

Higher Education Energy Efficiency Partnership Program

BEST PRACTICES AWARDS



UC / CSU Sustainability Conference, June 2005



*A program created by the
UC/CSU/IOU Partnership
under the auspices of the
California Public Utilities Commission*

University of California, Davis

VETERINARY MEDICINE INSTRUCTIONAL FACILITY

Bill Starr, Senior Project Manager, UC Davis
Jon Schleuning, Principal, SRG Partnership
Alisdair McGregor, Principal, ARUP



VMIF

University of California, Davis
Veterinary Medicine Instructional Facility
June 20, 2005

UC Davis

- **School of Veterinary Medicine**
Building Committee
John Pascoe, Dan Mitchell, Gary Schultz,
Mary Christopher, Dan Mitchell
- **UC Davis Architects & Engineers**
Project Management
Bob Strand, Bill Starr, Sally Finn,
Veronica McLure
Engineering Review
Ardie Dehgahni, Dominick Giglini,
Ernesto Signey
Construction Administration
Sam Bianco, Larry Wilson, Jorge Luna

Contractors

- **General Contractor**
Harbison Mahony Higgins Builders
John Stout, Tom Camden, Bob Arata,
Ben Rogelstad, Zach Price,
Joel Leung
- **Mechanical Subcontractor**
Luppen and Hawley
- **Plumbing Subcontractor**
Dowdle & Sons Plumbing
- **Electrical Subcontractor**
Empire Electric

Design Team

- **Architect**
SRG Partnership
- **Mechanical/Electrical Engineer**
ARUP
- **Landscape Architect**
Walker Macy
- **Telecommunication**
SFM
- **Lighting Designer**
Benya
- **Audio/Visual**
Spectrum

Others

- **Energy Modeling**
Energysoft, Martyn Dodd
- **Commissioning**
Facility Dynamics, Kevin Short,
Mark Porter



VMIF- under construction

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VMIF- under construction

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VMIF- under construction

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VM3A- under construction

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Key Benefits

- **Smart Site Planning**
- **Efficient Building Systems**
- **Good Materials Management**
- **Significant Occupant Benefits**

Smart Site Planning

- Access to public transportation and bicycle parking near changing rooms with showers.
- Reduction in urban heat island effect of the microclimate with improved landscape and roof reflectivity.
- Reduction in light pollution with full cut-off site light fixtures.
- 50% Reduction in potable water usage high efficiency irrigation system.

Technical Overview of Benefits

Efficient Building Systems

- 34% Improvement in energy conservation above Title 24, with displacement and natural ventilation systems and efficient lighting systems.
- 10% Reduction in annual electrical cost with daylighting controls and indirect evaporative cooling.
- 31% Reduction in potable water usage with high efficiency plumbing fixtures and waterless urinals.
- CFC and HCFC free HVAC systems which reduces the depletion of the ozone layer.
- Provisions for future photovoltaics on roof and reclaimed water to flush toilets.
- PG&E Savings by Design incentives for daylighting controls and indirect evaporative cooling adjusted the pay back period for these systems to 2.2 years.
- Ongoing monitoring of building systems with continuous metering equipment for optimization of energy and water consumption.

Technical Overview of Benefits

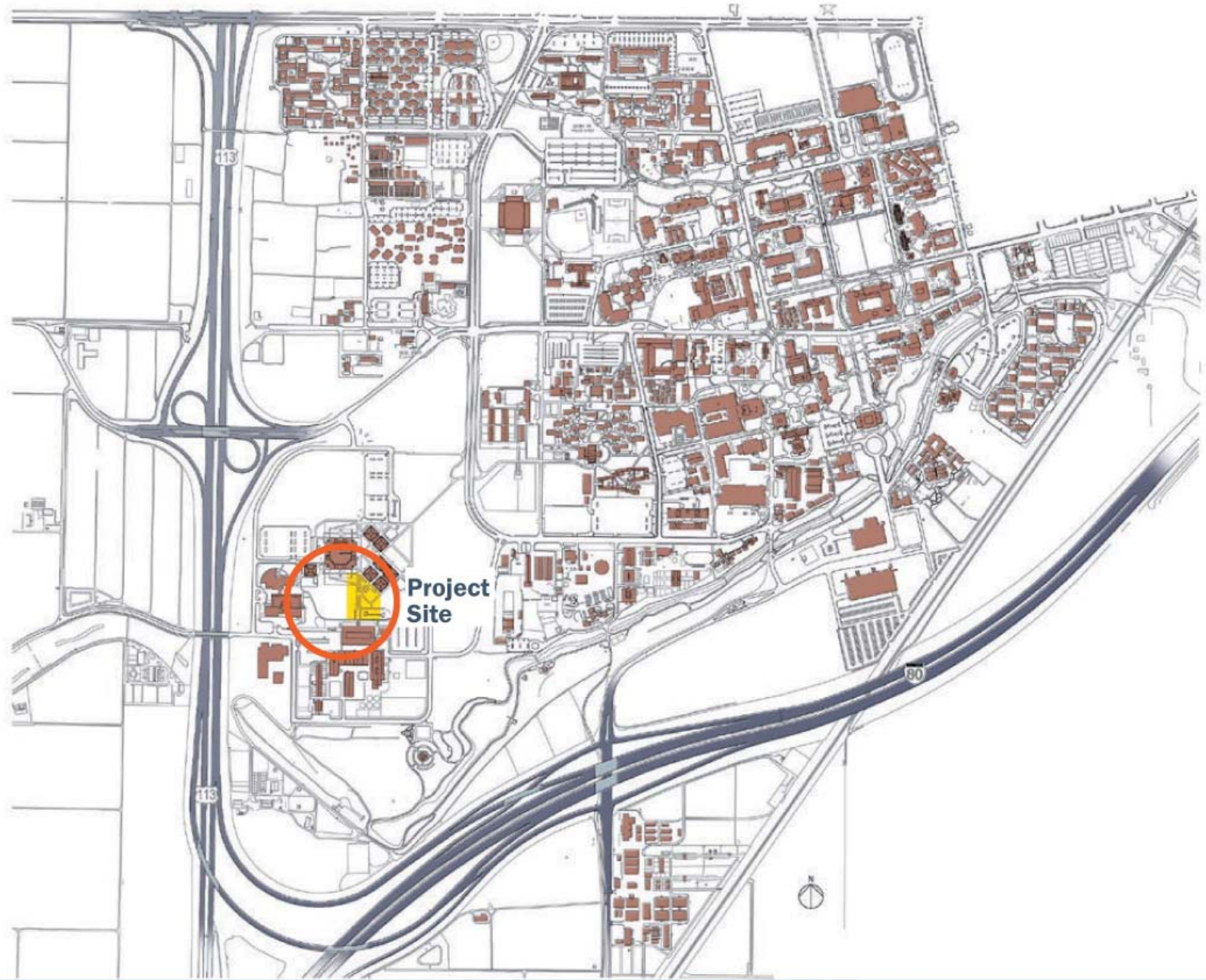
Good Materials Management

- Recycling stations through out building and projected greater than 75% of construction waste to be diverted from landfills.
- Projected high recycled content of building materials and high quantity of building materials to come from regional sources.
- Specified wood from well managed forests.

Significant Occupant Benefits

- Improved indoor air quality with construction practices, low emitting materials, and pollutant source control.
- Zoned ventilation controls with operable windows at personal spaces and automatic louvers at public spaces.
- Integrated audio visual controls with lighting, projection screens, and distance learning.

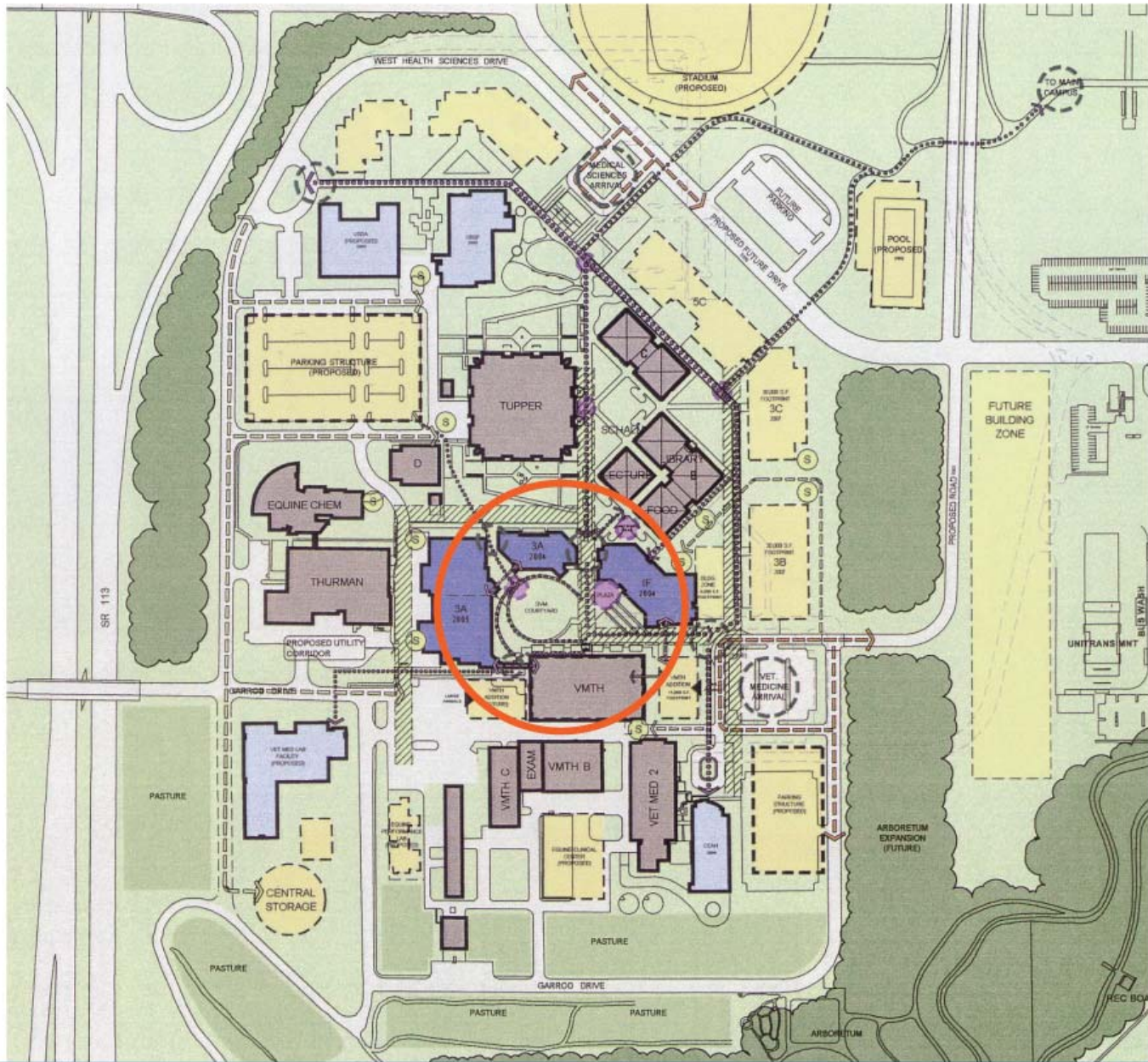
Technical Overview of Benefits



Project Location

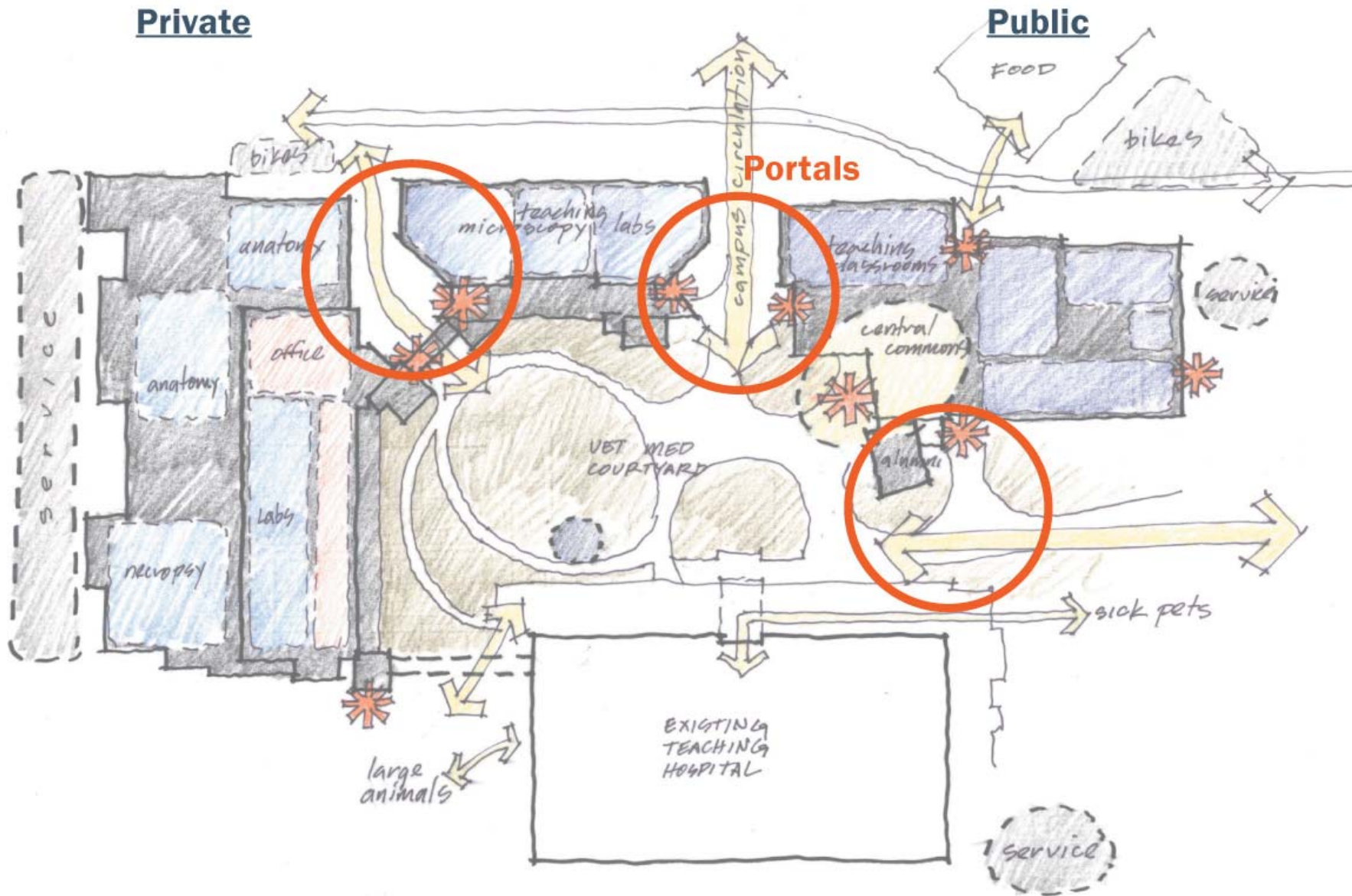


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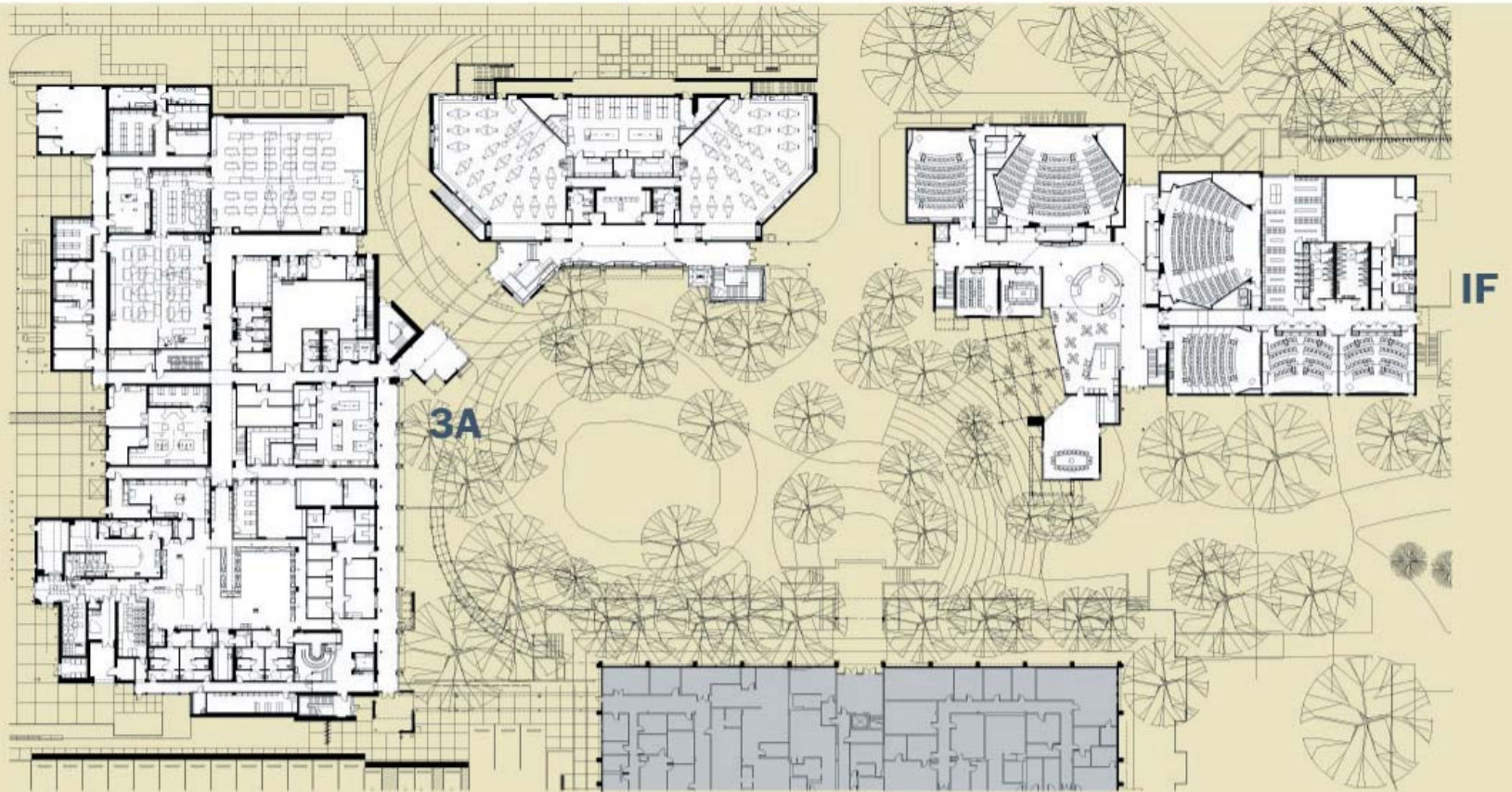


Campus Plan





Gateways

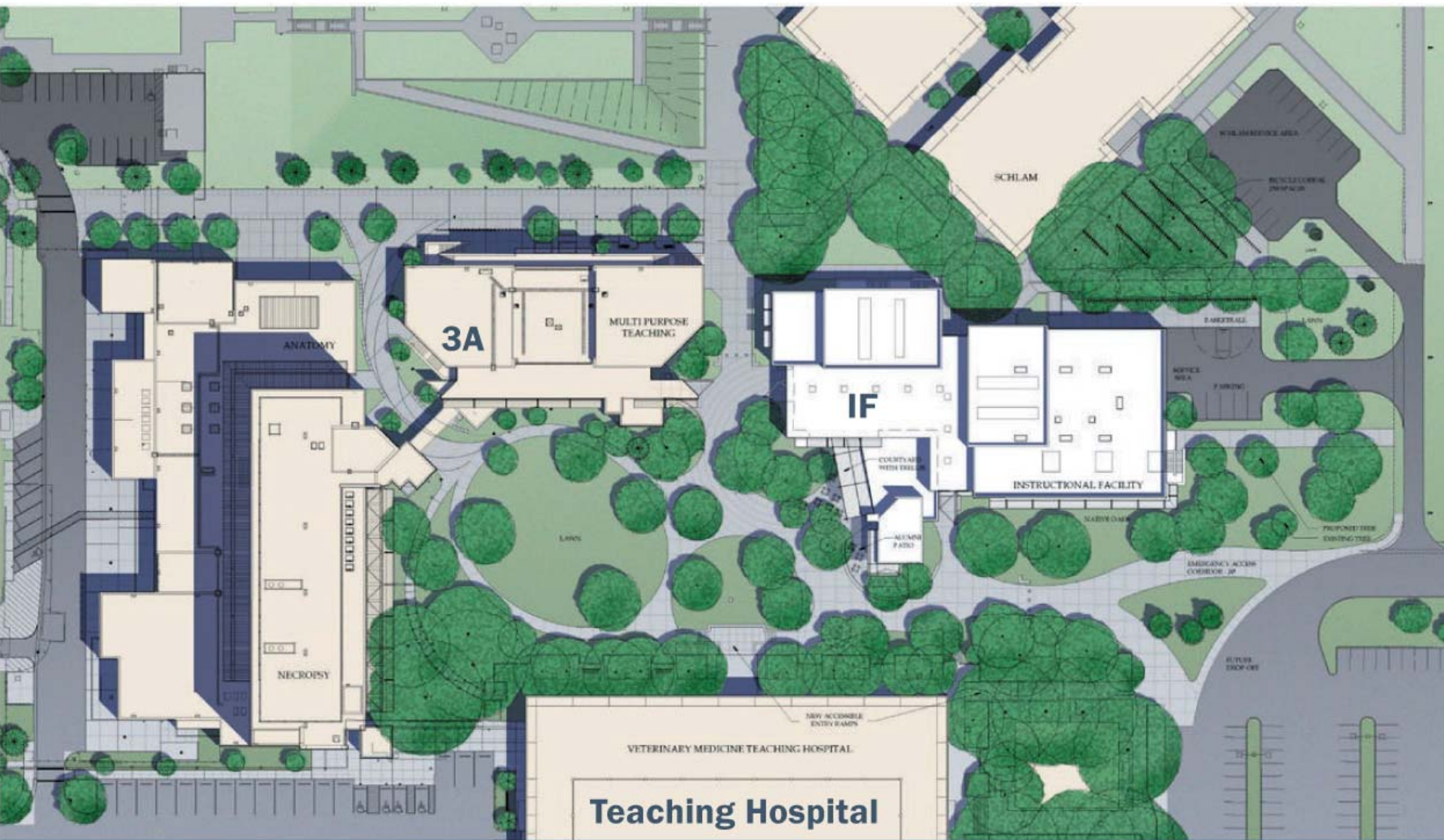


Teaching Hospital

Ground Floor Plan



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Site Plan





Site Section and Massing

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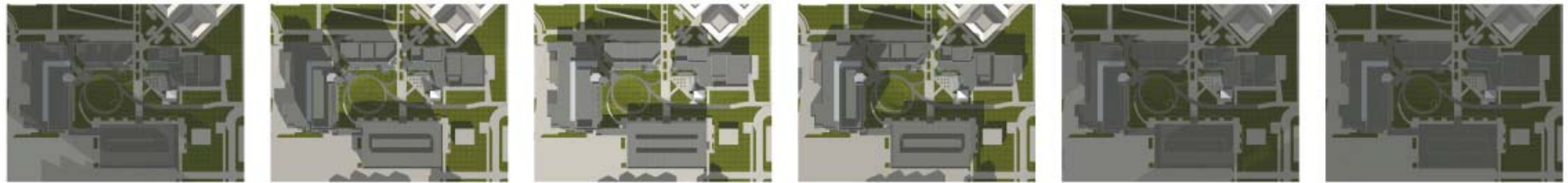
Site Sun Angle Studies



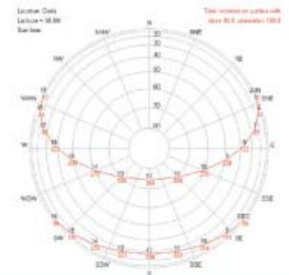
< SUMMER SOLSTICE >

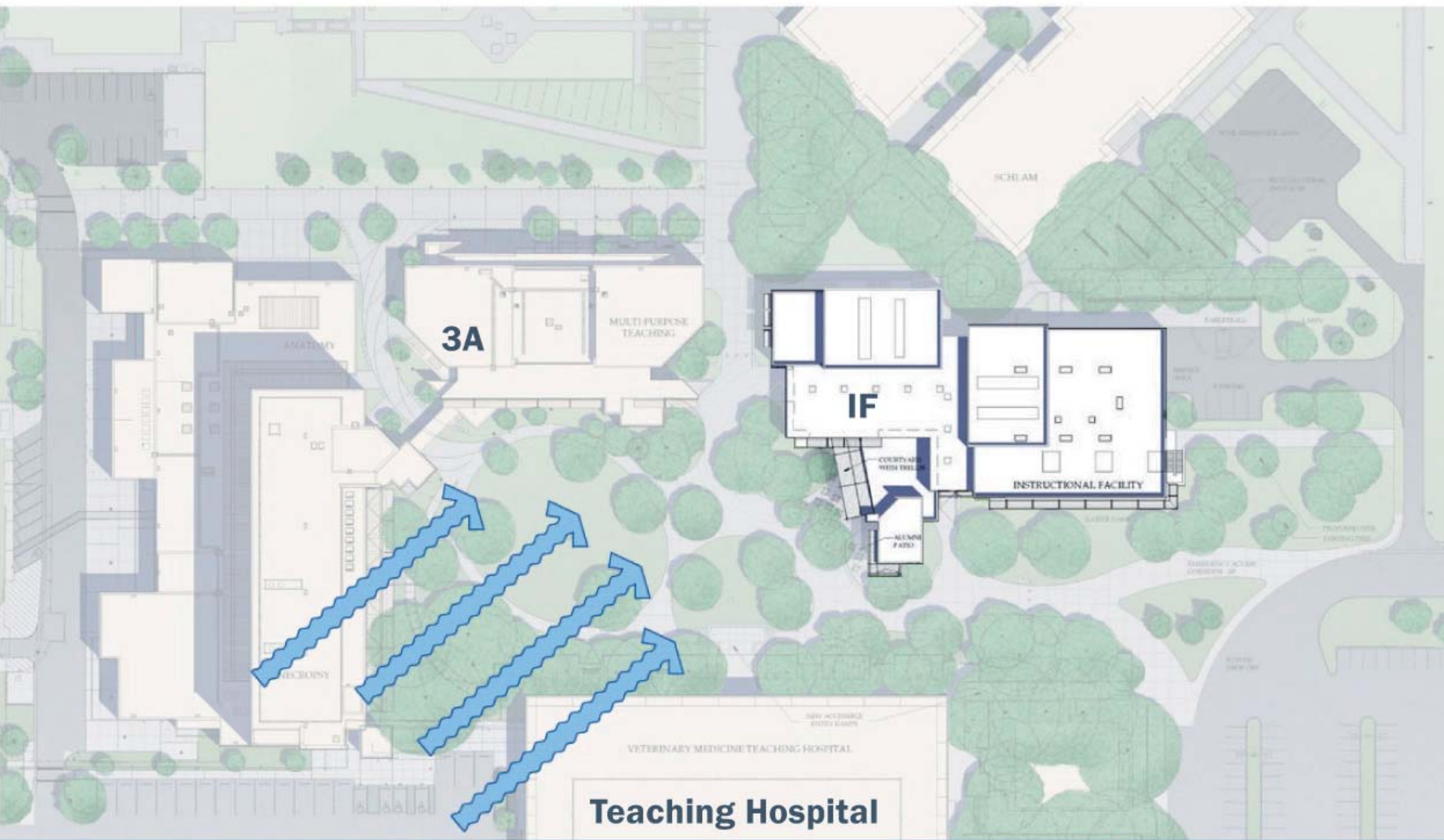


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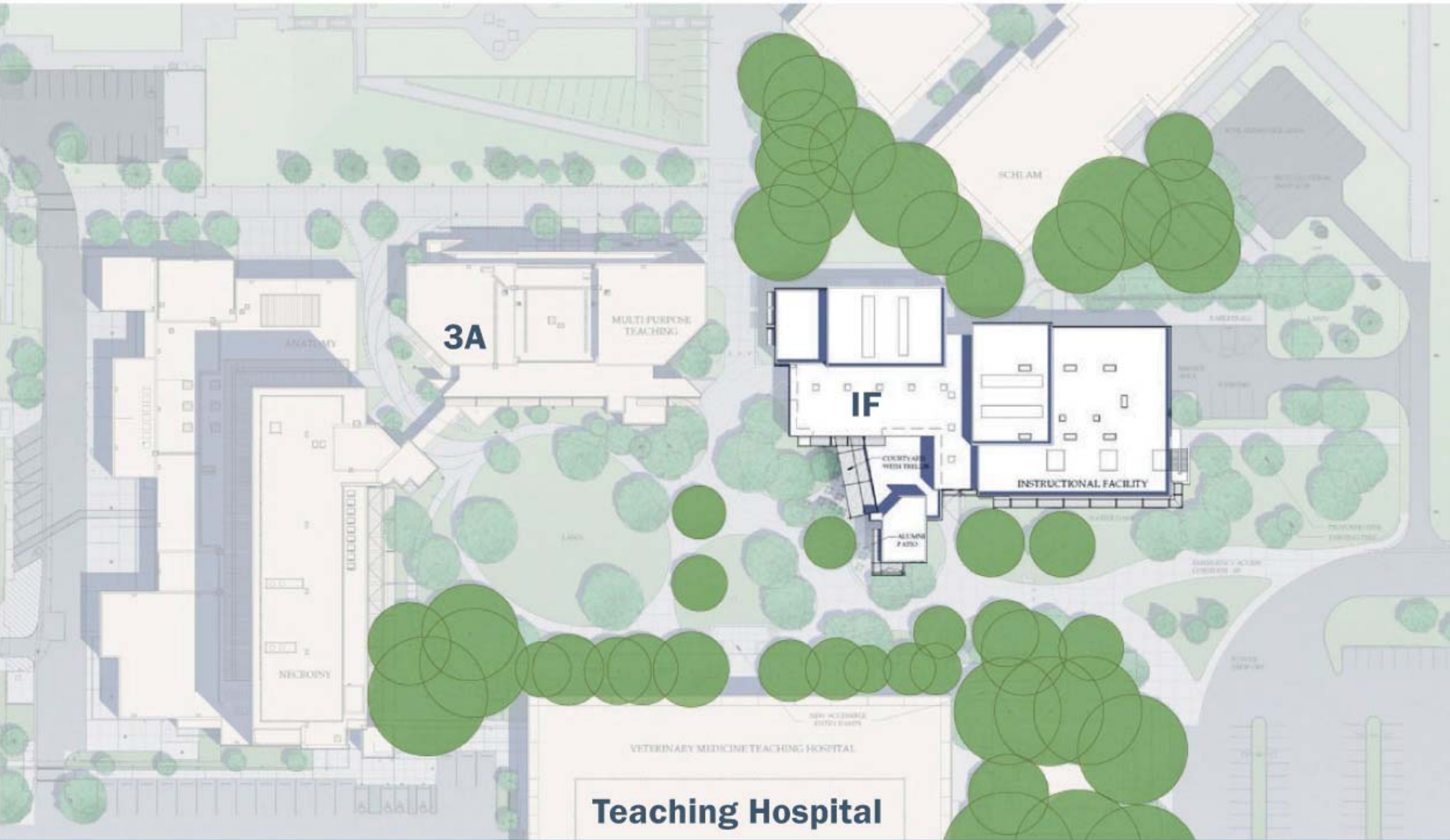
< WINTER SOLSTICE >





Prevailing Winds

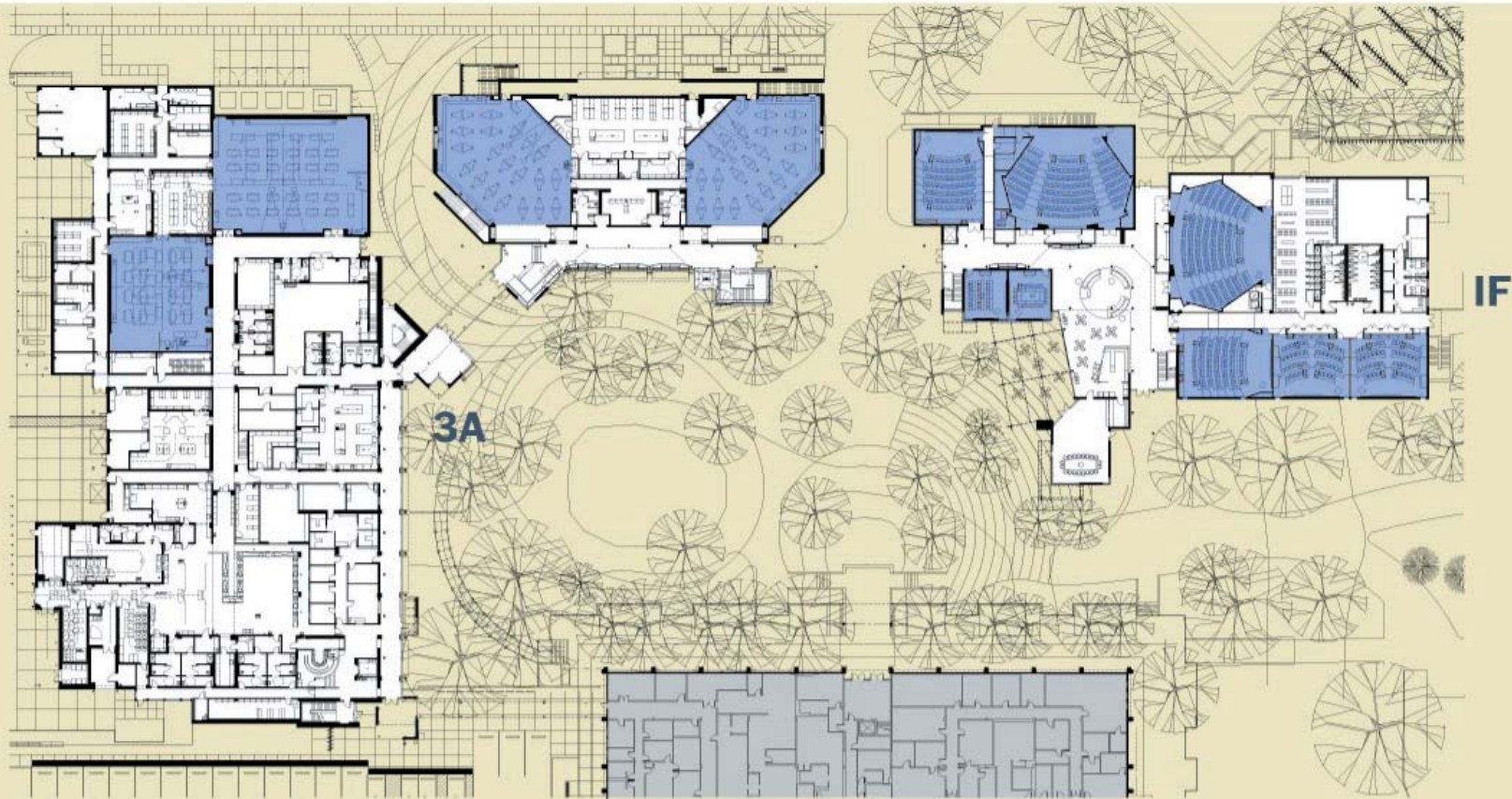




Teaching Hospital

Existing Trees





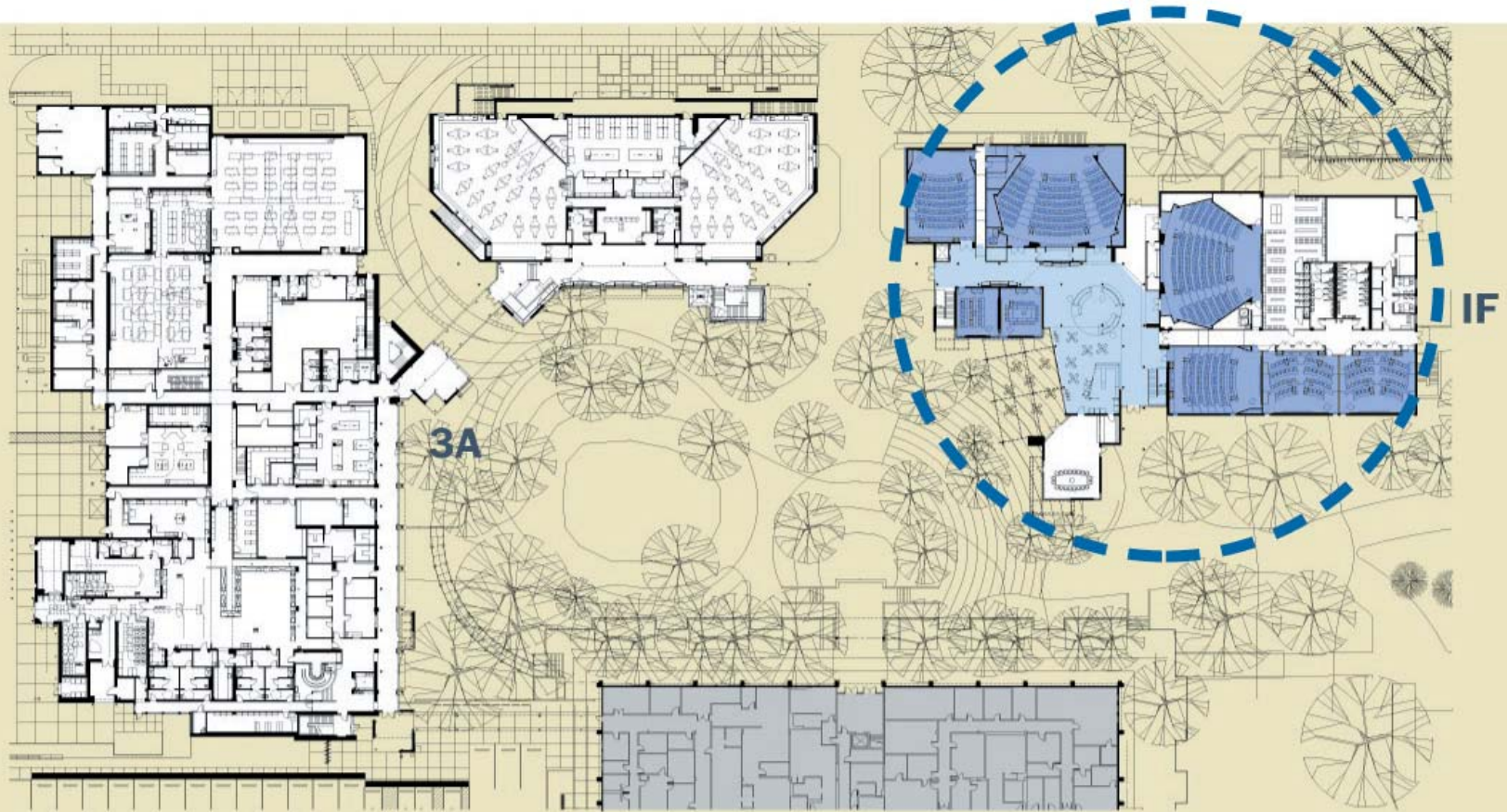
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Instructional Spaces



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AM Use

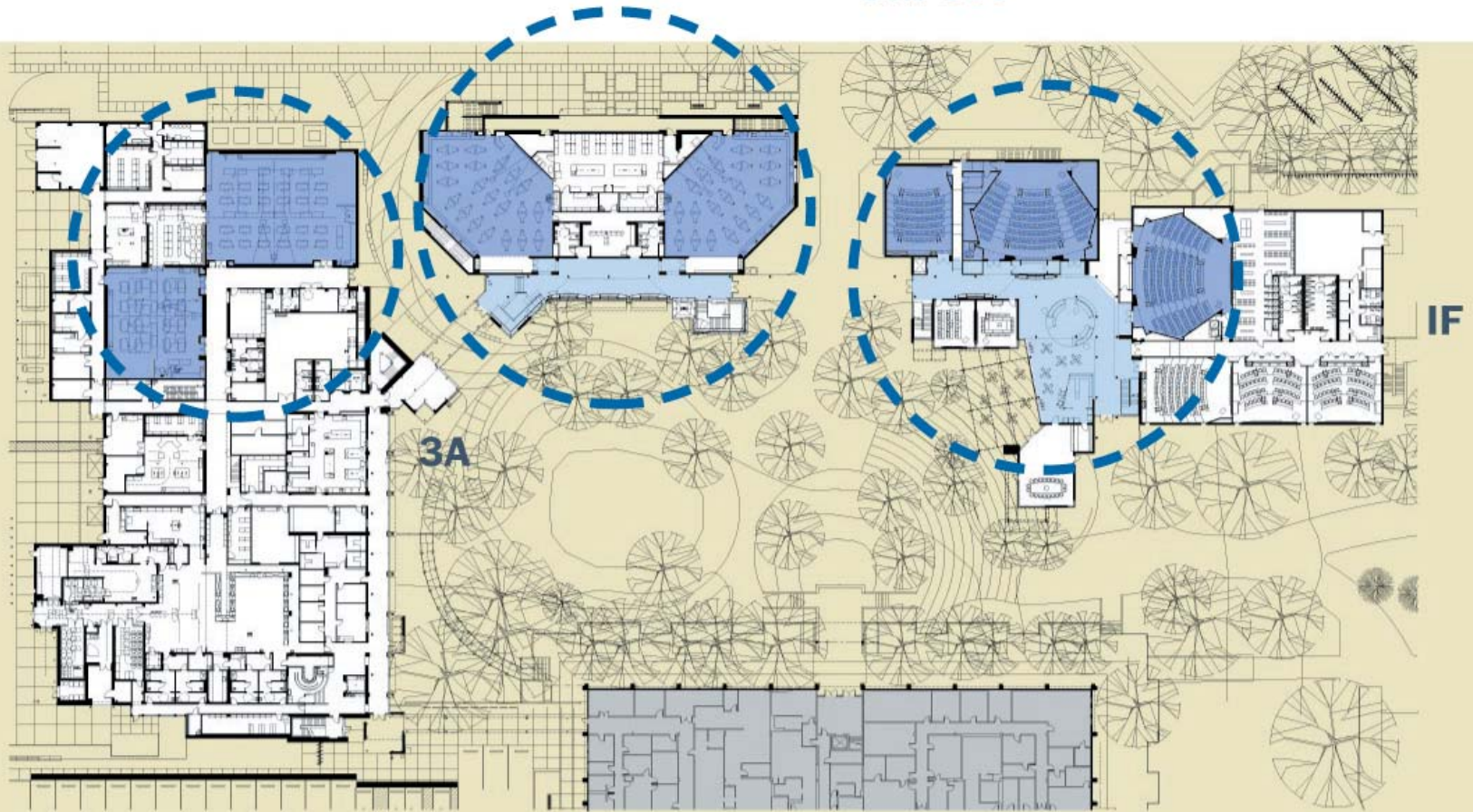


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Instructional Spaces



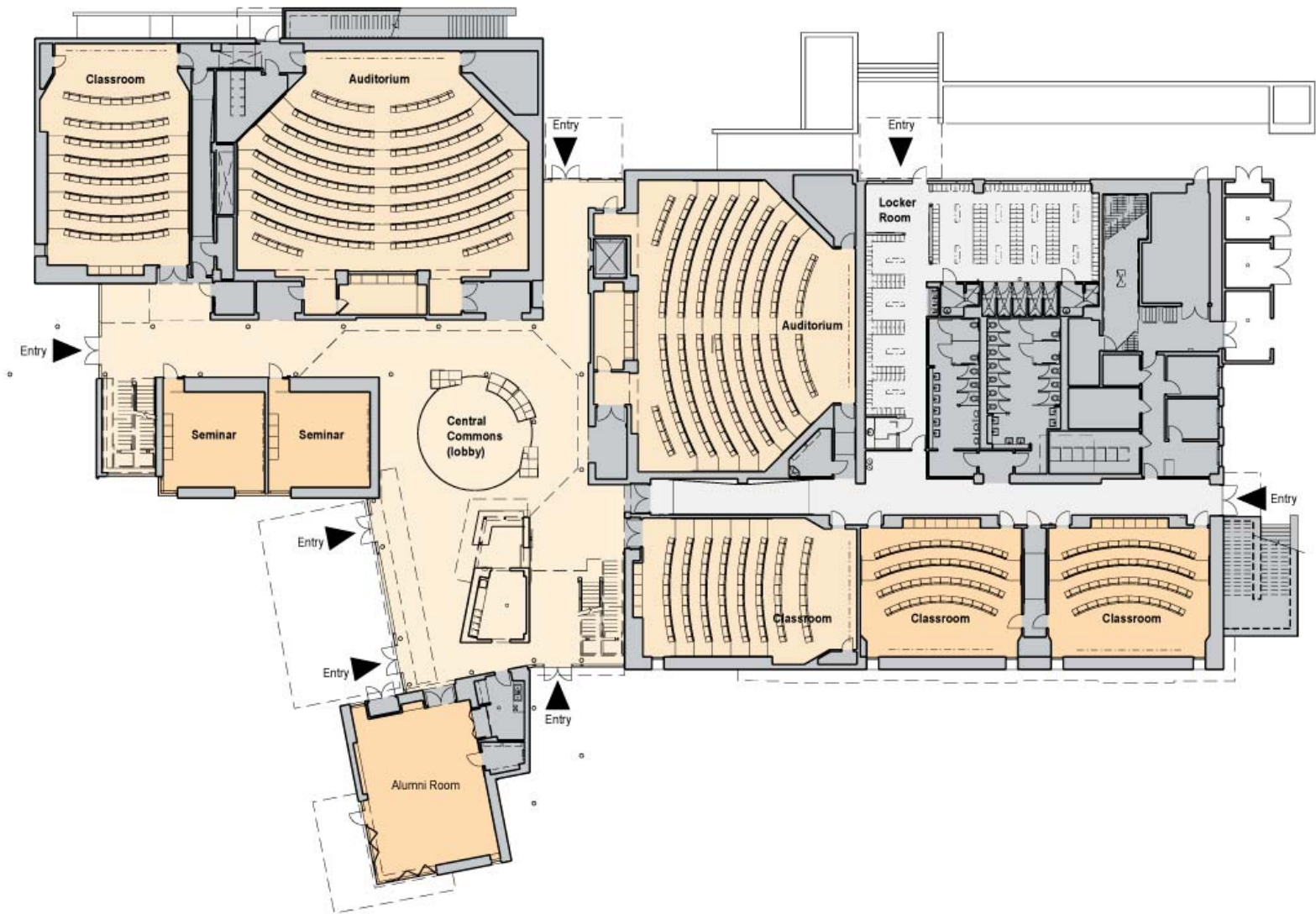
PM Use



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Instructional Spaces





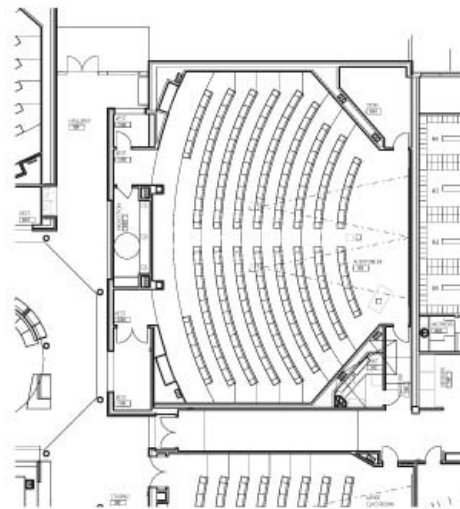
First Floor Plan





Second Floor Plan





Interiors-Auditorium

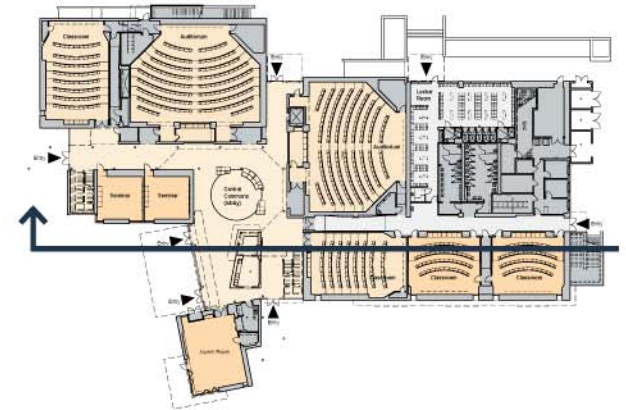
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Interiors-Commons

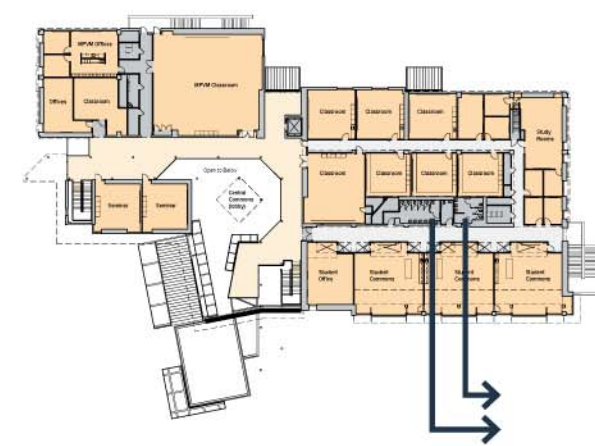
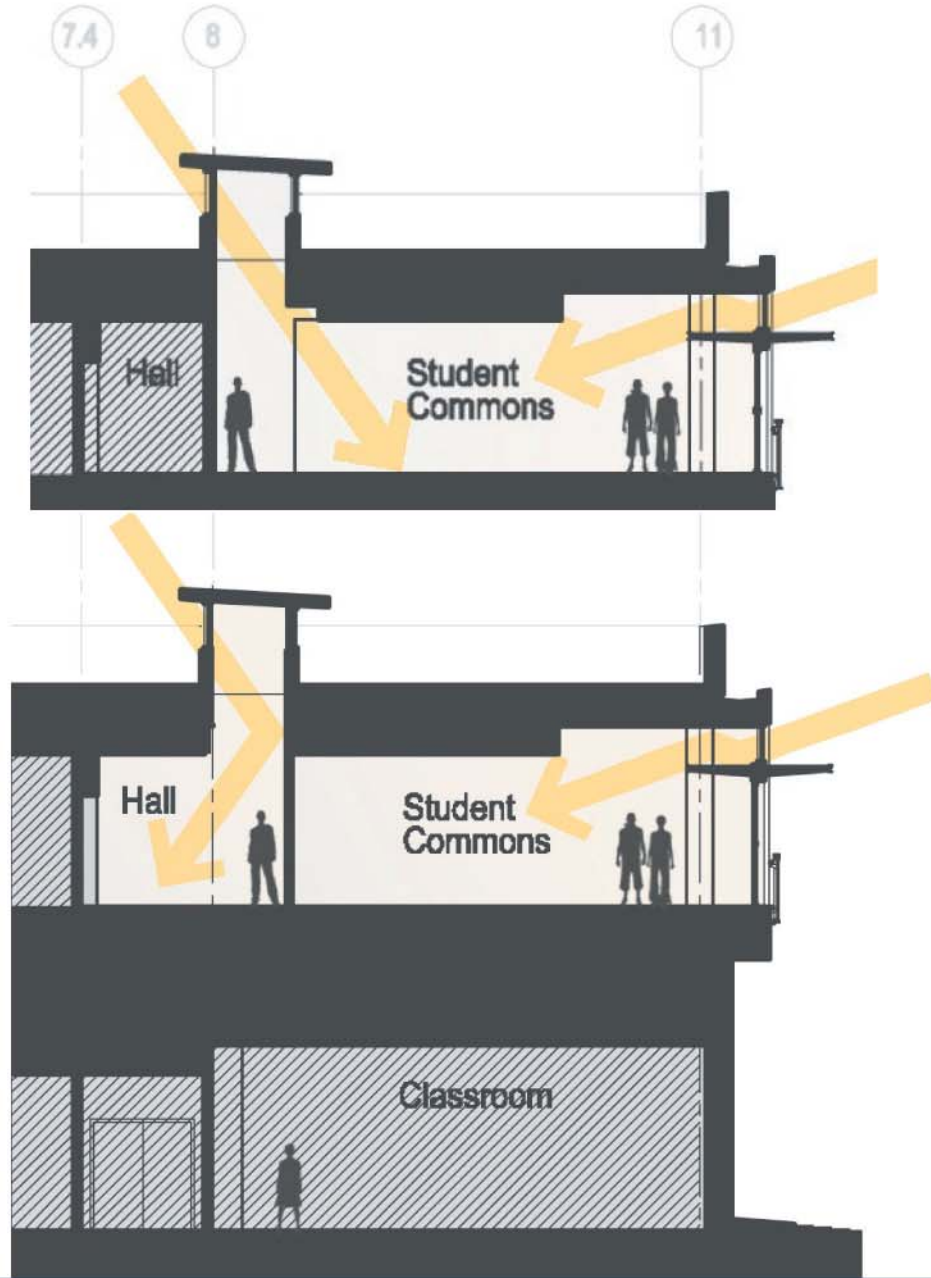
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Central Commons



Daylighting Strategies





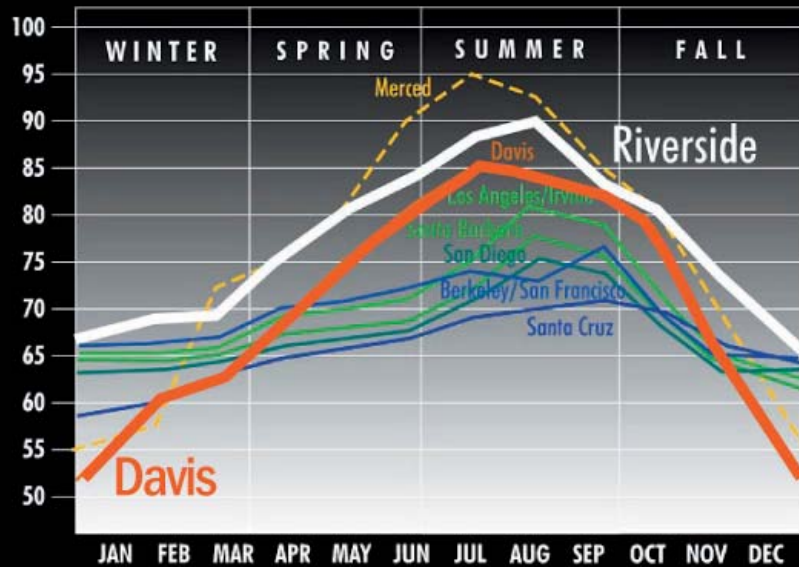
Student Commons

Daylighting Strategies

Climate and Temperature Data



Environmental Components Temperature

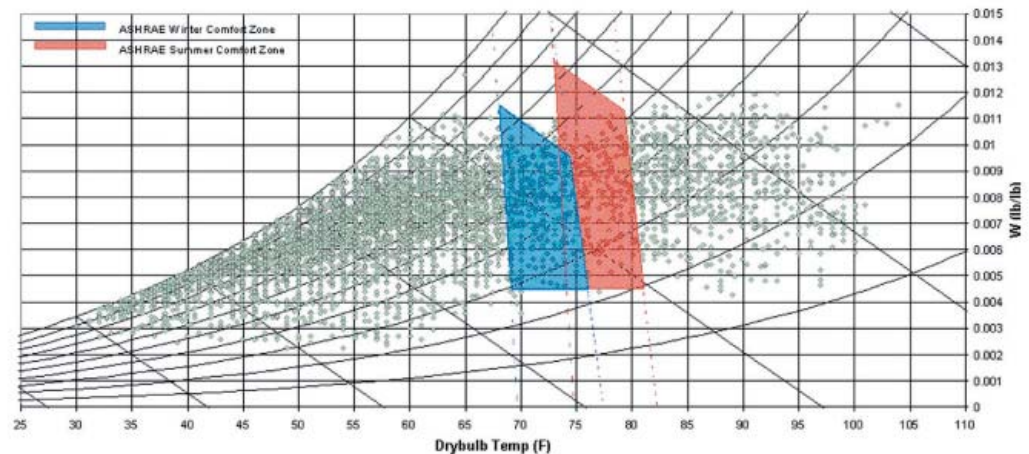
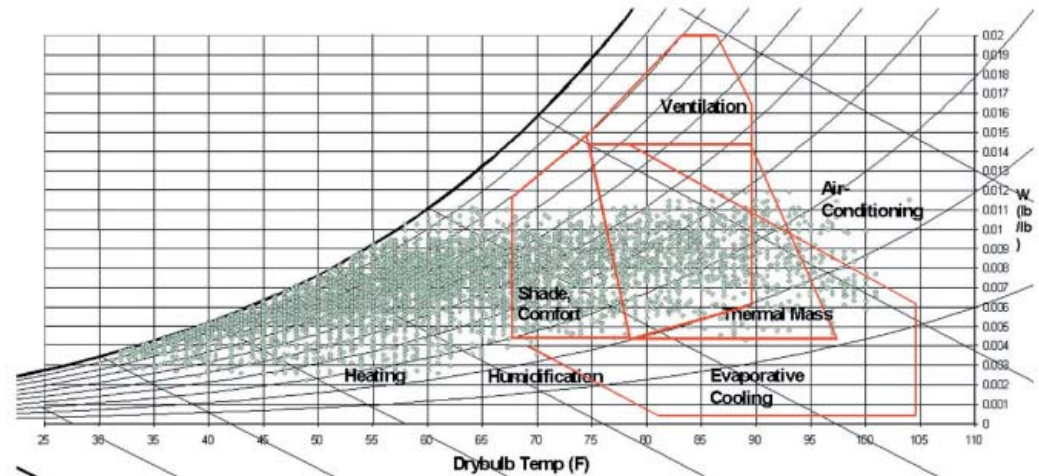


DATA: UNIVERSITY OF CALIFORNIA – CALIFORNIA WEATHER DATABASES www.ipm.ucdavis.edu/weather/

Design Criteria

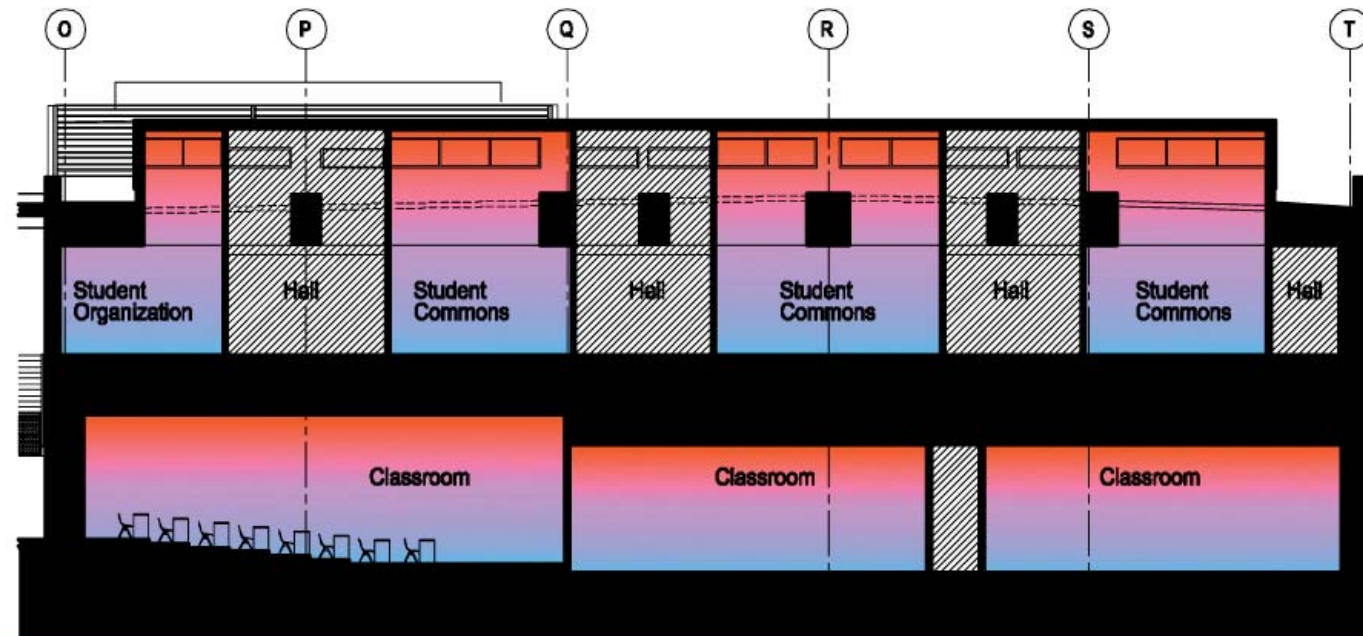
Designing for the Davis Climate

- Hot dry summers
- Evening Southwest breeze in summer
- Control solar gain
- Use Evaporative cooling
- Nighttime ventilation coupled with thermal mass



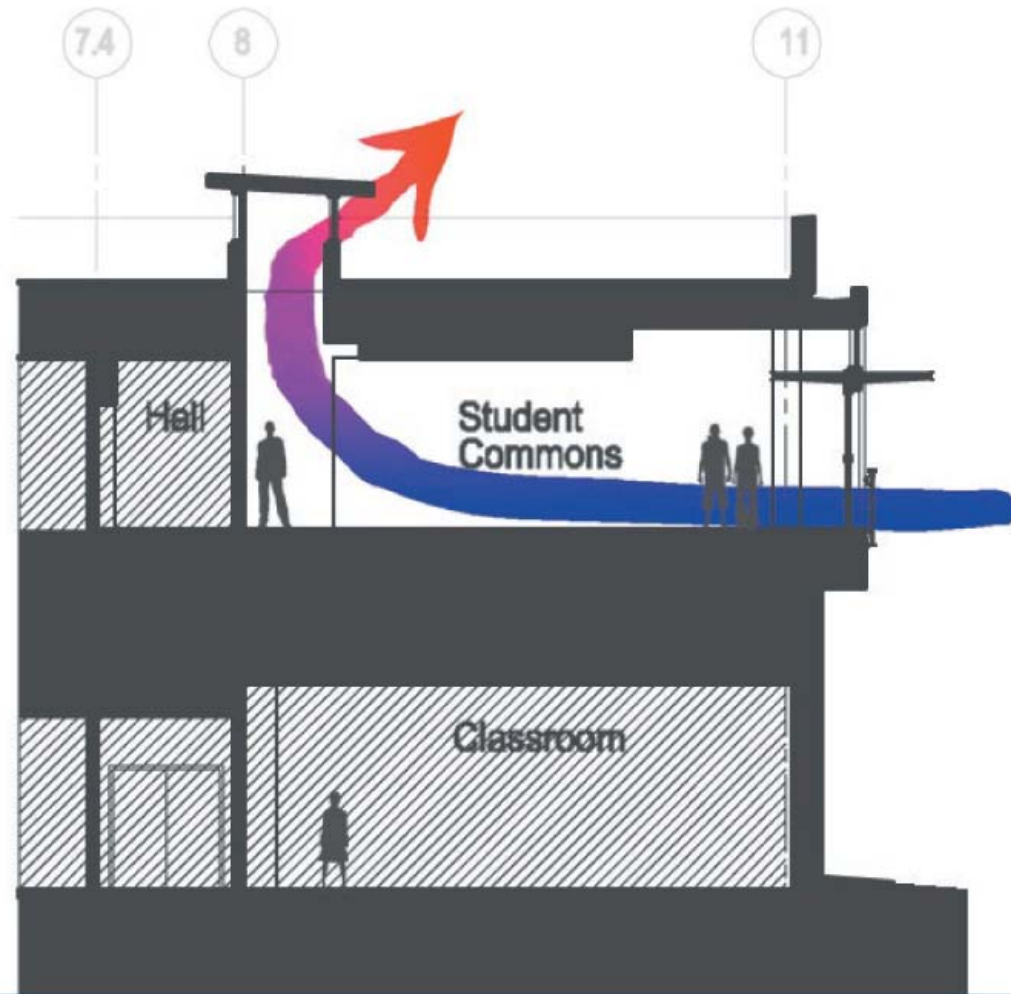
Designing for Function

- Displacement ventilation is ideal for auditoria but also efficient for office space. Makes use of stratification and is a low pressure system.
- 65°F supply air gives longer hours in economizer mode



Student Commons Environmental Design

- Mixed mode design:
Optimized to work in natural ventilation mode most of the year.



Mechanical Design

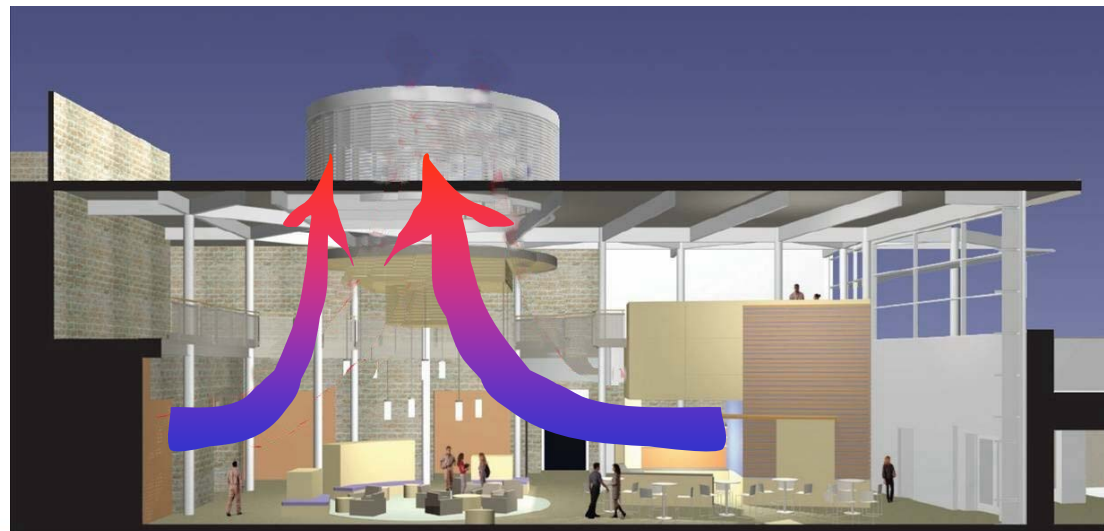
Central Commons – Winter and Mid-Season

Radiant heating on,
ventilation louvers closed



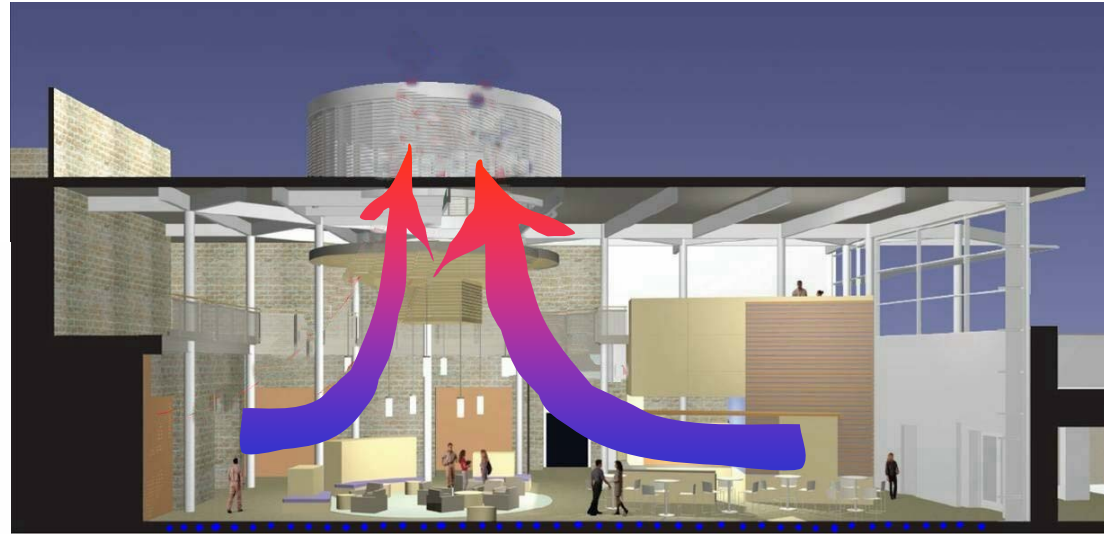
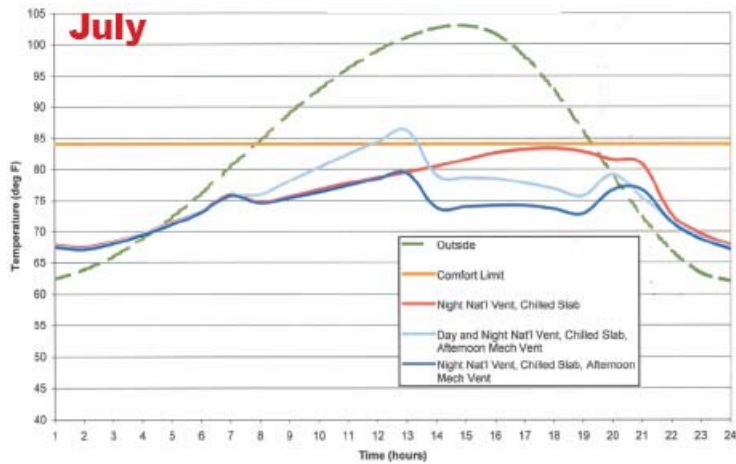
Natural Ventilation Mode:
No heating or Cooling,
louvers open

Outside air temperature range
60° F to 75° F



Mechanical Design

Central Commons – Summer Condition



Mechanical Design

Choose the right design team

- Charette selection, experienced and internally motivated

Set high goals and require justification for why they can't be met

Keep the Value discussion in VE

Incorporate clear directions and expectations in Contract Documents

Apply solutions appropriately

- Daylighting and temperature variation in Commons rather than Auditoriums

Do not preclude future changes

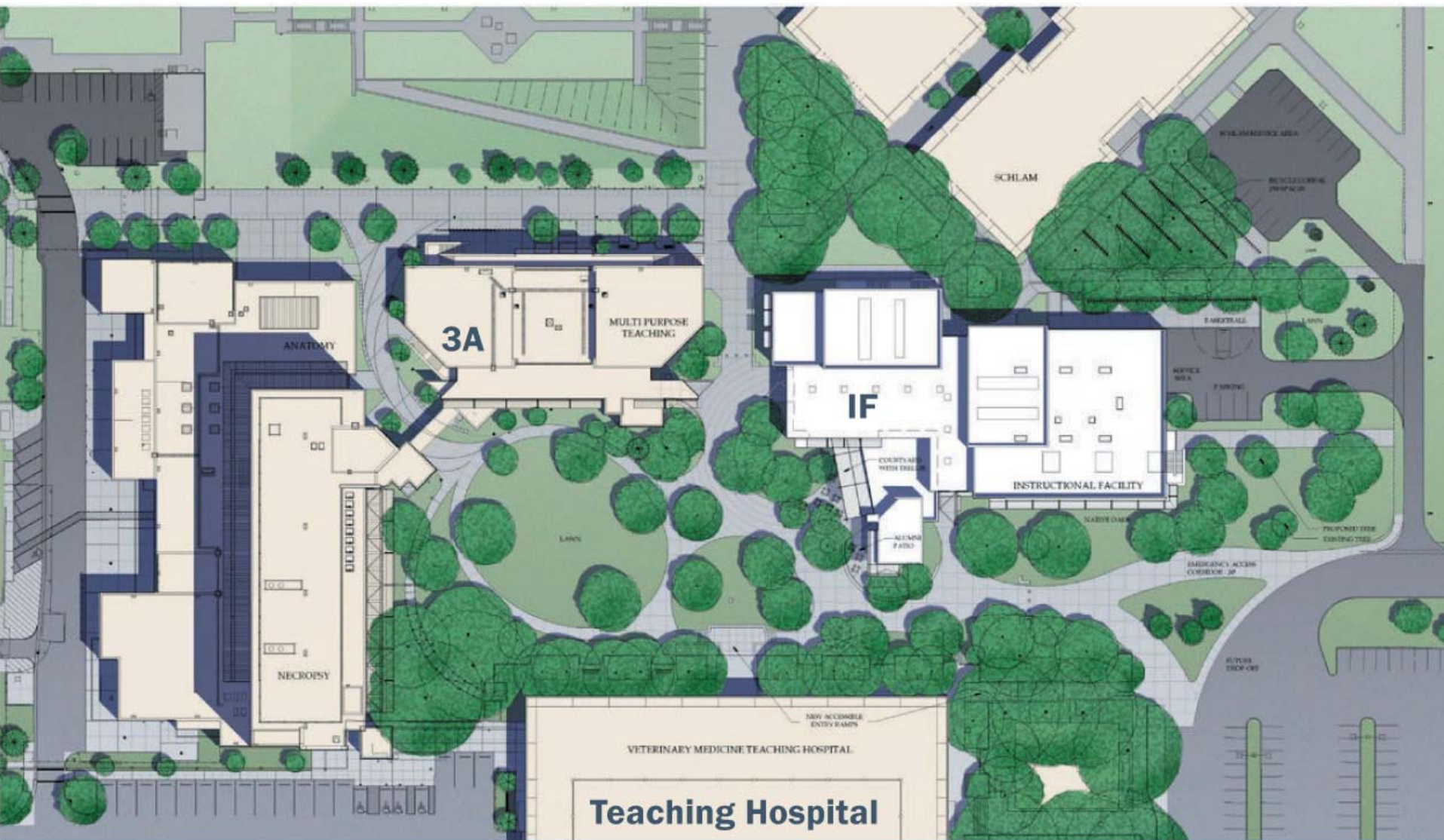
- Space reserved for Photovoltaics
- Provisions for reclaimed water

Project particulars are the best source for Integrated solutions

Integration is the only chance for achieving higher goals on a standard budget

Integrated design requires the right design team able to do the level of coordination required.

Lessons Learned



Site Plan



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Contact Information

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