

Warren Wilson College - EcoDorm



Type of Construction: New
Date of Completion: 2003
Building Size: 9,000 sq ft
Major Funding: WWC
Certification: LEED-EB
Registered
Location: Swannanoa, NC

“The EcoDorm is a testament to the power of a caring community.” - WWC student Liina Laufer

Warren Wilson College's (WWC) EcoDorm serves as the newest residence hall housing 36 students. Some of the most notable features of the building are its tight envelope, use of sustainable materials, composting toilets, and overall design. The soil and erosion control plan was designed by Equinox Environmental while the civil engineering was done by LandDesign. Duncan McPherson, LEED AP, and Bud Hart, Architect, both of Samsel Architects, designed the building. Blue Ridge Energy Systems were the general contractors and Thermacraft installed the solar energy systems and radiant floor. Cindy Meehan-Patton of Shelter Ecology provided green product consultation. WWC hopes to achieve the LEED Existing Buildings Platinum Certification for the EcoDorm.

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Solar PV panels on window overhangs

The idea of the EcoDorm began in 2001 as enrollment of the college increased. Students Jessica Lehman and Steve Yokim spearheaded early efforts and an EcoDorm Committee formed. The committee, made up of students, administration, staff, and Samsel Architects met once a week for a year. Students set four priorities: energy efficiency, water conservation, healthy indoor air quality, and use of local and highly recyclable materials which became project goals.

Energy

- True south orientation (within 10°) for passive solar heating & maximum benefit of shading of windows
- Structural Insulated Panels (SIPs) *Insulspan* (R24 walls, R38 roof @ 75°)
- Steel reflective roof, *McElroy Metal* (25% avg. recycled content)
- Doors & windows, *Kolbe and Kolbe, Ultra Series*, Low-E, argon filled, *Energy Star* rated (U=.34, R=2.94)
- Blower door test- 1.2 air changes/hour @ 50 pascals
- Boilers, *Munchkins High Efficiency* (92% efficiency) for back up to domestic hot water & radiant floor heating
- Solar hot water, *AET*, (6) 4x10 ft. collectors, *Heliodyne*
- Heat Recovery Ventilators, *Venmar, 1.8 HE*
- De-stratification fan, *Fantech*
- Highly-efficient, in-floor radiant hot water heating system
- Walls & roof, EPS *Styrofoam* insulation in SIPs (non-ozone depleting *Pentane* expanding agent)
- Slab insulation, XPS *Styrofoam*
- *Energy Star* rated appliances (Washer, Dryer, Refrigerator), *Kenmore*
- Exit signs, *LitePanel*, (¼ watt, 30 yr. maintenance free)
- Hand dryers, *Xcel* (80% less energy than paper towels)
- Fluorescent lighting throughout with motion & photo sensors
- Photovoltaic system, *Siemens* panels with *Sunnyboy* converter, 2.4 kW system



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“In the early years (early 90’s) of our green building, we first started with lights, then windows. In 2001 we began planning for the EcoDorm. It was our first LEED-designed building.” - Larry Modlin, Vice President and Chief Financial Officer of WWC



Setting up SIPS walls

Sustainable Materials

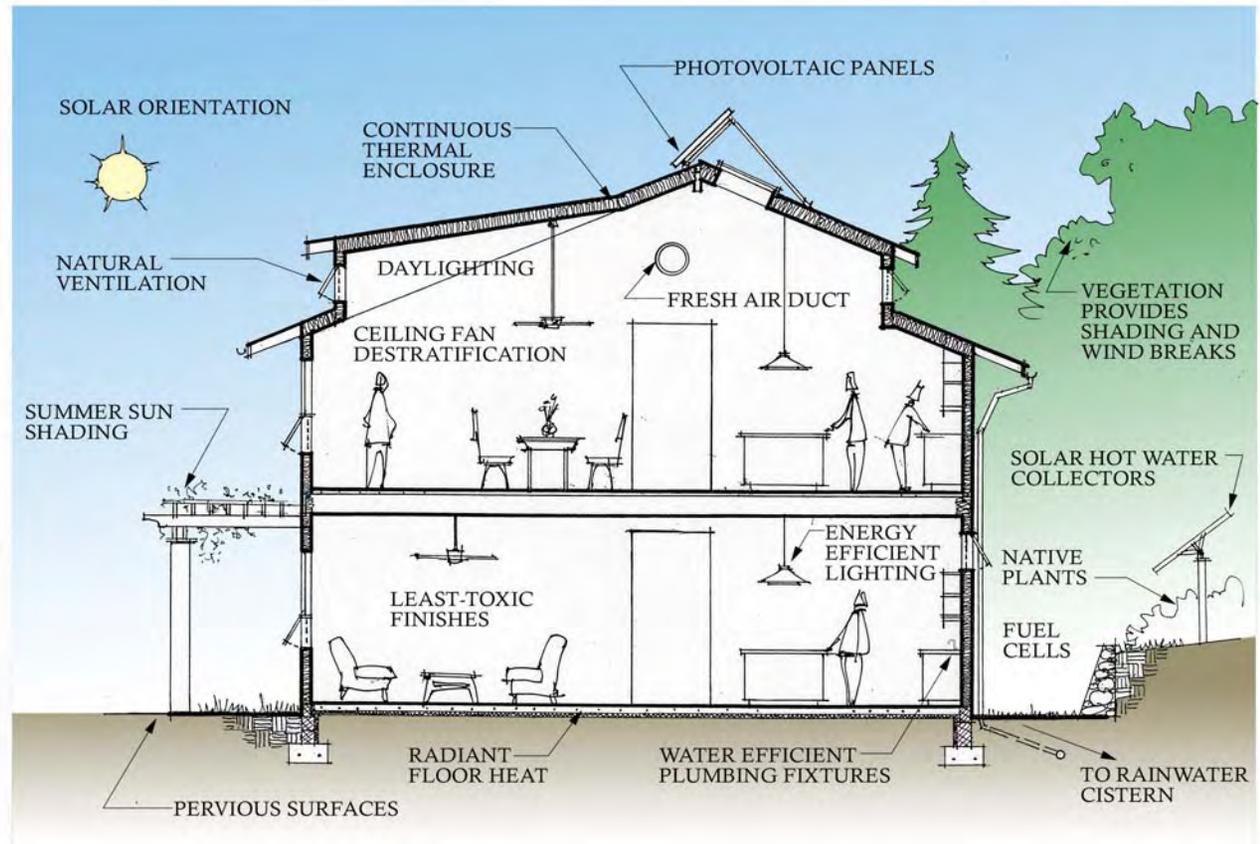
- Pressure treated framing, *Enviro-safe Plus* (non-arsenic)
- *Hardiboard* durable long lasting siding
- Structural door headers, reclaimed from deconstructed WWC campus building
- Interior framing from regional southern yellow pine (Georgia)
- Plywood underlayment, non-tropical rainforest wood (pine)
- Siding, trim, & cabinetry from WWC Forests
- Door trim & wainscoting from WWC campus beetle killed pine & oak trees, reclaimed oak & fir from deconstructed WWC campus buildings
- 24% fly ash content sealed concrete flooring, acting as a heat sink in winter
- Ceramic tile flooring & *Crossville EcoCycle* flooring (50% & 100% recycled content)
- Drywall, *US Gypsum* (95% recycled content, FGD Flue Gas Desulfurization)
- Rubber base board, *Johnsonite* (up to 80% recycled content)
- Wardrobes & desks, *University Loft*, fast growth plantation trees
- Bath partitions & countertops, *Comtec*, recycled content plastic



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“There was a continuous stream of discussion about construction (with students), maybe not always specifically about our building but about what’s happening in general with green building. They challenged us about why we do what we do.” - Duncan McPherson, LEED AP, Samsel Architects & Founder of WNCGBC

“We saw them (students) as a research body. They kept us on our toes, doing our due diligence with materials and design.” - Bud Hart, AIA, Samsel Architects



Eco Dorm - Warren Wilson College

Building Section Through Common Space

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“Economic factors do influence our decisions. What we recognize is this: supporting sustainable products and vendors will increase demand: supply will follow, and prices will drop. What is now sustainable and marginally more expensive will become the industry standard.” - Paul Braese, WWC Director of Facilities Management & Technical Services



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Indoor Air Quality & Health

- HRV controlled & filtered fresh air supply to every bedroom & living space
- Paint, *Sherwin Williams, Harmony*, low-toxic, low VOC
- Wood sealer, *Safecoat, Polyureseal BP*, low-toxic, low VOC
- Concrete sealer, *Safecoat, Watershield*, low-toxic, low VOC
- Sound insulation, *Cocoon*, cellulose insulation
- Ceiling fans, *Marley* – all bedrooms & living spaces, industrial grade high efficiency



Upper level of EcoDorm



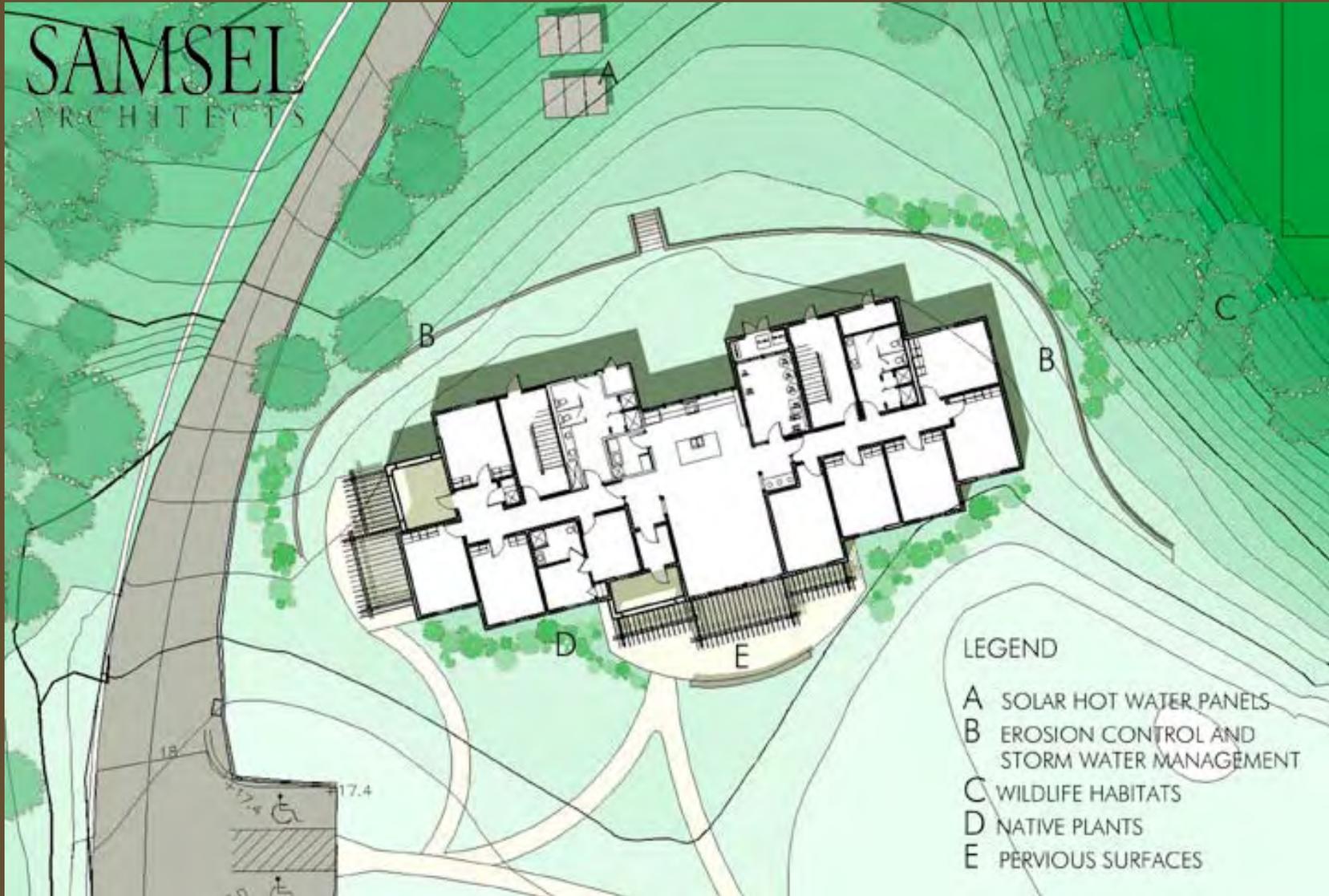
Lower level of EcoDorm

- A performance monitoring system, *Delta Systems*, monitors water consumption, gas consumption, electricity consumption and production, indoor and outdoor temperature and humidity of the EcoDorm.

Larry Modlin, Vice President and Chief Financial Officer of WWC commented, “While we wanted the EcoDorm to be environmentally friendly, we also wanted it to be user- friendly. We debated making the rooms smaller with lower ceilings, less glass—more of a monks’-cell feeling—but we ended up not doing that.”



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EcoDorm Site Plan



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Site & Water Conservation

- The site plan (see page 6) design minimizes grading, waste, & overall site disturbance
- The site was cleared under the direction of WWC Landscaping & Natural Resources crews
- Landscaping with native, drought resistant, edible planting & minimal grass
- Existing landscape used for wind breaks & summer shading
- Water run-off is contained in a storm water wetlands retention pond on site
- Rain water cistern, 10,000gal salvaged train tanker car
- Showers, *Niagra Conservation* <2.0 gpm
- Faucets, *Niagra Conservation* <1.5 gpm
- Urinals, *American Standard* <.5 gallons/flush (Some are waterless)
- Composting toilets, *Clivus Multrum, M3*
- Greywater is plumbed separately from black water for future on-site treatment



Clivus composting toilet

10,000gal rain water cistern



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“The joy of local, at-my-doorstep food is now my reality as I live off the permaculture landscaping of the EcoDorm.” - Liina Laufer, WWC Student

Even though Blue Ridge Energy Systems contracted this project, the students were involved throughout the planning and building process. According to the EcoDorm Manual, Warren Wilson Work Crews harvested trees, milled lumber, installed a telephone system, crafted cabinets and other woodwork, painted inside and out, built stone walls and walks, and planted trees.



"A key part of the design concept of the building was to not only create as green a building as possible, but to provide a demonstration building that teaches students and the community while increasing the occupants awareness of how their lifestyle affects the building's performance." - Duncan McPherson, LEED AP, Samsel Architects & founder of the WNC Green Building Council



For more information:
www.warren-wilson.edu/~elc/