

ESPERANZA P.A.R.C. (PRO-ACTIVE RECOVERY COMMUNITY): PLANNING FOR  
TEMPORARY HOUSING AFTER NATURAL DISASTERS

by

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(Under the Direction of Andrew Fox)

ABSTRACT

While housing is the largest component of economic loss from natural disasters, little attention is paid to the housing problem before disasters occur (Quarantelli 1995; Comerio 1997). Displaced people living in temporary housing communities suffer emotionally and have difficulty resuming daily activities. Disaster planning must therefore become more of a priority for urban areas (FEMA 2009). This thesis proposes a design application planning for temporary housing communities in urban areas in the United States. A park is devised to transform into a temporary housing community facilitating psychosomatic recovery and helping victims recommence daily activities, when needed. A site in Miami-Dade County, Florida has been chosen due its high vulnerability to hurricanes and large metropolitan center. Previous examples of temporary communities are analyzed within the context of site planning, community morale, and functional efficiency. Lessons from this thesis can hopefully influence disaster planning for temporary housing in other urban areas.

INDEX WORDS: Community, Disaster planning, Florida, Healing landscapes, Hurricanes, Miami-Dade County, Temporary Housing

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## CHAPTER 1

### CREATING SOCIAL EQUALITY THROUGH DESIGN

Imagine that a powerful hurricane spirals toward the Florida coast. The weatherman informs a young architect that he has 48 hours to evacuate before the storm will make landfall. He seeks refuge in an emergency shelter, but as the hurricane ravages the coastline, his house is completely destroyed. He does not want to leave his community or his job, but he has nowhere to live while his home is being rebuilt. He is informed that the only available temporary housing is 90 miles from his previous home—a significant distance from his community and his office. He cannot turn to his friends and family, as they are also devastated by the storm. Without other options, he moves to a community of countless mobile homes placed in a rigid grid with limited individual space. The atmosphere is sterile, and there is no accessible transportation to connect him with his previous community.

While living in the temporary community, the man fears for his safety. He has no idea when or how he can find a more permanent home. Two years after the hurricane, the man finds himself still living in the mobile home community because affordable housing has not yet been rebuilt. He is depressed, he has lost his job, and he has very little hope that his situation will improve in the foreseeable future. Unfortunately, many of his neighbors in the temporary community are similarly affected, and the community is ridden with hopelessness, depression, and crime. This thesis seeks to improve this man's fate and the fates of countless other people in similar situations.

Historically, America has been a country that prides itself on the promotion of equality among its citizens; however, conflicts revolving around inequality have prevailed

throughout the country's existence. In the 21<sup>st</sup> century, injustice continues to abound; however, it often appears in ways that are invisible or easily ignored by the general public. Impoverished people are often not accepted by mainstream society or cannot afford to live in desirable areas; they are thus forced to live on the margins of cities and towns (Watson 2006). As a result, these populations are disproportionately harmed by environmental destruction and pollution (Cronon 1996). They often live in naturally vulnerable areas or close to toxic or industrial disposal sites and they are forced to bear the health risks associated with these places (Davis 1978; Cronon 1996).

Unfortunately, although the poorest people are often harmed most severely by natural disasters—they tend to live in poorly built or maintained facilities and they often have less resources to relocate temporarily or permanently—disaster recovery efforts often treat them unjustly and inhibit both their personal recovery and the redevelopment of their previous communities (Bolin 1985; Comerio 1998; Chavan, Peralta et al. 2007). The poorer communities tend to get less assistance from aid agencies and receive the assistance later than those who have a higher socioeconomic level (Chavan, Peralta et al. 2007). In addition, the recovery efforts tend to pay little attention to disaster victims' experiences while living in temporary housing communities. Often, displaced people are moved to mobile homes where there are no amenities or accessible modes of transportation to connect them with their places of work or with the larger community (Davis 2005). The clear lack of concern for the quality of life of lower-socioeconomic groups is a civil rights abuse.

This thesis considers traditions of post-hurricane temporary housing communities and proposes a design for a community in Miami, Florida that more effectively responds to the needs of populations often marginalized by disaster-recovery efforts. It is the author's intent make designers and planning professionals more aware of the

environmental injustice inflicted upon impoverished people and enable them to facilitate equitable design through effective post-disaster designs.

Indeed, landscape architects can promote social equality through design. Well-designed spaces can effectively create community, provide learning opportunities, heal the natural world, heal people emotionally, promote equality, and benefit both individuals and society in numerous other ways. Although many designers acknowledge the humanitarian potential of environmental design, most landscape architects are commissioned by affluent clients to solve problems (Francis 1999). There is a need for increased representation of minority populations in design (Lawson 2005). Unidentified problems of the underserved and less fortunate populations remain, and landscape architects rarely proactively identify or address these social problems (Francis 1999; Lawson 2005). Rather than be reactionary, this thesis suggests landscape architects explore current social issues and work with other disciplines to decrease injustice. Landscape architects can and should become advocates for social programs through their work (Blum 2005).

Fortunately, architecture, landscape architecture, and planning have precedents for addressing social justice through design. Successful humanitarian-motivated designs include Frederick Law Olmstead's vision for Central Park, Garrett Eckbo's designs for migrant farm worker housing, Ann Spirn's collaboration with middle schools in West Philadelphia, Sam Mockbee's Rural Studio at Auburn University, and Ken Reardon's work with Hurricane Katrina victims. In addition to these well-known environmental design professionals, Architecture for Humanity is a "charitable organization that seeks architectural solutions to humanitarian crises and brings design services to communities in need" (2009). While this organization addresses all forms of design, it focuses primarily on architectural projects. Another mainly architectural organization, Design Corps, creates equitable spaces for migrant farm workers. This thesis applies similar

principles of equity and justice in a new context: that of the post-disaster temporary housing community.

Encouragingly, design competitions have recently brought attention to designing for social justice and, specifically, to finding new, innovative solutions for temporary housing. The Van Alen Institute's 1999 Transitional Housing competition and New York City's Office of Emergency Management's (OEM) 2007 "What If NYC..." competition called for new designs for temporary housing structures for international refugees and displaced post-disaster victims (Architecture for 2006; OEM 2007). Unfortunately, however, these two competitions focused on the actual housing structures rather than contextual site designs. Landscape architects, because they specialize in the planning and design of outdoor spaces that function, heal, and encourage safety, are highly qualified to design post-disaster temporary communities to aid in the disaster victims' recoveries. If landscape architects collaborate with architects and other design professionals to create temporary housing communities, solutions benefiting residents can be devised that assist the recovery process after natural disasters rather than delay it.

While this thesis encourages landscape architects to explore humanitarian design, it also opens up a discussion about designing for temporary communities. Temporary communities exist in a spectrum of environments in the United States: from the celebratory 2-week long festival called Burning Man in Nevada's Black Rock Desert, to an undesired terminal stay at a hospice. When unsought and for unknown amounts of time, temporary stays are not just about physical location and infrastructure; they are about connecting to people's emotional strife and providing them with a healing environment. This thesis acknowledges the psychological conditions among displaced hurricane victims and makes every effort to provide an appropriate response to them.

In addition to providing healing environments for people, this thesis emphasizes the need to plan and design for post-disaster temporary communities prior to a disaster's onset. Although disasters have occurred throughout human history, they often hit with little warning, with little indication of how much damage they will inflict, or where the damage will be concentrated. As a result, the location and mobilization of temporary housing has typically been an afterthought.

Unfortunately, housing is the largest component of economic loss from natural disasters (Comerio 1997). Although technologies are being developed to create buildings that can better withstand natural disasters, many current structures—and most structures occupied by lower socioeconomic groups—are not built with these innovations. For example, in Miami-Dade County Florida, stricter building codes require contractors to use reinforced concrete and window protection in new construction, but older buildings and mobile homes do not meet these guidelines (Viterbo, 2009). Disaster planning before disasters strike, therefore, must become more of a priority for urban areas (Comerio 1997; FEMA 2009). Just as sprinklers and alarms are standard precautionary measures in school buildings—despite the relative scarcity of school-destroying fires—precautionary plans and designs for post-disaster emergency management are important for protecting people's lives and livelihood. These preventative measures are vital to individual and community recoveries after a natural disaster. Recently, the publicity from Hurricane Katrina helped expose dangers and short-comings of current post-disaster planning.

As explained by E.L. Quarantelli, an expert on natural disasters and housing, there are four categories of post-disaster living arrangements: emergency sheltering, temporary sheltering, temporary housing, and permanent housing. Temporary housing—the category addressed in this thesis—refers to interim housing in which people should return to their household routines. The intent is to house people for up to 18 months until



they can find affordable permanent housing (Johnson 2007; FEMA 2009). However, in the past, people have remained in temporary housing for several years, as in the cases of Hurricane Katrina and Hurricane Andrew (Nigg, Barnshaw et al. 2006). In addition to the stress of being displaced from their homes, people living in FEMA camps are generally unhappy, feel unsafe, and have a limited connection to any city center (Spiegel 2007). All of these factors inhibit their abilities to return to their previous lifestyles. FEMA trailer cities typically fail because they worsen the emotional effects of the natural disasters rather than helping victims begin the recovery process (Lohr 2006; Seabrook 2008). A recent example of poorly-planned temporary housing was seen after Hurricane Katrina, where many people were housed in FEMA trailers up to 90 miles outside of Baton Rouge with no accessible public transportation (Davis 2005).

Encouragingly, the Federal Emergency Management Agency (FEMA)—the government agency in charge of housing people displaced by natural disasters—published a housing strategy in January 2009 that explained the need for better planning for temporary communities after natural disasters (FEMA 2009). This thesis begins to explore how planning for post-disaster temporary housing in urban environments in the United States can create restorative places that can also be efficiently set up and dismantled. Chapter 2 presents an overview of current disaster response organizations and past temporary housing conditions. Chapter 3 explores precedents for restorative design and highlights aspects of design required necessary to create better temporary housing communities after natural disasters. Chapter 4 gives background on Miami-Dade County, Florida and recalls the Hurricane Andrew. Chapter 5 illustrates a design application for temporary housing in Miami-Dade County. Chapter 6 presents this thesis's concluding arguments.

## CHAPTER 2

### DISASTERS: DAMAGE, POLICY, AND RESPONSE

#### Introduction

The threats of natural disasters, the assigned roles of those who help mitigate and respond to these disasters, and historical examples of the recovery process must all be studied in order to effectively plan and design for temporary housing after a natural disaster. Only by recognizing the climate in which temporary housing is necessary can one begin to understand the obstacles to its effectiveness. Once these challenges are known, mapping the responsibilities of the agencies and groups involved in the disaster recovery process can reveal potential sources and methods of planning for temporary housing. In addition, studying responses to past natural disasters can expose lessons learned from both existing and former policies, and offer insight into ongoing problems with the disaster recovery process.

#### Hurricanes

In particular, this thesis considers the issue of temporary housing in the context of hurricane recovery. Therefore, it is necessary to understand what hurricanes are, how they are categorized and predicted, and their associated dangers.

Hurricanes are devastating tropical cyclones usually created by African easterly waves off of the coast of North Africa (AMS 1993). According to NOAA, “the waves move generally toward the west in the lower tropospheric trade wind flow across the Atlantic Ocean” (NOAA 2007). These storms draw heat from the moist air above the

ocean and release this energy through heavy thunderstorms (NHC 2008). 85 percent of major hurricanes originate from these easterly waves (NOAA 2007).



**Fig. 2-1:** The Progression of Easterly Waves forming Hurricanes (NOAA 2007)

Hurricanes have sustained wind speeds of at least 74 miles-per-hour, are a minimum of 20 to 30 miles wide, and blow around a center known as the “eye” (FEMA 1993; NOAA 2008). Although hurricanes begin to dissipate and lose power upon landfall, storm surge, heavy rain, strong winds, tornadoes, flash floods, and landslides pose significant danger to people and infrastructure (AMS 1993; FEMA 1993).

The NOAA National Hurricane Center in Miami tracks tropical cyclones and predicts their intensities in order to assist in the timely evacuation of endangered people (AMS 1993).

In the United States, hurricane season begins on June 1 and lasts until November 1 of each year (NOAA 2008). Hurricanes are categorized on a scale of 1 through 5 on the Saffir-Simpson scale (NOAA 2008).

Hurricane Category					
	1	2	3	4	5
Barometric Pressure (inches)	28.94-28.53	27.50-28.91	27.91-28.47	27.17-27.88	< 27.17
Wind Speeds (mph)	74-95	96-110	111-130	131-155	>155
Storm Surge (feet)	4-5	6-8	9-12	13-18	>18
Damage	Minimal	Moderate	Extensive	Extreme	Catastrophic

**Fig. 2-2:** Saffir-Simpson Scale (Williams 2005; NOAA 2008; 2009)

Hurricane tracking is important because it warns emergency management officials and the public of potential dangers so they can take necessary precautions. New technologies are always being developed to increase the accuracy of hurricane predictions (NOAA 2008). Hurricanes are tracked every six hours from 120 hours to 12 hours before a storm hits; 48 hours is the most important for emergency management officials charged with the task of notifying the public when to evacuate from threatened areas (NOAA 2008). There are two forms of hurricane advisory communication, “hurricane watch” and “hurricane warning” (FEMA 1993). A “hurricane watch” is issued when there is a threat of a hurricane within 24-36 hours, whereas a “hurricane warning” means hurricane conditions are expected within 24 hours (FEMA 1993). Although humans cannot stop hurricanes from forming or reaching the United States, accurate prediction helps to evacuate and protect people from the storm’s initial strike, most specifically storm surge. Because 90% of hurricane-related deaths result from storm surges—typically ranging from 3 to 20 feet tall—evacuation of the predicted location of the surge is essential to protecting lives. While storm tracking helps inform people how and when to move out of harm’s way, people and the infrastructure on which they depend will not be able to completely avoid the wrath of hurricanes (Viterbo 2009).

In recent years, hurricanes have become a more prevalent threat to the United States; ten of the last fourteen seasons have produced above-average activity (NOAA 2008). 2008 was the fifth most active hurricane season since 1944 and was the first year in which six tropical cyclones hit the United States and three major hurricanes hit Cuba (NOAA 2008). Scientists believe that the increased storm volume and magnitudes since 1995 were created by multi-decadal oceanic and atmospheric conditions, residual La Niña effects, and warmer tropical Atlantic Ocean temperatures (NOAA 2008). Some scientists believe this increase in activity is related to land use and global warming—a phenomenon that gives planners, governments, policy makers, and citizens reason to

worry about the future threat of hurricanes and to begin planning ahead to mollify the disastrous effects of these catastrophic storms.

### Organizational Roles in Hurricane Planning and Response

In addition to the National Hurricane Center's storm-tracking, government planning, preparation, and infrastructure play an important role in what happens after a hurricane strikes land. Planning, preparation, and resources are required to facilitate evacuation, to provide short-term shelters and temporary housing for people, and to clean up the damage to infrastructure. Neither the specific time and place that a hurricane will strike, nor the amount of damage it may inflict can be predicted exactly; however, the government is responsible for cleaning up the mess efficiently and effectively so that the affected land and people can function as they did before the disaster. To address these governmental responsibilities, many agencies and organizations work together to mend the wounds created by natural disasters (FEMA 2009). Because this thesis seeks to identify solutions for temporary housing after natural disasters, governmental policies and responses are considered as they relate to housing issues. Specifically, this research focuses on governmental responses to hurricanes in urban areas because this type of government action is most relevant to the thesis design site in Miami, Florida.

Typically, local and state governments, with the help of non-governmental organizations (NGOs), are responsible for addressing natural disasters and facilitating recovery efforts. However, when the disaster-inflicted needs exceed the scope of a state government's capabilities, federal assistance is available in two ways: the Secretary of the Department of Homeland Security can declare the disaster an incident of national significance (INS), or a state's governor can ask for federal assistance if he or she believes that human safety is at risk or the state's resources cannot adequately respond

to the disaster (Nigg, Barnshaw et al. 2006). It is at this point when FEMA will step in to lead the recovery effort (Nigg et al., 2006).

Federal government intervention in natural disaster relief and recovery programs originally began in the 1930s after devastating floods overwhelmed the Red Cross and other relief charities during the Great Depression (Comerio, 1997). FEMA was established by executive order in 1979 to consolidate the various governmental programs that deal with disaster-related tasks (FEMA 2008). According to its website, FEMA “coordinates the federal government’s role in preparing for, preventing, mitigating the effects of, responding to, and recovering from all domestic disasters” (FEMA 2009). FEMA gives money to state and local governments to repair roads, remove debris, restore utilities, and get communities functioning on a level that will enable the provision of basic amenities to those in need (FEMA 2009). They pay either a fixed amount or a percentage of the total cost of damage of the disaster (FEMA 2009).

On January 16th, 2009, FEMA published the National Disaster Housing Strategy to summarize current housing responses to natural disasters, and to express the agency’s desire to better care for natural disaster victims and to work more cohesively with disaster response and recovery groups (FEMA 2009). This strategy was developed from 500 comments from individuals, state and local government representatives, and additional input from federal, state, and local agencies, organizations, and experts (FEMA 2009). FEMA’s Housing Strategy focuses on the entire National Disaster Task Force which is made up of FEMA, state and local governments, the Red Cross and other NGOs, the Department of Housing and Urban Development (HUD), and the private sector. The goal of the National Disaster Task Force is to improve communication and efficiency in order to keep people safe and to rebuild cities as quickly as possible through disaster relief and recovery efforts (FEMA 2009). Understanding the role of each

component of the National Disaster Task Force is important to understanding how planning for temporary housing can be improved.

In order to understand who is involved in each part of hurricane planning and response, the various phases of housing recovery after a natural disaster must be explained. After natural disasters, people are displaced from their homes for an indeterminate amount of time while their communities are repaired—some seek shelter for a matter of hours, while others remain in temporary settlements for years. As explained by Quarantelli, there are four phenomena for finding living quarters after a disaster: emergency sheltering, temporary sheltering, temporary housing, and permanent housing (Nigg, Barnshaw et al. 2006). Emergency sheltering and short-term sheltering are planned for people to stay for periods of 1-3 days or until other arrangements are made (Nigg, Barnshaw et al. 2006; FloridaDisaster.org 2008). Temporary housing is the situation when people reside in interim housing but return to their household routines (Quarantelli 1995). People may live in temporary housing for as little as a few months and up to five years (Nigg, Barnshaw et al. 2006). Finally, permanent housing is that which people move into after their former residence was destroyed or severely damaged after a disaster (Quarantelli 1995).

To respond to housing issues after disasters, state and local governments are charged with planning for short-term emergency shelters where people can go when a storm surge first hits land (FEMA 2009). These governments plan in advance how to get everyone to a viable shelter amidst a disaster. Sheltering usually takes place in existing structures—such as schools, convention centers, and/or large government building—that are suitable for housing large groups of people (FEMA 2009). For example, after Hurricane Andrew hit the Miami metropolitan area in 1992, the state of Florida learned from post-disaster evaluations that more appropriate public sheltering spaces were needed. In response to this need, the state developed a state-wide emergency

management plan to create adequate disaster relief housing for its residents by 2013 (FloridaDisaster.org 2008; Viterbo 2009). To assist in this effort, the state helps local governments by supplying funds to ensure that schools and public facilities meet the criteria for safe shelters as developed by both disaster experts and the Red Cross (FloridaDisaster.org 2008; Viterbo 2009). This short-term sheltering process was tested and proved effective in 2004 when more than a thousand shelters housed over 400,000 evacuees in response to Hurricane Charley (FloridaDisaster.org 2008).

By learning from its mistakes and working in conjunction with local governments and NGOs, the State of Florida developed a successful evacuation plan for each county. Indeed, as FEMA acknowledges, most hurricane prone areas have “well-choreographed” evacuation and short-term sheltering plans (FEMA 2009). However, catastrophic events such as Hurricane Katrina in 2005 showed FEMA and other disaster relief organizations that sheltering people displaced by a natural disaster can be an immense task that needs to be better planned, administered, and monitored (FEMA, 2009).

While state and local governments plan for short-term sheltering, NGOs, such as the American Red Cross, operate emergency housing shelters and assess people’s needs both during and after natural disasters to connect people to necessary services not provided by the government. Specifically, the American Red Cross is in charge of coordinating NGO efforts and taking care of people’s immediate needs in order to minimize harm and suffering (Cross 2008).

After short-term sheltering needs have been met, state and local governments decide when interim housing is needed. The federal government maintains the appropriate housing resources and deploys them when necessary (FEMA, 2009). At the federal level, FEMA and HUD work together to either establish housing voucher programs that pay for rental units for up to 18 months or provide temporary housing



units. If vouchers are used, HUD offers technical assistance and implements the housing voucher program through Section 8 Vouchers that can be used anywhere in the country (FEMA, 2009; Pollack, 2006). Because HUD is responsible for public housing throughout the United States, its network of 4,000 public housing agencies helps facilitate a large-scale response to a disaster-inflicted housing crisis (FEMA, 2009). To make transitions from short-term shelters more efficient, HUD developed a website that helps displaced people find rental units after federally declared disasters (FEMA 2009).

If temporary housing is determined a more appropriate response, FEMA is responsible for providing housing for 18 months after a disaster has occurred—a period that can be extended when there has been enough damage to infrastructure to significantly slow the rebuilding process (FEMA 2009). While FEMA locates, builds, maintains, and deactivates temporary housing, the infrastructure cannot be built without the approval of local governments (B. C. Davis & Bali, 2008). Sometimes, nongovernmental and community-based organizations like churches and individuals help finance temporary housing for displaced people (Davis 1978). When transitioning to temporary housing, local governments can also work with these community groups to assess needs of displaced community members (2006). These assessments help get people back to their routines to begin the recovery process (FEMA 2009). In addition to providing temporary housing, FEMA also repairs damages and repays costs not covered by insurance to construct new permanent housing, although the agency does not have the jurisdiction to construct permanent homes (FEMA 2009). After damage is assessed, the entire Natural Disaster Task Force works together to rebuild an affected area to function as it did in predisaster times (FEMA 2009).

In theory, FEMA and the National Disaster Task Force work to solve immediate housing problems that result from hurricanes. While policy may appear effective on paper, the prescribed plan is not always carried out as expected (Bolin 1985; Quarantelli

1999; FEMA 2009). Unfortunately, disaster planning policy is only tested in the event of dangerous natural disasters (Schneider, 1995). With thorough evaluation and analysis, though, these events can provide lessons for policy makers and planners; by looking at past governmental response to temporary housing responses, more insightful planning and design can occur in the future.

### Temporary Housing after Natural Disasters

For most disasters, short-term sheltering is the only housing assistance needed for recovery (FEMA 2009). For more intense and harmful disasters, however, temporary housing options are needed for people until their permanent homes are repaired or rebuilt (Quarantelli 1995; FEMA 2009). Temporary housing is more difficult to plan for than sheltering because it requires the consideration of long-term needs of displaced people, it is more costly, and it requires more coordination between organizations involved (FEMA 2009). As compared to short-term shelters, temporary housing allows people to begin the process of returning to everyday responsibilities (Nigg et al., 2006). As noted earlier, temporary housing can last from two months to five years. Children's education, food, recreational amenities, healthcare, daycare, transportation, daily needs and employment are all issues that should be considered in any temporary housing plan (FEMA 2009). Studies have shown that people do not like living in temporary housing, that displacement delays the recovery process, and that the associated stressors are related to the development of mental health problems (Bolin, 1985). Because of all of these factors, FEMA recognizes the need to give people privacy while living in temporary housing, help them reconnect to their communities, and find better ways to temporarily house displaced hurricane victims (FEMA 2009). Because many temporary housing stays are lengthy and because temporary housing appears to have significant psychological impacts on communities, expediting the recovery process should be a

priority for disaster relief organizations (Bolin 1985; Comerio 1998; Nigg, Barnshaw et al. 2006; FEMA 2009).

The form of temporary housing chosen is usually the result of the severity of the disaster, its impact on housing, and which demographic has been affected by the damage (Comerio, 1997; FEMA, 2009). Most displaced people live either in vacant rental apartments paid for by FEMA or in housing units provided by FEMA when rental apartments are not available (Nigg, Barnshaw et al. 2006).

When a disaster strikes and a city's infrastructure is not terribly damaged, putting displaced people into rental units within the city is the easiest and most affordable solution to temporary housing needs (Kaufman 2005; FEMA 2009). It is easiest to work within a city's existing infrastructure because these units already exist and can make comfortable private places where people can begin to rebuild their lives. The Northridge Earthquake, in 1994, affected a larger number of houses than any previous natural disaster in the United States: 15 neighborhoods lost 60% to 90% of their housing stocks (Comerio 1998). Finding homes for people displaced by the earthquake, however, was less of a problem than first predicted due to a high vacancy rate (Bolin and Stanford 1998). Soon after the earthquake, people found apartments at prices similar to what they had previously paid (Bolin and Stanford 1998). Displaced people were indeed helped by federal assistance, but the vacancy in the housing market helped those in need to normalize their lives more quickly (Comerio, 1997). The Northridge Earthquake illustrates how housing vacancies can help people recover from a disastrous event.

However, rental units are a fluctuating resource and are not always available where disasters strike (Comerio 1998). For example, the Loma Prieta Earthquake landed at 7.1 on the Richter Scale in 1989 and affected the cities of Oakland and San Francisco, and a few surrounding smaller towns (Bolin and Stanford 1991). The earthquake appeared to damage less than one percent (1%) of the housing stock in

Oakland and San Francisco; however, 60% of the damaged units were single-occupancy hotel rooms and apartments primarily inhabited by elderly, low-income, and migrant-worker residents (Comerio 1998). Each of the affected cities had low vacancy rates, and temporary low-income housing was unavailable (Bolin 1985). Most people displaced by the earthquake could not afford the high-priced coastal vacation homes and also feared discrimination (Fothergill and Peek 2004). Financing the recovery of multi-family apartments was difficult, and many people found themselves homeless (Fothergill and Peek 2004). After five years, only 50% of the low-income housing had been rebuilt (Comerio, 1997). In the case of the Loma Pieta Earthquake, dependence on the housing market to solve post-disaster housing needs proved inefficient and, ultimately, unsuccessful.

Similarly, when Hurricane Andrew—the most expensive hurricane at the time of its occurrence—blew over South Dade County, Florida in 1992, much of the affected land and infrastructure was “flattened”, and the 10% vacancy rate could not house all of the displaced victims (Comerio 1998). Over the next two years, the vacancy rate dropped, and rents increased (Smith and McCarty 1996). Evacuees had to travel a fair distance to find alternative housing, and approximately 25,000 people left the area permanently (Comerio 1998). In this case, displaced victims oversaturated the available vacant housing.

These examples show that the housing market is fickle and should not be solely responsible for solving temporary housing problems related to natural disasters. Additional precautions should be taken to quicken the pace of recovery. When communities know they are threatened by natural disasters, they must prepare ahead to mitigate more effectively for post-event hazards. Improving infrastructure standards and environmental mitigation will help reduce damage caused by natural disasters, but potential damage in existing older infrastructure will most definitely persist.

Although depending on vacant housing in disaster-affected areas is unreliable, many Hurricane Katrina victims were forced to flee across state lines to find vacant housing after being displaced from their homes. Hurricane Katrina demolished the Gulf Coast along Louisiana, Mississippi, and Alabama causing the greatest amount of natural disaster related damage ever recorded in the United States. Thousands of evacuees relocated to Texas; the housing stocks in San Antonio, Austin, Houston, and Dallas were quickly saturated (Pollack 2006). People were happy to have private and safe places to stay, but these facilities were temporary, did not feel like home, and had negative psychological effects on evacuees (Pollack 2006). Living in a foreign city without access to public transportation and without the ability to walk to a grocery store, people were left feeling isolated with their basic needs unmet (Pollack, 2006). These evacuees also had difficulty acquiring social services in scattered apartment complexes around various cities (Pollack, 2006). Without knowing how long they would have to live in temporary housing, evacuees had more instability in an already uncomfortable scenario. Ginny Goldman from ACORN—a group that helps low-income families—said that people stayed in temporary housing longer than necessary because they were afraid they would not be able to acquire jobs in a foreign city or to afford their own rent (Pollack 2006). In October 2006, a year after Hurricane Katrina, evacuees living in cities across state lines had a 16 percent unemployment rate, whereas evacuees who returned to their pre-disaster areas of residence only had an unemployment rate of 5.4 percent (Groen and Polivka 2008). Apparently, housing hurricane victims across state lines and far from their comfort zones makes acclimation and recovery difficult. While placing displaced people in vacant housing may be the easiest and most affordable option for disaster management agencies, its lasting and deleterious effect on those displaced may cause longer and more expensive recovery periods.

In turn, providing vacant apartments as temporary housing is a viable but risky solution that should never be the only planned response. Furthermore, research shows that it is important to keep families and communities together (FEMA 2009). By placing evacuees in scattered locations throughout a city, they are segregated from the communities they know. In these decentralized communities, there are no suitable locations for disaster recovery services—such as places to file insurance claims or to receive emotional support—that are proximate to all community members (Pollack 2006). An effective strategy for temporary housing after a natural disaster should incorporate more creative planning mechanisms to make temporary housing a more cohesive and community-based process, to keep disaster victims as close to their communities as possible, and to give victims easy access to needed social services. This will also benefit counties who keep their residents, as they remain as part of the tax base of the county (Viterbo 2008). Admittedly, although planning can significantly improve responses to temporary housing needs, no prescribed plan can fully account for all complications of natural disaster relief, as natural disasters do not have predetermined boundaries or limits.

Even when using existing unoccupied infrastructure is the preferred method of provisional housing, these facilities cannot always sufficiently accommodate the abundance of people needing sanctuary during and/or after a catastrophic disaster (FEMA 2009). When temporary units are necessary, FEMA provides manufactured homes and trailers for people displaced by the disaster. Legally, these units must meet the Federal Manufactured Home Installation Standards that were updated in 2008 to include higher standards (FEMA 2009). The manufactured homes are generally 60 feet by 14 feet; and the trailers are smaller, 30 feet by 8 feet (FEMA 2009). Due to the perceived need for new types of temporary housing units, Congress passed the Alternative Housing Pilot Program that granted \$4,000,000 to FEMA's Disaster Relief

Fund to explore innovative interim housing alternatives (FEMA 2009). These new housing alternatives consider livable spaces, durability during various weather conditions, timeliness of construction, and cost (FEMA 2009). Prototypes of these alternative housing units are already being used in Alabama, Mississippi, Louisiana, and Texas (Figure 2-3).

For years, people have sought newer and better emergency housing, whether for disaster victims or political refugees (Architecture for Humanity 2006). The magnitude of Hurricane Katrina—and the publicity that followed—caused many to seek creative solutions for temporary housing structures, as shown in Figure 2-3. As noted in the previous chapter, New York City created a design competition called “What if NYC...” to plan for housing in preparation for a catastrophic disaster (OEM 2007). Since the San Francisco Earthquake in 1906, many temporary housing structures have also been considered (Architecture for Humanity 2006). However, rarely has the site planning and design for temporary housing been addressed—this thesis seeks to fill this void.



**Fig. 2-3:** Proposed temporary housing solutions *left:* Mobile artist studio ([www.emergencyresponsestudio.org](http://www.emergencyresponsestudio.org)) *right:* Katrina Cottage (Lee 2006)

Trailers designed for interim living can be placed on four types of land: homeowners' private property, uninhabited trailer parks, existing trailer parks enlarged to

accommodate FEMA trailers, and greenfield sites<sup>1</sup> (B. C. Davis & Bali, 2008). Of these options, placing temporary housing units on private property is by far the most desirable because people live on their own property in the same location as before the storm (Nigg et al., 2006). Besides living in a different structure, people can resume living as they always have. Aside from private property, existing commercial trailer parks are the most technically convenient sites to establish trailer communities because they already have pads and utilities designed for trailers (FEMA, 2009). Greenfield sites are the least desirable to establish because they may require extensive construction, utility placement, and arrangement of services (FEMA 2009). These improvements add significant cost and time to the interim housing process (FEMA 2009). People enjoy trailer communities more than crowded shelters because they offer residents a space of their own; however, temporary housing experiences tend to be unconstructive and tiresome rather than hopeful and restorative (Kaufman, 2005).

#### FEMA Trailer Parks: Recovery or Deterioration

In 2004, 500 white trailers—also known as “FEMA City”—were set up on a grid in a dusty, treeless 64-acre lot in Charlotte County, Florida to house 1500 people displaced by Hurricane Charley (Kaufman, 2005).



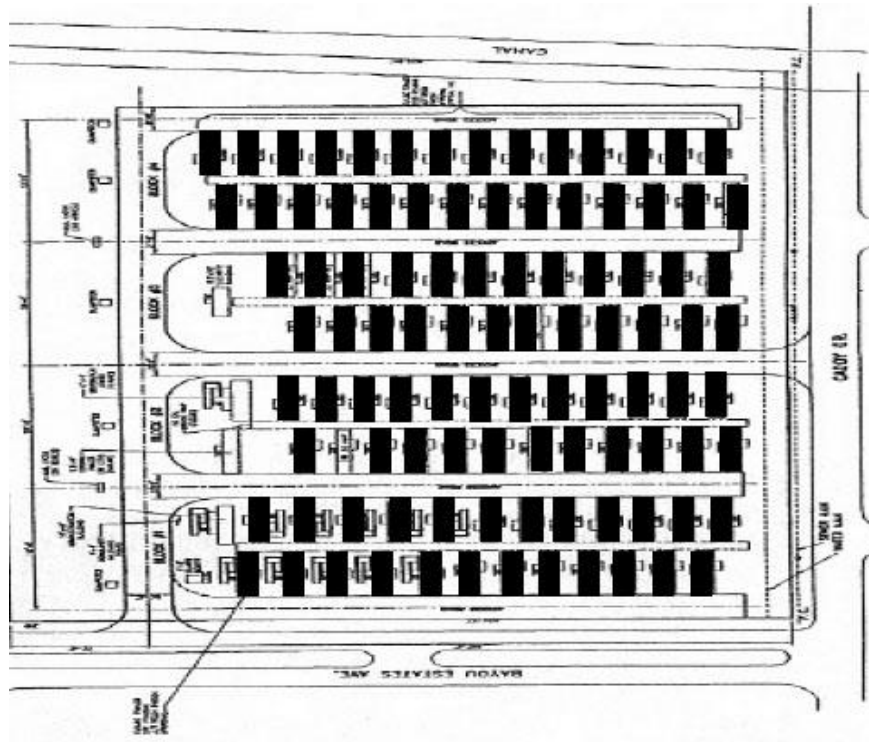
**Fig. 2-4:** FEMA City, Charlotte County Florida (Kaufman 2005)

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<sup>1</sup> In this thesis, greenfield sites are defined as sites not previously developed for intense human occupation.



One year later, Bob Herbert, the “Director of Recovery” for Charlotte County, explained, “FEMA City is now a socioeconomic time bomb just waiting to blow up” (Kaufman, 2005). Residents frequently complained about vandalism and criminal activity on the site (Kaufman, 2005). Because of FEMA regulations, the residents were required to leave after 18 months; however, most were afraid to move because their former housing was destroyed by the hurricane and the small amount of housing that was left or rebuilt had become too expensive (A. C. Davis, 2005; Kaufman, 2005). Instead of providing a place of revitalization, this FEMA City became a horrifying experience for people living there. Social services, programming, and/or other forms of assistance should have been available to encourage residents’ well-being and to help prepare them for life after FEMA City.



**Fig. 2-5:** Preliminary site plan for FEMA city (FEMA 2005)

Another FEMA City in Baker, Louisiana had a similar response from residents. Reactive planning prepared a site for 573 trailers, cost \$22,000,000 and required the installation of utilities and a sewage treatment plant (A. C. Davis, 2005). In addition, because FEMA City was placed 90 miles outside of New Orleans, the government cooked meals and provided night security for the residents (A. C. Davis, 2005). The people living in the Baker FEMA City had no access to transportation or places to acquire basic needs, thereby making them entirely dependent on FEMA. Furthermore, units were crammed close together, creating a claustrophobic environment (A. C. Davis, 2005). Indeed, the San Jose Mercury News was correct its in prediction that, “The trailer parks [were] likely to become crowded, remote and undesirable, giving residents little chance to conveniently tap into jobs or schools” (Davis 2005). Ultimately, the site’s location and design demoralized those living in temporary settlements. Although the interim housing in Baker gave people physical refuge, no planning was done to increase the quality of their lives or allow people to return to normal daily activities.



**Fig. 2-6:** FEMA City, Baker (Davis 2005)

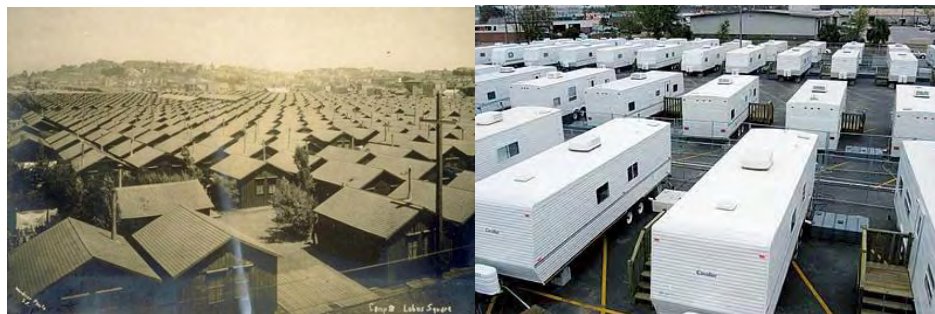
As shown in the previous examples, the majority of site planning for temporary housing usually occurs after a disaster strikes. Because emergency shelters are identified long before disasters occur, people know ahead of time where they are

supposed to go in case of an impending disaster, and—in the case of hurricanes—they are able to vacate more quickly and efficiently as a storm approaches (FloridaDisaster.org 2008). As for temporary housing in the case of Hurricane Katrina, temporary housing units were still being sited six months after the disaster occurred, further slowing the recovery process (B. C. Davis & Bali, 2008). If governments had surveyed potential temporary housing sites before Hurricane Katrina hit, many people could have moved into temporary housing units more quickly, creating less confusion and quicker relief from overcrowded shelters. Arguably, creating interim housing solutions for those affected by natural disasters is the most difficult and time consuming of FEMA's responsibilities (FEMA, 2009; Levine, Esnard, & Sapat, 2007). James McIntyre, a FEMA spokesperson, confirms that siting the temporary trailer cities is the most difficult task faced by their establishment (Kaufman, 2005). With careful and creative planning, the execution of temporary housing strategies could be easier for both the agencies responsible for the plans and for the displaced victims of natural disasters.

Once these sites have been chosen for temporary housing, FEMA Cities have traditionally been thrown together without proper planning, creating dysfunctional environments for people and ghost towns once the communities are gone (Sutherland 2008). Housing scenarios have long been shown to have behavioral and emotional effects on people (Bolin 1985; Lohr 2006; Spiegel 2007); therefore, establishing well-thought-out temporary housing strategies can expedite people's recovery from natural disasters rather than delaying or worsening their situations (Quarantelli, 1995). According to Quarantelli, people are more willing to endure uncomfortable living conditions for short periods of time, and each additional move that they make becomes increasingly harder and adds to post-disaster stress (Quarantelli 1995; Quarantelli 1999). A lack of comprehensive post-disaster planning fosters misdirection and potentially forces already-stressed and displaced people to move repeatedly. If disasters

continue to get stronger and occur more frequently—as recent trends suggest—and as urban areas continue to densify, temporary housing problems will only become more difficult to solve (Bolin 1985; Comerio 1997; FEMA 2009). FEMA representatives and policy critics agree that “deliberative housing plans” should be conducted for every level of disaster (FEMA 2009). Proactive and creative planning can potentially eliminate the atrocious and demoralizing living conditions experienced in previous temporary housing arrangements.

Unfortunately, most temporary housing communities (at least since the San Francisco earthquake in 1906) have neglected to consider site design (Davis 1978). Ian Davis, an expert in housing issues related to natural disasters, explains in his book, *Shelter after Disaster*, that he has only seen one disaster response which took site design into account when establishing temporary housing after natural disasters: the disaster recovery effort in Nicaragua after the 1971 earthquake led by Frederick C. Cuny (Davis 1978). This example will be addressed later in this thesis. Figure 2-6 shows temporary housing arrangements after the 1906 San Francisco earthquake and after Hurricane Katrina in 2005. Although the housing type has changed, the site designs, regrettably, remain almost the same.



**Fig. 2-7:** Comparison of Temporary Housing over a Century: San Francisco Earthquake in 1906 versus Hurricane Katrina in 2006 ([www.usace.army.mil/History/Pages/Brief/09-disasters/disaster.html](http://www.usace.army.mil/History/Pages/Brief/09-disasters/disaster.html), [http://ohmygov.com/blogs/general\\_news/fema-trailers.jpg](http://ohmygov.com/blogs/general_news/fema-trailers.jpg))

## Conclusion

Sandra Schneider—in her book *Flirting with Disaster*—says that the success of a disaster response is related to how much “post disaster human behavior corresponds to prior governmental expectations and planning” (B. C. Davis & Bali, 2008). In catastrophic hurricane events, it appears a large gap usually exists between the government’s expectations of disaster recovery intervention and the consequences that occur as a result of governmental inaction. By planning and designing for housing crises before disasters occur, there is a greater probability for quicker establishment of interim housing, more efficient use of resources, and more pleasing options for the disaster victims. By assessing governmental roles and studying past temporary housing efforts, research suggests that no previous solution has been completely satisfying to both the government and the affected citizens.

Using vacant apartments to house refugees is affordable, fast, and utilizes existing infrastructure. For these reasons, this approach should continue to be used as a temporary housing option; however, vacant housing is inconsistent, it separates communities, and it decentralizes social-service facilitation. Additional issues also arise when hurricane victims are sent to vacant apartments in other cities. These evacuees may feel isolated from their pre-existing communities and may have trouble locating necessities, factors that potentially add to the stress already caused by the disaster itself. Furthermore, removing people from their communities for months or even years may deter them from ever returning, which can have long-term effects on an already distressed city. Innovative approaches to post-disaster temporary housing should be considered.

Temporary trailer park communities, or FEMA Cities, keep people in one central location that allows for easy access to social services. These arrangements can potentially keep communities together and geographically close to the communities from

which they were evacuated. Site planning is usually not done until an event occurs, however, and FEMA Cities are often located away from infrastructure and transportation systems. These temporary communities have little aesthetic appeal and do not serve as restorative environments—characteristics that make them demoralizing for residents. In addition, siting, constructing, and dismantling temporary trailer communities can be timely and costly, affecting people's livelihood.

Indeed, temporary housing is not an ideal place for anyone to live, but its use is sometimes necessary for recovery after disasters. Because pre-existing vacant housing is not reliable, and in some cases not desirable, temporary units must be considered as a way to house those displaced. Historically, trailer communities have proven to be unappealing, dysfunctional, not well planned, and expensive. Temporary housing must be thought of differently if it is going to function better than it currently does. In accordance with FEMA's housing strategy, disaster planning should be developed to facilitate recovery (FEMA, 2009). This development should: 1. Incorporate social services; 2. Promote community identity and a sense of self-worth to residents, and 3. Provide a safe and secure environment (FEMA, 2009). In order to achieve these goals, temporary housing plans must be established before the onset of a disaster. While no one wants to live in temporary housing, perhaps its stigma can be reduced and people can tolerate and endure the rebuilding process with less difficulty. FEMA identifies the need for a better balance between responding quickly to housing and providing for people on an individual, familial, and communal level (FEMA, 2009). This feat can only be accomplished by redefining expectations and revitalizing planning efforts.

## CHAPTER 3

### DESIGNING FOR RECOVERY

#### Introduction

While temporary housing communities are necessary for recovery and reconstruction after natural disasters, they should not continue to exist in their current forms. As stated in the previous chapter, this thesis explores how to better plan for temporary housing communities to create a more beneficial experience for residents who may live in these situations. This chapter addresses both individual and community emotional issues, including the functional needs that should be addressed when planning and designing a temporary community for displaced disaster victims. This chapter also looks at past temporary communities that have lived in precarious situations to distill out aspects that enabled the development of a sense of community, attachment to place, and restorative environments. Once people's needs are better understood, criteria for designing temporary communities will be given. These essential characteristics—in concert with the information gleaned from Chapter 4—will then be used to inform a master planned design proposal in Chapter 5.

#### Emotional Distress in Disaster Victims

While the disasters described in this thesis are caused by natural forces, the planning and emergency responses discussed herein address damages inflicted by these forces upon people and their existing infrastructure. Understandably, an earthquake's measurement on the Richter scale does not necessarily correlate with the degree of damage it causes or with how much capital and time the government should invest to return normalcy to the affected areas (Comerio 1997). In the case of

hurricanes, a powerful storm in the Atlantic Ocean may be tracked and studied, but it is not considered a “natural disaster” until it directly affects the well-being of a group of people. All planning, designing, rescue, rebuilding, and recovery efforts target these affected people and their infrastructure. Because this thesis explores how to better design and plan for temporary housing after natural disaster events, it seeks to discover characteristics of those who typically live in these facilities, their emotional plight, and their recovery needs. Both individual and community needs should be assessed when considering temporary housing alternatives—not only to physically accommodate people displaced by the disaster, but also to devise a design that will promote recovery instead of prolonging and compounding damage and despair.

Natural disasters such as tornados, hurricanes, floods, and earthquakes can negatively affect people’s mental statuses and cause much psychological trauma (Steinglass and Gerrity 1990; Freedy, Saladin et al. 1994; Green 1996; Norris, Perilla et al. 1999). Because each event is unique in several regards, however, generalizations about the psychological effects of natural disasters are difficult to establish. For example, the severity of the actual disasters, the size and character of the areas affected, and the types of communities and individuals displaced by these disasters can vary greatly. Although rates of psychological disorders are inconsistent depending on these and other factors, commonly observed effects are post-traumatic stress disorder (PTSD), anxiety, and depression (Green and Solomon 1995; Norris, Perilla et al. 1999). Acute stress is often associated with the severity of a traumatic event, the loss of loved ones, and significant property damage (Green 1996). In various psychological studies of the emotional effects of natural disasters, the majority of victims’ distress is temporary and dissipates within 18-24 months of the event (Freedy, Kilpatrick et al. 1993; Freedy, Saladin et al. 1994; Norris, Perilla et al. 1999). This dissipation, however, is typically delayed by both residual stress and resource loss, and correlates with the disaster’s



magnitude (Green and Solomon 1995; Norris, Perilla et al. 1999). Of these three factors, resource loss has been determined to be the most important variable in prolonging psychological distress because it often reduces people's access to important coping resources (Freedy, Saladin et al. 1994). Arguably, people whose homes have been damaged or destroyed will be most distraught by a natural disaster; their temporary housing facilities, therefore, are an important factor in their psychological recovery.

### Temporary Housing: Solution or Problem?

Unfortunately, temporary housing communities tend to perpetuate grief rather than alleviate it. Upon arrival, residents are often pleased to vacate crowded shelters and to have private places of their own; however, due to poor site selection and camp-style design, lack of access to basic needs, concerns about neighborhood safety, and anxiety about permanent living conditions, experiences in temporary housing camps can become disastrous, depressing, and hopeless (2006; Lohr 2006; Spiegel 2007). National Public Radio reporter Alix Spiegel visited Scenic Trails—a post-Katrina FEMA trailer park located deep in the Mississippi woods—and reported that four people told her on the same day that they wished to commit suicide (Spiegel 2007). Indeed, the *Annals of Emergency Medicine* published a study of 92 FEMA trailer parks that concluded that “suicide attempts in Louisiana and Mississippi’s parks are 79 times higher than the national average. Major depression is seven times the national rate” (Spiegel 2007).



**Fig. 3-1:** Residents in Temporary Housing Fear for Their Future.  
(<http://www.zimbio.com/pictures/GcH8KjQdjF/FEMA+Deadline+Vacating+Trailers+Louisiana>)

In High Hills Trailer Park—a FEMA trailer park in Picayune, Mississippi constructed after Hurricane Katrina—residents complained about neighbors arguing, cursing, and abusing drugs and alcohol (Lohr 2006). In this park, as in many FEMA trailer parks, the thin-walled houses are placed close together, and residents can hear the activities of their neighbors (Davis 2005; Lohr 2006). Additionally, crime is a huge problem in FEMA trailer parks. In Scenic Trails, most residents have been robbed, and the sheriff from Pearl River County, Mississippi—the location of six FEMA trailer parks— noted a significant increase in crime in the county from the presence of the FEMA trailer parks due to trailer conditions (Lohr 2006; Spiegel 2007). In Scenic Trails, methamphetamine and cocaine addiction were vastly manifest, and people complained about mutilations to pets (Lohr 2006). Sister Judith Brun, the director of a foundation in Baton Rouge that provides services to FEMA trailer park residents, notes a distinct shift in the attitudes of residents of Renaissance Village, the first FEMA trailer community for Hurricane Katrina victims. As she explains, the displaced people were happy to have “space of their own” when they arrived in Renaissance Village, but by the time they moved out, the same residents were a “depressed group” (Seabrook 2008). She describes this trailer park as merely a place of refuge that severely lacked social support (Seabrook 2008).

Low-income, working-class people are most likely to be displaced by natural disasters (Davis 1978; Kaufman 2005; 2006). Inexpensive rental units that have been destroyed or damaged by a natural disaster tend not to be repaired or rebuilt, and the housing that is available after a disaster is often too expensive for those who have been displaced (Comerio 1997). In addition, government low-income housing usually takes a long time to rebuild (Davis 1978; Comerio 1997; Spiegel 2007). As a result, people tend to stay in temporary communities for long periods of time. This pattern occurred after the Northridge earthquake in Oakland, California (Comerio 1997), Hurricane Katrina in

coastal Mississippi (Lohr 2006; Spiegel 2007), and Hurricane Charley in Charlotte County, Florida (Kaufman 2005). Indeed, three years after Hurricane Katrina, New Orleans is still trying to rid its city of FEMA trailers, but many victims still do not have the money to repair storm inflicted damages (Sutherland 2008).

As shown, the unfavorable living conditions in current temporary housing communities compound psychological distress and make recovery even more difficult. If FEMA, state, and local governments do not want people to live in temporary communities for more than 18 months after a disaster, they must make governmental policy that will create affordable housing for displaced people within that timeframe. Encouragingly, in their 2009 National Disaster Housing Strategy, FEMA acknowledges that planning for disasters can accelerate recovery that interim housing should aid the recovery process, and that support during the interim housing phase can prepare people for permanent housing (FEMA 2009). An analysis of how to design a temporary community to better meet these goals, therefore, is very important.

### Healing and Landscapes

Designing for a temporary community inhabited by displaced hurricane victims is difficult because the designer will never know exactly who the residents will be or how long they will reside there; however, studies on how to design landscapes to aid in the healing processes of people suffering from various sicknesses and injuries have been conducted (Ulrich, Simons et al. 1991). Patients who have long-term stays in hospitals are similar to temporarily displaced disaster victims in that they suffer great emotional stress, they do not know how long they will remain in the temporary residence, and they do not necessarily know what the future holds (Marcus and Barnes 1999; Norris, Perilla et al. 1999). Many hospitals and rehabilitation facilities feature therapeutic gardens designed specifically to create healing environments for patients suffering from

psychological distresses such as anxiety, acute stress, and depression. An analysis of the designs used for these hospital patients may offer insight into how to better design temporary housing communities to facilitate recovery and healing for natural disaster victims.

By definition, healing means “to cause (an undesirable condition) to be overcome” (heal, 2009) or to provide “relief from physical symptoms or awareness of those symptoms” (Marcus and Barnes 1999). In a study taken in a hospital setting, 95% of patients surveyed reported feeling less stressed, anxious, or depressed after spending time outdoors. Even the simple act of viewing the outdoors had positive effects on patients’ recuperation (Ulrich 1979). Patients reported that visual, olfactory, tactile, and auditory cues were a “precursor to a calming or centering experience” (Marcus and Barnes 1999). Indeed, research confirms that access to outdoor areas can aid in recovery by reducing blood pressure and anxiety (Ulrich, Simons et al. 1991; Tyson 1998). Because of the positive effects that natural elements can have on the healing process, the organization responsible for the accreditation of 85% of the acute care hospitals mandates that long-term patients have access to outdoor facilities (Marcus and Barnes 1999).

Alternately, while positive sensory experiences benefit people, poorly designed spaces can cause equally negative effects such as anxiety, delirium, sleeplessness, and/or an increase in blood pressure (Tyson 1998). These negative effects of stress often occur when people feel helpless or as if they have lost all control in their lives; another way to combat stress and depression, therefore, is to provide people with a sense of control that will enable them to believe that they have the authority to direct what they do (Ulrich 1979). In hospitals, people feel a lack of control from unfamiliar surroundings, privacy loss, and lack of information (Marcus and Barnes 1999). Similarly, stress and depression are common to displaced hurricane victims and can put them

physically at risk by suppressing their immune systems or manifesting in “sleeplessness, drug abuse, angry outbursts, helplessness or passivity” and social withdrawal (Marcus and Barnes 1999). These manifestations of stress are visible in many FEMA trailer camps and make them unpleasant places to live (Spiegel 2007). Gardens can assist in the healing process by providing a feeling of “being away” or a “temporary escape” (Kaplan, Talbot et al. 1983; Marcus and Barnes 1999). This perceived ability to escape helps bestow an impression of individual power and relief by allowing people to walk in nature or passively look into a garden and daydream (Kaplan, Talbot et al. 1983).

Similarly, a well-designed garden can subtly instill a sense of control among users in temporary housing communities and, in turn, help them recover from acute stress. Most importantly, people must know where accessible outdoor spaces exist, and these spaces must be convenient to the community’s residents. The incorporation of passive and active—as well as public and private—recreational spaces offers residents a variety of places to choose to visit and helps instill a sense of independence. In addition, resident involvement in the design of these spaces can ignite a sense of control and ownership among users (Marcus and Barnes 1999). For example, national disaster assistance was delegated to local administration to carryout recovery efforts after two earthquakes hit Friuli, Italy in 1976. Local representatives selected sites and housing patterns for temporary housing (Davis 1978; Johnson 2007). Temporary housing units were grouped together forming courtyards. Each grouping chose representatives who were involved in the planning for reconstruction (Johnson 2007). This recovery process not only allowed for community involvement in reconstruction, but the housing design provided a forum to reestablish community solidarity (Johnson 2007).

In addition to instilling a sense of control, the incorporation of natural elements into the design of temporary communities can provide positive distractions that help reduce worrisome thoughts, lower blood pressure, and decrease the production of stress

hormones (Ulrich 1979; Marcus and Barnes 1999). Interestingly, the benefits of viewing nature are greatest when people are exposed to high levels of stress (Ulrich 1979). In high-stress environments, garden elements such as vegetation, flowers, and water inspire relaxation and promote peacefulness, tranquility, and serenity (Tyson 1998). Although research suggests that scenes lacking nature can actually hinder recovery, designers of therapeutic gardens must be careful because disliked or unpleasant outdoor environments can also increase stress levels (Marcus and Barnes 1999). Designers, therefore, should become familiar with the potential users of the spaces to better understand their tastes, and to create more relevant and successful places (Tyson 1998). Cultural issues should be taken into account and designs should incorporate a balance between promoting interaction and allotting space for privacy (Marcus and Barnes 1999).

In addition to improving health by instilling a sense of control over one's environment and creating positive distractions, outdoor spaces offer places where people can exercise. While exercise has widely understood physical benefits, it has also been proven to reduce stress, depression, and anxiety (Brannon and Feist 1997). For example, a study showed that depression symptoms in elderly women were significantly reduced if they walked for 20 minutes three times per week (McNeil, Leblanc et al. 1991). There is also evidence that stress in children and adolescents can be reduced through exercise (Whitehouse, Varni et al. 2001). Design can encourage exercise by providing places that motivate people to walk such as easily accessible gardens, trails, and other destinations. Places specifically designed for children to play are also important for their healing (Shepley, Fournier et al. 1998). In addition, sites should be designed appropriately for their climate (Marcus and Barnes 1999). For example, cold climates should have indoor facilities where people can walk with views outside, while designers of hot environments should consider shaded outdoor walkways.

In addition to offering options and engaging distractions, a variety of garden spaces that differ in design and size will help attract social interaction and potentially promote social support and a strengthened sense of community—two other important criteria for healing environments (Horsburgh 1995; Marcus and Barnes 1999; Kaplan and Kaplan 2003). People with sufficient social support who feel as if they are part of a community tend to be less stressed and in better health than those who are isolated (Marcus and Barnes 1999). Social support can bolster health through a combination of factors such as buffering the stress of challenging experiences and improving recovery rates in medical patients (Marcus and Barnes 1999).

A 1985 study investigating the psychological effects of two different natural disasters suggests that people with a strong sense of community recovered more quickly and effectively from the psychological effects of a natural disaster than the victims in communities without this sense of support (Steinglass and Gerrity 1990). A different study from 1998, researching open spaces in inner-city high-rise public housing, showed that the use of open spaces was related to the strength of community ties and social support within the community (Kweon, Sullivan et al. 1998). Studies also found that open spaces filled with trees and greenery were used more than those void of vegetation (Kuo, Sullivan et al. 1998).

As described above, psychological distress is a common problem in victims of natural disasters and can be exacerbated by living in temporary housing communities (Kaufman 2005; Spiegel 2007; Seabrook 2008). Fortunately, a community's design and the incorporation of nature as a healing tool can help ameliorate and reduce distress in the disaster victims (Tyson 1998; Marcus and Barnes 1999). Although other guidelines and precedents must be considered, an application of the principles of healing and restorative gardens may assist in reaching FEMA's goals of providing community

support and beginning the recovery process for natural disaster victims placed in temporary housing.

### The Power of Community

Temporary housing after natural disasters changes people's lives without foresight or forewarning. People are distressed because their livelihood has been jeopardized and they are ill informed as to where or how long it will be until they find stability or a place of permanent residence. History has shown that temporary housing is a method of last resort for people after natural disasters who seek refuge with family, friends, or by other possible means first (Davis 1978). Factors that reflect community cohesion and attachment to place must be explored to better design a temporary community that perpetuates recovery and stability rather than further loss and devastation.

As previously stated, FEMA trailer parks have not created communities; instead, they merely provide depressing places for people to wait until permanent housing becomes available. Temporary communities—whether they last two months or five years—are undoubtedly different from those built for permanent use; however, certain principles of community are comparable in both scenarios. While the previous section explains why a sense of community and social support are important in temporary housing developments, this section seeks to understand how to effectively design to instill a sense of community and apply its principles to temporary communities in hope of expediting residents' recovery processes.

The American Sociological Association (ASA) addresses the concept of *community* as derived from geographically and culturally homogenous groups, but that its meaning has diversified to include any emotional tie or bond that encapsulates people into similar factions (Collins 2009). While sharing a geographic location, people living in



temporary housing after natural disasters rarely feel connections towards each other (Lohr 2006; Spiegel 2007). How, then, can the design of a temporary community influence the sentiments of the people living there? It is clear that communities are organic entities that cannot be designed (Lynch 1960); however, physical form provides the structure and space that allows for these interactions to take place and be developed (Alexander, Ishikawa et al. 1977).

The first aspect of creating a sense of community is through the design of community *centers* that encourage social interaction (Jacobs 1961; Hester 2006). A *center* refers to a concentration of uses such as a corner store, a post office, or a school (Jacobs 1961; Hester 2006). *Centers* help establish community legibility, foster a sense of community, and provide for social contact; they also create a forum where people can get in touch with others and share life experiences (Lynch 1960; Alexander, Ishikawa et al. 1977). The key to successful *centers* is a variety of community facilities and uses for nearby residents (Lynch 1960; Alexander, Ishikawa et al. 1977). Even when temporary, communities utilize shared facilities to congregate and share resources.

After the Dustbowl in the 1930s, the Farm Security Administration (FSA) sought to incorporate social reform through the physical forms of temporary housing for migrant farm workers and their families (Hise 1997; Fanslow 1998). The FSA acknowledged that if they did not provide housing for these migrant workers, families would take refuge in fields or shanty towns on the sides of highways (Hise 1997).

The migrant worker housing that was created attempted to improve sanitation and public health problems, as well as develop a safe space where residents could “rekindle a sense of community” (Fanslow 1998). The design for this housing incorporated temporary units that surrounded a permanent community *center* (Hise 1997). The community *center* could be physically adapted to accommodate various camp uses such as laundry and shower facilities as well as dances and plays (Hise

1997). This set up a framework encouraging social movement and interaction. These *centers* became places where residents could play music and house dancing and singing activities (Fanslow 1998).



**Fig. 3-2:** Community Activities in FSA Migrant Farm Worker Housing in Tulare, CA *Left:* Saturday Night Dance (Library of Congress 1940) *Right:* Women's Club Meeting (Library of Congress 1940)

Comparably, the residents of Spanish Harlem in New York City have constructed their own *centers* called Casitas (Sciorra and Cooper 1990). These Casitas are places where locals can socialize, send their children to engage in activities, and receive social services (Sciorra and Cooper 1990; Winterbottom 2007). Although the Casitas are inherently temporary—most are illegally constructed on vacant land by community residents—they create community connectedness and fulfill nearby residents' needs for a social *center* (Sciorra and Cooper 1990). Because they are created from nothing by their users, the Casitas illustrate the significance a *center* can have for a community—a place where collective identity can be expressed.



**Fig. 3-3:** Las Casitas Men playing dominoes (CunyMatters 2002)

Hester provides “ten rules for good centers” (Hester 2006):

1. Have intense concentrations of multiple uses
2. Are easily accessible to everyone
3. Encourage daily use
4. Allow for different types of uses for community interaction
5. Provide settings where new ideas can contribute to local knowledge
6. Develop shared interests
7. Provide a sense of orientation inside and outside
8. Reflect ecological context
9. Present a consistency of building form
10. Are designed to invite commitment

While *centers* are community building forms, their use is commonly determined by a *center's* proximity to where people live (Alexander, Ishikawa et al. 1977). Creating *centers* that exist within a quarter-mile or a five minute walk—an acceptable walking distance—of residents is essential to good neighborhoods (Alexander, Ishikawa et al. 1977; Hester 2006). Depending on the size of a community, various connected *centers* can provide close *places* for everyone (Lynch 1960). In particular, this consideration is especially important for people displaced by natural disasters whose cars may have been damaged. In addition, because impoverished people tend to live in these temporary communities, many residents may not have access to private motorized transportation.

While creating a public *center* within walking distance is preferable for community involvement and instilling a sense of community, the *center* must reflect the patterns of activity and the culture of the people it serves (Lynch 1960; Hayden 1995; Hester 2006).

Communities must be legible and organized through form but also be elastic to allow for those inhabiting a place to make it their own (Lynch 1960).

In 1942, 150,000 Japanese Americans had between 6-21 days of notice before they were sent to internment camps at undisclosed locations for an unknown amount of time (Helphand 2006). Soon after arrival, the evacuees created *centers* in the form of parks and gardens where people could congregate and enjoy outdoor space (Helphand 2006). The gardens were symbolic, portraying culture and beliefs of the Japanese Americans through the creation of pools, fountains, stones, “bonsaied” sagebrush, and the like (Helphand 2006). By creating a comfortable setting, the evacuees were able to develop a sense of normalcy in the camps and feel an attachment to their temporary living conditions (Helphand 2006).



**Fig. 3-4:** Japanese Internment Camp Gardens (Helphand 2006)

When the Japanese were evacuated from one of their original communities, known as “Little Tokyo in California”, recently arrived African Americans from the South infiltrated the area (Hayden 1995). The area became known as “Bronzeville” and the *centers* changed accordingly. Where kimono etiquette and flower arranging classes used to be held, jazz clubs and a black community center were erected (Hayden 1995).

Additionally, the Casitas of Puerto Rican immigrants in Spanish Harlem have huts for playing card games and dominoes, and buildings painted coral, turquoise, and yellow to represent their activity interests and collective cultural history (Sciorra and Cooper 1990; Hayden 1995). These places use existing behavior patterns and cultural identity to create a sense of place and community. Designers of temporary communities should acknowledge the rituals of the displaced people and arrange for cultural activities and cultural expression within the community spaces (Hester 2006). If a temporary community does not allow residents to embrace and express who they are, the temporary community will inhibit residents from returning to everyday activities, feeling at ease, or embracing their surroundings. These activities allow people to interact with each other and celebrate. They can also teach different cultures within the community about each other (Hester 2006).

Even the FSA migrant worker camps were designed to provide “a safe space in which to retire from the discrimination that plagued them and in which to practice their culture” (Fanslow 1998). Responsibilities and governance were mostly carried out by residents. Culture was celebrated through oral stories, folk music, dance, and musical performances in Spanish (Fanslow 1998). In total, residents could celebrate their culture during a time of great hardship.

Good community *centers* tend to require investments from residents which, in turn, help them develop a sense of attachment and ownership of the centers (Hester 2006). Community projects generated by the public promote ideals of democracy and give control to the public (Alexander, Ishikawa et al. 1977). For example, community members who build *centers* that formerly did not exist must invest time, labor, and possibly materials to better their community, much like the Casitas, constructed gardens in Japanese Internment Camps, and the organized activities and groups in FSA migrant

worker camps. Likewise, slums<sup>2</sup> are created on uninhabited land by people without land or a place to live (Neuwirth 2005). By spending time building their own residences and communities, people residing in these slums indulge in a sense of ownership that comes from the investment of both time and resources (Neuwirth 2005).



**Fig. 3-5:** Kibera, a slum in Nairobi, Kenya (Rowam 2009;Ina 2008)

Community gardens—collaborative planting projects created by community members in urban environments—also show strong evidence of bolstering community support through investment, especially in neighborhoods with high rates of crime and other social problems (Linn 1999; Marcus and Barnes 1999). Community gardens are proven to enhance social activity and provide an opportunity for cultural expression in addition to benefits of producing food (Lawson 2007).



**Fig. 3-6:** Peralta community gardens bolster community interaction (Gudjonsdottir 2008)

<sup>2</sup> A *slum* is defined as a densely populated usually urban area marked by crowding, dirty run-down housing, poverty, and social disorganization (Slum 2009).

This evidence suggests that providing open spaces in temporary communities may indeed foster communal sentiment in places often devoid of deep-rooted community ties. In Berkeley, California, the Peralta and the Northside community established community gardens in 1997, creating a *center* which allows for investment through time and labor and provides a place for social interaction (Linn 1999). Local artists showcase work in the commons of the gardens, and neighbors who formerly did not interact, work together (Linn 1999). Gardeners connect their plots and feel a sense of ownership, responsibility and attachment (Linn 1999). In addition to growing, the gardens have become a place of social activity and meeting places (Linn 1999). Community gardens become a neighborhood *center*.

In addition to community gardens in Berkeley, California, community gardens at the University of Georgia Family Housing complex allow many international students to connect to their homelands and express their cultures through gardening plants and herbs (Walter 2003). Gardens are reallocated to users each year on a first come, first served basis, making investments temporary (Walter 2003). However, gardens reflect gardening traditions and bring familiarity to international students (Walter 2003).

By creating ways for temporary community residents to feel ownership of the spaces they occupy, these residents may become more attached to the community where they are living. These constructs can be intentionally temporary and short-lived, or they can become mobile and move with residents to make transitions more seamless. In addition to encouraging interactions and community identity, community investment can also instill a sense of control among residents and add to the healing aspect of a place (Marcus and Barnes 1999).

As prominent community planner and landscape architect Randolph Hester states, “poor city design divides us from others in our communities, undermines our

sense of community...and fails to inspire our spirits” (Hester 2006). On the contrary, good city design can make communities more resilient and fulfilled (Lynch 1960). Proper form can enable a sense of community that comes from shared experiences and values (Lynch 1960; Alexander, Ishikawa et al. 1977; Hester 2006). A consideration of these forms is important to designing a community that contains more than just physical connectedness.

### Connecting to the Greater Community

In the temporary housing phase of disaster recovery, people are expected to return to their everyday tasks (Quarantelli 1995; Comerio 1998). When people live in temporary housing 90 miles outside of a city with no accessible infrastructure or basic services, however, this adjustment becomes difficult (Davis 2005). For example, temporary housing communities constructed after Hurricane Katrina existed far outside of town making people unable to commute to jobs, send their children to school, or influence the rebuilding process of their destroyed city (Davis 2005; Kaufman 2005; Johnson 2007). By placing temporary housing closer to the damaged city, residents can benefit from the city infrastructure, contribute to the rebuilding process of the city in which they previously lived, and benefit from the community of which they were previously a part (Johnson 2007). In addition, by placing their temporary residences within the visible urban fabric, a temporary housing community with hundreds of families will be perceived more as a neighborhood than a temporary trailer park.

By allowing people equal access to social services and by placing their temporary residences within the visible urban fabric, they will perceive of their living situation as more equitable—a quality that will encourage them to participate and engage in their community and the larger city (Hester 2006). As Hester describes, in a functioning democracy, “citizens must perceive laws to be clear, impartial, and equitable”



(Hester 2006). Although exclusion in design—as seen in the wake of natural disasters—typically harms the poor and marginalized, equitable policies can be reinforced through proper design which will, in turn, encourage more democratic cities.

Another issue facing residents in primarily impoverished communities may be an “inferiority complex” (Hester 2006). People look at their status within communities to determine their self-worth, and they often feel inferior when they lack what others have (Hester 2006). It can be equally as devastating when governments take away resources from blighted communities (Lawson 2007). For example, community gardeners at the South Central Farm in Los Angeles felt insignificant and powerless as the city decided to sell a 14-acre lot that had been previously used as a community garden for 13 years to a single stakeholder for five million dollars (Lawson 2007). Although 350 families benefited from the plot, the city did not validate the community’s value (Lawson 2007).

By creating “sensible status seeking”, people can “redirect harmful expressions toward positive actions” (Hester 2006). If disaster victims are provided with what they need and located close to the hustle and flow of the city, they may not feel as marginalized. In these temporary communities, people’s feelings of equality may relate to where the community is placed, its amenities, and the accessibility of basic services. Walter Hood strives for the allowance of cultural and social diversity in spaces he designs and believes redesigns should account for people already using spaces (Hood 2003; Marcus 2003).



**Fig. 3-7:** Lafayette Square Park is designed for many different user groups (Hester, 2006)

In Lafayette Square in Oakland, California, homeless share grounds amongst office workers in a place where fences and locked bathrooms used to keep people away (Marcus 2003). By creating “hybrid landscapes”, all potential users have access to a variety of activities (Hood 2003). Focusing on the community’s strengths can help its residents associate themselves and their community with a positive identity and encourage them to work with what they have to thrive (Hester 2006).

### Functional Aspects of Design

While psychological healing, community identity, and safety are important considerations in designing temporary communities, a designer must also account for the functional aspects of community planning. First and foremost, planning for temporary housing after natural disasters must occur before the onset of the event (Cuny 1977; Davis 2005; ULI 2006; Johnson 2007; Levine, Esnard et al. 2007; FEMA 2009). By proactively planning for temporary housing, people in need can be transported out of emergency shelters and into spaces of their own to inhibit further psychosocial stress (Bolin 1985). If people know what temporary housing options are available to them before a disaster occurs, they may also suffer less psychological distress. Because site selection is one of the most difficult aspects of administering temporary housing, locating possible community sites before a natural disaster occurs should be a priority (Cuny 1977; Davis 2005; ULI 2006; Levine, Esnard et al. 2007; FEMA 2009).

Previous knowledge of where temporary housing is going to occur will make the transport of housing materials, goods, and services timelier and less problematic. Because temporary communities rely on having infrastructure in short period of time, they should be planned for in advance (Cuny 1977; ULI 2006). By planning these temporary neighborhoods in advance, community planners can have time to have a dialogue with and receive feedback from stakeholders, local and state governments,

FEMA, and NGOs (Cuny 1977). In the past, after disasters have hit, resources for temporary housing have been quickly diverted towards reconstruction efforts (Cuny 1977). By pre-planning for temporary communities, a commitment of aid resources can be established and planned for prior to the event (Cuny 1977; ULI 2006). Through proper planning, housing materials and goods could also be stored on-site, making the changeover even more prompt. Utilities, which take time and money to establish on-site, thus must also be considered during planning phases (Kaufman 2005). Through proactive planning, these utilities could be arranged on-site before the onset of a natural disaster to quicken the process because installation must be completed before temporary housing can be set up and residents settled (Cuny 1977). Additionally, local governments may be able to invest in renewable energy to make utilities for temporary housing easier to install and remove, and, therefore, potentially more affordable in the long term. Regardless of which tactic is used, access to temporary housing utilities must be planned before the natural disaster occurs. Once infrastructure exists and a site is prepared for temporary housing, it can always serve that function. By using the same site and revising planning techniques over time, temporary housing can become increasingly more efficient.

The second option integrates temporary housing units into the open spaces throughout the existing city. This method is recommended by the Urban Land Institute (ULI 2006). In the latter scenario, residents of temporary housing could make use of existing infrastructure to fit their needs. While this may seem to be a promising tactic, a psychological study done in two different communities affected by natural disasters concludes that those who were labeled as “victims” within a larger community were slower to recover than those who were part of a community confronting the damage together (Steinglass and Gerrity 1990). This trend suggests that keeping displaced people together may decrease their feelings of marginalization. Additionally, centralizing

displaced people simplifies the dispersal of housing materials, goods, and services. Locating temporary housing sites in metropolitan areas close to easily accessible transportation routes will help transport goods and services to victims quickly.

The sites chosen for temporary housing should have alternate functions before and after the event of a natural disaster and be easily transformable to and from temporary housing communities. A year-and-a-half after Hurricane Katrina, public parks that were converted into temporary FEMA-housing in New Orleans remain unsafe and have been notably contributing to youth crime because, while the trailers are gone, the parks have not returned to their original functions (Hammer 2008).



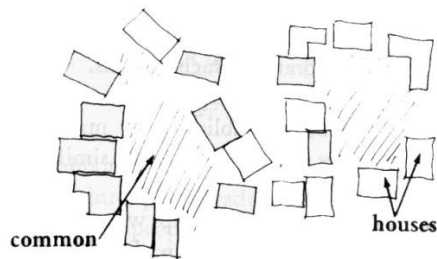
**Fig 3-8:** Abandoned Temporary Housing Sites Contribute to Crime  
1 1/2 years after Hurricane Katrina (Hammer 2008)

In Marion County, Mississippi, a 1 1/2-mile-long stretch of empty, white FEMA trailers remain set up in a staging area almost three years after the storm, creating an unattractive nuisance for residents in the area (Fessler 2008). The neglected area is unpleasant for nearby residents who want to continue recovering from and reconcile with the devastation caused by Hurricane Katrina. It is difficult to heal with a mess of leftover FEMA trailers in one's backyard. Just as temporary communities are essential for the

recovery of displaced victims, returning these sites to their pre-disaster conditions may be equally as important to the recovery of the community at large.

### Cluster Housing Arrangements

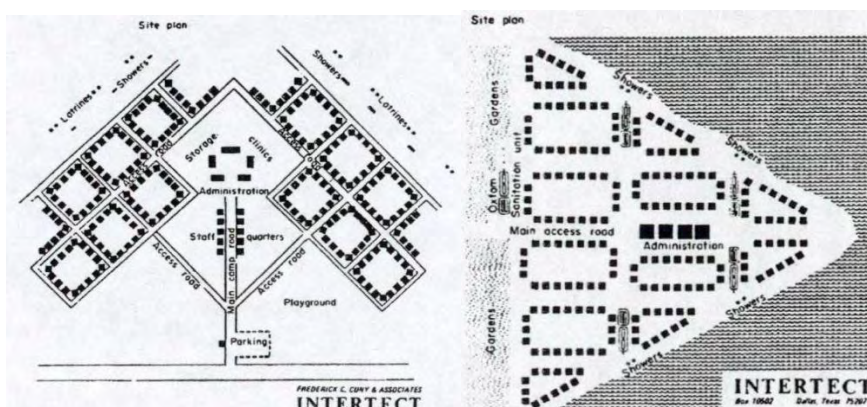
Knowing that a high density will be established, housing arrangements should also be discussed. Christopher Alexander, in his book, *A Pattern Language*, explains the need to offer people different environments to live in because people are unique and have various preferences (Alexander, Ishikawa et al. 1977). Therefore, different arrangements of clustered housing are recommended as they provide arrangements with common open space at high densities (McKeever 1968; Cuny 1977). Frederick C. Cuny, a specialist in disaster housing and refugee camp design, prefers cluster housing over a grid arrangement because it is “the best balance of land use and density” (p.140).



**Fig. 3-9:** Housing clusters (Alexander, Ishikawa et al. 1977)

After an earthquake in 1972 in Managua, Nicaragua, NGOs helped the government to establish several temporary housing communities throughout the country. The development of a community in Coyotepe serves as an example of how *clustered* housing in temporary communities promotes a sense of community and interaction among residents rather than the traditional grid design. This plan consisted of 10-16 houses surrounding a larger administrative *center*. Each housing *cluster* formed a smaller unit of houses. The common space contained communal cooking, washing, and

other communal uses. NGOs provided social services and community organization assistance (i.e., a community newspaper was established).



**Fig. 3-10:** Cluster housing arrangements proved to be more beneficial than traditional grid designs (Cuny 1977)

A study was later conducted comparing Coyotepe Camp with two camps built by United States Army in Tipitopa that used a grid layout with no prior planning to house the same number of displaced people. The results prove the success of a pre-planned, *clustering* design. Coyotepe cost 37 percent less to operate. People appeared happy while children played in communal areas and women worked together on chores. A community council and other informal groups derived in Coyotepe. In Tipitopa, community participation in groups was feeble and apathetic sentiment was commonplace; and the Army had to segregate the community by force because burglary was prevalent. The design of the camp promoted a sense of community and security as well as reduced the level of administration required to operate the camp. Displaced people were able to recover faster and take care of themselves sooner. The population at both camps had comparable economic incomes, professions, and education levels. In total, well-planned, thoughtful site design affects people's experiences and recovery periods in temporary communities (Cuny 1977).

## Be Safe

Safety is another important factor to consider when designing interim communities. A 1993 study by Brusik and Grasmick found that residential instability had the largest impact on crime rates (Snell 2001). But according to the National Crime Prevention Institute's publication *Crime Prevention through Environmental Design* (CPTED), "a happy neighborhood" does not tolerate or accept crime (Crowe 2000). Social networks and community cohesion are pertinent to reduction in crime and the ability of a community to internally control crime (Snell 2001). Temporary communities are also more at risk for high crime rates because residents tend to come from poorer backgrounds; backgrounds that—due to environments and the conditions those environments create—tend to have higher crime rates (Wilson 1987). Because quickly constructed without careful planning and design, post-disaster temporary communities lack social cohesion and support, thus allowing for crime to prevail. Therefore, the aforementioned ways to bolster community unity and attachment may directly affect crime rates in post-disaster temporary communities.

As previously noted, drugs and crime are threatening aspects of temporary FEMA cities and inhibit the ability of residents to act as a community (Davis 2005; Spiegel 2007). Indeed, uncontrolled crime in public areas has a profound effect on the behaviors and attitudes of people who live nearby these crime-ridden areas (Crowe 2000). In order to design for reduction in crime, public spaces should be designated for specific purposes that are reflected in their physical design.

There are many ways to create environments that promote CPTED to increase both actual and perceived safety. Allowing for public visual surveillance through design increases potential victim detection and reduces the risk of offenders (Crowe 2000). By using tall trees and low vegetation, people will be able to see at eye level. Also, creating "defensible space", or a transitional gradient of public-to-private space, can deter

potential intruders from entering areas where they do not belong (Crowe 2000; ULI 2006). As people recognize each other, it becomes easier to identify an intruder (McKeever 1968). By keeping “eyes on the street”, people watch what goes on around them, surveying each other and maintaining safety (Jacobs 1961). Physical borders, such as fences, markings, or landscaping, serve to deter unwanted intruders into areas (Crowe 1991). Lighting is also important for illuminating activities and making people feel safe (Crowe 1991). It is important to highlight the ground, while reducing footcandle strength (Crowe 1991). Landscaping in front of walls to reduce graffiti, or use art or other cultural elements that help people connect to a place and increase discernment of power (Crowe 2000). Security patrols and neighborhood watch are other ways to survey communities and keep people out of harm’s way (ULI 2006).

### Criteria for Planning for Temporary Communities

This chapter explores characteristics of environments that foster healing, a sense of community, safety, and functional transition for displaced people. This thesis highlights three criteria that are pertinent for establishing temporary housing communities after natural disasters: Transition, Recovery, and Function.

#### Criteria for Post-Disaster Temporary Housing Communities

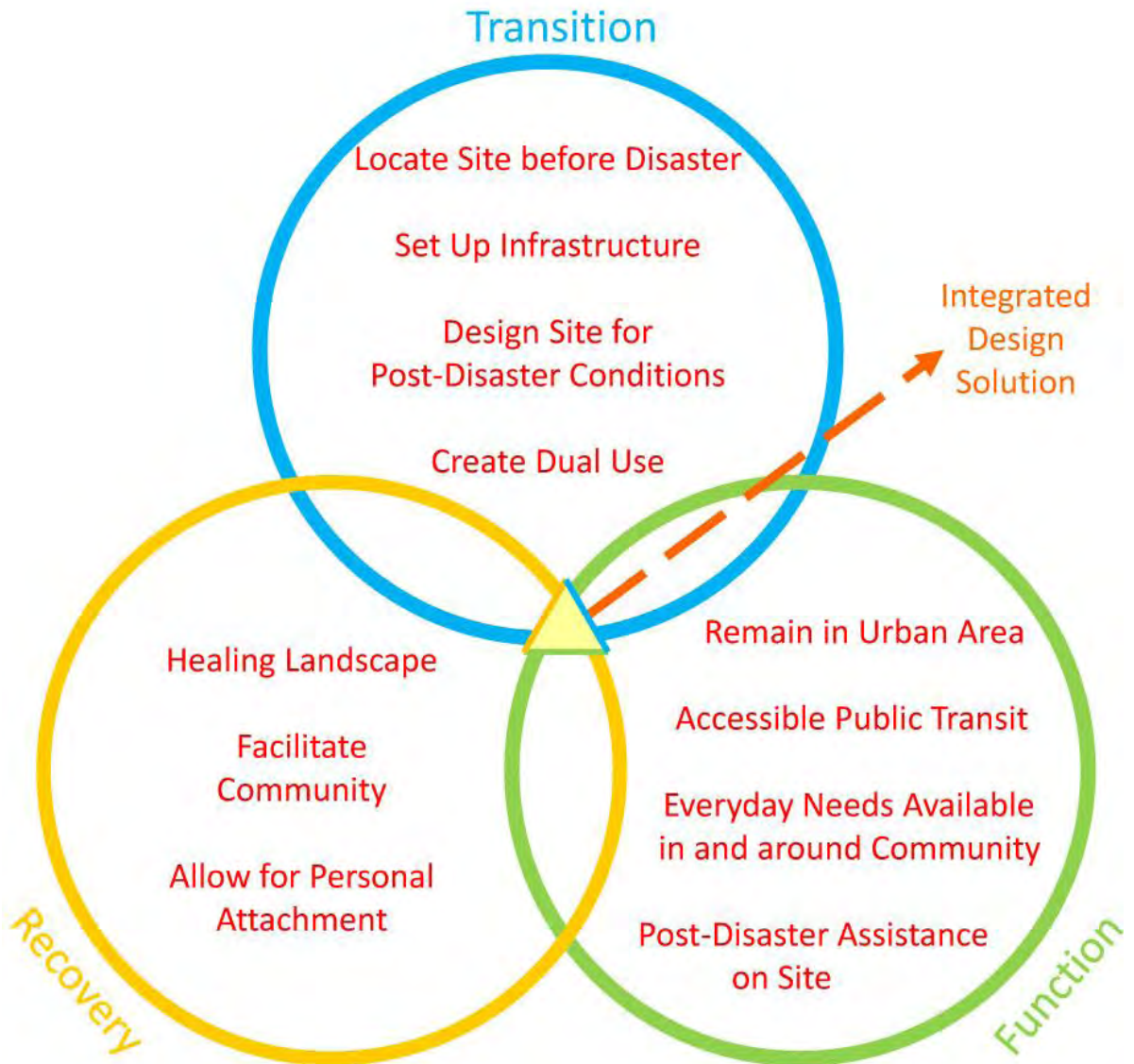
- DESIGN FOR TRANSITION: Defined as passing from one condition to another, or from one place to the next.
  1. Locate temporary site before disaster occurs;
  2. Create dual use on site;
  3. Generate a flexible design; and
  4. Set up infrastructure.



- DESIGN FOR RECOVERY: Defined as return to health, regaining balance control, and composure.
  1. Represent healing qualities on site: exercise, positive distraction, and sense of control;
  2. Facilitate Community Interaction with:
    - *Centers*: central spaces for interaction;
    - A variety of housing clusters with public, semi-private, and public spaces; and
  3. Allow for Personal Attachment through Expression and Ownership.
  
- DESIGN TO RETURN TO FUNCTION: Defined as normal characteristic action(s) of anything; employment.
  1. Locate site within an urban metropolitan area;
  2. Allow access to public transportation and personal automobiles;
  3. Make sure everyday needs are available outside and within the community; and
  4. Provide spaces within the community for disaster relief.
  
- It is always important to make a design appropriate to a specific context, including climate, culture, natural disaster, and etcetera.

The three criteria—and their sub-characteristics—fit together to make up a site’s design. When designing for a temporary community, it is important to consider the culture, climate, and place of the metropolitan area where the design is to be implemented. The design should be flexible because natural disasters are unplanned, sometimes without warning, and the amount damage is unknown until a disaster strikes. This thesis applies this insight to a temporary

housing site for natural disaster victims in Miami, Florida—a city commonly affected by hurricanes (AMS 1993). A design will be proposed to amend difficulties of coping after natural disasters and provide temporary housing which allows residents to function more closely to the ways they did before the storm.



**Fig. 3-11:** Temporary Community Design Criteria

## CHAPTER 4

### WELCOME TO MIAMI

#### Why Miami-Dade?

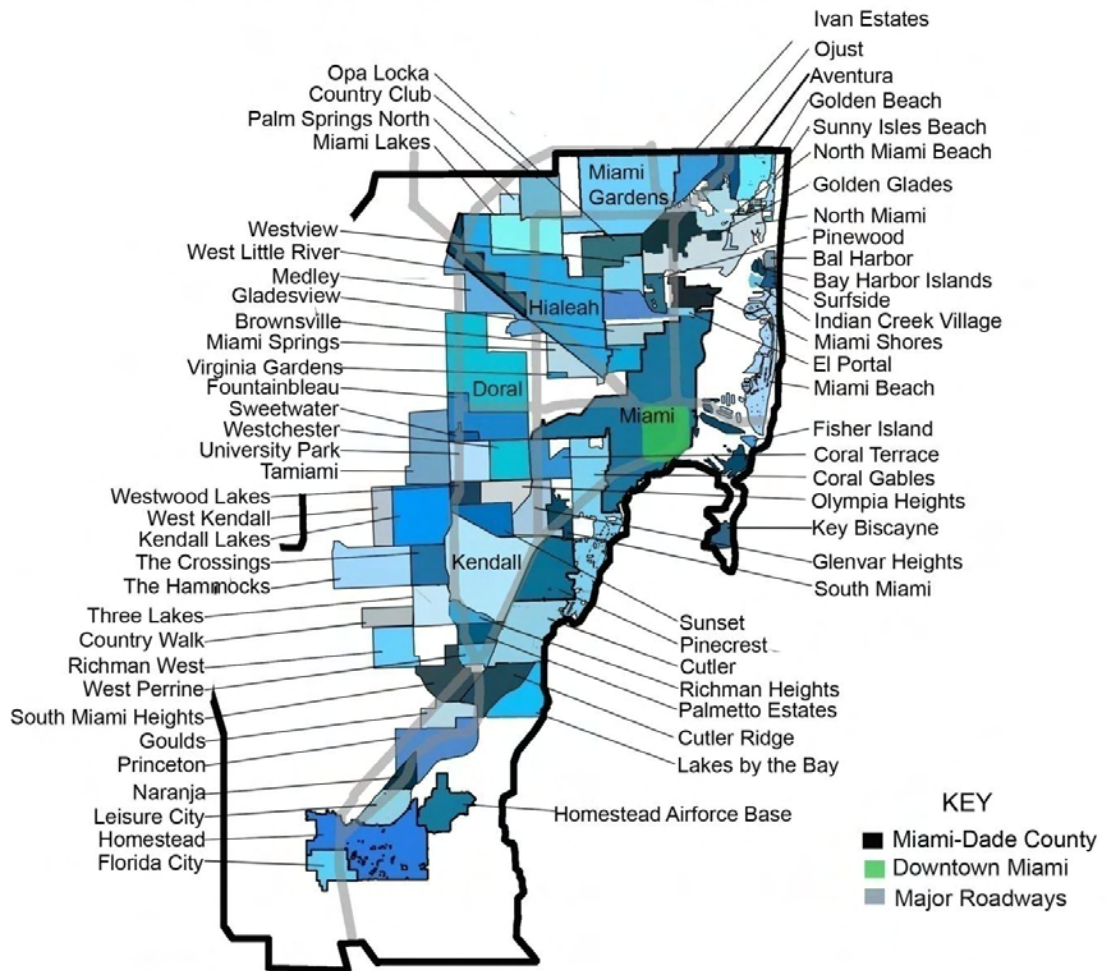
Miami-Dade County is the most southeastern county in Florida, shown in Figure 4-1, which is the most hurricane-prone state in the nation (Kane 2007). Between the years 1851 and 2006, southeastern Florida had more major hurricanes than any other region in the United States (Blake 2007). During the period from 1851-2004, 41 hurricanes hit southeastern Florida, 15 of which were a category three or higher (Chapple 2009).



**Fig. 4-1:** Miami-Dade County, Florida (digital-topo-maps.com 2005)

In 1992, Miami-Dade County was heavily damaged by Hurricane Andrew, currently marked as the second costliest hurricane in the United States (Blake 2007). This thesis focuses on a site design within this region due to the continual hurricane threat to Miami-Dade County each year. This chapter seeks to understand the demographics, culture, logistics, and hurricane history of the Miami region in order to locate an appropriate site and develop a culturally sensitive design for a temporary community in Miami-Dade County in Chapter 5.

## Miami-Dade County Neighborhood Map



**Fig. 4-2:** Neighborhoods of Miami-Dade County  
[http://www.miamidade.gov/planze/library\\_census.asp#Maps](http://www.miamidade.gov/planze/library_census.asp#Maps)

### Climate and Demographics

Miami's climate is a defining factor that influences Miami-Dade County's history and continues to define it as a place. In addition to climate, Miami's demographics are important because of the diverse cultural makeup of the city. Miami is a diverse city

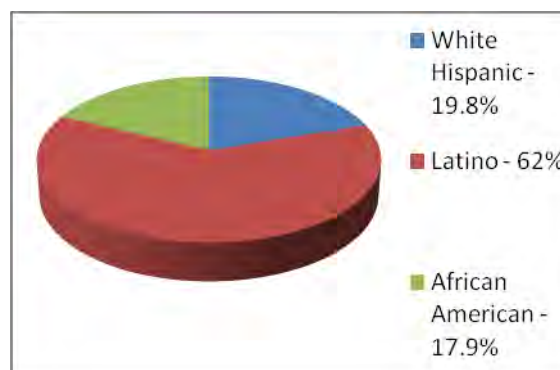
whose identity is defined by its immigrant culture. Understanding who makes up that diversity, and why, is important in understanding the city's social function.

Known for its subtropical climate, Miami typically has hot and humid summers and dry winters (rssweather.com 2008; worldtravels.com 2009). Miami-Dade County has an average of 249 sunny days per year, and average temperatures range from the upper 50s to the upper 80s (bestplaces.net 2009; floridasmart.com 2009). The county has an annual rainfall of 59 inches per year, and the hurricane season lasts from June 1<sup>st</sup> until November 30<sup>th</sup> (rssweather.com 2008). Miami-Dade County's comfortable climate and beaches are significant factors that draw people to the area.

Although the area was inhabited for thousands of years by Native Americans, the City of Miami was founded only 108 years ago when a rail line connected the region to the rest of the country (Grenier and Stepick 1992). With a population of 2,402,208 and a land area of 1,946.06 square miles, Miami-Dade County is the most populous county in Florida (US Census Bureau 2007). After Jacksonville, the city of Miami has the second largest metropolitan area in Florida. Of the 32 cities in Miami-Dade County, Miami, Miami Beach, and Hialeah are the largest (Cherry and Cherry 1996).

In Miami-Dade County, the median household income in 2007 was \$43,495—slightly less than the state's average of \$47,804 (US Census Bureau 2009). As a result of the current mortgage crisis, vacancies have recently increased throughout the county and housing prices are down significantly. In 2007, however, the cost of living in Miami-Dade County was 29.3% higher than the United States' average. The current unemployment rate is 3.8%, the lowest in 27 years (US Census Bureau 2009). According to the 2007 census, Miami-Dade County has a 15.3% poverty rate, and 50% of the single-family, female-headed households—most commonly found in the African-American population—live below the poverty line (US Census Bureau 2009).

Migration is the most significant factor contributing to Miami-Dade County's demographics, because its culture is composed of an amalgamation of tight-knit immigrant groups (Grenier 1992). Some of the most prominent demographic groups are Cubans, Haitians, other Latinos, Caucasians, and African-Americans (Grenier and Stepick 1992; Croucher 1997). 62% of the county's population is of Latino heritage, 19.8% is African-American, and 17.9% percent is white non-Hispanic (US Census Bureau 2009).

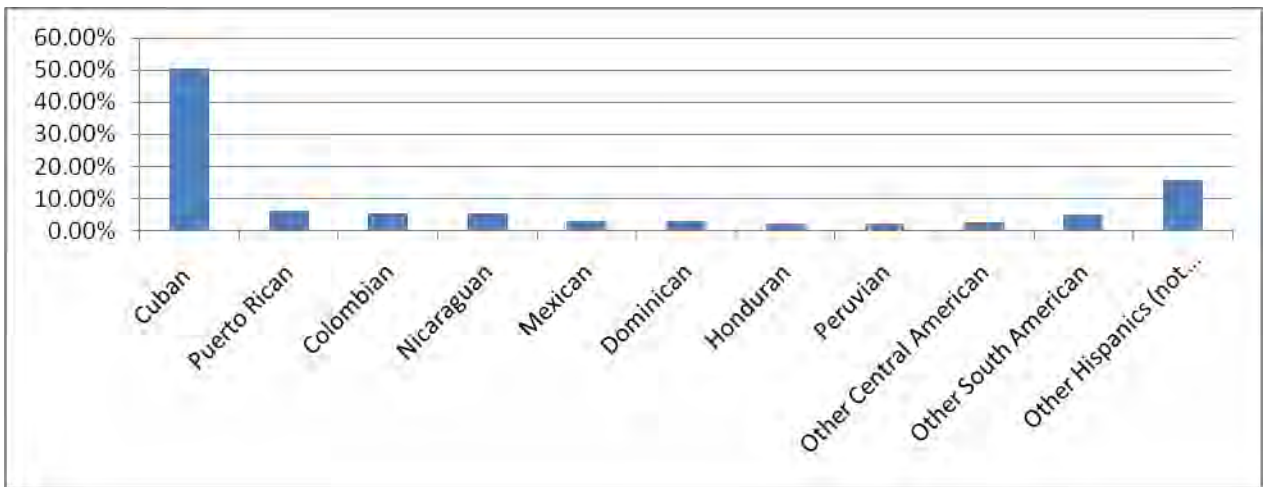


**Fig. 4-3:** Ethnic Background Pie Chart of Miami-Dade in 2000 (US Census Bureau 2009)

However, the 2000 Census underestimated the Hispanic population by 40-50%, so the actual current Hispanic population may be incorrect (Boswell 2002). Since 1960, Miami-Dade County's population has doubled and—due to its globalization—the county's economy has grown correspondingly (Nijman 1997). With its large Latino population and global economy, Miami now serves as a “node” for all of Latin America (Nijman 1997).

Due to the region's warm climate, Miami's economic base was initially founded upon agriculture and tourism (Croucher 1997); however, the Caribbean and Latin-American immigrants mentioned above have transformed the city economically, politically, and socially (Grenier 1992). In 2000, 50.9% of Miami-Dade County's

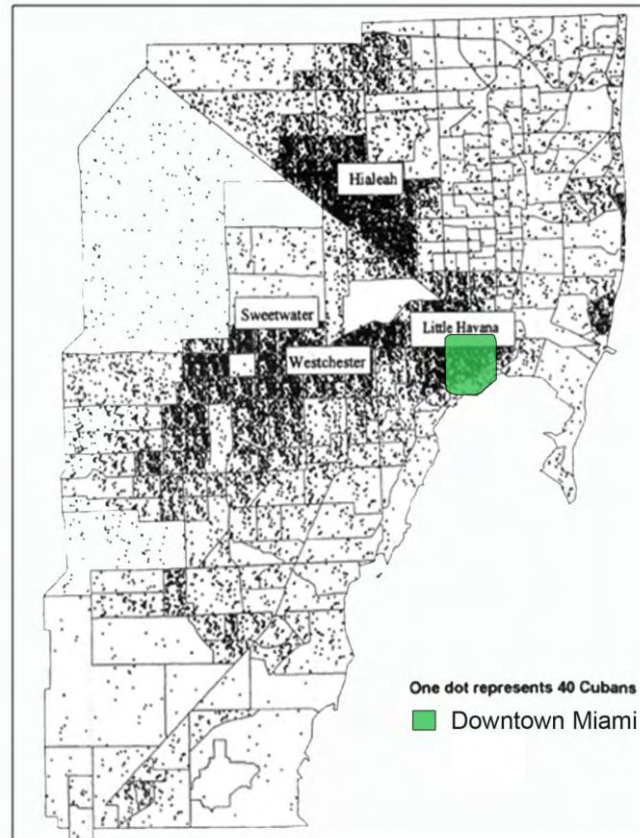
population was foreign-born, and 67.9% of the county's residents spoke a language other than English at home (Bureau 2009). One-third of the city of Miami-Dade County's residents are foreign-born, a higher percentage of residents than any other American city in 1992 (Grenier 1992). The segregation of many of these ethnic groups inhibits the creation of a larger cultural community (Nijman 1997).



**Fig. 4-4:** Hispanic National Groups in Miami-Dade County in 2000 (Boswell 2002)

Many Cubans fled to Miami when Fidel Castro took over Cuba in 1959, thereby establishing one of the most significant ethnic communities in the county. This community became successful within the larger city context by developing a cultural enclave for itself (Boswell 2002). The Cuban ex-patriots carved out “Little Havana,” a Hispanic neighborhood that stretches for 12-15 blocks west of downtown. The Cuban immigrants created an economic system that allows them to live entirely within the Cuban community. This ethnic solidarity helps the community retain its culture (Boswell 2002). Partially as a result of this enclave, the average Cuban has a higher income and education level than the average Hispanic immigrant from Central or South America and

Mexico (Boswell 2002). In the 2000 census, 650,000 Cubans were living in Miami-Dade County (Boswell 2002), a population that comprises over 60% of the total Latino population (Nijman 1997).

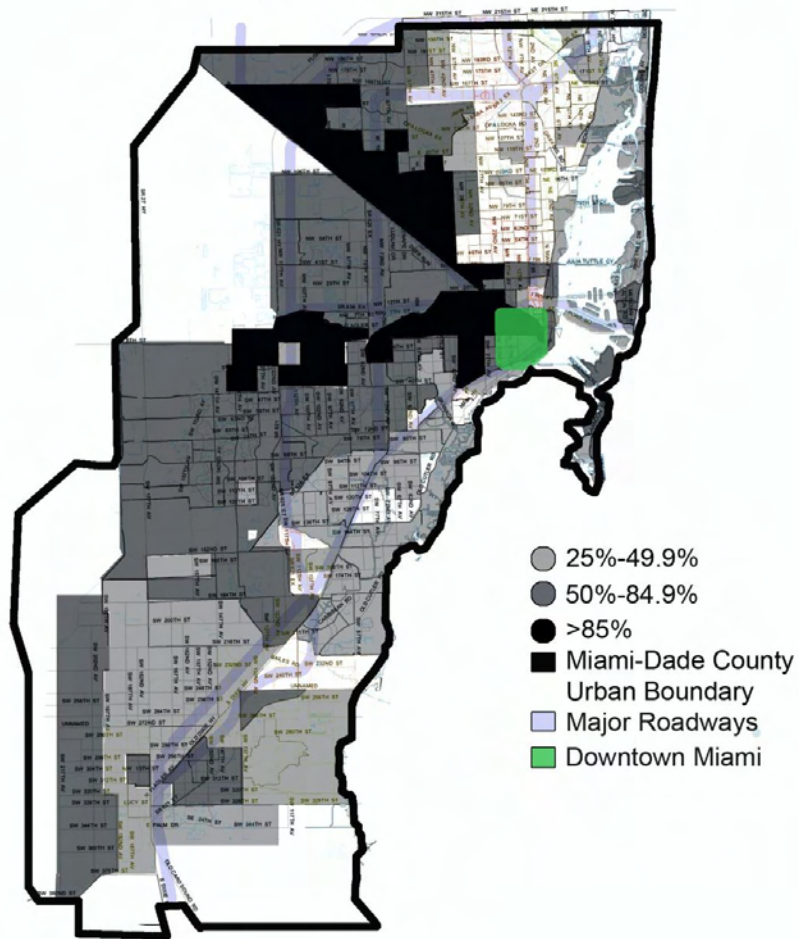


**Fig. 4-5:** Cuban Population Map in 2000 (Boswell 2002)

Although the Hispanic cultural enclave was established by Cuban-Americans in the Miami region, all Hispanic groups have benefited from its existence. The enclave thrives because it embodies multiple economic classes and functions independently on all levels (Grenier and Stepick 1992). Miami-Dade County is one of the only places in the country where a Hispanic enclave like this exists.



## Where Hispanics Live 2000 census tract data

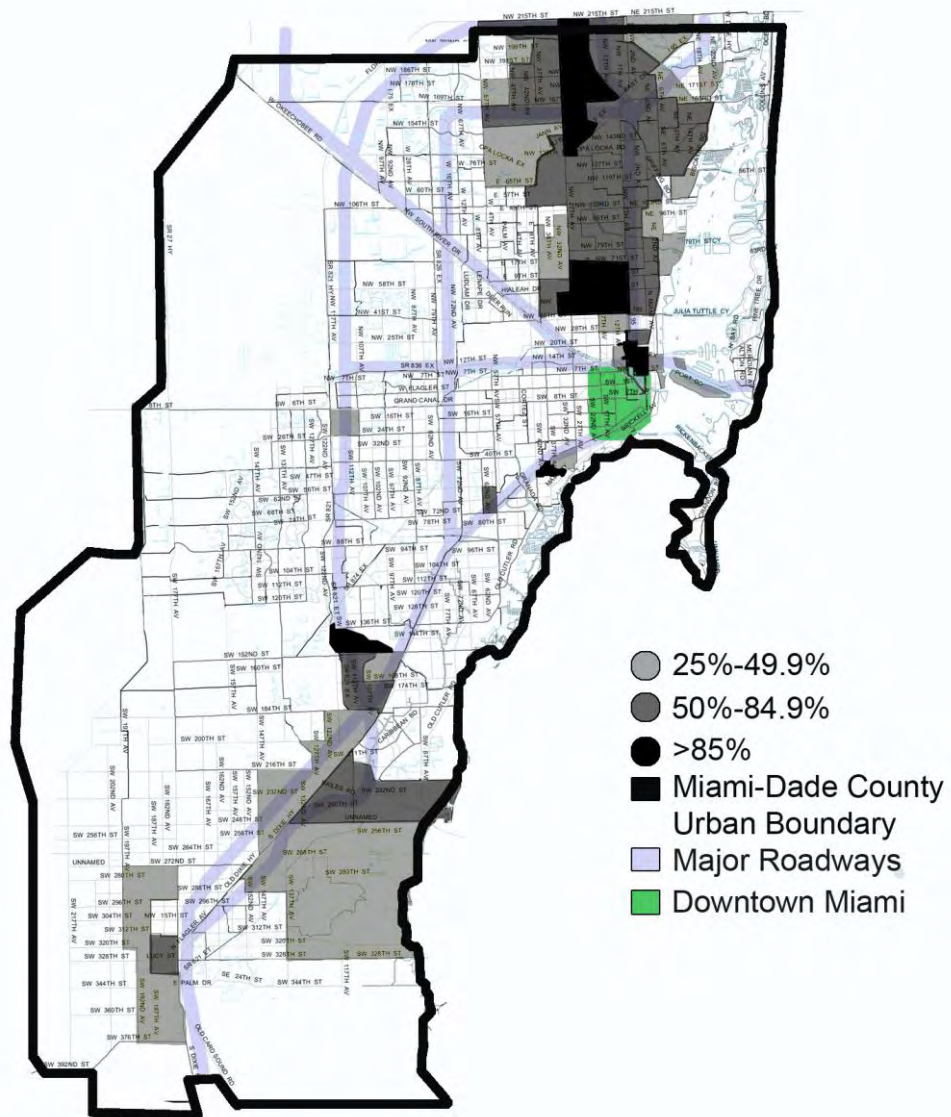


**Fig. 4-6:** Where Hispanics Live in Miami-Dade County according to 2000 Census Data (US Census Bureau 2009)

Another highly-segregated cultural group in the Miami region is composed of African-Americans from the northern United States, the Caribbean, and the Bahamas who came to Miami before the 1960's (Grenier 1992). The majority of these African-Americans live amongst themselves in the northern half of Miami and in Opa-Locka, Liberty City, and Brownsville (see figure 4-7). In 1992, one-third of the African-Americans in Miami-Dade County lived in poverty, with future predictions forecasting worse rates.

# Where African Americans Live

2000 census tract data



**Fig. 4-7:** Where African Americans Live in Miami-Dade County according to 2000 Census Data (Bureau, 2007)

Another significant African-American community was established by the 70,000 Haitians who moved to Southern Florida between 1977 and 1981 to escape Haiti's political turmoil. Most of these immigrants took the 720-mile trip in crowded boats, and

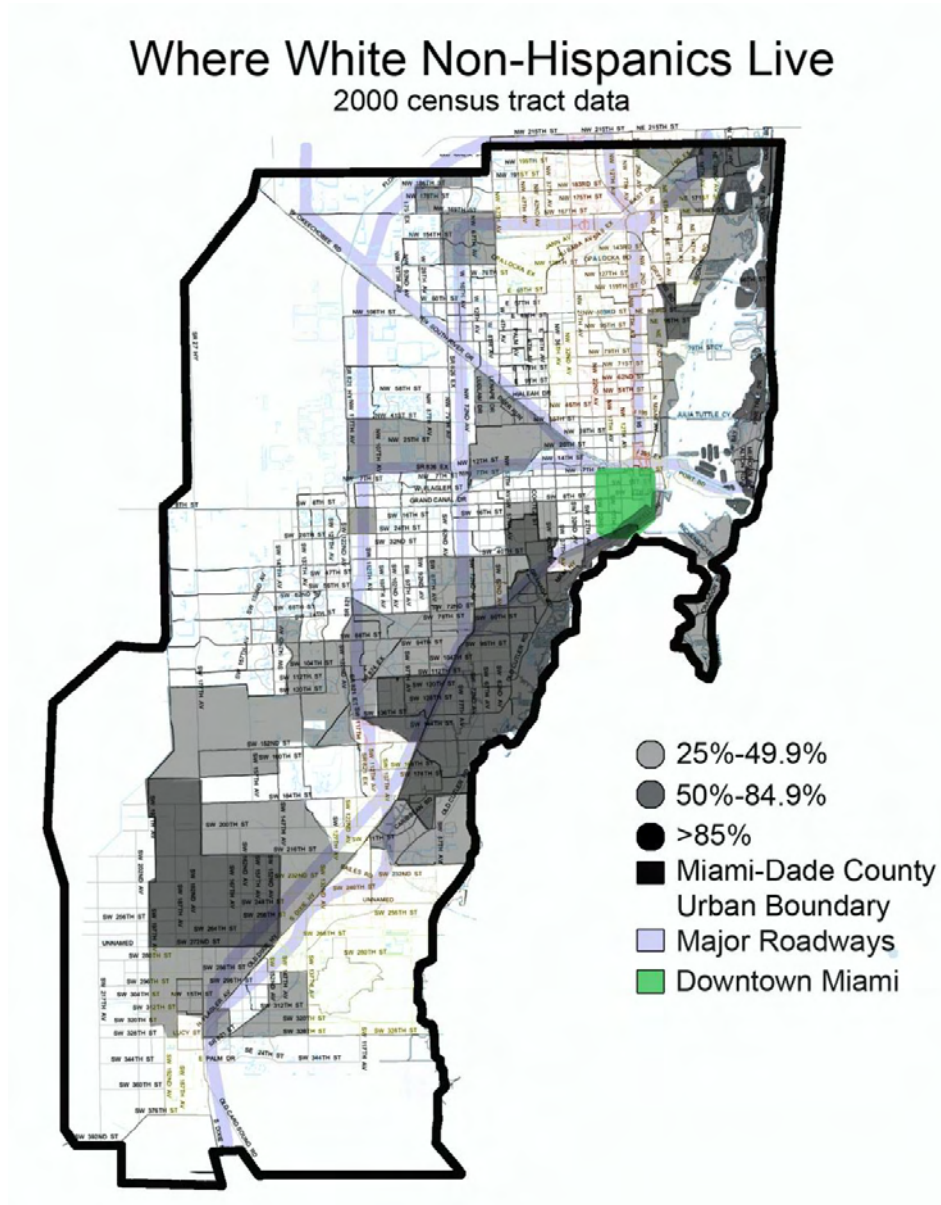
most did not return to Haiti when the political climate calmed (Alex 1992). As a group, Haitians are much poorer than other immigrants, and they are the most visible African-American immigrant group in Miami today (Sohmer, Jackson et al. 2005). Haitians are isolated from both the English- and Spanish-speaking populations and, therefore, tend not to benefit from the already-established Hispanic enclave.

As a result, Haitians have developed “Little Haiti”, a cultural center of their own located in the area of Edison and Little River. Significant populations of Haitians also live in Opa-Locka, Miami Gardens, and Florida City (Sohmer, Jackson et al. 2005). In the 2000 census, 95,669 Haitians—4.2% of the county’s total population—lived in Miami-Dade County. Following the trend of most immigrant populations in Miami-Dade County, South Florida serves as an “incubator for economic success” (Sohmer, Jackson et al. 2005). According to this trend, the Haitian population in South Florida tends to live in poverty, and successful Haitians move out of Miami as they their income increases (Sohmer, Jackson et al. 2005).

Miami-Dade County is one defined by its diverse cultural make-up and its subtropical climate. These two factors strongly influence the Miami-Dade’s identity and culture, explaining its uniqueness among counties in the United States. By understanding the ethnic diversity in Miami-Dade County before planning for post-hurricane temporary housing, culturally sensitive design and planning decisions can be made to help residents feel more comfortable.

Non-Hispanic whites are also a significant group living in Miami-Dade County, making up almost 20 percent of the population. White Americans were the first to settle in Miami-Dade County, attracted by the tourist and agriculture opportunities as well as the warm climate and beautiful beaches. While only 20% of the population, white non-

Hispanics are fairly dispersed throughout the county, without any high concentration in a particular neighborhood. White non-Hispanics have settled everywhere except for north and south Miami-Dade, where the African American population is concentrated (see Figure 4-7 and Figure 4-8).



**Fig. 4-8:** Where White Non-Hispanics Live in Miami-Dade County according to 2000 Census Data (Bureau, 2007)

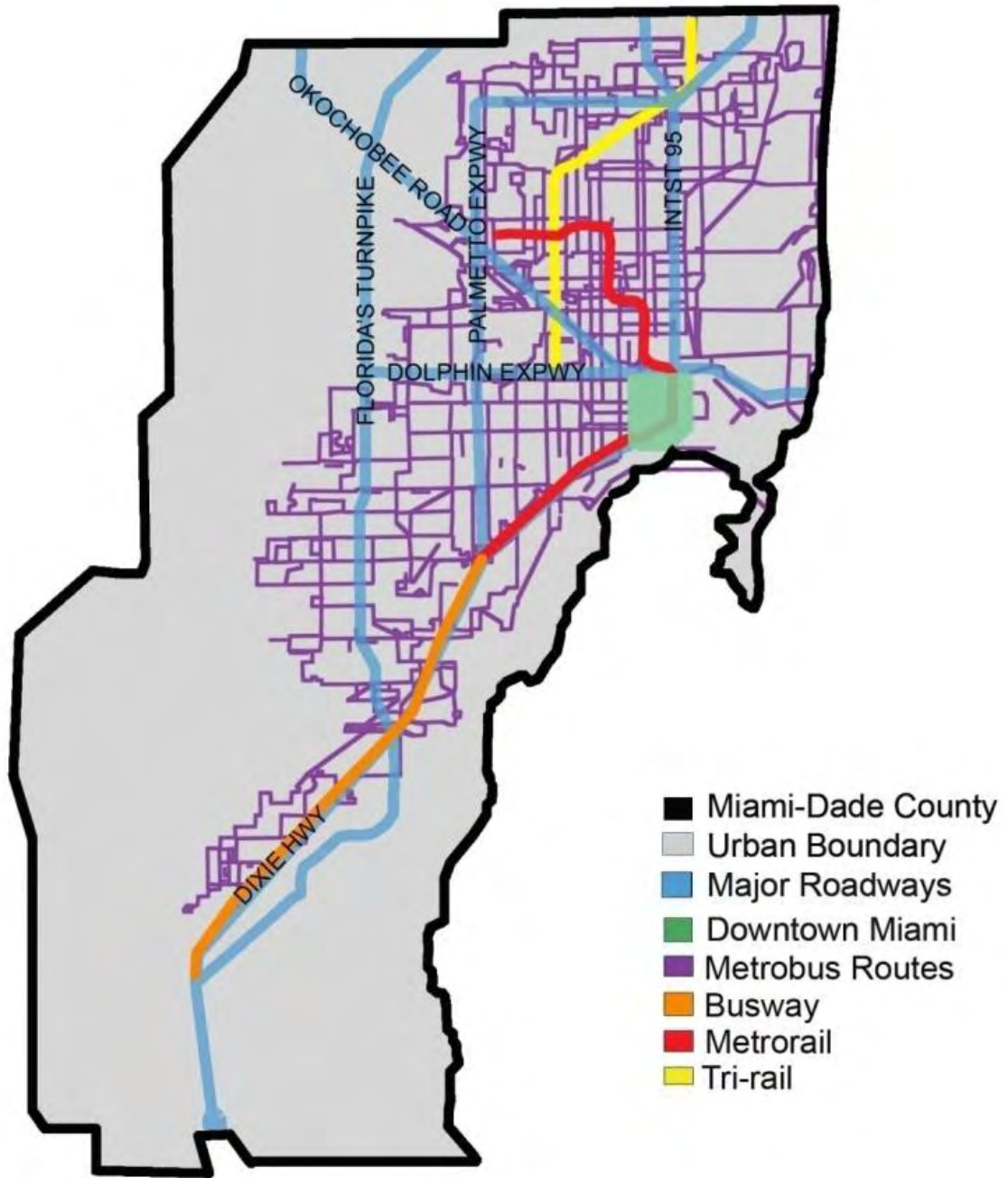
Miami is a web of diverse ethnic groups all living in the same metropolitan area. While Hispanics dominate the population in Miami, they are even a diverse group from different countries all over Latin-America. The White non-Hispanic population and the Hispanic population live throughout the county. The most significant segregation is among African Americans, who live concentrated in two areas—one to the south and one to the north. The areas settled by African Americans are quite segregated from the white non-Hispanic population.

### Transportation

Because use of public transportation is essential for people living in temporary housing, identifying current modes of public transportation in Miami-Dade is essential for selecting a temporary housing location. There are three types of public transportation in Miami-Dade County: Metrobus, rail system, and the People-Mover. The Metrobus system includes 891 buses and 95 routes and connects to both the People-Mover and rail system. In south Miami-Dade a busway—a highway lane only for buses—allows bus routes to travel without competing with cars for road space. Buses are handicap accessible and some routes run on a continuous, 24 cycle. The rail system is comprised of the Metrorail and Tri-rail which make up a 22-mile elevated train that runs through Miami-Dade County. The 22 stations are approximately one mile apart, and parking is available at 19 of these stations. Rides typically cost \$2, but high-school students and Medicare recipients receive reduced rates. In addition, monthly cards can be purchased to help regular users save money. The People-Mover is a free automated elevated train is used to transport people amongst 20 downtown stations quickly and easily (MDC 2009).

# Transportation Map

Roadways, Bus Routes, and Rails



**Fig. 4-9:** Miami-Dade County Transportation Map  
(<http://www.miamidade.gov/transit/metrorailstations.asp>)

As illustrated previously, people living in temporary communities after hurricanes tend to be the poorest, most impoverished group. Many rely on public transportation to get to and from work and/or to perform necessary daily tasks. Therefore, it is important to know what types of public transit are available and where they exist within the county. Deciding where a temporary housing community should be sited is important in relation to public transportation. Design decisions related to the location of temporary housing must utilize these important public services to integrate people back into the urban framework of the county.

Because many supplies and personnel travel to and from the temporary community site after a hurricane, it is important to also identify major roads and highway routes. There are three major roadways running north/south that encompass most of the Miami-Dade's metropolitan area: Florida's Turnpike (a toll road) to the west, the Palmetto Highway in the center, and Interstate 95 to the east. The Dolphin Expressway traverses through the middle of the county, while, Okachobee Road—another major roadway—runs at a diagonal towards downtown.

#### Case Study: Hurricane Andrew

Hurricane Andrew devastated many parts of Miami-Dade County in 1992. Examining what happened in this most devastating of local hurricane strikes may offer insight into the needs related to the next catastrophic hurricane event; and understanding what happened in this past event can also offer insight into effective future tactics for planning for temporary housing.

Second only to Hurricane Katrina (2005), Hurricane Andrew was the United States' next costliest natural disaster. It struck South Florida as a category four storm that hit South Florida in the early morning of August 24, 1992. With

winds up to 175 miles-per-hour and a storm surge five meters high, the hurricane struck the central part of the county—south of Miami and near Homestead, Kendall, and Cutler Ridge (Smith and McCarty 1996; Comerio 1998). Damages in Miami-Dade County alone cost over 30 billion dollars, and recovery took years in the areas where destruction was greatest (Cherry and Cherry 1996). The storm temporarily displaced 353,000 people—one of the largest displacements ever caused by a natural disaster (Comerio 1998).

Within Miami-Dade County, records indicate that Hurricane Andrew destroyed 27,813 residential units, severely damaged an additional 51,850 units, and caused minor damage to 54,189 units (Cross 1992); analysts, however, have determined that Red Cross surveys often underestimate the total numbers of damaged and destroyed units, sometimes by a large amount (West and Lenze 1994). In addition to property damage, the storm left over 1 million people without electricity, water, and telephone, and 500,000 insurance claims were filed by homeowners and renters in the 20 months following the storm (Smith and McCarty 1996).



**Fig. 4-10:** Hurricane Andrew Destruction (ABCnews.com 2008)

Many people whose homes were severely damaged by Hurricane Andrew had to find shelter elsewhere. About 60% of these displaced people found refuge among family



and friends, an estimate supported by a study conducted by the South Florida Regional Planning Council (Smith and McCarty 1996). According to this research, “18 percent [of displaced people] rented or bought a place to live for the meantime; 13 percent moved into a hotel or motel; 8 percent stayed in their pre-hurricane location in a tent, mobile home, or recreational vehicle; and 6 percent made some other type of living arrangement” (Smith and McCarty 1996). The poorest victims, who tended to have the lowest-quality housing, suffered greatest losses of homes due to Hurricane Andrew (Comerio 1998).

In response to the disaster, FEMA provided over 3,600 mobile homes and travel trailers to victims, and 8,000 Section Eight vouchers—housing assistance through the form of rental vouchers from HUD—within 90 days of the storm (Comerio 1998). Army tents and mobile home parks were set up to house those made homeless by the storm, which lasted about four years after the storm. Apparently, the FEMA provisions were insufficient in solving the housing shortage needs because squatter encampments that housed displaced families, previously homeless people, and families who came into the area looking for work became commonplace (Cherry and Cherry 1996). In response to these spontaneous communities, police destroyed the encampments and fenced vacant buildings to prevent the homeless from inhabiting them (Cherry and Cherry 1996).



**Fig 4-11:** Temporary Housing in Harris Field, Homestead, Florida after Hurricane Andrew (<http://www.geocities.com/hurricane/hurricaneandrew.htm>)

Two-thirds of the displaced Miami-Dade County residents returned to their homes by the summer of 1994 (Smith and McCarty 1996). In southern Miami-Dade County—the location of the majority of the damage—39% of displaced people were away from their homes for more than six months (Smith and McCarty 1996). 14 months after the storm, 70% of the homeless people recorded in the disaster area were homeless due to some result of Hurricane Andrew (Cherry and Cherry 1996). Many of these homeless people reported having a regular salary, but they could not find affordable housing (Cherry and Cherry 1996). Many struggled after the hurricane to find jobs and housing, expressing the need for housing provisions. FEMA states that people live in federal housing for 18 months, at most, before moving to permanent housing. However, the response to Hurricane Andrew disproves this number because people were unable to find appropriate and affordable permanent housing within that allocated time frame.

Following Hurricane Andrew, about 100,000 residents left Miami-Dade County permanently—partly because Homestead Air Force Base closed and partly because of the heavily damaged agricultural industry (Comerio 1998). The further the displaced victims moved after the hurricane, the less likely they were to return to the storm-stricken area (Smith and McCarty 1996). Almost all people who had not returned to their pre-hurricane residences within the first two years did not plan to do so. As a result, the county's population was significantly lower than it would have been if the hurricane had not struck (Smith and McCarty 1996).

### Current Hurricane Policy

In Miami-Dade County, the Office of Emergency Management is responsible for planning hurricane responses. The Office is currently preparing a Post-Disaster Housing

Plan that will be responsible for both evacuation and post-disaster housing options (Viterbo 2009). In Miami-Dade County, there are 63 schools designated to serve as emergency shelters for the evacuation zones (Viterbo 2009). Due to proactive planning, Miami-Dade County has ample room to house hurricane evacuees (OEM 2009). In addition, the Office of Emergency Management has identified vacant sites where temporary housing could be placed after a hurricane, although these sites are on private property and further negotiations are needed to publicly identify them (Viterbo 2009).

Miami-Dade County has also taken other measures to mollify the effects of potential hurricane strikes. In 1994 the county enforced a strict building code that, until 2002, was not adopted by the state and was only compulsory for high-velocity zones in South Florida (Viterbo 2009). In 1999, with the help of FEMA grants, the county created the C-4 Basin Initiative—a series of large pumps, canals, and dredging operations—aimed to mitigate potential flooding (OEM 2009). A debris pick-up service for disaster-related damage has proactively been arranged (Viterbo 2009). Ideally, Miami-Dade County would like to retain all of its residents in the event of a hurricane to maintain its tax base (Viterbo 2009). Planning for hurricanes assists in keeping the county safe and encourages Miami-Dade residents to continue to reside within county borders, despite the area's regular hurricane threats.

### Conclusion

Miami-Dade County has a large population and metropolitan area comprised of an ethnically diverse population. Its identity reflects the conglomeration of several distinct Latin and Caribbean ethnicities that function within the city's globalized economy. The region's mild, subtropical climate and well-known beaches attract people for vacations, seasonal stays, and permanent residency. Vulnerability to hurricanes

persists; while the Office of Emergency Management's proactive planning measures may help placate hurricane damage in the future, insufficient planning for post-disaster temporary housing remains an issue and should be further examined. The next chapter uses a design for a particular site to propose an equitable temporary housing plan for people displaced by hurricanes affecting Miami-Dade County, Florida

## CHAPTER 5

### ESPERANZA P.A.R.C (PRO-ACTIVE RECOVERY COMMUNITY)

#### Intent

Previous examples of post-disaster temporary housing illustrate the need for better site planning and design prior to the onset of natural disasters. Quick implementation of a temporary housing community is crucial to ease the minds of displaced people; locations and designs for temporary housing communities, therefore, should be planned before a disaster strikes. Because of the city's high risk for hurricane damage and its populous urban environment, this thesis presents an improved planning and design application for a site in the Miami metropolitan area.

As explained in the previous chapters of this thesis, displaced hurricane victims will benefit most from temporary housing located within the metropolitan area where they previously lived. In addition, temporary housing facilities should encourage victims through their recovery processes rather than prevent them from beginning it. Aspects of healing gardens such as a sense of control, positive distractions, a sense of community, and exercise should be weaved into the design of temporary housing communities to encourage this recovery. Community centers must be established to foster interaction among community members, and personal expression must be encouraged to create attachments to place. These elements will allow a sense of community to blossom within a temporary setting that will, in turn, promote recovery. By centralizing hurricane victims within their own communities, displaced people will have better access to necessary emotional support groups and other forms of aid. Furthermore, designing for safety will

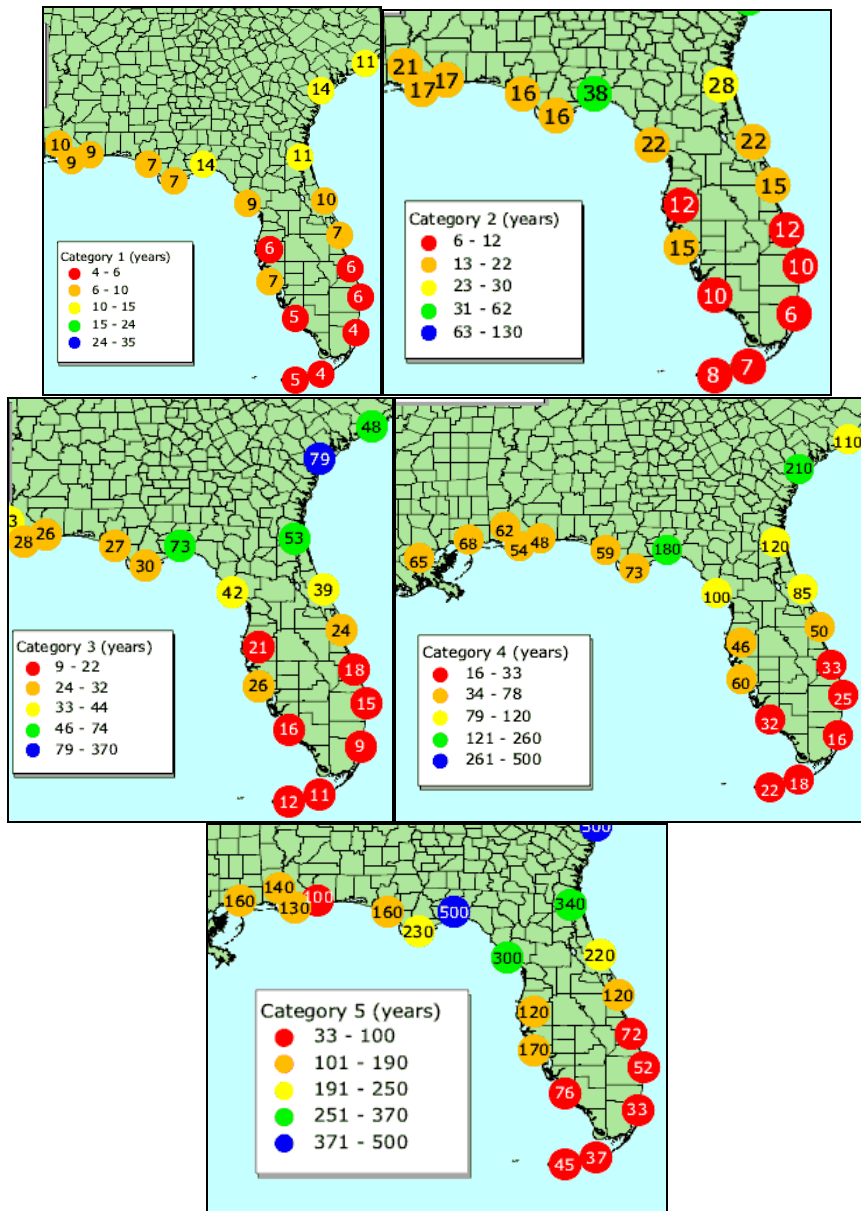
promote a sense of security among residents that will reduce unnecessary stress and allow a collective sense of community to emerge.

While serenity is important within the walls of a temporary community, connections to the surrounding larger community are equally as valuable. In addition to the communal feelings of belonging and security, recovery also depends upon people recommencing daily rituals; temporary housing facilities, therefore, must offer residents access to the larger metropolitan area. The design application presented in this chapter shows how a public park can quickly transition into a temporary housing community and suggests that short-term occupancy can be a positive experience where residents can begin their necessary recovery processes.

This thesis proposes the establishment of new public parks in metropolitan Miami, Florida that will accommodate up to 500 temporary homes for hurricane victims. This chapter describes the site-selection and design processes; related to the conceptual design of one such park. This chapter also presents plans for the park as both a fully-functioning public park and a location of a recovery-encouraging temporary housing community. Establishing a park that has the infrastructure to house people displaced by hurricanes will offer residents an opportunity to enjoy accessible green space and have connections to the existing urban fabric. Additionally, by establishing a park that is prepared to house a temporary community, the city does not have to rely on a fickle housing market to provide housing after a disaster.

Because of the multi-functional nature of this park/temporary housing community, its name represents the integration of both of its primary uses. Esperanza P.A.R.C (Pro-Active Recovery Community) is an acronym representing the everyday, public use of the site, while the series of words creating the acronym—Pro-Active Recovery Community—embody the P.A.R.C.'s function as it responds to hurricane damage. “Esperanza”—the Spanish word for hope—is used because the nature of this design is to nurture hope.

Without hope for recovery, people living in temporary housing fall deeper into despair; without hope, planners are unable to find viable options to assist those in need in a time of disaster; without hope, everyday people cannot persist beyond their daily struggles. The design and creation of the P.A.R.C. is an attempt to bring hope to those involved in its creation and those who use it.



**Fig. 5-1:** Return Periods for Category 1-5 Hurricanes (NHC 2009).

## Why a Public Park?

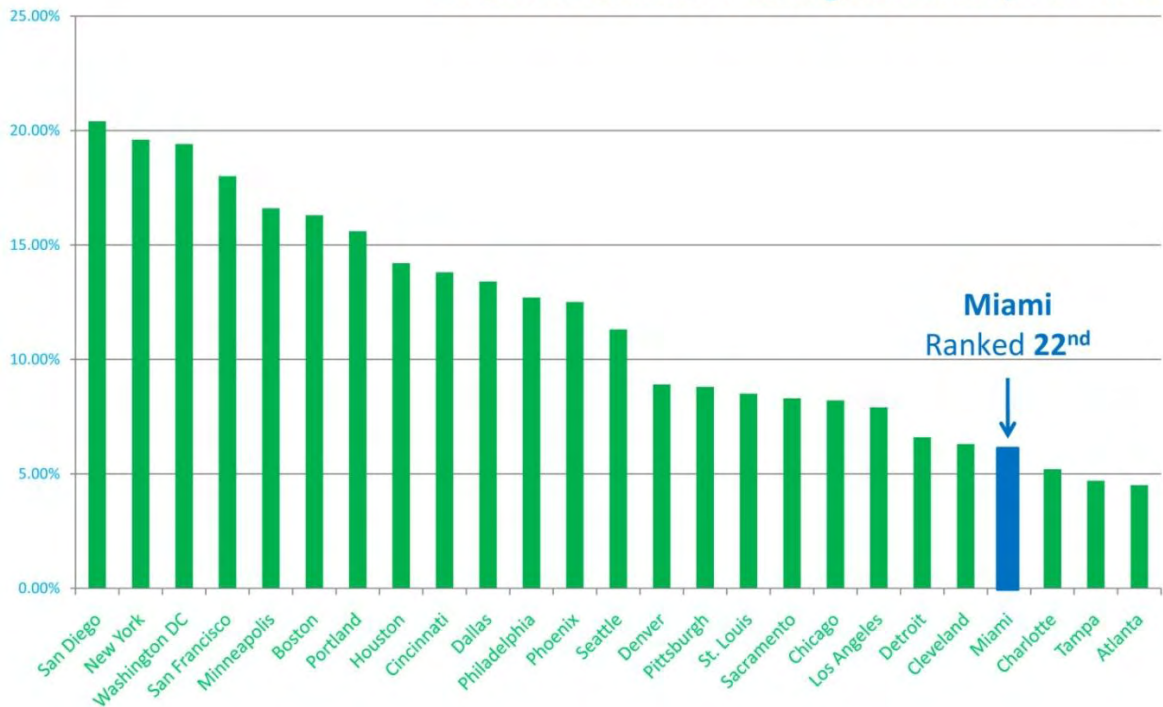
As shown in Figure 5-1, statistics suggest that catastrophic hurricanes—those most likely to require temporary housing due to their destructive strength—have long return periods<sup>3</sup> at any given location. A catastrophic hurricane—as defined by the National Response Framework (NRF) in FEMA’s National Disaster Housing Strategy is—“any natural or man-made incident that results in extraordinary levels of mass casualties, damage, or disruption severely affecting the population, infrastructure, environment, economy, national morale, and/or government function” (FEMA 2009). Higher category hurricanes usually have significant environmental impacts that destroy large amounts of housing, thus requiring the need for temporary housing communities. Because any site’s use as a temporary housing community will likely be infrequent, the site should have an alternative function. Because unused land in busy metropolitan areas is usually expensive and often difficult to find, additional intermittent uses will better enable connections between the infrequent temporary housing communities and the larger metropolitan areas that surround them. In cities with ample park space, existing parks can be retrofitted to accommodate temporary housing communities. In cities with less green space, sites designated for future temporary housing communities can assume alternative uses as public park space if their design allows for the quick and efficient assembly of temporary housing structures. Proposing additional park space in Miami is particularly relevant because, in 2007, Miami was ranked 22<sup>nd</sup> in a comparison of acres of parkland in the 25 largest metropolitan areas in the United States (Land 2007; Rosenberg 2008).

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<sup>3</sup> A return period is defined as the statistically determined time period between the landfalls of two hurricanes of a similar strength at any given location (NHC 2009).



## Amount of Parkland for 25 largest US Metropolitan Areas



**Fig. 5-2:** Miami ranks 22<sup>nd</sup> in a comparison of acres of parkland in the 25 largest metropolitan areas in the United States (Land 2007; Rosenberg 2008).

### Site Selection

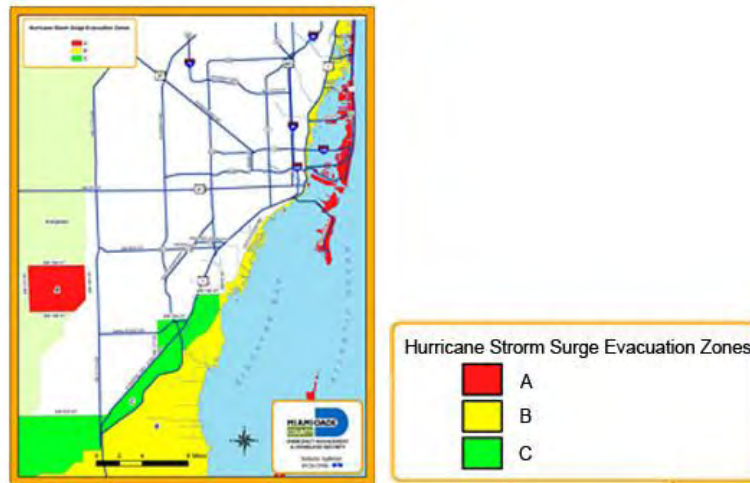
As explained in Chapter 3, pre-disaster site selection is essential to the efficient establishment of temporary housing communities (Johnson 2007). Additionally, proximity to the victims' pre-disaster communities is important for the victims' livelihood, for the county's prosperity, and for internal and city-wide community support. A set of criteria was developed based on the research presented in previous chapters (see Figure 5-3).

First, the site must be located within the limits of Miami-Dade County and preferably near the center of Miami's metropolitan area. In addition, the site must be within walking distance of at least one form of public transportation. Safety and comfort are also integral to site selection to encourage healing and recovery. For example, placing housing underneath a highway or in a highly dangerous neighborhood could cause unnecessary stress to residents.



**Fig. 5-3: Design Criteria Diagram**

Although proximity to the city is important, hurricane season lasts six months and subsequent hurricanes can potentially threaten temporary housing communities. The selected site, therefore, must be on high ground and outside of evacuation zones (see Figure 5-4). This criterion is crucial to preventing already displaced people from additional evacuations, and its implementation could potentially reduce the stresses placed on Miami-Dade County to accommodate extra bodies in the case of additional storms or floods. Although the timeline of this thesis did not allow for an extensive analysis, more research should be done regarding potential flooding after hurricanes to ensure the selection of low-risk sites.



**Fig. 5-4: Hurricane Storm Surge Evacuation Zones**

## Size

Before choosing an appropriate site, an ideal community size must be established. Because this particular temporary community exists within a complex urban context, this thesis treats the community as a neighborhood—a term defined by the Urban Land Institute as a local population confined within a boundary that promotes “community life” (ULI, 1968). In his book *Sustainable Urbanism: Urban Design with Nature*, Douglas Farr states that urban communities should have a density of at least 8 houses per acre to facilitate walkability (Farr and Duany 2008). Ideally, an urban community will be between 40 and 200 acres and have a town center that comprises roughly 6-10% of its total land (Farr and Duany 2008). Farr also suggests that a neighborhood have a minimum of 400 dwellings (Farr and Duany 2008).

In the case of post-disaster temporary housing communities, high density is even more relevant because of the temporality of interim housing and the high value of urban land; however, these communities should not be so dense that levels of crowding will negatively impact the health, safety, and welfare of the community dwellers (Cuny 1977). According to multiple sources, communities composed of 500-1,500 households can usually organize themselves, a quality desirable in post-disaster temporary communities (Jacobs 1961; Alexander, Ishikawa et al. 1977). The average number of people per household used by the Office of Emergency Management in Miami-Dade County is 2.83, which will be used to determine the actual number of residents living in the community (Viterbo 2009). The ultimate size of the temporary community should be determined by the available land deemed appropriate for acquisition. The site selection guidelines allow for a site with a land area between 40-200 acres that can accommodate between 500-1500 structures, and achieve a density greater than 8 houses per acre.

### Acquiring Appropriate Land

Ideally, an existing park or vacant land transformed into a public park would facilitate temporary housing communities. In dense urban settings, however, the acquisition of appropriate sites to adapt to these uses may require significant justification and transformation. In this thesis, properties deemed acceptable for acquisition were 40-200 acres, had uses that could function on a part-time basis, and whose reconstruction would not displace many residents. The following types of properties were considered:

- Big box stores and associated parking lots
- Golf courses
- Destroyed land that was not rebuilt after previous hurricanes
- Undeveloped land
- Land for sale
- Public parks
- Protected areas

Retrofitting any of the places listed above as a public park and temporary housing facility could arguably benefit both the public and the environment. In addition, because these places are not divided into smaller private lots, there are fewer stakeholders to appease in the case of an associated property acquisition.

### Choosing a Site

Two sites in Miami were considered for the placement of a post-hurricane temporary housing community. The first site considered is a former mobile home community in Homestead, Florida that was destroyed during Hurricane Andrew. The site is currently vacant and for sale.



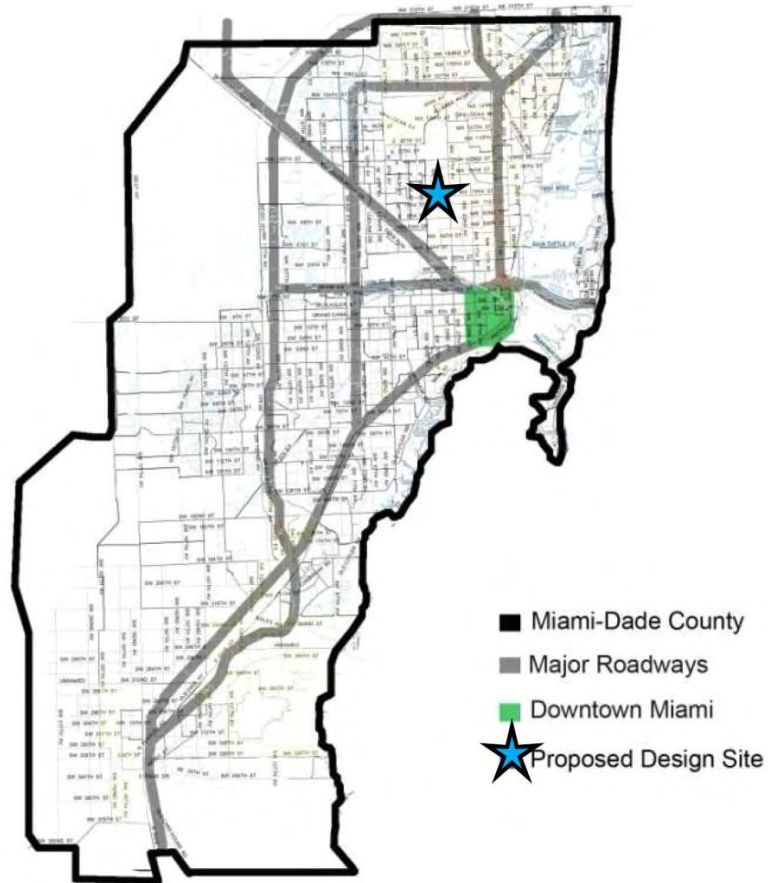
**Fig. 5-5:** Abandoned Mobile Home Park in Homestead, Florida destroyed by Hurricane Andrew

This mobile home community is less than one-fourth of a mile from Homestead's town center and from access to Miami's public transportation system. Many people currently living in Homestead commute to Miami daily via public transportation. In addition, this particular mobile home community would be an appropriate location for a temporary housing community because this transformation would restore and heal a site previously destroyed by a hurricane. Currently, the vacant tract is less than 40 acres; additional adjacent acres, therefore, would be proposed for acquisition to yield the appropriate acreage for the planned community.

The second location considered in this thesis—and the site of the design application—consists of 39 undeveloped acres currently for sale on the outskirts of Miami. This thesis proposes the acquisition of six additional acres to better approximate the ideal acreage previously established and to accommodate at least 500 temporary structures. In addition to developing the vacant lot, one apartment complex and a storage building will be displaced by the proposed park and temporary community. For the purposes of this thesis, this minimal displacement justifies the selection of this acreage to become both a public park and to prepare for hurricane relief.

The 45-acre park's boundaries are NW 79<sup>th</sup> Street to the north, railroad tracks near NW 74<sup>th</sup> Street to the south, the edge of a mobile home community to the west, and

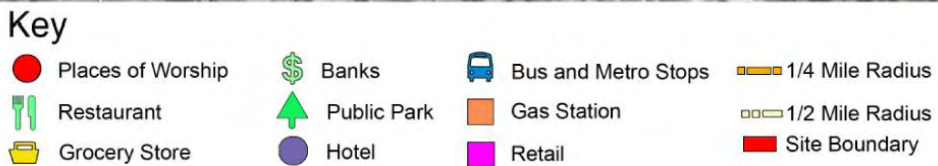
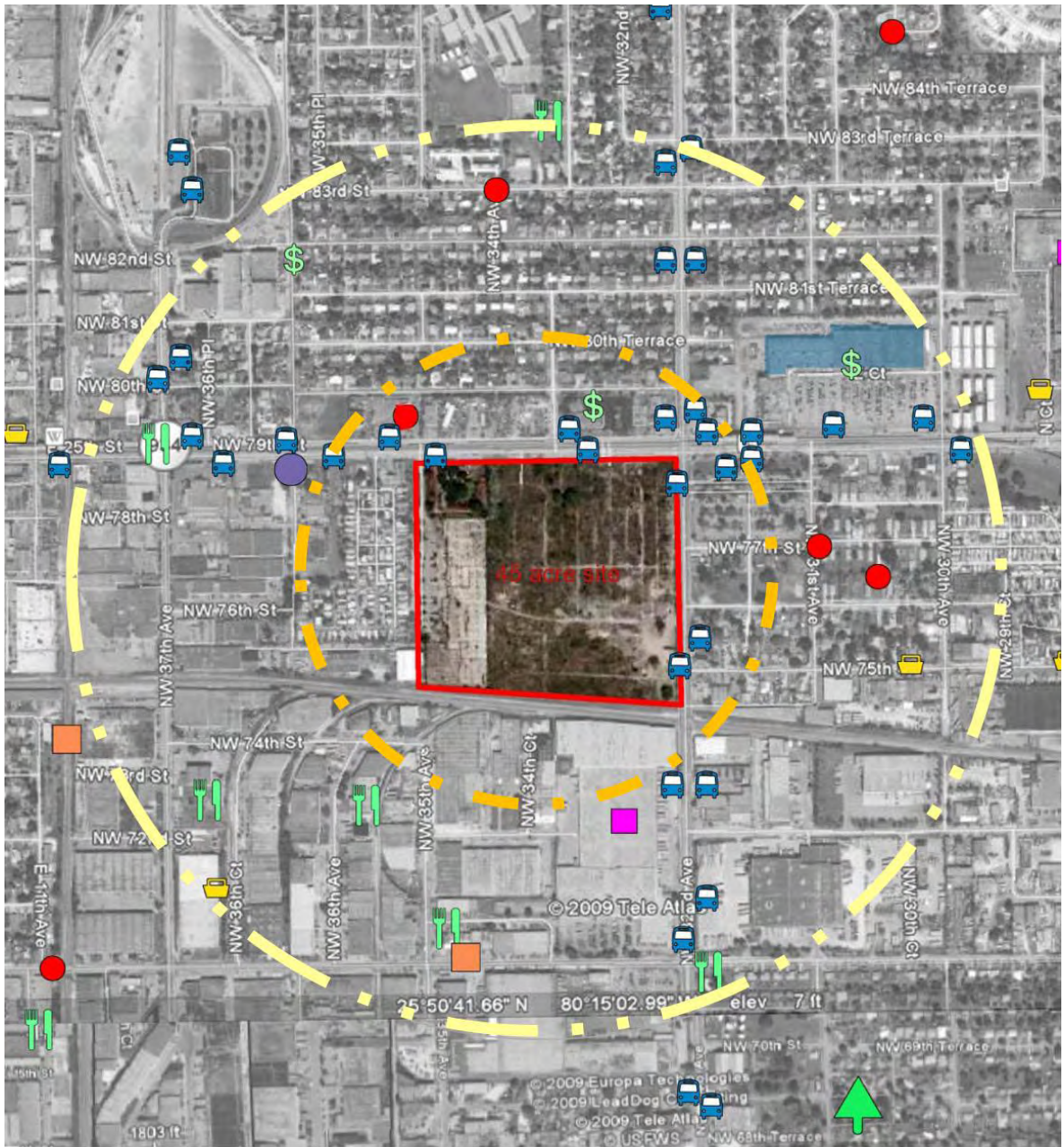
NW 36<sup>th</sup> Avenue to the east. Banks, grocery stores, churches, gas stations, restaurants, and multiple bus stops and metro stations lie within one-fourth of a mile from the site—an approximately five-minute walking distance.



**Fig. 5-6:** Proposed Design Site Location



**Fig. 5-7:** Current site conditions



**Fig. 5-8:** Site context map and nearby amenities

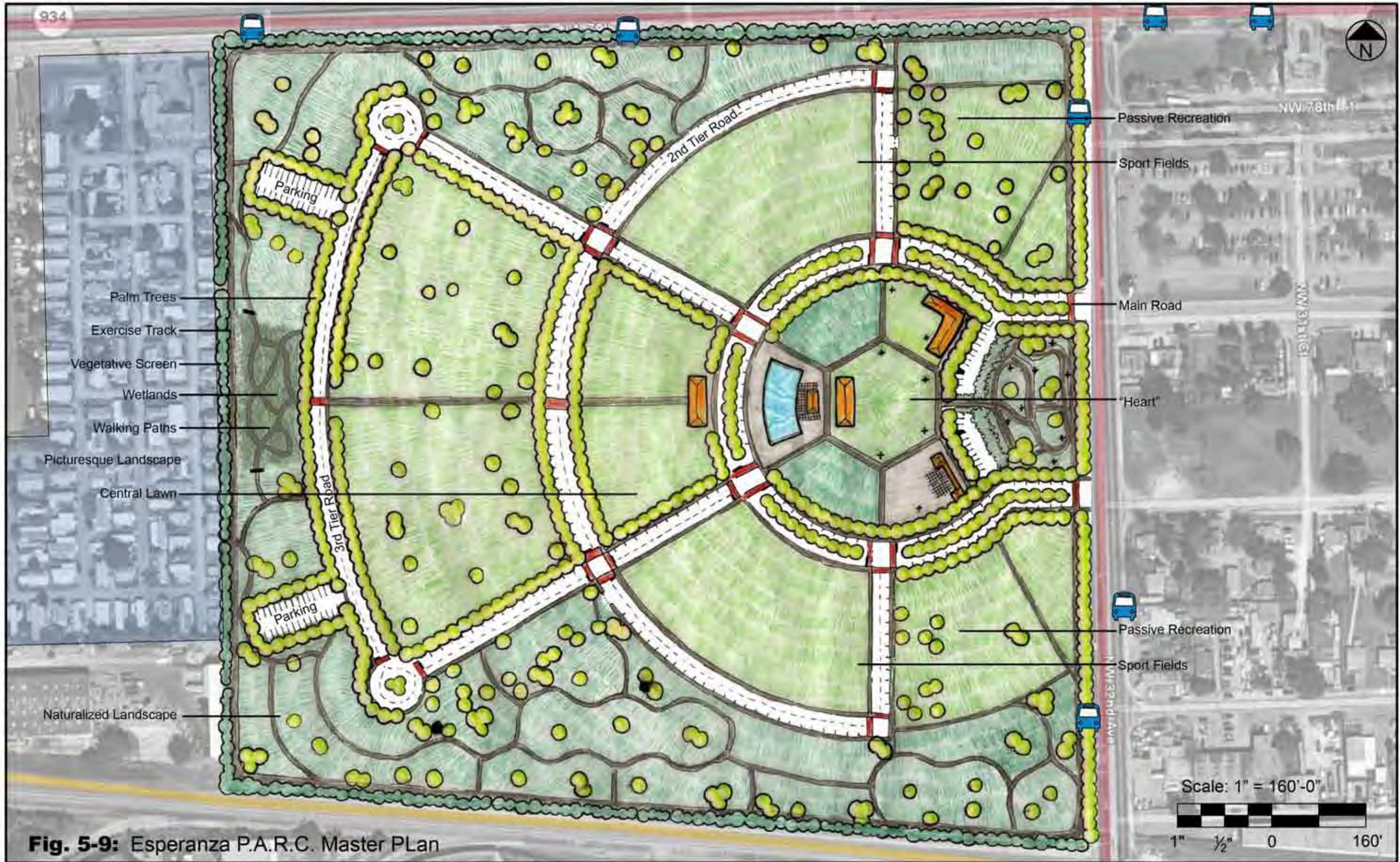
### Conceptual Design: A Web

A major concept driving the design application is the consideration of the similarities between a temporary housing community and a spider web. Metaphorically, any temporary housing community is a web of cultures, needs, desires, and previous residences and experiences. The design of the park, therefore, will reflect the attributes of a web: it will promote community structure and connectivity while also allowing for individual expression and personal attachments to place. In particular, a web can be constructed and dismantled quickly, but the web is highly functional and structurally sound. The web structure is similar each time it is built, but the intricacies are always different. The similar segments of the web join at the center to create a functional unit, but each is independent and slightly different from the others.

Just as the components of a spider web radiate from a unified center, the park's design elements surround the "heart" of the park and are connected by a series of pathways and roads. Because *centers* intentionally connect people to each other and promote community, the "heart" is designed for the highest volume of traffic and community activity. The park has a 4-tiered design that morphs from a structured, active urban park into a more naturalized, picturesque, and passive environment as it expands outward.

By encapsulating diverse environments and assorted activities, the space fosters an array of activities for a variety of users. When used as a public park, the spaces' activities and events will draw people from their busy urban lives to enjoy the restorative qualities of nature. In the event of a catastrophic hurricane, the park can quickly transition into a temporary housing community that will promote a sense of community, personal attachment to place, and healing from the disastrous event that displaced the community's temporary residents. The following sections independently present each side of this duality to thoroughly illustrate the park's functionality in both scenarios.





**Fig. 5-9:** Esperanza P.A.R.C. Master Plan



**Fig. 5-10:** The "Heart" of the P.A.R.C.

### A Public P.A.R.C.

The main entry into the P.A.R.C. circles around the central “heart” where the majority of infrastructure and programming is located. The “heart” is a large hexagon that showcases community sculpture and houses a public labyrinth to unite and soothe users. Labyrinths are single paths that classically have seven circuits, all leading to the center (labyrinthology.com 2009). They are thought to increase right brain activity and have relaxing effects on people (labyrinthology.com 2009). On the outside of the main circulation path are six parcels encircling the “heart”. Local art will help celebrate the local flavor of the P.A.R.C.

Parcel 1 (adjacent to NW 36<sup>th</sup> Avenue) is comprised of parking and a botanical garden that exhibits community sculpture. Immediately adjacent to the central hexagon is a public lawn area that progresses into a botanical garden. The garden serves as a place for contemplation and relaxation, and offers healing qualities derived from positive distractions of nature. By showcasing the works of local sculptors, elements of Miami’s eclectic culture are integrated into the P.A.R.C. Additionally, the botanical garden could be planted and cared for by local residents which would educate them in both the local flora and related horticulture practices.

Parcel 2 consists of a community center and a lawn. The community center can help unite people in the surrounding community from different cultures through cooking classes, community meetings, educational classes, exercise and dance classes, and other community-wide events. The lawn entertains children and facilitates social interaction among their parents. The architecture of the community center is brightly colored; emulating the vibrant colors often used in Miami architecture and made of stucco.

Parcels 3 and 5 consist of community gardens. These gardens will be divided into smaller parcels for Miami locals who wish to garden, but either do not have enough

space at home or enjoy gardening in a community setting. Here, local residents can develop new relationships with one another and can establish a sense of control over their environment—both healing experiences.

A pool, a pool house, and a banquet hall are located between the community garden parcels, in Parcel 4. The pool house and banquet hall are also colored brightly, but not garishly. These colors should match the neighboring aesthetic in the Miami metropolitan area. At the pool, local youth will learn to swim, elderly people will engage in water aerobics, and people of all ages will exercise. Because of Miami's hot climate, the pool offers people a comfortable place to relax and exercise—two healing activities. The pool house contains changing rooms, CPR and lifeguard-training facilities, and shade structures to avoid the scathing sun. The banquet hall can host a multitude of community events including weddings, birthday parties, school graduations, and ethnic celebrations. P.A.R.C. officials also have offices in this building.

Parcel 6 is the final parcel surrounding the “heart”. It features two small cafes with a patio for outdoor seating. Here, people will eat, socialize, read, and relax within the context of an urban park. A playgrounds lies between the community gardens (Parcel 5) and the café (Parcel 6). The circular nature of the “heart” allows for visibility and legibility in the landscape. Parents can keep an eye on their children while working in the garden or sitting at the outdoor café, and all elements and circulation in the central P.A.R.C. are easily navigated.

A secondary road encircles these parcels and separates them from the second tier of the P.A.R.C. This area is designed for both active and passive recreation. It features sports fields, game tables and chairs, and a main lawn for concerts, theater and recreational activities. Open sports fields facilitate a variety of pick-up games for adults and youth. Tables and chairs offer people a place to play cards, dominoes, or chess, or to do homework or catch up with friends. The central lawn serves as a place where

couples can sit together on the grass or individuals can draw in sketchbooks, play guitars, read novels, or fly kites. A central concert hall sits at the head of the main lawn where theater and concert events will bring people into the P.A.R.C. in the evenings or on weekends. People can bring blankets and sit on the grass while listening to music or watching performances.

The third tier of the P.A.R.C. is defined by the border of the next concentric road and consists of a minimally-programmed, picturesque strolling park. People can partake in activities similar to the central lawn, but the naturalistic design offers more privacy and a pastoral ambience. The final tier of the P.A.R.C. consists of the remaining green area surrounding the roadway. This area is designed to be natural and lush with meandering paths. Tree houses and other clubhouses for local youth are designed throughout this section of the P.A.R.C. A large wetland with boardwalks and viewing towers is located at the far end of the P.A.R.C. Here, visitors can enjoy the natural Florida landscape and view birds and other wildlife. A 10-foot wide track surrounds the entire P.A.R.C. and offers an additional exercise facility and circulation for P.A.R.C. vehicles.

Although this thesis calls for trees and vegetation throughout the P.A.R.C., none have been specified. Further development of the design would require planting design and vegetation specification. Palm trees and low native vegetation are recommended because they are most resilient during the harsh weather conditions associated with hurricanes, and they provide clear site-lines for individual surveillance that is integral to P.A.R.C. safety.

Even though the primary intention of the P.A.R.C. is to reserve space for post-disaster temporary housing, these 45 acres of publicly accessible green space will offer Miami residents a healing refuge from the city. The P.A.R.C. is programmed to attract a wide range of age groups and ethnicities. People can utilize the P.A.R.C. to celebrate

their own identities and to share their cultural practices with others. The P.A.R.C. has the opportunity to demonstrate various facets of Miami's diverse population simultaneously.

While the P.A.R.C. may facilitate unity among Miami's diverse population, the design elements and proposed uses of space presented in this thesis are speculative. In reality, community interests should be studied and carefully analyzed to determine the most appropriate programming and design elements. Due to time constraints of this thesis, however, community input was unattainable.

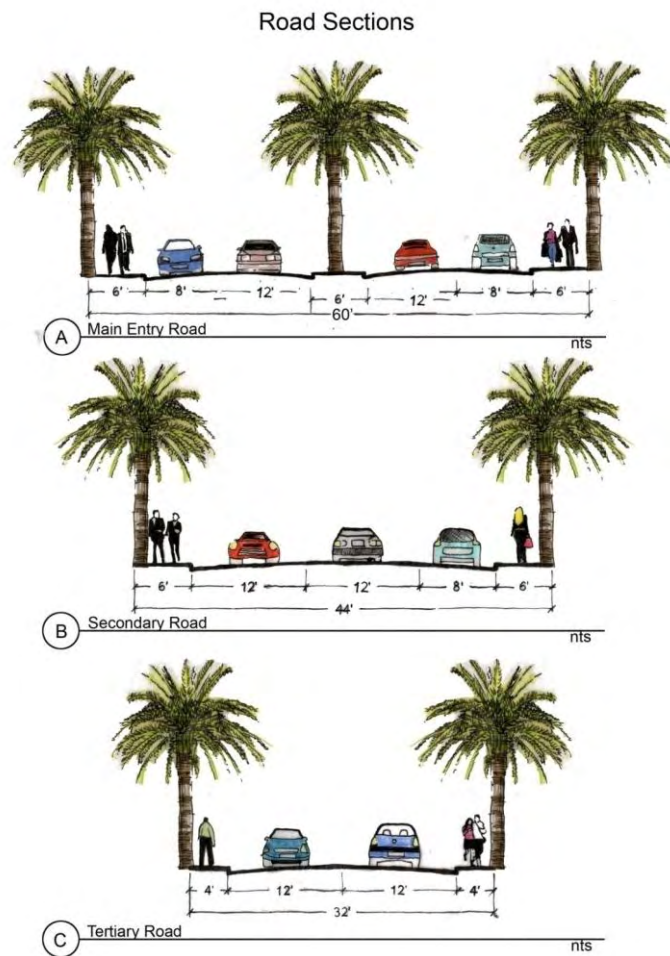
### Traffic: Cars and Pedestrians

As described above, three main roadways facilitate vehicular and pedestrian circulation throughout the site and emphasize the importance of the central "heart". The main road is lined with palm trees on both sides; there is also a center median to emulate traditions of a grand boulevard. Parallel parking is provided along both sides of the road, providing a physical buffer to the 6-foot sidewalks. The secondary roadway is scaled down and lacks a vegetated median. Parallel parking is allowed only on the western side of the street; however six-foot pedestrian sidewalks line both sides of the road. The tertiary roadway is even less pronounced: it carries two-way traffic but includes a narrower four-foot pedestrian sidewalk. The proposed design offers a limited number of entrances to maintain security. The P.A.R.C. is accessible to pedestrians through the main entrance or through four additional entrances near outlying bus stops, however cars are required to enter and leave the P.A.R.C. via the main entrance, which fronts 32<sup>nd</sup> Avenue only. Pathways traverse all throughout the P.A.R.C. providing means to stroll, contemplate, and exercise. An eight-foot-wide exercise track abuts the vegetated screen at the P.A.R.C.'s periphery. In this way, exercisers have views into the P.A.R.C. as well as into the robust vegetation surrounding the perimeter. When needed,

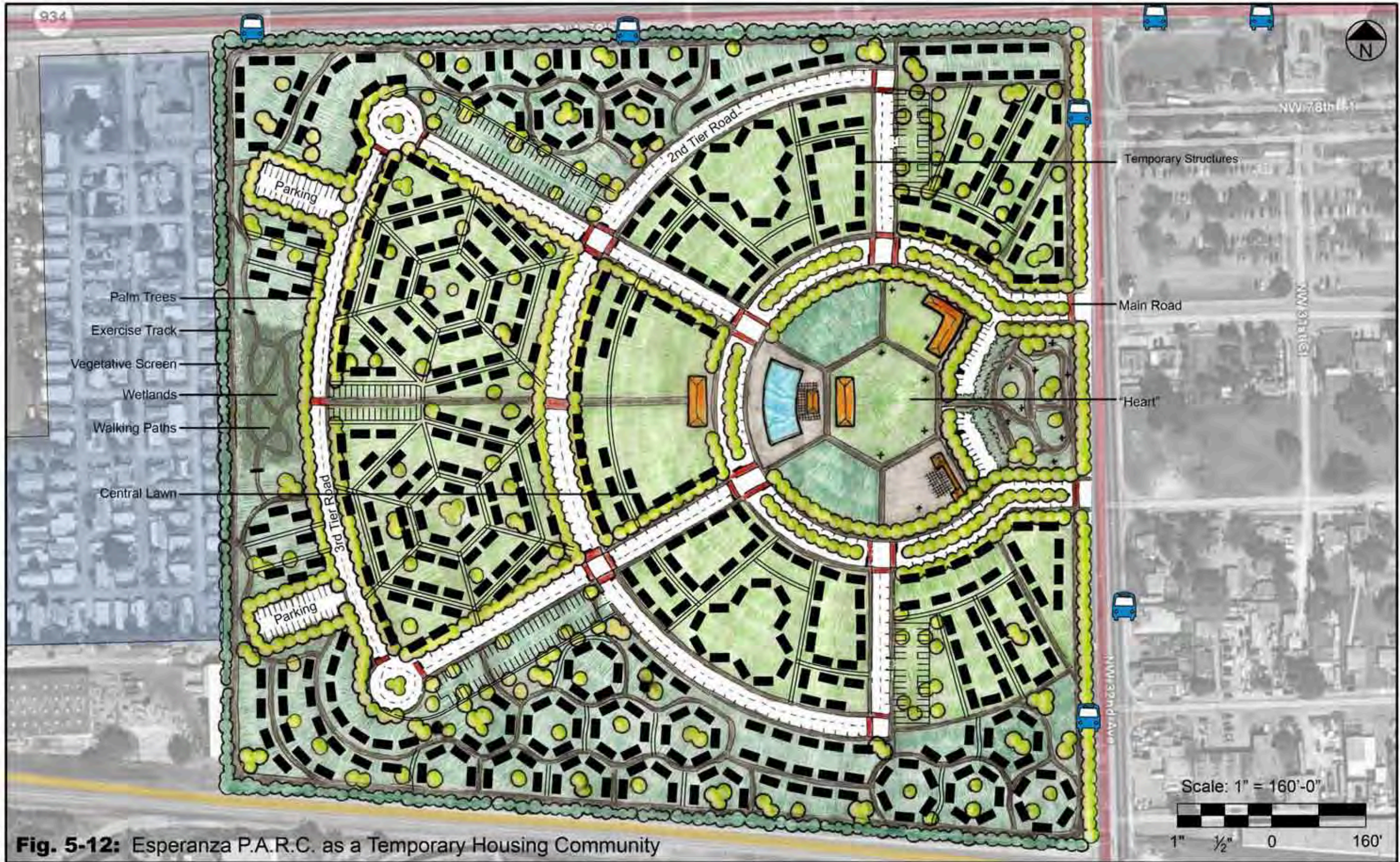
P.A.R.C. vehicles can utilize on the track for maintenance activities. Figure 5-11 illustrates road sections in the P.A.R.C.

Esperanza P.A.R.C. as a Temporary Housing Community

More importantly than providing public green space, the P.A.R.C. described above was designed to temporarily house 500 households in the event of a catastrophic hurricane. The design, as shown in figure 5-12, shows the P.A.R.C. when occupied at its full capacity of 500 temporary structures. The temporary housing community can also function at a lower density, depending on need.



**Fig. 5-11:** Road Sections for Esperanza P.A.R.C.



**Fig. 5-12:** Esperanza P.A.R.C. as a Temporary Housing Community



The “heart” of the P.A.R.C. will remain open to the public even if the P.A.R.C. becomes a fully occupied temporary housing community. The remaining space will be restricted to the residents of the temporary community to foster the sense of control and security necessary for them heal from the trauma of a hurricane. If the community were open to the public, residents would have difficulty differentiating between other residents and visitors, and this ambiguity could significantly inhibit community growth. Additionally, residents may not feel ownership in their own community.

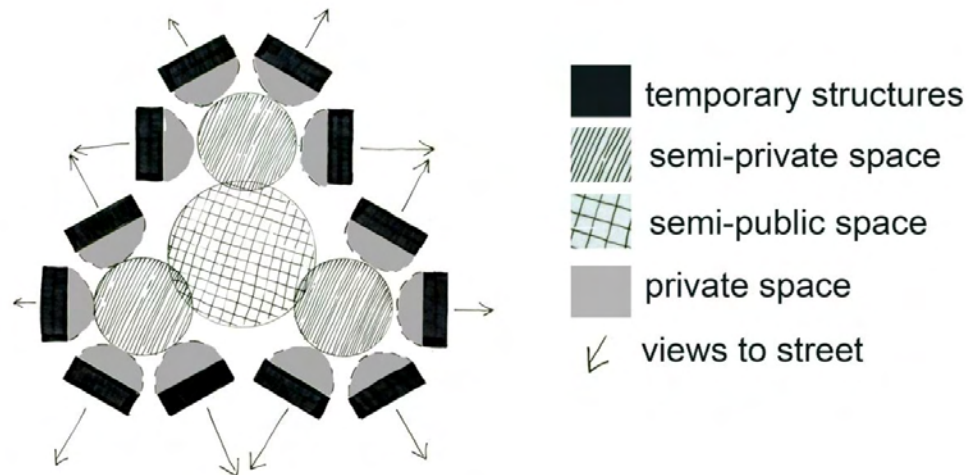
Although the “heart’s” infrastructure will remain the same in the case of a temporary community, some of its uses will change. The community center—built to the same code as the evacuation centers in Miami-Dade County—will continue to hold community activities, but it will also facilitate emotional support groups, insurance claim officers, FEMA representatives, and other aid agencies or NGOs offering assistance in recovery. By keeping disaster relief assistance in a centralized location, residents will have better access to facilitate the rebuilding process and promote permanent solutions to hurricane-inflicted issues.

In addition to offering recovery resources, the use of the banquet hall and community center for cultural and community activities will help build communal sentiment and provide positive distractions for residents. The community gardens may still be used by previous renters, but the produce grown there could help feed the interim residents who have lost their homes. If necessary, the outdoor café will serve as a kitchen to feed residents. The pool will become a recreation and exercise facility for the temporary community, and the pool house will double as a daycare center for children whose parents work.

Temporary housing is located in the second, third, and fourth tiers of the P.A.R.C. To improve upon past temporary housing that did not consider site conditions

or structural arrangements, the structures in this temporary community were located with careful consideration of the site and the unique needs of displaced hurricane victims.

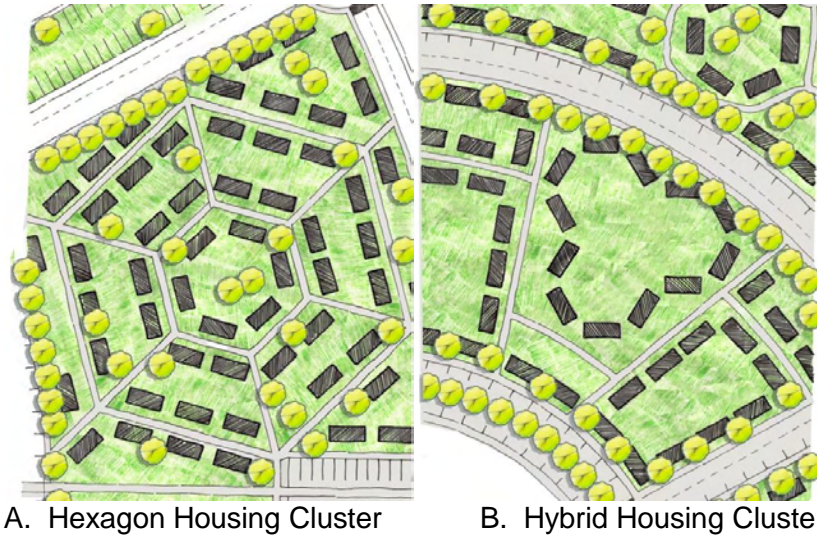
Similar to a traditional neighborhood, this design incorporates various cluster arrangements to account for the variety of lifestyles and preferences of the diverse residents living in them. The clusters range from 6-12 households; some clusters encircle a central courtyard, while others are placed in lines like row houses. To promote community and personal expression, each house is adjacent to a private space that transitions into a semi-private communal space and, sometimes, even further into a semi-public space.



**Fig. 5-13:** Housing Cluster Diagram

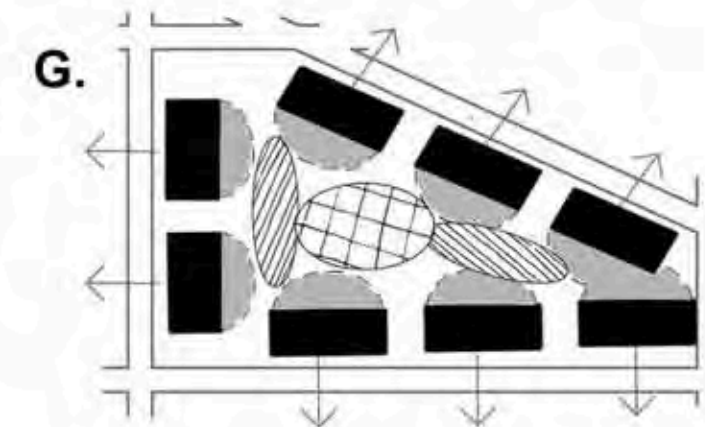
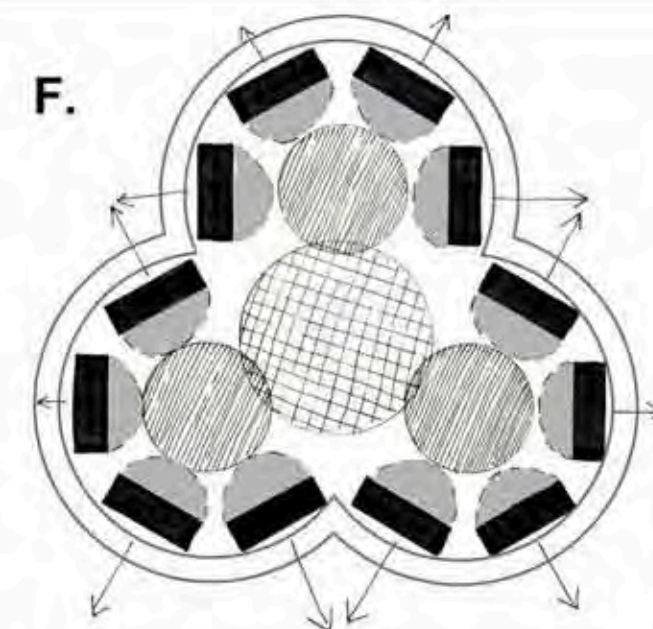
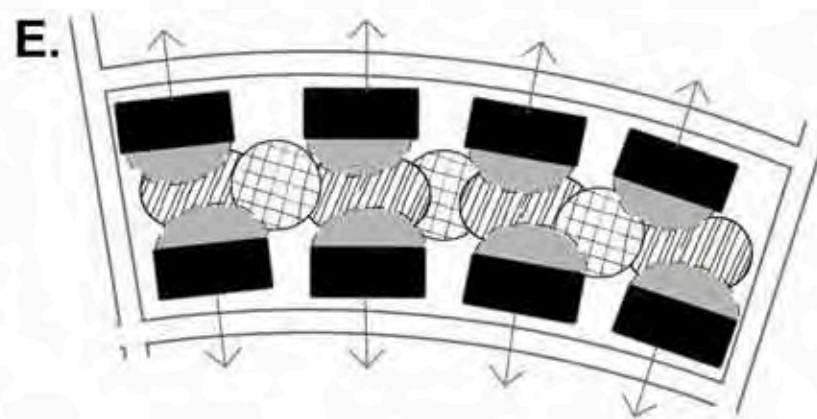
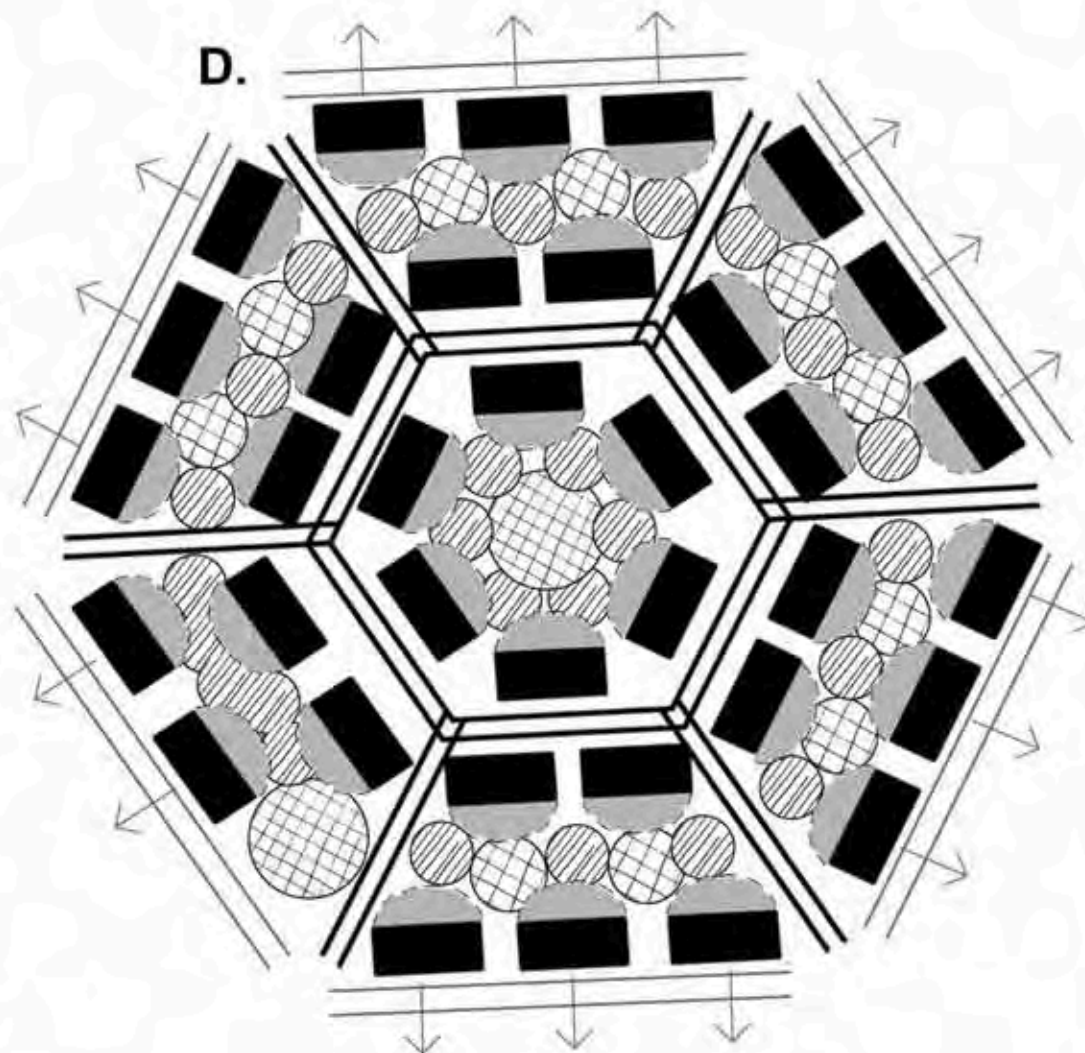
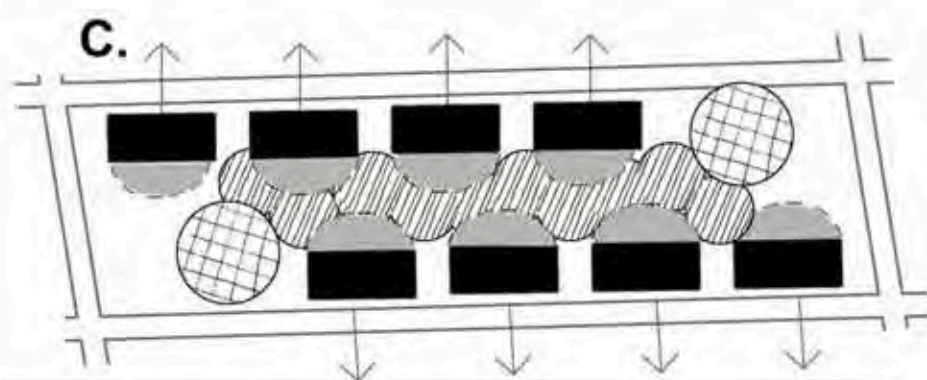
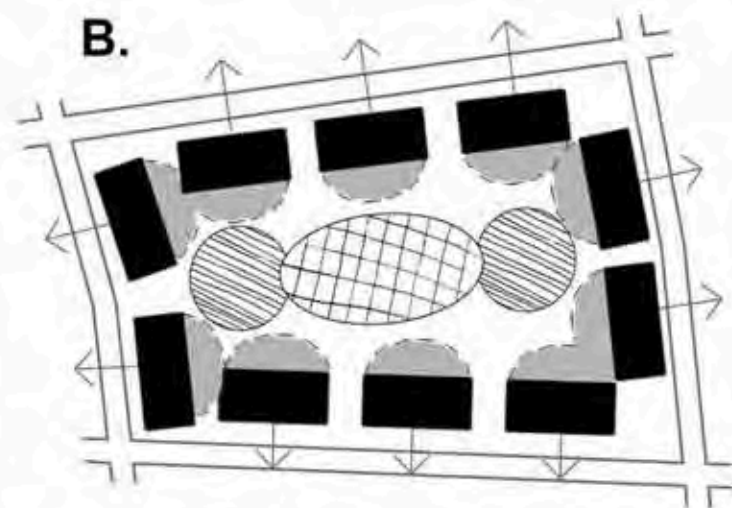
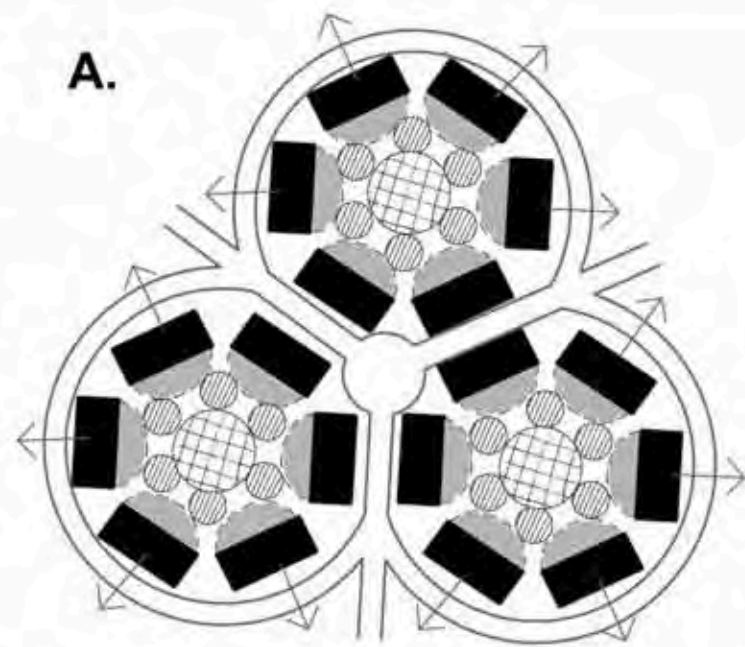
The private spaces will be shown by markers in the landscape—bricks, logs, or outdoor fabric that will demarcate private outdoor space. This can help people to feel as if they have their own garden plots and suggest ownership. The semi-private communal spaces can facilitate play spaces, vegetable gardens, or places for laundry lines. The private spaces will vary greatly from personal rose gardens, to swept yards, to showcases for garden ornaments. Each house faces a “street”—a wide footpath or road that is part of an interconnected system that connects houses and people throughout the







P.A.R.C. Here, people can view the movement and activities of their neighbors and other community members. This keeps “eyes on the street”, and, ultimately, encourages safety.



**Fig. 5-14:** Sample Housing Cluster Arrangements in Esperanza P.A.R.C.

In this arrangement, the community is composed of 11 different sub-communities. Each sub-community has an opportunity to develop its own comradery and identity within the larger communal context. The sub-communities are named after known Miami-Dade County neighborhoods to further give familiarity and meaning to residents, as well as help with way-finding and navigation. The cluster housing arrangement and sub-community identity promotes safety and security as neighbors know who lives among them. While this design is merely for one temporary housing community in Miami-Dade County, the housing arrangements can be extracted and used in other designs. The housing arrangements used in this design are important because of the inclusion of a variety of space, which promotes safety, community interaction, personal attachment, and a sense of control. As long as these elements are present, other housing cluster arrangements may be as effective as those presented here (see figure 5-15).



KEY	
	temporary structures
	semi-private space
	semi-public space
	private space
	views to street
	streets

**Fig. 5-14: Housing Cluster Arrangements**

While much of the programming and a large amount of the public open space disappear once the 500 temporary homes are assembled, the P.A.R.C.'s healing qualities prevail and offer comfort to this "new" community that is facing the harsh trauma of a hurricane strike and housing loss. The remaining open space and wetlands serve as naturalized positive distractions for residents. In addition, exercise is facilitated by a pool, a perimeter track, and system of walking and running trails. As discussed earlier in this thesis, a sense of control is encouraged by the variety of housing arrangements, the adaptable private and semi-private spaces adjacent to residences, the proximity to public transit, and by other design details such as adjustable benches and shade structures throughout the P.A.R.C.



**Fig. 5-15:** Perspective of Courtyard in Esperanza P.A.R.C.

## Parking

Additional parking lots can be added to the P.A.R.C. as it transforms into temporary housing to absorb the influx of residents. 500 parking spaces—enough parking for each household to have a car—will be dispersed in parking lots throughout the site. Because of the likely demographic make-up of this temporary housing community, however, many households may not own vehicles. In this case, excess parking will be for visitors and aid workers. During initial P.A.R.C. construction, the recreational lawn will be constructed with Rehbein Solutions Reflex Mesh Elements that uses polyethylene mesh mixed with a sandy soil to provide a system capable maintaining turf while supporting heavy vehicular traffic (rehbeinsolutions.com 2009).



**Fig 5-16.** Rehbein Solutions Reflex Mesh Elements Allow a Recreational Area to Double as Parking Lot (rehbeinsolutions.com 2009)

## Design Elements

While a schematic design has been carried out, there are many more elements to consider for this site's design. It is important to remember to apply the qualities of healing—sense of control, positive distraction, exercise, and community support—as well as providing opportunities for community investment and personal expression to all aspects of the P.A.R.C. This thesis identifies these qualities to be the most important for creating a healing community— or P.A.R.C.—meant to guide recovery. This project was originally designed to serve a temporary housing community of displaced hurricane victims, but it also functions to provide a comfortable, therapeutic setting for daily users.

The inclusion of various design elements not included in the plan are suggested to help represent these concepts through design. One example is the inclusion of adjustable benches and shade structures, enabling people to move the height and direction of their seats as well as keep the sun out of their eyes at any time of day. Contracting local artists, perhaps from underserved communities, to paint murals on walls in the P.A.R.C. can personalize the space by representing local culture and allowing for free expression. The inclusion of a water feature can impart visual, oratory, and tactile benefits. By allowing interaction with water, the public can find relief from Miami's scorching temperatures and searing sun. Play areas, allowing children to construct their own environments or representing local materials or cultural elements, allow children to express themselves among and have attachment to elements of play. These are but a few examples of more detailed elements that can be included in the P.A.R.C.'s design to incorporate healing qualities.

### Housing Types

In this thesis, housing types are not addressed; however, the structures in the site plan drawings are 34'x14', the same dimensions as the Katrina Cottage designs, one of the new prototypes of temporary housing structures presented after Hurricane Katrina (see Figure 2-3). These dimensions were chosen because the Katrina Cottage is designed to reflect the needs and cultures of people occupying them—an intent similar to this thesis; however, a different architectural style that reflects the housing vernacular in Miami-Dade County would be recommended for this community. Just as variety is included in the open space in the P.A.R.C., it should be offered in the form of housing as well. Differently colored houses or different architectural styles should be offered to residents of Esperanza P.A.R.C. These dimensions are within the realm of the 30'x8' trailers and 60'x14' manufactured homes previously distributed by FEMA.





## Design Context

Every design fits into a larger context of a place where a design will be established. Connecting a newly designed place to existing urban fabric is difficult, yet important. When designing, it is important to take the context of a site into consideration. Therefore, a diagram was derived to show how the design of Esperanza P.A.R.C. relates to the area around it (see Figure 5-18).

## Policy and Programming

One issue that arises from the dual function of the P.A.R.C. is determining who controls the P.A.R.C. and who has the authority to change its use. Additionally, if the P.A.R.C. is technically a public park, can it justifiably be used in a way that excludes the public? To ameliorate these jurisdictional problems, the author suggests that OEM purchase the P.A.R.C. land and implement the proposed design using FEMA grants. OEM can then lease the land to the Miami-Dade County Parks and Recreation Department who will control and manage the land until temporary housing is necessary. After the hurricane, OEM and FEMA can set up the housing units according to the plans presented in this thesis. FEMA, OEM, and other NGOs will manage the camp until its use is no longer necessary. Then, FEMA will be responsible for removing housing units and restoring the site to its previous condition; alternately, the lease could require the Miami-Dade County Parks and Recreation Department to share the responsibility of returning the P.A.R.C. to its original condition.

This proposed arrangement is similar to the purchase, construction, and organization of schools that function as evacuation centers during emergencies. These shelters are funded by OEM with help from FEMA, and they are run by OEM with help from the Red Cross. By proactively planning for temporary housing, management will be established prior to the hurricane event and serve as a conduit for positive relationships

before the stress of organization and agency mobilization is compounded by the onset of a natural disaster.

### Limitations and Further Research

While one strength of this design is the maximization of the site's use, a corresponding shortcoming is the limitation of public access when the P.A.R.C. is used as a temporary housing community. The public who utilize the park on a daily basis prior to the disaster may feel a significant loss when if they are suddenly prohibited from entering the P.A.R.C. They may develop a sense of entitlement that could potentially cause bitterness or Not-In-My-Backyard (NIMBY) attitudes towards the temporary housing residents. While proximity to parkland tends to enhance property values, houses near this P.A.R.C. may not be highly valued if the majority of the park is threatened by closure in the case of a hurricane—not to mention the high crime rates that tend to accompany other or historic temporary housing communities. Additionally, catastrophic hurricanes affect entire communities, and frequent users of the P.A.R.C. may seek the healing qualities of the P.A.R.C. regardless of whether or not their houses were rendered uninhabitable by the storm.

Despite these shortcomings, a primary purpose of this thesis is to advocate for equal opportunities among people. People displaced from their homes are often the most impoverished, and they often suffer from high proportions of hurricane-related stress. This thesis offers these displaced people the opportunity to live within the urban fabric of the city, to be part of the reconstruction process, and not to be forgotten. The public space described in this thesis will be used to help those most in need by making their situation visible to the entire community. As temporary housing consumes a valuable resource for local residents, the public will potentially prioritize finding permanent housing for the temporary community population. Furthermore,

approximately 8 of the 45 acres will be publicly accessible in the case of a temporary housing community, so local residents will not be entirely prohibited from the P.A.R.C.

This design proposal attempts to create a temporary housing community that provides a healing environment and comfortable living spaces for displaced hurricane victims. Additional research on housing density in urban temporary housing communities should be conducted because there is very little research from FEMA—or anyone else—specifying desired densities for temporary housing communities. Perhaps the problems associated with previous FEMA cities correlates to their densities. By obtaining research related to density, insight may be obtained to develop future plans for temporary housing communities. In addition to density, further statistical data should be derived to accurately analyze the percentage of displaced people that reside in temporary housing communities after natural disasters in relation to all people displaced. This may help bolster the argument for planning for temporary housing communities as well as give planners an estimate of how many sites to develop. In creating a design, this thesis used detached single family structures typical of the temporary housing prototypes currently used for natural disaster victims. As new technologies and temporary housing prototypes develop, the concepts and frameworks derived in this thesis should be altered and applied accordingly.

As Esperanza P.A.R.C. remedies part of the displacement problem after hurricanes while creating public parkland in Miami-Dade; more areas designated to house displaced people after hurricanes are needed within Miami in order to help a significant number of displaced people. Therefore, it is important to project how many communities would be necessary to remedy a significant portion of displaced people after a hurricane hit Miami-Dade. This is extremely difficult to do because each disaster displaces different amounts of people depending on it severity and where it lands. Many find their own forms of temporary housing or move in with family. Because vacant

housing is also part of the solution, the amount of temporary housing communities needed will depend on vacancy rates and the amount of housing destroyed by a hurricane.

In order to understand the scope of this issue an analysis of temporary housing after Hurricane Andrew—the largest and costliest hurricane that has landed in Miami-Dade in the last 20 years—may help derive an estimate of how the solution in this thesis relates to the context of the problem as a whole. Hurricane Andrew displaced 353,000 people—18 percent of residents—and damaged or destroyed 80% of all housing (Comerio 1998). 3,600 mobile homes and travel trailers were given to displaced people as well as 8,000 Section 8 rental vouchers for disaster victims. Temporary housing communities housed about 10,188 people accounting for about 3 percent of the displaced population<sup>4</sup>. Therefore, 7.2 P.A.R.C.s would have been used after Hurricane Andrew. With the addition of 7.2 Pro-Active Recovery Communities at 45 acres each in Miami-Dade County, a total of 324 acres would be used. Adding this parkland to the Miami metropolitan area would only have a 1.3% increase on its entire parkland which—as stated earlier—is ranked 22<sup>nd</sup> out of the 25 largest metropolitan areas in the United States. With the addition of 324 acres, Miami would move to 20<sup>th</sup>.

Lastly, if the design proposed in this thesis is intended to enhance disaster preparedness, an implementation strategy is necessary to ensure efficient transformation from a public park into a temporary housing community, and then back into a public park. Each organization's role in this process must be clearly outlined prior to the natural disaster. After the construction of the P.A.R.C., a post-occupancy evaluation and a detailed analysis of the design's effectiveness and efficiency will also

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<sup>4</sup> The number 10,188 was derived using the statistic of 2.83 people per household, which is used by Miami-Dade County (Viterbo 2009).

be crucial in tailoring the design and implementation strategy toward more successful future hurricane response(s).

Evaluation

After the design was completed and limitations were addressed, an evaluation of the design was conducted to see how it related to the design criteria derived in Chapter 3. Figure 5-19 shows how each of the three categories in the design criteria are related to the elements within Esperanza P.A.R.C. Then, figures 5-20, 5-21, and 5-22 look specifically at the design to explain how each is represented in the design.

	Recovery	Transition	Function
<b>Design Elements</b>			
Community Gardens			
Pool			
Botanic Garden			
Housing Clusters			
Restaurant/Food Bank			
Community Center			
Vegetation			
Exercise Track			
Parking			
Labyrinth			
Private, Semi-private, public space			
Art			
Dual use on site			

	Recovery	Transition	Function
<b>Design Elements</b>			
Concert Hall			
Paths and Walkways			
Playground			
Site Location			
Programmed Community Space			
Pro-Active Planning			
Walkable Amenities			
Open Space			
Banquet Hall/day care			
Size of Site			
Center or "Heart"			
Utilities			
Wetlands			

**5-19: Evaluation of Design Elements**

## Elements of Recovery

WETLANDS serve as a POSITIVE DISTRACTION for residents, allowing them to enjoy native Florida flora and fauna.

A VARIETY of HOUSING ARRANGEMENTS allow people a choice of living environment, giving them a SENSE OF CONTROL over where they live. Because the houses are formed in HOUSING CLUSTERS, they promote SOCIAL SUPPORT among residents.

PARKING on site allows the freedom to come, go, and travel around Miami freely, establishing a SENSE OF CONTROL.

A TRACK around the P.A.R.C. creates a place to EXERCISE.

PATHWAYS traversing around the site allow a resident to choose his or her path, establishing a SENSE OF CONTROL for the resident. The natural environment around, such as trees, shrubs, and flowers serve as a POSITIVE DISTRACTION.

COMMUNITY GARDENS provide a forum for SOCIAL SUPPORT among residents and give people a SENSE OF CONTROL over the garden elements.

A CENTER with programmed activities and a variety of uses attracts people, fostering a place for SOCIAL INTERACTION and SUPPORT.

BOTANIC PERENNIAL GARDENS with LOCAL ART provide residents with POSITIVE DISTRACTION from adversity from hurricanes.

A LABYRINTH is an iconic symbol that provides people with a SENSE OF CONTROL as all paths lead to the center.

A POOL serves to foster SOCIAL SUPPORT as well as a place for EXERCISE and recreation

COMMUNITY BUILDINGS on the site provide spaces to where residents are drawn, enhancing opportunities for COMMUNITY SUPPORT and interaction

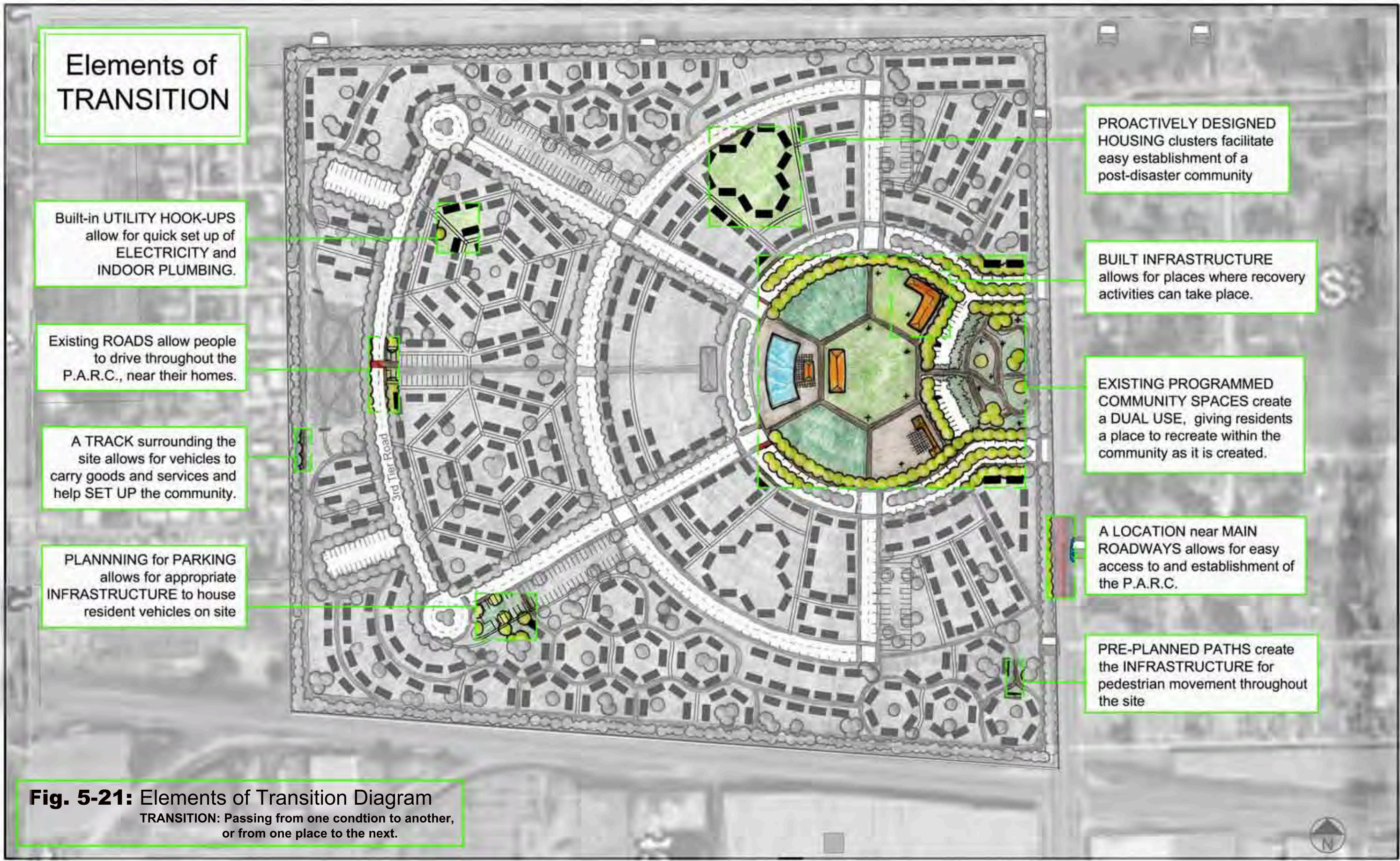
A CENTRAL LAWN creates a place for interaction, promoting a sense of community and SOCIAL SUPPORT as well as place to EXERCISE.

BUS STOPS adjacent to the P.A.R.C. give residents a SENSE OF CONTROL that they can travel freely to and from the site.

HOUSING CLUSTERS allow a communal environment, promoting a sense of community and fostering SOCIAL SUPPORT.

**Fig. 5-20: Elements of Recovery Diagram**

RECOVERY: Defined as return to health, regaining balance, control, and composure.



**Elements of  
TRANSITION**

Built-in **UTILITY HOOK-UPS** allow for quick set up of **ELECTRICITY** and **INDOOR PLUMBING**.

Existing **ROADS** allow people to drive throughout the **P.A.R.C.**, near their homes.

A **TRACK** surrounding the site allows for vehicles to carry goods and services and help **SET UP** the community.

**PLANNING** for **PARKING** allows for appropriate **INFRASTRUCTURE** to house resident vehicles on site

**PROACTIVELY DESIGNED HOUSING** clusters facilitate easy establishment of a post-disaster community

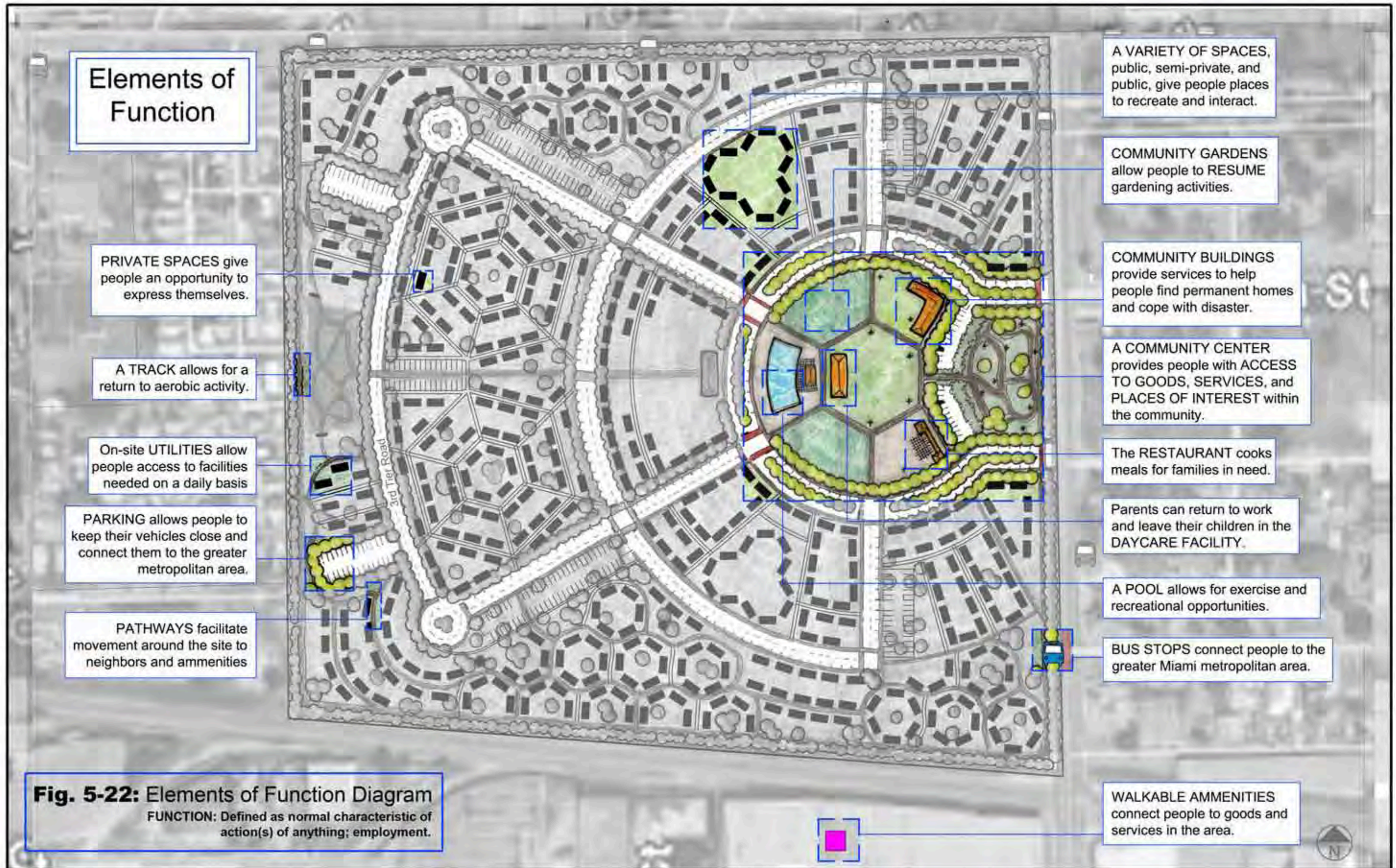
**BUILT INFRASTRUCTURE** allows for places where recovery activities can take place.

**EXISTING PROGRAMMED COMMUNITY SPACES** create a **DUAL USE**, giving residents a place to recreate within the community as it is created.

A **LOCATION** near **MAIN ROADWAYS** allows for easy access to and establishment of the **P.A.R.C.**

**PRE-PLANNED PATHS** create the **INFRASTRUCTURE** for pedestrian movement throughout the site

**Fig. 5-21: Elements of Transition Diagram**  
 TRANSITION: Passing from one condition to another, or from one place to the next.





## Conclusion

In addition to merely providing temporary shelter, a temporary housing community should be a place of healing and recovery for victims of natural disasters. Because stresses and anguish are not limited to hurricane victims, the healing-focused landscape of a well-designed temporary housing community can function as a public park for the majority of the time. The design outlined in this thesis suggests that the dual use of a temporary community site can mutually benefit both types of users. Through the careful planning and design of temporary housing communities, individuals and families can embrace the necessary period of displacement and begin their own healing and recovery processes. Instead of facilitating bitterness and resentment among neighbors, this design encourages community interaction and attachment to place while connecting residents to the larger metropolitan area. Although the P.A.R.C.'s construction may be initially costly, this cost will more than likely be reconciled by the money saved in relocating displaced residents in the case of a hurricane. By planning ahead of time for infrastructure that will eventually be needed, FEMA may actually save money in the end. In addition to balancing monetary costs, the proactive planning presented in this thesis will greatly ease the construction process and improve the experiences of temporary housing residents. By designing temporary housing communities before the onset of a disaster, organizations involved in disaster response can establish partnerships and healthy working relationships while developing a strategic plan addressing the ways in which a temporary community will be set up, how it will function, and how it will be dismantled. The design proposal in this thesis directly responds to FEMA's National Disaster Housing Strategy to help improve communication and efficiency. Through the use of proactive planning, the National Disaster Task Force has a forum through which to plan and communicate for future disasters.

## CHAPTER 6

### CONCLUSION

Remember the man referred to in Chapter 1 who was depressed, lost his job, and suffered in a temporary housing community far away from home? If Esperanza P.A.R.C. had been in existence, this man would have transitioned more quickly into temporary living accommodations. He would also be living within the confines of the urban environment from which he was displaced, thereby allowing him to maintain his job and use public transportation and urban infrastructure to suffice his daily needs. While only temporary, a community filled with trees and green space, community activities, and aid workers to help with hurricane relief efforts would be a huge relief for someone who is not only dealing with the leftover trauma from the hurricane, but also trying to find a new place to live. This man's future relies heavily on disaster relief and temporary housing conditions. This thesis advocates for one possible way to help him through his recovery period, and, ultimately, help him recover, transition, and function.

In response to the need for better planning for post-hurricane temporary housing, the design presented in this thesis creates a fully functioning public park that can adapt to accommodate temporary housing as necessary. In addition to merely providing physical shelter, the design incorporates healing qualities to foster recovery for displaced disaster victims. Planning these communities prior to the onset of a disaster will enable collaboration between organizations and more efficient facilitation of temporary housing than has occurred in the past. Resources can also be secured prior to the disaster which will allow more immediate rebuilding and recovery processes after the disaster. Because P.A.R.C. is strategically woven into Miami's urban fabric, residents

will be better connected to the greater local community and will more easily resume their daily routines. In addition, the P.A.R.C.'s alternative use as a public park alleviates the logistic and economic stresses of reserving a large urban space for infrequent use as a temporary housing facility. The introduction of the new 45-acre P.A.R.C. in Miami will offer current residents new opportunities for refuge from their urban lifestyles.

While a full evaluation of the P.A.R.C.'s functionality is difficult without its construction or use, the design's concept provides an innovative way to accommodate temporary housing and account for problems in previous FEMA cities. In the past, temporary housing was usually not addressed until after a natural disaster struck, and houses were usually placed in a grid with no community space. As previously stated in this thesis, failure to account for human emotional and functional needs in a community's design will only perpetuate the damage caused by the disaster. Many disaster experts and government organizations agree that further planning for temporary housing communities is necessary, but few plans have actually been made.

Although this thesis proposes a new typology for temporary community design, previous research relating to site design and planning strategies have contributed to the design and research process. For example, the Urban Land Institute's "Principles for Temporary Communities" offers eight guidelines about planning for temporary housing communities (ULI 2006). Although the principles are helpful, they tend to be vague and sometimes contradictory. Similarly, disaster expert Frederick C. Cuny offers guidelines for temporary community plans and housing clusters in his article, "Refugee camps and camp planning: the state of the art" (Cuny 1977) which provides convincing evidence successful housing arrangements in temporary communities. Likewise, Cassidy Johnson, Faculty of the Built Environment at the University of Montreal, offers a framework for issues to consider in future strategic planning, but he does not provide an actual plan (Johnson 2007). Although this thesis proposes a new type of design, all of

the articles mentioned above have contributed significantly to the design process. Additional research will only help planners, governments, and NGOs better prepare for post-disaster temporary housing.

The focus of this thesis is to offer design criteria and one conceptual design application for a temporary community; however, the research and design processes will hopefully provide disaster-relief organizations with suggestions and raise important considerations as they design and plan for temporary housing facilities. Due to the time constraints of this thesis, direct input from the Miami community and collaboration with NGOs, government organizations, and disaster experts were unattainable. The P.A.R.C.'s design and programming would likely benefit from community insight and expert critiques.

By devising design solutions for temporary housing communities, landscape architects can contribute to disaster relief efforts and work as advocates for social justice through the incorporation of healing qualities into these disaster influenced landscapes. If landscape architects join the effort to plan for temporary housing solutions, plausible resolutions may develop to establish faster and higher quality disaster—response strategies. In addition, because of increasingly dense urban landscapes, multi-functional places are becoming more significant design subjects for landscape architects. As landscape architects effectively respond to emerging urban dilemmas, the profession will become more significant among related fields. Furthermore, landscape architects' involvement in disaster relief programs will help them to establish relationships with new organizations which could, in turn, create more work and expand the scope of the profession. While many landscape architects have previously attempted to heal various social problems, new opportunities for involvement continue to emerge.

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