This guide covers the process for creating an assembly object that represents an individual cross section along a corridor. In this example, a simple assembly will be created which represents a typical cross section for a terrace.

The terrace cross section consists of a 10 foot flat bottom channel. To the left of the channel the section ties in to the original ground surface at a 3:1 slope. To the right of the channel a terrace ridge will be created with a 4 foot top width and an elevation that is 3 feet above the channel grade. The foreslope and backslope of the terrace ridge is 4:1, and the backslope ties in to original ground.

Assembly groups are made up of individual subassembly components which represent distinct portions of the assembly group. The individual subassembly elements used to develop the assembly group to represent the terrace cross section are discussed in more detail below.

1. Subassembly Catalog

   Subassemblies are stored in the Corridor Modeling Catalogs, which are located in the Autodesk Content Browser. The Content Browser icon is located on the Palettes pane on the View ribbon. Once in the catalog, select the *Corridor Modeling Catalogs (Imperial, .NET)*

   The subassembly catalog is organized into several sections. Most of the subassemblies are geared toward typical highway design cross section elements such as pavement profiles and ditches. Most assemblies for NRCS practices can be built using the subassemblies in the *Generic Subassemblies* Catalog.

   To access detailed information about an individual subassembly, right click on its icon in the catalog and select Help. The window that opens will contain a schematic diagram of the subassembly and a description of its parameters.

2. Organize Subassemblies on the Tool Palette

   Subassemblies are inserted into the drawing using an add-on tool called i-Drop, which is disabled in the NRCS Civil 3D installation. Since subassemblies cannot be added to an assembly group directly from the Subassembly Catalog, they must first be copied onto the Tool Palette. If you are using the NRCS customized tool palettes, you may already have a separate tab specifically for subassemblies. If not, you can create one by placing the pointer over the tabs along the edge of the tool palette, right clicking, and selecting *New Palette.*

   In this example, the following subassemblies will be used, and need to be placed on the tool palette before the assembly group can be created.

   | | |
   |---|---|
   | *LinkWidthAndSlope* | Used for the channel bottom |
   | *LinkOffsetAndSlope* | Used for the top of the terrace ridge |
   | *LinkSlopeAndVerticalDeflection* | Used for the foreslope of the terrace |
   | *LinkSlopeToSurface* | Used to slope from the channel and ridge to original ground |

   To copy a subassembly to the tool palette, right click on its icon in the Subassembly Catalog and select *Copy*. Then, place the pointer over the tool palette, right click, and select *Paste*.

3. Create the Assembly

   Once you have the subassemblies placed on the tool palette, you are ready to begin creating the assembly group. On the *Create Design* pane on the *Home* ribbon, click on *Assembly* and select *Create Assembly*.

   In the Create Assembly window, you can accept the default name for the assembly or provide your own assembly name. A description can also be provided . Select the *Assembly* assembly style and code set.

   You will be prompted to select a baseline location in the drawing. This location does not need to correspond to a point along an alignment, profile, or corridor object. The cross sections created based on the assembly group will automatically be placed horizontally along an alignment and vertically along a profile as dictated in the properties for the corridor that represents the finished terrace. When you select the baseline location in the drawing, the assembly will be created and will show up as a vertical line with a symbol at its midpoint. The vertical line is where the assembly will be placed along the horizontal alignment for the terrace, in this case the intersection of the terrace channel and the foreslope of the terrace ridge. The symbol on the baseline represents the point where the assembly will be placed on the finished grade profile for the corridor.

4. Add Subassembly Components to Build the Assembly

   a. To add the 10 foot flat terrace channel to the cross section, click on the *LinkWidthAndSlope* subassembly in the Tool Palette. The Properties window will automatically open. In the Properties window, in the Advanced Parameters section, set the *Side* to *Left*, the *Width* to 10' and the *Slope* to 0%, then click on the assembly baseline in the drawing. The terrace channel component should be added to the left of the baseline.

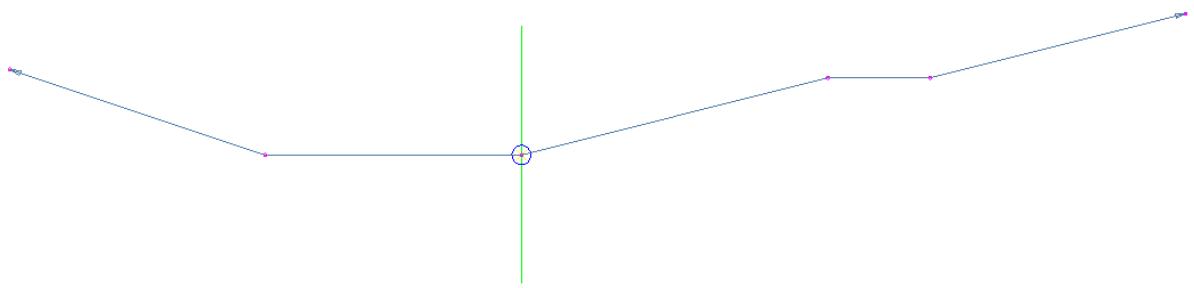
   b. Next, tie the channel to the original ground surface with a 3:1 slope. Click on the *LinkSlopeToSurface* subassembly in the Tool Palette. In the Properties window, set the *Side* to Left and the *Slope* to 33.33%. Note that if you type in 3:1 in the *Slope* cell, the value of 33.33% will automatically be calculated and entered into the cell in the Properties window. For this example, the *Add Link in* value should be set to *Cut Only*, assuming that the terrace channel will always be placed in cut. Click on the subassembly component that you added in step 4a to add the slope to the assembly.

   c. Add a 4:1 slope to connect the terrace channel to the ridge, located 3 feet above the channel elevation. Click on the *LinkSlopeAndVerticalDeflection* subassembly in the Tool Palette. The *Side* should be set to *Right*, the *Slope* to 25% (4:1) and the *Vertical Deflection* to 3'. Click on the assembly baseline in the drawing.

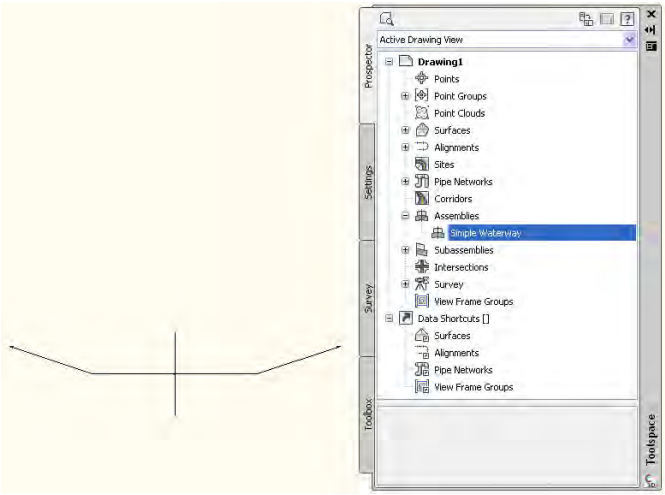
   d. Add the 4 foot top to the terrace ridge. Click on the *LinkOffsetAndSlope* subassembly in the Tool Palette. Set the *Offset from Baseline* value to 4' and the *Slope* to 0%. Note that with this subassembly type, unlike the *LinkWidthAndSlope* type, the direction that the line runs is determined by the value of the offset from baseline value rather than specifying a side. A positive offset value will extend the line to the right and a negative value will extend the line to the left. Click on the terrace ridge foreslope subassembly element in the drawing.

   e. Finish the section by tying in the terrace ridge to the original ground surface. Click on the *LinkSlopeToSurface* subassembly in the Tool Palette. In the Properties window, set the *Side* to *Right* and the *Slope* to 25% (4:1). For this example, the *Add Link in* value should be set to *Fill Only*, assuming the terrace ridge will always be constructed in fill. Click on the terrace ridge subassembly component to add the slope to the surface.

      The assembly schematic in the drawing (shown below) may show the slope extending upward, but the slope in the corridor will actually be oriented either up or down depending on where the original ground line is located in relation to the terrace ridge elevation.



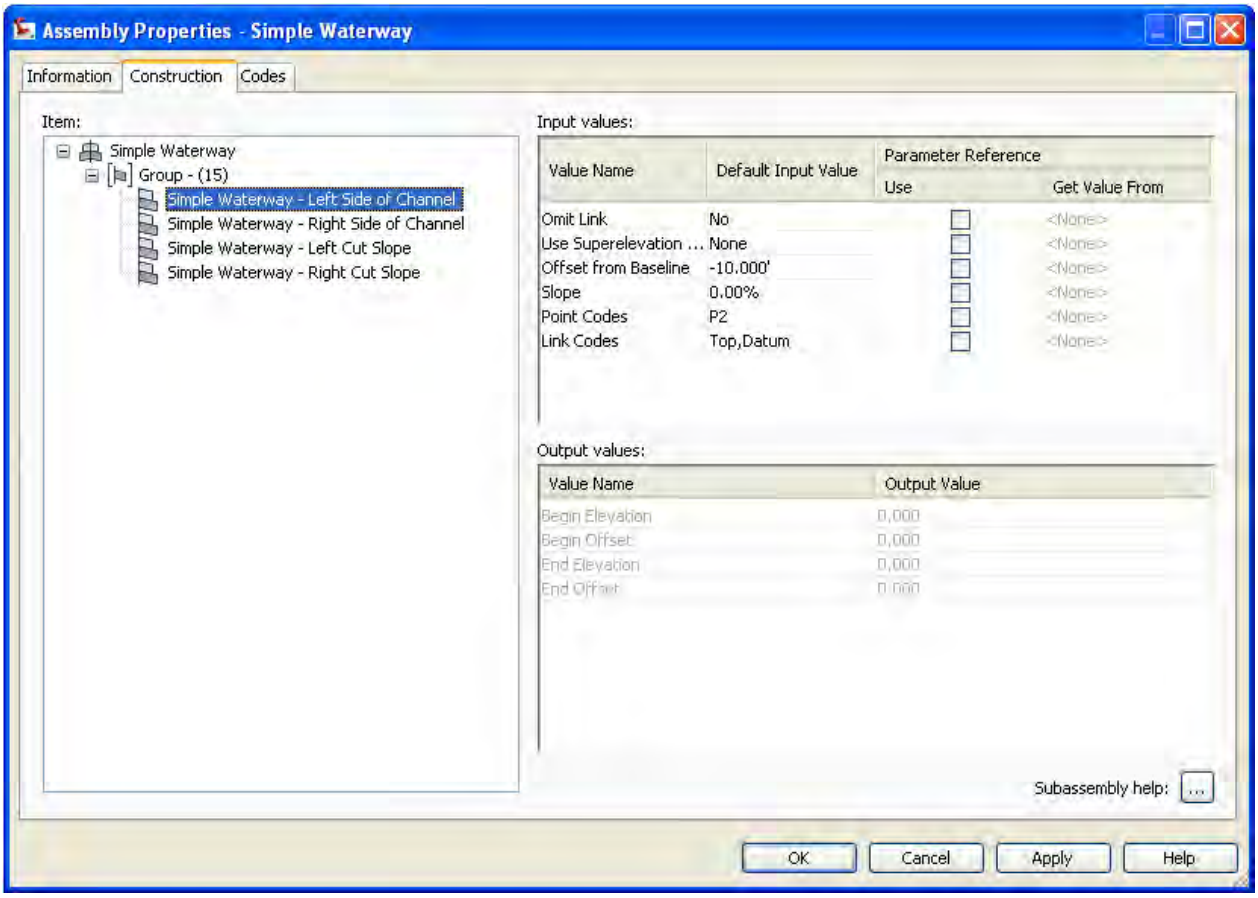
This guide covers the process of editing an assembly object that has been previously created. For this example, the *Simple Waterway* assembly object that is included on the *MN NRCS Customized Tool Palette*. For more information on this tool palette and how to set it up, refer to Quick Reference Guide *263.0 Setting Up MN NRCS Customized Tool Palette*.




When as assembly object is inserted into a drawing, it will be listed under *Assemblies* on the *Prospector* tab of *Toolspace*.

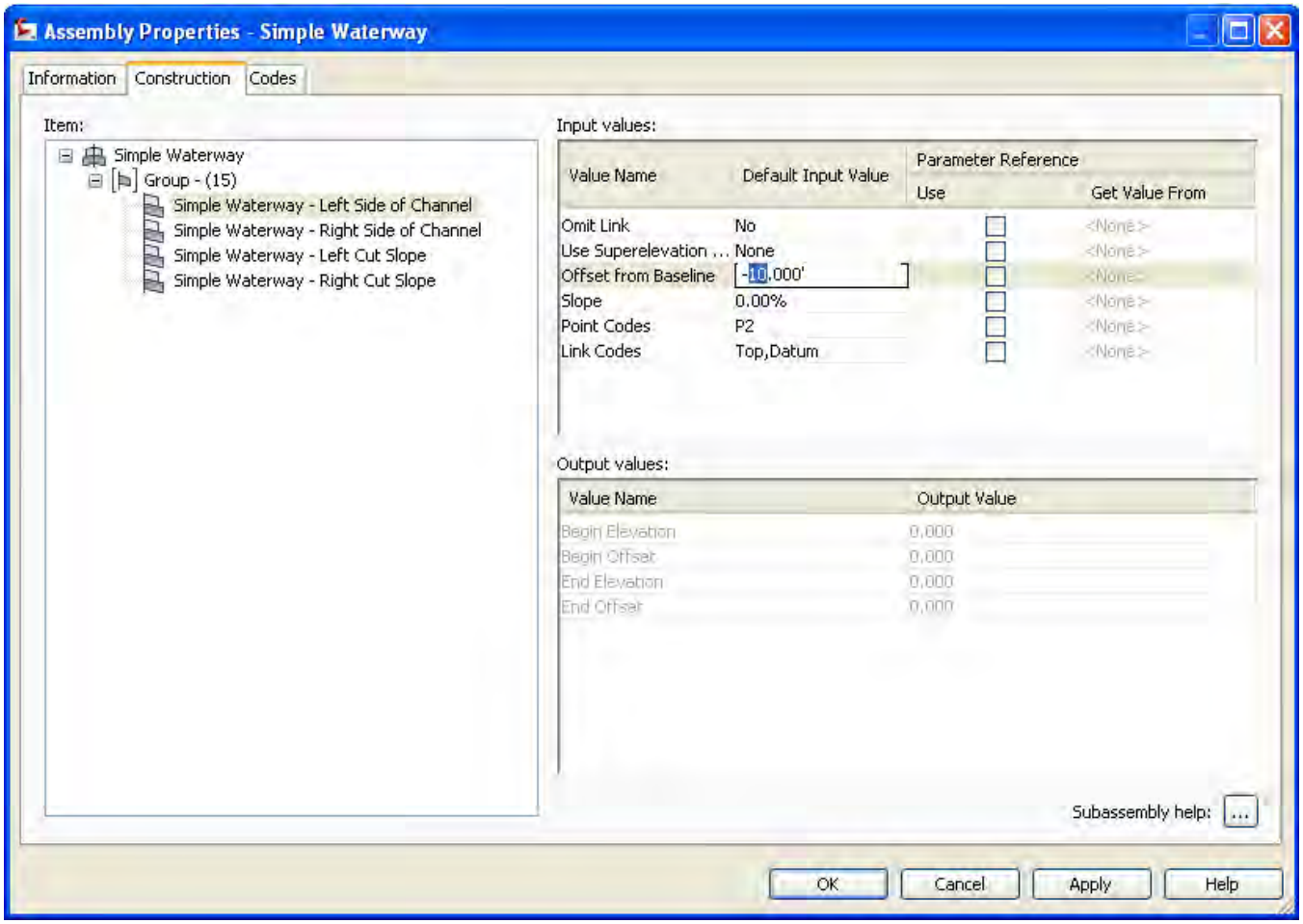
To edit an assembly, right click on its name in Prospector and select *Properties*…

In the *Assembly Properties* window, go to the *Construction* tab. The individual components of the assembly object will be listed in the *Item*: pane on the left hand side of the window.




The *Simple Waterway* assembly includes four components, which represent the left and right hand sides of the channel, and the left and right hand cut slopes that extend from the waterway channel to the existing ground surface. Select a component of the *Simple Waterway* assembly to display its values in the panes on the right hand side of the window.

To change an input value, double click in the cell in the *Input values*: pane and type in a new value for the field. For example, you can change the width of the left hand side of the waterway to clicking in the *Offset from Baseline* cell in the *Input values*: pane and change the value to a new width.



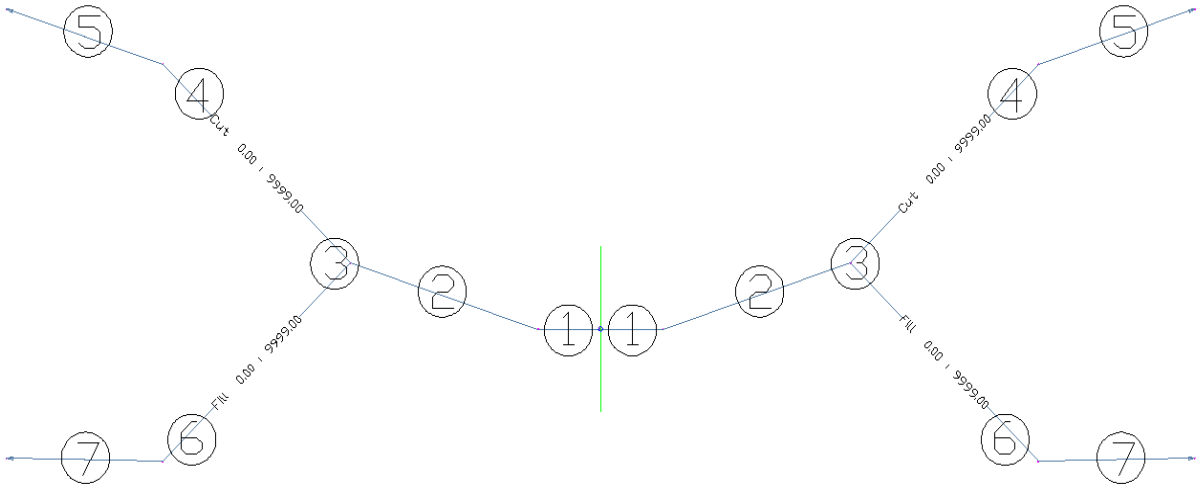

Keep in mind when specifying a width by changing the *Offset from Baseline* field that the value needs to be positive if the line extends to the right of the baseline and negative if it extends to the left of the baseline. In the example above, since the component representing the width of the left side of the channel is being edited, the *Offset from Baseline* value is negative.

Detailed information about individual subassembly component types can be accessed by clicking on the *Subassembly help:* button at the bottom right hand side of the *Construction* tab.

This guide covers how the *ConditionalCutOrFill* subassembly can be used. This is a customized subassembly which has been developed for NRCS and is included as part of the NRCS customization.

This subassembly is used to automatically control which subassemblies area used in an assembly object based on whether a cut or fill condition exists at the point where it is attached. To illustrate how this works, this guide will cover the process of utilizing a *ConditionalCutOrFill* subassembly to place either of the two cross sections shown below depending on whether the top of the channel's side slope is in cut or fill. The cross section to the left is placed when a design depth of 4 feet for the channel is reached before the cross section encounters the original ground profile, while the cross section on the right is placed when additional depth must be provided in order to reach the intersect the original ground surface.

The graphic below shows the assembly object that was used to create the sections above. It includes a flat bottom channel and side slopes that extend up to a design depth of 4 feet. At the top of the 4 foot high side slopes conditional cut or fill subassemblies have been added which will be used to determine how the cross section will be developed based on whether the section is in cut or fill at that point. If the cross section is above the ground profile at the top of the 4 foot high slope (in fill) then the section will be sloped down at a 2% slope until it ties into the ground surface. If the cross section is below ground at the top of the 4 foot high slope (in cut) then the slope will be continued at the same grade upward until it intersects the ground surface.




One thing to keep in mind when working with the conditional cut or fill subassembly object is that the way the cut and fill portions of the subassembly appear in the drawing does not necessarily reflect how the cross section will actually be plotted. These lines are used only to provide connection points for the subassemblies that will be used in each situation.

A summary of the individual subassembly components of the assembly are listed below:

1. Channel bottom width subassemblies.
2. Side slope of channel up to the design depth of 4 feet.
3. Connection point for the conditional cut/fill subassembly. This is the point at which the section will be evaluated to determine if it is in cut or fill at that location.
4. This is a line that is displayed in the assembly object that provides a connection point for the subassembly that will be used when the section is in cut at the location of point 3. This line does not represent how the cross section will actually plot, it is only included for display purposes.

5. This subassembly will extend the channel's side slope until it intersects with the ground surface. It will be used when the section is in cut at point 3, or the top of the channel slope when it reaches its design depth.
6. This is a line that is displayed in the assembly object that provides a connection point for the subassembly that will be used when the section is in fill at the location of point 3. This line does not represent how the cross section will actually plot, it is only included for display purposes.
7. This subassembly will provide a 2% slope to tie into the ground surface when the section is in fill at point 3, or the top of the channel slope when it reaches its design depth.

   If you want to ensure that this slope will always slope downward and away from the channel, you will need to set the properties of this subassembly object to fill only, otherwise the program will check both cut and fill and select the shortest of the two distances and slope the line up or down accordingly.

This guide covers the procedure for using an assembly that has been created to represent a typical cross section to create a simple corridor along an established alignment.

1. On the *Create Design* panel of the *Home* ribbon, click on *Corridor* and select *Create Simple Corridor*.

2. Make the following selections in the *Create Simple Corridor* window:

   - You can accept the name generated by the default naming template or you can provide your own name for the corridor.
   - The description is optional
   - Select the corridor style
   - By default, the corridor object will be placed on the layer PLAN-CORRIDOR, but this layer can be changed by clicking on the icon to the right of the Corridor layer field

   After you make your selections in the Create Simple Corridor window and click on the OK button, you will be prompted to select the alignment, profile and assembly that will be used to define the corridor. You can either manually select the objects from the drawing or hit Enter to bring up lists of objects that are available.

3. Set Targets

   After you select the alignment, profile and assembly, the *Target Mapping* window will appear. This window summarizes the features that will be used to create the corridor model. The existing ground surface needs to be set as the target in the *Target Surface* cells in the table. To do this you can either click each of the cells individually and select the original ground surface from the list of surfaces or click in the cell labeled *<Click here to set all>* to set the target surface in all of the cells.

   Click on the *OK* button to create the corridor. It should now appear in the Prospector tab under the list of Corridors.

4. Viewing Corridor Sections

   You can view the cross sections along the corridor by right clicking on the corridor name in the *Prospector* tab in *Toolspace* and selecting *View/Edit Corridor Section* or by selecting the corridor object in the drawing and clicking on the *Corridor Section Editor* icon on the *Corridor* contextual ribbon that appears.

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This example covers the process of creating a corridor that represents a simple waterway corridor along an alignment. The example assumes that you have the following objects in the drawing:

- Alignment representing the centerline of the waterway

  Refer to Quick Reference Guide **510.0 Creating an Alignment from Objects** or Quick Reference Guide **511.0 Creating an Alignment Using Alignment Creation Tools** for more information on setting up the waterway alignment.

- Profile of the original ground surface along the waterway alignment

  Refer to Quick Reference Guide **610.0 Profile from a Terrain Surface** for more information on developing a surface profile.

- Finished ground profile representing the design grade of the waterway along the alignment

  Refer to Quick Reference Guide **611.0 Developing a Finished Ground Profile** for more information on developing a design profile for the waterway.

- Assembly object representing the typical cross section of the waterway

  Refer to Quick Reference Guide **940.0 Assembly Guide – Simple Waterway** for more information on the assembly object used in this example.

1. On the *Create Design* panel of the *Home* ribbon, click on *Corridor* and select *Create Simple Corridor*.
2. Make the following selections in the *Create Simple Corridor* window:
   - Assign the name *Waterway* to the corridor
   - The Corridor style is *Corridor*
   - Leave the layer at PLAN-CORRIDOR
   - Click on the *OK* button
3. At the command line, you will be prompted to select the baseline alignment. Click on the alignment in the drawing or hit Enter and select it from the list of alignments in the drawing.
4. At the command line, you will be prompted to select a profile. Be sure you select the finished ground profile that represents the design centerline of the waterway and not the original ground surface profile.

   Click on the finished ground in the drawing or hit Enter and select it from the list of profiles in the drawing.
5. At the command line, you will be prompted to select an assembly. This is the *Simple Waterway* assembly that represents the typical cross section of the waterway. Click on the assembly object in the drawing or hit Enter and select it from the list of assemblies in the drawing.
6. The Target Mapping window will appear. Click in the cell labeled *<Click here to set all>* next to *Surfaces* and select the *Existing Ground* surface.
7. Click on the *OK* button to create the corridor. It should now appear in the drawing and be listed in the Prospector tab under the list of Corridors.

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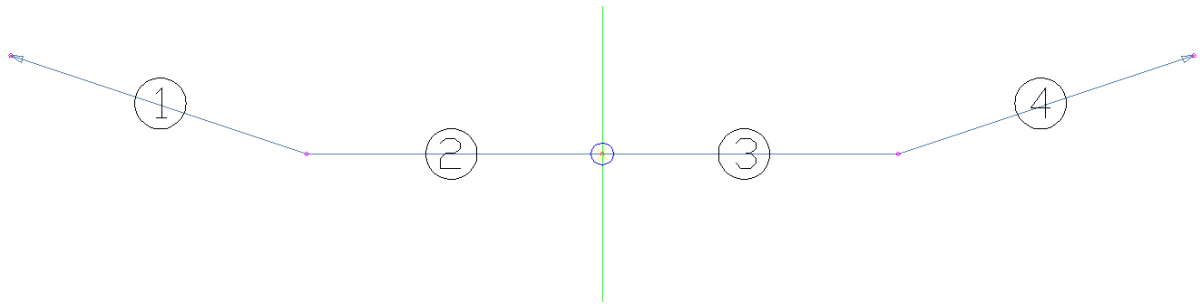
This guide covers the *Simple Waterway* assembly which is used to model an excavated waterway channel. The individual subassembly components of this assembly objects are discussed in further detail below.




1. Simple Waterway – Left Cut Slope

   LinkSlopetoSurface subassembly object. This component represents the left side slope of the waterway channel

   Controlling Parameters

   Slope — The default value is 33.33% or 3:1. This is the slope at which to continue the left hand slope when below the original ground surface at the design depth.

   Slope values can be entered as a numeric value (i.e. 33.3) or as a ratio (i.e. 3:1). If you enter "3:1" the slope will automatically be converted to its numeric value.

   Add Link In — The default value is Cut and Fill. This will allow the software to check both the cut and fill situations and choose the one with the shortest slope to daylight to the ground surface. For an excavated channel, the cut condition should always be the controlling situation. The value could be changed to Cut Only to ensure that the cut condition is always selected.

2. Simple Waterway – Left Side of Channel

   LinkOffsetAndSlope subassembly object. This component represents the left side of the waterway channel.

   Controlling Parameters

   Offset from Baseline — This is the distance between the channel centerline and the left hand edge of the channel. If the centerline is located at the middle of the channel, this value will be one half the width of the channel.

   Slope — The default value is 0% to provide a flat bottom channel. This value can be changed if the intention is to provide a waterway with a sloped bottom.

3. Simple Waterway – Right Side of Channel

   LinkOffsetAndSlope subassembly object. This component represents the right side of the waterway channel.

   Controlling Parameters

   Offset from Baseline — This is the distance between the channel centerline and the right hand edge of the channel. If the centerline is located at the middle of the channel, this value will be one half the width of the channel.

   Slope — The default value is 0% to provide a flat bottom channel. This value can be changed if the intention is to provide a waterway with a sloped bottom.

4. Simple Waterway – Right Cut Slope

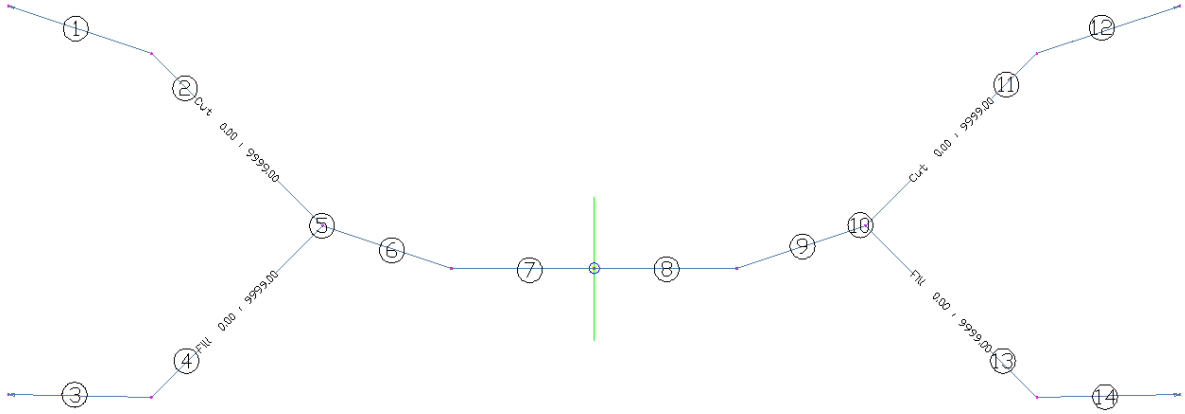
LinkSlopetoSurface subassembly object. This component represents the right side slope of the waterway channel

Controlling Parameters

| | |
|---|---|
| Slope | The default value is 33.33% or 3:1. This is the slope at which to continue the left hand slope when below the original ground surface at the design depth.<br><br>Slope values can be entered as a numeric value (i.e. 33.3) or as a ratio (i.e. 3:1). If you enter “3:1” the slope will automatically be converted to its numeric value. |
| Add Link In | The default value is Cut and Fill. This will allow the software to check both the cut and fill situations and choose the one with the shortest slope to daylight to the ground surface. For an excavated channel, the cut condition should always be the controlling situation. The value could be changed to Cut Only to ensure that the cut condition is always selected. |

This guide covers the *Conditional CutFill Waterway* assembly, shown in the diagram below. This assembly utilizes a conditional cut and fill subassembly that controls how the cross section is plotted depending on whether or not the section is in a cut or fill condition when the side slopes reach a specified design depth.

The individual subassembly components of this assembly objects are discussed in further detail below.




Subassembly Components

1. <u>Cond CutFill Wway – Upper Left Side Slope in Cut</u>

   LinkSlopeToSurface subassembly object. This subassembly is placed when the left hand side slope is in cut, or below the ground surface, when it reaches the design depth.

   Controlling Parameters

   | | |
   |---|---|
   | Slope | The default value is 33.33% or 3:1. This is the slope at which to continue the left hand slope when below the original ground surface at the design depth.<br><br>Slope values can be entered as a numeric value (i.e. 33.3) or as a ratio (i.e. 3:1). If you enter “3:1” the slope will automatically be converted to its numeric value. |
   | Add Link in | The default value is Cut Only. Setting this value to Cut Only will cause the line segment to slope upward until it ties into the original ground surface, rather than checking the cut condition (sloping upward) and the fill condition (sloping downward) and selecting the shortest option of the two. |

2. <u>Cond CutFill Wway – Link to Cut Section on Left Side</u>

   This component of the assembly object is merely a visual representation of the link between the point at the top of the left hand slope where the cross section is evaluated to determine whether it is in cut or fill, and the subassembly object that will be used if the section is in cut at that point.

3. <u>Cond CutFill Wway – Upper Left Side Slope in Fill</u>

   LinkSlopeToSurface subassembly object. This subassembly is placed when the left hand side slope is in fill, or above the ground surface, when it reaches the design depth.

   Controlling Parameters

   | | |
   |---|---|
   | Slope | The default value is 2%. This is the slope at which to continue the left hand slope when above the original ground surface at the design depth. |
   | Add Link in | The default value is Fill Only. Setting this value to Fill Only will cause the line segment to slope down until it ties into the original ground surface, rather than checking the cut condition (sloping upward) and the fill condition (sloping downward) and selecting the shortest option of the two. |

4. Cond CutFill Wway – Link to Fill Section on Left Side

   This component of the assembly object is merely a visual representation of the link between the point at the top of the left hand slope where the cross section is evaluated to determine whether it is in cut or fill, and the subassembly object that will be used if the section is in fill at that point.

5. Connection point for conditional cut and fill subassembly object on left side of cross section

6. Cond CutFill Wway – Lower Left Side Slope

   LinkSlopeAndVerticalDeflection subassembly object. This component represents the left side slope of the waterway below the design depth of the channel.

   Controlling Parameters

   Slope — The default value is 33.33% or 3:1. This is the slope at which to continue the left hand slope when below the original ground surface at the design depth.

   Slope values can be entered as a numeric value (i.e. 33.3) or as a ratio (i.e. 3:1). If you enter “3:1” the slope will automatically be converted to its numeric value.

   Vertical Deflection — The design depth for the channel. The default value is 3 feet.

7. Cond CutFill Wway – Left Side of Channel

   LinkOffsetAndSlope subassembly object. This component represents the left half of the waterway channel.

   Controlling Parameters

   Offset from Baseline — This is the distance between the channel centerline and the left hand edge of the channel. If the centerline is located at the middle of the channel, this value will be one half the width of the channel.

   Slope — The default value is 0% to provide a flat bottom channel. This value can be changed if the intention is to provide a waterway with a sloped bottom.

8. Cond CutFill Wway – Right Side of Channel

   LinkOffsetAndSlope subassembly object. This component represents the right half of the waterway channel.

   Controlling Parameters

   Offset from Baseline — This is the distance between the channel centerline and the right hand edge of the channel. If the centerline is located at the middle of the channel, this value will be one half the width of the channel.

   Slope — The default value is 0% to provide a flat bottom channel. This value can be changed if the intention is to provide a waterway with a sloped bottom.

9. Cond CutFill Wway – Lower Right Side Slope

   LinkSlopeAndVerticalDeflection subassembly object. This component represents the right side slope of the waterway below the design depth of the channel.

   Controlling Parameters

   Slope — The default value is 33.33% or 3:1. This is the slope at which to continue the left hand slope when below the original ground surface at the design depth.

   Slope values can be entered as a numeric value (i.e. 33.3) or as a ratio (i.e. 3:1). If you enter “3:1” the slope will automatically be converted to its numeric value.

   Vertical Deflection — The design depth for the channel. The default value is 3 feet.

10. Connection point for conditional cut and fill subassembly object on right side of cross section

11. Cond CutFill Wway – Link to Cut Section on Right Side

    This component of the assembly object is merely a visual representation of the link between the point at the top of the right hand slope where the cross section is evaluated to determine whether it is in cut or fill, and the subassembly object that will be used if the section is in cut at that point.

12. Cond CutFill Wway – Upper Right Side Slope in Cut

    LinkSlopeToSurface subassembly object. This subassembly is placed when the left hand side slope is in cut, or below the ground surface, when it reaches the design depth.

    Controlling Parameters

    | | |
    |---|---|
    | Slope | The default value is 33.33% or 3:1. This is the slope at which to continue the left hand slope when below the original ground surface at the design depth.<br><br>Slope values can be entered as a numeric value (i.e. 33.3) or as a ratio (i.e. 3:1). If you enter “3:1” the slope will automatically be converted to its numeric value. |
    | Add Link in | The default value is Cut Only. Setting this value to Cut Only will cause the line segment to slope upward until it ties into the original ground surface, rather than checking the cut condition (sloping upward) and the fill condition (sloping downward) and selecting the shortest option of the two. |

13. Cond CutFill Wway – Link to Fill Section on Right Side

    This component of the assembly object is merely a visual representation of the link between the point at the top of the right hand slope where the cross section is evaluated to determine whether it is in cut or fill, and the subassembly object that will be used if the section is in fill at that point.

14. Cond CutFill Wway – Upper Right Side Slope in Fill

    LinkSlopeToSurface subassembly object. This subassembly is placed when the right hand side slope is in fill, or above the ground surface, when it reaches the design depth.

    Controlling Parameters

    | | |
    |---|---|
    | Slope | The default value is 2%. This is the slope at which to continue the right hand slope when above the original ground surface at the design depth. |
    | Add Link in | The default value is Fill Only. Setting this value to Fill Only will cause the line segment to slope down until it ties into the original ground surface, rather than checking the cut condition (sloping upward) and the fill condition (sloping downward) and selecting the shortest option of the two. |

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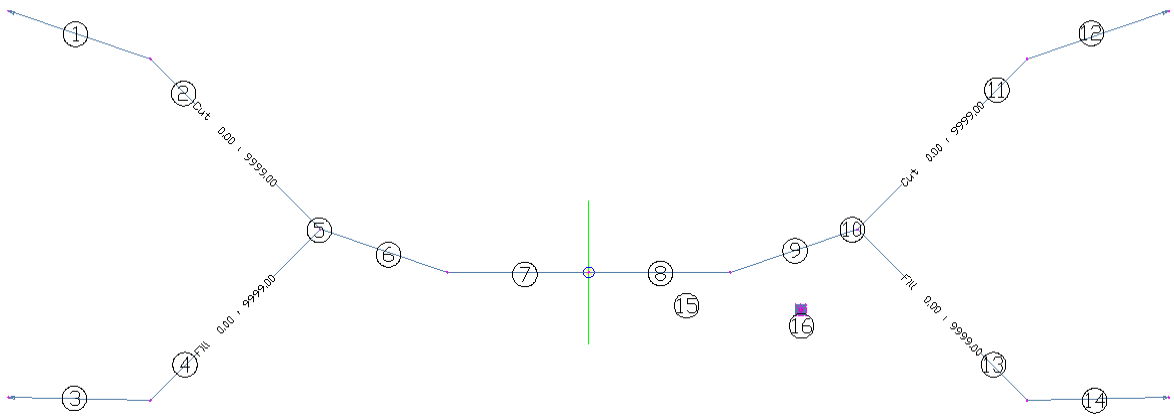
This guide covers the *Conditional CutFill Waterway With Support Tile* assembly, shown in the diagram below. This assembly utilizes a conditional cut and fill subassembly that controls how the cross section is plotted depending on whether or not the section is in a cut or fill condition when the side slopes reach a specified design depth.

The individual subassembly components of this assembly objects are discussed in further detail below.




Subassembly Components

1. <u>Cond CutFill Wway wTile – Upper Left Side Slope in Cut</u>

   LinkSlopeToSurface subassembly object. This subassembly is placed when the left hand side slope is in cut, or below the ground surface, when it reaches the design depth.

   Controlling Parameters

   | | |
   |---|---|
   | Slope | The default value is 33.33% or 3:1. This is the slope at which to continue the left hand slope when below the original ground surface at the design depth.<br><br>Slope values can be entered as a numeric value (i.e. 33.3) or as a ratio (i.e. 3:1). If you enter “3:1” the slope will automatically be converted to its numeric value. |
   | Add Link in | The default value is Cut Only. Setting this value to Cut Only will cause the line segment to slope upward until it ties into the original ground surface, rather than checking the cut condition (sloping upward) and the fill condition (sloping downward) and selecting the shortest option of the two. |

2. <u>Cond CutFill Wway wTile – Link to Cut Section on Left Side</u>

   This component of the assembly object is merely a visual representation of the link between the point at the top of the left hand slope where the cross section is evaluated to determine whether it is in cut or fill, and the subassembly object that will be used if the section is in cut at that point.

3. <u>Cond CutFill Wway wTile – Upper Left Side Slope in Fill</u>

   LinkSlopeToSurface subassembly object. This subassembly is placed when the left hand side slope is in fill, or above the ground surface, when it reaches the design depth.

   Controlling Parameters

   | | |
   |---|---|
   | Slope | The default value is 2%. This is the slope at which to continue the left hand slope when above the original ground surface at the design depth. |
   | Add Link in | The default value is Fill Only. Setting this value to Fill Only will cause the line segment to slope down until it ties into the original ground surface, rather than checking the cut condition (sloping upward) and the fill condition (sloping downward) and selecting the shortest option of the two. |

4. Cond CutFill Wway wTile – Link to Fill Section on Left Side

   This component of the assembly object is merely a visual representation of the link between the point at the top of the left hand slope where the cross section is evaluated to determine whether it is in cut or fill, and the subassembly object that will be used if the section is in fill at that point.

5. Connection point for conditional cut and fill subassembly object on left side of cross section

6. Cond CutFill Wway wTile – Lower Left Side Slope

   LinkSlopeAndVerticalDeflection subassembly object. This component represents the left side slope of the waterway below the design depth of the channel.

   Controlling Parameters

   Slope — The default value is 33.33% or 3:1. This is the slope at which to continue the left hand slope when below the original ground surface at the design depth.

   Slope values can be entered as a numeric value (i.e. 33.3) or as a ratio (i.e. 3:1). If you enter “3:1” the slope will automatically be converted to its numeric value.

   Vertical Deflection — The design depth for the channel. The default value is 3 feet.

7. Cond CutFill Wway wTile – Left Side of Channel

   LinkOffsetAndSlope subassembly object. This component represents the left half of the waterway channel.

   Controlling Parameters

   Offset from Baseline — This is the distance between the channel centerline and the left hand edge of the channel. If the centerline is located at the middle of the channel, this value will be one half the width of the channel. The default value is 10 feet.

   Slope — The default value is 0% to provide a flat bottom channel. This value can be changed if the intention is to provide a waterway with a sloped bottom.

8. Cond CutFill Wway wTile – Right Side of Channel

   LinkOffsetAndSlope subassembly object. This component represents the right half of the waterway channel.

   Controlling Parameters

   Offset from Baseline — This is the distance between the channel centerline and the right hand edge of the channel. If the centerline is located at the middle of the channel, this value will be one half the width of the channel. The default value is 10 feet.

   Slope — The default value is 0% to provide a flat bottom channel. This value can be changed if the intention is to provide a waterway with a sloped bottom.

9. Cond CutFill Wway wTile – Lower Right Side Slope

   LinkSlopeAndVerticalDeflection subassembly object. This component represents the right side slope of the waterway below the design depth of the channel.

   Controlling Parameters

   Slope — The default value is 33.33% or 3:1. This is the slope at which to continue the left hand slope when below the original ground surface at the design depth.

   Slope values can be entered as a numeric value (i.e. 33.3) or as a ratio (i.e. 3:1). If you enter “3:1” the slope will automatically be converted to its numeric value.

   Vertical Deflection — The design depth for the channel. The default value is 3 feet.

10. Connection point for conditional cut and fill subassembly object on right side of cross section

11. Cond CutFill Wway wTile – Link to Cut Section on Right Side

    This component of the assembly object is merely a visual representation of the link between the point at the top of the right hand slope where the cross section is evaluated to determine whether it is in cut or fill, and the subassembly object that will be used if the section is in cut at that point.

12. Cond CutFill Wway wTile – Upper Right Side Slope in Cut

    LinkSlopeToSurface subassembly object. This subassembly is placed when the left hand side slope is in cut, or below the ground surface, when it reaches the design depth.

    Controlling Parameters

    Slope — The default value is 33.33% or 3:1. This is the slope at which to continue the left hand slope when below the original ground surface at the design depth.

    Slope values can be entered as a numeric value (i.e. 33.3) or as a ratio (i.e. 3:1). If you enter "3:1" the slope will automatically be converted to its numeric value.

    Add Link in — The default value is Cut Only. Setting this value to Cut Only will cause the line segment to slope upward until it ties into the original ground surface, rather than checking the cut condition (sloping upward) and the fill condition (sloping downward) and selecting the shortest option of the two.

13. Cond CutFill Wway wTile – Link to Fill Section on Right Side

    This component of the assembly object is merely a visual representation of the link between the point at the top of the right hand slope where the cross section is evaluated to determine whether it is in cut or fill, and the subassembly object that will be used if the section is in fill at that point.

14. Cond CutFill Wway wTile – Upper Right Side Slope in Fill

    LinkSlopeToSurface subassembly object. This subassembly is placed when the right hand side slope is in fill, or above the ground surface, when it reaches the design depth.

    Controlling Parameters

    Slope — The default value is 2%. This is the slope at which to continue the right hand slope when above the original ground surface at the design depth.

    Add Link in — The default value is Fill Only. Setting this value to Fill Only will cause the line segment to slope down until it ties into the original ground surface, rather than checking the cut condition (sloping upward) and the fill condition (sloping downward) and selecting the shortest option of the two.

15. Cond CutFill Wway wTile – Link to Locate Tile Location

    LinkSlopeAndVerticalDeflection subassembly object. This subassembly object is used to locate the flowline of the support tile in relation to the centerline of the waterway channel. The subassembly itself will not be plotted.

    Controlling Parameters

    Side — Left or right depending on which side of the section the tile is located on. The default value is Right.

    Slope — The slope value is used to specify the horizontal distance between the centerline of the waterway and the flowline of the tile conduit. You can have the program automatically calculate the slope for you by entering a slope value in the form H:V, where:

    H = Total horizontal distance between the centerline of the waterway channel and the tile line. This equals the width of the half of the channel on the side where the tile line is placed plus the horizontal distance from the edge of the channel to the tile line.

    V = Total vertical distance between the flowline of the waterway at the centerline and the flowline of the tile conduit. This will be the same as the Vertical Deflection value below.

    Vertical Deflection — The vertical distance between the flowline of the waterway at the centerline and the flowline of the tile conduit. The value is positive if the flowline of the tile line is above the waterway channel elevation, or negative if the flowline of the tile line is below the waterway channel. The default value is -3 feet.

16. Cond CutFill Wway wTile – Tile Line

TrenchWithPipe subassembly object. This subassembly object is used to represent the tile line. The default values for the assembly are set to represent a pipe without a trench, but the dimensions for the conduit trench could also be provided.

Controlling Parameters

| | |
|---|---|
| Attachment Point | The point at which the subassembly object is attached to the *Cond CutFill Wway wTile – Link to Locate Tile Location* subassembly (component 15). The default value is Bottom center. |
| Side | The side the subassembly is inserted towards, which is only critical for tile line subassemblies that are not symmetrical. The default value is left. |
| Bedding Depth | Distance between the outside wall of the pipe at the bottom and the bottom of the pipe trench. The default value is set to 0.001 feet to approximate a zero bedding depth. |
| Bottom Width | The bottom width of the pipe trench. The default value is set to 0.7 feet, which matches the dimensions of a pipe with an inside diameter of 0.5 feet and 0.1 foot thick walls. |
| Depth | The depth of the pipe trench. The default value is set to 0.7 feet, which matches the dimensions of a pipe with an inside diameter of 0.5 feet and 0.1 foot thick walls. |
| Pipe Diameter | The inside diameter of the tile line. The default value is set to 0.5 feet. |
| Pipe Thickness | The wall thickness of the tile line. The default value is set to 0.1 feet. |
| Top Width | The top width of the pipe trench. The default value is set to 0.7 feet, which matches the dimensions of a pipe with an inside diameter of 0.5 feet and 0.1 foot thick walls. |