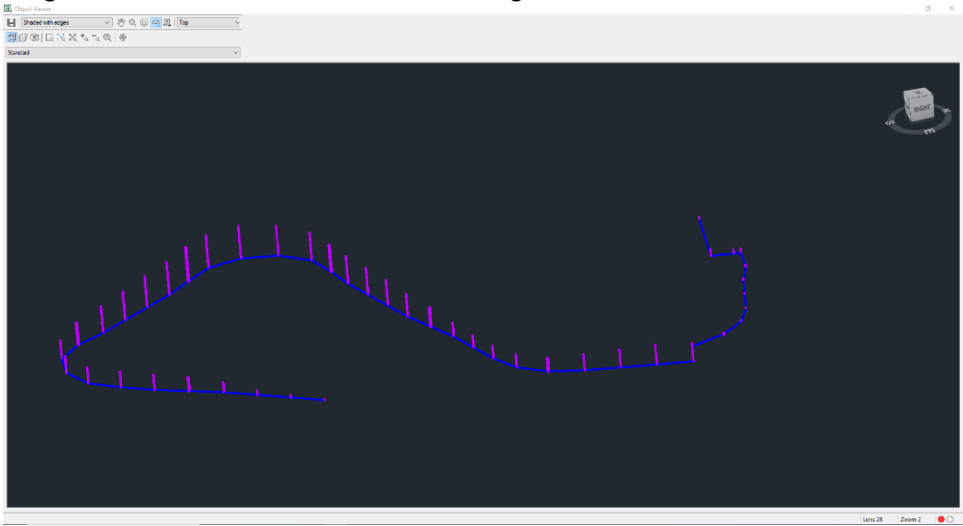
Right click the network you just created. This will allow you to click the select option, selecting the network.



Once the pipe network is selected, right click it and select the object viewer to see the pipe network on its own.

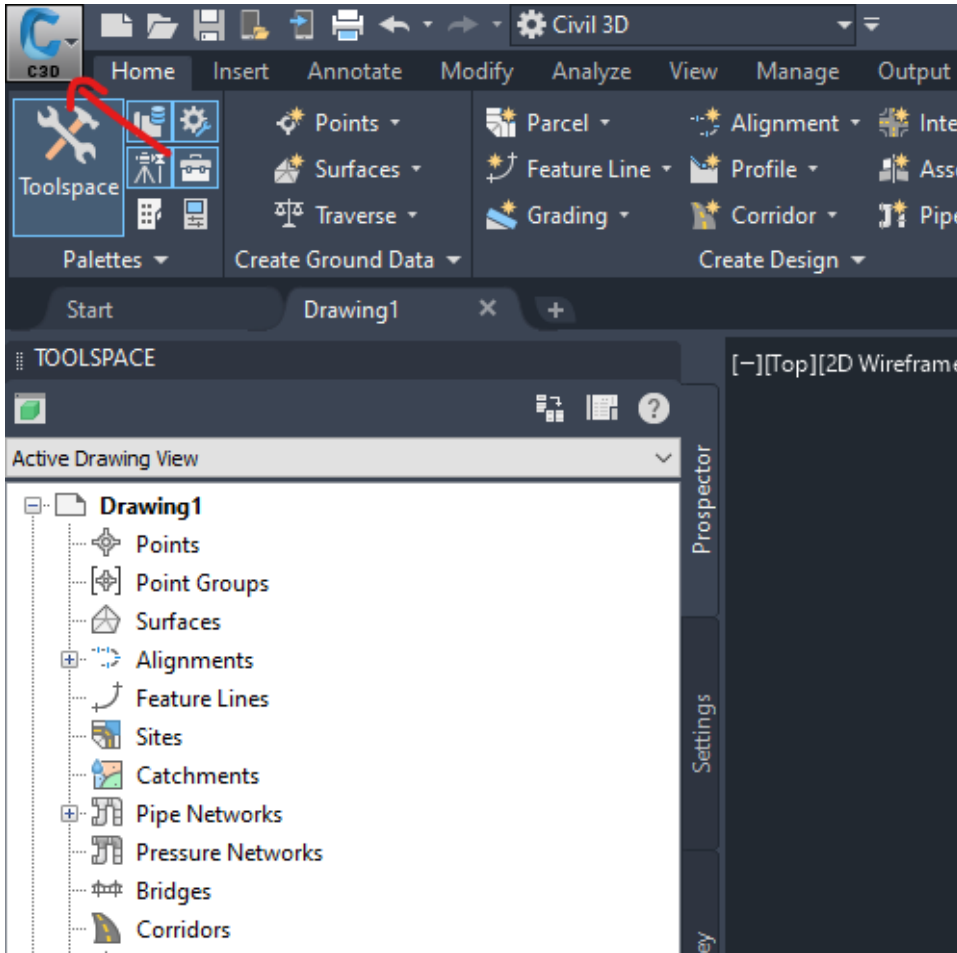


This is what the view looks like, it shows the below ground pipe network and the structures and heights of the structures relative to the ground.

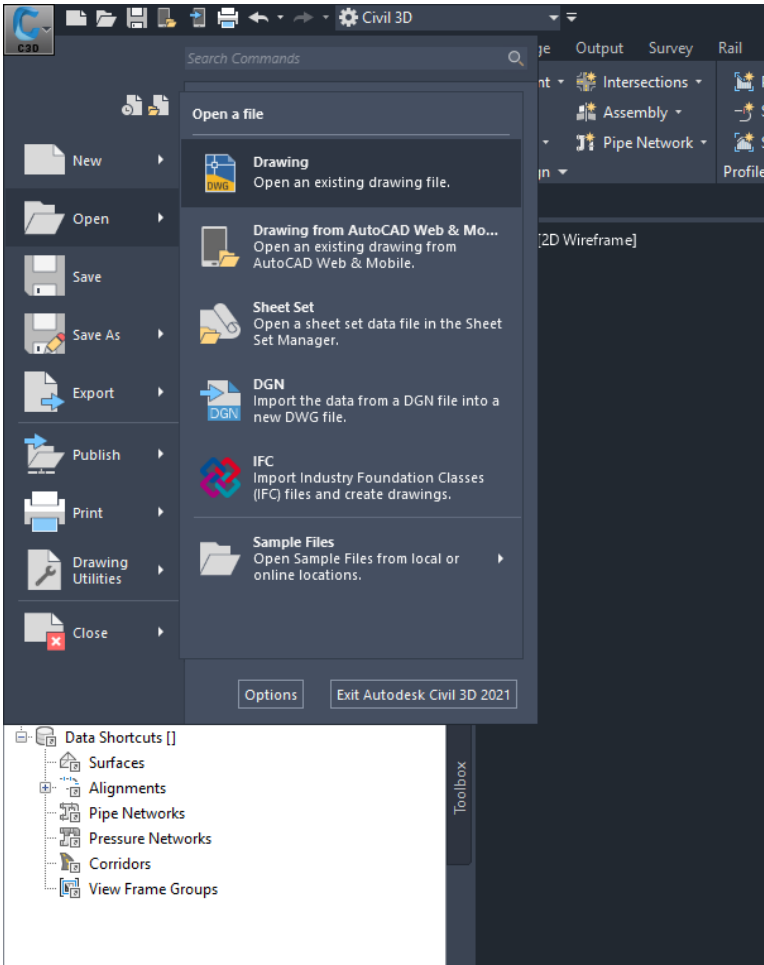


Importing Files

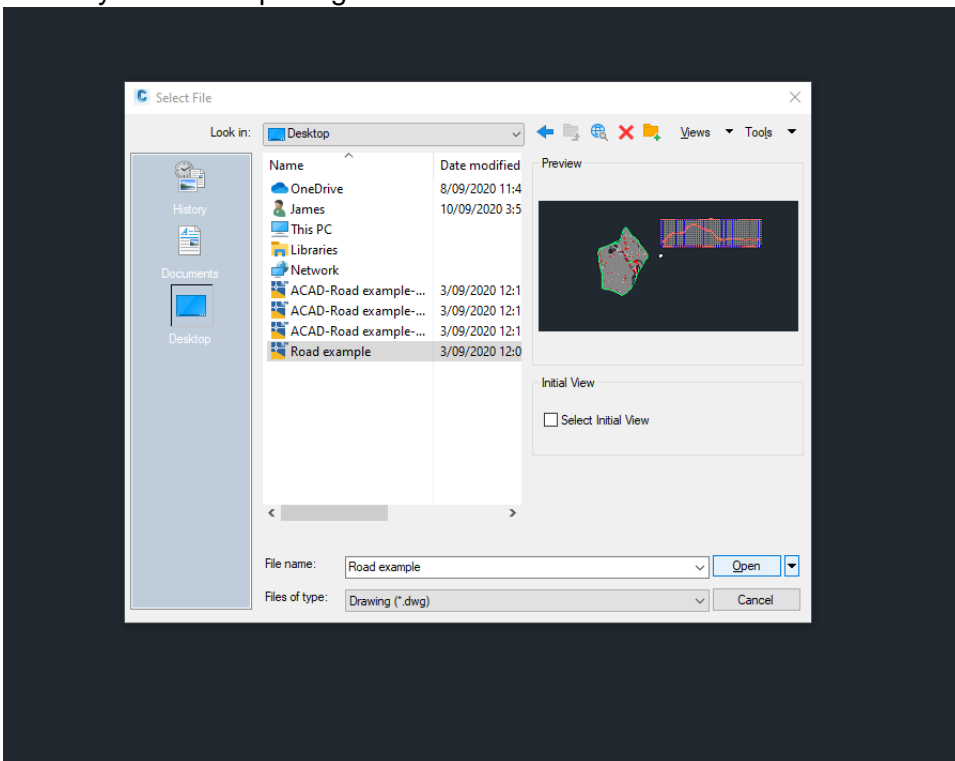
Most files that can be imported by Civil3D can simply be opened via the open menu. Many programs will export their files as .DWG files. These are the native files opened and saved by Civil3D. To open one of these files, open the Civil3D menu in the top left.



Select the Open menu and click the Drawing option to open the file browser.



Once the file browser is open, select the file you want to import into Civil3D. It will show a preview of the file you will be opening.



Your selected file will be opened, ready to edit.

