



**National Center for
Healthy Housing**

Green Housing Series:

A New Prescription for Asthma Sufferers: Healthier Homes



On a ridge overlooking downtown Seattle, a blighted public housing complex has been transformed into a vibrant, environmentally-friendly, mixed-income community of healthy homes. Criminal activity, once a neighborhood mainstay, has been replaced with children riding bikes and impromptu soccer games on grassy fields. Reconfigured streets tied back into the city's grid invite physical and social connection to the surrounding

neighborhood, restoring life to a once isolated, distressed community. And individuals with respiratory ailments have a place to call home where they can breathe easier.

Asthma is the sixth ranking chronic condition in Washington State and the most serious chronic illness for low-income children. Over the last thirty years, asthma cases have doubled in the general

population and quadrupled among low-income families. Asthma is often triggered by poor living conditions including inadequate ventilation and the presence of mold, mildew, and pests. A recent Seattle study found that 80 percent of the low-income families participating in the study had one or more triggers in their homes; 60 percent had at least three. Even a home kept meticulously clean can fall prey to asthma triggers.

Breathe Easy At-A-Glance

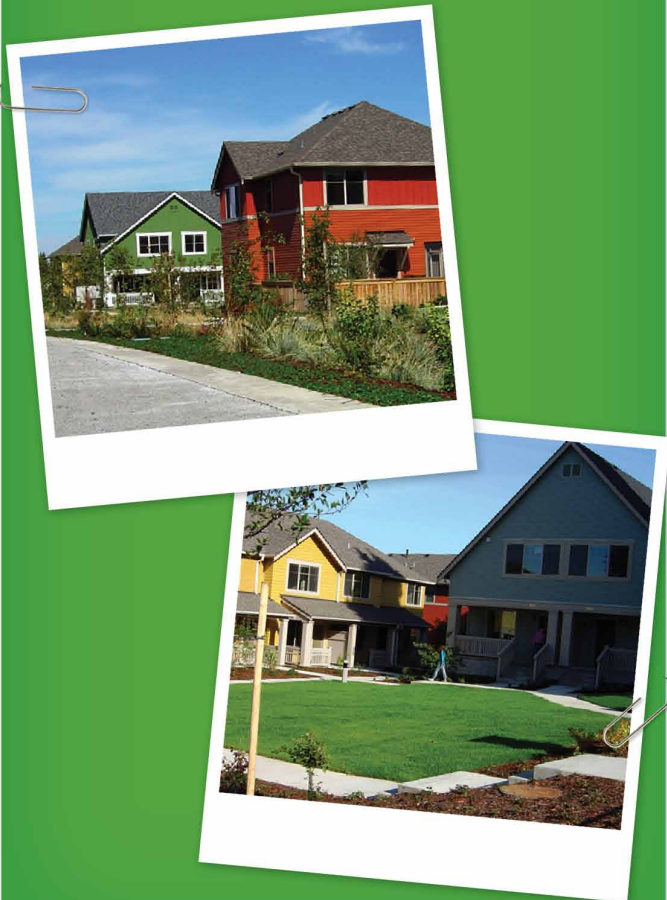
Owner/Developer: Seattle Housing Authority
Architect: Mithun
Civil Engineer: SvR Design
Landscape Architect: Nakano Associates
Contractor: Absher Construction

Density: 14-36 units per acre
Total Site Area: 120 acres (34 city blocks)

Development Costs: \$133 million

Resident Profile: 796 units for households earning less than 80%AMI
350 units for households earning less than 30% AMI
250 units for households earning less than 60% AMI
160 market rate rental units independent and assisted senior housing
644 for sale homes

Community Amenities: Library, medical and dental clinic, community center



Rebuilding a Community: Healthier and Greener

Sixty Breathe Easy Homes, designed to mitigate asthma triggers, were built as part of the Seattle Housing Authority's (SHA) highly acclaimed High Point HOPE VI redevelopment in West Seattle. The 1600-unit High Point redevelopment is a model of energy efficiency and green building: units exceed local energy code requirements by 30 to 50 percent and meet Seattle's Built Green™ standards at a 3-star level or higher; all rental units are ENERGY STAR qualified.

While all of the housing at High Point was constructed to healthy, green building standards, Breathe Easy Homes incorporated additional features to lower risk factors associated with respiratory ailments and substantially reduce triggers that spark asthma. They are among the first homes in the nation built specifically to improve indoor air quality. A year after the first residents moved in, findings indicate that asthma sufferers and their doctors may want to reconsider how to treat asthma in the future—a healthier home appears to be a critical compliment to medical management of asthma through prescription drugs.

High Point was built in 1942 to house defense workers. In 1953 it was transferred to the Seattle Housing Authority (SHA) to provide affordable housing to low-income families. Sixty years later, the barracks-style housing was still in service, but barely. By the time the SHA embarked on High Point's redevelopment journey, buildings throughout the community were dilapidated and living conditions were abysmal. Residents complained of water damage, mold, mildew, pests (mice and rats), crime, and lack of public safety.

Measuring 34-city blocks, High Point is SHA's largest affordable housing project. To redevelop High Point, SHA secured HOPE VI funding from the U.S. Department of Housing and Urban Development (HUD). The HOPE VI program provides federal funds to revitalize severely distressed public housing projects.

SHA launched High Point's development planning with a multitude of community meetings and conducted extensive stakeholder surveys to gain input from the community. They incorporated hundreds of ideas into the development plan, including features to make the homes healthier. As a leader in the green building movement, affordable housing in Seattle using city or state funding is already built to healthy, green standards. Both the city's "SeaGreen" standards as well as the state's "Evergreen" standards support energy conservation and sustainable building practices and are designed to reduce operating costs and promote healthy living environments. The resident challenge, however, prompted SHA to go a step beyond the city or state requirements and they reached out to the King County Health Department for assistance.

Integrating Public Health and Housing

King County Health officials, long concerned with the impacts of housing conditions on health, jumped at the opportunity. The ensuing collaboration between SHA, the County Health

Department, and the Department of Environmental and Occupational Health Sciences in the School of Public Health at the University of Washington gave birth to the “Breathe Easy” Home.

Public health officials conducted extensive research of other projects and worked with SHA to determine the best construction and design practices to minimize respiratory risk factors and asthma triggers. The goal was to reduce risk factors that cause or trigger asthma while making the Breathe Easy Homes indistinguishable from the rest of the community. The project team compiled promising and best practices from other projects and brought together experts in developing the Breathe Easy measures.

HUD HOPE VI funding covered the base development costs of High Point, which included 35 Breathe Easy Homes during the first phase of the project. Enterprise Community Partners funded an additional 25 homes during Phase II of the project. HUD also provided a Healthy Homes Grant to conduct a longitudinal study of participants before and after they moved into the Breathe Easy Homes and to cover the additional costs of modifications. The grant also provided funding for on-site education by Community Health Workers (CHW) to help study participants understand and control asthma triggers and improve overall health.

Breathe Easy Homes are built with air-tight construction with insulated windows and foundations to minimize the intrusion of dust, pollen, and other contaminants into the units. Airtight drywall construction reduces air leakage and mold growth. Positive ventilation removes stale air and filters incoming fresh air. A hydronic heating system, which uses hot water instead of forced air, reduces airborne particulates. Window blinds instead of curtains are installed to reduce dust. Marmoleum (a type of linoleum) covers most of the floors in the units instead of dust-trapping carpet and each unit comes with a High Efficiency Particle Air (HEPA) vacuum.

To be eligible for a Breathe Easy Home, a family must have a child with uncontrolled asthma (i.e. a child that continues to have asthma attacks despite following a regimen of prescription drugs to treat asthma symptoms) and agree to live in the unit pet and smoke-free. Public health officials interview residents before they move into units and then again a year later to determine what, if any, impact living in a Breathe Easy Home has had on the asthmatic. Interviews measure changes in home environments, participant behaviors, and asthma-related outcomes ranging from the number of

symptom days, quality of life, and healthcare access. The study also examined the benefit of the Breathe Easy Home over education-only interventions.

Community Health Workers (CHW) make three to five annual visits to participating families to assess the living environment and help the families determine how to reduce exposure to asthma triggers. CHWs teach residents housekeeping techniques that reduce dust and other allergens. They also provide bedding covers, green cleaning products and other supplies to preserve and encourage good health practices.

Although the Breathe Easy Homes are now occupied, SHA initially found that they needed to conduct additional marketing of the units to families most in need. The unique partnership between SHA and local public health officials also helped build word-of-mouth referrals about the project.

Breathe Easy Outcomes

Many of the former High Point residents have returned to other units in the redeveloped community; however, due to stricter eligibility requirements, all of the residents of the Breathe Easy Homes are new. They join a diverse community of families and seniors ranging from low-income households earning 30 percent of the area median income to those living in market-rate housing. Residents include immigrants from Latin America, Vietnam, Cambodia, Somalia, and Ethiopia.

Thousands of asthmatics live in unhealthy housing. Breathe Easy home results suggest substantial health improvements as good or better than those from asthma medications.

—Tim Takaro

Significant Health Gains

The modest improvements in housing design, materials, and construction at High Point greatly reduced asthma triggers and symptoms, providing enormous dividends to families living in the

Sources of Funding

Land Sales	39.9 million
Bonds and Equity	47.9 million
HUD/HOPE VI Funds	30.6million
Seattle HA Contributions	9.3 million
Grants	5.3 million
TOTAL	\$133 million

What can be done in a clinic is limited. The underlying social causes of disease must be addressed for long-term results.

—Jim Krieger

Breathe Easy Homes. Asthmatic children in Breathe Easy Homes have 63 percent more symptom-free days than in their previous homes and showed dramatic improvements in lung function. Improved health resulted in a 66 percent reduction in the need for urgent medical care. And as asthma symptoms and triggers decline, the family’s quality of life improves: fewer sleepless nights, less lost work and school time, increased exercise and outdoor activities, and lower medical expenses.

With the threat of asthma triggers greatly reduced, children are able to engage in more outdoor and exercise related activities such as basketball, bike riding, and tag in the playground. Being outside more often provides the children and their parents increased opportunities for social interaction. The pedestrian-friendly atmosphere promoted by the community’s narrow street design also encourages greater social interaction. Benches, tables and shelter constructed from recycled trees felled for the site redevelopment dot the parks and trails of the community, offering more areas to socialize.

Walkable amenities, including a new library, retail center, community center and athletic fields and playgrounds encourage additional physical and outdoor activity. And with a new medical and dental clinic located within walking distance, residents have greater access to healthcare.

Reduced Health Care Expenses for Families and the Community

Reducing the need for urgent clinical care and prescription drugs provides a significant monetary savings for both family and the community. The modest \$5,000 to \$7,000 cost increase associated with Breathe Easy Home upgrades is equivalent to a one-night hospital stay or the approximate annual amount families pay in medical care. Cost savings are not limited to individual families—policy makers should consider the healthcare savings that investing in subsidized healthy housing provides compared to the public costs related to acute asthma care.

A 1994 study of asthma costs estimated that the total care of asthma related conditions in the United States was \$6.2 billion. The largest single direct medical expenditure was inpatient hospitalization services. This same study estimated that the indirect costs, such as lost productivity due to missed work and school days, was \$1 billion¹. Given the explosion of asthma cases and hefty increases in healthcare costs, the Asthma and Allergy Foundation of America updated the estimated costs to \$18.3

¹Westley, CR *Cost Effectiveness of an Allergen Consultation in the Management of Asthma* (November 1994). Accessed online at www.jcaai.readyportal.net/file_depot/0-10000000/20000-30000/27387/folder/62846/Westley_Slide8.pdf



Photos courtesy of the Seattle Housing Authority

High Point Breathe Easy Home

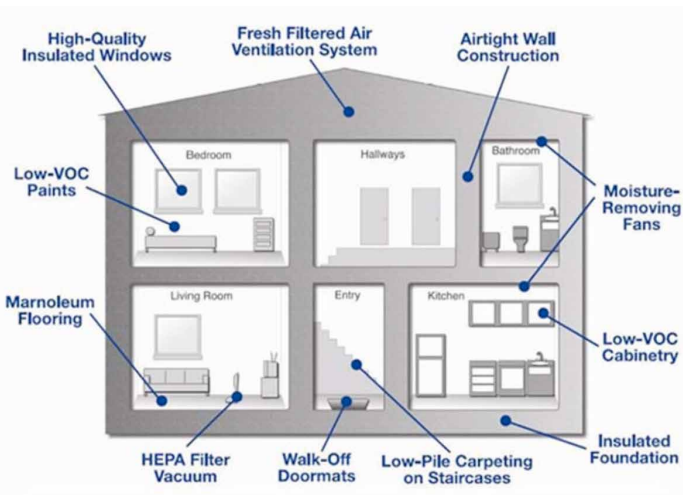


Diagram courtesy of Steve Barham

billion, with \$10.1 attributed to direct costs such as medicines and healthcare services and \$8.2 billion in indirect costs².

Breathe Easy residents also benefit from the energy efficient measures incorporated into the High Point community. Analysis completed a year after the first residents moved in found the combined utility savings from electricity, water and natural gas to be over 20 percent providing residents a monthly savings of \$16.55 per person in utility costs.

In addition to the environmental benefits of lower energy consumption, landscaping upgrades throughout the High Point community are providing substantial environmental benefits. The new drainage system is helping restore the water quality of Seattle's most significant salmon stream and the saving and planting of non-pollen emitting trees has reduced another asthma trigger for Breathe Easy Home residents.

High Point's "Market Garden" also provides environmental, health, and economic benefits. Residents grow fresh fruits and vegetables in the garden to sell to local subscribers.

Lessons Learned

- Determine the most important green elements to achieve your goals and do those first.
- Always conduct building commissioning when renovation is complete to identify problems—and fix them—before residents move in.
- Get buy-in from maintenance staff, especially when improved indoor air quality is a major goal. Filters must be changed frequently to ensure that the ventilation system works properly.
- Have community health workers make regular visits to homes to provide healthy living tips/lessons to residents and develop individual strategies to help reduce asthma triggers. Make sure health workers speak the native language of residents or provide translators.
- As possible, train and hire residents as community health workers. Studies show that peers carry more weight with residents than government agency staff or other officials who do not come from the community.
- Modify lease agreements to specify no pets and no smoking to further improve air quality.
- Create a solid infrastructure. Develop a good link between public health clinics and the housing authority to identify families most in need.
- Add related health questions to housing intake forms to ensure priority placement of families with highest healthcare needs.

²Cost of Asthma, Asthma and Allergy Foundation of America at www.aafa.org/display.cfm?id=6&sub=63

High Point Green Elements:

- Quiet, whole-house fan to remove moisture
- Advanced air filtration system
- Filtered fresh air intake ports in all living spaces and bedrooms to improve indoor air quality
- Airtight drywall installation to reduce moisture penetration and inhibit mold growth
- Low off-gas vinyl flooring with recycled content in bathrooms and kitchens
- Low volatile organic compounds (VOCs) paints, caulking and sealants
- Sealed cabinet construction to reduce emissions
- Hydronic (water/radiator) heating system, which reduces air-borne particulates
- Unit/housing layouts which feature open floor plans and large windows for good daylight penetration
- Walkable amenities: medical and dental clinic, new library, retail center, community center and athletic fields, more than 20 acres of land for parks, open space and playgrounds. Conducive and encouraging of outdoor activities.

Breathe Easy Specific:

- Positive whole house ventilation systems: Removes stale air, filters incoming air and reduces moisture
- Linoleum flooring in living areas and bedrooms, recycled content vinyl flooring in bathrooms and kitchens, low-pile carpeting in stair and halls to reduce allergens
- Low/no off-gas trim and mill work to reduce urea formaldehyde bonding agents
- Low/no off-gas or volatile organic compounds (VOCs) cabinet construction
- HEPA filter vacuums to remove allergens
- Walk-off doormats to reduce dirt in the homes
- Special attention to protect building materials from moisture during construction: included extra dry-out time to minimize mold growth; weather protection of on-site materials; ductwork protection to minimize dust, extra clean cycling with low/non-toxic and non-allergenic cleaners; and flushouts to allow the evaporation and off-gassing of materials.

The National Center for Healthy Housing (NCHH) is a 501(c)(3) nonprofit dedicated to creating healthy and safe homes for children through practical and proven steps. For more information about green and healthy housing, visit: www.nchh.org/training/Green-and-Healthy-Housing.aspx.