Peñitas House

Casa Peñitas

Peñitas Natural Reserve
Tehuastepec, Mexico, 2020-2022
Mariana Ávila Flynn, Roberto Michelsen Engell

Design Studio
Mariana Ávila Flynn, Roberto Michelsen Engell

Client
Private

Contractor
Taller AF. Alejandro Filloy, Miguel Hierro, Irving Esquivel

Consultant
Hugo Vargas (Sustainable Systems)

Start and Completion Year
2020-2022

Gross Area
412 m^2

Sustainable and healthy materials or systems
local materials and systems, nature

Photography
Roberto Michelsen Engell, Taller AF, Maria Ávila Flynn

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More information

REPORT. Sustainable and Healthy Architecture

Peñitas House is one of the structures of the "Reserva Peñitas," a country house development located in a natural protected area 30 minutes south of Valle de Bravo's Historic Center in the central region of Mexico. The Reserva's main objective is to foster natural system regeneration using approaches such as permaculture, rainwater collection, and an interconnected dam system to address the community's water needs without relying on external freshwater sources or wastewater connections.
The commission for the house consisted of designing a single-family home that integrates into the site's ecosystem from a technical, visual, and functional perspective. The project's conceptualization recognized the traditional residential architecture in Valle de Bravo, which responds to the region's rainy climate. Traditionally, houses in this area are low-rise constructions with gabled roofs and porticos, allowing outdoor interaction while providing shelter. Most roofs are finished with red clay tiles, creating a unified visual identity for the community. However, the traditional architectural values of the site are threatened as many new constructions introduce materials that are not receptive to climate and identity.

Under this premise, Peñitas House aimed to reassess the values of traditional architecture through the lens of a contemporary and sustainable approach. The design resulted in a one-story gabled-roof linear structure with a portico on each side. The porticos function as the house's primary circulation areas while opening the views to the east and west. The overall layout allows for crossed ventilation and natural light throughout the house.

The building materials were selected based on their local availability, construction simplicity, economic feasibility, long-term maintenance, and temperature management. The exterior walls were built of two-wythe adobe blocks contained by stone walls in a staple-like configuration at each end. The interior partitions were made of red bricks. Both the exterior and interior walls were finished with an adobe coating. The main structure was made of a continuous wooden truss system supported by wood columns with steel connections. The roof was finished with clay tiles and incorporated skylights at select locations to increase natural light and warmth. All materials were sourced locally, either from the site itself, such as soil, stone, and aggregates, or the nearby material stores for items such as brick, cement, or wood.

Sustainability in this project is understood as an interconnected system between nature and communities, using technology as a tool that ensures a circular cycle in the use of resources. Specifically, the technologies used at the house include solar energy for power and water heating purposes. The project also contributes to the Reserva's rainwater harvesting system through the strategic location of rainwater collection points that direct the water to a series of treatment areas to be reused in the house and returned to the site's dam system.

The project has continued to merge with its landscape while adapting to the evolving needs of its inhabitants, ensuring the preservation and restoration of ecological systems using architecture and people as active participants in this endeavor. The construction of the house as the first structure in the plot was finished in 2022. Shortly after, a parking and workshop pavilion was added to the program. This second structure was made of stone and wood with a flat roof that serves as an observatory and garden space. Over the years, the project's purpose has evolved to actively integrate the land into the daily lives of its inhabitants, including food production, creating a self-sustaining community. Ultimately, Peñitas House demonstrates that it is possible to achieve a balance between architecture, technology, and community needs while protecting and preserving natural resources.