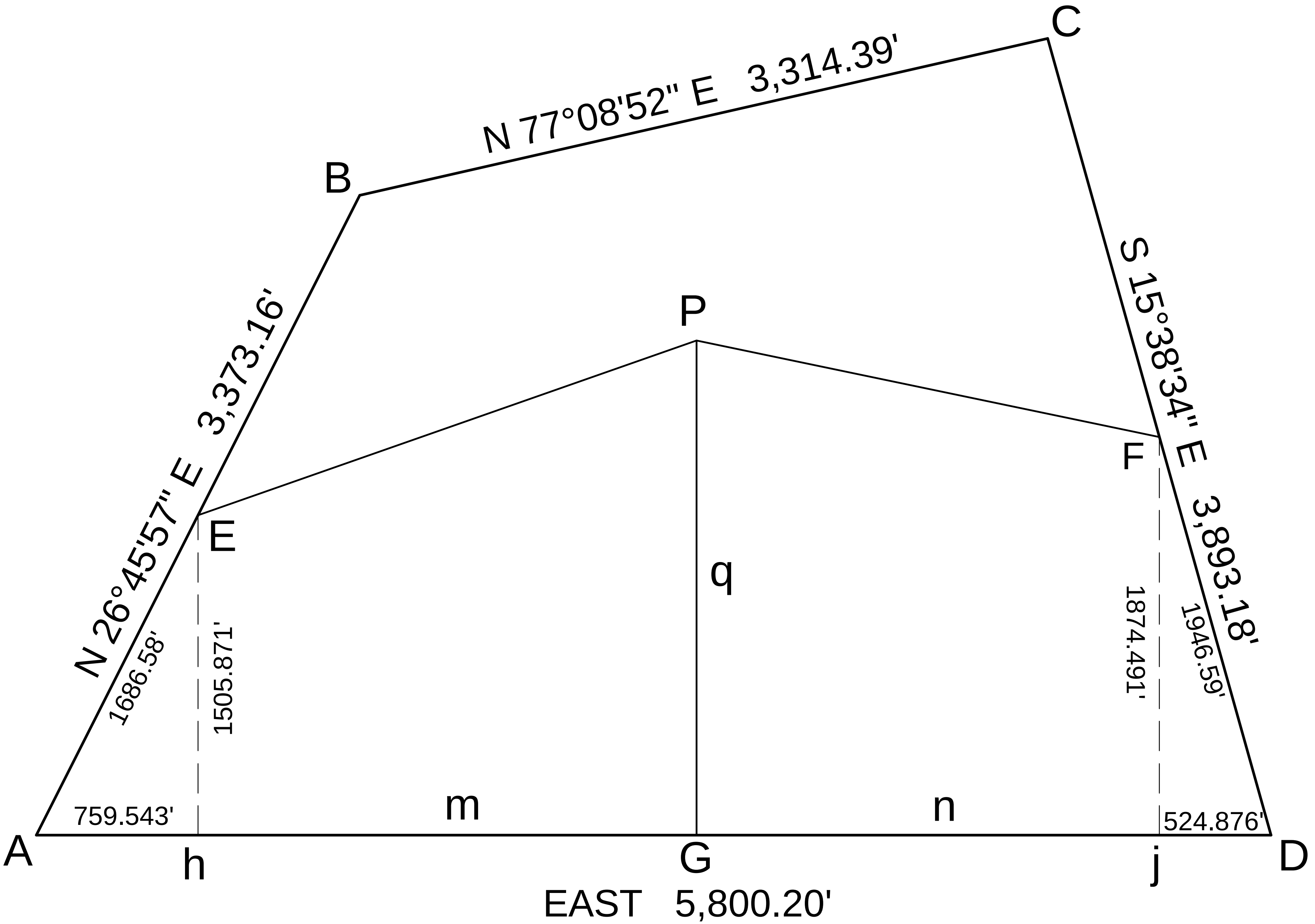

A
B
C
D
E
F
P
G
h
j
q
m
n
N 77°08'52" E 3,314.39'
N 26°45'57" E 3,373.16'
S 15°38'34" E 3,893.18'
EAST 5,800.20'
1686.58'
1505.871'
759.543'
1874.491'
1946.59'
524.876'

The total area must be calculated first. This is an ideal candidate for area by coordinates if you assign point A North 0.00, East 0.00, making point D North 0.00, East 5,800.20; point B North 3011.741, East 1519.086 and point C North 3748.981, East 4750.442:

$$\frac{0}{0}\cdot\frac{3011.741}{1519.086}\cdot\frac{3748.981}{4750.442}\cdot\frac{0}{5800.20}\cdot\frac{0}{0}$$

Twice the area equals:

(3011.741)(4750.442) + (3748.981)(5800.20) – (1519.086)(3748.981)=30,356,915.98

So, a third of the total area is 5,059,486.0 sq. ft. (Using only two decimal places for the coordinates yields 5 sq. ft. less.)

Construct a perpendicular from point E to side A-D at h and calculate the sides and area of the triangle formed: A-E=1686.58, E-h=1505.871 and A-h=759.543 with an area of 571,886.5 sq. ft. Also construct a perpendicular from F to side A-D at j; F-D=1946.59, F-j = 1874.491, and j-D=524.876 with an area of 491,937.7 sq. ft. The area of E-P-G-h is then to be 4,487,599.5 sq. ft. and that of P-F-j-G to be 4.567,548.3 sq. ft.

Let P-G be q, h-G be m, and G-j be n

$\frac{q+1{,}505.870}{2}\cdot m = 4{,}487{,}599.5 \ldots [1]\ and\ \frac{q+1{,}874.491}{2}\cdot n = 4{,}567{,}548.3$ ...[2]

A-D = 5,800.20 +759.543 + m + n + 524.876, so m = 4,515.782 – n...[3], substituting [3] into [1] eliminating the fraction in [2]:

$(q + 1{,}505.87)(4{,}515.872 - n) = 8{,}975{,}201.0$ and $(q + 1{,}874.491)\cdot n = 9{,}135{,}096.6$

Expanding and adding these equations yields n = 30,682.315 –12.2505·q, which is then substituted back into equation [2], expanded, and rearranged:

$$q(30{,}682.315 - 12.2505\cdot q) + 1{,}874.49(30{,}682.315 - 12.2505\cdot q) = 9{,}135{,}096.6$$

Which reduces to $q^2 - 630.0865q - 3.949.111.96$

so $q = \frac{630.086 \pm \sqrt{630.0865^2 + 4\cdot 3949111.96}}{2}$ yielding q = 2,327.10, which is then substituted back into the same equation to get

n = 2,174.20, and then m is found by equation [3] to be 2,341.58