

Houtwijk Analysis

Houtwijk – study models

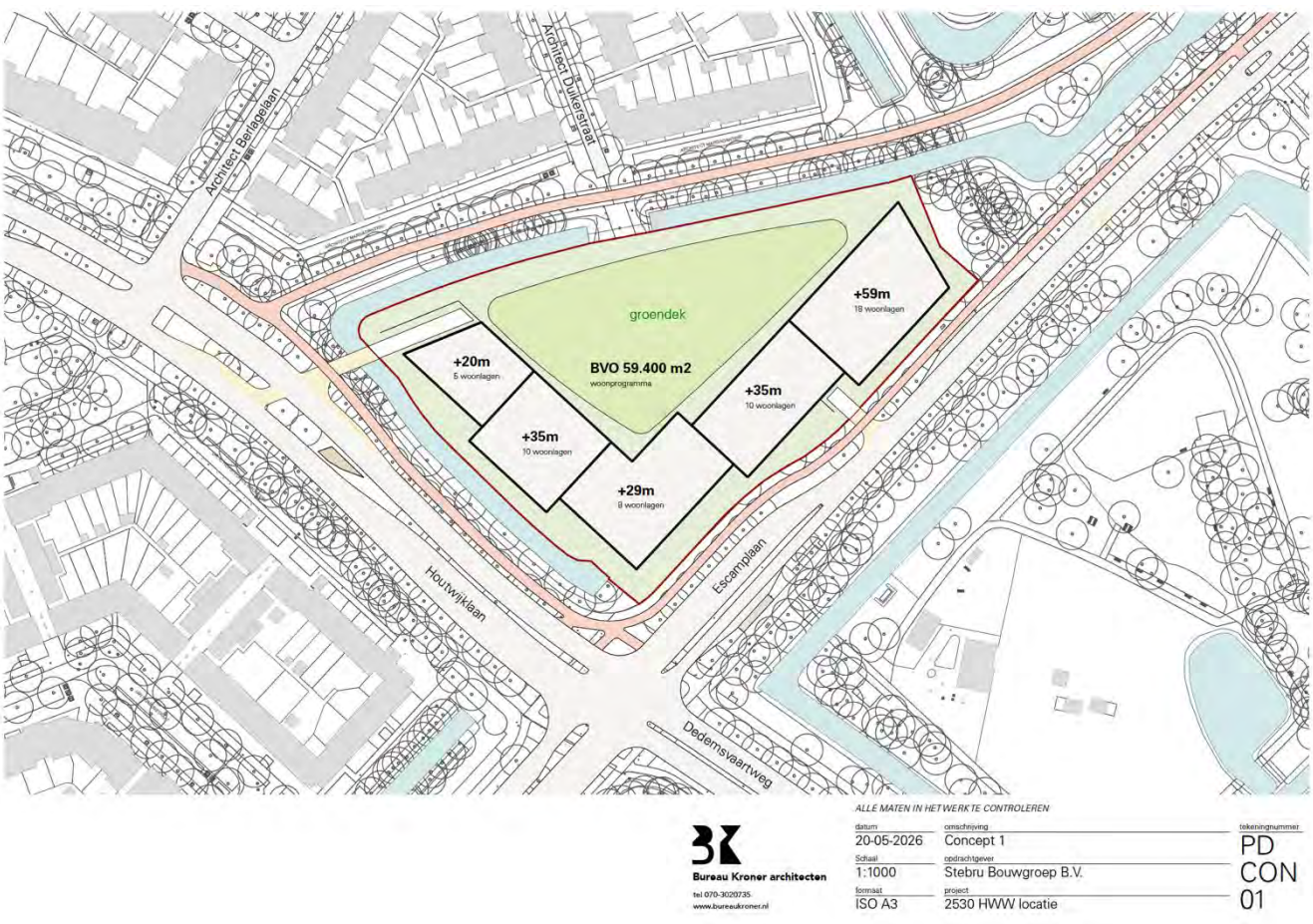


	Chapter Summary
Dimension Comparison	Data on over terrain area, paved and unpaved areas, building footprint, and total facade.
Daylight Simulation (All Year)	Amount of sun hours on building volumes across the year.
Daylight Simulations (February 19th)	Amount of sun hours on building volumes across 24 hours on February 19th.
Shadow Visualisations	Presence of shadow from building volumes onto surrounding landscape.
Visibility Percentage (All Year)	Percentage of accessible views to the terrain of the site from each building volume.
Direct Sun Hours (interior) (All Year)	Cumulative hours of direct sunlight entering apartments throughout the year.
Daylight Autonomy (All Year)	Assessment of total lux entering apartments to allow for daily activities without necessitating artificial light (range of 250 – 500/2000 lux).
Wind Analysis from South-West (All Year)	Wind pressure across the terrain from the South-West, as a result of the building volumes.

Urban planning



Parkstad



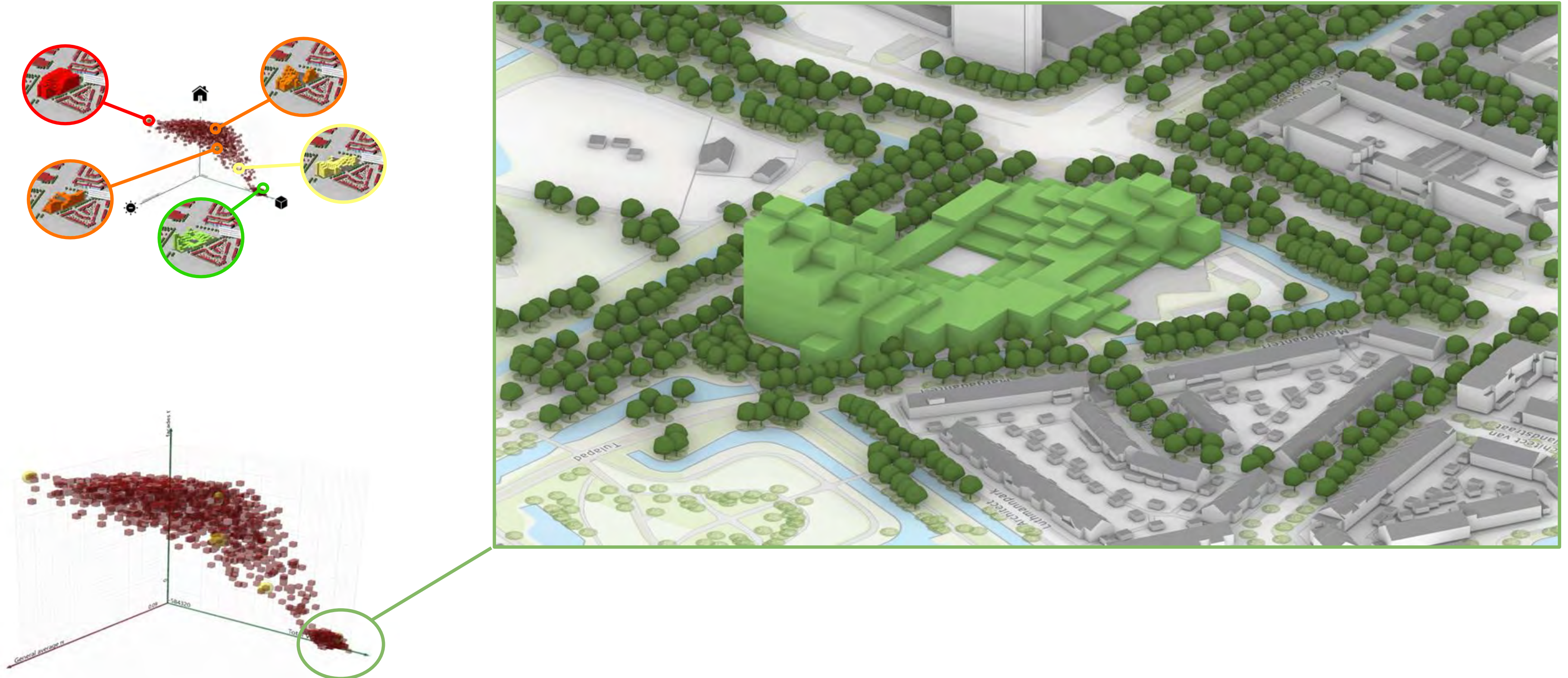
Stedelijke rand



Hoven

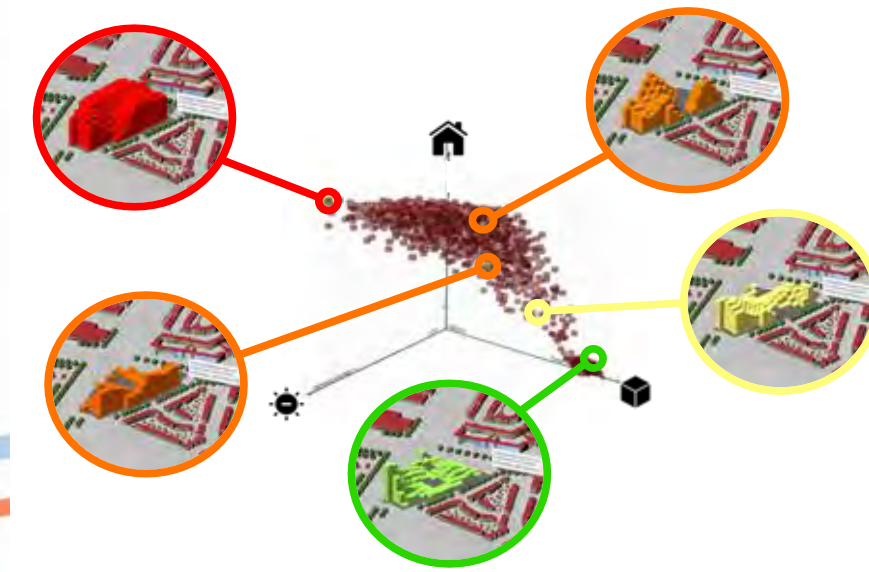
GENERATIEVE MASSASTUDIE

Optimalisatie schaduw en daglicht van stedenbouwkundig volume tot 60/70m



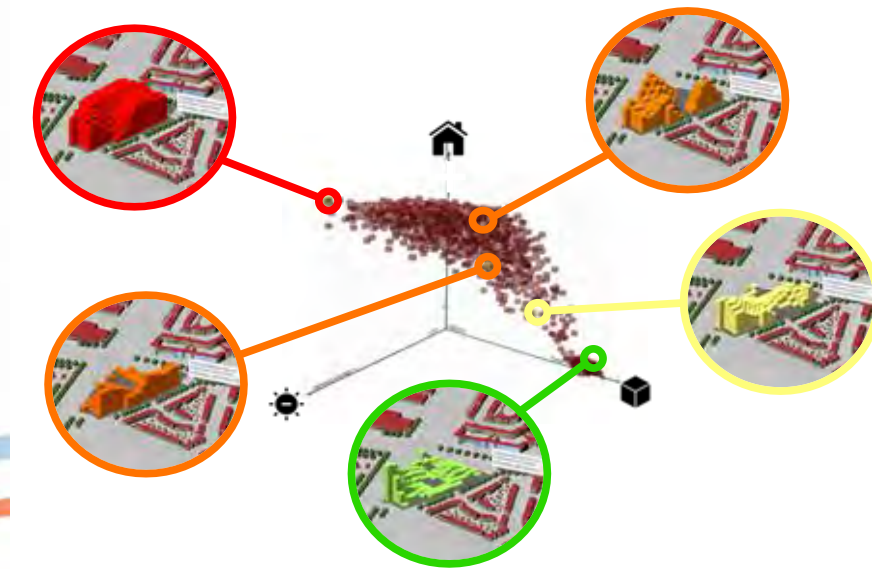
MASS ADDITION COMPARISON

Parkstad



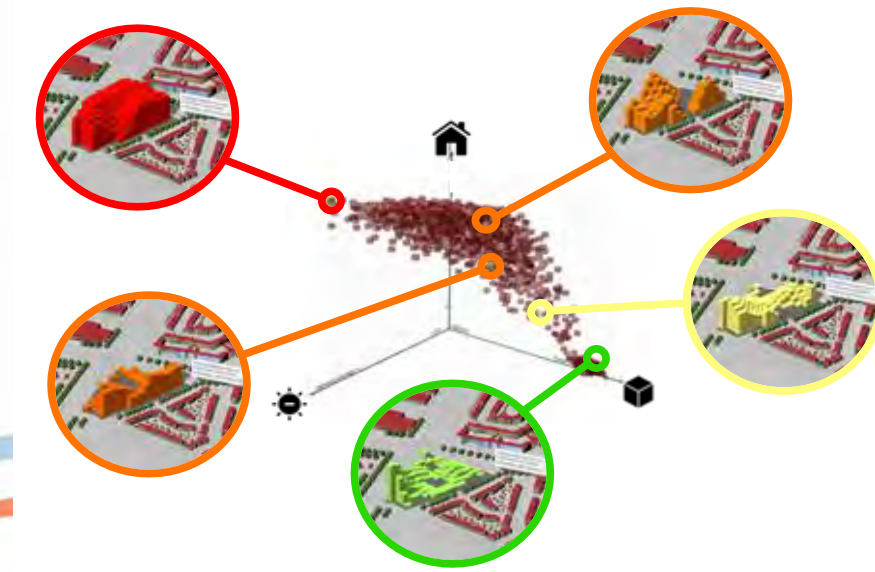
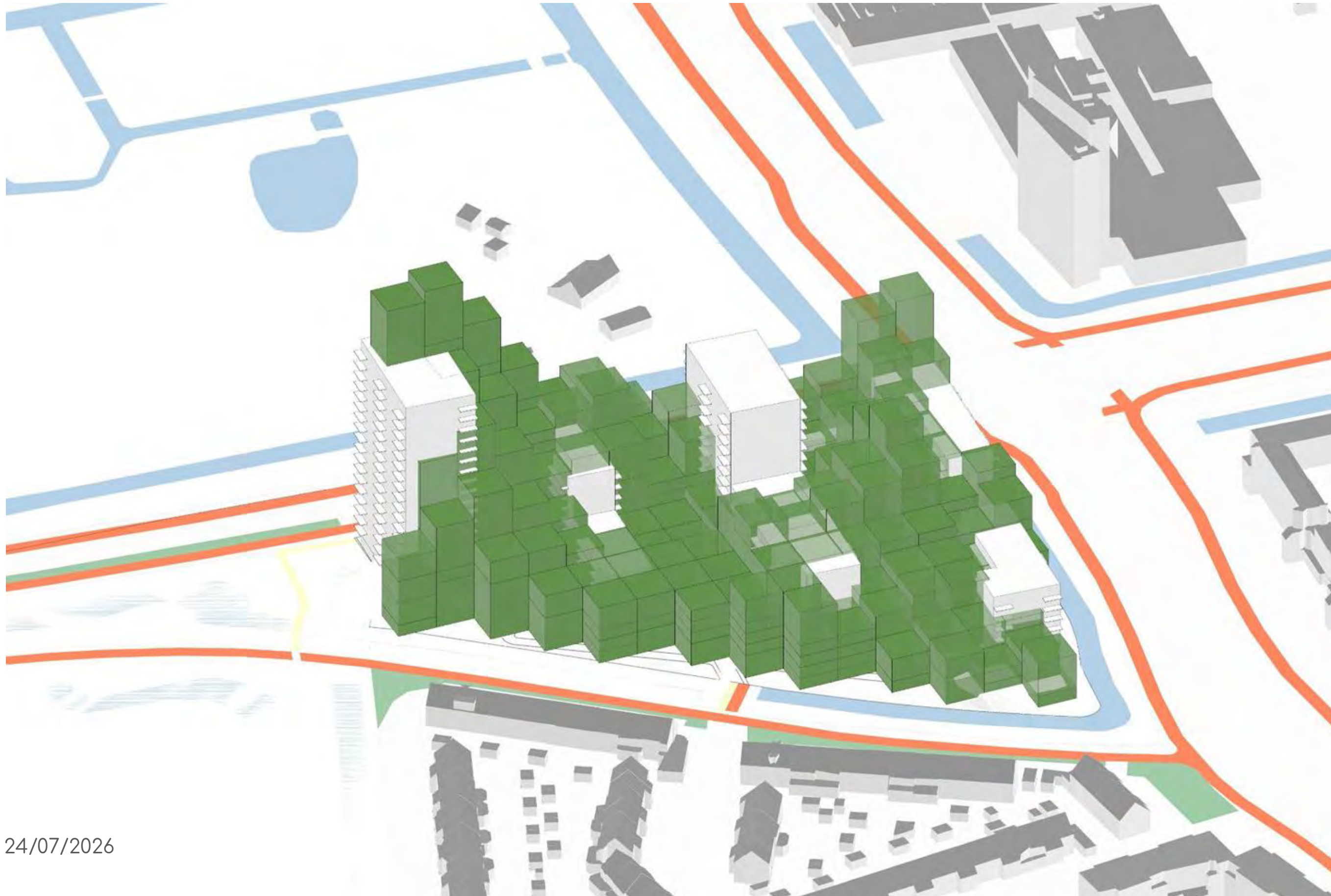
MASS ADDITION COMPARISON

Stedelijke rand



MASS ADDITION COMPARISON

Hoven



Houtwijk

Model comparisons



Parkstad

Oppervlaktes	(m2)	
Totaal Terrein	13724	
Verhard	1812	13%
Onverhard (volle grond)	5020	37%
Bebouwing (excl. parkeren)	3196	23%
Parkeerdek (dekgroen)	3681	27%
Totaal facade	22 516	



Stadsrand

Oppervlaktes	(m2)	
Totaal Terrein	13724	
Verhard	1554	11%
Onverhard (volle grond)	6054	44%
Bebouwing (excl. parkeren)	3872	29%
Parkeerdek (dekgroen)	2245	16%
Totaal facade	18 926	



De Groene Hoven

Oppervlaktes	(m2)	
Totaal Terrein	13724	
Verhard	1774	13%
Onverhard (volle grond)	4473	33%
Bebouwing (excl. parkeren)	4330	32%
Parkeerdek (dekgroen)	3081	22%
Totaal facade	21 548	

maximum facade:

22516
m2



-15.9% facade area



-5.3% facade area

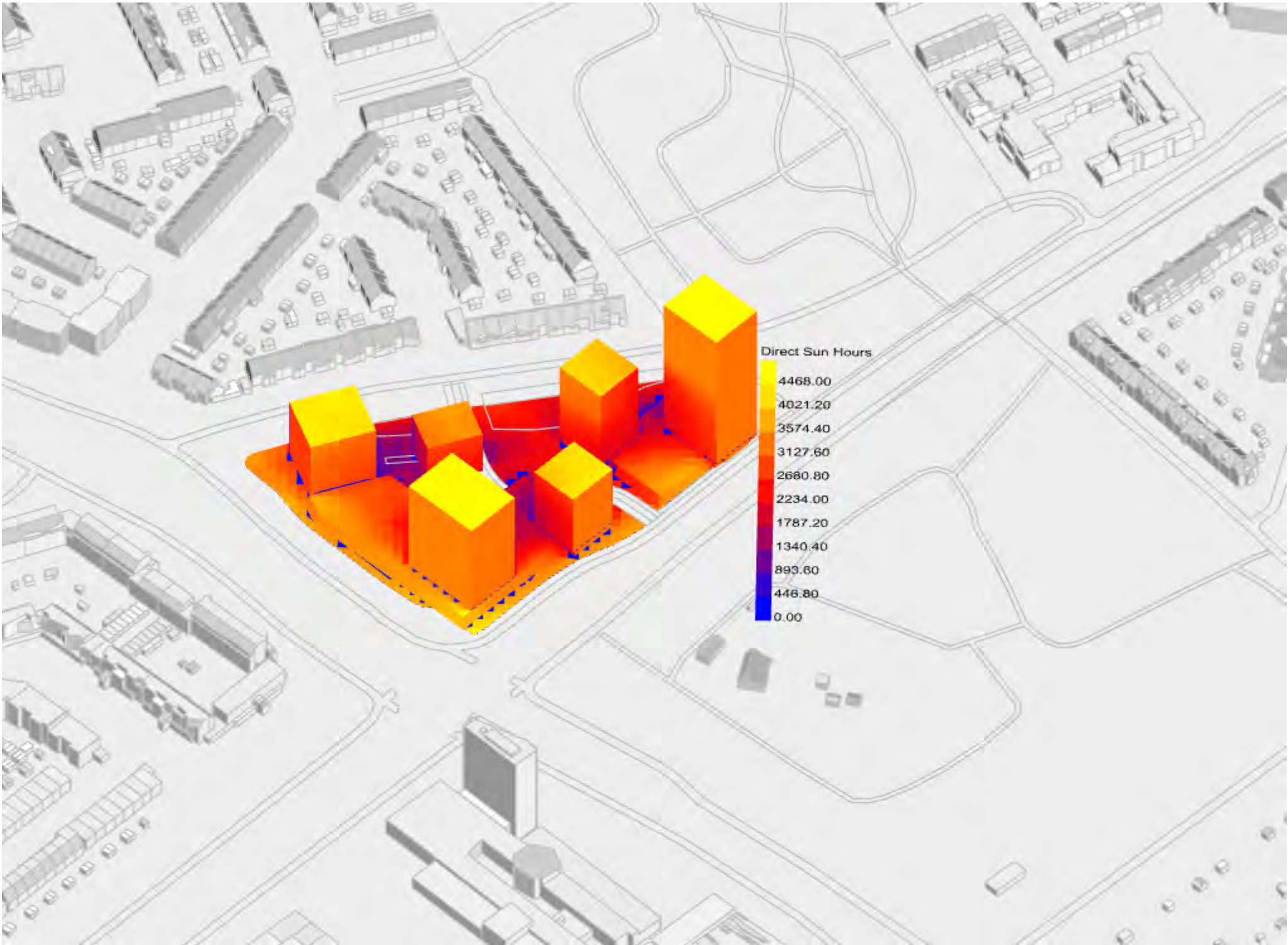
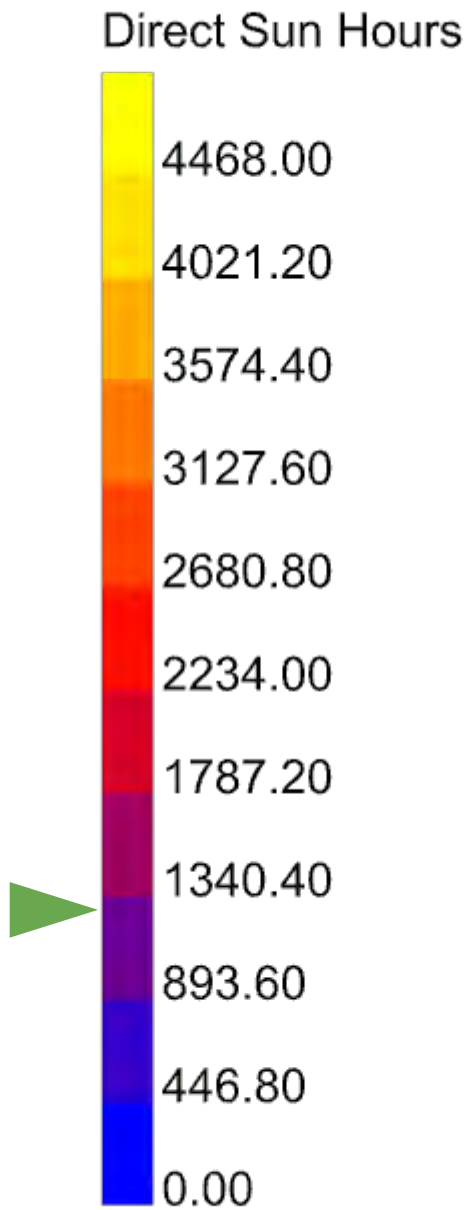


DAYLIGHT SIMULATIONS

ALL YEAR

DAYLIGHT SIMULATION

Parkstad (entire model)



south view

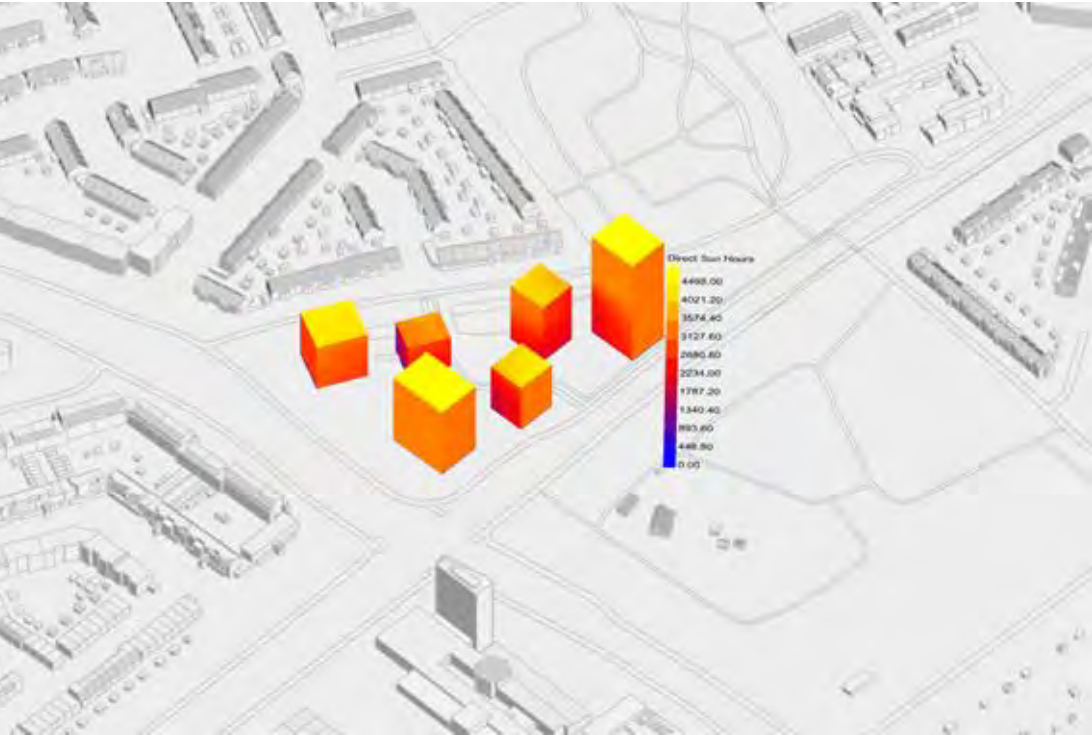


north view

Sun Hours	(hours)
MINIMUM	0
MAXIMUM	4468
AVERAGE	1296.73

DAYLIGHT SIMULATION

Parkstad (buildings)

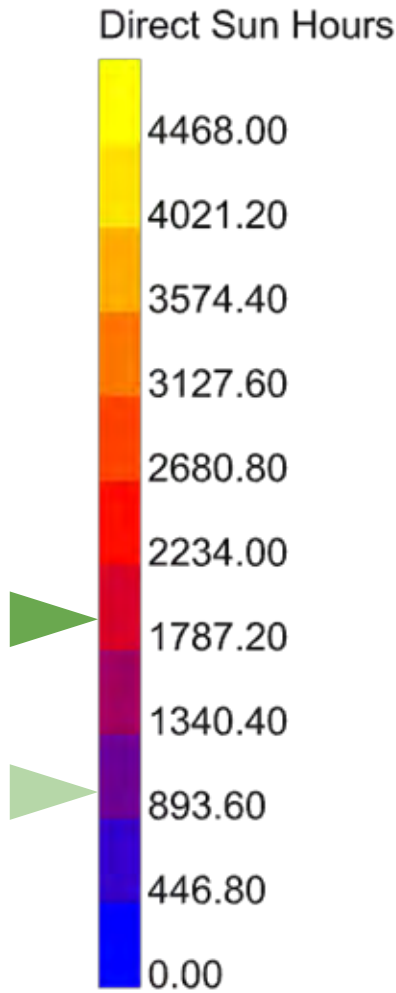


south view



north view

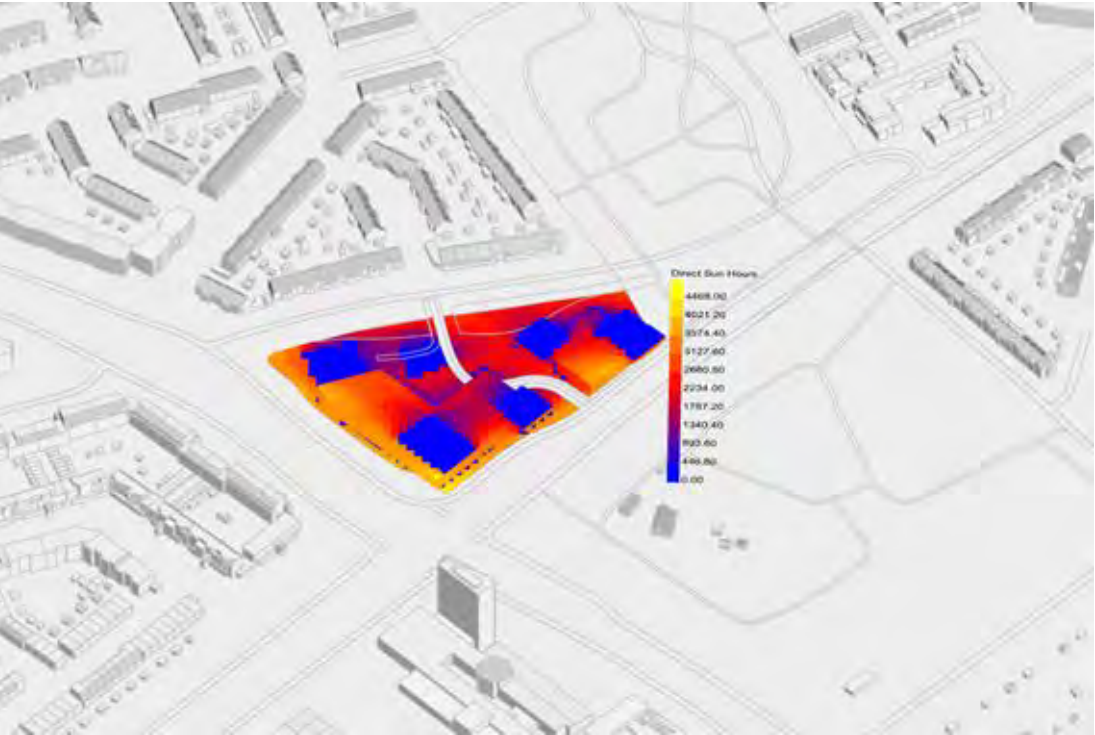
ontwerp - 24/08/2026



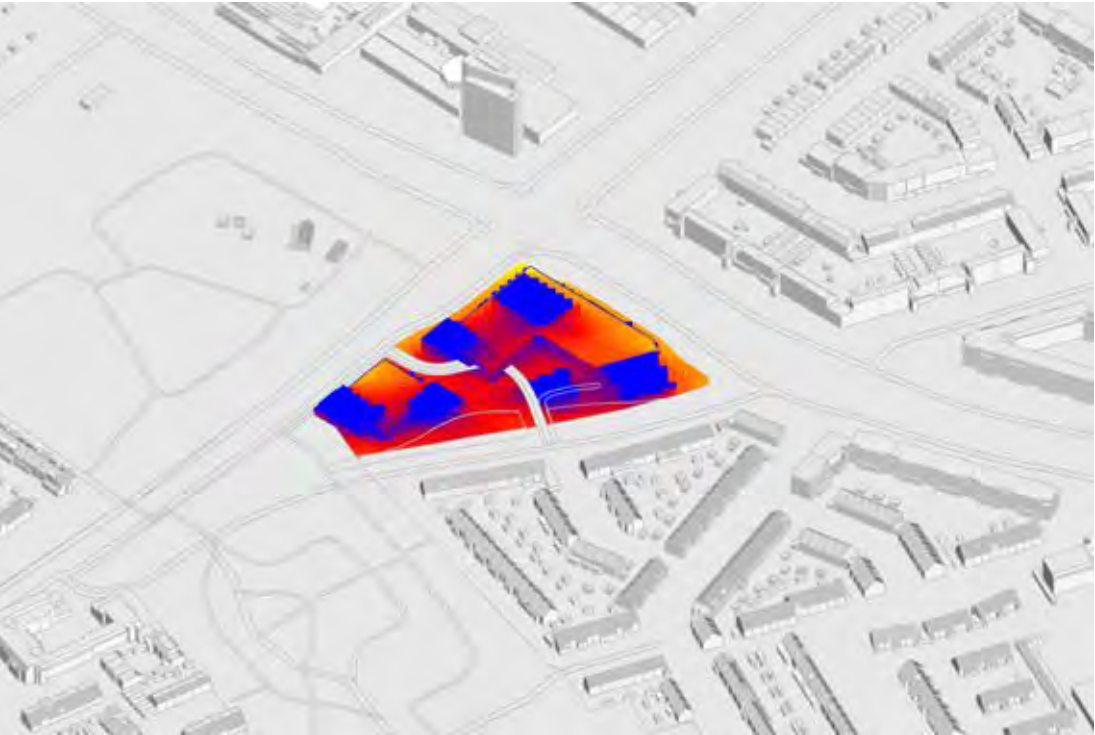
Sun Hours	(hours)
MINIMUM	0
MAXIMUM	4468
AVERAGE	1940.63

Sun Hours	(hours)
MINIMUM	0
MAXIMUM	4468
AVERAGE	1051.84

Parkstad (terrain)



south view



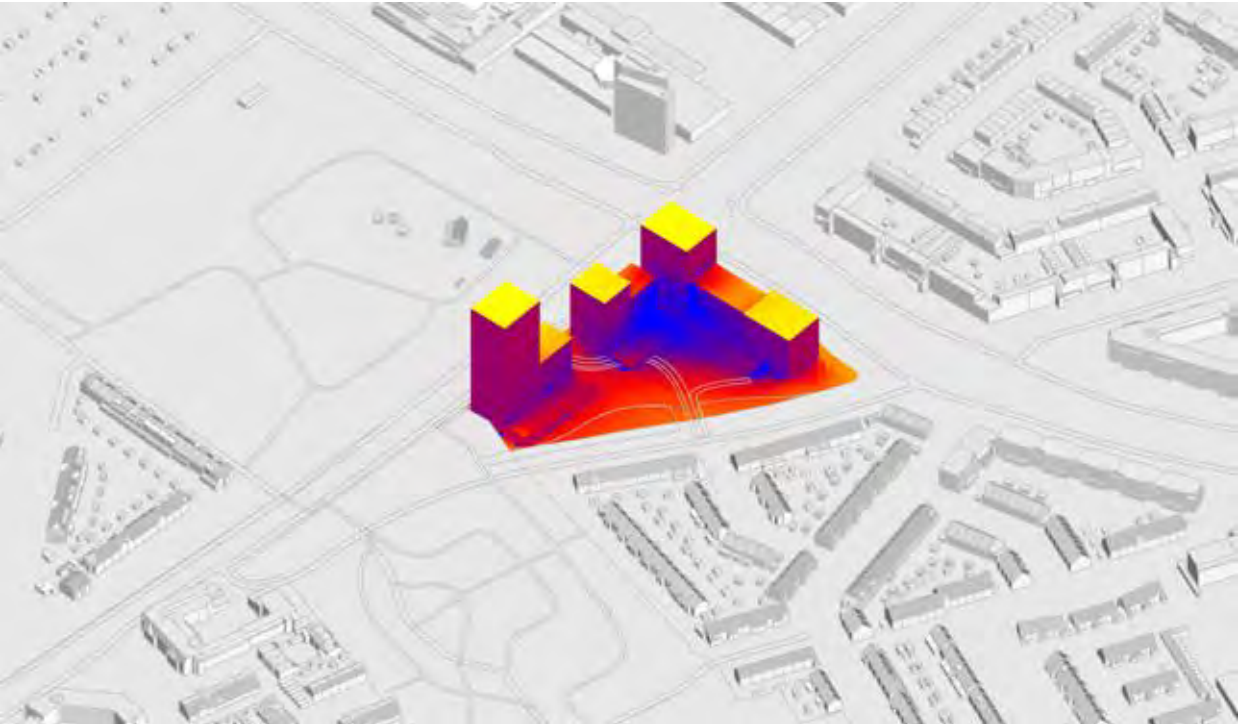
north view

DAYLIGHT SIMULATION

Stadsrand (entire model)



south view

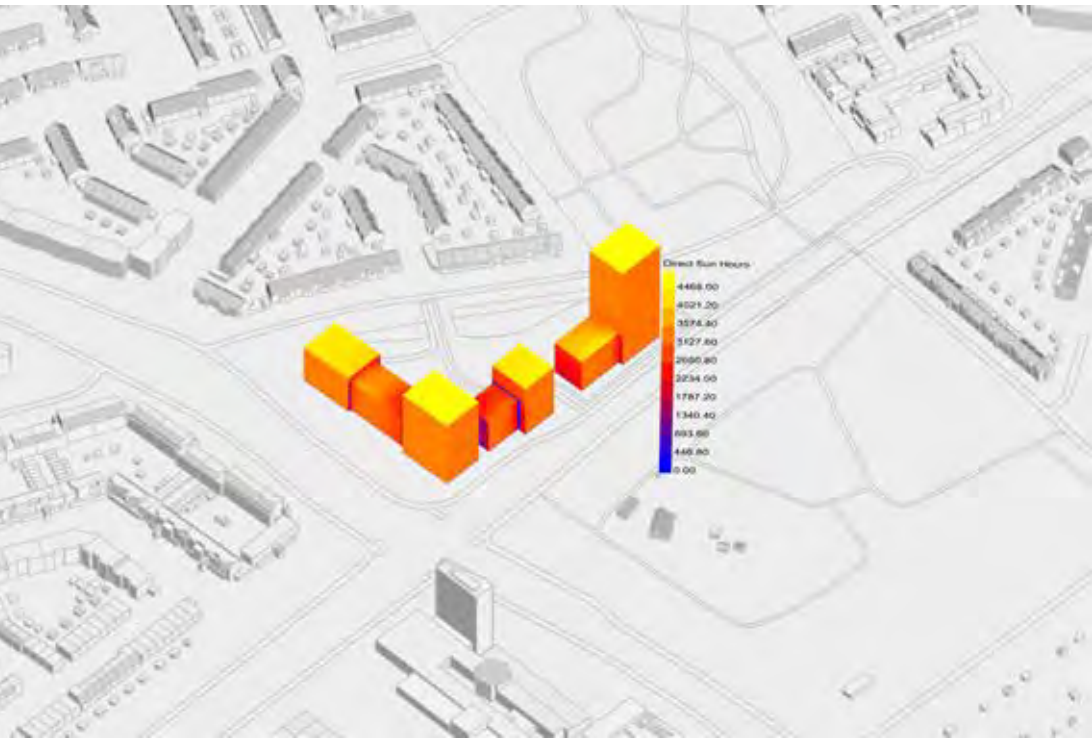


north view

Sun Hours	(hours)
MINIMUM	0
MAXIMUM	4468
AVERAGE	1044.18

DAYLIGHT SIMULATION

Stadsrand (buildings)

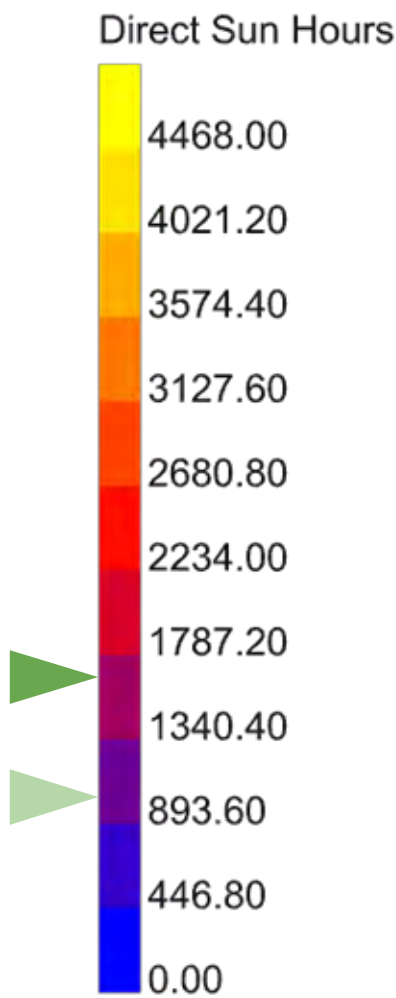


south view



north view

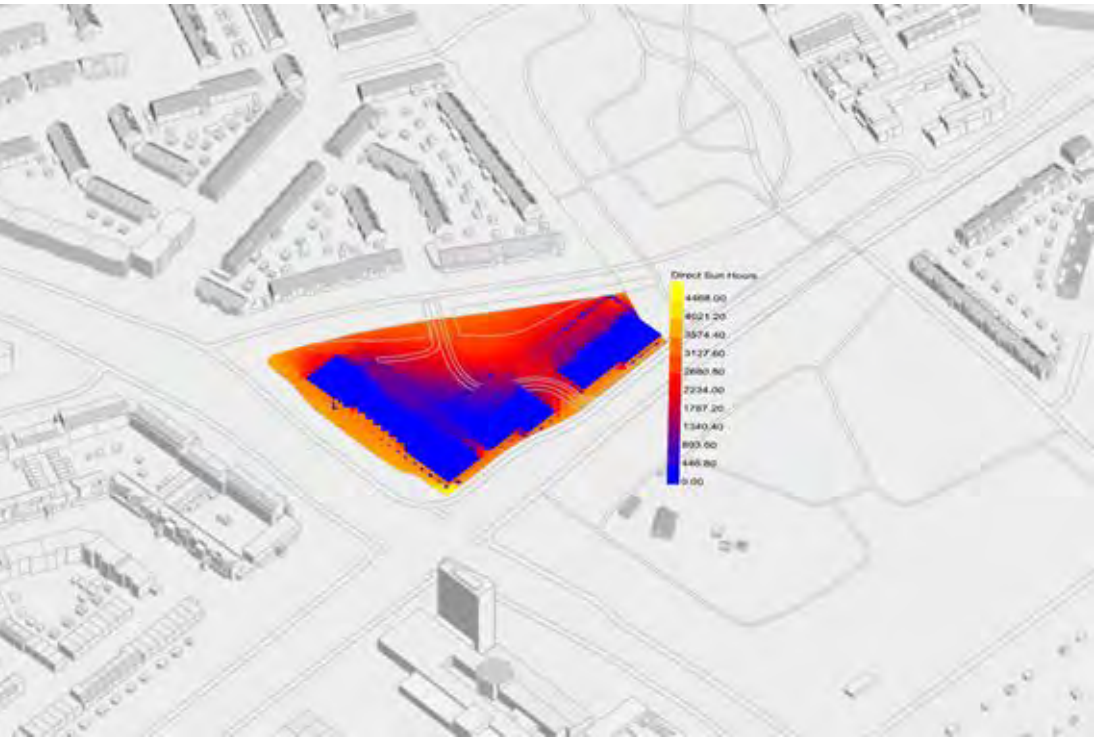
ontwerp - 24/08/2026



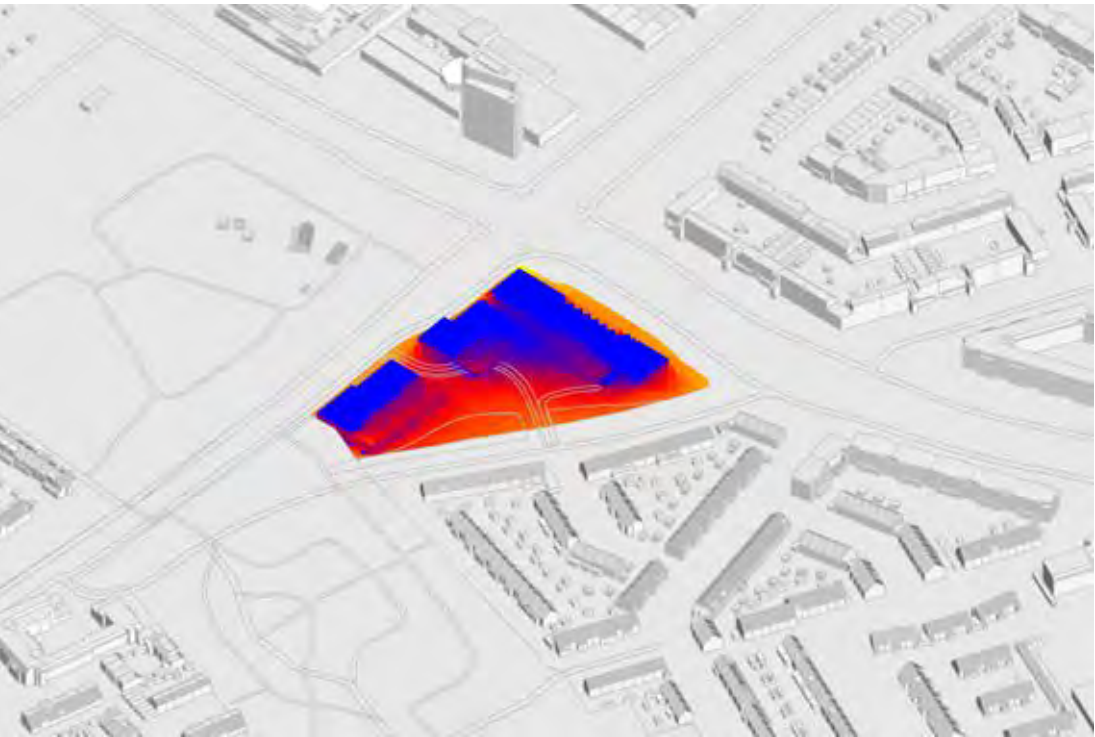
Sun Hours	(hours)
MINIMUM	0
MAXIMUM	4468
AVERAGE	1689.01

Sun Hours	(hours)
MINIMUM	0
MAXIMUM	4468
AVERAGE	1061.03

Stadsrand (terrain)



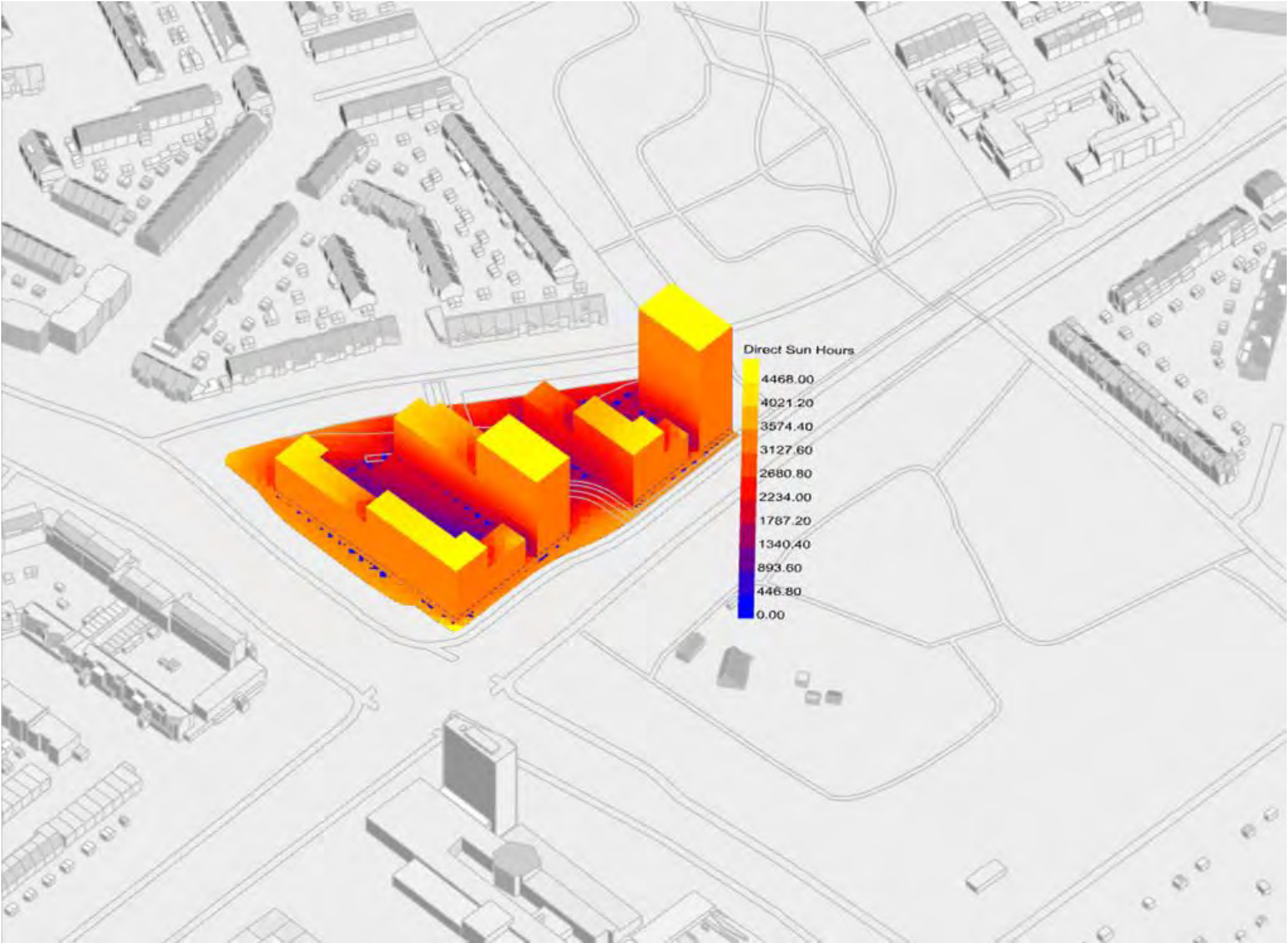
south view



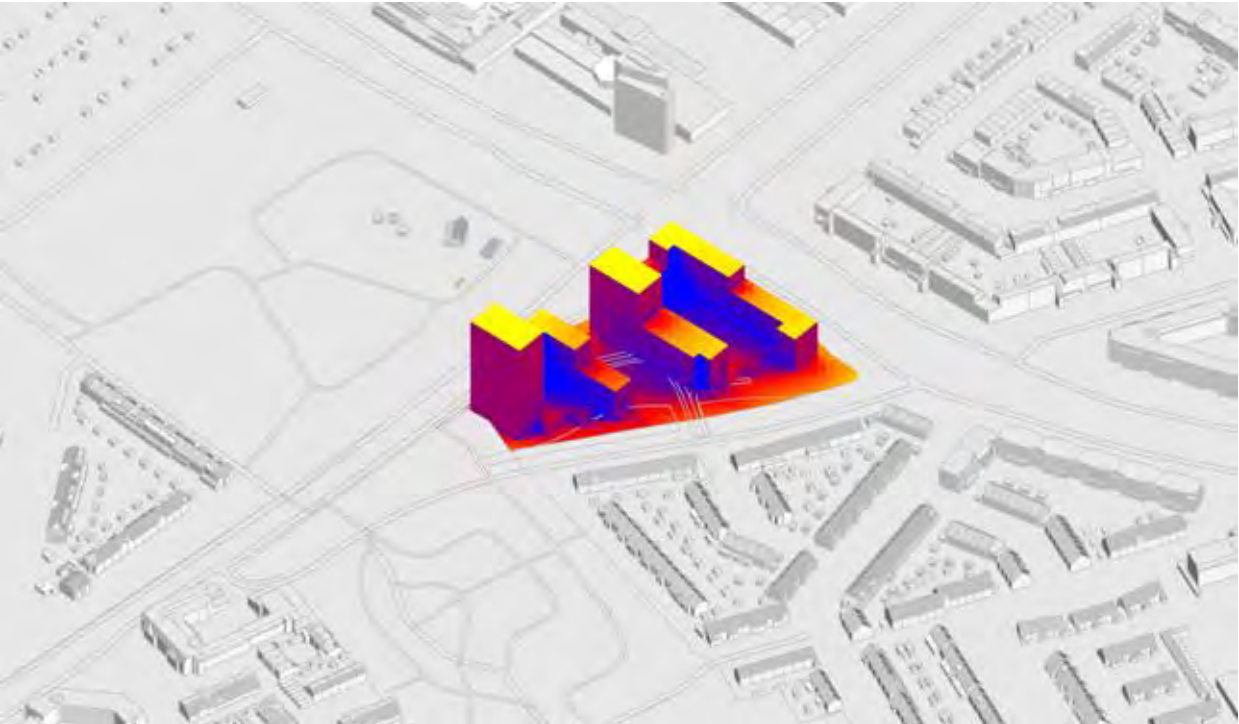
north view

DAYLIGHT SIMULATION

De Groene Hoven (entire model)



south view

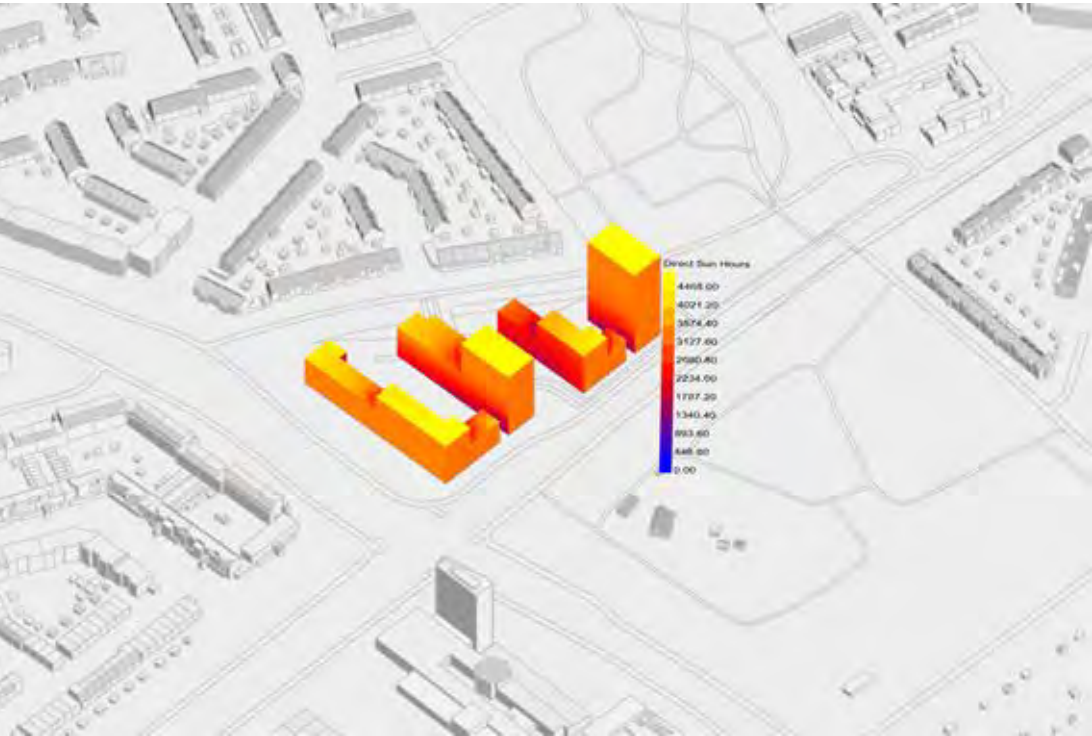


north view

Sun Hours	(hours)
MINIMUM	0
MAXIMUM	4468
AVERAGE	807.47

DAYLIGHT SIMULATION

De Groene Hoven (buildings)

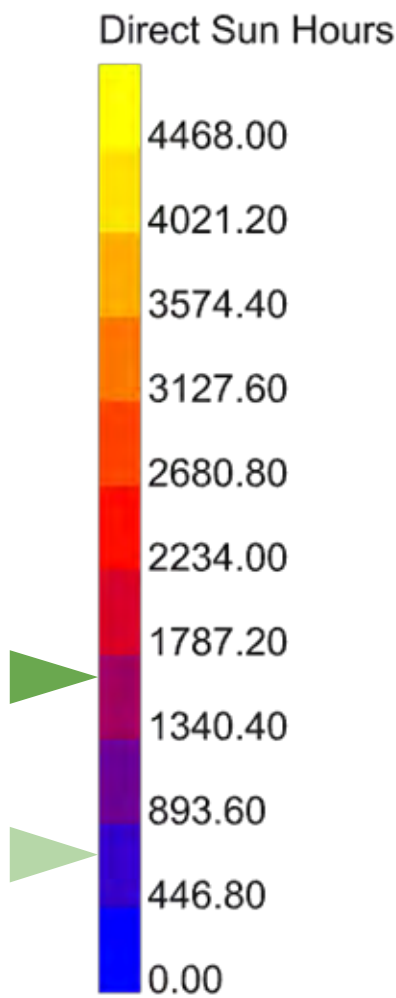


south view



north view

ontwerp - 24/08/2026

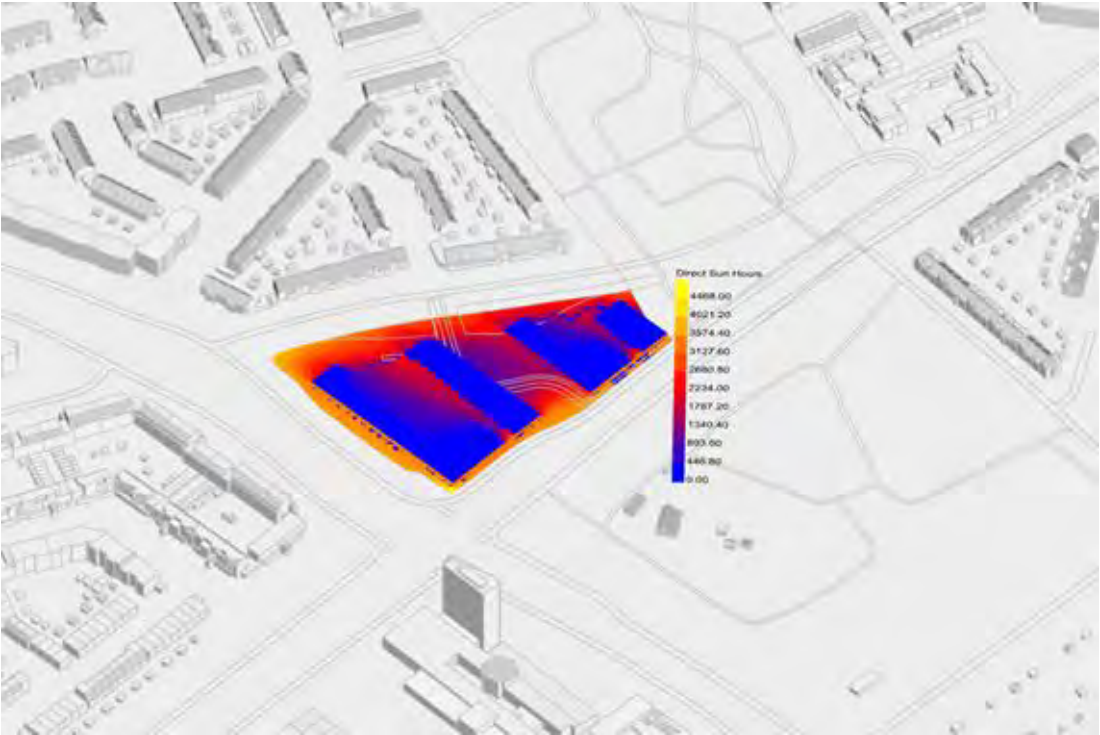


Sun Hours	(hours)
MINIMUM	0
MAXIMUM	4468
AVERAGE	1641.91

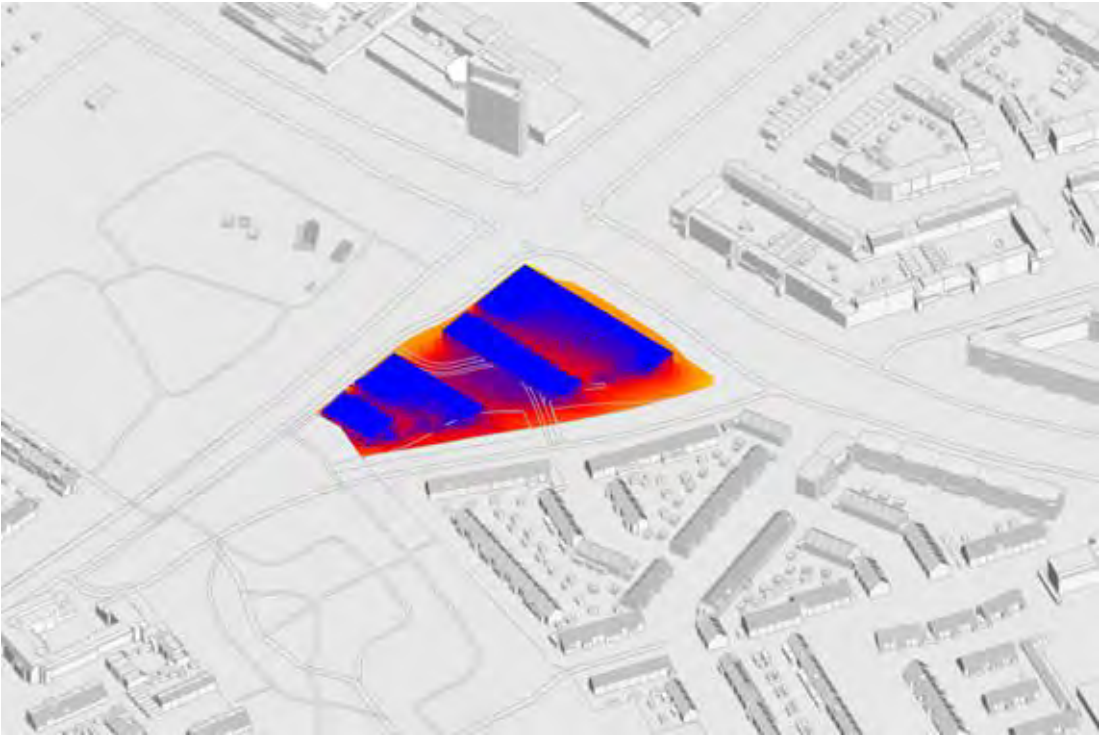
Sun Hours	(hours)
MINIMUM	0
MAXIMUM	4468
AVERAGE	693.71



De Groene Hoven (terrain)



south view



north view

DAYLIGHT RESULTS

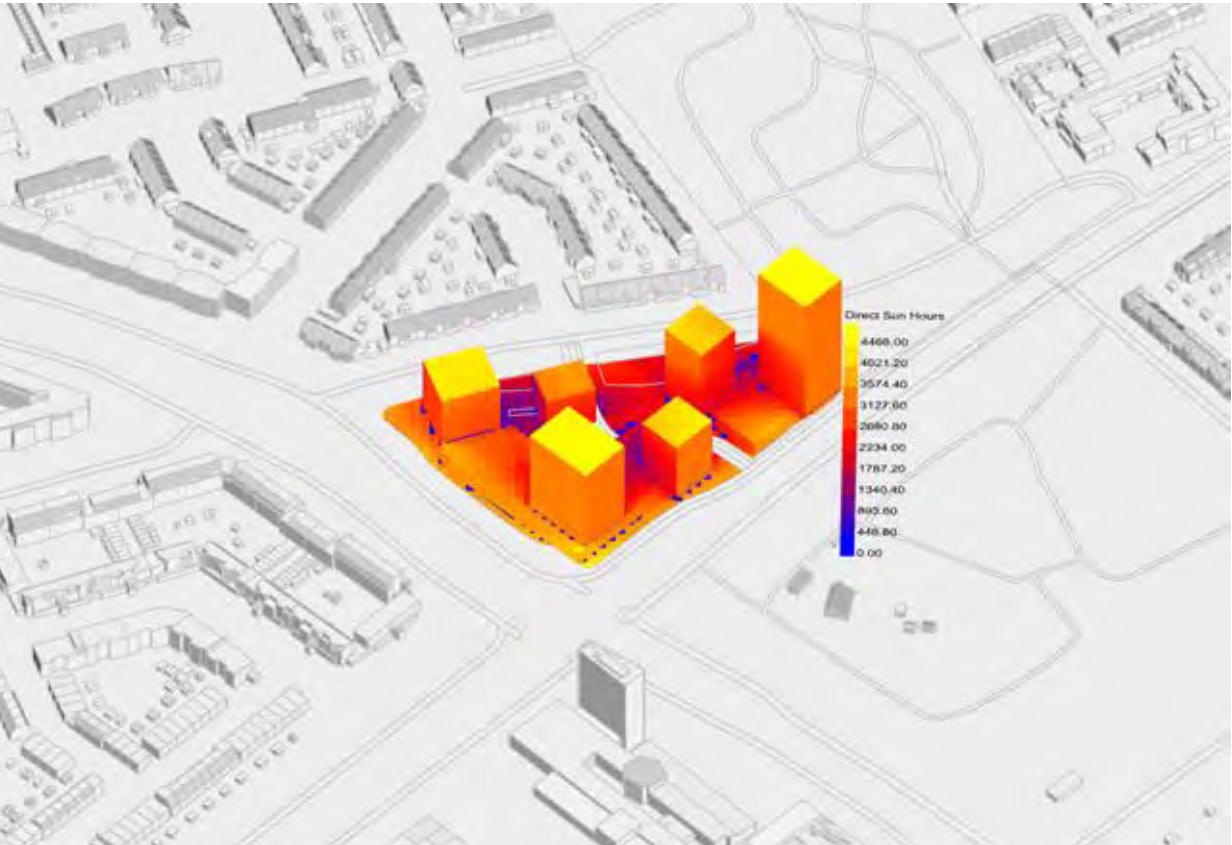
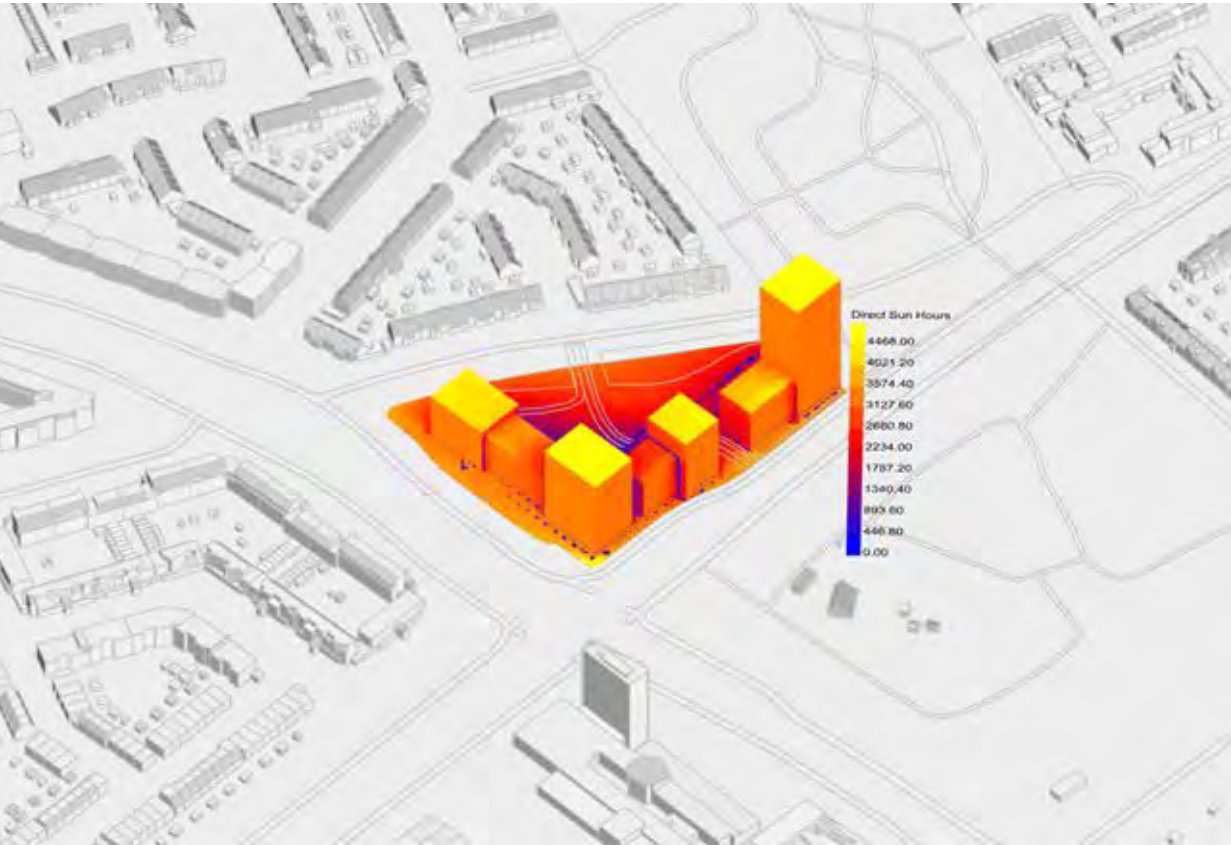
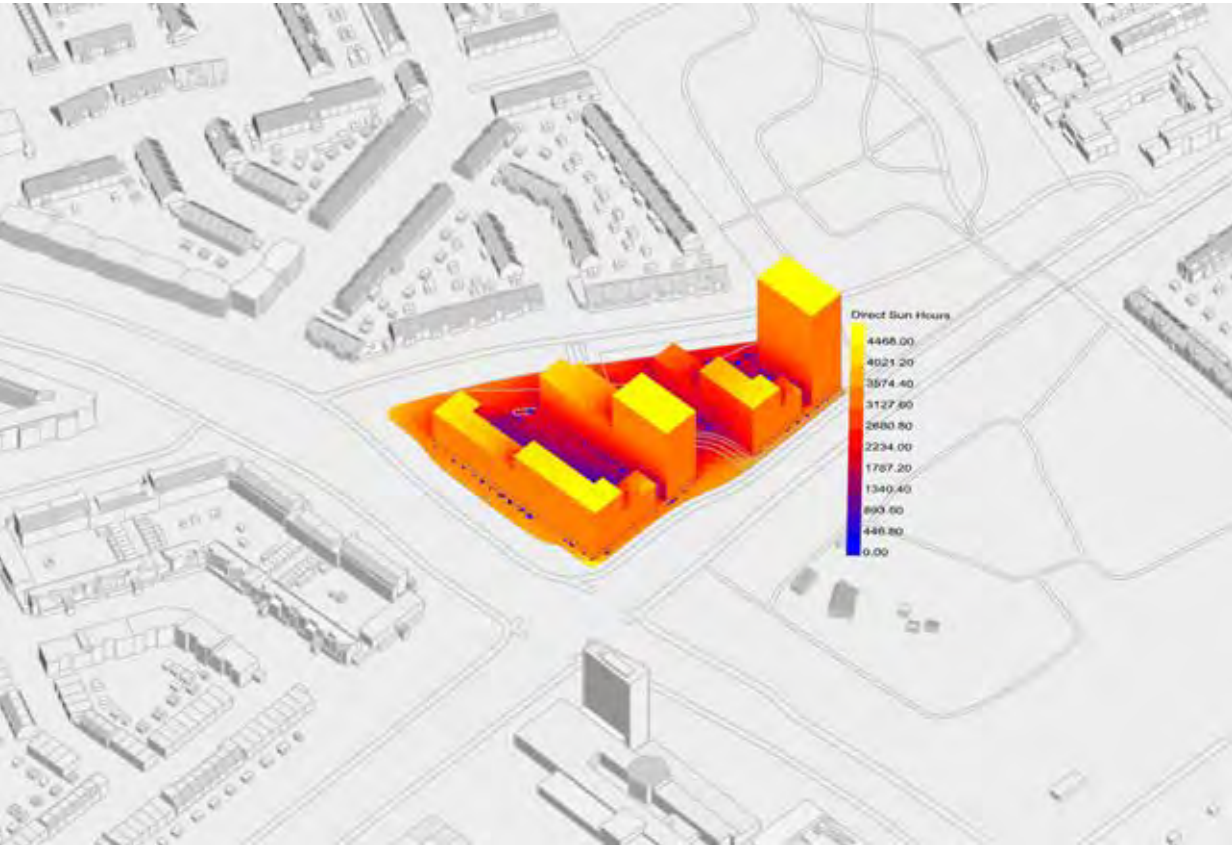
Overall comparison



Total facade	21 548
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Total facade	18 926
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Total facade	22 516
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De Groene Hoven (entire model)

Stadsrand (entire model)

Parkstad (entire model)

Sun Hours	(hours)
AVERAGE	807.47

Sun Hours	(hours)
AVERAGE	1044.18

Sun Hours	(hours)
AVERAGE	1296.73

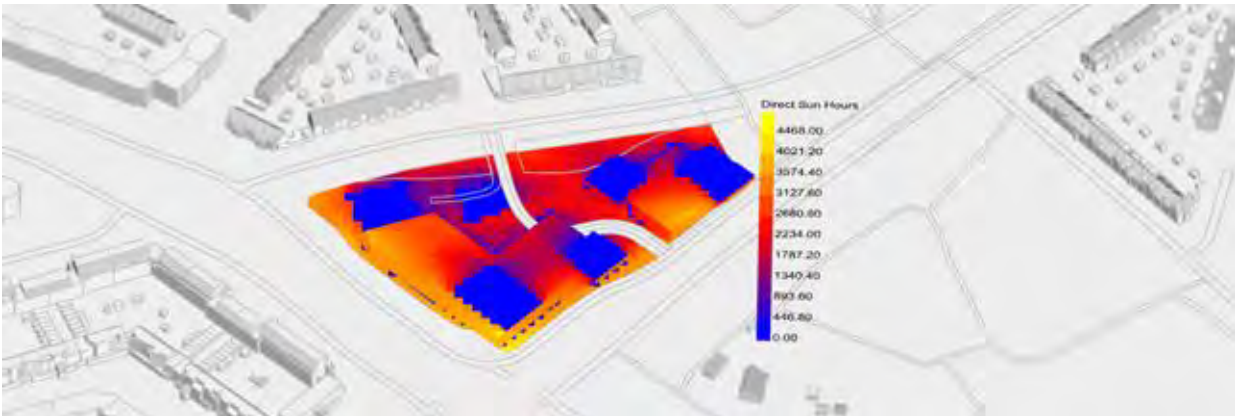
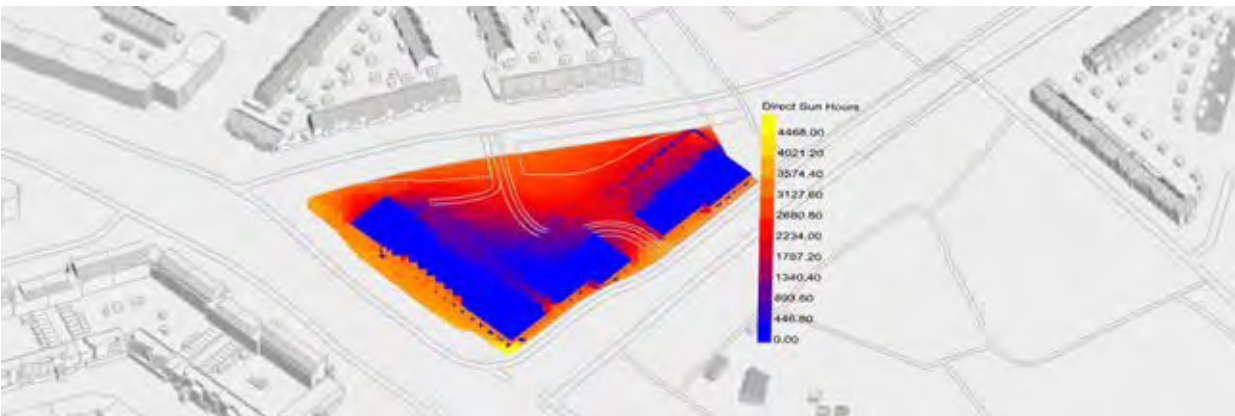
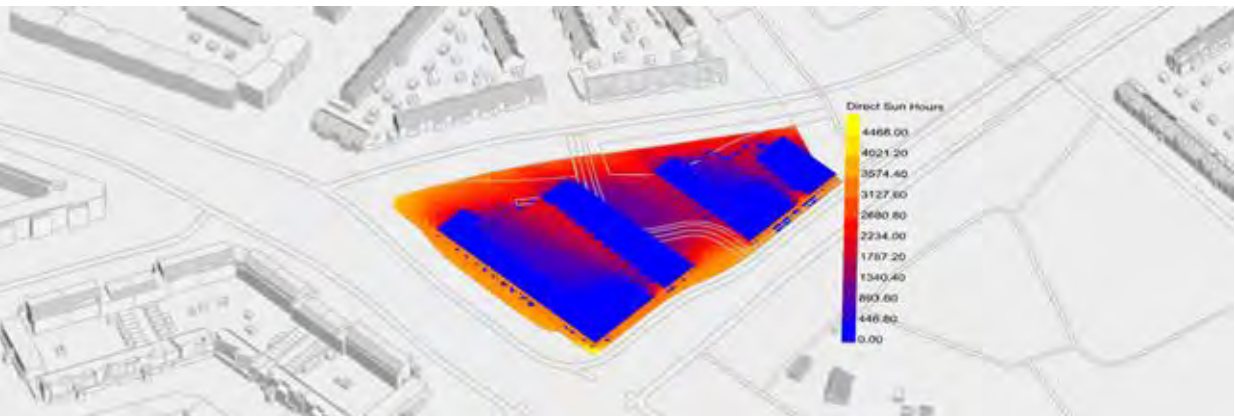
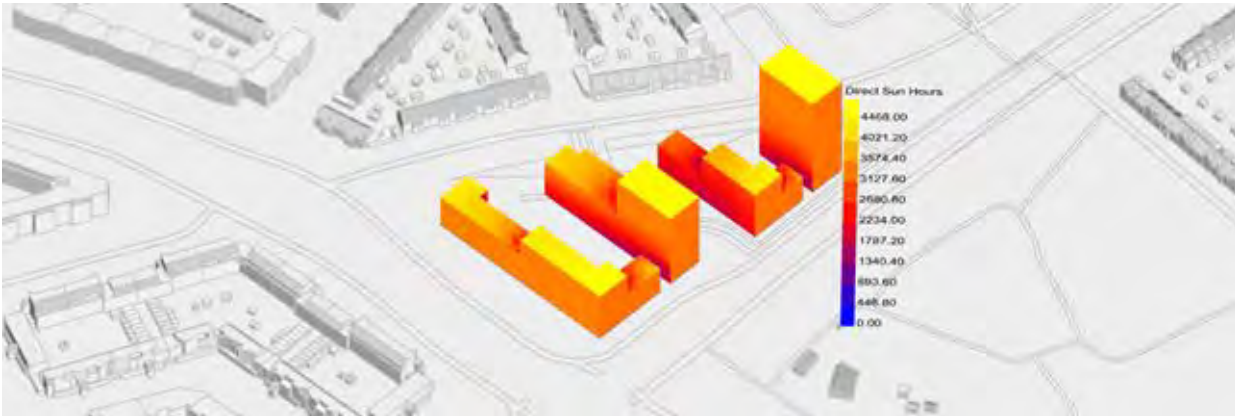
minimum baseline: 807.47 ▼

+29.3% sun hours ▲

+60.5% sun hours ▲

DAYLIGHT RESULTS

Overall comparison



De Groene Hoven (buildings + terrain)

Stadsrand (buildings + terrain)

Parkstad (buildings + terrain)

Sun Hours	(hours)
BUILDINGS average	1641.91
TERRAIN average	693.71

Sun Hours	(hours)
BUILDINGS average	1689.01
TERRAIN average	1061.03

Sun Hours	(hours)
BUILDINGS average	1940.63
TERRAIN average	1051.84

BUILDINGS baseline: 1641.91
TERRAIN baseline: 693.71 ▼

+2.9% sun hours ▲
+53.0% sun hours ▲

+18.2% sun hours ▲
+51.6% sun hours ▲

DAYLIGHT SIMULATIONS

FEBRUARY 19th

DAYLIGHT SIMULATION - Feb 19th

Parkstad (entire model)



south view

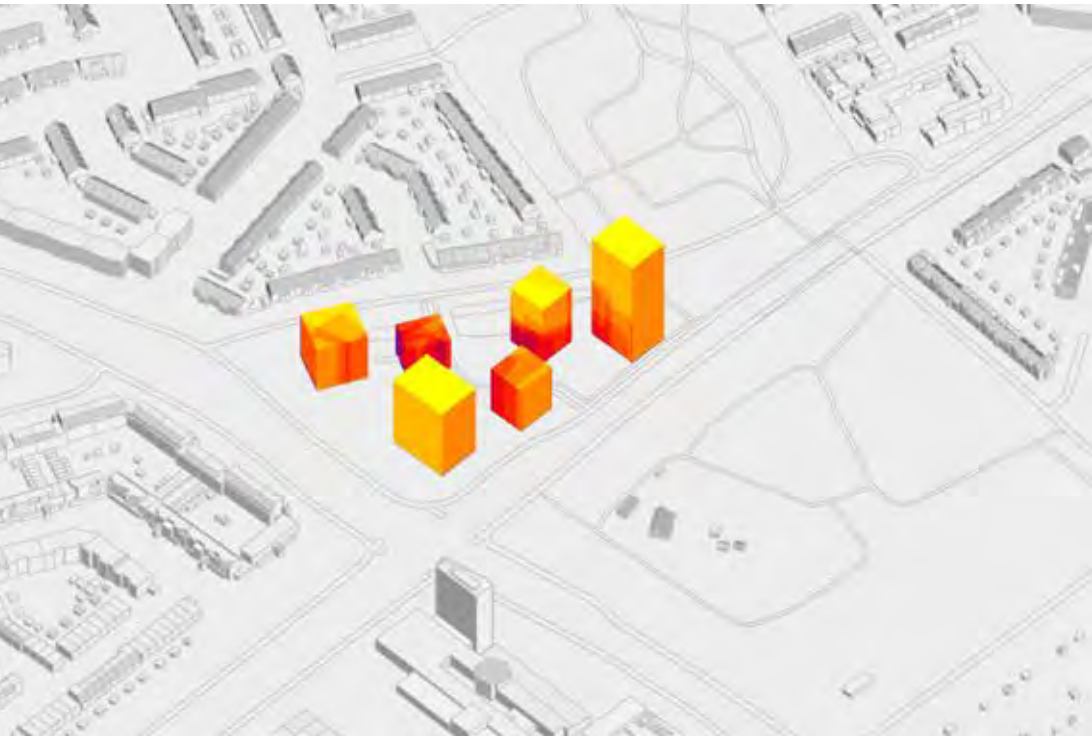


north view

Sun Hours	(hours)
MINIMUM	0
MAXIMUM	11
AVERAGE	3.25

DAYLIGHT SIMULATION - Feb 19th

Parkstad (buildings)

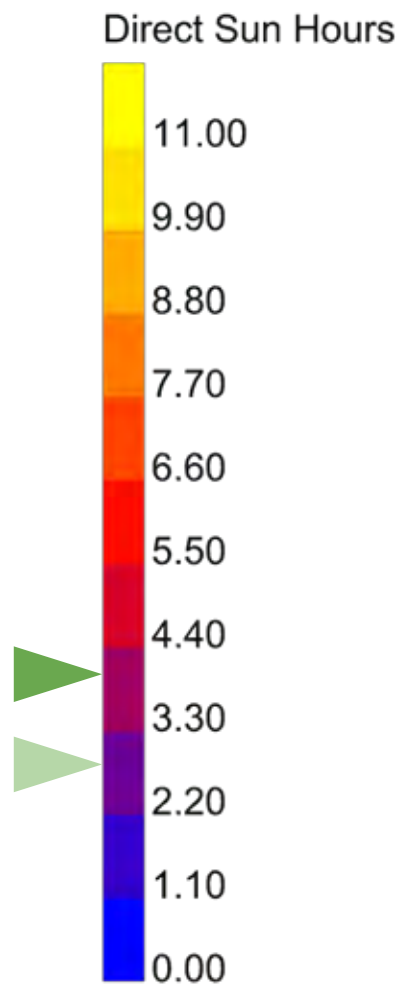


south view



north view

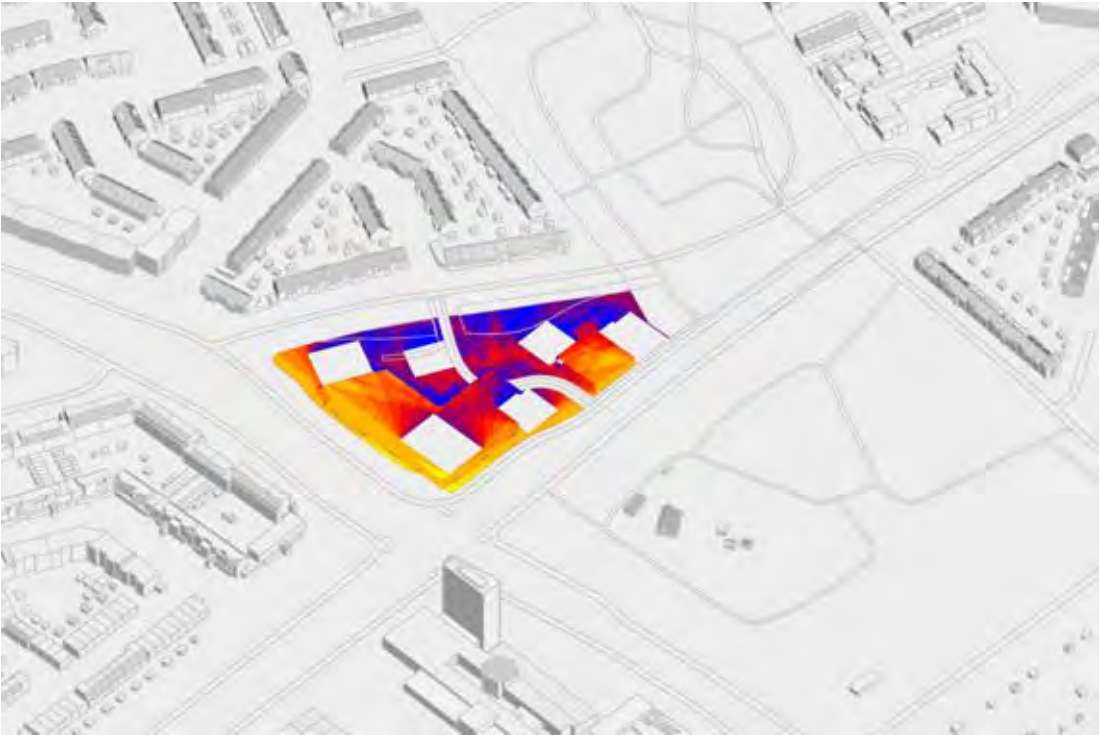
ontwerp - 24/08/2026



Sun Hours	(hours)
MINIMUM	0
MAXIMUM	11
AVERAGE	4.34

Sun Hours	(hours)
MINIMUM	0
MAXIMUM	11
AVERAGE	2.78

Parkstad (terrain)



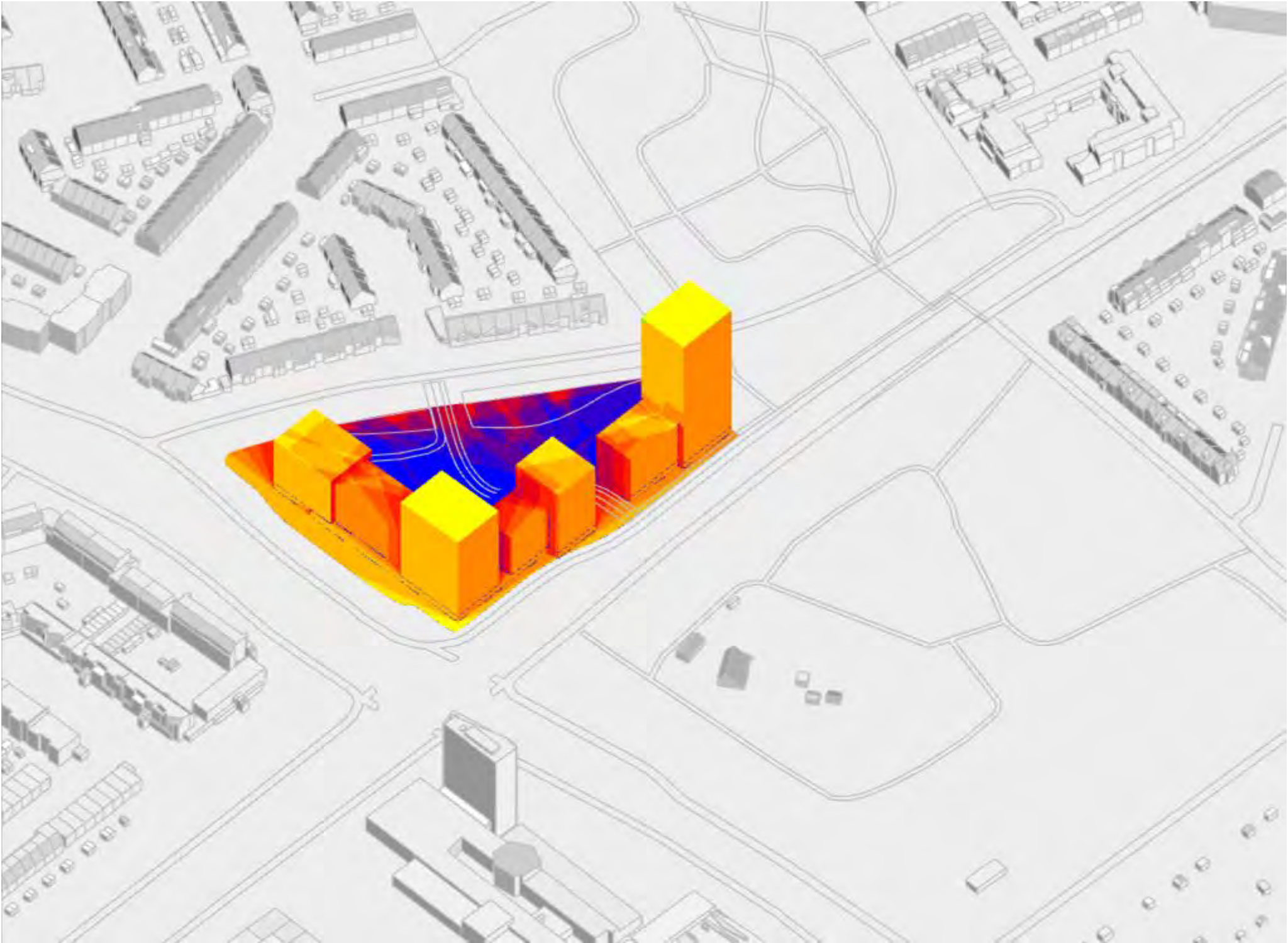
south view



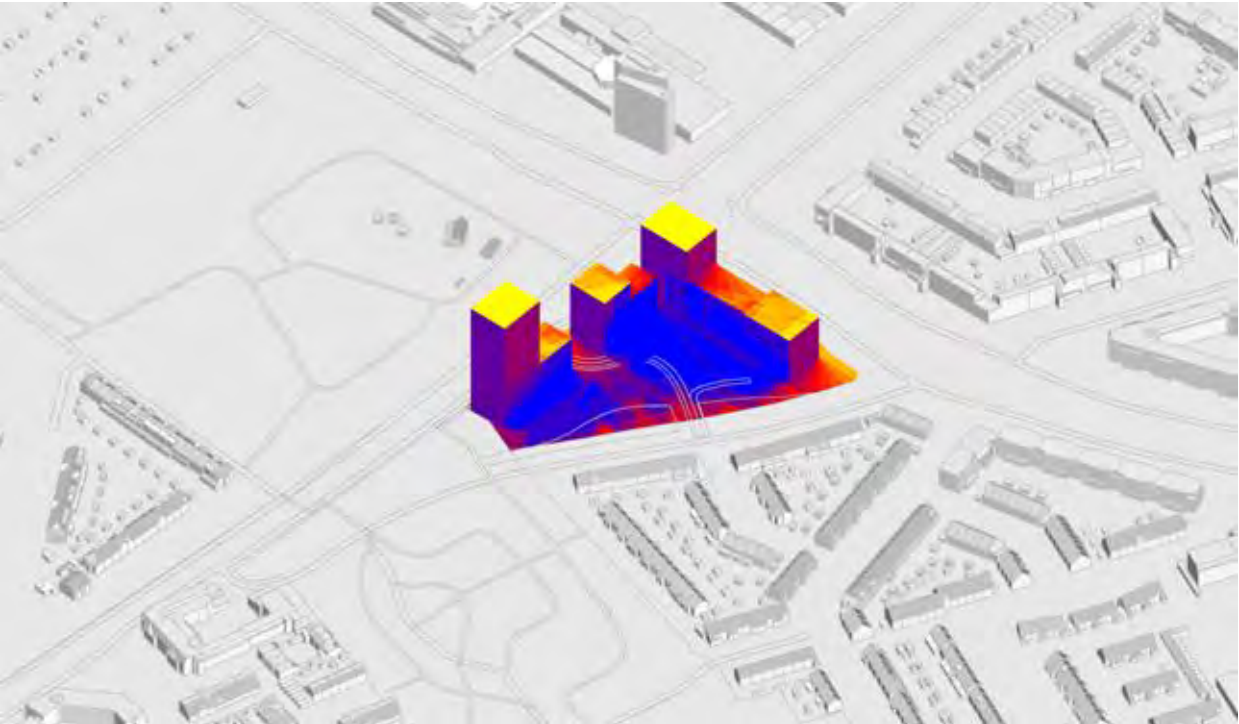
north view

DAYLIGHT SIMULATION - Feb 19th

Stadsrand (entire model)



south view



north view

Sun Hours	(hours)
MINIMUM	0
MAXIMUM	11
AVERAGE	2.83

DAYLIGHT SIMULATION - Feb 19th

Stadsrand (buildings)

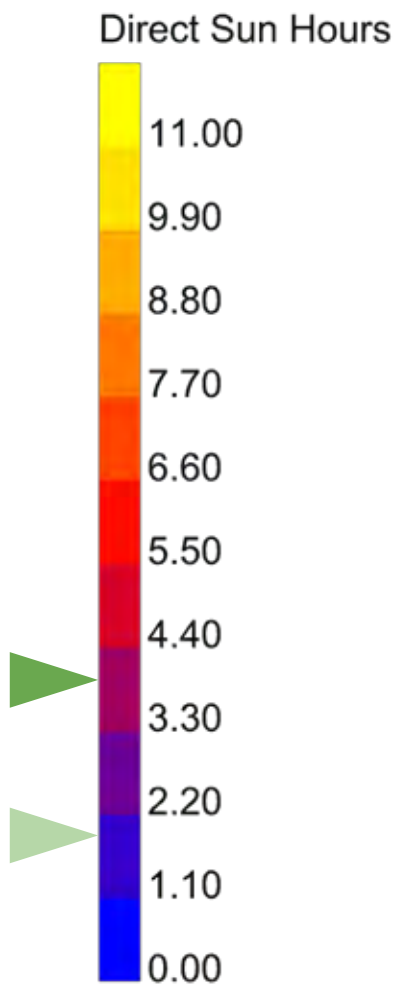


south view



north view

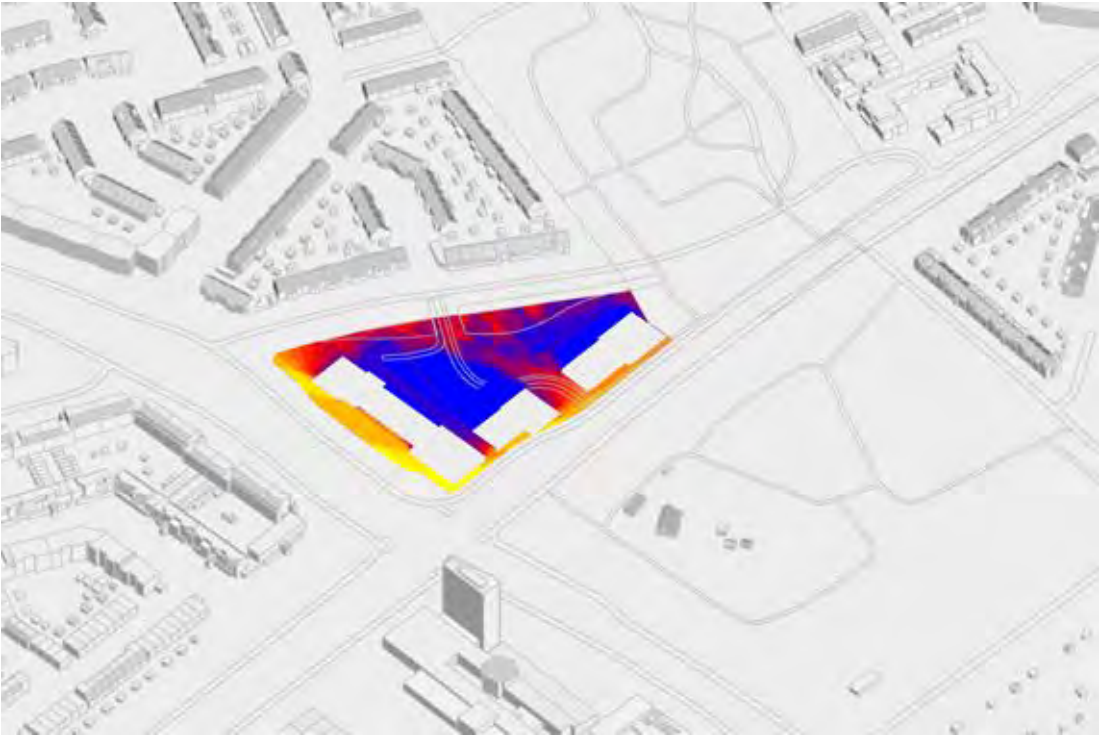
ontwerp - 24/08/2026



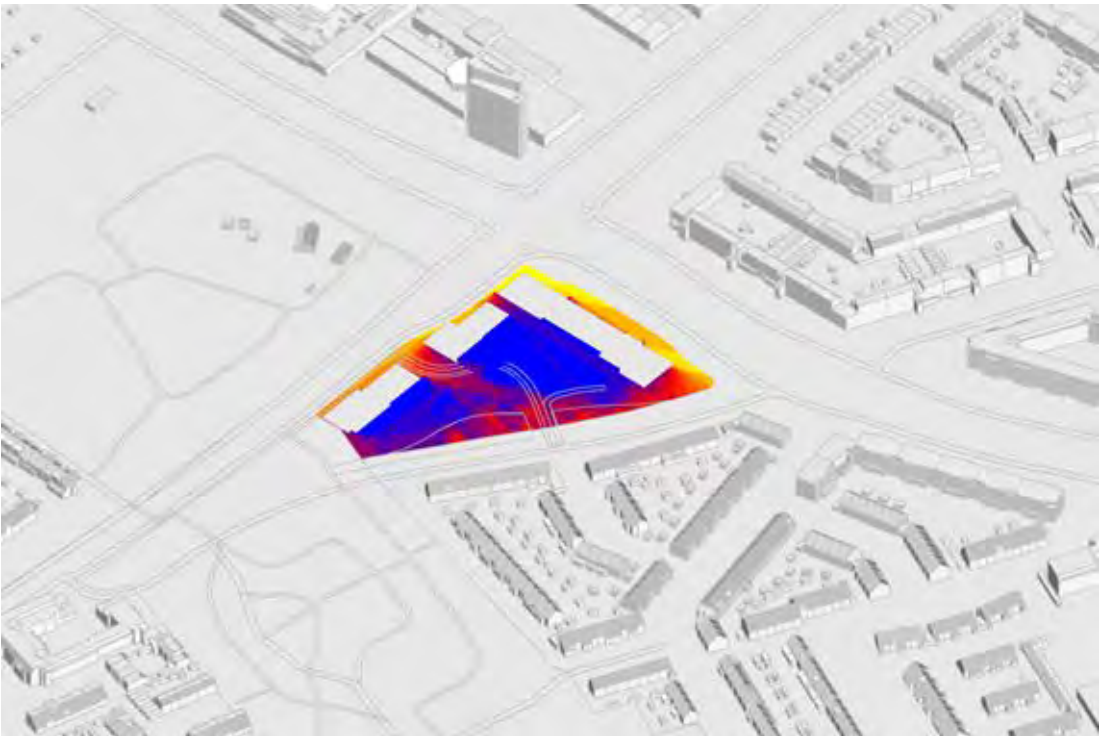
Sun Hours	(hours)
MINIMUM	0
MAXIMUM	11
AVERAGE	4.02

Sun Hours	(hours)
MINIMUM	0
MAXIMUM	11
AVERAGE	1.94

Stadsrand (terrain)



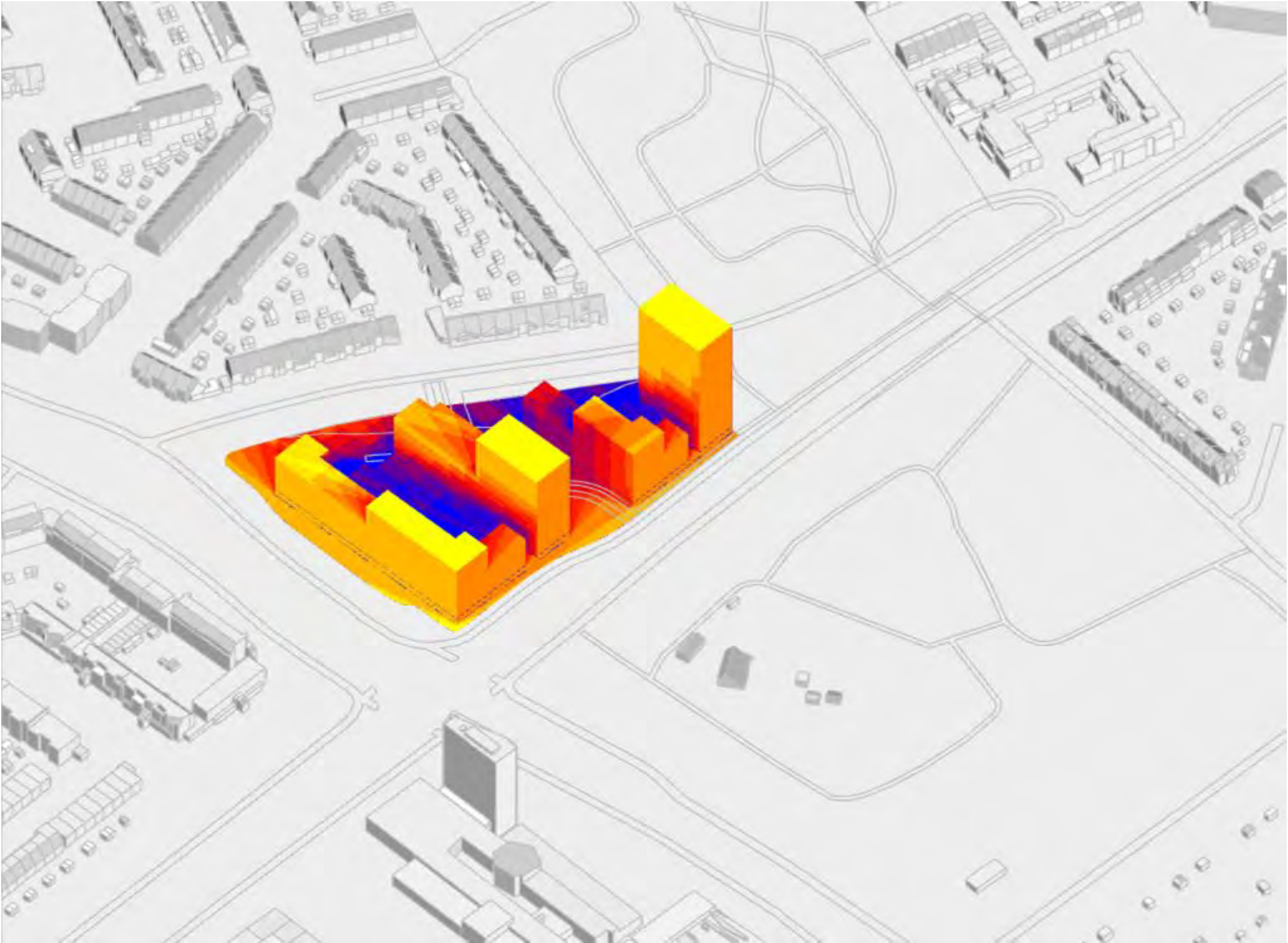
south view



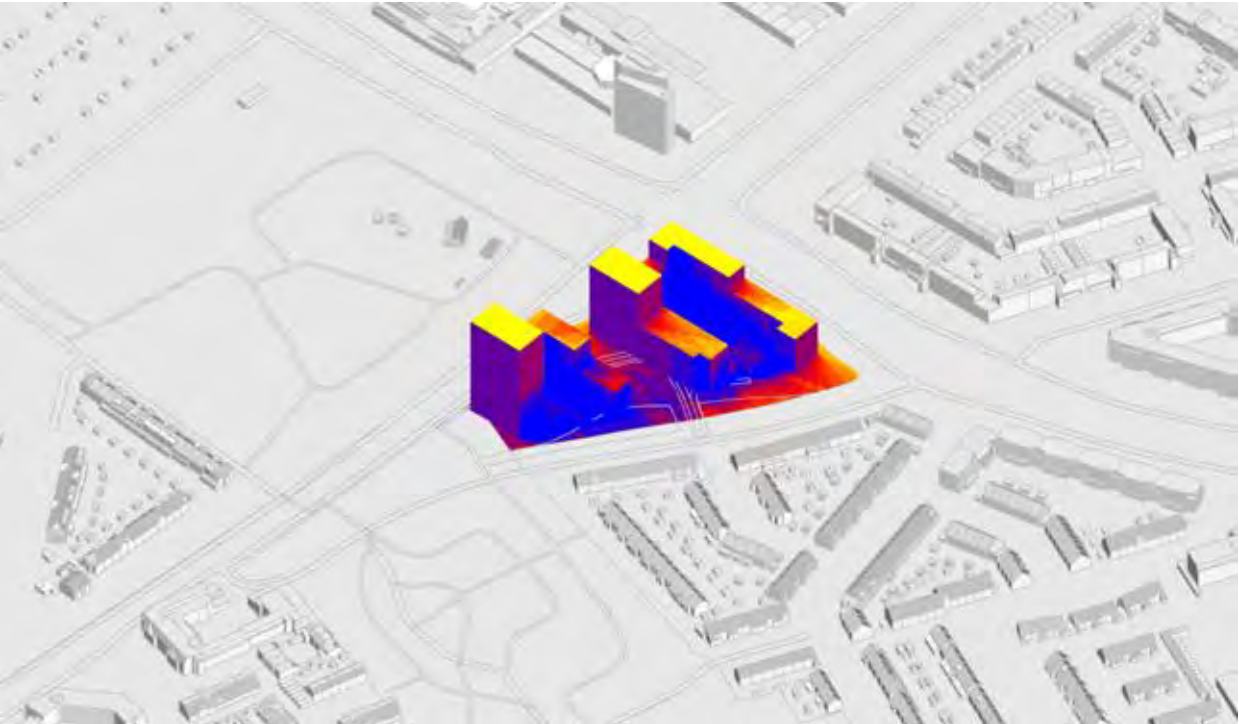
north view

DAYLIGHT SIMULATION - Feb 19th

De Groene Hoven (entire model)



south view

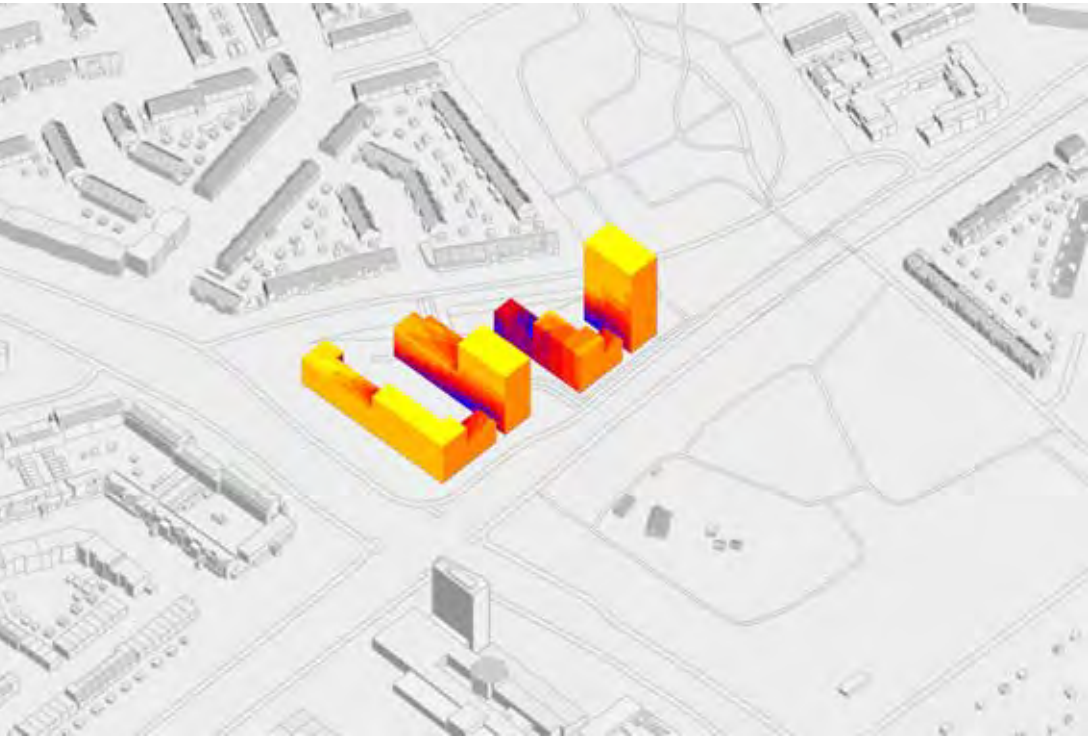


north view

Sun Hours	(hours)
MINIMUM	0
MAXIMUM	11
AVERAGE	2.61

DAYLIGHT SIMULATION - Feb 19th

De Groene Hoven (buildings)

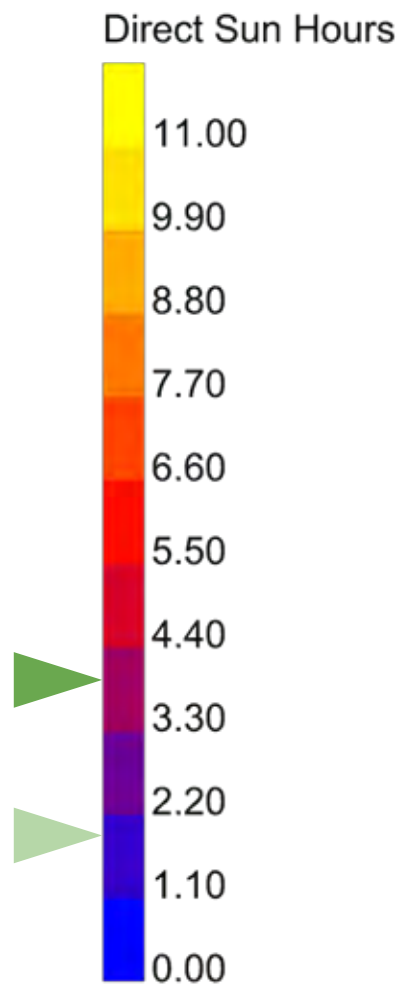


south view



north view

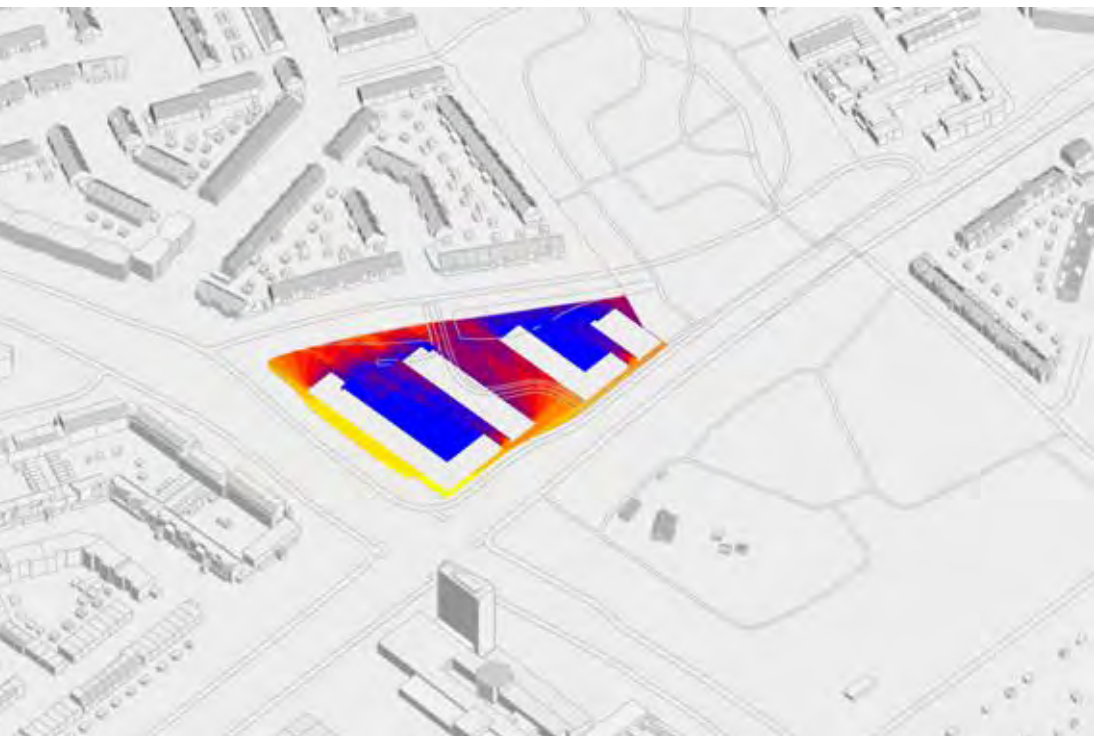
ontwerp - 24/08/2026



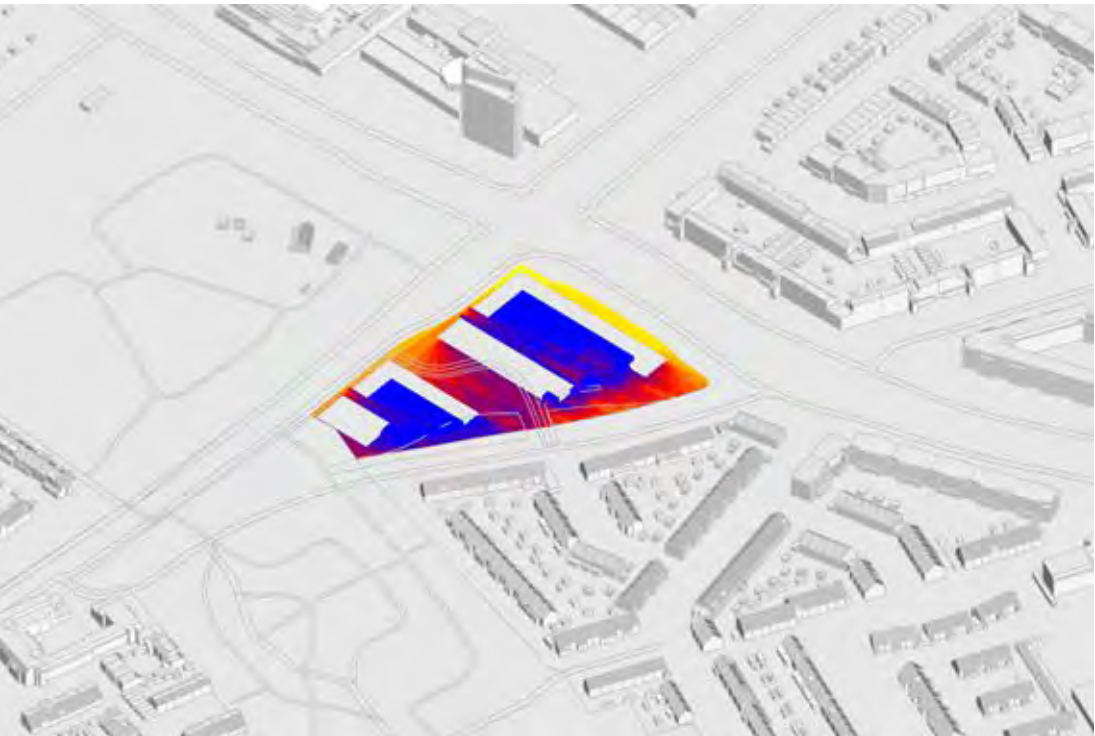
Sun Hours	(hours)
MINIMUM	0
MAXIMUM	11
AVERAGE	3.97

Sun Hours	(hours)
MINIMUM	0
MAXIMUM	11
AVERAGE	1.92

De Groene Hoven (terrain)



south view



north view

DAYLIGHT RESULTS - Feb 19th

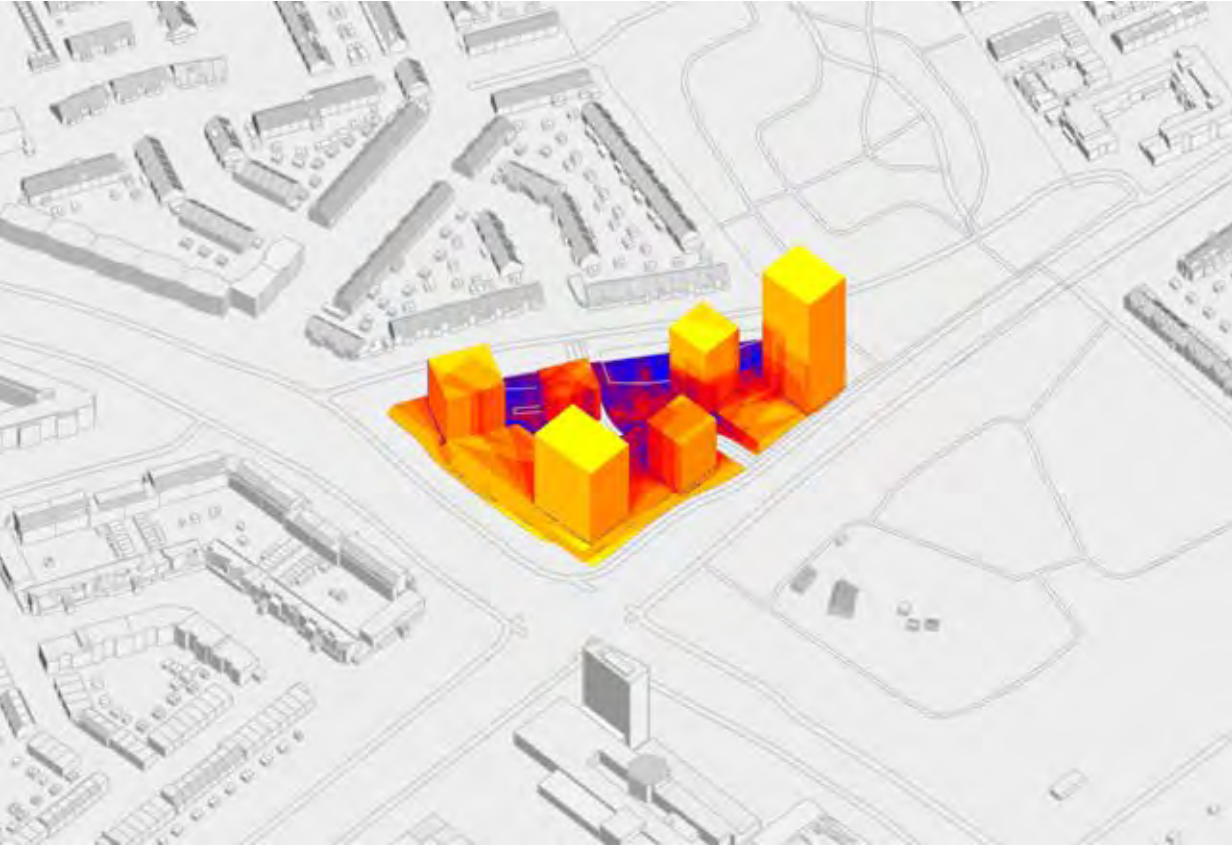
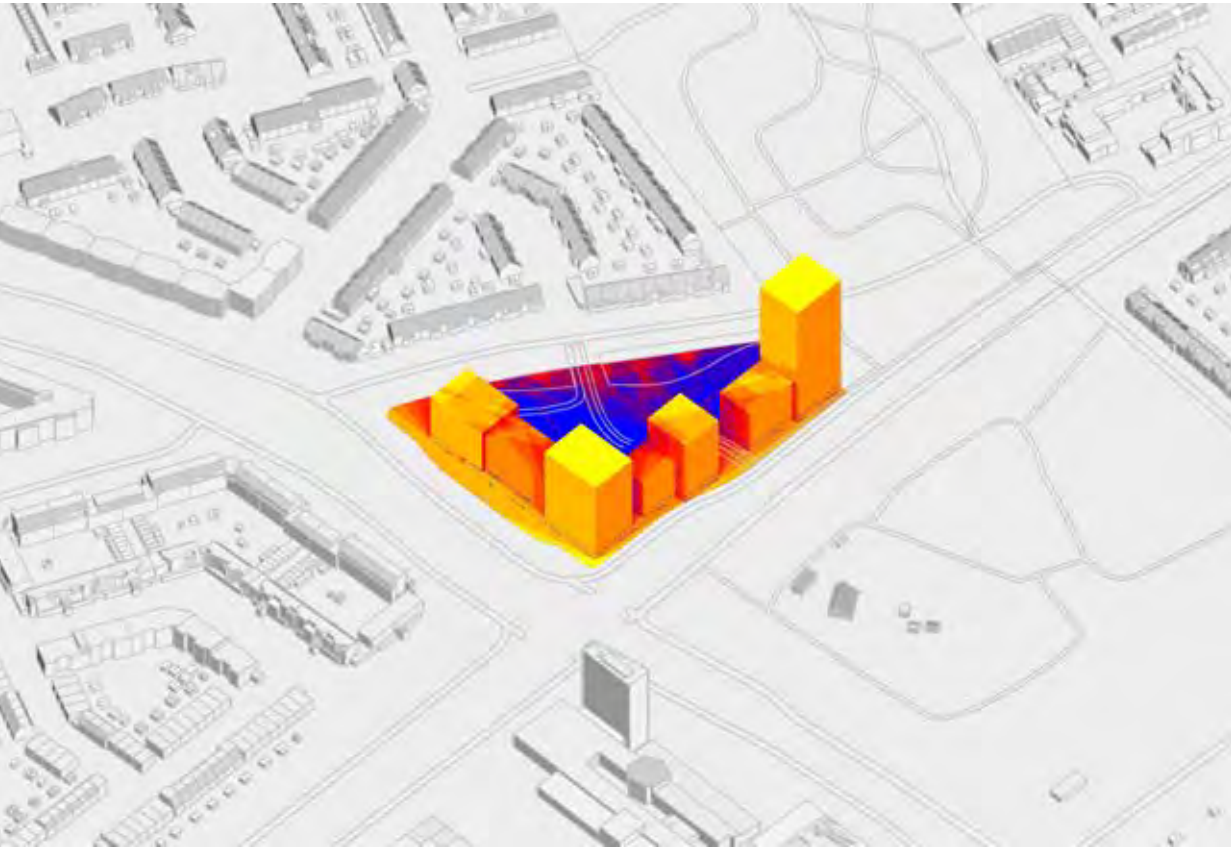
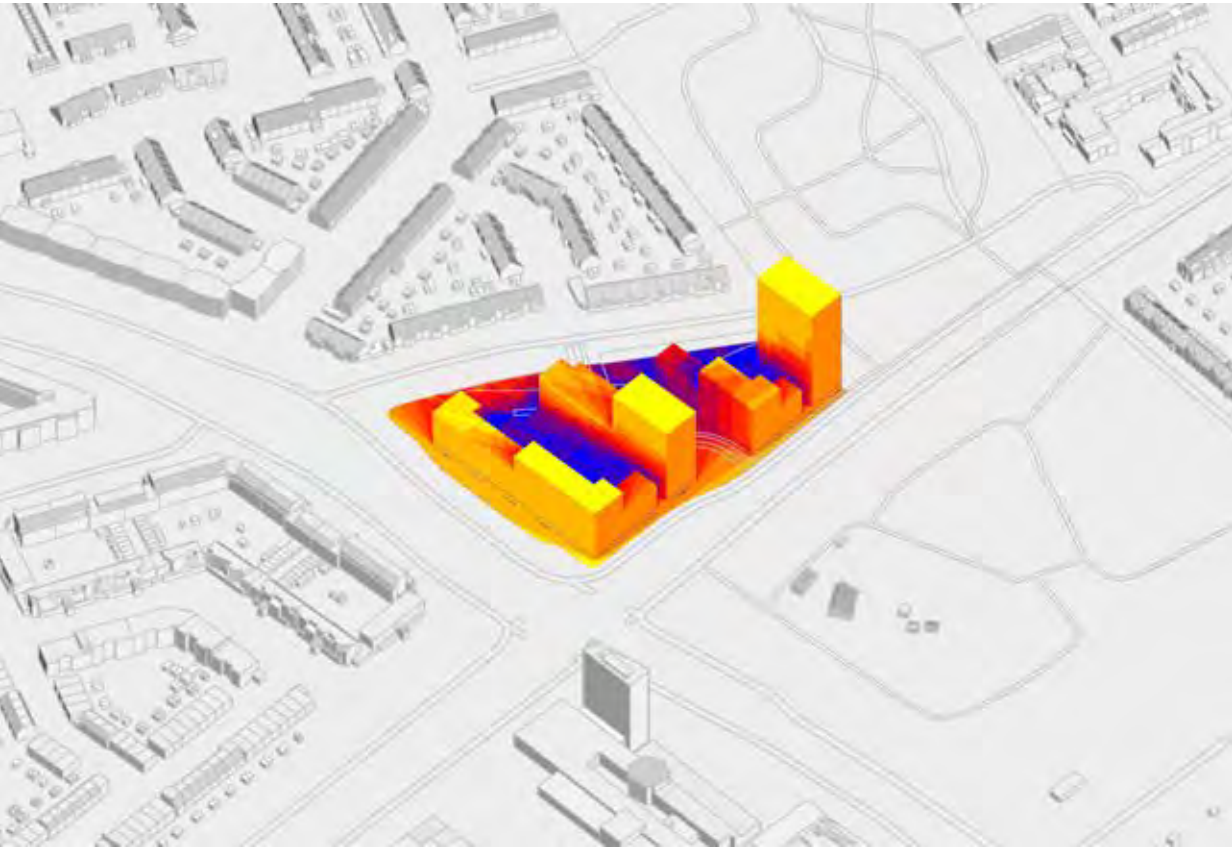
Overall comparison



Total facade	21 548
--------------	--------

Total facade	18 926
--------------	--------

Total facade	22 516
--------------	--------



<i>De Groene Hoven</i>	<i>(entire model)</i>
Sun Hours	(hours)
AVERAGE	2.61

<i>Stadsrand</i>	<i>(entire model)</i>
Sun Hours	(hours)
AVERAGE	2.83

<i>Parkstad</i>	<i>(entire model)</i>
Sun Hours	(hours)
AVERAGE	3.25

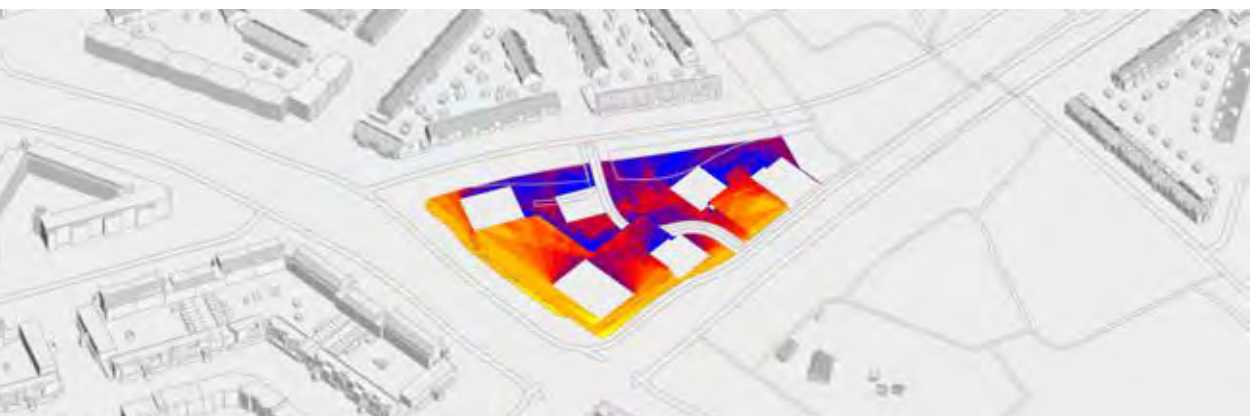
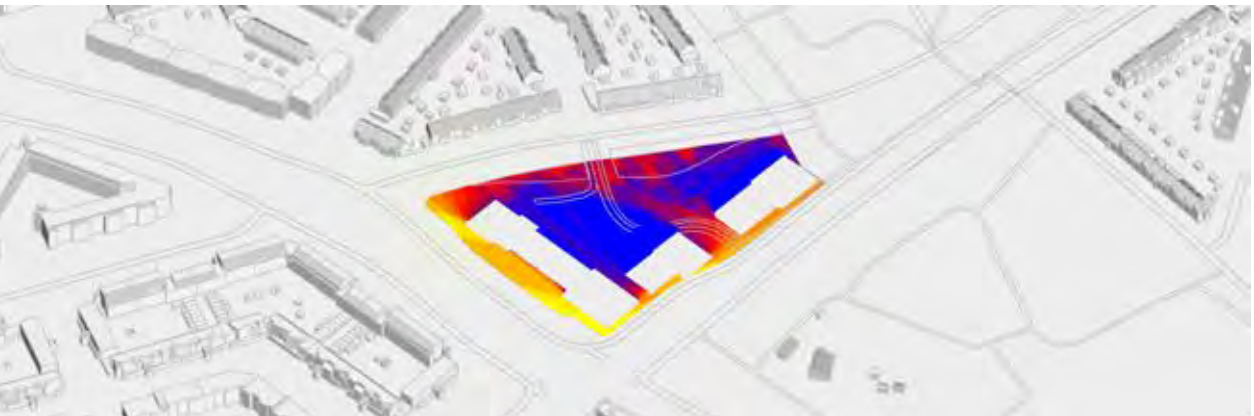
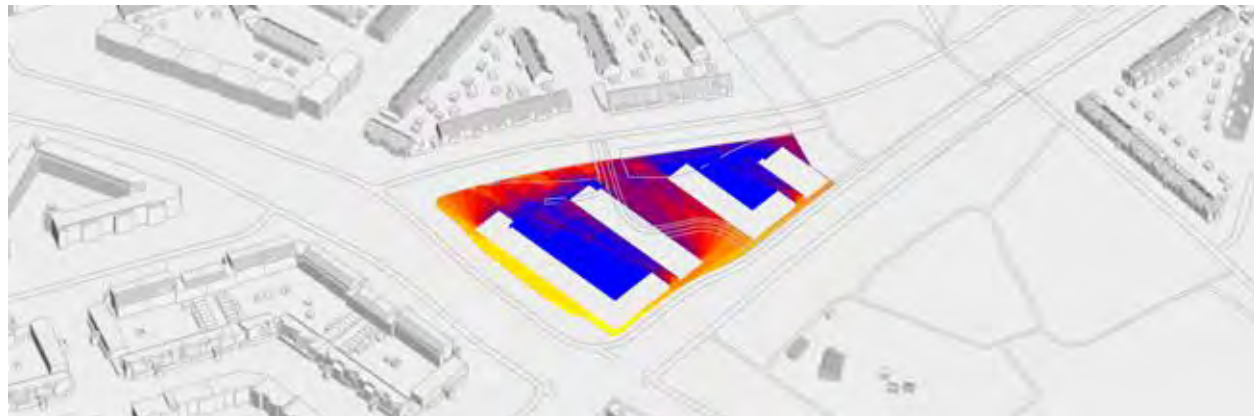
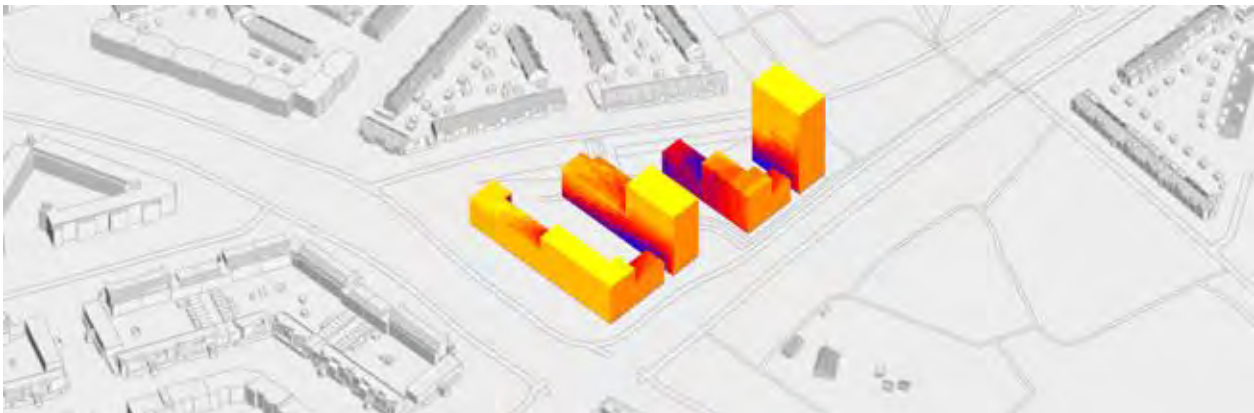
minimum baseline: 2.61 ▼

+8.4% sun hours ▲

+25.5% sun hours ▲

DAYLIGHT RESULTS - Feb 19th

Overall comparison



De Groene Hoven (buildings + terrain)

Stadsrand (buildings + terrain)

Parkstad (buildings + terrain)

Sun Hours	(hours)
BUILDINGS average	3.97
TERRAIN average	1.92

Sun Hours	(hours)
BUILDINGS average	4.02
TERRAIN average	1.94

Sun Hours	(hours)
BUILDINGS average	4.34
TERRAIN average	2.78

BUILDINGS baseline: 3.97
TERRAIN baseline: 1.09

+1.0% sun hours
+1.0% sun hours

+9.3% sun hours
+44.8% sun hours

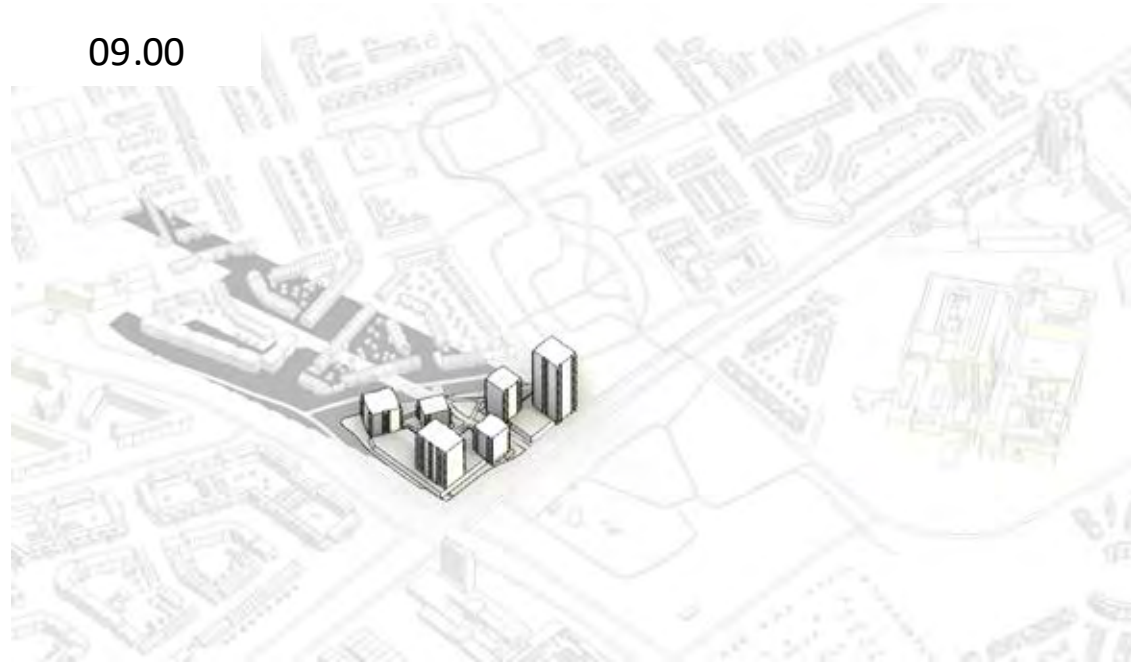
SHADOW VISUALISATIONS

FEBRUARY 19th

SHADOW SIMULATION

Parkstad (zoom-out)

09.00



11.00



13.00



15.00



17.00



SHADOW SIMULATION

Parkstad (zoom-in)

09.00



11.00



13.00



15.00



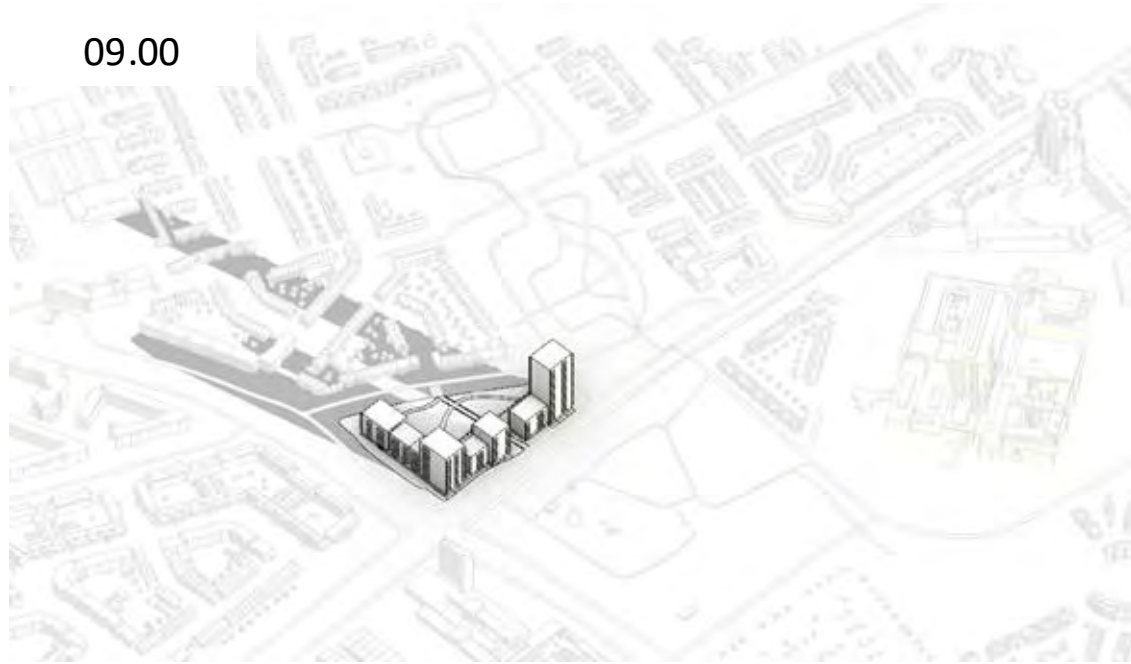
17.00



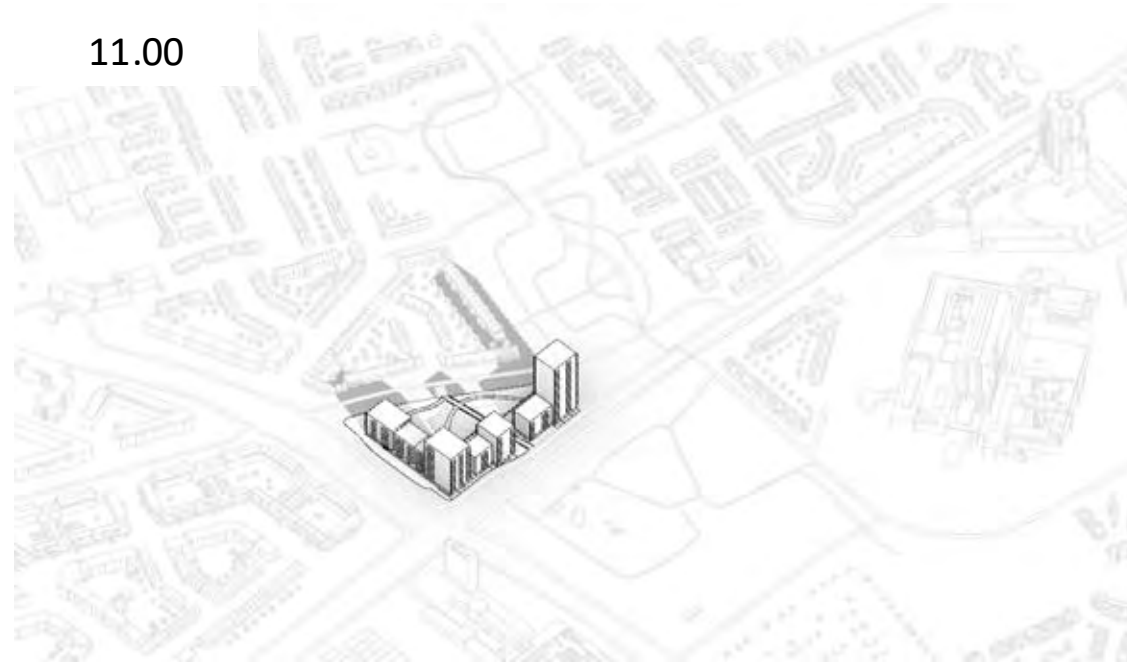
SHADOW SIMULATION

Stadsrand (zoom-out)

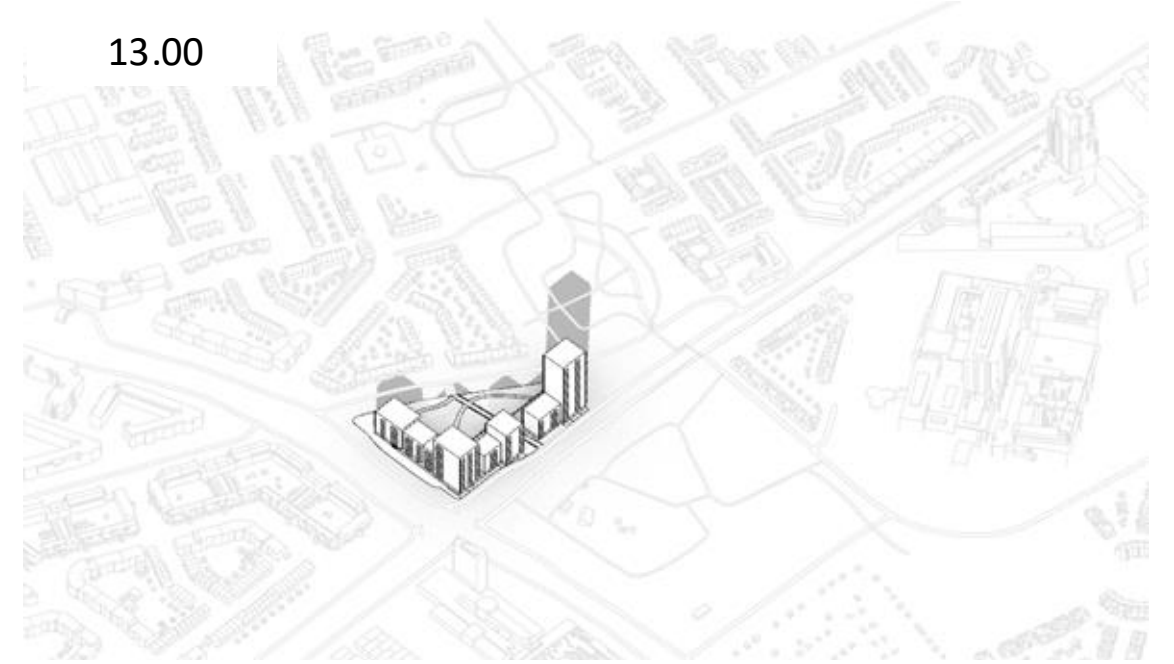
09.00



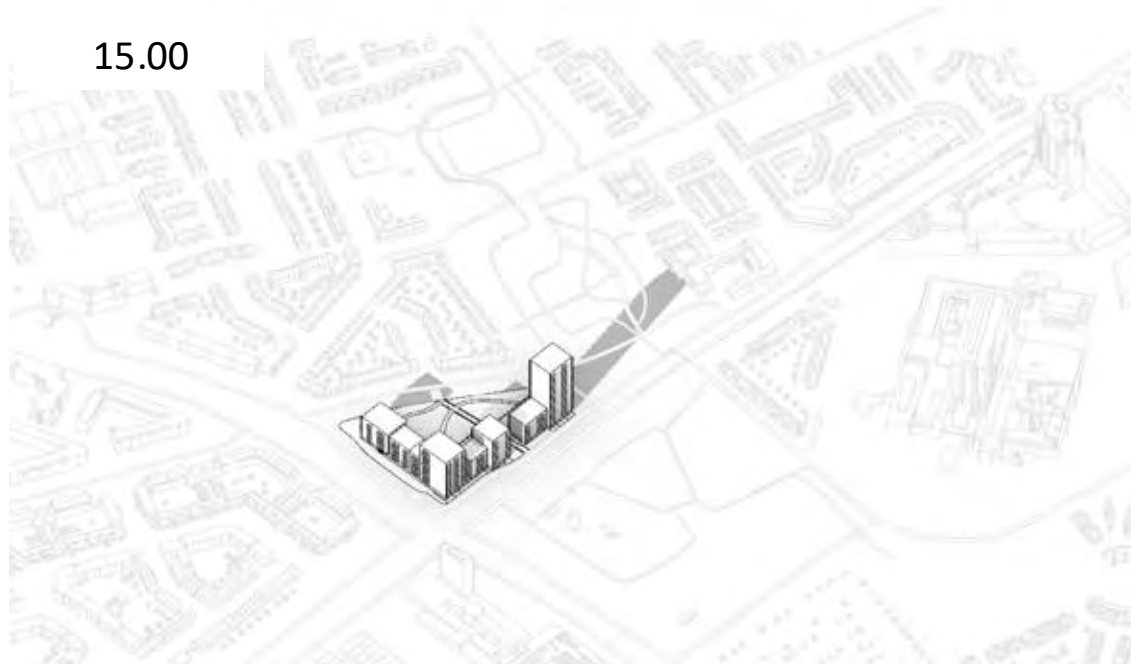
11.00



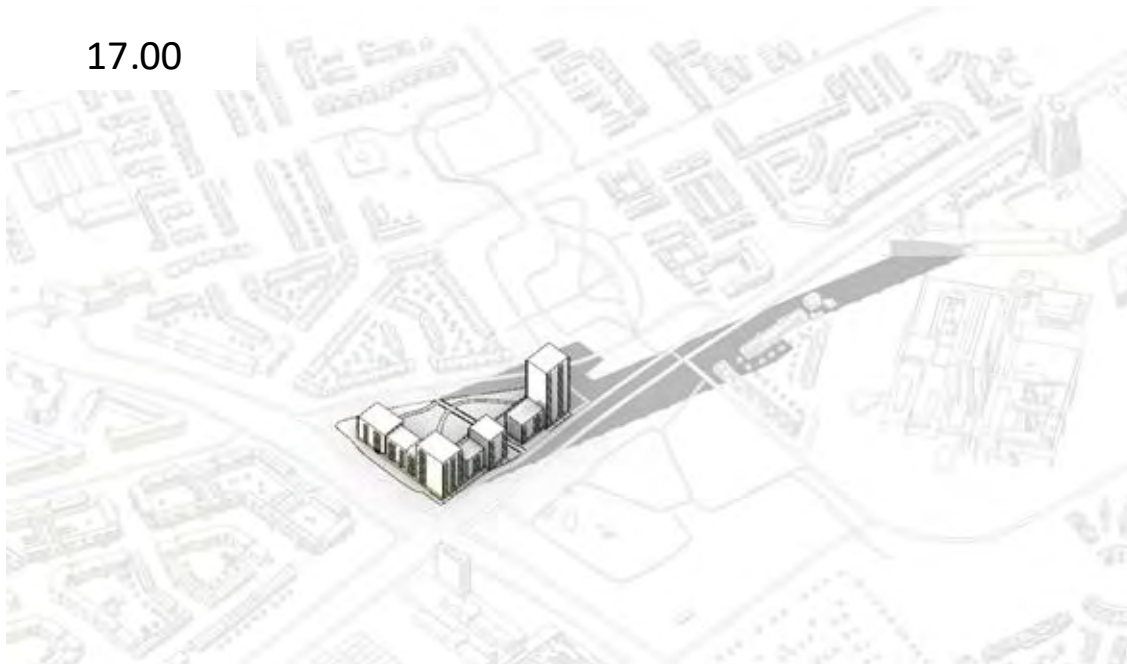
13.00



15.00



17.00



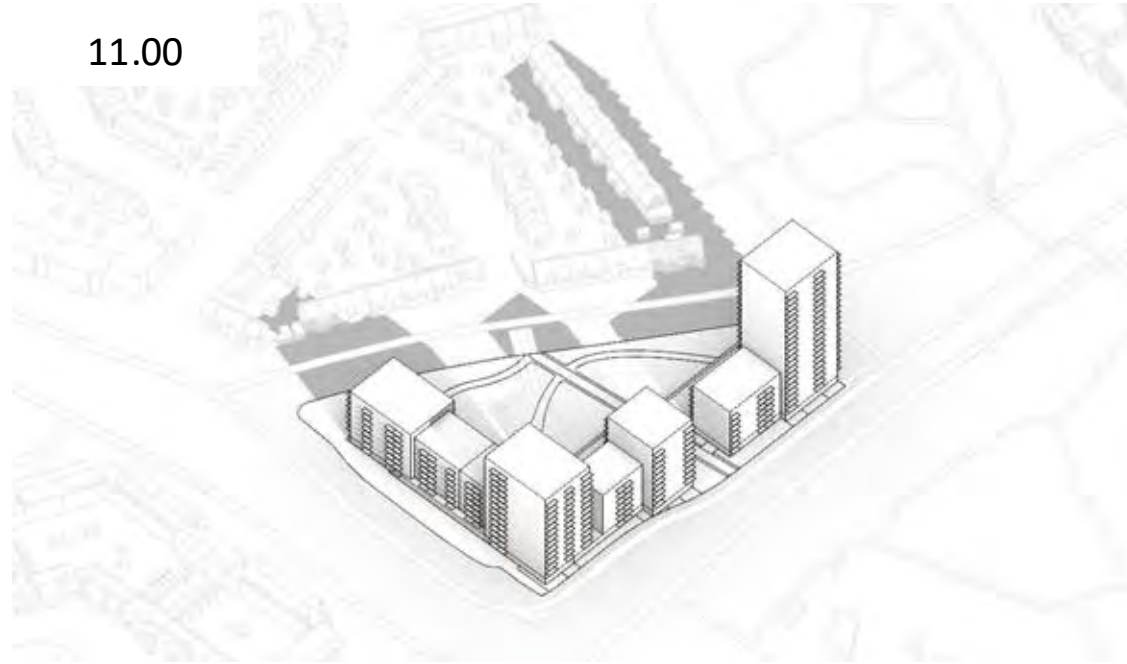
SHADOW SIMULATION

Stadsrand (zoom-in)

09.00



11.00



13.00



15.00



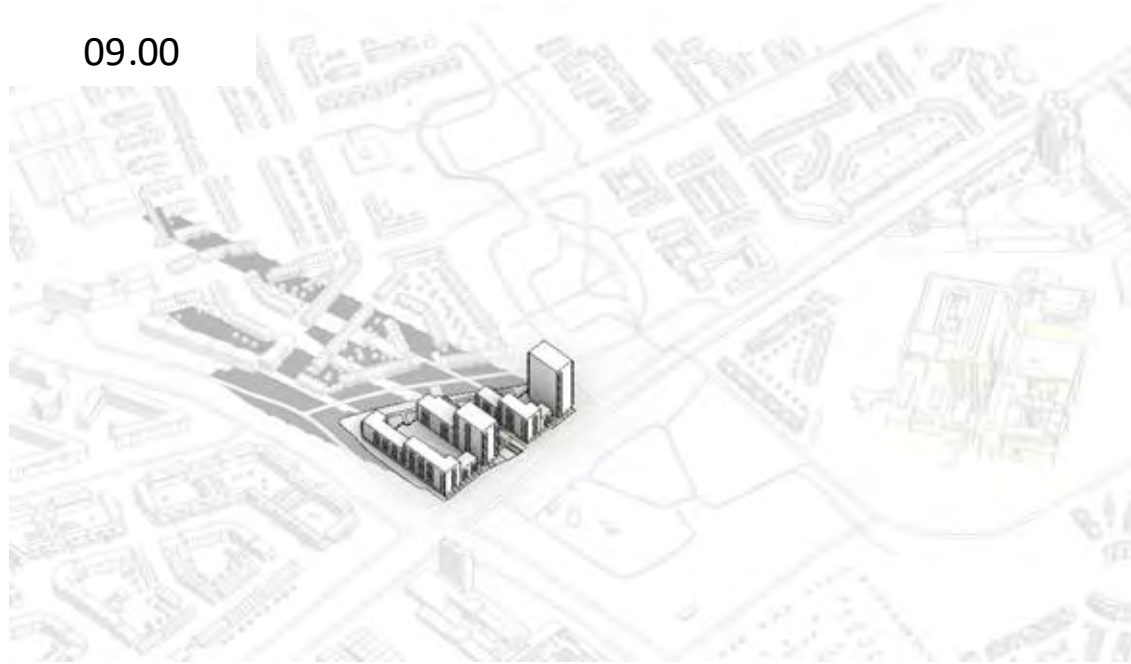
17.00



SHADOW SIMULATION

De Groene Hoven (zoom-out)

09.00



11.00



13.00



15.00



17.00



SHADOW SIMULATION

De Groene Hoven (zoom-in)

09.00



11.00



13.00



15.00



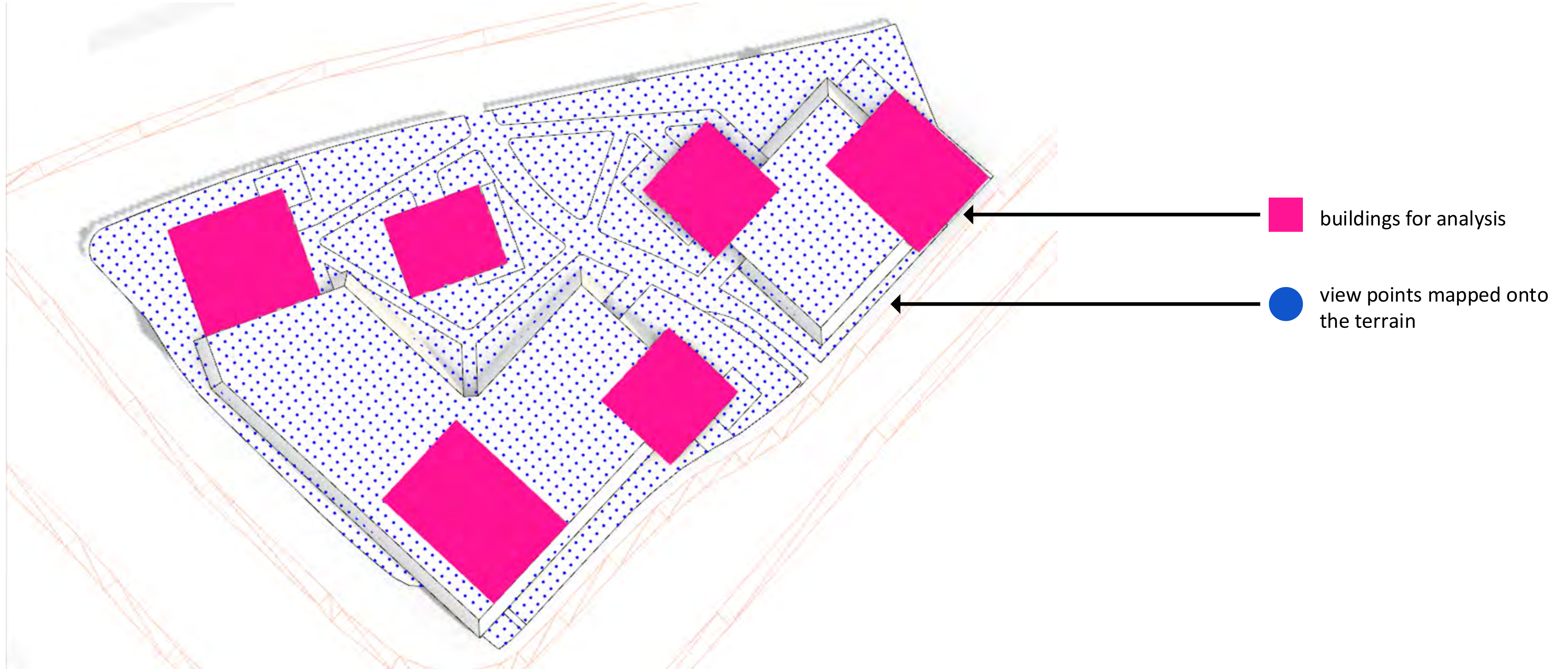
17.00



VISIBILITY PERCENTAGE

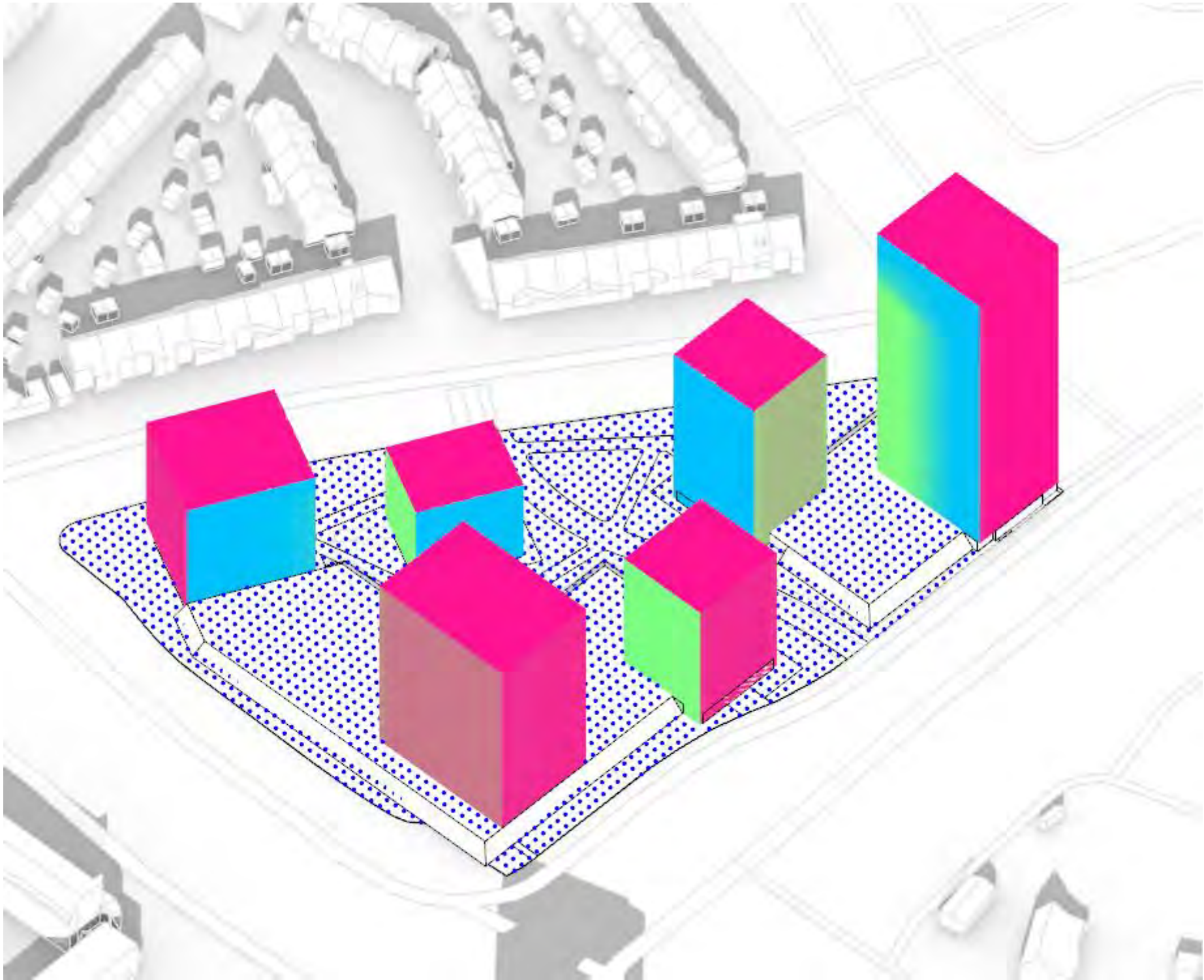
VISIBILITY PERCENTAGE DIAGRAM

View points

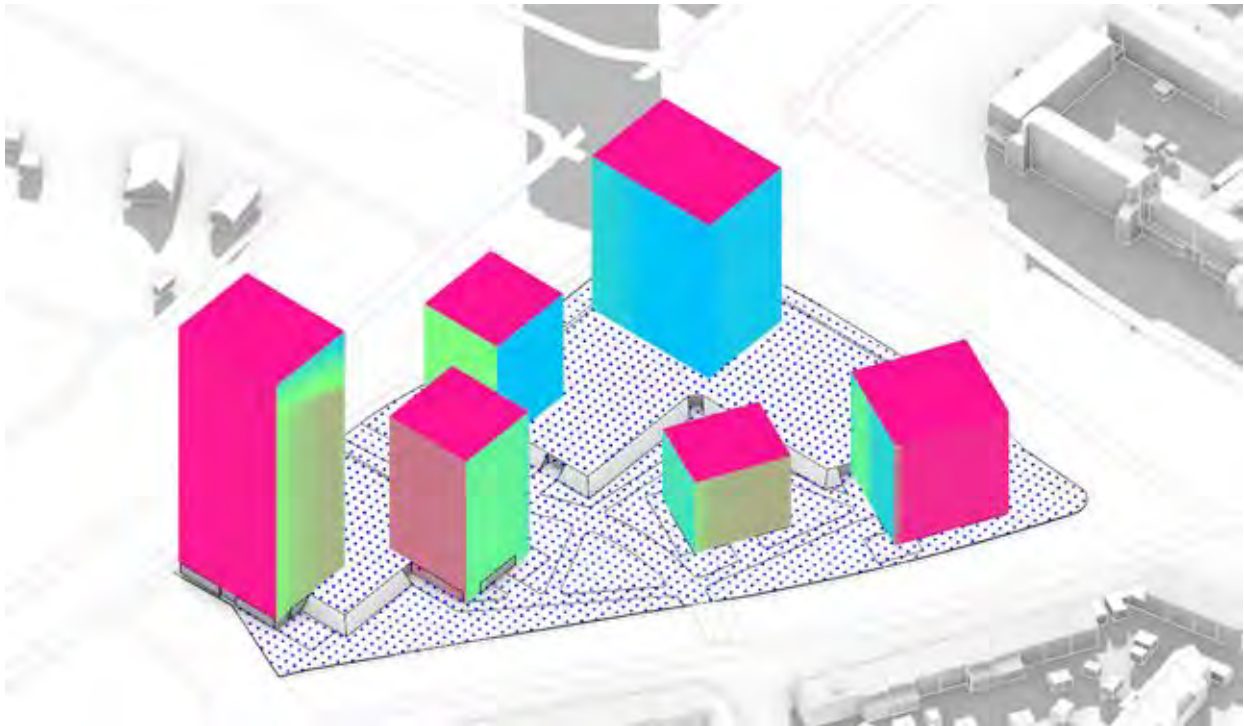


VISIBILITY PERCENTAGE

Parkstad



south view

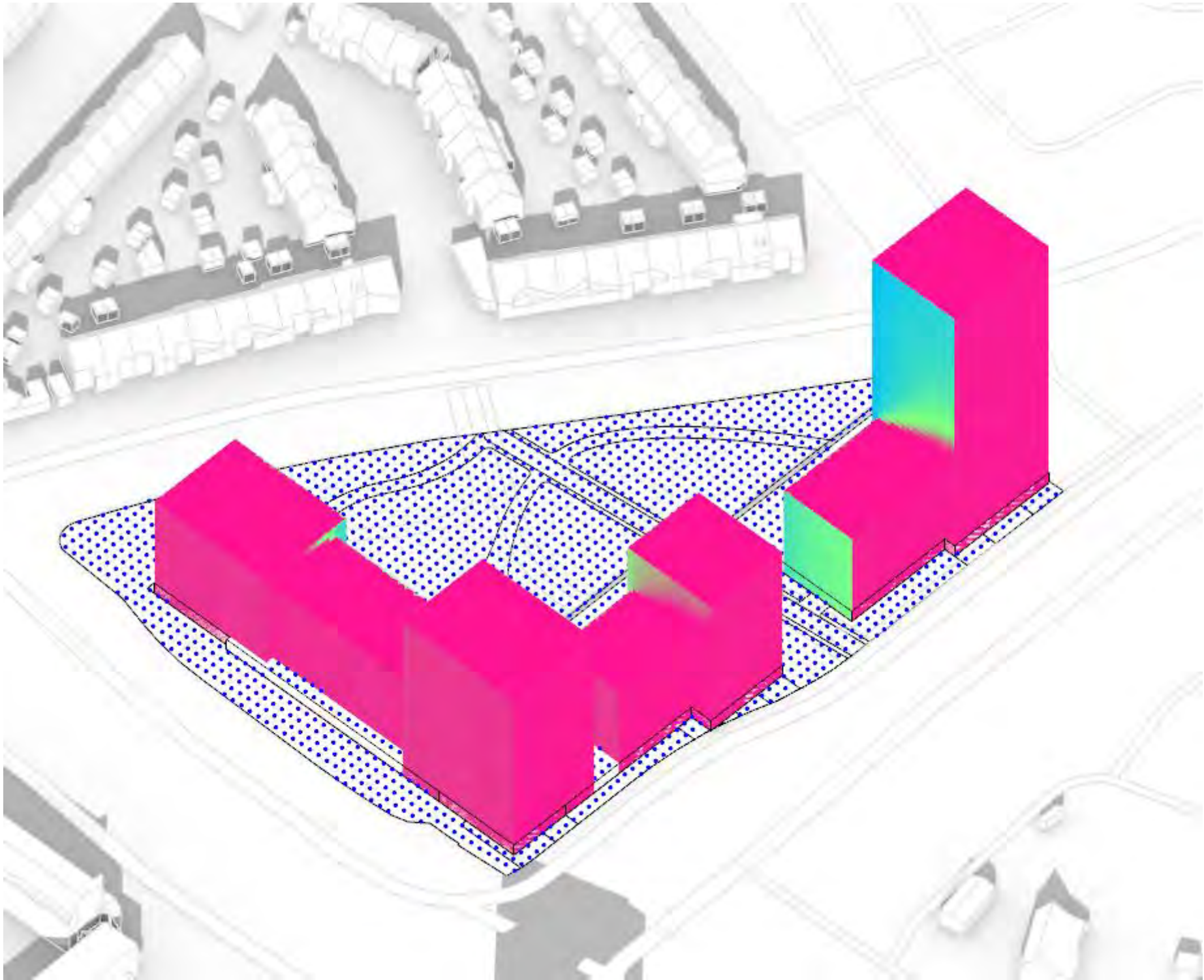
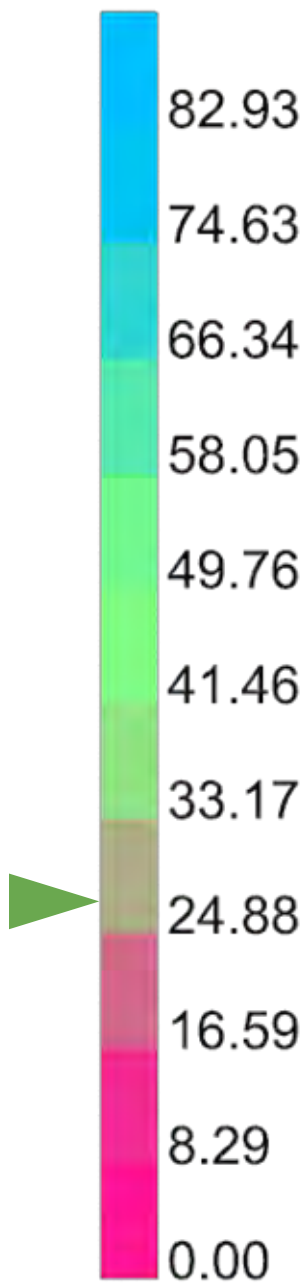


north view

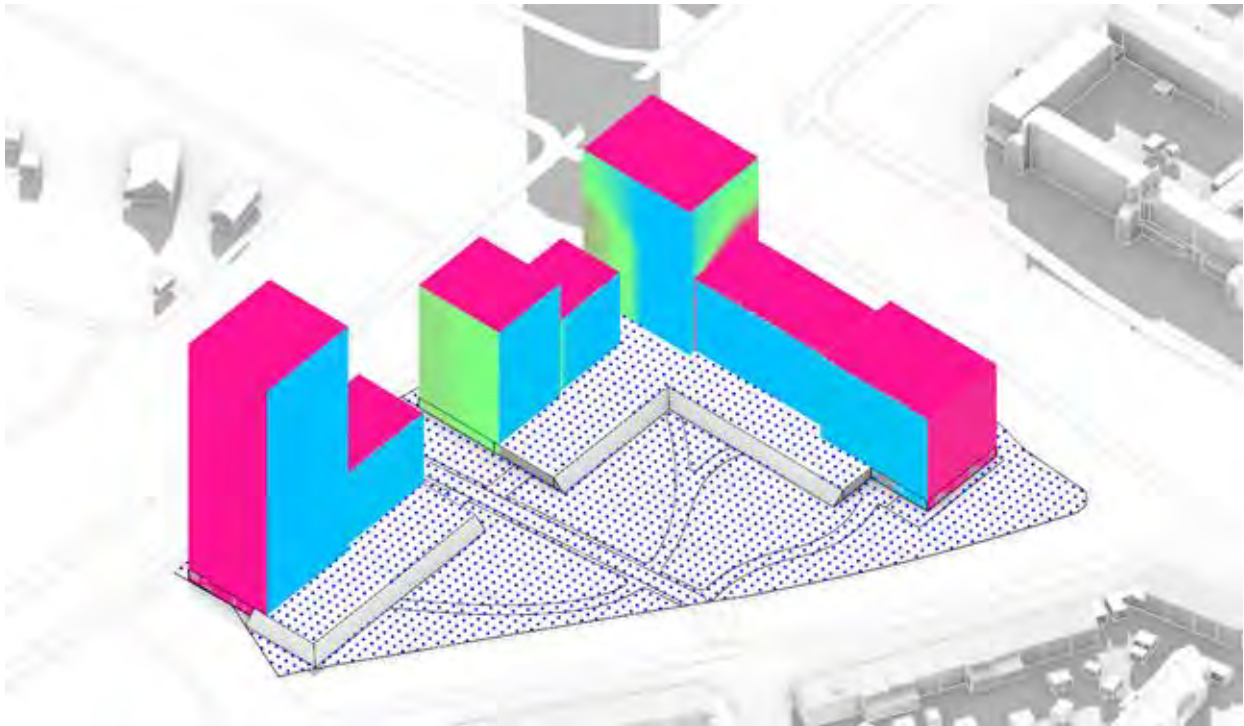
Visibility	(%)
MINIMUM	0
MAXIMUM	52.83
AVERAGE	19.45

VISIBILITY PERCENTAGE

Stadsrand



south view

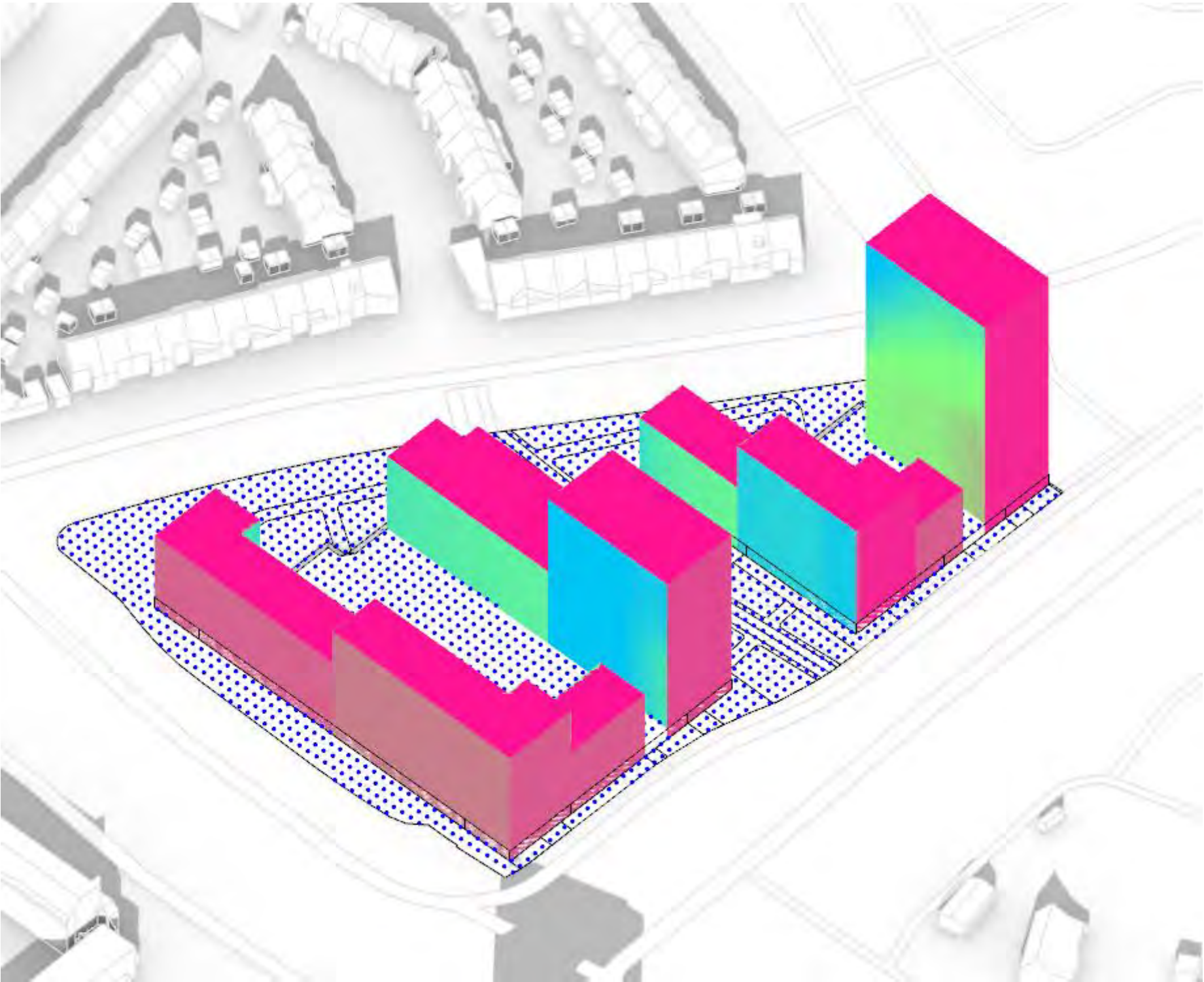
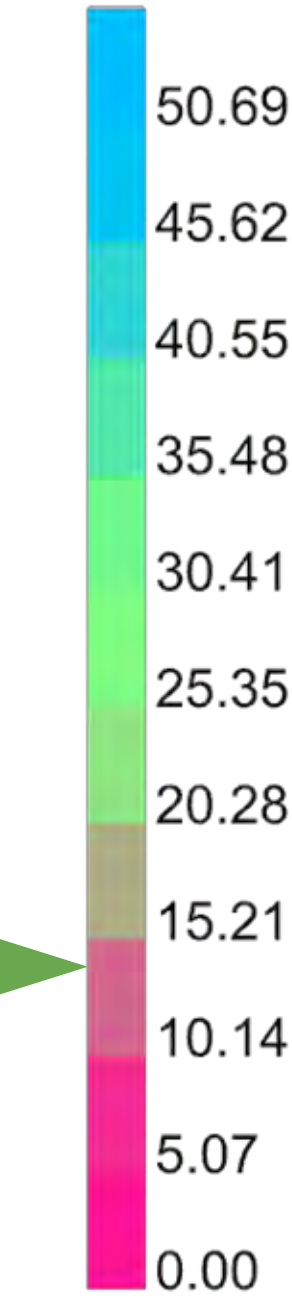


north view

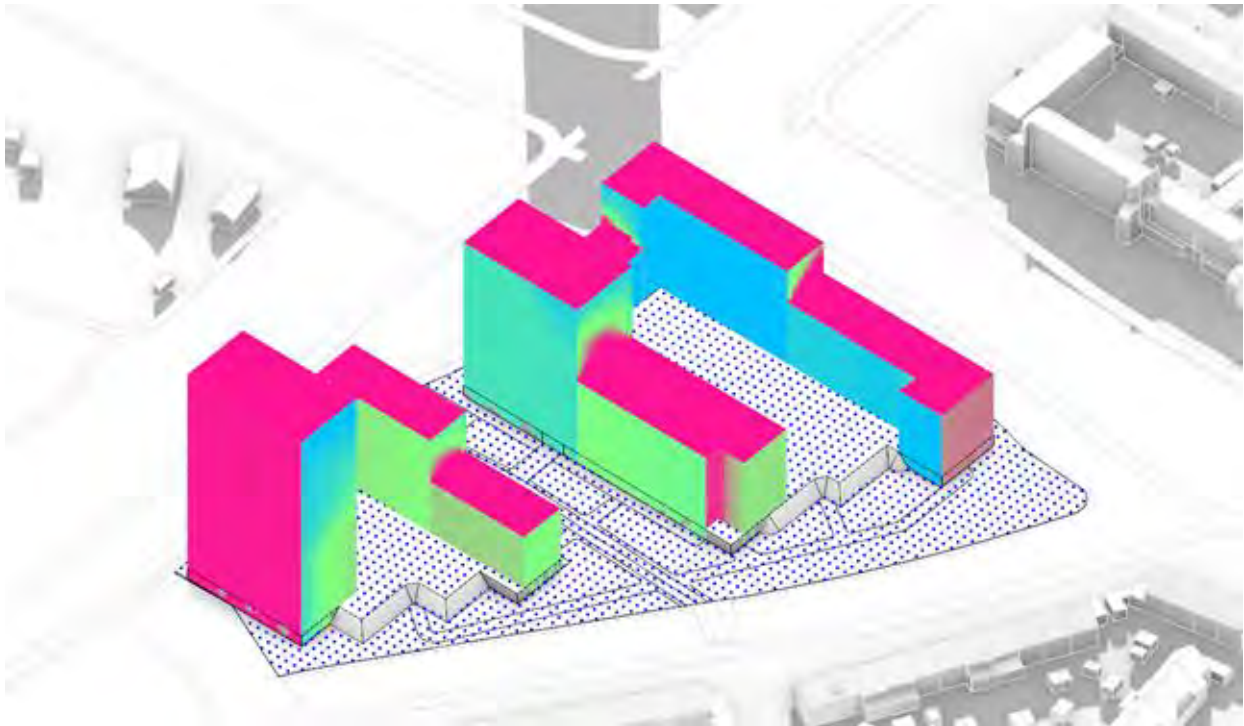
Visibility	(%)
MINIMUM	0
MAXIMUM	82.93
AVERAGE	26.19

VISIBILITY PERCENTAGE

De Groene Hoven



south view



north view

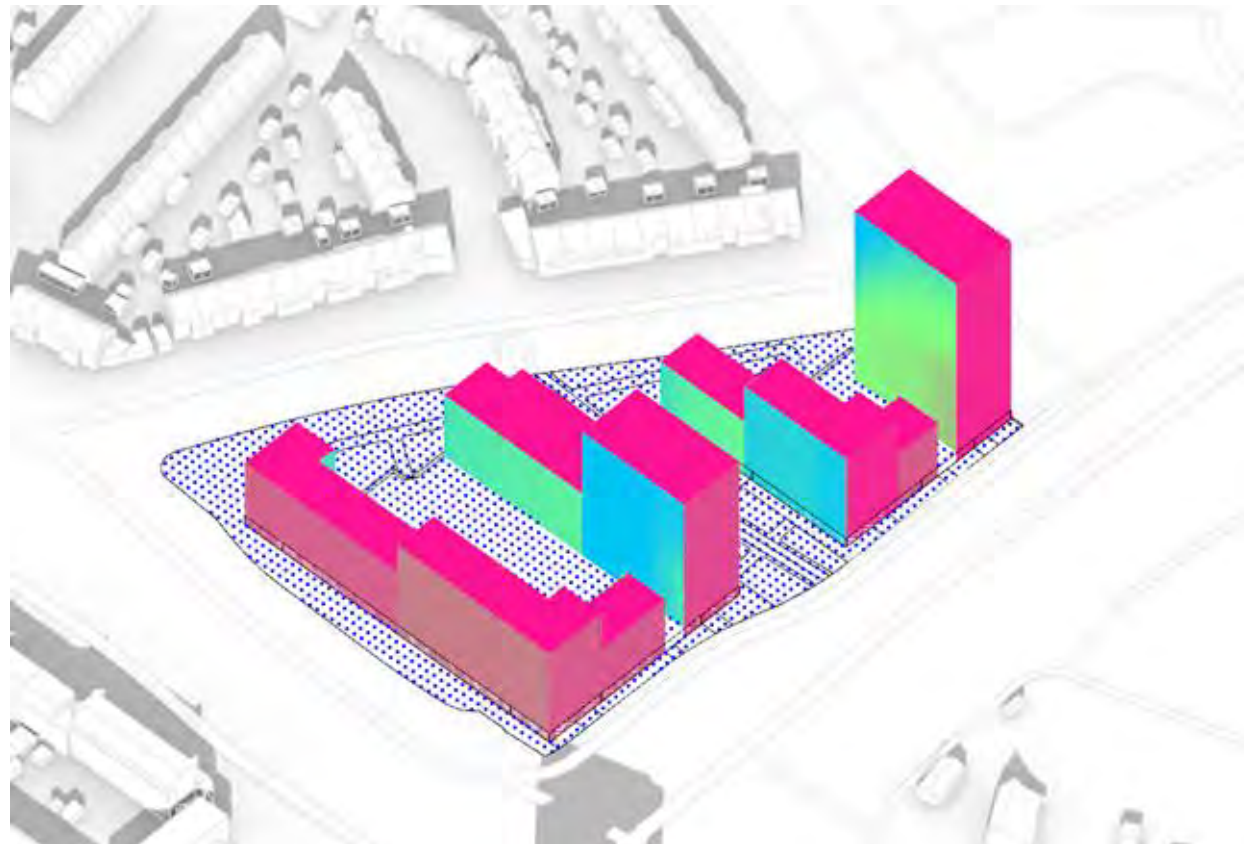
Visibility	(%)
MINIMUM	0
MAXIMUM	50.69
AVERAGE	14.46

VISIBILITY PERCENTAGE

Overall comparison



Total facade	21 548
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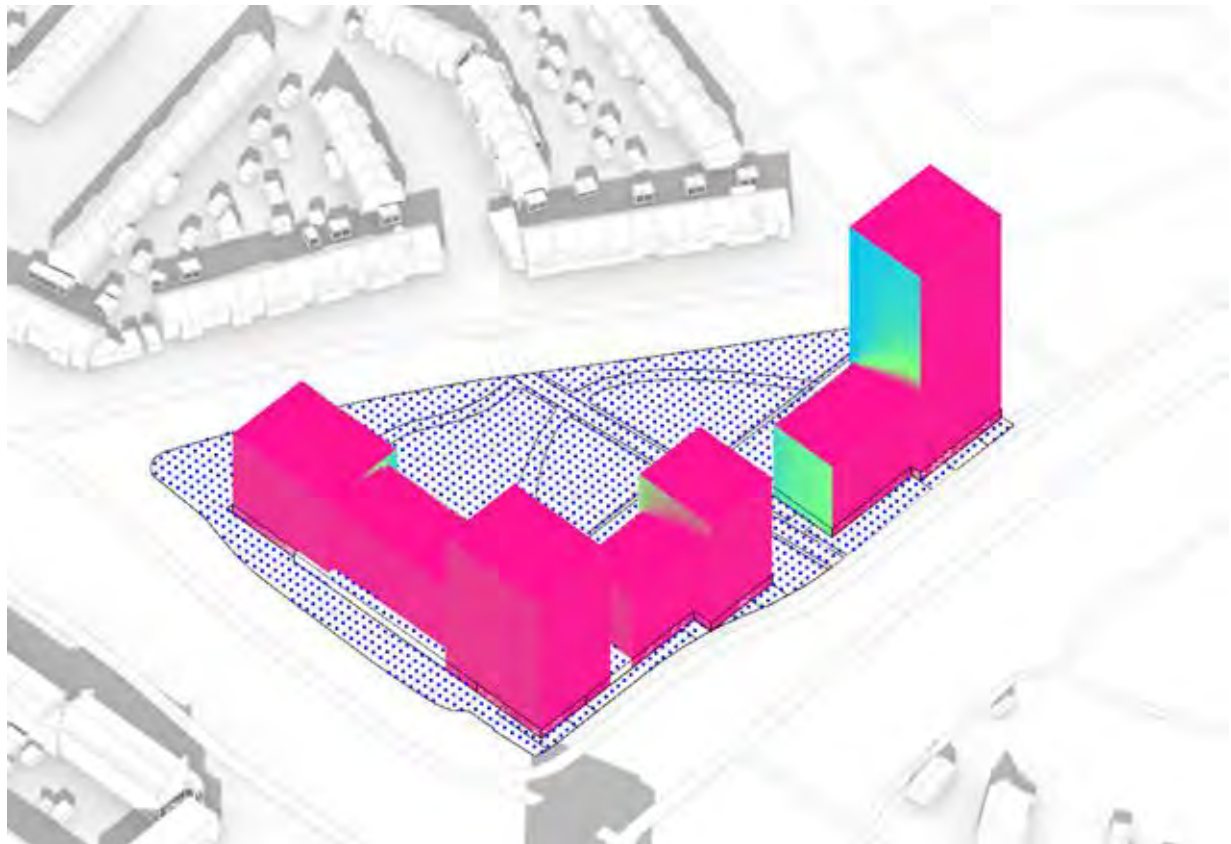


De Groene Hoven (entire model)

Visibility	(%)
AVERAGE	14.46

minimum baseline: 14.46% ▼

Total facade	18 926
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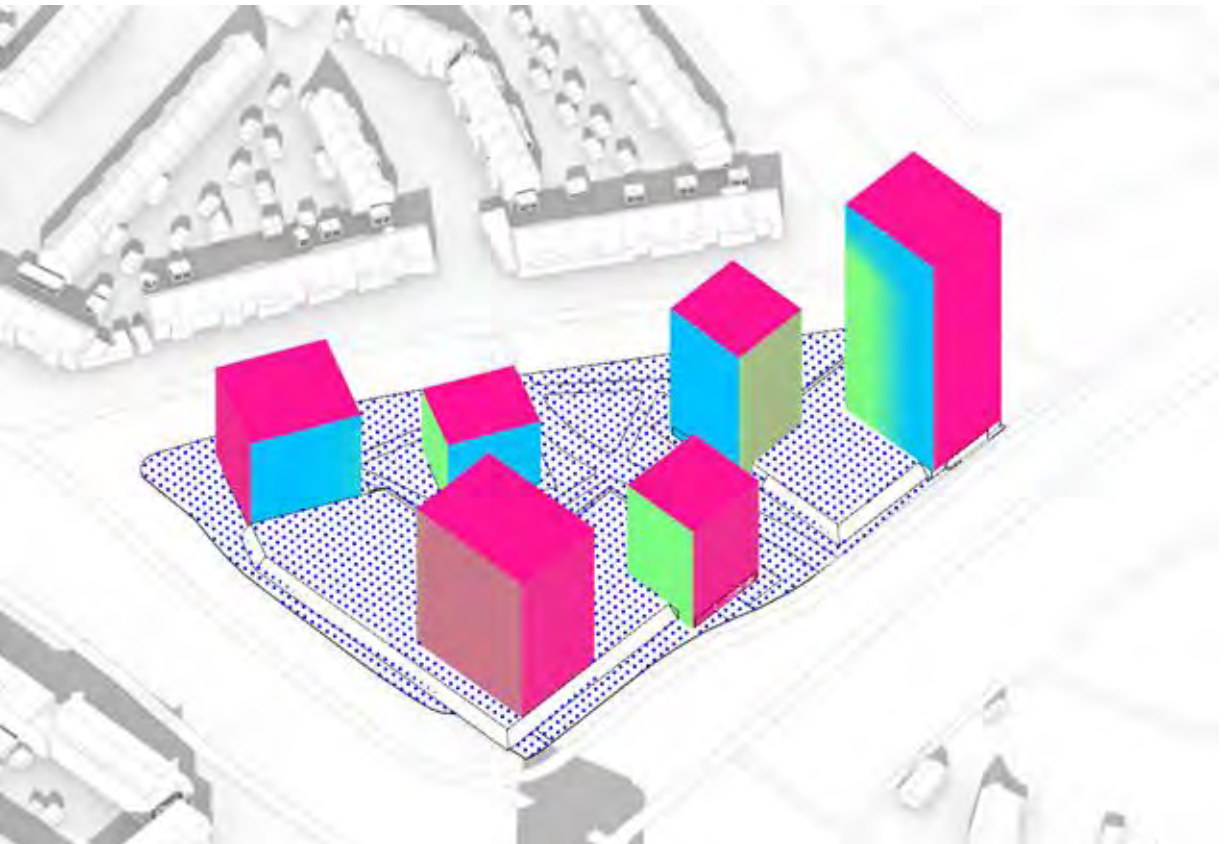


Stadsrand (entire model)

Visibility	(%)
AVERAGE	26.19

+81.1% overall radiations ▲▲

Total facade	22 516
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Parkstad (entire model)

Visibility	(%)
AVERAGE	19.45

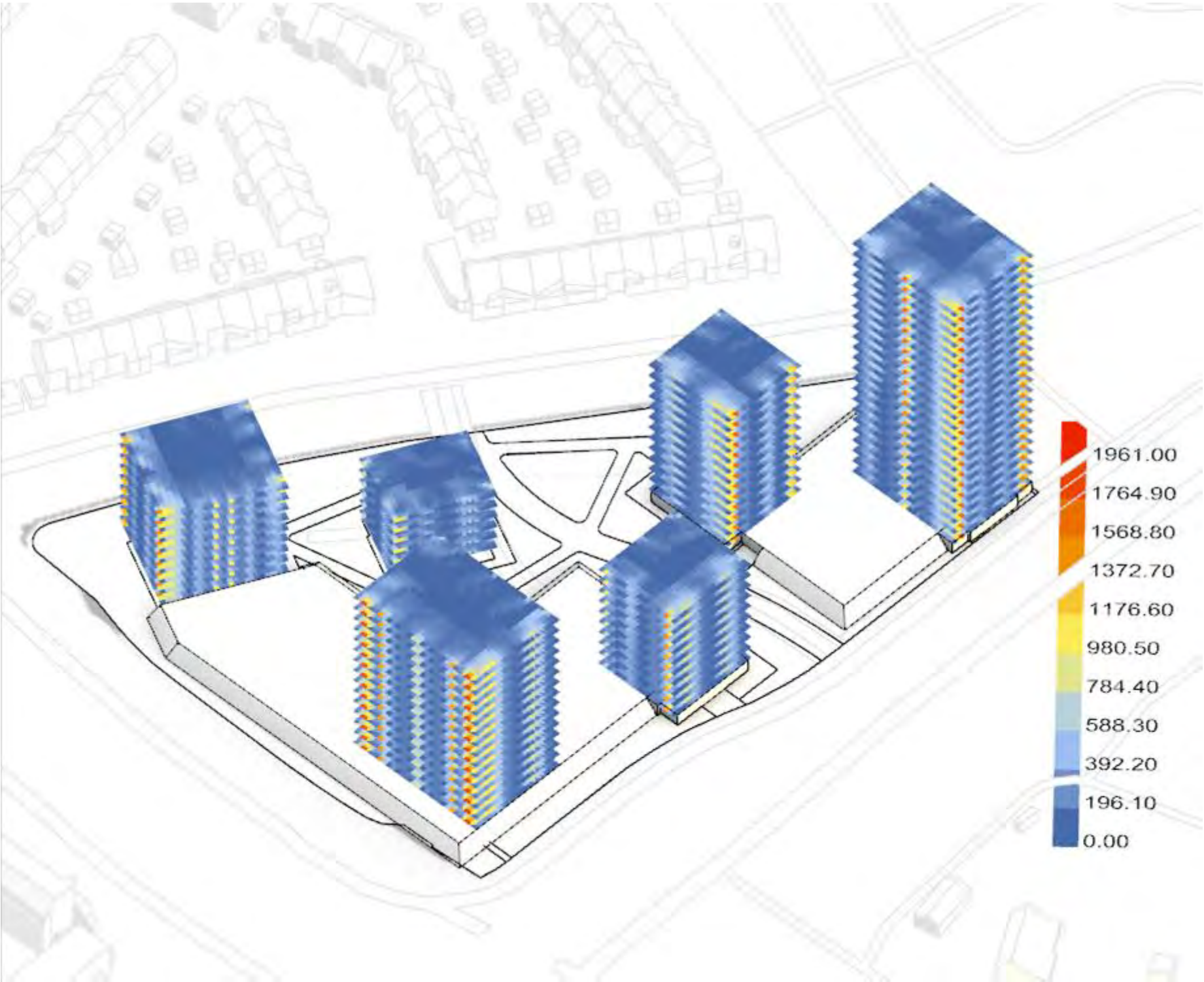
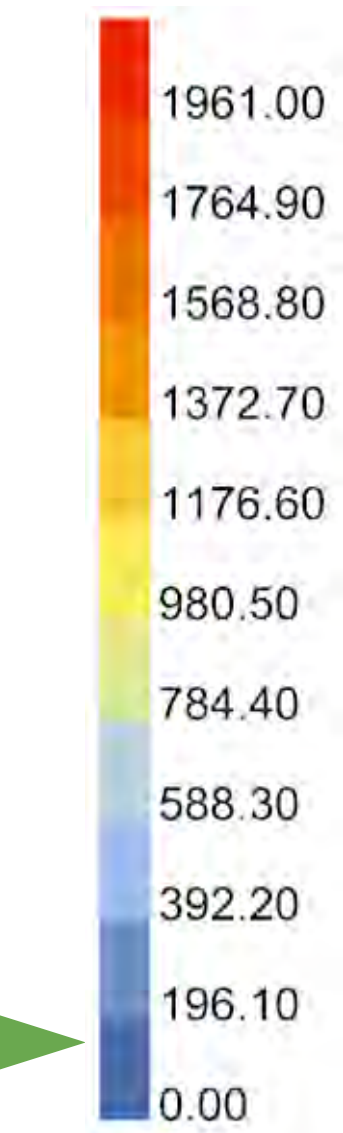
+34.5% overall radiation ▲

DIRECT SUN HOURS (interior)

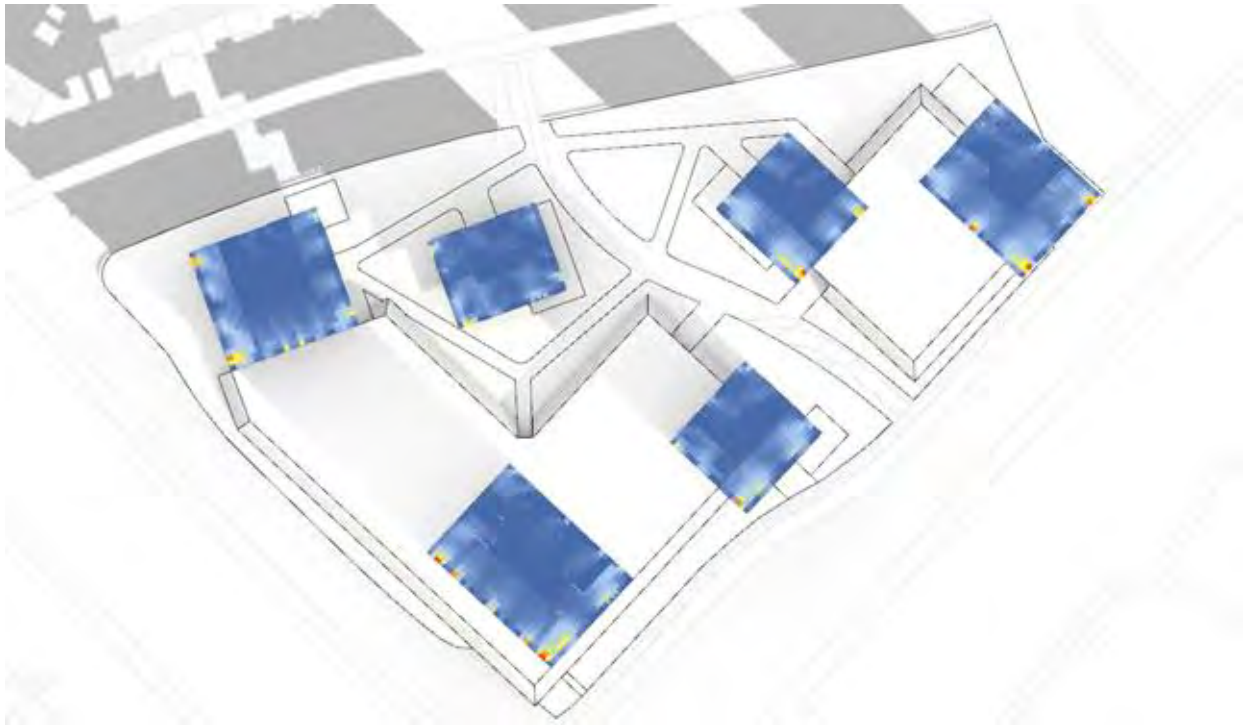
ALL YEAR

DIRECT SUN HOURS

Parkstad (all floors)



south view

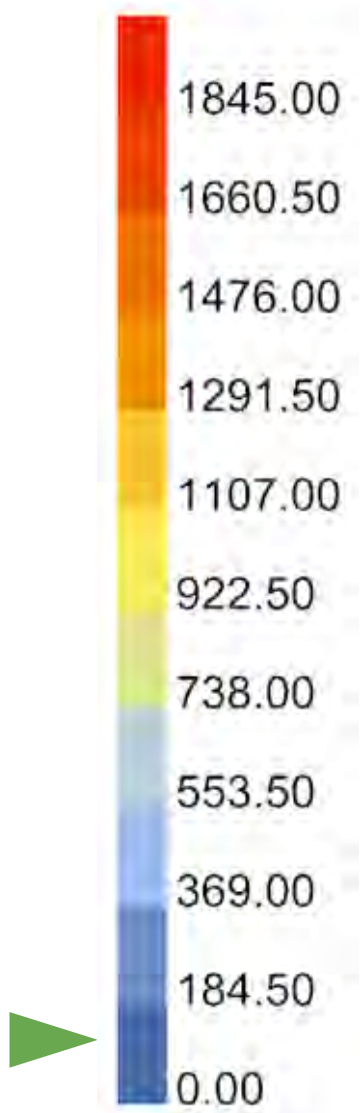


top view

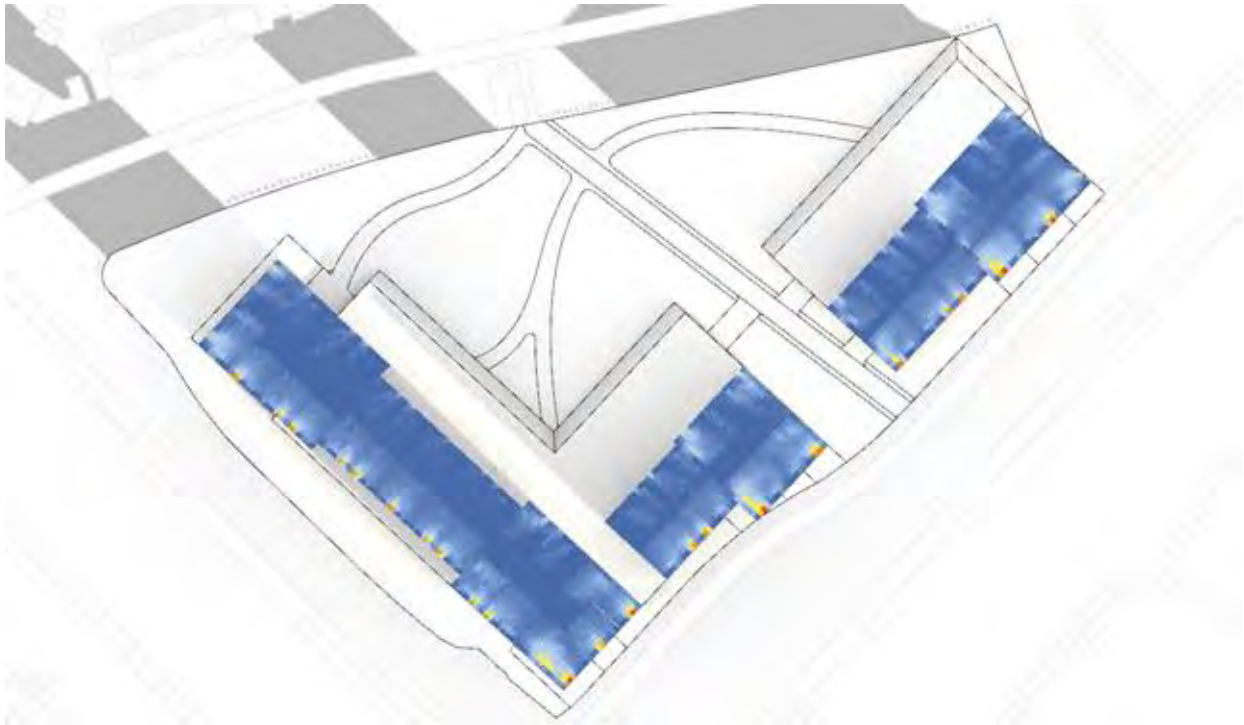
Direct Sun Hours	(hours)
MINIMUM	0
MAXIMUM	1961
AVERAGE	145.9

DIRECT SUN HOURS

Stadsrand (all floors)



south view

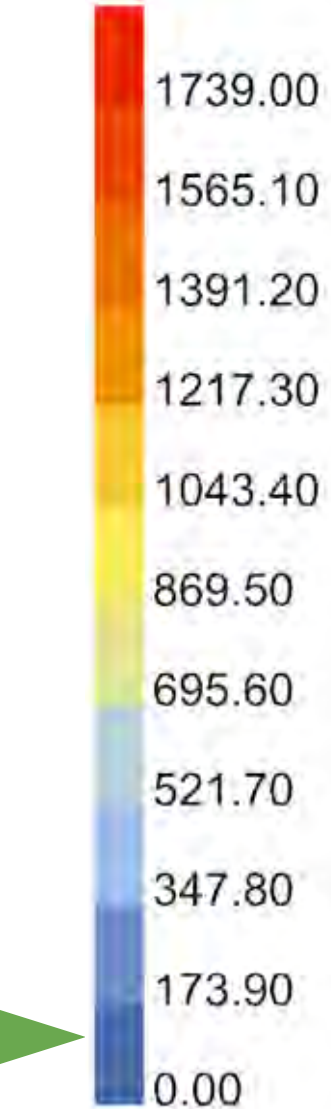


top view

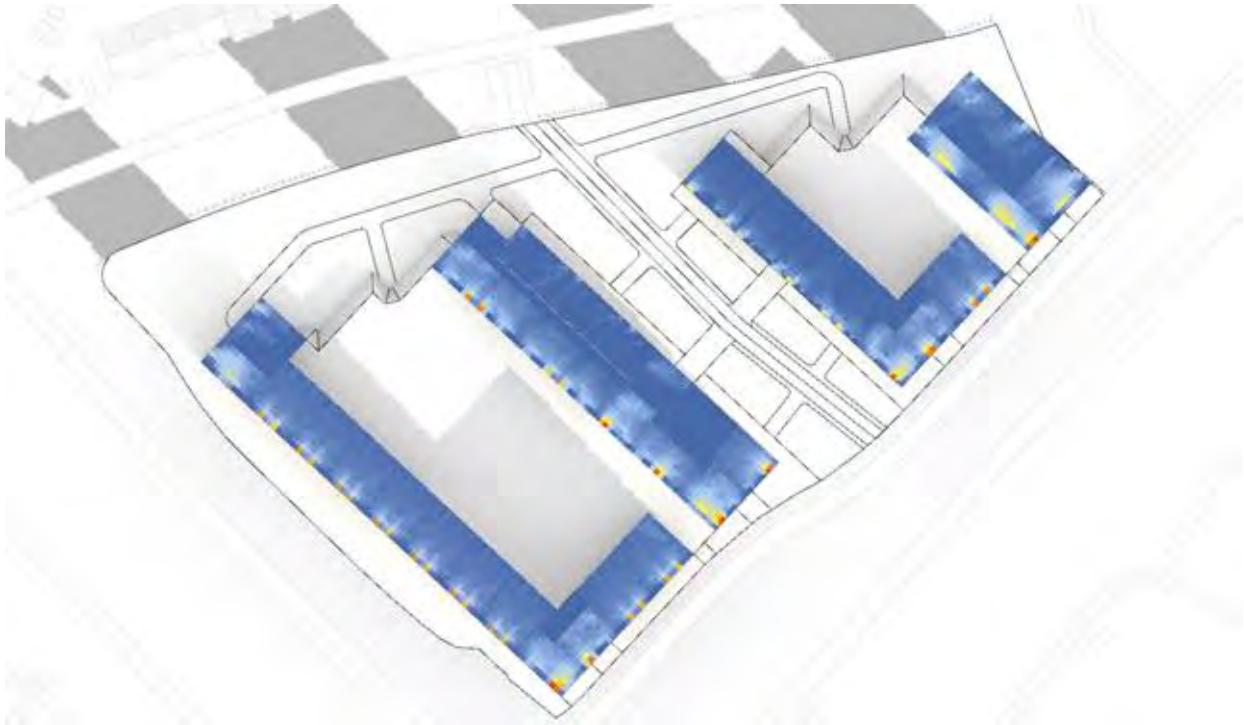
Direct Sun Hours	(hours)
MINIMUM	0
MAXIMUM	1845
AVERAGE	123.9

DIRECT SUN HOURS

Groene Hoven (all floors)



south view



top view

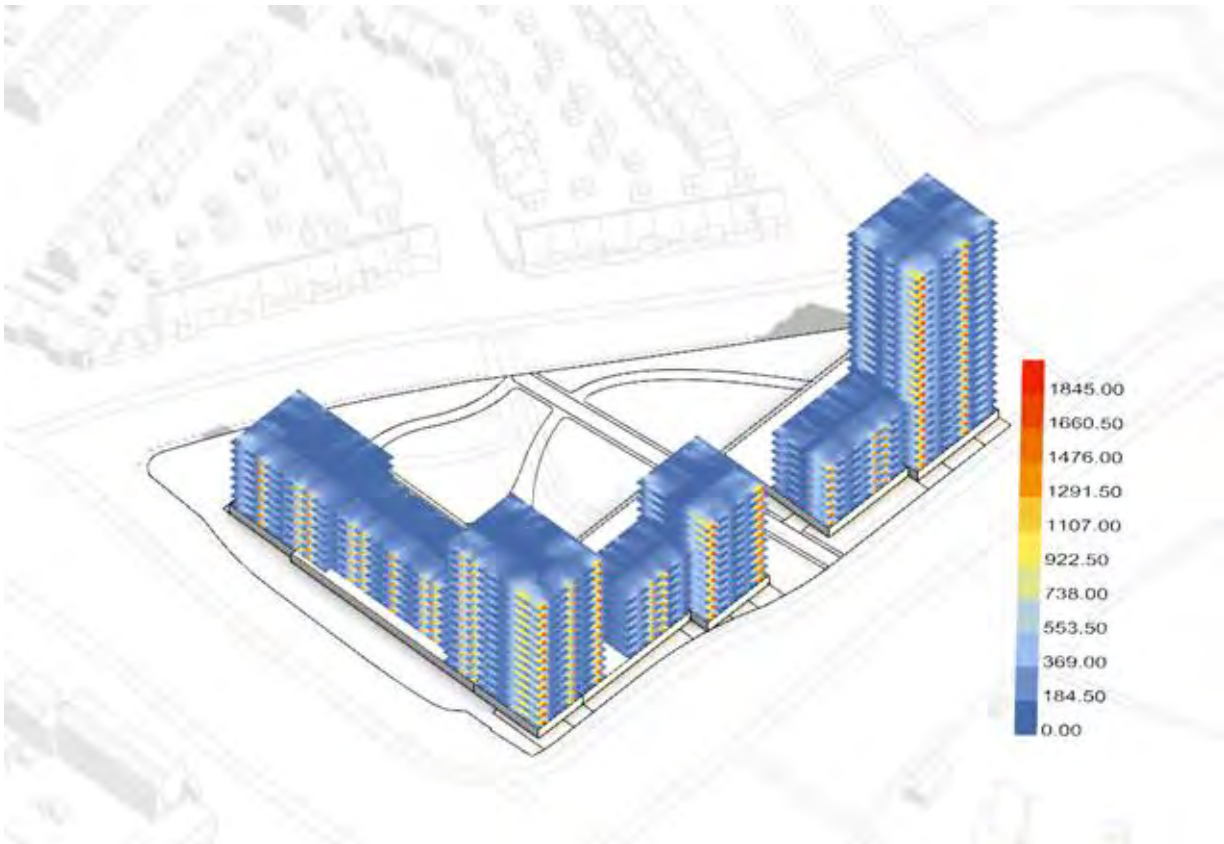
Direct Sun Hours	(hours)
MINIMUM	0
MAXIMUM	1739
AVERAGE	124.1

DIRECT SUN HOURS

Overall comparison



Total facade	18 926
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Stadsrand (entire model)

Direct Sun Hours	(hours)
AVERAGE	124

minimum baseline: 124



Total facade	21 548
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De Groene Hoven (entire model)

Direct Sun Hours	(hours)
AVERAGE	124

minimum baseline: 124



Total facade	22 516
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Parkstad (entire model)

Direct Sun Hours	(hours)
AVERAGE	146

+17% average sun hours

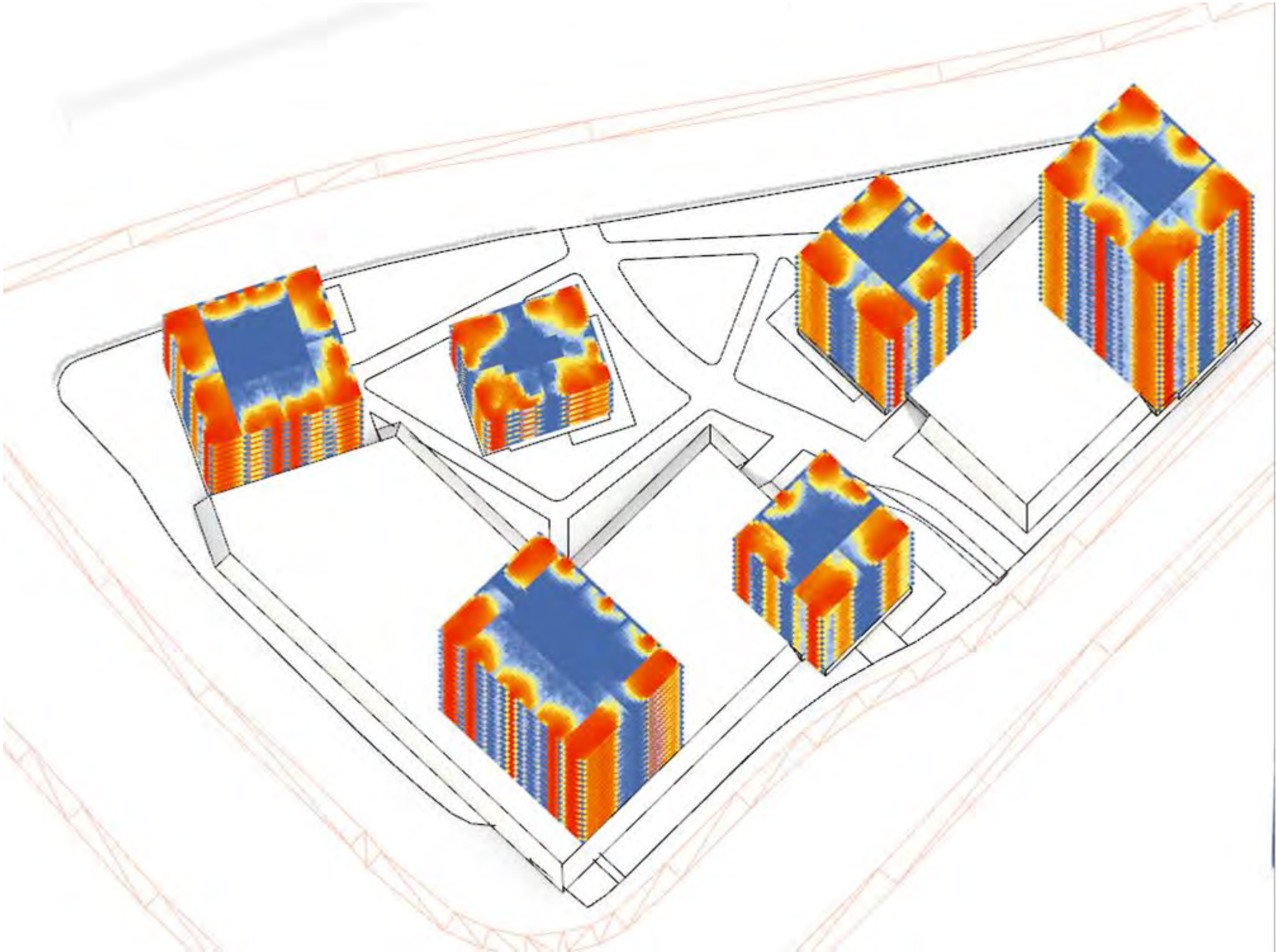
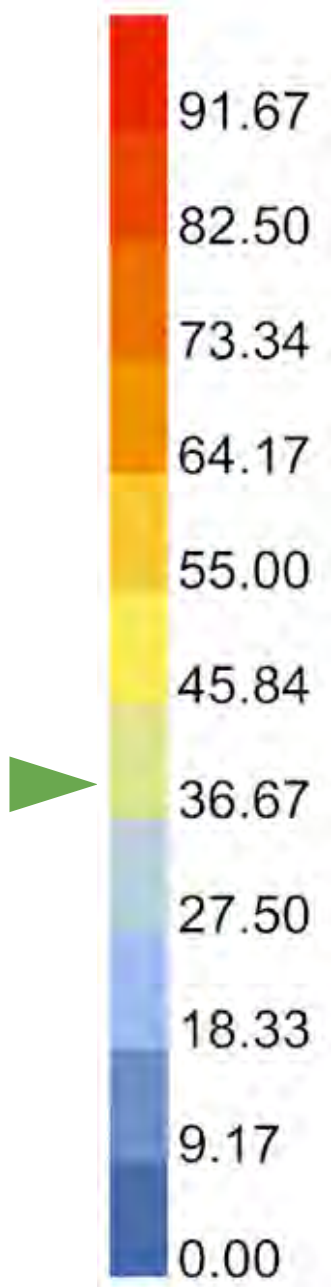


DAYLIGHT AUTONOMY

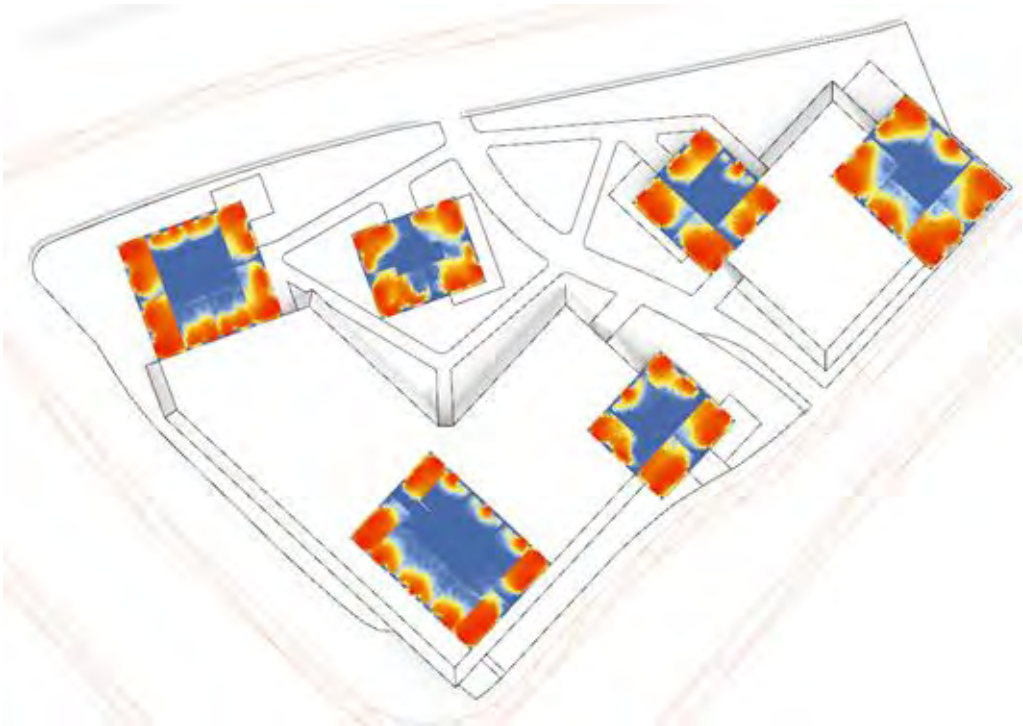
ALL YEAR

DAYLIGHT AUTONOMY

Parkstad (all floors)



south view

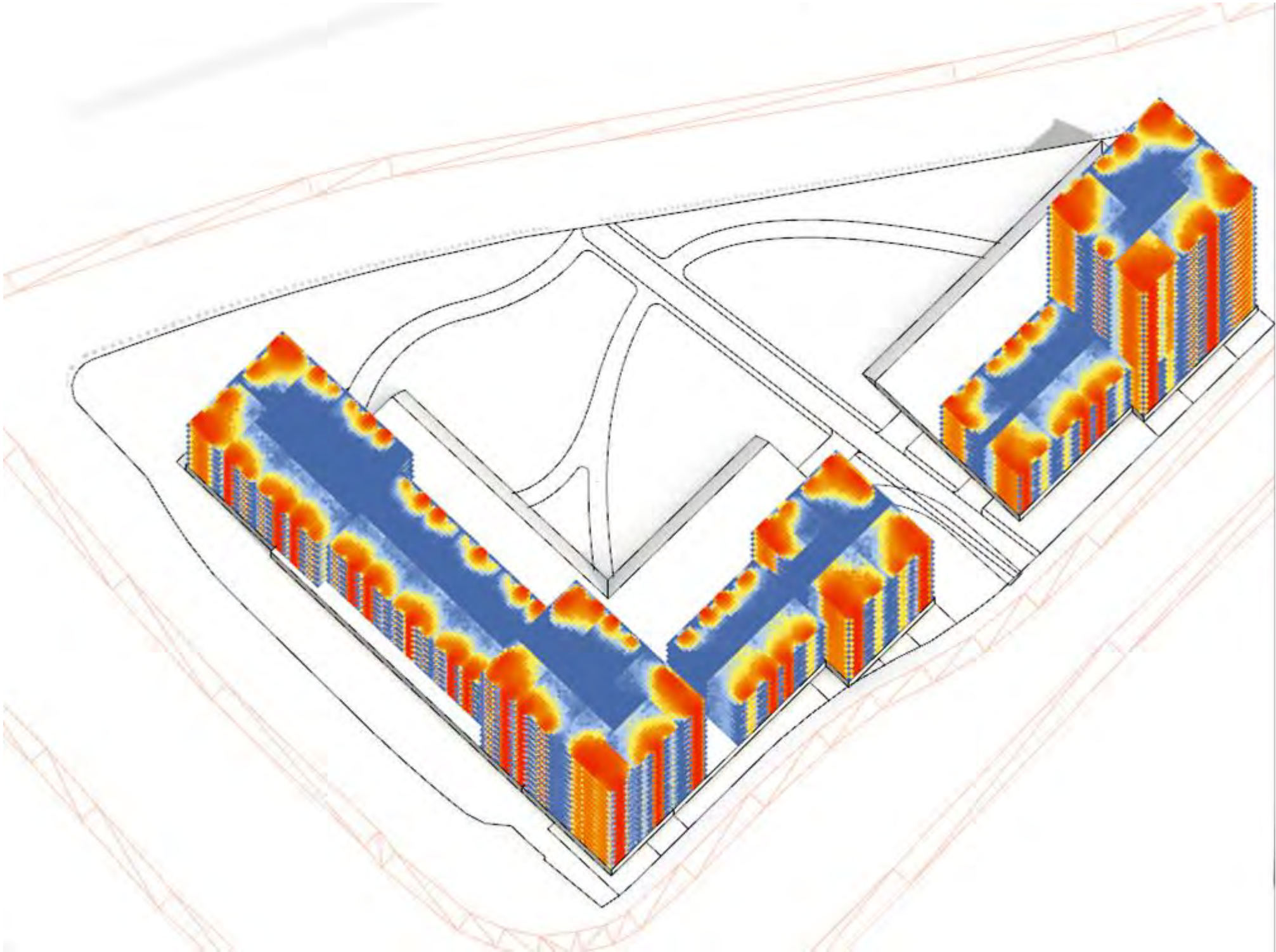
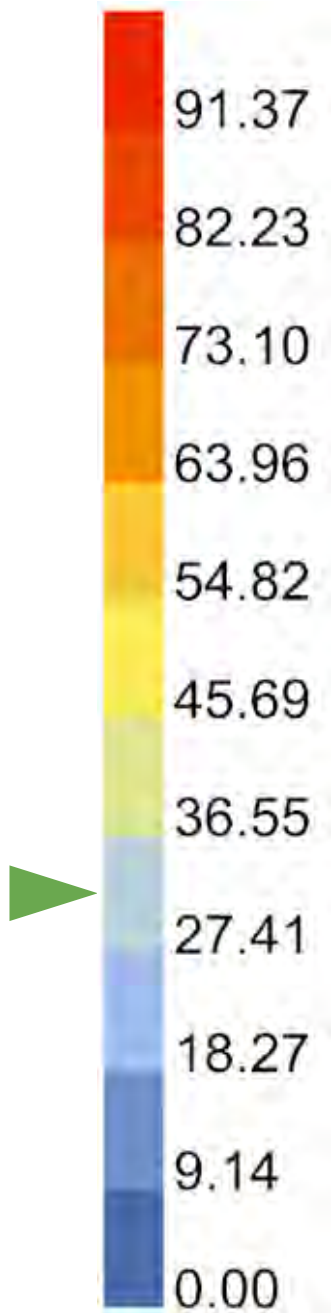


top view

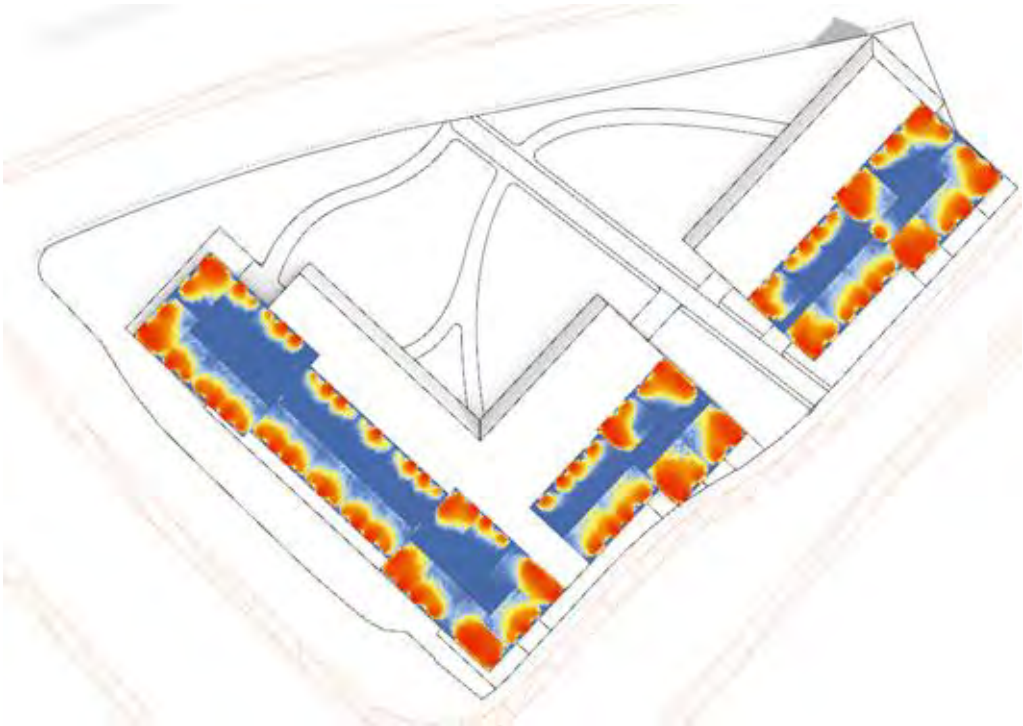
Daylight Autonomy	(hours)
MINIMUM	0
MAXIMUM	91.67
AVERAGE	37.76

DAYLIGHT AUTONOMY

Stadsrand(all floors)



south view

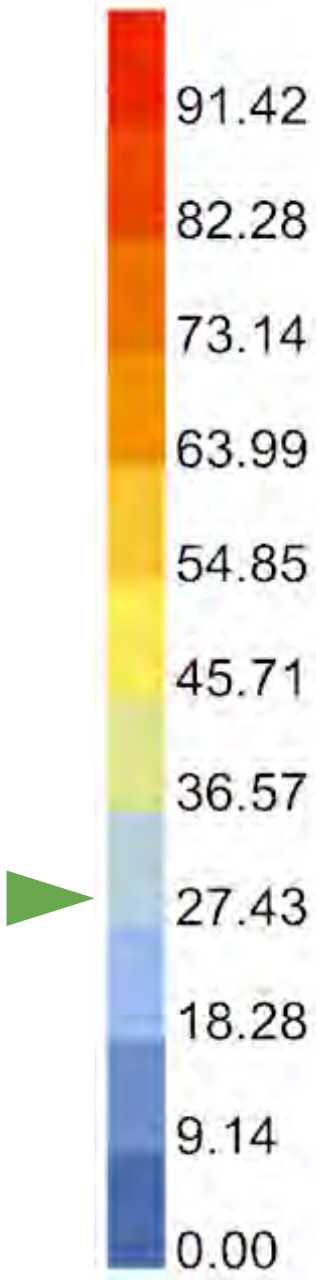


top view

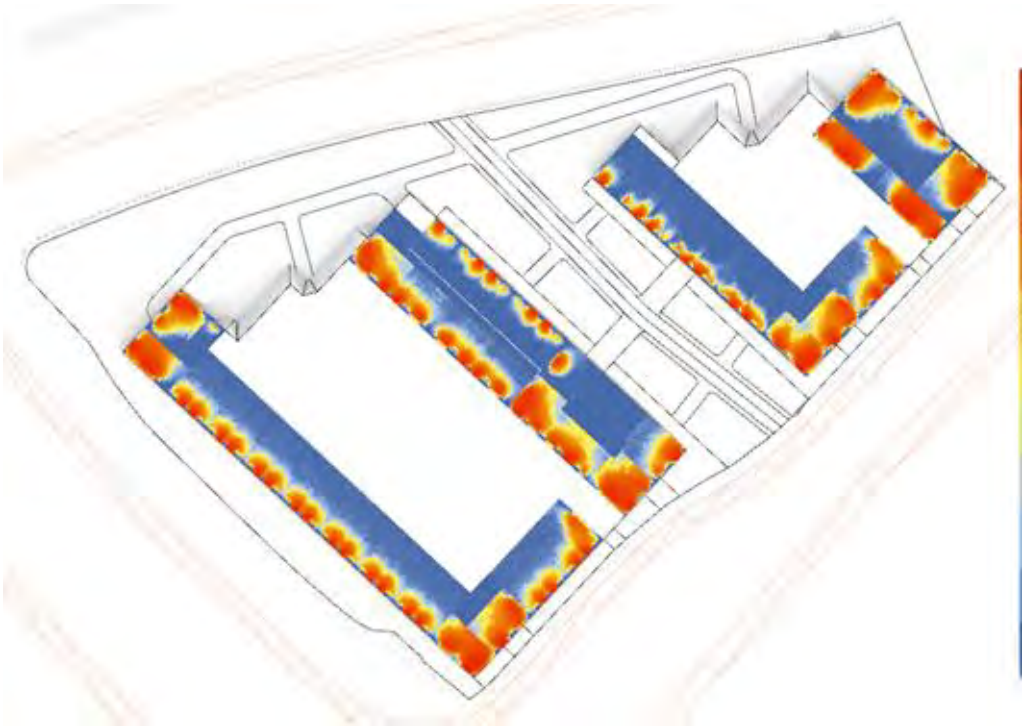
Daylight Autonomy	(hours)
MINIMUM	0
MAXIMUM	91.37
AVERAGE	31.37

DAYLIGHT AUTONOMY

Groene Hoven (all floors)



south view



top view

Daylight Autonomy	(hours)
MINIMUM	0
MAXIMUM	91.42
AVERAGE	28.37

DAYLIGHT AUTONOMY

Overall comparison



Total facade	21 548
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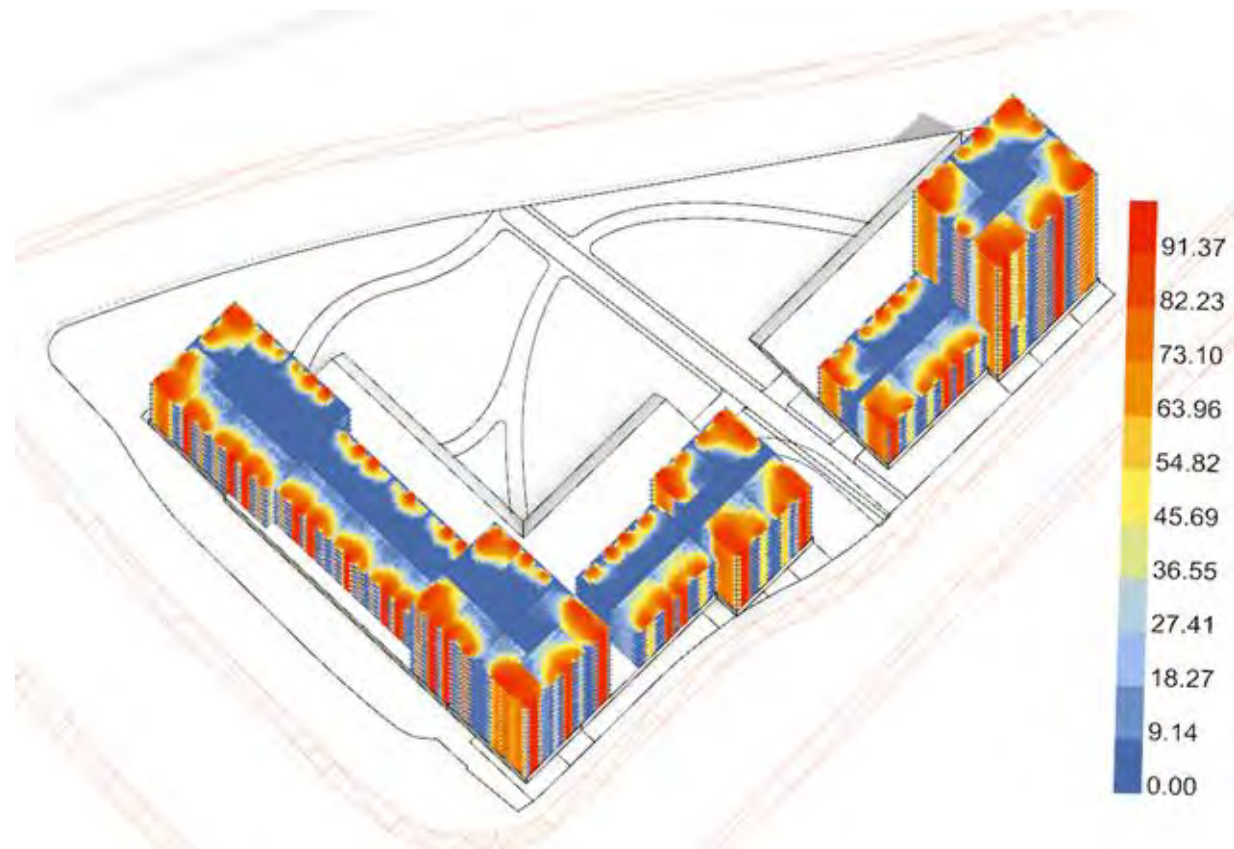


De Groene Hoven (entire model)

Daylight Autonomy	(hours)
AVERAGE	28.37

minimum baseline: 28.37

Total facade	18 926
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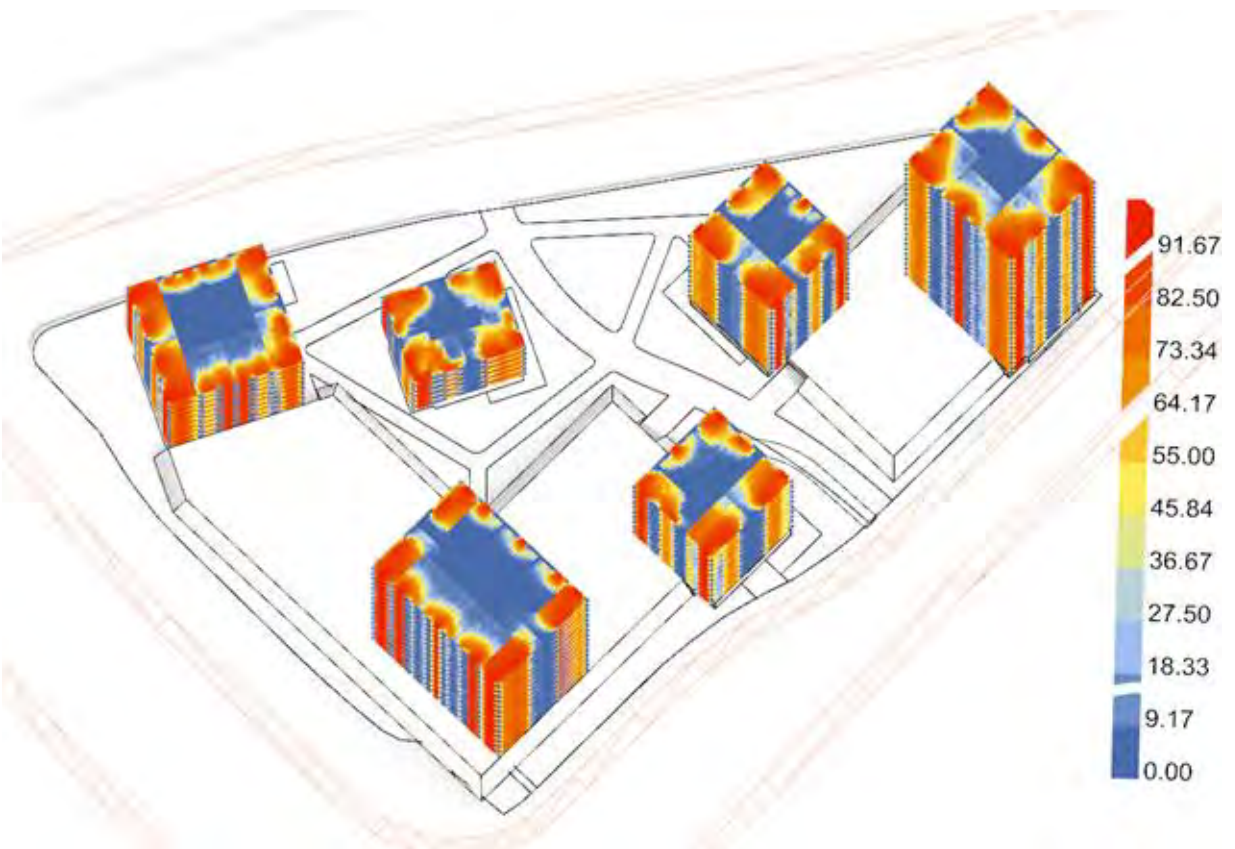


Stadsrand (entire model)

Daylight Autonomy	(hours)
AVERAGE	31.37

+10% average

Total facade	22 516
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Parkstad (entire model)

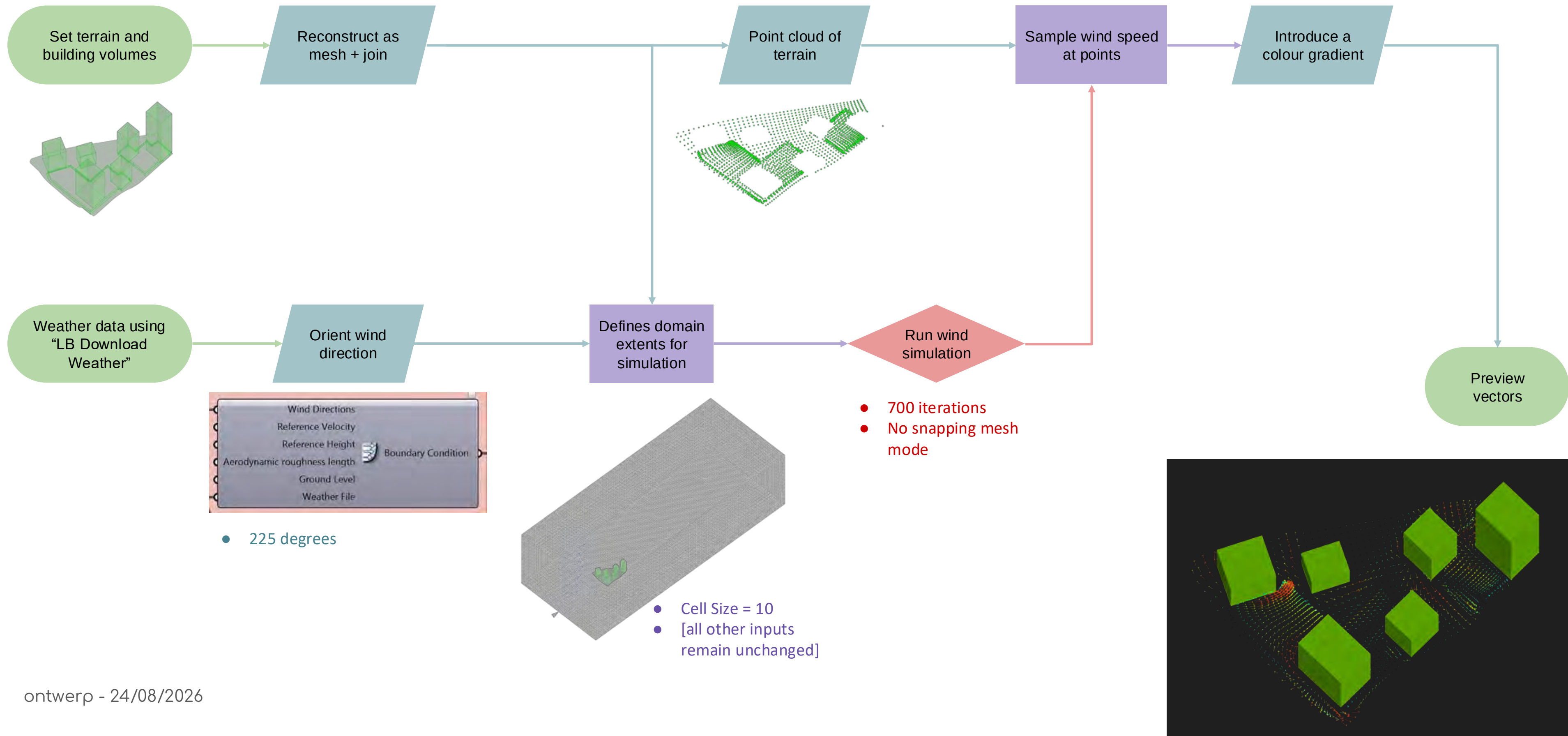
Daylight Autonomy	(hours)
AVERAGE	37.76

+33% average

WIND ANALYSIS

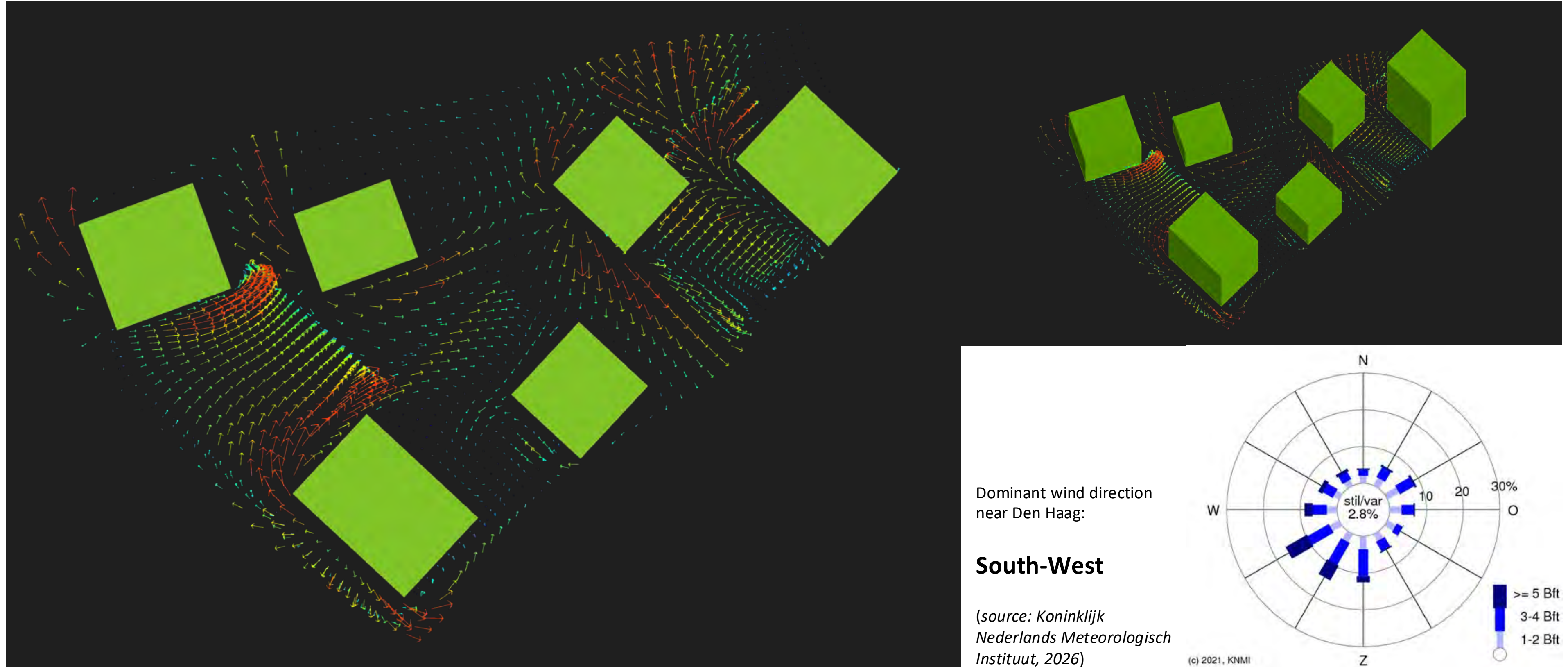
ALL YEAR – South west – Den haag

Wind Simulation with Eddy3D



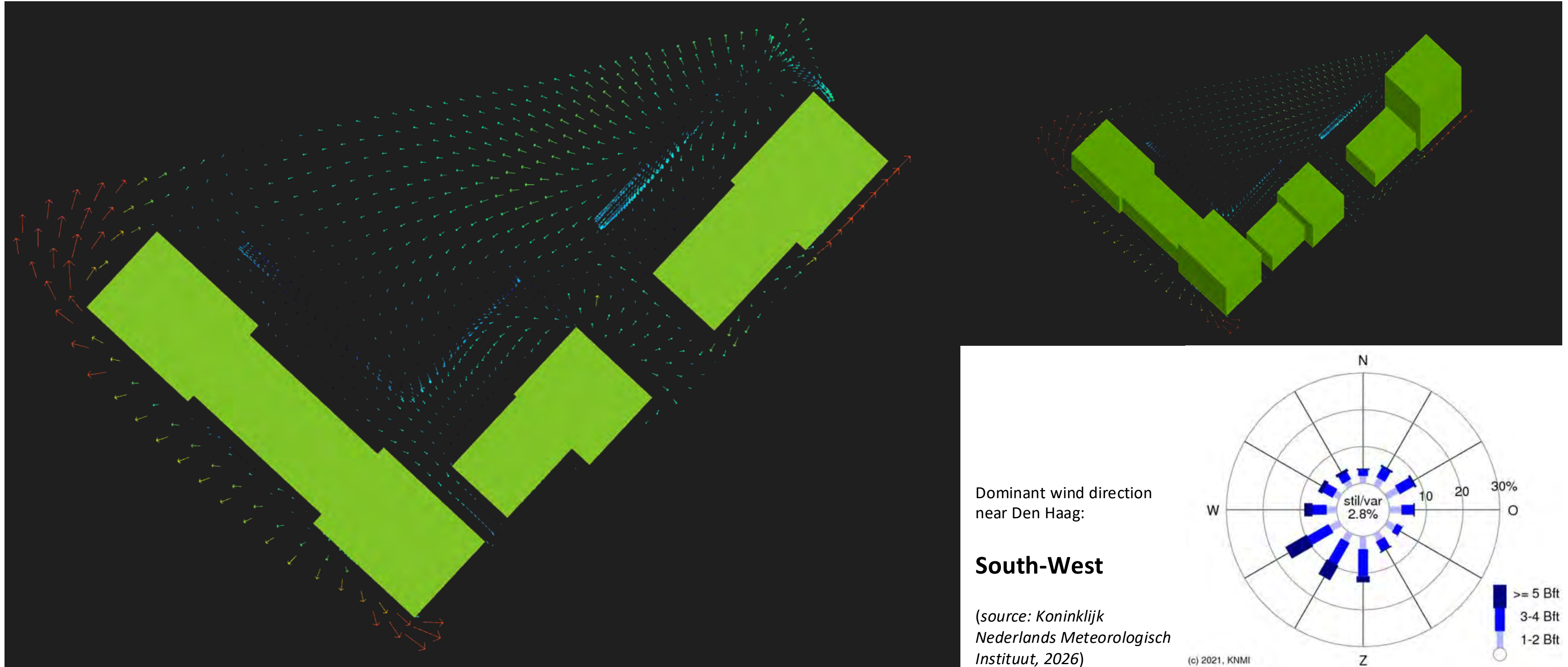
WIND MOVEMENT

Parkstad



WIND MOVEMENT

Stadsrand



WIND MOVEMENT

De Groene Hoven

