Neuman Forest Environmental Learning Pavilions

46.44.41 N 116.45.49 W

Located at the end of a recently-completed trail through a ponderosa pine forest in rural Troy, Idaho, the Neuman Forest Environmental Learning Pavilions act as a lens for direct engagement with this unique landscape. They provide multiple educational spaces (the site is walkable from the local K-12 school), as well as a refuge for community members and visitors alike to engage with the surrounding woods.

Students collaborated with numerous stakeholders that impacted the resulting project. These included the land owner, the Palouse Land Trust (who oversee the conservation easement on the site), educators from Troy schools, a Structural Engineer and Professor Emeritus of Renewable Materials, a local lumber mill, city and county officials, material and financial donors, forestry conservation experts, multiple community organizations, and the composite materials lab at a neighboring university. Having so many partners imbued the educational experience with a richness of perspectives and expertise. This integrated approach transformed an initial desire for a simple shelter in the woods, into a more meaningful resolution of community needs, ranging from conservation to education to recreation.

Three distinct, connected, Pavilions are sited in series along a ridgeline defining the site's primary axis. A desire for continual connection to the site, combined with strict requirements of the conservation easement, led to a design made of permeable timber screen walls, focused openings, limited enclosure, and minimal footprint. Each zone of the Pavilions is specifically tuned to the needs and opportunities of its micro-context. Programmatic needs are paired with specific elements of the surrounding forest (understory, canopy, meadow, etc), This approach ensured the surrounding forest remained integral to the user experience.

Working in a conservation easement brought an acute awareness of material and resource efficiency to the project. The Pavilions implemented multiple strategies for circular construction, alternative sourcing, optimization, re-use, and minimum-impact construction.

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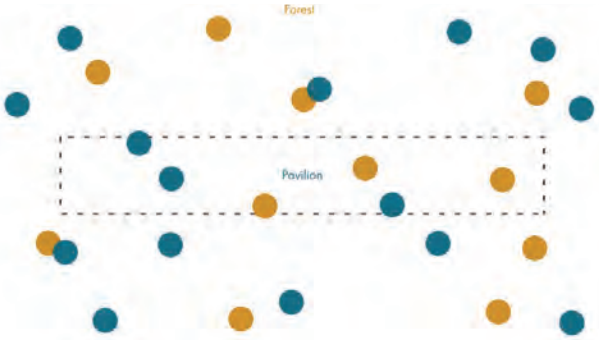
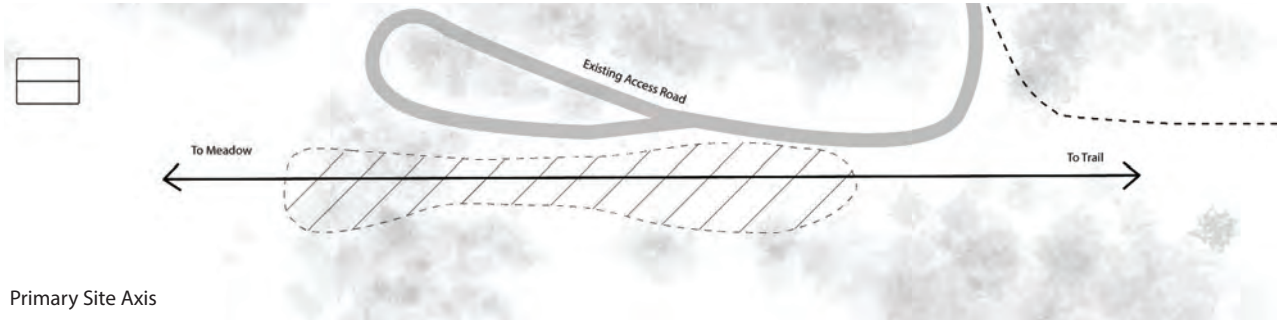
The Pavilions' location subjects them to a wide variety of seasonal conditions. Year-round comfort and a light touch on the landscape necessitated a design that had diverse spaces to provide wind cover, shade, direct sunlight, and permeability as needed.

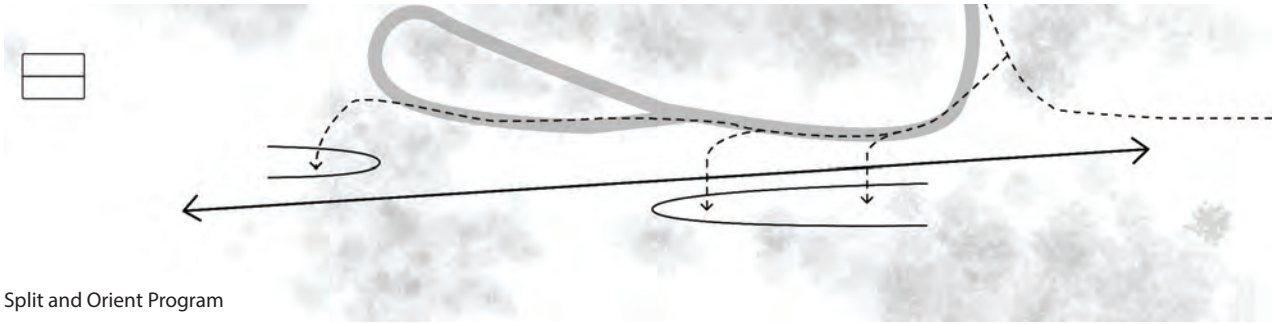
Direct engagement with the forest was also key to the design; the Pavilions' purpose was to augment the programmatic ability of the forest space, while never removing the visitor from that forest itself. Students discussed and diagrammed these challenges in depth, to ensure a proper response to them.



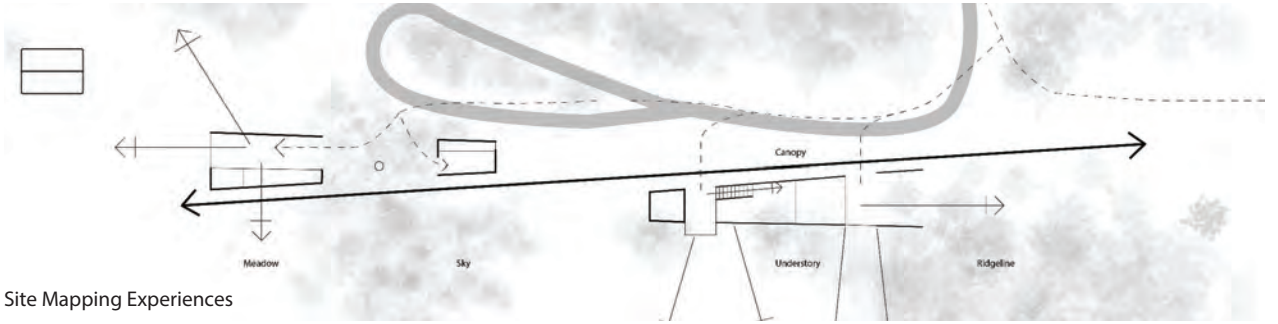
Context



Primary Site Axis



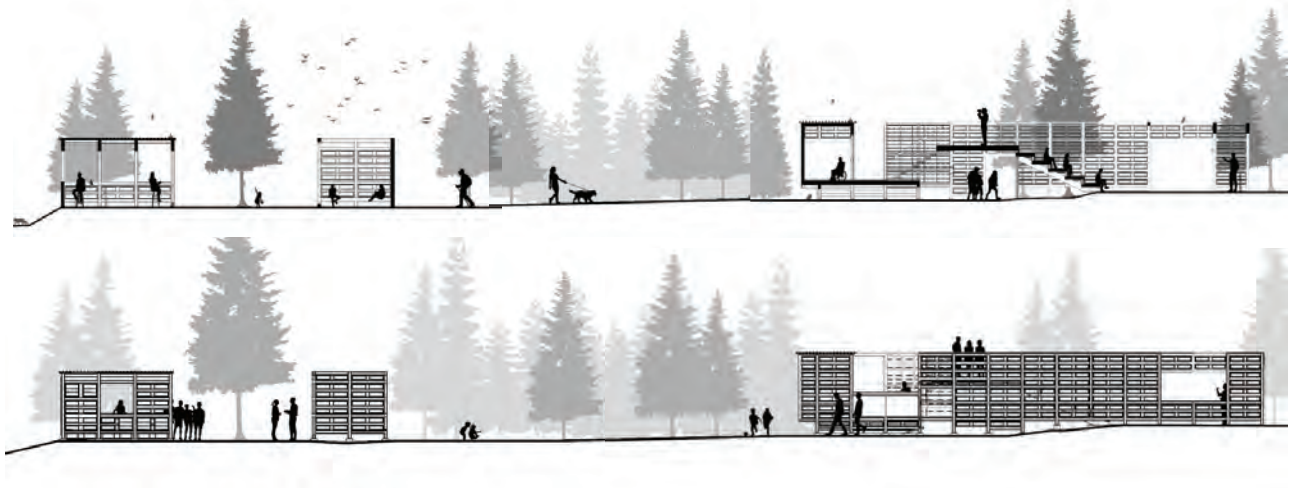
Split and Orient Program



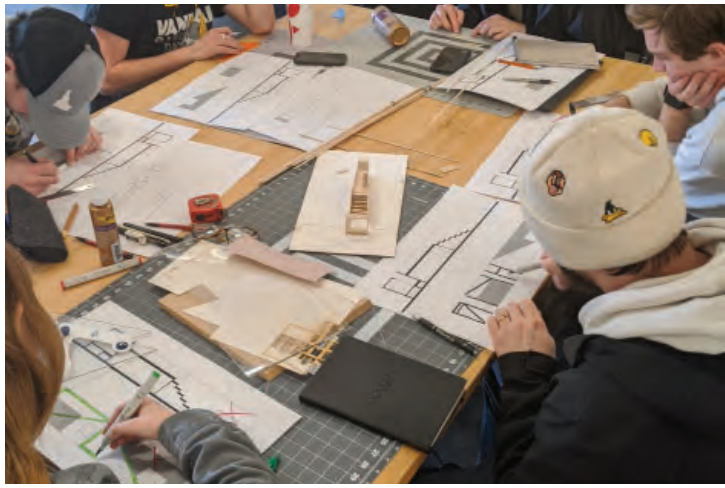
Site Mapping Experiences

A ridgeline connecting a meadow to the west with a new trail to the east forms the primary axis for the project. The program was split then mapped along this axis.

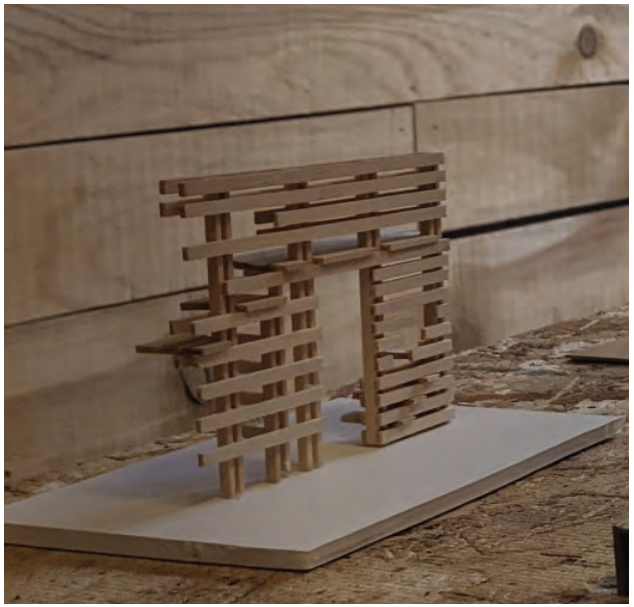
A wedge form was used to minimize footprint and optimized to user group size. This was overlayed with experience maps of the microsite to organize openings and orientations.

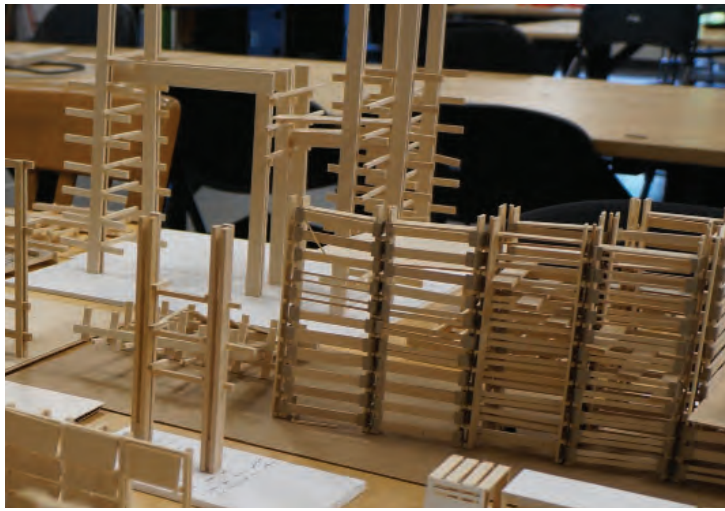


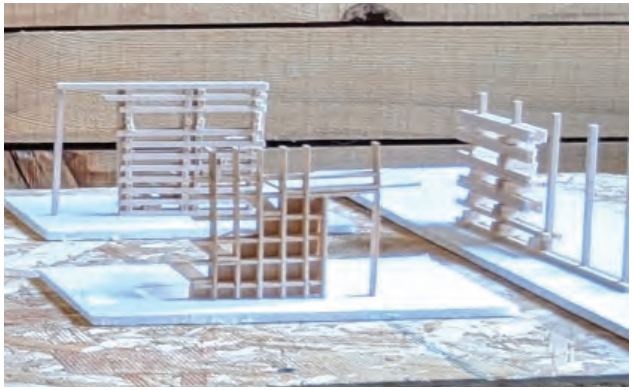
Site Responses

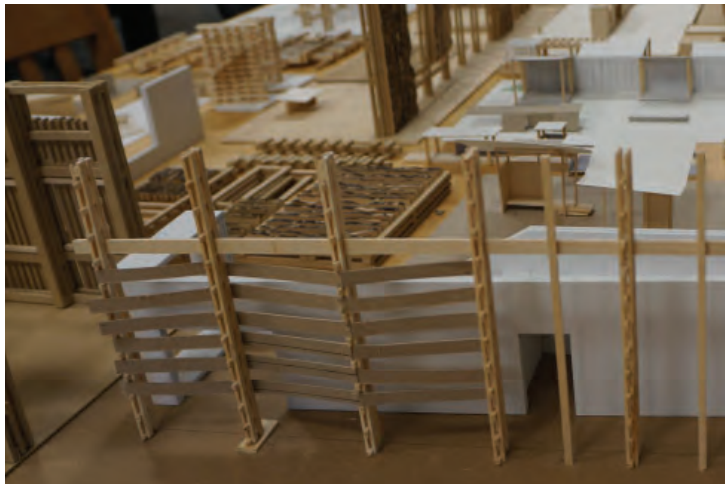


Design Development



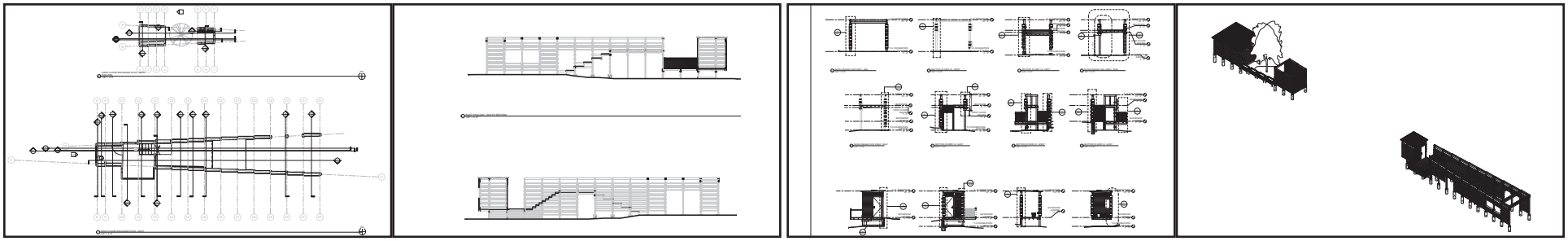




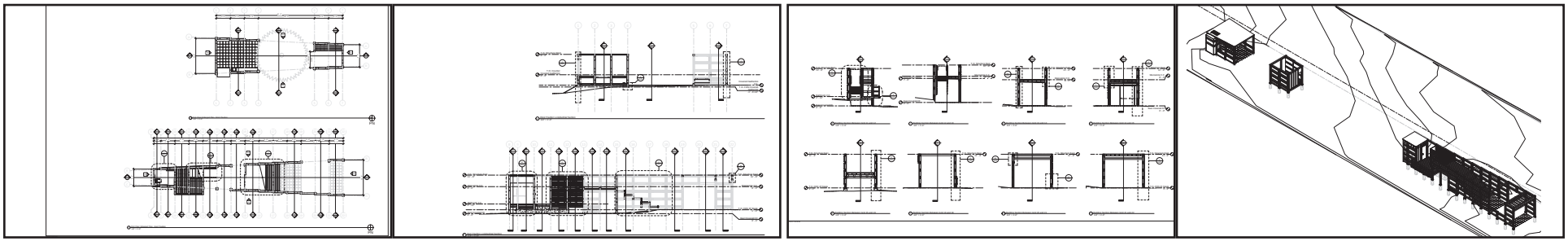


Structural Exploration

Scheme A



Scheme B



Scheme B Scheme A

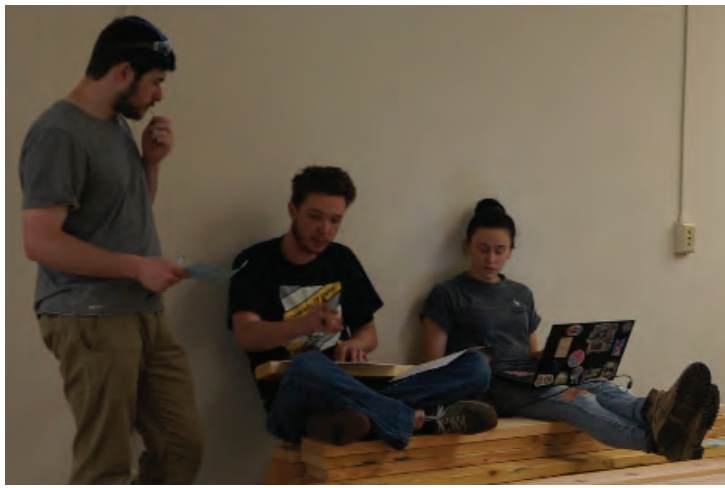
Students worked in parallel teams to design different approaches to structure. Eventually, commonalities were established and students combined the best aspects of both schemes in the final design.

This allowed for exploration of multiple designs, and provided all students with in-depth understanding of structure, detailing, and documentation.

Parallel Development

In order to better understand the experiential qualities of the project, students completed several full-scale mockups to test aspects of the design. These included a layout of the floorplan within the studio space, two structural bays configured to fit the two parallel design schemes, and several mockups to test cladding.

Full-Scale Exploration and Analysis



A dedication to innovative use of common materials drives the studio, so students were determined to get as much as possible out of simple materials. The Pavilions' structure is modular, pre-fabricated dimensional lumber assemblies with waste material repurposed for finer details. To accomplish this, the studio used software to optimize cutlists, saved all waste components for future use, and designed from the beginning with minimal site impact in mind.

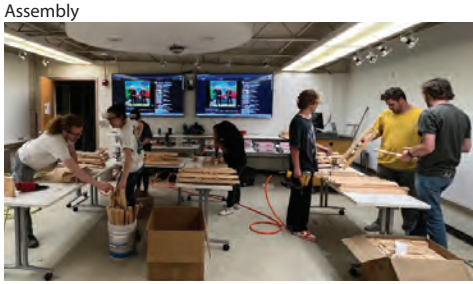
Material Optimization

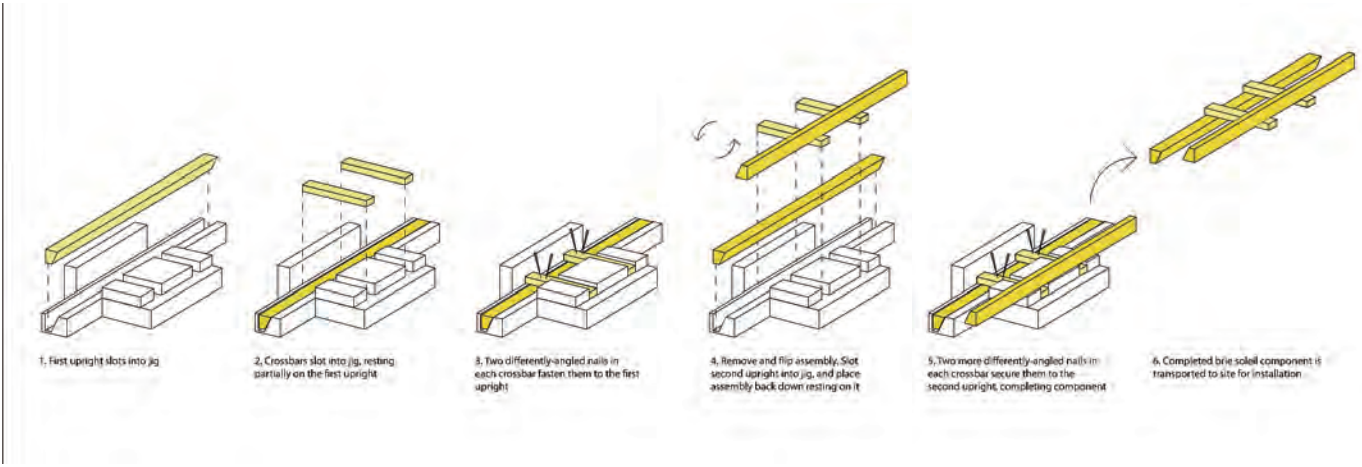
Scrap sorting and rough cuts

Cutting individual components

Transporting components to assembly space

Assembly





On-Site Installation

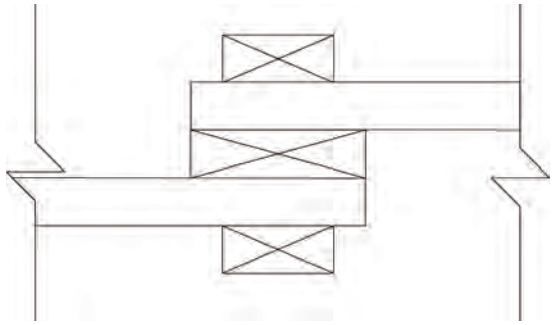
The brise soleil skin of the Pavilions was designed entirely from structural offcuts, while still presenting a unique view in and out of the structures. Students created jigs and an assembly-line process for producing the hundreds of components needed for the cladding quickly, precisely, and with minimal end waste.

Brise Soleil Prefabrication

The 46 individual footings of the project are located to minimize the structure's impact on forest ecology and hydrology.

Foundations

The 2x6 douglas fir structure was designed to be quickly erecte. The overall building form is derived from the material thickness of this base unit, allowing for a gradual widening of the Pavilions (6″ over 5′ 0″) without any angled cuts. This approach maximized reusable waste from offcuts.



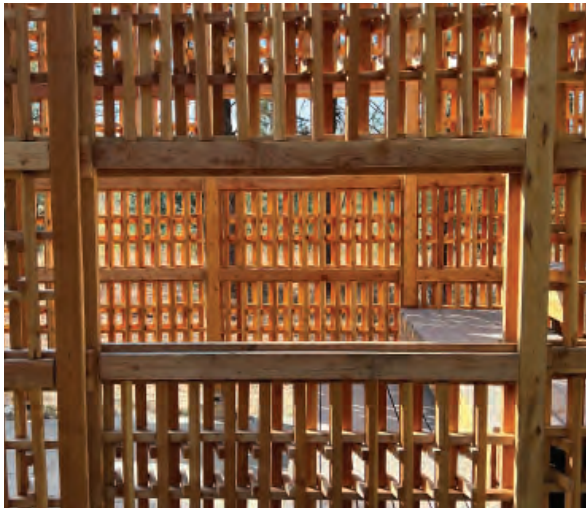
Primary Structure Assembly

Framing and Decking

The studio employed circular construction processes, including saving structural offcuts to be used as components for the buildings' brise soleil cladding, and salvaging the metal roof from a soon-to-be demolished barn on-site.

Circular Construction

Brise Soleil Installation



Mapping Placed Experiences

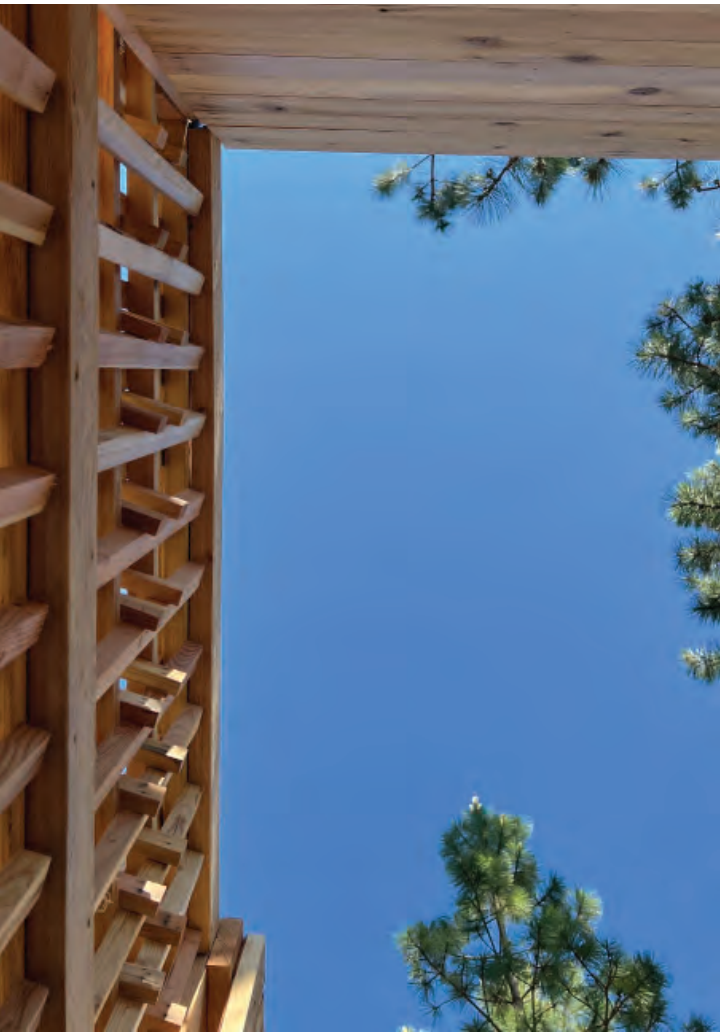
Large Group Presentation

Mapping Placed Experiences

Canopy Observation

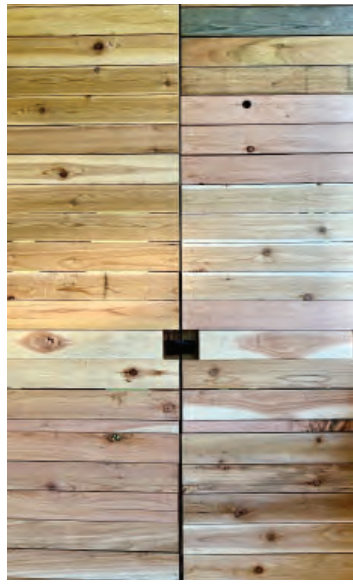
Mapping Placed Experiences

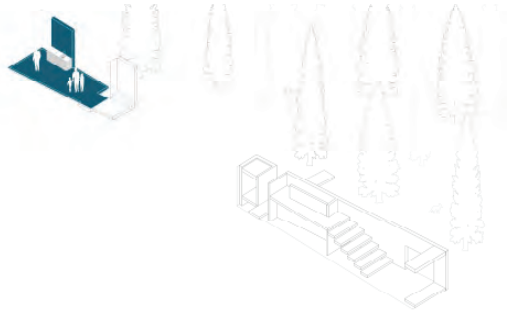
Understory Observation



Mapping Placed Experiences

Open-Sky Meditation





Mapping Placed Experiences

Science Lab