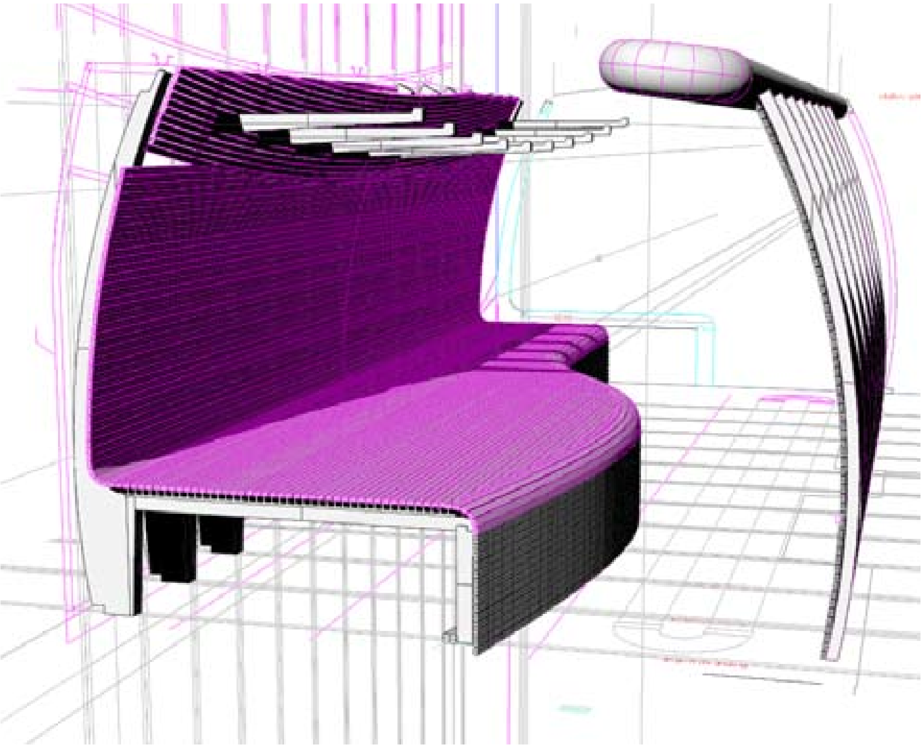
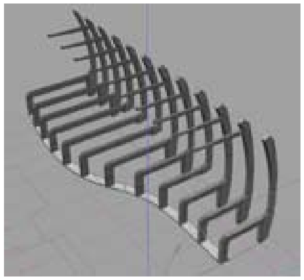
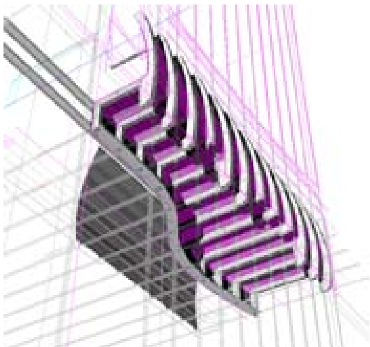
MATTHEW ALEX BITTERMAN:

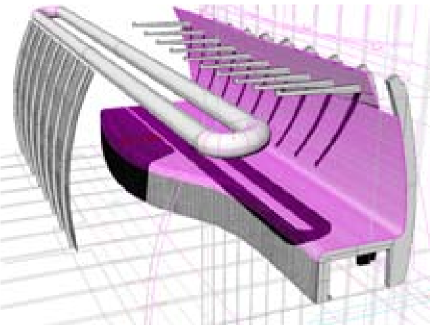
Some work related to architecture and materials.

VAN RENOVATION: Exploration of Digital Fabrication Techniques Iteration Two.









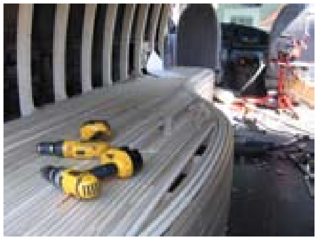
Date: Spring 2006

Materials:
1 Ford E-250 cargo van, 3 sheets of Spanish Birch Ply, Approx. 125 board feet of Poplar, PVC, Copper Pipe and Silver Solder, Steel for Swivel Base, Piano Hinges and One Old Window Unit Air Conditioner.

Program:
Accommodate one full-time resident. A double berth, easily cleaned and safe culinary facilities. Air conditioning, screening and cross ventilation. An open gathering space near starboard doors. A swiveling passenger seat. House lighting and AC power, showering facilities and sink. All storage on the interior to avoid roof racks (therefore achieving better gas mileage). Storage to include space for two bicycles and five surfboards. All construction shall be lightweight (again to save gas mileage), and all storage compartments must be breathable to hinder odor accumulation.

Time Frame: Approximately four weeks after-hours.





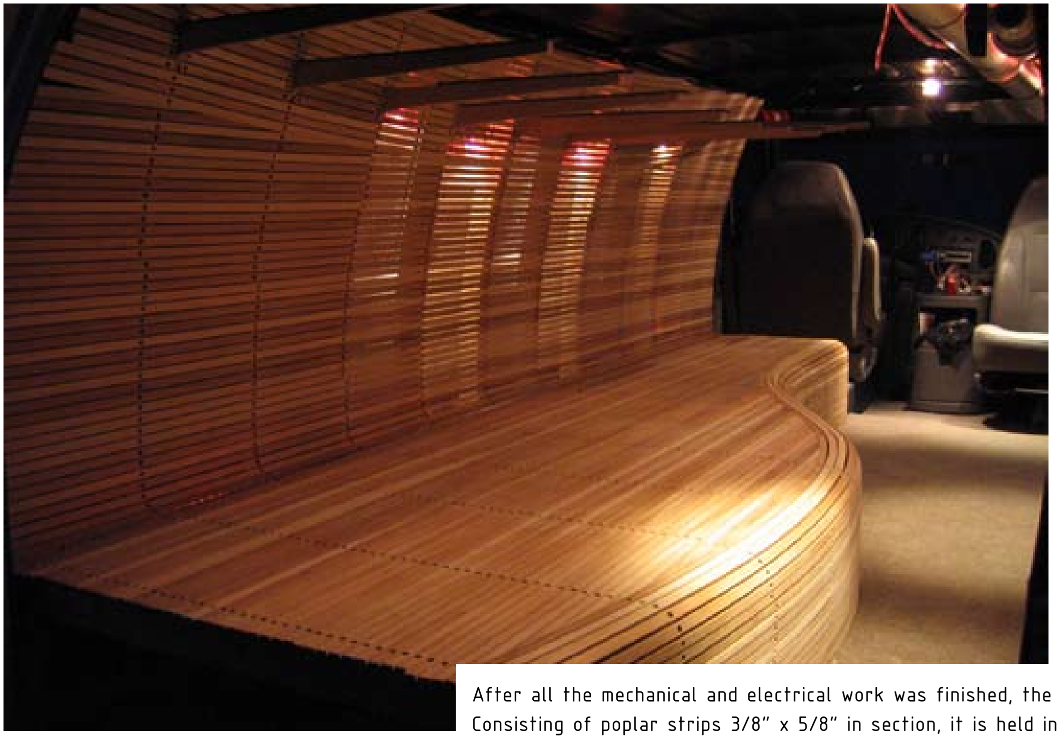

VAN RENOVATION: Exploration of Digital Fabrication Techniques
Iteration Two.



A week was spent on the computer designing the construction system and plan arrangement. The design was based primarily on the ergonomic considerations of living in an extremely small space with complex programmatic requirements. After generating the tool-paths , the structural frames were cut on the school's CNC machine. Their installation was guided by one computer splied and two pre-measured battens on the steel shell of the van. Each frame is a laminate of two 3/4" birch plywood pieces laid 1' O.C. at each station point in the van, equating to 10.5" spans for the poplar- a reasonable distance to keep the strips small and lightweight. A window unit air conditioner was dismantled and suspended within the skeleton of the insertion, with the condenser outside underneath the van and the evaporator inside to cool the van during stationary use. An auxiliary DC/AC circuit was also installed.

VAN RENOVATION: Exploration of Digital Fabrication Techniques Iteration Two.



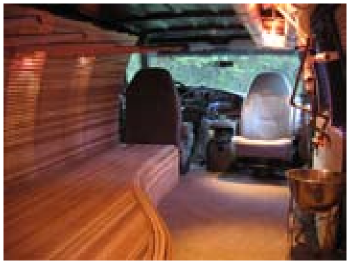



After all the mechanical and electrical work was finished, the skin was laid. Consisting of poplar strips 3/8" x 5/8" in section, it is held in place by approx. 10 lbs. of fasteners. The fasteners are countersunk to accommodate plugs at a later date. The strips have had no problems resisting point loads. The poplar will remain untreated and un-surfaced so as to darken with age and wear. The water system functions independently. The stoves were concieved as pods built in the same language and materials as the sink, housed under the skin of the main insertion. The swivel base allows the passenger seat to rotate, capturing the space while providing a comfortable chair to sit in.

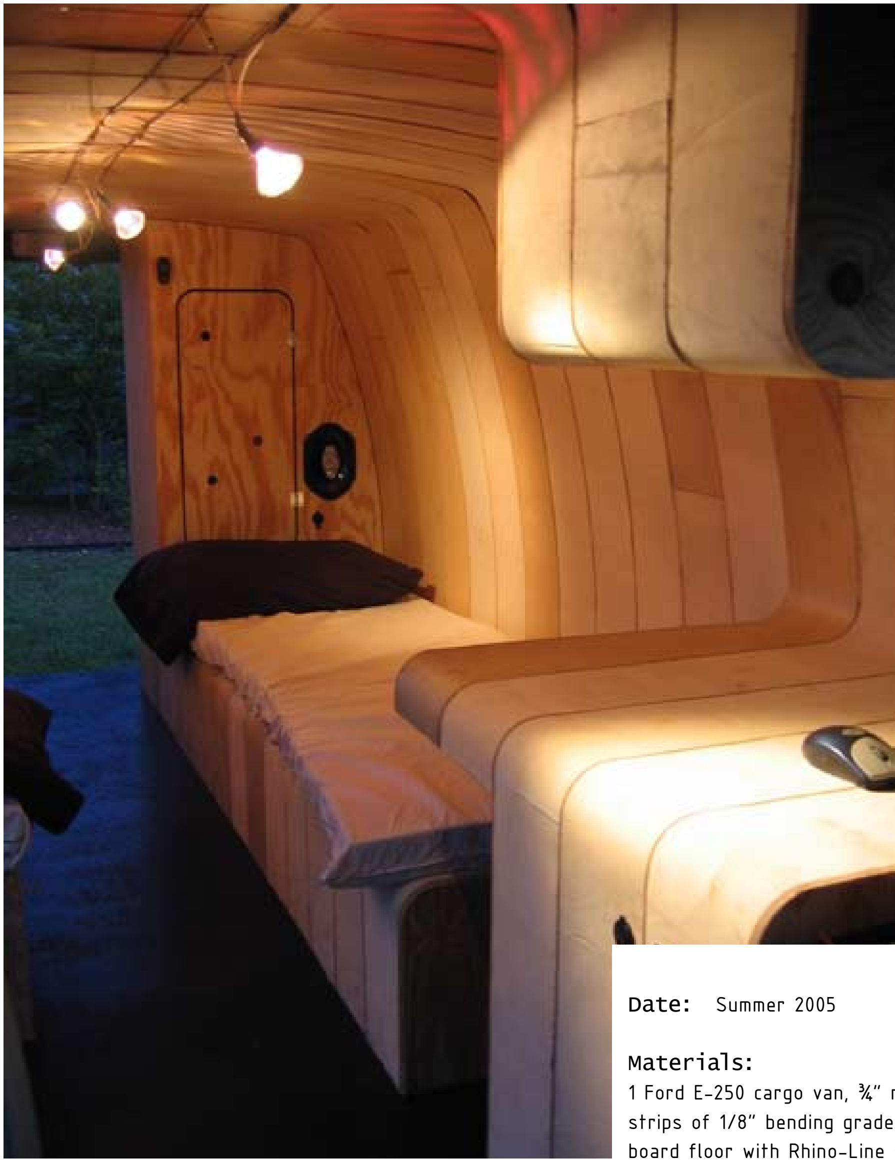
Water is stored in a series of standard 4" PVC pipes connected to make a container. Pipe connections are achieved with miscellaneous "Y" and "U" section fittings to allow for smooth water transition in the gravity fed system. The container is easily filled with a standard garden hose and can hold 22.5 gallons of water. One showers outside through an attachable fitting either behind or beside the van. The system vent is directed to the sink, which drains overboard, allowing it to double as the plumbing system overflow.

The skin lifts on a piano hinge against the portside wall, exposing the electrical and mechanical infrastructure (batteries and air conditioner) for easy service. Primary storage space is found aft. The skin also opens at intervals for faster access. Future clothes storage to be constructed in the port wall will create 6" of insulation. The roof is left bare to later accommodate sky lighting and additional ventilation. The overhead storage arms change in height along the length of the van to accommodate the camber of a longboard so as to minimize the spatial impact below. The rack comfortably holds three longboards in its arms, and an additional three shortboards can be strapped to the starboard wall forward of the berth.

VAN RENOVATION: Exploration of Digital Fabrication Techniques Iteration Two.



VAN RENOVATION: Exploration of Digital Fabrication Techniques Iteration One.



Date: Summer 2005

Materials:
1 Ford E-250 cargo van, ¾" routed and rabbeted OSB, inlaid 6" strips of 1/8" bending grade plywood, epoxy coated particle board floor with Rhino-Line surface treatment, Lexan, PVC, galvanized screws and hardware, stainless steel brad nails, wood glue, 1" foil backed polystyrene insulation, particle board.

Program:
Sleeping berths for two, desk, hanging closet, gallery, operating windows, water storage and shower, auxiliary electrical system.

Time Frame: Four weeks

VAN RENOVATION: Exploration of Digital Fabrication Techniques Iteration One.

Two 10' x 4" lengths of PVC serve as overhead water storage with a valve for showering. The fixed glass windows were removed and re-built in tinted and slumped Lexan and hinged with gas shocks to allow for proper ventilation without conditioning systems. Two 12V DC deep-cycle gel batteries were added and a house battery system was designed and built to accommodate an inverter, lighting, an electric cooler, and auxiliary DC outlets isolated from the engines starting battery. The cabinetry was an exploration of digital fabrication technique using the CNC router. This allowed for an incredibly lightweight and strong structure to be built relatively quickly, as well as to provide round edges to prevent injury underway. The desired use changed after some time and a newer, more pragmatic program was manifested in the next iteration (two.)

SURFBOARD FABRICATION

It took me a long time to get this process close to right; one could spend a lifetime perfecting these techniques. A surfboard has a very delicate balance of a vast number of design considerations; resultantly it can be either one of the most gratifying experiences or quite deplorable. I started out by shaping a board out of 3" blue rigid insulation and materials available to me in the boatyard, and got the bug. My friends called that board "The Slimer" because it turned this awful green color after the sun yellowed the epoxy, and I resolved to learn to do it correctly. The material and design exploration was both exciting and gratifying - research and experimentation in fiberglass and resin technology, skeg technology, and most importantly the shape and hydrodynamic considerations

Adjacent photographs describe the abridged process of fabricating a surfboard. In the example, a 5' 11" x 2 3/4" x 18 3/4" swallow-tail shortboard takes shape. Read like a book: Templating the profile, roughing out, shaping the bottom, finished deck shape, finished bottom shape, and painting (continued on next page...)

Far Left: A 10 foot longboard (tail first) takes shape in the shack (above).

This board (also shown in fabrication sequence below) has 8oz. of S-glass (fiberglass) on deck, 4 oz. on the bottom, with overlapping 12 oz. on the rails, laminated with West-Systems ultraviolet-inhibiting ultra-clear epoxy resin. Orchid graphics were hand drawn with india ink and suspended in the laminate. This board is one of nearly twenty surfboards I have shaped, glassed, and illustrated from 2002 - each one a little better than the last. I have yet to have the opportunity to explore these methods of fabrication in an architectural application.

SURFBOARD FABRICATION

The finishing, Read like a book: First laminate, hot coating, hard-ware installation, and the finished board.

ARCHITECTURE AND PHOTOGRAPHY

The relationship between photography and architecture is profound, and most especially relevant to the student and educator as images are a major (though representational) method of communication. Traveling to see some of the buildings I had read about began to expose the shortcomings and limitations of the medium. I have found that the pendulum swings both ways in this regard - the medias glorify some really bad buildings and defaces some beautiful ones. Faced with the challenge of representing buildings as I traveled to see them, I explored various ways in which I could more accurately represent them, including web based blogging to database buildings over time, and the contextual panoramics adjacent to this text.

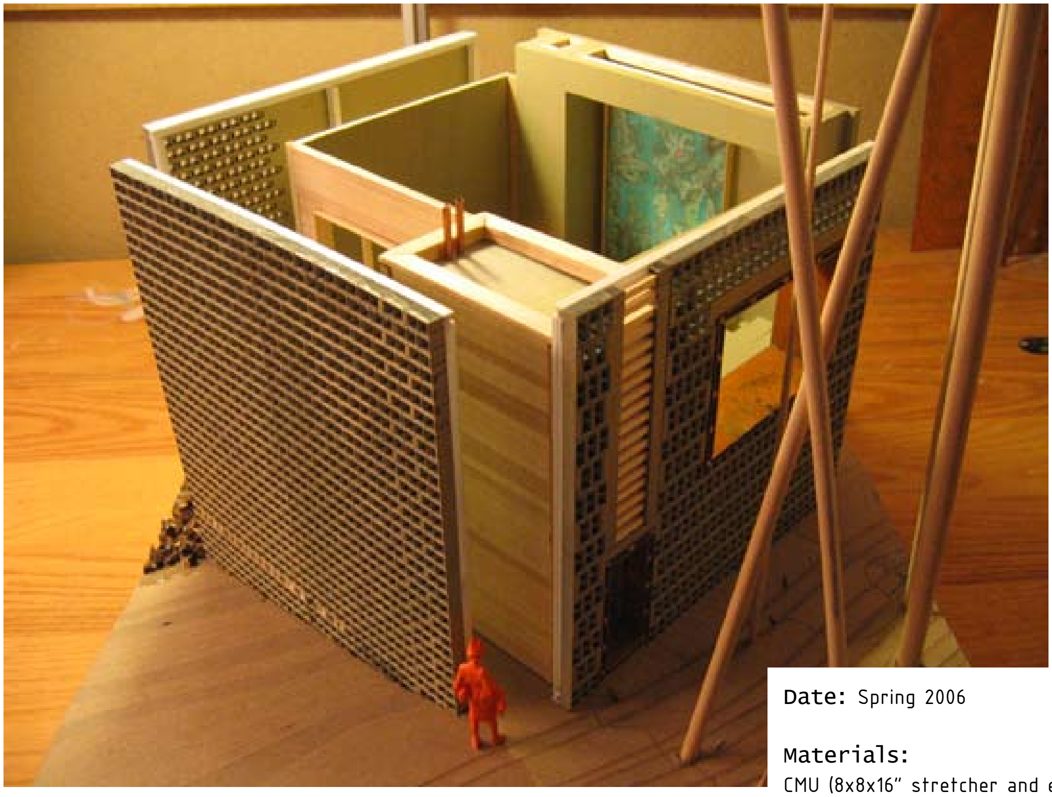
1 Wales National Assembly Building Cardiff, Wales. Richard Rogers Partnership

2 The Great Glasshouse Llanarthe, Wales Norman Foster and Partners

3 The Dirty House Adaje Architects London, England


CHANCE ST

PASTIME (PAINTING) PROJECT: A Meeting Place Between Idea and Experience- Translate a previous project to the program of a dwelling.



Date: Spring 2006

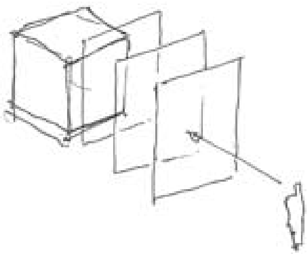
Materials:
CMU (8x8x16" stretcher and end block assigned as a primary building component), other standard residential construction systems

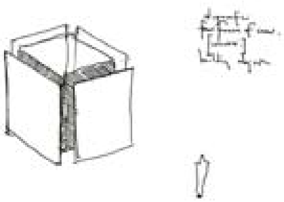
Program:
Provide a place to rest and take nourishment, using the pastime of painting to inform design decisions

Time Frame: Two Weeks (an elaboration of a previous project of one week)

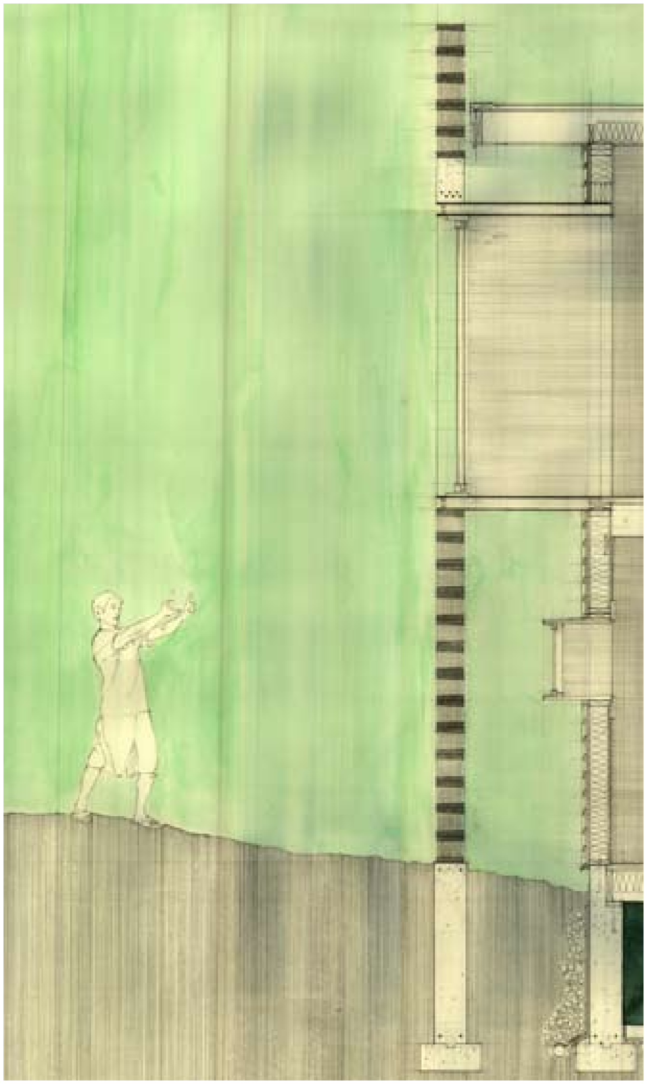
Location: Abstract wooded site in North Carolina, on a lake, 96ft. square

Professor: Epi Pazienza

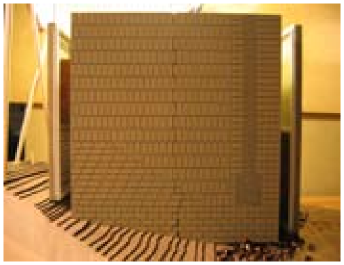




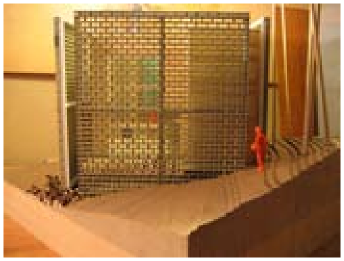
Analogous to the act, application, and experience of making and viewing a painting, CMU block is used in various orientations and applications to reinterpret this imaginary assigned site in North Carolina. All of the internal programmatic requirements of a dwelling make their manifestation on these canvasses around the perimeter, whether it be through allowing the passing of filtered and direct light, or reorganizing the mortar joints, resulting in vaying degrees of depths and densities. As a painting is a representation of an idea, place, or time, this building serves to experientially "re-present" certain physical characteristics of this site through the simple yet elegant medium of modular concrete masonry units. By orienting the block in different ways, the porosity, opacity, direction of sight, and other physical boundaries are defined in order to discuss in a new light the natural phenomenon of the falling of leaves, the lapping or vastness of a lake, or the dampness and color of the North Carolina clay.



South Elevation



West Elevation



East Elevation

North Elevation

DUKE DELTA SMARTHOUSE



Date: Fall 2004

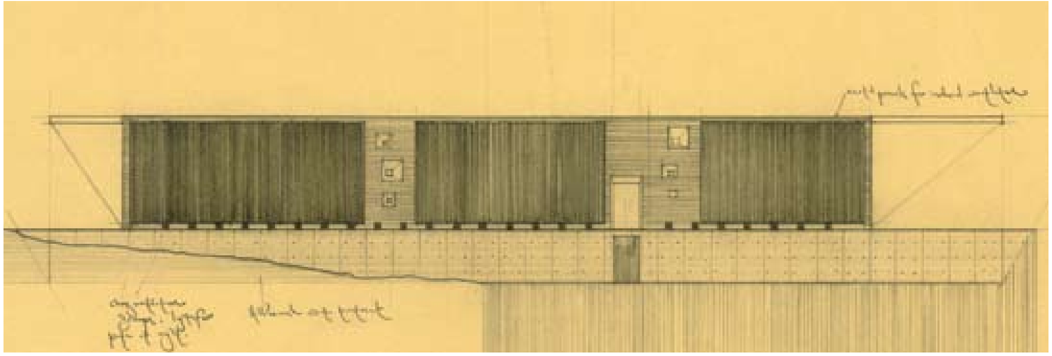
Materials:
Autoclave Aerated Concrete (AAC,) Assorted Wood Products, Glass, Steel Panels, PV panels, Earth.

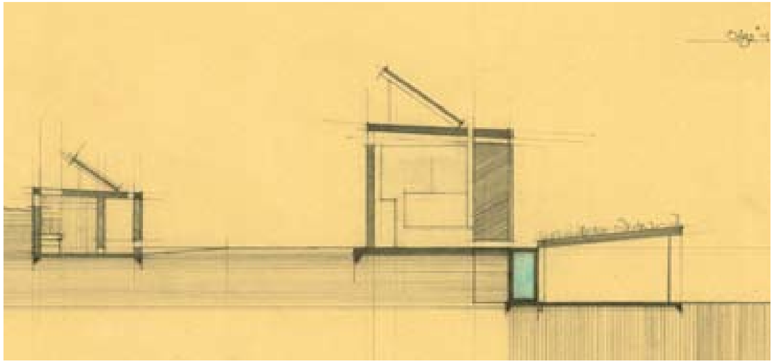
Program: National example in sustainability and technology for Duke University engineering, 6400 sq.ft. residence and laboratory for 8 students and 1 RA., including clean and dirty labs, living/dining/kitchen/study spaces.

Location: Duke University campus, Durham, N.C.

Time Frame: Eight weeks

Professor: Randy Lanou





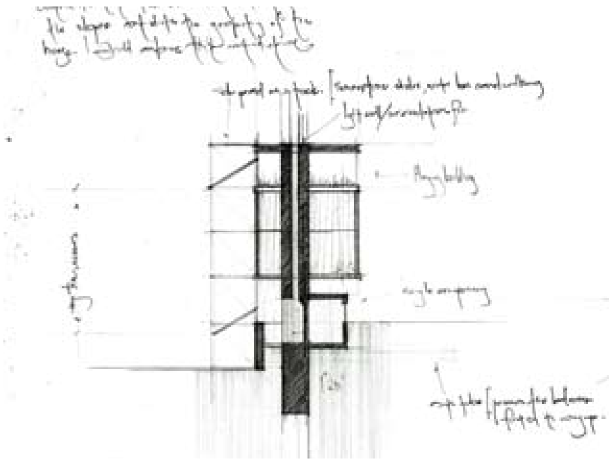
DUKE DELTA SMARTHOUSE

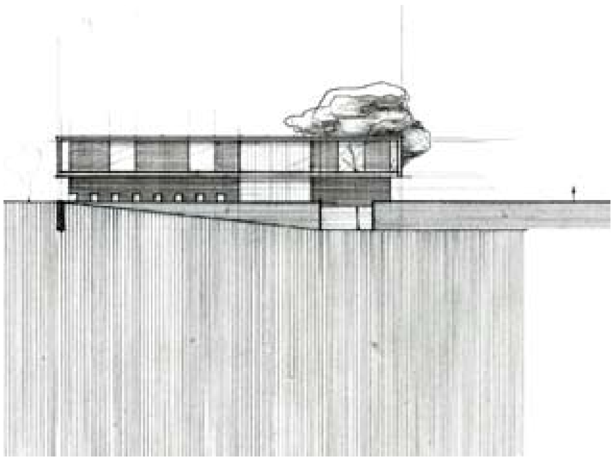
This is a project in the office of Frank Harmon Architects, currently under construction. We borrowed the program and client for the purposes of this studio project.

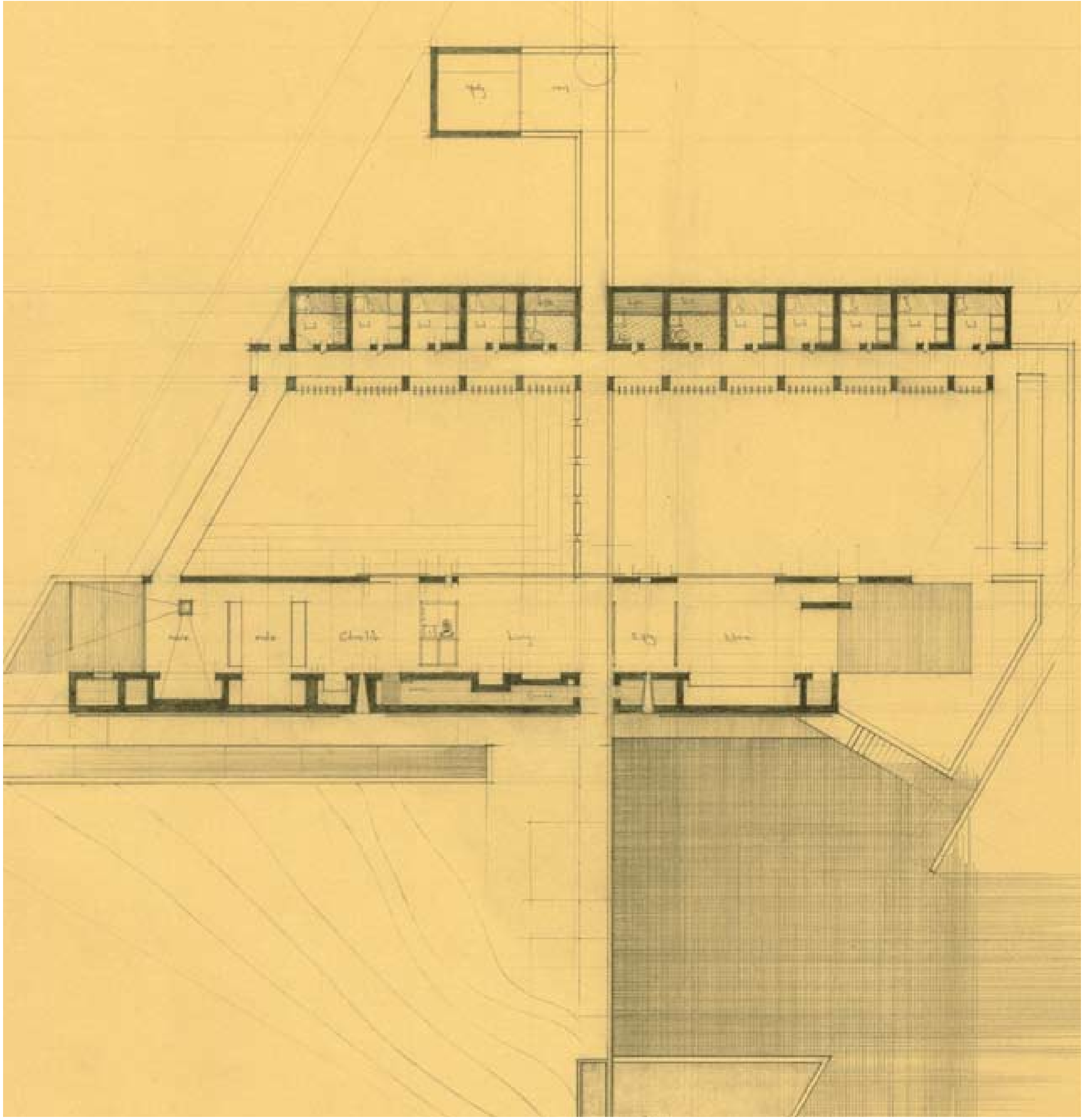
Duke University's engineering department was interested in this building being a testing ground for new ideas in sustainability and "smart" technology, both to be manifested in the building's infrastructure as well as the research that will be done within. The building itself was to be an experiment of sorts, a laboratory with the ability to be flexible to new technology as well as test and monitor the different systems in place. The forms of each of the separate buildings on the site illustrate a different approach to sustainable design, both active and passive solar techniques.

DUKE DELTA SMARTHOUSE

The south facade of the main building is clad with steel plate which serves as an active and passive solar system, capturing heat generated inside the wall cavity by the sun and inducing this heat by fan into the spaces in the wintertime. During the summer the convection created by the heat is used to draw heat from the spaces and exhausted from above. Additionally there is a photo-voltaic array above with surface area capable of far surpassing the energy needs of the building, which can be returned to the grid. The width of the spaces within is set at a reasonable depth to maximize cross-ventilation. The wall cavity is both an accessible space for the storage and manipulation of mechanical systems, general infrastructure, and technology (including a cistern for greywater reuse), as well as part of the living/working spaces at times for specific tasks or programmatic and material distinction.

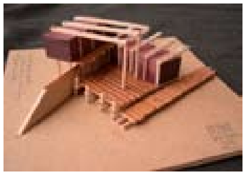






Special attention was made to choreograph the occupant's use and daily life within the context of the site and the natural: light, breeze, texture and materiality, spatial relationships, etc. Smart technology in this case would allow the different systems at work to be monitored and adjusted for maximum efficiency and comfort, as well as to control natural lighting for any purpose.



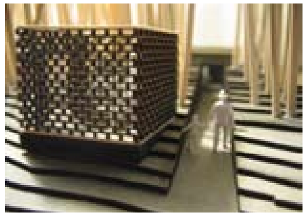


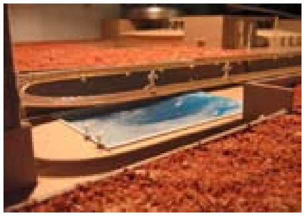
Modular construction and prefabrication has always been a strong interest of mine primarily because of the inherit marriage between design and fabrication. These images are a series of investigations trying to provide a possible alternative for the single-wide trailer, with mass production in mind.

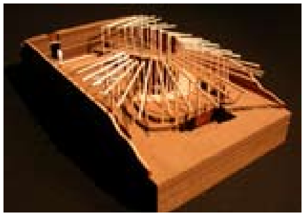
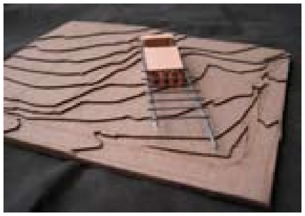
MODULAR + PREFABRICATION CONSTRUCTION EXPLORATIONS



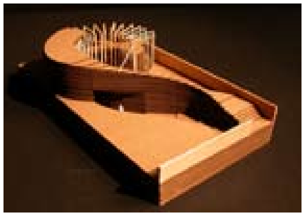




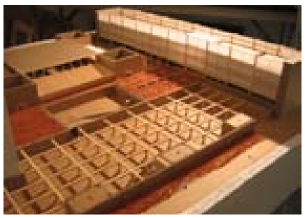



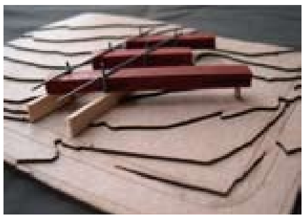





OTHER LITTLE WOODEN BUILDINGS:



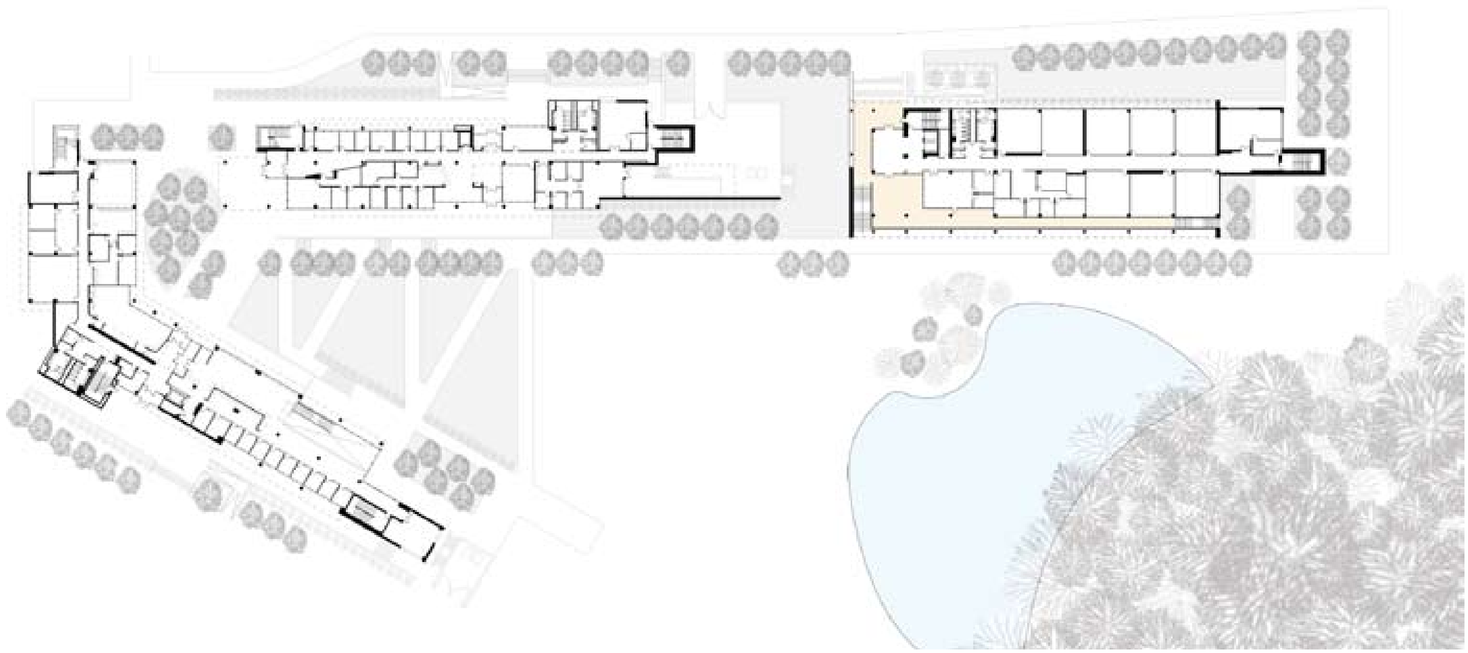



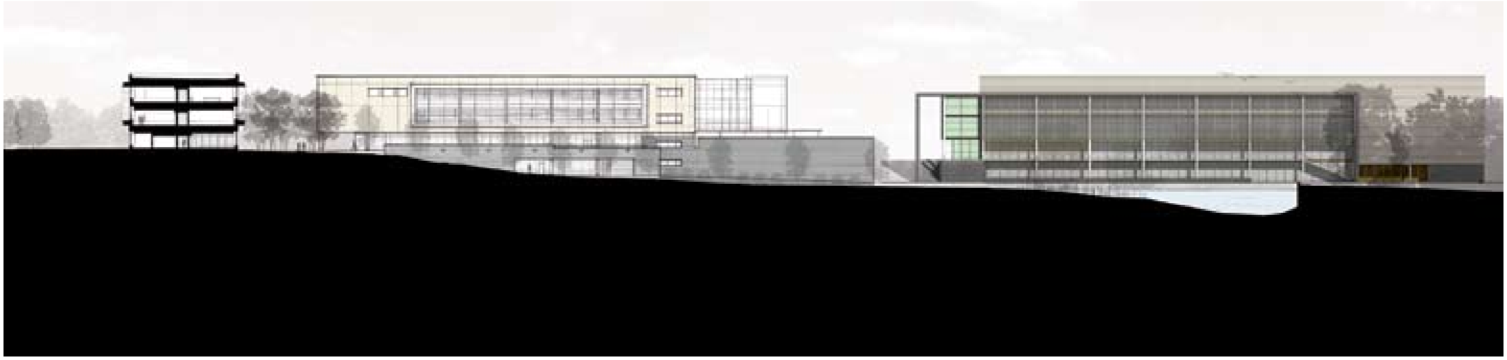



PROFESSIONAL WORK:

Wake Technical Community College Northern Campus,
Phase 1B classroom and office building
Pearce, Brinkely, Cease + Lee Architecture

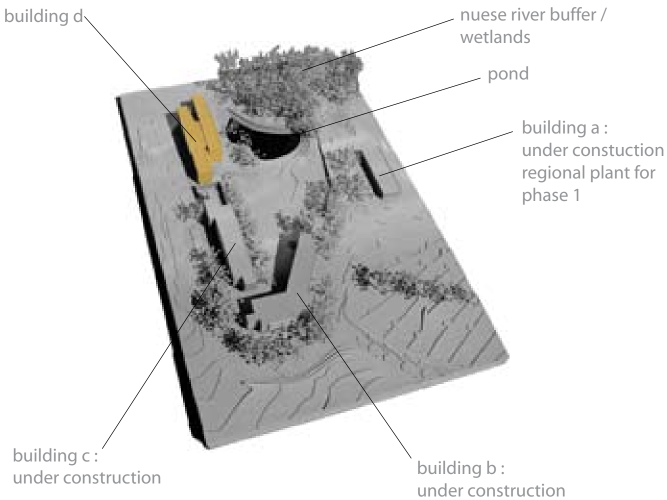
Architecture Team: Doug Brinkley, David Hill, Marni Vinton, Matt Bitterman, + Jenny Olson
Plumbing, Mechanical, and Electrical Engineers: Stanford White Associates
Civil Engineers: Mulkey Engineers + Associates
Landscape Architects: Reynolds + Jewell
Structural: Stewart Engineers + Associates
Budget: 28 million
Sq.Footage: approx. 80,000
My time on the project: August 2006 - March 2007



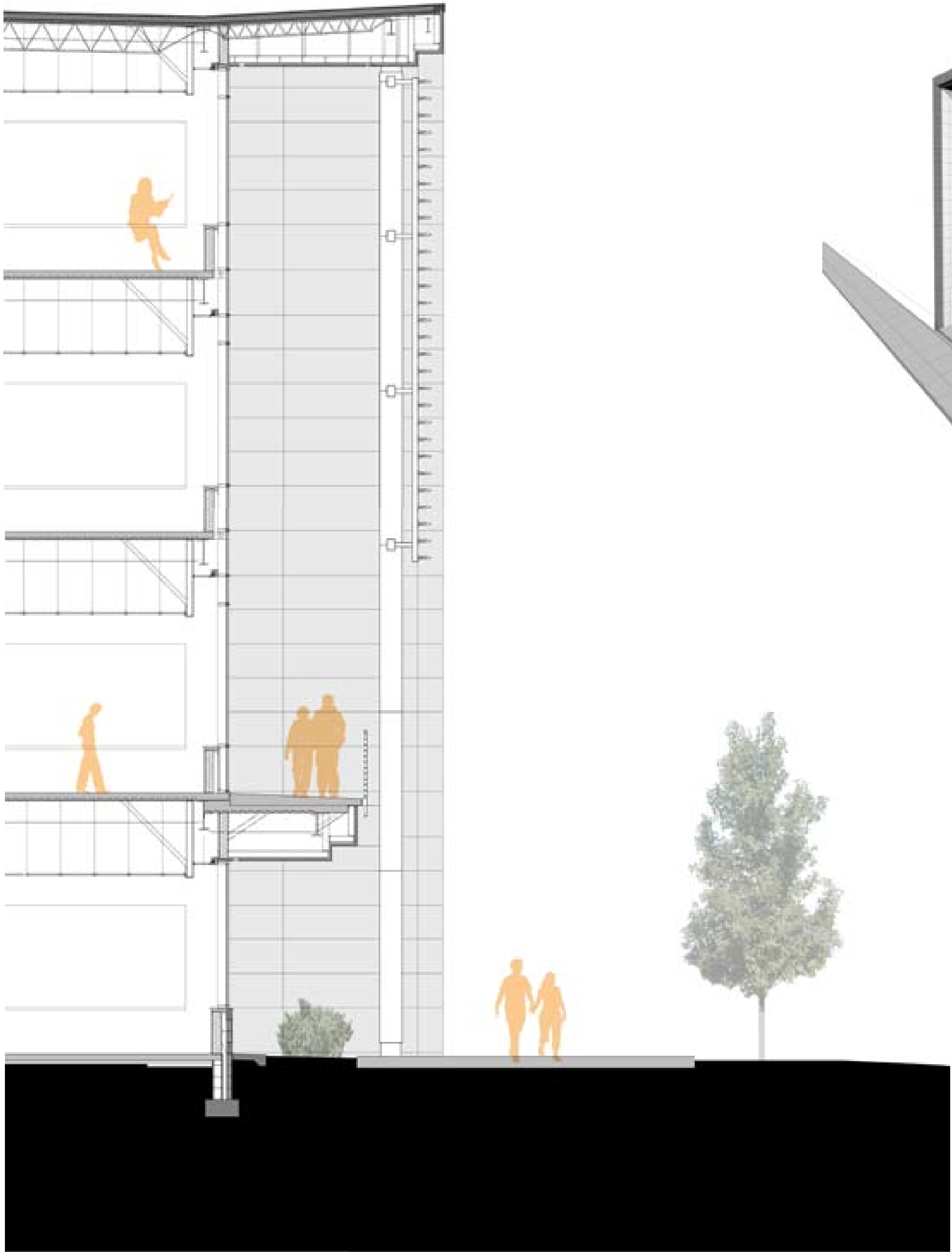


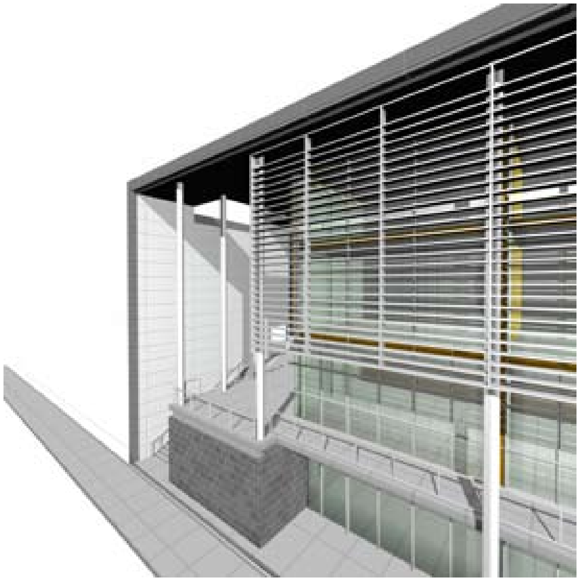
This building will be the fourth and easternmost classroom and office building on a new campus that PBC+L has masterplanned, designed, and now following through construction. The first three buildings are to be completed August of 2007, and Phase IB has already broken ground but will officially begin construction February of 2008. The masterplan maximizes favorable solar exposure to the north and south while straddling the existing wetlands. All of the buildings on this campus will be LEED certified, and Phase 1B is reaching for gold status.

I joined the team at the beggining of construction documents and saw them through completion. It is to the credit of my teammates David Hill and Marni Vinton, and to the client Wake Tech. Community college to have produced such a sensible and responsible design for this campus, and i feel very fortunate to have been able to be a part of this.

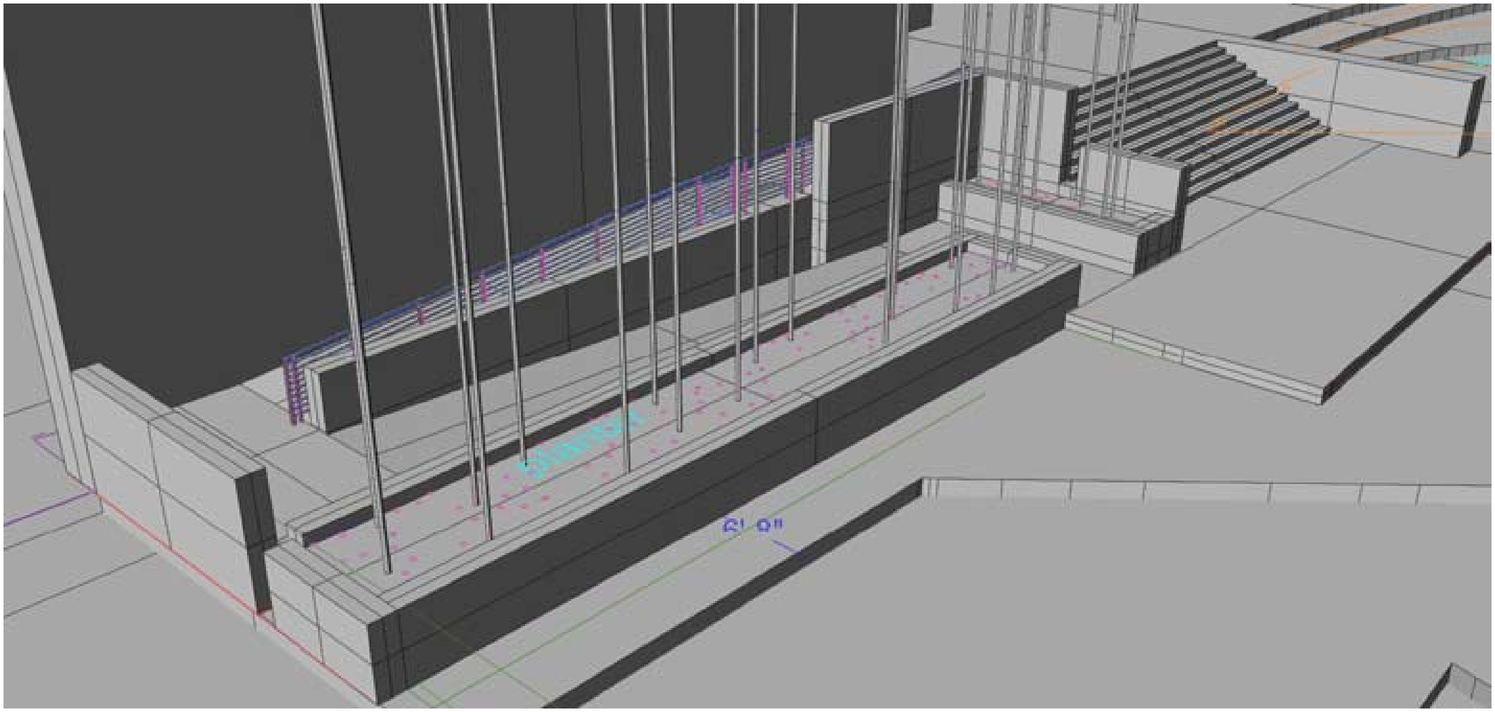


early conseptual moldels

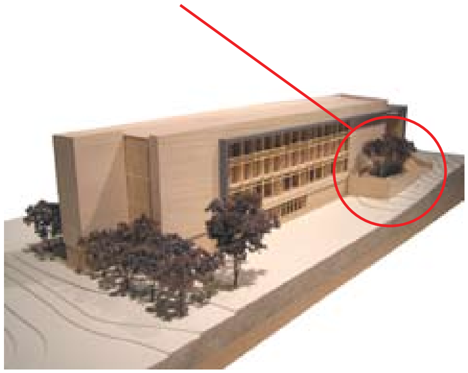




The building is attenuated along the East and West axis to maximize glazing along the North and South facades for daylighting and energy efficiency. A four story metal panel bent plane deliniates the glass volume of classrooms, offices, and cafe + bookstore, while framing the entry and creating a plaza overlooking the retention pond below. The stairs and mechanical systems fall behind masonry and GFRC (glass fiber reinforced concrete) precast panels.



Detailing this building was a great deal of fun all the way through. Above is a rendering of the main entry accessible ramp, one of three (others less glorious) I got to design and detail during the construction document production. The project was drawn in Autodesk Revit which is a wonderful tool; I was primarily responsible for the plans, elevations, building sections, column details, curtainwall elevations, door details, door schedules, ramp plans and details, and toilet details. Marni took the RCP's, interior elevations, elevator plans + details, stair and rail details, casework drawings, roof plan, and coordinated fixtures and finishes. David as the lead drew all the wall sections and handled the coordination, and Jenny helped us clean everything up in the end while drawing the window details. Doug took care of the specs and client, and helped us put this thing together. So many of the people at PBC+L have taken part in the project from the onset of Phase 1 and materplanning that they are too great to name here; I have simply described the few of us that drew this fourth building. All the representation shown here was done by David and Marni primarily, with the exception of the ramp rendering above. The physical model was built by summer intern Lane Van Buren.



Disclosure:

All of the images in this portfolio were taken by the author. There has been absolutely no digital manipulation of the images, excepting the digitization in itself when applicable. Levels of the Duke Delta Smarthouse drawings were adjusted to increase legibility due to the tan paper they were drawn upon.

All of the work contained was done by the author alone unless stated otherwise, or in conjunction with the advice and guidance of a professor if indicated.

Special thanks to Jeremy Ficca for his advice and guidance working with the CNC machine for the van renovations.

Thank you for reading/looking.

MATTHEW ALEX BITTERMAN:

Some work related to architecture and materials.