

MONTANA DEPARTMENT OF TRANSPORTATION



202 – Civil 3D Fundamentals – II User Guide



Prepared by:



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OUR MISSION IS – To plan, build, operate, and maintain a safe and resilient transportation infrastructure to move Montana forward.

Course Description

Course 202 – Civil 3D Fundamentals – II is the second part in the three-part Civil 3D Fundamentals learning path. This course continues developing knowledge of Civil 3D features and functionality. Upon completion, a better understanding of Corridors, Cross Sections, Pipe Networks, Project Explorer, and Volumes and Materials will be achieved.

Civil 3D Fundamentals courses 201, 202 and 203 have been developed to provide the basic functionality of the software to those who have had limited or no exposure to the Autodesk Civil 3D software. These three (3) courses deliver the building blocks to become more knowledgeable and proficient utilizing Civil 3D.

Course Length

8 hours

User Guide Notification Icons

This User Guide contains icons to help alert and assist the user with specific tasks and content. Each icon is identified and described in the table below.

ICON	DESCRIPTION
	The EXERCISE icon identifies tasks where users are guided through a hands-on review of the instructional topic using the software.
ţ.	The TIP icon identifies software best practices and useful tips.
	 The NOTE icon is used for identifying general information such as: To provide additional information that is not considered to be a warning or critical. To provide additional/alternative steps to workflow. To provide reminders of important information previously covered that may affect specific tasks throughout the workflow process.
CAUTION	The CAUTION icon is used to help identify and warn users of information and or workflow steps that should be followed or executed correctly.

Course Objectives

- How to model Corridors
- How to create Cross Sections
- How to create and edit Pipe Networks
 - o Pipe and Structure Catalogs and Parts Lists
 - Applying Pipe and Structure rules to Pipe Networks
 - Profile and Section display options
- Compute Volumes and Materials for a project. Quantity Takeoffs (QTO)
- Understanding and utilizing Project Explorer
- Migrating legacy project data to Autodesk

Topics Covered

- Introduction to Corridors
 - o Assemblies and Subassemblies
 - o Corridor Frequency of Stationing
 - Corridor Targets and Target Types
 - Understanding and Using Regions
 - o Corridor Surfaces
 - Cross Section Editor
- Cross Sections
 - o Generating Sample Lines
 - Single/Multiple Cross Sections
 - o Section Views
 - o Labeling
 - o Utilizing the Cross Section Editor
- Pipe Networks
 - Creating Pipe Networks
 - Pipe and Structure Catalogs
 - Pipe and Structure rules
 - o Splitting, merging, reconnecting, and renaming Pipe Networks
 - o Display options for Pipe Networks
 - Connection and insertion points
 - Generating tables and reports

- Project Explorer
 - Project data navigation, review, and editing
 - Evaluating design criteria
 - Generating tables and reports
- Quantity Takeoff (QTO)
 - o Earthwork Volumes
 - o Material Volumes
 - o Generating reports

Pre-requisites

- A basic understanding of design/drafting procedures and terminology
- A working knowledge of your operating system
- 101 AutoCAD Fundamentals for Bentley Users
- 201 Civil 3D Fundamentals I

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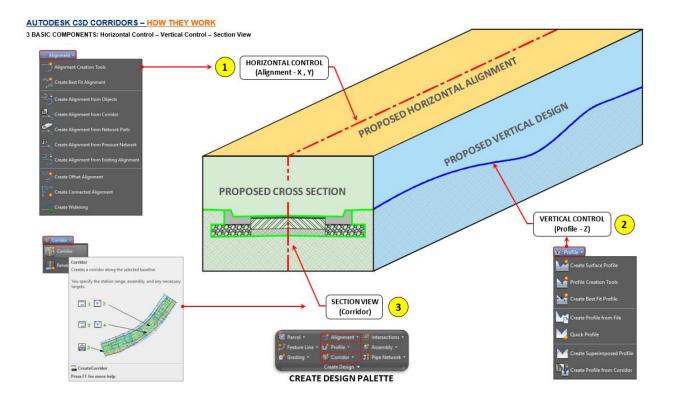
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Introduction to Corridors

You can use Autodesk Civil 3D corridor modeling to create flexible and configurable 3D models of corridors, such as roads, highways, ditches, and channels. A corridor model builds on and uses various Autodesk Civil 3D objects and data, including assemblies, subassemblies, surfaces, feature lines, alignments, and profiles. The corridor manages the data, tying various assemblies (applied for different ranges of stations) to the baselines and their finished grade profiles.



Design File Creation and Set-up

Design files are drawing files used for specific design elements related to the project design. Such as, surfaces, alignments, corridors, etc. The following steps will walk us through the creation and set-up of the Corridor Design drawing file which must be done prior to creating corridor assemblies and the corridor itself.

Create a New Drawing

Step 1: From the Start tab > Create a new drawing using the Standard: design-start.dwt

• C:\MDOH\StateKit\Civil 3D\2022\Templates_Start-Dwg

Step 2: Save and Name the drawing: 8684000RDCORD001-USER INITIALS.dwg

C:\mdtapps\Auto	desk_Training	\202-C3D Fun	damentals-II\ <mark>Wo</mark>	<mark>rking</mark>	Manage Reference Styles Manage reference styles from templates
C	v ∓ 🐔 Share	Autodesk Civil 3D 2022 8684000Ri Insparent InfraWorks Collaborate		r keyward ar phrase 🔍 💄 Sign	Press F1 for more help
Home Inset Annotate Modify Analyze View Mark	Record R	Interface Palettes	Help Add-ins Vehicle Tracking R.	≝ Layer Translator	erence Define Property Sets Dynamo Dynamo Player

Step 3: Navigate to the Manage tab > Styles panel > Select Reference

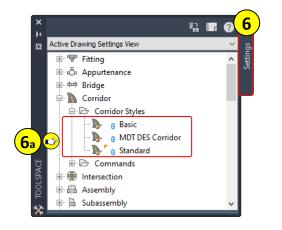
	C Attach Referen	nced Templat	2			×
	+ × 2					\
	Template Name	Status	Date	Saved Path	Load 4)
C	design-group	Loaded	2022-06-23 17:34:24	C: \MDOH\StateKit\Civil 3D\2022\Templates\Reference\design-group.dwt		Ŷ
						÷
				OK Cancel Apply	Help	*

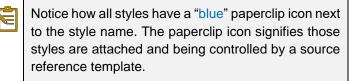
Step 4: Verify the attached design-group reference template is loaded.

Step 5: Click OK.

Step 6: Navigate to TOOLSPACE > Settings tab.

a. Expand the Corridor object collection > Expand Corridor Styles.

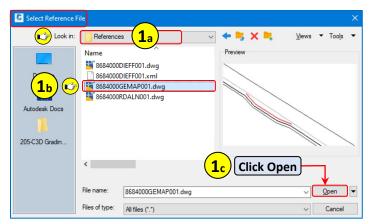


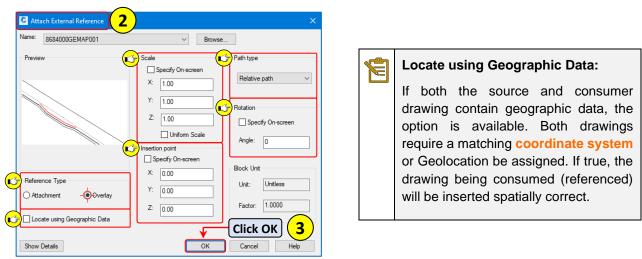


Attach External Reference Drawing Attach ■ 🍃 🗒 📙 🖥 🖶 🛧 · 8 Attaches a new reference file to the current draw E A 🔜 ATTACH Str I. ца, Creat 8 6 1 and LandXML T Import Survey Data *Frames vary* Press F1 for more help

Step 1: Navigate to the Insert tab > Reference panel > Select Attach.

- a. Navigate to C:\mdtapps\Autodesk_Training\202-C3D Fundamentals-II \References
- b. Select > 8684000GEMAP001.dwg
- c. Click Open.

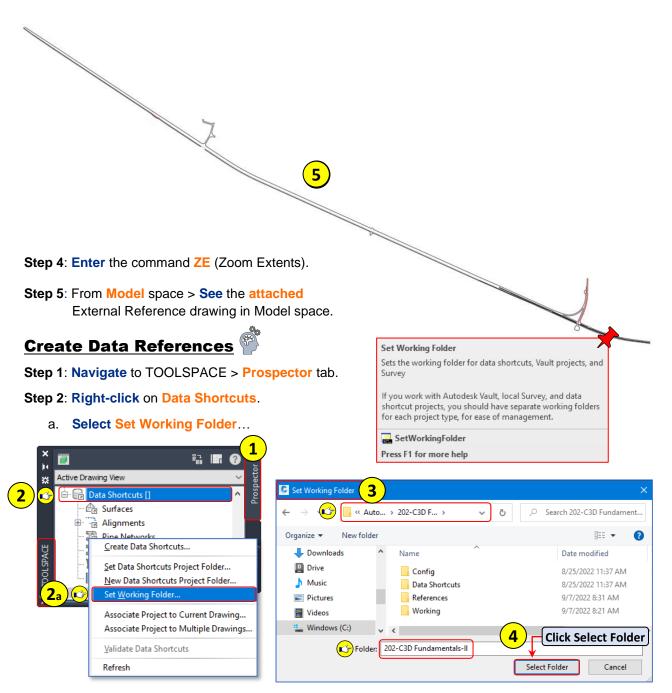




Step 2: From the Attach External Reference dialog box, verify the following parameters:

- **Reference Type** = Overlay
- **Scale** = Specify On-screen is unchecked
- Insertion point = Specify On-screen is unchecked
- Path type = Relative path
- Rotation = Specify On-screen is unchecked

Step 3: Click OK.



Step 3: From the Set Working Folder dialog box > Navigate to:

• C:\mdtapps\Autodesk_Training\202-C3D Fundamentals-II

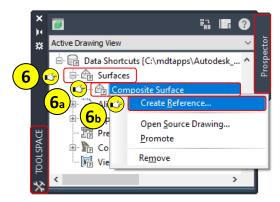
Step 4: Click Select Folder.

Step 5: Verify the Data Shortcuts path has been correctly set.

🗄 🕞 Data Shortcuts [C:\mdtapps\Autodesk_Training\202-C3D Fundamentals-II\Data Shortcuts]

E

If there is **NO** Data Shortcuts path visible from the Prospector, the path has been incorrectly set or there is no Data Shortcut Project in the selected directory.



Step 6: From Toolspace > Prospector tab > Data Shortcuts > Expand Surfaces.

- a. Right-click on 8684000DIEFF001 surface.
- b. Select Create Reference...

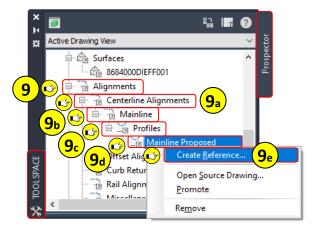
ource surface:	-	Surface layer:			
684000DIEFF001		C-SURF-8684000DIEFF001] 🛃	C Select Surface Style	
Properties	Value				
Information				🕞 🔗 REF EX Contours 1-5 🔽	-
Name	8684000	DIEFF001			
Description	Photo ar	nd Pick up survey combined		OK Cancel He	p
Style	REF EX C	Contours 1-5			
Render Material	ByLayer				
		OK Cancel Help	5		

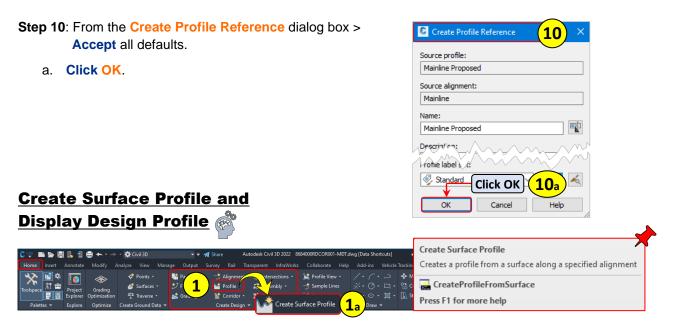
Step 7: From the Create Surface Reference dialog box > Set the surface style to:

- a. Select REF EX Contours 1-5 surface style.
- b. Click OK.

Step 8: From the Create Surface Reference dialog box > Click OK.

- Step 9: From Toolspace > Prospector tab > Data Shortcuts > Expand Alignments.
 - a. Expand Centerline Alignments.
 - b. Expand Mainline
 - c. Expand Profiles
 - d. Right-click on Mainline Proposed
 - e. Select Create Reference...





Step 1: Navigate to the Home tab > Create Design panel > Click Profile drop-down.

a. From the Profile drop-down list > Select Create Surface Profile.

Alignment: Mainline Station range Alignment: Start: 221+00.00' To sample: 221+00.00' Profile list:		2 b	ind: 391+19.77 ['] 391+19.77 [']			faces: 4000DIEFF e offsets:	(2 c)		Clic	k Add	Add>>
FIOTILE IISC.								Station		Elevation	
Name	Description	Type	Data Source	Offset	Lindate Mode	Laver	Style	Decidori		Lievauon	
Name	Description	Туре	Data Source	Offset	Update Mode	Layer	Style	Start	End	Minimum	Maximum
Name Mainline Proposed	Description		Data Source	Offset 0.000'	Update Mode	Layer	Style Standard		End 391+19.21		Maximum 4139.350'
	Description		Data Source 8684000DIEFF001	0.000'	Update Mode Dynamic	Layer		Start 225+91.90'	391+19.21	Minimum	

Step 2: From the Create Profile from Surface dialog box > verify and do the following:

- a. Alignment = Mainline
- b. Station Range = Default entire range
- c. Select surfaces = 8684000DIEFF001
- d. Click Add>>> (Clicking Add >> will populate the Profile list with the surface profile to be created)
- e. Click Draw in profile view

The Profile list contains profiles that can be drawn in a Profile View. The Mainline Proposed profile was previously Data Referenced into the drawing and is ready to be drawn.

General	Specify profile disp	lay optio	ns:														
Station Range	Name	Draw	Clip Grid	Split At	Des	Туре	Data Source	Offset	Update Mode	Layer	Style	Override Style	Labels	Alignment	Station Start	End	Elev Mini
Profile View Height	Mainline Propose Surface (1)	d 🔽	•	•			8684000DIE	0.00' 0.00'	Dynamic		PLN Design Profile PLN EX Ground	<pre>Not Ov</pre>		Mainline Mainline	225+91.90' 221+00.00'	391+19.21' 391+19.77	4027 4023
Profile Display Options									(3	d	<u> </u>			(3g		
Pipe/Pressure Network																	

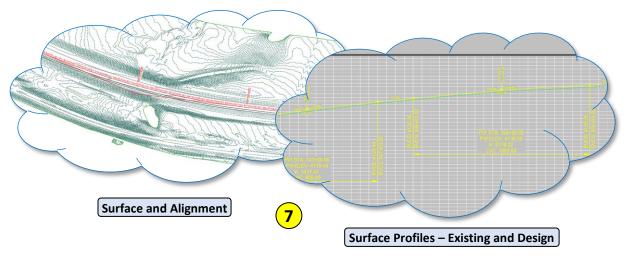
Step 3: From the Create Profile View Wizard > Review each page:

- a. From the General page > Accept defaults by clicking Next >.
- b. From the Station Range page > Accept defaults by clicking Next >.
- c. From the Profile View Height page > Accept defaults by clicking Next >.
- d. From the **Profile Display Options** page > **Set** the following parameters:
 - Mainline Proposed Style / Labels = PLN Design Profile / Design Labels
 - Surface (1) Style / Labels = PLN EX Ground / _No Labels
- e. Click Next >.
- f. From the Data Bands page > Select band set > _No Bands > Click Next >.
- g. From the **Profile Hatch Options** page > **Click Create Profile View**.
- Step 4: From Model space when prompted > Select profile view origin > Pick a location in Model space to place the profile view.

CREATEPROFILEVIEW Select profile view origin:

Step 5: From the Status Bar > Set the Annotation Scale to > 1" = 40' 🗶 1" = 40' -

Step 6: Enter the command ZE (Zoom Extents).



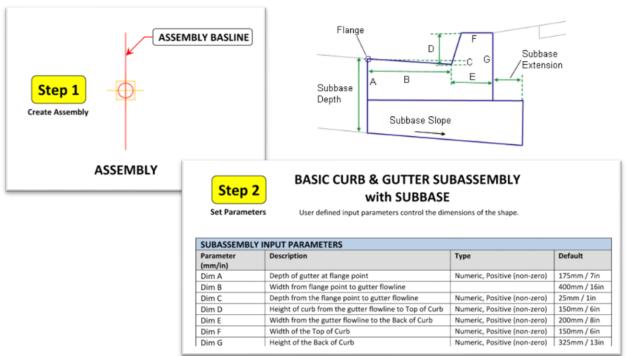
Step 7: From Model space > See the referenced C3D objects.

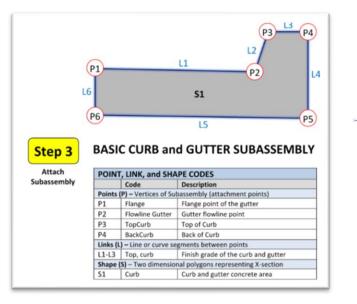
Step 8: Save the drawing

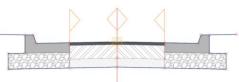
Assemblies and Subassemblies

An assembly is an Autodesk Civil 3D drawing object that manages a collection of subassembly objects that are used to form the basic structure of a 3D corridor model. Together, assemblies and subassemblies function as the basic building blocks of a roadway or other alignment-based design. An assembly object must be applied along an alignment to form a corridor. The assembly can reference one or more offsets needed for the corridor design.

The MDT State Kit includes preconstructed assemblies for Rural 2 Lane, Rural 4 Lane, Rural Divided, Urban 2 Lane – Sidewalk, Ramp and Widening. In some cases, there may be the need to create a nonstandard assembly. The MDT State Kit provides subassemblies that can be used to create the desired assembly.



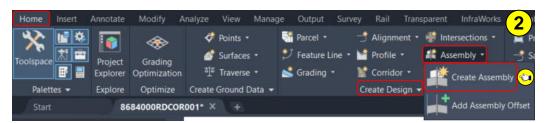




Creating an Assembly

Step 1: Continue working with the 8684000RDCOR001-USER INITIALS.dwg. previously created.

Step 2: Navigate to Home tab > Create Design panel, select Assembly, select Create Assembly.



Step 3: Change the parameters shown below, click OK.

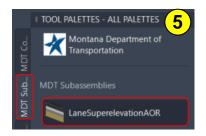
Name: Access Road

Assembly Type: Other

Assembly Style: MDT Standard

Code set style: All Codes with Hatching

Step 4: Select a point next to the profile view, when prompted to Specify assembly baseline location.

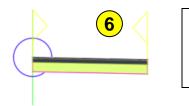


_	
	Create Assembly 3 ×
	Name:
C	Access Road
	Description:
	^
	~
	Assembly Type:
	Other ~
	Assembly style:
	🚯 MDT Standard 🗸 🖌
	Code set style:
	🗦 All Codes with Hatching 🗹 🍫 🗾
	Assembly layer:
	C-ASM ^{® Accel} Click OK
	OK Cancel Help

Step 5: Navigate to TOOL PALETTES > MDT Subassemblies, select LaneSuperelevationAOR.



Assemblies are created at a 1:1 scale. When you select a point on the screen to insert the baseline, Civil 3D will automatically zoom you to its location.

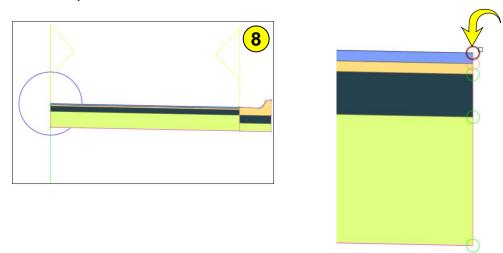


Prior to placing subassemblies, if needed, certain parameters can be revised and or set using the Properties palette. After placement, parameters can be set at any time through the subassembly properties.

Step 6: Accept the default properties, select the assembly baseline, select Esc to end the command.

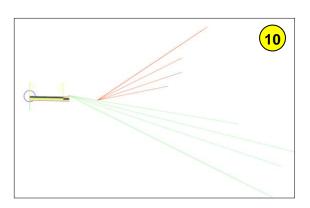
Step 7: Navigate to TOOL PALETTES > MDT Subassemblies, select MDT Curb and Gutter.

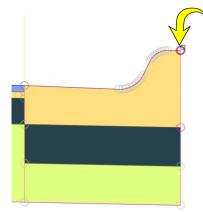
Step 8: Accept the defaults properties, select the upper right point of the LaneSuperelevationAOR subassembly, select Esc to end the command.



Step 9: Navigate to TOOL PALETTES > MDT Subassemblies, select MDT Daylight Urban.

Step 10: Accept the defaults properties, select the back of curb point of the MDT Curb and Gutter subassembly, select Esc to end the command.





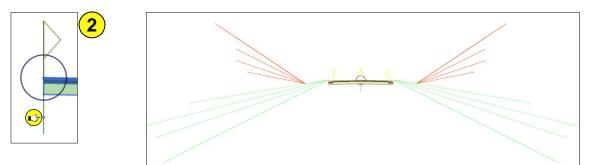
Mirroring Subassemblies

Step 1: Select the LaneSuperelevationAOR, MDT Curb and Gutter and MDT Daylight Urban subassemblies, navigate to Modify Subassemblies panel on the contextual ribbon, select Mirror.





AutoCAD commands should not be used on Subassemblies. The Modify Subassembly Move, Mirror and Copy commands must be used. AutoCAD Move and Copy commands should only be used for the Assembly.



Step 2: Select the assembly base line > Press Esc to end the Mirror command.

Organizing Subassemblies

Step 1: Select the assembly baseline, navigate to Modify Assembly panel, select Assembly Properties.

Home	Insert	Annotate M	Nodify	Analyze	e View	Manage	Output	Survey	Rail	Transp:
Prope	erties) 😫	Copy 🖹	Add to As	sembly		4	H:	Add Offset
🗾 Obje	ct Viewer	Subassembly	, 🖦 N	Nove 🖣	Clear Offs	et in Assem	bly 👩	Assembly		
🧐 Isolat	te Objects			Airror 🛋	Select Sin	nilar Subass	emblies	Properties		
General	Tools 🔻			Modify Su	bassembly	(Мо	dify A	ssembly

Step 2: Select Construction tab in the assembly Properties dialog box, rename the subassemblies _RT for right side and _LT for left side, click OK., press Esc to deselect the baseline.

<u>Right</u>

<u>Left</u>

LaneSuperelevationAOR_RT

MDT CurbAndGutter_LT

LaneSuperelevationAOR_LT

MDT CurbAndGutter_RT

MDT Daylight_LT

MDT	Daylight_	RT
	Duyingin_	

Other Item: Input values: Baseline Right LaneSuperelevationAOR_RT MDTCurbAndGutter_RT Side Cut / Fill Condition To ClaneSuperelevationAOR_LT	Default I		ter Reference
Baseline Right Value Name MDTCurbAndGutter_RT MDTDaylight_RT Left Value Name Value Name Side Cut / Fill Condition		n	
Right Value Name LaneSuperelevationAOR_RT MDTCurbAndGutter_RT MDTDaylight_RT Left Transform		n	
LaneSuperelevationAOR_RT MDTCurbAndGutter_RT MDTDaylight_RT Left Transform	Left	Use	
Cut / Fill Condition	Lert		Get Value
E-E- Left	Both		<none></none>
	6 00.1	H	Allonas
MDTCurbAndGutter_LT MDTDaylight_LT Output values:			>
Value Name	Ou	tput Value	
Final Fill Slope/Cut	Ditch In Sl 0.1	67	
Foreslope Width	0.0	00	

Naming an Assembly

Step 1: Type FIELD at the command line, select Enter.

Step 2: Select Objects from the Field category, select Object from the Field names, select the green box for the Object Type.

Field	2c)	2 ×
Field gategory:	Object type:	Preview:
G Objects V		####
Field names:	Property:	Format:
BlockPlaceholder Count		
Formula		
NamedObject		
T 🔿		
2 b		
Field expression:		
%<\AcObjProp>%		

Step 3: Select the assembly baseline when prompted to Select object.

🧕 Field		<mark>4</mark> ×
Field category:	Object type:	Preview:
Objects	~ Assembly	ACCESS ROAD
Field names:	Property:	Format:
BlockPlaceholder Count Formula NamedObject Object	Code Set Style Color Description Layer Linetype scale Linevveight Vame Object name Plot style Show Tooltips True Color	4a
Field expression:		
%<\AcObjProp Object(%	:_ObjId 2138706771584>%).Name \	Click OK 4b
		OK Cancel <u>H</u> elp

Step 4: Select Name for the Property, select Uppercase for the Format, click OK.

- Step 5: Select a point near the assembly baseline to place the Field in the drawing.
- Step 6: Select the Field, right click and select Properties, change the Text height to 1, close the properties palette, press Esc to deselect the field text.





Step 7: Select the assembly baseline, navigate to Modify Assembly panel, select Assembly Properties.

Home Insert Annotate Modify Analyze View Manage Out	tput Survey Rail Transp 7
🦻 Isolate Objects Properties 🗟 Mirror 🖹 Select Similar Subassembli	
General Tools Modify Subassembly	Modify Assembly
Assembly Properties - Access Road	— 🗆 X
Information Construction Codes	8
Name:	
Description:	
v .	
Object style	
Show tooltips	ck OK
ок	ancel Apply Help

Step 8: Navigate to the Information tab, change the name to Access Road Urban, click OK.

Step 9: Press Esc to deselect the assembly baseline.

Step 10: Type RE, select the Spacebar to regenerate the view.

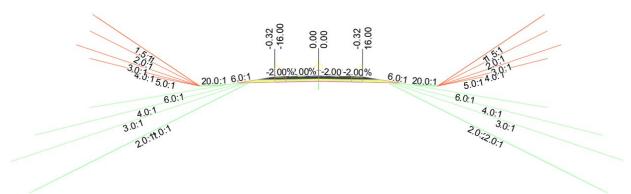


Fields can be used to add text links to drawing components. If the drawing component updates, the Field will update as well.

Step 11: Save the drawing

Leveraging an MDT Assembly for corridor design

Step 1: Navigate to TOOL PALETTES > MDT Assemblies, select MDT Rural 2 Lane, accept the default properties, pick a point on the screen to place the assembly, select Esc to end the command.

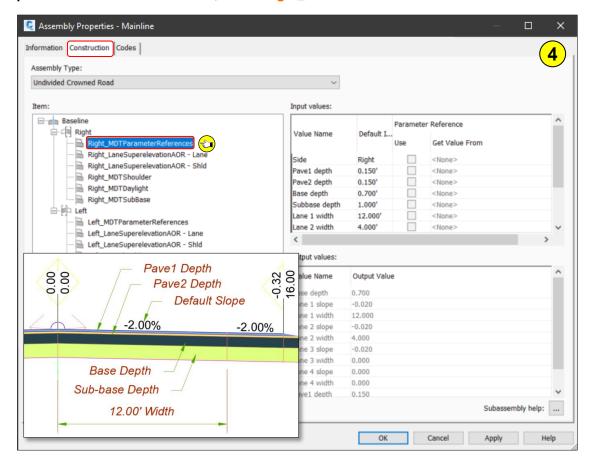


Step 2: Select the assembly baseline, navigate to Modify Assembly panel, select Assembly Properties.

Home	Insert	Annotate N	/lodify /	Analyze	View	Manage	Output	Survey	Rail	Transp 2
Prop	erties		😫 Cop	y 🛋	Add to As	sembly			H	Add Offset
🗾 Obje	ct Viewer	Subassembly	, 🖦 Mov	e 🗤	Clear Offs	et in Assem	bly 🔥	Assembly		
🧐 Isola	te Objects			or 🛋	Select Sim	nilar Subass	emblies	Properties	J	
General	Tools 👻		Мо	dify Sul	passembly			Mod	dify A	ssembly

Step 3: On the Information tab, rename the Assembly to Mainline.

Assembly Properties - MDT Rural 2 Lane	-	
Information Construction Codes		3
Name:		
Mainline		
Description:		
Rural Undivided 2 Lane - GDS 2.4 / RDM 5-19 12' Lanes 4' Shoulder Rural Slope Table		
Object style Image: MDT Standard Image: MDT Standard		
Show tooltips		
OK Can	cel Apply	Help



Step 4: Select the Construction tab, select Right_MDTParameterReferences.

The MDT Assemblies use a parameter reference subassembly to control the parameters of subassemblies attached to the assembly baseline. To make a parameter change for slope, depth, or width, the value in the parameter references will need to be changed.

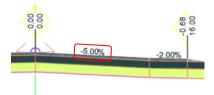
ime De	efault Input Value	Paramete	r Reference
		Use	Get Value From
Ri	inht		<none></none>
	-	~	Right_MDTParameterReferences.Lane 1 width
			Right_MDTParameterReferences.Lane 1 slope
	.150'	~	Right_MDTParameterReferences.Pave1 depth
	.150'	~	Right_MDTParameterReferences.Pave2 depth
th 0.3	.700'	~	Right_MDTParameterReferences.Base depth
Depth 1.0	.000'	~	Right_MDTParameterReferences.Subbase dept
relevation Ri	ight Lane Outside		<none></none>
ection Av	way from Crown		<none></none>
Pivot Ye	es		<none></none>
int Code Cr	rown		<none></none>
oint Code Ed	dge of Lane(Lane)		<none></none>
	1 lope -2 pth 0 pth 0 Depth 1 relevation R ection A Pivot Y int Code C	th 0.150' pth 0.150' th 0.700' Depth 1.000' relevation Right Lane Outside ection Away from Crown Pivot Yes	12.000' Image: Constraint of the second se

Step 5: From the Construction tab, select Right_LaneSuperelevationAOR – Lane.

Notice the Width, Default Slope, Pave1 Depth, Pave2 Depth, Base Depth and Sub-base Depth "Default Input Values" are not editable and the "Get Value From" is leveraging the Right_MDTParameterReferences values. To make a value change to the Right_LaneSuperelevationAOR – Lane subassembly the value must be changed at the Parameter Reference level.

Step 6: From the Construction tab, select Right_MDTParameterReference, change the Lane 1 Slope to -5.00%, click Apply.

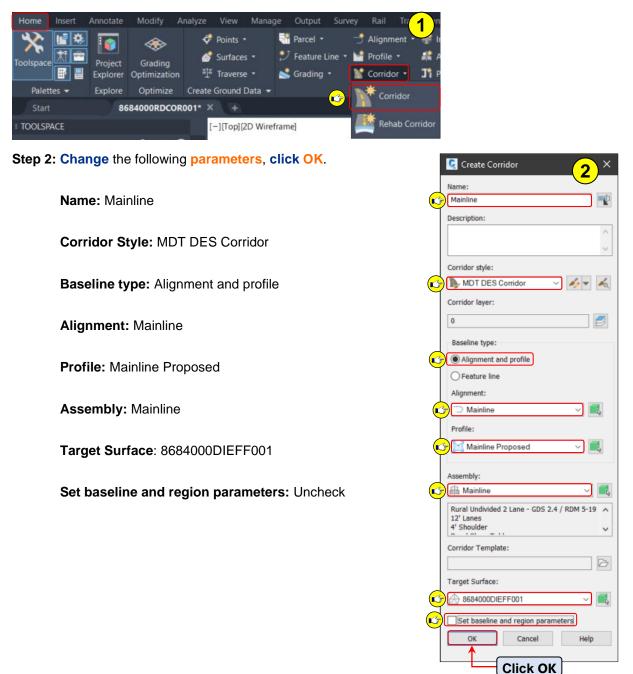
ormation Construction Codes				(6	
ssembly Type:					J	
Undivided Crowned Road	~					
item:	Input values:					
⊟-da Baseline				er Reference	^	
Right_MDTParameterReferences	Value Name	Default Input Valu	Use	Get Value From		
Right_LaneSuperelevationAOR - Lane Right_LaneSuperelevationAOR - Shld Right_MDTShoulder	Lane 4 width	0.000'		<none></none>		
	Lane 1 slope	-5.00%		<none></none>		
Right_MDTDaylight	Lane 2 slope	-2.00%		<none></none>		
Right_MDTSubBase	Output values:	2 000/		dianas		
Left_MDTParameterReferences Left_LaneSuperelevationAOR - Lane	Value Name		Output Value	put Value		
Left_LaneSuperelevationAOR - Shid	Base depth		0.700			
Left_MDTShoulder	Lane 1 slope		-0.020			
	Lane 1 width		12.000			
Left_MDTSubBase	Lane 2 slope		-0.020			
	Lane 2 width		4.000		~	
		Click	Apply	Supassembly help	c	



Step 7: Change the Lane 1 Slope to back to -2.00%, click OK, press Esc to deselect the baseline.

<u>Create a Corridor</u>

Step 1: Navigate to Home tab > Create Design panel > Corridor, select Corridor.

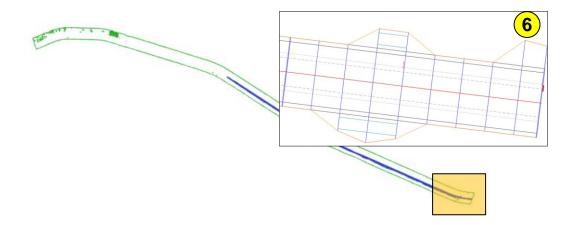


Step 4: Select Action, select Clear All Events, close the PANORAMA.

*	Open Log File	ent Viewer	96 event(s)			$\mathbf{\bigcirc}$
	Save Log File As	уре	Date	Time	Source	ιA
	Clear All Events	Error	7/14/2022	12:59:06 PM	Roadway	ā
A	Refresh	Error	7/14/2022	12:59:07 PM	Roadway	s
PANORAMA	Export List	Error	7/14/2022	12:59:07 PM	Roadway	5
<u></u> В		Error	7/14/2022	12:59:07 PM	Roadway	2
N N	Properties	Error	7/14/2022	12:59:07 PM	Roadway	٤ 🗸

Step 5: Type ZE + spacebar to zoom extents.

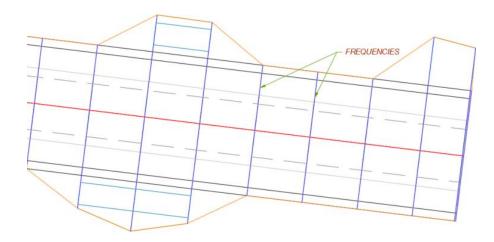
Step 6: Zoom to the southeast end of the Corridor. See the corridor.



Corridor Frequency

Corridor Frequencies are used to specify an incremental value of where to place an assembly along a corridor. Station frequency can be specified by referencing portions of an alignment and profile geometry in a region. For example, you can specify assembly insertion frequency for the following components of a corridor region:

- Along Tangents Specify the assembly insertion frequency along the tangent portion of an alignment.
- Along Curves Specify the assembly insertion frequency along the curve portion of an alignment.
- Along Spirals Specify the assembly insertion frequency along the spiral portion of an alignment.
- Along Profile Curves Specify the assembly insertion frequency along the curve portion of the profile.
- At Specific Points Specify whether assemblies should be inserted at specific geometry points, including horizontal geometry, superelevation critical, profile geometry, and profile high and low points.
- Along Offset Targets Specify whether assemblies should be inserted based on offset targets.



Adjusting Corridor Frequencies

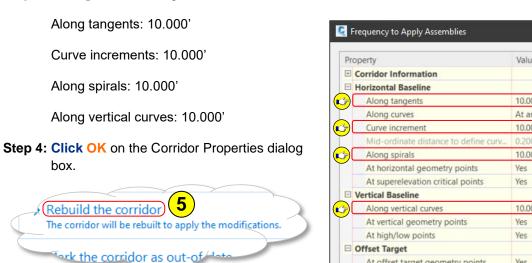
Step 1: Select the Corridor, select Corridor Properties on the contextual ribbon.



Step 2: In the Corridor Properties dialog box, select the Parameter tab, select Set all Frequencies.

Corridor Properties - Mainline									2
for Parameters Codes Feature Lines Surface	es Boundaries	Slope Patterns				(<mark>2</mark> b))		2
			Add B	aseline 🕝	Set all Freq	uencies	s	et all Targets	
Name	Horizont	Vertical Baseline	Assembly	Start Station	End Station	Frequency	Target	Overrides	
BL - Mainline - (1)	Mainline	Mainline Proposed		221+00.00'	391+19.77'				
RG - Mainline - (1)			Mainline	221+00.00'	391+19.77' 🗟	25.000'	•••	•••	
Select region from drawing						Lock Region	is To: Geome	try Locking	
					OK	Ca	ncel	Apply	Help

<mark>२</mark> ×



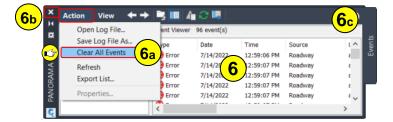
Step 5: Select Rebuild the Corridor from the Corridor Properties – Rebuild pop-up window.

Step 3: Change the following Values as shown, click OK.

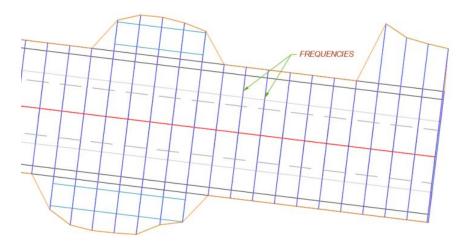
Be patient while the corridor updates.



	10.000' At an increment 10.000' 0.200'	Corridor Information Horizontal Baseline Along tangents Along curves Curve increment					
	At an increment 10.000'	Along tangents Along curves					
	At an increment 10.000'	Along curves					
	10.000'						
		Curve increment					
7	0.200'						
		Mid-ordinate distance to define curv.					
	10.000'	Along spirals					
	Yes	At horizontal geometry points					
	Yes	At superelevation critical points					
		Vertical Baseline					
	10.000'	Along vertical curves					
	Yes	At vertical geometry points					
	Yes	At high/low points					
		Offset Target					
	Yes	At offset target geometry points					
	Yes	Adjacent to offset target start/end					
>	>						
>	Yes Yes Yes	At vertical geometry points At high/low points Offset Target At offset target geometry points					



Step 6: Select Action, select Clear All Events, close the PANORAMA, press Esc to deselect the corridor.

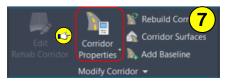




Notice not only the frequencies intervals increased, by applying additional frequencies, the corridor end conditions have smoother transitions as well.

By increasing the corridor frequencies, a more accurate depiction of the corridor model is presented. Use caution when increasing frequencies. The smaller the value the slower the corridor rebuild process will be and the drawing performance will decrease. Increasing the corridor frequencies should be applied after the design process and during the calculating volumes and materials process.

Step 7: Select the Corridor, select Corridor Properties on the contextual ribbon.



Step 8: In the Corridor Properties dialog box, select the Parameter tab, select Set all Frequencies.

🧕 Corridor Properties - Mainline									<mark>8)</mark> ×
Informer Parameters Codes Feature Lines Surfaces	Boundaries	Slope Patterns				(<mark>8</mark> b))		$\mathbf{\underline{O}}$
			Add Ba	iseline	Set all Freq		s	et all Targets	
Name	Horizont	Vertical Baseline	Assembly	Start Station	End Station	Frequency	Target	Overrides	
BL - Mainline - (1)	Mainline	Mainline Proposed		221+00.00'	391+19.77'		• • •		
RG - Mainline - (1)			Mainline	221+00.00' 🗟	391+19.77' 🗟	25.000'	•••	•••	
Select region from drawing						Lock Region	s To: Geome	try Locking	~
					OK	Ca	ncel	Apply	Help



Along tangents: 50.000'

Curve increments: 50.000'

Along spirals: 50.000'

Along vertical curves: 50.000'

Step 10: Click OK on the Corridor Properties dialog box.



Step 11: Select Rebuild the Corridor from the Corridor Properties – Rebuild pop-up window.

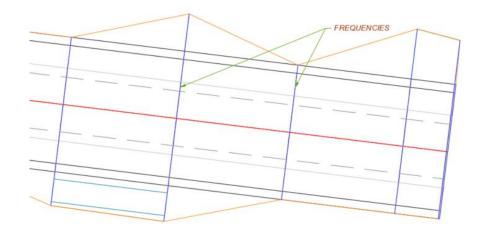
Be patient while the corridor updates.

Modeling Corridor	
inoucling contact	

Pro	operty	Value	^		
E	Corridor Information				
Ξ	Horizontal Baseline				
	Along tangents	50.000'			
Ĭ.	Along curves	At an increment			
	Curve increment	50.000			
I	Mid-ordinate distance to define curv.	0.200'			
	Along spirals	50.000'			
	At horizontal geometry points	Yes			
	At superelevation critical points	Yes			
Ξ	Vertical Baseline				
	Along vertical curves	50.000			
	At vertical geometry points	Yes			
	At high/low points	Yes			
	Offset Target				
	At offset target geometry points	Yes			
	Adjacent to offset target start/end	Yes	~		
<		,			
	\times				
Stat	ion Descrip	otion			
		Click OK			

	Open Log File	ent Viewer	96 event(s)			(12
	Save Log File As		Date	Time	Source	1^
	Clear All Events	12 a	7/14/2022	12:59:06 PM	Roadway	ā
¥.	Refresh	- nor	7/14/2022	12:59:07 PM	Roadway	ā
PANORAMA	Export List	Error	7/14/2022	12:59:07 PM	Roadway	5
Б.		Error	7/14/2022	12:59:07 PM	Roadway	2
A 1	Properties	Error	7/14/2022	12:59:07 PM	Roadway	د ب

Step 12: Select Action, select Clear All Events, close the PANORAMA, , press Esc to deselect the corridor.



Solving Event Viewer Errors

Step 1: Zoom to the **Mainline Profile**, notice that the proposed profile doesn't begin at the alignments starting station or extend to the ending station of the alignment.

A corridor leverages horizontal data from an alignment and vertical data from a profile. When the alignment and profile starting and ending stations do not match, the Event Viewer will populate with errors. To resolve the errors, in this case, the corridor starting and ending stations need to be adjusted to match the profile stationing.

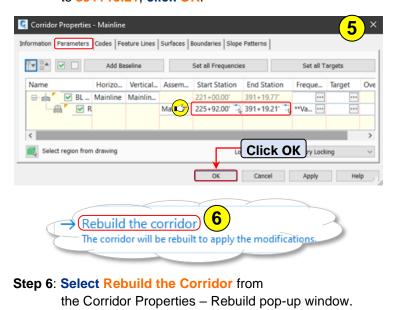
Step 2: Select the Mainline Proposed Profile, select Profile Properties from the contextual ribbon.

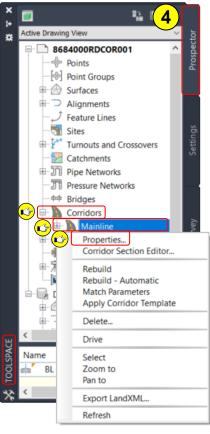


Step 3: On the Profile Properties, select Profile Data tab, note the Start and End stations, click OK, press Esc to deselect the Mainline Proposed Profile.

	es - Mainlin		osed							-		
ormation Profile D	ata Design	Criteria										<mark>(3</mark>
Name	Description	Туре	Data Source	Offset	U Layer	Style	Station Start	End	Elevation Minimum	Maximum	Alignment	
Mainline Proposed		\sim		0.000'		PLN Desig	225+91.90'	391+19.21	4027.220'	4139.350'	Mainline	
Parent horizontal a Name:	alignment											
	alignment											
Name:	alignment											
Mainline	alignment	En	d:									
Name: Mainline Stationing	alignment		d: 91+19.77'									
Name: Mainline Stationing Start:	alignment							 [0	lick O	ĸ		

- Step 4: Navigate to TOOLSPACE > Prospector tab, expand Corridors, right click on Mainline, select Properties.
- Step 5: In the Corridor Properties dialog box, select Parameters tab, change the Start Station to 225+92.00 and End Station to 391+19.21, click OK.





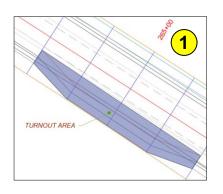
Modeling Corridor

Be patient while the corridor updates.

Corridor Targets and Target Types

Corridor targets can be leveraged to specify horizontal widths adjustments, vertical adjustments from 3D polylines o, feature lines or survey figures and for surface projections. Targets are required when the geometry of one or more of an assembly's subassemblies requires corresponding surface, offset, or elevation targets for defining that geometry. When a corridor contains subassemblies that use targets, the object names of the intended target objects must be mapped from the subassembly definition to the corresponding drawing objects. This task is referred to as setting targets or mapping targets.







Step 2: Select the Mainline Corridor, right click and select Corridor Properties.

Step 6: In the Corridor Properties dialog box, select Set all Targets.

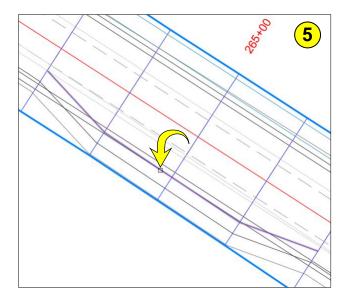
💈 Corridor Properties - Mainline							(3)×
Information Parameters Codes Feature Lines Surfaces Boundary	ies Slope I	Patterns						J
		Add Baselin	ie	Set all Fre	Set all Targets			
Name	Horizo	Vertical	Assem	Start Station	End Station	Freque	Target	Overrid
🖃 📩 🔽 BL - Mainline - (1)	Mainline	Mainlin		221+00.00'	391+19.77'			
			Mainline	225+92.00'	391+19.21'	**Va ····	•••	•••
Select region from drawing					Lock Regions	To: Geome	try Locking	\sim
				(DK Can	cel	Apply	Help



Step 4: In the Target Mapping dialog box, select the Collapse all button, expand Right_LaneSuperelevationAOR – Shld, select Width Target, select pick from screen button.

Mainline Offset and Elevation Surface Subassembly ♥ UrfLaneSuperelevationAOR - Lane Left_MTDayNight	221+00.00 Baseline ▼ BL - Mainline - (Region 🔻	391+19.77				-
Ubassembly Left_LaneSuperelevationAOR - Lane Left_LaneSuperelevationAOR - Shld		Pasian -					-
Left_LaneSuperelevationAOR - Lane Left_LaneSuperelevationAOR - Shld		Degion W				4a)	() 🕞 🕞 📡 🕻
E Left_LaneSuperelevationAOR - Shld	BL - Mainline - (Region +	Start Station	End Station	Assembly	▼ Side ▼	Assembly Grou
		RG - Mainline - (1)	225+92.00	391+19.21	Mainline	Left	Left
- Left MDTDavlight	BL - Mainline - (BL - Mainline - (RG - Mainline - (1) BL - Mainline - (RG - Mainline - (1) BL - Mainline - (RG - Mainline - (1) BL - Mainline - (RG - Mainline - (1) BL - Mainline - (RG - Mainline - (1)		391+19.21	Mainline	Left	Left
	BL - Mainline - (391+19.21	Mainline	Left	Left
Left_MDTParameterReferences	BL - Mainline - (391+19.21	Mainline	Left	Left
Left_MDTShoulder	B/ Nine - (391+19.21	Mainline	Left	Left
Left_MDTSubBase	E 4b he - (391+19.21	Mainline	Left	Left
Right_LaneSuperelevationAOR - Lan		RG - Mainline - (1)	225+92.00	391+19.21	Mainline	Right	Right
Right_LaneSuperelevationAOR - Shlo	d 🔁 - Mainline - (391+19.21	Mainline	Right	Right
Outside Elevation Target	BL - Mainline - (BL - Mainline - (RG - Mainline - (1)		391+19.21	Mainline	Right	Right
Width Target		RG - Mainline - (1)	225+92.00	391+19.21	Mainline	Right	Right
Right_MDTDaylight	-4c	RG - Mainline - (1)	225+92.00	391+19.21	Mainline	Right	Right
Right_MDTParameterReferences				391+19.21	Mainline	Right	Right
Right_MDTShoulder	BL - Mainline - (RG - Mainline - (1)	225+92.00	391+19.21	Mainline	Right	Right
Right_MDTSubBase	BL - Mainline - (RG - Mainline - (1)	225+92.00	391+19.21 Mainlin		Right	Right
Set Offset Targets							
			Select feature line	s, polylines, and su	rvey figures to targe	t: 🚺	
		i			rvey figures to targe In-use/Total	t: Detail	ta 🕝 🔳
Select alignment and pipe to target:	2	e		ime			
Select alignment and pipe to target:	2	2	Na	ime C	In-use/Total	Detail	<mark>40 @ 2</mark>
	2	.	Na Na O S68	ime C	In-use/Total 0/1 0/7	Detail	

Step 5: Select the red line representing the turnout, select Enter on the keyboard to return to the Target Mapping dialog box.



Step 6: Select OK on the Target Mapping dialog box.

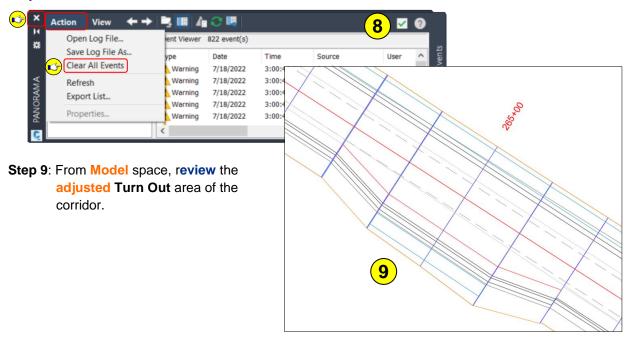


Step 7: Select OK on the Corridor Properties dialog box, select Rebuild the corridor.

Be patient while the corridor updates.

Modeling Corridor

Step 8: Select Action, select Clear All Events on the Event Viewer, close the Event Viewer.



Understanding and Using Regions

Corridor regions are used to associate assemblies to a specific range of stations along the corridor. Corridor regions can be created to specify different assemblies along the corridor at locations that may not be common to the overall design. For example, a corridor region can be created at an intersecting access road or intersection where the need for an end condition, cut or fill condition, is not needed. Regions can also be leveraged to organize the Corridor. Regions can be created to divide lengthy corridors into more manageable sizes, helping the rebuilding speed. Corridor regions can be turned off when not being focused on and turned back on when needed.



Step 1: Select the Mainline corridor, right click and select Corridor Properties.

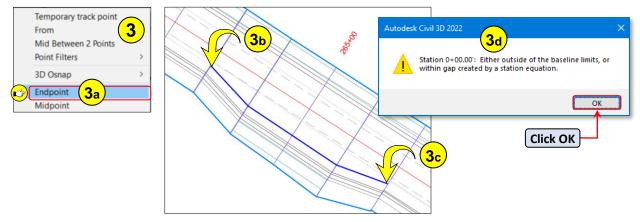


Step 2: Right click on RG – Mainline (1), select Split Region.

Corridor Properties - Mainline								2 ×
Information Parameters Codes Feature Lines Surfaces Bounda	ries Slope	Patterns						\smile
		Add Baselin	ne	Set all Fre	equencies	5	Set all Targe	ts
Name	Horizo	Vertical	Assem	Start Station	End Station	Freque	Target	Overrid
BL - Mainline - (1)	Mainline	Mainlin		221+00.00'	391+19.77'			
Split Reg Remove Copy va	egion - Befe egion - Afte gion	ore er	Mainline	225+92.00'	391+19.21	**Va		
Select region from drawing					Lock Regions	s To: Geome	try Locking	~
				(OK Can	cel	Apply	Help

Step 3: Select Shift + right click, select Endpoint, pick the northerly endpoint of the turnout (red Xref target line), repeat for the southerly end, select Enter to return to Corridor Properties. If presented with the Station 0+00.00' warning pop-up, click OK.

• This warning is common when working with corridors and regions.



Step 4: Rename the RG – Mainline – (2) to RG – Mainline – Turnout, Select the Target button for RG – Mainline – (1).

	С	Corridor	Properties ·	- Mainline 4										×
	In	formation	Parameters	Codes Feature Lines	Surfaces Bou	ndaries Slope	Patterns							
							Add Baselin	e	Set	t all Frequen	icies	5	Set all Targets	
		Name			Horizontal	Vertical Bas	Assembly	Start Statio	n End	d Station	Frequency	Target	Overri	des
		8.05	💌 BL - I	Mainline - (1)	Mainline	Mainline Pr		221+00.001	391+	+19.77		(4b)		
			37 👎 🖸	RG - Mainline - (1)			Mainline	225+92.00'						•••
(4 a	,)(C	3 👎 🖳	RG - Mainline - (2))		Mainline	264+00.57					•••	
			3 🗘 🔁	RG - Mainline - (3)			Mainline	265+99.91'	-13 391+	+19.21' -5	50.000'	•••	•••	
					↓									
					RG - Mainline	- Turnout								
		Selec	t region from	n drawing							Lock Region	is To: Geome	try Locking	~
										OK	Ca	ncel	Apply	Help

Step 5: In the Target Mapping dialog box, select Collapse all button, expand Right_LaneSuperelevationAOR – ShId, select Width Target, uncheck 8684000GEMAP001|C-ROAD-PVMT-WIDN, click OK.

orridor	Baseline S	tart Station:	Baseline End Stat	tion:		_	
Mainline	221+00.0	0	391+19.77			<u> </u>	Ŭ
Offset and Elevation Surface					1	<mark>(5a)</mark>) 🕞 📢
Subassembly 🔻	Baseline 💌	Region 🔻	Start Station	End Station	Assembly 🔻	Side 💌	Assembly Gro
	BL - Mainline - (RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Left	Left
Left_LaneSuperelevationAOR - Shld	BL - Mainline - (RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Left	Left
Left_MDTDaylight	BL - Mainline - (RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Left	Left
Left_MDTParameterReferences	BL - Mainline - (RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Left	Left
Left_MDTShoulder	B/ Vine - (RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Left	Left
Left_MDTSubBase	E 5b he - (RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Left	Left
Right_LaneSuperelevationAOR - Lane	PL fine - (RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Right	Right
Right_LaneSuperelevationAOR - Shld	- Mainline - (RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Right	Right
Outside Elevation Target	BL - Mainline - (RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Right	Right
Width Target		RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Right	Right
B. Right_MDTDaylight	BL-M 5c.)	RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Right	Right
Right_MDTParameterReferences	BL - Man (RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Right	Right
Right_MDTShoulder	BL - Mainline - (RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Right	Right
Right_MDTSubBase	BL - Mainline - (RG - Mainline - (1)	225+92.00	264+00.34	Mainline	Right	Right
Set Offset Targets							
Filter offset range 0 - 0.000' Select alignment and pipe to target:		a	Select feature lin	es, polylines, and surv	ey figures to target:		
Name Side				ame		In-use/Total	l Detail
Mainline No Side		(-	Dd 86	84000GEMAP001	-ROAD-ETRW	0/2	^
				84000GEMAP001(0	-ROAD-PVMT	0/12	
			(≤ 7) ≤ 86	84000GEMAP001	-ROAD-PVMT-WID	N 1/1	
			<			_	>
Selection choice if multiple							
Target to Nearest Offset							k OK

Step 6: Repeat for RG – Mainline – (3).



Step 7: From the Corridor Properties – Mainline dialog box, click OK, select Rebuild the corridor.

Be patient while the corridor updates.

Modeling Corridor

Corridor Surfaces

Once a corridor has been created, a corridor surface can be generated. Corridor surfaces are an output of a corridor model, they remain dynamically linked to the corridor. Any changes to the corridor definition are reflected in the surface definitions. The Surfaces tab of the Corridor Properties dialog box is used to create corridor surfaces. Corridor surfaces can be created from corridor links and features lines.

Create a Corridor Surface

Step 1: Select the Mainline corridor, right click and select Corridor Properties.



Step 2: Select the Surfaces tab in the Corridor Properties dialog box, select the Create a corridor surface button.

🧕 Corridor Proper	ties - Mainline				<mark>2</mark>)×
Information Paramet		Surfaces Boundaries Slope Patterns			
2b	Add data Data type:	~	Specify code: Top	~	×

Step 3: Rename the surface to Mainline Surface – TOP, change the Surface Style to PLN Prop Contours 1-5, set the Overhang Correction to Top Links.

🧕 Corridor Proper	rties - Mainline						(<mark>3)×</mark>
Information Paramet	ters Codes Feature Line	s Surfaces Boundaries	Slope Patterns					<u> </u>
	Add data							
	Data type:			Specify code:	:			
🏤 🐜 🐨	🗎 Links		~	Тор		`	 + 	×
			\sim					
(3a)e		Surface Style	Ren 3b	erial	Add as Bre 3c	Overhang Correction	Descrip	tion
	Mainline Surface - TOP	PLN Prop Contours 1-	5 🚖 🔁 yer			👉 Top Links]	
		_						
Overh	ang Correction	n forces the co	rridor surfa	ace to us	se either the	Top links or Bott	om lin	ks of
🔚 the su	bassembly(s).	In some case	s, the corri	dor surf	ace will use a	a variation of link	s to c	reate

the subassembly(s). In some cases, the corridor surface will use a variation of links to create the surface. By selecting Top links or Bottom links it will ensure the correct links are being leveraged for the desired corridor surface.

Step 4: Verify the Data type is Links and Specify code is Top, select green plus button 🛨 .

🧕 Corridor Properties - Mainline						<mark>4)</mark> ×
Information Parameters Codes Feature Lines	Surfaces Boundaries Slope	Patterns Specify co	de:		(4b) (2) (1)	×
Name	Surface Style PLN Prop Contours 1-5 彛	Render Material ByLayer 🛞	Add as Breakline	Overhang Correcti Top Links	Description	
Гор						
			OK	Cancel	Apply	Help

Step 5: Select the check box for Add as Breakline.

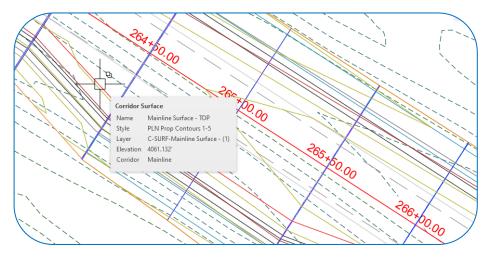
Ç	Corridor Prope	rties - Mainline						(<mark>5</mark>)×
Inf	formation Parame	ters Codes Feature Lines	Surfaces Boundaries Slope	Patterns					
	🏤 🐜 🗬	Add data Data type:		~	Specify co Top	de:		~ +	×
	Name		Surface Style	Render Ma	terial	Add as Breakline	Overhang Correcti	Description	
	⊟-@\ 🔽	Mainline Surface - TOP	PLN Prop Contours 1-5 💩	ByLayer	8	,	Top Links		
	🗎 🎽	Тор							
					Ŭ				
						ОК	Cancel	Apply	Help

Step 6: Select the Create a corridor surface button, rename the Surface to Mainline Surface – DATUM, change the Surface Style to _No Display, select Bottom Links for Overhang Correction.

Corridor Properties - Mainline			<mark>6</mark> ×
Information Parameters Codes Feature Lin	es Surfaces Boundaries Slope Patterns		\smile
6a Add data Data type: Image: Control type: Image: Control type: Image: Control type: Control type:	~	Specify code: Top	~ + ×
Name	Surface Style Rend	er Material Add as Breakline	Overhang Correcti Description
🕀 🔐 🔽 Mainline Surface - TOP	PLN Prop Contours 1-5 🔗 ByLay	er 🛞	Top Links
Mainline Surface - DAT	JM _No Display 🔗 ByLay	er 🧕	Bottom Links
<mark>6</mark> b			\$
		OK	Cancel Apply Help

🧕 Corridor Properties - Mainline						7
Information Parameters Codes Feature Lines Se	urfaces Boundaries Slope Pat	terns				\bigcirc
Add data Data type:		~	Specify code: Datum			<mark>7</mark> ⊳
Name	Surface Style	Render	Material	Add as Breakline	Overhang Correcti	Description
⊕- 😭 🔽 Mainline Surface - TOP	PLN Prop Contours 1-5 🕁	ByLayer	8		Top Links	
🖨 🔂 🗹 Mainline Surface - DATUM	_No Display 💩	ByLayer	8) 8)	<u> </u>	Bottom Links	
Datum						
<						>
				ОК	Cancel Ap	ply Help

Step 7: Verify the Data type is Links and Specify code is Datum, select green plus button, select the check box for Add as Breakline, click OK.



Corridor Boundaries

Corridor surface boundaries are used to prevent triangulation outside the extents of a corridor. Corridor surface boundaries can be created using the following options:

- **Corridor Extents As Outer Boundary** Trims the triangulation of a surface at the extents of a corridor (Shrink Wrap).
- Add Automatically Based on point codes to which feature lines are assigned. A single baseline must exist for this option.
- Add interactively Allows for feature lines from the corridor to be selected and used as boundary.
- Add from Polygon Uses a closed polyline as the corridor boundary extents.

Create a Corridor Surface Boundary

Step 1: Select the Mainline corridor, right click and select Corridor Properties.

Corridor Properties Corridor Surfaces Edit Code Set Style Apply Corridor Template
--

Step 2: Select the Boundaries tab, right click on Mainline Surface – TOP, select Corridor extents as outer boundary, repeat for Main Surface – DATUM, click OK, select Rebuild the corridor.

	roperties - Mainline rameters Codes Feature Lin		e Patterns		2	×
Name	2 b	Description	Render Material	Definitions	Use Type	
	Mainline Surface - TOP Mainline Surface - DATU	Add Automatically Add Interactively Add From Polygon	Re	build the corrido	2d	
	C Corridor Properties - Mainl	Copy value to clipboar Copy to clipboard Refresh	The	e corridor will be rebuil	t to apply the modificatio	
		Feature Lines Surfaces Boundarie	Slope Patterns		^	
	Name	Description	Render Material	Definitions	Use Type	
	Mainline Surface Corridor Bo Mainline Surface Mainline Surface	undary(1)	ByLayer	Scorridor Shrinkwrap	Outside Boundary	
	Corridor Bo		ByLayer	Scorridor Shrinkwrap	Outside Boundary	
			2c Click Ol		incel Apply H	lelp

Corridor Section Editor

The Corridor Section Editor can be used to view and modify corridor sections and to visually inspect how assemblies are applied at various stations. The Corridor Section Editor can be leveraged to apply assembly overrides to a corridor section or a range of sections.

Section Editor Overview and User Interface



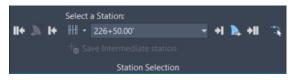
Baseline & Offsets panel:



Select a Baseline – Specify a baseline alignment for a corridor to view and edit sections. Selecting the down arrow allows for selecting available alignments.

- Used to select a baseline from the drawing.

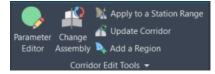
Station Selection panel:



- Display the first or start station on the corridor.
- Steps to previous corridor station.
- Filters the Select a Station list by type of station. All Baseline, Region, Overridden or Non-region.

Select a Station - Lists all baseline stations and allows selection of a station to view.

- Steps to the next corridor station.
- Displays the corridor section at the first station of the next region.
- Display the corridor section view at the end station on the corridor.
- Select a station from the drawing or by entering a station value.



Corridor Edit Tools Panel:

Parameter Editor – Allows for corridor parameter overrides to be applied to a station or range of stations.

Change Assembly – Allows for swamping an assembly at a station or range of stations.

Apply to a Station Range – This tool can be used once the Parameter Editor or Change Assembly tools are applied.

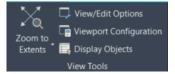
Update Corridor - Used to rebuild/update the corridor.

Add a Region – used to add a region to the corridor.



Analyze panel:

Station Tracker – Used to visually see which station is currently selected. Allows the station tracker to be visible in the current viewport, all viewports or turned off.



View Tools:

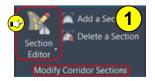
Zoom – Used to Zoom Extents of the assembly, Zoom to a station or offset or assembly.

View/Edit Options – Controls the visibility of the Section Editors objects. Scale, grid, grid text, section slider and code set style.

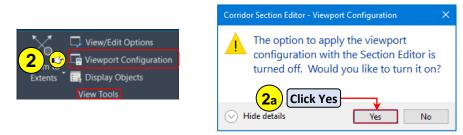
Viewport Configuration – Controls the number of viewports and which views, plan, profile, section or assembly, is displayed in each viewport.

Display Objects - Controls which objects are displayed in the Section Editor.

Using the Corridor Section Editor



Step 1: Select the Mainline Corridor, navigate to Modify Corridor Sections panel on the contextual ribbon, select Section Editor.

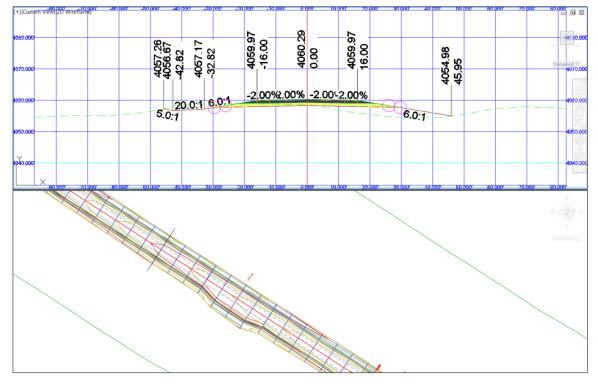


Step 2: In the Section Editor, navigate to View Tools, select Viewport Configuration.

a. If the Corridor Section Editor – Viewport Configuration warning pop-up appears, click Yes.

Corridor Section Editor: Vie	wport Configuration	- <mark>3</mark> ×
Options Layout: Two: Horizontal	Viewport 1: Section Viewport 2:	1
Vertical Split: 50%		2
	C	Click OK

Step 3: Choose the following parameters, Click OK.

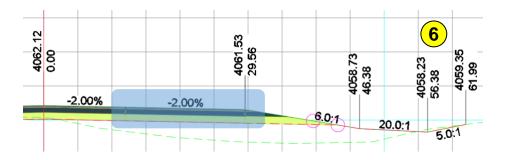


Step 4: Change the annotation scale to 1" = 20'.

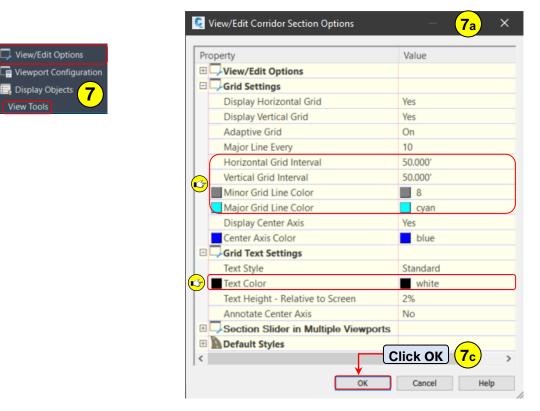
Step 5: Navigate to Station Selection panel, select station 264+00.00' from the Select a Station tool.

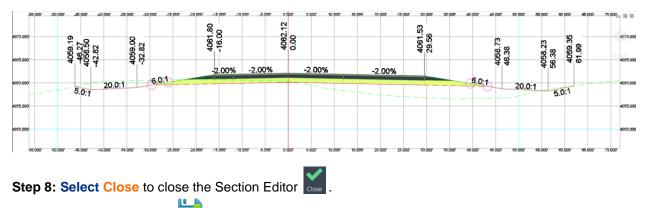






Step 7: Navigate to View Tools panel, select View/Edit Options, change the following settings in the View/Edit Corridor Section options dialog box, click OK.





Step 9: Save the drawing

Cross Sections

In Autodesk Civil 3D, section data is defined and displayed using sample lines, sections, and section views, all of which are managed through a collection called a sample line group. An alignment can have more than one sample line group associated with it, each having a unique set of sample lines and sections.

Use sections (also referred to as cross sections) to provide a view of the terrain cut at an angle across a linear feature, such as a proposed road.

Typically, sections are cut across horizontal (plan) alignments at a specified station interval using specified swath widths. These sections are then plotted, individually for a station, or as a group for a range of stations.

Autodesk Civil 3D handles the creation, management, and plotting of sections with the following components:

- Sections Terrain elevations that cut across surfaces, including corridor surfaces, which are associated with a specified sample line group. Elevations are sampled at each of the sample line XY vertices and also at locations where the vertical plane defined by the sample line intersects with surface edges.
- Section Views For each sample line, views displaying some or all of the sections sampled at that sample line. This graphical view has both horizontal limits based on the length of corresponding sample line and vertical values based on the minimum and maximum elevations from the set of sections it is displaying.
- Section Sheets Production-quality section layouts for plotting.

Sample Lines

A Sample Line is a linear plan object representing the direction along which sections are cut for a set of specified surfaces. Sample lines are linear objects that are used to cut sections across an alignment. Sample lines have their own styles and label styles. A set of sample lines makes up a named collection called a sample line group. A sample line group centrally manages the display styles and label styles for several sample lines, sections, section views, and mass haul lines and mass haul views.

Create a Section drawing

Step 1: From the Start tab > Create a new drawing using the Standard: design-start.dwt

• C:\MDOH\StateKit\Civil 3D\2022\Templates_Start-Dwg

Step 2: Save and Name the drawing: 8684000RDXS001-USER INITIALS.dwg

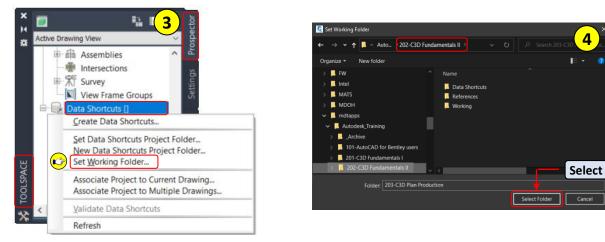
C:\mdtapps\Autodesk_Training\202-C3D Fundamentals-II\Working

New TEMPLATES design-start.dwt survey-start.dwt design-start.dwt land-start.dwt

If the Working Folder is still correctly set to **202-C3D Fundamentals II**, skip ahead to Step 6.

Step 3: Navigate to TOOLSPACE > Prospector tab > Data Shortcuts, right click on Data Shortcuts, select Set Working Folder.

Step	4: Bi	rowse to	C:\mdtapp	s\Autodesk	Training	202-C3D	Fundamentals I	select	Folder.
			o	0,0,000,000,000			I will waith officiate i	.,	



Step 5: Verify the Data Shortcuts path has been set.

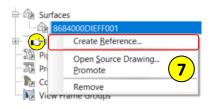
Data Shortcuts [C:\mdtapps\Autodesk_Training\202-C3D Fundamentals II\Data Shortcuts]

Step 6: Navigate to Data Shortcuts > Surfaces, expanded Surfaces.

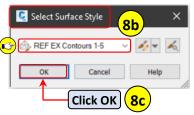
Data Shortcuts [C:\mdtapps\Autodesk_Training\202-C3D Fundamentals II\Data Shortcuts]
 Surfaces
 8684000DIEFF001

Step 7: Right click on 8684000DIEFF001, select Create Reference.

Step 8: In the Create Surface Reference dialog box, change the Style to REF Ex Contours 1-5, select OK in the Select Surface Style dialog box, select OK in the Create Surface Reference dialog box.

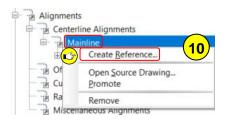


	ce surface: 000DIEFF001	Surface layer: C-SURF-8684000DIEFF001
Pro	operties	Value
	Information	
	Name	8684000DIEFF001
	Description	Photo and Pick up survey combined
(Style	Standard
	Render Material	ByLayer



Step 9: Type ZE, select Enter on the keyboard to Zoom Extents.

Step 10: Navigate to Data Shortcuts > Alignments, expanded Alignments, expand Centerline Alignments, right click on Mainline, select Create Reference.



Step 11: On the Create Alignment Reference dialog box, change the following parameters, click OK.

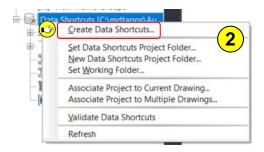
	Create Alignment Reference 11×
	Source alignment:
	Mainline
	Site:
	🛐 <none> 🗸 📑</none>
	Name:
	Mainline 🔹
	Description:
	Alignment style:
C	PLN Proposed 🗸 🏹
	Alignment layer:
	C-ALGN-Mainline
	Alignment label set:
	🚽 🖉 PLN ALG Plans 🔍 🍫 🗾 🍝

Sharing Data between Drawing Files

Step 1: Navigate to 8684000RDCORR001-USER INITIALS.dwg drawing tab, select the tab making it current.

• If the 8684000RDCORR001-USER INITIALS.dwg was closed previously, open the drawing.

Step 2: Navigate to Data Shortcuts, right click, select Create Data Shortcuts.



Step 3: Check Surfaces and Corridors boxes from the Create Data Shortcuts dialog box, click OK.

Create [Data Shortcuts		(3) ×
Share	Data		\smile
•	Selected objects will be accessible to all users who point to folder. These shortcuts are available in the Prospector.	the same	working
Ŧ	When you create a data shortcut of a corridor, data shortcu created for its baselines.	ts are autor	natically
Object		Status	Descript
- A .	Surfaces		
	🛛 🗹 Mainline Surface - Datum	To be ad	
	🛛 🗹 Mainline Surface - TOP	To be ad	
	Alignments		
	🖹 🔳 Centerline Alignments		
E	Mainline	Already	Replica o
	🗄 🥍 🔄 Profiles		
	Surface (1)		
	Corridors		
	🛛 🗹 Mainline	To be ad	
Hide alre	eady published objects	k OK	
🕠 Pick	in drawing OK C	Cancel	Help

- Step 4: Navigate to 8684000RDXS001.dwg drawing tab, select the tab making it current.
- Step 5: Navigate to Data Shortcuts, expand Surfaces, right click Corridor Surface DATUM, select Create Reference, change the style to _No Display in the Create Surface Reference dialog box, select OK.

Surfaces 5	G Create Surface Reference	×
Corridor Surface - DATUM	Source surface: Mainline Surface - Datum	Surface layer: C-SURF-Mainline Surface - Datum
5a omote	Properties	Value
Remove	Name Description Style Render Material	Mainline Surface - Datum
		5c Click OK

Step 6: Repeat Step 5 for Corridor Surface – TOP, change the style to PLN Prop Contours 1-5, select OK.

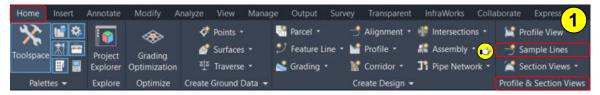
Step 7: Navigate to Data Shortcuts, expand Corridors, right click Mainline, select Create Reference, change the style to MDT DES Corridor in the Create Corridor Reference dialog box, select OK.

Corrid	ors ainline Create <u>R</u> eference	7	Create Corridor Reference X
	Open Source Drawing	_	Mainline
(<mark>7</mark> a)	Promote		Name:
	Remove		Mainline
			Description:
			Corridor style:
			MDT DES Corridor 🚽 🍫 🗾
			Corridor layer:
			When you create a reference to a corridor, references are automatically created to its baselines.
			Baselines:
			B-B Mainline Baselines
			Aainline
			Mainline Proposed
			OK Cancel Help

Step 8: Save 8684000RDXS001.dwg.

Generating Sample Lines

Step 1: Change the Annotation scale to 1" = 20', navigate to Home tab > Profile & Section Views panel, select Sample Lines.



Step 2: Select Enter to select Alignment from list, select Mainline from the Select Alignment dialog box, click OK.

🧕 Select Alignm	nent			2	×
	Description				
		ОК	Click OK	Help	

Step 3: In the Create Sample Line Group dialog box, change the following parameters, click OK.

Name: SLG-Mainline

Sample line style: MDT Sample Line

Sample line label style: Section Station

8684000DIEFF001 style: MDT Existing Ground

Mainline style: PLN XSec

Mainline Corridor Surface – TOP style: MDT Finished Ground

Mainline Corridor Surface – DATUM style: MDT Finished Ground

Description: Sample line label style: Sample line label style: Sample line layer: C-XSEC-SAMP Mainline						Description:
Alignment:			🖅 🌏 Section Station	(
Alignment:				· · · · · · · · · · · · · · · · · · ·		
Alignment:			Sample line layer:			
			C-XSEC-SAMP			Alianment:
Select data sources to sample: Type Data Source Sample Style Section laver Upd	Update Mode	Section layer	Style	Sample		
🖉 8684000DIEFF001 🗹 MDT Existing Ground 0 Dyn	Dynamic	0	MDT Existing Ground		8684000DIEFF001	<i>₽</i> <u>↑</u>
	Dynamic	0	MDT Finished Ground	~	Mainline Surface - Datum	<u>₽</u>
🕰 Mainline Surface - Datum 🗹 MDT Finished Ground 0 Dyn	Dynamic	0	MDT Finished Ground	~	Mainline Surface - TOP	<u>er</u>
	Dynamic	0	PLN XSec	✓	Mainline	

Step 4: On the Sample Line Tools tool bar, select By range of stations.



Step 5: In the Create Sample Lines dialog box, change the following parameters, click OK, select Esc to end the command.

Property	Value
General	
Alignment	Mainline
Station Range	
From alignment start	False
Start Station	260+00.00'
To alignment end	False
End Station	270+00.00'
Left Swath Width	
Snap to an alignment	False
Alignment	Mainline
Width	130.000'
Right Swath Width	
Snap to an alignment	False
Alignment	Mainline
Width	130.000'
Sampling Increments	
Use Sampling Increments	True
Increment Relative To	Absolute Station
Increment Along Tangents	50.000'
Increment Along Curves	50.000'
Increment Along Spirals	50.000'
Additional Sample Controls	
At Range Start	True
At Range End	True
At Horizontal Geometry Points	False
At Conservations Coldinal Chest	
	Click OK

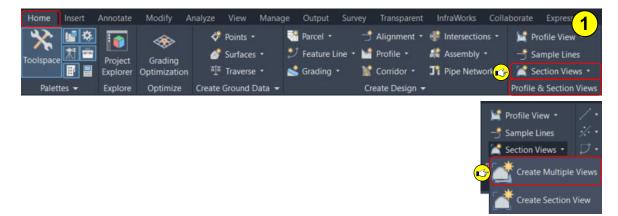
Step 6: Save 8684000RDXS001.dwg.

Section Views

Section views are created from existing sample lines and sections. A section view consists of a grid on which one or more sections are displayed as graphed lines. Multiple section views can be plotted on a sheet that is a specified size and configuration. A section view is very similar to a profile view. It consists of a grid or graph with specific characteristics that are controlled by section view styles. Bands can also be displayed above or below the section view. A section view can display one or more of the available sections at the sample line. Sections can be created as a single section for one sample line or multiple sections from all the sample lines in a sample line group. Objects can be projected in section view including COGO points, AutoCAD points, 3D solids, blocks, multi-view blocks. Crossing objects can be shown in a section view including feature lines, 3D polylines and survey figures. Additionally, pipe network and pressure network structures and pipes can be displayed in section views.

Create Section Views

Step 1: Navigate to the Home tab > Profile & Section Views panel, select Section Views, select Create Multiple Views from the drop-down list.



Step 2: In the Create Multiple Section Views dialog box, change the following parameters, click Next.

Create Multiple Sect	ction Views - General	<mark>2</mark> ×
Section Placement	Select alignment Sample line group name:	
Offset Range	Station range Start: End: O Automatic 221+00.00' 391+19.77'	
Section Display Options	() User specified:	
Section View Tables	Section view name:	
	Description:	
	Section view layer:	
	Section view style:	
Clie	ick Next > Create Section Views Cancel Help	

Step 3: On the Section Placement, verify the following parameters, click Next.

Create Multiple Sect	ion Views - Section Placement 3
General	Pick a placement option, then choose a group plot style.
Section Placement	Placement Options
	OProduction - Use a layout from a template file (.dwt) to place sections on sheets.
Offset Range	Template for cross section sheet
Elevation Range	C:\MDOH\StateKit\Civil 3D\2022\Templates\Sheets\XS-layouts.dwt\MDT_XS_20
Section Display Options	
Section Display Options	O Draft - Place sections in a grid in model space. Sheets cannot be created using this option.
Data Bands	Group Plot Style:
Section View Tables	
	PLN Section Sheet Layout
	Preview
	Click Next

Step 4: Select Next for the Offset Range and Elevation Range.

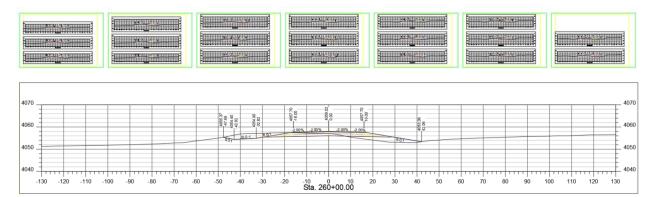
Step 5: On the Section Display options, change the following Label Sets, click Next.

Create Multiple Section	n Views - Section Display Options		<mark>5</mark> ×					
General Section Placement	Clip grid option will be ignored if the selec	ted section view style is set "clip to h	ighest section" option.					
Select sections to draw.								
Offset Range	Name	Draw Clip Grid Label Set	Style					
Elevation Range	8684000DIEFF001	No Labels	MDT Existing Ground					
	Mainline	No Labels	PLN XSec					
Section Display Options	Mainline Corridor Surface - TOP	No Labels	MDT Finished Ground					
Data Bands	Mainline Corridor Surface - DATUM		MDT Finished Ground					
Section View Tables								
		Next	>					
	< <u>Back Next</u> > Create Section Views Cancel Help							

Step 6: On the Data Bands, select	<u>No Bands, click</u>	Create Section	Views.
-----------------------------------	------------------------	-----------------------	--------

Create Multiple Sectio	n Views - Data Bands				<mark>6</mark> ×	
General Section Placement	Select band set		~ // * /0			
Offset Range Elevation Range	V	(s) include data bands. F	lease select the source surface(s) for the data band annotation.		
Section Display Options	List of bands Location: Bottom of section view	v ~				
Section View Tables Set band properties:						
	Band Type	Style	Surface1	Surface2		
			Click Create	Section Views		
	< <u>B</u> ack	Next > Create	Section Views	Cancel <u>H</u> elp	_	

Step 7: When prompted to Identify section view origin, select a point within the drawing to place the section views.



A

Section View Labeling

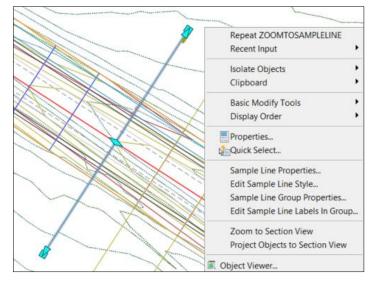
Sections can be automatically labeled when creating them or after. Section labels can include Major and Minor Offsets, grade breaks, segments, and corridor points. A section label set can be created from one or more label styles.

- Major Offsets Offsets, elevations, and instantaneous grades at major increments.
- Minor Offsets Offsets, elevations, and instantaneous grades at minor increments.
- **Segments** Section segment labels for each segment (line) of a section object. A user-specified weeding factor is supported, thus avoiding close annotation.
- **Grade Breaks** Grade break labels applied at every grade break point for a section. A user-specified weeding factor is supported, thus avoiding close annotation.
- **Corridor Points** Corridor point codes using a code set style or a section label set. Corridor points label style can be staggered, so they don't overlap.
- Label Sets A group of section labels used for sections when a section view object is created.

If a corridor has been sampled in a section view and the PLN XSec style is assigned to the corridor, the MDT State Kit is setup to automatically label it using a code set style.

Create Section View Labels

Step 1: Zoom to Sample Line 260+00.00, select the sample line, right click and select Zoom to Section View.

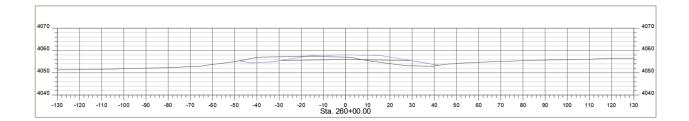


Step 2: Select the section view, select View Group Properties from the contextual ribbon.

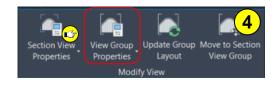


Step 3: Select the Mainline corridor style, change the style to DES Corridor, click OK to close the Code Set Style dialog box, click OK to close the Section View Group properties.

Section View Group Properties - Sect ection Views Sections Sheets	tion View	Group - 1	<mark>3</mark>)		- 🗆	×
Edit section options:	Draw	Clin Grid	Label Set	Shile	Override Style	
		Clip Grid		Style		_
8684000DIEFF001		0	<edit></edit>	MDT Existing	Not Overri	
Mainline Surface - DATUM	~	0	(3 a)	MDT Finished	Not Overri	
Mainline Surface - TOP	✓	0		MDT Finished	Not Overri	
Mainline			<edit></edit>	DES Corridor	Not Overri	
30	Click		de Set Style	ancel Hel	~	
Show sections for all sources				Click OK	<mark>3</mark> d	
		Г	ок	Cancel	Apply He	b



Step 4: Select the section view, select View Group Properties from the contextual ribbon.



Step 5: Select the Mainline Surface - TOP Label Set, change the Label set to FG Section Labels, click OK to close the Label set dialog box, click OK to close the Section View Group properties.

Section Views Sections Sheets		5			1
Edit section options: Name	Draw 🗲 Grid	Label Set	Style	Override Style	_
8684000DIEFF001	Draw 5a Grid	<edit></edit>	MDT Existing	Not Overric	lde
Mainline Surface - DATUM		<edit></edit>	MDT Finished	Not Overric	
		<edit></edit>	MDT Finished	Not Overric	
Mainline		<edit></edit>	DES Corridor	Not Overrid	
	🧕 Select Label Set	5ь	×		
	FG Section Labels Description:		~		
٢					>
Show sections for all sources				d	>
			lick OK) <mark>5</mark>		> telp
Show sections for all sources			Cancel	Apply F	
Show sections for all sources	and Break Offers - 32 82 - 1 and Break Offers - 32 82 - 1 and Break Offers - 32 82 - 1 and Break Offers - 32 82 - 1 Grade Break Offers - 22 82 - 1 Else - 4057 70 - 12 Else - 4057 70 - 12 Else - 4057 70 - 12 Else - 4057 70 - 12 Corde Break Offers - 000 - 1 Else - 4057 70 - 12 Corde Break Offers - 000 - 1 Else - 4057 70 - 12 Corde Break Offers - 000 - 1 Else - 4057 70 - 12 Corde Break Offers - 000 - 1 Else - 4057 70 - 12 Corde Break Offers - 000 - 1 Else - 4057 70 - 12 Corde Break Offers - 000 - 1 Corde Break Offers - 000	Concernence 2008 02 03 04 04 04 04 04 04 04 04 04 04 04 04 04	Lick OK 5	Apply F	ielp
Show sections for all sources	2054.55 2054.65 Break Offerst - 32.82 Break Offerst - 32.82 Break Offerst - 22.82 Break Offerst - 22.82 Break Offerst - 22.00 - 40.65 - 40.65 - 40.67 - 40.67		Lick OK 5	Apply F	ielp

Step 6: Select the section view, select View Group Properties from the contextual ribbon.

-20



-10 0 10 Sta. 260+00.00

30 40 50 60 70 80 90 100 110

20

40.4

407 406

404

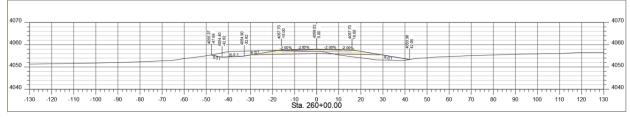
-90

-80 -70 -60 -50 -40 -30 Step 7: Select the Mainline Surface - TOP Label Set, change the Label set to _No Labels, click OK to close the Label set dialog box.

Section View Group Properties - Section Section Views Sections Sheets	on view	Group - 1					×	
Name	Draw	Clip Grid	Label Set	Style	Override	Style		
: 🖧 8684000DIEFF001	~	•	<edit></edit>	MDT Existing	🗌 <not (<="" td=""><td>Overridde</td><td></td></not>	Overridde		
Mainline Surface - DATUM	~	0	<edit></edit>	MDT Finished	🗌 <not (<="" td=""><td>Overridde</td><td></td></not>	Overridde		
🕰 Mainline Surface - TOP	~		<edit></edit>	MDT Finished	🔲 <not td="" 🤇<=""><td>Overridde</td><td></td></not>	Overridde		
Mainline	~		<edit></edit>	DES Corridor	🗌 <not (<="" td=""><td>Overridde</td><td></td></not>	Overridde		
Click OK 7c								
Show sections for all sources							-	
			ОК	Cancel /	Apply	Help		

Step 8: Select the Mainline corridor style, change the style to PLN XSec, click OK to close the Code Set Style dialog box, click OK to close the Section View Group properties.

dit section options: Name	Draw	Clip Grid	Label Set	Style	Override Style
2684000DIEFF001	~	•	<edit></edit>	MDT Existing	Not Overridde.
Mainline Surface - DATUM	~	0		MDT Finished	Not Overridde.
🖄 Mainline Surface - TOP	~	0		MDT Finished	Not Overridde.
Mainline			<edit></edit>	DES Corridor	<not overridde.<="" p=""></not>
<mark>8</mark> 0 CI	ick O		Cancel	Help	a



Step 9: Press Esc to deselect the Section View, save the drawing

Earthwork and Materials

Earthwork and material volumes are calculated by comparing two surfaces to each other. Quantities Can be calculated between sample lines derived from regular surface models and from corridor surfaces. Userdefinable tables specify which materials are defined by which surfaces, and the characteristics of these materials. Finally, average end area analysis is used to tabulate the material quantities along the corridor.

Earthwork Volumes

Calculating earthwork volumes in Civil 3D can be achieved using various methods. They can be calculated using corridors and sample lines, the Volumes Dashboard and by creating a grid or tin volume surface. Grading volume tools can be leveraged for grading as well.

<u>Corridor Surface Volumes</u>

Continue working in the 8684000RDXS001-USER INITIALS.dwg

1 🐺 Volume Report 🛛 🔀 🐺 Compute Materials Total Volume Table Mass Haul Volumes Dashboard Grading Volume 🔟 Material Volume Table 🏥 Earthwork Plan Production Tools Volumes and Materials 尾 Select a Sample Line Group 2 Step 2: Verify the Select alignment is Mainline, verify Select Select alignment: sample line group is SLG – Mainline. click OK. Mainline Select sample line group: D SLG-Mainline **Click OK** ОК Cancel Help

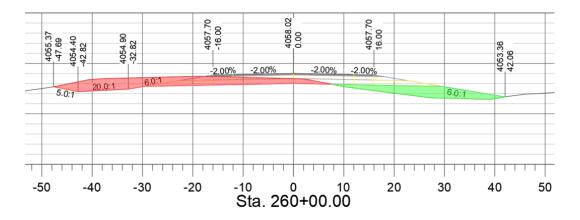
Step 1: Navigate to Analyze tab > Volumes and Materials panel, select Computer Materials.

Step 3: In the Compute Materials dialog box, select Cut and Fill for the Quantity takeoff criteria, select 868400DIEFF001 for the EG Surface, select Corridor Surface – DATUM for the Datum surface, click OK.

Quantity takeoff criteria:	<u> →</u>	Volume calculation Average End An		<u> </u>
Curve correction tolerance	001.0000 (d)	I	Map objects with same name	
Name in Criteria	Object Name		Material Name	
EG EG EG EG EG DATUM Corridor Shapes	Click here to Mainline Surface	01 01 set all> ce - DATUM	*VARIES* Ground Removed Ground Fill *VARIES* Ground Removed Ground Fill	
		[



Selecting <Click here to set all> allows for setting the EG and Datum surface for both Ground Removed and Ground Fill.





Notice the section views now show the Cut and Fill. This can easily be turned off in the View Group properties.



Step 5: Select one of the section views, right click and select Section View Group Properties.

lame	Draw	Clip Grid	Label Set	Style	Override Style
8684000DIEFF001	Z	•	<edit></edit>	MDT Existing	<not overridden=""></not>
- 🖳 Mainline Surface - DAT	UM 🗹	\bigcirc	<edit></edit>	MDT Finished	Not Overridden>
- 🖳 Mainline Surface - TOP	~	\bigcirc	<edit></edit>	MDT Finished	Not Overridden>
- 🏊 Mainline			<edit></edit>	PLN XSec	Not Overridden>
- 🚮 Ground Removed				Cut Material	Not Overridden>
Ground Fill		J		Fill Material	Not Overridden>

Step 6: In the Section View Group Properties, select the Section tab, Uncheck Ground Removed and Ground Fill, click OK, press Esc to deselect the Section View.



Step 7: Navigate to Analyze tab > Volumes and Materials panel, select Computer Materials.

Step 8: Select OK on the S	K	🧕 Select a Sample Line Group				×				
			(Click	5	Select alignmo Mainline Select sample SLG-Main OK	line group:	21	- I Help	
🧕 Edit Material List - SLG-Mainline							—	(9	×	
Add new material	Define material Data type: Surface			elect surface: 684000DIEFF			~	+	×	
Material Name	Condition	Quantit C	Cut Fact	Fill Factor	Refill Fa		Curve T 001.0	Gap		

Step 9: In the Edit material List dialog box, Rename Materials List (1) to Cut-Fill. Remain in the Edit Material List – SLG-Mainline dialog box.

Material Volumes

Once a corridor has been sampled, materials can be calculated using the Compute Materials tools. Corridor shapes are leveraged by the tool to compute the materials found within the corridor's assembly. A volume table can be created from the computed materials and displayed. The computed materials can be displayed in cross sections along with a materials table.

Creating a Materials List

Step 1: In the Edit Materials List dialog box, select Import another criteria, select Materials List from the Select a Quantity Takeoff Criteria dialog box, click OK.

🧕 Edit Material List - SLG-Mainline						-	(1)	×
Add new material		Defin	e material					
And new material	ĸ	Data	a type:		Select s	urface:		
Add a subcriteria		Surface			868400	0DIEFF001	~ 🕂	×
Material Name	Condi	tion	Quantity Type	Cut	t Factor	Fill Factor	Shape Style	
⊕- 🐺 Cut-Fill								
			Quantity Takeoff		Help	×		
Volume calculation method:			(1a)	_				>
Average End Area	\sim					Import anothe	er criteria	
			ОК	0	Cancel	Apply	Help	

Step 2: In the Compute Materials dialog box, select Mainline Pave1 for Pavement Material, select Mainline Base for the Base Material, select Mainline SubBase for the SubBase Material, click OK.

Compute Materials - SLG-Mainlin Quantity takeoff criteria:	V	olume calculation method:
Curve correction tolerance	001.0000 (d)	Map objects with same name
Name in Criteria	Object Name	Material Name
Corridor Shapes Pavement Material Base Material SubBase Material	Mainline Pave1 Mainline Base Mainline SubBas	Pavement Base SubBase
		Click OK

Step 3: Rename Materials List (2) to Pavement, click OK.

Edit Material List - SLG-Mainlin Add new material Add a subcriteria		efine material Data type: 🛆 Surface	Select s	urface: 0DIEFF001	3	×	
Material Name	Conditio	n Quantity Type	Cut Factor	Fill Factor	Shape Style		
< Volume calculation method: Average End Area	~	ОК	Click O	Import anothe Apply	er criteria Help	>	Section View Properties Edit Section View Style Section View Group Properties Update Section View Layout

Step 4: Select one of the section views, right click and select Section View Group Properties.

Notice the section views now show the Cut and Fill. This can easily be turned off in the View Group properties.

Step 5: In the Section View Group Properties, select the Sections tab, Uncheck Pavement, Base and SubBase, click OK.

dit section options:					
Name	Draw	Clip Grid	Label Set	Style	Override Style
🚱 8684000DIEFF001	~	•	<edit></edit>	MDT Existing	<not overridden=""></not>
- 🖄 Mainline Surface - DATUN	1 🗹	0	<edit></edit>	MDT Finished	Not Overridden>
- \land Mainline Surface - TOP	~	0	<edit></edit>	MDT Finished	Not Overridden>
🏊 Mainline	~		<edit></edit>	PLN XSec	Not Overridden>
- 🐺 Ground Removed				Cut Material	Not Overridden>
📲 Ground Fill				Fill Material	Not Overridden>
🖓 Pavement 🥑				Pave	Not Overridden>
🖓 Base 📢				Base	Not Overridden>
🔤 🔤 SubBase				Subbase	Not Overridden>
Show sections for all sources			_		

Generating Volume Reports and Table

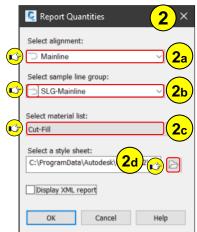
Reporting of the calculated earthwork and materials can be accomplished in Civil 3D using the Volume Report tool. The report can be saved or printed.

Generating Volume Reports

Step 1: Navigate to Analyze tab > Volumes and Materials panel, select Volume Report.



Step 2: In the Report Quantities dialog box, select Mainline for the alignment, select SLG-Mainline for the sample line group, select Cut-Fill for the material list, select browse for the style sheet.



🧕 Select Style Sheet							3	×
Look <u>i</u> n:	📜 xsl		~	-	× 📮	Views	▼ Tools	•
Desktop	Contraction of the second seco	- Multiple Materials.xsl	Date modif	ied	Ту	pe		>>
	File <u>n</u> ame: Files of <u>type</u> :	earthwork.xsl *.xsl			Clic	ck Open	Open Cancel]•

Step 3: In the Select Style Sheet dialog box, select earthwork.xsl, click Open.

- Step 4: In the Report Quantities dialog box, uncheck Display XML report, Click OK.
- Step 5: Click Yes on the Internet Explorer dialog box warning about Scripts, click Yes on the second warning, close Internet Explorer.

Internet	Explorer 5a
£	Scripts are usually safe. Do you want to allow scripts to run? Click Yes Yes
Internet	Explorer 5b ×
£	This page has an unspecified potential security risk. Would you like to continue?

Report Quantities						
Select alignment:						
🗁 Mainline 🗸 🗸						
Select sample line group:						
🔁 SLG-Mainline 🗸 🔣						
Select material list:						
Cut-Fill ~						
Select a style sheet: C:\ProgramData\Autodesk\C3D 2022\ent						
Display XML report						
OK Cancel Help						
Click OK						

	Volume Report											
Project: C:\mdtapps\Autodesk_Training'202-C3D Fundamentals Working'8684000RDXS001.dwg lignment: Mainine ample Line Group: SLC-Mainline tar Sta: 260-0000 nd Sta: 270+00.000												
<u>Station</u>	<u>Cut</u> <u>Area</u> (Sq.ft.)	<u>Cut</u> <u>Volume</u> (Cu.yd.)	<u>Reusable</u> <u>Volume</u> <u>(Cu.yd.)</u>	<u>Fill</u> <u>Area</u> (Sq.ft.)	<u>Fill</u> <u>Volume</u> (Cu.yd.)	<u>Cum.</u> <u>Cut Vol.</u> (Cu.yd.)	<u>Cum.</u> <u>Reusable</u> <u>Vol.</u> (Cu.yd.)	<u>Cum.</u> Fill Vol. (Cu.yd.)	<u>Cum</u> <u>Net V</u> (Cu.ye			
260+00.000	83.77	0.00	0.00	46.81	0.00	0.00	0.00	0.00	0.			
260+50.000	75.69	147.65	147.65	59.78	98.69	147.65	147.65	98.69	48.			
261+00.000	68.61	133.61	133.61	61.82	112.59	281.26	281.26	211.28	69			
261+50.000	61.45	120.42	120.42	67.77	119.99	401.68	401.68	331.27	70			
262+00.000	55.69	108.46	108.46	76.67	133.73	510.15	510.15	465.00	45			
262+50.000	48.39	96.37	96.37	79.53	144.63	606.52	606.52	609.63	-3			
263+00.000	50.00	91.10	91.10	79.47	147.22	697.62	697.62	756.85	-59			
263+50.000	53.49	95.83	95.83	80.36	147.98	793.45	793.45	904.84	-111			
264+00.000	53.39	98.97	98.97	76.81	145.52	892.42	892.42	1050.36	-157			
264+50.000	49.18	94.97	94.97	104.67	168.03	987.39	987.39	1218.39	-231			
265+00.000	47.24	89.27	89.27	103.36	192.62	1076.66	1076.66	1411.01	-334			
265+50.000	45.22	85.60	85.60	105.84	193.71	1162.27	1162.27	1604.72	-442			
266+00.000	45.62	84.10	84.10	74.98	167.43	1246.37	1246.37	1772.15	-525.			
266+50.000	48.09	86.76	86.76	75.42	139.27	1333.14	1333.14	1911.41	-578			
267+00.000	47.73	88.72	88.72	68.56	133.32	1421.86	1421.86	2044.73	-622			
267+50.000	48.61	89.20	89.20	67.72	126.19	1511.05	1511.05	2170.92	-659			
268+00.000	50.98	92.21	92.21	70.69	128.15	1603.27	1603.27	2299.07	-695			
268+50.000	51.84	95.21	95.21	64.65	125.31	1698.48	1698.48	2424.38	-725			
269+00.000	48.94	93.32	93.32	68.17	122.98	1791.79	1791.79	2547.36	-755			
269+50.000	42.65	84.80	84.80	72.41	130.16	1876.59	1876.59	2677.52	-800			
270+00.000	49.26	85.10	85.10	71.00	132.78	1961.69	1961.69	2810.30	-848			

Step 6: Repeat steps 1-5, selecting Pavement for the materials list, select Select Materials.xls for the style sheet, close Internet Explorer.

Project: C:\mdtapps\Auto II\Working\8684000RDXS0 Alignment: Mainline Sample Line Group: SLG-Mainli Start Sta: 260+00.000 End Sta: 270+00.000	01.dwg	-		
	Area Type	Area	Inc.Vol.	Cum.Vol.
	1	Sq.ft.	Cu.yd.	Cu.yd.
Station: 260+00.000				·
	Pavement	4.95	0.00	0.00
	Base	28.60	0.00	0.00
	SubBase	52.45	0.00	0.00
Station: 260+50.000				
	Pavement	4.95	9.17	9.17
	Base	28.60	52.97	52.97
	SubBase	52.45	97.14	97.14
Station: 261+00.000	1			
	Pavement	4.95	9.17	18.35
	Base	28.60	52.97	105.94
	SubBase	52.45	97.14	194.28
	-		-	

Creating Volume Tables

Step 1: Navigate to Analyze tab > Volumes and Materials panel, select Total Volume Table.

Analyze		
-	🛺 Volume Report	P Compute Materials
Volumes Dashboard Grading Volumes	Total Volume Table	Mass Haul 1
Tools	Material Volume Table	Earthwork Plan Production
	Volumes and Materials	

Step 2: In the Create Total Volume Table dialog box, verify the following parameters, click OK.

		Tal	bles	style	Cuta	and Fill												Create Total Volume Table	2 ×
		Se	lect	mat	erial li	st: Cut	Fil									(Table layer:	
Step	93:	Se	lect	a <mark>pc</mark>	<mark>oint</mark> wi	thin the	wo	rks	pa	ice	to p	olac	e t	he ta	able.			Select alignment:	~ 🛋
			Total \	/olume Ta	hle						Tota	il Volume	Tabl	0				Select sample line group:	
Station	Fill Area	Cut Area	FillVolume	Cut Volume	Cumulative FillVol	Cumulative Cut Vol	Sta	ina 5	I Area	Cut Area	Fill Volu			Cumulative Fill \	fol Cumulative Cut V	161		(r - 2	
290+00.00	46.81	83.77	0.00	0.00	0.00	0.00	270+	_	1.00	49.28	132.78	85.10		2810.30	1981.69	<u> </u>		SLG-Mainline	~ I
200+50.00		75.69	96.09	147.05	96.69	147.05							_			-		(c - 2	
201+00.00	61.82	68.01	112.59	133.01	211.28	281.28													
281+50.00	67.77	61.45	1 19.99	120.42	331.27	401.68												Select material list:	
262+00.00	76.67	55.69	133.73	108.48	485.00	510.15											\mathbf{d}		
282+50.00	-	48.39	144.63	98.37	609.63	606.62												Cut-Fill	\sim
283+00.00		50.00	147.22	91.10	758.85	697.62											Υ		
203+50.00		53.49	147.98	95.83 98.97	904.84	793.45 892.42												Split table	
284+00.00		53.39 49.18	145.52	98.97 94.97	1050.30	892.42 967.39												Split table	
205+00.00		47.24	192.62	89.27	1411.01	1076.66												Maximum rows per table:	20
205+50.00	-	45.22	193.71	85.60	1604.72	1162.27												Maximum rows per table.	20 •
200+00.00	_	45.62	167.43	84.10	1772.16	1248.37												Maximum tables per stack:	3
208+50.00	75.42	48.09	139.27	88.76	1911.41	1333.14												Maximum tables per stack.	· ·
207+00.00	68.50	47.73	133.32	88.72	2044.73	1421.80												Offset:	0.5000"
287+50.00	-	48.61	128.19	89.20	2170.92	1511.05												Under.	0.000
288+00.00		50.98	128.15	92.21	2299.07	1603.27												Tile tables	
268+50.00		51.84	125.31	95.21	2424.38	1698.48												0	
289+00.00		48.94	122.98	93.32 84.80	2547.38 2877.52	1791.79 1878.59												Across Open	
																		Behavior Reactivity mode: Static OK Cancel	K Help

Material Report

Step 4: Select the Total Volumes Table, select Table Properties from the contextual ribbon.

Properties		展	Static Mode	民	Add Items
Object Viewer	Table	₽,	Update Content	■,	Remove Items
🧐 Isolate Objects		覸	Realign Stacks		Replace Items
General Tools 👻			Modify		

Step 5: In the Table properties dialog box, change Maximum rows per table to 21, click OK.

Total Volume Table									
Station	Fill Area	Cut Area	FillVolume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol			
280+00.00	46.81	83.77	0.00	0.00	0.00	0.00			
280+50.00	59.78	75.69	96.69	147.65	98.89	147.65			
201+00.00	61.82	68.61	112.59	133.01	211.28	281.28			
281+50.00	67.77	61.45	1 19.99	120.42	331.27	401.68			
282+00.00	76.67	55.69	133.73	108.48	485.00	510.15			
282+50.00	79.53	48.39	144.63	98.37	609.63	606.52			
283+00.00	79.47	50.00	147.22	91.10	758.85	697.62			
283+50.00	80.38	53.49	147.98	95.83	904.84	793.45			
284+00.00	76.81	53.39	145.52	98.97	1050.38	892.42			
284+50.00	104.67	49.18	168.03	94.97	1218.39	987.39			
285+00.00	103.36	47.24	192.62	89.27	1411.01	1076.66			
265+50.00	105.84	45.22	193.71	85.60	1604.72	1162.27			
266+00.00	74.98	45.62	167.43	84.10	1772.15	1248.37			
288+50.00	75.42	48.09	139.27	88.76	1911.41	1333.14			
267+00.00	68.50	47.73	133.32	88.72	2044.73	1421.80			
267+50.00	67.72	48.01	128.19	89.20	2170.92	1511.05			
268+00.00	70.69	50.98	128.15	92.21	2299.07	1603.27			
288+50.00	64.65	51.84	125.31	95.21	2424.38	1698.48			
289+00.00	68.17	48.94	122.98	93.32	2547.38	1791.79			
269+50.00	72.41	42.65	130.16	84.80	2877.52	1878.59			
270+00.00	71.00	49.26	132.78	85.10	2810.30	1901.09			

able style:		•
Cut and Fill		~ <i>i</i> , ~ /
Split table		
Maximum rows per table:		21
Maximum tables per stack	:	3
Offset:		0.5000*
Tile tables:	Across	ODown
Sorce realignment o	f stacks	
lehavior		
Reactivity mode:	◯ Static	Oynamic
Force content updat	Click	ОК
¥		

Creating Material Tables

Step 1: Navigate to Analyze tab > **Volumes and Materials** panel, **select Material Volume Table**.

Analyze		
(iii)	🛺 Volume Report	P Compute Materials
Volumes Dashboard Grading Volume	🔟 Total Volume Table	Mass Haul 1
Tools	I Material Volume Table	Earthwork Plan Production
	Volumes and Materials	

Step 2: In the Create Materials Volume Table dialog box, verify the following parameters, Click OK.

Select material list: Pavement
Select a material: Pavement
Maximum rows per tale: 21

Step 3: Select a point within the workspace to place the table.

Pavement Volume Table											
Station	Area	Volume	Cumulative Volume								
260+00.00	4.95	0.00	0.00								
260+50.00	4.95	9.17	9.17								
261+00.00	4.95	9.17	18.35								
261+50.00	4.95	9.17	27.52								
262+00.00	4.95	9.17	36.69								
262+50.00	4.95	9.17	45.86								
263+00.00	4.95	9.17	55.04								
263+50.00	4.95	9.17	64.21								
264+00.00	4.95	9.17	73.38								
264+50.00	6.87	10.94	84.33								
265+00.00	6.99	12.83	97.15								
265+50.00	7.09	13.03	110.19								
266+00.00	4.95	11.15	121.33								
266+50.00	4.95	9.17	130.51								
267+00.00	4.95	9.17	139.68								
267+50.00	4.95	9.17	148.85								
268+00.00	4.95	9.17	158.02								
268+50.00	4.95	9.17	167.20								
269+00.00	4.95	9.17	176.37								
269+50.00	4.95	9.17	185.54								
270+00.00	4.95	9.17	194.72								

Table style:	
🕎 Standard	~ 🍫 🖌 📩
Table layer:	
0	3
Select alignment:	
🔿 Mainline	~ 🛋
Select sample line group:	
[]] SLG-Mainline	~ 🛋
Select material list:	
Pavement	
Pavement	~
	~
Select a material:	<u> </u>
	~
Select a material:	~
Select a material: Pavement	~
Select a material: Pavement Split table	× 21 3
Select a material: Pavement Split table Maximum rows per table: Maximum tables per stack:	
Select a material: Pavement Split table Maximum rows per table:	3
Select a material: Pavement Split table Maximum rows per table: Maximum tables per stack: Offset:	3
Select a material: Pavement Split table Maximum rows per table: Maximum tables per stack: Offset: Tile tables	3
Select a material: Pavement Split table Maximum rows per table: Maximum tables per stack: Offset: Tile tables Across Down	3
Select a material: Pavement Split table Maximum rows per table: Maximum tables per stack: Offset: Tile tables Across Down Behavior Reactivity mode:	3

Pipe Networks

Autodesk Civil 3D Pipe Network tools assist in creating gravity utility systems. A pipe network can contain pipes only, structures only, or, more commonly, both pipes and structures. A part catalog provides access to pipe network items, such as circular, elliptical, or rectangular pipes, manholes, catch basins, and headwalls, and more. A pipe network object manages a collection of pipe objects and structure objects that are associated with each other to represent a pipe system. Typically, the pipes and structure objects in a pipe network can be associated with a referenced alignment and or a surface, which provide them with station offset and elevation data. Each part in a pipe network can reference any given surface or alignment in the drawing.

Part Catalogs and Part List

The pipe networks feature references a part catalog and a parts list that define the size, shape, and certain behavior of the pipes and structures insert into drawings. The part catalog content is organized into types, subtypes (part shapes), and part families. A parts list contains a set of pipe network parts, pipes and structures, that can be used in a pipe network. A parts list also serves as a way to store defaults, such as styles, render materials and design criteria (rules) to any given part upon creation.

Create a culvert drawing

Step 1: From the Start tab > Create a new drawing using the Standard: designstart.dwt

Step 2: Save and Name the drawing:

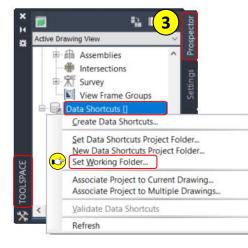
C:\mdtapps\Autodesk_Training\202-Civil 3D Fundamentals II\Working

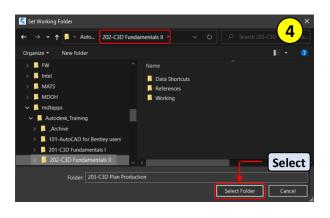
8684000RDCULV001-USER INITIALS.dwg

G If the Working Folder is still correctly set to 202-C3D Fundamentals II, skip ahead to Step 6.

Step 3: Navigate to TOOLSPACE > Prospector tab > Data Shortcuts, right click on Data Shortcuts, select Set Working Folder.

Step 4: Browse to C:\mdtapps\Autodesk_Training\202-C3D Fundamentals II, select Select Folder.





New

design-start.dwt

survey-start.dw

design-start.dwt land-start.dwt

Step 5: Verify the Data Shortcuts path has been set.

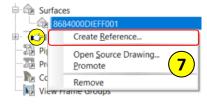
Data Shortcuts [C:\mdtapps\Autodesk_Training\202-C3D Fundamentals II\Data Shortcuts]

Step 6: Navigate to Data Shortcuts > Surfaces, expanded Surfaces.



Step 7: Right click on 8684000DIEFF001, select Create Reference.

Step 8: In the Create Surface Reference dialog box, change the Style to REF Ex Contours 1-5, select OK in the Select Surface Style dialog box, select OK in the Create Surface Reference dialog box.

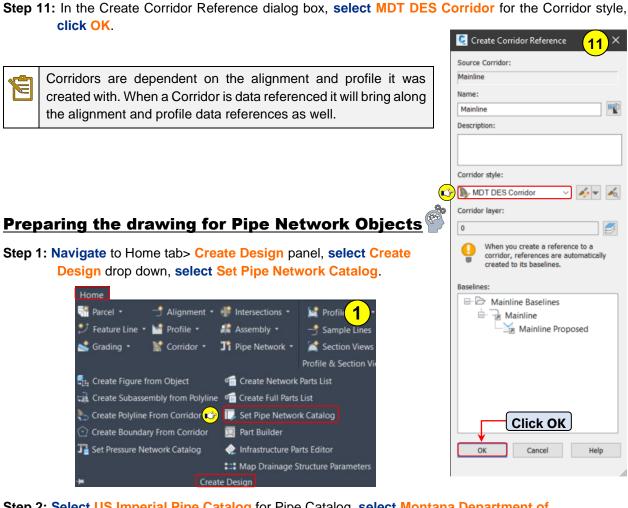


Surface layer:	C Select Surface Style
C-SURF-8684000DIEFF001	Select surface style
Value	REF EX Contours 1-5 🗸 🍂 🗸
8684000DIEFF001	OK Cancel Help
Photo and Pick up survey combined	
Standard	
ByLayer	_
	C-SURF-8684000DIEFF001

Step 9: Type ZE, select Enter on the keyboard to Zoom Extents.

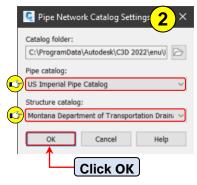
Step 10: Navigate to Data Shortcuts > Corridors, expanded Corridors, right click on Mainline, select Create Reference.

ine Alignments
inline 10
Create <u>R</u> eference
Open Source Drawing
Promote
Remove aneous Alignments



- Step 2: Select US Imperial Pipe Catalog for Pipe Catalog, select Montana Department of Transportation Drainage for Structure Catalog, click OK.
- Step 3: Navigate to TOOLSPACE > Settings tab, expand Pipe Network, expand Parts Lists, right click on MDT Drainage Parts, select Edit.

Active Drawing Settings View	\smile
Catchment	^
	F Drainage Parts
Interfere	Copy
⊞-⊘ Comma ⊞-⊘ Pipe ⊞-⊜ Structure	Find references Replace with
Pressure Ne	Refresh



Step 4: In the Network Parts List dialog box, select Pipes tab, expand MDT RCP.

Name	Style	Rules	Render Material	Pay Item	
B- C MDT Drainage Parts	←(A)				-
H-D MDT CAP	E		3 8	l	36
B- D MDT CMP	2		4 B		00
HDT CSP	E		2, 2		36
🕒 🗁 MDT HDPE	E		2 2		
B-D- MDT PVC	E		4 2	ļ	36
🖶 🗁 MDT RCP 🗲 🖪			2, B	ļ	36
- 6 12" RCP	Double Line (Storm) 🥯	MDT Basic Pipe Rule	🚪 ByLayer 🛛 🛞	[none]	30
60 15" RCP	Double Line (Storm) 🥯	MDT Basic Pipe Rule	🚪 ByLayer 🛛 🛞	[none]	30
62 18" RCP	Double Line (Storm) 🥯	MDT Basic Pipe Rule	🚪 ByLayer 🛛 🛞	[none]	20
- 🥪 21" RCP	Double Line (Storm) 🦃	MDT Basic Pipe Rule	🚪 ByLayer 🛛 🛞	[none]	20
	🕞 Double Line (Storm) 😔	🕂 D sic Pipe Rule 🛛 🕯	🚪 ByLayer 🛛 🛞	[none]	
🥟 27" RCP	Double Line (Storm) 🦃	MDT Basic Pipe Rule	🚪 ByLayer 🛛 🛞	[none]	30
	Double Line (Storm) 🥪	MDT Basic Pipe Rule		[none]	30
	Double Line (Storm) 🥪	MDT Basic Pipe Rule		[none]	30
62 36" RCP	Double Line (Storm) 🥪				30
	Double Line (Storm) 🥏	MDT Basic Pipe Rule	R BvLaver 🕅	Inonel	
		ОК	Cancel	Apply	Help
		OK	Culicer	лфыя	neip

Step 5: Select Structures tab, expand Type 3 Manhole, click Cancel.

Name	Style	Rules	Render
B G MDT Drainage Parts A			
Null Structure	-	l le	4
E D Type 1 Manhole	E	E E	
B D Type 3 Manhole - B	E	E	
Type 3 Manhole Surface Structure, pipe 48'	Storm Sewer Manhole		ByLaye
Type 3 Manhole Surface Structure, pipe 54	Storm Sewer Manhole	Basic 6	ByLaye
Type 3 Manhole Surface Structure, pipe 60	Storm Storm Manhole	Basic	ByLaye
- 🚰 Type 3 Manhole Surface Structure, pipe 66	stor C r Manhole	Basic 6	ByLaye
Type 3 Manhole Surface Structure, pipe 72	Storm Sewer Manhole	Basic 🐔	ByLaye
Type 3 Manhole Surface Structure, pipe 78	Storm Sewer Manhole	Basi	ByLaye
Type 3 Manhole Surface Structure, pipe 84	Storm Sewer Manhole 🔶	(D) 🧐	ByLaye
Type 3 Manhole Surface Structure, pipe 90	Storm Sewer Manhole		ByLaye
- 👸 Type 3 Manhole Surface Structure, pipe 96	Storm Sewer Manhole	Basic 6	ByLaye
Type 3 Manhole Surface Structure, pipe 10.	Storm Sewer Manhole 👸	Basic 6	ByLaye
Type III and Type VI Inlet	E	E E	4
MDT CMP Rectangular End Section			1 .
< .		Click Can	cel
			200
	OK Cancel	Apply	Help

Pipe and Structure Rules

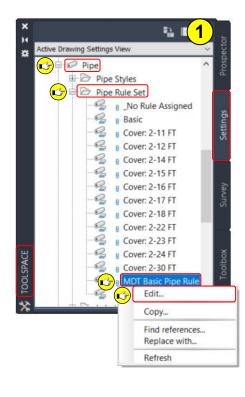
Part rules are properties that affect how pipe network parts behave on creation and when you move or edit them. Part rules automatically determine reasonable elevations for parts as they are created. The specific elevation behavior you see is based on choices you make, such as how you define the minimum slope, minimum cover, and desired drop across a structure. Rules also provide automatic validation of your pipe network design, such as checking to see if a structure is too small to accommodate a pipe size, if the length of a pipe is greater than desired, or the maximum cover above a pipe is exceeded. Rules provide an excellent way to give a good starting point for design.

Autodesk Civil 3D pipe network objects use part rules in the following ways:

- To determine elevations for pipes and structures when they are created.
- To determine how pipes connect to junction structures.
- To warn that certain criteria is not met while creating or editing pipe networks.

Exploring Pipe Rules

- Step 1: Navigate to TOOLSPACE > Settings tab, expand Pipe, expand Pipe Ruel Set, right click on MDT Basic Pipe Rule, select Edit.
- Step 2: In the Pipe Rule Set dialog box, select Rules tab, expand Cover Only, expand Length Check, click Cancel.



Pipe Rule Set - MDT Basic Pipe Rule	- 2
Add Rule Delete Rule	
Parameter	Value
Cover Only	
- Minimum Cover	0.500'
Maximum Cover	32.000'
Length Check	
Maximum Length	500.000'
Minimum Length	1.000'
	Click Cancel
	OK Cancel Apply Help

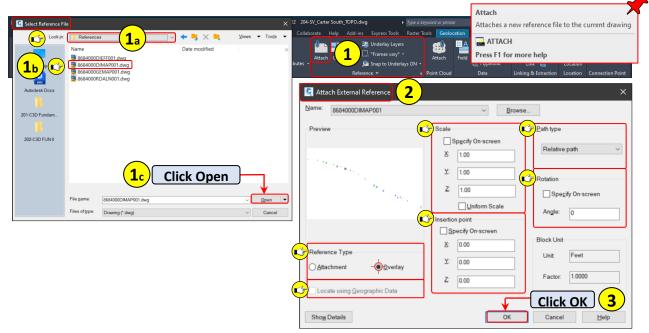
Creating Pipe Networks

There are several ways to create pipe networks. Pipe network can be created by using the Network Layout Tools toolbar or from objects including lines, arcs, polylines, both 2D and 3D, feature lines and alignments.



Step 1: Navigate to the Insert tab > Reference panel > Select Attach.

- a. Navigate to C:\mdtapps\Autodesk_Training\202-Civil 3D Fundamentals II\References
 - b. Select > 8684000DIMAP001.dwg
 - c. Click Open.



Step 2: From the Attach External Reference dialog box, verify the following parameters:

- Reference Type = Overlay
- Scale = Specify On-screen is unchecked
- Insertion point = Specify On-screen is unchecked
- **Path type** = Relative path
- Rotation = Specify On-screen is unchecked

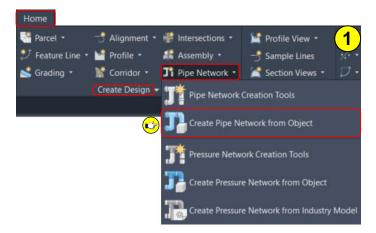
Step 3: Click OK.

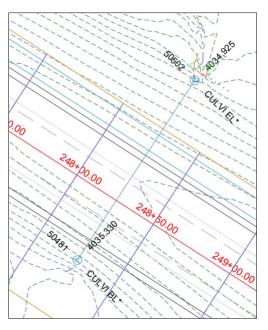
Step 4: Zoom to station 248+00.00 of the Mainline alignment.

Step 5: Save the drawing.

Pipe Network from Object

Step 1: Navigate to Home Tab > Create Design panel > Pipe Network, select Create Pipe Network from Object.





- Step 2: Select Xref from the command line, select the blue line representing the existing culvert, select Enter to accept the Northeast flow direction.
- Step 3: Make the following parameter changes, click OK.

Network name: Drainage

Network parts list: MDT Drainage Parts

Pipe to create: 48: RCP

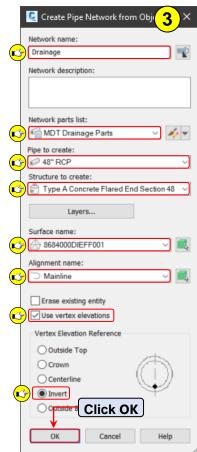
Structure to create: Type A Concrete Flared End Section 48.00 diameter 98.00 L X 94.00 W

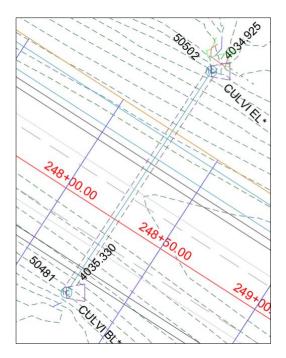
Surface name: 8684000DIEFF001

Alignment name: Mainline

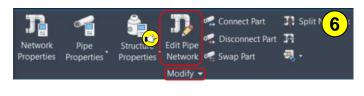
Use vertex elevations: check

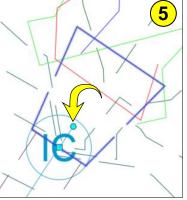
Vertex Elevation Reference: Invert





- Step 5: Select the northerly flared end section, select the circle grip, rotate the flared end section to align with the culvert.
- Step 6: Select the culvert pipe, navigate to Modify panel, select Edit Pipe Network.





Extending Existing Culverts

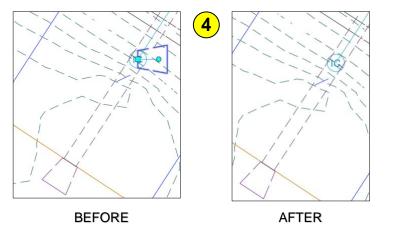
Step 1: On the Network Layout Tools tool bar, select Type A Concrete Flared End Section 48.00 diameter 98.00 L X 94.00 W, select 48" RCP, select toggle upslope, select Pipes and Structures.



Step 2: Zoom to the southerly end of the existing culvert pipe, hover the crosshairs over the existing culvert pipe, select the existing structure when the connect to structure symbol - appears.

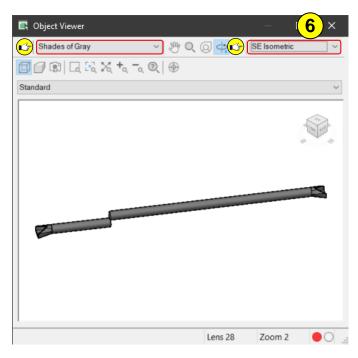
Step 3: Extend the new pipe to the edge of the corridor, select a point near the corridor limit, select Esc to end the command.







Step 6: In the Object Viewer application window, select Shades of Gray for the Visual Style, select SE Isometric for the View Control, press ESC when done viewing to close the Object Viewer.



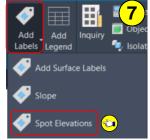
The new pipe culvert will need to be edited to match the invert of the existing pipe culvert. The invert of the existing pipe culvert is shown on the cogo point. To get the elevation of the surface a surface spot elevation can be added to the drawing.

Æ

Step 7: Select the 8684000DIEFF001 surface, navigate to Labels & Tables panel on the contextual ribbon, select Add Labels, select Spot Elevations.

Step 8: Select a point on the surface near the end of the new pipe culvert.





Step 9: Select the new 48" pipe, select Pipe Properties from the contextual ribbon.

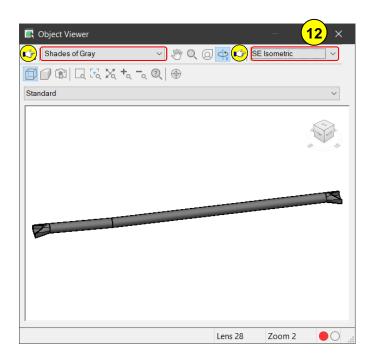


Step 10: In the Pipe Properties dialog box, select the Part Properties tab, edit the Start Invert Elevation to 4035.330, edit the End Invert Elevation to 4036.336, click OK.

Pip	e Properties	Value
	General	
	Pipe Flow Direction Method	End to Start
	Flow Direction	End to Start
	Reference Surface	8684000DIEFF001
	Reference Alignment	Mainline
Ξ	Geometry	
	Start Structure	Structure - (33)
	End Structure	Structure - (35)
	Bearing	S33° 50' 53.38"W
	Start Station	248+25.60'
	End Station	248+25.01'
	Start Offset	39.227'
	End Offset	73.539'
	Pipe Slope (Hold Start)	2.93%
	Pipe Slope (Hold End)	-2.93%
	Slope	2.93%
	Start Invert Elevation	4035.330'
	End Invert Elevation	4036.336'
	Start Crown Elevation	4039.330'
	End Crown Elevation	4040.336'
	Pipe Start Easting	1380632.6600'
	Pipe Start Northing	857292.8550'
	Pipe End Easting	1380613.5458

Step 11: Select a structure, select a pipe, right click and select Select Similar, right click again and select Object Viewer.

Step 12: In the Object Viewer application window, select Shades of Gray for the Visual Style, select SE Isometric for the View Control, close Object Viewer.



Step 13: Save the drawing.

Editing Pipe Networks

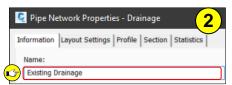
Once a pipe network or networks are created, there are several ways to edit and refine them. The pipe network layout tools, pipe network vista and using grips in both plan and profile views. Individual parts and structures can be edited within their properties dialog box as well.

Splitting Pipe Networks

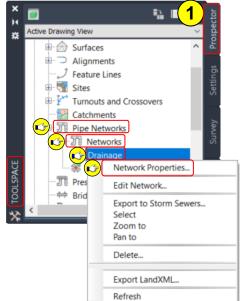
Splitting a pipe network, creating multiple pipe networks from an existing single network, maybe necessary through the design process. Most of the part properties of the selected parts are not modified when splitting a pipe network. Part properties such as the referenced surface, referenced alignment and labeling, remain unchanged when the pipe network is split. The only part property that changes is the pipe network that the parts are associated with.

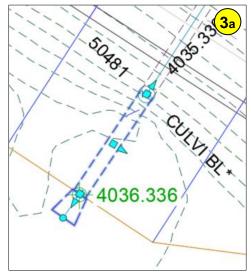
Creating a Proposed and Existing Network

- Step 1: Navigate to TOOLSPACE > Prospector panel, expand Pipe Networks, expand Networks, right click Drainage, select Network Properties.
- Step 2: In the Pipe Network Properties dialog box, select Information tab, rename the network from Drainage to Existing Drainage, select OK.













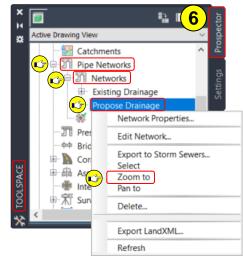
Step 5: In the Create Pipe Network dialog box, change the following parameters, select OK.

Network Name: Proposed Drainage Network parts list: MDT Drainage Parts Surface name: 8684000DIEFF001 Alignment name: Mainline

Create Pipe Network 5 ×
Network name:
Propose Drainage
Network description:
Network parts list:
😭 🖬 MDT Drainage Parts 🛛 🗸 🔻
Layers
Surface name:
▲ 8684000DIEFF001
Alignment name:
😭 🗆 Mainline 💎 🛋
Structure label style:
<none> 🗸 🍂 🖌</none>
Pipe label style cnone> Click OK
OK Cancel Help

Step 6: Navigate to TOOLSPACE > Prospector panel, expand Pipe Networks, expand Networks, right click Proposed Drainage, select Zoom to.



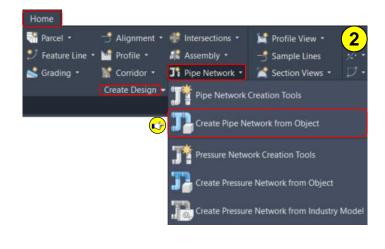


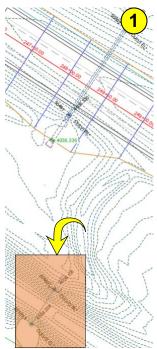
Merging Pipe Networks

Merging pipe networks, the opposite of splitting them, takes multiple pipe networks and creates a single pipe network from the pipes and structures. When using an analysis tool like Autodesk Storm and Sanitary Analysis (SSA) it may be necessary to merge existing and proposed pipe networks into a single network to perform the analysis.

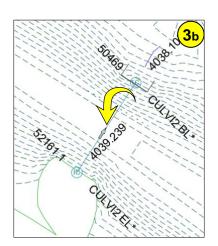
Creating a single Pipe Network from multiple

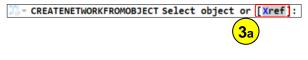
- Step 1: Zoom to the existing surveyed culvert located southerly of the pipe culvert that was created in the previous steps.
- Step 2: Navigate to Home Tab > Create Design panel > Pipe Network, select Create Pipe Network from Object.





Step 3: Select Xref from the command line, select the blue line representing the existing culvert, select Enter to accept the Northeast flow direction.







Step 5: Select the northerly headwall, rotate the headwall using the grip to align with the culvert.

Network Pipe Properties Properties Properties Modify
Modify

Step 6: With the headwall still selected, navigate to the Modify panel, select Edit Pipe Network.

Step 7: On the Network Layout Tools, select the Delete Pipe Network Object tool, select the southerly headwall, press Enter to complete the command.

	Network Layout Tools - EX Culvert		7 ×
Source Source	📅 🛆 つ 🖷 🖨 Null Structu	re 🗸 😥 12'' CAP	v 🖅 🛫 🗊 🗸 🧄 🗸
	Parts List: MDT Drainage Parts	Surface: 8684000DIEFF001	Alignment: Mainline
Charles and the second s			
50			
Series Barris			

Step 8: Navigate to the Modify tab > Design panel, select Pipe Network.

Step 9: Navigate to the Modify panel, select Merge Networks.	Home Insert 수 Points 삶 Surface 채 Survey Query Ground Data	🌙 Feature Line 🎽	Alignment 🌸 Inter Profile 👫 Asse	mbly
Network Pipe Structure Edit Pipe 🧖 Disconnect	plit Network lerge Networks eset Connect			

 Step 10: In the Select pipe network to be merged into another network dialog box, select EX Culvert, click OK.

 Image: Select pipe network to be merged into another network

Step 11: In the Select destination pipe network, select Existing Drainage, click OK.	Name
Select destination pipe network	Click OK >

Step 12: Navigate to TOOLSPACE > Prospector tab, expand Pipe Networks, expand Networks, verify only Existing Drainage and Proposed Drainage are listed.

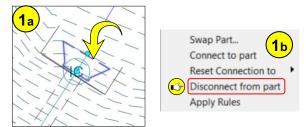


Disconnecting and Reconnecting Pipe Networks

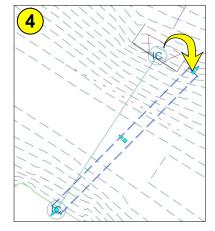
Disconnecting and reconnecting pipe network parts is a simple task in Civil 3D. When disconnecting a part, the disconnected part can then be moved in the drawing without moving parts that were attached to it. Even though a part may be disconnected from the other parts in the same pipe network, the disconnected part still belongs to the same pipe network. Once disconnected a part can be easily reconnected using the right-click menu.

How to Disconnect and Reconnect Networks

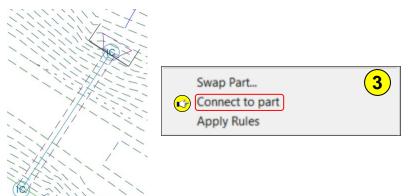
Step 1: Select the headwall, right click and select Disconnect from part, select the culvert pipe when prompt to Select Connect Part.



Step 2: Select the culvert pipe, move the culvert pipe away from the headwall using the square grip.



Step 3: With the culvert pipe still selected, right click and select Connect to part, select the headwall when prompt to Select Network Structure. The culvert pipe is reconnected to the headwall.



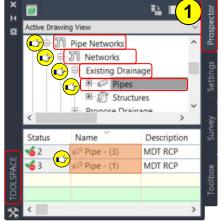
Renaming Pipe Networks

Using the Rename Parts command allows for rename one, all, or a sequence of connected parts within a pipe network. Using this command, a name template can be applied to the new part names as well.

Editing network parts names

- Step 1: Navigate to TOOLSPACE > Prospector tab, expand Pipe Networks, expand Networks, expand Existing Drainage, select Pipes. Notice the list of pipes and names at the bottom of the TOOLSPACE.
- Step 2: Select both pipes by holding the Ctrl button while selecting.
- Step 3: Right click on the selected pipes and select Select.





Step 4: Navigate to the Modify panel on the Pipe Network: Existing Drainage contextual ribbon, select the arrow next to Modify, select Rename Parts.

Network Properties	Pipe Properties	Structure Properties	Edit Pipe Network Modify	Connect Part Connect Part Swap Part	기 Split N 4 과 평 -
Reconn					
			Modify		

Step 5: On the Rename Pipe Network Parts dialog box, make the following parameter changes, click OK.

Rename structures: Uncheck

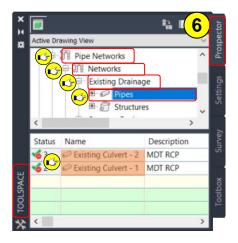
Rename pipe: Check

Name: Existing Culvert - <[Next Counter(CP)]>

Starting number: 1

Name conflict options: Rename existing parts

Step 6: Navigate to TOOLSPACE > Prospector tab, expand Pipe Networks, expand Networks, expand Existing Drainage, select Pipes. Notice the list of pipes and names at the bottom of the TOOLSPACE have been updated.



Rename Pipe Network Parts 5	×
0 structures and 2 pipes selected	
Rename structures:	
Structure name template	
Name: Starting number	873
Structure - (<[Next Counter(CP)]>) 38	
Pipe name template	
Name: Starting number	
Existing Culvert - <[Next Counter(CP)]>	
Name conflict options	
⊖ Skip number	
Click OK OK Cancel Help	

Step 7: Press Esc to deselect any network objects and to clear the command line.

Display Pipe Networks

Pipe network parts, or entire pipe networks, can be displayed in profile views and section views. Making changes to the pipe network in plan view, such as moving, swapping, deleting, or resizing parts, those changes are reflected when the parts are dynamically displayed in profile view and section view.

Drawing Network Parts in Profile views



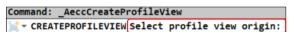
Step 1: Navigate to Home tab > Profile & Section Views panel, select Profile View, select Create **Profile View.**

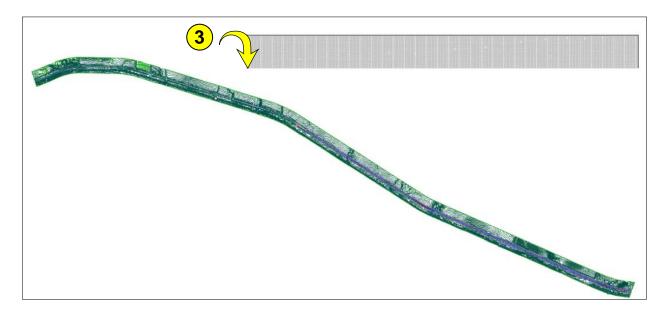
Ho	me Inser	t Annotate	Modify A	Analyze	View M	Manage	Output 5	Survey	Transparent	InfraWorks	Collabora	te Express Tools	Geote
3	2	*		4	Points •		Parcel •	-5		Intersection	and the second sec	Profile View •	<u>∠</u> .∪.
Too	Ispace	Project	Grading	1	Surfaces •	• 🤨	Feature Line	e • 🕍	Profile •	🕌 Assembly -		* Create Profile V	liew
	EF .		Optimization	শ্বাহ	Traverse •	· 💕	Grading •	M	Corridor •	JI Pipe Netwo	rk 💛 🛄		
	Palettes 👻	Explore	Optimize	Create	Ground Da	ita 👻		Cr	eate Design 👻		P	Create Multiple	Profile Views

Step 2: On the Create profile View wizard, accept the defaults for General, Station Range and Profile View Height, select Profile Display Options link, change the Style to PLN Design Profile, change the Labels to PLN P-P-Mainline, click Create Profile View.

🧕 Create Profile View - Profile	e Display Options					2 ×
General	Specify profile display	options:				
Station Range	Name Draw	Type Offset	Update M Style	Labels Alignment	Station Source P	Elevatio
Profile View Height		<i>"</i>			Start	End Mini
Profile Display Options	Mainline	0.00'	PLN Design Profile	PLN P-P Pro Mainline	225+91.90	391+19.21' 4027.2:
Pipe/Pressure Network						
Data Bands						
Profile Hatch Options						
	<		Click Create	Profile View		>
			< <u>B</u> ack	Next > Create Profi	le View Cancel	l Help

Step 3: Select a point on the screen to place the Profile View when prompted.





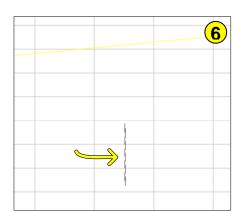
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	Status	Name	Description	Style	Rule Set	Override	Render	Shape	r Dia
	<mark>6</mark> 2	🥏 Existing Culvert - (1)	MDT RCP	Double Line	MDT Basic F	No	ByLayer	Circular	48.000"
\smile		Children (1)	MUTIKEP	Double Line	inter ousier		byedyer	Circular	40,000
	6 2	Existing Culvert - (2)	MDT RCP		MDT Basic F		ByLayer	Circular	36.000"

- Step 4: Navigate to TOOLSPACE > Prospector tab, expand Pipe Networks, expand Networks, expand Existing Drainage, select Pipes, right click on Existing Culvert – (1) from the list view, select Select.
 - The naming of the pipes could be different than what is shown here. Verify the selected pipe is the **48"pipe** crossing the roadway, and not the 36" pipe.
- Step 5: Navigate to Network Tools panel on the contextual ribbon, select Draw Parts in Profile.



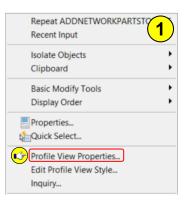
Step 6: Select the Mainline Profile View when prompted, press Esc to end the command.

The pipe is drawn in the profile view utilizing the pipe style. A style override is needed to properly display the pipe in the profile view.



Editing Network Parts Profile View Display

Step 1: Select the Mainline Profile View, right click and select Profile View Properties.



Step 2: On the Profile View Properties dialog box, select Pipe Network tab, select Style Override for Existing Culvert – 1, select Pipe Crossing Pipe (Storm) from the Pick Pipe Style dialog box, click OK on the Pick Pipe Style, click OK on the Profile View Properties dialog box.

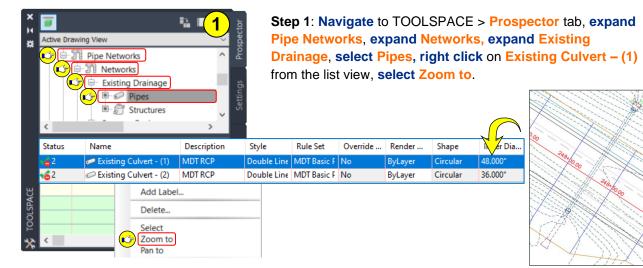
Structure - (5)	Yes No	MDT RCP	0.0005.0701.6		
🗭 Existing Culvert - (2)		MDT RCP	O DOOD OTOL		
Structure - (5)	No		C-PROF-STRM	Double 2b	🗹 Pipe Crossing Pi
		MDT RCP		Double Line (Storm)	Not Overridden>
Structure - (2)	No	RCP Headwall		Headwall	Not Overridden>
	No	Type A Concrete Fla		Flared End Section	Not Overridden>
Proposed Drainage					
💬 Pipe - (3)	No	MDT RCP		Double Line (Storm)	Not Overridden>
🚽 🛱 Structure - (3)	No	Type A Concrete Fla		Flared End Section	Not Overridden>
				ck Pipe Style	



Generating Labels, Tables and Reports

Like most Civil 3D objects, pipe networks can be dynamically labeled. Labels can be added to pipe network parts either when created or after being created. Labels can be added to single parts and multiple parts in plan, profile, and section views. Tables can also be created for pipe network parts. Pipe tables can include data such as pipe shape, size, length, slope, start and end stations, or almost any pipe property. The Civil 3D Reports Manager can be leveraged to generate reports for pipes, pipes and structures, structures, and structures in a CSV format. The Report settings can be customized to generate the preferred report format and data.

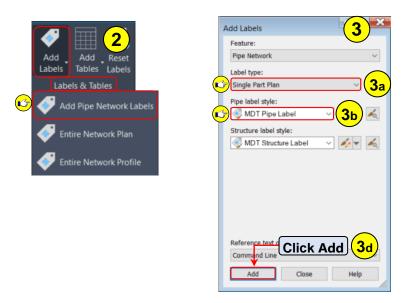
Labeling Pipe Network Parts

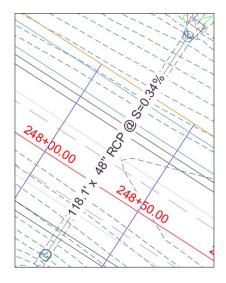


• The naming of the pipes could be different than what is shown here. Verify the selected pipe is the **48**"pipe crossing the roadway, and not the 36" pipe.

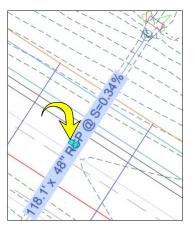
Step 2: Select Existing Culvert – (1), navigate to Labels & Tables panel, select Add Network Labels.

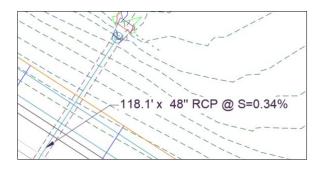
Step 3: On the Add Labels dialog box, select Single Part Plan for the Label type, select MDT Pipe Label for the Pipe label style, click Add.



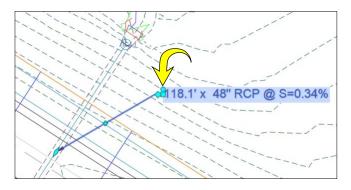


Step 4: Press Esc to deselect all objects, select the pipe label, drag the pipe label using the square grip.

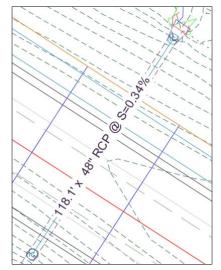




Step 5: Click the circle grip to reset the label position, press Esc to deselect the pipe label.



Step 6: On the Add Labels dialog box, select Single Part Plan for the Label type, select MDT Structure Label for the Structure label style, click Add.



Add Labels	×
Feature:	
Pipe Network	1
Label type:	
Single Part Plan	Sa)
Pipe label style:	
🧐 MDT Pipe Label 🗸 🍬 🖌	1
Structure label style:	
MDT Structure Label (6b)	1
	4
Click Add)
	1
Add Close Help	

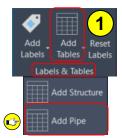
Step 7: Select the existing Flared End Section when prompted to Select structure or pipe.

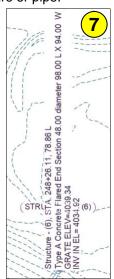
Step 8: Select the structure label, drag the structure label using the square grip.

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S i S	TRUCTURE - (6)			
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S S	tructure - (6), STA	. 248+26.11, 78	8.86 L	\smile
T	ype A Concrete F	lared End Secti	on 48.00 diameter	er 98.00 L X 94.00 W
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			C	

Creating a Pipe Network Table

Step 1: Select the 48" Existing Culvert – (1) pipe, navigate to Labels & Tables panel, select Add Table, select Add Pipe.





- Step 2: On the Pipe table Creation dialog box, select Name Size Length Slope Material from the Table style, click OK.
- Step 3: When prompted to Select upper left corner, select a point in the drawing to insert the table.

	Ρ	ipe Table		3
NAME	SIZE	LENGTH	SLOPE	MATERIAL
Existing Culvert - 2	48"	118.09'	0.34%	RCP
Existing Culvert - 1	36"	47.91'	2.37%	RCP

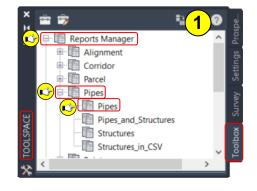
🧕 Pipe Table Creation	2 ×
Table style:	
Reference Name Size Length Slope Material	✓ ✓
Table layer:	
0	2
By network	
Select network:	
Existing Drainage	~ 🛋
Multiple selection	
Split table	
Maximum rows per table:	20
Maximum tables per stack:	3 🔶
Offset:	0.5000"
Tile tables	
Across O Down	
Behavior	
Reactivity mode:	
Static Click O	ĸ
OK Cancel	Help

Producing Pipe Network Reports

Step 1: Navigate to TOOLSPACE > Toolbox tab, expand Reports Manager, expand Pipes, double click on Pipes.

Step 2: On the Export to XML Report dialog box, click OK.

Export to XML Report	×
Specify objects to be exported:	
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🖻 🗁 🗹 Surfaces	
P→ P	
□ □ □ Centerline Alignments	
🗎 🗂 🚺 Mainline	
Superelevation Views	
⊨- M Profiles	
Mainline Proposed	
Offset Alignments	
Curb Return Alignments	
Rail Alignments	
Rail Diverted Alignments	
Miscellaneous Alignments	
Feature Lines	*
Specify LandXML version:	
1.2 ~	
Pick from drawing	
OK Cancel Help	



Step 3: In the Save As dialog box, browse to C:\mdtapps\Autodesk_Training\202-C3D Fundamentals II, click Save.

			You	ır Comp	any Nar	ne			
				123 Main	Street				
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pe Network: <u>Name</u>	Shape	<u>Size (in)</u>	Material	<u>US Node</u>	DS Node	US Inver	t <u>DS Invert</u> (<u>ft)</u>	2D Length (ft) center- to-center edge-to- edge	<u>%</u> <u>Slop</u>
Existing Culvert - 2 (Existing Drainage)	Circular	D:48.00	RCP	Structure - (33 (Existing Drainage		4035.33	4034.92	118.09 118.09	0.34
Existing Culvert - 1 (Existing Drainage)	Circular	D:36.00	RCP	StartNullStruct	Structure - (37) (Existing Drainage)	4039.24	4038.11	47.91 47.91	2.37
e Network:	Propose	Drainage							
<u>Name</u>	<u>Shape</u>	<u>Size (in)</u>	<u>Material</u>	<u>US Node</u>	<u>DS Node</u>	<u>US Invert</u> (ft)	(f+)	2D Length (ft) center- to-center edge-to- edge	<u>%</u> Slop
Pipe - (2) (Propose Drainage)	Circular	D:48.00	RCP	StartNullStruct3	Structure - (35) (Propose Drainage)	4035.33	4036.34	34.32 34.32	-2.93

Step 4: After viewing the report, close the web browser, save and close the drawing.

Project Explorer

Project Explorer is an all-in-one hub for managing the contents of and extracting information from Civil 3D models. It helps users to review, validate, report, export and edit models. Project Explorer helps users to gain a better understanding of their design, and to control the distribution of geometric information more efficiently. Project Explorer functions as a central hub for managing and easily accessing project data. Here are a few of the ways you can leverage Project Explorer to streamline project workflows.

- Project Explorer allows users to simplify access and navigation to important project data
- Simplify project data navigation, review, and design model editing.
- More easily discover and evaluate design criteria warnings to help meet design standards.
- Efficiently generate custom reports and tables that help meet delivery requirements.

Project Explorer is located on the Home tab of the ribbon >

User Interface (UI) and Navigation

Project Explorer Window

The *modeless* live operation of the Project Explorer window allows users to work both in C3D and Project Explorer, moving freely between both. The Project Explorer window displays live geometric project data from the active Civil 3D model. When project data is modified or added to the model, the content displayed in the Project Explorer window will automatically update. To offer greater control over how project data displays in the window, you can customize the window. By selecting an element in the Project Explorer window and pressing the *CTRL* button, you can highlight the element in the C3D workspace. To offer greater control over how project data displays in the window, a template-based approach is used to customize the window.

Using dynamic profile and section views in Project Explorer can aid in the design and review process more efficiently. Additionally, support for multiple object editing can help to streamline the process of making multiple design changes in Civil3D.

Step 1: Using your preferred method > Navigate to and open 8684000RDCOR001-PROJEXP.dwg

• C:\mdtapps\Autodesk_Training\202-C3D Fundamentals II\Working

Select OK if prompted for the use Online Maps.

Step 2: Save-as and Name the drawing: 8684000RDCOR001-PROJEXP-USER INITIALS.dwg

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0	🐡 🔹 🗱 Civil 3D		3D 2022 8684000RDCOR001-	-PROJEXP.dwg	Type a keyword or phrase	Project Explorer
Home Insert Annotate	Analyze View Mana	age Output Survey Rail Transparent InfraWo	rks Collaborate Help	Add-ins Vehicle Tr	acking Raster Tools Express Tools	Discover a more efficient way to edit, validate, and share information from your Civil 3D design with Project Explorer.
* 🔛 💽 💙	🛷 Points -	Parcel * Alignment * 🏶 Intersections	Profile View -	1.1.2	🕂 Move 🖒 Rotate 🏋 Trim - 🟒	💈 🔜 Project Explorer
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Step 3: Navigate to the Home tab > Select Project Explorer.

The Project Explorer window will remain open until closed by the user or C3D is closed.

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Before getting started with any model edits, let's first **review** the **Project Explorer** window to become familiar with the User Interface (UI).

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🛃 RG - Mainline -	(1)		Mainline	225+92.00	264+00.57	81	52	Mainline
自己 RG - Mainline -			Mainline	264+00.57	265+99.91	7	52	Mainline
自 RG - Mainline -	(3)	D	Mainline	265+99.91	391+19.21	322	52	Mainline
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Depending on the active object type, the main layout is generally divided into two or three panes.

- A. Project Explorer window. E. Profile or Section View pane.
- B. Object Category Type tabs. F. Pane Layouts (used to control layout of individual panes).
- C. Object List pane. G. Preferences (controls color, scaling, fonts, etc).
- D. Sub-object Lists pane. H. Layout Options (control both data displayed and report layout).

Object Category Type: Number in () indicates number of individual objects in model.

The *middle* mouse button can be used for panning and scrolling in the Profile or Section View pane same as in Civil 3D.
 Columns can be sorted and repositioned as desired.

- Click-n-Drag on column header to reposition.
- Click on column header to sort data per column data.

Multiple items (rows) can be selected using left-click+Shift or left-click+Ctrl.

J=

Preferences and Layout Options

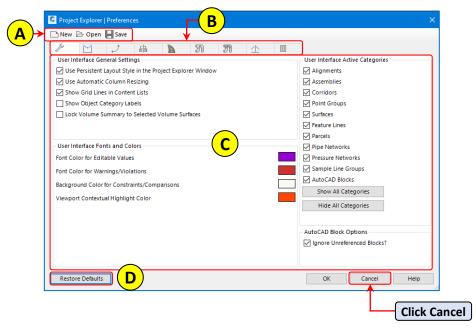
The Project Explorer Window and related layout panes are fully customizable. The available customization options are divided into two types, Preferences and Layout Options. Access to the settings and parameters for both are in the lower left corner of the main Project Explorer window.



Step 1: From the Project Explorer window > Select Preferences...

Step 2: From the Project Explorer Preferences dialog box, review the available settings.

Parameters in the Preferences dialog box control the graphical display of all user interface items not directly associated with the layout of columns and the generation of reports.



- A. Preference controls for creating new, opening exiting, and saving user set preferences.
- B. Tabs for General and Object specific preferences.
- C. Parameters of current selected tab that can be adjusted.
- D. Restore Defaults > resets all parameters to default settings.

Step 3: Click Cancel.

Line Interval:	10.0 Curve Interval:	5,,,
Preferences	Layout 4	Res

Step 4: From the Project Explorer window > Select Layout...

Step 5: From the Project Explorer Layout Options dialog box, review the available settings.

3

Parameters in the Layout Options dialog box provide control for the Project Explorer window and control for reports. The parameters for the Project Explorer window and reports work independently from the other allowing specific parameters to be set for the working display, and reports. Furthermore, parameters can be set for each type of object.

Alignment/Profile Name Text Left Ungrouped Alignment/Profile Name Object Style Text Left Ungrouped Object Style Image: Constraint of the state	Set Column Layout for Align		1	6.1	Constant of	C	Description of the second	✓
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- A. Preference controls for creating new, opening exiting, and saving Layout Styles.
- B. Tabs for General and Object specific preferences.
- C. Parameters of current selected tab that can be adjusted.
- D. Restore Defaults > resets all parameters to default settings.

Step 6: Click Cancel.

Reviewing and Editing Object Data

Changes and edits to a C3D model can be made directly through the Project Explorer window.

- Values with the text color *purple* and white background are editable values.
- Values with the text color *red* and shield are flagged as a warning and or in violation.
- **Double-click** on any editable parameter to revise the value.
- Right-click a selection of objects will provide access to a limited range of editable parameters.
- Use of the available dedicated tools specific to the object selected, such as edit Pipe Run.

Reviewing Object Data

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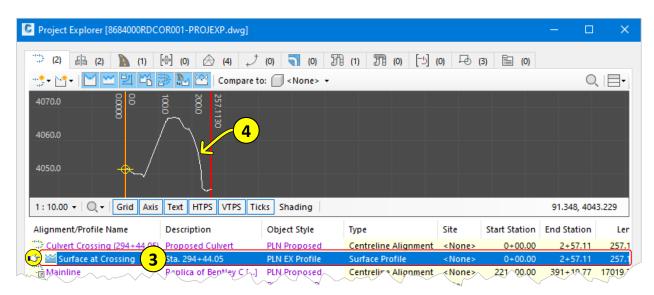
Step 1: From the Project Explorer window > Select the Alignments object tab.

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Surface at Crossing Sta. 294+44.05 PLN EX Profile	Surface Profile	<none></none>	0+00.00	2+57.11	
To Mainline Renta of Bertley C [] PLN Pronosed	Centr Alignment	<none< td=""><td>221+00.0</td><td>39/ 10-77</td><td>~* `^</td></none<>	221+00.0	39/ 10-77	~* ` ^

Step 2: From the Project Explorer window > Object List pane > Select Culvert Crossing (294+44.05).

Alignment Objects are not displayed in the Profile / Section View pane. Selected Alignment Objects only display the alignment stationing.



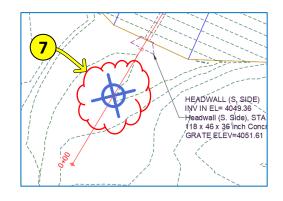
Step 3: From the **Project Explorer** window > Object List pane > **Select** the **Surface at Crossing** profile.

Step 4: From the **Project Explorer** window > Profile View pane > **See** the highlighted **profile**.

Calculated	Stations (27)			$ \wedge $	\sim	\sim		
Point Index	Station	Easting	Northing	Elevation	Bearing	Alignment Radius	Entity Type	Sub-Entity ^
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⊙ <u>3</u>	0+20.00	1384515.2933	854793.4354	4050.464	30° 54' 42.976"	Infinity	Line	Line
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Step 5: From the Project Explorer window > Sub-object Lists pane > Select any Calculated Station.

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Step 6: From the **Project Explorer** window > Profile View pane > **See** the highlighted **station**.

Step 7: From the Project Explorer window > Sub-object Lists pane, with any Calculated Station selected > Press Ctrl key > While pressing the Ctrl key > From Model space > See the highlighted station.

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Alignment/Profile Name	Description	Object Style	Туре	Site	Start Station	End Station	Ler
Culvert Crossing (294+44.05)	Proposed Culvert	PLN Proposed	Centreline Alignment	<none></none>	0+00.00	2+57.11	257.1
Surface at Crossing	Sta. 294+44.05	PLN EX Profile	Surface Profile	<none></none>	0+00.00	2+57.11	257.1
Mainline 8	Replica of Bentley C []	PLN Proposed	Centreline Alignment	<none></none>	221+00.00	391+19.77	17019.7
Mainline Proposed	<none></none>	PLN Design Profile	Layout Profile	<none></none>	225+91.90	391+19.21	16527.3
r	H			\sim	\sim	$\$	\land

Step 8: From the Project Explorer window > Object List pane > Select the Mainline alignment.

	<					\frown	\sim	\sim		
C	10 ₽ (Calculate	ed Stations (1	9 🚺 📝 Align	ment Entities (8) 9 Alignment	: Pls (7) 🛛 🧖	Superelevati	on Critical Stat	ions (22)	V .
	Entity	y Index	Entity Type	Sub-Entity Type	Tangency Constraint	Length	Start Station	End Station	Start Easting	Start N ^
	1		Line	Line	Fixed (Not Constrained)	491.8999	221+00.00	225+91.90	1378370.0680	8588
(10 a)	2 12		Line		Fixed (Not Constrained)	1108.1291	225+91.90	237+00.03	1378783.2040	8585
\sim	13		Sub-Ent	ity 1 (Line)	strained)	3228.1100	237\00.03	265+28.14	1379708.6130	8579 N
		wo	- Sub-er	ntity is not tangent wi	th next sub-entity.					

Step 9: From the Project Explorer window > Sub-object Lists pane > Select the Alignment Entities tab.

Step 10: From the Alignment Entities tab > Review the Entity Index column.

- a. Notice some Alignment Entities are displayed in *red* with a warning symbol.
- b. Hover over Entity 1 > See the Warning Pop-up > Sub-Entity 1 (Line).

4	Calculate	ed Stations (1	916) . Align	nment Entities (8)		nt Pls (7)			221	
Er	ntity Index	Entity Type	Sub-Entity Type	Tangency Constr	aint	Lengt		-	head N ^	
)./	1 (1:	Line	Line	Fixed (Not Const	rained)	491.8999	22			
N		Line	line	Eixe Not Son	rai	11/	91.90			

Step 11: From the Alignment Entities tab > Sub-object Lists pane > Select Entity 1 > Press Ctrl key.

a. While **pressing** the **Ctrl** key > From **Model** space > **See** the highlighted **Alignment Entity**. (The **right-click** menu can be used to Zoom or Pan to the selected entity.)

Editing Object Data

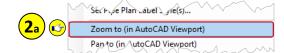
Not only can a C3D object be viewed in Project Explorer, but some parameters can also be edited. The edits in Project Explorer will automatically update the Civil 3D objects in the drawing model.



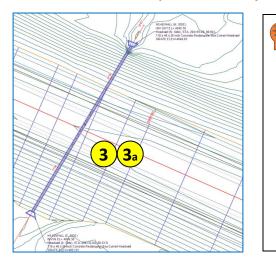
Step 1: From the Project Explorer window > Select the Pipe Networks object tab.

Project Explorer [8684000RDCOR001-PROJEXP.dwg]	—	□ ×
🌇 (2) 晶 (2) 🐚 (1) 🔄 (0) 🛆 (4) 🦯 (0) 瞏 (0) 🎛 (1) 🏗 (0) [1] (0) 圮 (3) 🖹 (0)		
🗊 🕶 🌇 Edit Pipe Run 🍵 Headwall (N. Side) 👻 💼 Headwall (S. Side) 💌 💼 🕇 Compare to: 🧰 <none> 💌</none>		
	160.0	188,5259
4050.0	<u></u>	
4040.0		
1 : 1.00 - Grid Axis Text Zone C/L Distance: 180.6259	47.799	9, 4037.433
Pipe Network Name Description Parts List Structures Pipes Default Reference Alignment Default Reference Surface	Structure Pla	an Label Style
E US-HWY 12 Drainage 2 MDT Drainage Parts 2 1 Mainline Composite Surface	MDT Structu	ire Label - Co

Step 2: From the Project Explorer window > Object List pane > Right-click on E US-HWY 12 Drainage.



a. Select Zoom to (AutoCAD Viewport).



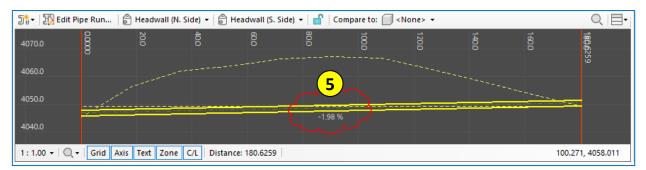
Project E	t Explorer Keyboard Shortcuts								
Z	Zoom to selected object.								
Р	Pan to selected object.								
S	Select the selected object.								
С	Clear or de-select current selection.								
A (or E)	Open C3D Properties for selected object.								
CTRL	Temporarily highlights selected object.								
CTRL A	Select all items in list.								
CTRL C	Copy selected list items to clipboard.								

Step 3: From Model space > See the E US-HWY 12 Drainage pipe network.

 With the Pipe Network object still selected in the Object List pane > Press the Ctrl key > From Model space > See the highlighted Pipe Network objects.

🛱 Structure	es 🕼 🕬 Pip	pes (1) 4 Pipe Run (3	3)		~~				~~~~
Pipe Name	Description	Pipe Style	Start Invert	End Invert	Slope	Start Structure	End Structure	Start Easting	Start N
🥏 Pipe 1	MDT RCP	Double Line (Storm)	4045.782	4049.356	-1.98 %	Headwall (N. Side)	Headwall (S. Side)	1384625.6046	8549
M	m		$\wedge \rightarrow$	\sim	\checkmark	\sim	~~~~	~~~~	

Step 4: From the Project Explorer window > Sub-object Lists pane > Select the Pipes tab.



Step 5: From the Profile View pane > See the highlighted pipe and existing Pipe Run Slope.

C Project Explorer [8684000RDCOR001-PROJEXP.dwg] -	
⇒ (2) 品 (2) 🐚 (1) 🔄 (0) 会 (4) ブ (0) 🤚 (0) 🍱 (1) 🏗 (0) ⊡ (3) 盲 (0)	
🖅 🌇 Edit Pipe Run 🜔 adwall (N. Side) 🕶 📄 Headwall (S. Side) 👻 💼 🖬 Compare to: 🦳 <none> 🕶</none>	

Step 6: Using the available tools above the Profile View pane > Select Edit Pipe Run...

C Project Explorer Edit Pipe Run Slo	pe and Elevations	×	
Control Parameters	Set and Hold Pipe Elevations By Crown Centerline Invert		
Start Elevation (Invert) Start Elevation of Pipe Run: 4045.782	Slope/Elevation Change Pipe Run Elevation Change: Pipe Run Slope (%) Pipe Run Slope (Rise : Run) 1 ÷ 50.527 ÷ Pipe Elevation Offset at Structures: 0.000 ÷ Ignore Null Structures?		ance: 180.6259 Structures arts 2 Unvert End Invert Slope Start S
Headwall (N. Side) Hea	dwall (S. Side) 180.626	ОК Сапсеі 180.661	4049.394 -2.00 % Head

Step 7: From the Edit Pipe Run Slope and Elevations dialog box > Revise the Pipe Run Slope to -2.00

Step 8: Click OK.

Step 9: From the Project Explorer window > Profile View pane & Sub-Object Lists pane > See the highlighted pipe and updated Pipe Run Slope.

Generating Tables and Reports

Tables and Reports

Project Explorer can quickly generate tables, reports, and spreadsheets from project data. The workflow is fully template driven using Layout Styles, Table Styles, and Report Styles. The Quick Report Window can be used to generate reports and spreadsheets.

Quick vs. Object Sets

It is important to understand the difference between generating a *Quick* report and or table verses generating a report and or table using *Object Sets*.

• Quick =

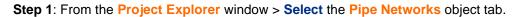
Static operation capturing current state of model object. Not dynamically linked to C3Dobject.

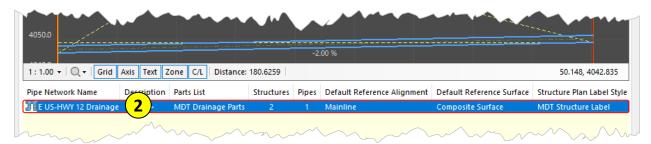
• Object Sets =

Dynamic operation providing real time updates to tables when C3D source object geometry is adjusted. Provides more user control over content, scope, and layout of tables and reports. Tables and reports can be generated quickly using predefined settings from the Object Set. The is no limit to the number of Object Sets that can be saved. Any Object Set created follows the drawing file, so anyone with access to the drawing and Project Explorer can utilize the same Object Set.

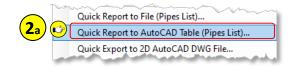
Tables using Quick Report







Step 2: From the Project Explorer window > Object Lists pane > Right-click on E US-HWY 12 Drainage.



a. Select Quick Report to AutoCAD Table (Pipes List)...

Project Explorer Create AutoCAD Table 3 ×	
Title Cell Text for AutoCAD Table	
Title Cell Text Template	
(Object_Name)	
E US-HWY 12 Drainage	When generating an AutoCAD table, there two key parameters that are needed to define the layout and format of the created table.
Use custom Layout Style	
Edit Layout Style	Layout Style : Required to define the layout, format, heading name, and what columns and values are visible.
Table Style for AutoCAD Table Use existing Table Style from current drawing: Use Project Explorer Table Style Edit Table Style	Table Style : Required to define the tableborder color, font type and size, cell marginsand general visual style for table.
Table Style Summary: Text Height for Title Row: 3.0, Calibri Text Height for Header Row: 2.5, Calibri Include Title Row: Yes Show Border: Yes Show Background Colors: Yes Restore Defaults OK	4

Step 3: From the Create AutoCAD Table dialog box > Accept all default settings:

- Title Cell Template = {Object_Name}
- Layout Style for AutoCAD Table = Use Layout of Project Explorer Window.
- Use Object Table(s) = CHECKED
- Use Sub-Object Table(s) = CHECKED
- Table Style for AutoCAD Table = Use Project Explorer Table Style.

Step 4: Click OK

Step 6: Press ESC to end the table placement command.

Step 7: From Model space > See and review the Quick table.

												E US-HWY :	l2 Drainage
Pipe Network Na	me	Descrip	otion	Parts List	\sim	Struct	ures	Pipes	Default Re	ference Alignment		Default Refere	nce Surface
E US-HWY 12 Drainage			MDT Drainage Pa	arts 7	2		1	Mainline		Composite Surface			
						,							
Pipe Name	Description		Pipe Style		S	tart Invert	1	End Invert	Slope	Start Structure	End S	tructure	St
Pipe 1	MDT RCP		Double Line (S	itorm)		4045.926		4049.539	-2.00 %	Headwall (N. Side)	Headw	all (S. Side)	1
Step 8: Sa	ve the	drav		.									

Tables using Object Sets

C Project Explorer [8684000RDCOR001-PROJEXP.dwg]	- 0	×
(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	1)	
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Step 1: From the Project Explorer window > Select the Object Sets tab.

	C Project Explorer [8684000RDCOR001-PROJEXP.dwg]	—		×				
	◎ (四) (1) (1) (1) (1) (2) (4) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1							
¹¹ (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)								
	Object Set Name Object Set Jon Action Type Layout Style Report Style Table Style Output Path / Insert Point Output File							
		\sim	\sim	~~~				

Step 2: From the Object Sets tab > Create a new Object Set > Select New Object Set ...

	C Project Explorer Create Object Set	×
3 a		File Output Op
<u>З</u> ь С	Object Set Description: Object set used for Culvert Pipe Crossing. 3h	Y: 856070.366395 • Z: 0.000000 • Title Cell Text Template: 1
3.	Object Set Action:	Generated Title Cell Text: {Object_Name} Table Style: OUse Default Table Style for Object Sets 3 Use Specific Table Style ()
<mark>3</mark> .	Layout Style: Use Layout of Project Explorer Window Use Specific Layout Style Edit: Style	Edit Style= Table Style Summary: Text Height for Title Row: 3.0, Calibri Text Height for Data Rows: 2.5, Calibri Text Height for Data Rows: 2.5, Calibri Include Title Row: Yes Include Title Row: Yes Show Background Colors: Yes Click OK
		OK Cancel Help

Step 3: From the Create Object Set dialog box > Set and verify the following parameters:

- a. Object Set Name = Culvert Pipe Crossing
- b. Object Set Description = Object set used for Culvert Pipe Crossing
- c. Object Set Action = Export to AutoCAD Table(s) in MODEL Space
- d. Object Set Action Type = Dynamic
- e. Layout Style = Use Layout of Project Explorer Window
- f. From the AutoCAD Table Output Options tab > Select Pick insertion point

- g. When prompted > Select an insertion point in Model space. \Box the table insertion point: (3_g)
- h. Title Cell Text Template = {Object_Name}
- i. Table Style = Use Default Table Style of Objects Sets

Step 4: Click OK.

S (0) S + N + ↓ ↓ × ⊗ ≣ ▼ Filter I	by 🙀 Compar	re to: 🗍 < Nor	1e> *		
	Sub-Object Type	Object Table	Sub-Object Table	Filter by	Compare to
Add/Remove Objects to/from Object Set 5	~~~	~~~		\sim	

Step 5: From the Object Sets tab > Object Lists pane > Select Add/Remove Objects to/from Object Set.

C Project Explorer Add Object	t(s) to Object Se	t					×
Search by Name:		(4) 🎝 (0) 🏹	m m	(1) 6	0 [5] (0) 🗗 (3)		
(2) 7 (2) (1) pe Network Name		(4) 🔑 (0) 🗨	Structures			Default Reference Surface	Structure Pla
E US-HWY 12 Drainage	<none></none>	MDT Drainage Parts	2	1	Mainline	Composite Surface	MDT Structu
<					<mark>(8</mark>)	Click OK	>
						ОК	Cancel

Step 6: From the Add Object(s) to Object Set dialog box > Select the Pipe Networks tab.

Step 7: Check I the E US-HWY 12 Drainage Pipe Network.

Step 8: Click OK.	C Select Sub-Object Type ×
9a)	Sub-Object Type Pipes List OK Cancel
🕂 쥰 슌 문 보 🗙 😣 🗃 🍸 Filter by 📡 Compare to: 🗍 <none> 🗸</none>	
Index Object Name Parent Name Object Type Sub-Object Type Object Tab	ble Sub-Object Table Filter by Compare to Click OK
1 E US-HWY 12 Drainage (9) 🕼 Structures List Yes	Yes N/A <none></none>

Step 9: From the Object Sets tab > Object Lists pane > Double left-click on Structures List.

- a. From the **Select Sub-Object Type** dialog box > **Select Pipes List** from the available types.
- b. Click OK.

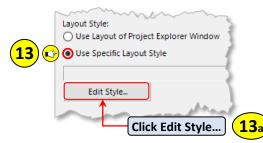
											E US-HWY 1	2 Drainage 🦷
Pipe Network N	lame	Descrip	otion	Parts List		Structu	ıres	Pipes	Default Re	ference Alignment	Default Referer	ice Surface
E US-HWY 12 Drain	nage	<none></none>		MDT Drainage Pa	arts	2		1	Mainline		Composite Surface	
Pipe Name	Description		Pipe Style		St	tart Invert	1	End Invert	Slope	Start Structure	End Structure	Start
Pipe 1	MDT RCP		DoubleLine(S	torm)		4045.782		4049.394	-2.00 %	Headwall (N. Side)	Headwall (S. Side)	138-

Step 10: From Model space > See and review the table inserted in the drawing.

Step 11: Save the drawing

Project Explorer 8684000RDCOF	001-PROJEXP.dwg]	– 🗆 X
12) (2) (1) (3)] (0) 🛆 (4) ブ (0) 🕄 (0) 趼 (1) 趼 (0) [1] (0) 圮 (3) 🖹 (1)	
	Run Selected Action i View History Action Action Type Layout Style Report Style	
Object Set Name	Action Type Layout Style Report Style Table Style	Output Path / Insert Point
Culvert Pipe Crossing 1	Export to AutoCAD Table(s) in MODEL Space Dynamic	MODELSPACE [1385482.8603, 8

Step 12: From the Project Explorer window > Object Sets tab > Double left-click on the Culvert Pipe Crossing Object Set to open the Edit Object Set dialog box.



Step 13: From the Edit Object Set dialog box > Layout Style options > Select Use Specific Layout Style.

a. Click Edit Style ...

	Proj	ect Explorer Layout Option	s					- 🗆	×
[🗅 Nev	v 🗁 Open 📙 Save 🛛			\frown				
		fil 🚺 👘		- \ .			Şə		
	Pipe	Network Column Chooser		la)					
C	Set C	Column Layout for Pipes	\vee					~	
	Colu	umn Label	Data Type	Label Alignment	Column Group Mode	Group Label	Group Alignment	Paramete ^	$\overline{\mathbf{O}}$
	✓ P	Pipe Name	Text	Left	Ungrouped			Pipe Nam	$\hat{\mathbf{t}}$
		Description \frown	Text	Left	Ungrouped	~		-Descriptic	
St	tep 1	I4: From the Layou		Ū.		Pipe Networks ta	b.		

Column Labels can be re-ordered using the hierarchy

arrow tools found on the right side of the Layout

b. Select the Clear All box to un-check the current Column Label selection.

Options dialog box.

- c. Check I the following Column Labels:
 - Pipe Name
 - Description
- Part Size Name
 - Start Structure
 - Start Invert
 - 2D Length (Center to Center)
 - Slope

Ŷ

- End Structure
- End Invert
- d. Using the hierarchy arrow tools > Reorder the Column Labels to match the list above.

MDT Internal Use Only

Step 15: Click OK.



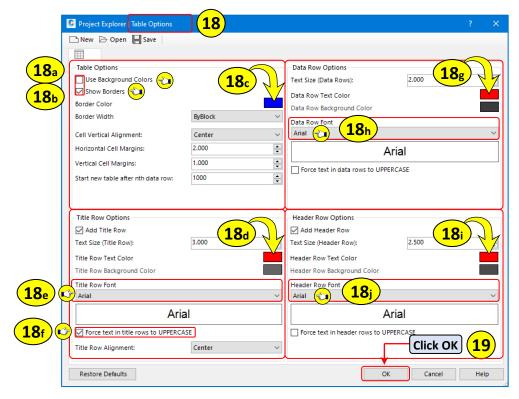
Step 16: When prompted from the Save Layout Style As dialog box > Navigate to:

- a. C:\mdtapps\Autodesk_Training\202-C3D Fundamentals II\Config\Project Explorer\Layout Styles
 - b. Enter File Name = Pipe Layout
 - c. Click Save.

1		
5	Table Style:	
	O Use Default Table Style for Object Sets	F
(17) 🕝	Use Specific Table Style	
	Edit Style	
	Click Edit Style	17 a

Step 17: From the Edit Object Set dialog box > Table Style options > Select Use Specific Table Style.

a. Click Edit Style...



Step 18: From the Table Options dialog box > Set and verify the following parameters:

Table Options

- a. Use Background Colors = Unchecked
- b. Show Borders = Checked
- c. Border Color = (EX: Blue)

Title Row Options

- d. Title Row Text Color = (EX: Red)
- e. Title Row Font = Arial
- f. Force text in title rows to UPPERCASE = Checked

Data Row Options

- g. Data Row Text Color = (EX: Red)
- h. Data Row Font = Arial

Header Row Options

- i. Header Row Text Color: (EX: Red)
- j. Header Row Font = Arial

*Leave ALL other defaults "As-Is"

Step 19: Click OK.

	C Project Explorer	ave Table Style As 20	×	
	<mark>(20₂) €∂</mark>	« Project > Table Styles	✓ Č	
(20	b File name:	Pipe Table		
	Save as type:	Table Style (*.xmpa)	Click Save	(<mark>20</mark> c)
	✓ Browse Folders		Save Cancel	

Step 20: When prompted from the Save Table Style As dialog box > Navigate to:

a. C:\mdtapps\Autodesk_Training\202-C3D Fundamentals II\Config\Project Explorer\Table Styles

- b. Enter File Name = Pipe Table
- c. Click Save.

C Project Explorer Edit Object Set	×
Object Set Name: Culvert Pire Crossing	File Output Options AutoCAD Table Output Options
	OK Cancel Help
Step 21: From the Edit Object Set dia	log box > Click OK.

Dbjects (1)								
+ ☆ ☆ ⊕ ★ ⊗ 圖 🍸 Filter by 📡 Compare to: 🗍 < Non 💊 🖌 (22)								
Index	Object Name	Parent Name	Object Type	Sub-Object Type	Object Table	Sub-Object Table	Filter by	Compare to
311	E US-HWY 12 Drainage		Pipe Network	Pipes List 🕼	Yes	Yes	N/A	<none></none>
N	1		\sim	\sim			\sim	

Step 22: From the Project Explorer > Object Sets tab > Object Lists pane > Double left-click on Yes.

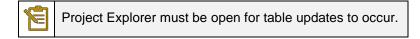
	C Project Explorer Object Set Item Output Options	×
<mark>22</mark> a (Object Table Use Object Table? Deactivate this option to suppress output of object parameters (such as alignments, assemblies, corridors, parcels, pipe networks or point groups).	
	Sub-Object Table Sub-Object Table(s)? Deactivate this option to suppress output of sub-object level parameters (such alignment entities, subassemblies, corridor feature lines, parcel segments, structures, pipes, or cogo points). Click	
	OK Can	cel

a. From the Object Set Item Output Options dialog box > Uncheck Use Object Table?

Step 23: Click OK.

					 (24)			
	E US-HWY 12 DRAINAGE							
Pipe Name	Description	Part Size Name	Start Structure	Start Invert	2D Length (Center to Center)	Slope	End Structure	End Invert
Pipe 1	MDT RCP	24" RCP	Headwall (N. Side)	4045.782	180.6259	-2.00 %	Headwall (S. Side)	4049.394

Step 24: From Model space > See and review the updated table.



Reports using Object Sets

	Project Explorer [8684000RDCOR001-PROJEXP.dwg] -								
	🌣 (2) 晶 (2) 🐚 (1) 🐼 (0) 🏡 (4) 🔎 (0) 🛐 (0) 郢 (1) 郢 (0) [5] (0) 圮 (3) (旨 (1)								
	🖹 🗙 🕅 📊 yns 🖹 Run Selected Action (i) View History								
	Object Set N 2 Objects Action Action Type Layout Style Report Style Table Style Ou	tput Path / Inser							
G	🙀 Culvert Pipe Crossing 1 Export to AutoCAD Table(s) in MODEL Space Dynamic Pipe Layout.xmpt Pipe Layout.xmpa MO	DDELSPACE [1385							
7									

Step 1: From the Project Explorer window > Object Sets tab > Right-click on the Culvert Pipe Crossing Object Set.



- a. From the **pop-up** menu > **Select Copy**.
- b. With the **Object Set** still selected > **Right-click** > From the **pop-up** menu > **Select Paste**.



Step 2: Right-click on the pasted Object Set > From the pop-up menu > Select Object Set Properties...

Object Set Name:		File Output Options	AutoCAD Table Out	put Options	
Culvert Pipe Crossing - Report		<u></u>			
Object Set Description:	\neg	File Name Template: {ObjectSet_Name} - {Draw	ing Name		
Object set used for Culvert Pipe Crossing reports.	~	[ObjectSet_Walle) - [Diaw	ing_indine)		
		Generated File Name:			
		Culvert Pipe Crossing - Re	port - 8684000RDCOR001-	PROJEXP,xlsx	(3e)
	~	Output Path:			Je
		C:\mdtapps\Autodesk_Tra	aining\202-C3D Fundamen	.\Working\	
Object Set Action:	<u> </u>		,,		
Report to XLSX File (*.xlsx)	\sim	Report Style:			
		O Use Default Report Sty	le for Object Sets	Browse For Folder	
Object Set Action Type	3 f)🗹	Use Specific Report Sty	/le		
Manual Dynamic Action is triggered when the Run Action button is clicke				_	
Action is anggered when the run Action bactoris circle	u.	Edit Style			Autodesk_Training
			4		201-C3D Fundamentals
				~	202-C3D Fundamentals II
Layout Style:			ck Edit Style		Config
O Use Layout of Project Explorer Window					References
OUse Specific Layout Style					Working
C:\mdtapps\Autodesk_Training\20\Pipe Layout.xmpt				>	203-C3D Plan Production
Edit Style				Make New Folder	OK Cancel
			OK Car	ncel Help	

Step 3: From the Create Object Set dialog box > Set and verify the following parameters:

- a. Object Set Name = Culvert Pipe Crossing Report
- b. Object Set Description = Object set used for Culvert Pipe Crossing reports.
- c. Object Set Action = Report to XLSX (*.xlsx)
- d. Layout Style = Use Specific Layout Style
 - Pipe Layout.xmpt (previously created for use with tables.)

From the File Output Options tab:

- e. Output Path = C:\mdtapps\Autodesk_Training\202-C3D Fundamentals II\Working
 - f. Report Style = Use Specific Report Style

Step 4: Click Edit Style...

C Project Explorer Report Options	?	×
🗅 New 🗁 Open 📙 Save		
Page Layout Options Page Header and Footer Options		
Page Size:	~~~~	

Step 5: From the **Report Options** dialog box > **Explore** the **options** and **parameters** that can be set and adjusted on each of the available tabs.

C Project E	vnlorer i Ren	ort Ontions				2	×	N N		
						•		\backslash		
	A, I	_						\mathbf{A}		
	ut Options –			Page Header an	d Footer Opi	tions		$\langle \rangle$		
Page Size:				- Add Page He						
Letter (8.5			~	(Drawing_Name)	.dwg		~	$\langle \rangle$		
Orientati	C Project I	Explorer Rep	ort Options							
Portrait	🗅 New 🛛	🗄 Open 📙	Save							
Layout U	D	A III								
inches		tions for Head	ler Rows			ions for Data Rows				
🗹 Repea	Preferred Arial	Font:		~	Preferred F Arial	Font:	~			
	Size (pt):		12		Size (pt):	10				
	512e (pt).		12		3126 (01).	10	•			
			Arial			Arial			(<u>5</u>)	l .
Restore			Explorer Report	Options				? ×	$\left(\begin{array}{c} \bullet \end{array} \right)$	
Restore	🗹 Use B	New 2	🗄 Open 📙 Sav	re						
	Force	D	A, 🔳						$\langle \rangle$	
		Table Boo	dy Options		т	able Header Options				
		🗸 Use Ba	ackground Colors		-	Include Header Rows				
		Odd Band	ed Row Font Cole	or		leader Row Font Color				
	Restore		led Row Backgrou		н	leader Row Background Colo	r			
L			led Row Font Col led Row Backgrou			Cell Margins (inches)			\	
		Use (C Project Expl		otions			? X		\
		Border C	🗅 New 🗁 O							\backslash
		Border V		-						
		Cell Vert	Report Head							
		Start nev	Add Field	Table to Report	Header		Add Image to I	Report Header		
			Field Name		Field Value		1			
		Restore	Drawing:		(Drawing_Na	ame}.dwg	Browse			
			Drawing Pa	C Project Exp	olorer Repo	ort Options				-
			Report Date Reported By	🗅 New 🗁	Open 📙 S	ave				
			Report Vers		-					
				Report Foot	ter Options					
				Add Field	d Table to Re	eport Footer		Add Volume Surface O Summary to Report F		
				Field Name		Field Value			00101	
			<	END OF REI	PORT		•			
			Restore De				•			
		L								
									$\neg \bigcirc$	
								Click O	к <mark>(6</mark>)	
				Restore De	efaults			OK Cancel	Help	

Step 6: After setting the options and parameters > Click OK.

	C Project Explorer	ave Table Style As 7	×	
	- <mark>7a) 🕑 🗏</mark>	« Project > Table Styles	✓ O Search Table Styles	
7	b File name:	Pipe Report		
	Save as type:	Table Style (*.xmpa)	Click Save	(<mark>7</mark> c)
	✤ Browse Folders		Save Cancel	

Step 7: When prompted from the Save Table Style As dialog box > Navigate to:

- a. C:\mdtapps\Autodesk_Training\202-C3D Fundamentals II\Config\Project Explorer\Report Styles
 - b. Enter File Name = Pipe Report
 - c. Click Save.

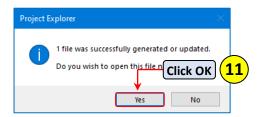
C Project Explorer Edit Object Set	
Object Set Name:	File Output Options AutoCAD Table Output Options
Culvert Pipe Crossing - Report	File Name Template:
Object Set Description:	{ObjectSet_Name} - {Drawing_Name}
Object set used for Culvert Pipe Crossing reports.	Generated File Name:
	Culvert Pipe Crossing - Report - 8684000RDCOR001-PROJEXPxlsx
	V Output Path:
	C:\mdtapps\Autodesk_Training\202-C3D Fundamen\Working\
Object Set Action:	Report Style:
Report to XLSX File (*.xlsx)	Keport Style: O Use Default Report Style for Object Sets
Object Set Action Type	Use Specific Report Style
Manual Dynamic	C:\mdtapps\Autodesk_Training\202-C3D Fu\Pipe Layout.xmpr
Action is triggered when the Run Action button is clicked.	Edit Style
	Report Style Summary: Page Size: Letter (8.5" x 11.0")
	Page Orientation: Portrait
Layout Style:	Header Rows Font: Arial, 12pt. Data Rows Font: Arial, 10pt.
Use Layout of Project Explorer Window	Report Header: 5 Field(s)
Use Specific Layout Style	Report Footer: No
C:\mdtapps\Autodesk Training\20\Pipe Layout.xmpt	Page Header: "{Drawing_Name}.dwg"
	Page Footer: "{Page_Number} of {Page_Count}"
Edit Style	
	OK Cancel Help

Step 8: From the Project Explorer > Edit Object Set dialog box > Click OK.

	C Project Explorer [8684000RDCO	R001-PRO	JEXP dur				- 0	×
			lected Action i View History					
	Object Set Na e 9	Objects	Action	Action Type	Layout Style	Report Style	Table Style	Outp
	Culvert Pi Crossing	1	Export to AutoCAD Table(s) in MODEL Space	Dynamic	Pipe Layout.xmpt		Pipe Layout.xmpa	MOD
Ú	Culvert Pipe Crossing - Report	1	Report to XLSX File (*.xlsx)	Manual	Pipe Layout.xmpt	Pipe Layout.xmpr		C:\mc
T								

Step 9: From the Project Explorer window > Object Sets tab > Select Culvert Pipe Crossing – Report.

Step 10: From the Project Explorer window > Select Run Selected Action.



Reports for other Civil 3D objects can be generated following the same steps previously outlined in the **Reports using Object Sets** section.





Step 12: The report is generated and opens > Review the generated report (EX: .xlsx).

Step 13: Save the drawing