

FUTURE OF COLLEGE CAMPUSES

AN IN-DEPTH LOOK AT VOL WALKER

Of all the components that define climate, temperature arguably has the greatest impact on energy usage in a building. Heating and cooling are responsible for roughly 30% of energy consumption in public buildings. Humans tend to be most comfortable in environments of 68-72 degrees Fahrenheit. Therefore, buildings tend to require heating for external temperatures below 68, and cooling for temperatures above 72. In 2016, when interest in sustainable energy initiatives is at an all-time high, temperature is becoming a very important factor in design.

Fayetteville is located in a temperate climate zone, meaning that temperatures reach neither an extreme hot nor an extreme cold, but tend to be moderately hot in the summer and moderately cold in the winter. Design in temperate zones requires the flexibility to address both when necessary.

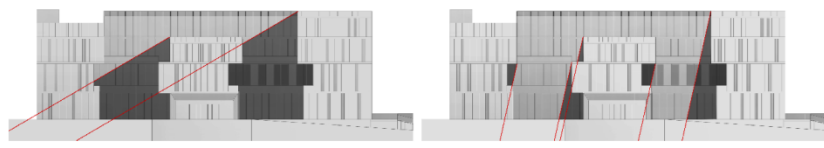
This project addresses temperature by utilizing passive strategies in shading and cross ventilation to reduce solar gain and flush out heat at night. The laminated building masses are stacked in the north south direction to shade each other and reduce solar radiation gain. The vegetation in the courtyards provide an extra layer of shading for when the sun is high. The lamination also allows the long side of the studios to be oriented towards the north and south towards the prevailing winds, allowing for more effective cross ventilation through operable windows. The courtyards also provide a buffer from these winds in the

winter to reduce surface area exposed to prevailing winds and therefore reduce heat loss.

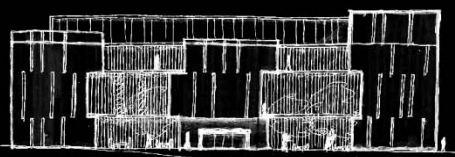
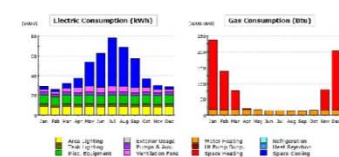
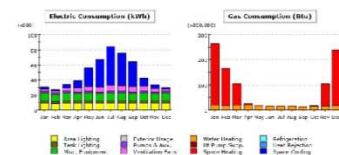
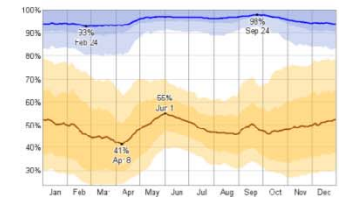
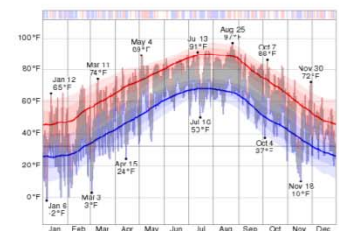
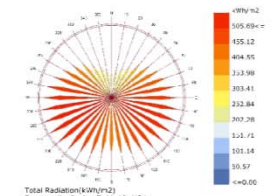
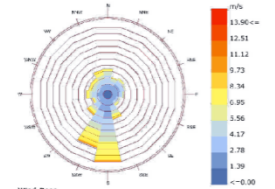
In Fayetteville, humidity rarely drops below 24% (dry) humidity, often reaching as high as 100% (very humid). Humidity plays a large role in determination of comfortability metrics. Despite moderate temperatures, Fayetteville's comfort index is significantly below national average, due largely to high humidity.

The presence of vegetation has been shown to reduce humidity by up to 10%. This project provides new courtyards in between building masses intended to act as comfortable spaces to work and study. In addition, air movement has little effect on actual humidity, but can have a large impact on perceived humidity. The cross ventilation effect through operable windows makes the space feel much more comfortable than one without air movement, and does so without expending energy.

Fayetteville receives about 25% more precipitation than the national average. The project seeks to make use of the extra precipitation through water catchment systems located underneath the new courtyards. Water is collected on the roof, drained onto the courtyards to feed the vegetation, and then captured to be used for watering the rest of the lawns.



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