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CROSS SECTIONS AND VOLUMES—Beach Methods: Variable Design Templates

By Connor MacDonald

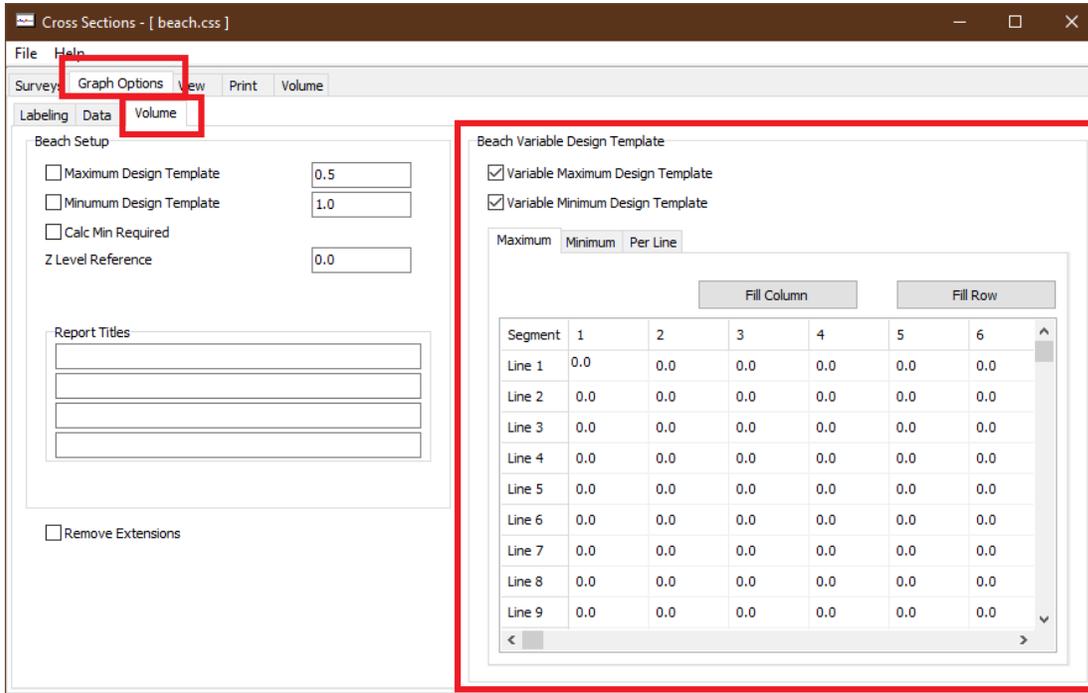
When performing volume calculations with Beach methods, HYPACK® offers the ability to use maximum and minimum design templates. These design templates are copies of the original template, but a vertical offset is applied to the original template points. Maximum applies a positive vertical offset while minimum applies a negative vertical offset.

While this works well and is useful, the feature lacks versatility. Only one offset value can be entered for each value—maximum and minimum. The maximum and minimum design template values apply to the entire CROSS SECTIONS AND VOLUMES session. Each maximum and minimum design template will be offset by the same value for each survey file; the only way to have different offsets between templates is to use multiple sessions. There is also no way to change the offset on a segment by segment basis. If the second segment of the design template needs a vertical offset of half a foot, but the fourth segment of the design template needs a vertical offset of an entire foot, users are left with no choice but to manually create templates for these special cases.

We have created a new feature called Variable Design Templates to cover all of the preceding cases where the maximum and minimum design template feature would not suffice. (Use our Sample_Beach project to follow along in the following explanation.)

To access the feature, open CROSS SECTIONS AND VOLUMES, load a session file or some data and templates, and set the volumes calculation method to the Beach Predredge option. In the Graph Options tab, open the Volume tab. There is a new section on the right side of the program titled “Beach Variable Design Template”.

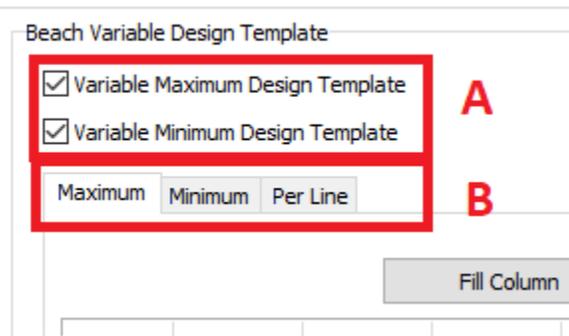
FIGURE 1. Graph Options—Volumes Tab Provides Beach Variable Design Template Options



Let's discuss the program features step by step.

FIGURE 2. Beach Variable Design Template Options

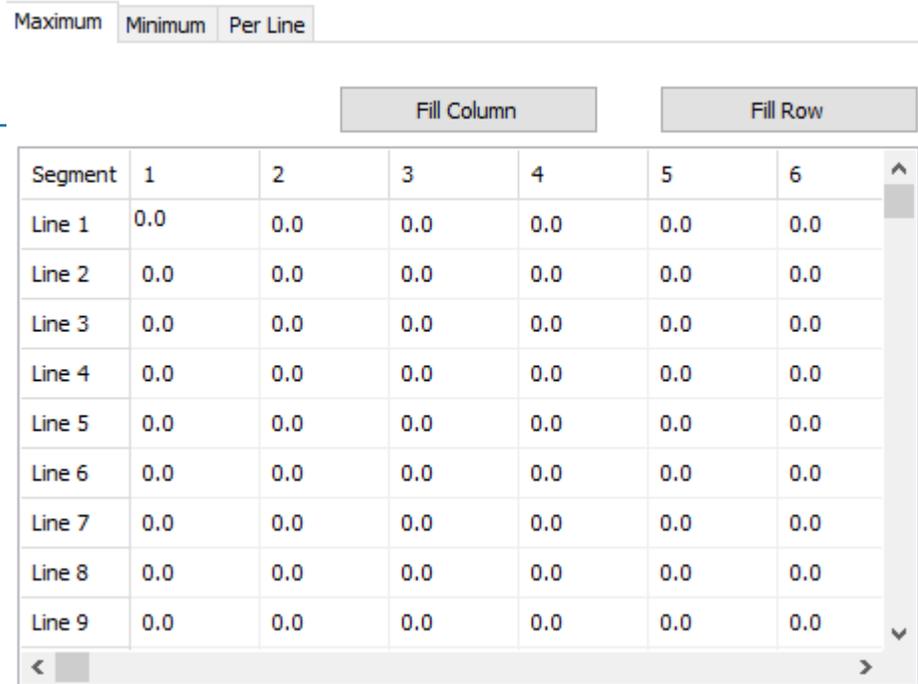
First off, just as with the regular design templates, there are checkboxes that enable the variable design templates (A). Checking these boxes tells the program to perform the volume calculations with the variable design templates created in the spreadsheet. The option is available to use both, either, or neither.



On a side note, the regular design templates can be used in conjunction with the variable templates, but only one maximum design template can be chosen and only one minimum design template can be chosen. For example, choosing both the Maximum Design Template and Variable Maximum Design Template checkboxes is not allowed, but you can choose a Maximum Design Template and a Variable *Minimum* Design Template.

Under the checkboxes are three tabs (B): Maximum, Minimum, and Per Line.

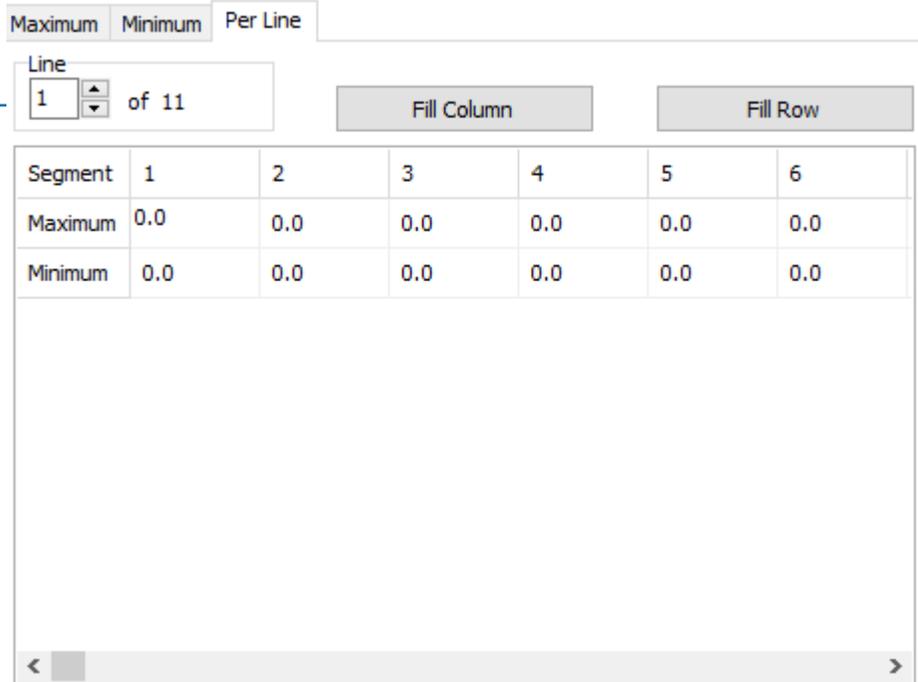
FIGURE 3. *Minimum and Maximum Spreadsheets*



The **Maximum and Minimum tabs** show a spreadsheet containing every offset value for every segment of every line in the current CROSS SECTIONS AND VOLUMES session. Maximum shows Variable Maximum Design Template offsets while Minimum shows Variable Minimum Design Template offsets.

[Fill Column] and **[Fill Row]** fill the column and row of the selected cell, respectively, with the value in the selected cell.

FIGURE 4. *Per Line Spreadsheet*



The **Per Line tab** shows the maximum and minimum values for the currently selected line.

You can scroll through your lines with the arrow keys.

The Fill Column and Fill Row buttons work the same here as in the other tabs.

And that is all of the controls for the new Variable Design Templates.

EXAMPLE

Here's a quick example of how it looks in action:

First I will use the regular design template with a maximum design template value of 1.

FIGURE 5. *Configuring a Constant Maximum Design Template of 1.*

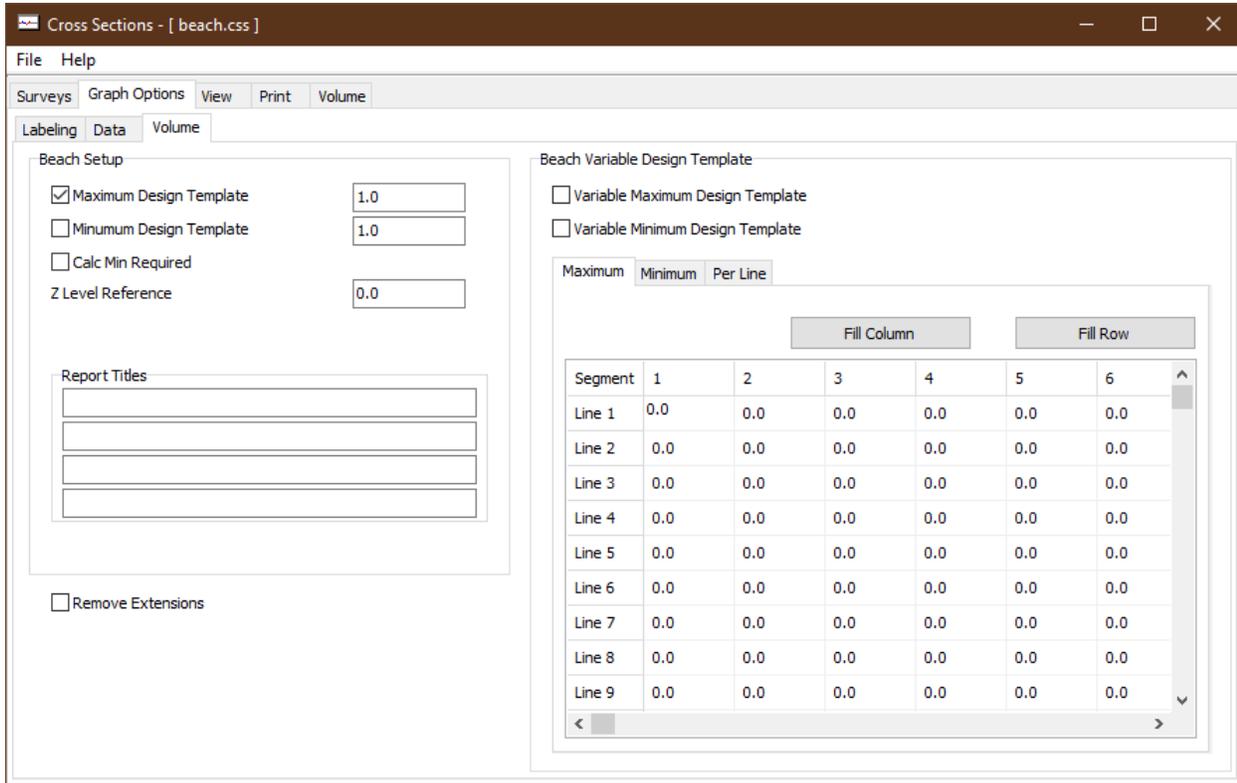
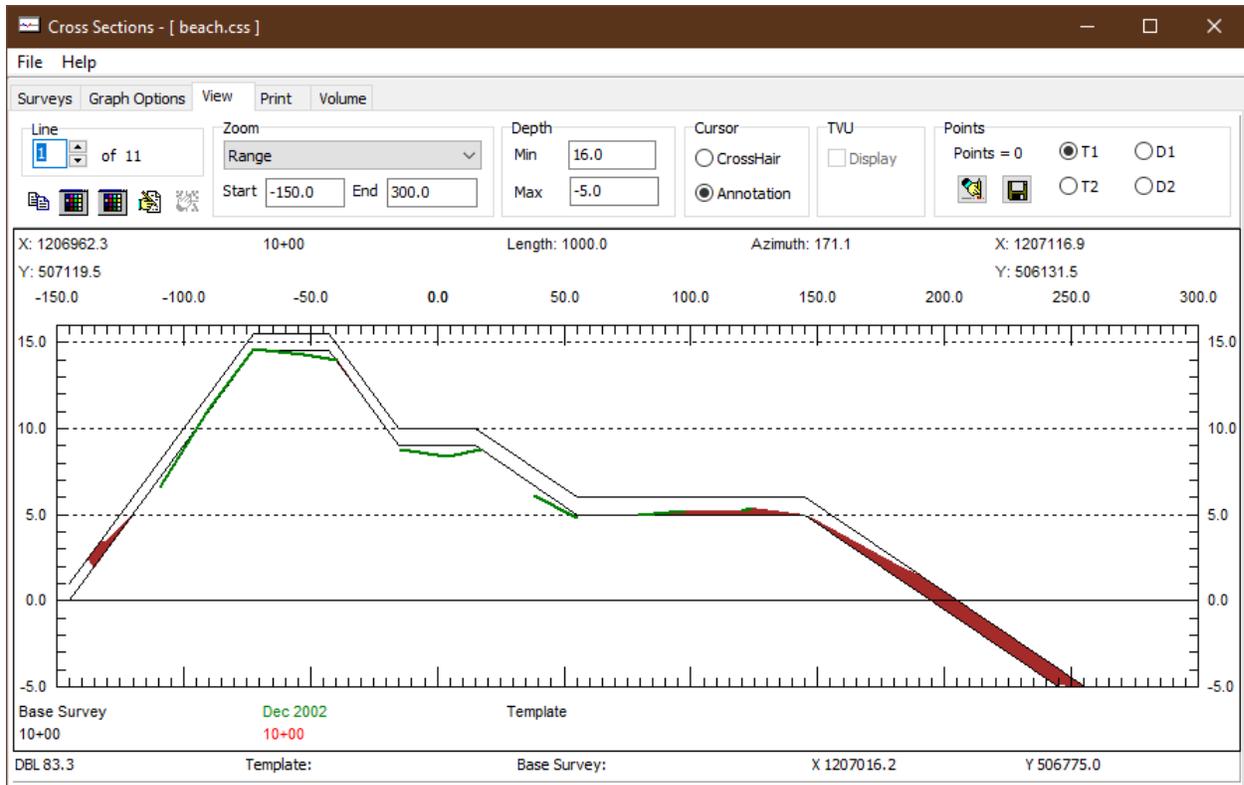


FIGURE 6. Profile View with a Constant Maximum Design Template of 1



Now I am going to recreate that with the Variable Maximum Design Template feature *for Line 1*:

1. **I check the Variable Maximum Design Template box**, and the Maximum Design Template box automatically deselects.
2. **In the Maximum spreadsheet, I enter the value 1 for the first segment of the first line.**
3. **I click [Fill Row]** and all values for Line 1 become 1, matching a regular maximum design template of 1 for the first line of the session. The Views are exactly the same as they should be.

NOTE: If I wanted to *completely* recreate the regular maximum design template for *all* lines of the session, I could use the Fill Column and Fill Row buttons to help fill all values in the spreadsheet with 1. For the purpose of this example, we are looking at line 1 specifically.

FIGURE 7. All Segments of Line 1 Have Maximum Design Template of 1

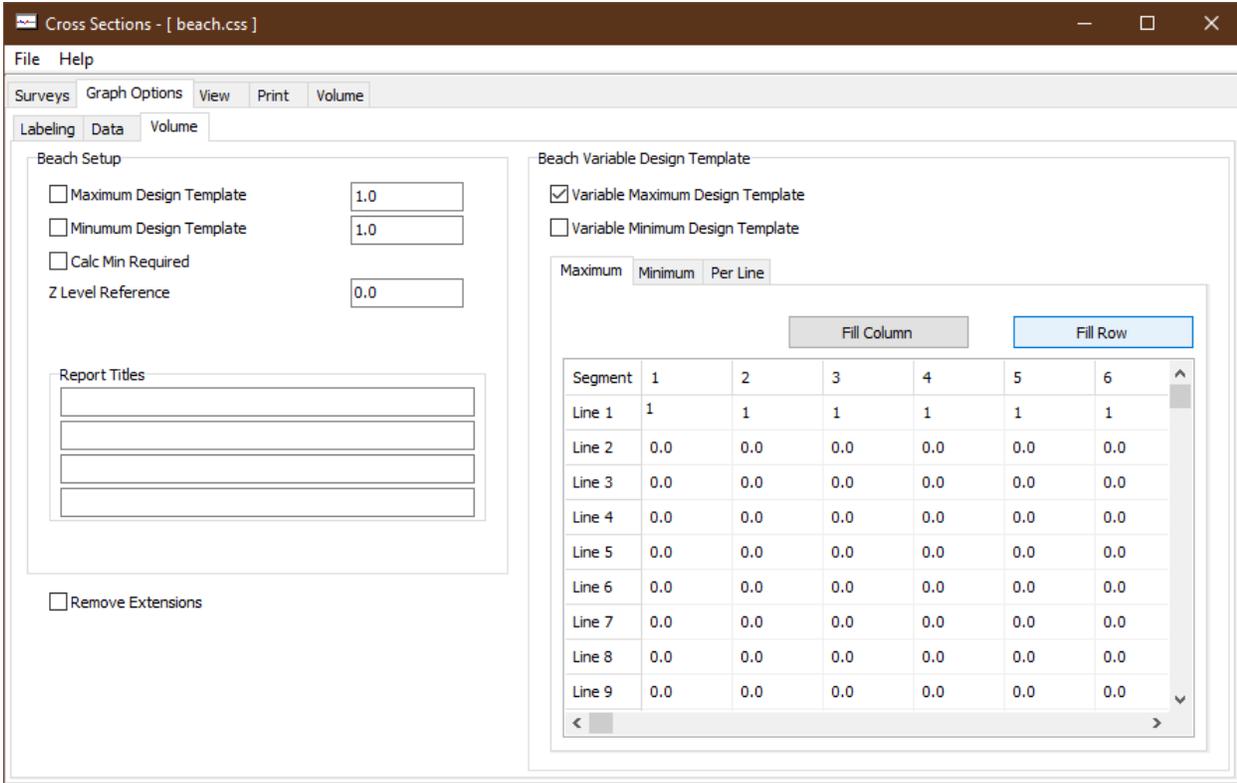
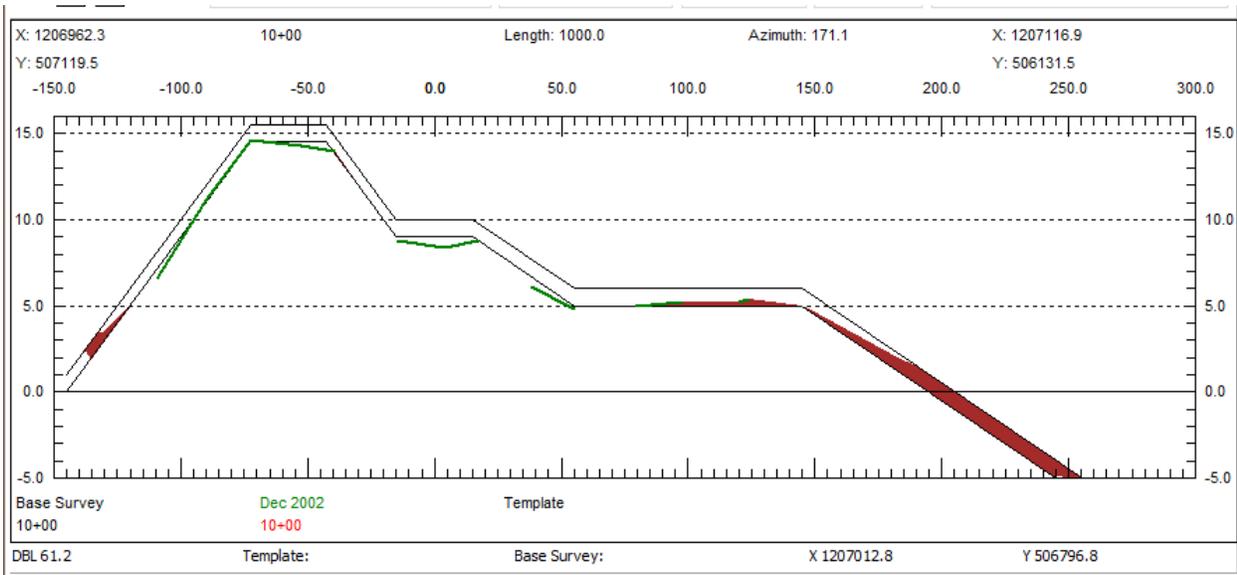
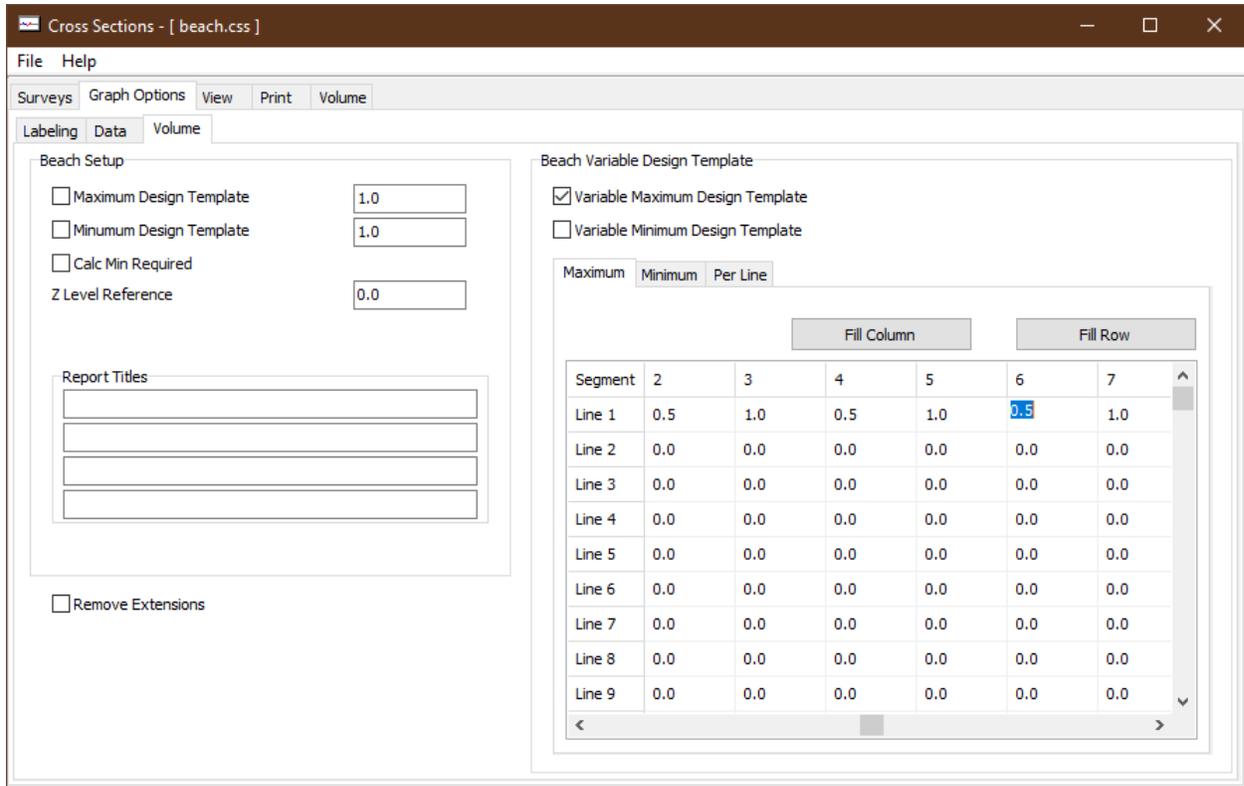


FIGURE 8. View of Line 1 Where Maximum Design Template for All Segments is 1



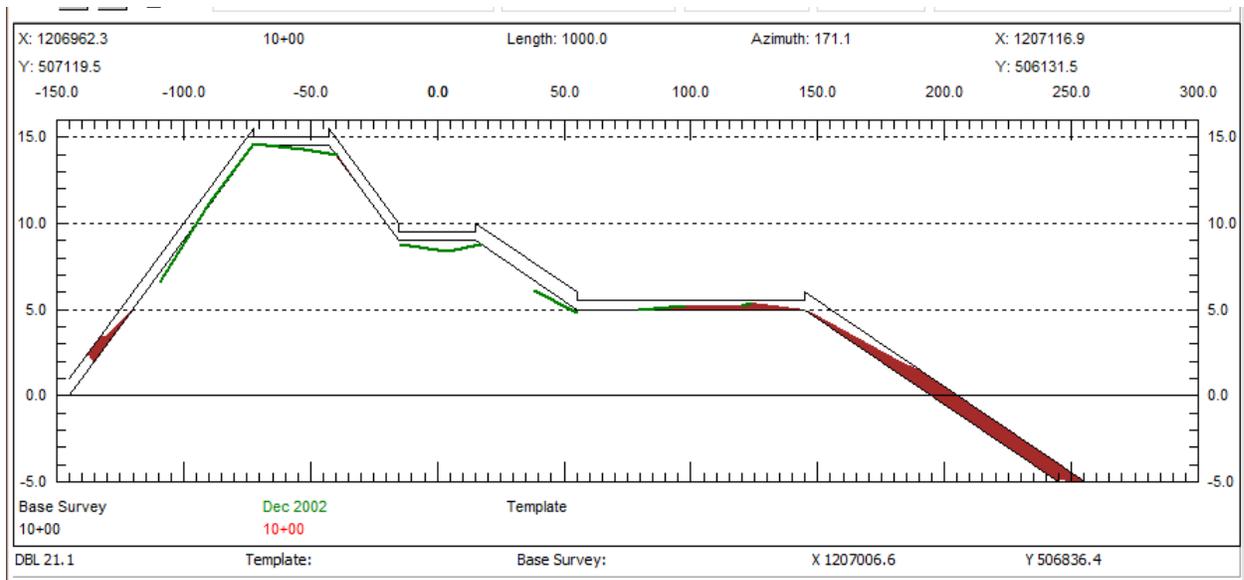
Now I am going change my template so that all of my slopes keep the offset of 1, but my flats are now 0.5:

FIGURE 9. Line 1 Where the Maximum Design Template for Flats is 0.5 and Slopes is 1



And there it is. The flat segments are offset lower than the sloped segments.

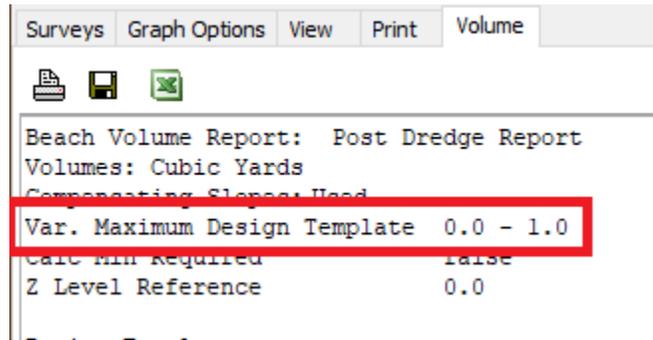
FIGURE 10. View of Line 1 Where Maximum Design Template for for Flats is 0.5 and Slopes is 1



UPDATED VOLUMES REPORT

The final difference to mention with this update to the Beach Method of the CROSS SECTIONS AND VOLUMES program is in the Volume Report.

The Volume Report now shows that a Variable Maximum Design Template was used, and lists the minimum offset and maximum offset for all segments of all lines loaded in the current session. In the case of the example, the maximum offset was 1, but all of the other lines had offsets of 0 for each segment. This means our minimum offset is 0, and the report properly shows that.



That is the new Variable Design Template feature for Beach Methods in CROSS SECTIONS AND VOLUMES. I hope the added functionality makes using the CROSS SECTIONS AND VOLUMES program a bit less time consuming and more efficient for everyone using design templates with the Beach Methods.