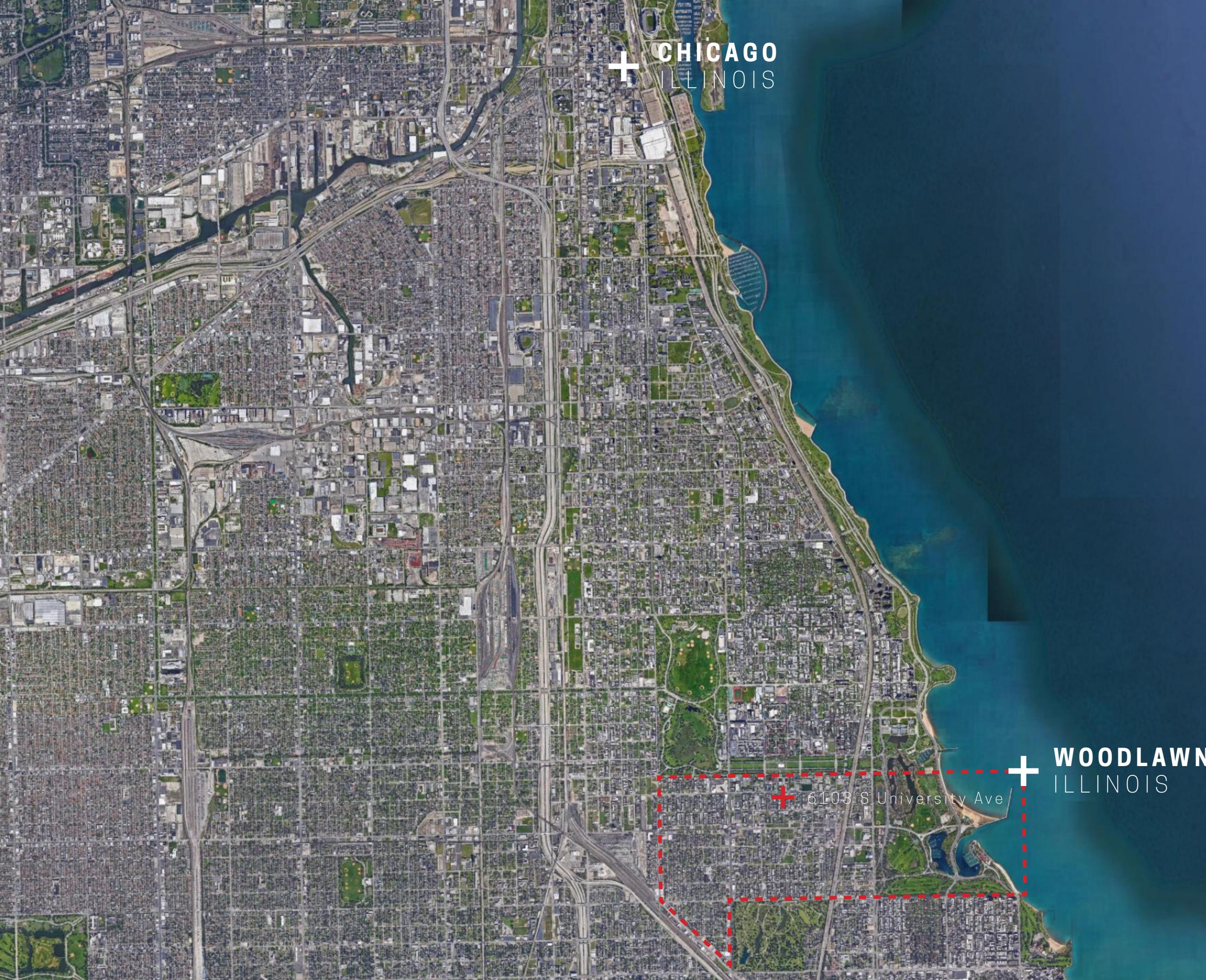




CHICAGO
ILLINOIS

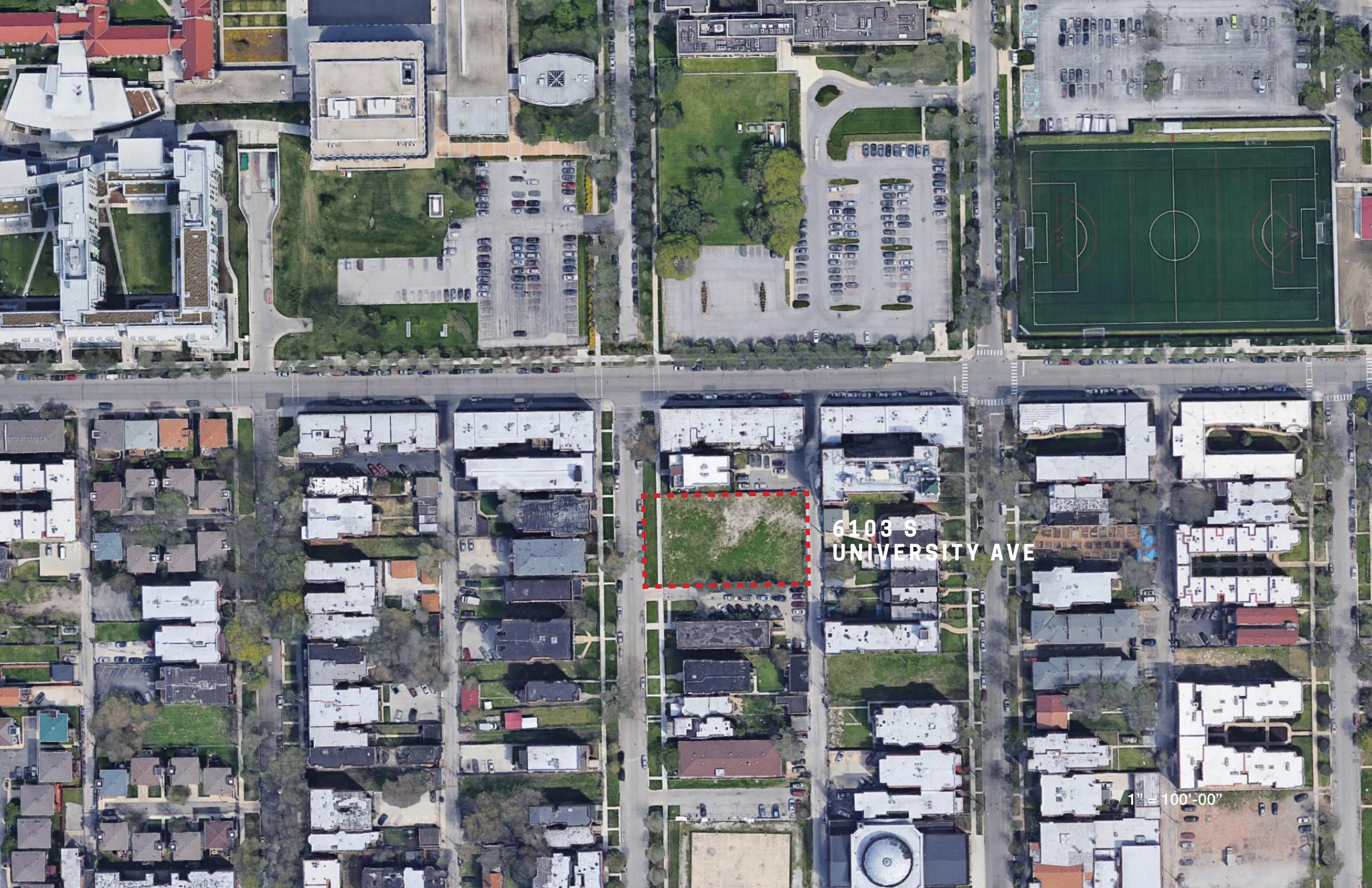
Climate Zone 5



CHICAGO
ILLINOIS

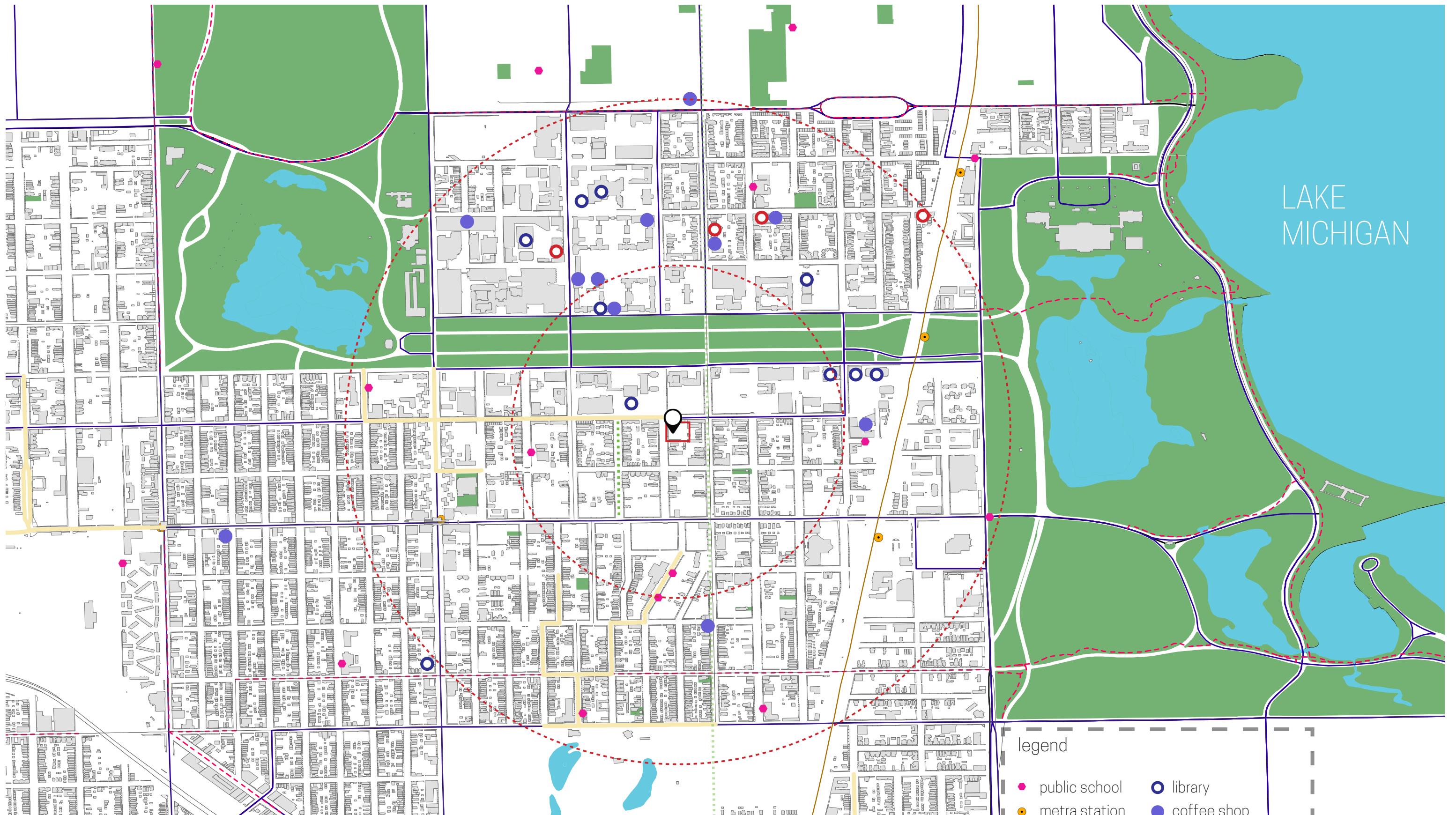
WOODLAWN
ILLINOIS

6103 S University Ave



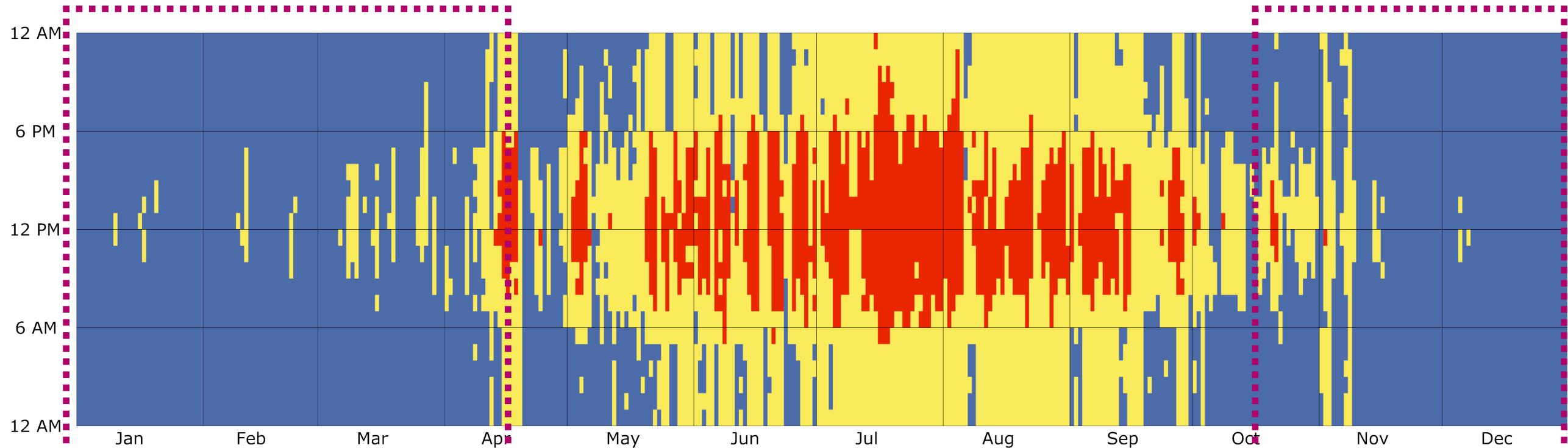
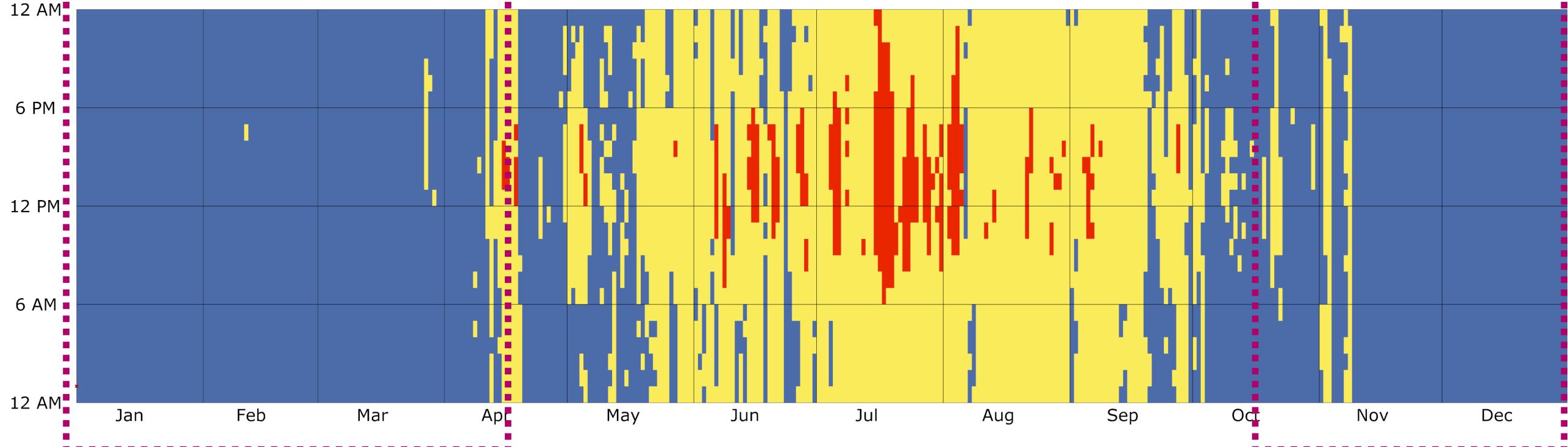
6103 S
UNIVERSITY AVE

1" = 100'-00"

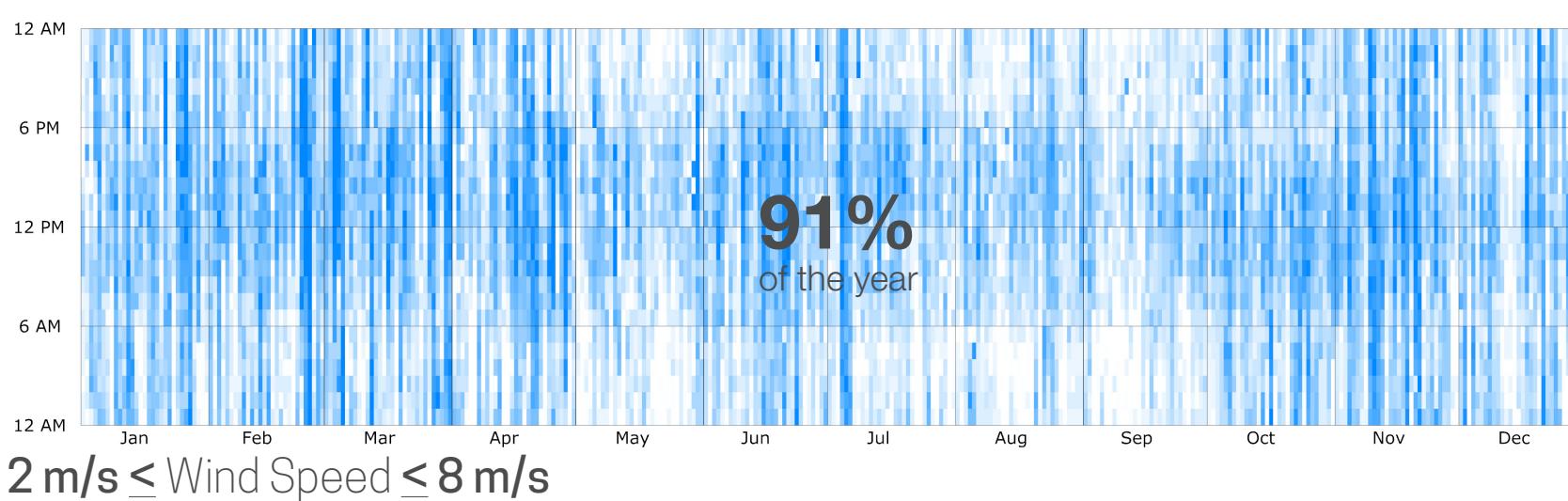
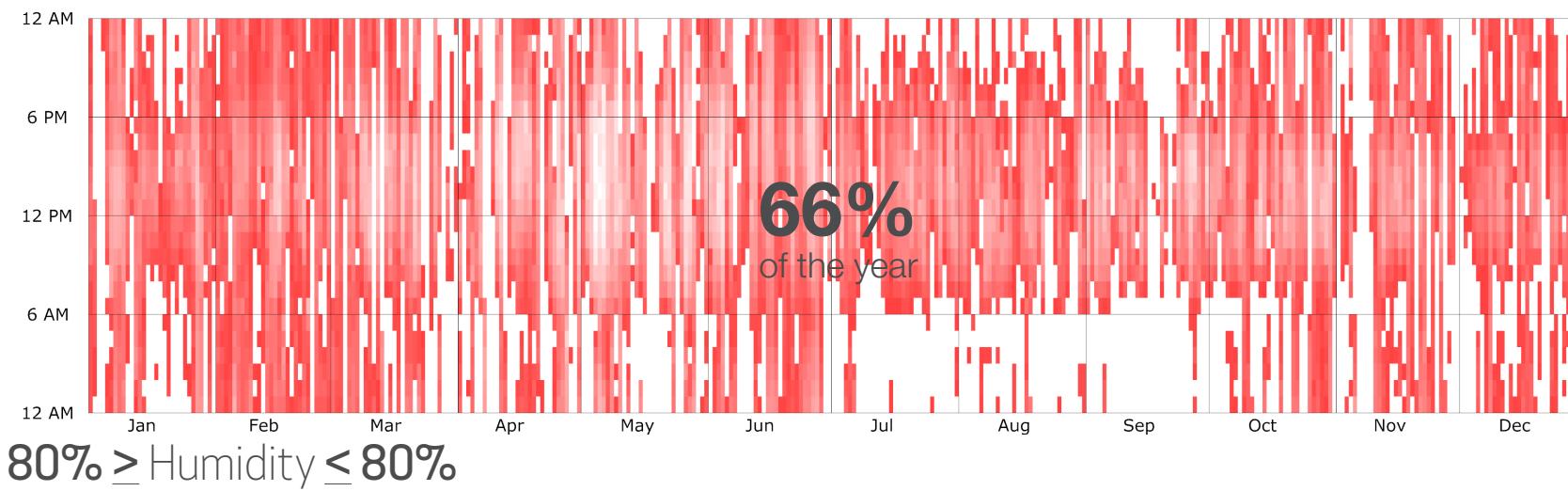
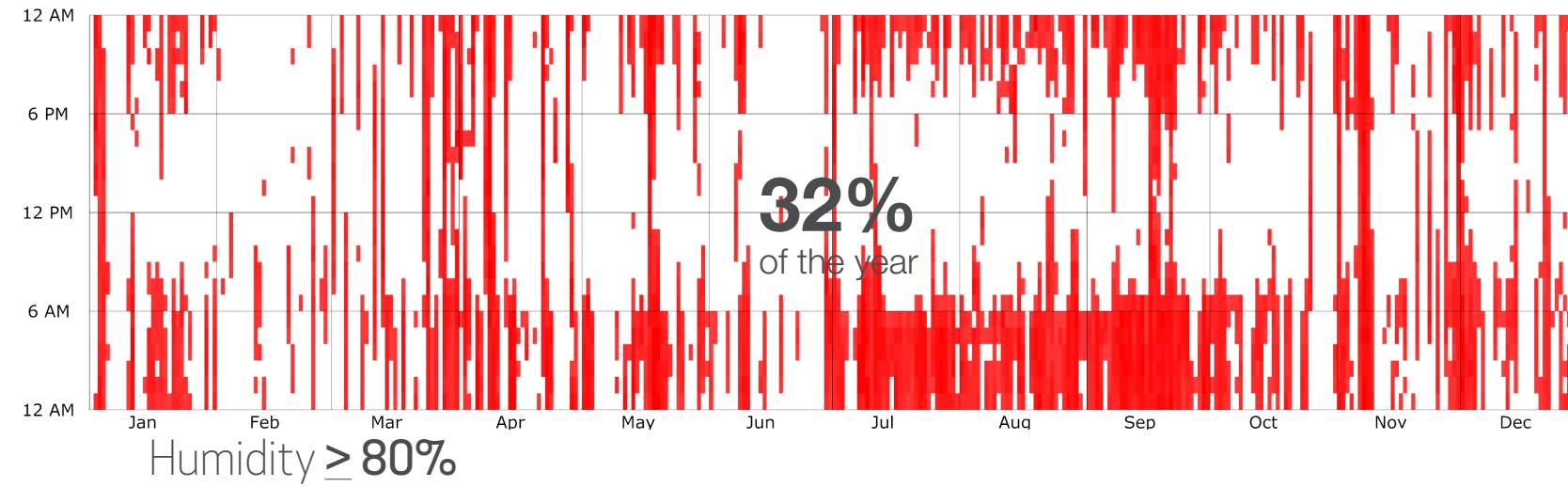


legend

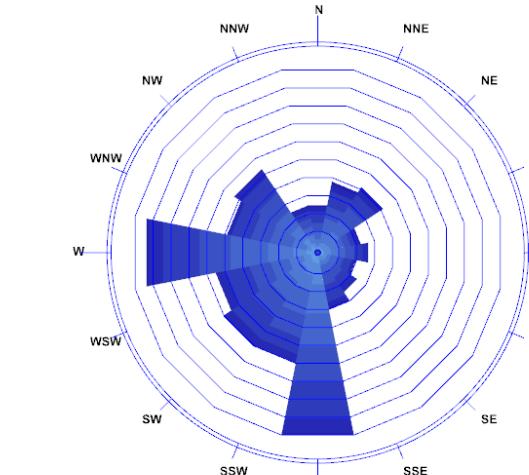
- public school
- library
- metra station
- metra line
- safe passage
- CTA route
- coffee shop
- bookstore
- bike route
- pedestrian walkway

OUTDOOR THERMAL COMFORT**UNSHADED****32.19%**
COMFORTABLE**8.65%**
HOT**41.53%**
COLD**SHADED****35.68%**
COMFORTABLE**1.52%**
HOT**45.10%**
COLD

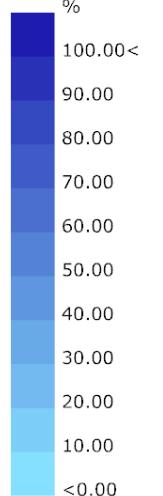
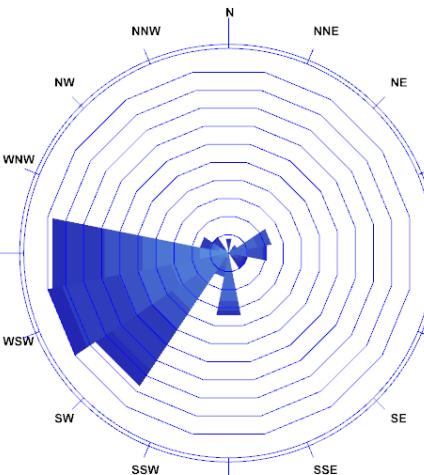
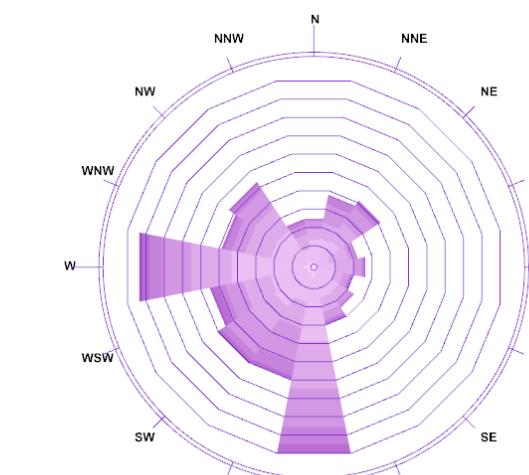
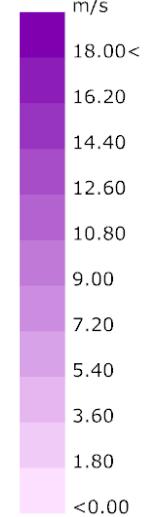
FACTORS DETERMINING COMFORT



ANNUAL



HOTTEST WEEK

Wind Direction \vee HumidityWind Direction \vee Wind Speed

IDEAL CONDITION FOR VENTILATION

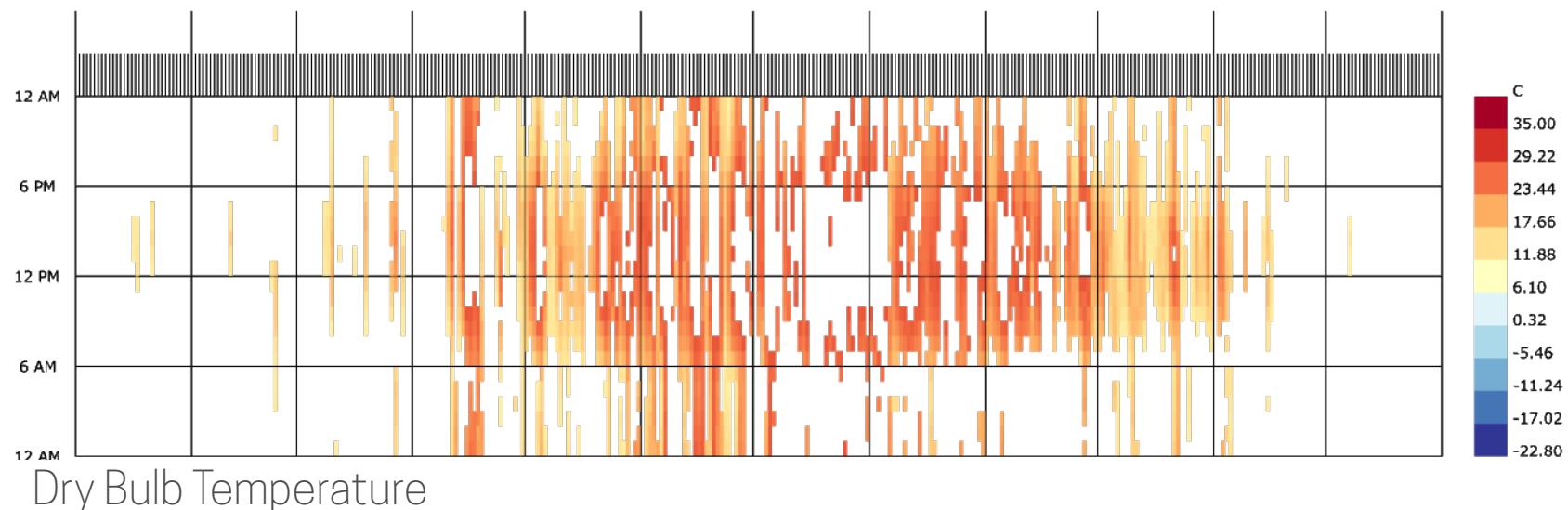
is indicated by the following parameters:

Outdoor Temperature: 9°C (42.8°F) $> T_o > 26^{\circ}\text{C}$ (78.8°F)

Indoor Temperature: $T_i \geq 24^{\circ}\text{C}$ (75.2°F)

Humidity: $20\% > H > 80\%$

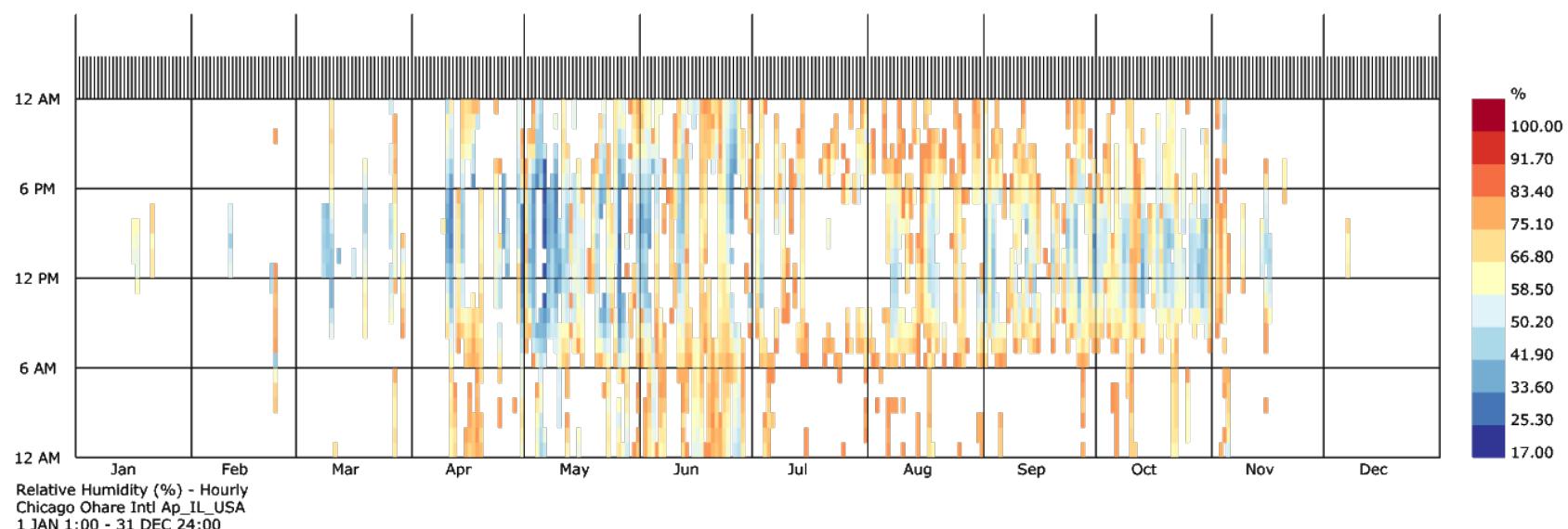
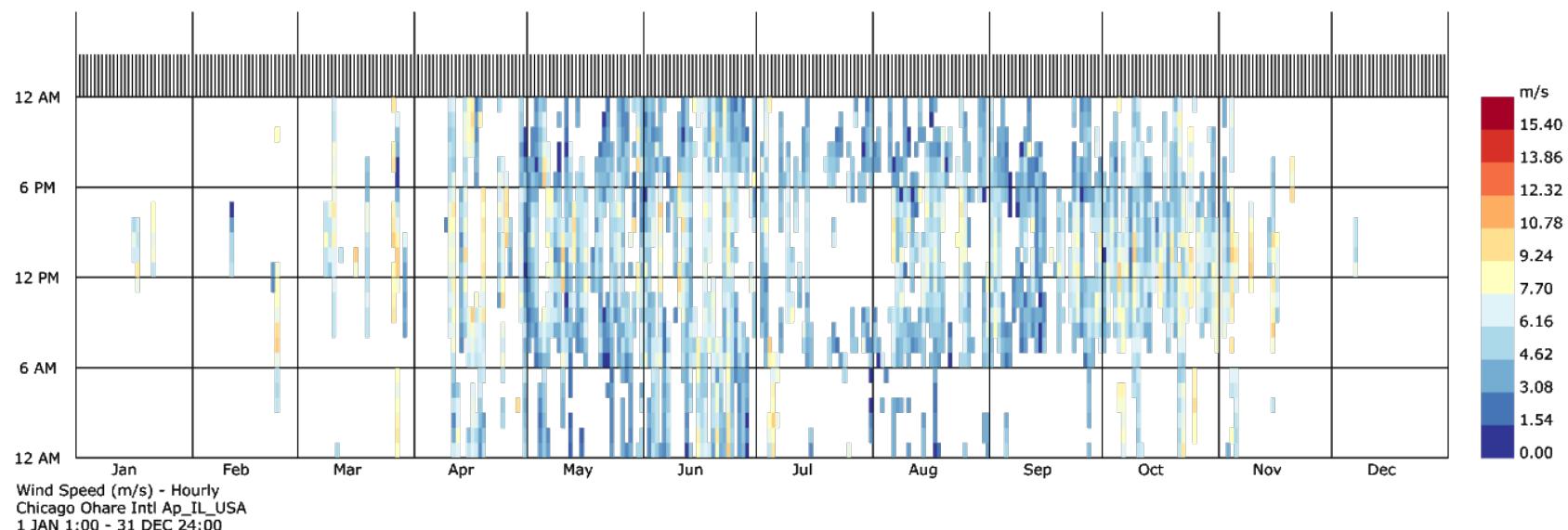
Wind Speed: $2 \text{ m/s} < \text{Wind Speed} < 8 \text{ m/s}$



27.5%

of the year

Ideal for Natural Ventilation



FACTORS

Chicago experiences **primarily long winters and short summers**, with short shoulder seasons. Approximately **2/3 of the year is considered too cold for comfort**. Even deep in the seasons, **sporadic weather changes happen on an hourly and daily basis**.

PRIORITIES & GOALS

Our aim is to **maximize thermal comfort in the winter time and cross-checking with summer parameters to prevent overheating**. We also want to **maximize hours of natural daylight throughout the year**.

DESIGN & TEST

MASS

- **Increase solar gain (exposure) by increasing south-facing surface area**

MATERIAL & CONSTRUCTION

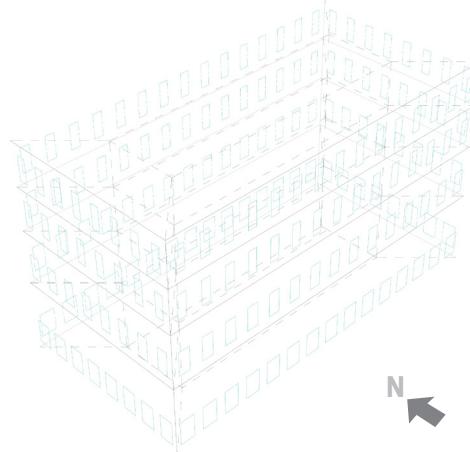
- **Increase insulation (R-value)**
- **Increase solar gain (exposure) by increasing WWR on the south and west**
- **Reduce infiltration (increase air tightness)**
- **Reduce thermal loss**

Climate to Building
SHOE-BOX STUDY TO INCREASE R-VALUE

[Fixed Parameters]

0.4 WWR

50' X 100' SHOE-BOX



[Tested Parameters]

ASHRAE 90.1-2010 **CZ 5**

R-VALUE (SI / IP)

Ext. Wall 1.81 / 10.26

Ext. Window 0.32 / 1.82

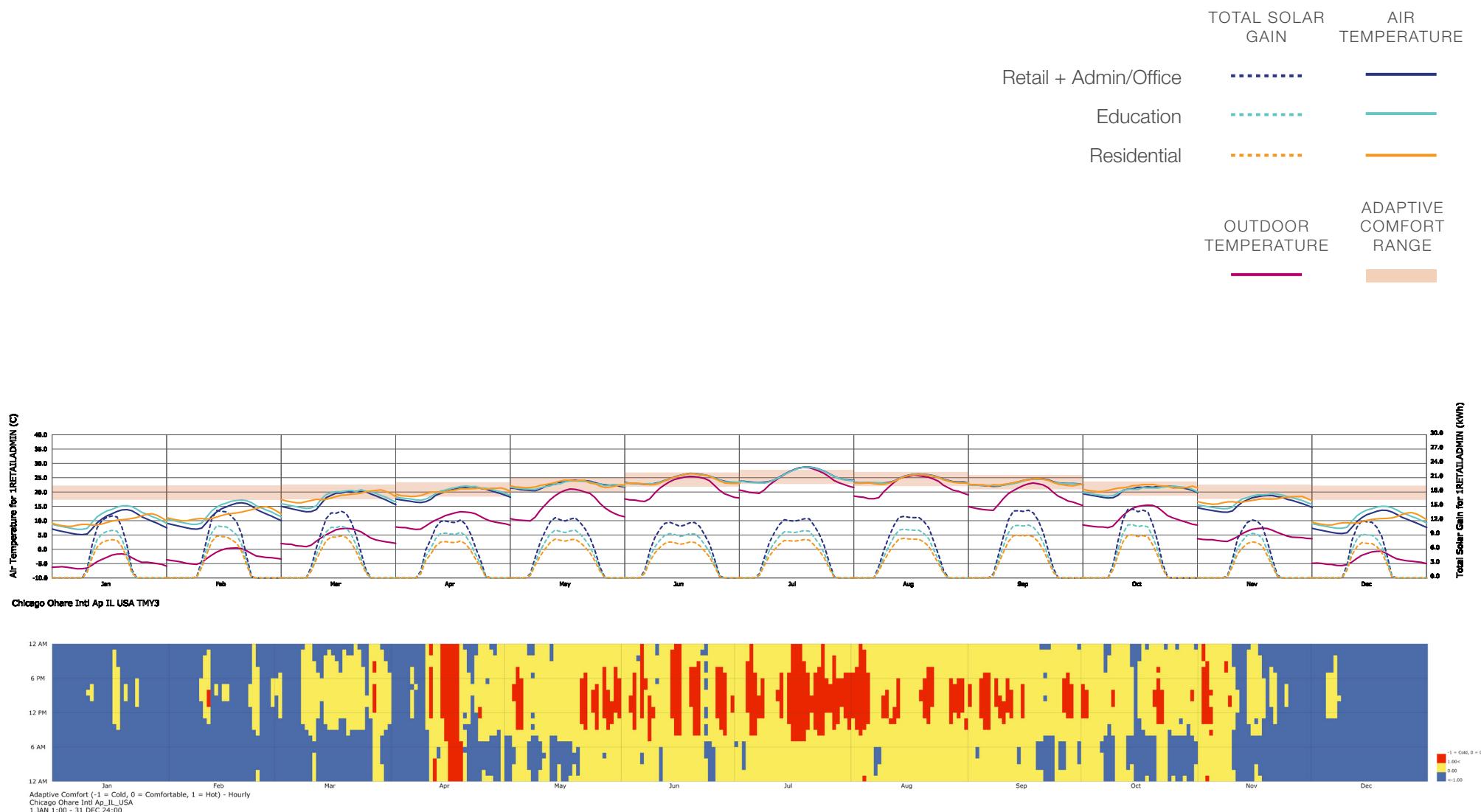
Ext. Roof 3.53 / 20.05

Attic Floor 6.33 / 35.97

53.07%
COMFORTABLE

9.40%
HOT

37.53%
COLD



ASHRAE 90.1-2010 **CZ 8**

R-VALUE (SI / IP)

Ext. Wall 4.74 / 26.93

Ext. Window 0.50 / 2.86

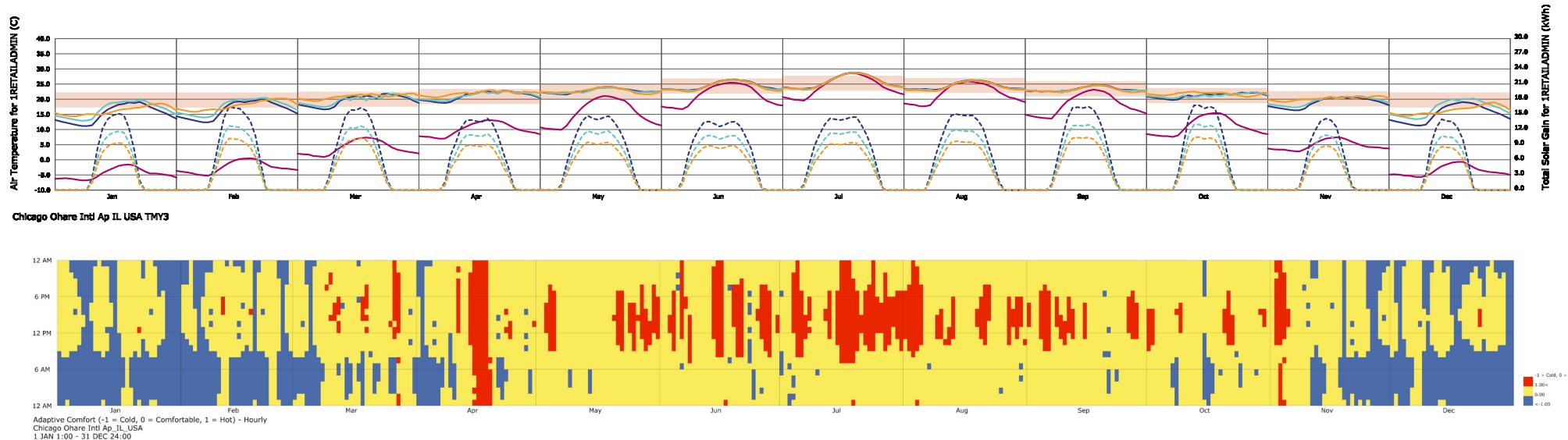
Ext. Roof 4.89 / 27.79

Attic Floor 6.33 / 35.97

68.90%
COMFORTABLE

11.68%
HOT

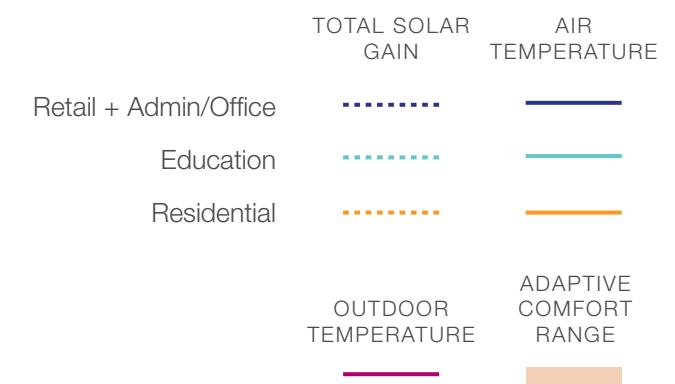
19.41%
COLD



Climate to Building
SHOE-BOX STUDY TO INCREASE R-VALUE

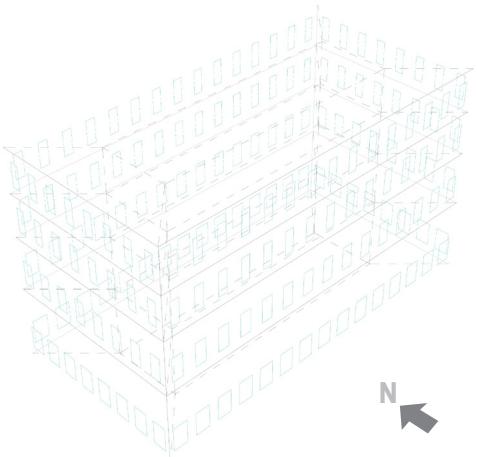
[Fixed Parameters]

50' X 100' SHOE-BOX
ASHRAE 90.1-2010 CZ 8 CONSTRUCTION

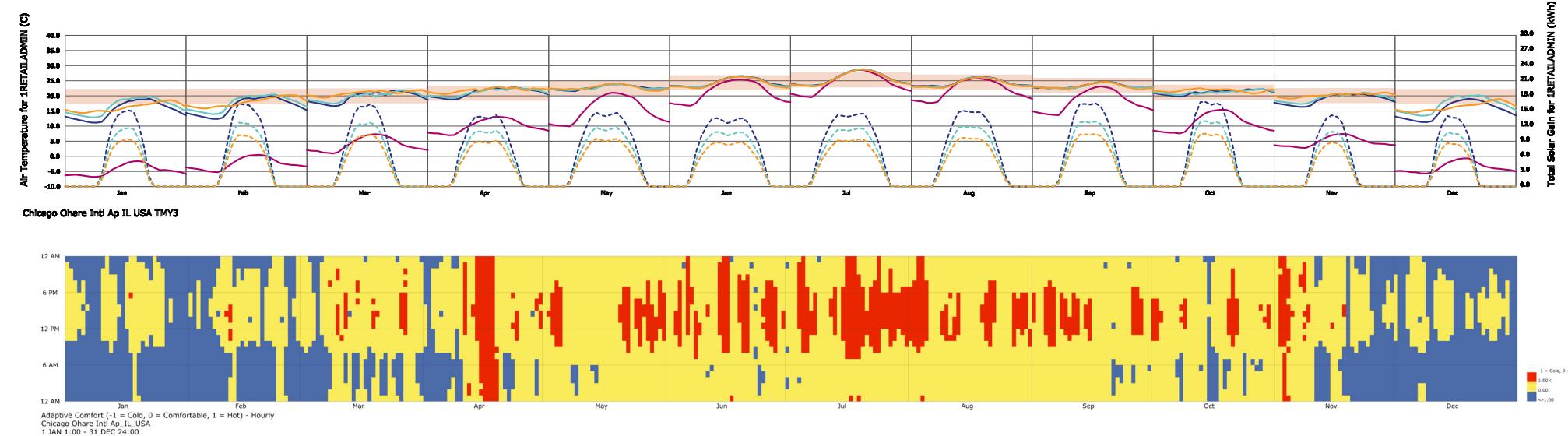


[Tested Parameters]

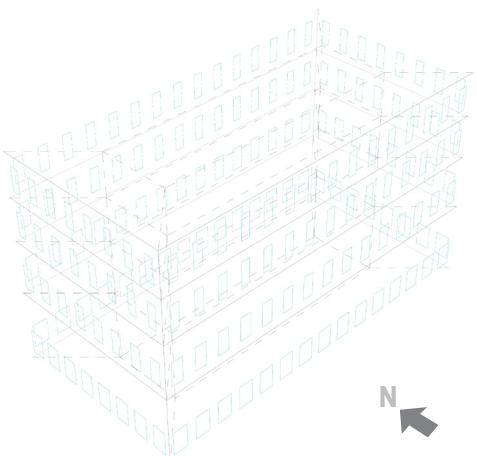
0.4 WWR 50' X 100' SHOE-BOX



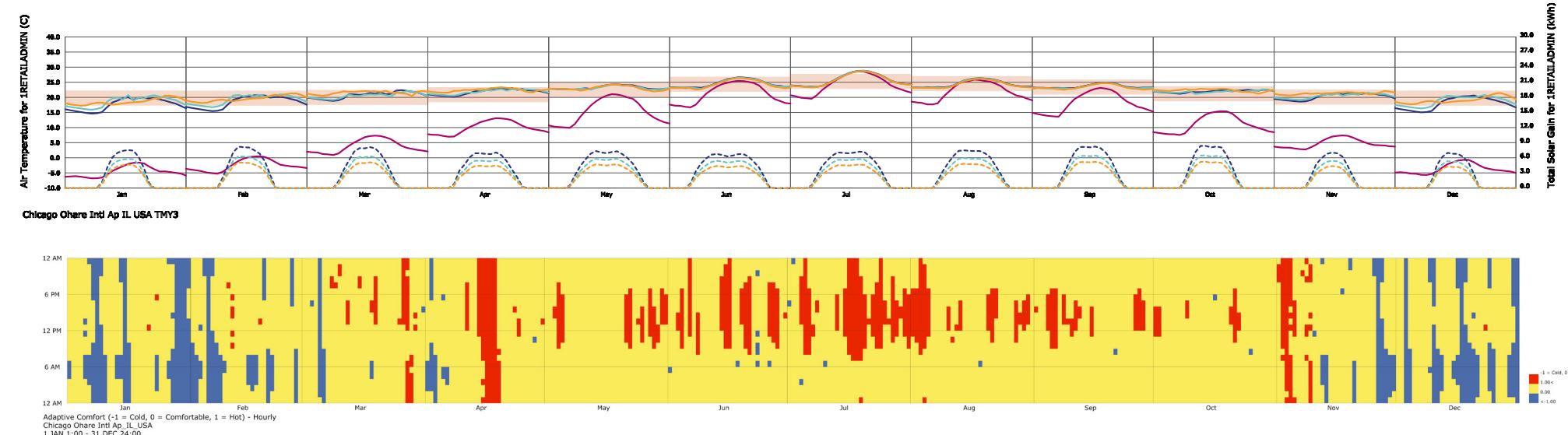
68.90%
COMFORTABLE
11.68%
HOT
19.41%
COLD



0.2 WWR 50' X 100' SHOE-BOX



79.70%
COMFORTABLE
10.94%
HOT
9.36%
COLD



Climate to Building
SHOE-BOX STUDY

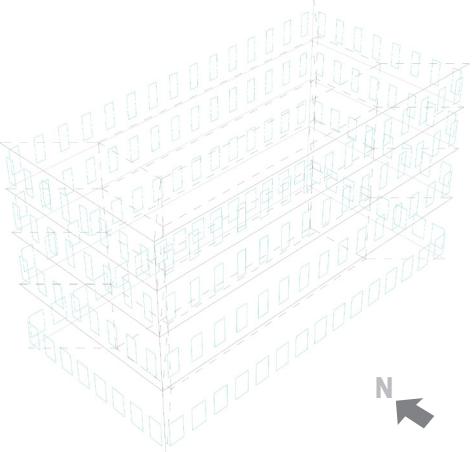
[Fixed Parameters]

**50' X 100' SHOE-BOX
ASHRAE 90.1-2010 CZ 8 CONSTRUCTION**

[Tested Parameters]

TO REDUCE THERMAL LOSS AND INCREASE SOLAR GAIN

0.2 WWR N & E | 0.4 WWR S & W



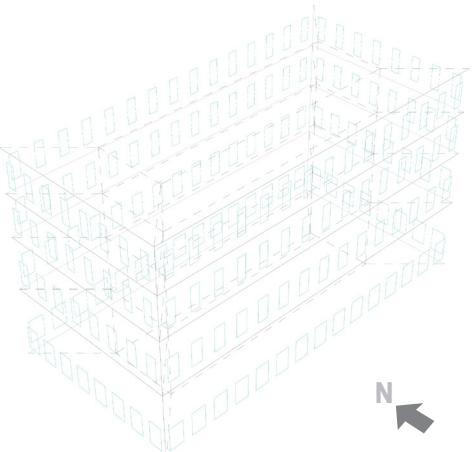
75.20%
COMFORTABLE

12.16%
HOT

12.64%
COLD

FOR ARCHITECTURAL EXPRESSION

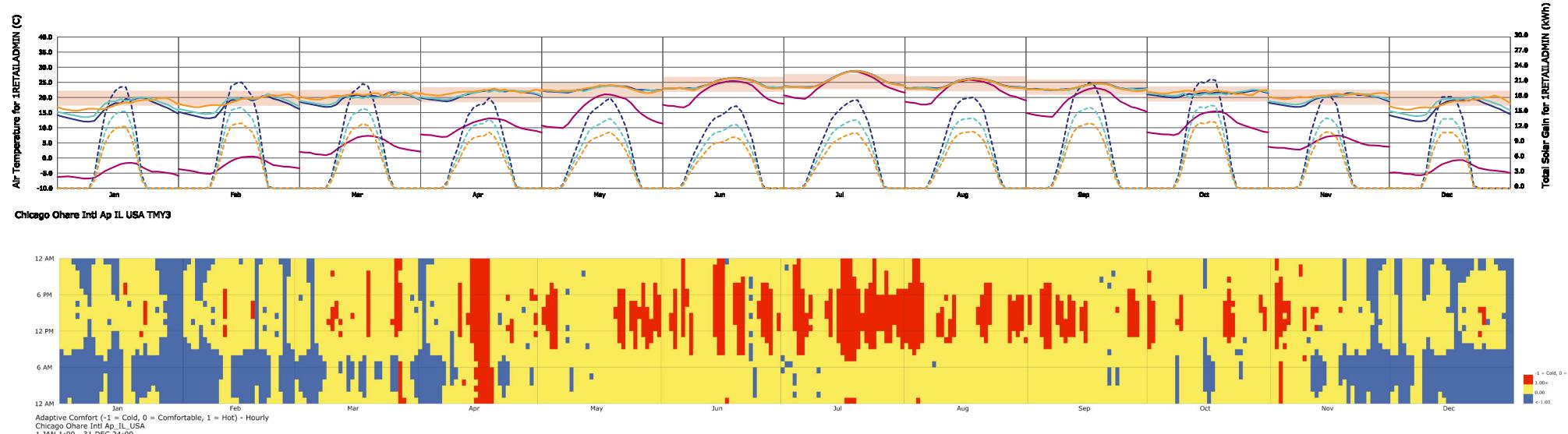
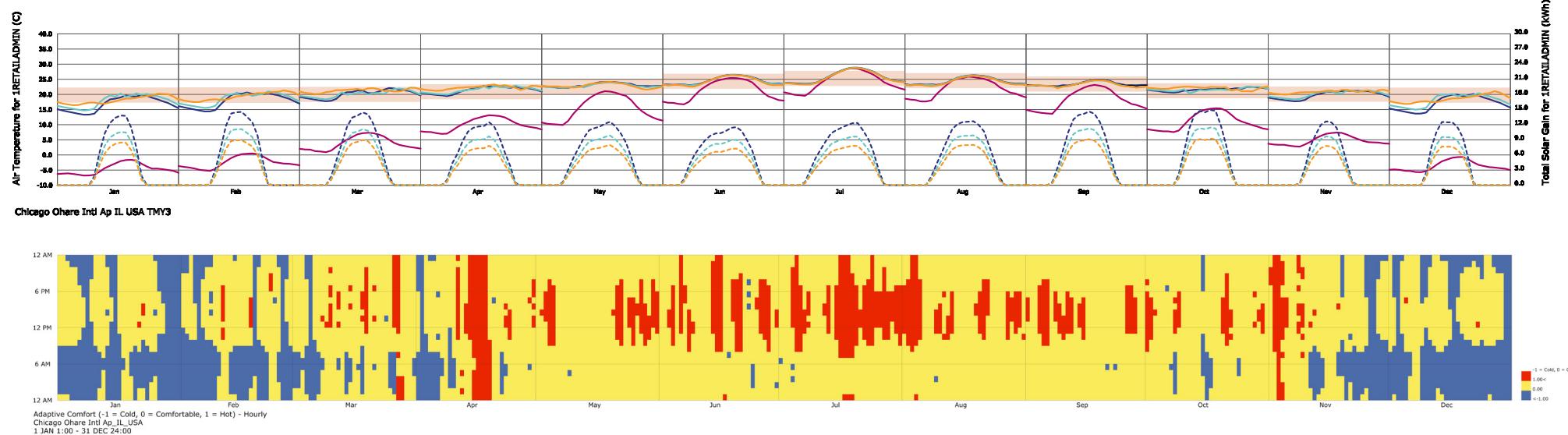
0.2 WWR N & E | 0.6 WWR S & W

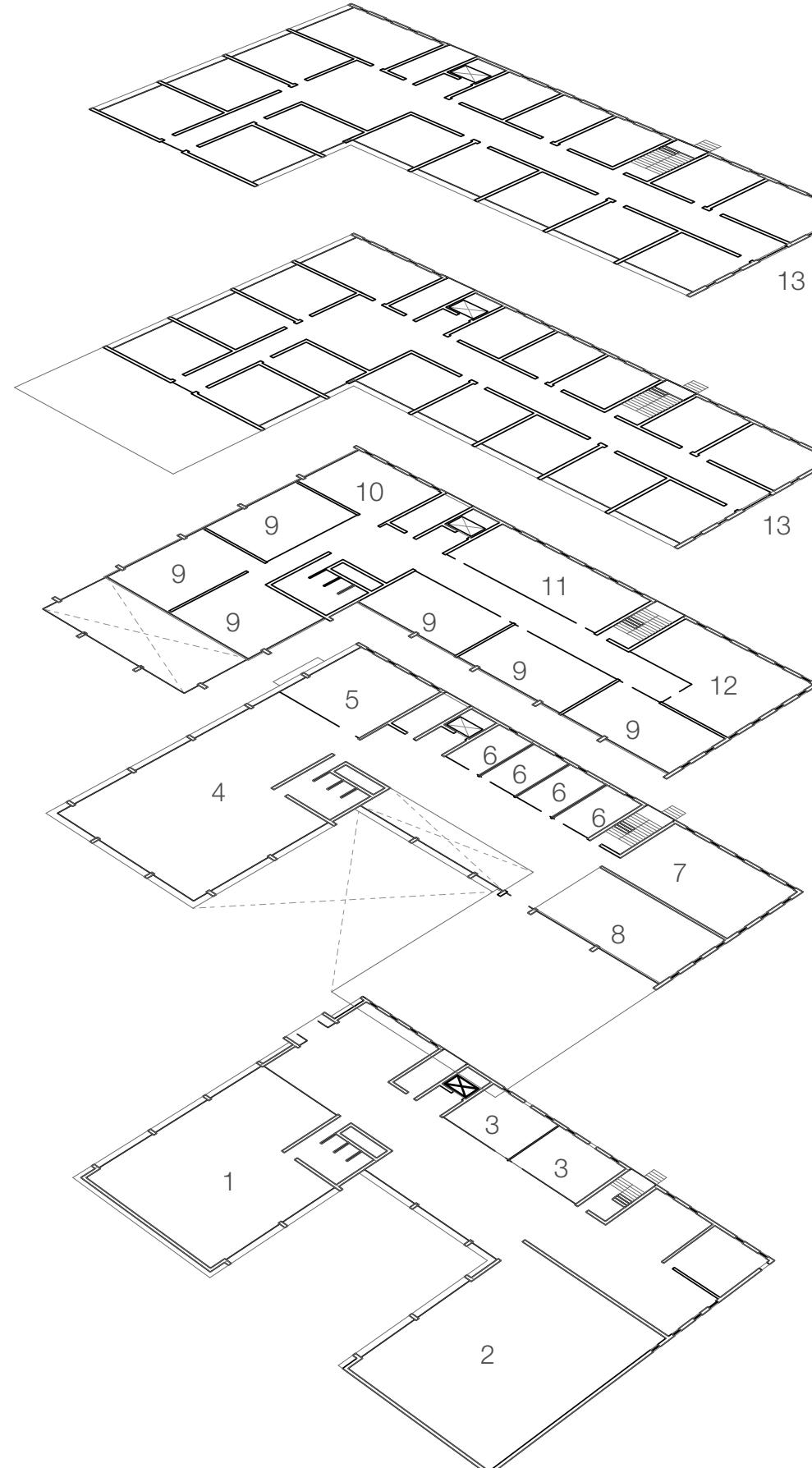
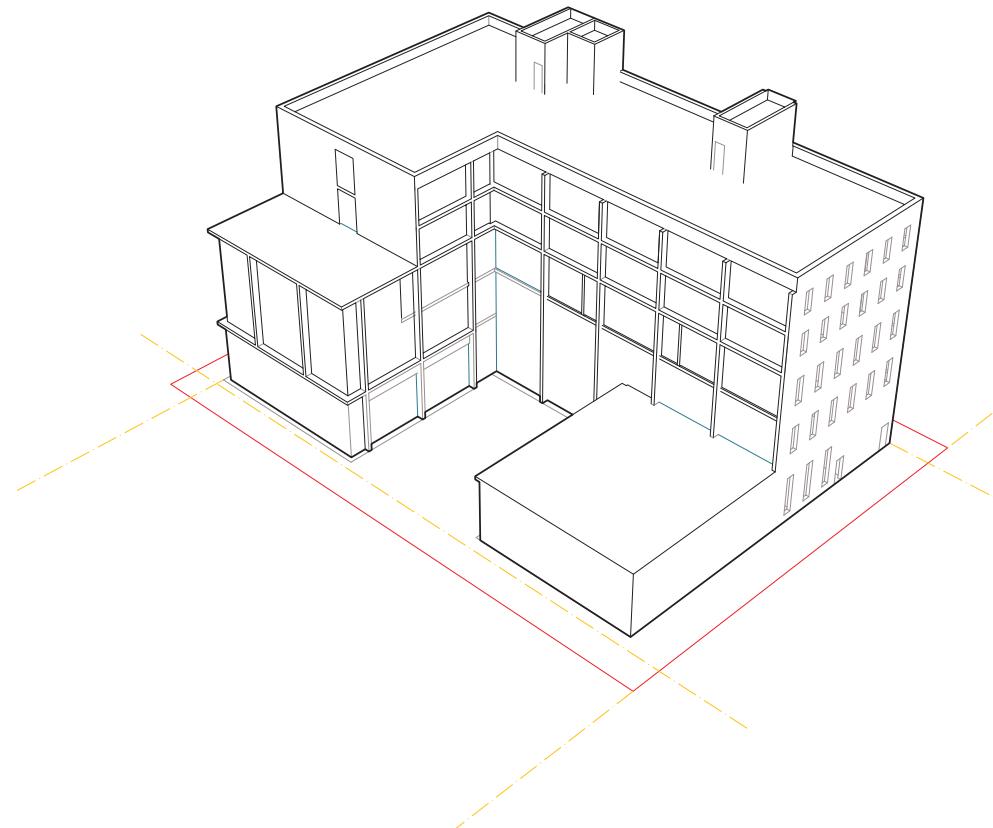


71.32%
COMFORTABLE

12.82%
HOT

15.86%
COLD

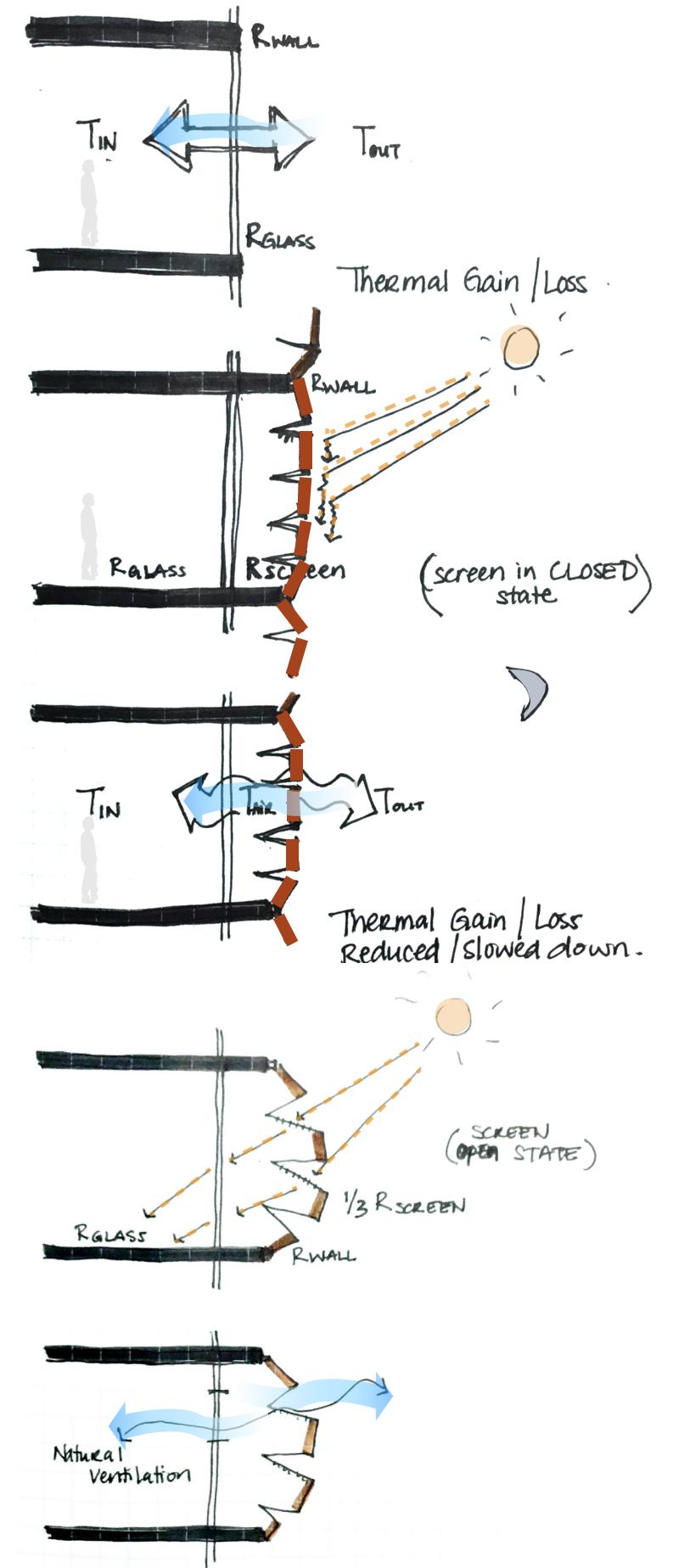
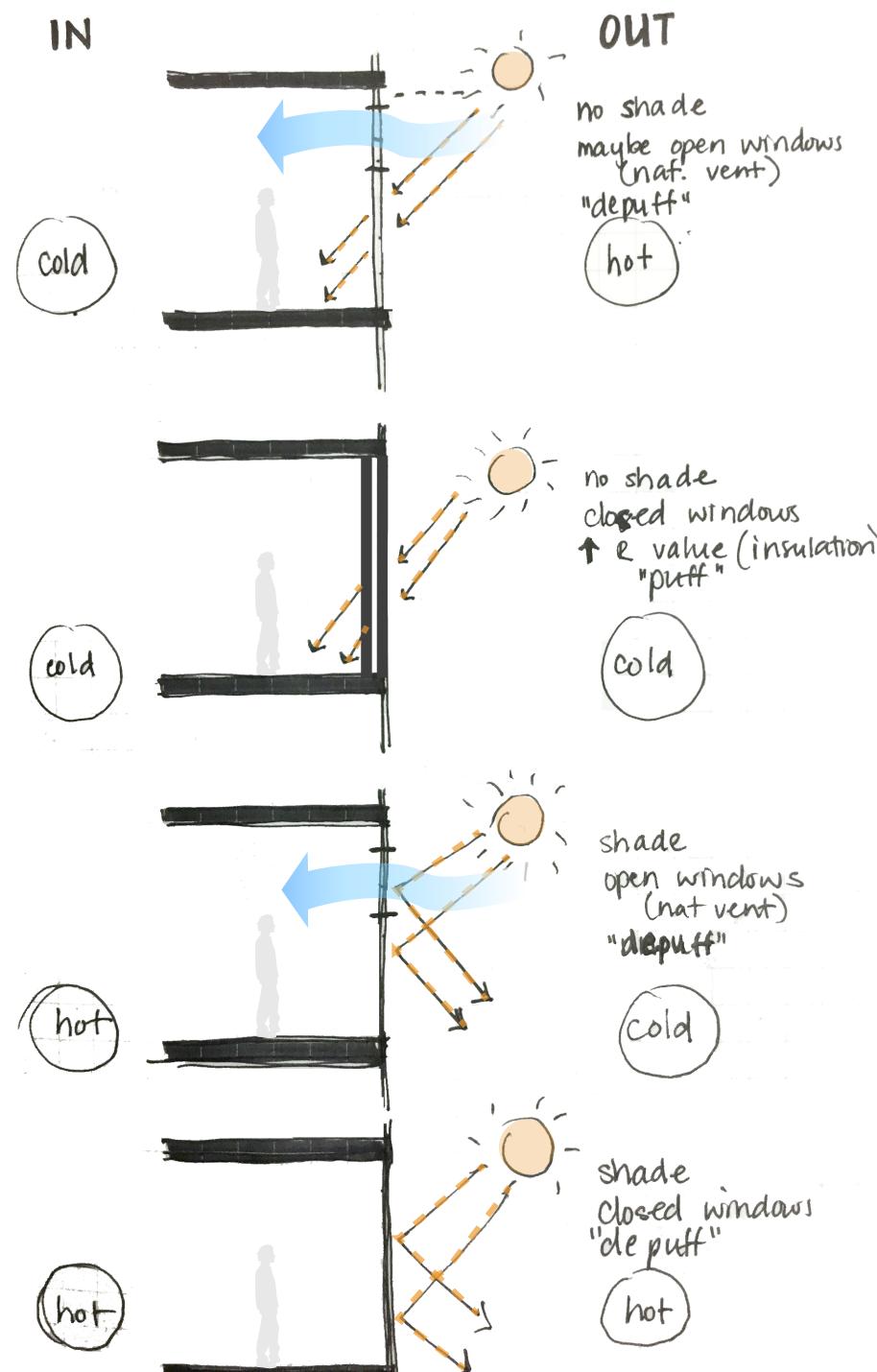
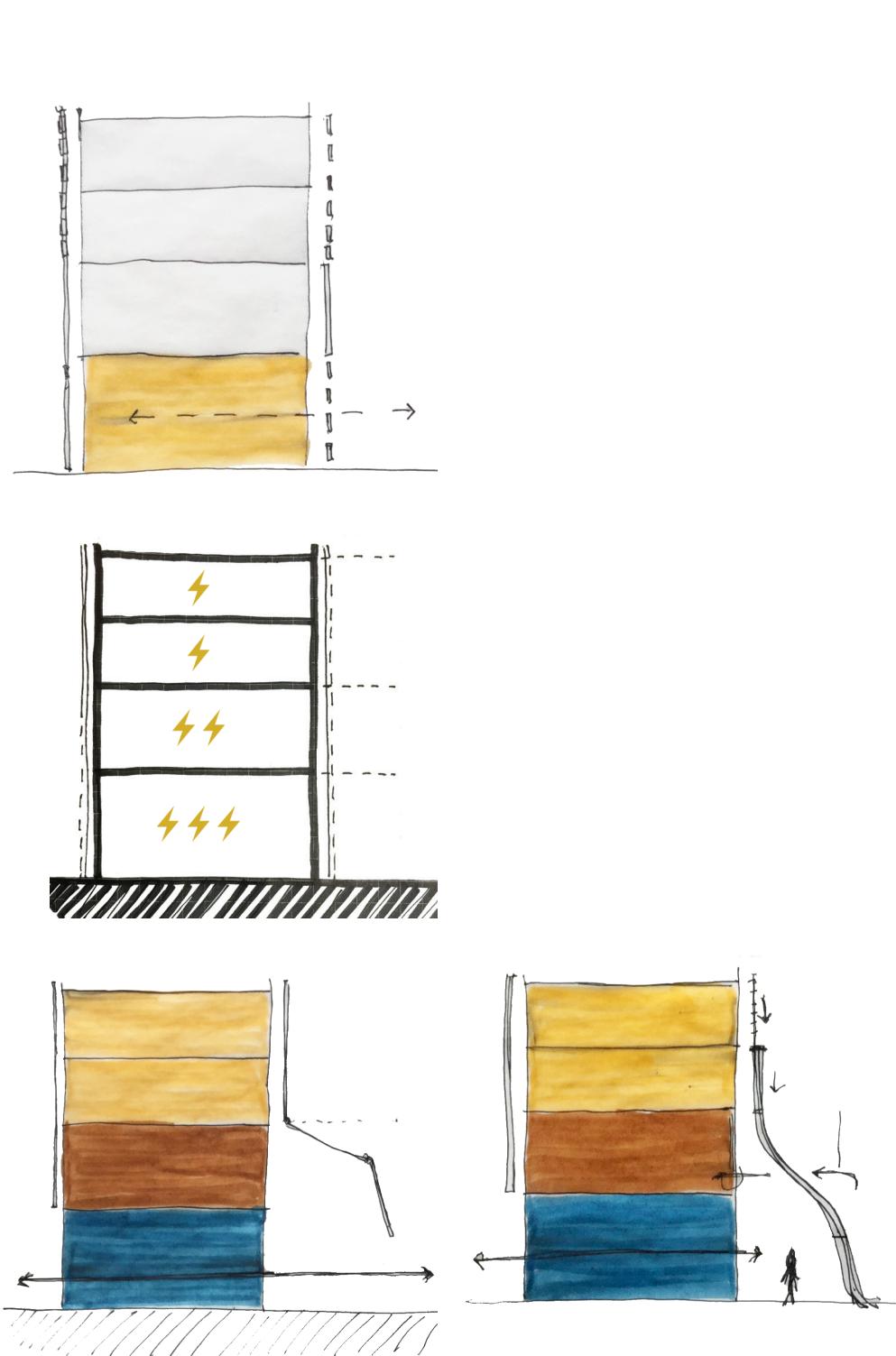




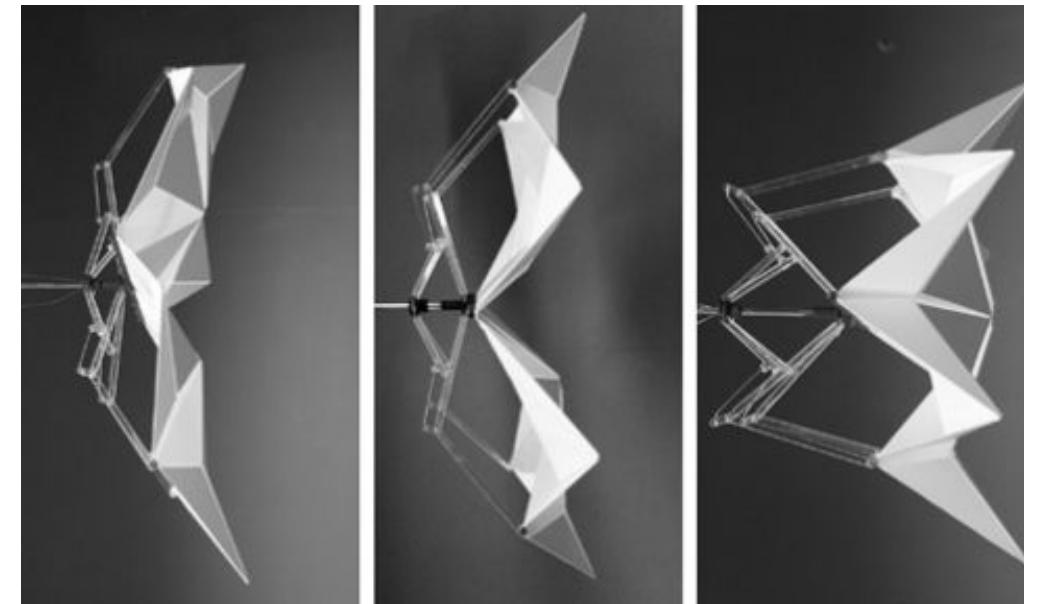
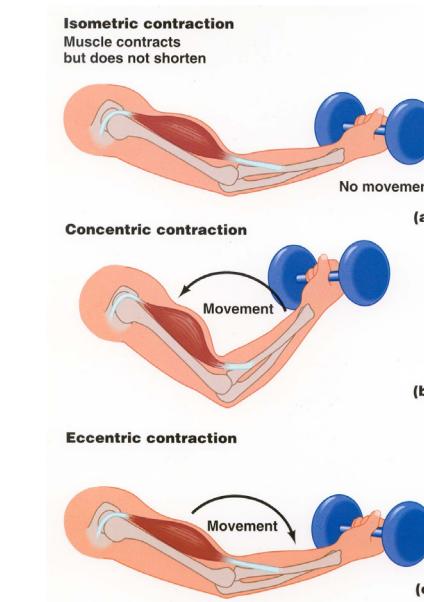
- [1] CAFE
- [2] AUDITORIUM
- [3] CONFERENCE ROOM
- [4] RESEARCH OFFICE
- [5] DIRECTOR OF ADMINISTRATION
- [6] LARGE OFFICE
- [7] KITCHEN // MAIL ROOM
- [8] TEAM ROOM // SMALL OFFICE
- [9] CLASSROOM
- [10] RESEARCH STAFF
- [11] CONFERENCE // WORK ROOM
- [12] RESEARCH DIRECTOR
- [13] RESIDENTIAL UNIT

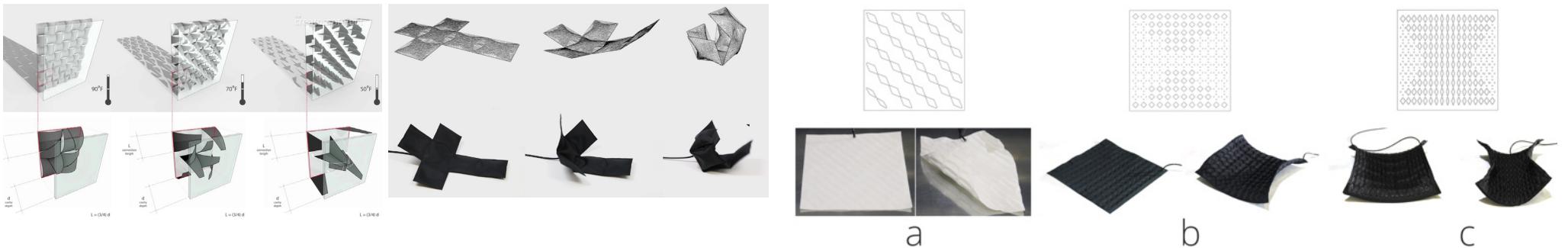
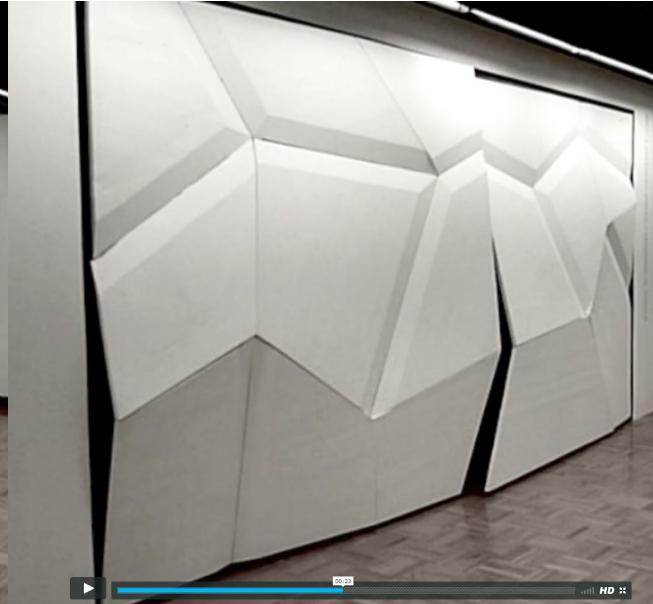
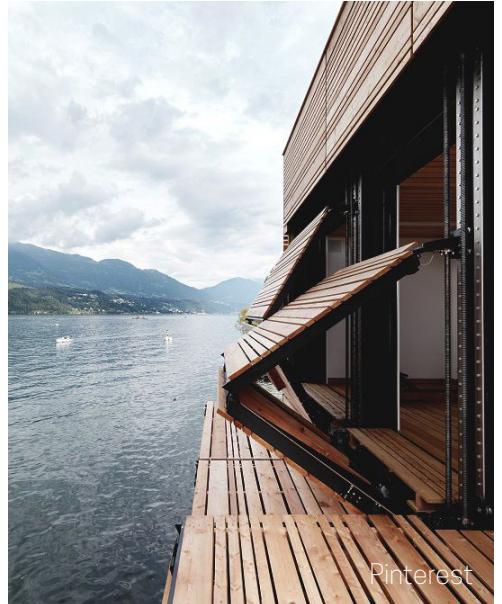
↑
N

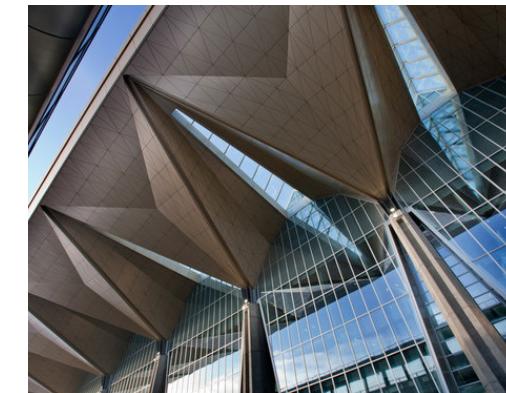
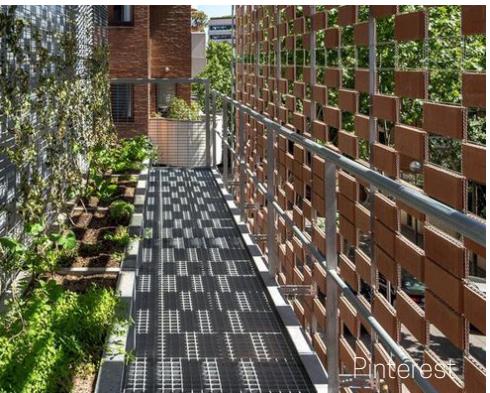
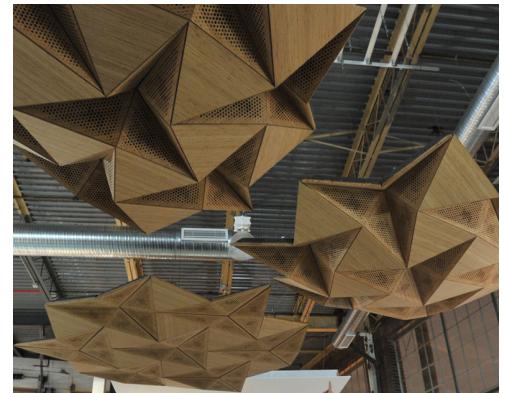
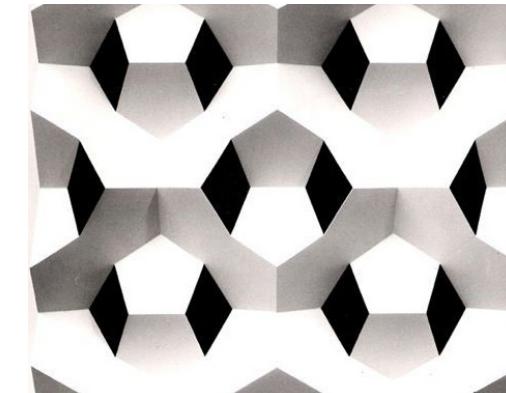
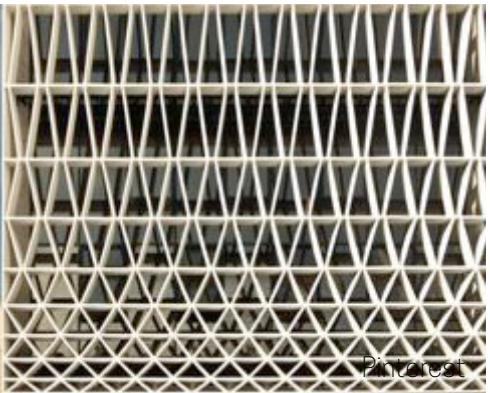
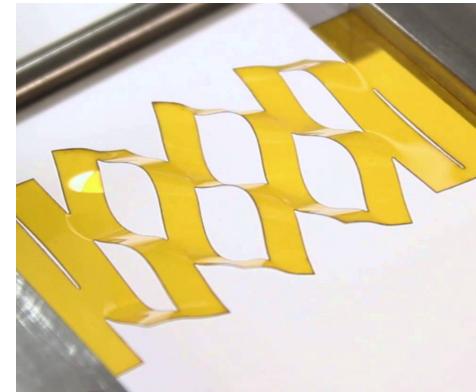
THE STATES AND PERFORMANCE OF THE EXTERNAL FACADE SYSTEM



Climate to Building
ENVELOPE BEHAVIOR INSPIRATIONS







Climate to Building
KIRIGAMI EXPLORATION

