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Architecture as Instruction: Paradigmatic Interventions in the Favelas of Rio de Janeiro

Noah Zaccaglini

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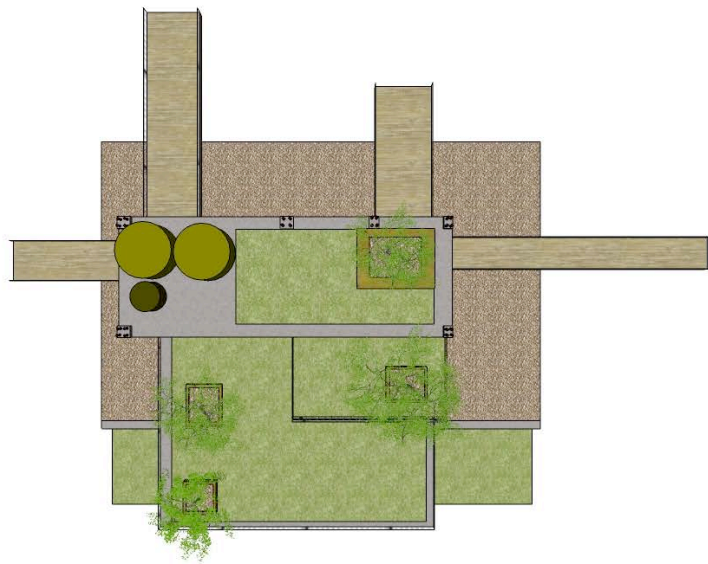
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Noah Zaccaglini

Urban Studies 2013

Advisors: Pinar Batur, Tobias Armbrorst

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Introduction

“Everyone has the right to a standard of living adequate for the health and well-being of himself and his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control.”

-Universal Declaration of Human Rights (Article 25.1)

The United Nations Universal Declaration of Human Rights is a noble document in its valuation of human life and dedication to every human being. Unfortunately the discrepancy between this proclamation and the actual experience of hundreds of millions of people is difficult to understate. In 2003, 51 years after the United Nations officially adopted the declaration, United Nations Habitat released a document, *The Challenge of Slums: Global Report on Human Settlements* that estimated that 921 million people globally lived in homes and neighborhoods the UN classified as “slums.” Though the declaration of human rights is clear in its intent, it lacks any means of enforcement, and left alone is little but a good intentioned, eloquent piece of literature.

In 2012, I was touring the city of Gulu in northern Uganda in the wake of the 25-year civil conflict. Since the early 1990’s, over 50,000 people have streamed into the town, more than doubling its population in less than a decade. During this period, infrastructure collapsed, roads were torn up, and every available piece of land was invaded to make room for Internally Displaced Persons (IDPs). In the aftermath, most did not wish to return home. A generation of children had grown up in the city didn’t want to go back to the fields and remote villages where their families were from. Many more who hadn’t grown up in the city did not want to return home for the simple reasons that they liked urban life more than farming. I spoke with a man who had to walk five miles to get water in his village, but in town, even though he lived in a

small, cramped, hut on illegal land, could simply walk down the block to get water from a community well.

What was forming was a massive parallel city of people who had no land rights and no legal claim to residence but chose (or were forced) to live in the city anyway. Today densely packed huts still line every available space and have formed a quasi-suburban sprawl into the surrounding countryside. These communities are as much a part of the city as the central city itself, though by United Nations standards they are almost entirely slums. These displaced people have formed communities, created jobs (almost the entire motorcycle taxi industry consists of formerly displaced boys) and have become integral to the urban setting. Even as the city is attempting to re-settle them back on their family lands they face the problem of dismantling essential parts of the urban structure.

Some of the arguments the city is making for the displacement of the displaced would be comical if they didn't hold such serious consequence for those living in legal limbo. The city wants to replace the golf course the English built in the 1940's for colonial governors. IDP communities look bad for the rest of the city. The open swamp in the middle of the town, largely unoccupied, needs to be environmentally remediated, even though they have too few resources to even create a city master plan now that the UN has stopped funding them.

IDP communities mainly consist of mud huts that haven't been replaced in over a decade, and many are starting to fall apart. As they do, concrete and brick homes are starting to be put up to replace them, but only slowly. These were the poorest residents in town and often don't have the money or the knowledge to build a "proper" urban structure.

This presents an interesting problem where thousands of people have or want to stay in the city, but there is no local precedent in how to transition from an urban "slum" to an urban

neighborhood. There is nothing particularly special about these settlements when looked at through a lens of global urbanism, which makes them an interesting paradigm for the larger global context. The conflict has acted as a catalyst for many of the urban processes that have led to the creation of global slums. In Gulu, architecture of the informal, urbanism of the informal, and the general formation of the informal are all shown with unusual clarity and fullness.

There is a certain accepted logic that development has historically followed to remove slums, promote formal development and repeat, but when examining the evidence even in Gulu it become clear that this overlooks the basic fact that the phenomenon of people moving from agricultural centers to urban centers is increasing globally and this strategy is not sustainable. There is a general understanding, at least among urbanists, that a sustainable solution to “slum” development is integration, but practice of this has seriously lacked. What I am proposing in this paper is architecture as the beginning of a sustainable solution. Architecture offers a solution that is structural but does not require massive interventions or formalizations, can be built cheaply, and can be used to target the areas that pose the most risk for the sustainable urbanization of cities in the global south.

Further, within existing frameworks architecture is the built expression of the values, social conditions, and living conditions that are prevalent in an existing space. Examining the development of slums through architecture is an approach that looks at the built form as an expression of the social and political dynamics of space. Even though often there are no formal architects, construction is one of the most important, if not the most important element in home building. In informal communities, this architecture is often copied from surrounding structures, perpetuating stylistic choices and structural choices.

Of course it is impossible to design every home in every slum of every city, and it is in recognition of this that I am presenting this design. Architecture as a paradigmatic form is an opportunity to promote efficient and stable architecture at minimal cost, and an opportunity for cities to show their commitment to quality of life for all residents and to human rights. This project frames architecture as a Universal Human Right. This design also recognizes that the commitment of urban governments to this right to housing is often gestural at best. Small, targeted architectural interventions allow a viral architecture to expand and allow the broadest reach with a small amount of money.

These designs are intended for the favelas in Rio de Janeiro, where the combination of notoriety and policy has placed the city in a unique position with regards to slum management. I have never been to Rio, and one of the largest obstacles in creating this project is the impossibility of understanding an urban landscape remotely. I have spent time working in informal communities and in cities of the global south around the world, and I could have chosen any one of these cities as the location for my design, but Rio's history of favela programs have made it a site of a fairly unprecedented approach to favela integration.

Favelas in Rio have also experienced a certain level of prestige that other cities have not which has contributed in part to the progressive policies that have been implemented. Michael Jackson filmed a music video in the favela of Santa Marta. Beyonce and Alicia Keys also shot a video in the same favela. Red Bull even held a down hill bike race there. The widely popular and critically acclaimed movie *City of God* took place in the favelas, which contributed to the awareness of the massive violence taking place, and since then the Hollywood action movie *Fast Five* has turned this violence into even more of a spectacle.

Another element that makes Rio's favelas unique is their visibility in the city itself. Historically favelas have been pushed to the margins of the city into the least desirable real estate, which outside of Rio often means slums are pushed to the periphery where they don't interfere with the "formal" city and can effectively be ignored. In the case of Rio because of its topography and climate some of the least desirable real estate has been the steep hillsides that line the city. Though they have the best views, they property is much more dangerous because of the risk of landslides. Deforestation of the Atlantic rainforest that used to cover the hills in the city has left the soil particularly unstable and resulted in the marginalization of this property. As a result, some favelas occupy land that has the clearest views of the city, and consequently can be seen clearly from the city.

The culmination of all of this is that favelas are among the most recognized informal settlements in the world. Seeing favelas is now part of the quintessential Rio experience for tourist. The Lonely Planet Travel Guide even offers "half day educational tours" of "the Brazilian equivalent of shantytowns" and even offers overnight options. Though this publicity has ramifications for the residents of favelas, it has also fostered a political climate where integration of favelas, rather than destruction, has become a viable option. Over 20% of the population of Rio lives in favelas which represents a powerful voting force in local politics, and when considered in the context of the publicity that favelas have received presents an opportunity for Rio to become a paradigmatic city in informal city policy.

The Project

The purpose of this project is to explore architectural and design related interventions as a way of both integrating favelas into the formal city and improving quality of life. This design experiments with the idea of informal architecture as illustrated in the introduction, as well as the idea of extremely dense informal urban spaces. The design attempts to meld these two into the existing framework of favela development and contemporary state actions and programs in a way that is realistic and potentially feasible.

This proposal is divided into sections to address the stages of urbanism, design, and implementation. The first is an overview of the history of favela improvement projects. This includes public policy from the early outlawing of favelas up through the most recent Favelas Barrio programs. It also includes a number of speculative projects released by both the Sustainable Living Urban Laboratory (SLUM Lab) the Harvard Graduate school of design, and Urban think tank, all who have put a substantial amount of time and effort into create designs and urban interventions not just in favelas but in informal communities around Latin America.

The second section deals with case studies of work that has been particularly influential in the design component of this project. They are a design, for a community center and park released by Urban Think Tank that incorporated a lot of the issues that I considered in this design, and a booklet, an “Urbanism Manual for Precarious Settlements” that was released by the faculty at the University of Buenos Aires. This is more of a conceptual case study that I have attempted to embody in the design.

The third section deals with the construction of favelas and how they are formed. As I mentioned, one of the major limitations that this proposal faces is that I have not actually been to Rio. As I will address later on, understanding completely the urban dynamics of a favela

remotely would be impossible, so I've dedicated a section of this paper to understanding the built dynamics of these communities, and created a theoretical favelas in which to contextualize my design. If this project were to be actualized, extensive work on a community-to-community basis would have to be undertaken.

The fourth section is the design component. This deals with the ideological framework that the design encompasses, as well as the built components and how they reflect the need of the constructed community. It also deals with the potential effects that this building and construction would have and the theoretical impact on the surrounding community.

The final section is the implementation process. This includes potential avenues for funding, the role of the community in the construction, and the conceptualization of the designer of projects like this in the process.

Why Now?

Rio is in a period of transition with regards to favela management. In light of the upcoming 2014 FIFA World Cup and the 2016 Olympics, both of which are being held in Rio, the city has shifted its policy from development to pacification. As Rio comes onto the global stage, the city's image is still tarnished by its outrageously high violence rate. Pacification policy, while effective in removing violent gangs from favelas, still does not address the issue of development. In many cases these communities have been established for decades and yet still lack formal plumbing, electricity, or even streets.

Pacification and the attention from these global events is also putting pressure on the real estate markets in favelas. Despite, in some cases, legal right to occupancy, residents are being forced out through gentrification and real estate speculation. Some are being misled by the local government as to their legal rights in order to make way for Olympic development. Often

residents are unaware of their rights, and real estate interests are capitalizing on this to transform neighborhoods.

This is creating an atmosphere of solidarity among residents who are fighting these developments. What this means is the opportunity for strong community movements to demonstrate to the city that they should not be displaced. Under the scrutiny of the international community, there is the potential that this solidarity can be transformed into action that has the support of the international community while presenting Rio with the opportunity to demonstrate their commitment to all of the residents of Rio.

Mixed into this political climate is a lot of money. With Rio trying to present an image of the modern city, the local and even federal government are investing billions of dollars into infrastructure and public works and it is almost obligatory for the city to spend a percentage of this money in favela upgrading projects in light of the prestige that favelas hold. Even a small percentage of this if dedicated to favela upgrades could present a sizable opportunity for development.

This is not to say that Rio does not have the money outside of the FIFA and Olympic budget to address the favelas, but these event have created a climate that force the city, even if out of tokenism, to invest some of it in favelas. Over the next three years, the city in all likelihood will be investing a steady, if relatively small amount of money in favela upgrading. These events have essentially earmarked money for to demonstrate that the city is committed to favelas. This can be capitalized on.

History of Policy

Though shanty towns existed earlier than favelas, the first official “favela” was formed in 1897 on a hilltop known as “Moro Da Providencia,” when soldiers returning from a war in Bahia. This is the first settlement that had the characteristic hillside dimension that has become the trademark of Rio’s favelas. Shortly after the turn of the century, under the leadership of Francisco Periera Passo the city underwent a period of urban renewal in which the narrow colonial streets were cleared of inner city tenements under imminent domain to make way for grand boulevards modeled after the streets of Paris. Thousands of lower class urban residents were displaced leading to a boom in favela construction.

The city soon turned towards the modernist visions of European theorists, and in an attempt to “modernize the city,” and called for the widespread elimination of favelas, sighting them as blight that needed to be removed. A revolution in 1930 stopped these plans, and under the new leadership of Gutulio Vargas, and for a time favelas were largely left alone (Godfrey, 2012, 365).

Beginning in 1950, the Brazilian Institute of Geography and Statistics (IBGE) began the registration of favela residents. At the time, only 169,000 people were registered as favela dwellers. At this time as well, local politicians were realizing the threat that hundreds of thousands of discontent urban citizens posed in the democratic process, and began to take notice of the favelas. In 1955, the government formed the Special Service of Recuperation of Favelas and Un-Hygienic Habitations (SERFHA) in an attempt to gain political control of the masses that were continuing to flood into favelas. One of the goals of SERFHA was to establish community associations as a way to get residents involved in the democratic process, but in practice was a thinly masked attempt to consolidate political power to a privileged few. After the organizations

had been formed, community leaders could then be bought with political favors in exchange for swaying their constituents towards certain elected officials. While this was a fairly one-sided equation, favela residents were still given some semblance of political power, which may have contributed to the death of SERFHA and serve to expedite favela removal.

Robert Gay (1993, 18), when writing about political agency and development in favelas, writes “this [political solidarity among favela organizations] more than anything, that led to SERFHA’s demise at the hands of Carlos Lacerda.” Governor Carlos Lacerda, elected as governor in 1960, had begun his career arguing that favela management could not simply be grounded in eradication and repression, but Gay points out that Lacerda’s main intention in taking this stance would have been to garner the support of favela residents. His policy decisions reflected a markedly different belief.

Shortly after dismantling SERFHA, Lacerda began a “Favela Eradication Program” which, over the course of five years, demolished 27 favelas across Rio. This demolition was under the authority of the Cooperative of Popular Housing, or COHAB, that was formed with the purpose of urbanizing some favelas, but demolishing many more. This program provided Lacerda with the organizational power to begin the formal consolidation of favela power (Gay, 21). In 1967, the Inhabitants Associations, formed under SERFH, were declare by the municipal government to be under the control of the social secretary, essentially solidifying the political agenda that the local government has set in motion over the previous years (Minoja, 2011, 23).

Under pressure from local real estate interests, Lacerda began COHAB’s demolition in Morro de Pasmado, a favela in the south zone, which was seen as particularly dangerous. It was claimed to be “at a 50 degree incline” with conditions that were “terribly dangerous” and “extremely unsanitary.” Community groups accelerated this demolition process by facilitating

the smooth relocation process, which for the entire community of hundreds took only 26 days (Dulles, 2010, 56). Today, Morro de Pasmado is a small park bordered by high rises on the beach.

The residents of Morro Pasmado along with thousands of other residents displaced during this time were moved to a government built housing project in a remote section of the city, known as a Conjunto. Lacerda hoped that these new Conjuntos would be located near new industrial plants that were being built for steel and Iron production, but these were delayed because of financing problems. Shortly after the governor was implicated in several corruption scandals surrounding the purchase of generators to address the energy shortages and the issue of Conjunto employment was more or less dropped (Dulles, 65). What he had managed to do in one stroke was successfully remove the favelas from the prime beachfront real estate in Morro Pasmado and temporarily gain their support as a proponent of adequate housing.

While in retrospect it can be recognized that these policies were fostered at least in part by political manipulation, the policies that were being implemented represented the best interests and best practices of the city at the time. Favelas were viewed as a “cancer” in the urban fabric that needed to be removed and any policy had helped facilitate this would have been welcomed. It’s also important that before the conjuntos Favelas had never been addressed as a problem that could be fixed by providing housing. Favela residents may indeed, as Dulles suggests, have preferred at first to move from their homes to these conjuntos, and if the iron plant had been completed as planned it may have been a successful program. But without the economic follow through and the shoddy construction of the new homes, the program essentially was what most residents feared: a mass eviction.

In 1964, a coup d'état by the military overthrew the democratically elected government in Brazil. Strangely enough, under the military dictatorship favela life may have remained the same or in some cases actually improved. Janice Perlman, when interviewing favela residents about the time under the dictatorship claimed that they had even had more bargaining power during the dictatorship than after the return to democracy (Perlman, 2007, 202). This is probably because the dictatorship had little interest in the favelas and the issue was being addressed on a more local level. Public works and social improvement would have had little impact on elections, as the government came to power through a coup and was by nature, a dictatorship. After the destructive policies pursued by Lacerda, even a military dictatorship may have been an improvement. The downside was that the political will of the residents was no longer valued, and as was reflected in the policies undertaken by dictatorship. Even if they were an improvement they still demonstrated a lack of commitment to the citizen.

An important distinction to make is that though the dictatorship would have had an impact on local policy, the coup happened at a national level and would not have directly influenced favela policy. It's only relevant because as in most dictatorships it would have had an effect on local elections and national sentiment. In 1968, Francisco Negro de Lima, a member of the political opposition to the military, was elected into office as the governor of Guanabara State (Gay, 20).

Under Negro, The Company for Community Development, or CODESCO, was formed and was an attempt to improve favelas on site rather than through demolition and displacement. Under the program residents were not given land title, but they were told that they would not be evicted and were given low interest, long-term loans with which to improve their own lots. Essentially the project worked, and it was one of the most progressive projects that had been

initiated in the favelas. CODESCO would later form the precedent for the widely acclaimed “Favela Barrio” program.

Unfortunately the Military government disagreed with the policies of Negrao and CODESCO and formed Coordination of Habitation of Social Interest in the Metropolitan Area, or CHISAM, as a way to create a bridge between the competing interests of COHAB and CODESCO. CHISAM was in essence a favela removal project that destroyed almost 100 favelas, primarily targeting those in the South Zone for the high land values. Like COHAB, CHISAM placed residents in remote, shoddily built social housing that did not address the issue of favela formation but simply moved it away from the central city. Favelas in the city continued to grow, and residents who either could not afford the payments or simply wanted to move back into the city abandoned the conjuntos. In 1975, CHISAM was cancelled and marked the end of the age of destruction. Favela removal policies have widely been seen as an almost complete failure from a social perspective.

In 1977, Municipal Governor Marcos Tomoyo began to propose the concept of “re-urbanization” of favelas rather than demolition. Though this didn’t have much manifestation for several years, the concept of addressing urban poverty as a systematic urban problem rather than blight would shape the policy from then on. In the 1980’s, the program “Cada Familia, Un Lote” began, which was the first attempt since CODESCO at land titling projects in favelas. In the early 1980’s, after his return from exile under the dictatorship, governor Lionel Brizola of the Brazilian Labor party began to encourage on site improvements (Minoja, 26).

Because of a loophole orchestrated by the military party to maintain unilateral control, Brizola was able to come to power accompanied by many other members of the Brazilian labor party. Before the election, the party of the military dictatorship whom Brizola opposed had

passed legislation stating that any ballot, in order to be valid, had to “vote the ticket” or only support one party through all levels of the government. The idea behind this was that the strong candidate for governor, presented by the party of the military, would carry the vote, and therefore bring many members of the same party into lower levels of the election. This backfired when Brizola won (Gay, 30).

Brizola took a progressive and involved stance on urban poverty in the city. They oversaw education reforms, construction and infrastructure projects, and other improvement projects. The other side of this though, was that the focus of these projects was on small, highly visible projects in as many favelas as possible to guarantee the continued support, politically, of the labor party. Another tactic that the labor party used was to increase accessibility of favela residents to positions in the local government. Though this is probably a good thing, Gay points out that it served to politically alienate independent favela organizations and make it difficult for political organization in favelas that were not directly tied to the labor party. Gay’s main critique of the labor parties approach is that while it did support urbanization and regularization of favelas, it objectified the residents as votes that needed to be bought by favors.

It is clearly not ideal that there was little long term commitment to favela residents, but even still, this recognition of the power of elections provided a window through which favela residents were acknowledged as citizens of the city. This is an important point in the history of favela development, as it clearly shows the shift from viewing favelas as a “cancer” to recognizing them as citizens. Perlman even devoted a whole chapter to “the importance of being Gente (people),” in her book, emphasizing the importance to this recognition. Even though this may have objectified residents into voting blocks, it still gave the residents power within local government structures.

Favela-Barrio

The most recent development in favela policy is the "Rio de Janeiro Urban Upgrading Program," or as it is commonly known, Favela Barrio.

The objective of the program, as stated in the loan application to the inter-american development bank (IDB), is to "improve living conditions of the urban poor by upgrading basic infrastructure and increasing the supply of urban and social services in targeted neighborhoods" (IDB, 1995, 1). The Favela Barrio Program marked a distinct change from the cities previous policies on favela treatment, and for the first time acknowledged that Favela's had become an integral part of the cities population and could no longer be institutionally marginalized to the extent that they had in the past. In the loan proposal to the IDB, the city explicitly states that the program, "reversing previous policies of regarding favelas as an "urban cancer", the Municipality of Rio has accepted the fact that one fourth of its inhabitants deserve recognition of their rights as citizens, and should thus have access to the same services as other city residents. Instead of ignoring or marginalizing the slums, municipal efforts now focus on their stabilization, improvement, and containment" (IDB, 1995, 3). The program embarked on an attempt to comprehensively address the needs of the communities living in favelas, and attempts to "avoid a piecemeal approach" instead working on a community-by-community basis to address the needs (4).

The program covered several areas of improvement including social work and education, but for the purpose of this proposal I will focus on the infrastructural projects and hard construction that was made possible by the funding. Originally, the first phase of the project allocated 192 million dollars for favela upgrades and 48 million dollars for "irregular subdivision formalization. The original scope of the project was intended to cover 220 thousand people

living in irregular or informal settlements. As stated in the loan, this money was to be used on a case by case basis after discussions with community members, and work for urban development plans, water and sewage, drainage, street paving, planting trees, as well as assistance in gaining land titles.

The document also describes the allocation of funds on a per household basis. Investments costs per household should be, in the case of favelas US\$ 4,000 maximum and US\$ 3,500 average throughout program implementation. In the case of subdivisions, US\$ 3,500 maximum and US\$ 2,000 average. Exceptions to these values have to be approved by the Bank" (IDB, 9). The document also includes a list of "eligible investments" on which the banks money can be spent. These include construction of drainage systems, hillside stabilization, and reforestation.

The predicted benefits of the program were three fold. The first was the improvement of homes and living standards of favela residents. The second was the recognition that by improving the living conditions and quality of life in favelas, the stigma associated with favelas in Rio would decrease, leading to a rise in tourism. The third was the most cohesive. The idea was that the tools presented in the program would offer an example for other governments dealing with similar situations.

Stage Two

The first phase of Favela barrio was widely viewed as a success, and a second proposal was sent to and approved by the IDB. In the introduction of the document, the first phase of favela-barrio is described as a "new paradigm for integrated urban interventions" with "controlled costs and a great rate of effectiveness." It goes on to say that between 82% and 99% of residents living in affected commentates were satisfied with services that were covered under

the program, such as paving, drainage, and lighting, while only between 33% and 60% of residents were satisfied with those same services in un addressed neighborhoods (IDB, 3).

The second Phase of the project requested and received as loan for 300 million dollars, and was planned to reach approximately 206 thousand more people living in informal settlements. Additionally, around 100 thousand people would receive social benefits, such as land tenure and regularization of subdivisions (10).

Stage Three

Again, this program was such a success that the city government continued the project after the second phase had been completed, with the "Rio De Janeiro Low Income Neighborhood Urban Development Program Stage III." The Third phase Loan Request Claims the since the programs implementation, over 137 thousand families had benefitted from the program. With the success of the other two stages of the program, the third stage of the program is beginning to deal with some of the issues that the other stages had not dedicated much attention to. One of these issues is the vertical and horizontal expansion of favelas, which, while beginning to become integrated into the formal city, are still by definition informal or illegal settlements. Another one of these issues that they are still dealing with is the problem of land titling. According to the document, once the government has granted them some form of permanency in their residence, many residents do not seek full responsibility of their land. Kenan Hazdic suggests a whole host of problems associated with official land titling of illegal land in his article about the conflict between legal tenure and development in the program, but I will discuss that in another section. The third phase of the program would affect an additional 30 neighborhoods, and impact roughly 100 thousand people.

Criticism

Janice Perlman, who I've quoted before, worked extensively in the favelas of Rio De Janeiro over an extended period of time, and commented on the successes and failures of the Favela Barrio Program. "In the case of Favela Barrio, regardless of how much was spent on urban infrastructure, paving roads, dredging and cleaning canals, building open plazas, and introducing urban design elements, it did not succeed in integrating favelas into their surrounding neighborhoods. There is no doubt in anyone's mind where the *asfalto* ends and the *morro* begins" (281). She also noticed "there was little sense of community pride once the construction crews left the sites and the project offices were closed." This shows that while the intentions may have been good on the part of the city, their actions, while certainly an improvement on removal, did not seriously take into account the social needs of the residents. This is a major issue facing more or less anyone trying to "improve" areas that are disadvantaged. William Easterly's book, sarcastically named *The White Man's Burden*, is dedicated almost exclusively to how to approach this issue. Perlman notes that many of the day care centers that had been constructed were left unstaffed because the communities could not afford to staff them, and the gutters that had been cleaned just filled up with garbage again after several years because there was no sense of ownership or responsibility.

One of the major failings of humanitarian missions in the developing world, Easterly argues, is a lack of accountability. Millions of dollars are spent every year to attempt to improve the living conditions of disadvantaged people, but no one is held responsible. His critique is if no one takes responsibility for the failures of humanitarian programs, there is little incentive to ensure meaningful improvement. As is fairly clear, the program obviously had enough success to

warrant a second and third stage, but in the eyes of Perlman, who I am using in lieu of personal experience, in some areas it did not take hold in the way that it was supposed to.

Favelas and the Environment

A popular contemporary argument for favela repression relates to the environmental impact that favelas have. Since their inception they have been expanding into the marginalized pieces of land, which are often the same pieces of land that have historically been Atlantic rain forest. This increases the danger of landslides as less and less water is absorbed by the natural hillside, as well as leading to increased pollution in the runoff, polluting the bay. Fifty years ago the forests and hillsides would have absorbed 70% of the rainwater runoff that hit the hillsides. Today that number is 30% (Godfrey, 2010, 379). Runoff from favelas is also often the most polluted because of the lack of formal sewage systems. This, paired with the general visibility of favelas, makes them a scapegoat for the environmental issues facing the city. Deforestation and runoff is inarguably detrimental, but this argument that frames favelas as the sole perpetrators of deforestation creates the false image that if there were no favelas, there would be no deforestation or runoff.

A tactic that has begun to gain momentum has been the construction of walls around favelas to prevent further expansion. Eleven walls have been started and are in various stages of completion primarily, as with most projects, in the South Zone (Minoja, 30). This is an attempt at containment, which is essentially a cosmetic fix to a structural problem. This places the blame for these environmental issues directly on favela residents, which as I've examined is extremely problematic.

Is this degradation the fault of favela residents? Yes and no. The encroachment into forests above the city is indeed a direct result of favela expansion, so in the most immediate

sense it is, but this expansion is a result of inadequate low income housing in the city. As I've established, the residents of the favelas are residents of the city, and as such are entitled to adequate housing. Even though the city is not directly responsible for these expansions, historical trends have shown obviously that these neighborhoods will continue to expand, implying this issue has been apparent for some time for those who cared to look. In addition, it is unclear in what ways is this expansion different than sanctioned deforestation to make way for the formal city. Is this informal expansion not in a way an expansion of the workforce of the formal city? Studies have shown that almost 20% of the city lives in these communities, so to view the problem as that of the favelas would signify that the city is not taking responsibility for the expansion of 20% of its inhabitants.

Contemporary Context and The Impact of the FIFA World Cup and the Olympics

In October of 2007, Rio de Janeiro was confirmed as the host of the 2014 FIFA World Cup. This is a monumental event for the development of the city for a number of reasons. The first is the economic effect that hosting a global event such as the world cup brings. In order to prepare for the event, Rio has been investing millions of dollars into stadiums, urban infrastructure, and airports to facilitate the event. The second effect is the global attention now aimed directly at Rio. Not only does Rio have to accommodate the thousands of people who will be making the pilgrimage to Rio, it also has to present itself as a clean, effective, and modern city.

In October of 2008, one year after the announcement of FIFA's decision to give the world cup to Rio, the UPP pacification program began with the intent of pacifying historically violent favelas and establishing a government presence. Though the program is intended to eventually affect all favelas, the first to be pacified were clearly chosen because of their high visibility and locality. The first pacification took place in the favela of Santa Marta, where the opportunity for publicity as well as its prominent location in the south zone made it ideal for a pilot project.

Pacification happens in several stages. The first involves the Battalion of Special Police Operations (BOPE), a militarized branch of the police force that moves in and takes over favelas by force. The scale of these raids is hard to overstate. These are military scale invasions, involving extensive air support as well as armored personnel carriers (APC's) and other heavy vehicles (Glenny, 2012). Footage of these invasions is available all over the web, from the surreal scenes of huge vehicles moving through cramped streets accompanied by scores of police

to intense firefights between gangs and the police. In one instance, drug gangs even managed to shoot down a police helicopter (World News, 2010).

The second stage of the pacification program involves installing Police Pacification Unit within the community. The purpose of this is to establish a permanent police presence in the community that has been lacking. These programs have been extremely effective in removing drug gangs control in the favelas where it has been implemented, though criticism has arisen over the complete lack of community input into the process.

In October of 2009, exactly one year after the pacification program began, Rio was chosen to host the 2016 Summer Olympics. These events indicate that Rio is attempting to change its image to establish itself as a global city and is in an increasingly ideal position to do so. While in many ways this is good for the city, it is also fundamentally changing the relationship between the city and the favela. These structural changes brought on by pacification though are having an adverse effect on the residents of favelas. They are become viable and valuable real estate markets.

With the boom in real estate associated with international events such as the Olympics or World Cup, places that were historically marginalized because of the populations who lived there are becoming more and more attractive for investors. Gentrification is becoming an increasingly imminent threat to the existence of many favelas in the South Zone. With open demolition no longer a publicly accepted option, people are attempting to buy up land in some of favelas located on prime real estate.

Vidigal, located just south of Rocinha, is one of the favelas that has exceptional views of the ocean and beach. Since the pacification in November of 2011, the threat of violent crime has greatly reduced, and the livability of the neighborhood has increased dramatically. While this is

unquestionably beneficial to both the residents and the city, it has placed the residents in a precarious position that now their neighborhood has become more attractive to people seeking to buy land. Through a series of local newspaper articles may available on "Rio On Watch," a website devoted to community reporting and a informal community awareness in Rio, it is possible to see the progression from a pacified community to a community at risk from outside investment. Tourists are now even showing up in the wake of the pacification, and residents are even renting out rooms to tourists (Albanese, 2012). Now even foreigners are attempting to buy up land as they recognize the potential in this prime real estate. Homes are even being threatened with displacement and plans to put in luxury hotels are beginning to gain traction (Fox News Latino, 2013). On the one hand, pacification has led the community to relative peace, but on the there it has clearly led to the infusion of the state into the community in a detrimental, and possibly destructive way. Though the process of gentrification in the whole of Rio de Janeiro is complicated, and in many cases not yet occurring, it's clear that these neighborhoods are not only threatened by violence of drug gangs, but from the peace that UPP provides. In the words of Rio's State Security Secretary José Mariano Beltrame, "[Vidigal] didn't exist, now it exists" (Albanese, 2012).

Favelas are now also being destroyed in areas that the city government claims that it needs for infrastructure related to the upcoming global events. Favela do Metro has been in the process of being destroyed since 2010 and is being destroyed in phases. Based on reports from Rio on Watch, the government began with displacing those most susceptible to manipulation, elderly and "more fragile" members of the community in the beginning. The advantage to this strategy is as these families move out they are able to destroy their homes, creating more and more reason to remove the rest (Faigen, 2010). Since the demolition of the first rounds of homes,

the government has reduced public services, trash collection, and public transportation to the area. There has been an influx of homelessness, drugs trafficking, and crime, and most of the businesses have shut down. Residents are being relocated to the west zone of Rio, several hours by transit away from their old homes. There has been resistance, and neighborhood associations in cooperation with the church have been resisting, but of the 700 families that originally lived in the neighborhood, only 65 remain. The cities plan, it is rumored, is to place a parking lot on the site of the old neighborhood that would service a stadium for the world cup (Seigel, 2013).

Favela do Metro is not an isolated event, and as the Olympics and the World Cup draw closer more and more favelas are under pressure to move out of site of the international community. Vila Autodromo is another example of the governments attempt to relocate people not through forceful expulsion but by taking advantage of the communities lack of knowledge of their legal rights. The community of Vila Autodroma has been displaced before, and in an agreement in 1994 with the city government finally secured land tenure for 99 years on their current location. Now with the Olympic park being constructed near by, members of the local government are attempting to encourage residents to move to a condominium off site. Members of the local government attempted to go through the community passing out pamphlets encouraging movement and talking up the advantages of the new housing developments, but they were followed by members of the local community who were explaining citizens to remain on site and encouraging them not to sign anything. The issue hasn't been resolved yet, but community organizers are hoping that the process can be resolved peacefully without the use of intimidation by the government (Steiker-Ginzberg, 2013).

Even of this rapid land grabbing is only threatening a few favelas located on more prime real estate, the issue of land tenure and rights of occupancy are not limited to them alone. One of

the more controversial issues that development programs working in favelas are working with is the issue of land tenure and legal rights to the land. Much of the land that favelas sit on is not owned by the residents. Often it is public land or unused private land that has been more or less abandoned where people take up residency.

As a result, the government is faced with the problem of how to regularize informal settlements that sit on illegal land and have no legal claim to the space they occupy. In my own experience working with government agencies in Colombia, one of the main hindrances to the execution of similar programs was the government was not able to allocate funds to improve homes that the owner had no deed to. According to local officials and members of the NGO I was working with, the government had experimented with land grants, but found that due to corruption, land titles would often end up in the hands of those closest to the people granting the titles.

In addition to local corruption, Rio is also dealing with the fact that in many favelas, the price of land is actually becoming valuable in a meaningful way. I addressed the issue of outside real estate interests, but another facet to this issue come from the residents themselves. Many of the residents could not afford to live in formalized real estate economies. Kenan Handzic points out that land tenure actually undermines the efforts of favela barrio by putting monetary value on plots of land rather than community. He backs this up by pointing out that Brazil already has "very strong squatters rights, stating that if someone can prove uninterrupted residency on a plot of land 250 meters square or smaller, then they gain rights to it after only 5 years according to Brazilian Law. His point is that if people have legitimate claims to occupancy, they can seek legalization of their land rights on their own.

Full legalization does a number of things. The first is that it opens up land in favelas for formal taxation. People in the most at risk areas in some cases can't afford this. The second is that it opens up favelas to the open real estate market and speculation. In the loan proposal to the Inter-American Bank, the city of Rio De Janeiro claims that "In terms of the impact on property values, the result of the estimation of aggregate impacts showed that the value created by the interventions, equivalent to US\$390 million, far exceed both direct investment costs (US\$257 million) and the cost of the program as a whole" (IDB, 14). It's clear that if we believe these numbers the program is obviously effective in increasing property values and having a meaningful impact on the city, it does create a strong incentive for external markets to begin to take interest in the land.

What Handzic proposes is granting rights to the land, but not ownership. This ensures that people will continue to improve their homes as the surrounding landscape improves, but no longer face the threat of eviction. As the Favela Barrio Program points out though, at some in the integration process there needs to be the regularization of land titles, and for this purpose the program allocated 18 million dollars in the most recent stage. In light of the current real estate boom, land rights without legalization are potentially the best option for favelas.

The Contemporary Favela Citizen

With the upcoming World Cup and Olympics, the government has committed to spending millions of dollars on public infrastructure in the form of airports, improved public transport, and roads, but this is disproportionately affecting the 80% of the city that will directly benefit from hosting these global events. This is the business class, real estate interests, hotel owners, and people who make a living selling a clean image of Rio. According to the Seven Pillars Institute, research suggests that these kinds of global events primarily benefit the wealthy

(Sheridian, 2013). While there will definitely be some effect on favela residents such as an increase in manual labor jobs related to the construction of this infrastructure, they are likely to feel much less of this economic boost than wealthier residents. This undoubtedly will serve to further alienate favela residents from the new vision of the city.

Of the millions of dollars that the city is spending on public infrastructure related to the upcoming games, one can expect that the amount spent on the average non-favela resident can vastly exceed that of the largest favela project ever conceived. The guardian estimates that London spent over £9 billion during the 2012 summer Olympics (Jenkins, 2012). The Seven Pillars Institute estimates that Rio will spend upwards of \$16 billion. That works out to \$2,500 per person over the course of the event. Favela Barrio, when broken down, only results in around 900 million dollars over 20 years. With current favela population estimates at 1.3 million, that works out to \$692 dollars per person over the course of 20 years, or a little over \$34 a year. Though the policy has shifted towards a more inclusive model, it's clear that favelas are still not seen on the same level as typical citizens. Though the city is encouraging economic growth and attempting to grow the city into a modern metropolis it still hasn't fully reconciled the role of the favela resident in the larger context.

Formation of the Favela: Architecture of the Informal

Sustainable Living Urban Laboratory, SLUM LAB, has released a number of documents proposing the process through which an architectural intervention should be conducted. They have compiled a list of tactics to use when beginning the process of implementing targeted urban improvements. “Understanding morphology” is placed third on their list and is particularly important in the case of this design proposal. This section is dedicated to understanding the physical construction and growth of favelas.

One of the major limitations of this proposal is that it is not designed for any favela in particular. It would be impossible to attempt to understand the urban dynamics of a given favela remotely, and since that has not been possible, I have instead chosen to deconstruct a series of favelas through histories and photos in an attempt to understand how a "generic" favela forms.

This section is divided into three parts: The Neighborhood, the Street, and the Home. These three scales are the three scales towards which the interventions layer out in the rest of this proposal will focus. The culmination of this is illustrated in figures 1 and 2 in appendix B.

The Neighborhood

Appendix A Figure 1 is an aerial image of a corner of Rocinha near the tunnel Zuzu Angel. This shows a number of elements of favela construction that will become important in the designs I present. This first thing this highlights is the dynamic nature of the favela. Each favela is constructed through thousands of individual designs stacked on top of each other and packed in next to each other, and this random and organized relationship between space and resource



Figure 1. Aerial image of Rocinha near the Zuzu Angel tunnel. Google Earth.

becomes clear. The second is to show how little space there is that is not occupied by housing in these neighborhoods. Every available piece of land is occupied.

These neighborhoods are also a reflection of the different time scales that are important in the logic of these favelas. Density is an important element not only because land is scarce but also because more density means less chance of eviction. Gabriella Sorda, faculty at the University of Buenos Aires, points out that because there is such a high risk of eviction and a history of demolitions and displacement, one of the central ideas is quick density, the logic of this being that if there are many people packed into an area, the likelihood of eviction or neighborhood demolition is decreased. This is evidence that while slum razing has fallen out of style, the logic of the neighborhood still remains.

The Street

Figure 2 is another image of Rocinha. This photo was taken from Google street view outside the mouth of the Tunnel Zuzu Angel that cuts underneath the mountain. I've selected this image because it gives a unique cross section of the settlements progression up the hillside.

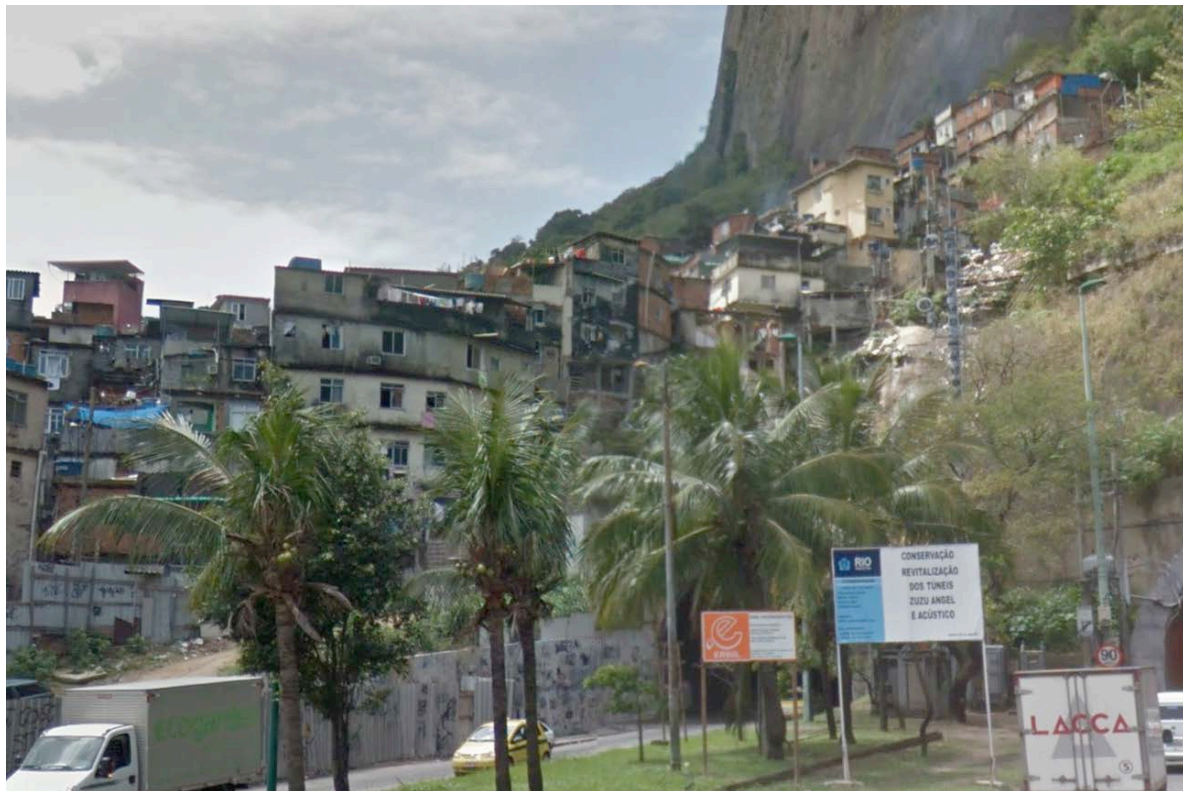


Figure 2. A street view image of the same area taken just before the road disappears into the mountain. Google street view.

What becomes apparent from looking at this image is that the favela is expanding farther up the hillside into the steeper and steeper real estate that becomes increasingly unsafe and undesirable, and as it does, the houses become cheaper and less permanent. These are the most at risk homes. As Perlman points out in her critique of Favela-Barrio, many of these people don't get access to government regularization projects, as they are too far away even from the favela cores to be integrated into the formal city. Not only are they farther away from infrastructure and basic services, but they also are at a higher risk of landslides and other natural disasters. These are most likely the homes with the least land security and least resources to improve their own

homes. Since they are so precariously perched atop the hillside, any expansion creates additional risk as well.

Farther down, the homes become more established. These are the homes that have had time to develop, have had money invested in them, and apparently have relatively secure land rights. Without it, there would be little incentive to build a five story concrete apartment, as can be seen in the center of the image. Farther left, it becomes clear that there has been an effort made to begin creating a positive image of the buildings as well.

As I've mentioned, Rocinha is one of the largest Favelas in Rio de Janeiro. It is also located in the Southern Region, near the wealthiest part of the city, and has been pacified by the UPP program. The changing imaginary of the favela is illustrated in this image as well, and it's clear that even though the favela still exists in the sense that it has been stigmatized for (poor construction, precarious location, crowded) it's also changing. Why this image is particularly interesting is it encapsulates all of this change into a single streetscape.

In Figure 3, I've abstracted the image. I've done this to extract an architectural section from it in an effort to create a generic favela. Since so many of the stages of formation and formalization are encompassed in this one image it gives the perfect cross section from which to create an ideal situation to address each stage of development. I feel that it is safe to say that no matter how much the city works to integrate the favelas into the larger urban context, there will always be marginalized urban residents that do not reap the benefits of integration efforts. As is evident by the fact that the favelas are still growing there is still a huge demand for cheap, if unofficial housing in the city. What this creates is a gradient of the different stages of

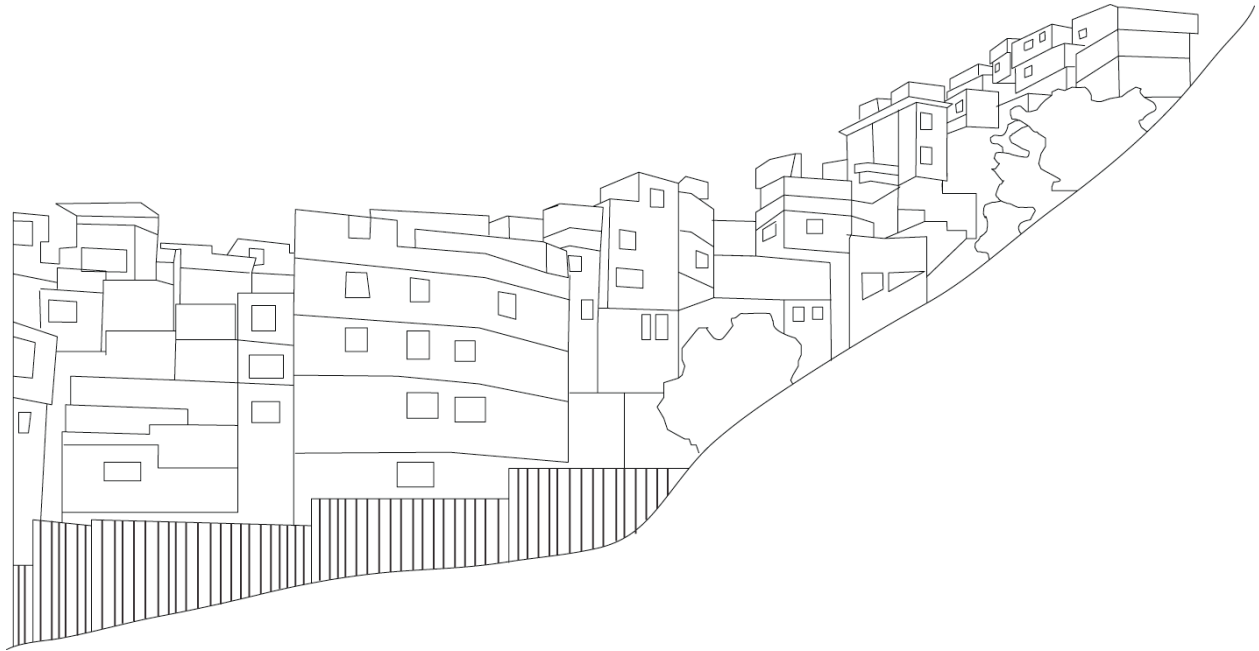


Figure 3. Abstracted view of the same street scape

development, and what I'm trying to extract is a cross section that expresses all of these into one cohesive image. Since the effort to integrate the favelas into the formal city is an ongoing process, I hope to outline an architectural strategy that addresses this as a process.

The Home

Looking at a favela it can be seen that more or less every building is a variation on the same theme. Even though favelas are the result of thousands of individuals constructing their own independent homes, there seem to be strong central principles in the nature of the architecture. Even across national lines, and throughout the region, many of these informal settlements visually look cohesive. This is an illustration of design by example, where the precedent for new structures builds on the knowledge of the structures that already exist.

It's important to keep in mind that this is not chaos created by desperation. These developments and homes are the result of the best possible combination of materials and spaced available. Som Sook Boonyabancha, the founding director of the Asian Coalition for Housing Rights, describes this style of home and neighborhood as representing "the best people can do with extremely limited resources," they are "*a reasonable and ordered* response to urgent necessity" (2009, 62, emphasis mine). Photographer Pedro Lobo (2013) has created an interesting photo journal called "The Architecture of Survival" which I believe expresses the style well. His images cover a series of favelas in Rio de Janeiro, and it's clear that each one capitalizes on their own environment, means, and resources that best create a living space and home for these people and families. The huge array shown by Lobo is certainly indicative of the process of construction, but as a whole there has been a style that has emerged. Bricks, concrete, and tin have proven to be the cheapest and most effective means of efficient construction. I spoke with a man in Colombia complaining of the cost of restoring a historic plaster and Daub building, because "just throwing up a brick wall would cost twenty dollars and be done in three hours." Brick is cheap. Tin is Cheap. Concrete holds it together. What this says is that given the proper resources and opportunities, people will make the best possible home with they have. This is an important point in the core concept of this design, as I will describe later.

These homes are the quintessential expression of functionalism, and in a way express many of the ideals of modernist architecture. They are rational responses to the programmatic needs of the families living in them. The Sao Paulo Architectural Experiment (SPAЕ) has done work analyzing these structures as a way to understand the way that communities form, and has found the families themselves to be often directly involved in the construction of the home. One of the connections they found was a correlation between the size of the home and the size of the

family (Brillembourg, 2008). This seems obvious, but when homes are constructed in pieces, this indicates that more and more pieces are added to accommodate more members as they move in, and as is evident in the photographs I've provided, are often added piecemeal as they are needed.

The key principle here is that favela homes and communities are built in stages. As the demand for housing increases in the favela, and the land decreases, people build up. One of the issues raised in the outline of the Favela Barrio program description was the uncontrolled vertical expansion. Many of these homes have gone up four or five stories when it's clear that architecturally, they would barely be considered stable at one. As you can see in figure 4 of appendix A, this home in the favela of Santa Marta has gone up 5 stories, all independent of each other as can be seen in the brick work and the wear on each floor. In addition, the home is continuing to be improved upon as the families in it have the opportunity. As you can see, on the fourth floor, a hole for a window has been layer in the original brickwork, but filled in until a window is installed.

It's also clear that this home was fit very tightly into it's environment, built sometime after the tram way was installed. This is particularly enlightening when it's considered as an indicator of the nature of growth in favelas. These insanely dense neighborhoods are characteristic of many favelas where people have adapted to fit in wherever they can. This has led to series of issues, not the least of which was lack of access which in part led to the criminalization of favelas, but also lack of urban infrastructure provided to these homes.

What can be read into these observations that is a fundamental principle in the designs I've proposed is that residents are improving their own homes as they can. The window in the home I just referred to at some point will probably be installed, the plaster on the first, third and fourth floors will probably be finished, and it will eventually make less of a shocking photo. This

is one of the reasons that favelas are beginning to be considered to be integrated into the formal city is that they have become established enough that it is no longer possible to see them as anything other than a city. This consistent investment undoubtable is in part fed by Brazil's strong squatter laws, which give some semblance of permanence to the residence and motivation to invest in their homes.

Based on this information I have created a context, shown in appendix B figure 2, that is a generic section of a favela. To further illustrate this point, I've taken a panoramic photograph of Rocinha and highlighted elements of individual houses and architectural decisions (appendix B, figure 1), and brought them out in my drawing. Highlighted as well are the different zones of favela expansion, as well as the high-risk areas where this project would be located. I will expand more on this drawing when talking about the individual elements of design.



Figure 4. A home in the Favela of Santa Marta.

Precedents

There are many precedents in architectural interventions in favelas, as well as relevant policies, but I have selected two to highlight in detail because they particularly well illustrate the built form as a precedent and the conceptual model of the policy that I have attempted to design. While both attempt to improve the lives of the residents, one is a solid, architectural approach that sees strong built community centers as a way to influence the surrounding neighborhood while the other attempts to inform, educate, and empower residents to do it themselves. I have attempted to do both.

Grotao Community Center, Sao Paulo

Urban think tank (UTT) is one of a few architectural and urban firms that is beginning to address the issue of informal development in cities. Their work attempts to look at the ways that the informal city interacts with the formal city and the consequences of this interaction. In addition to their architectural work, both founders, Alfredo Brillembourg and Hubert Klumpner also founded Colombia Universities Sustainable Living Urban Laboratory (SLUM Lab), which is one of the more prominent architectural groups looking into growth and architecture of favelas in Brazil (Berg, 2011).



Rendering of the center. Urban Think Tank, 2013.

The work of UTT includes infrastructural improvements, such as a tramway into Caracas, Venezuela, modular staircase designs that can be implemented anywhere where access due to topographical constraints is an issue, but also extends to more extensive work, such as neighborhood re-habilitation and design in Holland. Their work focuses on "architecture's failure to define informal urbanism and its effects on the city" and attempts to grapple with it's growing effects from a variety of perspectives (Urban Think Tank, 2013).

They have three main points of approach that guide their designs and interventions. The first is humanitarianism. The group attempts to look at the issues facing informal communities and interventions that can improve quality of life. The second is theoretical. They purpose of this is to understand the dynamic processes that shape the built environment of informal communities. The third is design. They see the informal as a "laboratory for the study of adaptation and innovation."

What is crucial about Urban Think Tank and other firms working in favelas is that they abandon the top down approach taken by many of the earlier attempts at favela improvement. They don't, as the conjuntos attempted, remove people from the lives they have created and form alternative "better" situations, but work to improve the situations that exist. As will be illustrated in a moment, the design for the Grotao Community center in Parisopolis, Sao Paulo, is one of the most contemporary architectural interventions into a favela that illustrates many of the key principles of tactical urbanism and the approach of the Urban Think Tank.

The Center

The Grotao community center and park, when built, will sit on an area that is extremely susceptible to landslides and flooding in Parisopolis. The area itself used to be housing that was torn down, either by a landslide or flood which is not uncommon in or because it posed too much of a threat of doing so. In either case, the housing was removed before the design proposal, leaving a gap in an otherwise extremely dense urban environment.

The Group has designed a series of "vertical gyms" that are exactly what they seem, as well as music schools that have been integrated into informal communities around the world. The point of the vertical emphasis is to be able to fit a large, programmed space into and otherwise high-density environment that could not accommodate a conventional project of that size. In the case of Grotao, there is an extremely limited space that can be manipulated to accommodate the program. As a result, they built up.

The building serves as an infrastructure hub, providing access to city transportation systems, park space, music school, soccer pitch, and even housing. The Ground floor is a soccer pitch and basketball court, contenting the park from outside, and then above is a music school complete with practice studios, classrooms, and performance spaces. The upper level provides

housing for those displaced from high-risk zones, and presumably those displaced from the site that the building is built upon.

The exterior shell continues the visual themes of the surrounding neighborhood, and fits unobtrusively into the tight area that it's been placed into. While the building does provide a series of programmatic options, it does so while not intruding upon the neighborhood and community either through its built form or by displacing those around it. It accommodates the needs of the specific community while not providing a genetic solution. It becomes part of the neighborhood.

The genius of this building is that it provides a community wide program without the need of community wide intervention. One of the most important aspects of this building is its visibility. Visibility is extremely important in the socio-political side of favela upgrading programs. People need to see improvements both for them to work and for them to continue to happen. As I've shown, the Favela of Santa Marta is one of the most blatant examples of this. What this visibility does as well is validate and empower the surrounding community. This building is a representation of the changing conception of the favela from a slum to a neighborhood, and this provides a tangible, built form that embodies this sentiment. It also provides a focal point for the community. One of the complaints that favela dwellers have voiced is the lack of parks or public spaces within their neighborhoods. The reason for this is that every square inch of space has been taken up by housing. This building provides for both.

As I've mentioned, UTT believes in informal communities as "laboratories for the study of adaption and innovation," and have capitalized on this theme in this building. The space has taken the many overlapping programs of a dense informal environment and combined them into this multifaceted structure. While I am a little skeptical of the feasibility or utility of providing a

music school in the middle of a favela, the conceptual framework with the building operates is what makes it important. A criticism of the Favela Barrio program was that it didn't provide a sustainable model for keeping the daycare centers and schools it built staffed, and it is quite possible that this building may suffer the same fate, but at the same time, that is not a legitimate reason to stop building schools.

Urbanism Manual for Precarious Settlements

In 2009, faculty at the University of Buenos Aires release the *Urbanism Manual For Precarious Settlements*. The document was made as a way to create a comprehensive guide to urban development based on the needs of informal and illegal communities, and outlines legal structures, urban planning codes, and building techniques that are often ignored when building slums. The document was produced when members of the faculty of architecture and urban studies at the University of Buenos Aires began a community outreach program into the slums and realized there was a lack of comprehensive knowledge on the best practices of how a slum could or should be built. Though this is a contested field, faculty put together a document in heavy cooperation with community members, that attempts to outline some of these practices.

The document is a 95-page, simply drawn and comprehensive book on sustainable urbanism. It includes sections on the formations of soil and the different typologies of soil and their effects on foundations, reforestation and conservation principles, legal frameworks from the city about construction regulations, the correct formation of city blocks, appropriate distances from telephone lines, trains, streams, drainage canals, parks, public spaces. The document covers more or less all of the aspects that could be influential in the formation of a healthy community. There is an index in the beginning of the book that delineates symbols for the different themes in the book and in each section there are paragraphs superimposed on the diagrams with pictures of judges, signifying a law or legal reference or cautionary images to indicate things that should be avoided.

The graphic approach to the booklet is simple. The entire book is filled with diagrams and illustrations drawn in a hand drawn, yet easily readable style that is visually accessible to a wide range of people. One of the struggles the authors had was the challenge of creating a visual

style to the document that was without being patronizing. Slum dwellers, architect Gabriela Sorda points out, are often not accustomed to reading complicated legal documents, so the manual had to present them in a way that was accessible, but in a way that didn't undermine their agency as capable citizens.

The booklet also attempts to deal with the social issues that influence the built space of the community. One of these issues that the booklet was created to address was the different time scales that slums operate on. In many slums, the driving force behind densification is to cram as many people onto a given piece of land as possible to avoid eviction. This is a perfectly logical defense mechanism, as many places lack the progressive legislation of Rio, but leads to difficulty in creating healthy urban spaces in the long run. This manual was intended to operate on this scale, and give people the opportunity and the knowledge to develop without the need for urban interventions at every stage of development.

A major thematic element of the booklet is its emphasis on maintaining the uniqueness and character of the individual communities. Though there are certain regulations and ways to create communities that are better than others, the nature of the individual slums themselves are not something necessarily to be hidden. Slum dwellers' self-perception is often that they have to assimilate to the formal city to begin to become integrated, a perception that is perpetuated by slum razing projects. But this gets rid of the uniqueness of the individual neighborhoods. The booklet argues that it is not a means to assimilate slums into the formalized city, but to improve the quality of life while still maintaining the communities that form them. The book is not copyrighted, and has been very successful within the communities where it has been distributed.

The major benefit of this book is that it allows communities to expand and improve upon themselves. It empowers the community and the individual residents to improve their own

quality of life without the intervention of the state. The state does play a crucial role in validating the citizenship of residents, but in this case, the absence of the state or any intervention is what makes it especially powerful.

This is also an important conceptual leap from traditional slum improvement projects because it fundamentally accepts that slums will continue to grow. Though the mentality is shifting there is still a consensus that slums are something that need to be shrunk and fixed rather than being accepted as part of the urban process. This accepts slum growth as a normative condition of urban expansion and is able to work within that new framework in a way that the state is still struggling to accept.

This is problematic from the perspective of the state because often city governments have not yet made this conceptual jump, which creates tension between the slum residents who have recently been empowered by this document and the state that still sees the slum as something to be removed or hidden. Even though in ways it begins to alleviate the responsibility of the state to “deal” with slums and informal communities, it also legitimizes slums in a way that could not be accepted under state control. One of the important elements of survival in favelas that I talked about in an earlier section was the relationship between local politicians and constituents within favelas that this document undercuts. With the state no longer responsible for the improvement of settlements, and with increased resident agency, threat of eviction becomes less of a political threat. This fundamentally changes the dynamics of power between the state and the favela in a way that is in the best political interest of the state to maintain. Though it “frees” the state from having to manage favelas, it also frees them from holding improvements over the heads of residents for political influence. A document like this presents a window into a different social hierarchy that is still controversial.

A design like the Grotao Community center maintains the dichotomy between the state and the favela and even though it is unquestionably an improvement for the favela as a whole it maintains the state in a position of power to impose upon the neighborhood. It is impossible for a favela to raise the funds needed to create something like the design that the Urban Think Tank has presented, so this perpetuates the position of the favela resident as the recipient of external support. This is not to undercut the importance of state intervention, it's role in creating a sense of responsibility for the citizens of favelas is crucial, but it's also important to recognize this relationship when thinking about create new interventions.

The reason this document was included as a case study along with the Community center was as a precedent to the conceptual framework under which this design operates. It attempts to capitalize on the importance of the state's presence to the citizenship of the favela residents while simultaneously promoting their own agency as individuals.

The Approach

Tactical or Targeted urbanism

This project falls into a school of thought broadly known as “tactical” or targeted urbanism. The main idea is that urban communities do not need broad planning to improve, but rather small and targeted interventions that improve on existing structures. The project “Design with the other 90%” displays a large number of these types of interventions, including integrated stair systems, pocket parks, and painting projects that capitalize on the resources and skills available to improve quality of life. Many of these projects even just include the formation of community groups to create a sense of solidarity in these neighborhoods.

William Easterly notes that there are two general schools of aid an intervention: the Planners and The Seekers. The Planners, he claims, think of plans from afar, large wide sweeping interventions that re-structure systems to meet larger ideals in a way that can be seen as progress. While good intentioned, many of these programs fail because they don not respond to the local needs in a comprehensive or meaningful way, but rather impose their views on people who don’t necessarily want those same goals. The Seekers, on the other hand, are those on the ground who respond to the local needs and make things work as they are relevant on the ground (Easterly, 2006).

SLUM Lab is one of the groups that is studying ways that this kind of urban design can be implemented, and the process of development when viewed through this lens. One of the important aspects is that except in very specific cases, the homes of the residents are not improved by outside designs. Milton Braga, as quoted in their publications “Informal toolbox,” claims that individual homes do no need immediate attention in the upgrading of informal settlements. What needs to be improved is infrastructure to integrate theses commentates into the

formal city in a more meaningful way (Braga, 2008, 34). Studies have shown that people tend to invest and improve their own homes when threat of eviction is removed, and when the surrounding neighborhood is improved. What this shows is that while some homes in the most at risk areas may need direct attention, for the most part, the most effective way to improve the quality of housing and the quality of life for residents is to improve the setting where they are situated (Werthmann, 2011). Through targeted interventions, it is possible to improve the overall quality of life in a neighborhood without actually doing anything for the individual homes. This is both cheaper for the investor, or whoever may be funding the project, and more sustainable as it allows for much more flexibility for community use. Edgar Pictorse, director of the African Center for Cities at the University of Cape town describes this sentiment eloquently. "Innovation arises when activists and entrepreneurs respond to the practical needs in ways that also people to bring their own creativity, cultural ownership, and sweat to the endeavor." While this can pertain to a whole host of interventions, I will look at it through the lens of architectural and design solutions, which include public space and infrastructure within favelas.

One of the issues with this approach to infrastructure and public space though is that while landscape and environment may be a key to low investment high return upgrading, it is least viable in the most cramped, developed neighborhoods. As Christian Werthmann, professor at the Harvard Graduate school of design in landscape architecture, points out, this creates an interesting paradox where the communities built on the least stable or most risky environments have the most potential for interventions and have demonstrated the most successful results while areas that have been more formalized, such as the much more established Rocinha, provide a more difficult environment to work in.

This density of social interactions also creates a whole host of sustainability opportunities that can only be realized in dense urban environments. As SLUM Lab succinctly phrases, "Density permits an effective use of resources and space. A compact urban fabric also stimulates social interaction, reinforcing the creation of networks" (SLUM LAB, 28). This leads to the conclusion that though these neighborhoods are stigmatized because of pollution, crime, and state of development, they also reflect many of the positive aspects of contemporary metropolises.

This project is framed in the conceptual approach of tactical urbanism and the Seekers. It attempts to utilize the favelas density as an advantage, and looks to create small, highly visible interventions that have the highest impact on the surrounding community. It attempts to serve as a precedent, rather than an intervention that places the burden of community development on the residents themselves to improve their own homes when possible. It attempts to create an example as a sustainable solution to a number of challenges that favelas present in a way to stimulate people to continue the work themselves. This project recognizes that there is a finite level of funding from the local government, but also a finite level of interest in even starting these projects. It's within this framework that these designs attempt to create precise, targeted interventions with the highest possible results.

Favela as Landscape

A re-conceptualization of the favela as a landscape is not terribly important in the immediate future, but part of what this design proposes is an attempt to promote architectural forms that create promote the image of the favela as a green space. Theresa Williamson from Catalytic Communities, an organization aimed at fostering communities and favela rights, says

“in order for the lives of the people living in the favelas to improve, the popular perception of their neighborhoods must improve (quoted by Godfrey, 2010, 380).

Pure nature no longer exists. Any form of urban nature, such as the Atlantic rain forests around Rio, has been irreversibly altered by human interference. In March of 2012, Time Magazine ran an article entitled "Nature is over," about this concept, arguing that there no longer a space on earth, or at least very few of them, that are “pure” nature. Human influence has changed everything. The larger point is that nature no longer is something that can be “preserved,” instead it has to be re-created.

As favelas inevitably continue to grow, there needs to be a reconceptualization of urban space as landscape. This doesn’t just apply to favelas, it applies to the entire city, but it’s important for favelas for the same reason that density is important to favelas; it gives the city one less reason to view them as a blight.

Urban centers all over the world are already taking this approach. Green, clean air corridors are being built in some of the more progressive cities in Europe, such as Freiburg, and green and living roofs are becoming increasingly popular as a way to integrate habitats and green space into the urban fabric (Beatly, 2010). There have been studies that have shown that on green roofs alone, rare and endangered species are returning to cities in Sweden using roofs as habitat (Lundholm, 2006). It is this new idea of nature, one that acknowledges the role of human development as intrinsically tied to that of the natural environment, that is pertinent to the deforestation of Rio de Janeiro. If the built form of favelas begins to express this concern for the environment, than measures such as containment will have less legitimate claim to being environmental.

The Role of the Architect

Werthmann said this about the role of the architect in designs for informal communities. “In the development of these integrated models, design schools must play a catalytic role. They can develop prototypical projects in which new approaches can be initiated, adapted, and carried on by local carriers ” (Dirty Work, 85). This design functions on this idea. This is not a solution in an of itself, the designs I propose are in fact supposed to have little impact as possible. The designs are simply tools to present ideas within the communities that are affected. The role of the designer in this case is simply to propose and demonstrate alternatives, not implement them. It’s possible that if this design were built it would have little or no impact on the community in one place while be extremely successful in another, but the failure of the design is not a failure of the built form but a failure to provide a *replicable model* to be implemented on a grassroots level. This is a particularly acute risk in the case of this project since I have not had the opportunity to travel or do field work in favelas, but that is the risk I take as the designer.

The Design

Design Principles

The design is focused around several key principles that shape the built form.

Cost and Efficiency

What makes this design different than other intervention architecture is that it accepts the favela home as an acceptable building block. The choice to build in the same style as the homes and buildings in the favela is intended to create a building that is relatable to its surroundings. If it has any hope to serve as an architectural precedent it has to readily be understood as a cheap building that is in many respects identical to those around it, but at the same time present new concepts of program and construction. It would have been simpler to create a building that implemented more sustainable practices, perhaps composing toilets, straw bale construction or solar panels, but the design was heavily directed by what had already been established as the cheapest and most efficient way to construct a residence. One of the challenges that this design attempts to address is how to integrate environmental building practices into homes where environmental quality is secondary to simply surviving. In creating this design it was more important to consider what to leave out than what to include.

Adaptability

One of the founding principles of favela architecture is adaptability and potential for growth. Spaces that are present in favelas are very rarely conventional lots, so the architecture has evolved to fit in to unconventional spaces. Maintaining this level of adaptability is crucial when designing targeted interventions because no two spaces with a favela are the same and the

design has to be flexible enough to work in a multitude of spaces and environments. The primary purpose of these designs is to present a series of built spaces that have minimal impact on the surrounding communities, which is impossible with a fixed prefabricated design, so I've presented a number of situations and scenarios in which these principles have been re-shaped for different scales and spaces.

Environmentality

The purpose of this design is to create a new precedent for construction as well as program, and by changing this also begin to change the imaginary of the favela. The focus of this shift is environmental impact, and as a result many of the defining design elements have been selected for their environmental qualities and potential to create an image of a environmentally conceived favela. If the stigma towards favelas as an environmental blight is going to begin to be reversed in ways other than containment, then there has to be some local action to initiate this. This design is intended to demonstrate some of the best practices, mostly in green roofs and walls, that can begin to change this perception by creating a large visual testament to this changing paradigm. Simply building stronger homes is not enough to re-conceptualize the image, action also has to be taken in fostering a more eco-sensitive favela.

If this seems secondary in importance to making basic quality of life improvements, this is in part because environmental quality and quality of slum life have been viewed in a false dichotomy. Environmental practice in favelas is a step towards the city and municipality recognizing their contributions to the larger city, and a step towards legitimacy, as well as improving the environmental rights of favela residents and improving quality of life.

Exemplary Potential

In order for these buildings to function as a new paradigm the buildings themselves have to be relatable to their surroundings while simultaneously creating an image of something to aspire to. As I mentioned, it would have been easier to create a building that simply sat in a favela context and was perfectly environmental, but that would have created too much distance between the favela and the structure. If the buildings themselves are to be a tool and a demonstration of potential with existing resources, they have to reflect existing resources. For this reason, these designs present nothing that could not be built in the context of a favela. The construction is simple concrete frame and brick and the whole building is intended not to revolutionize favela architecture but to solidify it. The main difference is the integration of alternative techniques such as the vertical park concept and green roofs, neither of which are expensive or difficult to install. The rainwater catchment and plumbing system is all built around more or less the same principles that are already being used.

The key concept is not to propose anything revolutionary. One of the challenges in designing this was the recognition of the limitations not of the government or architects to design and build a center, but of the limitations of the community to implement the practices presented. It's for that reason that very few "green" ideas have been presented, but instead a refined few that have the most potential to actually take hold and offer the most reward. The design itself actually looks similar to a typical favela home because, in essence, it is.

The exemplary nature of the building also adds to the political appeal of building such a structure. Policy since the end of the eradication phase has been towards on site improvements, often in the form of sewage and power (which are crucial and should not be superseded by this

project), and this offers another facet to the development strategy that has only been attempted with limited success.

Another issue that this addresses is the limitations of the government to reach every home. One of the issues when working with the Colombian Government in their slum revitalization programs was the limitation to spending public money on non-tenured land. Their direct actions could not, by city law, contribute to the remediation of any home that did not own a title or deed to their home. This limitation is indicative of the residual policies that were aimed at the elimination of informal homes, and though they are outdated, these policies do present serious hindrances to actual progress. The benefits of using architecture as a viral tool for development is that the laws regarding funding and bureaucratic process are irrelevant. This idea draws on the fundamental concepts of favela construction and embraces it. The informality is a key element in the success of this idea.

The other side of this challenge was that the design had to present something that wasn't too easy as to be useless or patronizing. This is why I've included a number of designs incorporating different levels of interventions. In many ways design 1 (appendix B, figure 3) is the culmination of these ideas. It presents a structure that is built in the same concrete and brick style as the rest of the favela, and it incorporates techniques such as extensive green roofs that are supposed to be easily replicable, but it also creates an image of something that is not necessarily attainable for every favela home immediately. The intensive green roofs and community garden space are things that only be achieved through strong and relatively expensive structural engineering, and would not even be advisable in many homes. What this does though is create signage to what the aspirations of the principles of the favela are, to create green space and show dedication to the environment in an extremely visual manner. This creates

a balance between example and aspiration, each which emphasize a different level in the complexity in favela development.

Locality

There are over 1 million people who live in favelas, and to fully “urbanize” them through a government project would be an impossible feat. What needs to happen is urban triage. Many of the over a million people I just mentioned are living in homes that work just fine and do not need to be addressed. This is not to say that they are ideal living conditions but they are structurally sound, and for the most part don’t fall over. To directly address these homes would take valuable resources away from communities that need them more.

The people that need these resources are the communities that are not doing fine. These are often the most marginalized people who have nowhere else to go but the most dangerous and unstable pieces of land. Many of these homes are fundamentally unsafe for human habitation by UN standards as well as by favela standards. It’s clear that land regulations have little impact on the shape of favelas, most were formed on illegal land anyway, so this project is intended to physically take the place of the homes that are most at risk. This keeps more people from building in the same space and provides an architectural precedent for new constructions in the area.

This also recognizes that favela development for the most part is moving in a direction towards urbanization on it’s own and does not need to be interfered with. As I’ve demonstrated, attempts at outside-in formalization have had the most success when residents carry out their own developments (with exceptions for infrastructure). The point of this project is not to get in the way of this, but target key spots that pose the most threat of creating larger problems in the future, prevent them and replace them with exemplary architecture.

Visibility

If no one can see these buildings, they will have failed. The idea that people improve their own homes if their environment improves only works if people can see the change in their environment. For this reason, these interventions need to be targeted in areas that either have prominent lines of site or are in areas that are heavily trafficked.

This is not to say that the project has to be big. On the contrary, the smaller the intervention, the more potential it has to be effective. One of the main purposes of tactical urbanism is that it has the potential to create change in an urban environment without physically changing much. This creates a situation where location is paramount. Areas with high visibility or heavy traffic allow for this potential while maintaining a small physical presence.

Areas that are highly visible are not only beneficial to the effect of the architecture, but also for the interest of the government. Governmentally funded projects are preferential to spaces where the potential to be seen by the public is highest. Visibility is arguably the most important to these design principles in the context of realistic implementation because it is most likely to encourage funding. Even if the location doesn't meet the first principle of high need, for the sake of political potential visibility might be more important to getting any project built at all.

Visibility is also key in beginning to change the perception of favela residents as having an active role in environmental remediation. Prominent green roofs and green spaces that begin to take an important place in the favela landscape will begin to shift the perception. Residents seeing more green space filling up empty spaces and re-vegetation of urban spaces, especially on rooftops has a powerful image about environmental efforts.

Verticality

As was shown with the Grotao Community center and Urban Think Tank's "Vertical Gyms," in dense urban environments it is often impossible to find the space to put in large programs horizontally. Looking at the aerial shot in appendix A figure 1 of Rocinha it's clear that almost every available open space has been built up leaving little or no room for new horizontal development. Programmatically in order to fit something as large as a community center or park into this existing fabric it has to be built up. This has the added bonus of increasing visibility and decreasing the level of displacement that needs to occur for new constructions.

This also emphasizes one of developed favelas strongest features, which is the vertical growth of homes. It encourages this vertical growth while promoting programmatic alternatives to simply putting more rooms in. It changes the dynamic of the traditional favela home in a way that can encourage more sustainable space use planning.

Accessibility

These buildings also have to be accessible to the larger community. One of the elements that I've attempted to highlight in these designs is the complicated and overlapping nature of favela connectivity. Access to any given space, as can be seen from the arial images I've presented, is not as simple as simply walking down the street. Often the only connections are series of tight paths and walkways that sometimes go through homes. In order to be a successful community building, these designs have to interact with this notion of connectivity and respond to the scale each location. Design 1 has presented the most comprehensive approach with access at different levels to different parts of the community.

Centrality

These buildings have to maintain a presence in the community not only for the reasons listed above but because, if implemented by the government, these buildings are a symbol of the solidification of the rights of favela residents. Even though land rights law has progressed significantly over the last few decades, tenure of residents can still be shaky. In light of the Olympics, these buildings can offer a legitimizing government presence. This doesn't imply that the community is home free, Vidigal has a police and government presence, but it is both a gestural step on the part of the government and a reassuring measure for the residents that, at least for a while, they will not be displaced.

If used as POUSOs (governmental community outreach offices) or other government offices, it would create a new space of overlap between the residents and the government. If the government is seen to be creating and occupying a space that has tangible positive impacts on the community, it could serve to alleviate some of the tensions that have built up between the two parties. Juxtaposing the imposing government force with positive change creates a new perception of their role in the community.

Publicity

The last principle is the publicness of the space and appearance of accessibility to the local community. These designs are intended to be public space, which in many ways is landscape architecture, so the designs attempt to create a notion of park space, public space, and public access. The programmatic uses of the buildings themselves may shift, and there are a number of potential uses that could take advantage these spaces, but the element of public access remains in all of them. Everything in these designs is targeted to create a sense of openness and community involvement in areas that have historically discouraged it. These are intended to

begin to open up favelas to both the residents and the outside city, furthering the integration process.

Design Components

The Vertical Park

As I've pointed out publicly accessible green space within favelas is extremely rare. From above it's often difficult even to find the ground. But what favelas have lacked in ground space they have made up for with vertical expansion. The vertical park is a component of the design that utilizes the verticality of the favelas as an opportunity to integrate green space into the existing precedent of tight favela life.

The space operates on the same principle as the pocket park, which is that a small space, though not expansive or very useful, can still significantly improve quality of life. It is also built with the idea of the green roof in mind, which will be addressed later, that helps to alleviate rainwater runoff and improve urban water quality.

The intended message is that although there is very little ground space, there is the opportunity to create public and diverse park space in the air. With minimized supports needed, the areas that would in normal circumstance be allocated for residents have the potential to completely re-image the use of conventional buildings. Though this itself is unlikely to take hold without government intervention, it creates a precedent that up until now has been absent.

The Community Center

The second element of the design is the multi use community center which forms the central element of these designs. The program of the space itself is not of consequence to the design and ideally it would vary based on location, but the architectural principle remains the

same throughout. As I've shown there has been a trend of interventions on the part of the government that culminate with the establishment of a police or government presence within the favela, and this provides the opportunity to soften the impact of this presence.

Multi-Level Access

One of challenges to these buildings was creating physical access to buildings that were intended to be placed in the most at risk areas of a community. This implies that the building may be on the steepest section of hillside, which when building vertically, presents a series of challenges and opportunities for points of entry. In each of the designs there are number of access points on different levels. The two smaller designs emphasize the different points of the ground level, while the Design 1 expands on this idea to create a series of paths to different points on the hillside as well as to surrounding residences. This is the physical representation of the complicated multi-level networks of connectivity within the favela, makes it a physical continuation of the existing networks. This makes the building fit as a key in the community, and allows the building to sit in context without disrupting existing connections. Another benefit to these paths is that they allow the scale of the building to be increased without creating obstacles to connectivity.

Exposed Re-bar

In order to embrace the adaptability of these designs the top floor has been left unfinished. As can be seen in design 1, each of the pillars the re-bar has been left exposed leaving the potential for more floors to be added. It also leaves room for community participation in the building after the initial floors have been put up. This is the most important symbolic element of the design and the success of the project is dependent on the utilization of the re-bar.

As the community wishes to expand on it or take it down, exposing the re-bar implies that the building is in transit and has the potential to be molded to fit the best needs of those it is serving. Leaving the buildings unfinished also contributes to the vernacular expression of the design helping it physically relate to the state of constant change that the community around it is undergoing.

Exposed Foundation

Partially exposed foundations serve as an example of how to ground a home correctly. Undoubtedly, the vast majority of homes in favelas are engineered well enough to survive, but some are not. Landslides are among the most dramatic problems that plague residents, and the impact of these is made worse by the often shoddy construction and foundation work that these homes are built on. Again good basic foundations are not a new concept, and are not rare in favelas, but because of the evidence it can be implied that there is some lack of knowledge, budget, or effort.

Power and Lack of Alternative Energy

When traveling through small villages in Uganda solar panels were regular features on the roofs of small grass huts. The monetary income in these villages was much lower than in favelas, so it may seem as though cheap solar may be a viable option in favelas, but in fact it is not. When looking at the larger context, many favelas already have electricity illegally. Some are legally plugged into the grid, but many are not, which means they are getting electricity essentially for free. To try and convince favela residents that instead of their free electricity they should invest in solar goes against the logic of this design. The reason solar panels were so

successful with small villagers was that they were so far away from any infrastructure that the only way they could get electricity was through solar.

One of the program initiatives of Favela Barrio, as well as many of the programs that have begun, have been the formalization of electricity and power in favelas. Even though this is a minor point, the building will provide a centralized location from which RIO-LUZ, the municipal light and Power Company, can begin to expand the formal grid into the rest of the neighborhood.

Building Techniques

Green Roofs

The green roof is the most important element of the design, and I've incorporated a number of techniques and styles into each building. Though not all of these are realistically feasible on favelas homes, such as the tree planting, they serve to set the buildings apart enough so that they don't simply disappear into the landscape of concrete and brick.

There are a number of reasons for the prominent installation of green roofs. The first is their potential for rainwater runoff alleviation. Green roofs have been shown to have an impact on slowing rainwater runoff, the cause of landslides. Green roofs are not a replacement for adequate infrastructure, but they are a start. In order for the effects of green roofs to really be felt in Rio or in any other urban setting, they would have to be installed in the majority of rooftops. The purpose of having a green roof in these designs is to further the idea of the exemplary building. The cost of building a single green roof is fairly cheap (when I was constructing them in Colombia they cost less than \$50 for pond liner grow cloth, two materials that probably would not even be necessary in concrete construction) but for an agency to attempt to build them on

thousands of homes would be prohibitively expensive. The idea of exemplary architecture allows the burden of upgrading the homes to the residents.

The second benefit of green roofs is the limit they place on vertical expansion. Looking at any picture of favelas it's clear that many homes are preparing further upward expansion, and the city government of Rio has expressed concern over the unchecked vertical growth. Promoting the installation of green roofs might begin to curb this. Even though realistically this would not have much of an impact (the benefits of having an extra floor are much more tangible than having grass on the roof) it would create an alternative that could be capitalized on if the city ever became serious about stopping the upward growth. This could be implemented through subsidies or tax breaks as the homes become legalized.

A third benefit is the increase of both public and private green space. Green roofs are an internalized step towards changing the perception of the favela away from an environmental disaster. Though it's clearly more environmentally friendly to stop chopping down the forests and putting in cheap homes, this is not a realistic goal when faced with the rate that favelas are expanding. As I've emphasized several times before, this visual shift is a powerful tool in changing the perception of the environmental role of favelas.

There are two main types of green roof that I've applied to these designs that differ in the depth of the soil. The construction of the roof is similar in both cases, and consists of the vegetation, substrate, a waterproofing layer, filter layer, drainage layer, and structural support (Getter and Rowe, 2006). Intensive green roofs have a substrate layer of more than 150 mm. These are often known as roof gardens. The deeper soils enable them to support a larger variety of plant life, as well as retain more water runoff and provide more insulation. These are included in design 1, where they enable trees to be planted and community gardens to be supported within

the structure of the floor/roof. This allows a tall, green image to be projects around the community, as well as providing opportunity for a more inspirational and visually striking design. They are however much harder to engineer and maintain than the alternative, extensive green roofs. These are roofs with a substrate of less than 150 mm, and are the most prevalent in contemporary architecture. This is the kind of roof that this design encourages to be placed on surrounding rooftops. One of the advantages to extensive roofs is that they can also be applied to sloped roofs, which is more relevant in favela construction. Of the two roof types, there are the more popular as they are simpler to maintain and easier to engineer. (Mentens, Raes, and Hermy 2005).

What makes installing these even a remotely realistic possibility is simply the amount of unused roof space in favelas. Figure 5 is a diagram of a section of a favela in Rio with all of the rooftops highlighted in red. Covering all of them is an impractical goal, but it's useful to keep in mind the scale of the under utilized space that this solution would address.



Figure 5. Highlighted unused roof space in a favela in Rio

Green Walls

Green walls are another cheap and extremely effective way to integrate vegetation into the built form. Unlike green roofs, they can be installed with very little planning or thought, and offer garden space on both interior and exterior walls, as long as there is access to light. They can be built and installed in a number of hours for extremely cheap. Simple utilitarian living walls can be installed at no more cost than building a wooden shelf. They can also be integrated into brickwork and concrete. The municipal government of Bogota, in cooperation with Architecture for humanity, experimented with using them as part of their slum improvement program during the pilot phase, but it was never followed through with not because of lack of success -the project went exceptionally well, but because of bureaucratic hindrances and lack of motivation.

This is one of the areas of the design that has the most potential to become successful because they are the simplest and most practical elements in the design that have the most immediate and tangible results. Small vegetables and herbs can be grown in green walls, and when covering enough wall space can contribute meaningful amount of food. In small wall installed in Bogota (6' x 4') held 40 heads of lettuce as well as assorted herbs.

Rainwater Catchment and Cisterns

Integrated into the design is a system of rainwater catchment. Many residents without running water already use systems of rainwater catchment, and cisterns can be seen on almost every roof in any image of a favela. This is simply another way to integrate environmental practice into the building. Along with the green walls, this is one of the easiest practices to spread to the larger community mostly because it's already prevalent. Rainwater catchment is economically effective, easy to install, and extremely useful. The key is maintaining this after running water has been installed. In my experience in informal settlements in Uganda, those who

managed to get consistent running water in their homes often abandoned rainwater as something that poor people used. It carried a stigma that people attempted to get away from, and this stigma is what installing it in a community space attempts to overcome. In this best practice application the goal is to demonstrate that even in a complete, infra structurally sound building, rainwater is still the best practice.

A Brief Note About Displacement

Inevitably, some displacement needs to occur to make room for these interventions. In general, if these communities are going to begin to be formalized, there needs to be some removal of the most at risk homes in order to insure the safety of the community as a whole. The scope of this project has not attempted to deal with displacement. There has been great work done by other firms, including that of Fernando Salles in his design of high-density single family homes, that have addressed this issue more in depth. Public housing for the displaced, although integral in this process, is not an issue that I adequately address in this design. The purpose is to provide the catalyst for people to improve their own homes, and while displacement is an issue, it is one that cannot be addressed here.

Implementation

It is important to stress that these projects are not aid. This is not relief work for needy families, favela residents are not refugees, and favela residents are not homeless. They are city residents and this is an infrastructure project, and it is the responsibility of the government to provide these. This is an important distinction because there is a stigmatization of handouts, and this not a handout. Perlman says "society convinces itself that the poor are poor because they are lazy, unreliable, and inferior-not through any societal injustice or inequality of opportunity. The

fault lies in the victim" (324). While this is obviously a gross misrepresentation of social structures, this stigmatization has real world consequences. The way people perceive themselves in the world effects how they act to themselves. Any project that attempts to integrate these marginalized communities has to address the people's perception of themselves.

It's for this reason that this design has to be implemented by the local government. It should be funded and executed by the local government as their own infrastructure improvement projects. Programs like Favela Barrio, though they are funded by the IDB, are still projects that are formed out of local responsibility and the city is still taking on the debt to address people and citizens within the city. The purpose of this design is to assist in raising the quality of life of favela residents, but also to help integrate these communities into the formal city in their own way. Even though these issues are faced across national borders in most cities of the global south, the principle behind international money implies that the recipients are in another category, that somehow they are being supported by the international community rather than assisting themselves or being part of the larger urban context.

"Aid" would also undermine the credibility of the local government to the favela residents. If the local government is not taking responsibility for the well being of the favelas, as they have historically not, then how does that reflect on the residents? Are they not citizens of the city? For these reasons, these designs can only be implemented when initiated on a local level. By doing this, the city reinforces in the communities as well, and in addition to validating the citizenship of the residents, it allows some semblance of government control over these areas.

There have been many complaints about the presence of the government in favelas, in particular the heavy handed approach of the police, but if these communities actually want to become more a part of the city they can't simply pick and choose which elements of government

support they wish to have. The presence of the government may begin to change the ways these neighborhoods look, but that is the point. One of the fear is that as neighborhoods "improve," such as Vidigal and Rocinha that were discussed earlier, gentrification will become a problem. That is a legitimate fear, and steps must be taken to ensure that communities do not get torn apart, as they were with earlier attempts at public policy. But this is not an excuse to avoid change. There are serious problems in favelas, otherwise there would be no need for interventions. These were developed as slums and even if they are integral to the city there are pieces that need to be addressed. While this is the responsibility of the local government, community involvement is crucial to ensure that these developments don't simply force the resident to move to more peripheral parts of the city, perpetuating social problems.

Communities must be consulted in implementation of these projects. Policy is already in place that would make this a relatively painless process. Favela Barrio already has a program for integrating the presence of these types of centers into the communities effected by the program. These Urban and Social Orientation Centers (POUSOs) are intended to be staffed by architects, engineers, and city planners that deal with issues in the surrounding communities about urban development and land tenure, working to further integrate these communities. I don't believe it's necessary to re-invent this plan, all I am propose is to house a similar program within a strategically designed building, adding one more layer of depth to the effort.

Funding for these projects could easily be integrated into the Favela Barrio budget or whatever project follows it. Rio has already shown that it has progressive and more importantly effective legislation when it comes to allocating funds for favela improvement projects and infrastructure, so these design principles could be easily folded into the budgets of these projects.

What makes this proposal particularly appealing in the field of public policy is that it doesn't actually have to deal with the issues of land tenure and land grants in its implementation. As was the case in Bogotá, land tenure is a politically charged battle that can lead to serious hinderances to real development. By improving public land as a means to improve a neighborhood, the design avoids the complications of handing out parcels.

The other benefit of this is that it has an immediate and prominent visual presence, but still is the foundation of a long-term project. People are more satisfied with things that have immediate pay off, and this offers an immediate presence. With the construction of these architectural centers, there is both a community center that is built and a precedent for future favela construction. Both the long-term development goals are beginning to be addressed and the immediate need for results, making it a politically viable option.

Concluding Remarks

As favelas become increasingly urbanized there has to be a shift in the conceptualization of them as part of the urban fabric. As I've outlined, this shift has begun to take place but there are still serious impediments to the completion of this change. Social perceptions of favelas, and global slums in general, both by residents and outsiders carry historic baggage about the role of slums that in a contemporary context are simply not true. Even though false, these perceptions carry real and tangible consequences for the lived experience of slum dwellers.

The growth of urban centers is continuing to grow, and the growth of slums and informal settlements is forming the majority of this growth, and in order to sustainably manage this influx, policy as well as perception has to change to address the modern role of informal city. What these architectural designs have attempted to do is create a precedent that both allows informal communities to continue growing in an organic manner as well as influence the

construction of future homes to change the physical form of the built environment. These buildings reflect a change in policy that embraces the favela as an acceptable urban paradigm. In the absence of affordable cheap housing, the favela is the most reasonable and rational response to a need. To attempt to control this through force has met limited success at best, and these plans are a departure from this strategy.

The contemporary context has created a political environment where ignorance of favelas is not possible and action is demanded. In this setting, the implementation of these designs is distinctly possible. Not many slums in the world are in such a position of power to implement policy changes. With the international community focused on Rio, I have attempted to create plans that showcase the cities commitment, create meaningful change, and empower favela residents through a single building.

Appendix A: Constructions and Designs

Figure 1. Figure 1. Highlighted elements in a photo of Rocinha.	71.
Figure 2. Figure 2. A constructed favela incorporating the elements listed in figure 1.	72.
Figure 3. Design 1	73.
Figure 4. Design 2	74.
Figure 5. Design 3	75.



5.Setback/terraced construction

1.Unfinished construction

9.Small, fragile settlements in remotest areas

2.Satellite tv access

3.Rooftop decks/social space

6.Occupation of unconventionally tight spaces

7.Cisterns and water storage

8.Interspersed green space

4.Stilt construction

Elements of the Built Favela

Highlighted elements in a photo of Rocinha

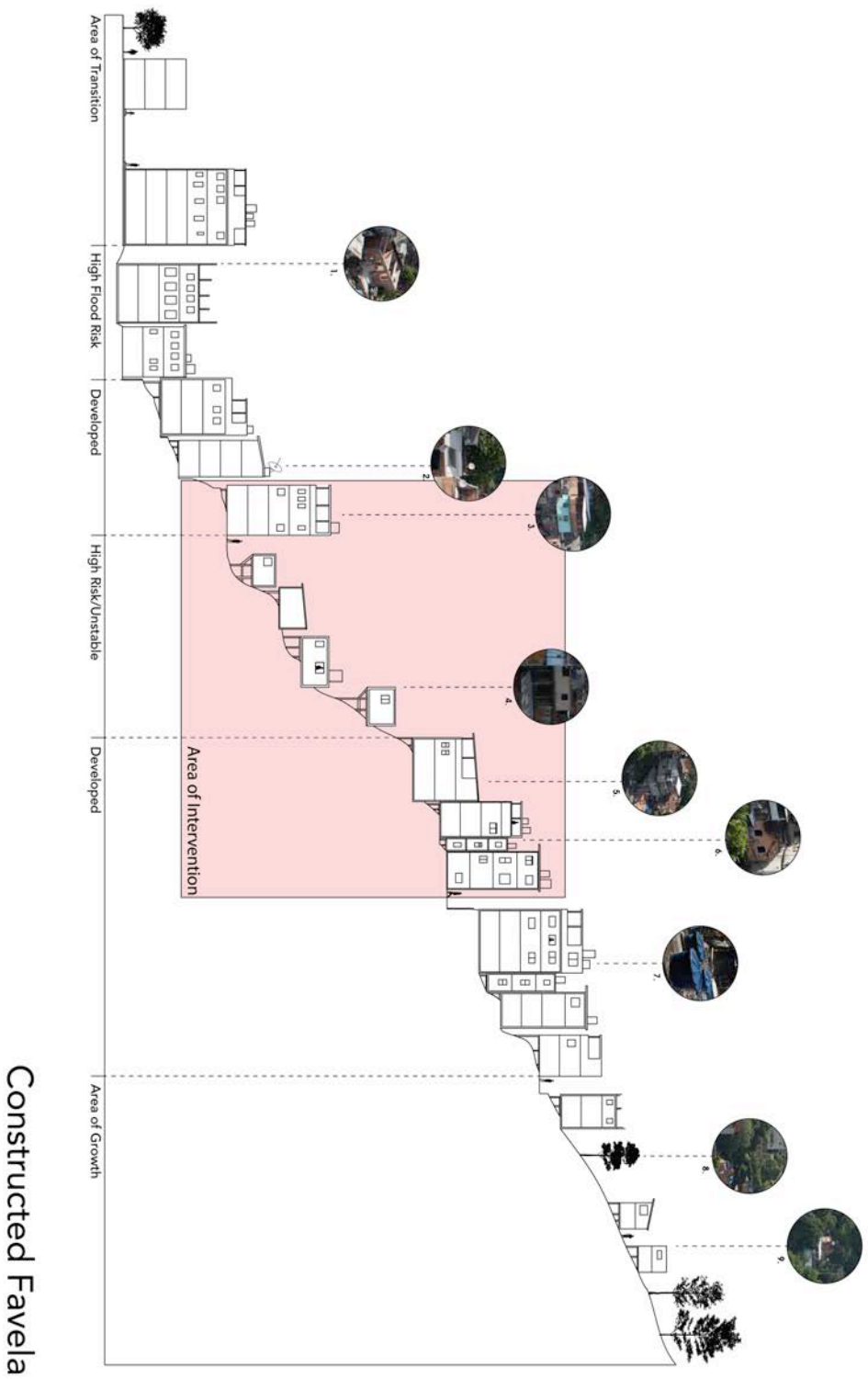
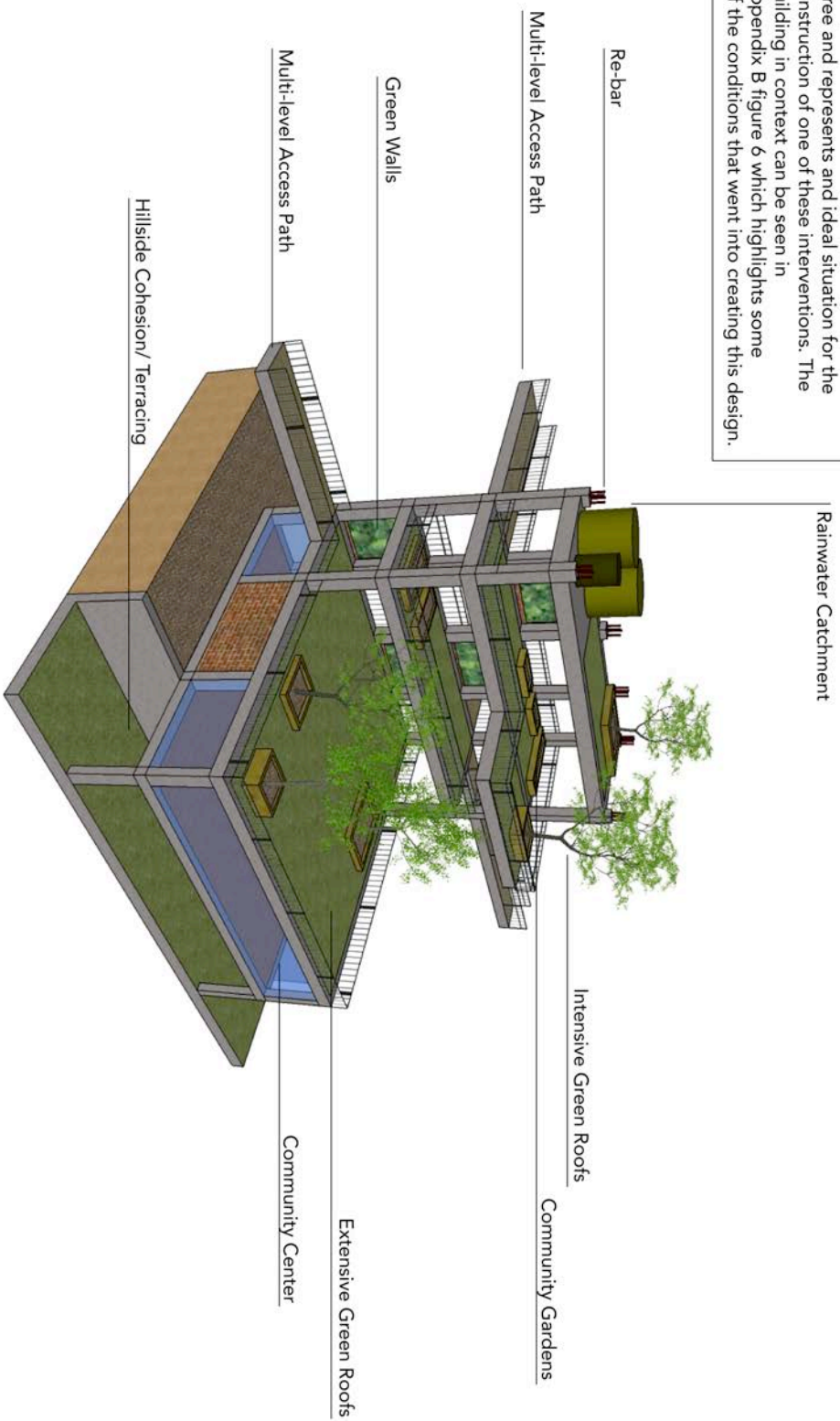


Figure 2. A constructed favela incorporating the elements listed in figure 1.

Design 1 is intended as a culmination of all of the themes and ideas presented in this paper. It incorporates the most of the techniques of the three and represents and ideal situation for the construction of one of these interventions. The building in context can be seen in Appendix B figure 6 which highlights some of the conditions that went into creating this design.



Design 1

Figure 3. Design 1.

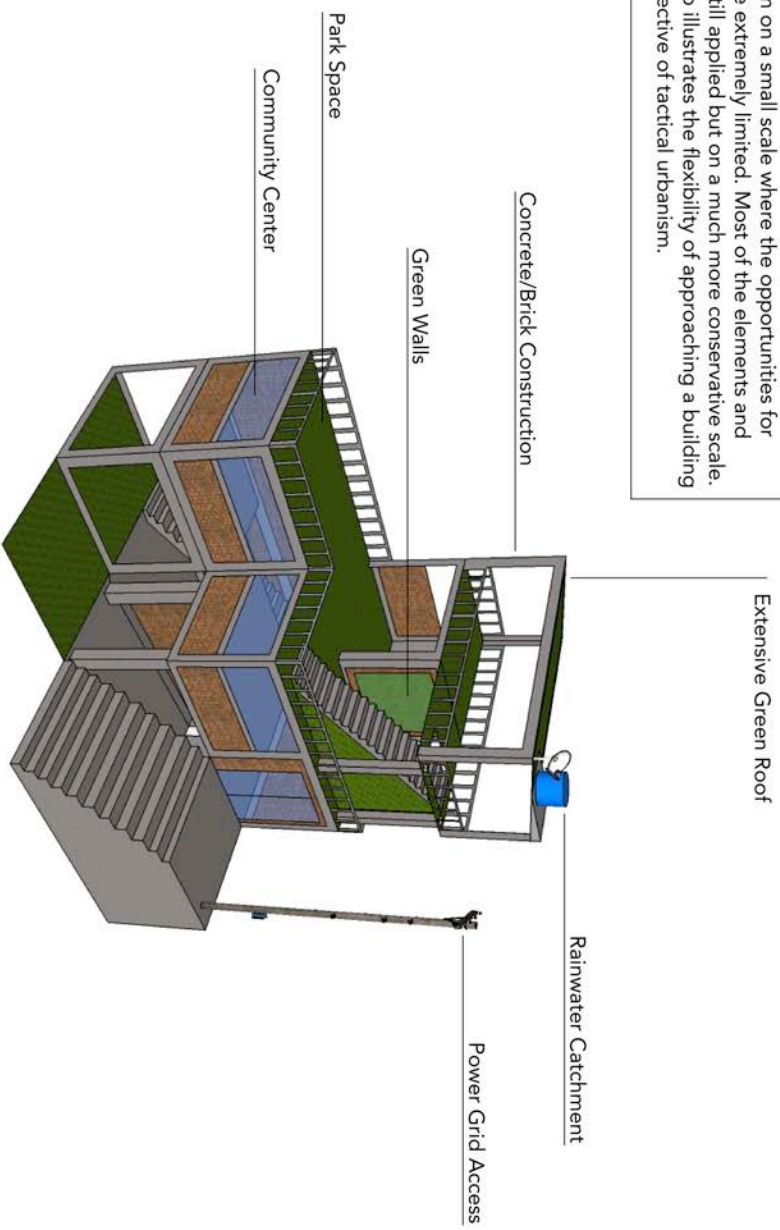
Design 2 is the representation of some of the principles, but implemented in a different context. The extensive green roofs have been left out as well as the multilevel access. This is a design that is intended for an area that needs intervention but does not have the resources or the geographical stability to justify placing the rest of the elements in.



Design 2

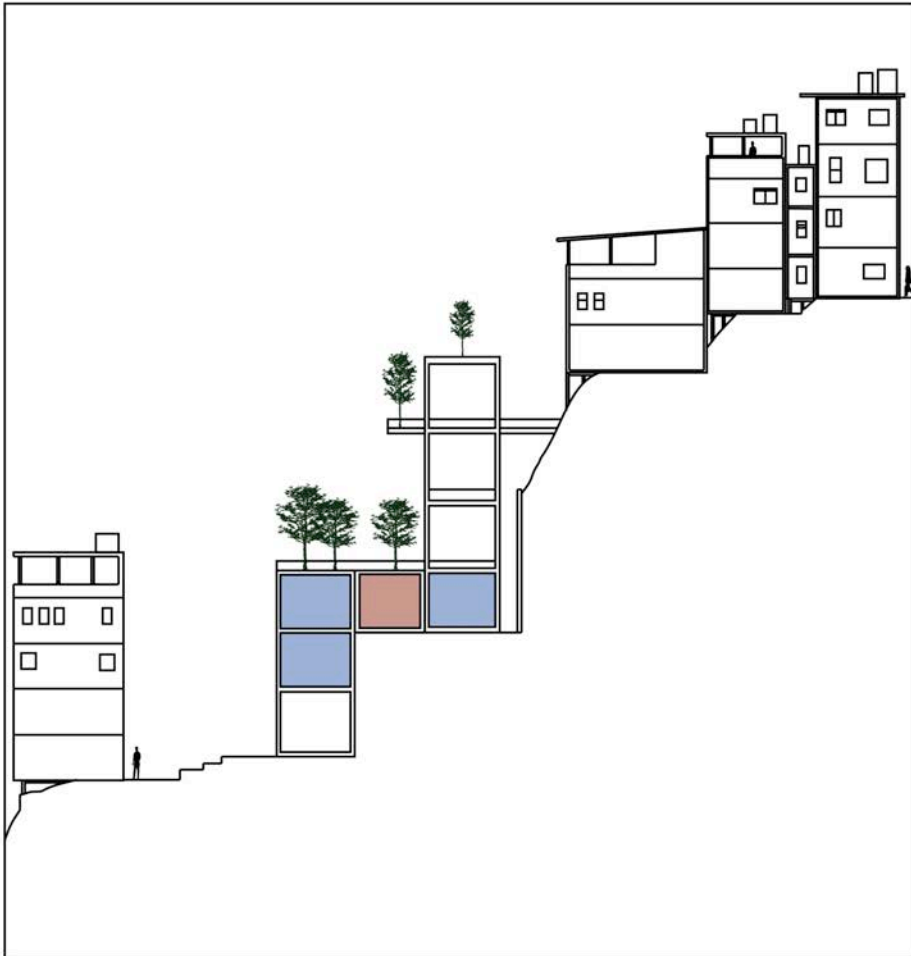
Figure 4. Design 2.

Design 3 is intended to illustrate how these principles can be applied even on a small scale where the opportunities for intervention are extremely limited. Most of the elements and principles are still applied but on a much more conservative scale. This design also illustrates the flexibility of approaching a building from the perspective of tactical urbanism.



Design 3

Figure 5. Design 3.



Improved Section

Figure 6. Section drawing of design 1 in context.

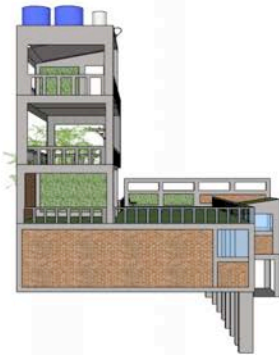
Appendix B: Detailed Design Images

Design 1.	<u>78.</u>
Design 2.	<u>79.</u>
Design 3.	<u>80.</u>

Design 1



Design 2



Design 3



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