ARCHITECTS

Our Background

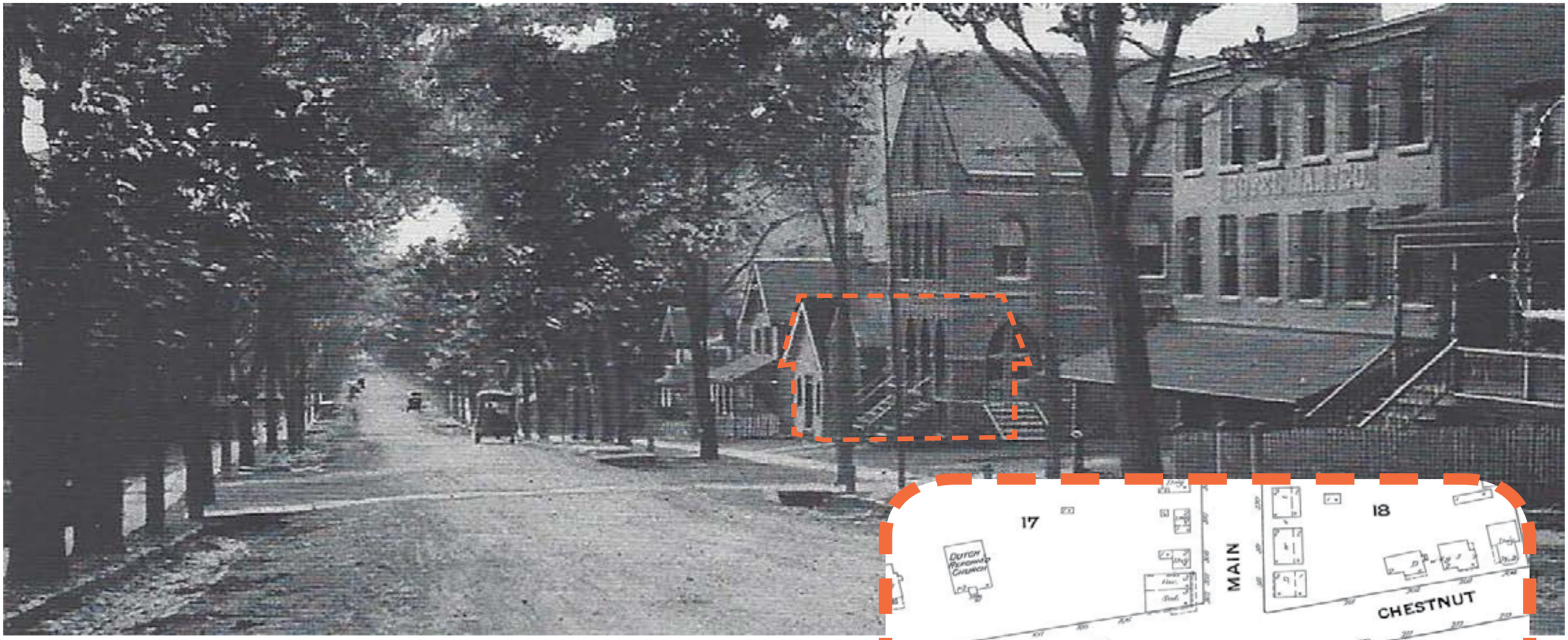
Juhee: Bridgemarket Project under Hugh Hardy

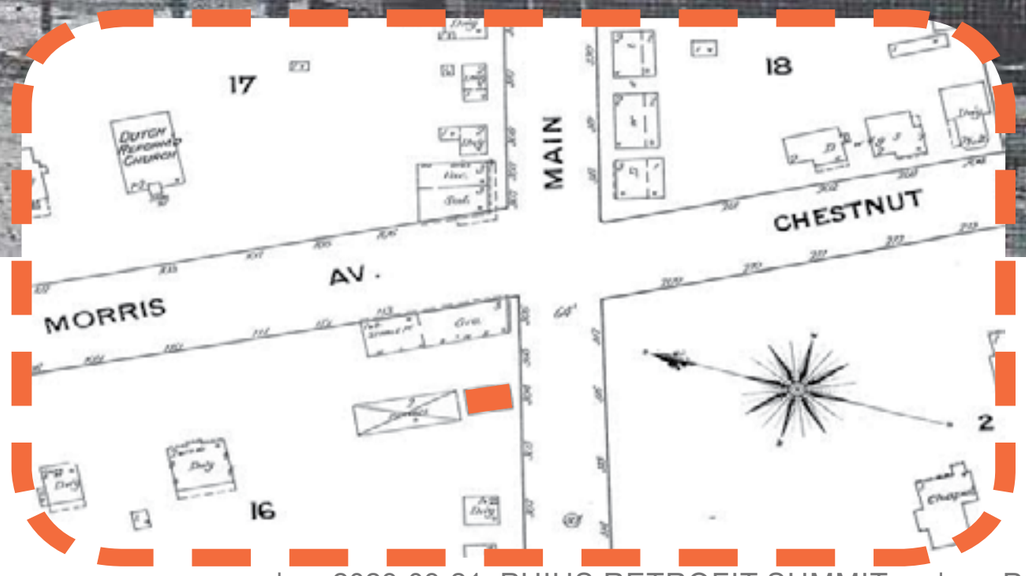
James: Trained under James Gainfort, AIA

River Architects Net Positive Studio Renovation

Cold Spring's First Phius Certified Commercial Building


A RYNG SALE
SALE
BUSINESS





HISTORIC PHOTO OF MAIN STREET
- The original construction date is un-known, however it is shown on sanborn maps as early as 1887

BUILDING SECTION

= AIR BARRIER
= WRB

THERMALLY BROKEN LIGHT WELLS IN PLACE OF EXISTING ATTIC VENTS

EXISTING FRAMING

NEW INSULATED EXTERIOR CAVITY

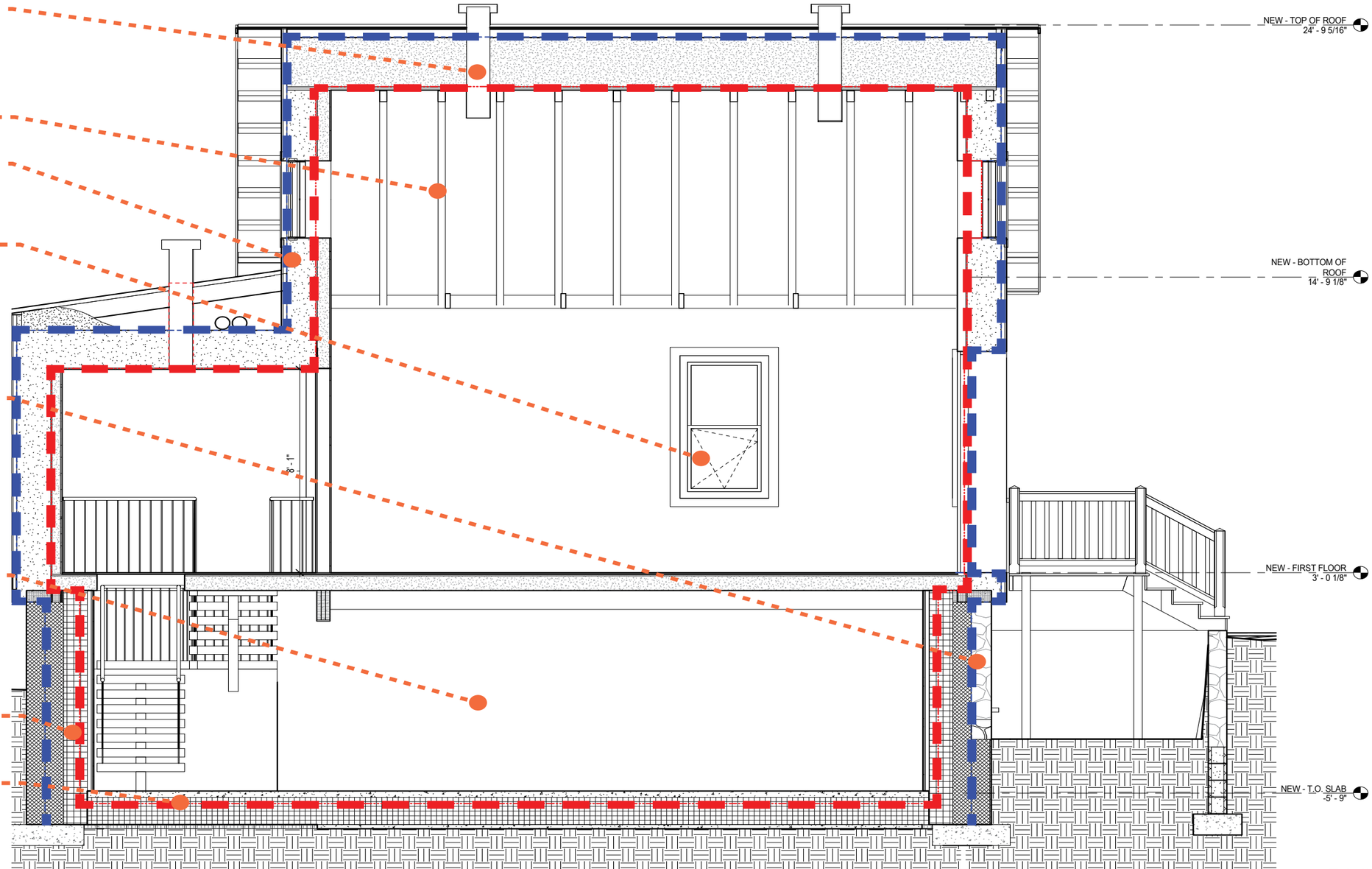
HIGH PERFORMANCE SIMULATED DOUBLE HUNG WINDOWS

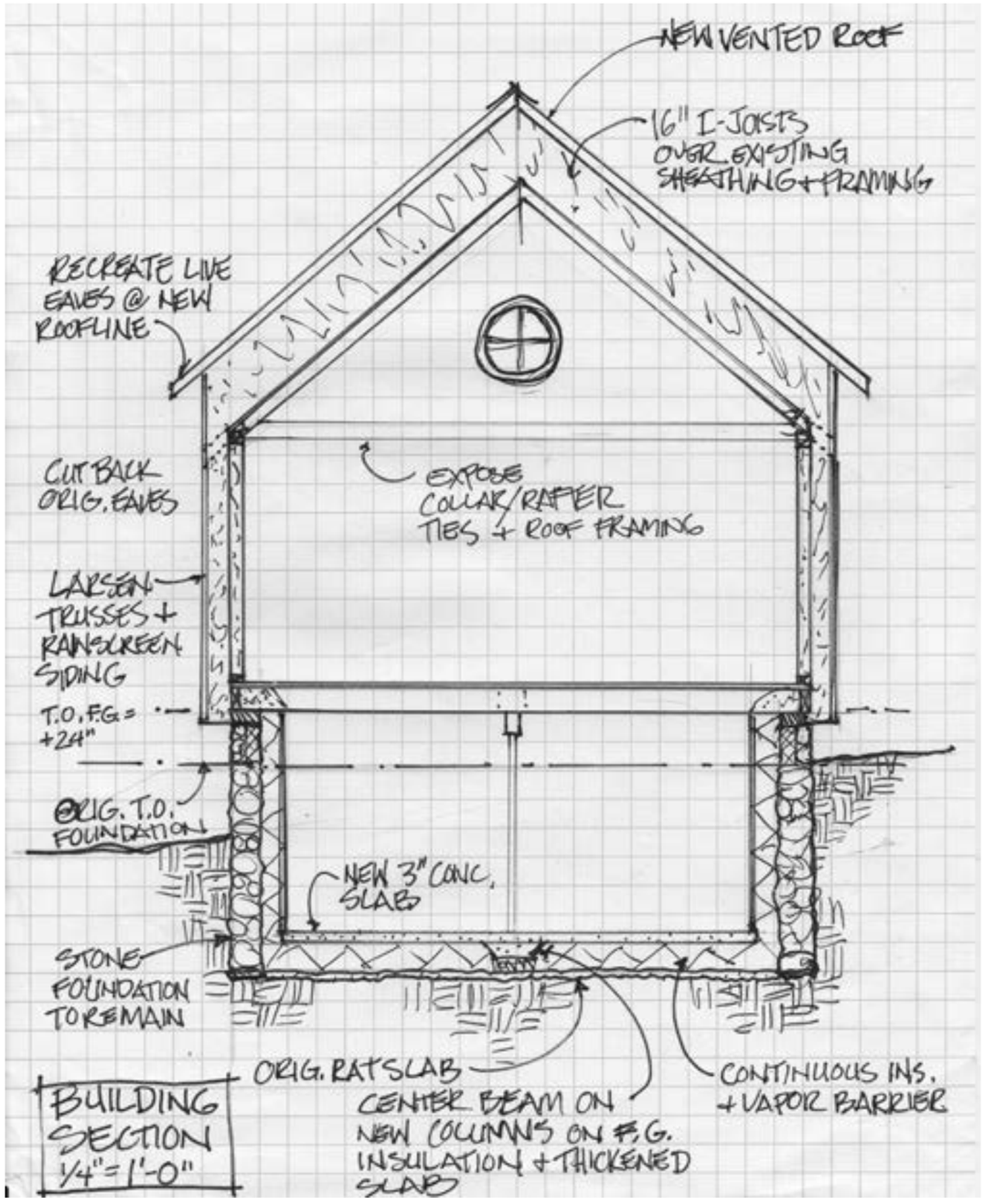
STONEWORK TO MATCH HISTORIC ORIGINAL

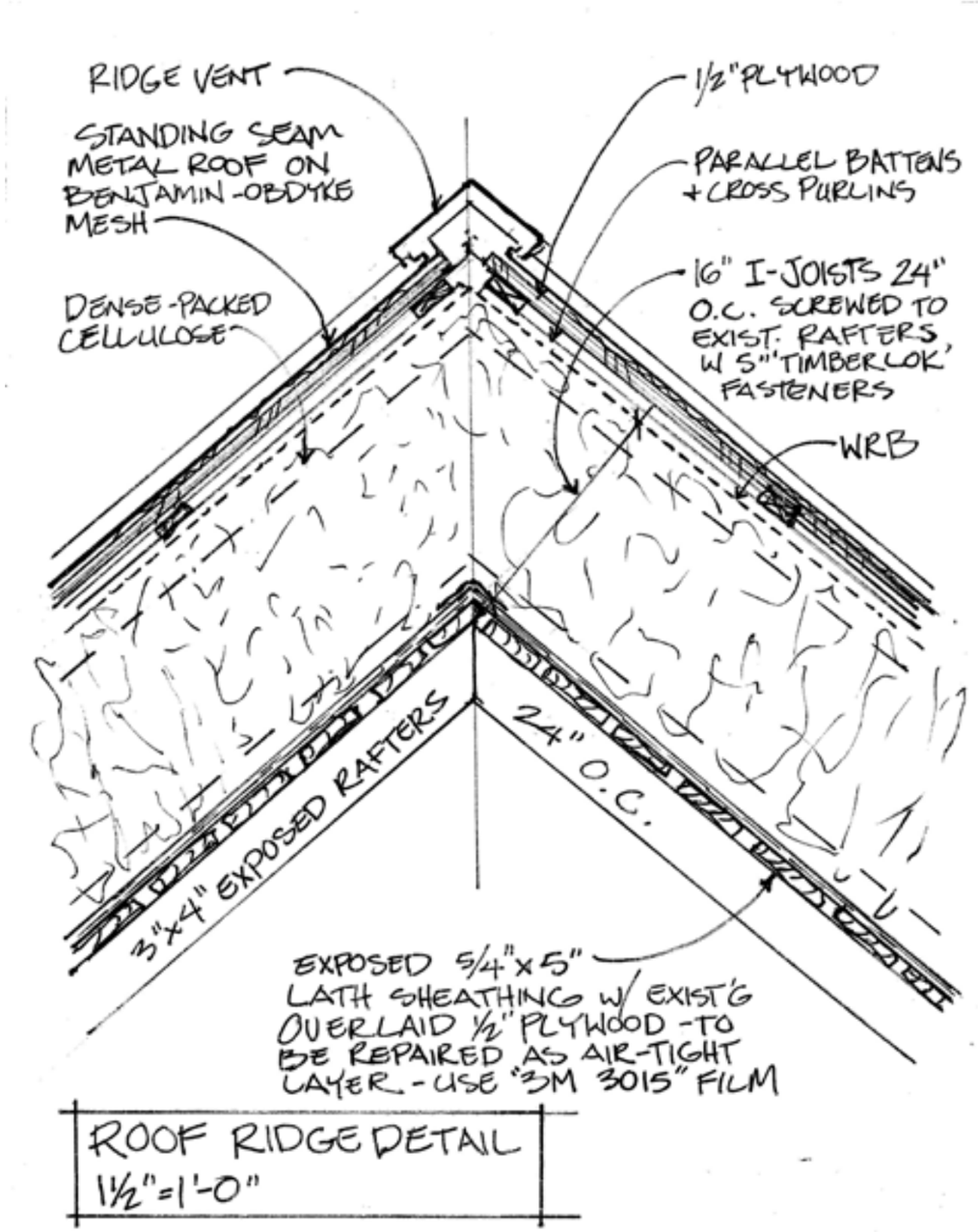
BUILDING RAISED FOR HABITABLE BASEMENT

RECYCLED EPS INSIDE FOUNDATION WALL

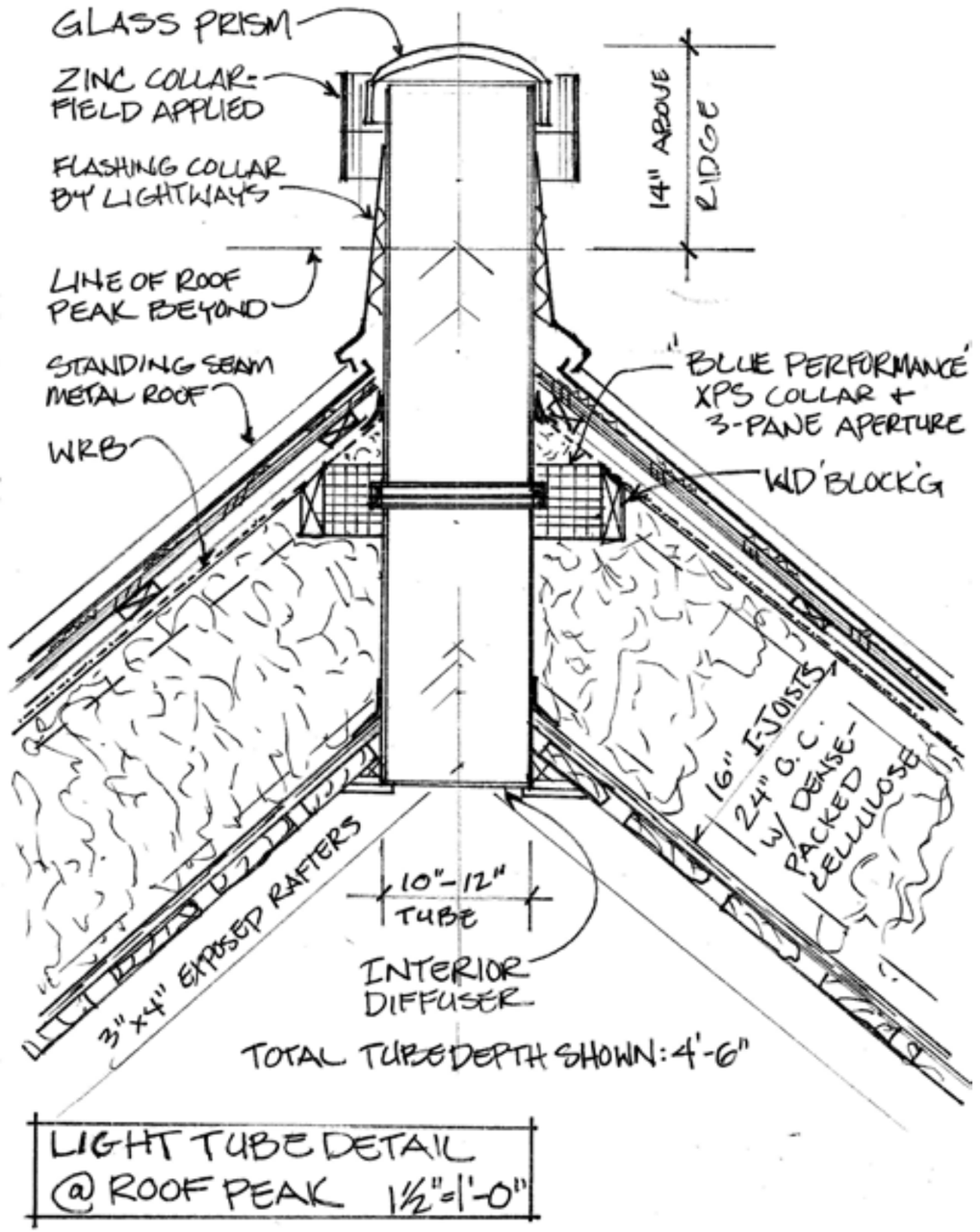
CONTINUOUS AIR BARRIER BELOW SLAB



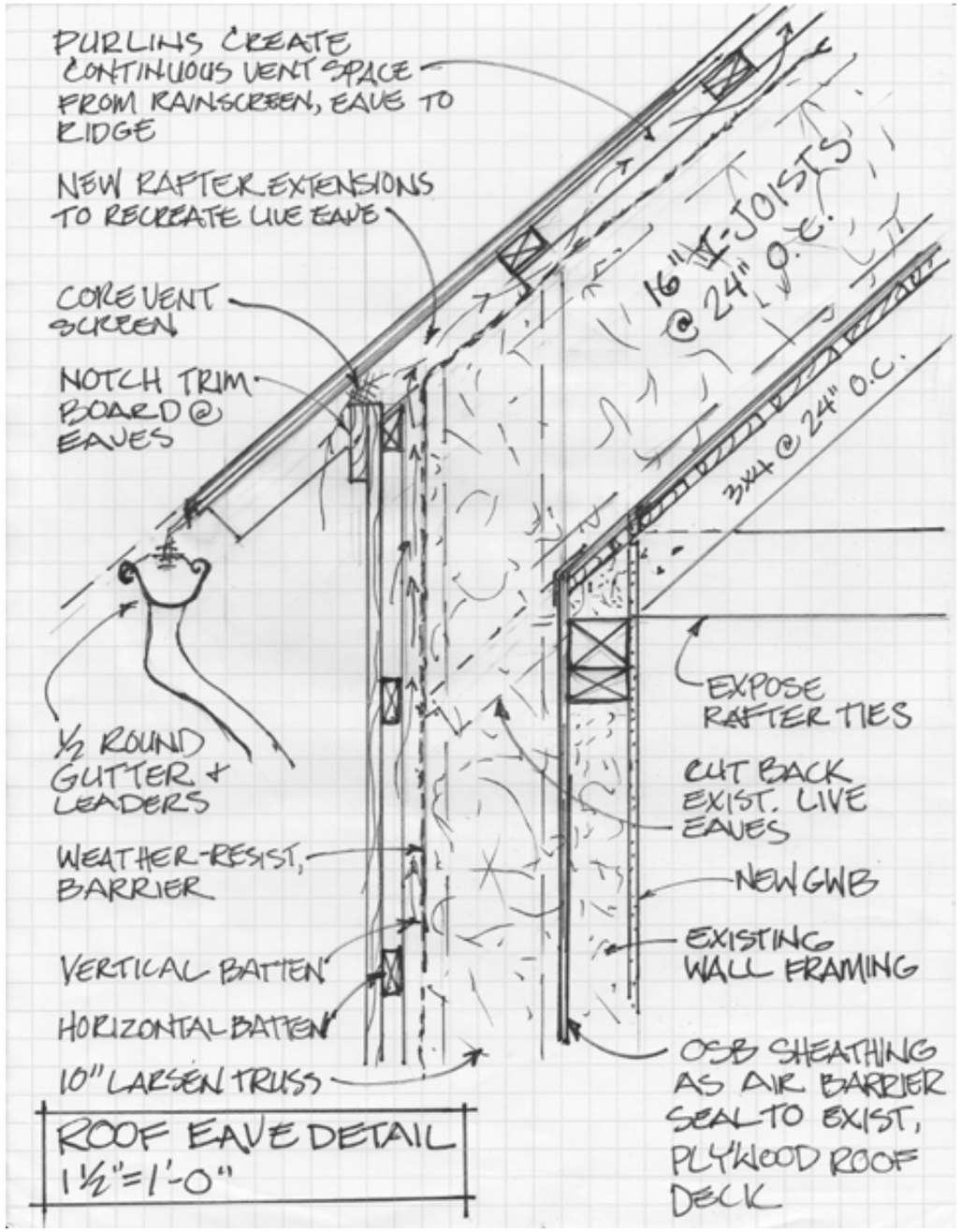

NEW VENTED ROOF
16" I-JOISTS OVER EXISTING SHEATHING + FRAMING
RECREATE LIVE EAVES @ NEW ROOFLINE
CUT BACK ORIG. EAVES
EXPOSE COLLAR/RAFTER TIES + ROOF FRAMING
LARSEN TRUSSES + RAINSCREEN SIDING
T.O.F.G. = +24"
ORIG. T.O. FOUNDATION
NEW 3" CONC. SLAB
STONE FOUNDATION TO REMAIN
ORIG. RAT SLAB
CENTER BEAM ON NEW COLUMNS ON F.G.
INSULATION + THICKENED SLAB
CONTINUOUS INS. + VAPOR BARRIER
BUILDING SECTION
1/4" = 1'-0"

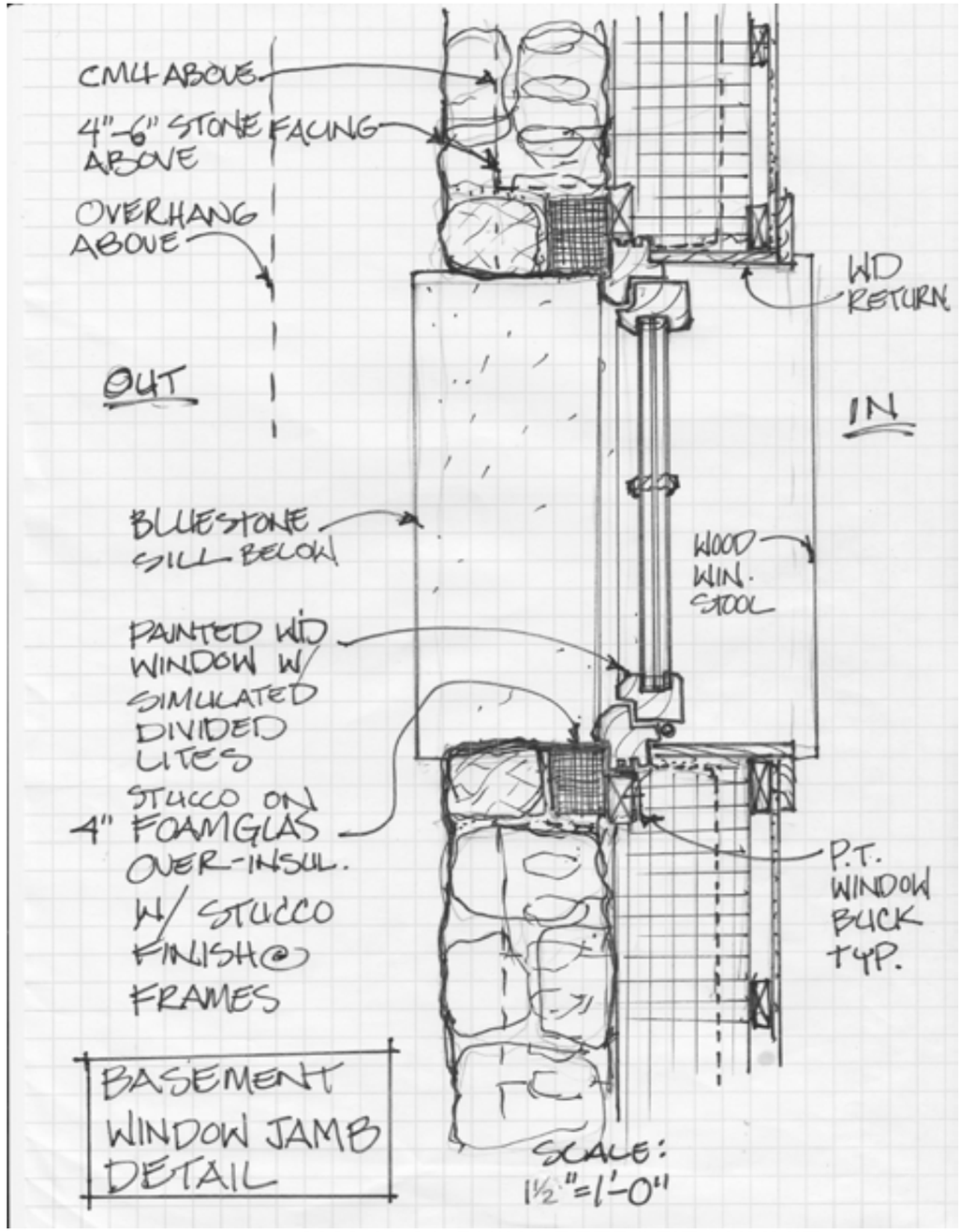


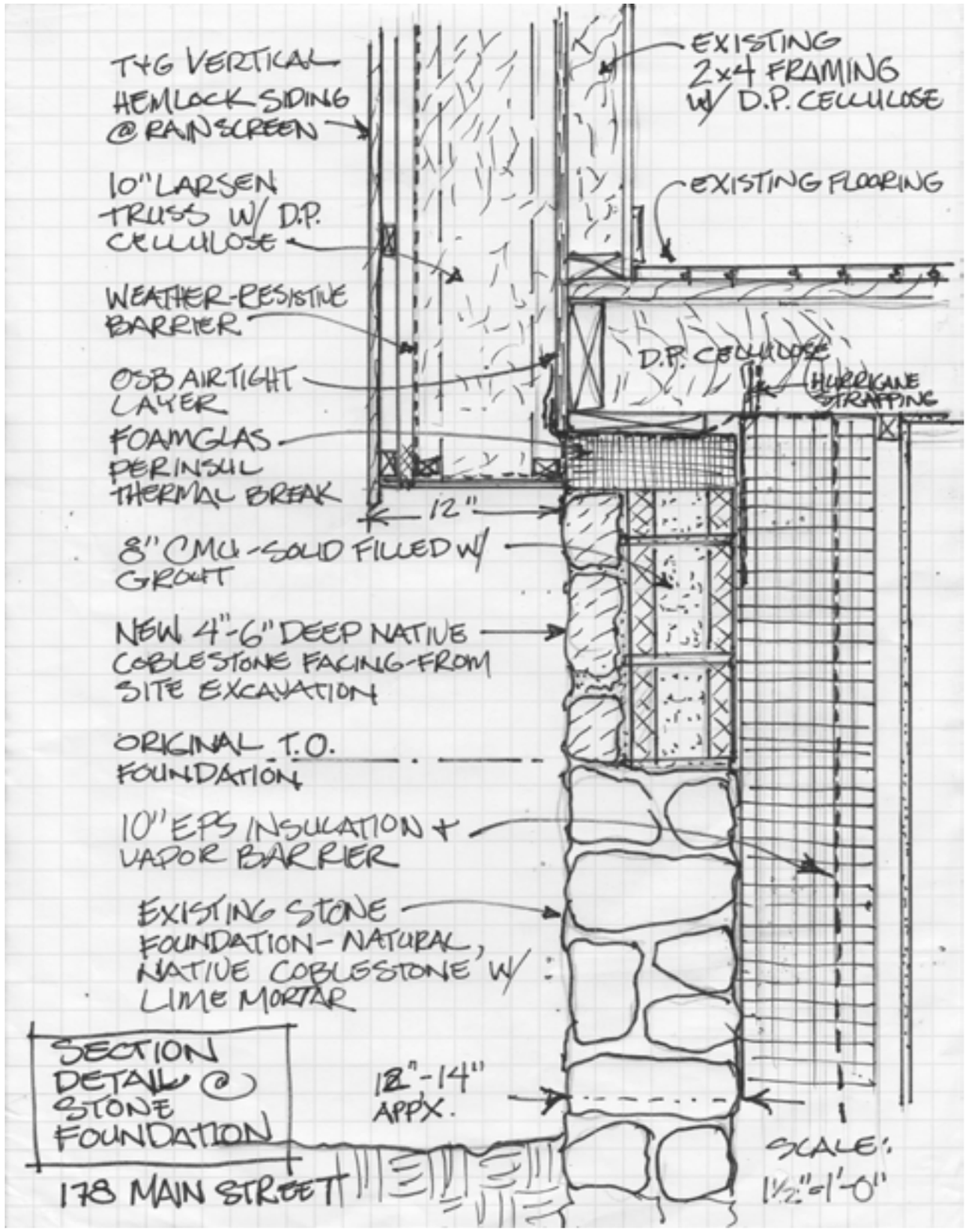
ROOF RIDGE DETAIL
1½"=1'-0"

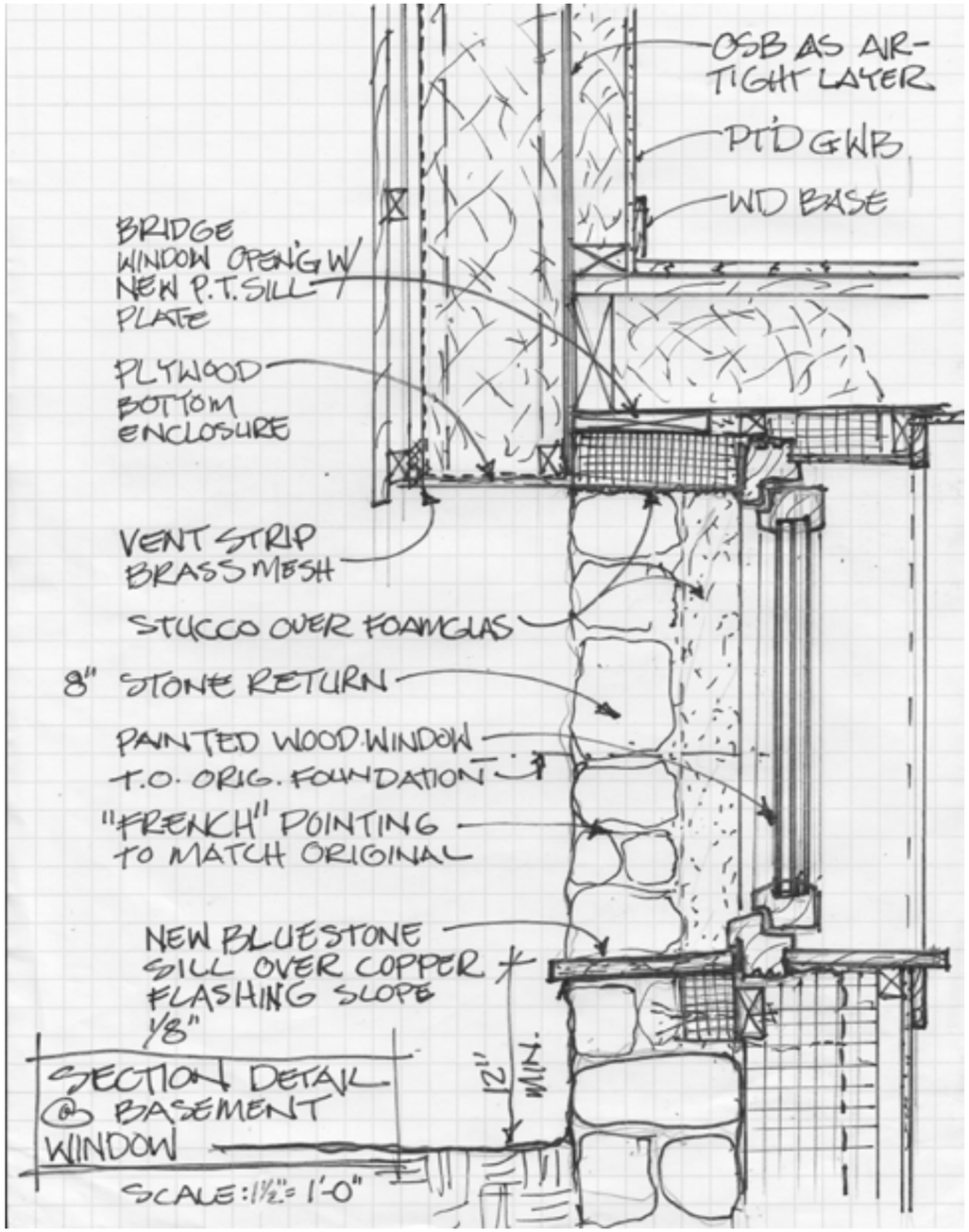


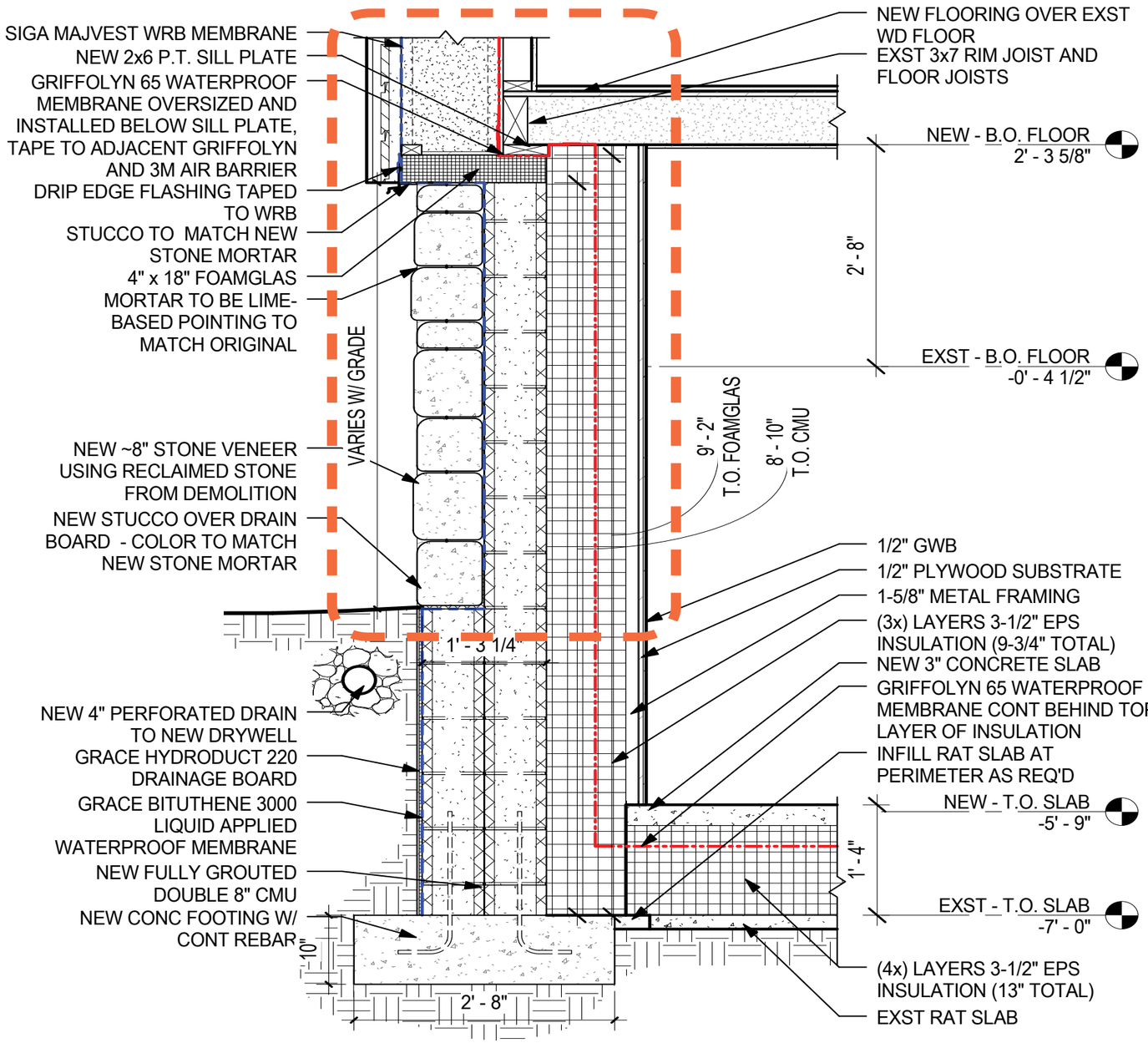
LIGHT TUBE DETAIL
@ ROOF PEAK 1½"=1'-0"

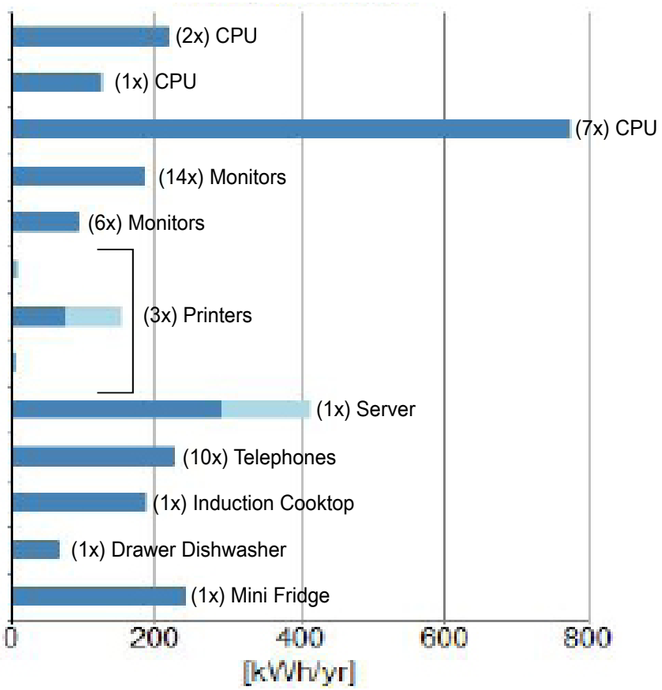

PURLINS CREATE CONTINUOUS VENT SPACE FROM RAINSCREEN, EAVE TO RIDGE
NEW RAFTER EXTENSIONS TO RECREATE LIVE EAVE
CORE VENT SCREEN
NOTCH TRIM BOARD @ EAVES
16" I-JOISTS @ 24" O.C.
3X4 @ 24" O.C.
EXPOSE RAFTER TIES
½ ROUND GUTTER + LEADERS
CUT BACK EXIST. LIVE EAVES
WEATHER-RESIST. BARRIER
NEW GWB
EXISTING WALL FRAMING
VERTICAL BATTEN
HORIZONTAL BATTEN
10" LARSEN TRUSS
OSB SHEATHING AS AIR BARRIER SEAL TO EXIST. PLYWOOD ROOF DECK
ROOF EAVE DETAIL
1½"=1'-0"

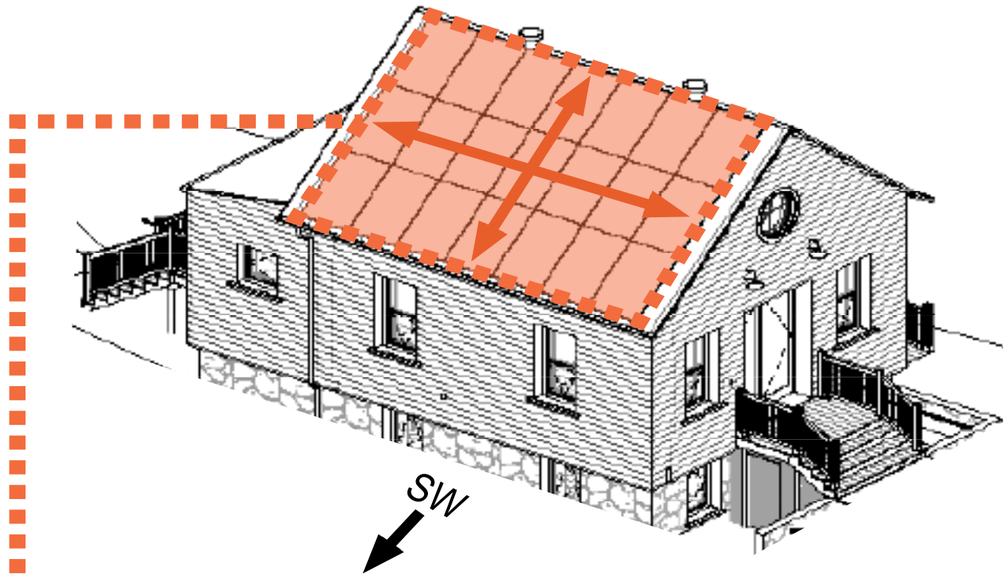

CMU ABOVE
4"-6" STONE FACING ABOVE
OVERHANG ABOVE
OUT
IN
WD RETURN
BLUESTONE SILL BELOW
WOOD WIN. STOOL
PAINTED WD WINDOW W/ SIMULATED DIVIDED LITES
STUCCO ON 4" FOAMGLAS OVER-INSUL. W/ STUCCO FINISH @ FRAMES
P.T. WINDOW BUCK TYP.
BASEMENT WINDOW JAMB DETAIL
SCALE: 1½"=1'-0"


T+G VERTICAL HEMLOCK SIDING @ RAINSCREEN
10" LARSEN TRUSS W/ D.P. CELLULOSE
WEATHER-RESISTIVE BARRIER
OSB AIRTIGHT LAYER
FOAMGLAS PERINSUL THERMAL BREAK
12"
8" CMU - SOLID FILLED W/ GROUT
NEW 4"-6" DEEP NATIVE COBLESTONE FACING-FROM SITE EXCAVATION
ORIGINAL T.O. FOUNDATION
10" EPS INSULATION + VAPOR BARRIER
EXISTING STONE FOUNDATION - NATURAL, NATIVE COBLESTONE W/ LIME MORTAR
EXISTING 2x4 FRAMING W/ D.P. CELLULOSE
EXISTING FLOORING
D.P. CELLULOSE
HURRICANE STRAPPING
12"-14" APPX.
SECTION DETAIL @ STONE FOUNDATION
178 MAIN STREET
SCALE: 1½"=1'-0"


OSB AS AIR-TIGHT LAYER
PT'D GWB
WD BASE
BRIDGE WINDOW OPENING W/ NEW P.T. SILL PLATE
PLYWOOD BOTTOM ENCLOSURE
VENT STRIP BRASS MESH
STUCCO OVER FOAMGLAS
8" STONE RETURN
PAINTED WOOD WINDOW
T.O. ORIG. FOUNDATION
"FRENCH" POINTING TO MATCH ORIGINAL
NEW BLUESTONE SILL OVER COPPER FLASHING SLOPE ⅛"
12" MIN.
SECTION DETAIL @ BASEMENT WINDOW
SCALE: 1½"= 1'-0"

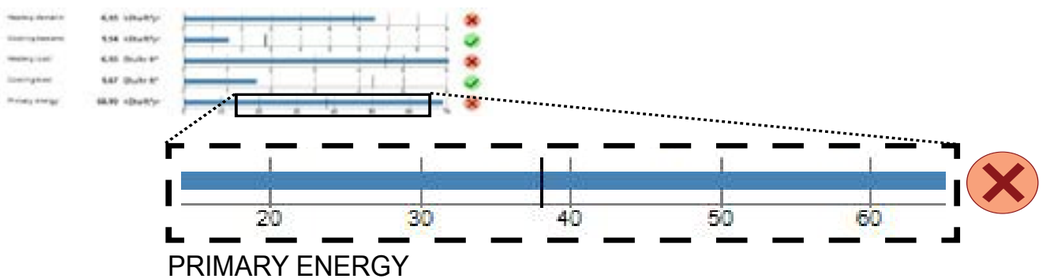

SIGA MAJVEST WRB MEMBRANE
NEW 2x6 P.T. SILL PLATE
GRIFFOLYN 65 WATERPROOF MEMBRANE OVERSIZED AND INSTALLED BELOW SILL PLATE, TAPE TO ADJACENT GRIFFOLYN AND 3M AIR BARRIER
DRIP EDGE FLASHING TAPED TO WRB
STUCCO TO MATCH NEW STONE MORTAR
4" x 18" FOAMGLAS
MORTAR TO BE LIME-BASED POINTING TO MATCH ORIGINAL
NEW ~8" STONE VENEER USING RECLAIMED STONE FROM DEMOLITION
NEW STUCCO OVER DRAIN BOARD - COLOR TO MATCH NEW STONE MORTAR
NEW 4" PERFORATED DRAIN TO NEW DRYWELL
GRACE HYDRODUCT 220 DRAINAGE BOARD
GRACE BITUTHENE 3000 LIQUID APPLIED WATERPROOF MEMBRANE
NEW FULLY GROUTED DOUBLE 8" CMU
NEW CONC FOOTING W/ CONT REBAR
VARIES W/ GRADE
9' - 2" T.O. FOAMGLAS
8' - 10" T.O. CMU
1' - 3 1/4"
10"
2' - 8"
2' - 8"
1' - 4"
NEW FLOORING OVER EXST WD FLOOR
EXST 3x7 RIM JOIST AND FLOOR JOISTS
NEW - B.O. FLOOR
2' - 3 5/8"
EXST - B.O. FLOOR
-0' - 4 1/2"
1/2" GWB
1/2" PLYWOOD SUBSTRATE
1-5/8" METAL FRAMING
(3x) LAYERS 3-1/2" EPS INSULATION (9-3/4" TOTAL)
NEW 3" CONCRETE SLAB
GRIFFOLYN 65 WATERPROOF MEMBRANE CONT BEHIND TOP LAYER OF INSULATION
INFILL RAT SLAB AT PERIMETER AS REQ'D
NEW - T.O. SLAB
-5' - 9"
EXST - T.O. SLAB
-7' - 0"
(4x) LAYERS 3-1/2" EPS INSULATION (13" TOTAL)
EXST RAT SLAB



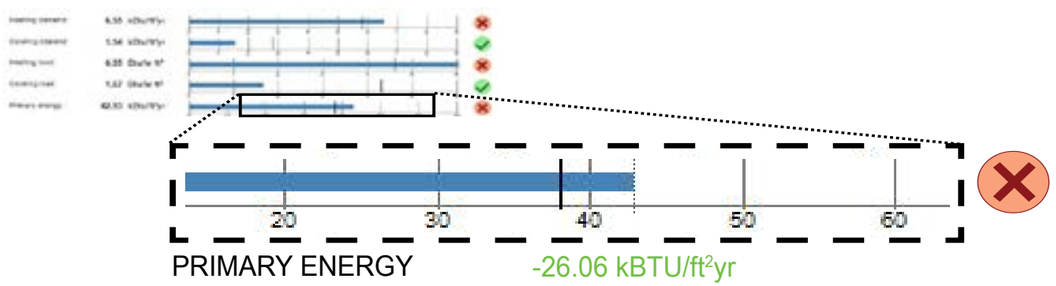


Lighthousesolar

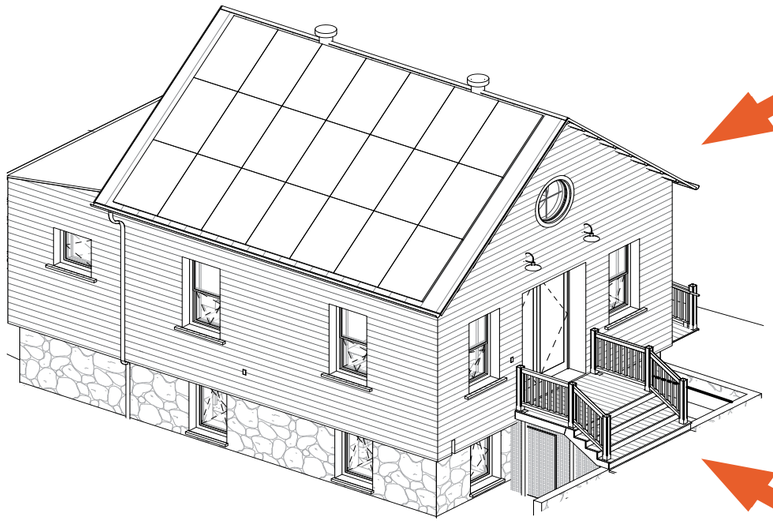
7,107 kWH/a Array
.373 onsite utilization

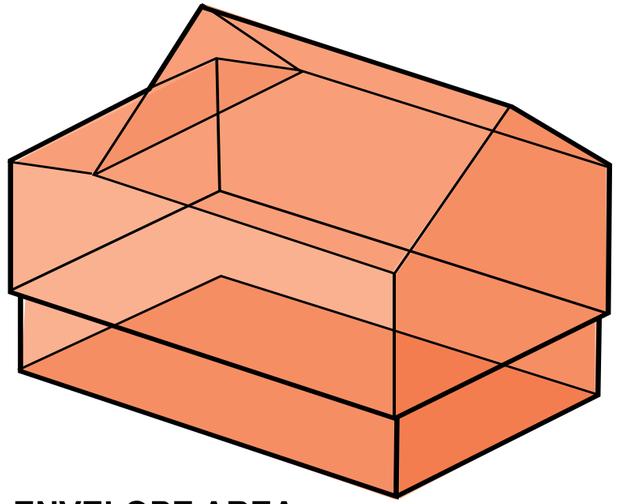


PRIMARY ENERGY

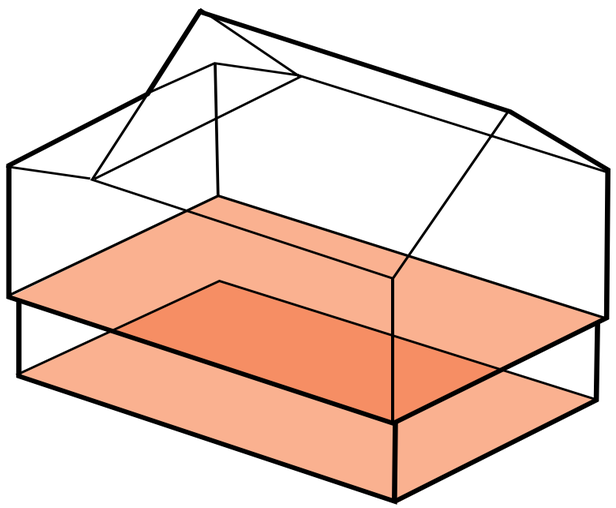


PRIMARY ENERGY -26.06 kBTU/ft²yr





ENVELOPE AREA
- proportional to ***transmission heat loss***



iCFA (WALKABLE FLOOR AREA)
- proportional to ***space conditioning*** targets

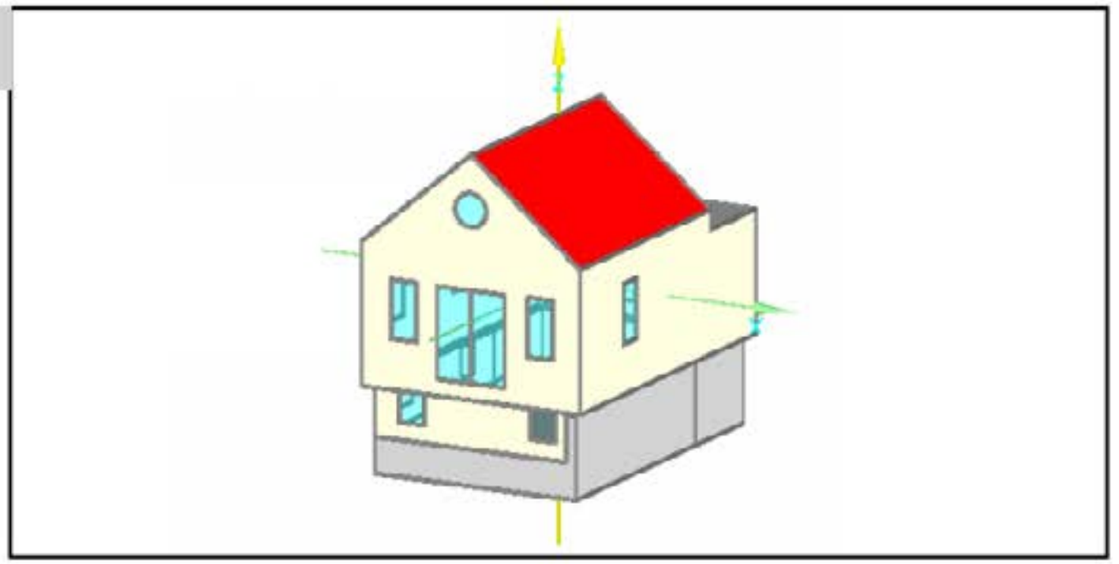
iCFA ⁝ ENVELOPE AREA

- Indirect way of putting pressure on material efficiency through compact forms and attached units during design

But, what about existing building retrofits that already have a set envelope?

BUILDING INFORMATION

Category:	**Non-residential**
Status:	**In planning**
Building type:	**Retrofit**
Year of construction:	
Units:	**1**
Number of occupants:	**10 (Design)**



Boundary conditions

Climate:	**POUGHKEEPSIE DUTCHESS CO AP NY**
Internal heat gains:	**1.3** Btu/hr ft²
Interior temperature:	**68** °F
Overheat temperature:	**77** °F

Building geometry

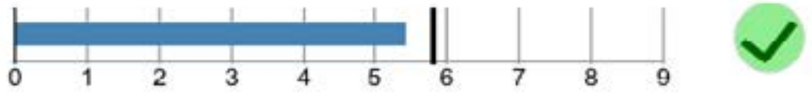
Enclosed volume:	**17,416.2** ft³
Net-volume:	**11,693.8** ft³
Total area envelope:	**4,107.3** ft²
AV ratio:	**0.2** 1/ft
Floor area:	**1,096.7** ft²

PASSIVEHOUSE REQUIREMENTS

Certificate criteria: **PHIUS+ 2015 Standard**

Heating demand

specific:	**5.39**	kBtu/ft²yr
target:	**5.8**	kBtu/ft²yr
total:	5,914.28	kBtu/yr

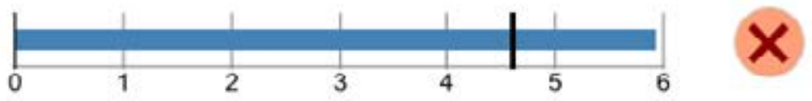


Cooling demand

sensible:	**0.24**	kBtu/ft²yr
latent:	**0.12**	kBtu/ft²yr
specific:	**0.36**	kBtu/ft²yr
target:	**2.8**	kBtu/ft²yr
total:	398.71	kBtu/yr

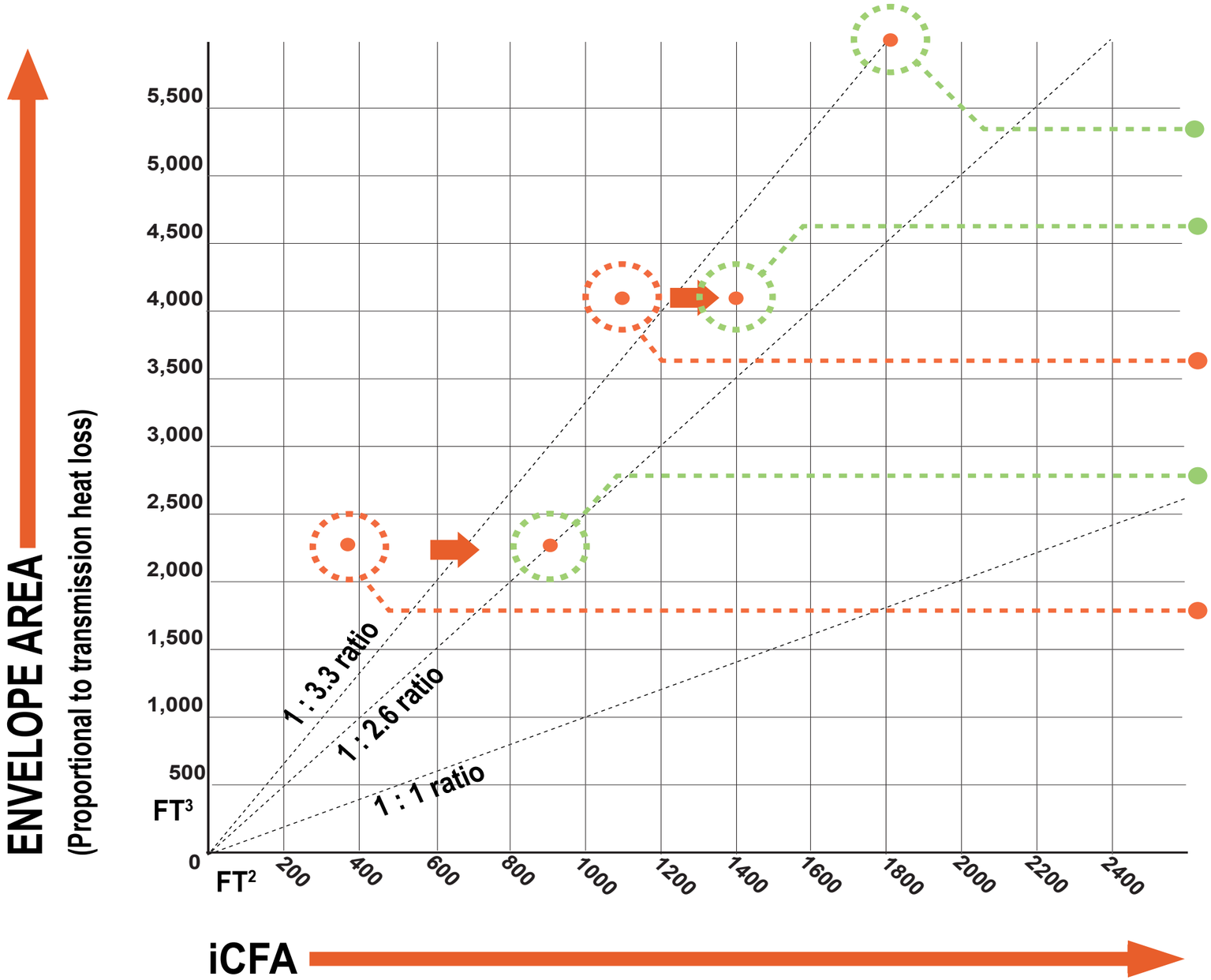
Heating load

specific:	**5.93**	Btu/hr ft²
target:	**4.6**	Btu/hr ft²
total:	6,503.74	Btu/hr



Cooling load

specific:	**0.67**	Btu/hr ft²
target:	**4.3**	Btu/hr ft²
total:	737.33	Btu/hr



SILVER LAKE PASSIVE PASS
1 : 3.3

RA STUDIO PASS
1 : 2.9
(Add hypothetical 300ft² Mezzanine)

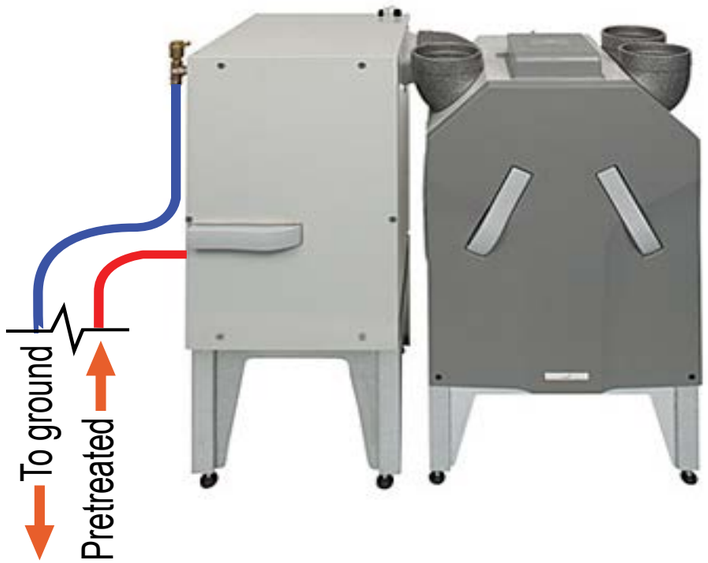
RA STUDIO FAIL - PEAK HEAT
1 : 3.6

BLUESTONE WORKSHOP PASS
1 : 2.6

BLUESTONE WORKSHOP FAIL - PEAK HEAT
1 : 6.2

CA200 ERV @ 100 cfm
(125 max cfm)

ERV efficiency: 80% (derated 12%)
Electrical efficiency: .63 W/cfm



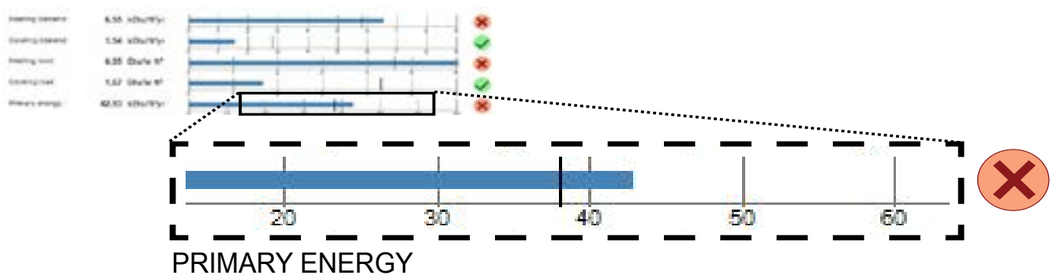
CA350 HRV @ 100 cfm
(215 max cfm)

HRV efficiency: 89%
Electrical efficiency: .32 W/cfm

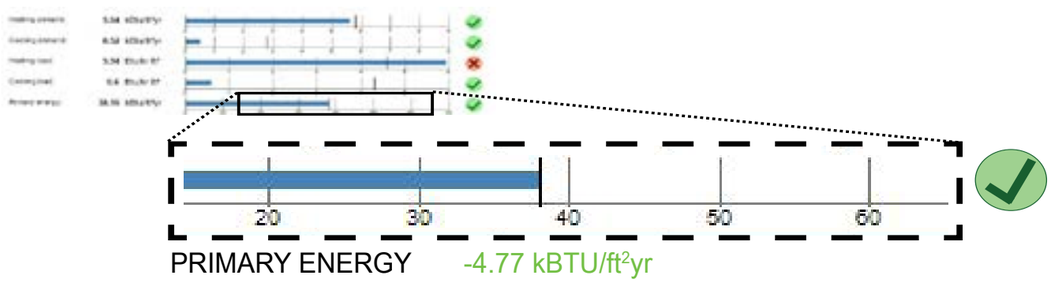
+

ComfoFond
Geothermal heat exchanger

Efficiency: 60%



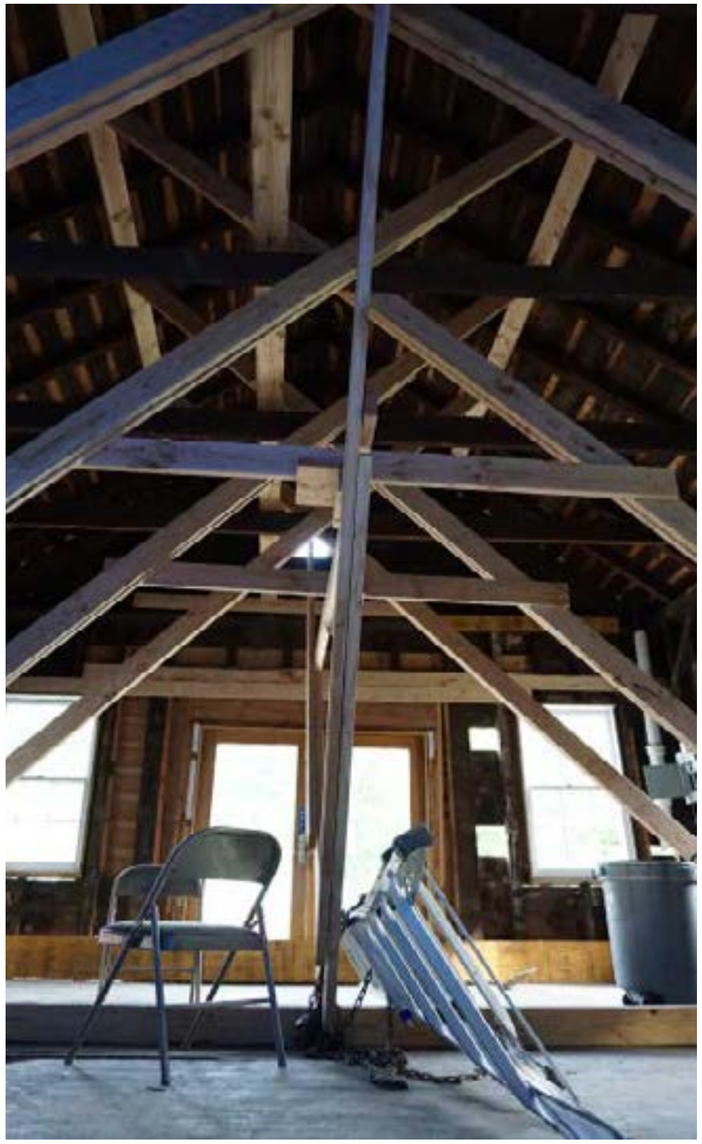
PRIMARY ENERGY



PRIMARY ENERGY -4.77 kBTU/ft²yr

EXCAVATION FINDINGS

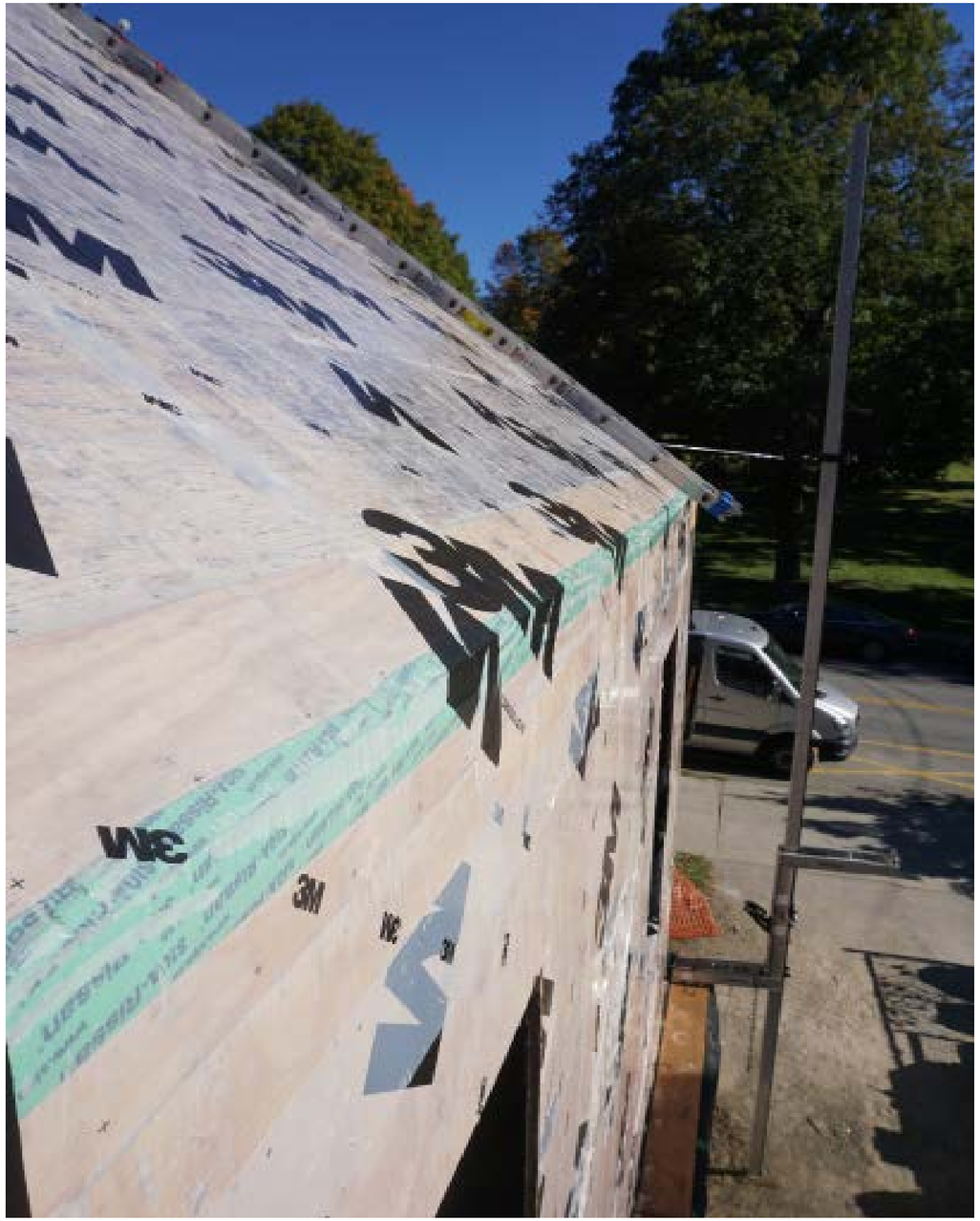
- While the existing foundation seemed to be in good condition from inside, excavation for a new rear foundation wall revealed that was not the case.



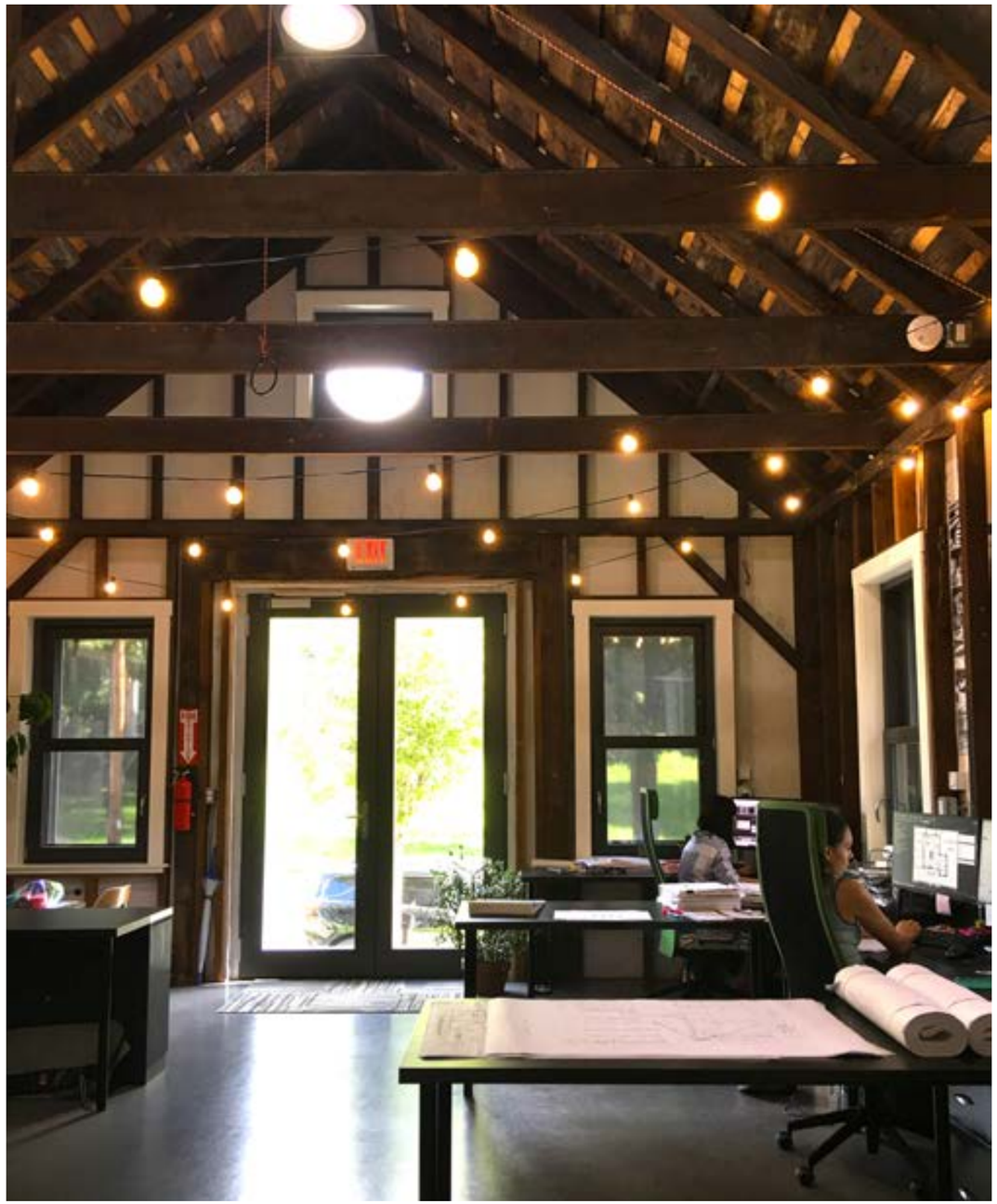

DANG
CONSTRUCTI
KEEP

Reclaimed insulation from
Green Insulation Group


GreenInsulationGroup
Products
Benefits
Blog
Contact Us
Supplies reclaimed, recycled,
and surplus rigid
insulation of all types
Monthly Special
Green Insulation Group supplies reclaimed, recycled, and surplus rigid insulation of all types
Pallet or truckload quantities
Save between 50-75% compared to new material
Environmentally responsible and qualifies for LEED credits
Typically the functionality and insulating capabilities of our product is consistent with new material
Our inventory is very diverse, please contact us for your specific needs
Surplus,Reclaimed, Recycled, and Once Used product available
Why Us
Diverse inventory
Save 50-75% compared to new
Pallet or truckload quantities
Environmentally responsible
Polyisocyanurate
ISO
ISO panels provide the highest thermal
Extruded Polystyrene
XPS
Also known as 'blue-board', XPS consists
Expanded Polystyrene
EPS
Also known as 'bead-board', EPS has the



Rater Notes (thermal bridges present and/or mitigation strategies)					
4	**Building Air Tightness Testing**				
4.1	**Preliminary whole building blower door test (optional)**				
		Building Envelope Area (ft^2)	**3776**		
	not ph volume	Project Net Volume (ft^3)	**17057**		
		CFM50 test result - depressurization	**70**		
		CFM50/Shell	**0.0185**		
		ACH50 - depressurization	**0.25**		
		CFM50 test result - pressurization	**68**		
		CFM50/Shell	**0.0180**		
		ACH50 - pressurization	**0.24**		
		Average CFM50	**69**		
		Average CFM50/Shell area	**0.018**		
		Average ACH50	**0.24**		
4.2	**Final whole building blower door test**				
		Building Envelope Area (ft^2)	**3776**		
	resnet volume?	Project Net Volume (ft^3)	**17057**		
		CFM50 test result - depressurization	**52**		
		CFM50/Shell	**0.0138**		
		ACH50 - depressurization	**0.18**		
		CFM50 test result - pressurization	**62**		
		CFM50/Shell	**0.0164**		
		ACH50 - pressurization	**0.22**		
		Average CFM50	**57**		
		Average CFM50/Shell area (ft^2)	**0.015**	**PASS**	PHIUS+
		Average ACH50	**0.20**		



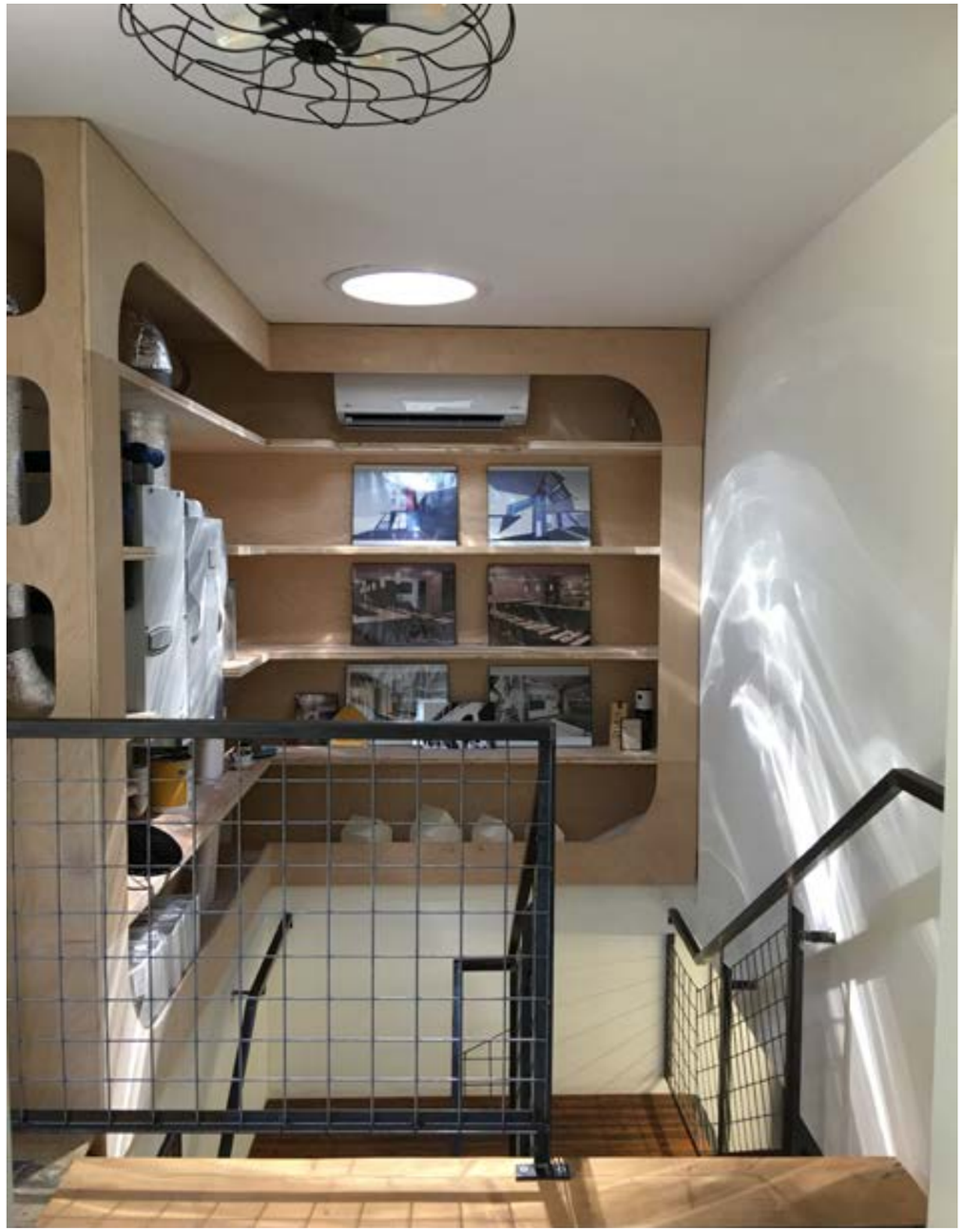


Photo by Nicholas Doyle

Lessons Learned

1. Never assume anything.
2. Small building penalty (PHIUS+ 2015) added difficulty.
3. It's easy to draw the red and blue lines on paper but hard to execute in the field.
4. We used HRV to pass the energy model but it is not ideal for our climate zone. We need better humidity control.
5. Heating and cooling loads seem to be inaccurate in WUFI model.
6. Avoid hanging outdoor minisplit unit under the roof eaves to mitigate winter drips and freezing of the equipment.
7. The external shades definitely help.
8. We wish we could've avoided making holes in the weather barrier to insulate the building with blown-in cellulose.

Key Question: Would anyone else put this much effort in converting a small historic building into a Net Zero office? (On the other hand, being committed made the execution easier.)

Note: While we did not have any problems with reclaimed EPS insulation, we want to inform that reclaimed EPS may not be suitable for all slab conditions. It's hard to control what compression strength you'll get. And, it's not suitable for point loads.

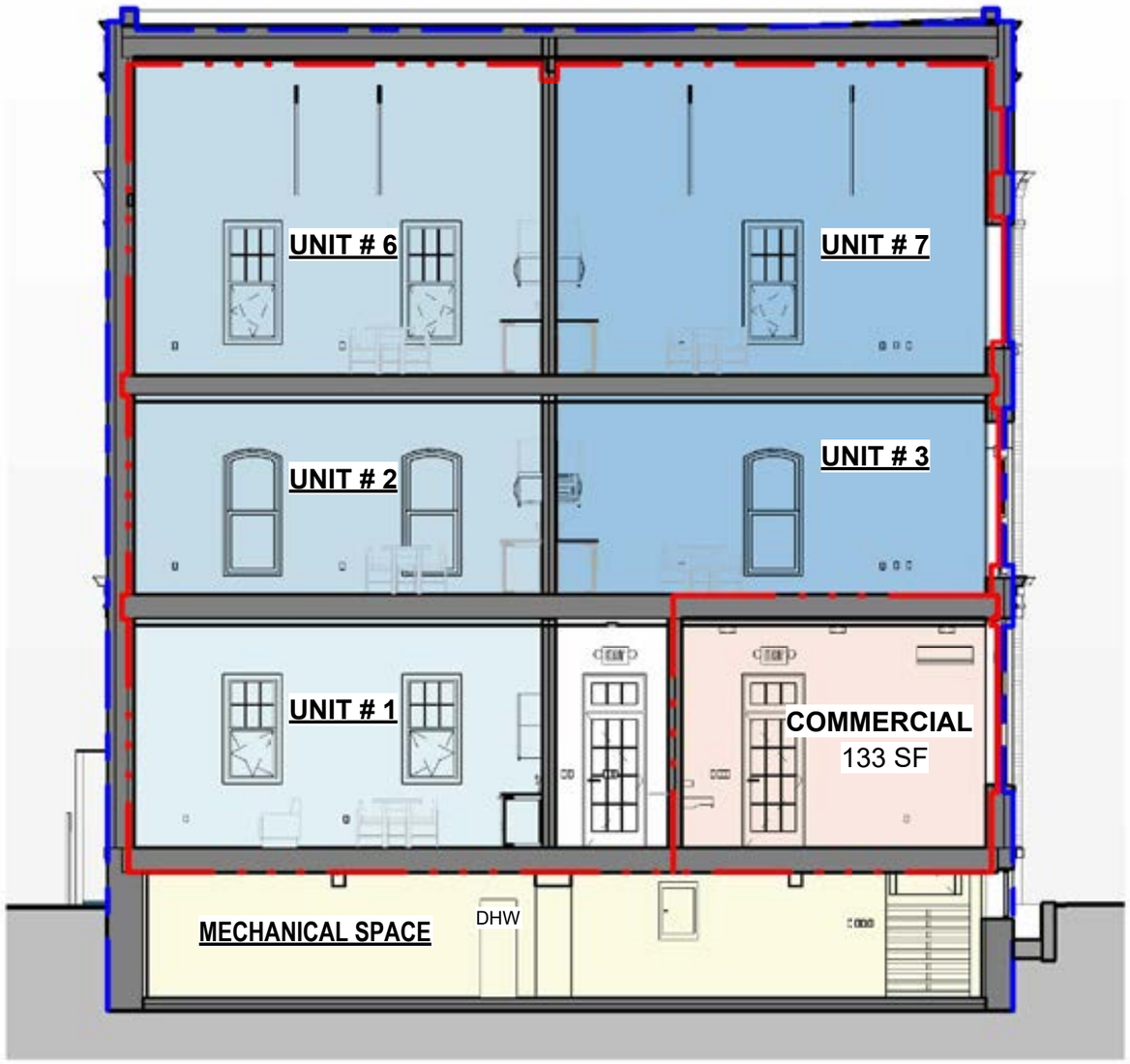
The Bank Lofts

Carbon Neutral Retrofit Mix-Use Building in Richfield Springs, New York

NYSERDA CNCED & Buildings of Excellence Early Design Partner Program

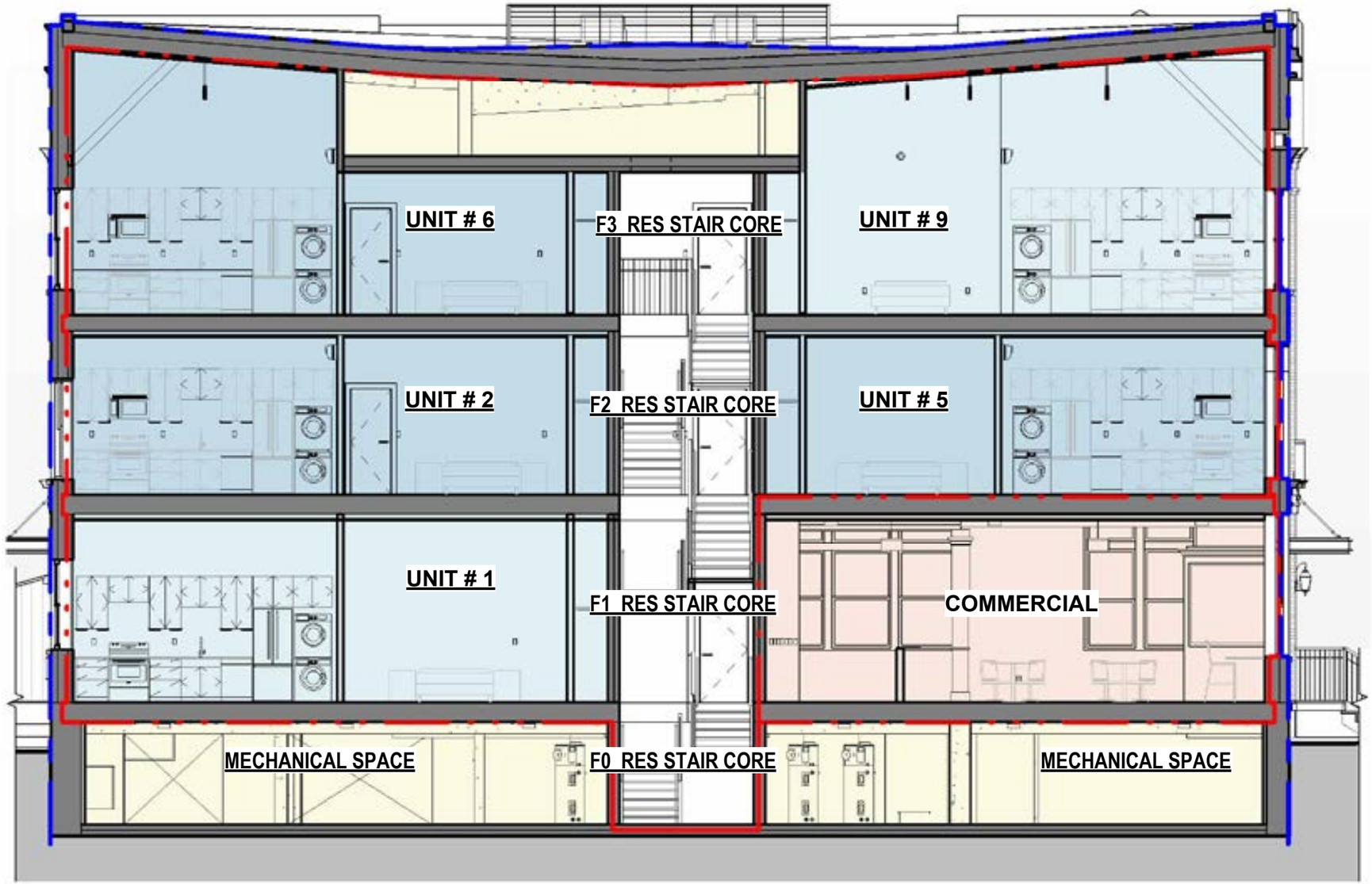

JOE
1911
HOLMES 1912 1911


FIRST NAT'L. BANK.
HIBBARD-ROBMAN-ELY SAFE CO.
NEW YORK.



AIR BARRIER

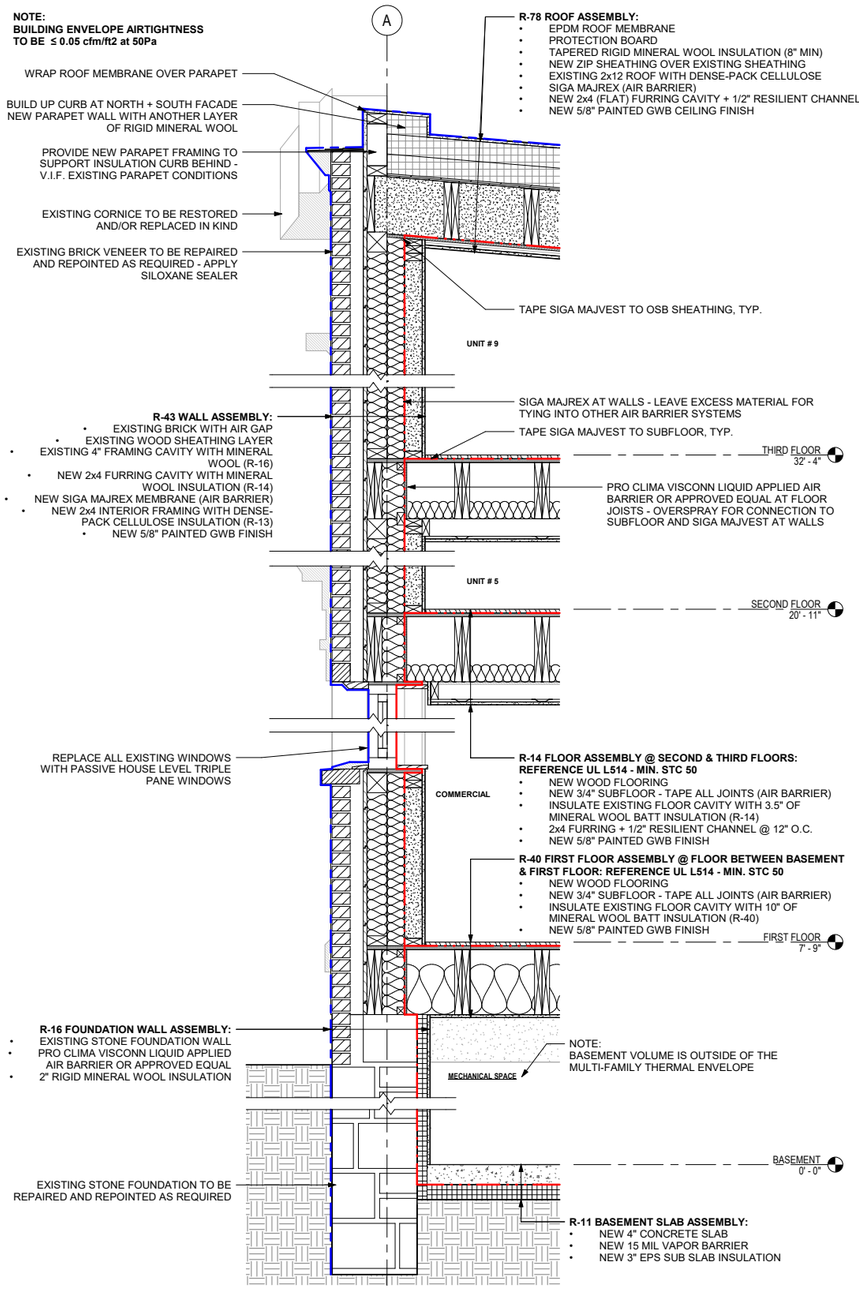
WRB

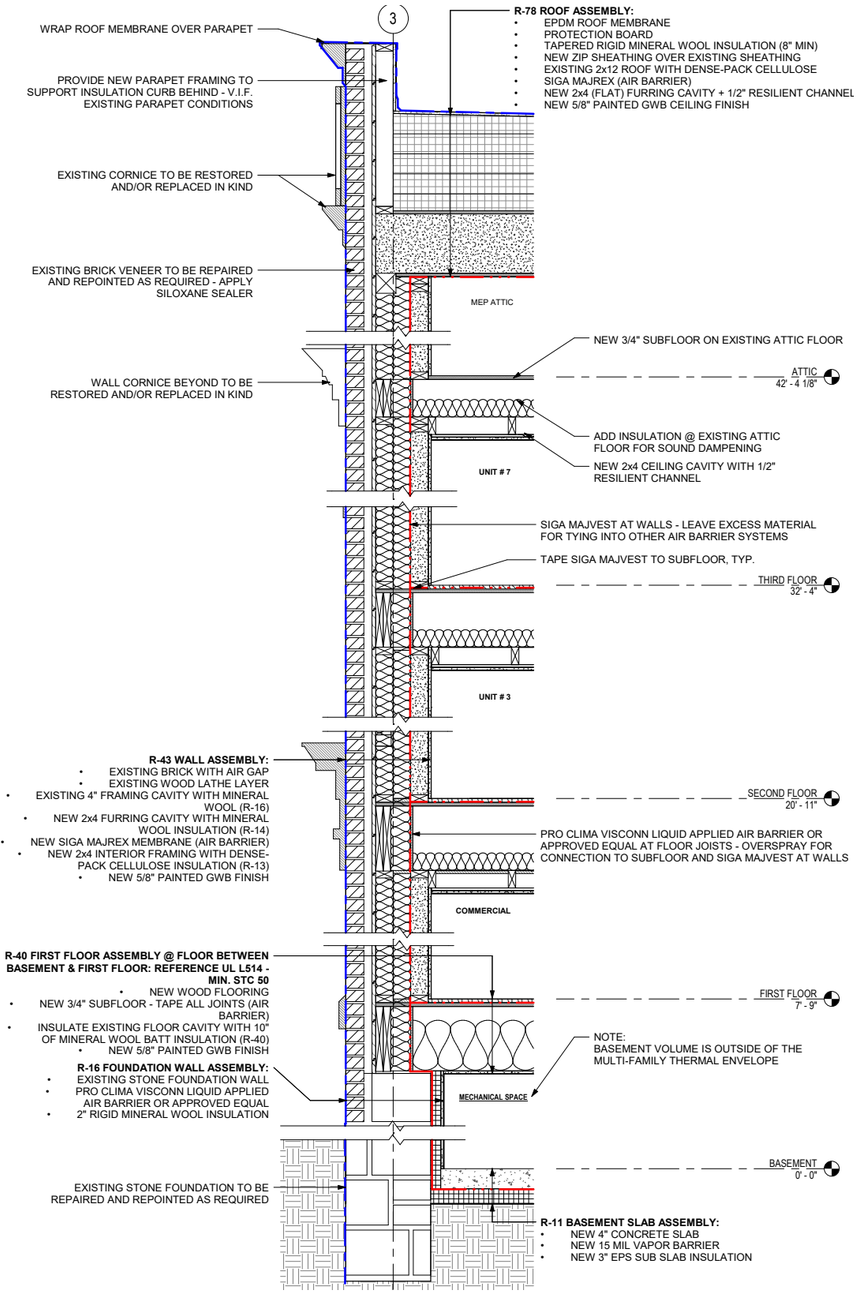


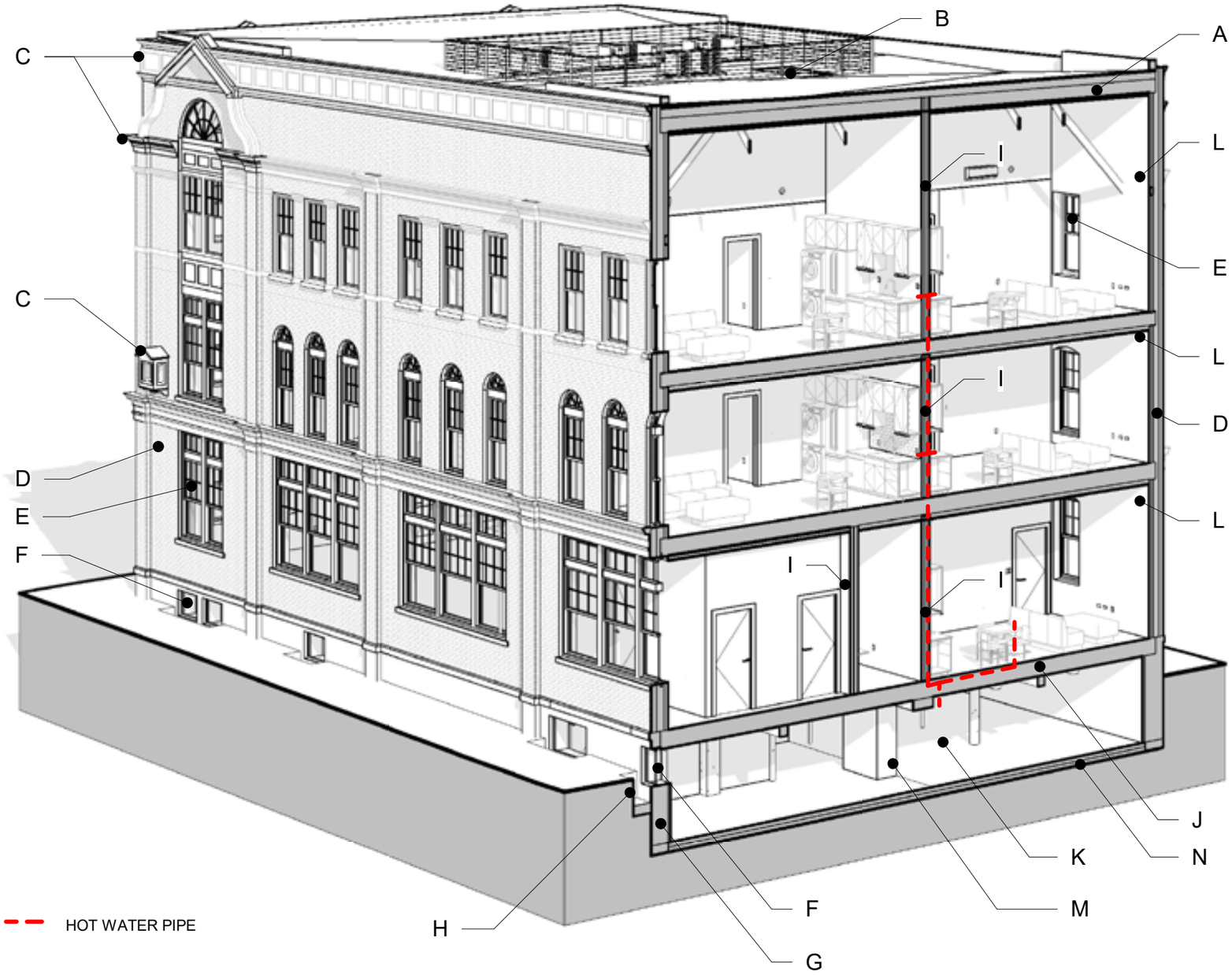
AIR BARRIER

WRB

WALL SECTIONS

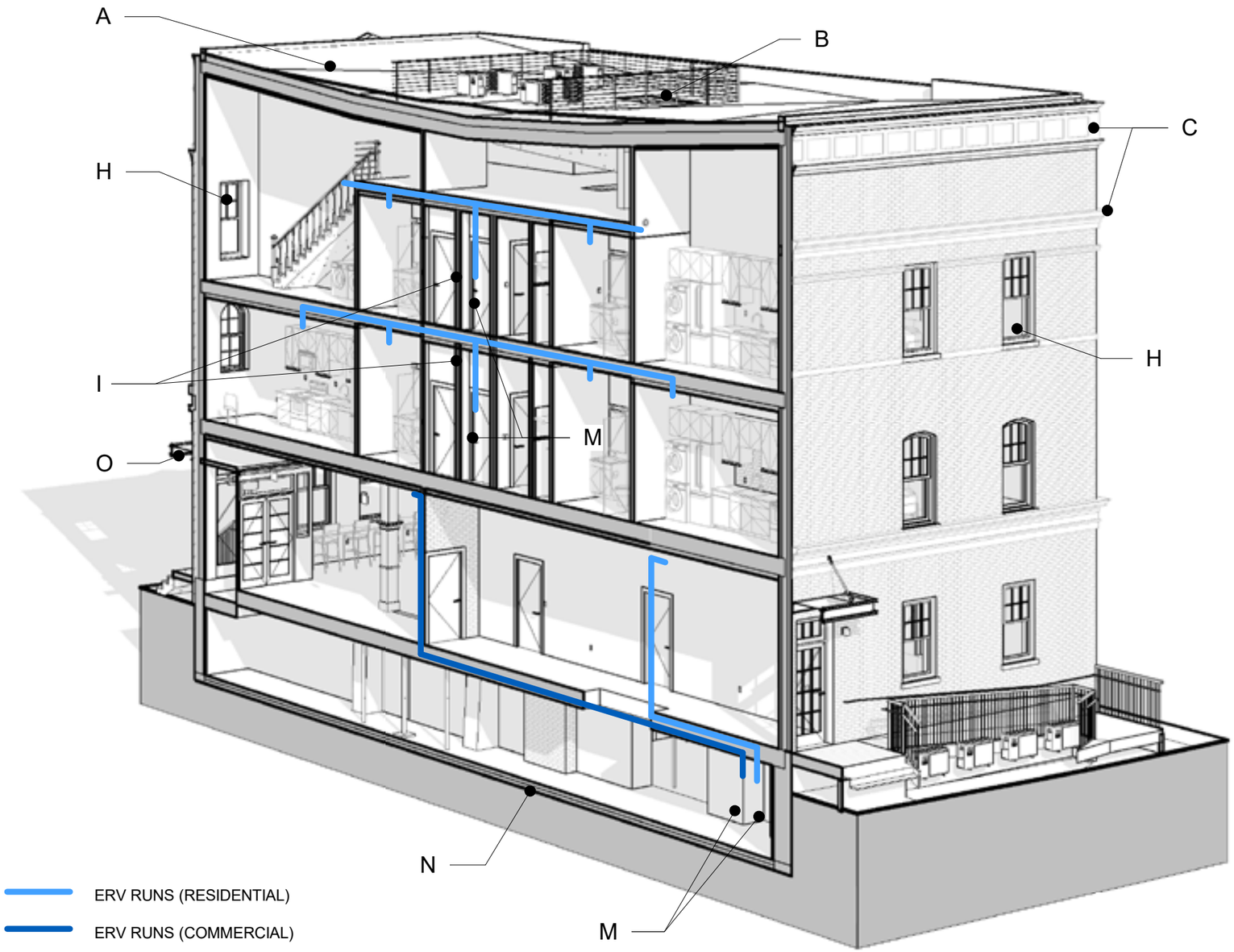






A. R-80 SUPER-INSULATED & AIR-TIGHT ROOF
B. INSULATED & AIR-TIGHT ROOF ACCESS HATCH
C. RESTORE & REPLICATE HISTORIC BUILDING ELEMENTS
D. R-43 SUPER-INSULATED & AIR-TIGHT WALLS
E. ENERGY EFFICIENT TRIPLE PANE WINDOWS
F. ENERGY EFFICIENT BASEMENT WINDOWS
G. R-16 INSULATED BASEMENT WALLS
H. WINDOW WELLS TO AVOID WATER DAMAGE TO BASEMENT WINDOWS
I. INSULATED & AIR-TIGHT INTERIOR DOUBLE 2X4 WALLS BETWEEN ZONES & UNITS
J. INSULATED & AIR-TIGHT INTERIOR FLOORS
K. HEAT PUMP OR HYBRID HOT WATER HEATERS. EFFICIENT PLUMBING DESIGN WITH BACK TO BACK FIXTURE ALIGNMENT WHEN FEASIBLE.
L. DUCTLESS MINISPLIT FOR HEATING & COOLING (1/ UNIT)
M. ENERGY RECOVERY VENTILATION UNITS FOR CLEAN IN DOOR AIR QUALITY, ERV UNITS ARE PLACED NEAR SPACES THEY SERVE FOR SHORTER DUCT RUNS.
N. R-16 INSULATED BASEMENT SLAB
O. ENTRY CANOPY TO REDUCE HEAT-GAIN THROUGH GLASS DOOR
P. OUTDOOR SEATING AREA WITH GREENERY & BIKE STORAGE
Q. ADA RAMP ACCESS FOR BOTH COMMERCIAL & RESIDENTIAL ENTRIES
R. PARKING INCLUDING ADA SPACES WITH 4 ELECTRIC CAR CHARGING STATIONS
S. CANOPY WITH SOLAR PV TO PROVIDE ELECTRICITY FOR BUILDING, AND PROVIDE SHADE FOR PARKING SPACE

SUSTAINABILITY & BUILDING STYSTEMS



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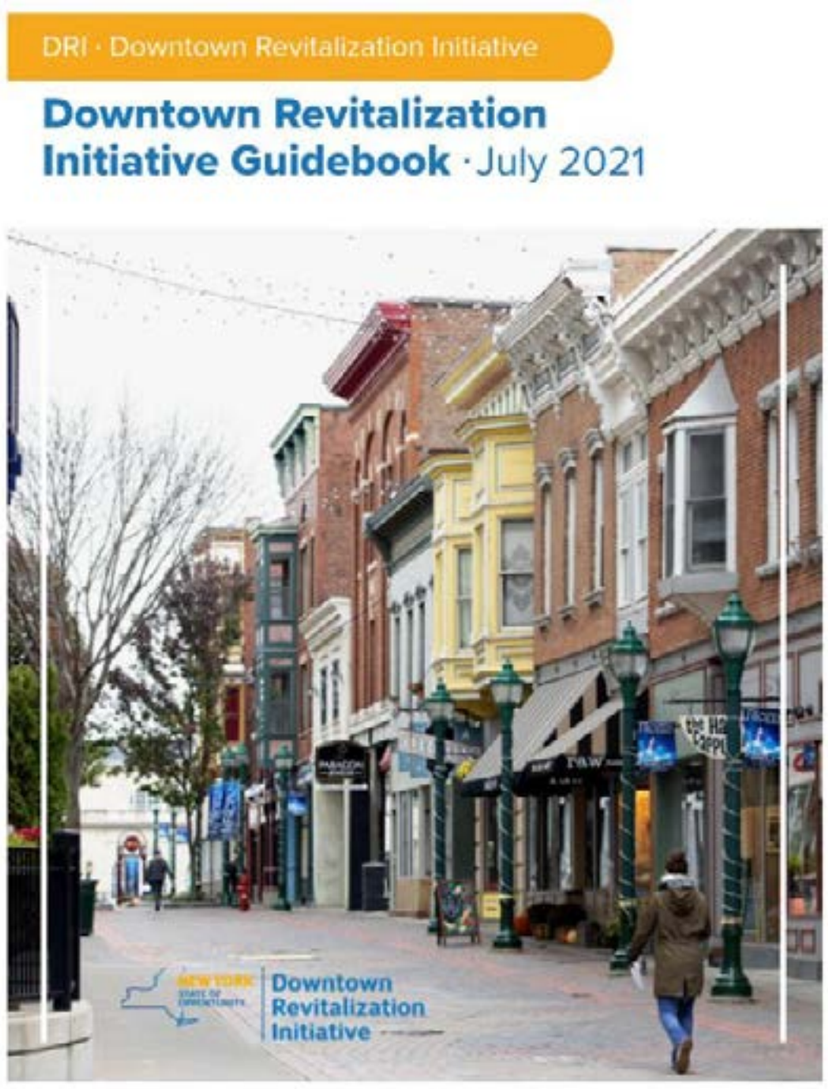
Foresights Applied

1. Digital scan: Using 3D scan instead of traditional survey.
2. Evaluate the type of masonry structure & brick reinforcement strategies
3. Energy model and determine mechanical systems early on to help inform the overall design. (Challenges with large area of existing, west-facing windows were mitigated.)
4. For historic building retrofits, get preservation requirements early on to avoid design changes in later stages (Historic stair relocation during CD phase)
5. Careful consideration of air-sealing strategies at framing transitions
6. Consider keeping the basement outside of the thermal envelope because old foundations are a challenge to air seal.

DRI Round 5 Project Examples



River Architects to Consult 16 Winning Cities of DRI Round 5 Program Towards Decarbonizing Their Key Projects
(Round 6 winning cities to be added soon.)

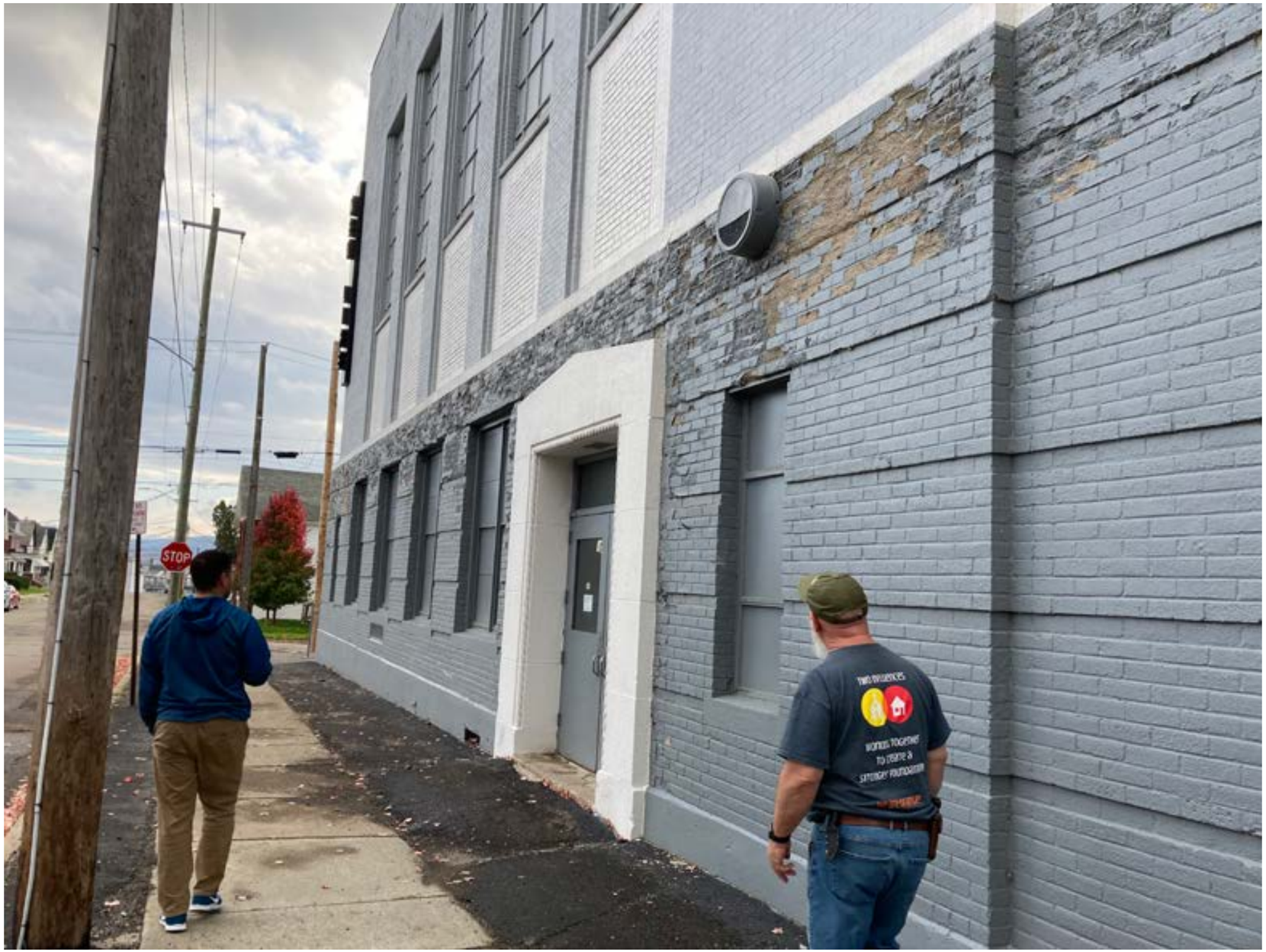
https://www.ny.gov/programs/downtown-revitalization-initiative

DRI Round 5 Winning Cities


WAREHOUSE
COMPANY


JP
PERFORM
FITNESS
BILLIARDS
PLATES


NEW LIFE
NO PARKING
NEW LIFE


STOP

Trinity Church_exterior_Syracuse

Trinity Church_interior_Syracuse

Foreseeable Challenges

1. Tough to achieve the basic continuous insulation and air barriers. How to mitigate potential condensation areas that are hard to reach?
2. Excavating around the perimeter of the building may not be feasible - i.e. city-owned sidewalk and infrastructure AND there is functioning basement
3. Cannot excavate below existing basement or slab-on-grade *and* we have limited ceiling height.
4. How to address historic building with exposed masonry structure that is a significant thermal bridge?
5. How to address the man-made criteria of various agencies that impede on energy improvement of a historic building?
6. What to do when you are “stuck” between historic exterior *and* interior?
7. Working with the occupants-in-place during the envelope and HVAC improvement
8. How to calculate the impact of thermal mass in energy consumption of buildings?
9. Limitations on clearances for adequate insulation - i.e. height difference between existing roof deck and stair door threshold
10. Working around various types of existing roof parapets
11. Mounting PV on existing roof structure, etc.

Thank you!

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Principal

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