

CARTON HOUSE

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The Semester in Sustainable Design-Build empowers students to explore sustainable design and construction through collaborative hands-on exploration, experimentation, and refinement. This immersive program is focused on the creation of a 350-450 s.f. structure as a vehicle for research, design, and consensus-based decision-making. Ten to fifteen undergraduates from different disciplines—constrained by a limited timeline—focus on environmental stewardship, architectural aesthetics, and affordability. Many students enter this program with little to no experience in construction or design, allowing for innovation, unique perspective, and personal growth.

In August 2013, the eleven students and three faculty of the Semester in Sustainable Design-build were tasked with creating a flexible, portable structure for a single woman in sixteen weeks. The client, a psychotherapist in private practice, intended that the CARTON HOUSE would serve as office, group and individual meeting space, and well-appointed residence. Further, the proposed site would serve only temporarily as the client hoped to move the structure to a yet-to-be-found, remote site within five years.

The CARTON HOUSE required a high indoor environmental quality to address the client's chemical sensitivities. This, combined with a desire to minimize the embodied energy of materials through local sourcing, informed material selection and finishes. Building in a northern New England climate focused attention on a super-insulated building envelope and minimizing mechanical systems. With these priorities in hand, students carried a well-developed and responsive design intent through construction and to fruition in a 350 s.f. transportable structure, balancing a flexible program with aesthetic finesse. Affordability and portability drove constraints, engendering creative solutions from the student group. Height and space limitations gave rise to a custom Murphy bed and in-floor storage, aesthetically-engaging roof lines, and well-articulated facades and section.

Students began the program with varying degrees of prior experience in: design, tool use, and problem solving. As the semester progressed, early apprehensions and uncertainties yielded to enthusiasm, confidence, and ingenuity. Students enter this program intending to learn design and construction, yet complete the program as skilled and creative problem solvers—empowered to better our built environment and effectively steward our natural one.



PHILOSOPHY

the success of the CARTON HOUSE rests in a foundation of hands-on pedagogy, exploratory collaboration, and responsible stewardship of our environment

METHODOLOGY

students are guided through the design/build process: from initial conception to construction and final detailing, while maintaining individual and collective ownership over process, priorities, and goals



GROUP PROCESS

students from diverse undergraduate disciplines collaborate through consensus-based decision-making, exploration and exchange of ideas, and experimentation and evaluation

hand-drafting and digital modeling provide a foundation for the integration of site informants, programmatic needs, and aesthetic intent



DESIGN/BUILD

engaging both design intent and the physical challenges of construction gives students an empowering vehicle for the transition from theory to execution of design

initial proposals are tempered with group discussion and critique, mock-ups and detailing, and integration into project management and design intent



CONTEXT

the CARTON HOUSE's response to its site is defined by client program and direction, regional history, local built environment, and ecological responsibility

students carry project components from aggregates of design, scheduling, and procurement into the reality of materials, fasteners, and finishes



SPECIFICATION

- 350 sf dwelling
- \$37,000 construction cost
- locally harvested and milled lumber
- high density cellulose insulation R-30 walls R-37 floor R-45 roof
- electric heat and appliances minimize mechanical infrastructure
- low- and no-VOC interior finishes
- high recycled-content concealed-fastener steel roofing
- operable wall allows for future addition
- custom murphy bed and in-floor storage



CARTON HOUSE

Eleven students carried design intent to fruition; constraints of size, affordability, and time meshed with aesthetics, constructability, and chemical sensitivity to create a well-crafted solution to a complex design problem. The CARTON HOUSE serves as office, group meeting space, and well-appointed residence. Locally-sourced materials, a super-insulated envelope, and efficient use of mechanical systems create an environmental sensitivity that stands alongside the balance of classic and modern aesthetic.



RESOURCE

with attention to embodied and operational energy, the CARTON HOUSE sits lightly on the land while the extensive use of natural materials minimizes the overall waste cycle

the CARTON HOUSE is designed to be infrequently (2-5yrs) transported to different sites; considerations of portability, siting aspect, and future adaptability in new locations drove volumetrics, fenestration, and details



CRAFT

the drive to maintain indoor environmental quality and enduring workmanship gave rise to a long-lasting structure designed for healthy living

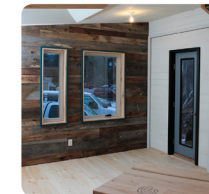
providing encouragement and design freedom, the client brought requirements of affordability, flexibility, and high indoor environmental quality



ADAPTABILITY

balancing office and residential functions, the CARTON HOUSE provides programmatic flexibility; an operable section of wall opens the interior to outdoors and provides an opportunity for future additions

operating under a 16-week timeline, size and scope of the CARTON HOUSE were limited, highlighting the efficiencies of collaborative process and the design/build model



SUSTAINABILITY

the CARTON HOUSE embodies its client's and designers' goals of sustainability, embedding a broader dialogue in the design process by giving voice to self-defined and -evaluated priorities

CONSTRAINT

the CARTON HOUSE is born of informative constraint: affordability, portability, and schedule; providing challenge, exploration, and opportunity

