LEVE KANPE (Rise Up): Creating Viable Communities in Haiti

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INTRODUCTION

A home, by definition is, "someplace where one lives" [1] But what does it really mean to live? The idea of "living" in first world countries often brings to mind a level of comfort and an enjoyment of daily life. However, in developing countries, like Haiti, living is mostly just surviving. There is little opportunity for life's comforts. What role can architecture play in the transition from surviving to living? In his book, *The Invisible Houses*, author Gonzalo Lizarralde offers insight to this question. He writes:

> *"The 'housing problem' in developing countries is not actually a problem of missing or inadequate dwellings, and its solution is not merely the provision of shelters. Rather, it involves creating conditions in which people can live lives they have reason to value."*[2]

All too often our architectural response in developing countries like Haiti is simply, as Lizarralde notes, "the provision of shelters". This response needs to change.

History of Challenges

For much of its history Haiti has struggled as a nation. Originally achieving independence from France in 1804 after a successful slave revolt, Haiti has undergone years of political and economic turmoil. Long ranked as the poorest country in the Western hemisphere, an estimated 80% of the population live under the poverty line with 54% in abject poverty.[3]

The small island is also no stranger to natural disasters. Haiti is frequently impacted by hurricanes and flooding. In 2010 an earthquake with a magnitude of 7.0 on the Richter scale "destroyed 105,000 houses, damaged 85,000 more and left more than 1.5 million people homeless. It took about 30

[1] *Merriam Webster d*efinition of home. http://www.merriam-webster.com/dictionary/home.

[2] Lizzarralde, Gonzalo. 2015. *The Invisible Houses: Rethinking and designing low-cost housing in developing countries.*

[3] Haiti is a free market economy that enjoys the advantages of low labor costs and tariff-free access to the US for many of its exports. Poverty, corruption, vulnerability to natural disasters, and low levels of education for much of the population are among Haiti's most serious impediments to economic growth. Haiti's economy suffered a severe setback in January 2010 when a 7.0 magnitude earthquake destroyed much of its capital city, Port-au-Prince, and neighboring areas. Currently the poorest country in the Western Hemisphere with 80% of the population living under the poverty line and 54% in abject poverty, the earthquake further inflicted $7.8 billion in damage and caused the country's GDP to contract. (https://www.cia.gov/library/publications/the-world-factbook/geos/ha.html)

seconds to reduce much of the country's housing stock and infrastructure to piles of rubble."[4] The earthquake revealed major pre-existing issues with housing construction and their inability to withstand seismic activity. The predominant construction material is hand-pressed concrete block, often made locally village to village. The aggregates and mix used for the block are inconsistent and unpredictable in terms of overall strength. The block is laid unreinforced, with thin concrete/rebar columns along the sides of the block walls and capping the top. On top of the walls, concrete floors and roofs are poured. The resulting buildings are very heavy – and proved to be extremely deadly in the earthquake.

International Response

Immediately after the earthquake, the international community responded with an enormous outpouring of financial aid and support for the country. The U.S. alone has invested an estimated $3.1 billion in relief and aid projects.[5] Many government agencies, non-governmental organizations (NGOs), and missionary organizations have been operating in the country over the last five years completing various rebuilding projects. Despite these huge support efforts today, Haiti is in the view of many only marginally better than it was immediately after the earthquake. [6] Hundreds of thousands of Haitians are still living in displacement camps, ragged tents, and temporary shelters never intended as permanent solutions.

Figure 1 - A "temporary" shelter constructed after the earthquake is now a permanent home (photo by author)

[4] Laurent, Olivier. 2015. *Time: Haiti Earthquake: Five Years After.* January 12. Accessed March 3, 2015. http://time.com/3662225/haiti-earthquake-five-year-after/.

[5] Kushner, Jacob. 2015. *Global Post - Five years after the earthquake, Haiti remains on unsteady ground.* January 12. Accessed March 3, 2015. http://www.globalpost.com/dispatch/news/regions/americas/haiti/150109/five-years-anniversary-earthquake-haiti-politics.

[6] Laurent, Olivier. 2015. *Time: Haiti Earthquake: Five Years After.* January 12. Accessed March 3, 2015. http://time.com/3662225/haiti-earthquake-five-year-after/.

Those that are rebuilding are using many of the same construction materials and methods that failed them so catastrophically in the 2010 earthquake. What has happened in Haiti? Why haven't the recovery efforts made more of a difference five long years after the earthquake?

The international relief efforts in Haiti demonstrate that money alone cannot overcome the complex issues the country has struggled with for hundreds of years. Similarly, architectural solutions that simply try to provide low-cost housing for the masses fail to address the root causes of the struggles for many Haitians. Real recovery will require more than housing solutions. Education and employment opportunities must also be addressed for recovery to truly take hold.

Architecture's Role?

As a practicing architectural designer, my desire, similar to many in the profession, is to solve problems through design. When confronted with a design problem my goal is always to achieve more than just the base criteria; I want my projects to exceed the expectations of my clients. The same should hold true when looking at architectural solutions in Haiti. The designs provided for Haitians should not only meet their basic needs, but provide opportunities to truly live. How do we develop successful architectural solutions that create economically and culturally viable communities for Haiti? How can these communities provide not only the basic needs of shelter, but also provide Haitians with opportunities for education and jobs? How can our designs foster the growth of vibrant communities?

RESEARCH METHODOLOGIES

To better understand the specific issues at hand and develop viable solutions, several research methods are discussed. First, and most importantly, time spent in Haiti provides the opportunity to closely examine existing conditions and meet face to face with Haitians to better understand their culture, lifestyles, and family and community interactions. Examining work conducted through grassroots initiatives, mission organizations, and other NGOs will help in understanding what needs may

be underserved. An analysis of a number of built projects by the United States Agency for International Development (USAID) and the Haiti's Unit for the Construction of Housing and Public Buildings (UCLBP) throughout Haiti asks: How successful are the projects they have completed? What do they offer for the future of Haitians impacted by the earthquake? What are the major challenges facing these projects?

A second group of projects proposed for Haiti which remain unbuilt, are also examined. These projects include proposals for Haiti envisioned by architects Steven Holl and Jan Wampler. In these case studies, each architect acknowledges similar challenges faced by the Haitian people. Their proposed solutions, though, are unique. What are the successes and failures of each of these proposals? How can their efforts be applied to future developments?

The challenges Haiti faces are similar to those seen around the world. By looking at successful examples of efforts in other countries, new strategies for Haiti can be applied. A unique approach to affordable housing solutions in Chile, designed by the firm Elemental, will be examined as a final case study. And in New Orleans, a business incubator concept established after hurricane Katrina, presents an example of development efforts building on the existing resources of the community.

Finally, a brief review of the ongoing work by the University of Notre Dame's engineering department program, "Engineering2Empower", provides an empirical analysis of construction materials and techniques. Addressing seismic concerns is obviously an important factor in all future developments for Haiti. In addition, elements of climate, hurricane resistance, security, privacy, cost, and availability of resources must also be considered.

The result of this research effort is not a criticism of the efforts being made to help in Haiti. The recovery projects done in Haiti have had successes. Many organizations are still at work in the country and are improving

Figure 2 - View from the roof of the JoyHouse – Gressier, Haiti (Photo by author)

lives every day. The goal through this research is to find architectural solutions that can expand on the strengths and successes already present in Haiti. By building on these successes the development of Haitian communities can be sustained by the people. The basic needs and welfare of those living in these communities can be restored, and opportunities for renewed hope and future prosperity can be created.

FIRST EXPERIENCES

In March of 2015, I made my first visit to Gressier, Haiti, a small community about 12.5 miles west of Port au Prince[7] and very near to the epicenter of the 2010 earthquake. With mountains on one side and the turquoise blue Caribbean on the other, Gressier is a beautiful landscape.

As a result of the earthquake, however, approximately 75% of Gressier's homes were destroyed.[8] Many of the houses in Gressier are still in ruin. Tarps, tents, metal panels, and any other useable materials serve to protect against the sun and rain. As they are able, people are rebuilding, often saving for one concrete block at a time.

Figure 3 - Homes in Gressier, Haiti (Photos by author)

[7] Gressier is a small town with a population of about 75,000. It is located approximately 12.5miles (20 km) west of Port-au-Prince, the Capital of Haiti. With a total land area of 41.11 square miles (102.69 sq.km), it is bordered on the north by the Gulf of La Gonâve. On the east, Gressier is bordered by the town of Carrefour, on the south by the Momance River, and on the west by the town of Leôgane. It has three main rural sections: Morne à Bateau, Morne à Chandelle, and Petit Boucan. *(Committee for the Advancement of Gressier, Haiti. http://www.gressier.org/about.aspx)*

[8] Boudreaux, Megan. 2015. *Miracle on Voodoo Mountain: A Young Women's Remarkable Story of Pushing Back the Darkness for the Children of Haiti*.

Immediately after turning off of the main highway, the roads in Gressier deteriorate to a mix of gravel, mud, and deep ruts. The community is not entirely rural, but the main road offers the only developed commercial section. On the side roads, small shops and businesses are freely mixed among home sites. Along the ocean private beach clubs offer access to the water to those that can afford it. Small groupings of houses and businesses form what appear to be distinct villages, but in reality are all part of the commune of Gressier. As I walk through the streets of the community, struggle is evident. Many of the collapsed home sites appear abandoned. Others, though just as destroyed as the abandoned sites, are occupied by families in makeshift structures or sheltered under whatever pieces of the original house remain. These people are *surviving*, now it is time to help them learn to *live*.

Figure 4 Top left - Fishing village along ocean in Gressier; Top right - cluster of homes; Bottom left – remnants of a house destroyed after earthquake (Photos by author)

Since the earthquake, some headway towards recovery has definitely been made. The rubble in the streets from collapsed buildings has been removed. Many major housing and reconstruction initiatives have been completed. New government facilities and public buildings are under construction in Port au Prince and many successful private developments have been built. A recent article published by Habitat for Humanity, *Five Years Later: The New Story of Haiti*, reflects on this. Claude Jeudy, national director of Habitat for Humanity Haiti, states:

Figure 5 - New classroom buildings constructed by Respire Haiti (Photo by author)

"We know Haitians are very resilient; the history of our country has shown this since our independence…We have demonstrated this capacity to restart our lives after devastation, time and again. Since the earthquake, we have made significant progress, but the work is far from over. "I do have hope," he said, "because we have come so far."[9]

Is the new construction in Haiti really an indicator of progress though? The restoration of collapsed buildings and roads does not, in and of itself, advance Haiti any further out of its state of despair than it was prior to the earthquake. In 1987 Haiti's constitution was amended to include Article 22 which reads:

> *"The State recognizes the right of every citizen to decent housing, education, food and social security."*[10]

The constitution was again amended in 2012, 25 years after the 1987 amendments and two years after the earthquake. Article 22, however, remain unchanged even though these basic rights for housing, education, and security are unavailable to most Haitians today.

[9] Habitat for Humanity International. *Five Years Later: The New Story of Haiti*. 2015. https://www.habitat.org/sites/default/files/14.41548.haiti_5year.pdf

[10] Article 22 of the Haiti constitution. *(Haiti, 1987(rev. 2012))* . https://www.constituteproject.org/constitution/Haiti_2012.pdf?lang=en

Five years after the earthquake, there are still an estimated 120 camps housing internally displaced people (IDP).[11] Thousands of people were forcibly evicted from other camps so the government could demonstrate improvements were being made – those evicted people are no longer accounted for in IDP figures. As a result of the forced evictions, three major new slums called Canaan, Onaville, and Jerusalem have sprung up on the outskirts of Port au Prince. [12] Caanan now houses an estimated 250,000 people, "in a makeshift community of tin shacks and cinder block homes. There is no running water, sewage, or electricity here."[13]

Figure 6- Haiti's Olympic training center (Photo by: http://www.haitilibre.com/en/news-11602-haiti-sports-inauguration-of-the-olympic-park.html)

Directly across from Canaan is a recently constructed Olympic training facility. Jointly funded by the IOC and Haitian government, the development cost an estimated $18 million. The building is titled *The Sport for Hope Centre*, and when it was opened in 2014 it was proclaimed to be, "open to all Haitians…"[14] The reality, according to Mike Jonet, a resident of Canaan, is that the center in only available for the wealthy while the impoverished children of Canaan are not even allowed to go inside.[15] Perhaps by some measure, this project may be a sign of progress in

[11] Haiti Grassroots Watch. 2014. "Questions about the reconstruction's housing projects." *Ayiti Kale Je - Haiti Grassroots Watch.* January 8. Accessed February 2015. http://haitigrassrootswatch.squarespace.com/haiti-grassroots-watch-engli/2014/1/8/questions-about-the-reconstructions-housing-projects.html.

[12] Sylvia Thomas. "Haiti's healing far from finished 5 years after deadly earthquake". *CBC News.* Jan. 2015.
[13] Sylvia Thomas. "Haiti's healing far from finished 5 years after deadly earthquake". *CBC News.* Jan. 2015. http://www.cbc.ca/news/world/haiti-s-healing-far-from-finished-5-years-after-deadly-earthquake-1.2897222
[14] Haiti - Sports : Inauguration of the Olympic Park. HaitiLibre. 7/16/2014. http://www.haitilibre.com/en/news-11602-haiti-sports-inauguration-of-the-olympic-park.html
[15] Mike Jonet is a resident of Canaan who lost his job working as a janitor at the U.S. embassy, and now takes care of local orphans. And looking out at the Olympic park is irritating, he says. The kids from Canaan see the park on the plain below them every day, but they aren't allowed to use it, he said, adding that it's more a place for wealthy kids who are brought in by bus.
"Just looking at it every day … and we can't go inside. We can't even go inside. And this is very bad," he said. "They made it for kids to play." (http://www.cbc.ca/news/world/haiti-s-healing-far-from-finished-5-years-after-deadly-earthquake-1.2897222

Haiti. In reality, it seems to highlight a lack of understanding or unwillingness on the part of the Haitian government to tackle the real challenges of inadequate housing, education, and employment opportunities faced by the Haitian people.

CASE STUDIES

By looking at some of the projects completed in Haiti, and even some of those simply proposed, there is an opportunity to take a birds-eye view of Haiti's dilemma. Displaced people need homes. Those with the ruins of their home still sitting on their land need to be able to rebuild. Opportunities for regular income are needed so people can simply afford to live. Through analysis of the work already underway, a new strategy will be developed to provide the opportunity for success the Haitians still desperately need.

Figure 7 - Artist rendering of Lumane Casimir Village (Image by UCLBP)

<u>Case Study #1</u>

Lumane Casimir Village, is a government financed project that is partially complete. This large development is located approximately 20 minutes north of Port-au-Prince. Currently around 1,000 houses of a planned 3,000, have been constructed at

Figure 8 –Image from tonymaurelli-inhaiti.blogspot.com

a reported cost of $49 million. When the development initially opened in 2013, only around 200 families were moved into the new homes.[16]

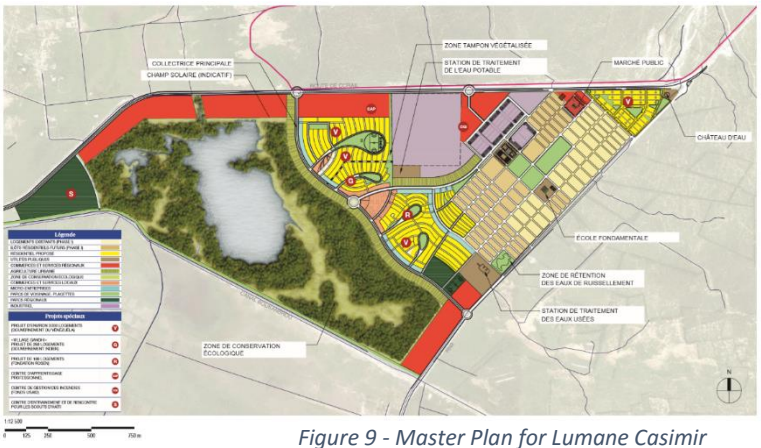

Figure 9 - Master Plan for Lumane Casimir (Image by UCLBP)

The project is managed by Haiti's government housing authority, the UCLBP. Besides housing, the development plans promise a police station, trash disposal systems, a health center, drinking water resevoir, a public square and market place, a soccer field, a vocational school, and an elementary school.[17] The community, however, is still largely vacant. Why has this project not seen more success? In the book *The Invisible Houses* author Gonzalo Lizarralde identifies this kind of turnkey government solution as one doomed for failure for a variety of factors.[18]

The first issue is the choice of location for the project. Government projects are *"too often developed on inexpensive land, usually in remote locations where jobs, services and infrastructure are not readily available."*[19] Lumane Casimir is literally a new village constructed well outside of the city along Route Nationale #3, described as a "flat, desolate, sparsely populated countryside."[20] This wasn't an area of the country heavily impacted by the earthquake.

Figure 10- Lumane Casimir Village lies well North of Port au Prince and access to jobs (Image by Google Maps)

[16] Haiti grassroots watch. 2014. p. 10

[17] Haiti Grassroots watch. 2014

[18] Gonzalo Lizarralde. *The Invisible Houses.* 2015. 12-13.

[19] Ibid. 13.

[20] Tony Maurelli. 2014. "tonymaurelli-inhaiti.blogspot.com". http://tonymaurelli-inhaiti.blogspot.com/2014/05/we-race-madsen-up-to-mirebalais-april.html

Instead of a rebuilding effort in damaged areas, the government opted to create something new on the type of inexpensive, remote land Lizarralde warns of.

The strategy of development outside of Port au Prince is not necessarily the problem. After a short drive through its streets, it is evident Port au Prince is poorly equipped to handle the over 2 million people who live there. Efforts to decentralize Port au Prince to relieve overpopulation has the potential to help provide better housing solutions and simulataneously ease the burden on an already taxed infrastructure.

The question is where can this strategy best be executed successfully? Lumane Casimir is being developed in an area without any existing support or infrastructure. Transportation, jobs, schools, and other services are all missing from this community making it an undesirable location for most people to live. The final plan for the development, according to the UCLBP, could resolve some of these issues, by providing the services necessary to make living in the village more viable. However, with less than half of the houses constructed and fewer occupied, it is hard to predict what the timeline will be for actual completion.

The second major issue seems to be the cost of the development. Lizarralde points out, *"governement agencies and instituions proved to be ineffecient builders."*[21] At a development cost of $49 million to date, Lumane Casimir Village confirms this point. At that cost, the average housing equates to approximately $38,000. The government, however, is not selling the units, but instead renting them for a range between $163-233/month.[22] Many Haitians earn roughly $2-5/day, often through irregular day jobs.[23] The rental cost for Casimir Village is well out of reach for many low income or displaced families. The result is one of the largest housing initiatives undertaken since the earthquake is not really

[21] Lizarralde. *The Invisible Houses.* 12.
[22] Haiti Grassroots Watch. 2014. 12
[23] Mark Curnutte. *A Promise In Haiti.* 2011.

housing earthquake victims at all. A fact acknowledged by the loose requirements for renting in the community is stated as having been "impacted by" the earthquake – criteria which could be applied to almost everyone in the country.[24]

Case Study #2

Architect Steven Holl along with the help of structural engineer Guy Nordenson and environmental engineer Matthias Schuler proposed a new village concept called Dense-Pack Villages, originally

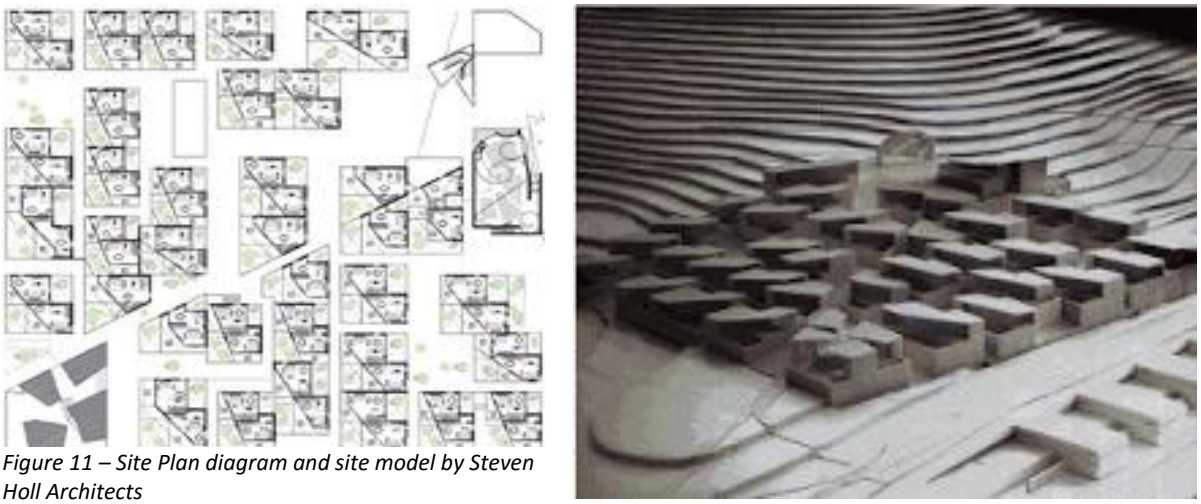

Figure 11 – Site Plan diagram and site model by Steven Holl Architects

developed for a site in Turkey. The goal of the new villages was to provide earthquake and hurricane resistant structures that were also completely energy-independent.[25]

The housing units in the village are laid out as courtyard homes. Each unit shares a party wall with another unit. The homes are staggered, allowing each to have a private, enclosed courtyard for gardening, which is an important cultural component of Haitian life. Holl envisioned each village would consist of approximately 70 homes.[26] Several different sizes of housing units were developed, allowing for flexibility and recognizing the varying nature of family sizes. The layout of the homes take into consideration the importance of privacy and safety valued by the culture. Each village unit also provides opportunities for shops along the main streets, a school, recreation space, and a chapel. These

[24] Haiti Grassroots Watch 2014)
[25] Steven Holl. 2010. *New Haiti Villages.* New York: Princeton Architectural Press. 4.
[26] Steven Holl, 2010. 16.

additional functions are the beginnings of the types of elements necessary to achieve sustainable communities that can create opportunities and become self-reliant.

Unfortunately, Holl estimated the cost of one village and all of the required infrastructure would be a staggering $5.3 million. This is clearly the biggest downfall to his design proposal. At that total, the cost per unit for the village would be approximately $75,000. That is twice the unit cost of the *Lumane Casimir* and obviously well out of reach for the people Holl is trying to help. The stated goal of the project was to seek sponsorship for the development of the village.[27] While that effort would have been admirable, Haiti's problems cannot be solved through donations alone.

Holl's team also explored alternative energy options to keep the villages energy independent. Haiti's infrastructure for water, sewer, and electricity is sparse at best and non-existent in many areas – especially away from major city centers. Solar power is proposed by Holl not only to generate electricity, but also to power desalination units for generation of fresh water. Haiti's Caribbean location offers excellent potential for the use of solar panels. Because of the potential for solar, Holl also proposes solar cooking units for outdoor kitchens. Haiti is currently 98% deforested primarily because of the Haitians dependence on charcoal for fuel. Trees were harvested to create the charcoal without any consideration for the long term consequences. Given that fact, implementing practical uses of solar and other alternative energy sources is an excellent idea. The challenge with this approach is managing the initial cost of these alternative systems – a challenge that Holl's proposal failed to address.

The designers of Lumane Casimir Village and Steven Holl both recognize a need to provide more than just a neighborhood of houses in their projects. Decisions about the kind of community spaces to provide seem disconnected from what people may actually want or need. In either project, there is no

[27] Steven Holl, 2010. Cite sponsorship goals near end of book.

indication the community was provided the opportunity to contribute ideas to what may meet their needs.

Case Study #3

The *Renaissance Project: Hope for Haiti* is designed by Jan Wampler along with architecture students from MIT. One of the primary goals of the project was to "develop a model for decentralizing the population of Haiti into self-sustaining villages"[28] The project is proposed for Arcahaie, a rural area approximately 20 miles north of Port-au-Prince. In an interview regarding the project, Wampler shared his view on why a rural setting is a viable option for Haiti. "Port-au-Prince never provided a great quality of life for its people. It's time for a new model. We have to abandon the Industrial Revolution idea of needing to be in a city to prosper."[29] The idea of moving outside of Port au Prince to create new opportunities for Haiti is a consistent thread in all of the projects.

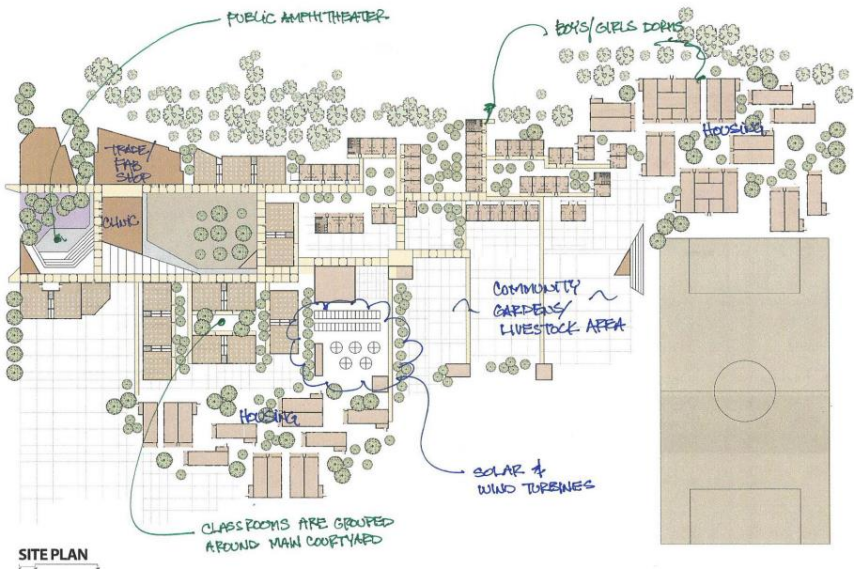

Figure 12 - The overall site plan proposes a new village. The community is intended to be entirely self-sustainable (Image by Jan Wampler, noted by author)

What starts to distinguish Wampler's proposal from the others, however, is the focus of his proposed village. He does not focus on housing, but instead centers the village around the need for education. Education space dominates the program area. The classrooms are grouped together and centered on a large courtyard space, creating a campus feel to the school. Classroom space for 400

[28] *Renaissance project Hope for Haiti presentation*
[29] 'Man with a Plan'. Ron Fletcher, 3/21/2010. *Boston Globe*

students proposed along with dormitories to house the boys and girls accepted into the program, many of which may be orphans. Covered walkways are proposed to tie the classrooms with the dorms.

The northwest corner of the village is dedicated to providing trade education, a small fabrication shop, a medical clinic, and a cultural center. There is also an amphitheater and water feature proposed at this entry to the village. The designers recognize the importance of not only providing housing solutions, but also providing a means for the residents to make a living.

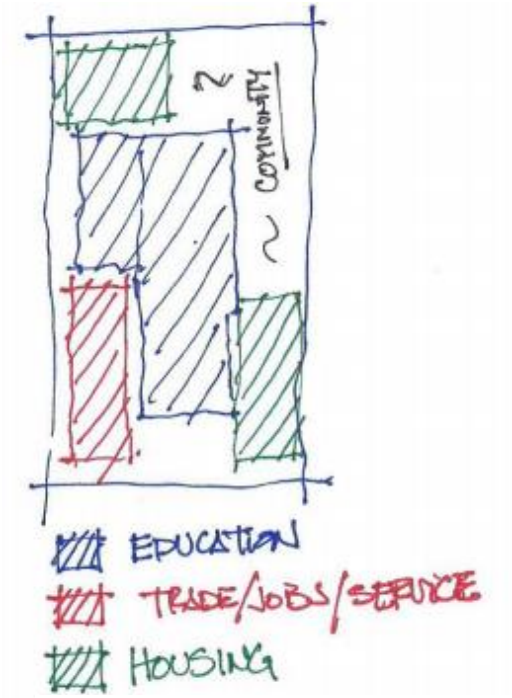

Figure 13 - Land Use Sketch (Image by author)

Wampler also chose a rural site envisioning an agrarian economy full of community space for gardening, micro farming, and reforestation projects. It is not clear whether the services provided in the village are enough to employ the entire population, but the addition of the trade school and the proposed garden and farming opportunities are all designed to help create a better future for those that live there.

The housing design is somewhat similar to the Dense-Pak Village concept proposed by Holl. Wampler is proposing a stacked duplex type of layout. The roofline and offset design of the houses provide private porch spaces for the upper and lower residents. It's not clear how the limited yard space around the homes is delineated, and at least from the available model views, I question how the amount of space provided was determined.

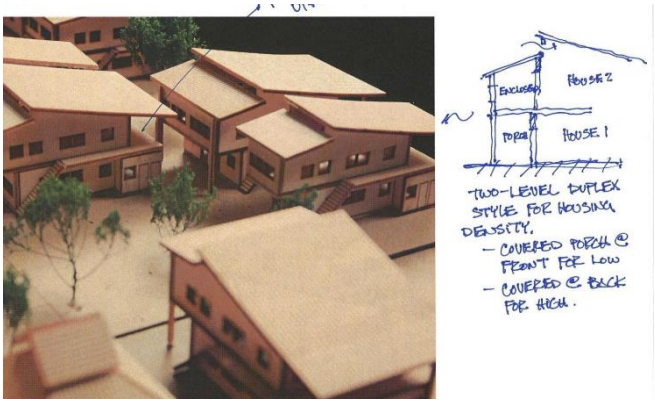

Figure 14 - Stacked duplex style of housing (Image by Jan Wampler)

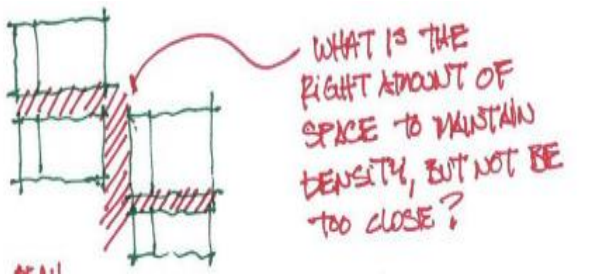

Figure 15 - Sketch of spacing between homes. Who owns these areas? (Image by author)

Another interesting aspect of Wampler's design largely lacking from the previous plans is the inclusion of an amphitheater, small cultural center, and water feature. While these may seem somewhat like luxury features, they recognize the importance of the people and their culture. In an interview regarding the project Wampler shares why these elements and the care of the overall design are so important, "The poor have only one house," said Wampler. "They should have the best architecture, not makeshift architecture."[30]

Wampler's proposal is very compelling. The goal - to not only provide the basic needs for shelter, but to also address educational, employment, and economic needs – is a direction that starts to create the kind of sustainable solutions Haitians need. Of some concern, however, may be the decision for the rural placement of the proposed community. While this may support the agricultural focus of Wampler's design, it also isolates the people in the community in the same way the previous proposals do. Who will this village sell their crops to if they are too rural and unable to easily access urban markets?

[30] 'Lifting the Poor with Sustainable Design'. Ron Fletcher, 1/25/09. *Boston Globe*

CASE STUDY #4

Figure 16 - Villa Verde Housing complex in Chile. The core or incremental housing model allows for owners to safely expand as their needs and budget allow (Photos by Elemental)

Many Haitians are extremely poor. How do you provide solutions for those families with so little money and often irregular income? The architectural firm Elemental, lead by Alejandro Aravena has constructed a series of housing projects in Chile attempting to address this issue. Referred to as "core housing" or incremental designs, the initial construction provides families essentially "half a house". The Villa Verde project, completed in 2010, was developed in Constitucion, Chile and consists of 484 units. The core, as Aravena describes it, provides the components like structure and plumbing that are difficult for the informal construction sector to properly build.[31] The unfinished shell, intially serving as covered porches or patios, are then available for the owners to complete as their family needs and as finances allow. A review by *Building Design* summarizes the concept:

"The concept of user-led expansion is at the heart of the scheme's design. A base build is provided that allows the residents to purchase a simple house within a relatively constrained budget.

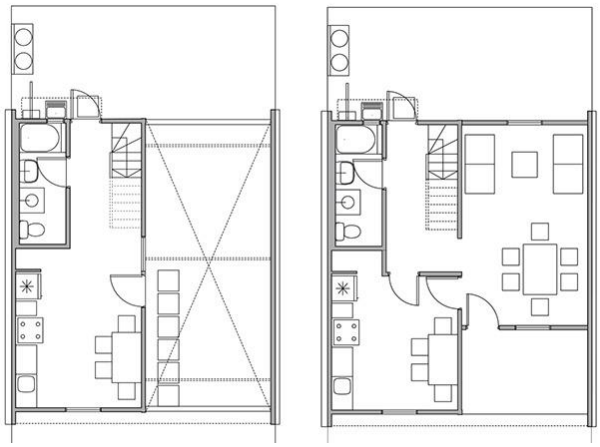

Figure 17 - Initial and expanded floor plans (Images by Elemental)

[31] Aravena, Alejandro. n.d. *Elemental.* Accessed May 2015. http://www.elementalchile.cl/en/proyecto/constitucion/

On the ground floor this base build comprises a small, shared space combining kitchen, dining and living room, plus a bathroom and outside laundry space. On the first floor there are two bedrooms and an additional bathroom. However, the 57sq m houses are structured so that they can be readily expanded to a final area of 85sq m.

In its initial phase the development comprises a terraced typology with each house separated from its neighbor by an undeveloped void. The pitched roofs form a continuous covering over this space and at first floor level joists are included that span to the adjacent party wall. Prior to further development these covered areas provide flexible usable spaces.

The plan configuration allows expansion of the accommodation into these spaces to provide a separate ground floor dining and living room and at first floor two additional bedrooms. As the circulation and the more complex building services are housed within the core structure, the residents are able to complete the expansion works themselves." [32]

Author Gonzalo Lizarralde, in the book *The Invisible Houses,* cites several advantages to this type of core-unit development approach. First, the smaller initial finished footprint offers larger housing units at a more affordable price which allow families to expand as their needs and finances allow. The units provide a structurally and seismically sound framework for the later owner expansions. The attached housing units also offer a balance of individual space and customization options for owners while still maintaining a cohesive design and shared infrastructure for the community.[33]

Despite the flexibility offered with the core unit concept, the Villa Verde approach is limited by only providing one size of unit developed on a mass scale. Varying the scale of offerings would allow different family sizes or multi-generational families to live together more comfortably. Varying plot and design options can also attact households of varying social and income levels – facilitating a social integration of lower income families. [34] An additional design consideration could also incorporate space for in-home business opportunities. Lizarralde points out, *"The sustainability of low-income settlements*

[32] http://www.bdonline.co.uk/villa-verde-housing-chile-by-elemental/5062384.article

[33] Gonzalo Lizarralde. *The Invisible Houses.* 195-196.

[34] Gonzalo Lizarralde. *The Invisible Houses.* 194.

largely depends on households' capacity to generate steady income. Therefore, spaces that can be used for both residential and income-generation activities must be carefully considered."[35]

IMPROVING CONSTRUCTION AND DESIGN

Whatever the proposed design solution, the importance of proper construction techniques cannot be overlooked. The enormous number of people killed (200,000+) as a result of the earthquake was not because of the size of the quake, but because of poor construction. Compared to other countries which have experienced significantly higher magnitude earthquakes, the loss of life in Haiti was catastrophic. Chile, for example, experienced an 8.8 magnitude earthquake in 2010. More buildings were damaged in Chile's earthquake than Haiti's, but less than 500 lives were lost in Chile[36] Why? Quite simply the existing construction materials and techniques in Haiti are inferior and no consideration for properly designing for seismic forces has been incorporated. In fact, current practice for housing construction does not utilize plans or engineering of any kind for construction. Nor are there codes or regulations enforced for most building construction. Design and construction means and methods are left almost entirely to the whim and knowledge of the constructor.

The University of Notre Dame has established an active program focused on developing housing solutions for Haiti as part of their Civil Engineering school. This initiative, called *Engineering2Empower (E2E),* "empowers informal construction sectors to overcome the challenges of delivering safe, affordable housing in the developing world."[37] E2E is attempting to tackle many of the existing construction challenges in Haiti. Concrete block, the predominant building material, is made locally in each community often by hand press methods. The aggregate used in the block is inconsistent and

[35] Lizarralde. 191.

[36] http://www.cnn.com/2010/WORLD/americas/02/27/chile.quake/

[37] Tracy Kijewski-Correa, Alexandros Taflanidis, Dustin Mix. n.d. *Engineering2Empower.* Accessed 2015. http://engineering2empower.org/.

unwashed resulting in unpredictable quality. Many buildings are built by small local builders who may have limited formal training. Much of this informal construction sector is now rebuilding Haiti using the same flawed materials and techniques that crumbled so easily during the earthquake. They will fair no better when the next natural disaster strikes. How can these issues be addressed?

The Lumane Casimir Village utilizes primarily concrete block construction. The techniques for construction and the quality of materials is better than typical Haitian construction. This project, however, was managed as a large construction project with a team of trained managers and layers of quality control. The project was also not a source of employment for Haitian builders – the contract for construction was awarded to a company from the Dominican Republic who brought their own crews into the country.[38] Opportunities to train and educate Haitians on improved techniques were, unfortunately, lost on this project.

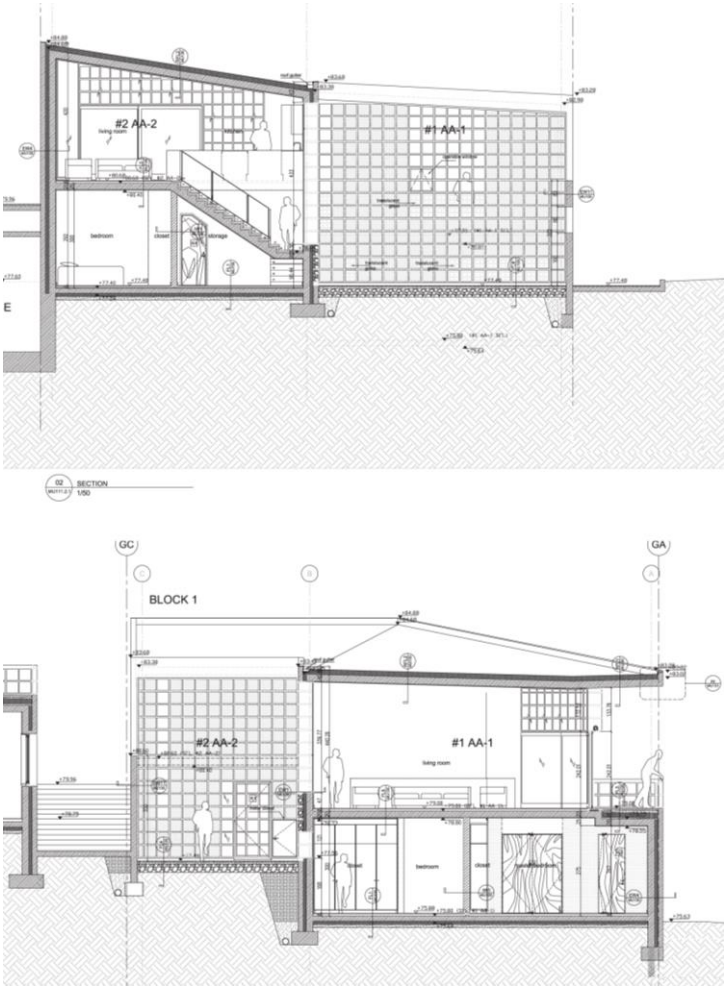

Figure 18- Sections through Holl's proposed Dense-Pak Village house (Images by Steven Holl Architects)

Steven Holl proposed "confined masonry" construction made from unreinforced concrete block and poured concrete columns and beams. This is essentially the method most Haitian builders use now. If executed well, this type of construction can be resistant to earthquakes. Unfortunately, as evidenced by the number of failed buildings, these techniques have not been built well in Haiti.

[38] Haiti Grassroots Watch. 2014.

According to Holl, his designs could be constructed by local labor. [39] His design, however, is quite complex and without any provision for proper training, engineering, or quality control in construction techniques local Haitian builders are not any more likely to properly construct his design than they are their own.

Jan Wampler proposed a primarily bamboo construction for his *Renaissance Project*. Wampler expressed concern for the traditional unreinforced block construction currently used by the Haitians. The inconsistency of block quality, lack of knowledge for any seismic resistant design strategies, and overall poor construction techniques as mentioned above all combine for insurmountable challenges in Wampler's view. Wampler suggests instead the use of bamboo and rammed earth walls as the primary materials. He suggests that the climate in Haiti is such that bamboo could be grown as a much needed resource for the island.[40]

The challenge with this of course is that bamboo does not currently exist in Haiti.. To immediately start building with bamboo, it would have to be entirely imported. Adding the cost of importing the primary building material seems contradictory to an affordable housing solution. Additionally, Haitians do not build with bamboo, and don't generally build with wood at all since the country is deforested. Not only would new construction techniques need to be taught, but the proposed techniques would need to be culturally

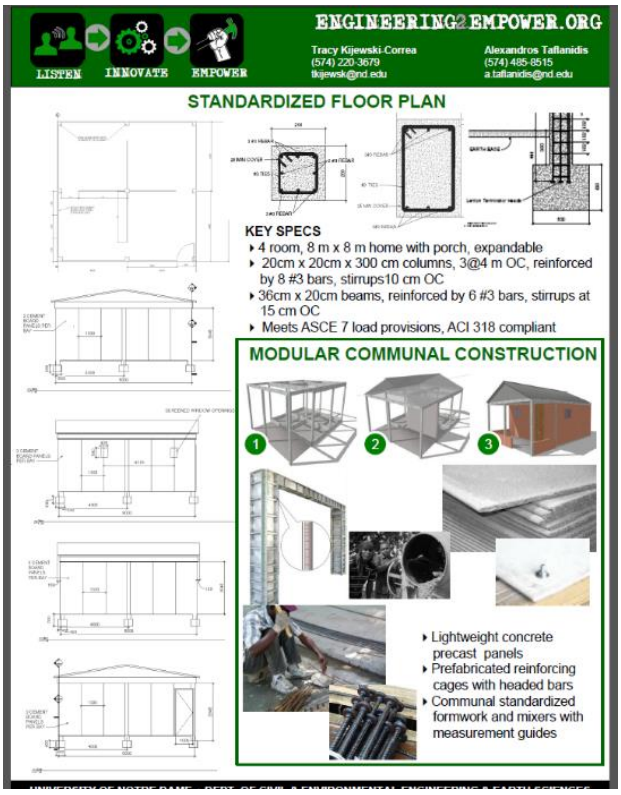

Figure 19- Engineering2Empower Housing poster (Image by Engineering2Empower)

[39] (Holl 2010, 17-25)

[40] 'Man with a Plan'. Ron Fletcher, 3/21/2010. *Boston Globe*

accepted by the people as a good construction method.

Other construction methods exist in the country as well. The most prevelant being the use of insulated wall panels wrapped with wire mesh. Once erected, the panels are skimmed with a concrete stucco finish. This provides a solid and lightweight construction technique. Unfortunately for most, it is cost prohibitive with projects coming in up to four times more expensive than block construction.

Engineering 2 Empower has developed their own technique for construction in Haiti. They attempt to remain sensitive to the cultural style Hatians are familiar with. Their buildings provide a concrete column and beam system, similar to what is used in current construction techniques. E2E uses larger and more heavily reinforced columns and beams, however, than Haitians typically do.

Figure 20 - E2E's model house under construction in Leogane, Haiti (Photo by author)

In place of the poor quality concrete block, however, E2E has developed their own precast concrete panel system. The primary advantage this system provides is safety in the event of another earthquake. The panels are pinned to the beams with anchor bolts and are designed to collapse and break apart indepedently of the structure in an earthquake, allowing the building to still stand and dramatically reducing the risk of fatalities.

E2E is hopeful that this system will be culturally accepted by Haitian homeowners because once the panels are erected and skim coated with concrete, the construction appears the same as concrete block homes. Unlike concrete block, however, this system's precast panels offer a level of built-in quality control unavailable in block construction. The infill panels also provide a level of flexibility for

the homeowners to easily remove panels in the future to allow for expansion or the addition of doors and windows.

Another innovative aspect of E2E's work is their goal for this new technique to be a Haitian-led effort. Their team invests as much time in training Haitians in critical thinking, problem solving, and innovation as they do in construction techniques. Through these training efforts, E2E is slowly establishing systems that will equip Haitians to fabricate the precast buildings, build the houses properly, manage quality control, and establish succesful business models around housing construction and other support services. This line of thinking extends beyond attempts to simply provide shelter to those in need or import ideas and designs that work in other places. E2E is working to make an impact in the self-reliance of Haitians necessary to their long term success. [41]

BEYOND HOUSING

In Jan Wampler and Steve Holl's proposed projects, the need to look beyond simply providing housing is acknowledged with the programatic additions of educational spaces, training centers, and opportunities for local marketplaces and community events. Engineering 2 Empower addresses these needs even further through the training efforts and goal of developing Haitian-led businesses around their construction solution. The major difference between Holl, Wampler and E2E is the focus E2E has put on developing relationships in Haiti. By establishing a permanent presence in the country and working side by side with the people, E2E is establishing a level of trust that will enable them to be more effective in realizing their vision.

Is economic viability even possible in the poorest country in the western hemisphere? Yes! If we start to look at opportunities to train small communities to think innovately and equip them with new

[41] Tracy Kijewski-Correa, Alexandros Taflanidis, Dustin Mix. n.d. *Engineering2Empower.* Accessed 2015. http://engineering2empower.org/.

skills and basic business knowledge, economic change is possible. An example of this was seen in the United States after hurricane Katrina devasted New Orleans.

Figure 21 - Participants of Propeller collaborating (Photo by gopropeller.org)

After the hurricane hit, many people simply abandoned the city which severely handicapped New Orleans' economy. As the city slowly recovered, so did the need for new and innovative business thinking. A nonprofit business incubator called Propeller was established to help develop social innovation throughout the community. Propeller provides physical space for developing businesses and also provides the essential training and support new entrepreneurs need. Since 2011, 60 business ventures have started with over $24 million in financing and grants. As a result, thousands of New Orleans residents have been positively impacted.[42] Propeller's concept is applicable to Haiti through their approach to addressing specific needs. They describe their focus in New Orleans as follows:

> *"We assess and identify New Orleans' biggest environmental and social challenges… Propeller takes a sector approach to driving innovation in New Orleans. Our four key sectors are: Healthy and Local Food Access, Water, Public Health, and Education & Youth Development."*[43]

This simple focus on core needs of the community, could be applied to creating viable communities in areas of Haiti. This is the vision of the non-profit organization Leve Kanpe, founded by Jeremy and Katie Beehn. The Beehn's have invested a great deal in relationship building in Haiti since they first visited the country in 2012. So much so, that they are now committed to moving their family to Haiti to work within Gressier full time. Their work includes *"assisting Haitian men and women in building their own small business so that they can provide a more reliable income for their family, become independent from needing the assistance of others, and help grow the economy of the city as a*

[42] http://gopropeller.org/impact/

[43] N.d. *gopropreeler.org*. Accessed May 2015. http://gopropeller.org/about/.

whole."[44] I am fortunate enough to partner with Leve Kanpe for this research and the future development of design solutions in Gressier.

Architect and affordable housing expert, Mike Pyatok, suggests that the role of architecture must reach beyond just providing housing as a "commodity". [45] To truly achieve this requires building relationships with the people we are trying to help. The commitments being made by organizations like E2E and Leve Kanpe are what is needed to make significant changes in Haiti. By coming alongside those organizations, the architecture we create can be more than simply commodities and can help lead to longterm postive change.

CONCLUSION

In our efforts to solve what we see as an international housing problem countless designs are developed, new and innovative materials are used, plans are drawn, money is donated, construction is completed, and, all too often, the people are forgotten. Haiti is no exception. Billions of dollars of good intention have been committed. But five years later little evidence of those good intentions can be found.

Figure 22 - A Haitian boy drawing a picture of the house he hopes to live in one day (photo by author)

Through the examination of our case studies several major factors that must be dealt with to create viable communities for Haiti have become evident:

- **Cost** – Many of the projects presented are simply too expensive for those that need them most. Utilizing strategies such as core-unit development or other methods to allow for incremental

[44] http://www.levekanpe.com/about.html

[45] Mike Pyatok article reference

construction options, as well as implementing cost effective construction techniques are essential criteria for viable communities.

- **Materials** – Readily available materials are very limited in Haiti. The prevalence of concrete block construction is as much out of necessity as it is out of preference or cultural attachment. People build with materials they can afford. To propose the predominate use of construction materials like wood or insulated panels comes with the price associated with importing them from somewhere else. Likewise, the benefits of introducing new technologies like wind turbines or composting toilets must be carefully weighed against costs.
- **Quality of Space** – Meeting the needs of specific families becomes an issue when trying to present mass housing solutions. Size, number of bedrooms, outdoor spaces, and opportunities for income generating activities are all factors that matter regardless of the housing price point.
- **Culture** – Regardless of the devastating loss of buildings in Haiti as a result of the earthquake, the architectural style being rebuilt today is much the same as it was before the earthquake. Some of this is a result of limited material resources as discussed above. Another part, however, is a cultural preference on architectural design. It is one thing to suggest modifications to construction techniques to improve quality. To attempt to superimpose a design style or foreign material that disregards the existing cultural preference, however, is quite another thing and ignores the people we are trying to help.
- **Location** – Finally, the location of any redevelopment effort is critical to its success or failure. Locations that are too rural in Haiti simply do not have the infrastructure and other resources needed to attract families. Transportation access is lacking, water is scarce, and electricity is often completely unavailable. Schools, hospitals, and job opportunities are also largely unavailable in rural areas. Development of these basic resources would tax most reconstruction efforts to the point of it being initially cost prohibitive. On the other hand, the infrastructure in Port au Prince is already so overwhelmed that redevelopment at any large scale would require tremendous resources and government initiative. By all appearances the current Haitian government does not have the organization or economic wherewithal to undertake this type of redevelopment effort.

Central to all of these factors is meeting the needs of the Haitian people. The role of architecture in this process is to merge the needs for safe, affordable housing models in a setting that will provide more

than shelter and will foster opportunities for education, business development, and eventually encourage economic growth in the community. Vibrant communities in Haiti will require a planning model that takes all of these factors into consideration. Dustin Mix, the Haiti director of Engineering2Empower, summarizes this idea as follows:

> *"Haitians will rebuild Haiti; daily life demands it. The question becomes, how can the international community walk with Haitians on that journey? And although the demands of donors, statistics and measurable results do not always align with it, there is only one sustainable strategy: lay not just foundations of block and mortar, but also of people and empowerment."*[46]

Housing, regardless of how affordable, does not fully address the depth of economic needs many Haitians are dealing with. In order for that to be addressed, education and employment opportunities must be considered with equal, if not more, fervent efforts than housing solutions. Revitalization of strong local communities within Haiti can shift the direction of the country as a whole and begin to attract new development and growth.

Leve Kanpe (Rise Up!)

The phrase *"leve kanpe"* is Haitian Creole meaning simply to "rise up". This is the call of the organization Leve Kanpe. Their stated mission is, *"to assist impoverished children, families and communities around the world to "rise up" and achieve their highest potential…"*[47] As this project moves into the design stage, we will work within the community of Gressier to develop an architectural solution that addresses the needs of the people and embraces the desire to help them achieve their

[46] Dustin Mix, In-country Director of Engineering2Empower (www.freepressonline.com, *Laying a Foundation*, 2/26/14)

[47] Leve Kanpe. 2015. http://www.levekanpe.com/about.html

highest potential. *Leve Kanpe will reach these goals in a sustainable way that also encourages economic development for the entire community. "* [48]

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ADDENDUM
Todd Yoby

My original written thesis examined multiple case studies proposed for reconstructing Haiti. Much of the review and discussion in the thesis was focused around housing proposals. While housing remains a significant issue in Haiti, I opted not to focus the design portion of my thesis on housing.

During the course of my research I had the opportunity to visit Haiti twice. On both trips I was able to visit completed housing projects in and around Gressier. Many of these projects were funded and developed by mission based organizations. In every case the buildings appeared fairly well built. The complexes seemed fully occupied, and the living conditions were certainly improved compared to many existing areas in the community.

Figure 8 - Housing community in Gressier (Photo by author)

What I noticed, however, is that these developments lacked some essential ingredients to provide long term solutions for the Haitian people. As I discussed in my paper, housing provides the necessity of shelter. It does not provide further opportunities for living. The Haitians living in a donated house are still just as poor as they were before. The provision of shelter has not provided them any additional education, job training, or opportunity to break the cycle of poverty. My design project attempted to address this issue of poverty as well as the idea of what viable communities may look like by exploring three fundamental ideas: Community, Education, and Opportunity.

The design ideas were derived from two major sources. First, during my visits to Haiti I had the chance to talk with many Haitians in the community. Overwhelming the people are looking for opportunities. They want jobs, they want training and education, and they're willing to commit to those efforts where they can find them. The problem of course, is that they can rarely find those kind of opportunities. Most existing NGOs simply don't focus on adult education or economic opportunities. Schools for children, orphanages, medical clinics, and housing developments abound. All of these projects are fantastic, but they offer little in terms of economic growth or employment.

The second source of inspiration for my design focus was the non-profit organization I partnered with, Leve Kanpe. The founders, Jeremy and Katie Beehn, are relocating their family to Gressier because

they understand the importance of becoming part of the community they hope to help. When we are called to help someone in need, there are times where all we may be able to do is provide a donation, gift of money, or a simple prayer. There are other times, however, where we must be willing to answer the call to do more and that is the commitment the Beehn family is making. Establishing themselves in Gressier will allow them the opportunity to understand the specific needs of the people and invest in them in ways that imported solutions would never be able to.

DESIGN ANALYSIS

The development of my design proposal was initially focused on responding to the specific site forces and edge conditions. As I continued to explore it, however, I returned to the ideas mentioned above and the specific goals for what a viable development in Haiti may look like. Again, I felt housing was not a major component of that solution. A small area of housing is proposed in the design, but is really envisioned as a teaching tool for construction techniques rather than as a solution for any larger housing needs. The main focus of the design shifted to the ideas of Community, Education, and Opportunity.

Community

The relationships the Beehn's are trying to create in Haiti revolves around the idea of community. Providing spaces where people can freely interact and get to know one another is important. In my design, the public plaza provides this community space. The plaza offers open areas for people to gather and children to play. It provides shelter from the sun and opportunities for an informal marketplace. And most importantly, it provides a community hub for the existing soccer stadium (currently one of the only existing community spaces) and the new developments surrounding it.

Education

The educational opportunities on the site include a small public library, classrooms, event spaces, and exhibition halls. These areas are intended to be flexible to meet varying training needs and topics. Additionally, specific training areas are proposed in agriculture and construction. The community gardens and orchards provide Haitians a scalable model for agricultural opportunities in the country. The aquaponic systems proposed could be used for individual families to grow vegetables and raise fish for their own use or they could be scaled to community and commercial levels to produce marketable product for sale in the surrounding areas. The construction technology building provides an essential training resource for safe construction techniques.

Opportunity

Overlapping with the educational aspects of the site are employment opportunities for the community. The proposed gardens and orchards are large enough to need several full time employees to manage their care. The library, café, and other community services would be staffed by Haitians. The proposed mixed use development along the border of the site offers opportunities to incubate new businesses and services. The production side of the construction technology building is intended to be a working block production plant, providing many additional job opportunities. Other building trades and construction related businesses can also be developed from the training provided at the construction facility.

CONCLUSION

Cameron Sinclair, the founder of Architecture for Humanity, wrote the following:

> *"Unless you build it, it doesn't matter. Sounds harsh, but it's true. In the eyes of a community, be it recovering from disaster, living in systemic poverty or ravaged by blight and neglect, visions and designs for a project are simply a dream. A well-rendered set of images, an exquisitely built model or a prototype structure is a great start, but it isn't a solution."*[49]

Building the design project is obviously not a requirement or even the point of the thesis process. As I conclude this part of the journey, however, Sinclair's words reflect some of my own feelings. Over the better part of the last two years, I've been researching and developing these ideas. I feel they are far from concluded, however, and simply represent a work in progress. My hope is to continue working alongside Leve Kanpe and others to see these ideas built and the programs they offer realized. I believe this kind of development is what Haiti needs. Community, education, and opportunity are three simple words, but I believe they offer a world of possibility for Haiti.

[49] Architecture for Humanity. *Design Like You Give a Damn.* Abrams, New York. 2012. p 12.