

PROBLEM 5.1

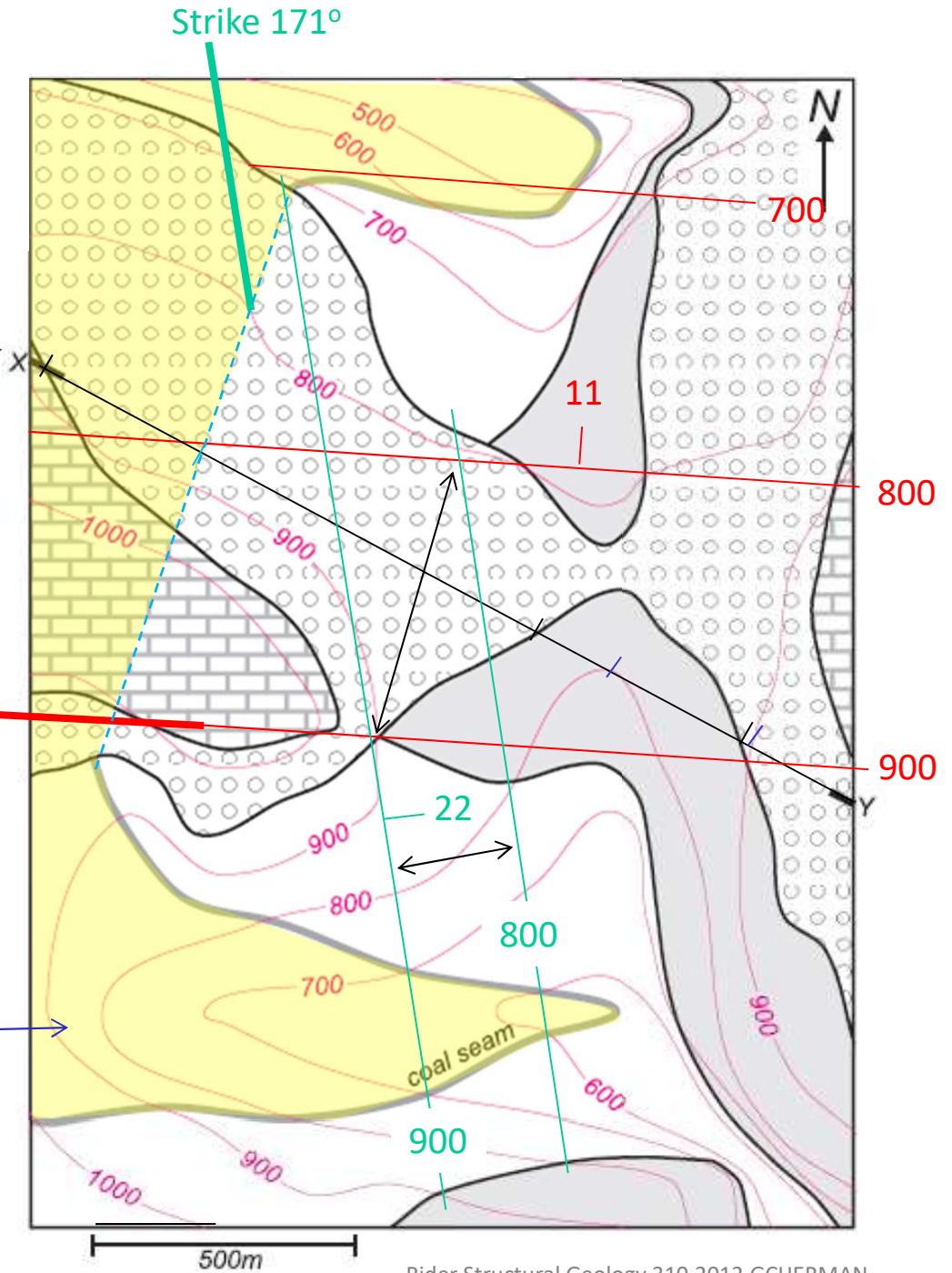
Construct a cross-section for the line X-Y on the map. Shade the regions on the map where the coal seam does not exist at depth.

Azimuth of cross-section trace 298-118°

1. Generate structure contours on the **lower** (a) and **upper** (b) units to find strike and dip of each.
2. Intersect the structure-contours to find the eroded limit of the sub cropping coal seam.
3. Generate a line representing the sub crop trace of the coal seam.

Strike 093°

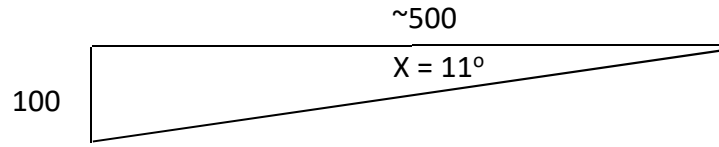
Area where coal is eroded



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**Dip of beds above the unconformity
dip to left relative to the section trace**

$TAN X = 100/5400$ or $X = 11.3$ OR 11°

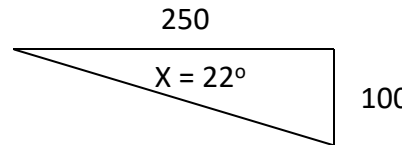


Strike dip azimuth dip alpha and **apparent dip** of beds **above** unconformity

093° 003° **11°** $360^\circ - 298^\circ + 11^\circ = 73^\circ$ **3°**



**Dip of beds below the unconformity
dip right relative to the section trace**



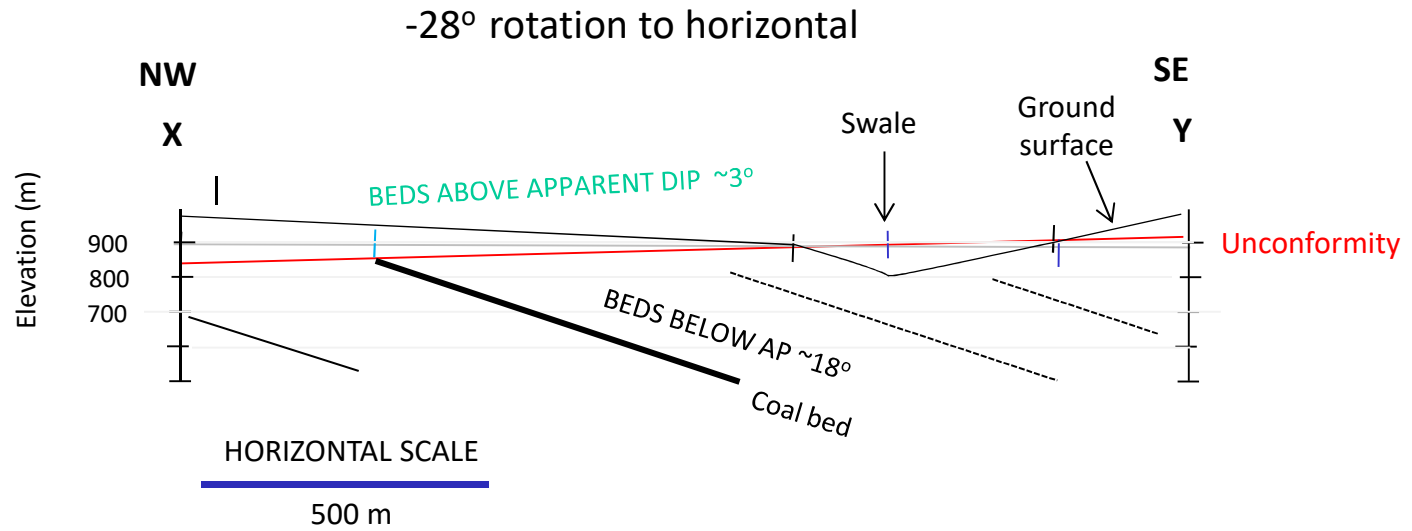
$TAN X = 100/250$ or $X = 21.8$ OR 22°

Strike dip azimuth dip alpha and **apparent dip** of beds **below** unconformity

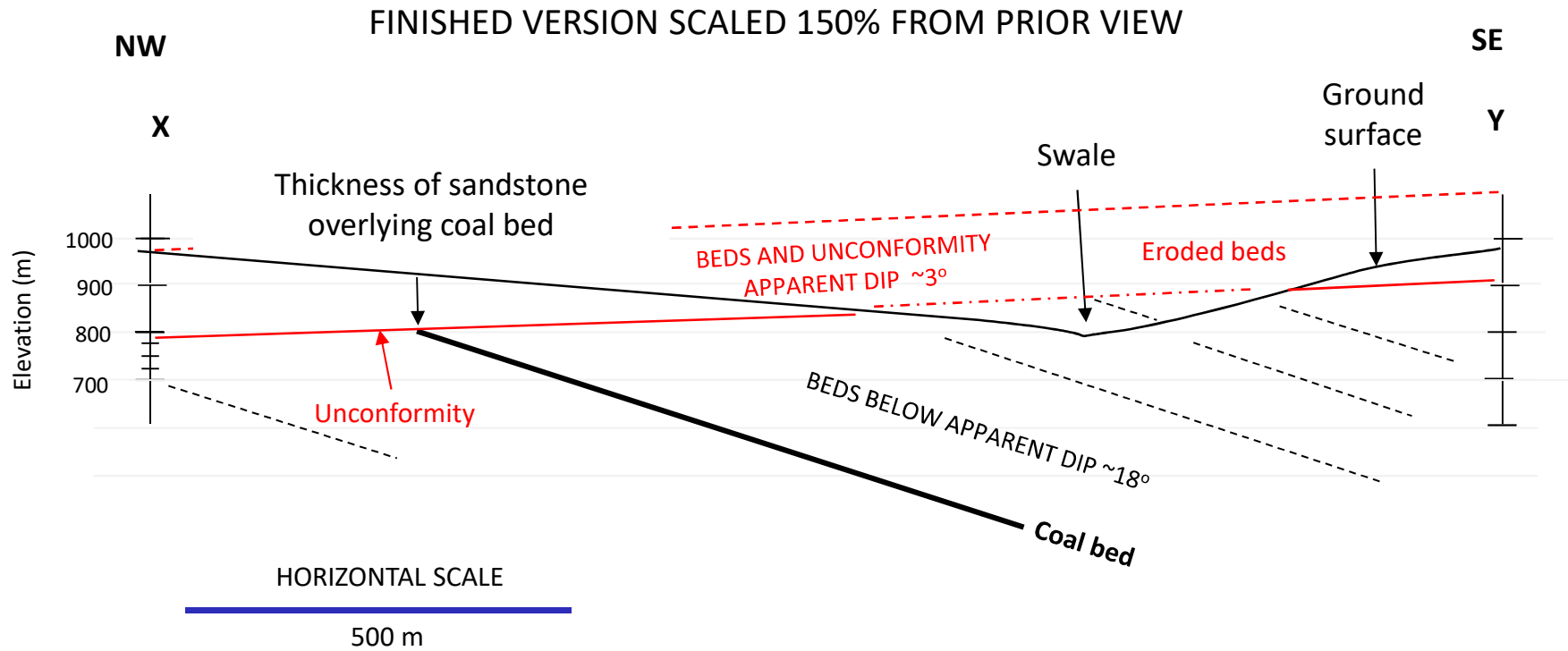
171° 081° **22°** $118^\circ - 081^\circ = 37^\circ$ **18°**

APPARENT DIP = $TAN^{-1} ((TAN (DIP^\circ) * COS (alpha^\circ)))$ where alpha = acute deviation between section azimuth and dip azimuth

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Observations:

- 1) The unconformity surface and thickness of the overlying gravel/conglomerate varies in the area of the swale
- 2) Along the section trace there is ~ 100 m of material to remove to access the coal seam.

1. The exercise is worth ten points.
2. With respect to grading, 2 points will be given for each of the following items:
 - a. Calculation and recording of strike and dip of upper and lower units on the completed profile figure.
 - b. Generation of an accurate topographic surface in cross section.
 - c. Transformation of the cross-section elements into horizontal display for generation of completed cross section figure.
 - d. Representation of the apparent strikes and dips of the two units in cross section with respect to the unconformity and depicting the coal seam which is the target of exploration.
 - e. Completeness, clarity, and neatness of presentation style. This includes adequate annotation and labeling of cross section elements for cross-section orientation, scaling labels, and feature labels.