Overview: Create a graphical plot and a report showing the cut/fill at each top width edge of a waterway design. A new alignment is created along each edge and a profile of the waterway top and a profile of the ground and of the cut/fill depth at the same location is created. The profile view is created and a cut sheet report can be created.

Note: The alignments along the edge of the waterway will have slightly different stationing values due to curves and direction changes.

Software: AutoCAD Civil 3D, NRCS 2018 WW subassemblies & template

Notation: Button to Press Displayed Text Icon Action {Text to Enter} Menu Item...

Prerequisite
A waterway has been completed using the instructions for Waterway Corridor Design including creating a volume surface

Create the Alignment & Profiles along the Waterway Edges

Create an alignment along the edges of the top width of the waterway.
1) Click Home... Create Design... Alignment... Create Alignment from Corridor...
2) Select the feature line along the right top width of the waterway. Press Enter
3) Input the Name to {RTop WW1}
4) Uncheck Create Profile.
5) Click OK
6) Select the feature line along the left top width of the waterway. Press Enter
7) Input the Name to {LTop WW1}.
8) Uncheck Create Profile.
9) Click OK
10) Press ESC
11) Set the drawing annotation scale to match the desired horizontal profile scale.

(Optional) Extract a Profile of the Ground & Waterway Surfaces to a profile view

12) Click Home... Create Design... Profile... Create Surface Profile ... 
13) Pulldown the alignment to RTop WW1.
14) Click to select the original ground surface to be profiled. E.g. {Ognd}
15) Click Add>>
16) In the Profile list pulldown the style for the ground surface E.g. Original Ground.
17) Click to select the design waterway surface to be profiled. E.g. {WW1 Planned}
18) Click Add>>
19) In the Profile list pulldown the style to indicate the side of the WW. E.g. Bank – Right (Orange) or Bank – Left (Blue).
20) Click Draw in Profile View
21) Set the Profile View style to the Horizontal/Vertical scaling desired. E.g. 
   \{A100Hx5V\} Click Next
22) Select User Specified range. Adjust values if needed. Click Next
23) Select User Specified view height. Adjust values if needed. Click Next
24) Click Create Profile View
25) Click a location in the drawing for the profile to appear.
26) Repeat for the opposite edge.
Create a Named View in order to find these Profile Views easily later
27) Zoom to a full view of the profile view that you just created.
28) Click the View Controls… View Manager… New…
29) Input a View Name. E.g \{RTop WW1 Profile\}
30) On the View Properties tab Uncheckmark Save layer snapshot with view.
31) Click OK. Click OK.

Create Graphical Plot of the Cut/Fill Values

Create Cut/Fill Profile along the Right edge from the Volume Surface into a Profile View
32) Click Home… Create Design… Profile… Create Surface Profile
33) Pulldown the alignment to RTop WW1.
34) Click to select the surface to be profiled. E.g. \{V WW1 - Ognd\}
35) Click Add>>
36) In the Profile list pulldown the style to match the side of the WW. E.g.: 
   For Right use Bank – Right (Orange)
37) Click Draw in Profile View
38) Set the Profile View style to the Horizontal/Vertical scaling desired. E.g.
   \{A100Hx2V\} Click Next
39) Set Station Range = Automatic. Click Next
40) Select User Specified view height & input grid elevations of \{-4\} & \{2\}. Click Next
41) Uncheck all except RTop WW1– V WW1– Ognd.
42) Click Create Profile View
43) Click a location in the drawing for the profile to appear.

Create Cut/Fill Profile for the Left top edge cut/fill
44) Click Home… Create Design… Profile… Create Surface Profile
45) Pulldown the alignment to LTop WW1.
46) Click to select the surface to be profiled. E.g. \{V WW1 - Ognd\}
47) Click Add>>
48) In the Profile list pulldown the style to match the side of the WW. E.g.: 
   For Left use Bank – Left (Blue).
49) Click Draw in Profile View
50) Set the Profile View style to the Horizontal/Vertical scaling desired. E.g.
   \{A100Hx2V\} Click Next
51) Set Station Range = Automatic. Click Next
52) Select User Specified view height & input grid elevations of \{-4\} & \{2\}. Click Next
Create Cut/Fill Profile for the CL cut/fill

56) Click **Home... Create Design... Profile... Create Surface Profile**

57) Pulldown the alignment to **CL WW1**.

58) Click to select the surface to be profiled. E.g. **{V WW1 - Ognd}**

59) Click **Add>>**

60) In the Profile list pulldown the style. E.g.: For CL use **Excavation**

61) Click **Draw in Profile View**

62) Set the Profile View style to the Horizontal/Vertical scaling desired. E.g. **{A100Hx2V}** Click **Next**

63) Set Station Range = **Automatic**. Click **Next**

64) Select User Specified view height & input grid elevations of {-4} & {2}. Click **Next**

65) Uncheck all except **CL WW1– V WW1– Ognd**.

66) Click **Create Profile View**

67) Click a location in the drawing for the profile to appear.

Superimpose the Right & Left cut/fill profiles into the CL cut/fill profile.

68) Click **Home... Create Design... Profile...Create Superimposed Profile...**

69) **Source Profile:** Select the profile of the Right Edge Cut/Fill “orange” from the Rt Top WW1 Profile view

70) **Destination Profile View:** Click on the grid of CL Cut/Fill Profile

71) Click **OK**.

72) Click **Home... Create Design... Profile...Create Superimposed Profile...**

73) **Source Profile:** Select the profile of the Left Edge Cut/Fill “blue” from the Lt Top WW1 Profile view

74) **Destination Profile View:** Click on the grid of CL Cut/Fill Profile

75) Click **OK**.

Note: These profiles will update either automatically or by doing a manual rebuild of the corridor & surfaces.

Note: If the waterway alignment is changed then a new “alignment from corridor” will be needed for the right & left top edges.
Create a Named View in order to find these Profile Views easily later.

76) **Zoom** to a full view of the profile view that you just created.
77) **Click** the View Controls… *View Manager… New…*
78) **Input** a View Name. E.g. *{WW1 Cut-Fill Graph}* 
79) On the View Properties tab **Uncheck**mark *Save layer snapshot with view*.
80) **Click** OK. **Click** OK.

Make changes to the waterway profile as needed. If necessary manually rebuild the corridor and surfaces.

**Create a Report with the Cut/Fill Values**

Important: This process will need to be redone if the waterway design profile is modified.

Create a final alignment along the edges of the top width of the waterway.

81) **Click** Home… *Create Design… Alignment… Create Alignment from Corridor…*
82) Select the feature line along the right top width of the waterway. **Press Enter**
83) **Input** the Name to *{Final WW1 R}*.
84) **Check** Create Profile.
85) **Click** OK
86) General: Profile Style = *Finished Ground*
87) **Click** OK
88) Select the feature line along the left top width of the waterway. **Press Enter**
89) **Input** the Name to *{Final WW1 L}*. 
90) **Check** Create Profile.
91) **Click** OK
92) General: Profile Style = *Finished Ground*
93) **Click** OK
94) **Press** ESC

Extract a Profile of the Ground Surface for each edge

95) **Click** Home… *Create Design… Profile… Create Surface Profile* ...
96) **Pulldown** the alignment to *Final WW1 R*.
97) **Click** to select the surface to be profiled. E.g. *{Ognd}* 
98) **Click** Add>>
99) In the Profile list **pulldown** the style to match the type of surface E.g. *Original Ground*.
100) **Click** OK
101) **Repeat** for the opposite edge.

Create the report showing the cut along the edges

Note: Report precision settings are found in *Toolspace… Settings…* then right-click on the Active drawing name and **click** *Edit Drawing Settings*. **Click** the Ambient Settings tab. *Coordinate--Precision, Elevation--Precision, & Station--Precision* apply to this report.
Waterway Cuts along Top Width Edges

Note: To set the Report defaults go to Toolspace... Toolbox... and click the Edit Report icon. The Owner section is really the designer and contains “Prepared by” info. The Client section contains “Client” info. The Alignment and Profile settings found here do not affect this report.

102) Click Toolspace... Toolbox... Reports Manager... Profile...
    Double click Incremental Station Elevation Difference Report
103) In the List of design profiles find the alignment named Final WW1 R and checkmark the “Right” profile (See A).

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<th>Description</th>
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104) In the List of existing profiles checkmark the “Ognd” profile (See B).

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105) In the Report settings checkmark only Regular Interval and set the Station Interval.

Important: The alignments along the edge of the waterway will have slightly different stationing values than the CL due to curves and direction changes.

106) Click Create Report and click Yes at the message to continue.
    The report will open in a web browser. The Existing elevation is the Ognd. The Design elevation is from on the corridor.
    The Elevation Difference is the amount of Cut. A negative value means fill.
107) When finished close the browser and then Click Done.
108) Repeat for the opposite top width edge.

Note: The alignments are found in Prospector as Offset Alignments.
Profile Elevation Differences Report

Client: Prepared by:
Client 
Client Company USDA NRCS
Address 1
Date: 5/7/2019 10:17:37 AM

Vertical Alignment: WWay1C Left
Existing Profile: Final WW1 L - Ognd
Description:
Station Range: Start: 2+68, End: 16+74

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<th>Northing</th>
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