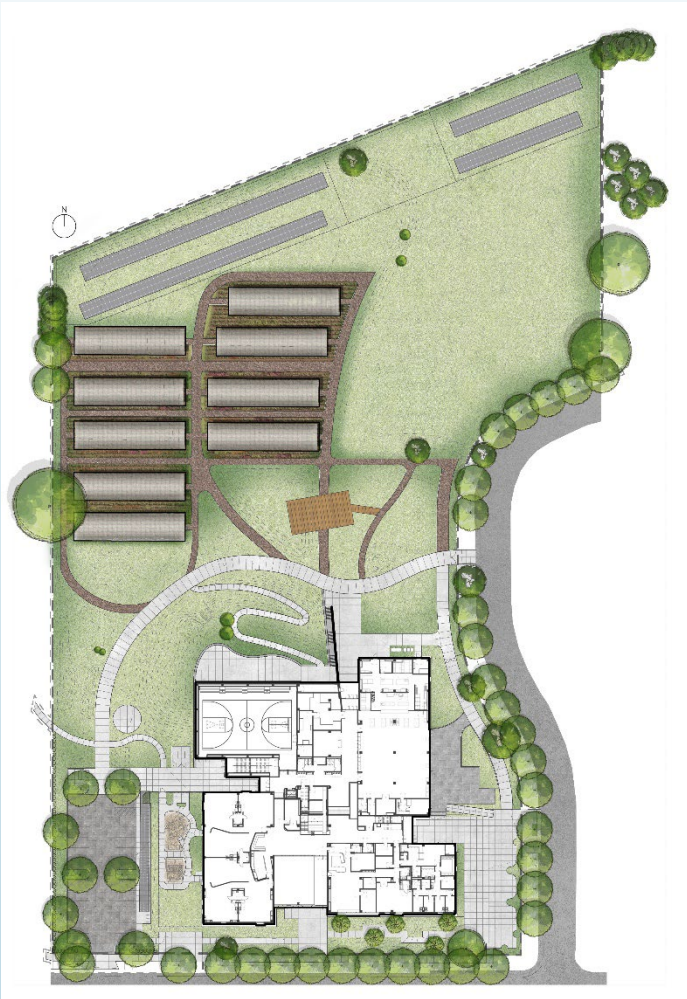




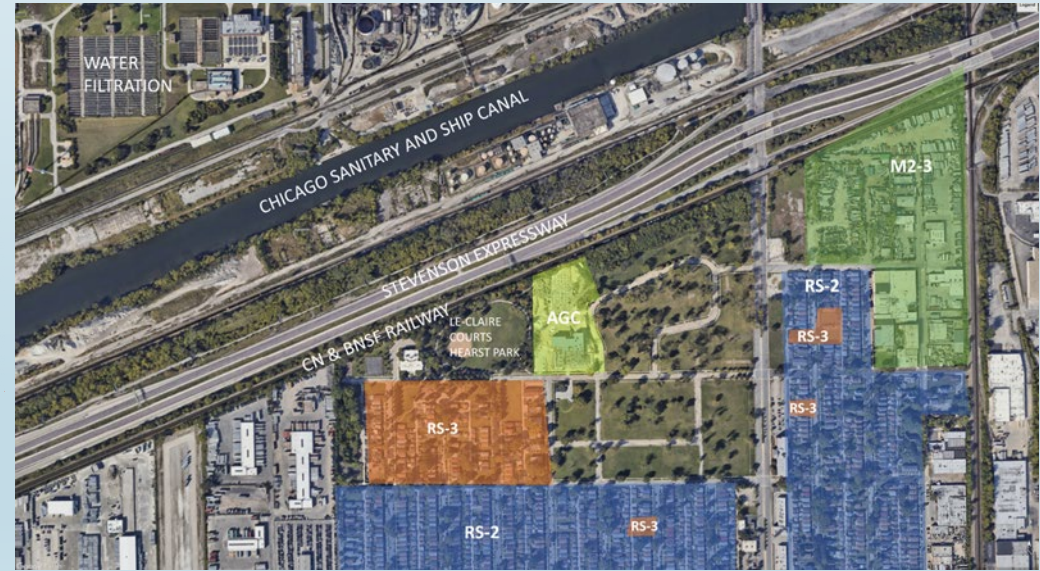
NGA GLASS CONFERENCE: MILWAUKEE 2024

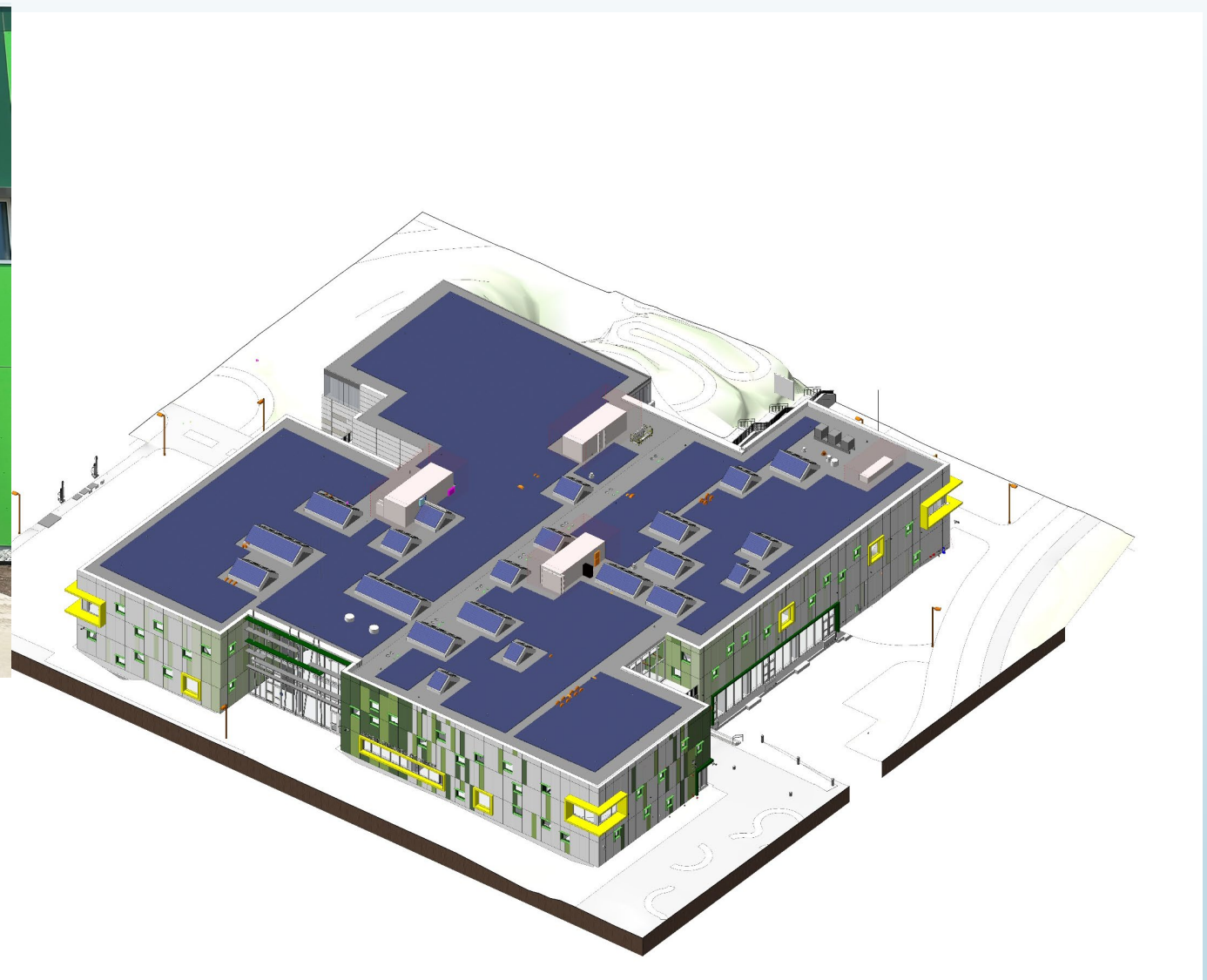
GLASS AND HIGH PERFORMANCE BUILDINGS

**LEN SCIARRA, AIA, ASHRAE, LEED AP+/F, CPHC
FARR ASSOCIATES**



- K-8 School
- 5 “tenants”
- 70,000 square feet
- 2 stories
- 6 acres





- 4 types of glazing
 - Curtainwall
 - Punched
 - Translucent
 - Skylights



	NFRC Test Size		COG	
	U-	SHGC	U-	SHGC
Stick Built Curtain Wall				
CW1	0.33	0.32	0.24	0.32
CW2	0.20	0.42	0.14	0.44
Punched 1	0.14	0.46	0.13	0.57
Punched 2	0.14	0.28	0.12	0.35
Punched 3	0.16	0.25	0.12	0.35
Punched 4	0.17	0.39	0.13	0.57
Translucent	0.15	0.09	--	--
Skylights	0.19	0.20	--	--

+ Solar Control by Façade/Orientation

- Roof R-60
- Wall R-40
- Slab R-20
- Air Leakage 0.06 L/s @ 74Pa

- Heat Recovery Chiller Linked to Geothermal Well Field
- DOAS units with ERV

- Occupancy Sensors Throughout

- Stormwater Management/Rainwater Harvesting for Net Zero Water
- Photovoltaic array for Net Zero Energy



- Interior Views and Daylight



- Interior Views and Daylight



The timeline

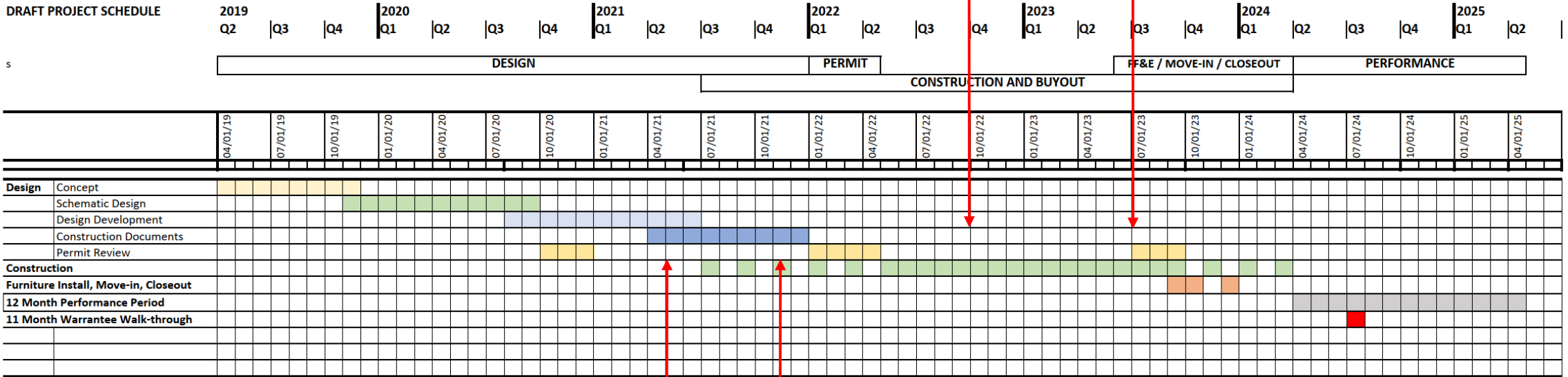
Blower Door Test - final

Mid Construction Blower Door Test

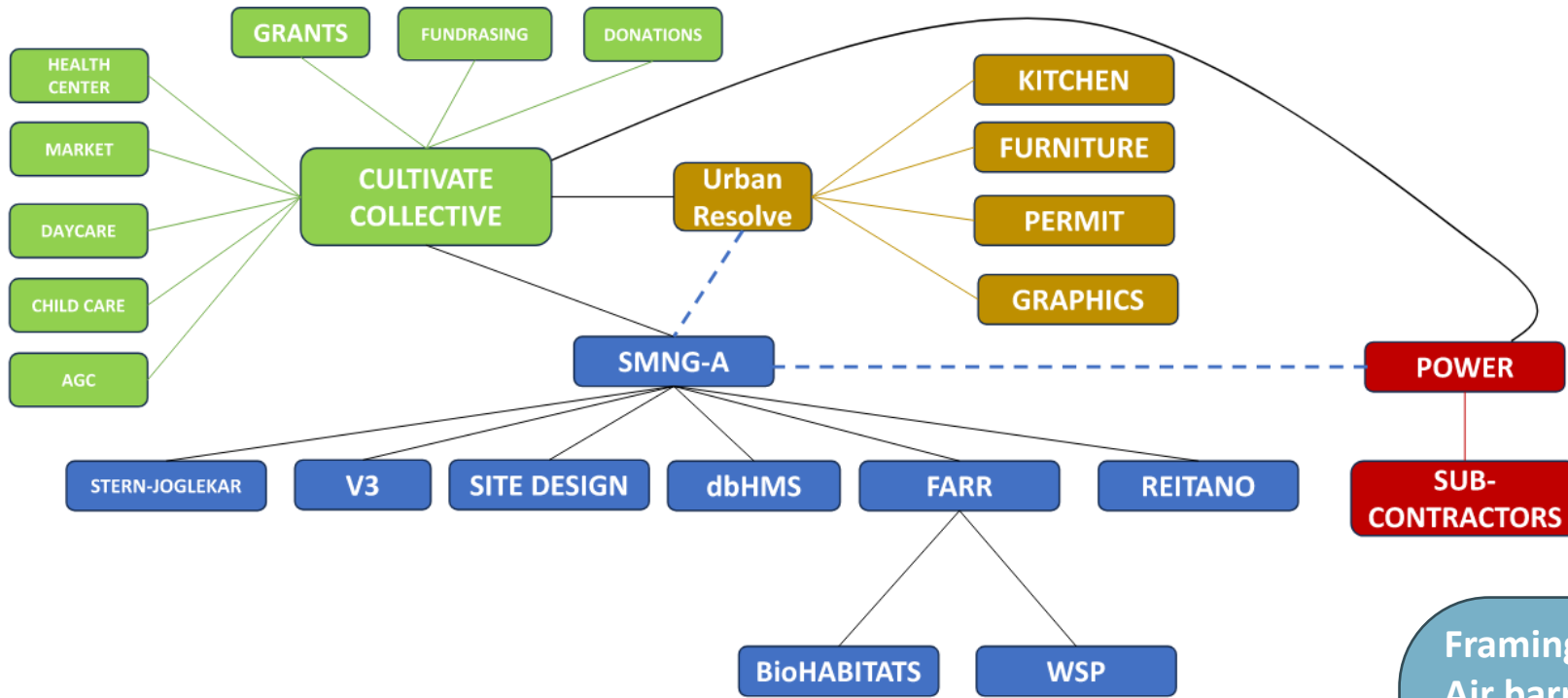
procurement

Academy for Global Citizenship

DRAFT PROJECT SCHEDULE

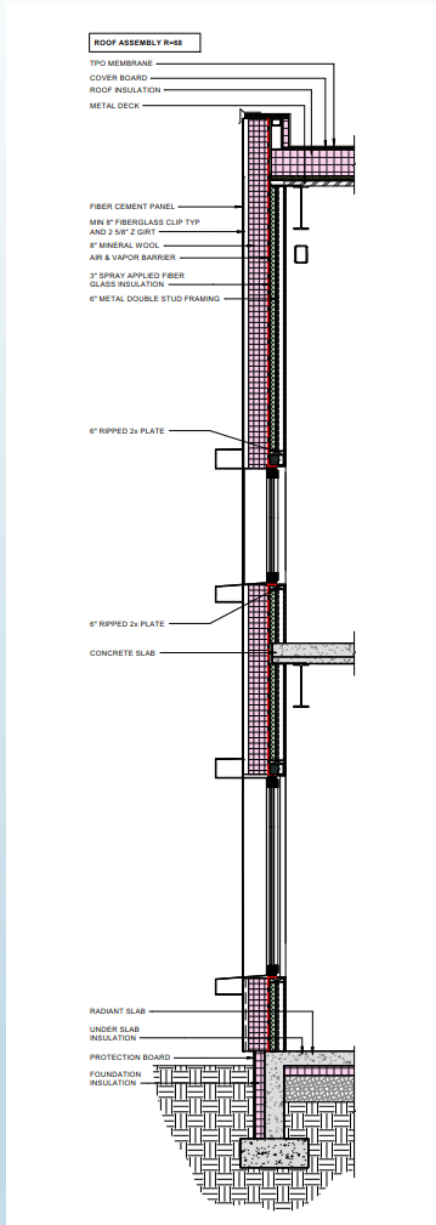


\$\$\$ → +/- 20% more than a typical CPS school, however with 0 operating costs

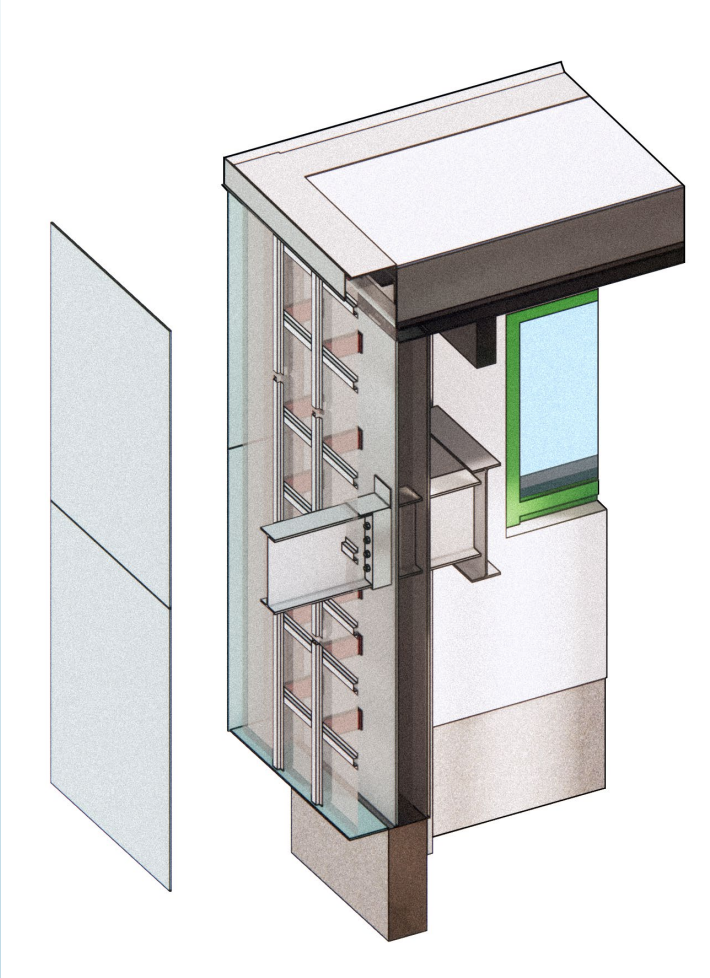


Framing and sheathing – RG Construction
 Air barrier installation - Kedmont
 Concrete and associated thermal – Cerami
 Punched windows – Alpen installed by Northern Glass
 Curtain wall – Gateway
 Roof - Bennet and Brousseau
 Skylights – Velux installed by Whited Brothers
 Plumbing and Mechanical – AMS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

The team



The wall section

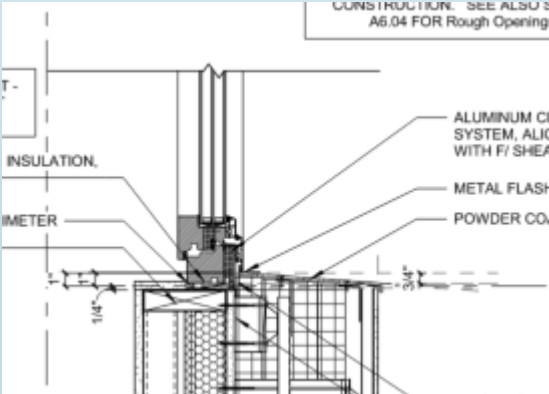
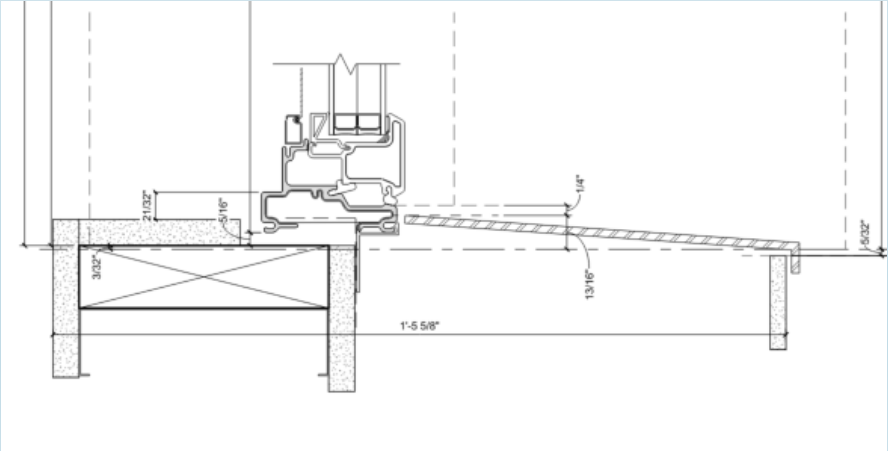


The mock up

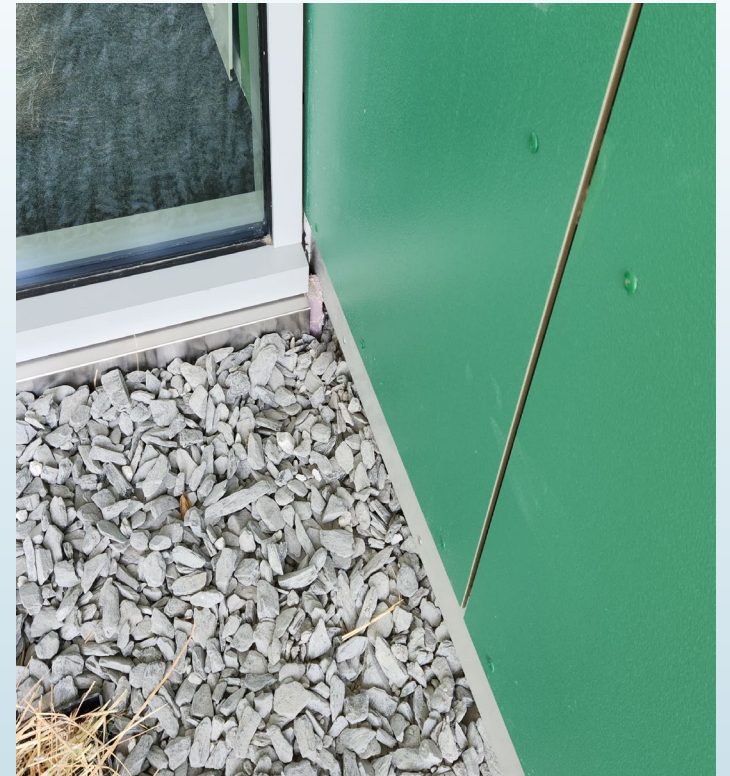
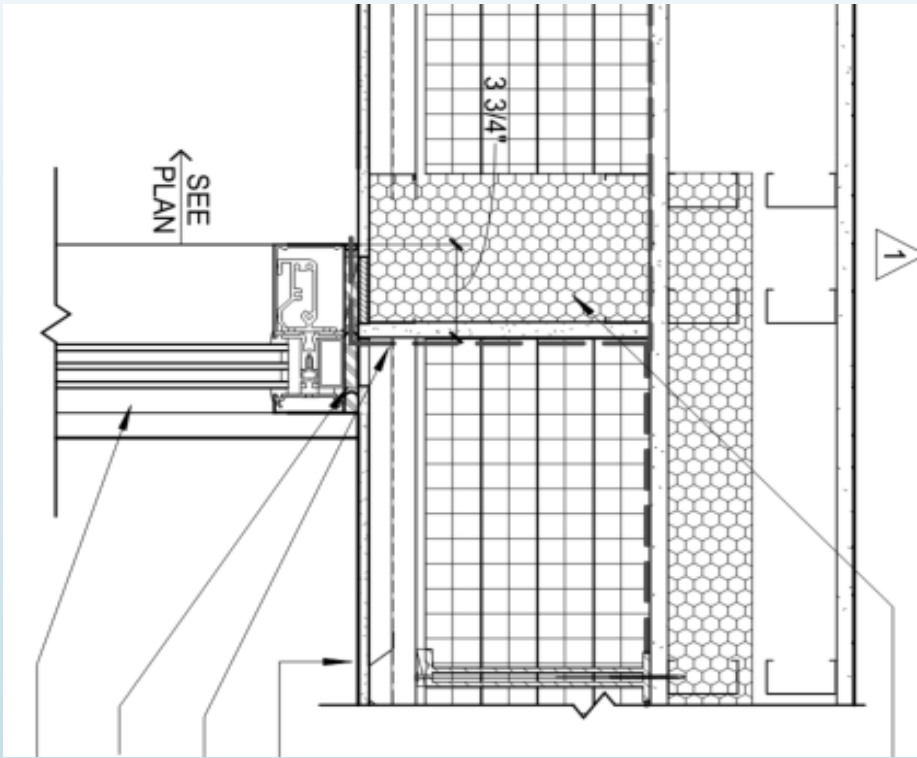


The details

Challenges with a "thick" wall



The details





Baseline EPF / Proposed EPF +/- 49%



Reduce Base and Peak Loads

Insulation

Air leakage

Solar Heat Gain control

Energy Recovery Ventilation

kWh / sqft target, for Annual and Peak



20 Imperatives, Grouped into

7 Petals

Petal 03 – Energy



Imperative 07 – Energy + Carbon Reduction

Imperative 08 – Net Positive Carbon

Requirements:

- Use 70% less energy than typical baseline building.
- Demonstrate 20% reduction in embodied carbon of building materials.
- Pre-install wiring for future renewable energy systems.

Petal 04 – Health And Happiness



Imperative 09 – Healthy Int. Environment

Imperative 10 – Healthy Int. Performance

Imperative 11 – Access to Nature

Requirements:

- Prohibit smoking within 25' of building openings.
- Develop a plan to reduce air-borne particulates and toxins.
- **Provide views and daylight to 75% of regularly occupied spaces. (95%)**

Requirements:

- Test the air quality six months after occupancy.
- Pick two:
 - **Provide operable windows**
 - Allow occupants to control thermostats

Requirements:

- **Provide human-nature interactions. (views)**
- Complete a post-occupancy evaluation that addresses the health benefits of the project.

Petal 05 – Materials



Imperative 12 – Responsible Materials

Imperative 13 – Red List

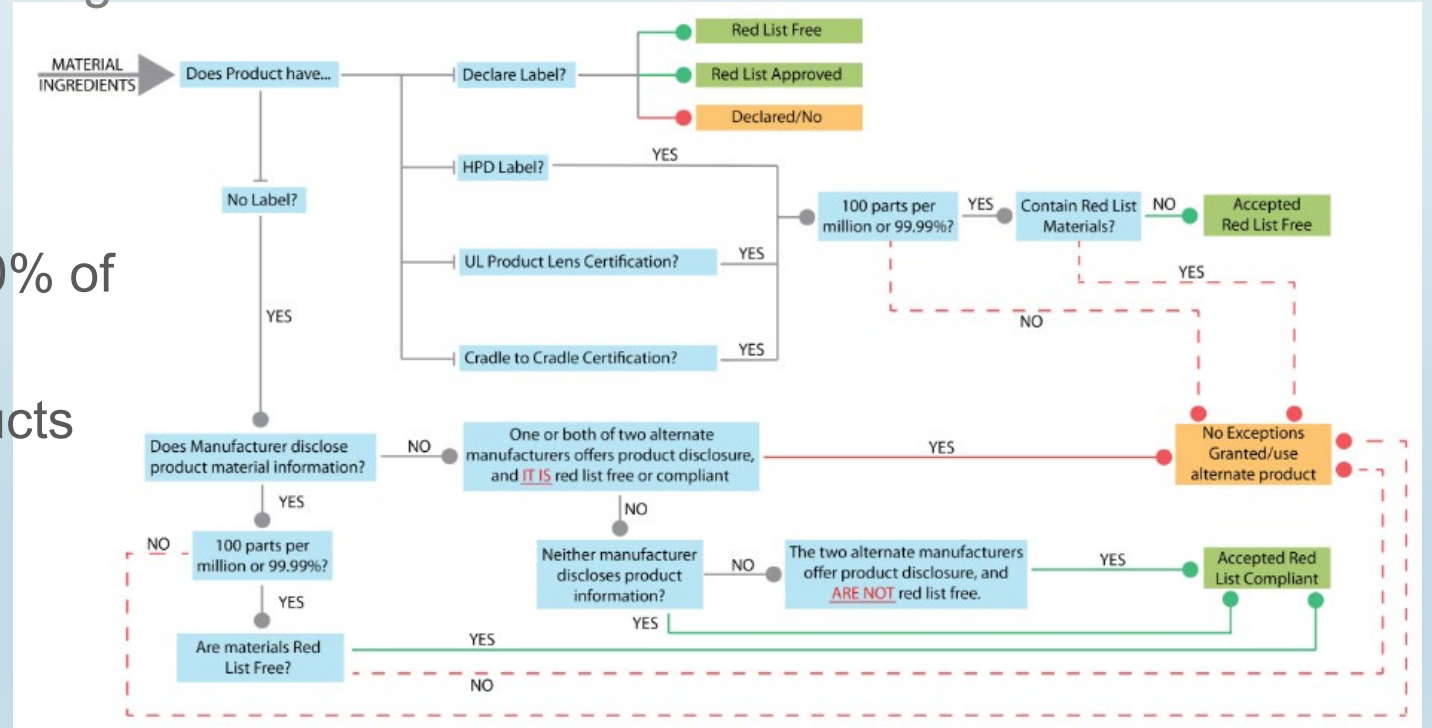
Imperative 14 – Responsible Sourcing

Imperative 15 – Living Economy Sourcing

Imperative 16 – Net Positive Waste

Requirements:

- Avoid red list chemicals in 90% of the project's new materials.
- Low to No VOC/TVOC products



MANUFACTURER'S RED LIST LETTER | LIVING BUILDING CHALLENGE



Submitted by: _____ Submission Date: _____

INSTRUCTIONS: Provide materials information in the sections below. Check off all attributes applicable to the material.

Project Summary

Project Name: **AGC School**
 Project Location (State): **IL**
 Project Location (City): **Chicago**

Product Summary

Product Name: _____
 Product Number #: _____
 Product Type: _____

Manufacturing

Manufacturer: _____ Contact: _____
 Manufacturing Location: City _____ State _____ Email: _____
 Distance from Site: _____ miles Phone: _____

Documentation Summary

TRANSPARENCY Attached?

Declare Y N Red List Free? Yes No Unknown VOC (g/L) if applicable: _____

HPD Y N Red List Compliant? Yes No Unknown

EPD Y N

MSDS Y N Recycled Content: post consumer %: _____

Other? Y N Declare Label #: _____ post industrial %: _____

Materials Composition Summary

Please list all material components in the table below, a full and comprehensive ingredients list is required.

Subcomponent Description	Material/ Ingredient Name	Proprietary Ingredients?	If Y, %	Documentation Provided			
				Comp MSDS	CAS#, ASTM#, UNS#	FSC COC#	RoHS Compliance
		Y <input type="radio"/> N <input type="radio"/>		Y <input type="radio"/> N <input type="radio"/>			
		Y <input type="radio"/> N <input type="radio"/>		Y <input type="radio"/> N <input type="radio"/>			
		Y <input type="radio"/> N <input type="radio"/>		Y <input type="radio"/> N <input type="radio"/>			

USG Sheetrock® Brand Joint Tapes by USG

Health Product Declaration v2.2

created via: HPDC Online Builder

HPD UNIQUE IDENTIFIER: 23665

CLASSIFICATION: 09 20 00 Plaster and Gypsum Board

PRODUCT DESCRIPTION: USG Sheetrock® Brand Joint Tapes include USG Sheetrock® Brand Paper Joint Tape and USG Sheetrock® Brand Heavy Joint Tape. Use these strong, cross-ribbed tapes with our joint compounds to reinforce joints and corners. The roughened surface ensures a strong bond and features a positive crease that simplifies corner applications.

Section 1: Summary

Basic Method / Product Threshold

CONTENT INVENTORY

- Inventory Reporting Format
- Nested Materials Method
 - Basic Method
 - Threshold Disclosed Per
 - Material
 - Product

- Threshold level
- 100 ppm
 - 1,000 ppm
 - Per GHS SDS
 - Other

- Residuals/Impurities
- Considered
 - Partially Considered
 - Not Considered
- Explanation(s) provided for Residuals/Impurities?
- Yes No

All Substances Above the Threshold Indicated Are:

Characterized Yes Ex/SC Yes No
 % weight and role provided for all substances.

Screened Yes Ex/SC Yes No
All substances screened using Priority Hazard Lists with results disclosed.

Identified Yes Ex/SC Yes No
All substances disclosed by Name (Specific or Generic) and Identifier.

Petal 05 – Materials

Imperative 12 – Responsible Materials

Imperative 13 – Red List

Imperative 14 – Responsible Sourcing

Imperative 15 – Living Economy Sourcing

Imperative 16 – Net Positive Waste

Requirements:

- Advocate for third-party standards (re. sustainability and fair labor) for resource extraction. (FSC)
- Declare Products
- LPC products



**LIVING
BUILDING
CHALLENGE™**

Declare.

**Gold RX
Swegon North America**

Final Assembly: Markham, Ontario, Canada
Life Expectancy: 25 Year(s)
End of Life Options: Recyclable (95%), Landfill (5%)

Ingredients:
 Iron; Aluminum; Zinc; Steel; Polyethylene Terephthalate; Polyethylene; EPDM; Nylon 6; PC/ABS; Saturated polyester; Acetic acid ethenyl ester, polymer with ethene; Polypropylene; Polycarbonate; Titanium dioxide; Glass, oxide, chemicals; Melamine; Amorphous silica; Polyether

Living Building Challenge Criteria: Compliant

I-13 Red List:
 LBC Red List Free % Disclosed: 100% at 100ppm
 LBC Red List Approved VOC Content: Not Applicable
 Declared

I-10 Interior Performance: Not Applicable
I-14 Responsible Sourcing: Not Applicable

SWE-0001
 EXP. 01 MAR 2021
 Original Issue Date: 2020

INTERNATIONAL LIVING FUTURE INSTITUTE™ living-future.org/declare

Living Product Challenge 2.0
Superior Essex
 CAT 6+ LSHF

Manufacturing Location: Houston, Kansas, USA

2/3	Place	Imperative Certified 11/20 Imperatives Achieved	Life Expectancy: 25 Years End of Life Options: 100% Recyclable Functional Unit: 1 Meter of Cable
1/2	Water		
1/2	Energy		
1/3	Health		
2/4	Materials		
2/4	Equity		
2/2	Beauty		

Climate Impact
 cradle-to-gate footprint: 0.0068 kg CO₂e

Water Impact
 cradle-to-gate footprint: 0.0037 m³

Energy Impact
 cradle-to-gate footprint: 814 MJ

Waste Impact
 100% diverted from landfill global landfill footprint

Declare.
 LBC 1.3 Red List:
 LBC Red List Free
 LBC Red List Approved
 Declared

Verified By: GreenCircle Certified **SPX-LP001**
 EXP. 07/31/2024

INTERNATIONAL LIVING FUTURE INSTITUTE™ living-future.org/lpc

Petal 05 – Materials

Imperative 12 – Responsible Materials

Imperative 13 – Red List

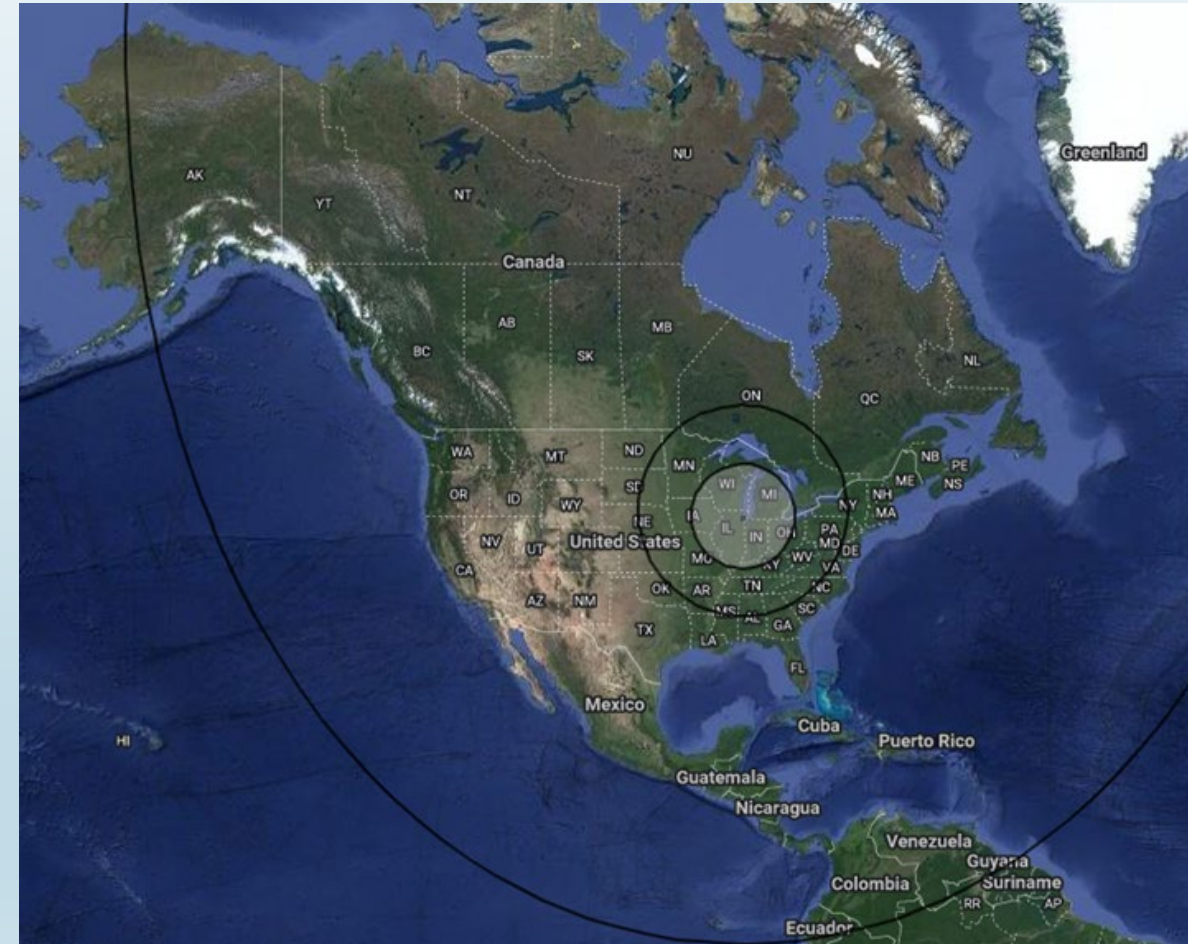
Imperative 14 – Responsible Sourcing

Imperative 15 – Living Economy Sourcing

Imperative 16 – Net Positive Waste

Requirements:

- Contribute to expansion of regional economy.
- 20% of material budget must come from within 500km
- 30% of material budget from within 1000km
- 25% of material budget from within 5000 km







Academy For Global Citizenship - NGA | August 2024

THANK YOU