

Rhode Island's first passive house



Demetrick Housewrights – Builder

Steven Baczek – Architect

Project goals

- Simple construction details
- Builder friendly – materials and methods
- \$282,000 construction budget – This number was dictated by the bank loan/appraisal
- 1800 sq. ft, 3 BR, 2.5 baths
- PHIUS certification



WTF!

- Yeah, that's \$156/sq. ft.
- And yes, we did it, well almost did it

How did we get there?

- Simple construction details
- Local, cost-effective materials from lumberyard
- Builder friendly construction details
- Builder, architect and owner committed to the plan

Excavation



Foundation



Tremco and sill seal



Standard framing



Zip sheathing with, yes, more tremco



Attention to detail



Critical top plate detail



Top plate completed, ready for trusses





The battle raged



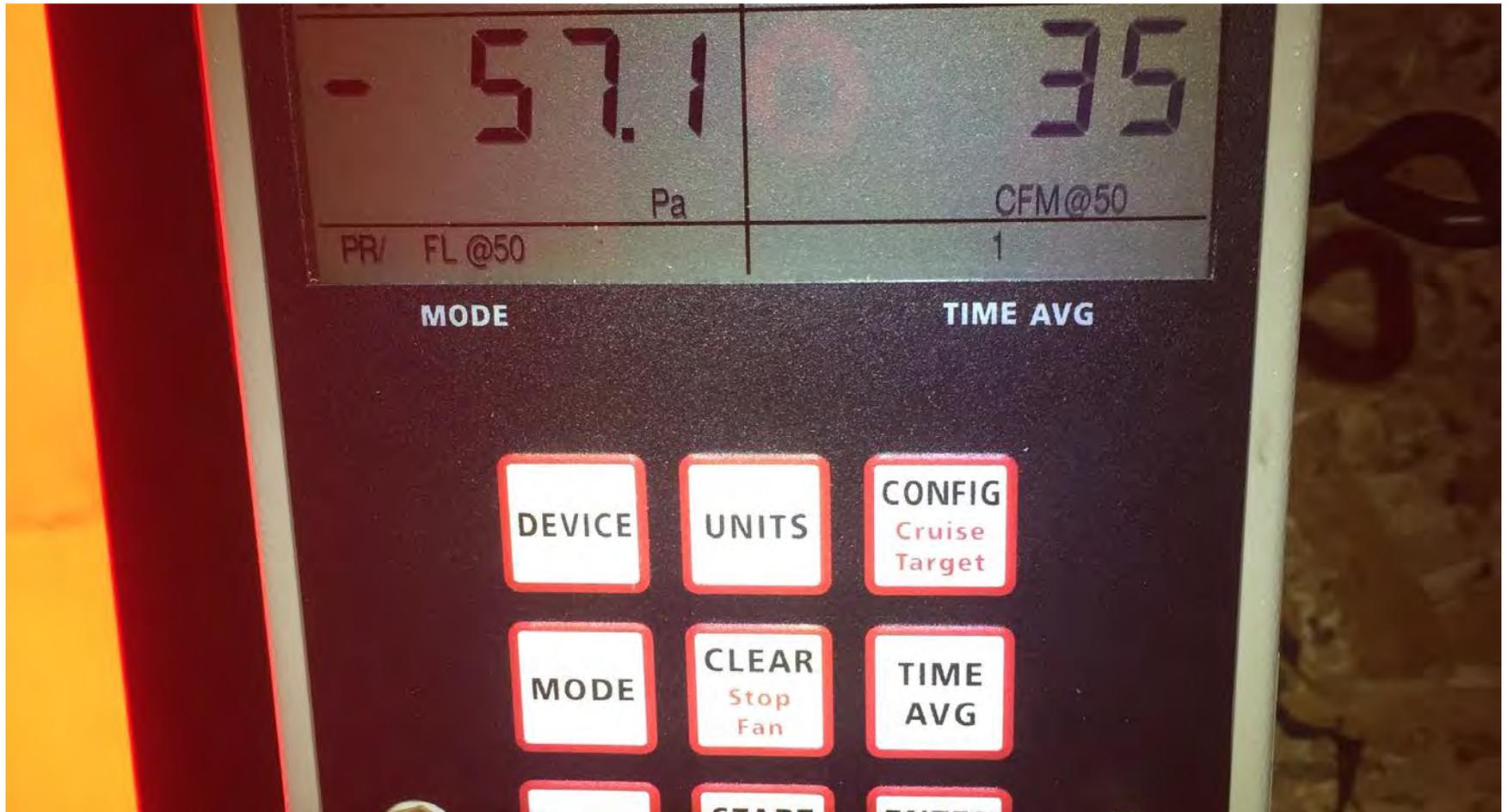
The obligatory green box, juiced up with orange trim



Airtight drywall in 20 degree weather



Success!!



Sub Slab foam – 6"=R-26 - and vapor barrier



Finished concrete floor is installed



Now we make holes

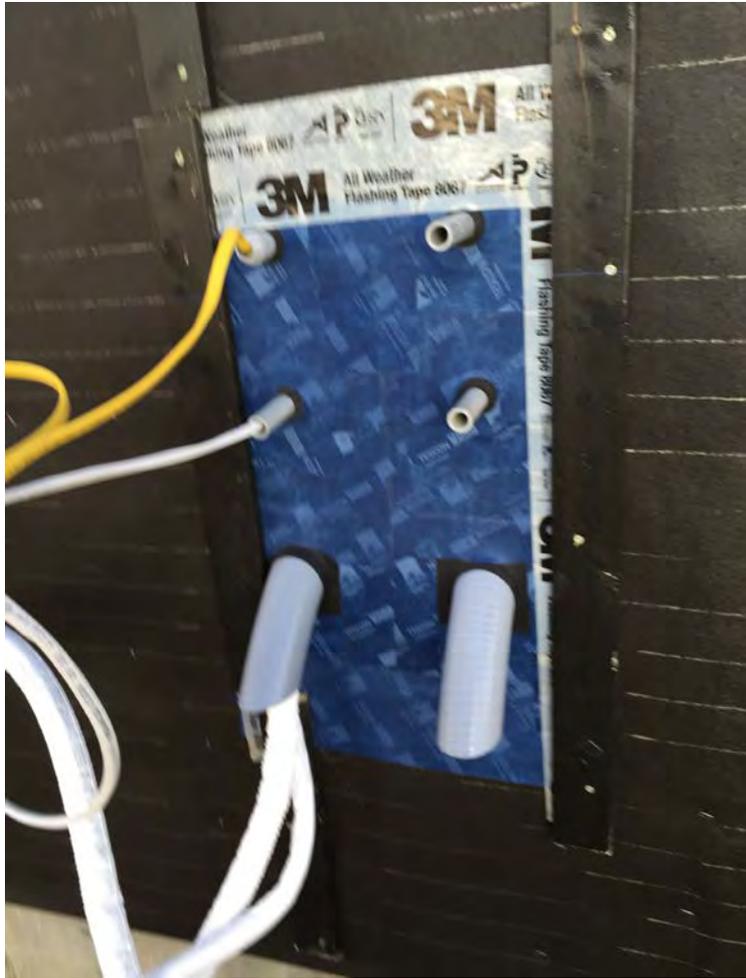


And fix them



The Devil is in the details







Tape holds the window in and water out

Schuco UPVC windows, R 7.7, U.13



Now we frame walls



Insulation

R – 56 walls –

4" closed cell foam

8" dense pack fiberglass



R – 92 roof

28" loose fill cellulose



Trim and Siding

- 1x6 #2 pine siding
- Boral flatstock trim
- James Hardie board and batten detail
- Open rainscreen installation

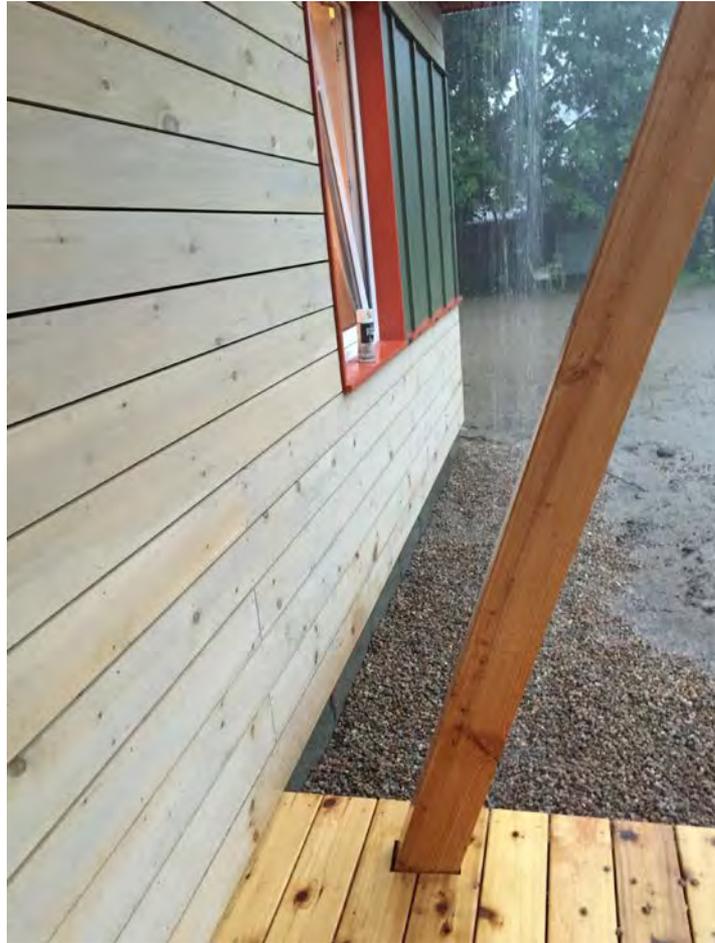


Painted furring strips provide drainage space

#30 felt hides green Zip and integrated flashings



Form and Function



Mechanicals

Zehnder comfoaire 350 ERV

GE Geospring HPHW heater

Daiken Quaternity minisplit on 1st floor

Standard energy star appliances



Final project numbers

Annual Heating demand 4.17 kbtu/sq ft/yr

Annual cooling demand 1.42 kbtu/sq ft/yr

Specific primary energy demand
31.5 kbtu/sq ft/yr

Heating load – 4.26 btu/sq ft/hr

Cooling load – 4.11 btu/sq ft/hr

0.16 ACH50



Final Project Costs

Original budget - \$282,690

Final Construction costs - \$300,420.25

\$/Sq. Footage - \$163 (american style)

Builder net profit - %10

Cost overruns due to:

- Builder: +/- \$4000
- Weather: +/- \$4000
- Owner changes: +/- \$10,000

Passive House fees – approx. \$8,000 additional

- CPHC
- PHIUS+ rater
- PHIUS application and certification fees

Architectural fees – a steak dinner

The last frontier

- What to do about the humidity?



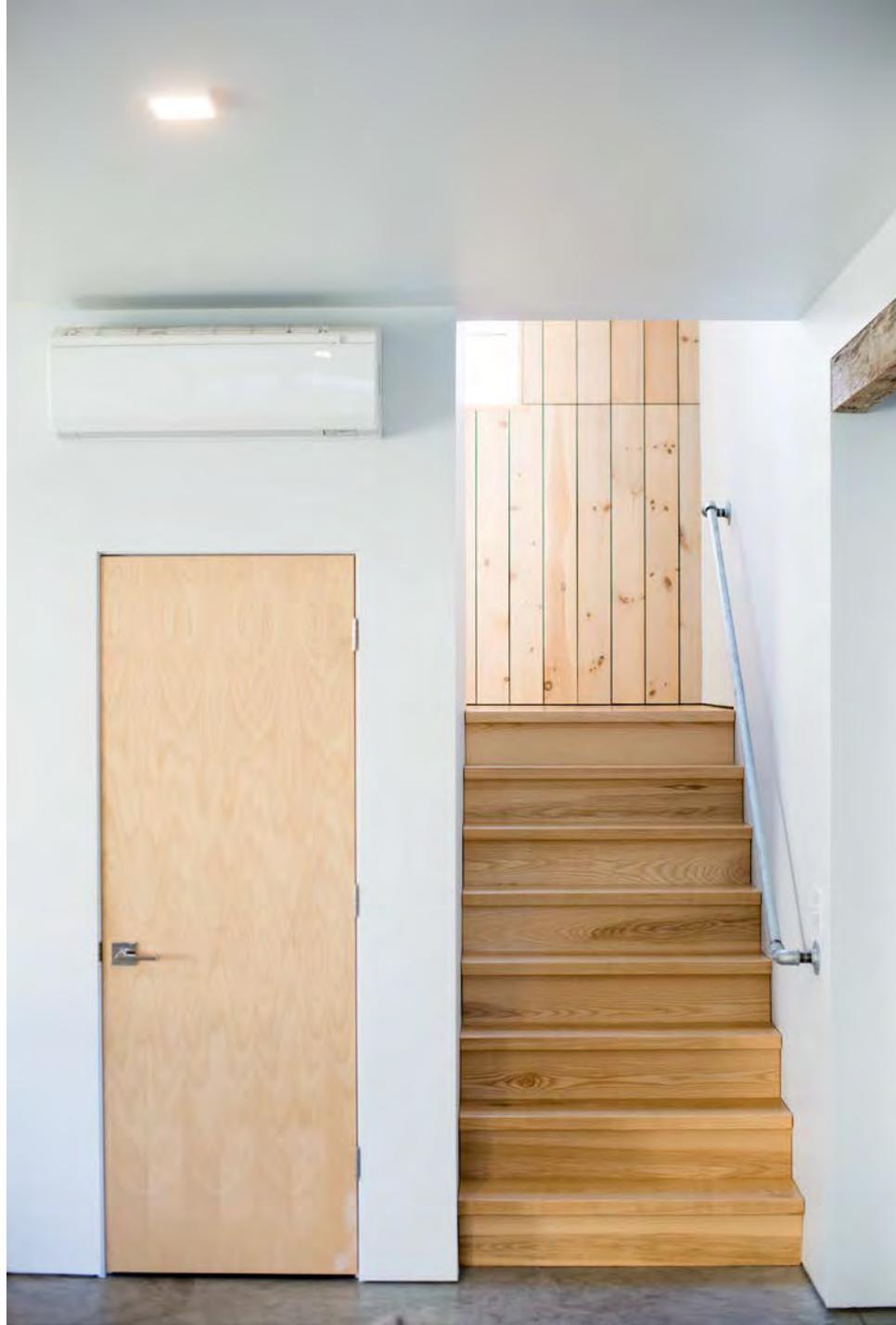
1st floor, kitchen



2nd floor hallway









In summary, what defined this Project?

Simple redundencies

- Sheathing Serves as air barrier, secondary WRB, structural sheathing and nailbase for rainscreen/siding
- Air barrier – Zip Sheathing, tape and Tremco, drywall Ceiling, simple shape, no origami!
- WRB – taped zip, #30 felt for shadow and to integrate flashings
- Double stud walls – carpenter friendly
- Minimized difficulty for subcontractors with simple construction details – business as usual
- Wicked awesome builder/Wicked awesome builder

Lessons Learned



The Slabless Slab















