OpenRoads Designer: Template Exercises

Exercise 1: Create Templates from Components

In this exercise we will assemble the template for St. Peter Road by dragging and dropping components from the ODOT template library.

- ✓ Open **ProjectWise Explorer**

- ✓ Browse to the folder containing the training data. The folder location will be provided by the instructor for each class.
- ✓ Browse to the **400-Engineering\Roadway\Basemaps** folder.
- ✓ Open the file **123456_BK001.dgn**. The design file that is used does not matter since we are editing the template library .itl file.
- ✓ From the Corridors tab, choose **Template > Create Template**. The *Create Templates* dialog is opened with the template library for the WorkSet loaded
- ✓ Create a folder named **St. Peter Road** to store all the templates for St. Peter Road. Right-click on the **Project Templates** folder and choose the **New > Folder** option.

Take the following steps to create the template for St. Peter Road:

- ✓ Right-click on the St. Peter Road folder and choose **New > Template** to create the first template for St. Peter Road. Name the template "St. Peter Road".
- ✓ Open the *Dynamic Settings* dialog (**Tools > Dynamic Settings**) to define the **Step** increment values as 0.5 and 0.1. This is helpful to ensure that the initial pavement placement is constrained on the "grid"
- ✓ In the *Dynamic Settings* dialog, turn off the **Affixes** option. We will drag in a pavement backbone that already has the left and right sides defined.
- ✓ Drag the following pavement backbone into the template at the 0,0 origin:

  ODOT > Backbones > Undivided Roadways > Pavement and Shoulder 301-8E Uncurbed > 2-Lane > Asphalt Concrete without Stabilization

St. Peter Road will use a pavement width of 10'. Take the following steps to define the pavement width:

- ✓ Edit point **L-ACSC_T_EP** to define the **Horizontal** constraint with a value of **-10**
- ✓ Edit point **R-ACSC_T_EP** to define the **Horizontal** constraint with a value of **10**

Next add the end conditions to the template.

✓ In the *Dynamic Settings* dialog, turn on the **Affixes** option
✓ Drag the following component onto the edge of shoulder point.

ODOT > End Conditions > 307-4E Common and Barrier Grading > 307-4E Cut 3:1

Tip: Since this template is symmetrical, you can right-click while dragging the end condition into the template to activate the **Mirror** option (CTRL-R) to place it on both sides simultaneously.

The completed template should appear as shown below.
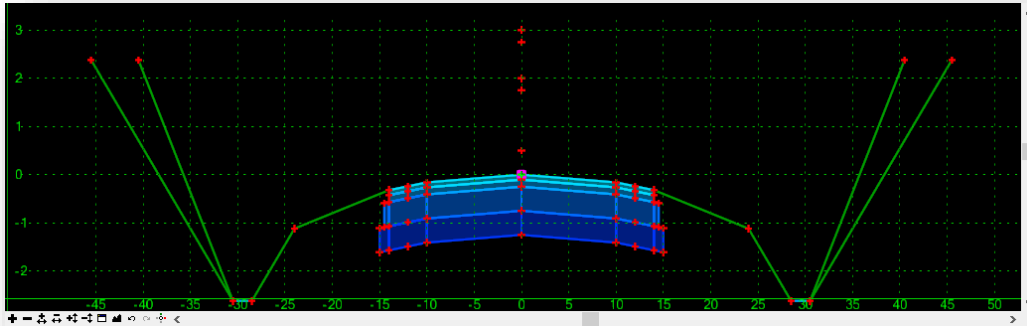
✓ When complete, save your template by choosing **File > Save** from the *Create Template* dialog pull-down menu.

Exercise 2: Creating the S.R. 185 and Jameson Road Templates

In this exercise we will create the templates for S.R. 185 for and Jameson Road

- ✓ Open **ProjectWise Explorer**

- ✓ Browse to the folder containing the training data. The folder location will be provided by the instructor for each class.
- ✓ Browse to the **400-Engineering\Roadway\Basemaps** folder.
- ✓ Open the file **123456_BK001.dgn**. The design file that is used does not matter since we are editing the template library .itl file.

S.R. 185 Template

- ✓ From the **Corridors** tab, choose **Template > Create Template**. The *Create Templates* dialog is opened with the template library for the WorkSet loaded
  - ○ Create a new template named **S.R. 185** in the **Project Templates** folder.
  - ○ Open the *Dynamic Settings* dialog to ensure the **Step** values are defined as desired.
  - ○ Create the S.R. 185 template by dragging in the components listed below.

    Be sure to pay attention to the **Apply Affixes** setting (*Dynamic Settings* dialog). Should this setting be toggled on or off as each of the components listed below is dragged into the template?

    ODOT > Backbones > Undivided Roadways > Pavement and Shoulder 301-8E Uncurbed > 2-Lane > Asphalt Concrete without Stabilization

    ODOT > End Conditions > 307-4E Common and Barrier Grading > 307-4E 3:1 Cut, Fill Table

- ✓ After dragging in the end conditions, the next step is to remove some of the options. For this project, slopes of 3:1 or 2:1 will be used.

  There are two different Graded Shoulder components in the end condition on each side of the template. The components R-GSH1 and L-GSH1 are used when the 6:1 slope is used. Remove these two components by right-clicking on the component and choosing the **Delete Component** option. Since these two graded shoulder solutions overlap, you are prompted to select the component you wish to delete as shown on the following page. Remove the R-GSH1 and L-GSH1 components. The 6:1 slope component is also removed since it has been defined as a "child" component of the graded shoulder 1 component.
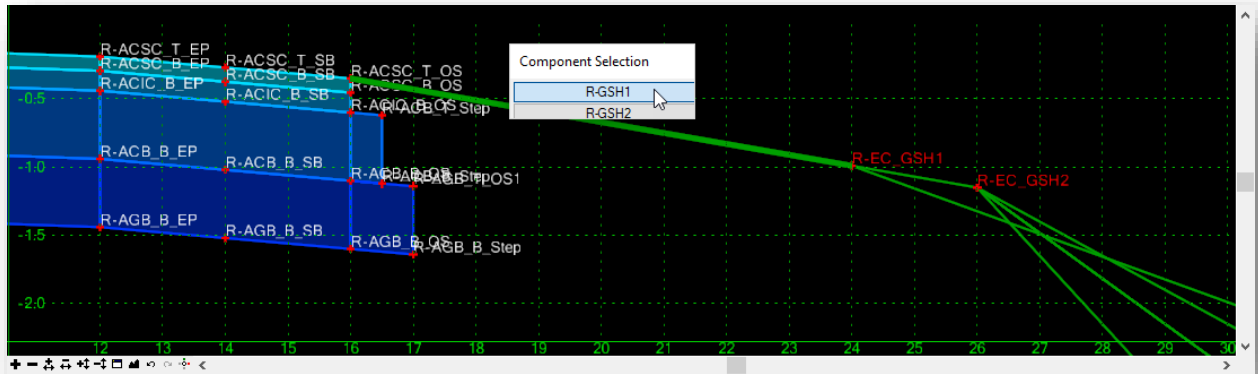
✓ Delete the 4:1 fill slope component on each side of the template. The completed template should appear as shown below.
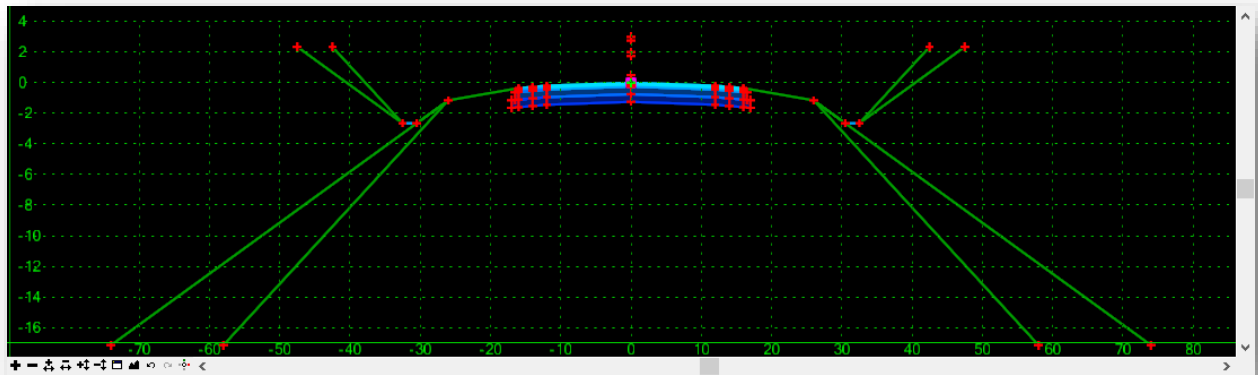
Intersection and Driveway Display Rules

The backbone for the template contains four Null Points that are used to seek the intersection with another road (**INT-Left** and **INT-Right**) and points that are used to seek the intersection with a driveway (**DRIVE-Left** and **DRIVE-Right**). These points are defined to find elements of specific symbology defining the limits of an intersecting road or driveway. The properties for the point **INT-Left** are shown below.

The **Horizontal Feature Constraint** item defines the symbology for the element that the point will seek.

The **Range** defines the horizontal limit that the software will search for an element matching the defined symbology.

When the template is applied to a corridor, these points will seek for any elements matching the assigned symbology and will move to intersect the element. If the point moves, a **Display Rule** is applied to toggle off the display of selected components.

For example, if a driveway is found to the right, point **DRIVE-Right** moves to intersect the line that defines the limits of the drive. The display rule turns off the display of the shoulder components.

The behavior of the points can be tested in the template dialog. Take the following steps to test the behavior of the **DRIVE-Right** point:

- ✓ Right-click the point **DRIVE-Right**
  - ○ Choose **Test Point Controls > Test Horizontal Point Control**
  - ○ Move the cursor to the left and right of the template center point. Observe the behavior of the template components

    As the point is moved to the right, the shoulder components on the right side of the template disappear. Notice that the end condition components are not defined to observe the display rules at this point, as shown below.
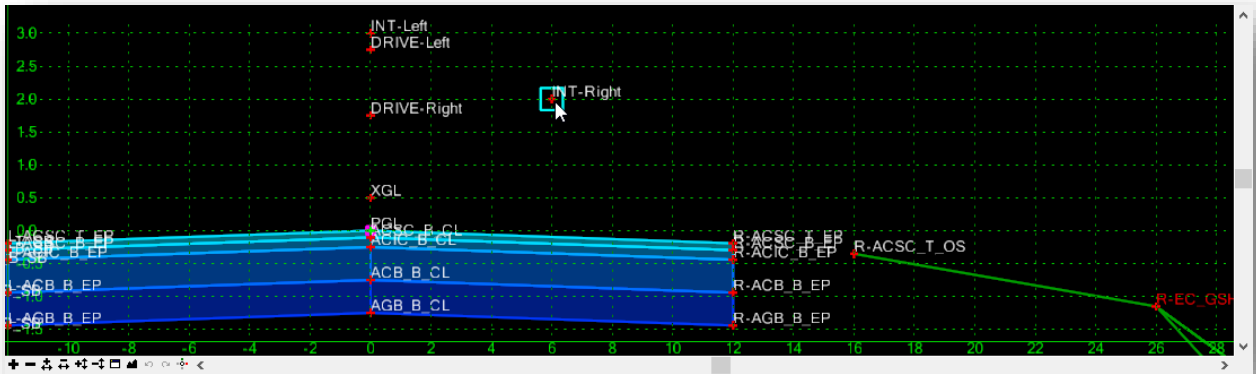
Take the following steps to assign the display rule to the end condition components:

✓ Left click in the template window to terminate the testing process

   The **Display Rule** is applied to the top shoulder component. Take the following steps to review the display rule:

✓ Double-click the top component of the right shoulder, R-ACSC-SH

✓ Select the **Edit** button to the right of the **Display Rule** parameter to open the *Component Display Conditional Expression* dialog.
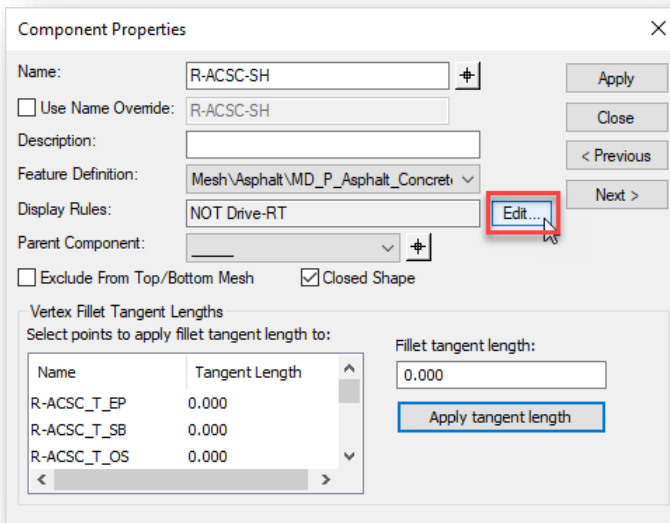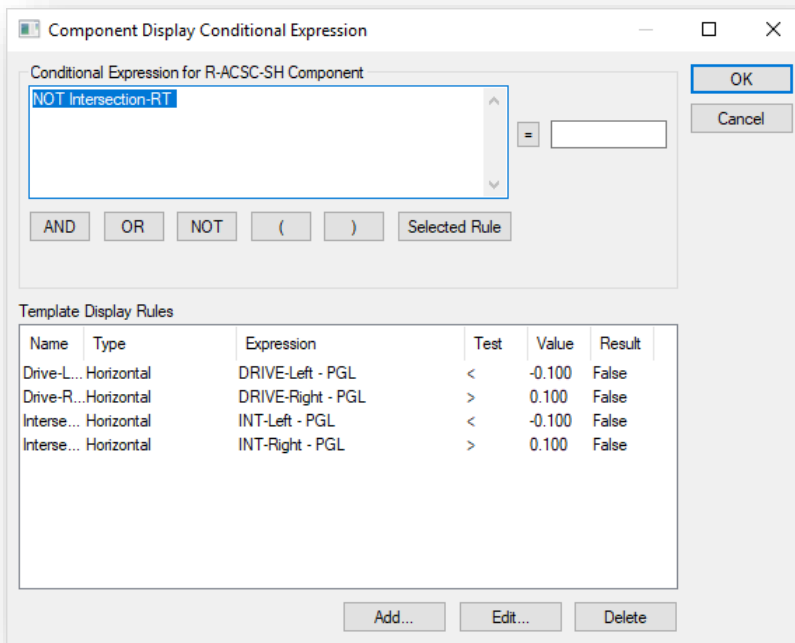
✓ Review the display rule settings. Select the **Cancel** button when complete.

✓ From the *Component Properties* dialog, select **Close**.

Note that the display rule is only applied to the top component of the shoulder buildup in this template. Each of the sub-components of the shoulder are defined as "child" components with the top component as the parent component. Display rules assigned to the parent are inherited by the children.

This parent-child relationship can be reviewed or defined using the **Active Template** portion of the *Create Template* dialog as shown at right.

The parent component is at the top of the hierarchy for each branch. Components can be arranged in a hierarchal relationship by using drag-and-drop operations within the **Active Template** portion of the dialog.

If a display rule is set to turn off the display of the parent component, the display of each child component is also toggled off.
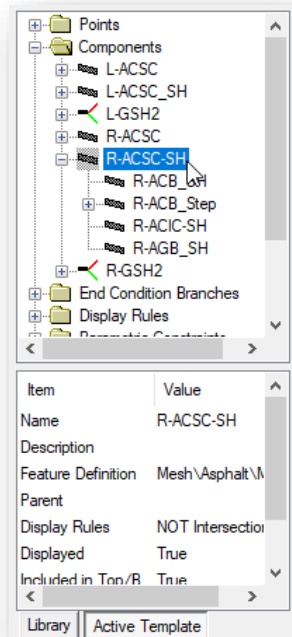
When an intersection or a driveway element is encountered, the display of the end conditions must also be turned off.

Take the following steps to apply displays rule to the parent component of the left and right end conditions:

- ✓ Double-click on the component **L-GHS2** to access the *Component Properties* dialog
  - o Select the **Edit** button to the right of the **Display Rules**
  - o Add the following display rule:
    - **NOT (Intersection-LT or Drive-LT)**
  - o Select **OK** to accept the display rule
  - o Select **Apply** on the *Component Properties* dialog

- ✓ Test the point control by right-clicking on points **INT-Left** and **DRIVE-Left** to test the **Horizontal Point Control**.

  If the display rule is applied correctly, the shoulder and end condition will not display when point INT-Left is moved to the left, and the shoulder steps and the end condition will not display when point DRIVE-Left is moved to the left.

  Note: The **Library** option must be selected to test the display rule behavior. If the **Active Template** option is selected, the display rules cannot be tested. Be sure to select the **Library** option before testing the point and display rule behavior.

- ✓ Repeat the process to define the display rule for the right end condition by editing the **R-GSH2** component.

- ✓ When complete, choose **File > Save** from the *Create Template* dialog to save the changes to the template library.

Jameson Road Template

The Jameson Road template will use the same design as the S.R. 185 template.

- ✓ Right-click on the name of the S.R. 185 template
- ✓ Chose the **Copy** command
- ✓ Right-click on the **Project Templates** folder
- ✓ Choose the **Paste** command
- ✓ Rename the copied template as "Jameson Road"

The pavement width for proposed Jameson Road is 20'. Take the following steps to edit the template with the pavement width values:

- ✓ Double-click on the name of Jameson Road template to edit the template
- ✓ Edit points **R-ACSC_T_EP** and **L-ACSC_T_EP** to change the **Horizontal** constraint value to **10**

This completes this exercise.

- ✓ From the *Create Template* dialog, choose **File > Save**. Close the *Create Template* dialog.
- ✓ Exit OpenRoads designer, checking the design file back into ProjectWise

Additional Template Exercises

Simple Components

In this exercise we will create a simple template consisting of pavement and shoulders for a two-lane road.

✓ Open **ProjectWise Explorer**

✓ Browse to the folder containing the training data. The folder location will be provided by the instructor for each class.
✓ Browse to the **400-Engineering\Roadway\Basemaps** folder.
✓ Open the file **123456_BK001.dgn**. The design file that is used does not matter since we are editing the template library .itl file.

Take the following steps to create a new template for this exercise:

✓ From the **Corridors** tab, choose **Template > Create Template**. The *Create Templates* dialog is opened with the template library for the WorkSet loaded
✓ In the **Template Library** list, right-click on the **Project Templates** folder and choose the **New > Template** option. Name the new template **Exercise 1**.

    o Select **Tools > Options** to open the *Template Options* dialog. Set the parameters for the dialog as shown at right.
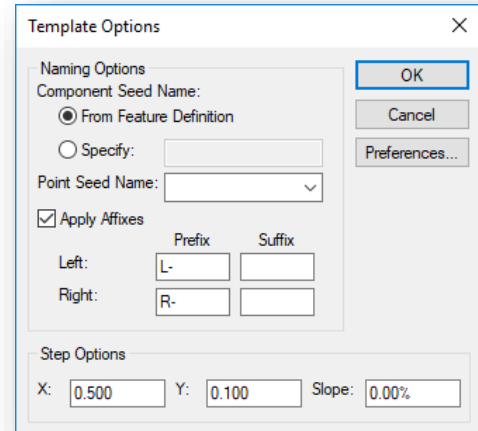
o Select **Tools > Dynamic Settings** to open the *Dynamic Settings* dialog. Set the parameters as shown at right.

o Right-Click in the template window and choose **Add New Component > Simple**. A simple component is floating on the cursor using the default settings for the **Slope**, **Thickness**, and **Width**.

o Set the parameters for the new component that will be created as follows:

Name:	ACSC
Feature:	MD_P_Asphalt_Concrete_Surface_Course
Slope:	-1.60%
Thickness:	1.25"
Width:	12
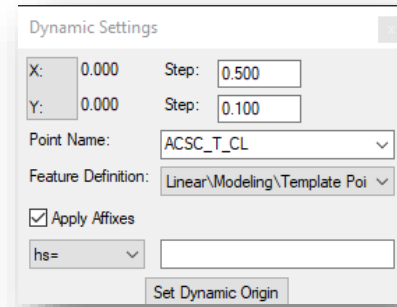
o Right-Click in the template window and choose the **Mirror** option (**Ctrl-M**). The simple component is now mirrored and appears on both the left and right sides. The component is mirrored about the **Dynamic Origin** location.

o Identify the template origin by issuing a data point at the (0,0) coordinate location in the template window. The component constrained to the nearest point in the grid by the **Step** values defined in the *Dynamic Settings* dialog. The mirrored components are shown below.
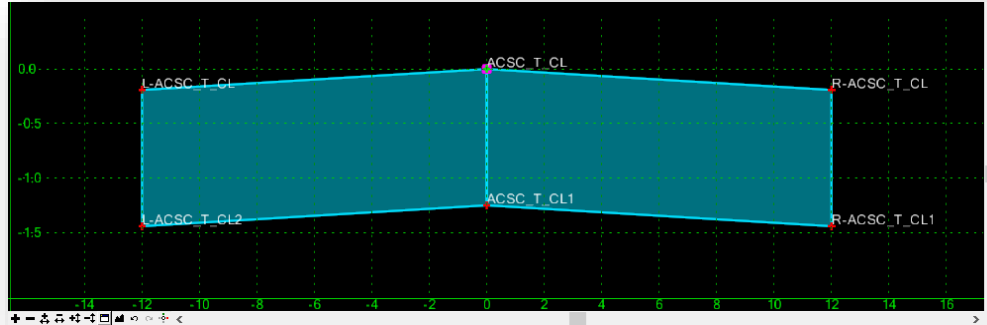
Tip: You can use the **XY=** option in the *Dynamic Settings* dialog to enter the (0,0) coordinate.

Take note of the point names for the components. Each point is named according to the **Point Name** parameter in the *Dynamic Settings* dialog. Points to the left and right of the origin are prefixed according to the affixes defined in the *Template Options* dialog shown on the previous page. The **Point Style** (feature definition) is the same for each point. It is necessary to review and edit the points to assign the appropriate point name and style.

The *Point Properties* dialog is used to edit points.

✓ Double-click on point **L-ACSC_T_CL** to review and edit the properties of the point. Take the following steps in the **Point Properties** dialog:

o Change the point name to **ACSC_T_EP** by selecting the name from the list.
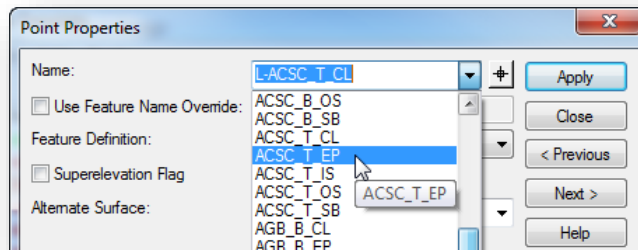
o When the point name is selected from the list, the corresponding **Feature Definition** is automatically assigned for the point. Verify that the **Feature Definition** is now set to **MD_P_ACSC_T_EP**

o The point name still needs to have a prefix assigned. Add the prefix **L-** to the point name. The point name and feature definition should be set as shown below.
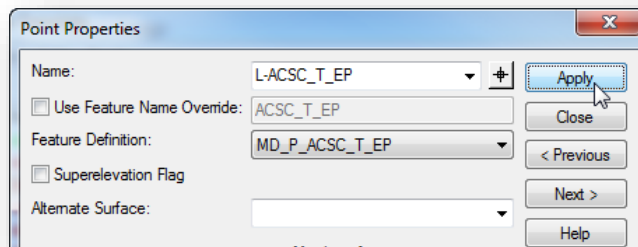

o Select the **Apply** button to save the changes.

✓ Review the remaining points to set the appropriate point **Name** and **Feature Definition** for the top and bottom of the pavement layer. Remember, the feature definition that is assigned to each point will control the level symbology for the 3D line strings that are drawn in the corridor model.

✓ Add a simple component for the shoulder surface to the template using the **Mirror** option with the following settings:

Name:	ACSC-OS
Feature:	MD_P_Asphalt_Concrete_Surface_Course
Slope:	-4.00%
Thickness:	1.25"
Width:	4

✓ Edit the point names for the shoulders by double-clicking on each point to open the *Point Properties* dialog. Be sure the pick the point names from the drop-down menu list so that the corresponding feature definitions are assigned. When completed, the points should be named as shown below.
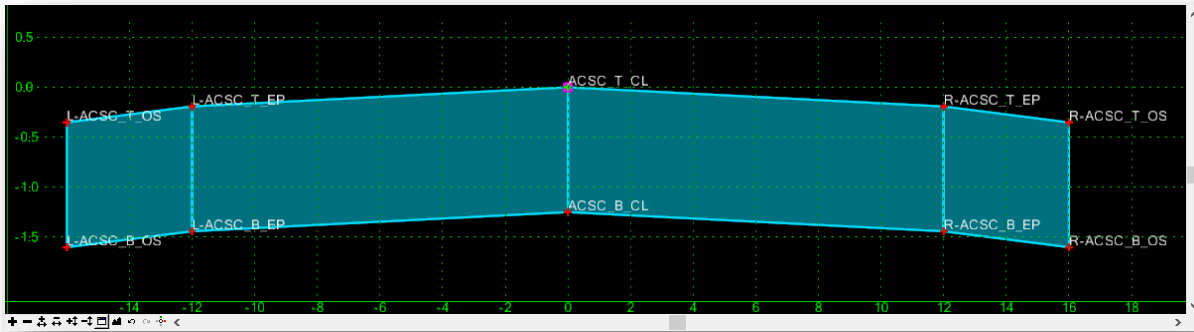
✓ When complete, save your template by choosing **File > Save** from the *Create Template* dialog pull-down menu.

Creating and Testing End Conditions

In this exercise, you will create a simple cut end condition with a 3:1 foreslope and a 2' ditch. The backslope will contain two end conditions, a 3:1 slope and a 2:1 slope as shown below.
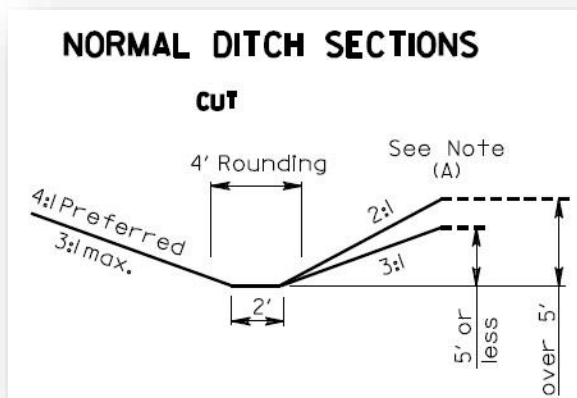
✓ Open **ProjectWise Explorer**

✓ Browse to the folder containing the training data. The folder location will be provided by the instructor for each class.

✓ Browse to the **400-Engineering\Roadway\Basemaps** folder.

✓ Open the file **123456_BK001.dgn**. The design file that is used does not matter since we are editing the template library .itl file.

Take the following steps to create a new template for this exercise:

- ✓ From the **Corridors** tab, choose **Template > Create Template**. The *Create Templates* dialog is opened with the template library for the WorkSet loaded

- ✓ Right-click on the Project Templates folder and choose **New > Template**. Create a new template named **Normal Ditch**.

- ✓ Open the *Dynamic Settings* dialog and select the **Point Name** to "EC_HINGE" from the list. The **Point Style** is automatically set. Set the **Step** values as desired. Uncheck **Apply Affixes**.

- ✓ Add an end condition for the graded shoulder
  - ○ Right-click in the template window and choose **Add New Component > End Condition**.
  - ○ Start the End Condition at coordinate 0, 0 (xy=0, 0).
  - ○ Name the component "GSH1"
  - ○ Use the Feature "MD_P_Graded_Shoulder" for the component
  - ○ Be sure to check off **Check for Interception** in the *Dynamic Settings* dialog after placing the first point.
  - ○ Change the Point Name in the *Dynamic Settings* dialog to "EC_GSH1" After placing the first point but before placing the second point. By choosing the name from the list, the **Feature Definition** is automatically assigned.
  - ○ Place the second point 6' horizontally from the first point at a slope of -8% (hs=6, -8%)
  - ○ Right click and select Finish.

- ✓ Add an End Condition for the ditch foreslope.
  - ○ In the *Dynamic Settings* dialog, select the **Point Name** EC_FSLP.
  - ○ Right-click in the template window and choose **Add New Component > End Condition**.
  - ○ Name the component "3:1 Foreslope"
  - ○ Use the **Feature** "MD_P_Foreslope" for the component
  - ○ Create the component with a vertical constraint of -1.5 at a 3:1 slope (vs=-1.5,-1:3) from the point EC_GSH1. Be sure to check off **Check for Interception** in the *Dynamic Settings* dialog after placing the first point.
  - ○ Right click and select Finish.
  - ○ Double click on the 3:1 Foreslope End Condition and set the Parent component to GSH1. Hit **Apply**.

- ✓ Add an End Condition for the 2' ditch bottom.
  - ○ In the *Dynamic Settings* dialog, select the **Point Name** EC_DITCH.
  - ○ Right-click in the template window and choose **Add New Component > End Condition**.
  - ○ Name the component "DITCH"
  - ○ Use the **Feature** "MD_P_Ditch" for the component
  - ○ Create the component with a horizontal constraint of 2.0 and a vertical constraint of 0 (dl=2,0) from the point EC_FSLP. Be sure to check off **Check for Interception** in the *Dynamic Settings* dialog after placing the first point.
  - ○ Right click and select Finish.
  - ○ Double click on the DITCH End Condition and set the Parent component to 3:1 Foreslope. Hit **Apply**.

Next, define two end conditions for the backslope.
- ✓ In the *Dynamic Settings* dialog, select the **Point Name** EC_BKSLP

✓ Right-click in the template window and choose the **Add New Component > End Condition** option.
✓ Name the end condition "3:1 Backslope"
✓ Set the Feature for the end condition to "MD_P_Backslope"
✓ Create the component with a vertical constraint of 5' at a 3:1 slope (vs=5,1:3) from the point EC_DITCH. Be sure to check on **Check for Interception** in the *Dynamic Settings* dialog after placing the first point.
✓ Right click and select Finish.
✓ Double click on the 3:1 Backslope End Condition and set the Parent component to DITCH. Hit **Apply**.

Add a second End Condition for the 2:1 backslope using the settings detailed below.
✓ In the *Dynamic Settings* dialog, select the **Point Name** EC_BKSLP
✓ Right-click in the template window and choose **Add New Component > End Condition**.
✓ Name the end condition "2:1 Backslope"
✓ Set the Feature for the end condition to "MD_P_Backslope"
✓ Set the component **Priority** to **2**
✓ In the *Dynamic Settings* dialog, toggle on the **Check for Interception** and **End Condition is Infinite** options (options not available until the first point of the end condition is placed).
✓ Create the component with a vertical constraint of 5' at a 2:1 slope (vs=5,1:2) from the point EC_DITCH
✓ Right click and select Finish.
✓ Double click on the 2:1 Backslope End Condition and set the Parent component to DITCH. Hit **Apply**.

Next, review the point names and feature styles, as well as the Override names for the points and components.
✓ Double-Click on the point **EC_BKSLP** to make the following change:
  o Toggle on the **Use Feature Name Override** option and enter an override name of "**BKSLP**" and change the name to "**EC_BKSLP3**" then hit **Apply**.
✓ Double-Click on the point **EC_BKSLP1** to make the following changes:
  o Toggle on the **Use Feature Name Override** option and enter an override name of "**BKSLP**" and change the name to "**EC_BKSLP2**" then hit **Apply**.

Review the component properties for the backslope components to set the override name.

✓ Double-click the **2:1 Backslope** component. Toggle on the **Use Name Override** option and set the override name to "**Backslope**"

✓ Double-click the **3:1 Backslope** component. Toggle on the **Use Name Override** option and set the override name to "**Backslope**"

The completed template should appear as shown below.
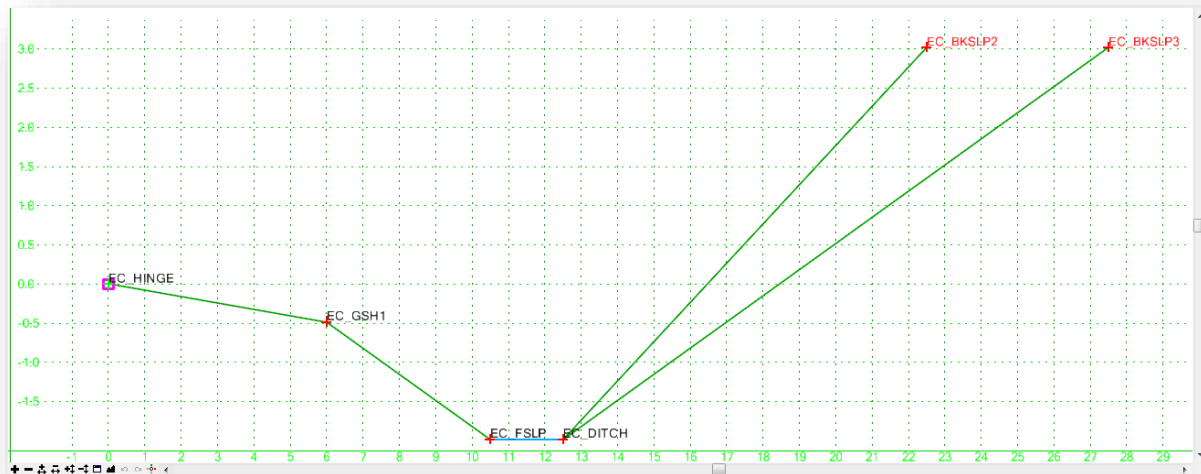
✓ Use the **Test** option to ensure that the backslope components behave as intended. The 3:1 backslope should solve first for backfills up to 5' high. The 2:1 solution should solve for backslopes greater than 5'.

✓ When complete, choose **File > Save** from the *Create Template* dialog to save the changes to the template library.

OpenRoads Software Version

This document was prepared using the following software version:

OpenRoads Designer CONNECT Edition – 2021 Release 1 Update 10 – Version 10.10.01.03

Contacts

For any questions, suggestions, or problems with this document please contact the ODOT Office of CADD and Mapping Services by use of the following form on the ODOT website:

https://odot.formstack.com/forms/cadd_servicerequest