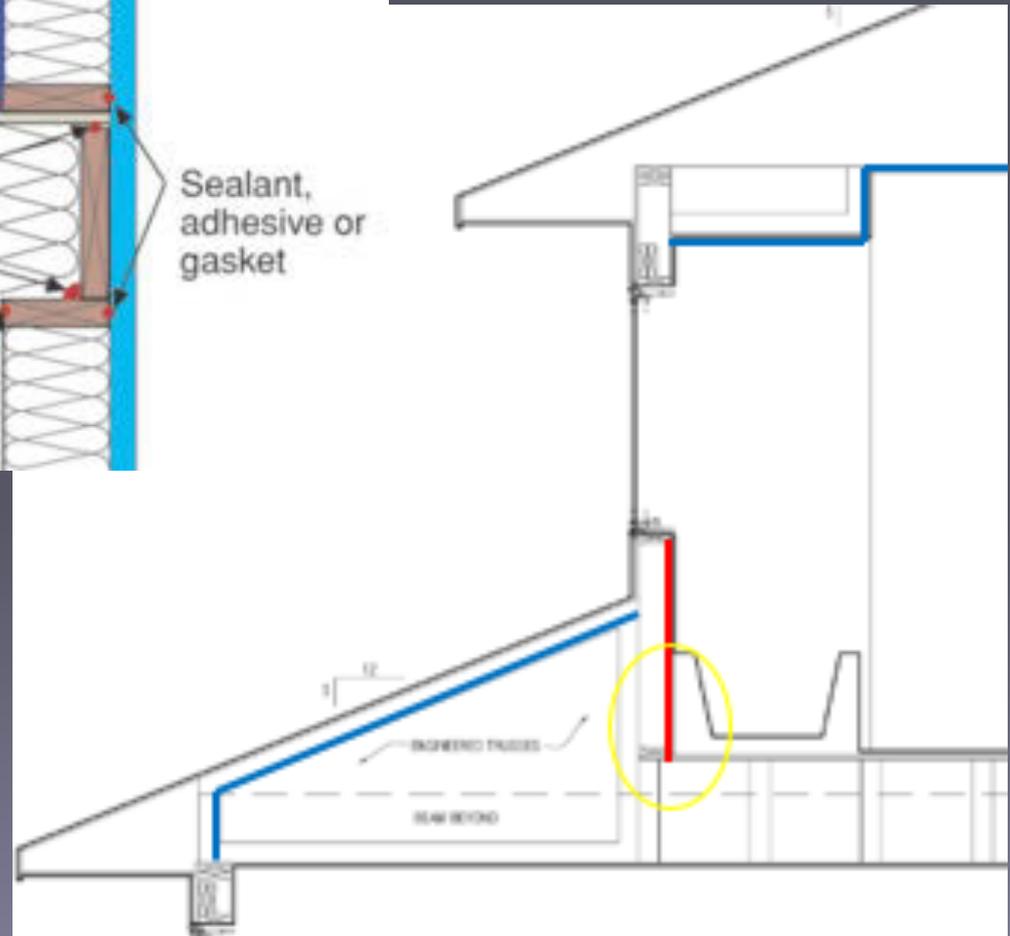
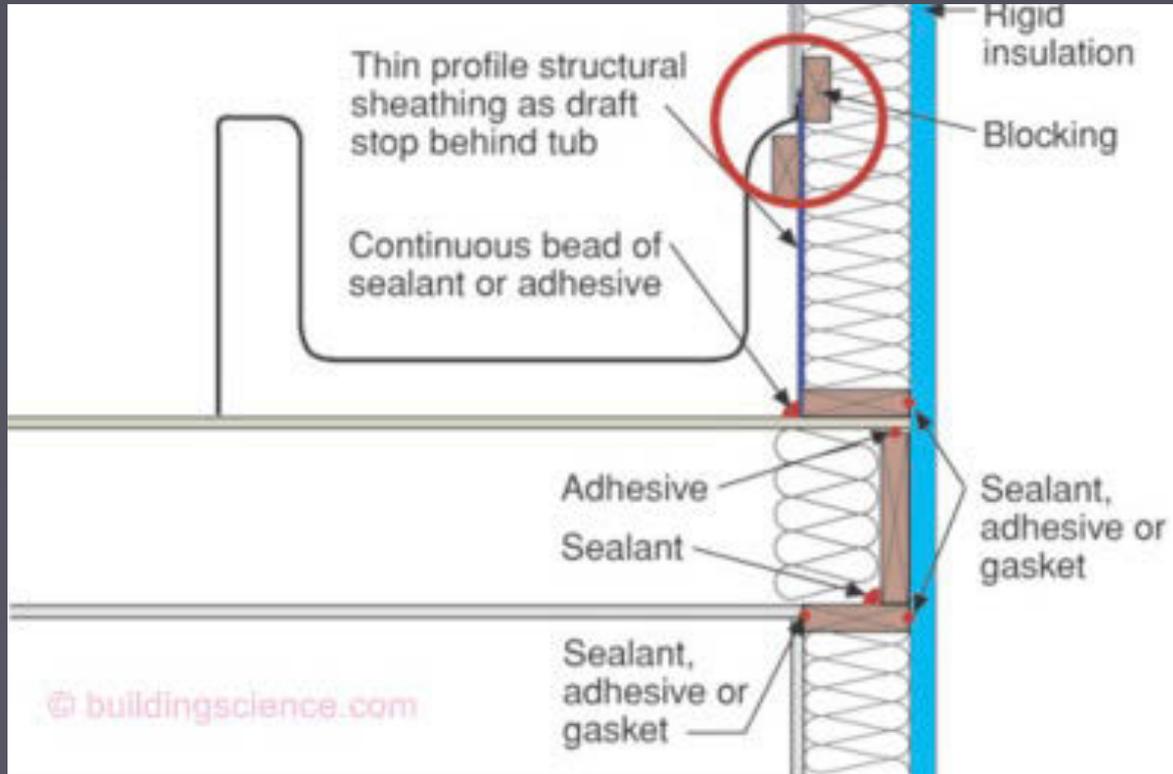
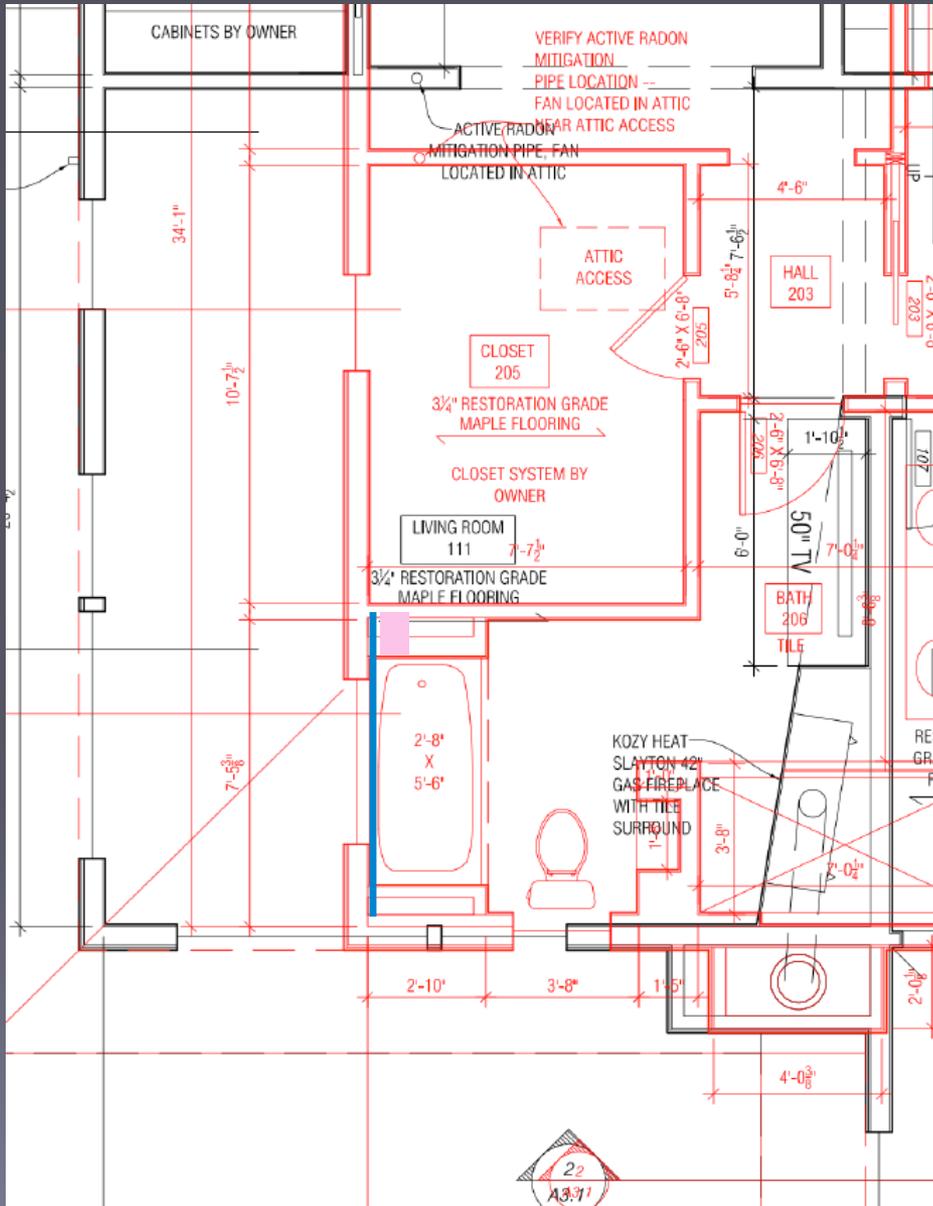




Diagnosis



Prescription



<https://basc.pnnl.gov/images>

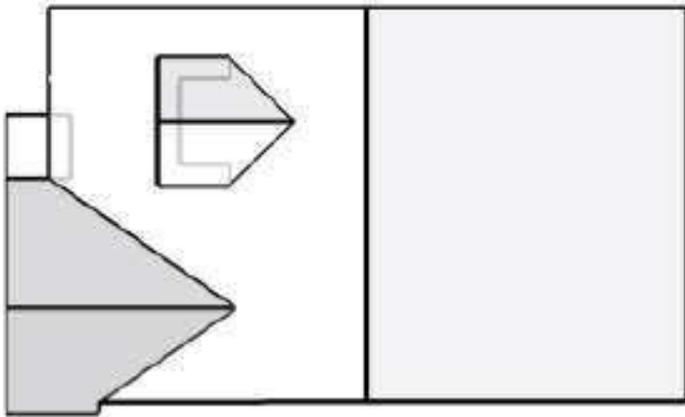
Case Study 3



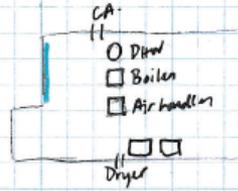
- Minneapolis, MN
- 1924 with remodels

Pain

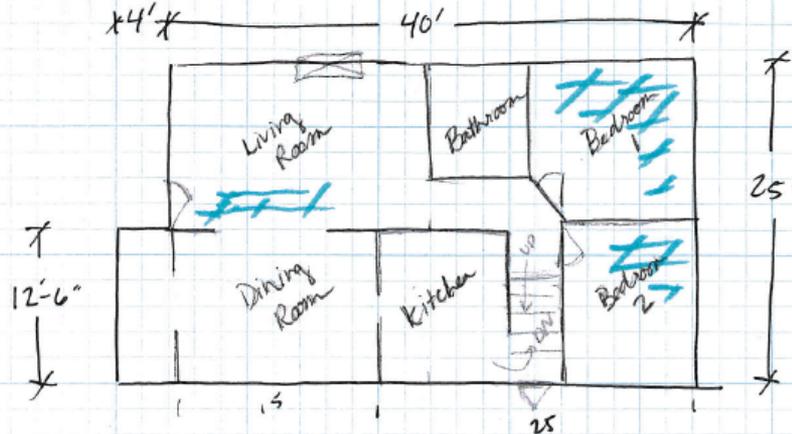




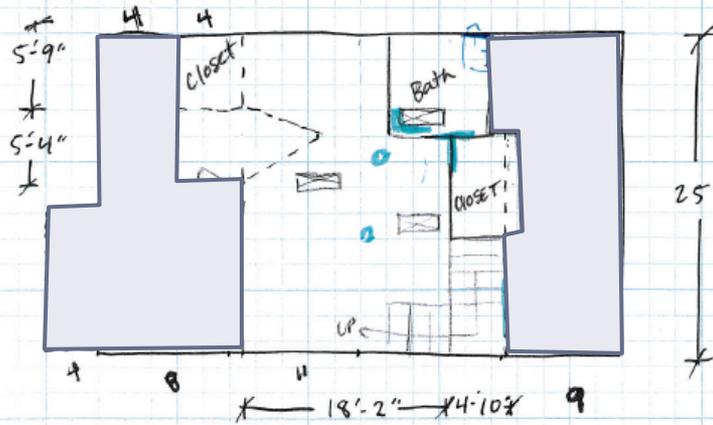
Water intrusion



Bsmnt
 1050 ft²
 9450 ft³



1st FLOOR
 1050 ft²
 8400 ft³

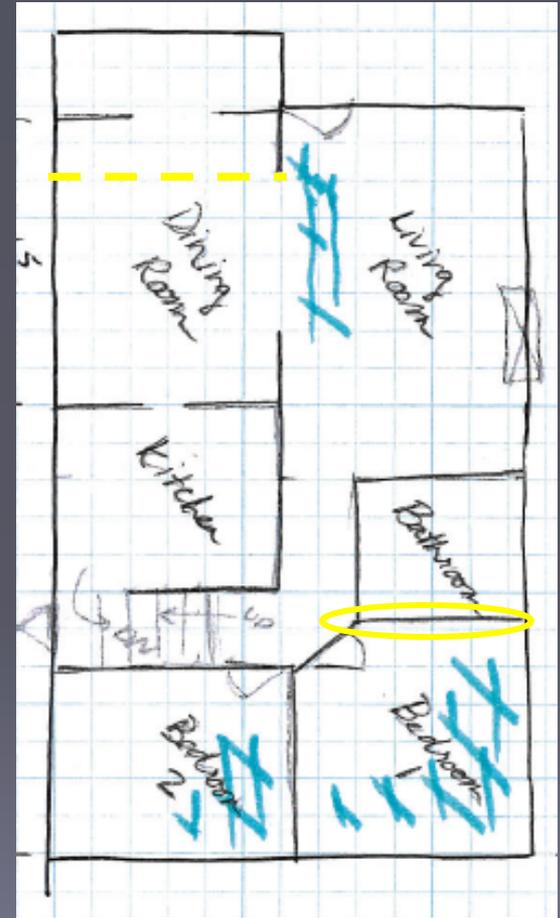
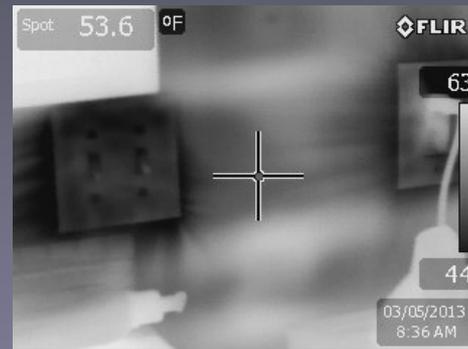


25'
 2nd FLOOR
 455 ft²
 4009 ft³

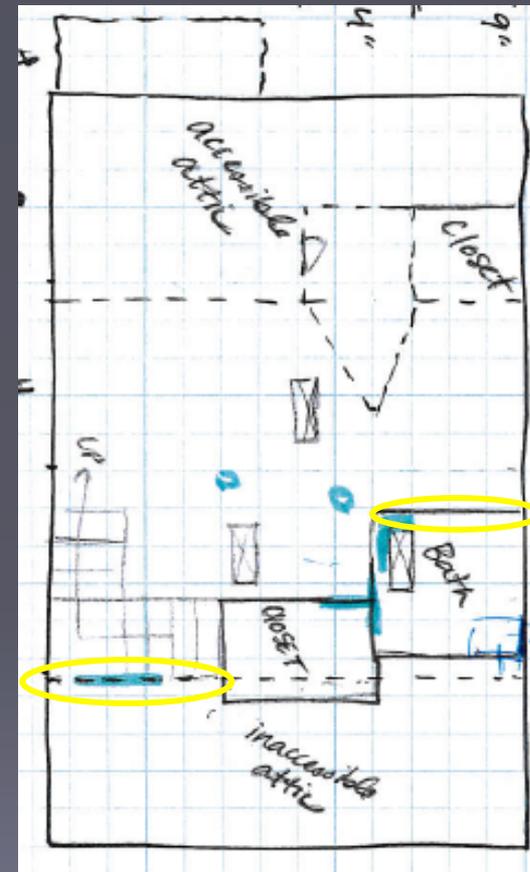
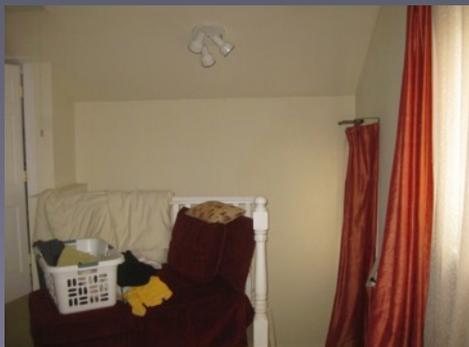
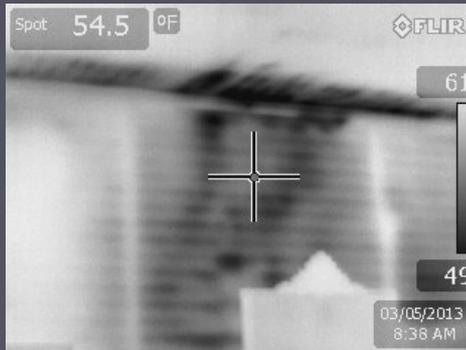
11'-7" @ peak
 5'-7" @ low end

TOTAL SQ FT = 2,555
 TOTAL VOLUME = 21,859

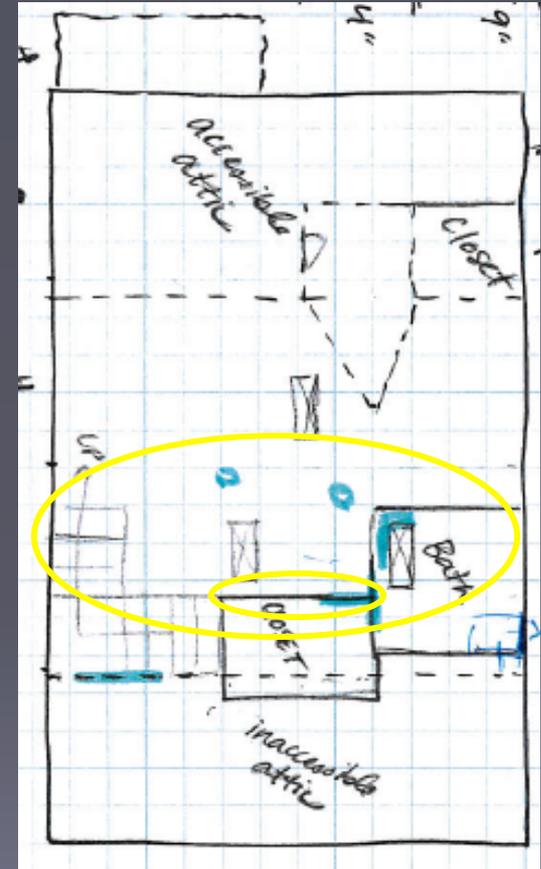
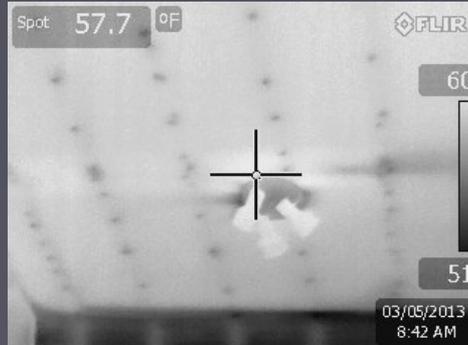
Diagnostic Pre Test



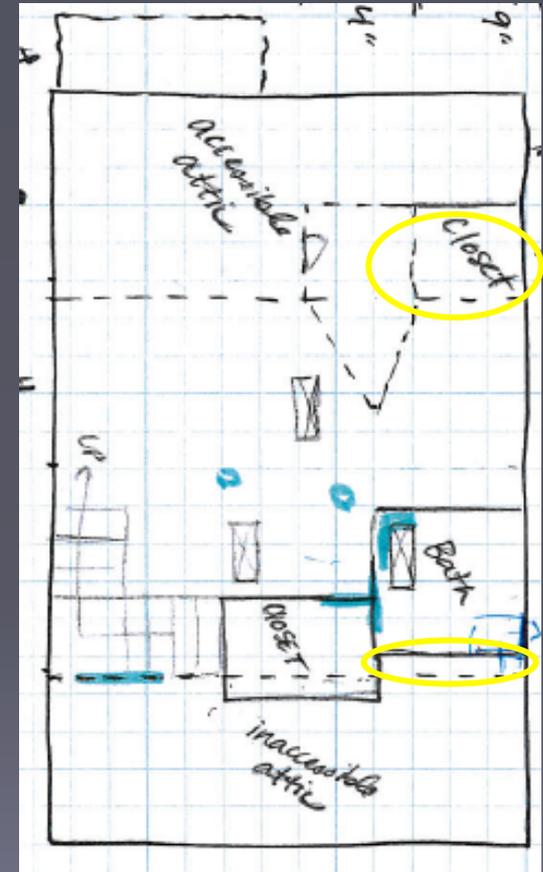
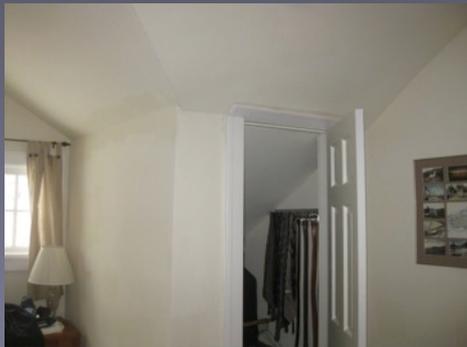
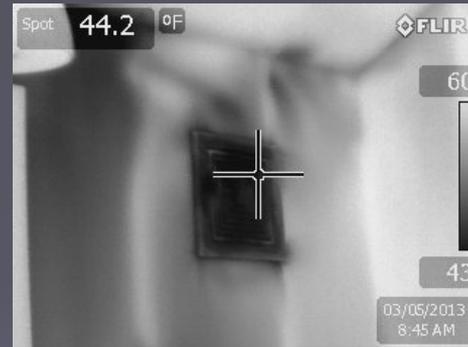
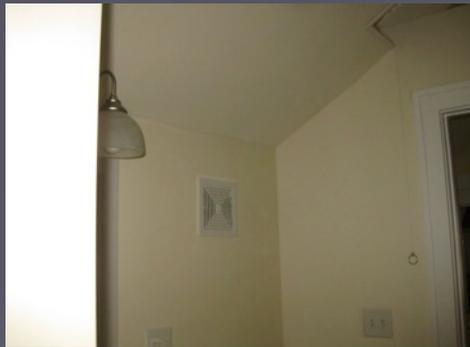
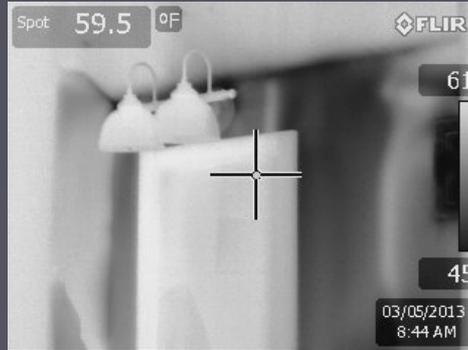
Diagnostic Pre Test

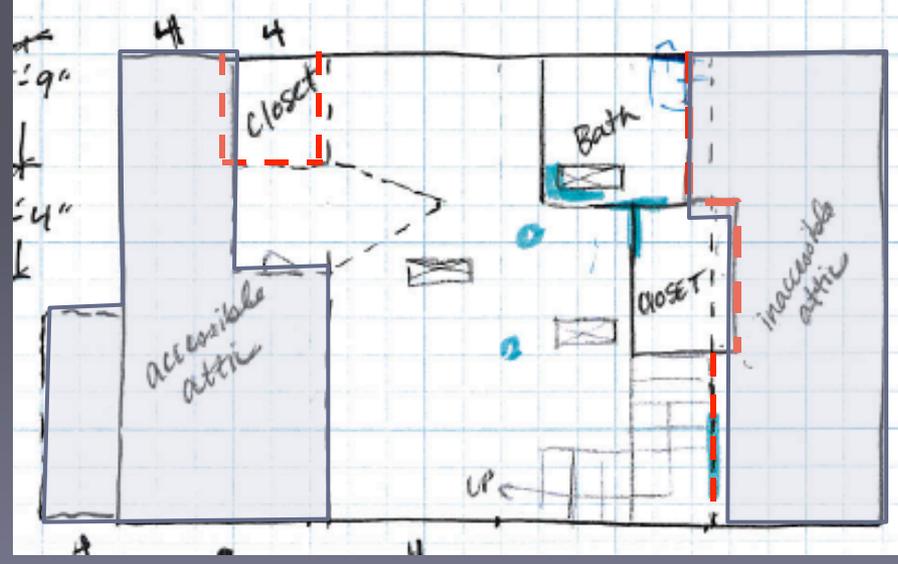
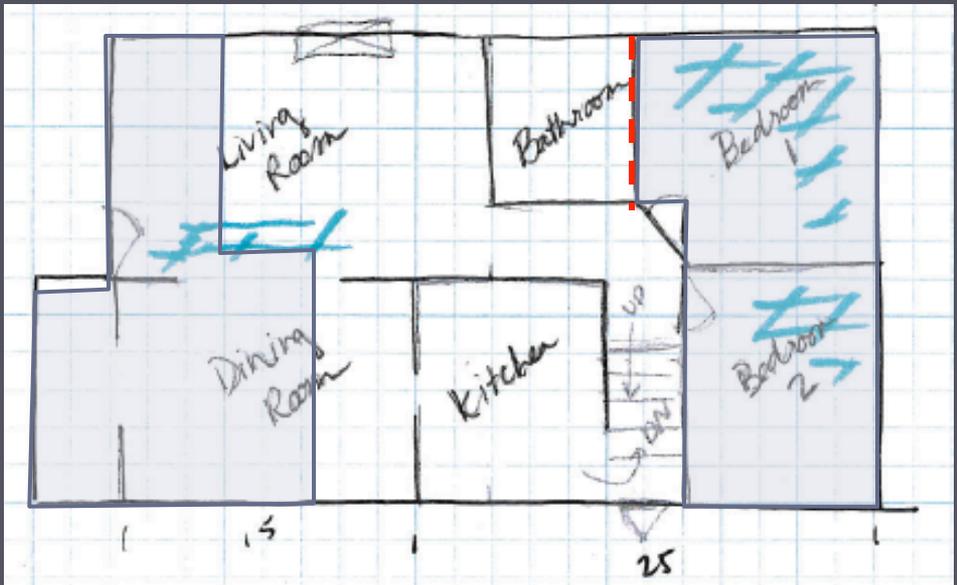


Diagnostic Pre Test



Diagnostic Pre Test





Prescription

- Homeowner Goal: Stop water intrusion and ice dams
- House Needs:
 - Consistent thermal and pressure boundaries
- Constraints
 - Limited opportunity for attic ventilation
 - Unknown side attic and knee wall conditions
 - Unknown vault assembly including R-value and venting



Prescription

Rear Side Attic (inaccessible)

- 2" ccspf (R13.5) to attic floor
- 3" ccsf (R20.3) at back of knee walls
- Blow 13" fiberglass (R-38) over floor (R-49 total)

Front Side Attic (accessible)

- 2" ccspf (R13.5) to attic floor
- 3" ccsf (R20.3) at back of knee walls
- Blow 13" fiberglass (R-38) over floor (R-49 total)



Rear Side Attic



Rear Side Attic



Rear Side Attic



Front Side Attic



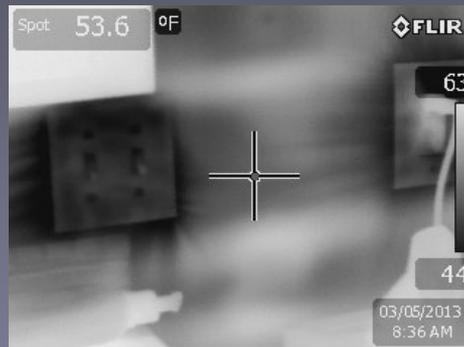


Blower Door Results

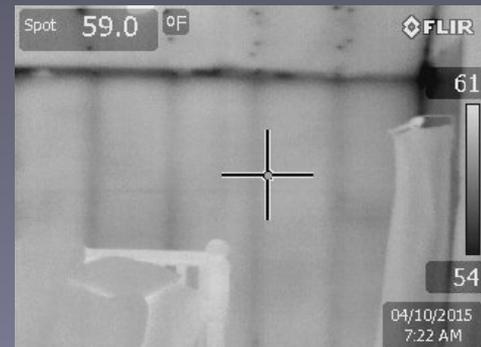
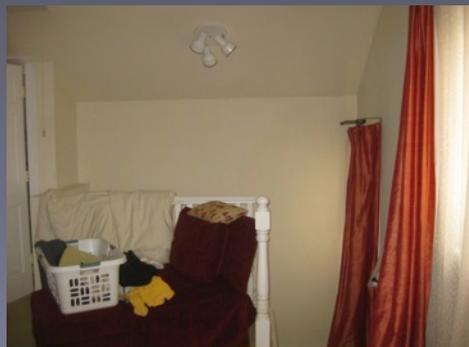
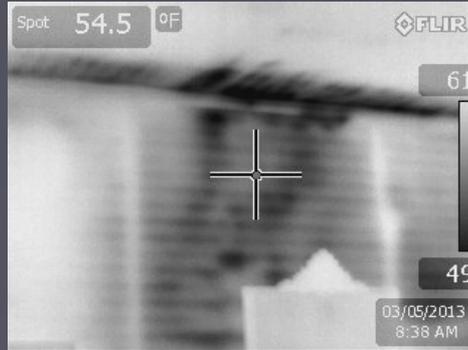
- Pre Test: 2417 CFM50, 6.63 ACH50
- Post Test: 1765 CFM50, 4.85 ACH50

Difference: -652 CFM50, 1.78 ACH50, 27%

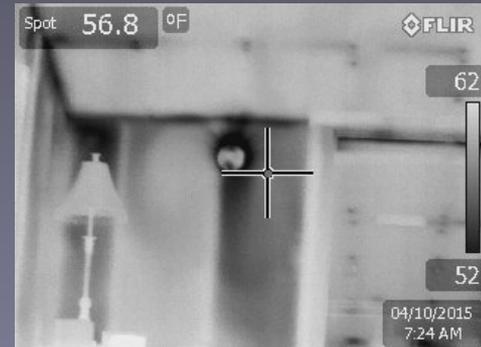
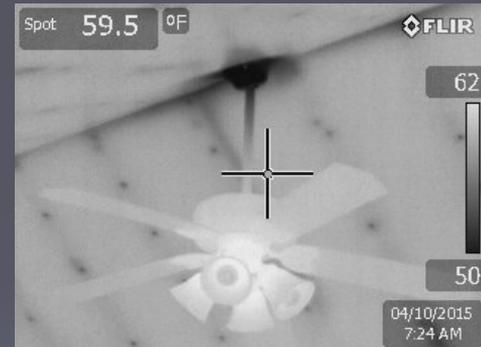
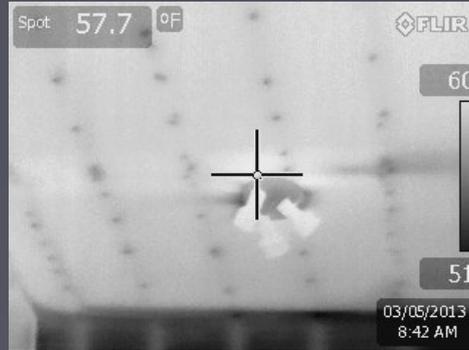
Post Test



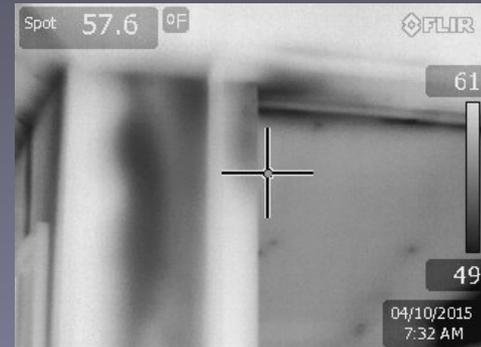
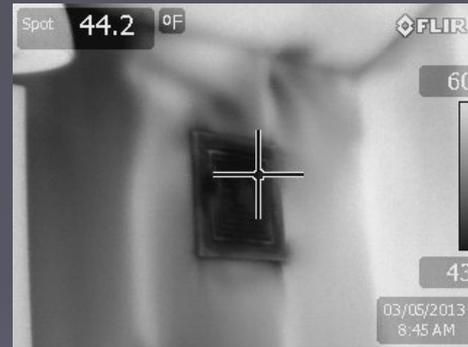
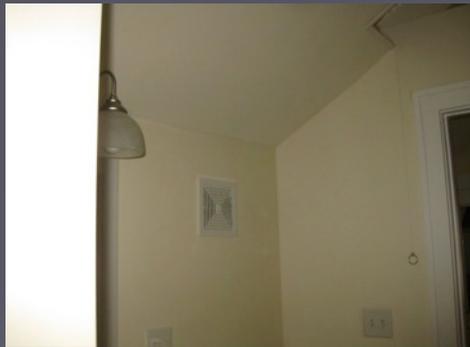
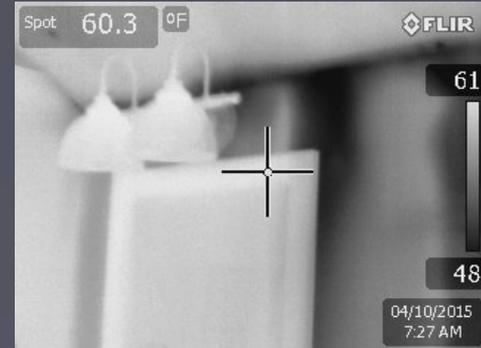
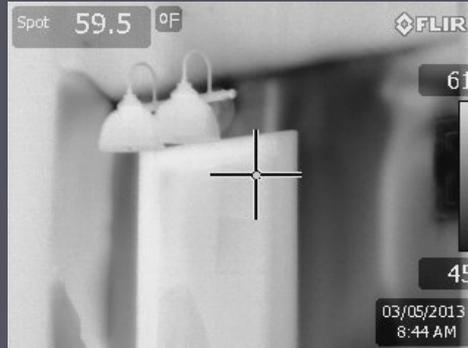
Post Test



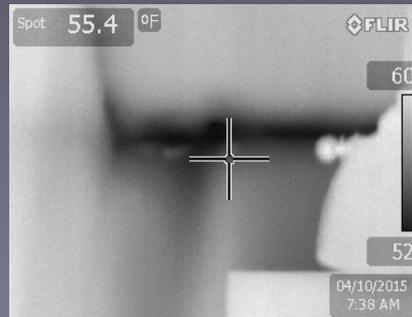
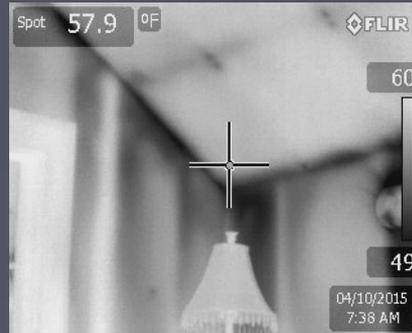
Post Test



Post Test



What Happened?



Remember this knee wall?





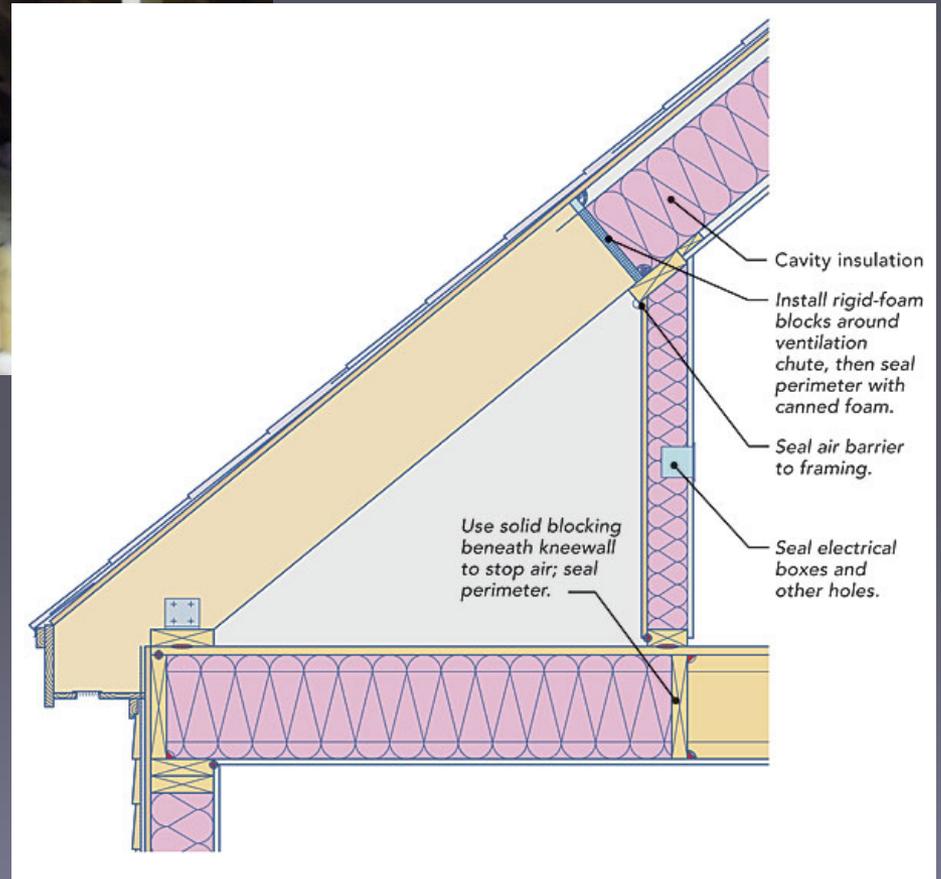


Photo courtesy of Building Science Corps

This doesn't help either...



Case Study 4



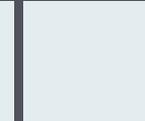
- Plymouth, MN
- 1985 with remodels



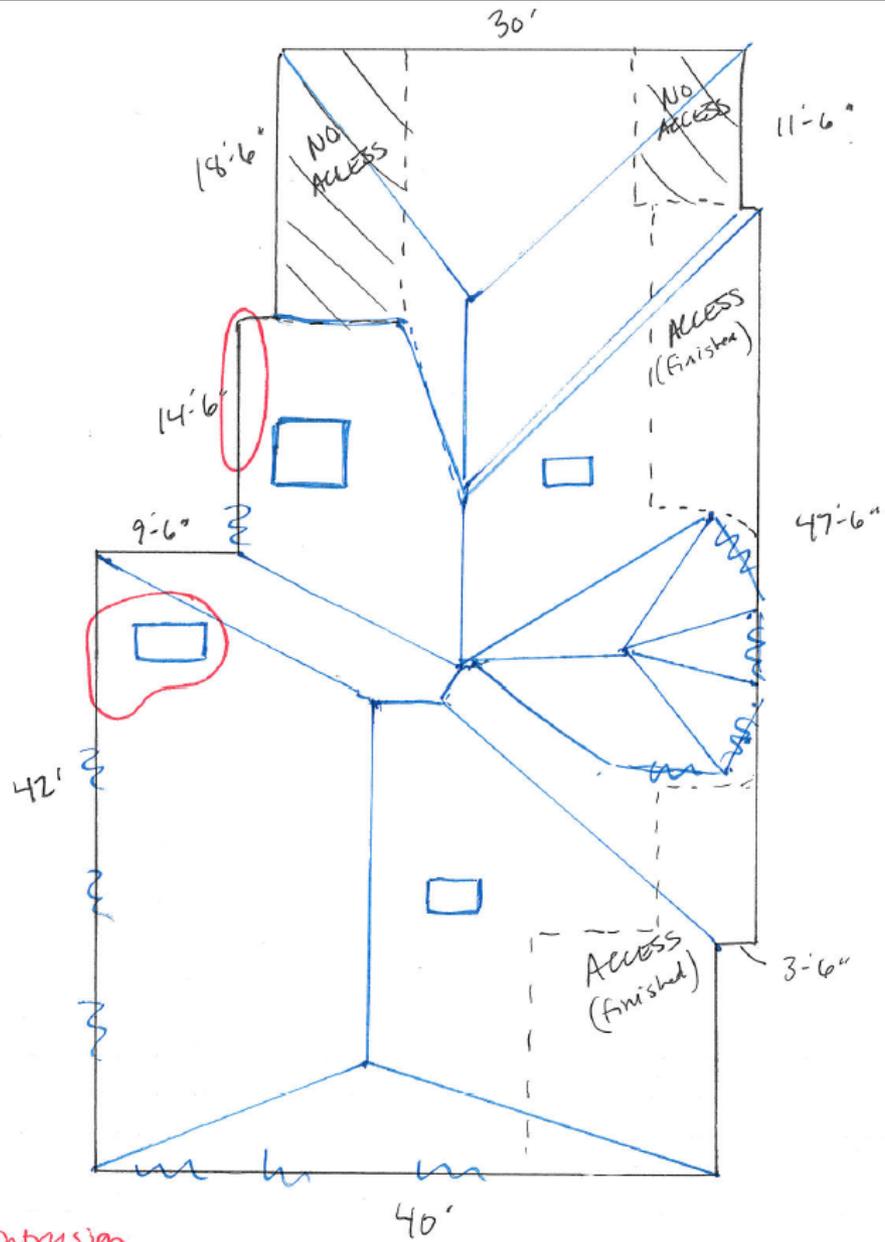
Pain

- Ice dams
- Water Intrusion



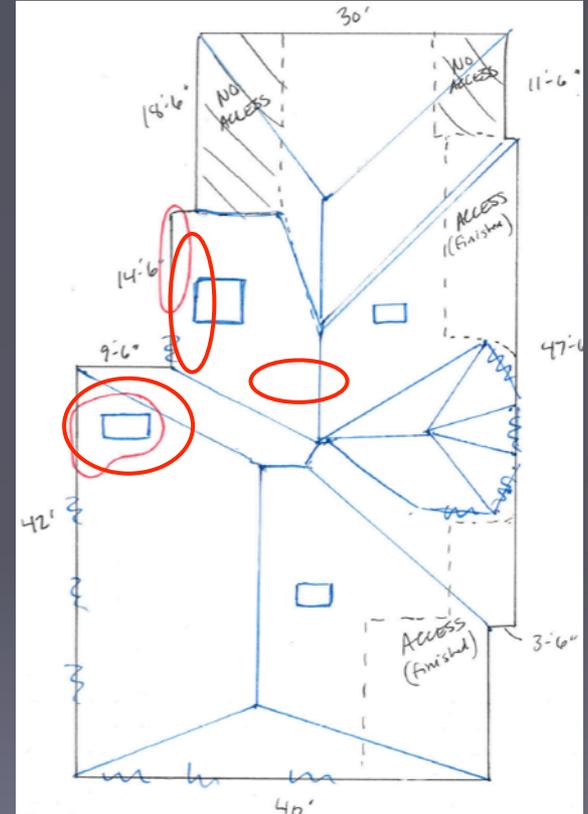
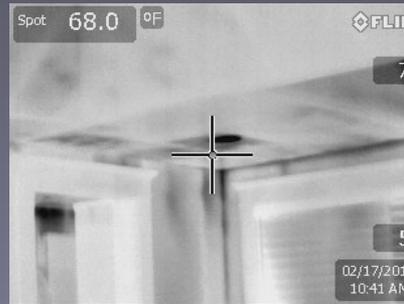
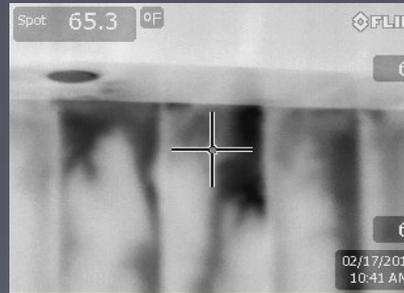
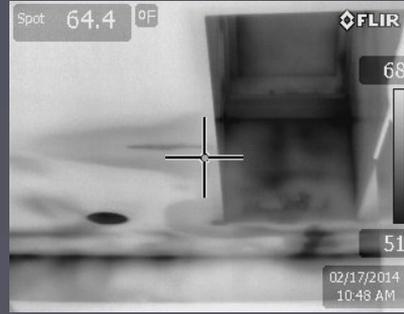




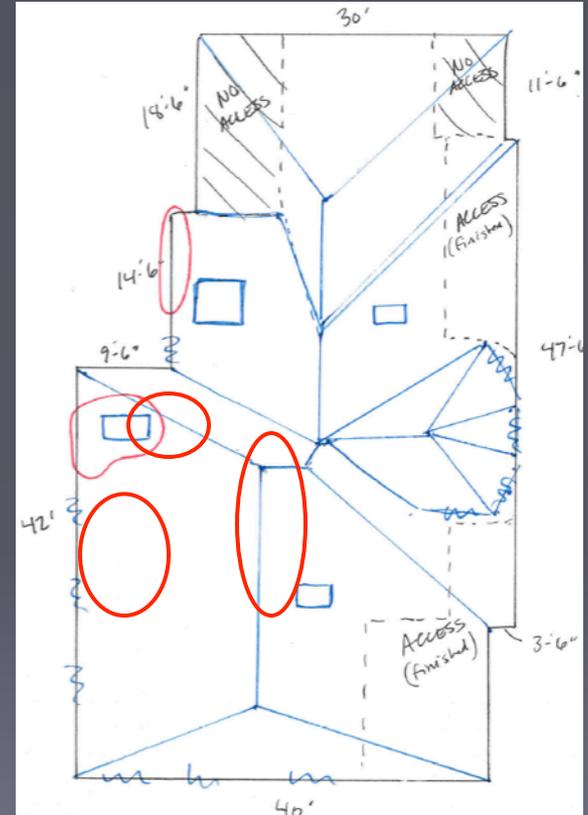
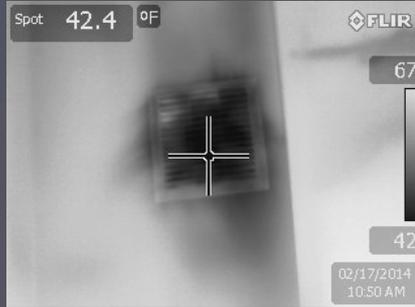


Visible water intrusion

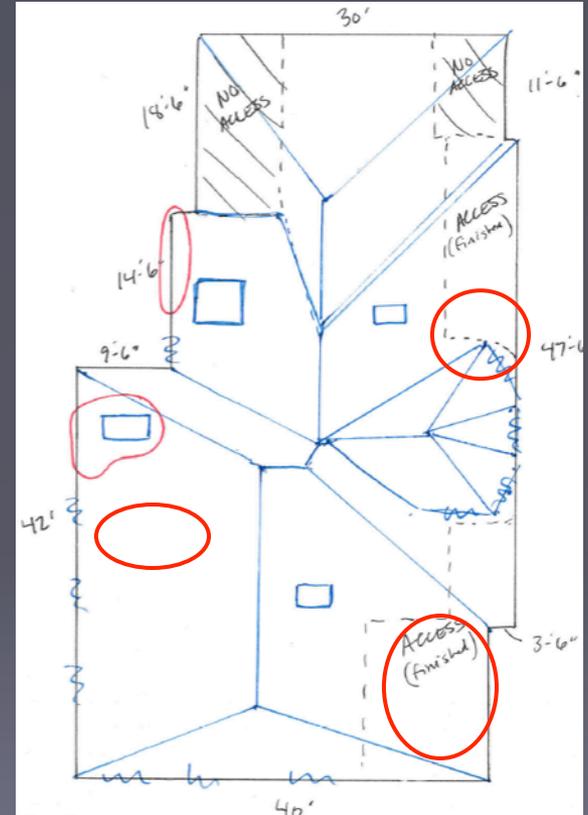
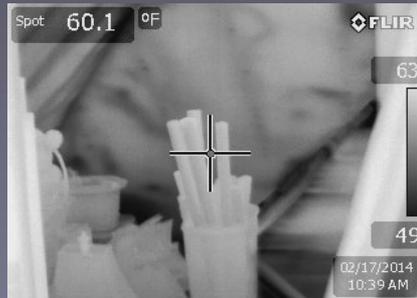
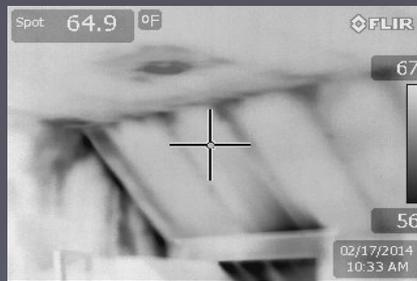
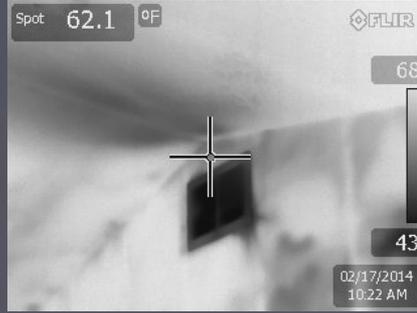
Diagnostic Pre Testing



Diagnostic Pre Testing



Diagnostic Pre Testing



Attic Inspection



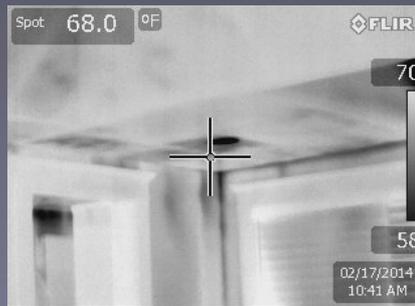
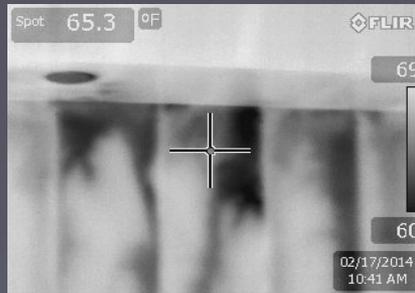
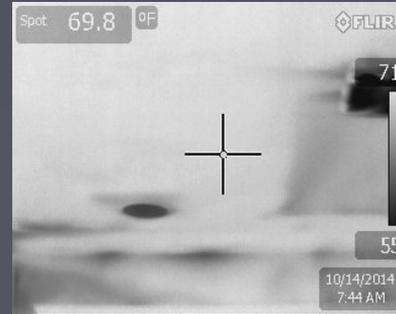
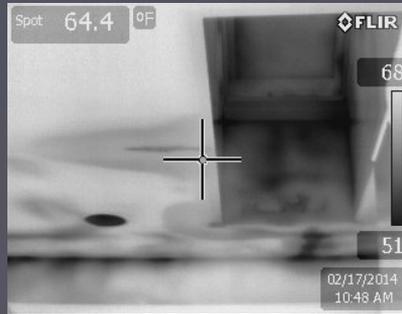
Prescription



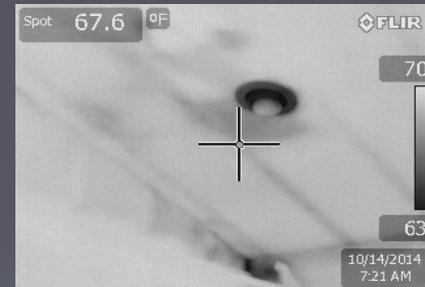
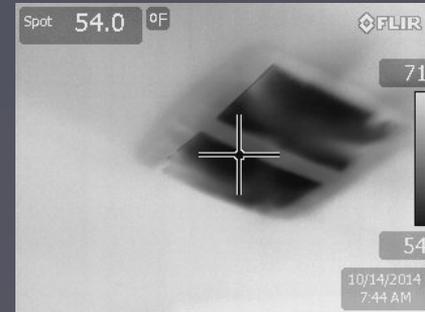
Blower Door Results

MEASUREMENT	PRE TEST	POST TEST	REDUCTION	% REDUCTION
Air Leakage (CFM50)	2924	2336	588	20%
Air Changes (ACH50)	3.62	2.89	0.73	20%

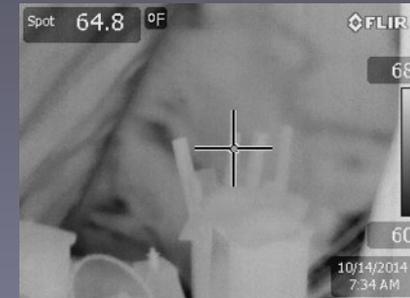
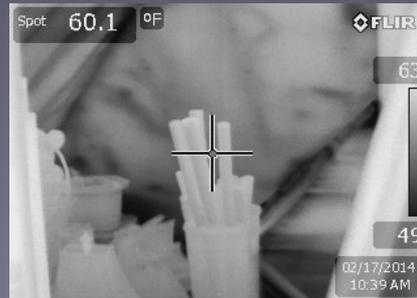
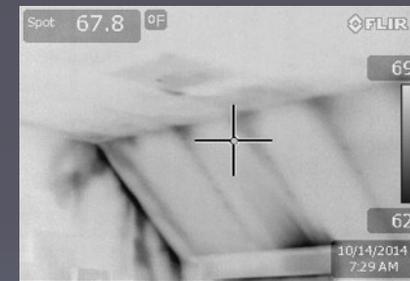
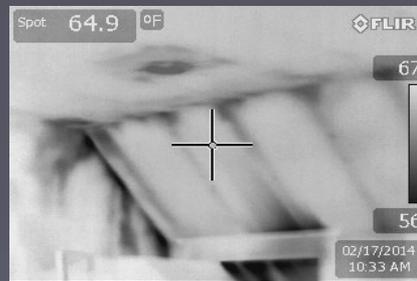
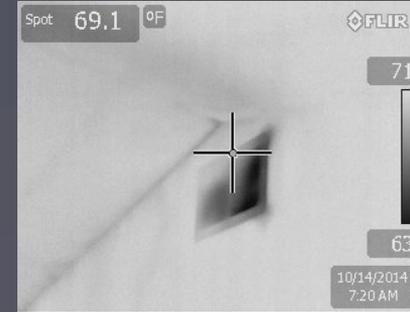
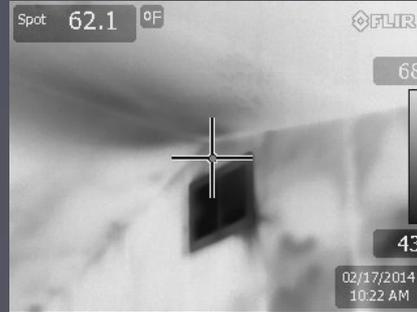
Post Test



Post Test

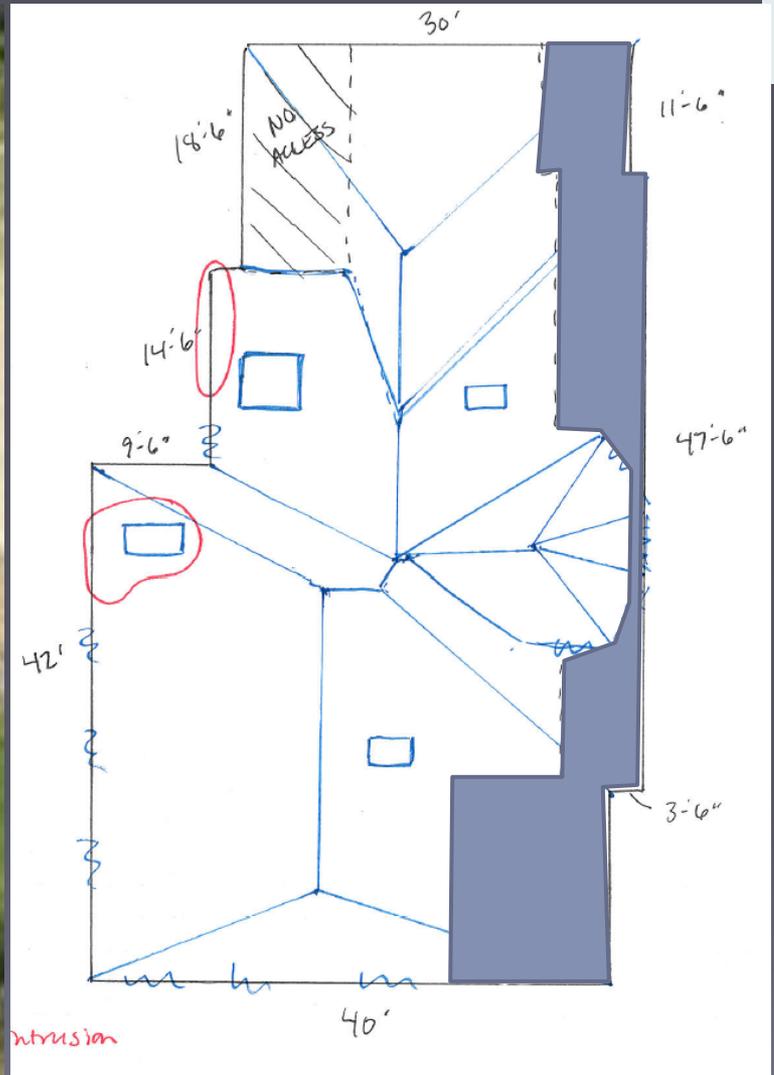


Post Test



Effect of not air sealing front slant





What effects did not air sealing the front slants have?



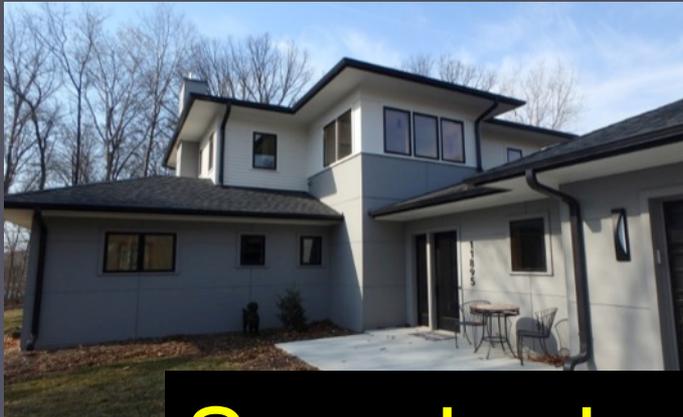
Low CFM50

≠

High Performance Home



Building science would not exist if houses were built perfectly.
As long as we're designing and building houses like this...



Somebody call the (House) Dr.!



Questions?



Tessa Murry

tessa@structuretech1.com

952-915-6466