UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF FLORIDA
MIAMI DIVISION

CASE NO. 1:24-cv-24253

DWAYNE WILSON, TYRONE HARRIS,
and GARY WHEELER, individually
and on behalf of those similarly situated,

Plaintiffs,

vs.

RICKY DIXON, in his official capacity
as Secretary of the Department of Corrections,
FRANCISCO ACOSTA, in his official capacity
as Warden of Dade Correctional Institution, and
FLORIDA DEPARTMENT OF CORRECTIONS,
an agency of the State of Florida,

Defendants.

Second Declaration of Stefano Schiavon, Ph.D.

I, Stefano Schiavon, declare as follows:

I. Introduction

A. Background, Qualifications, and Experience

1. I am a Professor of Architecture and a Professor of Civil and Environmental Engineering at the University of California, Berkeley (hereafter "UC Berkeley") in Berkeley, California. I joined UC Berkeley as a member of the faculty in 2011. A list of my work experience, training, and publications is contained in my curriculum vitae, attached hereto as **Exhibit A.**

2. Before my appointment at UC Berkeley, I was a Postdoctoral Scholar and Assistant Professional Researcher at UC Berkeley, where my research focused on Heating,

Ventilation and Air Conditioning ("HVAC") systems for commercial buildings. I received my Master of Science in Mechanical Engineering and my PhD in Energy Engineering from the University of Padua in Italy.

3. My teaching covers a wide range of topics, including fundamental principles of energy flows in buildings, thermal properties of building materials, thermal comfort, solar geometry, passive solar design, passive cooling, daylighting, indoor air quality, acoustics, renewable applied to buildings, and mechanical and electrical lighting. I teach graduate seminars on Heating, Ventilation, and Air Conditioning ("HVAC"), research methods, building energy and performance simulations, and indoor environmental quality measurement and modeling.

4. My research focuses on finding ways to reduce energy consumption in buildings while improving occupant health, well-being, and performance. We spend most of our time inside buildings, whose environments substantially affect our health, well-being, and job/learning performance. My research focuses on sustainable building design; building energy efficiency; indoor environment quality; well-being; thermal comfort; indoor air quality; mechanical systems; lighting, post occupancy evaluation; energy simulation; building standards and codes; heat; and window view quality.

5. I am the Associate Director of the Center for Environmental Design Research (CEDR) and the Associate Director for Research of the Center for the Built Environment (cbe.berkeley.edu), which is one of the CEDR research centers. The Center for the Built Environment is a National Science Foundation Industry/University Cooperative Research Center. Its mission is to improve the design and operation of buildings to assure high performance and quality for their occupants and owners. It is a research collaboration between

UC Berkeley and its contributing Industry Partners. CBE currently has ~50 Industry Partners representing architecture and engineering firms, building owners, facility managers, manufacturers, utilities, and government agencies. CBE's primary work emphasizes evaluating and improving the environmental quality of buildings, testing new technologies for increasing occupant well-being, and reducing the energy used by buildings and their environmental control systems. In addition to the significant research programs developed under CBE's umbrella, it is also a forum for information exchange in a cooperative environment. CBE's activities include research, building evaluation and benchmarking studies, standards participation, publishing a newsletter and website for technology transfer, and semi-annual meetings with 120-150 people attending. I am one of the three active faculty in the center; I lead the research enterprise.

6. I have published 122 peer-reviewed scientific articles in international journals, 94 peer-reviewed papers or extended abstracts in conference proceedings, 2 editorials and 3 book chapters. I serve on the editorial boards of *Energy and Building* and *Building and Environment*, two of the top-tier journals in the architectural, engineering, and construction industry. Many of these papers relate to thermal comfort, indoor air quality, and HVAC systems. I have a Google citation rate of 14076 and an h-index of 59, placing me among the top ranked faculty in the field of architectural engineering, thermal comfort and heat globally. Among my papers, there are contributions on developing new thermal comfort models, assessing accuracy of the most commonly used metric for thermal comfort indoor, a literature review for assessing indoor environmental quality (noise, light, thermal and acoustics), a model to predict the clothing insulations, several assessment of thermal environment and indoor air quality in hot and humid climates, the estimation of humidity-dependent temperature thresholds during heatwaves, modeling the effect of solar radiation on people, the physiological effect of

heat exposure, the assessment of passive and low-energy strategies to improve sleep thermal comfort during heat waves and cold snaps and personal exposure to heat. I am one of the top global top experts on the effect of air movement generated by fans.

7. I have led the development of software designed to estimate thermal comfort, heat stress and perform climate analysis. The CBE Thermal Comfort Tool is a free online tool for thermal comfort calculations and visualizations that implements thermal comfort and heat stress calculations from national and international standards. It incorporates the major thermal models, including the ASHRAE and ISO Predicted Mean Vote (PMV), Standard Effective Temperature (SET), adaptive models, local discomfort models, dynamic predictive clothing insulation and Predicted Heat Strain. The CBE Thermal Comfort Tool provides results compliant with ASHRAE 55-2023. It can be freely accessed at comfort.cbe.berkeley.edu. The CBE Clima Tool is a web-based application built to support climate analysis, specifically designed to support the need of architects and engineers interested in climate-adapted design. It allows users to analyze the climate data of more than 27,500 locations worldwide. It furthermore calculates several climate-related values (i.e. solar azimuth and altitude, Universal Thermal Climate Index (UTCI), comfort indices, etc.). It can be freely accessed at clima.cbe.berkeley.edu. I co-authored the Python library *Pythermalcomfort*. It is a comprehensive toolkit for calculating thermal comfort indices, heat/cold stress metrics, and thermophysiological responses based on international standards and peer-reviewed research. Designed for researchers, engineers, and building-science professionals, it simplifies complex calculations while promoting accuracy and standards compliance. It can be freely accessed at https://pypi.org/project/pythermalcomfort/. It includes models for Heat Index, Discomfort Index, Humidex, ASHRAE and ISO Predicted Mean Vote (PMV), Standard Effective

Temperature (SET), Predicted Heat Strain Index, Physiological Equivalent Temperature (PET), Universal Thermal Climate Index (UTCI), and Wet Bulb Globe Temperature Index (WBGT).

8. My work has been featured on media outlets including the Washington Post, the Wall Street Journal, NPR, Time, CNN, Forbes, The Atlantic, USA Today, Newsweek, The Associated Press, The Boston Globe, ArchDaily and Architectural Record.

9. I have won four Best Paper Awards from the leading journal *Building and Environment*, the 2017 Faculty Award for Excellence in Postdoctoral Mentoring from the Berkeley Postdoctoral Association, and the Ralph G. Nevins Physiology and Human Environment Award 2013 from the American Society of Heating, Refrigeration and Air Conditioning Engineers ("ASHRAE"). I also won the 2010 Young Scientist Award from the European Federation of Heating Ventilation and Air Conditioning Associations ("REHVA") for outstanding research work by a researcher under 35 years of age.

10. I was a Technical Advisory Group (TAG) member for the World Health Organization (Department of Environment, Climate Change, and Health), the World Meteorological Organization, and the Global Heat Health Information Network on "Informing decision-making about indoor heat risks to human health." This work contributed to the update of the WHO fact sheet for heat and health published in May 2024 (https://www.who.int/news-room/fact-sheets/detail/climate-change-heat-and-health).

11. I am a member of the "Extreme Heat Work Group" of the International Code Council (ICC) to develop a maximum temperature limit for all building types covered by ICC. The ICC model codes have a large influence on the building sector in the US because they provide standardized, comprehensive, and up-to-date guidelines for building safety, sustainability, and performance.

12. Because my research focuses on design and assessing real-life built environment, it necessarily intersects with the rules and regulations governing building construction. My work requires deep knowledge of standards for heating, ventilation, and air conditioning inside buildings, as well as other aspects of environmental health in buildings. For more than a decade, I have extensively studied, used, and/or worked to improve a wide range of building standards. Indeed, a meaningful portion of my professional work is dedicated to improving building standards to reflect modern research on indoor environmental quality. I focus my efforts on the professional society ASHRAE. For over a decade, I have been a non-voting member of the technical committee responsible for ASHRAE Standard 55, which specifies conditions for acceptable thermal environments. I was a founding member and a voting member of the ASHRAE committee developing ASHRAE Standard 216, which specifies testing methods for determining application data for overhead circulator fans (i.e., ceiling fans).

13. Many substantial changes to ASHRAE Standard 55 have been made based on my group research results and the amendments I helped to develop. For example, I led the development and implementation of a dynamic clothing insulation model. The model predicts clothing insulation levels based on outdoor temperature levels (an input to thermal comfort modeling). This model has now been implemented in the standard.

14. I was retained by Plaintiffs' counsel to provide expert opinions on how to evaluate the heat index and air quality at Dade Correctional Institution (Dade CI). I have been retained at an hourly rate of $445 an hour for general consulting, site visit, record review, and report/declaration drafting, $320 per hour for travel time, and $530 per hour for deposition, hearing, or trial testimony. My compensation is not dependent in any way on the outcome of

this matter or on the substance of my findings and conclusions. The matters set forth are my independent opinions, based on my personal and professional knowledge. If called as a witness to testify, I could and would testify competently.

15. The opinions contained in this declaration are based on my training, professional experience, and familiarity with the literature on the subjects of heat, indoor thermal conditions, building performance simulation, indoor environmental quality assessment, the effect of outdoor thermal environment indoor, indoor air quality and human response to the thermal environment.

16. In the past four years, I have served as an expert witness writing a report and by deposition in one case: *National Fire Protection Association, Inc. v. UpCodes Inc., Scott Reynolds and Garrett Reynolds*, Case No. 2:21-cv-05262-SPG-E. I have not served as an expert witness in any trial or court hearing.

B. Materials Reviewed

17. For purposes of this declaration, I have reviewed the following:

a. Sworn declaration of Timothy Jones;

b. Map from Google Maps of the dormitories at Dade Correctional Institution (Dade CI);

c. Additional images of Dade CI from Google Maps and Google Earth;

d. Chart of the highest daily heat index recorded at Homestead Airforce Base (Homestead AFB) from May-September of 2023;

e. Amended declaration of Timothy Jones;

f. The class action Complaint in this case;

g. Data Files Downloaded from Hobo Devices Installed at Dade CI Dormitories.

Dates of files are June 5, 2025, July 18, 2025, July 28, 2025, September 5, 2025, and October 3, 2025;

h. Hobo device location and file key;

i. Dade CI map with dorm notations (PLS 0003000)

j. Pictures of the locations of the sensors within Dade CI;

k. Data showing outdoor temperatures recorded at Homestead Airforce Base from May 2-August 7 2025;

l. 2025-02-07 FDC Answers to Interrogatories (PLS002059);

m. 2025-05-13 Amended FDC Answers to Interrogatories (PLS002074);

n. 2025-07-18 Department's Amended Rog Response (PLS002095-002099)

o. 2025-07-30 FDC Responses to Tyrone Harris Interrogatories (PLS002100-002111)

p. Air Flow Test Document 2022 (FDC_000010371)

q. 602.060 Seasonal Preparedness Effective 2024 (FDC_000007955)

r. Air Flow Test Documents 2024 (FDC_000002329)

s. Upper Level Floor Plan (FDC_000020414)

t. Exhaust/Ventilation Work Order List - 2020-2025 (FDC_000010383)

u. Maps, diagrams, and plans of Dade CI dormitories (FDC_000391810 – 000391834)

v. Rothfusz, Lans P. 1990. The Heat Index "Equation". SR 90-23. NWS Southern Region Headquarters, Fort Worth, TX.

w. Blazejczyk, Krzysztof, Yoram Epstein, Gerd Jendritzky, Henning Staiger, and Birger Tinz. 2012. "Comparison of UTCI to Selected Thermal Indices."

International Journal of Biometeorology 56 (3): 515–35. https://doi.org/10.1007/s00484-011-0453-2.

x. Meade, Robert D., Ashley P. Akerman, Sean R. Notley, Nathalie V. Kirby, Ronald J. Sigal, and Glen P. Kenny. 2024. "Effects of Daylong Exposure to Indoor Overheating on Thermal and Cardiovascular Strain in Older Adults: A Randomized Crossover Trial." Environmental Health Perspectives 132 (2): 027003. https://doi.org/10.1289/EHP13159.

y. Tartarini, Federico, and Stefano Schiavon. 2020. "Pythermalcomfort: A Python Package for Thermal Comfort Research." SoftwareX 12 (July): 100578. https://doi.org/10.1016/j.softx.2020.100578.

z. Tartarini, Federico, Stefano Schiavon, Ollie Jay, Edward Arens, and Charlie Huizenga. 2021. "Application of Gagge's Energy Balance Model to Determine Humidity-Dependent Temperature Thresholds for Healthy Adults Using Electric Fans during Heatwaves." Building and Environment 207 (October): 108437. https://doi.org/10.1016/j.buildenv.2021.108437.

18. On April 22, 2025, I conducted a site visit at Dade CI. During this visit, I walked through and viewed each wing of the following prisoner dorms: A, B, C, D, E, F, G, H. Dorms A through E are open-bay dorms, meaning the prisoners sleep in bunkbeds in one large room. Dorms A through E have two wings each. Dorms F, G, and H are two-story units that have rows of two-person cells with metal doors. Dorms F, G, and H have three wings each. In total, I visited 19 wings and I was able to view and feel the effects of the exhaust systems, ceiling fans, and caged fans within each.

19. The ceiling fans were small, approximately 48-60 inch in diameter, so not

sufficient to cover the needed large area. Because they are undersized, they do not produce enough air movement to provide homogenous coverage and effectiveness. The caged fans were around 30 inch, and located closer to people, but they do not blow any air into the individual cells within F, G, and H dorms. The exhaust systems appeared to be functioning at varying capacities. In some dorms, I could feel them drawing out some air. In other dorms, I could barely feel the exhaust system working at all.

20. In this report, I will refer to Dorms and Wings with a letter followed by a number. For example, "H-2" would be H Dorm, Wing 2. In some cases, I will spell them out fully.

21. All my opinions and conclusions are rendered to a reasonable degree of scientific certainty. I reserve the right to supplement this declaration and to refine my opinion, or develop additional opinions, based on additional information that may become available to me.

C. Summary of My Opinions

22. As I predicted in my previous Declaration, the data collected during the summer of 2025 confirm that many factors affect the heat index within the dormitories at Dade CI.

23. The data conclusively demonstrate that the prisoner dormitories at Dade CI were persistently hot throughout the monitoring period (I analyzed data from May 23 to October 3, 2025). Across all locations, the heat index exceeded the 88°F threshold 97% of the time. In some locations, the heat index exceeded the 88°F threshold 100% of the time. Even in the least-hot location, the heat index exceeded that threshold 87% of the time.

24. The 88°F threshold was chosen in consultation with Dr. Susi Vassallo, who

asserts that the risk to human health increases dramatically at that threshold.[1] I have also provided thresholds in 5°F increments above 88°F to demonstrate the spread of the heat index data at Dade CI.

25. The median heat index across all monitored locations was 98.3°F. The maximum heat index was 119.4°F.

26. The peak indexes usually occurred at night in Dorms F, G and H, between 9:00 p.m. and midnight. They usually occurred in the early afternoons in Dorms A, B, C, D and E.

27. During the three-day period in which heat index was monitored in individual cells within F, G, and H dorms, the heat index in all three cells exceeded the 93°F threshold 100% of the time. In the cell within F Dorm, the heat index exceeded the 98°F threshold 100% of the time, and it exceeded the 103°F threshold 50% of the time.

28. In all dorms, the heat index remained above the 88°F threshold for many consecutive hours and days. In F-1, for example, the heat index did not drop below 88°F for 2,888 consecutive hours (more than 120 days).

29. There were also long periods of time when the heat index exceeded 108°F. For example, in H-2, there was a period in July when the heat index did not drop below 108°F for 34 consecutive hours.

30. At every location, it was usually hotter inside the prison than it was outside. This was particularly true in Dorms F, G, and H. In H-2, for example, the heat index inside the dorm exceeded the heat index outside 93.1% of the time. Overall, across all wings of all dorms, the

[1] Other researchers have proposed lower thresholds at which the heat poses danger to human health. A 2024 study from a prominent thermal physiologist research group lead by prof. Glen Kenny concluded that 26°C (79°F) was the "indoor temperature upper limit" for protecting vulnerable occupants from overheating. In their experiment the relative humidity was 45% and the relative heat index was equal to ~26°C (~79°F). *See* Meade, Robert D., Ashley P. Akerman, Sean R. Notley, Nathalie V. Kirby, Ronald J. Sigal, and Glen P. Kenny. 2024. "Effects of Daylong Exposure to Indoor Overheating on Thermal and Cardiovascular Strain in Older Adults: A Randomized Crossover Trial." Environmental Health Perspectives 132 (2): 027003. https://doi.org/10.1289/EHP13159.

indoor heat index exceeded the outdoor heat index 79.6% of the time.

31. The existing mechanical systems at Dade CI are unable to lower the heat index to levels consistently below 88°F.

II. ANALYSIS: THE HEAT INDEX AT DADE CI

32. Heat stress is a major health concern in indoor environments. The heat index is a metric that combines air temperature and humidity. It is used to estimate human heat stress.

33. While useful, the heat index has several important limitations. First, the heat index is based on the assumption that people are exposed to air movement equal to 5 knots (~2.5 m/s).[2] This is not the case in the cells of dorms F, G and H. I was unable to perform air speed measurements, but based on my professional judgement, I doubt that the average air speed at which inmates are consistently exposed is equal to 2.5 m/s even in areas that use fans. In such locations, prisoners will be exposed to higher heat stress than suggested by the heat index. Second, the heat index is an instantaneous measure and does not account for cumulative heat exposure. Scientific evidence suggests that prolonged heat exposure over several days can have negative health effects.

A. General Observations of Dade CI

34. Dade CI is located at a latitude of ~25°N of the equator. It is classified according to the Köppen–Geiger climate zone as Aw, meaning tropical wet and dry. It is close to zone Am (tropical monsoon). July and August are usually the hottest months. In that climate, even a well-ventilated building would not be able to create comfortable conditions during the summer months.

[2] Rothfusz, Lans P. "The Heat Index 'Equation' (or, More Than You Ever Wanted to Know About Heat Index)." NWS Southern Region Headquarters, Fort Worth, TX, July 1, 1990.

35. Based on Google Map and Google Earth images and my own observations at Dade CI, there are no large trees, windows shading devices, or other large structures that would shield the dormitories from the sun's radiation. Moreover, according to the drawings I review, it appears that there is no insulation on the walls. Thus, the dormitories will absorb the sun's radiation through the walls and roof throughout the day. This solar radiation will raise the air temperatures (and therefore heat index) within the dormitories. Solar radiation heats indoor surfaces, raising their temperatures above the air. Neither our measurements nor the heat index fully capture this radiant load. When surface temperatures exceed the air temperature, inmates experience greater heat stress than the heat index indicates.

36. Apart from solar radiation, outside temperature, and humidity, the indoor heat index is further increased by the internal heat gains of people, lights, appliances/equipment (TVs, tablets, CPAP machines, Securus kiosk, etc.) and motors.

37. Sensible heat is transferred directly to the dorm through conduction, convection, or radiation. Latent heat is gained when moisture is added to the dorm from humans (breathing and sweating) and from equipment that produce water vapor, like showers. Sensible heat released to the space via convection warms the air instantaneously, while radiant heat is mediated by the thermal mass.

38. People are significant sources of both sensible and latent heat gain. I visited 8 prisoner dorms at Dade CI: A, B, C, D, E, F, G, and H. I understand that Dorms A through E have two wings each with a capacity of approximately 70-80 people per wing (140-160 people per building). Dorms F through H have 3 wings each, with a capacity of 86 people per wing (258 people per building). Such a large number of people amounts to a major heat load, particularly in a small, confined area like the dorms Dade CI.

39. In dorms A through E, a communal bathroom and shower area is adjacent to the part of the dorm where the bunk beds are. There are approximately six showers. In dorms F through H, there are eight one-person shower stalls (four on the first tier and four on the second tier). I noticed that some showers had a sign listing them as cold; I assume that the other showers are hot. The result of this setup is that hot steam from the showers will increase the temperature and humidity within the dorms.

40. There is no air conditioning in the prisoner dormitories at Dade CI. The dormitories have exhaust systems that are designed to draw air in through the windows, and push air out through exhaust vents in the ceiling. No ventilation system of this type would be able to consistently lower the heat index to or below the heat index outside; Only the use of air conditioning could reliably and consistently keep the heat index inside below 88°F.

41. The ventilation systems (both supply and exhaust) at Dade CI are unable to provide heat index below 88°F. During my visit, some of the exhaust fans seemed to be operating at a reduced capacity given that they were not producing noticeable air flow. Moreover, according to the Exhaust/Ventilation Work Order List from 2020-2025 (FDC_000010383), the fans frequently break.

42. In Dorms F, G, and H, I was permitted to enter individual cells, but I was prohibited from bringing my sensors inside. The cells in F and G have windows that are three feet in width and approximately five inches in height (the vented area). The openings are covered by a stainless steel security screen (perforated metal plate) with holes approximately the size of a pencil head. The cells in H Dorm do not have windows. Instead, they have rectangular metal plates, roughly six by eight inches, that are perforated with holes. There is a piece of metal on the outside of most windows, which blocks much of the air that would come

in through the wind and airflow is only based on pressure difference caused by exhaust fans. Overall, the tiny window-like openings in F, G, and H are insufficient to provide sufficient cooling.

43. In Dorms F, G, and H, the exhaust vents are located in the ceilings of the corridors. Given that the window-like openings are in the cells, the flow of air from the windows to the exhaust vents can be impeded by the solid metal doors to each cell. When those doors are closed, additional resistance is created and less air will circulate from the outdoors.

44. In dorms F through H, I entered a cell, closed the door, and spent several minutes inside. I could not test the heat index or CO_2 level, because FDC prohibited me from bringing my equipment inside the cells. I tried to feel the air flow from the window and the vent above the toilet, but the flow was very weak. To confirm the lack of air flow, I wet my finger (to increase sensitivity to air speed) and assessed if I could detect any air movement.

45. Airflow measurements inside the cells of dorms F through H will likely vary depending on whether the cell doors are open or closed, and also on the status of other openings (for example, windows or vents to the outside, or food passes to the corridor).

46. In dorms F through H in particular, I experienced the caustic smell of smoke. This is concerning because I was not able to identify a source of combustion and smoking and burning should not happen indoors.

B. Data

47. I have analyzed data from 31 sensors that were installed throughout the prison. Twenty-four sensors were HOBO MX1101 loggers, which measure temperature and relative humidity. The remaining seven sensors were HOBO MX 1102A loggers, which measure temperature, relative humidity, and CO_2. Both are produced by the USA based Onset (now part

of Li-Cor), a well-known and respected brand in the field with more than 40 years of experience.

48. I am familiar with both types of HOBO loggers. I have worked with them in the past and found them to be accurate and reliable. I have published papers in scientific journals based on data collected from these types of sensors. The MX1101 have a rated temperature measurement range of -4° to 158°F, an accuracy of ±0.38°F from 32° to 122°F and a relative humidity range of 1% to 90% and an accuracy of ±2% from 20% to 80% typical to a maximum of ±4.5%; below 20% and above 80% ±6% typical. The MX1102A have the same temperature and RH performance of MX1101 and a CO2 range of 0 to 5000 ppm and an accuracy of ±50 ppm ±5% of reading in standard operating conditions. All the sensors were new when installed in the prison.

49. The HOBO loggers recorded indoor environmental conditions at five-minute intervals. From temperature and relative humidity data, the heat index (°F) was calculated and categorized using the *pythermalcomfort* 3.6.1 Python library,[3] which implements the Rothfusz regression formula adopted by the U.S. National Weather Service.[4]

50. I viewed pictures of the locations where the HOBO data sensors were installed throughout the prison. Twenty-eight sensors recorded continuously throughout the summer, from May 23 through October 3, 2025. In Dorms A through E, one sensor was placed in each wing on a central column in the middle of the dorm, roughly 8 feet above the ground. In Dorms F through H, two sensors were installed in each wing. One sensor was placed in the dayroom on the wall to the right upon entering each wing, approximately 8 to 10 feet off the ground—

[3] Tartarini, F., Schiavon, S. (2020), "pythermalcomfort: A Python package for thermal comfort research," SoftwareX 12, 100578, https://doi.org/10.1016/j.softx.2020.100578.

[4] Rothfusz, L.P. (1990) The Heat Index Equation. National Weather Service Technical Attachment (SR 90-23).

this sensor is referred to as "Dayroom." The other sensor was placed roughly in the middle of the first-floor hallway, on the right side of the hall when facing into the dorm, near cell 119, about 7 feet off the ground—this one is referred to as "Hallway." Each sensor was enclosed and locked in a plastic lock box. In my opinion, they were placed in locations that would adequately and accurately capture the heat index within the dorms.

51. For the remaining three sensors, my understanding is that they were placed in Cell 1214 of F-1, Cell 2222 of G-2, and Cell 3222 of H-3. They remained in those cells for approximately 72 hours, from approximately 12:30 pm on July 18 through approximately 3:00pm on July 21. My understanding is that the doors on these cells were operated in the same manner as the rest of the doors on the wing; that is, they were open when other cell doors were open and closed when other cell doors were closed.

52. Each device is identified by a unique label, logger number, device number, and a description of the device's precise location within the buildings. A log of each sensor and the corresponding location is included in the Appendix to this report.

C. Results

i. Data from Sensors in the Dormitories

53. As noted above, a total of 28 sensors were installed in the dormitories from May 23 through October 3. All but one of the sensors functioned properly throughout the monitoring period. Due to a setting error, the sensor in the G-1 Hallway only recorded data from June 5 through October 3.

54. Heat stress conditions were aggregated and summarized by location across the study period. For each location, I computed the median and maximum of the heat index. I then quantified exceedance frequency at five thresholds (88, 93, 98, 103, and 108°F) by dividing the

number of samples with heat index greater than each threshold by the total number of valid samples at that location, expressed as whole percentages and set to zero where no exceedances occurred. I also calculated the overall median and maximum and the overall percentage of samples above each threshold across all locations, and appended these as a final row labeled "Overall."

Location	Median Heat Index (°F)	Max Heat Index (°F)	Timestamp of Max Heat Index	Percentage of Time Above Specific Thresholds (%)				
				(88°F)	(93°F)	(98°F)	(103°F)	(108°F)
A-1	96.5	111	Aug. 19, 2 PM	95	75	38	10	0
A-2	95.3	109.9	Aug. 19, 2 PM	92	65	32	8	0
B-1	95.1	110.8	Aug. 19, 2 PM	90	64	32	7	0
B-2	96.6	112.5	Aug. 26, 3 PM	95	75	40	12	1
C-1	96.4	114.9	Aug.12, 11 PM	94	72	40	12	1
C-2	97.4	116.9	Aug.13, 12 AM	97	81	45	15	1
D-1	94.4	110.5	Aug. 19, 2 PM	87	59	27	5	0
D-2	95.9	111.6	Aug. 19, 2 PM	94	70	35	9	0
E-1	97.1	110.9	July 22, 3 PM	96	77	43	12	1
E-2	96	112.9	Aug.19, 2 PM	91	68	37	12	0
F-1 Dayroom	101.3	114.3	Aug. 16, 1 AM	99	98	82	33	5
F-1 Hallway	101.2	113	Aug. 16, 12 AM	100	98	83	31	3
F-2 Dayroom	95.6	105.8	July 30 08 PM	98	77	23	2	0
F-2 Hallway	96.7	106.5	July 30, 9 PM	99	87	31	2	0
F-3 Dayroom	96.1	107.5	July 30, 9 PM	98	81	30	3	0
F–3 Hallway	95.2	106.1	July 30, 9 PM	98	77	20	1	0
G-1 Dayroom	100.1	112.8	July 30, 9 PM	99	97	70	23	3
G-1 Hallway	98.4	108.5	July 30, 9 PM	100	94	54	10	0
G-2 Dayroom	100.1	111.6	July 30, 9 PM	99	96	69	23	1
G-2 Hallway	98.3	108.5	July 30, 9 PM	99	94	53	9	0
G-3 Dayroom	99.2	110.3	Aug. 3, 9 PM	99	94	61	17	1

G-3 Hallway	98.3	108.1	Aug. 4, 11 AM	99	94	53	8	0
H-1 Dayroom	100.5	117.4	Aug. 22, 7 PM	99	97	75	24	2
H-1 Hallway	99.7	109.4	July 28, 9 PM	100	97	69	16	0
H-2 Dayroom	102.4	119.4	July 28, 10 PM	100	98	85	44	7
H-2 Hallway	101.9	117.7	July 28, 10 PM	100	99	85	35	3
H-3 Dayroom	99.9	110.7	July 28, 9 PM	99	96	70	18	1
H-3 Hallway	99.6	110.1	July 30, 9 PM	100	97	68	15	0
Overall	**98.3**	**119.4**	**July 28, 10 PM**	**97**	**85**	**52**	**15**	**1**

55. As the Table above indicates, there is sustained, widespread heat stress across the site. The overall median heat index was 98.3°F, with an overall maximum of 119.4°F. Across all locations, the threshold of 88° was surpassed 97% of the time, the threshold of 93°F was surpassed 85% of the time, the threshold of 98°F was exceeded 52% of the time, the threshold of 103°F was exceeded 15% of the time, and the threshold of 108°F was exceeded 1% of the time.

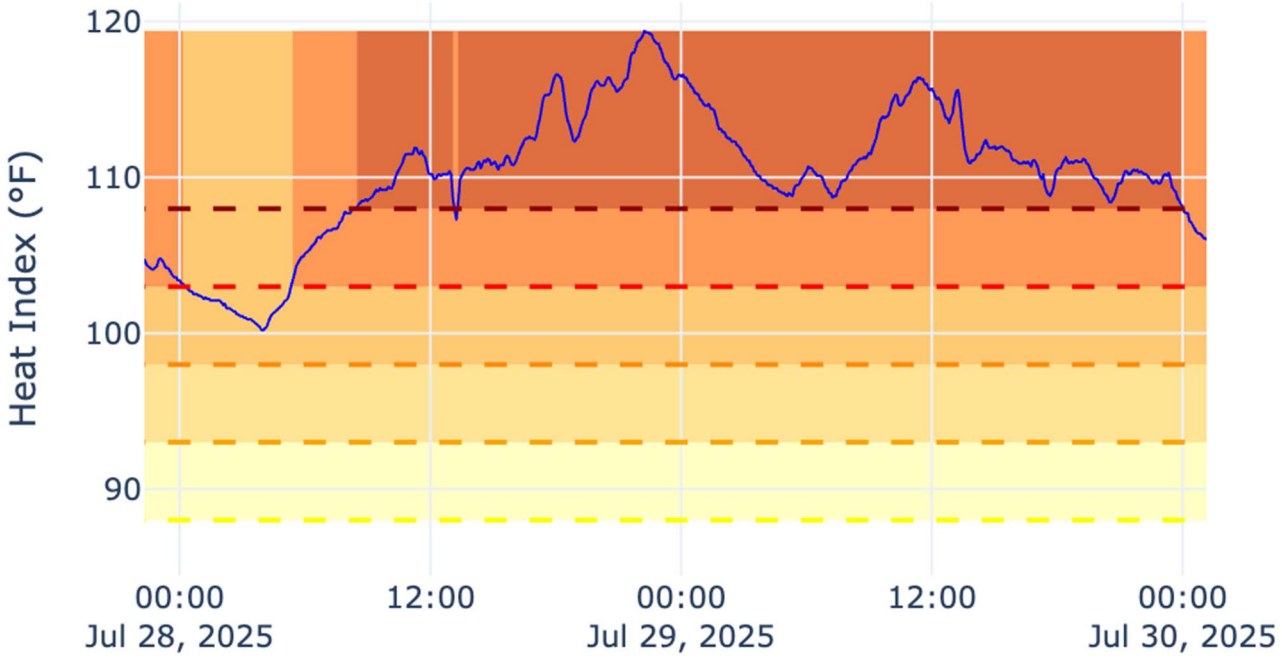
56. Heat burden was highest in Dorms F, G, and H. In the H-2 Dayroom, the median was 102.4°F with a maximum of 119.4°F; 100% of the samples were above 88°F, 85% above 98°F, 44% above 103°F, and 7% above 108°F. The F-1 Dayroom and Hallway showed comparably severe conditions, with medians above 101°F, maximums above 113°F; nearly all samples exceeded 88°F, over 80% exceeded 98°F, and about one-third exceeded 103°F. In Building G, dayrooms and hallways also exhibited intense heat exposure, with medians around 99–100°F and over 95% of samples above 93°F.

57. Buildings A–E also had high heat burdens, with median heat indexes between 94°F and 97°F, and 87–97% of measurements exceeding 88°F.

58. The highest heat indexes were usually recorded late at night, after 9:00 p.m. The

peak heat index—119.4°F—was recorded at 10:00 p.m. in H-2.

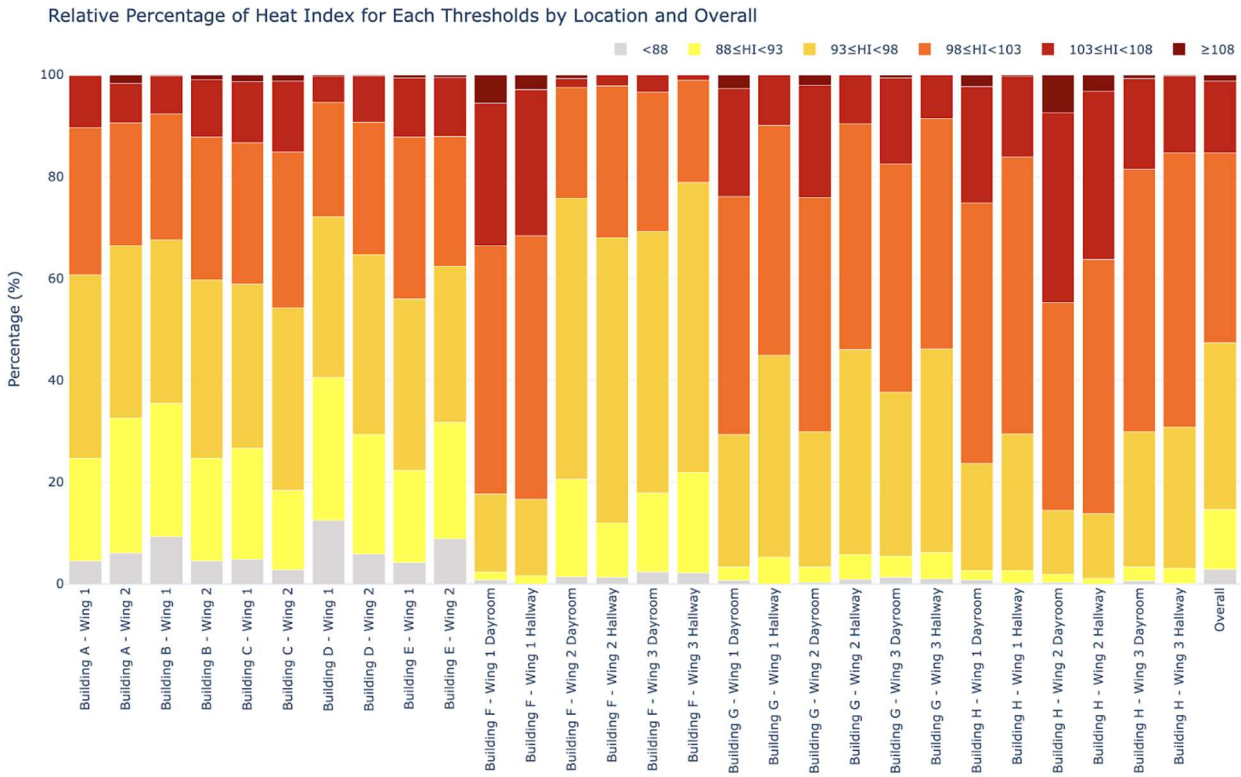
59. In the figure below, I show the conditions in H-2 Dayroom during a 48-hour period from July 28 to July 30, 2025. The colors are based on the thresholds of 88, 93, 98, 103, and 108°F. The heat index stayed above 108°F for 34 hours.



60. As the chart indicates, the peak heat index occurred in the late evening (10 PM). It was frequently the case that the peak heat index in a 24-hour period was recorded late at night, despite the fact that the outdoor heat index usually peaks in the early afternoon. This is primarily because the prison is a high-mass structure that heats up gradually throughout the day. During the daylight hours, it is like a battery that gets charged up by the sun. Even after temperatures cool off outside, the inside of the prison remains extremely hot as the prison building slowly discharges its heat.

61. The data in the graph below show that the heat index classified according to the proposed thresholds. Overall, only 2.8% of the measurements were below 88°F, while 97.2%

of the time the heat index exceeded this threshold. About one-third (33%) of the measurements were between 93°F and 98°F, 37% were between 98°F and 103°F, and 15% were between 103°F and 108°F. Critically, 1.3% of the data exceeded 108°F. Buildings H, F, and G showed the most intense and sustained heat.



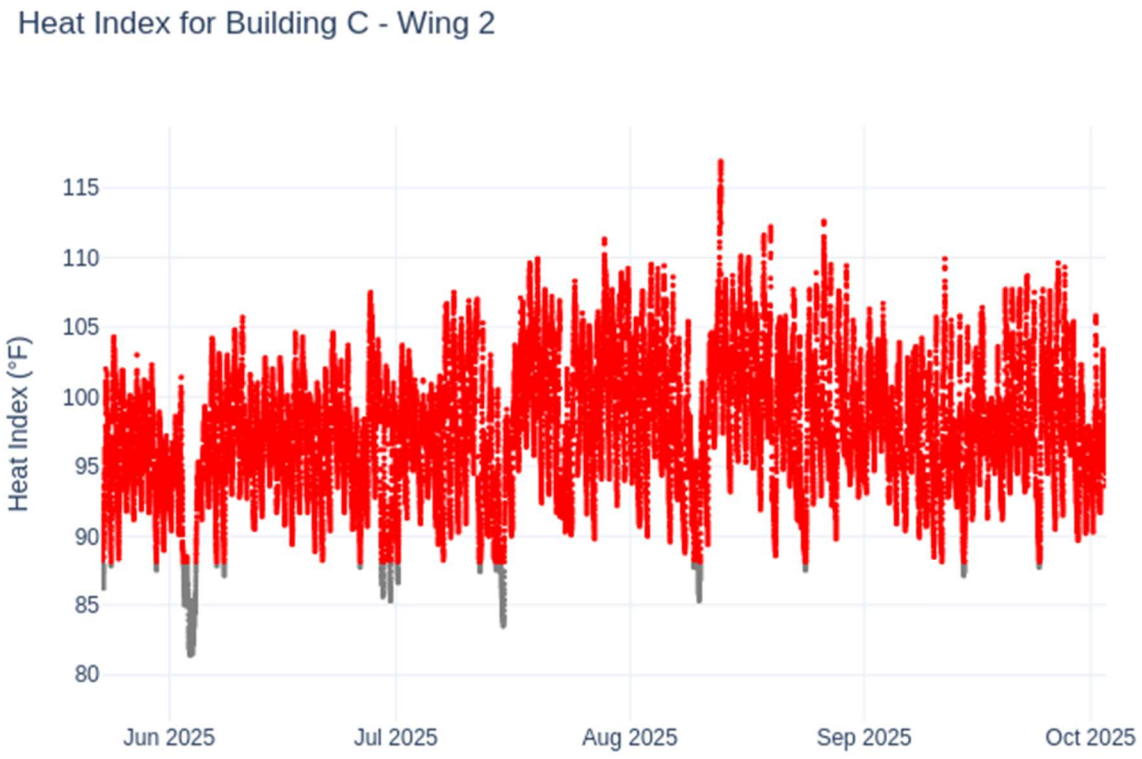
62. Again, these results demonstrate pervasive and consistent heat stress across all locations, with highest levels in F, G, and H dorms.

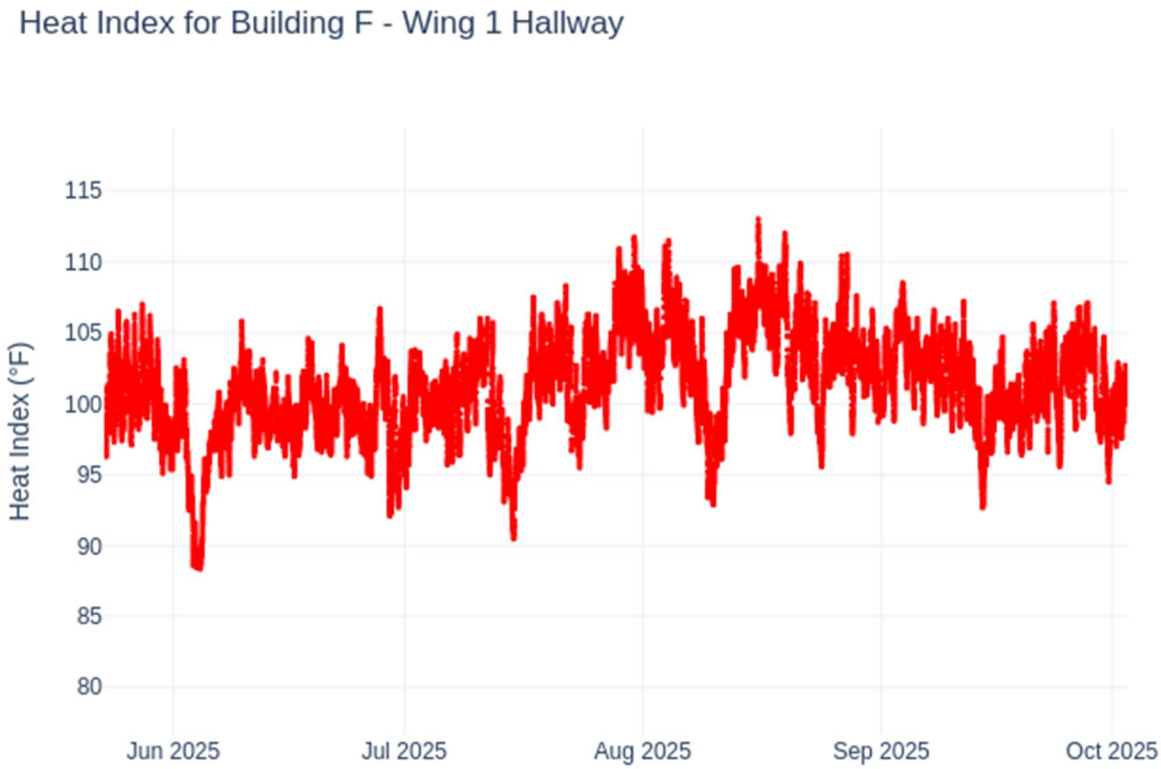
63. I have created time-series charts for every location, showing the heat index in degrees Fahrenheit over the study period. For each location, every five-minute observation is plotted as a point, with values at or below 88°F shown in grey and values above 88°F shown in red.

64. All location charts share the same vertical and horizontal scales. The y-axis range is fixed to the global minimum and maximum heat index found in the filtered dataset,

and the x-axis is fixed to the common earliest and latest timestamps. Using uniform axes makes charts directly comparable across locations; differences in the density and duration of red points reflect how often and how long each space exceeded 88°F. Each figure is titled "Heat Index for" and the location. No smoothing or aggregation is applied, so the reader sees the raw temporal variability.

65. The Appendix contains charts for every location. Here, I provide two sample charts: one from C-2, to illustrate the conditions within the "open-bay" Dorm, and the other from F-1, to illustrate the conditions within the dorms with two-man cells.





66. I have also conducted an analysis to identify and quantify continuous periods when the heat index remained above specified thresholds (88°F, 93°F, 98°F, 103°F, and 108°F). The table below shows the results of this analysis for three locations: F-1 Dayroom, G-1 Dayroom, and H-2 Dayroom. These locations were chosen as exemplars because the raw data suggested that F, G, and H dorms consistently had high heat indexes, even overnight. The duration of every "period above the threshold" was calculated in hours. I reported here the single longest continuous run and reported its start time, end time, and total duration in full hours. This approach allowed for a clear characterization of extreme heat persistence and timing within the monitored period in the selected building.

Location	Consecutive Hours (Approximate Days) Above Specified Thresholds				
	(88°F)	(93°F)	(98°F)	(103°F)	(108°F)
F-1 Dayroom	2888 (120)	837 (35)	357 (15)	93 (4)	16 (1)
G-1 Dayroom	1914 (80)	614 (26)	203 (8)	36 (2)	5
H-2 Dayroom	2894 (121)	833 (35)	209 (9)	47 (2)	34 (1)

67. As the table indicates, there are long stretches of time when the heat index exceeds the specified thresholds. In the H-2 Dayroom, for example, the head index exceeded 88°F for 2894 consecutive hours (121 days). It exceeded 93°F for 833 consecutive hours (35 days), 98°F for 209 consecutive hours (9 days), 103°F for 47 consecutive hours, and 108°F for 34 consecutive hours.

68. Overall, the data show that, throughout the Dade CI dormitories, the heat index exceeded 88°F nearly all summer long.

69. It is also apparent from the data that the exhaust and ventilation systems are unable to keep the heat index below 88°F.

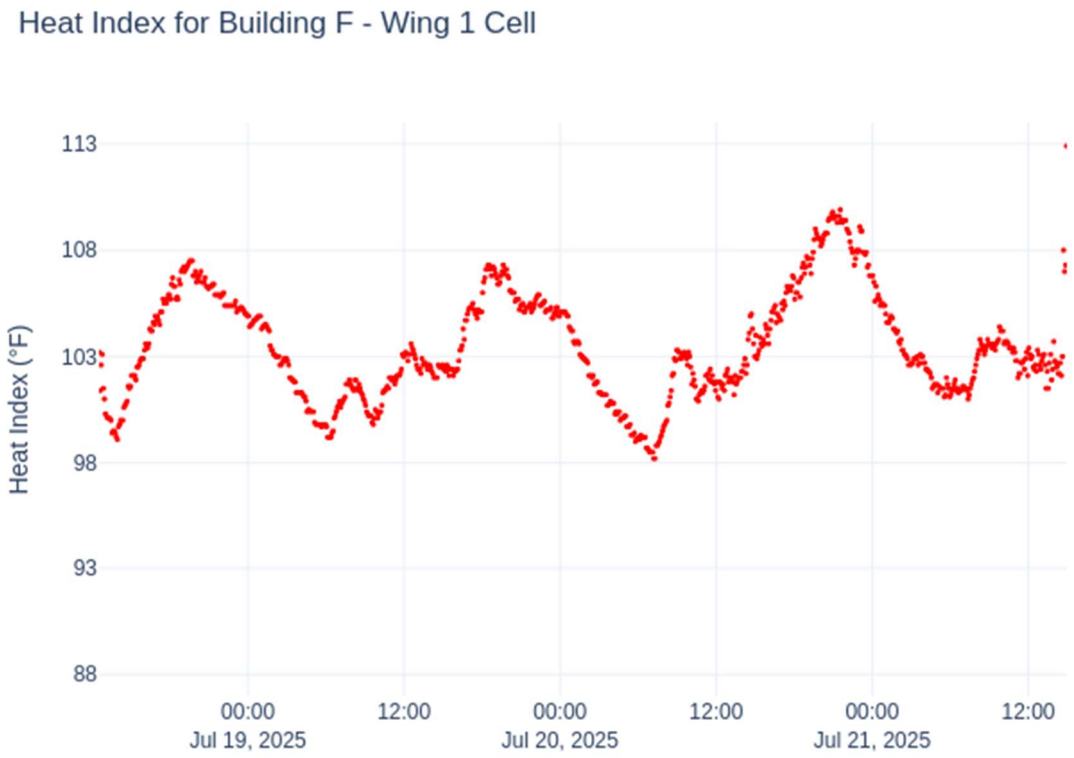
ii. Data from Sensors in the Cells

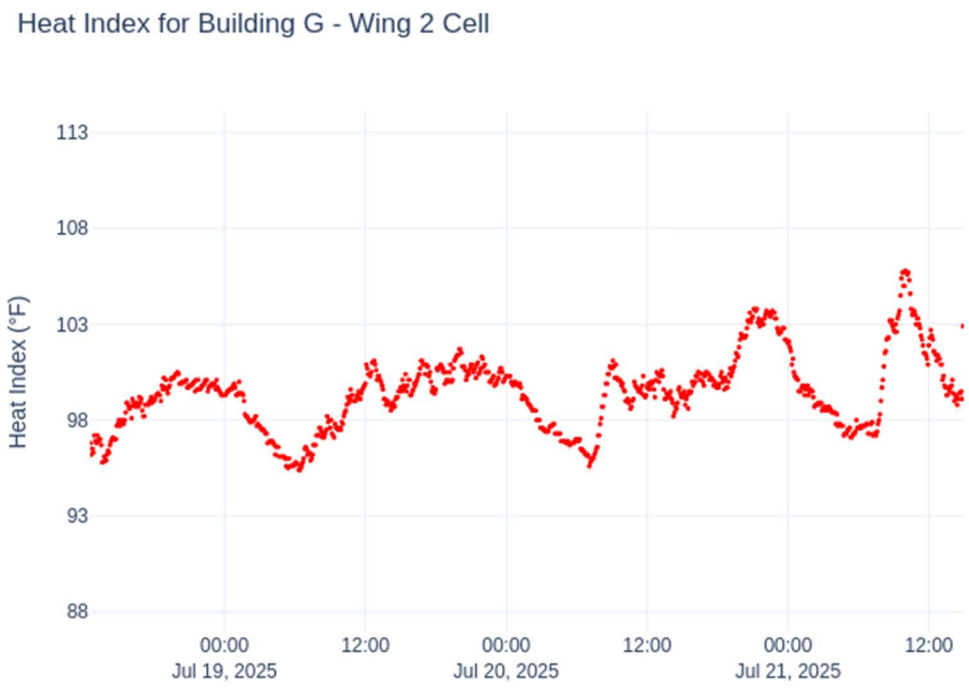
70. As noted above, three sensors were installed inside cells in F, G, and H dorms: Cell 1214 of F-1, Cell 2222 of G-2, and Cell 3222 of H-3. They collected data from 12:30 pm. on July 18, to 3:00 p.m. on July 21.

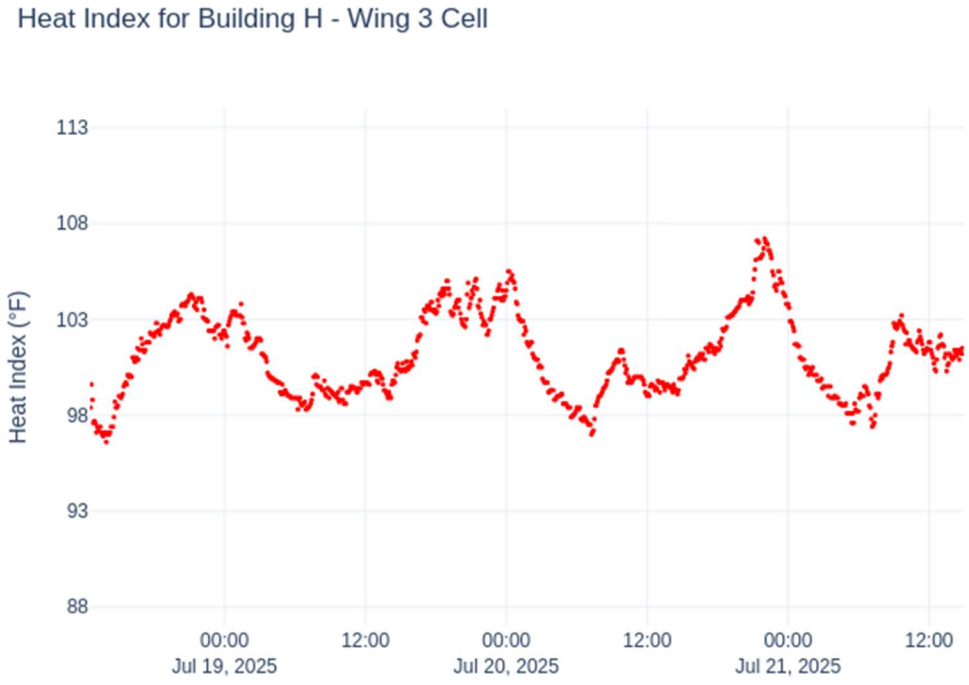
71. The following table lists the median and maximum heat index in each cell, as well as a percentage of the time that the heat index exceeded five thresholds (88, 93, 98, 103, and 108°F). I also calculated the overall median and maximum and the overall percentage of samples above each threshold across all locations combined, and appended these as a final row labeled “Overall.”

Location	Median Heat Index (°F)	Max Heat Index (°F)	Percentage Above Threshold (88°F) (%)	Percentage Above Threshold (93°F) (%)	Percentage Above Threshold (98°F) (%)	Percentage Above Threshold (103°F) (%)	Percentage Above Threshold (108°F) (%)
F-1 Cell	103	112.9	100	100	100	50	4
G-2 Cell	99.5	105.8	100	100	73	6	0
H-3 Cell	100.9	107.2	100	100	95	22	0
Overall	**100.9**	**112.9**	**100**	**100**	**89**	**26**	**1**

72. Below are time-series charts for each location, showing the heat index in degrees Fahrenheit over the three days for each location. Every five-minute observation is plotted as a point.




Heat Index for Building G - Wing 2 Cell
Heat Index (°F)
113
108
103
98
93
88
00:00
Jul 19, 2025
12:00
00:00
Jul 20, 2025
12:00
00:00
Jul 21, 2025
12:00


Heat Index for Building H - Wing 3 Cell
Heat Index (°F)
113
108
103
98
93
88
00:00
Jul 19, 2025
12:00
00:00
Jul 20, 2025
12:00
00:00
Jul 21, 2025
12:00

73. The three cells exhibit persistently elevated heat index across the entire monitoring period. In all three cells, the heat index never dropped below 93°F. The F-1 Cell is the most severe, with a median heat index of 103°F, a maximum of 112.9°F, all samples above 98°F, half above 103°F, and 4% above 108°F. The H-3 Cell is also high burden, with a median of 100.9°F, a peak of 107.2°F, 95% of samples above 98°F, and 22% above 103°F. The G-2 Cell had a median 99.5°F, a peak of 105.8°F, 73% of samples above 98°F, and 6% above 103°F. Overall across the three cells, the median is 100.9°F, the maximum is 112.9°F, 89% of samples surpassed 98°F, and 26% surpassed 103°F.

74. Based on the time series for these cells, the heat index is typically lowest in the early morning around 5–6 am and highest in the evening around 7–9pm. The evening peaks, together with sustained exceedances throughout the day, indicate substantial heat accumulation and no sufficient cooling relief overnight. In H-3, for example, the heat index remained at peak levels well after midnight.

iii. Indoor Data Compared to Outdoor Data

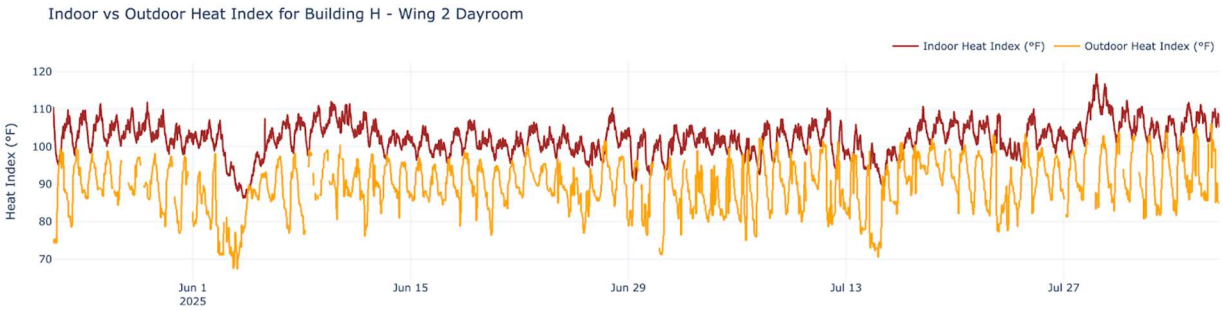
75. I processed hourly outdoor weather data collected from the HOMESTEAD AFB, FL US station (USW00012826) and published by the National Centers for Environmental Information (NCEI).

76. The availability of NCEI weather data has been affected by the federal government shutdown. Prior to the shutdown, weather data was downloaded for the period from May 23, 2025 through August 6, 2025. Data for after August 6 was not available as of this writing.

77. I selected relevant variables including station ID, date, station name, dry-bulb temperature, and relative humidity, then renamed them for clarity. I converted temperature and

humidity into numeric values and expressed temperatures in both Celsius and Fahrenheit. Using the Rothfusz regression mentioned above, I calculated the heat index in Celsius and converted it to Fahrenheit. I rounded the temperature, humidity, and heat index values to one decimal place.

78. I created a visualization comparing indoor and outdoor heat index values for the H-2 Dayroom location over the period from May 23, 2025, to August 6, 2025. The indoor heat index is plotted as a brown line and the outdoor heat index as an orange line.



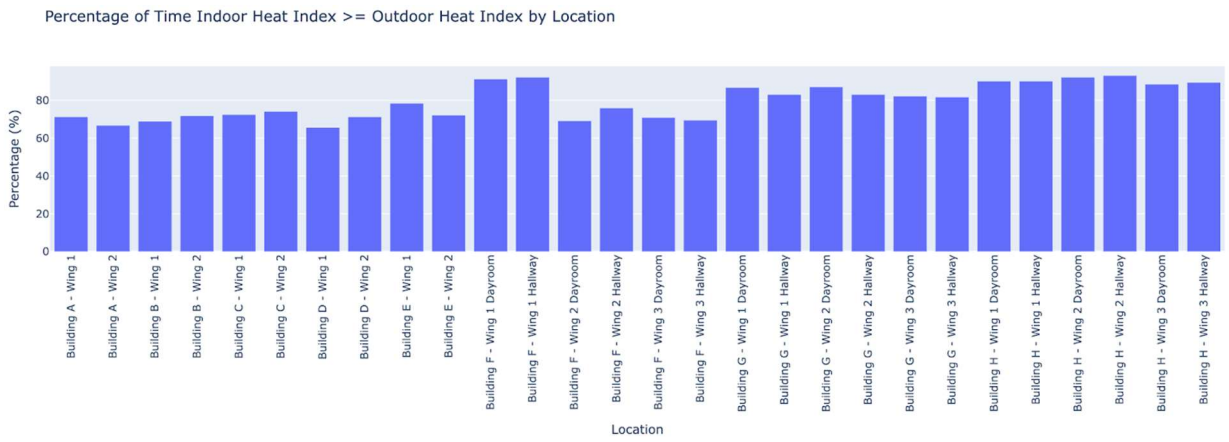
79. As the graph illustrates, the heat index in H-2 exceeded the heat index outside 92.2% of the time. The indoor heat index remains consistently high, typically around 95–110°F, with relatively small fluctuations. In contrast, the outdoor heat index exhibits large daily variations, ranging from below 75°F at night to above 100°F during hot days. Thus, while outdoor conditions fluctuate with daily temperature and humidity cycles, the indoor environment stays at a persistently elevated heat index. The consistently high indoor values indicate limited cooling or ventilation and sustained heat stress risk for occupants, compared to the more variable outdoor conditions.

80. I performed similar analysis for every monitored location at Dade CI. The following table summarizes the percentage of time when the heat index at a particular location exceeded the heat index outside.

Percentage of time when the indoor Heat Index is higher than the outdoor Heat Index by location

Location	Percentage (%)
A-1	71.3
A-2	66.7
B-1	65.9
B-2	71.8
C-1	72.4
C-2	74.1
D-1	65.6
D-2	71.3
E-1	78.4
E-2	72.2
F-1 Dayroom	91.2
F-1 Hallway	92.2
F-2 Dayroom	69.1
F-2 Hallway	75.9
F-3 Dayroom	70.9
F-3 Hallway	69.5
G-1 Dayroom	86.7
G-1 Hallway	83.1
G-2 Dayroom	87.1
G-2 Hallway	83.1
G-3 Dayroom	82.2
G-3 Hallway	81.7
H-1 Dayroom	90.1
H-1 Hallway	90.1
H-2 Dayroom	92.2
H-2 Hallway	93.1
H-3 Dayroom	88.5
H-3 Hallway	89.4

81. The same data in this table are visualized in the following bar chart:



82. For the entire dataset, the overall percentage of time when the indoor heat index is higher than the outdoor heat index is 79.6%. For the period we have outdoor data, the average

indoor heat index is 89.7°F (median=89.8°F) and the average outdoor heat index is 97.8°F (median=98.1°F), confirming the conclusion of the first report: "I expect that the average heat index within the dormitories cannot be lower than the average heat index outside."

83. Indoor heat index generally rises as outdoor heat index rises, but fluctuations in indoor heat index cannot be accurately predicted based on outdoor heat index. In practical terms, indoor conditions are persistently elevated, suggesting limited cooling/ventilation responsiveness and a sustained heat-stress burden indoors.

84. In general, across the prison, the indoor heat index is higher than the outdoor heat index about 80% of the time. This highlights the imperative of measuring heat index conditions inside the dorms rather than relying on outdoor data for policymaking. If outdoor heat index values must be used, a less accurate approach, adding 14°F to the outdoor value would approximate the indoor heat index and capture about 75% of the observed difference between indoor and outdoor conditions. Seasonal Preparedness protocols (FDC_000007955) should take into account indoor conditions.

85. I expect that, from October onwards, the heat index within the prison will generally remain higher than the heat index outside.

86. The only doable, resilient and effective way to lower the heat index to safe levels in this prison is using mechanical cooling, for example, air conditioning, which must be designed, built, commissioned and maintained according to relevant building mechanical codes.

III. CONCLUSION

87. The heat index within the prisoner dormitories at Dade CI was almost always above 88°F in the summer months. In some locations, the heat index did not drop below 98°F for days (or weeks) on end. All of the data demonstrate the heat index levels are dangerously

high.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on October 26, 2025, in Berkeley, California.

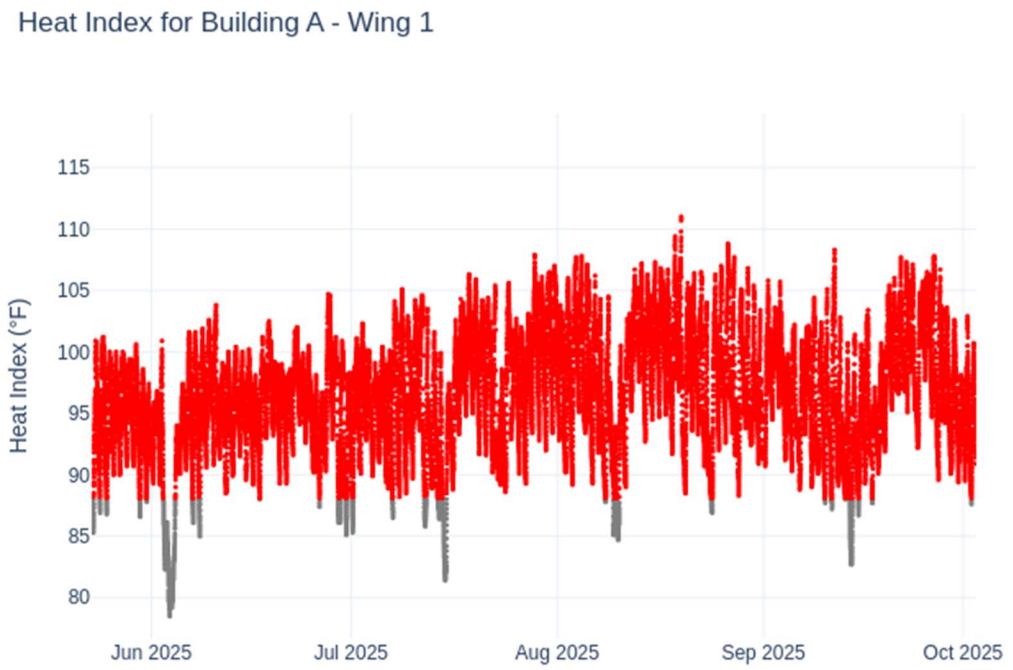


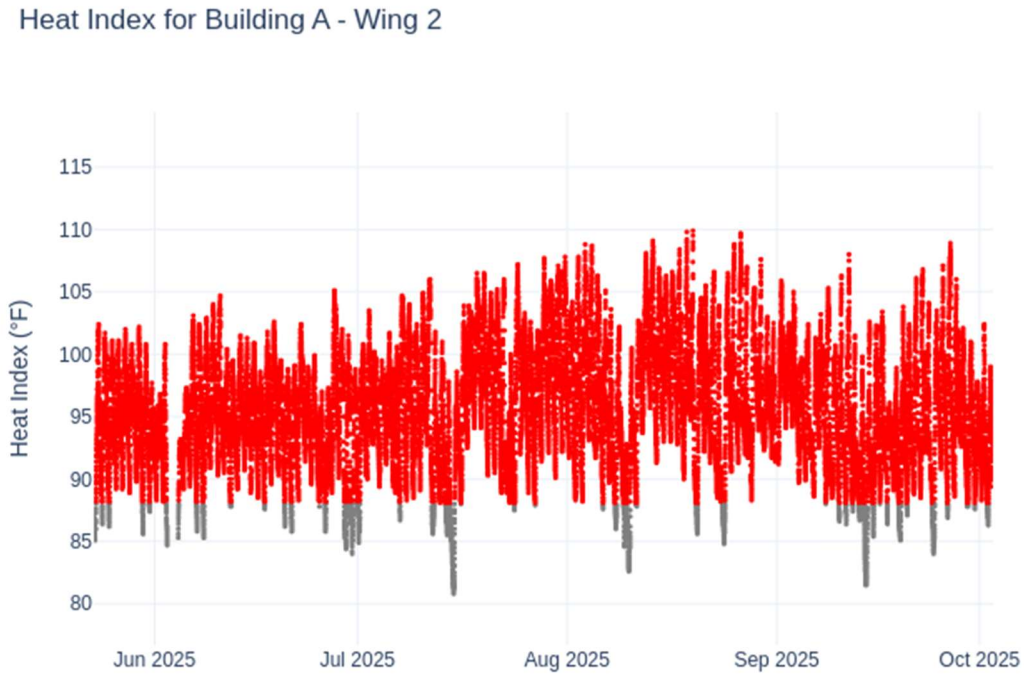
Stefano Schiavon, PhD

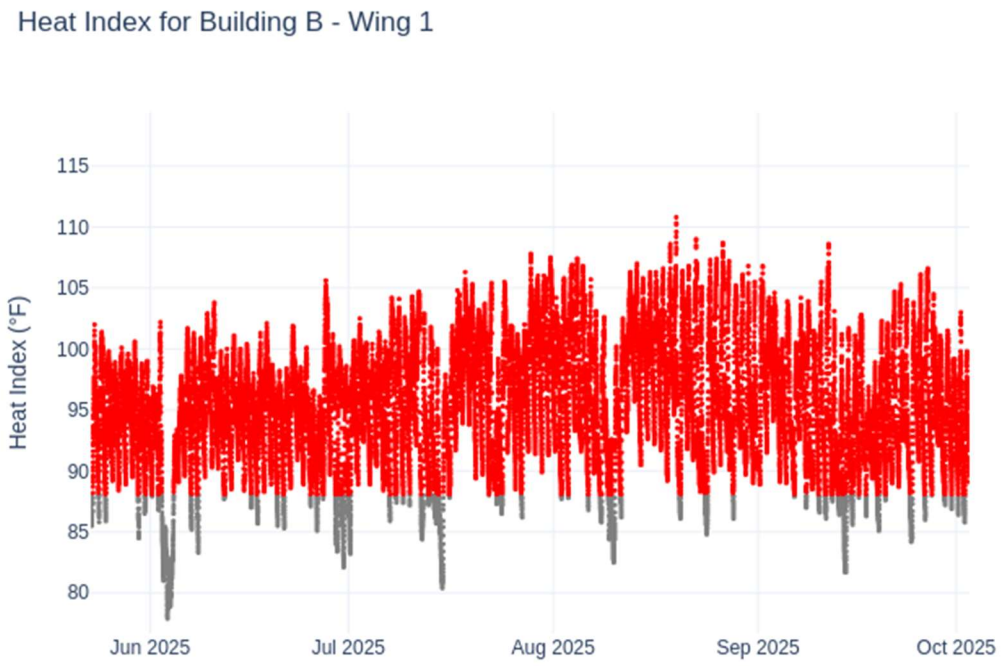
APPENDIX

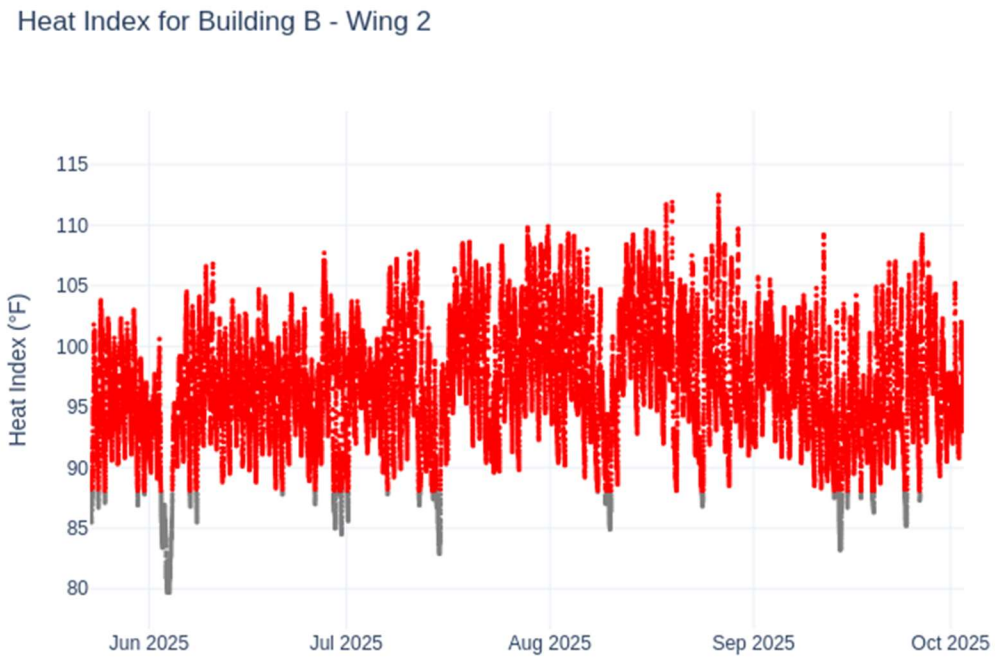
Table 1: Table of Loggers and Locations

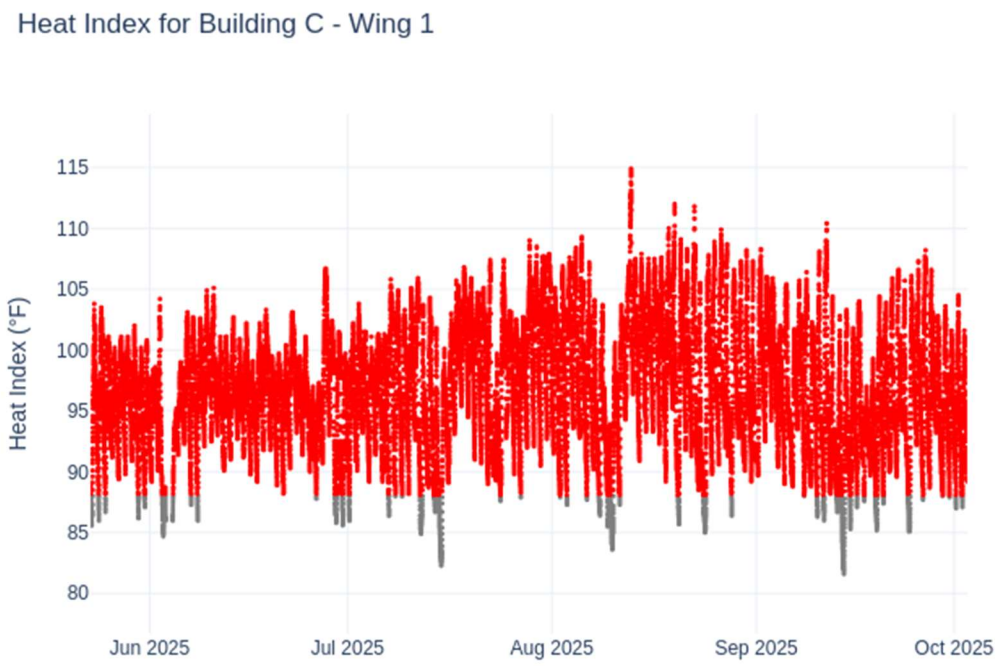
Logger Number	Type	Location
22164336	MX1101 - Temp Logger	Building A - Wing 1
22286893	MX1102A - CO2 Logger	Building A - Wing 2
22164337	MX1101 - Temp Logger	Building B - Wing 1
22164338	MX1101 - Temp Logger	Building B - Wing 2
22286894	MX1102A - CO2 Logger	Building C - Wing 1
22164339	MX1101 - Temp Logger	Building C - Wing 2
22164340	MX1101 - Temp Logger	Building D - Wing 1
22164341	MX1101 - Temp Logger	Building D - Wing 2
22164342	MX1101 - Temp Logger	Building E - Wing 1
22164343	MX1101 - Temp Logger	Building E - Wing 2
22164344	MX1101 - Temp Logger	Building F - Wing 1 Dayroom
22164345	MX1101 - Temp Logger	Building F - Wing 1 Hallway
22286895	MX1102A - CO2 Logger	Building F - Wing 2 Dayroom
22164346	MX1101 - Temp Logger	Building F - Wing 2 Hallway
22164347	MX1101 - Temp Logger	Building F - Wing 3 Dayroom
22164348	MX1101 - Temp Logger	Building F - Wing 3 Hallway
22164349	MX1101 - Temp Logger	Building G - Wing 1 Dayroom
22164350	MX1101 - Temp Logger	Building G - Wing 1 Hallway
22286896	MX1102A - CO2 Logger	Building G - Wing 2 Dayroom
22164351	MX1101 - Temp Logger	Building G - Wing 2 Hallway
22164352	MX1101 - Temp Logger	Building G - Wing 3 Dayroom
22164353	MX1101 - Temp Logger	Building G - Wing 3 Hallway
22164354	MX1101 - Temp Logger	Building H - Wing 1 Dayroom
22164356	MX1101 - Temp Logger	Building H - Wing 1 Hallway
22164357	MX1101 - Temp Logger	Building H - Wing 2 Dayroom
22164359	MX1101 - Temp Logger	Building H - Wing 2 Hallway
22286897	MX1102A - CO2 Logger	Building H - Wing 3 Dayroom
22164358	MX1101 - Temp Logger	Building H - Wing 3 Hallway
22185799	MX1101 - Temp Logger	Building F - Wing 1 Cell
22286899	MX1102A - CO2 Logger	Building G - Wing 2 Cell
22286898	MX1102A - CO2 Logger	Building H - Wing 3 Cell

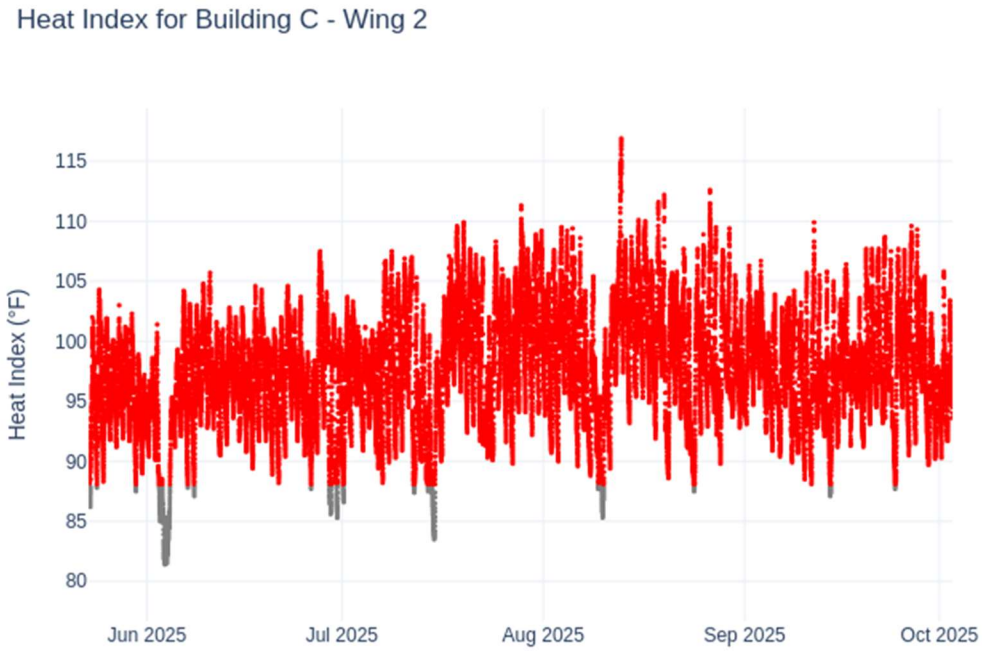

Heat Index for Building A - Wing 1
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

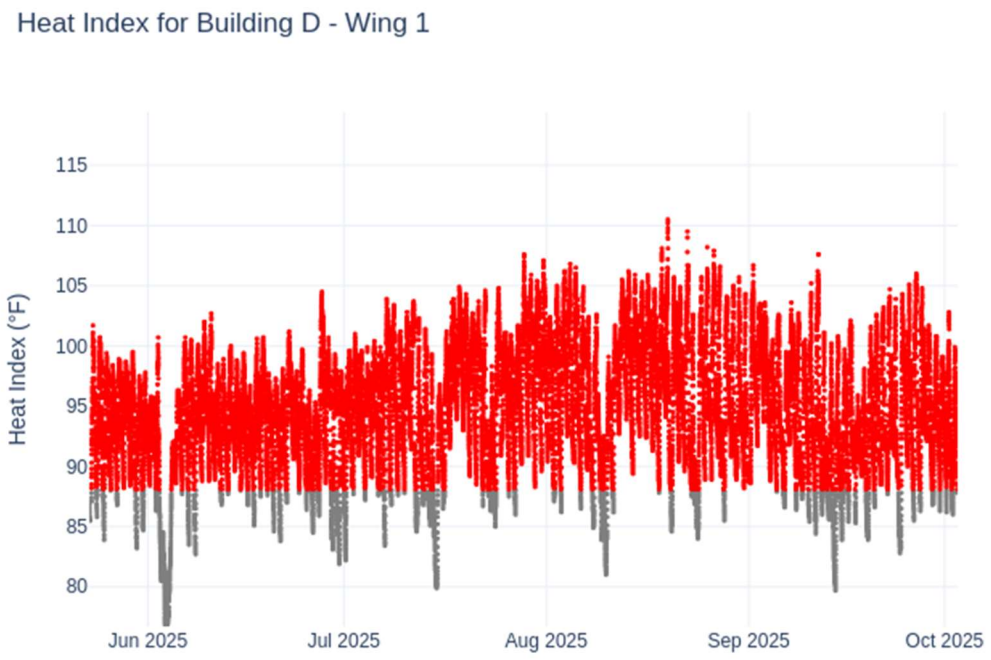

Heat Index for Building A - Wing 2
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

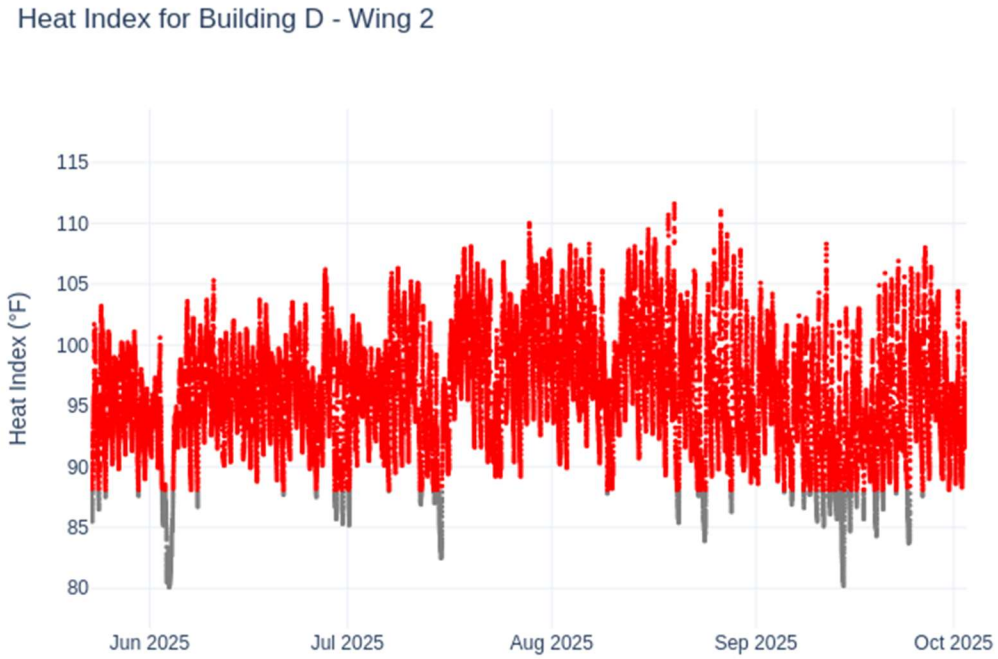

Heat Index for Building B - Wing 1
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

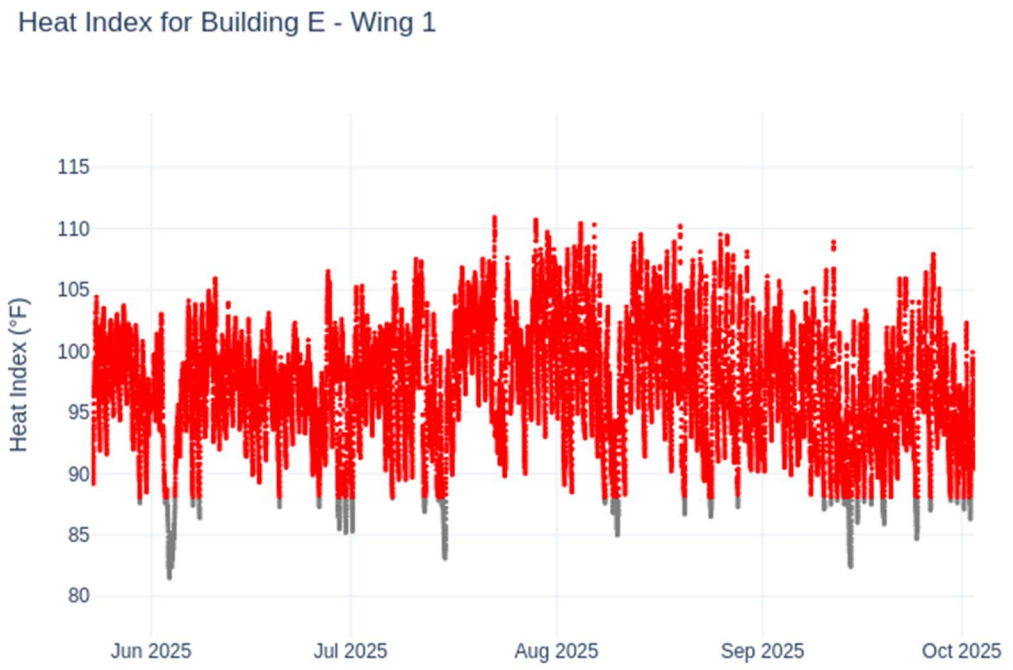

Heat Index for Building B - Wing 2
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

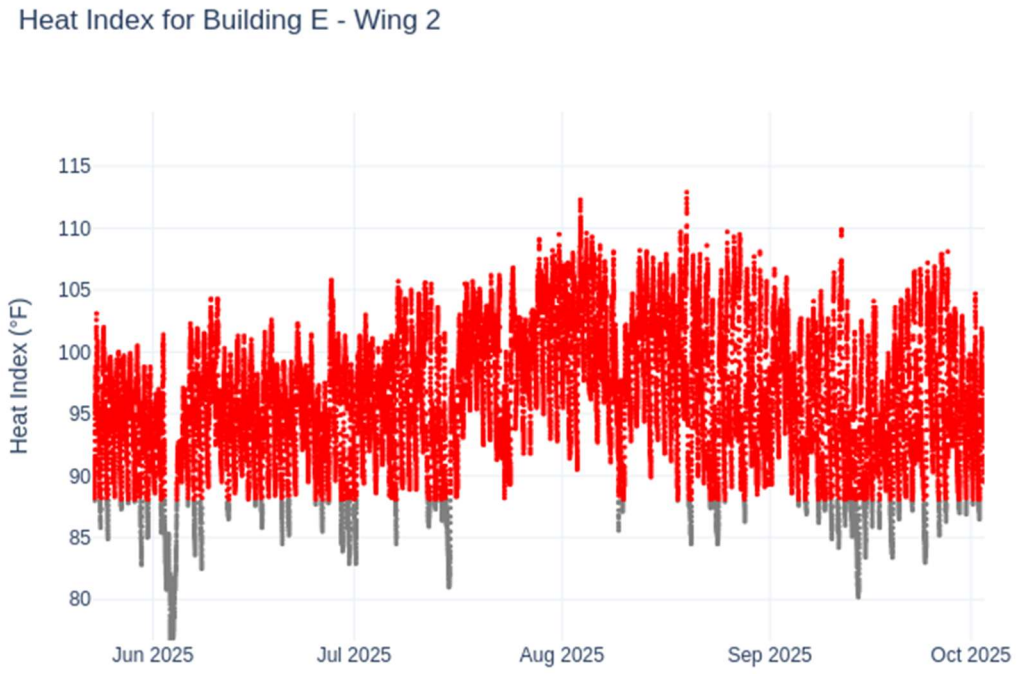

Heat Index for Building C - Wing 1
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

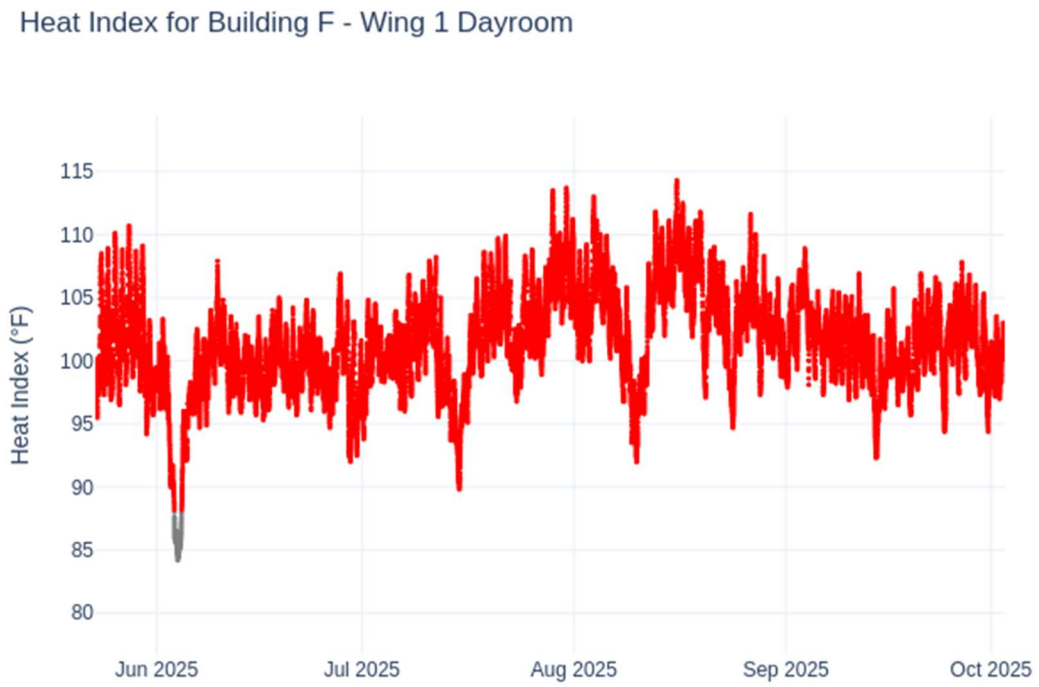

Heat Index for Building C - Wing 2
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

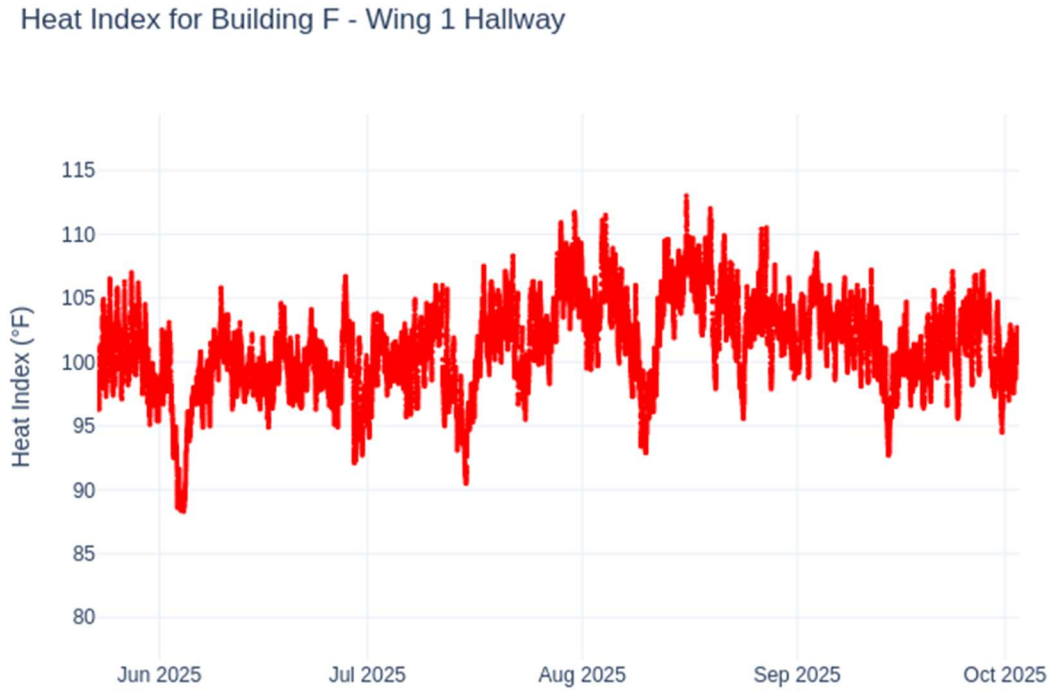

Heat Index for Building D - Wing 1
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

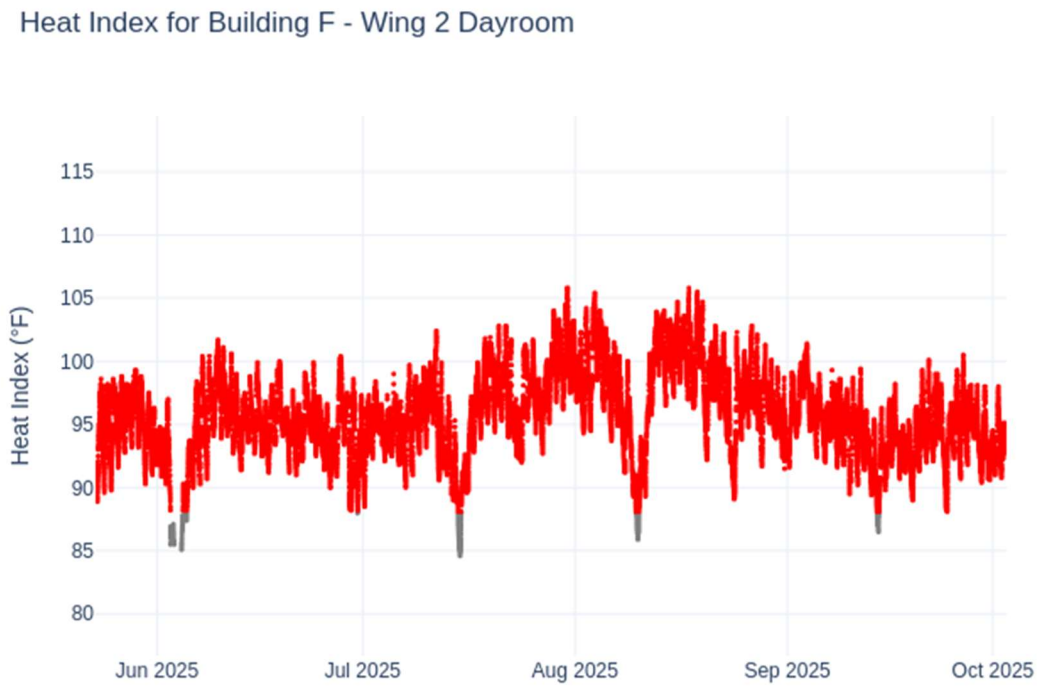

Heat Index for Building D - Wing 2
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

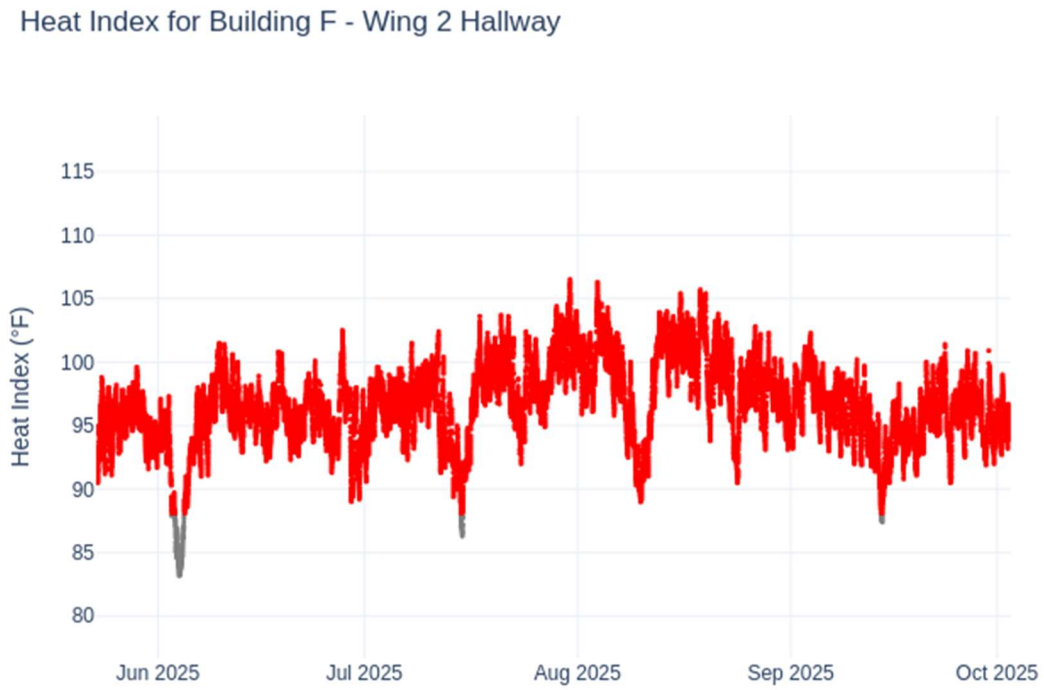

Heat Index for Building E - Wing 1
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

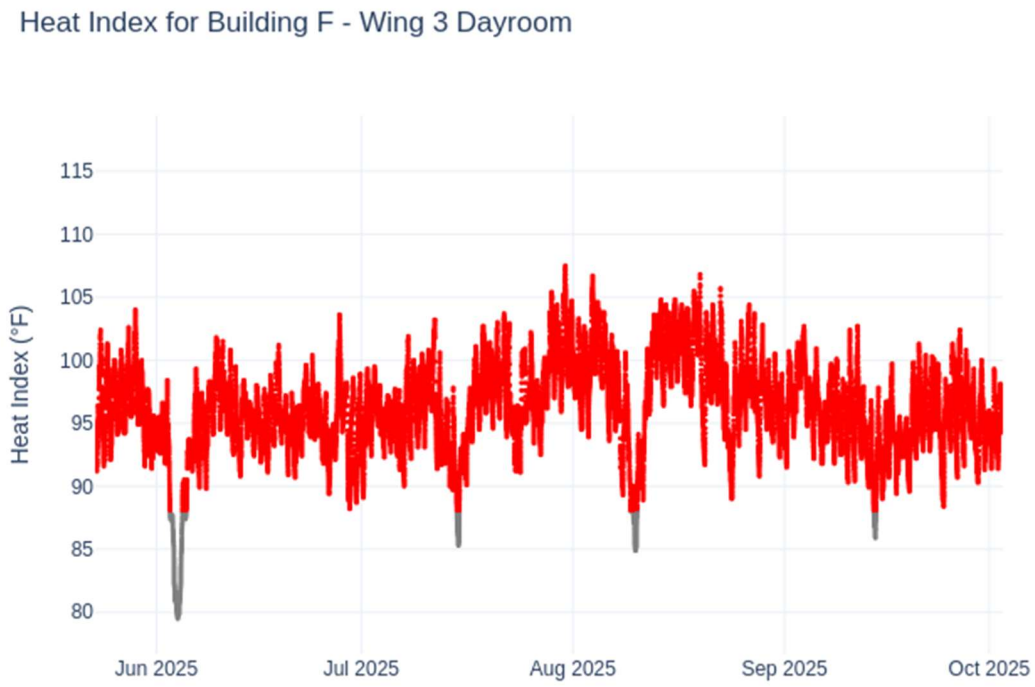

Heat Index for Building E - Wing 2
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

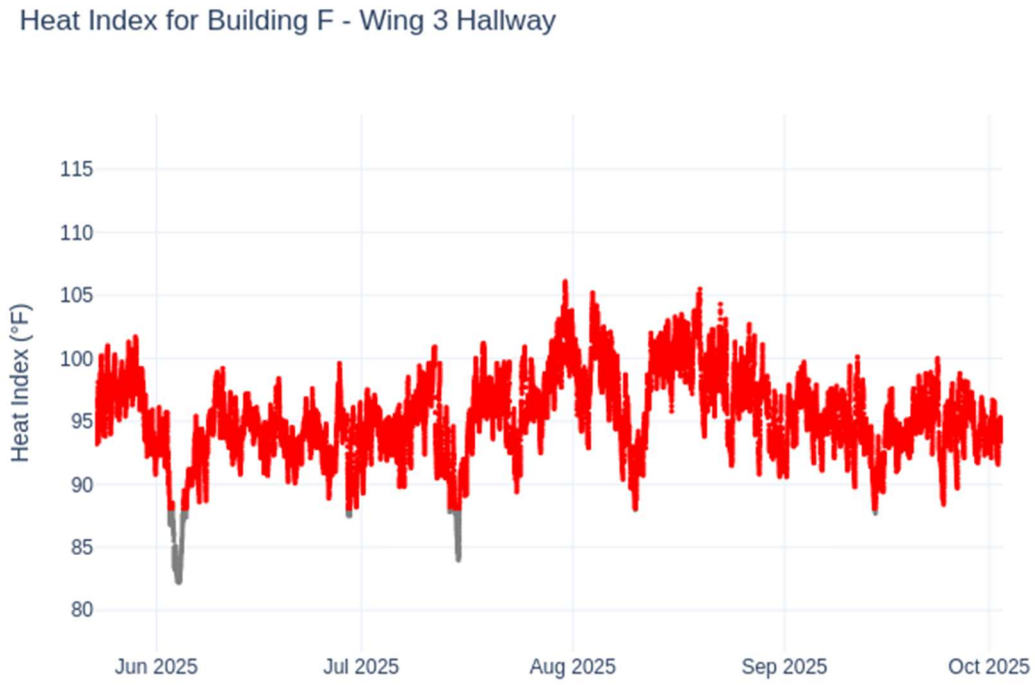

Heat Index for Building F - Wing 1 Dayroom
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

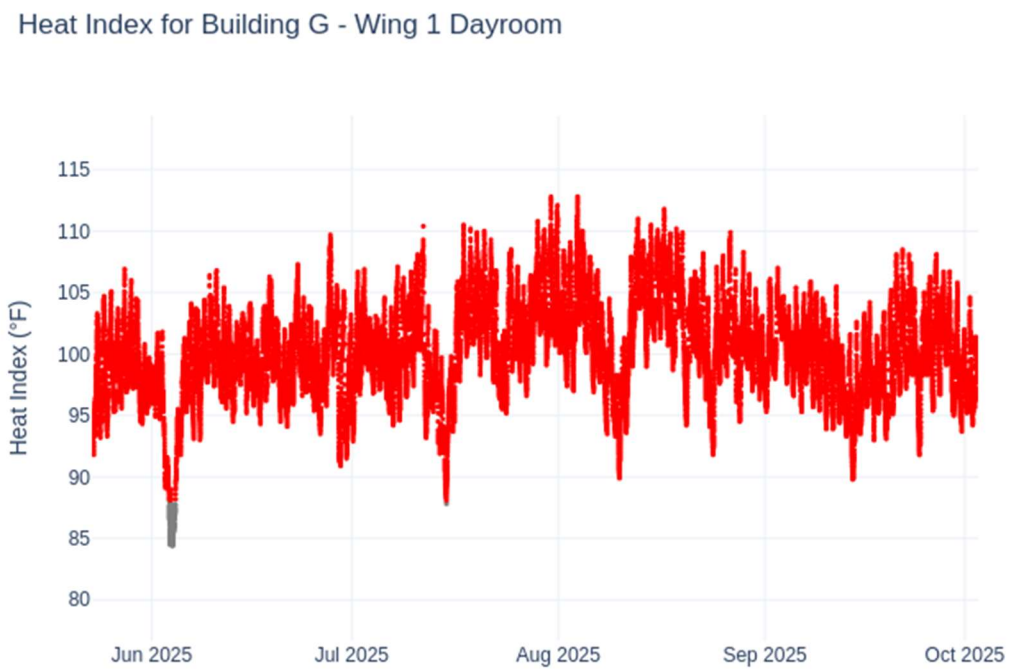

Heat Index for Building F - Wing 1 Hallway
Heat Index (°F)
115
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85
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Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

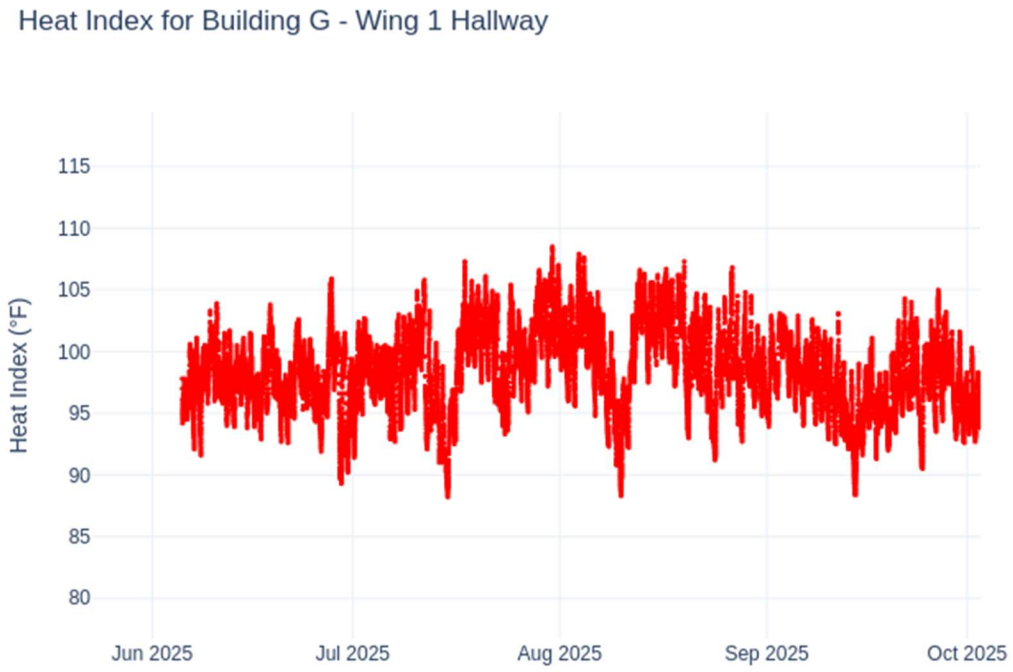

Heat Index for Building F - Wing 2 Dayroom
Heat Index (°F)
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Jun 2025
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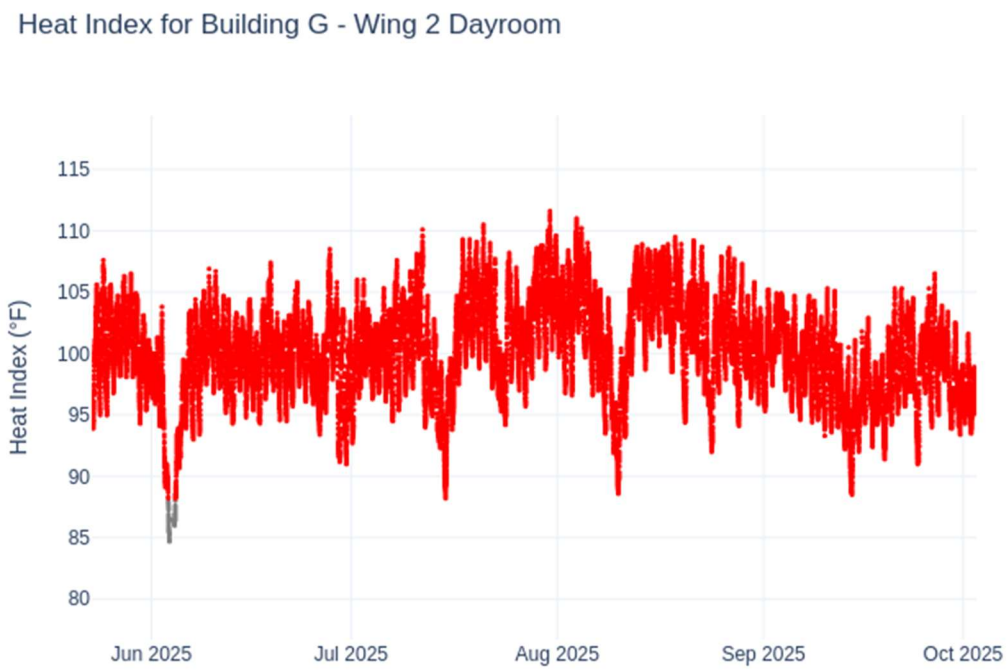

Heat Index for Building F - Wing 2 Hallway
Heat Index (°F)
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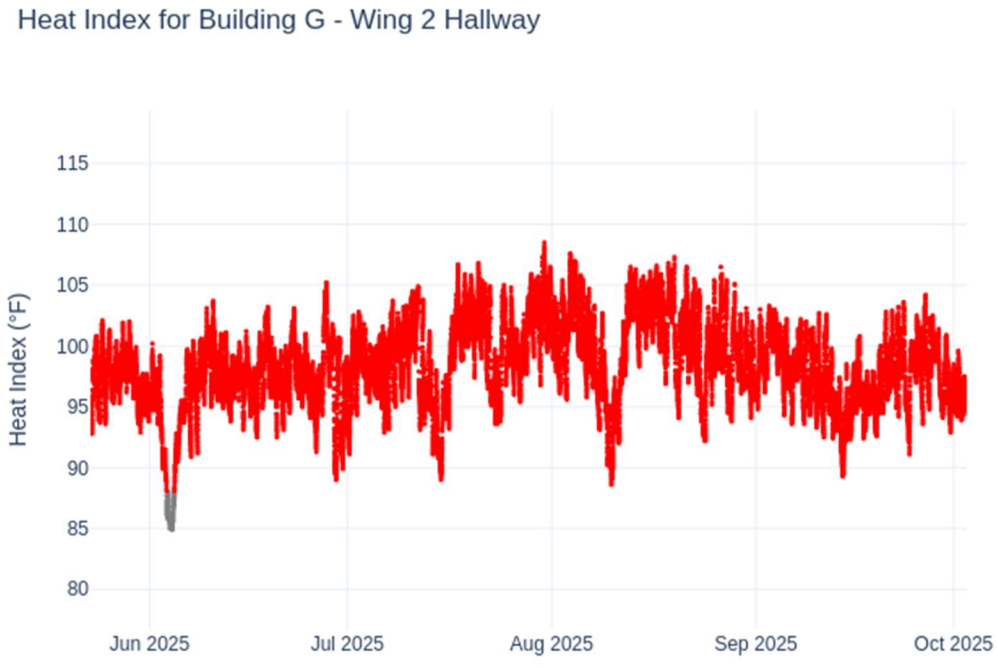

Heat Index for Building F - Wing 3 Dayroom
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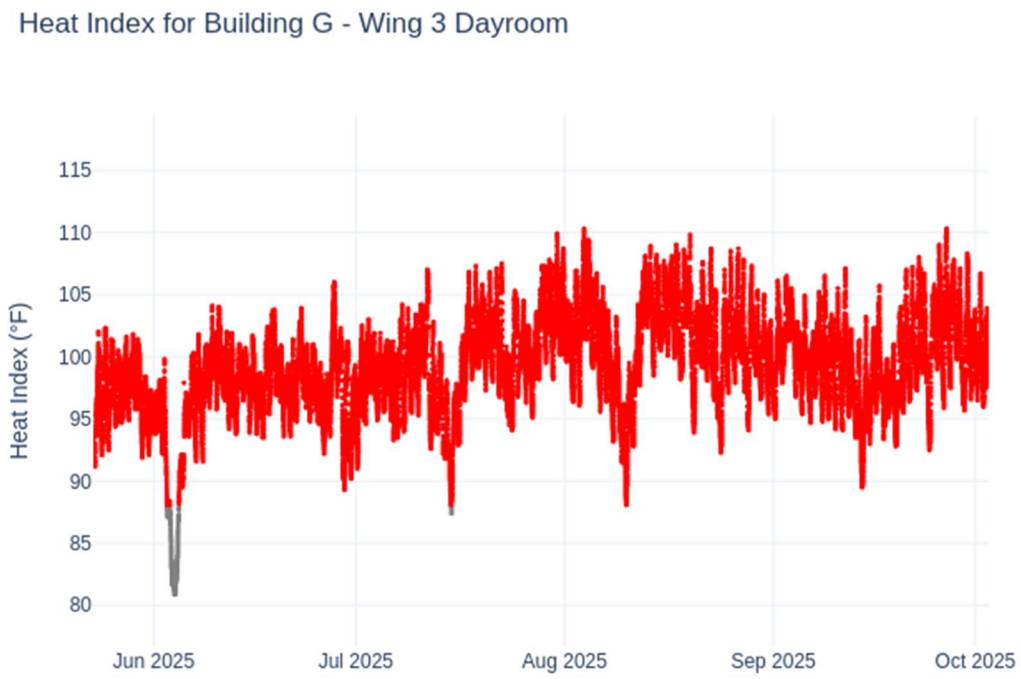

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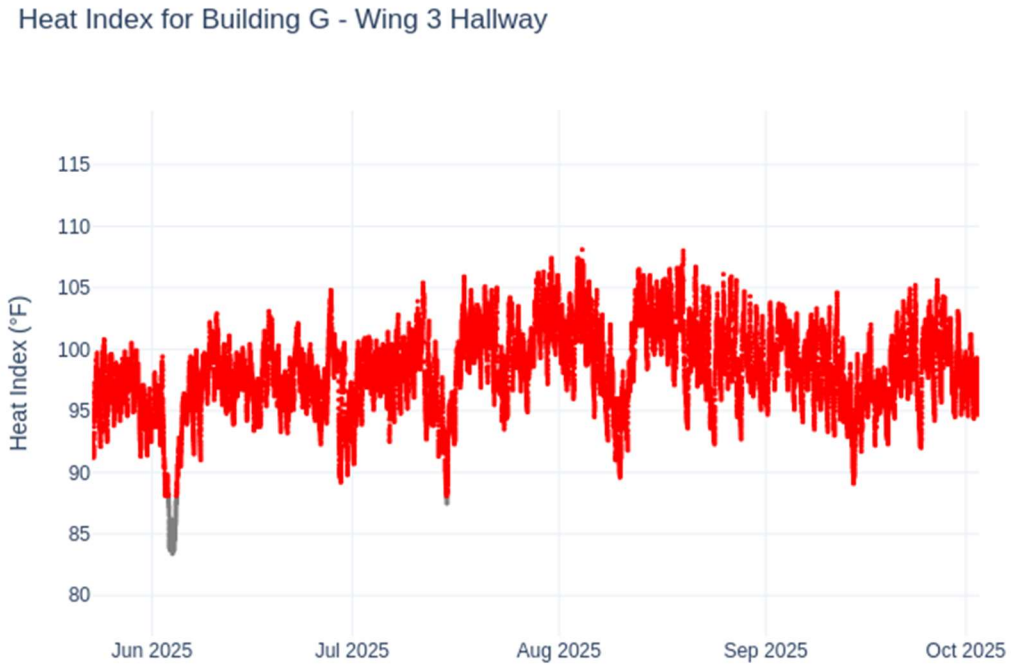

Heat Index for Building G - Wing 1 Dayroom
Heat Index (°F)
115
110
105
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95
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85
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Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

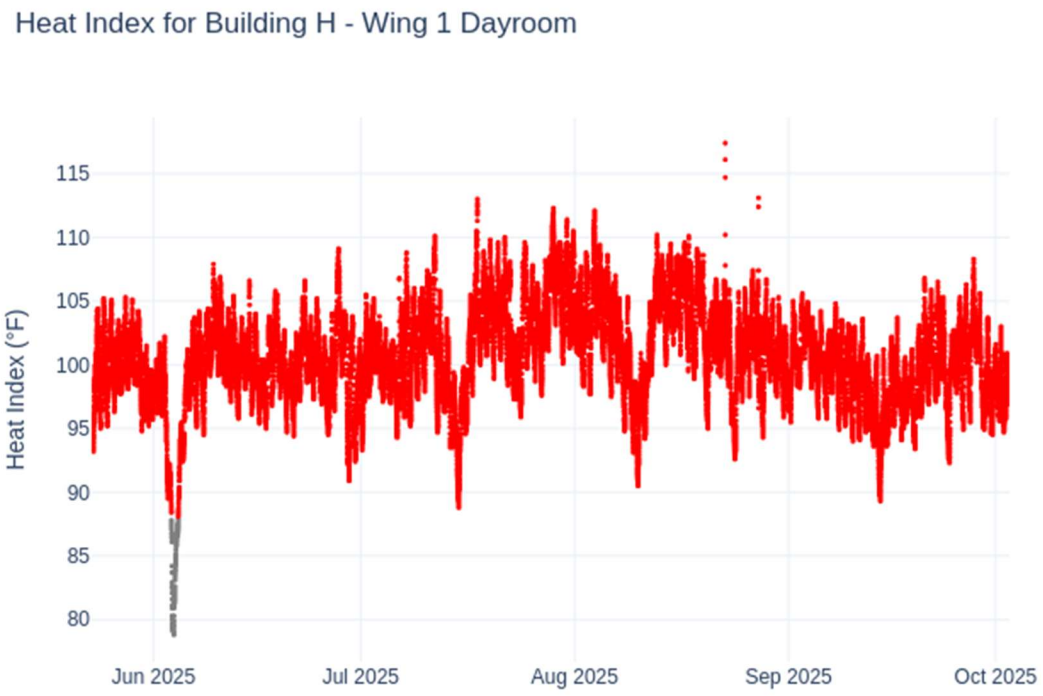

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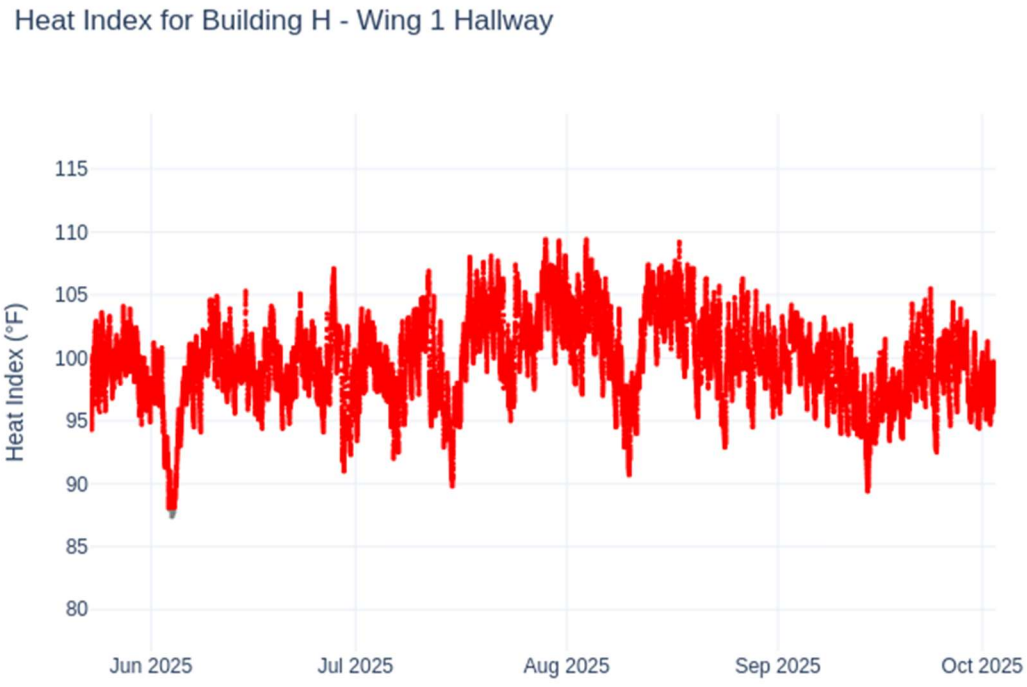

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Oct 2025

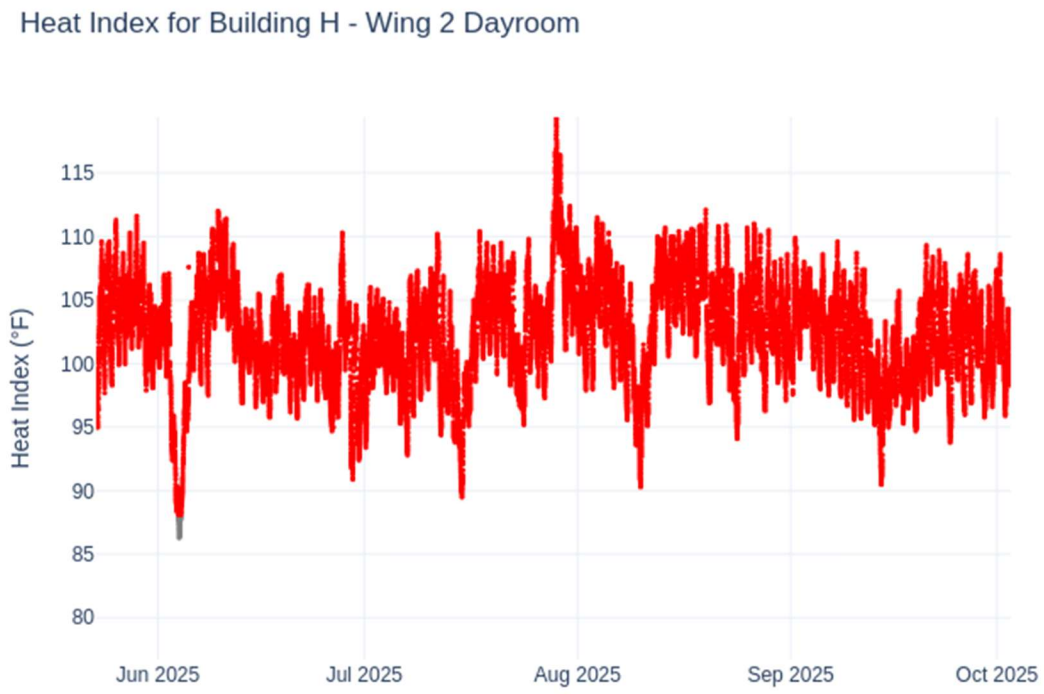

Heat Index for Building G - Wing 2 Hallway
Heat Index (°F)
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105
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95
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85
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Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

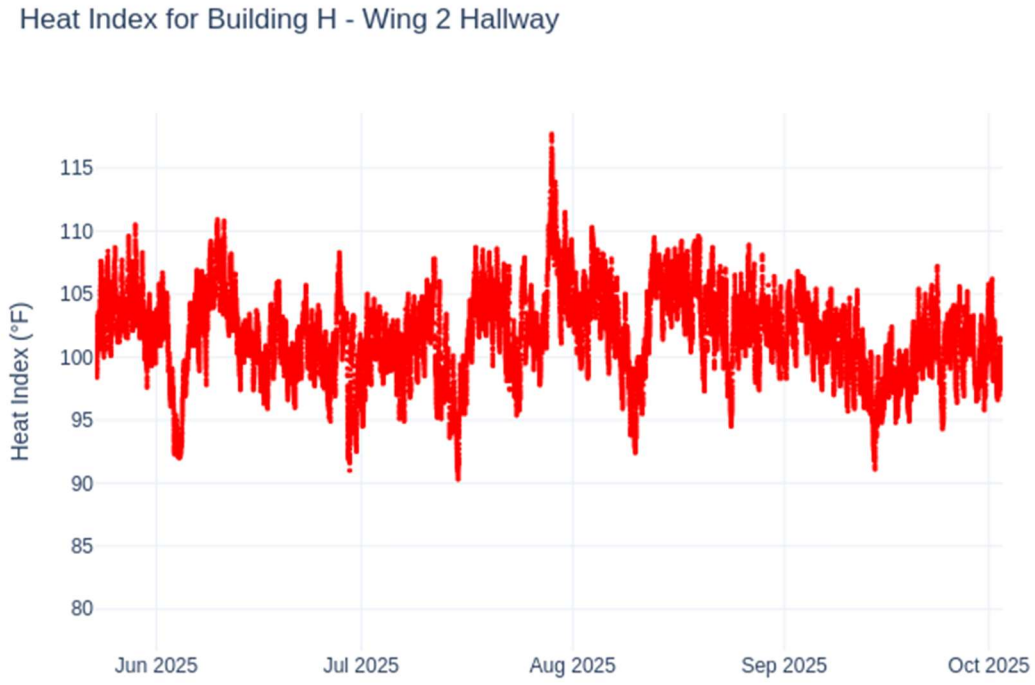

Heat Index for Building G - Wing 3 Dayroom
Heat Index (°F)
115
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105
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95
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85
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Jun 2025
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Aug 2025
Sep 2025
Oct 2025

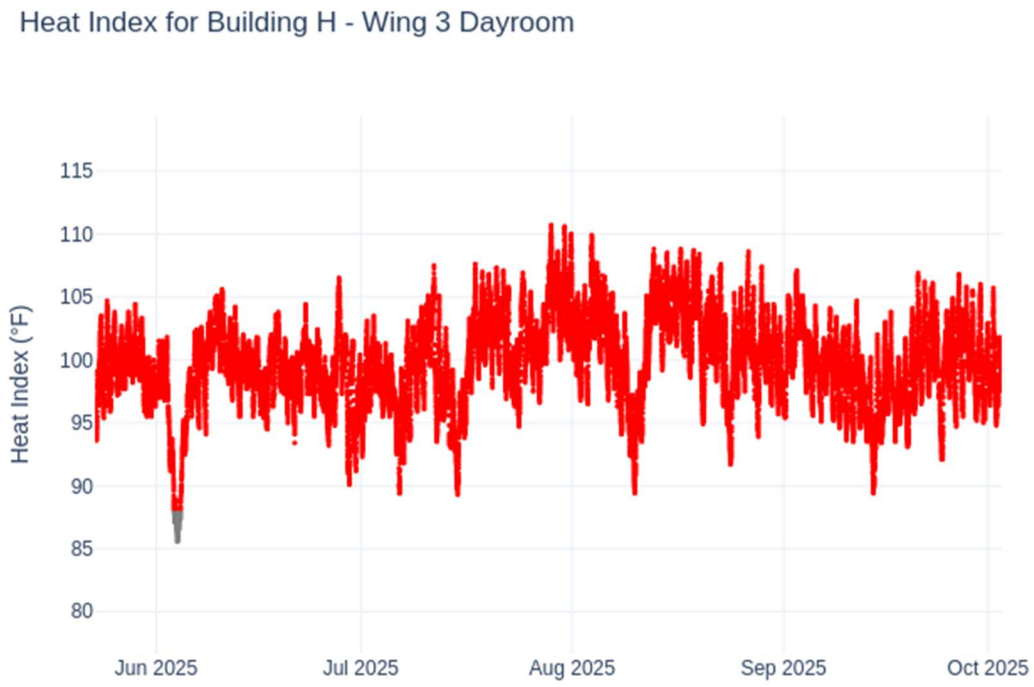

Heat Index for Building G - Wing 3 Hallway
Heat Index (°F)
115
110
105
100
95
90
85
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Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

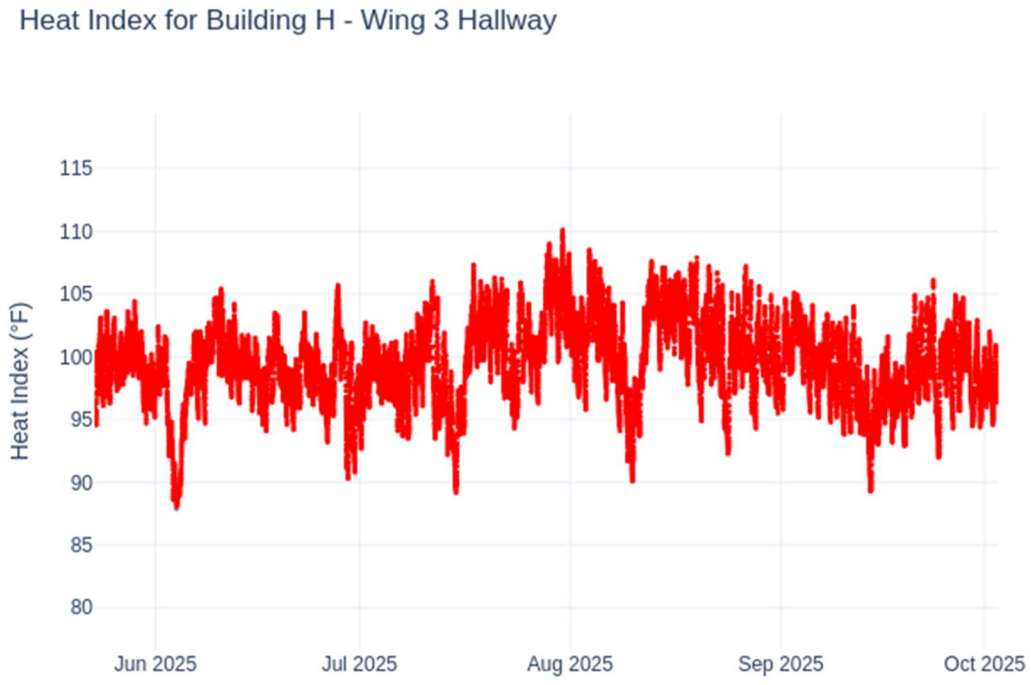

Heat Index for Building H - Wing 1 Dayroom
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025


Heat Index for Building H - Wing 1 Hallway
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025


Heat Index for Building H - Wing 2 Dayroom
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025


Heat Index for Building H - Wing 2 Hallway
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025


Heat Index for Building H - Wing 3 Dayroom
Heat Index (°F)
115
110
105
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95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025


Heat Index for Building H - Wing 3 Hallway
Heat Index (°F)
115
110
105
100
95
90
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Jun 2025
Jul 2025
Aug 2025
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Oct 2025