

# Case in Point...

## A GREEN AFFORDABLE HOUSING COALITION Case Study

[MF-001]



## Betty Ann Gardens

Betty Ann Gardens illustrates that Green Building is compatible with mainstream construction practices. The project is one of the few affordable housing projects in the area to incorporate formaldehyde-free medium-density fiberboard for cabinetry and trim. The Community Center incorporates shingles made of 100% recycled materials, reinforced vinyl and cellulose fiber.



### Project Summary

- **Location:** Lundy Avenue at Berryessa Road, San José
- Completion date: August, 2003
- **Owner/developer:** First Community Housing (FCH)
- **Architect:** Office of Jerome King
- **General contractor:** Branagh Construction
- **Other:** Engineering Network performed Title 24 analysis; Plogco Inc. provided HVAC design; Betty Ann Gardens, LLP, to own & operate, FCH will remain a General Partner

### Project Description

First Community Housing's goal is to build sustainable, high-quality, affordable housing developments and offer resident services that meet the needs of those who earn less than the area's median income. Betty Ann Gardens represents an important step forward in the pursuit of this goal. The development features all gas heating and cooling. Sustainable, "Green" building products and energy-conserving appliances are used throughout Betty Ann Gardens. The project is particularly noteworthy for its incorporation of formaldehyde-free medium-density fiberboard

<b>By the Numbers...</b>	
<b>Parcel size:</b>	3.87 acres
<b>Total sq. ft.:</b>	
Floor area	85,169 ft <sup>2</sup>
Footprint	27,504 ft <sup>2</sup>
<b>Number units:</b>	
1-bedroom	16
2-bedroom	36
3-bedroom	20
4-bedroom	4
Total	76
<b>Site acquisition costs:</b>	\$2,720,000
<b>Development costs:</b>	
Construction	\$11,124,300
Soft costs	\$7,775,700
Total	\$18,900,000
<b>Funding sources:</b>	
City of San José (loan)	\$5,129,744
City of San José (grant)	\$934,370
Tax Credit Limited Partner	\$6,058,696
CitiBank	\$7,610,000
General Partner	\$66,065
<b>Ave. cost / sq. ft.</b>	\$130.61
<b>Ave. cost / unit</b>	\$146,373
<b>Ave. monthly utilities</b>	
<b>Affordability Targets</b>	<b># units</b>
30% med. income	8
50% med. income	15
60% med. income	52
On-site property manager	1

cabinets and trim and recycled-content shingles. A bus stop is located in front of the Community Building and residents are provided with free "Eco-passes" for public transportation.

This development provides 76 one-, two-, and three-bedroom Family Apartments on a 3.87 net acre (20 DU/AC). The site runs along the banks of the Penitencia Creek, a riparian preserve in San Jose's Berryessa District. It is located near local shopping and major public transportation. Four three-story structures form a curving line that cradle the centralized Community Room and Play Field and screen parking areas from the King Road by locating them along the rear of the site.

The flats vary in size and orientation. The ground floor units look into private courts, while the upper units look east toward Mount Hamilton or west into the preserve along the creek. Each air-conditioned apartment contains a full kitchen, bathrooms with a tub/shower, bedrooms (many with walk-in closets), generous living/dining rooms and a 60 square foot private deck or enclosed courtyard. The site plan accommodates 144 parking stalls (1.8 stalls per unit avg.). 62 parking stalls are located in enclosed garages

The Community Center is located next to the tot lot at the center of the site. This shared common

area contains a Waiting Lounge, Computer Learning Room, Reception/Office with support spaces, Grand Activity Room, and a Kitchen, Storage and Mechanical Room. A large lawn area and a mini-plaza, both protected from the street by a fenced landscaped strip are also provided for outdoor activities.

## Planning, Design, and Development Process

The General Contractor was hired through a negotiated bid process and was actively involved in the project from the earliest stages of conceptual design. The developer, architect, and general contractor worked together as a team on project design.



Community Center roof features recycled “fake-slate” shingles

Project design was already complete and the project had already received development approvals from the City of San José when a change in staff at First Community Housing opened the door to more aggressive incorporation of green features. Any green feature that would have entailed a change in the City’s development approvals had to be rejected as administratively unfeasible, even if it would have been technically and economically feasible if incorporated into the project at the outset.

The General Contractor had already prepared a set of cost estimates for a conventional design when the development team decided to incorporate Green Building features. The General Contractor facilitated the process by developing a second set of cost estimates for the green alternatives.

Once construction was underway, the General Contractor was required to include with any Requests for Information his proposed resolution of the issue. The RFI and proposed solution then went to the architect, who reviewed it and either signed off on the solution or proposed an alternative. This strategy generally produced solutions that were more practical to implement than might have been the case if the architect had to develop a solution starting from zero.

The General Contractor had already prepared a set of cost estimates for a conventional design when the development team decided to incorporate Green Building features. The General Contractor facilitated the process by developing a second set of cost estimates for the green alternatives.

## Sustainability Goals

- **Energy and Atmosphere:** Minimize occupant energy consumption; select fuels to minimize utility costs
- **Materials and Resources:** Durability; sustainability of sources; recycled content; recyclability
- **Water:** Minimize occupant water consumption
- **Health and Safety:** Promote family health and good indoor air quality by minimizing use of products containing formaldehyde, vinyl, VOCs, and other potential toxins
- **Site and Community:** Promote transit use; promote tenant education and job training opportunities; restore adjacent creek; provide open space and recreation opportunities



Kitchens feature natural linoleum, formaldehyde-free MDF cabinets, and ENERGY STAR® appliances

### Green Building Features at a Glance

Green Building Feature	Base Case	Benefits
<ul style="list-style-type: none"> <li>▪ Rehabilitation of adjacent transit stop</li> <li>▪ Free “Ecopasses” to residents</li> <li>▪ Restoration and protection of adjacent creek</li> <li>▪ On-site homework club for kids</li> <li>▪ On-site computer training, job training, and ESL courses</li> <li>▪ Protection of site’s heritage trees</li> <li>▪ Management Company develops and conducts program based on resident needs</li> </ul>	<ul style="list-style-type: none"> <li>▪ No on-site amenities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Residents can be functionally independent and mobile without incurring the costs of owning and maintaining a personal vehicle</li> <li>▪ Natural open creeks contribute to good water quality and storm water runoff management. They also provide educational opportunities, recreation, and other psychological benefits.</li> <li>▪ On-site homework club promotes economic independence for residents</li> <li>▪ On-site computer training, job training, and ESL courses promote economic independence for residents</li> <li>▪ Heritage trees provide shade promote psychological well-being.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Engineered joists and trusses</li> <li>▪ OSB sheathing</li> </ul>	<ul style="list-style-type: none"> <li>▪ Solid wood joists and trusses</li> <li>▪ Plywood sheathing</li> </ul>	<ul style="list-style-type: none"> <li>▪ Engineered joists and trusses and OSB sheathing contribute to more sustainable use of resources by incorporating wood scraps rather than solid wood</li> <li>▪ Engineered lumber contributes to overall project durability because components are straighter and more uniform; which contributes to a more solid and water-tight project.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Fiber-cement siding</li> </ul>	<ul style="list-style-type: none"> <li>▪ Wood siding</li> </ul>	<ul style="list-style-type: none"> <li>▪ Fiber-cement siding contributes to sustainable resource use by avoiding the use of solid wood</li> <li>▪ Fiber-cement siding is considerably more durable than wood and requires less maintenance</li> </ul>
<ul style="list-style-type: none"> <li>▪ Screw-in compact fluorescent lamps in living rooms and bedrooms</li> </ul>	<ul style="list-style-type: none"> <li>▪ Incandescent lamps in living rooms and bedrooms</li> </ul>	<ul style="list-style-type: none"> <li>▪ Compact fluorescent lamps reduce energy consumption and save occupants money on their energy bills</li> <li>▪ Compact fluorescent lamps last up to 10 times longer than incandescent lamps, thus reducing maintenance and replacement costs</li> </ul>
<ul style="list-style-type: none"> <li>▪ Natural gas stoves, water heaters, and space heaters</li> <li>▪ Energy Star air conditioners, SEER 12</li> <li>▪ Energy Star dishwashers</li> <li>▪ Energy Star refrigerators</li> </ul>	<ul style="list-style-type: none"> <li>▪ Electric stoves, water heaters, and space heaters</li> <li>▪ Conventional air conditioners, SEER 10</li> <li>▪ Conventional dishwashers</li> <li>▪ Energy Star refrigerators</li> </ul>	<ul style="list-style-type: none"> <li>▪ Natural gas is typically cheaper per BTU than electricity, thus contributing to lower energy bills for occupants</li> <li>▪ Energy Star appliances reduce energy consumption and save occupants money on their energy bills</li> </ul>

Green Building Feature	Base Case	Benefits
<ul style="list-style-type: none"> <li>▪ Community Center roof comprised of 100% recycled materials, reinforced vinyl and cellulose fiber, molded to resemble gray slate tiles</li> </ul>	<ul style="list-style-type: none"> <li>▪ Asphalt shingles</li> </ul>	<ul style="list-style-type: none"> <li>▪ Tiles address Materials and Resources goals for durability by featuring a 50-year warranty, Class A fire rating (UL® 790), and Class 4 impact rating (UL® 2218). Tiles also pass 110 mph Wind Driven Rain Testing</li> <li>▪ Tiles address Materials and Resources goals for recycled content materials by incorporating 100% recycled content</li> </ul>
<ul style="list-style-type: none"> <li>▪ Formaldehyde-free batt insulation (R 13 exterior walls, R 19 attic)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conventional fiberglass batt insulation (R 13 exterior walls, R 19 attic)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Insulation contributes to good indoor air quality by avoiding formaldehyde</li> </ul>
<ul style="list-style-type: none"> <li>▪ Vinyl-frame double-glazed windows and sliding doors (ave. SHGC 0.68, U 0.60)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Aluminum-frame single-pane windows and sliding doors (SHGC 0.83)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Windows reduce occupant energy consumption by minimizing solar heat gain and conductive heat gains and losses</li> <li>▪ Windows promote durability and lower maintenance costs by reducing fading of carpets, finishes, and furnishings do to UV radiation</li> </ul>
<ul style="list-style-type: none"> <li>▪ Combination water heating / space heating systems</li> <li>▪ Hydronic space conditioning distribution system</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conventional water heating and space heating systems</li> <li>▪ Conventional forced air distribution system</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reduced energy consumption and operating costs</li> </ul>
<ul style="list-style-type: none"> <li>▪ Formaldehyde-free medium-density fiberboard (MDF) cabinets and trim</li> <li>▪ Low-VOC paints and varnishes</li> </ul>	<ul style="list-style-type: none"> <li>▪ Wood cabinets and trim</li> <li>▪ Oil-based paints and varnishes</li> </ul>	<ul style="list-style-type: none"> <li>▪ MDF contributes to more sustainable use of resources by incorporating over 90% pre-consumer recycled wood, which includes residuals from primary wood products, non-commercial wood scrap, and managed forest sub-commercial-sized thinnings.</li> <li>▪ Both MDF and low-VOC paints and varnishes contribute to good indoor air quality by minimizing off-gassing of formaldehyde and VOCs</li> </ul>

Green Building Feature	Base Case	Benefits
<ul style="list-style-type: none"> <li>▪ Natural linoleum floors in kitchens and bathrooms</li> <li>▪ Recycled-content, fully recyclable carpet in tiled sections in living rooms, bedrooms, and common areas</li> </ul>	<ul style="list-style-type: none"> <li>▪ Vinyl floors in kitchens and bathrooms</li> <li>▪ Conventional wall-to-wall carpet in living rooms, bedrooms, and common areas</li> </ul>	<ul style="list-style-type: none"> <li>▪ Linoleum is more durable than vinyl (expected useful life of 30+ years, compared to 5–7 years for vinyl)</li> <li>▪ Linoleum contributes to good indoor air quality by avoiding off-gassed toxins associated with vinyl</li> <li>▪ Linoleum is made of rapidly renewable materials</li> <li>▪ The manufacturing process reuses all scrap material and thus generates no waste.</li> <li>▪ Linoleum is recyclable: it can be ground up and composted at the end of its useful life.</li> <li>▪ Annual maintenance costs are much lower than vinyl flooring due to its inherent durability and its lack of need of sealers or waxes to maintain its appearance.</li> <li>▪ Recycled-content carpet minimizes use of virgin materials</li> <li>▪ Use of carpet tiles contributes to durability and lower maintenance costs by permitting replacement of worn sections rather than entire carpet</li> </ul>
<ul style="list-style-type: none"> <li>▪ Collaborative design process</li> <li>▪ RFIs from General Contractor accompanied by proposed solution</li> </ul>	<ul style="list-style-type: none"> <li>▪ Linear design process (architect to civil engineer to mechanical engineer to general contractor)</li> <li>▪ Architect responds to RFIs by developing solution in a vacuum.</li> </ul>	



Even the bathrooms have linoleum.

## Lessons Learned

The project illustrates the importance of collaborative design. The developer, architect, and general contractor worked together as a team on project design. A mutual understanding of goals and process was already established at prebid and preconstruction. The collaborative approach continued through construction. Whenever the General Contracting Supervisor felt the need to issue a Request for Information to the design team, he was required to include his proposed solution to the identified problem. The design consultants then had the option of accepting or modifying the proposed solution but they were not inventing solutions in a vacuum. The team approach helped minimize change orders and keep costs down. The result is a project that meets the developer's objectives, incorporates Green Building principles, and features appealing architectural design, all in a way that addresses the contractor's need for feasible, practical, cost-effective design solutions that meet scheduling and labor force constraints.

The project benefited from having a service-oriented General Contractor. The General Contractor was hired through a negotiated bid process and was actively involved in the project from the earliest stages of conceptual design. The General Contractor had already prepared a set of cost estimates for a conventional design when the development team decided to incorporate Green Building features. The General Contractor facilitated the process by working with the architect to develop a second set of cost estimates for the green alternatives.

In presenting Green Building alternatives to contractors, subcontractors, lenders, and the public, the developer emphasized how alternatives are similar to conventional materials and practices, rather than different. This approach encourages their use and adoption as a general, mainstream practice and promotes positive change.

Additional Green features could have been incorporated into the project if an integrated design process emphasizing Green Building had been pursued from the earliest stages. Preliminary project design was already complete when a change in staff at First Community Housing opened the door to more aggressive incorporation of green features. Any green feature that would have entailed a change in the City's development approvals had to be

The project benefited from having a service-oriented General Contractor. The General Contractor

Carpets are made of recycled and recyclable material, laid in tiles for easy maintenance



rejected as administratively unfeasible, even if it would have been technically and economically feasible if incorporated into the project at the outset. Thus the project was not able to include features such as permeable paving, drought-tolerant landscaping with native plants, nor a solar powered lighting system.

## 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, visit our website at [www.greenaffordablehousing.org](http://www.greenaffordablehousing.org) or call Bruce Mast at 510-271-4785.

## Disclaimer

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Playground structures avoid arsenic and chromium-treated wood

