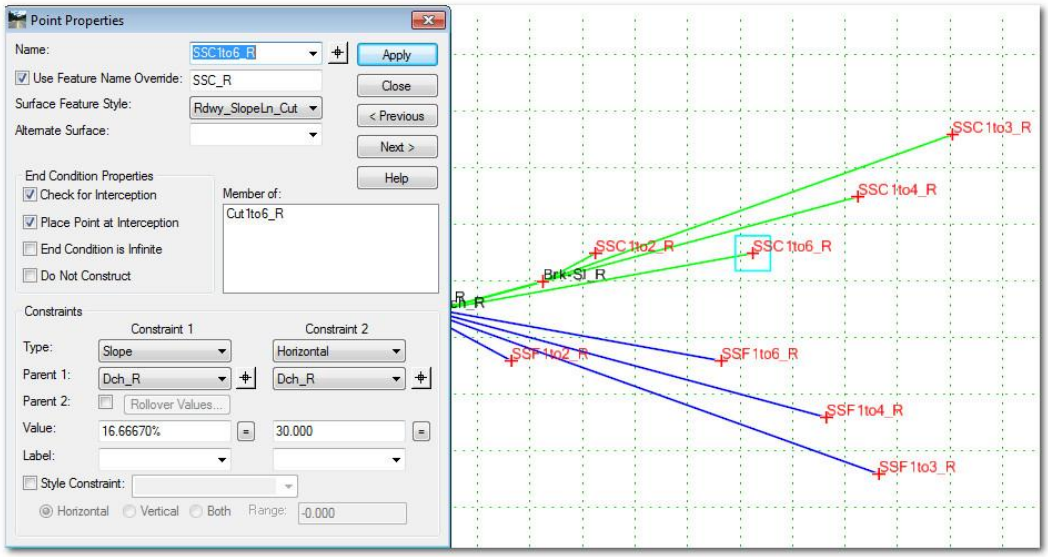
Roadway Designer Guidelines and Tips

Troubleshooting Tips:

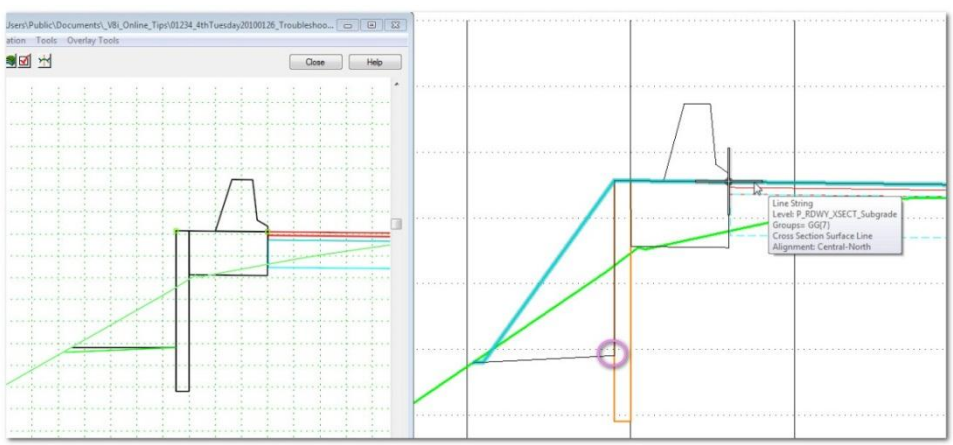
1. **Recognize that the Roadway Designer displays a snapshot of one template drop only – just components.** It cannot look behind or ahead on station to check feature continuity or component integrity between template drops. The Roadway Designer will display an attempt at the triangulated surface (use **Tools>Options** "Display Triangulated Surface") in the cross section view; this will not display the surface correctly in all cases, but is a helpful tool. You can use Target Aliasing to display a fully triangulated surface that you created to compare with the Roadway Designer cross section view – without cutting actual cross sections.
2. **If after creating a design surface, InRoads presents the message informing you that "Triangles are out of date – retriangulate?" – respond [No].** Display the triangles, as created by the designer, to assist you in locating the area where InRoads had difficulty. Then look for point controls that cross, parametric constraints that lead to crossing features, and locations where your exterior boundary may be crossing itself.
3. **Recognize that cross sections will not match Roadway Designer cross section view when point controls use curved alignments as secondary alignments.** The Roadway Designer will display a bent or dog-leg cross section as flattened out – you can see the dog-leg planimetric of the template in the Plan View of the Designer. Perpendicular cross sections will not follow the template after it hits a secondary alignment – it continues perpendicular to the main line.
4. **Use the Surface>View Surface tools to display in plan view,** items that are created by the modeler: features, components, and triangles. Rotate the view and look for crossing and discontinuous features. Verify component display. Look for unusual patterns in triangulation, such as missing areas or missing exterior boundaries. After displaying triangles, change the View Attributes for Presentation to Transparent or Smooth to render the faces, adjust the Global Brightness to see shadows.
5. **Use Surface>Feature>Component Properties…, [List…]** for different component names to verify that they are defined across the expected station range and with expected feature membership.

Guidelines to Follow During Design:

1. **Point names should be the same in each template if points are to create one feature on one surface.** Points dropped in each template create longitudinal features which, for the integrity of a triangulated surface and component display, should be continuous. Points with the same name from one template drop to the next template drop, will connect up to create the feature. Use of "Feature Name Overrides" in point properties assists in creating one feature for an end condition catch line even if the successful catch slope varies.

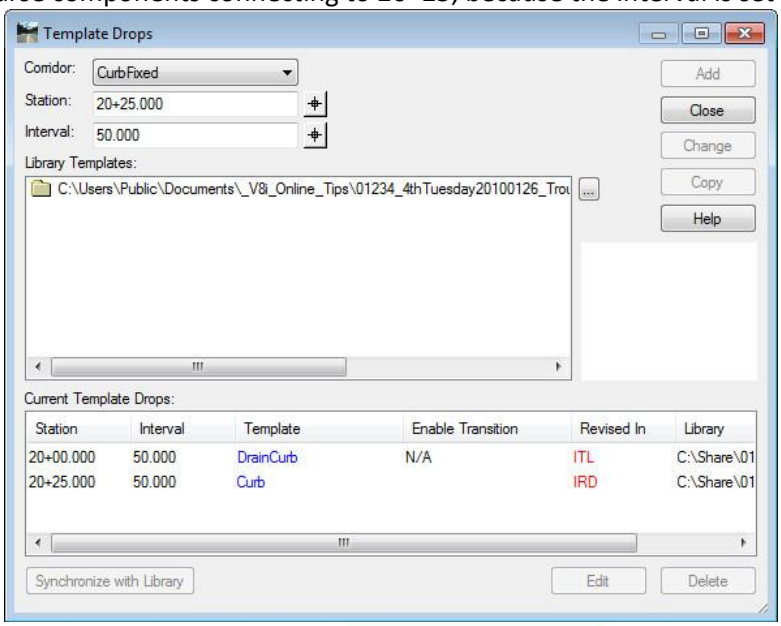


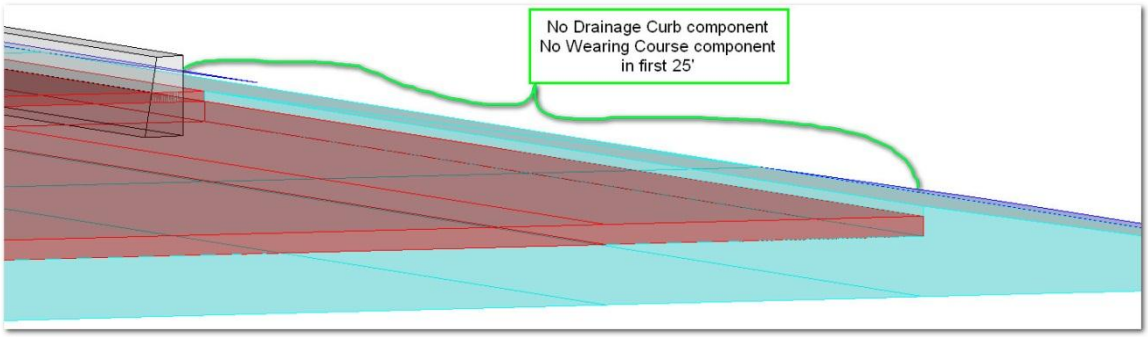
2. **Points (features) should not cross.** Template points should maintain the same relative position in every template. If template A has points EP_L, CL, and EP_R in that order and template B has points in order CL, EP_L, EP_R, then the resulting features will cross, one of the features will not be triangulated, the surface will be determined incorrectly, and the components will lack integrity and may not be drawn. **Template position, parametric constraints, or point controls both horizontally and vertically can cause crossing features.** The image below shows the components on the left side following a vertical line from the top of wall to the bottom. On the right, the triangulated surface is missing a point in the cross section because of a true vertical component or template position (which is the same as crossing features).



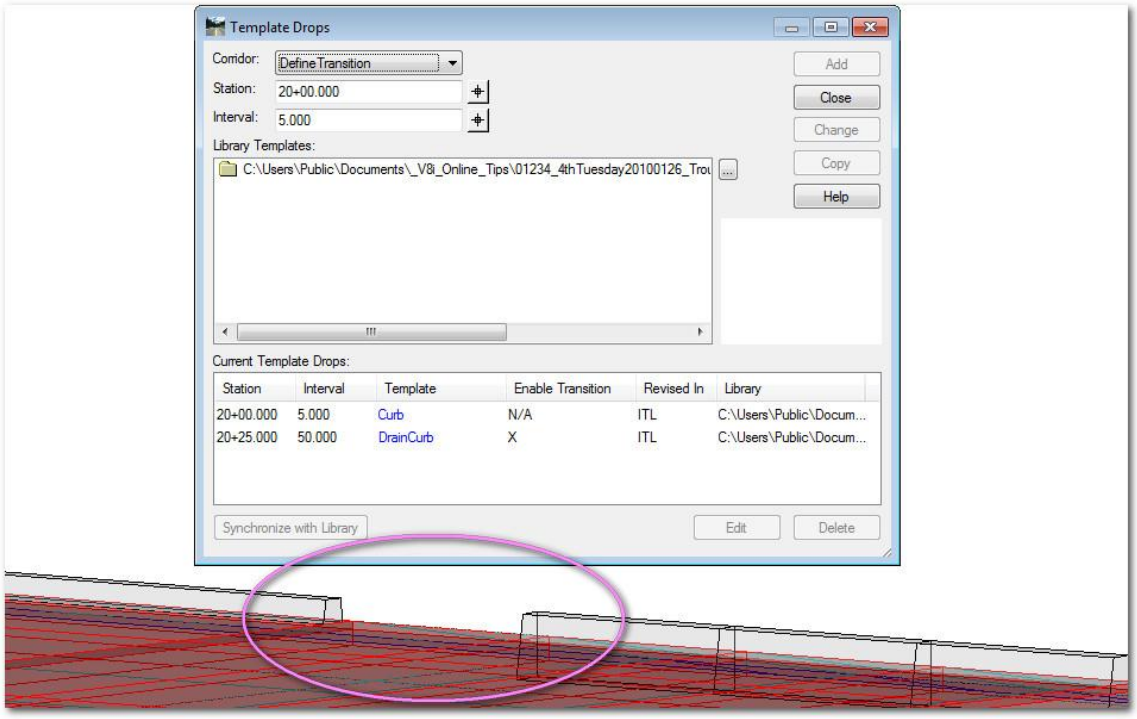
3. **Components should contain the same point members (with the same names) from one template to another.** Another way to say this is, if the component is made up of different points in template B than in template A, then the component in template B should have a different name. Attempting to connect components from one template drop to another, when the components have different feature membership causes a lack of component integrity and the component may not be displayed. ***If component membership changes on subsequent templates, give the component a unique name.***

4. **Make template drop intervals and abrupt template drops such that a linear feature (and components) may be created.** A template drop with an interval greater than the distance to the next template drop station results in only one template being dropped. If an entirely different template is dropped prior to the next interval, with no matching point names and a transition is not enabled and then defined, you create a feature with only one point. A line requires two points - so you will *not* have created a longitudinal linear feature and any component that is defined from that *point* feature, will not be created. The template drops in the image below will create points only at station 20+00 that do not create the drainage curb or wearing course components connecting to 20+25, because the interval is set to 50'.





5. **Enable and define template transitions when template point names change.** When point names are not used in template B, that are present in template A, and the transition is not defined, the feature will abruptly stop at the last interval drop of template A, leaving a gap longitudinally. A component that relies on the feature that ended early, will not be drawn across the gap. Abrupt changes in templates (over 0.1 feet or less) may be used instead of enabling transitions. Note the gap in the curb below; gap is left because I did not define the transition. Another template drop of "Curb" at 20+24.99 would produce an abrupt change.



6. **Name point names uniquely in different templates when the triangulation needs to change, when the relative location (horizontally or vertically) changes, or the point name is not used for a station range.** If a point name must end before the end of the corridor and another point in the same location must be reintroduced later on in the corridor - those points should have unique names. As a point moves along an alignment, it will attempt to create a <u>continuous</u> feature of the same name. If the feature has discontinuities - the component defined by those features may lack integrity and may not be displayed. Though the feature has discontinuities, it may only be either triangulated or non-triangulated for its entire length. If the relative location changes, crossing features could be introduced which affects the integrity of the triangulated surface.

Tips for Strengthening or Densifying Surfaces:

1. Add Transverse Features.
2. Increase template drop intervals around/over curves.
3. Set reasonable Chord Height Tolerances in **File>Project Options** (Tolerances tab), and when using **Create Surface**, check boxes for “Horizontal Curves” and/or “Vertical Curves” in the “Densify using Chord Height Tolerance” section. Note: your tolerances may need to be different for main line curves than they are for tight radius curve returns. Also note: this is something that you should save for your final design surface creation due to the amount of processing and time it takes for InRoads to perform the densification.