Using Microsoft (MS) PowerPoint (MSPP) as a computer-aided drafting tool

• Prior to the advent of personal computers, geological analyses were normally conducted using graph paper, calculators, and measurement tools like protractors.

•Today, powerful software tools like MSPP and Google Earth (GE) can be used to do most of the tasks traditionally done by hand in an 'old-school' manner.

• This lesson focuses on learning how to use MSPP as a 2D, digital-drafting tool to facilitate geological investigations, and how to use GE to construct a cross-section.

• The first part focuses on the MSPP key-stroke shortcuts that are commonly used and some approaches that I commonly use to conduct map- and cross-section geological analyses.

PART 1 MSPP keyboard shortcuts, lines, and polygons

• As with all MS software products including Excel and Word, the following list of keyboard shortcuts are used to help expedite your work.

The following keyboard shortcuts will save you time so you can edit and format in a snap!

Ctrl+X: Cut selected text, selected object(s), or selected slide(s)

Ctrl+C: Copy selected text, selected object(s), or selected slide(s)

Ctrl+V: Paste selected text, selected object(s), or selected slide(s)

Ctrl+B: Add or remove bold to selected text

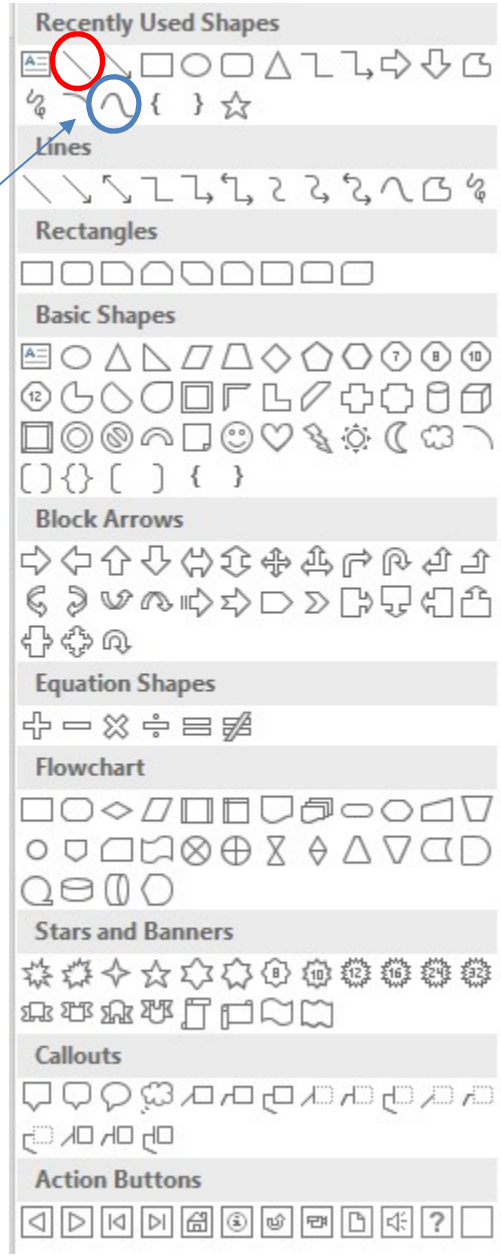
Ctrl+M: Insert a new slide

Ctrl+D: Duplicate the selected object or slide (for the latter, click on a slide thumbnail first)

Delete: Remove selected text, selected object(s), or selected slide(s)

Sizing, moving, and rotating MSPP Shapes

The shapes dropdown menu provides the means to insert new lines, polyline, and polygons into a composition.



We'll first practice making and manipulating straight and curved line segments, the latter of which will generate a colored polygon if you digitize a closed loop.

Make a strike and dip symbol with dip annotation like that below.

50

The <Insert> 

gives you cursor control for generating and placing annotation next to the dip line.

Next group the objects together so that you can rotate all of them specifically through menu commands summarized on the next page. (When selected, <Right click> <Group>)

Making land-surface profile traces using GE and MSPP

- Use Google Earth to capture a profile elevation plot along a custom line to extract the land surface representation as part of a MSPP project to depict RVCC Campus topography in profile.

- This exercise has many steps in learning how to rescale and manipulate graphic objects using MSPP as a CAD tool for generating engineering-type diagrams representing land surface. These profiles are usually a necessary, key component for conducting many types of environmental, engineering, and geologic investigations that benefit from having representation of that 3rd dimension to compliment the 2D map.

- First we will review how it was done the old-school way, then learn how to do it using state-of-the-art virtual systems.

Part 2 – REVIEW: Old-school way to create land-surface profile traces

Vertical ***cross-sections*** represent the form of the topography and geological structure as seen on a 'cut' through the earth. This vertical cut is imaginary rather than real, so the construction of such a cross-section usually involves a certain amount of interpretation. The features displayed in the cross-section are the lines of intersection of the section plane with topographical and geological surfaces. Where contour patterns are given for these surfaces the drawing of a cross-section is straightforward. If a vertical section is to be constructed between the points X and Y on Fig. 2.13, a base line of length XY is set out. Perpendiculars to the base line at X and Y are then drawn which are graduated in terms of height (Fig. 2.13B). Points on the map where the contour lines for the surface intersect the line of section (line XY) are easily transferred to the section, as shown in Fig. 2.13B. Provided the vertical scale used is the same as the horizontal scale (1:1), the angle of slope will be the correct slope corresponding to the chosen line of section. For example, if the surface being drawn is a geological one, the slope in the section will equal the apparent dip appropriate for the line of section. If an exaggerated vertical scale is used, the gradients of lines will be steepened and the structures will also appear distorted in other respects. *The use of exaggerated vertical scales on cross sections should be avoided*.

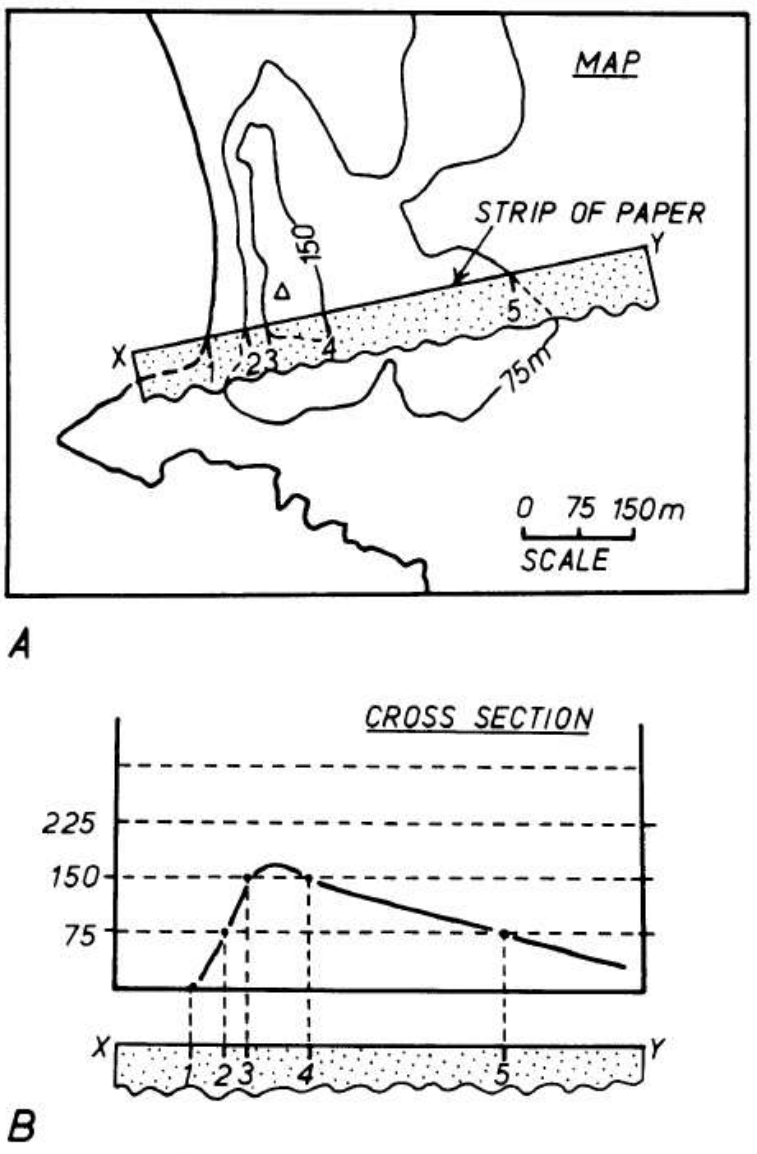


Fig. 2.13 Construction of a cross-section showing surface topography.

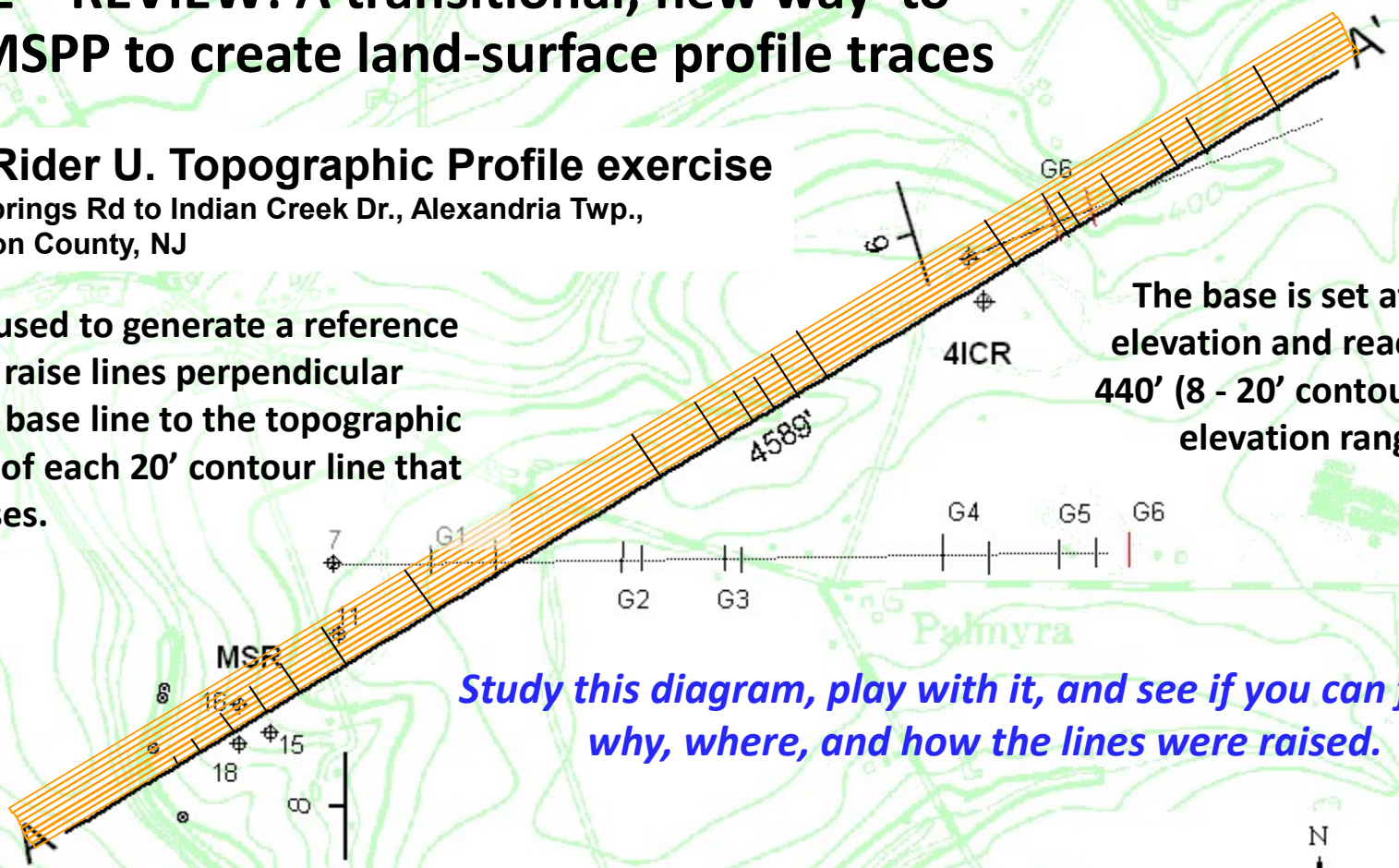
Part 2 – REVIEW: A transitional, new way to use MSPP to create land-surface profile traces

2012 Rider U. Topographic Profile exercise

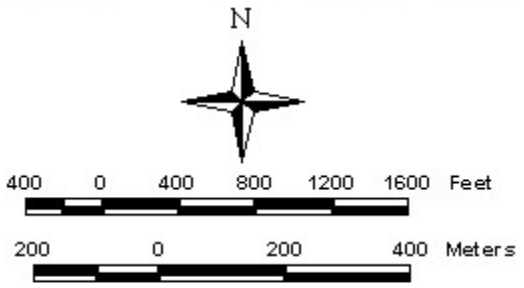
Maple Springs Rd to Indian Creek Dr., Alexandria Twp., Hunterdon County, NJ

MSPP used to generate a reference grid to raise lines perpendicular from a base line to the topographic height of each 20’ contour line that it crosses.

The base is set at 280’ elevation and reaches to 440’ (8 - 20’ contours, 160’ elevation range)



Study this diagram, play with it, and see if you can follow why, where, and how the lines were raised.



Base map from the US Geological Survey Frenchtown, NJ-Pa 7-1/2' Topographic quadrangle.

EXPLANATION:

Water well with line trace of penetrated stratigraphic interval

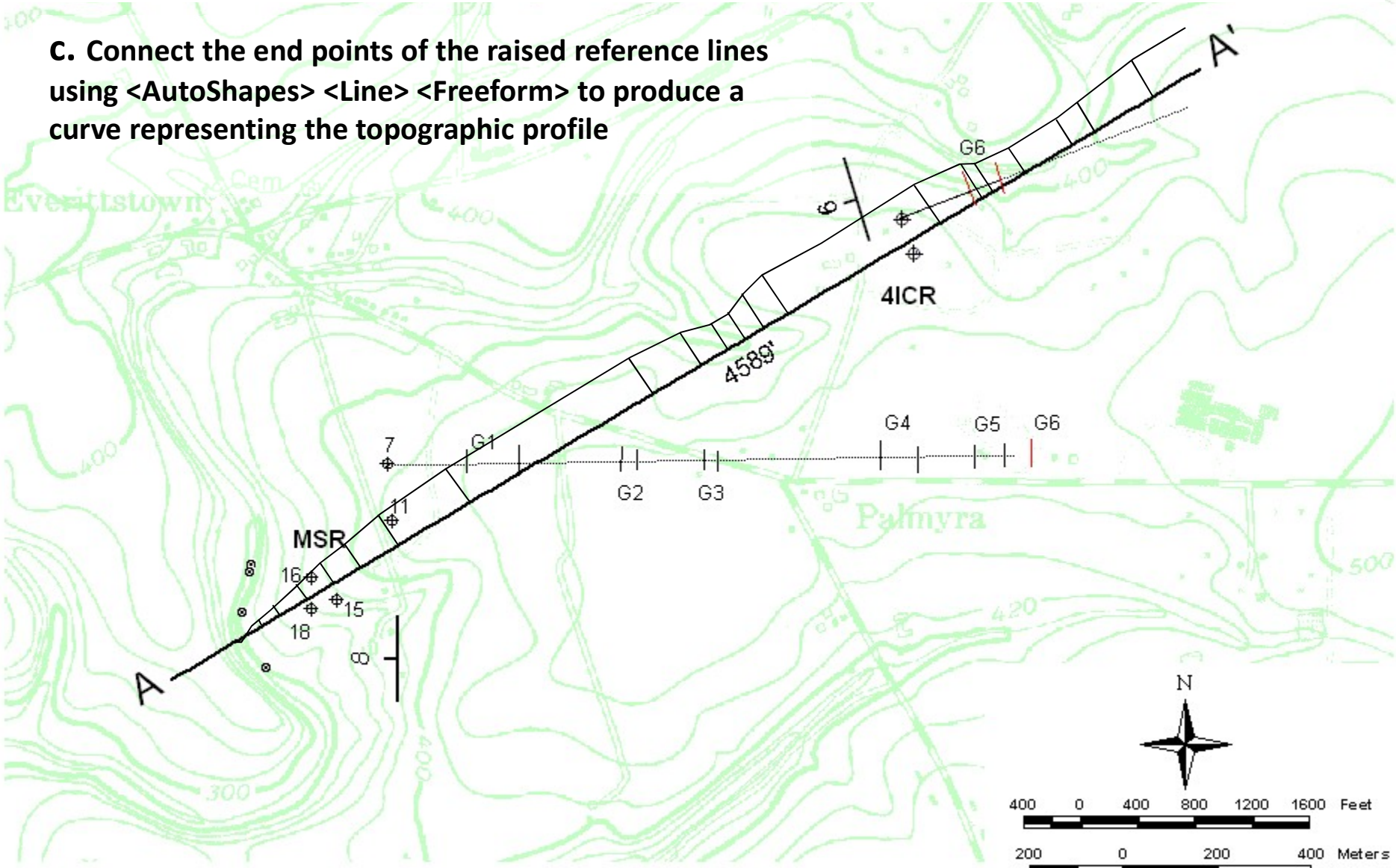
A—— A' Cross-section trace

Outcrop notes

8 Stirke and dip from OBI image analysis

Topographic Profile 1 Maple Springs Rd to Indian Creek Dr., Alexandria Twp., Hunterdon County, NJ

c. Connect the end points of the raised reference lines using <AutoShapes> <Line> <Freeform> to produce a curve representing the topographic profile



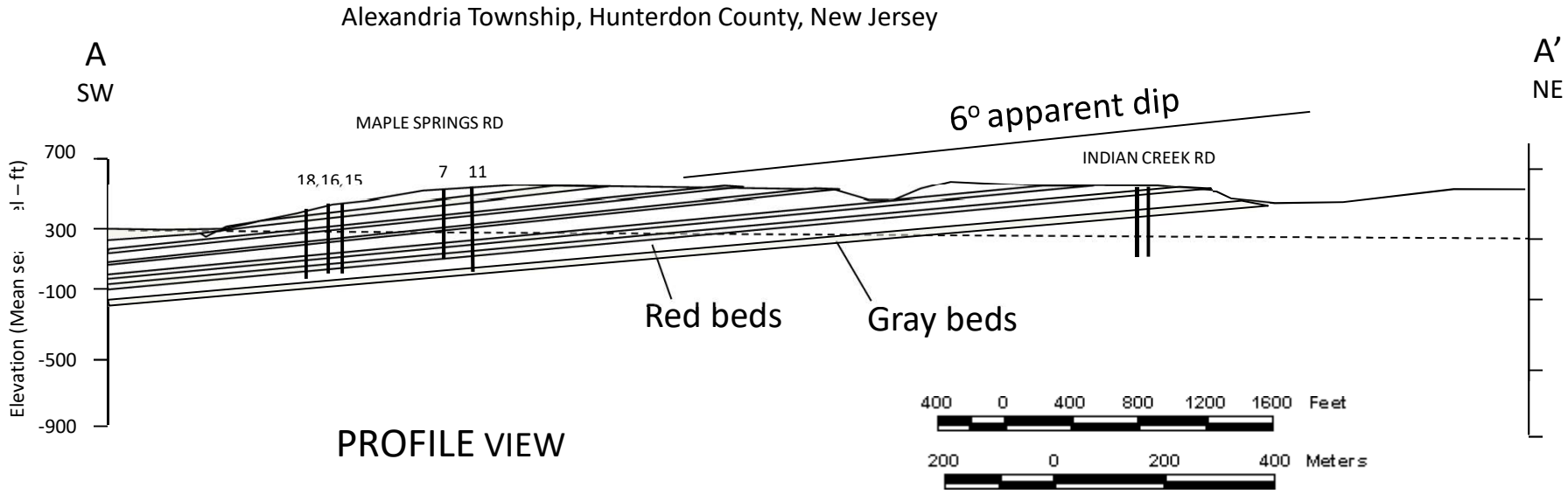
Base map from the US Geological Survey Frenchtown, NJ-Pa 7-1/2' Topographic quadrangle.

EXPLANATION:

- Water well with line trace of penetrated stratigraphic interval
- A—— A' Cross-section trace
- Outcrop notes
- 8 Stirke and dip from OBI image analysis

Cross Section 1 Maple Springs Rd to Indian Creek Dr., Alexandria Twp., Hunterdon County, NJ

f. The completed profile. Some ancillary notation and dashing the base elevation line (300') makes it look more presentable. It is also important to have both the A-A' and directional (SW – NW) labels and note the profile view.



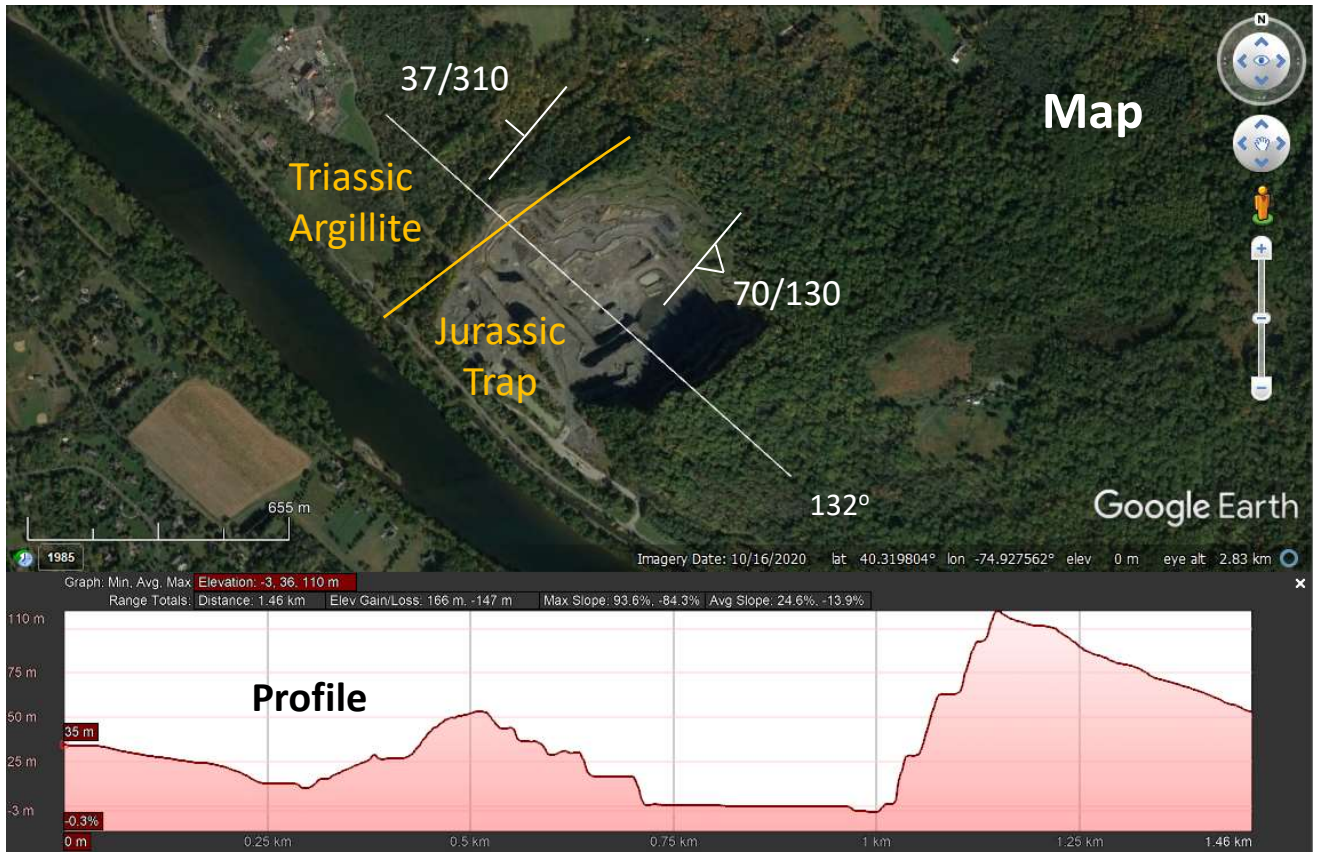
Part 2 – Make land-surface traces in profile using MSPP and GE

STEP A: <Make sure that the <ENVI-201 Exercise> folder is expanded and click on the <Profile Lines> folder. Double click on the folder to zoom to the appropriate level. Expand that folder and turn on both profile lines (A-red & B-green).

STEP B: <Right click> on Profile A and choose <Show Elevation Profile> and the following display to the right should show.

STEP C: Move the mouse cursor over different parts of the bottom profile graphic to explore how the elevation and slope (expressed in %) changes along the profile line. Also note where the streams occur and how they appear in profile.

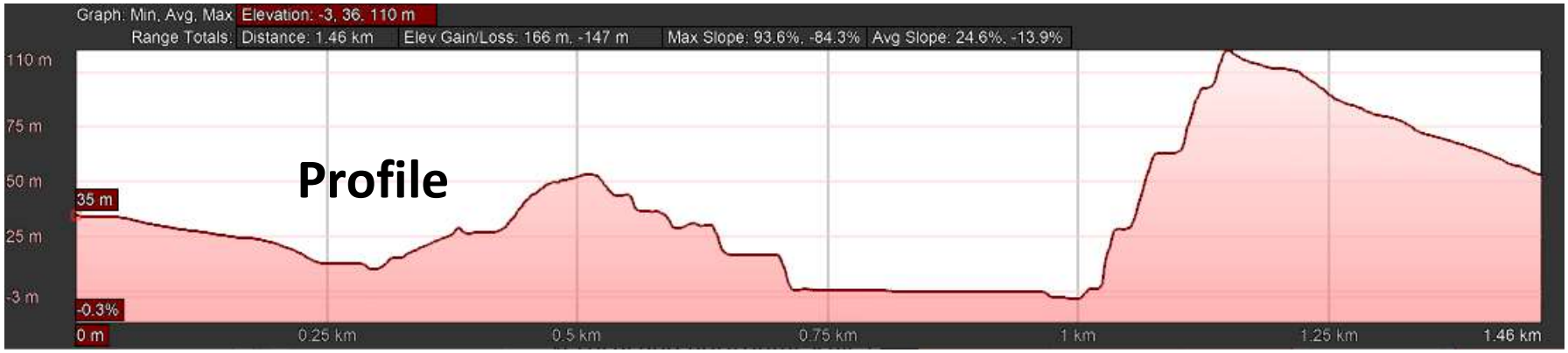
STEP D: At this point you will need to adjust the display of the GE Window in order to adjust the scale of the profile so that the numbers and marks on the vertical and horizontal scales on the profile end in 0 (preferable) or 5.



Part 2 cont.– Make land-surface traces in profile using MSPP and GE

STEP D cont. The reason for the window and scale adjustment is because GE arbitrarily scales the profile graphic so one needs to adjust their window dimension to adjust the scale divisions. This is one inconvenience in an otherwise remarkable program.

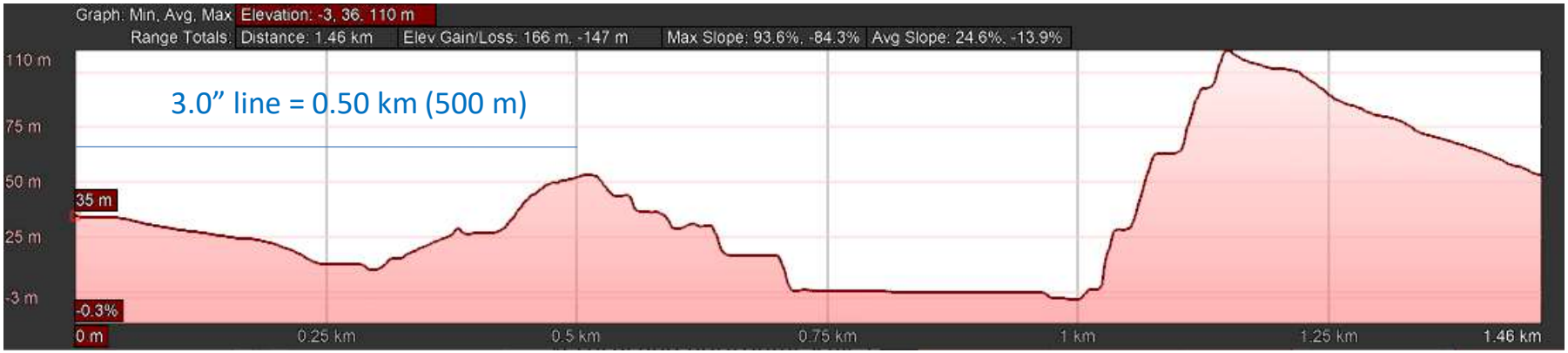
STEP E: Capture the profile graphic by using Windows *Snip* tool  that enables your mouse to draw a box around a screen graphic and copy the selected region to your clipboard, where it can be pasted into MSPP, as shown below for profile A. If you don't know where to find the Snip tool hover your mouse cursor over the Windows <Search> button at the lower left corner of your screen and type in <Snip>.



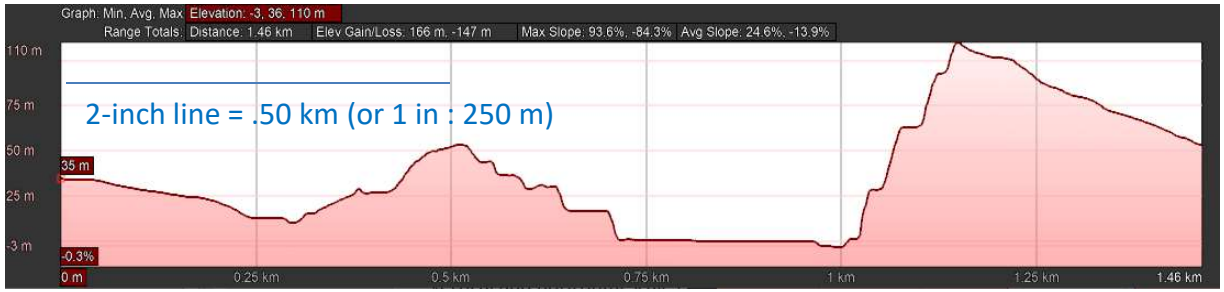
STEP F: Once the profile graphic has been copied, <Left clicking> on the small white <X> at the upper-right-hand corner of the profile graphic will dismiss it from your view.

STEP G: Determine a suitable scale for the graphic to work with it.

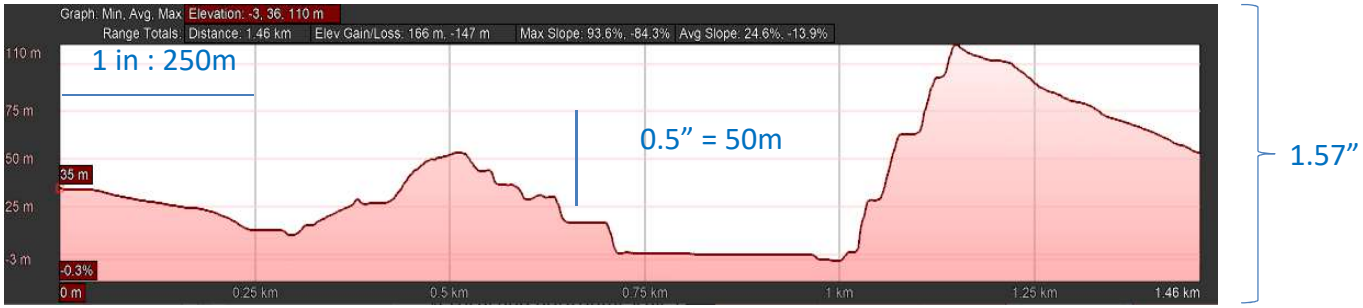
Part 2 cont.– Make land-surface traces in profile using MSPP and GE



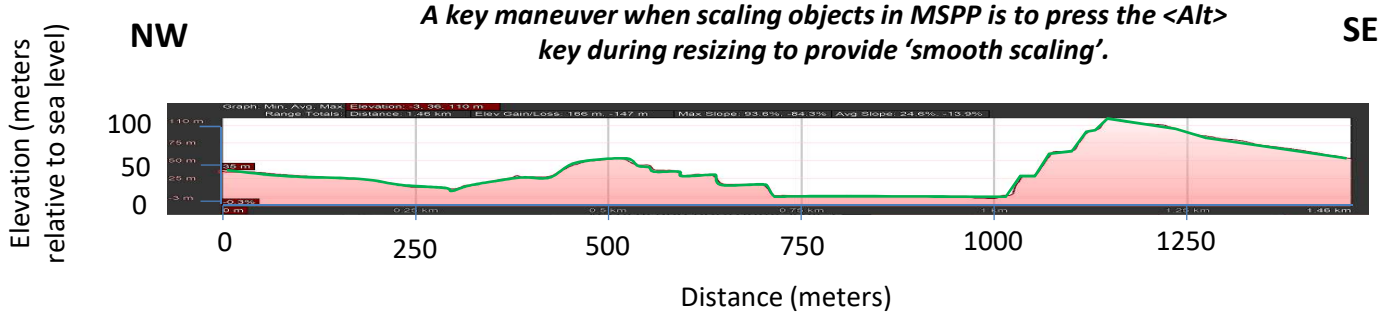
STEP G cont. Use the MSPP <Insert><Shape><Line> to draw a horizontal line between two marks on the profile bottom scale as shown above. Select the line with your mouse and <Right click><Size and Position>. The <Format Shape> pane will open and use the size tools to specify the width of the line that you drew *to either end in 0 or .5*. For example the line above below is 3.0” wide with the graphic stretched such that 3” equals 0.50 km (500 m), or 1” = 166.7 m. To achieve a 1”=150 m scale (that is more easily divided), adjust the line width to 2” and stretch the graphic horizontally so that 2” = 30 km (as shown below)



Part 2 cont.– Make land-surface traces in profile using MSPP and GE

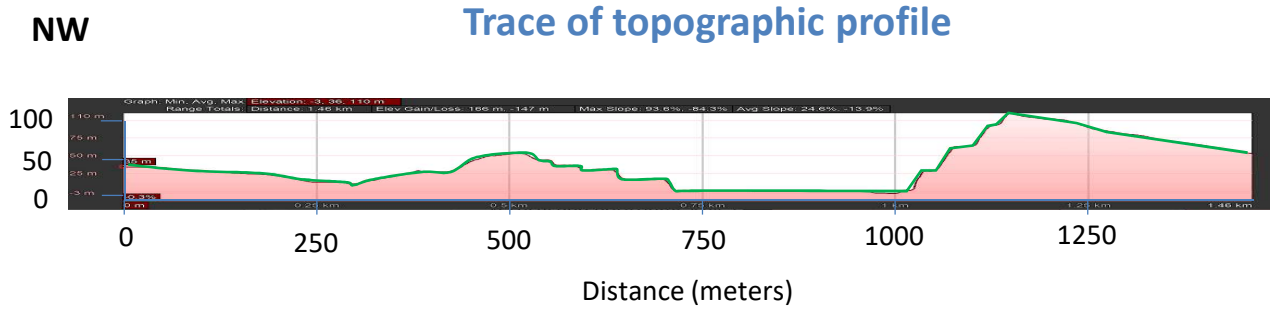


STEP H: Scale the graphic so the vertical and horizontal scales are equal to achieve a 1:1 aspect ratio. This requires generating a second, vertical line equal to the elevation range, then scaling the graphic in the vertical dimension accordingly to achieve the desired scale. For the example above, the vertical dimension of the profile was manually stretched so that 0.5" = 50 m, or 1" = 100 m, since the desired scale is 1 inch = 250 m, vertically stretch the image down by a factor of 0.25 (100/250). Because the image is currently 1.57" in height, simply readjust the height to the new value (1.57" x 0.4) = 0.69"



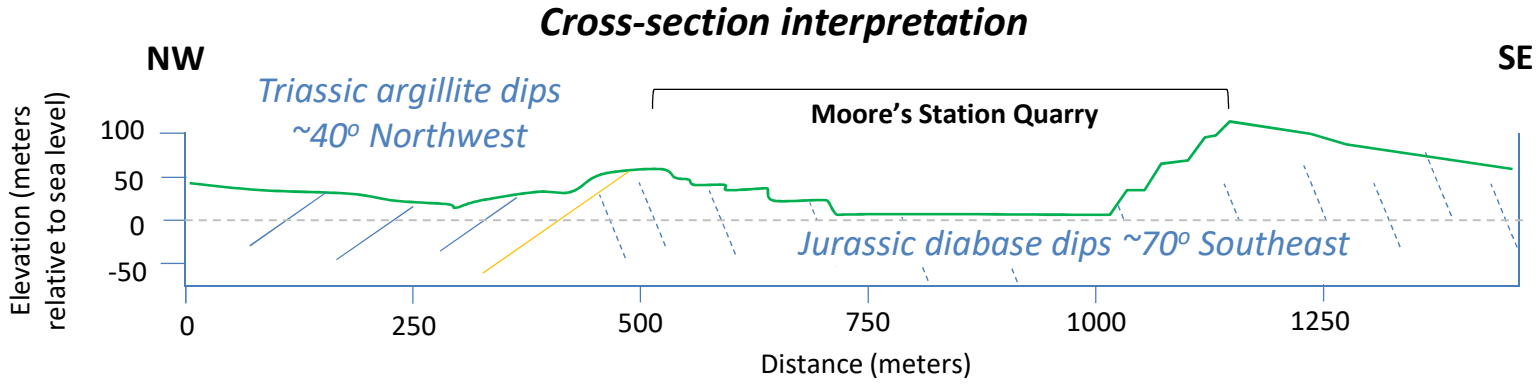
STEP I: With the graphic now set at 1:1 scale the next step is to use <Insert><Shape><Curve> and <line> and <Text Box> functions> to add graphics elements noting the horizontal and vertical dimensions as illustrated above. Also note how the curve is close but not exact to the raster depiction of the surface.

Part 2 cont.– Make land-surface traces in profile using MSPP and GE



STEP J: The vector graphics from the prior page from the lower diagram are selected, duplicated and grouped above. This is the final product of the exercise and is the framework for adding subsurface geological interpretations. For example, the sedimentary beds shown below dip ~ 40° NW whereas the trap rock dips about 70° SE.

STEP K: Repeat this process demonstrated above for Profile B to generate its land trace, isolate the final graphic (like that shown above only for Profile B) and email the pptx file to me for 5-points credit.



Final graphic