



URBANIZATION PROJECTS IN THE STATE OF SÃO PAULO

UNIVERSITY, SOCIETY AND CITIES

JEFERSON C. TAVARES (ORGANIZER)



COORDENATION



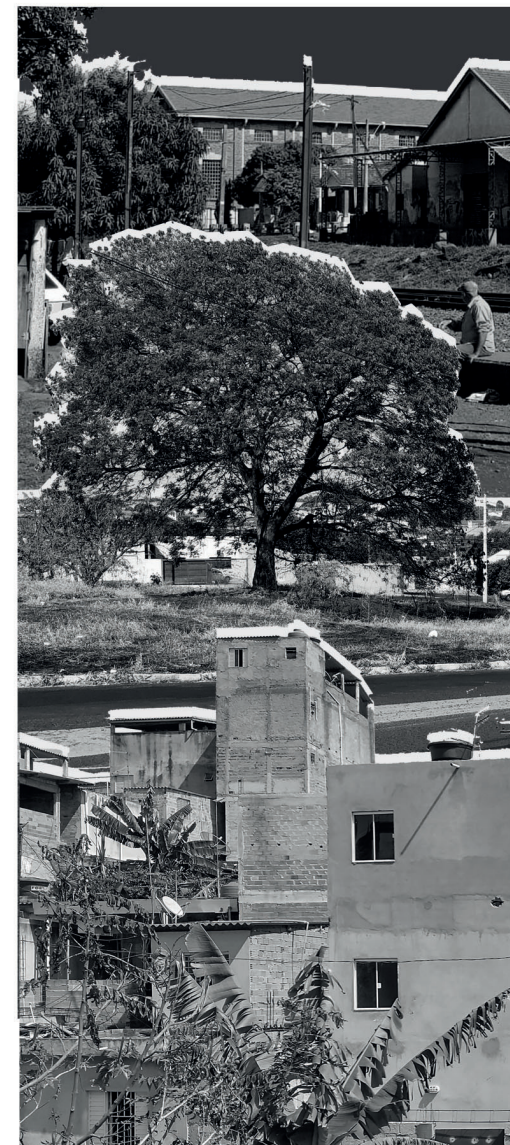
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INTRODUCTION

This book presents three urbanization projects in the state of São Paulo that were developed in network, through a circuit of simultaneous actions and based on new perspectives of territorial assumptions. They were developed at the University of São Paulo (USP), based at the Institute of Architecture and Urbanism and with collaboration of professors and students from the School of Engineering of São Carlos, the School of Law of Ribeirão Preto, the School of Architecture and Urbanism, and the School of Arts, Sciences and Humanities. They benefitted from partnerships with the municipal governments of Araraquara-SP, Cordeirópolis-SP and São Paulo-SP, with the Union of Housing Movements (UMM), the Mutual Cooperative of Work and with civil society (citizens and the Cachoeira das Garças Association), between February 2021 and October 2022.

With the purpose of expanding the reflection on urbanistic practice and the role of the university in public management and society, the book is divided into three parts:

Part I, with the projects of Vila-Praça in Araraquara-SP, Parque Ferroviário in Cordeirópolis-SP, and the Urbanization of the Cachoeira das Garças Community in São Paulo-SP

Part II, presenting the circuit of actions of the three projects, demonstrating the outreach of academic activities in society and how these actions contribute to the critical formulation of urbanistic alternatives

Part III, with the list of institutions, resources, bibliographic references and people involved.

This book aims to promote the dissemination of works, but also to instigate debates on ways to integrate university research, education and extension in the social and environmental improvement of Brazilian cities. Since, although this publication is motivated by the experiments in the field of urbanism, they are explored considering the university as an important niche of innovation in relation to decision makers.

These experiments were integrated and made possible with the help of funding programs from the University of São Paulo (from the Dean of Undergraduate Studies, the Dean of Research and the Dean of Culture and University Extension). And the support of professors, students and employees of the Institute of Architecture and Urbanism (IAU-USP) including its Research, Graduation, and Culture and Extension commissions.

The results presented and the procedures, stages and discussions are the product of intense collective work including professors, students, public managers, social organizations, and communities. This particularity draws the projects away from individual authorship and brings them closer to a collective practice of propositional reflection and criticism. And it proves there are alternatives to face housing, environmental and urbanistic issues in an integrated manner and within inter-federative and intersectoral public policies.

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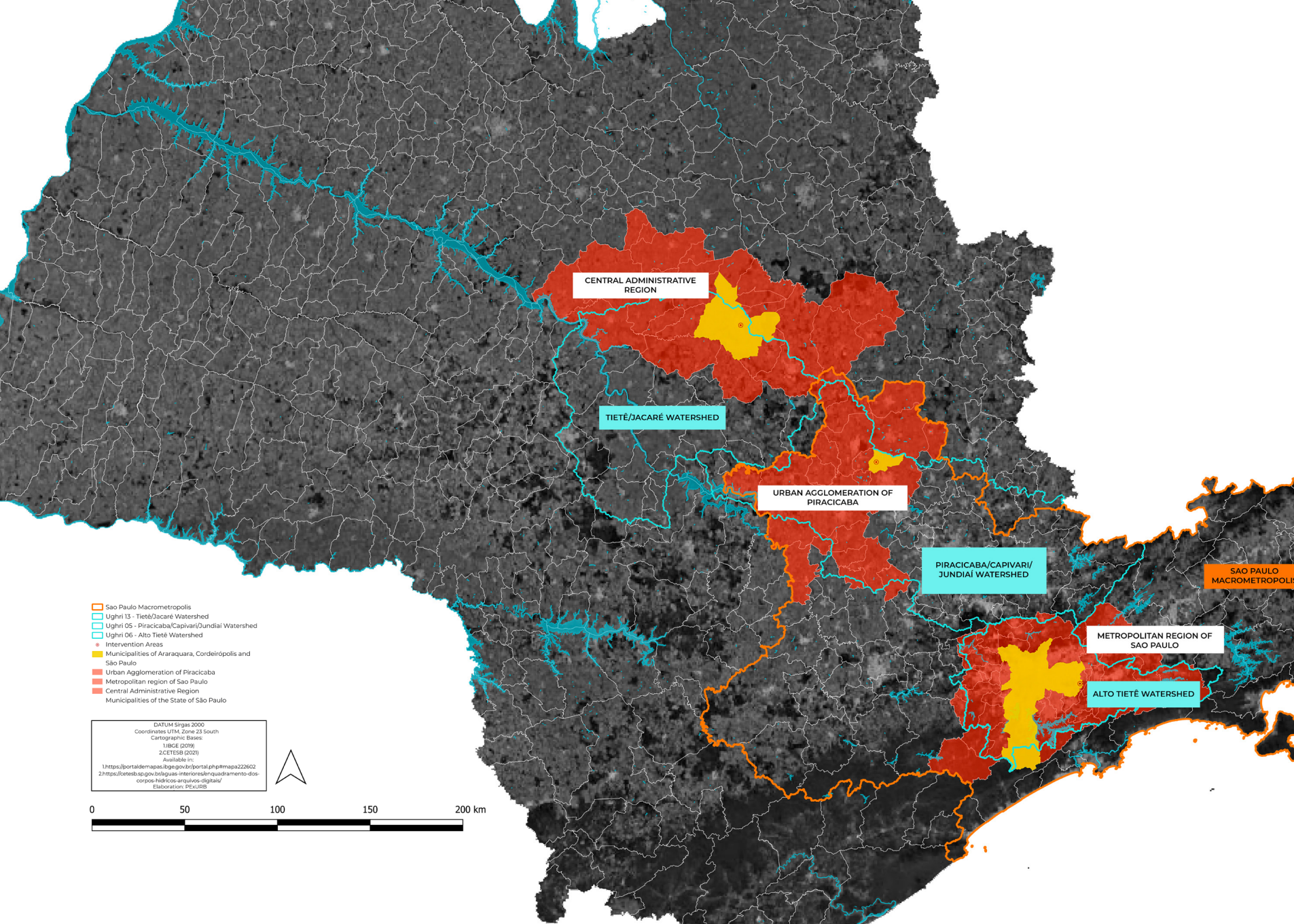
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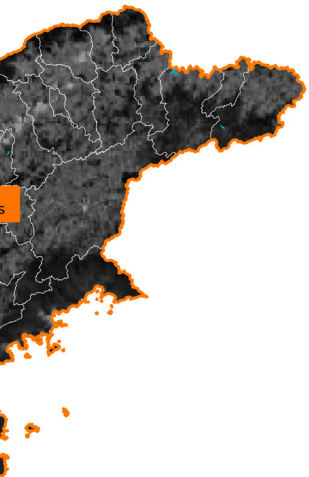
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PART I

PROJECTS





PROJECTS IN NETWORK

The projects were consolidated in a network with the strengthening of solidarity ties between the cities involved and the transfer of experiences. In the course of their design, the particularities of each area were valued because they present different stages of development and degrees of social and environmental vulnerabilities.

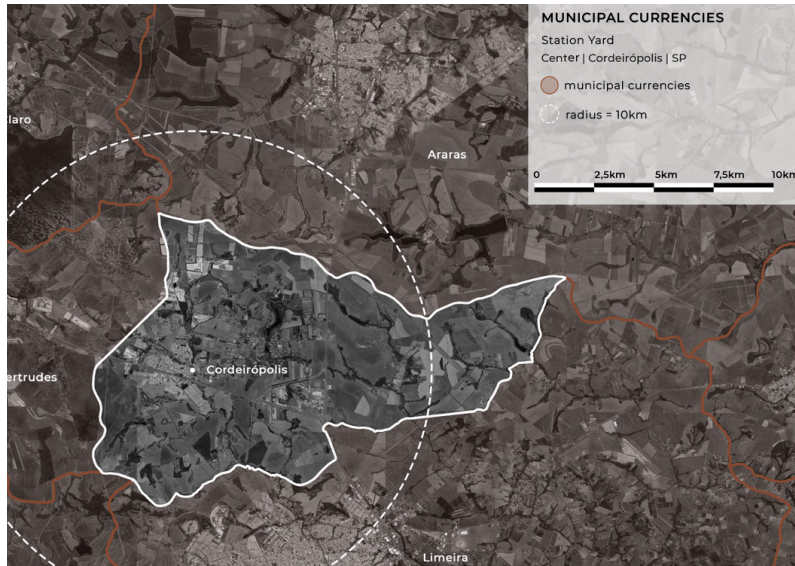
Distributed along an important development axis in the state of São Paulo, the areas can be succinctly characterized as follows:



Figures 1, 2 and 3
Location and readings of the
surroundings of Jardim Pai-
neiras in Araraquara - SP.
Source: PEXURB Group

a. Jardim das Paineiras, Araraquara-SP: demand of 45 families from risk areas and registered by the municipal government to be settled in a municipal land of 13,925.12 m². The land is located in an urbanized neighborhood between Alberto Santos Dumont Avenue, José Carmona Street and Mario Possetti Avenue and the resettlement is conducted within the scope of municipal land regularization program;

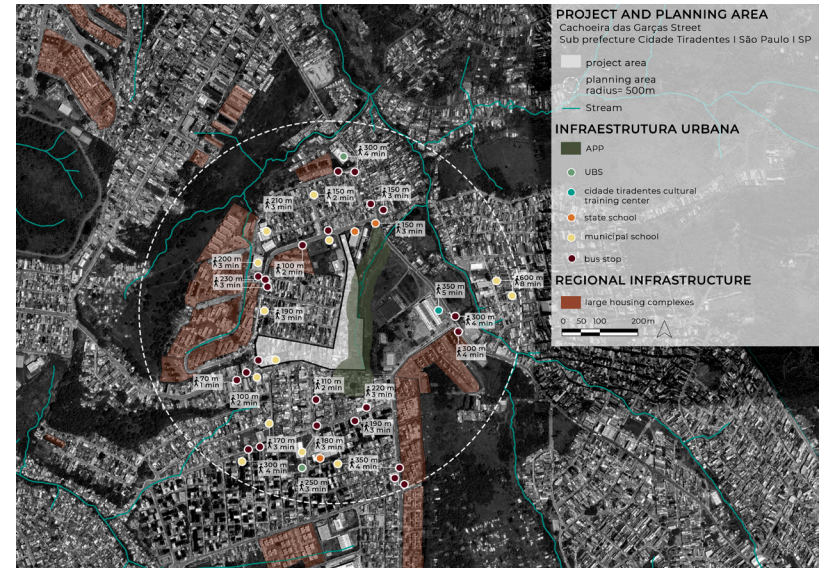
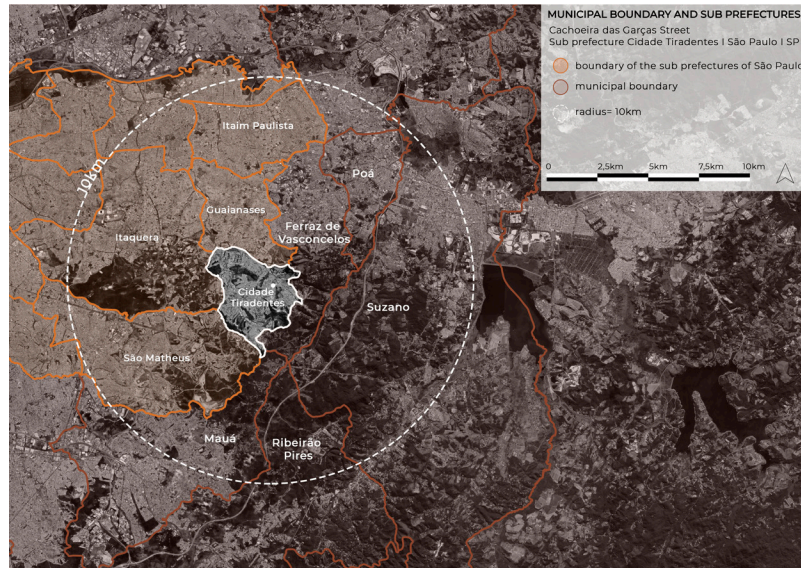




Figures 4, 5 and 6
Location and readings of the
surroundings of Pátio da Es-
tação in Cordeirópolis - SP.
Source: PEXURB Group

b. Pátio da Estação, Cordeirópolis-SP: 50 families live in the railway village, in federal government area and next to the permanent preservation area of Ribeirão Tatu. It has an area of approximately 95,831.57 m² already registered by the municipal government, but without a previous project, although it is part of the Meu Pedaco de Chão Municipal Program that subsidizes resources for housing construction and promotes financing for the purchase of land;

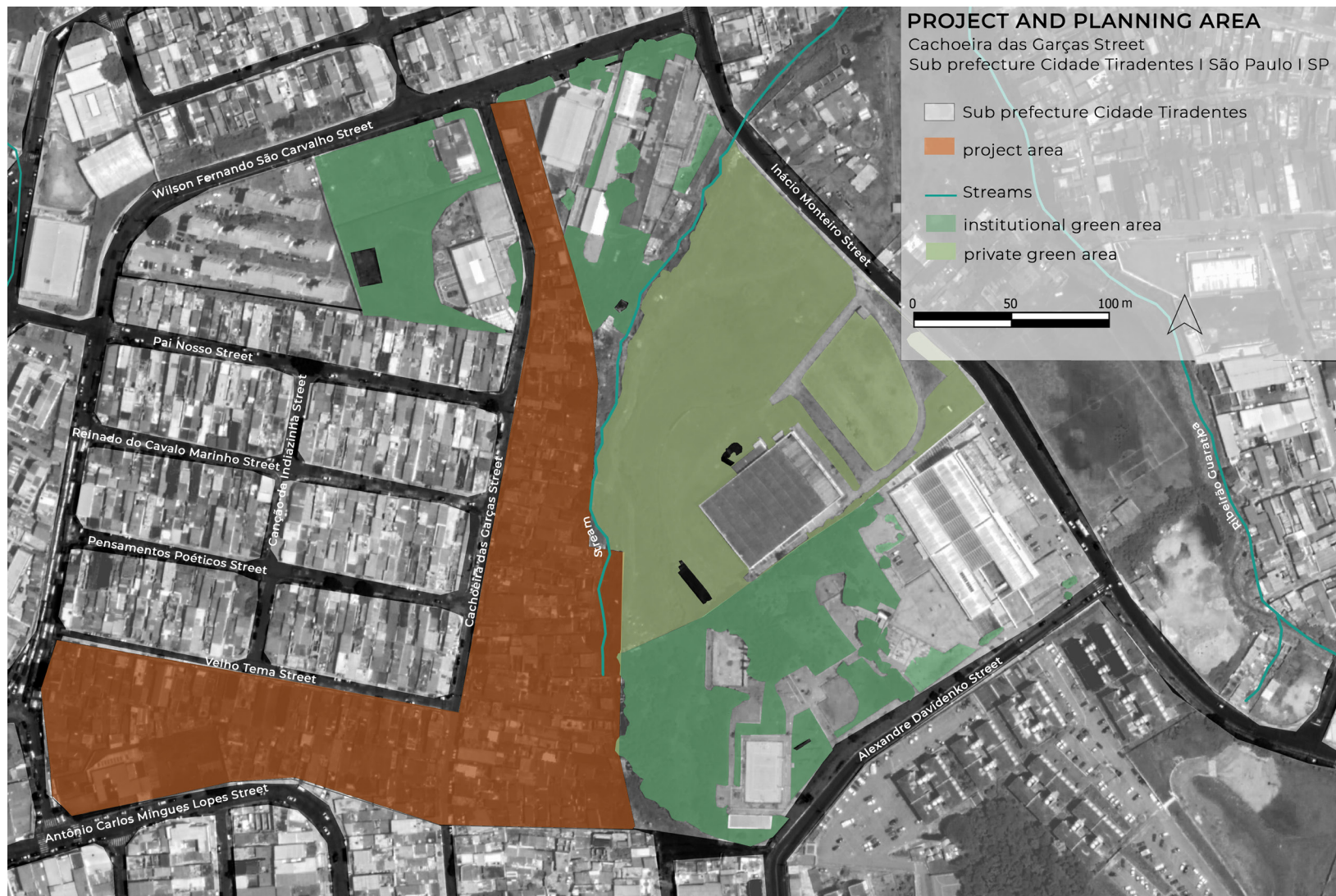




Figures 7, 8 and 9
 Location and readings of the surroundings of the Cachoeira das Garças Community in São Paulo - SP.

Source: PExURB Group

c. Cachoeira das Garças Community, São Paulo-SP: precarious settlement of approximately 500 families occupying the green area of the Sítio Conceição Housing Complex (1,078 units), built by Cohab between 1987 and 1989 in the eastern part of the city. It has an area of 14,203.66 m², and is located next to Cachoeira das Garças Street. It is an area demarcated as ZEIS (Special Zone of Social Interest), but in a permanent preservation area over which there is a spring and a tributary brook of the Guaratiba stream. There are no environmental or urbanistic studies for the area and it is assisted by the Cidade Tiradentes Cultural Education Center.



The settlements have social organizations in different stages and with different characteristics that required experimentation with methodologies and expanded the opportunities for an integrated and political view of the urbanization processes that contributed to their formation. The condition of precariousness and of community or institutional structuring justified the presence of actions for planning in the area and for land regularization, reinforcing the social aspect of the practices.

Taking into consideration the current forms of urban and housing production and the fields of work of architects and urbanists, the projects aimed at the diffusion of new project tools to be used in the conquest of the right to the city. In this aspect, the projects promoted the development of knowledge and enabled the exchange between different professional areas and agents related to the field of social housing and urbanism.

Furthermore, the experiment of these works sought to develop a methodology for implementing projects considering the weaknesses of orthodox methods for surveying, urban mapping and access to content produced about the city and its dynamics. The practices developed provided debate as a facilitating tool for spatial and identity empowerment in precarious settlements, considering intrinsic issues and specificities of social groups and their contexts.

TERRITORIAL ASSUMPTIONS

The projects were founded on the understanding of what the city has become through institutionalities, precariousness, activism and the role of the State. And that precarious settlements, because they are outside the interest of the formal market — and to a certain extent, of conventional formality —, can constitute places of innovation, of constitution of new institutionalities, with cooperation connections and, in the case of projects in network, cross-connections that break with the top-down, pyramidal planning hierarchy. So that the urbanistic practice constitutes networks of projects, but also networks of sociability and learning across the territory.

Topics such as the post-covid city, cooperation, solidarity, circular economy, food security, access to land, water, climate change, labor relations, and urban-regional territorial relations were transversal to the solutions adopted. And they were guided by investigations that sought to understand housing precariousness within a broader territory of social relations that have common

characteristics due to basic problems.

These are factors that proved that it is not the size of the city that conditions more or less complex, larger or smaller issues; and that the scale issue does not refer to dimension, but to the disputes that are innate to the urbanization process. This implied an understanding of the urbanization process, the regional role of the city, its part in the environmental context of hydrographic basins and the socioeconomic composition of these communities.

And when analyzing the role of the State in the search for solutions to these issues, we observe standardized public policies that, in turn, result in the standardized production of space. These conditions intensify the reproduction of similar issues in different territories with different temporalities. In the three cases discussed, the following were common: legal insecurity of the property; risk of floods and landslides; unsanitary housing; precarious housing; over-density of buildings and people; interference with large infrastructure; occupation of a non aedificandi area; degradation of the environment; inviability of development of economic activity in homes; invisibility of gender, race and class conditions; and domestic violence.

While it can be said that although the issues are similar, their stages of development and their territorial particularities are quite distinct. Evidence that requires a repositioning of the role of the State and that reaffirms the need to dispute it for the notion of justice and not just law enforcement.

Ownership, under these conditions, is a way of advancing to environmental debate for social security; and titling should not be interpreted as a way of accumulation, but as a guarantee of the permanence of these people in the city, security of tenure and the possibility of decision-making. It should be interpreted as quality of life in the face of the alternation, or absence, of social and territorial public policies. Therefore, it is avoiding the transformation of poverty into a market to be exploited by the recent flexibilization of land and environmental restrictions or the privatization of

land regularization services.

This gives land regularization an important role in terms of formalization and guarantees for the strengthening of people who are in precarious conditions (without title deeds, property, possession, etc.). A means to stop the exploitative forms that result from the State-Capital relationship, guaranteeing rights associated with citizenship. And to understand that residing does not only imply the construction of housing, but also the right to the city, to environmental quality and to urbanistic values.

These elements are consistent with the labor basin that involves each municipality and directs the opportunities of the poor classes. This relation is reinforced by the regional aspect of administrative scope, of the hydrographic basins and infrastructure that directly or indirectly affect the area. And based on these standards of facilities and management/regulation of regional and urban spaces, these areas function as important parts in the maintenance of cities as we know them.

Therefore, a new perspective on territorial assumptions implies the recognition of common points between areas and the understanding that different regional conditions (urban agglomerations, administrative or metropolitan areas) can influence decisions for environmental and social improvements. Climate change, intensification of extreme events, worsening of water and air quality, and social vulnerability impacted decision-making considering these areas as a small but important part of the city because they represent the possibility of changes in the planning and urbanization paradigm. Composing systems, they are potentiated by decisions in network that are shaped by local and regional particularities.

The integrated analyses made it possible to observe some common factors between the three areas, even with different origins and contexts (small-sized, medium-sized and metropolis).

The three areas covered are close to regional infrastructures (power distribution, railway, highway, airport, housing projects) with reciprocal interferences between regional and local scales. They have — or are the result of — a long history of public policies (productive, social, economic) that confirm the presence of the State in their formation and in the orientation of private resources. They are part of regional organizations (agglomeration, metropolitan or macro-metropolitan) whose social dynamics and labor relations demonstrate this particularity. And they constitute systems (environmental, housing or labor) that require equally systemic and integrated solutions across different sectors.

Locally, they confirm the social segregations due to the concentration of poverty and spatial precariousness. They have housing as the main demand for improvements that motivated the projects, but they represent important opportunities for recovery of the hydrological cycle and water resources. These are monofunctional, underused areas, served by infrastructure (facilities for public services, sanitation, mobility), but which do not fulfill a social function in the context of which they are part. They are public areas (belonging to the federal or municipal governments) and originally had — or should have had — other functions within the productive system and the forms of subdivision in force in the period in which they were originally divided.

They have different origins and complexities, but show tangencies of the urbanization process along an important axis of development of the state of São Paulo formed by the Anhanguera-Bandeirantes-Washington Luis road system. Above all, due to the different temporalities guided by productive modes, interfederative clashes, real estate, sectoral and class disputes. However, they all have surroundings characterized by facilities and minimum conditions of urbanization provided by public and private services, reaffirming this condition of urbanization in São Paulo (capital and countryside).

And their particularities led to opportunities for valuing cultural heritage, natural resources and social relations through transversal decisions of public policies that favored the optimization of resources of different secretariats. Based on the fundamental need of housing, the proposals are structured by the public space and determined territorially structural solutions, but possible at the local level as parts of a broader and more desirable system for the city or region.

They incorporated an innovative urban agenda that is focused on the circular economy, income generation, safety for women and children, social inclusion, mobility and restoration of the hydrological cycle with architectural, urbanistic and landscape solutions. In the end, they fulfilled purposes associated directly or indirectly with learning through the territory, the integration of public policies, social mobilization and the fight against inequalities and segregation. And they have become consolidated as methods that can orient new actions in other municipalities, not through the reproduction of solutions, but through the reference of approaches.

The projects are presented through a Technical Data Sheet with synthetic data about the project and through a Descriptive Memorandum that presents the reflections, inventories, theoretical-conceptual approaches and a more detailed description of the design decisions.



URBANISTIC PROJECTS

VILA-PRAÇA IN ARARAQUARA-SP



TECHNICAL DATA SHEET

Scope

Implementation of 30 lots in a public area (green area of Jardim das Paineiras) located between Alberto Santos Dumont Avenue, José Carmona Street and Mario Possetti Avenue, based on the municipal land regularization program.

Topic

Housing deficit and judicialization of public policies.

Area

The site is a public area for the green system of the Jardim das Paineiras lot subdivision. It is at the head of a stretch of the hydrographic sub-basin; therefore, it represents an area of environmental interest. The environmental situation is also influenced by infrastructures and economic activities at a regional level, due to the proximity to the SP-225 highway, the Bartholomeu Gusmão airport and the sugar cane cultivation area, which are sources of atmospheric pollution. In addition to the presence of a High-Voltage Line strip and retention ponds along the Água Branca stream.

Objective

Implement land subdivision that is integrated with the use of public spaces, options for income generation and environmental strategies.

Main issues

How to create multiple-use environmental corridors, consider the legal aspects of the master plan, take into account the original public use function of the area, incorporate in the project the locational advantage for the view of the city center, and take into account the possible connections (environmental, social, visual) of the surroundings? How to consider regional infrastructures as motivators of solutions that are territorially broader than the geographical limits of the project area?

Program

Implementation of at least 30 lots for social housing, commercial space, square, community vegetable gardens, urban garden under the high-voltage line, income generation activity through space for street market, guaranteeing city views, draining green area system, pedestrian safety in the roundabout crosswalk area, incorporate the several bus stops around the area, green infrastructure in the square, incorporate the concepts of safe streets, leverage the slope and existing vegetation, contribute to the hydrological cycle, maintain the supply and recharge of the water table at the headwaters, reinforce fauna and flora corridors.

City Concept

The city envisaged in the project is multifunctional, as diversified uses of housing, food production, income generation facilities, public space and coordination with urban and regional infras-

structures are integrated in the same block.

Urbanistic Unit

The urbanistic unit adopted is the block and its multiple forms of morphological configuration that can provide public and private uses, constitute paths, connections, integration with the surroundings, and infrastructure provisions.

Design approach

Form a village-square overlooking the city center, which maintains the pedestrian flows of Jardim das Paineiras, intended for the resettlement of 45 families (additional 50% in relation to the original demand) and connecting environmental corridors formed by the permanent preservation areas and green strip of the High-Voltage Line.

Solutions

Land division with the purpose of constituting a functionally diversified space that adds housing, income generation activities, the constitution of visual, circulation, fauna and flora axes, contributing to the hydrological cycle and air quality. Therefore, it is not a standard subdivision, but infrastructure of environmental compensation for the containment, retention and infiltration of water in addition to the constitution of a central square associated with social housing.

Implementation

A central square was formed whose main attraction is the view of the city center and which allows for different uses and the permeability of the soil. The lots were implemented with different orientations aligned to and facing the sidewalks, promenades and square in order to promote the diversity of uses and safety in public spaces. The paths form small patios to increase social permeability and provide continuation of the surrounding urban fabric. Urban vegetable gardens were planned to stimulate activities in the neighborhood and to generate income. The generation of income can be supported by space for street market (marquee) implanted in the square with leisure infrastructure (tables and benches), which can also be used for recreation. The rain garden in the lower part of the square symbolizes the project's intention to treat water as a central issue in the city. The slope allows the downstream houses to be located without obstructing the view of the central hill from the upstream houses. The sidewalks are 6.4 meters wide to accommodate existing trees. The location of internal paths and courtyards were also planned for the same purpose. The raised crosswalk in the entire area of the road crossing aims to increase pedestrian safety without the need to interrupt traffic.



①

IMPLANTATION

lots with different orientations and connected to circulation: they promote gender security by ensuring diverse and permanent uses in all spaces



①

SOCIAL HABITATION

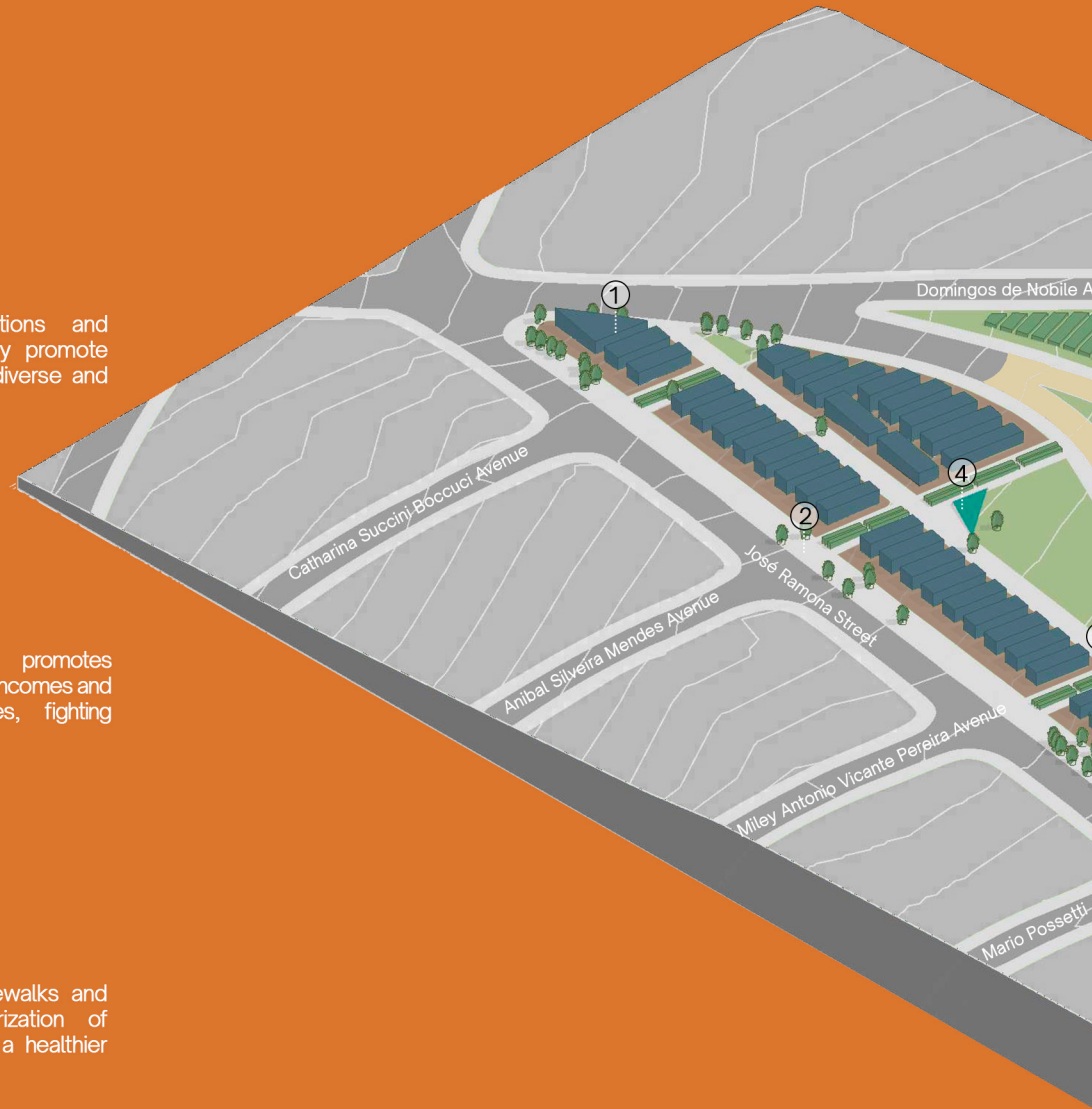
attend the housing deficit, promotes habitation for people of different incomes and intensification of mixed uses, fighting inequality



②

WALKABILITY

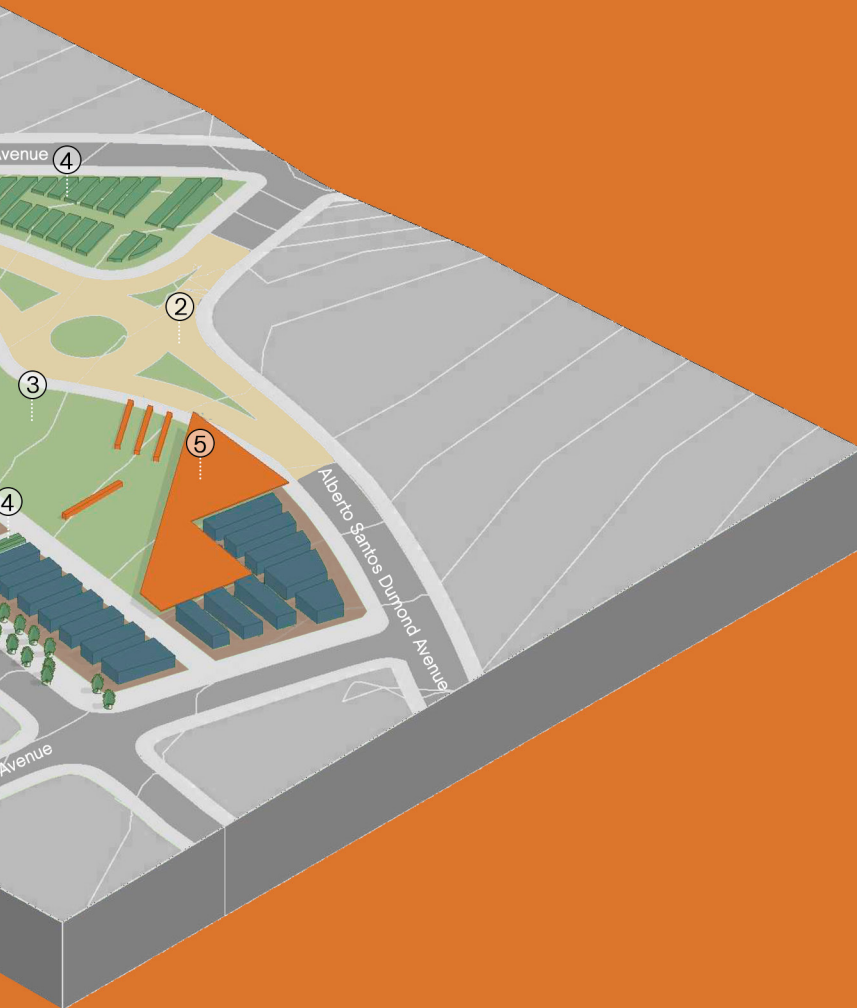
different types of roads, sidewalks and boardwalks favor the valorization of pedestrians, collaborating for a healthier city



Subtitle

- Social habitation
- Lots
- Elevated crosswalk
- Lawn

- Space for fairs: marquee and be
- Urban gardens
- Rainbed
- Recyclable permeable flooring



inches

0 20 50 100



3

PUBLIC SQUARE
functions as green infrastructure,
water retention, reconstitution of the
hydrological cycle, urban afforestation
and combating climate change



4

PERMEABILITY
grassy areas, permeable and recyclable flooring
and use of sustainable building standards
contributing to create sustainable cities
URBAN GARDEN
sustainable development contributing to food
security



5

SPACE FOR FAIRS
provides a place for income generation for
residents and contributes to the reduction
of inequality



DESCRIPTIVE MEMORIAL

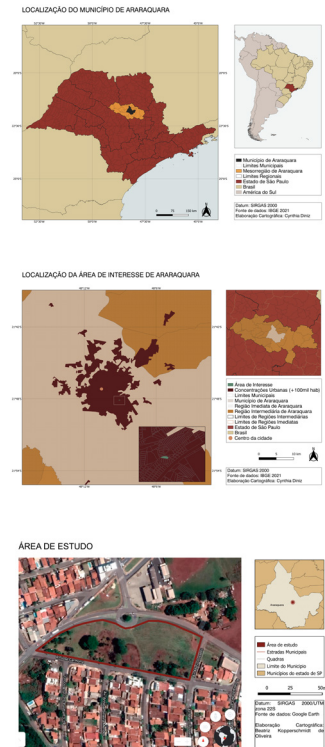
Problematization

The municipality of Araraquara has 208,662 inhabitants, shows characteristics of a medium-sized city, and forms a conurbated area with São Carlos-SP and Ibaté-SP along the Washington Luis highway. Medium-sized cities in the state of São Paulo provide important opportunities for high quality of life and great opportunities for development at lower costs than large cities or metropolises. These characteristics have led to territorial dynamics that, since the 2000s census, indicate demographic and economic growth in these cities.

The basis for the formation of São Paulo cities of this size is found in the regional development policies adopted with greater emphasis since the 1960s. These policies poured resources into cities with potential for industrial development and located along the main road axes, fostering the expansion of productive activities toward the interior portion of the state of São Paulo. The direct result was the formation of polarized systems of cities along the highways that play an important role in the urban-regional hierarchy of these axes.

The polarization of development has been reinforced by public works and private investments over the last three decades, which have transformed the hubs into important financial nodes, as they concentrate a growing real estate market, the implementation of new industrial activities, public and private service centers (education, hospitals, leisure, etc.). This transformation has formed continuous strips of urbanization that are characterized by urban dispersion and the metropolization of everyday life.

Urban dispersion operates by pressure on the Cerrado area with expansion of the urban fabric and the consolidation of new neighborhood centers and even new centralities. And metropolization in-



Figures 7 to 9
Location of the study area.
Data source: IBGE and
Google Earth. Cartographic
elaboration: Cynthia Diniz
and Beatriz Kopperschmidt.

tensifies regional relations in people's daily lives through regional markets and increased intermunicipal commuting. The community's resettlement site illustrates this reality by being located in a neighborhood of urban expansion, close to regional infrastructures linked to the expansion of the urban economy (such as highways, airport, power transmission line). But also urban infrastructure linked to water management and flood prevention (such as retention basins in the Água Branca stream floodplain) that seek to minimize the impact of urban expansion based on the reproduction of gray infrastructure.

In addition, they are neighborhoods with different social classes, equipped with quality public services and regulated by the municipal master plan. Conditions that confirm that even in the face of urban expansion, these types of medium-sized cities manage to guarantee the minimum conditions of habitability.

With an urbanization process characterized by urban dispersion and by the metropolization of everyday life, this proposal seeks to resize the scale of the project so that its solutions meet the socio-environmental aspects in a circumscribed area of the territory, but with wider reverberations. And that can be introduced in public management by public policies intensifying their results.

Local, regional and social aspects

The land is located in the region classified as ZOEMI-ACOP. The ZOEMI — Special Mixed Use Zones — comprise the largest urban territorial portion and are areas and fragments intended for the multifunctional use of urban land, typological diversification and commercial and service activities up to environmental interference level 2 (NIA 2), prioritizing the production of the compact city. They are subdivided into other types of zones, including the ACOP.

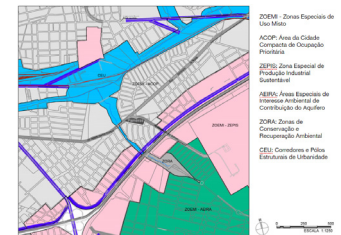
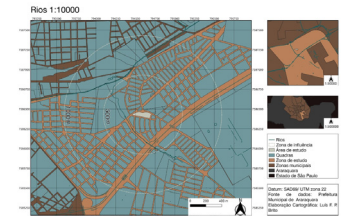
The ACOP — Compact City Area of Priority Occupancy — represents the largest territorial sub-

division of the zoning; it is one of the priority and strategic zones for inducing and consolidating the urbanization process, encouraging the construction in urban land and the occupation of idle, unused or underused urban properties, according to sustainable city concepts. The urbanistic parameters are: Maximum occupancy rate: 70%; Basic utilization index: 2.00; Maximum utilization index: 4.50; Permeability Index: 20%; Vegetation cover index: 10%; Net density: 1,200 inhab/km². The master plan considers this part of the city as a privileged point of view in relation to the central occupation hill.

The population to be served will be registered in municipal housing programs. The Minha Morada program is a municipal program for urbanized lots (lots with water, electricity, sewer, etc.) to serve families without housing alternatives with the ending of the Minha Casa Minha Vida program — range 1; who have an average income per family member of R\$ 499.00; family income less than or equal to 1 minimum wage; priority for high degree of want, the elderly, people with serious illnesses, families in risk areas, women victims of domestic violence. The plan is to immediately benefit around 250 families in the first call, with a target of 3,000 families in total.

For service, the lot must be located close to social public facilities such as CERs — Specialized Rehabilitation Center —, schools, health care units, and CRAS — Reference Social Care Centers. The houses must have up to 69 m² of building, a minimum lot of 125 m², with a minimum frontage between 6.5 m and 7.0 m. Car parking spaces or area with an estimate of 1 parking space for every two units, measuring 4 x 2.5 m. The lots can have mixed use and the buildings can have up to two floors, with setbacks of 4 m in the front, 2 m in the back, 1.5 m on the side when there are openings. In the case of the present lot subdivision into parcels, the lots will be donated for self-construction.

According to information from CRIS — Residential Complex of Social Interest —, category of



Figures 10, 11 and 12
Location maps of squares and gardens in the vicinity of the design and planning area; Hydrography around the intervention site; Urban Zoning.

Source: Araraquara Municipality

Horizontal Multifamily Housing according to Supplementary Law No. 910 of August 16, 2019, the project must comply with Chapter II, Art. 4, items I to IX for: sustainable constructions, favoring non-motorized modes of transport, active movement, integrating modes of transport, bringing housing closer to employment and services, locating housing close to service provisions, mixed lot subdivisions to promote sustainable urban development, expansion of areas for interaction and circulation of pedestrians and public spaces.

The area is located in the Jacaré-Guaçu Sub-basin of UGRHI 13 – Tietê-Jacaré, which has actions planned by the state that include pollution control (of soil, air and water), preservation and conservation of biodiversity and control of the use and occupation of urban land for positive impacts on water resources. The basin consists of 34 municipalities, marked by accelerated urban growth with increased demand for water and basic sanitation infrastructure (7th largest total water demand in the state in 2019) and a 43.8% increase in groundwater demand. A total of 100% of surface demand results from agricultural and industrial activity, being the 2nd largest demand for the industrial sector of the state. It has good sanitation indicators, although the greatest effectiveness is observed in small municipalities. It requires forest restoration in permanent preservation areas and environmental adaptations in urban land use.

The area allocated for the project affords a view of the city center, a condition emphasized by the Master Plan, and is bordering the central strip of the High-Voltage Line, the high-traffic roundabout to the southeast sector of the city, the commercial and service areas, and area of recent urbanization provided with basic infrastructure. And it has the potential to be constituted as a microclimate and air quality control strategy, integration of vegetation fragments from the surrounding areas (from the high-voltage line, permanent preservation area, among other green areas), and to serve as a connector for fauna and flora.



Figures 13 to 16

Field trip photographs that demonstrate the use of land in the vicinity of the project area, its proximity to the High Voltage Line, aspects of the vegetation in the place and surroundings and the privileged view of the city center.

Source: PEXURB Group



Figures 17 to 20
Field trip photographs that
show the characteristics of
the intervention site, the use
of the land in the surroundin-
gs and the mobility aspects.
Source: PExURB Group

Initial actions

The main objective was to create a parceling model that would meet social, environmental and urban functions, whose solutions would integrate regional and urban aspects related to labor and the environment. The supplementary objectives of the proposal seek to integrately comply with the requirements placed by the secretariats of mobility, environment, housing and urban planning so that territorial solutions correspond to local public policies. Additionally, the urban unit block was adopted as a strategy for its applicability as a municipal public policy. And it integrated precepts of transport engineering, environmental engineering, public planning and housing policies, as well as social public policies for income generation and social inclusion.

Theoretical-conceptual approaches to solutions

The block, as an urban unit, has represented a means of making decisions about the housing provision that advances to the lot design and has become the main project unit (Vigliecca, Rubano, Recamán, 2014). Housing provision through blocks supposes a coordination of the whole, of the design of the city, its coordination with the street, with free spaces and with the urban form.

In Brazil, some examples that follow this orientation have shaped urban paradigms, such as the implementation of residential blocks in Parque Guinle, in the district of Botafogo in the city of Rio de Janeiro-RJ, designed by Lúcio Costa in the 1940s (Costa, 2018 [1995]). And its best-known variation, the 1957 Brasília superblock, which recovers principles of the early 20th century neighborhood units. The neighborhood unit itself is an expression of efforts to rethink the suburb or the periphery of the modern city according to the Chicago sociological school community framework (Roldan, 2019).

Previous Brazilian examples reinforce the importance of the block in housing provision projects,

such as workers' villages consisting of row houses, many of them terraced. These houses were built at the edge of the lot and at the interface with the sidewalk; or in the core of the block optimizing its underused areas. Effects of the urbanization and industrialization process induced by the private sector in the role of offering alternative housing for industrial workers.

COHAB housing condominiums (Negrelos, 2021) can be considered its state parallel, built on public land and with typological diversity: single-family houses, multi-family buildings, minimal units (embryo) and parceled lots. The mass production to absorb the territorial demographic dynamics and the rural exodus constituted great dismemberments and subdivisions in the form of subdivisions or condominiums, conforming a typological derivation of conventional blocks by traditional occupations of lots, "H" or laminar buildings in the center of the block.

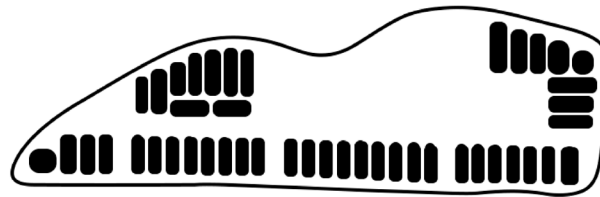
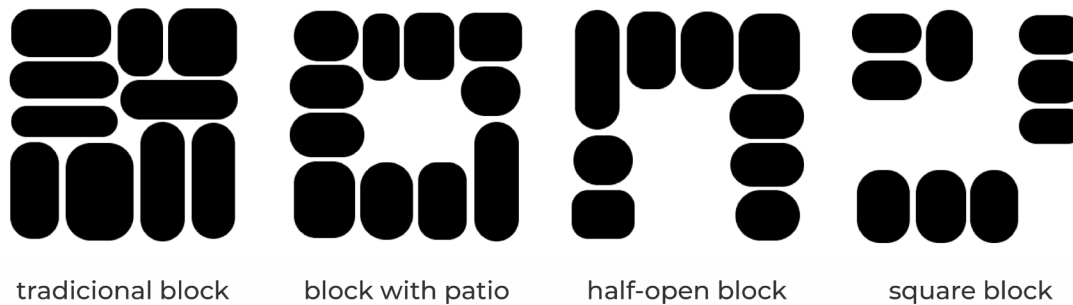
With regular square with approximate dimensions of 100 x 100 m widely used for the expansion of coffee cities in the countryside of the São Paulo state, or the narrow blocks with approximate dimensions of 200 x 50 m that adapt to the standard of popular lots (5 x 25 m), these models alternate and express different temporalities of the construction of cities. In the first case, frequent between the late 19th century and the early 20th century; the second case after the passing of federal law 6,766/1979.

The most contemporary alternative to these models combines the design of the perimeters with the diversified form of their internal division, with provision for unbuilt spaces, passages and differentiated volumes. Called semi-open or open block (Guerra, 2011), this model is common in large metropolitan service developments and incorporates free and green areas as an alternative to the traditional pattern of separation between private blocks and public squares or parks.

Other historical experiments compose a wide repertoire of forms and solutions that, to a greater or lesser extent, are integrated into the topography; related to public aspects; derived from the

real estate market or state action. With their variants, they expose an evolution of typologies whose international references go back to the medieval models of traditional dense blocks, the innovations of Paris (Baron Haussmann) and Barcelona (Ildefons Cerdà), the blocks with perimeter occupations, the disappearance of the limits of the block by the modernist experiments, the megastructures of the 1960s, the contextualist postmodern block, and the open block (by Christian de Portzamparc) that, finally, seeks to recover the most traditional elements of cities (Figuerola, 2006).

Considering that the block is an important element of urban morphology and that urban morphology can be understood as a process that refers to social values, contemporary blocks must



Jardim das Paineiras Community

Figures 21 and 22
Implementation study of the
Vila-Praça project in Arara-
quara-SP.
Source: PEXURB Group

assume not only the private functions of housing provision, but also functions of public interest in the socio-environmental context. And to be the opportunity for diversity in urban design, for breaking with the monofunctional model and for constituting an environmentally compensatory infrastructure. And to take into consideration the aspects of gender, class and race for inclusive modes of urban design.

Description

Vila-Praça is a new block typology for precarious settlements and housing relocations in risk areas. The typology was formulated according to emblematic cases and urban and housing issues and can be reproduced and adapted to different conditions, optimizing actions and resources of the public administration. Its solution covers aspects related to the environment, income generation, food security, and the fight against gender, racial and income violence.

As it was conceived in the context of a project in network, it considered the different characteristics of the cities addressed (the capital São Paulo as an example of a metropolis, Araraquara as a medium-sized city and Cordeirópolis as a small-sized city) in order to deal with the housing and urbanistic precariousness in low-income areas. Its model was formulated according to dialogues in different areas of knowledge (architecture and urbanism, civil engineering, traffic engineering, environmental engineering, law, and sociology), with government sectors (planning, housing, works, culture, social, environmental, and mobility) and with the participation of organized civil society.

Standard village-square typology

Due to these characteristics, the village-square was designed to be a land subdivision solution for different urban conditions. Going beyond a design, the village-square represents a desire for a city that incorporates the current topics of the urban agenda: social inclusion, sustainable deve-



Figure 23
Standard typology of
Vila-Praça
Source: PExURB Group

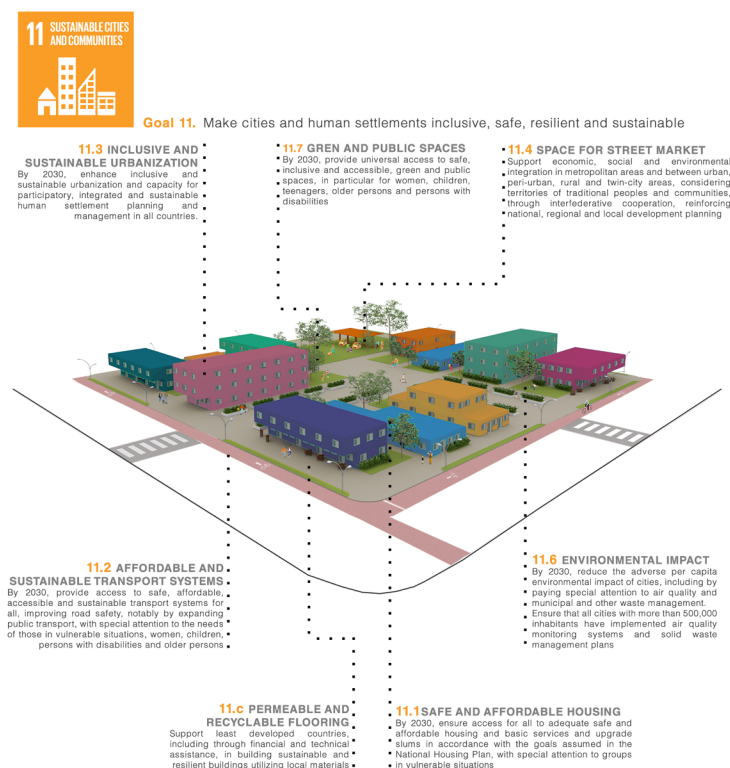
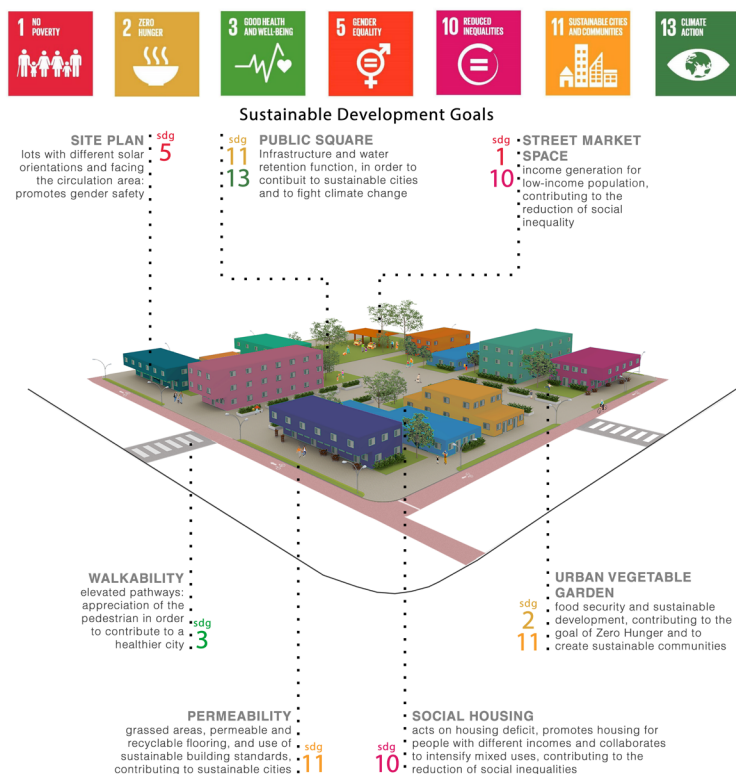
lopment, gender-race-income issues, combating climate change, food security, interscalarity and the multifunctionality of zoning, the recomposition of the hydrological cycle, combating extreme events at the microscale, urbanistic solutions for urban resilience and adaptability.

As it is reproducible, the project has become a public policy in Araraquara-SP and is currently being implemented for 45 families and with the prospect of meeting the housing deficit for about 1,000 people in 2022. The multifunctional potential of the project also addressed a very com-

Figure 24

Articulations between the proposed Vila-Praça standard typology and the Sustainable Development Goals (SDGs).

Source: PExURB Group



The solutions sought to combat pollution (of soil, air and water), preserve and conserve biodiversity and collaborate in controlling the use and occupation of urban land through positive impacts on water resources. It has the potential to constitute a microclimate control strategy and was conceived to contribute to improve the containment, retention and infiltration of water.

Results

The central result of these works was the development of a block typology that would address the problems, demands and intentions observed in the areas, with society and with the public au-



Figure 25
Longitudinal section: Articulated solutions that incorporate issues of social inclusion, sustainable development, housing use, interscalarity and multifunctionality of zoning, recomposition of the hydrological cycle, mobility and food security.

Source: PEXURB Group

Figure 26

Cross-section: Articulated solutions that incorporate issues of social inclusion, sustainable development, housing use, interscalarity and multifunctionality of zoning, recomposition of the hydrological cycle, mobility and food security.

Source: PExURB Group



thorities of Araraquara-SP. This typology was then adapted to the demands of the municipality in order to meet the resettlement of families removed from risk areas. It consists of a social housing village and a square whose implementation meets the master plan.

The most relevant social impact was the transformation of the village-square project into a public urbanization policy, by the municipal administration. The understanding was that the project is based on a block typology and that this typology can be reinterpreted and adjusted to each place because it was conceived according to many variants of different urban situations that meet the structural issues of social housing.

It is possible to indicate other direct and indirect impacts: construction of alternatives to the housing and urbanization standards stigmatized by the BNH, CDHU and PMCMV housing projects; establishment of dialogues with the different social agents that democratically participate in the construction of the city; and guarantee of the social function of the public university, encouraging students and the community to innovate in the production of urban space.

Finally, the project was used as an urbanization model for homeless families and was recognized by state legal bodies as an alternative to poor quality housing standards.

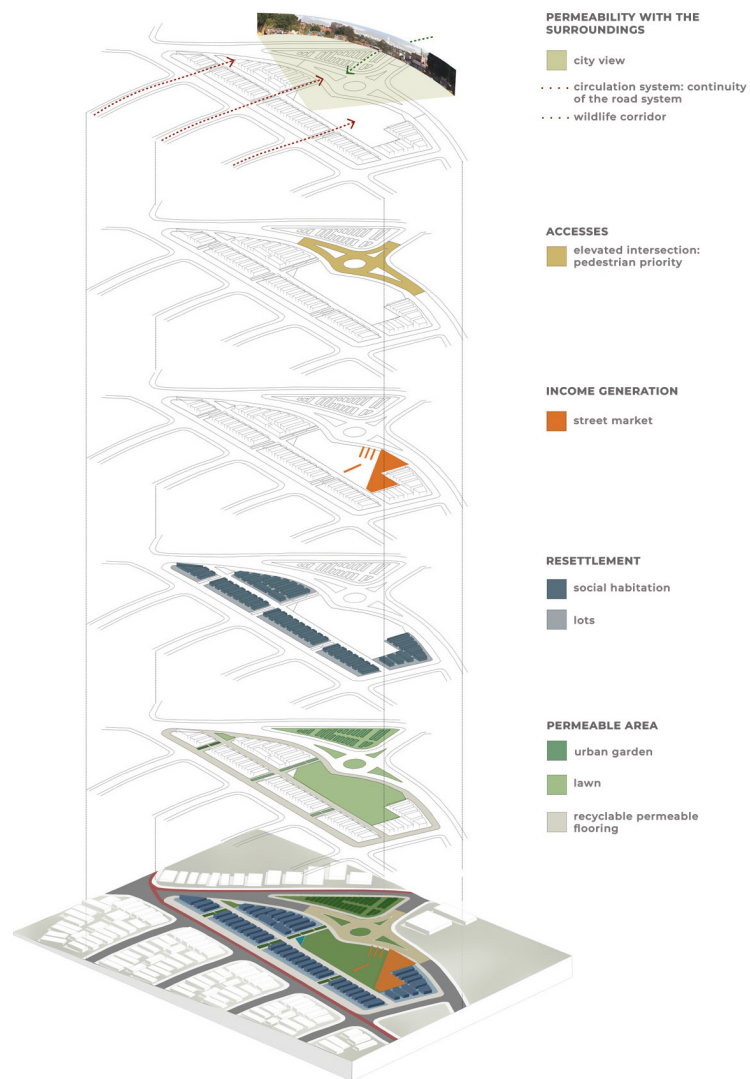
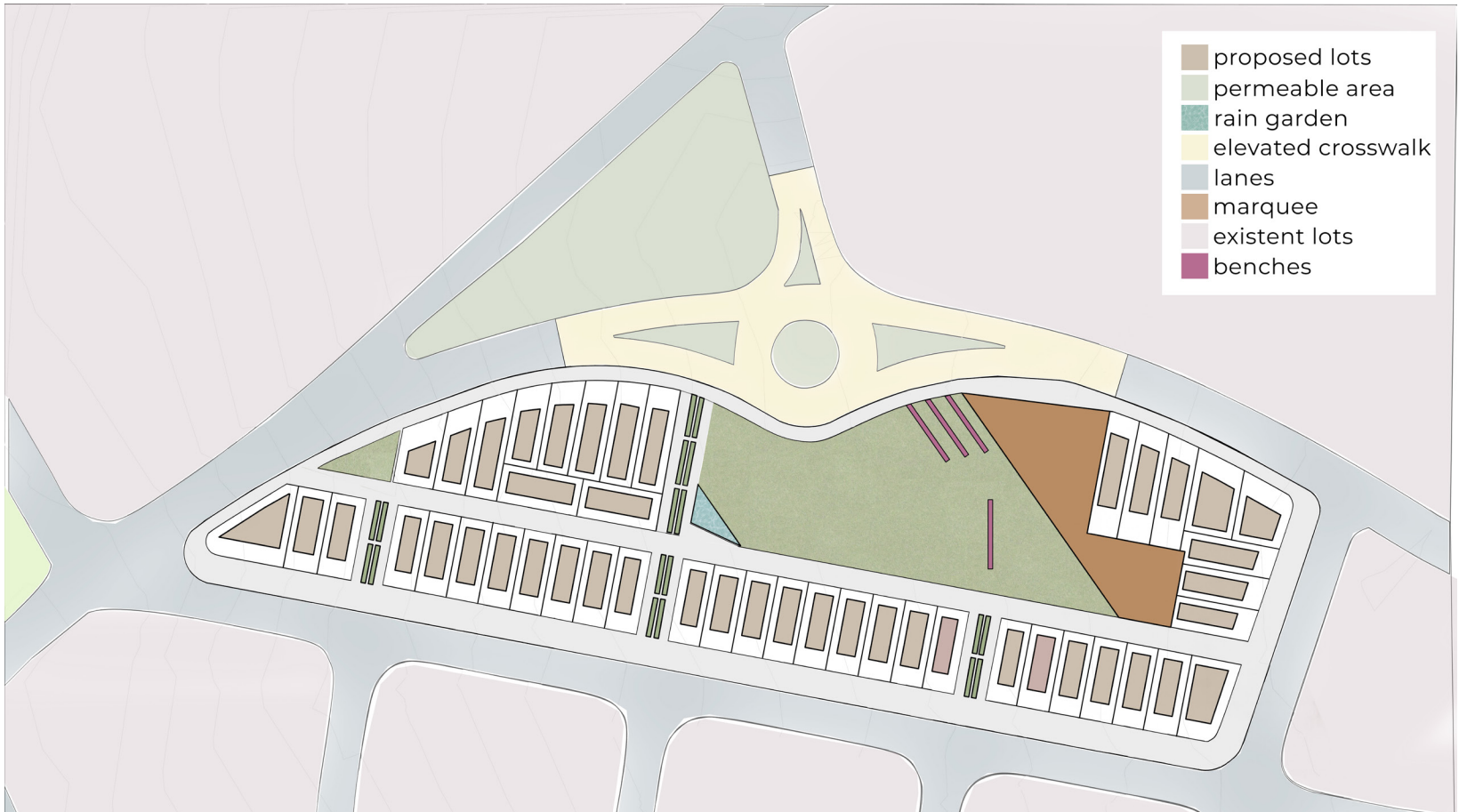


Figure 27
Main design strategies adopted in the proposed Vila-Prança in Araraquara-SP.
Source: PExURB Group

Figure 28
Implementation of the project proposal in Araraquara-SP.

Source: PEXURB Group



Quantitative data

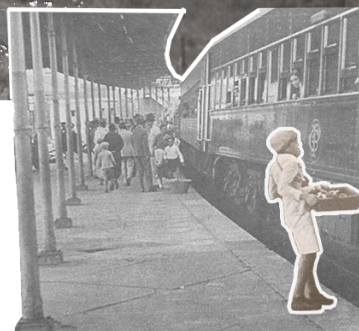
FUNCTION	UNIT	QUANTITY (percentage of total)
Total Project Area	m2	13,925.12 (100%)
Lots	m2	6,203.55 (44.55%)
Squares	m2	5,437.75 (39.05%)
Green Area	m2	2,998.63 (21.53%)
Paved Area	m2	4,975.80 (35.73%)
Service and Commerce Sector	m2	785.30 (5.64%)
Housing	units	45
Total Plan Area	m2	13,925.12 (100%)
Permeable Areas	m2	3,038.51 (21.82%)
Pedestrian Mobility Infrastructure	m2	2,467.55 (17.72%)
Total Area of Study	m2	1,990,672.7 (100%)
Directly Benefited Area	m2	13,925.12 (0.7%)
Indirectly Benefited Area	m2	1,990,672.7 (100%)
Area of Environmental Interest	m2	196,217.01 (9.86%)
Direct Beneficiaries	persons	180
Indirect Beneficiaries	persons	10,000











URBANISTIC PROJECTS

PARQUE FERROVIÁRIO IN CORDEIRÓPOLIS-SP



TECHNICAL DATA SHEET

Scope

Deal with housing precariousness and environmental vulnerability in the train station yard.

Topic

Interfederative conflicts between the Federal Administration and the municipality involving interests in cultural heritage, logistics and social needs.

Area

The area is located between Vilson Diório avenue, Rodovia Washington Luis (SP 130) and the railway line of the extinct Companhia Paulista de Ferrovias, owned by the Federal Government and currently conceded to Rumo Logística. The community is located at the bottom of a valley and discharges sewage into the Ribeirão Tatu stream, in addition to occupying the permanent preservation area. And the interface with the city center is precarious and requires dealing with mobility, sanitation and containment infrastructures.

Objective

Develop a urban design study with a mass plan integrating heritage, cultural, social and environmental aspects.

Main issues

How to address in an integrated way aspects of: railway heri-

tage, social and environmental vulnerability, lack of integration with the center, housing precariousness, lack of sanitation, geological and geotechnical problems, need for income generation for women, care for different age groups? How to incorporate regional railway infrastructures as spaces of the city's daily routine?

Program

The program was developed with all the secretariats of the municipal government of Cordeirópolis-SP and can be summarized by the following points: a) recover the heritage memory of the station yard by valuing the elements of the railway complex (station, village, warehouse and green areas); b) transform regional infrastructure for local, inclusive uses that meet the class and gender demands of current occupations; c) maintain the current use of social housing and provide better living conditions through actions of Technical Advisory Services for Housing of Social Interest (ATHIS) through programs of the Council of Architecture and Urbanism (CAU); d) carry out the necessary removals from occupied areas of non aedificandi areas (permanent preservation area and railway domain strip) and that de-characterize the heritage buildings; e) define new functions for railway heritage buildings (warehouse, station and engine room); f) reforestation of the permanent preservation area and establishment of access to it through the sewage trunk collector strip to avoid its occupation; g) extension of da Saudade street to the station

yard; h) avoid obstacles in the permanent preservation area to guarantee the movement of fauna (shelters, passages, etc.) and biodiversity.

City Concept

The city intended in this project is one that manages to concretely provide the socio-technical transitions without erasing the historical importance of its formation: valuing the transition from the agricultural production mode based on rail infrastructure to the industrial production mode based on road infrastructure; and from there to new productive modes of social and environmental services based on infrastructures aimed at the well-being of citizens and at the environment.

Urban unit

The urban unit adopted was the urban fabric as a founding part of the municipality.

Design approach

Constitute a Railway Park composed of the railway complex (consisting of the station, warehouse, railway village and the permanent preservation area) from which environmental corridors radiate through the urban fabric of the center of Cordeirópolis-SP. This structure repositions the railway heritage as a radiator of urbanistic transformations in the city and reinforces the urban fabric of the formation of its center that was the result of the railway expansion in the 20th century, in the State of São Paulo.

Solutions

A design study with a mass plan that integrates public policies and optimizes resources from sectors traditionally with more funds (mobility, sanitation, education) to sectors with less funds (housing, culture, leisure, social). Thus, it is constituted by integrated planning and design actions as a way of coordinating the station yard to the city center and to the permanent preservation area. And enable the installation of new functions to the railway heritage to activate the daily uses in the area and ensure better habitability to its current residents.

Implementation

Recovery of the railway village buildings by removals and housing improvements. This action can rely on the participation of technicians involved in ATHIS works. The removed uses (bars, workshops, doll recovery atelier, services such as hairdressers, barbershop, hip hop group area, etc.) will be relocated to the warehouse building, also part the railway facilities.

The warehouse building is expected to be converted, in the long term, into a new modal station for connecting the passenger train to the city of Campinas-SP. Thus, the interventions will be carried out with light materials that enable new future arrangements, without excluding them.

The station building will be used as a museum and restaurant and the engine room will be used for culture and education (toy library and children's library).

The buildings, which are planned to constitute a kind of commercial and service gallery with open and covered areas, will have a metallic marquee, recovering the importance of the coverage that surrounded the station yard for passengers to embark and disembark. Two metallic walkways are planned to integrate the city center with the station yard. Both will have universal accessibility with ramps or elevators and stairs (according to the new guidelines from RUMO Logística), also serving as a lookout point for the permanent preservation area. They are proposed as porticos that demarcate the configuration of the station yard.

In the strip bordering the center, gabion-based retaining walls, water collectors, stairs-stands, rain gardens and wooden decks are planned, configuring a linear square next to the station yard, incorporating proposals from the Cultural Corridor. Ramps installed with the gabion walls make it possible to overcome the unevenness between the center level and the railroad level.

Finally, the plan provides for implementation of an Environmental Education Center, permaculture vegetable garden, native and ornamental plant nursery, and recovery of the permanent preservation area in analogy to the environmental role that forest gardens played in the railway expansion.

The extension of da Saudade street will make it possible for public services to have adequate access to the yard and the implementation of paving, sanitation networks, bicycle lanes and urban afforestation.

Through this intervention, it is planned the irradiation of affores-

tation to all the central streets of the city interconnecting the main green areas. The objective is to value the small block that is in the historical formation of the urban area of the municipality and that was due to the railway expansion in the more rural areas of the state of São Paulo.

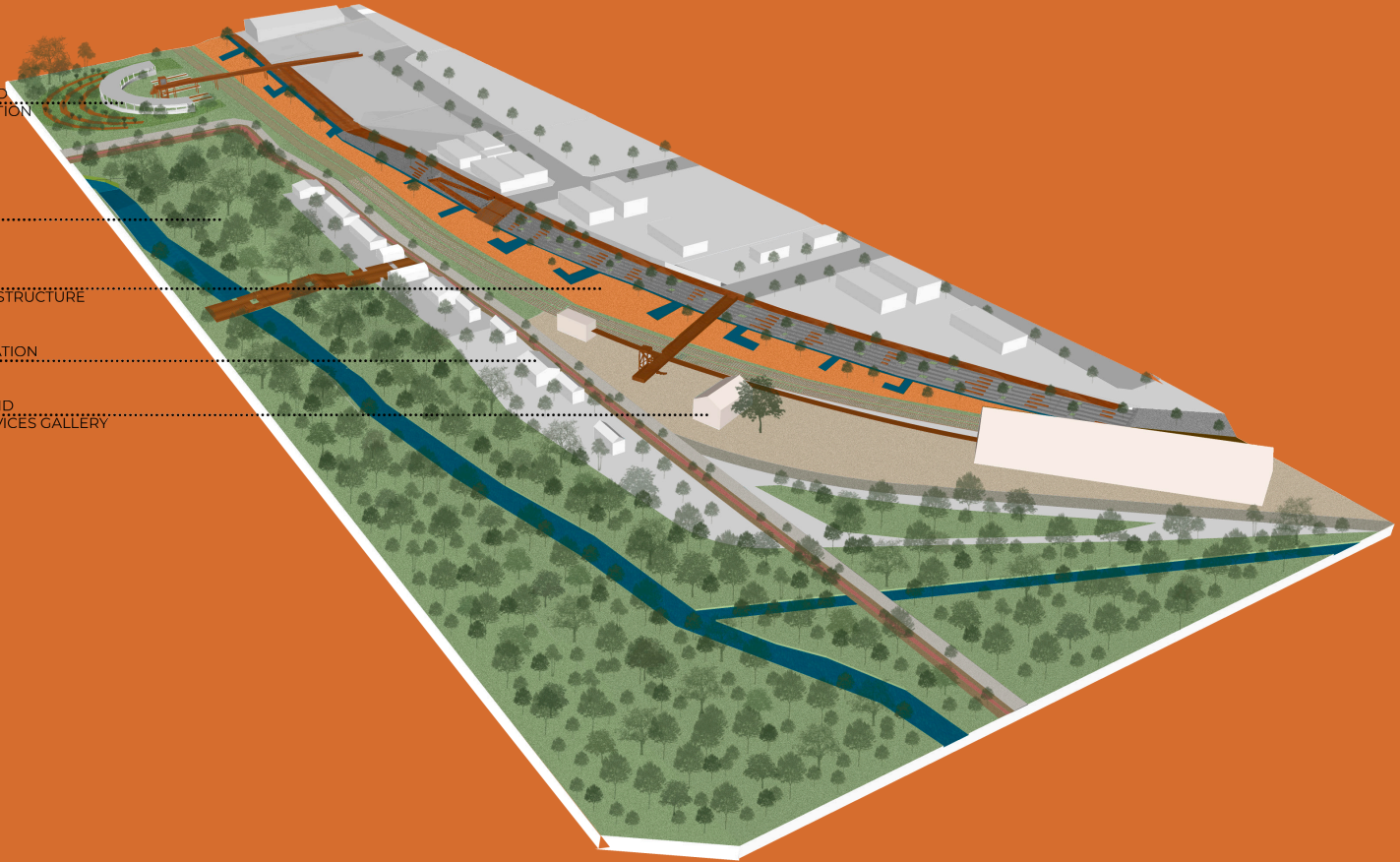
SEEDLING NURSERY AND
ENVIROMENTAL EDUCATION

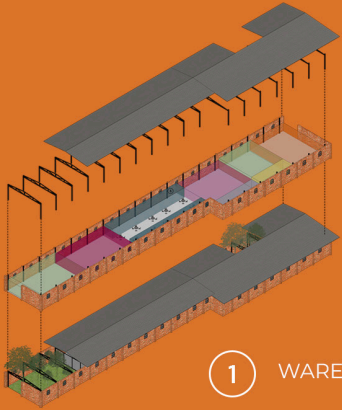
PERMANENT
PRESERVATION AREA

INTEGRATED MOBILITY
AND SANITATION INFRASTRUCTURE

HOUSING AND RESTORATION

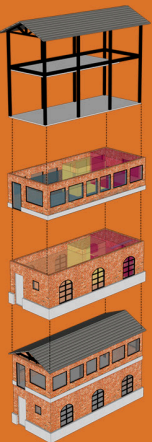
HISTORIC BUILDINGS AND
COMMERCIAL AND SERVICES GALLERY





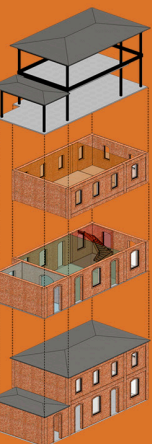
1 WAREHOUSE

- open space with existing vegetation
- relocated commerce and services
- relocation of "Casa das Bonecas"
- toilet and equipment support room
- after-hours for children and young people



2 MACHINE HOUSE

- children's library
- restroom
- stairs
- study and computer room



3 TRAIN STATION

- restroom
- stairs
- restaurant
- cultural center museum

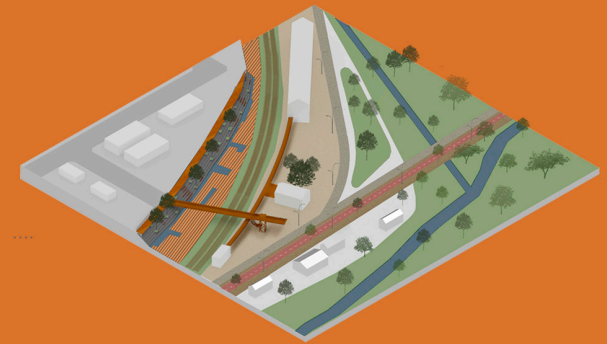




4

STATION PLAZA

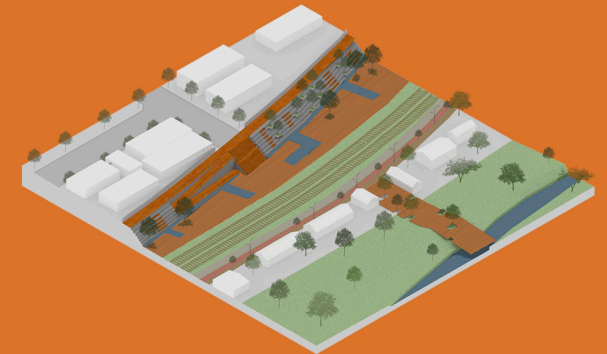
- integration with the city center via footbridges
- implementation of green infrastructure
- deck installation for recreation area
- gabion retaining wall
- improvements by athesis on the railroad village houses



5

INTEGRATED MOBILITY AND SANITATION INFRASTRUCTURE

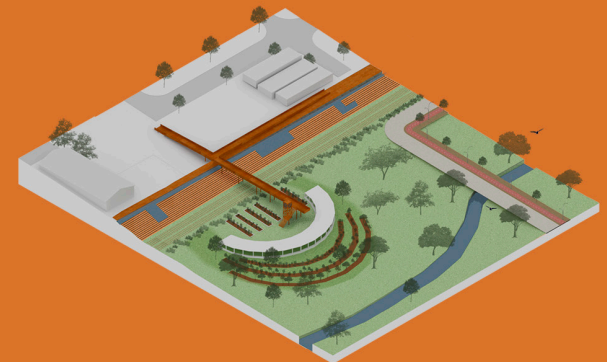
- containment and re-tilting to eliminate risk areas
- implementation of drainage systems and water mirrors
- housing qualification actions
- pedestrian walkway installation
- stairs and bleachers
- trunk collector strip protection
- recovery of the permanent preservation area



6

RECONSTITUTION OF THE GARDEN BY SEEDLING NURSERY

- space for the cultivation of ornamental plants and nursery of seedlings
- small crops and vegetables associated with environmental education
- cultivation based on a gradation of sizes in harmony with the preservation area (vegetables-shrubs and small-medium-sized (fruit trees)-preserved forest)
- opening of Rua da Saudade
- traffic disciplining in the lane bordering the railway line
- deployment of safety devices along the railway line



DESCRIPTIVE MEMORIAL

Problematization

The intervention object defined between the USP units and the Municipality of Cordeirópolis-SP for the urbanistic project was, initially, the set of precarious occupation areas with about 50 houses along the stretch of the railway line located in the station yard, in the central area of the municipality. However, the research into the area led the team to review the object of action, expanding the approach to what had been the Companhia Paulista railway complex considering the recognition of the memory of this complex. Thus, the object went from a land regularization plan to an urbanistic project on the Cordeirópolis-SP railway complex.

Through the territorial selection made by the railway heritage, the land, social and environmental conflicts led to the consolidation of the areas benefited directly by the project (the railway complex) and indirectly by the planning (the central urban fabric).

The history and development of cities in the center-west area of the São Paulo state are related to their railway axes. From the late 19th century and more intensely in the first two decades of the 20th century, many cities were created or developed from trunks and branches established by the railway companies.

Cordeirópolis-SP, a small city with approximately 25,000 inhabitants, is an important example of this urbanization process. In the city, the train yard and the urban fabric are the material expressions of symbolic references of the railway culture and urbanization of that period and, therefore, have become objects of intervention in the valorization of the heritage memory and of the state culture.

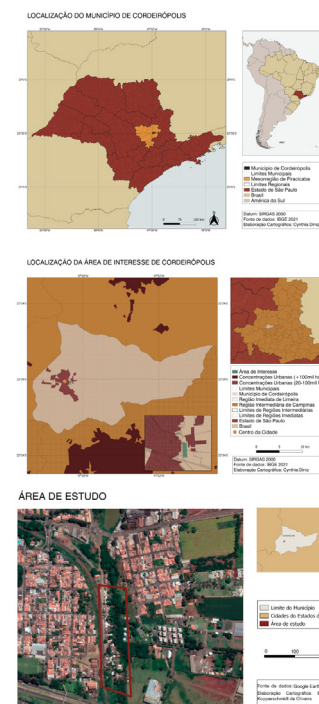


Figure 29, 30 and 31
Location of the project area.
Source: PEXURB Group

Figure 32
Location of the municipality
of Cordeirópolis-SP and the
intervention area.
Source: PExURB Group

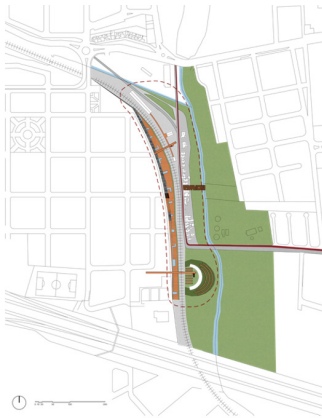
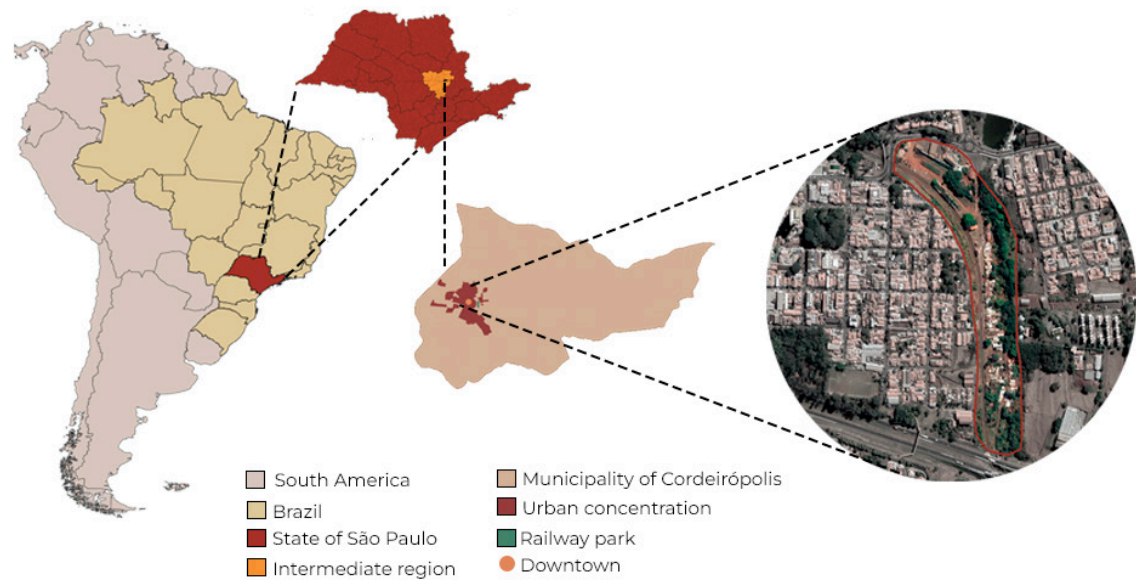


Figure 33
General implementation of
the projected area.
Source: PExURB Group

The railways in the more rural areas of the São Paulo state, more than transport and logistics infrastructure, created cities through a complex composed of villages, warehouses, stations and forest gardens. The Companhia Paulista de Estradas de Ferro railway company is an important example of the constitution of this regional network that propagated and consolidated some urbanization patterns. The train yard in Cordeirópolis-SP, in this process of rail expansion, was fundamental for being an articulator of two branches of the company and connecting the capital São Paulo to the west of the state and of the country. Currently used for the logistics function of the operator RUMO Logística and despite all institutional efforts, its symbolic function disappears along with the material heritage. And with it, the understanding that the cultural value is greater and broader than the building of the station itself.



Figures 34 to 41
Field research, inventory,
surveys and analysis of the
project area.
Source: PExURB Group



The process of overlapping functions and coordinations to update the uses of this asset has led to land conflicts that relate the federal, municipal, and state governments and the activities resulting from the concession, demonstrating the layers of constitution of the urban land and land structure. The municipal urban management of this land, the incidence of state land regularization programs, and the propagation of local community actions increase the complexity of these conflicts.

Environmentally, it can be observed that the area under study is more broadly related to the ecosystem as a structure of masses and energies; and with components that contribute to this social and environmental configuration of the territory. This system depends on some conditions to maintain itself and has a capacity to adapt to the given context. Resilience as a support capacity of certain systems has been the response to disturbances. This makes it possible to delimit the territory by environmental aspects associated with the capacity of a given structure to absorb a given impact. These are factors that justify broader interventions that are environmentally integrated with social and heritage aspects.

Due to its topography and occupations, the level of surface water runoff in heavy rainfall events causes some flooding events that affect the station yard. This situation interferes with the collection and removal of sewage that is discharged into the permanent preservation area of Ribeirão Tatu.

The central area, bordering the intervention area, presents geotechnical problems of containment adjacent to the railway line, precarious rainwater flow and no accessibility or safety for pedestrians. Finally, the informal buildings were expanded from the original limits of the railway village houses and currently occupy areas of environmental restrictions and logistical security (in the 30 meters of permanent preservation area of Ribeirão Tatu and in the 15 meters of the axis of the non



Figures 42 and 43
Readings on local aspects.
Source: PEXURB Group

aedificandi area line along the railway) requiring removals and resettlement.

Local, regional and social aspects

The area, which belongs to the Federal Heritage, is the object of land regularization of the state program Cidade Legal and the municipality has ceded some buildings of the railway heritage.

From the point of view of the information collected with the technicians of the municipality, with the managers and with the public servants, there is a set of disjointed actions planned for improvements in the area. The houses are part of the land regularization initiatives and are registered; the municipality has conceded the area; RUMO Logística plans to invest in infrastructure in the stretch of the railway line, the culture department has a project to implement a cultural strip, there are income generation programs linked to the residents of the area and the municipality was called by the Public Prosecutor's Office to resolve demands of drainage and geotechnics related to the central areas and that affect the station yard.

The Meu Pedaco de Chão Program, which subsidizes municipal resources for the purchase of lots, construction material, etc. for needy and homeless families can be applied to the population, but requires specialized projects for this purpose. This opens a field for ATHIS to act in an innovative mode linked to the railway material heritage.

The City administration is preparing the Estação do Futuro-Parque de Inovação de Cordeirópolis Project, which provides for a linear environmental park in Ribeirão Tatu, includes housing in the Moradia Digna Program, recovery of some of the non-residential buildings of the railway heritage and implementation of municipal theater and college.

The Master Plan (Supplementary Law No. 177 of December 29, 2011), in turn, advocates speci-



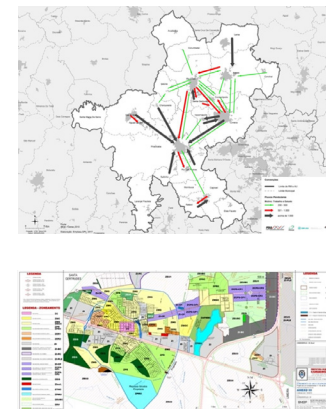
Figures 44 and 45
Readings on local aspects.
Source: PExURB Group

fic policies for the use of public spaces that were incorporated by the project, such as valuing pedestrians and universal design, encouraging the use of squares, the enhancement of security mechanisms, the minimization of conflicts between pedestrians and motorized vehicles; for the road system with draining pavement solutions; for housing, through urbanized lots; for road hierarchy, landholding regularization, environment, heritage, culture, landscape and recovery of valley bottoms and establishment of ecological corridors.

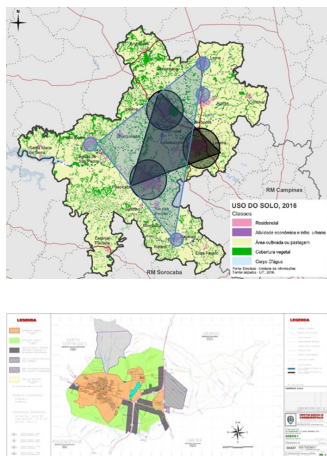
The area is regulated by Tourist, Historical and Cultural Zone in conjunction with the Special Area of Historical Interest and the Special Area of Environmental Interest 03 – APP Córrego do Ribeirão do Tatu. This overlapping of zones in the same area demonstrates, by itself, the regulatory conflicts to which the heritage is subjected. Territorially, these areas of cultural interest are at the base of the formation of cities and the institutional evolution that generated them left a set of actions and particularities to be regulated.

The area is subject to the provisions of Law No. 2,780 of December 29, 2011, which provides for land subdivision and special urbanization (Section IV of Housing of Social Interest, art. 100), which establishes allocation of 13% for the road system, 10% for free spaces for public use (green areas/leisure systems) and 7% for institutional areas (community facilities and urban facilities). In permanent preservation areas, up to 50% can be considered open spaces, in case of public development, and open and institutional spaces can fall to 50% of the plan in case they are of Social Interest.

In the Integrated Urban Development Plan of the Piracicaba Urban Agglomeration, prepared by the state government (2017), Cordeirópolis stands out for being at the intersection of the Bandeirantes, Anhanguera and Washington Luis highways. Due to having medium commuting flow (work, study) with Limeira and low commuting flow with Araras, Rio Claro and Santa Gertrudes. In other



Figures 46 and 47
Overlapping of different functions by urban and regional zoning in plans for the Urban Agglomeration of Piracicaba, for the PCJ Hydrographic Basin and for the economic, environmental, tourist and social development of the municipality.
Source: Integrated Urban Development Plan - Piracicaba Urban Agglomeration, 2017 and Cordeirópolis Municipality, 2011



Figures 48 and 49
Overlapping of different functions by urban and regional zoning in plans for the Urban Agglomeration of Piracicaba, for the PCJ Hydrographic Basin and for the economic, environmental, tourist and social development of the municipality.
Source: Integrated Urban Development Plan - Piracicaba Urban Agglomeration, 2017 and Cordeirópolis Municipality, 2011

words, intense relations with surrounding municipalities due to regional dependence, and an intensified relation with the entire Macrometropolis and the Ribeirão Preto Metropolitan Area. These are factors that explain, for example, the regional commuting of the population residing in the intervention area.

It is located in the urban macro-zone of the Piracicaba Urban Agglomeration, with a profile of receptor of entry of the working-age population (twice as large as that of exit), which characterizes the municipality as an intra-regional migration attractor accounting for informal occupations. And it has problems with mining at a regional level, such as the pits of deposits of raw material for ceramic production that require low-paid labor.

The recommendations of the summary report of the Piracicaba-Capivari-Jundiaí Basin Plan (PCJ) (2020) highlighted aspects of sanitation (water, sewer, drainage and solid waste) and the approach to the Cantareira System that includes the transfer of water from the PCJ basins to that of Alto Tietê. These are factors that reinforce the need to preserve water resources considering the increased demand in the PCJ Basin due to the transposition project. Considering that the area object of intervention is adjacent to the permanent preservation area of Ribeirão Tatu.

At the base of these observations are the social and labor relationships formed at the regional level. The economic development of the municipality is configured as a hub of ceramic production. This activity employs a good part of the city's workforce and, especially, the population residing in the area object of intervention, factors that transform their daily lives through regional and inter-municipal labor relationships. This condition implies an intense mobility of citizens; however, they are deprived of public transport integrating the municipalities.

Additionally, these regional activities require aerial basins and raw material extraction pits that directly affect water quality. And given the impact of air pollution generated by the concentrations

of industries in this field in Santa Gertrudes-SP, the city also suffers from poor air quality.

The socioeconomic characteristics of the study area indicated a high degree of poverty, social and environmental vulnerability, and labor relationships based on commuting with neighboring districts and cities. But also availability of public services close to the community providing health care (central clinic and hospital); social care (Cras, Creas and the Secretariat for Women and Social Development); education (public day care centers, municipal and state schools), among other programs at the municipal, state and federal levels. These factors justify the understanding of the permanence of the population in the area as a guarantee of the right to the city for this population.

In the area, there is a large presence of young people and children, demand for educational and cultural facilities and for the Boneca Project, which restores dolls for income generation. Cordeirópolis, as an attractive point for the working-age population, is becoming a place of low-income housing for the population that works in the ceramic industry distributed regionally in the municipalities around it. And as it is the junction point of three important highways in the state of São Paulo, it connects directly with the São Paulo Metropolitan Area and Campinas, improving macro-metropolitan relations.

Initial actions

The objective is to institute an urban project for Parque Ferroviário that incorporates and values the Cordeirópolis-SP railway complex and the city's central urban fabric as examples of the São Paulo urbanization process in the early 20th century. The proposal is a work at the design study level for advice on public policies for the municipality. Interdisciplinarity was a structuring condition to understand and act on the sociological, environmental, legal and territorial conflicts that were established in the area and that are common to a set of cities in the more rural areas of São Paulo. Its innovation lies in urban solutions with an interscalar approach in the local, regional



Figures 50 and 51
Importance of the rail system in the urbanization of the State of São Paulo – the Companhia Paulista rail network (above) and the complete rail network (below).
Sources: Report no. 112 of the Board of Directors of Companhia Paulista de Estradas de Ferro, 1960 and Public Archive of the State of São Paulo, 1977



and national scope that the railway cultural heritage requires. Based on theoretical and historical premises, the solution was to conserve the cultural landscape of the railway complex (station, warehouse, railway village and forest garden/permanent preservation area) from which environmental corridors radiate that value the city's blocks, a historical solution of the formation of the urban fabric in the railway expansion toward the interior of São Paulo. The project mobilized all municipal secretariats for programs of cultural valorization, income generation, early childhood education, infrastructure, housing, land regularization and the environment based on the station yard.

Theoretical-conceptual approaches to solutions

In the field of urbanism, the understanding of the notion of dispersed urbanization (Reis, 2006) was adopted to understand the current structuring of the urban fabric of the municipality. Cordeirópolis-SP is part of the Piracicaba Urban Agglomeration and belongs to the São Paulo Macrometropolis, urban conditions marked by the expansion of the urban fabric stemming from real estate, service, commerce and logistical infrastructure demands. These elements configure an impact on the structuring of the city that interferes directly in the central area and, therefore, in the area object of urban design.

Theoretically, the urbanistic project was supported by recognized academic studies on the subject, especially those linked to social history and that address the railway industrial heritage of São Paulo (Inoue, 2016). This approach was fundamental to understand specifically the case of the Companhia Paulista de Estradas de Ferro railway company and to structure the intervention proposal. In other words, the recognition of the railway heritage was also consolidated by research on the subject that guarantee the preservation of the cultural memory of these buildings and the related pieces of knowledge.

Between the creation of RFFSA, in 1957, and its closure, in 2007, the Companhia Paulista railway

company and all its assets passed from private property to state and federal property, today being part of the federal heritage. The end of the federal railway network in 2007 led to the end of the possibility of a direct state action to preserve the railway cultural heritage and all the material and immaterial potential that surrounds it. The Southeast region and mainly the state of São Paulo holds the largest branch of the Brazilian rail network with an important configuration of the São Paulo territory and influence on an urbanization pattern that spread in the late 19th century and in the first three decades of the 20th century. It regionally articulates urban fabrics in the form of blocks resulting from the concentration of work and wealth due to the expansion of coffee farming to the west of São Paulo (Retto Jr., Ekonibara, 2011).

The urbanization process was consolidated by the coordination between the railway companies and the sanitation companies responsible for the water reservoirs; of electricity responsible for the generation of electric energy and electrification of the railway lines, replacing the wood-fired locomotives; the first factories responsible for the processing of coffee, production of bags, etc.; and the banks forming an agroindustrial complex (Segnini, 1982).

This movement was associated with a national and regional economic development of which the railway complex was a strategic part as infrastructure for transport, housing, technologies, etc. Thus, the railways were responsible for the urbanization of the more rural municipalities of São Paulo state, meeting regional and national demands. This aspect is particularly important because it demonstrates the interscalarity of urbanization processes in the interior of São Paulo. And the infrastructure that supports these processes was organized as a complex consisting of the loading and unloading station, the warehouse for storing groceries, the railway village for the Company's employees and the forest garden responsible for the production of eucalyptus and supply of sleepers and firewood for the locomotives.

The junctions of lines, as in Cordeirópolis-SP, attracted a greater number of residents and therefore required a greater number of houses constituting more than one railway village and shaping the beginning of the urban fabric with streets, blocks and workers' lots. In order to regulate the price of coffee, there was a need to store the products, so sheds/warehouses were built for this purpose, in addition to workshops for the repair of wagons.

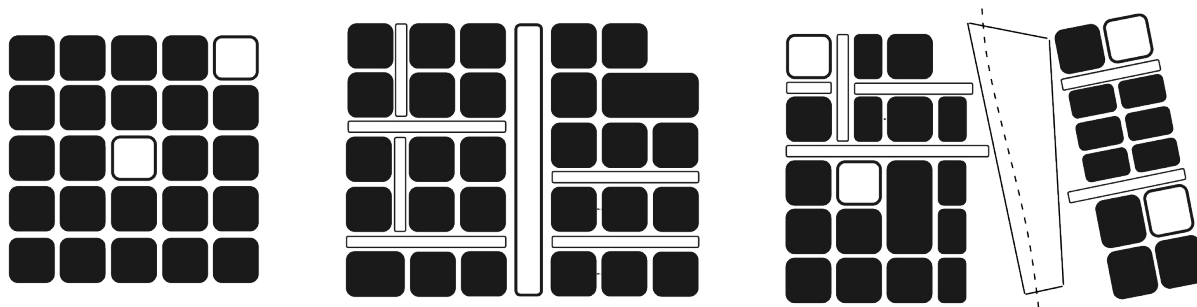
What is configured as a solution for the railway heritage of Cordeirópolis-SP is, therefore, the resulting of the problematization of the urbanization process of the São Paulo countryside through a comprehensive and systemic view of the historical process of formation of cities resulting from the implementation of the railway infrastructure in the state of São Paulo. Whose comprehension was only possible when supported by research and studies on the subject.

For example, isolated houses in lots were intended for engineers and houses in lines were intended for maintenance workers. Terraced houses, separate laundry and bathroom, stationmaster's house with an office were some of the typologies found in the area after research and lectures. Which led to the questions of how to recover this heritage and make it compatible with contemporary uses.

Finally, the numerous field visits, some of them including students and technicians from the city hall, had an impact on the view of the area as a place of intersection between two urban models that were constituted throughout the 20th century in Brazil. The agricultural city related to railway infrastructure and the industrial city related to road infrastructure. The sanitation infrastructures (such as a water treatment plant pipeline and sewage outfall) implemented in the area also reinforce its environmental function within a broader infrastructure system.

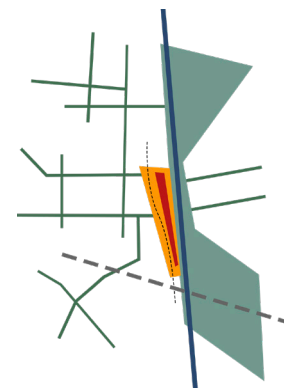
It is because of its territorial formation as a hub of economic, logistical, environmental, historical and cultural relations that the structuring vision of the project incorporated different scales of

approach and dialogued with the integrated formulation of sectoral public policies. This implied consultations with RUMO Logística about its expansion studies, research in documents of the Federal Heritage Secretariat-SPU and the need for obtaining approval of uses (of roads and nurseries) from the permanent preservation area and obtaining approval of the basic and executive projects from federal, state and municipal authorities.



Description

Based on the historical perspective and understanding that each infrastructure left a type of development of the urban fabric, the urban project reconstituted the railway complex (station, village, warehouse and nursery/permanent preservation area) with new uses forming a Railway Park from which radiate environmental corridors that connect the main green and cultural spaces of the city, reinforcing the solution of the urban fabric in blocks, typical of the period of São Paulo's railway expansion.



Figures 52 and 53
Concept schematic diagram
and design party.
Source: PExURB Group

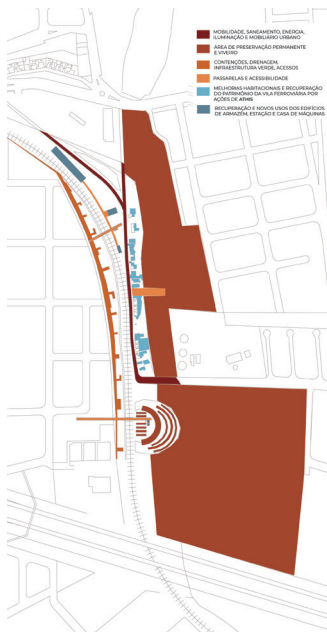


Figure 54
Map of sectors for works in the main areas of the project.

Source: PExURB Group

Directives

a) Railway Park

The Railway Park, the synthesis of the public space, received walkways, squares and patios that enhance the buildings of the railway complex (station, warehouse, railway village and garden/nursery). The following solutions focus on it:

Historical buildings: transformed into a commercial and service gallery by using the station and warehouse buildings to relocate services and shops removed from non aedificandi areas and new uses composing a commercial gallery integrated by the enhancement of the station yard, which already exists. In the warehouse building: pubs, workshops, doll recovery atelier, services such as hairdressers, barbershop, area for hip hop groups, etc.; in the station building: restaurant and museum; in the engine room: toy library, children's library.

Integrated mobility and sanitation infrastructure: the unevenness between the central area and the intervention area is overcome through walkways and elevators for longitudinal and transversal connections. To avoid the risk of landslides, retaining and drainage systems integrated with green infrastructure are planned to enable the elimination of unstable areas of the slope on the margins of the center and to reconstitute the hydrological cycle through the potential for water absorption in the soil by employing rain gardens. These solutions have multiple functions as they constitute small leisure spaces along the railway.

Seedling nursery and permanent preservation area: similarly to the forest gardens created by the Companhia Paulista railway company, form a nursery patio for agroforestry and the reconstitution of the riparian forest of the Ribeirão do Tatu stream. It will host an environmental education center and provide the recovery and revegetation of the permanent preservation area and will host permaculture activities and ornamental plants in order to give the area uses and prevent invasions.

Figure 55
Plan and schematic section
of the project.
Source: PEXURB Group

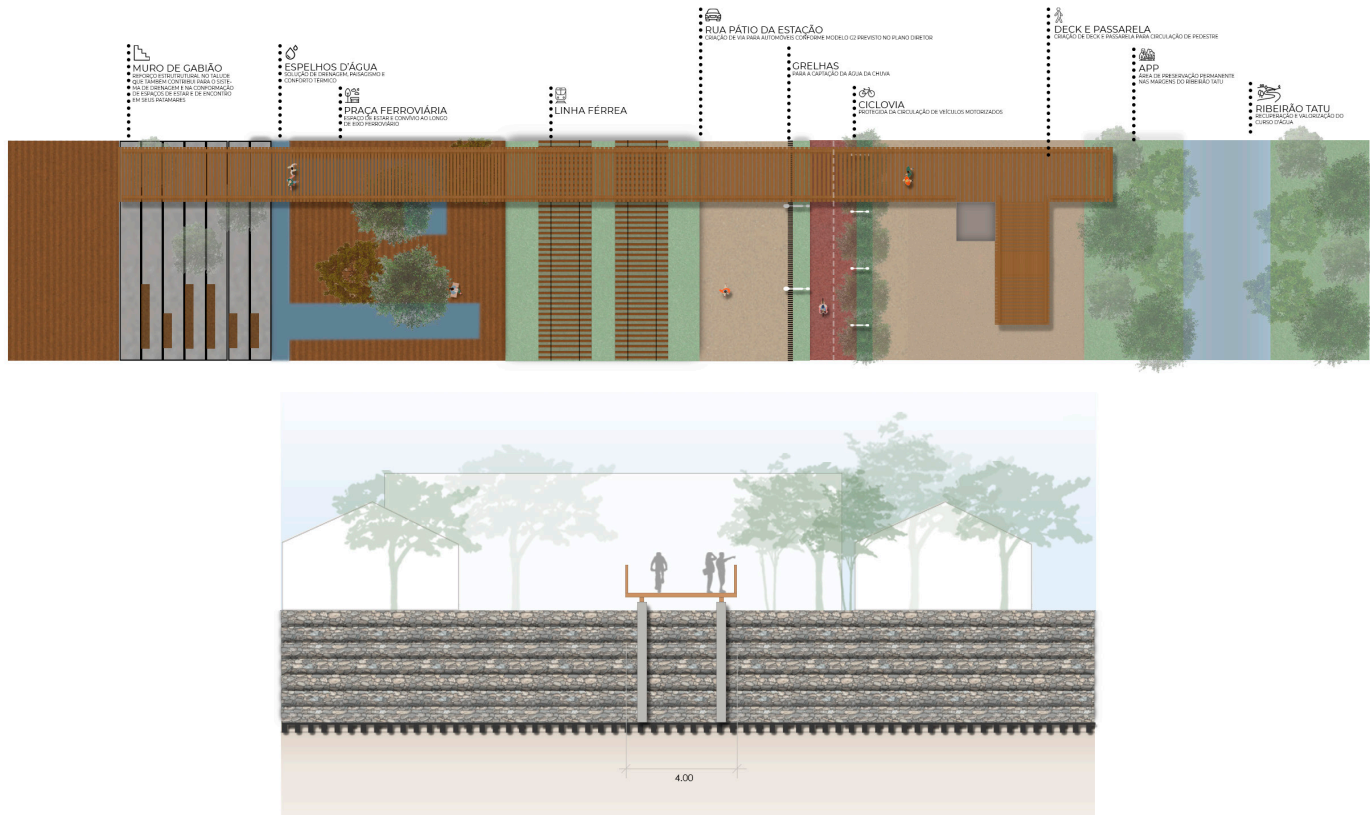
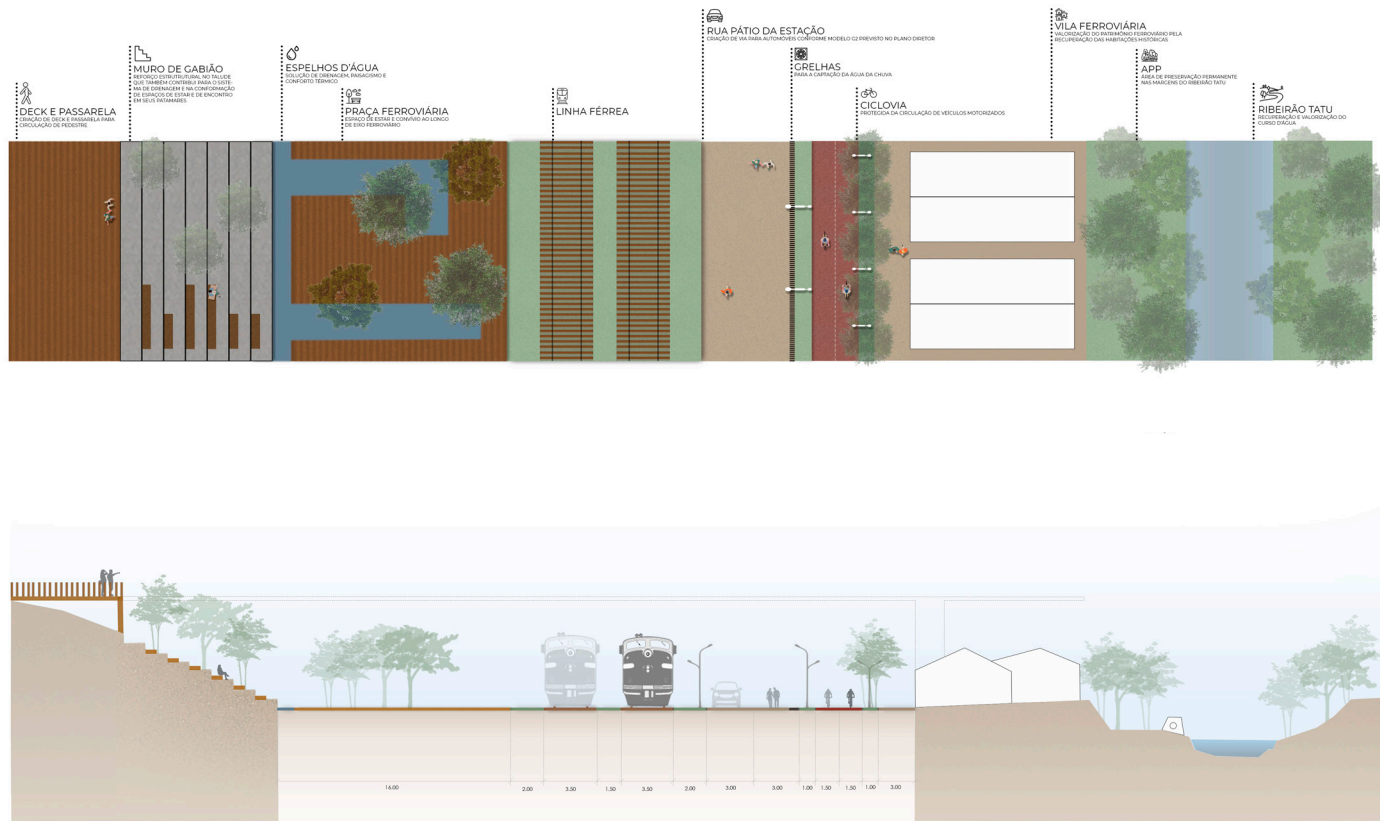
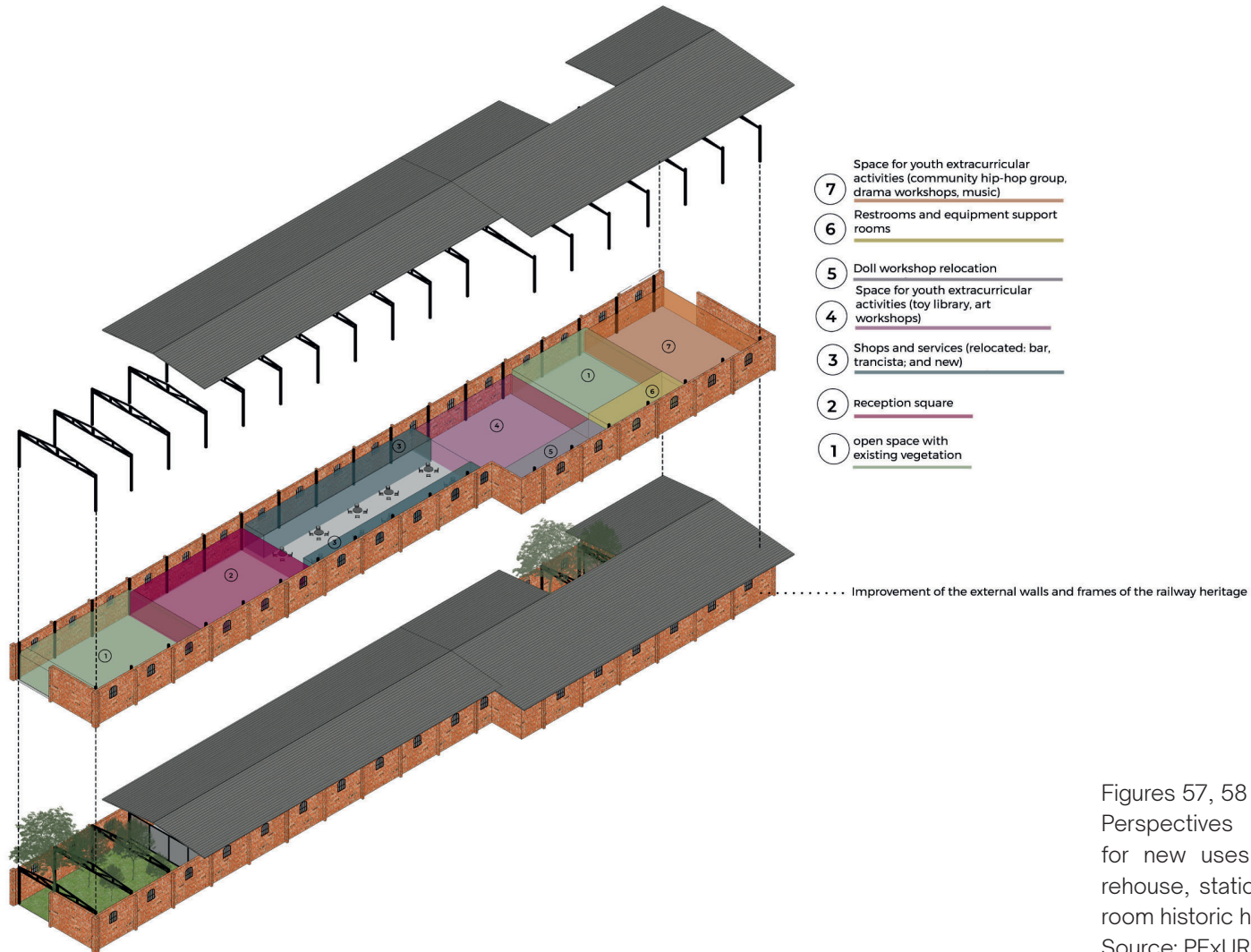
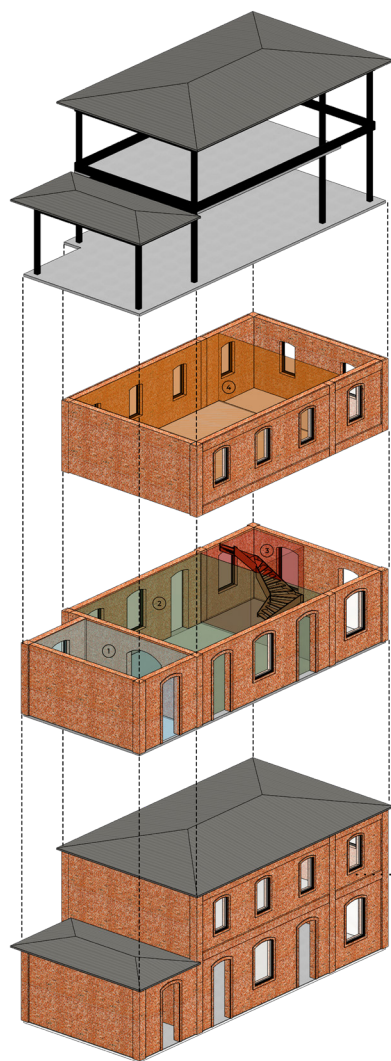


Figure 56
Plan and schematic section
of the project.
Source: PEXURB Group





Figures 57, 58 and 59
 Perspectives of proposals
 for new uses for the wa-
 rehouse, station and engine
 room historic heritages.
 Source: PEXURB Group



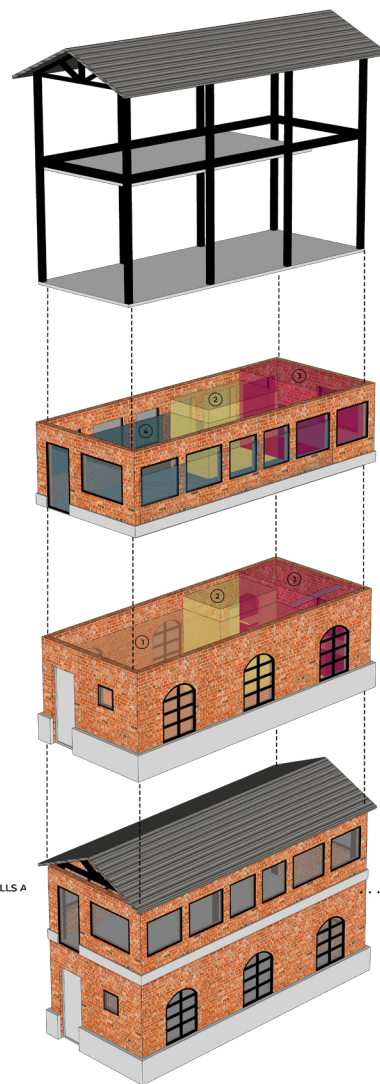
④ MUSEUM
CULTURAL CENTER

③ STAIRS

② RESTAURANT

① BATHROOMS

IMPROVEMENT OF THE EXTERNAL WALLS &
FRAMES OF THE RAILWAY HERITAGE



④ STUDY AND COMPU-
TER ROOM

③ STAIRS

② BATHROOMS

③ STAIRS

② BATHROOMS

① CHILDREN'S LIBRARY

MELHORIA DAS PAREDES EXTERNAS E ESQUADRIAS
DO PATRIMÔNIO FERROVIÁRIO

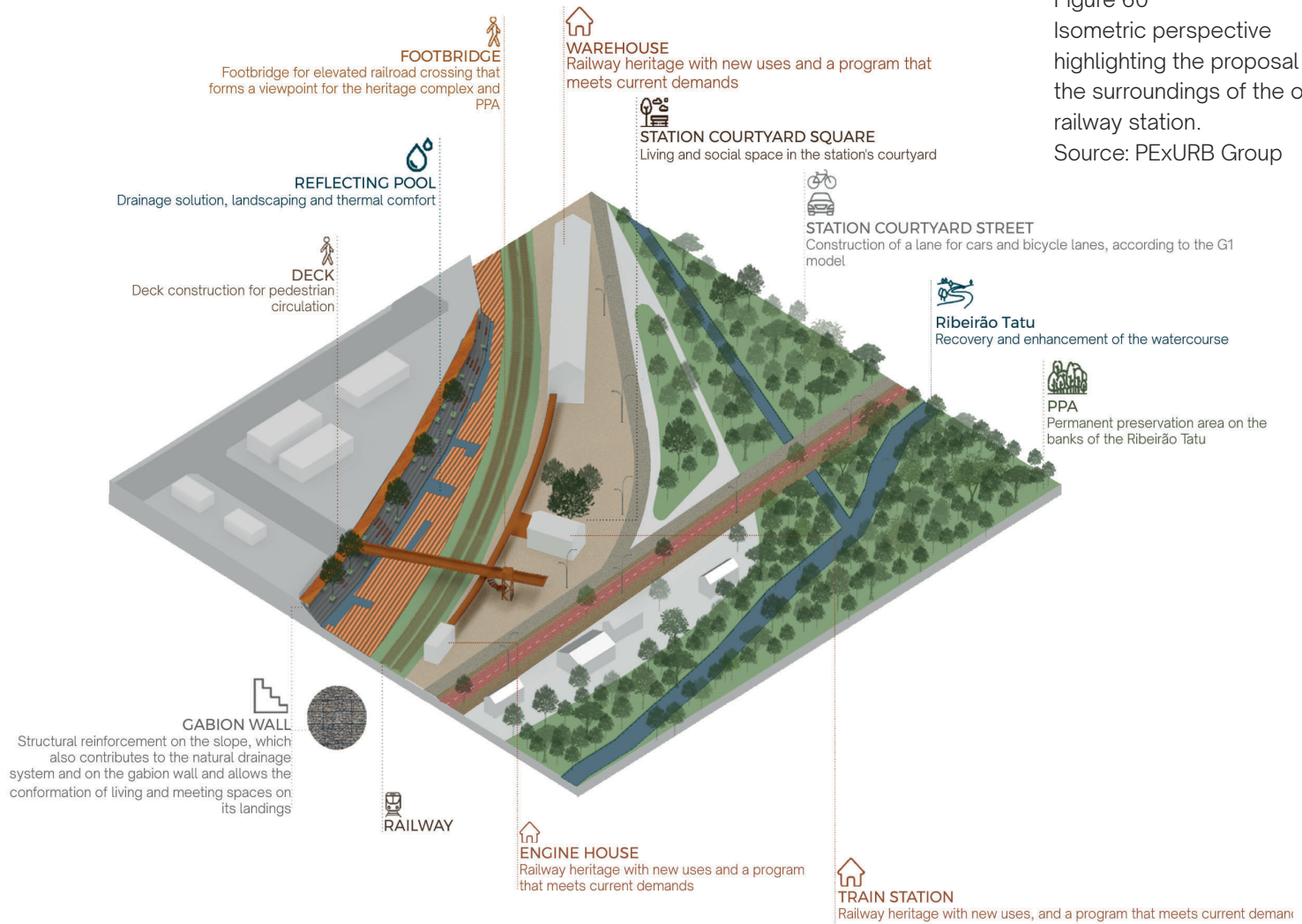
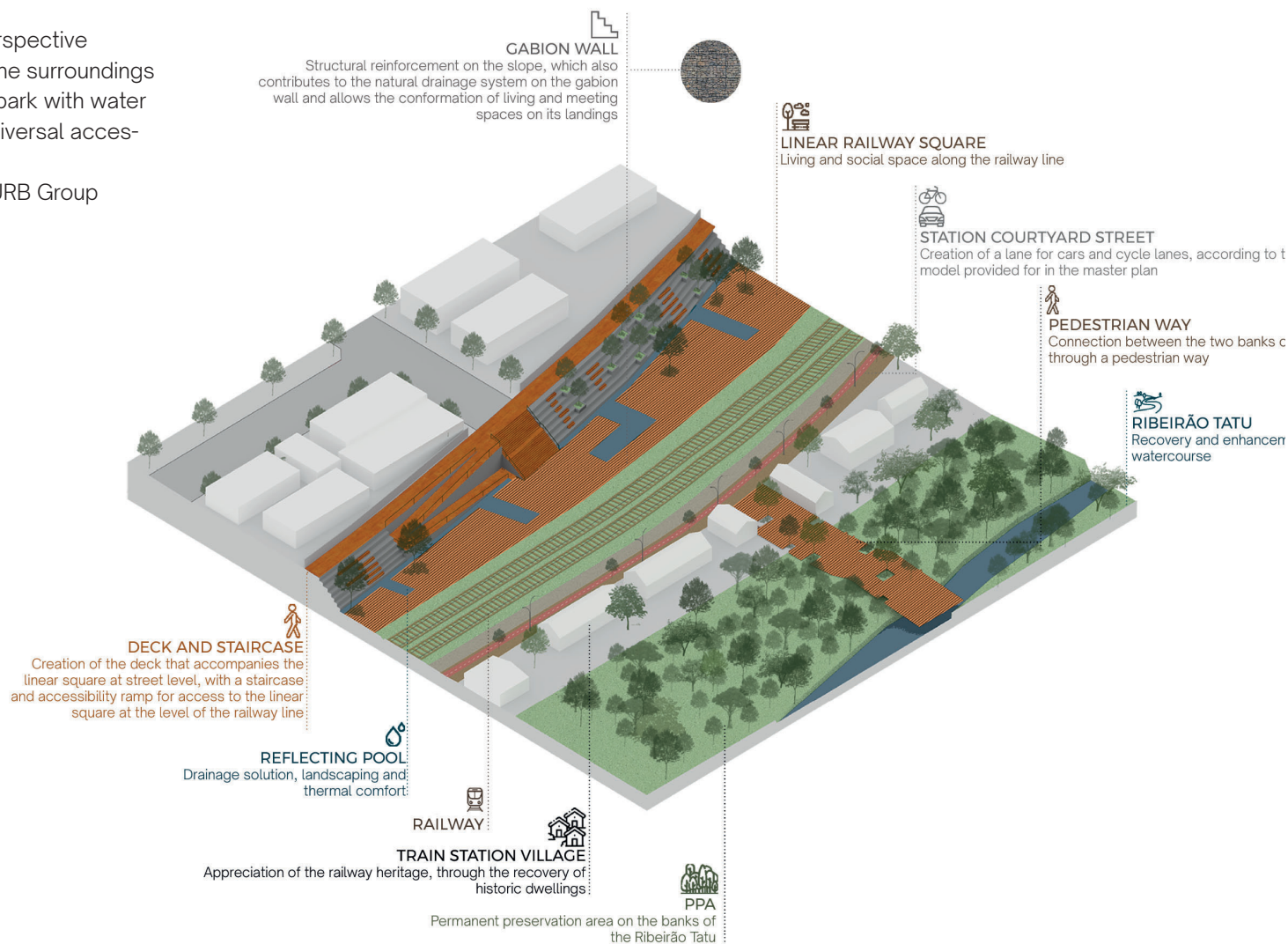


Figure 60
Isometric perspective
highlighting the proposal for
the surroundings of the old
railway station.
Source: PExURB Group

Figure 61
Isometric perspective
highlighting the surroundings
of the linear park with water
mirror and universal acces-
sibility.

Source: PExURB Group



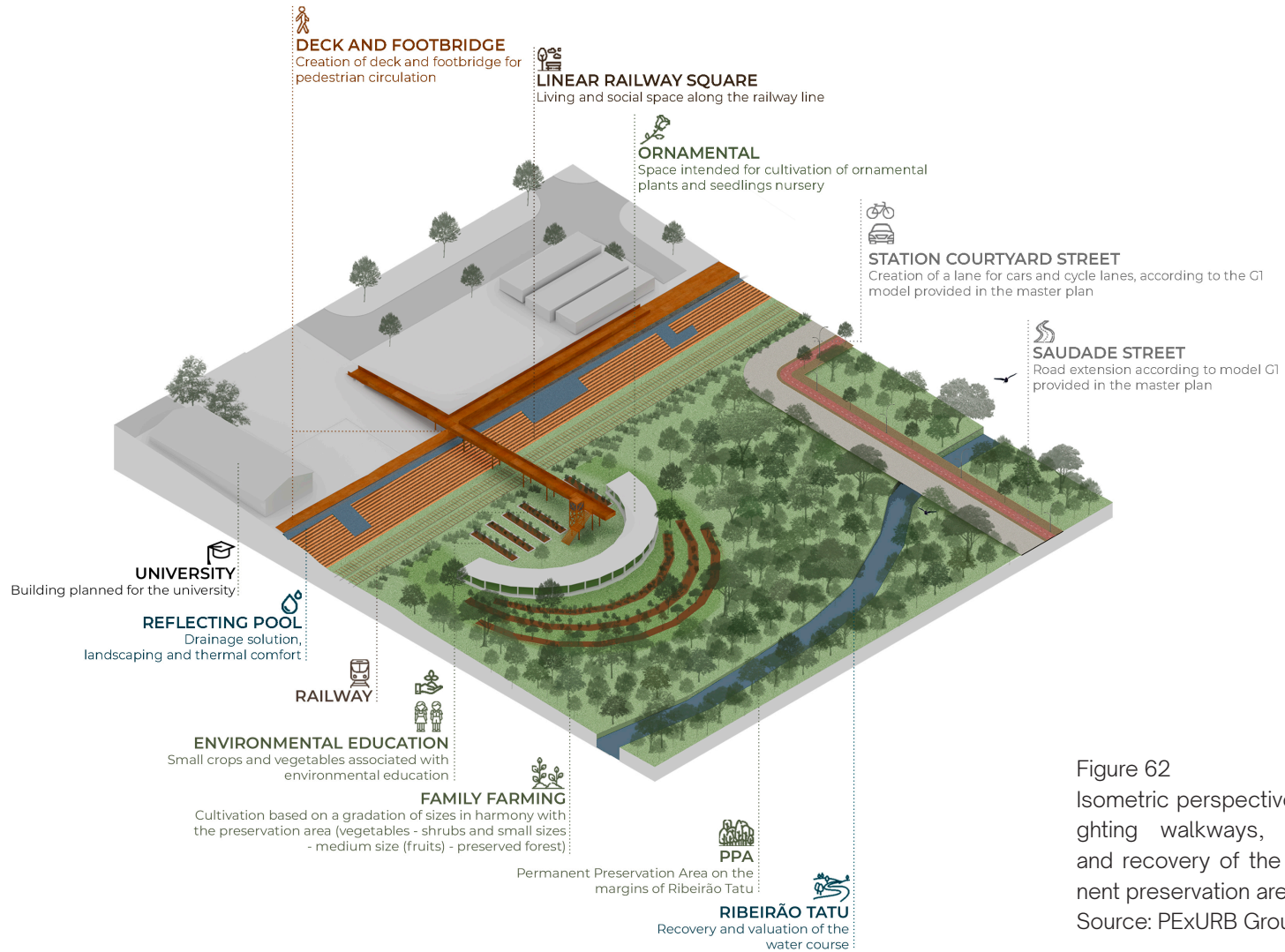


Figure 62
Isometric perspective highlighting walkways, nursery and recovery of the permanent preservation area.
Source: PEXURB Group

Housing: recover the original characteristics of the volumes, facades and roofs of the houses, enhancing them for maintaining the resident population. Partnerships with CAU-SP are planned through ATHIS programs for the conception, design and detailing of these actions.

b) Environmental corridors



Figures 63, 64 and 65
Progressive irradiation of Environmental Corridors from the Railway Park to the urban grid in a grid.

Source: PExURB Group

Through the Refloresta Cordeirópolis Program, create environmental corridors linking the bottoms of valleys, squares, leisure areas and cultural activities in the city center. By valuing the historical formation of the urban fabric by blocks, the urban afforestation solution reinforces the identity of the city, which originated from the railway activities. Its environmental purposes are: control of air and acoustic pollution; increased environmental comfort; surface stabilization through soil fixation by plant roots; interception of rainwater in the subsoil reducing surface runoff; wildlife shelter;

balance of the moisture content in the air; protection of springs and fountainheads; organization and composition of spaces in the development of human activities; visual and ornamental enhancement of the environment; recreation; diversification of the built landscape.

Results

In addition to the urbanistic project itself, which becomes the legacy of a systemic and structural planning for the municipality with the possibility of obtaining resources for the valorization of the railway memory, the present proposal consolidated a strategic result: the integration of sectoral public policies by the topic of cultural heritage. Public managers understood that the area has the potential to integrate the set of municipal actions of economic development, social care, public security, income generation, environment, infrastructure and urbanization in dialogue with Rumo Logística, the concessionaire that operates on the railway line. Thus, the urbanistic project was a motivation for the sectoral integration of decision-making, with cultural heritage as a central element of these decisions.

The sectoral division in which Brazilian municipalities have been based since the 1930s has resistance and structuring problems in the construction of cities because they inhibit a systemic view of public policies. And, consequently, in obtaining resources given the nature of programs that favor certain sectors, such as roads or sanitation, as opposed to others, such as preservation and culture. The proposal of the urbanistic project sought to coordinate the different departments involved in a cohesive way and the city hall understood the opportunity of sectoral integration through the railway complex to overcome these obstacles. And that has concrete results in decision-making and implementation of actions that will result in a basic and executive project plan to raise funds for works.

In addition, the project helped to conduct the civil inquiry “CI No. 14.0243.0000141/2016-0 —

Figure 66

A timeline that conceptually demonstrates the construction, the full use, the crisis and the perspective of new uses such as the valorization of cultural heritage, in Cordeirópolis-SP, through the integration of public policies.

Source: PExURB Group

Investigation of the measures adopted by the municipality of Cordeirópolis-SP aimed at solving the existing risks in the areas identified by the National Center for Monitoring and Alert of Natural Disasters (CEMADEN) and the National Center for Risk Management and Disasters (CENAD).” The civil inquiry dealt with rainwater in the municipality and was initiated by the Public Prosecutor’s Office of the State of São Paulo in 2016, specifically addressing the washout of the slope between the central area of the municipality and the station; and the flooding of the rail yard, both addressed by the Parque Ferroviário project. By defining integrated solutions, the project directly meets the demands of the inquiry by advancing decisions.

And on a regional scale, the project can inspire other projects in São Paulo cities as a benchmark, considering what was the implementation of railways, in transforming these abandoned / precarious / underused / undervalued spaces into points radiating a green, walkable city oriented by its



cultural values. A condition that makes it possible to enhance actions outside the sectorial scope and make them systemic and structural for municipal development based on cultural references.

Quantitative data

FUNCTION	UNIT	QUANTITY (percentage of total)
Total Project Area	m2	95,831.57
Total Plan Area	m2	6,327,150.42
Total Area of Study for Project	m2	199,883,000.00
Directly Benefited Area	m2	95,831.57
Indirectly Benefited Area	m2	588,298.47
Recovered Permanent Preservation Area	m2	34,397.11
Directly Benefited Urban Afforestation Area	m2	36,319.44
Improvement of the Service, Commerce and Institutional Area	m2	1,258.55
Nursery and Environmental Education Area	m2	820.23
Housing Area	m2	1,995.7247
Housing units	unit	30
Ways	m2	2,754.62
Bike lanes	m2	1,365.46
Sidewalks	m2	1,365.46
Deck	m2	8,295.67
Walkway and Marquee	m2	2,073.98
Retaining Wall	m2	1,972.08
Retaining Wall	linear meter	432.3
Permeable area	m2	48,628.23
Green infrastructure	m2	1,246.26
Squares	m2	21,930.20

Freight elevator	unit	6
Car lanes	m2	2,754.62
Pedestrian paths	m2	3,791.618
Sanitation infrastructure (water, sewer, drainage) — in front of houses and along the deck	linear meter	1,135
Pedestrian mobility infrastructure (walkway+stairs+marquee)	m2	2,759.45
Removal	m3	1,672.8
Resettlement	m2	848.80
Environmental recovery area	m2	34,397.11
Intervention in property	m2	1,258.55
Direct Beneficiaries	users	240
Indirect Beneficiaries	residents of the surroundings	10,000



URBANISTIC PROJECTS

URBANIZATION OF THE CACHOEIRA DAS GARÇAS COMMUNITY IN SÃO PAULO - SP



TECHNICAL DATA SHEET

Scope

Urbanization project for land regularization of the Cachoeira das Garças Community with approximately 500 houses in public and permanent preservation areas.

Topic

Precarious settlement in the valley bottom with a high degree of social and environmental vulnerability.

Area

The area where the occupied site that originated the Cachoeira das Garça Community is located is owned by the municipal government of São Paulo and was originally intended for the green area system of the Sítio Conceição Housing Complex, located in the district of Cidade Tiradentes in the municipality of São Paulo-SP. The occupied site is located at the headwaters and on the left bank of a watercourse that feeds the Ribeirão Guaratiba stream, a tributary of the Itaquera, and in the stretch of the Alto Tietê hydrographic basin, therefore with an important environmental function of aquifer recharge and prevention of floods and landslides in the downstream sections. The community is located about 30 km from the center of the city of São Paulo-SP and on the border with the cities of Mauá, Poá, Suzano and Ferraz de Vasconcelos, in the São Paulo Metropolitan Area. It is subject to the great influence of the dynamics of the East Zone of São Pau-

lo and is supplied by urban education, sports, culture and health facilities. It is defined as ZEIS 1 in the 2014 Strategic Master Plan.

Objective

Develop a design study for an urban project to ensure the permanence of its residents with safety and quality through urbanization that provides conditions for land regularization.

Main issues

How to establish a balance between social and environmental functions in the permanent preservation area, minimizing the number of removals? How to approach valley bottom occupations taking into account the hydrographic microbasin system? How to ponder the housing deficit and environmental justice? And how to promote the multiplication of uses of the city, meeting different ecosystem functions?

Program

With the community, the following priorities were defined: start a land regularization plan and develop general urban guidelines for the permanence of the population in the area. The demands and purposes of the population collected through 06 visits to the area between February/2021 and August/2022 can be summarized by: property security, leisure area, spaces for parties, places for young people, special treatment for cases of residents close to the stream, place for delivery of letters and shopping products, vegetable gardens, recovery of the spring/

mine, improvement of pedestrian circulation, lighting, sanitation. Additionally, there was a need to: improve the stairs, eliminate blind spots that create unsafe conditions for children, young people and women; eliminate irregularities in accessibility; utilize empty lots for public uses and provide them with retainment; at the bottom of the valley, ensure the path of pedestrians, bicycles and vehicles, eliminate flood points and washouts, eliminate direct discharges of untreated sewage, increase the number of crosswalks, discuss the criteria for removals and areas for resettlement; on Cachoeira das Garças street: take advantage of the intense use on weekends, expand rainwater drainage, foster commercial activities and community services, implement bus stops. And, above all, provide residents with addresses. The population residing in the blocks and lots delimited by the stairs does not have an address, a condition that inhibits or prevents their access to services, employment opportunities and citizen dignity.

City Concept

SActions for a healthy city are advocated, through the configuration of friendly neighborhoods for early childhood and meeting the minimum criteria defined by the WHO (World Health Organization), in which spaces of walkability, safety, inclusion and varied uses in the green, open and public areas are accessible at short distances and in people's daily lives.

Urban unity

The urban unit adopted is the stairs because it delimits blocks, provides an address for residents and provides integration between street and river, transforming the watershed into a green-blue web of urban-environmental compensations.

Design Approach

The project adopts stairs as socio-technical facilities that connects the high sections to the lower sections of the community and allows comfortable circulation, leisure areas for children through patios created in the vacant lots around them, production of electricity by photovoltaic cells, and reuse of water, production of food through urban garden and implementation of the entire public sanitation system. Thus, they integrate daily functions (housing, leisure, income generation and services) with environmental functions (recomposition of the hydrological cycle and the formation of a fauna and flora corridor).

Solutions

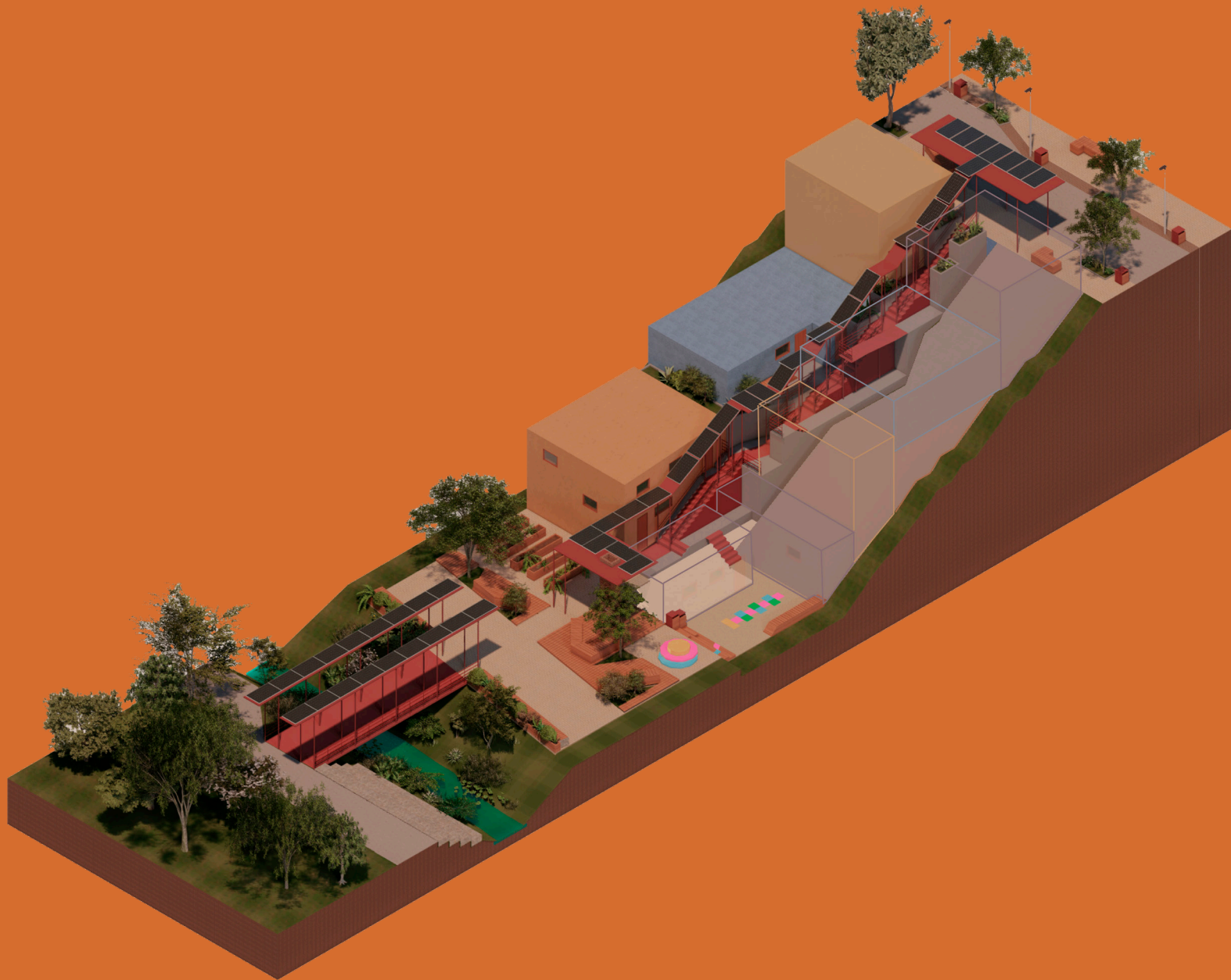
Transformation of Cachoeira das Garças street into a linear square with green infrastructure and leisure and traffic calming devices. Restitution of the environmental functions of the two banks of the stream, with a plan for initial removal of 68 houses and 1 hotel from the left bank. At the bottom of the valley, implementation of a leisure system and green areas with public pedestrian walkways and traffic-enabled areas for service vehicles. Improvement of all stairs while combining different func-

tions, especially those intended for the production of energy, clean water and food. Finally, development of a neighborhood plan based on the healthy city precepts of the WHO and attentive to child inclusion according to the precepts of BAPI (Early Childhood Friendly Neighborhoods).

Implementation

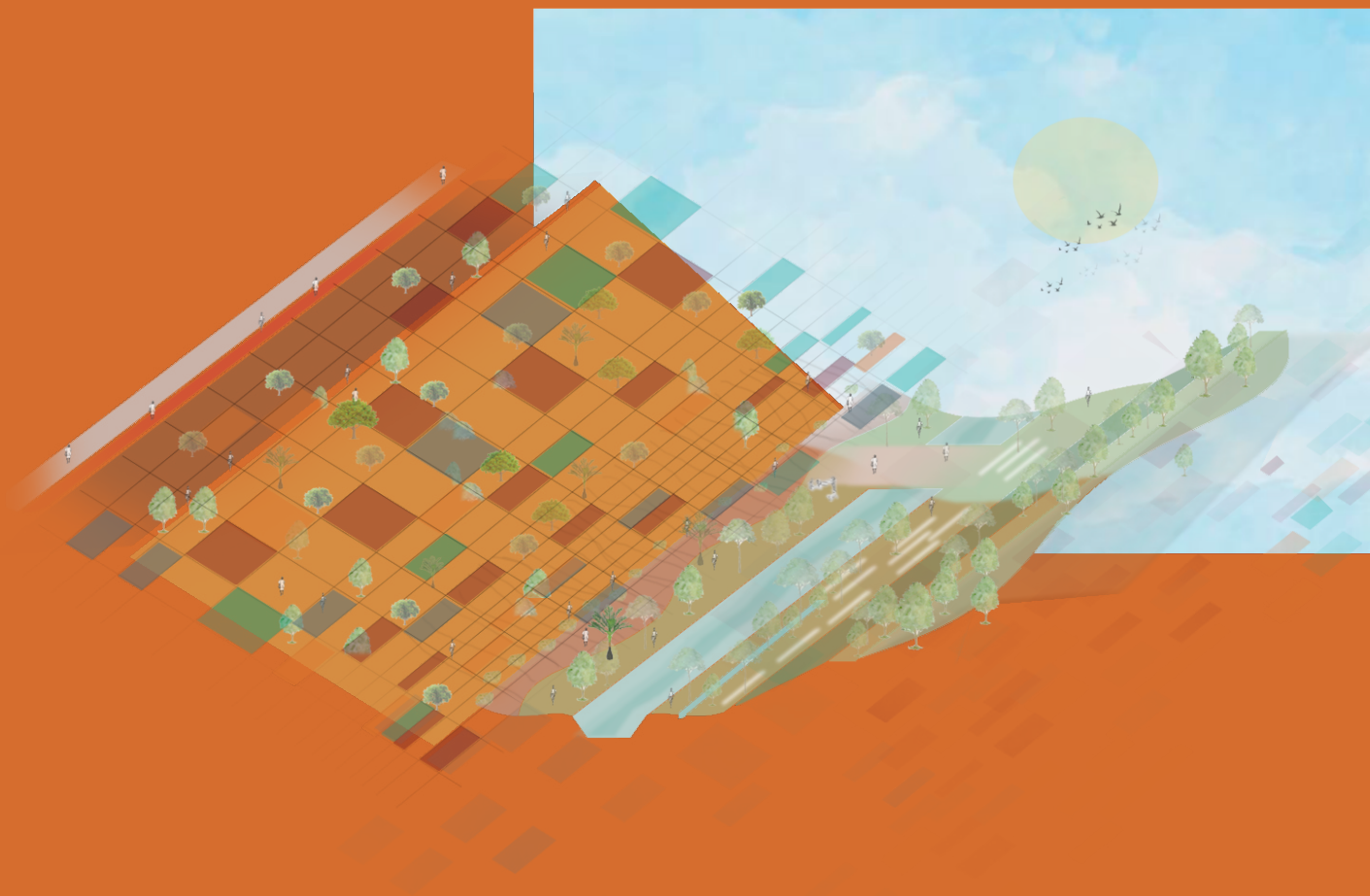
The proposal is based on three levels of governance of actions: district, neighborhood and community. At the district level, guidelines were proposed for a healthy city favoring: walkability through diversified uses of streets and improvements in the road system intended for pedestrians; air quality through afforestation of sidewalks and open areas; the encouragement of physical exercises and leisure activities through the multifunctionality of public spaces. At the neighborhood level, interventions were proposed that favor the autonomy of children in the neighborhood through: differentiated treatment of the streets and surroundings that connect the main schools and cultural and sports facilities. At the community level, urban design actions provide for the formation of a green-blue web consisting of green vegetation and gray infrastructure. The main actions are: a) establishing shared use between cars and pedestrians on Cachoeira das Garças street through the implementation of green infrastructure for rainwater drainage, afforestation, lounge furniture and traffic calming elements; b) transformation of the valley floor into a collective public yard with facilities for leisure

use by adults (barbecue grills), young people (sports areas) and children (children's toys), close to one another; removal of houses located within 10 meters of the permanent preservation area or that are subject to flooding, increase in permeable area, traffic lane restricted for public and private services; sanitary strip for sewage treatment/drainage; privileges for pedestrians and cyclists; encouraging the opening of commercial enterprises in neighboring houses; containment at the margins; installation of street market areas and crossways; installation of a retention pond for off-line storage of excess rainwater; renaturalization of the river and spring with restoration of the riparian forest; restoration of riparian forest on the right bank, in the 30 meters of APP; c) on the stairs, implementation of: regular steps and landings, ramp and side handrails, sanitation network (water, sewage, drainage) and hydrants, roofs with photovoltaic cells and water capture for reuse, patios for children, community gardens, retaining walls in specific places, and in the alignment of the main stairs the installation of crossways over the stream, mainly close to the cultural center.



Hydrologic cycle and mitigating measures:
a continuous process between exchanges and balance







1

STREET CACHOEIRA DAS GARÇAS
shared use between automobile and pedestrian through the implementation of green infrastructure for rain drainage, afforestation, seating furniture and traffic calming solutions



2

STAIRCASES
Improvement of the staircases associated with the courtyards, urban gardens and stream crossings, articulating different functions, mainly the production of energy, clean water and food, in addition to the implementation of the sanitation network (water, sewage, drainage)



3

LEISURE AND LIVING SPACES
Collective public backyard with equipment which use is intended for the leisure of adults (grills), young people (sports area) and children (children's toys), close to each other



4

COMMUNITY GARDENS
community gardens in the upper and lower part of the accesses, associated with leisure and sitting areas, for own consumption and, eventually generating income



Subtitle

Blocks for land regularization

Staircases

Cachoeira das Garças Community

Permanent Protection Area (PPA)



5

LEFT BANK

Public walk of pedestrians and trafficable areas for service vehicles, receives the sanitation network (water, sewage, drainage)



6

EXISTING PATH

Improvement of the pedestrian road from the existing path on the right stream bank, with access by the new crossings aligned to the staircases



7

RIGHT BANK

Recomposition of the environmental functions of the two banks of the stream, with recomposition of the riparian forest on the right bank, in the 30 meters of APP



8

RETAINING POND

Installation of retention pond for off-line storage of rainwater surplus



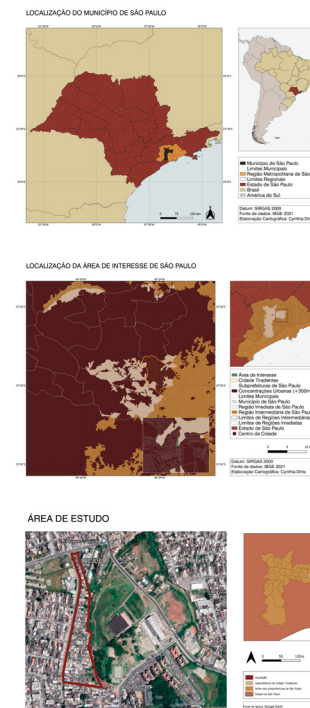
DESCRIPTIVE MEMORIAL

Problematization

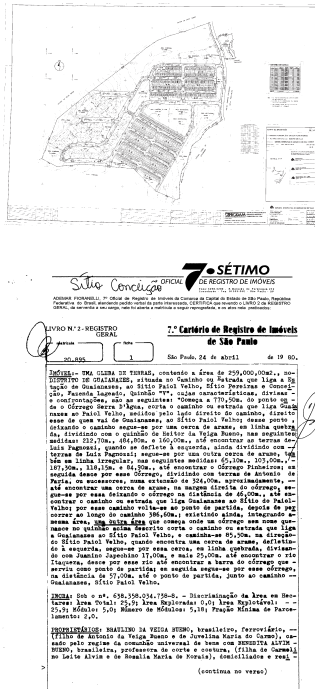
The Cachoeira das Garças Community was formed by the occupation of a green public area defined by COHAB when the Sítio Conceição Housing Complex was implemented, in the district of Cidade Tiradentes, in the city of São Paulo. The occupation of the community took place through the sale of lots in the public and permanent preservation areas at the head of the watercourse, from 1992 onwards. At the time of the occupation, the population did not have transport, electricity and paving and the time needed to reach the center was 2 hours. The occupation of land and buildings was consolidated as a housing alternative in the face of the absence of effective public housing policies in the 1980s—1990s and the impossibility of paying rents due to the high cost of living in the period of inflation.

In 1994, the municipal government undertook an attempt at removals by means of a request for repossession. However, social organization and the Catholic Church's joint action with social lawyers ensured the permanence of the population by filing the request through a lawsuit in the 3rd court of the Public Treasury, No. 1399/94. Since amendment 13/2005 to the state constitution, the possibility of legal disablement of public areas for land regularization purposes has been legitimized.

In the following years, the efforts of the people and community leaders resulted in the basic infrastructure of sanitation, transport and social services (daycare, school, cultural center). More recently, the proximity of mass transport and reduced travel time to the city center provided better conditions for staying in the community, in addition to the feeling of belonging and neighborhood of the territory. Accordingly, the community is an expression of popular movements in the construction of cities and in the resistance by public action for the right to the city.



Figures 67, 68 and 69
Location of the preliminary
study area.
Data source: IBGE
Cartographic elaboration:
Cynthia Diniz



Figures 70 and 71
Implementation Plan and
Area Enrollment.
Data source: COHAB SP

Currently, families in the community lack proper sanitation and accessibility, occupying the spring area and the stream bed in steep areas with a tendency to geological and geotechnical risk. They lack land titles and the houses have health, structural, electrical, sanitation and densification problems. The political, economic and health crises after 2016 contributed to increased unemployment and increased number of precarious houses in the area. And the pandemic compounded this context of problems and increased the building of precarious shacks and irregular masonry houses with expansion into two-story houses or densification by internal division of properties to accommodate unemployed, evicted or displaced families.

The informal real estate and civil construction markets are in a boom phase and can be observed by the intense expansion of occupation close to the stream and by the value of properties and rents. In 2022, the average values range from R\$ 30,000.00 for houses with two bedrooms and a bathroom located in the most precarious areas; R\$ 90,000.00 for houses with two rooms, living room, kitchen and bathroom located on Cachoeira das Garças street; up to R\$ 600,000.00 for properties with 6 floors. The free rooms of the houses are rented and the value of the housing rent ranges from R\$ 400.00 to R\$ 600.00. Bartering negotiations, such as exchanging buildings under construction for automobiles, are common.

Leisure areas consist in one of the major lacks. The small squares in the surroundings located in residual areas of the road system do not favor their daily use. And the number of children playing in inappropriate places, such as in the floodplain or in the stream bed in the midst of waste, demonstrates the danger of the lack of proper areas for children's play, putting them at risk of contamination by sewage or injury caused by garbage thrown into the valley floor (glass, debris, food scraps, etc.).

And the major problems are related to the increased number of houses over the stream, over the water spring and over the fountainhead. The occupation area is an amphitheater basin headwater



2001



2004



2007



2008



2010



2011



2012



2013

Figures 72 to 87
Historical evolution of the
area. Source: Google Earth.



2014



2015



2016



2017



2018



2019



2020



2021

with a large volume of water that can generate future floods due to the complete waterproofing of the soil and occupation of the valley floor, whose environmental function was completely mischaracterized. These conditions require precautionary and structural measures in order to eliminate the risks, even though municipal studies (according to information from Geosampa, in 2021, on geological risk areas in precarious settlements) found no risk points in the community.

The valley floor is strategic in the community because it is the main access route to half of the houses, to the Cidade Tiradentes Cultural Training Center and connects the Cachoeira do Campo Grande, Alexandre Davidenko and Inácio Monteiro streets. However, the works on the houses have caused the silting of the banks of the stream or their channeling by construction of irregular ducts to allow the expansion of rooms, the implementation of garages or the construction of new houses. This context is exacerbated by the lack of safe crossings along the banks. The only safe bridge was built in 2014, during the X Biennial of Architecture by the collective NACCO and the Ecuadorian office Alborde, but it was removed for construction/expansion of housing. The cultural center also provided for an access bridge to the other bank, which was not built.

Morphologically, the community consists of 2 stairs patterns: 1) double stairs, but separated by a wall with terraced houses; 2) stairs separated by rows of overlapping houses, in both cases with widths from 1 to 1.20 m. They are the main streets of the community, they concentrate the activities of services of the houses (mainly laundries) and under it or under the houses the sewers in natura that reach the watercourse are released. There are many negative thresholds and vacant lots, problems of containment of cuts and embankments and difficulties of access and mobility.

The most recent and precarious occupations, as well as the expansion of garages and service rooms over the stream, confirm the imminent risk situations and need to be removed. At the valley floor, the points of flooding are noticeable and in the amphitheater formed by the topography,

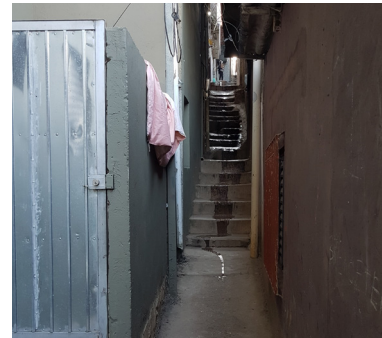
the water outflow. Residents build irregular hydraulic ladders, but they do not prevent erosion and washout points on the banks of the stream. The resloping, also carried out irregularly, intensify the problems of housing, together with the points of humidity in the buildings located close to the spring.

The houses have a morphology of blocks in levels, with overlapping houses, shared structures, rooms without ventilation, infiltration, absence of setbacks and windows, difficult access to different levels, absence of backyards or service areas implying the use of stairs to release water from tanks and washing machines. Commonly found are alley houses, houses without a yard, two-story or overlapping houses, houses that form channels or bridges in relation to the valley floor, rookery and subletting for income generation, especially in the core of the blocks. They form community clusters with close relationships with neighbors, family members, services, common uses or similar to condominiums. Technical networks (sanitation and energy) when they exist are shared by loans or divided between users.

In meetings, residents of the most precarious areas or housing stated that, in the event of possible removals, they agree for resettlements even if they do not remain in the Community, but that the process is conducted in conjunction with transparent debate and decision-making.

Local, regional and social aspects

Cidade Tiradentes is a housing complex started by the public initiative, in the 1970s, in the eastern end of the city of São Paulo with about 40,000 houses. In this area, housing provision was undertaken by housing complexes, embryo house with pre-molded structures, houses and urbanized lots. In addition to the public initiative, the private initiative occurs intensively through clandestine, illegal or irregular subdivisions.



Figures 88 to 96
Field surveys in
São Paulo-SP.
Source: PExURB Group



Figures 97 to 105
Field surveys in
São Paulo-SP.
Source: PExURB Group

Public programs in the area of housing and land regularization have favored the private market as a promoter of policies and actions, which generates privileges for developers, selective investments in popular market housing, inaccessible costs of land regularization and property acquisition for the poorest population and lack of subsidies.

There are also initiatives by social organizations through collective efforts. In this sense, it is the housing function that characterizes the broader use of the neighborhood, especially because in Cidade Tiradentes housing is a metropolitan service that reaches and merges with neighboring municipalities belonging to the São Paulo Metropolitan Area. This characterization of its limits is marked by high poverty rates that intensify the inter-municipal flow of demands for services and land for housing purposes, even if informal. In other words, the housing provision and urban social facilities and services meet a metropolitan demand and not exclusively a demand from São Paulo city.

These actions contributed to consolidate Cidade Tiradentes as a sub-centrality and the surroundings of the Cachoeira das Garças community as a neighborhood center. The surroundings are served by shops, some services (elementary and secondary education, basic health unit, regular collection of domestic waste, public transport, paved roads and electricity) and show real estate dynamism. The landscape is marked by the intensity of housing projects, social housing, collective efforts and clandestine subdivisions. In addition to some industrial activities. A part of the residents work informally in their own homes and a small portion have shops or services on Cachoeira das Garças street. The main access street is Inácio Monteiro, which plays a structuring role in Cidade Tiradentes.

In this context and in the face of recent changes in land tenure regularization, promoting it in the Cachoeira das Garças Community is to offer conditions for staying in the city for security of tenure

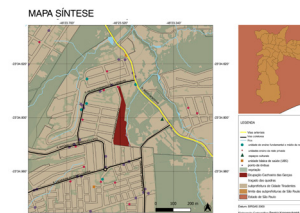


Figure 106
Synthesis map of equipment and roads.
Cartographic elaboration:
Beatriz K. de Oliveira

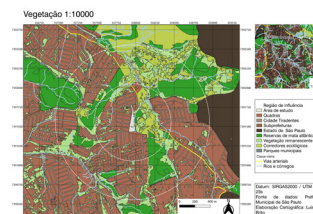


Figure 107
Vegetation.
Data source: Municipality of
São Paulo
Cartographic elaboration:
Luís F. P. Brito

and the recognition of the family in a system of city rules that can ensure them quality of life. For example, the residents of the Cachoeira das Garças Community lack an address and this prevents them from being recognized in a set of employment opportunities or public services.

In the municipal aspect, the macro-zone of which it is part is one of urban vulnerability reduction and environmental recovery. The areas bordering the community are demarcated as a Mixed Zone of Social Interest (ZMISa) and the community is demarcated as ZEIS with priority for the formulation and implementation of an urbanization plan with a management council. In addition to belonging to the East Atlantic Rainforest Ecological Corridor (of the Atlantic Rainforest municipal plan). However, the community does not have a land or building registry. The State is present through different social projects and mainly through the Territórios Ceu that configure a set of actions through the network of public services of education, leisure and culture. And ZEIS 5, voids intended for social use that would be possible land reserves for resettlement demands, are about 4.5 km away from the community.

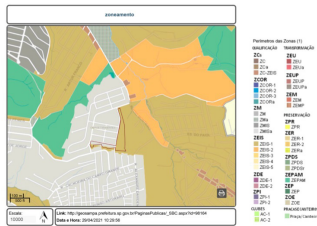


Figure 108

Zoning map.

Data source: GeoSampa

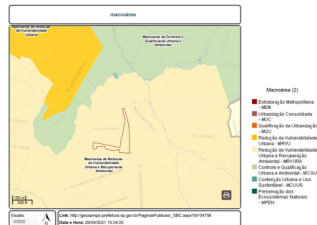


Figure 109

Map of the Urban Vulnerability Reduction and Environmental Recovery Macro Area.

Source: GeoSampa

The area is located in UGRHI 06 Alto Tietê and, according to studies, some general problems of the basin are reproduced in the community: very low sanitary sewer service (32% of the population of the basin is not served by a sanitary sewer system); occupation conditions that promote landslide and flood hazards (there are 700 risk areas related to flooding and landslides); underutilization of the watercourse for solid waste disposal (there are 117 solid waste deposition areas in the São Paulo Metropolitan Area that affect water supply, impact the quality of groundwater and surface water); informal occupation of public areas (there is conflict over land use); type of densification without technical resources and inappropriate to local conditions (inadequate use and occupation of the soil that generate erosion, as the geological formation is susceptible to erosion). Erosion contributes to sediment carried by streams that are deposited in the Guarapiranga and Billings dams, which reduces the storage capacity of the reservoirs.

There is also the washout of the banks of streams and rivers due to the erosive action of the waters that excavate the banks. And improper occupation by embankments, narrowing of beds, soil sealing, construction on streams and rectifications without design or calculation, in addition to underestimated crossings generate conditions of risk of flooding and landslides.

The community has a dynamic neighborhood. Relations in this scope intensify the use of the street as a leisure space and intense daily journeys of young people to schools. On weekends, Cachoeira das Garças street is occupied by teenagers, like an extensive linear square. Although risky to users due to the intense traffic of cars, motorcycles, and trucks at high speed. There are several public service facilities, but little private service, such as banks, shops, etc. The Cultural Center is heavily used by adolescents.

Problems of depredation of public property, cases of violence linked to drug consumption and the closing of stairs for public access are common. Security, as in most precarious settlements, is a priority issue and stems not only from the misuse of open spaces, but above all from the existence of blind spots in the stairs and patios around them.

Initial ideas

The central objective of the proposal was to provide residents of the community with an address and local transformation for their land regularization. Therefore, the adoption of stairs as a design element is structuring, as it enables actions to enhance the public space, becomes the delimiter of blocks and lots, consolidates itself as a reference for the implementation of sanitation networks and daily facilities, in addition to integrating materially and immaterially the upper part to the lower part of the community. Within the neighborhood, the whole community and the right bank of the stream are consolidated as a large linear park, reestablishing the original environmental function of the area with the removal of more precarious or risky houses.



Figure 110
Map of the watershed of the
São Paulo study area.
Data Source: USGS 2021
Cartographic elaboration:
Juliana da Costa Oliveira

Theoretical-conceptual approaches to solutions

107

The purpose of the actions on the Cachoeira das Garças community is to build a design study that enables chain actions, coordinated with one another to mobilize the community and provide for land regularization. It starts with the local problem of social and environmental vulnerability of precarious settlements in the valley floor and formulates solutions within the neighborhood, integrated with one another and consistent with structural strategies considering the urbanization process of which the community is part.

The project design adopts a strategy from the late 1980s that took place in the center of São Paulo-SP through circumscribed and structuring actions, but in a territorial scope of the neighborhood



Figure 111
Project concept diagram,
highlighting Cachoeira das
Garças Street, the residen-
ces, the stairs and the APP.
Source: PExURB Group

with improvement of occupied areas, rehabilitation of blocks and lots for housing, interventions in houses (according to Bonduki: <https://www.youtube.com/watch?v=5Nvdd13xoeg>). As the characterization of these urbanized areas is more in line with the precarious central areas of São Paulo at the end of the 20th century than with the peripheries of the same period, since Cidade Tiradentes has its own dynamics and has undergone progressive public policies that make it an important centrality.

In a broader and more structural context, the project provides permanence of people where they already have housing, family and social ties, urban and regional public infrastructure, and adequate livelihood conditions (low cost of private services and high access to public services). Nevertheless, it also consolidates actions aligned with the fight against climate change and segregation through inclusive and socio-environmental solutions that are guided by the assumptions below..

Sustainability

Why think of cities through precarious areas as a place of investment? Because they are the most affected by the impacts of socio-territorial inequalities and segregation and by the impacts of climate change. The political agenda on climate change has dominated the debate in academic and social spheres due to its global urgency and, mainly, the role that local entities represent in the construction of alternatives (Di Giulio et al., 2017; 2018; 2019).

Mitigation, energy, water and food security are some of the priorities to impact the causes of problems or the adaptability of cities. The Brazilian regulatory framework of the last 20 years is of a high level, but with low concrete adherence by its federative entities through effective public policies.

In Brazil, there is no sustainability effectiveness with an increase in poverty and social and regio-

nal inequalities. Therefore, the resurgence of sustainable actions involves combating social and environmental vulnerabilities with real potential for systematic and structural change. Because the complexity of climate change requires a synergistic framework of actions with the materiality of proposals and legal directives. Breaking paradigms or hegemonic thinking through experimentation in the urban field are strategies, means and ends of this process. To this end, theoretically, the project is based on the idea of a systemic planning with nature, contrary to the monofunctional green belts of 19th and 20th century cities or squares and parks isolated in the urban fabric. According to Oliveira (2017), the idea of “green wedges” feeds this new model and can be understood as a new paradigm of urban actions.

Conceptually, it dialogues with nature-based solutions that seek to respond to ecosystem services and provide advances in their four categories: support, culture, provisions and regulation by, specifically: soil improvement; aesthetic and healthy quality of the area through outdoor activities; provision of food and clean water; restoration of the hydrological cycle, combating erosion, implementation of sanitation networks and adaptability to extreme events. Thus, it explores the multifunctionality of spaces to make them more resilient over time, through a systemic approach to infrastructure, simultaneity of uses, ecological and social connectivity with different environmental niches and spheres of society, through integration of the planning process, mediating social aspirations and state restrictions and incorporating innovation in design development in multilevel dialogues.

Methodologically, it incorporates the interscalar concept through relationships that vary from macro (regional) to nano (lot) through the crossing of regulations, requirements, guidelines and technical and administrative directives. And focusing on the scope of the local community, the neighborhood and the district for solutions that involve plans, projects and directives.

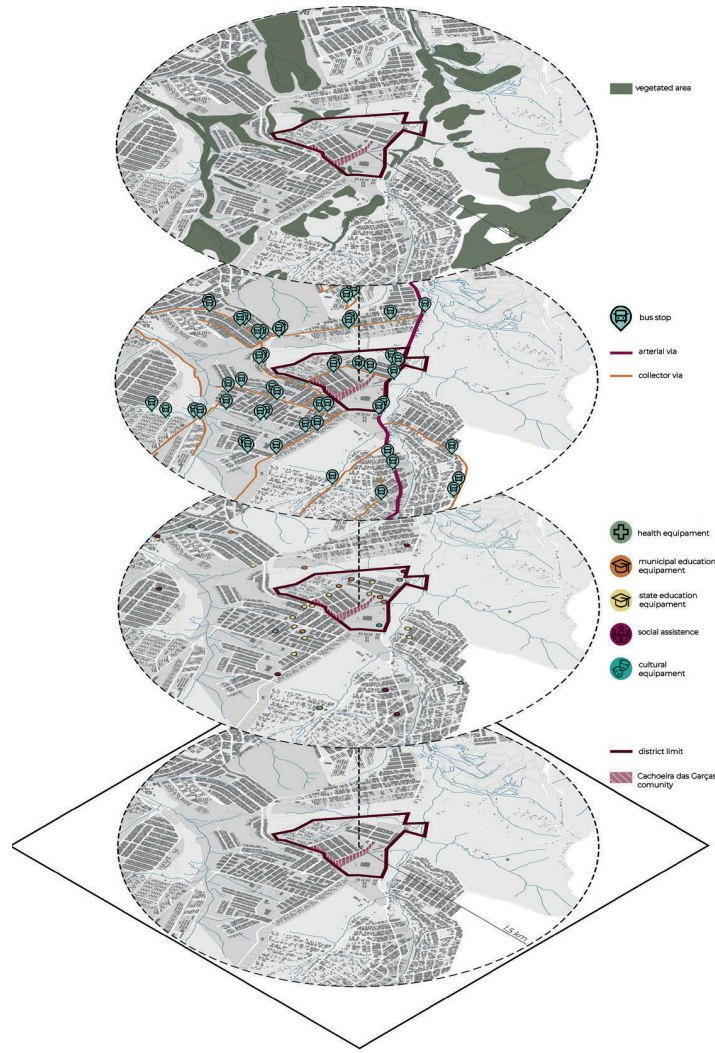


Figure 112 (left)

Analysis of green areas, mobility and equipment around the project area in São Paulo.

Source: PEXURB Group

Figures 113 to 116 (right)
Drainage maps, green areas system, location of equipment and mobility elaborated as motivators of a Neighborhood Plan for Sítio Conceição.

Source: PEXURB Group

DRAINAGE MAP

- OPEN AREAS
- VEGETATED AREAS
- RIVERS AND STREAMS
- URBANIC WATER PERCOLATION
- URBANIC WATER WAY FLOW



RESILIENT



SECURE



WATER PERCOLATION IN PERMEABLE AREAS

ALLEYS ACTING AS WATER FLOWS INFRASTRUCTURE TOWARD THE STREAM

GREEN AREAS SYSTEM MAP

- OPEN AREAS
- GREEN AREA
- PPA - PERMANENT PROTECTION AREA
- ROAD AFFORESTATION
- URBANIC VEGETABLE GARDEN



RESILIENT



INCLUSIVE



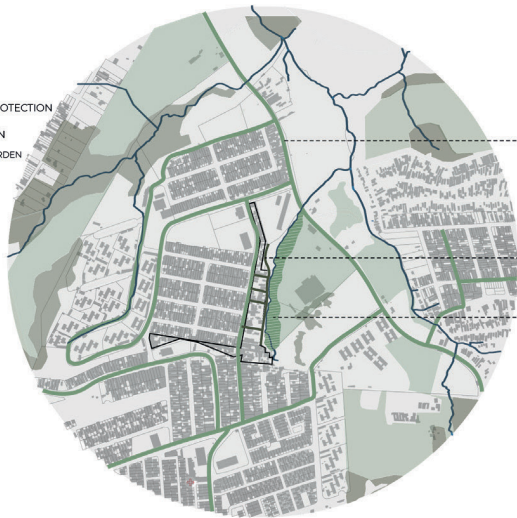
DYNAMIC



SECURE



CONNECTED



SIDEWALK AFFORESTATION: CONNECTION SYSTEM BETWEEN GREEN AREAS AND EQUIPMENTS



URBANIC VEGETABLE GARDEN



PPA'S AMBIENTAL FUNCTION RECOVERY

EQUIPMENTS MAP

- MUNICIPAL SCHOOLS
- STATE SCHOOLS
- BASIC HEALTH UNIT
- SOCIAL ASSISTANCE
- CULTURAL CENTER



INCLUSIVE



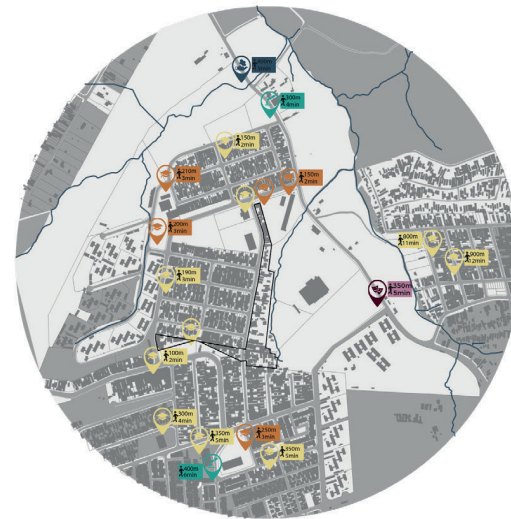
DYNAMIC



SECURE



CONNECTED



MOBILITY MAP

- VIAS QUALIFICATION
- SHARED USE VIAS



INCLUSIVE



DYNAMIC



SECURE



CONNECTED



The place of the project is the valley floor in urban river. To that end, it evolved with a discussion about the urban permanent protection areas, understanding the legal restrictions and their environmental functions. The application of the APP concept in rural and urban areas, without distinction, has generated conflicts and led to the predominance of a legalistic view that disregards the particularities of urbanization. This vision obscures some deep problems of urbanization and requires a methodological review that incorporates the basin as a whole.

Recent changes in the forest code through Federal Law No. 12,651/2012 implied a review of the regulation of the permanent preservation area, involving updating the way it was treated in Federal Law No. 6,766/1979. And Law No. 14,285/2021 intensifies the importance of the municipality in this regulation and management, although with low autonomy in the execution of environmental and urbanistic principles and negotiation with private entities that press for new uses in these areas.

In order to resolve the impasses faced in these processes, Ferreira (2021) calls attention to new criteria for understanding actions in these areas based on public policies that take into account variables of historical formation of use in permanent preservation areas, the relationship with the population, with the laws, with the management structure, the presence of natural resources, the relationship with water bodies, the role of the State and its absences. And, considering what Ciminelli (2022) points out about environmental licensing, plans and projects must be prepared and applied taking into consideration the current situation of the place.

For that, projects must consider water in its multiple scales and functions through a sustainable vision of green and gray infrastructure and a neighborhood vision based on urban waters and rivers, which is applicable and replicable in similar conditions to break the unsustainable and uneven ur-

ban design. That is, a vision of development and urban and environmental facilities in conjunction (continuous or segmented) with communities and neighborhoods that provide urban water with decentralized management through: reuse, treatment, retention, infiltration, evapotranspiration. Whose implementation is multilevel: by the community, by the public initiative, by the private initiative, by institutions, etc.

Thus, considering the water districts of Coapa, in Mexico (according to Zires and Tudela, <https://www.youtube.com/watch?v=cFi1dcfyaKQ&t=24s>), the project incorporates water as an integrating element: the circular economy of water through sustainable local management, of social and geographical identity and cohesion, through integrated and collective infrastructures, etc. And it seeks to bring about a circular water economy: groundwater and springs + precipitation and evapotranspiration + infiltration and supply of the aquifer + drainage + treated wastewater. Thus, planning must provide: retention, capture and storage, treatment, infiltration, conduction, and for each of these functions there must be specific solutions for open areas, for water and vegetation corridors.

To that end, it is necessary to check: what are the water stages? Where are the free areas? What are infrastructure networks like? The most problematic occupation is on the slope that forms the valley floor, but for that reason we chose to understand the valley through the system that makes up the hydrographic microbasin to design the project, incorporating: the amphitheater, the spring, the crest/interfluvium or – in our case – the terrace, the slope, the banks, the thalweg, the bed, the watercourse and its transposition downstream. In other words, to design an intervention in the valley floor, two aspects were taken into account: the system in which it is involved and the category of its socio-environmental function.

For this, the project started from the urban environmental corridor model (Anelli, Santos, 2014)

that structures some functions in the valley floor: removal, mobility, resettlement, drainage, leisure, sanitation. Transposed to the reality of the community, the scope, functions and dimension of the solutions were adapted through the formation of a park, retention ponds, leisure, removals, resettlement, circulation of pedestrians, cyclists and service vehicles, sanitation and sports uses.

Inclusion

As the scales of direct actions are contained more especially in the Cachoeira das Garças community, in its neighborhood and in the Sítio Conceição neighborhood; and as there is a special demand for the strong presence of children resulting from this scale, the decision was to introduce solutions aimed at early childhood, trying to mediate solutions at the local, district and neighborhood levels for their uses. The studies by Soares (2021) show that free and green areas, when appropriate, with safety and quality, positively affect the upbringing of the child if they are used by the family. Mainly in areas of precarious settlements where the day care center is far from them because, in general, they are located in urbanistically consolidated areas or better equipped with infrastructure.

This focus helps to delimit the scope of actions and measure their functionality for a more democratic and inclusive public environment, since conditioning the quality of public space to children is to ensure that all citizens, including the elderly, disabled and other age groups can also use it. And, in the community, what happens is that the community stairs are more often used by children, although they are less safe; contrary to what happens in housing projects that are located around the community where the streets are safer, but less used by children.

Thus, the project follows an analogy of the five domains of neighborhood of Goldfeld et al. (2015) for child development: physical, social network, service provision, socioeconomic, and governance and interrelates them with the domains of child accessibility in early childhood of the Early

Childhood Friendly Neighborhood guide (Bernard van Leer, Instituto de Arquitetos do Brasil, 2021).

In addition, the design of the other open public spaces was incorporated into this logic in order to meet the principles of a healthy city (UN-Habitat, WHO, 2020). The conformation of a healthy neighborhood by this model is consistent with the valorization of natural resources (flora, fauna and water), the control and balance of land use in the street-river relationship, the control of the urban form in view of the salubrity and the possibility of creating conditions for daily and routine physical exercises (sports), the valorization of active modes of travel (pedestrians, cyclists), and the recomposition of the hydrological cycle. Combating extreme events and climate change, on a large scale, involves the design of urban form, control of land use and of the levels of transformation in urban lifestyles.

Description

The community is embedded in the urban fabric of the neighborhood and integrated into it, but it itself is fragmented by the predominant form of occupation and the natural elements on which it has been installed over the decades. Thus, the proposed solutions are consistent with a general and integrated view of the community that seeks to connect its parts: street-stairs-river. The *tabula rasa* vision of replacing the existing fabric with another fabric was avoided and the proposal was consolidated by the idea of *tabula scripta* as opposed to *tabula rasa*, that is, by valuing the already constituted fabric and actions that transform it.

Accordingly, the synthesis of the project occurs through the conversion of the stairs into a socio-technical facility. Observing the local reality, a stair module was proposed that includes accessibility, mobility, leisure areas, production of energy and water for reuse, food security, source of income and sanitation alternatives. The intervention through the stairs was enhanced by the possibility of using it as a reference for the limits of the blocks and as an address for the houses.

As a hub of connection between the upper and lower parts of the community, it consolidates the strategy of balance between the two through the material and immaterial connection of social and environmental functions.

The empty lots and the small setbacks are transformed into children's patios because they are open, but protected by the houses and under the control of their doors and windows. The water collected by the roofs of the stairs undergoes an initial treatment to be used for reuse in the patios and vegetable gardens. The stored energy is used to light the stairs and the valley floor. And the vegetable gardens, present in the upper and lower parts of the accesses, are for their own consumption and, eventually, income generation. A total of 4 new crossings were planned for the right bank of the stream, aligned with stairs number 71/74, 91/95, 121A/124, 113/157. Steps and patios were standardized, as far as possible, according to ABNT norms and adapted to the accesses of the houses and to the sanitation networks.

The intense and diverse use of the Cachoeira das Garças street and its location on the terrace of the watershed were the main arguments to transform it into a linear square with greater presence of living areas and green infrastructure. The objective is to balance social and environmental uses with the valley floor in a circularity of compensatory functions between the high part (which starts to receive more environmental functions) and the low part (which starts to receive more social functions). With a permeable floor, the street becomes a facility that delays the runoff of rainwater and has a higher infiltration rate, expanding the hydrological safety equation. Longitudinally, the street became a square with restricted passage of cars. Thus, it connects two important axes of circulation in the neighborhood: Wilson Fernando São Carvalho street and Cachoeira do Campo Grande street, which is the commercial center of the surroundings. Benches, tables, vegetation and green infrastructure configure the street's identity. There is also a proposal for the integration

of schools with the street by altering the walls and access to sports areas, seeking to enable these areas to be more integrated into the community.

Figure 117
Perspective of the staircase module.

Source: PExURB Group

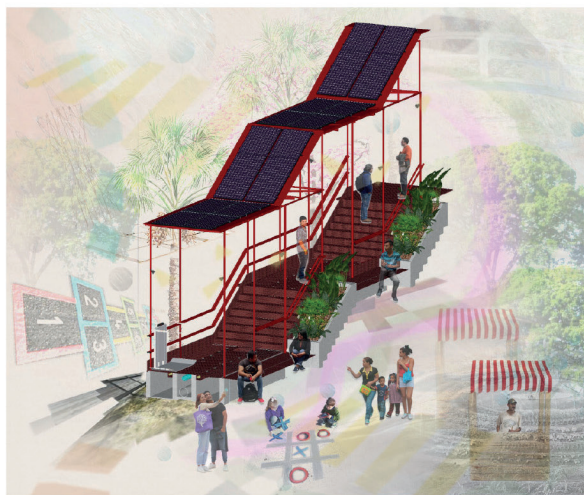
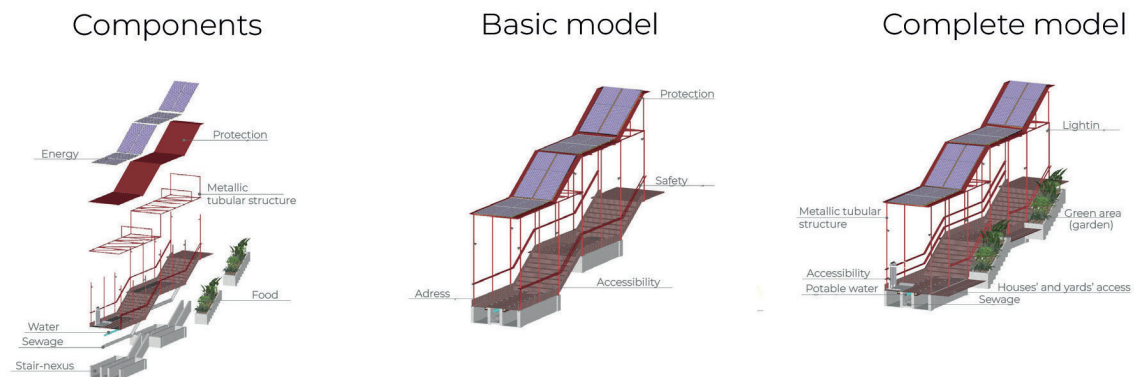


Figure 118
Staircase design concept re-
presentation.

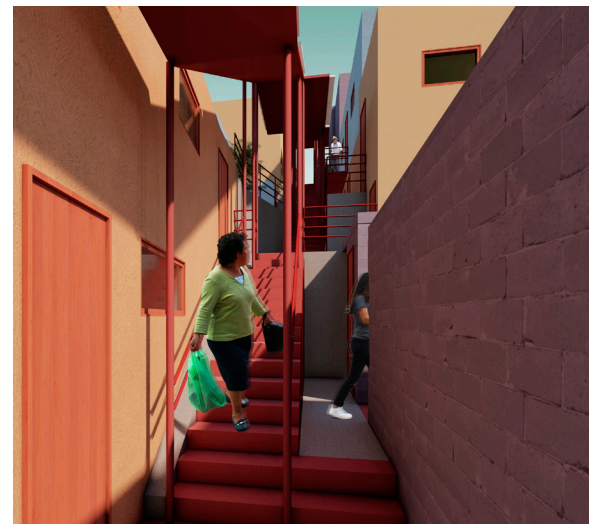
Source: PExURB Group



Figures 119 and 120
Cut of the staircase of one of
the alleys in the current and
proposed situation.
Source: PEXURB Group



Figure 121 and 122
Cut of the staircase of one of
the alleys in the current and
proposed situation.
Source: PEXURB Group



Figures 123 to 126
Implementation of stairs,
patios and access.
Source: PExURB Group

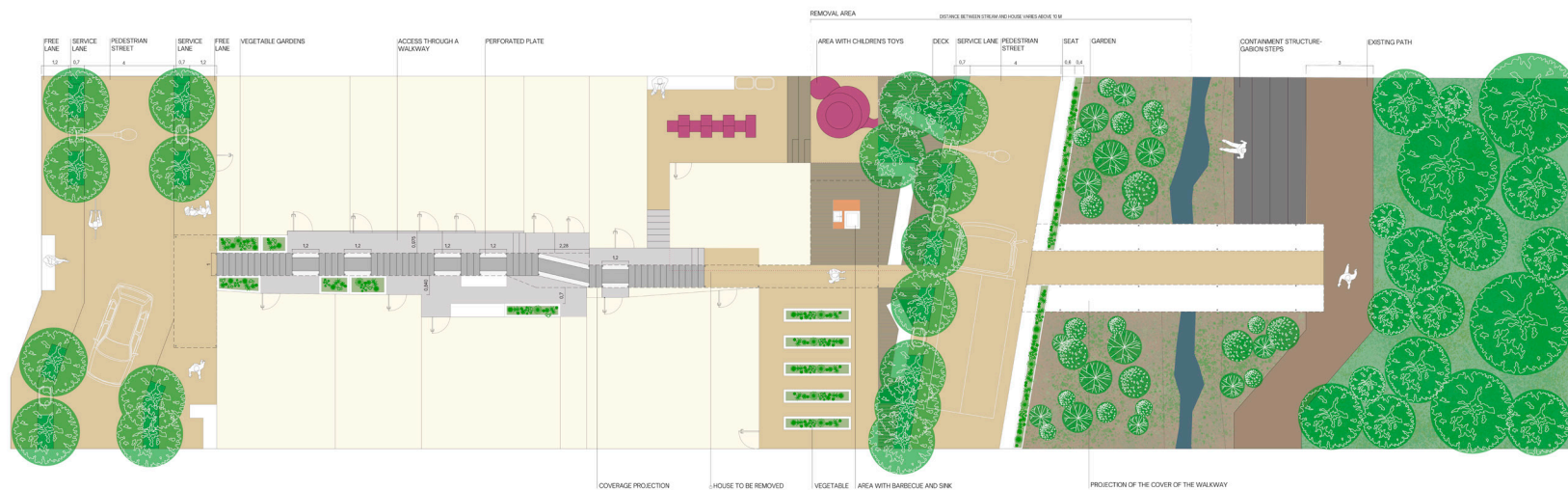
The resumption of the environmental function of the valley floor depends on the multiplicity of uses that guarantee its collective appropriation and the public character, in addition to the social aspect. It is estimated that in the portion originally intended as a green area there are 284 lots (approximately 397 houses), of which 102 (approximately 143 houses) are within 30 meters of the permanent preservation area.

Seeking mediation between the social and environmental aspects, removals of houses that are over the stream are proposed because they narrow its passage, houses in the range of the first 10 meters of permanent preservation area because they are at risk of flooding and geotechnical instability due to washout of margins and because they are in the range of implementation of technical networks (mobility and sanitation). These criteria resulted in the removal of 49 lots (approximately 68 houses and 1 hotel). They are the most urbanistically vulnerable constructions, many of them from recent occupations with alternative material; or as a result of expanding rooms,

Figure 127

Floor plan of a section of the urbanization between Cachoeira das Garças street and the valley floor.

Source: PEXURB Group



such as garages, bedrooms, etc. These removals provide the possibility of widening the range of public use with the recovery of the bank of the stream and the implementation of leisure uses on a community scale. This decision was preceded by intense debates that changed the criteria for removals of 30 m, 16 m and 7 m from the watercourse. The risk factors of flooding and washout of the banks prevailed, as well as the need to pass the technical sanitation and mobility networks on the banks of the stream.

Two investigations were carried out in the valley floor area (left bank, currently occupied by the community): an alternative consistent with the restoration of the environmental function and another with the recovery of part of the bank, but with facilities aimed at everyday uses. The population opted for the second alternative because the option of complete revegetation could cause blind spots, misuse, greater violence and even future reoccupations.






Following this alternative, the design of the valley floor mediates functions related to the environment, mobility (predominantly for pedestrians given the dimensions of the valley), leisure, sanitation, existing housing and induction of commercial uses. Thus, sanitary strips were arranged

Figures 128 to 131
Preliminary studies.
Source: PExURB Group



Removals map

SUBTITLE

-  Cachoeira das Garças Community
-  stream
-  PPA's 7m range
-  PPA's 15m range
-  PPA's 30m range
-  removals considering 10m from the PPA

Estimated removals in the 10m range of PPA:
68 houses and 1 hotel

Source: Planialtimetric Leaning
(April 2021)

Notes:

1. The map was produced by the 2021 planialtimetric leaning (GPS2 SIRGAS2000)
2. It will be necessary to estimate removals by:
 - a- unsanitary
 - b- densification
 - c- precariousness
 - d- structural instability
 - e- geological and geotechnical instability
3. It is necessary to survey houses and families



Photo 1. Date: 19/03/22



Photo 2. Date: 06/11/21



Photo 3. Date: 06/11/21



Photo 4. Date: 19/03/22



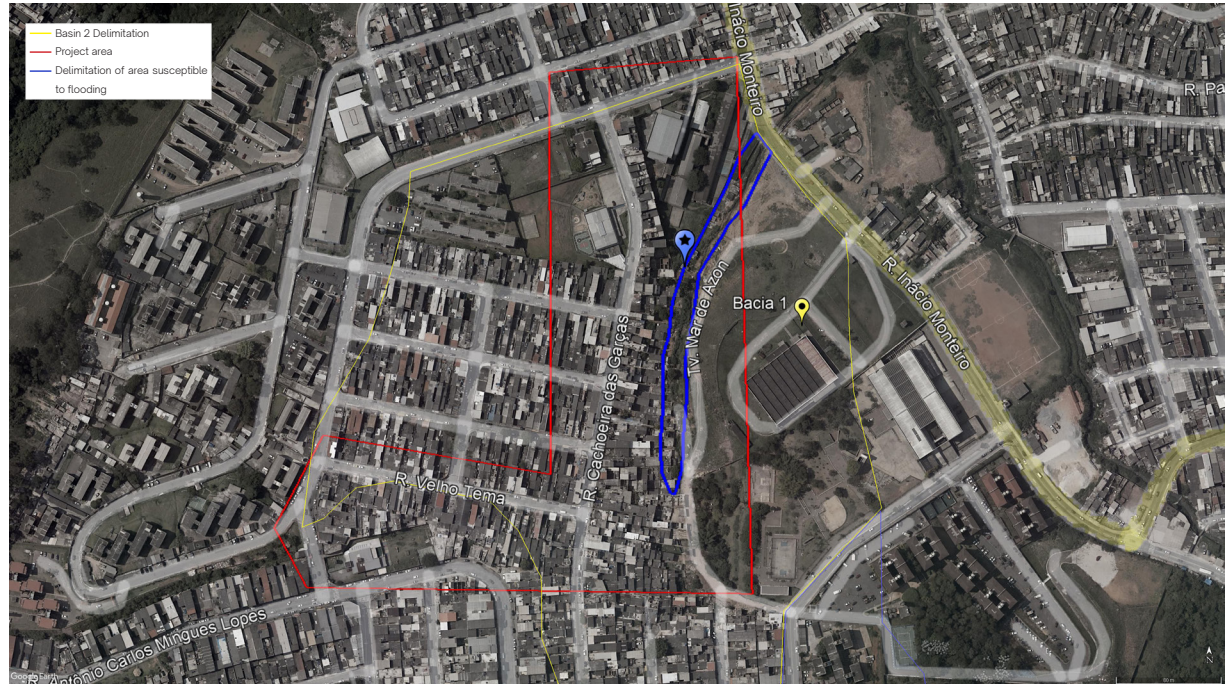
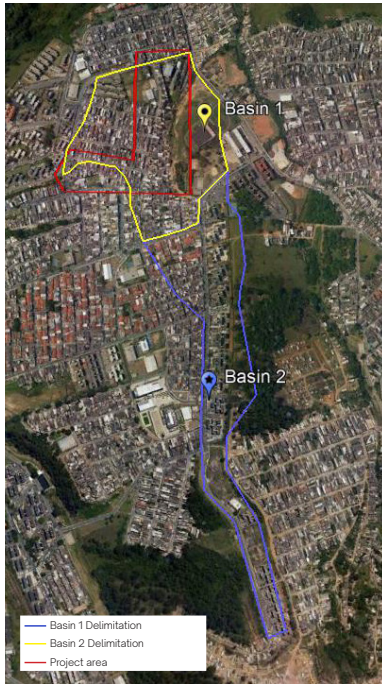
Photo 5. Date: 21/08/21



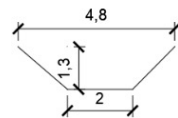
Photo 6. Date: 06/11/21



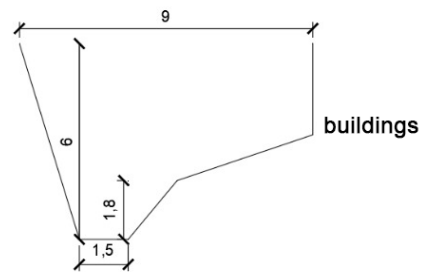
Photo 7. Date: 06/11/21



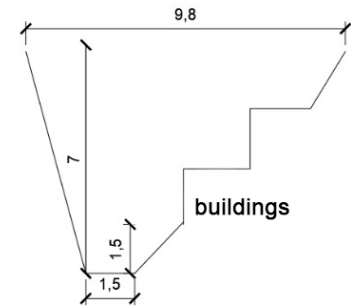
Figures 132 to 134
Basin flow calculations and
stream flood quota.
Source: PEXURB Group



SECTION 1



SECTION 2



SECTION 3

for the collection or treatment of sewage and reuse of rainwater, alternating gray and green infrastructures. And with intense recovery of riparian forest in conjunction with retaining of washout areas. The indication of flood areas in a period of concentrated and intense rainfall required water retention areas, but also the planned increased flow in the crossing. The spring area was reconstituted and integrated with the borders of the cultural center, configuring a landmark in the water mine that is part of the history of the formation of the community and is still present in the collective imagination.

Results

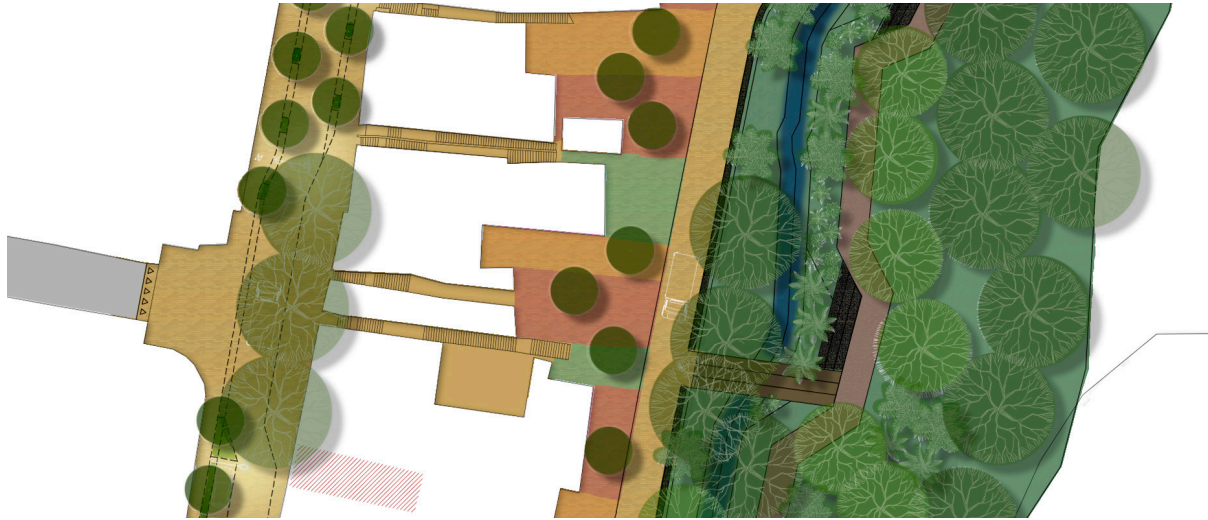
This purpose of reconstituting the hydrological cycle, the fauna and the flora in circular movements between the street and the river must be spread to the surroundings by analogous solutions adapted to local conditions, reinforcing the concept of the green-blue web that is implemented in the existing city.

In addition to the details of the present design, the project provides for additional and urgent studies and interventions that are indicated in the technical report and in the technical package referring to the land regularization request: a) geological and geotechnical studies to understand the stability of the soil and buildings; b) studies of soil and water contamination and environmental damage; c) socioeconomic research; d) housing studies to identify problems with: accessibility,



Figures 135, 136 and 137
Sketches of the APP design
process.
Source: PExURB Group.





Figures 138 to 141
Comparison between the project proposal without any removal and the project proposal with removal of dwellings located on the 10m of APP demonstrates the valorization of public space and the possibility of environmental services.
Source: PExURB Group.



salubrity, ventilation and insolation, structural and electrical adequacy, risk of physical injuries, sanitary installations, infiltration, risk of fire, permissible density, precariousness of materials and sealing, negative thresholds; e) hydrological study of the stream to assess the risks of flooding and expand the flow under the existing crossing; f) studies to trace and correct risks of washout in the banks of the stream and silting; g) technical assistance for social housing; h) surveys in the areas of paving, opening of roads and installation of infrastructure, especially retaining walls; i) basic and executive projects. The priority for studies of precariousness and risk areas aims to avoid disasters related to the intensification of irregular occupation and extreme events. The resumption of discussions with the community must occur through the process of basic and executive project for refining the decisions launched in this design study.

In order to map housing problems, the following criteria must be taken into account: absence of coatings, absence of water tank, inadequate sanitary and electrical installations, infiltrations, inadequate frames, lack of ventilation and insolation, structural insecurity, architectural barriers, super densification.

At their current stage, the actions received approval of the municipal government of São Paulo, through the coordination of land regularization of the Municipal Secretariat of Housing (in meetings in July/2021 and July/2022), and were consolidated as a document according to Municipal Law No. 13,465 and Ordinance No. 85 to adapt to land regularization. Thus, the legal directive is to initiate the Reurb process by conceding special use for housing purposes and with the provision for land legitimacy, respecting local morphologies and family and neighborhood organizations.

The community steering council was also formed and has strengthened social participation through objective interventions and contributions from leaders and from the general community, including the poorest population and those who are better settled.

QUANTITATIVE DATA

FUNCTION	UNIT	QUANTITY (percentage of total)
Directly benefited population (approximate)	Families/community people	600 families (2000 persons)
Indirectly benefited population	Families / people from the watershed	4500 families (18000 persons)
Planialtimetric and socioeconomic data survey area	m2	41.775, 31
Urbanistic plan and project area	m2	41.368,52
Land regularization area	m2	19.047,93
Removals/Attendance	units	68 houses + 1 hotel / 150 families
Environmentally vulnerable area to be improved	m2	37.946,92
Indirectly benefited area	m2 (of the micro-basin)	260.933
Area of urbanistic improvements in the neighborhood - Neighborhood plan area	m2	86.193,75
Service network	linear meter	1.446
Trunk infrastructure	linear meter	275
Green infrastructure	m2	12.790,88
Road and mobility	m2	8.342,31
Mobility facilities	stairs	16
Linear square	m2	5.763,09
Linear park	m2	14.493,7

Public transportation	houses served	600
Drinking water supply	m2	8.342,32
Drainage	m2	8.342,32
Solid waste	m2	8.342,32
Sanitary sewer	m2	8.342,32
Electricity through photovoltaic cell	houses served	400
Urban furniture and landscaping	m2	21.132,2
Land subdivision — blocks and plots	m2	18.582,55
Recreational areas	m2	18.952,72
Environmental recovery	m2	11.164,37
Reconstruction of riparian and native forest	m2	6.430,31
Environmental improvement and recovery in a permanent preservation area	m2	11.164,37
Flood prevention drainage devices	m2	11.275,67
Recovery of springs	units	1
Recovery of areas with washout and erosion	m2	11.164,37
Area with application of nature-based solutions	m2	11.164,37
Community vegetable gardens	units	64
Areas for income generation (street markets)	units	5
Risk area treatment	m2	11.164,37
New public areas	m2	21.133,2
Restoration of the Hydrological Cycle	m2	21.133,2

Goals and Indicators for the community

Residents participating directly at the end of the process		80%, considering participation in the meeting or in response to consultations and surveys
Leaders involved		05
Housing data survey		100% of the houses
Area data survey		100% of the area

Social and academic benefits

Project activities and participatory activities. Meetings with public managers to define guidelines, approve and present the project	units	06 urbanistic surveys 01 planialtimetric survey 01 group dynamics activity 01 socioeconomic survey
Workshops with the Community/Managers	units	06
Final Graduation Works	units	02

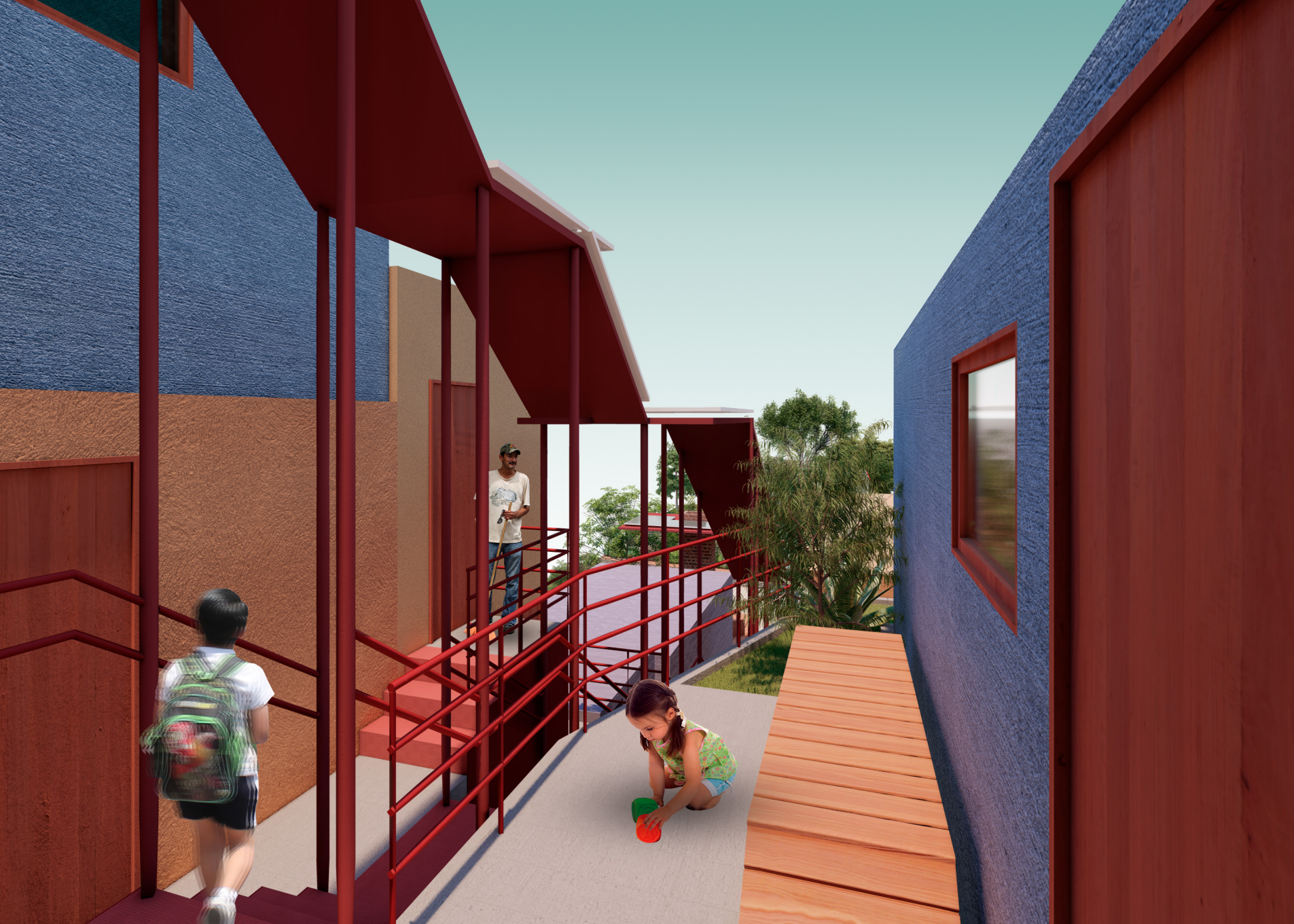
















PART II

METHODS

CIRCUIT OF ACTIONS

The possibility of developing projects in network made it possible to find the tangent points between each community/city/region and leverage them in broader solutions than the geographical selection of the area object of intervention. These solutions were conceived, matured, discussed and consolidated in a circuit of integrated actions. Due to the nature of these projects and given the particularity of being carried out by the university initiative, the activities were based on the education, research and extension practices of the IAU-USP and of the other units involved (including students and/or professors) of the São Carlos School of Engineering, the Ribeirão Preto Law School, the School of Arts, Sciences and Humanities, and the School of Architecture and Urbanism.

This experiment breaks with the traditional urban design model developed in isolated stages of diagnosis, design study, design and detailing to investigate methodological alternatives that favor

the exchange of knowledge between technicians, community, managers and civil society. And provide reciprocal learning considering that the city is the laboratory of innovations. Therefore, vertically non-hierarchical modes of decision making, redundancies of work phases, and crossed forms of exchanging experiences were explored.

The main activities were: inter-unit elective courses, development of course completion works, development of undergraduate research, research through participation in assemblies, workshops, technical meetings, meetings with public managers in city halls, with housing movements and field visits with community, diffusion course offered to society and within one of the communities (Cachoeira das Garças, in São Paulo-SP), preparation of texts and scientific articles about the processes and results and the projects themselves, which required 18 months of weekly meetings and horizontal and vertical workshop activities.

As they are practices that merge education, research and extension, it is difficult to classify them. On the other hand, they prove the intra- and extra-university outreach and their potential for dialogue at different levels with society, be it related to academic, community or political spheres. Therefore, the results of these activities break some paradigms of the understanding of the city and the relations of planning, of production of space, and of the ways of understanding urban reality, especially in São Paulo state.

They contributed to the understanding that the lot cannot be understood exclusively as a commodity and, therefore, that the city or planning must advance to this understanding, as well as the cities that host them have a regional role that have profound influences on their development. For it is necessary to understand that the workers are part of a productive chain and a territorial division of labor that contribute to the formation of these settlements.

Regional diversity and interdisciplinarity contributed to the understanding of aspects of the urbani-

zation and land regularization projects, but also expanded the scope of experience to understand the role of planning, urbanization processes and urban and regional public policies.

And research has found evidence of these perceptions. In urban and regional planning: small cities included in regional organizations, such as Cordeirópolis-SP, have more planning directives than medium-sized cities outside regional organizations, such as Araraquara-SP. In the metropolises, regional planning does not have much influence on the peripheries, as in the case of São Paulo-SP. In other words, the periphery has not been considered as a representative issue in regional or metropolitan planning. In the urban context, all areas emerge as a place of overlapping actions and functions, as in the exemplary case of the station yard, in Cordeirópolis-SP, which brings together aspects of land regularization, an area with environmental, heritage, cultural and tourist functions.

In the urbanization process: through the cases, three temporalities were identified that somehow evidence the recent process of urbanization in São Paulo state and contribute to the understanding of the formation, development and prospects of the communities: 1960–1980, marked by the provision of great infrastructures for transportation and housing on the edges of the urbanized area and directly linked to federal actions; 1990–2000, marked by occupations stimulated by the crises arising from previous decades and the existence of cheap or public land with facilities close to centralities already formed by social facilities and with incidence of municipal actions; post-2010: rise and fall of urban public policies with disconnection from regional public policies and intensification of discussions on a new model of urban development through community actions.

In urban and regional public policies: the areas have a history of urbanization that contributed to their conformation as they are today. São Paulo-SP by the large-scale provision of housing (since the 1960s) and social facilities (since the 1980s) in the East Zone; in Cordeirópolis-SP by land re-

gularization actions; and in Araraquara-SP by housing provision programs. However, these areas were deprived of the many most recent programs in slums that subsidized sanitation, mobility and housing actions. Therefore, they indicate a lapse in these programs in terms of their scope, which worsens housing and urbanization precariousness.

Regarding the integrated interdisciplinary reading, the following aspects can be pointed out: all areas are close to complex infrastructures for energy generation or logistics (energy distribution networks, railways, highways, airports, etc.) with mutual interferences that reinforce the need to understand regional and local relations; and communities have the potential to form systems of work, housing, services, urban and environmental facilities (water, fauna and flora) that require an interdisciplinary and structuring understanding of their solutions.

The formation of settlements is directly linked to the role of the State in the urbanization process, which is clear in the regional inclusion of each city and its community; and the dynamics of changes planned in the short term by state action. Cachoeira das Garças, São Paulo-SP, in the São Paulo Metropolitan Area; Jardim das Paineiras, Araraquara-SP, in the Central Administrative Area about to become an urban agglomeration; and Pátio da Estação, Cordeirópolis-SP, in the Piracicaba Urban Agglomeration, which has a bill to become a metropolitan area.

These dynamics reinforce broader relations than local ones in relation to the process of formation of these communities, especially due to the ease of access to road trunks close to these areas, to employment in other cities, to the informal production chain diffused in central or peripheral urban areas, to municipal public services that meet regional demands. And with a fundamental role in hydrographic basins, due to the proximity to water bodies, whether due to the lack of sanitation in these communities, or the opportunity to transform them into radiators of environmental solutions.

And they all are located or will be resettled on public lands, demonstrating the importance of the State in the intermediation or solution of conflicts of different natures: notary (Araraquara-SP), land use and occupation (São Paulo-SP), interfederative with federal land and the private concession (Cordeirópolis-SP). A condition that reinforces its role as an inducer and executor of public policies and social well-being, provided that it is provided with resources, land and institutional capacity.

Another aspect that reinforces the role of the State in these areas is the presence of public facilities (health, education, leisure) and local infrastructure in the surroundings, whether in the central area or on the edge of the urbanized fabric. Including with the presence of large sanitation infrastructures, such as water treatment plants or sewage collection networks. They are located close to employment opportunities or areas with easy mobility, although far from central areas, as in the case of São Paulo. And of regional infrastructure that was leveraged as motivator of solutions at the local level: highways, railways, airports, high-voltage lines, containment basins, housing projects.

Finally, it should be noted that the housing issue was central; however, it was not approached in isolation, but within the complex context that requires its understanding. For, based on the local conditions, it was possible to build an understanding of public policies, housing provision, social relations, the dilemmas of public management and participatory processes as well as the limits and aspirations as to what the role of the architect and the urbanist should be in the face of these complexities.

One of the roles of the university is to recognize this new context and address it with innovative, inclusive, environmentally appropriate solutions and with a critical and constructive perspective. That is, to advance to the current standards and constitute an innovative field of actions.

UNIVERSITY-SOCIETY

IN EDUCATION

In education, the main goal was to promote the opportunity for undergraduate students to surpass the university's limits as to learning through the territory, together with the community and with interaction between different fields of knowledge through inter and transdisciplinary knowledge construction. The practices sought to provide reflections on urban projects and a critical view on the material and immaterial construction of the city. And they were conducted through the preparation of courses and course completion works.

The purpose was to introduce the student to the setting of professional practice that involves different fields of knowledge and that requires an approach with fieldwork and joint action with society in a diffused and organic manner. Their goal was to provide opportunities for the student to develop differential skills that could not be developed in the classroom; interact with professionals, professors and students from different fields of knowledge; produce direct and indirect impacts on society in terms of strengthening their participation in the construction of academic knowledge and of the professional training model, especially as these are public university courses; seek methodological innovation in the application of plans and actions for urbanization and land regularization in precarious settlements; produce reports and scientific articles with the results of the work, for dissemination in national and international media; establish critical dialogues with the Sustainable Development Goals; reinforce the advancement of the objectives of the initial project that preceded this experiment, with the possibility of expanding its results, improving its methods and deepening the scientific and academic debate around these previous experiments and future experiments.

The work had an inter and transdisciplinary character, as it brought together the fields of knowledge of architecture and urbanism, environmental engineering, environmental management, law and social sciences, in addition to relying on the support of the movements in defense of housing and public management.

Thus, it sought to be a moment of experimentation and criticism of traditional design methodologies considering the vast literature that points out the slowness and problems arising therefrom. In this case, the proximity of the students to the community and to public management afforded the opportunity to work with a propositional, transformational character that, without failing to obtain knowledge of reality, is not restricted to data collection.

The educational experiments were based on two fundamental questions in relation to professional training: how to promote an interdisciplinary program that corresponds to the technical demands of the field of knowledge of urbanism and how to prepare students for the regional diversity of the country and, especially, of the state of São Paulo ?

Thus, the experiment sought to provide education through a work routine that integrated different fields of knowledge by means of theoretical and practical activities; and afforded opportunities between students and society for reciprocal learning. This exercise was conducted as part of the courses offered and pedagogically integrated into them and through the course completion works developed by students of the courses involved based on the experiences in the location.

These aspects enable pointing to the structural relevance of the experiment through the theoretical, conceptual and methodological deepening of urban planning works by means of reflection on their results.

It is well known the lack of establishing a closer relationship between academia and the public administration; between academia and the community, although there are — more recently — experiments in this approach. Consistently, the goal was to recognize the experience accumulated through these pioneering experiments and apply it in the interdisciplinary and transdisciplinary relation between architecture and urbanism, sociology, environmental engineering, environmental management and law in the formulation of urban proposals and reflections. This connection con-

solidated a space for broader debates in which students could explore the different temporalities of the urbanization process considering the cases of precarious settlements. The practices turned into an opportunity for building and exchanging knowledge.

Courses and Course Completion Works

Two courses offered to undergraduate students, but with the participation of graduate students, consolidated this setting and legitimized the integration of different fields of knowledge.

Elective

Elective course IAU2105 and IAU2102: Housing and City. Urbanistic Project, Environment and Land Regularization in Precarious Settlements, it aimed at approaching the process of urbanization of precarious settlements, understanding the specificity of the Brazilian reality through the relationship between State and Society, learn about the concepts, foundations and basic instruments of urban planning and design, environmental planning and land regularization plans. It discussed the current directions of public management on land regularization and urban management and urbanization and land regularization actions for precarious settlements through the construction of alternatives to the current urban design model and through an interdisciplinary perspective. Its program included lectures given by professors who collaborated in the Learning in the Community Program (with resources from the Dean of Graduate Studies at USP), it was offered to four classes and had 63 applicants, 5 undergraduate scholarship holders, and 4 graduate collaborators.

Content

01 - State and Society Relation and Brazilian specificities / Exercise 1: Presentation of the areas of Araraquara, São Paulo and Cordeirópolis

02 – Steps for an urbanization and land regularization plan / Exercise 2: Key issues to be address-

sed in each area

03 - Obstacles to the management of municipal public policies / Exercise 3: Research on public management instruments in each municipality

04 - Challenges for community leaders in the participatory process / Exercise 4: Enhancement of the cartographic base with data on the areas

05 - Environmental planning actions / Exercise 5: Main environmental issues in the areas

06 - Land regularization instruments / Exercise 6: Possibilities for land regularization

07 - Experiments of technical assistance in social housing / Exercise 7: Housing directives

08 - Final Exercise: Formulation of directives for territorial planning (descriptive memorial and map)

Elective course IAU2205(1) - Infrastructure, Landscape and Environment. Project for urbanization and urban and regional planning in areas of environmental and social vulnerability aimed to address issues related to urban water, permanent preservation areas, sanitation, mobility and housing through transdisciplinary lectures and practice of design on precarious settlements, with the participation of geographers, environmental engineers, architects and urbanists, political scientists and public health workers. The bases of the debates were areas of social and environmental vulnerabilities to enable students to practice urban planning and design. Thus, the goal was to introduce basic concepts, arguments and current research on the relationship between the environment, precarious settlement and environmental impact assessment considering the Brazilian reality. As well as discussing international concepts involving these themes, such as the water-energy-food nexus, the Sustainable Development Goals, economic issues, land regularization, combating risk areas, among others. And consolidate directives and teamwork methods for the professional practice of urbanists in precarious settlements and in areas that involve environmental conflicts. The Program was structured into horizontal lectures and workshops between undergraduate and graduate students, totaling 102 undergraduate students, with the collaboration of 3

graduate scholarship holders, 3 undergraduate scholarship holders and 2 graduate volunteers. In addition to the participation of speakers and professors, collaborators and vice-coordinator of the Rios Urbanos project (with resources from the Dean of Culture and University Extension at USP).

Content

01 - Nature-Based Solutions

02 - Workshop 1

03 - International practices of water districts

04 - Workshop 2

05 - Urban waters and urbanization actions in vulnerable areas

06 - Workshop 3

07 - Environmental Impact Assessment Practices

08 - Workshop 4

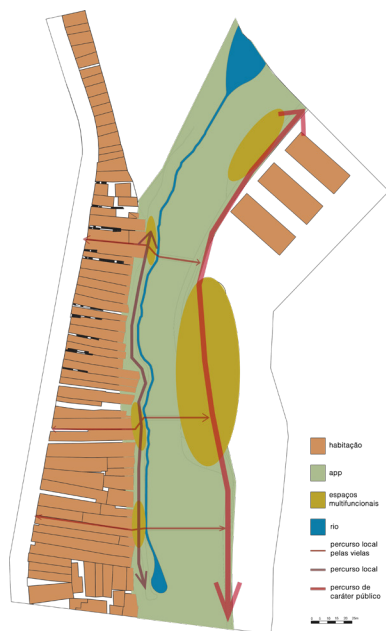
09 - Public health policies in the territory

10 - Presentation of results

Concurrently, teaching activities were conducted at the undergraduate level through two final course completion works that involved the areas of project, discussions and courses: the work Use of games as a tool for urban design, developed by Joana Teresa Pinheiro Rodrigues at the School of Architecture and Urbanism, supervised by Leandro Velloso); and the work Urban occupation in a spring area: the case of the Cachoeira das Garças community in Tiradentes, developed by Isadora da Silva Melo, at the School of Arts, Sciences and Humanities (course ACH1087 Graduation Project I), supervised by Jeferson Tavares.

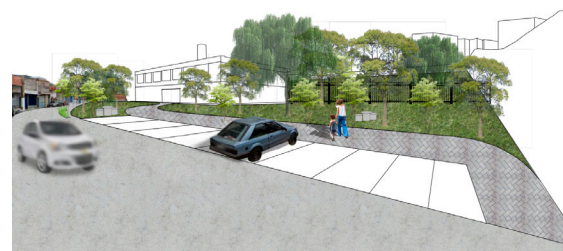
The reciprocal results between society and university resulted in:

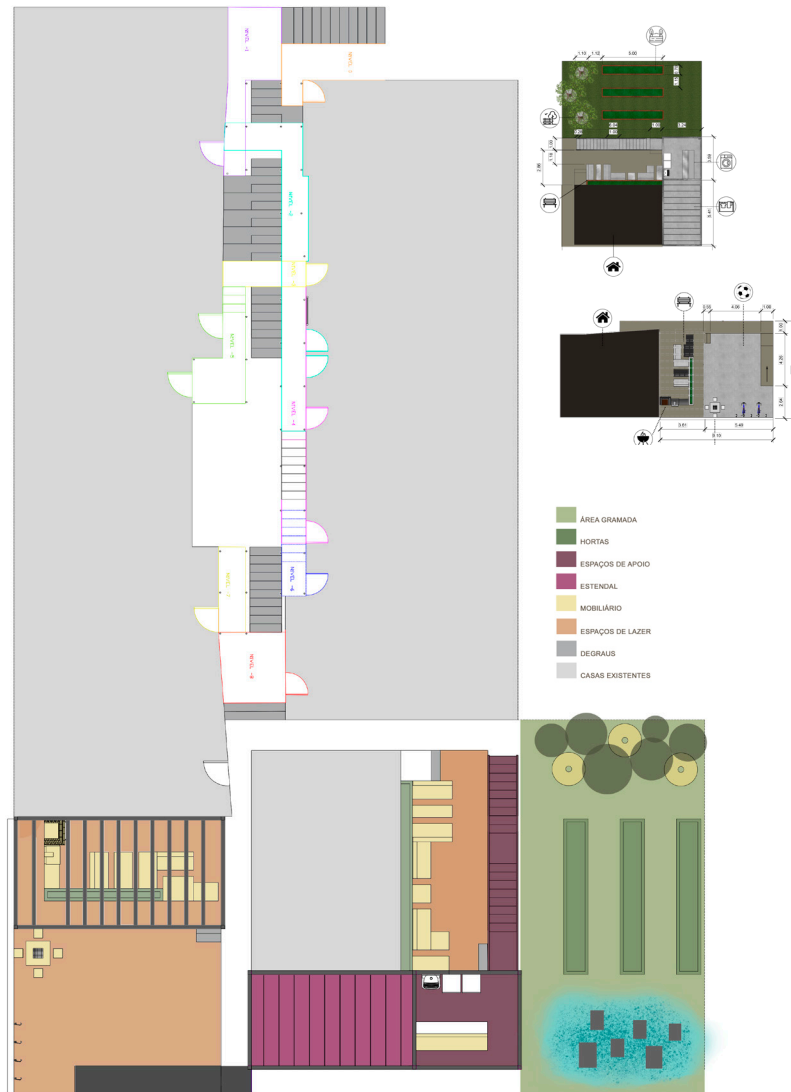
- Building plans and planning actions for urbanization and land regularization with the communities;
- Bringing the University closer to Society through a learning process;
- Establishing dialogues with the different social agents that democratically participate in the construction of the city;
- Providing a new teaching space for undergraduate students through interaction and reciprocal learning with the community;
- Providing integration between education, research and extension through the field of knowledge of urbanism, specifically through urbanistic design;
- Creating an inter and transdisciplinary environment by bringing together the fields of knowledge of architecture and urbanism, environmental engineering, environmental management, law, social sciences and public policies;
- Providing practical project experience to undergraduate students;
- Improve innovative models of urbanistic plans and projects;
- Ensuring the practice of the social function of the public university, encouraging students and the community to innovate in the production of the urban space.



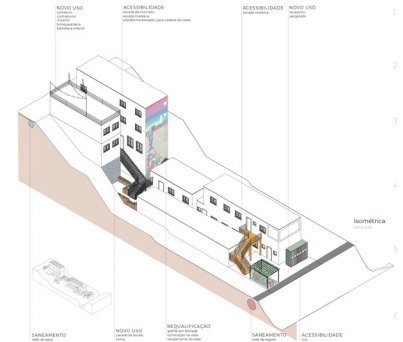
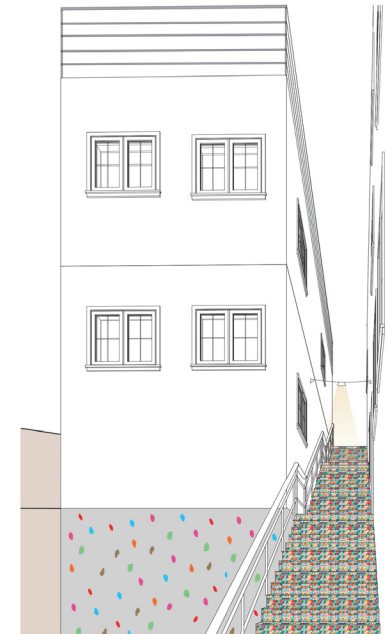
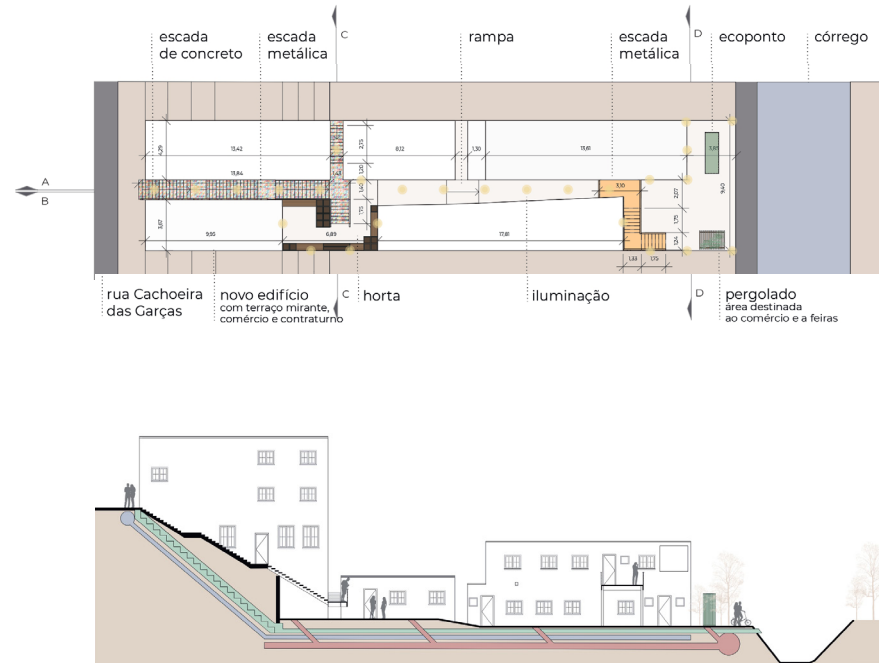
Figures 142 to 145
Results of the elective
course IAU2205(1), products
made by students for the
permanent river protection
area.
Source: IAU USP students.

Figures 146 to 149
Results of the elective
course IAU2205(1), products
made by students for Ca-
choeira das Garças Street.
Source: IAU USP students.

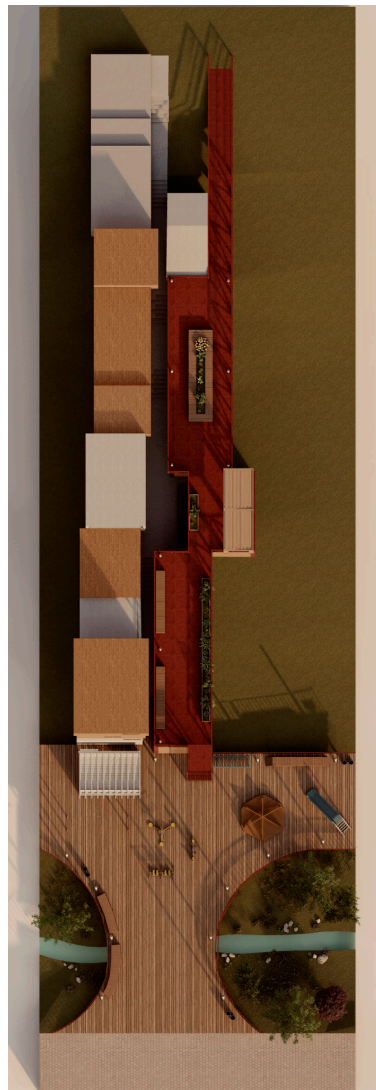
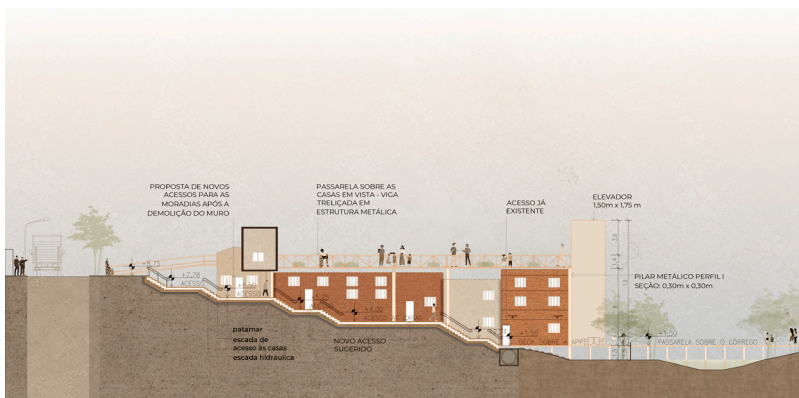




Figures 150 to 158
Results of elective course
IAU2205(1), products made
by students for staircase
53-54.
Source: IAU USP students.



Figures 159 to 163
Results of elective course
IAU2205(1), products made
by students for staircase
99.
Source: IAU USP students.



Figures 164 to 169

(to the left)

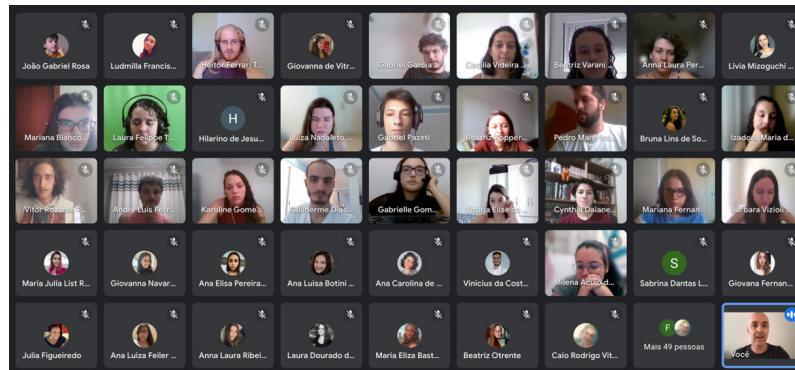
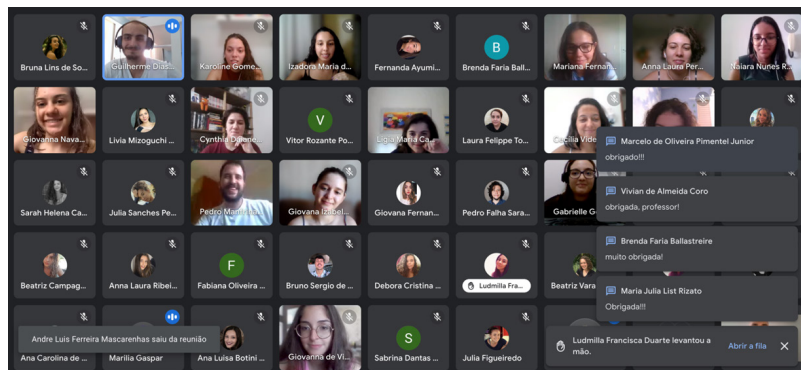
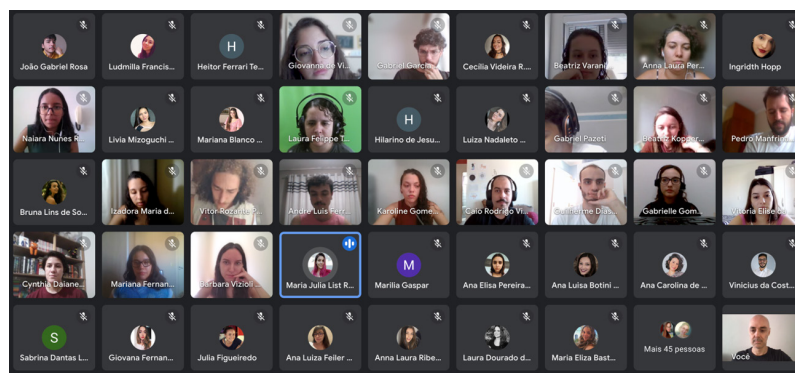
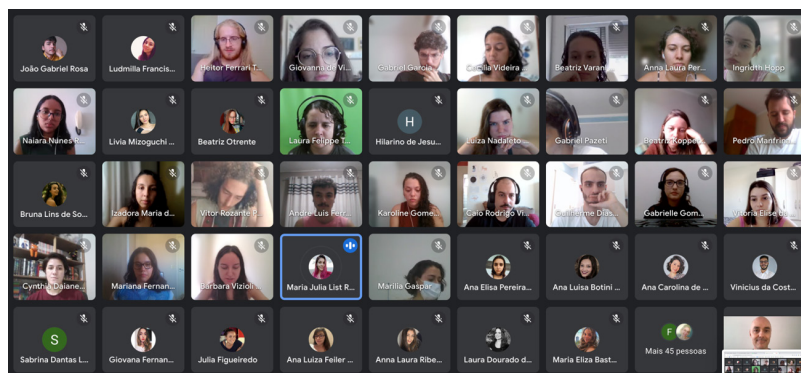
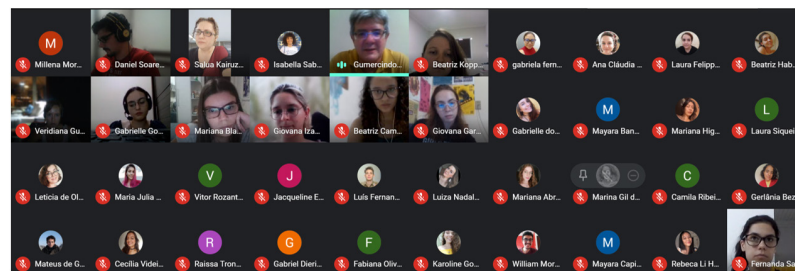
Results of elective course
IAU2205(1), products made
by students for staircase
123.

Source: IAU USP students.

Figures 170 to 175 (right)

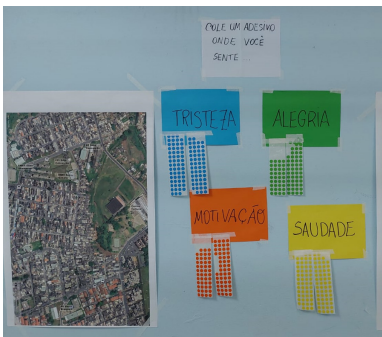
Lectures with a group of 70
students made up of differ-
ent classes and areas of
knowledge from the cam-
puses in the interior of USP,
from which theoretical and
reflective debates on the
field of urbanism and social
housing in Brazil were deep-
ened.

Source: PEXURB Group





Figures 176 to 181
Conducting the dissemination course in the community.
Source: PExURB Group.



Figures 182, 183 and 184
TCC development activity.
Source: PExURB Group.

UNIVERSITY-SOCIETY

IN RESEARCH

The research took place at different levels: through academic activities of bibliographic reviews, undergraduate research works, master's and doctoral studies; but also through actions with communities and public management, spreading academic rigor as a way of working in urbanistic projects.

Academic activities progressed by deepening the themes of precarious settlements, on the history of the urbanization of slums in Brazil, the experiences of land regularization and the innovations of the activities of ATHIS (Technical Advisory on Housing of Social Interest) as a strategy for action regarding precarious settlements. Finally, a critical and conceptual review of the role of the State and, especially, its contemporary function in the urbanization of precarious settlements.

The actions with the communities and city halls took place through field visits, meetings with specialists and public managers and participation in assemblies that provided empirical and theoretical data surveys that were fundamental for structuring the proposals. These activities alternated and were repeated for the same area throughout the process, which made it possible to review decisions, adjust to local conditions and collective solutions between the manager and the community and, mainly, the mediation of ideas between the different courses, such as the use of permanent preservation areas for purposes related to recreation, environment, society, mobility, etc. A type of research that would be very limited if restricted only to literature review.

Methodologically, the activities turned to the planning and design of the city based on a central evidence: housing and urbanistic precariousness and deficit. Based on that, the goals was to answer the following questions:

- How is it possible to understand a network of social territories integrated by common basic problems (access to land, infrastructure, work);

- How is it possible to understand the process of urbanization that promoted it and that promoted the city and which has in common the process of metropolization, urban dispersion and the precariousness of housing;
- How to take into account the regional context and the territorial function of the city considering existing basin plans, administrative areas, regionally integrated urban development plans, master plans;
- How to measure the impact of regional infrastructures (logistics, communication, energy, air and land transport, sanitation, housing) on the planning of these communities;
- Finally, how to dialogue with the urbanistic conditions that are traditional, but absent in these settlements: parks, squares, roads, mobility, sanitation, housing, etc.

For the set of these activities, the research incorporated partnerships with the City Hall of Cordeirópolis-SP, City Hall of Araraquara-SP, City Hall of São Paulo-SP, Union of Movements for Housing (UMM), the Mutual Cooperative of Social Work and the Cachoeira das Garças Association. In addition to resources from USP (through the Dean of Research), from UMM. And given the permanence of the pandemic, the planned phases were adjusted in order to maintain the set of activities, without detriment to the development of the work. And therefore guarantee the interdisciplinary nature of the research.

These activities provided opportunities for discussion and formulation of proposals between students and the different areas of knowledge as follows: the research of existing material had the collaboration of the area of Law for the understanding of the legal framework incident in the area; the research of practices in precarious settlements took place with the collaboration of Environmental Engineering, especially in the conceptualization and demonstration of environmental



Figures 185 to 193
Field surveys in
São Paulo-SP.
Source: PExURB Group.



Figures 194 to 202
Field surveys in
Cordeirópolis-SP.
Source: PExURB Group.



Figures 203 to 211
Field surveys in
Araraquara-SP.
Source: PExURB Group.

vulnerabilities. The local surveys were developed with the guidance of the Social Sciences area. The preliminary and infrastructure and environment studies took place with Civil Engineering and Environmental Engineering, in addition to Law and Social Sciences. The review of preliminary studies and the final review of the proposal was conducted in conjunction with Civil Engineering, Environmental Engineering, Law and Social Sciences in cross dialogues for the definition of integrated solutions. And the preparation of the definitive proposal deepened these solutions, but with greater precision as to territorial issues, having been practiced since the first investigations.

In other words, the research was not designed as a stage or an instrumented and preliminary product that supports solutions, but it is itself part of the solutions because it is permanent in the decision-making process and transversal in the project discussions.

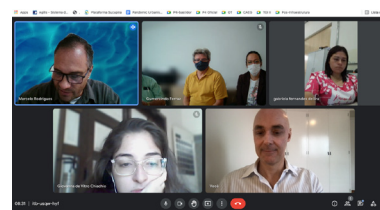
Thus, the workshops, field visits, meetings and assemblies took place with public managers and the community, providing the opportunity for an interdisciplinary setting for gathering information beyond the academic milieu. These strategies reinforced the plan itself as a means of integration and interdisciplinarity, seeking the concreteness of these concepts through practical field research.

Taking into account the current forms of urban and housing production and the fields of action of the architect and urban planner, it was supported by the dissemination of new research and inventory tools to be used in the conquest of the right to the city. In this aspect, the research promoted the development of knowledge and enabled the exchange between different professional areas and agents related to the field of social housing and urbanism.

In addition, participatory investigations were carried out to implement the projects considering the questioning of orthodox methods of survey, urban mapping and access to content produced about the city and its dynamics. The practices provided academic debate as a facilitating tool for



Figures 212 to 217
Assemblies, workshops and meetings with managers and communities with the participation of students.
Source: PExURB Group.



processes fostering spatial and identity empowerment in precarious settlements, considering intrinsic issues and specificities of social groups and their contexts.

The results consolidated a horizontal system of investigations, which demonstrates that innovation resides in the opportunity that network projects provided in the reciprocal relationships between student and community, which places the university in a broader role than that delimited by the walls of the university campus. And it expands and values the role of professionals and science in the social and political field of their work.

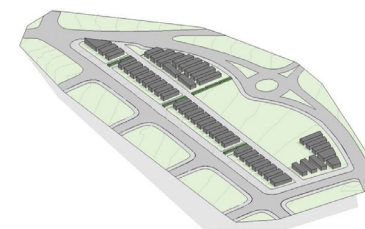
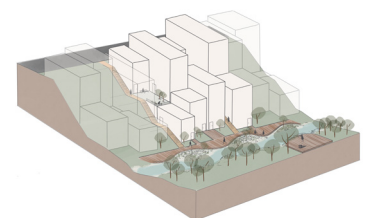
What was developed was a supplementary view of technical knowledge along with empirical, political and historical knowledge with the community and public managers transferring the elaboration of solutions to a cultural debate of the production of urban space through different forms of research.

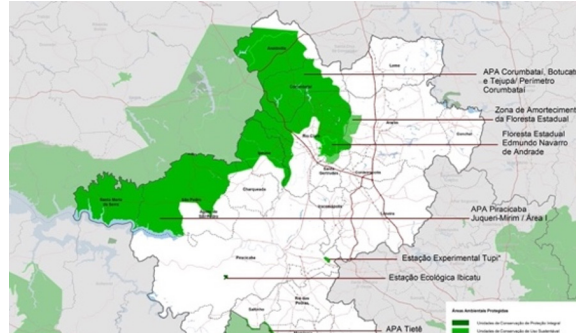
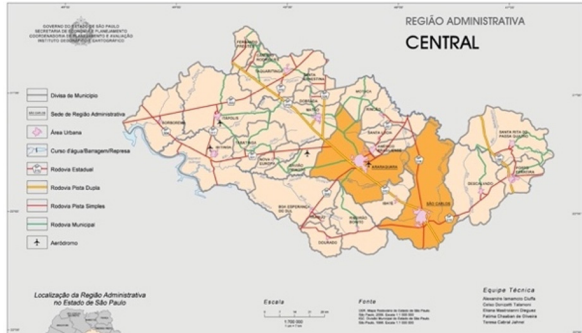
Objectively, these forms of research contributed by supporting critical debates that allowed the works to break the sectoral pattern of urban and regional planning; advanced to the diagnosis as a conclusive understanding considering it part of the action strategy, but not its end; understood that the urbanization process is not the cause, but the expedient through which changes occur, as factors, causes, origins are important, but if not understood in the dynamics of production and construction of cities, they crystallize as fragments disconnected from reality.

Figures 218 to 221

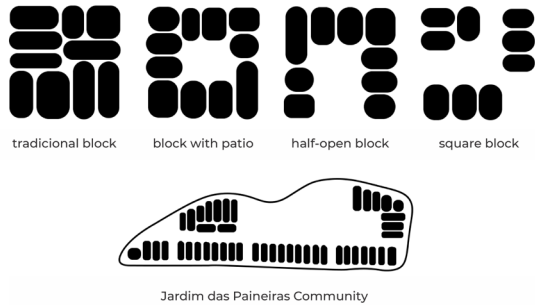
The centrality of housing and urban planning issues in education (removal in non aedificandi areas of Cordeirópolis-SP and resettlement in public areas in Araraquara-SP; integration of uses in Cachoeira das Garças, São Paulo-SP).

Source: PExURB Group.





Figures 222 and 223
Different approaches to planning (Araraquara-SP in the Central Region, on the left; Cordeirópolis in the Urban Agglomeration of Piracicaba, on the right).
Source:



Figures 224 and 225
Innovative solutions that integrate different urban systems (from squares in Araraquara-SP, on the left; of sanitation in São Paulo-SP, on the right).
Source: PEXURB Group.



Figures 226 and 227
Solutions that involve areas larger than the local issue (the urban fabric in Cordeirópolis-SP, on the left; the watershed in Araraquara-SP, on the right).
Source: PEXURB Group.

UNIVERSITY-SOCIETY

IN EXTENSION

Broadly speaking, the activities in education and research intersected with university extension activities because they ensured, in all their phases, an interaction and exchanges between university and society.

But, more specifically, the extension works took place in two segments, by the diffusion course and by the urbanization project. And thereby they contributed to the consolidation of decisions.

The Diffusion Course on Urbanization and Combating Environmental and Social Vulnerabilities, which took place in the Cachoeira das Garças Community, in the city of São Paulo-SP, aimed to train students and members of civil society to understand the main concepts of urbanization of precarious settlements. In addition, it aimed to present and debate the case of the community itself, its challenges, prospects and ways of making projects viable in order to eliminate vulnerabilities. In this sense, classes were given with theoretical content, discussions with those present, field analysis in the community and project practice with maps and drafts.

During the course, there were visits to the study site for community exploration and analysis. The field visit was essential for the students to have in-depth contact with the reality under study, an experience that photos and mapping do not provide. In addition, the area is characterized by high social and environmental vulnerability. At this point, we emphasize the relevance of dialogue between students, professors and community members so as to understand their needs for the place.

The opening for members of civil society with wide dissemination to community residents was important for expanding participatory channels in the decision-making process regarding the urbanization of the settlement to which they belong. Not limiting participation to protocol consultations or legalistic hearings.

The urbanization of precarious settlements must have as main objectives the improvement of the quality of life of the inhabitants using actions related to land regularization, security, health and habitability, aiming at their permanence or relocation through the execution of integrated actions for housing, sanitation and social inclusion. To this end, civil society, students and professionals who experience and work in these areas must be equipped with the knowledge to act and fight for overcoming the precarious condition of these settlements through an integrated approach to urban, housing, land, social and environmental issues.

In addition, it is important for society, students and professionals to be informed about the environmental risks of the areas where precarious settlements are located, as well as about the rights that can be guaranteed to them so that they can play a political role in the decision-making process.

The course had 89 applicants from the most varied backgrounds and from cities in the state of São Paulo, with the participation of 60 students, including an age range that ranged from 11 to 70 years and which required different dynamics. And it was implemented with resources from the Commission for Culture and University Extension of the IAU-USP.

Content

- *Introduction to the urbanization of precarious settlements*
- *Project concepts on urbanization of precarious settlements: Urban parameters of subdivision, use and occupation of land; Urban infrastructure; Environmental recovery and preservation*
- *Field analysis of the community context focusing on possibilities and qualities of the area*
- *Practical activity with maps and sketches relating theoretical content to the field*
- *Discussion of prospects for the Community*
- *Introduction to projects for the viability of urbanization of precarious settlements*

- *Physical, environmental and financial constraints of urbanization and safety and habitability issues*
- *Field analysis of community context with focus on constraints and risks*
- *Practical activity with maps and sketches relating theoretical content to the field*
- *Discussion on viability of urbanization for the community.*

And amid the development of urbanistic projects, the complexity of the Cachoeira das Garças community required in-depth research and solutions. Thus, the works continued with the Rios urbanos project (with resources from the Dean of Culture and University Extension at USP), with four undergraduate scholarship students and four graduate scholarship students. The project had the purpose of using the urbanization and environmental planning project in the fight against social inequalities, environmental vulnerabilities and in favor of the effective exercise of human rights in precarious settlements in the State of São Paulo.

With this objective in mind, the work started from the recognition of irregular, informal or illegal occupations of valley floors and with high rates of violence, social segregation and poverty to an extending planning and project work with involvement with the community. Thus, urban rivers were considered as an important planning element at different scales that enables social inclusion through rights to housing and public space in their floodplains, their uses in order to minimize areas at risk of floods and landslides and possibility of constituting areas that are used for inclusive green economies such as community vegetable gardens. The work was directly linked to Sustainable Development Goal (SDG) 11, but has affinities with other SDGs due to its interdisciplinary nature.

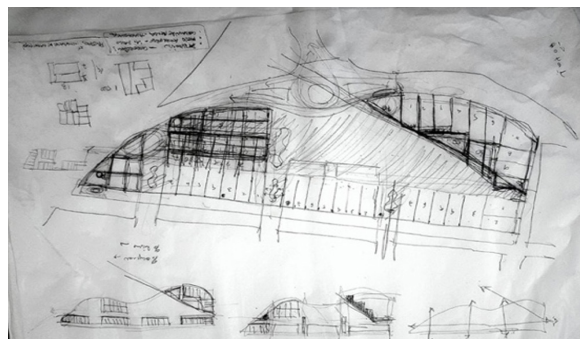
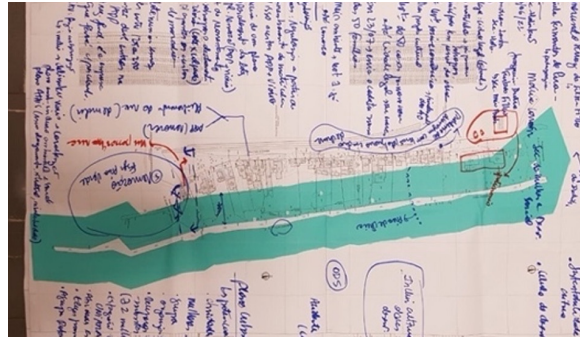
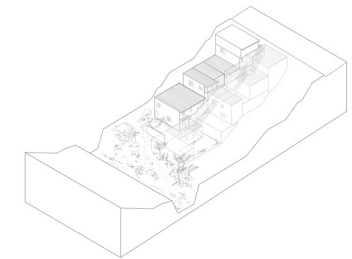
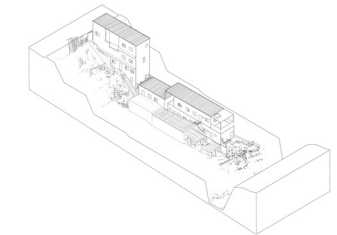
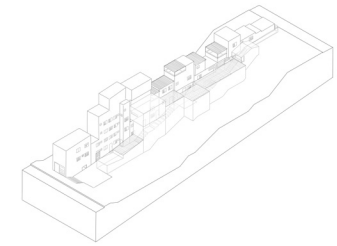
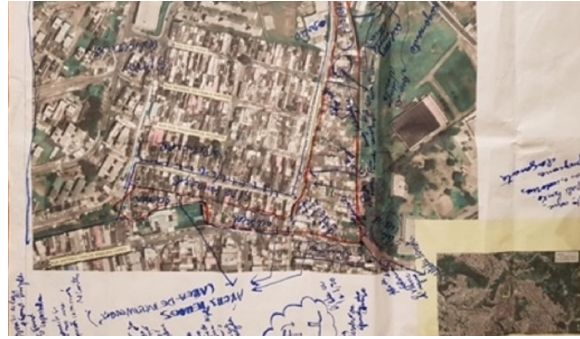
The plan and project sought to keep its residents in dignified places and close to the areas best served by infrastructure in the city. In the social sphere, the project enables awareness of the struggle for access to urban infrastructure in line with the environment and water resources. In

addition, the project seeks to reach other communities with a similar situation as a way of stimulating and presenting tools for demanding rights, as well as disseminating this practice to other professionals who can work in this aspect.

Many municipalities in São Paulo state were formed along rivers and water courses. However, the road planning, the waterproofing of the watersheds and the inappropriate uses around them led to constant problems, such as: flooding in central areas, slope collapses, irregular occupations, water scarcity due to the misuse of river headwaters, poor use of its edges and floodplains, suppression of riparian forest, inconsistent infrastructural uses such as marginal roads and disposal of urban waste, lack of sanitation, etc. These elements result in serious environmental and social consequences and are rarely addressed objectively by traditional planning instruments, such as municipal master plans, neighborhood plans and land use and occupation laws.

Considering this context, the specific objectives were: a) to map the existing problems along the river; b) contribute to ensuring the human rights of the community's population, providing conditions to reduce social inequalities through urbanization projects and environmental improvements; c) improve urban quality in order to combat social discrimination suffered by community residents; d) build a repertoire of solutions in relation to urban waters; e) formulate urban guidelines for viable short, medium and long term actions; f) formulate proposals that consider sustainability in its broader concept of meeting society's demands while preserving a healthy environment for current and future generations; g) plan considering cultural characteristics.

The proposal took into account the history of planning by hydrographic basins; constitution of public spaces through linear park projects; current aspects of national legislation; the interfaces with the sanitation and retaining infrastructure; alternative uses of its banks (agroecology, recovery of riparian forest, etc.); use of green infrastructure; relationship with physical and mental health; cul-



Figures 228 to 236
Records of the design
process and the results of
dialogues with managers
and communities.
Source: PEXURB Group.

tural and social importance of urban waters.

And as an extension action, the main contribution was to constitute a technical-social instrument that enables decision-making by public managers related to sustainable development based on needy communities through improvements that involve urban rivers.



Figures 237 to 242
Records of meetings and
workshops with residents.
Source: PExURB Group.

RESULTS

ACTIVITY

PLANNED

EXECUTED

Numbers of the community directly and indirectly impacted

Directly benefited population	400 families (2,000 persons)	595 families (2,380 persons)
Indirectly benefited population	approximately 600,000 persons (area of influence of watersheds, neighborhoods and cities)	600,000 persons
Environmentally vulnerable area to be improved	74,000 m2	123,960.35 m2
Indirectly benefited area	500,000 m2	5,732,596.17 m2

Number of activities

Project activities and participatory activities.	05	14 Meetings with public managers to define guidelines, approve and present the project
--------------------------------------------------	----	-------------------------------------------------------------------------------------------

Events

Field activities with the Community for data survey	03	11
Workshops with the Community/Managers	05	15

Products

Levantamento de Data collection by workshop por oficina	03	03
Preliminary studies	03	03
Definitive products	01	03 Technical Reports

Projects

Urbanization and Land Regularization Plan	03	03
Direct resources (USP)	---	R\$ 153.066,00

Activities not planned, but developed and with importance in the education of students

Courses	0	03
Classes	0	20
Talks	0	07
Internal meetings for discussion and training through project (between professors and students)	0	120

Goals and Indicators for training

Total number of students directly involved	15	27
Number of scholarship students	05	13
Attendance in field activities	70% for scholarship holders / 60% for other students	70% for both
Attendance in activities in the Research Group	70% for scholarship holders / 60% for other students	90%
Resulting undergraduate research projects	01	01

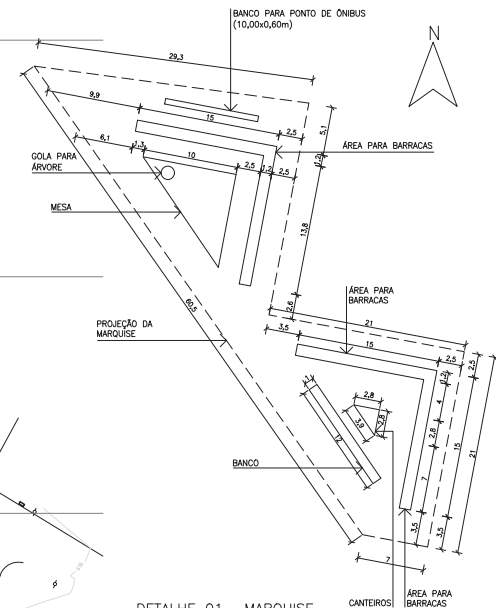
Final Course Completion Works	0	02
Publications of communications and articles	01 communication in a national event; 01 article in academic journal	03 communications 04 articles 05 technical reports
Project Completion	10 months	10 months / 18 months
Innovative constitution and methodology of urban design in a precarious settlement based on the experience of the urbanization and land regularization plan	1 publication (executive summary)	5 technical reports 1 publication (executive summary) 1 e-book
Integration of interdisciplinary education	Report of attendance and participation by student member of the group	5 reports

Goals and Indicators for the community

Residents participating directly at the end of the process	20% of residents	80%, considering participation in the meeting or in response to consultations and surveys
Leaders involved	06	09
Housing data survey	50% of the houses	100% of the houses
Area data survey	100% of the area	100% of the area
Completion of planned activities	100% of activities	100% of activities
Completion of the Plan	In 10 months	10 months / 18 months
Learning through self-management of data collection and determination of housing and urban problems	30 residents	The pandemic prevented training in Cordeirópolis and Araraquara, so the surveys were applied by public managers and technicians of the leaders. In São Paulo, the application involved around 50 residents
Questionnaire applied to residents assessing satisfaction with the process and the final result	50% of those responsible for households	Replaced by presentation meeting and satisfaction assessment: 90% satisfied



Figures 243 to 246
Some of the documents
presented to the Municipa-
lities.
Source: PExURB Group.



ESCALA 1:250

02/04

IMPLANTAÇÃO, DET. MARQUISE, DET. CANTEIRO DE CHUVA

PROPRIETÁRIO: 00000000000 00 0000000000 00000000000000000000 CPF: 000.000.000-00

ENDERECO DA OBRA:
RUA/AV. 0000000000 000000000 00 00000000, Nº

LOTE: 000 QUADRA: 0000 INSCRIÇÃO CADASTRAL: 000.000.000 MATRÍCULA: 000.000

LOTEAMENTO: 00000000000000

CIDADE: **ARARAQUARA/SP**

SITUAÇÃO SEM ESCALA:

CIDADE: **ARARAQUARA/SP**

DECLARO QUE A APROVAÇÃO DO PROJETO NÃO IMPLICA NO RECONHECIMENTO POR PARTE DA PREFEITURA MUNICIPAL DE ARARAQUARA DO DIREITO DE PROPRIEDADE DO TERRENO E QUE AS



SECRET/NO

QUADRO DE ÁREAS:

LOTES
 ÁREA DE COMÉRCIO E SERVIÇOS
 PRAÇAS E CALÇADÃO
 ÁREA PERMEÁVEL TOTAL
 ÁREA PAVIMENTADA
 ÁREA TOTAL DE PROJETO

6203,55 m²
785,30 m²
5437,75 m²
2998,63 m²

4975,80 m ²	APROVAÇÃO P.M.A.
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OBSERVAÇÕES
Este projeto acompanha relatório técnico.
As medidas e cotas devem ser verificadas no local.
Os projetos complementares devem ser compatibilizados com o projeto urbanístico.
Os trabalhos foram desenvolvidos conforme dados fornecidos pela prefeitura municipal.
Necessidade de adequar a horta urbana à locação da torre da Linha de Alta Tensão.
Após locação do eixo da Linha de Alta Tensão, verificar compatibilidade do parcelamento.

PREFEITURA DO MUNICÍPIO DE ARARAQUARA
Secretaria de Desenvolvimento Urbano
Coordenadoria Executiva de Edificações
Gerência de Aprovação de Projeto de Edificações

A P R O V A D O

Guichê nº.: _____ / _____

Processo nº.: _____ / _____

_____ / _____

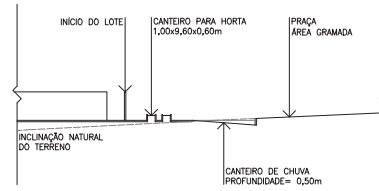
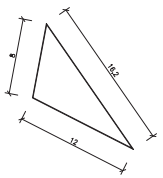
carimbo e assinatura do responsável pela análise e aprovação

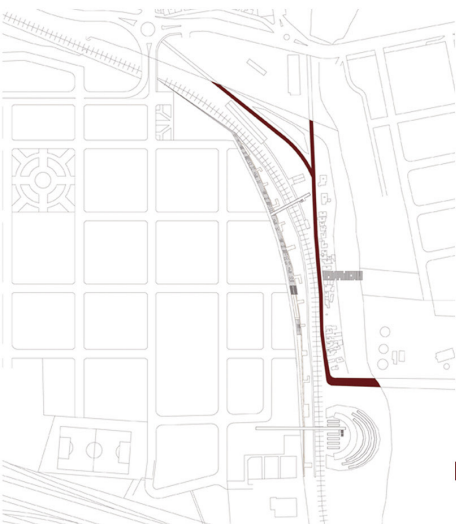
COMUNICADO

LOMBOFAIXA
 ÁREA PAVIMENTADA
 ÁREA GRAMADA
 HORTAS
 CANTEIRO DE CHUVA

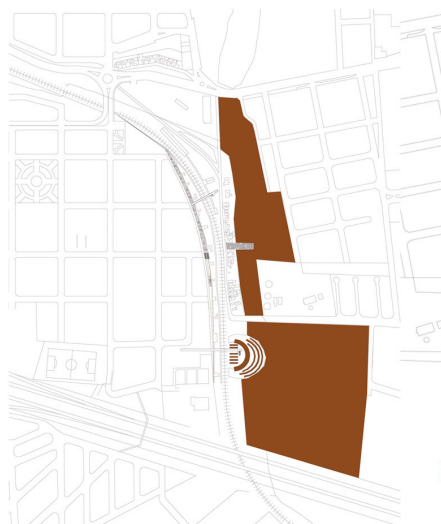


CORTE
DETALHE 02- CANTEIRO DE CHUVA
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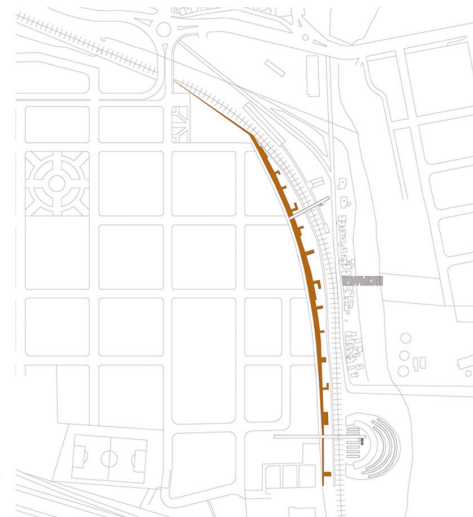




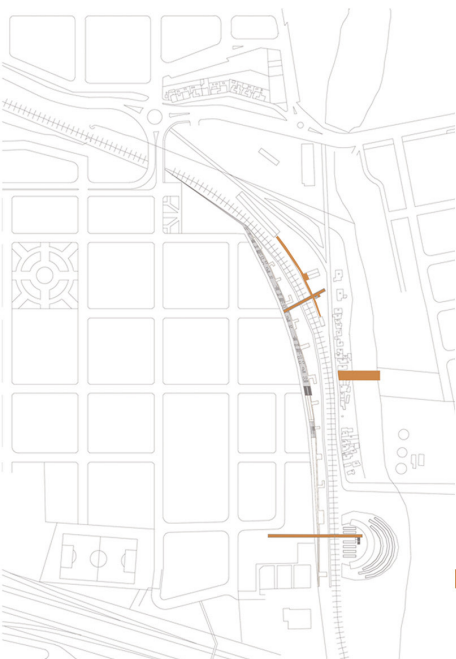
MOBILIDADE, SANEAMENTO,
ENERGIA, ILUMINAÇÃO E
MOBILIÁRIO URBANO



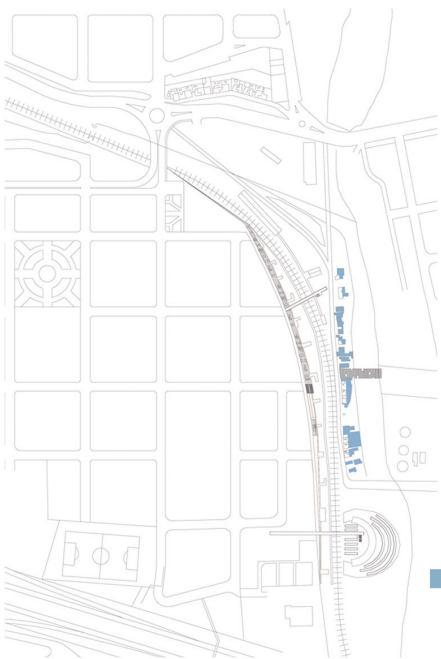
ÁREA DE PRESERVAÇÃO
PERMANENTE E VIVEIRO



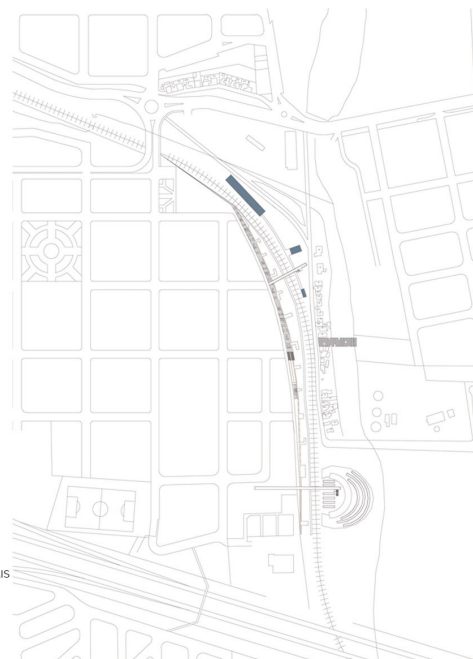
CONTENÇÕES, DRENAGEM,
INFRAESTRUTURA VERDE
E ACESSOS



PASSARELAS E
ACESSIBILIDADE



MELHORIAS HABITACIONAIS
E RECUPERAÇÃO DO
PATRIMÔNIO DA VILA
FERROVIÁRIA POR AÇÕES
DE ATHYS



RECUPERAÇÃO E
NOVOS USOS DOS
EDIFÍCIOS DE
ARMAZÉM, ESTAÇÃO E
CASA DE MÁQUINAS

TESTIMONIALS

Students

A fundamental step for the development of the project and for the training of the students was the visits to the communities, following the safety protocols as they occurred during the COVID-19 pandemic. The field visit enabled a more in-depth understanding of the area of intervention, nuances that a research with photos and satellite images are not able to capture, and the direct contact with the population, which enabled understanding the reality of that community and the needs and desires of its residents, which provided a more humane perspective to the project.

Periodic meetings were also held with municipal administrations and local associations, most of them remotely, but final in-person presentation meetings were also held. The contact with different instances of power from different institutions of the public administration enabled the students to understand the functioning and the bureaucracy involved in land regularization. As-

pects such as points of view defended by different bodies, technical requirements for approvals, legislation to be followed and solutions to judicial issues could be observed by the students, knowledge about the practice that is not obtained in a conventional classroom.

In addition to the extension experiences of contact with civil organizations and public authorities, the projects also involved important interdisciplinary experiences among students. During the virtual meetings, there was exchange of knowledge and experiences between people from different fields of knowledge and training stages, as the group is composed of undergraduate, master's and doctoral students from three different programs: architecture and urbanism, environmental engineering and environmental management. This enabled a broad discussion on the topics involved in each of the cities that contributed to the learning of each of us, from a technical to a more social sphere.

Another important result obtained from the work development process was to participate in three different projects that are in different stages of development, which we would hardly have the opportunity to follow in the same period of time.

The work developed in São Paulo reached the stage of urbanistic planning, because, given the data, obstacles and complexities of the city and region, the process demanded more time for discussion and understanding. Meanwhile, the result achieved in Cordeirópolis, which has an urban reality very different from the previous one, enabled us to reach a more advanced stage, with more detailed and in-depth design proposals. Finally, the work developed for Araraquara, in a smaller area, enabled us to reach the stage of a preliminary project, with a scale of greater detail than the previous ones, providing students contact with an important stage of project plans in urban proposals.

Although the projects started from the proposal for land regularization, throughout the process

we came across particularities that added other important aspects to be worked on, such as environmental aspects in São Paulo and Araraquara, and heritage aspects in Cordeirópolis. However, it is worth mentioning that we found the reading of the social issue as a common point in all works, whether due to vulnerabilities or absences of urban facilities and infrastructure.

The project, therefore, enabled active learning and the practical experience of different realities, but all of them very common in Brazilian cities — often hidden and neglected by society and public authorities.

All the activities led to disturbances and questions as they enabled us to have a closer relation with both the public administration, to understand their difficulties and obstacles, and with the community, which afforded much practical knowledge and a different perspective. This enabled us to develop proposals in line with the local reality and to escape the bubble of the university milieu, contributing to the training of professionals who are more connected with the practice and with a greater social view.

Groups of students from IAU-USP and from the Environmental Engineering program at EESC-USP (2021)

Residents

When Edilson Mineiro told me about this project, he informed me that he would talk to USP and that we would have an opportunity to have a more solid urbanization and land regularization project, including housing. When the project started, we set up a team, with Natal, which I monitored; this was in May 2021. Subsequently, the USP team came to us. And we are having the opportunity to work on it that has good results. It's been very good.

Adalberto Conceição de Souza, teacher and resident of the Cachoeira das Garças Community

Through the first meeting we had contact with all the other residents. Until then they didn't know the immensity of where they were stepping, because they thought it was just this Cachoeira das Garças street. They were unaware that Três Ilhas, Sete de Setembro, Fernando de Carvalho and Wilson also belonged to this occupation. Those people who never knew that they were also part of the area became aware after the meeting. Thank God we had the first process. Adalberto says that it's the little ant's work that we're doing. So, being aware of where they are living, the only thing they want is the guarantee of their house documentation. Through you and the community, we are letting them know that they have more rights. And that they, really, in the meetings, they have to be there so they can say "yes" and "no." And that we cannot confirm for them. So far they are still in doubt, but gradually you are clarifying any doubts. So even people who were against it, fortunately, are now in favor. We were even amazed, because there were people who were against it, but when they saw the end of your work, they really changed their minds and took all of us by surprise. So your work was very important and will continue to be important after it ends. And it will be completed! Thank you so much for your help and for the opportunity! Because it's not easy for you to be here. It's not easy for us to be in this environment. But little by little we'll get there

Edvani Barbosa de Farias, Caregiver and resident of the Cachoeira das Garças Community

Public managers

The Learning in the Community Program is a work between management secretariats in partnership with Universities. It is the exchange of knowledge along with practice and theory that go hand in hand and consequently directs the project to its execution.

Sandra Santos, Municipal Secretary of Justice and Citizenship of the municipality of Cordeirópolis

The Urbanized Lots project for the Municipality of Araraquara, Minha Morada Program, was designed based on the local context of urban development and the profile of housing production in the city in recent decades, combined with the present lack of resources from federal and state programs allocated to social housing. Currently, the city has a reasonable stock of urbanized and well-located public lands, areas donated by enterprises in the land subdivision processes. Based on a diagnosis of this land stock, it was possible to select areas in neighborhoods already equipped with urban infrastructure and facilities, to be used for housing programs. Through minimal investment in infrastructure, it is possible to create small sets of lots located in structured neighborhoods, with structured facilities, commerce and services, to allocate to the low-income population for self-construction. In addition to the constitution of the complexes, the program also provides for technical assistance for the construction of housing units with model executive projects for these units, guaranteeing access to urbanized land, well located, and with construction with all the necessary quality for housing, in its full sense.

Sálua Kairuz Manoel Poletto, Municipal Secretary of Urban Development of Araraquara

Social organizations

The Cachoeira das Garças area, with more than 30 years of existence, is the result of the action of workers from the extreme east of São Paulo and represents a form of resistance in defense of housing. Its existence compels the Public Administration to fulfill its role.

When discussing the project, we observed that residents have dreams, are aware of their rights and are concerned about the fate of risk areas that were traced during the participatory process.

Discussing the project with professionals and future professionals in architecture and other fields was a unique opportunity to honor the pioneers, such as late Dona Nair, and to encourage the current residents.

May the project discussion be a major new step towards decent housing.

Edilson Mineiro, Lawyer and Militant of the Union of Movements for Housing

PART III

CONTRIBUTIONS

INSTITUTIONS

Preparation

Instituto de Arquitetura e Urbanismo (IAU-USP) — PExURB Group (Research, Education and Extension Practices in Urbanism)

Collaboration

Escola de Direito de Ribeirão Preto (FDRP-USP), Escola de Engenharia de São Carlos (EESC-USP), Faculdade de Arquitetura e Urbanismo (FAU-USP), Escola de Artes, Ciências e Humanidades (EACH-USP), Municipal Government of Araraquara-SP, Municipal Government of Cordeirópolis-SP, Municipal Government of São Paulo-SP, Union of Movements for Housing (UMM), Mutual

Cooperative for Social Work, Cachoeira das Garças Community (East Zone of São Paulo-SP), NEPA – Center for Environmental Policy Studies (EESC-USP), Social Activities, Gender, Markets And Mobilities from Bellow (Latin America) — SAGEMM (IAU-USP).

Financial Resources

USP Dean's Office of Research: Program to Support Research Projects that Adhere to at least one of the United Nations Sustainable Development Goals — 2030 Agenda, namely: 4. Quality Education; 5. Gender Equality; 10. Reduced Inequalities and 16. Peace, Justice and Strong Institutions of the UN (PRP Ordinance

No. 778 of September 21, 2020) with a project selected: Fighting Social Inequalities in Precarious Settlements. R\$: 14,600.00. Period: December/2020 to April/2021. Product: cadastral planimetric survey of 14,203.66 m²

Dean's Office of Undergraduate Studies at USP: Public Notice 02/2020-2021 — Learn in the Community Program with a selected project: Urbanization and Land Regularization: Plans and Actions in the State of São Paulo. R\$: 37,116.00 / period: February/2021 to November/2021. Scholarship holders: Beatriz Kopperschmidt de Oliveira, Cynthia Daiane Diniz, Juliana da Costa Oliveira, Luís Fernando Pereira de Brito, Millena Cristny de Moraes.

Dean's Office of Culture and University Extension at USP: Public Notice 02/2021 Social Inclusion and Diversity at USP and in the Municipalities of its Campi with a selected project: URBAN Rivers — Urbanization, environment and social inclusion. R\$: 95,100.00 / period: August/2021 to September/2022. Undergraduate Scholarship Holders: Ana Victoria Silva Gonçalves, Cynthia Daiane Diniz, Giovanna de Vitro Chiachio, Natália Jacomino; Graduate Scholarship Holders: Ana Paula de Castro Vieira, Anna Laura Pereira Rossi, Mariana Fernandes Minaré, Marília Gaspar de Souza Lima.

Culture and Extension Commission (CCEX-IAU-USP): Public Noti-

ce CCEX/IAU/USP 03/2021 — Program for Financial Support to Dissemination Courses at the IAU with a selected project: Course on Diffusion of Urbanization and Combating Environmental and Social Vulnerabilities. R\$: 1,250.00 / period: March/2022

Dean's Office of Culture and University Extension at USP: 7th USP/FUSP/SANTANDER Program – Promotion of Culture and Extension initiatives with the Urbanization Projects project. Dissemination of Experiences in Urban and Regional Planning. R\$: 5,000.00 / period: May/2022 to September/2022. Product: production of teaching material and internationalization of academic works

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Project Development Period

Project Development Period

Vila-Praça in Araraquara-SP: Feb/2021 to Oct/2021

Parque Ferroviário in Cordeirópolis-SP: Feb/2021 to Oct/2021

Cachoeira das Garças Community Stairs, São Paulo-SP: Feb/2021 to Oct/2022

Awards and recognitions

PARQUE FERROVIÁRIO: from the train yard to the urban fabric. Conservation and appreciation of the cultural heritage of Cordeirópolis-SP — Good Practices for the Preservation of Cultural Heritage Award promoted by CAU/SP (Council of Architecture and Urbanism of the State of São Paulo) — 2021

PROJECTS IN NETWORK – Award for Good Practices in Education, Extension and TFG promoted by CAU/SP (Council of Architecture and Urbanism of the State of São Paulo) — 2022

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The texts that constitute this publication are based on academic reports, technical memorials, descriptive memorials, documents for publicity in competitions and exhibitions, on research, extension and education projects submitted to different levels of USP funding and on articles, papers and academic dissemination media. It is not an unpublished work, but a compilation of the results and critiques of these works.

COORDENATION



ELABORATION



COLABORATION



FINANCIAL RESOURCES

