

ALIGNMENTS and PROFILES

Alignment Overview:

As in previous CAD versions, an alignment is a line that describes where you intend the centerline of your planned work to be and that was all. But, in Civil 3D that line is now interactive with both existing ground and finished ground. You can move it around and it changes the stationing automatically.

Profile Overview

Using profiles, you can view changes in elevation along a horizontal alignment. In addition to the centerline profile, you can create offset profiles for features such as waterway or ditch banks. If you change the location of your alignment, the profile adjusts automatically.

The following uses a waterway as an example, but the same concept can be applied to a dam or any other simple alignment.

I. CREATE AN ALIGNMENT:

1. From the pull-down menu → “Alignments” → “Create by layout”
2. From the pop-up window “Create Alignment – Layout”.
 - a. Give your alignment a relevant name (i.e. WW1).
 - b. Leave the rest of the defaults alone.
 - c. Hit “OK”.
3. You’ll get a toolbar called “Alignment Layout Tools”
 - a. Pick “Draw Tangent-Tangent without curves” icon



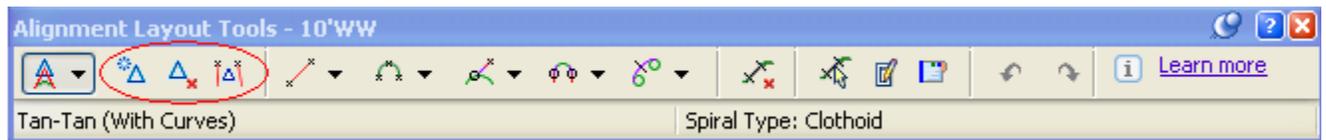
- b. Starting at 0+00, draw the centerline of your alignment. The alignment will label itself.
 - c. When you get to the end of your alignment, just “Esc”.

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- d. Common Alignment Errors:
- i. Let's say you accidentally started your alignment at the wrong end, resulting in 0+00 where you don't want it. From the pull-down menu, select "Alignments" → "Reverse Alignment Direction",



- ii. Select your alignment, click "OK" on the warning message, and your alignment will automatically become reversed!
- iii. If you forgot a point or need to add one you didn't want: From the pull-down menu, select "Alignments" → "Edit Alignment Geometry", the first few buttons allow you to add/delete/break your alignment..

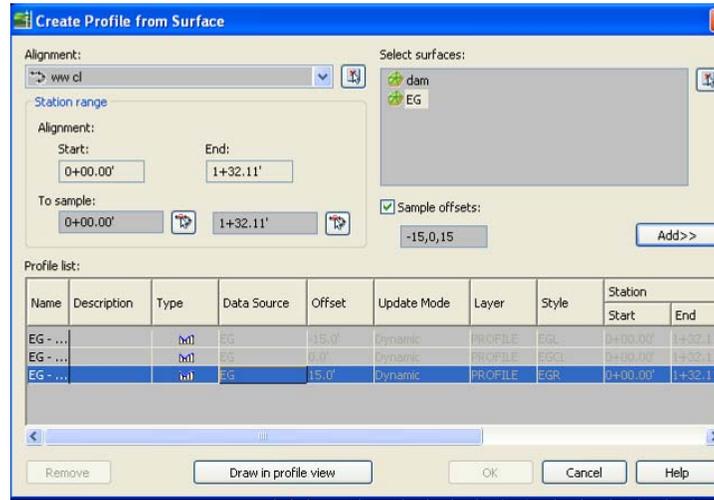


II. CREATE A PROFILE:

1. From the pull-down menu → "Profiles" → "Create Profile from Surface"
2. From the pop-up window : "Create Profile from Surface"
 - a. The profile will use the entire alignment unless you edit the stations you wish to assign the profile to under the "Station Range" section.
 - b. Pick small box marked "Sample Offsets". When the window enables, enter your planned bank shots and centerline shots relative to the alignment (i.e. -15,0,15)*
(*Note: sample distances left of centerline are designated as a "negative" distance
 - c. Left bank and right banks, in this case, are sampled 15' off centerline. And the centerline is sampled right on the alignment.
3. Pick the "Add" button. The data will show up in the Profile List.

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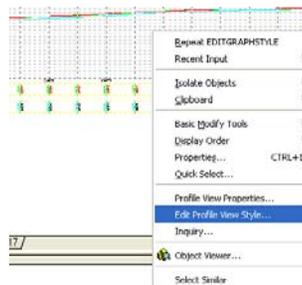
4. Click on the “Style” button.
 - a. Double Click and Assign Left Bank “EGL” and Right Bank “EGR” to the appropriate samplings (Centerline should have “EGCL” as a default).
 - b. Pick “OK”.



5. From the pull-down menu: “Profiles” → “Create Profile View”
 - a. You’ll get a “Create Profile View” dialog box.
 - b. If you have more than one alignment, pick the one you want to profile under “Select Alignment”
 - c. Give the Profile View a name.
 - d. Pick “Create Profile View” button.
 - e. Pick a spot on the screen to place the Profile.

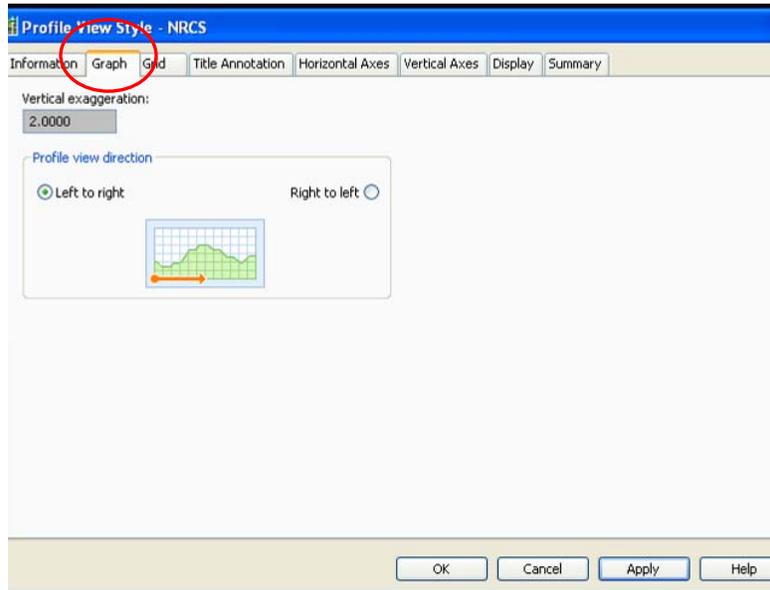
III. EDIT THE PROFILE

1. Select the profile by clicking anywhere on the profile, (the whole thing lights up).
2. Right-click on the selected profile and choose “Edit Profile View Style” and the “Profile View Style” window pops up.



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3. If you want to change the vertical exaggeration of the profile, for example, Go to the “Graph” tab and change the “vertical exaggeration” to a higher number. Pick “OK”



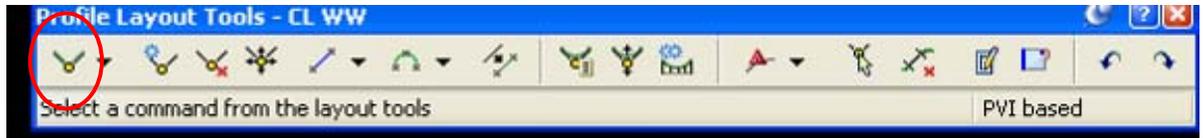
4. There are many things you can change by selecting different tabs in the “Profile View Style” window.

IV. CREATE FINISHED GROUND PROFILE

1. From the pull-down menu: “Profiles” → “Create Profile By Layout” You’ll get a “pick” box.
 - a. Pick anywhere on the profile and a “Create Profile-Draw New” window pops up.
 - b. If you have more than one alignment, pick the one you want to use under “Alignment”
 - c. Give your FG a name (ex. FG). If doing more than one finished ground in the same drawing, the names need to be different (i.e. if you’re doing a dam and a waterway in the same drawing and doing profiles for each).
 - d. Click OK

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2. The “Profile Layout Tools” toolbar will automatically popup.
 - a. Choose “Draw Tangents without Curves” icon.



- b. Starting at the beginning of your profile (0+00), draw-roughly-the grades and grade breaks (PVI's) you want across the profile.
 - c. When done, hit “Enter”.

3. To edit the line to exact grades, grade changes, and/or elevations,
 - a. Pick the FG line you just drew. Right-click.
 - b. From the menu, choose “Edit Profile Geometry”
 - i. You’ll get a “Profile Layout Tools” toolbar.
 - ii. Choose “Profile Grid View” icon



- iii. The panorama window opens up and you can edit grades, grade break locations, and elevations as needed by double-clicking in the boxes and editing the numbers. When finished, select the “X” in the upper left to close panorama window.

The image shows a "PANORAMA" window with a table of profile data. The table has columns for No., PVI Station, PVI Elevation, Grade In, Grade Out, A (Grade Change), Profile Curve Type, K Value, and Sub-Entity Type. The "X" button in the top left corner of the window is circled in red. A red arrow points to a transparency icon in the bottom left corner of the window. Below the table, there is a red text annotation: "Click here to change the Transparency Properties".

No.	PVI Station	PVI Elevation	Grade In	Grade Out	A (Grade Change)	Profile Curve Type	K Value	Sub-Entity Type
1	0+00.00'	91.58'		2.28%				
2	1+50.00'	95.00'	2.28%	1.33%	0.95%			
3	3+75.00'	98.00'	1.33%	0.67%	-0.67%			
4	5+25.00'	99.00'	0.67%	3.10%	2.43%			
5	6+26.74'	102.15'	3.10%					

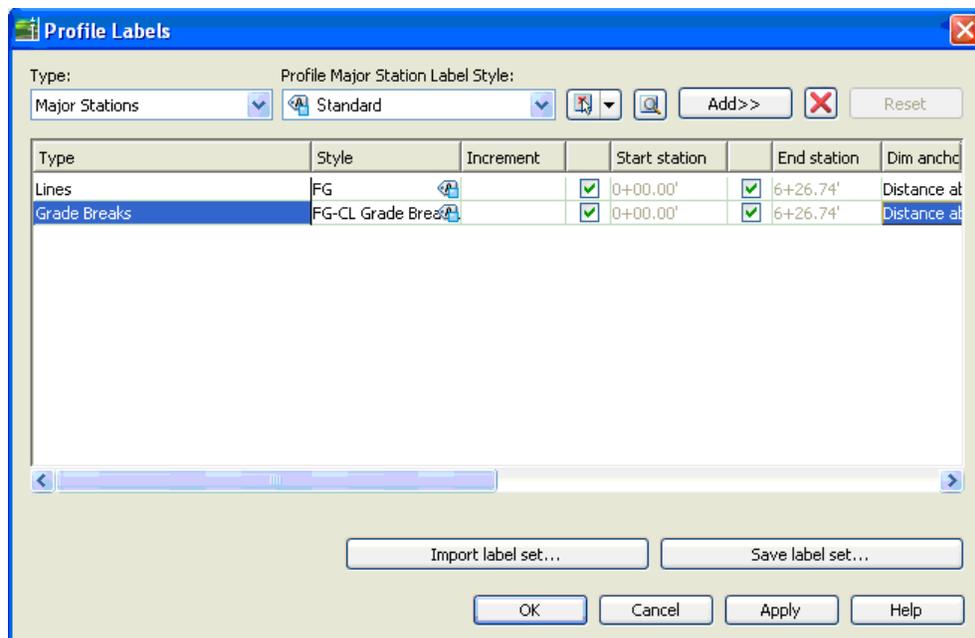
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- iv. You can remove or add a grade break by picking the appropriate tool on the “Profile Layout Tools” dialog box.



V. LABELING PROFILE TO SHOW FINAL GRADES AND ELEVATIONS:

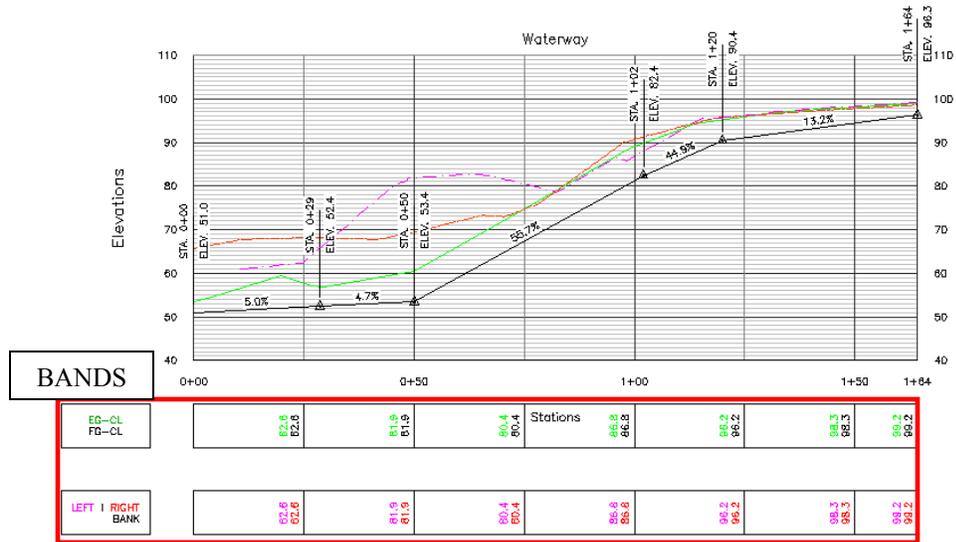
1. On the profile, pick the FG line, right click and select “Edit Labels”
2. Under the “Style” column change the Style of:
 - a. “Lines” to be FG
 - b. “Grade Breaks” to be FG-CL Grade Break Label
 - c. Delete any other Label “Types” in the box by highlighting them and picking the big red “X” at the top of the box. All we want to see on the FG profile are “Lines” and Grade Breaks”



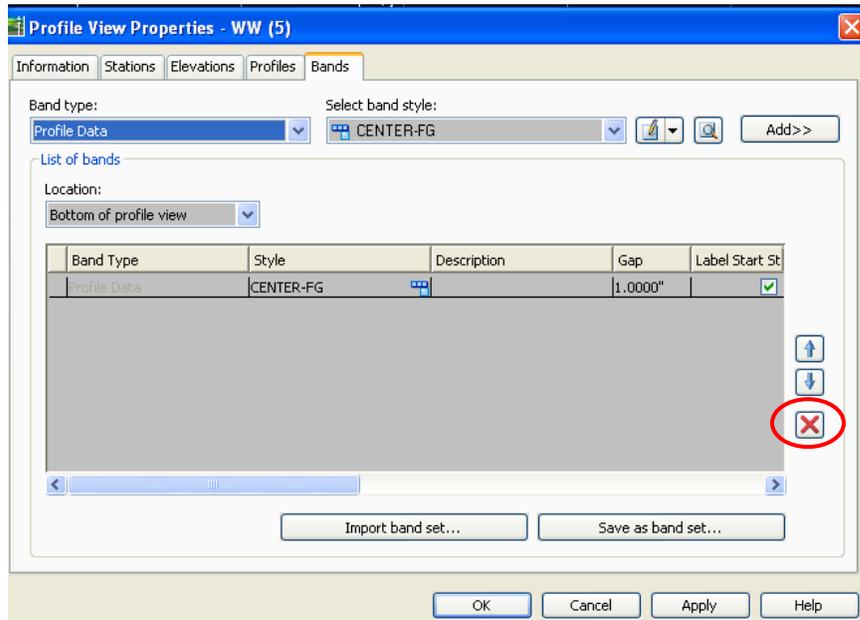
- d. Use the slider at the bottom of the dialog box to view the column marked “Weeding”. Make sure all the values are “0.0” and Pick “OK”.

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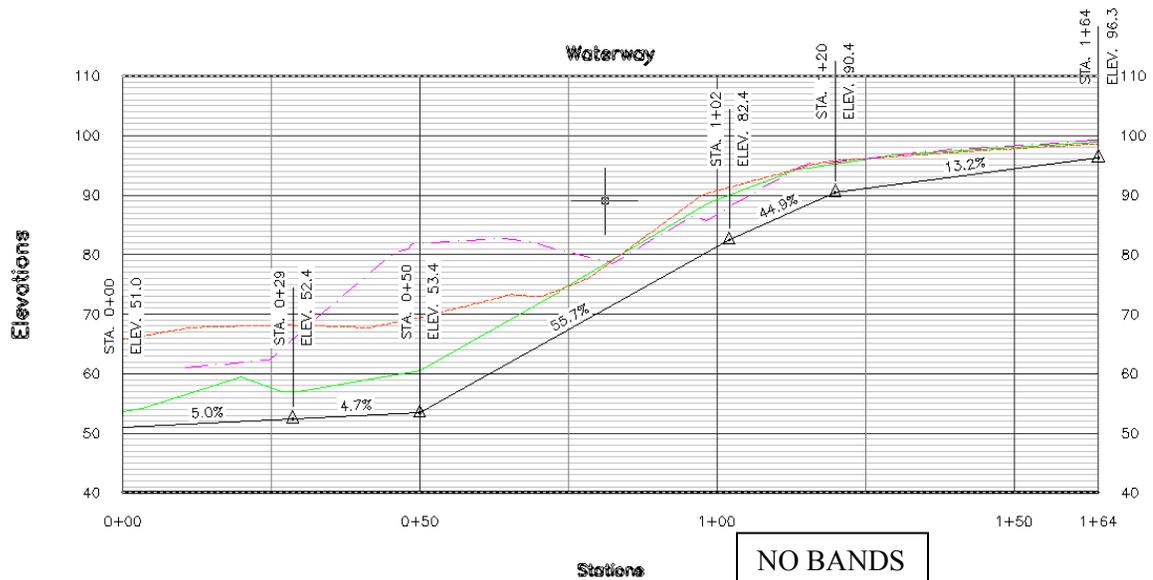
- e. On the Profile, the Finished Ground will have the grades, elevations and stations (PVI's) shown.. (Sometimes the PVI's don't plot if the stations are too close together. That means you didn't change the weeding to "0.00".)



- f. The above diagram shows bands – if you don't want the bands
 - i. Select EACH row and click on the red "X", then "OK".

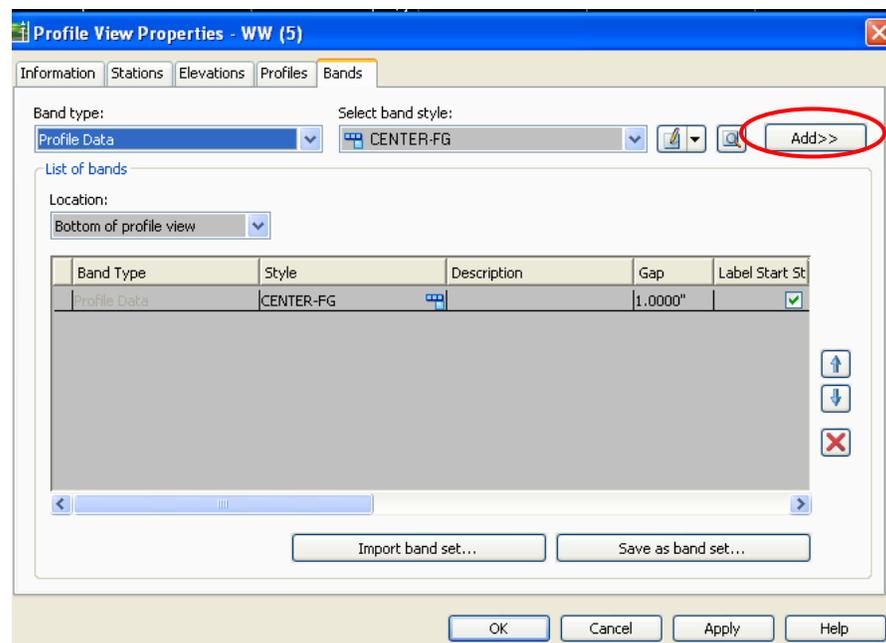


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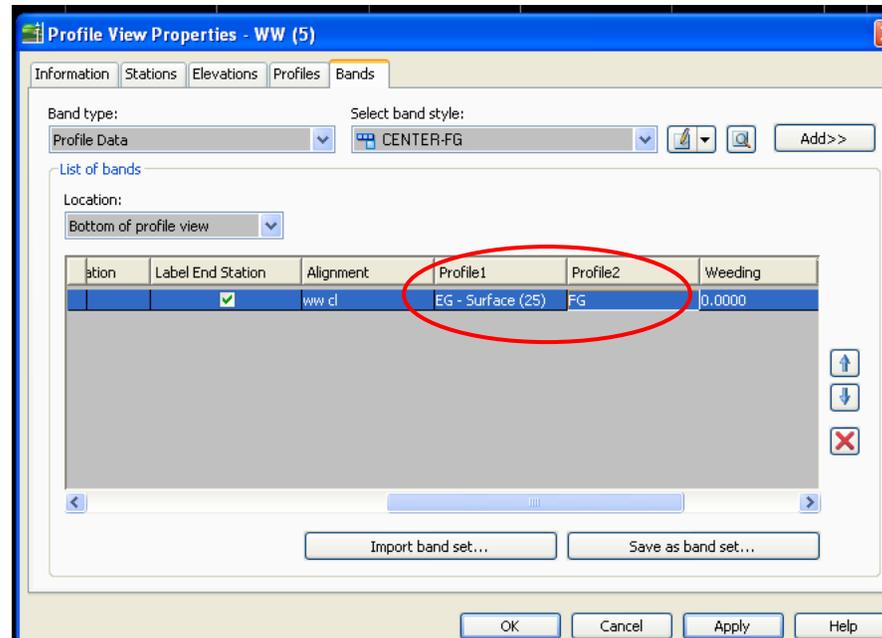
3. To Add or Modify Bands

- a. Pick anywhere on the profile grid. Right-click. Choose “Profile View Properties”
A window pops up with the same name.
- b. Pick the “Bands” tab.
- c. If one “Center-FG” row under the style column DOES NOT show up, click “ADD”.



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- d. For the “Center-FG” row, make sure “Profile 1” column has the Existing Ground (EG) centerline data and “Profile 2” column has Finished Ground (FG) data.



- e. When finished, hit “OK”. Elevation data on the bottom of the graph should match the profile lines for existing and finished ground.