RETRO BOOMIN: MARY CHURCH TERRELL HOUSE RETROFIT

BACKGROUND

Our project is centered around the Mary Church Terrell House, a historic house located in the Le Droit Park Neighborhood of Washington D.C., an area known for a historic hub for prominent African American residents. One of those prominent residents was Mary Church Terrell, a known African American educator and activist. She occupied the house along with her husband from 1899-1913 but continued her education and activism until her death in 1954. In the 70s, the house, which was originally a duplex, burned down. The firewall separating the two residences, fortunately, saved the remaining structure and its unique figure. After the fire, the residence deteriorated in its condition, even being placed on the Most Endangered List. Howard University purchased the residence in 2018 with the intent of keeping onto the property and its history and providing renovations. Now, our team Retro Boomin is primed to explore ways to redesign and repurpose the Mary Church Terrell House with regards to sustainability, efficiency, and historic perserverance

OBJECTIVE

Our project is focused on the revival of the Mary Church Terrell House with net zero strategies. While our project is primarily centered around the renovating a historic house for the intent of the homeowner, we also found this retrofit as a perfect opportunity to open up the house for the appreciation and usage of the community. Due to the historic nature of the residence, we plan on implementing exhibition areas dedicated to the history of Mary Church Terrell and other noted African American pioneers who resided in Le Droit Park Historic District. This space will also be dedicated to ongoing social justice initiatives.

DESIGN GOALS

LEGACY: Reflection and appreciation of the historical ties of Mary Church Terrell, the Le Droit Park Area, and Howard University through our retrofit

EQUITY: Promotion of Social Justice initiatives & practices through programming and design.

DECARBONIZATION: Achieving equity that would prove beneficial to the residents and users of the Mary Church Terrell house through financial and energy improvements.

Washington D.C.

PROJECT DATA

Location: 326 T St NW
Washington DC 20001
Lot Size: 2,497 sqft
Lot Number: 3095 0023
Climate Zone: 4A
Building Size: 2,390 sqft

PROJECT HIGHLIGHTS

ARCHITECTURE:

Renovations to the interior design of the Mary Church Terrell House to maximize energy savings through solar and lighting conditions. We have created a community space with added programming to become a social justice center which will also highlight the legacy of the MCT House and Le Droit Park Historical District.

MARKET ANALYSIS:

This community-led model provides a precedent for equitable decarbonized housing in the Le Droit Historic Park District, making homes safer, healthier, and more adaptable in our ever-changing environment. Furthermore, net-zero housing makes living more affordable and sustainable for present and future generations by reducing utility consumption costs and offering long-term savings via tax credits, renewable energy certificates, and stormwater retention credits. Most importantly, this project will amplify underserved community voices and create equity by providing a wide range of social justice resources. Using actual 2022 market information for the DC area, the total construction cost for this retrofit is $451,738.

INTEGRATED PERFORMANCE:

The focus revolved around achieving a level of net zero performance and beyond. Optimizing passive systems and daylighting to rely on efficient natural ways to incorporate lighting. Having an open plan that will increase natural ventilation and increase airflow throughout the building. Using a highly sustainable and efficient insulation such as hemp wool, which is high in thermal mass and has low conductivity. Geothermal heat pumps were a necessary addition as they are energy efficient, flexible in the temperature, and align with reducing noise pollution.

EMBODIED ENVIRONMENTAL IMPACT:

While evaluating the embodied environmental impact on our site, we decided on using locally sourced materials, that will achieve decarbonization of the building. We incorporated Pinewood, Brick, and Vertua concrete, which will prove beneficial to the offset of carbon on our site. Utilizing the EPIC life-cycle assessment tool, we found that our baseline is 700 tons total carbon emissions, which we reduced to 100 total ton carbon emissions.

DURABILITY AND RESILIENCE:

We revolved the building's engineering to reduce energy consumption & operational costs through sustainable materials and methods. We firstly instilled a by use of passive building systems reduce the loads on mechanical systems, allowing for inexpensive units. Utilizing on site renewable energy reduces energy costs along with providing protection to the facade.

OCCUPANT EXPERIENCE:

The Historic Preservation of our site will provide occupants with a unique experience of the space. Site Programming defines clear boundaries between dwelling & community spaces, keeping the site accessible to the homeowner. Time-controlled lighting, energy efficient appliances, and ease-of-use technologies will aid in creating a comforting environment for occupants.

COMFORT AND ENVIRONMENTAL QUALITY:

The approach involved installing a passive heat recovery ventilator with a geothermal heat pump in order to provide a healthy comfortable space for the building occupants & increase long-term energy savings. The hedge landscaping works alongside the MVHR to deposit and remove local air pollutants enhancing the outdoor air quality. This low energy consumption system creates an all-year-round, healthy indoor and outdoor environment.

ENGINEERING:

Our approach to involved addressing the flooding and fire protection. We wanted to implement a water collection system that both irrigates the back yard and provides water for toilets. This will offset the amount of flooding that occurs on the site. We also revamped the electrical systems to be energy efficient and backed up via solar.

ENERGY PERFORMANCE:

We approached this project with the goal to achieve net zero energy and to fully decarbonize the building. This consisted of a step-by-step process of transitioning to electric heating and cooling, then implementing production and storage of solar energy generated on-site. In addition to the building's decarbonization, we achieved lowering the baseline energy use index (EUI) of the building from 49 to 15 by incorporating more efficient systems.