

The Core House

The Core House is designed with three primary intentions: First, design a net zero home in which the goal to be a sustainable residence inspires the architecture. Second, design a home with architectural elements that respond to the site and speak to both traditional and modern. Lastly, design a home that allows for a range of living, leisure, and work.

All three intentions intersect conceptually and architecturally with The Core: a thick northern service wall. The Core serves as a protective thermal and acoustic layer the living areas of the home. A place for permanent program such as storage, bath, kitchen, and structural elements. Additionally, the core is a vertical circulation element which is revealed as an aesthetic element on the interior and exterior.



The gable roof is angled at a 42.3 degree angle for optimal solar gain. Hybrid solar thermal panels are used on the south facing roof to generate and store energy for the home. This dual nature system contributes to the overall efficiency of the residents.

High vents on the north facade which can be opened in the summer to draw air from the lower levels through the house to provide natural cooling.

Architect - Judy Johnson, AIA
 Designer - Kathryn Wetherbee
 Firm - Harriman Architects + Engineers, Portland Maine.

Wall insulation have an R30 rating and roof has R60 to minimize the cooling and heating loads throughout the year.

High R values, Triple glazed energy efficient windows throughout the house allow for views to the exterior and a connection to the surrounding area.

Concrete floors with radiant heating tubes to warm the house in the winter.

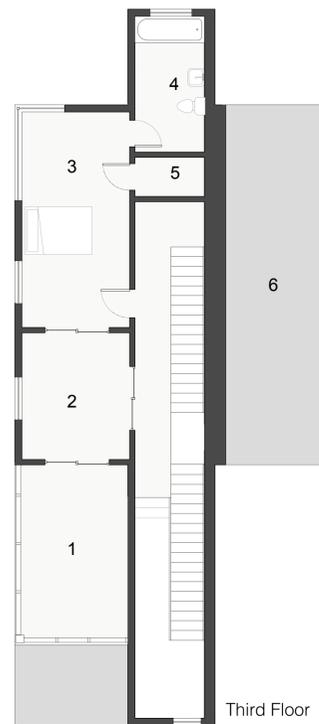
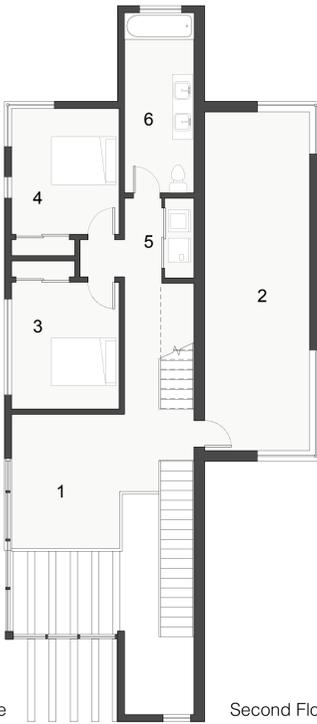
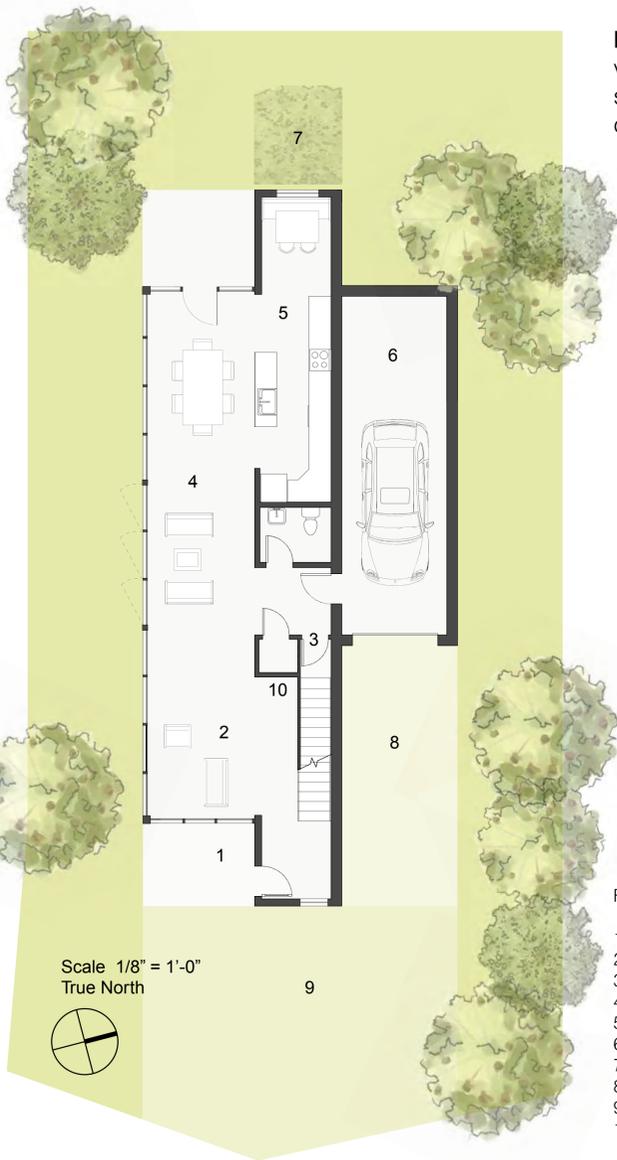
Flat roofs are used for rain water harvesting to be used for non-potable water functions in the house.

Pervious pavers serve as a natural landscape feature as well as reduce stormwater runoff on the site.

Net Zero | The goals of the home are to **reduce** the load of energy being used, **recover** energy and natural resources, **generate** energy from these resources, and lastly **educate** the occupant. Using U.S. Census data for the average Massachusetts residence, to be a net zero home, the Core House will have thirty, 300 kwh solar panels to supply 100% of the electric load of the house. This translates to the homeowner:

- Elimination of 163531 lbs. of CO2 per year; equivalent to planting 237 trees every year
- \$22,000 added home value
- A yearly savings of over \$1,000 in electric bills

Program | The spaces in the house allow for a range of living. Primary living spaces are on the southern side of the home, with various ceiling heights and exposure to the exterior that relate to the private and public nature of those spaces. On the northern side of the home, connected by the core, are more functional areas. Exterior program functions include a garden, rooftop rainwater collection, and site strategies that implement the pre-determined geometry of the narrow site.



Educate | A sculptural light piece in the entry way to inform the homeowners if they are producing more or less energy than they are consuming. Lights green when producing and red when consuming.



First Floor + Site

Second Floor

Third Floor

- 1 Entry Through The Core
- 2 Double Height Den
- 3 Entry to Basement
- 4 Dining + Sitting
- 5 Kitchen + Breakfast Nook
- 6 Garage + Utility
- 7 Garden
- 8 Pavement
- 9 Grass Pavement
- 10 Education Sculpture

- 1 Loft | Study
- 2 Studio | Home Office
- 3 Bedroom
- 4 Bedroom
- 5 Laundry in Core
- 6 Bathroom

- 1 Outdoor Patio
- 2 Indoor Sun room
- 3 Master Bedroom
- 4 Master Bath
- 5 Walk-In Closet
- 6 Roof for Rainwater Collection



Architecture | The form provides visual cues for the function of the interior spaces. Key features include: The Core wall which is solid and closed on the exterior except for glazing on the East and West walls to make visible and reinforce the function of vertical circulation and systems. As well as the North studio to allow for natural light. The interplay between glass and solid on the South facade to inform the location of the interior spaces, the open study, and the outdoor balcony. The use of materials that reinforce the interior function with the exterior, metal siding for the modern core, traditional horizontal wood siding for the living areas and vertical wood siding for the garage and studio area.

