CIVIL 3D (2014)   ***REMEMBER TO SAVE OFTEN***
                                ALIGNMENTS & 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 nothing else. 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.   <u>**CREATE AN ALIGNMENT FROM AN OBJECT**</u>

- Using a 2D Polyline, draw where your alignment will go (i.e. centerline of waterway)

- From the *Home Ribbon→ Create Design* Tab → Choose the *Alignment* drop down → Click *Create Alignment from Objects* and Follow the directions at the Command Line
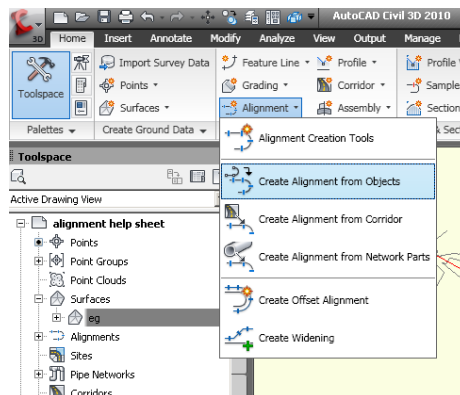

- o Select the polyline by clicking on it.
- o Press Enter
- o Press Enter to accept the direction of the alignment or type R to reverse the direction.

- From the pop-up window *Create Alignment from Objects*.

  - o Give your alignment a relevant name (i.e. WW1).
  - o At this point you can change the starting station, style, and label set if you choose by clicking on the appropriate boxes.
  - o Click *OK*

REMEMBER TO SAVE OFTEN
**ALIGNMENTS & PROFILES**

- Changing the direction of the alignment after it is created.
    - o If you forget to change the direction of your alignment as you were creating it, you can change it <u>after</u> the alignment has been created.

    - o   Click on you alignment.

        A conceptual toolbar will appear. Click on the *Modify* Tab → Click the pull down arrow → Click *Reverse Direction* → A dialog box will appear →

         Click OK

   The Direction of the Alignment Will Change.
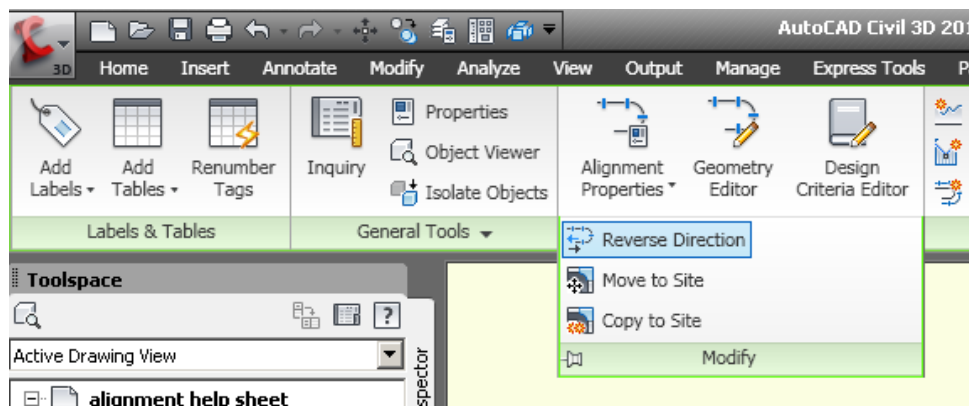
- To Modify the Alignment
- If you need to add a point of intersection (PI) or need to delete a PI: Click on the alignment → A conceptual toolbar will appear → Click on *Geometry Editor* → The *Alignment Layout Tools* toolbar will appear.

    To <u>add</u> a PI: Click on the second icon from the left △ → Click a point on your alignment where you would like to insert the new PI → The PI will be inserted.

    To <u>delete</u> a PI: Click on the third icon from the left △ₓ → Click the PI you want to delete → The PI will be deleted.
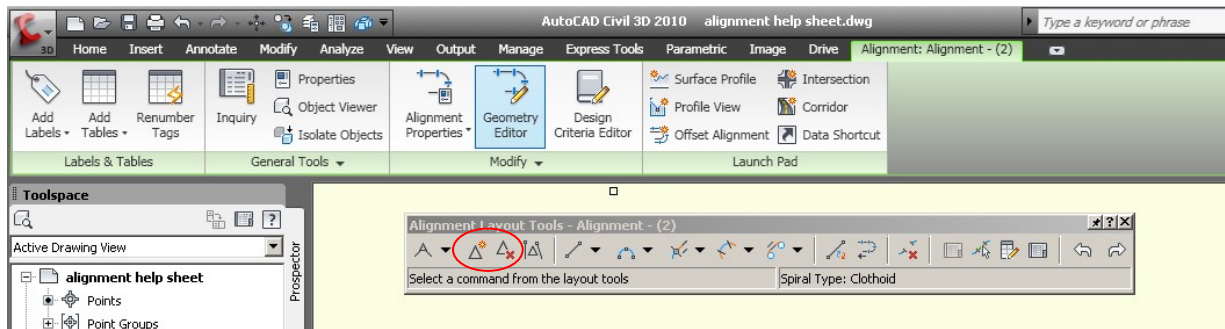
II.   CREATE AN ALIGNMENT USING ALIGNMENT CREATION TOOLS

o   From the Home Ribbon → Create Design Tab → *Alignment* → Click *Alignment Creation Tools*
- o   The *Create Alignment Layout* dialog box pops up
- o   Give your alignment a name (such as WW1)
- o   Select the type of alignment you wish to create. (Typically a centerline alignment)
    - o   At this point you can change the *Site*, *Starting Station*, *Alignment Style*, and *Alignment Label Set* if you choose by clicking on the appropriate boxes.
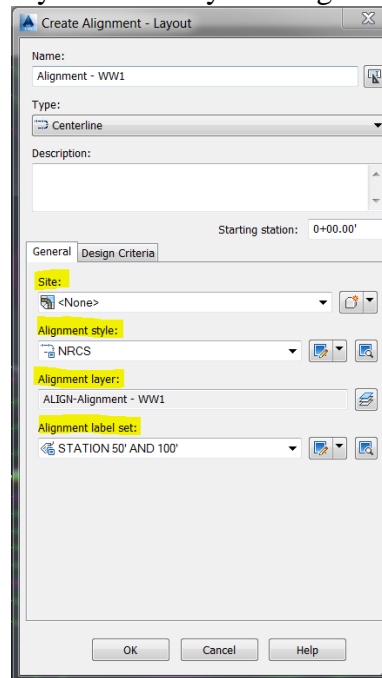
- o   Click *OK*
- o   The *Alignment Layout* Toolbar pops up

REMEMBER TO SAVE OFTEN
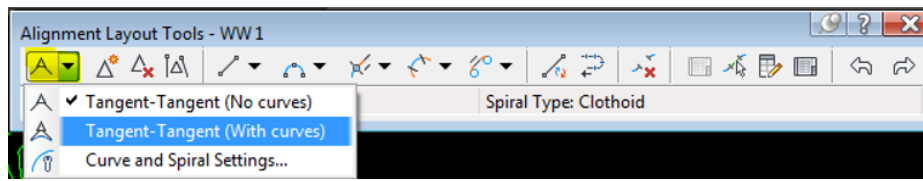ALIGNMENTS & PROFILES
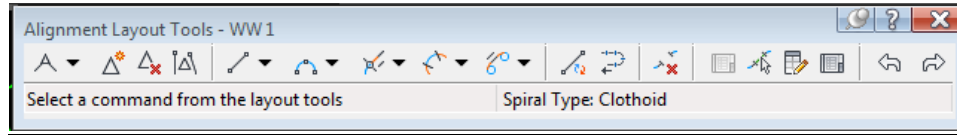
o Click the chevron next to the *Draw Tangent* icon on the *Alignment Layout* Toolbar and select either *Tangent – Tangent (No Curves)* or *Tangent – Tangent (With Curves)**.
*Note: If you plan on creating a waterway with an assembly and corridor, using Tangent – Tangent (With Curves) will give you better results. *
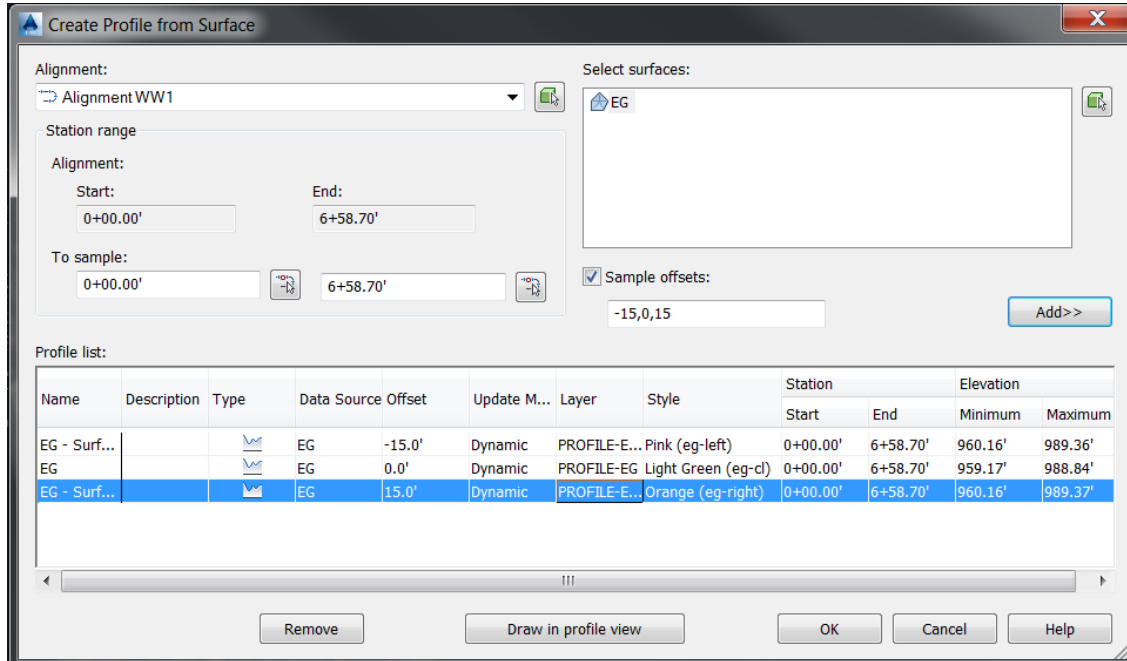

o The *Command Line* will prompt you to *Specify a Start Point* → Click the start point of the waterway → Continue drawing the desired path of the waterway → After selecting the end point of the waterway Tap *Enter* → Your Alignment is created.

III.   CREATE A PROFILE

- From the Home Ribbon → Create Design Tab → *Profile* → *Create Surface Profile*

  o The profile will use the entire alignment unless you edit the stations you wish to assign the profile to under the *Station Range* section.

  o **OPTIONAL STEP: Pick the 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 underline left of centerline are designated as a "negative" distance. Left bank and right banks, in this case, are sampled 15' off centerline, with 0 marking the centerline of the alignment.*

- Select the Surfaces you want to sample and click the *Add* button. The data will show up in the Profile List.

- To change how the profile line will look in the Profile View, Click in the *Style* Column on the Profile you wish to change.

  o Use the pull downs to choose an appropriate style.

  o Pick *OK*.

REMEMBER TO SAVE OFTEN
ALIGNMENTS & PROFILES

Create Profile from Surface

Alignment:
Alignment WW1

Select surfaces:
EG

Station range

Alignment:

Start:	End:
0+00.00'	6+58.70'

To sample:

0+00.00'	6+58.70'

☑ Sample offsets:
-15,0,15

Add>>

Profile list:

Name	Description	Type	Data Source	Offset	Update M...	Layer	Style	Station Start	End	Elevation Minimum	Maximum
EG - Surf...		﹏	EG	-15.0'	Dynamic	PROFILE-E...	Pink (eg-left)	0+00.00'	6+58.70'	960.16'	989.36'
EG		﹏	EG	0.0'	Dynamic	PROFILE-EG	Light Green (eg-cl)	0+00.00'	6+58.70'	959.17'	988.84'
EG - Surf...		﹏	EG	15.0'	Dynamic	PROFILE-E...	Orange (eg-right)	0+00.00'	6+58.70'	960.16'	989.37'

Remove | Draw in profile view | OK | Cancel | Help

- o   Click the *Draw in Profile View* Button

- o   Select your alignment

- o   Name the profile you are creating

- o   Choose a *Profile View Style**

- o   Click Next

- o   Adjust the Station Range if needed by clicking the *User Specified Range* Button**

- o   Click Next

- o   Adjust the Profile View Height if needed by clicking the *User Specified* Button**

- o   Click Next

- o   Double check or change your *Profile Display Options*

- o   Click Next

- o   Click Next to advance through the *Pipe/Pressure Network* Option

- o   Choose the Data Band style (Typically No Display)**

- o   Click Next

- o   If using hatching in your profile choose your hatch style**

- o   Click Create Profile View

- o   Select your Profile View Origin by clicking in a blank area of Model Space

- o   Your Profile is created

*The NRCS template includes Vertical Exaggerations (VE) of 1, 4, and 10 which are useful in displaying different lengths of waterways etc. For example a short steep waterway may be adequately displayed with a vertical exaggeration of 1, whereas a long flat waterway may need a vertical exaggeration of 4 to adequately display the features. The VE can be changed after the profile is created as shown below.

** Many of the Profile View options can be added/changed after the profile is created by clicking, then right clicking on a grid line and choosing *Profile View Properties* or *Profile View Style* as shown below. You can click the *Create Profile View* button at any time after naming your profile and selecting the *Profile View Style* to quickly create a profile.
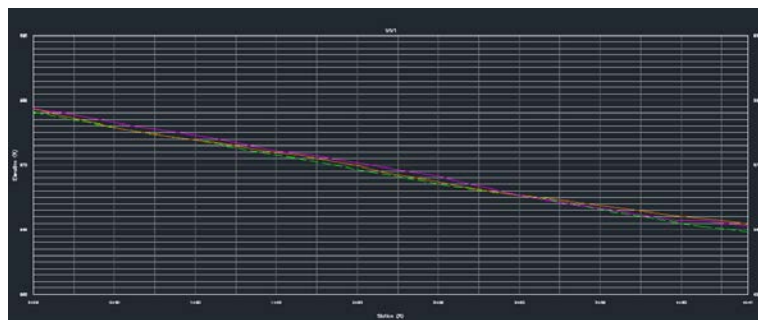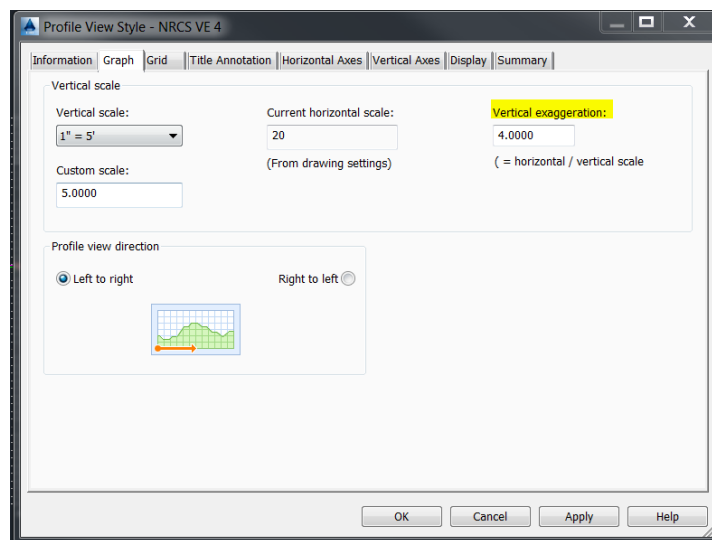

IV.   EDIT THE PROFILE VIEW STYLE

- Select the profile by clicking anywhere on the profile grid, (the entire profile lights up).

- Right-click on the selected profile grid and choose *Edit Profile View Style* and the

  Profile View Style window pops up.

REMEMBER TO SAVE OFTEN
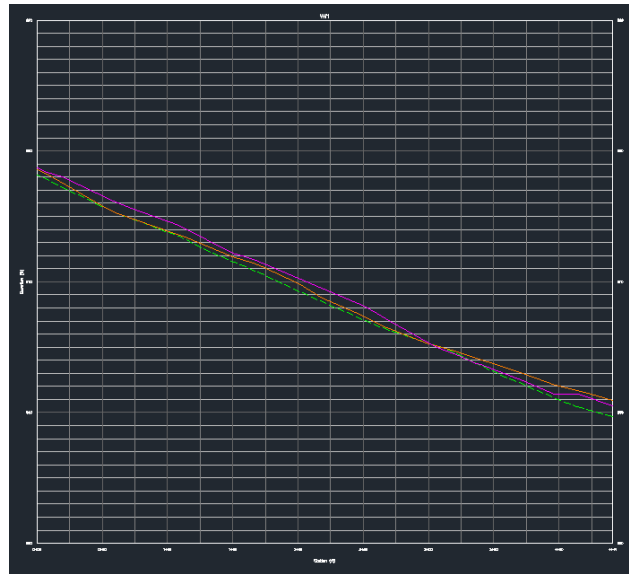**ALIGNMENTS & PROFILES**
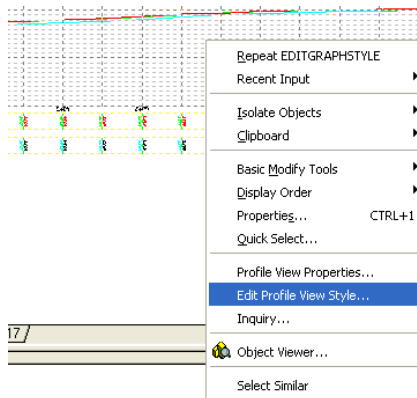
- If you want to change the vertical exaggeration of the profile, for example, go to the *Graph* tab in *Profile View Style* and change the *Vertical Exaggeration* to a higher number. Click *Apply* → Click *OK*

Vertical Exaggeration of 4

Vertical Exaggeration of 10

- There are many things you can change by selecting different tabs in the *Profile View Style* window.

  For Instance:

  - Change the title and text height of the profile

  - Change the axis titles and locations

  - Change the major and minor tick interval, location and rotation for both axes

  - Change grid, text, and title colors, and much more!

V.   CREATE FINISHED GROUND PROFILE

- From the *Home* Ribbon → *Create Design* Tab → *Profile* → *Profile Creation Tools*
  - Click on the Profile View you want to add a profile to
  - The *Create Profile* dialog box opens → Name the Profile (i.e. WW)
  - Choose a *Profile Style*
  - Choose a *Profile Label Set* such as Finished Ground – Centerline (FG-CL)
  - Click *OK*

- The *Profile Layout Tools* toolbar will automatically pop up.
    - Choose the *Draw Tangents without Curves* icon.

    - Starting at the beginning of your profile (0+00), draw roughly the grades and grade breaks (PVIs) you want along the profile.*

        *It is helpful to have Object Snap (F3) turned on at this point with Endpoint enabled. For best results snap to the endpoints of the Existing Ground (EG) profile when drawing your Finished Ground (FG) profile.

    - When done, hit Enter.
- To edit the line to exact grades, grade changes, and/or elevations:
    - Pick the FG line you just drew. Right-click.
    - From the menu, choose *Edit Profile Geometry*

        Alternatively you can click on your FG line and choose the Geometry Editor icon from the contextual ribbon.

    - Either method will bring up the *Profile Layout Tools* toolbar.
    - Choose the *Profile Grid View* icon

    - 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 the panorama window.
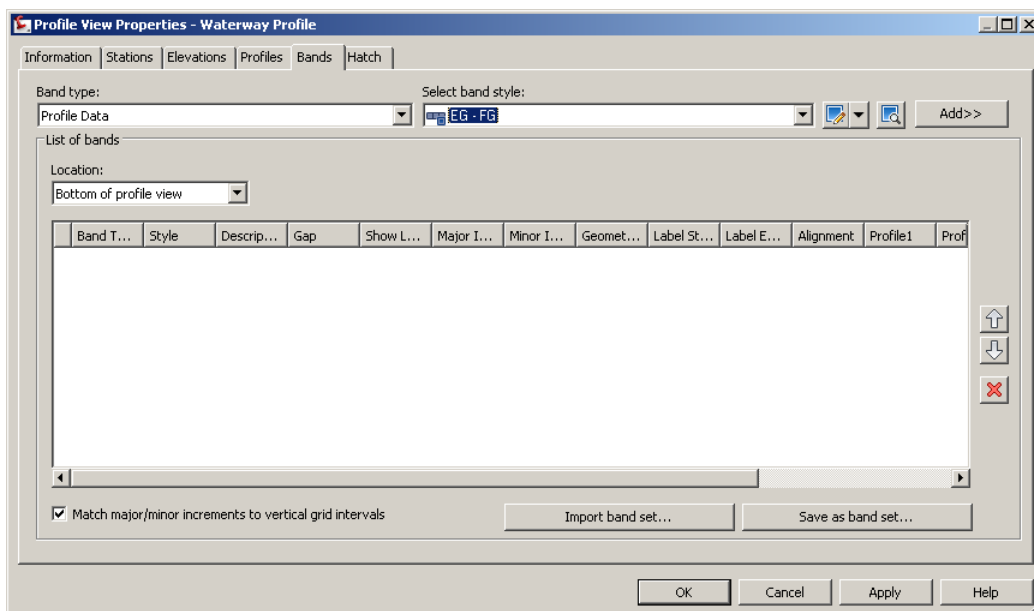
No.	PVI Station	PVI Elevation	Grade In	Grade Out	A (Grade Change)	Profile Curve Type	Pr
1	0+00.00'	978.18'		-8.37%			
2	0+50.00'	974.00'	-8.37%	-4.00%	4.37%		
3	1+00.00'	972.00'	-4.00%	-4.00%	0.00%		
4	2+00.00'	968.00'	-4.00%	-4.00%	0.00%		
5	3+00.00'	964.00'	-4.00%	-4.00%	0.00%		
6	4+00.00'	960.00'	-4.00%	-0.83%	3.17%		
7	4+40.99'	959.66'	-0.83%				

     o   You can remove or add a grade break by picking the appropriate tool on the *Profile Layout Tools* dialog box.

Profile Layout Tools - WW

Select a command from the layout tools   PVI based

VI.   **Adding Data Bands**

- To Add or Modify Data Bands
  - o   Click anywhere on the profile grid. Right-click. Choose *Profile View Properties.* A window pops up with the same name.
  - o   Click the *Bands* tab. Select the Band Style you want and click *ADD*.

Profile View Properties - Waterway Profile

Information | Stations | Elevations | Profiles | Bands | Hatch

Band type:
Profile Data

Select band style:
EG - FG   Add>>

List of bands

Location:
Bottom of profile view

Band T...	Style	Descrip...	Gap	Show L...	Major I...	Minor I...	Geomet...	Label St...	Label E...	Alignment	Profile1	Prof

☑ Match major/minor increments to vertical grid intervals   Import band set...   Save as band set...

OK   Cancel   Apply   Help

CIVIL 3D (2014)   ***REMEMBER TO SAVE OFTEN***
                              ALIGNMENTS & PROFILES

- o For the "EG-FE" row, make sure the *Profile 1* column has the Existing Ground (EG) centerline data and *Profile 2* column has Finished Ground (FG) data.

- o Change the *Weeding* to 0
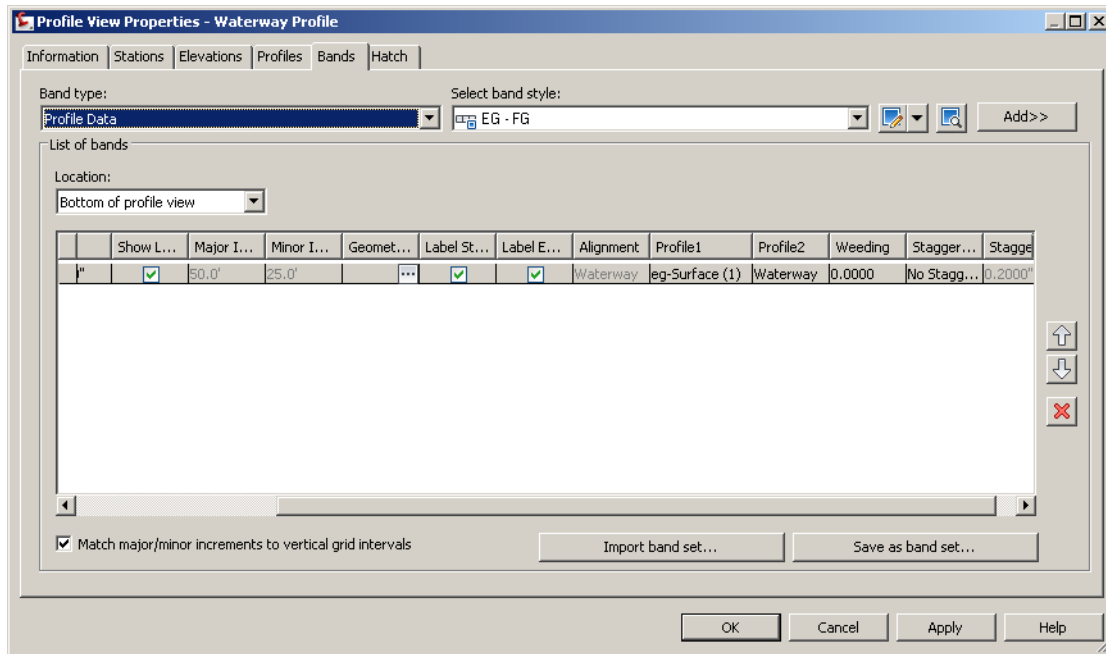
- o When finished, click *Apply* and click *OK*. Elevation data on the bottom of the graph should match the profile lines for the existing and finished ground.
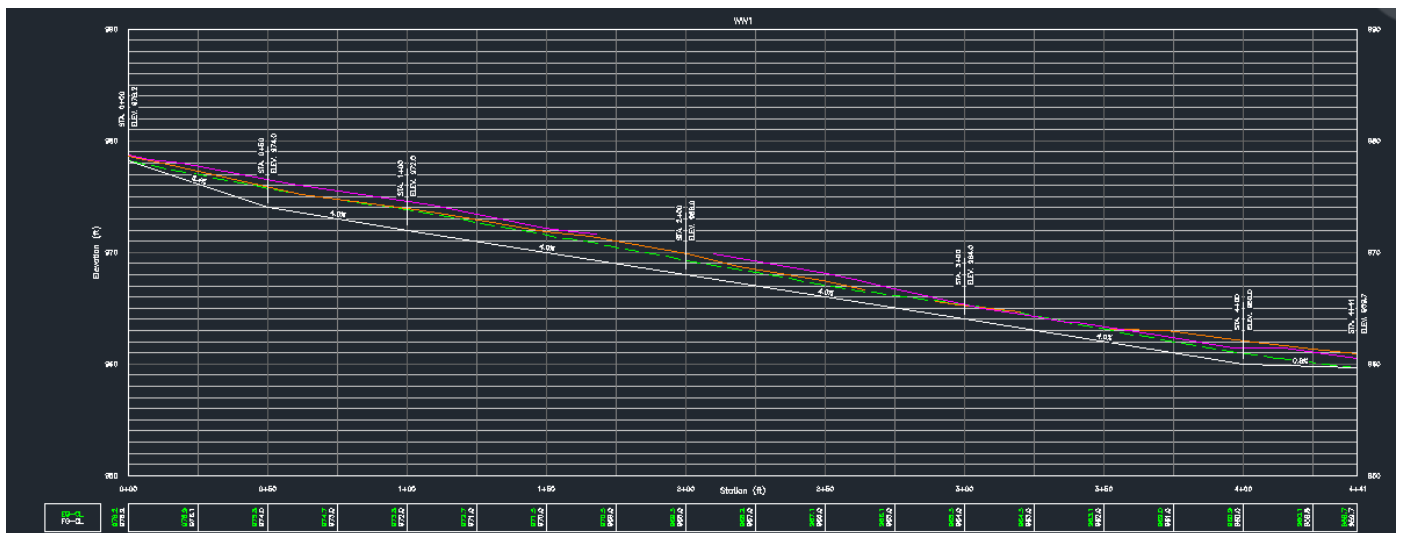
VII.   <u>Adding More Data to Profiles</u>

- Sometimes you will not have all the finished ground surface(s) when you create your profiles. For example, you may want to add your as-built surface to your original profile for comparison. These can easily be added to the existing profiles with a few clicks.
- From the *Home* Ribbon → *Profile* → *Create Surface Profile*
    - Select the correct Alignment
    - Select the Surface(s) you want to add to the Profile/Cross Sections
    - Click the *ADD* Button
    - Change the style of the newly added surfaces so you can differentiate them in the profile.
    - Click *OK*
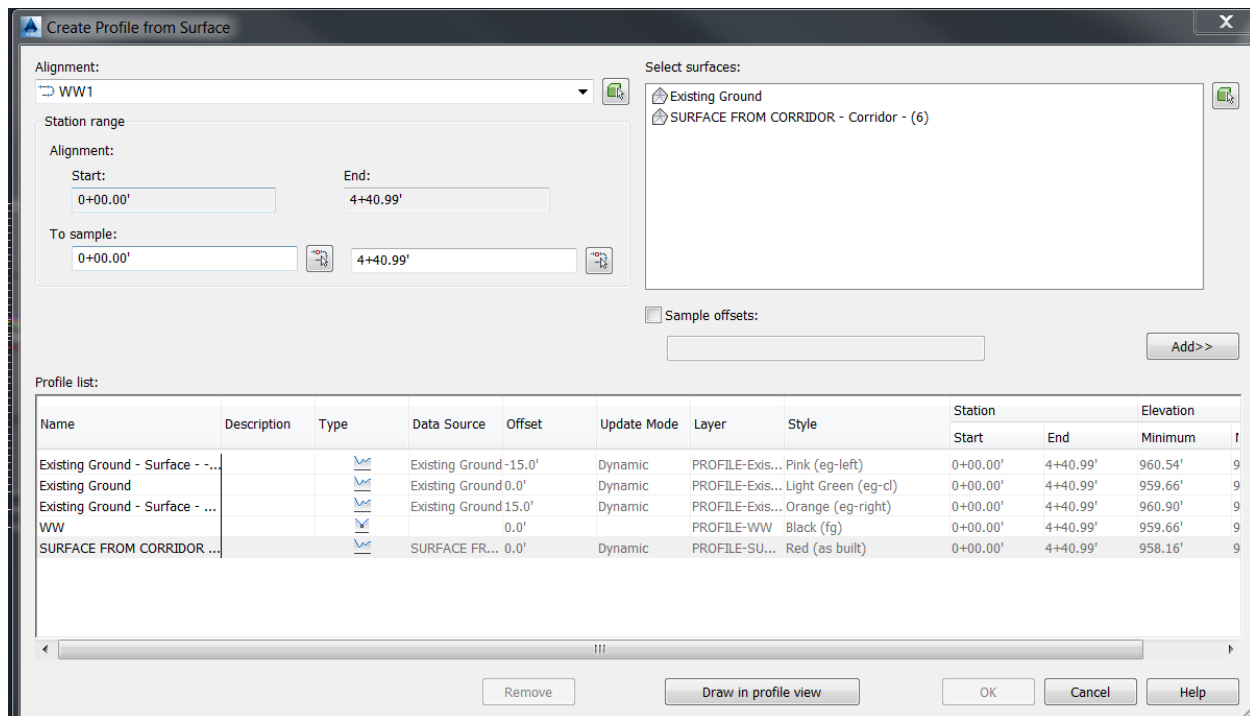
    - Your selected profile will be added to the original profile.

REMEMBER TO SAVE OFTEN
ALIGNMENTS & PROFILES
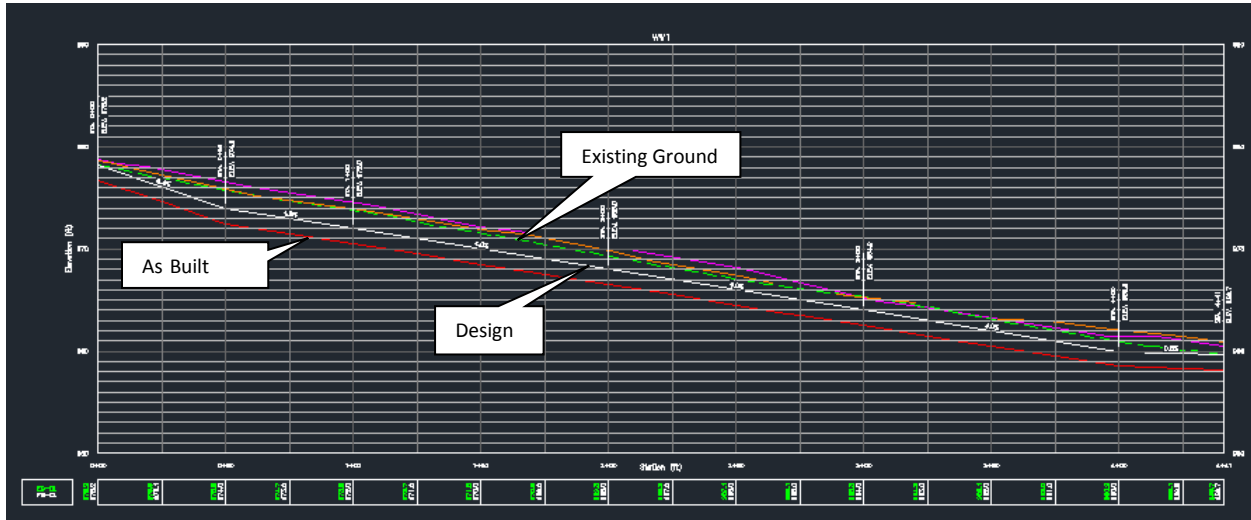
VIII.   Reversing The Direction of the Profile

In rare instances you may want to reverse the direction of your profile to match what the plan view shows. For instance, if your alignment is modeling a roof line for gutters from right to left to show the flow direction of the water and you will be displaying your profile on the same page as your alignment or plan view, you would want your profile stationing to reflect the right to left flow. To do this:

- Click and then right click on your profile
- Click *Edit Profile View Style*
- Click the *Graph* tab at the top of the *Profile View Style* dialog Box
- Under *Profile View Direction* click the Right to Left Button
- Click *Apply*
- Click *OK*
  Your profile(s), stationing, and data bands will be reversed.