A Counting Squares Challenge Question

This image is the VF from the zig-zag truncated pentagrams image sequence discussed here, if the original n = 25 is changed to n = 20, in which case, VCF = 5 so the image has 90° rotational symmetry and there are 240 900-line images in the new image sequence. This VF has a number of rectangles as a result but some of them are also squares. The question is: ***How many squares are in the image?***

3 Hints: **1.** You should be able to see a 5x5 square in this image (connecting vertices 3, 8, 13, and 18) so certainly that is included. But there 3x3, 2x2 and 1x1 squares that also must be counted. **2.** To avoid double counting, you should start by noting a "*distinguished vertex*" (you have four choices here: lower left, lower right, upper left or upper right) and only count based on that. **3.** To be a square, at least one of the opposing sides must have opposing vertices that are on a diagonal of the 20-gon (i.e., on one of the lines connecting vertex a to vertex a+10 for 0 ≤ a < 10) which in this case means on 3-13 or 8-18.