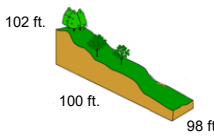


Topographic Survey

Construction of Contours

- For our project, the spacing of the grid is established by requiring that **no more than 1-foot contour elevation** change in each grid cell.
- To compute that spacing consider the slope along each edge of your site:



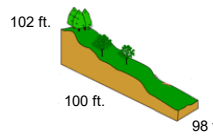
$$\text{slope} = \frac{\Delta \text{elevation}}{\text{length}} = \frac{102 - 98}{100}$$

$$\text{grid spacing} = \frac{1}{\text{slope}} = \frac{100}{4} = 25 \text{ ft.}$$

Topographic Survey

Construction of Contours

- Repeat this calculation for each side of your site and use the smallest value for you grid spacing
- If the grid spacing value is problematic to use or set-up, round down to a convenient value - probably a multiple of 10 would be convenient.



$$\text{slope} = \frac{\Delta \text{elevation}}{\text{length}} = \frac{102 - 98}{100}$$

$$\text{grid spacing} = \frac{1}{\text{slope}} = \frac{100}{4} = 25 \text{ ft.}$$

Topographic Survey

Construction of Contours

- Compute the spacing of the elevation grid such that there is **no more than 1-foot contour elevation** change in each grid cell.
- Consider the following survey data:

Side	Length (ft.)
AB	150
BC	100
CD	160
DA	90

Point	Elevation
A	100
B	103
C	105
D	101

Topographic Survey

Construction of Contours

- Grid spacing = Length/|ΔElevation|
- Repeat this calculation for each side of your site and use the smallest value for you grid spacing

Side	Length (ft.)	ΔElevation	Grid Spacing
AB			
BC			
CD			
DA			

Topographic Survey

Construction of Contours

- Grid spacing = Length/|ΔElevation|
- Repeat this calculation for each side of your site and use the smallest value for you grid spacing
- Select the smallest spacing = 40 ft.

Side	Length (ft.)	ΔElevation	Grid Spacing
AB			
BC			
CD			
DA			

Topographic Survey

Construction of Contours

- If the grid spacing value is problematic to use or set-up, round down to a convenient value – probably a multiple of 10 ft.
- Grid spacing is 40 ft.

Side	Length (ft.)	ΔElevation	Grid Spacing
AB	150	103-100	50
BC	100	105-103	50
CD	160	101-105	40
DA	90	100-101	90

Topographic Survey

Construction of Contours

Topographic Survey

Once your contour grid is established, measure the elevation of each grid point

Topographic Survey

- We want a contour map on 5 ft. intervals
- The grid is rectangular, the dimensions of the sides are 80 ft. (north) and 100 ft. (east)

Topographic Survey

Construction of Contours

- The basic method for estimating contour is applied to each grid cell individually
- Use **linear interpolation** to find the location of the desired contour interval
- Let consider the cell in the upper left-hand corner - remember the contour interval is 5 ft.

Topographic Survey

Construction of Contours

- First see if a contour interval exist between nodes of the grid cell; if so, estimate where along the side the contour interval would be located
- Apply simple linear interpolation to each side to locate the contour interval

Topographic Survey

Let's look at the top edge of the grid cell

$$a = \text{slope} = \frac{102 - 98}{100}$$

$$b = \text{intercept} = 98$$

$$x = \frac{2(100)}{4} = 50 \text{ ft.}$$

Topographic Survey

Let's look at the bottom edge of the grid cell

$a = \text{slope} = \frac{108 - 101}{100}$
 $b = \text{intercept} = 101$

$x = \frac{4(100)}{7} = 57 \text{ ft.}$ ← $105 = \frac{7}{100}x + 101$

Topographic Survey

Let's look at the left edge of the grid cell

$a = \text{slope} = \frac{101 - 98}{80}$
 $b = \text{intercept} = 98$

$x = \frac{2(80)}{3} = 53 \text{ ft.}$ ← $100 = \frac{3}{80}x + 98$

Topographic Survey

Let's look at the right edge of the grid cell

$a = \text{slope} = \frac{108 - 102}{80}$
 $b = \text{intercept} = 102$

$x = \frac{3(80)}{6} = 40 \text{ ft.}$ ← $105 = \frac{6}{80}x + 102$

Topographic Survey

Locate the contour intervals locations on the grid cell

- Next, simply connect points of equal contour intervals
- One grid cell down, eight to go . . .

Topographic Survey

Repeating the linear interpolation for each of the remaining grid cell gives:

Topographic Survey

End of Topographic Surveying