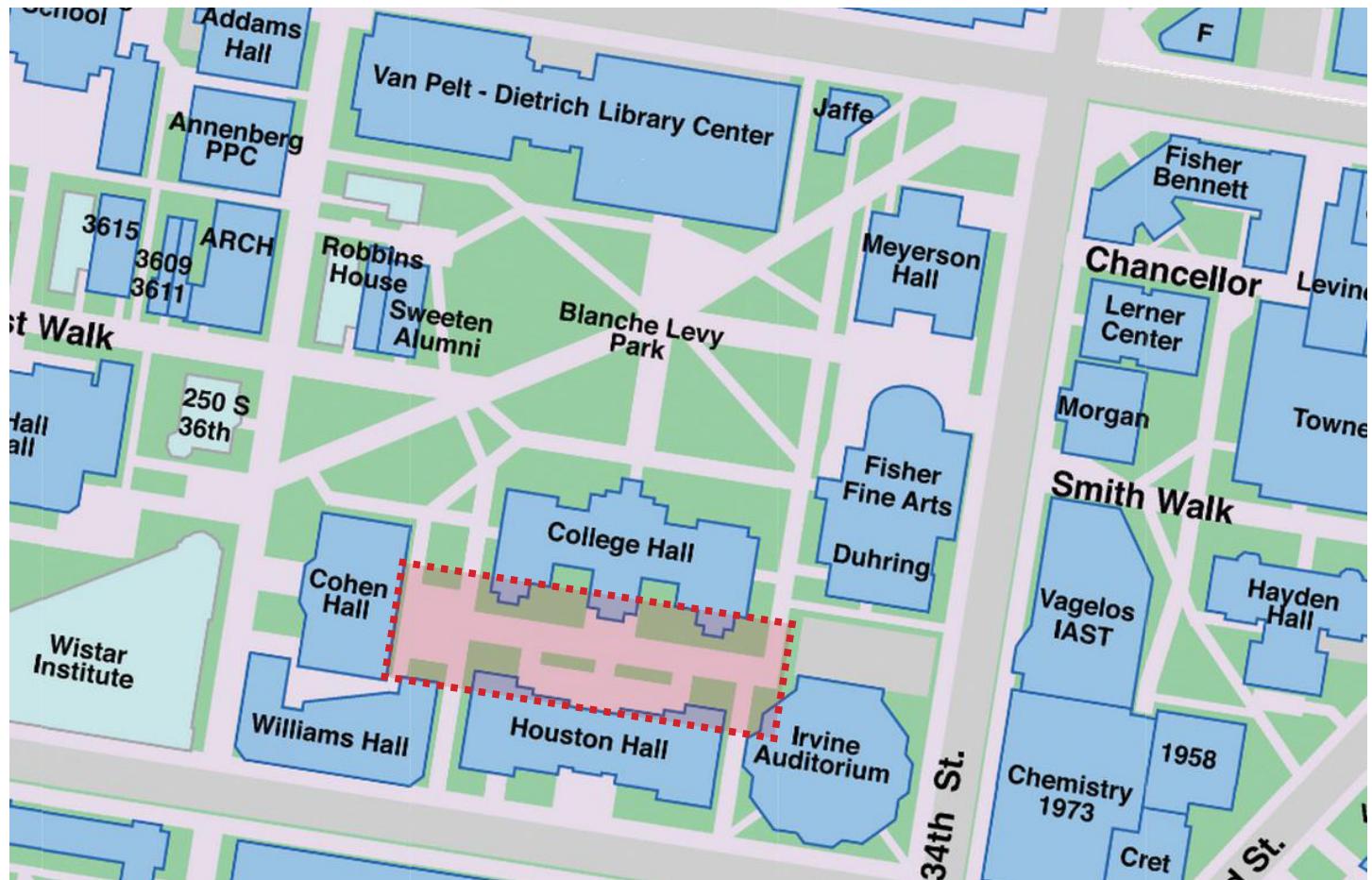


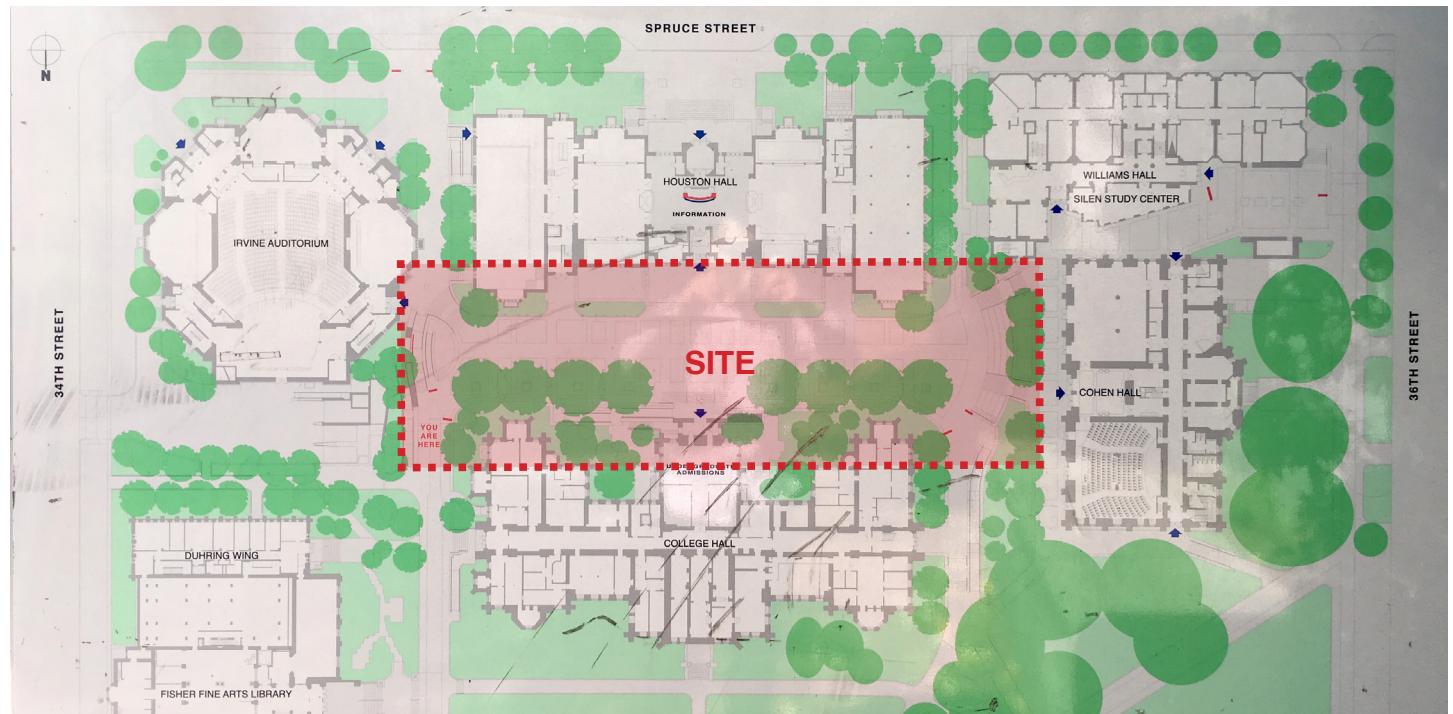
**Assignment 3:
Thermal Climate Documentation Report**

**Group 3
Shih-Kai Lin
Yefan Zhang**

Site Basic Information



Campus Map



Perelman Quadrangle Map

Location:

Area:

Documentation Date:

Documentation Times:

Weather:

Perelman Quadrangle, between College Hall & Houston Hall

20,000 m²

September 16th, 2017

10:00 12:00 14:00 16:00

Sunny

Site Photos Documentation



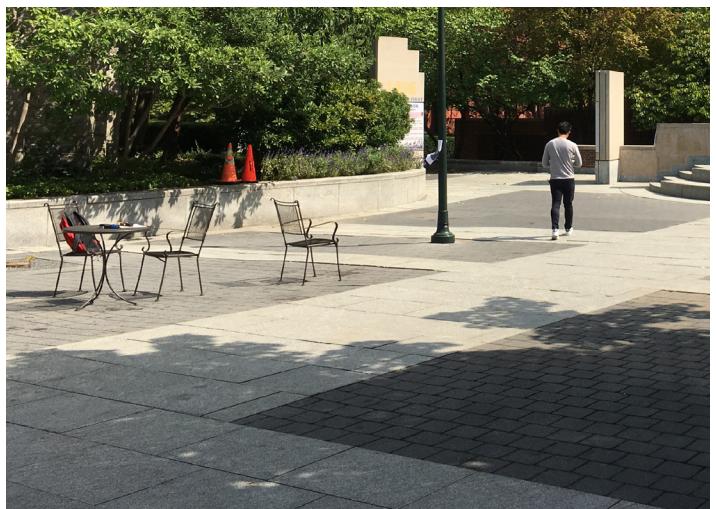
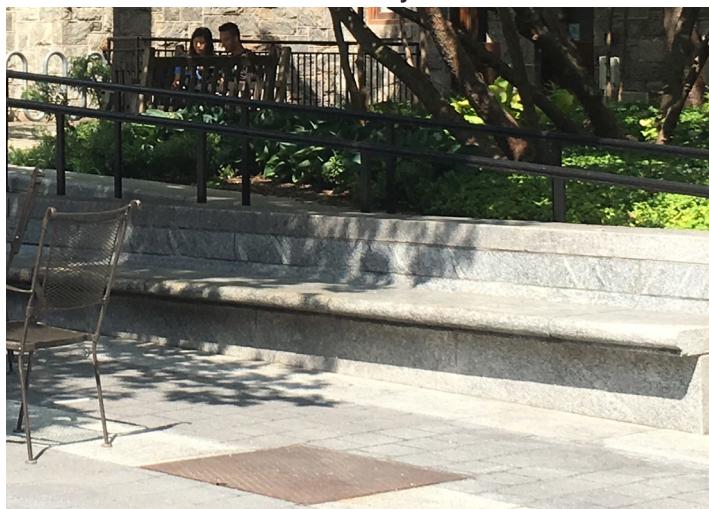
Site Condition



Iron / Masonry Seats



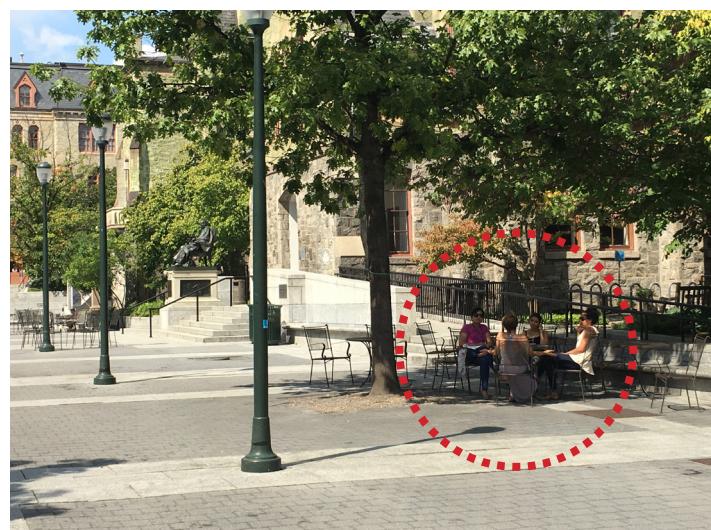
Ground in Sun / Shadow



Time 1: 10:00

	Data from Site	Data from Weather Station
Dry Bulb Air Temperature:	25.8°C	25°C
Wind Speed / Direction:	1.0 m/s (AVG)	0.9 m/s ENE
Feel Like Temperature:		25°C
Relative Humidity:	62.5%	74%
Surface Temperature:		
(Iron Seats)	37.0°C	
(Masonry Seats)	30.5°C	
(Ground in Sun)	29.2°C	
(Ground in Shadow)	24.5°C	
Comfort Condition:	Comfortable	

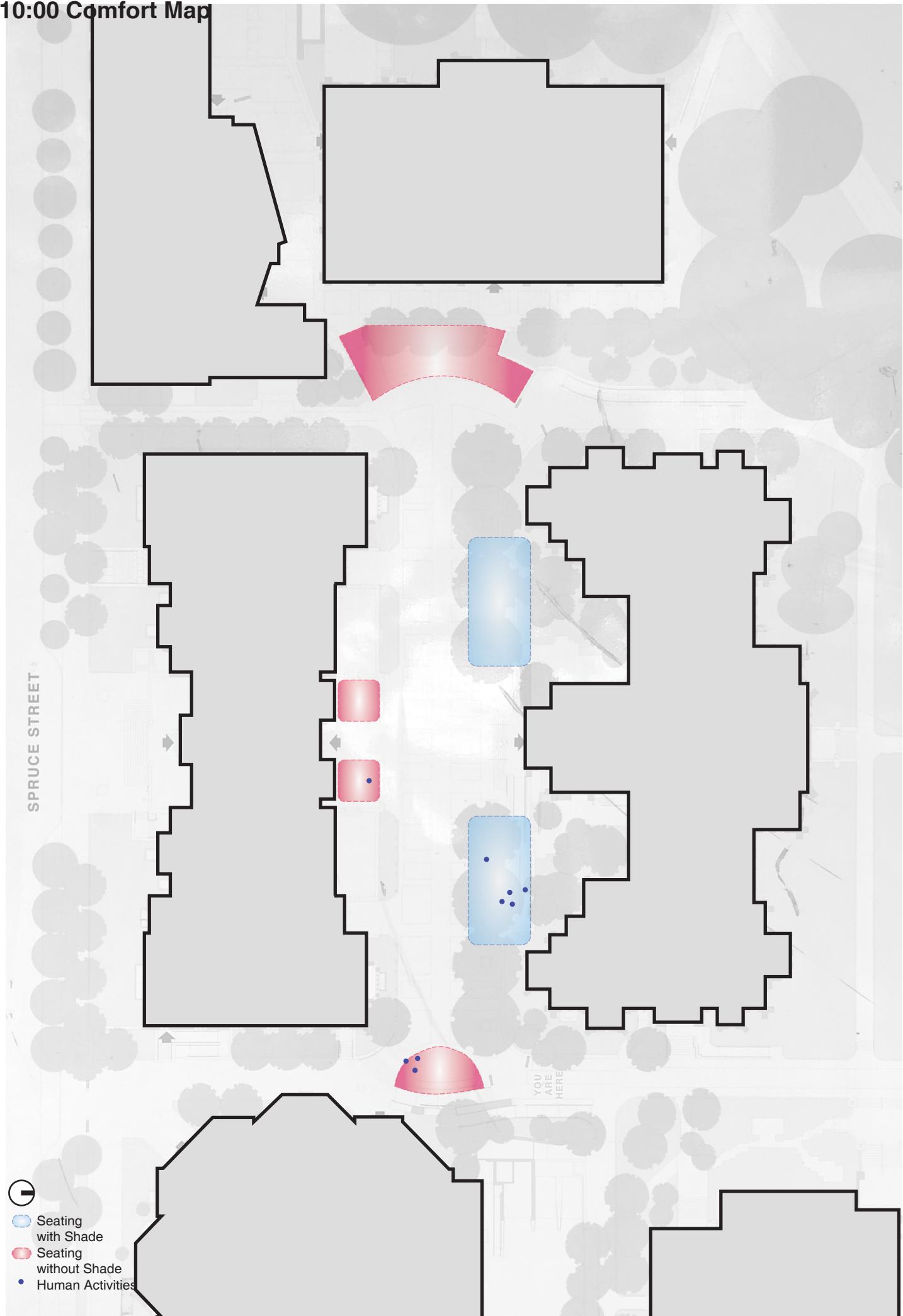
Behavior Photos



Analysis

The temperature is about 25°C at 10:00 am in the morning, which is very comfortable without too much direct sunlight. The two different kinds of seating, iron seats and masonry seats, are also in a comfortable temperature. Therefore, people sat very randomly, but it seems that they prefer to talk with each other under the sunshine. Perhaps because it is Sunday morning time for people to enjoy their relaxing weekend.

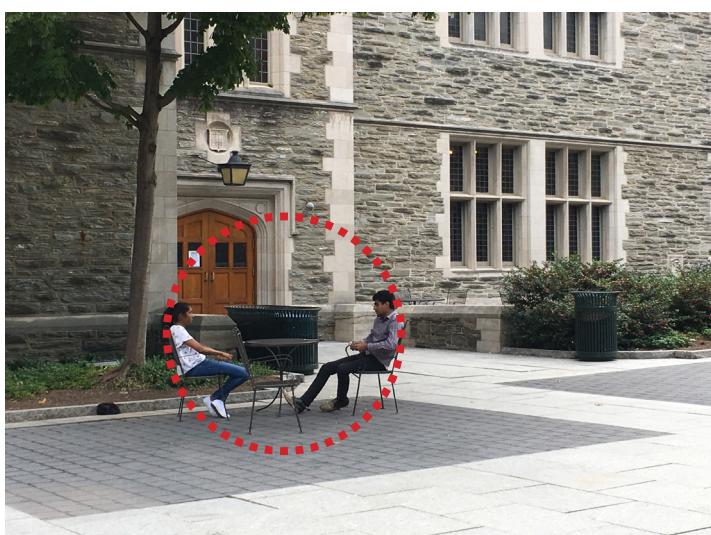
10:00 Comfort Map



Time 2: 12:00

	Data from Site	Data from Weather Station
Dry Bulb Air Temperature:	27.1°C	28°C
Wind Speed / Direction:	0.8 m/s (AVG)	0.9 m/s ESE
Feel Like Temperature:		30°C
Relative Humidity:	48%	57%
Surface Temperature:		
(Iron Seats)	43.9°C	
(Masonry Seats)	34.2°C	
(Ground in Sun)	39.5°C	
(Ground in Shadow)	28.2°C	
Comfort Condition:	Comfortable	

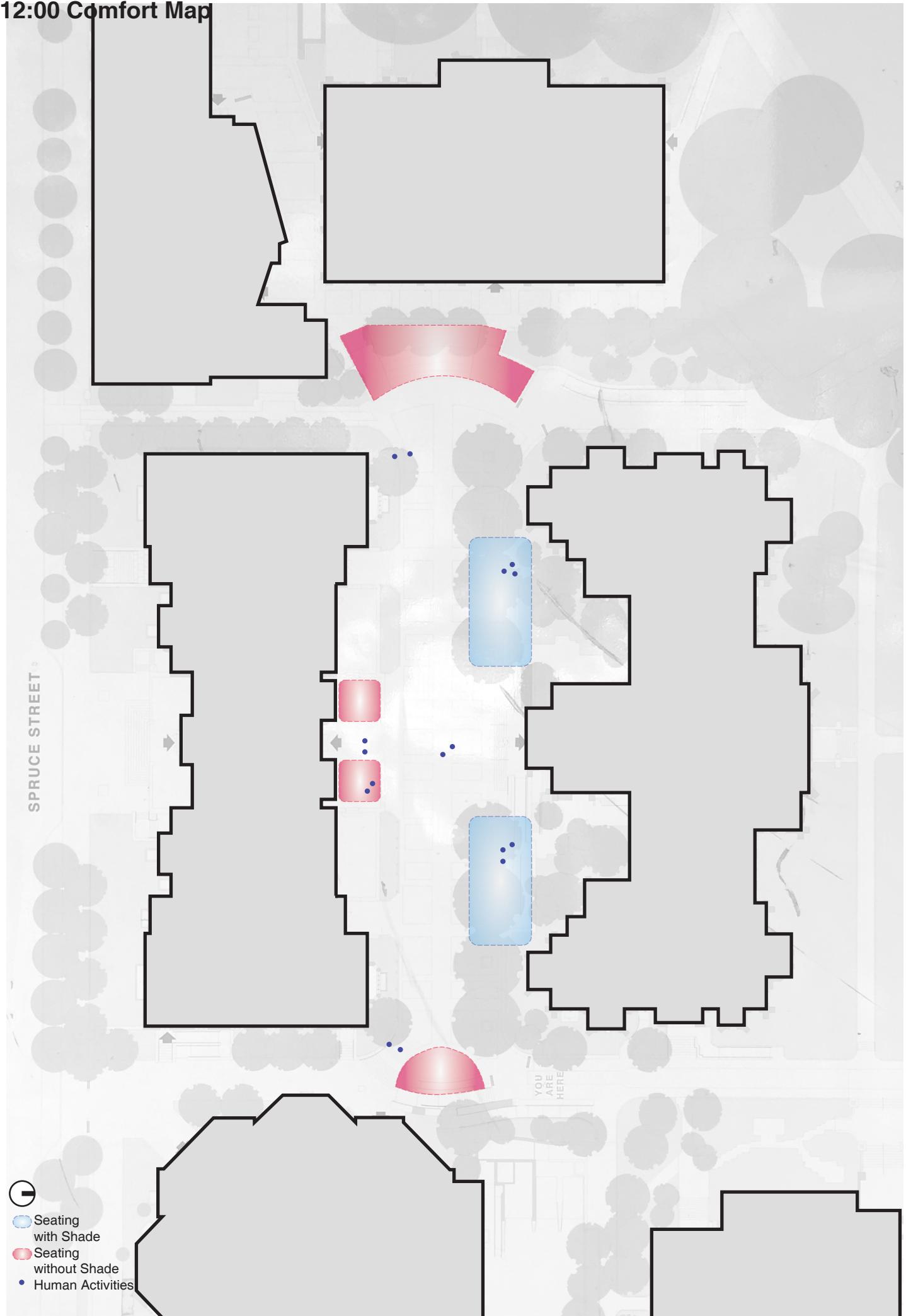
Behavior Photos



Analysis

The temperature is around 27°C according to measurement at noon, which is a little higher than the morning, but still very comfortable for people. Thus more students gathered in the area, talking, eating or studying here in outdoor spaces. Around this time, people chose to sit more randomly, in shadow or sunshine, on iron or masonry seats more according to personal preference. Either of the space or seating area are in moderate feeling temperature, which are comfortable for people.

12:00 Comfort Map



Time 3: 14:00

	Data from Site	Data from Weather Station
Dry Bulb Air Temperature:	28.7°C	30°C
Wind Speed / Direction:	0.3 m/s (AVG)	1.3 m/s SE
Feel Like Temperature:		31°C
Relative Humidity:	52.2%	49%
Surface Temperature:		
(Iron Seats)	31.2°C	
(Masonry Seats)	34.4°C	
(Ground in Sun)	- °C (Cloudy)	
(Ground in Shadow)	30.8°C	
Comfort Condition:	Hot	

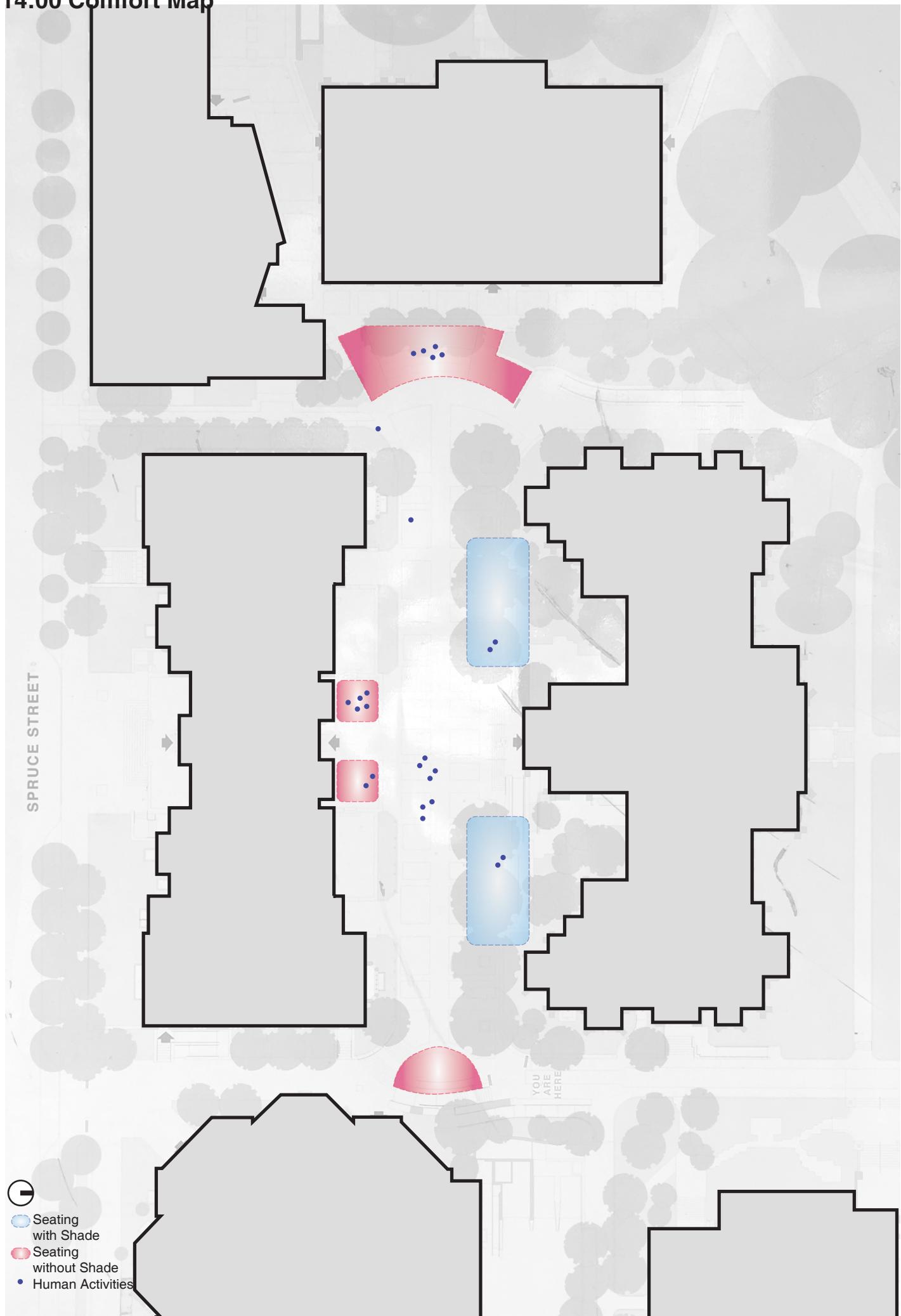
Behavior Photos



Analysis

Temperature is around 28°C at 2pm. Since it is quite hot at 2pm that day, there is not many people in the area. The feeling is hot and wind doesn't help to cool down the feeling.

14:00 Comfort Map



Time 4: 16:00

	Data from Site	Data from Weather Station
Dry Bulb Air Temperature:	30.1°C	30°C
Wind Speed / Direction:	0.3 m/s (AVG)	1.3 m/s SE
Feel Like Temperature:		31°C
Relative Humidity:	49.2%	48%
Surface Temperature:		
(Iron Seats)	31.0°C	
(Masonry Seats)	27.9°C	
(Ground in Sun)	33.5°C	
(Ground in Shadow)	27.8°C	
Comfort Condition:	Hot	

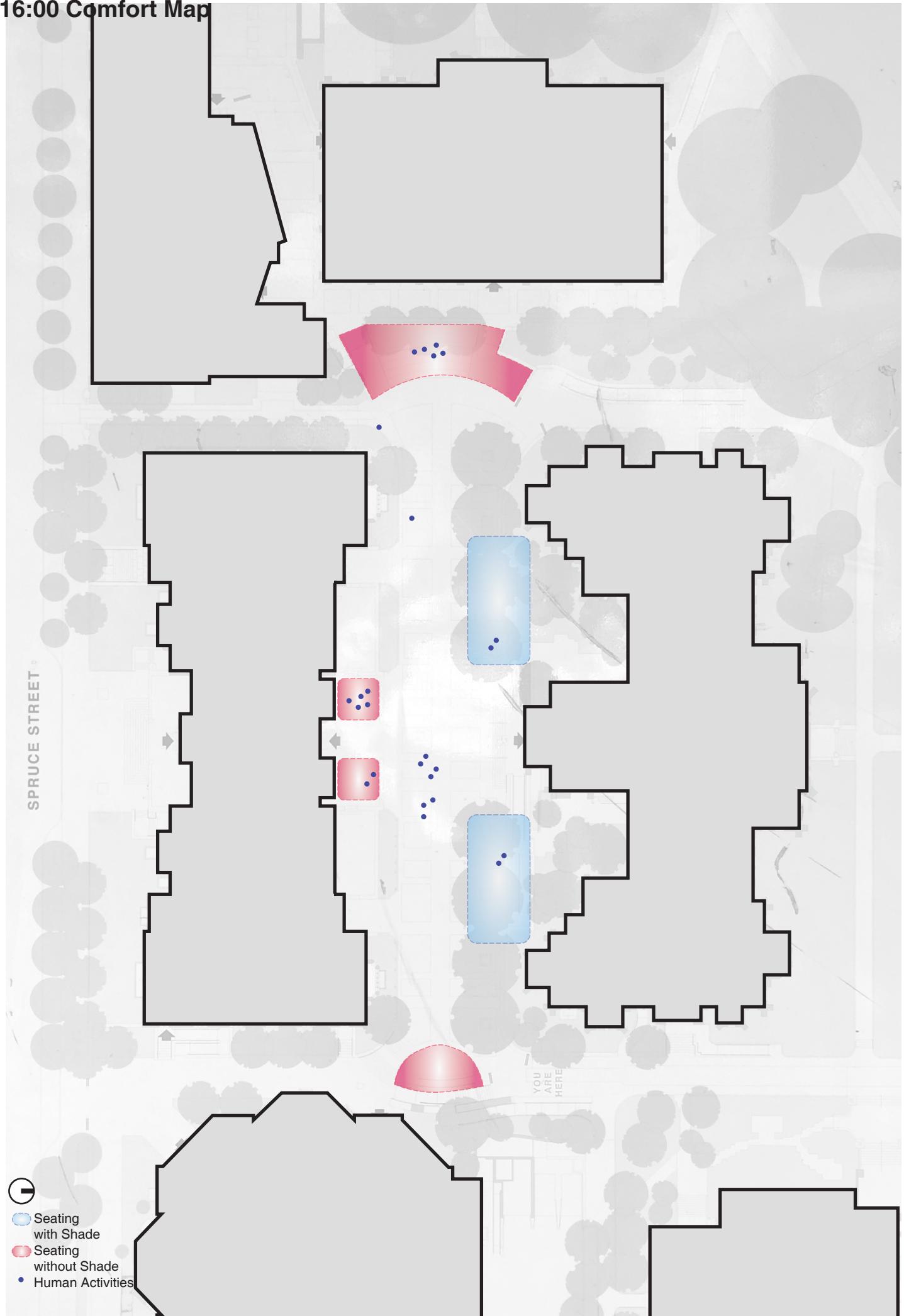
Behavior Photos



Analysis

4:00 pm condition is hotter with temperature at around 30°C. However, many people still come out to sit outside. Some of the area in the plaza is covered with shade. But it didn't affect where people choose to sit, and most students sit in the sunlight area. The combination of temperature, wind and humanity made people feel quite hot at that moment.

16:00 Comfort Map



Question & Answers

1. Relationship between thermal comfort and behavior

Since the temperature in the measurement day is from 25°C to 30°C ; the wind is mild from 0.3m/s to 1.0 m/s; people usually feel quite hot. However, there is not much close relationship between people's behavior and the thermal comfort. Some people prefer to sit under the sunshine, while some chose to stay in the shadow, maybe according more likely to the personal preference instead of real thermal comfort condition.

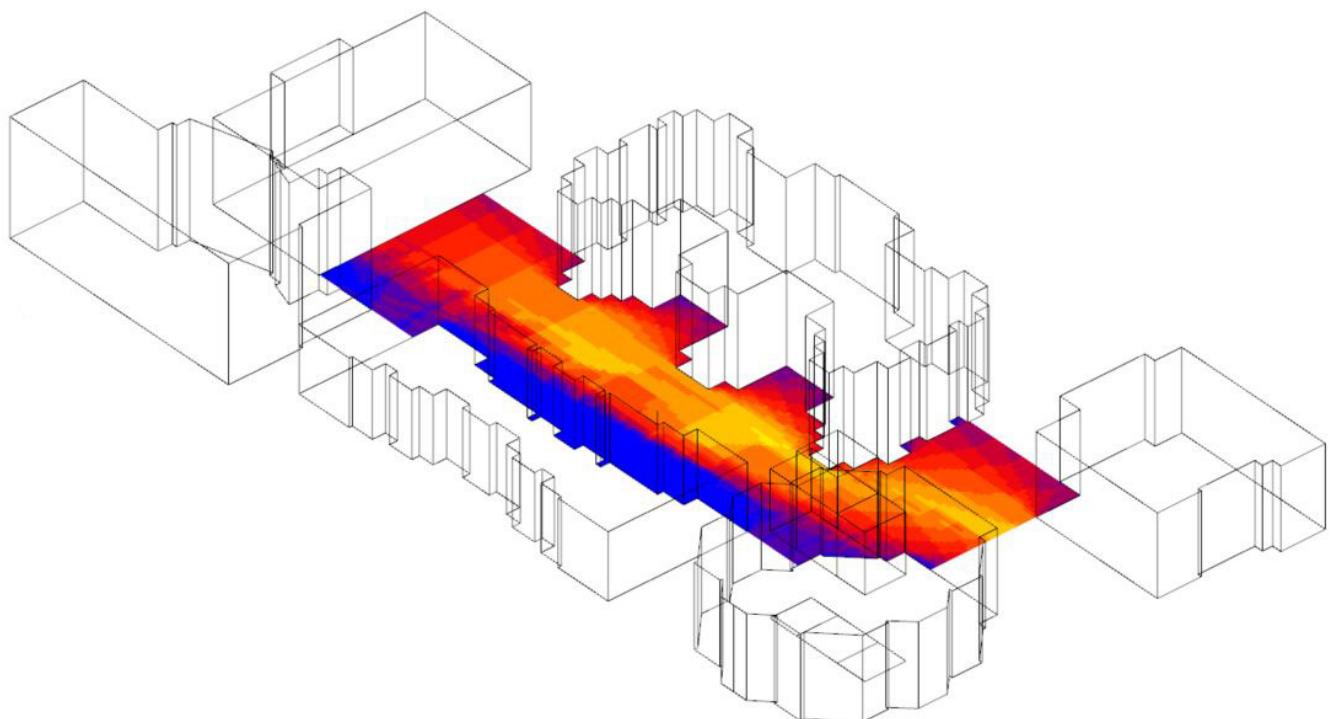
2. 2 design proposals to make the space more comfortable for outdoor activities

Because most area in the square is under the sunshine, and there are many iron seats and table around, maybe it is better to put most iron seats under the shadow space. The reason is that in hot summer, iron could absorb much heat and surface temperature could be very high, which is not comfortable for people to sit.

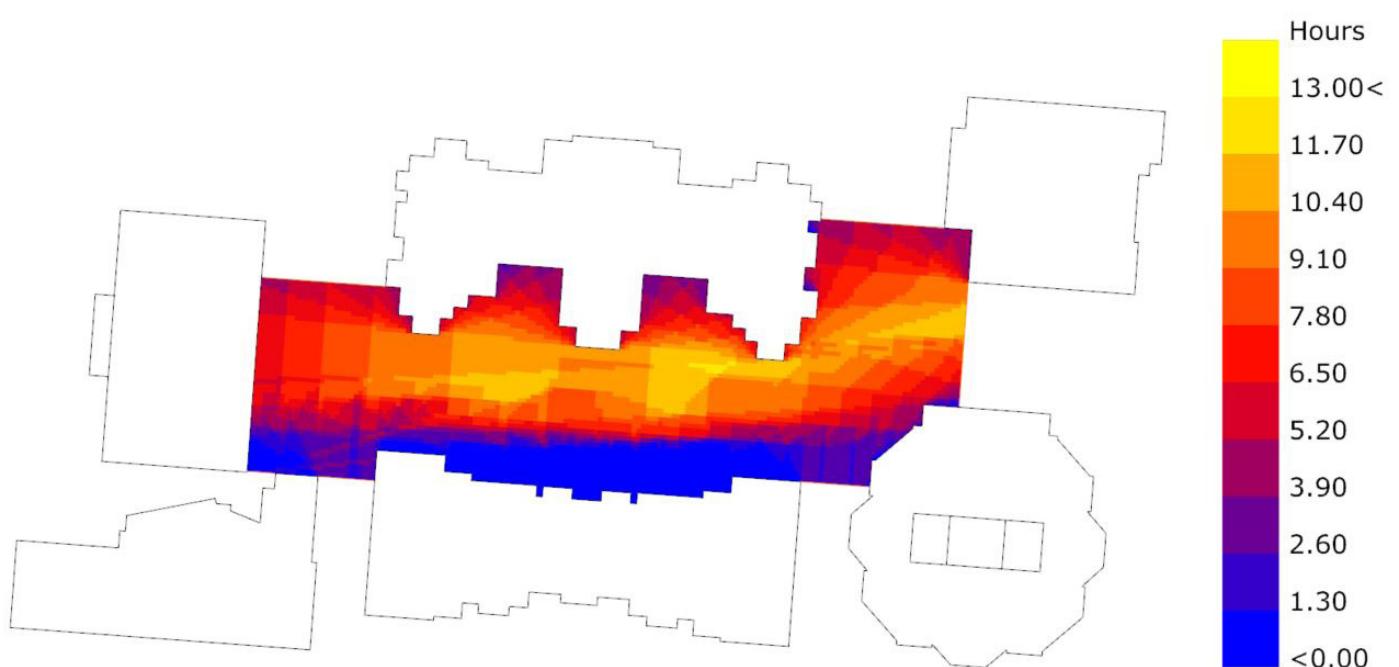
Another proposal maybe could add some water landscape for the area, to moderate the temperature differences in different area of the square's micro-climate.

3. Difference between local weather data, weather file and station weather data

Especially for wind speed, there is much difference between local weather data and weather file. Because station weather data is collected in wider and broader area, such as International Airport for this case, the wind is much stronger compared with in the city. The square measured is surrounded by building in all 4 sides, thus the wind speed were lower. Furthermore, the air temperature still show some difference with the weather data, probably due of the inaccuracy of the measure tool.



SunlightHours Analysis - Axon



SunlightHours Analysis - Plan