



PH Verification for Large Buildings: What We've Learned So Far

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Overview

- Focus: Verification of Insulation and Air Barrier Continuity
- Issues that dictate QA/QC program
- Case Studies
 - Cornell
 - Beach Green North
 - 3365 Third Ave



Verification for Large Projects

- Project Sequencing:
Foundations
 - Abutting neighbor?
 - Staging of foundation?
 - Under slab
 - Stem walls



Verification for Large Projects

- Inspection & testing process above grade
 - Wall construction
 - Brick & block
 - Panel
 - Metal Stud
 - Staging
 - Drywall starting on lower levels, still insulating at top
 - Opening like hoistways, elevator shafts, HVAC shafts



Verification for Large Projects

- Inspection & testing process roof insulation
 - Equipment on roof
 - Curbs
 - Brackets
 - Small dividing walls
 - Bulkheads/unconditioned mechanical rooms – roof insulation needed in these areas before main roof



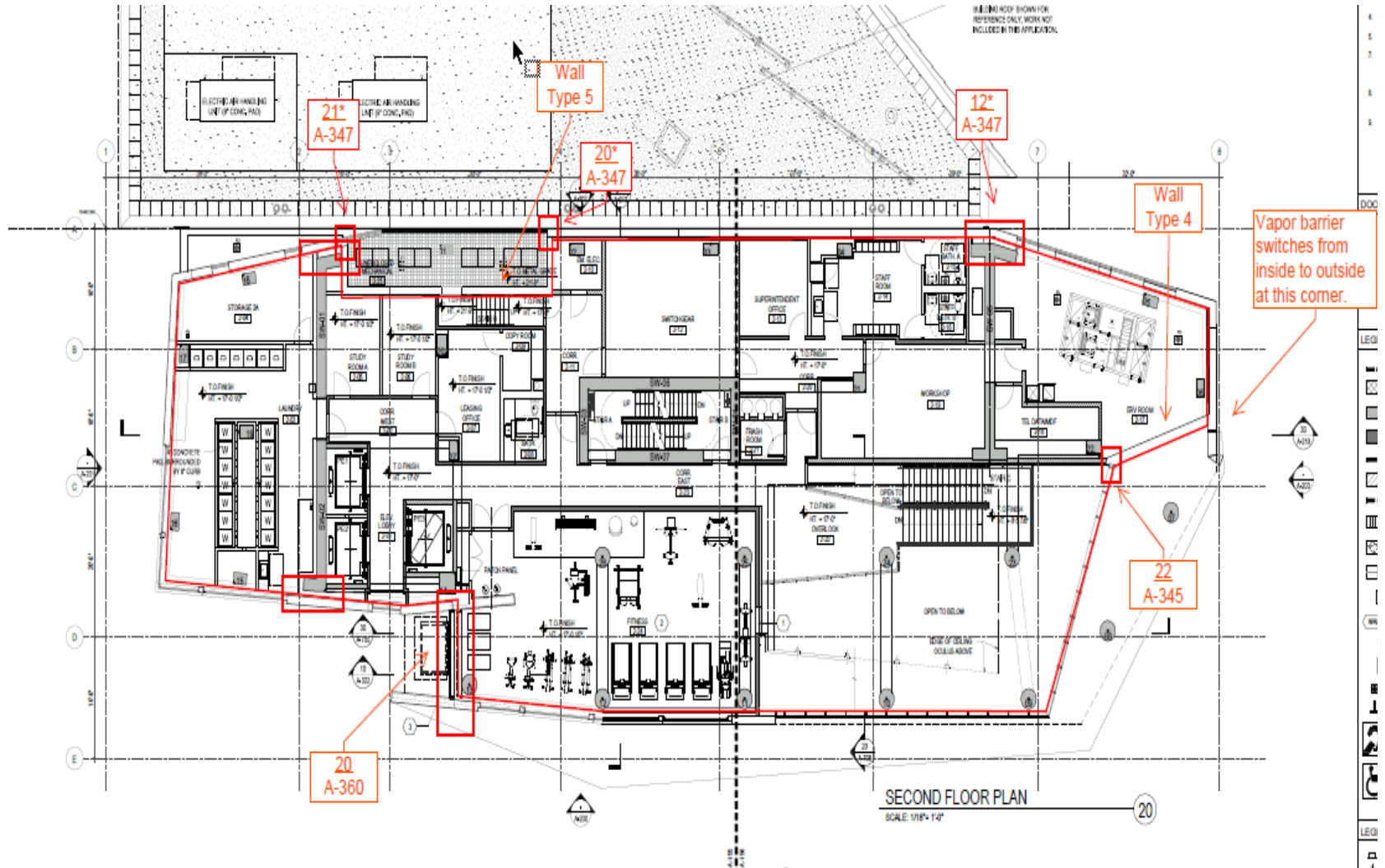
CORNELL ROOSEVELT ISLAND, NY

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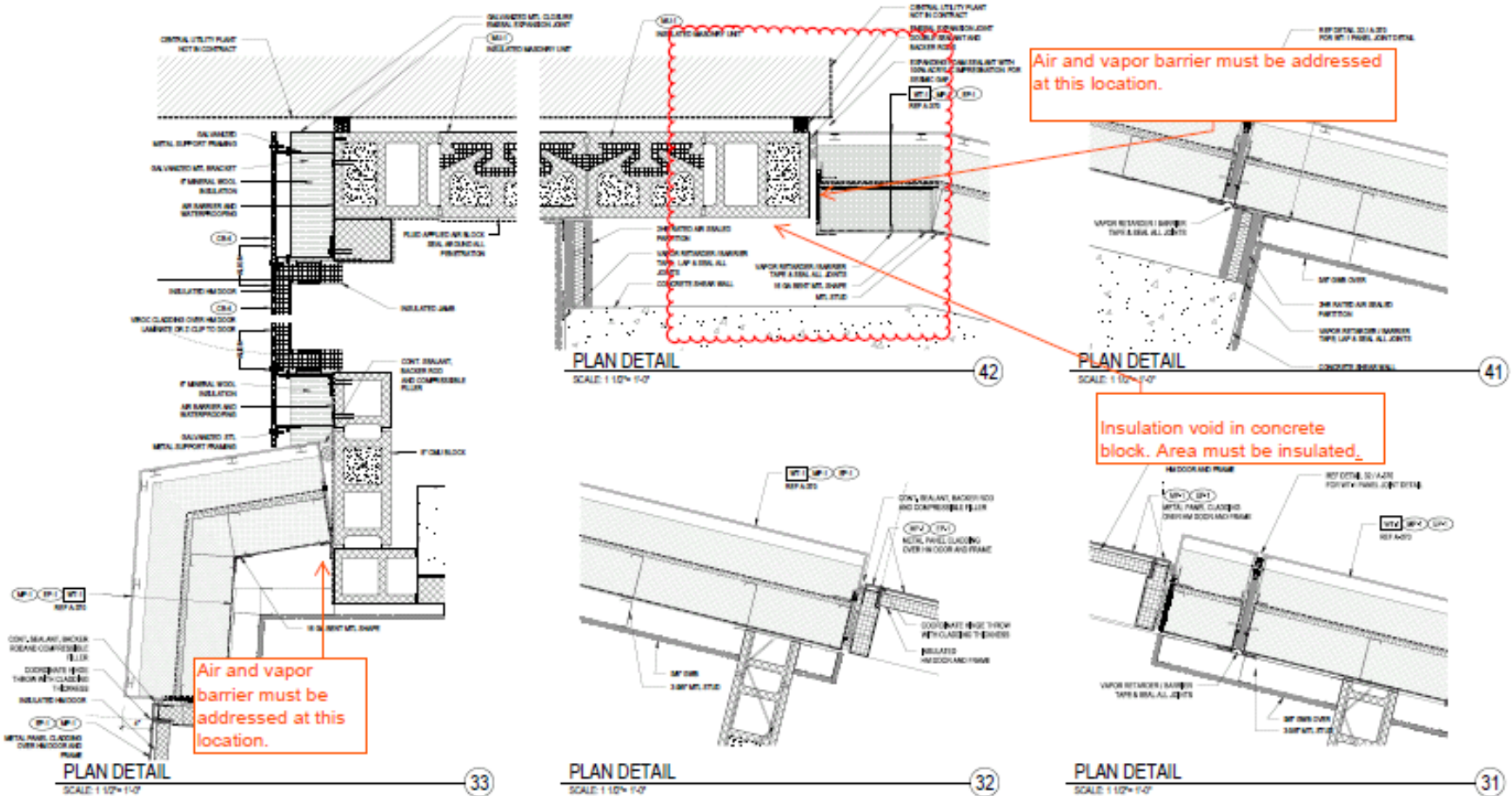
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Redline Plan & Section

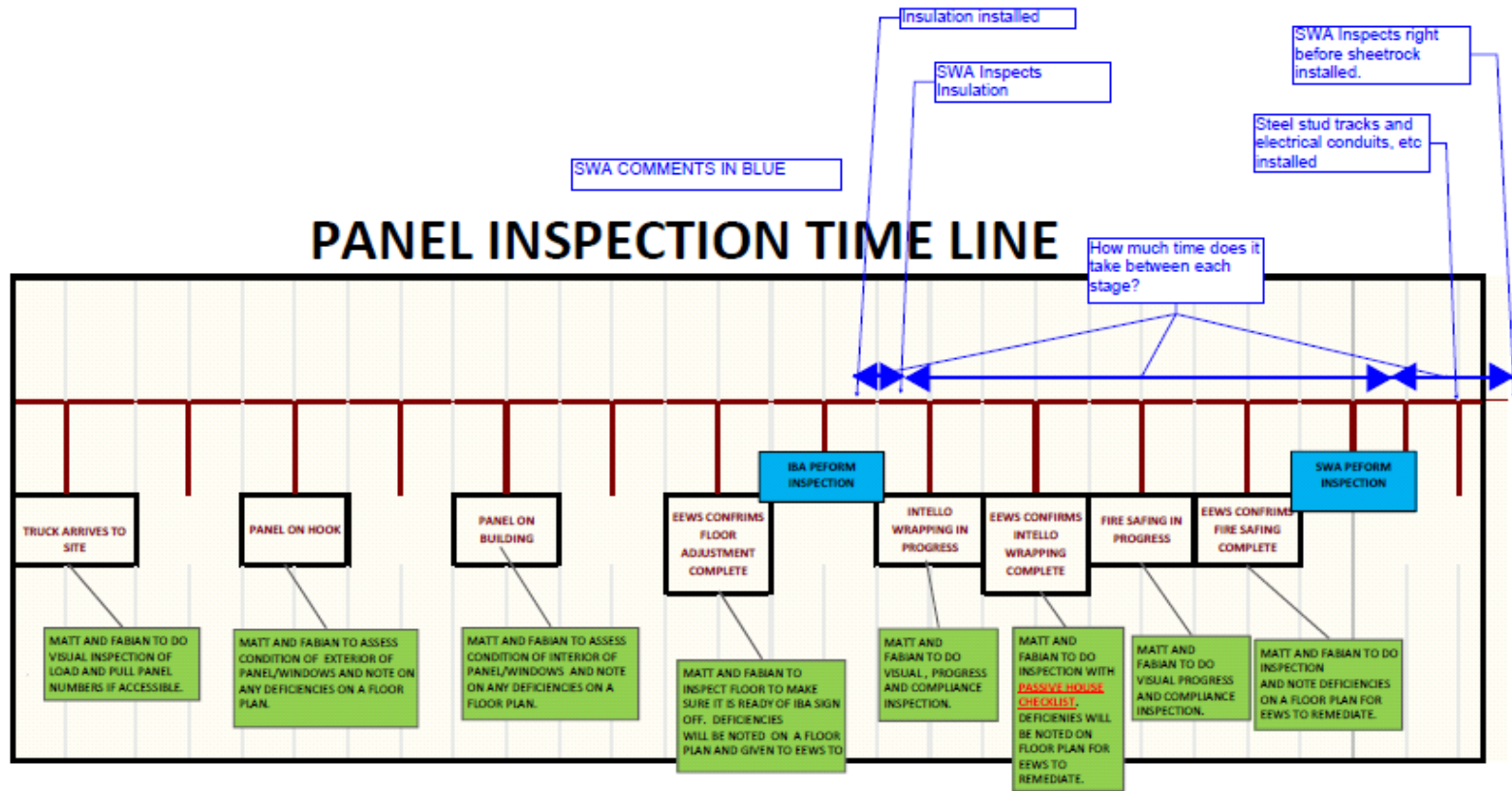


Drill Into Details





Identify Sequencing & Timing of Inspections





SWA's Scopes

- Include prelim QA/QC checklist development
 - Dependent on construction type
- Final blower door test plan



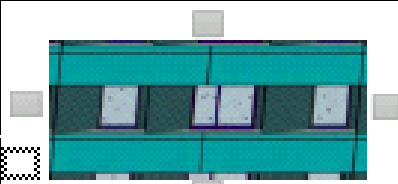
Develop Contractor Checklists

DATE: _____ WEATHER: _____
 PANEL # _____ FLOOR: _____

MONADOCK CONSTRUCTION, INC.

PASSIVE HOUSE PANEL WALL INSPECTION CHECKLIST

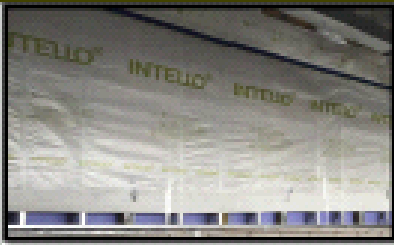
PANEL SUBSTRATE



A. PANEL

B. POURED CONCRETE

C. CMU



PANEL WALL INSPECTION

PANEL INSULATION

	YES
Wall panel insulation installed without gaps?	<input type="checkbox"/>
Insulation installed at panel slab anchors?	<input type="checkbox"/>
Panel insulation dry?	<input type="checkbox"/>
Insulation installed at panel to panel transitions?	<input type="checkbox"/>

NOTES:

Mark locations where insulation, studs or tape is missing or damaged

NOTE: DOUBLE WITH INTELLO OR INSULATION.

CONFIRMATION OF INTELLO SURFACE PREPARATION

	YES
Is surface dry per EWAS checklist?	<input type="checkbox"/>
Is surface even free of voids and sharp protrusions per EWAS checklist?	<input type="checkbox"/>
Is surface free from dust, dirt or other foreign matter per EWAS checklist?	<input type="checkbox"/>
If substrate is concrete has it been allowed to cure?	<input type="checkbox"/>

INTELLO INSTALLATION

	YES
Is printed side facing installer?	<input type="checkbox"/>
Is membrane free of rags or creases?	<input type="checkbox"/>
Is Intello to concrete surface adhered with Contage 94 tape?	<input type="checkbox"/>
Is Intello to metal stud surface adhered with Duplex double sided tape?	<input type="checkbox"/>
Is Intello to Intello seam adhered with Tescon Vana tape?	<input type="checkbox"/>
Has Intello and Tescon Vana tape anchor patch been installed?	<input type="checkbox"/>

PANEL WALL WINDOW INSPECTION



SWA Checklists

Automated Inspection Checklists

- Large projects w/ multiple dwellings
- Repetitive Tasks – duct & unit by unit leakage testing
- Insulation inspections

Verizon 4:43 PM 66%

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Item #1


Verification Item #1:
Insulation inspection on 24th floor

Description of Verified Item #1:
SWA inspected the 24th floor insulation installation. Minor issues were found and immediately repaired by Eastern.

Action Required:
None.

Reinspection Required?

Item 1 - Photo 1



Item 1 - Photo Caption 1
24th floor insulation installation.



Site Visit Reports

Item #	Description	Image
	<p>2nd Floor Slab Edge Insulation: Refer to architectural details 20 A-356.</p> <p>Detail 20 shows 4" thick insulation at the slab edge between the CUP and the Residential Tower extending 2" above and below the slab (highlighted area in detail at right)..</p> <p>This conditions exits at the area highlighted on the plan to the right.</p>	



Progress

- Panel installation started in March
- Finished top floor end of August
- Drywalled up to 13th floor
- Finishes being installed on lower levels
- Majority of effort spent inspecting insulation & air barrier – at least 1x per week since March

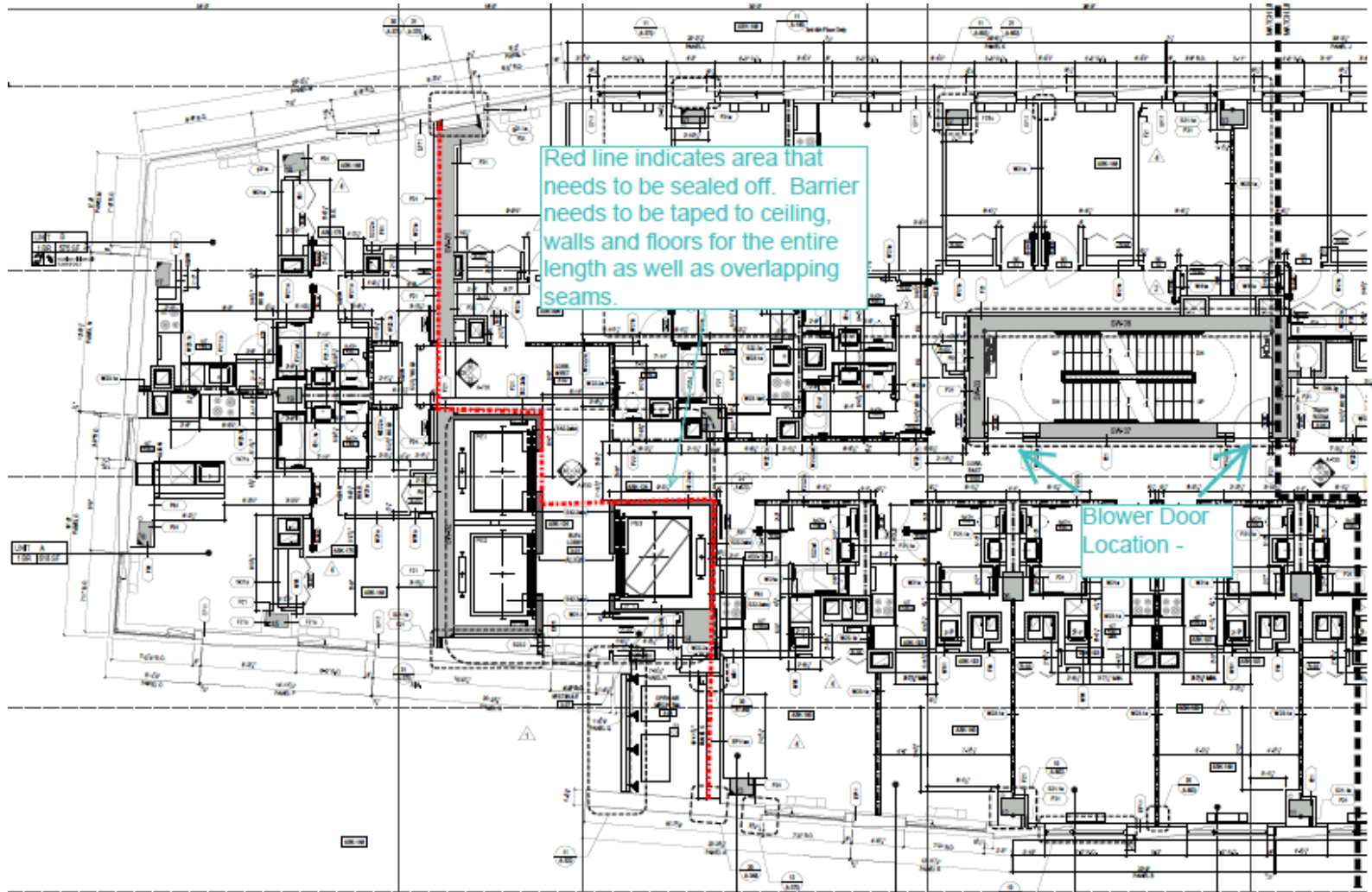


Interim Testing

- Ductless mini-splits – no leakage testing required
- Original plan – no whole floor testing
- Revised plan – guarded testing on 4th, 5th and 6th floors
- Window & Door Leakage
- Façade Leakage
- compartmentalization



Guarded Testing



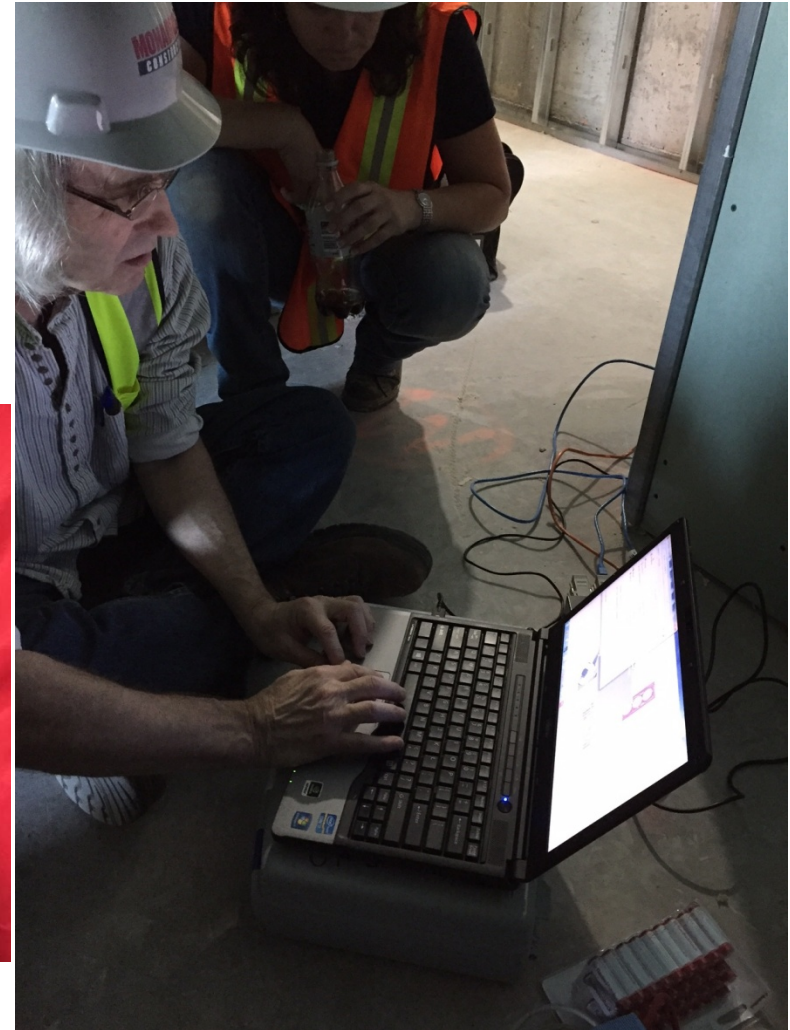


Temporary Air Barrier

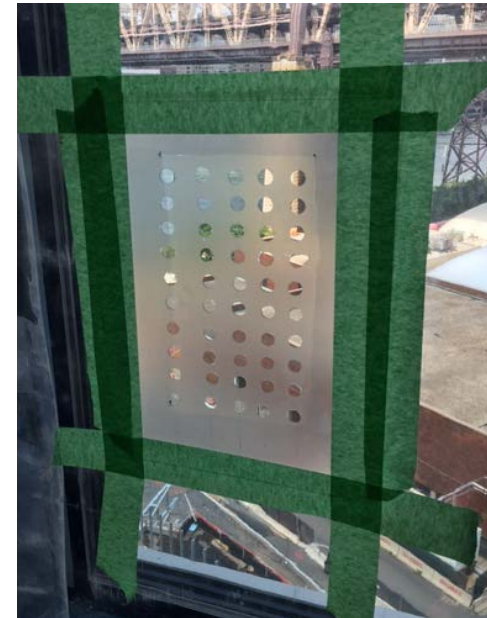




Blower Doors on 3 Floors



Façade Leakage Measurements: Quantitative





Façade Leakage Measurements: Qualitative





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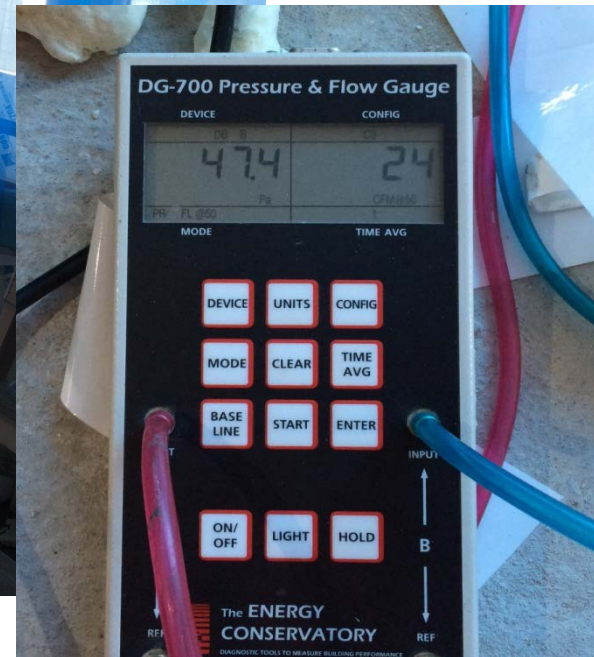


Wall Insulation Inspections



- ICF doesn't require as many inspections for insulation

1st Window Mockup



2nd Window Mockup



Duct Sealing on ERVs



Blower Door Test Plan



WHOLE BUILDING INFILTRATION TESTING PLAN TO DETERMINE COMPLIANCE WITH PHIUS+ AIRTIGHTNESS REQUIREMENTS AT BEACH GREEN NORTH, 41-19 ROCKAWAY BEACH BLVD., QUEENS, NY

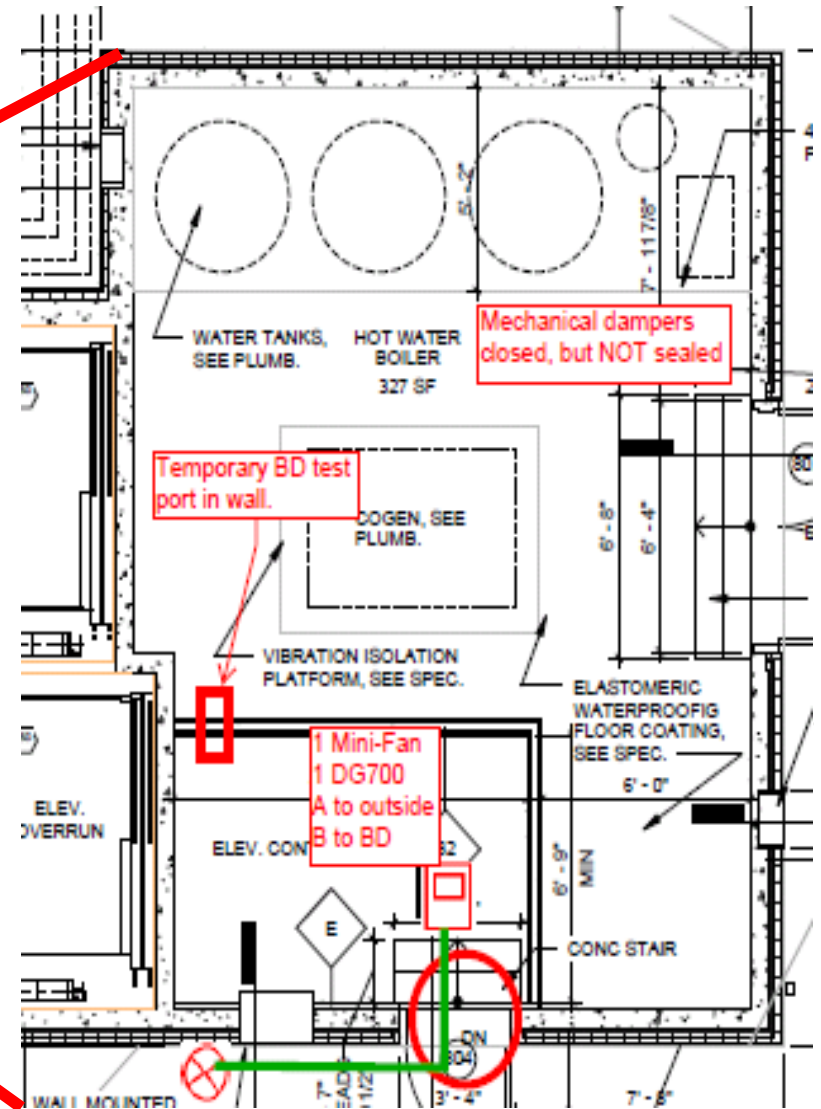
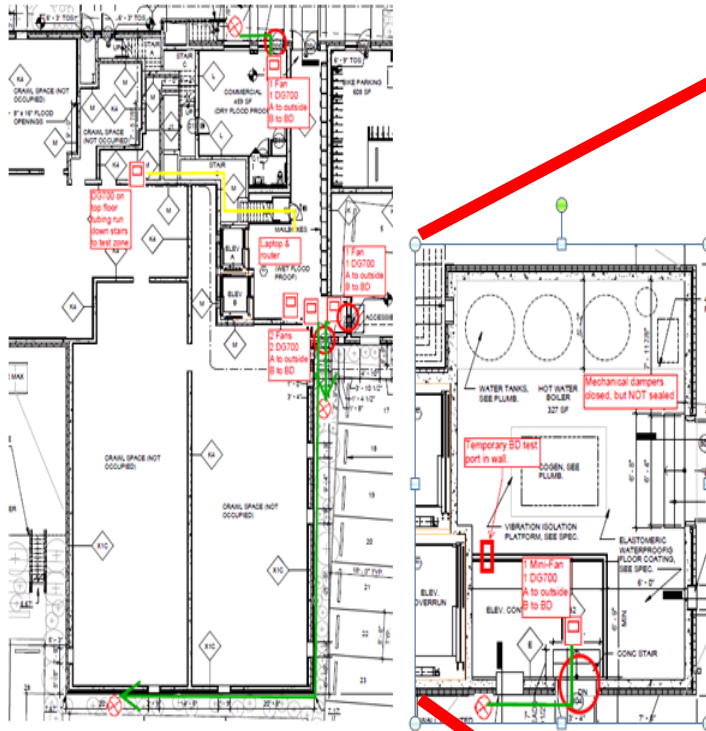
MAY 6, 2016





Blower Door Test Conditions

Figure 1 – location of test fans, indoor and outdoor pressure taps



Blower Door Test Conditions



Intentional Opening	Test Setting	Notes
Windows, doors, skylights and hatches in the building enclosure	Closed and latched	
Dryer doors	Closed and latched	
Doors, hatches and operable windows inside the <u>test enclosure</u>	Open	Use stairways A & B to connect all zones of the building
All motorized dampers	Fan off, damper closed but NOT sealed	Penthouse boiler room. Elevator hoistway
Fire dampers	Remain as found	
ERV's	Fan off, dampers closed. Ducts to outside sealed inside ERV cabinet.	Ventilation is continuous, so dampers closed and sealed
Heat / Cool system	Thermostat to 'off', supply and return ducts open & uncovered	
Combustion appliance flue gas vents	Appliance set to pilot or off Flue left in their as-found position	Penthouse boiler room
Plumbing traps	Sealed or filled with water	

Individual ERV & Blower Door



- Need to seal off ERV for final test.
- Can't seal off vents from outside
- Will leave ducts to unit disconnected at first, then connect after testing.





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Complicated Foundations

- Infill site
- Walls near neighbors being poured in stages
- Several foundation inspections needed





Questions?

larena@swinter.com



Come by Our Booth

- High Performance Building Guides available
 - Details for efficient façade attachments
 - Guidance on de-rate for penetrations
 - Product information

Thank you!