

A New Norris House

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University of Tennessee, Spring 2009 - Fall 2011

Site: The project is located in Norris, Tennessee. In 1933 the Tennessee Valley Authority constructed this model community as part of the Norris Dam construction project. A key feature of this New Deal village was the Norris House, a series of homes built as models for modern and efficient living.

Program: In light of the 75th anniversary of the Norris Project, an interdisciplinary team of students and faculty reinterpreted the Norris paradigm and created a New Norris House — an 800 ft² sustainable home designed for the 21st century.

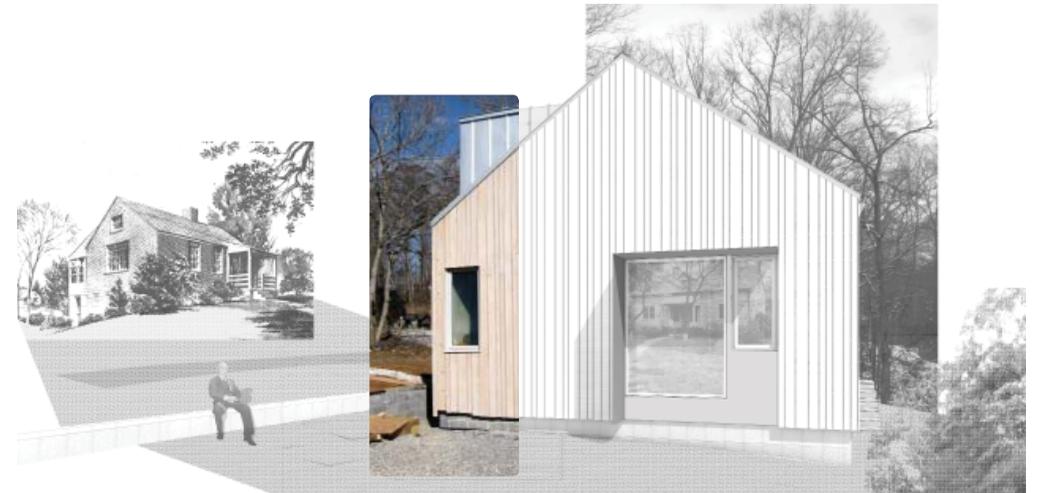
Concept: As with the original Norris designs, the New Norris House uses state of the art technologies and techniques. The house incorporates green materials, leverages energy conscious design strategies, and utilizes off-site construction methods. Yet the challenge goes beyond the creation of a model home design. The house design responds and is reforming community and legal constraints that currently deter sustainable home construction. To accomplish this, the project team consulted with community residents, researched local codes and worked with local and state government. The project also addresses affordability and “fit” in light of median home prices and the town’s status on the National Register Historic District. The project thus confronts and resolves not only technological or scientific challenges; but also legal, social, and aesthetic issues that currently restrict green construction. The New Norris House is registered with the US Green Building Council and is certified LEED for Home Platinum.



The Norris Dam; Norris, Tennessee

Selected Design Awards

ACSA Design-Build Award (2012)
Merit Award - Residential Architect Design Awards (2012)
Merit Award - AIA Gulf States Design Awards (2012)
NCARB Prize Recipient (2011)



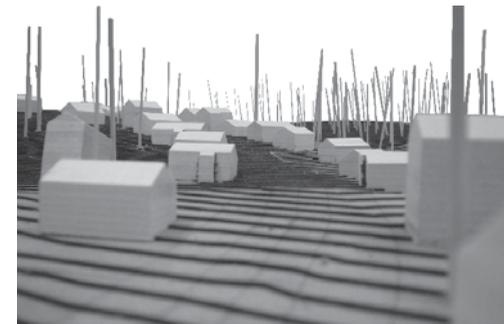
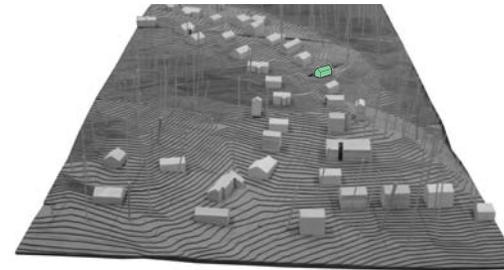
A New Norris House

As a member of the original student design team, I have been working on the project continuously since its inception (with the exception of fall 2009). As a student I helped the first full studio of architecture students refine the construction document set. Upon graduation, I was hired as a researcher with the college to help lead a group of students in a 12 credit-hour design/build setting. I performed many roles and had a hand in many processes, but primarily my responsibilities included coordinating with Clayton’s design team to complete the construction document set; coordination of building systems and MEP subcontractors; coordination and oversight of the LEED for Homes submission and corresponding work on-site; aiding in regulatory and permitting needs; and aiding in the management of on- and off-site personnel and scheduling.

Historically, construction workers for public works lived in temporary camps. Norris Dam workers were joined by technical and professional staff and their families, and remained for longer. The TVA built a permanent town that would, at a smaller scale, reflect its larger vision of stewardship and innovation for the betterment of society. The town is one of the first “planned communities” and “garden cities” in the US.

Supported by a strong community center, Norris was originally planned to operate economically around several small cooperative industries. The original Norris plan accommodated shared garages, which were utilized by the surrounding cluster of homes and connected by a network of walking paths. While the garages no longer exist, the walking paths remain.

Today, Norris is largely a bedroom community for nearby Oak Ridge and Knoxville. Many original homes have been enlarged and modified to accommodate more contemporary lifestyles.



The New Norris House seeks to become anonymous in the context of a historic town— the form of the house echoes the form, scale and materiality of original Norris Cottages. The siting of the home responds to the dominant pattern of existing homes along Oak Road. The new home orients similarly to the road and maintains a similar, minimal footprint. The home is then shifted toward the middle of the site, opening up a front courtyard for the accommodation of a car. The use of gravel softens the nature of the courtyard and allows water to drain through its surface.

The project also uncovers a long forgotten walking path that once connected Oak Road to the greater network of pathways. Before the automobile, citizens of Norris used these pathways to move between their homes and shared amenities throughout the town. The reconstruction of the pathway furthers a return to a more local lifestyle free of the automobile and further connects the project to the urban scale of Norris.



An original 1933 Norris home clustered around a shared green space. Most homes in Norris do not address the street, but rather community spaces that sit adjacent. (above)

A shared parking garage as it existed in 1933. No garages remain, but their existence served as a source of inspiration for the home as a prime example of shared resources amongst the community. (left)



Site Design

The house siting works with existing topography and mediates the street and the wilderness behind. The house is neither at odds with the site or part of it, rather in the in between. It seeks a sensitive relationship to the site, leveraging the normative quality of the typical form of Norris homes, and a subtle understanding of environmental issues and systems integrated for performance and experience.

The site and landscape design integrate performance and aesthetics - improving on-site species diversity while maintaining a modern aesthetic. Rain and grey-water storage and filtration is combined with traditional strategies, such as a hand pump and raised vegetable beds, to create a simple, efficient, on-site water management system. Texturally and chromatically interesting plantings filter and absorb storm water on site, prevent soil erosion, and provide diverse habitat and forage for other forms of life.



A series of terraced bio-retention beds is designed to process all greywater and stormwater on-site. (above)

A walking path once existed on the site to connect Oak Road to a larger city-wide network of trails. The path has been re-constituted as part of the site efforts. (left)

I designed and assembled a garden irrigation system that accepts overflow water from the primary cistern in the home. This secondary cistern will overflow (or be manually diverted) to the bio-retention beds where it naturally infiltrates. (center)

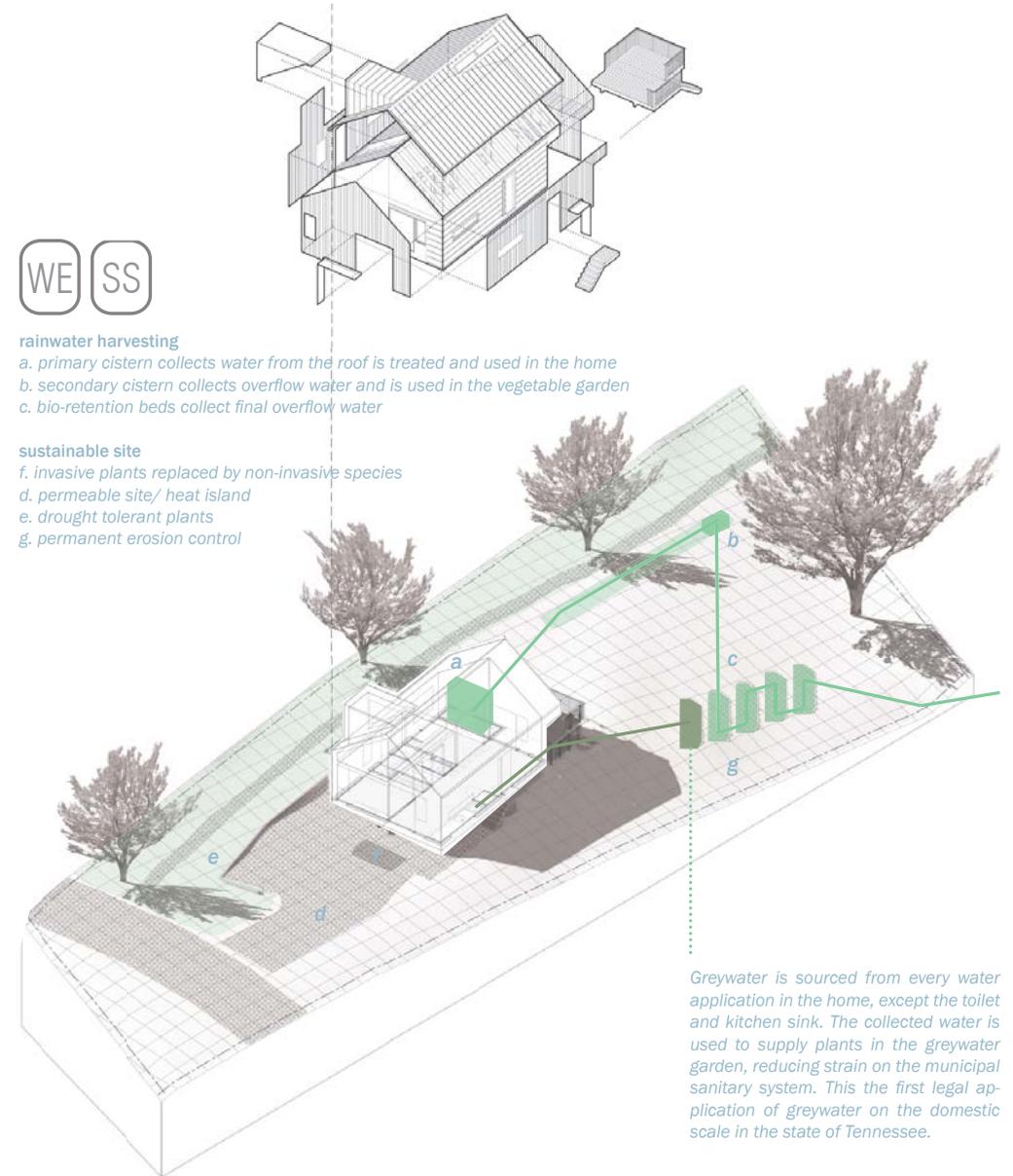


rainwater harvesting

- a. primary cistern collects water from the roof is treated and used in the home
- b. secondary cistern collects overflow water and is used in the vegetable garden
- c. bio-retention beds collect final overflow water

sustainable site

- f. invasive plants replaced by non-invasive species
- d. permeable site/ heat island
- e. drought tolerant plants
- g. permanent erosion control



Greywater is sourced from every water application in the home, except the toilet and kitchen sink. The collected water is used to supply plants in the greywater garden, reducing strain on the municipal sanitary system. This the first legal application of greywater on the domestic scale in the state of Tennessee.

Spatial Design

The recognizable aspects of original Norris homes and their settings is retained – a simple, rectangular volume with a gable roof is placed within the context of Oak Road. The interior of the home departs from the traditional, opening up the volume and allowing views and natural light to define new relationships between interior and exterior.

The plan of the home separates private and public. The living space becomes an extension of public activity within the home and in the site. A front picture window and rear exterior porch reinforce these connections. Adjacent spaces contain the bedroom, a bathroom, and a loft. These spaces offer the residents a retreat from the compact urbanism of Norris.

The location of windows and doors reinforces intended degrees of privacy, and transforms traditional placement to maximize passive environmental response and views. Refined contemporary detailing reinforces spatial concepts.

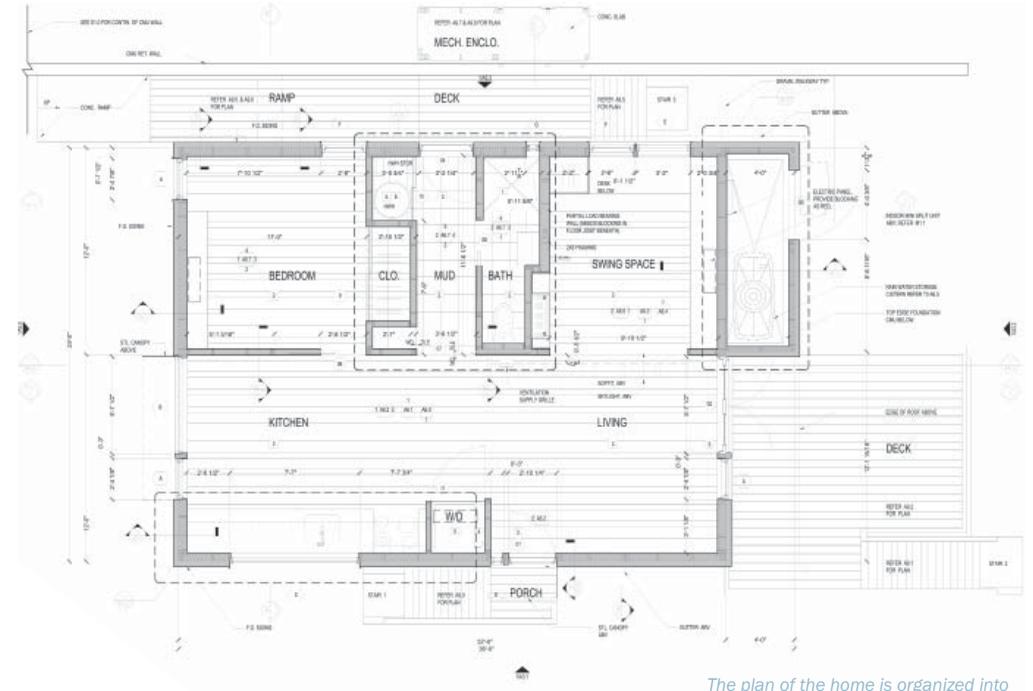


The marriage wall acts as the primary organizer of space in the home. (above)

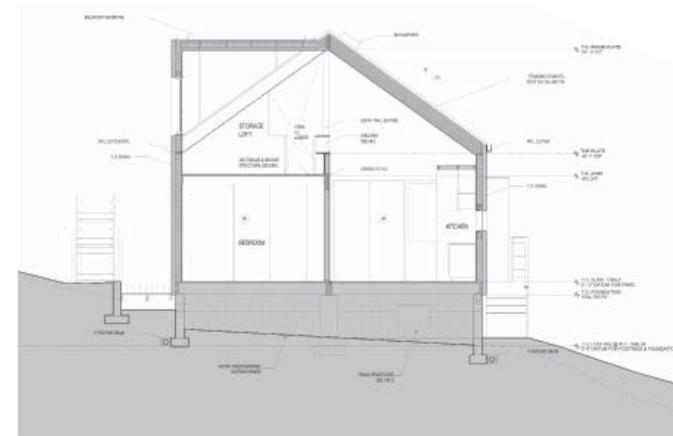


In the afternoon light, the locations of windows and carefully placed moments of color create distinctly different moods in each spatial zone. (left)

Skylights along the ridge-line provide an abundance of natural daylight to the living and kitchen spaces. (right)



The plan of the home is organized into public and private halves. Partitioned spaces, smaller windows, and the placement of the service core help designate the private zone. In contrast, the public half is open to the lofted ceiling above, is spatially very fluid, and flows into the outdoors through the placement of large windows. (above)

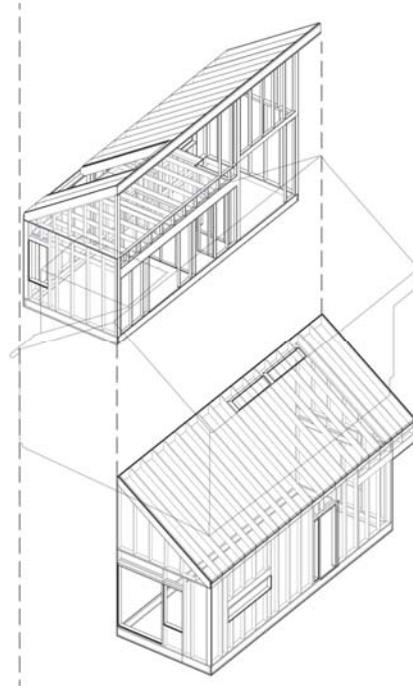


Transverse section through dormer. (left)

Modular Partnership with Clayton Homes

The TVA used the original Norris houses to experiment with new materials, technologies and building techniques of the era, such as precast concrete beams, plywood interiors, and modular construction. The New Norris House expands on this history of innovation by partnering with Clayton Homes (the largest modular builder in the US) to construct the shell of the home. The majority of framing, insulating, sheathing, and MEP rough-in work was completed off-site in a controlled environment, and was finished in five days with minimal waste.

After the modular units were delivered to the site, the design/build project team began the task of completing custom interior and exterior finishes. As an infill site, phasing of on-site and off-site work required careful phasing and coordination. Furthermore, the necessary hinging of the roof structure for shipping and building with zero collar ties pushed the modular partner to new limits and innovations.



The home was built in two modules. As the primary design contact with Clayton, I was responsible for the coordination of our construction documents with Clayton's designers. Through this process, the design team modified the home to conform with Clayton's manufacturing process, and created a clear scope of work to designate where production work would end and on-site work would begin. (above)

I spent five days in the production facility conducting construction administration in collaboration with Clayton engineers. (left)



The transport and installation of the modules required careful staging of on-site work (primarily the partial completion of the foundation). After the two units were backed into place and married together, the home was lowered onto the finished foundation two weeks later. (above)

The high pitch of the roof necessitated the hinging of the roof structure. (left)

Once the home had been set on the foundation, the design/build team began installing missing building components (windows, doors, roof, etc), collaborating with MEP sub-contractors, and working to complete custom interior and exterior finishes. (right)

Exterior

The recognizable aspects of original Norris homes and their settings is retained – a simple, rectangular volume with a gable roof is placed on the hillside between street and Forrest, largely conforming but subtly adjusting to better relate to access, sun and view. A dormer lends space, light, and air filling traditional roles and the added role of supporting passive solar water heating– its proportions and detailing adding a contemporary edge to the traditional form.

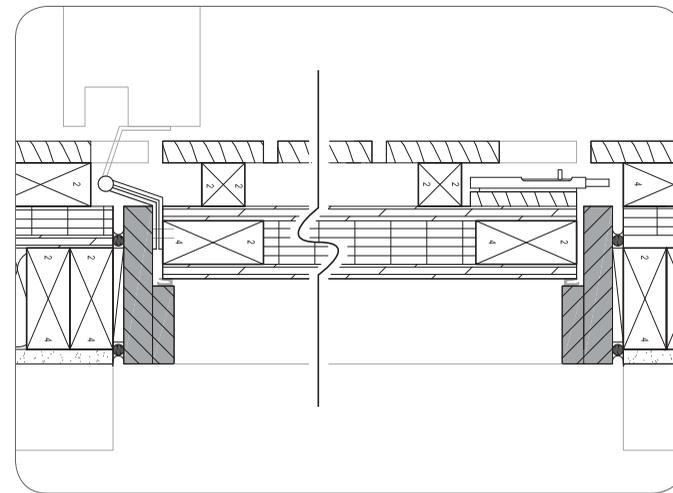
Natural materials, textures and color, hand crafted details where the hand and foot touch, and an intimate scale provide further opportunities to speak to the everyday objects and to the spirit and physicality of the original cottages. Yet, it is also hoped that visitors might realize special attention, exaggeration, and craftsmanship in designing, detailing and making that put the New in this Norris House.



French doors in the rear of the home extend the living space into the landscape. I was responsible for the design and detailing of the soffit, which is clad in Atlantic White Cedar and creates a sense of continuity between the two planes. (above)

The atypical roof slope, prefabrication requirements, large window on the north side, and operable ventilation shutter all contributed to the complexity of the dormer's detailing and fabrication. (left)

The door to the mechanical room. (right)



View of the parking court and home from the street. The home is clad in Atlantic White Cedar, a regional material chosen for its natural resistance to moisture damage and weathered grey appearance. The steel canopy provides functional shading to southern glazing, but also acts as a formal element in the composition of the façade. (above)

Jamb details of the mechanical room door. I designed the door to conceal itself into the rainscreen façade. (left)

Interior

Modest entries from the side continue efficient planning of the original Norris model, but upon entry the soaring, light filled space and its extension into the street and landscape is a welcome departure from the models of old.

A continuous ridge-beam and advanced framing techniques allows for large vaulted interior with no collar ties. To make the most of the small footprint, built-in cabinetry in the kitchen, swing-space, and bedroom is treated as furniture rather than an enclosed space—concealing appliances and storage in order to make more room for living.

The home makes extensive use of environmentally preferable products, using local, recycled, reclaimed, or low-VOC materials almost exclusively. These efforts played heavily into the home's LEED for Homes rating, which is projected to achieve a Platinum level. This will be the first project built by the University of Tennessee to achieve such a status.

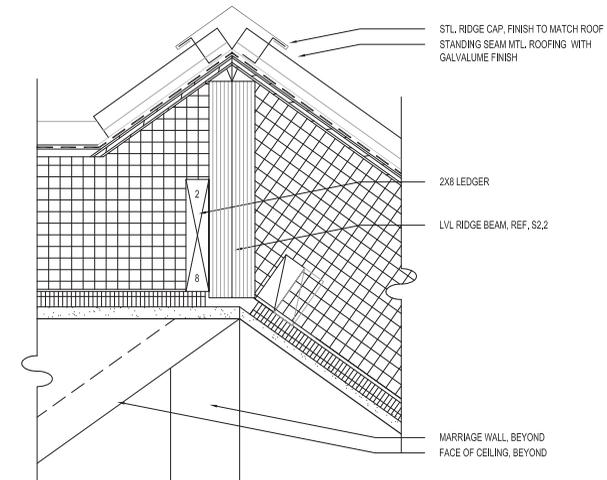


View of bedroom. Exposed structural wood ceiling becomes floor of the storage loft above. Built-in cabinetry attempts to be anonymous, yet functional. (above)



A dormer in the storage loft meets the ridge-line. The dormer was custom designed and fabricated off-site to accommodate a non-traditional roof pitch. (left)

A window in the kitchen frames a view into the landscape. All cabinetry in the home was custom designed and built by the project team. (right)



The public half of the home supports the kitchen/dining area and living space. A large picture window on the front of the home provides literal and phenomenal transparency through the home towards the landscape in the rear. (above)

One of four ridge details that I carefully developed to allow for the interior ridge-line to precisely meet the dormer, marriage wall, and skylight along a singular, crisp path. (left)