

Finishing the Model

Module Overview

The focus of this workshop is to concentrate on design issues that occur during the final design process which need to be addressed in order to complete proposed grading for the project. The workshop will explore doing this with a variety of tools including the Roadway Designer, the Apply Template tool, and site tools.

Module Prerequisites

- Familiarity with the overall InRoads Product.
- A firm understanding of the Roadway Designer and template creation in InRoads 8.7 and higher.
- Knowledge of the InRoads' site tools.

Modules Objectives

After completing this module, you will be able to:

- Incorporate radius returns into an existing Corridor.
- Target Styles to increase productivity in the Designer.
- Learn to use the Apply Template Tool.
- Use Site tools to complete your design.

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Introductory Knowledge

Before you begin this module, let's define what you already know.

End Conditions can target the style of particular features in your DTM?

- True
- False

Site tools only found in InRoads Site?

- True
- False

Point Controls and Parametric Constraints are the only external influence on Template points.

- True
- False

Site tools are only productive for site development?

- True
- False

Feature Lock allows for only one feature to be designed at a time?

- True
- False

Answers

Can End Conditions target the style of particular features in your DTM?

True

InRoads' End conditions can target a style that is defined for multiple features in a surface. This prevents you from targeting each feature individually.

Site tools are only found in InRoads Site?

False

The Site tools are found also in InRoads & InRail.

Point Controls and Parametric Constraints are the only external influence on Template points.

False

Style & Project to Surface constraints can act as external control for points within a template. These constraints obtain values from surfaces and geometries as Point Controls do.

Site tools are only productive for site development?

False

Site tools are valuable assets in complementing your corridor design. This workshop will display this.

Feature Lock allows for only one feature to be designed at a time?

False

The Feature Lock allows InRoads to scan for Features in the active DTM, and ignore any MicroStation Graphics.

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Before You Begin

Before beginning the exercises outlined in this workshop, you need to start InRoads and load the workshop files. To do so, follow these steps:

- 1. From the Start > Programs > Bentley > InRoads Group XM menu, select InRoads.
- 2. Navigate to the workshop directory and select the *proposed.dgn* file from the *MicroStation Manager*. This design file has several reference files attached showing some of the existing topological features which are stored in the DTM and also displays proposed pavement markings. You may turn off the display of the reference files at any time, if you wish, by selecting *File > Reference* from the MicroStation menu and toggling off the checkmark in the *Display* column. We only use this data for visual references during the workshop.
- 3. Select *File* > *Open* and load the workshop files by selecting the project file named *finishing.rwk*. This project file contains a geometry project, an existing surface, a template library and a roadway design file for use in the remainder of this workshop.
- 4. Select *Tools > Locks > Toolbar* to turn on the *Locks* toolbar, if it is not already on.

You are now ready to begin the exercises in this workshop. If, for any reason, you must exit the software before the end of the workshop, simply repeat the steps in this section.

If you are unable to complete an exercise as you proceed through this workshop, the completed files for that lesson are stored in \Finished subdirectory labeled with the exercise's topic. For example, if you cannot complete Driveways, you can open the completed files from the $\Finished\Driveways$ subdirectory and continue with the exercise.

Adding Radius Returns at Intersections

In this exercise you will take the Horizontal and Vertical alignment of the radius returns and assigns them to the design. Existing point controls are adjusted and priorities are set to ensure accurate modeling.



→ Adding Point Controls

- 5. Return to the Roadway Designer. Select the *CL*-south corridor.
- 6. Select the Point Controls
- 7. Add a point control for the edge of pavement points on the template.

Point Controls	🚟 Point Controls
Corridor: CL-south Point: Mode Horizontal Overtical O Both	Corridor: CL-south Point: Mode Horizontal Overtical O Both Station Limits Stat: 0+346.94 Stop: 0+357.52 Station Limits
Control Type: Alignment Horizontal Offsets Horizontal Alignment: SW quad Start: 0.0000 Vertical Alignment: SW quad Vertical Offsets Vulse as Secondary Alignment Vertical Offsets Vertical Offsets Start: 0.0100 + Priority: 1	Control Type: Alignment Image: Control Type: Horizontal Alignment: SE quad Image: Control Type: Vertical Offsets Start: Control Type: Priority: 1

Hint You can use the Select button to identify the template point and the alignment.

Add the point controls.

Note: Note the use of the secondary alignment option. This option will model orthogonal to the radius return.

8. Revise the <u>Stations</u> or change <u>Priorities</u> on the controls that are in conflict.

Priority:	1						
Horizon	tal and Vertical Controls:						
En	Prio Name	Start Station	Stop Station	Mode	Туре	Control	
X	1 XEP_RT	0+115.00	0+357.52	Both	Feature	Existing:XEP_R	
X	1 XEP_LT	0+115.00	0+357.52	Both	Feature	Existing:XEP_L	
X	1 XER LT	0+348.68	0+357.52	Both	Alignment	SW guad:SW guad	
X	1 XEP DI	0+346.94	0+357.52	Both	Alignment	SE guad:SE guad	
		\ \					
		Change t	he station lin	nits or pri	iorities		
		Change t	he station lin	nits or pri	iorities		

9. Process the stations and note the change in the way the template changes within the intersection at the north end of the corridor.

Driveways

This exercise will demonstrate a procedure that will allow End Conditions to determine where to place depressed curbing instead of full curbing to accommodate for driveway entrances. After the depressed curbing is placed at a driveway location then the End Conditions can continue to test for different tie in situations that are relevant for only when a driveway is present. This method can be quite useful on large corridors, where many driveways exist. This is because this workflow's End Conditions target a Style and not just an individual feature. This eliminates the mapping of each individual driveway as a type of external control within the Roadway Designer.

Note: The main goal of this lab is to display the functionality of End Condition using a Style as a target. This Style can exist in an ALG or a DTM, but it must be active for it to operate correctly.

→ Exercise: In this section we will modify the first template drop in our corridor to allow it to adjust the end condition solution if a driveway is found.

10. Window your view to the beginning of the *CL*-south corridor alignment. There are driveways in the location, on the left and the right of the baseline. The drive openings are marked with annotation that resides in the *Proposed.dgn*.



- 11. Go to **Reference** Display in MicroStation and shut off the references. This will make the following steps easier by isolating the graphics.
- 12. In InRoads go to File>Import>Import Geometry>From Graphics.
- 13. Import the right driveways. Enter a Seed Name of Drive Rt with a feature style of Drive_Rt.

Toport Geometry	<u>_ </u>
From Graphics ICS Vertical from Surface	
Lype: Horizontal Alignment	Apply
Geometry <u>N</u> ame: Drives RT	
Description:	
Style: Drive_Rt	<u>H</u> elp
Horizontal Curve Definition: Arc	
⊻ertical Curve Definition: Parabolic ▼	
I arget Geometry Project: Urban Horizontal Alignment: CL ✓ <t< td=""><td>es</td></t<>	es
✓ All Selected Elements Added to Single Alignment	
Attribute Tags	
Project: Active	
Name Conflicts: No Overwrite	
Close	

- 14. Repeat this process for the left driveways. Enter a Seed Name of **Drive Lt** with a feature style of **Drive_Lt**.
- 15. Go to the **Template Drop** dialog, highlight the first template entry, and then press <**Edit**>.
- 16. At this time we need to modify the template to include new End Conditions to determine when to use Depressed Curbing and Drive aprons. Right click in the template dialog and <Delete Components>, draw a line through the existing End Conditions and sidewalk.

17. The End Condition will determine when to place the curbing so the current curbing components will need to be in the End Condition. Bring in the new End conditions from the *Misc Components* Folder on the left. You will notice two end conditions named **Drives Lt** and **Drives Rt**. Drag and drop the end conditions from the preview window into the template stored in the Roadway Designer. Both end conditions should be placed at the Sidewalk points. Your template should appear as below.



18. Press the Template <Test> button. Observe the behavior of the template when there depressed curb styles are defined and when they are not.

Hint: This workflow can easily modified to test to see if your proposed end condition is within the legal right of way.

- 19. After observing the behavior of the template, press <**OK**>.
- 20. The Driveways now appear in Designer, this will aid in seeing if the Design is appropriate. Cycle through the stations by the driveways.

The template drop interval is set to 5m for this particular template drop, this may or may not satisfy the precision that is required to determine where our driveways are located.

- 21. The design may call out that a template drop must occur at the beginning and end of each driveway location, increasing the accuracy of the model. First, go to File>**Save** in the *Roadway Designer*.
- 22. Proceed to **File>Import Geometry>From Graphics**. Change the type **Event Points** and verify that the horizontal geometry is **CL**.
- 23. Select the driveways graphically in the *proposed.dgn* and Press <**Apply**>. Remember to *Accept* your selection by clicking an additional data click. Right click to exit the operation and then **Close** the Import Geometry tool.

+	Timport Geometry	
Select Driveway Alignment Graphics DRIVES LEFT	From Graphics ICS Vertical from Surface Type: Event Points Appl Geometry Image: Image: Description: Image: Image: Style: Default Image: Horizontal Curve Definition: Arc Image: Vertical Curve Definition: Parabolic Image: Target Geometry Project: Urban Image:	y
	Indizional Auguinient. Image: Constant auguinient. Use Fence Resolve Gaps and Nontangencies Join Elements No Duplicate Cogo Points All Selected Elements Added to Single Alignment Attribute Tags Use Tag Data Project: Name Conflicts: No Overwrite	

- 24. Return to the **Roadway Designer.** Verify the additional template drops at the beginning and end of each driveway location.
- 25. Verify the Horizontal Event Points are turned on in the Roadway Designer options.

Note: Note the processing at the beginning and end of each drive by implementing this technique.

26. Save the Roadway Designer by going to **File>Save**. Then **Close** the Designer.



Retaining Wall End Condition Override

- 27. Locate the area for a required retaining wall in the beginning of the *CL*-south corridor.
- 28. Select the End Condition Exceptions tool and Add a Right Side Override.

End Condition Exce	ptions		<u>_ ×</u>
Corridor: CL-south			Add
Station Range	Apply T	o Override 🖌	Close
Stop: 0+185.00		ht Override	Change
		t Transition	Help
Backbone Only	C Rig	ht Transition	
End Condition Exception	s:		
Start Station	Stop Station	Туре	
0+142.16	0+185.00	Right Over	ide
		E dit	Delete //.

- 29. Select the End Condition Exception and Edit. Delete the existing end condition solution.
- 30. Edit the back of the sidewalk to maintain a 3.0m width by assigning constraints to that point.
- 31. Select the Retaining Wall EC from the folder and drag and drop onto this point.

Right Override - 0+142.16 to 0+1	85.00	
Template Library: C:\Conference and Training Data\2 Doint Name List Misc Components Crives Lt Crives Rt Retaining Wall in Cut	Current Template Name: Rehabilitation, curb and sidewalk Description:	Display Components Display Point Names Display All Compone
Variable slopes	×	·····
Name: RSW_P1 Feature Name Override: RSW_P1 Surface Feature Style: RSW_P1 Alternate Surface: Image: Style End Condition Properties Image: Constraint 1 Place Point at Interception Image: Constraint 1 It Constraints Constraints Constraint 1 It Parent 1: RC_PTB_RT Value: 3.0000 Label: Image: Constraint: Horizontal Image: Constraint:	_RT	

32. Process stations through this area and examine the results.

Apply Template Tool



In this section, the Apply template tool will be used to generate a concrete curb island.

Concrete Curb Template

Note: This exercise will display the use the Apply Template Tool, it will use a MicroStation graphic that does not exist as a feature or as geometry. This provides the ability to perform grading task quickly and easily.

Locate the traffic island layout at the north end of the project in *proposed.dgn*. This line in MicroStation is currently at elevation of zero. However, this line needs to be at the elevation of proposed surface.

- **Note:** The Apply Template tool can accomplish this as it is placed if the controlling point has a *Project to Surface* constraint added.
- 33. Create a **New** surface from the Roadway Designer for the *CL-north* corridor.

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Create Surface	×
Name:	Apply
Default Preference: Default	Close
🔽 New Surface for Each Corridor 🛛 🛶 🛶	Preferences
🔲 Empty Design Surface	Help
🔲 Include Null Points	
Add Exterior Boundary - Style: Default	- ·
Densify Horizontal Curves using Chord Height To	olerance
🔲 Densify Vertical Curves using Chord Height Tole	rance
🔽 Triangulate 🛛 🗕	
Create Surface(s) from:	
CL-north	←
CL-south	
	All
	None
Clipping Options	
Duplicate Names:	
• Append O Replace O Rename	O Modify
Add Transverse Features	
Style:	

34. View the Triangles for the new surface.

Wiew Triangles	×	
Surface:	Apply	
Fence Mode: Ignore	Close	
Colored Model	Preferences	
Symbology:	Help	
Object Name		
l riangles		
	4	
	Alter and	
	ANN PRACE	

35. Select the Surface > Design Surface > Drape Surface command. Use this command to drape the island graphic to the elevations of the proposed surface.

Trape Surface		_ 🗆 ×
Current Locate Mode:	Graphics	Apply
Destination Surface:	Existing	Close
Graphics		Filter
Input Mode:	Single	1-1090
Source Level:	0 🔽	Preferences
🗖 Destination Level:	0 🔽	Help
🔲 Delete Original Grap	hics	

- 36. Apply the command and select the island graphic. Close the dialog when complete.
- 37. Use the Design Surface > Apply Template command to generate the features for the raised curb island.



- 38. Follow the prompts and reject an unacceptable solution.
- 39. Perform any analysis and evaluation to confirm your design.

Module Summary

You are now able to:

- Use the power of point controls to model intersections..
- Place Depressed Curbing at driveway locations by targeting Styles within your End Conditions.
- Use End Condition Overrides to establish preliminary wall layout and impact..
- Use Surface tools to complete a variety of design functions to finish your model.