1 Q3

1.1 Calculation of Width

A',B',C',D' are points corresponding to A,B,C and D in real world.

Cross Ratio

$$\frac{(AC/AD)}{(BC/BD)} = \frac{(A'C'/A'D')}{(B'C'/B'D')}$$

Coordinates of points A,B,C and D
A = 1022,811
B = 1060,721
C = 1126,558
D = 1139,519

Let AB' = CD' = x in real world coordinate system
A'C' = (x + 44)
A'D' = (2x + 44)
B'C' = 44
B'D' = (x+44)

Cross ratio

$$\frac{(x+44)*(x+44)}{44*(2x+44)} = \frac{273.54*216.8}{314.5*175.85}$$

Solving this quadratic equation we get valid x = 15.39
Now the width A'D' = (2x+44) = 74.78

1.2 Calculation of Length

B',E',F',G' are points corresponding to B,E,F and G in real world.
Cross Ratio

$$\frac{(BF/BG)}{(EF/EG)} = \frac{(B'F'/B'G')}{(E'F'/E'G')}$$

Coordinates of points B,F,G and H
B = 1052,720
F = 845,681
G = 463,613
H = 67,540
Let E'F' = y in real world coordinate system
Due to symmetry B'F' = F'G' in real world
B'F' = (y + 18)
B'G' = 2(y + 18)
E'F' = y
B'D' = (2y+18)
than cross ratio will be

$$\frac{(y+18)*(2y+18)}{y*2(y+18)} = \frac{613.40*790.67}{394.39*1009}$$

solving this we get y = 40.922
total length B'G' = 2(y+18) = 117.84
Hence the dimension of ground is approximately = 75yd x 118yd