Overview: Creating a surface that represents the Original Ground is done by utilizing the prototype surface settings and then triangulating the survey points and breaklines. Contours and contour labels can be displayed for the surface. Once a good Original Ground surface is created it should be locked to avoid being accidentally deleted or changed.

Software: Eagle Point 2006 Q4 6.4.0, Autodesk Map 2006 (NRCS/EP v2.00 menu), NRCS national CAD std v1.0

Notation Method
Button to Press *Displayed Text* **Icon** Action {Text to Enter} *Menu Item…*

Note: Sections marked with * must be done in model space.

Eagle Point Steps Using the NRCS/EP Customized Menu

Preparing Surface Model settings for Original Ground

1. From AutoCAD Click *NRCS/EP… Create Contours… Manage Surface Model…*  .
2. Click the **New Surface Model Icon**  . This brings up New Surface Model box.
3. Click on the **Library icon**  and select *the Original Ground* surface model.
4. Click Load Prototype. Click Yes. Click Close.
5. Input a Description name. E.g {Ognd}, which would represent original ground.
6. Verify any settings, then *Click* OK.
7. Click Close to close out Manage Surface Models

Draw a boundary for the Surface model*

This will represent an outer limit for the surface model.

8. From the NRCS Tool Palettes (Ctrl + 3 to toggle on/off) select *Breaklines*
9. Click *Boundary Line* 
10. While not snapping to the points, click to draw a border around outside of the survey. (F3 toggles Osnaps on/off.) To close the line cleanly, type {C} and press Enter.

Adding Breaklines to get more Realistic Contours*

Adding a breakline between flowline shots prevents contours from jumping across banks. Note: 3D Polylines  plot out only as solid lines. 2D Polylines  plot out using linestyles but should be at elevation 0 to ensure the surface is correct.

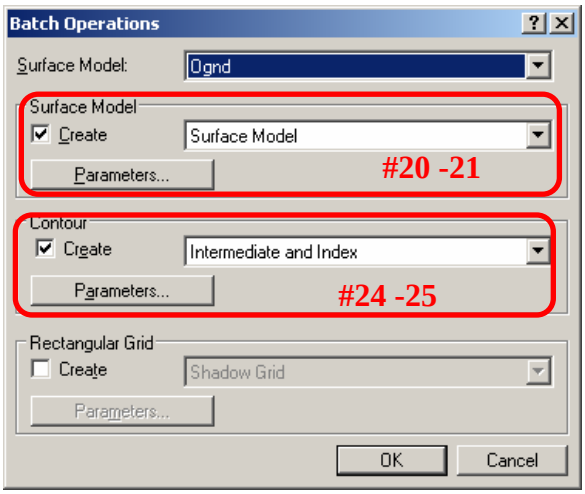
11. Right Click the **Osnap Status.** Click *Settings…* and checkmark only *Node* and *Object Snap On*. Click OK.
12. From the AutoCAD Tool Palettes select *Breaklines*
13. Click *Flow Line* 
14. Click onto the nodes to Snap to the Flow line shots.
15. Press Enter when done with a breakline.

16. Repeat for any other breaklines.
17. For any 2D polyline breaklines drawn:
    a. Select the breaklines. Then Right Click *Properties…*
    b. Click into the elevation line of the Properties and type {0}. Press Enter
    c. Press ESC to deselect the objects.

Creating the Triangulation & Placing Contours for Original Ground*

Survey points and breaklines are used as the basis for creating the original ground surface and contours.

18. From AutoCAD Click *NRCS/EP… Create Contours… Batch (Triangulate/Contours)…*.
19. In the Batch Operations dialog Pulldown the Surface Model name being created – E.g. *Ogrnd*.
20. In the Surface Model section checkmark *Create* and pulldown *Surface Model*
21. In the Surface Model section click Parameters…
22. Pulldown to set the Boundary as *Select*. Normally all other items will be Unchecked.



23. Click OK.
24. In the Contour section checkmark *Create* and pulldown *Intermediate and Index*
25. In the Contour section click Parameters…
26. Click Settings and verify or change the contour interval. Click OK.
27. Usually no checkmarks are placed in any of the boxes. Click OK.
28. Click OK. [When repeating this process (after adding extra breaklines, etc) a TIN message box appears. Just click YES to overwrite.]
    Pay attention to your Autocad command line as you continue.
29. Command line displayed: *Select Objects*
    Use AutoCAD selection methods to pick the objects to triangulate. One option is using a CAD selection window. Once objects are selected press the Enter key.
30. Command line displayed: *Select boundary*. Click on the boundary line.
31. If a Crossing Breaklines message appears, it means that 2 of your breaklines cross each other and it will try to guess which one is right. You will click Yes to proceed.
32. The surface will be created and contours will be placed into CAD.
33. At the Batch Operations dialog click Cancel once the contours have been placed.
34. Review the contours to make sure that the surface was properly modeled.
35. If you need to make improvements to the surface be sure to erase the contour lines before triangulating again. Adding additional breaklines is one way to improve the surface model.
36. See Locking the Surface Model to Protect it.

Verifying Elevations of a Surface Model*

Inspect the elevations for a surface to verify that it is valid.

37. From AutoCAD Click *NRCS/EP… Create Contours… Track Coordinates…*.
38. Pulldown the correct surface model. E.g {Ogrnd}
39. Click Apply
40. Move cursor around in CAD and elevations will be displayed.
41. Click Close

Adding Labels for Contours*

Contour labels are helpful during the design process & on construction drawings.

42. From AutoCAD Click *NRCS/EP…Plot Scale…*.
43. Input the Horizontal scale that you'll use for plotting the contours & labels. E.g. {50}
44. Click OK.
45. Click *NRCS/EP… Create Contours… Annotate…*.
46. Pulldown the correct surface model. E.g {Ogrnd}
47. Checkmark the contours to be labeled. Usually *Index* & *User-defined*.
48. Click Annotation Settings.
49. Pulldown Annotation Location to *Middle* and checkmark *Break Contour*.
50. Checkmark Annotation Direction as *Uphill/Downhill*.
51. Click OK.
52. Method is usually *Crossing*. With Crossing you will click the starting & ending points of a line so that the labels will be placed where this line cuts through the contours.
53. Uncheck *Erase Existing*.
54. Click **CAD settings**.
55. Pulldown unit to *Plotted inches*.
56. Input Plotted size {.078} for 11x17 drawing size, {.156} for 22x34. Click OK.
57. At the Annotate Contours dialog box click Apply.
58. Command line displayed: *Select Start Point*. Click in CAD to select the starting point of the crossing line. Start at a lower elevation to get the text rotation correct.
59. Command line displayed: *Select End Point*. Click the ending point for the line of labels near the higher elevation. Repeat for additional labels.
60. Press Enter to quit labeling. Click Close.
61. If the labels are not what you want, use the AutoCAD **Undo Icon** multiple times to return back to the unlabeled contour lines.

Placing Surface Triangles into CAD*

If your surface doesn't look correct you can place the triangles into CAD that represent the surface to help find out why it doesn't look right.

1. From AutoCAD Click *NRCS/EP… Create Contours… Place Triangles…*.
2. Pulldown the correct surface model. E.g {Ogrnd}
3. Click Apply.
4. Click Close.

Erasing Contour lines & Labels, & Triangulation lines from CAD*

If a surface is incorrect, or if the contour lines & triangulation lines don't need to be displayed they can be eliminated from the CAD drawing.

1. From AutoCAD Click *NRCS/EP… Create Contours… Erase Existing Objects…*.
2. Checkmark *Triangles*, *Contours*, and *Contour Annotations*.
   Note: Eagle Point can not erase objects that are on frozen or locked layers.
3. Click Apply
4. Contours will be erased from the CAD drawing. Click Close

Locking a Surface Model to Protect it
(Highly Recommended)

Lock the EP data for the surface model once you are satisfied with it.

1. From AutoCAD Click *NRCS/EP… Create Contours… Manage Surface Models…*.
2. Highlight the correct surface model name. E.g. *Ogrnd*
3. Click the **Properties for Surface Model Icon**. Min/Max elevation & area is displayed. Use it for verifying whether the surface is good.
4. Click Close.
5. Click the **Lock Icon**. This will protect the EP surface model.
6. Click Close.