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Portland State University, Stephen Epler Hall Case Study

Project Description

"Stephen Epler Hall at Portland State University is a 6-story, 130-unit student residence situated over ground-level classrooms and faculty offices. Located on a campus in downtown Portland, Oregon, the mixed-use building is well positioned for urban strategies. It is close to multiple transit options, including bus, light rail and streetcars. The design carefully integrates energy conservation into the building's structure and the high-performance systems are exposed to increase awareness and learning opportunities. It represents a new direction in campus expansion—accommodating increasing numbers of students while reducing the carbon and economic footprints of new buildings."[1]

Architect:	Mithun Architects, Seattle, WA
Energy Engineer:	Interface Engineering, Portland, OR
Structural Engineer:	KPFF Consulting Engineers, Portland, OR
MEP Engineer:	Interface Engineering, Portland, OR
General Contractor:	Walsh Construction, Portland, OR
Landscape Architect:	Atlas Landscape, Portland, OR
Green Consulting:	Green Building Services, Portland, OR

Project Awards

- 2006 American Society of Landscape Architects Merit Award
- 2005 City of Portland BEST Award for Stormwater Management
- 2005 LEED NC v2.0 Silver, U.S. Green Building Council
- 2004 Excellence in Construction Award from the Associated Builders & Contractors Pacific Northwest Chapter

Project Data

Completion: August 2003

Cost: 10,000,000 U.S. Dollars (2003)

Area: 64,400 ft²

Location

City: Portland, OR

Latitude: 45.32 North

Longitude: 122.42 West

Climate[2]

HDD65: 4522

CDD50: 2517

Annual Precipitation: 36.3"

Solar Radiation: 376 kBtu/sf/year

Energy Metrics

Energy Code: Oregon Non-Residential Energy Code

Predicted % Below Code: ~49%

Measured EUI: 41 kBtu/sf/year[3]

[1] From the Mithun website at www.mithun.com
[2] From the National Oceanic and Atmospheric Administration website at www.noaa.gov
[3] EUI: Energy Utilization Intensity estimate for onsite usage. EUI calculated from gas and electric bills.

University of Oregon Professor Alison G. Kwok, graduate student Britni L. Jessup, and Nicholas B. Rajkovich of Pacific Gas and Electric Company (PG&E) prepared this narrative.

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Stephen Epler Hall Narrative: Architects Roger Gula, Ron Van der Veen, and Steve McDonald

Getting the Project

Roger Gula (RG): The design of Epler was before the big green boom right before the wave, at least our internal wave.

We interviewed for the project. We were doing a lot of student housing at the time. We had just gotten done with projects for UW[1] and PLU[2] and were really gearing up for a lot of student housing. We responded to an RFQ[3] and got short-listed. We were so excited about student housing. We are a strong housing firm to begin with, but student housing is a very interesting type that's just a lot of fun. You get to do some innovative stuff with it. The client, College Housing Northwest, was a former contact. We got a hold of it and were really passionate and won the project. That was probably in 2001. College Housing Northwest is a public-private partnership. PSU[4] and College Housing Northwest controlled most of PSU's student housing and dormitories. They were very progressive when it came to environmental issues so that synergy right off the bat was pretty big between College Housing Northwest and us. Being a progressive Oregon school, PSU had it in the back of their mind, too, but it was that big spark between College Housing Northwest and us that really helped things out.

Selecting the Project Team

RG: KPFF[5] is a big firm and we work with them a lot. We got lucky and got Steve Murray as the principal engineer.

Steve McDonald (SM): Steve was a big advocate of innovative ways to deal with storm water.

Ron Van der Veen, AIA, LEED AP
principal

Roger Gula, AIA, LEED AP
associate principal

Steve McDonald, AIA, LEED AP
senior associate

[1] University of Washington in Seattle, WA
[2] Pacific Lutheran University in Tacoma, WA
[3] Request for Qualifications
[4] Portland State University
[5] KPFF Consulting Engineers in Seattle, WA

RG: That was a big click because we were pushing for celebrating some kind of storm water system and he just grabbed it. He was a big team member for us because he could get a civil (engineer) to think differently than just putting it underground.

We had a good repertoire off-the-bat; he's a Texas A & M Aggie — has a good personality, was a good team member, and embraced the fact that we wanted to do something that was progressive and educational about stormwater by making it visible.

SM: We encouraged him to participate in finding a solution that became visible for storm water. It wasn't something where you just stuck all the pipes underground; he was excited about it.

RG: He was a good guy, he still is a good guy, but he's still an Aggie. We often get dismissed by civil engineers, especially when they are looking at nuts and bolts and numbers. It was a breath of fresh air to have him embrace it and help us out. He was dealing with all the water issues.

SM: Structural[6] was done with KPFF also.

RG: And then our landscape consultant was from Atlas.[7] Nick Wilson was definitely was supportive when it came to those natural drainage bioswales in the courtyard. We pretty much drove –the-bus on that, but he supported us pretty well.

SM: The mechanical, electrical and plumbing was all done by Interface, but Mark Heizer was the person that really took the challenge of LEED[8] and embraced it.

RG: I remember selecting Interface because we wanted a local presence and a lot of experience in multi-family housing.

Ron Van der Veen (RV): The same was true for KPFF. We have worked with them here in Seattle and they had a lot of local experience.

ST: And the Atlas guy, he was your buddy.

RV: He was a buddy of mine from college at the U of O.

RG: I don't think we had done much sustainable work with any of those consultants. Maybe KPFF; we had probably already worked with them at that time.

SM: We chose them as much based on LEED or sustainable design as it was for their experience with the product type.

RG: Housing and urban adaptability.

RV: We wanted someone familiar with the downtown Portland market. All three of them were downtown Portland firms and they were all within less than a mile of the site.

RG: That probably subconsciously stems a little bit from us not being a local architect. When they want to stack-the-deck locally we can say, "hey, everybody we are working with is local and eight blocks away. I know KPFF is right down there. "

RV: That was part of trying to get the job. To select the internal team, you rolled a pair of dice or something, right? It was darts, really. It ended up being the three of us and a few others.

RG: We were mostly the student housing team at that time.

SM: I had done student housing for a while.

RG: I think it was a convergence of a lot of student housing people, perfect timing, and schedule. We were all available. It was probably the greatest asset that we all knew each other and get along really well. We have the same kind of design groove.

[6] Structural engineering services.
[7] Atlas Landscape Architecture from Portland, Oregon.
[8] Leadership in Energy and Environmental Design.

RV: We had already, before the project ever came out, worked with College Housing Northwest. That is the company that runs their student housing at Portland State University. We already knew Gary Meddaugh[9] quite well and he had already been up here to talk about sustainability in general. He's a real leader of sustainability in Oregon. By the time we had interviewed for the project, he knew us quite well.

RG: We were really excited about this project because there was almost an inherent future with College Housing Northwest. Gary was really progressive and environmentally savvy. We hoped there might be a lot of projects down the road, so we were really revved up for this.

RV: The other thing is that up until that point most of our sustainable projects were more suburban or rural. This was an opportunity to do a very urban project that had all of the problems of a real typical urban site. It had poor orientation, it was next to a freeway, right in the middle of a city and it had a low budget.

SM: A very low budget.

Setting Goals for the Project

RV: Up until that point we had exceptional projects that were sustainable. The exceptional projects were the sustainable projects, not the sort of mundane, regular projects. We thought this was an opportunity to solve a real, more typical, urban issue. It was a chance to tackle a more typical urban project, something that we knew, down the road, was going to be a foreshadowing of a lot of projects that we are doing now.

RG: It was a challenge. There was a lot of in-house discussions. I remember talking to the team working on Islandwood.[10] They basically controlled their own destiny with that greenfield[11] development where you can do what you want, especially with solar orientation. Like Ron was just saying, we were stuck with a thin site, poor orientation and all these other challenges. People were watching us, saying, "ok, can you pull this off?" There was a high challenge mark.

RV: The fact that it was next to the freeway made the challenge even greater.

RG: You can't have natural ventilation when you are looking out onto a highway. A lot of things were happening at the site. The density, or unit count, was really high and, like Steve said, the budget was really low. A lot was stacked against us.

RV: We did an eco-charette and it was big.

SM: The entire consultant team was there. College Housing Northwest was there; the University was there, and so was KPFF.

RG: The whole team.

RV: We probably had 40 people there. That's where we laid out the strategies and how we were going to go about getting the LEED points. After that we also had an in-house crit[12] with Rich Franko and Dave Goldberg.[13] They really challenged us to design this as though it were a natural building as opposed to designing a building and then adding the sustainable parts. We took a little bit of a different approach after that. We were more aggressive about natural ventilation. It was a mixture of both those that set our goals and our direction. The design direction came out of the sustainable goals. The concept that we started with was "dumb box, smart box." We looked at the typology of Portland apartment buildings in downtown and it was a very clear, simple, rectangular box. We said, "well then, let's start with a dumb rectangular box and every move, every design move, we make after that has

[9] Gary Meddaugh is the CEO of College Housing Northwest.
[10] IslandWood School is located on Bainbridge Island, WA.
[11] Greenfield development is building site that has no prior construction and is in a natural state.
[12] critique
[13] Richard Franko and David Goldberg are principals at Mithun.

to have a sustainable rationale to it. We're not going to just add modulation or material just to add it, but we wanted it to be looked at in a series of layers; that main layer being sustainability. That's how we came up with this idea of "dumb box, smart box." The dumb box, with no orientation, actually became four smart boxes that each had an orientation and a way to address its microclimate. That's why all four sides are different.

RG: We also looked at the entire alphabet; we looked at the "O"-scheme, the "A"-scheme, the "E"-scheme, etc. The "Z," and then we had the "S."

RV: The "Z"-scheme. Also the "D."

SM: We started with the "I."

RG: When we looked at all the alphabet, the strongest and cleanest was the "I," meaning a rectangular, north-south building.

SM: That also broke it free from the King Albert.[14] A lot of those other ideas tapped into tying the two buildings together.

RG: Exactly. At first, when it came to the master plan, those buildings were supposed to tie together. When we looked at the floor heights and the ceiling heights, it was just not going to work. It was pretty intense, so we just detached.

RV: We definitely led the process and were just flying ideas out. They were just coming from everywhere. Then we'd have an in-house crit and we'd get more ideas. We were looking at all kinds of complex things and finally we just remembered what Dave Goldberg said, "The best situation here is probably a simple I-scheme. That's probably the best for ventilation and the other goals you are trying to accomplish." We explored that and it turned out to be the case. Because of the nature of the site and the geometries of the site, it didn't hinder the density that we needed to hit. It actually helped it a little bit because we got rid of the inside corners that you can't do much with.
RG: We also looked at an even more sustainable model. It was a three-bar scheme that was all single-loaded and south facing. That was the hyper sustainable, hyper-green answer. We grabbed onto what we could use from that because, obviously, the unit count was really low. We grabbed onto some of the concepts that brought out.

SM: If you look at the I-scheme, the north and south wings are single-loaded corridors. We call those the "gills." Those are the indentations with the operable windows that bring in light and air. Another goal was to bring natural light into the double-loaded corridors. You don't see a lot of that. The organization allowed a really nice and rational way to accomplish that goal.

RG: You have to have a client that is willing to give up a little of the square foot benchmarks. A lot of those developers are looking at every inch saying, "nope, we could probably squeeze another unit or two in there if you get rid of those gills," Because the client was so excited about that, we had the breathing space, pardon the pun, to use those gills. We had the leeway we needed.

RV: It was a challenge. I realized the importance of daylight in the corridor experience. Consequently, all the projects I've been working on since then push for more and more daylighting. That started to generate some ideas for a lot of what we did. A lot of the ideas were intuitive because there wasn't a lot of science or precedent around. We probably started designing this way only about eight years ago; LEED was pretty much in it's infancy at the time. We worked with the engineers and they gave us things they thought were going to work like, for example, the solar chimneys.

SM: The mechanically-assisted natural ventilation system idea bounced back and forth as did the structural system, but that was more of an

[14] King Albert Residence Hall on the Portland State University Campus, adjacent to Stephen Epler Hall.

economic necessity. We were looking at whether a 24-foot space is better than a 20-foot or an 18-foot. There was some iterative design that went back and forth.

RV: With the structural system, for instance, we were trying to push for certified wood, but it just couldn't, didn't, and wouldn't work. Instead, our structural engineer came up with this super-framing system where the goal was to reduce 25% of the framing in the building. We looked at every corner of the building, every inside and outside corner where we could reduce the amount of wood used.

Project Tax Credits and Incentives

SM: From the State's perspective there was a mandate for SEED,[15] the State of Oregon SEED program. That tripped us into monitoring and predicting the energy performance of the building. It dovetailed into what LEED was at the time. There were a couple of grants that the owner, College Housing Northwest and Portland State University, received. They received a grant from an organization in Portland; there was sponsorship that helped us with our LEED charette. I believe it was Northwest Natural Gas, the local gas utility. They helped us administer the eco-charette.

RV: We had some water subsidies, too.

SM: There was a grant from PDC, the Portland Development Commission to help us offset the cost of our rainwater harvesting system. The Portland Office of Sustainable Development, with the assistance of Greg Acker,[16] provided funding for the eco-charette. Those were the two incentives that we got.

[15] SEED is the State Energy Efficiency Design program that designates through policy of the State of Oregon that state facilities be designed, constructed, renovated and operated so as to minimize the use of nonrenewable energy resources and to serve as models of energy efficiency.

[16] Greg Acker formerly the director of sustainability for the Portland Office of Sustainable Develop and is now in his own firm as principal of Gregory Acker Architect.

There was additional compensation that wasn't an incentive but it was something the city offered for the reduction in water use we were proposing. If we could demonstrate that the project used a lesser amount of water in it's in practice then they would offset some of the system development charges. That ended up amounting to a sizeable amount of money, approximately $70,000. After everything was said and done, there were approximately $140,000 in system development charges that College Housing Northwest would have paid otherwise. They recognized a year later that it was not going to provide as much waste, as much stormwater, or utilize as much water as the city had planned initially.

Selecting Technologies for the Project

RV: None of those were really the motivators behind the project. The biggest motivator was the challenge to get all these things integrated into the building and within the budget that was required.

RG: If anything, there were couple of speed bumps I can remember since sustainability was still pretty young, like flushing toilets with rainwater and other little, teeny, tiny things.

RV: That became a huge thing.

SM: The state plumbing board that was governing the use of certain elements, such as rainwater use, had not approved it. They ended up approving it tentatively on the project for use in the public spaces but not in the private spaces.

RV: And we had to put some signs up in the bathroom.

SM: It says, "Do not drink the toilet water."

RG: It is the stuff like that that, if anything, slowed us down a little bit and maybe disheartened us, but we kept moving on.

SM: I think all of those challenges were playing alongside the water and energy strategies. I don't think it's as visible an element in the building, but

it certainly was an important element to the design. Without that energy savings we would not have been able to meet the SEED requirements or get the LEED certification.

RV: We were trying to make an elegant building, an infill building, in an urban context that expressed sustainable ideas in a beautiful way. Portland is a city of fountains; I think of the rainwater harvesting system as sort of a 21st century contribution to that city of fountains. One of the first times when it was raining and we went down into the alley and heard the crashing of the water on the rock it was astounding; I didn't realize the power of those design decisions until then. We never anticipated that was going to happen and that it would make this great sound and reverberate off the walls and create that visceral kind of experience. We never, never, thought it would turn out like that. We just wanted a cool way to get the water across the alley without piping the water across. We thought it would be cool to see the water and that's how that whole idea emerged. We were determined to make that water work and we were determined to make it visible, come hell or high water, we were going to make that water visible.

SM: And it became high water.

RG: I think the biggest driver of that was trying to activate the space.

RV: The "bio-alley."

RG: We had disengaged ourselves from the other building and the proportions aren't great for the alley so we said, "we are going to do everything in our power to activate that space so it kind of detracts from the alley-ness." That's why Ron just said "bio-alley." We really tied it together as the "bio-alley." Everything had to go through it: plants, water, and as much sun as possible. That's part of the activation.

SM: And getting people there; getting people to utilize that spot.

RG: Exactly. The water was one of the big layers of activation on that alley space and it works. When it is raining, it's active.

RV: That was new stuff, but it's old stuff, because it's old technologies. You see it in the Alhambra.[17] We wanted the runnel[18] and we had to work it for ADA,[19] which was the big problem. We couldn't make the gaps more than ¼" inch. Between the Oregon State Plumbing Board and the stringent ADA requirements, that almost killed the project. We just couldn't figure out a way to make this runnel work so that it is wide enough. Portland State University was worried that there was going to be a maintenance problem if leaves got into the system. Then Gary Meddaugh said, "Listen, I manage these buildings, I'll get out there with a rake or a pressure washer if I have to myself, to make that work."

RG: That helped. We wanted to avoid putting in the grates, the kind of underground grate that you can roll the wheelchairs over. We didn't want to do that; we went for the strict stone runnel.

RV: Then they brought up a "what-if scenario." What if a dog goes to the bathroom in the water. Then the water goes through the bioswale and doesn't get completely cleaned. Then it goes into the detention system and is used as grey water. What if there's an earthquake and somebody has to drink out of the toilet in an emergency?

RG: That was the emergency.

RV: It would still be unclean feces from the dog; that was the worst-case scenario. I said, "Well, if that happens, you have a lot bigger problems to worry about."

SM: The way we solved that, at least from their standpoint, was to introduce those UV lights so all that water went across the courtyard, went down

[17] Alhambra Gardens in Spain.
[18] A runnel is a small channel for a waterway.
[19] American Disabilities Act requiring accessibility.

through the bio-filtration patterns, was collected underneath the ground and then piped back into the building but it went through a UV filter, which is supposed to kill the *Giardia* or *E. coli*.

RV: We also had to put signs on the toilet to warn against drinking the water.

RG: Another great part of this project is that we had a good team that either laughed it off or took it as a challenge. Some teams hear "we can't do it," and think, "OK, let's try something else." But I think we had a strong enough team that we chuckled and just kept moving.

RV: Roger and I had worked on several projects together, so we were kind of in a groove. This was the most urban student housing project that we had worked on. And when Steve came on board, we all knew that we wanted to make a real urban building. We wanted it to be more planar and have the same kind of relationships to the street that a real urban building has. We put it in the materials, the richer materials, and less of the suburban modulation that you would see. That was a big point. I was really interested in that myself. We all kind of grooved on that and we knew that it wasn't going to be a real exuberant building in terms of form, but it was going to be a well-crafted building.

RG: The joke was that it would be like a "German box." We knew that it would be elegant and fit together really well.

RV: We had just done Nordheim Court,[20] another student housing project, which was LEED certified. I always said that if that was sort of our "Moulin Rouge" of student housing, this project was sort of our "student housing, unplugged." We were trying to push the typology in terms of everything: the floor plans, how students congregate, and how a sense of a community develops. We were trying a lot of different things and asking a lot of different questions about how to create community, how to create a neighborhood, and how students live together. It was a really fun time; we had some good clients that didn't want to do the same cookie-cutter buildings. When we got to Nordheim Court we really began to experiment with different unit types including two-story units and townhouses. That was something that we were particularly interested in.

RG: You can't really neglect the fact that the contractor was the same on a lot of these projects: Walsh Construction. That's when our mind-meld started to gel because we had done so many other buildings with Walsh. They anticipated our next move and were very good about it. We were able to go further with Nordheim. We wanted more and their energy was there.

RV: They had a sustainability director at that point, which was really unusual at that time.

RG: It was huge.

SM: Carrington Barrs. He was a University of Florida grad, that's why I remember. It was great to have the contractor come to the table with an eye for sustainability, not only the talk. Also, to have a focused staff member looking at all of their jobs and how to integrate sustainability into the construction site—that was a huge breath of fresh air.

SM: It wasn't just the design team, it was the execution team as well, and that was part of the process. They were part of the eco-charette as well.

RV: That was pretty important. They were part of the eco-charette; we specifically hired them before the eco-charette.

RG: It was a negotiated-bid coming in.

RV: That makes a big difference because it's hard enough to make any kind of project work properly. When you have a project with

[20] Nordheim Court is a pedestrian-oriented student housing development of walkup townhomes at the University of Washington completed in 2003.

aspirations like this, it is a new thing for a lot of people, and you have to push up hill. Your contractor wants to expedite the construction process. They have to buy-in to the process of documenting LEED and making sure that their subs[21] are honest.

Tracking Progress on the Project

RG: We tracked ourselves by meetings and phone calls.

SM: Walsh Construction was involved in a lot of our team meetings. The contractor was a part of those team meetings early on, during design, and late into design. They had to be conscious of the costs of what we were trying to implement. They moved along with the design like everyone else.

RV: We had some times where there were money issues and I remember it was thrown out on the table not to go for LEED certification. That would have saved pennies on the dollar for this project but they wouldn't have gotten the benefit that they are getting, performance-wise, on the project. At the end of the day, nobody says now, "Gosh, I wish we would have spent $100,000 less on this project." You don't hear that. Mostly you hear that they wish they had spent $100,000 more to implement a few of the things that we weren't able to. Now they are seeing that they're saving. The Epler Hall project has more than paid for anything we did for LEED.

RG: And they are only at only 6 or 7 years later.

SM: They've seen energy conservation, resource conservation, and a demand for this housing from the students to the point where they've doubled up three different floors. There are tangible benefits to this method. The top floor was a cultural-pairing for students that were attending Portland State University from the Pacific Rim. The top floor they had always planned on doubling up, but I think since then there has been such a demand for this building and housing in general on campus that they've doubled up other floors. I'm not sure what their overall occupancy is now; I think it's in the 180s. It was designed for 120 or 130.

Lessons Learned

RV: There was a post-occupancy evaluation that was done on the building that looked at energy and water savings.

SM: Cathy Turner[22] was a graduate student at PSU and did her thesis on it.

RV: She did her Masters thesis in Environmental Management on Epler Hall. She did a post-occupancy evaluation and ran the numbers on the payback for water and for using the conservation techniques that we are using. We have used it ever since because it's so provocative; it's one of the few pieces of information that we have about performance—she did a great job. It was funny because I was speaking at a conference about sustainability at Portland State University. I found out she was speaking right after me and I read her bio and what she was speaking on and I said to her, "Tell me, how's the building doing?" She said, "Oh, it's doing great. You're going to be happy to hear this presentation." She found it was using about half the amount of energy that code required for a building of this type.

RG: It's a comprehensive report, too.

RV: The building is doing really well with respect to water, too. She looked at paybacks based on 2002. I'd love to see that adjusted to the kind of energy costs to present day.

SM: I still think there is more water conservation there than we were anticipating and I think the occupancy has gone up and grown so much that we're not recognizing the additional savings there, too. We need to find a different matrix for the

[21] Subcontractors

[22] Cathy Turner is a senior analyst at the New Buildings Institute, www.newbuildings.org/

measurement that's not by suite, but by occupant. We measured it by fixture count.

RV: At the time it was using 27% less water, but there was also a extra floor of students. So it's 27% less water counting an extra floor of students.

SM: We assumed 130 occupants and there were 156 right off the bat, 26 per floor. And now they've added 52 students in that building which is going to drive that water use up.

RV: This project was a real prototype for a lot of our strategies for water and energy in future projects, both urban and non-urban. REI[23] was such a one-off project, Islandwood was another one-off project, but Epler Hall was different because it is basic—this is how you solve urban problems.

RG: It wasn't talked up a lot; we were just doing it. We didn't market the green features. We were just doing it because we wanted to; there wasn't a lot of hype.

RV: It did take on a life of its own. It received national press, but we never really expected that, it just kind of happened.

SM: I think it has affected our design process in terms of integrated design. This project emphasized getting and seeking input from the balance of your design team. It was not about taking that traditional path of creating a building and then applying all these systems within the building, but learning how those systems can influence the building's design. It can be expressed and reflected and tell a story while making architecture. We now bring those consultants into the picture a lot sooner even than they were when we worked on Epler Hall.
RG: They were all great consultants, every one of them. Team-wise, the planets were aligned. The issues are still there and the techniques are still there, but it was still the best team I've ever been a part of. We were on the fifth dimension.

RV: We were the fifth dimension of architects. We didn't even know what the fourth one was.

RG: The fourth dimension is love, right?

RV: I thought it was sustainability.

Hiring New Staff

RV: We are still looking for conceptually strong people. As we get into more and more sophisticated projects we need people that understand complicated programming issues, and how to put complicated buildings together.

SM: We are looking for people that are listening to the entire team; that have a strong concept and are willing to push for that, but are also willing to step back and listen to what the influences of those other positions can offer. That's a really important part.

RV: I f you come here under the old paradigm of the architect as the lone genius, you're going to get your booty whipped at this firm because you will have too many strong landscape architects and interior designers. You can't do that anymore. They will come down hard. The projects that we are involved with now are so complex that you need multiple voices. At the end of the day there are still certain things that are fundamental about architecture: we want to be conceptually driven. We're not just a function of double loaded corridors and checking all the programmatic functions off. We still want to create very beautiful work that enhances community, brings people together, and is timeless. It's really hard with the old paradigm to accomplish that. That's why the firm is Mithun; it's named after a dead guy because there isn't technically a personality driving this design. We have purposely not created a hierarchical system here where there are three or four lead designers and then it is handed off. We try and keep it as horizontal as possible.

[23] REI's flagship store located in downtown Seattle, WA.

SM: We have systems within the office; we have a process called "glimpse." We take projects at various stages of development, they could be something as developed as construction drawings or something that's in a very conceptual level, and we post them up on the wall for the week along our "main street" to get feedback. Sometimes it's welcome, sometimes it's unwelcome, but that's what it's all about. It really is. We get different perspectives at different levels of the development of the drawings. It can be very influential.

RV: We also have an in-house review process. We modeled it pretty closely after the UW[24] design studios where we have different crit processes. We have all-office crits or select crits but, technically, every project is supposed to have other eyes on it as a fresh look. We usually have someone that acts like a professor would and follows that project through. They give input periodically. A couple of other people come in at a few points and then we have what we call the "four musketeers." t's changing a little bit, but it's basically four focuses: technical, management, sustainability, and design. Those four people are making sure that our projects are honest, aligned with our values, and not making stupid mistakes. There's an overriding check. We're not a very organized firm; we're kind of a more organic, entrepreneurial firm. I've been involved with the quality support person as the design lead in the office and it's like riding a bucking bronco, it's all over the place, all the time. That's part of the beauty of the energy. It can be unnerving sometimes because there are so many different projects going on and so many wild things going around.

RG: It's like a zoo

SM: I think it's that tension that creates a good product

[24] University of Washington

Closing Thoughts

RV: I think the University of Oregon is producing some great students; much more well-rounded students. We hire students from all around the country. When we hire U of O graduates we do not have to teach them a lot about sustainability when they come in. They know what LEED is, they know what LEED buildings are, and they know sustainable strategies. If they aren't accredited when they get here, they will be within six months or they're not here anymore. All our technical staff is LEED accredited.

SM: For most of our staff that comes here it's not a big stretch, they know that coming in, and they know our commitment to that effort.

RV: They come here because of our commitment to sustainability. We're trying to find a design vocabulary that expresses LEED, expresses sustainability, and creates a new vocabulary in architecture. That might be a little bit nebulous. Norman Foster's work exemplifies that that kind of vocabulary that we are searching for; a northwest or American expression of that. Students that we perceive can help move us in that direction and have strong conceptual bases, understand natural systems and how a building needs to respond to natural systems are what we are looking for. They can then begin to use those as ways to design and express building form. That's particularly interesting to us.

RG: The joke is that we're looking to this expression of sustainability and hopefully it doesn't look like a straw bale, geodesic dome. We're trying to look for something that is very contemporary, very modern, and also is very sustainable. That's a weird balance that you have to grab. Epler Hall does that; it expresses the rainwater system but it's not overtly green, flower children dancing everywhere. It's still pretty contemporary.

RV: There's this idea that the sustainable firms all do shed roofs, like Miller Hull and Mithun, and that we're all trying to out-do each other with

heavy timber and metal roofs. It's a serial type that we've had to overcome. Some of these urban buildings, particularly the buildings we've done for Universities, we have purposely gotten away from the wood and some of those traditions and materials that you might stereotypically think of and gone to the more modern choices. We've used the Europeans to help guide us. I have flat out told my teams that whatever we do, we will solve this without a shed roof. I've done that on the last several projects. We just have to figure out a different way to solve it.

RG: You do a lot of mansard roofs now.

RV: I am doing mansard roofs because mansards are coming in; they're very in.

RG: You must do a mansard. That's it.

This narrative, part of a larger case study describing the Stephen Epler Hall, was supported by a 2007 AIA Upjohn Research Initiative Grant.

This narrative is based on an interview with architects Ron van der Veen, Roger Gula, and Steve McDonald at the Mithun office in Seattle, Washington on April 15, 2008. University of Oregon graduate student, Britni Jessup, transcribed a digital audio recording of the interview. The interview was conducted by University of Oregon Professor Alison G. Kwok.

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Stephen Epler Hall Narrative: Engineer Mark Heizer

Getting the Project

Mark Heizer: Mithun had the project. We had heard of it and had approached them about being on the team while they were searching.

Selecting the Project Team

We hadn't done many projects together prior to Epler, but have done a few since and continue to do some work together.

I was the lead for the mechanical side and did a bit of the project management, although they may have had different principals on that project.

Setting Goals for the Project

The overall goals were directed by College Housing Northwest (CHNW).[1] This was back when the State didn't allow the University to own their housing stock. PSU was looking to get an example building and had noticed some interest from students who wanted to live in a more environmentally friendly building. They also were conscious of the budget restrictions of new housing, but still wanted to get something that would attract students by showing them that they could actually live a more environmentally-friendly lifestyle in this building. It was going to be their first project like this. It was a pretty early LEED project and probably the first one for Portland State University. It was my first one, and I learned a lot as well on this project.

CHNW wanted to know what they could do to minimize the impact from the standpoint of water and energy. They were also looking at constructing this as a pseudo developer- run project and to make it

Mark Heizer, PE, LEED AP, Associate, Interface Engineering was the lead mechanical engineer for Epler Hall.

[1] College Housing Northwest (CHNW) is a non-profit organization providing housing for students at Portland State University and Central Oregon. They are the owners of the project.

They wanted smaller rooms that fit the style of student that goes to school at Portland State, which is more of a year-round type of occupant, as opposed to the living style in a dormitory (9-month occupancy).

We wanted to reduce energy use as much as possible within the limitations of the project budget. We also tried to take advantage of how the building was going to be used. The small apartments and studios were actually pretty good from a heating standpoint. They didn't have a lot of exposed perimeter per living space. We thought from the beginning that the people themselves could keep the place warm most of the year.

Tracking the Progress on the Project

First we met with the owner, College Housing Northwest, and the University who provided the maintenance staff. We discussed how they planned on operating the building, what they're used to dealing with, and how they would keep the building operating. We also worked with the architects, and went through early versions of a LEED charette to figure out some of the goals. We recruited some student-input [as users] as a part of the charrette. We decided not to air-condition the upstairs and we experimented with the office space downstairs. We thought, "What can we do for them if they aren't going to get cooling? What can we do to ventilate and keep them from being miserable in the middle of summer?" We looked at trying things that hadn't been done before at that time, such as a mixed mode system. We were trying to do that and also move toward a natural ventilation system for the downstairs. We were always looking at how we could keep the upper levels from getting too warm in the summer time, and also use the vegetation for shading from the nice set of trees on the west. The trees kept the lower levels pretty cool, but we had to do something for the upper levels.

We gave feedback about the glazing, the wall insulation, and the roof insulation to help us reduce the heating and cooling loads. That is my motto, "We're here to provide comfort, but let's see what we can do to not use energy to keep people comfortable, and try to find ways to let it happen on its own."

The architects and contractor looked at new framing techniques for the building that helped provide better insulation in the walls. Again, we looked at the glazing and how we could make it perform better. We figured out how we could get the frames to reduce the heat loss in the winter. Throughout the whole process there was a lot of discussion back and forth. There was a tough time finding a locally-produced glazing material within the 500-mile range. It came down to deciding whether it was more important to have the overall energy savings from this type of glazing or finding local suppliers that could give as good of a window from an energy standpoint.

Everybody learned a lot on this process. The water closets were one of my favorite parts of the whole project. We showed the owner that a couple of manufacturers had low-flush toilet fixtures. We were trying to convince them that they really needed to consider a toilet that not only uses less water, but also performs better than the existing fixtures. There was a perception that the low-flow toilets were going to clog and give them all kinds of problems. There was a lot of back and forth with the maintenance staff. We said, "These work better even at a low-flow or a lower quantity than the one you're used to getting." Back then, if there was a clogged toilet, they would actually call in an outside contractor like Roto-Rooter to fix it. It cost $200 each time. We explained they were getting a very good cost for the fixture ($120 for the low-flush versus $75 for the traditional). They balked at more than a $50 increase per fixture.

We finally got the manufacturer to install a low-flush toilet in their maintenance office to try out and after a few weeks they said,"Yes, we want this one." We did do a lot of work with the owner using real-world situations. We let them try it out themselves. Back then, people remembered the first 1.6 gallons-per-flush toilets, which didn't work because all the manufacturers did was change the flapper. We were able to show them

that they could get a good quality fixture that in the end has saved them $200 a fixture just on clog calls.

Water was a really big focus. We looked at as many things as we could. There were some things that didn't make it in. We looked doing heat recovery because it was five stories of residential over office space. We wanted to get all of the showers and drains to pipe into one tank and do heat recovery from that. It just didn't make it into the budget. We wish it could have been included in the building and saved a little bit on heating domestic hot water, but you win some and you lose some. And deciding what is important was part of the process.

We also looked at the energy recovery potential using the exhaust air that leaves the building, to pre-heat the air coming in because it was such a densely populated building. Heating the air coming in was where most of our heating load was going to be, so it became a critical issue for us to find a way to make that more efficient. It turned out quite well and the energy use was less than the model predicted.

The one surprise is that this building has nearly double the population that we expected. The 128-square foot rooms were supposed to be just for one person and evidently close to half of those rooms have two people in them. They are getting a lot for their money especially since the model predicted occupancy at a much lower level. With the increased occupancy there is more water use, from an increased number of showers, plus more water heating. The water use is definitely higher than initially expected.

A lot of students are actually cooking in the space. We didn't expect that they'd use those kitchenettes as much as they do. Even with those unexpected increases, the building is still coming out at a lower energy-use than we had expected. That's why we're happy with it. CBECS, [2] unfortunately, doesn't take into account the per-person data of this building.

Mithun's architects and designers were the ones running the meetings and doing the general meeting notes. Then, through the construction process, Walsh was doing most of that. Walsh had a very aware construction manager on that project to help get people through the whole process. They wanted to do well on a good LEED project, so they were bought into the process early. That's something that is now becoming more commonplace now. In the past seven or eight years it hasn't been something that has happened on every project. Getting that support, not just from the contractor, but from the people who were on the site, was really helpful.

In other regions you may get one out of six major players into a building's design process that has the true buy-in. It may be that owner, the subcontractors, or the person who's actually running the job site for the general contractor to say, "I want it; I want a plaque," but still don't really support (the LEED process). Many engineers are not buying into the process yet. I don't think it is as across-the-board throughout the country as it is here in Oregon and Washington. Here [in the Northwest] there may be only 5-10% of the project team that is not fully aware and bought-in to the process, but it's lining up to be close to 100% on a lot of projects these days. The awareness factor and the desire to be a part of the whole process are much more prevalent nowadays.

On our Interface team the principal was Jon Gray, and electrical and lighting was done by Robert Dupuy. Over time a lot of people worked on the project. Internally our company is divided within teams. Other than our specialty lighting group, the mechanical, electrical, and plumbing, all met

[2] CBECS is the Commercial Buildings Energy Consumption Survey of end-use consumption data of commercial buildings conducted by the Energy Information Administration (EIA).

weekly and discussed their projects and goals. John Gray managed how the plumbing would integrate with the HVAC and the lighting. It's just how we normally do business.

Selecting Technologies for the Project

We used eQuest[3] for our energy modeling. We used it to see our baseline, what our building would be for the LEED submission, and for looking at how the building was performing.

Some of the heat recovery system hadn't been modeled before so we created some metrics. We did small iterations to see what happens if we increased the wall thickness or tried a different insulation. It was at the last minute that SEED[4] was looking at this project as well. Dealing with the State energy people was fun. They had their ideas and made us model this building against heat pumps while we were saying, "But we don't have cooling in the building. How can we model it against heat pumps?" Then the students would use the cooling in the middle of summer and that's not going to do much for energy conservation efforts.
The small block of space that the students would be in, would have their computer and their light on. It took some discussion to convince them that you can heat the building effectively (down to the about 40 degrees outdoors) with that energy. The energy savings of putting in the heat pump cost just wasn't going to be that much over a small electric baseboard heater, the owner could easily replace. That allowed us to put money into other things like heat recovery of the outdoor air. We went through a process of saving money here, putting it over there, to get more bang-for-our-buck. One other item about the small baseboard heaters; we said, "You should buy the oil-filled models. They're $50 more per unit, but are a little safer, and they came with a long warranty, since we never know what students using in their rooms. Sure enough, there was a fire the first month of occupancy and all the heaters were swapped out and there hasn't been a problem since. That was just the learning process. This was an early building to really test a lot of strategies.

We got very lucky on the construction of this building to have some of the footprint about 6 feet underground due to the slope of the site along the west side. The nice, heavy concrete walls work well for us. We didn't have to air condition the elevator machine room because of that and it's done quite well for 7 years. They have a fan-assist on the ventilation for the offices and classrooms, on the upper levels it's just operable windows for cooling. If you look at the naturally-ventilated buildings in England and Germany, the temperature difference between us is just a few degrees. It's that extra couple of warmer degrees that we have here that makes the whole difference.

The rainwater harvesting and storage was a little different. I wish we could have done it for all the rooms, but it's the back and forth, especially with residential. There was fear of someone using the toilet as a back-up water supply. Other than my dog, I don't think anybody would use it for a back-up water supply. But over time, these different issues would come up. We hashed things out with the contractor and they were very helpful. I think the process went rather well from that "holistic design" standpoint. It wasn't, "we need to save $5,000.00, let's cut this out."

There is a tendency to have a line-item driven process but that doesn't look at the connections between all the different pieces. This affects this, which affects this, which affects this and it actually costs money in the long term. It was a very well-run team. Everyone realized that there was an overall goal of making this a good working example and a learning laboratory. There were goals for the future. They wanted people to go

[3] eQuest is an building energy use analysis tool used to compare building design and technologies and uses a DOE-2 engine to run the building energy use simulation program.
[4] SEED is the State Energy Efficiency Design program that designates through policy of the State of Oregon that state facilities be designed, constructed, renovated and operated so as to minimize the use of nonrenewable energy resources and to serve as models of energy efficiency.

further with these ideas in terms of energy, water conservation, and construction methods.

Lessons Learned

In terms of residential projects, we've taken some of the lessons we learned on Epler Hall and applied them to other projects, such as pre-heating the outdoor air and with the exhaust air. I think we've learned that residential projects, especially student residences, use a lot more water than the LEED calculations tell you. The students are going to use a whole lot more because of their dishwashing habits, like turning the faucet on and letting it run forever. It also taught us that we should not give them high-flow fixtures or really anywhere near the normal flow levels, for kitchen fixtures. From the water efficiency side, we are now seeing better fixtures on the market that we can bring into dorms or similar projects. Now there are other new technologies that do an even better job of taking advantage of energy use in buildings that we didn't have for Epler Hall.

There were some hard lessons learned. The things that worked okay and the things that worked very well are now used in our current projects.

Hiring New Staff

We are seeing more people who have the fire to do projects like this. People are seeking us out to work here because they see our past work. It's still tough, even now, to find people in the engineering business. This project has helped us recruit people because they want to work in our environment, even here in the rain. They are coming here from around the country. We're looking for people that are trained as LEED Accredited Professionals.

Closing Thoughts

There needs to be a bit more research in getting information to owners to backup the strategies. With rising energy costs, they need to know the certain things should be considered as far as insulation and glazing. There's a need to get owners familiar with some of the small items that help get the project to that next level. At that time on Epler, there was no way to show the pay back benefits. Providing education to owners and showing them what happens if energy costs get to a certain level and how different technologies might remediate that cost, is essential. They need to know why they should consider using these technologies and higher efficiencies that weren't considered once upon a time. Ground source heat pumps are an example out there right now that nobody wants to touch because of the drilling costs. People have said it just doesn't pay back. Well, that was a few years ago.

The radiant heating and the low-temperature systems that don't take as much energy, natural ventilation, and mixed mode systems like the ground-floor offices of Epler, are all technologies that people are starting to talk about. Now the topic is, what is acceptable as far as temperatures go. If there is a 105 degree [F] day you're going to have to treat it like a snow day. Tell people not to come in to work that day or to close business at noon. We allow people to dress for the weather. The biggest need is for people used to a larger range of temperatures. People did quite well without air conditioning for a long time. Having 72 degrees year round is something that just isn't going to happen anymore. Can we get everybody to buy-in to it?

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This narrative is based on an interview with engineer Mark Heizer by telephone to the Interface in Portland, Oregon on July 9, 2008. University of Oregon graduate student, Britni Jessup, transcribed a digital audio recording of the interview. The interview was conducted by University of Oregon Professor Alison G. Kwok.

Exhibit 1: Stephen Epler Hall

Fig. 1. Stephen Epler Hall

Fig. 2. Epler Hall exterior

Fig. 3. Epler Hall exterior

This exhibit, part of a larger case study describing Stephen Epler Hall, was supported by a 2007 AIA Upjohn Research Initiative Grant. University of Oregon Professor Alison G. Kwok and Britni Jessup with Nicholas B. Rajkovich, Pacific Gas and Electric Company (PG&E), prepared the associated narrative.

Fig. 4. A detail of the runnel and connection to the bioswale

Fig. 5. The connection between Epler Hall and adjacent King Albert Hall across the "bio-alley"

Fig. 6. Detail of the downspout system and its connection to the runnel across the alley

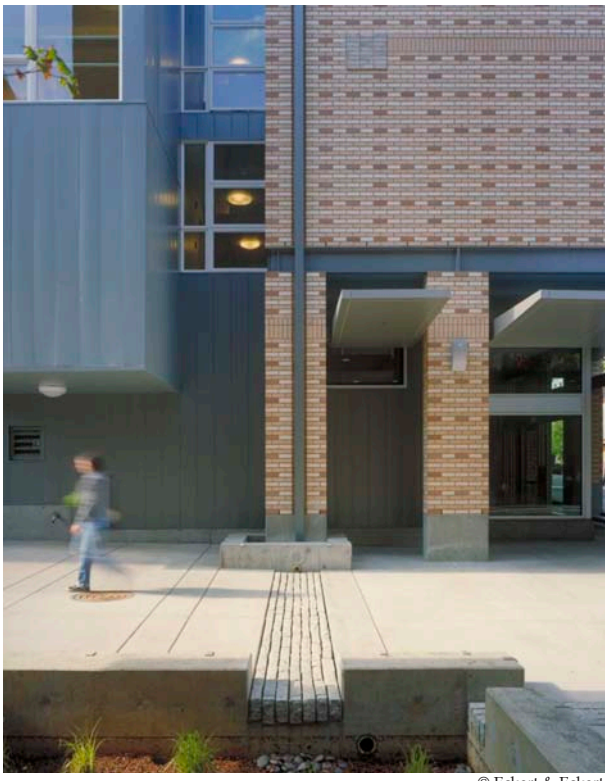

Fig. 14. The courtyard and bioswale

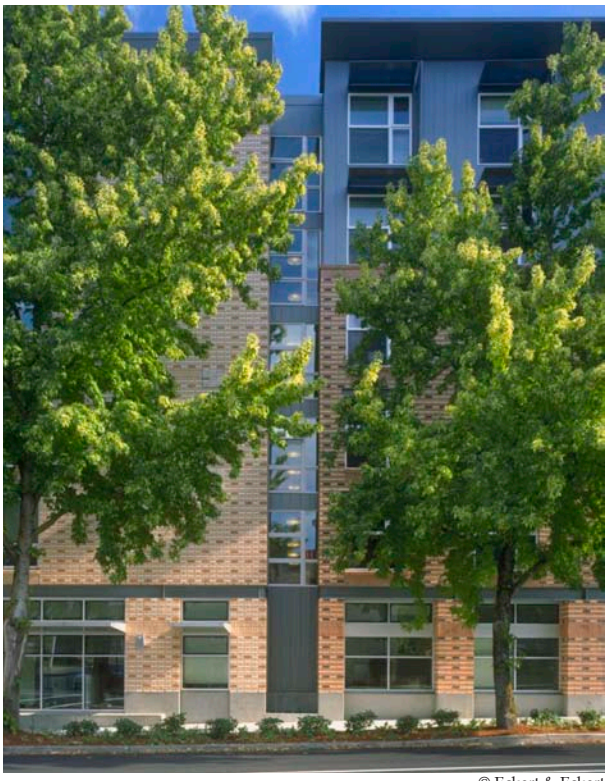

Fig. 15. Epler hall elevation

Fig. 16. Detail of shading devices

Fig. 7. The “bio-alley”

Fig. 8 A runnel taking water from Epler across the “bio-alley”

Fig. 9 Entrance hall for the ground floor classrooms

Fig. 10. Upper floor residence interior

Fig. 11. Upper floor residence kitchenette

Fig. 12. Upper floor residence restroom

Fig. 13. Upper floor residence restroom