

Original Ground Contours

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 border="1"><tr><td>Button to Press</td></tr></table> <i>Displayed Text</i> Icon <u>Action</u> {Text to Enter} <u>Menu Item</u> ...	Button to Press
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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... <i>Surfaces...</i> <u>Right click</u> <i>Ognd...</i> <u>Click</u> <i>Rebuild...</i> Or refresh the display by <u>typing</u> {rea} and <u>Press Enter</u> Or <u>type</u> {LevelOfDetailOff} and <u>Press Enter</u> .
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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


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
- 10) **Important:** Refresh the *Surface* point group: In Toolspace> Prospector... *Point Groups..* Right-click *EX- Surface...* Click *Properties...* Query Builder... Click

Draw a boundary for the Surface model

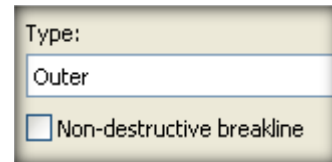
This will represent an outer limit for the surface model.

- 11) Tool Palette>NRCS 11x17B... Click *Breaklines and Boundaries...Boundary Line...*



 Boundary Line (+ to toggle on/off Tool Palettes)


Original Ground Contours

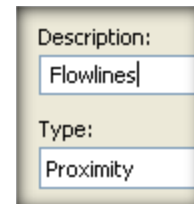
- 12) While not snapping to the points, click to draw a border around outside of the survey. (F3 toggles Osnaps on/off.) To close the line cleanly, type {C} and press Enter.
- 13) In Toolspace> Prospector... *Surfaces... Ognd... Definition...* Right click *Boundaries*
- 14) Click *Add*
- 15) In the Add 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


Original Ground Contours

- 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)

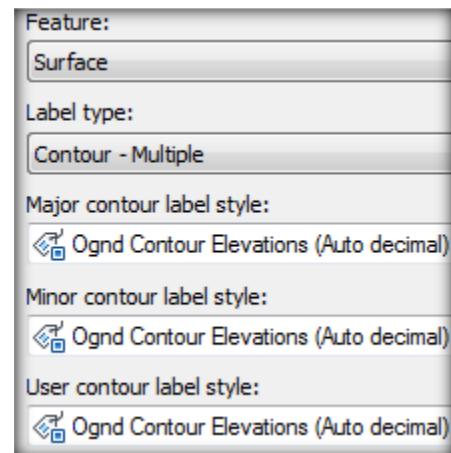
- 42) Toolspace> Prospector... *Surfaces... Right click Ognd... Click Surface Properties...*
- 43) Click the *Information* tab and Set the *Surface Style* to *_User Defined Contours*.
- 44) Click the *Analysis* tab and set *Analysis type = User Defined Contours*
- 45) Set *Ranges Number* to the number 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.