GUARDWALL, TYPE 2

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About Retaining Wall Layout Procedures (For *CFLHD employees*)

The FLH criteria library supports nine wall types; Parapet, MSE, Soil Nail, SMSE, Cut, Fill, Gabion, Guardwall and Rockery. Creating a constructible wall layout is an iterative process, which requires the involvement of the Highway Engineer as well as the Structural and/or Geotechnical Engineer. The process requires two or three phases, depending upon the wall type. The first phase is to create the initial proposed cross sections, using the CFLHD default AdHoc attributes. From these cross sections, several chains and profiles are stored. This information is then given to the Structural/Geotechnical Engineer, to assist in the determination of the appropriate project specific design criteria that will be required. The second phase is to produce proposed cross sections that reflect a constructible wall profile and appropriate site specific design requirements.

Workflow: Guardwall Layout

Phase 1

1. Draw pattern lines *every five feet through the guardwall site in the mainline pattern file. Use a different level for the pattern lines than the mainline cross section pattern lines. If the guardwall is located on a tight switchback curve, three-foot pattern lines will be needed to provide a smooth guardwall face. Additional cross sections may be required at the beginning and end to determine where the guardwall should begin and end.*

2. Cut existing ground cross sections *based on the pattern lines created in step 1.*

3. Run the proposed cross sections*. Use the default AdHoc attributes for the guardwall dimensions, with the exception of the Adjacent To Structure AdHoc. Set this AdHoc to "P" if the guardwall is adjacent to pavement, "A" if it is adjacent to an aggregate shoulder or "S" if it is adjacent to a sidewalk.*

4. *To* create the Guardwall profiles*, click on Reports & XS Quantities from the Road Project Manager dialog box as shown in the figure below.*
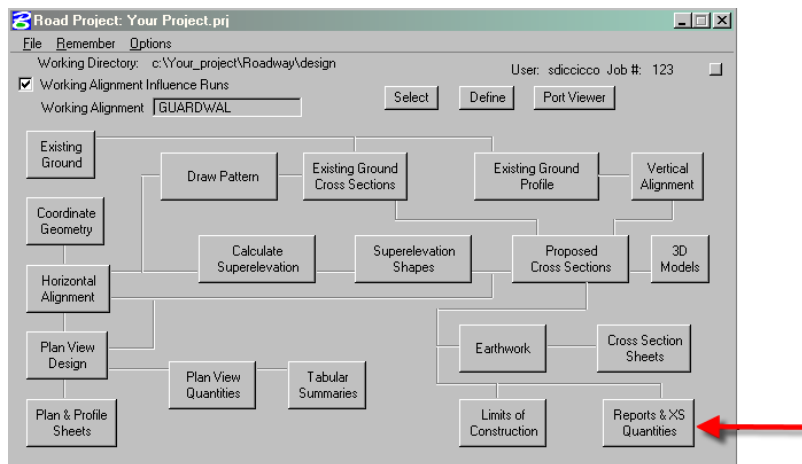

Figure 1-1: Reports & XS Quantities

5. *Click on the Profile Grade button in the XS Report dialog box. This will open the Profile Grade Report dialog box. Fill in the Begin and End Station of the guardwall station range as shown below. Do not include cross sections that do not require a guardwall.*
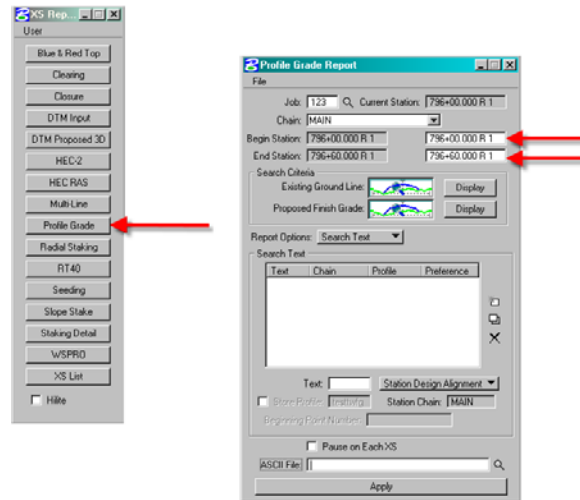

Figure 1-2: Profile Grade and Profile Grade Report

6. *Under Search Criteria, click on the button next to Existing Ground Line. Add the Lv Names to the Existing Ground Line dialog as shown in the figure below. The Existing Ground Line dialog box should only have the existing ground level (X_E_Ground_XS) in the Lv Names. Close the dialog box.*
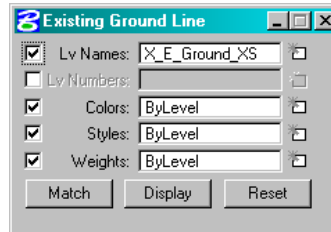

Figure 1-3: Existing Ground Line Dialog

7. *Under Search Criteria, click on the button next to Proposed Finish Grade. Add the Lv Names to the Proposed Finish Grade dialog. The Proposed Finish Grade must travel from catch point to catch point, and it must pass through the text points GU and BWFB (See Figure 1-7 for text locations). The following levels must be specified for a guardwall: X_P_GD_Wall_Above; X_P_GD_Wall_Below and X_P_GD_Wall_Backfill2 and X_P_Parkway_Top. The existing ground level (X_E_Ground_XS) must also be included, to locate the TWFG text. Close the dialog box.*
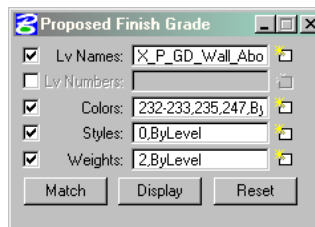

Figure 1-4: Proposed Finish Grade Dialog

8. *Pull down the Search Text menu and fill in the text dialog box as shown below. Select Station Text Alignment from the pull down menu. The Beginning Point Number should not be a point used in any other chain. Click on the Add tab to populate the search text field.*
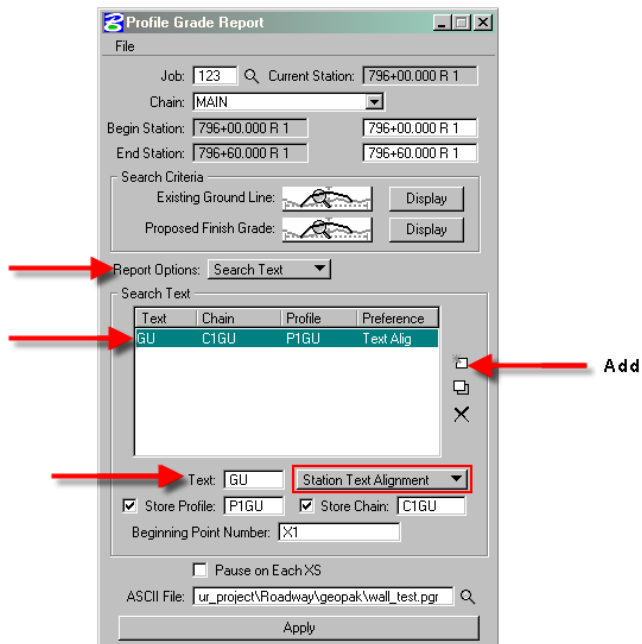

Figure 1-5: Add Profile & Chain at Gutterline (GU)

9. *Add the search text for the Bottom of Guardwall Footing Back (BWFB) as shown below. Click on the Add tab to add the text to the search text box. Add the search text for the existing ground at the wall footing (TWFG). Click on the apply button to generate the chains and profiles based on the locations of the GU, BWFB and TWFG text (See Figure 1-7).*
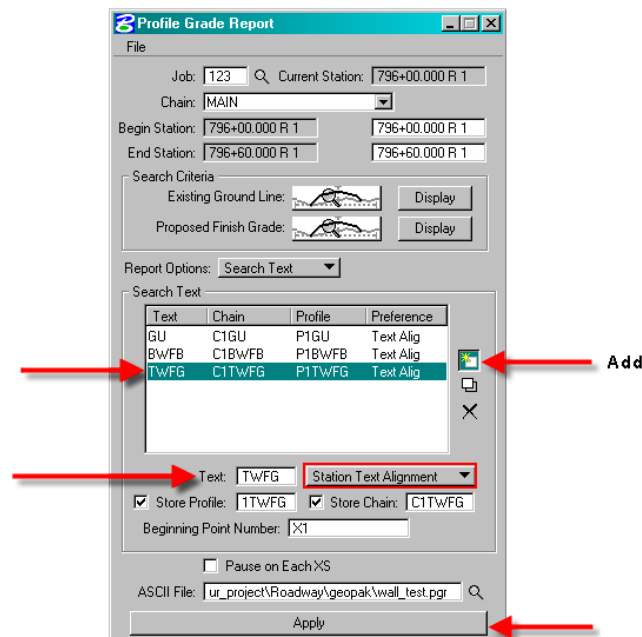

Figure 1-6: Add Profile & Chain at Bottom of Wall at Footing Back (BWFB) and at Existing Ground at Footing of Wall (TWFG)
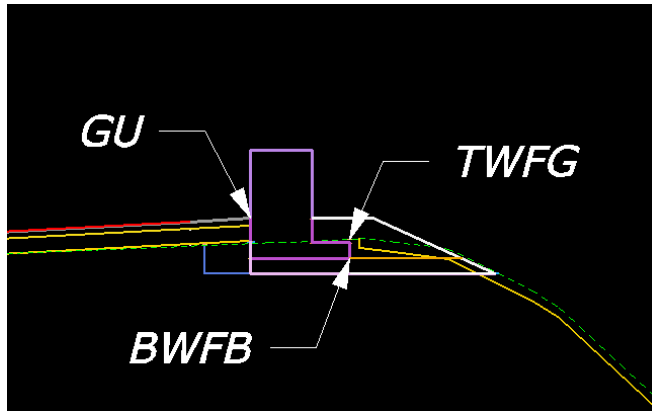
Figure 1-7: Search Text Locations

Note: All chains will begin at station 0+00

10. Create a new design file for the guardwall profiles *(See CADD Standards Manual for naming conventions). Open the Draw Profile from the Geopak Road Tools dialog as shown in the figure below.*
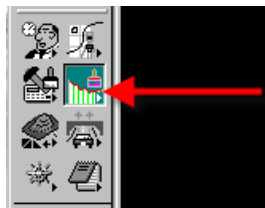

Figure 1-10: Geopak Tool Draw Profile

11. *Select the gutterline chain (C1GU) in the Draw Profile Dialog box. Click on the dialog for Profile Cell Control as shown below.*
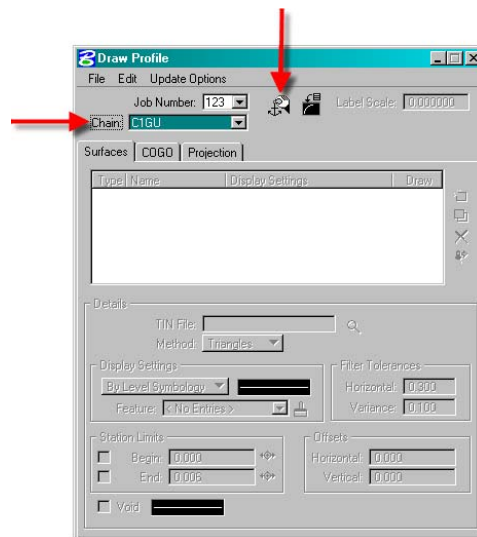

Figure 1-11: Geopak Tool Draw Profile

12. *Select the Active chain. Click on the Place Profile Cell in the Profile Cell Control dialog box as shown in the figure below.*
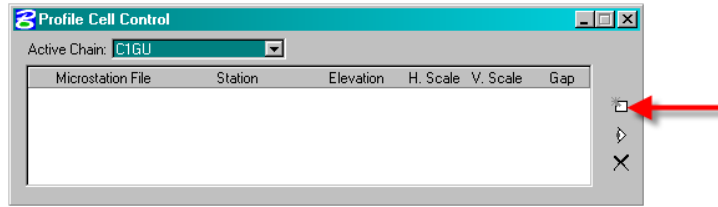

Figure 1-12: Profile Cell Control

13. *Enter the beginning station, elevation (lower than proposed cross sections) and 1:1 scale in the Place Profile Cell dialog box. Then place the curser in the View 1 window and click to place the profile cell location as shown below.*
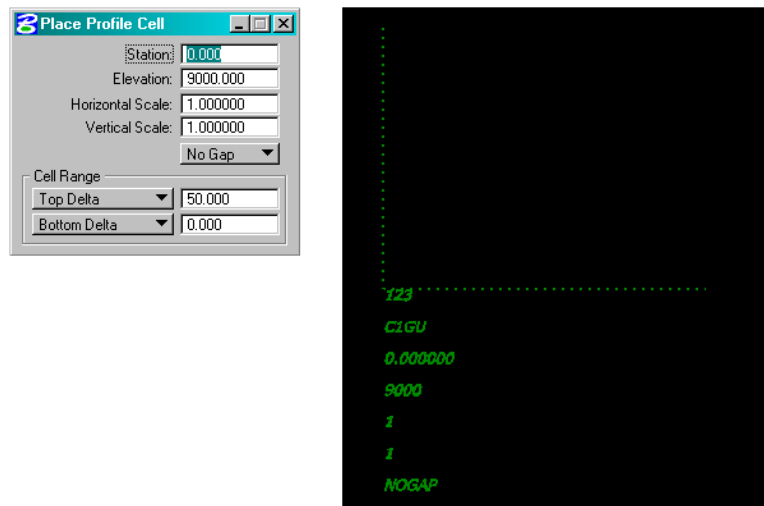

Figure 1-13: Place Profile Cell

14. *The Profile Cell Control will appear with the Active Chain information as shown in the figure below. Close the Profile Cell Control box.*
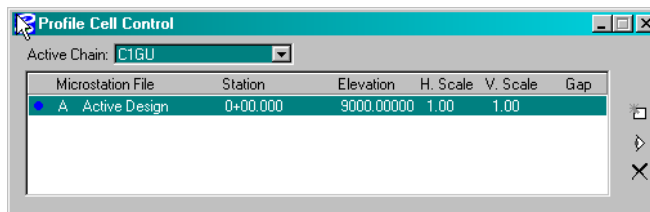

Figure 1-14: Active Profile Cell Information

15. *Click on the COGO tab in the Draw Profile dialog box. Double click on the By Level Symbology field. Change the level symbology as shown below.*
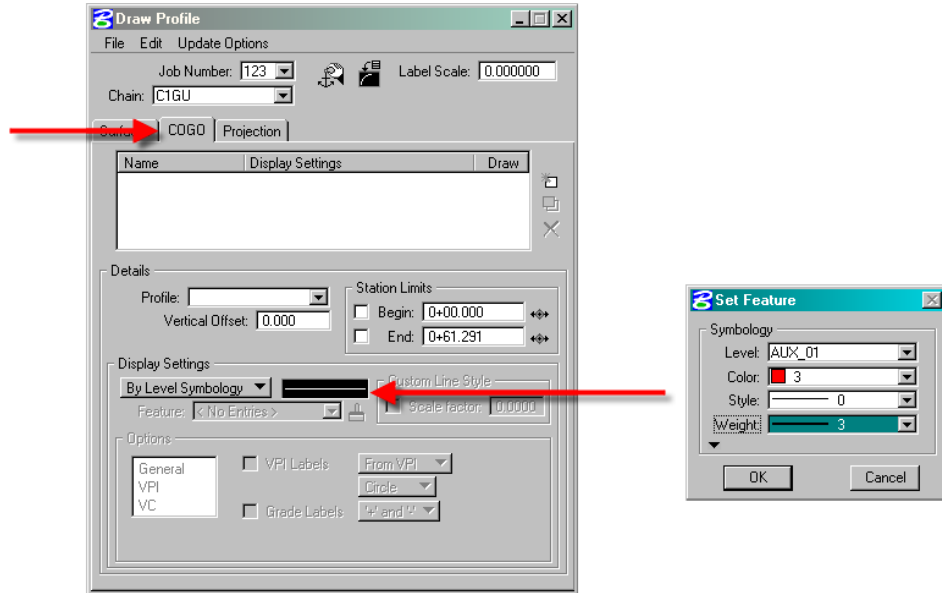

Figure 1-15: Draw Profile

16. *Select the gutterline profile (P1GU) and click on the Add COGO Profile Settings as shown below. The gutterline profile will display in the design file.*
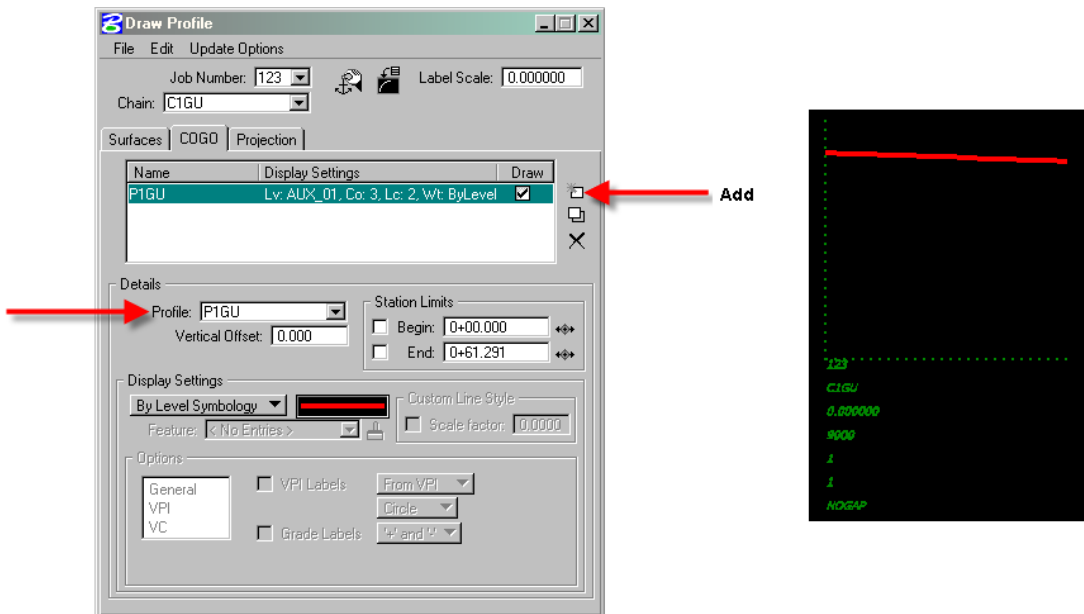

Figure 1-16: Draw Gutterline Profile

17. *Click on the Projection tab in the Draw Profile dialog box. Select the chain and profile for the BWFB text. Double click on the By Level Symbology field and select the symbology as shown in the figure below and click on OK.*
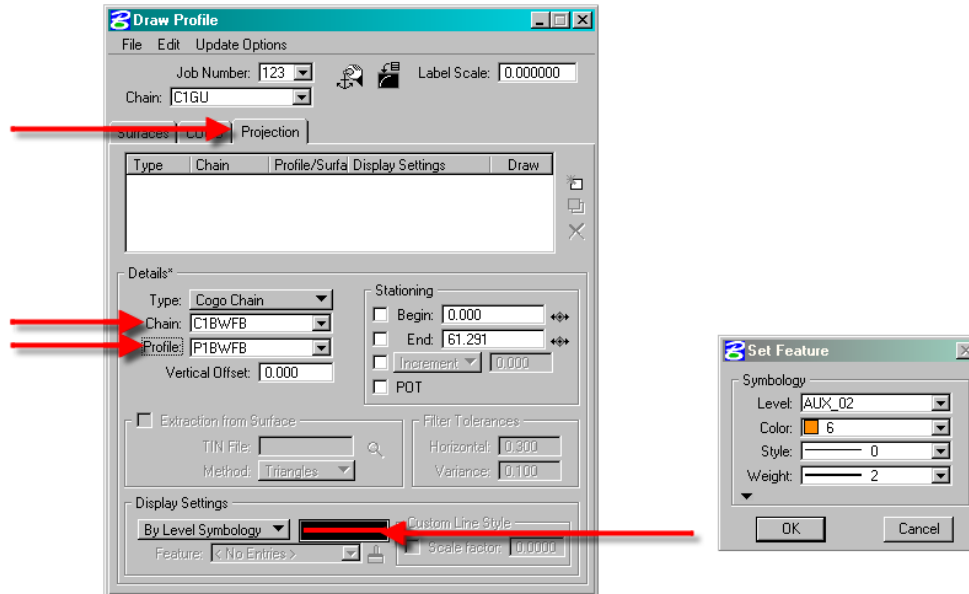
Figure 1-17: Project Profile for BWFB

18. *Click on the Add COGO Profile Settings as shown in the figure below. The bottom of guardwall profile will be displayed in the design file.*
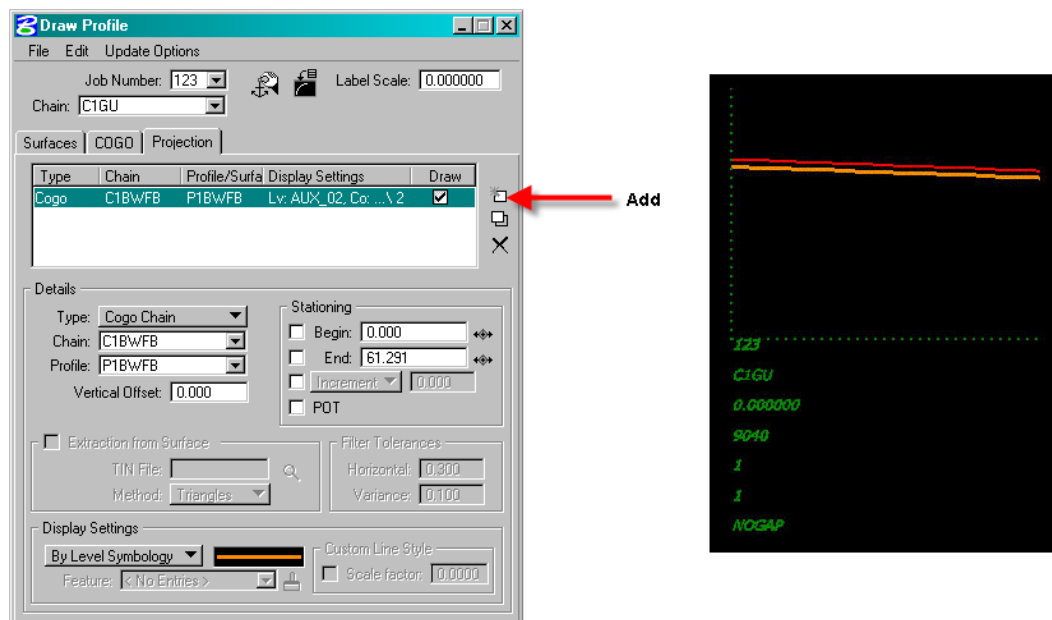
Figure 1-18: Draw Bottom of Guardwall Profile

19. *Change the Details in the Draw Profile dialog box to the TWFG profile. Double click on the By Level Symbology field and select the symbology as shown below and click on OK.*
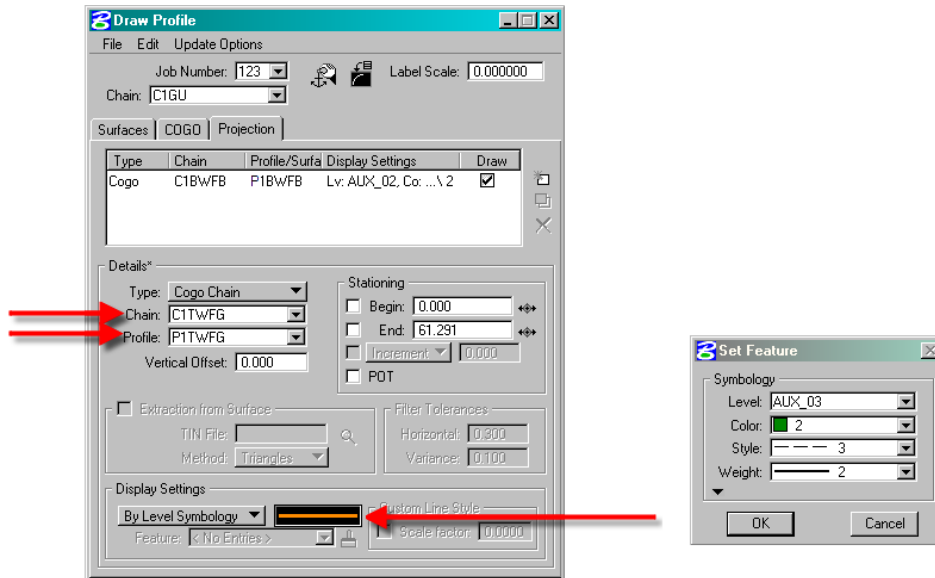

Figure 1-19: Project Profile for TWFG

20. *Click on the Add COGO Profile Settings as shown below. The existing ground profile at the guardwall footing will display in the design file.*
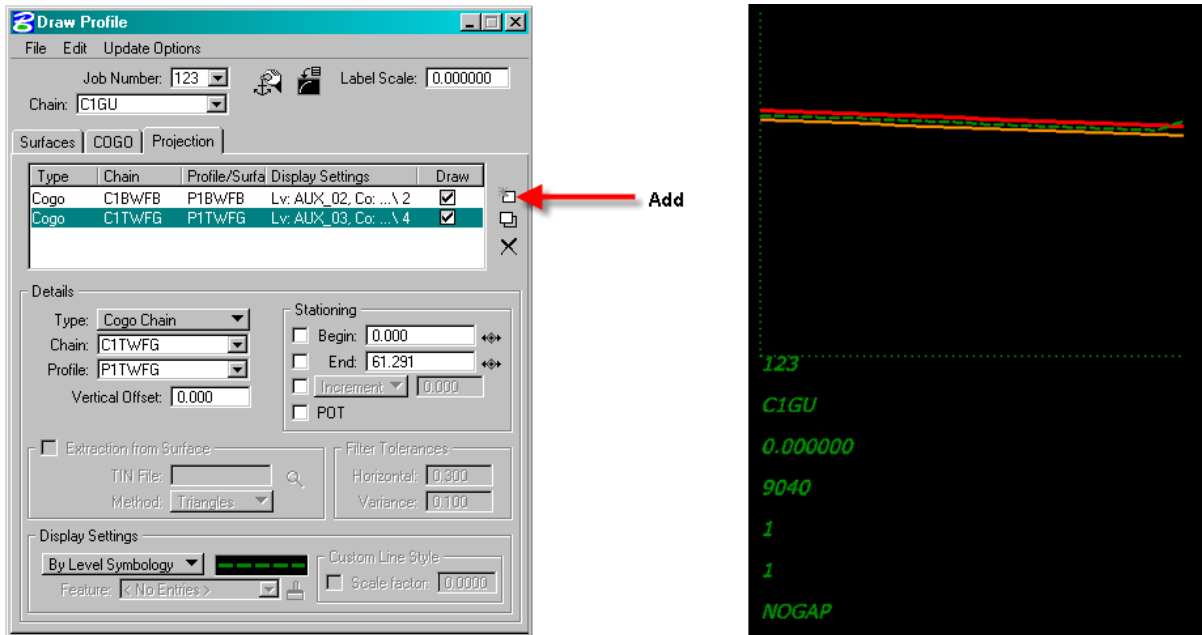

Figure 1-20: Draw Profile of Existing Ground at Footing Back

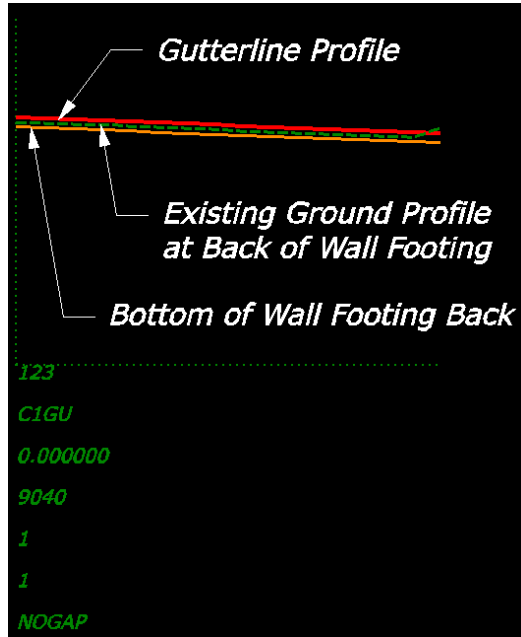21. *Label the four profiles as shown in the figure below.*

Figure 1-21: Draw Profile of Existing Ground at Offset from Gutterline

22. Send the dgn files with the plan view, profiles and cross sections to the Structural Engineer *for review. Provide the Chain and Profile names for the four profiles. Include a print out of the AdHoc attributes used for the guardwall as shown below. Generally, a second phase of design will not be needed for the layout of a guardwall, unless the Structural Engineer indicates otherwise.*

Figure 1-22: Printout of AdHoc Attributes used for Guardwall Layout

Keep in mind that if your guardwall ties into a retaining wall, then care must be given that the designed gutterline profile of the guardwall must match the gutterline profile of your retaining wall.