

Case Studies – High Performance Glazing

- Stroud Water Research Center, Chester County, PA
- Winston Preparatory School, Norwalk, CT

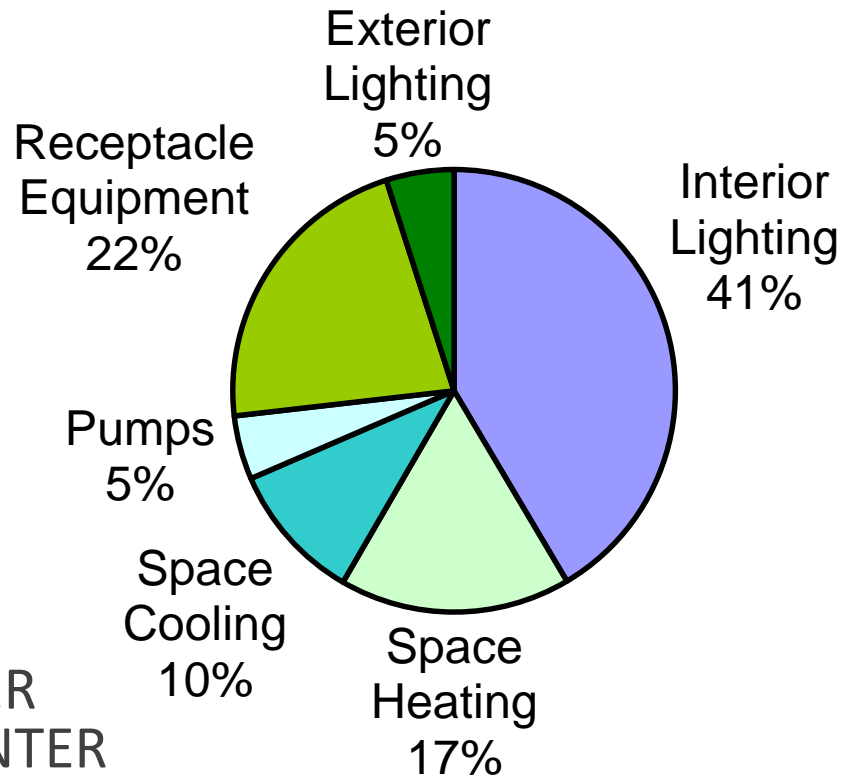


STROUD WATER RESEARCH CENTER

Avondale, Chester County, PA (4900 degree-days)

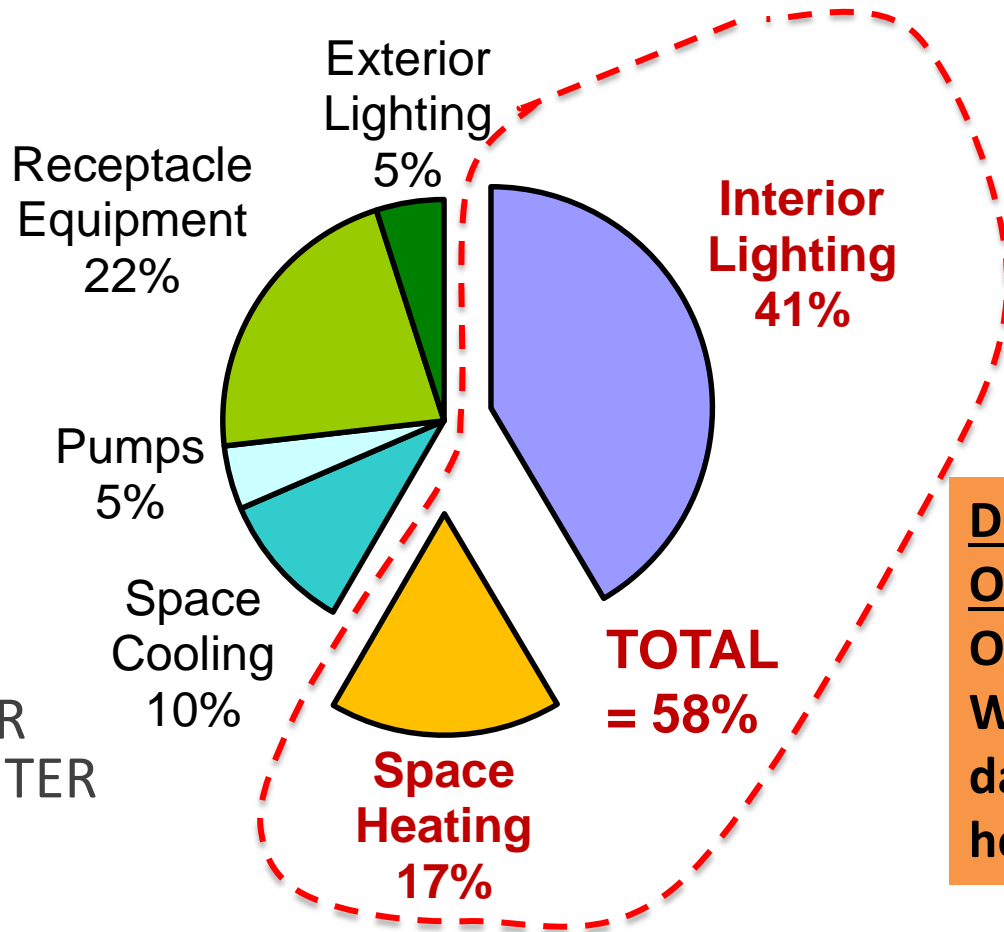
- Education & Public Outreach Building.
 - Optimize daylighting and heat loss in teaching spaces and offices.
 - Exterior sunshading
 - 45° orientation off of cardinal directions
 - Extensive daylight modeling and testing
- High Performance Glazing Utilized
 - Double pane insulated units.
 - Serious® Windows (*now Alpen Glazing*)
 - Serious Glass (*now Alpen Glazing*)

Predicted Annual Building Energy Use - Preliminary Design



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Chester County, PA

Predicted Annual Building Energy Use - Preliminary Design

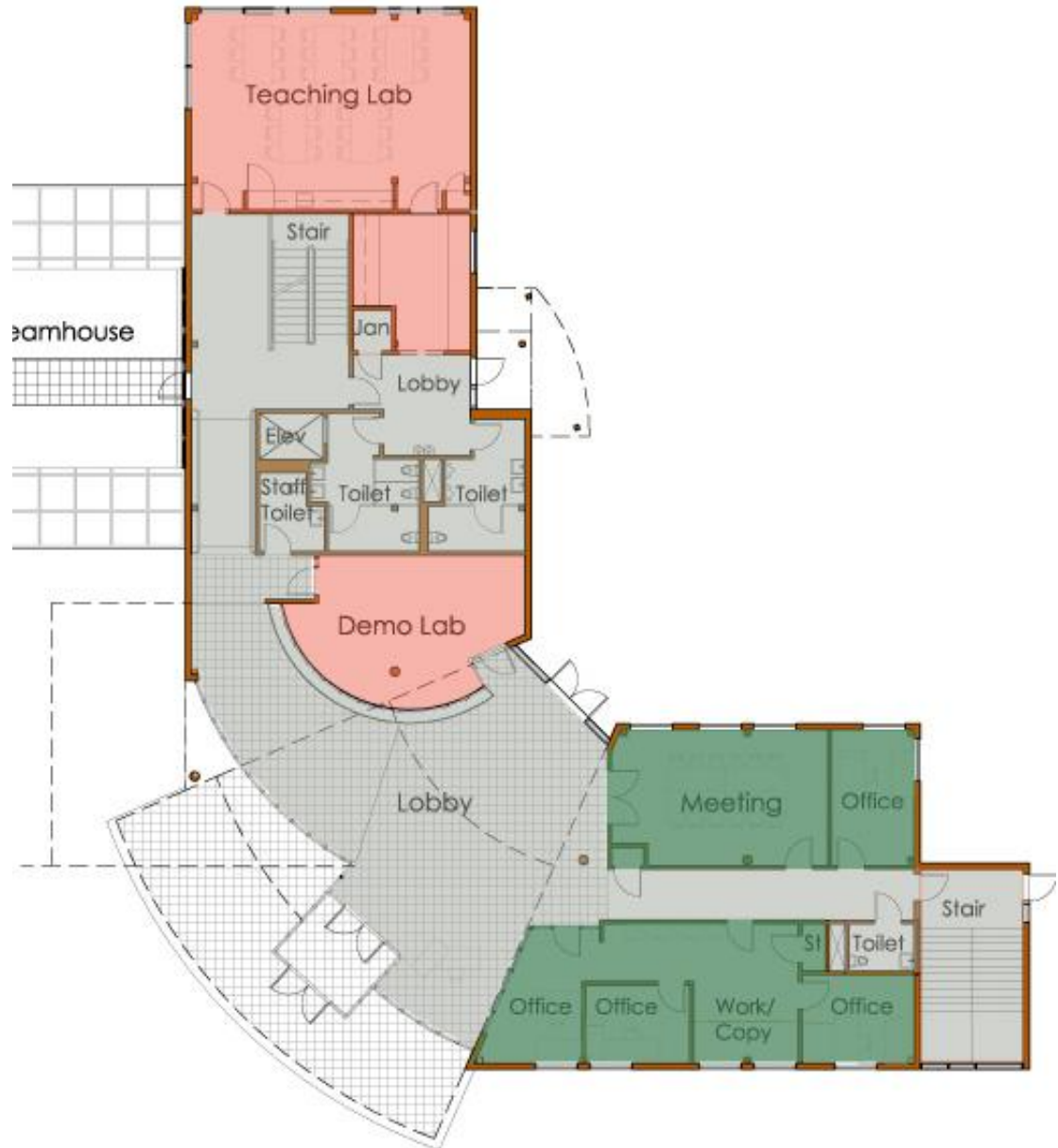


Design Objective:
Optimize Windows for daylighting and heat loss

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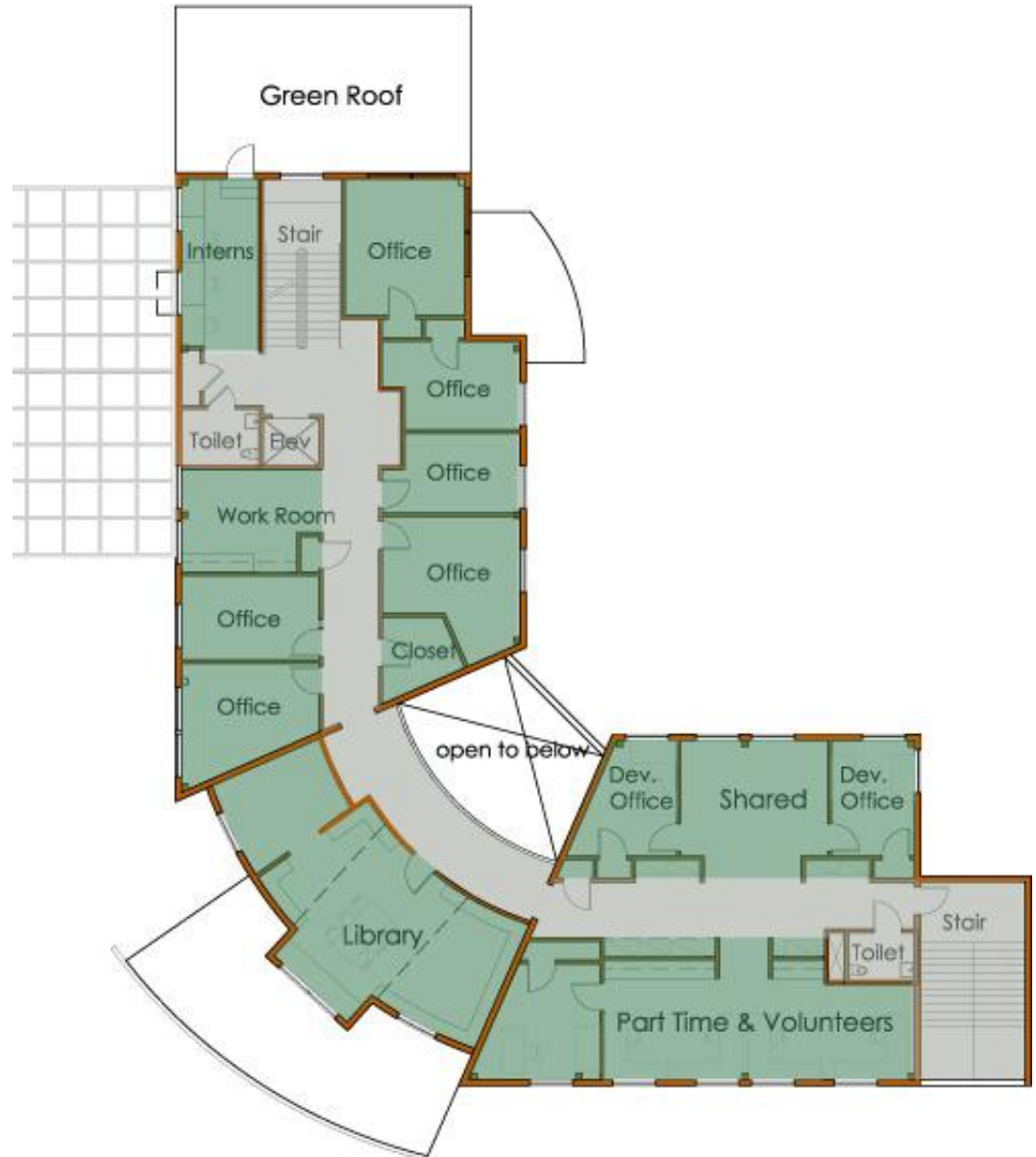


MAIN FLOOR



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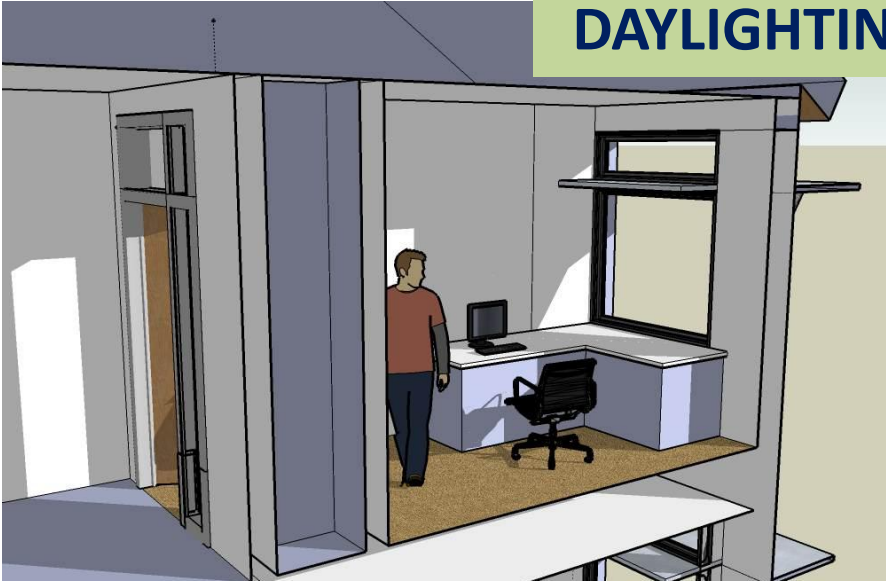
Chester County, PA



UPPER FLOOR



DAYLIGHTING ANALYSIS



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Chester County, PA

SOUTHEAST

NORTHEAST



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Chester County, PA



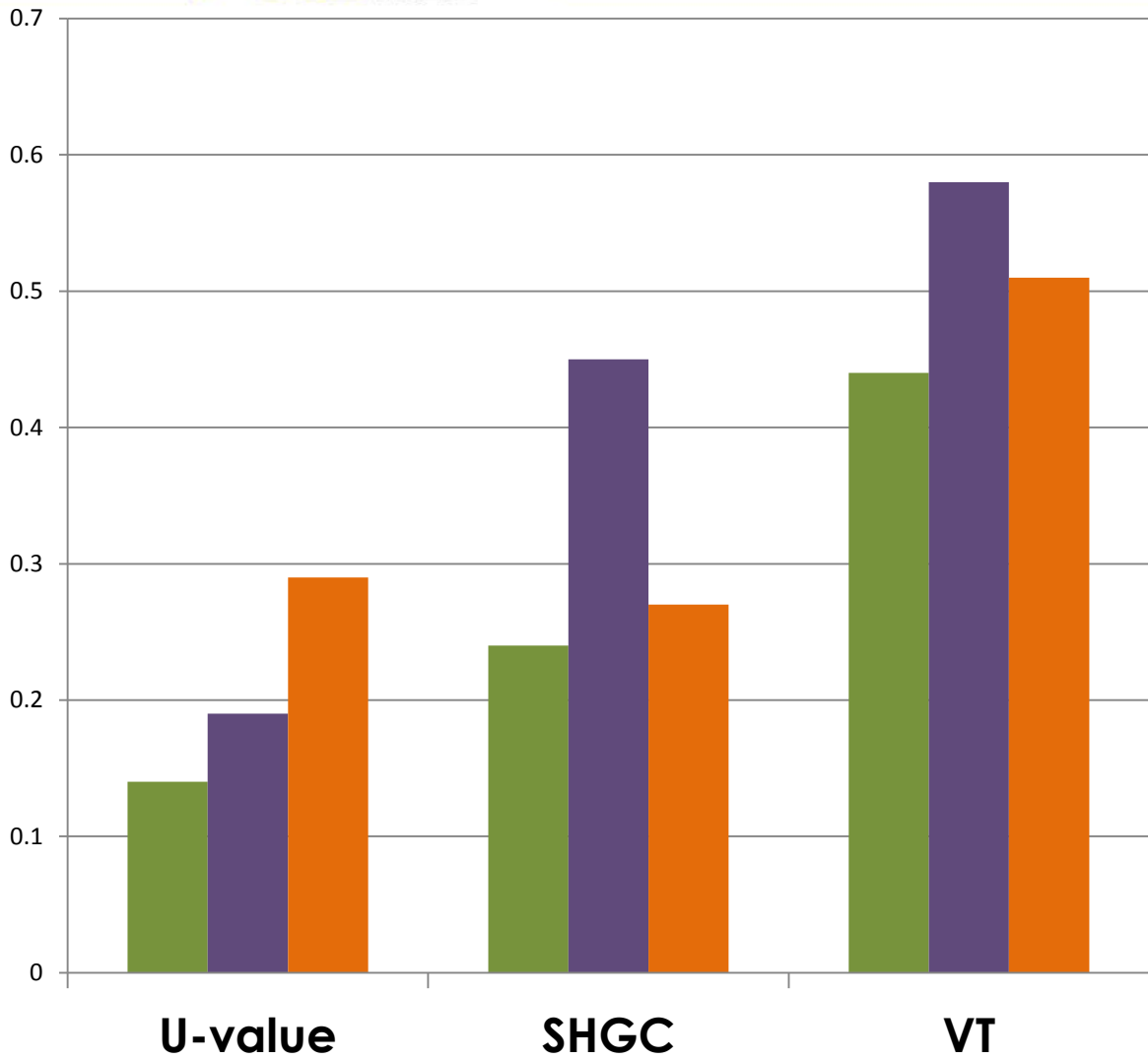
NORTHWEST

SOUTHWEST

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Avondale, Chester County, PA (4900 degree-days)

- Architectural Design:
 - Exterior sunshading
 - Glare Control
 - Appropriate window:wall ratio
- High Performance Glazing Requirements:
 - Main focus = heat loss (low-U value)
 - Solar Heat Gain Coefficient not as important (sunshading)
 - Visible Light Transmittance not as important
 - Same glazing used in almost all locations.

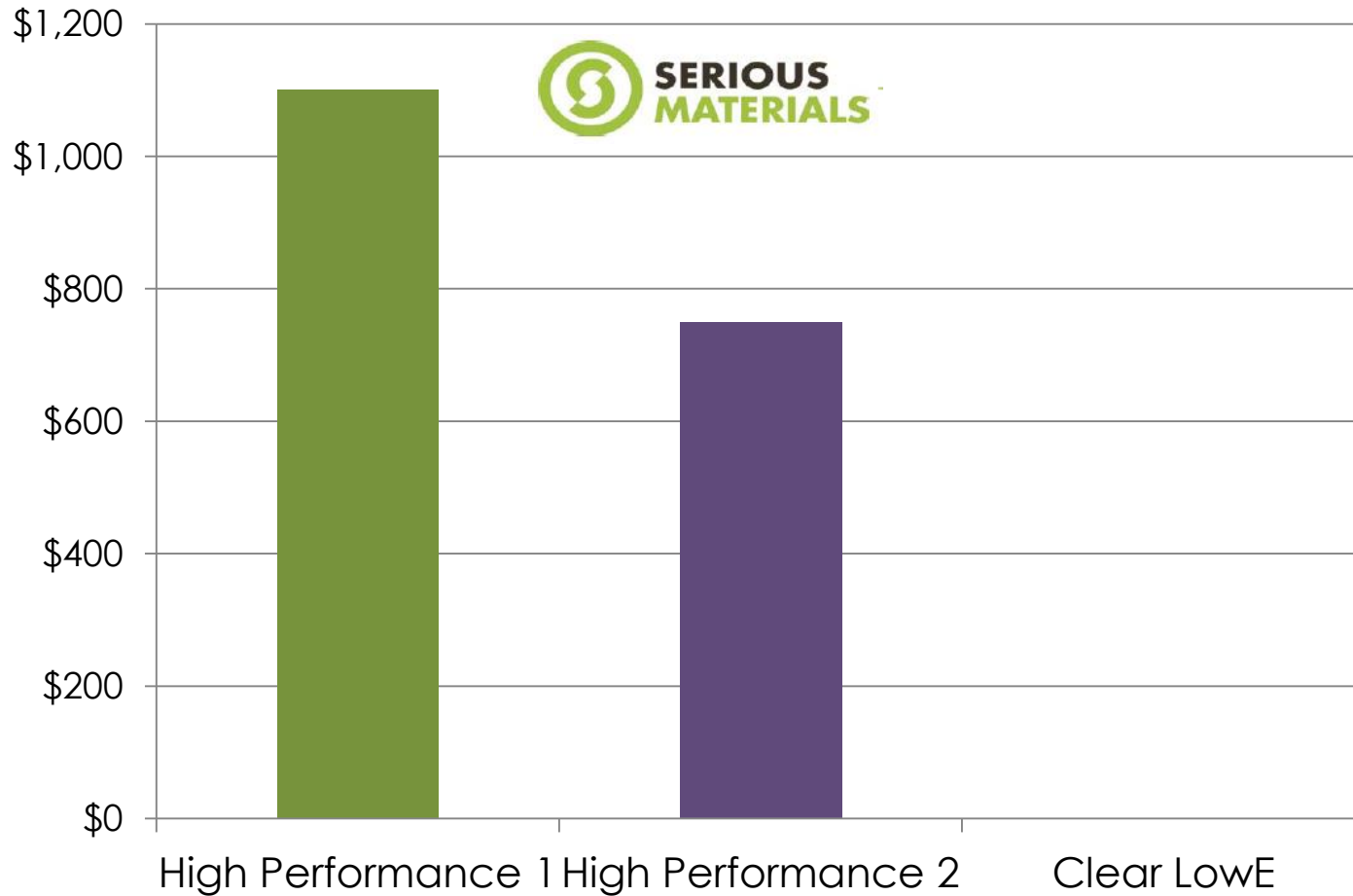


- High Performance 1
- High Performance 2
- Clear LowE

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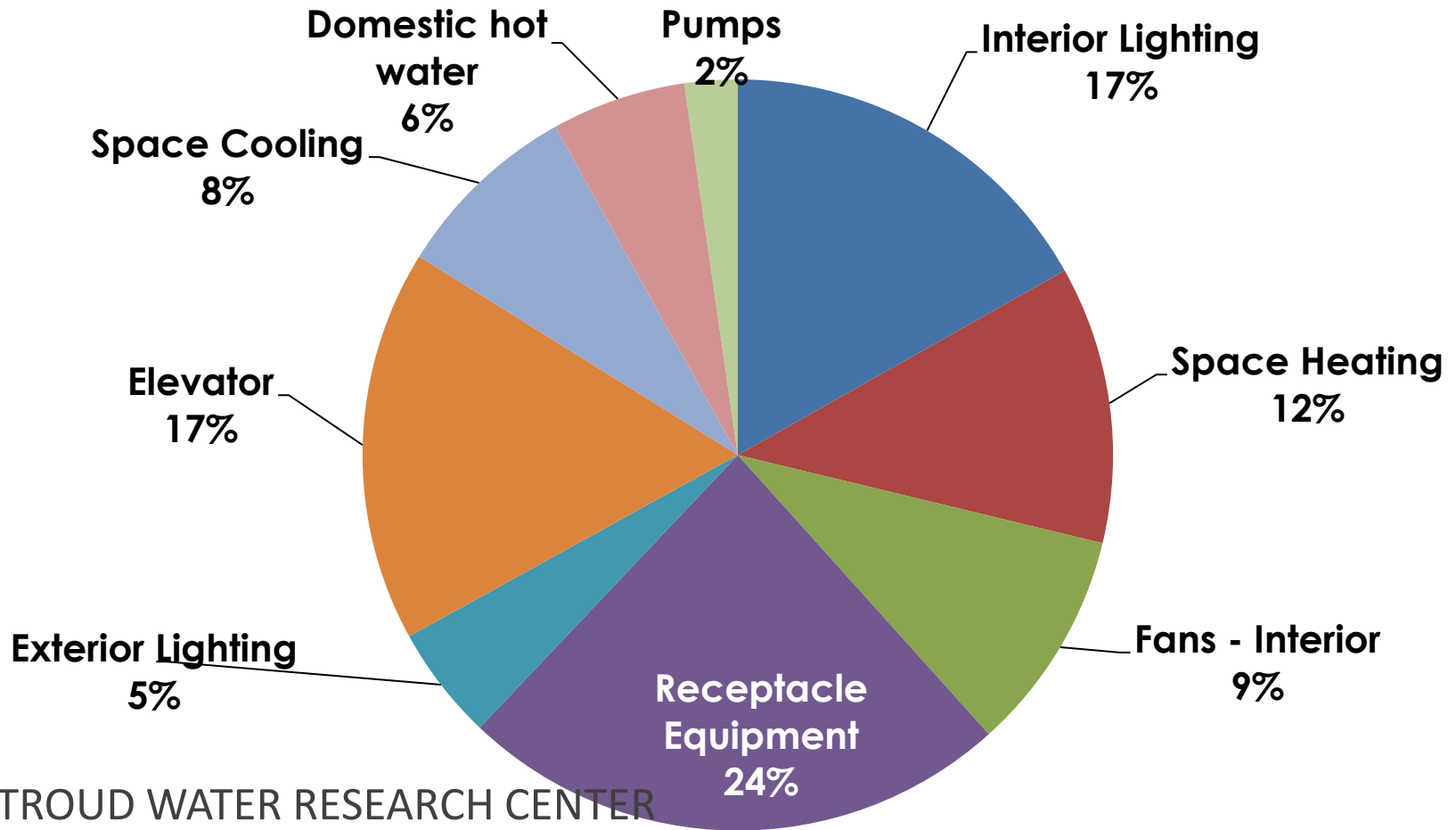
Annual heating cost savings



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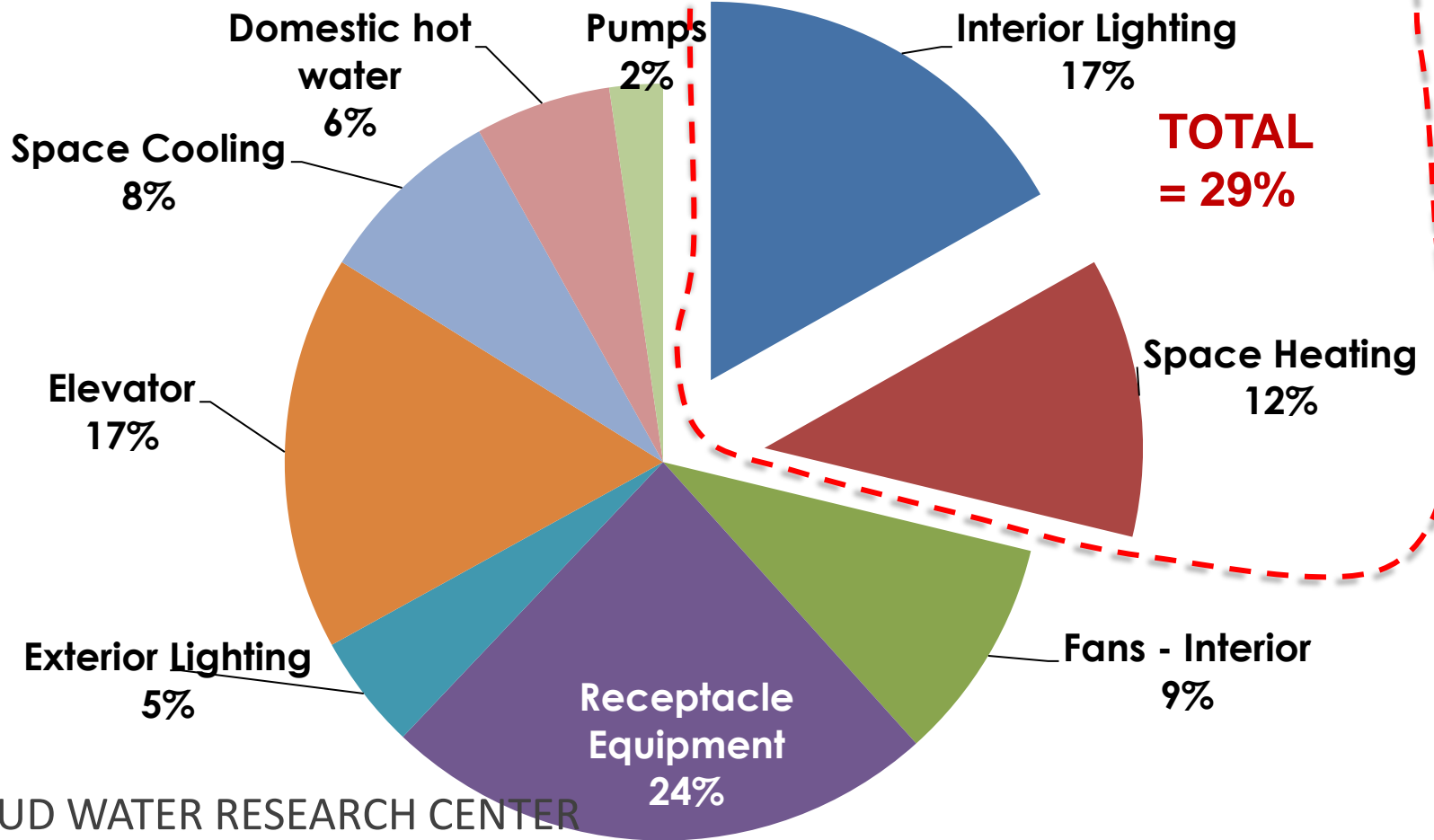


Annual Energy Use Prediction – Final Design



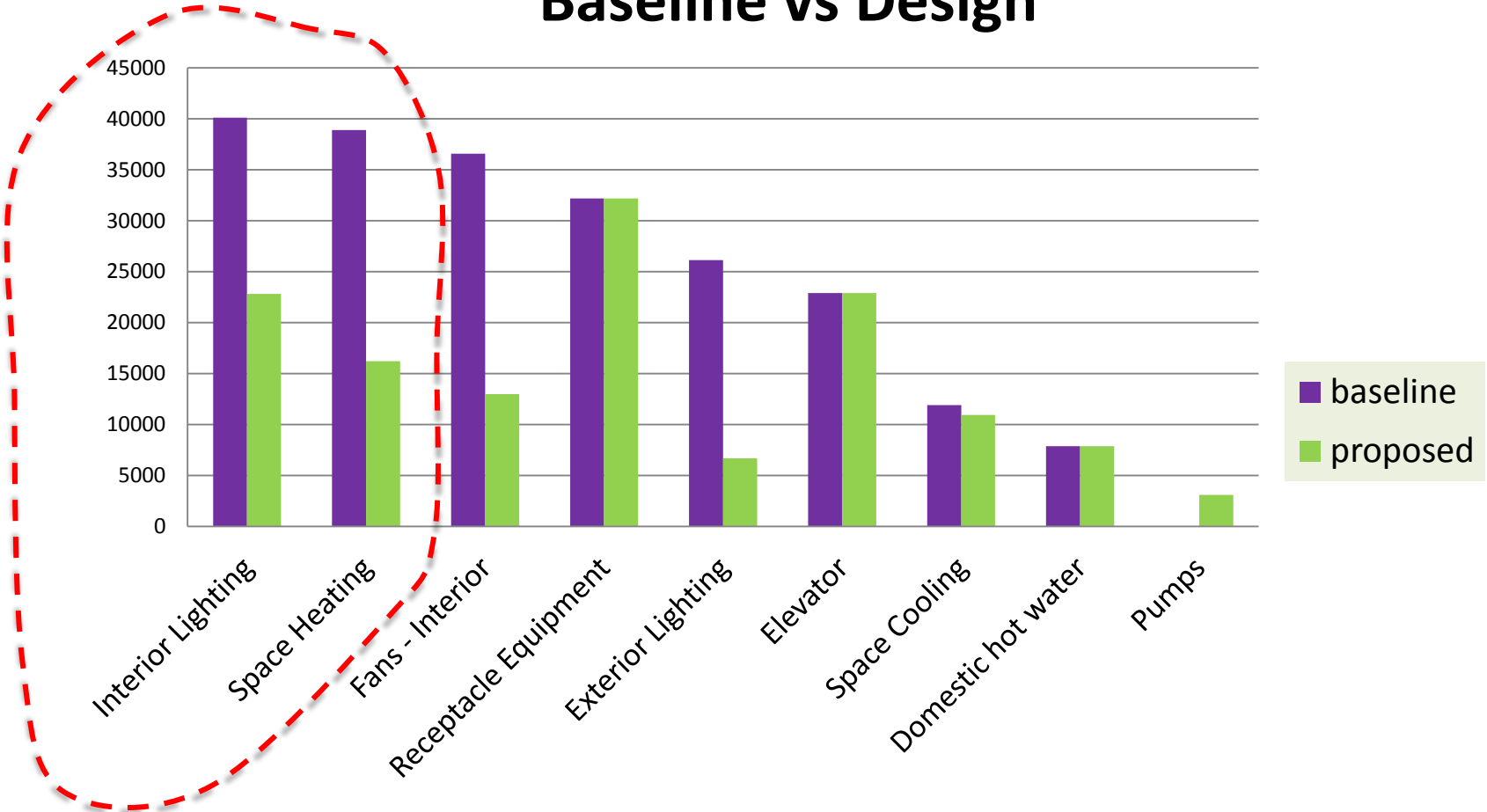
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Annual Energy Use Prediction – Final Design



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Energy Use Prediction Baseline vs Design



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WINSTON PREP SCHOOL

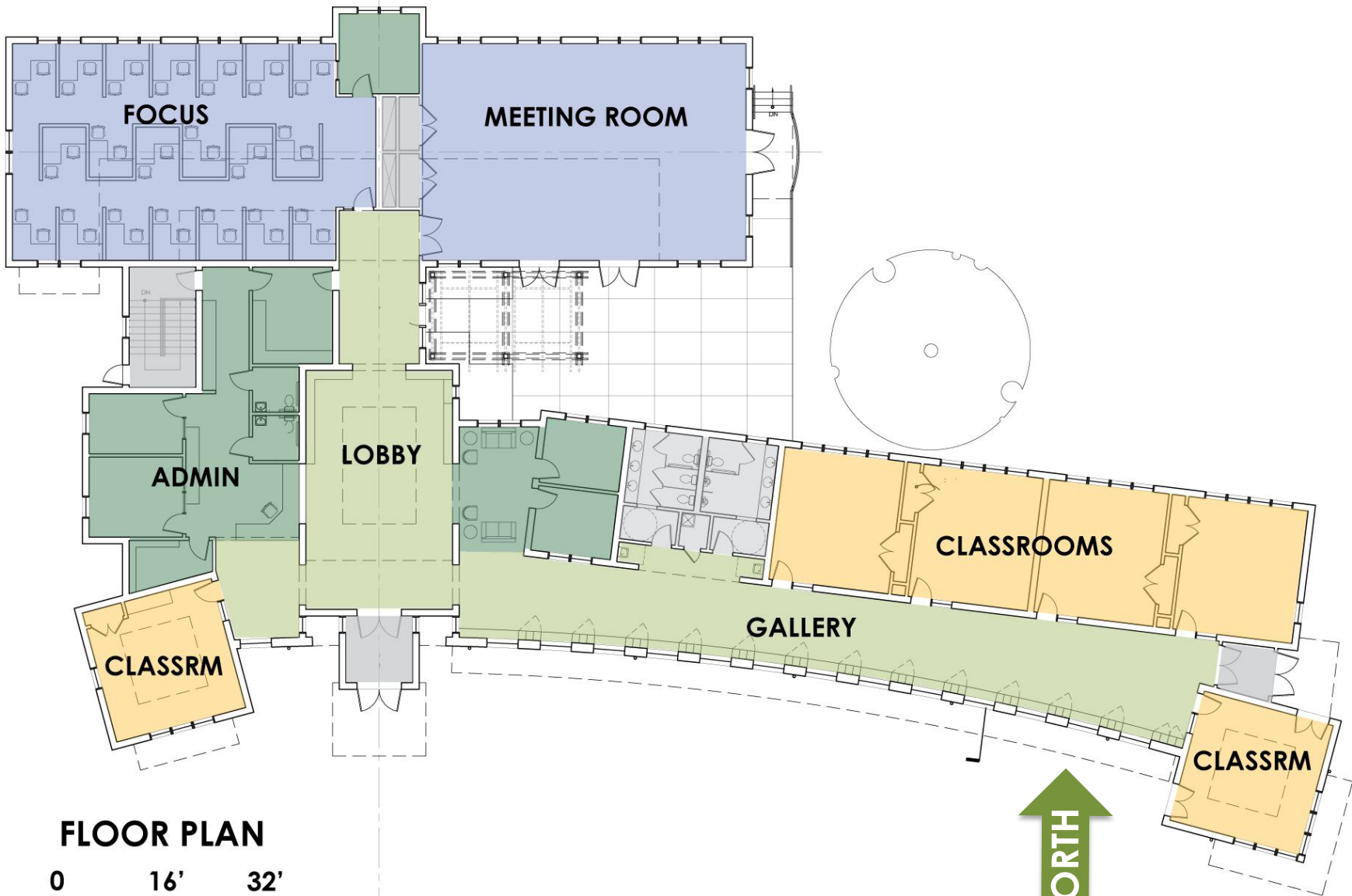
Norwalk, CT (6100 degree-days)

- Classroom Building with meeting rooms and offices.
 - Maximize Daylight Autonomy (goal = 100%)
 - Optimize daylighting and heat loss in teaching spaces, offices
 - Optimize heat loss in public areas, etc.

- High Performance Glazing:
 - Multiple glazing types for different needs
 - Mostly triple pane insulated glass units (limited double pane).
 - [Fibertec Windows](#)
 - [Cardinal Glass](#): LoE²-180[®], LoE²-272[®], LoE³-272[®]
 - Etched glass for light diffusion in selected locations.



WINSTON PREP SCHOOL
Norwalk, CT

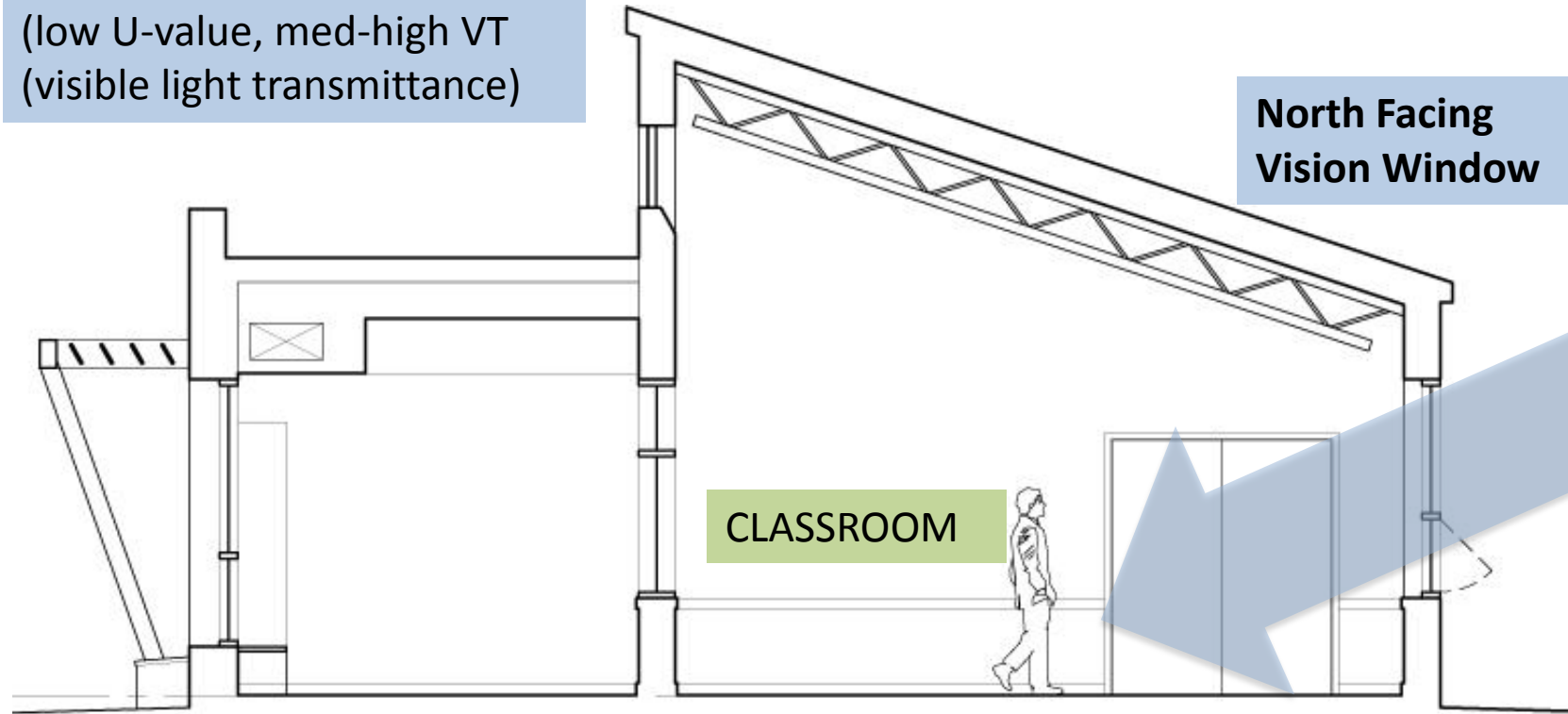


FLOOR PLAN

0 16' 32'

Norwalk, CT

Triple pane IGU:
Cardinal LoE² -272
(low U-value, med-high VT
(visible light transmittance))



North Facing
Vision Window

CLASSROOM

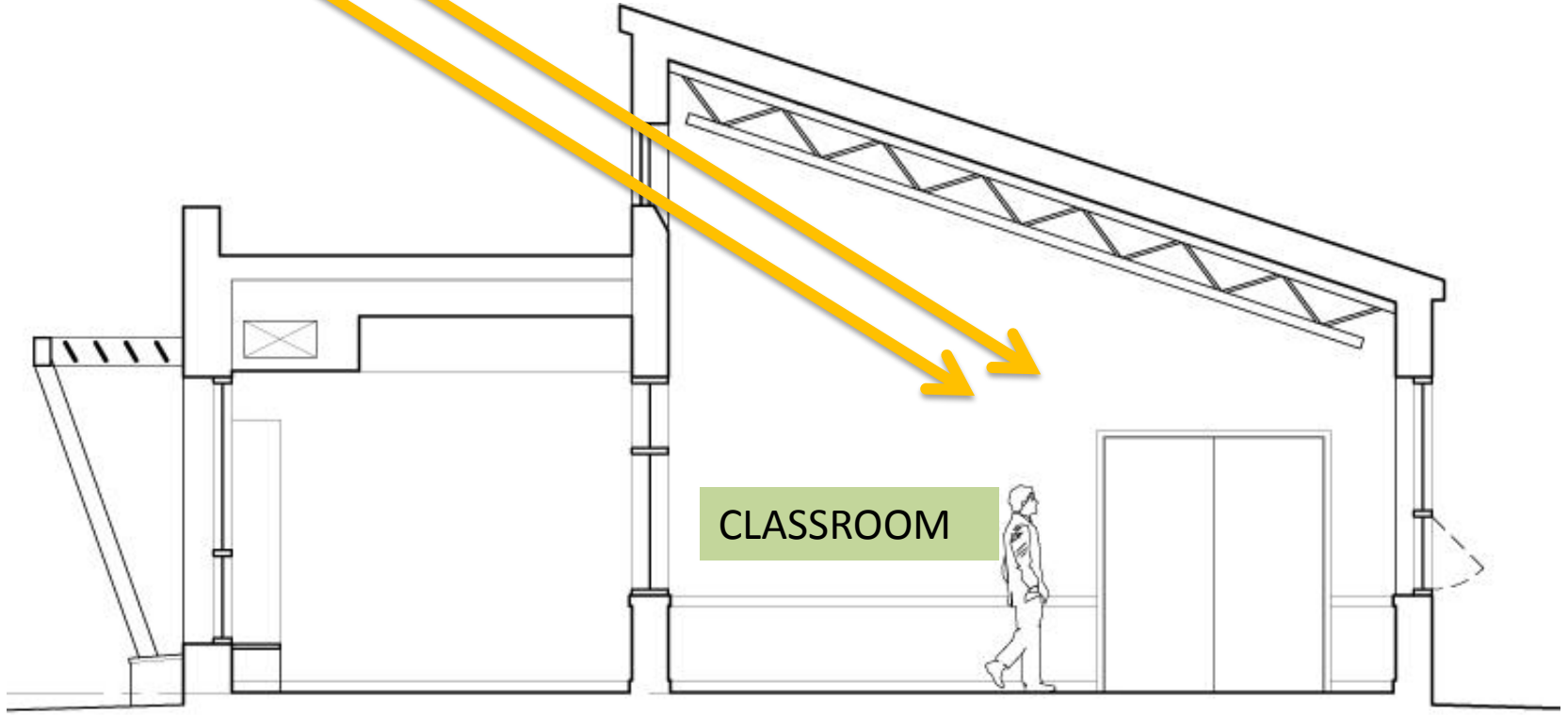
TYPICAL CLASSROOM SECTION



WINSTON PREP SCHOOL
Norwalk, CT



South Facing
Clerestory Window



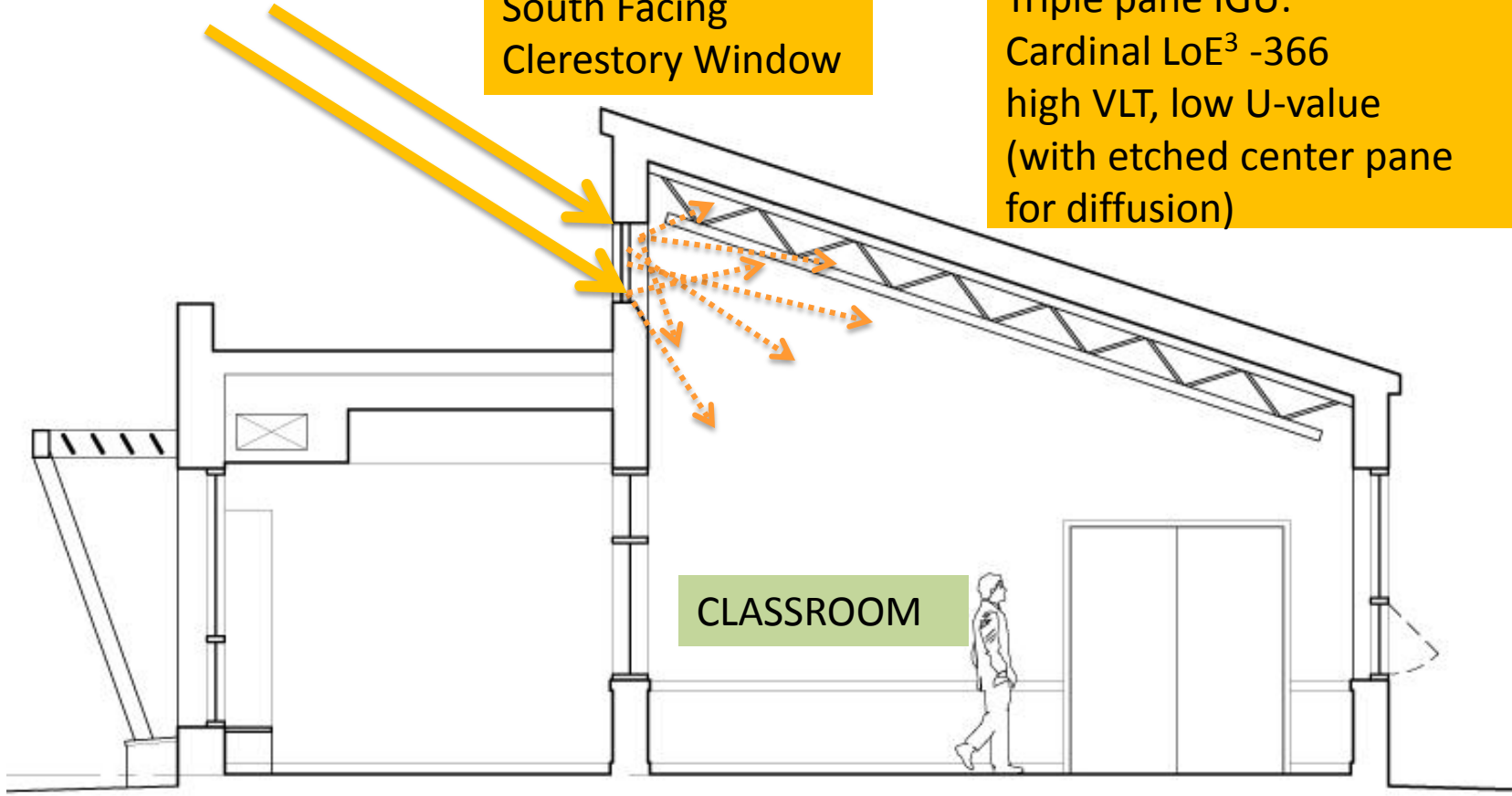
TYPICAL CLASSROOM SECTION

WINSTON PREP SCHOOL
Norwalk, CT



South Facing Clerestory Window

Triple pane IGU: Cardinal LoE³ -366 high VLT, low U-value (with etched center pane for diffusion)



CLASSROOM

TYPICAL CLASSROOM SECTION



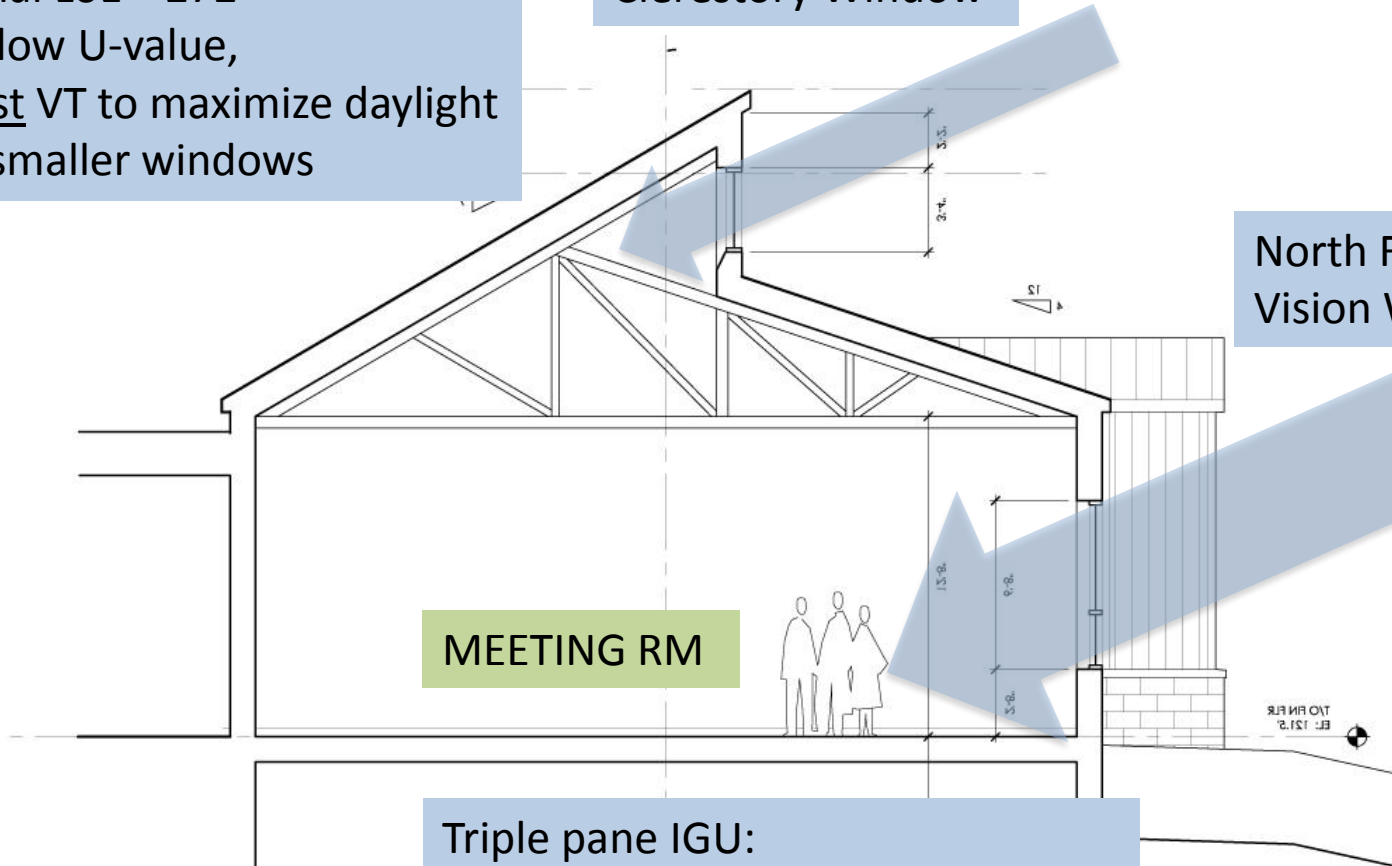
WINSTON PREP SCHOOL
Norwalk, CT



Double pane IGU:
Cardinal LoE² -272
(med low U-value,
highest VT to maximize daylight
from smaller windows

North Facing
Clerestory Window

North Facing
Vision Window



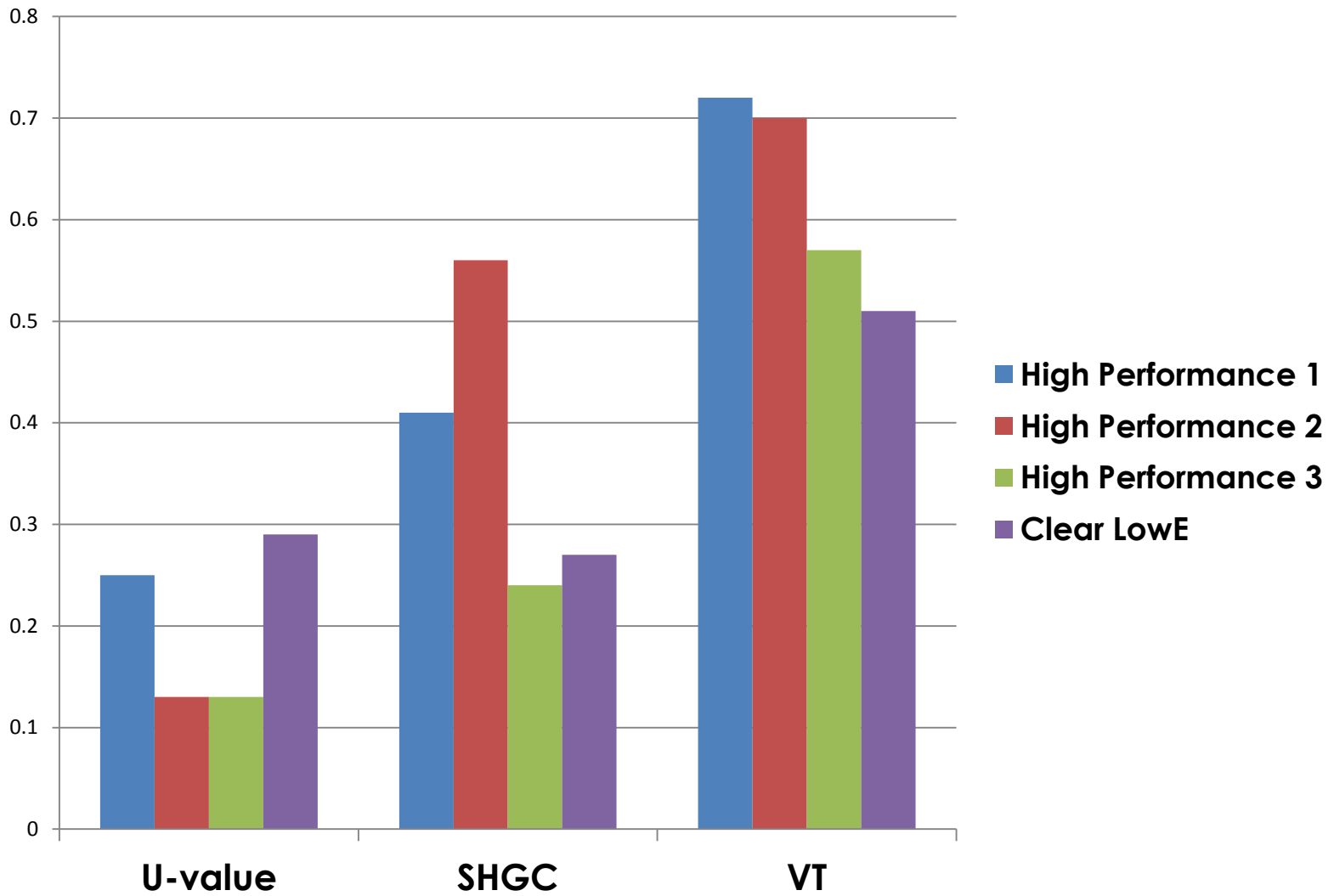
MEETING RM

Triple pane IGU:
Cardinal LoE² -272
(low U-value, med-high VT (visible
light transmittance - same as
classrooms



WINSTON PREP SCHOOL
Norwalk, CT





WINSTON PREP SCHOOL
Norwalk, CT





WINSTON PREP SCHOOL
Norwalk, CT

Case Studies – High Performance Glazing

Stroud Water Research Center

- M2 Architecture
- Bruce E. Brooks & Associates, MEP and Energy Analysis
- David Nelson Associates, Lighting Design and Daylight Analysis



Winston Preparatory School

- M2 Architecture
- John Boecker, Design Architect
- In Posse, LLC, MEP
- Energy Opportunities, Energy & Daylighting Analysis



Muscoe Martin, AIA, LEED

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School of Design

M2 Architecture

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