InRoads – Component Display Options

Overview

Template component properties can be modified and enhanced by a number of methods including display rules and parent/child component relationships. These tools provide a powerful mechanism for displaying components based on conditional rules and settings.

There are multiple ways to display or override components. You can use **conditional display rules** that are applied to specific components, or you can assign **parent/child** relationships between components. You can also assign **end condition priorities** that can affect the order in which conditional components are selected and displayed. This document contains three design scenarios, with alternative display methods provided in each case.

Component display rules are set on components and based on points. You can select any relevant point in your template, including end points or null points.

There are several types of conditions that you can use in display rules:

- Horizontal
- Absolute Horizontal
- Vertical
- Absolute Vertical
- Slope
- Absolute Slope
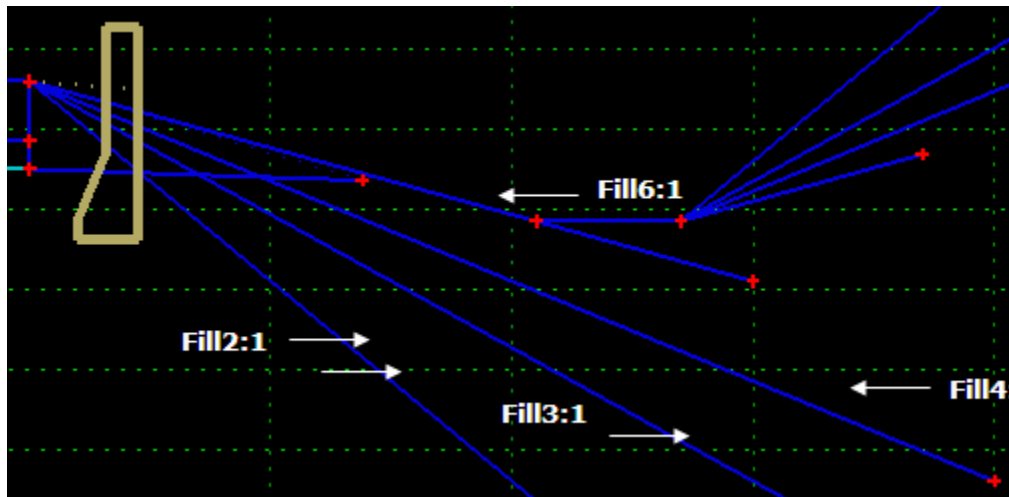- Component is Displayed

In all of these types except for the **Component is Displayed**, you can create expressions for your rules based on the relative position of two selected points in your template.

Parent/child relationships are set on components to tie the display of one component to another. This setting can be applied to either an end condition or non-end condition component. If the component has a parent component, then it is only displayed if the parent is displayed.

Barrier Example

Component Display Rules
In this example, a barrier will display if the side slope is steeper than 4:1.

1. Insert a barrier component in your typical section template as an end condition.

2. Right-click on the barrier component.

   The barrier may be a combination of two components: a connector and the actual barrier. Assign the barrier as the parent component of the connector. You can use the snap function or the drop-down list in the *Parent Component* field to select the parent.
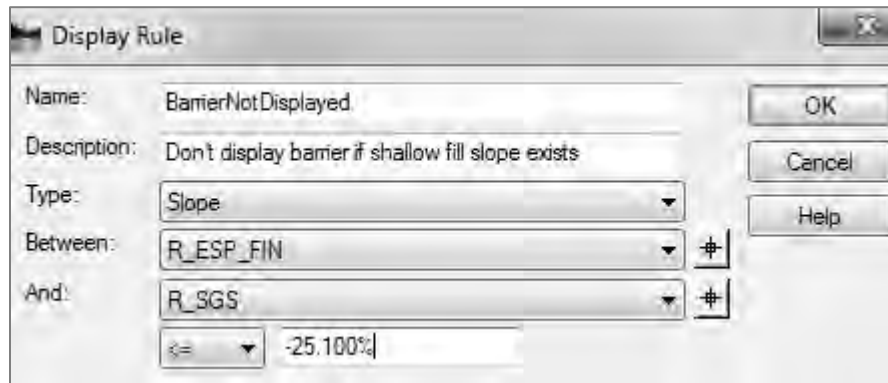
3. Click on the **Edit...** button for the *Display Rules:* field.

4. The Component Display Conditional Expression dialog is displayed.

5. Click **Add...** to display the Display Rule dialog.

6. Type a name and description for the rule.

   Make sure that the correct component is selected (use the target button to snap to the component that you are creating the rule for).

In this example, we want the barrier component to be displayed with a 2:1 fill slope when the slope is steeper than 4:1.
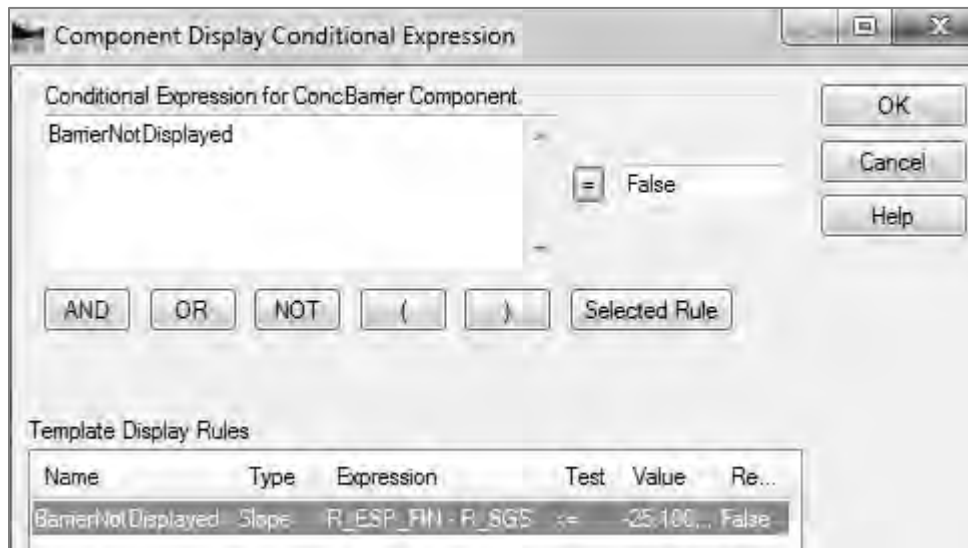
7. Set the *Type* to **Slope**. Snap to the edge of finished shoulder in the *Between* field and the subgrade shoulder catch in the *And* field. Select the **<=** 'less than or equal to' expression in the drop-down list and type in -25.10, then click **OK**.

8. In this dataset, the right edge of finished shoulder is named **R_ESP_FIN** and the right subgrade catch is **R_SGS**.

9. In the Component Display Conditional Expression dialog, highlight the **Barrier** rule that you just created and click on the **Selected Rule** button.

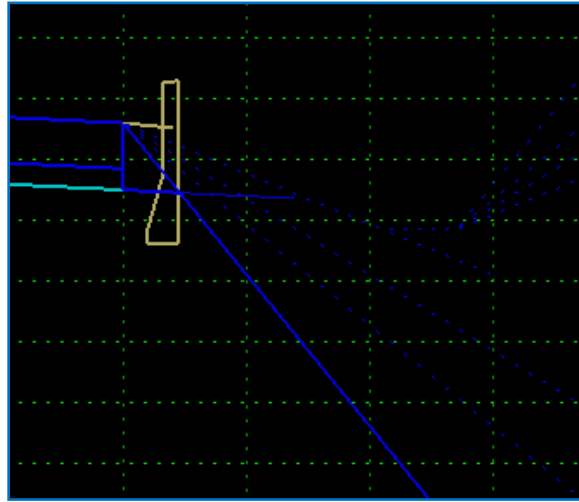   This rule is now tied to the barrier component.

To test the syntax, click on the = button. A message is displayed if there is an error, and the location of the error is highlighted.
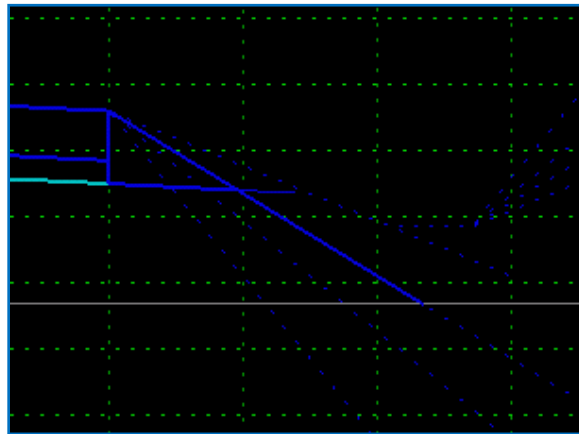
A common component display rule error is a recursive problem. This occurs when you are setting a *Component is Displayed* rule on the component that is referred to in the rule.

It's a good idea to use the Template Editor's *Test* button to access the Test End Conditions dialog. This process is helpful when you are developing a series of display rules that are tied to end conditions.

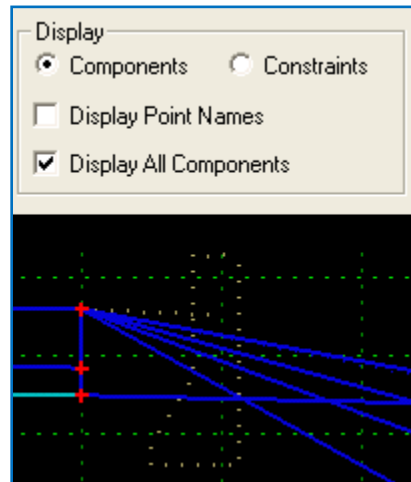The barrier displays when the fill slope is steeper than 4:1.

The barrier does not display when the slope is 4:1 or shallower.

This test confirms that the barrier component displays when the slope is greater than -4:1.

You can toggle the True or False values in the *Display Rules* area in the lower right side of the Test End Conditions dialog.

Because the template points are left or right side-specific, you will need to create separate rules for each side.

The components in your template that have display rules attached to them are displayed with dashed lines. Toggle on the **Display All Components** option to view and access all of the components.

Component Parent/Child Settings

An alternative method for viewing the barrier component is to set up parent child relationship. In our barrier scenario, the barrier is displayed with the 3:1 fill slope is displayed, so set that fill slope component as the parent of the barrier.
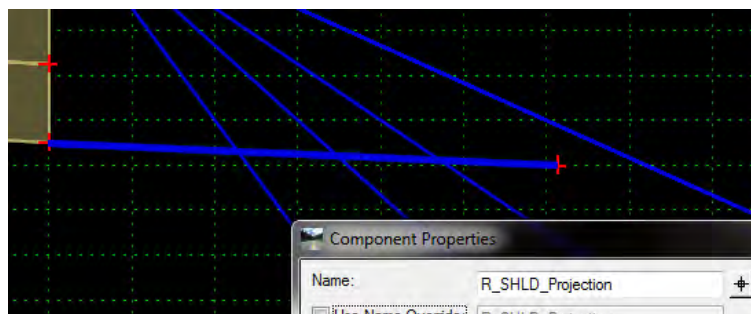
One of drawbacks to this method is that there can only be one parent per component. So if this condition also exists for the 2:1 fill slope, you would need to create an additional barrier component that is set as the child of the 2:1 component.

Subgrade Intercept Example
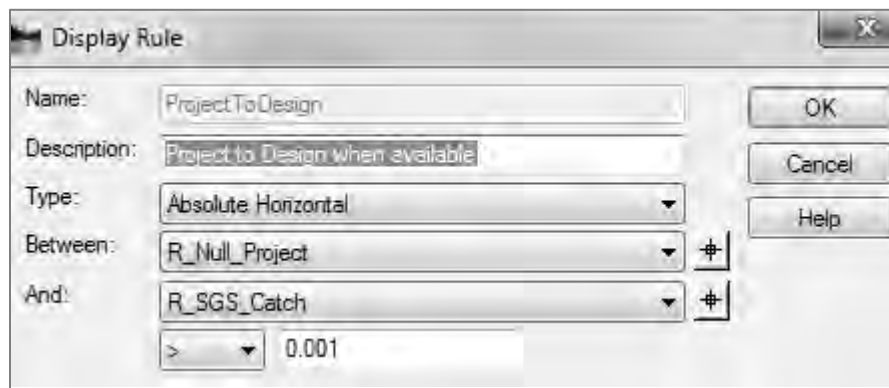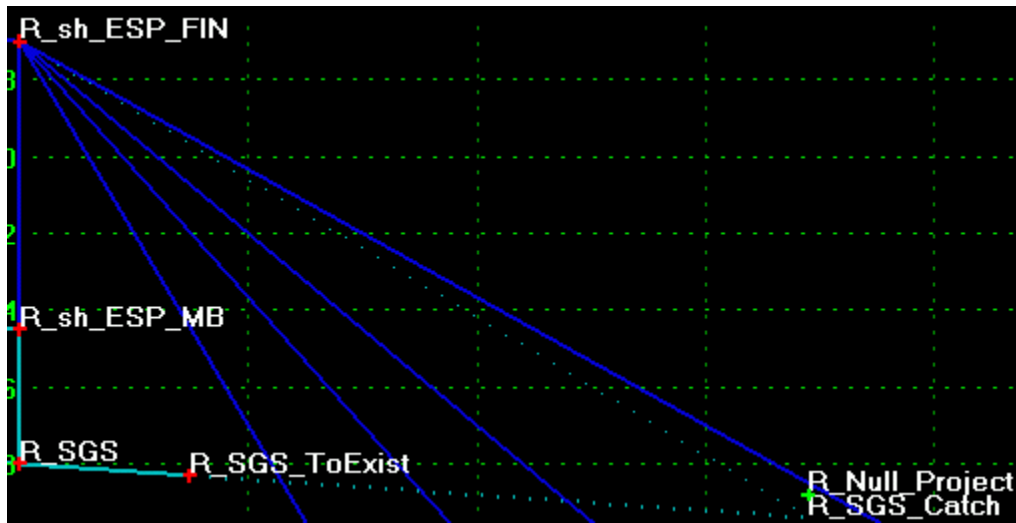
Component Display Rule Option

In this example, the component display rule will be set up to change the target for the subgrade intercept catch point. This catch typically projects to a design, or finished surface, but the display rule will allow it to catch to existing ground when this condition is not available.

1. Create a component on the top of the shoulder projection component with a catch point property that projects to a surface (instead of projecting to design).

2. Create a null point directly above the subgrade catch.

    This point will be used in the display rule.

3. Create a display rule for the subgrade catch component that projects to design:
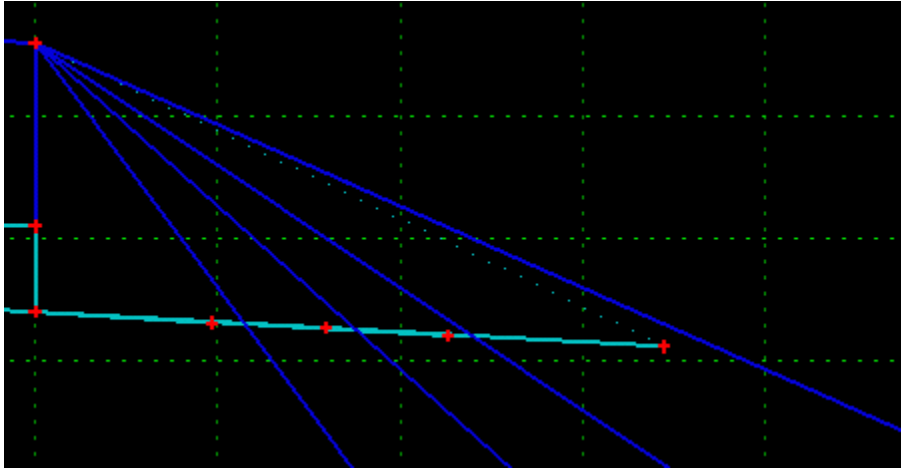
4. Create a display rule for the component that projects to a surface (in this case existing ground).

Remember to create a display rule for the left side of the template.

Component Parent/Child Settings

An alternative method for conditionally displaying the subgrade is to create multiple subgrade catch components and to assign them to parent components.

The **FILL2:1** component is the parent of the **SGS_2:1** catch component, the **FILL3:1** component is the parent of the **SGS_3:1** component, etc.

Bridge Component with Null Points

Null Points are a type of component that can be used as switches. Here is an example of component display rule using null points.
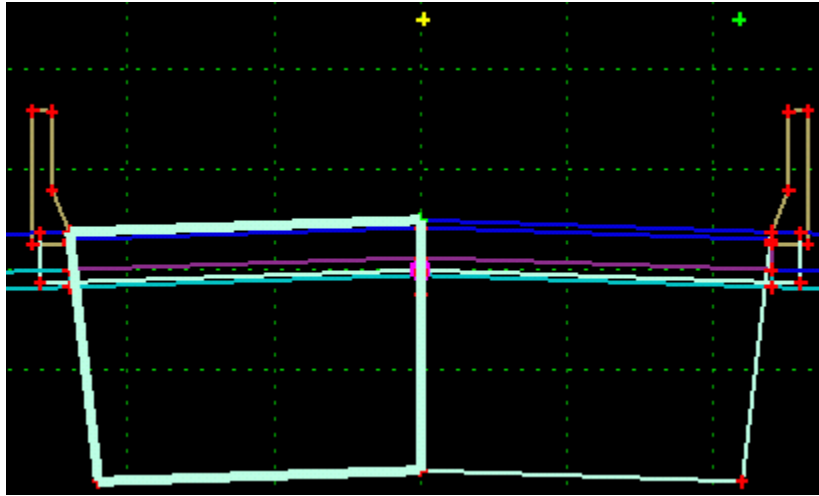
Bridge alternative

In this example, a bridge backbone is displayed instead of the typical roadway template with end conditions.

1. Insert a bridge component to your typical section.

    In this example, there are left and right side components. The right side of the box bridge is a child of the left side, so when the left side is displayed, the right side is also visible. This parent/child relationship for components can also apply to barrier connections, lanes and shoulders, etc.

2. Insert two null points by right-clicking in the template editor and selecting *Add New Component > Null Point*.

    In this example, one of the null points is above the template centerline and the other is to the right of it. The relative positions between these points is not important at this point, because the horizontal offsets will be set later on in the Roadway Designer.

3. Create a component display rule for the bridge component with the following parameters.
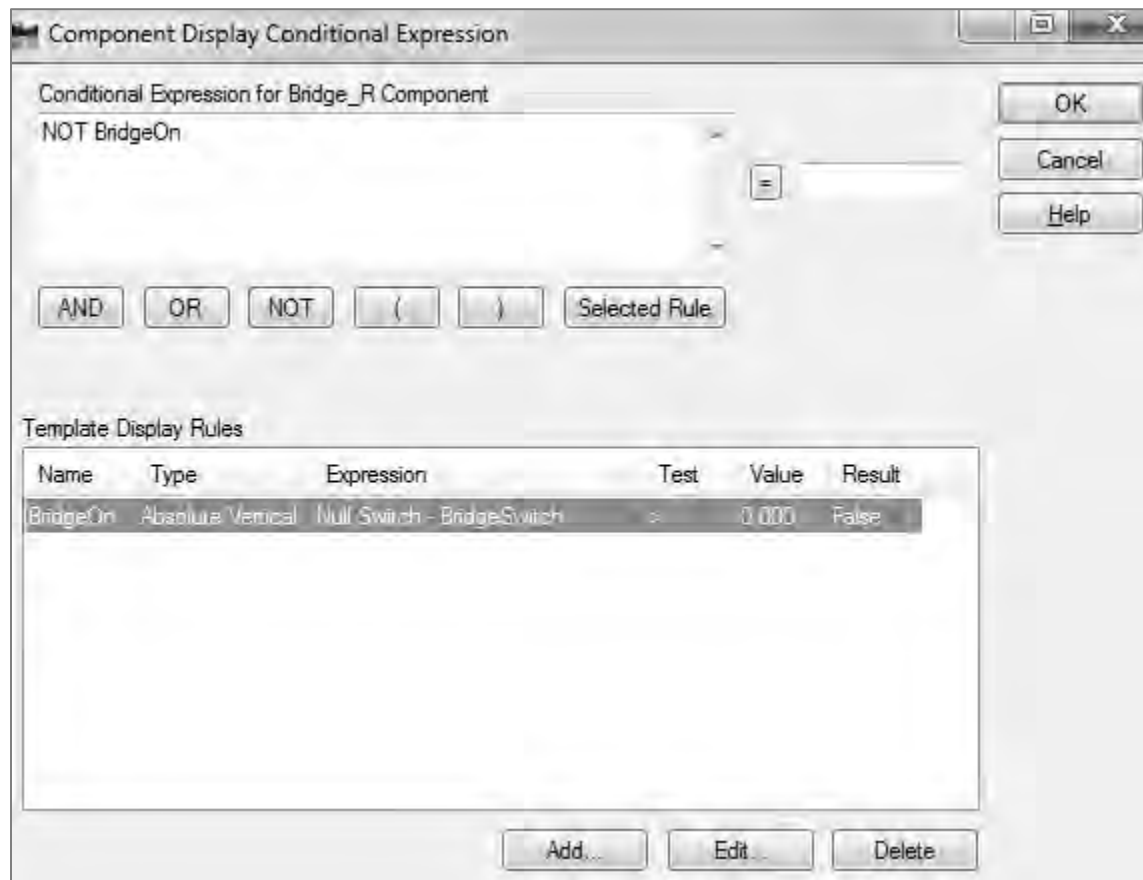

4. Constrain the **Bridge Switch** point vertically to the **Null Switch**, and add a *Label*.

This label will be used in the Roadway Designer as a parametric constraint.

When the roadway template is displayed then the bridge alternative is not displayed. To accomplish this, you will need to tie all of the roadway template components together with parent/child relationships.

5. Tie the components on the left side to the left finished lane component, and the components on the right side to the right finished lane components.

6. For both the left and right finished lane components, add this display rule:

7. Open the **Roadway Designer** and select the *Tools > Parametric Constraints* command. Select the constraint label that you set up earlier for the **BridgeSwitch** (in this example it is **Bridge>0**).

8. Enter station limits by keying in stations or snapping to the plan view in the Roadway Designer. Enter a start and stop value. This will be any value larger than zero.

9. Process the corridor and run the modeler through the station ranges.

    If your component display rules, parent/child component relationships and parametric constraints are set correctly, your bridge components should be displayed when your roadway template is not, according to your set station range.

Alternatives

An alternative to using display rules for bridge superstructure display is to create another template along the bridges and use template drops to define the bridge locations. This method assures that the earthwork quantities beneath the bridge will be calculated.

Another approach that models the bridge abutment slopes is to apply the standard roadway template through the bridge area and then to use target aliasing to clip the over-passing roadway with the bridge abutment slopes. You can then create a separate corridor for the bridge deck model.

For questions or comments on this tech note, contact your regional CAE Support Coordinator or the WSDOT CAE Help Desk at (360) 709-**8013**.