PASSIVE HOUSE for AFFORDABLE HOUSING DEVELOPERS

PASSIVEhouse
MASSACHUSETTS

Mass Save Residential New Construction

Passive House Training

Workforce development and market transformation

The Sponsors of Mass Save®, in partnership with Passive House Massachusetts, have launched a Passive House Training offer to support workforce development and market transformation in the energy efficiency and building construction industries.

WE ARE MASS SAVE®:

BERKSHIRE GAS An AVANGRID Company

Cape Light Compact

EVERSOURCE

Liberty

nationalgrid

Unitil

Passive House Project Incentives

Passive House Incentive Structure for Multi-Family Mid- and High-Rise			
Incentive Timing	**Activity**	**Incentive Amount**	**Max. Incentive**
Pre-Construction	Feasibility Study	100% of Feasibility costs	$5,000
	Energy Modeling	75% of Energy Modeling cost	$20,000
	Pre-Certification	$500 / unit	N/A
Post-Construction	Certification	$2,500 / unit	
	Net Performance Bonus	$0.75 / kWh	
		$7.50 / therm	

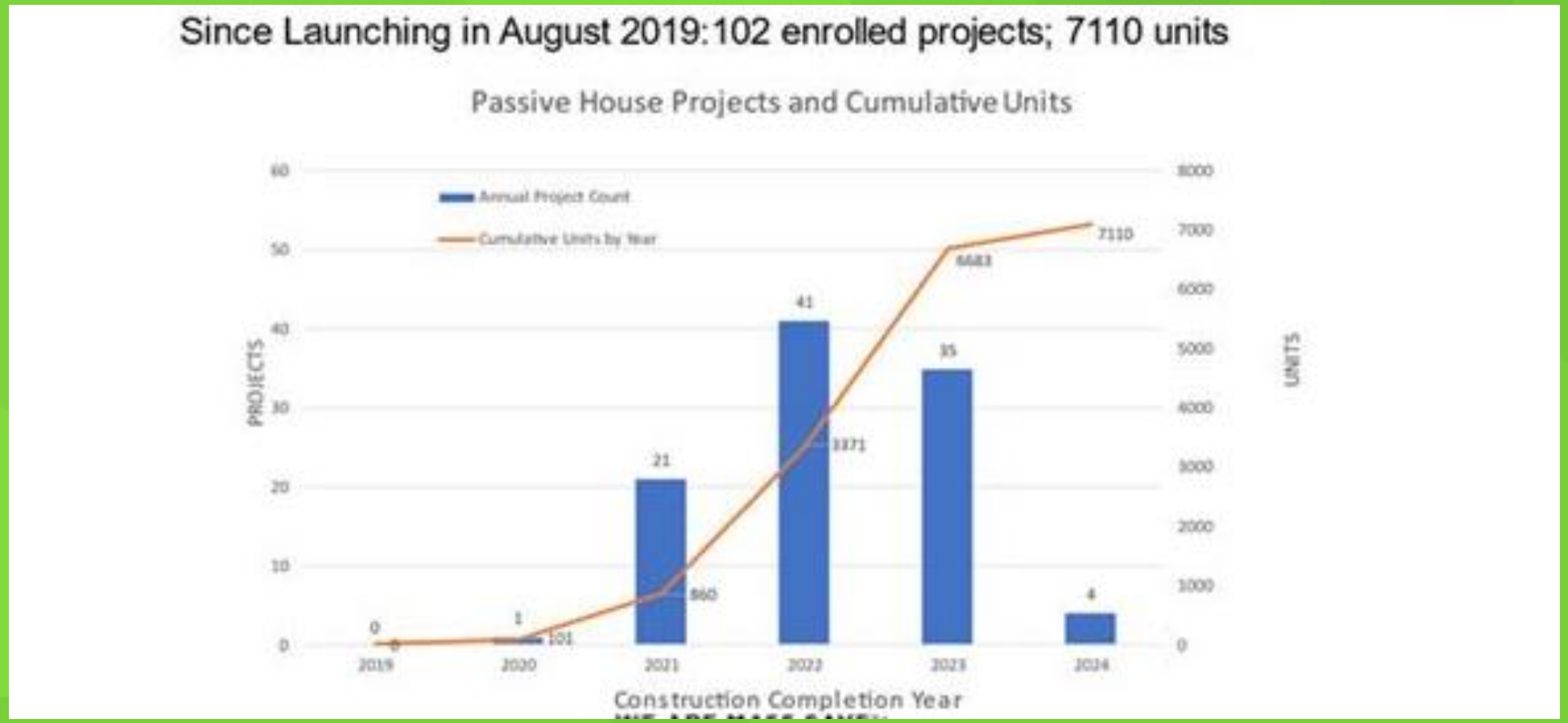
The Net Performance Bonus is calculated by determining the final pay for savings incentives and subtracting the pre- and final certification incentives. The result is the Net Performance Bonus.

Projects that pre-certify but do not achieve certification are eligible for the pre-certification incentive and Net Performance Bonus.

Projects over 100 units must be pre-approved by the applicable Sponsors of Mass Save.

MassSave.com/PassiveHouse

Passive House Project Incentives



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nationalgrid

Unitil

PASSIVE HOUSE IN MASSACHUSETTS

DHCD 2020-21 QAP funding plan awards 5 extra points for projects seeking PH certification.

Boston's DND Design Standards include PH as a method for large buildings to meet the city's new Zero Emission Buildings standards.

Somerville's 2019 Zoning Ordinance includes Passive House as a qualification for density bonuses and requires PH or comparable performance in specific Master Plan districts.

Cambridge's 2019 Zoning Ordinance includes Passive House as an alternative pathway for Green Building compliance for all large projects.

Newton included PH in their 2020-25 Climate Action Plan while citizen group Green Newton incorporated it into their building and development platform.

MA State's Stretch Code for Buildings is considering adopting Zero Energy and Passive House requirements.

Mass Save has introduced incentives for multifamily Passive Hose projects of 5 units plus.

Winthrop Square, MP Boston

DHCD Low Income Housing Tax Credit Program 2020-2021 Qualified Allocation Plan

Certified Exemplary Energy Performance
5 Points Maximum

Projects will be eligible for up to five points as delineated below if they are designed to meet the following standards:

- LEED Certification (1 point new construction; 2 points rehabilitation projects)
- Enterprise Green Communities Certification – 2 points
- Passive House (PHI or PHIUS+ precertification) – 5 points

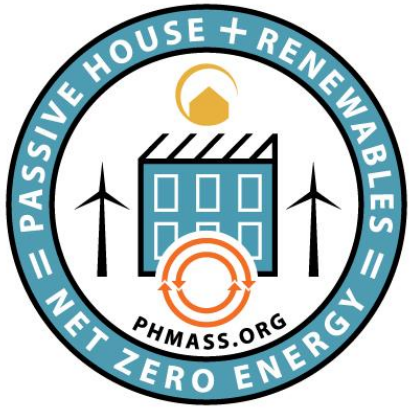
Sponsors of projects designed to meet Passive House certification standards must agree to provide DHCD with appropriate reports, including annual per unit operating cost reports, for at least five years post-occupancy

Passive House + Renewables = Net Zero Energy

PHMass is launching a public campaign to:

- Promote the role of Passive House in achieving net zero energy
- Position Passive House as a platform for Net Zero energy building codes
- Maintain and expand Passive House rebates and incentives

Join is us each month (second Tuesday) and at our Symposium this fall as we push Passive House forward.



THANK YOU!

www.PHMass.org

PassiveHouseMA@gmail.com

Follow on Twitter
@PassiveHouseMA

PASSIVEhouse
MASSACHUSETTS

DESIGN+ BUILDING PERFORMANCE
Preservation of Affordable Housing

May 2021

POAH Passive Houses

1. Mattapan (New)
2. Bartlett (New)
3. Salem Heights (Rehab)

DESIGN+ BUILDING PERFORMANCE
Preservation of Affordable Housing

WHERE WE ARE

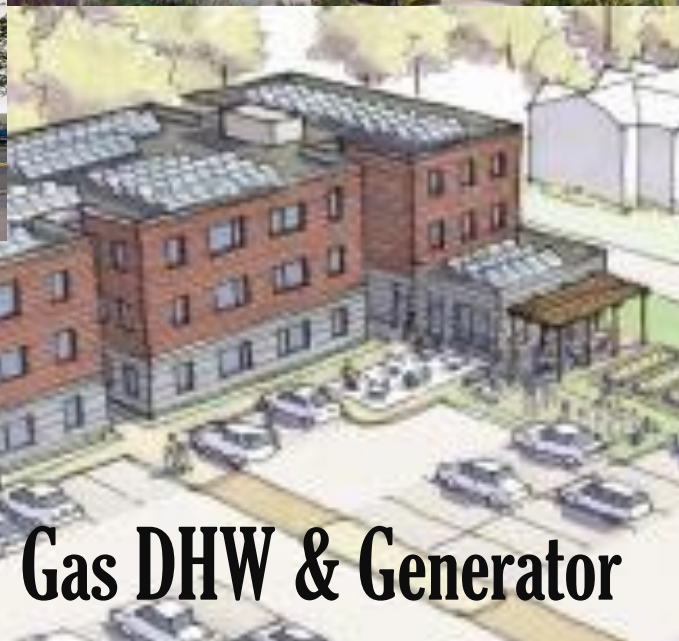
Connecticut	257 units
Washington, D.C.	94 units
Florida	1,356 units
Illinois	2,155 units
Kentucky	41 units
Massachusetts	3,426 units
Maryland	100 units
Michigan	645 units
Missouri	1,538 units
New Hampshire	264 units
Ohio	1104 units
Rhode Island	1,007 units
TOTAL	**11,987 units**

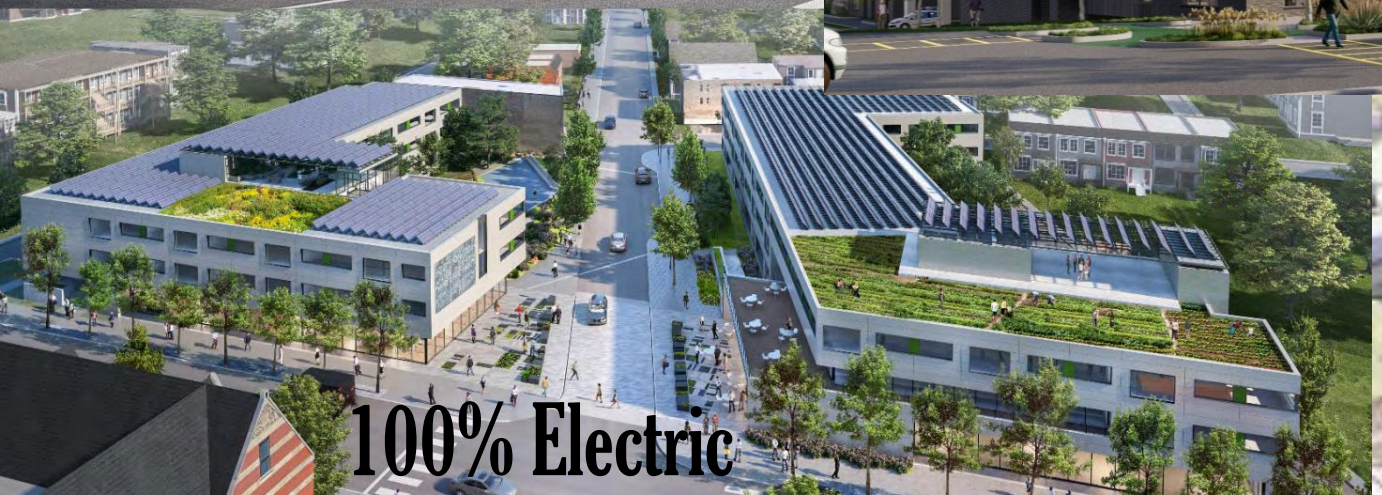
CORPORATE OFFICES: BOSTON | CHICAGO | KANSAS CITY | WASHINGTON, D.C.

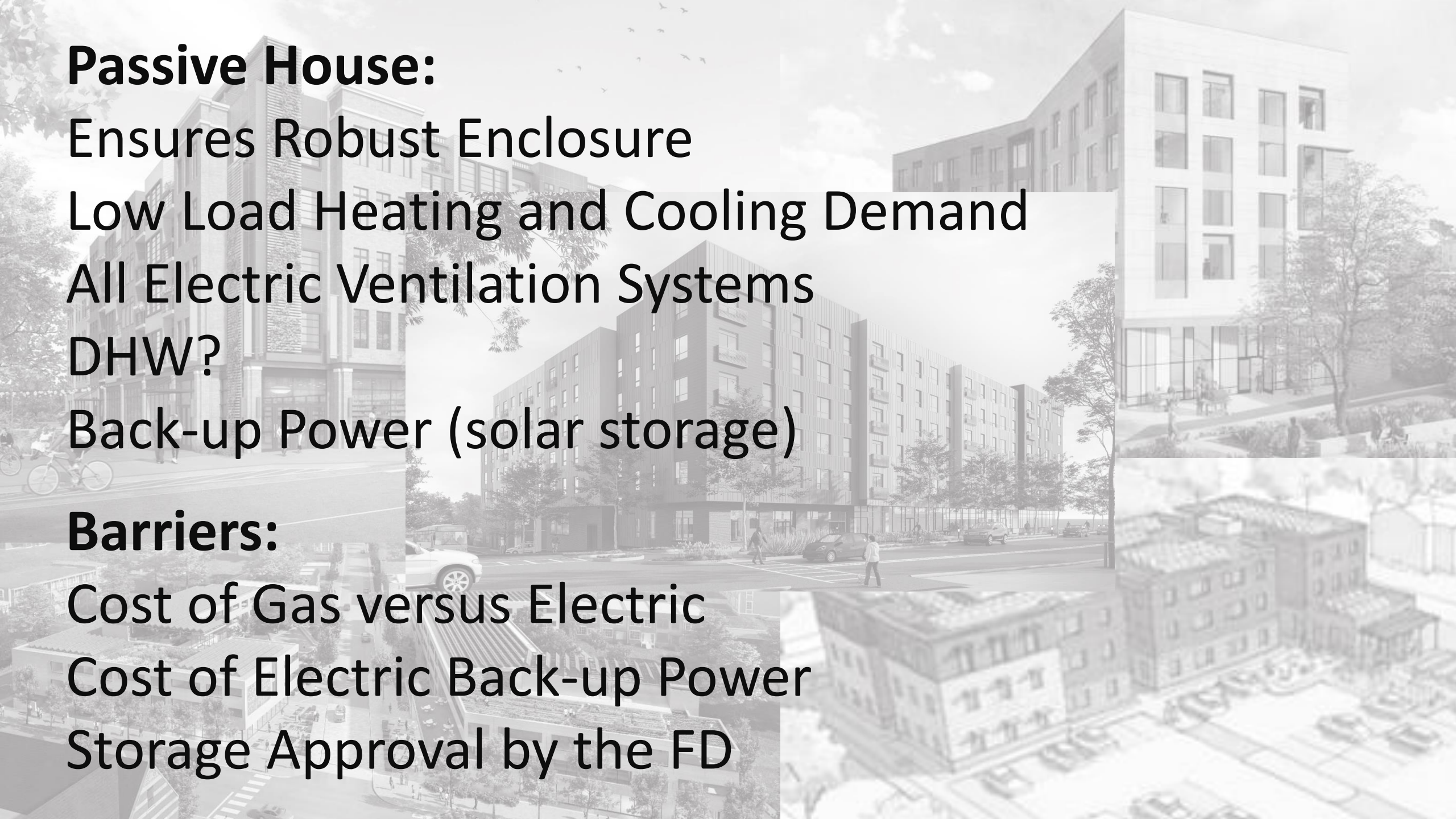

100% Electric


100% Electric


Gas DHW & Generator


Gas DHW & Generator


100% Electric



Passive House:

Ensures Robust Enclosure

Low Load Heating and Cooling Demand

All Electric Ventilation Systems

DHW?

Back-up Power (solar storage)

Barriers:

Cost of Gas versus Electric

Cost of Electric Back-up Power

Storage Approval by the FD

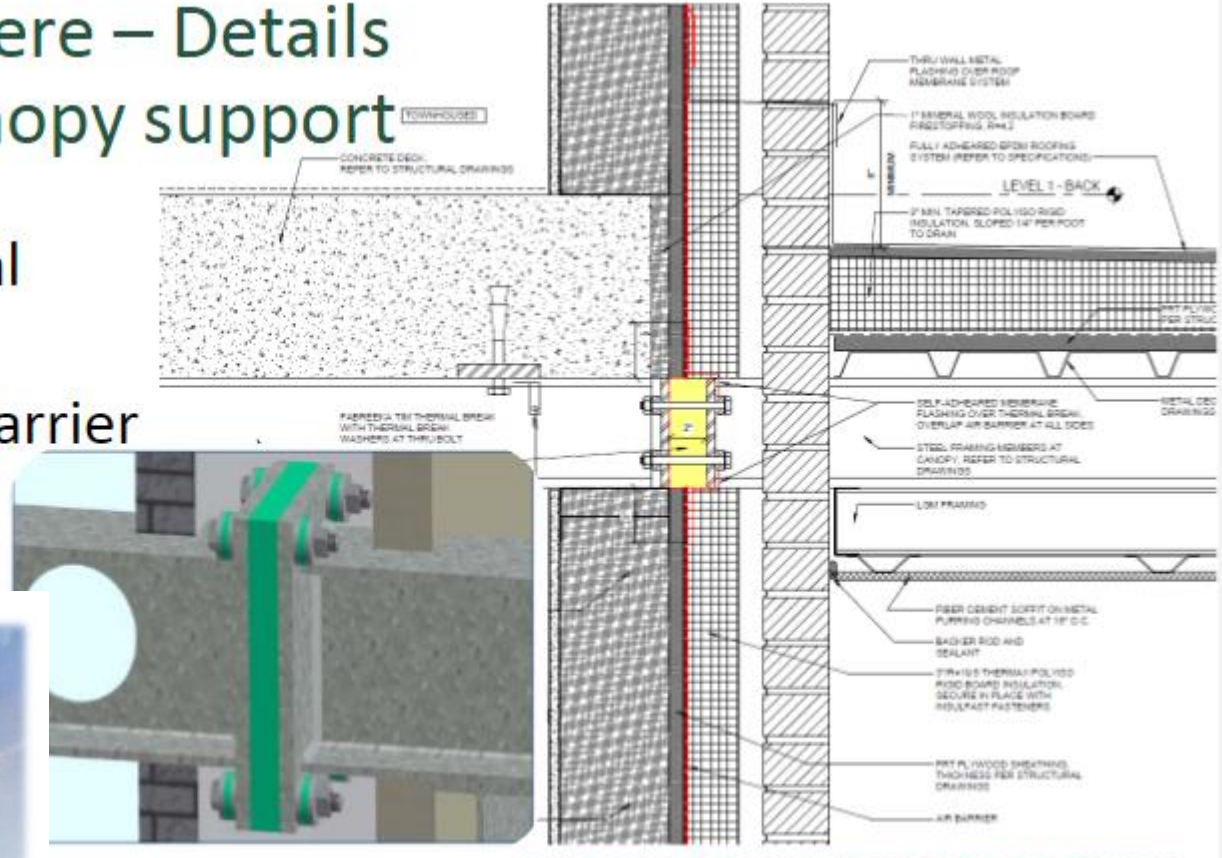
DESIGN+ BUILDING PERFORMANCE
Preservation of Affordable Housing

Trainings for GCs:

1. Enclosure
2. MEP
3. Estimating

How we get there – Details example 3) canopy support

- Avoid thermal bridging
- Simplify air barrier and flashing



orward

Mattapan Station:
The Leap or Glide to Passive House

BUILDING EVOLUTION CORPORATION
Achieve Performance & Durability Through A Holistic Approach™

Simplify Details and Pay Attention to Sequence

Mattapan Construction Photos

DESIGN+ BUILDING PERFORMANCE
Preservation of Affordable Housing

- All Electric
- Solar Storage Back-up
- 90 kw PV Array

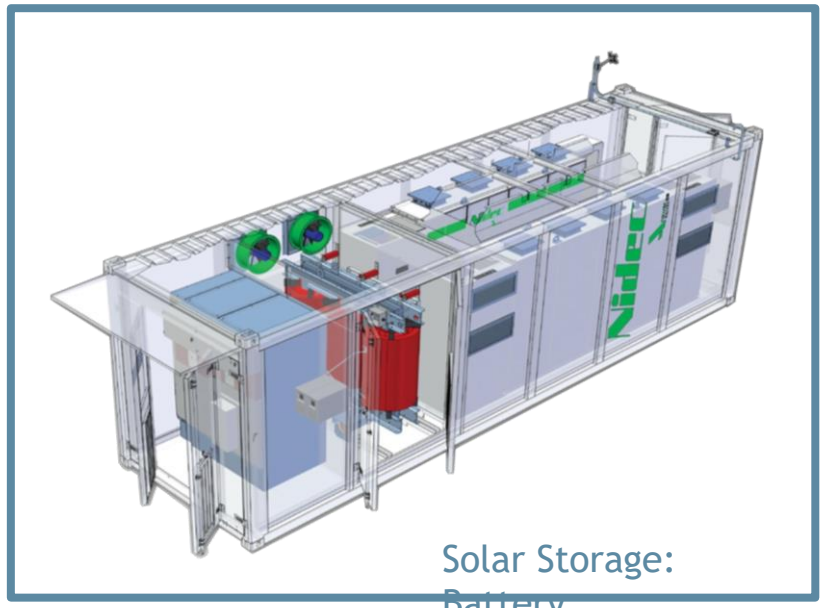
Bartlett Lot D, 52 Units Senior, Boston, MA

SOLAR STORAGE AT Bartlett

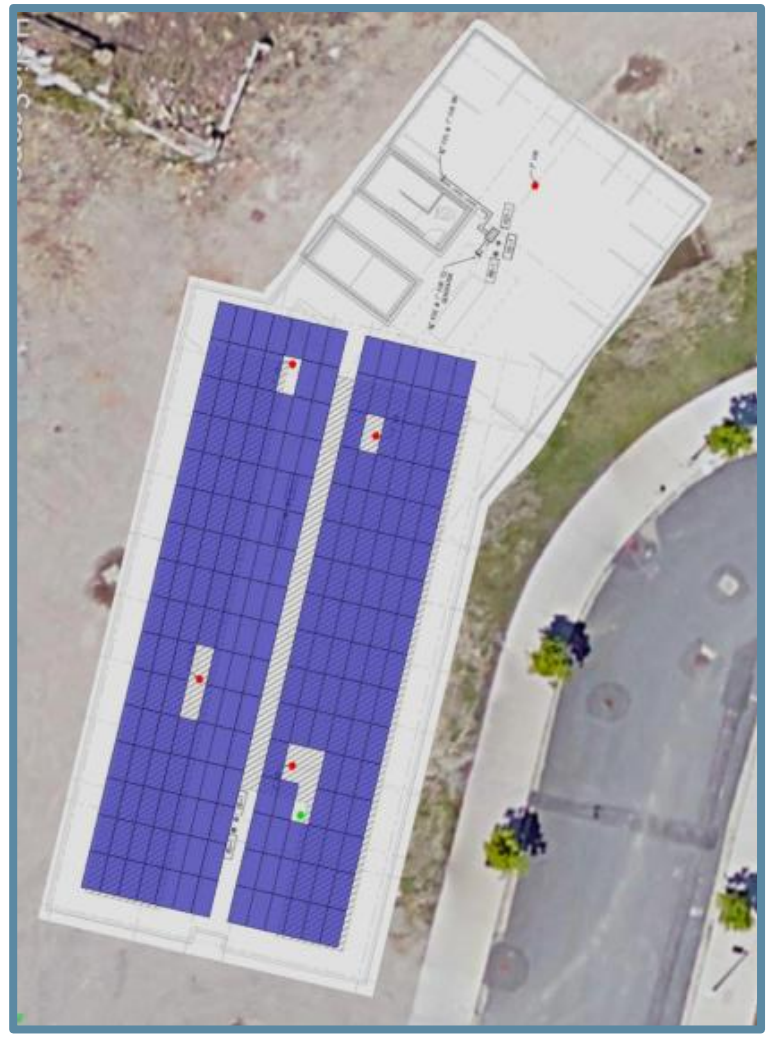
Comments from the City:

what happens when something goes Wrong?

- Thermal runaway causes toxic off gases that go where?
- Energy release causing harm to fire fighters
- Supervision – they will not allow remote supervision
- What is the test cycle?
- Is it tied into the grid?
- How do the relays work?
- Hydrogen release
- Perform a fire model with x k-watts and see if the structure next to them needs to be reinforced
- Drains in the container – where does it drain, sewer?
- Access for the fire department to be able to keep them cool
- FD doesn't have enough training to put them out
- Technology is growing faster than the national standards (NFPA 855)



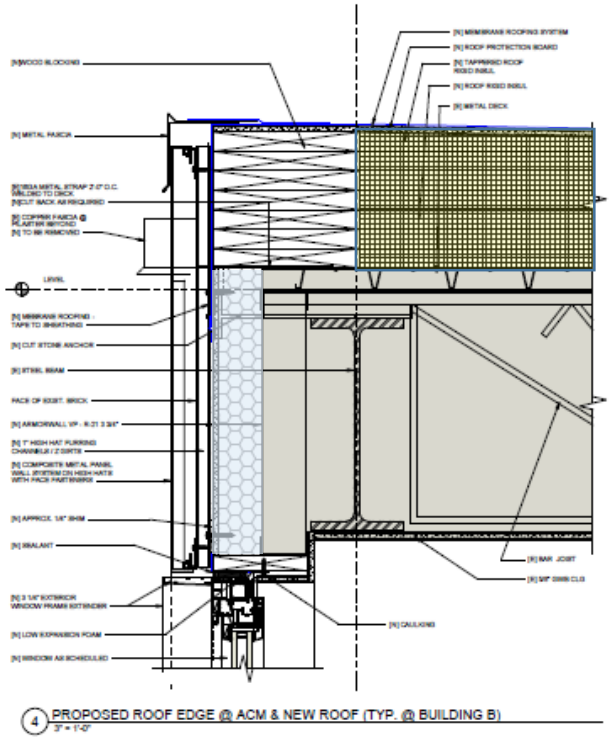
Solar Storage: Battery



Solar Storage: PV

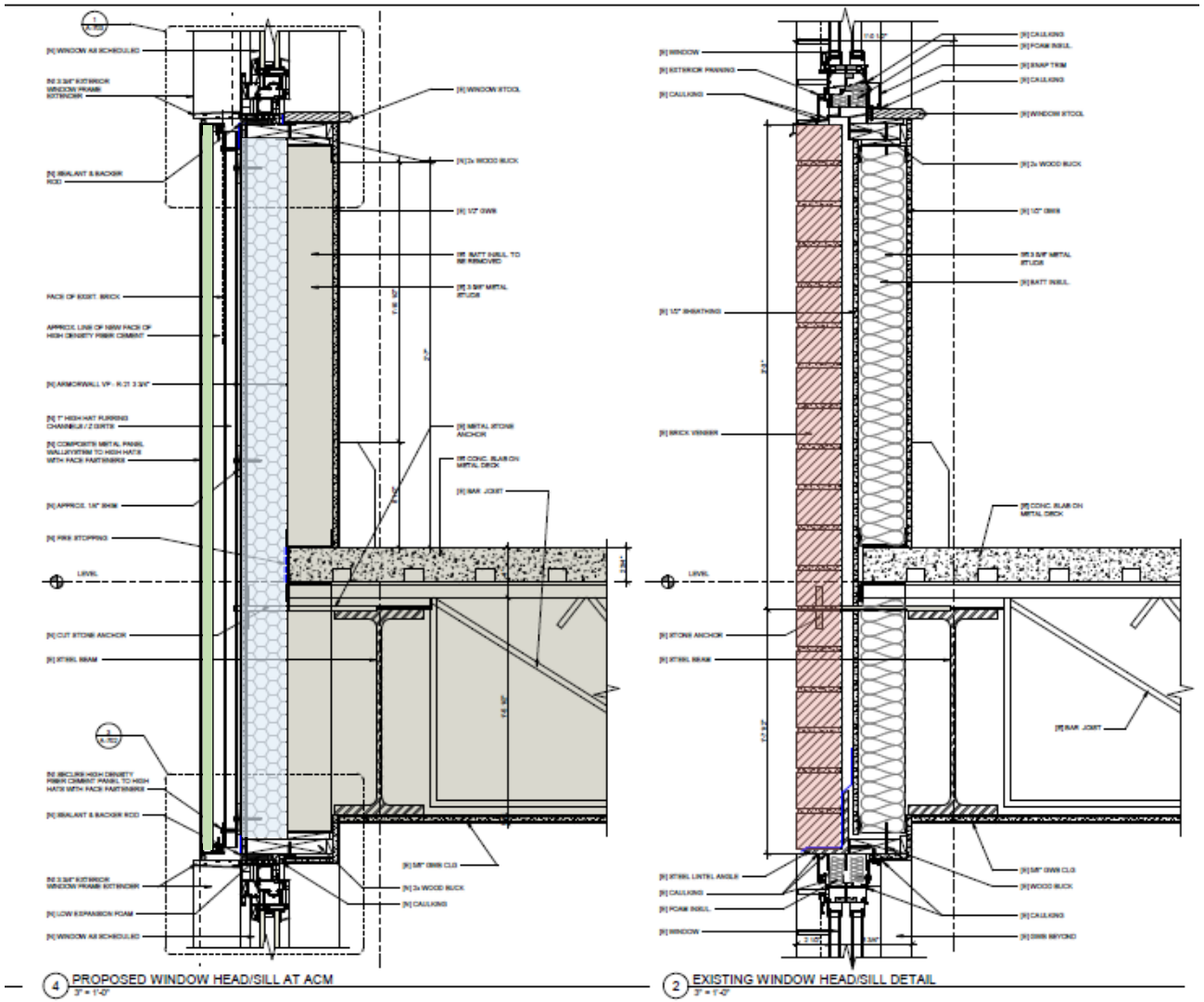
Salem Heights
283 Units Family
Salem, MA

Enclosure Details



New Roof with Insulation

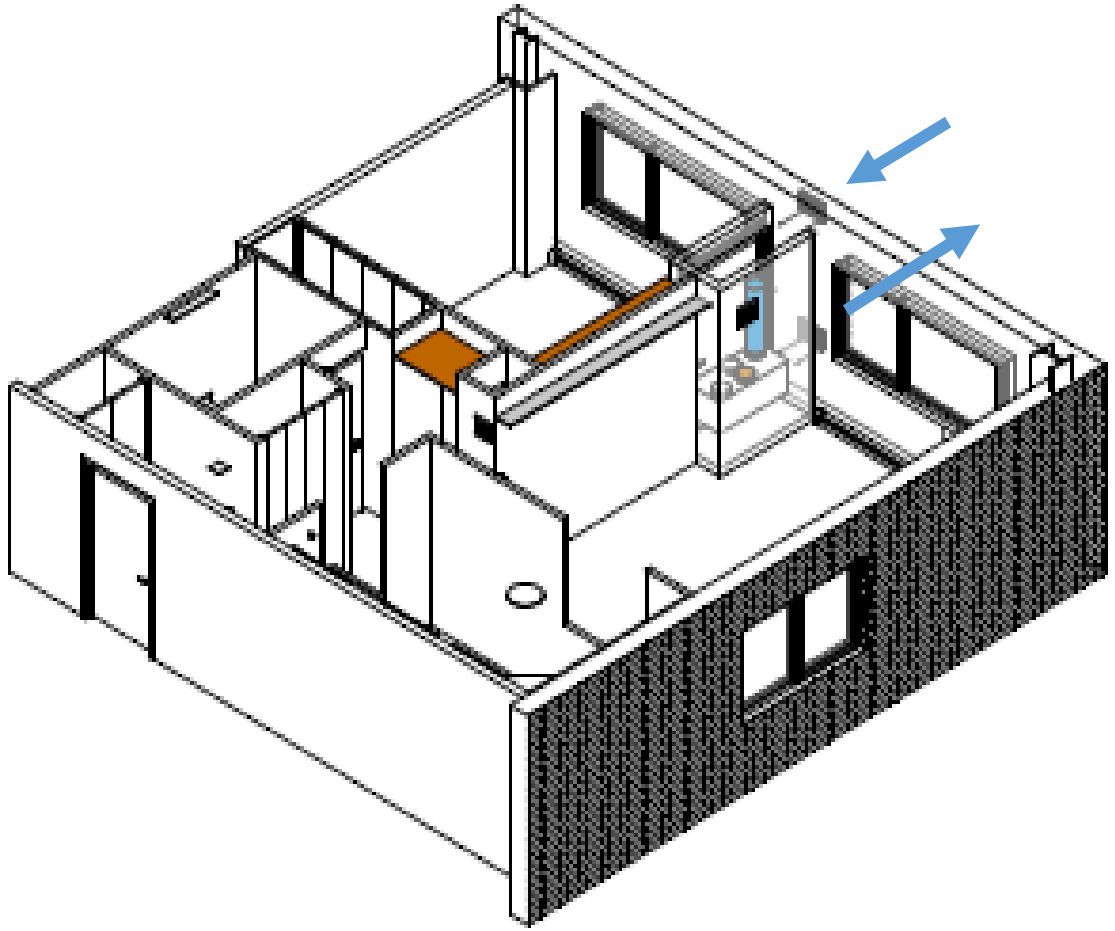
Roof to Wall Detail

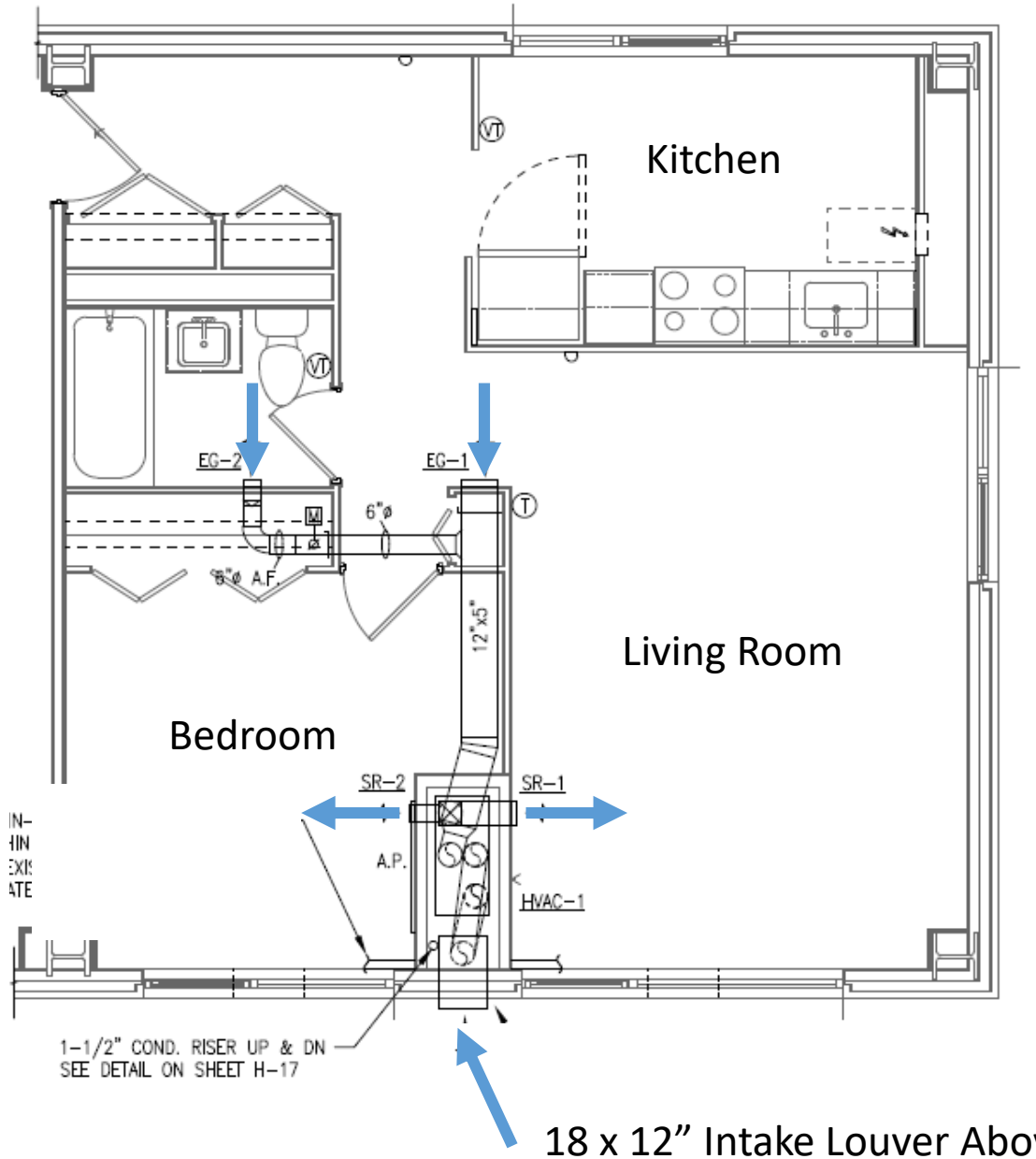


New Metal Panel Cladding
(with Armorwall)

Existing Brick Cladding

Exterior Wall Details





18 x 12” Intake Louver Above
18 x 12” Exhaust Louver Below

Rooftop

269.2 kW DC

South Wall

106.2 kW DC

How close are we?

Robust Enclosure
All Electric HVAC
Solar PV (Wall and Roof)

DESIGN+
BUILDING
PERFORMANCE
Preservation of Affordable Housing

Thank you.

Jklump@poah.org

PASSIVE HOUSE: Building Inherent Value

ICON ARCHITECTURE

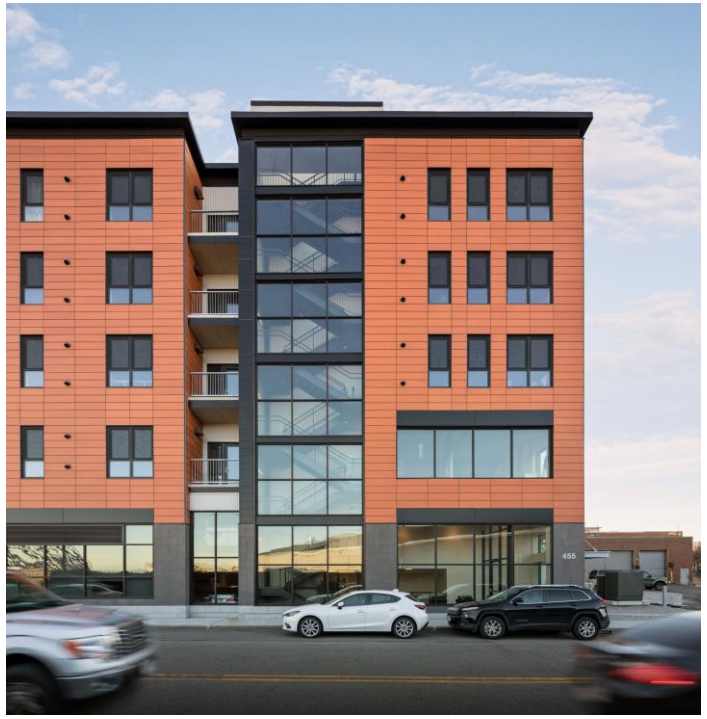
INTENTION
TEAMWORK
ANALYSIS
COMMUNICATION
CRAFT

PASSIVE HOUSE IN ACTION

Distillery North
Finch Cambridge
Harbor Village
The Lighthouses

Riverdale
Simon C. Fireman
555 Merrimack
Rindge Commons

Cape View Way
108 Center
Hawkins
Cable Mills



INTENTION

2015: MA Amendment to the IBC 2015

Accepted as Alternative Compliance path

2018: Mass CEC Passive House Design Incentives

Affordable Housing

2019: Mass Save Incentives

Multifamily – Market attention

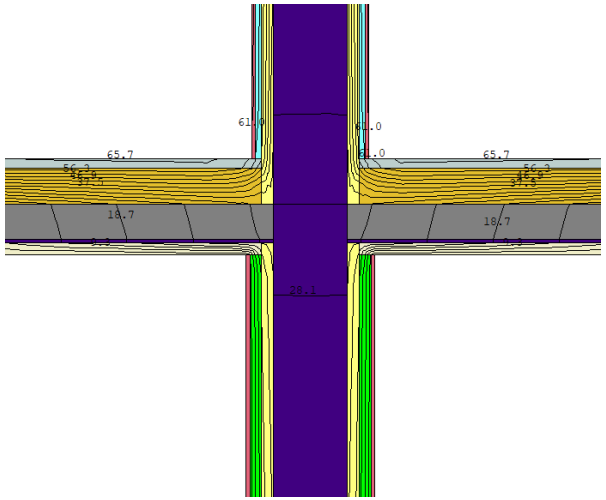
Ongoing…. Community Advocacy - Municipal Policy – Future Codes?

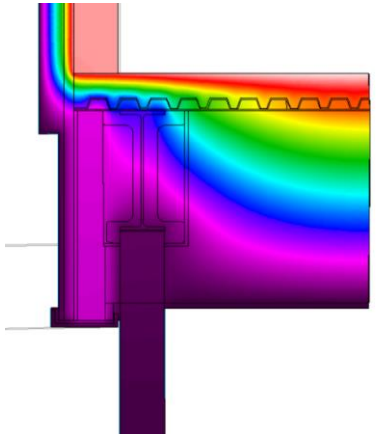
TEAMWORK

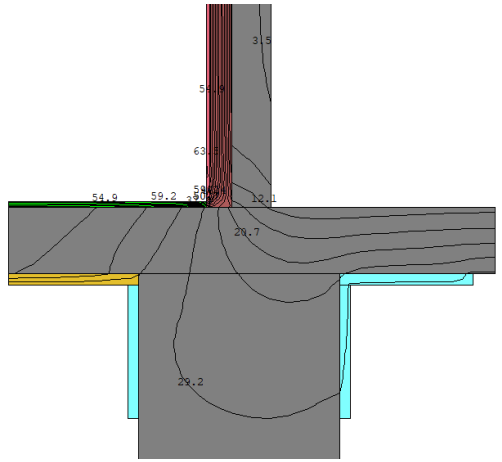
Owner
Architect
Mechanical Engineer
Structural Engineer
Energy Modeler/CPHC
Rater/Verifier
Envelope Consultant
Commissioning Agent
General Contractor
Trades

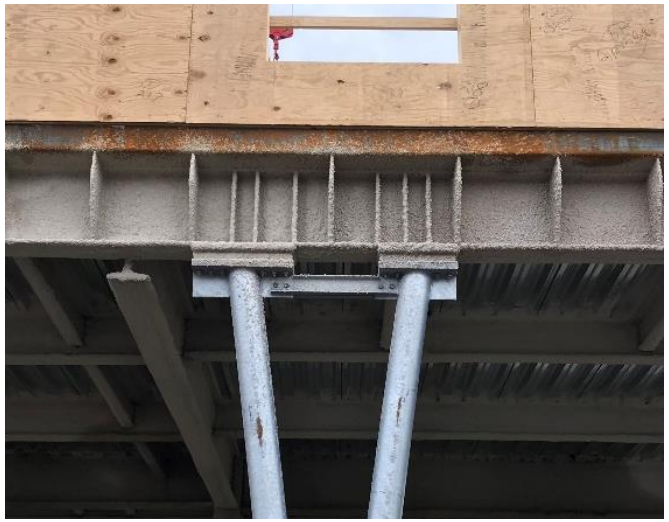
DESIGN INCLUDES ANALYSIS

Thermal Bridging



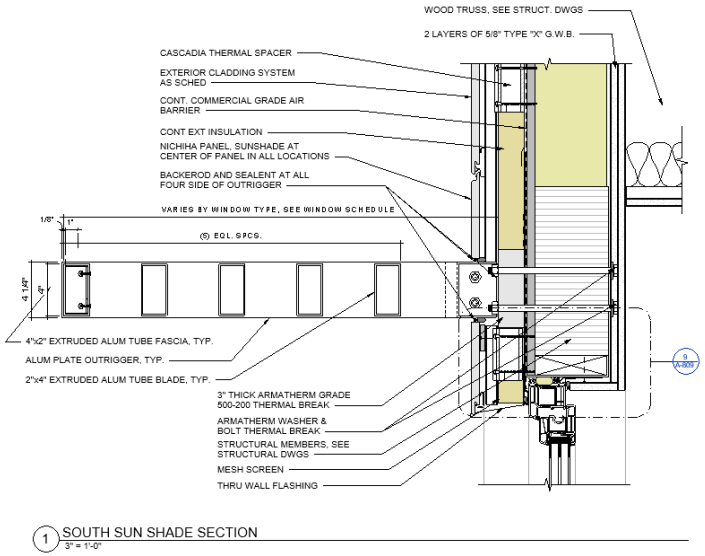






DESIGN INCLUDES ANALYSIS

Shading

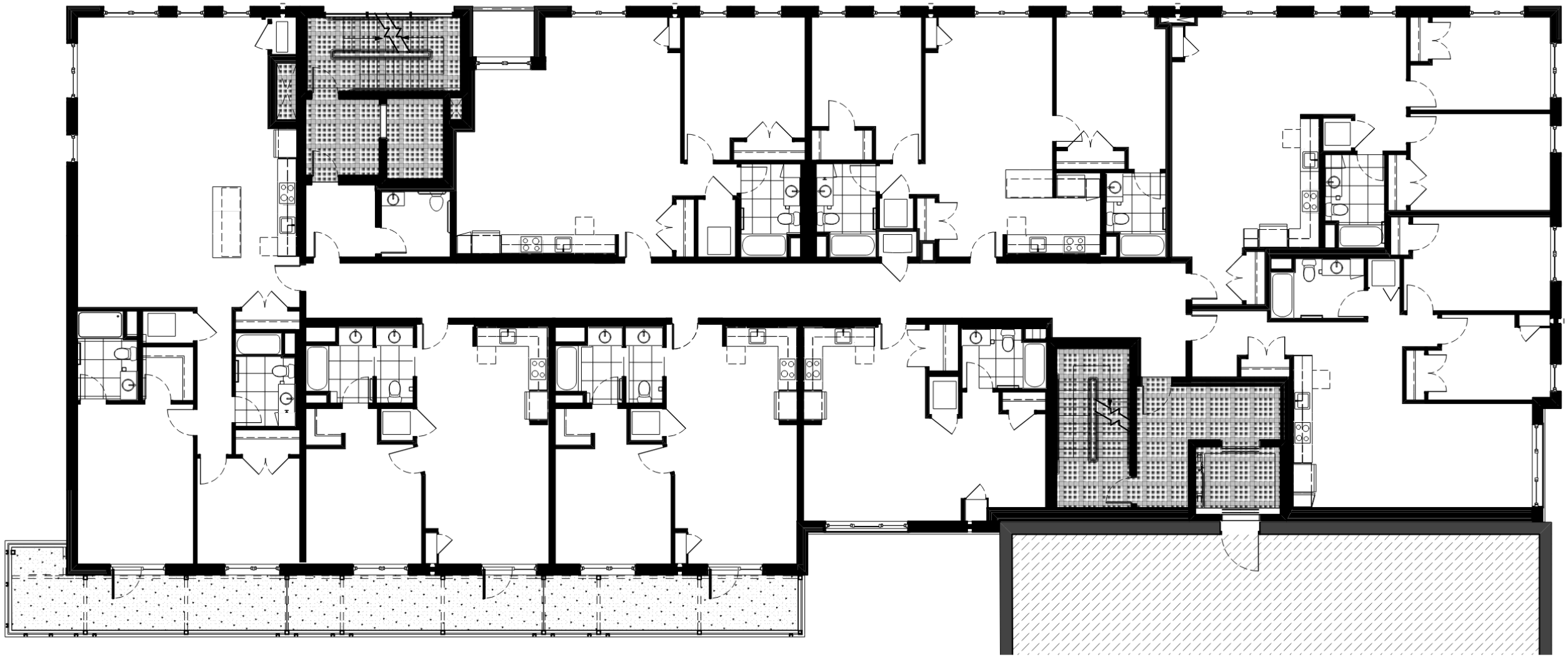


1 SOUTH SUN SHADE SECTION
3" = 1'-0"

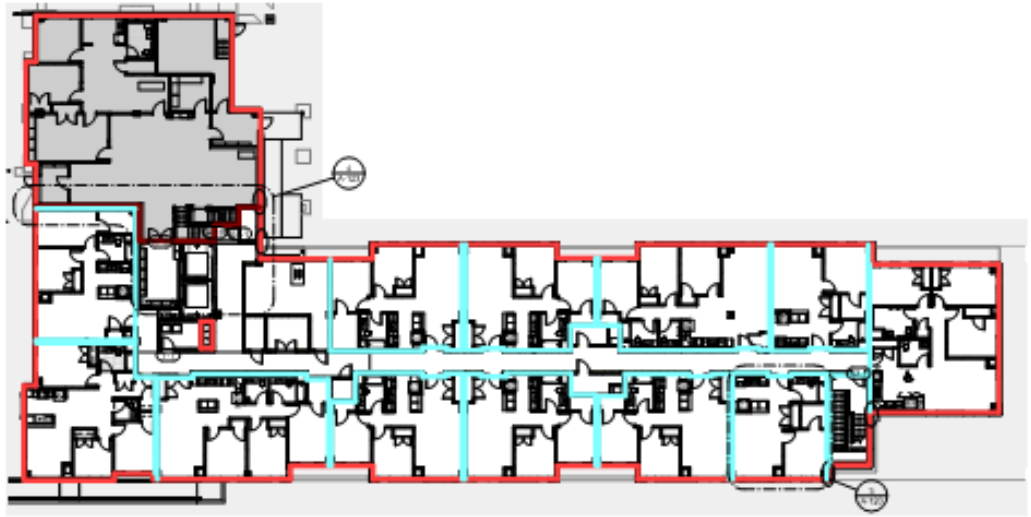
COMMUNICATION

Drawings
Field Representatives
Dealing with Reality
Speaking the same language

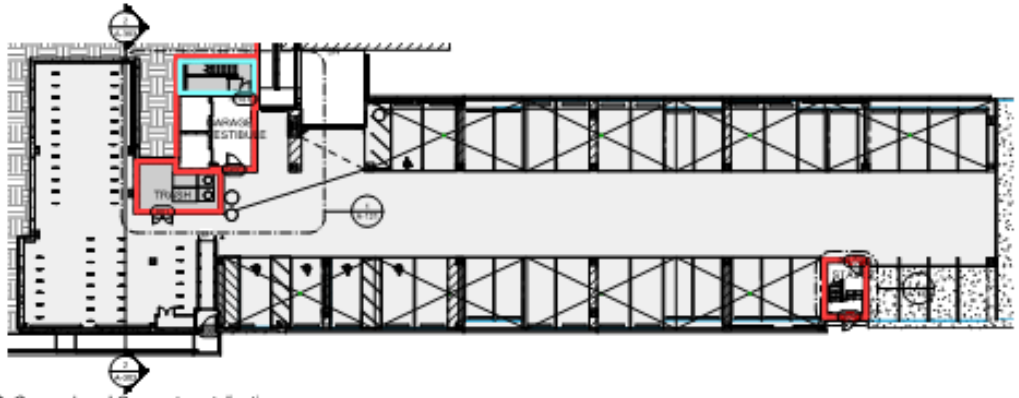
DEFINING THE BOUNDARY– 1ST Pass



DEFINING THE BOUNDARY– 2ND Pass



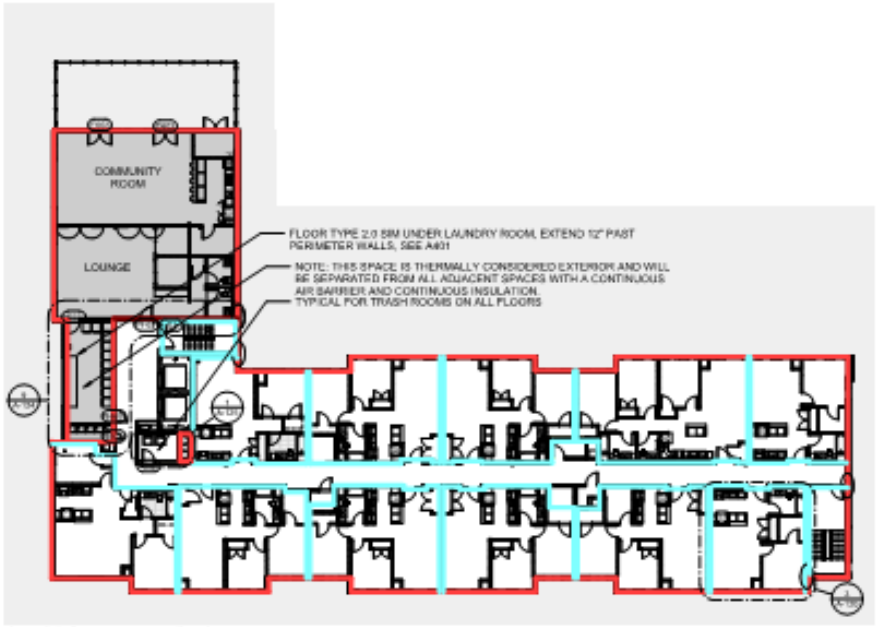
2 GROUND/ FIRST FLOOR COMPARTMENTALIZATION



1 Garage Level Compartmentalization

3 TYPICAL UNIT COMPARTMENTALIZATION

TYPICAL AT EVERY UNIT ON ALL FLOORS



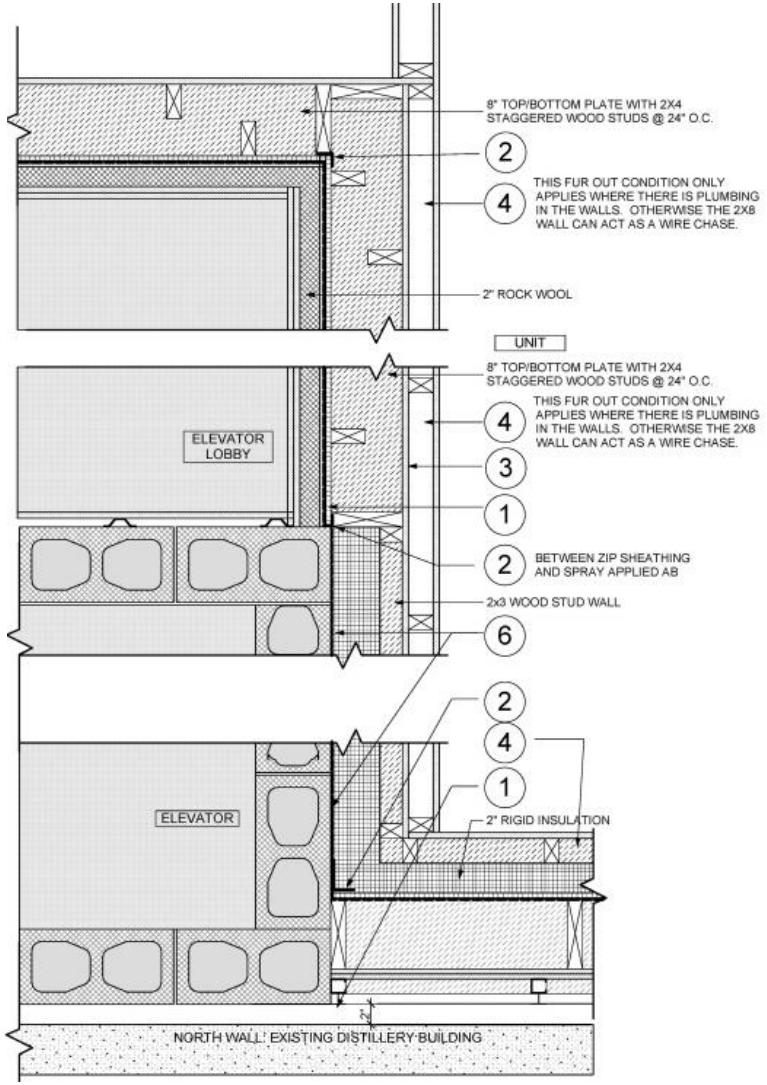
4 Level 6 Compartmentalization

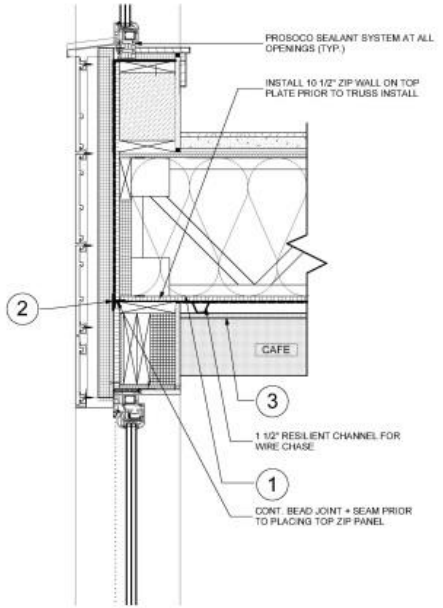
ARTICULATING TRANSITIONS– 1ST Pass

LEGEND

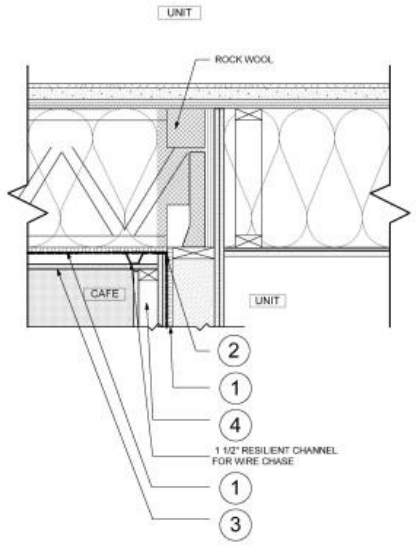
——— DENOTES LOCATION OF CONTINUOUS AIR TIGHT BARRIER

1. 1/2" ZIP SHEATHING. ALL JOINTS & INTERSECTIONS TAPED W/ ZIP TAPE OR ZIP SEALANT.
2. TAPE JOINT WITH ZIP TAPE OR ZIP SEALANT
3. 5/8" TYPE X GWB., TAPED & PAINTED
4. 2X3 FURRING AT 16" O.C.
5. 10 MIL CONTINUOUS VAPOR BARRIER
6. LIQUID APPLIED AIR BARRIER



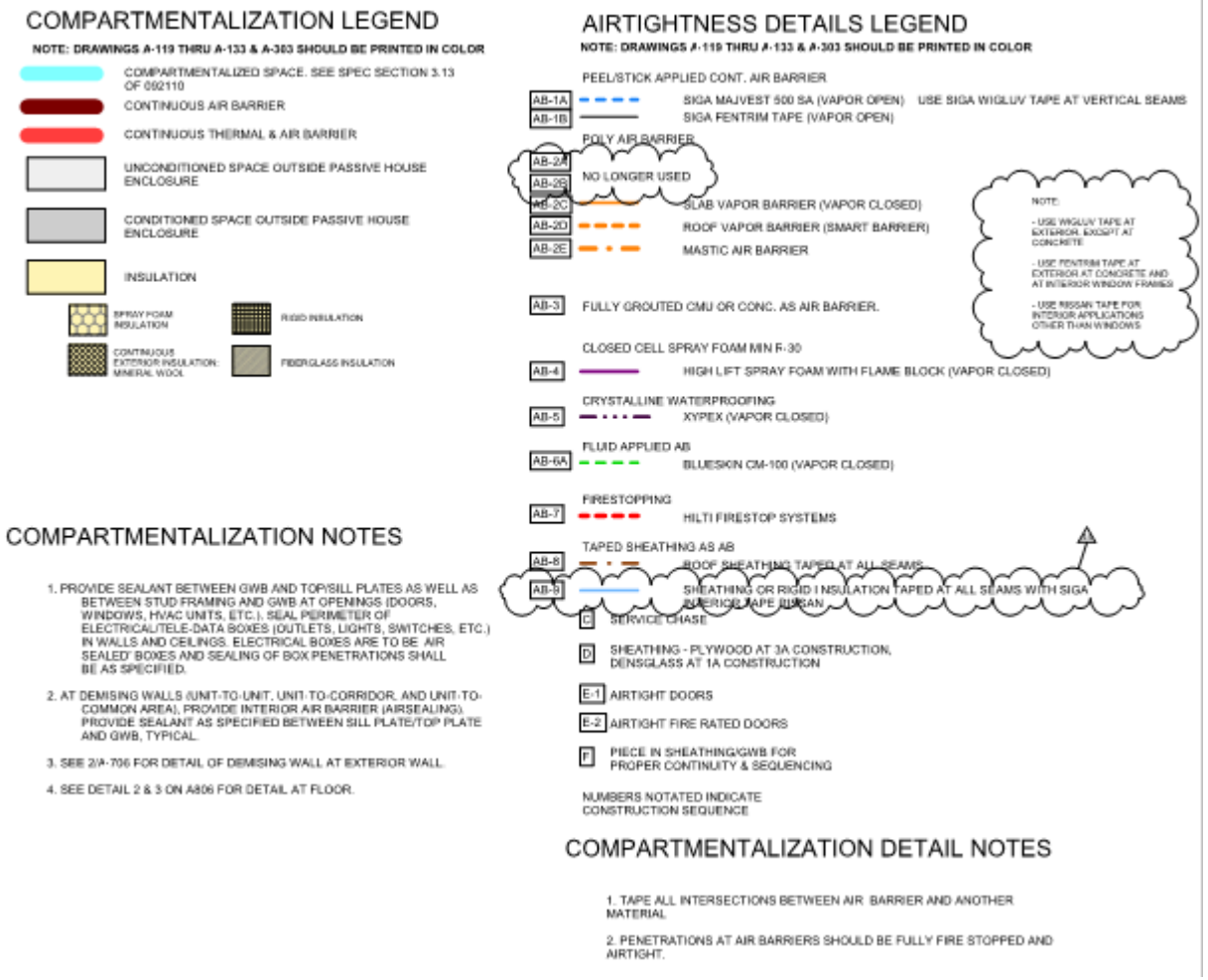


6 EXTERIOR SECTION ABOVE CAFE



4 INTERIOR SECTION ABOVE CAFE

ARTICULATING TRANSITIONS– 2ND Pass



COMPARTMENTALIZATION LEGEND

NOTE: DRAWINGS A-119 THRU A-133 & A-303 SHOULD BE PRINTED IN COLOR

- COMPARTMENTALIZED SPACE. SEE SPEC SECTION 3.13 OF 092110
- CONTINUOUS AIR BARRIER
- CONTINUOUS THERMAL & AIR BARRIER
- UNCONDITIONED SPACE OUTSIDE PASSIVE HOUSE ENCLOSURE
- CONDITIONED SPACE OUTSIDE PASSIVE HOUSE ENCLOSURE
- INSULATION
  - SPRAY FOAM INSULATION
  - RIGID INSULATION
  - CONTINUOUS EXTERIOR INSULATION: MINERAL WOOL
  - FIBERGLASS INSULATION

COMPARTMENTALIZATION NOTES

1. PROVIDE SEALANT BETWEEN GWB AND TOP/SILL PLATES AS WELL AS BETWEEN STUD FRAMING AND GWB AT OPENINGS (DOORS, WINDOWS, HVAC UNITS, ETC.). SEAL PERIMETER OF ELECTRICAL/TELE-DATA BOXES (OUTLETS, LIGHTS, SWITCHES, ETC.) IN WALLS AND CEILINGS. ELECTRICAL BOXES ARE TO BE 'AIR SEALED' BOXES AND SEALING OF BOX PENETRATIONS SHALL BE AS SPECIFIED.
2. AT DEMISING WALLS (UNIT-TO-UNIT, UNIT-TO-CORRIDOR, AND UNIT-TO-COMMON AREA), PROVIDE INTERIOR AIR BARRIER (AIRSEALING). PROVIDE SEALANT AS SPECIFIED BETWEEN SILL PLATE/TOP PLATE AND GWB, TYPICAL.
3. SEE 2/A-706 FOR DETAIL OF DEMISING WALL AT EXTERIOR WALL.
4. SEE DETAIL 2 & 3 ON A806 FOR DETAIL AT FLOOR.

AIRTIGHTNESS DETAILS LEGEND

NOTE: DRAWINGS A-119 THRU A-133 & A-303 SHOULD BE PRINTED IN COLOR

PEEL/STICK APPLIED CONT. AIR BARRIER

- AB-1A: SIGA MAJVEST 500 SA (VAPOR OPEN) USE SIGA WIGLUV TAPE AT VERTICAL SEAMS
- AB-1B: SIGA FENTRIM TAPE (VAPOR OPEN)

POLY AIR BARRIER

- AB-2A, AB-2B, AB-2C: NO LONGER USED
- AB-2C: SLAB VAPOR BARRIER (VAPOR CLOSED)
- AB-2D: ROOF VAPOR BARRIER (SMART BARRIER)
- AB-2E: MASTIC AIR BARRIER

NOTE:
- USE WIGLUV TAPE AT EXTERIOR, EXCEPT AT CONCRETE
- USE FENTRIM TAPE AT EXTERIOR AT CONCRETE AND AT INTERIOR WINDOW FRAMES
- USE RISSAN TAPE FOR INTERIOR APPLICATIONS OTHER THAN WINDOWS

- AB-3: FULLY GROUTED CMU OR CONC. AS AIR BARRIER.

CLOSED CELL SPRAY FOAM MIN R-30

- AB-4: HIGH LIFT SPRAY FOAM WITH FLAME BLOCK (VAPOR CLOSED)

CRYSTALLINE WATERPROOFING

- AB-5: XYPEX (VAPOR CLOSED)

FLUID APPLIED AB

- AB-6A: BLUESKIN CM-100 (VAPOR CLOSED)

FIRESTOPPING

- AB-7: HILTI FIRESTOP SYSTEMS

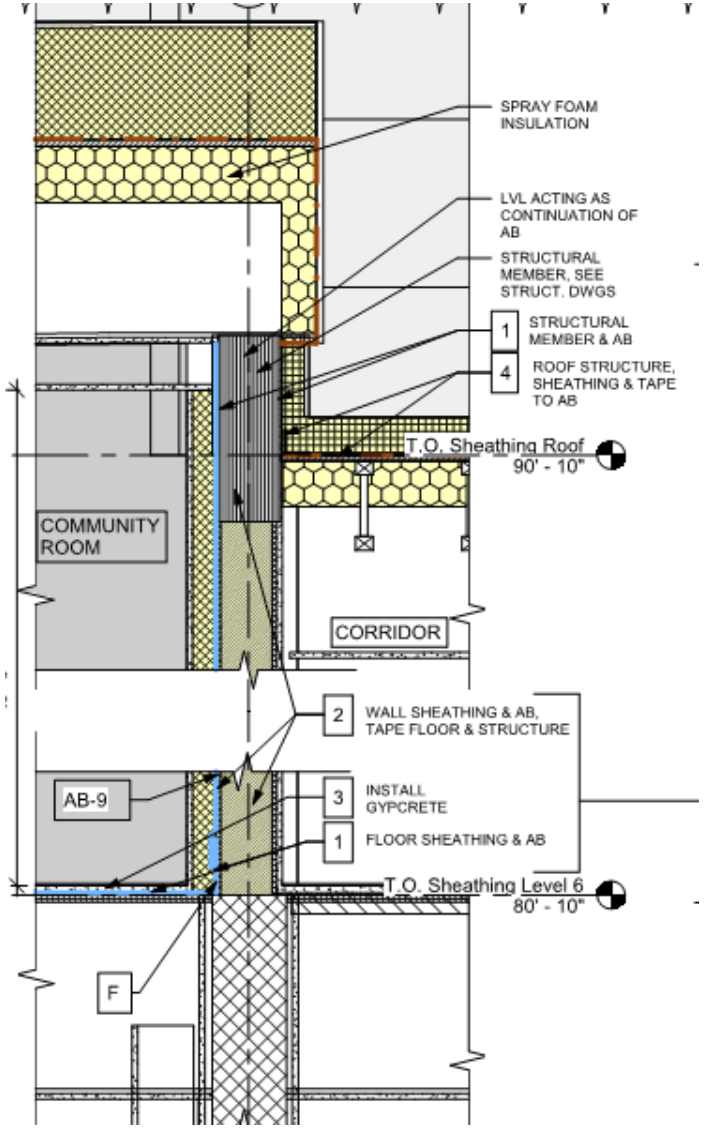
TAPED SHEATHING AS AB

- AB-8: ROOF SHEATHING TAPED AT ALL SEAMS
- AB-9: SHEATHING OR RIGID INSULATION TAPED AT ALL SEAMS WITH SIGA ULTRICE TAPE SYSTEM
- C: SERVICE CHASE
- D: SHEATHING - PLYWOOD AT 3A CONSTRUCTION, DENSGLASS AT 1A CONSTRUCTION
- E-1: AIRTIGHT DOORS
- E-2: AIRTIGHT FIRE RATED DOORS
- F: PIECE IN SHEATHING/GWB FOR PROPER CONTINUITY & SEQUENCING

NUMBERS NOTATED INDICATE CONSTRUCTION SEQUENCE

COMPARTMENTALIZATION DETAIL NOTES

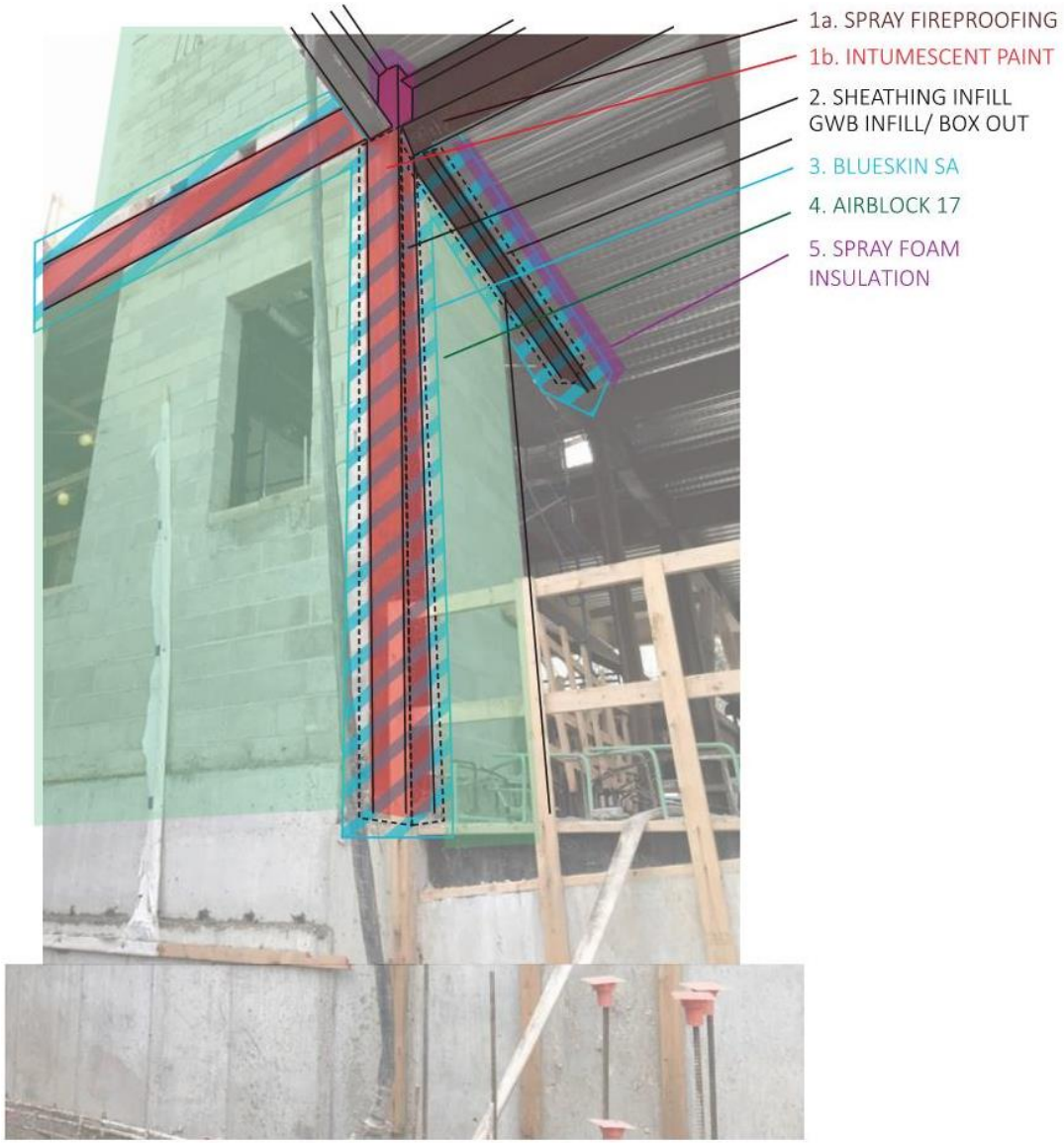
1. TAPE ALL INTERSECTIONS BETWEEN AIR BARRIER AND ANOTHER MATERIAL
2. PENETRATIONS AT AIR BARRIERS SHOULD BE FULLY FIRE STOPPED AND AIRTIGHT.



SITE COMMUNICATION

- Prominently post Airtight Building signs for duration of project
- Assign one person responsibility for maintaining the air barrier
- Discuss the air barrier with all subs prior to commencement of their work

COMMUNICATION – Dealing with Reality



COMMUNICATION – Speaking the same Language

3 Week Look Ahead Schedule

Job Number: 18-005001
Project Name: 206 Main Street Gloucester
Superintendent: Keith Marescalchi

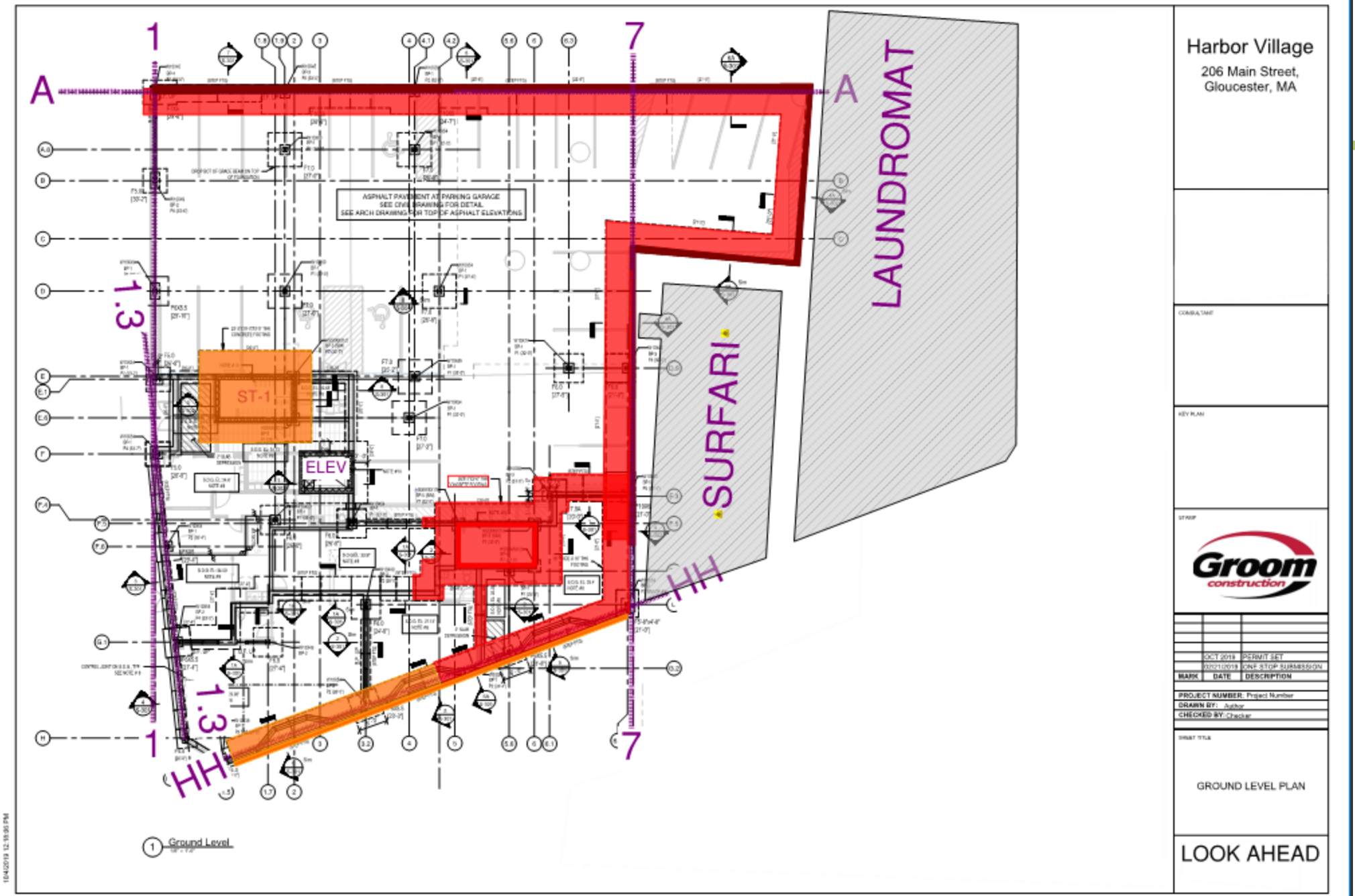
Date: 4/13/2020
Start Date: 4/13/2020
End Date: 5/3/2020
Project Executive: Dave Groom
Project Manager: Matt Robbins

Entering S, B or X will shade cell automatically

S Scheduled | B Behind Schedule | X Will shade cell black

***Subcontractors must notify Groom Construction Project Manager or Superintendent within 24 hours of receiving this Three Week Look Ahead Schedule if not able to meet this schedule.

Item/Task	Subcontractor	Week #1							Week #2							Week #3							Remarks/Notes
		M	T	W	Th	F	Sa	Su	M	T	W	Th	F	Sa	Su	M	T	W	Th	F	Sa	Su	
		4/13	4/14	4/15	4/16	4/17	4/18	4/19	4/20	4/21	4/22	4/23	4/24	4/25	4/26	4/27	4/28	4/29	4/30	5/1	5/2	5/3	
BUILD ELECTRICAL INCLOSE FOR TEMP POWER	GROOM		S	S	S																		
FORM WALLS HH LINE	FORM UP	S	S	S																			MONDAY IS A RAIN OUT
FORM FOR PAD AT STAIR # 2	FORM UP	S	S	S																			
RECEIVE REBAR	GROOM	S																					
INSTALL DRAINAGE	LINSKEY	S	S	S	S	S			S	S													
FINISH DIGGING FOR FOOTING AT A LINE	LINSKEY		S																				
FORM FOOTING AT A LINE	FORM UP		S	S																			
POUR THE REST OF THE FOOTING ON A LINE	FORM UP			S																			
POUR PAD FOR STAIR # 2	FORM UP				S																		
REMOVE FORMS AT FOOTINGS AND PAD	FORM UP					S			S														
BACK FILL 1/2 OF THE WALL ON 7 LINE	LINSKEY										S	S											
FORM WALL ON A LINE	FORM UP								S	S	S												
POUR WALL ON A LINE	FORM UP											S											
START CMU STAIR # 2	VAZ											S	S			S	S	S	S	S			
FINISH DIGGING HH LINE FOR FOOTINGS , FORM AND POUR FOOTING HH LINE	LINSKEY AND FORMUP																	S	S				
POUR THE REST OF FOOTING ON HH LINE	FORM UP																			S			
HOPE FOR TEMP POWER	GROOM															S	S	S	S	S			



Harbor Village

206 Main Street,
Gloucester, MA

CONSULTANT

KEY PLAN

STAMP

Groom construction

MARK	DATE	DESCRIPTION
	OCT 2019	PERMIT SET
	02/21/2019	CNF STOP SUBMISSION

PROJECT NUMBER: Project Number
DRAWN BY: Author
CHECKED BY: Checker

SHEET TITLE

GROUND LEVEL PLAN

LOOK AHEAD

10/4/2019 12:18:35 PM

1. FOUNDATION: WATERPROOFING

2. STEEL POSTS

3. CMU WALLS

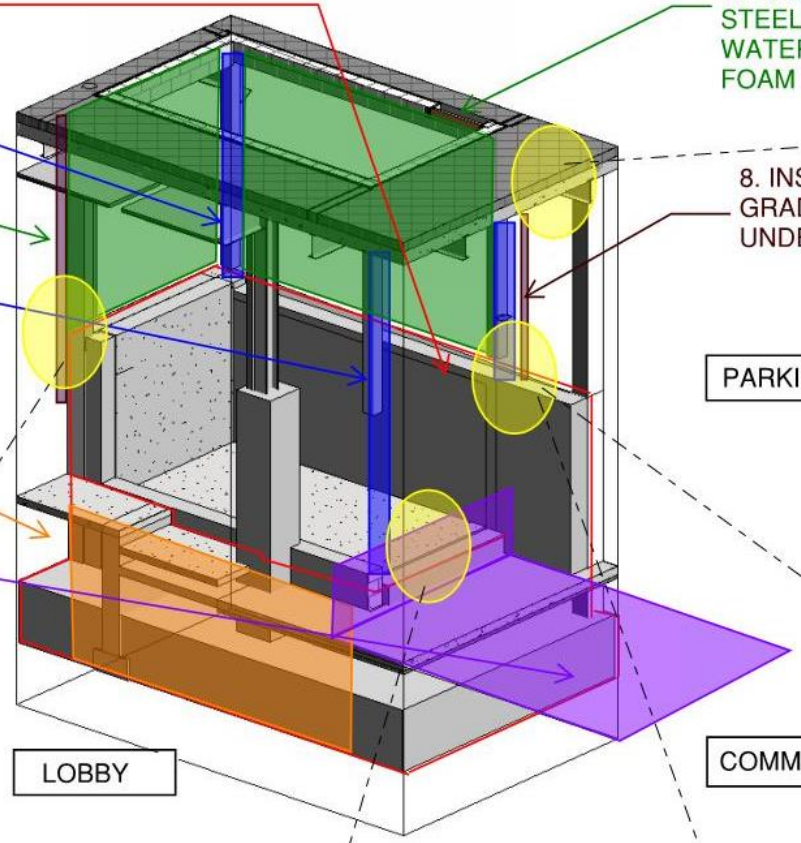
4. **INTUMESCENT** PAINT ON STEEL AS AIR BARRIER

5. SUB GRADE INSULATION MIN 48" BELOW GRADE

6. SUB SLAB INSULATION, VAPOR BARRIER, LAPS UP, SLAB POURED

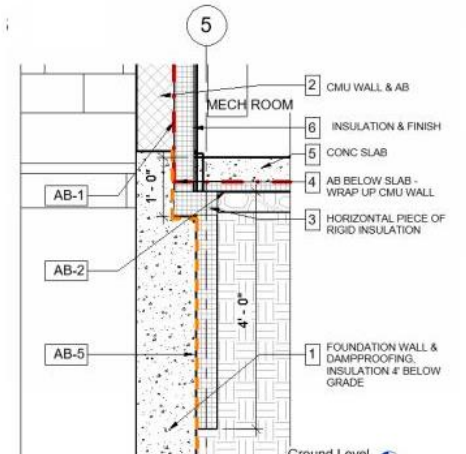
7. **AIR BARRIER** ON CMU, LAP VAPOR BARRIER, INTUMESCENT PAINT ON STEEL & FOUNDATION WATERPROOFING & SPRAY FOAM UNDERSIDE OF DECK

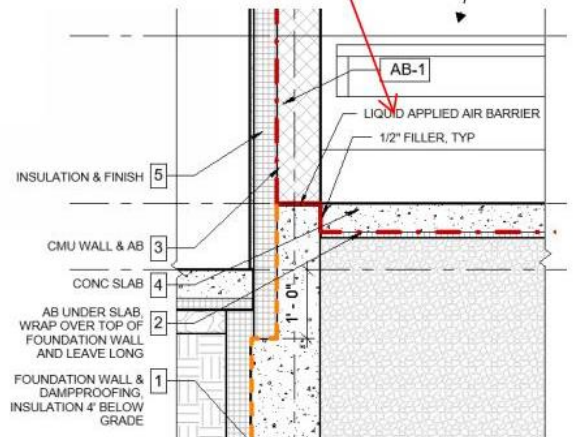
8. INSULATION ABOVE GRADE, & SPRAY FOAM UNDERSIDE OF DECK

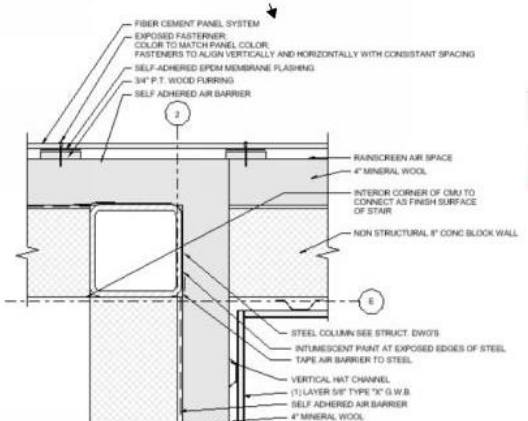


3/A116

DO WE NEED?

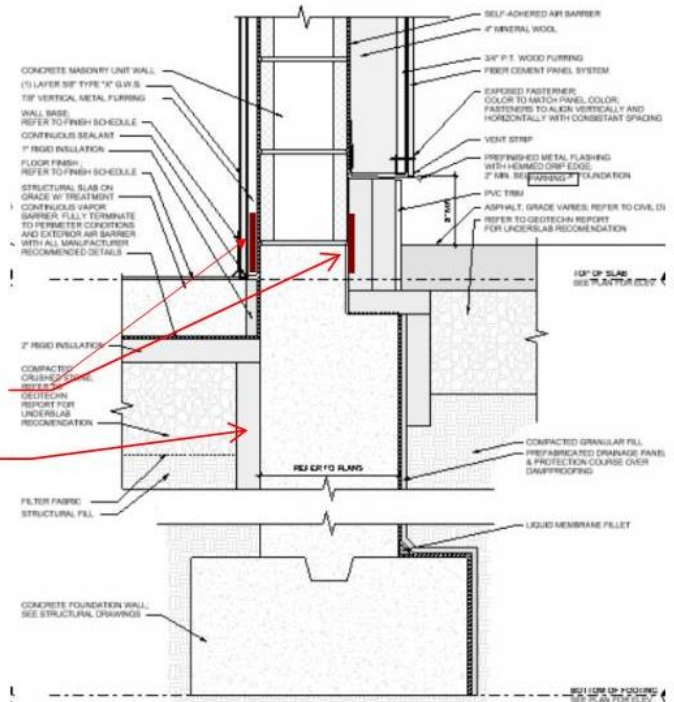






TAPE TRANSITION

4' BELOW GRADE



CRAFT

Carpenters
Insulators
Plumbers
HVAC Installers
Electricians

CRAFT– Carpenters

Caio’s Team rocking the Air Barrier

CRAFT– Insulators

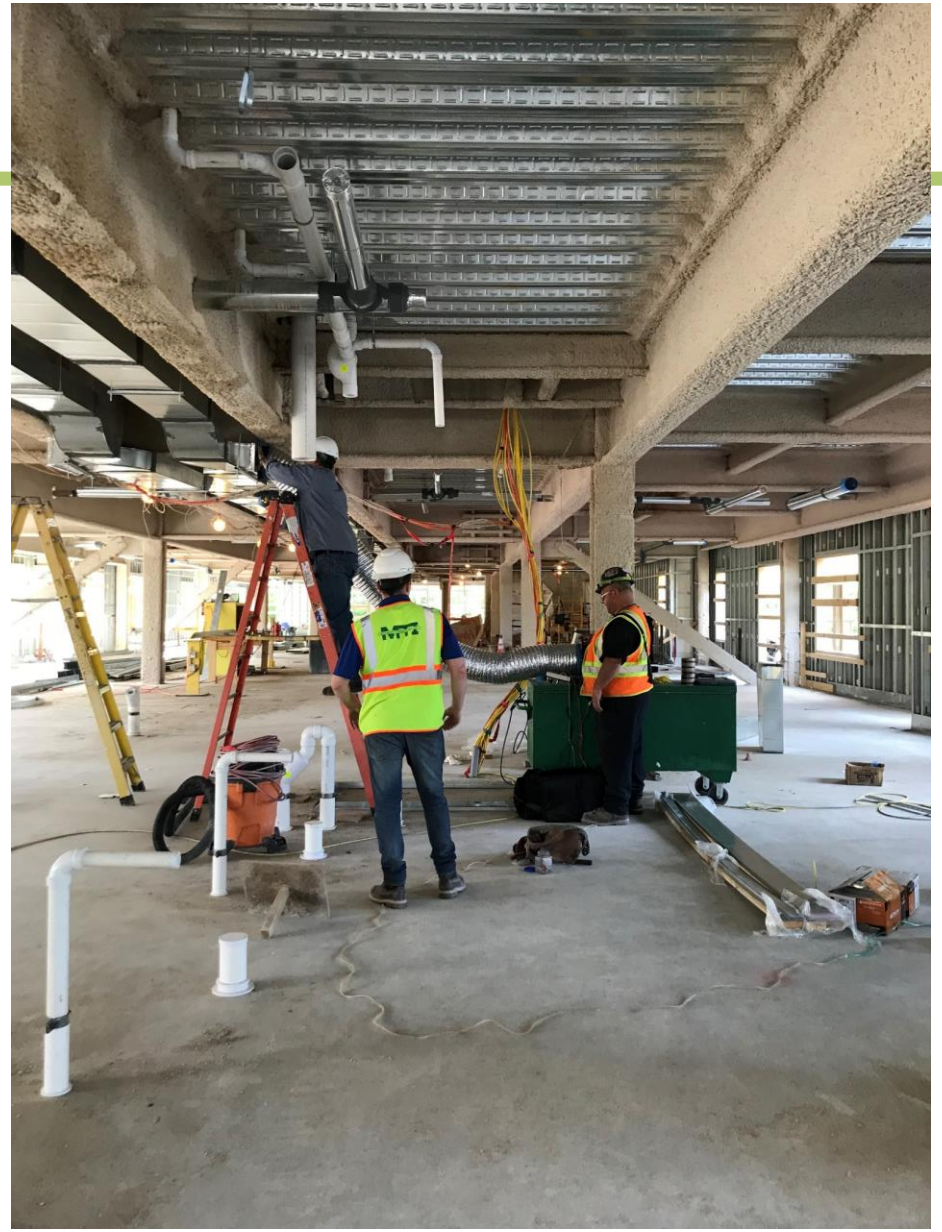
CRAFT– Plumber

First Try – Not Approved

Ian Russell - Plumber

Second Try –Approved

CRAFT– HVAC



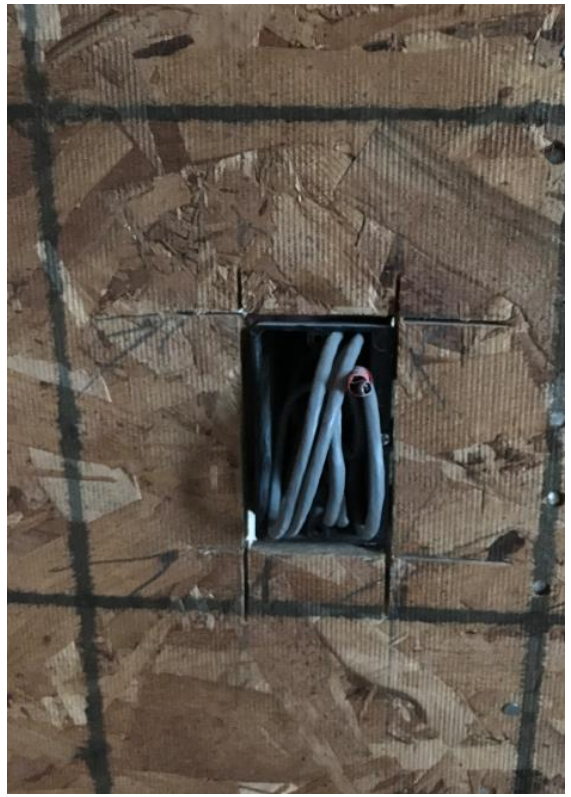
Testing/Verification

CRAFT– Electrician

Not Approved

Approved

Not Approved



Approved

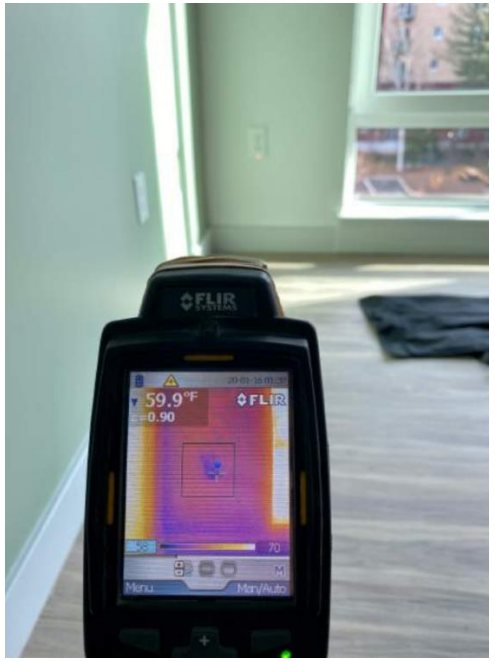
TESTING/VERIFICATION

Blower Door Testing
Fog
Infrared
Regular Inspections
Commissioning

TESTING/VERIFICATION

Windows
Airtightness
Duct Leakage
Thermal Bridging/Gaps

.6 ACH$_{50}$	2611 CFM$_{50}$
DUCLOS METHOD RECOMENDATIONS	
Stage #1 Test (envelope no windows & Doors)	652.75 CFM$_{50}$
Stage #2 Test (windows & doors)	1552.75 CFM$_{50}$
Stage #3 Test (MEP penetrations)	2219.35 CFM$_{50}$



TEAMWORK

Owner
Architect
Mechanical Engineer
Structural Engineer
Energy Modeler/CPHC
Rater/Verifier
Envelope Consultant
Commissioning Agent
General Contractor
Trades

Michelle Apigian
AIA, LEED AP, AICP, CPHC
Associate Principle, Practice + Sustainability Leader
mapigian@iconarch.com
627-939-0721

E-ICON ARCHITECTURE