For some credits under the Community Rating System of the National Flood Insurance Program, a community must calculate the area of its jurisdiction that is affected by certain regulations or other activities. This handout explains how to use a simple grid overlay to calculate the appropriate area. Additional copies of this handout are available from your ISO/CRS Specialist or by e-mailing NFIPCRS@ISO.com.

Using the Grid Overlay to Figure Areas

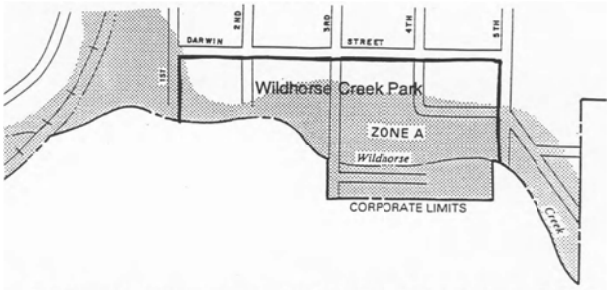
The grid overlay is a simple method to calculate areas on a map. It is not as accurate as using a planimeter or geographic information system, but it produces results accurate enough for Community Rating System impact adjustments.

At the end of these instructions is a template for two grid squares:

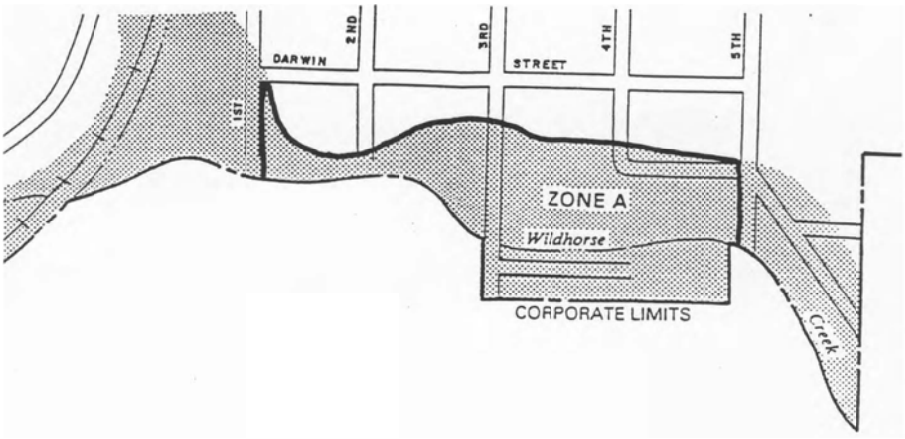
- Grid Square #1 has three squares to the inch. This is used for measuring larger areas.
- Grid Square #2 has six squares to the inch and produces more accurate measurements for smaller areas.

Print the two grid squares on an overlay or clear acetate. Note that there may be some distortion of the dimensions, depending on the printer, but the resulting measurements will be accurate enough for CRS impact adjustment calculations.

In this example, the community has a park on Wildhorse Creek. The park boundaries are from Darwin Street to the corporate limits between 1st and 5th Streets. The CRS Coordinator wants to know how much of the park is in Zone A.

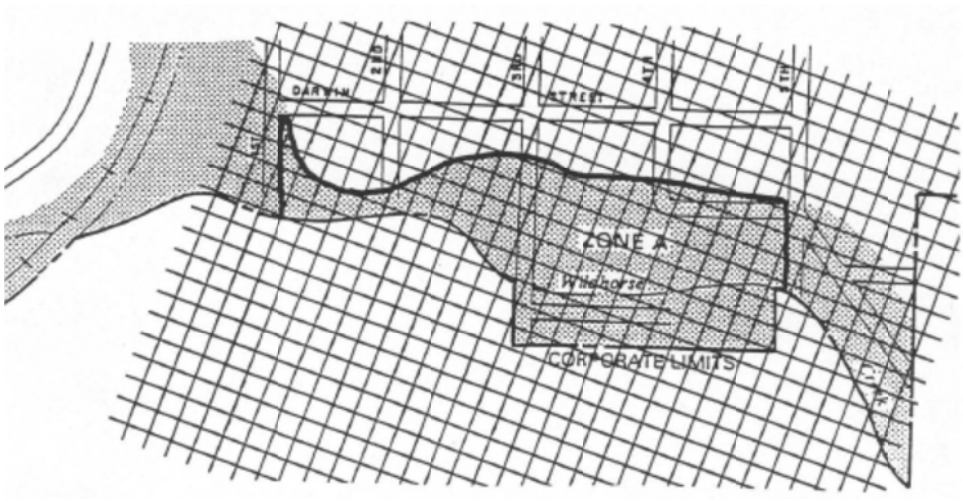


Step 1. Highlight the area to be measured.
Mark the outline of the area so that it will be easy to see the boundaries through the overlay.

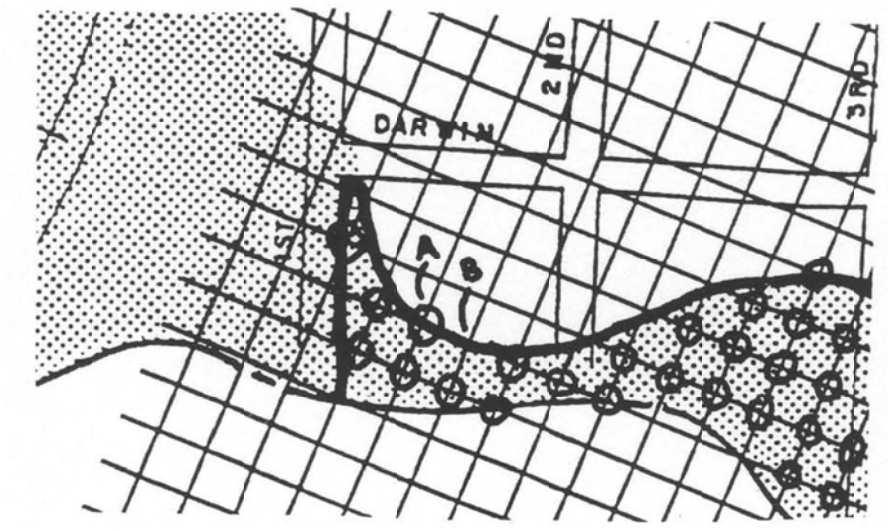


Step 2. Select the overlay to use. For larger areas, Grid Square # 1 will take less time because there are fewer squares to count. However, the smaller squares (Grid Square #2) should be used to calculate smaller areas. These instructions use #2 because the example area is small.

Step 3. Lay the overlay over the area to be measured and count the number of crosses.

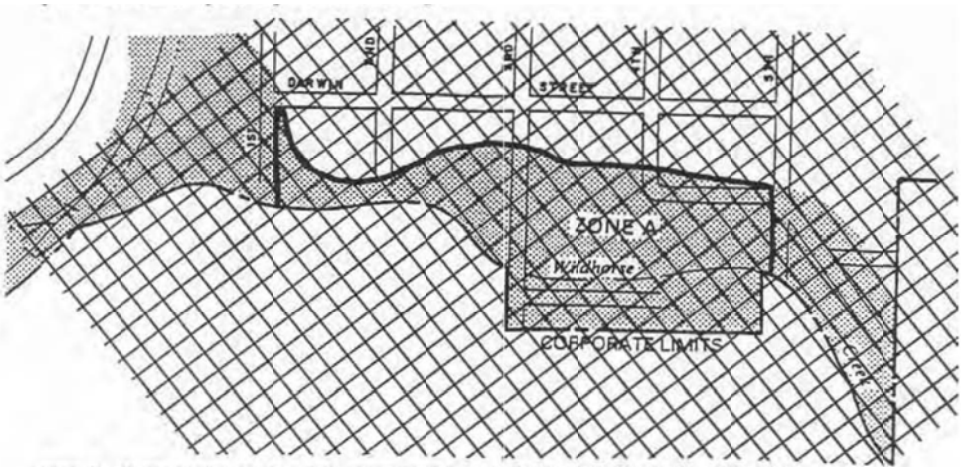


Count every other cross that is on the boundary. In the blow up below, the crosses to be counted are circled. Cross" A" is on the boundary. It is counted but the next cross on the boundary, Cross "B" is not. In the above illustration, there are 111 crosses.



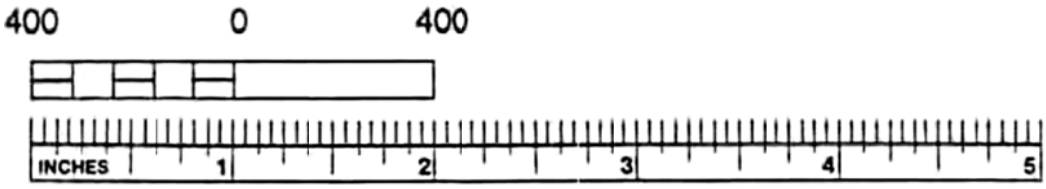
Step 4. Lay the overlay over the area at a different angle and count the number of crosses.

In the example below, there are 113 crosses in the area. If the number is not close to the previous count, repeat step 4 at a third angle.



Step 5. Average the count of crosses. In this case 111 + 113 divided by 2 is 112.

Step 6. Determine the scale of the map. In this case, the map scale is 1" = 400'



Step 7. Find the conversion factor. At the bottom of the grid squares are the conversion factors for the more common map scales. For Grid Square #2, 1" = 400" and the conversion factor is .103 acres per square and .00016 square miles per square. If you are using a map with a scale not listed on the grid squares, see the instructions below.

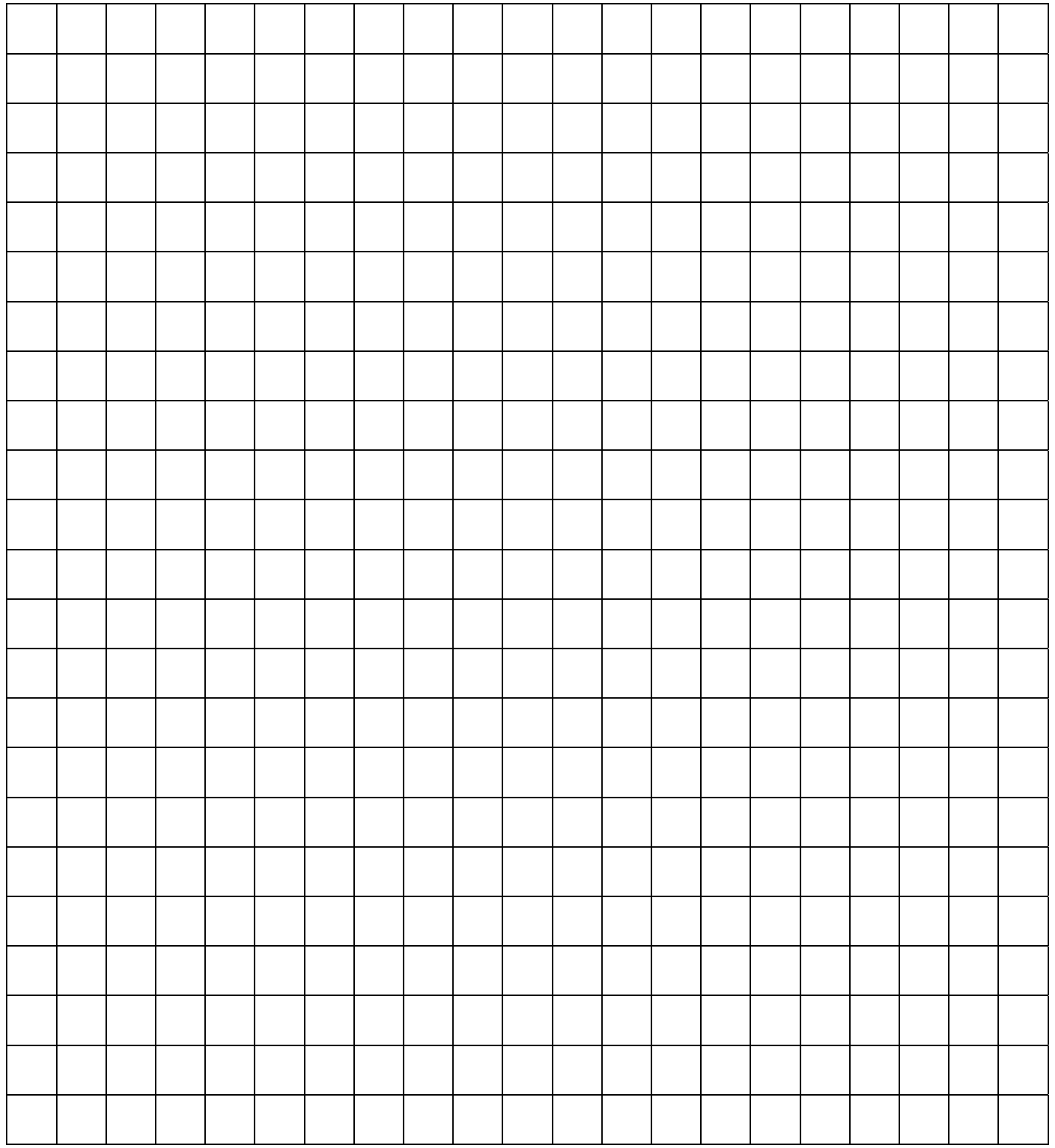
Step 8. Multiply the average count of crosses times the conversion factor. The result is the size of the area measured. For the example illustrated, the area of Wildhorse Creek Park in Zone A is 112 x .103 = 11.54 acres.

Instructions for Step 7 if you are using a map with a scale not listed on the grid squares: Grid Square #2 has six squares to the inch. Divide the number of feet per inch on the map scale by six and square the result. Example: 1" = 600' 600/6 = 100. 100^2 = 10,000. One grid square is 10,000 square feet.

There are 43,560 square feet to an acre. Divide the size of the grid square by 43,560 to determine the number of acres per grid square. Example: 10,000/43,560 = 0.23. One grid square is 0.23 acres.

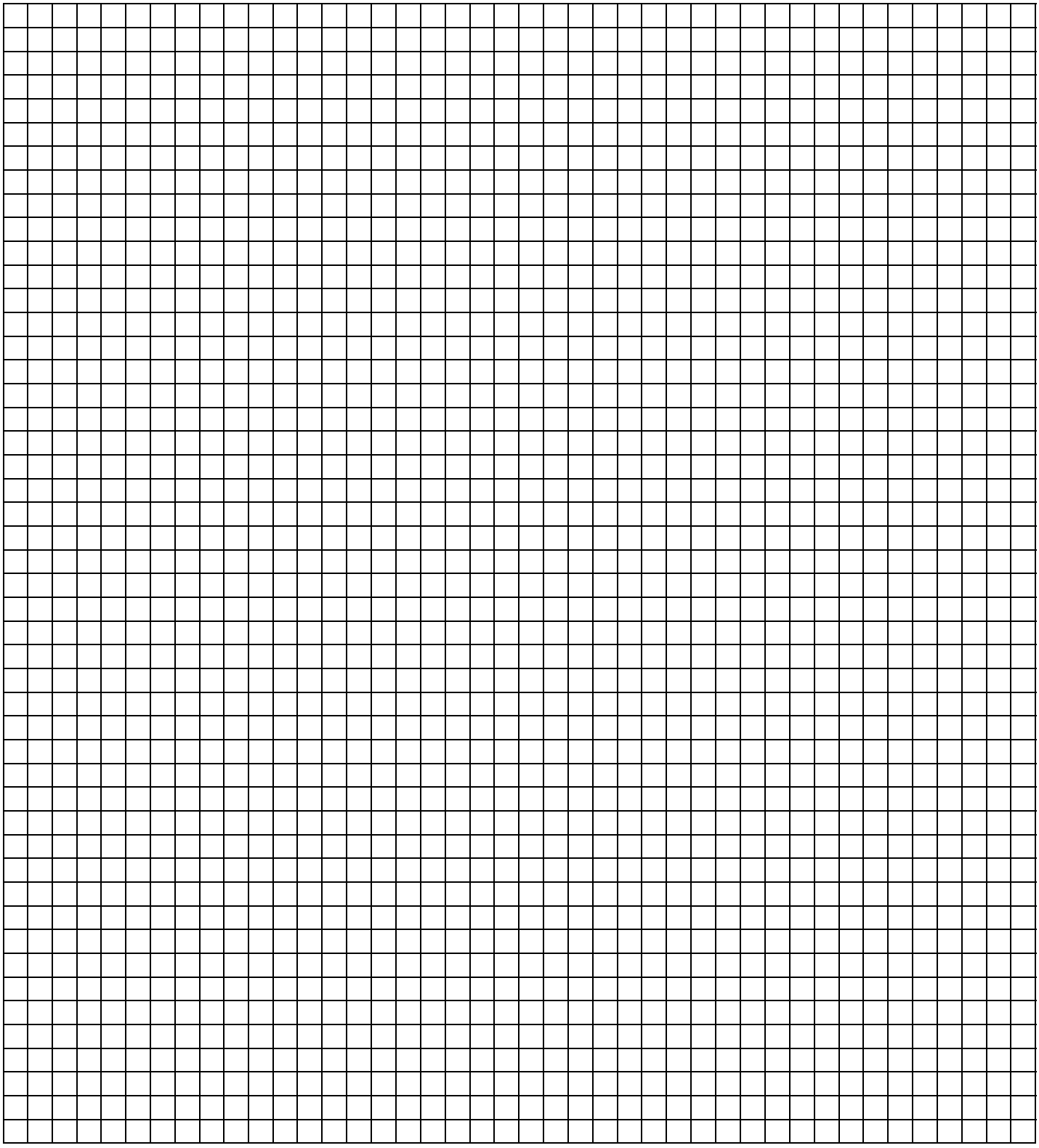
In this example, the conversion factor for 1" = 600' is 023 acres/square. If you are using Grid Square #1, use the same approach but divide the map scale by 3 instead of 6. If you are working in square miles instead of acres, divide the size of the grid square by 27,818,400 instead of 43,560.

Grid Square #1



Map scale	1” = 200’	1” = 400’	1” = 500’	1” = 800’	1” = 1,000’	1” = 2,000’
Acres/square	0.1	0.41	0.64	1.63	2.55	10.2
Square miles/square	0.00016	0.00064	0.001	0.0025	0.004	0.016

Grid Square #2



Map scale	1” = 200’	1” = 400’	1” = 500’	1” = 800’	1” = 1,000’	1” = 2,000’
Acres/square	0.260	0.103	0.160	0.408	0.638	2.550
Square miles/square	0.00004	0.00016	0.00025	0.00063	0.001	0.00399