

## Expanded Sustainability: Supporting a Design Strategy of Stewardship

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Our firm has been studying design as a force of positive social effect for the past ten years. We believe that this mission is one of the most important an architect and citizen of the world can embrace. In all areas of practice, there are important and delicate relationships between culture, community, and climate. We believe it is of utmost importance to maintain, sustain, and promote these relationships in the built environment. It is imperative that the architect contributes to the continuum of the culture as well as the environment. We must be vigilant in our pursuit to understand the principles that led to such an identifiable and vibrant relationship between culture, community, and climate. We must be vigilant to understand that no culture is stagnant.

We live, practice, and teach in Southern Louisiana; a place that is identified almost universally as extraordinarily rich in our strong connections between culture, community and climate. Southern Louisiana provides a rich canvas in which to study how the built environment can engage an expanded definition of sustainability that includes cultural sustainability along with the more expected climatic and material definitions. The expanded understanding of sustainability to include the maintenance and promotion of climatic and cultural strategies allows us to vivify, to analyze, and to create relevant building strategies in the physical, cultural, and phenomenal identity that is Southern Louisiana. This paper will discuss these notions through three awarded and peer reviewed design projects by our office: two house prototypes for Habitat for Humanity, the HHsg and the Veranda House, and Slip-Joint Housing for the High Density for Higher Ground competition.



Fig. 1: HHsg

### HABITAT // HHSg HOUSE

The first two projects originate with a request from our local chapter of Habitat for Humanity to re-visit their housing prototype. We believe that the mission of 'Habitat for Humanity' to provide 'simple, decent, and affordable' housing for the public is one that is worthy of investigation. Because of the deep sense of community reliant on cultural identity Southern Louisiana provides a canvas in which to complete this mission. Thusly, this strong rooted community identified universally as unique requires a specific and regionally relevant response to the 'Habitat for Humanity' mission.

### INSPIRATION

The shotgun housing type provides us with a clear built example of the connection between these

relationships. Developed by the Native Peoples of the Caribbean Islands (African slaves brought to help develop agriculture) the shotgun house is geographically distributed where French imported slaves descended (southern Louisiana, especially in and around New Orleans.) Locally, it is culturally, historically, and aesthetically familiar. Physically, a shotgun house is elevated off the ground, with one room placed behind the other in a linear fashion without a hallway. A door to one side of the room lines up from the front door to the back. The porch and front door were on the narrow end of the building with the roof ridge perpendicular to the street. <sup>1</sup> We start with the traditional, delineating its relevant cultural and physical components and then use these principles to address contemporary concerns. The HHsg house is the resultant of this analysis. It provides a 'simple, decent, and affordable' home and establishes pride of place by sustaining the local culture, climate and community.

### CULTURAL SUSTAINABILITY

The cultural sustainability of the HHsg starts with a clear architectural diagram of the range from community to private space. The front porch is a space that is a cultural necessity. It allows the inhabitants to communicate with the street and define their individuality within the greater community. It is the place where stories are told, public information is exchanged, and unique personal flair is established. It is the public face of the house. It must have integrity and be a PLACE to be, not just a front door or small covered area. The extension of the gable creates the porch and draws the house towards the street. It gives space to the façade extending the space within the house into the community. The porch is not a privilege; it is a necessity if one is to live with a sense of pride, both civic and personal, in the American South. The living and dining room are next in the range from public to private, with the kitchen at the back, adjacent to the back porch. Since one is invited into the kitchen, it acts as a semi-private space. It is a private room for the family where guests are received; similar to the occupancy of its adjacent back porch. Lying immediately adjacent to the interior public spaces, are the HHsg private spaces. They are banded together, clearly dividing the house into public and private zones. They are not separated by a hallway, which wastes space,

but by the strong spatial line created by the central bearing wall.

### CLIMATIC SUSTAINABILITY: HOT AND HUMID CLIMATES

For the HHsg house, the basic tenets of climatic sustainability found in the shotgun house are combined with other qualities to provide a built diagram of climatically relevant solutions for a hot and humid climate. The thin linear one-room design of the shotgun promotes cooling and internal airflow. High ceilings with centered ceiling fans draw the hot air up and combined with the operable gable windows remove the hot air to the outside. The steep metal roofs provide the necessary attic space to help release the hot air and drain the abundant rainfall. Other climatic responses include:

- a. raised floor to allow for cooling air circulation below
- b. thin, light-colored exterior walls to minimize daytime heat gain
- c. large, reflective roofs to minimize solar gain
- d. porches with overhangs and lattice screens to shield high summer sun and to allow low winter sun: provide environmental shading
- e. long thin plan with aligned openings to promote circulation and air draw
- f. ventilation to the roof space and insulation to the ceiling minimize heat storage
- g. fenestration is climatically responsive, more on the north, less on the south; windows/doorways are aligned to allow for cross-ventilation. A high window in the high ceiling living room promotes the release of hot air.

The HHsg prototype utilizes the balloon-frame building system. It is fast, efficient, easily learned, and does not require specialized machinery. It is the construction system Habitat presently employs. The building form is simple and does not require complex framing or carpentry joining knowledge. It is also locally familiar. The exterior materials, Hardie-plank, wolmanized lumber, and metal roofing are climatically appropriate, have long lives, and minimize maintenance such as painting and re-roofing. The details and decorations are composed of standard readily available materials. It is in their assembly and variations that they become unique place-makers for the owner.



Fig. 2: Veranda

## HABITAT // VERANDA HOUSE

### INSPIRATION

veranda, verandah, n. (Port. *varanda*, a balcony, of Hindu origin.) a kind of open portico or porch, usually roofed, extending along the outside of a building; a porch; a piazza. <sup>2</sup>

The second house is inspired by the tropical dwellings found in Malaysian kampongs. The traditional Malay house is characterized by a post and beam timber frame with lightweight screen walls. The roof is supported from the frame and is steeply pitched to create an attic space under the roof. Large gables are placed at each end of the space. Ventilation to the attic space is provided through the gable walls. These walls are split into segments, which are inclining and displaced. This has two functions, first preventing low angle sun from penetrating the attic and second providing ventilation. The roof overhangs also cover external terrace and provide a shaded inside/outside space for family interaction. The dwellings sit on stilts to encourage airflow under the floor and to provide outside storage space. Interiorly, the room layouts are simple and practical with many spaces being multifunctional. The use of internal partitions is minimal which responds to the cultural and social demands of the occupiers whilst also encouraging effective cross ventilation.

### CULTURAL SUSTAINABILITY

The Veranda House transforms the architecture of a veranda into an overall design language. Two

verandas frame the proposal: one at roof level and one adjacent to the south side. They serve as the cultural response to the requisite porch, yet their arrangement and orientation deviate from the traditional. The roof veranda serves as the public exterior room where communication occurs. It addresses the street, establishes the owner's identity, and presents the home to the neighborhood. Its placement above the home provides better vantage of the street and gives precedence to this necessary cultural transitional space between public and private. It also allows the external elements surrounding the house to bleed through, creating a unique façade wherever it is placed. The side veranda creates a semi-private exterior room. Its adjacency to the private portion of the interior results in a change of program from the more social roof veranda. On the side veranda, laundry can be hung, outside toys can be stored, and children can play under the watchful eye from the kitchen. It also provides sheltered entry from the drive into the private portion.

In response to the culture of Habitat to provide 'simple, decent, and affordable' housing, the Veranda House provides an expandable design. The base design consists of the required program of three bedrooms, one bathroom, living, dining, and kitchen. The house can be added to or subtracted from as needed by the prospective owner without disturbing the overall aesthetic or construction. Since Habitat for Humanity builds homes for a variety of owners, the Veranda House provides a simple yet flexible design.

### CLIMATIC SUSTAINABILITY: HOT AND HUMID CLIMATES

The climatic responses of a Malay house inspire the Veranda House with a roof dominant architecture. In hot and humid climates, the appropriate methods for energy efficiency are as follows: to minimize heat gain, to maximize ventilation, and to maximize shading. The roof addresses these methods. The Veranda House uses the roof veranda as a defensive element providing rain and sun protection to the walls (shape and structure), shading the external spaces from extreme heat (reflective material), and diffusing the natural light (overhangs and fiberglass sheets). The side veranda also responds to the climate by providing much needed shade on the south face, reduc-

ing ultraviolet radiation and heat gain. It can also serve as an armature for plants to promote evaporative cooling. These verandas, in a sense, are intermediate zones between building and climate, sheltering and shading spaces.

- a. raised floor to allow for cooling air circulation below
- b. thin, light-colored exterior walls to minimize daytime heat gain
- c. fenestration is climatically responsive, more on the north, less on the south; windows and doors are aligned to allow for cross-ventilation
- d. inclined south wall combined with veranda blocks extreme heat gain

The Veranda prototype makes use of SIPs, structurally insulated panels. SIPs are high-performance building panels for floors, walls, and roofs in residential construction and have been used by many Habitat for Humanity chapters. Homes built using SIPs have been tested for air-tightness and have proved to be superior to the typical 2x4 balloon frame construction. Each panel is made using expanded polystyrene (EPS), or polyisocyanurate rigid foam insulation sandwiched between two structural skins of oriented strand board (OSB). Other finish surfaces are available allowing an owner to designate an aesthetic. This aspect can help establish ownership, *'provide them with a sense of pride something worthy of the title HOME'*. SIPs are easy to install since the cutting and fabricating are done in the manufacturing plant. That reduces site labor and the time building materials are exposed to the weather on the job site. SIPs are also made in large sizes up to 8 ft by 24 ft so assembly on-site is faster, work crews are more productive, and the project is "dried-in" sooner. The result is a building system that is very strong, predictable, energy efficient, and cost effective.

### HIGH DENSITY ON HIGHER GROUND// Slip-Joint Housing

As we mentioned in the introduction, there exists in Southern Louisiana a unique hybrid ground for architectural investigations. This ground consists of geological, cultural, ecological, and tectonic conditions that interweave and overlap to create a non-repetitive, patterned identity of multiple and hierarchically understood variables.



Fig. 3: Grand Isle Dwelling

It is easy to pick up and move when the culture you know is all McDonalds....But if you grow up the way I did, in Louisiana, you don't in your travels, find anything like it. <sup>3</sup> *Glen Petre, Harvard educated filmmaker who moved back home to Southern Louisiana.*

We call this hybrid ground the "Terra Viscus: a super-saturated ground, one that is never completely solid or liquid, one that is never in stasis but in a continuous state of being made and being removed." The Terra Viscus condition allows us to vivify, to analyze, and to create relevant building strategies in the physical, cultural, and phenomenal identity that is Southern Louisiana.

Our first project after the catastrophic events of hurricanes Katrina and Rita was an entry into the New Orleans housing competition "High Density for the High Ground" competition, sponsored by McGraw-Hill Construction's Architectural Record and Tulane School of Architecture. The competition brief called for a 160-unit housing community with mixed-use components on a high-ground site by the Mississippi River. In response to our research of the last 7 years, our solution to settlement in the Terra Viscus is a hybrid tectonic, a slip-joint. We re-conceive the traditional strategies at every scale to allow for a contemporary occupation. High Density on High Ground is a hybrid. It demands an expansion of the traditional New Orleans vertical occupational layering (a compact vertical stack of land and/or water\_air\_occupation\_skin\_sky.) hybridizing the traditional vertical occupation as an urban strategy. When both occupation and urban are expanded vertically, multiple

physical, cultural, and phenomenal events can simultaneously occupy the limited high ground.

This proposal allowed us to study ideas of expanded sustainability at a much larger scale. Unlike the two housing prototypes for Habitat where the intention was to maintain, sustain, and promote habitation of a singular building within a typical southern urban fabric, High Density on High Ground demands a new interpretation of the urban fabric. A multi-use, high density urban project in post Katrina New Orleans demands a hybrid solution that sustains at every scale and at every program: geological, infrastructural, domestic, urban form, multi-income housing, public amenities, streetscape, commercial, office, etc. It must be a microcosm of the complex city in which it operates. The slip-joint is a strategy that allows for the absolutes of New Orleans to continue to operate, but not in such a fixed and separate manner that catastrophic failure is the only outcome of movement. When asked the question, 'should New Orleans rebuild itself in the same way, or should we create a new contemporary vision', our answer is yes, both.

The residential occupation begins on higher "Higher Ground." As part of our solution, we created a new "Higher Ground" 28 feet above the original site. The two levels contained below this new ground hold all the parking, lower courtyards, and retail components. It is an area designated for flood if need be, made of structure and materials that except water. Upon the new "Higher Ground", the project consists of four major components: courtyards, levees, battures, and the housing towers. There are 14 towers ranging from four floors to eight floors. They are all connected by a series of gallery walks yet they remain structurally independent to allow for maximum airflow, views, and exposure to natural light. The residential towers are skinny, reminiscent of the shotgun form found throughout the city, as are the typical units. The street facades are clad with a shuttered skin that subtly changes depending on its relationship to the sun; the interior facades the gallery walks shutter. The new "Higher Ground" is made with courtyards, levees, and battures. The new topography these components create, provide the residents with areas to congregate, garden, play, and be outdoors. It also provides views to the city and



Fig. 4: Section

to the river giving this new residency block place in the city.

Why do this? Because our Louisiana Culture is tied to this land and always has been.<sup>4</sup>  
AmeriCorps Volunteer, Ian Richard

In order to achieve the phenomenal identity of the *High Density for Higher Ground* proposal we attempted to hybridize accepted physical and cultural design strategies. This hybridization creates sustainable habitation in the Terra Viscus. A habitation that refuses the either/or design strategy (tradition vs. modern, cultural vs. physical, natural vs. manmade). The both/and approach results in the Slip-Joint tectonic.



Fig. 5: Living in the Skin

**STRUCTURED LAND:****Cultural Sustainability**

The land itself is both natural and tectonic.

It is built up, reinforced, layered over time.

The land lifts and delaminates to allow for multiple occupations and programs.

Parking, access, open levee parks at the river edge, bocage, dense planted courtyards.

**Physical Sustainability**

Permeable and tilted surfaces accept and structure the water flow.

Raised surfaces allow for cooling air to circulate below.

Covered parking reduces heat gain and allows for shelter.

Planted levee parks reduce heat gain.

Shaded, densely planted courtyard reduces heat gain.

Bocage buffers river and train sounds, produces oxygen, and masks levee wall.

Concrete structure grounds the thermal mass.

**URBAN OCCUPATION:****Cultural Sustainability**

Commercial spaces and main entry create the street edge and protect the courtyard.

Private spaces and views are directed to the river.

Open Galleries negotiate public from private space and provide 'eyes on the street'.

**Physical Sustainability**

Thin deep forms allow for maximum ventilation, force airflow, reduce building mass and allow for natural light penetration into block.

Open Galleries provide shade and shelter and reduce cooling loads

**HUMAN OCCUPATION:****Cultural Sustainability**

Thin deep forms are closely spaced and lie perpendicular to the street/river.

Open to closed spaces and public to private spaces are lined end to end delineating the traditional order.

They have porches, both in front (public) and rear (private).

Traditional spatial and programmatic relationships are maintained.

1 Bed: shotgun, 2 Bed: shotgun double, 3 Bed: camelback shotgun.

**Physical Sustainability**

Thin deep forms have aligned openings to promote circulation and air draw.

Thin, light-colored exterior walls to minimize daytime heat gain.

Porches at either end protect the interior space from solar gain and rain.

**SKIN:****Cultural Sustainability**

Roof, shutters, and rails are a continuous cultural skin.

It wraps the building to create the primary reading of façade.

Permeable planted roofs provide exterior recreation space.

Shutters provide personal control of space.

**Physical Sustainability**

Skin reacts to sun orientation.

It creates a built diagram of climatically relevant solutions for a hot and humid climate.

Horizontal surfaces shield high summer sun and allow low winter sun.

Permeable planted roofs minimize solar gain both interior and urban, produce oxygen, and reduce storm water runoff and heat storage.

Photovoltaic shades shield the roof and provide power.

Shutters provide personal control of light and airflow.

In 1983, the Italian architect Vittorio Gregotti addressed the New York Architectural League and proposed, "that the marking of ground, rather than the primitive hut, is a primordial tectonic act."<sup>5</sup> He stated:

Geography is the description of how the signs of history have become forms, therefore the architectural project is charged with the task of revealing the essence of the geo-environmental context through the transformation of form. The environment is therefore not a system in which to dissolve architecture. On the contrary, it is the most important material from which to develop the project.<sup>6</sup>

Combine this with Kenneth Frampton's position on a "lens of techne,"<sup>7</sup> The 'Hybrid Tectonic Nature' is the most important material from which to develop new strategies for the Gulf Coast. Now, more than ever, we need to make sure to avoid the already apparent tendency to close down discussions. Rebuilding the Gulf Coast should not become an argument between opposing forces and ideals. History has proven that neither is entirely correct. We must resist the false dichotomy of man versus nature, or the impossibly utopian man with nature models. The newer, more vibrant, relationship between settlement and environment could help avoid disaster. This newer more vibrant relationship should center on an expanded view of sustainability; one that refuses the false dichotomies between traditional and contemporary habitation or between traditional and technological environmental solutions. If we are vigilant, and act within the complexities of today's world, we will be able to contribute to both the continuum of culture and the environment.

## ENDNOTES

1. Edward Jon Cazayoux, *A Manual for the Environmental & Climatic Responsive Resoration & Renovation of Older Houses in Louisiana* (Baton Rouge: Department of Natural Resources, Technology Assessment Division, Energy Section, 2003), 9.

2. Merriam Webster, *The Merriam-Webster Dictionary*, New Revised edition (Springfield, MA: Merriam-Webster Inc. July 2004).

3. Blaine Harden, "Born On The Bayou and Barely Feeling any Urge to Roam," *New York Times*, Sept. 30, 2002, A1.

4. Mike Tidwell, *Bayou Farewell* (New York: Pantheon Books, 2003), 272.

5. Vittorio Gregotti, 'Lecture at New York Architectural League,' *Section A*. (No. 1 Feb/Mar 1983.)

6. Ibid.

7. With the tectonic in mind, it is possible to posit a revised account of the history of modern architecture, for when the entire trajectory is reinterpreted through the lens of techne certain patterns emerge and others recede. Seen in this light a tectonic impulse may be traced across the century, uniting diverse works irrespective of their different origins. In this process well-known affinities are further reinforced, while others recede and hitherto unremarked connections emerge asserting the importance of criteria that lie beyond superficial stylistic differences.

Kenneth Frampton, "Rappel à l'Ordre: The Case for the Tectonic," *labour, work, and architecture* (London: Phaidon Press, 2002), 99.