# CREATING A SURFACE

This help sheet covers the procedure for creating a surface by either:

- *Method 1*- Using imported points
- *Method 2*- Referencing a point file (txt or csv file)
- Method 3- Referencing a LIDAR point file (xyz file)
- *Method 4*- Referencing a LIDAR point SHAPEFILE (shp file)

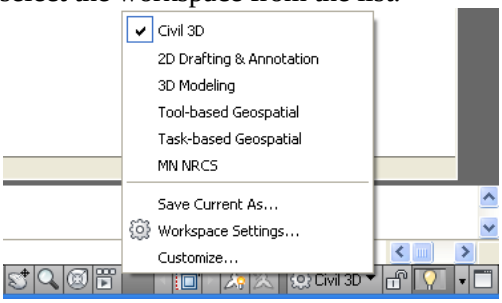
Refining and labeling your surface is also included.

**You will need to know which format your point file is in before you begin**. In this example, the file contains survey data in PNEZD comma delimited format, as shown in the samples below.

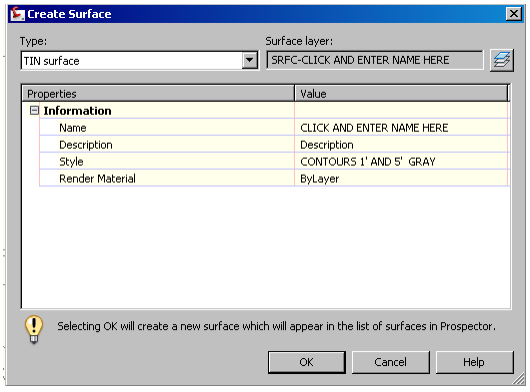
## I. Method 1 – Using imported Points to Create a Surface

This method utilizes points that have been added to your drawing.

1. Make sure the Civil 3D workspace is loaded. To do this, check the workspace that is listed in the lower right hand corner of the window, as shown below. To switch a workspace, click on the down arrow next to the workspace name and select the workspace from the list.




2. Go to the *Prospector* tab in *Toolspace* and right click on *Surfaces*, select "create surface".




3. Enter a name for the surface in the right column of the dialog box, as shown above.
4. In *Toolspace*, expand the menu under Surfaces, and then expand the named surface that you just created. In this example, the surface is named *Existing Ground*. Expand the *Definition* menu for that surface.
5. Right-click on the Point Groups subdirectory.
    i. Pick Add.

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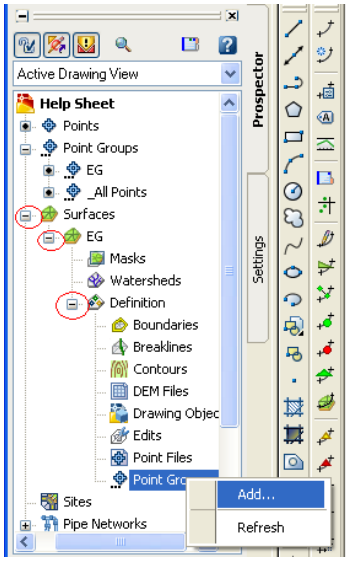
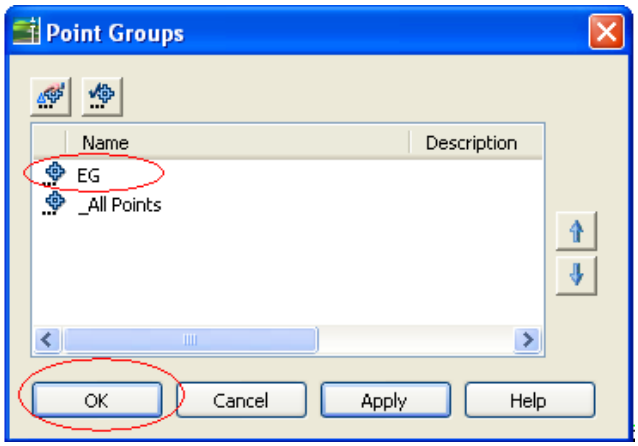
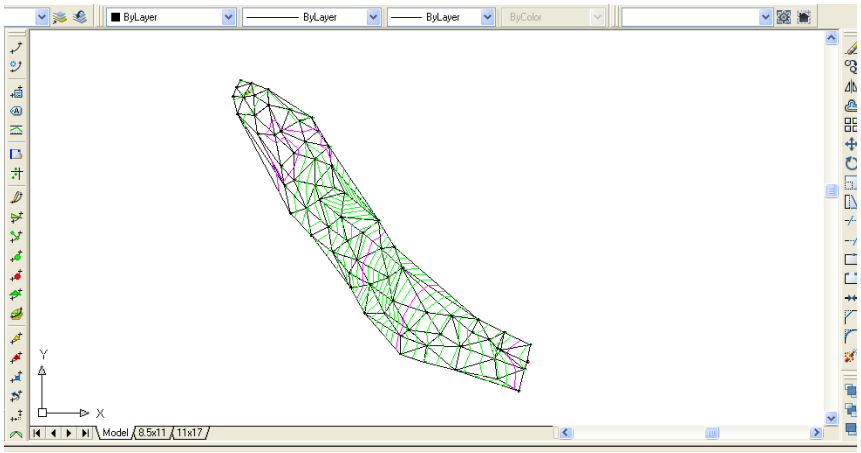
ii. The point group you created should be on the list. Chose it and pick OK.

iii. Your surface should appear, already built.



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## II. Method 2 – Referencing a TXT or CSV point file

Appearance of text file data:

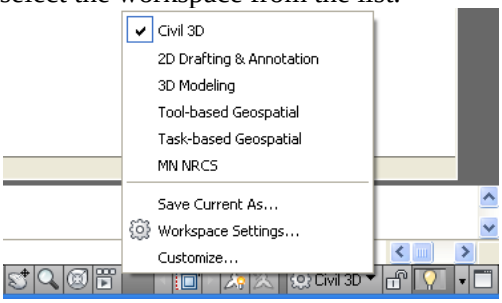
```
100,745.1372,933.2802,1275.5866,SPOT
101,695.2444,926.5438,1271.9057,SPOT
102,657.1006,932.2727,1267.7108,SPOT
103,631.4184,931.3466,1257.8583,SPOT
104,602.6458,929.6008,1253.2811,SPOT
105,566.2690,925.1058,1256.1897,SPOT
106,540.3683,923.0105,1261.0048,SPOT
107,513.2654,919.3450,1268.5872,SPOT
108,522.5083,934.3847,1264.7061,FNC
```

Appearance of csv file data:

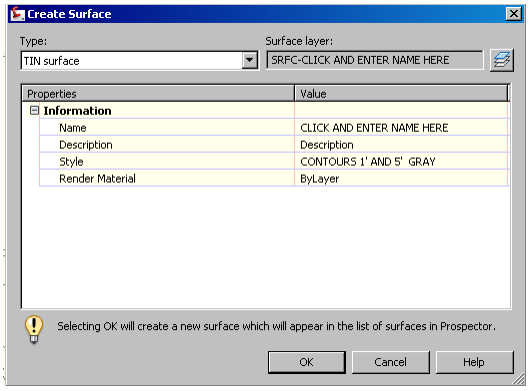
| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | 245 | 678004.3 | 847506 | 833.765 | G |
| 2 | 246 | 678022.1 | 847508.6 | 834.184 | G |
| 3 | 247 | 678059.1 | 847503.2 | 835.371 | G |
| 4 | 248 | 678027.8 | 847535.9 | 833.864 | G |
| 5 | 249 | 678009.4 | 847570 | 833.305 | G |
| 6 | 250 | 678026.5 | 847588.8 | 833.039 | G |
| 7 | 251 | 678061.4 | 847611.5 | 833.439 | G |
| 8 | 252 | 678065.3 | 847668.6 | 832.943 | G |
| 9 | 253 | 678038.2 | 847680.9 | 832.298 | G |

NOTE: When you link point data into a drawing using this procedure, the actual point objects will not be inserted into the drawing. You will be able to see the point markers but the point data is not available. You can snap to the points for measuring or drawing a line. The only way to get the point data is by manually hovering over the point with the cursor and observing the display of surface elevation and coordinates.

1. Make sure the Civil 3D workspace is loaded. To do this, check the workspace that is listed in the lower right hand corner of the window, as shown below. To switch a workspace, click on the down arrow next to the workspace name and select the workspace from the list.




2. Go to the *Prospector* tab in *Toolspace* and right click on *Surfaces*, select "create surface".




3. Enter a name for the surface in the right column of the dialog box, as shown above.
4. In *Toolspace*, expand the menu under Surfaces, and then expand the named surface that you just created. In this example, the surface is named *Existing Ground*. Expand the *Definition* menu for that surface.
5. Right click on the *Point Files* category under the surface definition and select *Add…* from the menu.

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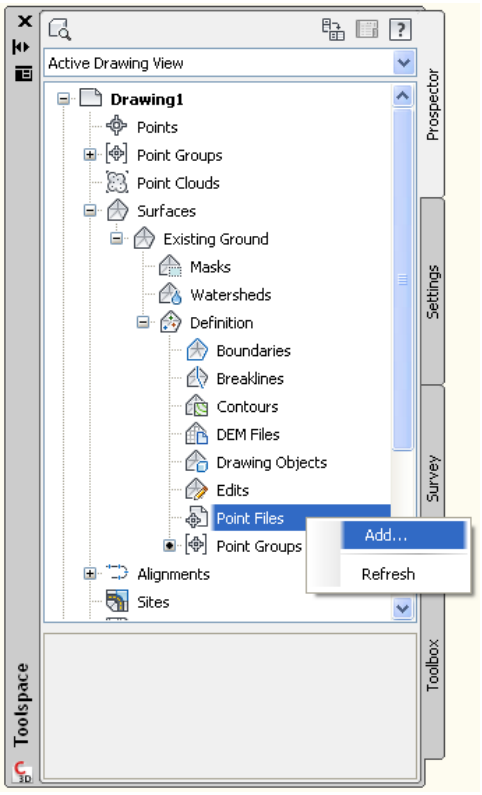
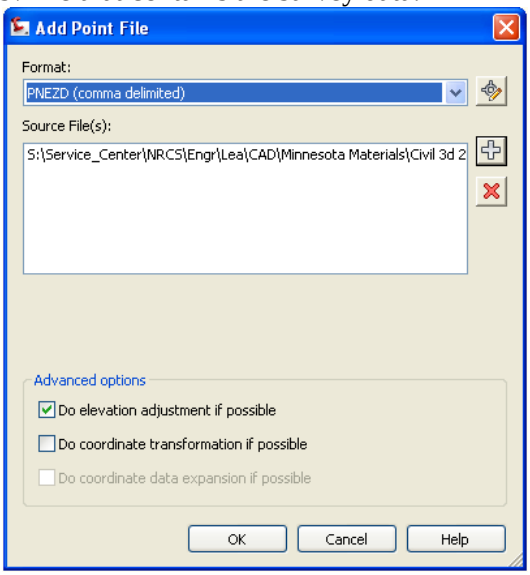



6. In the *Add Point File* window, select the PNEZD (comma delimited) format. Click on the  button and browse to the text or csv file that contains the survey data.




7. Click on the *OK* button to establish the link to the point file.
8. The survey data contained in the text or csv file will be included in the definition for the named surface, and the surface can be displayed in the drawing. The surface functions the same as always, except that the point data is not available.

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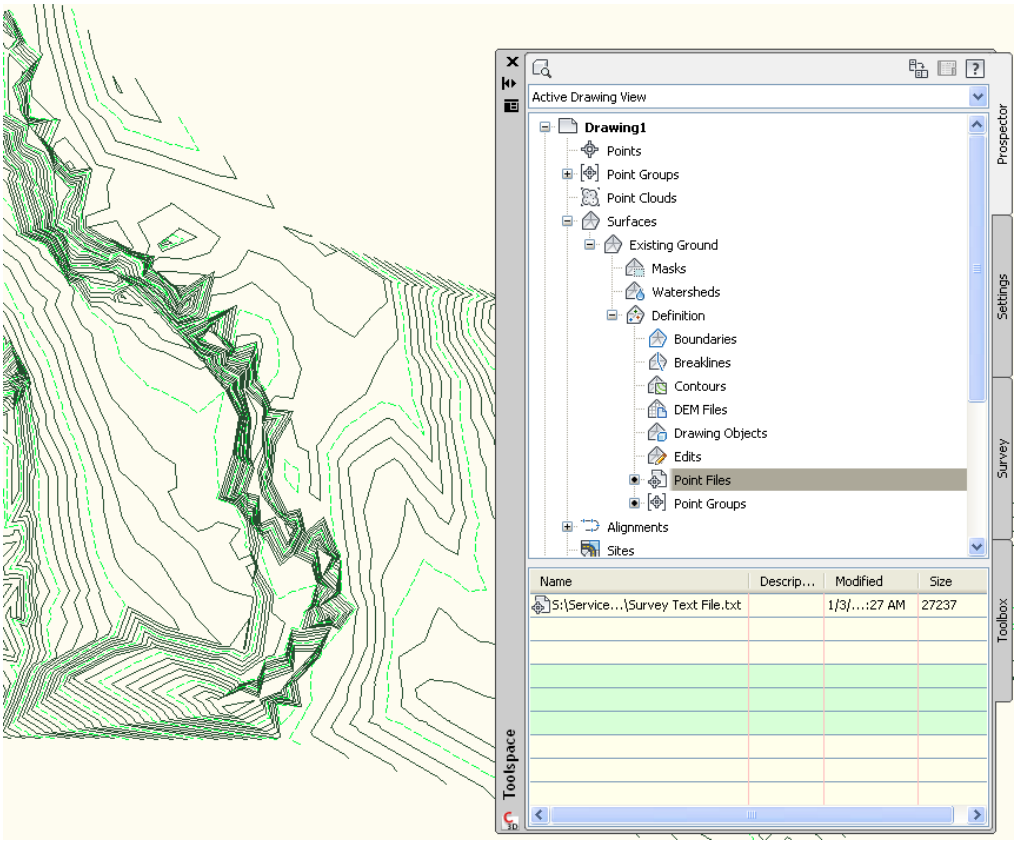
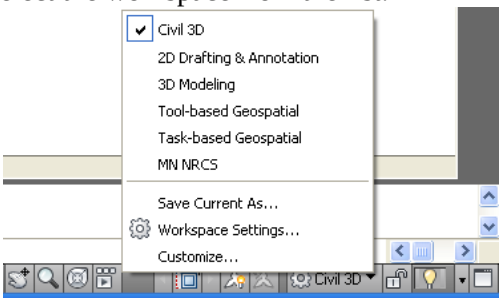



## III. Method 3 – Referencing a LIDAR point file

LIDAR point files are generally huge and are too much for Civil 3D to handle. This method utilizes data clip under Surfaces to reduce the number of points referenced.

1. Make sure the Civil 3D workspace is loaded. To do this, check the workspace that is listed in the lower right hand corner of the window, as shown below. To switch a workspace, click on the down arrow next to the workspace name and select the workspace from the list.




2. Go to the *Prospector* tab in *Toolspace* and right click on *Surfaces*, select “create surface”.

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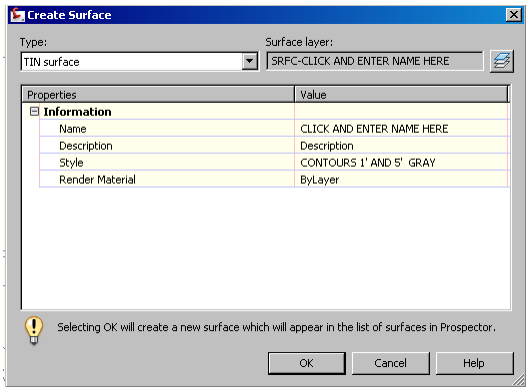
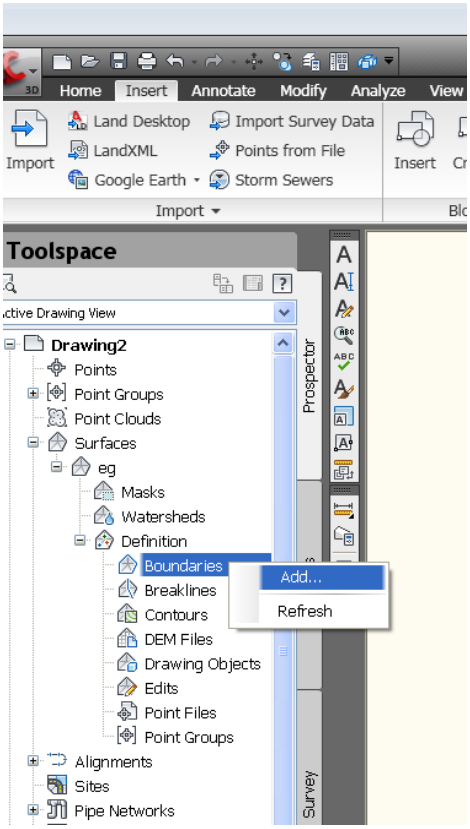



3. Enter a name for the surface in the right column of the dialog box, as shown above.
4. In *Toolspace*, expand the menu under Surfaces, and then expand the named surface that you just created. In this example, the surface is named *Existing Ground*. Expand the *Definition* menu for that surface.
5. Draw a ***closed*** polygon around your area where you want contours
6. Right click on "Boundaries" and then select "add"




7. In the dialog box, give it a name and for TYPE select "data clip" , then OK
8. Use the cursor to select your closed polygon you drew above

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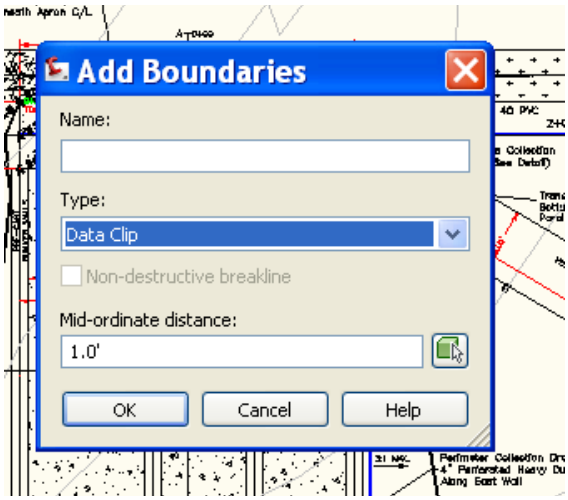
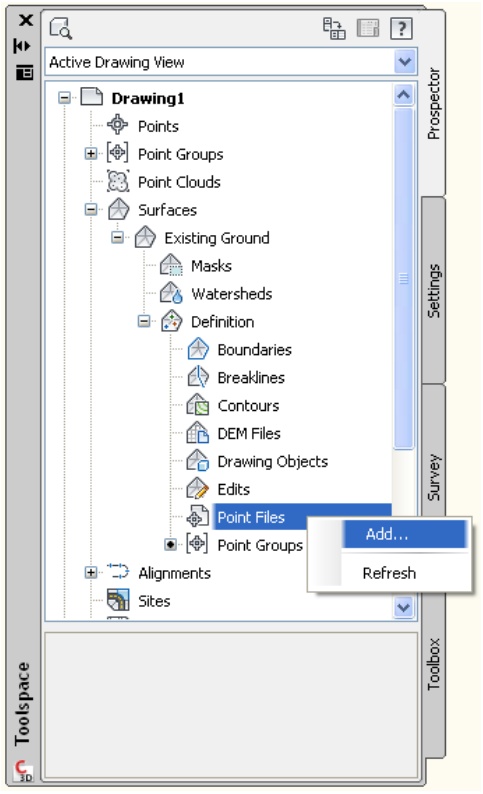



9. Right click on the *Point Files* category under the surface definition and select *Add…* from the menu.




10. In the *Add Point File* window, select the format your LIDAR data is in. Click on the  button and browse to the LIDAR file.

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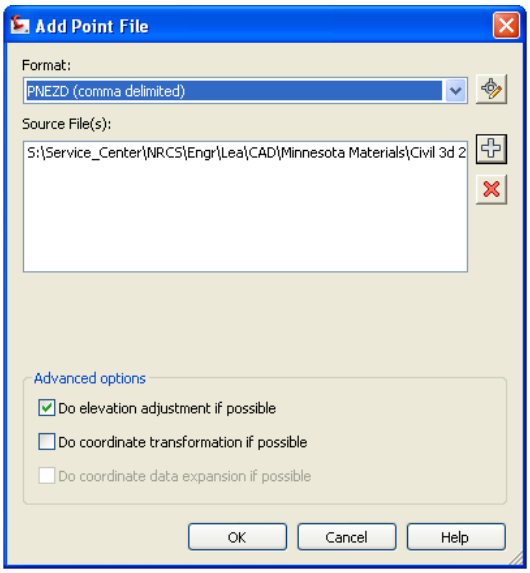
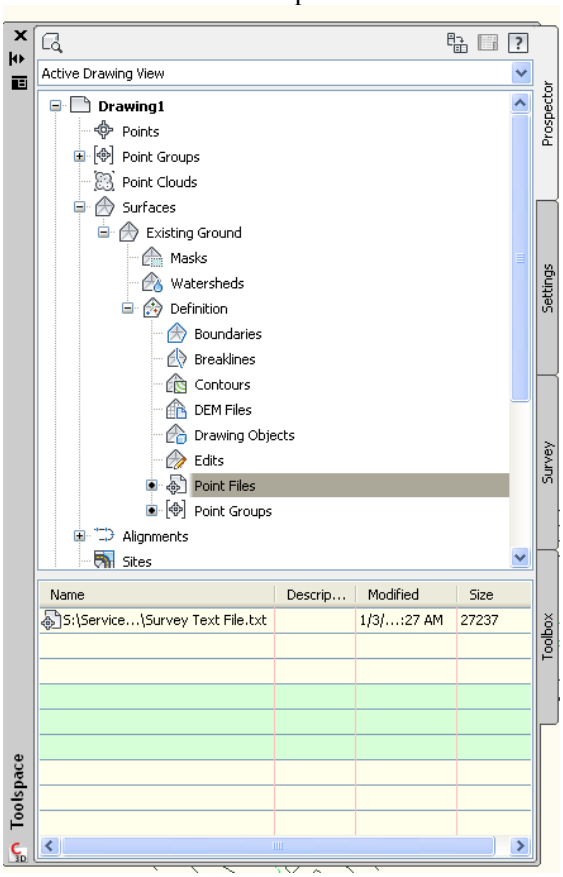



11. Click on the *OK* button to establish the link to the point file.



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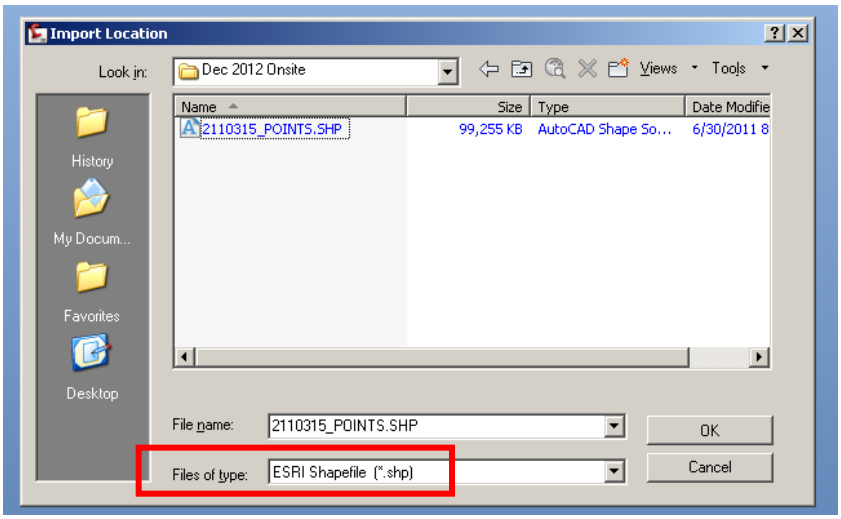
## IV. Method 4-Referencing a LIDAR point SHAPEFILE (shp file)

- LiDAR contours can be used for planning purposes.
- LiDAR bare earth points can be used under some circumstances in the design process.
- The LiDAR data should be used with the orthophoto which was flown at the same time the LiDAR data was gathered.
- Please discuss with your Engineering Contact if you are unsure if LiDAR should be used.
-

**Importing LiDAR Shapefiles**

- Be sure the coordinate system is set in the cad drawing. Map Import brings your data into the drawings coordinate system. Therefore, it is important to set the coordinate system of the drawing ahead of time!
- To insert the LiDAR shapefile into Civil 3D 2010 type "mapimport" at the command line
  - A dialog box will open asking to browse to where the shapefile is located
    - You may have to change the "File Type" at the bottom of the dialog box to ".shp"




  - The Import Shapefile Dialog Box will open
    - If your project area is smaller than a section you can define the area of interest
      - In the "Spatial Filter" area click on the icon near "Define Window"
        - In the CAD drawing the command line will ask you to define the window for data import… which means draw a box where you want the points to be visible.
      - In the Input Coordinates drop down set the coordinate system if needed.

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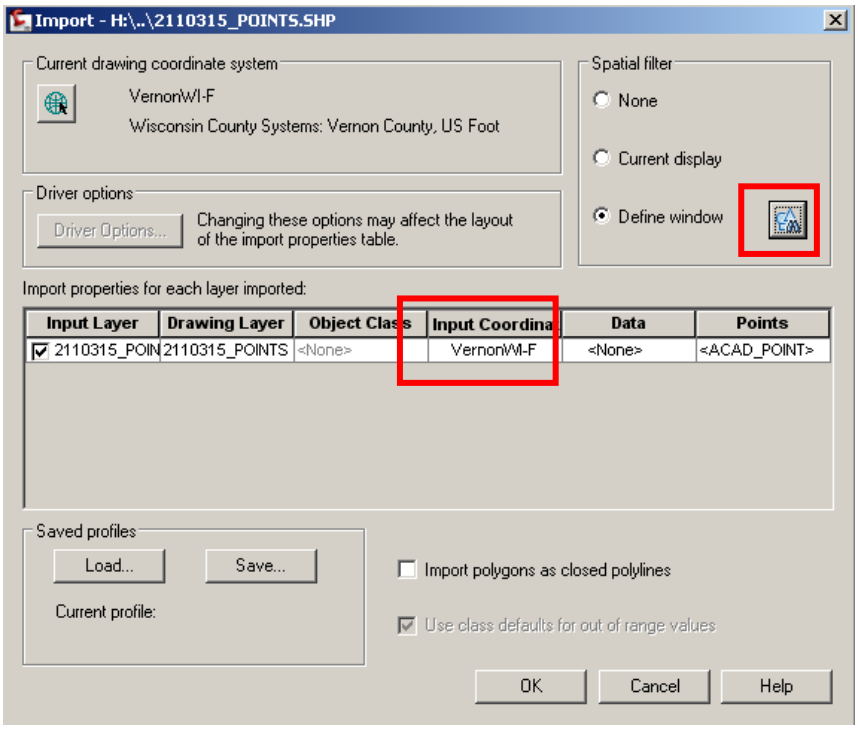
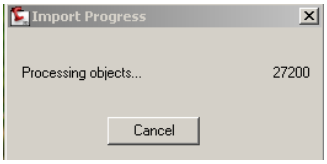



- Click "OK"
- It will take some time to process and import the data. A dialog box will appear showing the progress




- When the data has loaded it will appear in your drawing (this example is using LiDAR point data).

**Building a Surface (for Point data)**

- In Toolspace > Prospector > right click on Surfaces > Create Surface
  - In the dialog box give the surface a name and say ok
- Expand the surface so you can see the options under "Definition"
  - Right click on "Drawing Objects" > "Add"

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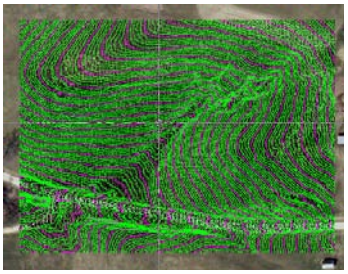
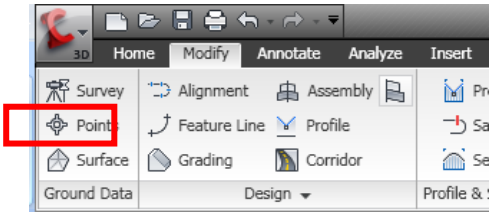
- In the dialog box be sure the Object Type is Points > ok
  - The command line will ask you to select the objects
    - draw a box around the lidar points
      - the surface will then be built



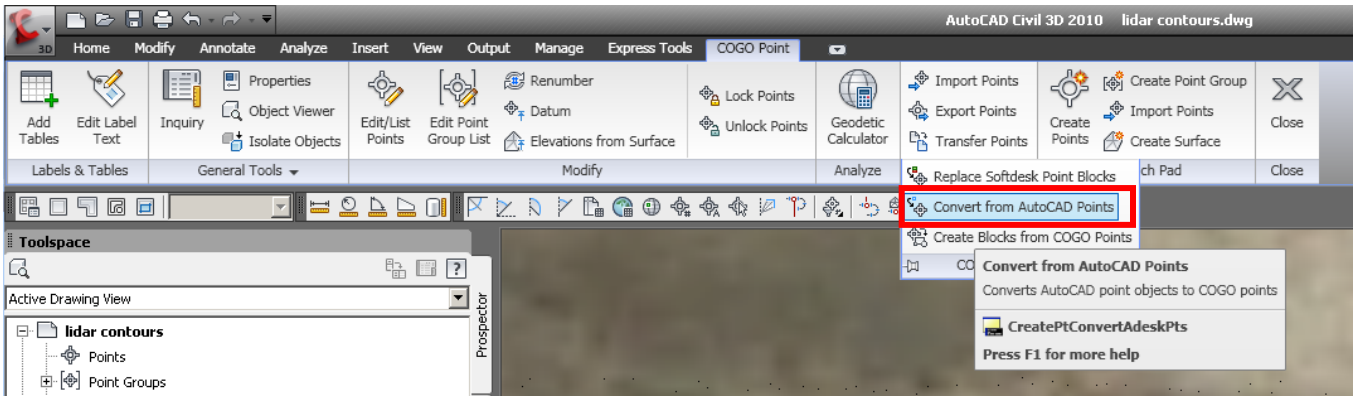
- The points can then be frozen or deleted,
  depending on if they are needed anymore.

**Changing a point from an object to a Civil 3D Point**

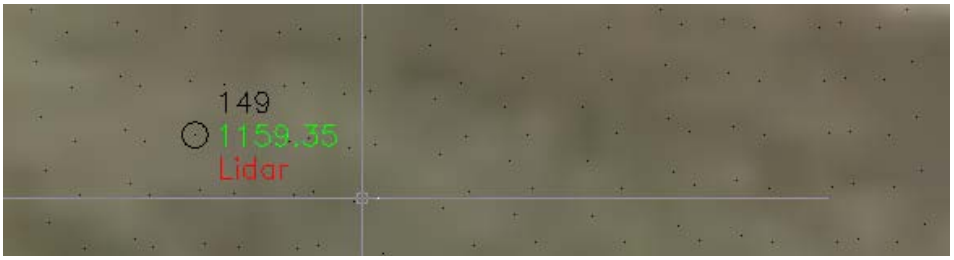
- On the Modify Ribbon > Ground Data Panel click on "Points"




- The Cogo Point Conceptual Ribbon will open




  - Click the down arrow on the Cogo Point Tool Panel
    - Click on "Convert from AutoCad Points
      - Follow the command line
        - select the autocad points
        - enter a description for the point
          - The point will then become a Civil 3D Point



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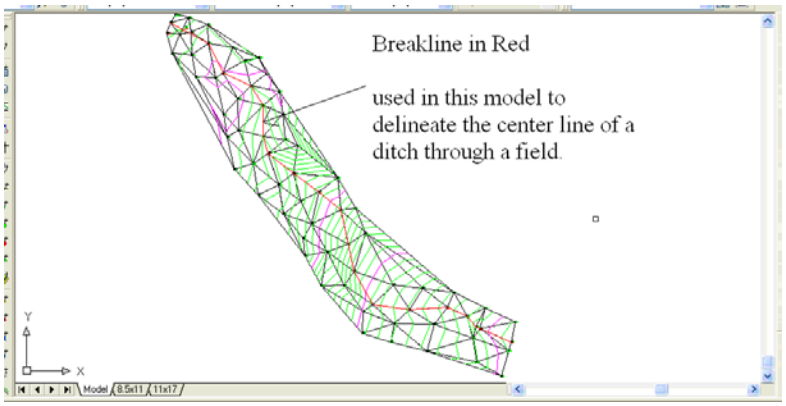
## V. REFINING YOUR SURFACE

### 1. Adding Breaklines to your Surface

a. Using the 3d polyline draw tool, draw a 3d polyline, attaching it to the Nodes of the points that define it.




b. From the Toolspace toolbar → Surfaces directory → EG → Definition subdirectory

i. Right-click on Breaklines.

ii. Pick Add. You will be prompted to give a description (optional), pick OK.

iii. Your command line will ask you to Pick Objects. Pick the polylines you wish to be breaklines. Hit Enter.

iv. The surface will rebuild itself using the polylines.

**Note:** at this point you may get an annoying incident dialog box popping up, If the surface does what you want, ignore the box. In fact in most cases you can ignore that box. Pick the corner to close the box.

*c.* Further editing the surface can be accomplished by Right-clicking the Edits subdirectory under Definition.

*i.* In here, there will be the familiar editing tools, like: Add or Delete line; Add or Delete point, etc. *Note: Flip Face is now called Swap Edge.*

*ii.* In order to edit your surface, it is recommended that you have your contours, tin lines and points all showing.

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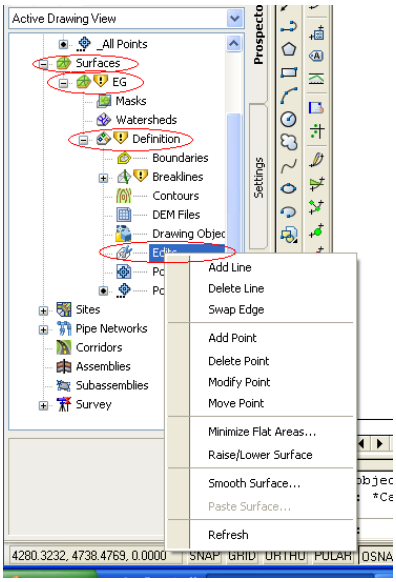



**2. When you are done refining your surface, and you want to only see the contours,**

a. Right-click on your surface name.

b. The top option in the menu should be Surface Properties. Pick that.

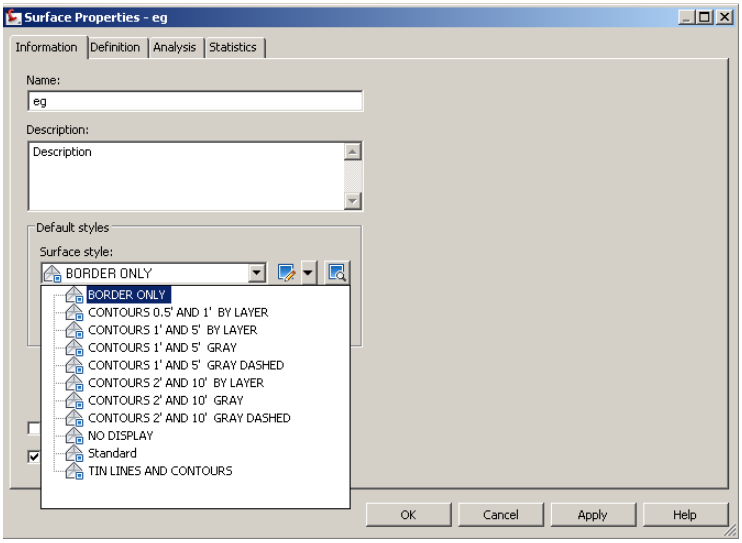
c. In the large dialog box that appears, the Information Tab should be foremost.

d. Under the window marked Surface Style, pick the scroll button on the right.

e. Choose CONTOURS from the options.

f. Pick OK.

g. Your surface will show contours and the original points. You can freeze the points if you want to.



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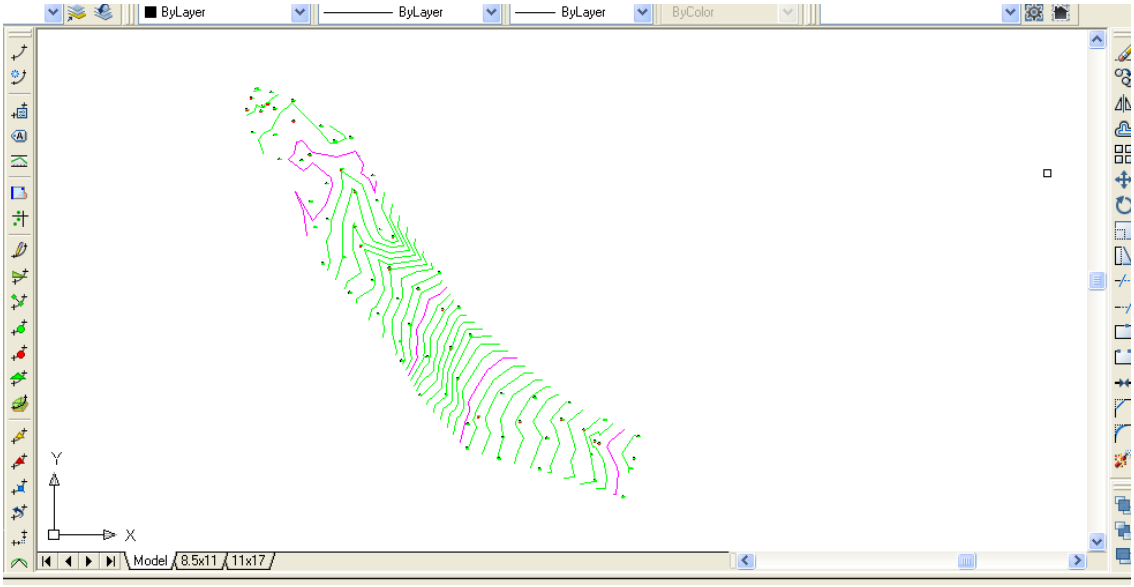
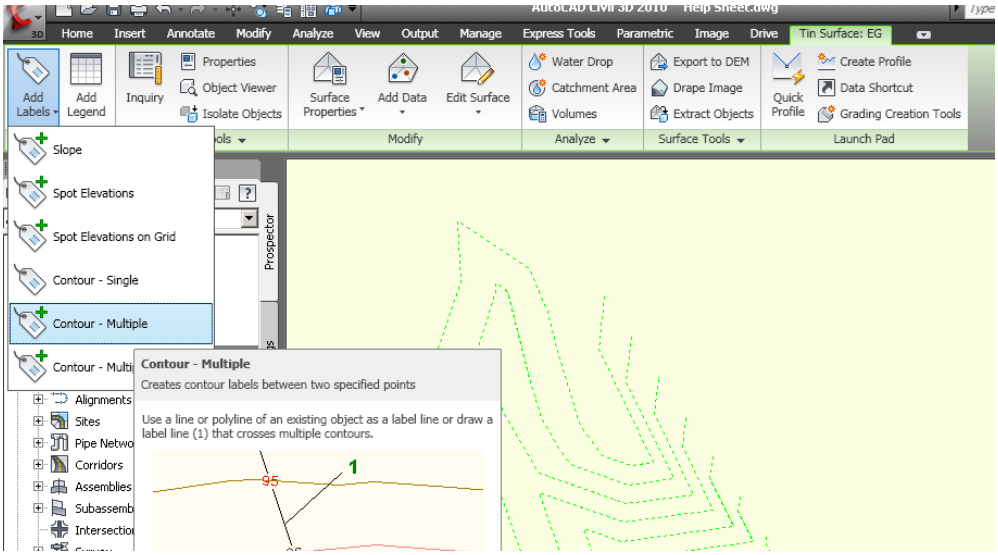



## VI. LABELING THE SURFACE

a. Click on the contour lines of the surface you want to label
b. A Conceptual Toolbar will appear
c. Click on "Add Labels" and choose the labeling method you want to use than follow the directions at the command line.




d. To change the contour label precision, click on the label and select properties.
    - Change the Surface Contour Label Style Major and/or Minor as appropriate

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