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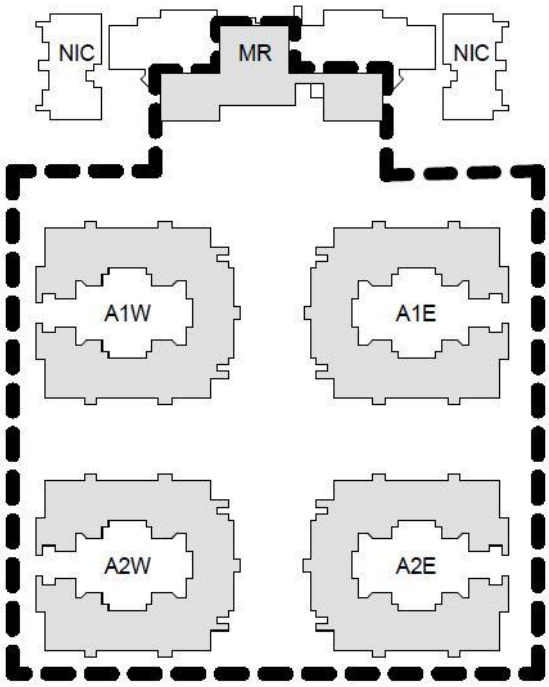
Roosevelt Tower Low-Rise Buildings Modernization – Case Study

Roosevelt Towers is a federally- and state-assisted family living development located in the dense residential neighborhood of East Cambridge, Massachusetts operated by the Cambridge Housing Authority (CHA). Although referred to as Roosevelt Towers, the apartment complex is actually a group of eleven apartment buildings constructed around 1949. There are six low-rise buildings of 3-stories each, and one mid-rise building of 8-stories.



The scope of our project was limited to the four larger, U-shaped, low-rise buildings with interior courtyards with some minor MEP work in the mid-rise.

The Roosevelt Towers low-rise Modernization project consists of the renovation of 112 apartments in the 4 Low-Rise buildings. Interior renovations include updates to kitchens and baths, all new interior finishes, all new doors inside and out, construction of a dedicated boiler room, and Mechanical, Electrical, Plumbing repairs throughout. Exterior renovations include masonry repairs, new windows and exterior doors, new roofs, site hardscape repairs and improvements, and new landscaping.

Because the renovations occurred throughout partially occupied buildings, the phasing strategy centered around resident access and egress. The construction activities in each building could be limited to a group of five to 6 units served by a common stair. This strategy resulted in twenty renovation phases which closely corresponded to extensive exterior, civil, and landscape work associated with each building.

Project Goals

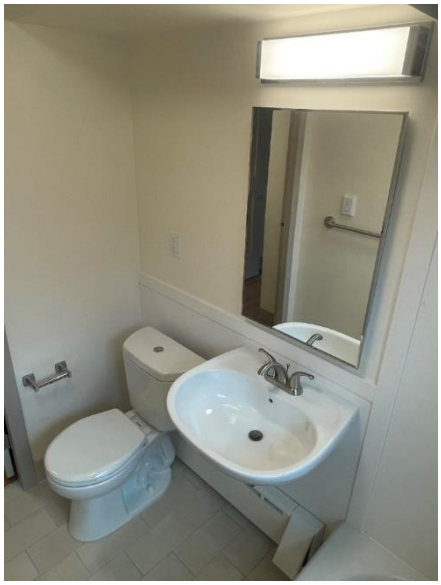
As stated in the initial Request for Proposals, the design and construction project were to promote energy efficiency and sustainable design, minimize long-term operating costs, and improve habitability and the tenant experience. We aligned our design strategy closely with the values of Owner by putting the lived experience of the residents first. Renovation phasing and unit

improvements were focused to minimize resident disruption and to make the biggest possible impact on the quality of life in the future.

Interior Renovations

Although the unit layouts remained mostly unchanged, the kitchens and bathrooms were completely gutted to receive mechanical, electrical and plumbing systems upgrades. High-quality HUD compliant kitchen cabinets were installed in a new layout to better serve the resident's needs. To improve ease of cleaning and longevity, a moisture resistant FRP backsplash was added along with a decorative stainless-steel panel behind the range. Solid surface countertops and backsplashes add durability and a sophisticated appearance. High efficiency LED light fixtures (including under-cabinet lighting), Energy-Star appliances, LVT flooring and interior paint throughout complete the re-imagining of the interior.

Following mechanical and plumbing upgrades in the bathrooms, moisture resistant gypsum and cement board were installed on the ceiling and walls, respectively. A waterproof membrane was installed over the wet walls and floor before solid surface wall panels and tile flooring were installed. These durable materials provide longevity and ease of maintenance while substantially upgrading the quality of finish. High efficiency plumbing fixtures were installed in both the kitchens and baths to substantially contribute to a water use reduction for the apartments.



Energy Performance and the Building Envelope

Multiple areas of focus were required to meet Cambridge Housing Authority's sustainability goals.

One of the first phases of construction included a new central boiler room of 3 high-efficiency gas-boilers. This allowed the low-rise buildings to be disconnected from the existing, aging system in the neighboring mid-rise building. Additionally, new co-generation equipment was constructed to supply additional heat and on-site electricity to help reduce the project's overall energy footprint.

Along with replacing inefficient lighting and plumbing fixtures, energy loss through the leaky building envelope needed to be addressed. The existing black EPDM roof was at the end of its useful life and contributing to excessive heat loading in the summer months. Replacing it with a highly reflective ENERGY STAR-certified, white, PVC membrane roof decreased summer heat loads. The replacement of the roof also allowed us to upgrade the roof insulation to current energy code standards thus decreasing winter heat loss and increasing the overall thermal efficiency of the building envelope.

Another major contributor to building leaks were the existing windows. Once the old windows were removed and the openings abated of hazardous materials, an air/vapor barrier was wrapped around the edges. The new windows were then insulated and caulked into place to provide a tight installation which was air and water tested. This process insured that the new windows were meeting the highest standards of envelope tightness.

Once the building envelope was tightened up to reduce unwanted air and moisture leakage, maintaining indoor air quality became a high priority. To introduce fresh air without sacrificing energy losses a Heat Recovery Ventilator (HRV) was included for each unit. Energy is conserved as cold fresh air from outside passes through the HRV's heat exchanger past warm moist air exhausted from the bathrooms and kitchen. Heat is transferred without mixing the air streams. The HRV operates on a continuous low mode to maintain exhaust of moist stale air and supply of fresh air to the unit. When the bathroom is in use, the HRV switches to high ventilation mode, drawing warm moist air from the bathroom and kitchen and expelling it through roof vents. It is expected that this system will reduce the occurrence of mold in the units while maintaining improved levels of fresh air.

Among the most difficult aspects of the project was the repair of the exterior masonry walls. The cast stone trim and steel window lintels needed extensive repairs or replacement. This work necessitated abatement of hazardous materials. It was decided once the project started that the envelope consultant would work closely with the masonry restoration subcontractor to clearly identify areas for strategic repair. This close cooperation resulted in a highly targeted masonry repair that saved the project nearly two million dollars!

Sustainable Design and Construction Certification

The Roosevelt Towers Low-rise apartments were renovated to comply with the 2014 Enterprise Green Communities Standard. The project was designed through an integrative process, closely involving residents, the CHA staff, and our team of Architects and Engineers. The community development standard guided. There was increased clarity for key design decisions about energy and resource efficiencies because the Owner committed to this design standard. All plumbing fixtures met the EPA's WaterSense, appliances are Energy Star-rated, light fixtures were super-efficient LEDs, and paints, adhesives, and sealants were low- or no-VOC. Healthy living is promoted with the new ventilation system, mold prevention, and making the buildings tighter and dryer. Finally, the CHA has engaged with its residents to provide for sustainable operations, maintenance, and management of the property.

Conclusion

Through targeted systems upgrades, strategic construction phasing, and a sustainable vision by the Owner, the Roosevelt Towers Low-Rise apartments received a modernization that has improved energy efficiency, minimized long-term operating costs, and improved the tenant experience for years to come.