



U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

## *New Technologies Upgrade Older Homes* Chesapeake Habitat for Humanity Rehabilitation Projects

### TECHNOLOGY HIGHLIGHTS:

Optimum Value Engineering

High-Efficiency Furnaces

ENERGY STAR® Appliances

Habitat for Humanity International (HfHI) strives to provide durable, comfortable, and affordable housing solutions for people in need. The nonprofit builder and developer has teamed up with the U.S. Department of Housing and Urban Development's Partnership for Advancing Technology in Housing (PATH) program on several occasions in the past in its efforts to build high performance homes affordably. The two organizations agreed to jointly sponsor a demonstration program in the Mid-Atlantic region. Their mission was to design, construct, evaluate, and showcase rehabilitated

low-cost housing that meets the goals of both HfHI and PATH. The housing would be affordable, energy efficient, environmentally responsible, durable, safe, and accessible—in addition to being “volunteer friendly” to build.



Chesapeake Habitat for Humanity, incorporated in 1982, became the first urban affiliate project of Habitat for Humanity International. Chesapeake HfH agreed to renovate two rowhouses in Baltimore, Maryland as part of the rehab showcase project. The Board of Directors pursues renovation projects as a means to provide safe, affordable homes while eliminating vacant, boarded-up properties. Vacant houses are renovated and sold at cost or at fair market value, whichever is less, to lower-income families. The families who purchase the homes are regarded as partners; they are required to assist in the project before and after they move into their homes, and are required to make regular and timely payments

so that funds are available to build more houses.



The first of the two properties identified by Chesapeake for rehabilitation as a PATH demonstration project, pictured above, was located at 500 Rose Hill Terrace in the Pen Lucy section of Baltimore. The second property, 937 Homestead Avenue, was a few blocks from the Rose Hill Terrace building.

## Advanced Technologies

One of the major goals of this project was to demonstrate and promote advanced building technologies in a modest single-family home. Upon completion, this project would showcase durable and energy-efficient design and construction techniques serving as a model to promote PATH technologies to builders, developers, architects, and the public. HfH committed to implementing energy-efficiency measures and technologies that promote optimum indoor air quality while PATH identified technologies that could be incorporated including:

### Optimum Value Engineered Framing

The technical advisors to the project wanted to incorporate Optimum Value Engineered (OVE) framing techniques to reduce the lumber and labor needed to build the house. With careful consideration of the specific site requirements, the designers were able to specify an economical, structurally sound framing system for a remarkably well-insulated low-income showcase house using engineered lumber.

### High-Efficiency Furnaces

Affordable housing is only truly affordable if the homeowner can afford the utility bills. In keeping with this goal, PATH provided technical services in the form of Value Engineering and HVAC design services. To reduce heat loss to the unconditioned basement, engineers designed and specified a compact duct layout and provided air-sealing specifications.

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Central returns were designed for the first and second floors. Because of high ceilings, the Chesapeake affiliate dropped the ceilings to 8 feet, providing a chase space in which to route the mechanical system (1). In this way duct runs were minimized and both the first and second floor distribution made use of this chase. A highly efficient Janitrol 92.6% Condensing Gas furnace equipment was specified. Efficient four-way ceiling diffusers were used to maximize air flows to the designated rooms.

The house at 957 Homestead Avenue, the smaller of the two properties, proved to be the more challenging reconstruction project. SWA provided technical services in the form of architectural redesign. A very narrow footprint afforded only a few opportunities to optimize the HVAC design.

### ENERGY STAR® Appliances

ENERGY STAR® appliances were chosen to reduce the total energy usage of the house. For example, an ENERGY STAR® refrigerator selected for the home will yield savings of \$35 per year, offsetting the initial price increase in a short time.

### Conclusion

PATH's involvement enabled Chesapeake Habitat for Humanity to transform previously vacant properties into snug, energy-efficient homes for Baltimore's newest homeowners. The project is one more addition to a growing list of PATH collaborations with Habitat for Humanity that implement advanced building technology in an affordable home format. PATH technologies that can be applied well to rehab projects include a compact HVAC system and high efficiency furnace; an optimum valued engineered design; low-e windows; and ENERGY STAR® appliances. In combination, these technologies can save building materials and labor up front, in addition to long-term energy savings over time.

