

Case in Point...

A GREEN AFFORDABLE HOUSING COALITION Case Study

[MF-003]



2662 Fruitvale Avenue

The Fruitvale Avenue Project features four single-family detached homes at the corner of Fruitvale Avenue and Davis Street in Oakland, California. The homes were sold to first-time homebuyer families with incomes below 60 percent of the Area Median, and are permanently restricted. The project incorporated many sustainable elements to reduce energy consumption and waste. Like all Habitat projects, the Fruitvale project relied heavily on donated materials and volunteer time.

Project Summary

- **Location:** 2662 Fruitvale Ave., Oakland, CA
- **Completion date:** November 2003
- **Owner/developer/general contractor:** East Bay Habitat for Humanity
- **Architect:** Gray Architecture / GHA
- **Site Cleanup and Development Funding:** City of Oakland
- **Sustainable Design/Construction Technical Assistance:** Alameda County Waste Management Authority



Photovoltaic system produces electricity for the home from sunlight

Project Description

This development consists of four two-story town homes with a similar floor plan and small private yards. All units include a living room, kitchen, and laundry downstairs, with either three bedrooms and 1.5 baths (1,170 ft²) or four bedrooms with two baths (1,360 ft²).

This development incorporates a number of Green Building practices, including the use of sustainable and recycled building materials, passive and active solar energy features and recycling of 90 percent of construction waste. The homes incorporate

Reclaimed lumber used for porch framing



modular framing practices, basing all layout on 24" centers (using 30 percent less lumber) and specifying FSC certified wood.

Planning, Design, and Development Process

Partner families contributed sweat equity to build the homes alongside volunteers and Habitat for Humanity’s construction supervisors. The former gas station site was vacant for many years before the City of Oakland bought it with Community Development Block Grant (CDBG) funds and started the cleanup process. East Bay Habitat was selected through a competitive proposal process.

The process of design and construction was based on the Alameda County Waste Management Authority’s Green Building Guidelines. With the help of the Authority’s grants for architectural services and materials, and the provision of technical assistance, Habitat was able to include significantly more sustainable features than with previous projects. Habitat was introduced to many new practices they would have otherwise not had the time to investigate themselves with the help of hired architects Geoff Holton and Tim Gray who had sustainable design experience, and construction and energy experts provided by the Authority.

By the Numbers

Parcel size:	0.31 acres
Total sq. ft.:	
Floor area	5,060 ft ²
Footprint	5,016 ft ²
Number units:	
4-bedroom	4
Site acquisition costs:	\$1
Development costs:	
Total	\$800,000
Funding sources:	
City of Oakland	\$112,000 + Land
HUD	\$33,888
Alameda County	\$ 41,500
Other Fundraising and Gifts	\$612, 611
Total	\$799,999
Ave. cost / sq. ft.	\$159
Ave. cost / unit	\$200,000
Ave. monthly utilities	No data
Affordability targets:	40-60% AMI



Fluorescent fixtures reduce energy consumption by 50–75 percent



Sustainability Goals

- **Energy and Atmosphere:** The project was designed and built to exceed Title 24 energy efficiency standards by at least 15 percent. Achieving this goal is expected to help occupants minimize their energy consumption and manage their monthly utility bills. It also earned the project energy-related points for tax credit allocation purposes.
- **Materials and Resources:** Wherever feasible, the project incorporates durable materials, sustainable resources, salvaged materials, materials high in recycled content, and recyclable materials.
- **Site and Community:** Providing the residents with a generous yard space encourages recreation and gardening, and also promotes a connection to a natural environment in an otherwise urbanized setting.



Private yard space alongside each unit encourages gardening and outdoor recreation.



Green Building Features at a Glance

Green Building Feature	Base Case	Benefits
Site and Community		
<ul style="list-style-type: none"> 90% of construction waste recycled 	<ul style="list-style-type: none"> 51% of construction waste recycled (per City requirements) 	<ul style="list-style-type: none"> Recycling reduces landfill waste and avoids tipping fees.
Foundation		
<ul style="list-style-type: none"> High fly ash content in concrete (35%) 	100% Portland cement (+ sand and aggregate)	<ul style="list-style-type: none"> The manufacture of cement is energy intensive and produces a significant amount of carbon dioxide emissions. Using fly ash reduces the amount of cement needed, thereby decreasing the overall environmental impact while increasing the strength and durability of the concrete.
Structural frame		
<ul style="list-style-type: none"> Roof trusses: certified and raised heel Certified framing materials. Engineered floor joists Finger jointed studs OSB wall sheathing Modular, low waste framing (24" on center) Landfill-diverted roofing Salvaged lumber for post and beams 	<ul style="list-style-type: none"> Trusses without raised heels Non-certified framing materials Solid sawn lumber for joists, trusses, studs, headers and beams Plywood sheathing Framing 16" on center New roofing materials Lumber from old-growth trees 	<ul style="list-style-type: none"> Raised heel allows insulation to continue to wall, unlike conventional trusses where insulation is held back or compressed Certification encourages more sustainable forestry management practices Engineered joists and trusses and OSB sheathing incorporate wood scraps rather than solid wood, which means they require smaller trees. Engineered lumber also eliminates waste due to warping and contributes to overall project durability because components are straighter and more uniform; which contributes to a more solid and water-tight project. Low waste framing reduces materials requirements by an estimated 30 % Project diverts roofing material from the landfill Use of reclaimed lumber reduces lumber consumption and landfill deposits
Exterior finish		
<ul style="list-style-type: none"> Fiber-cement siding Recycled exterior paint Diverted cypress decking 	<ul style="list-style-type: none"> Wood siding Conventional latex paint Conventional decking and porch framing using virgin materials 	<ul style="list-style-type: none"> Fiber-cement siding reduces the demand for redwood or cedar siding., improves durability and fire resistance Project diverts paint from the landfill Using diverted and reclaimed materials reduces the project's need for virgin materials and prevents (or delays) diverted and reclaimed materials from going to the landfill.

Green Building Feature	Base Case	Benefits
Electrical		
<ul style="list-style-type: none"> ▪ Fluorescent fixtures/bulbs ▪ Photovoltaic system 	<ul style="list-style-type: none"> ▪ Fluorescents in kitchen and baths only; incandescent in other rooms 	<ul style="list-style-type: none"> ▪ Fluorescent fixtures reduce energy consumption by 50–75%, saving homeowners money on their energy bills. They also last up to 10 times longer than incandescent lamps, thus reducing maintenance and replacement costs. Fluorescents generate less heat than incandescents. ▪ The photovoltaic system produces electricity for the home from sunlight
Appliances		
<ul style="list-style-type: none"> ▪ ENERGY STAR refrigerators 	<ul style="list-style-type: none"> ▪ Conventional refrigerators 	<ul style="list-style-type: none"> ▪ ENERGY STAR appliances reduce energy consumption and saves occupants money on their energy bills
Plumbing		
<ul style="list-style-type: none"> ▪ Solar panels for domestic hot water 	<ul style="list-style-type: none"> ▪ Conventional water heaters 	<ul style="list-style-type: none"> ▪ Solar hot water reduces the load on the gas hot water system, thereby saving money on the homeowner’s utility bills
Insulation		
<ul style="list-style-type: none"> ▪ Cellulose insulation 	<ul style="list-style-type: none"> ▪ Conventional fiberglass batt insulation 	<ul style="list-style-type: none"> ▪ Cellulose Insulation contributes to good indoor air quality by avoiding formaldehyde. It is also fire resistant and manufactured with recycled materials.
HVAC		
<ul style="list-style-type: none"> ▪ Operable skylights 	<ul style="list-style-type: none"> ▪ Conventional forced air distribution 	<ul style="list-style-type: none"> ▪ Skylights provide natural ventilation, as well as daylight
Windows		
<ul style="list-style-type: none"> ▪ Sun shades for south facing windows 	<ul style="list-style-type: none"> ▪ No shades on windows 	<ul style="list-style-type: none"> ▪ Sun shades minimize unwanted solar heat gains from large south facing windows. Overhangs are designed to shade windows when the sun is high in the summer.
Flooring		
<ul style="list-style-type: none"> ▪ Forbo Marmoleum flooring ▪ Diverted eucalyptus flooring (living rooms only) 	<ul style="list-style-type: none"> ▪ Vinyl floors in kitchen and bathrooms ▪ Conventional wall-to-wall carpet in living rooms, bedrooms, and common areas 	<ul style="list-style-type: none"> ▪ Linoleum is more durable than vinyl ,which means lower maintenance costs. It also contributes to good indoor air quality by avoiding off-gassed toxins associated with vinyl. Linoleum is made of rapidly renewable materials and can be recycled. The manufacturing process reuses all scrap materials and thus generates no waste

Lessons Learned

Like all Habitat for Humanity projects, the Fruitvale project relied heavily on volunteer labor and donated materials. These aspects of the project rarely presented barriers to Green Building and, in some instances, enhanced opportunities. The project's reliance on salvaged materials was undoubtedly enhanced by Habitat's status as a well-known channel for materials donations.

By the completion of the project, Habitat was able to summarize the environmental benefits and problems with the Green Building components used and assess them for possible inclusion in future projects. Several Green Building components offered environmental benefits without any added cost or work delays. These include the use of raised heel roof trusses; FSC Certified and engineered lumber; high fly-ash content concrete; passive solar design; and construction waste recycling, which produced savings due to the fact that the sorting labor was by volunteers and pick-up was at no cost.

A few components were later realized as project obstacles. The use of finger-jointed studs presented the only performance problem. Habitat does not recommend using these studs in future projects. Other components presented financial challenges, but were otherwise good practices. These include cellulose insulation; photovoltaic (PV) electrical systems, salvaged lumber; and ventilating skylights. Habitat thinks the benefits of these components far outweigh the added cost. If funding allows, Habitat will make an effort to incorporate these into future projects.



*Sun shades on south facing windows
reduce the intensity of solar heating*

These lessons learned are immediately influencing Habitat's next project in Livermore. Sustainable and Green Building practices are becoming an increasingly important priority with East Bay Habitat projects and with each learning experience, the lessons will be carried over towards future accomplishments.

For more information

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About the Green Affordable Housing Coalition

We are a coalition of San Francisco Bay Area public-sector and private-sector professionals committed to incorporating green building practices into the construction, operation, and maintenance of affordable housing. Through education and outreach, we promote the use of construction materials and practices that conserve energy and water; minimize construction waste; use resource-efficient materials; promote good health for both the construction workers and the occupants; are durable and easily maintained; are integrated to the site and region; and enhance housing affordability. Success in this endeavor will produce economic and quality-of-life benefits for tenants, improve the financial bottom line for property owners, and generate economic and environmental benefits for the local, regional, and world community.

For more information about the Coalition, call Bruce Mast at 510-271-4785 or visit our website at www.GreenAffordableHousing.org.

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