

abaa2024 building enclosure conference

A Case study in enclosure coordination how the Academy for Global Citizenship achieved Passive House air leakage rates

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AIA
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A Case study in enclosure coordination: How the Academy for Global Citizenship achieved Passive House air leakage rates

This presentation will showcase the process which allowed this 70,000 square foot two story K-8 school located on the Southwest Side of Chicago, to achieve the air tightness required to achieve both Living Building Challenge and PHIUS 2021. The team will discuss strategies employed and challenges faced from design and procurement to construction and site observation. We will discuss the multiple types of envelope components, complex geometries, and penetrations through different materials encountered, each of which required specific attention to detail, specific observations and material compatibility. Any project of this size involves multiple trades, and we will discuss the communication and strategy involved in managing that process. Material choices were further complicated as the project required limited Red List materials. We will discuss bidding and estimating concerns as this project was delivered on budget and in a shorter timeframe than a typical CPS school, with a high percentage of local MWBE contractors.



Learning Objectives

1. Describe the key communication strategies for a successful air barrier installation program.
2. How to organize your design documents for a successful air barrier procurement.
3. How to prepare a large project for a successful air leakage test.
4. Summarize the benefits of early design and pre-construction strategies such as energy modeling and mock-ups.





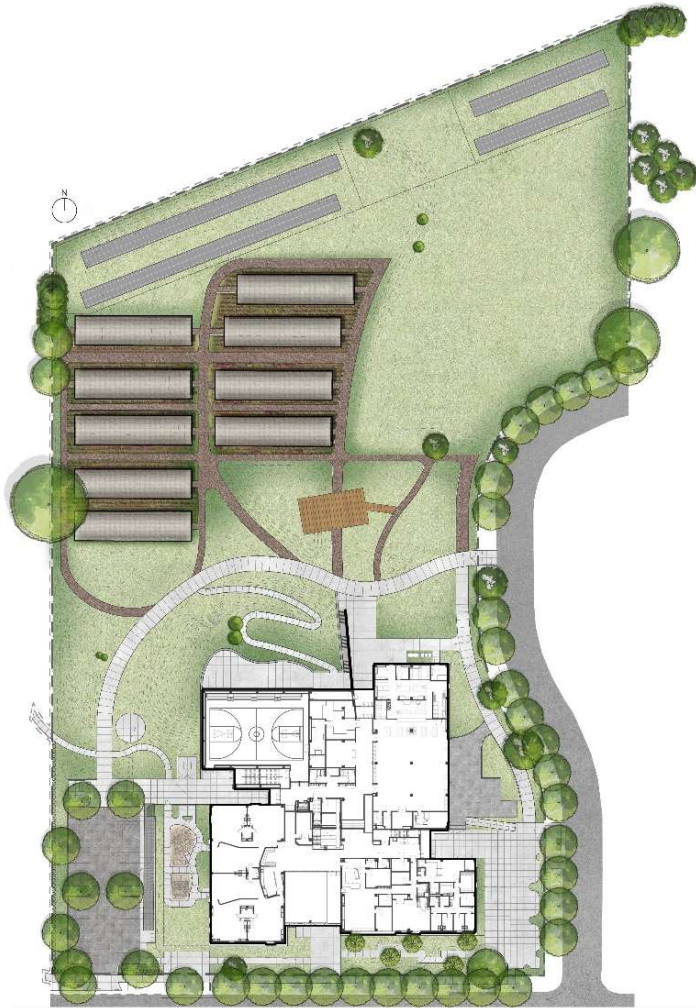
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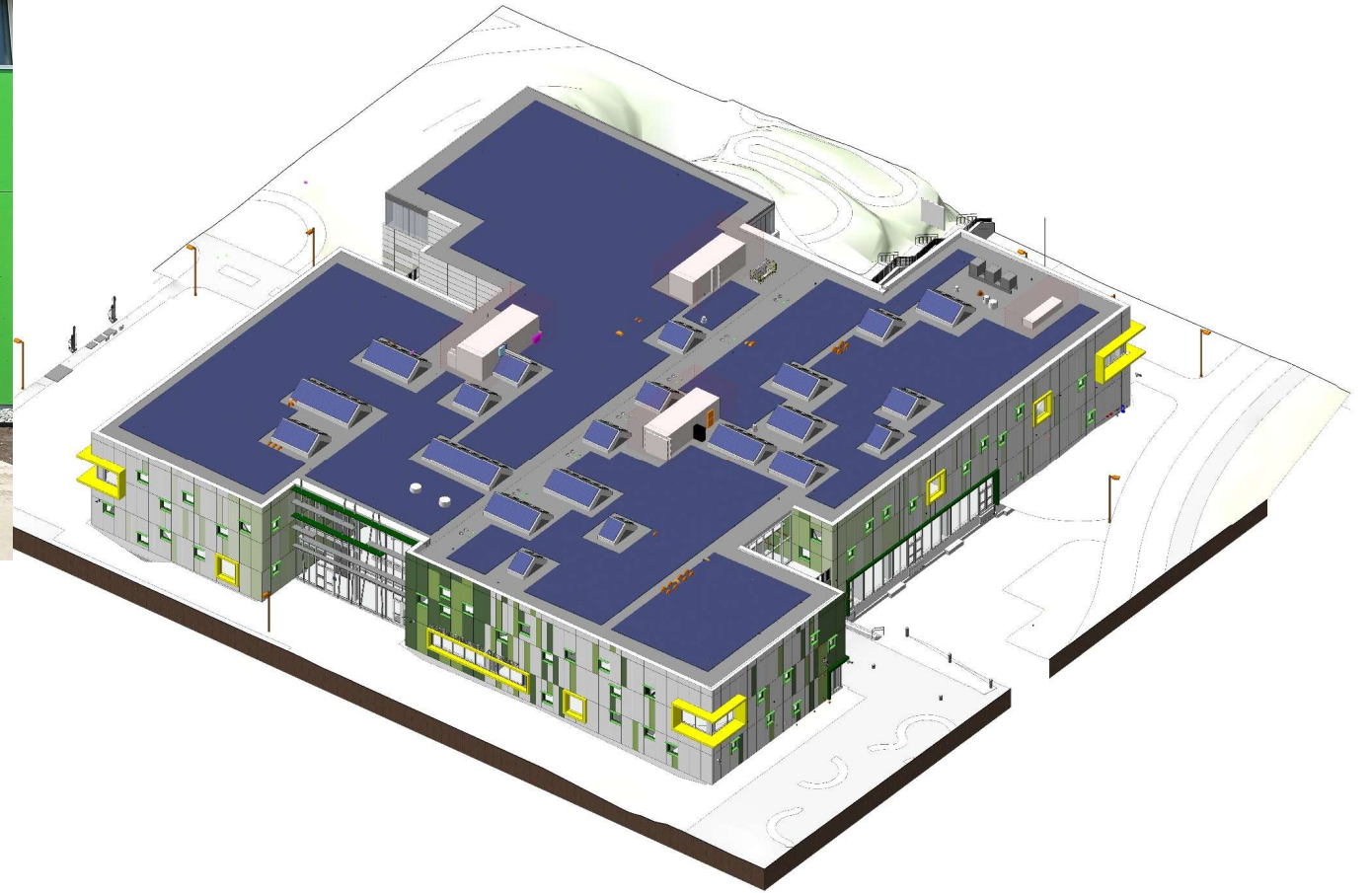
Steve Black
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Quality Support Director
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- K-8 School
- 5 “tenants”
- 70,000 square feet
- 2 stories
- 6 acres







The timeline

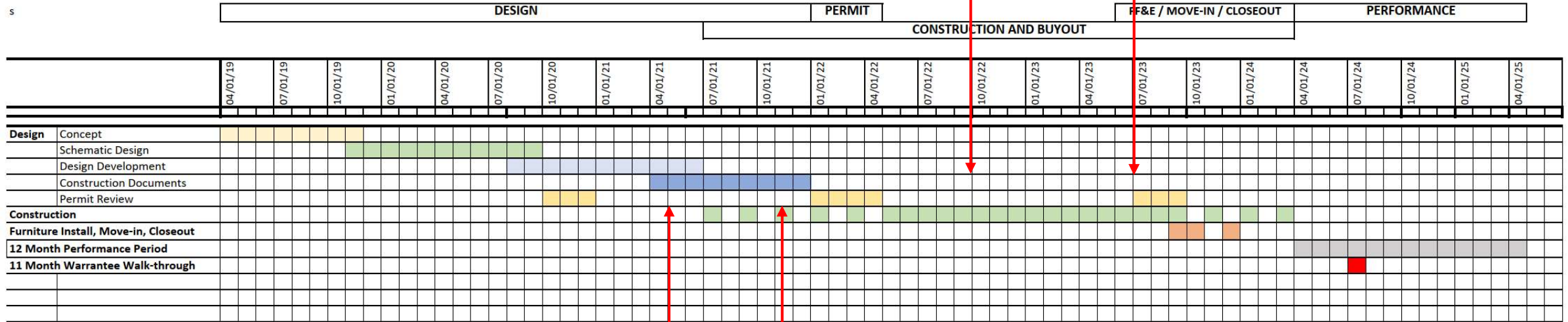
Blower Door Test - final

Mid Construction Blower Door Test

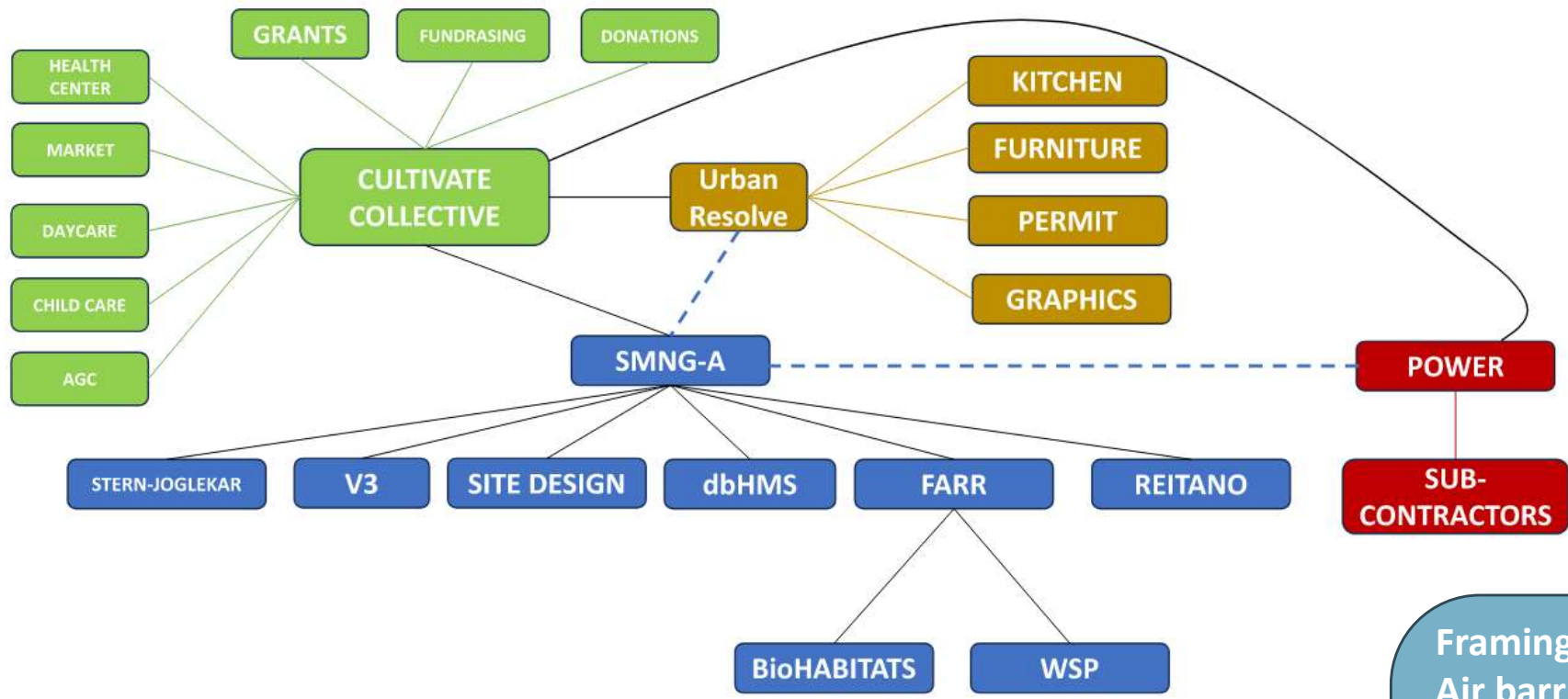
Academy for Global Citizenship

DRAFT PROJECT SCHEDULE

2019 Q2 | Q3 | Q4 | 2020 Q1 | Q2 | Q3 | Q4 | 2021 Q1 | Q2 | Q3 | Q4 | 2022 Q1 | Q2 | Q3 | Q4 | 2023 Q1 | Q2 | Q3 | Q4 | 2024 Q1 | Q2 | Q3 | Q4 | 2025 Q1 | Q2 |

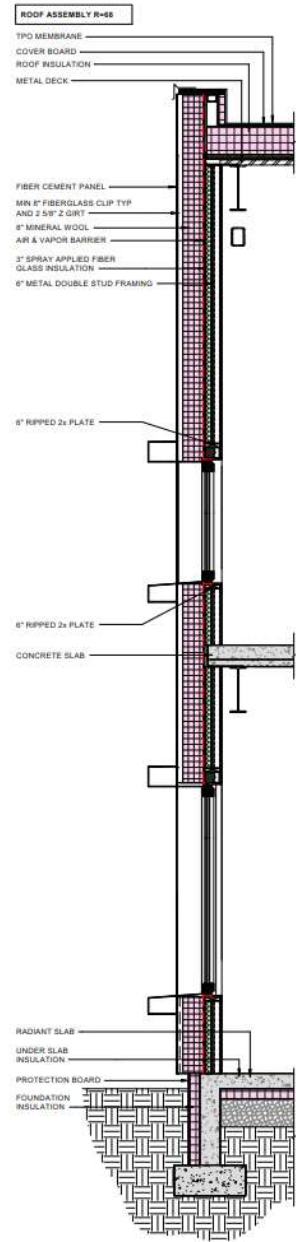


procurement

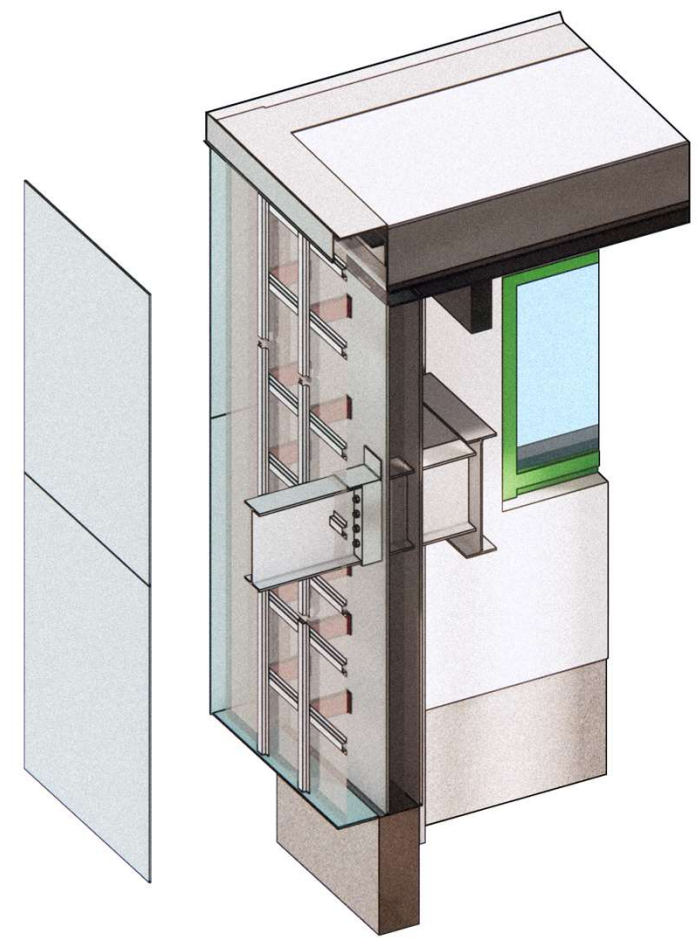


Framing and sheathing – RG Construction
 Air barrier installation - Kedmont
 Concrete and associated thermal – Cerami
 Punched windows – Alpen installed by Northern Glass
 Curtain wall – Gateway
 Roof - Bennet and Brousseau
 Skylights – Velux installed by Whited Brothers
 Plumbing and Mechanical – AMS
 Electrical – G&M Electric

The team



The wall section



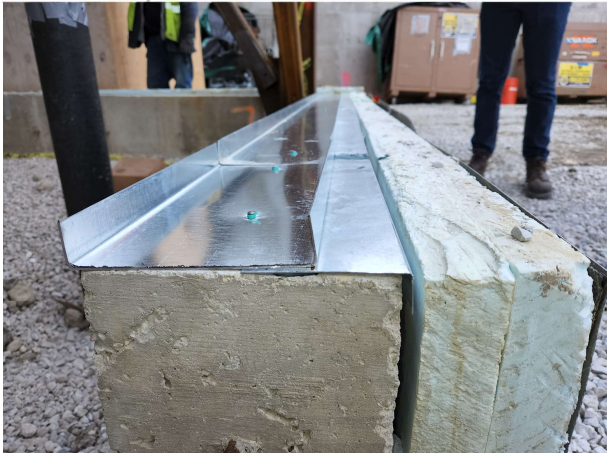
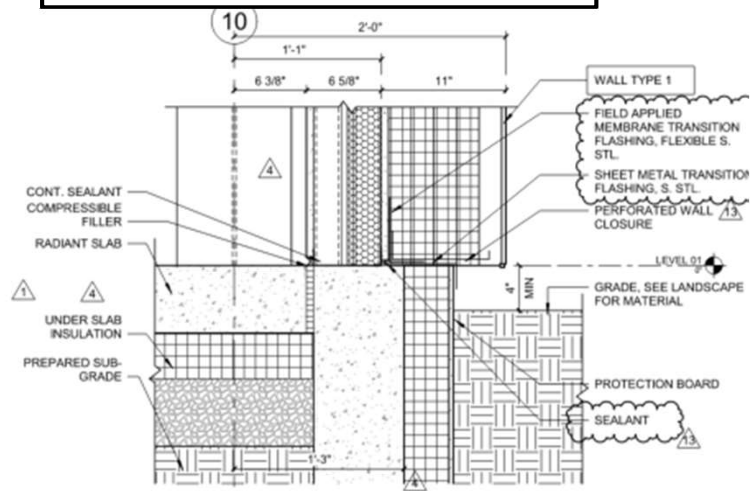
The mock up



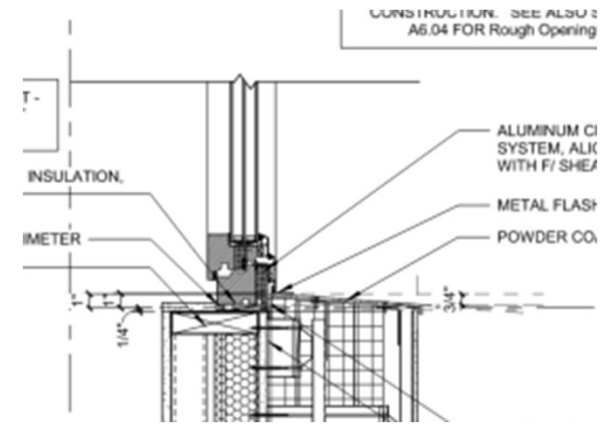
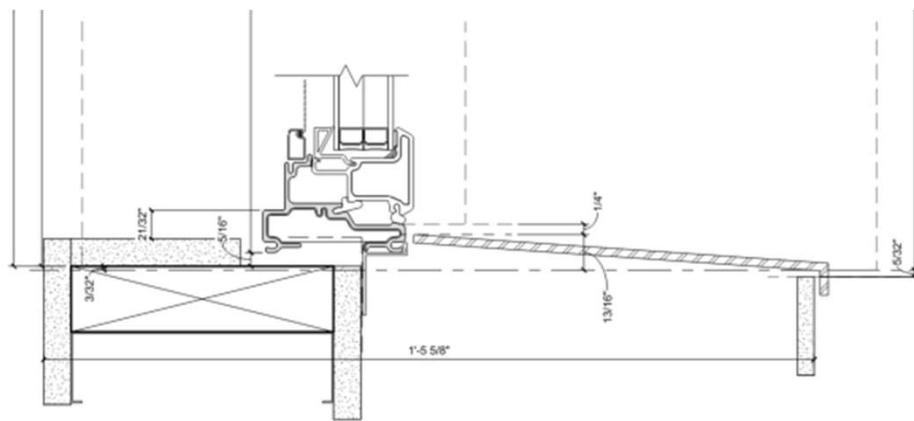
The mock up - Tested



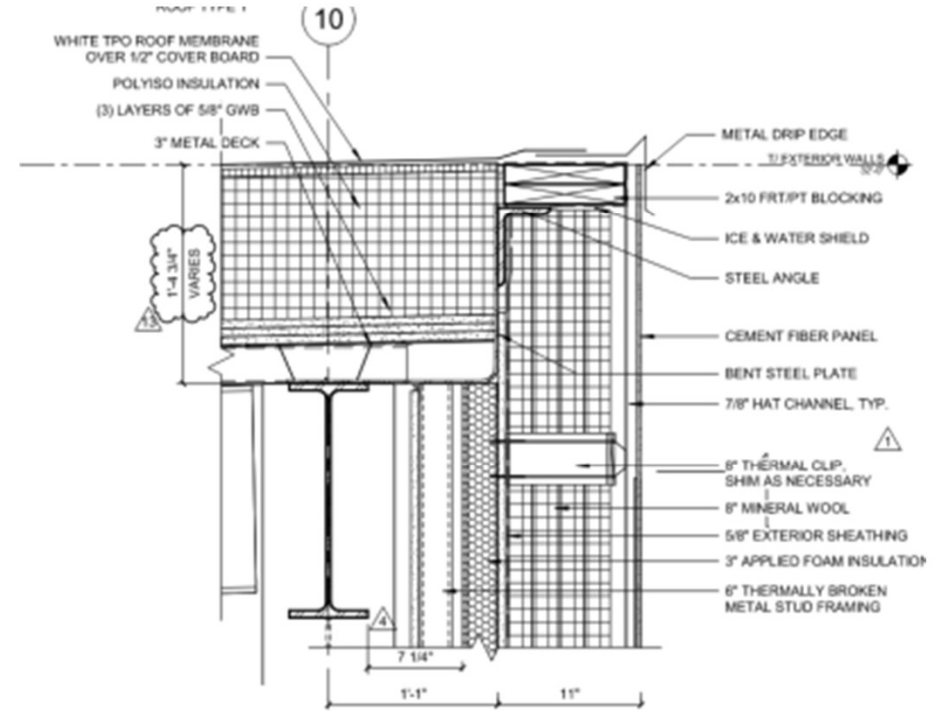
The details



The details



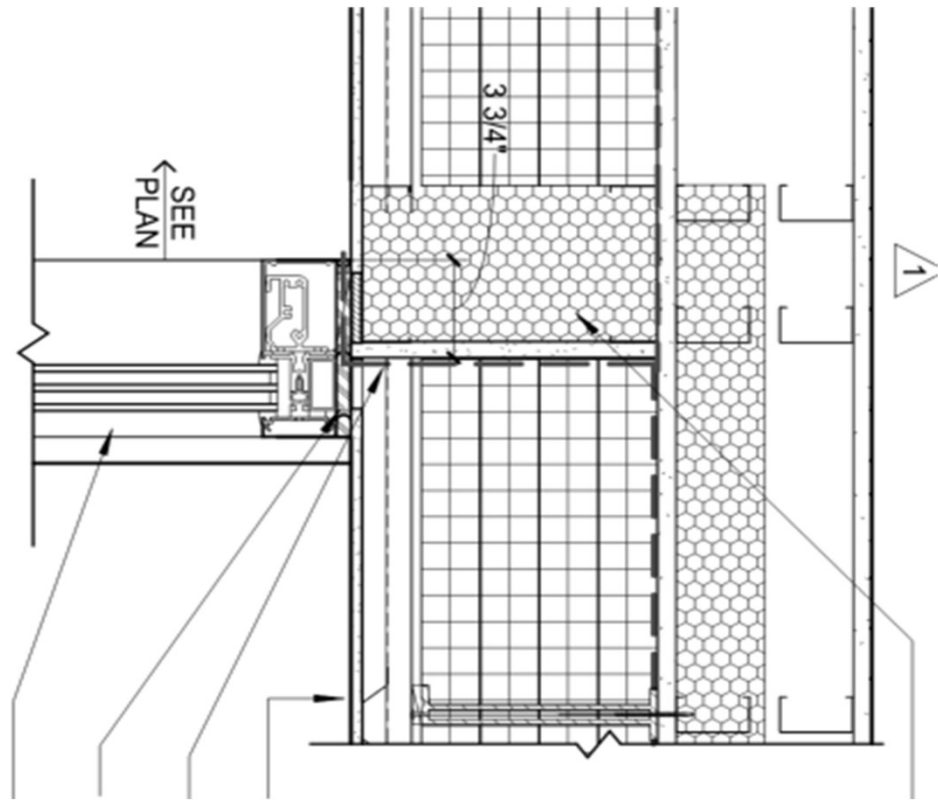
The Roof



The Roof



The details



The unexpected



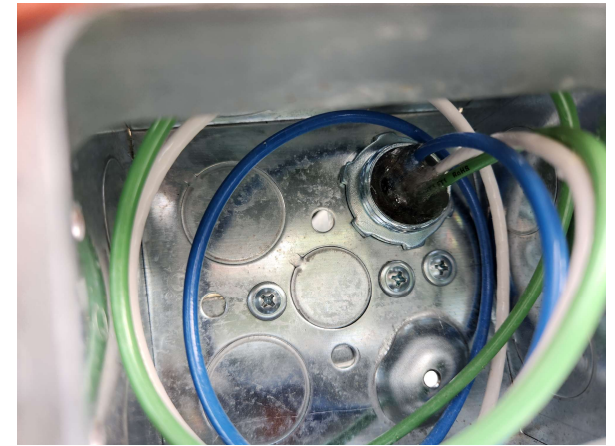
The unexpected



The unexpected



The trades



The materials



The tests....

1. ASTM E1105 – Static Water Test – No penetration of uncontrolled water beyond plane parallel to innermost glazing edge.
2. ASTM E783 – Static Air Test – Air infiltration not exceeding 0.1 CFM/SF at 75 PA
3. ASTM E1186 – Bubble Test – No leakage detected via visible bubbles in the detection fluid
4. ASTM D4541 – Pull Test – Meets manufacturer’s rated pull-off strength within repeatability and reproducibility limits specified in ASTM D4541 Tables 1-5
5. AAMA 501.2 – Hose Test – No visible leakage detected at interior
6. ASTM D5957 – Flood Test – No visible leakage detected at interior
7. ASTM E779 – Blower Door Test – Air infiltration not exceeding 0.6 ACH at 50 PA

The tests....

ASTM D4541 – Pull Test – Meets manufacturer’s rated pull-off strength within repeatability and reproducibility limits specified in ASTM D4541 Tables 1-5

ASTM E783 – Static Air Test – Air infiltration not exceeding 0.1 CFM/SF at 75 PA



The tests....

ASTM E1105 – Static Water Test –
No penetration of uncontrolled
water beyond plane parallel to
innermost glazing edge.

ASTM E783 – Static Air Test – Air
infiltration not exceeding 0.1
CFM/SF at 75 PA



Mid Construction Test



The tests....

ASTM E779 – Blower Door Test –
Air infiltration not exceeding 0.6
ACH at 50 PA

This is the final exam...



Our grade...



MID - 0.063 cfm/ft²@50pa
0.082 cfm/ft²@75Pa

FINAL - 0.059 cfm/ft²@50pa
0.077 cfm/ft²@75Pa

(envelope surface area)

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