

PHIUS WINDOWS

Enabling Flexibility in High-Performance Buildings

Coal Harbour Passive House
Vancouver, BC

AGENDA: WHAT ARE WE LOOKING AT TODAY?

- Intro to Cascadia Windows & Doors
- The Problem with Buildings
- Understanding PHIUS Windows
- Selecting a PHIUS Windows
- Window U-values in the real world

CONTINUING EDUCATION PRESENTATION

INTRO TO CASCADIA WINDOWS & DOORS

PHIUS WINDOWS:
Enabling Flexibility in High-Performance Buildings

825 Pacific Passive House
Vancouver, BC

FIBERGLASS INNOVATION

COMMERCIAL & MULTI-FAMILY
Windows & Window Wall
Storefront Glazing

RESIDENTIAL
Fixed & Operable Windows
Swing & Sliding Doors
Passive House Windows & Doors

THERMAL SPACER
Exterior Cladding Assemblies
Low-sloped Roofs & Soffits



University of Victoria - Cheko'nien Passive House
Victoria, BC

FIBERGLASS INNOVATION

COMMERCIAL & MULTI-FAMILY
Windows & Window Wall
Storefront Glazing

RESIDENTIAL
Fixed & Operable Windows
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Passive House Windows & Doors

THERMAL SPACER
Exterior Cladding Assemblies
Low-sloped Roofs & Soffits



Westside Clerestory
Vancouver, BC

FIBERGLASS INNOVATION

COMMERCIAL & MULTI-FAMILY
Windows & Window Wall
Storefront Glazing

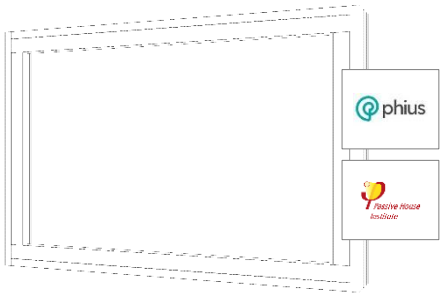
RESIDENTIAL
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THERMAL SPACER
Exterior Cladding Assemblies
Low-sloped Roofs & Soffits

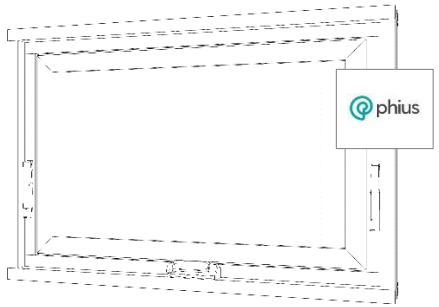


Belmont Park Village
Elmont, NY

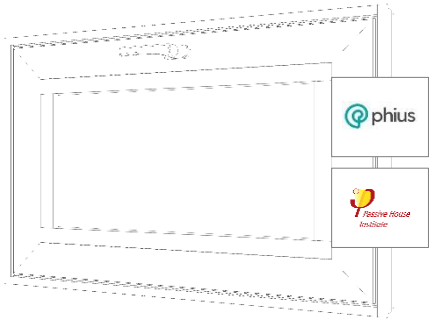
WINDOW PRODUCTS



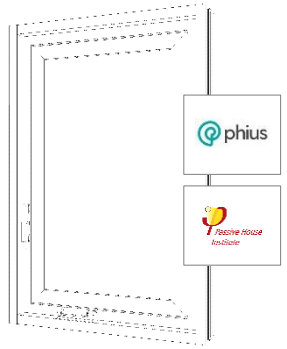
FIXED



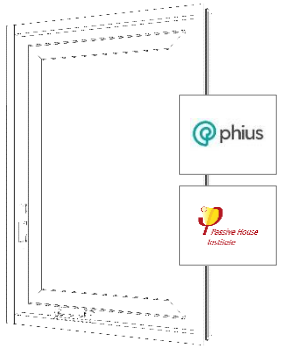
AWNING



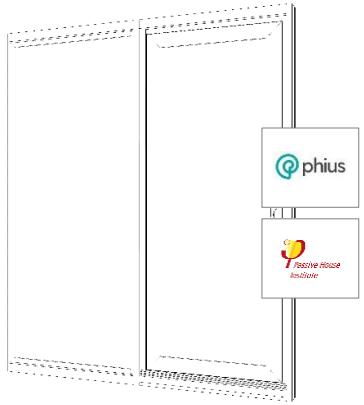
HOPPER



CASEMENT
INSWING & OUTSWING



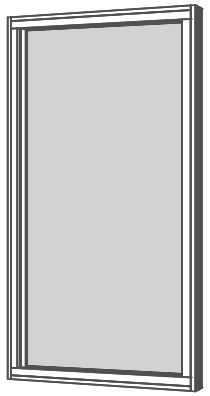
TILT & TURN



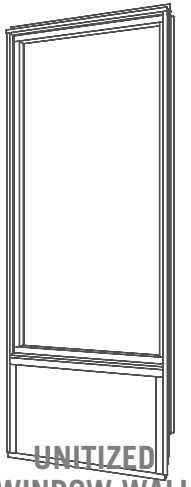
SLIDING DOORS
TILT / SLIDE & OUTSLIDE



SWING DOORS
TILT / SWING & OUTSWING



OPAQUE AREAS
GLASS & METAL PANELS



UNITIZED
WINDOW WALL

LEVERAGING HIGH-PERFORMANCE FIBERGLASS

HIGH PERFORMANCE. HIGH PRIORITY.

DOUBLE GLAZED
U – 0.20 – 0.26 btu/hr · ft^2 · F

TRIPLE GLAZED
U – 0.13 – 0.17 btu/hr · ft^2 · F

TRANSPARENT INSULATION
U – 0.07– 0.15 btu/hr · ft^2 · F

LOOKING TO GO BIG

DOUBLE GLAZED FIXED
Up to 60 ft^2

CASEMENT
36” x 84”

TILT & TURN
60” x 99”

AWING
48” x 84”
& 84” x 36”

LONG-TERM THINKING

Modelled lifespan
up to 80 years

Declare Red List Free

Full LCA & EPD

Wildfire Resistant
(SFM 12-7A-2 tested)

CONTINUING EDUCATION PRESENTATION

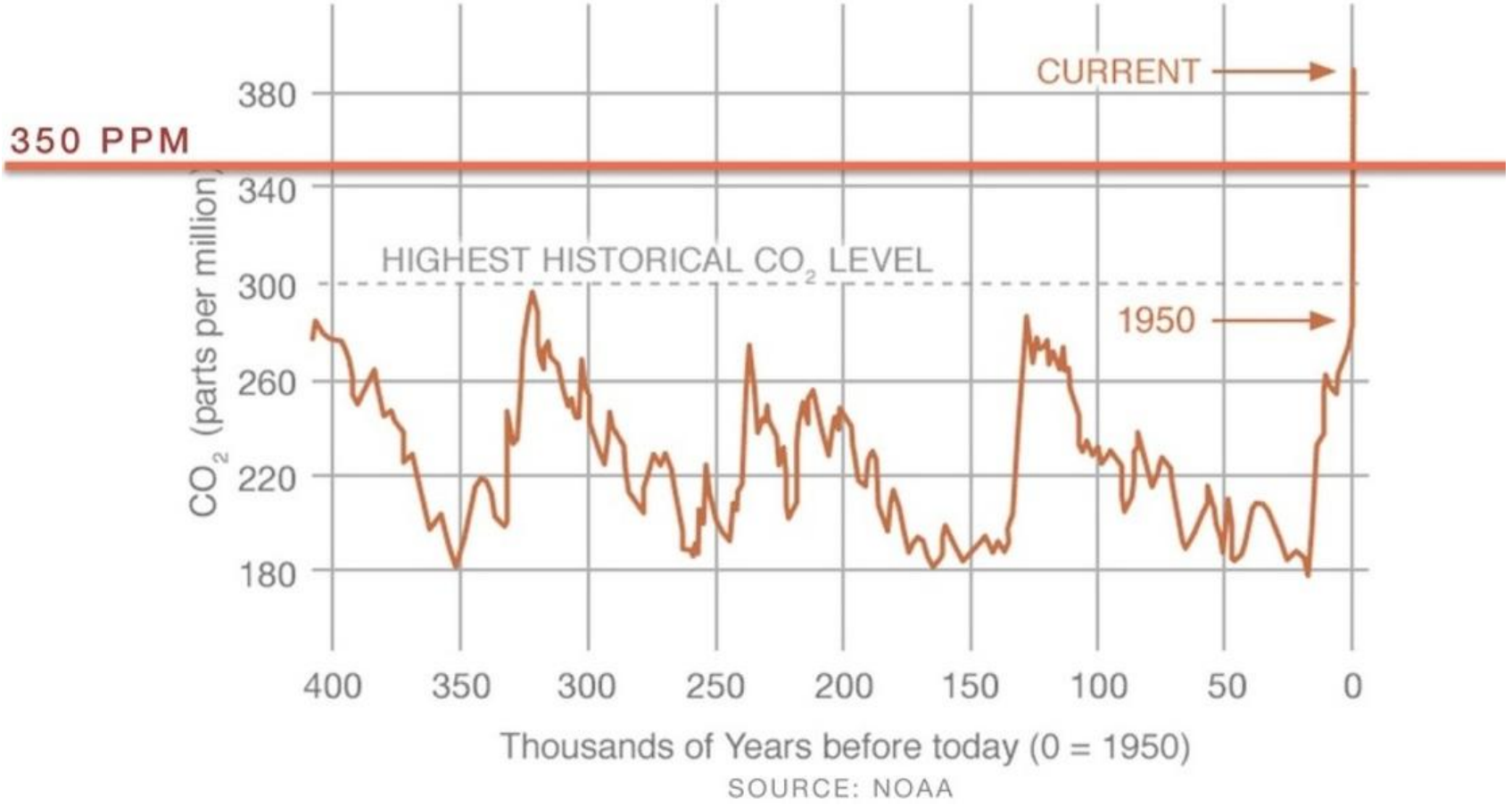
THE PROBLEM WITH BUILDINGS



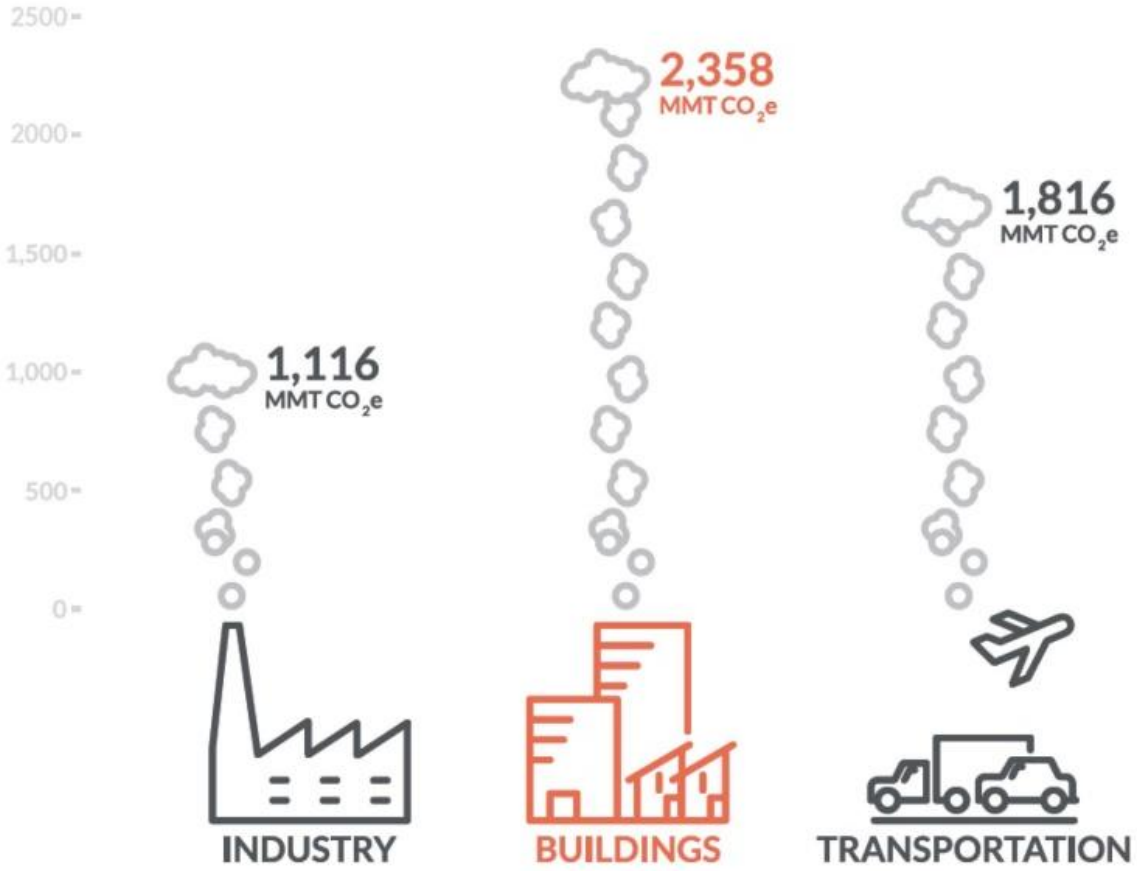
PHIUS WINDOWS:
Enabling Flexibility in High-Performance Buildings

The Chelsea
Vancouver, BC

THE WORLD IS CHANGING. QUICKLY.

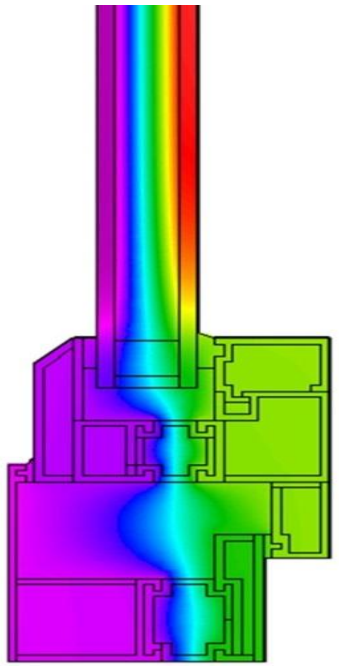


WHAT'S THE PROBLEM?

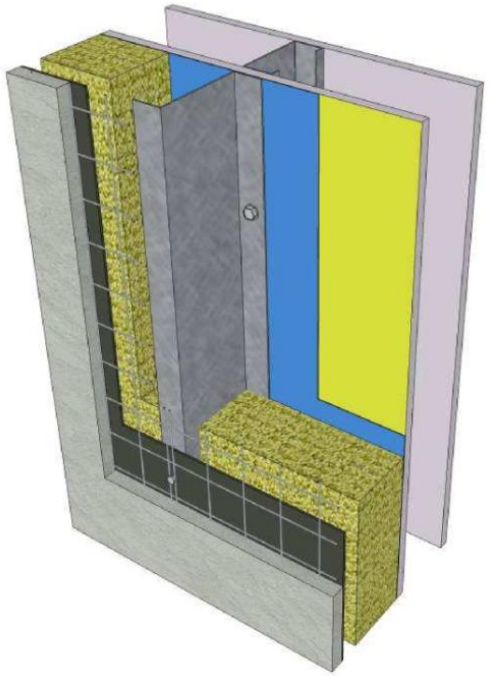


BUILDINGS ARE RESPONSIBLE FOR 44.5% OF US CO_2 EMISSIONS.

WHAT ARE THE LARGEST CONTRIBUTORS TO HEAT LOSS?



POOR WINDOW PERFORMANCE



POOR WALL PERFORMANCE



30% TO 50%

OF A BUILDING'S HEATING & COOLING ENERGY IS LOST THROUGH WINDOWS

BY IMPROVING THE WINDOW FRAME, YOU IMPROVE THE OVERALL PERFORMANCE OF THE ENTIRE WINDOW

Broeckx-Smith, S., Suh, S., 2019

THE IMPACT OF HIGH-PERFORMANCE

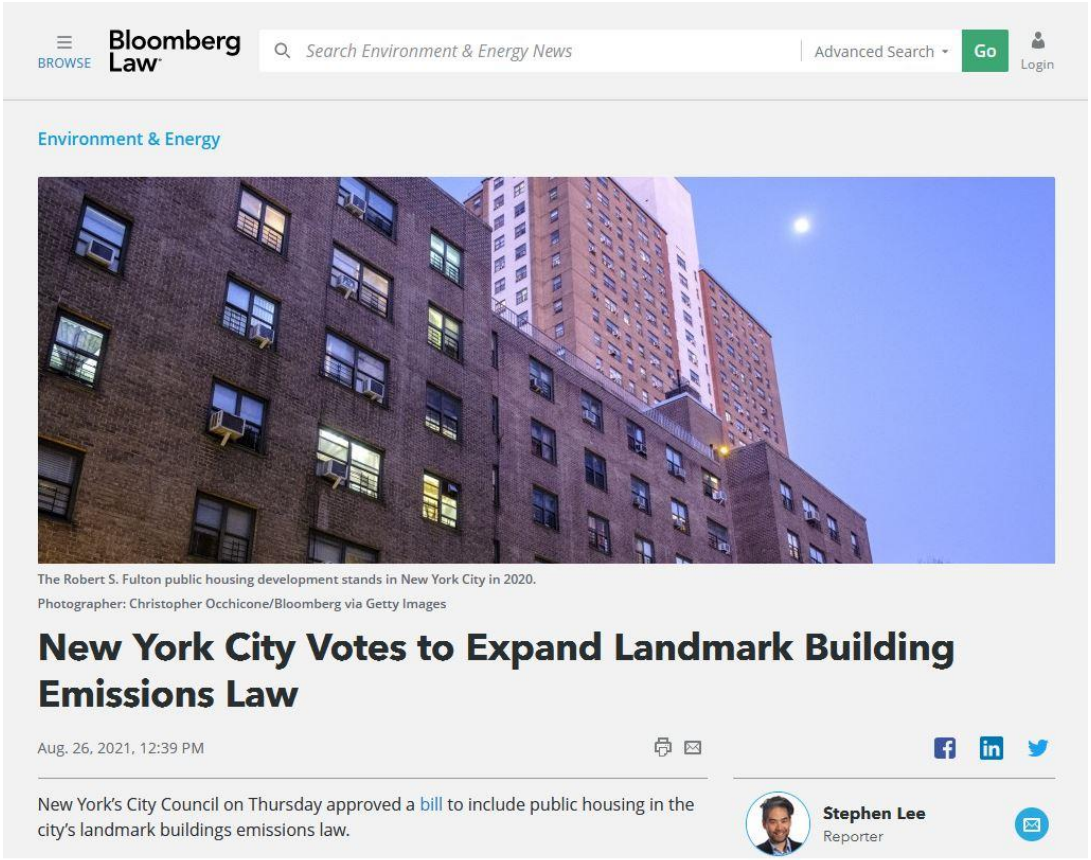


Jervis Street
Vancouver, BC

WHAT ARE WE DOING ABOUT IT?

EXISTING BUILDINGS

DICTATING BETTER PERFORMANCE



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Environment & Energy

The Robert S. Fulton public housing development stands in New York City in 2020.
Photographer: Christopher Occhicone/Bloomberg via Getty Images

New York City Votes to Expand Landmark Building Emissions Law

Aug. 26, 2021, 12:39 PM

New York's City Council on Thursday approved a bill to include public housing in the city's landmark buildings emissions law.

Stephen Lee
Reporter



DICTATING BETTER PERFORMANCE

ENERGIZE DENVER

- Denver's building performance standard for existing buildings ≥25,000 sf, based on measured energy use—not design intent
- Performance-driven compliance elevates the role of high-performance envelopes (airtightness, insulation continuity, thermal bridge control)
- Phased targets through 2040 support strategic envelope retrofits aligned with capital improvement cycles
- Electrification goals increase enclosure importance, reducing loads and supporting all-electric systems
- Early envelope decisions reduce compliance risk and cost, enabling downsized systems and long-term performance



Brief

New Era of Energy Policy: Energize Denver & Building Performance Colorado

August 13, 2024 10 Minute Read

Energy policies focused on building performance are taking shape in Colorado and across the U.S. to varying degrees despite facing legal challenges that could alter the impacts to commercial real estate stakeholders down the road. Energize Denver and Building Performance Colorado (BPC) are local initiatives that aim to improve energy efficiency in buildings, including through electrification.

Looking for a PDF of this content?

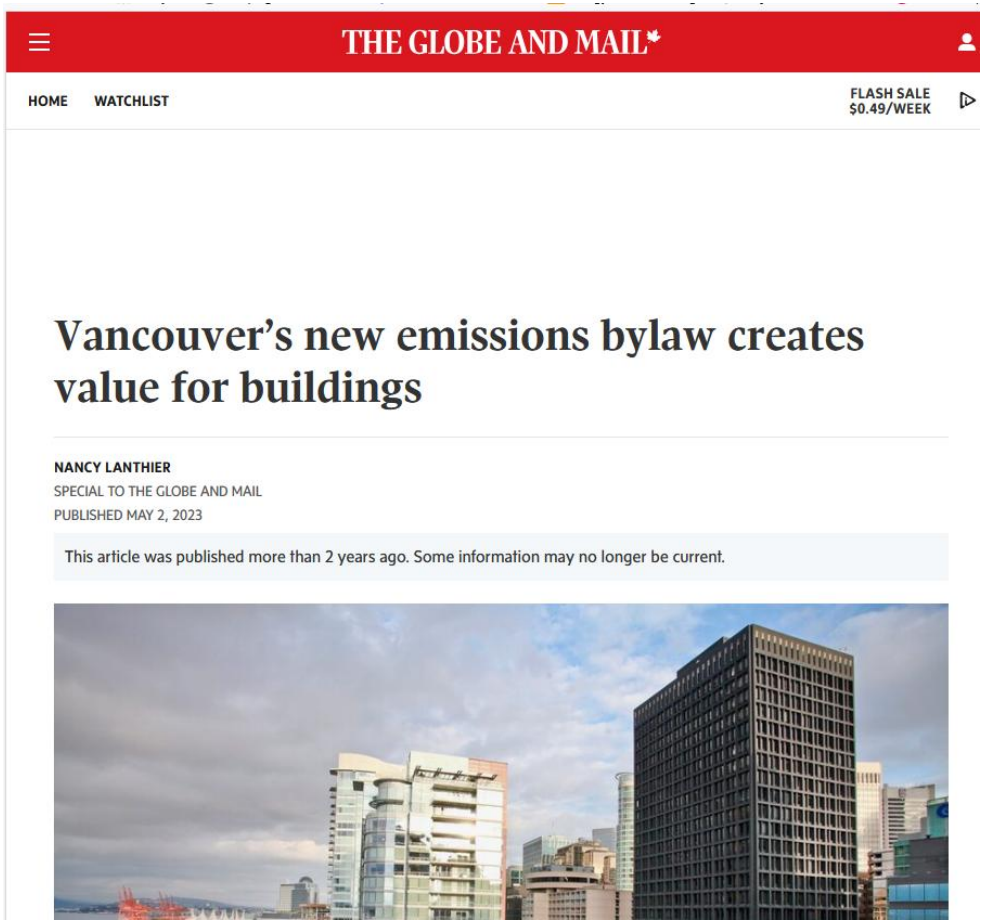
Download

Both policies hold significant relevancy for occupiers, owners, or investors alike as the process to achieve compliance can be complex and costly, particularly for properties of an older vintage. 57% of Metro Denver's commercial space was constructed in the 1990s or earlier.

DICTATING BETTER PERFORMANCE

ENERGIZE VANCOUVER

- Vancouver's building performance standard for existing large buildings, using measured energy and carbon performance
- Carbon-focused compliance increases the value of high-performance envelopes to reduce heating demand and operational emissions
- Progressive targets toward 2050 support long-term retrofit planning and deep energy upgrades
- Electrification and low-carbon heating heighten the need for airtight, well-insulated enclosures to manage peak loads
- Envelope upgrades lower compliance risk and costs, enabling efficient systems and improved occupant comfort



THE GLOBE AND MAIL

HOME WATCHLIST

FLASH SALE $0.49/WEEK

Vancouver's new emissions bylaw creates value for buildings

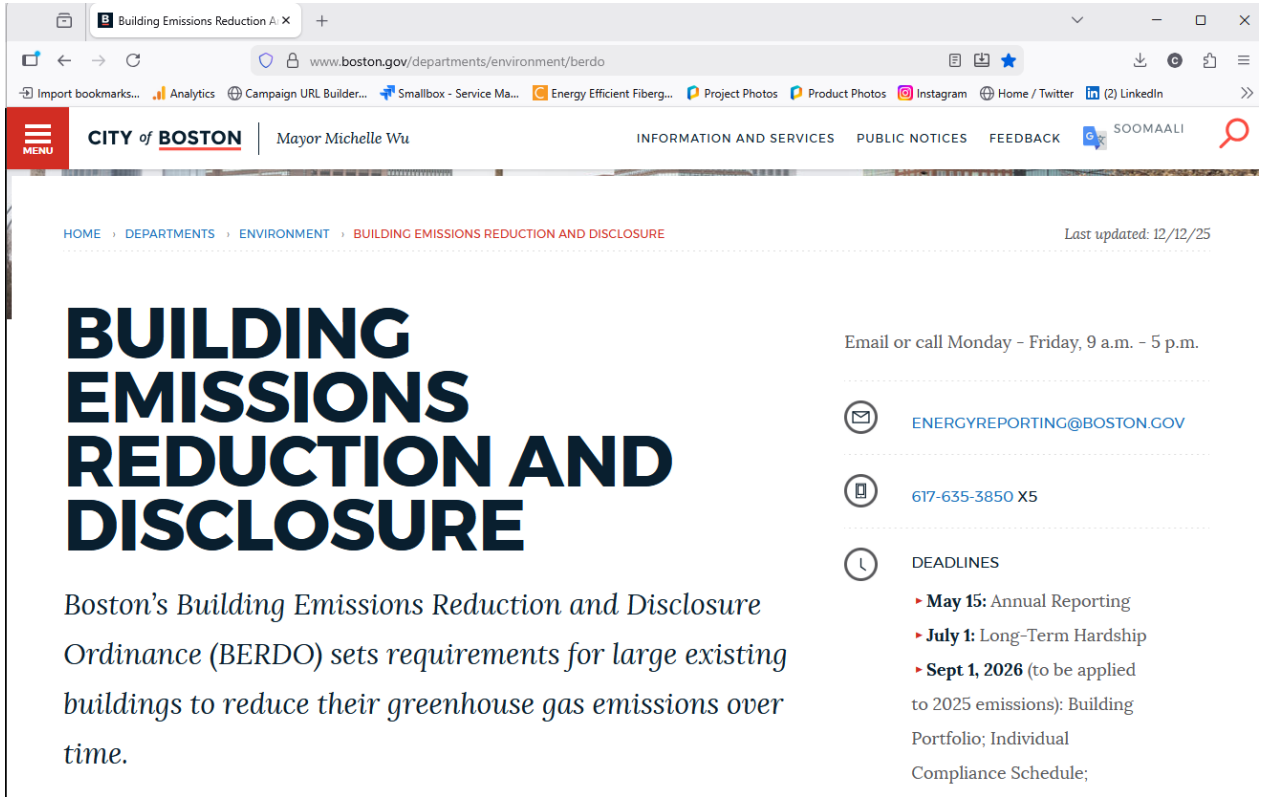
NANCY LANTHIER
SPECIAL TO THE GLOBE AND MAIL
PUBLISHED MAY 2, 2023

This article was published more than 2 years ago. Some information may no longer be current.

DICTATING BETTER PERFORMANCE

BERDO

- Boston's building emissions standard requiring large existing buildings to report energy use and meet declining operational carbon limits
- Carbon-based compliance (tCO_2e) shifts focus from energy alone to envelope-driven load reduction and fuel switching impacts
- Tightening targets through 2050 encourage phased deep retrofits aligned with major renovation cycles
- Electrification amplifies enclosure performance needs, as airtightness and insulation help control winter peak loads in a cold climate
- High-performance envelopes reduce compliance risk and cost, supporting smaller systems, resilience, and long-term decarbonization



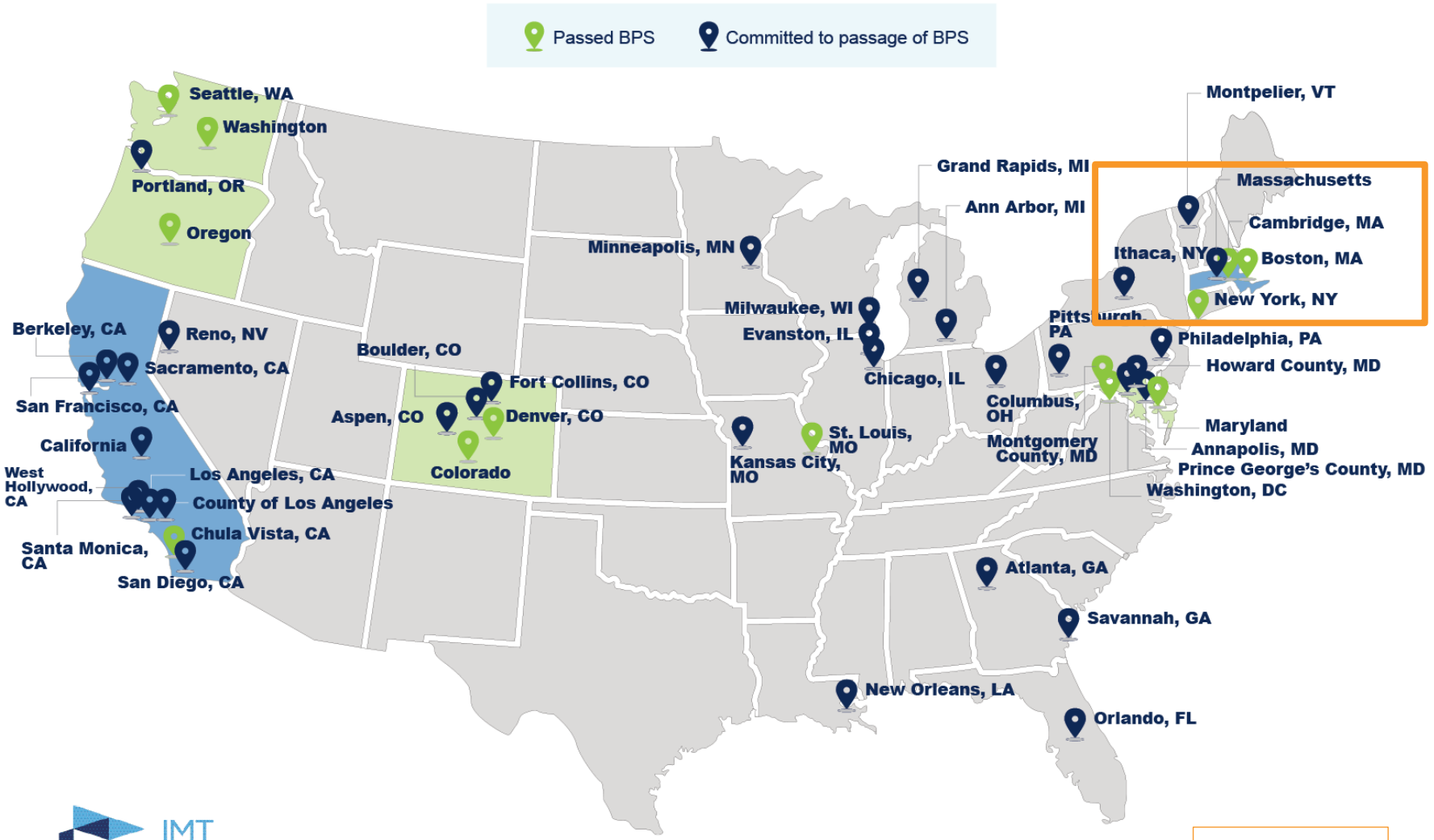
WHAT ARE WE DOING ABOUT IT?

NEW CONSTRUCTION

SHIFTING TOWARDS PERFORMANCE

The State of Building Performance Standards (BPS) in the U.S.

Members of the National BPS Coalition as of July 2024



IMT
INSTITUTE FOR MARKET TRANSFORMATION

MASSACHUSETTS APPROACH

BASE CODE

Aligns with the 2021 International Energy Conservation Code (IECC) with specific Massachusetts amendments.

STRETCH CODE

An optional, more stringent code emphasizing energy performance over prescriptive measures, aiming for cost-effective, energy-efficient construction.

SPECIALIZED CODE

An opt-in code offering higher energy efficiency standards for municipalities seeking advanced sustainability goals.

MASSACHUSETTS APPROACH

STRETCH CODE

- **INTRODUCTION:** First adopted in 2009, Massachusetts' Stretch Code serves as an appendix to the base code, focusing on enhanced energy performance.
- **ADOPTION:** As of November 15, 2024, numerous municipalities have adopted the Stretch Code, reflecting a statewide commitment to energy efficiency.
- **IMPLEMENTATION:** The Stretch Code is updated periodically to incorporate advancements in energy efficiency, with the latest updates aligning with the 2021 IECC.

Massachusetts cities embrace voluntary green building codes

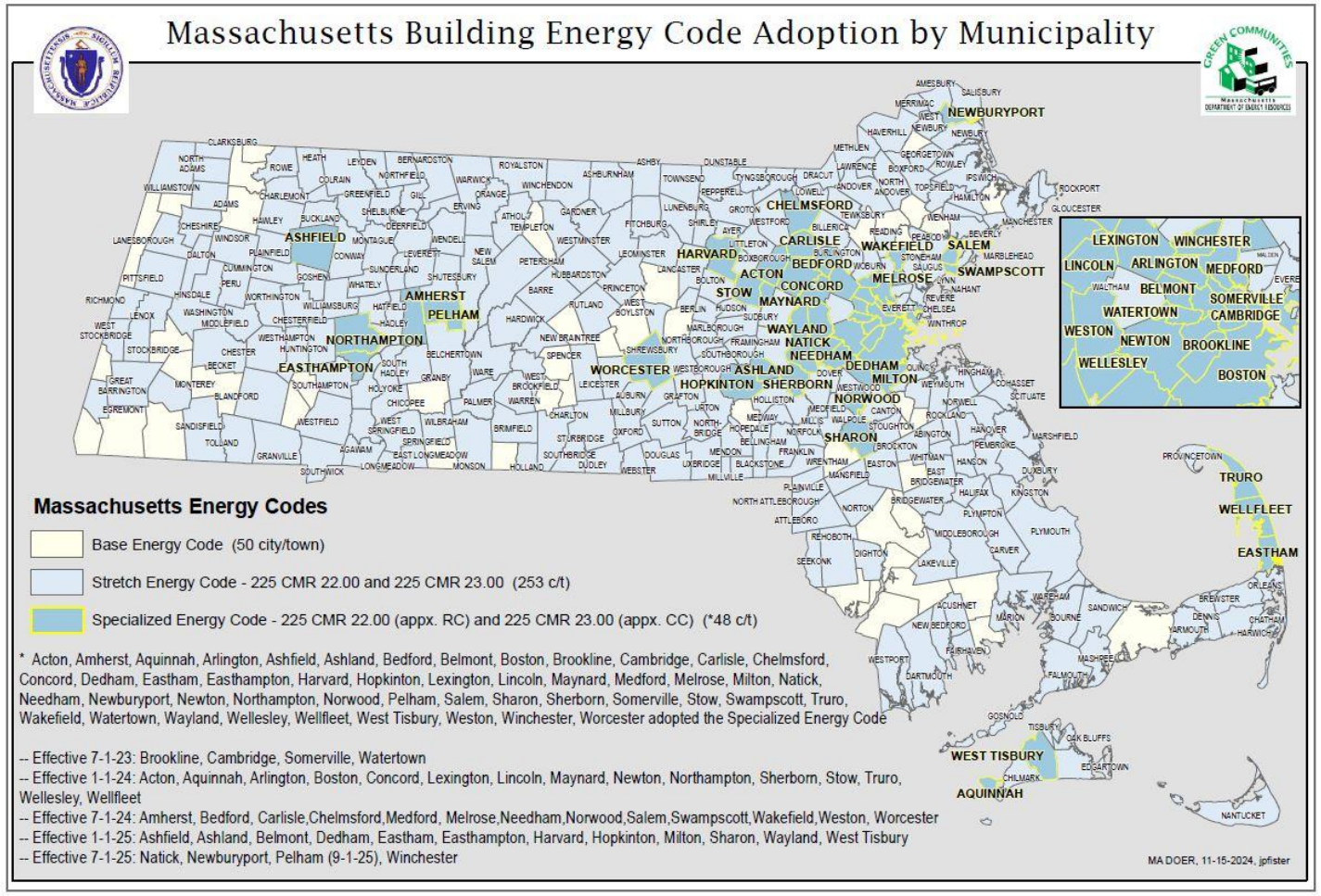
Since state lawmakers approved an optional stretch code early last year, 45 municipalities covering about 30% of the state's population have adopted the guidelines.



By **Sarah Shemkus**
11 September 2024



MASSACHUSETTS APPROACH



CONTINUING EDUCATION PRESENTATION

UNDERSTANDING PHIUS WINDOWS

PHIUS WINDOWS:
Enabling Flexibility in High-Performance Buildings



Bush School Passive House
Seattle, WA

PASSIVE HOUSE US (PHIUS) APPROACH

THERMAL CONTROL

HIGH-PERFORMANCE ENCLOSURE

THERMAL BRIDGE ELIMINATION

AIR CONTROL

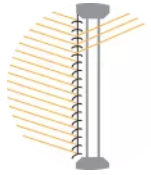
AIR-TIGHTNESS

BALANCED VENTILATION

RADIATION CONTROL



HIGH PERFORMANCE GLAZING



SHADING & DAYLIGHTING

MOISTURE CONTROL

MATERIAL MOISTURE

AIR HUMIDITY

Image courtesy of PHIUS

PHIUS FOR WINDOWS

PHIUS WINDOW & DOOR CERTIFICATION

PHIUS-certified windows and doors provide precise thermal performance data, allowing professionals to model performance at project-specific dimensions, not just standard sizes.

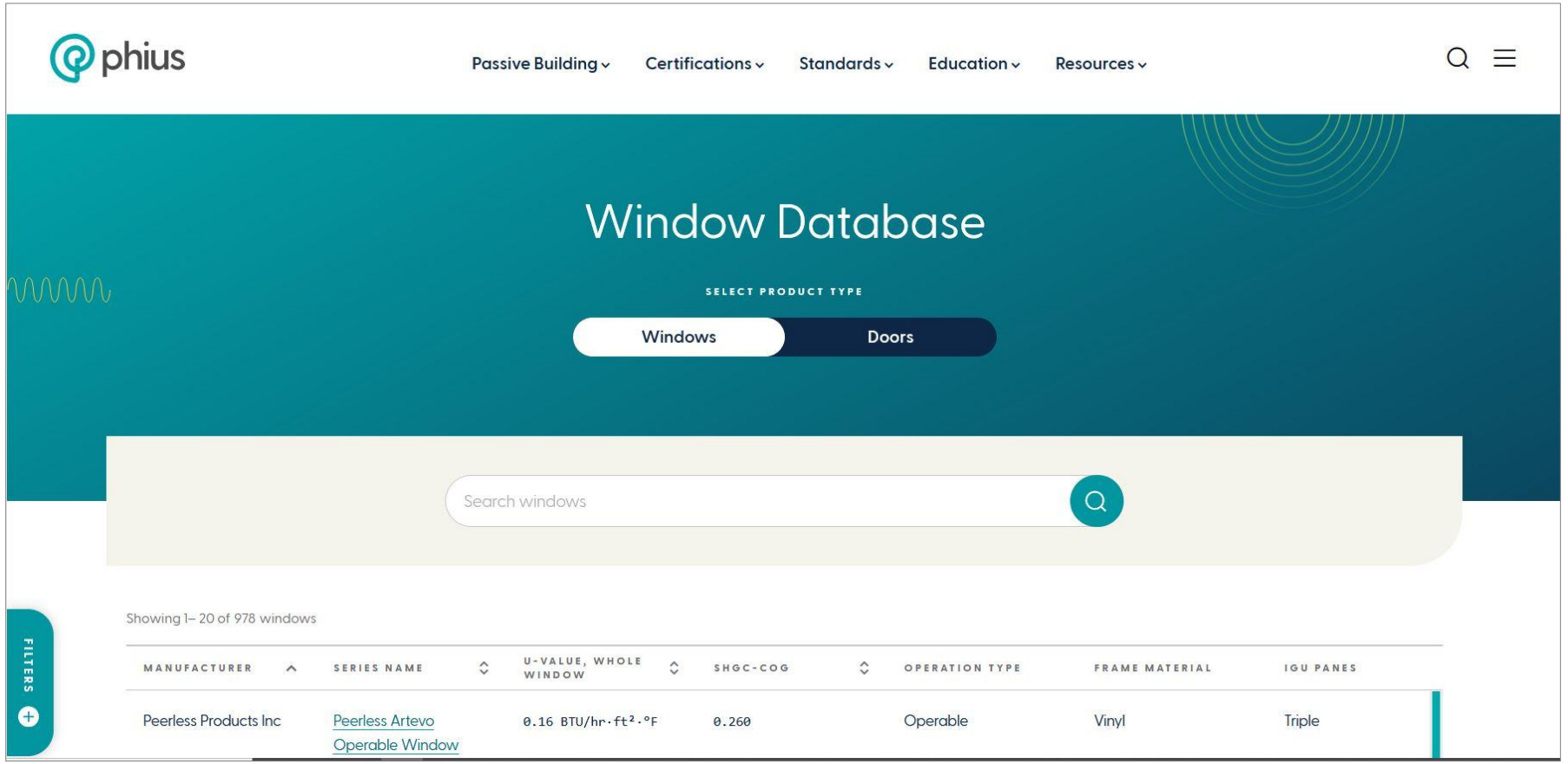
BLUE PATH

Utilizes existing National Fenestration Rating Council (NFRC) certifications to streamline the PHIUS certification process.

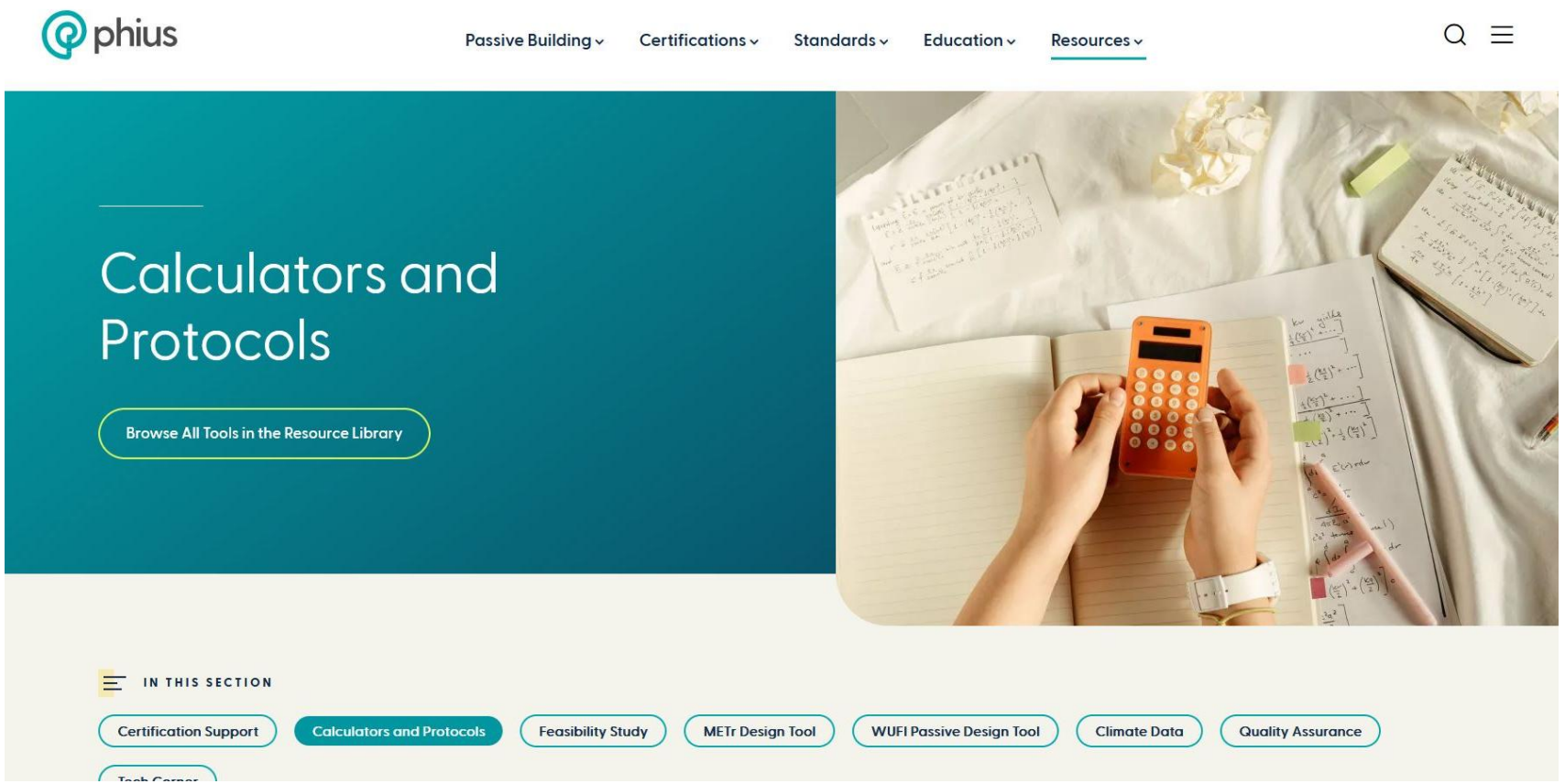
ORANGE PATH

Designed for products without prior certifications, involving performance modeling by PHIUS-trained simulators.

PHIUS WINDOW DATABASE



PHIUS CALCULATORS & TOOLS



CONTINUING EDUCATION PRESENTATION

SELECTING A PHIUS WINDOW

PHIUS WINDOWS:
Enabling Flexibility in High-Performance Buildings

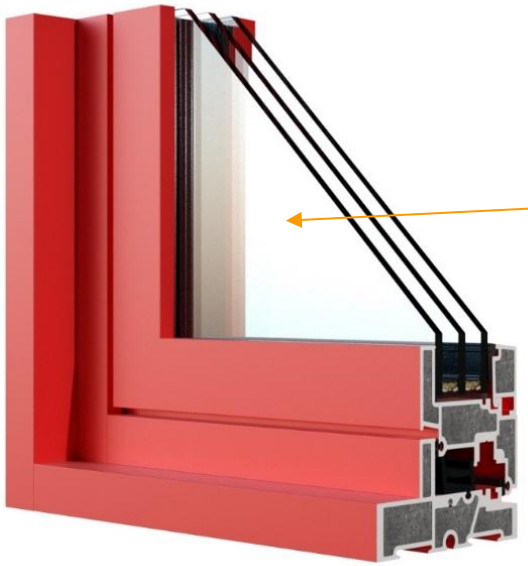
PAE Living Building
Portland, OR

PASSIVE HOUSE - WINDOW PRODUCT STRATEGY



WINDOW PRODUCT STRATEGY

SUMMARY OF GOOD WINDOW DESIGN



TRIPLE PANE
(GAS-FILLED
& LOW E-COATINGS)

WINDOW PRODUCT STRATEGY

SUMMARY OF GOOD WINDOW DESIGN

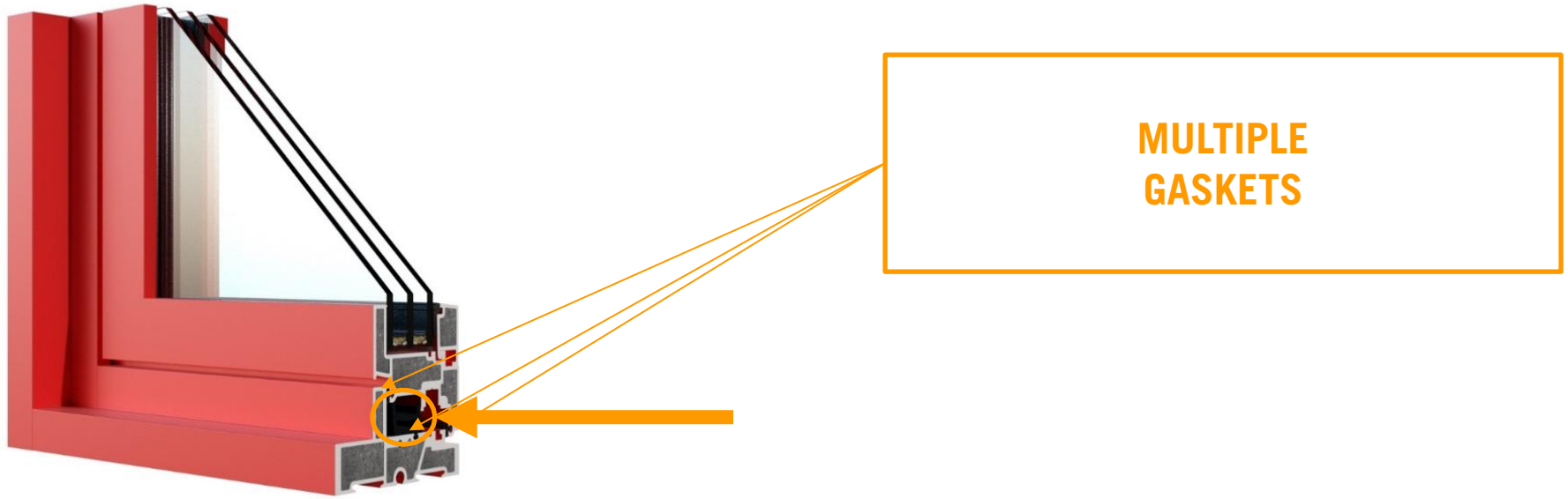


WARM EDGE SPACERS

TRIPLE PANE
(GAS-FILLED
& LOW E-COATINGS)

WINDOW PRODUCT STRATEGY

SUMMARY OF GOOD WINDOW DESIGN



TRIPLE PANE
(GAS-FILLED
& LOW E-COATINGS)

WARM EDGE
SPACERS

WINDOW PRODUCT STRATEGY

SUMMARY OF GOOD WINDOW DESIGN



INSULATED FRAME
(LOW CONDUCTIVITY
&/OR THERMAL BREAKS)

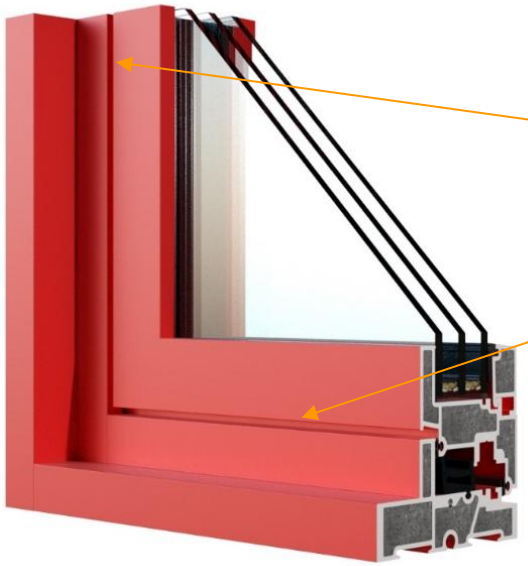
TRIPLE PANE
(GAS-FILLED
& LOW E-COATINGS)

WARM EDGE SPACERS

MULTIPLE GASKETS

WINDOW PRODUCT STRATEGY

SUMMARY OF GOOD WINDOW DESIGN



MULTI-POINT LOCKING

TRIPLE PANE
(GAS-FILLED & LOW E-COATINGS)

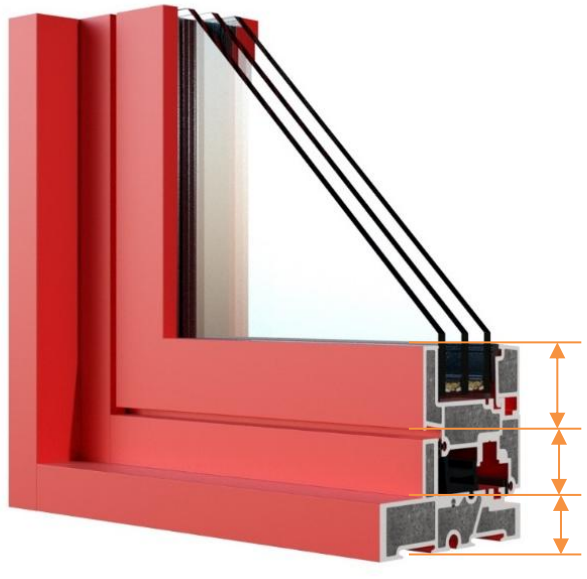
WARM EDGE SPACERS

MULTIPLE GASKETS

INSULATED FRAME
(LOW CONDUCTIVITY &/OR THERMAL BREAKS)

WINDOW PRODUCT STRATEGY

SUMMARY OF GOOD WINDOW DESIGN



MINIMIZED FRAME AREA

TRIPLE PANE (GAS-FILLED & LOW E-COATINGS)

WARM EDGE SPACERS

MULTIPLE GASKETS

INSULATED FRAME (LOW CONDUCTIVITY &/OR THERMAL BREAKS)

MULTI-POINT LOCKING

MINIMIZED FRAME AREA

WINDOW PRODUCT STRATEGY



WINDOW PRODUCT STRATEGY

THERMAL CONDUCTIVITY (W/MK)



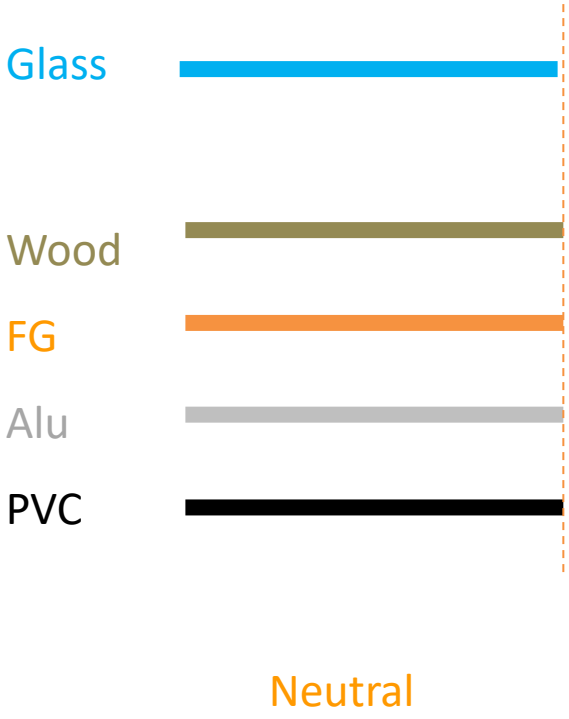
WINDOW PRODUCT STRATEGY

STRENGTH & STIFFNESS

MATERIAL	MODULUS OF ELASTICITY (GPa)
Steel	**200**
Aluminum	69
Fiberglass (polyester resin)	24
Wood, various	7 - 14
PVC/Vinyl	2.4 – 4.1

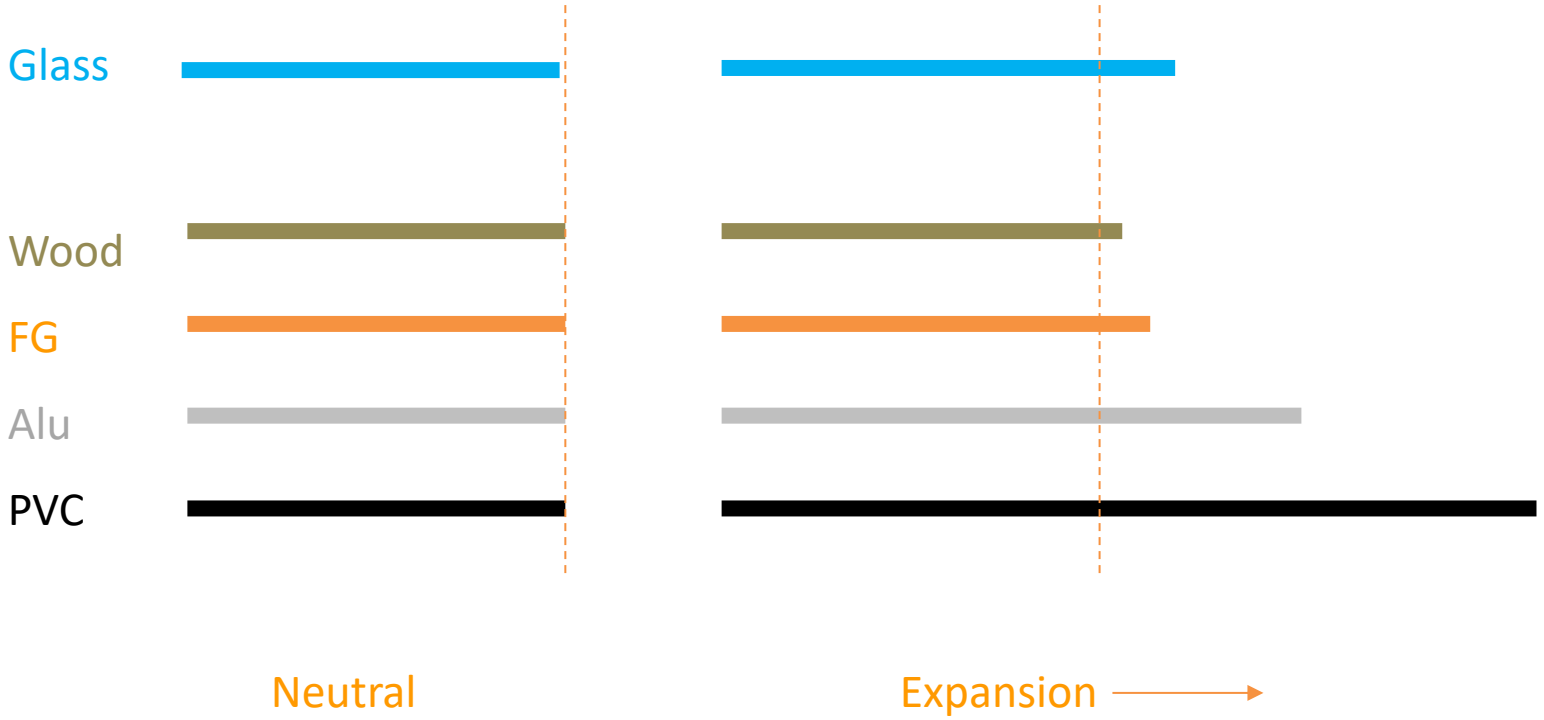
WINDOW PRODUCT STRATEGY

THERMAL EXPANSION COEFFICIENT - 10^{-6}M/(M°C)



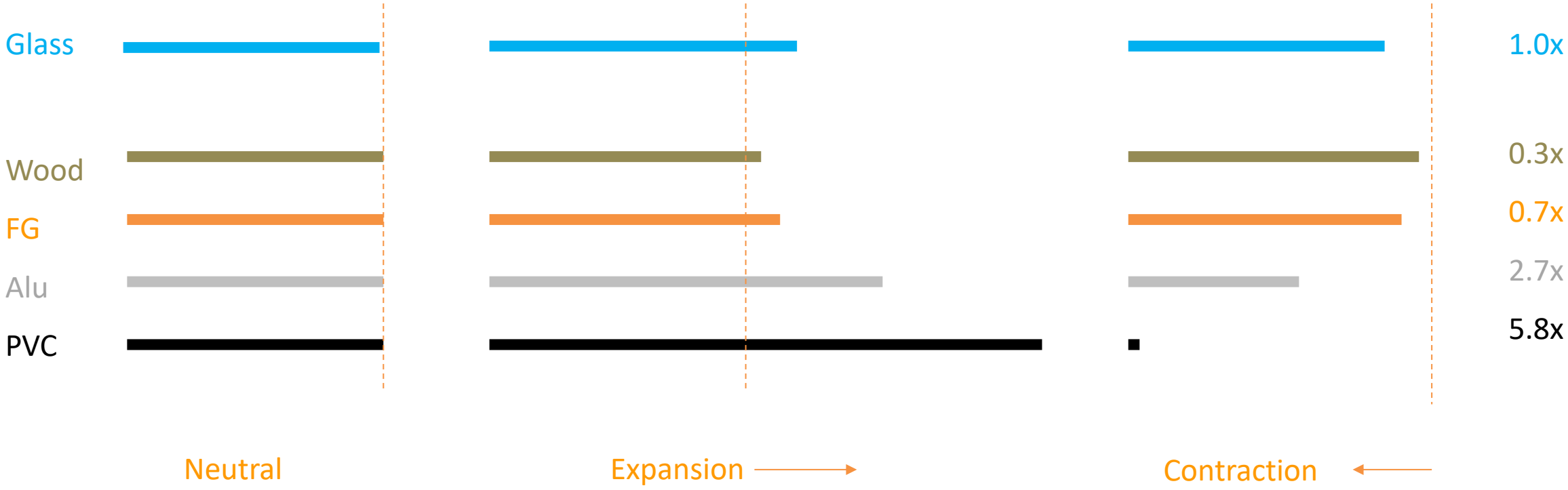
WINDOW PRODUCT STRATEGY

THERMAL EXPANSION COEFFICIENT - 10^{-6}M/(M°C)



WINDOW PRODUCT STRATEGY

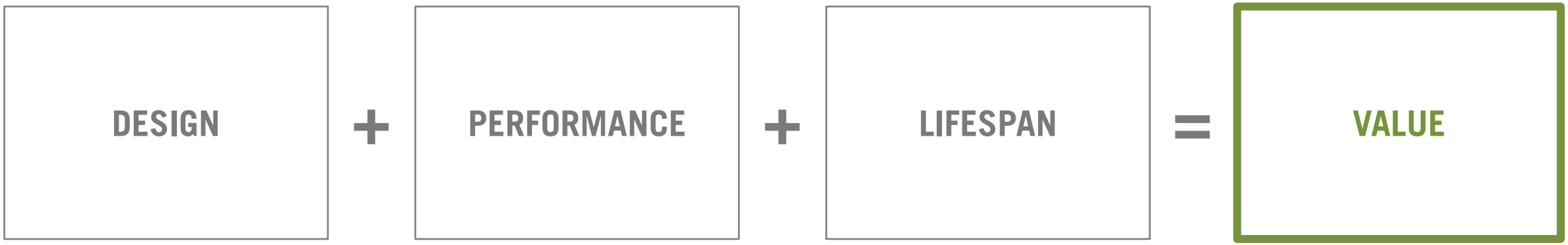
THERMAL EXPANSION COEFFICIENT - $10^{-6}M/(M^{\circ}C)$



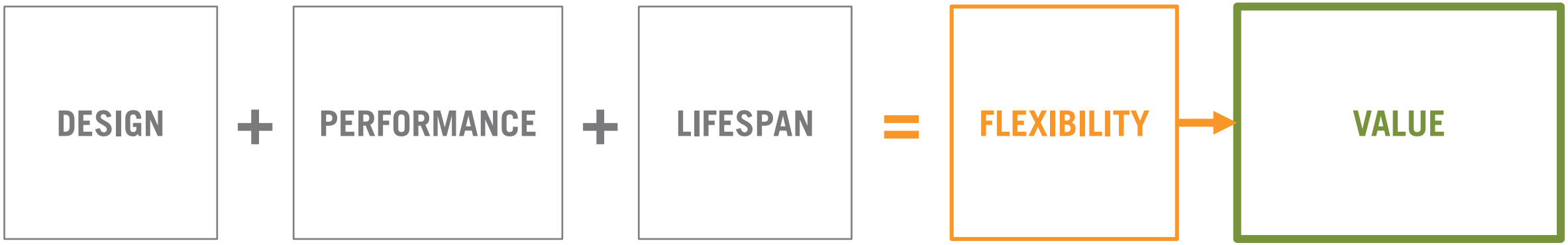
WINDOW PRODUCT STRATEGY



WINDOW PRODUCT STRATEGY



WINDOW PRODUCT STRATEGY





CONTINUING EDUCATION PRESENTATION

U-VALUES IN THE REAL WORLD

PHIUS WINDOWS:
Enabling Flexibility in High-Performance Buildings

Ken Soble EnerPHit
Hamilton, ON

BUSH SCHOOL – NEW UPPER SCHOOL

Seattle, WA

phius

ARCHITECT
Mithun

CONTRACTOR
Sargent Construction

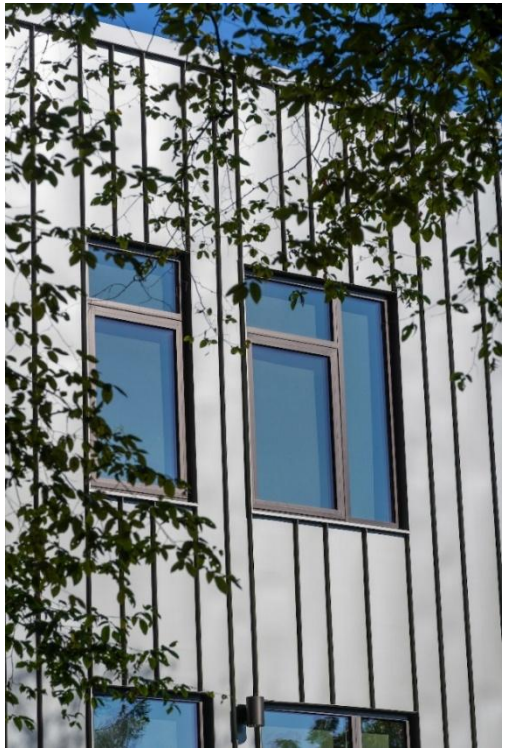
OWNER
Bush School

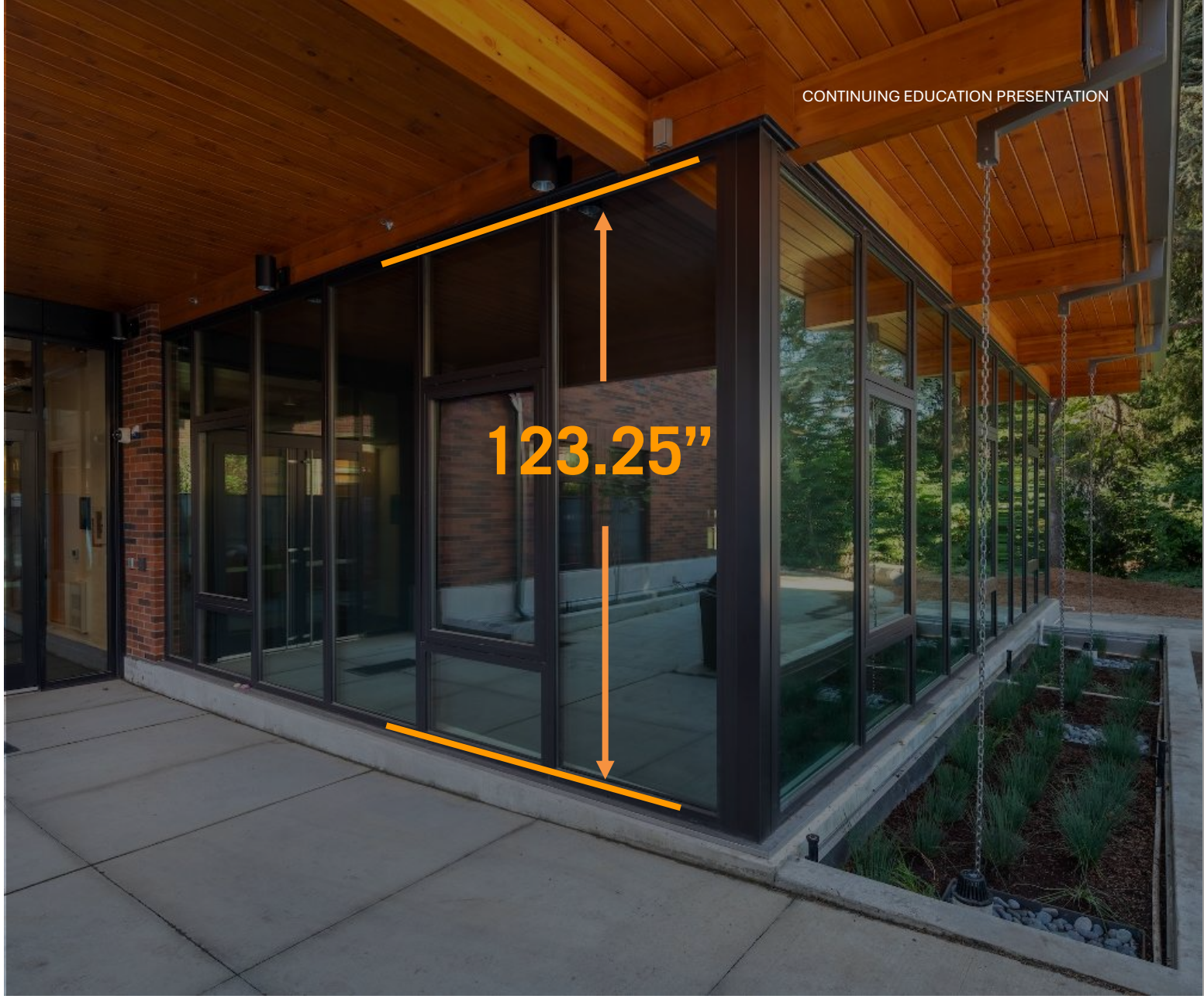


SIZE & STRENGTH

Images courtesy of Cascadia Windows & Doors

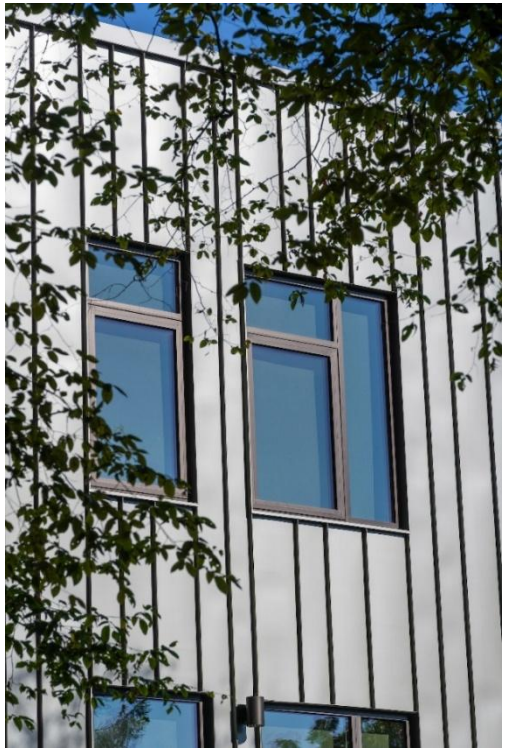
BUSH SCHOOL – NEW UPPER SCHOOL

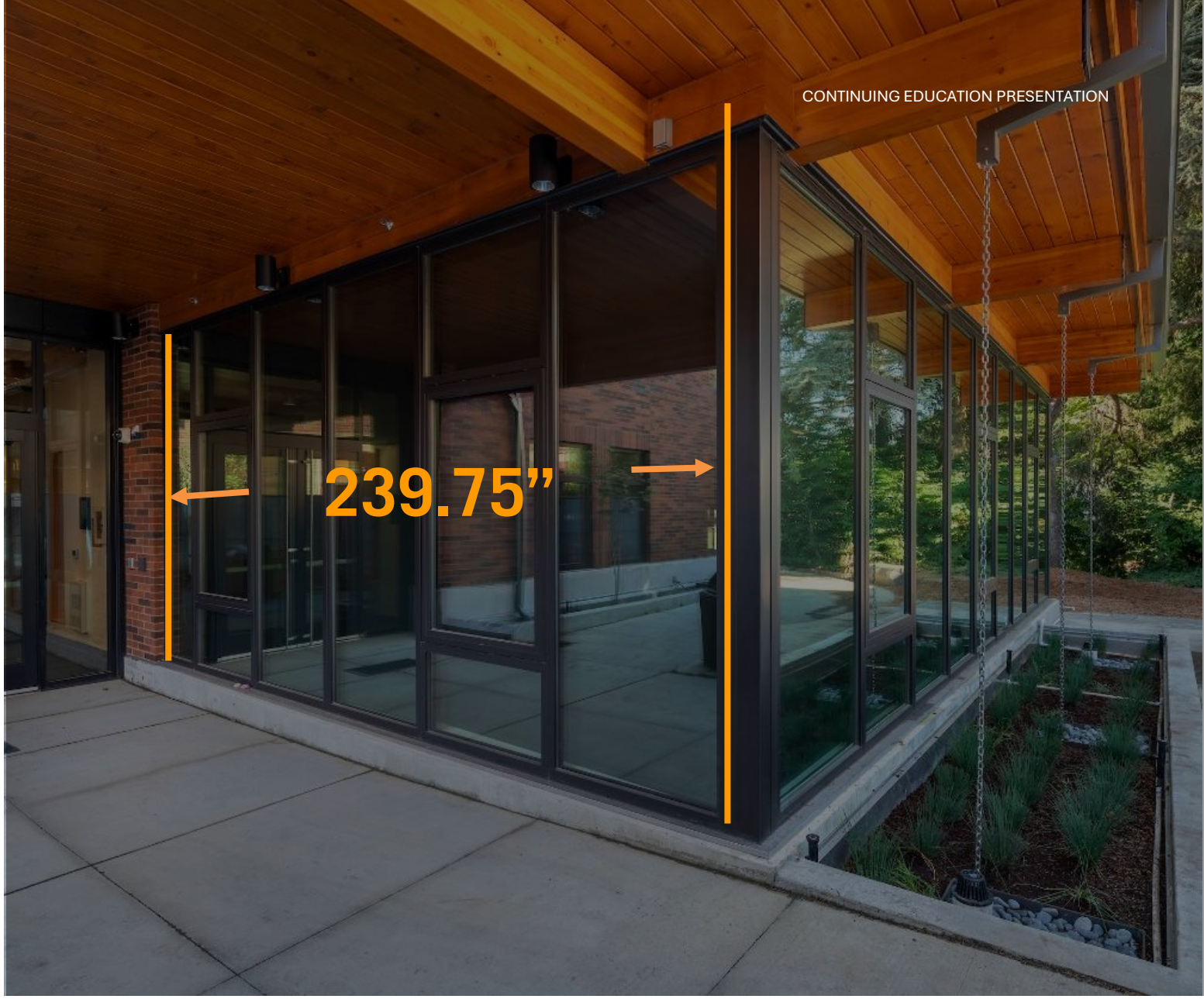




Images courtesy of Cascadia Windows & Doors

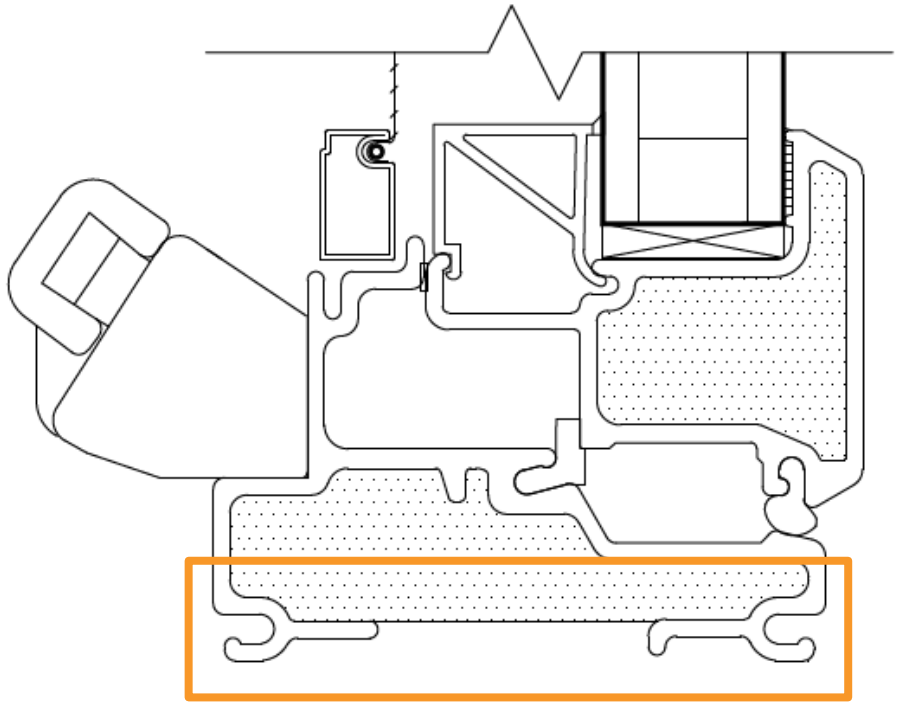
BUSH SCHOOL – NEW UPPER SCHOOL



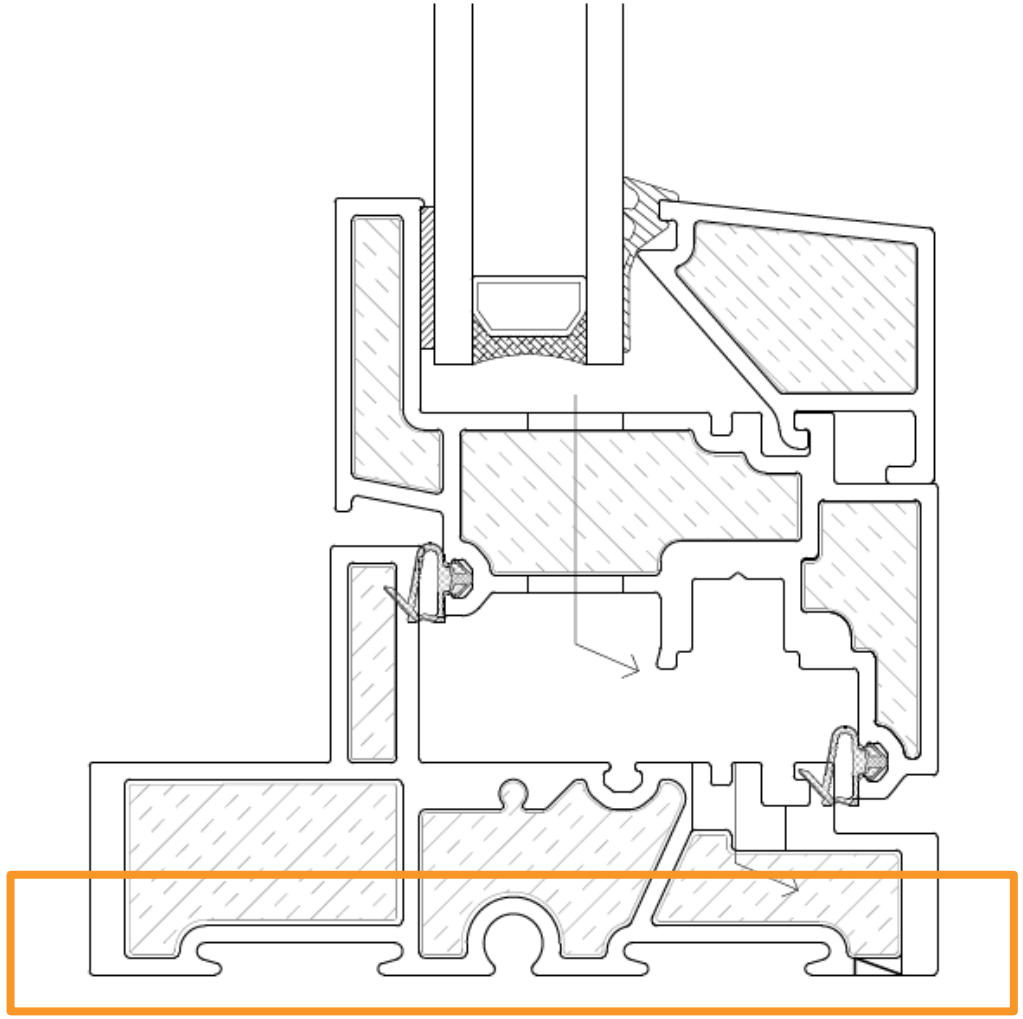


Images courtesy of Cascadia Windows & Doors

FIBERGLASS PROFILES

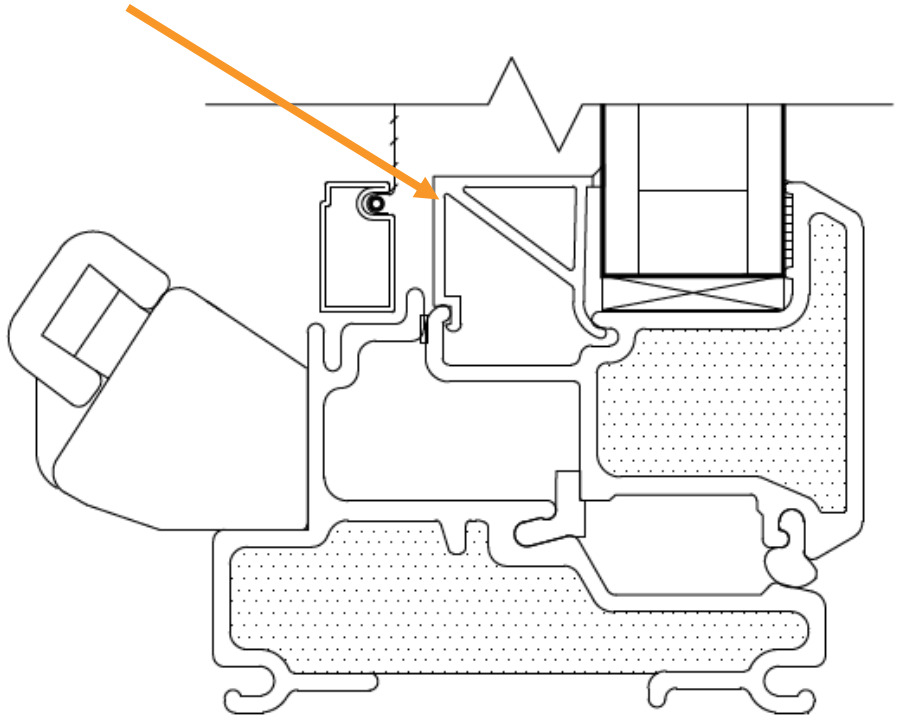


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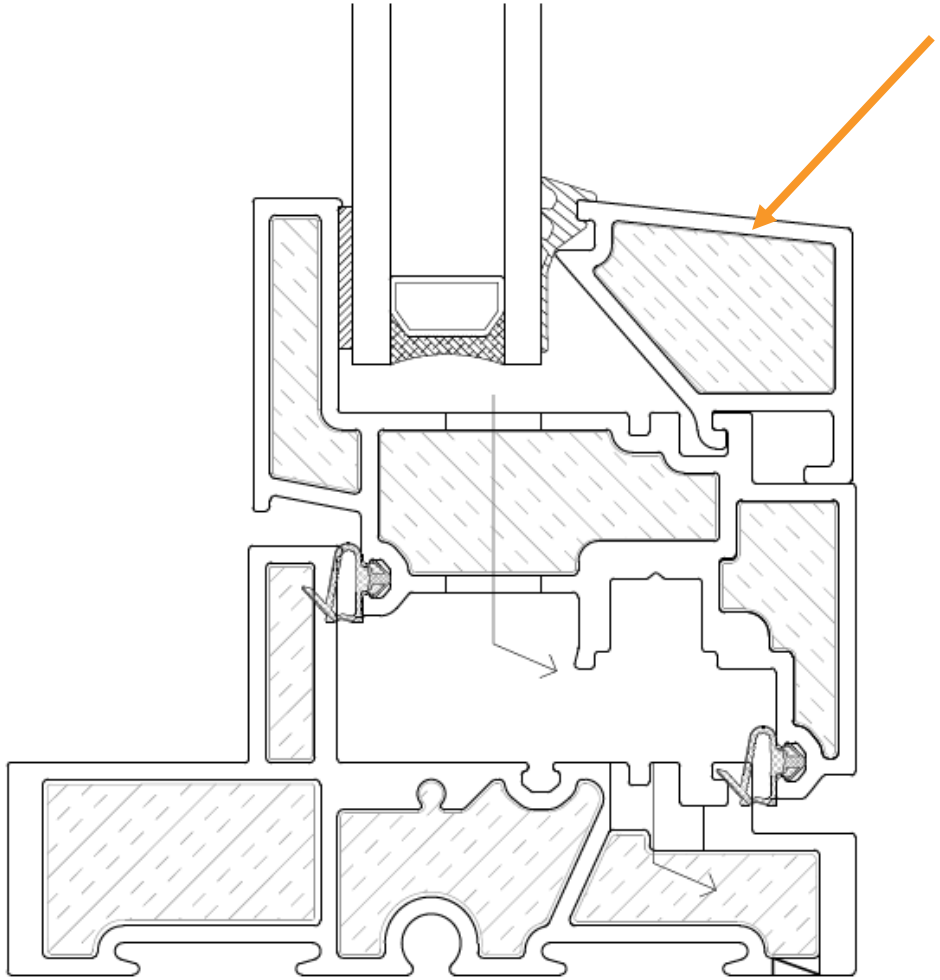


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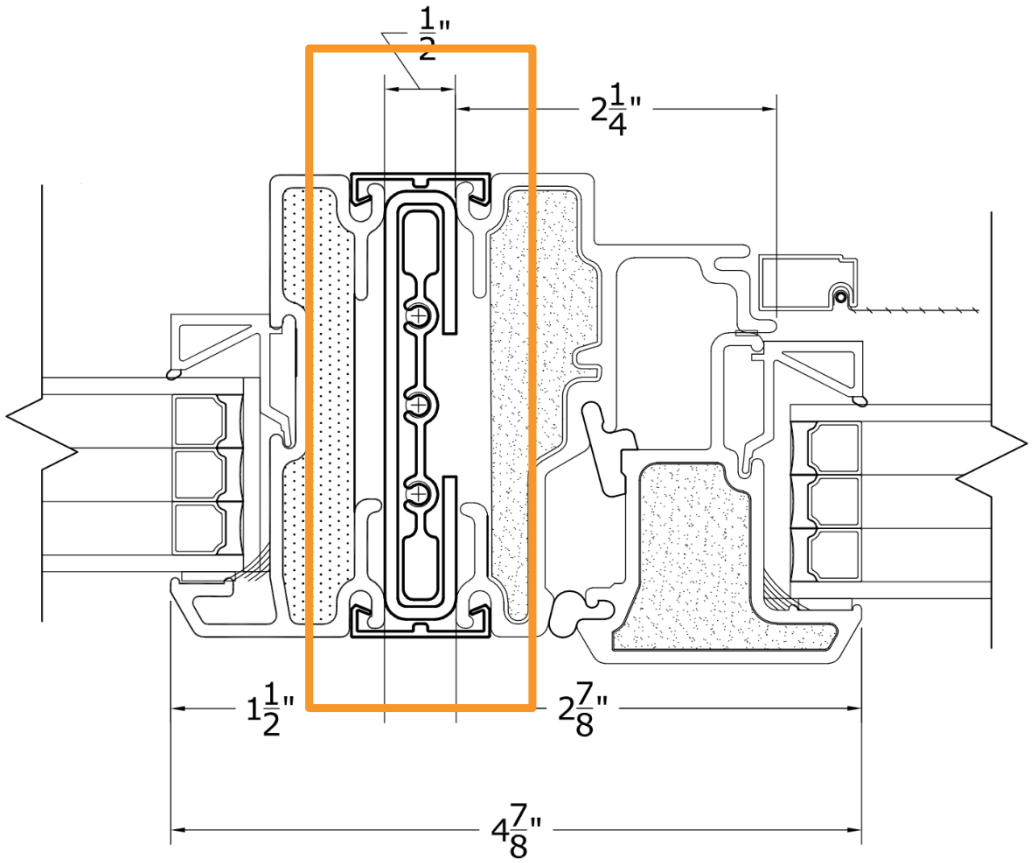


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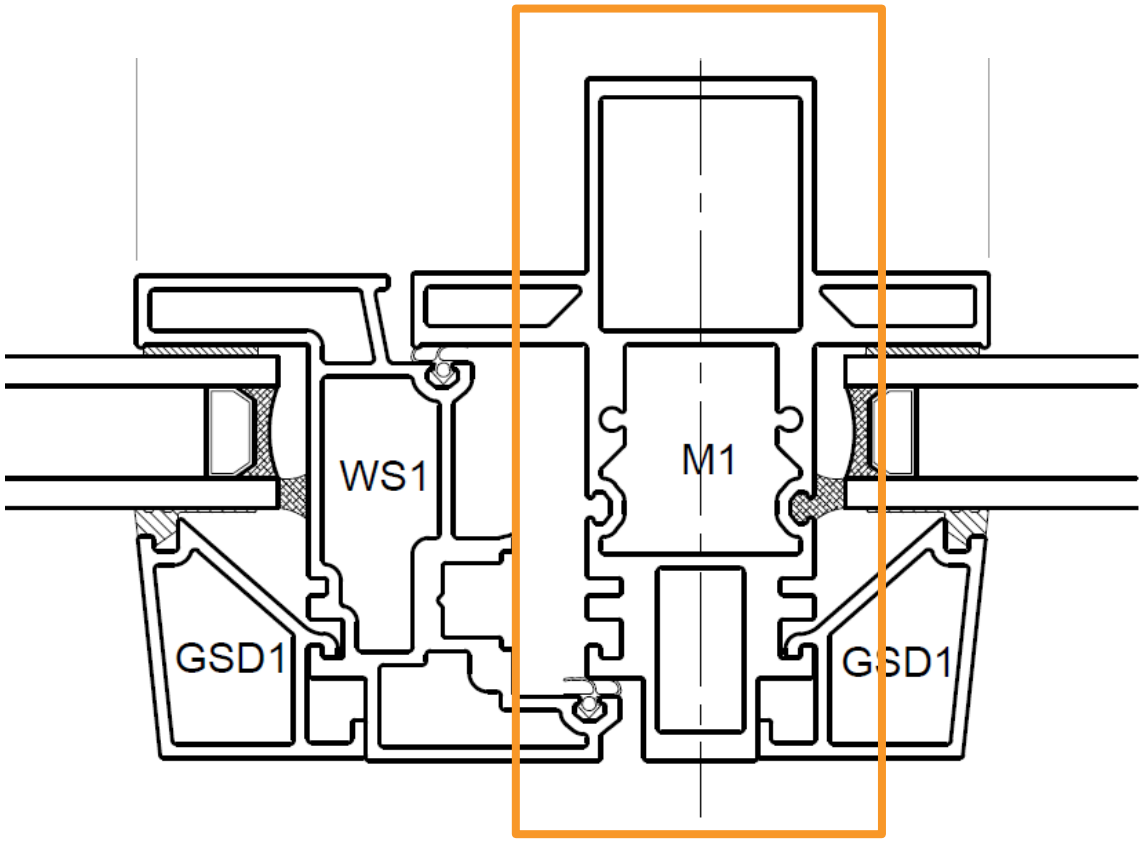


COMMERCIAL

FIBERGLASS PROFILES

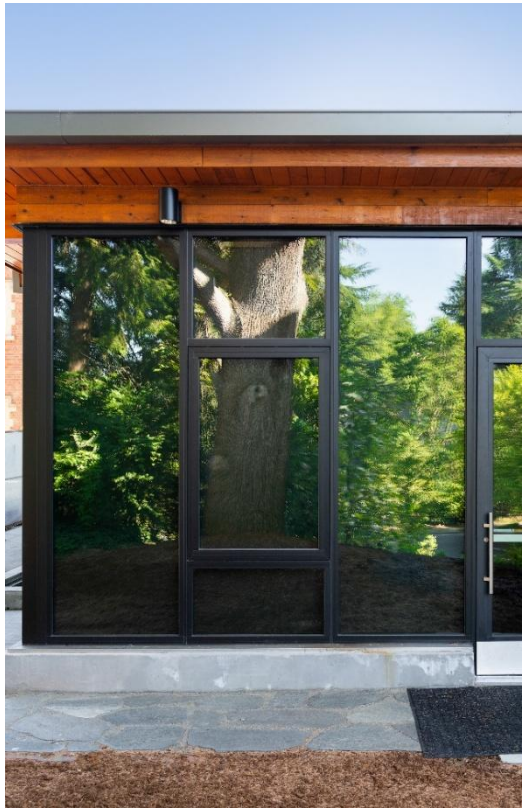


RESIDENTIAL



COMMERCIAL

BUSH SCHOOL – NEW UPPER SCHOOL

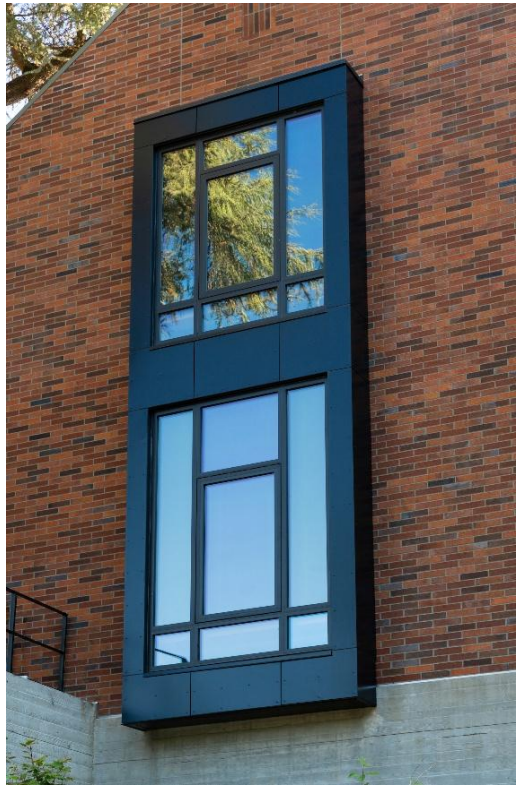


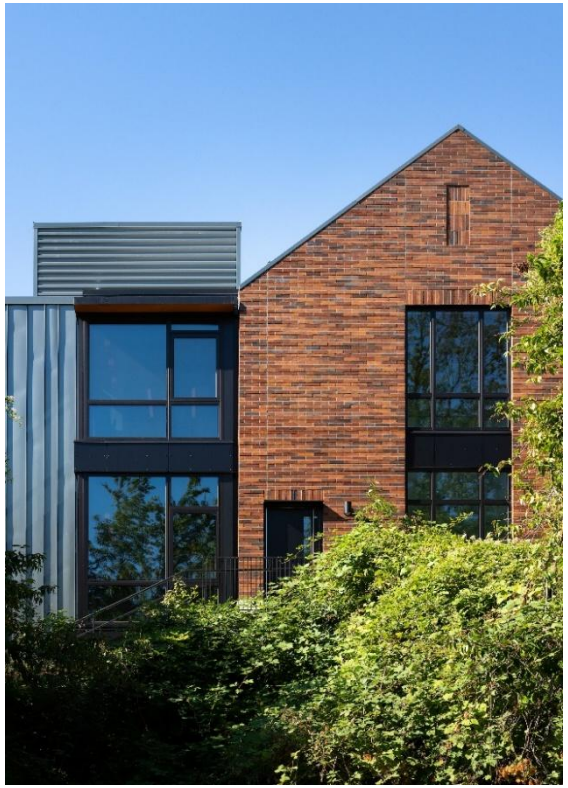




Images courtesy of Cascadia Windows & Doors

BUSH SCHOOL – NEW UPPER SCHOOL







Images courtesy of Cascadia Windows & Doors

SQUANTUM SCHOOL

Quincy, MA

phius

ARCHITECT
ARROWSTREET

OWNER
CITY OF QUINCY



LONGEVITY & DURABILITY

Images courtesy of Arrowstreet





Images courtesy of Arrowstreet

FRAME TYPES - LIFESPAN

VINYL / UPVC



PHOTO CREDIT: EUROLINE WINDOWS

ALUMINUM



PHOTO CREDIT: GLO EUROPEAN WINDOWS

FIBERGLASS



PHOTO CREDIT: CASCADIA WINDOWS & DOORS

FRAME TYPES - LIFESPAN

VINYL / UPVC



10-30
YEARS

APPLICATIONS
Residential
Multi-Family

PHOTO CREDIT: EUROLINE WINDOWS

ALUMINUM



30-45
YEARS

APPLICATIONS
Residential
Commercial
High-Rise

PHOTO CREDIT: GLO EUROPEAN WINDOWS

FIBERGLASS



50-80
YEARS

APPLICATIONS
Residential
Multi-Family
Commercial
High-Rise

PHOTO CREDIT: CASCADIA WINDOWS & DOORS

THERMAL EXPANSION ISSUES

ABOVE ≈160ºF DARK VINYL CAN PLASTICIZE

(DIRECT SUNLIGHT + AMBIENT TEMPERATURE)

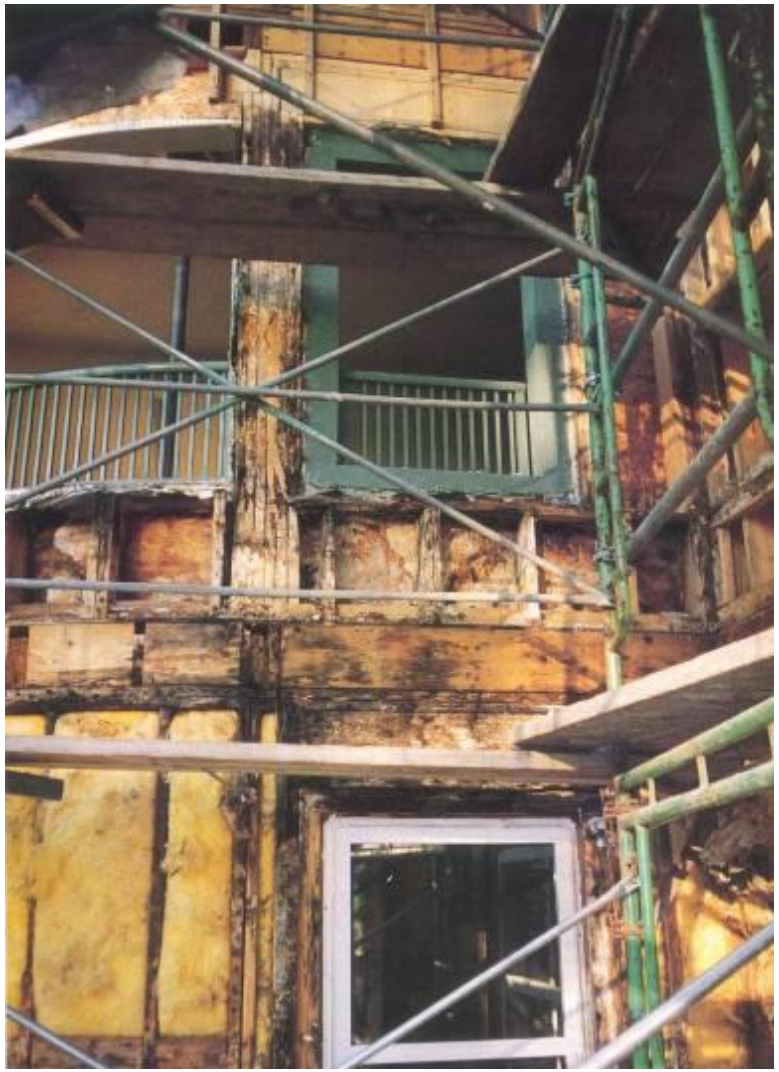
PERMANENT DEFORMATION



VINYL WINDOW



IMPACTS OF SHORT LIFESPANS









Images courtesy of Arrowstreet

YALE DIVINITY STUDENT HOUSING

New Haven, CT

LIVING BUILDING CHALLENGE℠

ARCHITECT
BRUNER/COTT AND HÖWELER + YOON

OWNER
YALE DIVINITY SCHOOL

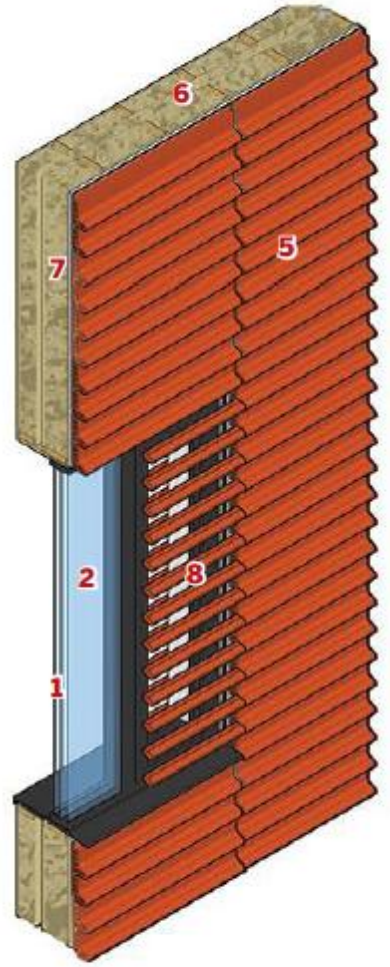
CARBON & LIFECYCLE



YALE'S LIVING Village sits adjacent to a 1930s complex modeled after the "academical village" at the University of Virginia.

Images courtesy of Architectural Recor / Robert Benson

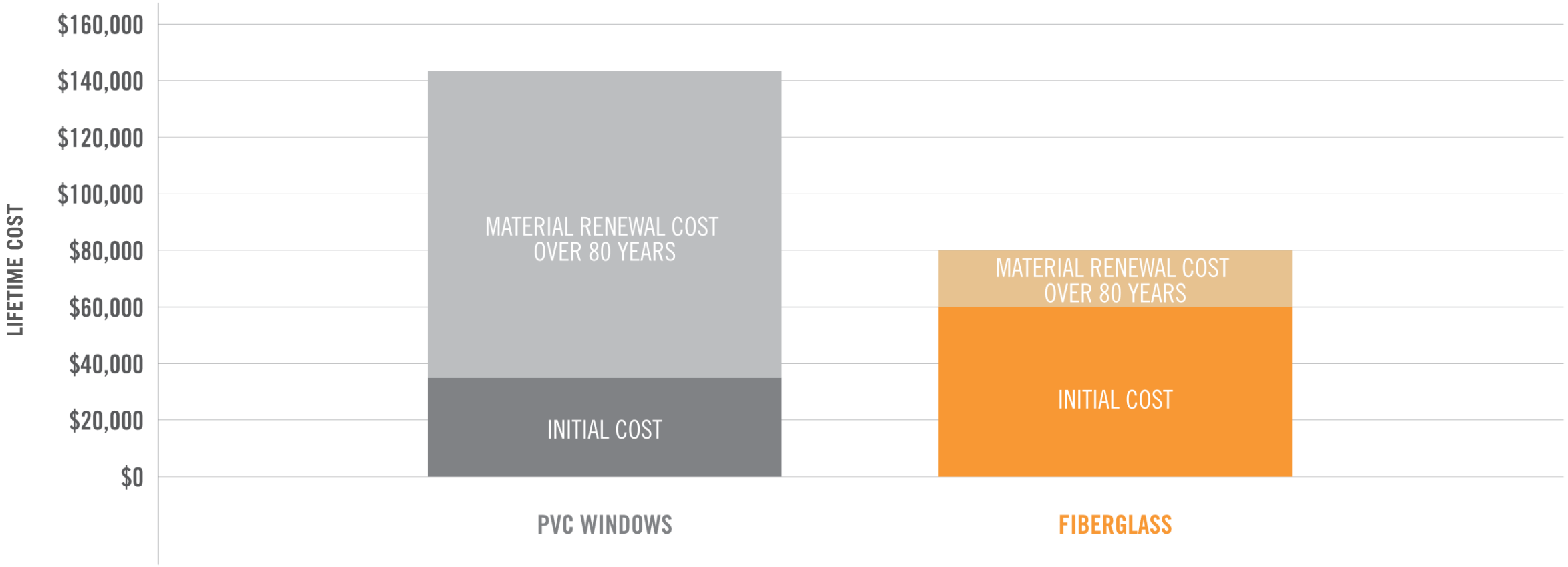




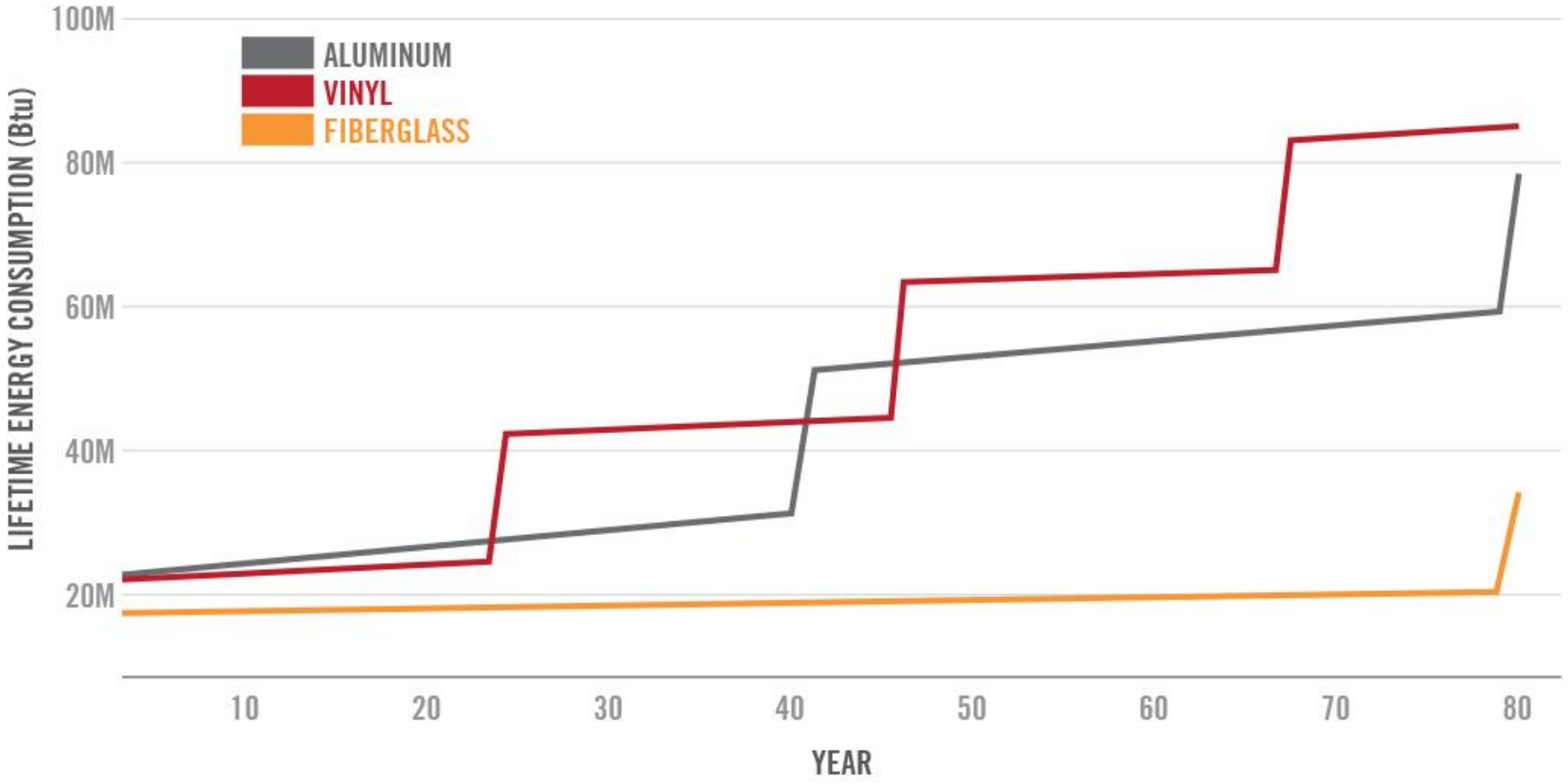
RAINSCREEN-FACADE ASSEMBLY

Images courtesy of Architectural Recor / Robert Benson

FRAME TYPES - LIFESPAN



LIFECYCLE COMPARISON

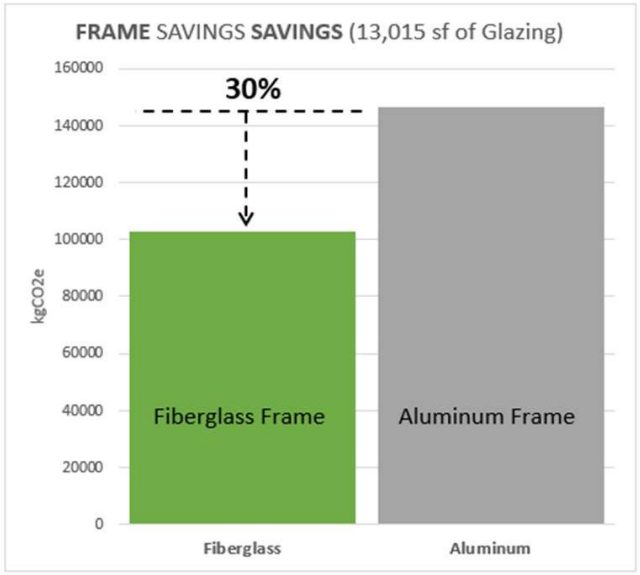


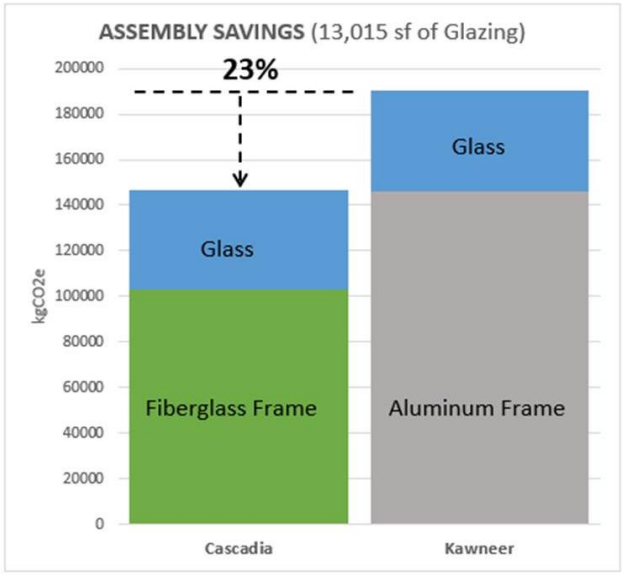
VITALMETRICS (IERS LLC.)

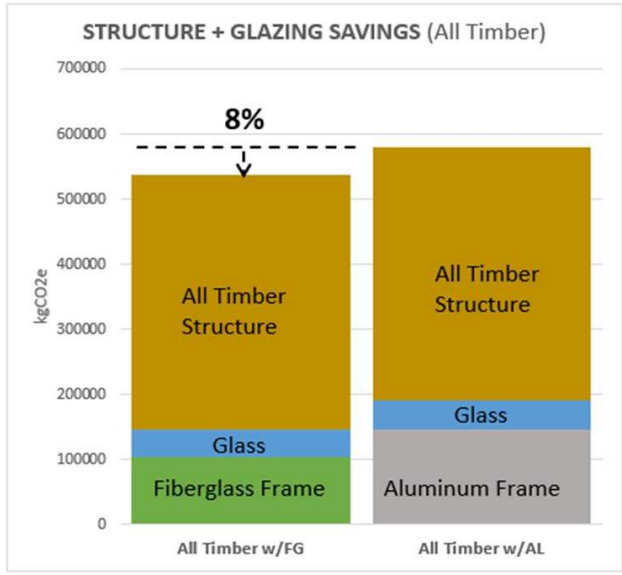
CALCULATING EMBODIED CARBON

Fiberglass vs. Aluminum Glazing – SCALES OF ANALYSIS

Smaller







Key assumptions:

Fiberglass data based on study: "Research on the impacts of Innovative Fenestration Materials on the Embodied and Operating Carbon of Buildings." PDF link: https://sustain.ubc.ca/sites/default/files/2022-018_Research%20on%20the%20impacts%20of%20Innovative%20Fenestration%20Materials_Zargar.pdf

Aluminum frame based on Kawneer Fixed & Ribbon Aluminum Windows EPD. This is in liue of comparing against Kawneer storefront product EPD --- this EPD better matched up with the window size and frame ratio from the Cascadia study - EPD link:

All-Timber Structure and Hybrid Timber Structure cases from KPFF study sent on 10/5. Athena LCA study, Cradle to Grave, structure only, includes biogenic carbon

Glazing comparisons are Cradle to Gate, A1-A3 only with no replacement cycles

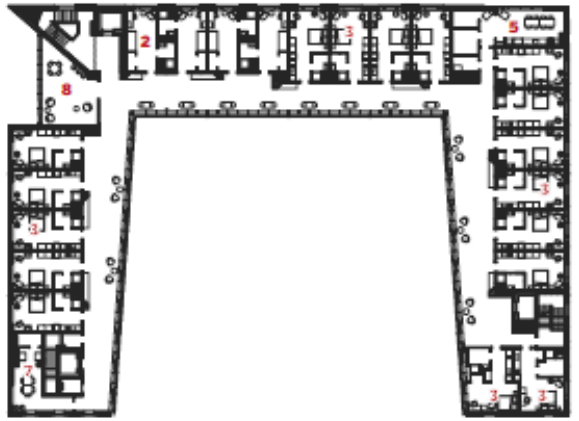
Images courtesy - Confidential



1 ENTRY PORTAL
2 VESTIBULE
3 MICRO-UNIT
4 STUDIO
5 SHARED KITCHEN
6 COMMUNITY KITCHEN
7 STUDY
8 COMMONS



FIRST-FLOOR PLAN



SECOND-FLOOR PLAN

0 30 FT.
10 M.

Images courtesy of Architectural Recor / Robert Benson

SUFFOLK UNIVERSITY 101 TREMONT STREET

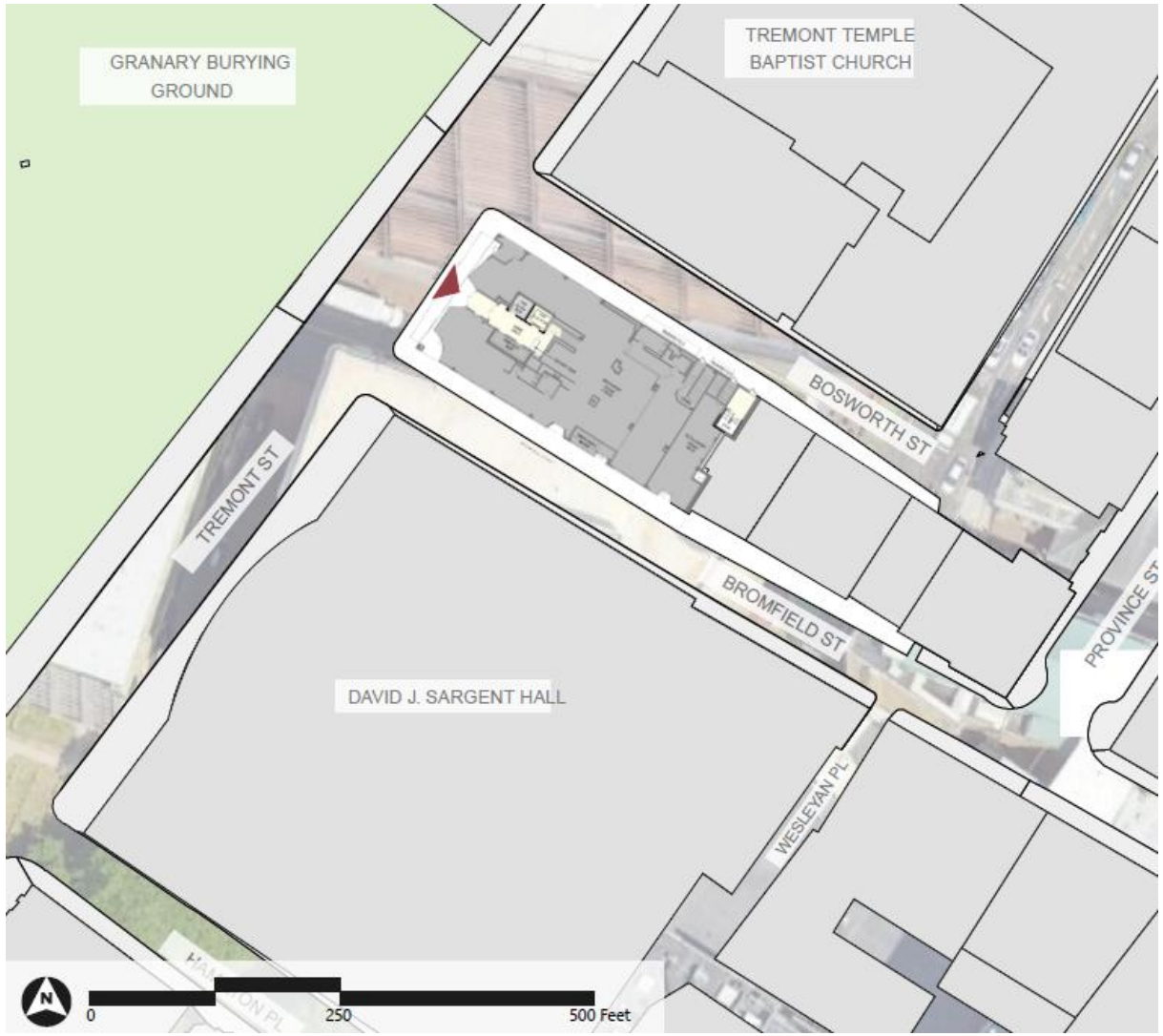
Boston, MA

OWNER
SUFFOLK UNIVERSITY



DETAILING & INSTALLATION

Images courtesy of K&H Electrical Systems Inc





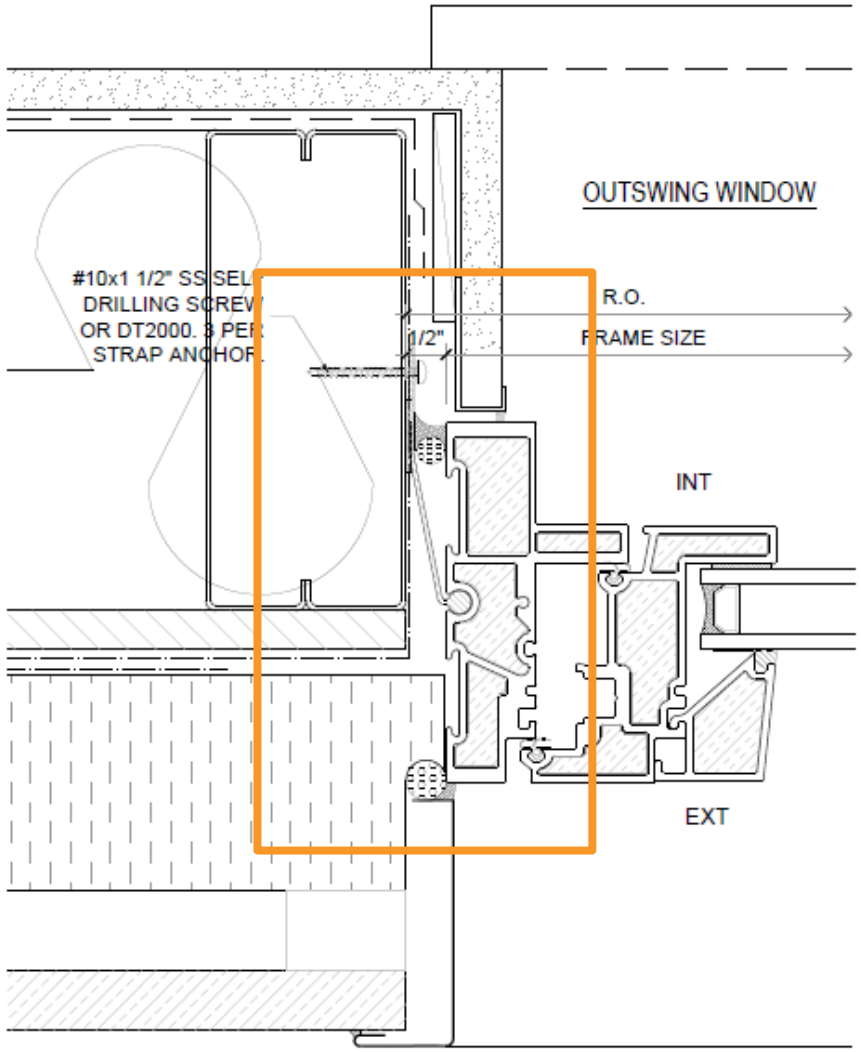
Images courtesy of City of Boston

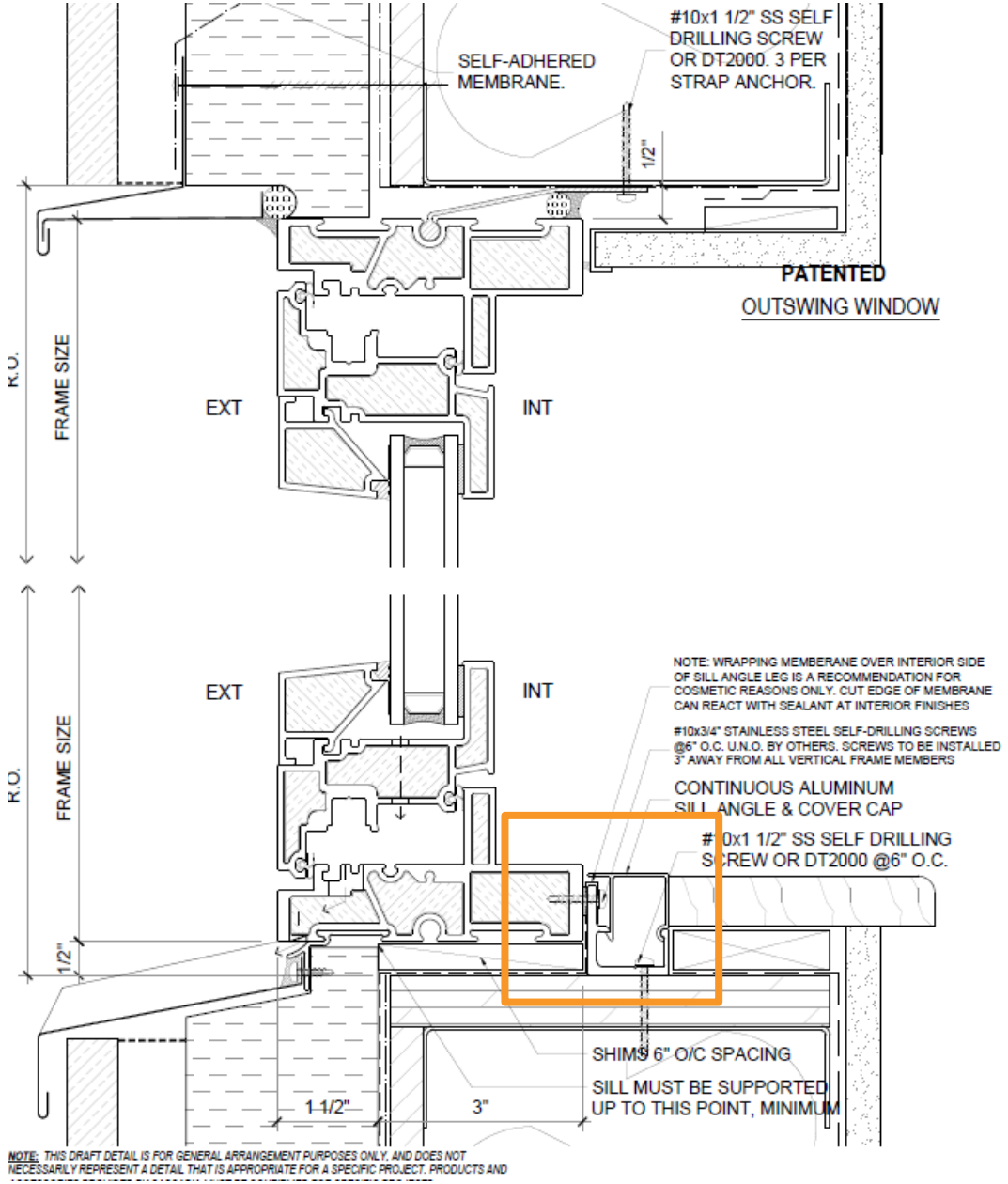




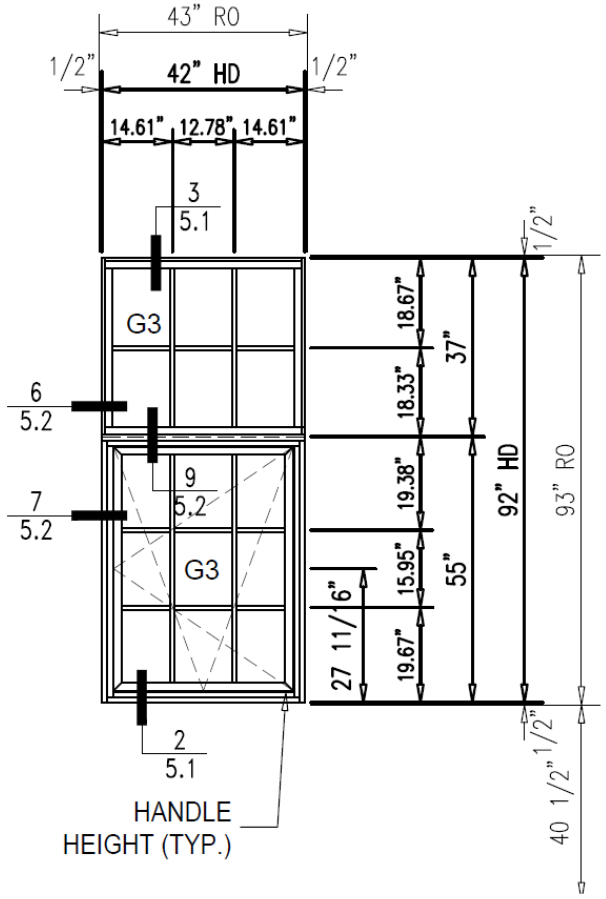


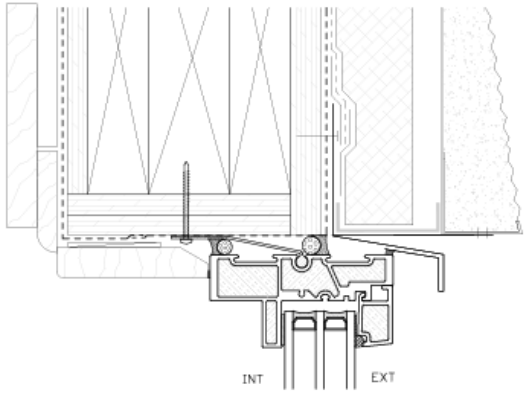
Images courtesy of City of Boston

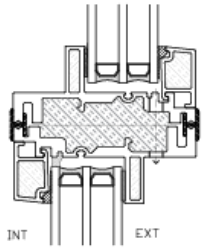


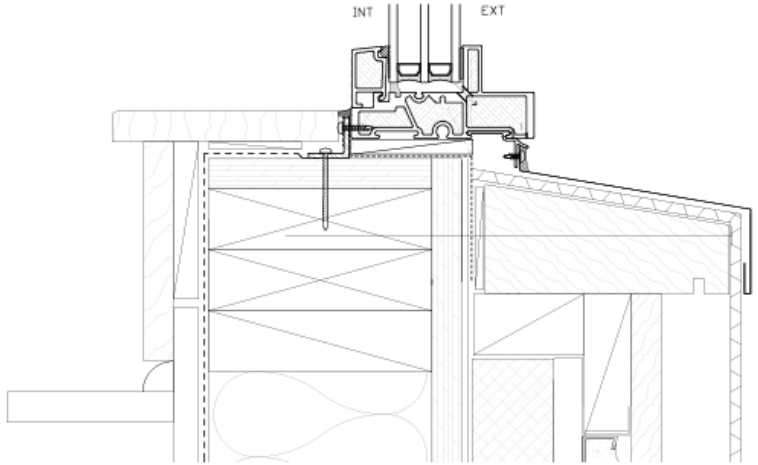


Images courtesy of Cascadia Windows & Doors











Images courtesy of Cascadia Windows & Doors

OUR LADY OF PERPETUAL HELP

Vancouver, BC

DESIGNER
RDH BUILDING SCIENCE

CONTRACTOR
LEGACY WINDOWS & DOORS

OWNER
OUR LADY OF PERPETUAL HELP SCHOOL



FLEXIBILITY & CUSTOMIZATION

Images courtesy of Cascadia Windows & Doors





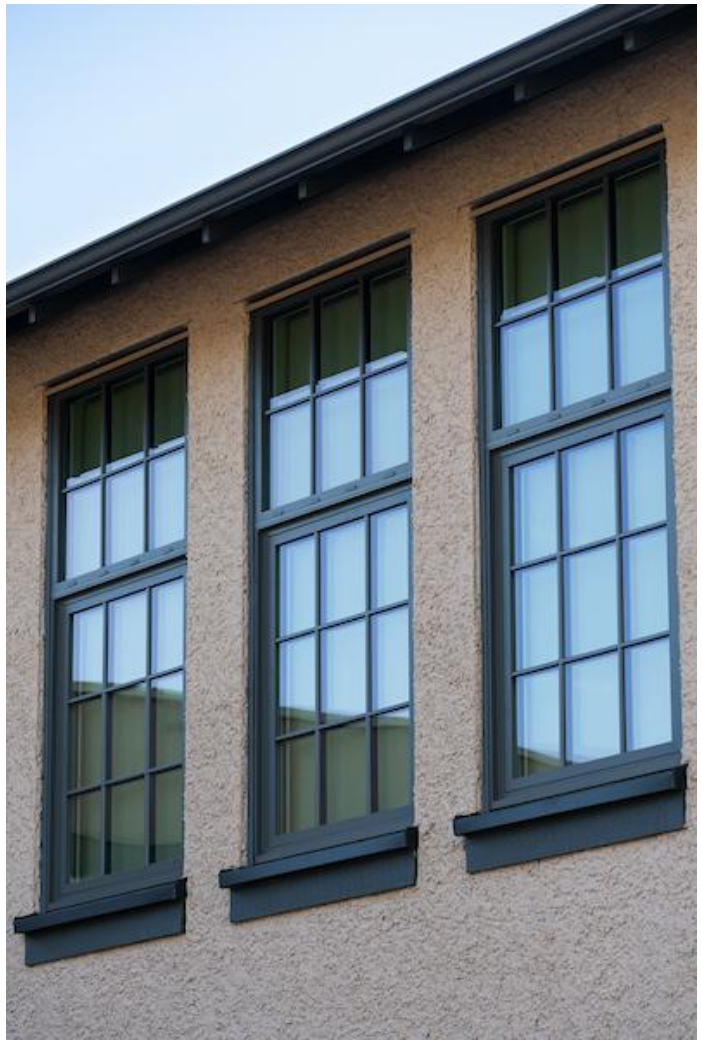
Images courtesy of Cascadia Windows & Doors







Images courtesy of Cascadia Windows & Doors





Images courtesy of Cascadia Windows & Doors

MERIDIAN COVE

Vancouver, BC

ENGINEER/DESIGNER
RDH BUILDING SCIENCE

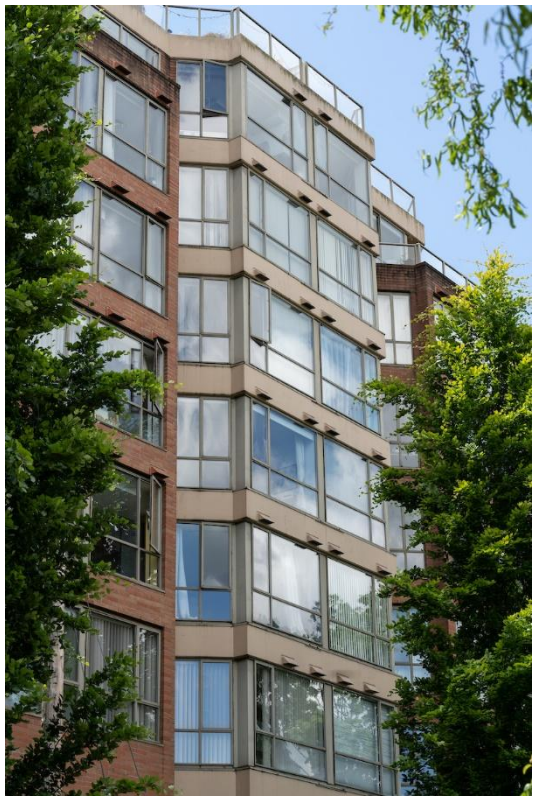
CONTRACTOR
HIGHRISE GLASS

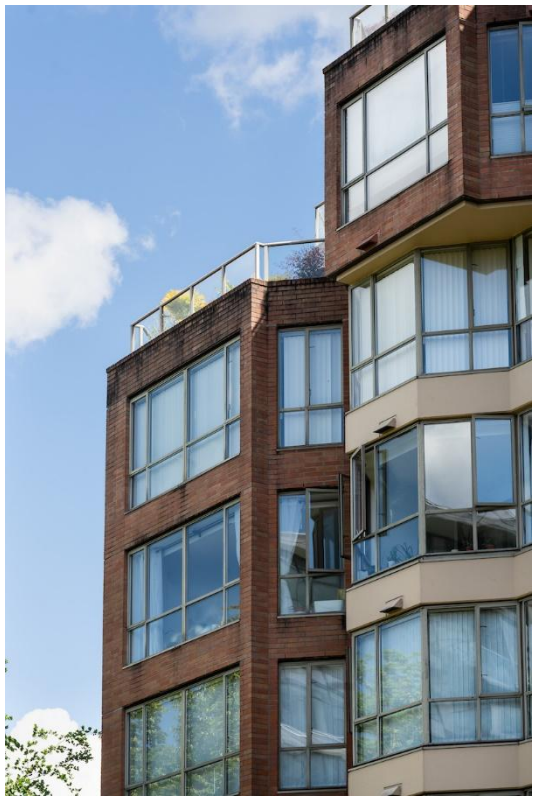
OWNER
STRATA



GLAZING & DAYLIGHT

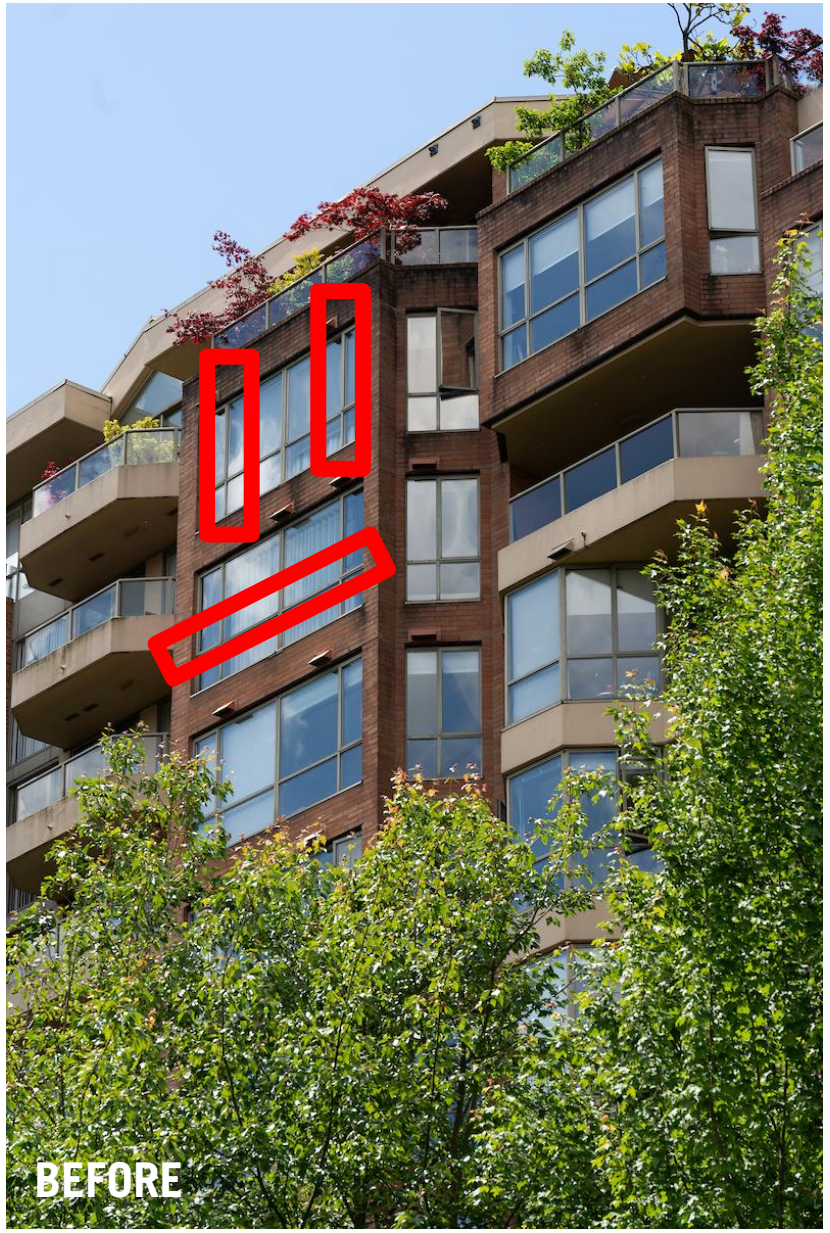
Images courtesy of Cascadia Windows & Doors

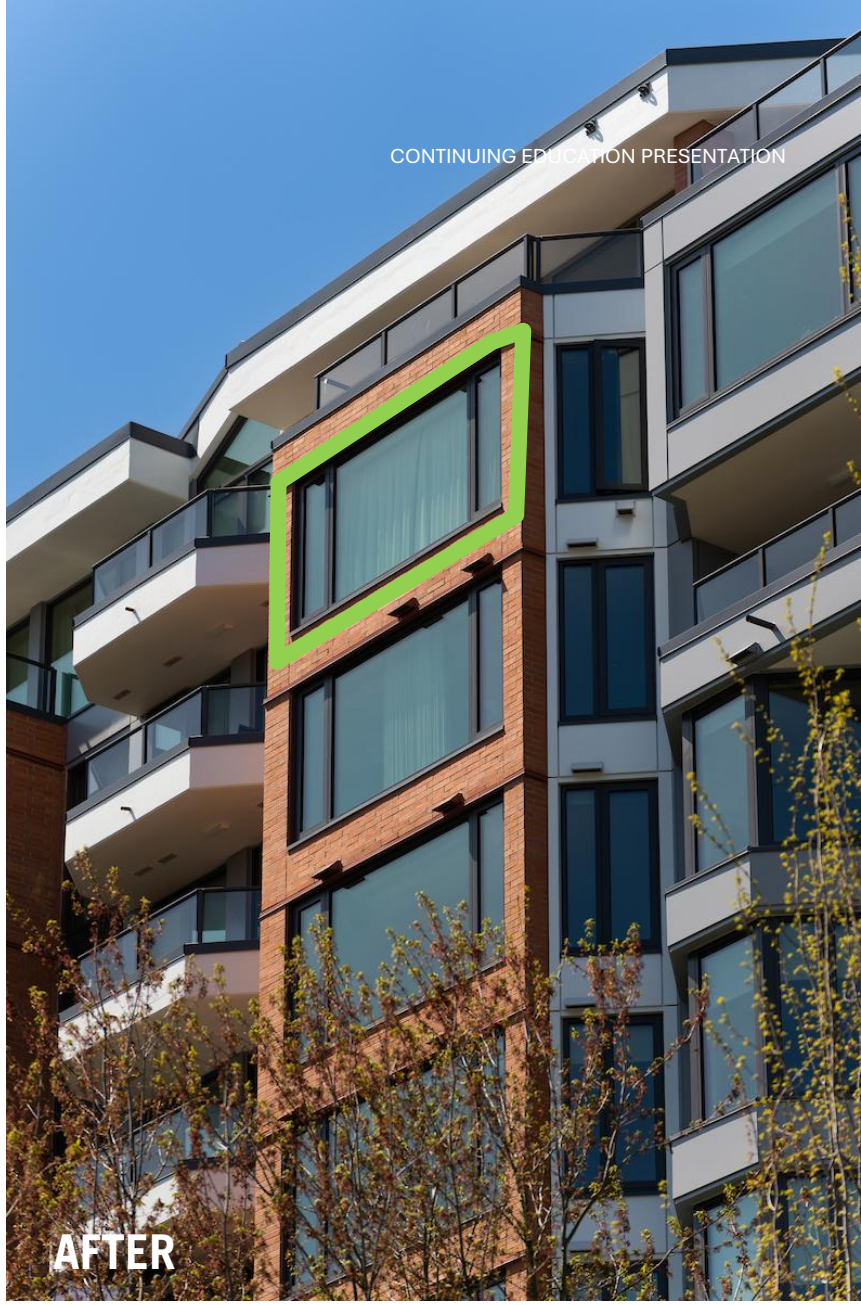






Images courtesy of Cascadia Windows & Doors



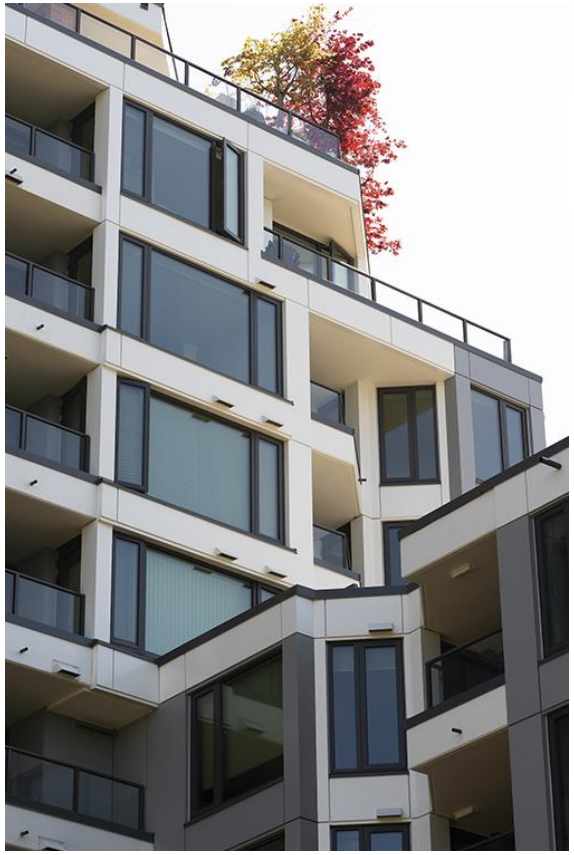


Images courtesy of Cascadia Windows & Doors





Images courtesy of Cascadia Windows & Doors





Images courtesy of Cascadia Windows & Doors

PROJECT INNOVATION
PRODUCT INNOVATION

VACUUM INSULATED GLASS (VIG) – UNIVERSAL SERIES™

CURRENT UNIVERSAL SERIES™ R-VALUE

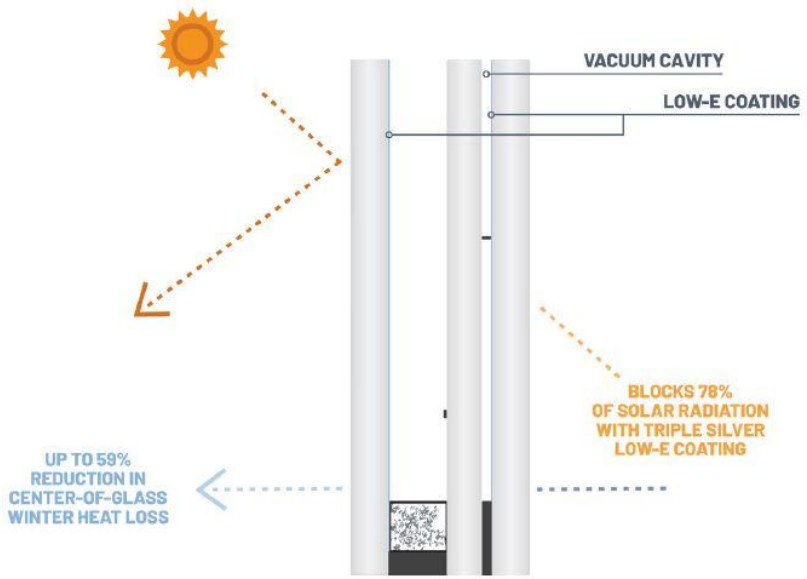
R-7.1

STANDARD TRIPLE GLAZED IGU

PROJECTED UNIVERSAL SERIES™ R-VALUE

R-11+

VACUUM INSULATED GLASS (VIG) UNIT





VACUUM INSULATED GLASS (VIG) – EXISTING WINDOW UPGRADE

CURRENT NON-CASCADIA WINDOW R-VALUE

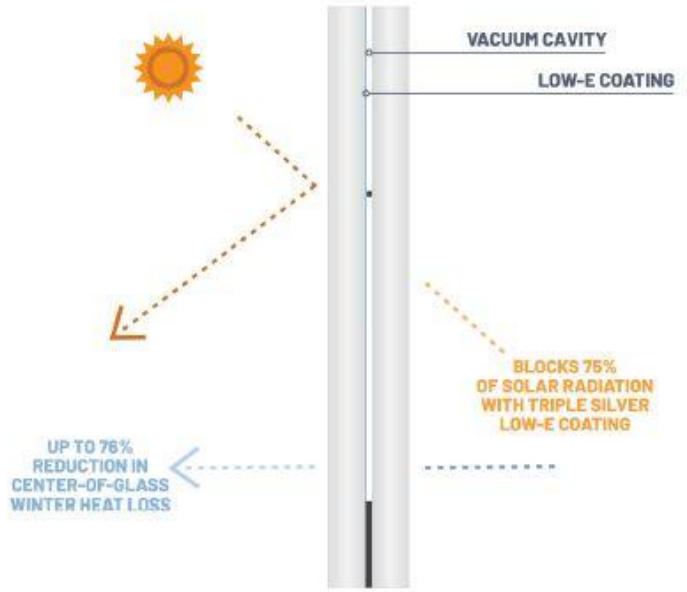
R-1 – R-2

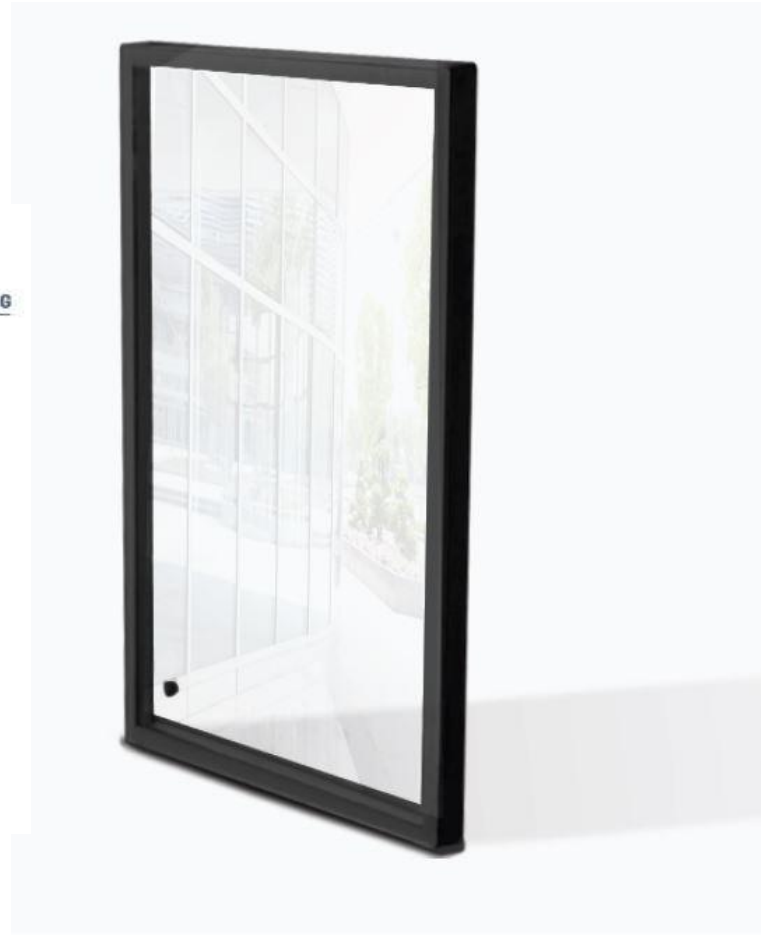
EXISTING IGU

PROJECTED NON-CASCADIA WINDOW R-VALUE

R-3 – R-4

SINGLE PANE VACUUM INSULATED GLASS (VIG)





KEN SOBLE TOWER ENERPHIT

Hamilton, ON

ARCHITECT
ERA ARCHITECTS

CONTRACTOR
PCL CONSTRUCTION

OWNER
CITY OF HAMILTON



ENVELOPE INTEGRATION

Images courtesy of Intuitive / ERA Architects





Images courtesy of Intuitive / ERA Architects





Images courtesy of Intuitive / ERA Architects

PROJECT INNOVATION
PRODUCT INNOVATION

COAL HARBOUR PHASE 2

Vancouver, BC

ARCHITECT
HENRIQUEZ PARTNERS ARCHITECTS

CONTRACTOR
PHEATERBRAE BUILDERS CO.

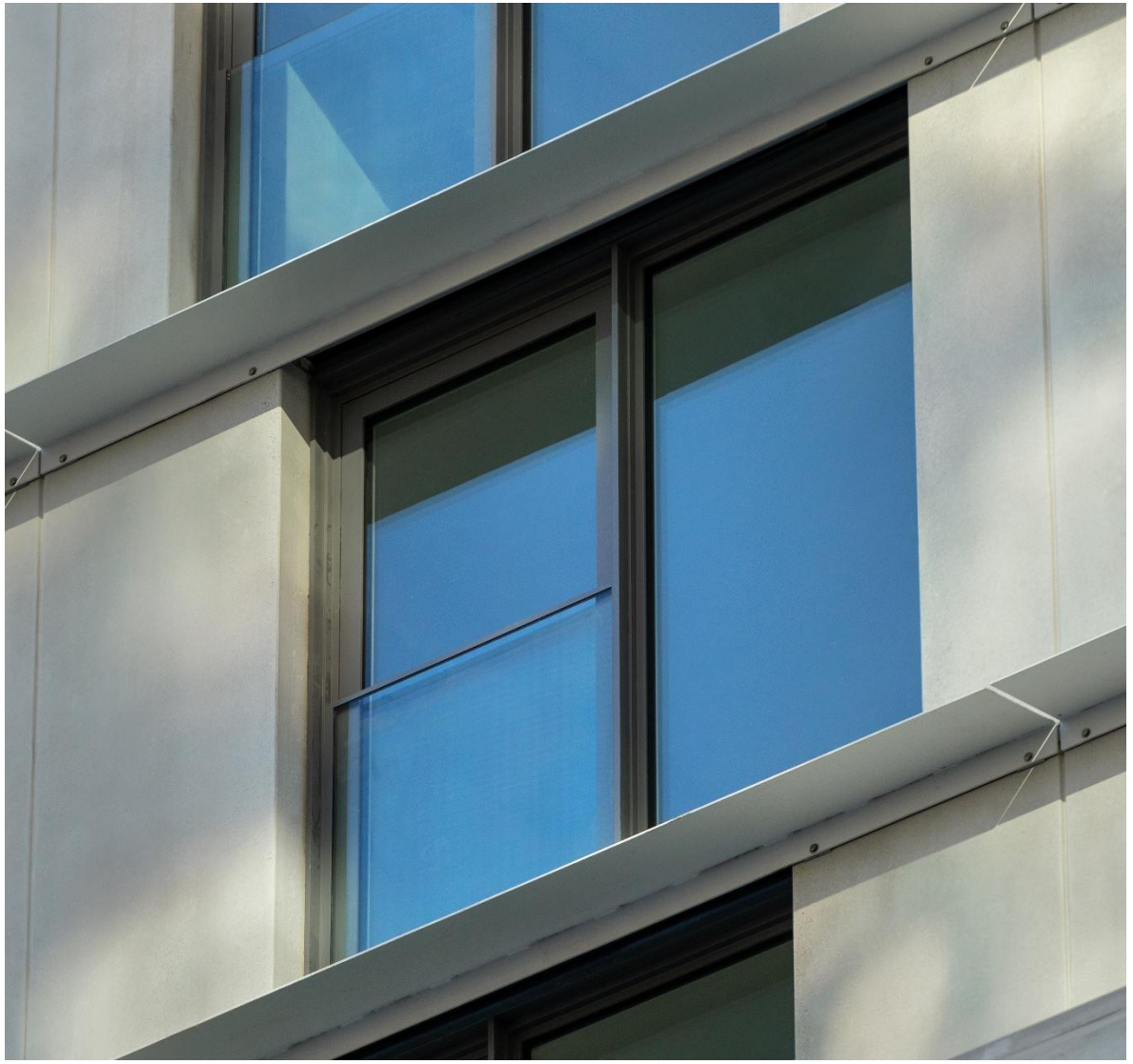
OWNER
CITY OF VANCOUVER



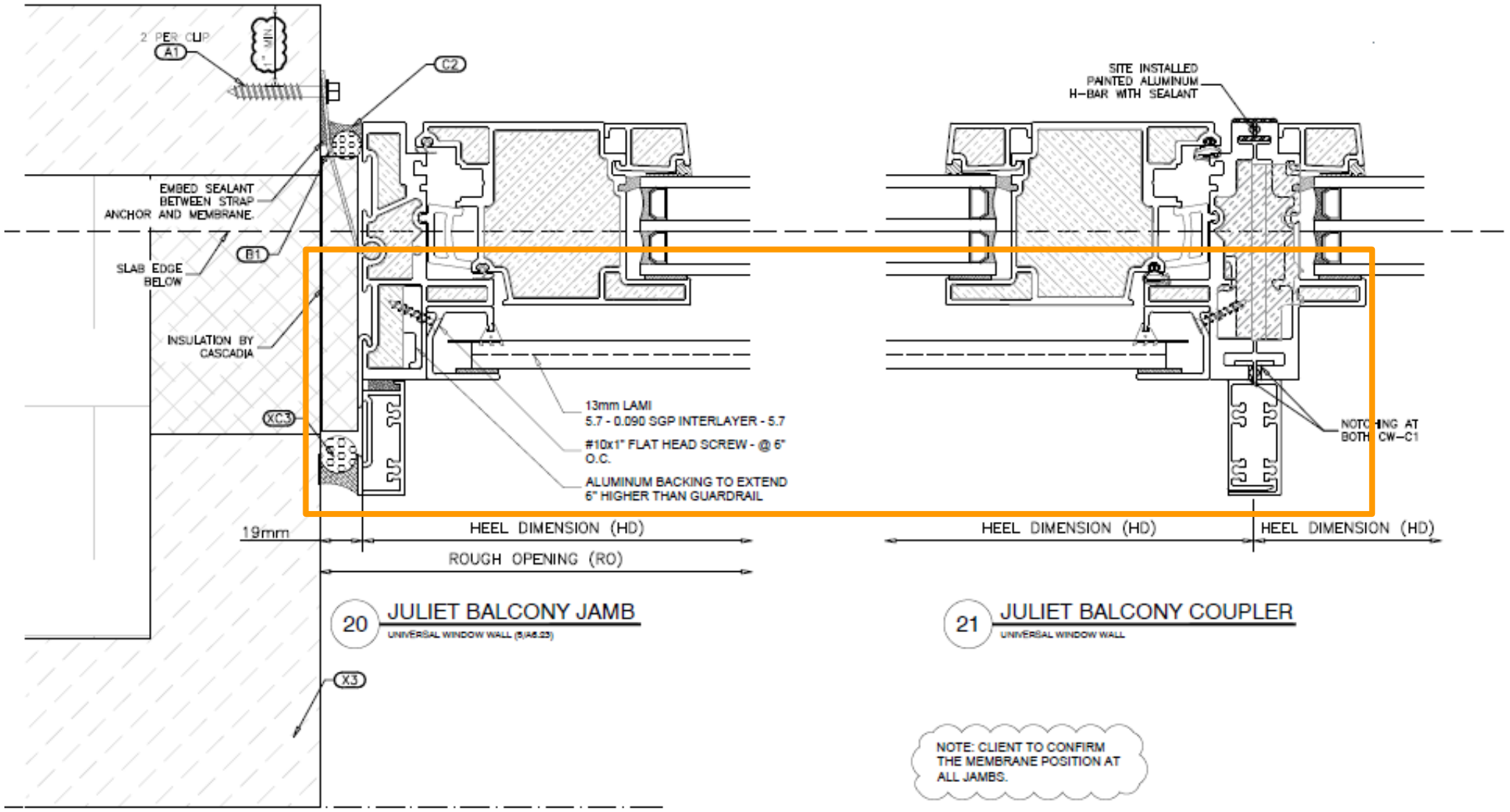
ENVELOPE INTEGRATION

Images courtesy of Henriquez Partners Architects/Vancouver School Board/City of Vancouver





Images courtesy of Cascadia Windows & Doors



Images courtesy of Cascadia Windows & Doors

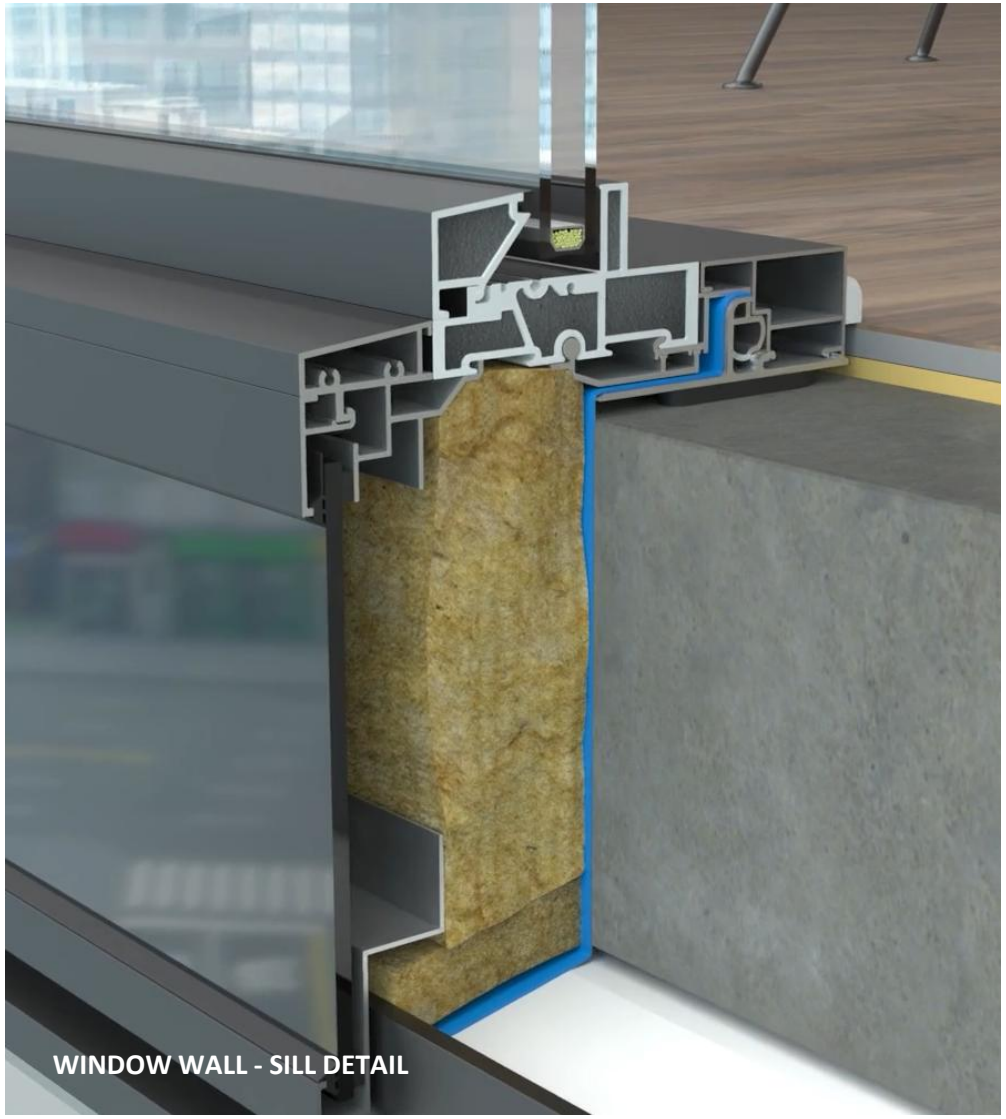




Images courtesy of Cascadia Windows & Doors



Images courtesy of Cascadia Windows & Doors

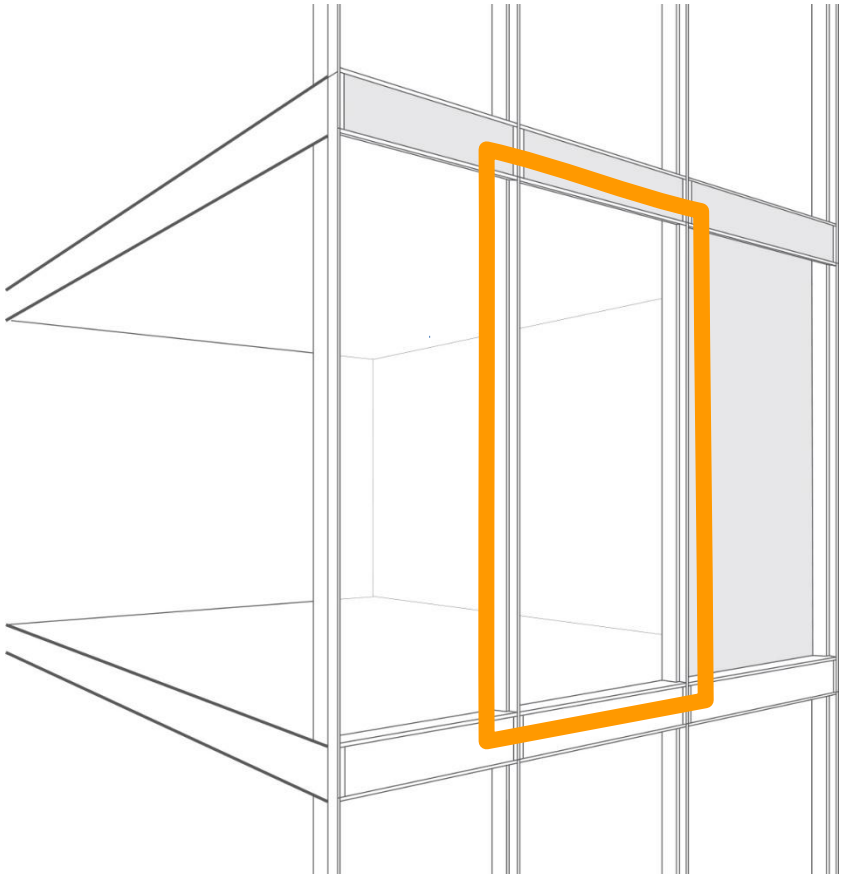


WINDOW WALL - SILL DETAIL



WINDOW WALL – HEAD DETAIL

WINDOW WALL



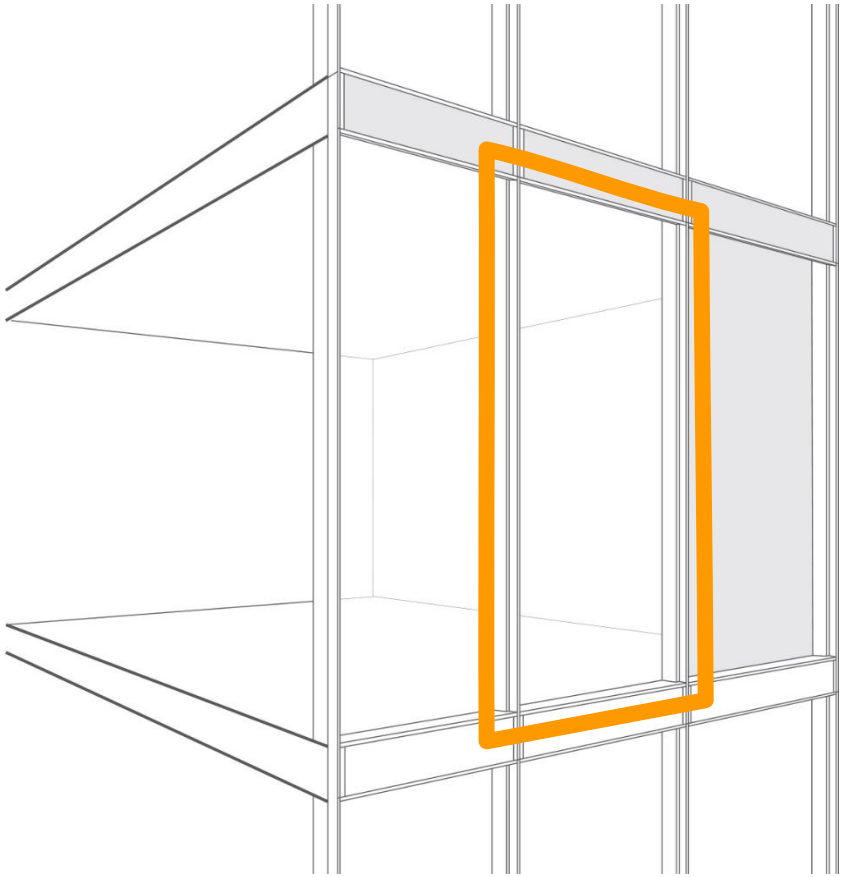
VISION GLASS

R-4.1

0.24 Btu/h·ft²·F | 1.36 W/m²·K

DOUBLE-GLAZED HIGH-PERFORMANCE FIBERGLASS FRAME

WINDOW WALL



VISION GLASS

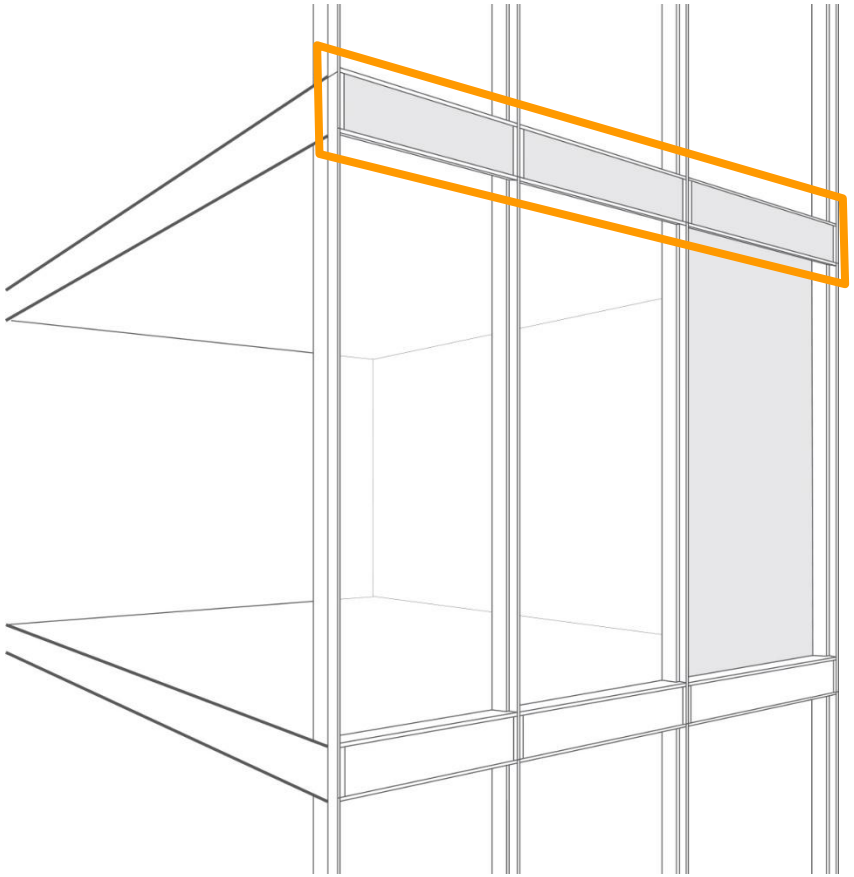
R-7.1

STANDARD TRIPLE GLAZING

R-7.7

PREMIUM TRIPLE GLAZING

WINDOW WALL

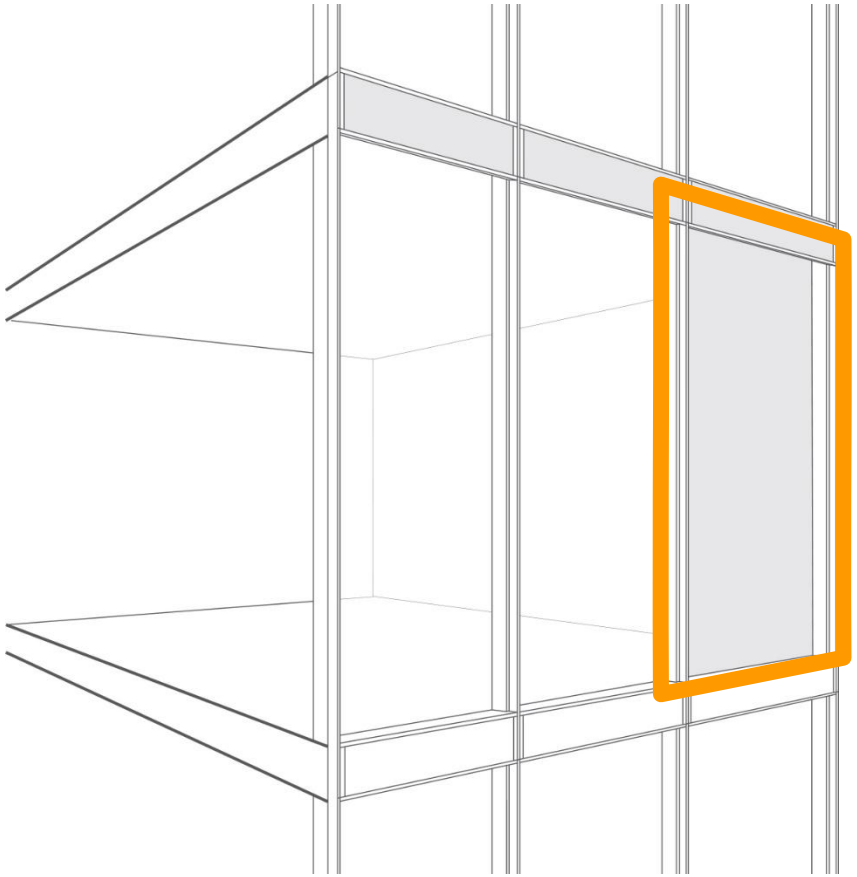


OPAQUE AREAS

R-8.1

SLAB BYPASS

WINDOW WALL



OPAQUE AREAS

R-16.2

METAL BACKPAN

WHAT HAPPENS IN A PMU?

- Large format (full height)
- Withstand high +/- pressure loads with low air leakage
- Withstand wind driven rain with no water leaks
- Withstand extreme temperature ranges (resist condensation)
- Withstand building movement, large deflections during service life as well as seismic event
- Extreme hardware durability
- Combustibility
- **All of this and maintain air and water tightness, operability and thermal performance!**



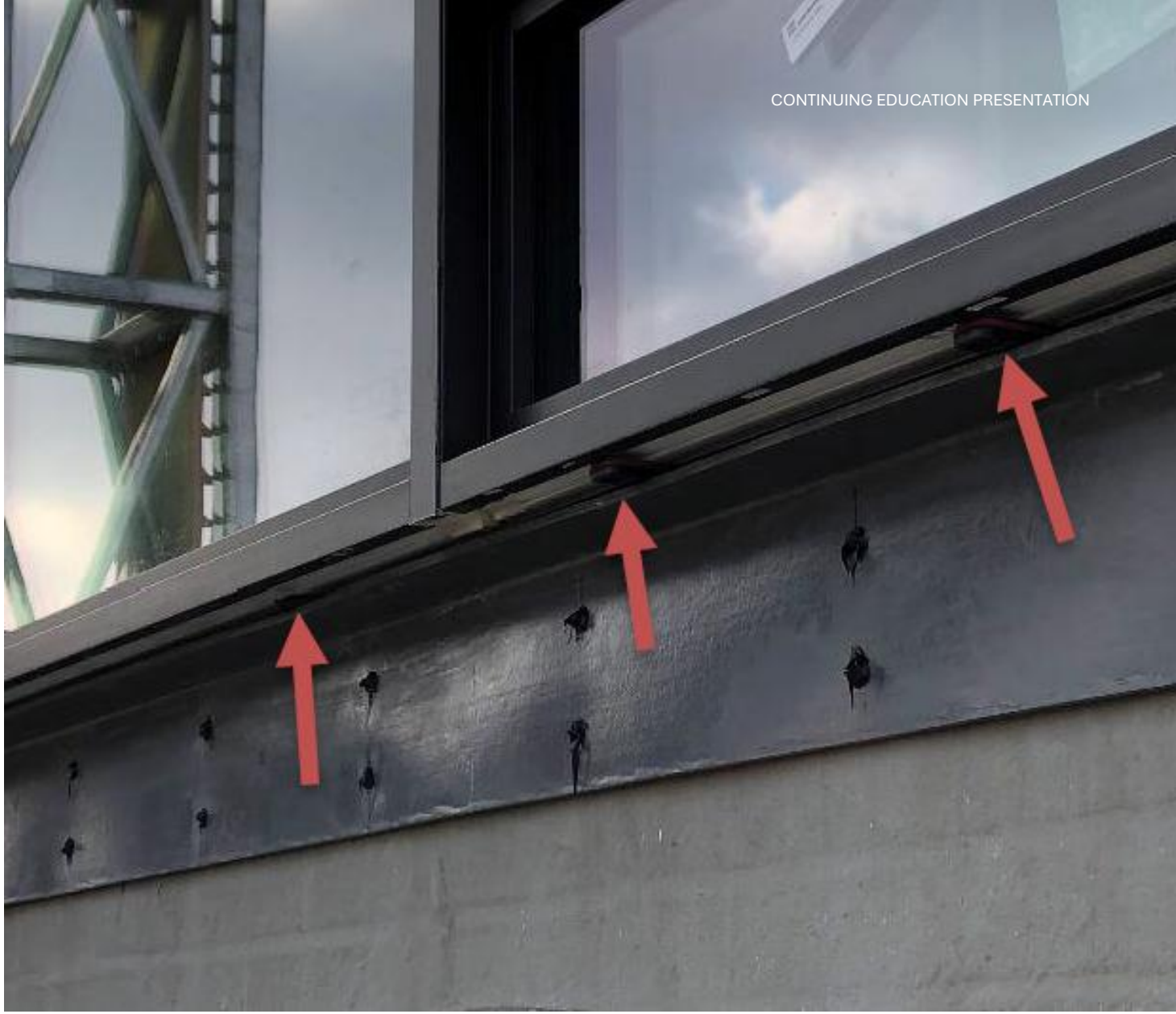
Images courtesy of Cascadia Windows & Doors





Images courtesy of Intuitive / ERA Architects

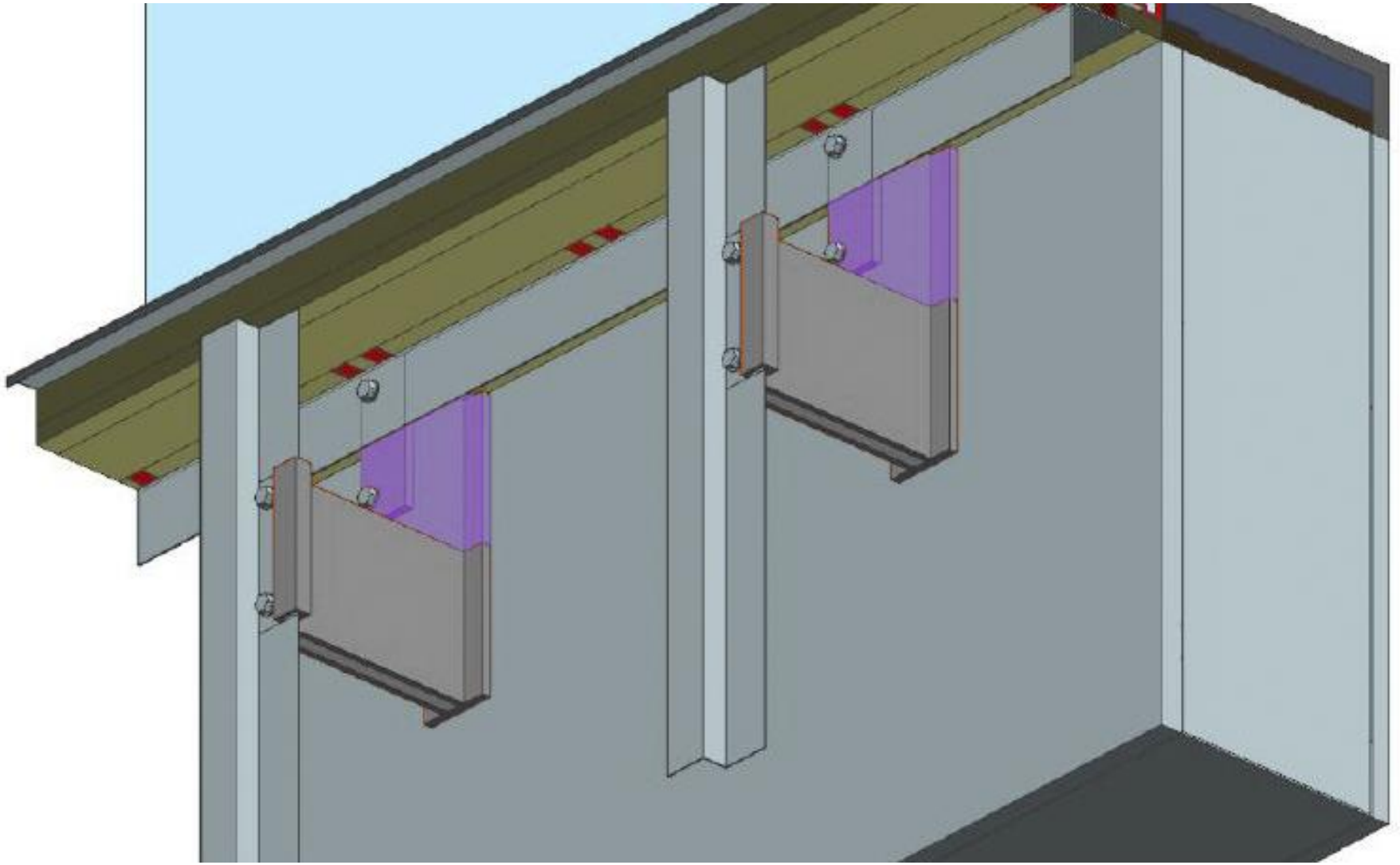




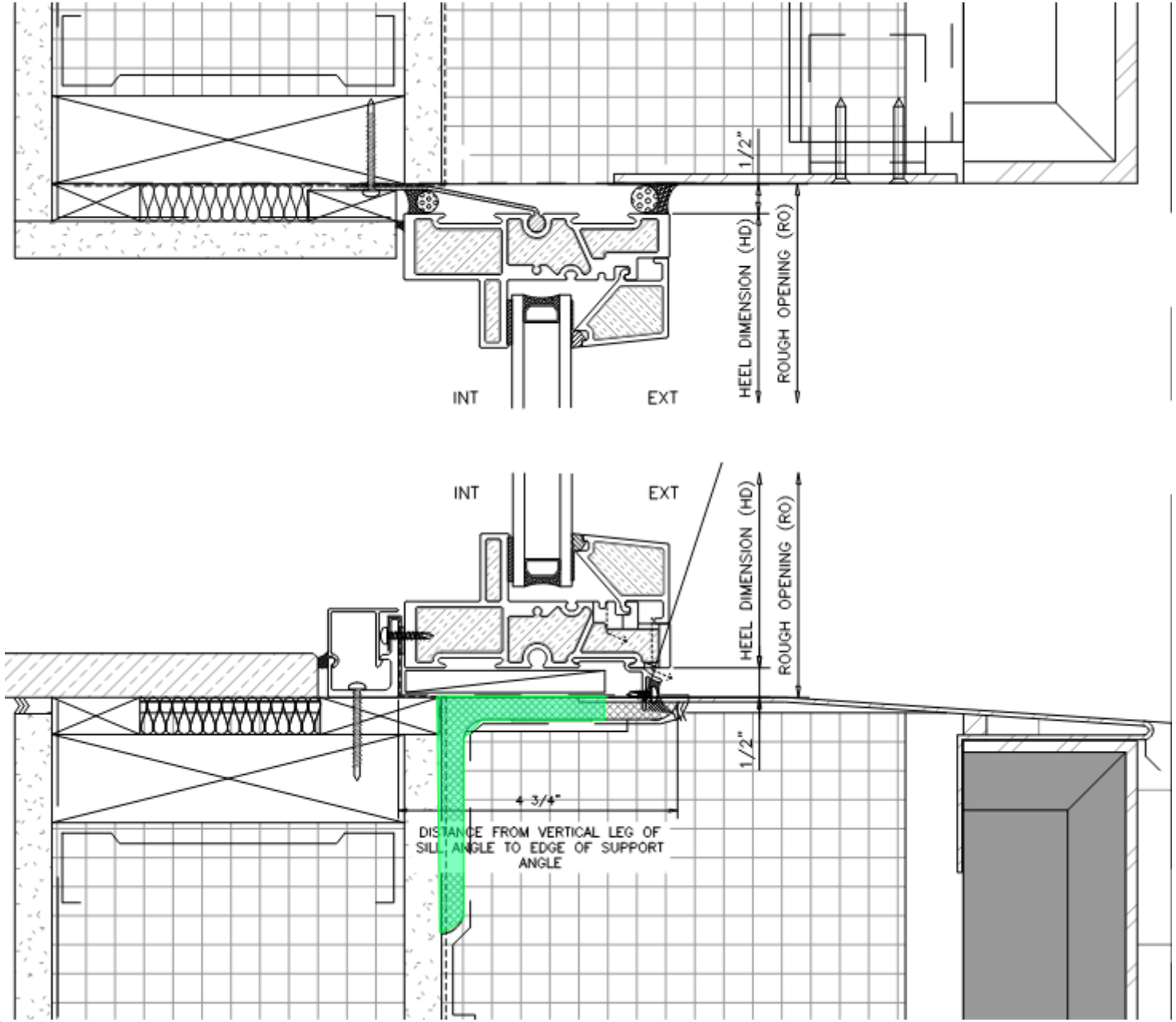
Images courtesy of Intuitive / ERA Architects

PROJECT INNOVATION
PRODUCT INNOVATION

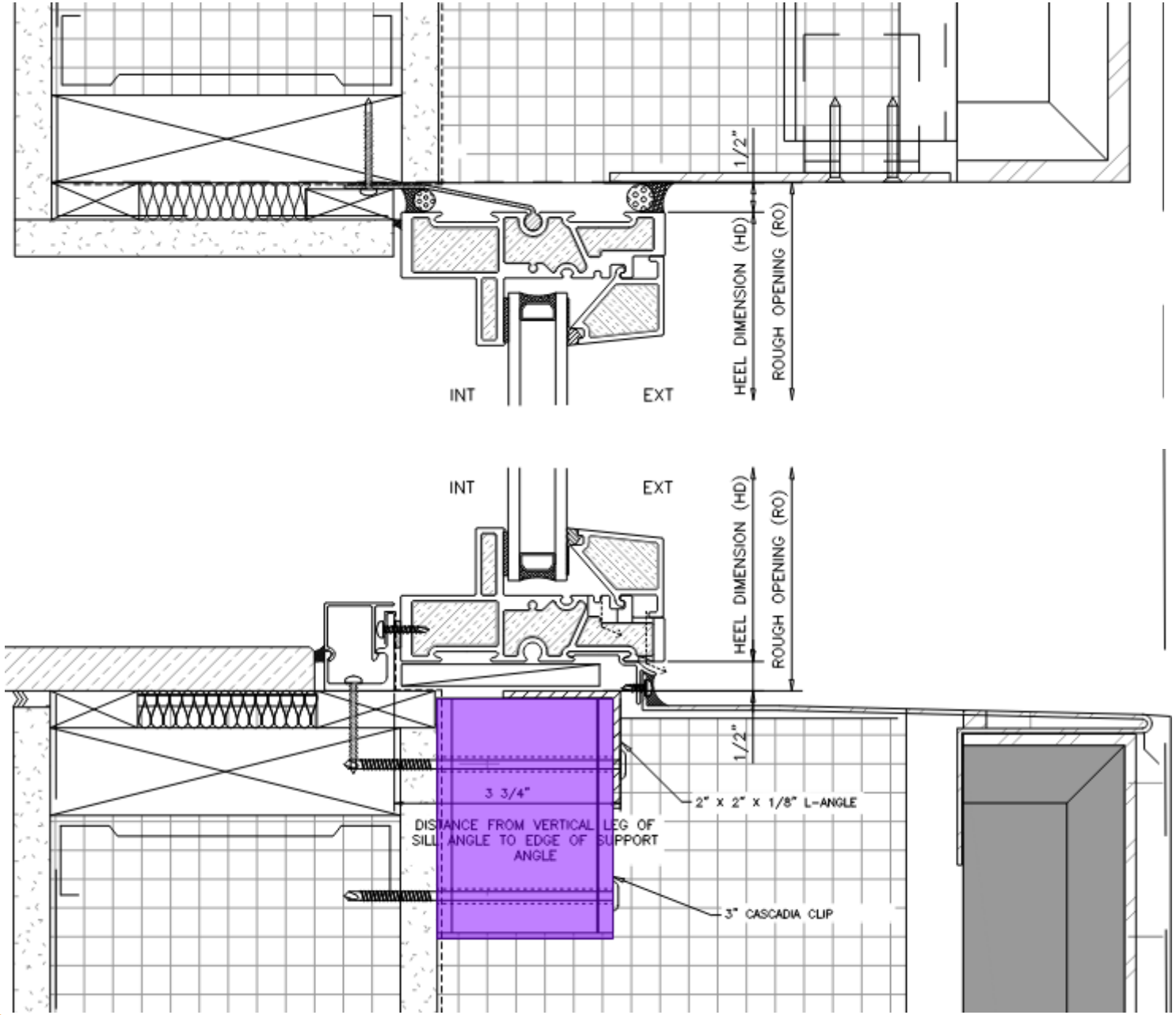




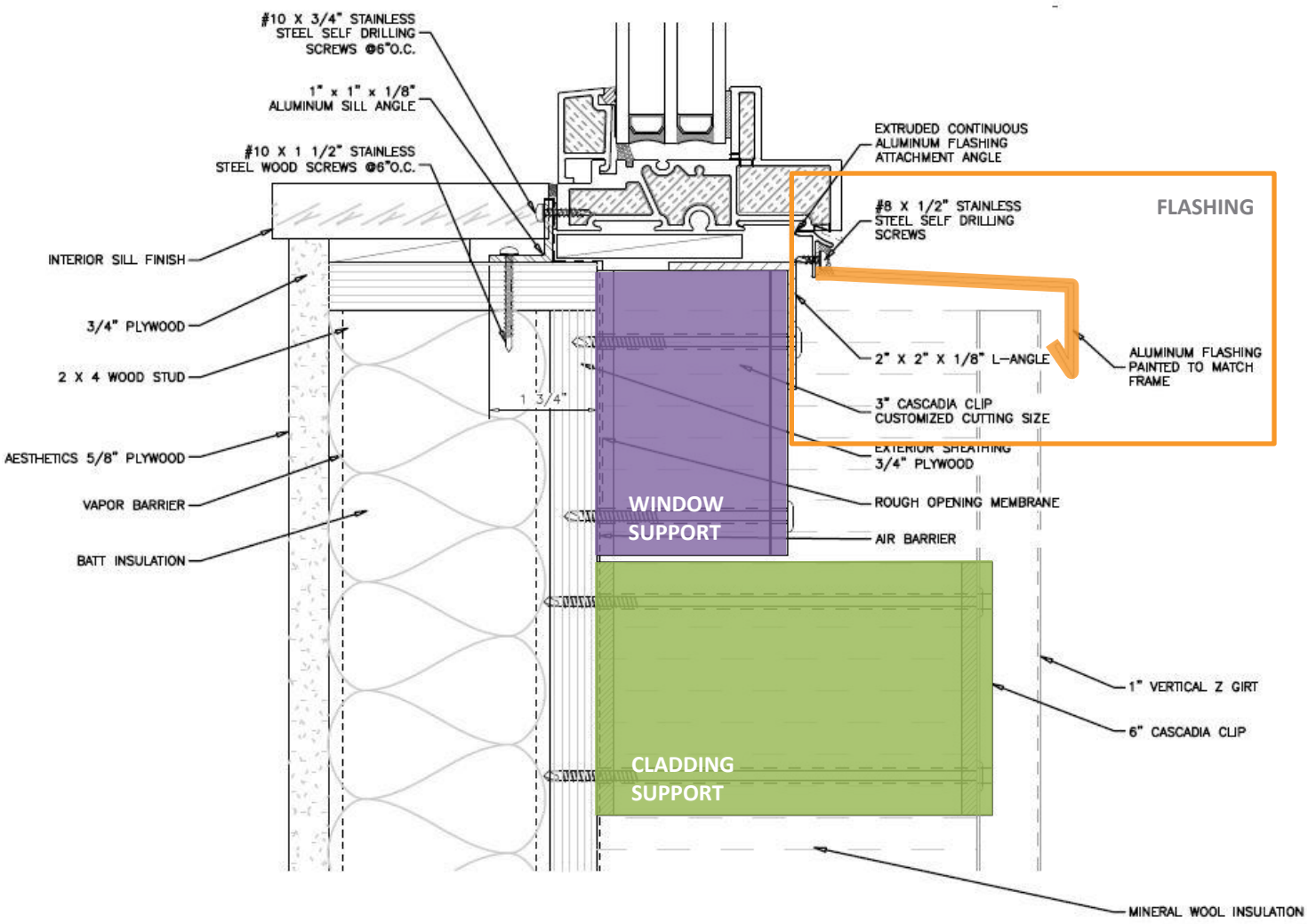
Images courtesy of Morrison Hershfield / Stantec

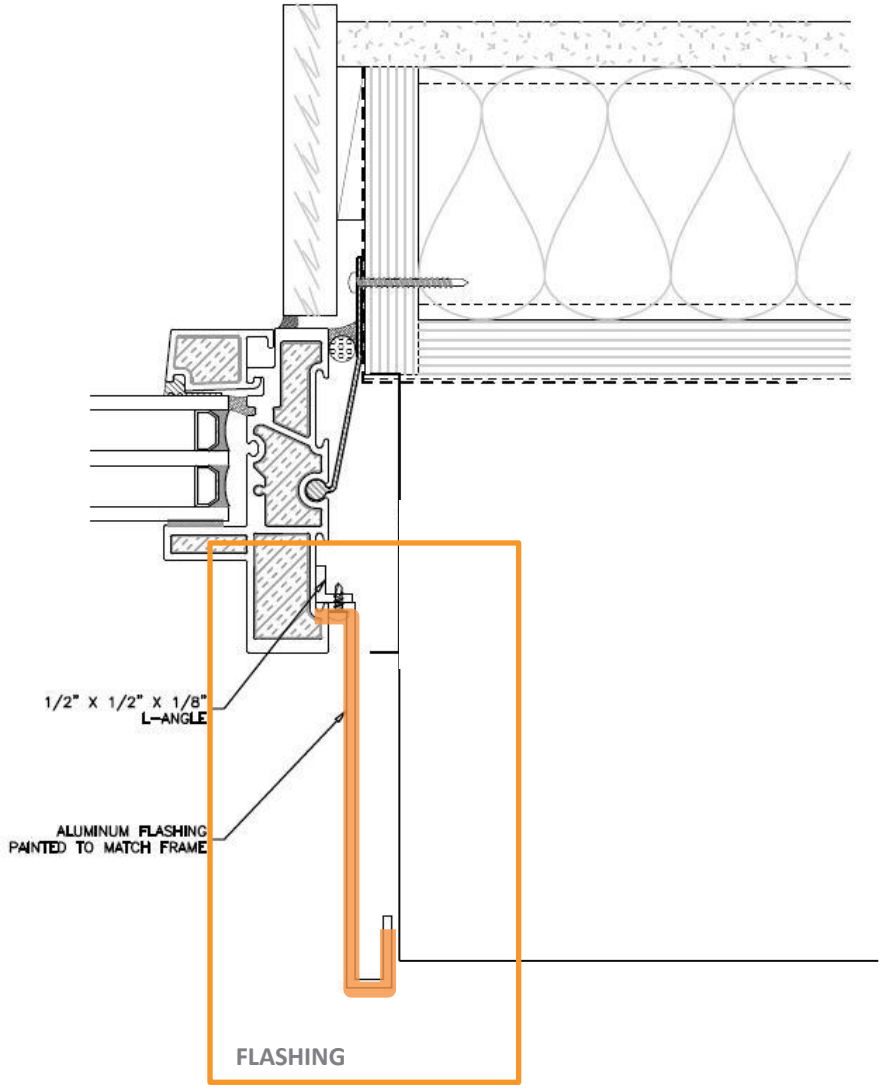


Images courtesy of Cascadia Windows & Doors

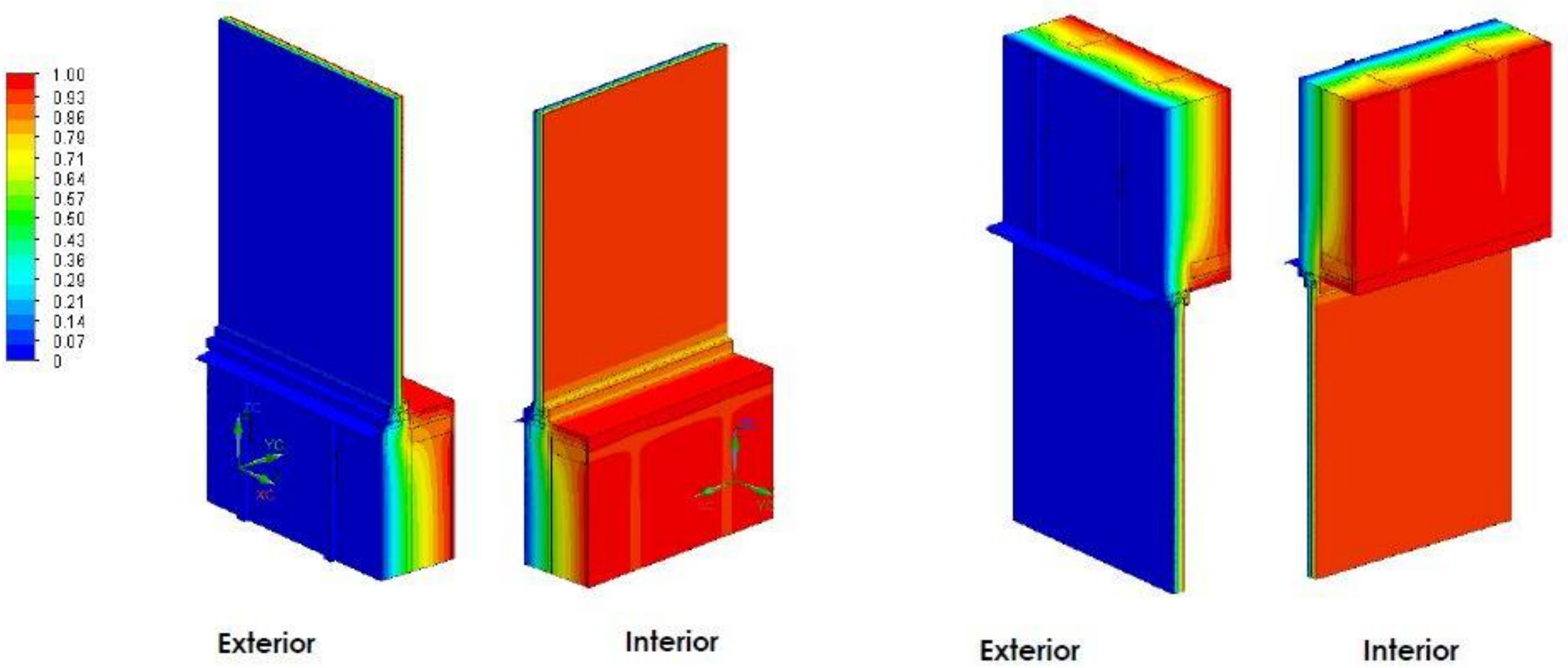


Images courtesy of Cascadia Windows & Doors





Images courtesy of Cascadia Windows & Doors



Images courtesy of Morrison Hershfield / Stantec

WATER PENETRATION TESTING

- ASTM E1105
- 15PSF
- 730PA







Images courtesy of Cascadia Windows & Doors

GLADSTONE VILLAGE SOCIAL HOUSING

Ottawa, ON





ENVELOPE INTEGRATION

Images courtesy of Skyrise Cities





Images courtesy of Skyrise Cities

CONTINUING EDUCATION PRESENTATION

LEARNING SESSION KEY TAKE AWAYS



Simon Fraser University – Courtyard Residence
Burnaby, BC

PHIUS WINDOWS:
Enabling Flexibility in High-Performance Buildings

KEY TAKE AWAYS

WINDOWS HAVE HUGE IMPACT

Type I Location I Installation

Often the weakest link in a building's envelope, a little extra attention on windows can have large overall impact

PAY ATTENTION TO PRODUCT DETAILS

Material I Modeled vs Real-World

Ensure you're verifying general product details and performance within the context of your project

PASSIVE HOUSE FOR ALL BUILDINGS

Residential I Multi-Family I High-Rise

Building to Passive House standards offers significant environmental and financial incentives for all stakeholders

QUESTIONS

PAE LIVING BUILDING

Portland, OR

ARCHITECT
ZGF ARCHITECTS

ENGINEERS / OWNER
PAE



Images courtesy of Cascadia Windows & Doors





Images courtesy of Cascadia Windows & Doors





Images courtesy of Cascadia Windows & Doors

UNIVERSITY OF VICTORIA – CHEKO'NIEN PASSIVE HOUSE

Victoria, BC

ARCHITECT
HENRIQUEZ PARTNERS ARCHITECTS

CONTRACTOR
PHEATERBRAE BUILDERS CO.

OWNER
CITY OF VANCOUVER



Images courtesy of Cascadia Windows & Doors





Images courtesy of Cascadia Windows & Doors





Images courtesy of Cascadia Windows & Doors



GASTOWN CHILDCARE CENTRE

Vancouver, BC

ARCHITECT
ACTON OSTRY ARCHITECTS

CONTRACTOR
HEATHERBRAE BUILDERS CO.

OWNER
CITY OF VANCOUVER

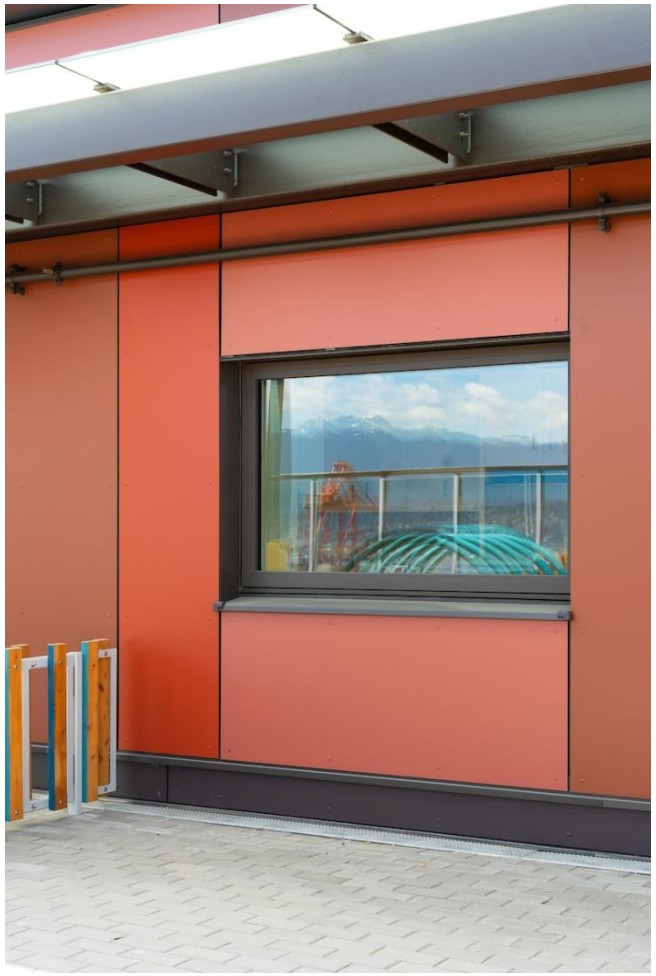


Images courtesy of Acton Ostry Architects & Rikur Energy





Images courtesy of Cascadia Windows & Doors





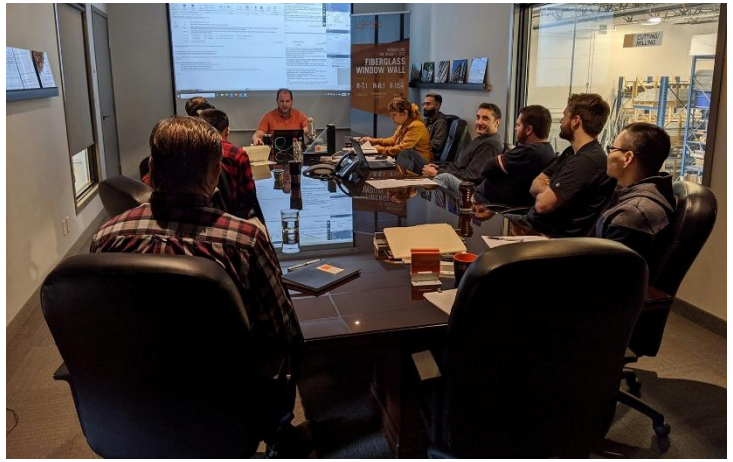
Images courtesy of Cascadia Windows & Doors

ABOUT CASCADIA WINDOWS & DOORS











WINDOW EPD JOURNEY

2017
DECLARE LABEL
International Living Future Institute

2020
INTERNAL DISCUSSIONS FOR EPD DEVELOPMENT
Issues with existing PCR identified

2021
CASCADIA JOINS PCR WORKING GROUP
Observer role providing feedback

2023
FENESTRATION ASSEMBLIES PCR PUBLISHED
Using latest North American standards and new functional units based off NFRC (2023 – 2028)

2024
CASCADIA WINDOW, WINDOW WALL & DOORS EPD PUBLISHED
World's First EPD Published Using Fenestration Assemblies PCR



CLIP EPD JOURNEY

2015

DECLARE LABEL
International Living Future Institute

2020

INTERNAL DISCUSSIONS FOR EPD DEVELOPMENT

2021

RAINSCREEN ASSOCIATION OF NORTH AMERICA
Working Group Established

SUSTAINABLE MINDS ENGAGED
Development of Product Category Rule (PCR) Part B

PCR PART B PUBLISHED
Cladding Support Components & Systems (2022 – 2027)

2022

CASCADIA CLIP EPD PUBLISHED
World's First EPD Published Using Cladding Support Components & Systems PCR



HIGH-PERFORMANCE CHARACTERISTICS

CASCADIA EXAMPLES

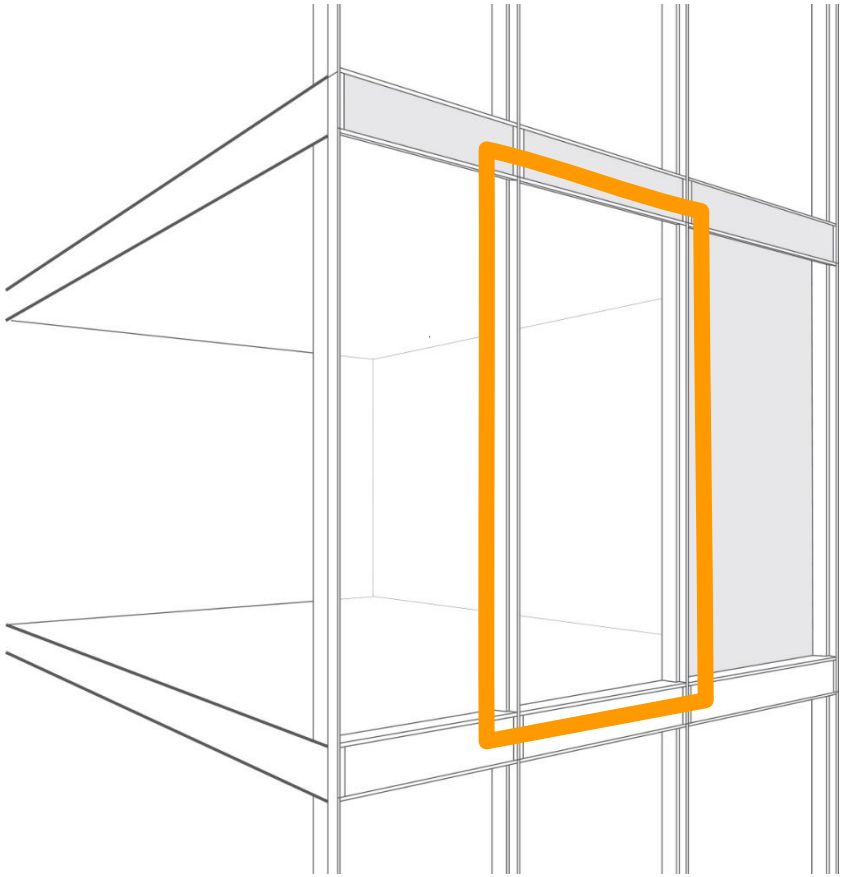


TYPICAL THERMALLY BROKEN ALUMINUM FRAME



TYPICAL FIBERGLASS FRAME

WINDOW WALL



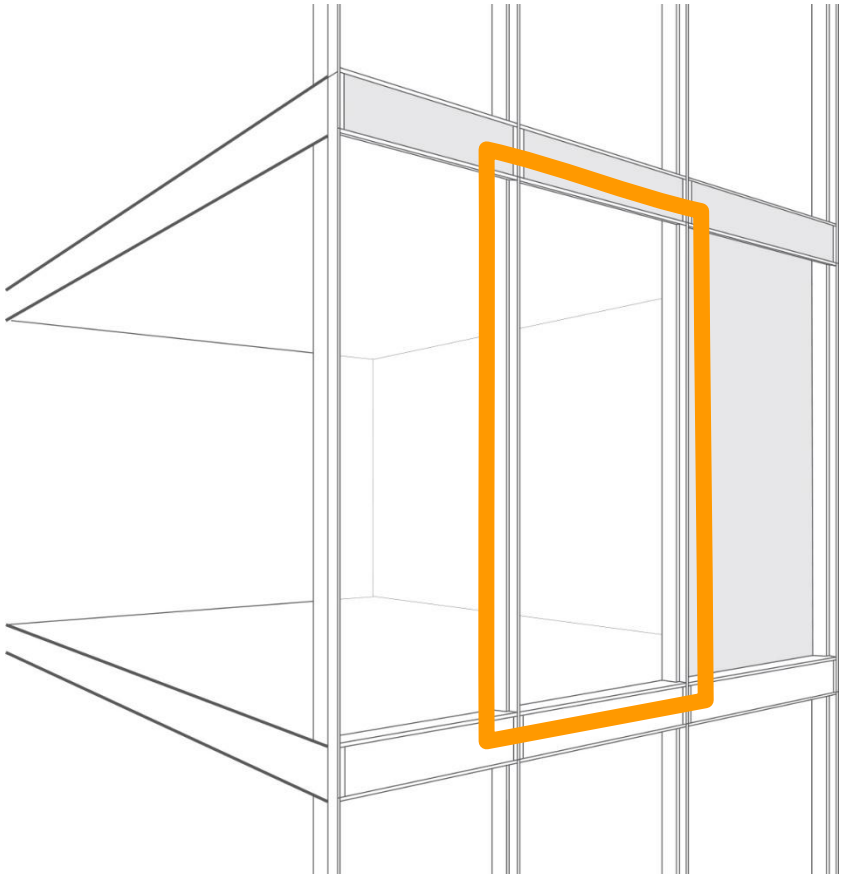
VISION GLASS

R-4.1

0.24 Btu/h·ft²·F | 1.36 W/m²·K

DOUBLE-GLAZED HIGH-PERFORMANCE FIBERGLASS FRAME

WINDOW WALL

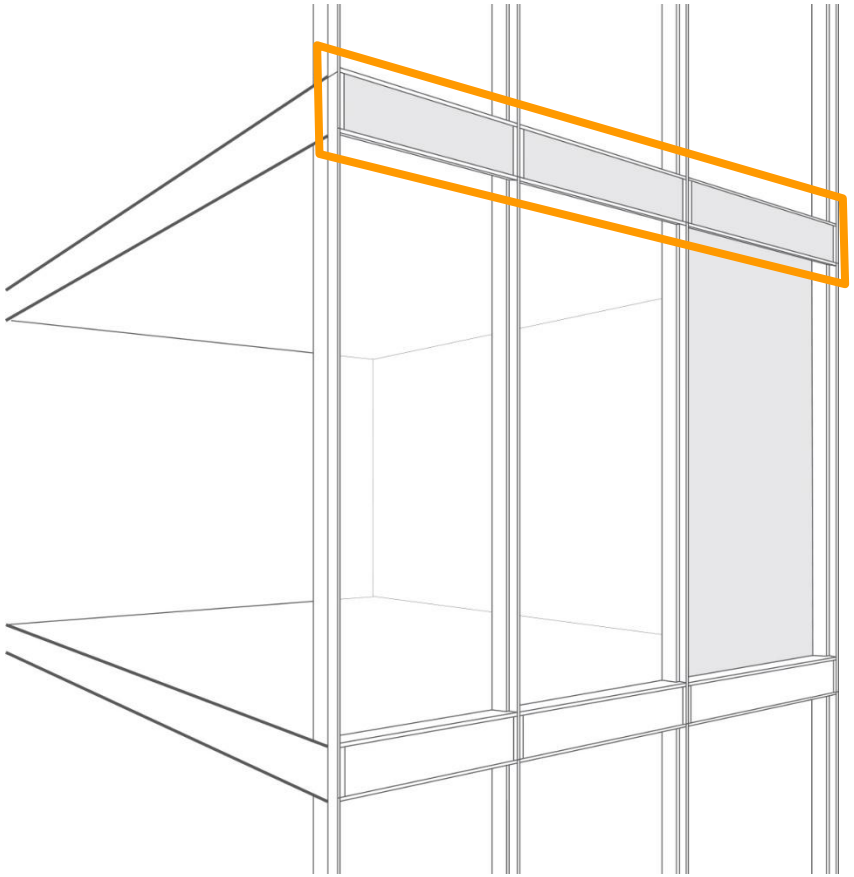


VISION GLASS

R-7.1
STANDARD TRIPLE GLAZING

R-7.7
PREMIUM TRIPLE GLAZING

WINDOW WALL

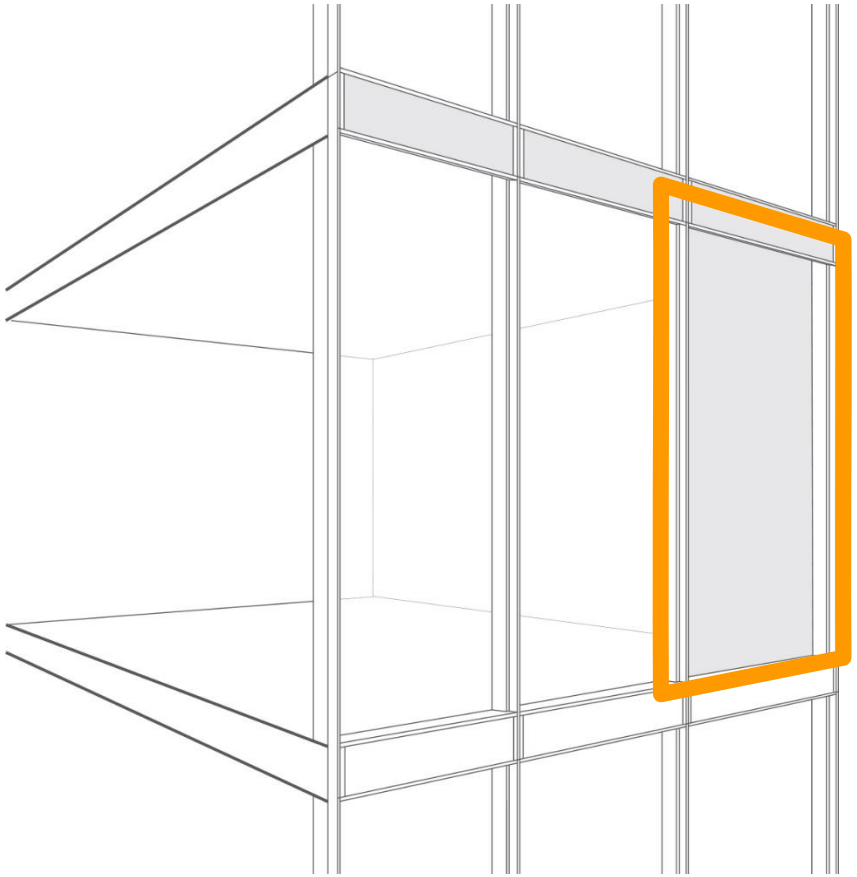


OPAQUE AREAS

R-8.1

SLAB BYPASS

WINDOW WALL



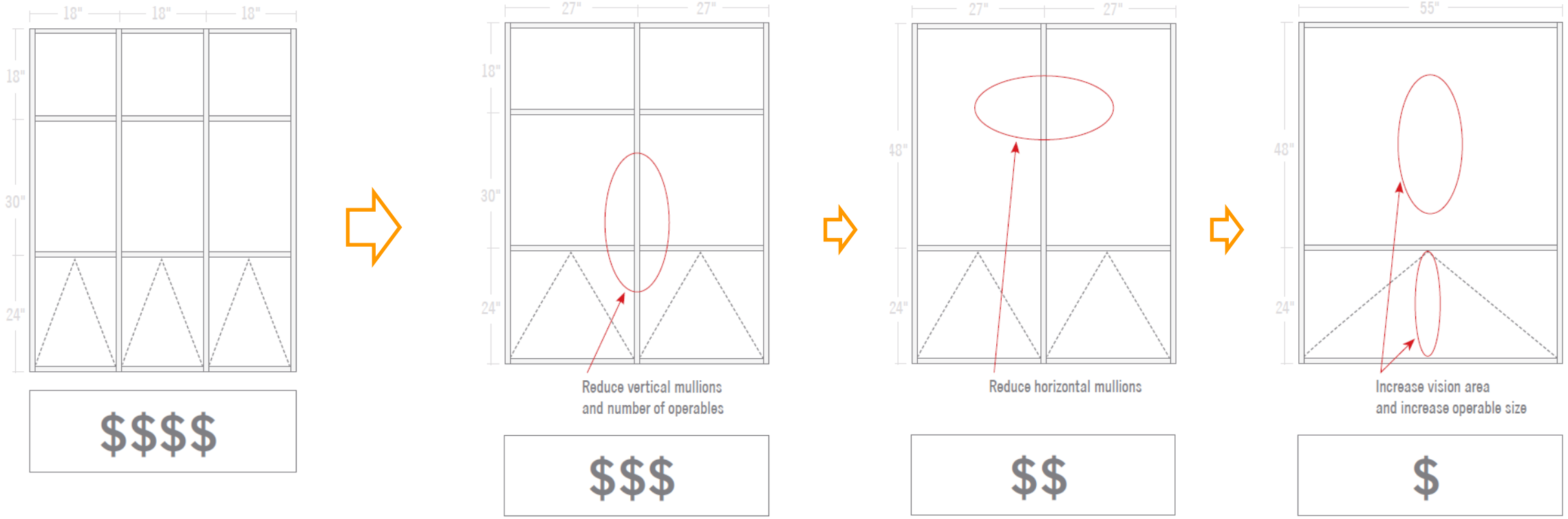
OPAQUE AREAS

R-16.2

METAL BACKPAN

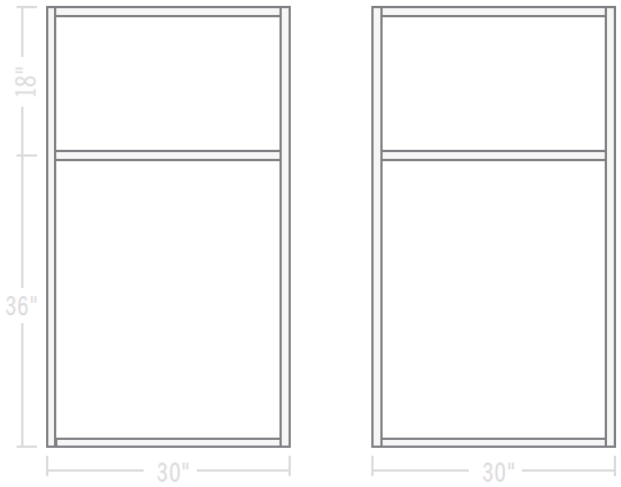
OPTIMIZING WINDOWS

Reduce Mullions

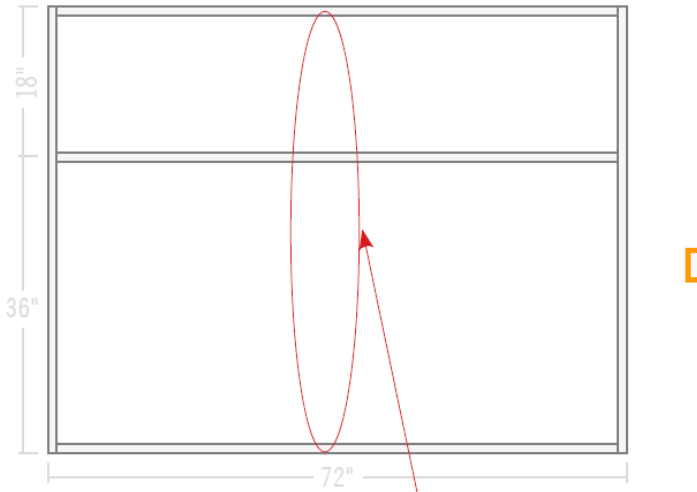


OPTIMIZING WINDOWS

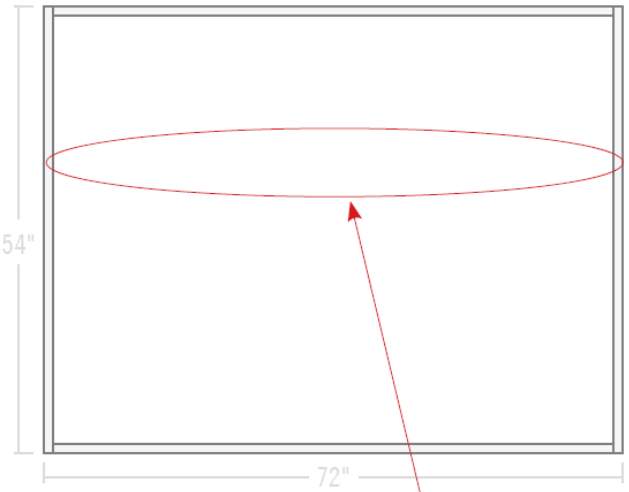
Increase Window Size



$$$$ / FT²



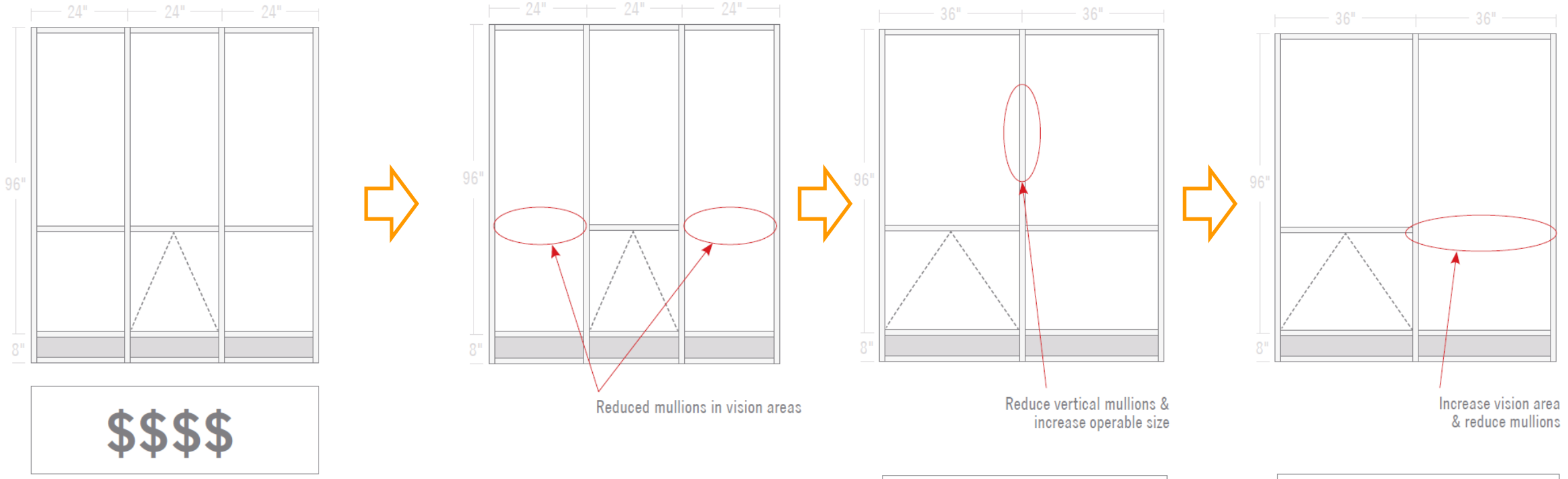
$$$ / FT²



$$ / FT²

OPTIMIZING WINDOWS

Window Wall



CONTINUING EDUCATION PRESENTATION



PHIUS WINDOWS:
Enabling Flexibility in High-Performance Buildings