

Sao Paulo Exhibition Center



The Sao Paulo Exhibition Center in Brazil engages with its context, integrates sustainable materials, and coheres the interior and exterior, private and public. An ode to the rich Brutalist history and sustainable construction material potential of Sao Paulo, the Center is composed of concrete and mass timber. It houses an exhibition/market space on the ground floor, classrooms and lecture halls on the second, an office on the third, and a cafe on the top floor. Balconies on each floor allow fresh ventilation and connection to nature.

Overall, I wanted to create a sustainable space in terms of embodied carbon in its material construction as well as lowered operational energy use, and to create an accessible, public, and inviting space that can be used not just for classes and offices, but also exhibitions, indoor markets, and gatherings.

Goal 01 - Material Sustainability

Incorporate durable and sustainable materials that would reduce the overall embodied CO2 of the building construction.

Design Strategies

The concrete in my building utilizes high fly ash concrete that utilizes coal waste products that actually help strengthen the building. Additionally, the structural glulam mass timber beams have a fraction of the embodied carbon of steel and concrete, and sequester CO2. Assuming the development of Brazil's mass timber industry, the glulam columns and beams should be sourced locally.

Goal 02 - Operational Sustainability

Lower overall energy consumption by minimizing HVAC loads (heating + cooling), maximizing passive solar heat gain for heating demand days, integrating passive ventilation strategies for ventilation.

Design Strategies

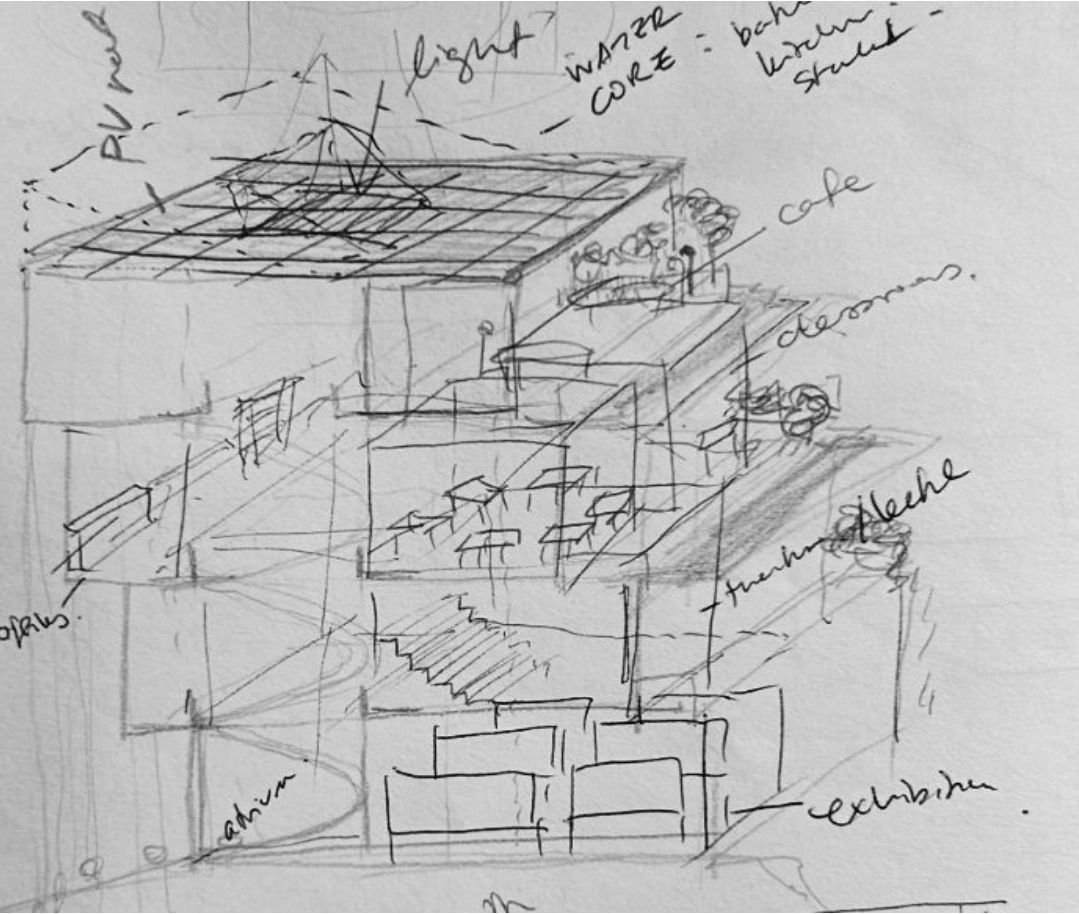
The current concrete/insulated wall has a high thermal mass with R-46 and a very low WWR, which would reduce the heating and cooling loads. The staggered form allows the building to maximize daylight potential (02) and passive solar gains on the North side. The daylight also reduces the lighting load of the building, as well. Air based HVAC systems were used instead of radiant heating and cooling (more efficient) due to the humidity of the climate and consequent decrease in radiant cooling efficiency.

Goal 03 - Public Usage + Experiential Quality

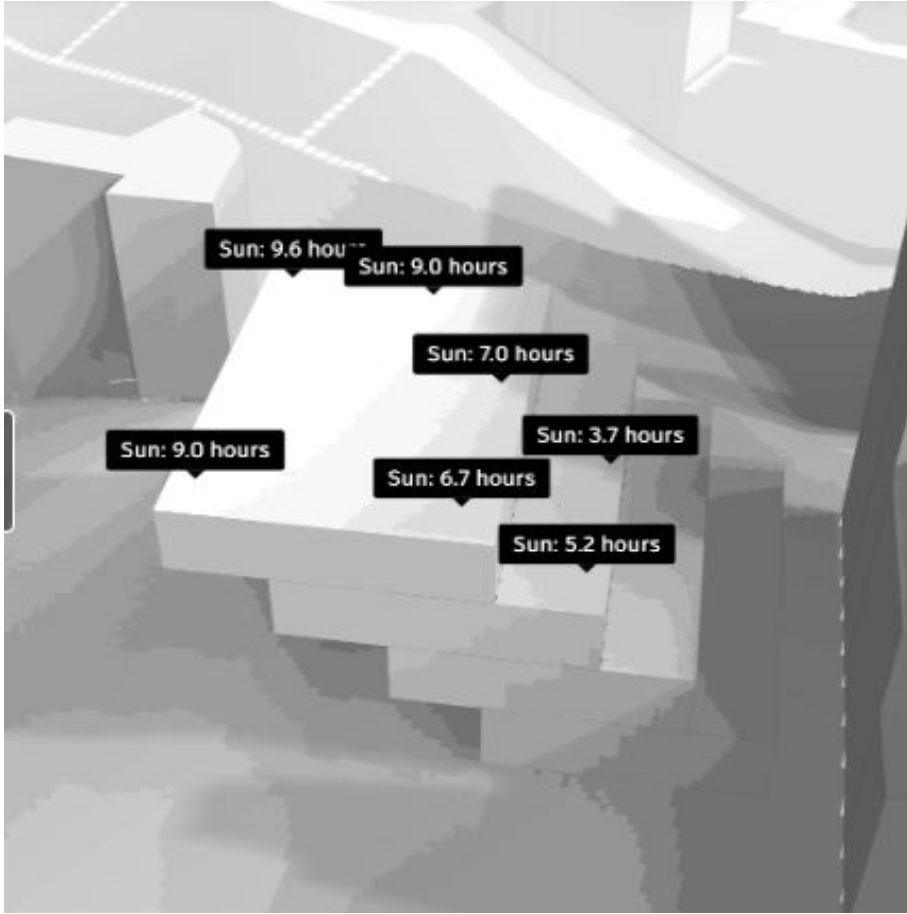
Provide optimal occupant comfort and experience by utilizing natural materials and maximizing daylighting opportunities in creating an inviting and accessible public space.

Design Strategies

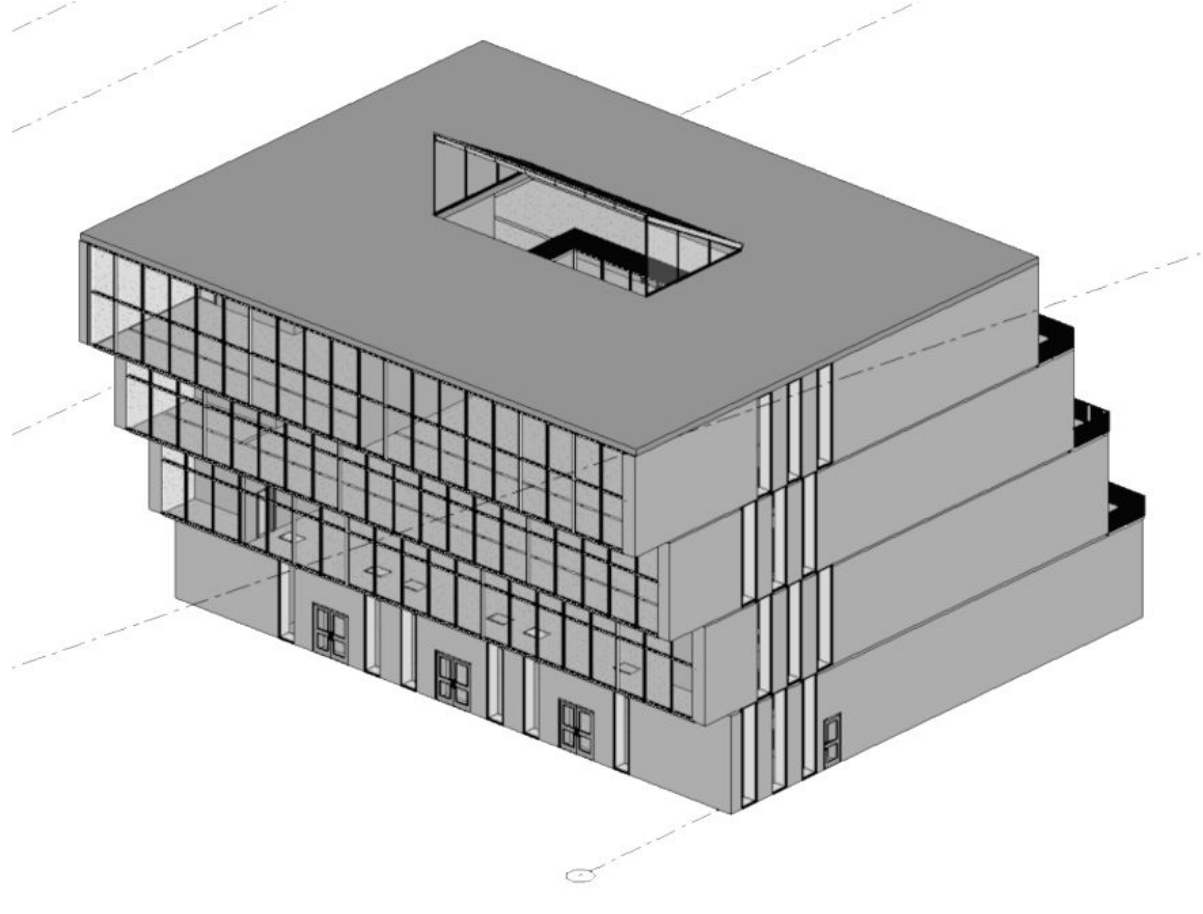
Leaving the structural glulam beams exposed evokes biophilia and connection to nature for the occupants (04+05). Though the views of the initial building envelope (03) were scrapped in favor of a higher thermal mass, the central atrium and balconies provide plenty of natural light in the spaces. Additionally, the staggered form of the building over its environment creates a covered urban space that helps draw in the public and active the exterior environment.



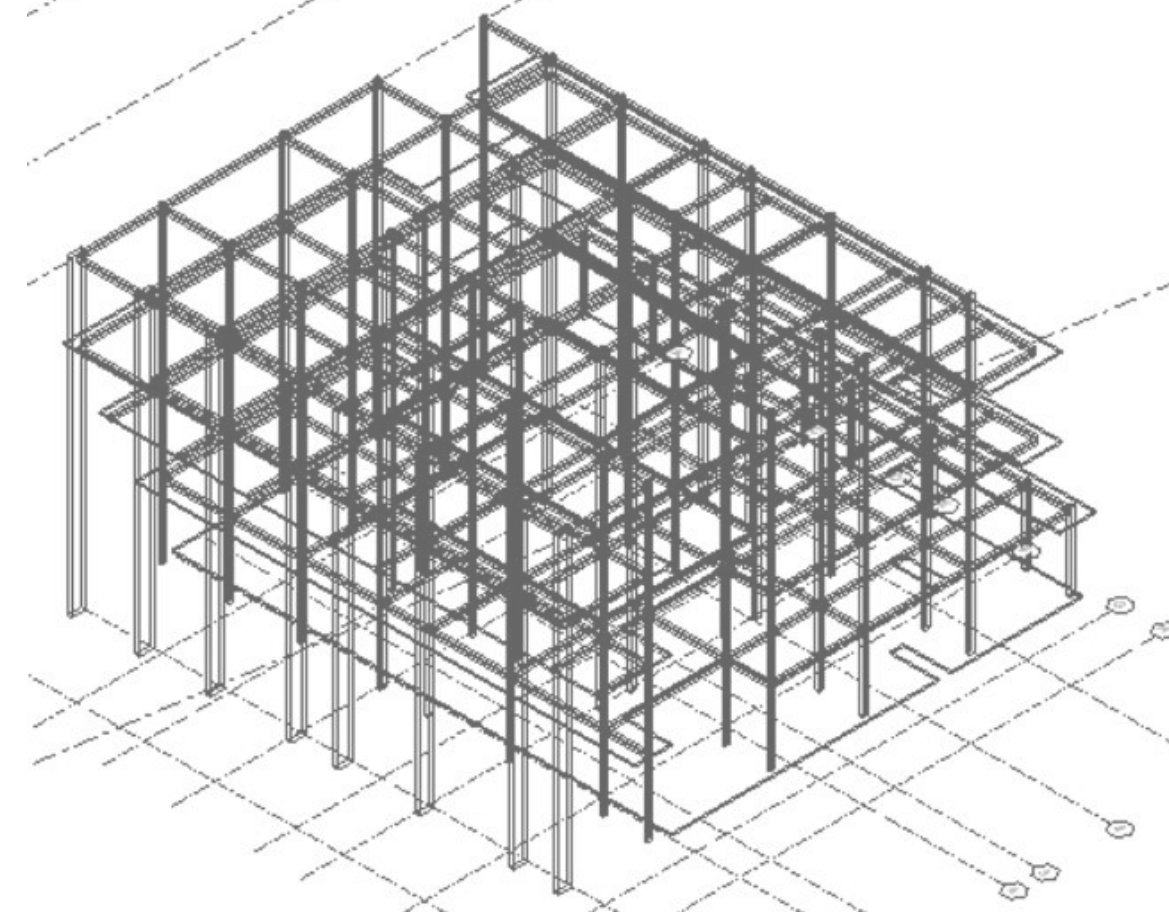
01 initial layout sketch



02 massing + energy studies



03 initial form + envelope



04 structural model



05 coordination view - first floor

Michaella Park