



# Informal Urbanism: The Slow Evolution of a New Form

## THE INFORMAL CITY

One billion people live in slums worldwide.<sup>1</sup> This accounts for a staggering one in six people globally, and the number is climbing rapidly. The UN estimates that by 2030 it will be one in four people and by 2050 it will be one in three, for a total of three billion people.<sup>2</sup> The vast majority of slum dwellers reported in the UN document are those living in the informal settlements of the developing world.

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Informal settlements vary in their characteristics, but what they have in common is a lack of adequate housing and even basic services such as roads, clean water, and sanitation. In addition, residents often have no legal claim to the land they have built upon. Consequently, these neighborhoods develop outside the political and legal structure that defines the formal city. Existence outside these abstract organizational structures has a profound impact upon the spatial reality of these settlements. New construction happens where and when it is needed, unconstrained by the principles of planning that regulate construction and guarantee integration of services elsewhere. In fact, the process at work in most informal settlements is a nearly perfect reversal of that at work in the formal city: buildings come first, and roads, utilities, and government follow later.

How does this affect its form in comparison to the rest of the city? The building stock is normally shorter and less structurally robust. Its arrangement is often organic and more closely follows the terrain. The density of buildings is often much higher, with circulation routes for pedestrians and vehicles under constant assault by those seeking to claim new territory.

The informal city is a physical manifestation of a very particular kind of social order, one that remains relatively free of institutional power and that does not, therefore, produce form with outwardly hierarchical structure. It responds to human ambitions and need in the most direct way possible—by providing an almost completely unregulated, open environment for building.

It is shaped by an intimate relationship between individual need, the physical landscape, and available resources, both economic and material. It is built

by decisions made locally and without much regard for the larger whole. Consequently, it exhibits very little formal variation no matter how large it becomes. The fabric of the informal city may now be found worldwide. Its sheer quantity guarantees that it is here to stay and suggests that we are witnessing the establishment of important new urban forms.

The growth of large-scale informal settlements is a recent phenomenon. Most of these settlements were built during the past 60 years as waves of migration to urban areas outpaced the ability of cities to absorb them. This was especially true in the postcolonial states of Africa and Asia, where important political and economic changes occurred in the decades following World War II.<sup>3</sup> Similar patterns of urban migration occurred in Latin America, with high growth in informal settlements occurring during the 1960s and 1970s.

Although much of today's informal fabric was established in the post-war period, the favelas of Rio de Janeiro began much earlier. Morro da Providencia, where the term "favela" was first used to describe informal settlements, is located in the city center and began as a camp for Brazilian Republican Army soldiers lacking accommodations after the Revolta dos Canudos.<sup>4</sup> It was established in 1897 and has the distinction of being the earliest marginal settlement in Latin America.<sup>5</sup>

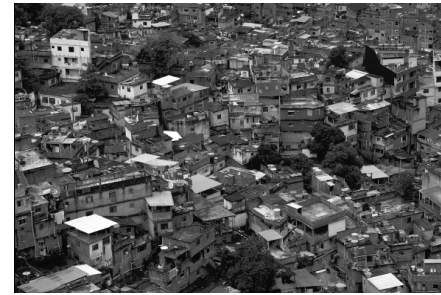
More favelas soon followed, absorbing the populations of newly homeless and unemployed ex-slaves who left the coffee plantations after slavery was abolished in 1888 and migrants from rural areas searching for work in the rapidly industrializing economy of the early twentieth century.<sup>6</sup>

Many of the favelas established in Rio de Janeiro during this period persist and are now relatively developed. Building stock has been progressively upgraded, and the majority is now concrete and masonry. Robust commercial districts have developed, and residents are accumulating wealth in ways that closely resemble those of the formal sector, including investing in property.<sup>7</sup>

While the fabric of the informal city may now be ubiquitous in the developing world, Rio's favelas are uniquely capable of suggesting how it will adapt as it acquires increasingly modern infrastructures and economies. They are excellent candidates for this not only because of their age but also because their conspicuous presence has compelled politicians to implement many policies addressing them, including the highly regarded Favela Bairro program and its successor, Programa de Aceleração do Crescimento (PAC-1 and PAC-2).

## ROCINHA

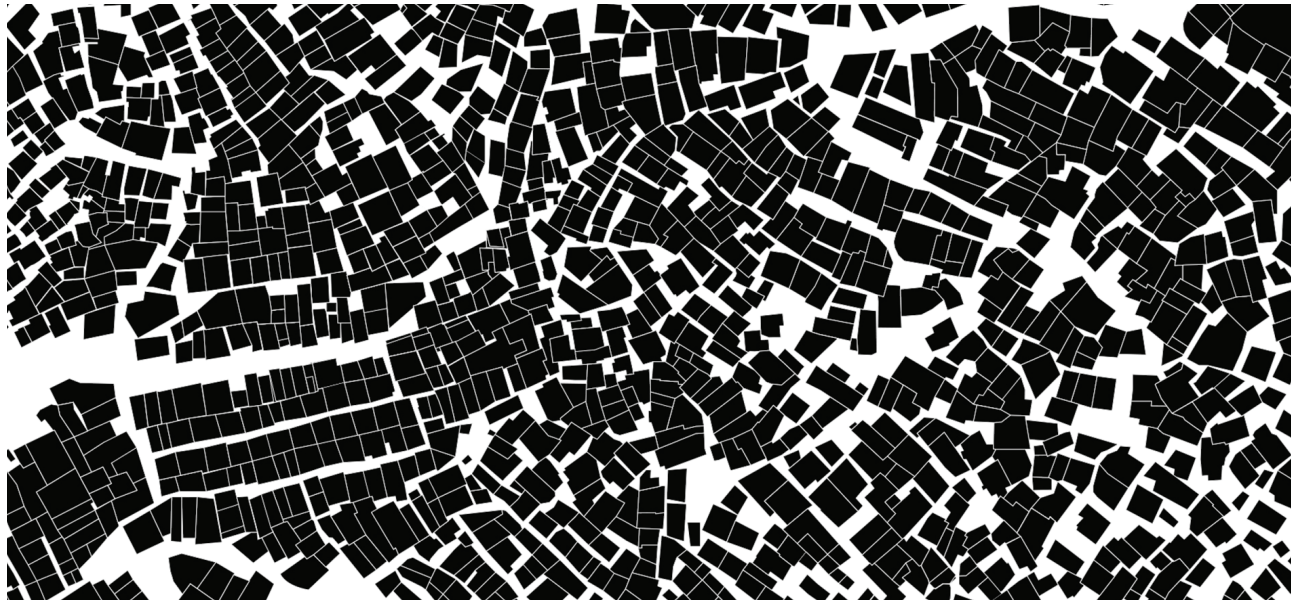
Rocinha is one of the largest and most well-known informal settlements in South America. It was established in the late 1920s and occupies a prominent hillside in Rio de Janeiro adjacent to Gavea, one of the wealthiest neighborhoods in the city. Its size, prominent location, and reputation as a haven for violent drug gangs have all contributed to its status as one of the most infamous favelas in South America.



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Figure 1: Rocinha's urban fabric. Photo by Andreas Nilsson.

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It escaped demolition during the razing of slums in the 1970s, and by the turn of the century, the census recorded its population as 56,338. The 2010 census reported Rocinha's population to be 69,356,<sup>8</sup> although this is widely regarded as an underestimate. Most informal estimates put it significantly higher, some as high as 400,000. The consensus view seems to be that the population is between 150,000 and 200,000.

#### RECENT CHANGES

Rocinha is one of the most developed of the estimated 1,000 favelas in Rio de Janeiro. It was formally recognized as a neighborhood by the city in 1986, and after eight decades of growth, much of its building stock is now concrete and brick. It is currently experiencing a process of rapid transformation as money and commercial interests flood into the lowermost regions of the settlement adjacent to wealthy Sao Conrado and within easy reach of Leblon, Ipanema, and Copacabana beaches. Intrusion of capital and investment from the outside, or *asphaltizacao*, as it is referred to locally, has taken hold here and moves deeper into the settlement with each passing year.<sup>9</sup> In 2012 local officials began issuing titles to the land that residents occupy, providing security of tenure and expanding access to credit but also monetizing their property, something virtually certain to accelerate this process.

Government initiatives intended to dislodge the drug cartels in advance of the 2014 World Cup and 2016 Summer Olympics are also contributing to this process. The reputation of Rio's hillside settlements as a setting of deadly violence between drug lords and the police has been a continuing source of concern to politicians who are now acutely aware of the international attention that these upcoming events have drawn. Brazilian police recently took the alleged leader of the gang running Rocinha into custody and are currently in the process of establishing a more permanent presence in the settlement through the UPP program outposts. A permanent police

Figure 2: Rocinha's urban fabric, figure/ground. Image by author.

presence here is something new and yet another sign that services taken for granted in the rest of the city are moving into this settlement. If efforts to purge the favela of the drug gangs are successful, they will represent a profound change in the social context of the settlement and almost certainly lead to further economic development by outsiders.

### **PERSISTENT PROBLEMS**

Taken together, these changes suggest a community on the cusp of transforming into something new; nonetheless, Rocinha still possesses many characteristics of informal settlements and has significant shortages of most basic infrastructure and services. Notably, there is still only one road large enough to accommodate city buses—Estrada da Gavea. Smaller passages at a variety of scales have been left between buildings elsewhere in the settlement, and many are big enough to accommodate motorcycles and scooters, the most common forms of transportation, but this system still leaves the majority of the settlement inaccessible to delivery and emergency service vehicles.

The absence of an adequate transportation network also complicates integration of other utilities and services that normally organize along these lines of movement. A recent study by Brazilian economist Marcelo Neri puts the number of residents with indoor running water at 21%, and according to the same study, only 12% of residents have regular trash collection.<sup>10</sup> Many still pirate water and electricity from the mains supplying Gavea, resulting in snarls of PVC piping and electrical wire running in every direction throughout the settlement. There is also no coherent sewer system. Eventually, these hazards will need to be addressed, and finding room to locate such services will be a major challenge.

### **ROCINHA AS A CASE STUDY: EVOLUTION OF THE INFORMAL MORPHOLOGY**

Transformation is a constant process in informal settlements; however, what is occurring in Rocinha seems to be qualitatively different from routine upgrading of building stock. The settlement appears poised to begin integration of many new infrastructures and services at once.

Many of these services typically reside in exactly the part of the city that is most planned and therefore most scarce here—roadways. The lack of advance planning that characterizes informal settlements not only permits construction of the city without integrating such circulation but also actually works against allocation of adequate space within the urban fabric since each actor constantly seeks to maximize the amount of his or her own territory. The resulting shortage of void space complicates later integration of services considerably since a coherent system inevitably comes at the cost of some proportion of the building stock. In addition to the loss of existing structures, another consequence of this is the injection of new spatial hierarchy into the predominantly uniform spatial matrix, creating a profound transformation in the character of the urban environment.

Current pressures on Rocinha to upgrade coupled with the apparent inability of its physical form to absorb new infrastructure pose important



questions: What is the correct balance between intervention and preservation? How “formal” must a community like this become? And what values and constituencies should be served in the search for answers?

### **APPROACH TO RESEARCH AND DESIGN**

These issues were the focus of several design studios I recently led in the Department of Architecture at the University of Minnesota. While these issues are broad and charged, they have the advantage of offering students the opportunity to connect social and ethical. The work was research intensive, allocating equal time to research and design, and much of it was undertaken collaboratively. Research focused on both local conditions and regional precedents. Research into precedents was done in small teams and site analysis as one large group. Students formed small teams around common areas of interest for the design phase, tailoring the scope of their work in ways that complemented and supported the work of their peers.

This process revealed two related issues deserving special attention: the character of void space in the urban fabric and the absence of adequate public programs and infrastructure.

### **VOID SPACE**

The spatial condition of Rocinha resembles a dense, porous mat. Buildings and void space are similar in shape and scale, with voids being perhaps half as big and sometimes smaller. From within the settlement, this is most evident in the flattened spatial hierarchy and conspicuous shortage of formal circulation systems. Apart from the path that Estrada da Gavea carves through the settlement, the only real disruptions in the spatial field are undulations reflecting the steep local terrain.

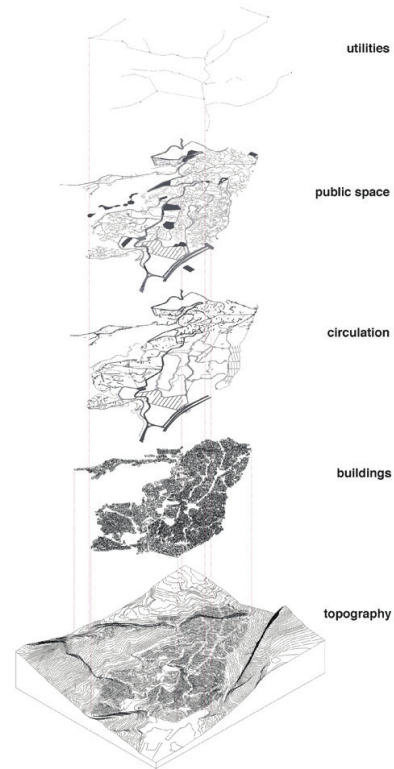
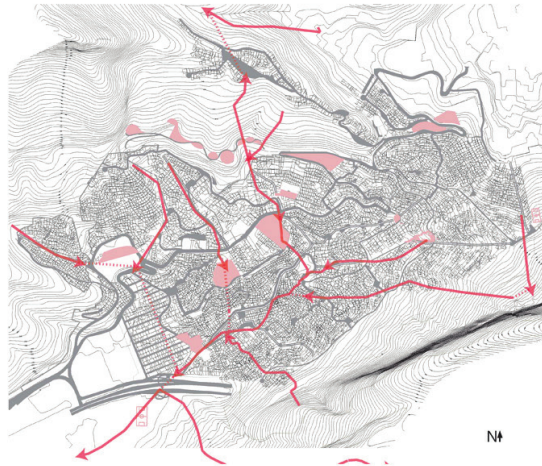
This structure is markedly different from that of the formal city. Not only does it lack the hierarchy, integration, and organizational structure of the formal city but also its circulation routes are often not “routes” at all but rather a sequence of overlapping residual space within the fabric. Traversing this environment requires moving through a series of interconnected voids or gaps between buildings.

This spatial condition is remarkable. The size and configuration of gaps between buildings are such that they actually acquire figural properties. At this scale, the effects of building without centralized planning are obvious. Gaps between buildings may be read as individual figures not only because of their size but also because they do not relate to any larger structure or organizational framework. Even when many voids connect to form a path through the fabric, their edges are not smoothed into larger spatial entities such as streets. They remain granular and provisional.

This organization is productive at the local scale. Its freedom from larger planning principles makes it capable of producing a wide diversity of spatial conditions in response to each individual’s particular needs. It is also highly adaptable, offering owners the flexibility to expand buildings or shape courtyards as resources become available. The ability of this fabric

## urban environment

Rocinha has emerged as an epicenter for informal settlement. The lack of regulations and oversight has created a complex system of unorganized construction that only responds to one element, topography. The result is a city with strong communal bonds without infrastructure or organization. To gain an understanding of the urban fabric that is Rocinha, its chaotic pieces must be separated into layers of topography, buildings, circulation, public space and utilities.



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to accommodate small-scale public space along passages is exceptional, and these have become important social spaces within the settlement. The absence of formal planning has not resulted in spatial incoherence. Limits imposed by available materials, labor, and financial resources serve to regulate the scale and material character of each building in similar ways. This unifies the visual field, resulting in a cohesive matrix of buildings and exterior space.

This organization does not address other scales of the city as successfully. Its logic, being derived from individual rather than collective needs, does not contain provisions for larger urban structures such as public squares, parks, or streets. It was thus unable to produce coherent medium- to large-scale structures as it developed. The result is shortages of public space, green space, and circulation routes able to accommodate robust traffic flows, mass transit, and legible navigation within the settlement.

### PUBLIC PROGRAMS AND INFRASTRUCTURES

Public programs and infrastructures were left unaddressed by the formative logic of the settlement. Rocinha suffers from a lack of many services: safe, reliable water and power supply, sewer systems, trash removal, public spaces, and circulation routes. In addition to these, there are also critical shortages of schools, medical facilities, social services, and mass transit.

Figure 3: Rocinha, site analysis. Student work, team project. considerations with their design work. For many, this invested it with deeper personal meaning and resulted in exceptional commitment to their projects.



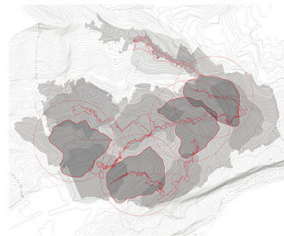
### WALKING RADIUS

Creating a network for circulation provided an answer for connecting each zone, but to make traveling easier walking radii of 5 minutes, considering topography, were looked at to find areas where medium sized spaces could fit. These would give breaks to someone traveling through the favela.



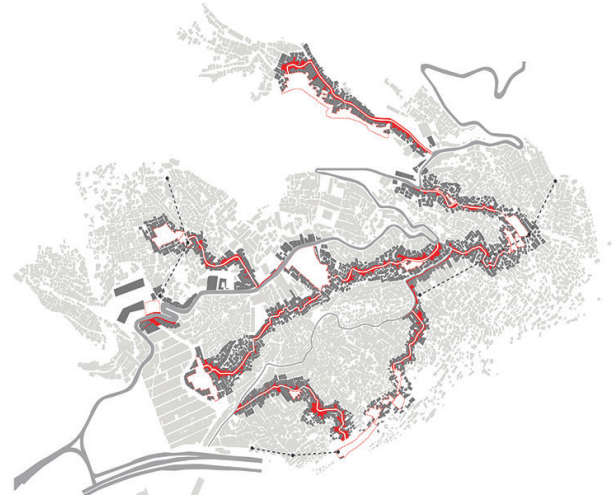
### CONNECTIONS

After deciding where each space would be located, more precise plans were created considering the topography and features of each zone. Connections between them then had to be made creating a network that provides circulation between each zone and ultimately the entire favela.



### INTERMEDIATE RADII

Once the walking radii were adjusted to account for topography, gaps were clearly visible along the main arteries that connected the public spaces. Using the same technique, these radii determined placement of smaller intermediate plazas in areas not yet accounted for.



### FINAL PLAN

Considering features of each zone, connections, and walking radii, a final plan was developed for each space, and the overall network. The six spaces were developed in pairs based on similarities between the zones.

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Some of these shortages are now being addressed. In 2007 the federal government funded projects for some of these missing programs through PAC. A day care center, sports center, and emergency health care center were all included in the package of PAC-1 interventions. These projects are a good start, but more must be done to fully address the scale of Rocinha's needs. Furthermore, the size of these buildings often requires that they be built along substantial roadways such as Estrada da Gavea, clustering them all in the most developed and affluent parts of the settlement. Providing services to the poorest sectors of the settlement will require coupling plans for new facilities with strategies for improving access.

Sewers and trash collection are also major problems. Open sewers within the settlement and its new sports facility degrade quality of life and threaten the health of residents. Additionally, the lack of an effective storm sewer system leaves the settlement vulnerable to deadly landslides during heavy rains. Luiz Carlo Toledo, the local architect who developed the comprehensive plan for upgrading Rocinha in 2004, points to the sewer system as the most essential project to be completed.<sup>11</sup>

Currently, 100 tons of trash is collected daily, although the estimated daily production is much higher, resulting in piles of it accumulating throughout the settlement. According to Carlos Roverto Osario, a municipal secretary of conservation, a shortage of roads capable of accommodating trucks and equipment is a major issue to be resolved before trash collection services may be improved.<sup>12</sup> Addressing sewers and trash collection will require significant restructuring of the settlement's circulation system.

Figure 4: Rocinha, increasing void space in the fabric for circulation and public space. Student work, Christian Borgan and Kyle Beneventi.

## INTERVENTIONS IN THE FABRIC

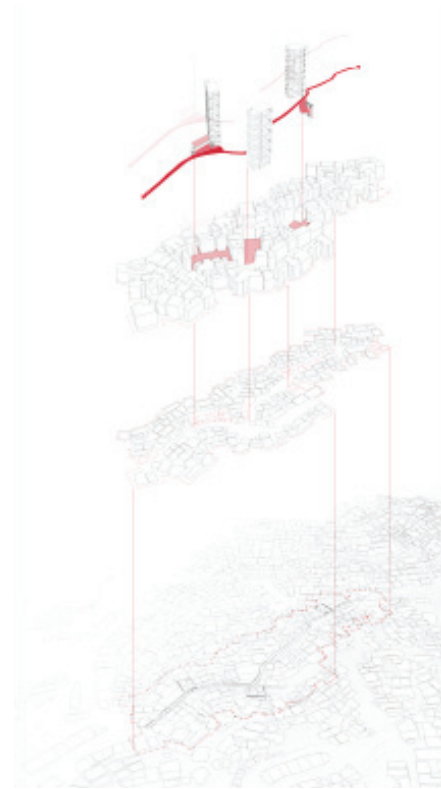
In the 1970s the World Bank began promoting on-site upgrading of informal settlements. It convinced the Brazilian military dictatorship, which had adopted a policy of razing and resettlement, to include at least one upgrading project as a condition for a large “low-income” housing loan.<sup>13</sup> The World Bank was not the only source of such ideas; small programs implementing similar approaches were springing up at various levels of government, beginning as early as CODESCO in 1968.

In 1985 the dictatorship ended, restoring democratic rule to Brazil and shifting the balance of political power. In Rio de Janeiro, where roughly a third of the population was living in informal housing, this rendered favela eradication programs politically unsustainable.<sup>14</sup> By the early 1990s Rio’s favela residents had the municipal government’s attention, and small-scale but benevolent assistance policies were being adopted. Finally, in 1994 the more substantial Favela Bairro program was undertaken, suggesting that a more committed, long-term approach to settlement upgrading had begun.

The Favela Bairro program recognized informal settlements as legitimate parts of the city and focused on upgrading infrastructure and legalization of tenure for residents. Its ambition was to integrate favelas with adjacent formal neighborhoods by transforming their physical, legal, and economic contexts. It established a participatory design process to achieve these aims, involving residents in decision making and hiring workers from within the settlement. This program and its many successors placed priority on maintaining the social and economic bonds of the settlement, recognizing them as essential elements to preserve and build upon during the process of upgrading.

What is the importance of this program? First, it was adaptable to many contexts, and it was successful. It was not perfect but did result in real, measurable change where it was implemented and thus became a model for other initiatives. Second, it focused not on producing housing, which had been the focus for decades, but on the production of public space. In doing so, it prioritized the urban environment, suggesting new possibilities for urbanism as a spatial practice in these places. Last, it revealed the conflicting demands such work must address. If priority is placed on maintaining existing social and spatial networks, preserving existing building stock becomes essential. At the same time, introducing new elements into the typically dense, granular fabric of the favelas demands some restructuring or removal.

Rocinha’s fabric presents exactly this challenge. The work that flowed from students’ attempts to balance these issues was tactical in nature, seeking to generate a maximum effect from interventions with minimal footprints. Projects grouped into three categories: those that integrated new circulation, those that integrated new programs, and those that integrated new infrastructures. Many also dealt with the collateral effects of their interventions, developing strategies to relocate displaced residents as part of their planning. Thus, many projects were hybrid in nature.



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Figure 5: Rocinha, increasing void space in the fabric by shifting density from ground plane to tower. Student work, Christian Borgan and Kyle Beneventi.



## ENDNOTES

1. United Nations Human Settlements Programme. 2003. *The Challenge of Slums: Global Report on Human Settlements, 2003* (Sterling, VA: Earthscan).
2. Ibid.
3. Mike Davis, 2006. *Planet of Slums* (London: Verso), 55.
4. Fernanda Magalhaes and Helia Nacif Xavier. 2003. "The Case of Rio de Janeiro, Brazil," in *Understanding Slums: Case Studies for the Global Report on Human Settlements Urban Slums Report*, 2-3.
5. It shares this distinction with a settlement in Havana, Cuba. Roberto Segre, "Formal-Informal Connections in the Favelas of Rio de Janeiro: The Favela Bairro Programme," in *Rethinking the Informal City: Critical Perspectives from Latin America*, eds. Felipe Hernández, Peter Kellett, and Lea K. Allen (New York: Berghahn Books, 2010), 165.
6. Fernanda Magalhaes and Helia Nacif Xavier. 2003. "The Case of Rio de Janeiro, Brazil" in *Understanding Slums: Case Studies for the Global Report on Human Settlements Urban Slums Report*, 9-10.
7. Robert Neuwirth. 2006. *Shadow Cities: A Billion Squatters, a New Urban World* (New York: Routledge), 26-30.
8. "Bairro: Rocinha," *Rio Prefeitura*, accessed on September 15, 2012.
9. Robert Neuwirth. 2006. *Shadow Cities: A Billion Squatters, a New Urban World* (New York: Routledge), 45-49.
10. Juliana Barbassa. "Brazil Economist: Rio Slum Poised for Improvement," *Boston Globe*, November 16, 2011, accessed September 17, 2012.
11. Rogerio Daflon and Ruben Berta. "Na Rocinha, Construcao de Planos Inclinaados, Cresce Mercado Esta Parada," *O Globo*, July 19, 2011, accessed November 17, 2012.
12. Ashley Cantor. "Living in Rocinha: Post Pacification," *Rio Times*, November 29, 2011, accessed November 27, 2012.
13. Janice Perlman. *Favela: Four Decades of Living on the Edge in Rio de Janeiro* (Oxford: Oxford University Press, 2010), 272.
14. Ibid, 273.

Design strategies were generally consistent with the principles set forth above and led to a variety of different proposals for strengthening and redirecting existing structures within the settlement, the majority of which incorporated new public spaces as a core element. These schemes revealed multiple ways that the settlement could transform productively, supporting existing spatial typologies and patterns of use while simultaneously absorbing new spatial and infrastructural hierarchies.

## CONCLUSION

It seems inevitable that market forces and political pressure will push informal settlements such as Rocinha into a form more closely resembling the formal city in its available services and infrastructures. This is especially true in countries such as Brazil and Colombia, where financial resources and the political will to address urban poverty at this scale exist. Current approaches in many Latin American countries encourage the belief that thoughtful restructuring of the spatial realm will play a central role in this work. Such change will almost certainly be accompanied by taxation and many other obligations of citizens in the formal city, permanently changing their way of life. Opportunities to what seems less certain are how the physical environment will change.

The amount and configuration of eventual void space seem most difficult to predict. The assumption that public transportation, utilities, and other infrastructure must find their place in these settlements does not necessarily lead to the conclusion that they will take familiar forms, carving orderly thoroughfares out of the dense fabric. Indeed, recent projects in Medellin, Caracas, and Rio de Janeiro have all established gondola systems as the principal mode of public transportation.

This strategy suspends lines of movement above the urban fabric instead of running them through it, preserving as much of the building stock as possible. Voids in the fabric need only occur at stopping points where public space may be established as well. Such configurations allow the settlement to flow freely under the lines of movement and minimize the amount of demolition required to provide public transit. These, like many such solutions, are more successful in some cases than others, but they suggest that different and new spatial structures are capable of developing as these settlements upgrade and that urban form in these places may be shaped in unexpected ways as they evolve to integrate new infrastructure. ♦