THE MET SACRAMENTO

Sacramento City Unified School District’s First High Performance Renovation
PRESENTATION OVERVIEW
The Met Sacramento

• **Who:** Sacramento City Unified School District
• **Where:** The Met Sacramento High School – 8th/V Streets, Downtown Sacramento
• **Why:** Program Needs and District Green Goals
• **What:** Full Renovation of Existing – 1950’s Era Campus
• **How:** State and Local Funding
• **Results:** Significant Energy Savings
• **Results:** Best Classrooms in the District
• **My Role:** Paul Breckenridge, Community Architecture
• **Today:** Building Envelope, Daylighting, Electric Lighting
CAMPUS EVALUATION
The Met Sacramento

• Successful Educational Program
• Site/Program Relationship Strong
• Tired Fifty-Year-Old Facility
• Eligible for State Funding Programs
• Do we bring in the wrecking ball?
SUSTAINABLE LEADERSHIP AND VISION
District Emphasis on Green Programs

• SCUSD Board of Education - Green and Grid Neutral Policy Initiative
• CHPS - District Resolution
• Sustainable Facilities Master Plan
• Better Classrooms, Cheaper to Operate

How does the District start to transform their aging facilities into high performance schools?
PROJECT FUNDING
The Met Sacramento

- State Overcrowding Relief Grant – funding for replacing portables
- State Modernization Funding – rehabilitate 50 year-old building
- High Performance Incentive Grant – Going Green
- Drawing Submittal to DSA timed to take advantage of $250K bonus

*DSA/HPI Verified Credits allowed for $394,000 in additional funding*

*Total Construction Budget: $6.9M*
PROJECT PLANNING
The Met Sacramento

• Educational Delivery Needs and Redesigned Campus Plan were in Harmony
• State Facility Funding Contribution was Significant
• Cost of Transforming vs. New Construction Penciled Out
• Small Campus as District case study for HPI process/approach Made Sense
• Demonstration of District Green Goals Implemented
PROJECT PLANNING
The Met Sacramento

PREVIOUS CONDITIONS

- Open space dedicated to autos
- Boarded and barred windows
- Various types of noisy wall mounted cooling units
- 30-year-old portable classrooms
- Failing wood windows, trim and roof fascia throughout
PROJECT PLANNING
The Met Sacramento

PREVIOUS CONDITIONS

Lighting
Heating
Plumbing
Cooling
Electrical
ADA
Finishes
Windows
Doors / Hardware
PROJECT PLANNING
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BUILDING ENVELOPE  
The Met Sacramento

- Envelope Analysis with Energy Pro Modeling
- Solutions based on Cost and Performance
- Provided Early Data for High Performance Incentive Funding and CHPS Criteria
- Sustainable Theme for the Project: Utilize Existing Shell and Overlay Current High Performance Technologies
- Look for Sustainable Synergy Opportunities: High Performance Components that Address Several Green Goals
# Building Envelope

**The Met Sacramento**

<table>
<thead>
<tr>
<th><strong>Existing Main Building</strong></th>
<th><strong>New Multipurpose Building</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- R-30 Roof Insulation</td>
<td>- R-30 Roof Insulation</td>
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<tr>
<td>- R-19 Wall Insulation</td>
<td>- R-19 Wall Insulation</td>
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<tr>
<td>- High Performance</td>
<td>- High Performance Glass</td>
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<tr>
<td>Replacement Window</td>
<td>System</td>
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<tr>
<td>System</td>
<td>- Minimize Windows Facing</td>
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<tr>
<td>- Continue With Window</td>
<td>South</td>
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<tr>
<td>Orientation</td>
<td>- Shading at Windows</td>
</tr>
<tr>
<td>- Mineral Wool Insulation</td>
<td>- Cool Roofing – Single Ply</td>
</tr>
<tr>
<td>at Interior Walls</td>
<td>and Shingles</td>
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<tr>
<td>- Tempered Corridor</td>
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</tbody>
</table>
BUILDING ENVELOPE
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PREVIOUS CONDITIONS

- Lead and Asbestos
- Lath and Plaster
- Water Damage
- Minimal Insulation
- Single Pane Windows
BUILDING ENVELOPE
The Met Sacramento

- Envelope stripped down to structural system
- Existing passive design layout reutilized
- Overlay of new interior design to fit program
- Overlay of structural system upgrades
- Overlay of high performance systems

PREVIOUS CONDITIONS
BUILDING ENVELOPE
The Met Sacramento

- Uncovered existing openings
- Reuse and expansion of openings
- Kept and celebrated original architectural features
- Took advantage of tall ceilings

PREVIOUS CONDITIONS
BUILDING ENVELOPE
The Met Sacramento

- Designed to Infill Existing Openings
- Performance and Value
- Integral Shading
- Thermal Break
- Long Life Cycle

WINDOWS
Building Envelope
The Met Sacramento

Windows

Upper Clerestory Infill Locations
- Bayer Makrolon Polycarbonate
- 1” Thickness, triple wall system
- High Performance and Durable

Standard Infill Locations
- ¼” clear PPG Sungate 500 glass, 1-1/8” air space w/ 1” blinds, and ¼” clear tempered glass
- 0.1 Solar Heat Gain Co-Efficient
- 0.33 U-Value
- SCUSD Glazing Shop Approved
BUILDING ENVELOPE
The Met Sacramento

- Exterior walls infilled with fiberglass batt insulation – no insulation previously
- Additional wall infill due to structural system upgrade
- Roof insulated with standard R-30 batts
- Penetrations and air gaps sealed at entirety of envelope
- Greater insulation studied but did not yield enough return

INSULATION
ENVELOPE UTILIZATION

- Use of existing envelope to incorporate new systems
- Thermal and sound insulation at attic spaces
BUILDING ENVELOPE
The Met Sacramento

- High thermal insulation
- High STC rating
- Coupled with resilient channels
- Recycled content
- Fire proofing

MINERAL WOOL
DAYLIGHTING
The Met Sacramento

• Utilized and Expanded Existing Window Openings Throughout the Campus
• Followed CHPS Criteria for Daylighting and Views
• Existing Solar Orientation of Building and Windows Designed Correctly
• Original Wood Shading Devices on South Elevation Windows Removed Many Years Ago
• Daylight Transfer Windows Incorporated to Push Natural Light Further Into the Building
• Skylights Placed at the Multipurpose Room to Compensate for the Larger Footprint
• Solatubes Incorporated at the Multipurpose Building Kitchen to Compensate for the Inability to Provide Windows
DAYLIGHTING
The Met Sacramento

DAYLIGHTING SYSTEMS
- Infill Existing Large Window Openings w/ New Glass System
- Infill Existing Small Upper Clerestory Window Openings w/ New Glass System
- Infill Existing Small Punched Openings
- Perimeter Large Glass Doors
- Skylighting
DAYLIGHTING
The Met Sacramento

- Windows Were Covered Up by Walls, Dropped Ceilings, Mechanical Units Over the Years

PREVIOUS CONDITIONS
Upper clerestory windows filter direct sunlight and provides abundant natural light to every classroom.

New windows now provide wonderful views to the surrounding neighborhood.

Integral window mini-blinds provide easy daylight control in a low maintenance format.
DAYLIGHTING
The Met Sacramento

CLASSROOMS

- Glazing at Breakout Rooms provide shared daylight and address supervision needs
DAYLIGHTING
The Met Sacramento

- Sunoptics 2x4 Skylights at Multipurpose Room
- Solatube 14” Tubes at Kitchen

SKYLIGHTS
DAYLIGHTING
The Met Sacramento

- Large glass doors provide daylight and natural ventilation
- The openings are oriented to the two courtyard spaces
Operable windows were provided where possible and appropriate
Integral blinds make access to the operable windows convenient
Existing wood frames and sills were repaired not replaced to reduce cost and maintain the building aesthetic
DAYLIGHTING
The Met Sacramento

OPPORTUNITIES

Unnecessary building entry turned into a conference space with an emphasis on daylighting

• Numerous interior door sidelites allow transfer of daylight
ELECTRIC LIGHTING RETROFITS
The Met Sacramento

• Lighting Energy Efficiency and Better Lit Classrooms
• Followed HPI/CHPS Criteria for Electric Lighting and Energy Performance
• Minimize Watts/SF Wherever Possible
• Purposeful Lighting
• Lighting Controls Utilized to Save Money and Create Better Learning Environments
• SCUSD Maintenance Department – Looking Beyond T8 Fluorescent Lamps
ELECTRIC LIGHTING RETROFITS
The Met Sacramento

LIGHTING SYSTEMS
- Linear Fluorescent Direct/Indirect Light Fixtures w/ controls
- Recessed Indirect Fluorescent Lighting
- Linear T-5 Direct Pendants and Circular Direct Fluorescent Lighting
- LED Demonstration Area
- Linear T-8 Recessed Fixtures
- Standard Recessed Fluorescent Fixtures
ELECTRIC LIGHTING RETROFITS
The Met Sacramento

- Lighting design and layout specific to individual room conditions
- General area and teaching wall
- Pendant fixtures worked well with tall ceilings and where there was no space available in the ceiling
ELECTRIC LIGHTING RETROFITS
The Met Sacramento

- Teaching wall as focus
- Maximize projector lumen output to maintain classroom light levels
- Emphasis on lighting controls and ease of use

CLASSROOM LIGHTING
ELECTRIC LIGHTING RETROFITS
The Met Sacramento

- A/V Mode Setting
- Teacher Flexibility
- Simplicity of Use
- Energy Savings
- Cost Effective to Install

LIGHTING CONTROLS
ELECTRIC LIGHTING RETROFITS
The Met Sacramento

- Good Price Point
- Performance and Lamp Life
- Watts/SF Density
- First Use in the District
- District Standard Established
- Placed Conspicuously in Lobby

LED LIGHTING
ELECTRIC LIGHTING RETROFITS
The Met Sacramento

- Minimize Watts/SF
- Fixtures placed to accent walls or circulation nodes
- Varied fixture types to breakup hallway lengths
- T-5 HO fluorescent test case
RESULTS
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• 26% Better Than California Title-24 Energy Code
• 30% Better Than Baseline Lighting Power Density
• High Efficiency HVAC Systems – 43% Better Than Baseline for Cooling, 36% Better Than Baseline for Heating
• Monitoring Systems in Place to Test and Verify Above
HPI/CHPS
The Met Sacramento

• Sustainable Sites 10 Points (13)
• Water 2 Points (7)
• Energy 10 Points (44)
• Materials 10 Points (19)
• Indoor Environmental Quality 13 Points (25)

45 DSA-HPI Points Verified
RESULTS
The Met Sacramento

A Sustainable Demonstration of:

- High Performance Envelope, Daylighting, and Building Systems
- Building Reuse
- Environmentally Preferable Products
- Improved Classroom Acoustics
- Controllability of Natural Ventilation and Temperature Controls
- Use of Low-Emitting Materials
- Low-Water Use Plumbing Fixtures and Landscape Irrigation
- Outdoor Light Pollution Reduction
- Reduction in Heat Island Effect
- Encouraging Public Transportation and Bicycle Ridership

QUALITATIVE
RESULTS
The Met Sacramento

GREEN FEATURES
FURTHERING THE VISION
District Sustainability Moving Ahead

- Sustainable Facilities Master Plan
- Center for Green Schools Fellowship
- Project Green
- Measure Q and R Local Bonds
- Implementation of Bond Projects
THANK YOU

• Owner: Sacramento City Unified School District
• Project Architect / District Project Manager: Paul Breckenridge, Community Architecture
• Architect of Record: SKW Architects