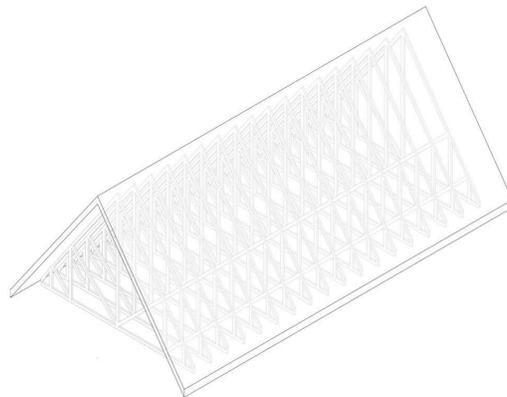


Building Orientation

The window placement and size are designed to optimize passive solar gains. For this reason, there are no windows on the north side of the house and abundant windows (20m2) on the south side, facing Campus Avenue, with moderate openings on the east and west to allow for good cross ventilation.

The house is 20 feet by 40 feet in plan, built on the 4' x 8' module of building materials, and with the south facade facing south to allow for the required window openings and solar panel area on the roof.

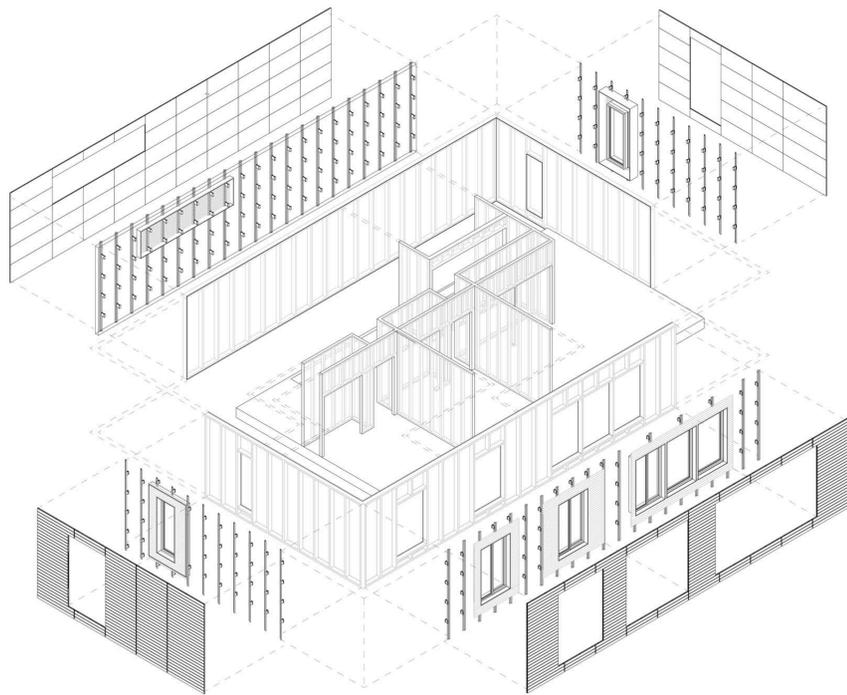


Roof



Wall Construction

Typical wood frame construction was used with 2" x 6" stud walls on 24" centers with standard R20 fiberglass batt insulation between the studs. In addition, the building was then sheathed with a layer of 1/2" XPS rigid insulation laminated to OSB board (this provided an addition R8 on all walls of the house) and was covered with a Tyvek house wrap.

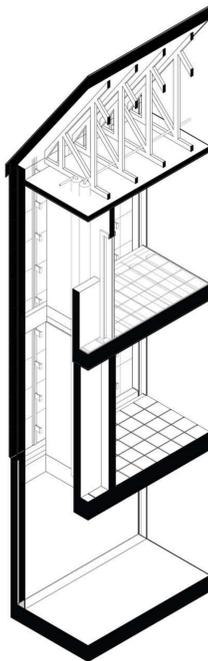


Level 2 Construction

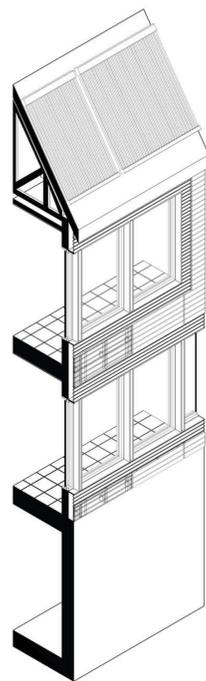
Wall Composition

- * exterior 1" x 6" x 48" western red cedar slats (beveled top edge) provided by The Wood Source
- * 1" x 3" vertical cedar strapping to provide air space behind cedar slats
- * 24" x 48" red 22 gauge Ideal Roofing metal panels mounted to back of cedar strapping
- * 6 hex-head metal screws attaching rain-screen panel
- * Gratiem Proulx 18 GA AZ 50 coated Z-girts with 4" face
- * 3.5" (or 5") Cascadia Clips fiberglass rainscreen spacers
- * 8" Leland Industries DT2000 coated fasteners
- * 5" Roxul Cavity DD insulation (on North Wall only)
- * Tyvek Homewrap
- * 2" XPS laminated to 1/2" OSB sheathing (OSB faces exterior)
- * 2" x 6" stud wall on 24" centers
- * 6" fiberglass batt insulation
- * vapour barrier
- * 1/2" drywall

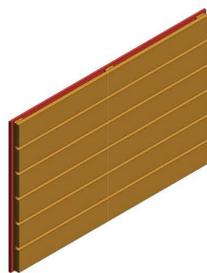
The north side of the house is the coldest by virtue of being on the dark and windy side of the house. Longer 5" Cascadia Clips are used on the north side to accommodate an additional 5" of exterior mineral wool insulation (R-21) which sits in behind the rainscreen panels and between the Cascadia Clips. This outboard insulation brings the total R-value of the north wall to R-48 – an excellent warm coat for a Canadian house. Innovative insulation materials will be tried and tested on the walls of the house as future research projects.



North Wall Section



South Wall Section



Rain-Screen

Rain-Screen Innovations for the Canadian Climate: an Adaptable, Removable, Modular facade

To accommodate further research projects and instrumentation in the building envelope, the project used a non-conductive fiberglass spacer by Cascadia to create a large space (3.5 to 5") between the exterior wall and the cedar rain-screen. These Cascadia Clips are fastened with long Leland Industries DT2000 coated screws to the studs and they support Gratiem Proulx metal Z-girts on a 24" vertical pattern to allow for the 24" x 48" wide rainscreen panels to be attached and removed with ease.

The rainscreen panels (or siding) is a unique combination of The Wood Source western red cedar (on the exterior) and Ideal Roofing Ltd. 22 gauge metal panels (red panels behind the cedar) which combine a rain and wind barrier and naturally weathering finish with the strength, durability and color of metal as its structural support. These lightweight panels are designed to act as a weather-proof yet breathable "gortex coat" for the house.

