

Comprehensive Template Design



Engineering\CADD Systems Office

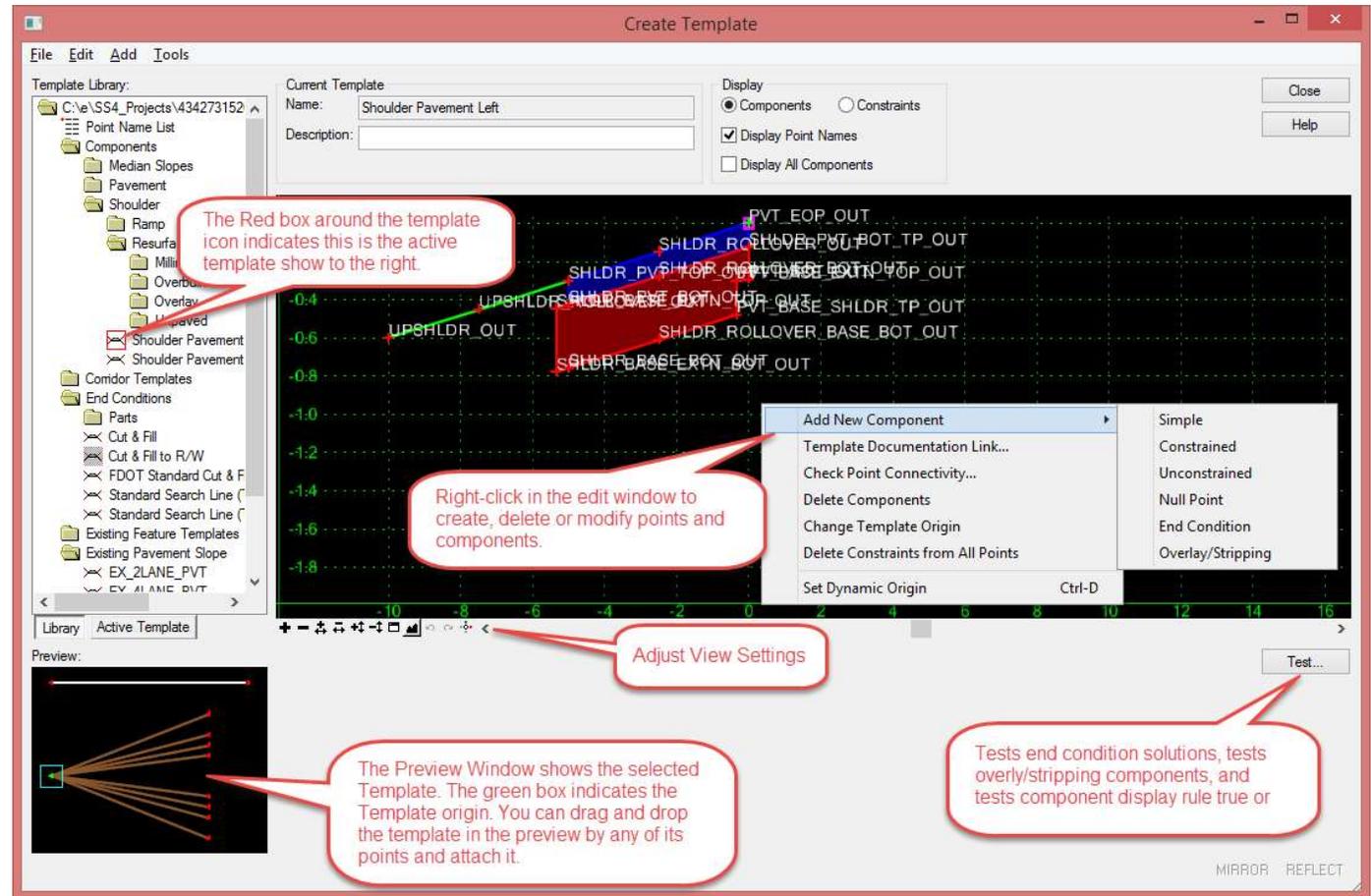
Learning Objectives

- ◆ UI, Points, Components
 - ✓ The Basics – Point Properties, Component Properties, and Constraints
 - ✓ Creating Simple (Static) Templates -
 - ✓ Setting Preferences
 - ✓ Dynamic Settings \ Apply Affixes
 - ✓ Working with Components – Deleting, Merging Points, Updating Constraints
 - ✓ End Conditions



Create Template Dialog

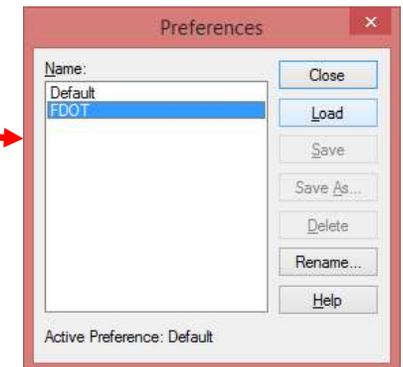
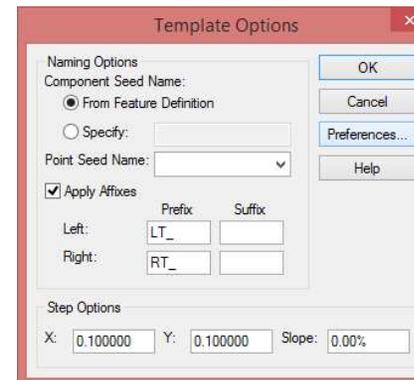
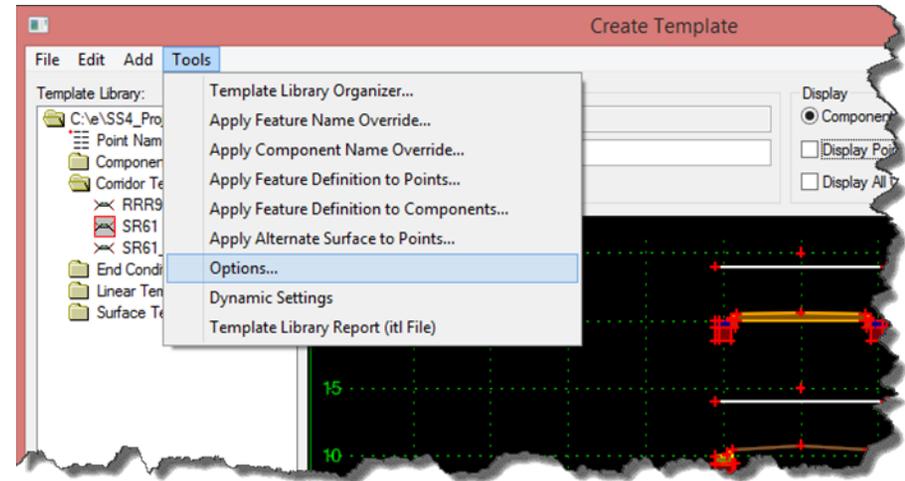
- ◆ User Definable Folders
- ◆ Create Templates, Components and End Conditions
- ◆ Right-click Functions
- ◆ Copy and Paste, and Drag and Drop
- ◆ Red-colored Box Indicates Current Template
- ◆ Drag and Drop Components to Current Template Window



Setting Preferences

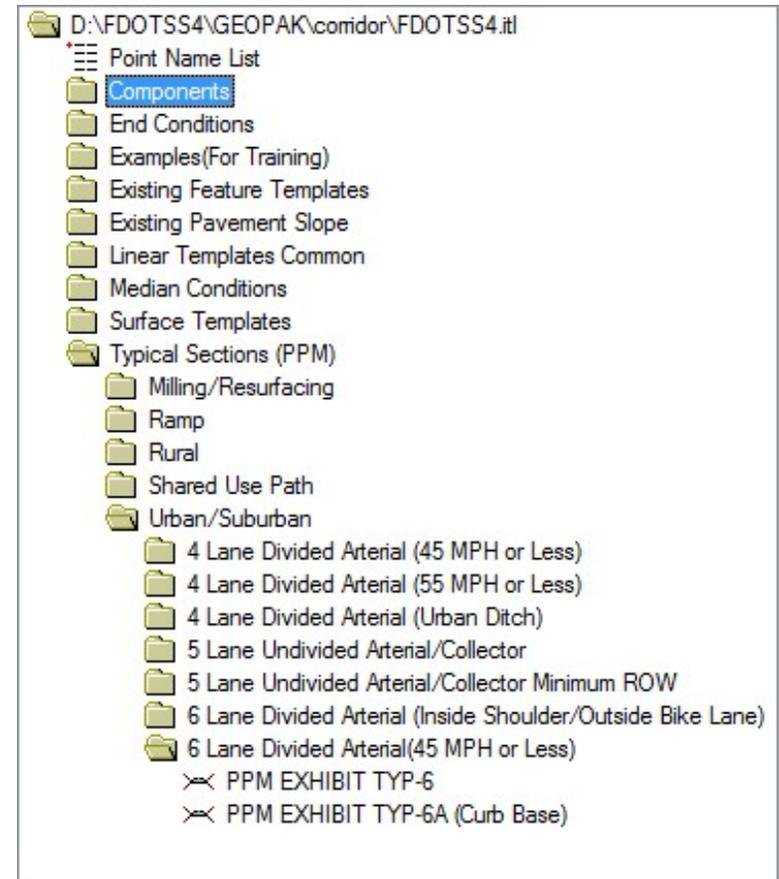
FDOT has defined a collection preferences that should be applied before creating templates.

1. From the Create Template dialog select Tools > Options.
2. On the Template Options dialog click the Preferences button.
3. On the Preferences dialog select FDOT and click Load (or double-click FDOT)



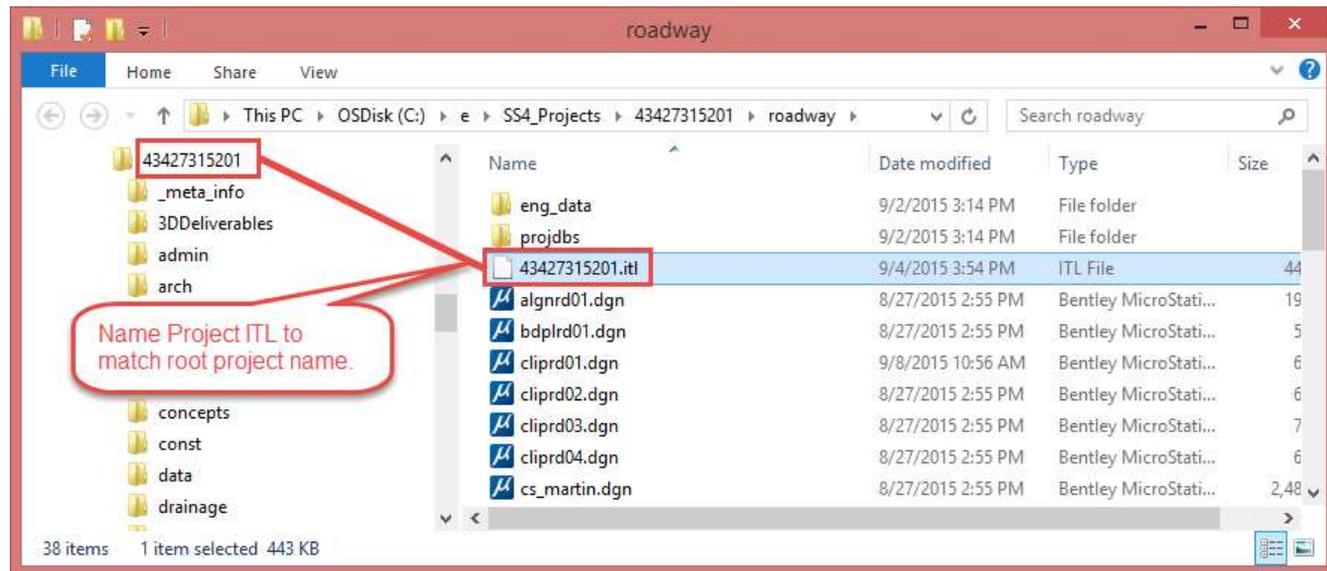
Template Library

- ◆ FDOTSS4.ITL is located in the \FDOTSS4\GEOPAK\Corridor directory.
- ◆ It contains a collection of components and templates that were developed from the FDOT Design Standards and PPM.
- ◆ These templates can be copied into a project specific ITL and customized to meet the needs and unique conditions of each project.



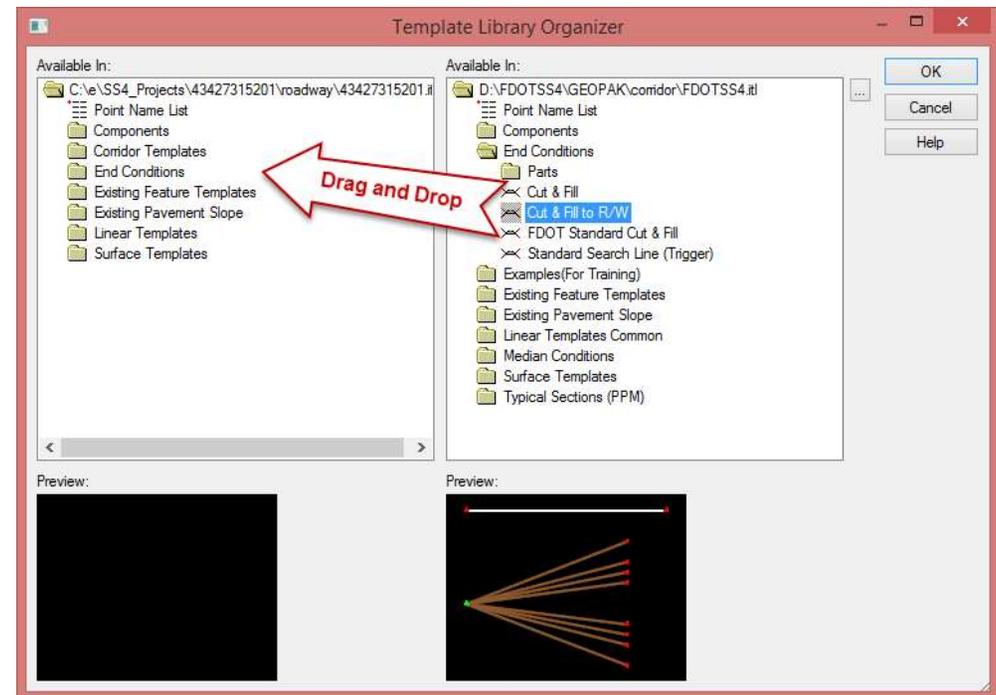
Project ITL

- ◆ Create a Project ITL file to store customized templates.
 - ✓ A blank ITL containing only a folder structure is available in the \\FDOTSS4\GEOPAK\corridor\ directory on the server.
 - ✓ Set name to <ProjectNumber>.ITL for easy access.



Template Library Organizer

- ◆ After creating and opening the project specific template library you can import Templates and Components using the Template Library Organizer
- ◆ On the Create Template dialog select “Tools > Template Library Organizer”

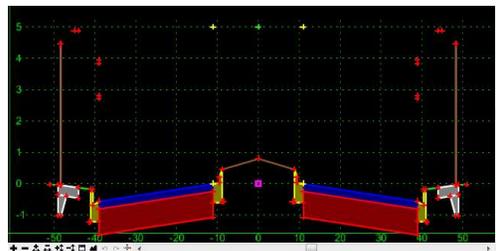


The Basics

- ◆ A Component is a set of points that define an open or closed shape.



- ◆ A Template is a collection of points and components.



- ◆ Templates are stored in a template library (*.itl).



Point Properties

The screenshot shows the 'Point Properties' dialog box with the following fields and callouts:

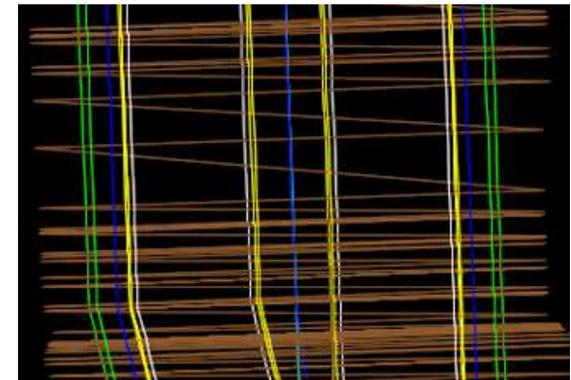
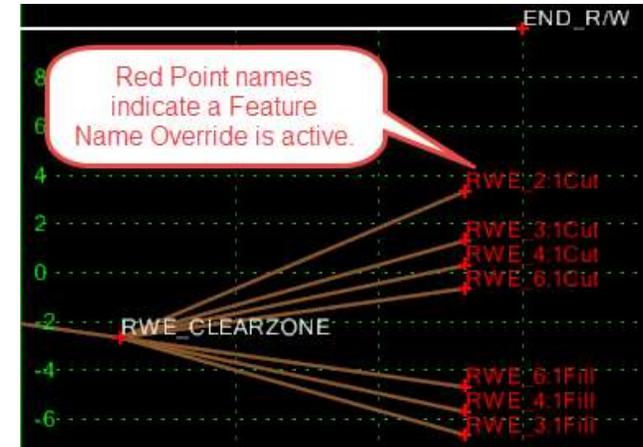
- Name:** PVT_EOP_OUT (Callout: Point Name)
- Use Feature Name Override: PVT_EOP_OUT (Callout: If the check box is selected, this will be the name of the feature (3D Line) that will be created in the model.)
- Feature Definition:** PavementAsphalt_pm (Callout: Defines the Feature Definition (symbology) that will be applied.)
- Superelevation Flag
- Alternate Surface:** (Callout: Allows to specify the name of an alternate surface)
- Member of:** Pvt (Callout: A list of components the point is included in.)
- Constraints:**
 - Constraint 1:**
 - Type: Horizontal (Callout: Specifies a constraint type.)
 - Parent 1: PVT_CROWN (Callout: Specifies the parent point from which the constraint is based.)
 - Value: -12.000000 (Callout: Specifies a second constraint value.)
 - Label: EOP_WidthOutLt (Callout: Displays an optional label for the constraint. The Label's value is a variable name that can be used to override a constraint's value using Parametric Constraints after the template has been assigned to a corridor.)
 - Horizontal Feature Constraint: PavementAsphalt(EOPA) (Callout: Specifies, when selected, a Feature to search for. If an element is found in the search range with that feature the "Constraint Value" will be overridden with the location of the element found.)
 - Range: -50.000000 (Callout: Specifies the maximum distance to search, from the point's current location, for an element with a Feature matching the Horizontal Feature Constraint.)
 - Constraint 2:**
 - Type: Slope
 - Parent 1: PVT_CROWN
 - Value: 2.00%
 - Label: EOP_SlopeOutLt



Feature Name Overrides

Feature Name Overrides provide a way around the requirement of unique point names in a template.

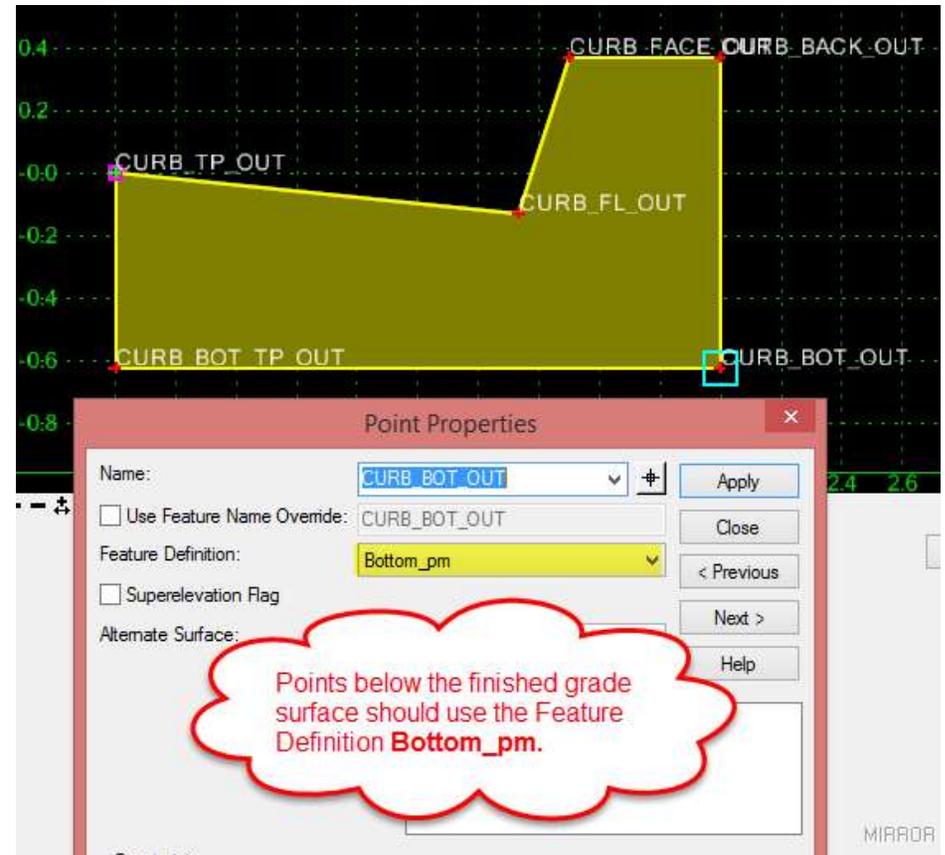
- ◆ Acts as alias when many points represent a single “Feature” (3d linear element)
 - ✓ Commonly used in End Conditions
 - ✓ Useful in variable templates
- ◆ Can cause problems if not used correctly
 - ✓ Zig zag lines indicate a problem
 - ✓ Use “Apply Affixes” to avoid using same name on both sides of the road.



Point Feature Definitions

Feature Definitions define the symbology of the point and how it should be displayed in the various views.

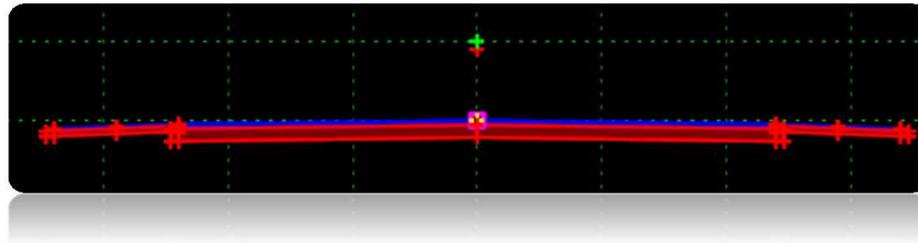
- ◆ Points in a template should always have a `_pm` Feature Definition.
- ◆ `_pm` indicates that the element is shown in a Proposed Model view.
- ◆ `Bottom_pm` should be used for points below the finished grade so they can be easily turned off when producing 3D Deliverables or creating a finished grade surface.



Constraints on Points

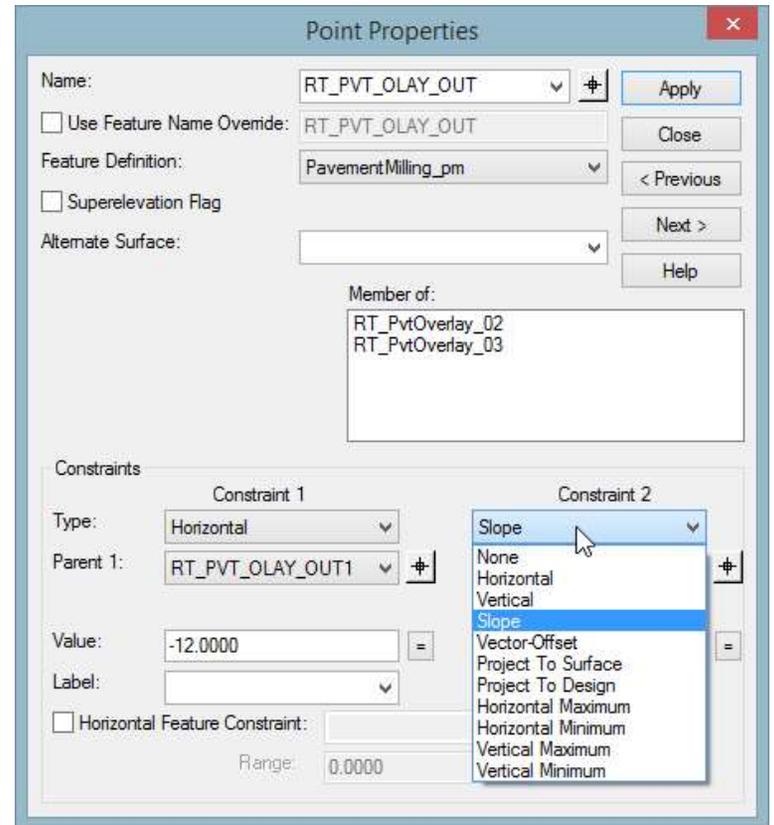
Point constraints are used to manage the behavior of points in a template.

- A point can have, at most, 2 constraints on it. It is then “fully constrained”.
 - A point with only one constraint is “partially constrained”
 - A point with no constraints is “unconstrained” and the point is shown as a green plus sign
- ◆ A rule of thumb is to have only one green point per template and all other points are red.



Point Constraints

- ◆ Point Constraints provide structure to the points making up each component.
- ◆ A Constraints basically defines where a point is located, relative to another “Parent” point.
- ◆ Constraints can have different parents.



Constraint Types

There are a variety of constraint types that can be applied to a point's properties. By applying two of these constraints to a point structure defining the points relationship to others is established.

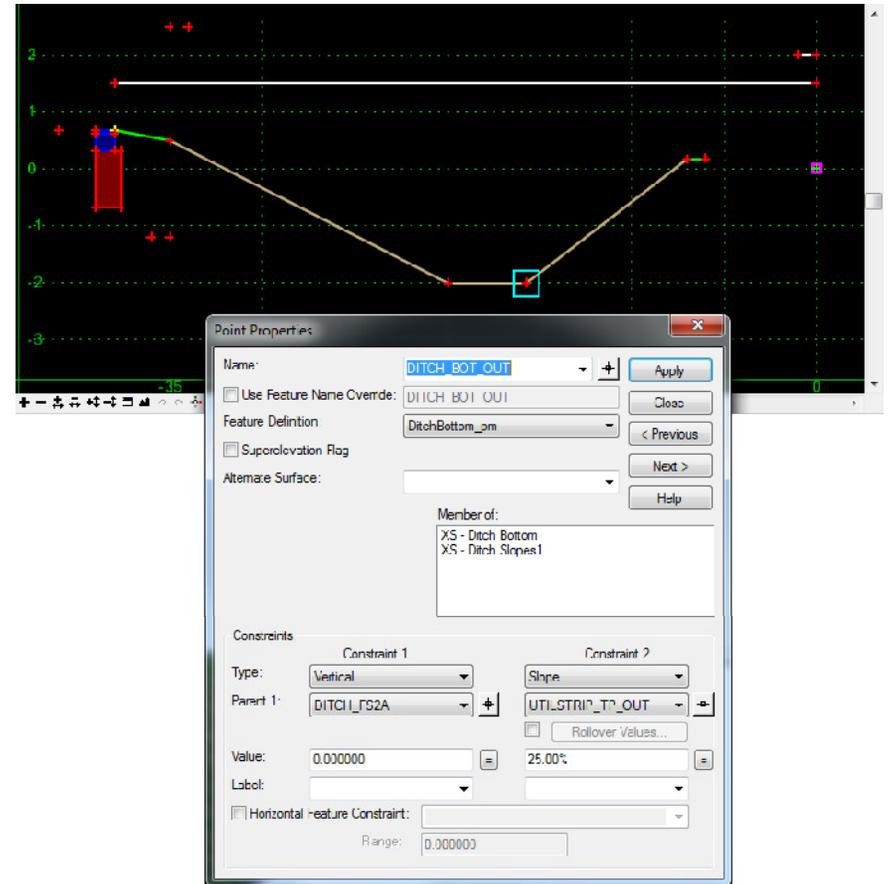
- ◆ Horizontal
- ◆ Vertical
- ◆ Slope
- ◆ Vector Offset
- ◆ Project to Surface
- ◆ Project to Design
- ◆ Angle Distance
- ◆ Vertical Maximum
- ◆ Vertical Minimum
- ◆ Horizontal Maximum
- ◆ Horizontal Minimum



Point Constraints Example

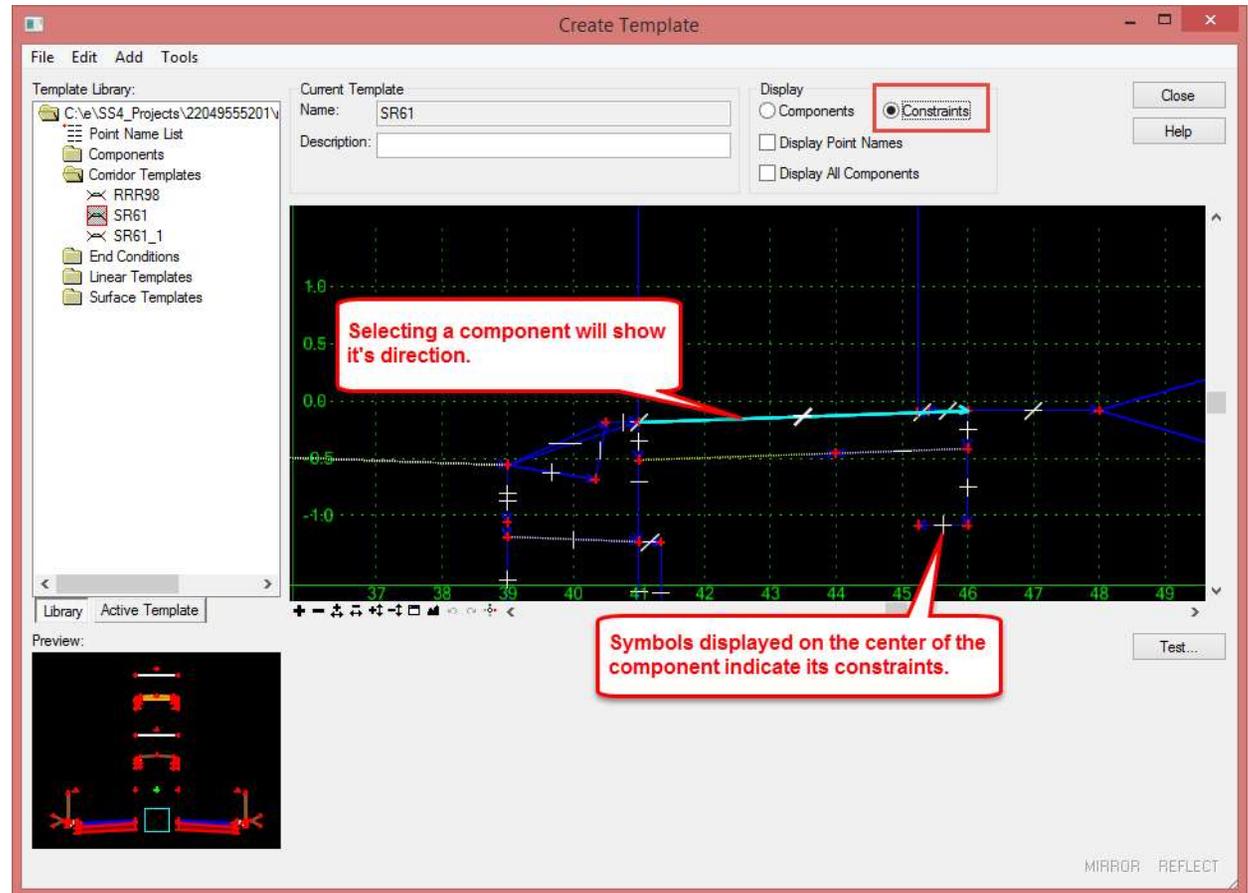
Each project has its own requirements. Constraints give you the flexibility to adjust a template to meet the requirements. Ditches provide a good example of this.

- ◆ Hold ditch width
- ◆ Hold ditch depth
- ◆ Variable ditch width hold slopes



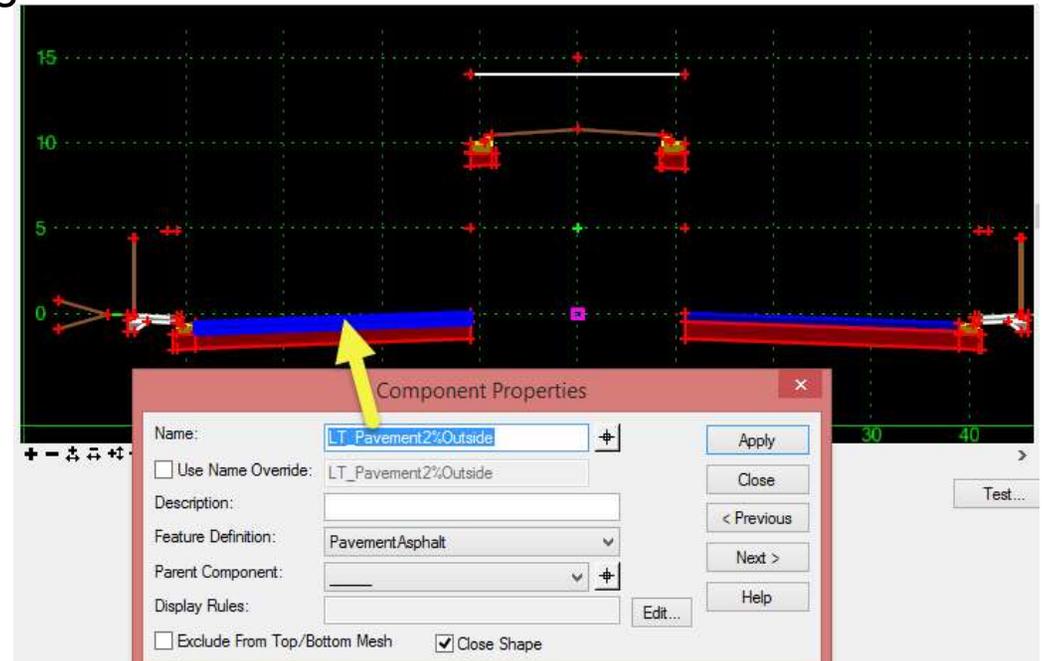
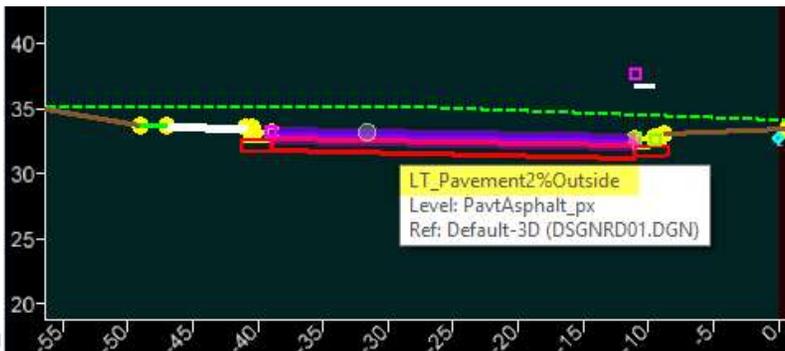
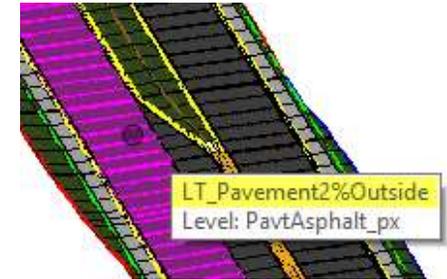
Display Constraints

- ◆ Switching the Display mode from Components to Constraints will provide a graphical representation of the relationships of the points making up the template.



Component Naming

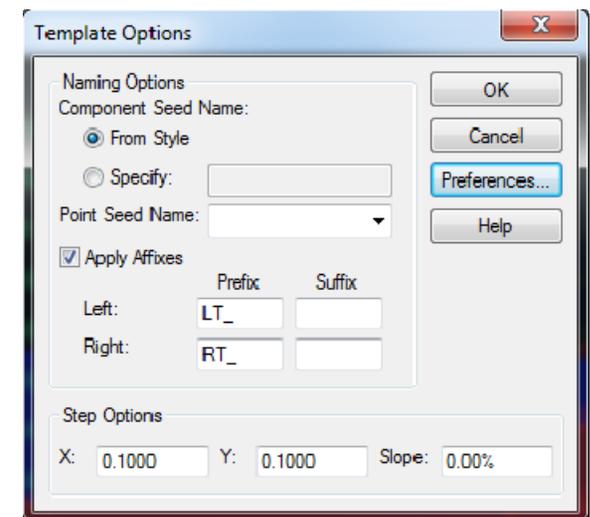
- ◆ Consistency is important
- ◆ Component naming is recommended to be consistent with the material type.
 - ✓ Used for identifying components
 - ✓ Template Transition



Template Options

There are some options you will find helpful when working in the Create Template dialog. To select the FDOT defined Preferences:

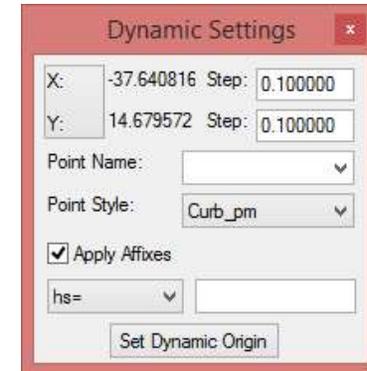
- ◆ Select Tools > Options from the menu in the Create Templates dialog.
- ◆ Click the Preferences Button
- ◆ On the Preferences dialog select FDOT then click Load and OK.
- ◆ Click OK to accept the options and close the dialog.



Dynamic Settings

The Dynamic Settings dialog is used for precision input of the template components and to assign point names and styles when creating components.

- ◆ The Options shown on the previous slide can be accessed and applied as needed using the Dynamic Settings dialog.
- ◆ To Access the Dynamic Settings dialog select Tools > Dynamic Settings.



Dynamic Settings

X: -37.640816 Step: 0.100000
Y: 14.679572 Step: 0.100000

Point Name:

Point Style: Curb_pm

Apply Affixes

hs=

Set Dynamic Origin

Construction of Templates

◆ Components - Building Blocks of Templates

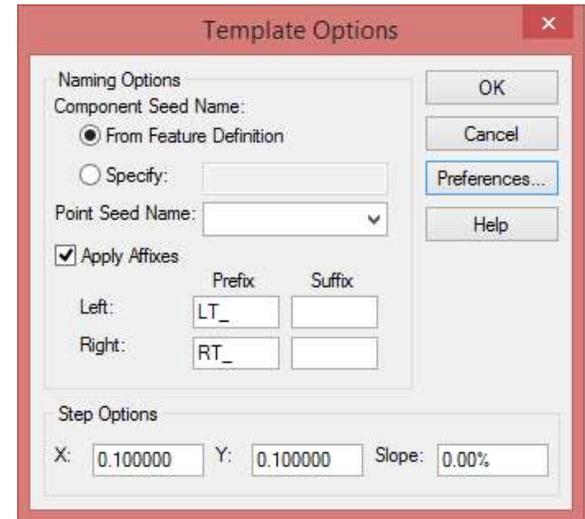
- ✓ Pavement
- ✓ Curbs & Sidewalks
- ✓ Tie Down & End Conditions

◆ Allows Drag & Drop

◆ Mirror/Reflect and Affixes

- ✓ Components
- ✓ Points (Including Overrides)
- ✓ CDR's

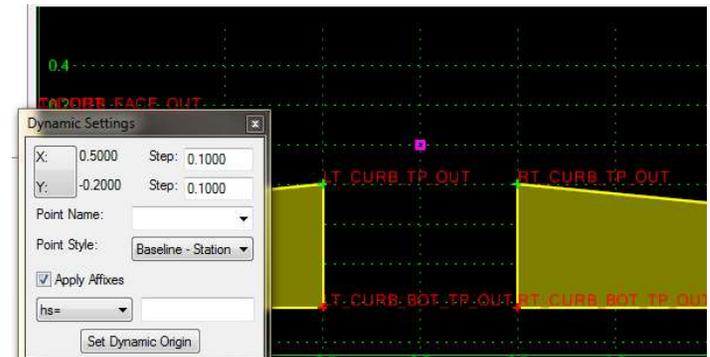
◆ Allows for One Component



The 'Template Options' dialog box is shown with the following settings:

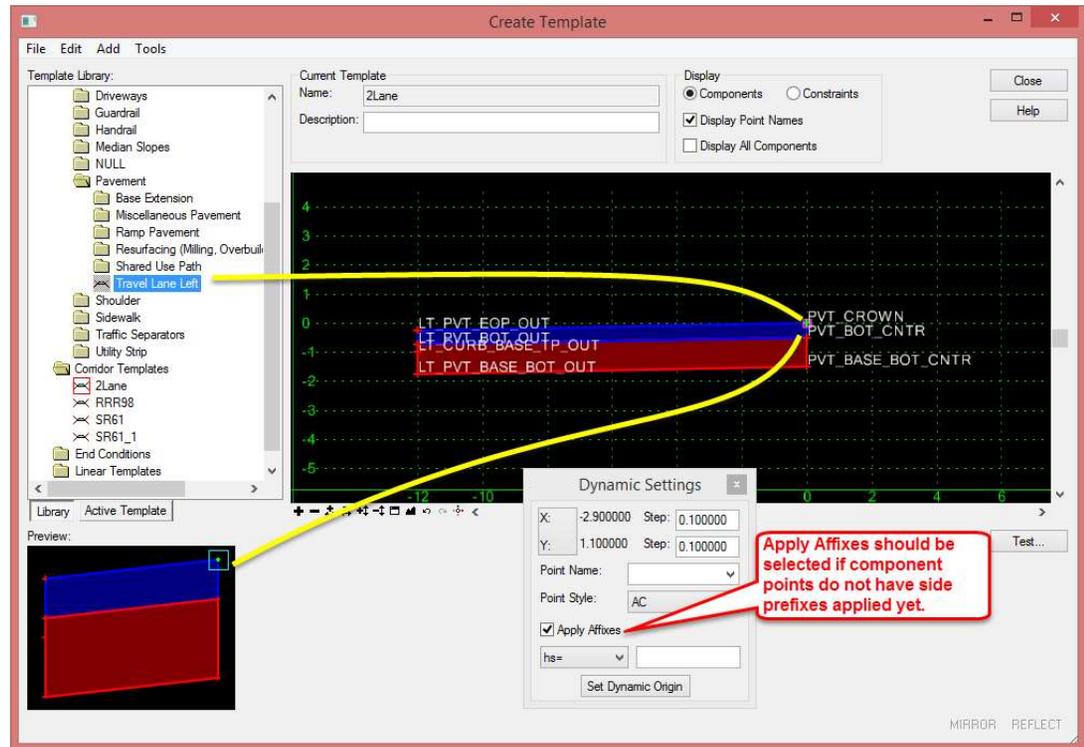
- Naming Options:**
 - Component Seed Name: From Feature Definition, Specify: []
 - Point Seed Name: []
 - Apply Affixes
 - Left: Prefix [LT_], Suffix []
 - Right: Prefix [RT_], Suffix []
- Step Options:**
 - X: [0.100000], Y: [0.100000], Slope: [0.00%]

Buttons: OK, Cancel, Preferences..., Help



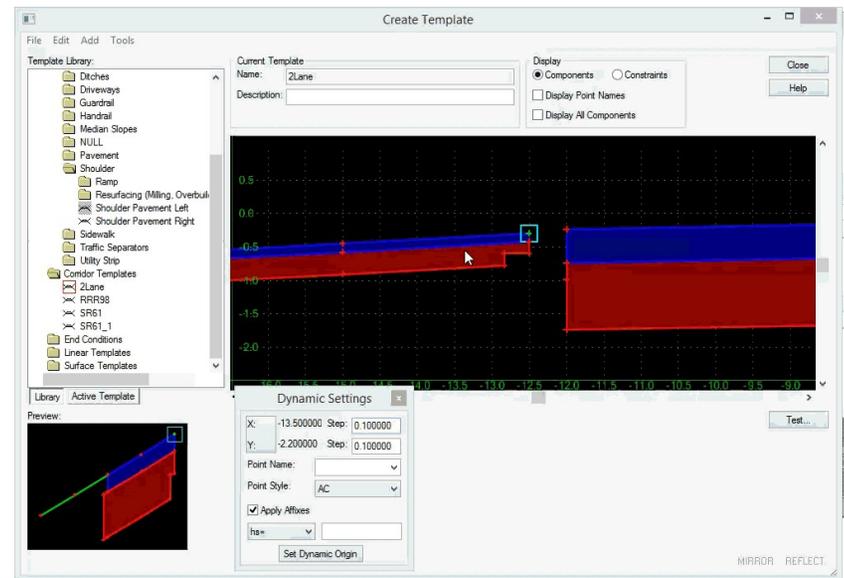
Building a Template from Components

- ◆ Drag components from Template Library folders or the Preview Window into the editing window.



Merging Points

- ◆ Points will be merged automatically if a new component is attached directly to an existing component.
- ◆ Points will be merged automatically if a new component is attached directly to an existing component.
- ◆ If an existing component is moved onto another existing component the points will not be merged automatically.
 - ✓ Manually merged by Right-clicking on the points and selecting **Merge Points** from the context menu.

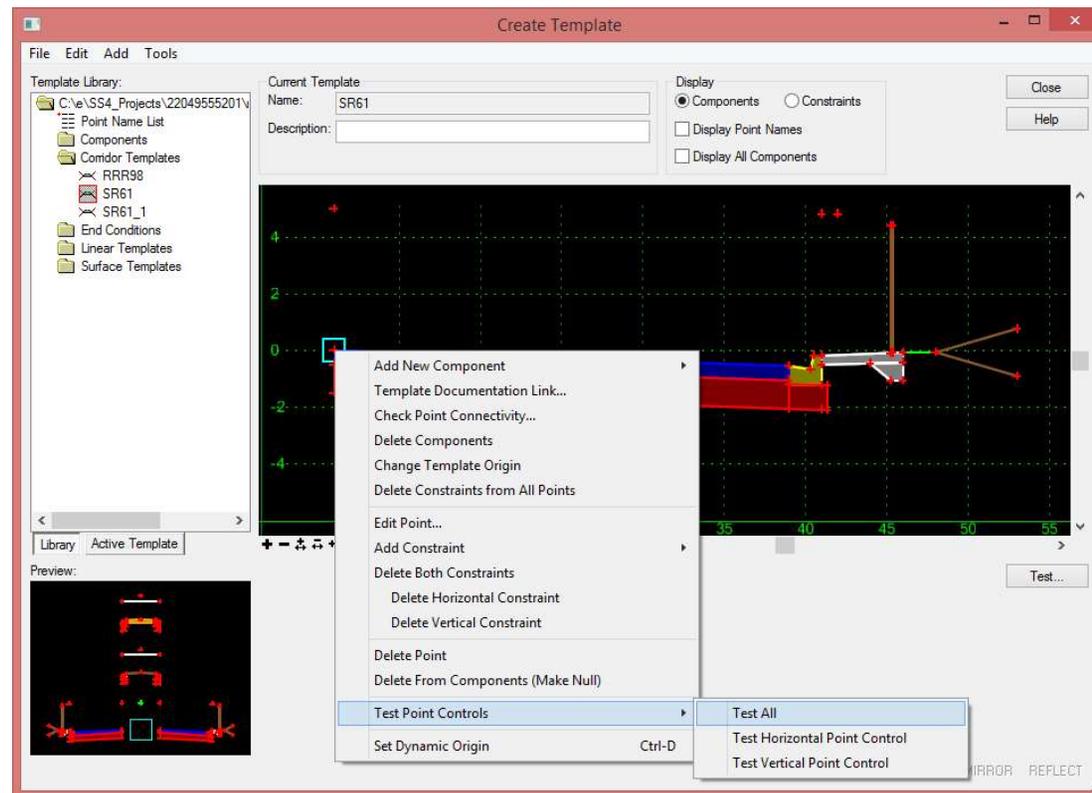


TIP: If the point remains green, you deleted the wrong one.



Testing Components

- ◆ You can test constraints in components by moving points to see results.



Inserting Components

To insert a component between other components in a template you will need to Unmerge the components.

- ✓ Right-click on the component and select Unmerge Component points.
- ✓ Points in the component will be renamed, inserting “Copy of” before the name. This breaks other components constraints to the points allowing you to move the component.
- ✓ You can then insert the new component and rename the points of the unmerged components before attaching it to the inserted component(s).
- ✓ Previous constraints and attachments will have to be recreated and points should be merged after moving components into place.



End Conditions

End Conditions are different than simple, constrained, unconstrained, null point, and overlay/stripping components because they have the ability to target surface or elements with specified Features.

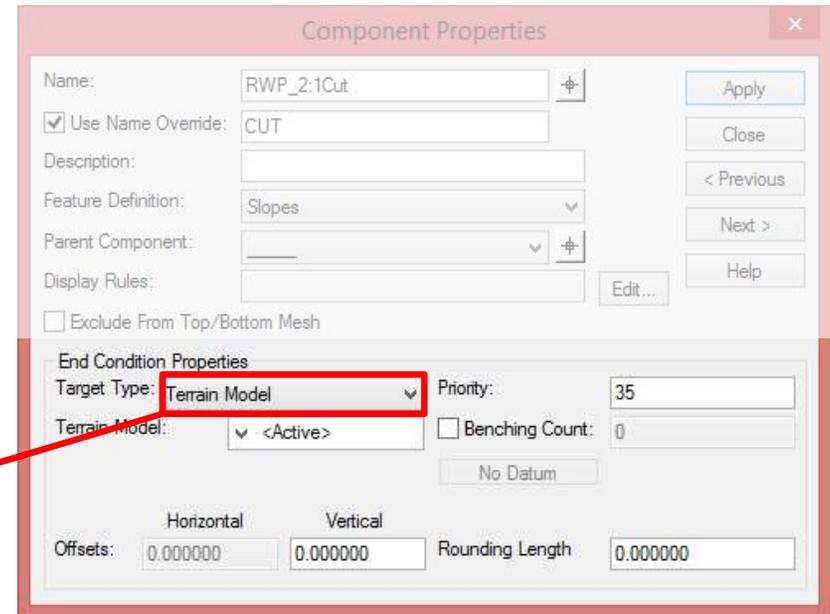


End Condition Properties

The Component Properties dialog additional properties when editing .End Conditions.

Target Type - Specifies the type of element the end condition will be searching for.

Priority – When more than one End Condition starts at the same point, this value determines the order in which End Conditions are attempted.



- Terrain Model
- Elevation
- Linear Horizontal
- Linear Vertical
- Linear Both
- Feature Definition Horizontal
- Feature Definition Vertical
- Feature Definition Both



Testing End Conditions

- ◆ End conditions can be tested to see how they react to the surface or other features by clicking the Test button on the Create Template dialog.



Best Practices

1. Create a project template library in the project folder
2. Use TLO to copy FDOT templates
3. Organize templates by corridor
4. Version the templates or organize by template drop stations
5. Use Apply Affixes when building new templates (tools options)
6. One green point per template (as a rule)
7. Remove point name overrides (All white text), except on common tie down points
8. Remove component name overrides except on common tie down components
9. Use the same label on common constraints
10. Create a good Parent/Child relationship Organized in Active Template



Contact Info

Jimmie Prow
CADD Support Coordinator
Phone no: (850) 414-4863
Toll Free no: (866) 374-3368 extension 4863

email ecso.support@dot.state.fl.us

jimmie.prow@dot.state.fl.us

web: <http://www.dot.state.fl.us/ecso>

