

Illinois Institute of Technology

Multifamily Building | 04/04/2023

The Growing Haven

Project Summary

The Growing Haven is a proposal for an affordable Multifamily Mixed-use building in the Woodlawn neighborhood of Chicago. The population of the once thriving Woodlawn neighborhood has declined by 67% over the last 40 years due to extreme racial transition. The restrictive policies and exploitive real estate maneuvers left an economically deteriorated neighborhood. The Housing Equity Initiative (a program by Sunshine Gospel Ministries) works in the Woodlawn neighborhood to promote equity by empowering families to build generational wealth through home ownership, retention, and neighborhood revitalization. Through our partnership with HEI, we are designing an affordable multifamily building with commercial space on the first floor. The end use will not only establish home ownership for future residents, but the design allows for residents to generate income by renting part of their unit to local college students. Additionally, the retail spaces on the street level will be rented out to entrepreneurs in the neighborhood; part of the money generated from the commercial programs will lower the costs of shared spaces within the building.

Design Strategy

Flexibility is used as the main approach to design for both the residential and commercial spaces. The residential portion of our building focuses on creating architecture that can grow and change as the families that own the property change and grow. This is programmatically accomplished by creating a rental unit, which is adjacent to the home owner's primary residence, that the home owner owns. The rental unit is intended to generate income by offsetting operational costs, thereby making their mortgage more affordable. As the families grow, the rental units can be absorbed into primary units. The commercial part also uses a similar concept where both the café & boutique can expand into the central courtyard.



Project Data

- **Location:** Chicago, Illinois
- **Climate Zone:** ASHRAE 5A
- **Lot Size:** 15,625 ft²
- **Building Size:** 20929 ft²; 4 stories
- **Occupancy:** 60 people
- **Energy Target:** 22.56 kBtu/ft²/yr EUI
- Excluding renewable energy source
- **Average Utility Cost:** \$13,210/month (Exc. renewables)
- **Annual Carbon Emissions:** 35-ton CO₂e/ft²/yr (Exc. Renewables)

Technical Specifications

R-Values

- Wall: R-30
- Floor: R-40
- Roof: R-40
- Windows: U-0.3

HVAC

- Commercial: VRF Air Source system & 100% OA System
- Residential: VRF Air Source system

On-Site PV

- 499,322 kBtu / yr

Partners

Industry Partners – Sunshine Gospel Ministries

Design Partner – HKS Architects

Project Highlights

Architecture: Inspired by the neighborhood, the architectural fabric includes elements such as bay windows and brick facades. The proposed architecture is minimal and diaphanous so that activities can mutate and change over time. The shape of the building allows the users to expand and appropriate the outdoor public space, offering seasonal activities such as street markets. The project poses to be an educational experience for visitors by visually exposing Net-zero strategies such as solar panels.

Engineering: Energy conservation fundamentals specified how we monitored heat flow through our spaces, and available square footage shaped our structures key operations. Heat transfer at exchange locations are provided redundancies through insulation, vapor barriers, and heating sources. Mechanical systems are integrated into architecture to provide functionality, maintainability, and uniform aesthetic.

Market Analysis: With a median household income of \$33,140 at Woodlawn, the Growing Haven's goal is to be an affordable solution not only as an initial purchase for new home owners but also as a long-term investment with reasonable maintenance costs. To accomplish this, cost-efficient construction strategies such as precast structures and double pane glazing are used. Additionally, the building is used as a revenue generating tool with income from the first floor and above rental units, helping offset some of these costs.

Durability and Resilience: The building is designed to withstand the tumultuous Chicago weather while also meeting net-zero requirements. This is accomplished by limiting thermal bridging, utilizing resilient materials (reinforced concrete, brick and steel), and incorporating veneer facades to combat strong winds and colder weather. The project additionally builds resilience at a community and neighborhood level.

Embodied Environmental Impact: Strategies to reduce the project's embodied carbon footprint include blended cement, steel and aluminum with higher recycled content, reclaimed brick and EPS insulation. Window sizes were optimized to ensure adequate daylight in the spaces without increased energy loss, enabling the use of double-pane glazing as a low-carbon solution for facades.

Integrated Performance: The team's approach to integrated performance is exemplified by using solar panels as both an architectural element and sustainable energy source. Through the aggregation and positioning, the panels not only effectively collect solar energy but also act as a canopy to provide shading. Solar panels on the first floor additionally act as shading devices along the pedestrian entry to the building.

Occupant Experience: The Growing Haven considers its occupants' health, wellness, and productivity, as they are highly affected by the indoor environment. Natural ventilation and efficient heating and cooling systems are designed to provide excellent air quality and thermal comfort. By locating the main building to the North side of the lot, privacy and sound isolation from the main street is achieved. Interior wall assembly includes soundproofing to maintain sound isolation between units. The choice of natural finishes like brick, and wood on the interiors creates a feeling of comfort and adds to aesthetic appeal.

Comfort and Environmental Quality: To provide the residents with maximum thermal comfort, the design utilizes separate VRF systems for commercial and residential spaces and an additional 100% OA system for the Café & Kitchen. Additionally, passive strategies for thermal comfort in residential spaces include operable windows and fans. Daylighting strategies such as light shelves and tall windows are used in the living spaces to enhance the occupants' comfort within the units.

Energy Performance: The target for this design is 22.56 EUI. Over and above passive strategies such as air-tight, properly insulated envelopes, light shelves, efficient HVAC systems and energy star appliances to reduce the buildings energy demand, PV panels are used to meet the Net-zero goals.