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Bioclimatic Solutions in the 1950s: A Study of the Cristal Racecourse and the Esplanada Building

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Soluções Bioclimáticas na Década de 50: Um Estudo do Hipódromo do Cristal e do Edifício Esplanada.

RESUMO

Objetivo – Analisar as estratégias bioclimáticas presentes em duas obras da Arquitetura Moderna em Porto Alegre, RS: o Hipódromo do Cristal (1951–1959) e o Edifício Esplanada (1952–1962), ambas projetadas pelo arquiteto uruguaio Román Fresnedo Siri.

Metodologia – O estudo utiliza como base metodológica as ferramentas oferecidas pela plataforma ProjetEEE e os critérios do Selo Casa Azul da Caixa, avaliando aspectos como implantação, ventilação e iluminação natural, funcionalidade e materialidade.

Originalidade/relevância – A pesquisa contribui para preencher uma lacuna teórica no campo da arquitetura moderna sul-americana ao investigar como os princípios bioclimáticos foram aplicados em obras representativas da década de 1950.

Resultados – Verificou-se que ambas as obras apresentam soluções projetuais funcionais e tecnológicas inovadoras para a época, com atenção às condições climáticas e ao contexto urbano. Contribuições teóricas/metodológicas – O estudo reforça a importância de se adotar ferramentas de análise bioclimática em pesquisas sobre o legado moderno, propondo um diálogo entre prática projetual histórica e critérios contemporâneos de sustentabilidade.

Contribuições sociais e ambientais – As análises ressaltam o valor de projetos arquitetônicos que, mesmo há décadas, já buscavam soluções mais sustentáveis e adequadas ao meio, contribuindo para o debate atual sobre eficiência energética e conforto ambiental.

PALAVRAS-CHAVE: Hipódromo do Cristal. Edifício Esplanada. Análise Bioclimática.

Bioclimatic Solutions in the 1950s: A Study of the Cristal Racecourse and the Esplanada Building

ABSTRACT

Objective – To analyze the bioclimatic strategies applied in two Modern Architecture works in Porto Alegre, RS: the Cristal Racecourse (1951–1959) and the Esplanada Building (1952–1962), both designed by Uruguayan architect Román Fresnedo Siri.

Methodology – The study adopts the tools provided by the ProjetEEE platform and the criteria of the Casa Azul Seal from Caixa, evaluating aspects such as site planning, natural ventilation and lighting, functionality, and materiality.

Originality/Relevance – The research addresses a theoretical gap in the field of South American modern architecture by investigating how bioclimatic principles were integrated into prominent 1950s designs.

Results – The findings show that both projects present functional and technological solutions that were innovative for their time, reflecting a conscious response to climate and urban context.

Theoretical/Methodological Contributions – The study emphasizes the relevance of bioclimatic analysis tools in researching modern architectural heritage, bridging historical design practices with contemporary sustainability criteria.

Social and Environmental Contributions – The analyses highlight the early incorporation of sustainable and context-sensitive strategies, contributing to the current discourse on energy efficiency and environmental comfort.

KEYWORDS: Cristal Racecourse. Esplanada Building. Bioclimatic Analysis.

Soluciones Bioclimáticas en la Década de 1950: Un Estudio del Hipódromo do Cristal y del Edificio Esplanada

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RESUMEN

Objetivo – Analizar las estrategias bioclimáticas presentes en dos obras de la Arquitectura Moderna en Porto Alegre, RS: el Hipódromo do Cristal (1951–1959) y el Edificio Esplanada (1952–1962), ambas diseñadas por el arquitecto uruguayo Román Fresnedo Siri.

Metodología – El estudio se basa en el uso de las herramientas proporcionadas por la plataforma ProjetEEE y los criterios del Sello Casa Azul de la Caixa, evaluando aspectos como implantación, ventilación e iluminación natural, funcionalidad y materialidad.

Originalidad/Relevancia – La investigación aborda un vacío teórico en el campo de la arquitectura moderna sudamericana, al estudiar la aplicación de principios bioclimáticos en obras emblemáticas de la década de 1950.

Resultados – Se constató que ambas obras presentan soluciones funcionales y tecnológicas innovadoras para la época, en consonancia con las condiciones climáticas y el contexto urbano.

Contribuciones Teóricas/Metodológicas – El estudio refuerza la importancia del uso de herramientas de análisis bioclimático en investigaciones sobre el legado moderno, proponiendo un diálogo entre prácticas proyectuales históricas y criterios contemporáneos de sostenibilidad.

Contribuciones Sociales y Ambientales – Los análisis destacan el valor de proyectos arquitectónicos que, incluso en su época, ya incorporaban soluciones sostenibles y contextualizadas, contribuyendo al debate actual sobre eficiencia energética y confort ambiental.

PALABRAS CLAVE: Hipódromo do Cristal. Edificio Esplanada. Análisis Bioclimático.

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1 THE ARCHITECT AND HIS WORKS

Román Fresnedo Siri was born on February 4, 1903, in Salto, a city in northwestern Uruguay. Between 1923 and 1930, he studied at the Faculty of Architecture at the Universidad de la República in Montevideo. During his academic formation, he traveled to Europe, with his first trip taking place in 1937, followed by two others in 1951 and 1956. He also visited the United States in 1941 and 1956. Fresnedo Siri traveled to other Latin American countries, including Brazil, where he designed important buildings (Boronat & Risso, 1984).

Fresnedo Siri created his works with formal, functional, and constructive coherence, composing expressive volumes that reflect rhythm, textures, colors, light, and shadow in harmonious and subtle compositions. His most well-known works in Uruguay include: Facultad de Arquitectura (1946), Hipódromo de Maroñas (1945), Palacio de la Luz (1948), and Unidad de Habitación Cerro Sur (1959), among others (FADU, 2007).

In 1951, after winning the competition for the Hipódromo de Maroñas (1938–1945), Fresnedo Siri was invited by the construction company Azevedo Moura & Gertum to design the Cristal Racecourse (1951–1959) and later the Esplanada Building (1952–1962). These two works are considered classics and milestones of Modern Architecture in Porto Alegre (Luccas, 2004).

The Cristal Racecourse (1951–1959) is one of the most important works of his career. It stands out not only for its aesthetic and spatial qualities in the use of modern materials but also for its spatial dynamics. Its connection with Lake Guaíba and the treatment of the façade facing Diário de Notícias Avenue reveal an interaction between full glazing and the need for solar protection, creating a layering effect that, in the Esplanada Building, materializes as a highly expressive façade grid. His ability to synthesize diverse references with original expression and plastic beauty solidifies Román Fresnedo Siri's legacy as a visionary and innovative architect (Comas, 2004).

The Esplanada Building (1952–1962) incorporates modern elements and original plastic solutions in a large-scale residential architecture context. It features distinctive façades, including a grid and a play of solid and void spaces. Regular colonnades help define the rhythm of the space around the building, resulting in a subtle composition (Souto, 2023).

These works highlight the importance of Román Fresnedo Siri (1903–1975) in the development of Modern Architecture in Porto Alegre between the 1950s and 1960s (Luccas, 2004). Consequently, this article analyzes these works through the lens of bioclimatic concepts drawn from the ProjetEEE platform and the Casa Azul Seal from Caixa.

2 THE STRATEGIES OF THE PROJETEEE PLATFORM

The online tool *ProjetEEE* (Designing Energy-Efficient Buildings) is a collaborative initiative between PROCEL/Eletrobrás and the Federal University of Santa Catarina. Its purpose is to serve as a resource for students and professionals in the construction sector, offering information and analysis of the specific climatic conditions of each city and presenting bioclimatic strategies appropriate to each regional context. ProjetEEE was chosen as the tool to

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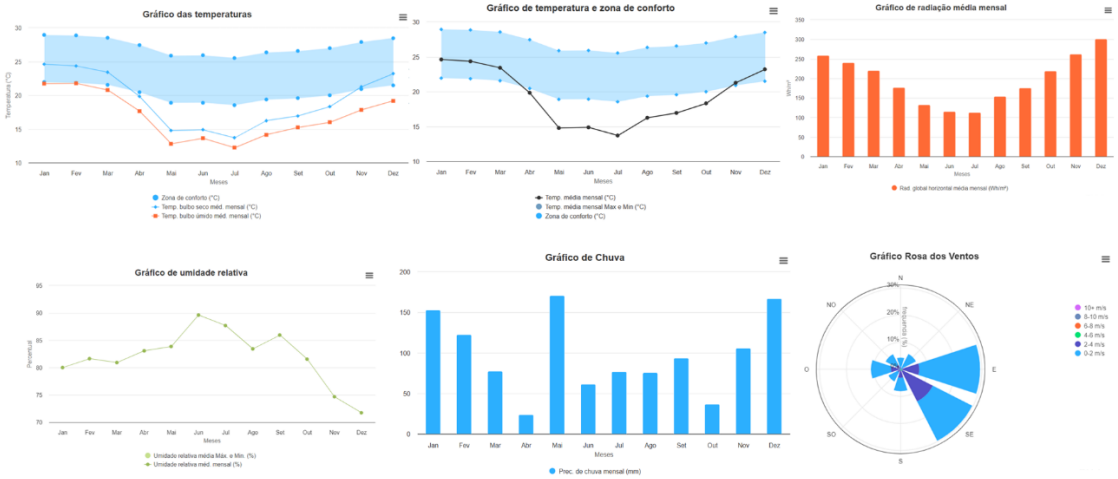
characterize the climate of Porto Alegre, where the two buildings analyzed in this study are located.

Figure 1 – Location Map of Porto Alegre, RS.

Source: Google Images (2023).

Porto Alegre, the capital of the state of Rio Grande do Sul, is situated in the eastern portion of the state's central depression (Mascaró, 1996), located at the geographical coordinates of Latitude -30.033056 and Longitude -51.230000. With an estimated population of 1,409,351 inhabitants, the municipality covers a territory of 495.39 km², of which 214.91 km² are urbanized areas (IBGE, 2023).

Figure 2 – Charts of temperature, comfort zone, radiation, humidity, rainfall, and wind for the city of Porto Alegre/RS.



Source: ProjetEEE Platform (2023).

. According to the ProjetEEE platform, the temperature chart shows that during summer, from December to March, the average dry-bulb temperature ranges from about 23ºC to 24.6ºC, while the wet-bulb temperature ranges from 19ºC to nearly 22ºC. This difference indicates that the thermal sensation is lower than the actual air temperature, providing greater user comfort in hot conditions. It's important to note that the platform works with monthly

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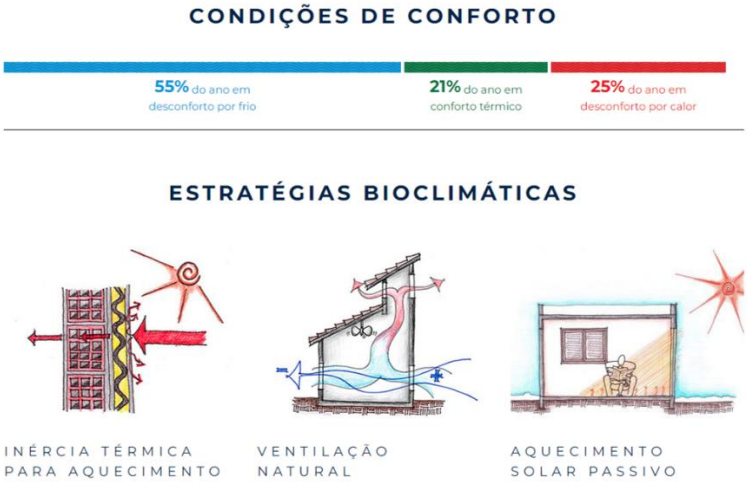
averages, not daily real-time temperatures. Nevertheless, the climate in southern Brazil is known for its extreme variations, with very cold winters and summers reaching temperatures as high as 40ºC. Solar radiation peaks are observed from October to March.

The humidity chart shows a peak in June (winter), with values gradually decreasing to the lowest levels in December (early summer). In the rainfall chart, there's monthly variation, with December, January, and May registering monthly totals equal to or above 150 mm. According to the wind chart, the predominant winds come from the southeast and east, with less frequent winds from the south, west, and northwest.

Figure 3 – Bioclimatic Strategies for Porto Alegre/RS.



)Source: ProjetEEE Platform (2023).

The most relevant bioclimatic strategy suggested by ProjetEEE for Porto Alegre's climate is the use of *thermal inertia* with a focus on heating, considering that the main discomfort stems from cold conditions. This approach is directly related to the choice of materials and components used in the building envelope and roofing. For cooling strategies, natural ventilation combined with thermal inertia is recommended, as it facilitates heat removal by accelerating convective exchanges and contributes to improved thermal sensation for occupants by enhancing evaporation rates.

3 THE CASA AZUL SEAL FROM CAIXA

Created by CAIXA in 2009, the *Casa Azul Seal* was the first system for classifying the sustainability index of housing projects developed specifically for the Brazilian residential construction reality. The *Casa Azul + CAIXA Seal* is an ESG (Environmental, Social, and Governance) classification instrument aimed at housing development proposals that adopt efficient solutions in the design, execution, use, occupation, and maintenance of buildings (Caixa, 2023).

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The goal of the Casa Azul + CAIXA Seal is to recognize and encourage the adoption of quality urban and architectural solutions, as well as the rational use of natural resources in housing developments carried out under CAIXA's housing programs. Its application also aims to raise awareness among developers and residents about the social and economic benefits of sustainable construction, including reduced building maintenance costs and lower monthly expenses for users (Caixa, 2023).

Figure 4 – Classification Levels of the Casa Azul Seal by Caixa

Source: Caixa (2023).

The Casa Azul + CAIXA Seal features four certification levels — Crystal/Bronze, Topaz/Silver, Sapphire/Gold, and Diamond — awarded according to the score obtained across 50 assessment criteria, in addition to bonus points (Caixa, 2023).

4 OBJECTIVES OF THE STUDY

To analyze the bioclimatic strategies applied in two buildings from the 1950s: the Cristal Racecourse (1951) and the Esplanada Building (1952), both located in the city of Porto Alegre, in the state of Rio Grande do Sul. The study seeks to understand how architect Román Fresnedo Siri incorporated solutions for site planning, natural ventilation and lighting, functionality, and materiality into his projects, taking into account the context in which the buildings were inserted.

5 METHODOLOGY OF THE STUDY

The methodology was based on studies conducted on the selected buildings, cross-referencing the bioclimatic strategies proposed by the *ProjetEEE* platform and the *Casa Azul Seal* from Caixa. The analysis focuses on the site planning characteristics of the buildings, the solutions and strategies adopted by the architect in the layout of the spaces, and an updated assessment of the Esplanada Building using the evaluation criteria of the Casa Azul Seal from Caixa.

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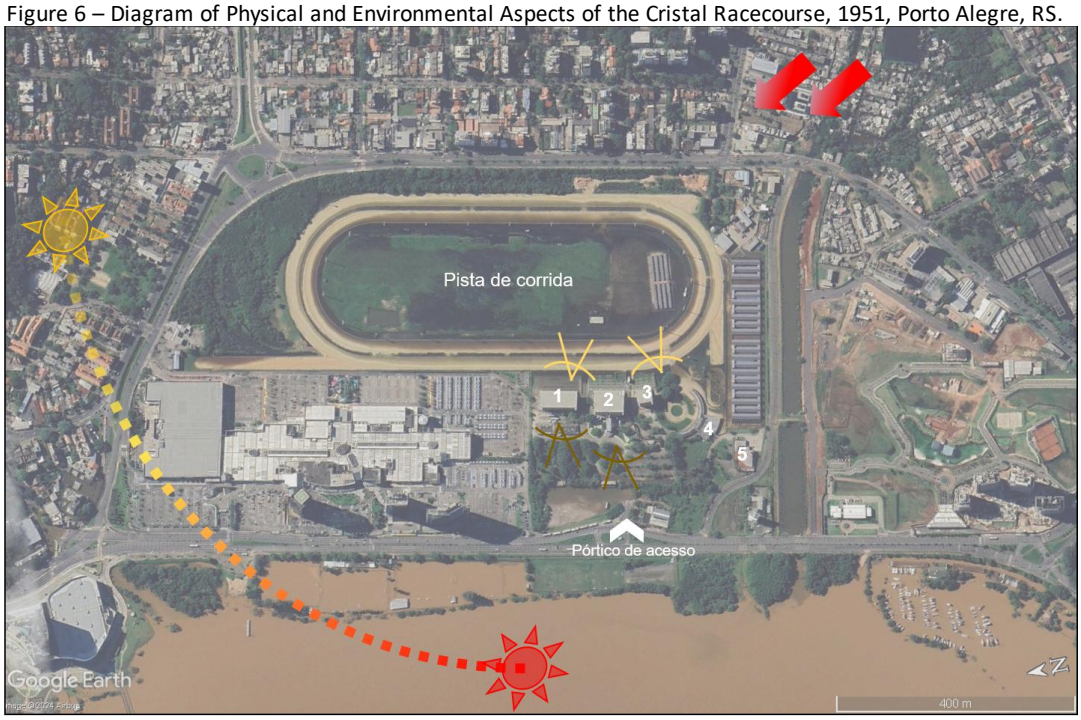
6 THE CRISTAL RACECOURSE (1951–1959)

Located in the Moinhos de Vento neighborhood, Porto Alegre's racecourse was relocated following a decision established by the city's Master Plan in 1938. The new location was planned for the Cristal neighborhood, in a portion of land near the Guaíba River (Comas, 2004).

Figure 6 – Diagram of Physical and Environmental Aspects of the Cristal Racecourse, 1951, Porto Alegre, RS.



Legenda:
1 – Tribuna popular
2 – Tribuna Social
3 – Tribuna Especial
4 – Casa de apostas
5 – Baia para animais

Visuais internas
Visuais externas
Ventos predominantes
Acesso

Source: Google Earth, 2024 (adapted by the author).

Situated on a large rectangular plot, the Cristal Racecourse complex (1951–1959) comprises three main buildings, each featuring a set of common elements that define the composition of each unit. The compositional principle is consistent across the three pavilions, functioning like a prototype repeated with slight adaptations for function and size, depending on their use. There are four basic elements: a central colonnaded sequence, sloped grandstands, a glass box, and a roof structure. An exterior panel clad in tiles marks the central line of internal columns that support the cantilevered roof. This panel also defines the boundary between the enclosed and open areas. The volumetric composition revealed by the side façade is both unified and complex. The panel, the two tiers of grandstands, and the roof define the structural set of the building, while the glass volume forms a regular, transparent, and almost immaterial prism (Weizenmann, 2008).

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In the layout of the complex, it is evident that the architect was thoughtful in how the buildings were arranged. The grandstands and views toward the racetrack were oriented to the southeast, which receives less solar radiation throughout the day. Meanwhile, the waiting hall of the tribunes features a glazed façade facing the Guaíba River, offering privileged views to visitors.

Figure 7 – Cristal Racecourse, 1951, Porto Alegre, RS.

Source: FADU (2007).

As an innovative solution for the time, on the southeast façade, Fresnedo Siri used a concrete roof over the grandstands with spans ranging from 20 to 27 meters, allowing for panoramic views of the racetrack. For the northwest façade, which receives the most sunlight during the day, the architect protected the glass curtain walls with horizontal brise-soleils and fixed metal sunshades, creating internal shading. This was a precise, functional solution aimed at improving thermal comfort for users.

Figure 8 – Functional and Technological Strategies, Cristal Racecourse, 1951, Porto Alegre, RS.

Source: Photo archive Prof. Luciana Martins (2010).

Thus, the significance of this work becomes clear in its historical context. Its artistic plasticity was the result of functional and technological choices, creating a space that is both pleasant and contemplative. Moreover, the architect's concern in adapting modern architectural principles to the local climate is noteworthy.

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6 THE ESPLANADA BUILDING (1952–1962)

After designing the Cristal Racecourse, Fresnedo Siri was invited to design the Esplanada Building, constructed in 1952, which became another icon of modern architecture in Porto Alegre. With its imposing architecture, the large rectangular volume raised on pilotis captivates with elegance and subtlety. Positioned on a prominent elevated corner in an important node of the city, the Esplanada has become a visual landmark and point of reference in Porto Alegre (Luccas, 2004).

Figure 9 – Grid Façade, Esplanada Building, 1952, Porto Alegre.

Source: Google Images (2023).

Designed for the upper classes, the building promised to offer the most modern and spacious accommodations. An advertisement in the newspaper *Correio do Povo* (June 22, 1952, p. 11; June 26, 1952, p. 07) listed several features of the Esplanada: apartments with front-facing views, four large rooftop party halls, four luxurious and independent entrances, a magnificent central garden, a shared children's playground, two independent bathrooms, permanent hot and cold water, dedicated elevator power, heating in all rooms, sound insulation, abundant sunlight in every apartment, a panoramic view of the city extending to islands, hills, and rivers, underground garage, trash incinerator, and high-end finishes (Weizenmann, 2008).

The trapezoidal shape of the plot allowed for a U-shaped configuration, with an approximate area of 2,500 m² and the following dimensions: 22.32 m facing André Poente Street, 87.89 m along Ramiro Barcelos Street, 37.19 m facing Independência Avenue, and 83.74 m along the rear boundary (Luccas, 2004). The analysis of the physical and environmental conditions employed by the architect made it possible for most of the building's volume to receive moderate sunlight, with peak solar exposure occurring on the lower apartment levels where service areas are concentrated.

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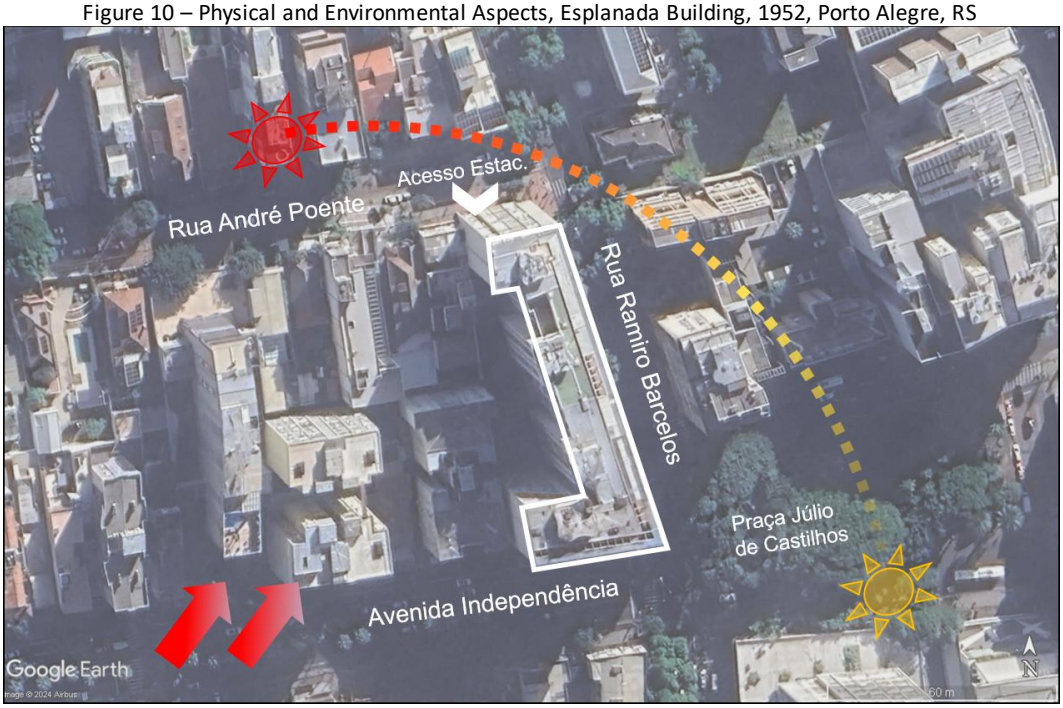
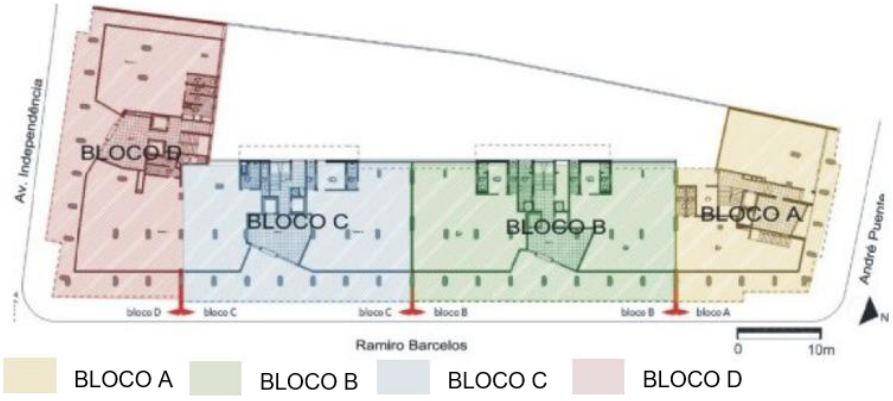
Figure 10 – Physical and Environmental Aspects, Esplanada Building, 1952, Porto Alegre, RS



Source: Google Earth, 2024 (adapted by the author).

Although it presents a unified façade, the Esplanada Building is divided into four blocks, each with independent access. Each block contains 15 floors, resulting in 126 apartments. The ground floor consists of the entrances to the residential blocks and commercial spaces. The pilotis are clad in tiles, showcasing the robust structure. Access to the basement is via André Poente Street, taking advantage of the sloped terrain; this level houses the garage and the building's infrastructure (Luccas, 2004).

Figure 11 – Ground Floor Plan, Esplanada Building, 1952, Porto Alegre, RS.



Bloco A e B construídos antes – 10 anos para a conclusão do ed. Completo (1952-1962).

Source: Weizenmann, 2008 (adapted by the author).

An analysis of the floor plans reveals that the room layouts were directly influenced by external views and the maximization of natural light and ventilation. The ground floor plan

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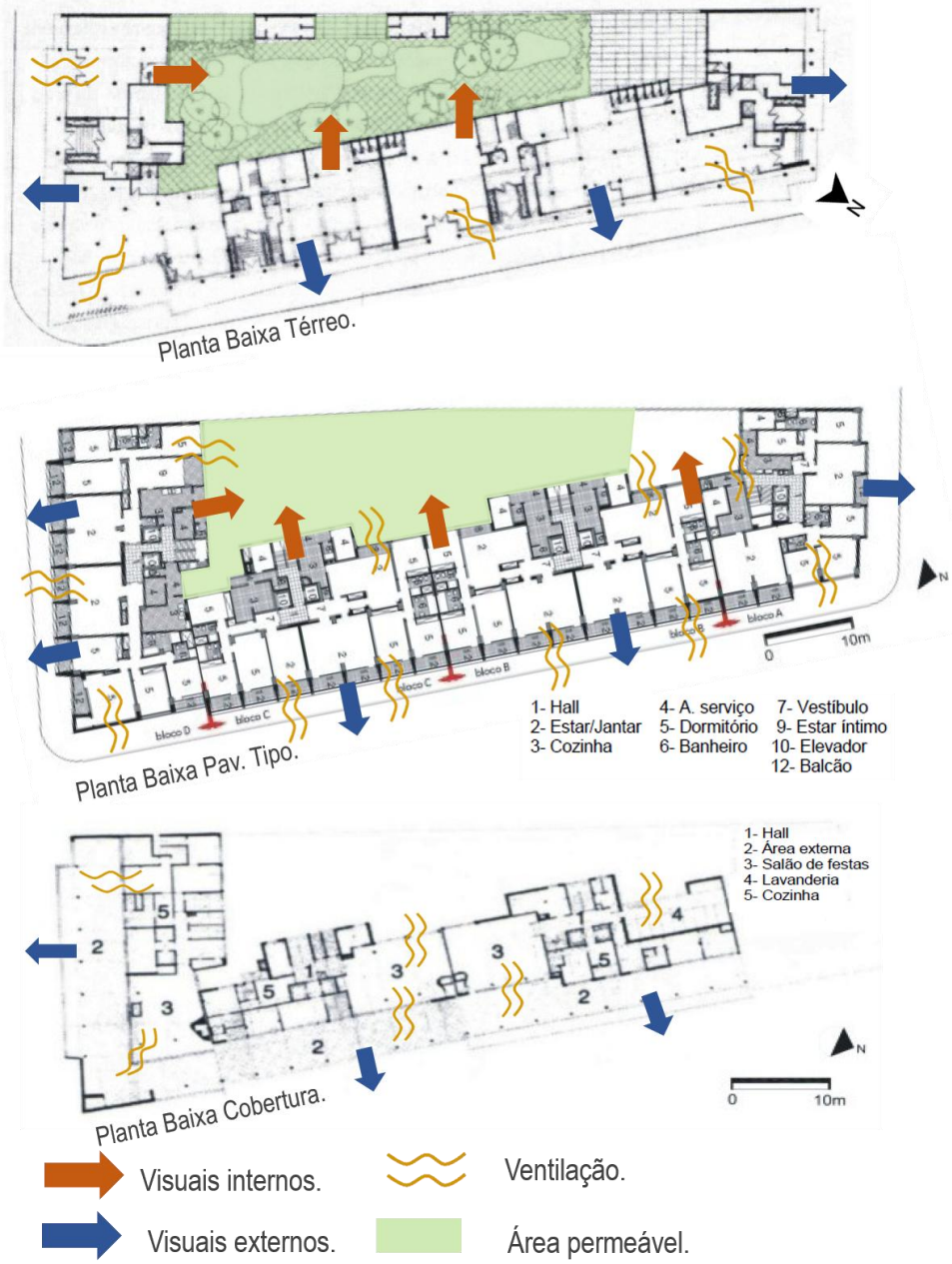
reflects a typical solution of modernist buildings: internal courtyards. The architect utilized the center of the plot to create a pleasant garden for residents. This level also includes internal and external views that enhance the experience of the commercial spaces.

Figure 12 – Diagram of Physical and Environmental Aspects, Esplanada Building, 1952, Porto Alegre, RS



Source: Weizenmann, 2008 (adapted by the author).

The typical apartment plans include large openings arranged to allow for cross-ventilation. The balconies define the grid façade and, being set back from the main living areas, provide effective shading. Furthermore, service areas were located in the parts of the building that receive the most sunlight—an intentional strategy to enhance comfort in daily household

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tasks. At the rooftop level, views become even more expansive thanks to wide and ventilated openings surrounded by a generous terrace.

Figure 13 – Internal Views and Images, Esplanada Building, 1952, Porto Alegre, RS.

Source: Loft Real Estate (2023).

In addition to identifying the bioclimatic care taken by Román Fresnedo Siri in designing the Esplanada Building, these strategies were applied to the evaluation criteria of the *Casa Azul Seal* by CAIXA.

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Figure 14 – Evaluation Categories Table from Caixa's Casa Azul Seal

CATEGORIA	ITEM	CRITÉRIO	FAIXA DE PONTUAÇÃO	OBRIGATÓRIO	DIAMANTE	IDENTIFICADO #mais	CRISTAL	TOPÁZIO	SAFIRA	DIAMANTE
1. QUALIDADE URBANA E BEM ESTAR	1.1	Qualidade e infraestrutura no espaço urbano	2	4	x	x	Mínimo 20 PONTOS	50 PONTOS	60 PONTOS	80 PONTOS	100 PONTOS e #maisInovação
	1.2	Relação com o entorno - interferências e impactos no empreendimento	0	3	x	x					
	1.3	Separação de resíduos	2	3	x	x					
	1.4	Melhorias no entorno	2	3							
	1.5	Recuperação de áreas degradadas e/ou contaminadas	3	3							
	1.6	Revitalização de edificações existentes e ocupação de vazios urbanos em áreas centrais	3	4							
	1.7	Paisagismo	2	3		x					
	1.8	Equipamentos de lazer, sociais, de bem-estar e esportivos	1	4							
	1.9	Adequação às condições do terreno	3	3							
	1.10	Soluções sustentáveis de mobilidade	2	4		x					
2. EFIC. ENERGÉTICA E CONFORTO AMBIENT.	2.1	Orientação ao Sol e estratégias bioclimáticas (livre escolha para Cristal)	3	4	x	x					
	2.2	Desempenho e conforto térmico	0	4	x	x					
	2.3	Desempenho e conforto lumínico	0	4	x	x					
	2.4	Dispositivos economizadores de energia	2	3	x	x					
	2.5	Medição individualizada de gás	1	3	x	x					
	2.6	Ventilação e iluminação natural de banheiros	2	3							
	2.7	Iluminação natural de áreas de circulação de edifícios verticais	3	3							
	2.8	Sistema de aquecimento solar	2	4							
	2.9	Geração de energia renovável	3	5		x					
	2.10	Elevadores eficientes	2	2							
	2.11	Gestão de energia	1	1							
3. GESTÃO EFICIENTE DA ÁGUA	3.1	Dispositivos economizadores de água	0	3	x	x	Mínimo 12 PONTOS	50 PONTOS	60 PONTOS	80 PONTOS	100 PONTOS e #maisInovação
	3.2	Medição individualizada de água	0	0	x	x					
	3.3	Áreas permeáveis	2	6	x	x					
	3.4	Pegada hídrica	2	2							
	3.5	Reuso de águas servidas/cinzas	3	5							
	3.6	Aproveitamento de águas pluviais	2	4		x					
	3.7	Retenção / infiltração de águas pluviais	3	3							
4. PRODUÇÃO SUSTENTÁVEL	4.1	Gestão de resíduos de construção e demolição	0	4	x	x	Mínimo 14 PONTOS				
	4.2	Forma e escoras reutilizáveis	0	3	x	x					
	4.3	Madeira certificada	0	3	x	x					
	4.4	Coordenação modular	3	3							
	4.5	Componentes industrializados ou pré-fabricados	1	4							
	4.6	Uso de agregados reciclados	3	3							
	4.7	Gestão eficiente de água no canteiro	3	4		x					
	4.8	Mitigação do Desconforto da População Local Durante as Obras	2	2							
5. DESENVOLVIMENTO SOCIAL	5.1	Capacitação dos moradores para gestão, manutenção e operação do empreendimento	3	4	x	x	Mínimo 13 PONTOS	50 PONTOS	60 PONTOS	80 PONTOS	100 PONTOS e #maisInovação
	5.2	Ações de desenvolvimento social no território	2	3	x	x					
	5.3	Educação ambiental dos trabalhadores e moradores	1	2	x	x					
	5.4	Ações de planejamento financeiro	2	2							
	5.5	Inclusão de trabalhadores locais	1	1							
	5.6	Capacitação dos trabalhadores do empreendimento	2	2							
	5.7	Ações para desenvolvimento socioeconômico	2	2							
	5.8	Ações de integração comunitária	2	2							
6. INOVAÇÃO	6.1	Aplicação do BIM na gestão integrada do empreendimento	3	3			Mínimo 10 PONTOS				
	6.2	Gestão para redução das emissões de carbono	2	5		x					
	6.3	Sistemas eficientes de automação predial	3	4							
	6.4	Conectividade	2	2		x					
	6.5	Ferramentas digitais voltadas a prática de sustentabilidade	2	2							
	6.6	Possibilidade de adequação da UH às necessidades dos usuários	1	3							
	6.7	Outras propostas inovadoras	2	10							
BÔNUS	7.	Critério Bônus I	2	6			-				

Poderá atender. Atender.

Source: Caixa, 2023 (adapted by the author).

In the presented table, the criteria met by the architect during the building's design are highlighted in green. Items highlighted in red represent aspects the building could meet if sustainable measures were implemented. In category 1, related to urban quality and well-being, the building scored 3 points for including a central internal garden and could gain 6 more points with the implementation of waste separation and site improvements. In category 2, on energy efficiency and environmental comfort, it earned 14 points due to its solar orientation strategy, bioclimatic solutions, and thermal performance—potentially reaching 26 points with solar heating systems, renewable energy, efficient elevators, and energy management. For water management (category 3), the building scored 6 points, with a potential of 15 if greywater and rainwater reuse systems are adopted. In category 5, regarding social development, it could achieve 4 points through financial planning initiatives and socioeconomic development actions. In category 6, innovation, the building could score 13 points with measures such as carbon emission reduction, efficient building automation, connectivity, and digital tools for sustainability. In total, the building could score 70 points, achieving a Topaz or Sapphire certification level.

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7 C FINAL CONSIDERATIONS

As a conclusion to the analyses carried out on the Hipódromo do Cristal (1951–1959) and the Esplanada Building (1952–1962), both projects designed in the 1950s, we find that these works present functional and thermal solutions that remain applicable today. Furthermore, it was possible to identify the care taken by the architect in the positioning of these buildings, making use of the best sun exposure and resolving, in a technically efficient way, the solar incidence on façades with greater exposure. These are two iconic works of Modern Architecture in Porto Alegre that, in addition to their plastic quality, offer functional solutions and were designed with the local climate and surroundings as guiding principles.

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DECLARAÇÕES

CONTRIBUIÇÃO DE CADA AUTOR

Ao descrever a participação de cada autor no manuscrito, utilize os seguintes critérios:

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- **Curadoria de Dados:** Larissa Rodrigues
- **Análise Formal:** Larissa Rodrigues
- **Aquisição de Financiamento:** Não se aplica
- **Investigação:** Larissa Rodrigues
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- **Supervisão:** Ana Elisa Souto

DECLARAÇÃO DE CONFLITOS DE INTERESSE

Nós, Larissa Rodrigues e Ana Elisa Souto, declaroamos que o manuscrito intitulado "**Soluções Bioclimáticas na Década de 50: Um Estudo do Hipódromo do Cristal e do Edifício Esplanada ”:**

1. **Vínculos Financeiros**: Não possui vínculos financeiros que possam influenciar os resultados ou interpretação do trabalho.
2. **Relações Profissionais**: Não possui relações profissionais que possam impactar na análise, interpretação ou apresentação dos resultados.
3. **Conflitos Pessoais**: Não possui conflitos de interesse pessoais relacionados ao conteúdo do manuscrito.