

LEED STORIES FROM PRACTICE

CASE STUDY

KENYON HOUSE










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CASE STUDY

Kenyon House

Prepared for the U.S. Green Building Council

Case Study Lab
Center for Housing Innovation
University of Oregon

GBCI CMP HOURS		LEED SPECIFIC		Earn the listed GBCI credit hours for reading this case study and taking a quiz. Visit www.usgbc.org/casestudies for information.			
2		Homes					
PATH HOURS	 Site	 Water	 Energy	 Materials	 Indoor Environment	 Stakeholder/ Innovation	 Surrounding/ Outreach
	NA	NA	.5	.5	1	NA	NA

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Written permission has been obtained from all participants in this project, following an extensive edit and approval process, to include their interviews and videos in this document.

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TABLE OF CONTENTS

Kenyon House, Seattle, Washington	5
Introduction to Case Study: Project Team Members, Project Description, Project Data, Notable Green Features, Best Practices and Lessons Learned, Project Awards, Timeline, and LEED Scorecard	
Becky Bicknell	15
Senior Housing Developer, Housing Resources Group	
John Woodworth & Christina Bollo	23
Principal, SMR Architects & Architect and Project Manager, SMR Architects	
Greg Linnell	35
Project Manager, Walsh Construction Co.	
Dana Fontes	41
Mechanical Engineer, Sider + Byers Associates, Inc.	
Jay Tilley	45
Senior Designer, Cierra Electrical Group	
Elly Bunzendahl	53
Sustainability Consultant, O'Brien & Company	
AnnaMaria Downey	61
Program Coordinator, Sound Mental Health	
Appendix A	65
Images	

USGBC Case Study Project

The U.S. Green Building Council, in conjunction with the University of Oregon, initiated this pilot program of five case studies to gather information on green building practices. Through a series of interviews, selected project team members from the Biodesign Institute at Arizona State University tell their stories in this case study. The interviews were recorded, transcribed, edited, and compiled to form the narratives on the following pages.

The USGBC intends to use these narratives as educational content for instructor-led workshops, podcasts, webinars, books, magazines, articles, and other research-oriented and curriculum products. The University of Oregon will use the material for educational purposes only, in classes and conferences. The five pilot case studies comprise a cross-section of certification levels, building types, and themes that occur in practice. The USGBC plans to expand its case study database with more project stories covering different themes, to enhance case-based teaching methods.

KENYON HOUSE

SEATTLE, WASHINGTON



Kenyon House provides a home for recently homeless people with HIV and AIDS.

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PROJECT TEAM MEMBERS

Developer/Owner:	Housing Resources Group, Seattle, WA
Architect:	SMR Architects, Seattle, WA
General Contractor:	Walsh Construction Co., Seattle, WA
Property Manager/Owner:	Sound Mental Health, Seattle, WA
Green Consulting:	O'Brien & Company, Seattle, WA
Lighting Designer:	Cierra Electrical Group, Seattle, WA
Mechanical Engineer:	SIDER + BYERS Associates, Inc., Seattle, WA
Landscape Architect:	Graysmith Landscape Architects, Seattle, WA

University of Oregon Professor Alison G. Kwok, Advisor Nicholas B. Rajkovich, and research assistants Rachel B. Auerbach, Kristen B. DiStefano, Britni L. Jessup, and Amanda M. Rhodes prepared this narrative. © 2009 U.S. Green Building Council and the University of Oregon. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the permission of the USGBC.

PROJECT DESCRIPTION

Developed through a collaborative partnership between Building Changes, the Housing Resources Group and Sound Mental Health, Kenyon House is a two-story, 18-unit residence providing affordable housing for formerly homeless people living with HIV and AIDS. Residents of the 12,700 square foot project have on-site support services as well as a community dining area, laundry facilities and an inviting outdoor space.

PROJECT DATA

KENYON HOUSE

LEED-H v.1.0 Platinum

Completion: September 2008

Cost: 5,000,000 U.S. Dollars (2008)

Area: 12,700 ft²

LOCATION

City: Seattle, WA

Latitude: 47.53 North

Longitude: 122.28 West

CLIMATE²

HDD65: 4854

CDD50: 2272

Annual Precipitation: 37.2"

Solar Radiation: 382 kBtu/sf/yearr

ENERGY METRICS

Measured EUI:

86 kBtu/sf/year (2008-2009)³

NOTABLE GREEN FEATURES

The developer did not initially consider LEED® certification. Christina Bollo, the project architect from SMR Architects, however, was using the LEED for Homes Reference Guide throughout the design phase to track her personal sustainability goals. Realizing the project's potential, the team asked O'Brien & Company, green building consultants, to conduct a preliminary rating, which found the project was on track to achieve certification. Once the developer approved registration, the team began to focus on LEED, but made sure Kenyon House's project delivery timeline stayed on schedule. The two-week flush out was the only requirement that necessitated a scheduling modification. The project team worked hard to finish construction with enough time to complete the flush-out step without adversely affecting the overall timeline.

The zoning code allowed for no more than 50 feet of street frontage, so the original design included short faces towards the streets and long faces on the east and west sides. Bollo realized that rotating the building would achieve the optimal solar orientation. Such a significant departure from the zoning code required a design review. By attending community meetings to address neighborhood concerns and demonstrating to the review board how the solution best supported the project's programmatic and sustainability goals, SMR gained the needed support and approval to change the building's orientation.

A detailed site plan of a house, showing the layout of the building, landscaping, and outdoor spaces. The plan includes a large central living area, a kitchen, and a dining area. There are several outdoor spaces, including a large backyard and a front entrance area. The plan is labeled "Site Plan" in the bottom left corner.

Site Plan

The re-design also created a peaceful backyard and a front entrance that allowed employees and residents to better monitor outside activities. In addition, the project team took particular care to achieve high indoor air quality because of its direct impact on the tenants' sensitive health. The team also specified paint and finishes that were durable and had low Volatile Organic Compounds (VOCs). They selected energy-efficient windows, insulated the slab, installed water-efficient lavatory faucets and shower heads, used gas-fired radiant heating, and sought a mechanical system to reduce overhead costs and lower utility bills. These sustainability measures easily aligned with the goal of creating a safe and inviting home that was durable and conserved resources. Kenyon House is the first project in the State of Washington to attain LEED for Homes Platinum certification for affordable housing and only the second in the United States.

Walsh Construction Co., the general contractor, has an established LEED project management process that was tapped when it was decided to pursue certification. The goal of the process is to ensure team members understand LEED and to minimize costly on-site changes. Even with the training and LEED-specific meetings, issues arose during construction, confirming how important it is to establish a protocol to address on-site concerns. For example, Kenyon House's green rater—a green rater is a professional who oversees all verification services on a LEED project—discovered paper-faced dry-wall installed behind the tub enclosures, which needed to be fixed to meet LEED requirements and address air sealing problems. The green rater followed the established system to tackle such issues by immediately flagging the problem, calling the appropri-

ate contacts, and scheduling a meeting to determine corrective actions. Implementing such a protocol allowed Walsh Construction to move quickly to remedy the situation and keep LEED certification on track.



Construction Photo

Walsh Construction has incorporated these lessons learned and others into their standard construction practices, believing that adopting such practices will make it easier to fulfill the LEED requirements of future projects. Walsh has also developed a project database to quickly access information. The hope is to use the case studies captured in the database as templates to streamline efforts on like projects. In addition, Walsh Construction has established an in-house sustainability manager to track the company's LEED projects and to conduct in-house green building training.

The integrated design process is a critical component of all green building projects and, even though the pursuit of LEED came late in the process for Kenyon House, its design process had mirrored this collaborative approach. Because no one team member can know every aspect of how to design, construct, operate and maintain a green building, a team of experts must work together to align individual efforts in order to complete the project and ensure the building operates as intended. This collaborative process should extend beyond the design phase to include construction and operations as well.

The project team's collaborative spirit is also reflected in the outreach efforts to the building occupants. To ensure residents understood the green features of their new LEED-certified home, the Housing Resources Group provided a manual, Kenyon Healthy Home Guide. It focused on helping residents transition into their new home and included information on the building's green features. When the house opened, Christina Bollo and Becky Bicknell, the senior housing developer with Housing Resources Group, hosted a dinner at the house and encouraged the residents to provide feed-back on the building's sustainable features to determine what was working and what needed improvement.

BEST PRACTICES AND LESSONS LEARNED

- Work collaboratively with the owner/client to create a relationship rooted in trust. In the case of Kenyon House, the relationship set the foundation to successfully approach the neighbors and the design review board to secure their approval for the needed zoning changes. A trusted relationship also allows for a free exchange of ideas and a willingness to consider innovative solutions.
- Communication among team members was key to the success of achieving LEED for Homes Platinum certification. The open dialogue fostered a collaborative working environment. The dedication and leadership skills of the project team were also critical.
- Kenyon House has received significant press regarding its certification. As a result, there is a false sense that, even if LEED certification is pursued late in a project's development, achieving it is easy. The decision to seek LEED certification should be decided as early as possible, which on closer examination, was the case for Kenyon House. The architect designed the building with LEED in mind, tracked the LEED points from the project's beginning and skillfully guided the team through the process.
- Subcontractors did not bid Kenyon House as a LEED project. The design and specifications were similar, but did not include the additional time and effort needed to compile the LEED documentation. The contractor worked closely with the subcontractors to ensure the transition from a traditional to a LEED project went smoothly.
- Convene a meeting with each subcontractor to explain the scope-of-work and to outline specific responsibilities related to LEED. Schedule the meeting about a week before a particular subcontractor starts construction, so the information stays relevant and fresh. A general preconstruction meeting for all team members is also helpful.
- Develop operations and maintenance guidelines and be willing to train facilities staff and occupants on the specifics of the building systems. Explain their roles and responsibilities to ensure the green features of the building are functioning as intended.
- Videotape the green building's mechanical systems and key operations procedures and maintenance activities. Use the tape to train new staff.
- The commissioning agent held a two-hour training session for the facilities staff during the initial startup and an additional training 60 days later. The second training provided a forum for the facilities staff to ask questions after they had time to use and understand the new systems.



Common Area

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Insulation in framing

- Identify one person on staff to monitor the building site to ensure subcontractors are installing products and materials as specified. For a small project like Kenyon House, this is possible; larger project may find this recommendation difficult to implement. An example of the value of a job-site monitor is well illustrated by an incident that occurred at Kenyon House. Low-VOC sealants were specified for the project and their usage reviewed with the subcontractor. A substitute subcontractor came to the jobsite and was unaware he was working on a LEED project. He began installing the wrong sealant. The on-site monitor noticed the misstep in time, but such incidents can threaten to derail a green building project.

- The integrated design approach requires more than convening meetings with key members of the team; it means understanding why a particular architectural, engineering or product decision was made. Integrated design should be seen as a process that merges the sustainability, accessibility, security and programmatic issues into one solution.

- Appoint an in-house sustainability manager. The contractor for Kenyon House had created such a position and their responsibilities include conducting in-house trainings on green building and helping staff prepare for the LEED AP exam. The manager is also tasked with tracking the company's LEED projects through a database. The database is populated with case studies that include information on project size, the LEED credits attempted and secured, challenges faced, successful solutions and suggestions for future projects. The sustainability manager is also responsible for staying informed about new green products and materials and sharing this information with staff during training sessions.
- Establish an internal green committee to help the company outline its sustainability goals and determine a strategy to meet them. The committee can also create a process to research and disseminate new green product information on resources, services and tools to all company employees.
- Since LEED certification was decided late in the process, contingency funds were used. The cost was reasonable—less than \$30,000 to achieve LEED for Homes Platinum certification, so the decision to proceed with certification was not difficult to make. It should be noted that the design and the size of the project made it amenable to upgrades and changes.
- Financing for Kenyon House's green features came from a variety of innovative sources, including the Home Depot Foundation, the City of Seattle's rebate program for lighting and appliances, the Sound Energy rebate to upgrade the boiler, and a grant from Enterprise Green Communities (EGC) was awarded in tandem with a tax credit equity from a different branch of the EGC.
- LEED certification helps Kenyon House's affordable housing developer with current fundraising efforts. The certification tells potential funders that the developer implements a strategic and thoughtful process when designing and constructing projects. More grants and incentive programs are needed to encourage affordable housing developers to build green and help defray any additional costs.

- Consider creating an internal specifications book to capture the knowledge gained from projects. Include feedback from the maintenance staff to track the success of systems and products. The book can be used to communicate preferences and to share experiences. The specifications are a solid starting point, but should not be set in stone. Always be open to new ideas.
- Feedback on how Kenyon House's buildings systems are working is currently more anecdotal than scientific. Cost-effective and data-driven systems to analyze the operations and maintenance of small projects, like Kenyon House, are needed.
- Kenyon House's developer gained important green building knowledge. This has proved invaluable as green building practices have become standard practices for the building industry.
- Create a manual to educate case and program managers as well as residents on the building's green features. Consider including other sustainability measures such as nearby transit options and community resources. Develop welcome packets that contain reusable shopping bags, compact fluorescent light bulbs and information about how to conserve energy and resources.
- Kenyon House has greatly affected the tenants. Learning about the building and how it was designed to care for the health of its occupants and the environment has given some tenants a renewed interest in taking care of their own health.



Roof Installation

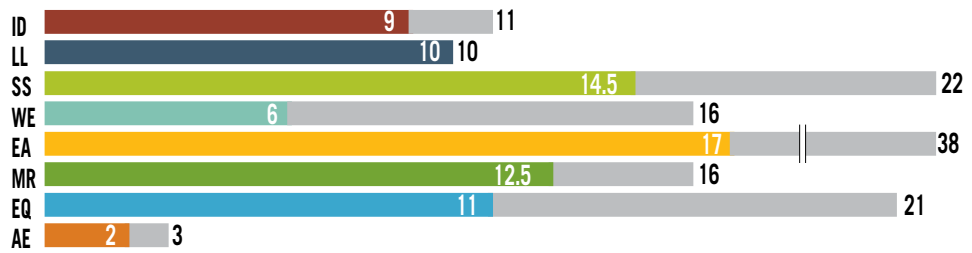
PROJECT AWARDS

- 2009 10x10x10 Green Building Slam Selection; Northwest Ecobuilding Guild
- 2009 Best of 2009: Best Green Housing; Northwest Construction
- 2008 LEED-H v.1.0 Platinum; U.S. Green Building Council

LEED CREDIT DISTRIBUTION

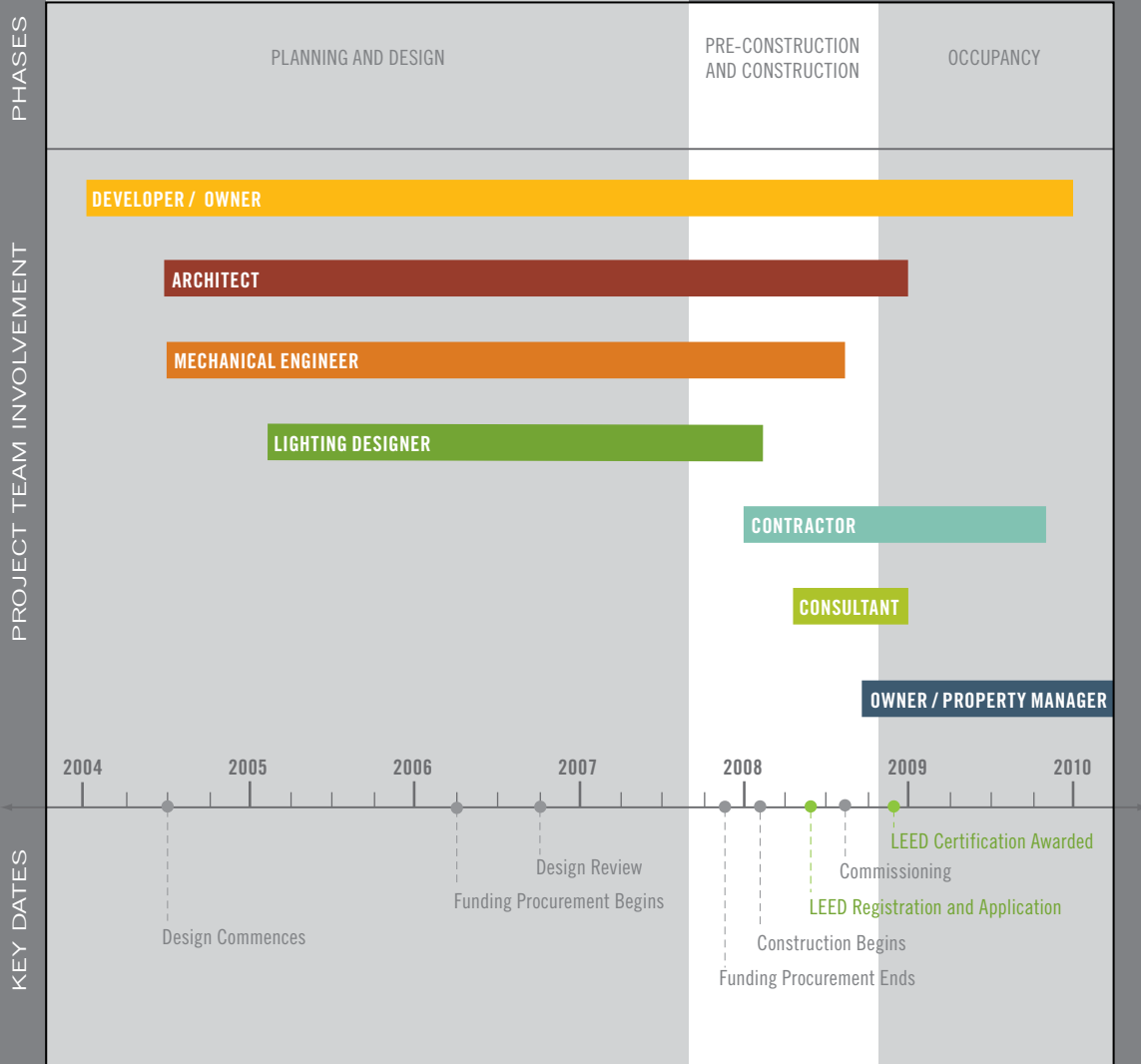
LEED CREDITS

LEED-H v.1.0 Platinum



TIMELINE

KENYON HOUSE LEED-H v.1.0 Platinum



* This timeline contains an approximation of key dates, project phases, and project team member involvement.

SCORE CARD: KENYON HOUSE

Rating System: LEED-H v.1.0



Platinum 82 of 136 possible points

INNOVATION AND DESIGN PROCESS (ID) 9 of 11 possible points

		INTEGRATED PROJECT PLANNING
x	x	Prereq 1.1 Preliminary Rating
1	1	Credit 1.2 Integrated Project Team
1	1	Credit 1.3 Professional Credentialed with Respect to LEED for Homes
	1	Credit 1.4 Design Charrette
	1	Credit 1.5 Building Orientation for Solar Design
		DURABILITY MANAGEMENT PROCESS
x	x	Prereq 2.1 Durability Planning
x	x	Prereq 2.2 Durability Management
3	3	Credit 2.3 Third-Party Durability Management Verification
		INNOVATIVE OR REGIONAL DESIGN
1	1	Credit 3.1 Innovation #1: Universal Design
3	3	Credit 3.2 Innovation #2: Water Use
	1	Credit 3.3 Innovation #3
	1	Credit 3.4 Innovation #4

LOCATION AND LINKAGES (LL) 10 of 10 possible points

		LEED ND
	10	Credit 1 LEED for Neighborhood Development or LL2-6
		SITE SELECTION
2	2	Credit 2 Site Selection
		PREFERRED LOCATIONS
0	1	Credit 3.1 Edge Development
2	2	Credit 3.2 Infill or LL 3.1
1	1	Credit 3.3 Previously Developed
		INFRASTRUCTURE
1	1	Credit 4 Existing Infrastructure
		COMMUNITY RESOURCES/TRANSIT
0	1	Credit 5.1 Basic Community Resources / Transit
	2	Credit 5.2 Extensive Community Resources / Transit or LL 5.1, 5.3
3	3	Credit 5.3 Outstanding Community Resources / Transit or LL 5.1, 5.2
		ACCESS TO OPEN SPACE
1	1	Credit 6 Access to Open Space

SUSTAINABLE SITES (SS) 14.5 of 22 possible points

		SITE STEWARDSHIP
x	x	Prereq 1.1 Erosion Control During Construction
1	1	Credit 1.2 Minimize Disturbed Area of Site
		LANDSCAPING
x	x	Prereq 2.1 No Invasive Plants
	2	Credit 2.2 Basic Landscape Design or SS 2.5
	3	Credit 2.3 Limit Conventional Turf or SS 2.5
	2	Credit 2.4 Drought Tolerant Plants or SS 2.5
6	6	Credit 2.5 Reduce Overall Irrigation Demand by at Least 20%
		LOCAL HEAT ISLAND EFFECTS
1	1	Credit 3 Reduce Local Heat Island Effects
		SURFACE WATER MANAGEMENT
1	4	Credit 4.1 Permeable Lot
1	1	Credit 4.2 Permanent Erosion Controls
0	2	Credit 4.3 Management of Run-off from Roof
		NONTXIC PEST CONTROL
.5	.5	Credit 5 Pest Control Alternatives
		COMPACT DEVELOPMENT
0	2	Credit 6.1 Moderate Density
0	3	Credit 6.2 High Density or SS 6.1, 6.3
4	4	Credit 6.3 Very High Density or SS 6.1, 6.2

WATER EFFICIENCY (WE) 6 of 16 possible points

		WATER REUSE
0	4	Credit 1.1 Rainwater Harvesting System or WE 1.3
0	1	Credit 1.2 Graywater Reuse System or WE 1.3
0	3	Credit 1.3 Use of Municipal Recycled Water System
		IRRIGATION SYSTEM
0	3	Credit 2.1 High Efficiency Irrigation System or WE 2.3
0	1	Credit 2.2 Third Party Inspection or WE 2.3
4	4	Credit 2.3 Reduce Overall Irrigation Demand by at Least 45%
		INDOOR WATER USE
0	3	Credit 3.1 High-Efficiency Fixtures and Fittings
2	6	Credit 3.2 Very High Efficiency Fixtures and Fittings

ENERGY AND ATMOSPHERE (EA) 17 of 38 possible points

		OPTIMIZE ENERGY PERFORMANCE
x	x	Prereq 1.1 Performance of ENERGY STAR for Homes
15	34	Credit 1.2 Exceptional Energy Performance
		WATER HEATING
0	2	Credit 7.1 Efficient Hot Water Distribution
1	1	Credit 7.2 Pipe Insulation
		RESIDENTIAL REFRIGERANT MANAGEMENT
x	x	Prereq 11.1 Refrigerant Charge Test
1	1	Credit 11.2 Appropriate HVAC Refrigerants

MATERIALS AND RESOURCES (MR) 12.5 of 16 possible points

		MATERIAL-EFFICIENT FRAMING
x	x	Prereq 1.1 Framing Order Waste Factor Limit
1	1	Credit 1.2 Detailed Framing Documents or MR 1.5
1	1	Credit 1.3 Detailed Cut List and Lumber Order or MR 1.5
.5	3	Credit 1.4 Framing Efficiencies or MR 1.5
	4	Credit 1.5 Off-site Fabrication
		ENVIRONMENTALLY PREFERABLE PRODUCTS
x	x	Prereq 2.1 FSC Certified Tropical Wood
8	8	Credit 2.2 Environmentally Preferable Products
		WASTE MANAGEMENT
x	x	Prereq 3.1 Construction Waste Management Planning
2	3	Credit 3.2 Construction Waste Reduction

INDOOR ENVIRONMENTAL AIR QUALITY (EQ) 11 of 21 possible points

		ENERGY STAR WITH IAP
	13	Credit 1 ENERGY STAR with Indoor Air Package
		COMBUSTION VENTING
x	x	Prereq 2.1 Basic Combustion Venting Measures or EQ 1
2	2	Credit 2.2 Enhanced Combustion Venting Measures or EQ 1
		MOISTURE CONTROL
	1	Credit 3 Moisture Load Control or EQ 1
		OUTDOOR AIR VENTILATION
x	x	Prereq 4.1 Basic Outdoor Air Ventilation or EQ 1
2		Credit 4.2 Enhanced Outdoor Air Ventilation
1		Credit 4.3 Third-Party Performance Testing or EQ 1
		LOCAL EXHAUST
x	x	Prereq 5.1 Basic Local Exhaust or EQ 1
1		Credit 5.2 Enhanced Local Exhaust
	1	Credit 5.3 Third-Party Performance Testing
		DISTRIBUTION OF SPACE HEATING AND COOLING
x	x	Prereq 6.1 Room-by-Room Load Calculations or EQ 1
1	1	Credit 6.2 Return Air Flow / Room by Room Controls or EQ 1
2		Credit 6.3 Third-Party Performance Test / Multiple Zones or EQ 1
		AIR FILTERING
x	x	Prereq 7.1 Good Filters or EQ 1
1	1	Credit 7.2 Better Filters
2		Credit 7.3 Best Filters or EQ 7.2
		CONTAMINANT CONTROL
1	1	Credit 8.1 Indoor Contaminant Control during Construction or EQ 1
1	2	Credit 8.2 Indoor Contaminant Control
1	1	Credit 8.3 Preoccupancy Flush or EQ 1
		Radon Protection
x		Prereq 9.1 Radon-Resistant Construction in High-Risk Areas or EQ 1
1		Credit 9.2 Radon-Resistant Construction in Moderate-Risk Areas or EQ 1
		GARAGE POLLUTION PROTECTION
x		Prereq 10.1 No HVAC in Garage or EQ 1
2		Credit 10.2 Minimize Pollutants from Garage or EQ 1
1		Credit 10.3 Exhaust Fan in Garage or EQ 1
3	3	Credit 10.4 Detached Garage or No Garage or EQ 1, 10.2, 10

AWARENESS AND EDUCATION (AE) 2 of 3 possible points

		EDUCATION OF THE HOMEOWNER OR TENANT
x	x	Prereq 1.1 Basic Operations Training
	1	Credit 1.2 Enhanced Training
1	1	Credit 1.3 Public Awareness
		EDUCATION OF BUILDING MANAGER
1	1	Credit 2 Education of Building Manager

BECKY BICKNELL

SENIOR HOUSING DEVELOPER,
HOUSING RESOURCES GROUP

I. PROCESS

GETTING INVOLVED WITH THE PROJECT

The Kenyon House project was the brainchild of AIDS Housing of Washington¹ and the Bailey-Boushay Adult Day Health Center.² The Bailey-Boushay House is a resident care facility for people living with HIV/AIDS that provides long-term, inpatient care; they also have a daily health clinic for extremely low-income individuals with HIV/AIDS who need medication or services.

The health center opened about 20 years ago, and AIDS Housing of Washington quickly realized that housing was a huge component of how people were dealing with their health issues related to HIV and AIDS; so, the idea behind the building has been around for a while. About five years ago, a decision was made by AIDS Housing of Washington to pursue United States Department of Housing and Urban Development (HUD)³ financing for people with disabilities, but that funding fell through. That's when Housing Resources Group (HRG)⁴ became involved as a development consultant; our role was to bring in tax credit equity, which is a complicated funding source for affordable housing.

When HRG entered the project, AIDS Housing of Washington, which is now Building Changes, had assembled a focus group of people in the community who were already working on these types of housing services. King County, Washington, has an HIV/AIDS housing continuum. There were quite a few individuals involved in these initial meetings. AIDS Housing of Washington had developed an initial design for the building, and they had begun the permitting process. They had also completed the due diligence work for the site and the property. They had the property under contract, and all of the background site work and permitting was completed



BECKY BICKNELL is a Senior Housing Developer with Housing Resources Group. She works to provide affordable housing to low-wage workers. She received her MA in Urban and Regional Planning from the University of Colorado and holds a degree in Urban Studies from Stanford University.

¹ AIDS Housing of Washington is now Building Changes, an organization aimed at meeting the needs of all homeless populations through a variety of housing and social service programs. Building Changes is located in Seattle, Washington.

² The Bailey-Boushay House was built by AIDS Housing of Washington and is operated by Virginia Mason Medical Center. It is located in Seattle, Washington.

³ The U.S. Department of Housing and Urban Development (HUD) is a federal department whose mission focuses on increasing homeownership while encouraging community development and the availability of affordable housing. HUD is based in Washington DC.

⁴ Housing Resources Group (HRG) is a nonprofit organization whose mission is to promote the availability of affordable housing. HRG is the co-owner and developer for the Kenyon House project.

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as well. That was the status of the project when HRG came into the picture, and from that point forward, we worked to pull together the financing. We got funding from the City of Seattle's Office of Housing and the State of Washington. We also ended up getting a federal award from the Housing Opportunities for Persons with AIDS (HOPWA) Program.⁵ The focus was on creating a community of permanent apartments that included support services for people with HIV and AIDS. The entire funding process took about a year and a half. We began getting the financing in about the middle of 2006, and we had put all of the pieces together by the end of 2007.

EVOLVING ROLE IN THE PROJECT TEAM

HRG's involvement in the Kenyon House project increased over time. We went from being a development consultant to being a grantee for some of the project financing, and eventually we became a co-owner of the project. We came into that role when AIDS Housing of Washington withdrew from ownership since they felt that the project was getting away from their mission. Sound Mental Health (SMH)⁶ was happy to take on the role as owner and manager, but they were not well known in the Seattle affordable housing community; as a result, HRG acted as a technical advisor with some co-owner responsibilities in order to assure some of the financing entities that there is an experienced developer on the team.

At HRG, we don't specialize in developing housing for people with special needs or extreme health considerations. Our focus is on providing more general, workforce housing; we don't have the social service experience required for the management of these specific types of properties. It would have been our preference to provide only technical and contractual assistance, instead of being involved in an ownership role. However, in this case, we had to step back and

ask ourselves what decision was in the best interest of the Seattle affordable housing community. We're taking a risk for about three to four years on this project, but we decided that taking on a leadership role was a reasonable risk to take. It is essential for team members in any affordable housing project to be flexible in their roles. The pre-development period in this type of project is extensive, and Kenyon House had an added component of complexity since Building Changes withdrew from its ownership position. We had confidence in SMH as the operator of the building, and we were comfortable taking the risk.

WORKING WITH THE PROJECT TEAM

HRG engaged SMR Architects⁷ and Walsh Construction Co.⁸ as soon as we came onto the project. Often on affordable housing or not-for-profit projects, it's advantageous to pre-select or negotiate with your contractor at a very early stage rather than having a competitive bid. It allows you to put forth your programmatic needs early and to know that the contractor is tracking those needs and assisting you as you try to pull together all of the financing. We continued to have monthly or bi-monthly meetings with them throughout the project. HRG has base-level design and systematic preferences that we incorporated into the process, and SMR has extensive experience with affordable housing. We brought in our construction manager early and immediately started to work with the other team members in order to refine the specifications.

ESTABLISHING PROJECT GOALS

The biggest thing that HRG brings to a project is a set of goals which are focused on long-term durability. We overlay that with a goal to conserve resources and bring down operating costs, but we won't do this at the expense of durability. We then overlay these objectives with the goals for this particular resident population: creating a good community, creating great interaction between the building staff and residents, creat-

⁵ The Housing Opportunities for Persons with AIDS (HOPWA) program is managed by the U.S. Department for Housing and Urban Development's Office of HIV/AIDS Housing. HOPWA funding may be used for housing support services in addition to a variety of health care services.

⁶ Sound Mental Health, of Seattle, Washington, is a community mental health agency providing vocational, housing, and counseling services. This organization handles the property and building management for Kenyon House.

⁷ SMR Architects is an architectural design firm located in Seattle, Washington that specializes in affordable housing and designed Kenyon House.

⁸ Walsh Construction Co. is a general contractor with offices in Portland and Seattle. The firm was the general contractor for Kenyon House.

ing community space for the residents, and also making the house a safe environment. On this project, in particular, there were significant concerns about air circulation between the apartments, due to the sensitive immune systems of residents. We made the availability of constant, fresh air a priority in the apartments.

II. DESIGN

COMMUNICATION AND RESOURCES

HRG has a good, base level of sustainable design. We primarily focus on common sense and durability, and we try to lessen our impact as we take on new construction projects. Ideally, we would always be able to renovate existing buildings, but in lieu of that, we're trying to be as conscientious as we can be in our choice of systems and products during the construction process. Cost is always a main consideration for us, and there is tension between upfront costs, long-term durability, and long-term maintenance. We're typically not on the cutting edge in terms of building technologies; if a technology hasn't been tested on other projects, then we're probably not going to install it.

Here at HRG, we have our own internal specifications book, which reflects the knowledge gained from previous projects and acts as a specification book for new and future projects. We use feedback from our maintenance group in order to track the success of certain products. We hand this off to the architect and contractor at the beginning of a project, in order to communicate our preferences to them and share with them the information that we have gathered from experience. These specifications are a good starting point; but they are not set in stone, and we're always open to new ideas.

I think that staying on top of products is one of the hardest things for us. We know the products that work well for us, but we rely on our architects and contractors to make us aware of new products that might be a bit more sustainable or offer better performance. That happened on Kenyon House a couple of times, particularly with the flooring and cabinetry.

INTERNAL FEEDBACK AND STRATEGIES

HRG is the developer, owner, and property manager for about 28 different properties around Seattle; within our organization, we have our own maintenance department along with a construction management department. These departments have the same director, and there is good interaction between the two departments. The construction management department is responsible for developing our design standards, but a lot of the standards are developed with feedback from our property maintenance group. So, there is a great feedback loop there. The maintenance group consists of about 20 staff people who are at all of our buildings doing maintenance and repairs. We grapple with the fact that a lot of our feedback is anecdotal, but we're trying to figure out if and how we can make our ongoing operations analysis more technical. We've had many discussions with architects, and with the city, to try and determine if there is a way to better track building performance. At a minimum, we do have this great, anecdotal feedback loop and the written design standards, which have really guided our decisions on new projects.

III. CONSTRUCTION

THE CONSTRUCTION PROCESS

HRG acted as the owner's rep; actually, we are the co-owner of Kenyon House. We did our own construction management, though. We had a construction manager, who had technical expertise, be present at weekly meetings. She managed our contingency and signed off on change orders. HRG handled the accounting, as well.

DECIDING TO PURSUE LEED CERTIFICATION

Before deciding to pursue LEED on this project, we went through a difficult spot where the cost of the project increased significantly. When we experienced this cost increase, we had to circle back and find more resources. Ultimately, that resulted in a project delay. Both HRG and the architect assumed that LEED certification wouldn't be financially feasible because of this

cost increase. However, once the construction contract was finalized, we had a certain amount of contingency available.

During construction, Christina⁹ came forward to say that she had been tracking the LEED credits. She was about to become accredited, and she thought that tracking LEED on Kenyon House would be a good exercise. We found that out at one of our weekly meetings, and it was at that point that we decided to have her and the contractor price out the upgrades that would be needed to achieve LEED. It was determined that the cost impact to achieve LEED for Homes Gold was less than 1% of the total construction contract and that the architect and contractor were highly motivated to make these upgrades. Therefore, HRG approved the use of contingency funds to pursue LEED certification. Once the decision was made to pursue LEED for Homes, the team then examined the upgrades we would need to move the project to Platinum from Gold. We basically had a three-month exercise with Christina, Walsh Construction Co., and O'Brien & Company¹⁰ where we looked at the costs and benefits of pursuing individual components of LEED on this project. We realized that it was going to take less than \$30,000 to achieve Platinum, which was feasible as we approached the end of construction. So, it was a pretty easy decision to make.

The overall increase in the construction budget due to LEED certification ended up being about 1.5% of the construction contract. We also had a contractor who was engaged and motivated. They absorbed some of the cost difference by using a portion of their contingency; that helped with the overhead and the extra time that the project took. Collaborating really helped. The premium for LEED was not unreasonable when compared to larger projects or projects that didn't have a high baseline of specified materials and systems. The design and the size of this project really made it amenable to upgrades and changes, certainly when compared to a building with more units or a project of separate homes.

⁹ Christina Bollo is currently an architect at SMR Architects in Seattle, Washington. She was the project manager and architectural designer for Kenyon House.

¹⁰ O'Brien & Company is a sustainability and green building consulting firm in Seattle, Washington.

CONSTRUCTION TIMELINE

The LEED certification process didn't really have an impact on the project schedule; we treated it more or less like we would treat a series of change orders. We did have to look at our finances and the construction contract in order to figure out what we needed to shift around to make this happen. It was actually a pleasant experience and a great exercise to go through. We had already established a great team, and from my perspective, the whole process seemed pretty smooth. It was a small project that could absorb the changes without impacting the schedule very much. The contractor was ahead of schedule the whole time, and they never fell behind because of anything we were doing in pursuit of LEED. That was critical to the project's success.

THE LEED CERTIFICATION PROCESS

I relied on Christina to come to me with specific LEED components throughout the project. We got some baseline criteria for sustainable design from the City of Seattle and the State of Washington. Christina initially outlined the criteria necessary to bring the project up to LEED Gold standard. In the case of Kenyon House, there was not a huge premium to achieve this. The LEED process definitely required extra time from the staff, and it required a bit of reworking of the design and components, but it all came together. Christina's lead was critical, and we were lucky to be working with a contractor like Walsh Construction, who is familiar with the LEED objectives and understood the importance of the decisions we were making. The added step of achieving LEED Platinum ended up being a fairly smooth process, especially with the assistance we received from O'Brien & Company, the LEED for Homes provider in Seattle. Also, the financial assistance from the Home Depot Foundation¹¹ sealed the deal and made pursuing LEED Platinum a pretty easy decision to make.

¹¹ The Home Depot Foundation supports the construction of affordable homes while encouraging environmental responsibility.

LEED EXPENSES AND FUNDING SOURCES

We had a few additional funding sources that were helpful in achieving LEED certification for Kenyon House. The City of Seattle has a rebate program for lighting and appliances, and that definitely helped with the lighting costs. Some of the lighting design had already been included in the specifications, but this financial assistance helped make the whole design possible. A Puget Sound Energy¹² rebate allowed us to upgrade the efficiency of our boiler from 88% to 92%, and that was huge. The building is heated through hydronic wall heaters which are powered by gas. We also received an \$18,000 grant from Enterprise Green Communities¹³ that was awarded in tandem with our tax credit equity from a different branch of Enterprise. Those small pieces covered the premium to pursue a higher standard of LEED certification.

To a certain extent, we are seeing a shift in available funds for LEED projects. As an owner, if you prioritize having a 93% efficient boiler and you can show the reasons that boiler helps an affordable housing development, then you can have access to all of the traditional resources we use for affordable housing. Those resources, in a way, then support that specific component. However, there are not adequate resources available if you want to push a project to a more sophisticated level of sustainability. Built Green,¹⁴ for instance, has \$10,000 grants. That money is a drop in the pan compared to the work required to get that money. For example, they require photovoltaics, and that alone could eat up \$10,000. There is generally more support among equity and public investors to improve durability and sustainability. However, as far as the higher-level systems or products, we're not finding financial support that is proportionate to the cost of those amenities.

¹² Puget Sound Energy (PSE) is a utility company that provides electric and natural gas service to the Puget Sound region of Washington State.

¹³ Enterprise Green Communities is a national green building program developed for affordable housing.

¹⁴ Built Green ® Washington, located in Bellevue, is a non-profit, residential building program that provides suggested standards and rating systems for environmentally responsible building practices.



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Southern Windows "There was a direct financial benefit to LEED certification."

THE VALUE OF LEED CERTIFICATION

There was a direct financial benefit to LEED certification, especially with components such as the boiler and electric lighting. We may have upgraded those elements anyway, but LEED gave us the extra incentive. The actual level of LEED certification is less important to the owner/operator, but the fact that we were able and willing to invest the extra \$10,000 in order to achieve this status speaks a lot to our values. We would have gone for Platinum even if it had not directly benefited the residents and the operations of the building, but the fact that we

were able to pursue those two goals in tandem was great. LEED provides a good standard to reference as we move forward. We can use it to gauge what we might be able to achieve in future projects, and we look to it when we're considering upgrades to other buildings. Financially, having a LEED certification is a nice thing to mention when fundraising; it is beneficial to show that we are being strategic and thoughtful about how we're designing our buildings. We want to show that we're considering the impact the building has on both the residents and the broader environment.

LEED FOR HOMES

The LEED for Homes certification process ended up being really smooth. We had previously been through a LEED-NC development, two years prior to Kenyon House. In that situation, both the cost and process were at least twice as complex. For instance, when Kenyon House got its certification, this other project still had not received certification, and it had been operational for 1.5 years. It is great to see that a standard has been developed that is amenable to smaller, more affordable housing developments. It offers affordable housing developers an incentive to add an extra layer to projects. They are then able to raise the project's standard of efficiency and lower its resource consumption without having to get as technical as LEED-NC requires. Our experience was that the requirements for LEED-NC were overly complex for affordable housing, but LEED for Homes worked well for us.

IV. OPERATIONS

SHARING INFORMATION

As a result of the Kenyon House project, HRG now has more insight into LEED. It has become a buzzword, and now knowing the specifics behind the process, as well as the technical requirements, is helpful. From a developer's standpoint, learning about the interaction of the systems in a building is incredibly useful. In addition, we always try to stay on top of the latest recommendations for sealants and material choices. We want to use products that are going to be both durable and sustainable.

BUILDING OPERATIONS

Since the end of construction, HRG has been focused on operational stability and getting SMH up to speed on the compliance issues involved with affordable housing. At this stage, we are available for them if they have any questions about the building. Walsh Construction is a great contractor, and they're also available as a resource; as a result, we haven't received any negative feedback regarding the operation of the building. The only issue that's come up related to building performance is that the south-facing glazing has caused the offices to be really hot. We could have taken steps to ventilate that space, reduce the glazing area, or put in a better window treatment system. I don't know if Walsh Construction and SMR have heard more than we have about that problem. The contractor definitely has the potential to be more involved during the first year because everything is still under warranty.

OCCUPANT AND USER RELATIONSHIPS

Primarily, we work with Walsh Construction, Christina Bollo, and SMH's management staff to communicate about issues related to building performance. SMH has about four different staff members at the building: a facilities manager, a building manager, a program manager, and a couple of the case managers of the residents. We never trained the residents directly, but we did do a walk-through with the contractor and the building manager which was technically focused. In addition, we created a resident manual for the two case managers and the program manager. They then distributed this manual to the residents. We had seen templates, provided by LEED and the Enterprise Green Communities program, which outlined occupant manuals. The goal was to let the residents know about transit options, community resources, and even simple things such as light bulb use.

HRG has changed its operating policy for our portfolio over the past couple of years. We've developed welcome packets for new residents that contain compact fluorescent light bulbs, reusable shopping bags, and information about conserving energy and resources. This was the first time that we provided materials to distribute to the

residents of the entire building. It was fun, and, in order to develop the relationship between our developers and our property managers, it's definitely an area that we need to improve upon.

SUCCESSSES OF THE PROJECT

This was my first solo project, and it was Christina's first solo project. It also happened to be the superintendent from Walsh's first solo project. The three of us were highly motivated to do something new, challenging, and interesting. The design is a little different from what we usually see, but it works really well, and there was great collaboration throughout the entire project.

This narrative is based on a video- and audiotaped interview conducted by Kristen DiStefano on August 20, 2009, at the offices of Housing Resources Group in Seattle, WA.

JOHN WOODWORTH & CHRISTINA BOLLO

PRINCIPAL, SMR ARCHITECTS & ARCHITECT
AND PROJECT MANAGER, SMR ARCHITECTS

I. PROCESS

GETTING INVOLVED WITH THE PROJECT

JW: We were originally asked to be the architect for Kenyon House by AIDS Housing of Washington¹ who later partnered with Housing Resources Group (HRG).² They're a good housing provider, and we've worked with them in the past on several low-income and special needs projects. These types of projects are a specialty of our firm, and we have a long-standing relationship with HRG.

ASSEMBLING THE TEAM

JW: When we assemble an external team we look at our regular, staple consultants. For Kenyon House, we had to consider the size of the project. At that time, the project budget was just over \$1 million. The budget was small, and we wanted to target small consultants who were familiar with us and who we knew would be responsive. We knew that each consultant would be putting one individual onto the project team, and we had to have a high level of confidence in the consultant and their particular team leader. We selected each consultant based on the relationships that we had with them in the past; all of the consultants had worked on similar projects and had similar experiences. The only one that we had not worked with was the landscape consultant. The client had worked with them on a previous project and had been very happy with the results. So, we were glad to engage them as part of our team. Our internal team consisted of Christina, one other project architect, and me. From the beginning, it was



JOHN WOODWORTH, AIA, has been a Principal at SMR Architects since 2004. He received his Bachelor of Arts in Architecture from the University of Washington in 1989. He currently serves on the Design Review Board for the Southeast area of Seattle.



CHRISTINA BOLLO, AIA, LEED AP, received her Master of Architecture degree from the University of Oregon and her Bachelor of Arts in English Literature from the University of North Carolina, Chapel Hill. She is a member of the ADPSR (Architects/Designers/Planners for Social Responsibility) National Board and the Seattle Pedestrian Advisory Board. During the Kenyon House project, Christina was an architectural designer.

1 AIDS Housing of Washington is now Building Changes; an organization aimed at meeting the needs of all homeless populations through a variety of housing and social service programs. Building Changes is located in Seattle, Washington.

2 Housing Resources Group (HRG) is a nonprofit organization whose mission is to promote the availability of affordable housing. HRG is the co-owner and developer for the Kenyon House project.

University of Oregon Professor Alison G. Kwok, Advisor Nicholas B. Rajkovich, and research assistants Rachel B. Auerbach, Kristen B. DiStefano, Britni L. Jessup, and Amanda M. Rhodes prepared this narrative. © 2009 U.S. Green Building Council and the University of Oregon. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the permission of the USGBC.

clear that Christina wanted a much larger role in the project. We encourage that in the office, and it was great to see her take that on.

FUNDING THE PROJECT

CB: At the beginning of this project, we had a lot of internal discussions. Projects like this require a multi-step funding process. The first step is going to the city to seek funds for affordable housing. We have a levy in Seattle³ which provides a pool of money that's set aside for affordable housing, but it's a very competitive process for our clients. We give the clients a package of drawings which they bring to the city in order to show the feasibility of the project. At that point in the project, we really start getting involved in the design. We tend to design those initial schemes in compliance with the zoning regulations. In the original scheme for Kenyon House, the project was oriented with the long faces running east and west and the short faces oriented to each of the streets. We went to the Office of Housing in Seattle⁴ with that design, and we had a lull before we found out if we would get funding or not. That's when I became involved with Kenyon House. John introduced me to the project and told me that I would be working on it if the project received funding.

Half of the project sites at SMR⁵ are property-line buildings in tight urban conditions, so this project was unusual. For Kenyon House, we had only 18 units on a large, half-acre site, and for this office that was a really low-density solution. Once the funding came through, we had to figure out what to do with the site, and in this case, we couldn't go through a rezoning process because there wasn't enough time.

JW: We had a design that was fundable and was accepted by the zoning code,⁶ but Christina had much better ideas of where to take the project de-

sign. The issue was that we couldn't do it according to the code.

II. DESIGN

SITE SELECTION AND GOALS

JW: When the project started in 2004 it was on a more difficult site with a greater number of units. We weren't able to develop the site, and that put the project on hold for a couple of years while the owner looked for a new location. One of the main project goals was accessibility; with that in mind, it made sense to choose a flatter, more appropriate site that was closer to the light rail and bus lines.

CB: Our firm typically has very little involvement in site selection, and it's rare that we have the situation of an original site followed by a new site. We went to the site with someone from HRG early in the project, and we looked at the number of trees on the land. There was a huge row of large, coniferous trees. We were told that we could take down the numerous poplars on the site, but the site is situated between two streets, and these trees formed a border around the site. HRG was concerned about the number of trees that would be cut down, so we had to figure out how we were going to get 18 apartments on this site in a way that would work with the existing conditions.

JW: Originally the site had a low spot in the ground which resulted in a swamp area that ran through part of the site. It also contained three or four abandoned houses. Some people had started living in those abandoned houses, and so security was an ongoing problem. We were also concerned about relating the project to the large Buddhist temple that closely interlocks with the site.

CB: I wanted to orient the building so that the long faces were on the north and south. To me, that was a no brainer. There was enough street frontage, and the project also had an incredible southern exposure. This orientation would also allow us to have a really peaceful backyard. I knew the program well enough to understand the issues of private and public spaces associated with the future tenants. They weren't just

3 The Seattle Housing Levy, passed in 2002, provides for the creation and preservation of affordable housing in Seattle, Washington by funding generated by a property tax levy.

4 The Seattle Office of Housing strives to strengthen communities through the creation and support of housing opportunities for Seattle community members of all income levels.

5 SMR Architects is an architectural design firm located in Seattle, Washington that specializes in affordable housing and designed Kenyon House.

6 The zoning code referred to is the Seattle Municipal Code.



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South Elevation "By orienting the long faces of the building towards the street we had opportunities for both southern exposure and a backyard."

coming out of homelessness; they were emerging out of homelessness with fragile health. It was clear they were going to need some levels of retreat from the outside world. By orienting the long faces of the building towards the street we had opportunities for both southern exposure and a backyard. John told me that if I wanted to make this change to the design that I was going to have to take it through the design review⁷ process. I jumped at the opportunity. It was a unique situation to have the time and the project schedule to be able to take this project through design review and to give it the care it needed to get through such a huge departure. The zoning code requires a maximum of 50ft for street frontage in this zone, and we're at 120ft of street frontage. Numerically, that's a very big shift.

JW: Without a departure we could only have accomplished a similar site organization by breaking the building into multiple pieces; however, that wouldn't work for the program at all because the building needs to be self-contained.

CB: In Seattle, if you want a departure from something as important as building depth, then you are required to go through a design review process. John is on the board for that region of the city; so he had to recuse himself from the process and couldn't do the presentation.

Before going through the design review, I went to about four neighborhood community meetings with the owner in order to build support for the project. Close collaboration with clients is something that we do really well at SMR. By attending community meetings we are able to eliminate the chance for appeal through zoning. We were asking for a big departure and we were vulnerable to someone denying the departure in order to stop the project. Betsy Lieberman,⁸ from AIDS Housing of Washington, initiated the project. She and I went frequently to meetings so that we could build the support necessary to get the project approved.

JW: That work really paid off during the formal and public design review process. Christina

⁷ In order to receive a variance on the Seattle Municipal Code the proposed design must present a case to the Design Review Board.

⁸ Betsy Lieberman is the founding Executive Director of Building Changes in Seattle, Washington.

knew the neighborhood and each time a neighbor stood up and asked a question, Christina was able to point out where that person lived on the vicinity map. She was able to identify the community organizations and knew the history behind each of them. People said that she was very well-informed about what was happening in the neighborhood directly around the project. They trusted that she had thought about the way in which the project would be incorporated into the community.

CB: Our office had just come out of a big fight on another affordable housing project in that same general area. We had a different client, but I was still anxious about the neighbors. Neighborhood resistance can kill an affordable housing project. Our clients don't have time to delay construction, because each piece of the funding has a specific deadline. We tried to woo the community. Betsy Lieberman is not involved in the project now, but she is a force of nature. She's a force in the community, and she makes people living with HIV/AIDS seem less frightening to the general public; she's done that for 25 years. We were definitely out in the community pushing this project.

DESIGN STRATEGIES

JW: You have to really know what the client is looking for, and you also can't be afraid to suggest new things. HRG might have been happy with the code-compliant version of the project. That would have been successful, but it wouldn't be nearly as successful as the project is now. Close collaboration allowed our client to be comfortable with us, and we were able to personally go to the neighborhood and ask that they approve the changes to the zoning of the project.

Changing the direction of the project design was almost like doing a cost benefit analysis. We had to figure out the benefits that could be derived from certain exceptions to the length, width, or modulation requirements. We showed how it would impact the entry sequence and how the solar gain would work. It was pretty easy for the owner to see the benefits.

CB: I try really hard — I think we all do — to balance the particular programmatic needs of each project with our sustainability goals. What got this client on board with the design changes was the fact that the changes would enable the staff members to see the entire street and backyard; there were no blind corners on the site. By turning the building 90 degrees, everything became visible. The project had a much stronger presence on Kenyon Street, in particular. The neighbors were tired of kids cutting through the property, but the changes in building orientation enabled the project to become a sentry for that part of the neighborhood.

That's integrated design. For us, integrated design doesn't just mean that we meet with the consultants ahead of time; we've always done that. That's just making a building that actually works. Integrated design, for me, is figuring out all the reasons why I make a particular, architectural move and then building on those reasons so that the solution becomes more than the sum of those parts. I wish there was more of a focus on that in the integrated design process; you really have to look at each move and be able to merge the sustainability, accessibility, security, and programmatic issues into one solution.

JW: We'd like to take a sustainable approach on all projects, but we don't always have owners who are accepting of that goal. Some owners may be resistant to us going out and working with the community. Others are very much for it. It does come down to the individual owner. One of the great things about Kenyon House was that I was able to appoint Christina to the project. The project would not have gotten this far, and with the green components intact, without Christina's dedication driving the process.

CB: It took a lot of stubbornness.

JW: She definitely didn't give up.

CB: When I came onto the project, the building envelope for the other scheme had been set. Actually the units have never changed from that initial scheme. Scott,⁹ who was the other project architect, has a lot of experience with universal design; he came up with a unit plan that was un-

⁹ Scott Starr is an associate at SMR Architects in Seattle, Washington.

like any of our previous projects.

JW: The unit design was a totally different kind of a studio apartment. It's much larger than other special needs studios that we've done in the past, and it's very efficient. We went through the process to make all the units universally accessible and adaptable. Once we had that module in place, we were able to come up with a lot of different designs. Christina mentioned that the previous design was a long, linear form. I was pretty convinced that it should look like a barn, and we went back and forth with that idea. It was a very, engaging process with the team, as well as the entire office.

CB: Everyone in the office wanted to weigh in; we were saying that it was our boutique project since it was so small and was a four-sided project. Many of our buildings are three-sided, and sometimes two-sided, because they're right up against another building. Scott had the unit design, and I started work based on that assumption. My emphasis was on creating a building that had total visibility and enabled the staff to monitor the building without it feeling like a prison to the tenants. I wanted it to feel like a lodge. It was an iterative design process, especially for this office, where buildings sometimes just spring up. We worked a lot in plan, and then we really massaged the elevations.

JW: At one point Christina took this long, linear plan and cut it up into pieces. Then she slid them back and forth.

CB: I did this in order to get more visibility, but the Seattle zoning code also required modulation. That requirement often produces solutions in which bays are tacked onto the building, which you can see all over Southeast Seattle. I wanted to finesse the building in a way that would allow more visibility while still creating blocks on the street, instead of just little pieces tacked onto the building. I went through a lot of iterations, but I did have an outside design review with the Seattle Housing Authority. They told me that it looked like an assisted living project. That was depressing, and they were brutal.

JW: Getting reviewed by your peers is sometimes pretty tough. You can get a lot of outside influences that aren't necessarily about the project.



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Entrance Lobby "My emphasis was on creating a building that had total visibility and enabled the staff to monitor the building... I wanted it to feel like a lodge."

CB: People at SMR Architects were worried that the fiber-cement siding was going to look like T1-11,¹⁰ which it not a building product we use anymore. There was a lot of talk about that during the design process, more so than any project I've worked on in this office before or since. That discussion took a lot of time.

¹⁰ T1-11 is a wood-based siding product that has a less desirable appearance and a lifespan of only 20-30 years.

We had a lot of charrettes with the owner where we discussed issues of accessibility, universal design and supervision. Those charrettes dealt with very influential programmatic issues. We met with the owner frequently. AIDS Housing of Washington brought in other consultants, too, and HRG brought in a universal design consultant; we were sharing information with the owner as it was being processed. I had a pretty good relationship with the consultants; we communicated over the phone and by sending sketches back and forth. That was particularly the case with Robyn Mah, the project contact from I.L. Gross Structural Engineers in Seattle. I told Robyn that I wanted to expose the structure in the two lobbies to emphasize the expansiveness of those spaces and to highlight the fact that the roofs go in different directions. She made sure that feature could not be value engineered by making it part of the structure and, therefore, it remained in the budget. I think that this design feature really makes those spaces feel like a lodge. The residents just love the exposed structure, and I think that it's one of the biggest advantages of the building. Every time I'm at the building people always comment on how beautiful the wood is. Walsh Construction¹¹ had a great finish carpenter who worked with the trim and made it work well with the exposed structure. Robyn and I have worked together a lot, and she made those lobbies happen. We have a lot of volume in the spaces, and we needed it for staff-resident interaction.

JW: You just don't see that kind of space or those kinds of materials in many of the affordable housing projects that get built, including our own. It was a very unique situation. One of the key components in being able to do that was our decision to use the new International Building Code (IBC). Exposing the structure while still keeping the costs down was a large part of being able to work within the budget.

CB: Another code issue that we were able to take advantage of was the fact that we have both stairs exiting through the lobbies. There are no stairs at the ends of the hallways, which

meant that we could keep the circulation central to the building. John and I both love making the building code work for us.

GRANTS AND INCENTIVES

JW: We made a couple of design decisions that weren't necessarily geared towards rebates. We could have gone with an electric heat system for the building and received a number of rebates from the local utility. Instead, we went with a high efficiency, gas-fired system. In a case like this, where the owner is paying all of the tenants' utility bills, the priority was to keep that bill as low as possible in order to reduce the yearly overhead. On many projects like this, the budget is in place to simply build the building. The budget is tenuous, and there's not always enough money to keep the operations going after construction. Whatever we can do to keep those day-to-day operation costs down is really helpful. Instead of receiving a bit more money upfront in electrical rebates — which would still produce a high electricity bill in later years — we went with the lower costs of a gas system, even though the upfront costs of a central hydronic system were higher for the owner.

We used durable materials when they would add a cozy feeling to the building. We tried to limit the amount of carpet, which is something that gets replaced over and over again. Instead, we went with hard surfaces and more durable materials, especially durable exterior surfaces.

LEED FOR HOMES

CB: LEED for Homes has a greater focus on durability than LEED-NC. That worked to our advantage, because the durability of the finishes is something we always consider. We want each project to be attractive and functional, but it's so much more important that the building last and remain in good condition. I've been a LEED AP for a long time. I participated in LEED when I was with my former employer, and I was also very involved with sustainability at the University of Oregon, where I got my architecture degree. My dad is an environmental attorney; so it's in my genes to automatically think about sustainability.

¹¹ Walsh Construction Co. is a general contractor with offices in Portland and Seattle. The firm was the general contractor for Kenyon House.

I was inspired by a LEED-NC project we had done for another client. I did not personally work on it, but John did. I watched him go through great efforts with the LEED-NC certification process, because on that project the residents were also allowed to smoke in their own apartments. We have some clients who provide very low-income housing, but we also have a middle-range of workforce clients. In that middle range, owners are able to tell the tenants that they can't smoke in the units, in the building or anywhere close to the building. They're able to say this to tenants who, in any other city, would probably be renting at market rate. Then we have the very low-income housing providers, organizations that are serving people with special needs or people who have been chronically homeless for decades. They can't tell the residents that they can't smoke since the tenants are already dealing with a host of other issues. Doing so would lead to people smoking surreptitiously, which would lead to fires that destroy buildings. So, most organizations in that situation allow their tenants to smoke.

JW: Smoking is a small luxury for some of the tenants; you may have as many as 80 percent who smoke. It was so difficult to go through the LEED-NC process in that situation. There is so much cost involved with a smoke control system, and it ate away at the budget again and again. Since Kenyon House fell into the category of LEED for Homes, that process was fairly simple.

CB: LEED for Homes was in its pilot stage during that project. There was only one provider in the Northwest, and they were in Oregon. We were doing everything right on that project, and I was so angry that LEED-NC was not allowing us to get certified. I'm not saying that smoking is good. I know that smoking is bad and that airborne pollution is horrible, but to say that people can't do what they want to do in their personal units felt so at odds with what I was trying to do with affordable housing. I want LEED to work, but I don't think that the requirements are one-size-fits-all. When LEED for Homes came out, I thought that this was the way that we could make LEED work for our poorest residents. I tracked LEED for Homes, and I did the first checklist and then the second checklist. I

knew that we couldn't pursue LEED certification, but I just kept watching it. I knew that LEED for Homes was a way for me to keep track of my sustainability goals on Kenyon House and to work on getting great products, materials, finishes, and specifications. I used LEED to keep track of my own personal goals, and LEED's checklist and guidelines kept me honest about the sustainability of the project by comparing it to someone else's standards.

JW: Christina would come by to tell me what certification level we could get based on certain design decisions.

CB: I made design decisions in order to benefit the residents, but I also made decisions that I knew were going to help the performance of the project. For example, I selected good windows for the project. In addition, the whole slab is insulated, which is rare for us. We had only done that once before on a project. The tenants on the first floor are on concrete; so we put R-10 insulation underneath the entire slab. We started construction in January and we got off the ground really well on a site that had some unknowns.

III. CONSTRUCTION MANAGING THE PROJECT

CB: We have a pretty high level of Construction Administration in this office. Our clients expect that from us, and we attend project meetings every week. We integrated the documentation process for LEED into the project meetings even before we knew for sure that we were going to pursue LEED certification.

JW: We don't do projects without Construction Administration involvement. It's just our policy. In this case we were lucky to be working with Walsh Construction. They were a very responsive contractor. We had some hiccups at the beginning of the project, before the LEED certification came into the picture, but we were fortunate to have James Welch¹² assigned as the superintendent. He was a lot like Christina; he really wanted to push the project, was really energetic, and had a good idea about the end

¹² James Welch is a Superintendent with Walsh Construction Co. in Seattle, Washington.

goal. He sympathized with what we were trying to accomplish.

COLLABORATION DURING CONSTRUCTION

CB: James Welch has worked on projects with us before, but this was his first job as a superintendent. It was also my first job being the point-person for a project. We almost had a sibling relationship. We were in constant communication, and we were working together to solve problems. He was fabulous and very helpful in keeping the process going. We had already established a good, collaborative relationship between the months of January and May; LEED became another component of that process, and we were able to just roll with it. Greg Linnell¹³ was also really excited about pursuing LEED certification. Greg was in the process of taking his LEED exam; he is a fairly new project manager at Walsh Construction. He wanted to establish a reputation for Walsh Construction as being able to accomplish a really interesting marriage between sustainability and affordable housing. He was very motivated.

JW: We were very comfortable with Walsh Construction since we had already worked with them on about ten projects. We knew what to expect from them in terms of documentation, and overall they're very well organized; that was important to closing out the project.

CB: Walsh Construction is great at paperwork. They know how to do the construction documentation that architects need, and as a result, it only required a minor shift for them to add additional information about VOCs and recycled content. The big challenge is always defining the radius of where the materials are coming from. I would ask Greg about the origin of specific materials, and he would compile the appropriate documentation on letterhead and send it to me as a PDF the same day. That level of responsiveness, communication, and collaboration was just outstanding.

JW: Walsh Construction really pushed the subcontractors as well. The subcontractors didn't

bid this as a LEED project. The design and specifications included the same components, but it didn't initially include the additional time and effort needed to compile the LEED documentation requirements. Walsh Construction was great about working with the subcontractors and getting the required documentation while still keeping the costs down and staying within the budget.

CB: Walsh Construction made it seem like the subcontractors had no problem with the added documentation. I don't think that was actually the case, but Greg always gave me the impression that things were fine, and that he just needed to know what specific documentation he needed to collect. They were really great.

JW: I don't think that pursuing LEED certification caused the construction timeline to expand. The construction timeline was already short; it was a tight project. LEED, however, did require more of a time investment from individual team members. Everybody on the project team wanted to go for LEED certification on this project. We wanted it in our portfolios as part of our work. It was very exciting to do this project. SMR Architects, Walsh Construction, and HRG were really committed to going above and beyond the basic requirements just to make sure that the project got LEED certified.

CB: I did put together a proposal for the owner, and I did track my time. So, there was an increased cost in the documentation. There was also a small increased cost to achieving Platinum over Gold, but those changes led to better finishes for the residents. Toward the end of the project, the owner invested more money in order to hit the Platinum level of certification; that money was used for upgrades in the cabinets, carpet, and paint. We placed a large emphasis on indoor air quality, because we knew this would have the most direct impact on the tenants. It was important to design for tenants with health issues and to provide a no VOC environment. Everybody says this about low VOC projects, but the first time we walked into the building it didn't smell like a new building. When I punched the building I was there for two days straight; I didn't get that weird cough that you get when you're in a building with carpet that's off-gassing. I can't imagine that a month

¹³ Greg Linnell is a Project Manager with Walsh Construction Co. in Seattle, Washington.

later the residents experienced anything related to VOCs.

The costs associated with LEED certification ended up being about 0.5% of the total construction costs. There were costs associated with hiring O'Brien & Company. HRG paid those, and there were costs related to our work, but less than 1% of the fee can be attributed to LEED certification. There were, however, some added costs in doing some of the later upgrades.

IMPLEMENTING LEED DURING CONSTRUCTION

CB: HRG's involvement in Kenyon House grew over the course of the project, and Becky and I became friends during this time. Becky had a strong interest in sustainability, and she understood the importance of following a standardized system of sustainable benchmarks. At one point I told her that we could get Gold certification under LEED for Homes; however, that was during the Seattle construction boom, and the project budget was really tight. We were already having a hard time getting the project under budget, so we weren't considering LEED as a possibility. In November of 2007, HRG signed a contract with Walsh Construction. The price was pretty high, but then Seattle housing construction prices started dropping. We saw an opportunity to increase the value of the project while staying within the existing construction budget. That's when Becky asked me if LEED for Homes was still a viable option.

By this time, LEED for Homes was no longer a pilot program and O'Brien & Company¹⁴ had been chosen as the Washington state provider. I learned that if the building were already under construction, then we couldn't pursue LEED for Homes certification. I wrote to Becky on April 29 telling her that it was too late, and I remember getting a call from her asking me to call Alistair¹⁵ at O'Brien & Company to confirm this information. I found out from him that there was still a possibility for us to pursue LEED but that we needed to act quickly. On

May 7th I set up an appointment to meet with Chris¹⁶ and Elly¹⁷ of O'Brien & Company. This project had an extended design process where we were very slowly tracking LEED. Then in a span of only two weeks, we decided that we were actually going to pursue LEED for Homes and we had to get on it really, really fast.

Becky shamed me into pursuing LEED certification; she told me that I couldn't give up on it after tracking it for two years. It was not a smooth process, but we had a great deal of investment from O'Brien & Company. I worked really closely with Elly on meeting many of the requirements. The hardest part was getting all of the inspections that had to happen during construction lined up in such a way that they didn't impede construction. O'Brien & Company was fabulous.

During the first week of April, I looked at the LEED checklist again and reevaluated our standing; we were already three months into a nine-month construction schedule. I looked specifically at the mandatory items, and I started getting scared about a couple of them. It is a mandatory requirement to keep the framing order waste factor under 10%, but we already had all of this lumber on site. I thought that was going to kill it. The first thing that I officially did in the pursuit of LEED certification was to ask Greg Linnell,¹⁸ from Walsh Construction, about our waste factor. At that point Greg figured out that the waste factor was still going to be less than 10%. My next email was to Jay Tilley,¹⁹ and he responded that our lighting design already satisfied the mandatory LEED lighting requirements. So we were in compliance with the mandatory items in those areas.

JW: We couldn't have done that so quickly if we had not been tracking and designing around some of those credits. In addition to the points for LEED for Homes, we were also following recommendations from our local SeaGreen ini-

¹⁴ O'Brien and Company is a sustainability and green building consulting firm in Seattle, Washington.

¹⁵ Alistair Jackson is a Principal at O'Brien & Company in Seattle, Washington.

¹⁶ Chris Edlin is a Project Associate at O'Brien & Company in Seattle, Washington.

¹⁷ Elly Bunzendahl is a Project Associate at O'Brien & Company in Seattle, Washington.

¹⁸ Greg Linnell is a Project Manager with Walsh Construction Co. in Seattle, Washington.

¹⁹ Jay Tilley is a Senior Designer at Cierra Electrical Group, Inc. an electrical engineering firm in Seattle, Washington which designed the lighting for Kenyon House.

tiative.²⁰ Beyond that, we knew that a new standard, Evergreen,²¹ was coming out. So, we were already using those resources to look at the very base levels of sustainability.

We were doing really well on the LEED points. Every time we looked at the checklist we had a few more points. Suddenly we went from Silver to Gold; the points were just kind of falling in our lap. We specified the right products, and the decisions we made were all in the right ballpark. Once it was official that we were going for LEED, we got really excited about it. I remember walking by Christina's desk and just whispering, "Platinum."

CB: I'm very competitive, and I was being encouraged to push this process as hard as I could. We were Gold throughout the process, and then at the end, we bumped up to Platinum. That was due in part to changes we made to some materials, but we also worked hard on documentation. We had two huge hiccups. We had a big problem with the drywall behind the tubs, and we also had some problems with the Home Energy Rating System (HERS).²² I didn't fully understand this at the time, because HERS is not a very transparent process, but some of the units were struggling in terms of HERS, because the units are really different from one another. Elly went beyond the extra mile and examined each unit, because it looked like we might have some that qualified as Gold and others that could be considered Platinum. We were happy with Gold, but we didn't want to mix the units, because it was heartbreaking to think that we were so close to achieving Platinum for all of them. Those were lessons I learned, and I have already applied that knowledge to other projects.

20 The SeaGreen initiative was developed by the Seattle Office of Housing as a way of sharing cost-effective recommendations for environmentally responsible building materials, systems, and practices with building professionals working in the affordable housing industry.

21 The Evergreen Sustainable Development Standard (ESDS) sets a minimum level of sustainable performance for any affordable housing developed with funding from the Washington State Housing Trust Fund (HTF). The Housing Trust Fund provides financial assistance to organizations working with housing for low-income and special needs populations.

22 The Home Energy Rating System (HERS) is a standardized scoring system established by the Residential Energy Services Network (RESNET) to rate a home's energy efficiency and expected energy costs.

Becky asked me if the Green Communities²³ checklist could work with the LEED for Homes checklist since Green Communities would give us a grant if we could comply with their requirements. We knew that if we could mesh those two programs, then the Green Communities grant would be a way to pay for LEED. There were a couple Green Community components that HRG had to appeal, but in general we were able to meet their standards.

NEW BUILDING TECHNOLOGIES

CB: For clients the word "new" is worse than the word "expensive." They are not interested in new or untested materials. If we say that something is expensive, then they are at least curious about the benefits. However, if a product or system has not been used before, then it's not generally selected to be part of the project. We used fiber cement panels to do a full rainscreen on the Kenyon House. We tried to do new, prefinished fiber cement panels so there wouldn't be a lot of paint on site. The contractor advised against this, because they couldn't get the level of quality control that they needed from that product. The owner found out that it had been used on one of their other projects and that the punch list tape had peeled the paint off the prefinished material. After that, we tried to do a new assembly system with the fiber cement board in order to save material. This system overlapped alternating panels in order to give relief to the facade, but the contractor could not figure out where to nail the panels. It was almost like nailing in the dark. I wanted to save material that way, but when we looked at the framing documents we saw that the system would actually require putting more studs into the wall. Doing that would have killed the insulation value of the wall, and we'd have to use structural wood instead of fiber cement paneling. Fiber cement paneling has a fairly low embodied energy, and a lot of it is recycled. These new construction techniques for fiber cement panels ended up not working for the project.

23 Enterprise Green Communities provides funds and expertise to enable developers to build and rehabilitate homes that are healthier, more energy efficient and better for the environment without compromising affordability. Green Communities also assists state and local governments to ensure their housing and economic development policies are smart and sustainable.

IV. OPERATIONS

SHARING INFORMATION

CB: Walsh Construction handles the operations and management process very thoroughly. They actually videotape the building turnover for future staff; then, when there is staff turnover they still know what to do with the building. I think that the mechanical system is the most complicated sustainable feature of Kenyon House. It's a very complex system for a building of this size.

There is some training necessary with the mechanical system. Sound Mental Health's²⁴ buildings are generally older, and some of them are adaptive reuse projects. This was their first new construction project, and I'm sure there has been a learning curve for them; it really takes a year or two to break in a new building.

It is typical for an affordable housing project to have an operating budget that is totally separate from the construction budget. The owners were so focused on that piece of the puzzle because they had to raise private funds, and that's really hard. No matter which HVAC system we're dealing with, it's important to tell the owners upfront: their bill will be less for each month of each year.

JW: Walsh Construction is great with training occupants.

CB: Becky asked me to do a manual for the tenants. I used a version developed by Leddy Maytum Stacy Architects for one of its projects for Mercy Housing in SOMA, San Francisco. They posted their tenants' manual on the internet so that other people could use it. I had so much fun making that work for Kenyon House. The tenants have a manual in a drawer next to each stove. Some of them have said that they liked parts of it. It was definitely fun to do that book.

CHALLENGES OF THE PROJECT

JW: Consultant selection happened at the beginning of the project, before Christina was

involved. Overall, the team performed really well, but there were a couple of consultants that we would replace if we had to do it again. There are a few things that we would adjust in the budget.

CB: In the future, I think that we should have higher budgets for landscaping if we have sites that large. The landscape design is great, but I don't think that we are used to having that much land. Most of my projects are downtown — I'm used to planters on a deck. I could have encouraged the owner to invest more into the lushness of the landscape, but we were able to save a lot of trees, and that has allowed the landscape to be thicker and more like a canopy. Now that I know more, I will push harder on that in future projects.

JW: In time, it will fill in, but it would have been nice to start off with a lush landscape for the tenants.

CB: In most of our projects there is a relationship between the project architect and all of the consultants; the architect is the primary connection for all the team members. We have a responsibility to the owner. We have to let the owner know what's happening with the other consultants' work, even if it's not our specialty. For example, I know nothing about plants, but as I learned more I could have discussed the landscape design with HRG; the landscape architect can't have that discussion, because he or she doesn't have a relationship — financial or otherwise — with the owner.

MAKING IMPROVEMENTS FOR THE FUTURE

JW: Kenyon House gave us a false sense of security since we were able to achieve LEED Platinum even though we started the official LEED process during construction. However, we had been tracking the LEED points on Kenyon House from the beginning; the project was really designed with LEED in mind. This project has been well documented, and as a result, other clients have asked us about getting involved with LEED later in the process. We have to explain to them that we actually put a lot of time into the front end of it. It doesn't usually work that way. For us, the key is to become engaged in the

²⁴ Sound Mental Health, of Seattle, Washington, is a community mental health agency providing vocational, housing, and counseling services. This organization handles the property and building management for Kenyon House.

project and to let each person's individual interests come through in the project. With Kenyon House, we were all so engaged and excited about the project that we did whatever we had to do to make it work; we put a lot of time into getting the project done. I think it's going to be more difficult to take that route on future projects, because it's so much easier to begin that process from the beginning.

Architects have always been jacks-of-all-trades, but now we're going even further by focusing on lifecycles and carbon footprints; those were never considerations before. We may have been thinking about it and not wanting to use a material that would have to be replaced often or that was extremely toxic, but now we have to document it. It's just another step.

CB: My hope is that some of the more painful lessons we learned from Kenyon House, such as paying close attention to drywall behind the tubs, will be incorporated into our base specifications in the future. I've started doing that on projects since then, and anyone who listened to my conversations with Alistair during Kenyon House knows to put a drywall product that is non-paper backed behind the tubs. That's such a simple example, but I think there are a lot of those that we have now incorporated into our specifications. The other thing that has emerged since Kenyon House is the Evergreen checklist, through the state of Washington. All of our projects have to follow that in order to get funding. Many of points that were optional in LEED for Homes are now mandatory in Evergreen. I've been lucky because my knowledge base there is pretty high, and I've been able to share that with other people who are now faced with Evergreen compliance. We can't avoid the Evergreen checklist, and it helps to know what some of the expectations are from working with Kenyon House and LEED for Homes.

THE FUTURE OF PROJECT TEAMS

JW: With the push to make projects more sustainable, many projects require charrettes with the project team, owner, users, and managers. We're seeing project teams getting together earlier and more often. As a result, we now have

some projects where the owners are very comfortable with our consultants and what those consultants bring to the table. They have had enough interaction with the consultants to feel comfortable having that person come to a community meeting and present what they're doing; they're comfortable with that consultant meeting members of the board. The players are not so separate anymore; the team has just gotten larger. We definitely need a bigger conference room.

This was a great project to work on; that was due to Christina's efforts. We have a lot of people in the office, and everybody has a different specialty. Christina was able to focus on the sustainability of the building and, at the same time, make it livable. She got so engaged with the owner that the project came together correctly. We could see that she was in tune with the issues of the project; she was doing a great job, and we were able to give her the freedom to run with her ideas. You have to have someone who is dedicated to sustainability on each project.

CB: I was really lucky to have been given the room to run with my ideas. It is very important for a young designer to be able to present the project at design review. In the case of Kenyon House, it was necessary to have a design review to gain approval for reorienting the building. Those of us in the lower ranks of SMR Architects are very lucky because we're given those chances more often than the employees of many other firms. I was given the freedom to pursue my ideas and goals, and I just kept pushing the project forward. That was a great experience.

This narrative is based on a video- and audiotaped interview conducted by Kristen DiStefano on August 20, 2009, at the offices of SMR Architects in Seattle, WA.

GREG LINNELL

PROJECT MANAGER,
WALSH CONSTRUCTION CO.

I. PROCESS

GETTING INVOLVED WITH THE PROJECT

One of our project managers, Jack Kuester,¹ has worked with SMR Architects² and Housing Resources Group (HRG)³ on numerous occasions. Jack interviewed with HRG to get the job, and our past relationship helped us understand what the client's needs were in the early stages of preconstruction.

The project was handed over to me, from the second project manager, about a month into construction. The company didn't feel we were giving the owners what was necessary, and we weren't proud of that. I was actually working on another project at the time, but this situation gave me the opportunity to step in and take over the project. I collected a lot of information in order to quickly get up to speed. Walsh Construction⁴ has worked on a lot of LEED projects; however, Kenyon House was the first LEED project I had been involved with, and it was a new experience for me.

ESTABLISHING PROJECT GOALS

When I took over, we had not yet been notified that Kenyon House was going to be a LEED project. I was focused on getting all of the construction contracts out the door and finishing the contractor buy-out, which involves selecting the low-bidding subcontractors. Kenyon House required a new process from all of us. We didn't know that we were going to pursue LEED for Homes until the architect and owner approached us about it during construction. At that point, we were eager to jump on board, and it ended up being a quick process for us, in terms of gathering all the necessary information and assembling the required documentation.



GREG LINNELL, LEED AP, has been a key contributor on green building teams since the start of his construction career, working on projects seeking Built Green, Evergreen, and LEED certification. Greg joined Walsh Construction Co. in 2003 as a project engineer after earning his Construction Management degree at Washington State University.

¹ Jack Kuester is a Project Manager with Walsh Construction Co. in Seattle, Washington.

² SMR Architects is an architectural design firm located in Seattle, WA that specializes in affordable housing and designed Kenyon House.

³ Housing Resources Group (HRG) is a nonprofit organization whose mission is to promote the availability of affordable housing. HRG is the co-owner and developer for the Kenyon House project.

⁴ Walsh Construction Co. is a general contractor with offices in Portland and Seattle. The firm was the general contractor for Kenyon House.

University of Oregon Professor Alison G. Kwok, Advisor Nicholas B. Rajkovich, and research assistants Rachel B. Auerbach, Kristen B. DiStefano, Britni L. Jessup, and Amanda M. Rhodes prepared this narrative. © 2009 U.S. Green Building Council and the University of Oregon. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the permission of the USGBC.

LEED for Homes was in its pilot⁵ stage. A project like Kenyon House is a perfect fit for the program. LEED-NC⁶ is too robust for a project that small and the requirements for the HVAC systems in the New Construction rating system wouldn't fit with Kenyon House. It's great that they're coming out with pilot programs to test different methods of LEED certification. LEED for Homes is more specific to the type of work we do; typically, we build four to six-story buildings. By using LEED for Homes, we ensure that we're not over-designing the HVAC systems for the project. That gets expensive for the owners.

COMMUNICATION

An important aspect of this project was the communication among members of the team. We were open with our budget, and the owners were open about their budget. We understood what their limitations were, and they were very active in pursuing LEED; that collaboration definitely helped drive this project.

II. DESIGN

STRATEGIES AND TECHNOLOGIES

The selection of the high-efficiency boiler was really important to the client. In affordable housing projects, we commonly find that the owners will receive initial funding to build the project, but they don't get much money to maintain the building. As a result, durability is important to affordable housing developers. A high-efficiency boiler will require less maintenance over time and will result in lower overhead costs.

EVALUATING COST

Typically, we are interviewed by the owners. They give us the award, and then we sign a preconstruction agreement. After that, we meet with the owner to try and identify their goals and wishes for the project. We use a budget con-

trol log to track and assign value to each item on their wish list. During the course of preconstruction, we try to fully identify the client's wants and needs; we have to make decisions that allow us to work within their budget. We meet once a week for a discussion, and usually the design team is a part of the meeting. That way they can also understand the owner's goals.

Because of the current market, we've noticed that the funding for many projects is taking longer to process on the owner's side, and preconstruction is taking longer. That is unfortunate, but that's the reality of the market right now.

III. CONSTRUCTION

MANAGING THE PROJECT

Our team really meshed well with the architect and the owner on Kenyon House; the relationships were the key to the success of achieving LEED Platinum on this project. Once we got to a certain point in construction, we were able to identify some contingencies on our end and we knew that we would have some extra money to earmark towards the LEED process. The owner was willing to do what it took to achieve LEED Platinum and the architect was great to work with.

With this owner, most of the projects have negotiated contracts. Negotiated contracts allow some latitude in deciding which subcontractors are going to fit the job. It's not necessarily a matter of finding the lowest price, even if that is the ultimate goal for the owners. If a subcontractor is not qualified, then we normally don't select them; they become a risk to the project. In the case of Kenyon House, we identified a few key players we worked with in the past and selected them for the project team. Going through the subcontractor selection process in this way is important for any project, and especially a LEED project. If you know that you're going to pursue LEED early enough in the process, then you can write that into the subcontractor contracts. At Walsh Construction, we sit down with each of the subcontractors during a preconstruction meeting and explain safety, parking, and the scope of their work. It's a good opportunity

⁵ The pilot stage for LEED programs involves testing of the rating systems and requirements before the program is officially rolled out for use by the larger building industry.

⁶ LEED-NC refers to the LEED rating system for New Construction and has a different set of requirements, intents, and goals from the LEED for Homes rating system.

for us to outline the LEED requirements and to make sure that they understand what they need to do. This happens about a week before a particular subcontractor starts construction, so the information stays relevant and fresh in their minds.

The good thing about a LEED project is that the architects typically identify what is required for that type of work in each specification section. We reference those specifications in our contracts and require that the subcontractors follow the steps that have been outlined in those documents. We don't normally get very specific on their scope of work until we sit down and meet with them.

In the case of Kenyon House, the LEED process did not impact our project delivery schedule. The only scheduling difference for us on a LEED project is the requirement to flush out the building. That is a schedule-driven activity; we have to make sure that we finish with enough time remaining to complete that step.

CHALLENGES DURING CONSTRUCTION

There was a point in the project when we were getting ready to seal the building. We had met with O'Brien & Company⁷ the week before and they had given us a spreadsheet that showed what we needed to seal in order to achieve a particular credit. We got that spreadsheet to our subcontractors and, literally, a week later we had the building sealed. That timing was crucial. If we had covered the penetrations and not sealed them, we would have lost credits. That situation illustrates the importance and success of Christina's⁸ and the owners' close involvement with our schedule.

For Kenyon House, we had to review the sealants that were being installed to make sure they met LEED's low VOC⁹ requirements. In one in-

stance, a subcontracted employee came onto the jobsite as a substitute for another employee and he wasn't even aware that he was working on a LEED project. I was on site and noticed that he was getting ready to install the wrong sealant. It's crucial to have someone at the building, walking around and making sure that the subcontractors are installing what they're supposed to be installing. For this type of small project, it was easy to keep an eye on that stuff, but for larger projects it is more difficult, and we're finding out that we need to identify a single person for that type of supervision.

On Kenyon House, we managed our construction waste by contracting a company which specializes in sorting those materials. They're used to LEED and other, similar programs. We contacted them as soon as we found out that Kenyon House was going to be a LEED project. In the end, we recycled 65% of our construction waste, which is great. Now, we aim for greater success if we know early enough that it's going to be a LEED project. We rely on our waste management supplier to produce the waste management plan and waste management documentation. We leave it up to them to make sure the materials are sorted and documented correctly.

The most notable challenge on Kenyon House was with the material behind the tubs. LEED does not allow paper-faced drywall in shower or tub areas. We had installed this material based upon the architect's specification. Architects generally specify a mold-resistant, paper-faced drywall for affordable housing projects because it's tough and really resistant to mold; it's a design specification that they're used to making. In this case, we ended up consulting a third party and learned that as long as we installed a sealant over the drywall, we could keep it in the project. That was critical because, obviously, we didn't want to tear out the drywall in order to meet the requirement. It was a challenge, but we got through it.

COLLABORATION DURING CONSTRUCTION

O'Brien & Company is very knowledgeable about LEED for Homes, and we relied on that guidance. I was actually studying for the LEED

⁷ O'Brien & Company is a sustainability and green building consulting firm in Seattle, Washington.

⁸ Christina Bollo is currently an architect at SMR Architects in Seattle, Washington. She was the project manager and architectural designer for Kenyon House.

⁹ VOCs are volatile organic compounds comprised of organic chemical compounds that vaporize and enter the atmosphere under normal pressure. VOCs combine with nitrogen oxides in the air to form ozone. Some VOCs are neurotoxic and carcinogenic.

exam during this process. So, I was very familiar with the requirements and was able to use the LEED manual as a reference. O'Brien & Company was proactive in coming out to the site and meeting with us. They did a great job of identifying targets and explaining what we needed to do in order to fulfill those requirements based on construction. That was helpful, and I rarely had to call and ask them how to interpret a particular credit.

We met with the owners every week. During that meeting we tracked all of the documents and followed up on certain items. In addition to those meetings, the architect was willing to take phone calls and drop whatever she was doing to make sure she made the construction of this project a priority. She deserves a lot of credit for the success of this project.

The architect was very involved in the Kenyon House project. She understood the challenges we faced by committing to LEED certification so late in the process. She helped us because she was very in-tune with our schedule and she knew that we needed certain documents at very particular times; she guided us through the process. I wouldn't recommend starting LEED mid-project, but in this case, it worked.

THE COST OF LEED CERTIFICATION

It's difficult to quantify the cost of LEED on a construction budget since it depends on the project type. If it's a larger project, the mechanical systems can get quite expensive. I would estimate the cost of pursuing LEED was a small percentage of the cost for Kenyon House. We added approximately \$20,000 to the cost, which doesn't seem like much, but with an affordable housing project, every penny counts.

RESOURCES AND TOOLS FOR CONSTRUCTION

At Walsh Construction, we do some in-house training. That training is done by our Sustainability Manager, Chuck Halling, whose job, among other things, is to keep track of the LEED projects that we do. He also keeps track of the new products coming on the market, and he shares this information with us during in-house

training sessions. The research is very informative, and he does a great job of relaying that information. He also helps us prepare for passing the LEED exam so that we can develop even more experience as a group. We've started doing that during the past year. Chuck is an architect and we brought him into our company to take over the Quality Assurance and Quality Control (QAQC) program. LEED is something that he's really excited about, and taking on that portion of the job was a perfect fit for him. Walsh Construction differs from other contractors in that we do an initial design evaluation to look for potential challenges in the constructability of the design during the design phase. We try to address any challenges early so that we don't run into problems in the field.

Walsh Construction has a company-wide intranet. It's a place where employees can find any documents they might need. Chuck has spent a lot of time preparing different documents for us to refer to when we have questions. We're building an internal case study database, and we're trying to categorize our past projects. Mainly, we categorize projects by size, and then we determine if the requirements for one are different from another. For example, how is the mechanical system different for a two-story building versus a five-story building? We use these studies as templates so that we know what to look for in certain types of projects. Chuck will write a report that lists the different credits we attempted, some challenges we faced on each project, and suggestions for what to pay attention to; it's really helpful. We usually consult this database during the interview phase of each project. When we respond to a Request for Proposal (RFP), and we know the project is going for LEED certification, then our in-house case studies allow us to do some research and see what we've done in the past and how we might proceed in the future. A good strategy for us has been to go to the owners, show them how we are going to pursue LEED certification, and then show them examples of our other projects. We don't do many two-story buildings, so Kenyon House is definitely a project that we want to be in our database.



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Southwest Corner "A good strategy for us has been to go to the owners, show them how we are going to pursue LEED certification, and then show them examples of our other projects."

IV. OPERATIONS

FUTURE IMPROVEMENTS

I'm part of the sustainability committee at Walsh Construction; we meet to discuss our sustainability goals as a company. This involves an overall discussion of how our company can operate in a more sustainable way, and it also involves a look at the resources and tools which are currently available. Part of our goal is to make informational resources readily available for everyone in our company to reference. We look for information on new products, and we rely on our subcontractors and suppliers to help us. The committee draws from many different positions within the company; it includes a mixture of senior project managers, administrators, and field people. The committee purposefully contains more than one skill set so that it represents a good mix of ideas and concerns.

MONITORING BUILDING PERFORMANCE

We're approaching our one-year warranty on the Kenyon House. The building manager keeps me up-to-date on the warranty items, especially if anything needs to be replaced. We take care of those specific replacements, but I haven't been involved in the operations of the building since the end of construction.

THE COMMISSIONING PROCESS

The commissioning on the Kenyon House was actually pretty straightforward. The HVAC system is fairly limited; it has a boiler and some fan coil units. The subcontractor did a good job of getting the system balanced. O'Brien & Company, the third party reviewer, took care of the

blower door test.¹⁰ The initial tests went well, and we were relieved. If you don't pass those tests, then there's not much that you can do at that point in the project; the building is almost complete.

Commissioning ensures that every system is working correctly; you certainly want to address that before handing the building over to the owners. Commissioning really is part of doing a quality job, but we only do third party commissioning on our projects if it's specified. We try to select subcontractors with whom we're familiar. Those subcontractors do their own type of commissioning, but they do it simply by doing a quality job and making sure the systems are working right when they install them. Even if it's not required, they'll do a minimal amount of commissioning.

SHIFTING SKILLS

The skill set to be a contractor is definitely changing. It's important to have an awareness of products that are on the market, and understand the mechanical systems that are available. During preconstruction, we have to know whether or not a certain strategy will work and we have to know if specific system upgrades will be cost-effective. Personally, I am really interested in trying to better understand each system to see if our clients are getting what they pay for, in terms of performance.

As a company, we're environmentally friendly. This company is working on a lot of green projects, and we're building our reputation, which allows us to be selected for LEED projects. We already have an in-house QAQC department, and they took over the research role for us, which really helped. Personally, I am very conscious about the future, for our kids. I want to make sure that we leave the planet in a good condition. Everybody in the company is on-board with that idea. We started the sustainability committee to make sure that, as a company, we're doing our part.

¹⁰ A Blower Door Test checks for the air tightness of construction by equalizing the interior and exterior pressure with a fan and noting the power required to maintain equal pressure. This fan rate is recorded in cubic feet per minute (cfm), which can be translated to building infiltration rates, or air changes per hour (ACH) to determine the "tightness" of the space.

GAPS IN RESOURCES

There is a greater need for funding options that target affordable housing developers. These developers have very limited funds, and if LEED could provide an incentive or provide help with the fees for affordable housing projects, then that would really help those projects get built. Going for LEED-type materials is an added expense to a project, and if you're already strapped on a budget, and you're a low-income developer, then it's hard to justify paying for LEED certification when you might need the money to operate the building. There needs to be a way to mesh the two priorities. That would be very helpful for this type of client.

This narrative is based on a video- and audiotaped interview conducted by Kristen DiStefano on August 19, 2009, at the offices of Walsh Construction in Seattle, WA.

DANA FONTES

MECHANICAL ENGINEER,
SIDER + BYERS ASSOCIATES, INC.

I. PROCESS

GETTING INVOLVED WITH THE PROJECT

Generally speaking, my firm gets involved early in the process by assisting the architect during Schematic Design (SD).¹ It's very introductory at that point; for example, we have initial conversations about the size of the mechanical room. During Design Development (DD),² we present the architect with different options; we produce diagrams, write memos, and have meetings. We get the ball rolling by talking about the client's requests; at this point, we also talk about LEED,³ if that's something we're going to pursue. This is when we nail down some of the guidelines and start looking at which mechanical systems will be appropriate for the project. At the end of DD, we typically select the system that we are going to use, before proceeding into working Construction Documents (CD).⁴



DANA FONTES, P.E., LEED AP, is a Mechanical Engineer with SIDER + BYERS Associates, Inc. She is a graduate of the University of Washington.

ROLE IN THE PROJECT TEAM

I assisted with the selection of many system options for Kenyon House. Cost is always a factor, and I put together memos and forms for different systems and their costs early in the project. I was also the project manager on the job, and after the systems were selected I continued to go to meetings and work on the design.

Sometimes projects can have ongoing problems, specifically related to the construction phase, but this project had a familiar hydronic heat system and equipment which we've used many times. As a result, the project went smoothly. I also have to give credit to Christina⁵ of SMR Architects,⁶ because she did a great job managing the project.

¹ The Schematic Design phase is part of the design and delivery process, which consists of the following phases, listed in their order of sequence: Schematic Design, Design Development, Construction Documentation, and Construction Administration.

² Design Development (DD) is the second part of the design and delivery process, which consists of the following phases, listed in their order of sequence: Schematic Design, Design Development, Construction Documentation, and Construction Administration.

³ The Leadership in Energy and Environmental Design (LEED) Green Building Rating System, developed by the U.S. Green Building Council (USGBC), is a suite of voluntary standards for green buildings. It awards certifications at Certified, Silver, Gold, and Platinum levels.

⁴ The Construction Documentation phase is part of the design and delivery process, which consists of the following phases, listed in their order of sequence: Schematic Design, Design Development, Construction Documentation, and Construction Administration.

⁵ Christina Bollo is currently an architect at SMR Architects in Seattle, Washington. She was the project manager and architectural designer for Kenyon House.

⁶ SMR Architects is an architectural design firm located in Seattle, Washington which specializes in affordable housing and also designed Kenyon House.

University of Oregon Professor Alison G. Kwok, Advisor Nicholas B. Rajkovich, and research assistants Rachel B. Auerbach, Kristen B. DiStefano, Britni L. Jessup, and Amanda M. Rhodes prepared this narrative. © 2009 U.S. Green Building Council and the University of Oregon. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the permission of the USGBC.



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Front Door "For this project I did what we know how to do: design an energy efficient, comfortable, and low maintenance system... a project doesn't have to be on the cutting edge to be successful."

COMMUNICATION AND RESOURCES

I prefer having open communication during projects. I use phone, email, and meetings to obtain information and to coordinate with all the project team members. Sometimes architects want everything to go through them first, but often it's more efficient for the subconsultants — like the mechanical — to talk directly to the other members of the design team, such as the electrical engineer. The members of the design team know when there is an issue that requires

the architect to become involved, but that's what was great about Christina and SMR Architects: they allowed the design team members to communicate directly with each other.

II. DESIGN

ESTABLISHING PROJECT GOALS

Kenyon House was a standard project, in terms of mechanical systems. Our primary goal was to provide comfort for the occupants. We were hired to design a mechanical system that met all the design criteria set by ASHRAE⁷ and the State; that was our first priority. As an engineer, I want to provide an energy-efficient system that's durable and simple; I want to do that even if it's not a LEED project. In this particular case, some of the system decisions were influenced both by LEED and the desires of the owner. The owners felt that using a hydronic water system would serve their needs by being both energy efficient and LEED friendly; the system met their requirements for longevity and low maintenance.

For this project, I did what we know how to do: design an energy efficient, comfortable, and low maintenance system. I didn't do anything extravagant; it's a simple hydronic heating system with fin-tube radiators and a central, high-efficiency boiler system. It's just great that Kenyon House can be recognized as a LEED Platinum project. It shows that a project doesn't have to be on the cutting edge to be successful.

WORKING WITH THE PROJECT TEAM

During Schematic Design, I assist the architect with the building form; I want to make sure they know the physical sizes of the system elements. Then, the sizes of the mechanical equipment aren't a surprise as we go forward with the project. We proceed with system selection and coordinating mechanical spaces and size requirements with the architect during Design Development. Then, we develop Construction Documentation and also perform Construction Administration services. We didn't provide en-

⁷ ASHRAE stands for The American Society of Heating, Refrigerating and Air-Conditioning Engineers.

ergy modeling for Kenyon House; it didn't seem desirable or necessary on this particular project. I'm involved with a lot of LEED commercial projects; I do energy modeling for many of those projects, but it wasn't required by the LEED for Homes⁸ rating system. I also assist the owner by performing some cost estimations to define the budget. For Kenyon's load calculations, we used our standard computer software.

CHALLENGES OF THE PROJECT

There was only one frustrating challenge with LEED. We wanted to get the credit for EA 7.1 Efficient Hot Water Distribution, but were unable to do so. There are criteria which define the maximum length of pipe in a circulating system, and because our building was rectilinear, we couldn't make the length of pipe shorter. I know we have an efficient hot water distribution system, but that point wasn't available because of the building form. Our only option to meet that credit would have been to hook up the sinks without hot water, and obviously, we couldn't do that. That was a little frustrating, because we felt like we were meeting the intent of the credit, but due to the specifics, we weren't able to obtain it. Generally, using LEED and being more sustainable opens up opportunities for different system selections. Owners are open to a wider range of systems, and in this case, LEED reinforced the use of a central boiler plant with hydronic heating. LEED allows us to choose a variety of more efficient products.

After system selection, it was a pretty standard design for us. Typically in LEED projects, we utilize the score card and revisit that to make sure that we're meeting the intent of each of the points as we proceed with design.

TOOLS AND RESOURCES

The LEED resource guide and the internet are definitely helpful when problems arise, but for me, the most useful resource — one that I use a lot — is the ASHRAE book. However, on this

project I didn't have anything that was so complicated that it needed to be looked up.

When it comes to filling out forms, it's always easier to first look at what someone else has done instead of simply creating it again. To address this, LEED-NC needs more examples to accompany each of the points. LEED for Homes is more straightforward than LEED for New Construction, but the Home Efficiency Rating System (HERS)⁹ was not really appropriate to apply to a multi-family project. I don't know if there is another resource out there that LEED could use for that subject.

III. CONSTRUCTION INVOLVEMENT DURING THE CONSTRUCTION PROCESS

I also assist with the bidding process during construction. At that time, I go through prior approval requests for products, I review product submittals, and I answer questions and clarify the drawings. If there are any questions from the contractor, I deal with those as well. I answer RFIs,¹⁰ and I do some site visits. The number of site visits really depends on the job and the dollar amount of our contract. I also fill out forms for LEED and assist with energy incentives for public utilities when those are available. With Kenyon House, I worked with the local utility here and was able to acquire some money for the upgrade in the boiler system. The standards require 80% efficiency, and we went with 92% efficient boilers.

Submittal review gives me an opportunity to make sure that everything's going in the right direction. This portion of the project is critical because it addresses product selection. It's important to get the right products on the job so we can be as energy efficient as possible. That's a vital part of every job, not just LEED projects. Site visits are really useful for us, and we would love to be contracted to do more of them. With

8 LEED for Homes is a rating system that promotes the design and construction of high-performance green homes. Green homes use less energy, water and natural resources, create less waste, and are more durable and comfortable for occupants.

9 The Home Energy Rating System (HERS) is a standardized scoring system established by the Residential Energy Services Network (RESNET) to rate a home's energy efficiency and expected energy costs.

10 RFI stands for Request for Information, which is the standard protocol for receiving clarification from any party of the design team.

larger jobs, we typically go to the site about three times: at 50% completion, close to 100% completion, and then we usually follow up with a review to make sure they did the punch list. Kenyon was a fairly small job, and it wasn't necessary for us to be at the site that often.

COLLABORATION DURING CONSTRUCTION

It is important for us to be a part of the construction process; we are trying to protect the owner and their investment. We want to make sure that they get what they pay for and that they are able to achieve the goals they have set forth. There is no point in buying an energy efficient system if it's not installed properly, and ultimately, we want to make sure that people will be comfortable.

IV. OPERATIONS

THE COMMISSIONING PROCESS

Once Kenyon House was up and running, we received a few questions from the contractor; we are always available as a resource to help answer those questions. Once a building is running, we review the testing and balancing reports and make sure that those look right. We're supposed to have a commissioning report as part of the State energy code, but typically, that doesn't get done. It's just not being enforced at the inspection level. Often, we will get questions once the season changes; many times, the construction is completed during the summer, and the heating system doesn't kick on for two months.

OCCUPANT AND USER RELATIONSHIPS

I talked to Christina recently; she had been in contact with the owners, and they love the building. They said that everything's working really well. The only complaint — and it is minor — is that the boiler room is warm, which is making the room above it a little too warm. In hindsight, we should have put an exhaust in that room, and there may still be an opportunity to do that, just to evacuate some of that heat out of the boiler room. Christina mentioned possibly installing some extra insulation so that it didn't affect the neighboring rooms. Other than that, it seems like it's the right system for them. It's simple to

operate, efficient and comfortable. I would say we achieved our goals.

THE LEED CERTIFICATION PROCESS

In some ways, LEED is more stringent than it should be. For example, with the plumbing system distribution, we didn't meet the specific requirements for that point, but we felt that we met the intent. From that stand point, it would be nice if the LEED process for both LEED for Homes and LEED-NC allowed for some negotiations on each point. I know that implementing that might open up a Pandora's Box. You don't want people to get points when they haven't met the requirements, but every building is different. We aren't building cookie-cutter buildings that can exactly match each specific point.

ADVICE FOR FUTURE PROJECT TEAMS

It's great that the engineers have more of a voice when it comes to designing buildings. Often, architects tend to do most of the designing, which is great; they do fantastic work, but if they could broaden their spectrum a bit, then we could assist them with the design. Then, maybe the mechanical systems would work more efficiently and fit more efficiently within the building. We still want to achieve their vision for the project, but it's so helpful for us to be part of that early on. That is becoming more prevalent now with LEED and sustainable buildings. Architects are now more open to having us come in and talk about the project earlier. It would be great if the commissioning report could be enforced. I think that would be the single most useful thing to do. That way everybody knows that the system is working the way it's supposed to be working. It's so positive that we are heading in this direction, and as much as we all like to whine and complain about some of the paperwork — and there's a lot — LEED is good. It's doing good things for the industry. We just have to keep the bureaucracy to a minimum; that way it doesn't get in the way of the actual project.

This narrative is based on a phone interview conducted by Britni Jessup on September 25, 2009.

JAY TILLEY

SENIOR DESIGNER,
CIERRA ELECTRICAL GROUP

I. PROCESS

ROLE IN THE PROJECT TEAM

Cierra Electrical Group¹ did the electrical and lighting design for the Kenyon House project. Kenyon House came along shortly after we completed work on a very similar affordable housing project, and we were able to carry several of the elements from the previous project over to Kenyon. This firm has been involved with the project since the Schematic Design² phase. I came into the project late, about midway through the Design Development phase, and a good bit of work had been done by the time I stepped into my role. Some of the lighting schedule had already been selected, but the fine-tuning was left up to me and I completed the lighting design for the project.



JAY TILLEY has been a Senior Designer with Cierra Electrical Group since he joined the firm in 2006. He was previously a Controls Specialist with Milligan + Associates of Seattle. Jay attended the College of Southern Idaho.

GETTING INVOLVED IN THE PROJECT

We got involved with Kenyon House because of the carryover from the previous project. We had developed a relationship with the architecture firm; they knew us, and they knew our capabilities. They also knew that we were priced right for the project; that's a large concern, of course.

ESTABLISHING PROJECT GOALS

This type of project is vastly different for us. It's affordable housing, so obviously, the cost is going to be a larger concern than in many of the typical commercial projects that we do. The budget for Kenyon House was more of a concern than the budgets of our typical multifamily residential projects. We always want to make sure that the lifecycle costs are low.

We have a good history of working on retirement homes, nursing homes and things like that. Those are projects where the client wants to make a statement at the entrance, in order to let people know that it's a place where their family member is going to be well cared for. As a result, they have a greater budget for that visual statement. With affordable housing, the biggest concern is the budget. They want to know that the fixtures and electrical equipment

¹ Cierra Electrical Group is an electrical and lighting design firm located in Seattle, Washington.

² The Schematic Design phase is part of the design and delivery process, which consists of the following phases, listed in their order of sequence: Schematic Design, Design Development, Construction Documentation, and Construction Administration.

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are going to last so that the operating costs stay low. We were able to do that with Kenyon House. We knew upfront that we needed to be very conscious of the budget, and knowing that informed our decisions from the very beginning.

II. DESIGN

WORKING WITH THE PROJECT TEAM

Typically, at the beginning of a project, we'll go over what the architects' ideas are for the design and find out where they want to have the best visual impact. We focus on these areas and allow ourselves to save money in other areas where it won't sacrifice the aesthetic integrity. That conversation helps us understand what direction we should go in with the lighting design. We need to understand from the beginning what design decisions have already been made. We want to know what type of electrical distribution is available. We need to know whether or not we have to deal with service upgrades.

Early on in Design Development, we start putting together lighting packages. By coordinating with the architect, we find out whether we're approaching the project in the same way. We're able to fine-tune the proposed fixture selections and get a project that looks good, but that takes a lot of initial communication with the architect.

With Kenyon House, we specified many of the same fixtures that were used on a previous project which involved a similar type of housing. I was able to identify a couple of areas that needed to look nicer and which required some extra attention. The first focus was the dining area and the second focus was the main entry space. The main entrances have beautiful, two-story areas, and we wanted those to have a good visual impact on people when they entered the building. By communicating with the architects, I understood the key areas better; I could pick the right fixtures to go in those places while still remaining budget-conscious. I also made sure that the fixtures were low-wattage and that they would provide a good amount of light.

PROJECT TEAM COMMUNICATION

I should have communicated more with the architect face to face. We communicated quite a bit through email, but you don't have the same type of flow if you have the architect look at a cut sheet via email and send it back with comments. You don't get a sense for what the architects are thinking if you can't see their faces. They can see a fixture and immediately know whether it's something they can work into their design. Having more face-to-face meetings would have allowed us to discuss issues and work together more effectively.

DESIGN TOOLS AND TECHNOLOGIES

We based our decisions for the interior lighting design of Kenyon House on experience. We completed quite a few calculations on the previous job and we knew that with a certain lamping and spacing of the fixtures, we were going to get the lighting levels that we needed. The exterior was quite a bit different than the previous project, and I ran several calculations using photometric software to predict what was going to happen on the exterior of the building. I did quite a few of those calculations for Kenyon House.

We primarily use AGI32³ for our lighting calculations. I also use lighting design software called Visual.⁴ When I check for accuracy, I double-check to make sure that the IES⁵ files that we plug into the program and those provided by the manufacturer, have the right settings. I've seen some situations when the manufacturer is a little generous with the lighting data. By checking to make sure that the lumen output is correct for the chosen lamp, I can make sure that the analysis is done correctly. My experience has been acquired through trial-and-error. I do a lighting design, and then I go out and check it after it's built. I can tell if the software is accurate. I knew the software was capable of giving us a good prediction for Kenyon House, and I just had to make sure that all the settings were correct.

³ Agi32 is lighting analysis software that calculates lighting levels and produces renderings for use in electrical and daylighting design.

⁴ Visual is design software that combines lighting calculation tools with 3D modeling software to provide an analysis tool for interior and exterior lighting design.

⁵ IES stands for the Illuminating Engineering Society of North America's Photometric file.

We've learned to trust the software after using it two or three times. We do work with some municipalities that are pickier than others, as far as getting exactly the lighting levels that they require. We've had inspectors go along with a light meter, and we know that we need to be really careful with our predictions. In those situations, we've been able to test the existing conditions against the model's predictions, but it's not something we have to do very frequently.

GRANTS AND INCENTIVES

We were already going for the Seattle City Light,⁶ BUILT SMART⁷ program, and simply meeting the Seattle energy code requirements allowed us to fulfill a lot of the LEED objectives simultaneously. We were working toward the BUILT SMART program requirements so that we could get the maximum rebates from Seattle City Light.

For example, Seattle City Light gives \$25 for each fixture installed in the individual dwelling units. Most of the time with residential projects, we would just install an outlet, that may or may not have a switch connected to it, and the resident would have the option to plug in whatever they wanted. However, if we install a hardwired fixture we can control exactly how much wattage that unit is using. So, the BUILT SMART program rewards you for controlling the wattage in the room by giving you a rebate. The same thing happens with the lighting controls. The more lighting controls we have, the more rebates we get. Basically, they're offsetting the cost of the lighting controls and installation by reimbursing us \$30 per wall mounted lighting control. They're repaying the cost of buying and installing each switch that we put in to control a different group of area lighting.

If I were to show three light switches for three fixtures in a residential unit, it would normally be considered overkill. That would throw up red flags for many people on the design team. If I'm able to show that the cost of the switches is offset by the rebates the client is going to receive,

then there's no additional cost. In fact, we're saving some money. These rebates allow me to create a good, smart lighting design without having to worry about it being value engineered out at the end of the project. I'm able to make design decisions which are environmentally conscious, and really, the most financially conscious for the residents. The client saves money on the power bills, and those rebates allow me the freedom to do what I really want to do — what I need to do.

Just about every utility has some sort of rebate program for retrofitting fixtures, using good lighting design, and employing energy-saving lighting. It's a huge trend. We were able to have a design upfront that we knew was going to last through the entire project.

TECHNOLOGIES

We didn't use the variety of lighting controls for Kenyon House that we might use in other projects, but we did a couple of things that are going to be really useful for the residents. We primarily used manual controls in the residential units. Typically, there's a fixture over the sleeping area and another one in the kitchen. Instead of connecting those together, we added a separate switch for each one. This allows the resident to control his or her own environment more effectively. Having those options allows the residents to turn on only the fixtures they really need at the time, which saves energy. The corridor and exterior lighting are on a relay panel with a time clock. The panel was programmed with an astronomic time clock: an hour before the sun is supposed to go down, the exterior lights turn on, and the metal halide fixtures are fully operational by the time the sun actually sets. That way they don't ever have an issue with the parking lot being dark. The time clock also has a photocell so that the lights are turned on during overcast days and turned off on bright days. The time clock controls both the interior and exterior fixtures.

Finding fixtures with a low wattage and good lighting distribution is one of the biggest challenges we face. It's difficult to find a fixture that saves energy and is actually attractive. With a residence like Kenyon House, I have to feel com-

⁶ Seattle City Light is a publicly-owned utility that delivers power to Seattle, WA.

⁷ BUILT SMART is a program backed by Seattle City Light. The program establishes standards for building efficiency and offers incentives for meeting this set of criteria. BUILT SMART is a certification available in the Seattle, WA.



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Studio Panorama "I pulled a lot of ideas for Kenyon House from the job we had done before... finding fixtures with a low wattage and good lighting distribution is one of the biggest challenges we face."

fortable putting a fixture on a project. The same people are going to see the same fixtures every day, and I don't want them to get tired of a certain fixture. That is my biggest concern. After that, I start fine-tuning the design and making sure that the fixtures are placed in the right locations.

DESIGN RESOURCES

Usually, I have an initial idea of what I want in a fixture. If I have an idea of what I want a particular fixture to look like, then I call the lighting representatives in the area. They know their line, and they know what they have available. They're excited to help me, too. They always come up with new ideas. The internet is also an important resource. I can paw through dozens and dozens of product lines and then narrow it down really quickly that way. Of course, catalogs are still an important resource.

Right now, everybody is trying to be as energy-conscious as possible. Everyone's trying to develop a good LED⁸ fixture to meet the needs of any circumstance. We're seeing LED downlights and LED exterior and area lighting. LEDs are definitely a big trend, but it's really just been in the last year that LEDs have advanced far enough to be used in a general applications. We

didn't use LED lighting in Kenyon House; in the past, the fixtures have been very expensive, and they are only now starting to come down. That product still has a way to go, but it's good to see manufacturers trying.

Sometimes we'll find product lines — or particularly architects will find product lines — where the fixture has a particular look that's perfect for them, but that line is not represented locally. My firm tries to stick with products that are locally represented. That way, if there's a problem during construction, the contractor has a local representative whom they can go to in order to correct any problems or errors.

DESIGN CHALLENGES AND SOLUTIONS

For Kenyon House, there were some challenges during design. The ceiling height changes mid-way in the upstairs corridor, and then it changes back. That was something that wasn't caught until fairly late in the design process, and we suddenly had a problem. We were able to catch the issue early enough that it required only a simple change in the fixture schedule. That corridor is an area which is visible from the entries, but it's on the second floor, and it wasn't something that I thought about. Normally, I visualize a person walking into the building through the entry, and usually, they're not going to see any of the second floor corridor fixtures. On Kenyon, I

⁸ LED stands for Light Emitting Diode which has many advantages over traditional light sources including lower energy consumption, longer lifetime, smaller size, and faster switching.

had to make sure that the fixtures coordinated across the board. That was an interesting challenge, but it was fun selecting a set of fixtures that matched.

One of the 3D modeling tools that's being developed now, Revit, will help us avoid those types of problems in the future, at least as far as the coordination is concerned. If we'd had a 3D model going into the project, it would have been easy to spot that issue, but the building was presented to us on a 2D plan. We have to be able to look at the plans and visualize them in 3D in order to really understand the building. Having new 3D tools will make that a much easier task, and we'd be able to regularly use that software as a predictive tool. Architects are usually the first ones to really grasp onto those tools, because they're dealing with three dimensions all the time. As a result, they're the best at visualizing the entire project in all three dimensions. As electrical engineers, we just figure out where the outlets go. We're dealing with transformers that will fit in a room, and we don't really care what the elevation looks like. Lighting designers want to be more three dimensionally aware. We have predictive tools, as well. AGi32, for example, is a 3D modeling tool. We're becoming a lot more familiar with what's happening in every dimension.

Right now, we're not able to use Revit effectively. That's just starting to be developed for lighting design, because the models of fixtures are complex. It's either going to take the architects or the lighting designers quite a while to actually build the 3D models for each particular fixture. We're hoping that eventually the manufacturers are going to start providing those for us, but so far, they're not yet doing that. Primarily, we do our work in the 2D program, AutoCAD. The architect gets that information and incorporates it into the Revit model.

III. CONSTRUCTION

COLLABORATION DURING CONSTRUCTION

In this area, lighting systems are presented as a package. It doesn't happen that way all over the country. A lot times, it'll be done item-by-item.

In Seattle, lighting packages come from the manufacturer's representatives; they supply everything. The contractor goes to the lighting representative to put the submittals together for us to review; then we make sure that anything that needs to be substituted is going to be of the same quality that we specified. When a substitution occurs, then we are concerned about the performance of each fixture. The lighting designers' most important task during construction is to make sure that the products we specify and the designs we create are being represented well. We make sure those products are actually being installed. There are, of course, coordination issues that have to be resolved, such as if a new mechanical duct has to be put in and a fixture has to be moved to do so. We get involved for issues like that, but luckily, there weren't many on Kenyon House. It was designed very well. Typically, after the bid has happened, our contact is primarily with the contractor. The contractor is the person who deals with the distributors and reps., at least as far as the submittals are concerned. We get the submittals from the contractor after they've already bid the job.

My communication with the contractor goes through the architect. The architect is the official avenue for requests for information (RFIs).⁹ The contractor will submit an RFI to the architect, and the architect will submit it to rest of the team. Often, we'll get an RFI that will cover all the different disciplines; we check our specific portion to see if we have to go in and answer questions or make some minor alterations. Then, we submit it back through the architect, and he or she distributes it to the rest of the team. Even if we're only making a small change, it's important that happens, because that change might affect something mechanical that we didn't even notice. We're just not as familiar with the mechanical systems. There also might be a structural issue. If the structural engineer has a minor change, they need to let us know, in case we were expecting a particular recess depth for the lighting fixture installation. Having the architect send that communication to the entire team is really important, because that helps us stay coordinated throughout the entire

⁹ RFI stands for Request for Information, which is the standard protocol for receiving clarification from any party of the design team.

project. That's typically the way it happens. Occasionally, when we get to a specific problem we will start working directly with the contractor. In that case, we just copy the architects so they stay informed, but our line of communication goes directly through the contractor. That can often be the quickest and most economical way for everyone involved to solve problems.

There isn't really anything I would have done differently during the construction phase of Kenyon House. We coordinated the project really well, and it's a fairly simple project. There aren't a lot of areas that could have gotten complicated. We went in for a little earlier punchlist than we normally do, and we were able to catch a couple of things ahead of time that allowed us to coordinate a little better. Kenyon House went really well.

IV. OPERATIONS

THE COMMISSIONING PROCESS

Commissioning is required by the state of Washington. Typically, the commissioning process starts with the commissioning agent, whether that is the reps' lighting controls specialist or a specific commissioning agent. They get in touch with the owner and can determine exactly what the schedule needs to be. We like to find that out ahead of time in order to create a schedule that the commissioning agent can use to begin programming his panel. They figure out what should be on a photocell, what should just be on a time clock and what should be on both. The commissioning agent sets up the program and completes user training at the same time.

Kenyon House was fairly simple, but on more complex projects, the owner often wants to integrate multiple systems into the controls. Sometimes we discourage having HVAC and lighting tied together, but it depends on the complexity of the total lighting controls and what the owner and the lighting designer are trying to accomplish within the building.

For Kenyon House, we specified a commissioning agent. The commissioning agent can be a controls person sent by the lighting representative to program the lighting control panel, or it

could be the contractor. These days, many contractors are familiar enough with the control panels that they can do their own programming. Sometimes there are commissioning agencies that will commission both the mechanical and lighting controls. I'm not sure which was used on Kenyon House. I think a rep sent out a lighting controls specialist to do the programming.

OCCUPANT AND USER RELATIONSHIPS

We specify that the commissioning agent hold a two-hour training session for the facilities folks during the initial startup and programming; then, they must do it again, 60 days later. That way, the facilities people have some experience with the facility, and they can have the rep come back in to tweak the systems. They can get anything fixed that's not working the way it was intended to work. It allows them a second chance to fine tune things. In general, we don't really do a lot of training for the residents. So, in our design process we have to make it as simple and as easy as possible for someone to step in and be able to use the controls. They shouldn't have to struggle to figure out what's going on. It should be natural for them. That's why we try to use a standard lighting switch or an occupancy sensor that doesn't need to be adjusted. That way the residents are comfortable as soon as they walk in.

The lighting system in Kenyon is practically automatic, and the staff doesn't have to worry about it. They have plenty of other things they need to deal with on a daily basis, and they shouldn't have to worry about how the lighting system works. That's how lighting controls should really be. You set them up once, and then you just let them run.

BUILDING OPERATIONS

I don't really see a trend with integrated design controls. It's more a question of the capabilities of the maintenance people and the possibilities within the budget of the project. Many times, if the project is large enough and the owners are environmentally or financially conscious enough, they understand that saving energy means they're saving money. The better the integrated system is, the more money and energy savings they're going to be able to attain. For ex-

ample, in Kenyon House there was no way they were going to be able to afford a building management system or integrated lighting control. They couldn't do anything fancy, but I was able to provide a relay panel equipped with a photocell and a built-in time clock that allowed them to get quite a bit of savings on their energy usage. It was a pretty simple and cost effective strategy, but what we do really depends on the budget of the project.

LESSONS LEARNED

We've learned that we don't have to specify high-end fixtures to be able to get something that looks good. We've also learned that we can have an energy efficient fixture in an area where we wouldn't have considered one in the past. Basing all the decisions on the cost of the fixtures and the project, forced us to discover products that we hadn't thought about for the larger budget commercial projects.

THE LEED CERTIFICATION PROCESS

I hope that LEED can evolve in the future. There are so many areas where I feel there could be better requirements and available credits. They need to make more credits available for saving energy with the lighting, like having controls built into fixtures. Many lighting manufacturers have photocells that can be built into the fixture, but there's no specific credit that's available for the individual control of fixtures. There are credits for controlling fixtures and controlling fixtures within the daylighting zone, but as far as Washington State is concerned, that's already mandatory.

Currently LEED is not pushing us to provide better and better lighting designs; it's not pushing us toward more environmentally friendly or cost effective designs. If extra LEED credits were available for those things, then we would be encouraged to go after those points and be more aggressive in our designs. That would give us the freedom to really address those issues. As a lighting designer, I want to provide really cool lighting designs that are going to save a lot of energy. Often, though, the budget isn't there for that. If I had more encouragement through LEED, then that would be something that I

could accomplish. It would also encourage the manufacturers to change their products, and in this case, to have standard occupant and daylight sensors built-in.

This narrative is based on a video- and audiotaped interview conducted by Kristen DiStefano on August 18, 2009, at the offices of Cierra Electrical in Seattle, WA.

ELLY BUNZENDAHL

SUSTAINABILITY CONSULTANT,
O'BRIEN & COMPANY

I. PROCESS

GETTING INVOLVED IN THE PROJECT

I started working at O'Brien & Company¹ the week before Christina² called and told us about this project. She said they had started construction, but she had been using the LEED for Homes³ Reference Guide the whole time and thought we could achieve a Gold rating. She asked what we could do since we're the LEED for Homes provider in the area. We talked about it and looked at what they had: the design so far, all of their integrated team meetings, and the experience of all the team members. We did a preliminary rating, and just as she said, they were really on the ball; so we registered the project. Housing Resources Group (HRG)⁴ approved the registration, and we were on-board right away. Typically, there is a pre-construction meeting, but since they were already under construction, we incorporated some of those topics into a meeting at the job shack, where we went through a lot of the air sealing details and the durability issues. We went through the checklist with the whole project team and laid out a schedule for inspections, check-ins, and additional meetings.

ROLE IN THE PROJECT TEAM

Our contracts with clients vary in terms of our involvement and vary depending on whether the project is pursuing LEED for Homes, Built Green,⁵ ENERGY STAR,⁶ tax credits, or general sustainability consulting. We encourage the client to include onsite inspections because that is where challenges and opportunities come up and are easily identified and corrected. Our po-



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¹ O'Brien & Company is a sustainability and green building consulting firm in Seattle, Washington.

² Christina Bollo is currently an architect at SMR Architects in Seattle, Washington. She was the project manager and architectural designer for Kenyon House.

³ At the time of this project, LEED (Leadership in Energy and Environmental Design) was in pilot stages of establishing the LEED for Homes guide, which is specific to sustainability issues related to housing.

⁴ Housing Resources Group (HRG) is a nonprofit organization whose mission is to promote the availability of affordable housing. HRG is the co-owner and developer for the Kenyon House project.

⁵ Built Green is an environmentally-friendly, non-profit, residential building program of the Master Builders Association of King and Snohomish Counties, developed in partnership with King County, Snohomish County, and other agencies in Washington State.

⁶ ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping Americans save money and protect the environment through energy efficient products and practices.

University of Oregon Professor Alison G. Kwok, Advisor Nicholas B. Rajkovich, and research assistants Rachel B. Auerbach, Kristen B. DiStefano, Britni L. Jessup, and Amanda M. Rhodes prepared this narrative. © 2009 U.S. Green Building Council and the University of Oregon. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the permission of the USGBC.

tential impact on the project is larger before the walls close up, before everything else goes in, or before the tub surround goes in, as in the case of Kenyon House. We try to work onsite inspections into the contracts, as much as possible, especially in multi-family projects or projects where construction is staged and we can go see the first stages and correct the problems before other stages begin. This enables everyone onsite to know what's expected and how the verification happens. Depending on how the first, or first few inspections go, the frequency of the onsite inspections may decrease over the course of a project, but the first few are really critical. Depending on the requirements of the rating system, the project team may take photos or call us out to the site if they have questions in subsequent stages of the project.

We include site visits and our expectations in the budget of the original proposal. Very rarely would the site-visit portion ever get cut. Perhaps a detailed specifications review may be paired down a little bit, but we would still want to look at the plans and the specs, and perform the onsite inspections.

II. DESIGN

DESIGN STRATEGIES

Christina established a really nice foundation for the whole project to be certified. She wanted to use the LEED for Homes Reference Guide as a checklist for her work, whether or not the project was going to pursue certification. Also, it was apparent throughout the whole project that Christina's architecture school⁷ actually had a building science emphasis. Her knowledge and our conversations about the project made that obvious. There were already durability and energy efficiency features built into the design, which came both from her background and from using the LEED for Homes Reference Guide; those were really valuable for the project.

We always start out with a list of prerequisites and go through that list with the whole project team to make sure all those prerequisites are

being met; that happens pretty early on when we're called ahead of time. For this project, we went through that list during the preliminary rating and checked many things off, but the paper-faced drywall issue came up a little later than we would have liked. The Green Rater⁸ for this project is also an O'Brien & Company employee. During one of the inspections, he noticed that there was paper-faced drywall behind the location where the tub enclosures were to go, and that's not allowed. He immediately put the flag up, called the appropriate project contacts, and scheduled a meeting to determine corrective actions. We submitted a CIR⁹ and determined that the type of drywall they were using, even though it was paper-faced, could meet the requirements, especially since they applied another layer of primer over top of it. That issue was resolved, but it was stressful and required a lot of meetings and phone calls to figure out a solution. We now bring up that issue in every initial conversation with all our other projects.

ADDITIONAL RESOURCES

Another important aspect of this project, and the decisions that were made early on, was that the architect hired a Universal Design¹⁰ consultant. There were carefully constructed pieces coming together throughout the project in order to make it accessible and inviting to all residents and visitors.

III. CONSTRUCTION

ON-SITE INVOLVEMENT

It's especially important that site visits occur at the right times. We were onsite at least four times during this project. We planned to be there before the insulation was finished so that we could inspect it, and luckily the insulator

⁷ Christina received her M. Arch degree from the Architecture school at the University of Oregon.

⁸ LEED for Homes requires a third party inspection of many systems, including insulation and duct sealing, to obtain certification. The person who carries out these inspections is called a "Green Rater."

⁹ A Credit Interpretation Request and Ruling (CIR) is a process by which a process by which the organization or seeking a LEED certification for a project can seek a ruling from the USGBC as to suitability of an approach toward securing one specific LEED point.

¹⁰ Universal Design Consultants promote equity and accessibility for all potential users of the building, regardless of physical or mental ability.



© Josh Partee 2009

Studio Apartment "Our site visits are very important, and it's especially important that they occur at the right times."

was onsite when we were there and could correct some of the problems that we saw. They sent someone who was less trained than they would usually send. In general, that subcontractor does a very good job, but they didn't realize the stipulations and the quality expectations of this project. Walsh Construction¹¹ added more instruction and oversight, and the subcontractors did an excellent, Grade 1¹² job in the end.

We were also involved in the air sealing inspection. It was the first experience for the folks on the job site from Walsh Construction to have expectations that high for air sealing. They were already doing a fairly decent job, but there were still a few things that they overlooked just because they don't typically seal every possible penetration on a regular basis. They've noted that they will start doing it on a regular basis

and their practices will change, just based on the outcome of this project and how well it worked. It's a lot easier to plan ahead and integrate strategies into the project ahead of time than to go back and have to redo things later.

MANAGING THE PROJECT

Our role during construction varies from project to project, especially depending on who the client is, how we are involved, and the experience of the client. Some folks have a lot of experience, and in that case we may have more of a mentoring role. We'll end up just checking on a few project details here and there. Other clients may have very little sustainability experience, and then we're involved in checking everything. In that case, we're looking at plans and specifications every step of the way; we're present, with all the sub-consultants, at most of the consultant meetings, and we're really providing whatever support is necessary to inform the client of how they can best choose options or tweak the design.

¹¹ Walsh Construction Co. is a general contractor with offices in Portland and Seattle. The firm was the general contractor for Kenyon House.

¹² Grade 1 refers to a high quality installation of insulation such that only very small gaps are acceptable.



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Exit to the Backyard "An earlier energy model could have informed the design, but, at the same time, using it as a measuring tool at the very end still helped us show how well it was assembled and it verified our assumptions.

CHALLENGES ON THE PROJECT

Other than the paper-faced drywall, we didn't have any other difficulties during construction. During Christina's initial assessment, she thought that Gold would be attainable and that was on the table at all of the meetings. We thought about how we could keep the project at the Gold level. It wasn't until it dawned on us that there is no cooling in this building that we realized that we needed to do an energy model. Until that point, we were us-

ing the prescriptive pathway¹³ in the Energy and Atmosphere category, which gave us a sufficient amount of points, just based on the insulation levels and the decent windows they were using. In this area, even though we don't need cooling, we still have to model the building for LEED to show that the building will be comfortable for the occupants without cooling. The design was really well done, as far as solar orientation, shading, and natural ventilation, which they were able to maximize by fighting the local ordinance to reposition the building on the lot. The local ordinance dictated that the building footprint needed to align north and south along the property line. SMR¹⁴ and Christina Bollo really fought to reorient the building so that there was better solar orientation. On the south side they used really great overhangs and windows. The building was designed well from the very beginning. Additionally, it's a multifamily building, so there were a lot of energy benefits to the common walls. Once we ran the energy model, we realized that they were going to get quite a few more points.

Walsh really did a great job of tracking all the materials, and HRG made sure there was enough money for the finishes to qualify for the Materials and Resources¹⁵ Credit 2.2. They really maxed out that whole category. In addition to the eight maximum points, they also received some extra points in that category, due to the commitment of HRG and the fact that they really respect the future occupants; a lot of those credits have to do with quality of the indoor materials. Walsh Construction's organization of the materials and documentation of what was installed really helped. They made a great table and kept track of the materials that helped achieve the points. At that point, we realized that we actually could achieve Platinum. Even during the final certification phone call, there was either a half point or a whole point that we'd overlooked. We received that additional point. The project achieved

¹³ The prescriptive pathway allows projects to obtain some of the points available in the Energy and Atmosphere category with less documentation than a complete energy model of the project. This pathway can be used most often in smaller projects with tighter budgets where computer-aided modeling is not an option.

¹⁴ SMR Architects is an architectural design firm located in Seattle, Washington that specializes in affordable housing and designed Kenyon House.

¹⁵ Materials and Resources is a category of credits in the LEED for Homes program, which focuses on the sourcing and sustainability of materials and resources.

Platinum, which was really great for the whole project team. In this case, the LEED certification served to verify the whole project, instead of the project using LEED as a goal to shoot for the whole time. It was really a measure of how well the project team did throughout the whole design and construction process.

O'Brien & Company completed the energy modeling for Kenyon House. It was so late in the game when we did the energy modeling; the building was already built and everything was already in place. We had completed the onsite inspections and performance testing. We plugged in actual numbers for the air infiltration rates and the insulation grading; the model was definitely a measuring tool at the end, and was not predictive at that point. Christina said that if she had run the model ahead of time, she likely would have tried to convince the team to install exterior rigid insulation to increase the insulation value of the whole building because of the thermal bridging between the building materials. There's an excellent rainscreen siding assembly on this building, which is very appropriate for this region; at the same time, there's still thermal bridging with the studs. There is quite a bit of exterior wall with this building. I think an earlier energy model could have informed the design, but, at the same time, using it as a measuring tool at the very end still helped us show how well it was assembled and it verified our assumptions.

We don't use a particular, formal tool for actual energy information at this point. We have baseline energy-use data that we can look at for the region, state, country, or era that a home was built in order to find out what an average energy-use per square foot value might be. We can use that for comparison with a project.

COMMUNICATION AND RESOURCES

I would have liked to involve the subcontractors in some of the job-shack meetings. Even though this is pie-in-the-sky thinking and an ideal situation for every project, the reality is that subcontractors don't want to pay for the extra time onsite for a meeting or do extraneous work. Having them at part of at least one initial meeting in order to go through all of the expectations

of the project, be it air sealing or insulation, helps them to know the quality that's expected of them, what it all means, and why it matters. Many times, if you can explain and describe the reasons behind a decision and show them the end result, then it will really help convince them that their job is important. Usually, they'll do a better job. I don't mean just using LEED certification as an incentive; you have to explain that using less insulation in this wall means that part of the wall is going to be cold, water will condense, and mold will grow. Then, the person living there, who already has fragile health, is going to become sicker.

Outlining expectations in the subcontractors' contracts helps as well. Communicating with the contractor and encouraging them to include the expectations of quality into the subcontractors' contracts is really important. For example, it is necessary to make sure that the contract that says the insulation installation will be Grade 1, with pictures of what Grade 1 installation actually means. They need to show that all of the holes and penetrations need to be sealed, and then include pictures of what that means; this is really critical for the whole job to be completed correctly. For example, with the air sealing, we got to the very end, and even though we had been back twice during the air sealing to make sure they had it right, the electrical panels were installed and there were a couple of small plumbing runs that might not have been sealed in between the units. That doesn't seem like it's going to affect the energy use or airflow, but the overall goal of the project was to build very airtight units. Communicating that to the whole project team, making sure they know why we want the units to be compartmentalized and why we want them really airtight, might have helped them realize just how careful they needed to be with every single penetration.

IV. OPERATIONS TOOLS AND RESOURCES

We haven't yet begun to keep track of the building performance metrics as a resource, and the modeling program that we use for residential

projects, REM/Rate,¹⁶ is not as robust as all of us would like it to be. It is a rudimentary model, and it's only as good as the information that we put in; even then, there are limitations. We definitely look at best practices and strategies to upgrade the building envelope components. At this point, we have not yet put in the resources, time, or effort into the post-occupancy evaluations of any of our buildings. We've offered that to clients; we just haven't had any takers yet. It will be interesting, especially with Kenyon House, to see how it is being occupied and how the energy bills reflect the energy system in the building.

GAPS IN RESOURCES

One third of O'Brien & Company's work is through our Sustainable Development Training Institute. We develop curriculum and create educational products and tools; it's a main part of our work as well. We incorporate that into our contracts whenever possible. We're always involving that educational component, even with Kenyon House, even if it is underlying. For job shack meetings, we bring educational tools like air sealing diagrams and handouts to show photos of the expectations. We looked at the occupant manual that Christina created, and we walked around to look at the signage they had installed for all the green, energy saving, comfort, and accessibility features within the house.

We've developed operations and maintenance (O & M) guidelines, and we're willing to train operations and maintenance staff, as well as the building occupants.

SHIFTING SKILLS

Our company is a metaphor for sustainability, because we have three departments, or branches, just like sustainability has three legs. That's really what has kept us strong. Over time, those legs do shift a little, and right now, with the downturn in the economy, we're seeing a little less development and construction. Our education and programs branches, as well as the plan-

ning and policy portion, are definitely growing.

In this very tight region, as recycling infrastructure continues to improve, and contractors become really savvy and have a very high waste-diversion rate, we have less of a need to really hammer down on the waste management plans. That frees up more time to actually look at what materials are being specified, and where they come from. As we all improve, the whole industry improves its practices and increases its knowledge about certain areas. Now other areas can become strong and really be emphasized, and the web of knowledge can expand.

THE LEED CERTIFICATION PROCESS

LEED certification will hopefully become more difficult to achieve as it changes the industry and raises the bar. It will definitely be more prevalent among developers; we're already seeing increases in the numbers of participants and registrations. As more people learn about green building and that it is the right way to build, then that way of building just becomes building and not necessarily "green" building. At that point, the certification should be more robust and difficult, and it should continually result in a higher standard of building.

LEED CREDIT CHALLENGES

One hurdle in documenting the LEED process, especially since we started so late, was that we needed accountability forms from consultants who had been off the project for quite a while. They completed their work, their contract was over, and traditionally, they weren't needed on the project anymore. Christina had to go back to them and say that we were pursuing LEED certification, and we needed them to fill out an accountability form. Had we known about LEED from the beginning of the project, it would have been a little less daunting a task. I don't think anyone was unwilling to provide that information, but it was months later when they received the phone call about a project they had already signed, sealed, and delivered; it was difficult to fit that into the schedule. It would be easier if, at the very beginning, all the consultants were aware that we were going to ask for an account-

¹⁶ REM/Rate is software developed specifically for residential energy modeling needs. It helps to generate the HERS (Home Energy Rating), which determines the predictive energy efficiency of a planned home.

ability form and certain documentation. That was really the only small challenge with the LEED documentation process, and Christina took care of it and maintained a really great project binder with all the necessary documentation.

We could have achieved even more points. One example is the showerheads. HRG said they'd find funding to upgrade to better, low-flow showerheads. The very efficient showerheads were approved during construction, but after the specifications had been written. Walsh Construction was unable to source them within that limited timeline. The ADA hand-held showerheads did not meet the upgrade requirements for HRG, and they didn't end up getting that point. So, HRG received money back. Although the very efficient fixtures were not installed, there was a commitment on everyone's part to upgrade the showerheads. If that decision had been made earlier in the design phase, then it could have worked, but the materials were already specified. The showerheads that were installed were a part of HRG's normal package, and Walsh really did a great job installing them. Christina had already specified the materials that were most appropriate for this clientele, so the fixtures that were installed were great. Timing is crucial during all phases of any project, especially a LEED Platinum project.

This narrative is based on a video- and audiotaped interview conducted by Kristen DiStefano on August 19, 2009, at the offices of O'Brien & Company in Seattle, WA.

Developer

Architect

Contractor

Engineer

Lighting Designer

Consultant

Program Coordinator

ANNAMARIA DOWNEY

PROGRAM COORDINATOR,
SOUND MENTAL HEALTH

I. PROCESS

GETTING INVOLVED IN THE PROJECT

As the Program Coordinator for Kenyon House, I work here through Sound Mental Health (SMH),¹ where we do case management and run clinical programs onsite for the tenants. My job is to supervise the clinicians, the residential housing manager, and the housing support staff. They deal with crisis intervention, clinical services, and case management for the tenants. I have a lot of interaction with the tenants of Kenyon House.

I became involved with the project in October, when we started housing tenants. So, my relationships with Housing Resources Group (HRG)² and Building Changes³ have been pretty minimal. Building Changes was involved earlier in the project, and HRG was involved in planning the development of the project. There were other staff members from SMH who were more involved than I was in the initial planning and design phases.

II. DESIGN

LEED CERTIFICATION

Kenyon House has such unique features that really make it interesting. The way that it's designed does foster a desire to learn more about healthy living. It doesn't really take much encouragement to learn how to do something differently, especially if it's helping the environment and using less energy.

The fact that Kenyon House is a green building serves as a focus point to educate the tenants



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¹ Sound Mental Health, of Seattle, Washington, seeks to improve the lives of its clients by delivering excellent health and human services tailored to meet their needs. The organization handles the property and building management for Kenyon House.

² Housing Resources Group is a nonprofit housing organization in Seattle, Washington. The organization specializes in affordable housing and served as the developer for Kenyon House.

³ Building Changes is a nonprofit organization in Seattle, Washington, that engages in a multi-faceted approach to ensure that housing and service delivery systems meet the needs of all homeless populations. Its activities serve approximately 8,000 individuals annually. Building Changes serves as the long-term owner of Kenyon House.

University of Oregon Professor Alison G. Kwok, Advisor Nicholas B. Rajkovich, and research assistants Rachel B. Auerbach, Kristen B. DiStefano, Britni L. Jessup, and Amanda M. Rhodes prepared this narrative. © 2009 U.S. Green Building Council and the University of Oregon. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the permission of the USGBC.

about how to have a normal routine and how to maintain cleanliness in their apartments. We focus on the fact that this is a green building, and as a result, the residents take a more active role in the building itself. I don't think that they would have this motivation if the building weren't built this way.

There are advantages to this type of building, because even though the tenants are living life normally, they're thinking twice about their choices. I don't think many of the residents would have actively taken the steps to recycle or to use less water or less energy on their own if there hadn't been a building constructed to help them do that. This environmental awareness helps raise their awareness of their own well-being. There are also people here who are educated about the building and are determined to educate each resident about the building while he or she lives here. We probably wouldn't have been prompted to educate them about being environmentally aware had the building not been designed in this way. There are definitely advantages to buildings like this: it was set up to help people change their lives.

III. OPERATIONS

PROJECT TEAM COLLABORATION

SMH collaborates with Building Changes in the areas of funding and finance. They field any questions that we have about reports or yearly documents. HRG handled all of the tenant leases, managed the tenant compliance files, and reviewed the housing files in the beginning to assure compliance for our tax credit agreement. I was more involved with them when we were leasing clients and getting clients moved into the building. Becky⁴ from HRG, and Christina⁵ from SMR have continued to be really involved in this project; they even came here and hosted a dinner at the house after the tenants moved in. They've been very helpful in continuing to answer any random questions that come up.

⁴ Becky Bicknell is the Senior Housing Developer for the Seattle Housing Resources Group.

⁵ Christina Bollo is currently an architect at SMR Architects in Seattle, Washington. She was the project manager and architectural designer for Kenyon House.

COMMUNICATION AND RESOURCES

There is another person, Steve Lucas,⁶ who is the facilities manager for most of the sites that Sound Mental Health operates. If someone wants to schedule an inspection for HUD⁷ it goes through him, or Robert Holm, who is the Administrative Operations Manager at Sound Mental Health.

The architects have been very hospitable to the tenants here, and I have been able to get information from them when I needed it. I mentioned they hosted a dinner. That doesn't happen all the time; the architect doesn't usually make dinner for the tenants. They've been more than accessible and really helpful. Because they were so readily available when we were leasing clients and moving them in, we haven't had to contact them that frequently because many of our general questions were answered in the beginning.

That relationship has been fantastic. The tenants, in general, were so surprised that the people who built this building wanted to make dinner for them. They were able to sit down and ask them questions about the building, talk about the building, and let them know how they had decorated and changed their units. It was very pleasant, but it's definitely not something that happens with every project like this.

BUILDING OPERATIONS

My training was done by Steve Lucas, who is the facility manager at Sound Mental Health; he is much more involved in maintaining the facility and learning about the building. He makes sure it is up to code and that it has the different licensing certifications that it needs. I spent a large portion of my first day here going around the building with him; he showed me what things were and how to turn things off and on. It was a pretty extensive session. Over time, the staff and I have built our own checklist of things we have to know, like where things are located and how to turn certain things on and off. Steve also trained John Adkisson, the residential housing

⁶ Steve Lucas is a facilities manager at Sound Mental Health in Seattle, Washington.

⁷ The U.S. Department of Housing and Urban Development (HUD) is a federal department whose mission focuses on increasing homeownership while encouraging community development and the availability of affordable housing. HUD is based out of Washington DC.

manager. He spent time with him and showed him how everything works.

In addition to the staff training, HRG provided us with the “Kenyon Healthy Home Guide.” We were able to give that to the tenants when they moved in so they would know how to use the building; they could then be aware of how to use different features in the units, like the stove, the shower, and other things like that. I was able to get the knowledge I needed to operate the building directly from certain people who had a great deal of knowledge in this area. The guidebook was very helpful for our tenants.

John deals with most of the daily maintenance of the building now. He walks around the building every hour and makes sure that everything is operating. If something is not working John knows who to contact. He usually notifies Steve if it’s something that isn’t easily fixed or if it’s something under warranty. Certain appliances and fixtures are under a one-year warranty. Many of the things in the unit, like the fans, are under that warranty as well. If something breaks or it’s not working correctly, Steve will contact Walsh Construction.⁸ Usually someone comes out to fix the problem on the same day or the next day. They’ve had to do this a couple of times when we’ve had some issues with the fans in the units.

OCCUPANT AND USER RELATIONSHIPS

The first day that the tenants move in is pretty overwhelming for them. Most of our tenants are coming straight off the streets. They have been homeless for a while, and having a home for the first time in a long time is a big adjustment for them. The leasing process at Kenyon House was pretty fast — we had people move in and get settled quickly. It was October when the tenants first moved in, and we had to show them how the heat worked, how to turn the shower on, and how to use the stove and the oven. Those are the main things that we went over with them the first day. We checked in with them daily to make sure they didn’t have any additional questions about operating their units.

⁸ Walsh Construction Co. is a general contractor with offices in Portland and Seattle. The firm was the general contractor for Kenyon House.

Since all of the tenants moved in, we’ve been having house meetings every two weeks. We were able to use the house meetings to give the tenants the “Kenyon Healthy Home Guide,” go over it with everyone, and give people a chance to ask questions. Initially, it was more about building a relationship with the tenants so that they felt comfortable coming to us, asking us questions about the building, and reporting items that weren’t working well. We want them to feel comfortable coming to us with any problems they might have. It’s really been an ongoing process.

OCCUPANT FEEDBACK

For the most part, the responses from the tenants have been positive from the day that they moved in. Some of the tenants haven’t had homes in a long time, and they were just really excited to be here. We have people walk in and tell us that they can’t believe this place is their home. The building is brand new, and when I walked into the building for the first time I was amazed at how nice it was. We have tenants who have really taken an active interest in maintaining their units. They’re happy to make the units and the whole house their home. The only negative feedback that we have received is centered on the lack of soundproofing. We have had some tenants complain that they can hear their neighbors. When Christina had the dinner here, there were a couple of tenants who had questions as to why she had done things one way or another, and she was able to explain the decisions to them personally. Most people have had a really positive experience.

IMPACTS ON THE OCCUPANTS

The clientele that lives in this building understands sustainability, but they are not as knowledgeable about it as other tenants might be. They always want to know what they can do and what can be done to make it a greener building. The garden out back is something that many of the residents were really interested in. They wanted a garden at Kenyon House. They wanted a reason to go outside and pick vegetables and fruit. That’s something that we started as a group. A clinician is leading that project; they’re researching and planning things together. The

garden is promoting green living. Some people just like gardening, but others still think it's kind of neat, even if they don't know much about gardening. They also think it's neat that they can live in a building that's green. There is one particular tenant who has taken a real interest in the sustainable features of the building. He thinks it's great that it's a green building, and he wants to make it even more sustainable. He's mentioned that he wants solar panels. That's what he thinks of when he thinks about a green building: solar panels.

The building has an indirect affect on the tenants' health, just in terms of the tenants wanting to take care of their own health. Learning about the building and the way that it has been designed to care for the environment has given some of them a renewed interest in taking care of their own health. This interest could also come from the fact that they're finally in housing.

This narrative is based on a video- and audiotaped interview conducted by Kristen DiStefano on August 18, 2009, at Kenyon House in Seattle, WA.

APPENDIX A: IMAGES





Section



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"Kenyon House is an 18-unit two-story affordable housing project for formerly homeless people living with AIDS/HIV. The two-story, 12,700 sq ft building, constructed of wood-framed slab on grade, is made up of studio apartments. Residents have a secure entry area, support services onsite, family-style dining space, laundry facilities, and exterior parking."

– *Northwest Construction Website*

Prepared for the U.S. Green Building Council by the Case Study Lab of the Center for Housing Innovation at the University of Oregon, this book documents the visioning, design, construction, and operation of the Kenyon House in Seattle, Washington.



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