Design Studio as Intergrated Living Lab for Climate Justice: Houston

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Practitioners, local leaders and agencies in Texas are working together with the undergraduate architecture students at Prairie View A&M University (Historic Black College and University) through a unique service learning program to explore and propose architectural design solutions for the looming push of climate gentrification in historically segregated neighborhoods. Several projects are on the boards to be built as small footprint, scalable, design-build demonstrations. The student designs showcase sustainable building strategies informed through the U.S. Department of Energy, Race to Zero student competition, building science and sustainable building courses, and research of Federal Emergency Management Agency (FEMA) and Fortified Home construction standards. The integrated design studio, Living Lab for Climate Justice, at the School of Architecture, Prairie View A&M University, is rooted in environmental justice and service learning, as a framework for weaving culture, climate and ecology into long-term housing solutions for post-disaster communities facing sustained environmental injustice in the Gulf Coast.

INTRODUCTION

On, August 2017, Hurricane Harvey hit Houston, Texas and left behind compounded devastation in the neighborhoods historically the most impacted by natural disasters and environmental injustice. Harvey began as a wave with a large convective mass (Blake and Zelinsky 2017) moving, transforming, eventually reaching Houston and damaging an estimated 148,413 single family homes primarily through flooding. Of those homes, 53% (78,659) of families are earning at or below 80% of the AMI for Houston and Texas. (HCD 2019) These families living paycheck to paycheck on fixed incomes, without home and flood insurance, of homes are hit the hardest by the challenges of sheltering in place, finding immediate temporary housing, protecting health, maintaining homeownership, and repairing damage from multiple mega-storms. The post-disaster landscape uniquely burdens seniors who are aging in place, with their dependents, in neighborhoods that have been historically segregated. In Houston and other major Cities, the post-disaster milieu reveals that seniors living in previously segregated neighborhoods, current sites of gentrification and reterritorialization, are at high risk of displacement due in large part to compounded lack of access to resources and unequal distribution of aid. Critical regional and geographic environmental justice overlays with vulnerability indexes can position neighborhoods that have been historically exposed to receive equitable funding to rebuild.

ENVIRONMENTAL JUSTICE POST-DISASTER

The U.S. EPA defines environmental justice as “Fair treatment means that no group of people, including racial, ethnic, or socioeconomic groups should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies” (Bullard 2007).

Dr Robert Bullard and his colleague, Dr. Glenn Johnson, have arguably written the most current and action-oriented literature on environmental justice in the United States. Their work collectively describes the legacy of unequal protection and vulnerabilities in communities of color (Bullard and Wright 2009). In Race, Place, and Environmental Justice after Hurricane Katrina: Struggles to Reclaim, Rebuild, and Revitalize New Orleans and the Gulf Coast, Bullard wrote, “The differential effects of this disaster were neither natural nor accidental. Moreover, race seems to be the most significant predictor of disparities that are tied to an existing system of privilege for some and discrimination against others” (2009). In Growing Smarter: Achieving Livable Communities, Environmental Justice, and Regional Equity, Bullard’s extensive environmental policy work in the Deep South reveals that “people of color have borne greater health and environmental risks than society at large, independent of income and class status” (2007). Bullard also looks at the consequences of the FEMA trailers that were deployed as a temporary housing solution (2009). Residents waiting to rebuild were exposed to toxic indoor air quality attributed to high levels of formaldehyde from the glues, plastics, and panels of the building materials. Two years after the storm, the Federal program negatively impacted, “more than 65,000 Gulf Coast families, an estimated 195,000 people, were living in FEMA trailers” (Bullard 2009). Federal court later ruled that that FEMA acted unethically throughout the process of administering the program.

Figure 1. Rosia Wilkerson and daughters. Image by Ronald Jones. 2017.

INTEGRATED LIVING LAB FOR CLIMATE JUSTICE

Service learning curriculum offers students intimate exposure to a place, through experience which enables them to more deeply integrate the regionally responsive strategies that they read about in: the Living Building Challenge; the U.S. Department of Energy, Race to Zero student competition; the American Institute of Architects (AIA), Committee on the Environment, Top 10 Measures and some LEED Credits.

The first line of flight in the Living Lab for Climate Justice is an encounter with residents through the collection of oral histories, walking audits, mapping exercises, and community meetings. These encounters generate the first seed of co-creation, giving voice to residents. Through dialogue, a new place emerges. Often, students and senior residents bond during the collection of oral histories. Examples from their conversations and oral histories collected are presented in the next section. One student, Sean Benson, reflects on the experience:

"It's rare that you actually get to meet the people that you could potentially affect and that's something that has kind of become standard in our studio. It's interesting, you learn a lot about people, about yourself, about how to work with people and I almost want to say, power, that you have when you are an architect." (2016)

Students have curated and output historic research, maps, diagrams, energy models, daylighting analysis, construction drawings, wall sections, building envelope prototypes, walking audits, charrettes, life-cycle and life-cost analysis, wood, formal and informal design reviews and countless presentations. They have met and worked with various neighborhood residents in multiple neighborhoods in Houston; mechanical, structural, and civil engineers; energy modelers, HERs raters, LEED and Passive House Alliance professionals; City planners and council members; local, regional and national experts with all the various certifications designed to push and pull our profession today. They have attended community meetings and national conferences, sharing knowledge and pushing each other as they worked in teams of different sizes, transcending individual studios and semesters. Some students have become Passive House certified. The work has received numerous awards and recognitions from the U.S. Department of Energy, Race to Zero student competition; the City of Houston; the Houston AIA; and the Texas Society of Architects. The design studio as integrated Living Lab for Climate Justice is adaptive and evolves over time, the upcoming academic curriculum will include breaking ground

on an accessory dwelling unit and increased air and water quality testing in the field.

To build long-term connectivity with the community, the Living Lab for Climate Justice relies on partnerships with local non-profits, specifically; Living Paradigm CDC, Avenue CDC, and Houston Habitat for Humanity. In one case, the homeowner met a former student of the Living Lab for Climate Justice, serving as a Design Fellow for Living Paradigm CDC. They worked on one phase, implementing low impact site development in partnership with Avenue CDC. Later that Fall and again in the Spring, a small group of new architecture students from the Living Lab for Climate Justice would sit around the homeowner's kitchen table, listen to stories of picking blackberries and receive grandmotherly encouragement. Then they would go to the backyard to help cut the grass, draw, measure, and observe. The original home her father had built would be completely physically dismantled in a few days. The students would return over the course of their semester to help salvage the wood and share their work as they developed an accessory dwelling unit for aging in place and sheltering in place. The homeowner, City planners, and other partners would visit the students in their studio on campus. They would review models, as-built drawings, research, and designs for something new, something hurricane-ready. Figure 3 is an as-built drawing of the structure and weather diagram by a student who went on to participate in the Friends of the Texas Historical Commission Preservation Scholars Program.

ORAL HISTORIES

Resident reflections on climate gentrification during oral history interviews with the students of the Living Lab for Climate Justice inform the design process. "It saddens me, because this is my life, this has been my life, and for the buildings to go down, you are tearing down my memories, they are all gone," one senior, 82, told students in one of the first home interviews (interview with senior, 2015). After Hurricane Harvey, students learned from another senior, 86, that the number of people wanting to buy her home "no matter what shape it is in" has increased to multiple letters and phone calls each week and the stress that it brings:

"I asked them, did you see a for sale sign out front? I get letters all the time. People wanting to buy the house. If I sell my house, what am I going to do? I've got to live somewhere. I'll have to pay rent to somebody else, so why should I sell my house when I own it and move somewhere else? Hell no.. I'll be right here till Jesus comes." (interview with senior, 2019)

Another homeowner, Ms Wilkerson, 77, sits on the front porch of a worn, wood clad structure that she has been court ordered to tear down post-Harvey and recalls when her father built the Fifth Ward home (Figure 1). Less than eighty feet away, a train pulls slowly by. Loud metal sounds grind and screech interrupting the interview. We move inside to the front home, the newer one, built when she was 14. This is the slab on grade home that Harvey destroyed. We set back up in the gutted belly of the whale. Once the kitchen area, we can now see through the stud wall to the bathroom and bedroom beyond. She finishes the oral history, "Harvey was a little scary to me, because I had experienced floods before, but nothing like Harvey. It never stopped raining, the water never stopped coming in the house. The next morning when we all awoke, we stepped in water" (Wilkerson 2017). She describes not being able to reach the convention center, living with mold post-Ike, being grateful for volunteers and incremental aid received throughout the years after other storms. Figure 4 shows the driving routes from Ms. Wilkerson's home to two different municipal shelters and one private shelter that were offered. Road flooding prevented her and her family from leaving their home. She mourns the loss of her brother, a verteran who was receiving in home care, who died two months after the storm. She describes the family history and the original home her father built:

"We moved here in 1947, I was 7 years old at the time. It was only four rooms to the house. We had the experience of burning wood. We used, what you call, relief stations outside the home. We didn't have sewage at that time. We only had lights. We didn't have but one wall to the house and facing the north we felt much coldness, in the winter and plenty (of) heat in the summer." (Wilkerson 2017)

CONCLUSION

A scientific synopsis of Hurricane Harvey details the path of the storm across the Atlantic Ocean with its blip moment near Houston. Herein lies the truth architects hold close, impacts from natural disasters and mega-storms exacerbate and reveal gaps in our infrastructure, built environments and social systems. This is recognized in communities of color, who have been income deprived and lack access to resources. The design studio as integrated Living Lab for Climate Justice wasn't just born out of the Harvey event, or the previous Hurricane Ike, Katrina, or any other tropical storm in the past 100 years. It emerged out of the legacies of humanitarian architecture programs in our Country, a ubiquitous need for affordable housing, and an acknowledgement that no architectural act, as Lebbeus Woods theorized, is apolitical.

A large disparity exists between the number of homes throughout the neighborhoods discussed still in need of repair after Harvey and the number of homes actually repaired by the City of Houston, Housing and Community Development, two-years after the storm. Of 148,000 homes that were flooded, 14 homes, representing various incomes and demographics were rebuilt by the City of Houston, Housing and Community Development (2019). Of the 20,589 homeowners who registered for assistance 70% were non-white (HCD 2019). Only 14% of low income households (80% below AMI) flooded reached out to the City for assistance. Of the 11,724 low-income households that reached out, 57% are seniors.

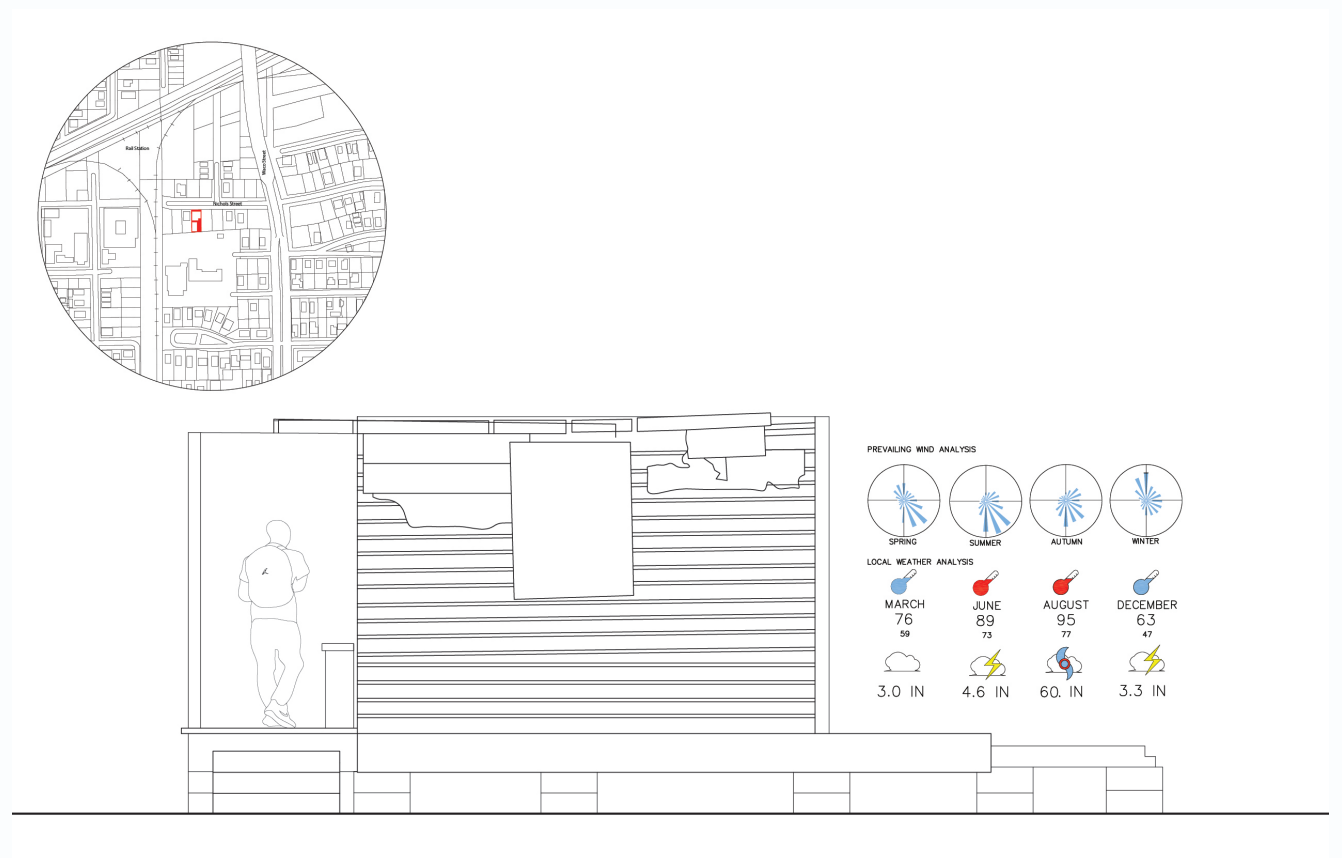

Figure 3. As-built drawing of Rosia Wilkerson's original home and weather diagram. Image by architecture students, Jovany De Los Santos and Allen Johnson. 2019.

Through the lens of environmental justice, climate change must be viewed over extended periods of time and the vulnerability of neighborhoods. The post-disaster landscape is uniquely positioned as a triangulation of data, resources and opportunity to support the rebirth of neighborhoods aging in place. This is the stuff of resilience that architects seek in our constructed systems and landscapes. These are the exercises that empower the students of the Living Lab for Climate Justice and propel them toward sustainability focused positions with firms and companies when they graduate. Architecture student, Yasmine Parker, said, "It isn't just about getting an A in studio, or getting a degree in architecture or construction science, or whatever have you. It's so much more, and it's so much more rewarding" (2016). Through shared participation, these are the sensibilities and lessons that they carry with them.

ENDNOTES

1. Benson, Sean. 2016. Interview by Ronald Jones. Houston. 2016.
2. Blake, Eric S. and David A. Zelinsky. 2017. National Hurricane Center Tropical Cyclone Report: Hurricane Harvey. May 9, 2018. National Hurricane Center. U.S. Department of Commerce, National Oceanic and Atmospheric Administration.
3. Bullard, Robert D. and Beverly Wright. 2009. Race, Place, and Environmental Justice After Hurricane Katrina: Struggles to Reclaim, Rebuild, and Revitalize New Orleans and the Gulf Coast. Boulder, CO: Westview Press, 2009.
4. Bullard, Robert D. 2007. Growing Smarter: Achieving Livable Communities, Environmental Justice, and Regional Equity. Cambridge, MA: Massachusetts Institute of Technology Press, 2007.
5. City of Houston, Housing and Community Development (HCD). 2019. City of Houston Build it Forward Homeowner Assistance Program Situation and Pipeline Report #5. Houston.
6. Parker, Yasmine. 2016. Interview by Ronald Jones. Houston. 2016.
7. Wilkerson, Rosia. 2017. Interview by author. Houston. 2017.

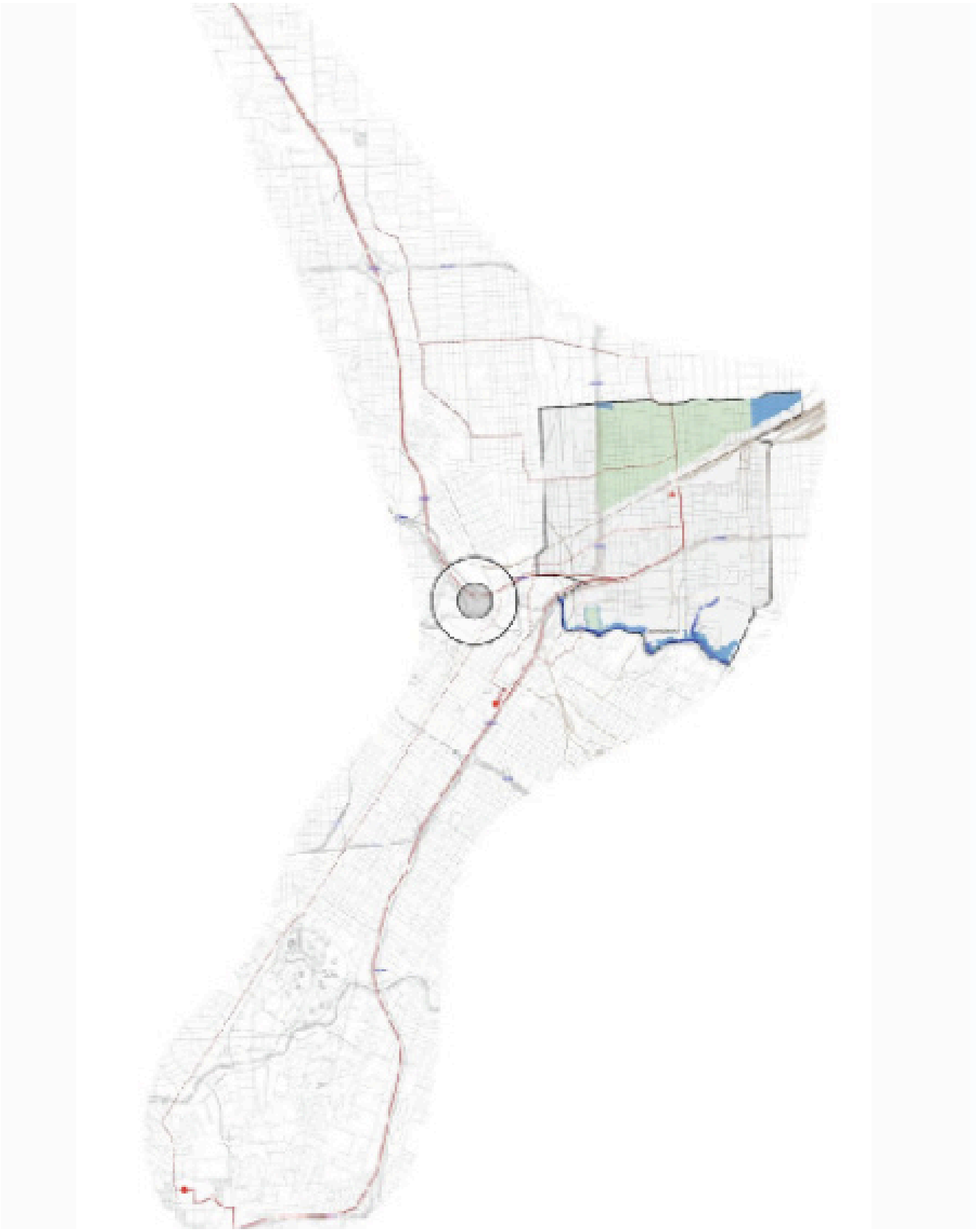

Figure 4. Evacuation routes to nearest storm shelters. Image by architecture student, Zirren Maren. May, 2019.