

GRADING RUBRIC INCLUDED**Project challenge exercise****Model civil site features: Create a site project with a proposed surface and utilities**

In this project challenge, you'll apply a full range of Civil 3D skills and create your own solution from start to finish. You will create a new data shortcut project, work with surfaces, create grading, create a storm pipe network and a pressure pipe network, and add labels.

Using the Site drawing (*CE_Site_Metric.dwg* or *CE_Site_Imperial.dwg*), you will set the working folder, create a data shortcut project, and add the dataset files to the project's Source Drawings folder. You will create a data shortcut and data reference the Existing Ground surface from the Existing Surface drawing (*CE_Surface_Existing_Metric.dwg* or *CE_Surface_Existing_Imperial.dwg*).

You will then import the proposed surface from the XML file (*CE_Site-Grading_Metric.xml* or *CE_Site-Grading_Imperial.xml*). Both surfaces will then be added to the Combined surface that already includes the Pond surface. The operation order will then be updated so that the POND and SITE-Grading surface override the Existing Ground surface where they overlap.

Then you'll add an infill grading inside the pond grading and a daylight grading from the pond bench edge using a 4:1 slope using the Existing Ground as the target surface. The grade to surface object will then be modified to use a 3:1 slope.

Next, you'll create a storm pipe network with alignments, profiles, and profile views.

The pipe catalog used for this exercise is the one that is installed with Civil 3D (Metric Pipe Catalog and Metric Structure Catalog or US Imperial Pipe Catalog and US Imperial Structure Catalog).

The storm pipe network will connect labeled area drains to a single headwall in the pond. You'll place the trunk line 2 m (5') north of the north parking lot curb line and daylight the trunk line in the pond. Laterals from each area drain (labeled A1-A6) will be connected to the trunk line at a 90-degree angle using pipe sizes of 150 mm (6") and null structures at all initial connection points. Crown elevations should match in the final design. For the

trunk line, apply the design rule that the trunk line pipe size will increase to 200 mm after three area drains are connected and to 300 mm after size area drains are connected. Structures will then be swapped so that a headwall is the structure used in the pond, Junction boxes are placed where pipe sizes change, and a manhole is placed where AD6 makes a 90-degree bend into the trunk line near the northeast corner of the parking lot. Structures should be rotated so that area drains are parallel with the parking lot layout and junction boxes are parallel with the storm trunk line.

Finally, you'll create a pressure network from the object labeled PROPOSED WATER LINE. You will add valves near both ends of the main line traversing the site where it connects to existing waterlines in the right of way.

Complete the required activities

- Project setup and Data Shortcuts:
 - Set the Working Folder to C:\Civil 3D Projects
 - Create a Data Shortcut Project (C3D90_CE) using a project template.
 - Add the dataset drawings and XML file to the project's Source Drawings folder.
 - Associate drawings to a Data Shortcut Project
 - In the Existing Surface drawing, create a Data Shortcut for the Existing Ground surface.
 - In the Site drawing, create a Data Reference to the Existing Ground surface.
- Working with surfaces:
 - In the Site drawing, import the Site Grading surface from the XML file.
 - Change the surface style for SITE Grading to a Design surface style.
 - Add the Existing Ground and SITE Grading surfaces to the Combined surface.
 - Adjust the operation order in the Combined surface so that the POND and SITE Grading surfaces will override the Existing Ground surface where they overlap and rebuild the surface.
- Pond grading:
 - Create an infill for the POND grading object.
 - Add a 4:1 slope to surface grading object along the outside of the pond bench.
 - Adjust the 4:1 slope to surface grading object to 3:1 to resolve the area that overlaps the nearby parking area.
- Storm pipe network horizontal layout (2D design):

- Layout a storm pipe network using temporary construction lines. The centerline of the main storm trunk line should be set 2 m (5') north of the parking lot back of curb in the area labeled FUTURE GREEN INFRASTRUCTURE AREA and daylight the network inside the pond. Add laterals connecting to the trunk line at 90-degrees. (For a hint about the trunk line location, thaw layer C-SITE-HINT.)
- Create alignments for the storm pipe network using based on the construction lines.
- Create a storm pipe network and associate the proper alignments with all pipes and structures. Use a pipe size of 150 mm (6") and place null structures for all bends and connection points for this layout.
- Swap pipe sizes for the trunk line as follows. The trunk line should increase to 200 mm (8") after collecting from three area drains (AD6, AD5, and AD4) and increase to 300 mm (12") after collecting from six area drains (add AD3, AD2, and AD1).
- Swap structures so that a junction box is placed where pipe sizes change, and a manhole is placed at the 90-degree bend connecting AD6 with the trunk line near the northeast corner of the parking lot. Also swap the structure in the pond to a headwall and area drains for the structures at circles AD1 through AD6.
- Confirm rotation of area drains to be parallel with the parking lot layout and the junction boxes to be parallel with the trunk line pipes.
- Storm pipe network vertical layout (3D design):
 - Create profile views showing existing and proposed profiles for all alignments in the STORM pipe network.
 - Add pipes and structures to the profile views of the referenced and connected alignments. For example, the junction box on STORM-A that connects to the lateral STORM-A1 should be shown on both profile views.
 - Label all pipes and structures for lateral AD1 in profile view.
 - Adjust the crown elevations of the lateral pipes connecting to the structures along the STORM-A alignment. Maintain a 1% slope on the pipes along the STORM-A alignment even though the pipe at the headwall will be below the designed pond elevations.
- Pressure pipe network:
 - Create a Pressure Pipe Network named WATER using the polyline labeled PROPOSED WATER LINE. The pipe run name should be WATER-A and the reference alignment name should match. Use 200 mm (8") ductile iron

pipe and the Water pressure parts list. Set the pipe flowlines to follow the Combined surface at a depth of approximately 3 m (10') at cut lengths.

- Add a water valve to the WATER pressure pipe network run near both the start and end of the alignment where the proposed pressure network connects to the existing water line.

Deliverable:

- Submit any screenshots, reference documents, or assumption notes used to complete the exercise.

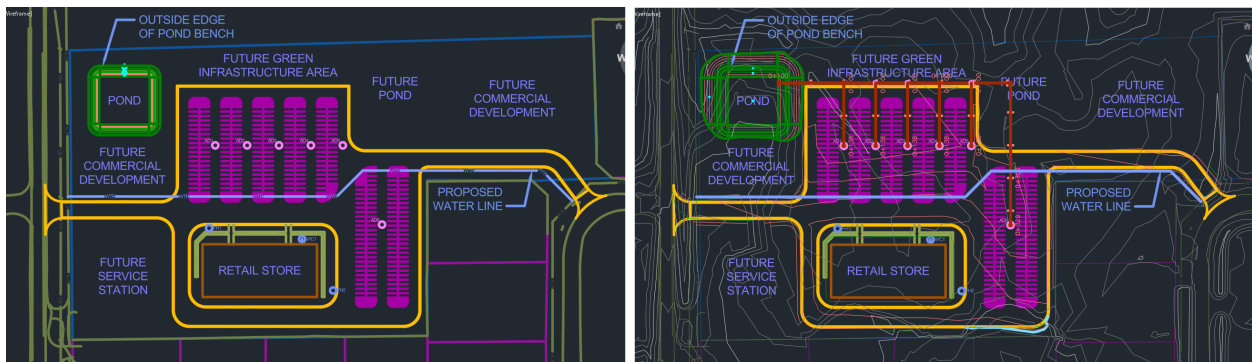
Bonus Activities:

- Bonus Surfaces: Add contour labels for both existing and proposed surfaces. Use Elevation design analysis to determine a better location for the pond on the site.
- Bonus Site design: Add buildings and parking spaces to areas marked as future development. Change parking spaces to be angled. Add accessible parking spaces of 2.6 m (8') wide and add a 1.5 m (5') access aisle. Indicate accessible routes to the building. Add fire hydrants and water connections for the building.
- Bonus Pipe Networks: Design a pond in the area labeled FUTURE POND and redesign the storm layout to daylight into the new pond location. Adjust reference alignments and rename the structures in the STORM pipe network using a consistent format such as including the alignment and/or the structure type abbreviation. Add labels to all structures and pipes in both plan and profile view. Show the crossing water line pipe in the STORM-A profile view.
- Bonus Pressure Pipe Networks: Add Pressure Pipe Runs to the WATER pressure pipe next to connect the fire hydrants (FH1 and FH2) and the building water connection (WC1) to the proposed water pressure pipe network running through the site. Include water valves for each new run. The connections to the main line should use a TEE (90-degree connection). Create profiles and profile views for the WATER pressure pipe network and label spanning lengths between connection point fittings and appurtenances.

Success Criteria:

- Data Shortcuts:
 - Project created

- Project assigned to the project drawings.
- Surfaces:
 - Existing Ground and SITE Grading surfaces in the correct drawing and properly created.
 - The proper order of operations in the Combined surface definition.
 - Pond grading properly edited to not overlap the SITE Grading surface.
- Storm pipe network:
 - Storm gravity pipe network created and connecting area drains AD1 through AD6 to a headwall in the pond.
 - Pipes resized and connected with correct angles.
 - Structure type and rotation updated.
 - Pipes and structures shown in profile views with appropriate labels.
 - Crowns match and 1% slope is maintained along the STORM-A alignment.
- Water pressure pipe network:
 - Water pressure pipe network created from the labeled object and the flowline follows the CombinedSurface profile at the specified depth.
 - Pressure pipe network uses the correct parts list, pipe size, and material.
 - Valves are correctly placed at both ends of the WATER-A pressure pipe run.



Before and after

(note that lineweights were modified in the drawings for this image, but are not part of the challenge)

Grading Rubric:

	Advanced	Proficient	Basic	Emerging
Data Shortcuts and Data References	Data shortcut project created and associated to all related project drawings including both survey and site using a project template. All data shortcuts created and data referenced into the correct drawings. No broken references. Existing Ground surface in the Survey drawing is frozen.	Data Shortcut project created, but maybe without the project template and assigned. The required surfaces referenced or imported correctly.	Data Shortcut project was created but without the project template. Data references are missing or incomplete. Some surfaces missing.	Data Shortcut project was not created or not assigned. Surfaces imported manually instead of data referenced. Broken or missing references.
Surfaces	XML surface imported and correct styles assigned. The Combined surface is updated with the correct surface additions in the correct order.	XML surface imported, but combined surface operations partially incorrect. Overlapping of proposed surfaces	XML surface not imported correctly. Combined surface operations are partially updated. Some overlap of surfaces and rebuild errors.	XML surface not imported correctly. Combined surface operations are not updated. Combined surface not working as expected.
Pond Grading Edits	Slopes on pond grading updated and infill added. Location and elevations remain as originally designed.	Pond grading edited and no overlaps with nearby proposed site grading.	Pond grading edited but conflicts remain or infill missing.	Pond grading missing infill, overlapping other surfaces, extending outside of property lines, or incorrect grade/slope.
Storm Pipe Network	Full network created with proper connection angles, pipe sizes, rotation, and flow direction. Network labels added in profile views including use of spanning pipe labels in profile views.	Full network created with correct pipe sizes, rotation, and flow direction Minor alignment or profile inconsistencies such as styles or incorrect labeling.	Network partially created, some area drains not connected, missing connection to headwall in pond. Some pipes not sized correctly. Some structures not rotated correctly.	Multiple networks created instead of one, some area drains not connected, missing connection to headwall in pond, pipes not resized, structures not rotated. Profile elevations at connection points don't match
Pressure Pipe Networks	Pressure pipe network and created using proper fittings and	Pressure pipe network created. Minor	Pressure pipe network was created, but with	Separate pressure network was created as a pipe

	appurtenances used. Elevations set to follow the surface at design depth at cut length.	alignment or elevation profile issues.	incorrect name for network or alignment. The original linework used to create the network remains in the drawing. Missing valves or incorrectly sized valves.	network instead of a pressure pipe network. The original linework used to create the network remains in the drawing. Missing fittings or appurtenances. Profile elevations at alignment PIs instead of at cut lengths. Appurtenance sizes are incorrect. Incorrect pipe sizes or materials. Incorrect parts list used.
Additional bonus features	6-7 additions made to the site	4-5 additions made to the site	2-3 additions made to the site	1 addition made to the site

Steps to provide students if they require assistance:

1. With at least one drawing open and saved, open Toolspace and select the Prospector tab. Right click on Data Shortcuts and choose Set Working Folder.

Choose C:\Civil 3D Projects in the Set Working Folder dialog for the target folder.

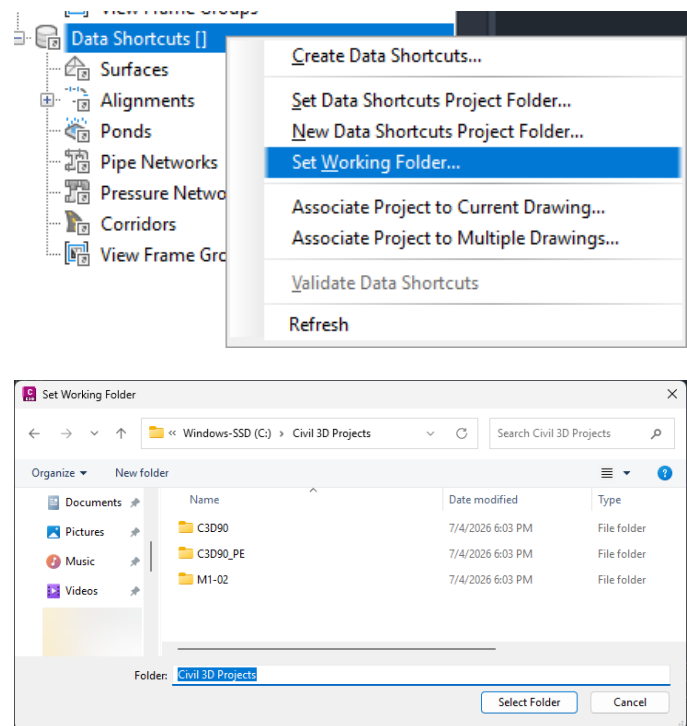


Figure 1. Set the Working Folder to C:\Civil 3D Projects.

2. In Toolspace, Prospector tab, right click on Data Shortcuts and choose New Data Shortcuts Project Folder.

In the New Data Shortcut Folder, name the project C3D90_CE and use the default Civil 3D project template.

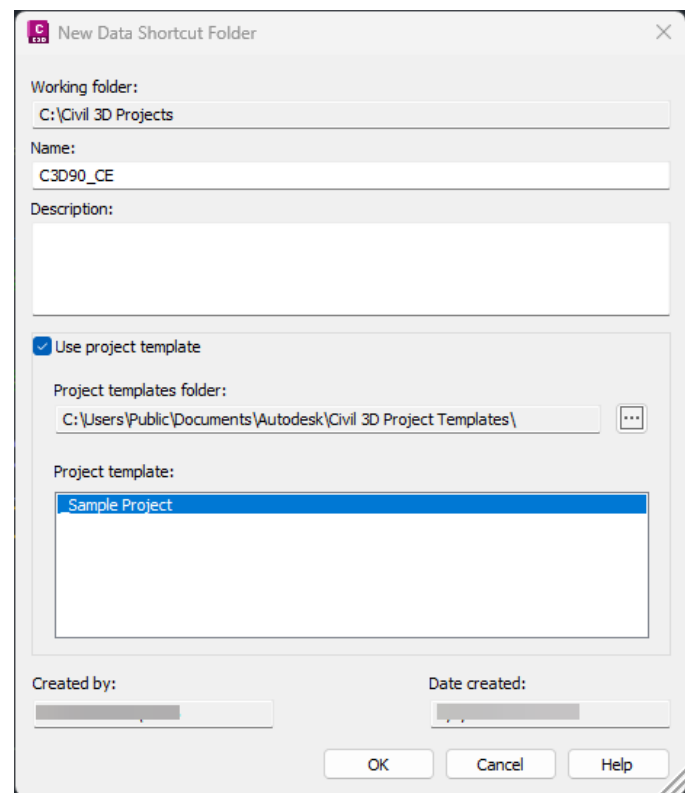
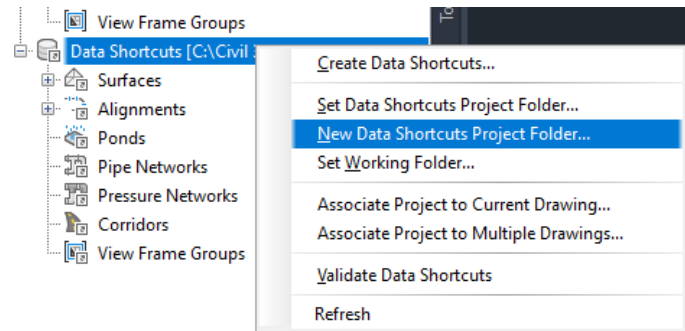


Figure 2. Create the Data Shortcut Project Folder using the default project folder option..

3. Copy the metric or imperial data set Survey and Site drawings to the project's External References, DWG folder and the Existing Surface drawing and the XML file to the project's Source Drawings, Surfaces folder.

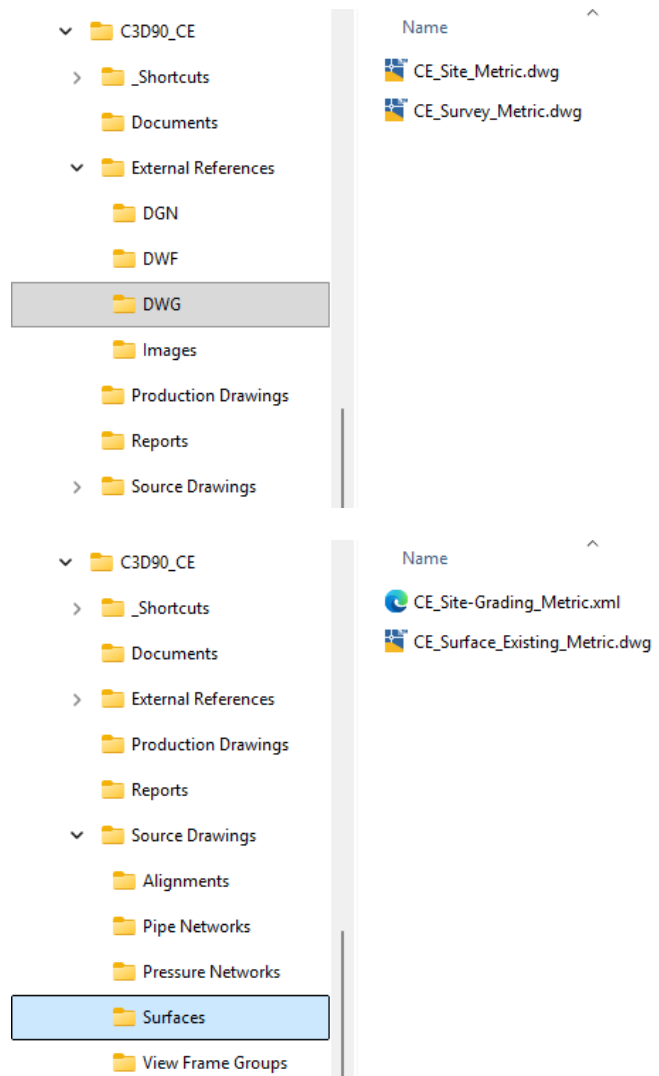
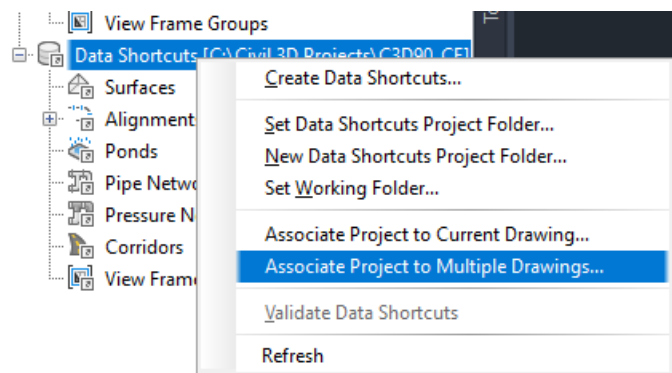


Figure 3. Copy dataset project files to the new project.

4. In Toolspace, Prospector tab.

Right click on Data Shortcuts and choose Associate Project to Multiple Drawings.

Select the C3D90_CE data shortcut project from the list and click OK.



Browse into the project's Source Drawings, Surfaces folder and click Select Folder.

Repeat the process for the project's External References, DWG folder.

Alternate workflow:

Open the Existing Surface drawing.

Right click on Data Shortcuts in the Toolspace, Prospector tab and choose Associate Project to Current Drawing.

Select the C3D90_CE project from the list and choose OK.

Save the drawing, then repeat with the Site and Survey drawings.

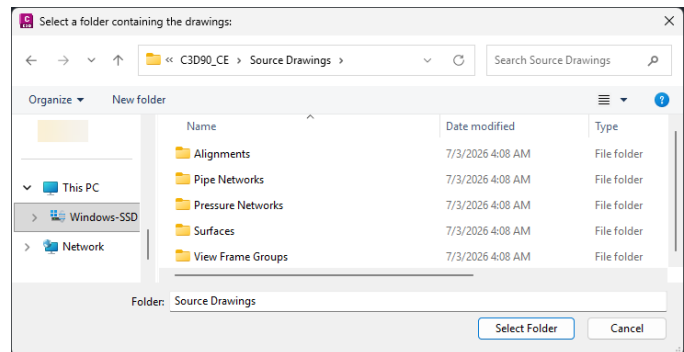
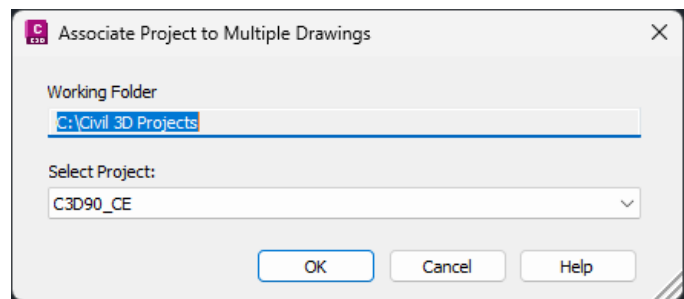


Figure 4. Associate drawings to a data shortcut project.

5. Open the Existing Surface drawing in the project's Source Drawings, Surfaces folder and save.

In Toolspace, Prospector tab, right click on Data Shortcuts and choose Create Data Shortcuts.

In the Create Data Shortcuts dialog, check the box next to the Existing Ground surface and click OK.

Save and close the survey drawing.

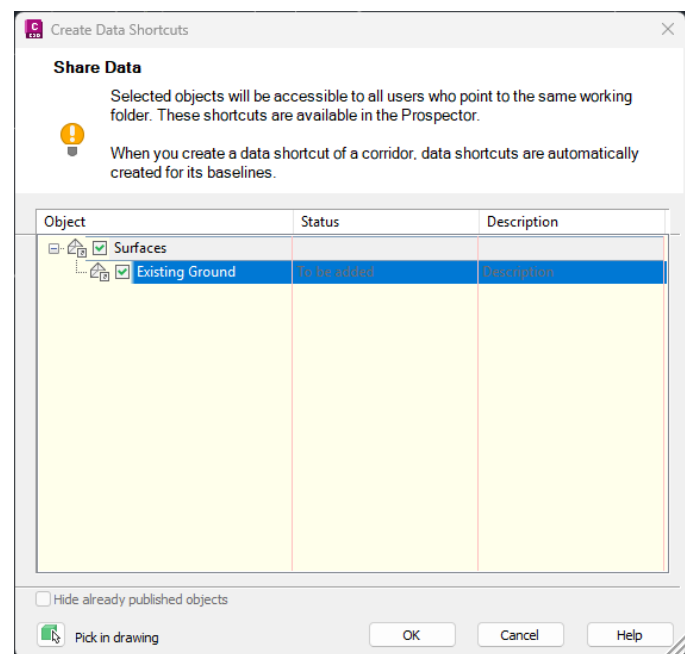
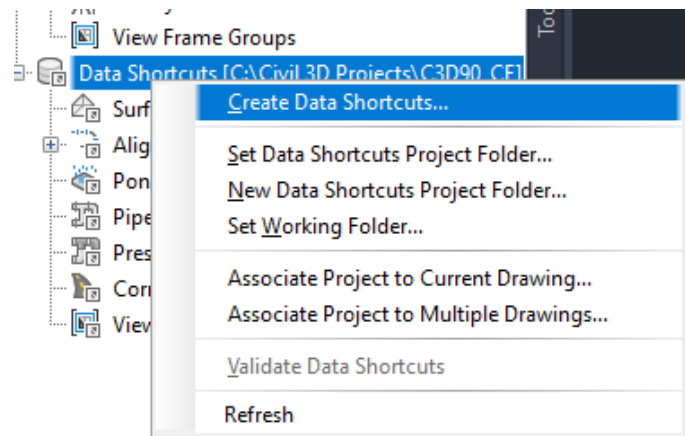


Figure 5. Create a data shortcut for the Existing Ground surface.

- Open the Site drawing in the project's External References, DWG folder.

In Toolspace, Prospector tab, expand the Surfaces collection under Data Shortcuts.

Right click on the Existing Ground surface and choose Create Reference.

In the Create Surface Reference dialog, click OK to accept the default values.

Save the drawing.

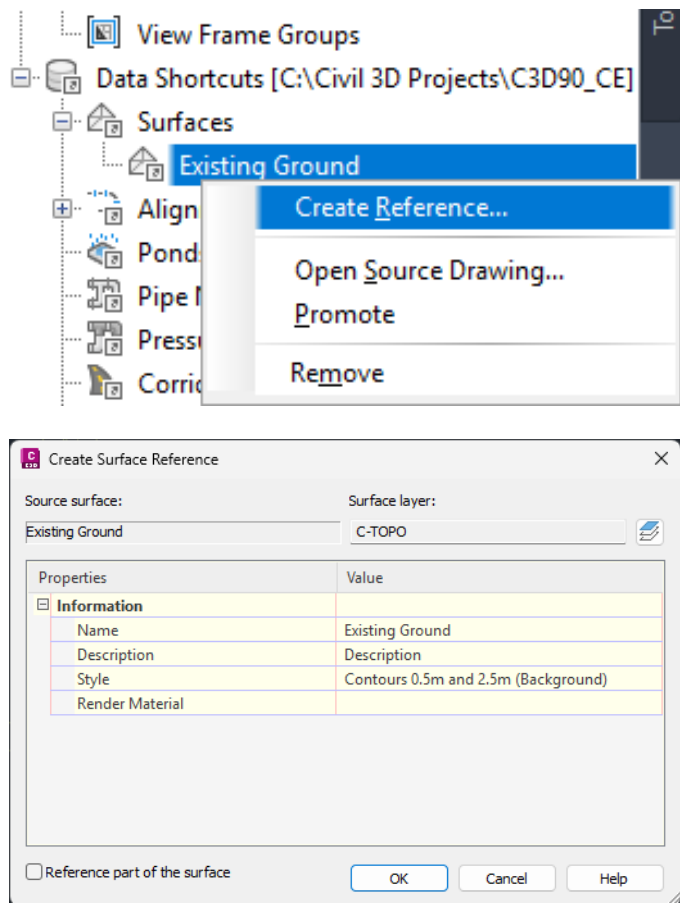
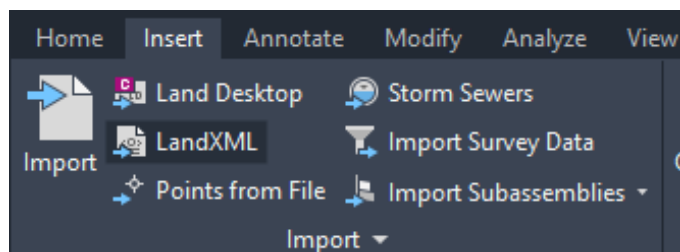


Figure 6. Create a Data Reference of the Existing Ground surface in the Site drawing.

- In the Site drawing, select the Insert ribbon tab and click on LandXML.

Select the CE_Site-Grading_Metric.XML file, or CE_Site-Grading_Imperial.XML for imperial units, from the project's Source Drawings, Surfaces folder and click Open.

In the Import LandXML dialog, expand



Surfaces and Surface desc, then uncheck SourceData and click OK.

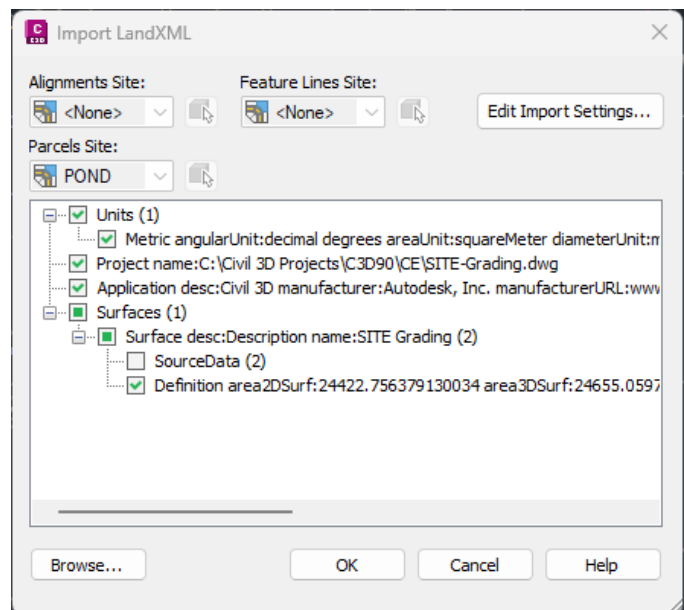
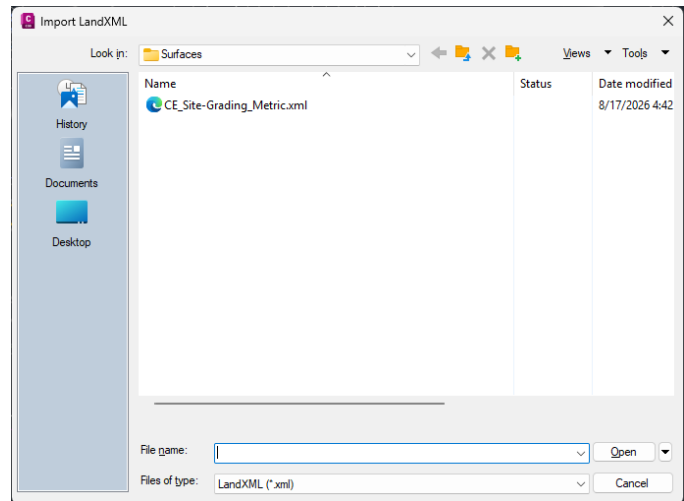


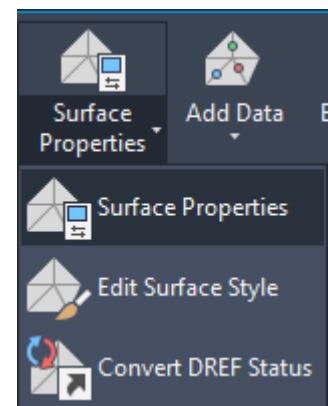
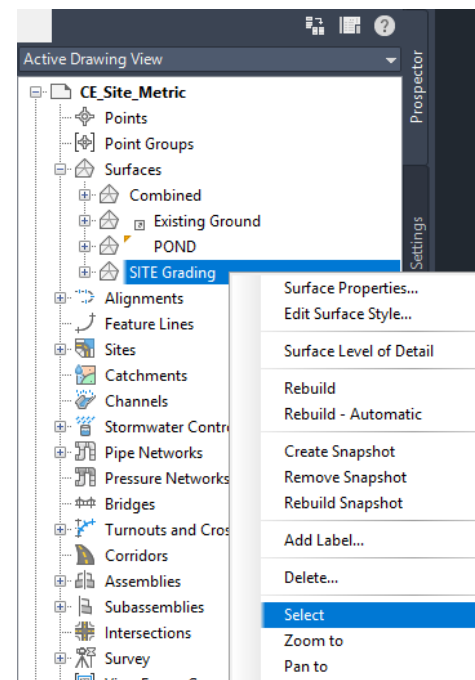
Figure 7. Import the SITE Grading surface from XML.

8. In Toolspace, Prospector tab, expand the Surfaces collection.

Right click on the Site Grading surface and click Select.

In the contextual ribbon, expand Surface Properties and select Surface Properties.

In the Surface Properties dialog, select a Design style from the list of surface styles then click OK and save the drawing.



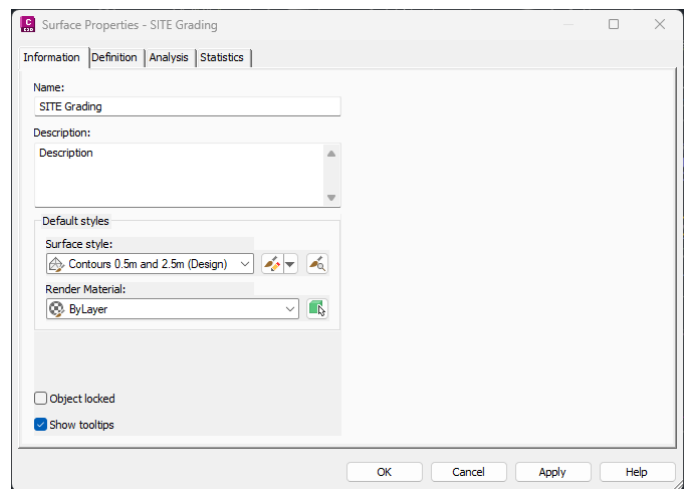


Figure 8. Change the surface style assigned to the SITE Grading surface.

9. In Toolspace, Prospector tab, expand the Surfaces, Combined, and Definition.

Right click on Edits and click Paste Surface.

In the Select Surface to Paste dialog, select both the Existing Ground and SITE Grading surfaces then click OK.

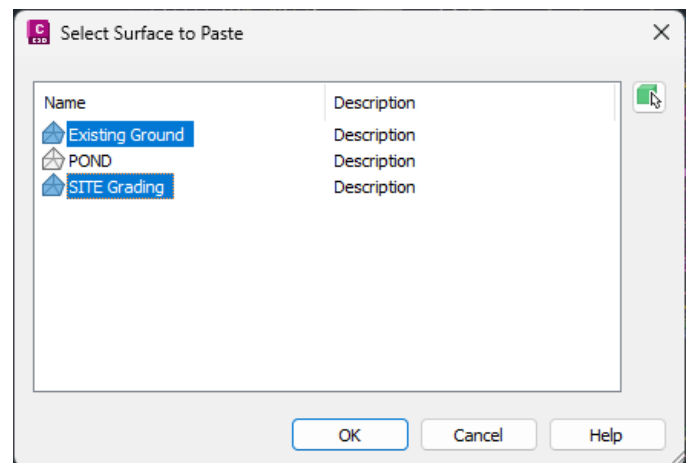
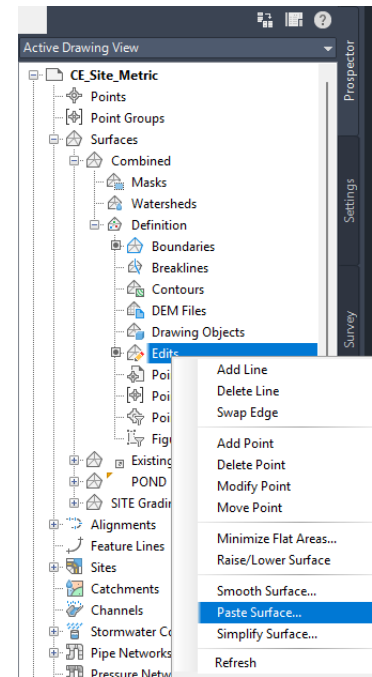


Figure 9. Edit the footprint of the roof

10. In Toolspace, Prospector tab, right click on the Combined surface and click Select.

In the contextual ribbon, expand Surface Properties and select Surface Properties.

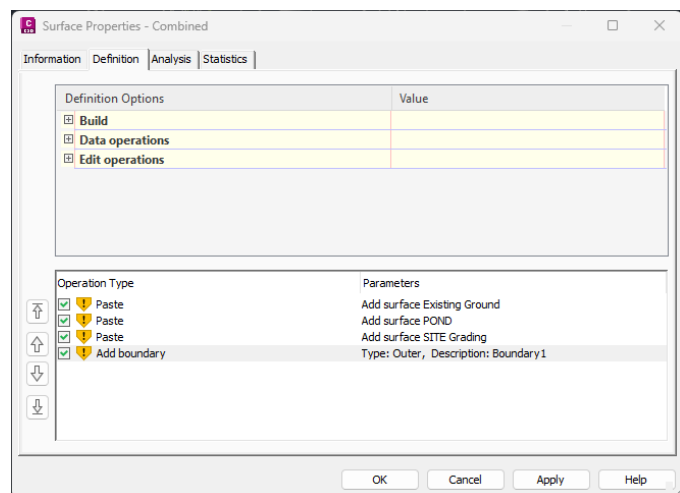
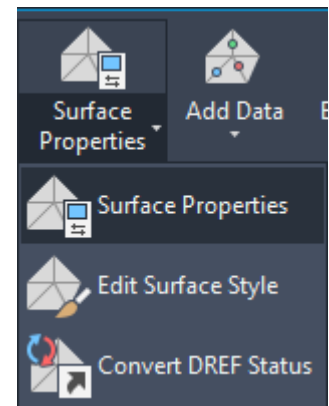
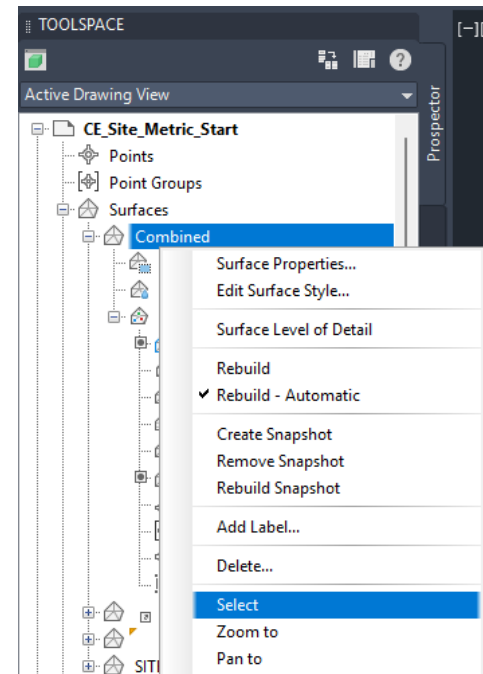
In the Surface Properties dialog, select the Definition tab.

In the Operation type listing, select the Existing Ground entry and use the arrow keys on the left to move it to the top of the list.

Select the Add boundary entry and use the arrow keys on the left to move it to the bottom of the list.

Confirm the operation order is correct (existing surface, proposed surfaces, boundary) then click OK.

If prompted, select Rebuild the surface in the Surface Properties – Rebuild Surface dialog and save the drawing.



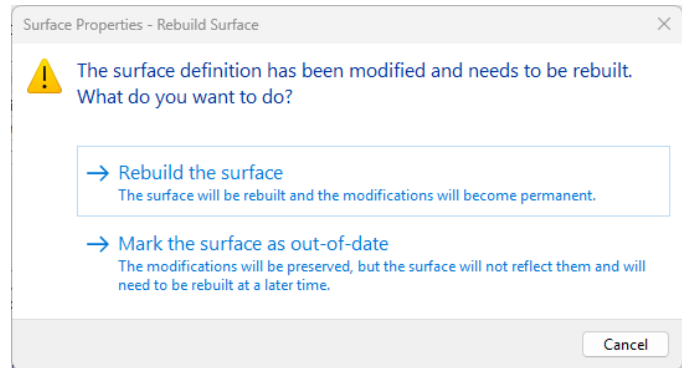


Figure 10. Adjust the operation type order in the Surface Properties dialog and rebuild the surface.

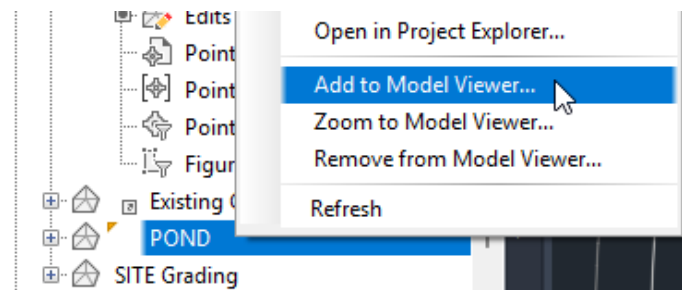
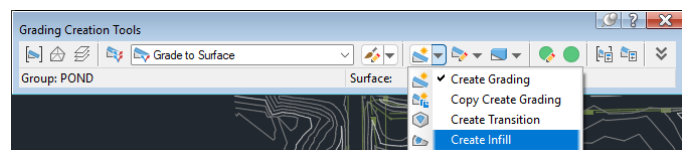
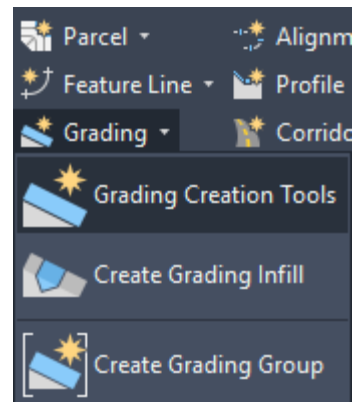
11. Zoom into the area labeled POND in the Site drawing.

On the Home ribbon tab, expand Grading and select Grading Creation Tools.

On the Grading Creation Tools toolbar, expand the grading tools and select Create Infill.

Click on a point inside the pond and then press Enter to end the selection process.

Optional: Select the Pond surface and add it to the Model viewer to confirm that the inside of the pond was successfully added. This viewer can remain open while making additional edits to the pond grading.



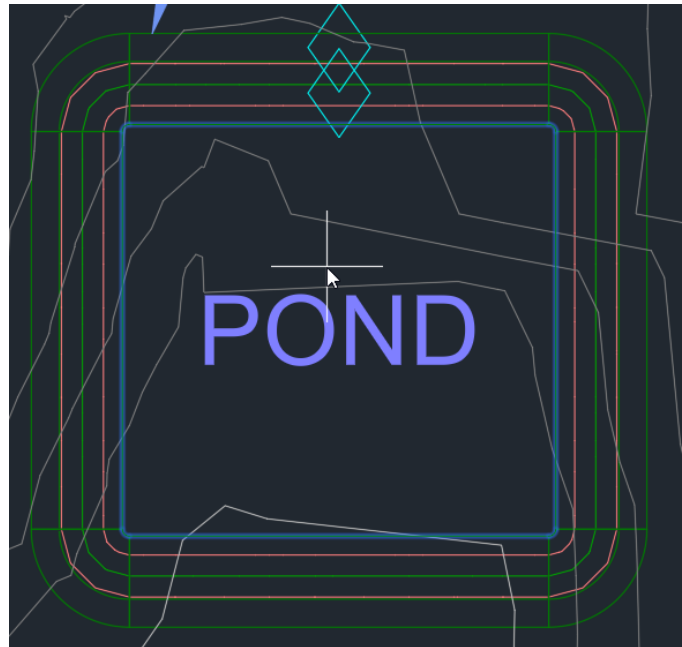
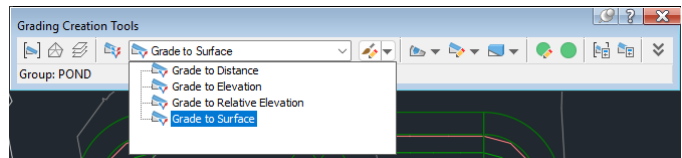


Figure 11. Create a grading infill for the inside of the pond.

12. On the Grading Creation Tools toolbar, select Grade to Surface from the list of grading criteria.

Expand the grading tools and select Create Grading.



If prompted to set the target surface, click OK. Then, in the Select Surface dialog, select Existing Ground from the list of available surfaces for the target surface and click OK.

When prompted to select the feature, select the feature line labeled OUTSIDE EDGE OF POND BENCH.

Type Y and press Enter to apply the grading to the entire length of the feature line.

Type S and press Enter to select Slope as the cut format.

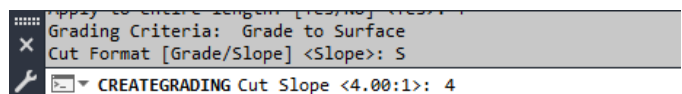
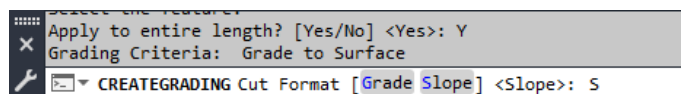
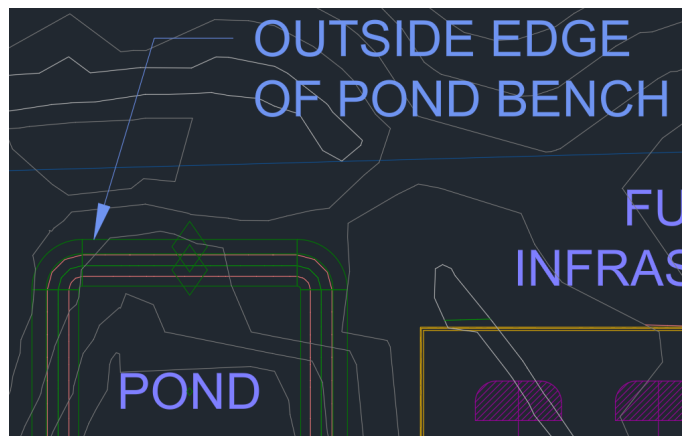
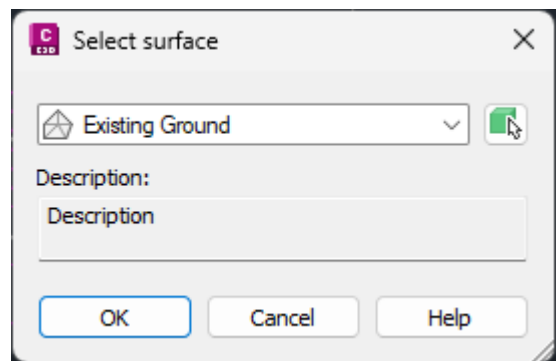
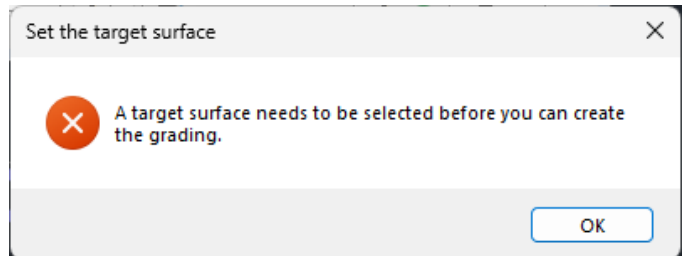
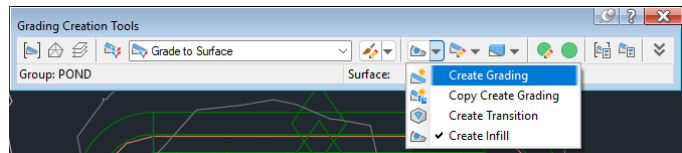
Type 4 and press Enter for a 4:1 cut slope.

Type S and press Enter to select Slope as the fill format.

Type 4 and press Enter for a 4:1 fill slope.

When prompted to select the feature again, press Esc to end the command.

Click the red X to close the grading creation tools toolbar and save the drawing.



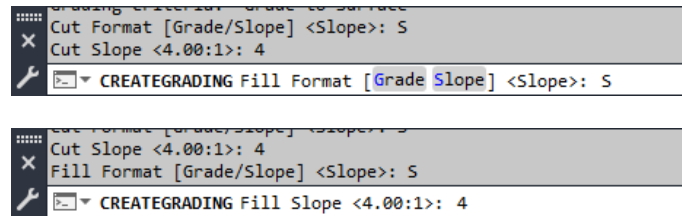


Figure 12. Create a grade to surface object surrounding the pond bench.

13. Select the center marker for the grade to surface object.

In the contextual ribbon, select Edit Grading.

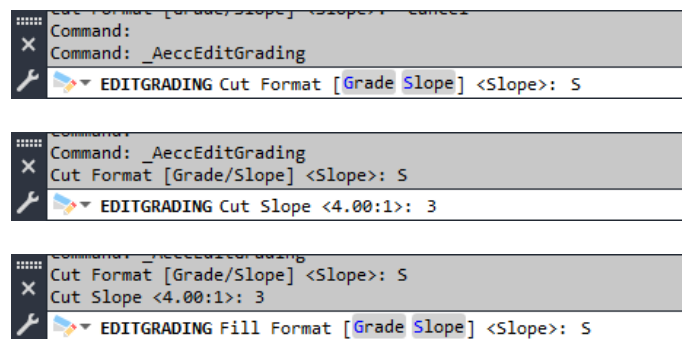
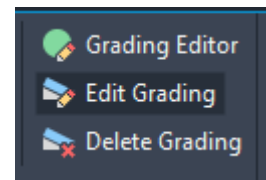
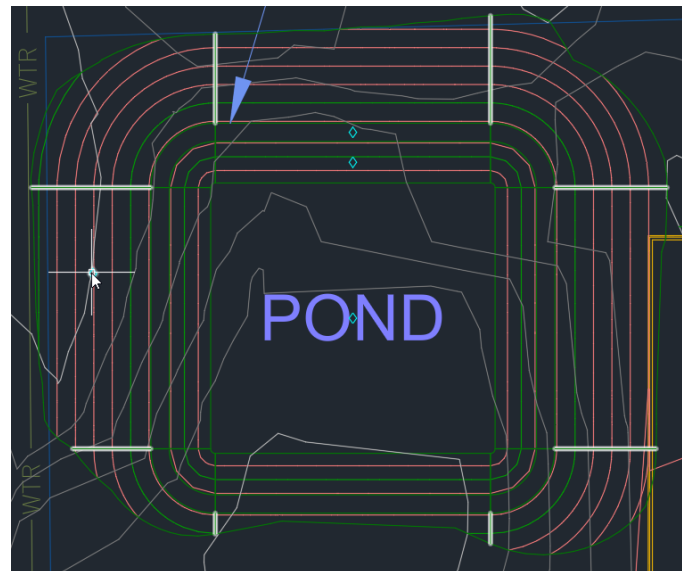
Type S and press Enter to select Slope as the cut format.

Type 3 and press Enter for a 3:1 cut slope.

Type S and press Enter to select Slope as the fill format.

Type 3 and press Enter for a 3:1 fill slope.

Save the drawing.



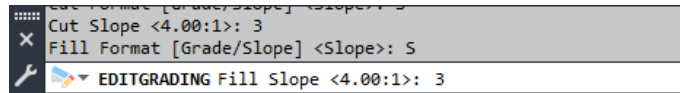


Figure 13. Edit the grade to surface object surrounding the pond bench.

14. Set the C-STRM-CNTR layer current.

Create a temporary polyline along the back of curb on the north side of the parking lot.

Offset the line by 2 m (5') and delete the source polyline. This new polyline will become a portion of the main storm trunk line. (For a hint about the trunk line location, thaw layer C-SITE-HINT.)

Draw a polyline from the center of the circle labeled AD1 perpendicular to the main storm trunk line.

Repeat for the circles labeled AD2 through AD6.

Extend the storm trunk line to where it will intersect the polyline from circle AD6.

Extend the main storm trunk line to the bottom of the pond feature line. The exact location of the headwall can later be adjusted along this construction line to where the proposed storm line daylights into the

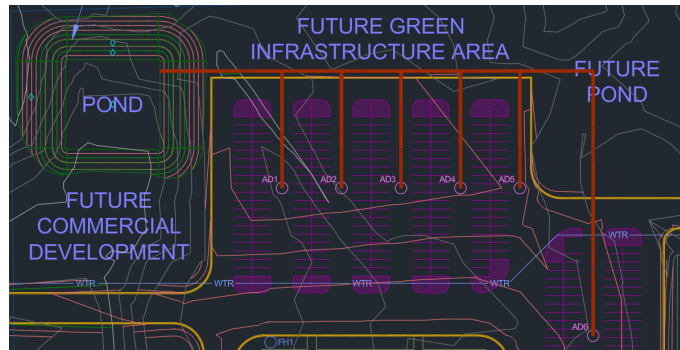


Figure 14. Layout the proposed storm pipe network with temporary construction lines.

NOTE: The polylines shown in this image have a thickness applied for clarity in the image.

pond.

Save the drawing.

15. On the Home ribbon tab, expand Alignment and select Alignment Creation Tools.

In the Create Alignment dialog, change the name to STORM-A and set the starting station to 0+100 (1+00 for imperial). Set the alignment style to Proposed (Storm) and the alignment label set to Major and Minor only. Click OK to create the alignment.

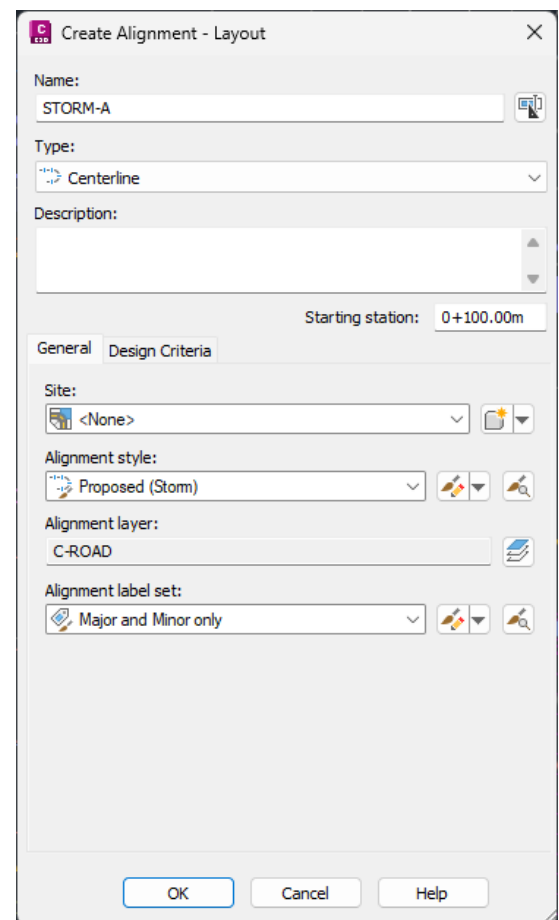
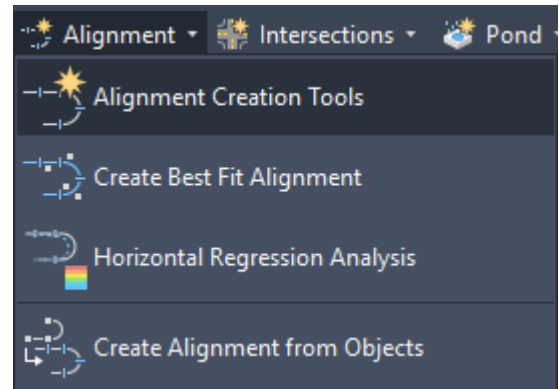
In the Alignment Layouts Tools toolbar, expand the Draw Tangent menu and select Tangent-Tangent (No curves).

For the start point, select the endpoint of the storm main trunk construction line that is within the pond.

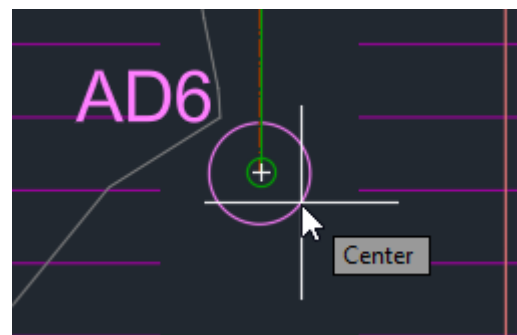
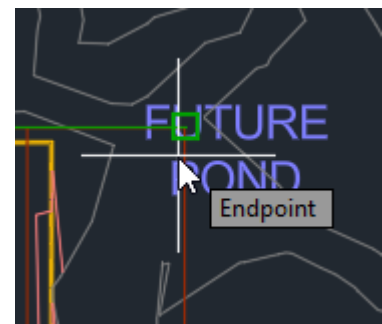
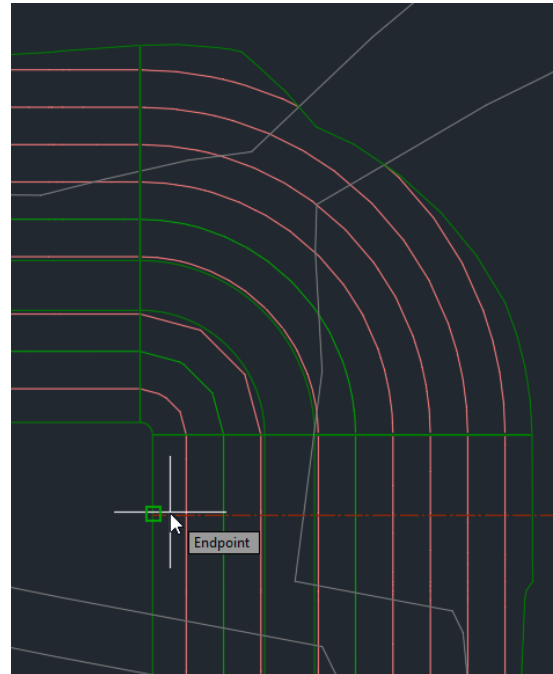
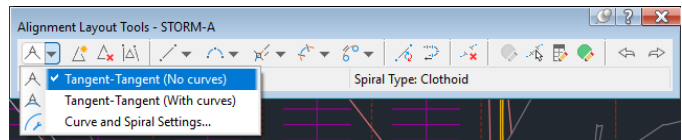
For the next point, select the angle bend where the AD6 area drain meets the main storm trunk line.

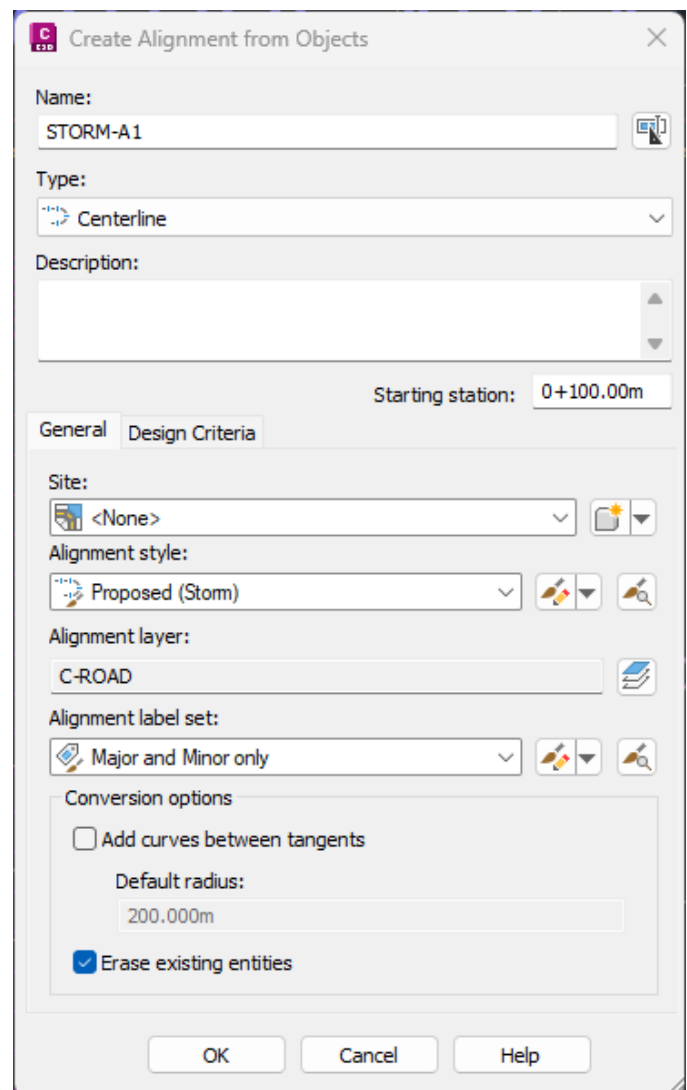
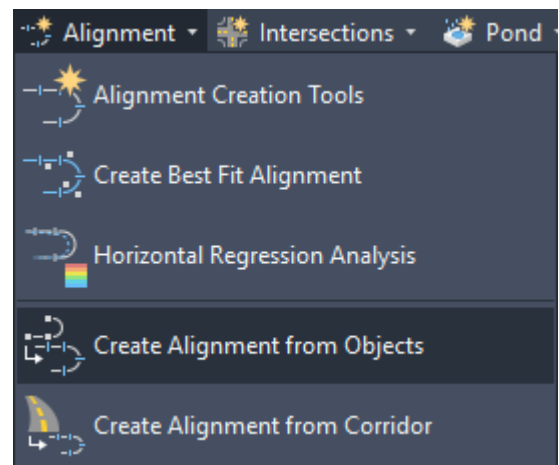
For the final point, select the center of the circle labeled AD6 then press Enter to end the selection process.

Delete the construction line along the STORM-A alignment and close the Alignment Layout Tools toolbar.



For the lateral lines, use the Create Alignment from Objects command in the expanded Alignment creation menu. Ensure that the alignment direction is correct for each lateral (start station at trunk line) and name the alignments STORM-A1, STORM-A2, STORM-A3, STORM-A4, and STORM-A5 respectively. Use the same start station, alignment styles, and alignment label sets as the STORM-A alignment. Uncheck the Add Curves between tangents option and leave Erase existing entities checked to eliminate that step after alignment creation.





Create Alignment from Objects

Name: STORM-A1

Type: Centerline

Description:

Starting station: 0+100.00m

General Design Criteria

Site: <None>

Alignment style: Proposed (Stom)

Alignment layer: C-ROAD

Alignment label set: Major and Minor only

Conversion options

☐ Add curves between tangents

Default radius: 200.000m

☒ Erase existing entities

OK Cancel Help

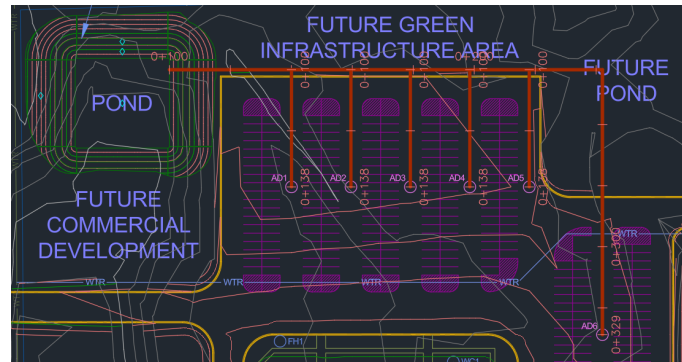


Figure 15. Create storm alignments by layout and from object.

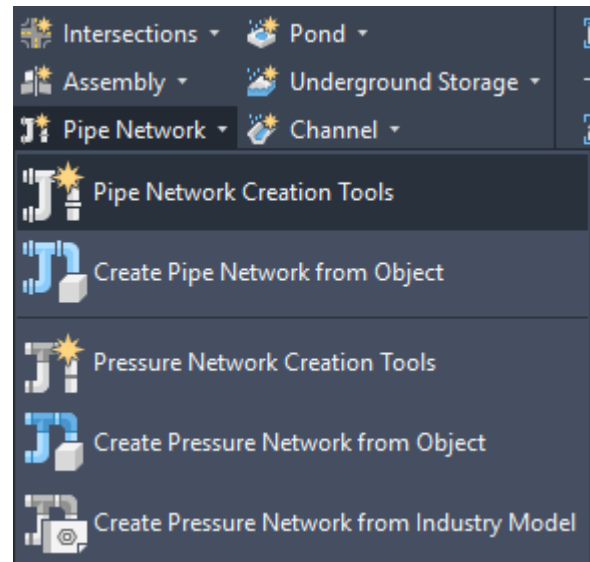
16. On the Home ribbon tab, expand Pipe Network and select Pipe Network Creation Tools.

In the Create Pipe Network dialog, change the name to STORM and select Storm Sewer as the network parts list. Select Combined for the surface name and STORM-A for the alignment name. Click OK to create the pipe network.

On the Network Layout Tools toolbar, select Null Structure in the structure list and 150 mm RCP (6" DIP) in the pipe list.

Expand the Draw command and select Pipes and Structures.

Select endpoints and the point of intersection on the STORM-A alignment beginning at AD6 and ending at the pond.



Press Enter to end the STORM-A portion of the network.

Click the alignment tool on the Network Layout Tools toolbar.

Select STORM-A1 from the list of alignments and click OK.

Expand the Draw command and select Pipes and Structures.

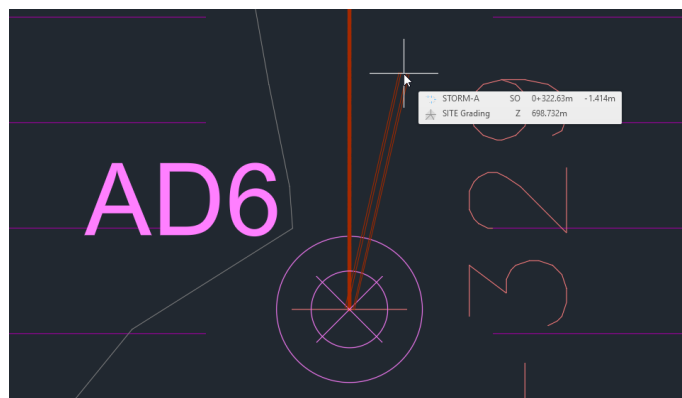
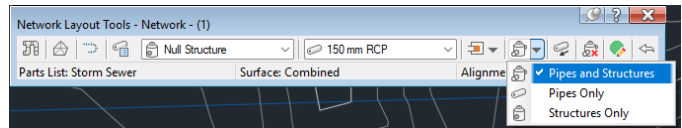
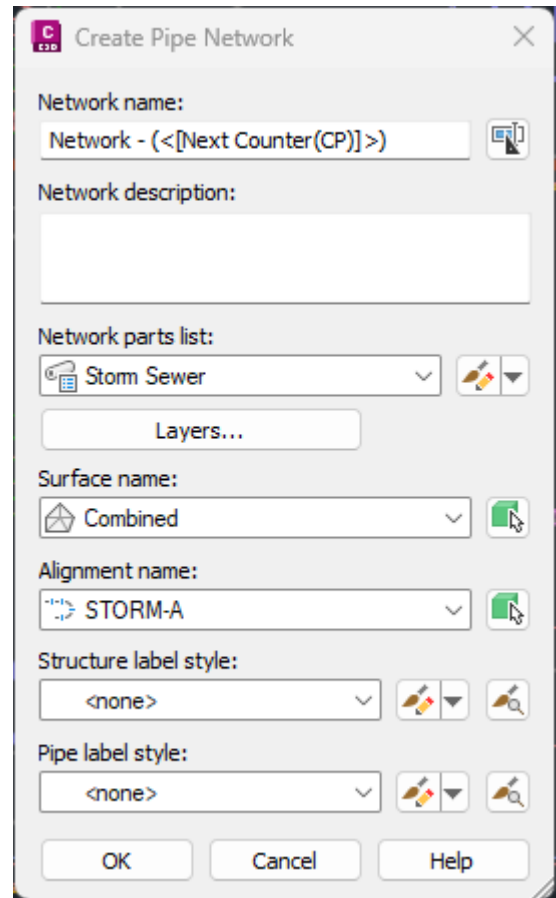
Select the endpoint of the STORM-A1 alignment at AD1.

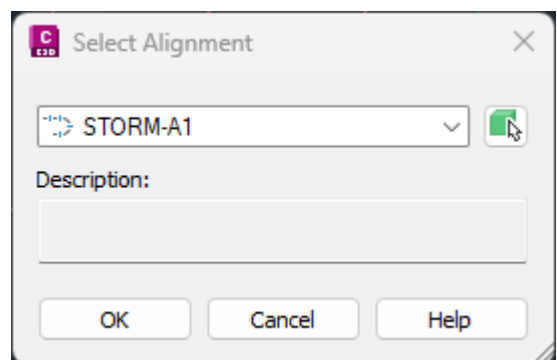
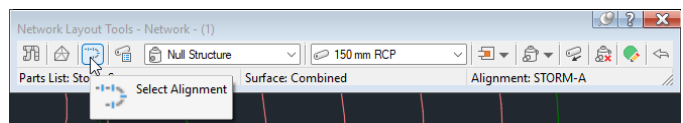
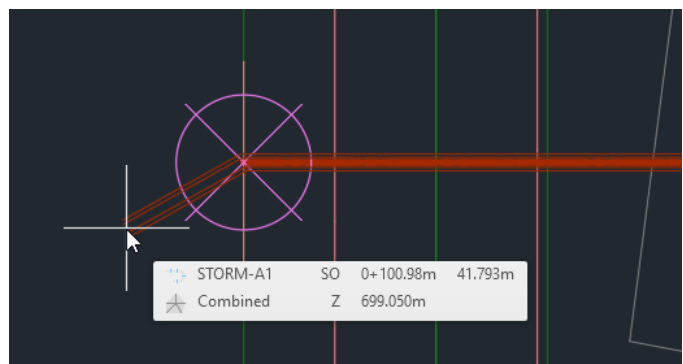
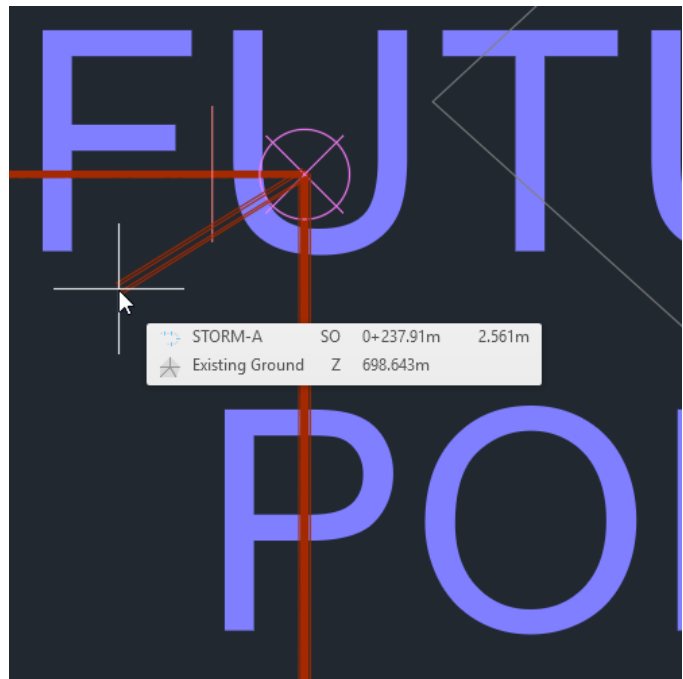
Hover near the start of alignment STORM-A1 at the main storm trunk line. When the pipe break symbol is visible, select the start point of alignment STORM-A1.

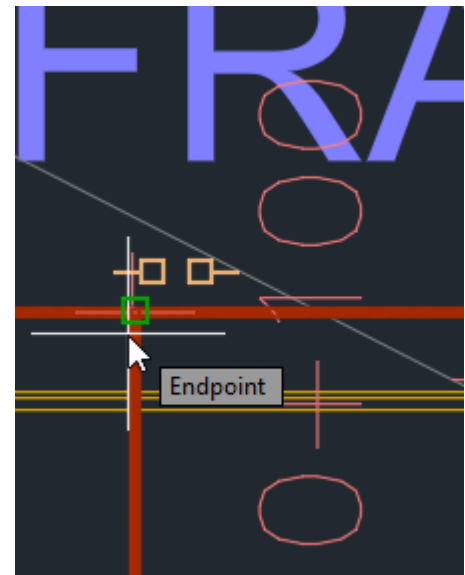
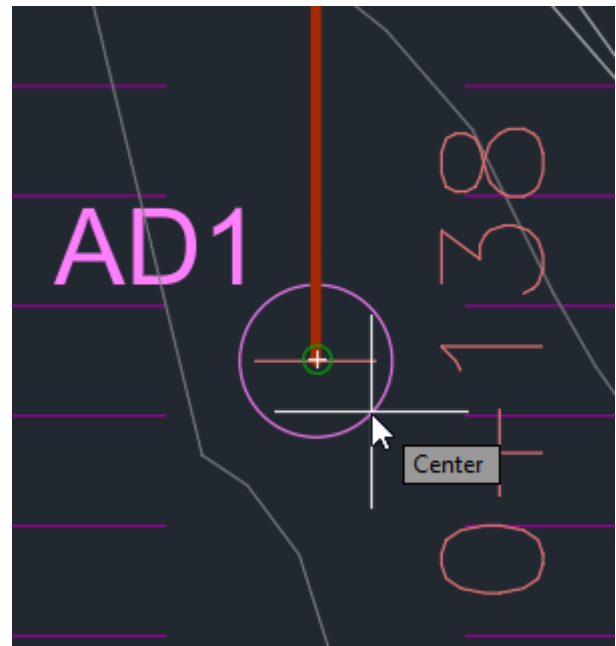
Press Enter to end the layout along this lateral.

Repeat these steps for the remaining laterals assigning the appropriate alignment for each one.

Close the Network Layout Tools toolbar.







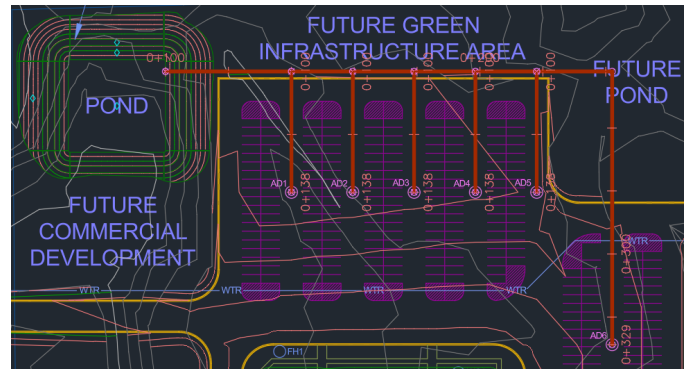


Figure 16. Place pipes and structures along the storm alignments

17. Select the pipe on the main storm trunk line between alignments STORM-A4 and STORM-A3.

On the contextual ribbon, click Swap Part.

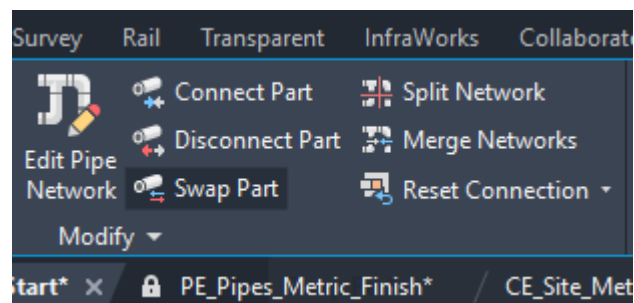
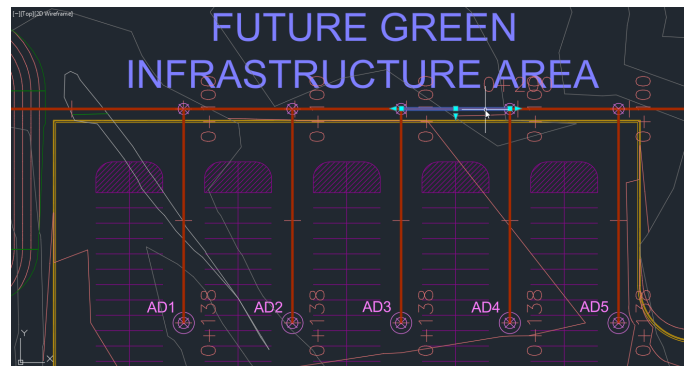
In the Swap Part Size dialog, select 200 mm RCP (8" DIP) and click OK.

Press Esc to clear the selection set, then repeat the process for the pipes between STORM-A3, STORM-A2, and STORM-A1.

Select the pipe between STORM-A1 and the pond.

On the contextual ribbon, click Swap Part.

In the Swap Part Size dialog, select 300 mm RCP (12" DIP) and click OK.



Press Esc to clear the selection set,

Save the drawing.

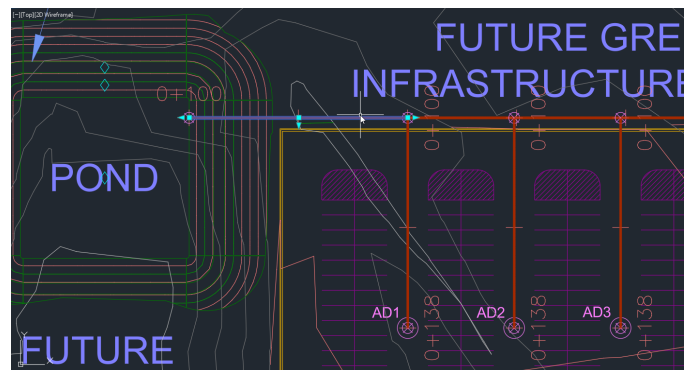
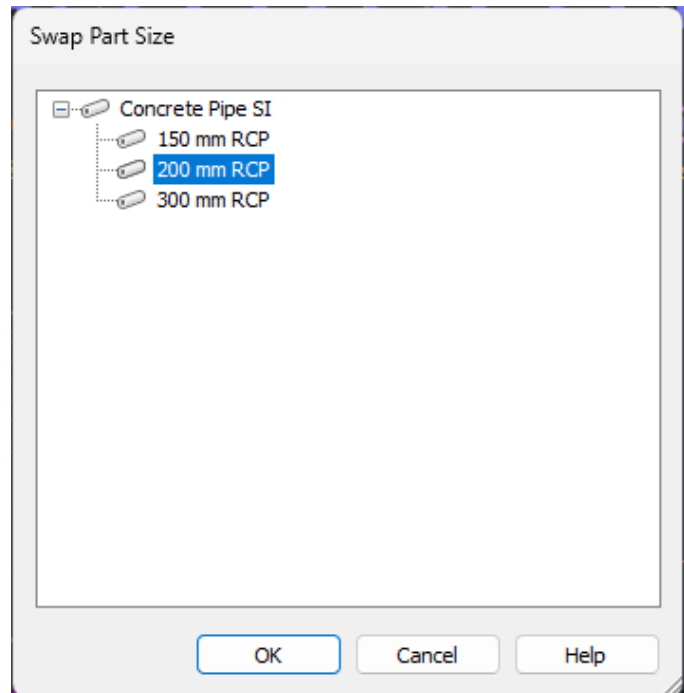


Figure 17. Swap pipe sizes to meet design requirements.

18. Select the structure on the main storm trunk line at the beginning of alignment STORM-A1.

On the contextual ribbon, click Swap Part.

In the Swap Part Size dialog, select JUNCTION BOX from the list of structures and click OK.

Press Esc to clear the selection set, then repeat the process for the structure at the beginning of alignment STORM-A4.

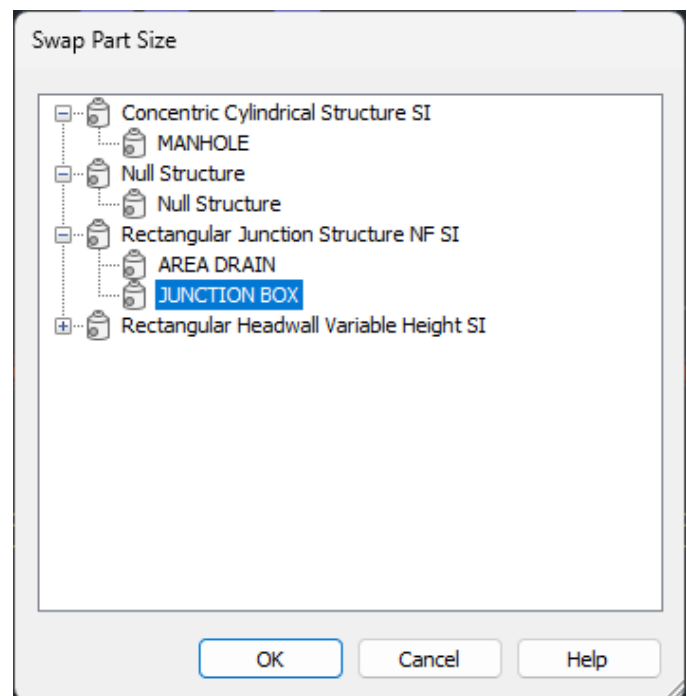
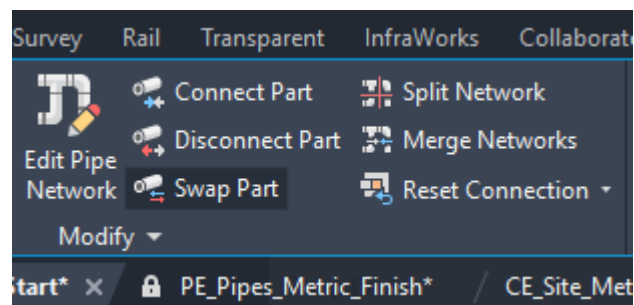
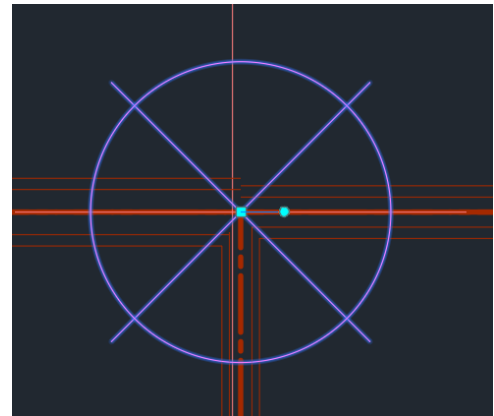
Select the structure near the northeast corner of the parking lot on alignment STORM-A where the pipe from AD6 connects to the main storm trunk line.

On the contextual ribbon, click Swap Part.

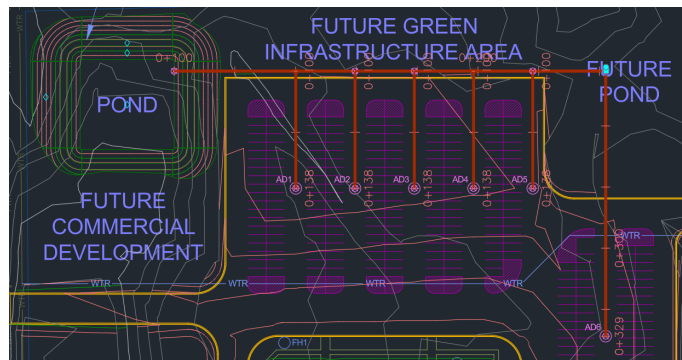
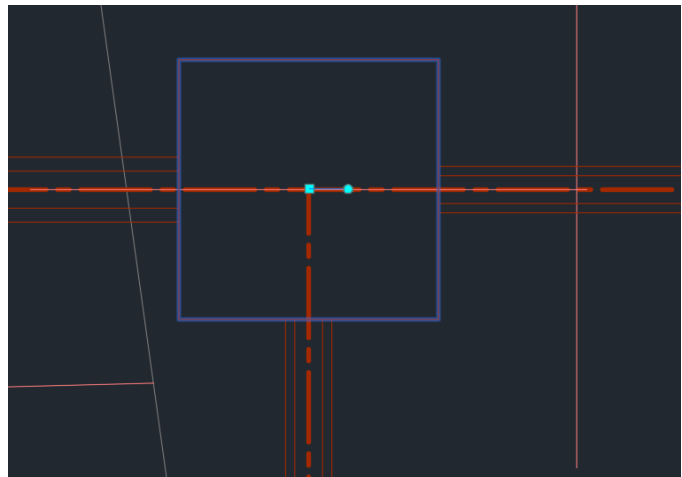
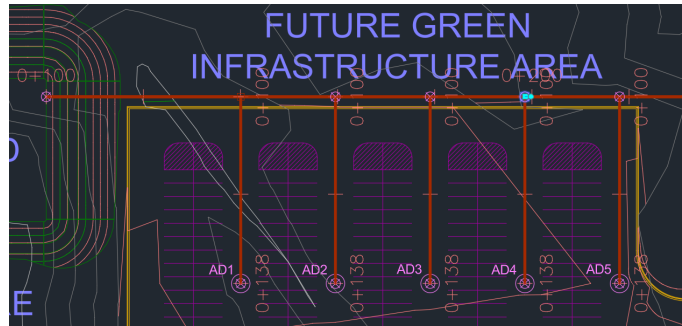
In the Swap Part Size dialog, select MANHOLE from the list of structures and click OK.

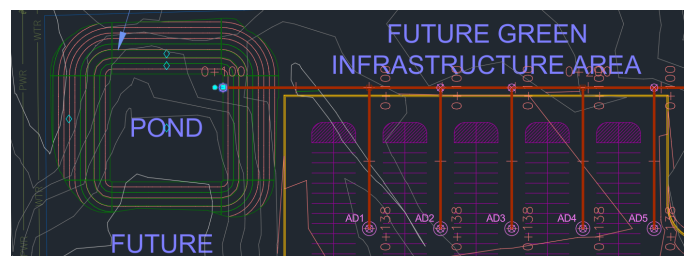
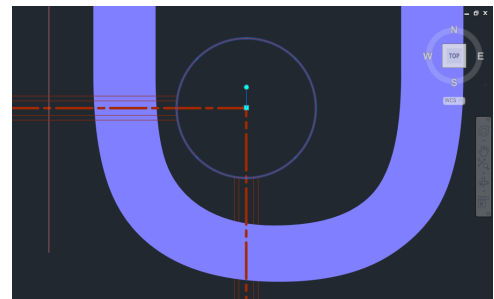
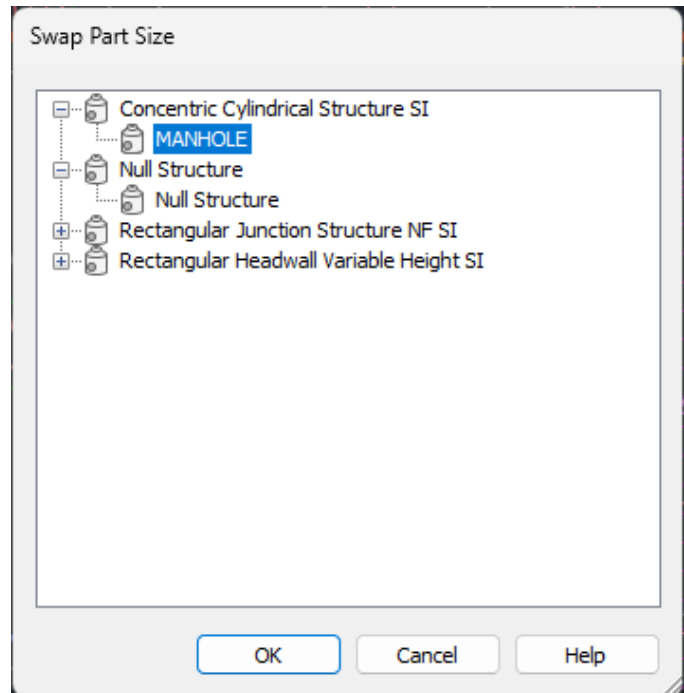
Press Esc to clear the selection set, then repeat the process for the structure in the pond. Swap that structure to be a headwall, then press Esc to clear the selection set.

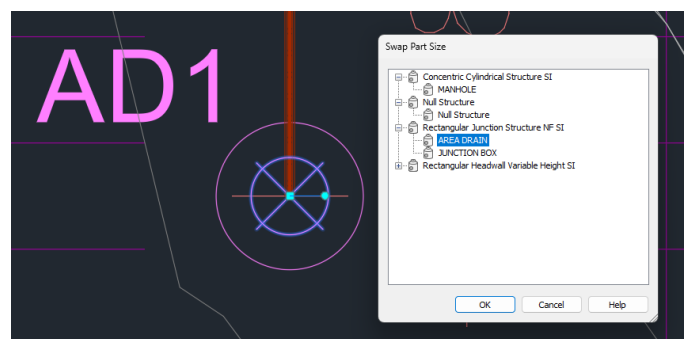
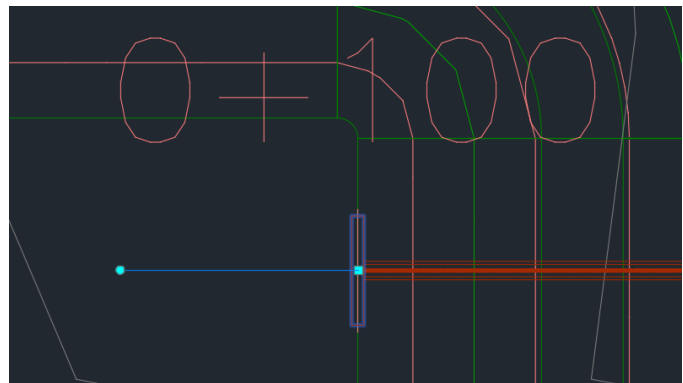
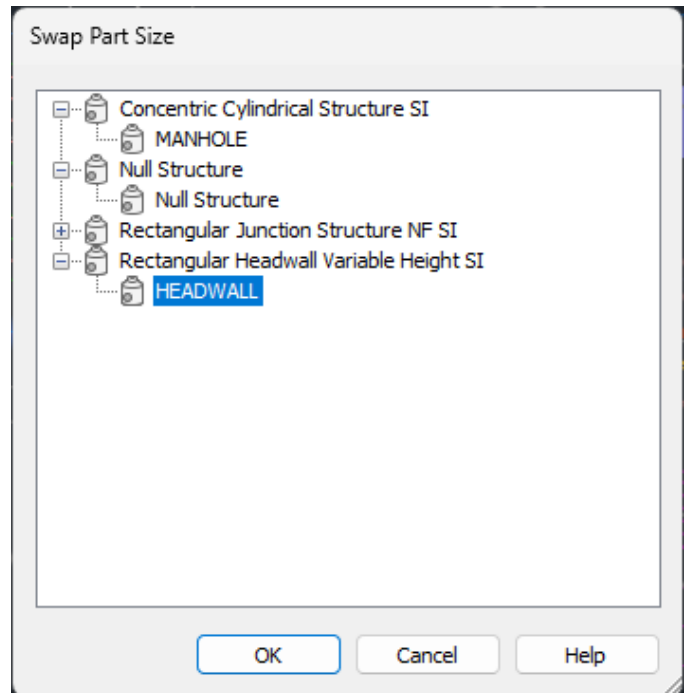
Finally swap the structures in the



circles labeled AD1 through AD6 to be area drains then save the drawing.







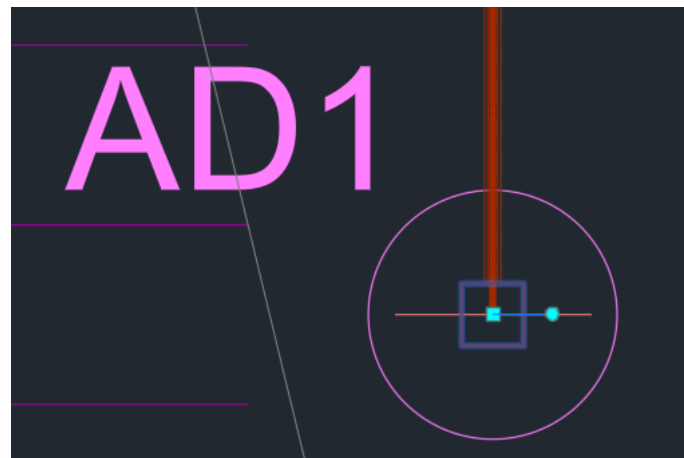
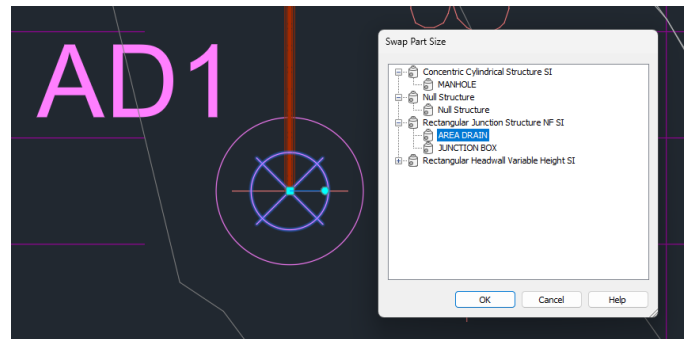


Figure 18. Swap structures to junction boxes, a manhole, a headwall, and area drains.

19. Review the structures and make any necessary rotations by selecting the structure and using the rotation grip to snap to the desired angle then save the drawing.

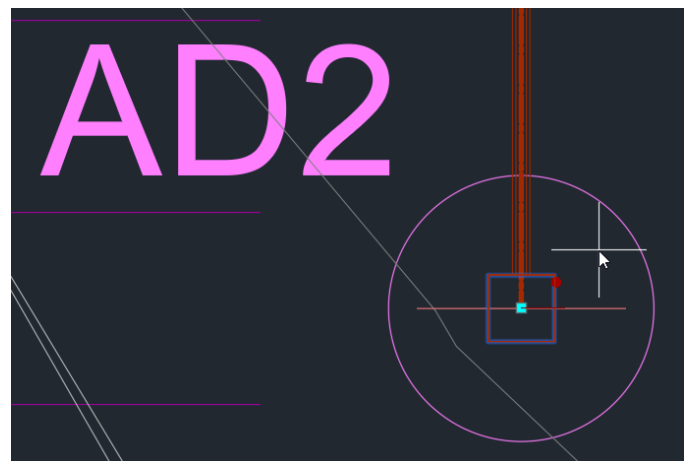


Figure 19. Rotate structures.

20. In Toolspace, Prospector tab, expand Alignments and Centerline Alignments.

Right click on STORM-A and click Select.

On the contextual ribbon, click Surface Profile.

In the Create Profile from Surface dialog, select the Existing Ground, POND, and SITE Grading surfaces on the right then click Add.

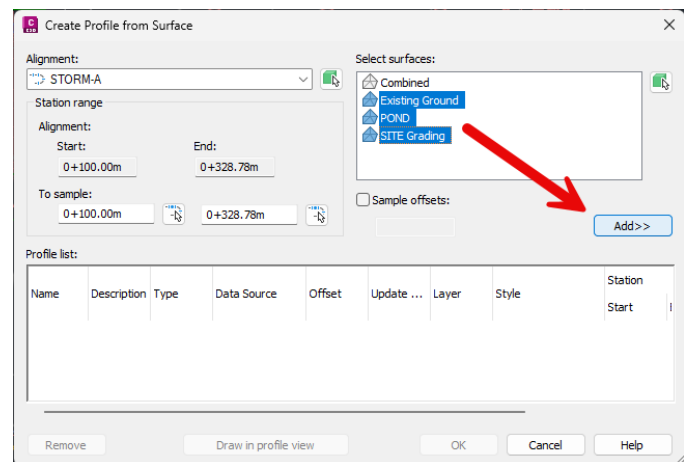
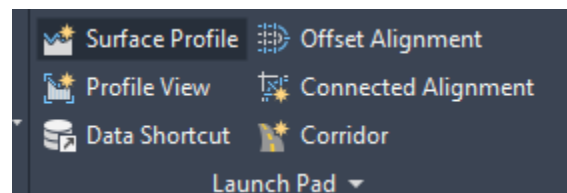
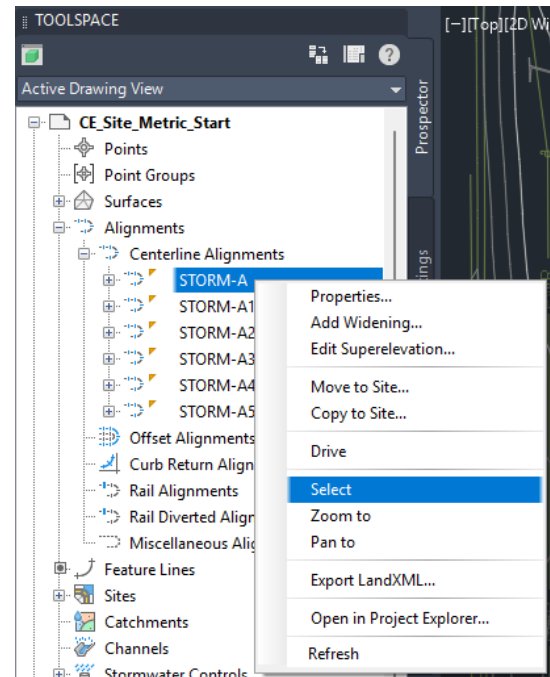
Change the profile style to Proposed Ground Profile for the POND and SITE Grading surface profiles then click Draw in profile view.

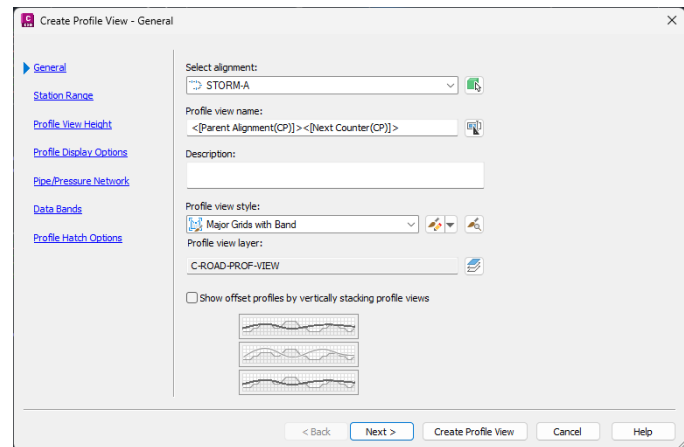
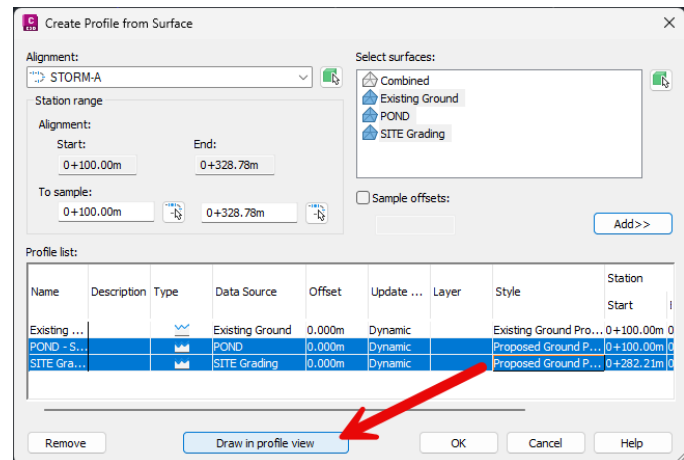
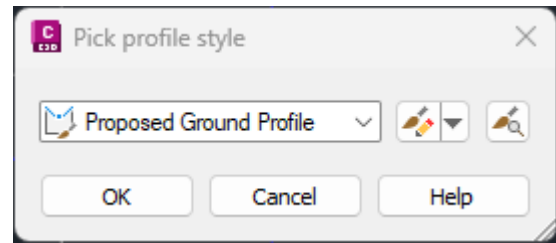
In the Create Profile View dialog, set the profile view style to Major Grids with Band and click Next.

Adjust the station range and profile view heights to show the full extent of the profile without using split profile views and click Create Profile View.

Place the profile view to the right of the project plan view.

Repeat the process for the remaining STORM alignments then save the drawing.





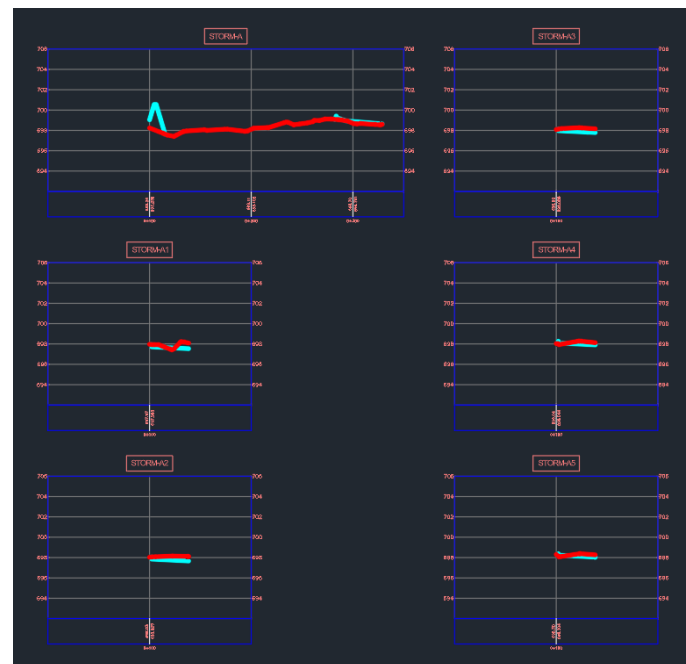
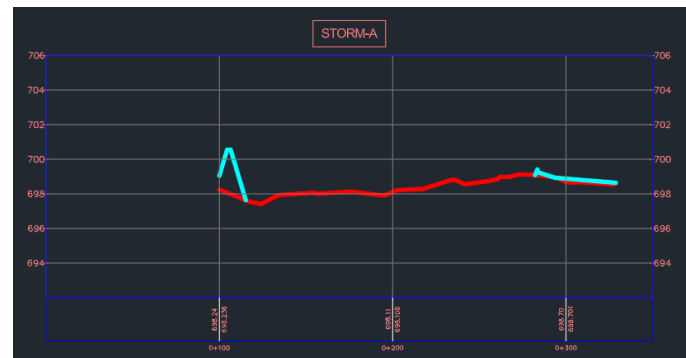
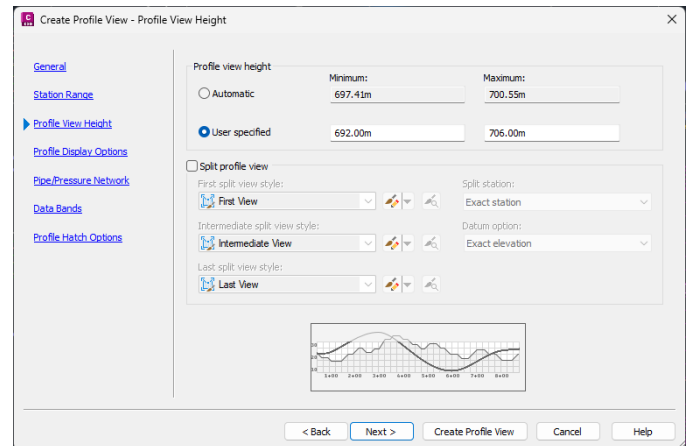


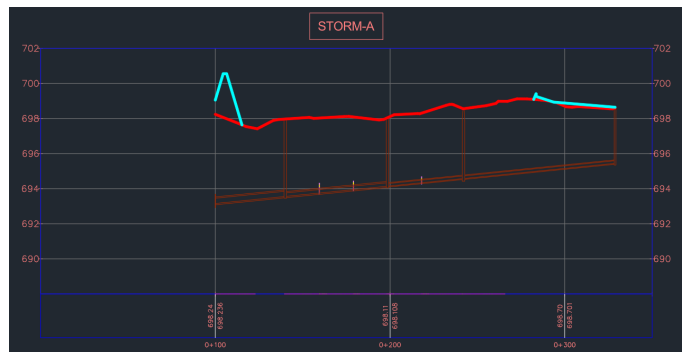
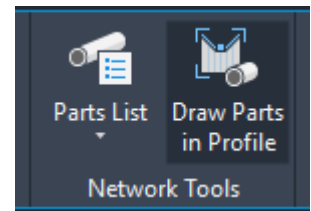
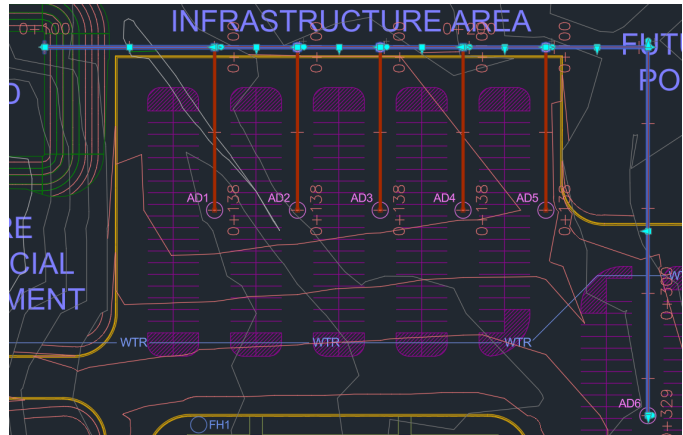
Figure 20. Create profiles and profile views.

21. Select all pipes and structures along the STORM-A alignment.

On the contextual ribbon, select Draw Parts in Profile.

When prompted, select the STORM-A profile view.

Repeat the process to place the appropriate pipes and structures into the remaining STORM profile views. Adjust the profile view extents if necessary to allow space below the pipes added to the profile views.



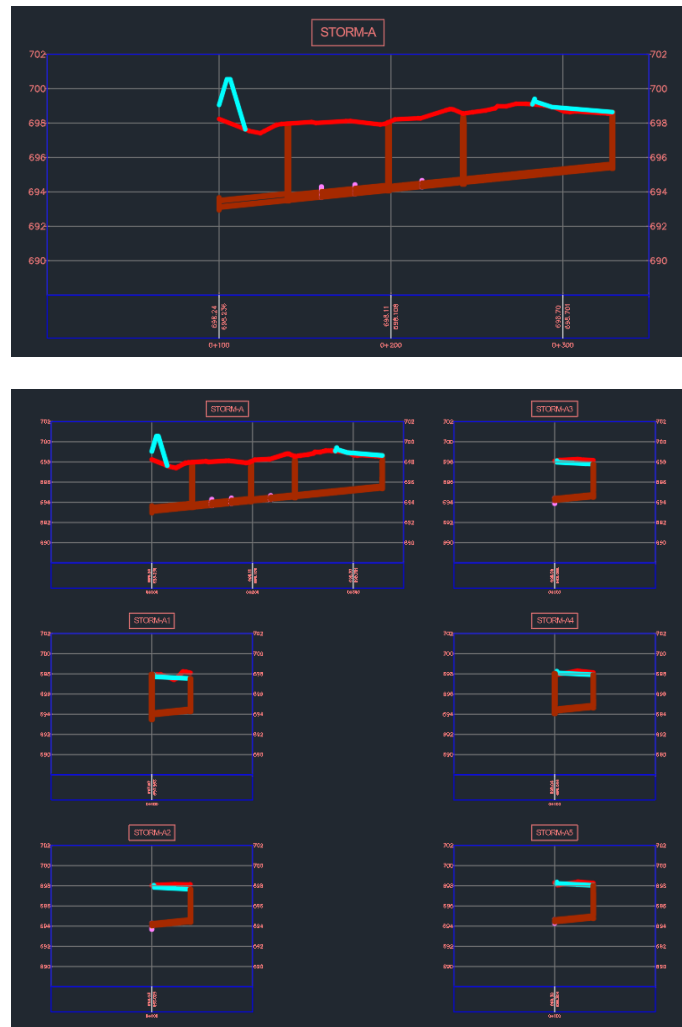


Figure 21. Add pipes and structures to profile views.

22. Select the pipe in the STORM-A1 profile view.

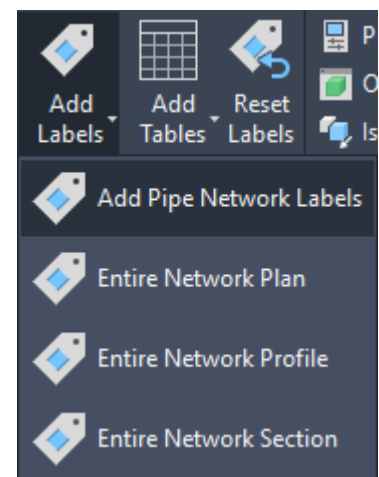
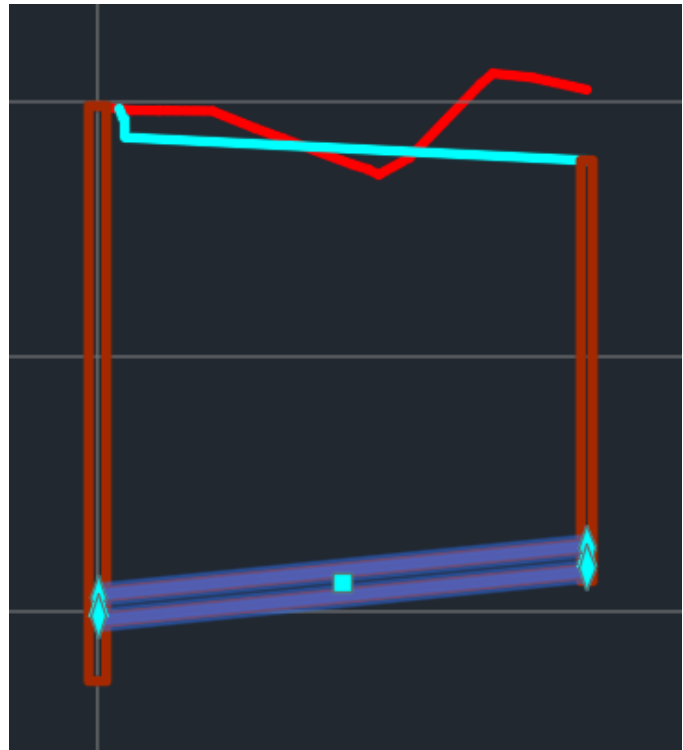
On the contextual ribbon, expand the Add Labels drop-down menu and select Add Pipe Network labels.

Press Esc to clear the selection set.

Set the Label type to Single Part Profile and click Add.

Individually select the structures and pipe in the STORM-A1 profile view to add labels, then press Esc and close the Add Labels dialog.

Select each label and use the grips to position the labels to avoid overlaps then save the drawing.



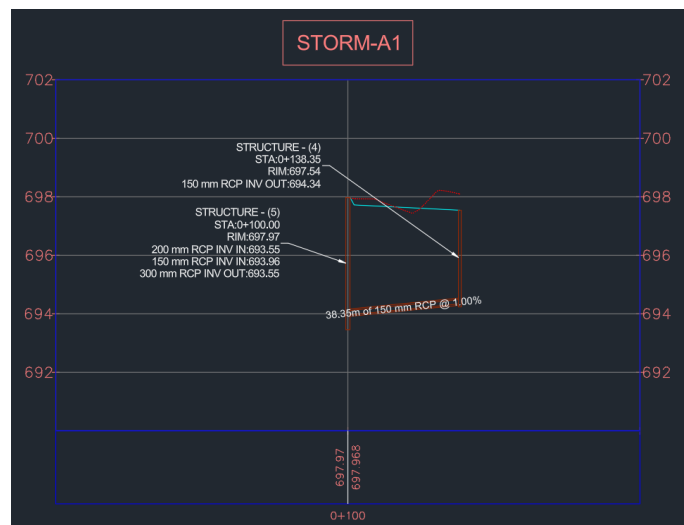
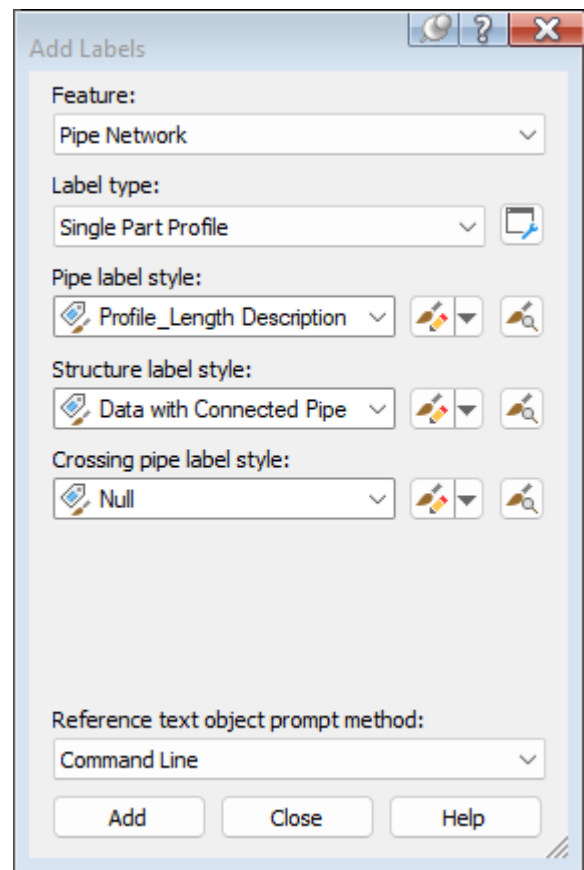


Figure 22. Add labels to pipes and structures in profile views.

23. In plan or profile view, select the null structure where the STORM-A5 alignment connects to the STORM A alignment.

On the contextual ribbon, expand the Structure Properties drop-down menu and select Structure Properties.

In the Structure Properties dialog, select the Connections tab.

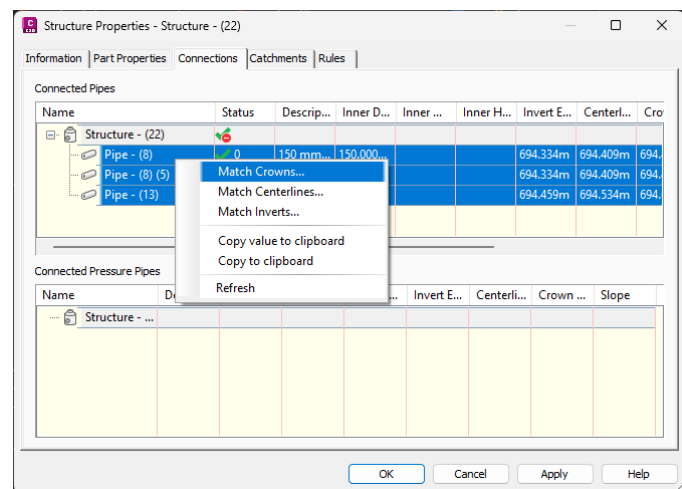
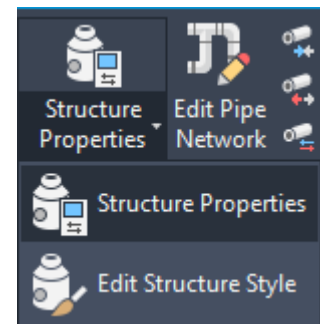
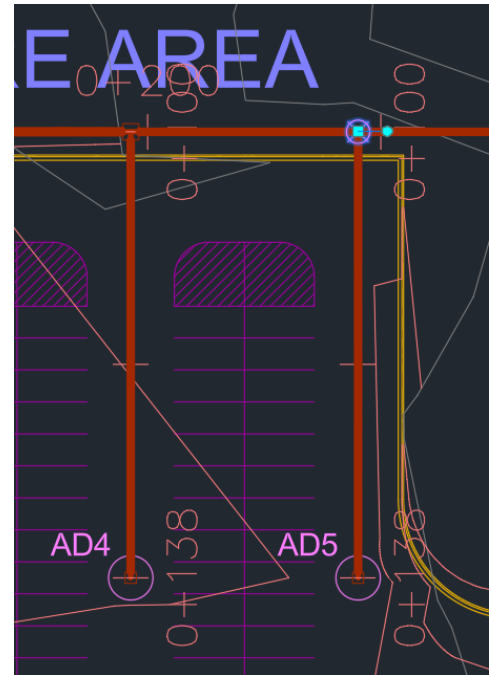
Select all three pipes in the list, right click, and click Match Crowns.

Select the pipe labeled “Out” and click OK.

Confirm that the crown elevations match, then click OK.

Locate the connection structure in the STORM-A profile view to confirm that the crowns match visually as well.

Maintain a pipe slope of 1% for all pipes along the STORM-A alignment by adjusting the pipe slope in Pipe Properties, then adjusting the connected pipes in Structure Properties so that crowns match the incoming STORM-A pipe elevation on at each structure.



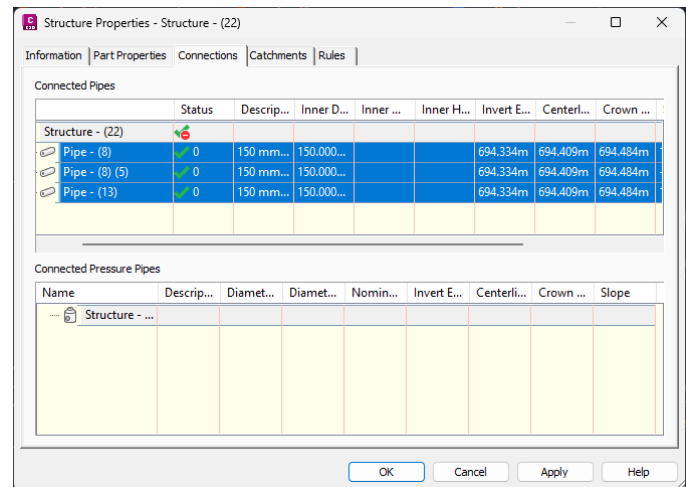


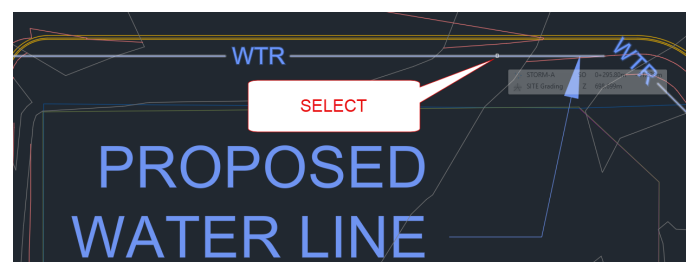
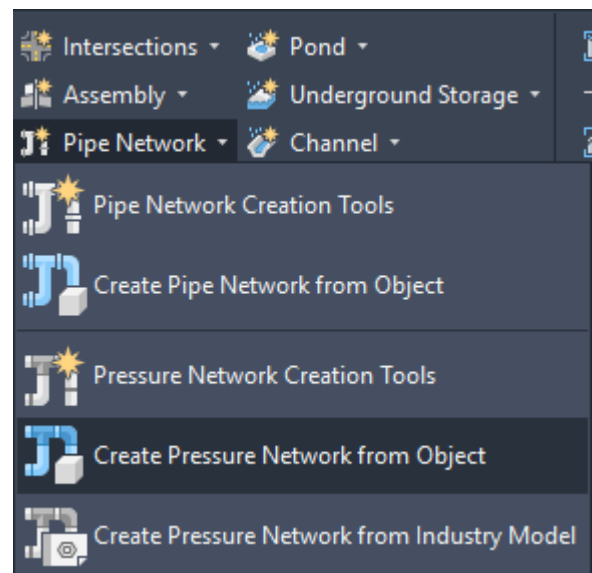
Figure 23. Adjust pipe elevations and slopes in Pipe Properties and Structure Properties dialogs.

24. On the Home ribbon, expand the Pipe Network drop-down menu and select Create Pressure Network from Object.

When prompted, select the polyline labeled PROPOSED WATER LINE near the arrow of the leader.

Type R and press Enter to reverse the alignment direction and Enter again to accept the direction change.

In the Create Pressure Pipe Network from Object dialog, set the name to WATER, the pipe run name to WATER-A, the parts list to Water, the pipe size to 200 mm (8"), the reference surface to Combined, enable the Create surface profile to follow option, set the reference alignment to <This Pipe Run>, select the cover option and set



to 3m (10'). Uncheck the Erase existing entity option then click OK.

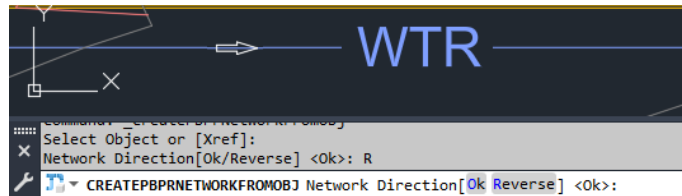
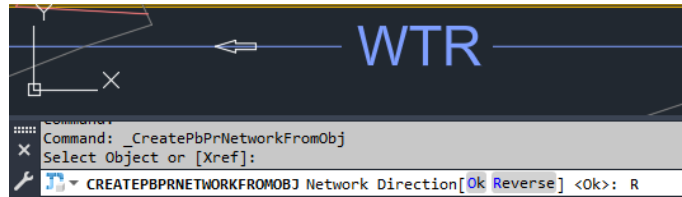
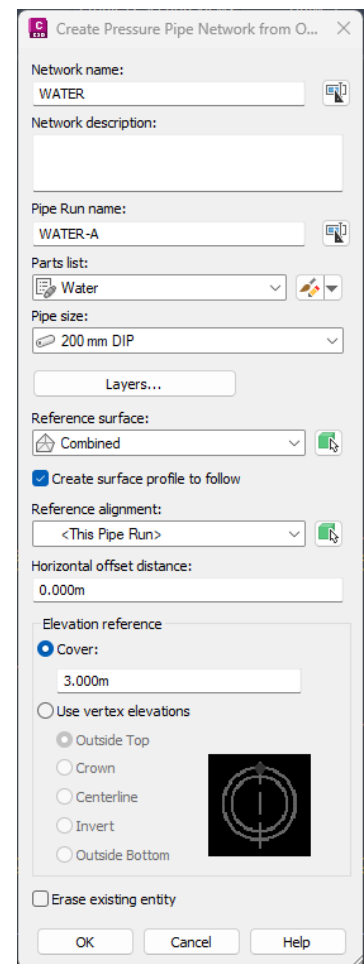
Select one of the pressure pipes.

On the contextual ribbon, click Pipe Run Profile.

In the Pipe Run Profile Settings, set the offset style to Cut Length, offset distance to 3 m (10'), enable the Update Dynamically option. For the Draw Profile in option, select New Profile View then click OK.

In the Create Profile View dialog, choose Major Grids with Band for the profile style, set an appropriate station range and profile view height (no split profile view), and click Create Profile View.

Select a location for the profile view near the STORM profile views.

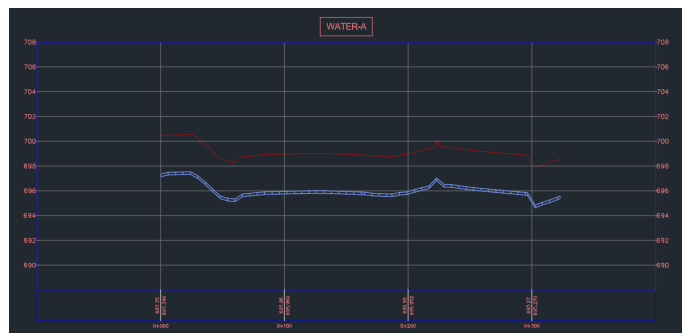
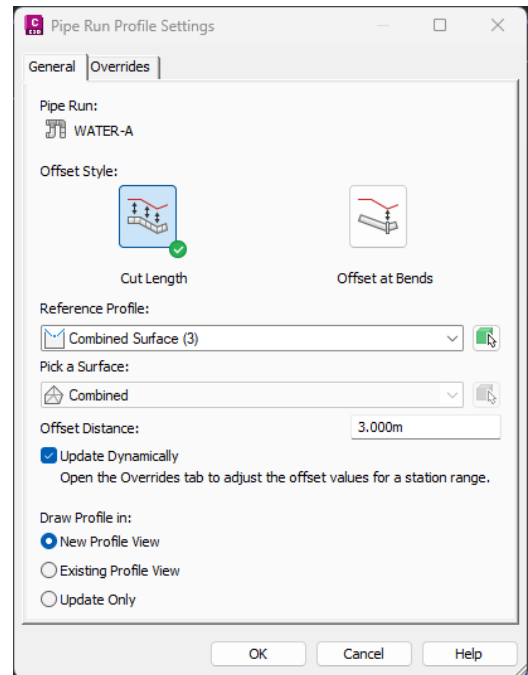
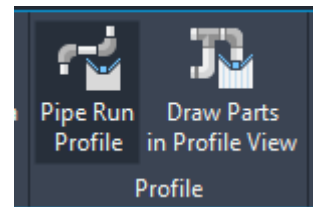


Figure 24. Create a pressure pipe network and adjust profile elevations.

25. Select the pressure pipe near the start of the alignment on the west side of the project.

On the contextual ribbon, select 200 mm (8") GATE VALVE from the list of appurtenances.

On the contextual ribbon, select Add Appurtenance.

When prompted to specify a placement point for the appurtenance, disable object snaps and hover over the pressure pipe near the start of the pressure pipe alignment.

When the break symbol appears, click to accept the location.

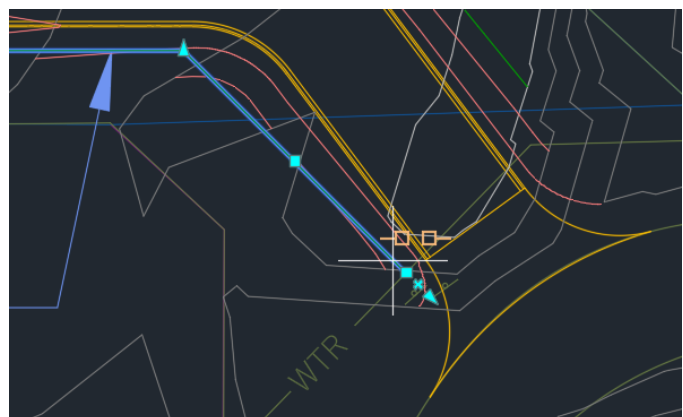
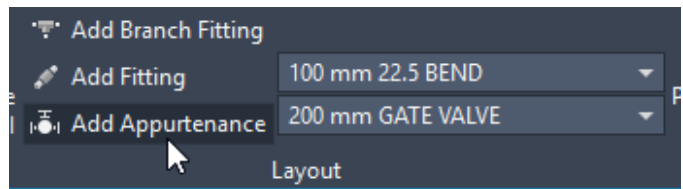
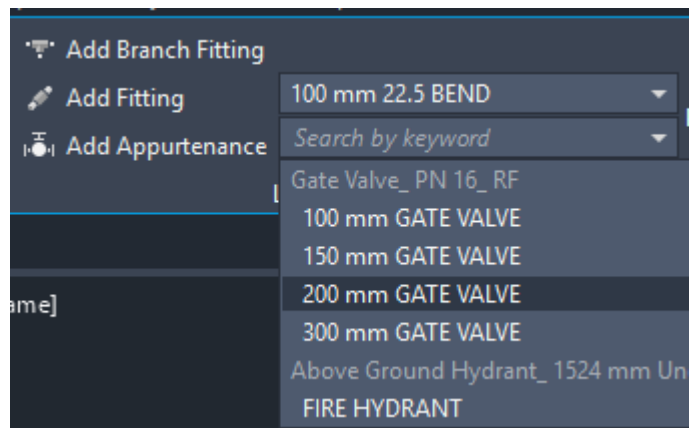
Hover over the pressure pipe near the end of the alignment.

When the break symbol appears, click to accept the location.

Press Esc to end the command.

Save the drawing.

The valves are automatically visible in the profile view for that alignment.



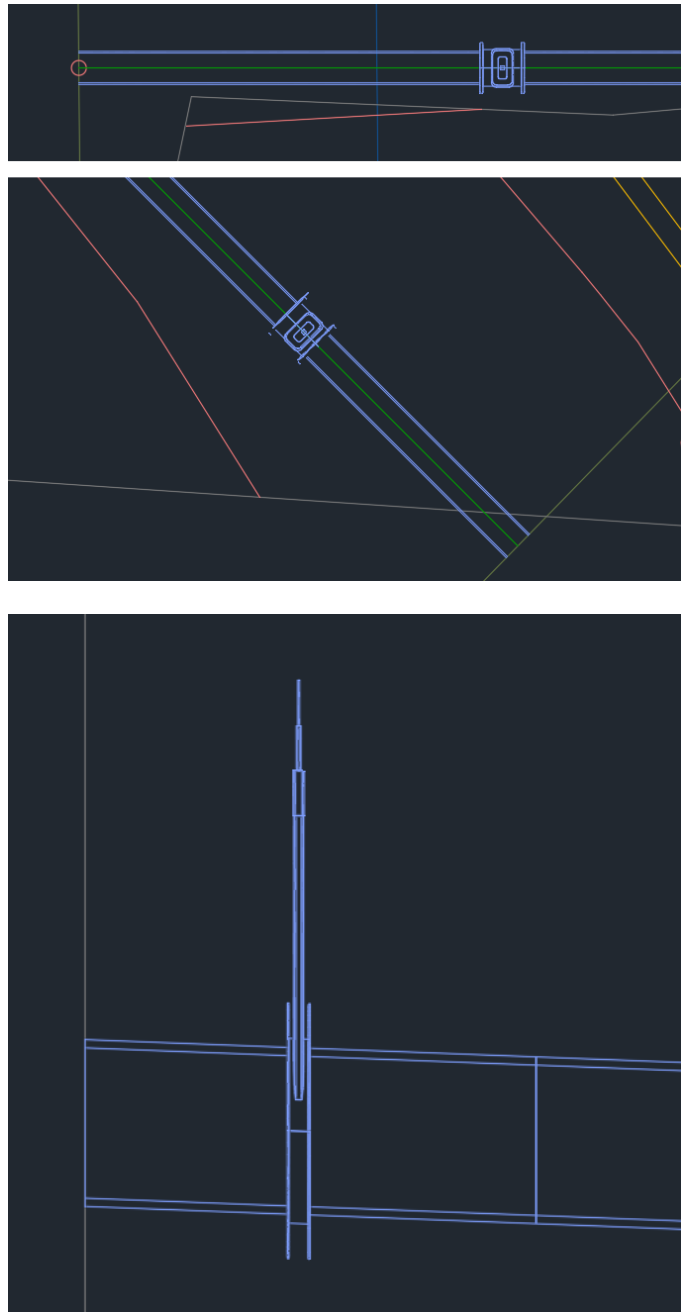


Figure 25. Add appurtenances to a pressure pipe network.