# MULTI-UNIT RESIDENTIAL BUILDING

BUILDING ENVELOPE
DESIGN COMPETITION

2026

ft3
Architecture
Landscape
Interior Design

# CONTENTS

# TEAM


**ADAM DUBYNA**

Architect

dubyna@ft3.ca



**ZAHRA SHARIFI**

Architectural Intern

sharifi@ft3.ca



**BROOKE DE ROCQUIGNY**

Architectural Intern

deRocquigny@ft3.ca



**JENNIFER ATHERTON**

Sustainable Building Analyst/Coordinator

atherton@ft3.ca



**MARY TORREFALMA**

Architectural Technologist

torrefalma@ft3.ca


# PROJECT DESCRIPTION

THIS PROJECT FOCUSES ON DEVELOPING INNOVATIVE BUILDING ENVELOPE ASSEMBLY FOR A THEORICAL MULTI-UNIT RESIDENTIAL BUILDING THAT IS LOCATED IN WINNIPEG. THE PURPOSE OF THIS PROJECT IS TO CREATE A BUILDING ENVELOPE THAT MEETS THE NATIONAL ENERGY BUILDING CODE (NECB), TIER 3 PERFORMANCE STANDARDS WHILE STILL MAINTAINING A STRIKING AESTHETIC.

THE PROPOSED FOUR-STOREY RESIDENTIAL BUILDING CONSISTS OF A TOTAL OF 16 UNITS, FOUR PER FLOOR. EACH APARTMENT INCLUDES A LIVING ROOM, KITCHEN, LAUNDRY, TWO BEDROOMS, AND TWO BATHROOMS. THE BUILDING CONSISTS OF SEMI-BASEMENT UNITS AND ALL UPPER THREE FLOORS INCLUDE PRIVATE BALCONIES.

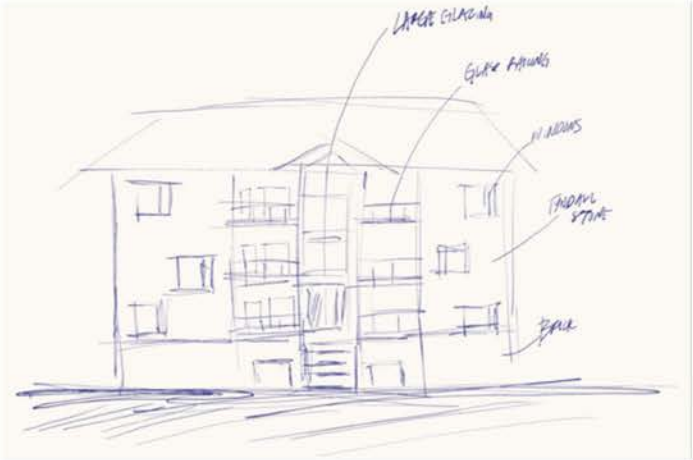
THE RISING DEMAND FOR QUALITY HOUSING IN WINNIPEG COMES WITH THE CHALLENGES OF THE CITY'S EVOLVING CLIMATE CONDITIONS. OUR MAIN GOAL FOR THIS PROJECT IS TO DESIGN AN ENERGY EFFICIENT FACADE SYSTEM THAT WITHSTAND WINNIPEG'S CLIMATE CONDITIONS WHILE STILL MAINTAINING A DISTINCTIVE DESIGN THAT COMPLEMENTS THE EXISTING NEIGHBORHOOD.

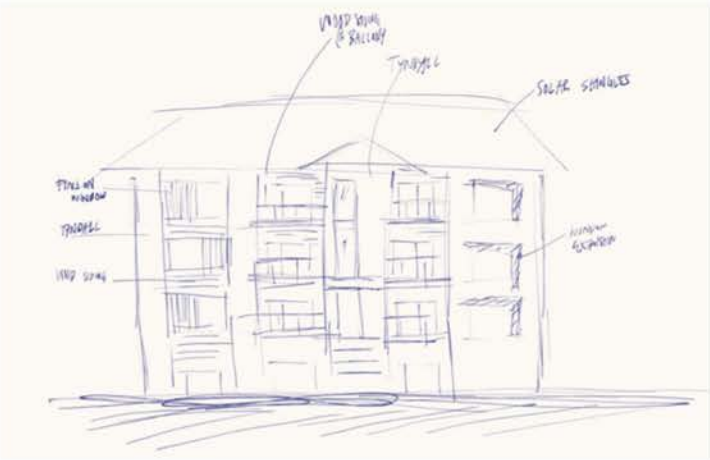
# AESTHETICS/ CONCEPT/ DESIGN

THE SELECTED SITE FOR OUR FICTIONAL MULTI-UNIT RESIDENTIAL BUILDING IS WITHIN AN ESTABLISHED AREA AT THE CORNER OF RIDDLE AVENUE AND CLIFTON STREET, JUST OFF PORTAGE AVENUE. SITUATED NEAR THE CITY'S ONLY RAPID TRANSIT ROUTE (BLUE), THIS TRANSIT-ORIENTED DEVELOPMENT WILL REDUCE THE NUMBER OF REQUIRED PARKING SPACES AND ASSOCIATED EV CHARGING STATIONS NECESSARY FOR THE INEVITABLE TRANSITION AWAY FROM FOSSIL FUELS. WITH MULTIPLE NEARBY AMENITIES FOR DINNING, SHOPPING, RECREATION, EMPLOYMENT, AND EDUCATION, THE INCREASED RESIDENTIAL DEVELOPMENT DENSITY BROUGHT BY THIS 16-UNIT PROJECT WILL REVITALIZE ITS ESTABLISHED, WALKABLE NEIGHBOURHOOD AND ALLOW FOR MORE SHARED OUTDOOR AMENITY SPACE.

THE ENVELOPE CONCEPT WAS PRIMARILY INFORMED BY ITS CONTEXTUAL SURROUNDINGS. THE USE OF LOCAL MATERIALS, INTENTIONAL BUILDING ORIENTATION, AND A CAREFULLY CURATED PALETTE OF TEXTURES AND COLORS WERE ALL SELECTED TO ALIGN WITH THE CHARACTER OF THE ADJACENT NEIGHBORHOOD AND TO INTEGRATE SEAMLESSLY WITHIN THE PREDOMINANTLY SINGLE-FAMILY RESIDENTIAL CONTEXT.

A STRONG EMPHASIS WAS PLACED ON OPTIMIZING NATURAL LIGHT. THE SOUTH FAÇADE WAS DESIGNED TO MAXIMIZE HIGH-QUALITY DAYLIGHT, WHILE THE EAST AND WEST ELEVATIONS WERE COMPOSED TO MODERATE SOLAR EXPOSURE WITHOUT LIMITING ACCESS TO NATURAL ILLUMINATION FOR KEY SPACES SUCH AS THE LAUNDRY ROOMS. FOURTH-FLOOR KITCHENS NOW BENEFIT FROM ROOF-MOUNTED SOLATUBE DAYLIGHTING, AND THE INTRODUCTION OF SMALL PRIVATE PATIOS AT THE BASEMENT LEVEL ENHANCES BOTH VIEWS AND DAYLIGHT ACCESS, ALLOWING FOR LARGER LIVING-ROOM WINDOWS.





## CHOSEN FINISHES:

SUNSTYLE
(BLACK SOLAR SHINGLES)

TYNDALL (SAWN)

WESTERN RED CEDAR,
V JOINT CEDAR SIDING
(T&G)

MITREX PANELS,
EFACADE PRO+ &
NON-SOLAR
(NATURAL GREY)

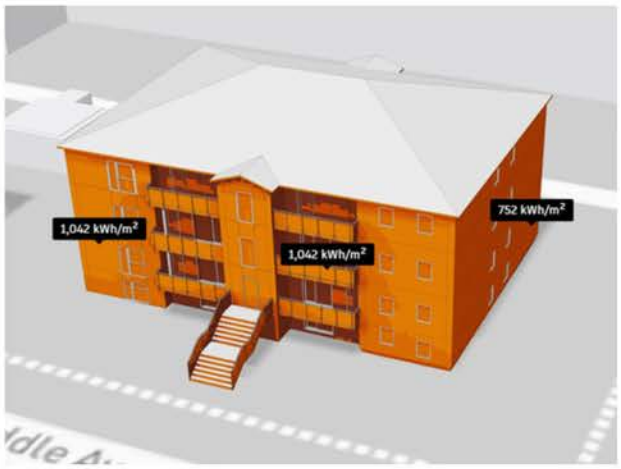

TYNDALL STONE—AN ESTABLISHED LOCAL MATERIAL IN MANITOBA—WAS CHOSEN FOR ITS TIMELESS, GROUNDED AESTHETIC AND ITS ABILITY TO COEXIST HARMONIOUSLY ACROSS VARYING ARCHITECTURAL CONTEXTS. COMPLEMENTING THIS, NATURAL CANADIAN RED CEDAR PANELING PROVIDES THE WARMTH EXPECTED IN A FAMILY-ORIENTED RESIDENTIAL ENVIRONMENT. THE HORIZONTAL ORIENTATION OF THE CEDAR PANELS REDUCES PERCEIVED VERTICALITY, SUPPORTING A SCALE MORE CONSISTENT WITH THE SURROUNDING STREETSCAPE.

THE FACADE-INTEGRATED SOLAR PANEL CLADDING, ROOF-INTEGRATED SOLAR SHINGLES, AND SOLAR-PANEL GUARDRAILS COLLECTIVELY STRENGTHEN THE BUILDING'S RESILIENCY WHILE CONTRIBUTING TO A UNIFIED ARCHITECTURAL EXPRESSION. THESE SYSTEMS ENABLE A THOUGHTFUL COMPARTMENTALIZATION OF OPENINGS AND PROMOTE A COHESIVE VISUAL RELATIONSHIP BETWEEN THE ROOF AND EXTERIOR WALLS.

# CLIMATE RESILIENCY

BASED ON SITE ANALYSIS USING AUTODESK FORMA, PRELIMINARY SOLAR ENERGY CALCULATIONS INDICATED THAT BUILDING INTEGRATED SOLAR PANELS COULD SUPPLY THE PROJECT WITH APPROXIMATELY 33% OF ITS TOTAL ANNUAL ELECTRICITY NEEDS. THIS ONSITE RENEWABLE ENERGY GENERATION WILL REDUCE STRAIN ON THE EXISTING ELECTRICITY GRID DURING COLD SNAPS AS WELL AS DURING THE INCREASING NUMBER AND LENGTH OF SUMMER HEAT WAVES PREDICTED BY CLIMATE MODELS (AVERAGE NUMBER OF VERY HOT DAYS AND HEAT WAVES IN WINNIPEG ARE EXPECTED TO MORE THAN DOUBLE WITHIN THE NEXT 30 YEARS).

THE HIGH-PERFORMANCE AIR-TIGHT BUILDING ENVELOPE WITH ITS CONTINUOUS EXTERIOR INSULATION, LOW THERMAL BRIDGING, AND GLAZING WITH LOW SHGC VALUES, WILL ALLOW THE BUILDING TO STAY COOL DURING EXTREME HEAT, AND WARM DURING WINTER WITHOUT EXCESSIVE ENERGY USED TO REPLACE HEAT LOST THROUGH THE ENVELOPE. WINNIPEG MANUFACTURED WINDOWS WITH THE LOWEST U-VALUES AVAILABLE ON THE MARKET, REDUCE CONDENSATION RISK AND ALLOW FOR MORE COMFORTABLE INDOOR HUMIDITY LEVELS IN WINTER, POTENTIALLY HELPDING TO REDUCE SPREAD OF RESPIRATORY VIRUSES THAT THRIVE IN LOW HUMIDITY CONDITIONS.





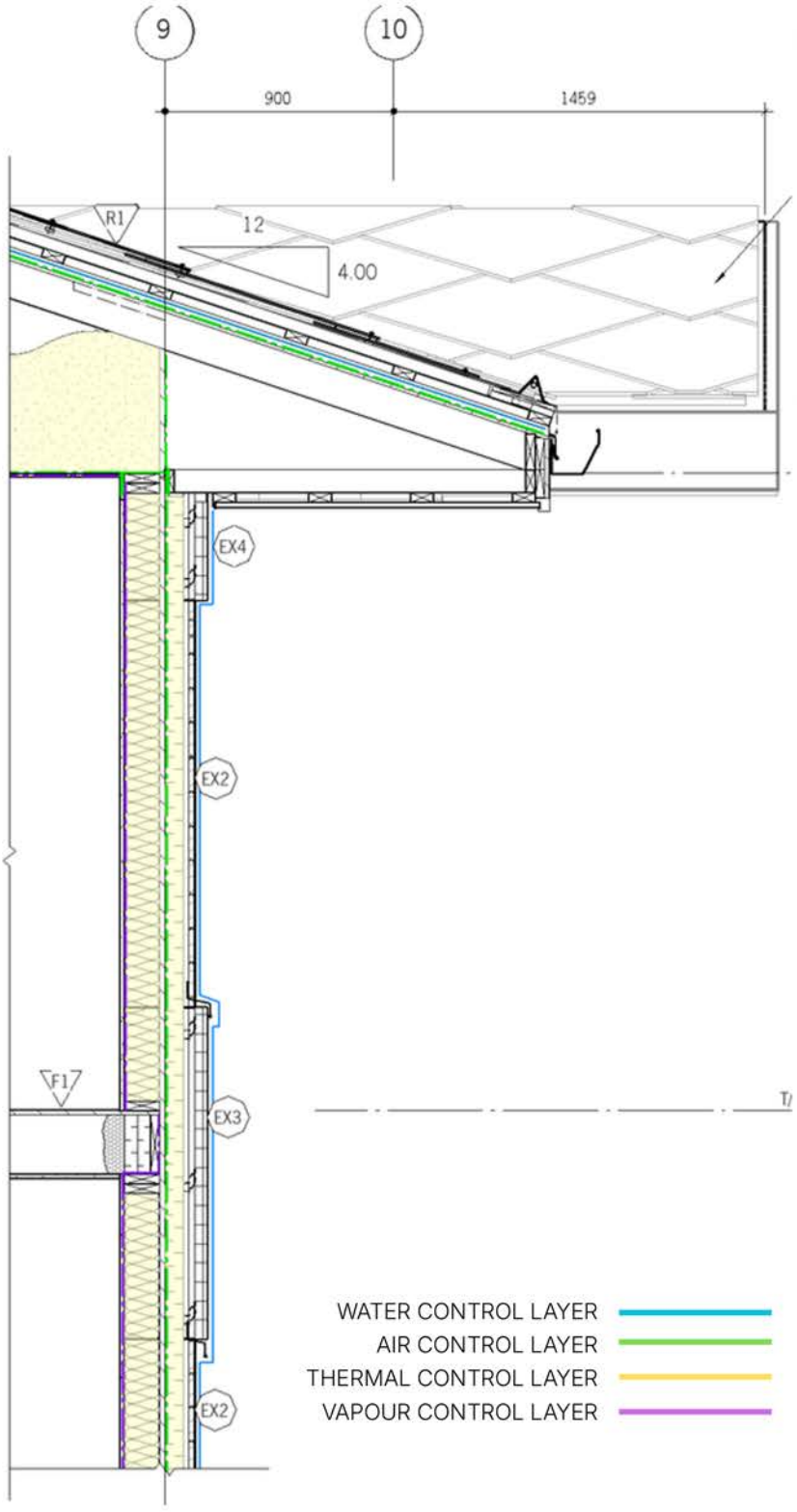
# CONSTRUCTIBILITY

WOOD FRAME CONSTRUCTION IS A COMMON BUILDING METHOD IN MANITOBA, FAMILIAR TO MANY LOCAL TRADESPEOPLE. WOOD STRAPPING WITH LONG/THROUGH SCREW CLADDING ATTACHMENTS IS CONSIDERED TO HAVE GOOD EASE OF CONSTRUCTION.

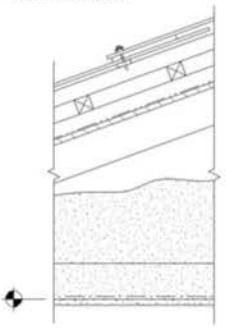
WE HAVE SPECIFIED 3/4" PLYWOOD SHEATHING INSTEAD OF THINNER MORE COMMON 1/2" PLYWOOD SHEATHING TO ENSURE BETTER STRUCTURAL INTEGRITY OF THE ASSEMBLY IN THE EVENT THAT SCREWS ACCIDENTALLY MISS THE FRAMING MEMBERS. POTENTIALLY THIS ALSO MEANS USE OF FEWER SCREWS AND LESS THERMAL BRIDGING POTENTIAL.

BLOWN-IN CELLULOSE INSULATION WAS SELECTED FOR THE ATTIC INSULATION SINCE IT IS MANUFACTURED IN MANITOBA, CAN FILL SMALL CREVICES AND CONTRACTORS FREQUENTLY PREFER BLOWN-IN THAN BATT INSULATION FOR EASE OF CONSTRUCTION.

# ASSEMBLIES / CONTROL LAYERS

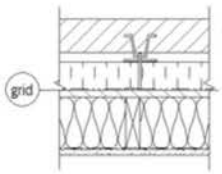



## ROOF TYPES

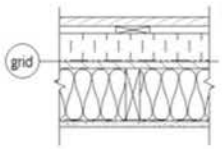


R1
WOOD TRUSS ROOF
SOLAR SHINGLES (SUNSTYLE)
45mm SOLAR SLATS
38mm HORIZONTAL SLATS
38mm COUNTER SLATS
BLUESKIN RF200 ICE & WATER BARRIER
13mm ROOF SHEATHING
ENGINEERED WOOD TRUSSES
BLOWN IN CELLULOSE - R-60
AIR / VAPOR BARRIER MEMBRANE
TYPE X 16mm GYPSUM BOARD

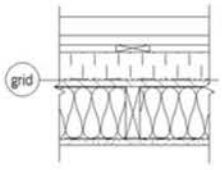
## EXTERIOR WALL TYPES



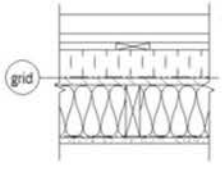

EX1
TYNDALL STONE VENEER ON WOOD STUDS
90mm TYNDALL STONE (SAWN) C/W FERO THERMAL TIES
25mm AIR SPACE
102mm ROCKWOOL COMFORTBOARD 80
BLUESKIN VP160 SELF-ADHERED WATER-RESITIVE AIR BARRIER
19mm PLYWOOD SHEATHING
140mm WOOD STUDS @400 O/C
ROCKWOOL COMFORTBATT BETWEEN WOOD STUDS
VAPOR BARRIER
16mm TYPE 'X' GYPSUM BOARD




EX2
WOOD SIDING ON WOOD STUDS
WESTERN RED CEDAR V-JOINT SIDING (T&G)
19mm x 89mm WOOD FURRING STRIPS
102mm ROCKWOOL COMFORTBOARD 80
BLUESKIN VP160 SELF-ADHERED WATER-RESITIVE AIR BARRIER
19mm PLYWOOD SHEATHING
140mm WOOD STUDS @400 O/C
ROCKWOOL COMFORTBATT BETWEEN WOOD STUDS
VAPOR BARRIER
16mm TYPE 'X' GYPSUM BOARD




EX3
MITREX SOLAR PANELS ON WOOD STUDS
MITREX SOLAR PANEL (GREY)
INTERLOCKING CHANNEL SYSTEM
19mm x 89mm WOOD FURRING STRIPS
102mm ROCKWOOL COMFORTBOARD 80
BLUESKIN VP160 SELF-ADHERED WATER-RESITIVE AIR BARRIER
19mm PLYWOOD SHEATHING
140mm WOOD STUDS @400 O/C
ROCKWOOL COMFORTBATT BETWEEN WOOD STUDS
VAPOR BARRIER
16mm TYPE 'X' GYPSUM BOARD




EX4
MITREX SOLAR PANELS ON WOOD STUDS
NON-SOLAR MITREX PANEL (GREY)
INTERLOCKING CHANNEL SYSTEM
19mm x 89mm WOOD FURRING STRIPS
102mm ROCKWOOL COMFORTBOARD 80
BLUESKIN VP160 SELF-ADHERED WATER-RESITIVE AIR BARRIER
19mm PLYWOOD SHEATHING
140mm WOOD STUDS @400 O/C
ROCKWOOL COMFORTBATT BETWEEN WOOD STUDS
VAPOR BARRIER
16mm TYPE 'X' GYPSUM BOARD

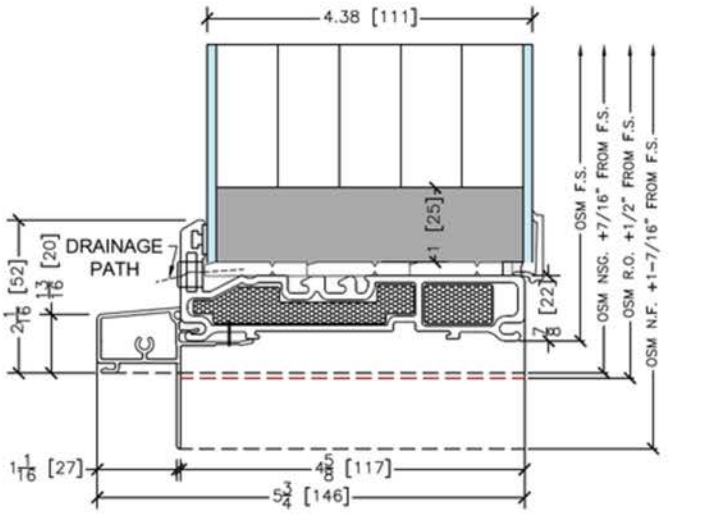
# ENVELOPE PERFORMANCE

SEE THERMAL BRIDGING CALCULATIONS ATTACHED.

THE OVERALL ROOF USI-VALUE IS 0.114 (R-50), SLIGHTLY HIGHER THAN THE MINIMUM REQUIREMENT, ACHIEVED WITH THE USE OF R-60 BLOWN-IN CELLULOSE INSULATION.

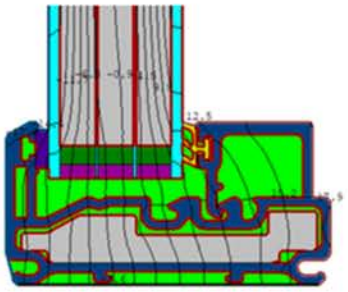
THE OVERALL WALL USI-VALUE IS 0.271 (R-21) INCLUDING FENESTRATION AND OPAQUE ASSEMBLIES. USE OF HIGH-PERFORMANCE WINDOWS ALLOWS FOR A THINNER LAYER OF EXTERIOR INSULATION AND REDUCED EMBODIED CARBON FOOTPRINT.

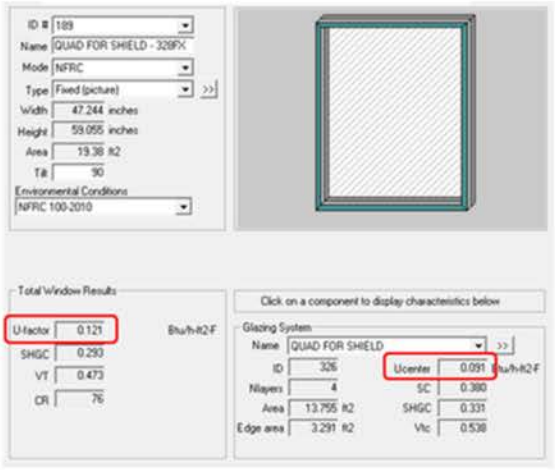
WINDOWS WITH LOW SOLAR HEAT GAIN ARE SPECIFIED TO ENSURE SPACES DO NOT OVERHEAT IN THE SUMMER. WE SPECIFICALLY SPECIFIED DUXTON AS IT IS A LOCAL MANITOBA MANUFACTURER.




SERIES 458FX: w/ 4.38 LITEZONE

SIX PANE, AIR FILLED,
USI-0.568, SHGC 0.18





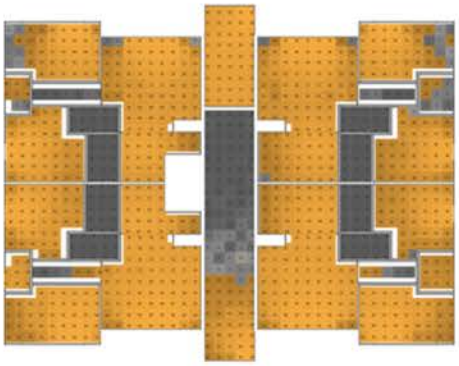

THIN QUAD PANE,
KRYPTION FILLED,
USI-0.620, SHGC 0.13

# DAYLIGHTING &VIEWS

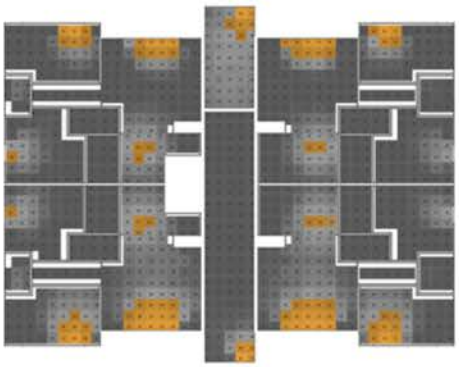
THE PROJECT'S WINDOWS BALANCE ENERGY PERFORMANCE WITH ACCESS TO DAYLIGHT AND VIEWS THROUGH CONSIDERATION OF SIZE, PLACEMENT, AND VISIBLE LIGHT TRANSMITTANCE. DAYLIGHT TUBES BRING NATURAL LIGHT INTO THE KITCHENS WHICH ARE LOCATED FAR FROM PERIMETER GLAZING. OVERALL, THE PROJECT IS WELL DAYLIT, BUT FALLS SHORT OF MEETING THE CHALLENGING LEED V4.1 BD+C NC DAYLIGHT CRITERIA. HOWEVER, IT WOULD MEET LEED V4.1 BD+C RESIDENTIAL DAYLIGHT AND VIEWS CREDIT CRITERIA.

Solatube

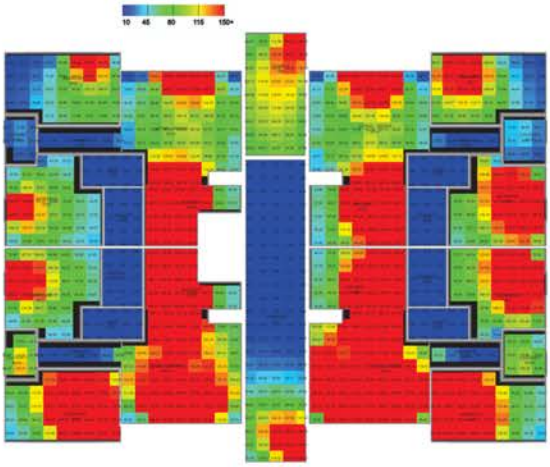
AT 36.3% DAYLIGHT (SDA100/10%) IN NON-REGULARLY OCCUPIED FLOOR AREAS, THE PROJECT FALLS JUST SHORT OF ACHIEVING A LEED V4.1 BD+C NC INNOVATION CREDIT FOR 40% DAYLIGHT IN NON-REGULARLY OCCUPIED SPACES. WITHOUT ADEQUATE DAYLIGHT AT THE ELEVATOR LOBBY, THE PROVISION OF AMPLE DAYLIGHT IN THE STAIRWELL ENCOURAGES ACTIVE LIVING THROUGH INCREASED STAIR USE WHILE REDUCING ELEVATOR ENERGY CONSUMPTION.
AT 11.6% DAYLIGHT AREA (SDA300/50%) IN REGULARLY OCCUPIED FLOOR AREAS, THE PROJECT FALLS SHORT OF ACHIEVING THE LEED V4.1 BD+C NC DAYLIGHT CREDIT FOR 40% DAYLIGHT IN REGULARLY OCCUPIED SPACES. HOWEVER, AT 9 A.M. ON THE EQUINOX EVERY REGULARLY OCCUPIED SPACE ACHIEVES A MINIMUM 10 LUX OF DAYLIGHT, AND AT 3 P.M. ON THE EQUINOX 98% OF REGULARLY OCCUPIED FLOOR AREA ACHIEVES 10 LUX OF DAYLIGHT. THIS EXCEEDS THE MINIMUM 90% COMPLIANT FLOOR AREA REQUIREMENT FOR LEED V4.1 BD+C RESIDENTIAL. THE BUILDING ACHIEVES 150 LUX MINIMUM DAYLIGHT FOR 40.4% OF REGULARLY OCCUPIED SPACES AT 9 A.M. ON THE EQUINOX AND 150 LUX MINIMUM DAYLIGHT FOR 36.6% OF REGULARLY OCCUPIED SPACES AT 3 P.M. ON THE EQUINOX, BELOW THE TARGET FOR AT LEAST 50% OF REGULARLY OCCUPIED FLOOR AREA FOR LEED V4.1 BD+C RESIDENTIAL.



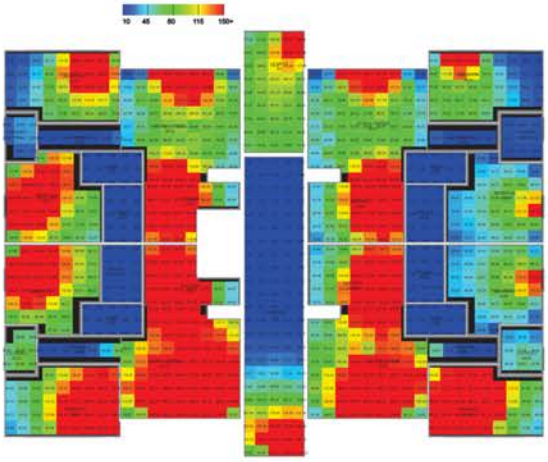
sDA100/10%



sDA300/50%



9am Equinox

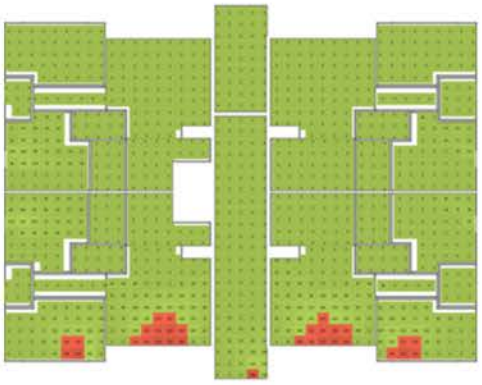


3pm Equinox

# DAYLIGHTING &VIEWS

GLARE IS ADDRESSED THROUGH THE PROVISION OF MANUAL INTERIOR WINDOW SHADES. DAYLIGHT SIMULATIONS INDICATE MINIMAL GLARE POTENTIAL FROM DIRECT SUNLIGHT IN MOST REGULARLY OCCUPIED SPACES, WITH ANNUAL SUNLIGHT EXPOSURE (ASE1000,250) GREATER THAN 10% IN ONLY 3 SPACES (SOUTH LIVING/ DINING ROOM AND SOUTH EAST BEDROOM).

VIEWS TO VEGETATION AND URBAN OBJECTS AT LEAST 7.5 M FROM EXTERIOR OF GLAZING ARE AVAILABLE TO ALL THE 4TH FLOOR SUITES, WITH 79.5% OF REGULARLY OCCUPIED SPACES HAVING A VISUAL CONNECTION TO THE OUTDOORS. THIS SURPASSES THE LEED V4.1 BD+C NC CRITERIA FOR 75% QUALITY VIEWS, AS WELL AS THE LEED V4.1 BD+C RESIDENTIAL CRITERIA FOR 50% QUALITY VIEWS (EARNING 1 OUT OF 1 AVAILABLE POINTS FOR THE DAYLIGHT AND QUALITY VIEWS CREDIT UNDER THE LEED RESIDENTIAL STANDARD).



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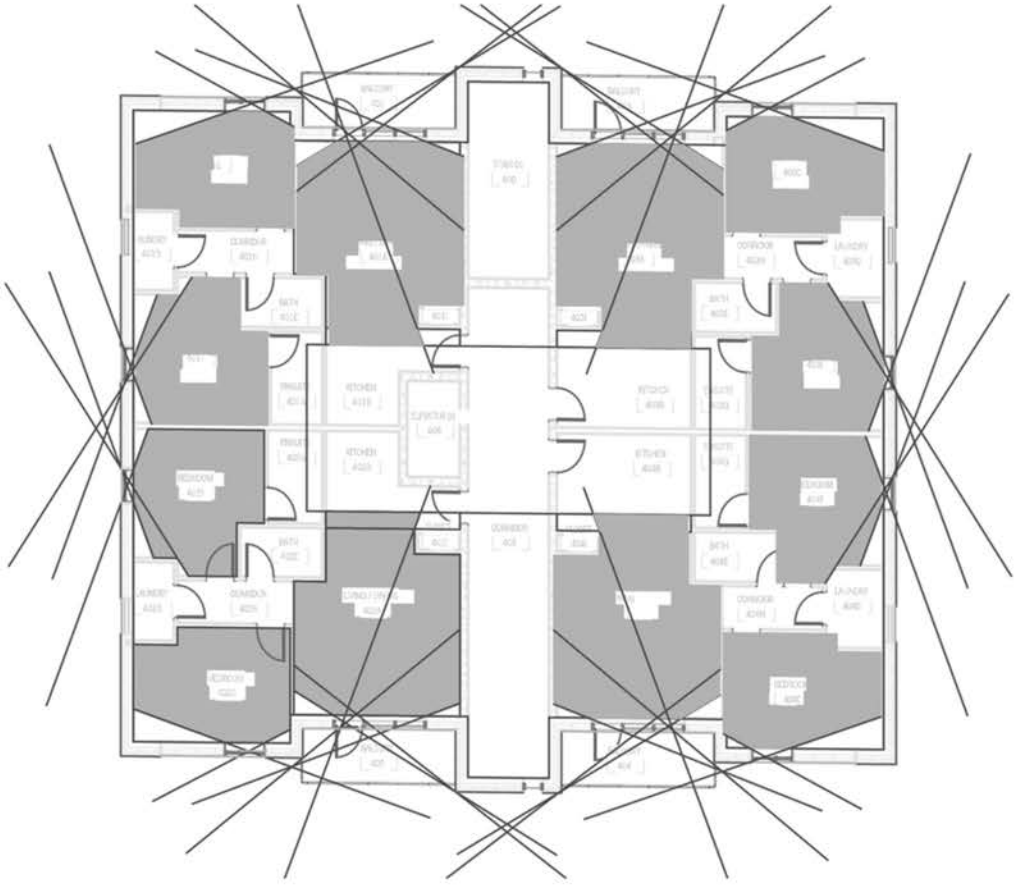

LEED View Area Calculation

# RENDERS