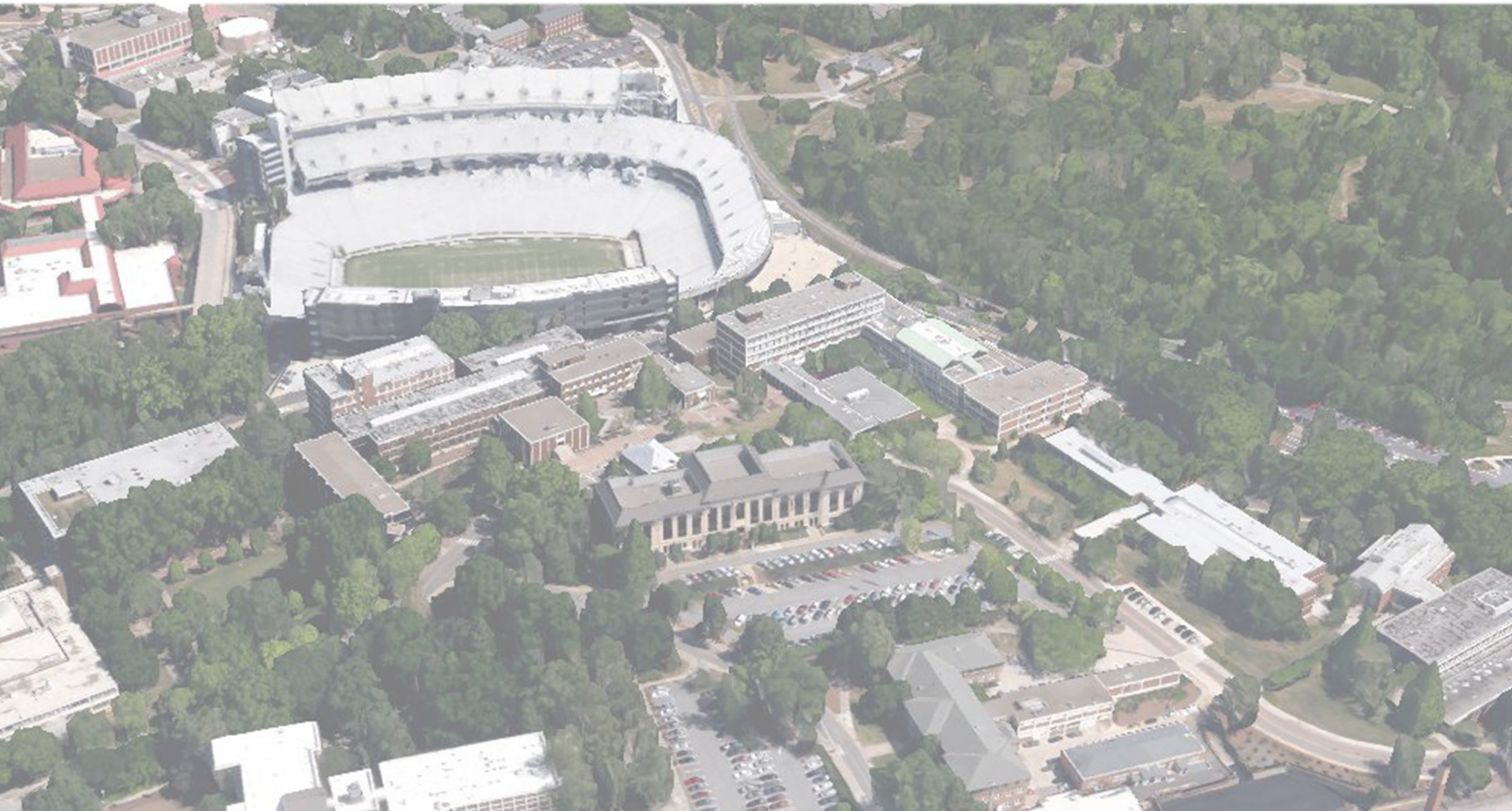




Biological Sciences & Chemistry:

November 23, 2015



Context & Background

PHYSICS, 1969
75,557 GSF

CHEMISTRY, 1960
185,341 GSF

POULTRY SCIENCE, 1960
64,980 GSF



GEOGRAPHY/
GEOLOGY, 1962
97,887 GSF

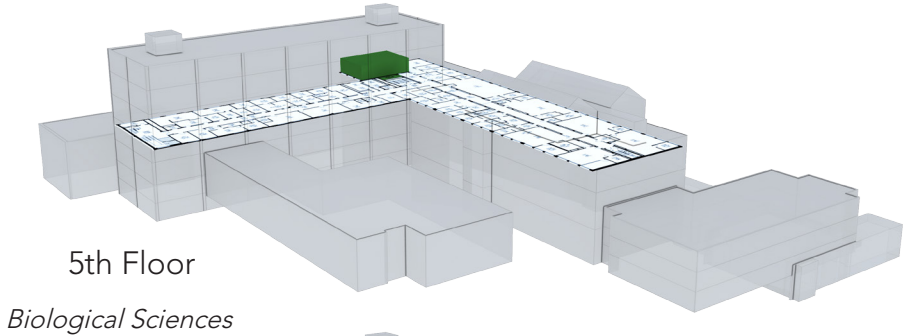
BIOLOGICAL SCIENCES, 1960
212,311 GSF

FOOD SCIENCE, 1959
64,384 GSF

CAMPUS CONTEXT
Science Hill

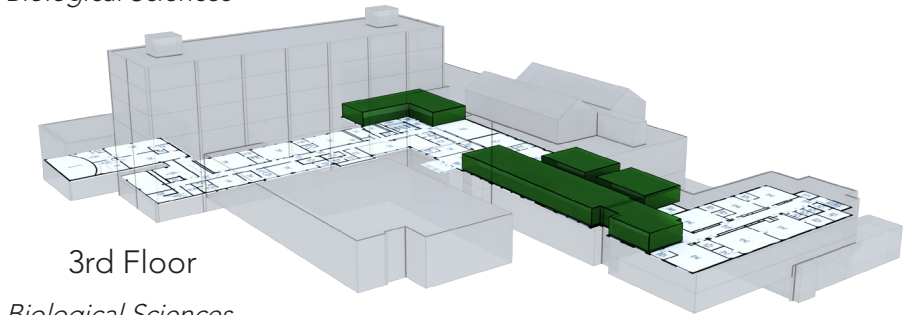
TOTAL GROSS SQUARE FEET = 700,460

SPACES TO BE VACATED



5th Floor

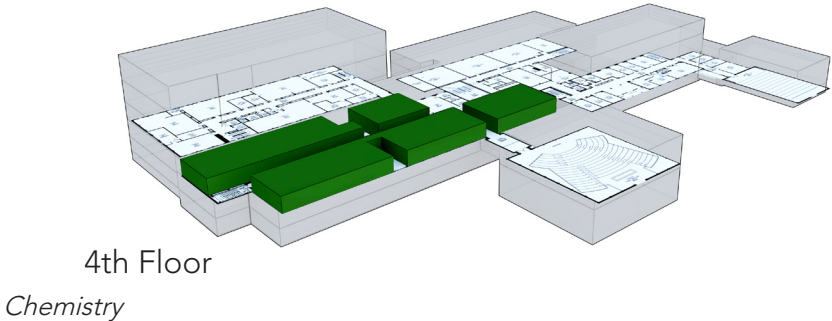
Biological Sciences



3rd Floor

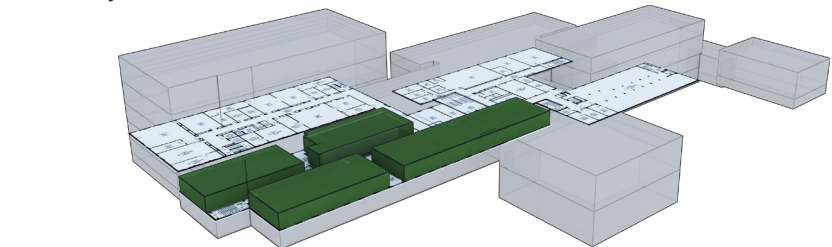
Biological Sciences

<i>Biological Sciences</i>	5th Floor	1,177 asf
	3rd Floor	8,972 asf
	Subtotal	10,149 asf *



4th Floor

Chemistry



3rd Floor

Chemistry

<i>Chemistry</i>	4th Floor	9,618 asf
	3rd Floor	9,984 asf
	Subtotal	19,602 asf *

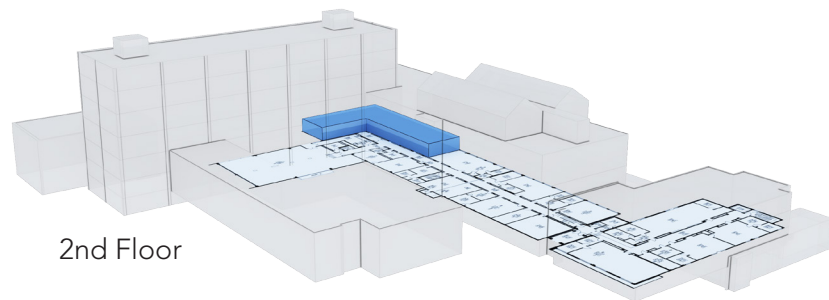
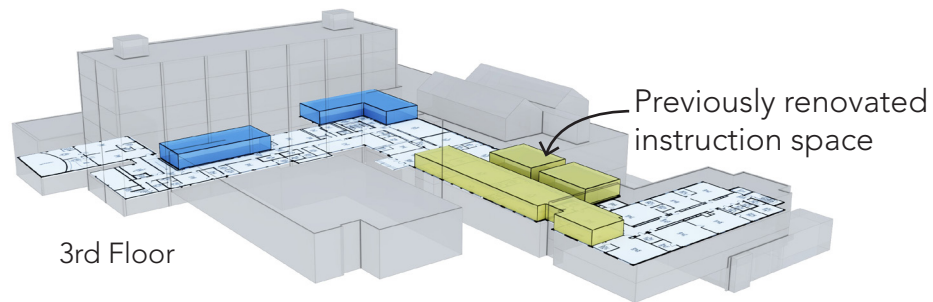
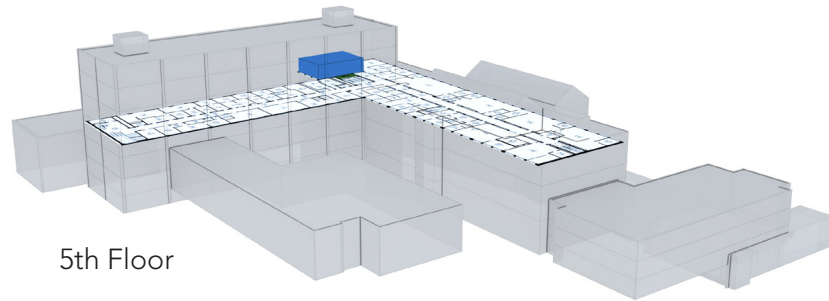
* APPROXIMATE ASF AVAILABLE TO USE AS SWING SPACE OR USE TO RENOVATE IN A SERIES OF RENOVATIONS

TOTAL VACANT & VACATED
Chemistry & Biological Sciences

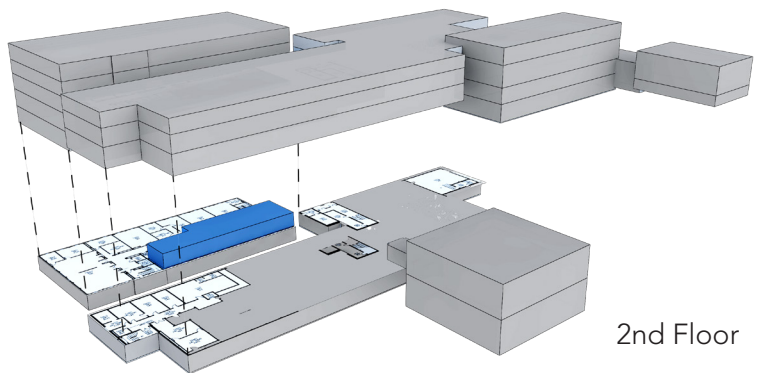
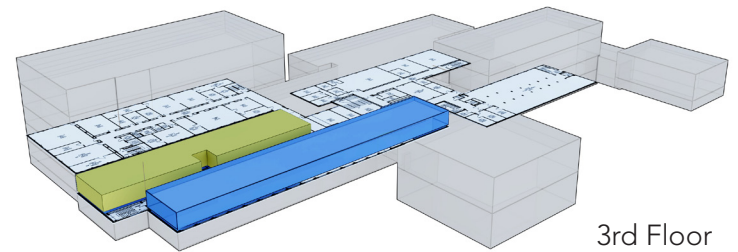
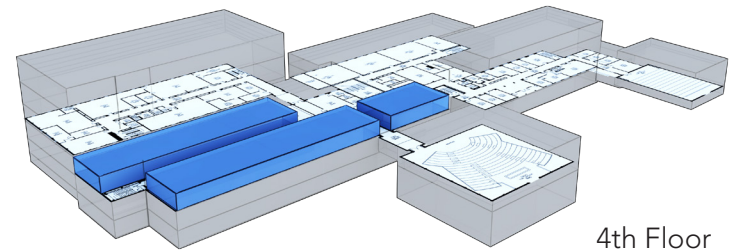
TOTAL 29,751 ASF*
4

REQUESTED RELOCATIONS (RESEARCH AND INSTRUCTION)

Biological Sciences 15,821 ASF



Chemistry 20,183 ASF



■ RENOVATE FOR RESEARCH
■ RELOCATED INSTRUCTION

CAPITAL OUTLAY REQUEST

- \$10M large capital disbursement scheduled for FY 2019
- \$10M institutional commitment to match state allocation
- With approximately 30% soft costs, \$15.4M available for construction
- Potential 38,000 gsf phase one target

COSTS & TIMEFRAME

SIMPLE OFFICES & LABS *(Limited Systems Upgrades)*

\$200-300/GSF Construction Cost
3-6 months Selection/Approvals
6-9 months Design
6-9 months Construction

INTENSE MECHANICAL LABS

\$400-600/GSF Construction Cost
3-6 months Selection/Approvals
9-12 months Design
9-12 months Construction

FUNDING OPPORTUNITIES

Biological Sciences & Chemistry

OPPORTUNITIES TO IMMEDIATELY BACKFILL VACATED SPACES

1200SF LABORATORY MODULE COMPARISON:

FEASIBLE OPTIONS: Lower HVAC Intensity Module

- **Biological Sciences Wet Labs**
 - Less HVAC intensive
 - Generally 0-1 fume hoods required
 - Similar HVAC demands as office use
 - 5 to 6 air changes per hour
- **Computational Labs**
 - Similar HVAC demands as office or single fume hood lab, IF server farm is remotely located

**RE-USE TYPE
IS LIMITED BY
EXISTING
MECHANICAL
SYSTEMS**

LESS FEASIBLE OPTIONS: Higher HVAC Intensity Module

- **Chemistry Wet Labs**
 - More HVAC intensive
 - Generally 4-6 FUME HOODS with 15 to 16 air changes per hour
- Equivalent heat loads (i.e. Laser research) require equally robust HVAC

ADDITIONAL CONSIDERATION:

- **Shared Hydrofluoride Lab is an identified need**

Overview of UGA Facilities Condition Performed by Sightlines

Putting Your Campus Building Age in Context

The campus age drives the overall risk profile

Pre-War

Built before 1951
Durable construction
Older but typically lasts longer

Post-War

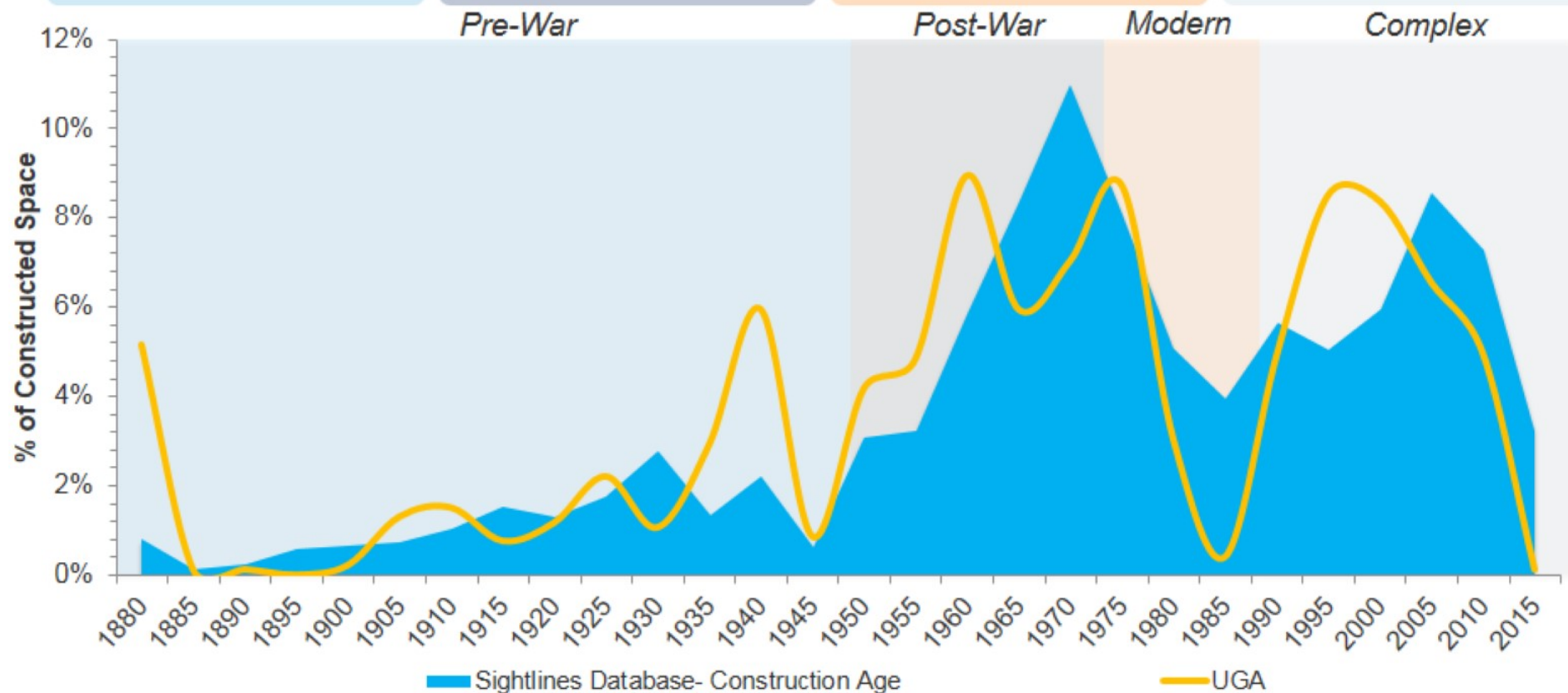
Built between 1951 and 1975
Lower-quality construction
Already needing more repairs and renovations

Modern

Built between 1975 and 1990
Quick-flash construction
Low-quality building components

Complex

Built in 1991 and newer
Technically complex spaces
Higher-quality, more expensive to maintain & repair



Peer Institutions

ROPA+ Analysis includes R.I. space totaling 9.2M GSF

Institution	Location
Georgia Institute of Technology	Atlanta, GA
Iowa State University	Ames, IA
Michigan State University	East Lansing, MI
Purdue University	West Lafayette, IN
The Ohio State University	Columbus, OH
The Pennsylvania State University	State College, PA
The University of Tennessee	Knoxville, TN
University of Florida	Gainesville, FL
University of Illinois	Champaign, IL
University of Iowa	Iowa City, IA
University of Michigan	Ann Arbor, MI
University of Minnesota	Minneapolis, MN
University of Nebraska	Lincoln, NE

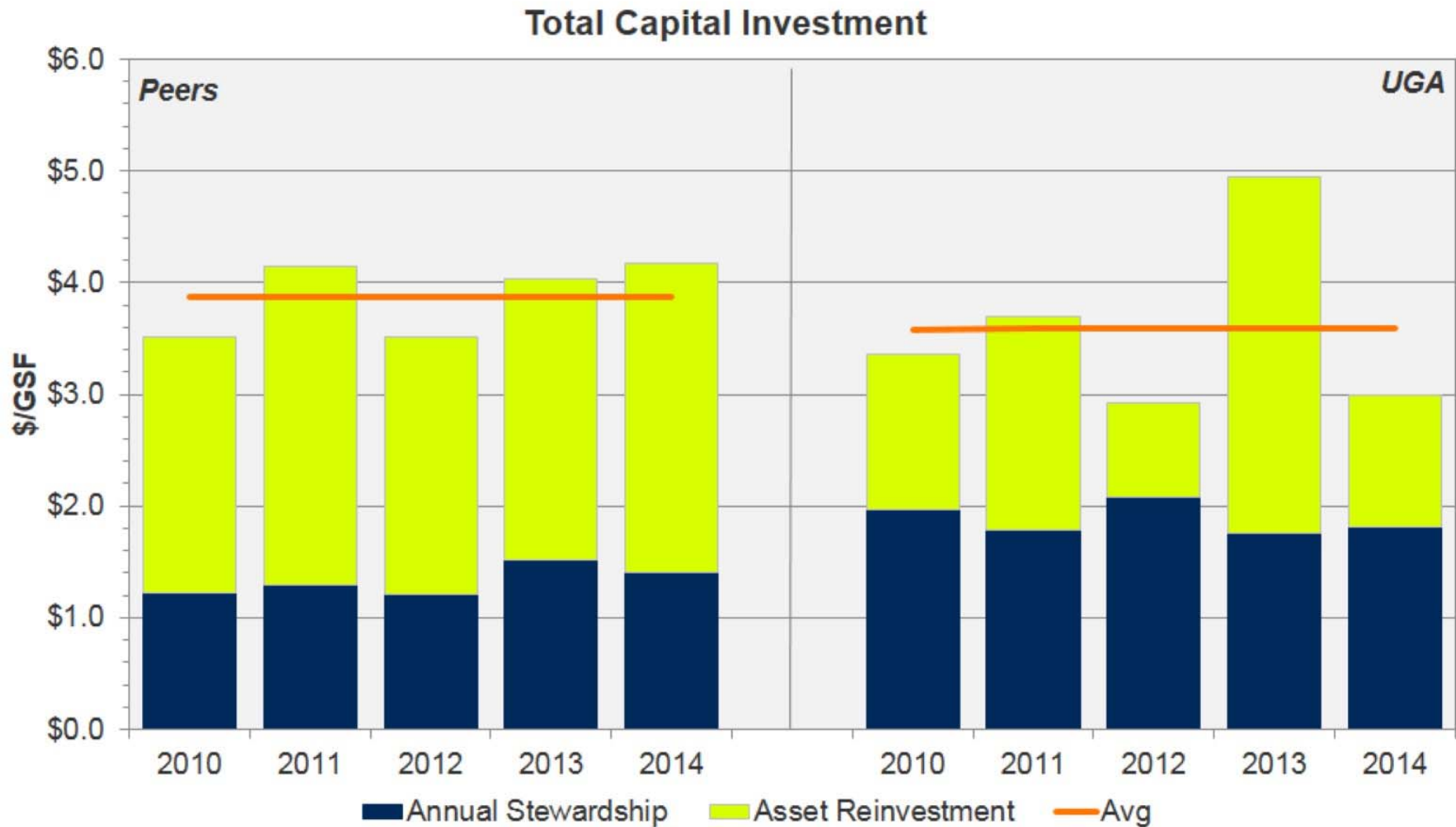


Comparative Considerations

Size, technical complexity, region, geographic location, and setting are all factors included in the selection of peer institutions

Total Project Spending vs. Peers

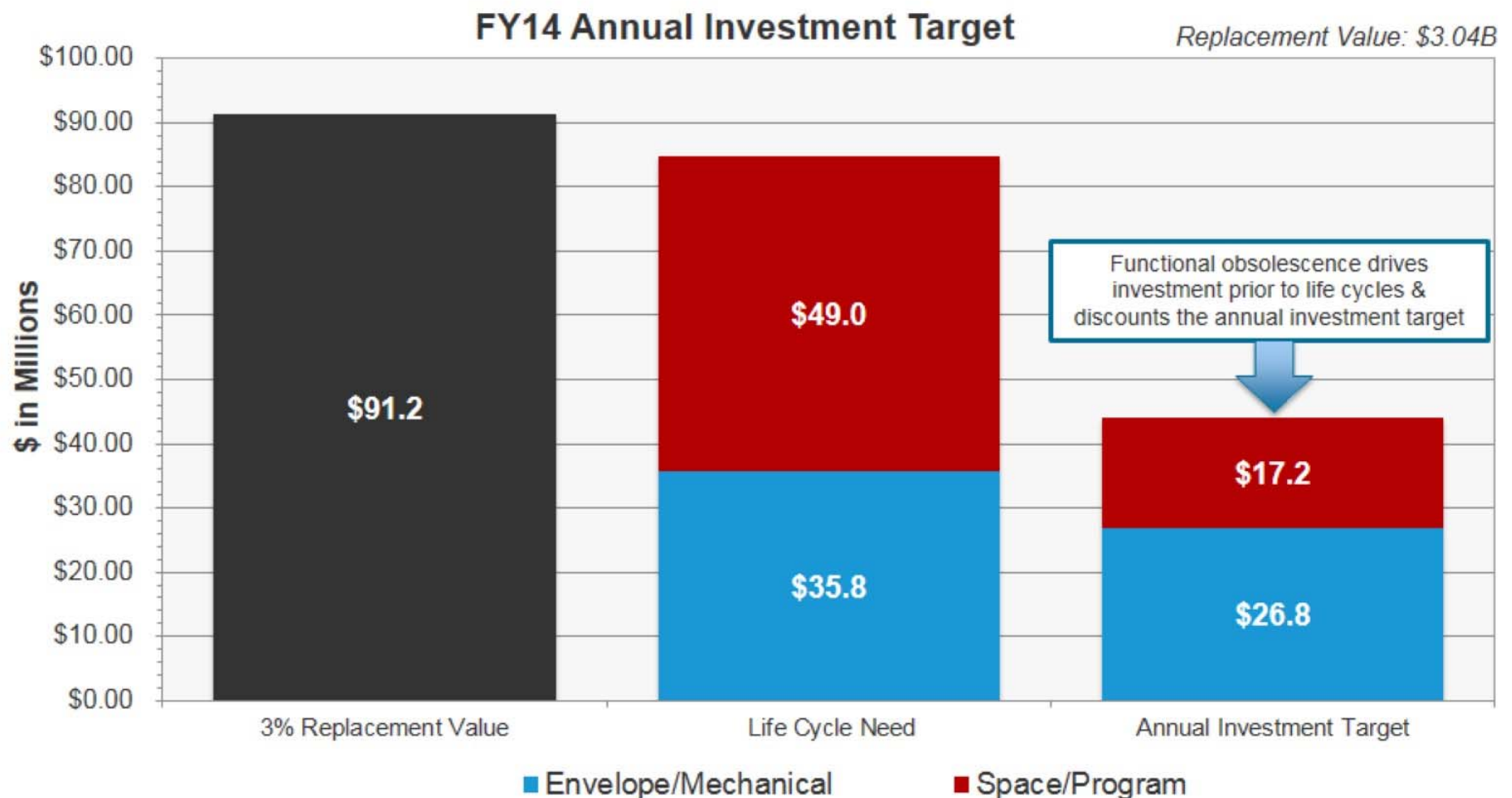
Split into recurring vs. one-time funds



**Does not include Infrastructure Spending*

Defining an Annual Investment Target

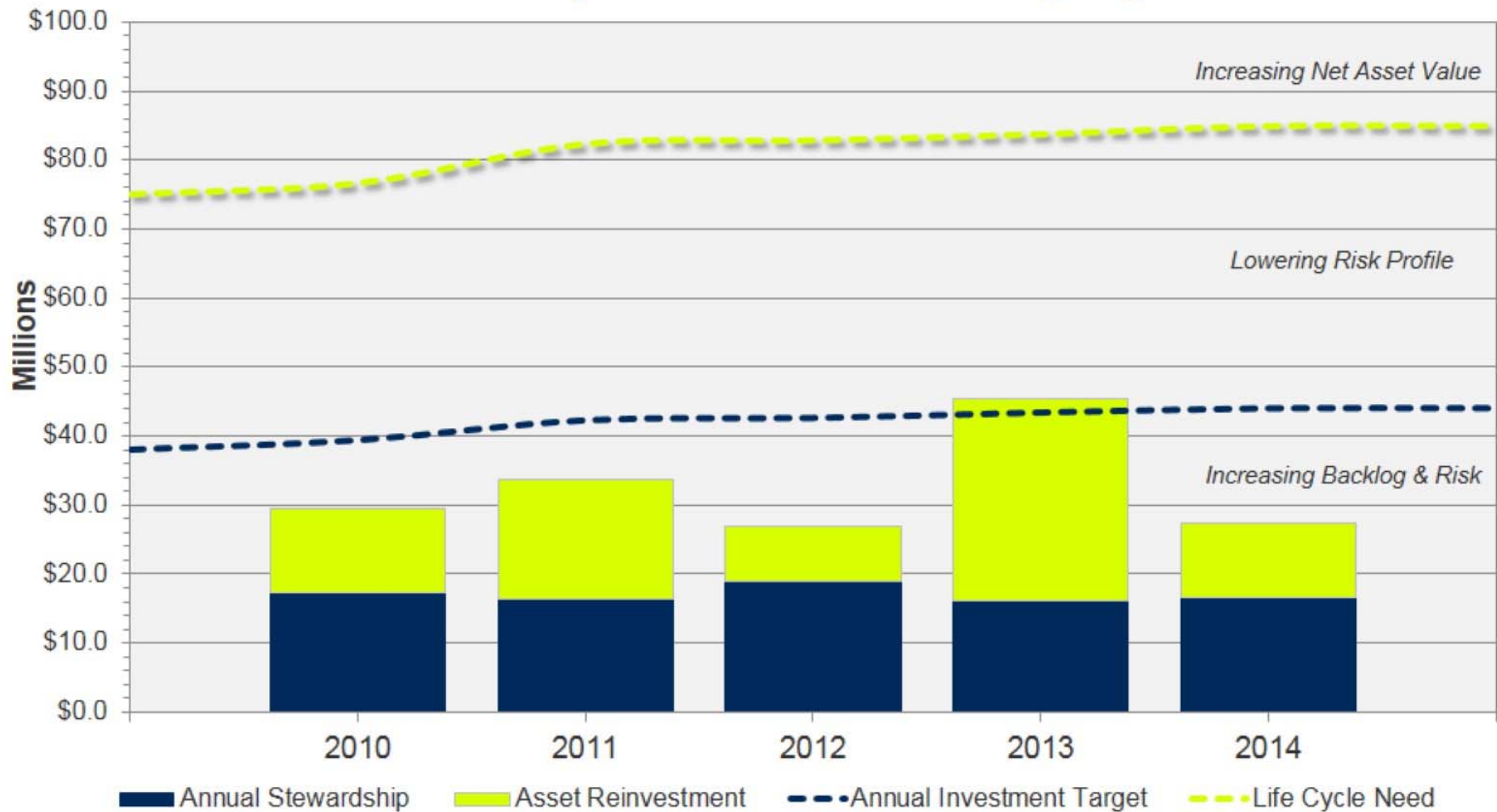
Annual Funding Target: 43.9M



Total Capital Investment vs. Funding Target

UGA relies on unstable AR funds to get closer to target

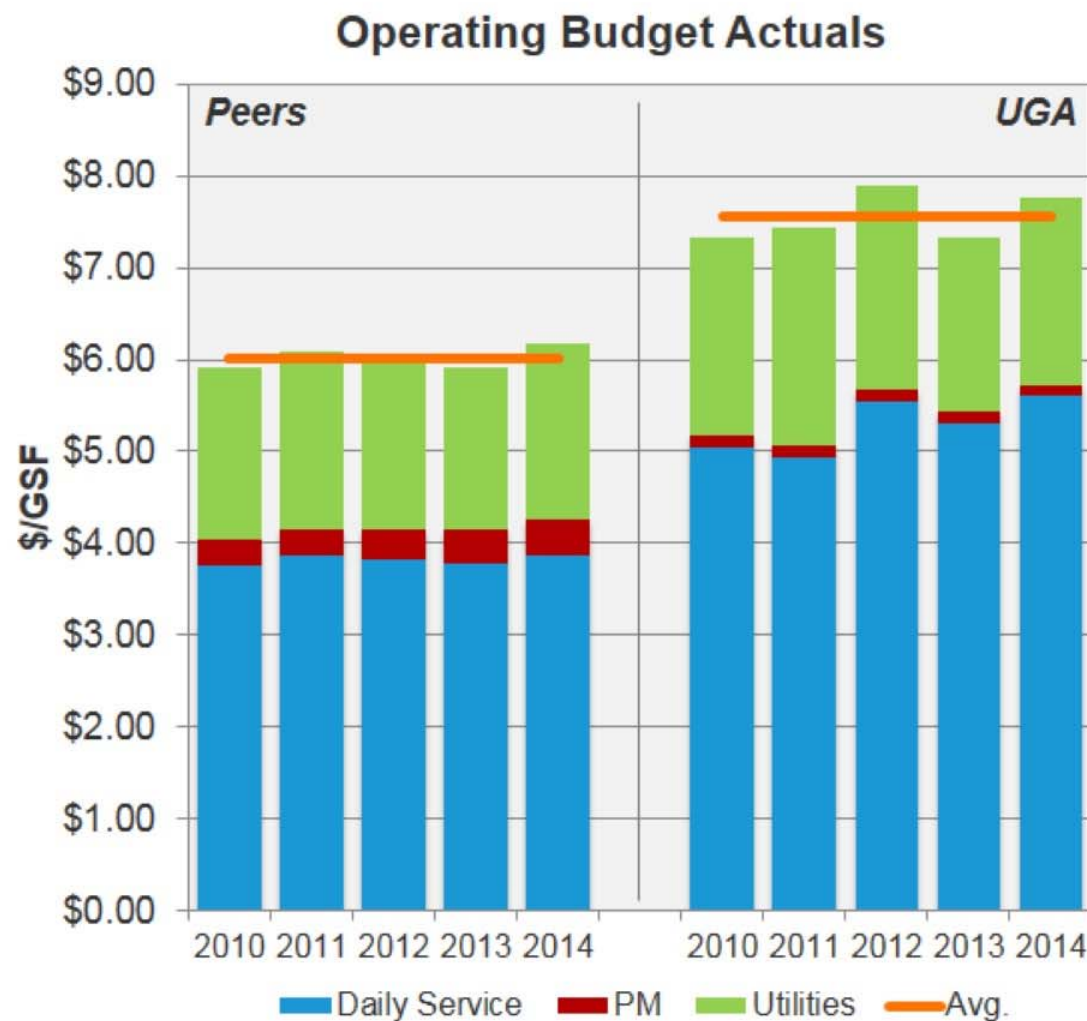
Total Capital Investment vs. Funding Target



**Does not include Infrastructure Spending*

Facilities Operating Expenditures

UGA's daily service costs are driving overall budget above peers



Utilities
Fossil, Electric, Water/Sewer

Planned Maintenance
Contracts, Labor & Materials

Daily Service
People Costs & Expenses

Biological Sciences & Chemistry Facilities Condition



DAVIDSON LIFE SCIENCES, 1992 - 260,719 GSF

SCIENCE LEARNING CENTER, 2015

COVERDELL, 2006 - 172,180 GSF

PREVIOUS OPPORTUNITIES

Renovation and Capital Facilities Planning

Science Hill Building Subsystem Assessment Biological Sciences & Chemistry

	1 (Fail)	2 (Poor)	3 (Avg.)	4 (Good)	5 (New)
Structure			●		
Interior Finishes			●		
Services/Conveying			●		
Plumbing		●			
HVAC		●			
Electrical		●			
Site Improvements		●			
Precinct Infrastructure		●			
Controls/ Instruments		●			
Fire Protection *				●	

* System updated in 1992



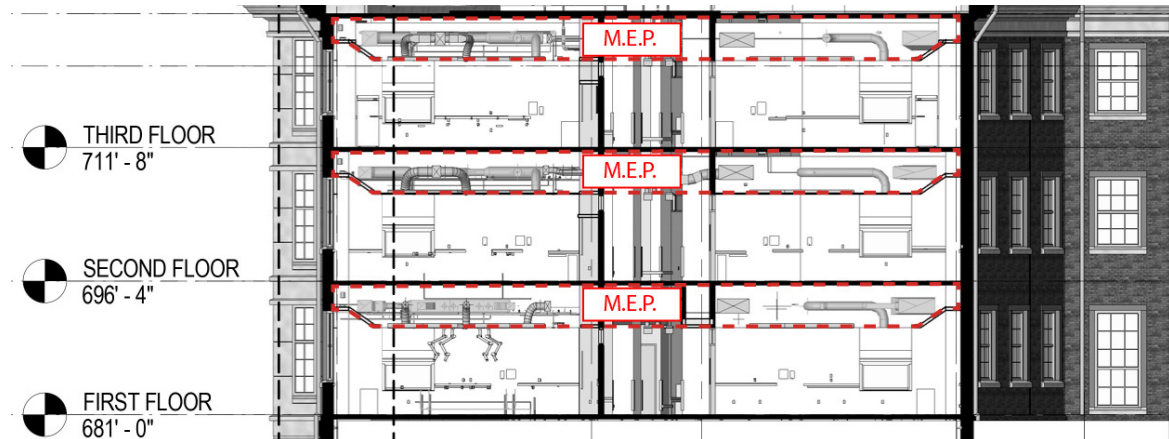
CHEMISTRY: Floor to Floor heights range from 10' 4" - 10' 11"



BIOLOGICAL SCIENCES: Floor to Floor heights typ. 11' 4"

LIMITATIONS OF FLOOR TO FLOOR HEIGHT

- No overhead capacity to retrofit HVAC with ducts adequately sized to accommodate wet labs' higher air change rates
- Alternative ductless HVAC systems such as chilled beams require tight envelope to implement.
- Other alternatives require significant reallocation of ASF to horizontal and/or vertical mechanical distribution spaces.
- Alternative lab types that do not demand high air change rates or generate significant heat loads, such as computational labs with remote servers, present an additional alternative for reuse of low floor-to-floor spaces.



SCIENCE LEARNING CENTER SECTION
15'-4" FLOOR TO FLOOR

SPATIAL "RED FLAGS"

Biological Sciences & Chemistry



Lab fan coil units limit overhead space



MECHANICAL

HVAC major components at end of anticipated useful life

Single fan AHU in 8 story research-office wing poses greatest risk for loss of research in event of failure

Temporary air-cooled chiller is band aid. Failure at Bio-Sciences would affect entire Science Hill loop.

NON-COMPLIANT return air via the central corridors in 8 story research-office wing present both fire safety and air quality risks

OUTDATED fume hoods with failing, non-redundant fans are lined with asbestos-containing transite

PIECEMEAL service needs provided by suspended fan coil units in labs limit overhead space



Typical auxiliary air lab fume hood with non-conditioned air ventilation



Roof-mounted exhaust fans, stacks, and condensing units



Large diffuser in hallway supplies ventilation to central building



Mechanical systems exposed in hallways



Auxiliary HVAC



Old Chemistry and New Chemistry

MECHANICAL

HVAC major components exceeded anticipated useful life

NON-COMPLIANT supply of ventilation air via the central corridors in central "Old" chemistry raises air quality concerns

West lab portion of "Old" chemistry not originally cooled; piecemeal systems added over time

"New" chemistry has insufficient make-up air to accommodate fume hood additions resulting in inadequate ventilation, air quality issues, and inefficiency accommodating wet labs and other high air change rate environments

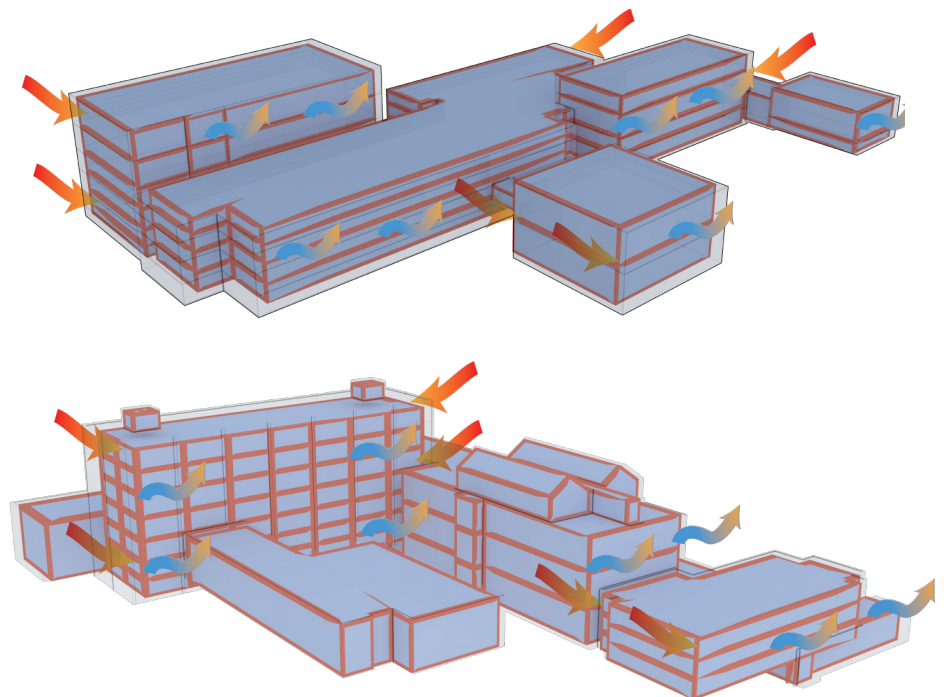
Original 1960 aluminum frame windows modified by piecemeal cooling and ventilation systems.



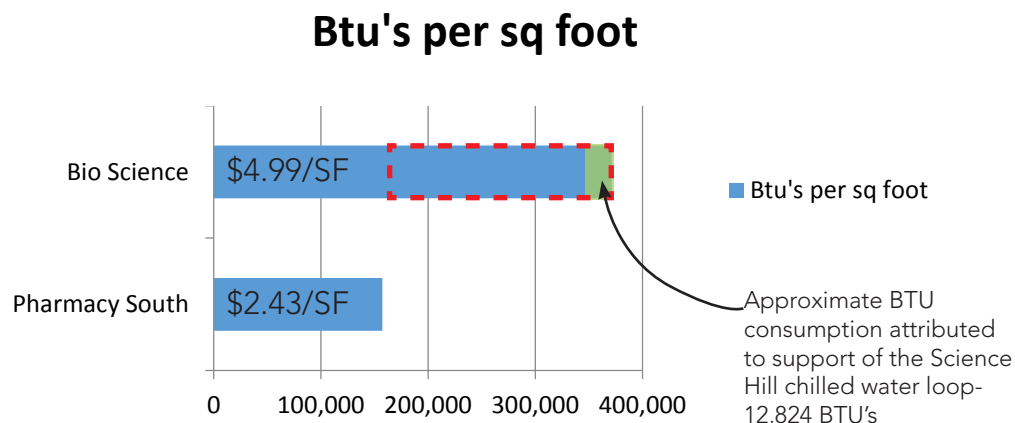
- *Heat loss in winter; Cool air loss in summer via poorly insulated envelope*
- Brick veneer with CMU backup - **No insulation in wall cavity**
- **Single-pane, non-thermally broken** aluminum framed windows
- Piecemeal HVAC systems (i.e. window units and ventilation grilles) complicate envelope upgrade phasing options.
- Envelope improvement and mechanical systems directly linked

New HVAC system could be considerably smaller and more efficient if envelope is addressed at the same time

Aluminum frame windows modified by piecemeal cooling and ventilation systems



ENERGY USAGE COMPARISON DATA



- Annual energy costs in Bio-Sciences are more than double the cost/sf in Pharmacy South. With major renovations targeting envelope and systems efficiencies, total annual operating savings for Biological Sciences could exceed \$500,000 or \$5 million over ten years.

Bio-Sciences' inefficient envelope and piecemeal systems yield excessive energy consumption.



Biological Sciences & Chemistry Renovation Considerations

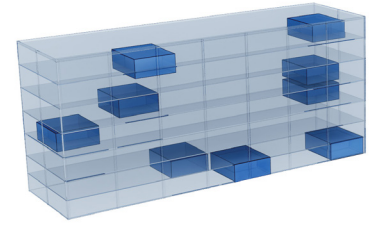
PIECEMEAL

Partial Renovation

Assignable space-driven approach; Lowest up front costs;

Highest long term costs

Capital Renewal Deferred



ADVANTAGES

Responsive to department requests for organizing research and instruction

Limited to no swing space required

Lowest short-term costs

DISADVANTAGES

Minimal to no opportunity to address building systems renewal or to reduce risks to research from systems' failures

Continued life safety and air quality issues from aged, non-compliant systems

Renovation activities disruptive to adjacent users

Space inefficiencies maintained

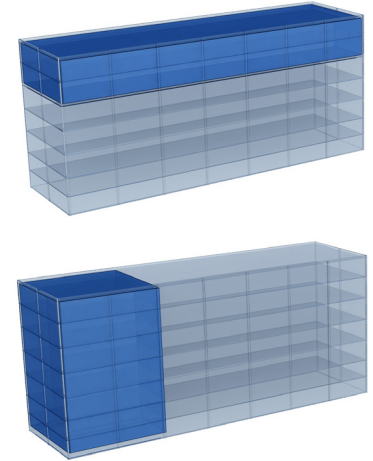
Deferred capital renewal; Higher long term operating costs

SECTIONAL

Full Renovation Multiple Phases -

Systems-driven phasing plan in horizontal or vertical building sections; Higher overall costs but lower single year costs; more disruptions to current occupants; minimum 33% SF target for efficient renovation

Capital Renewal Achieved



ADVANTAGES

- Opportunity to address building systems renewal and to reduce risks to research from systems' failures
- Opportunity to create modern, flexible and efficient research environment
- Opportunity to organize research to support academic strategic initiatives
- Moderate swing space required compared to traditional renovation model
- Phased capital renewal approach limits single-year capital costs

DISADVANTAGES

- Longest overall renovation period
- Higher overall capital costs than traditional, full renovation
- Temporary disruption to research with swing relocations
- Costs associated with swing space upgrades to accommodate ongoing research

SECTIONAL RENOVATION

Biological Sciences & Chemistry

FUNDING SUPPORT

MRR

- Currently direct $\approx$ 8% of our annual MRR allocation toward these two facilities
 - o Main portion of Bio-Sciences roof is presently being replaced at a cost of \$1M
- Five-year commitment to address additional deferred maintenance needs at Chemistry and Biological Sciences
- Create an Exterior Envelope/MEP/Regulatory Compliance Program that will capture 20% of our annual MRR A-Unit dollars
 - o \$2,200,000/yr based on historic data
 - o Additional \$11M investment over 5 years

SPECIAL MRR APPROPRIATION

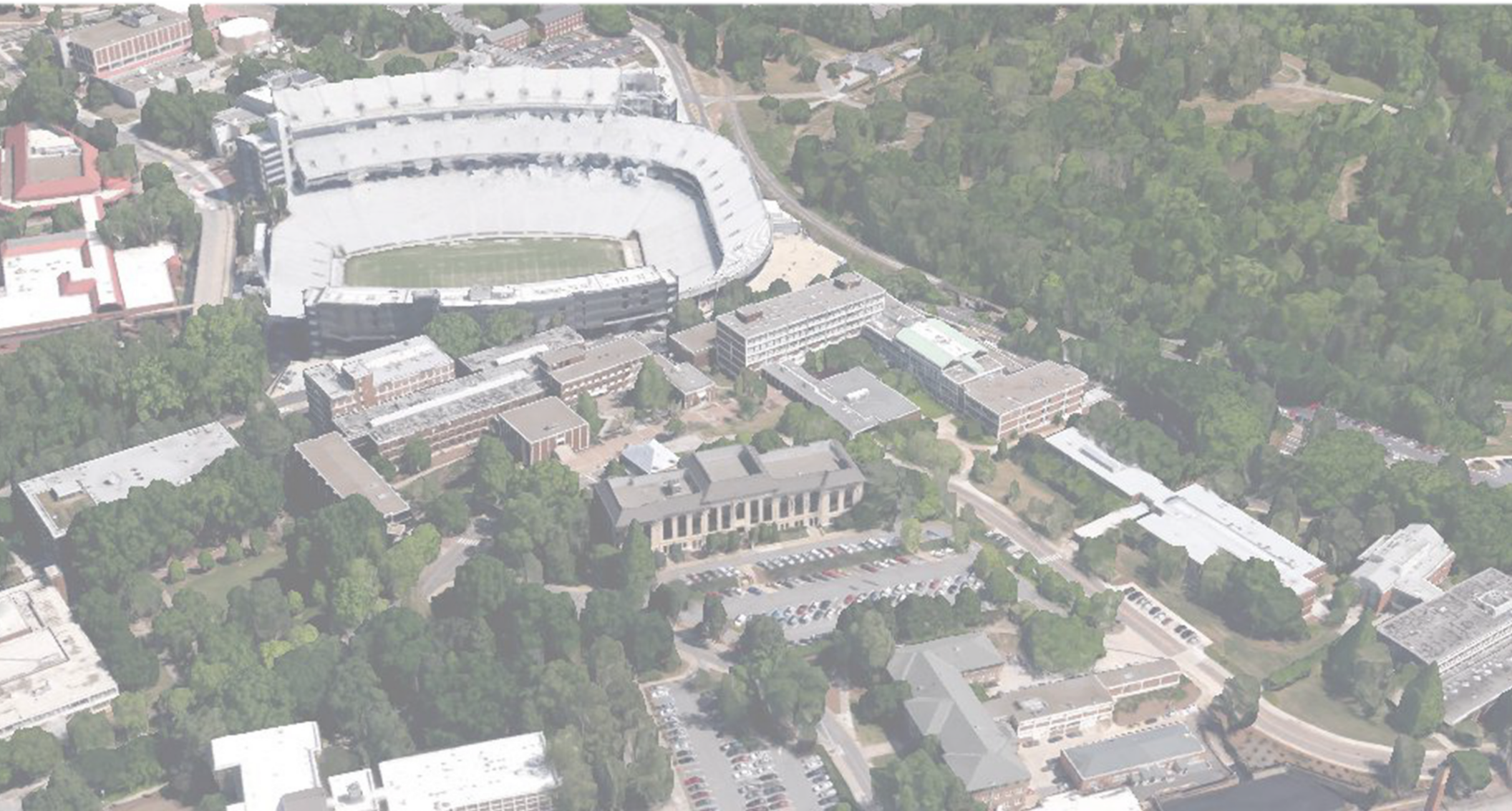
- CAES received separate MRR allocations in FY 2012 thru FY 2015 to help offset the backlog of deferred maintenance at their Experiment Stations and Cooperative Extensions
 - o \$20M over the four-year period
- CAES has made a similar request for one additional year of funding support in FY17

OTHER OPPORTUNITIES

- Energy Savings Dollars
 - o Georgia Energy Savings Performance Contracts (GESPC)
 - o Internal Opportunities
- Future Capital Outlay Requests
 - o Series of Small Capital Requests
 - o Supplemental Large Capital Request
- Internal Plant Funds

FUNDING OPPORTUNITIES

Biological Sciences & Chemistry



Biological Sciences & Chemistry:

QUESTIONS & COMMENTS?

