Seth von Dardel
2021-04-29

Starkstad.

EXAMPLES TO IMPROVE SOLAR ACCESS FOR THE COURTYARD

CONCLUSION

Two main parts of the block (marked in blue in Figure 1) can be altered to improve solar conditions for the courtyard in the afternoons.

There are three main ways that the building can be altered: by removing the buildings at the locations completely, to lower building heights or to install glass walls.

Removing buildings completely increases the courtyards exposure to wind while lowering the building heights lets in less sunlight but means better protection against wind. By having glass walls solar access is increased while wind protection is maintained.

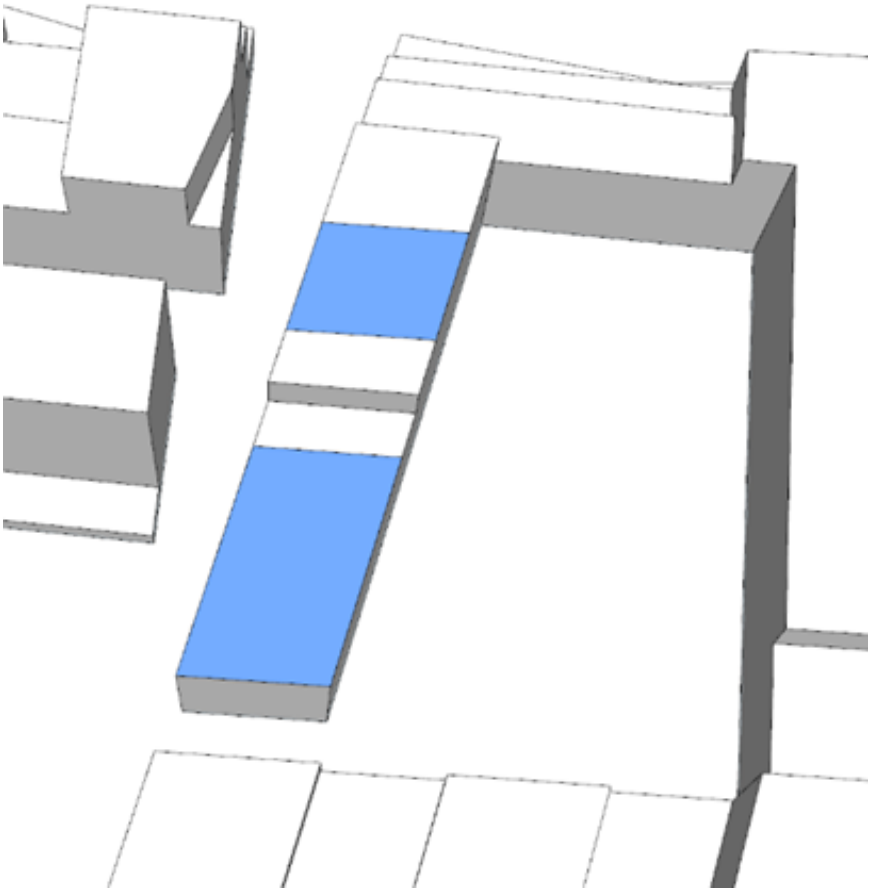

Figure 1 Parts of building that can be altered to improve solar access in the afternoons

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SOLAR ACCESS STUDY

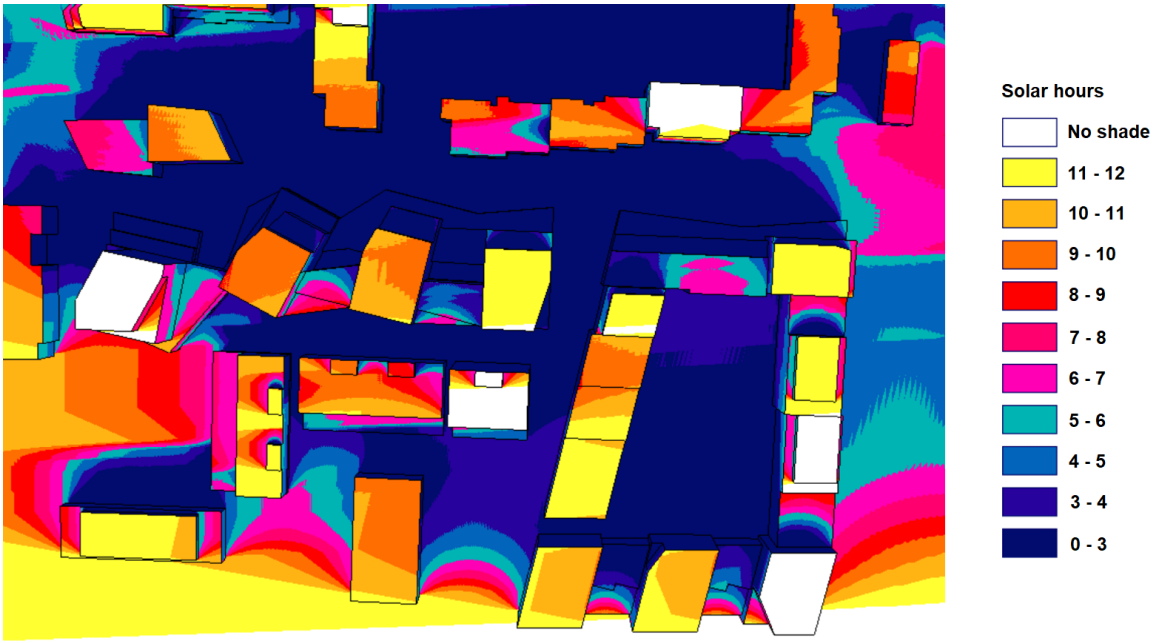
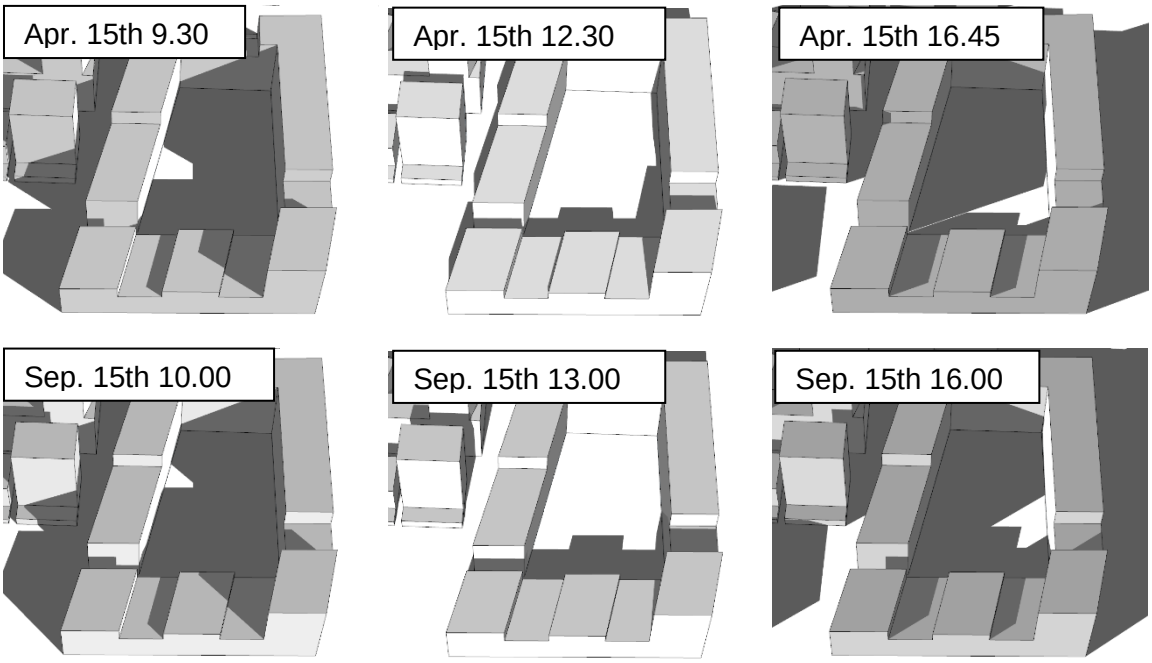


Figure 2 Solar hours March 21st



Conclusion:

With the current design the courtyard is completely shaded before 9.30 and after 16.45 on April 15th and before 10.00 and after 16.00 on September 15th.

In the morning hours it is the east side shading and, in the evening, the west side.

To improve solar conditions in the courtyard in the afternoons building height needs to be adjusted in the west.

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Solutions:

By removing the west flank we can study what parts are significantly shading the courtyard and what we can do about it.

Conclusion:

The existing tall building to the west of the block has a tall but narrow shade. Removing the west flank completely gives solar access to a large part of the courtyard to around 18.30 on April 15th.

There are two main areas that can be changed to improve afternoon solar conditions on certain areas of the courtyard (marked in blue in Figure 3).

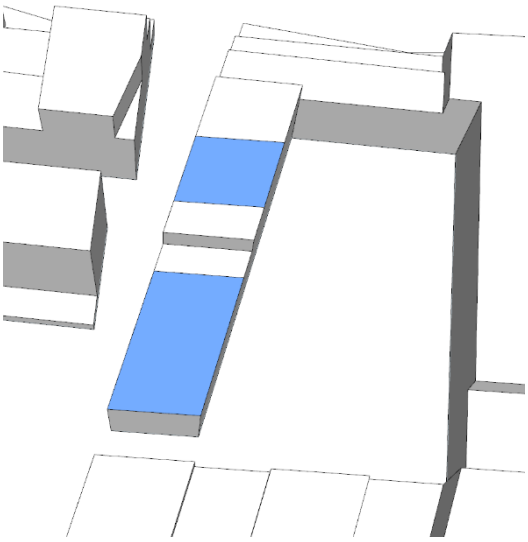

Figure 3 Areas to work with to improve afternoon solar conditions marked in blue

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When working with the building structure it is important to consider wind as well. An opening to the west means that the courtyard gets increased exposure towards north western, western and south western winds (a combined percentage of approximately 30 % of the year) (Figure 4).

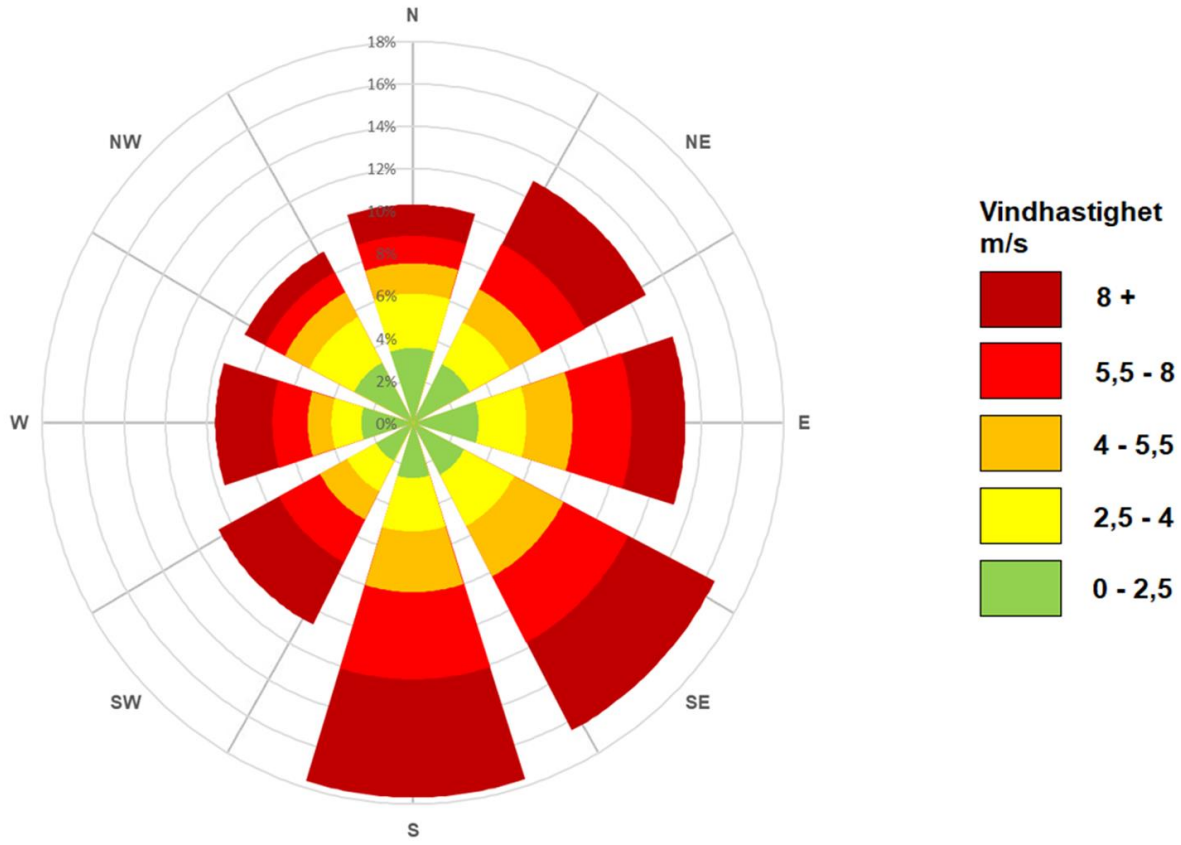

Figure 4 Kopavogur wind directions, full year

There are a few design examples to work with which each have their own advantages and disadvantages. Three main options will be discussed below.

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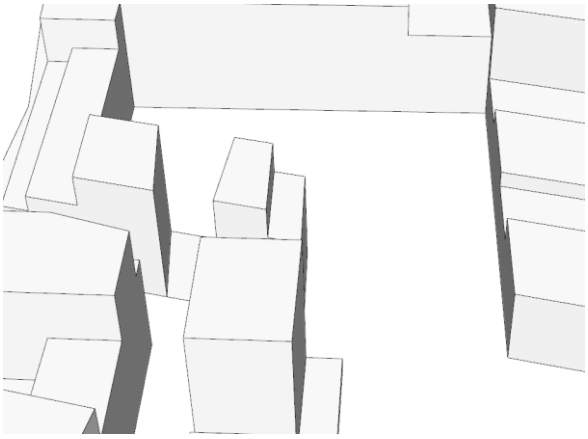
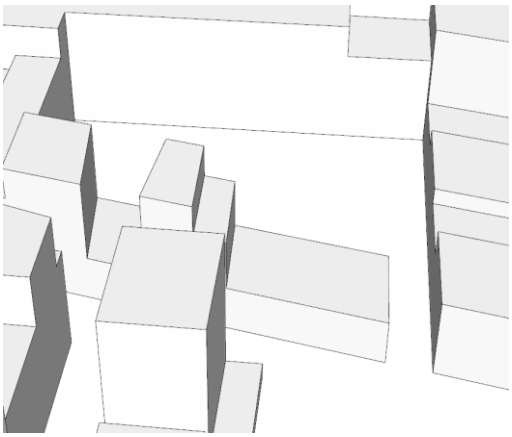
Completely open

Removing the objects blocking the sun completely lets in a lot more sunlight to the courtyard but exposes the courtyard to wind a large portion of the year.



Lowering building height

Lowering building height lets in more sunlight but keeps a lot of the wind protection. Still, because the buildings in the east of the courtyard is a lot higher than on the west side there will still be a problem of wind pushed down to the courtyard from westerly and southwesterly winds. This alternative is preferable to opening completely.



Glass walls

Sun can be let in to the courtyard through openings between buildings while keeping the wind protection by putting up a glass wall. Figure 5 and Figure 6 below shows examples from Hammarby Sjöstad in Stockholm where the glass walls are faced towards the south to let in more daylight during mid-day. Protected balconies are placed behind the glass wall on the

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building facades as well as wide balconies reaching all the way from building to building to provide green house like conditions to the tenants while providing sun to the courtyard.

Figure 5 Hammarby Sjöstad, Hammarby Allé

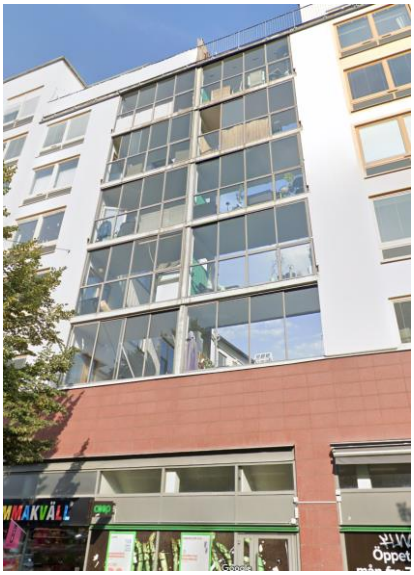

Figure 6 Hammarby Sjöstad, Hammarby Allé

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