



Introduction of Trimble Terramodel™ S/W: *Contouring and DTM*

(designed only for GGE2012 students in 2009)

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Overview

Agenda:

1. Develop a preliminary contour map from surface model
2. Display point elevations and labels.
3. Edit survey points and surface model
4. Edit surface model with breaklines
5. Define the surface model boundary
6. Produce finished contour map

Please follow all the procedures without skip!

(If you find some troubles or mistakes, just let me or Kaizer know to fix it)

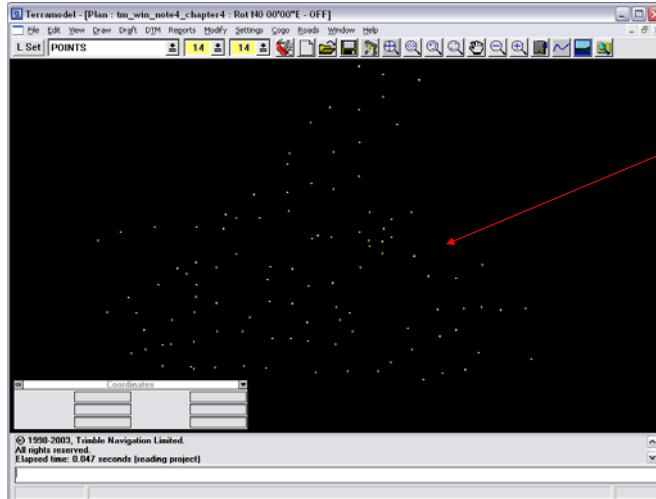
Example Project File → tm_win_note4_chapter4.pro (please download)



Overview



File → Open Project → Selected the file (please save a different file name)



Example points.

All 3D different points.

You will have your own values from the survey once you finished.

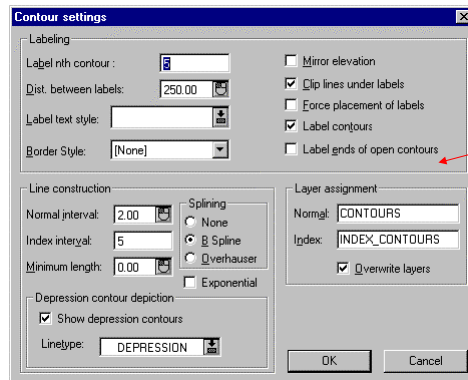


Overview



1. Develop a Preliminary Contour Map

Contouring Options (DTM → Generate Contours [ContourSet] → Contour Settings



This box allows users to edit the properties of contours. When the setting is fine, click [OK], otherwise click [Cancel]. Please follow as it is.



Overview

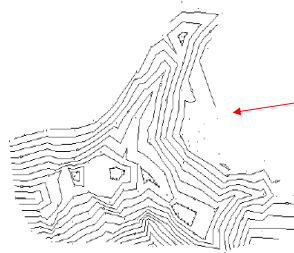


Contouring procedure

DTM → Generate Contours

→ DTM layer

→ OK to contour



This figure may not accurately represent the surveyed landscape. There are editing features that allow manipulation of the surface model from which the contour map is generated. Editing can be easier if the point labels and elevations are visible.

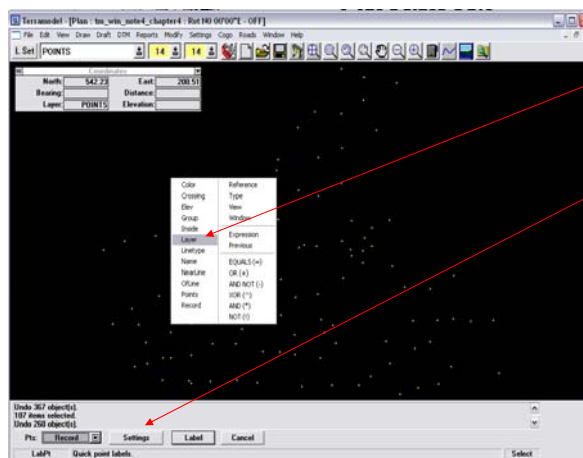


Overview



2. Create Labels for Point Elevations and Names

Draft → Label points with text...



→ Change the select control to Layer and then choose the Points layer

→ Setting (this will bring up the Point Label content dialog box)

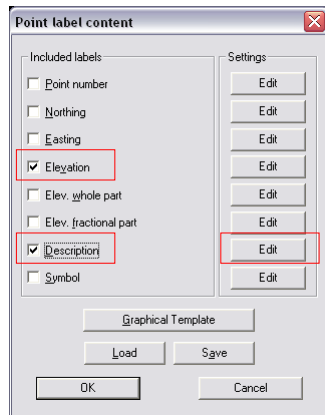


Overview



2. Create Labels for Point Elevations and Names

Cont'



→ This box allows the user to select which labels will be shown. Check only elevation and description in this example.

→ Elevation label will show the elevation of the point in the format "El=76.65". You can hit [F1] any time from the help menu.

→ Edit button

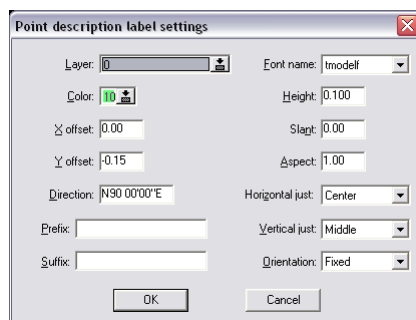


Overview



2. Create Labels for Point Elevations and Names

Cont'



→ Edit button will show you a Point label settings dialog box. (you can change the layer, color, height, etc. for each of the type)

→ Click OK once you set.

→ If everything is fine, click [Label] On the command bar

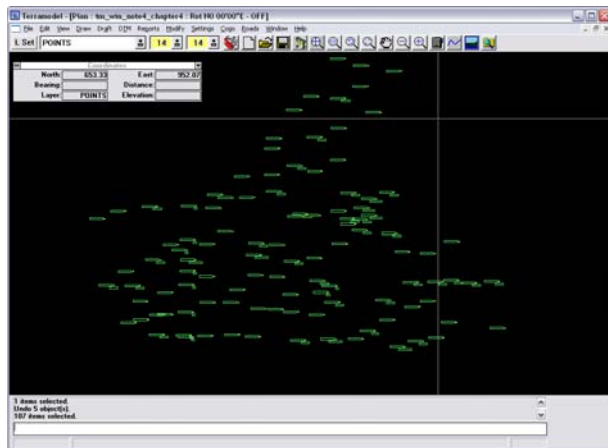


Overview



2. Create Labels for Point Elevations and Names

Cont'



→ Label looks too small to see. Please magnify it and then you can see the details.

Note: contouring is inactive for my example screen shot. Yours should be fine.

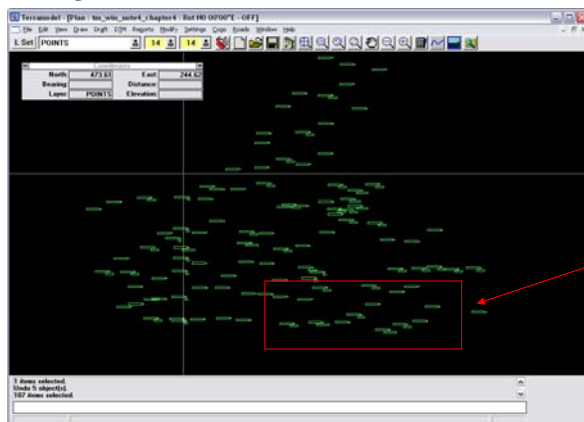


Overview



3. Adding & Editing Survey Points

Sometimes, the survey points must be added (due to elevations changed), deleted, moved, or inserted.



→ Current layer must be POINTS layer. If not, please select it. (on upper left part)

→ We will exercise the following the highlighted part.

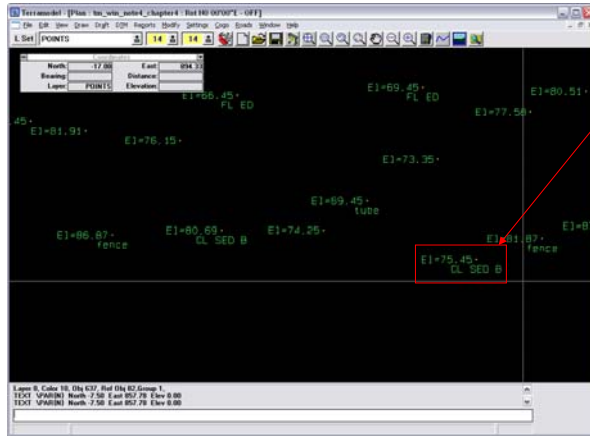


Overview



Change elevation:

Cont' → View → Zoom



→ CL SED B point with elevation 75.45 is wrong. It must be 80.60, and we will change it.

→ Edit → Edit Object → Select Point (click on the right spot!)

→ OK on the Edit box, CLOSE on command bar

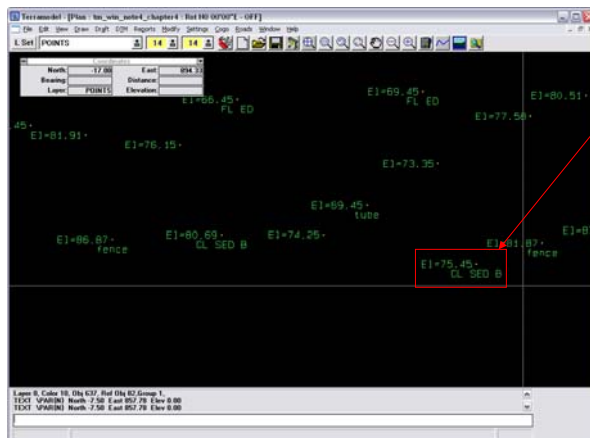


Overview



Change Elevation:

Cont' → Now we changed the elevation → Please go to View → Redraw



→ CL SED B point with elevation 75.45 is wrong. It must be 80.60, and we will change it.

→ Edit → Edit Object → Select Point (click on the right spot!)

→ OK on the Edit box, CLOSE on command bar



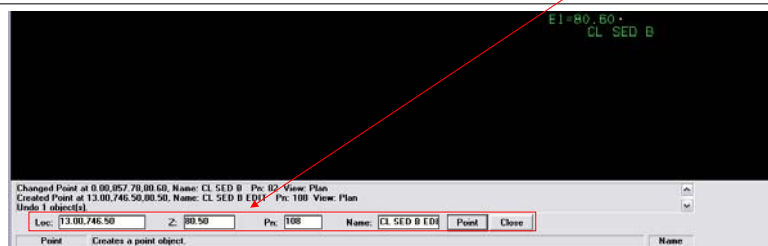
Overview



Insert Points with an Elevation and Name:

→ A point will be created and an elevation assigned which will enable the software to close contour lines along the downstream of the sediment basin. The name of the point will indicate that it was not part of the original survey. The new centerline point elevation will be 80.5.

→ Draw → (Point) Point → Type coord. (13.00, 746.5), Z (80.5), and Name



13/34

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Overview



Insert Points with an Elevation and Name (cont'):

→ The point will show up as a dot. The name and elevation will not be displayed unless the labels are created for this point. Altering point locations or elevations doesn't change the surface model and map until the contours are regenerated.

→ Re-contour to see the effects of adding this new point.

→ DTM → Generate Contour (Select the POINTS as the DTM layer) → OK

→ View All.

14/34

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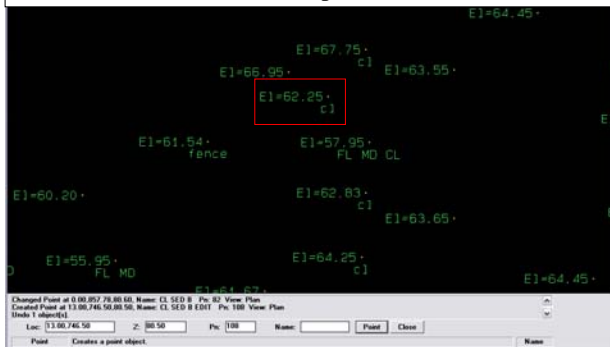
Overview



Move a survey point:

→ An error in processing the survey data has resulted in a centerline point (Elev 62.25) plotted in the wrong location. The point can be moved to match other centerline points. Magnify this location.

→ To remove the centerline point with Elev 62.25

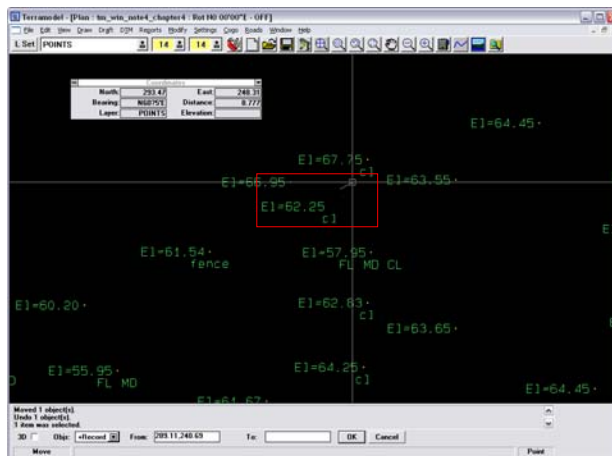


Overview



Move a survey point:

→ Modify → Move (select the point to be moved) → From ? To ? (drag)



→ The maps will not change until recontoured (DTM → Generate Contours → Select DTM layer → OK to contour)



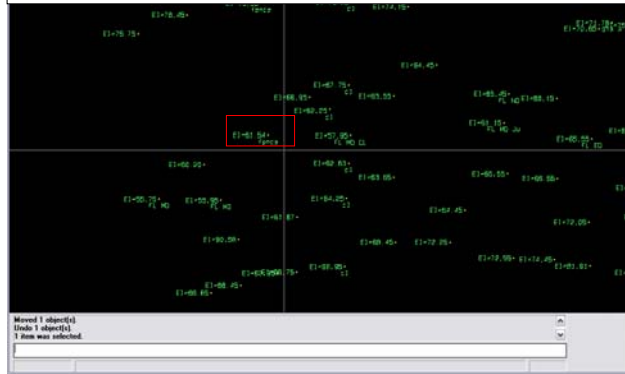
Overview



Delete a survey point:

→ An survey point located at coordinates, North 250.39, East 159.09, will be deleted as an exercise.

→ Edit → Delete



→ select the point to be deleted.

→ OK

(point description will not be deleted with the point and must be erased separately)

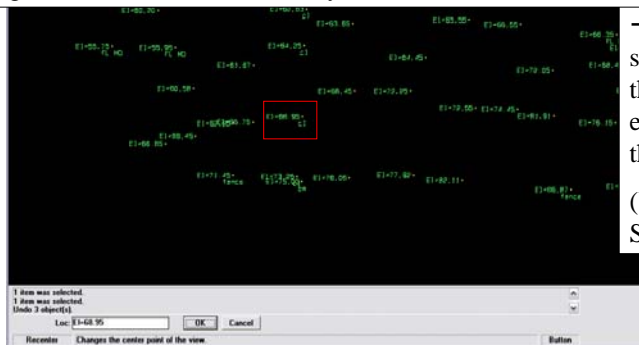


Overview



Move survey points to another layer:

→ Sometimes a survey point should not be part of the surface model and must therefore be moved to a different layer. As an example, survey points on a concrete structure would not be part of the original ground surface model. This tutorial file has a benchmark (at coordinates 27.89, 252.5) which is not on the ground surface. Use the ReLayer command to move it to another layer.



→ First, re-center the screen display, using the centerline shot at elevation 68.195 as the new center:

(View → Recenter → Select the point)

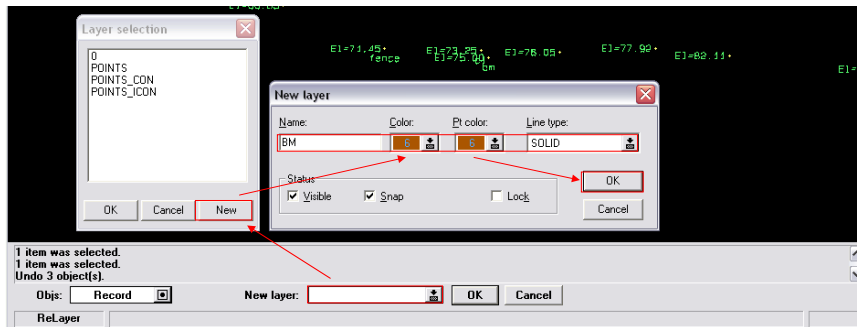


Overview



Move survey points to another layer:

→ (To re-layer the benchmark) Modify → ReLayer



→ Click New layer → New → Type BM in the name window on the new layer box, select color 6 and solid line → OK → OK → OK on the Relayer command bar → (View entire project) View → All (Pl. save the file)



Overview



4. Edit Surface Model with Breaklines

Displaying Triangulated Irregular Network (TIN)

The surface model links (triangles) can be displayed to check proper point connection and elevation interpolation by using the link settings command.

Settings → Link Settings

(Ele. Tolerance for flat triangle windows; 1.00

(Max. edge distance window; 250

(check Display links box

(check Remove flat triangles box

(choose link color of 9, and select POINTS layer

→ OK



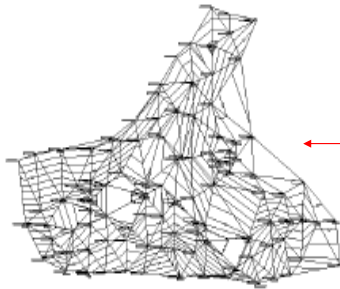
Overview



Cont' Displaying Triangulated Irregular Network (TIN):

If you can't see any, please click "View → Redraw" and/or "View → All".

Links can be turned off by unchecking the "Display Links Box"



You have to see a similar network to the left.

This software links the survey points to form plane surfaces from 3 adjacent points and interpolates contour elevations along the edge of the planes. Please use the name not to make incorrect links.



Overview



Cont' Displaying Triangulated Irregular Network (TIN):

Connecting the surface model triangles (links) is simpler if those points, which will be connected with breaklines, are identical during the survey. If the survey points are described during the survey with identical labels, they can be easily displayed along with the associated survey points and elevations. Breaklines can then be created connecting the points.

Before selecting specific point labels to be visible, all of the point labels should be turned off.

(To turn off the point labels) Draft → Label points with text (POINTS layer) → Setting → uncheck all → OK → Label on the command bar



Overview



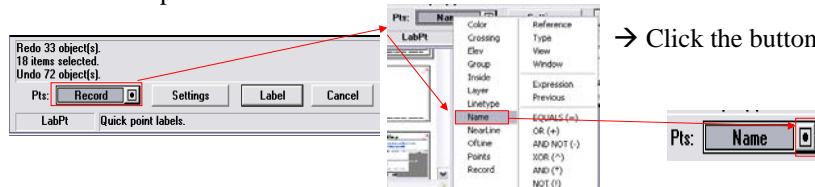
Displaying Selected Point Labels:

In many cases, the labels of select points are the only ones needing displayed. For this example, the points identified as flowlines with a “FL” label will be turned on.

(Note: Typing “*” (asterisk) before and after the intended labels is a wildcard symbol that will capture all labels containing FL.

To label the points:

Draft → Label points with text → double-click “Record” → choose “Name” → Click the button



23

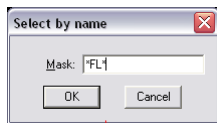


Overview

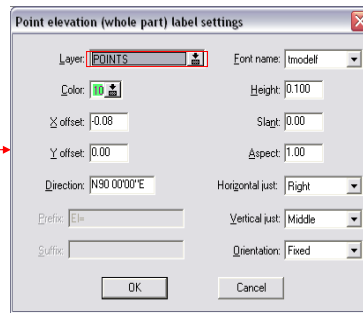
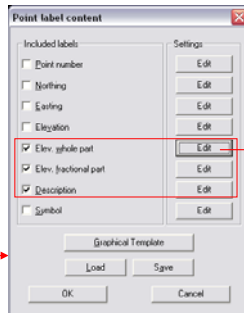


Displaying Selected Point Labels:

Input [*FL*]



Settings



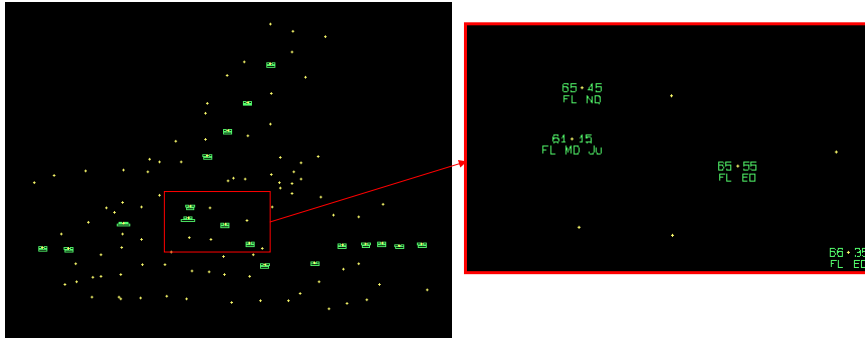
Repeat all “Edit” and choose “POINTS” layer, appropriate color, text height etc.



Overview



Displaying Selected Point Labels:



You will see the selected labels



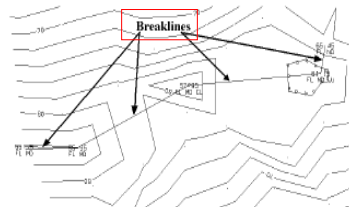
Overview



Adding Breaklines to Connect Surface Model:

This section describes the process of manual breakline insertion. You can get more detailed information from Terramodel Note 3 for automatic insertion of breaklines using point descriptors.

Breaklinks are constructed between two points by placing the cursor box over the points and selecting them with the mouse button. {ESC} stops the process.



To add breaklines:

Draw → Set → Breaklines

(select the first point to be connected)

(select additional points)

{ESC} or [CLOSE] to exit the command



Overview



Adding Breaklines to Connect Surface Model:

To delete breaklines:

Edit → Break

(select breaklines to be erased)

(Note. Breakline effectiveness and accuracy can be checked by periodically recontouring.)

DTM → Generate Contours → Select POINTS as the DTM layer → OK



The edited contour map (without the flowline labels) is shown.



Overview



5. Defining the Surface Model Boundary:

Sometime, contour lines will extend past the limit of the survey; interpolate two survey points on the edge of the survey that are on the opposite of a nose of a hill.

Previously, the user displayed the link using [Setting] → [Link settings]. In doing so, the user had chance to set the maximum edge distance, or link length. The default length is set to 250 feet, which tells the software to interpolate between any two points that are 250 feet or less apart. Limiting the boundary can avoid making contouring, interpolating, or performing any calculations outside this boundary. All points must be 3D and in the same layer.

Draw the DTM edge for the POINTS layer. First edit the color of layer POINTS so it will be easy to distinguish the DTM edge.

(Make POINTS the current layer, and change color to 13)



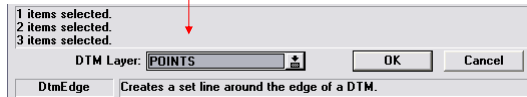
Overview



5. Defining the Surface Model Boundary:

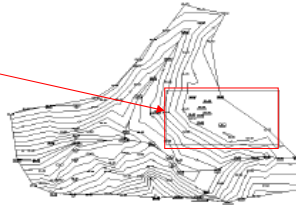
Create the DTM edge:

DTM → DTM edge (select POINTS as the DTM layer) → OK



The default boundary for the surface model will be drawn using color 13. Edit the default edge:

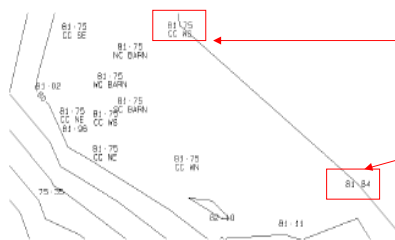
View → Zoom → select first corner
→ select second corner



Overview



5. Defining the Surface Model Boundary:



Break out the set line connecting CC WS (elevation 81.75) and the point at elevation 81.84

Edit → Break (select the segment to be broken)

After breaking, finish the set to define the desired boundary (next page)



Overview



5. Defining the Surface Model Boundary:

To finish the set to define the desired boundary:

Draw → Set → Set

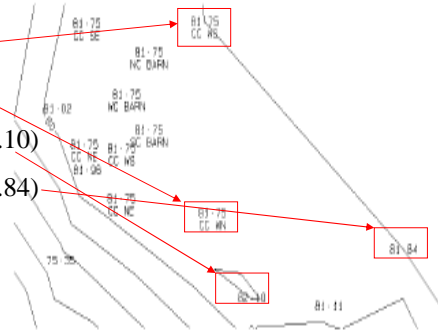
(select the point at CC WS)

(select the point at CC WN)

(select the point at elevation 82.10)

(select the point at elevation 81.84)

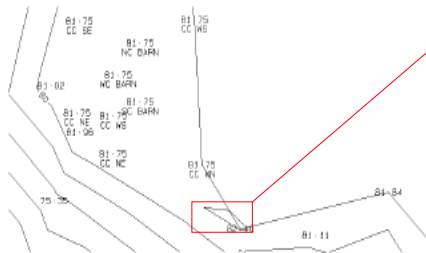
→ {ESC} or [CLOSE] to exit



Overview



5. Defining the Surface Model Boundary:



Please re-contouring to see the result, but we noticed that the 82 contour is no longer a closed contour.

DTM → Generate Contours

Select POINTS as the DTM layer → OK

To display the entire map:

View → All



Overview



6. Produce a Finished Contour Map:

The finished contour map should have the points and point labels turned off.

To turn off the points (better making invisible):

[L set] → highlight both POINTS and BM layers (using CTRL key)

→Uncheck Visible status box → OK

Note: The user may prefer the finished contour map to have smooth contour lines. Do this by enabling the Smooth contour check box found in the Contour setting dialog box. (and make sure to re-contouring)



References



[1] Natural Resources Conservation Service, Nebraska

[2] Trimble Manual