The Learning Barge: Architecture Working for the Community and Environment

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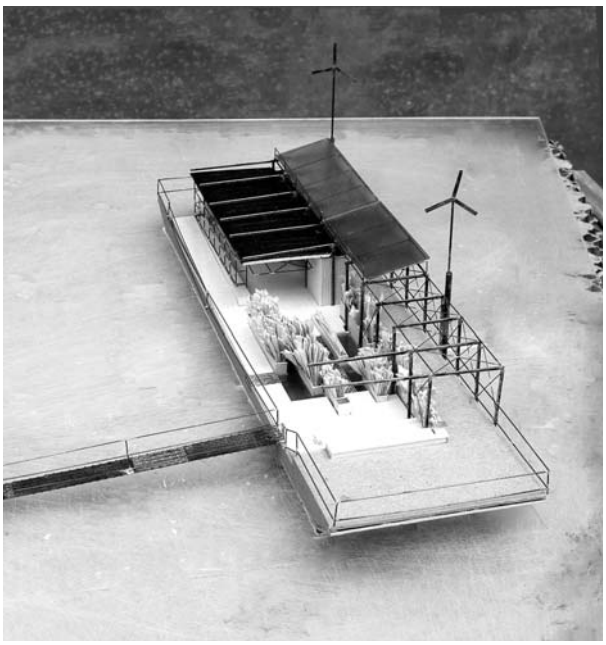
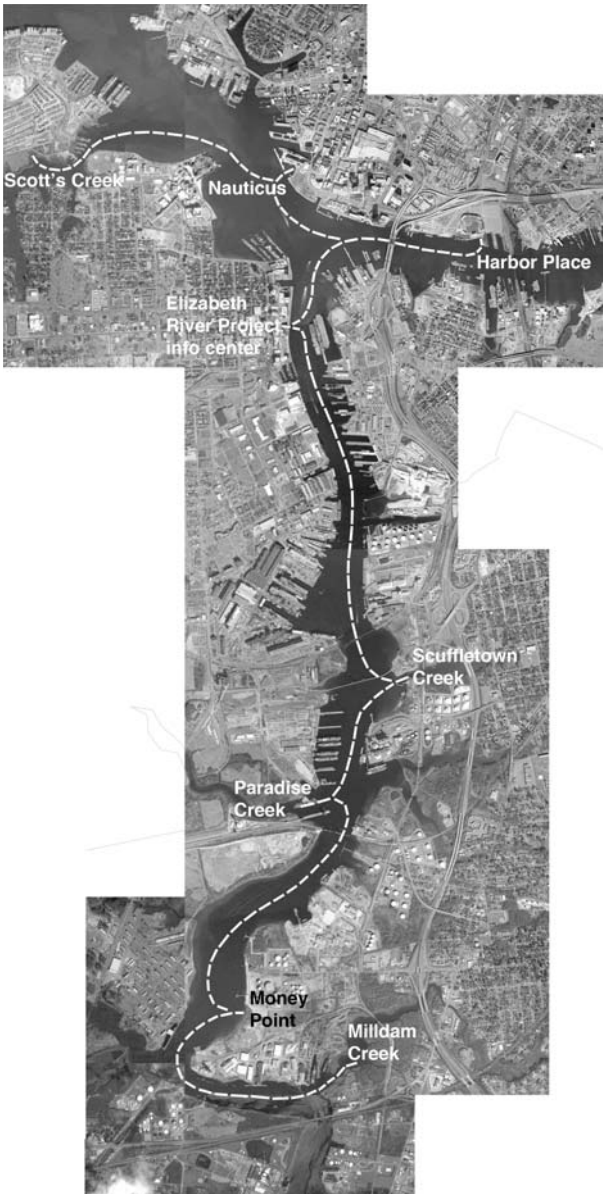
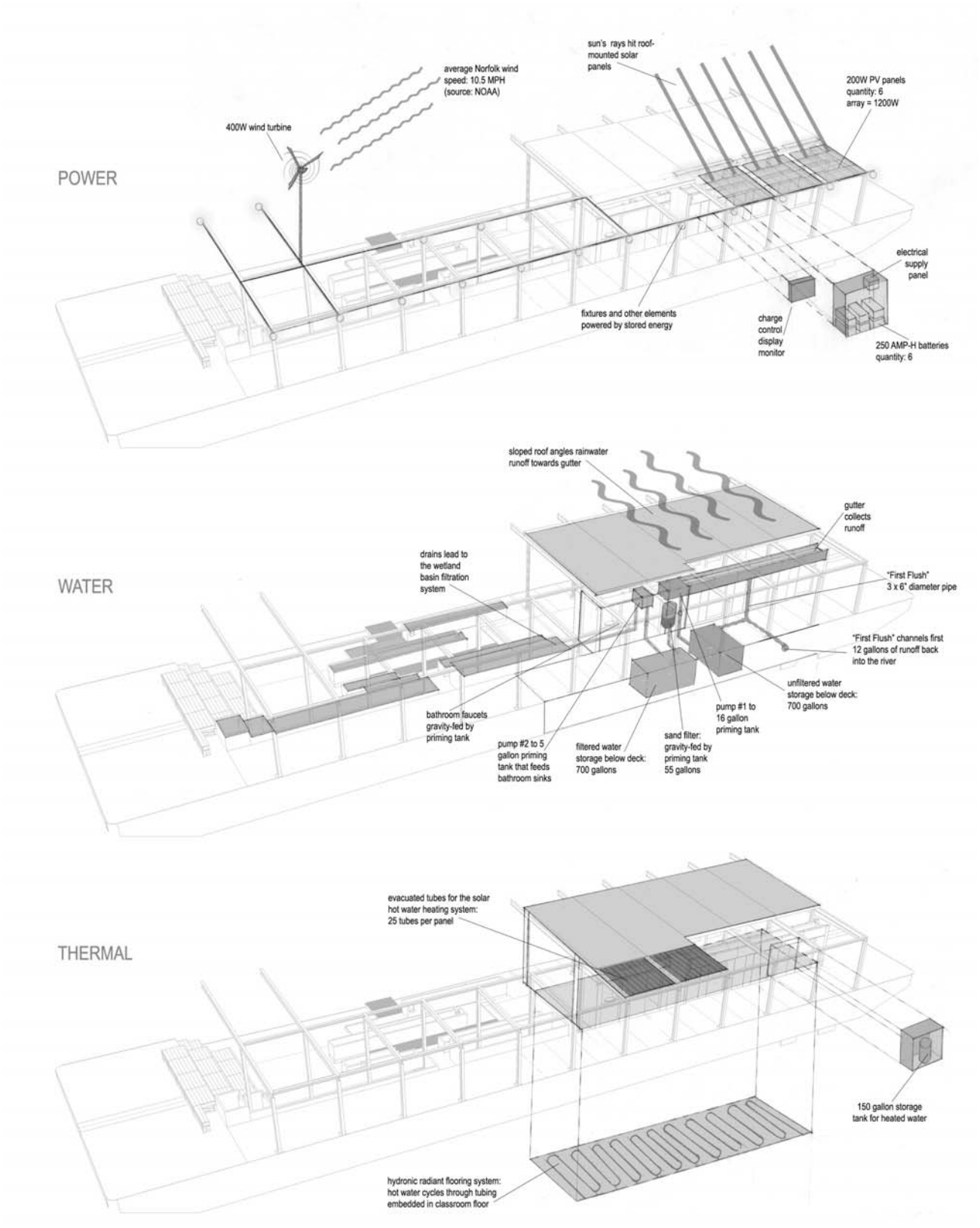
The Learning Barge initiative is an excellent example of university students and community partners collaborating to realize a project with wide-reaching environmental, educational and social benefits. Associate Professor Phoebe Crisman is directing a multi-semester process to research, design, build and create the curriculum for a semi-nomadic, off-the-grid field station. University of Virginia architecture, engineering, art, landscape, education and history students and faculty; the Elizabeth River Project, a non-profit environmental group based in Portsmouth, Virginia; federal and state regulatory agencies; engineers, naval architects, ecologists and public middle school teachers are working together to achieve a shared goal.






POWER
sun's rays hit roof-mounted solar panels
average Norfolk wind speed: 10.5 MPH (source: NOAA)
200W PV panels quantity: 6 array = 1200W
400W wind turbine
electrical supply panel
fixtures and other elements powered by stored energy
charge control / display monitor
250 AMP-H batteries quantity: 6
WATER
sloped roof angles rainwater runoff towards gutter
gutter collects runoff
drains lead to the wetland basin filtration system
"First Flush" 3 x 6" diameter pipe
"First Flush" channels first 12 gallons of runoff back into the river
unfiltered water storage below deck: 700 gallons
pump #1 to 16 gallon priming tank
bathroom faucets gravity-fed by priming tank
pump #2 to 5 gallon priming tank that feeds bathroom sinks
filtered water storage below deck: 700 gallons
sand filter: gravity-fed by priming tank 55 gallons
THERMAL
evacuated tubes for the solar hot water heating system: 25 tubes per panel
150 gallon storage tank for heated water
hydronic radiant flooring system: hot water cycles through tubing embedded in classroom floor

Located on the most polluted tributary of the Chesapeake Bay, the Learning Barge will provide interactive K-12 and adult education about how the river ecology and human activities are inextricably linked. Unlike environmental education centers located in pristine *nature*, the Barge will traverse an important urban river and major world port. Moving to a different restoration site every few months, the Learning Barge will teach participants about the tidal estuary ecosystem, wetland and oyster reef restoration, and pollution remediation efforts. The project has been designed to teach through example by harnessing energy from sun and wind, collecting rainwater, filtering gray water in a contained bed wetland, and utilizing recycled materials and green technologies.

Research, design, interactive and site-specific curriculum development, and construction have been interwoven in the University-based process. Each year the field station will connect more than 19,000 people with their home river through school field trips, university research, teacher training, and public workshops and events. By actively engaging students in the Elizabeth River's cultural and environmental ecologies, the Learning Barge will foster stewardship and create a significant national model for education about urban habitat restoration and sustainable architecture. Funded by the US EPA, Virginia Environmental Endowment, NCARB and Lowe's Foundation, the project has received national design awards from the American Institute of Landscape Architects, Environmental Protection Agency, US Green Building Council, NCARB and the American Institute of Chemical Engineers. Learning Barge launching and start of the educational programs is planned for fall 2008.

The Learning Barge initiative exemplifies a synthesis of community, environment and education achieved through an innovative form of collaborative practice. Students make connections between diverse disciplines, ideas, people and places—from watershed, to district, to detailed architecture. Learning through a *real* project inspires them to develop an ethical commitment to environmental justice, social responsibility and the role of aesthetics in everyday life, while they take action in places and with populations underserved or even unaware of the potential benefits design can have on their environment. Demonstrating the didactic value of architecture for environmental education, the Learning Barge establishes a model of university-based community outreach through design.

Project Team: University of Virginia School of Architecture, with School of Engineering and Applied Science; Project Director: Phoebe Crisman; Engineering Faculty: Paxton Marshall, James Durand; Student Team: Erin Binney, Laura Bandara, Kim Barnett, Neil Budzinski, Allegra Churchill, Andrew Daley, Eliza Davis, Kevin Day, Lauren DiBianca, Adam Donovan, Erin Dorr, Zoe Edgecomb, Ayman El-Barasi, Matt Hural, Kate Lafsky, Hy Martin, Matt McClelland, Kelly McConnaha, Molly O'Donnell, Farhad Omar, Katherine Pabody, James Pint, Kurt Petschke, Phoebe Richbourg, Sarah Rosenthal, Robin Schick, Jayme Schwartzberg, Jennifer Siomacco, Clark Tate and Danielle Willkens; the Elizabeth River Project; Eric Matherne; Michael Petrus; Virginia Beach, Portsmouth and Chesapeake School Districts; NOAA Chesapeake Bay Office.