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energy saving solutions

TUTORIAL GRUPO III

DOING THE SOLAR SITE SURVEY

SOLAR THERMAL WATER HEATING SYSTEMS

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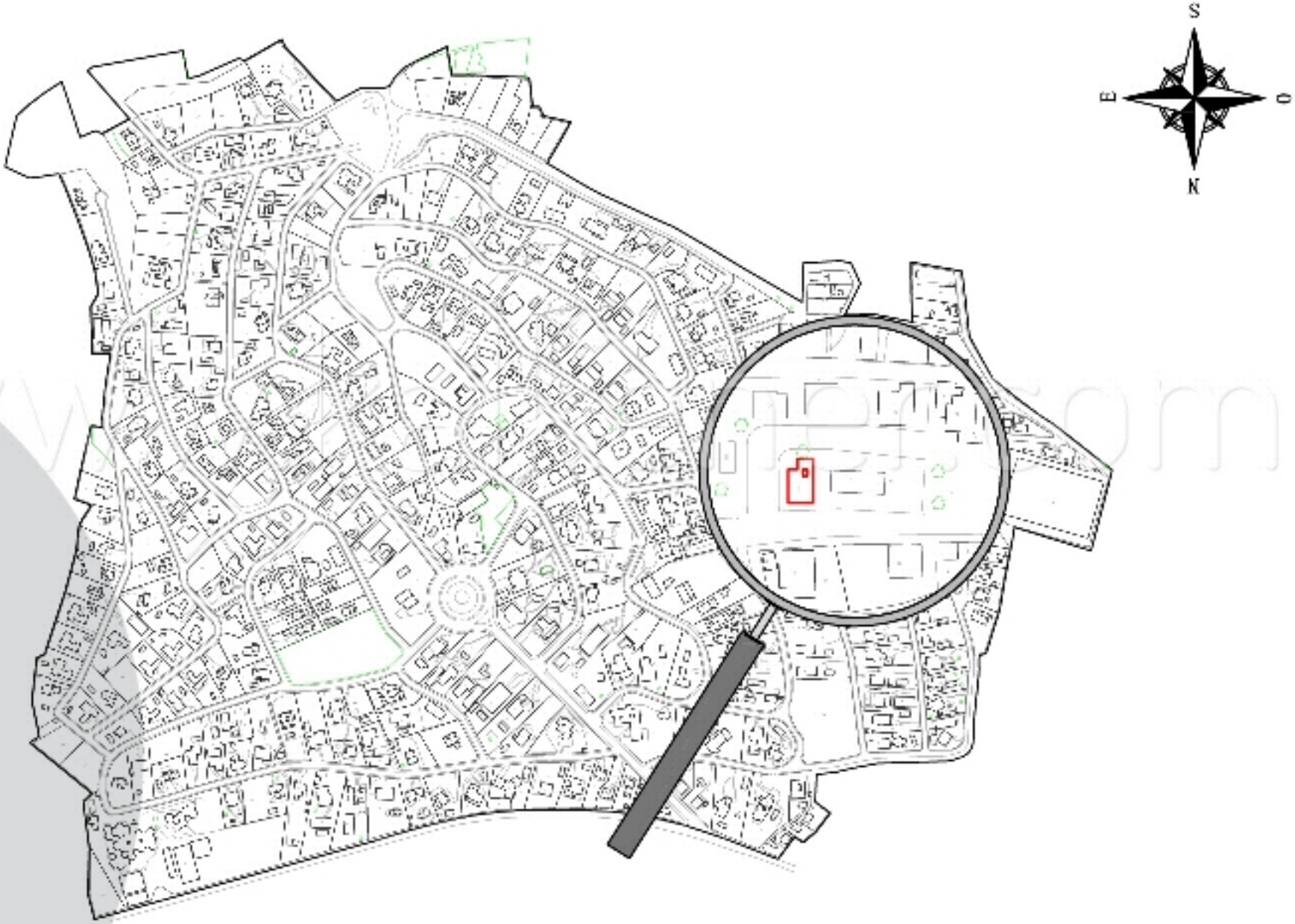
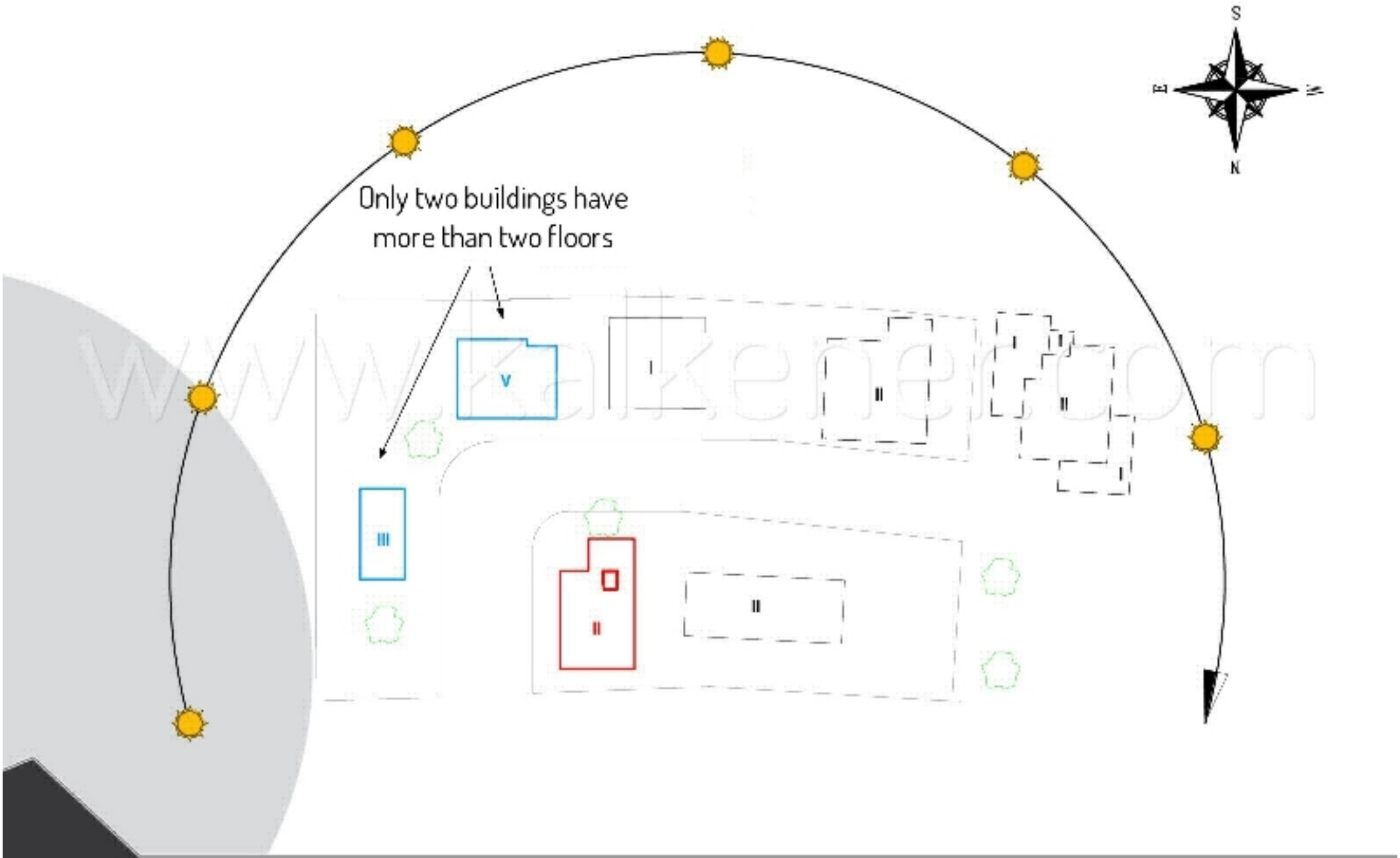
1. ORDENACIÓN URBANA

The aim is to plot the **'Solar site obstacle survey'** it's to say, the curve made up of the contour of the items that can cast shadows on the solar collectors. Therefore, the first is necessary to identify the items whose height is higher than the roof where the solar collectors are placed. To do this, the drawings from General Urban Development Plan should be used.



Only objets that are above solar collectors must be taken in account when studying shading
If the facility is located in the Northern Hemisphere the collector field should be oriented southwards. In this case, from East to West there are two buildings higher than our solar collectors



GENERAL VIEW

3. PERSPECTIVA

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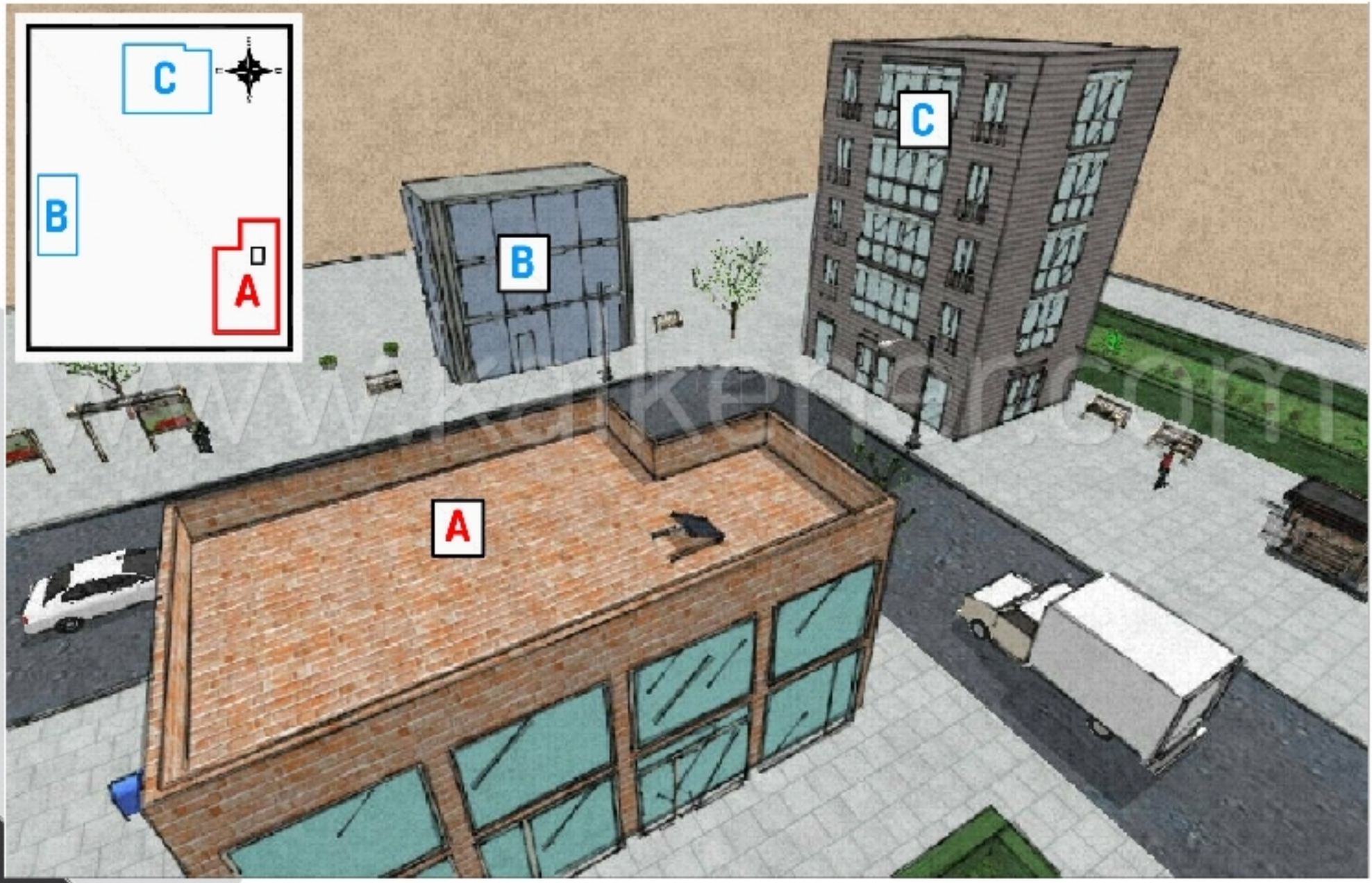
In the plan view, the buildings or items higher than the solar collectors' floor must be identified and referenced to the collectors field

4. PERSPECTIVA

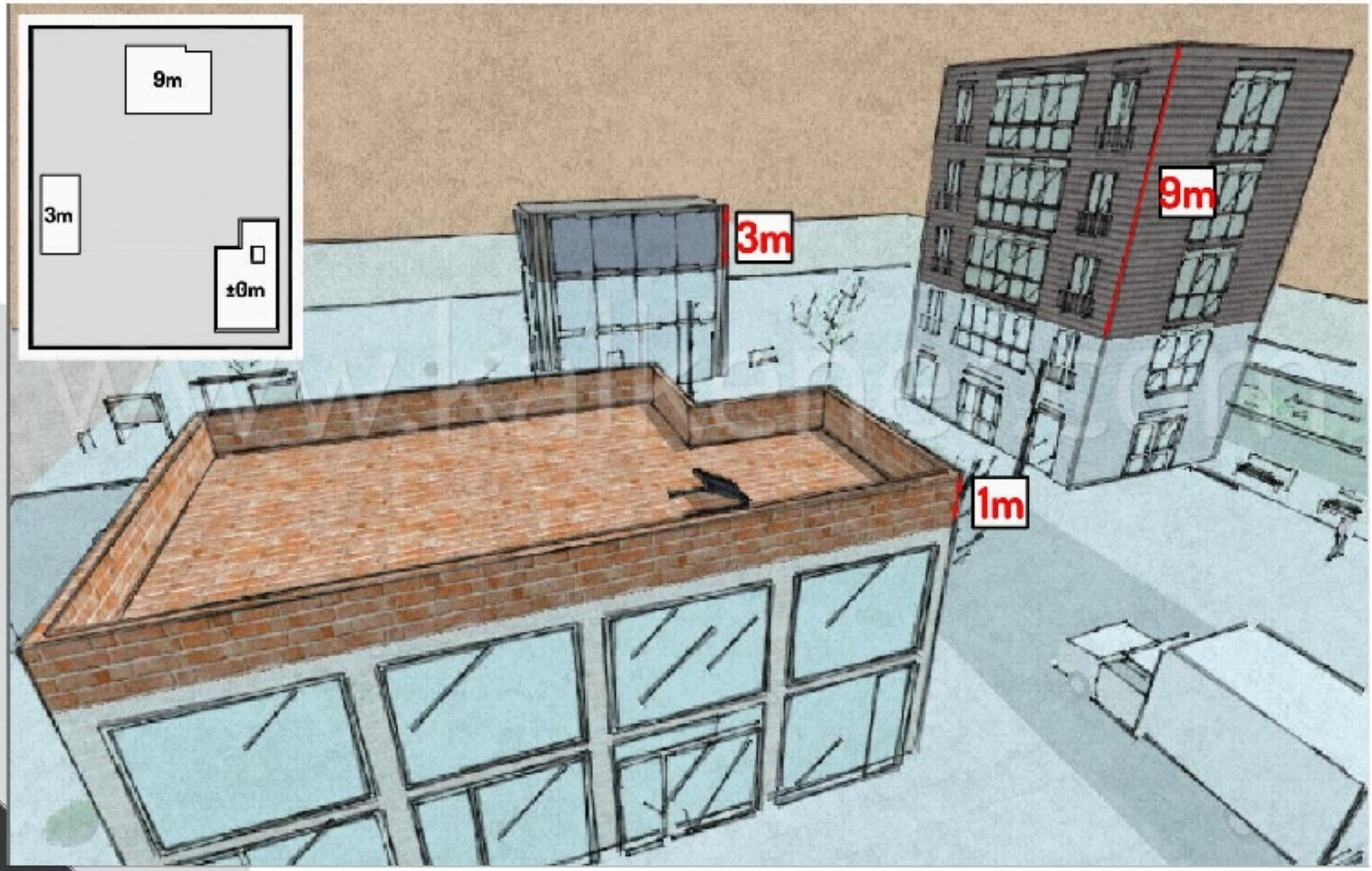


The Solar collectors' floor is set as Zero Level so only the items that are above this baseline must be taken in account

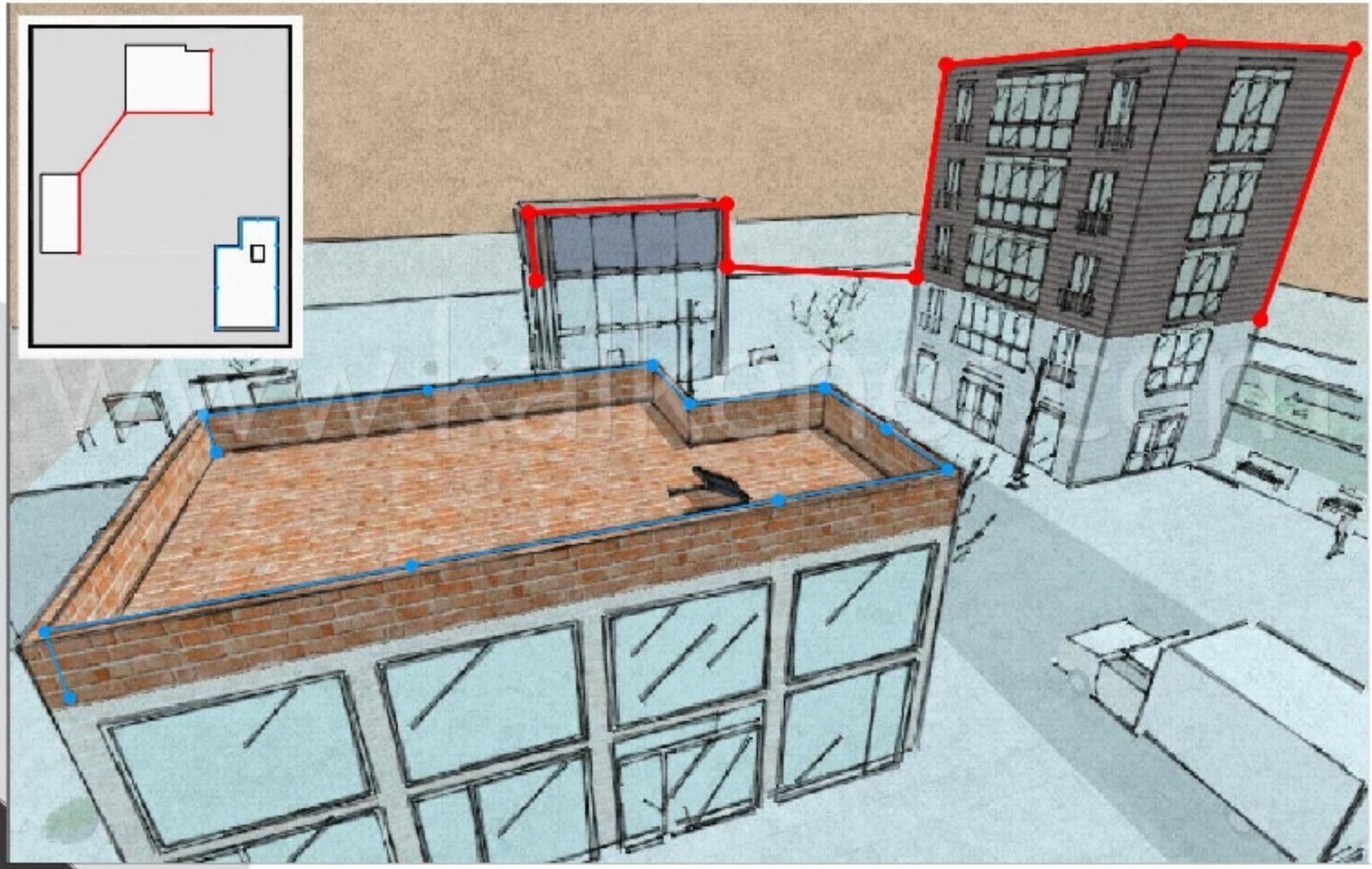
5. COTA CERO

After having set the zero level, the relative heights of the surrounding items must be measured.

6. ALTURAS A PARTIR COTA 0



Sometimes, when there are surrounding items to different distances, is difficult to know which shadow prevail. A high but distant object can cast less shade than another one, lower but closer, and vice versa. In the following example, one contour for each set of items at different distances will be created, so the 'Contour of the surrounding obstacles' will be plotted overlapping all these two single contours.



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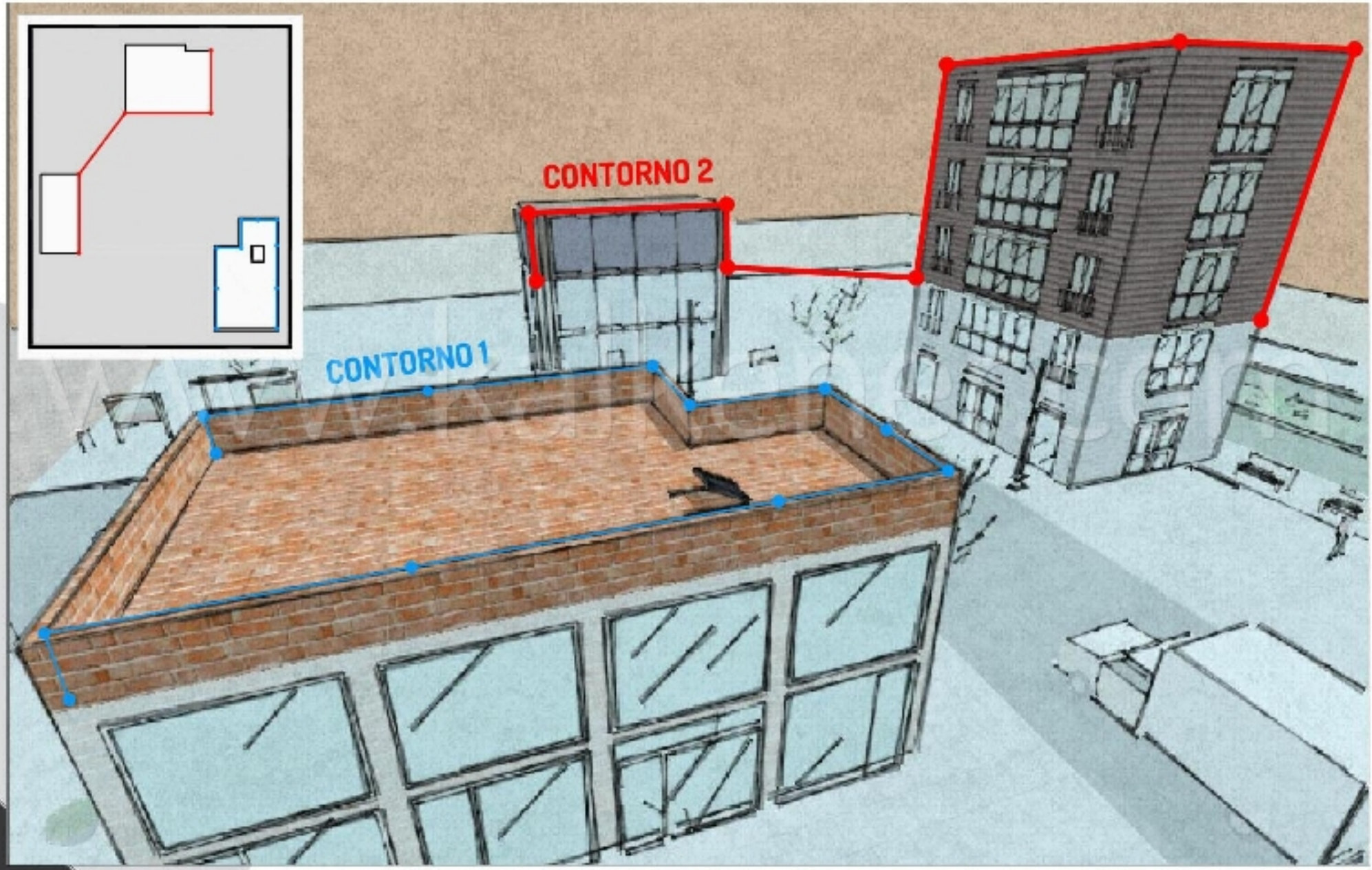
8. DETERMINAR EL PERFIL

Looking from solar collector to its around, the flat cover's parapet (**contour 1**, with relative height of 1 m) is overlapped with the other two buildings further away (**contour 2**, with relative height of 3 and 9 m respectively). For this reason is convenient to create two single contours one for closest items (**contour 1**), another for the ones further away (**contour 2**). The resulting contour will be obtained overlapping both of them

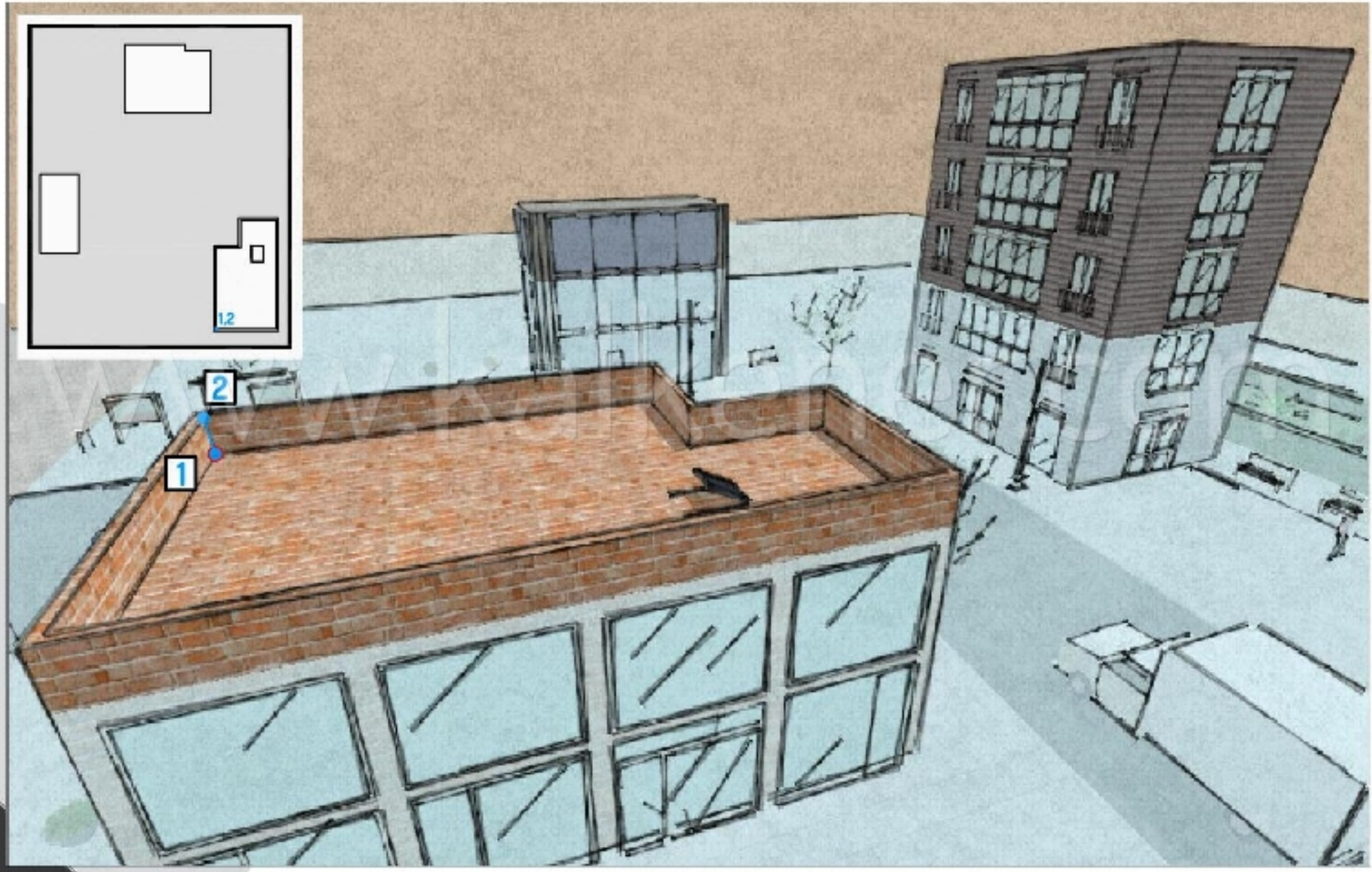


"CONTORNO 1"

Point 1: The parapet's points must be marked,from east to west, starting with the further east on zero level.

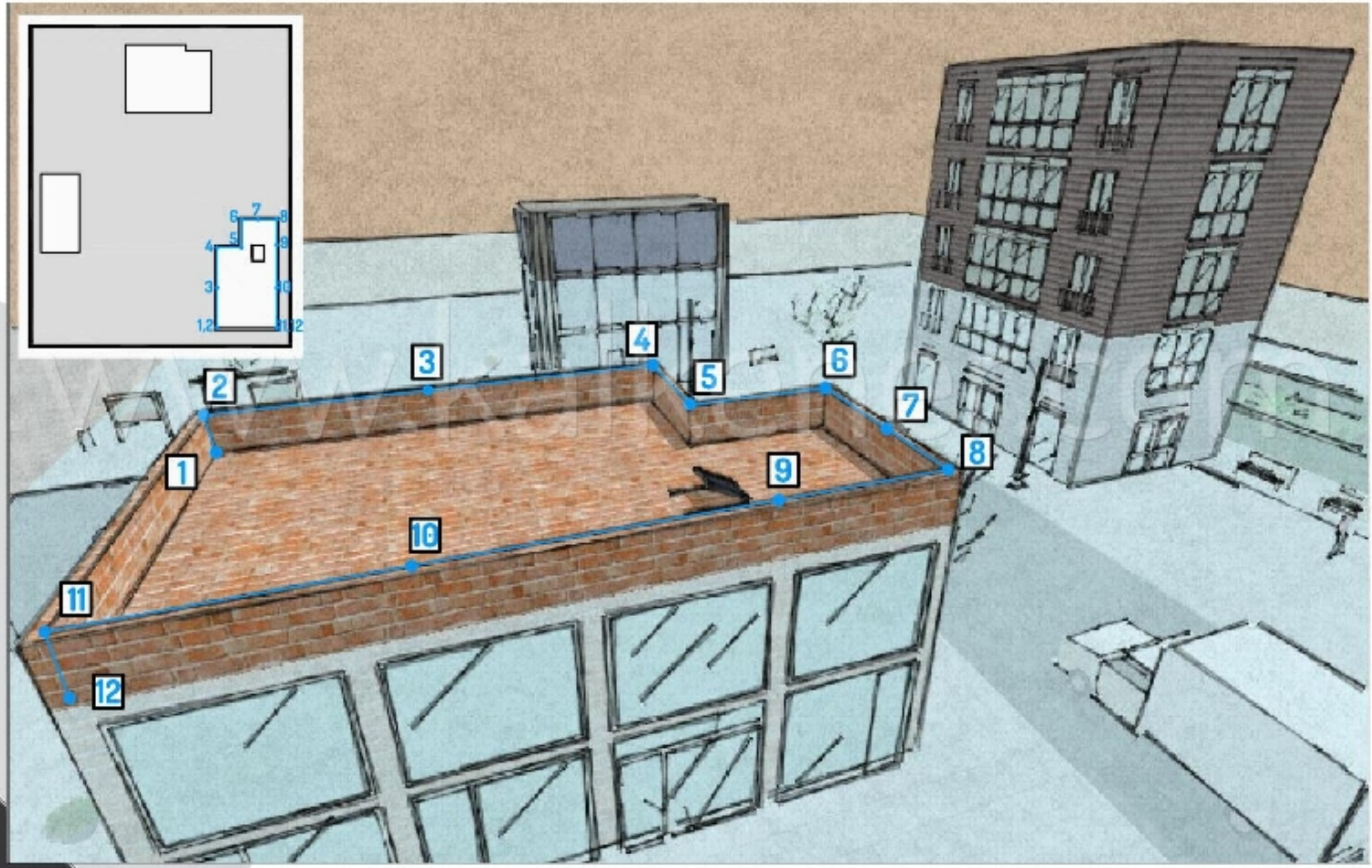
Point 2: Any part of the object which height is greater than the solar collector must be marked, keeping on clockwise.

9.CONTORNO 1



Poits 3 to 12: The more points are marked the more accurate the final result will be.
Once the whole object has been marked, coordinates to each point in the plan view will have to be assigned

10.CONTORNO 1



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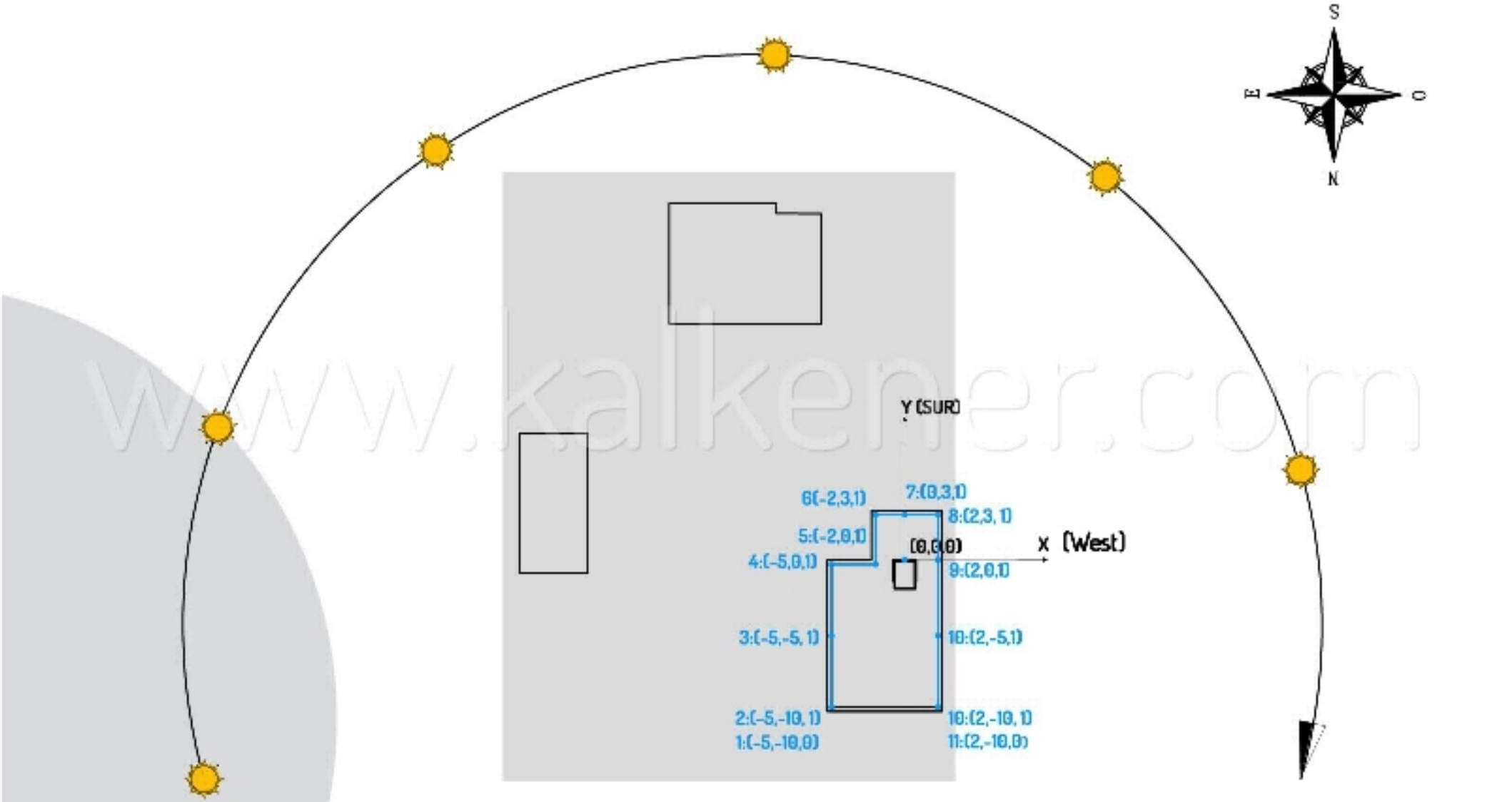
11. CONTORNO 1

Set coordenates, referenced to the solar collector (the reference source), to each of the 12 points marked on the object



"CONTORNO 2"

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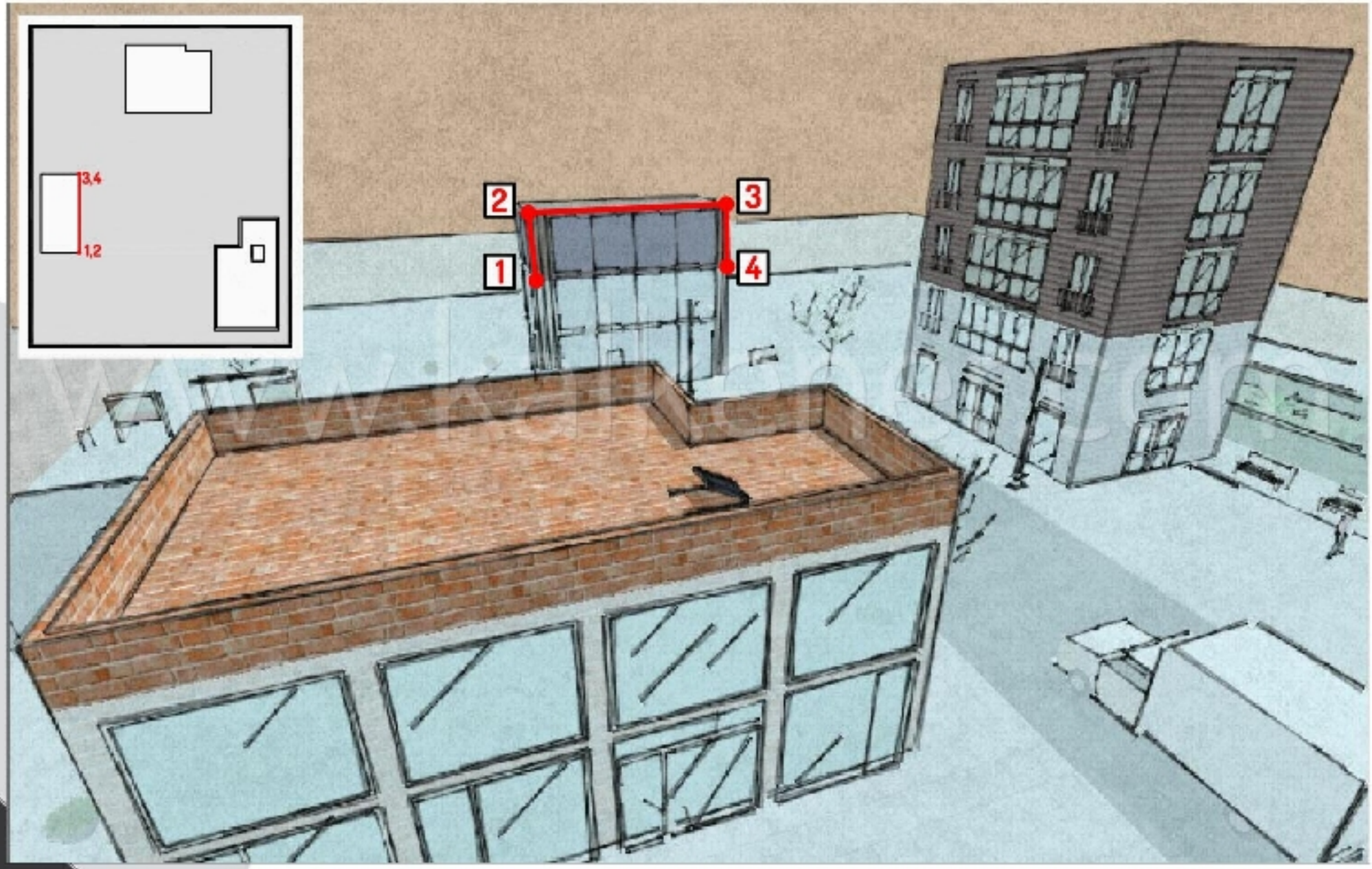
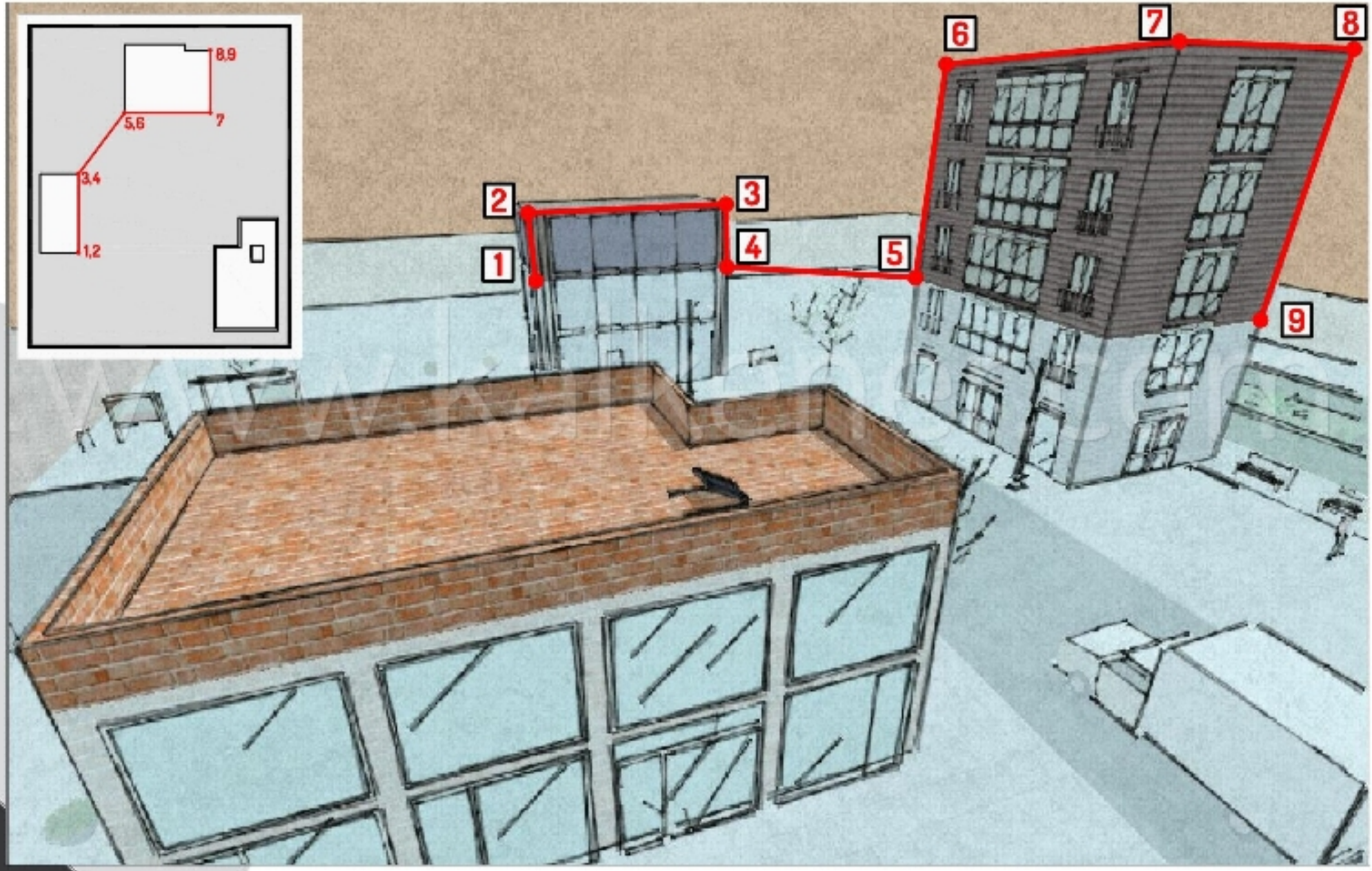
12. CONTORNO 2

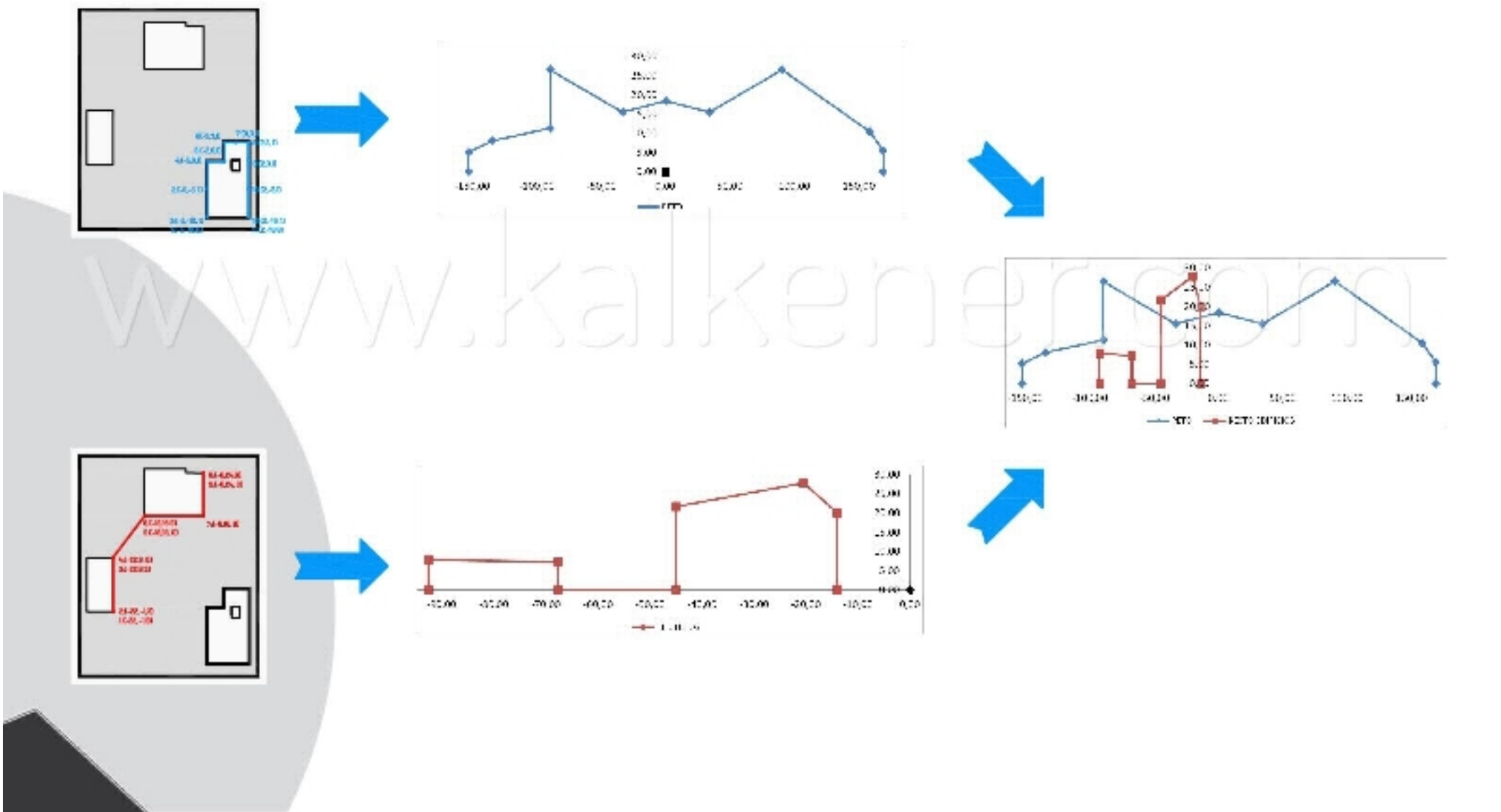
Let's continue with the **second shading contour**, which is made up of two different buildings' points. Starting from the zero level, from east to west, the building's outline will be marked through points. The more points are marked the more accurate the resultant contour will be



Although the two buildings are separated it is necessary to give continuity to the outline, so point 4 must be connected to point 5 and from there the rest of the second building's points must be marked as well, always from east to west, finishing on zero level.



Once the whole points of each outline have been entered using Cartesian coordinates, Kalkener translates them automatically to Cylindrical coordinate system and overlaps both outlines. The resulting contour will be used to calculate the shading losses later.



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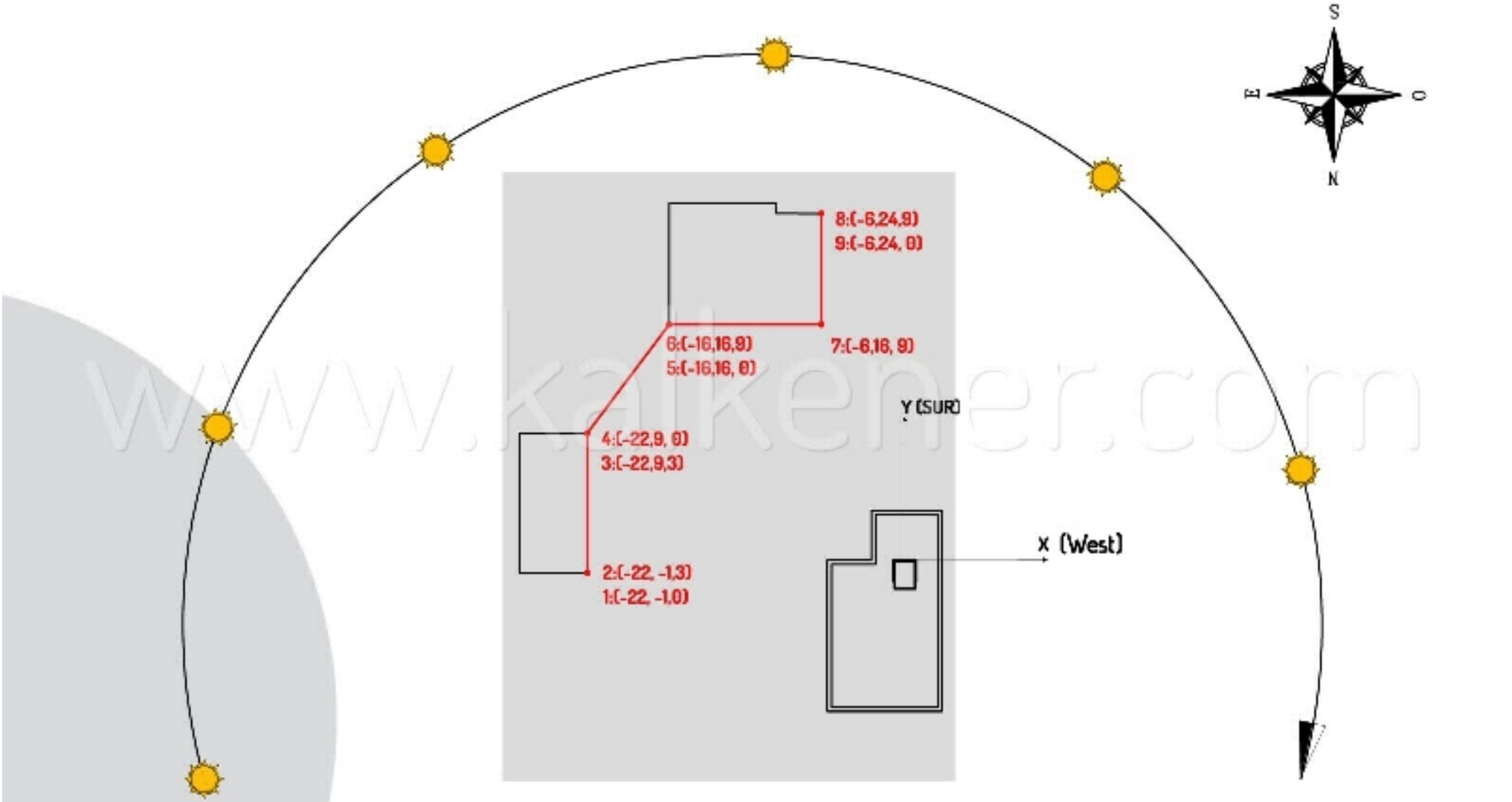
Set coordenates, referenced to the solar collector (the reference source), to each of the 9 poitns that made up the outline

14. CONTORNO 2



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