Overview: Creating a surface that represents the Original Ground is done by utilizing the **EX-Surface** point group. The user is to put unwanted points into the **EX-Not for Surface** point group. Breaklines and a boundary can be added to improve the surface. Once a good Original Ground surface is created it should be locked to avoid being accidentally deleted or changed.

Software: AutoCAD Civil 3D 2016, Civil 3D Workspace, NRCS C3D 2016 template

**Notation:**

<table>
<thead>
<tr>
<th>Button to Press</th>
<th>Displayed Text</th>
<th>Icon</th>
<th>Action</th>
<th>{Text to Enter}</th>
<th>Menu Item…</th>
</tr>
</thead>
</table>

Prerequisite

Follow the instructions for Importing Survey Coordinate Point Files into C3D.

Note: If a surface doesn’t rebuild or display as expected use:

Toolspace > Prospector… Surfaces… Right click Ognd… Click Rebuild…
Or refresh the display by typing {rea} and Press Enter
Or type {LevelOfDetailOff} and Press Enter.

View the Original Ground Surface

1) Toolspace > Prospector… Surfaces… Right click Ognd… Click Surface Properties…
2) Click the Information tab and Set the Surface Style to the Display that you want. Triangles are helpful for identifying points used or not used in the surface model.
3) Click OK

Finalizing Points for the Original Ground Surface

4) Determine Points that should be excluded from the original ground surface. Points in **EX-Survey Control** and **PR-Staking** groups are excluded from the Ognd Surface.
5) In Toolspace > Prospector… Point Groups… Right-click EX-Not for Surface… Click Properties…
6) Click Include… Checkmark With Numbers Matching… Click Selection Set in Drawing…
7) Click on the points that should be NOT used to build the original ground surface. E.g. Top of Well, Top of Wall, etc. When done selecting points in CAD press Enter
8) Click on the Point List tab to see the details of all of those points.
9) Click OK
10) **Important:** Refresh the Surface point group: In Toolspace > Prospector… Point Groups… Right-click EX-Surface… Click Properties… Query Builder… Click OK

Draw a boundary for the Surface model

This will represent an outer limit for the surface model.

11) Tool Palette > NRCS 11x17B… Click Breaklines and Boundaries… Boundary Line…

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12) While not snapping to the points, **click** to draw a border around outside of the survey. 
   (F3 toggles Osnap on/off.) To close the line cleanly, **type {C}** and **press Enter**.
13) In Toolspace> Prospector… **Surfaces**. **Ognd**… **Definition**… **Right click** **Boundaries**
14) **Click Add**
15) In the Add Boundaries Box set the **Type to** **Outer** and **Uncheckmark Non-destructive breakline**.
16) **Click Ok** and **select** the previously drawn boundary line object.
17) To edit the boundary hover your cursor over a vertex and the options to Stretch, Add, or Remove a vertex will be available.

**Adding Breaklines to get more Realistic Contours**

Adding breaklines connecting flowline shots prevents contours from jumping the banks. 
Note: 3D Polylines plot out only as solid lines. 2D Polylines plot out using linestyles.
18) **Right Click** the **Osnap Status**, **Click** Object Snap Settings… and **checkmark** only **Node** and **Object Snap On**. **Click OK**.
19) Tool Palette>NRCS 11x17B… **Click Breaklines and Boundaries**…Flow Line
20) **Click** onto the nodes to **Snap** to the Flow line shots.
21) **Press Enter** when done with a breakline.
22) Repeat for any other breaklines.
23) In Toolspace> Prospector… **Surfaces**… **Ognd**… **Definition**… **Right click** **Breaklines**
24) **Click Add**
25) In the Add Breaklines box set the **Type to** **Proximity** and input an optional description. E.g. {**Flowlines**}
26) **Click Ok** and **select** the previously drawn breakline objects.
27) **Press Enter**

**Locking a Surface to Protect it**
(Highly Recommended)

Lock the surface model once you are satisfied with it.
28) Use **Home…Palettes ▾. Coordinate Tracker** to inspect the elevations of the Ognd surface.
29) In Toolspace> Prospector… **Surfaces**… **Right click** **Ognd**… **Click Lock**...

**Create a Surface for Computing Stripping Earthwork Volumes**

Create the stripping surface model & lock it.
30) Toolspace> Prospector… **Right click** **Surfaces**…**Click Create Surface**
31) **Type = TIN surface**, **Name = Strip**,
32) Pulldown **Style = <off>** **Click OK**
33) **Click OK**
34) Toolspace> Prospector… Surfaces… Strip… Definitions… Right-Click Edits…
   Click Paste Surface…
35) Select Ognd Click OK
36) Toolspace> Prospector… Surfaces… Strip… Definitions… Right-Click Edits…
   Click Raise/Lower Surface…
37) Input strip depth as a negative, E.g. {-0.5} Press Enter
38) Toolspace> Prospector… Surfaces… Right-Click Strip… Click Lock…

View Statistics about the Original Ground Surface (Optional)

39) Toolspace> Prospector… Surfaces… Right click Ognd… Click Surface Properties…
40) Click the Statistics tab and expand the General, Extended, and TIN details
41) Click OK

Create User Defined Contours (Optional)

42) Toolspace> Prospector… Surfaces… Right click Ognd… Click Surface Properties…
43) Click the Information tab and Set the Surface Style to User Defined Contours.
44) Click the Analysis tab and set Analysis type = User Defined Contours
45) Set Ranges Number to the number of contour elevations wanted. Then click:
46) Input the contour elevation values
47) Click OK

Add or Edit Surface Contour Elevation Labels

48) Toolspace> Prospector… Surfaces… Ognd… Right-click Add Label…
49) In the Add Labels box: Feature = Surface; Label Type = Contour Multiple: Major, Minor & User = Ognd Contour Elevations (Auto decimal)
   a) Click Add
   b) Click on a contour of the Ognd surface model.
   c) Command line displayed: Specify First Point. Click in CAD to set the starting point of a hidden line that will go across the contours and create labels.
   d) Command line displayed: Specify next point. Click in CAD to select the next point of a line for creating labels.
   e) Repeat or Press Enter when done creating labels.
50) Or use Label Type = Contour - Single to place labels by clicking at specific points on the contour lines.
51) Click Close
52) To edit label locations, click an elevation label and move the grips of the hidden line.