Modernization Planning & Energy Sciences Building

APS/Users Monthly Operations Meeting

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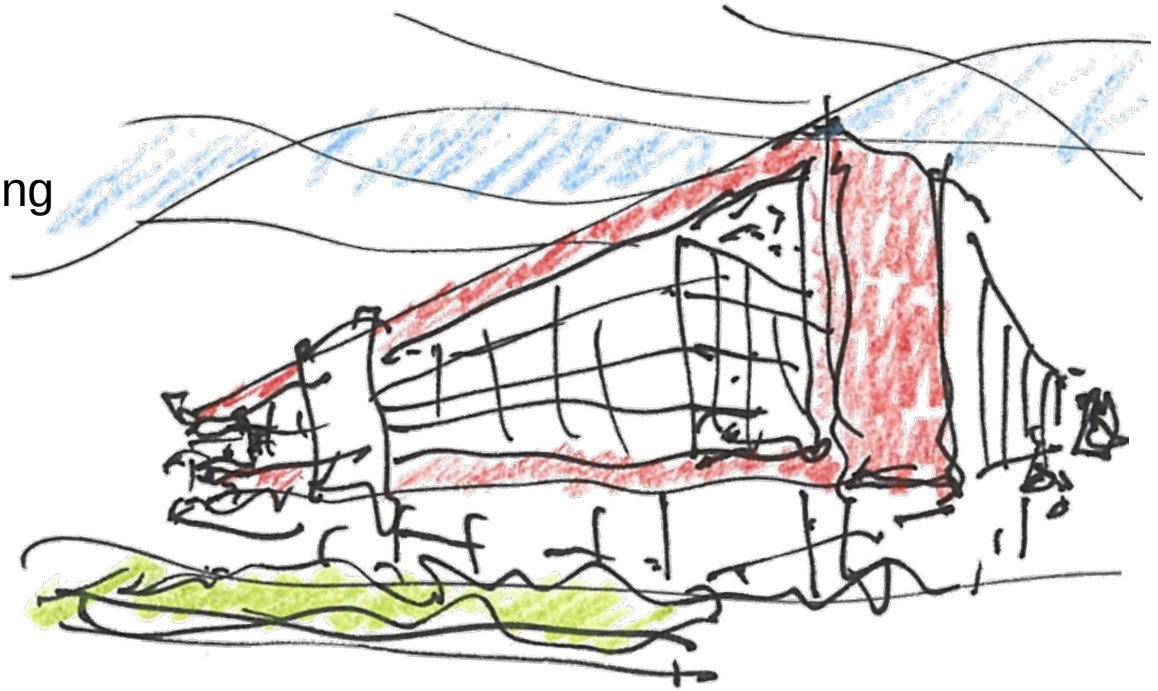
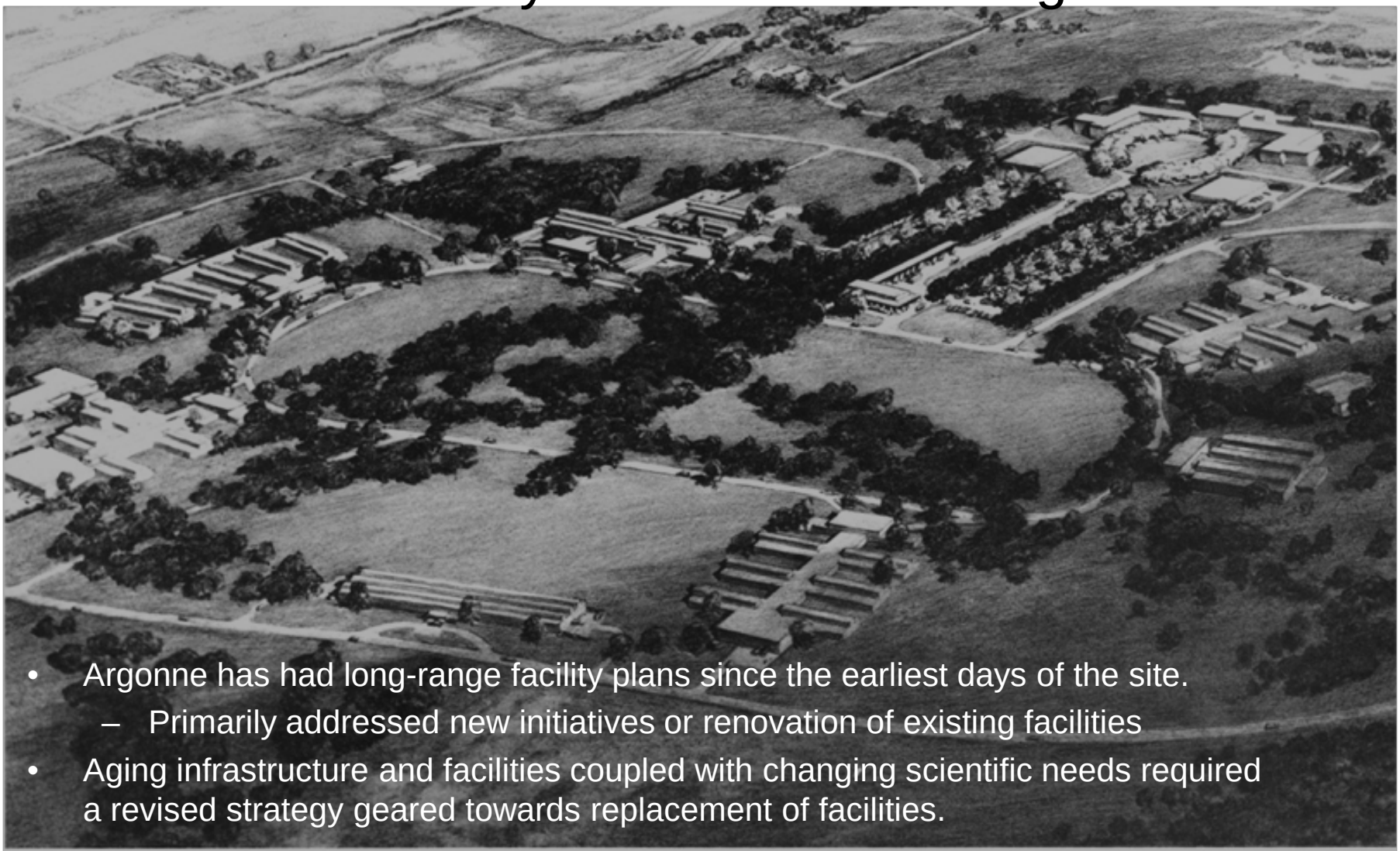
January 26, 2011

Outline

- Changing Focus for Modernization
- Modernization Program
- Modernization Guiding Principles
- Modernization Projects
- Energy Sciences Building



Laboratory Modernization Program



- Argonne has had long-range facility plans since the earliest days of the site.
  - Primarily addressed new initiatives or renovation of existing facilities
- Aging infrastructure and facilities coupled with changing scientific needs required a revised strategy geared towards replacement of facilities.

Artist's Rendering of Original ANL-East Site Development Plan – Prepared 1948

Changing Focus on Modernization of Laboratories

- *SLI Program* initiated to support development of replacement facilities
- FY 2007 GPP Support transitioned to *IGPP*
- Annual GPP of $5M increased to over $13M IGPP *laboratory investment* in 2010
- IGPP *threshold* increased to $10M

Laboratory Modernization Program

Modernization Program is a logical extension of the long range facility planning that has been in place since the beginning of the site – at the same time, it is designed to ensure that the Laboratory is fully Mission Ready to perform cutting edge 21st century science in support of the goals and missions of the Department of Energy.

Laboratory Modernization Program

- Initial Modernization Plan prepared in 2007
- Funding
  - *SLI Program* funds for replacement of existing facilities and infrastructure upgrades over 10+ years
  - *EM* component addresses demolition of outdated and legacy facilities
  - *ARRA, Omnibus* funding to address legacy issues
  - *Alternative* financing utilized where appropriate
- SLI Program and EM Program are crucial to continuation of Argonne's Modernization

Modernization Guiding Principles

- **Development Program**: Modernize existing and new facilities and infrastructure

- **Development Pattern**: Balance building heights, proximity, circulation and open-space

- **Visual Character**: Reflect leading-edge science while leveraging the abundance of our natural environment

- **Circulation, Parking, Accessibility**: Improve the movement of people, emergency vehicles, services and goods

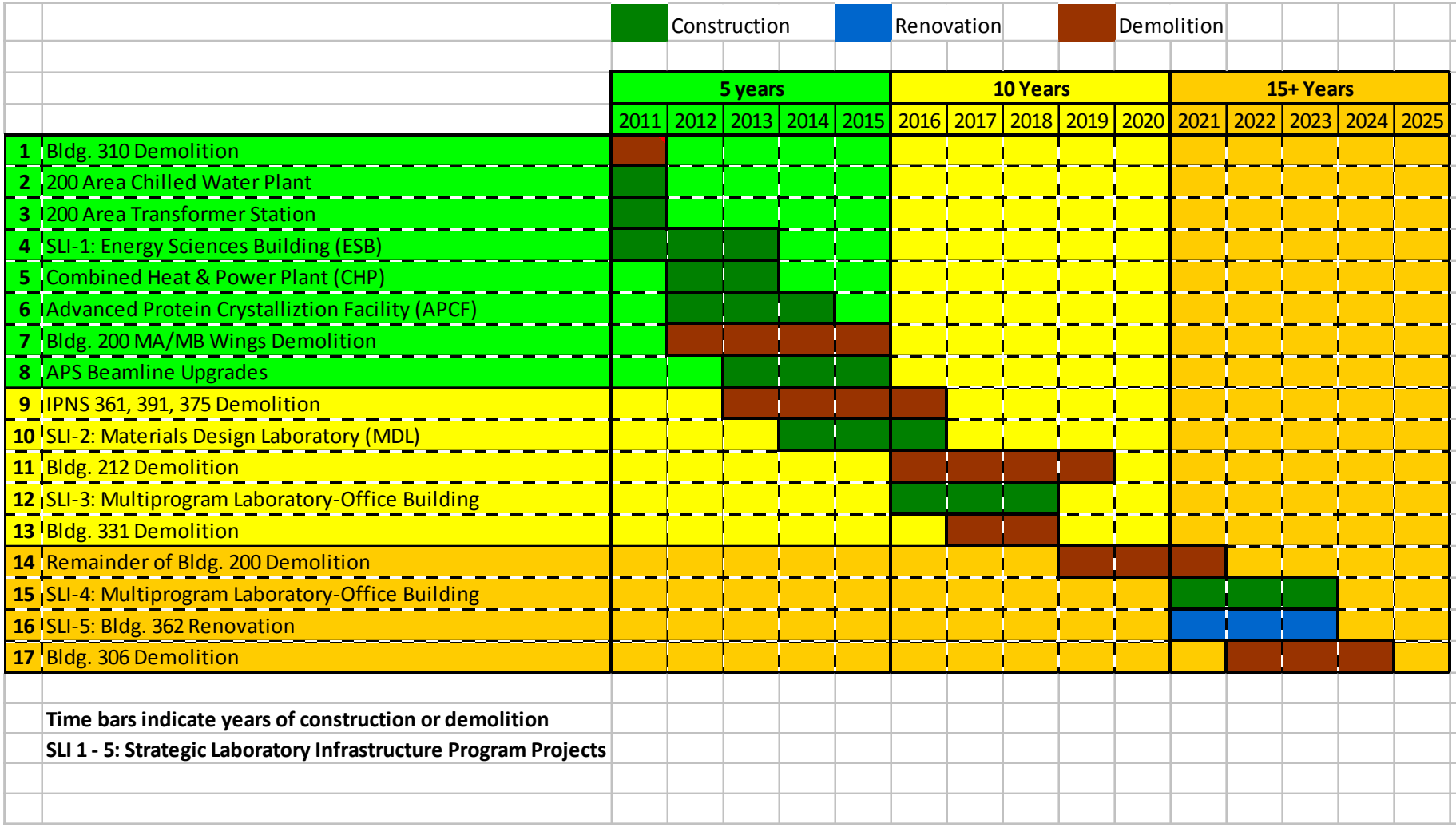
Modernization Guiding Principles (continued)

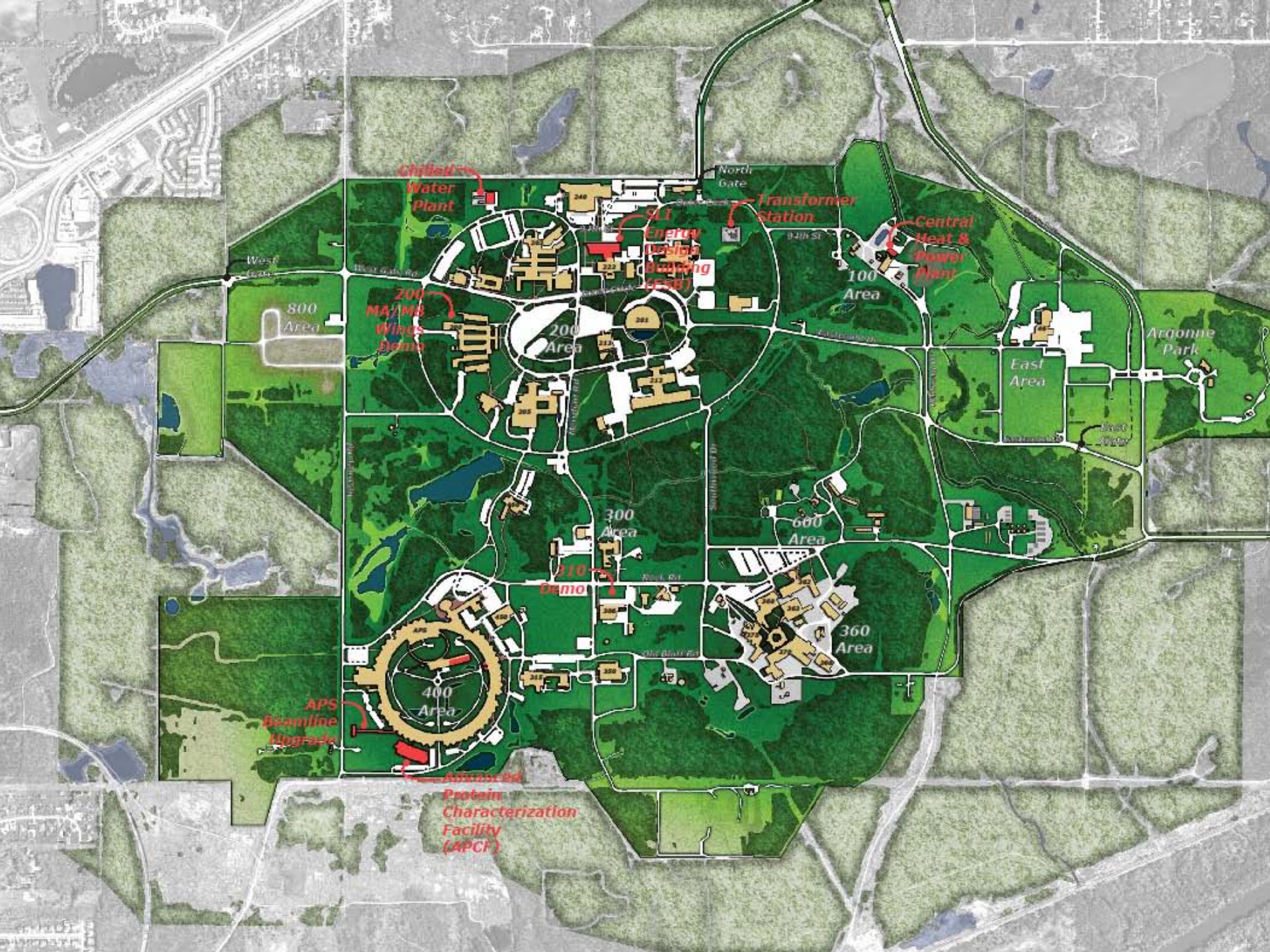
- **Environment and Sustainability**: Implement proactive policies to achieve energy-efficient and environmentally responsible development

- **Safety and Security**: Protect from hazards and risks

- **Infrastructure and Utility Systems**: Focus infrastructure modernization to support core capabilities

Known & Expected Site Development Projects




Chilled Water Plant
North Gate
Transformer Station
CLI Energy Design Building (ESB)
Central Heat & Power Plant
West Gate
800 Area
200 MA/MB Wings Demo
200 Area
100 Area
Argonne Park
East Area
300 Area
600 Area
210 Demo
360 Area
400 Area
APS Beamline Upgrade
Advanced Protein Characterization Facility (APCF)

ESB Project Scope – Key Performance Parameters

High Level Design Parameters

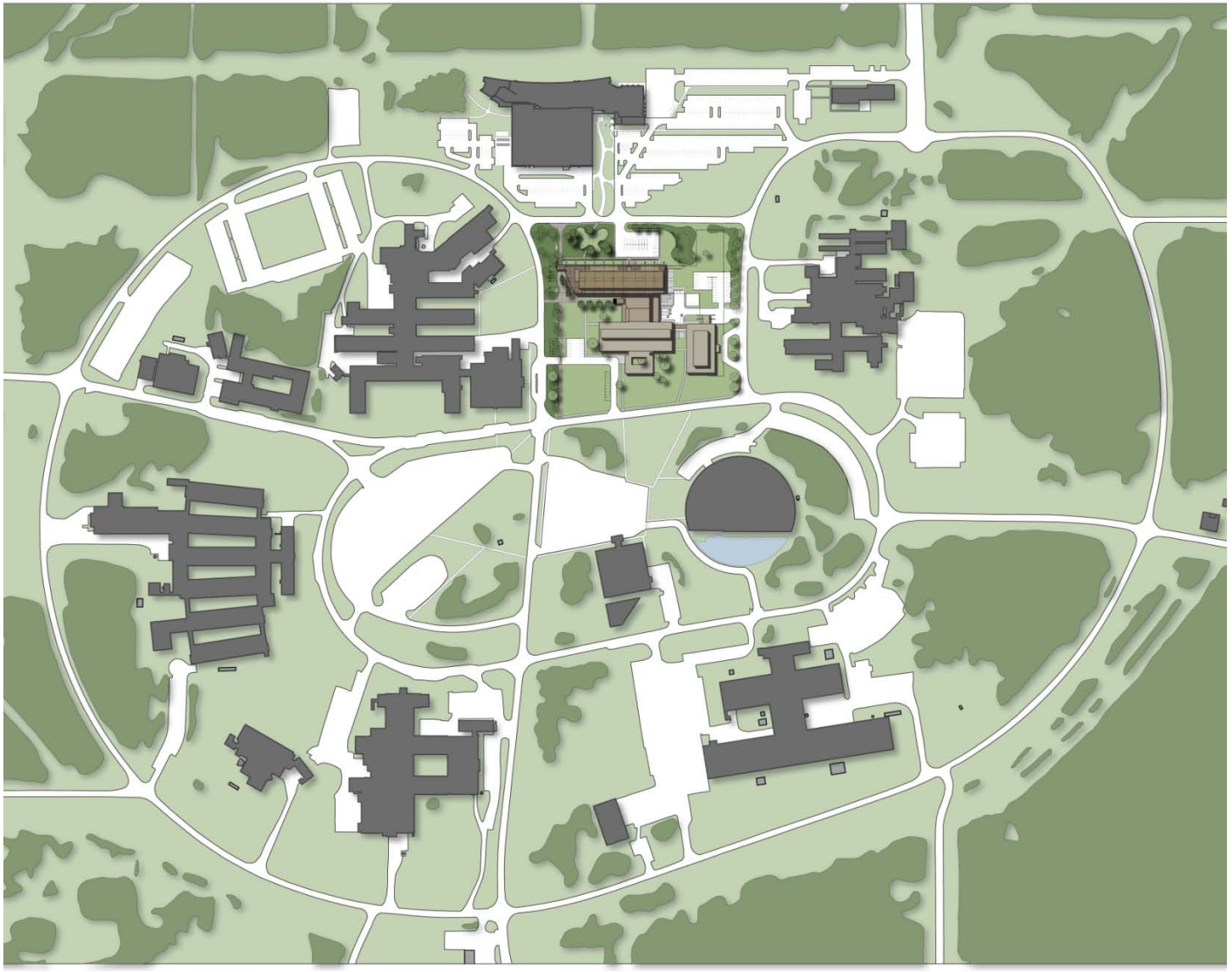
- ✓ Provide 125,000gsf to 165,000gsf multistory state of the art research building
- ✓ Mix of laboratory office and conference space
- ✓ LEED GOLD

- Program meets this with 144,745gsf

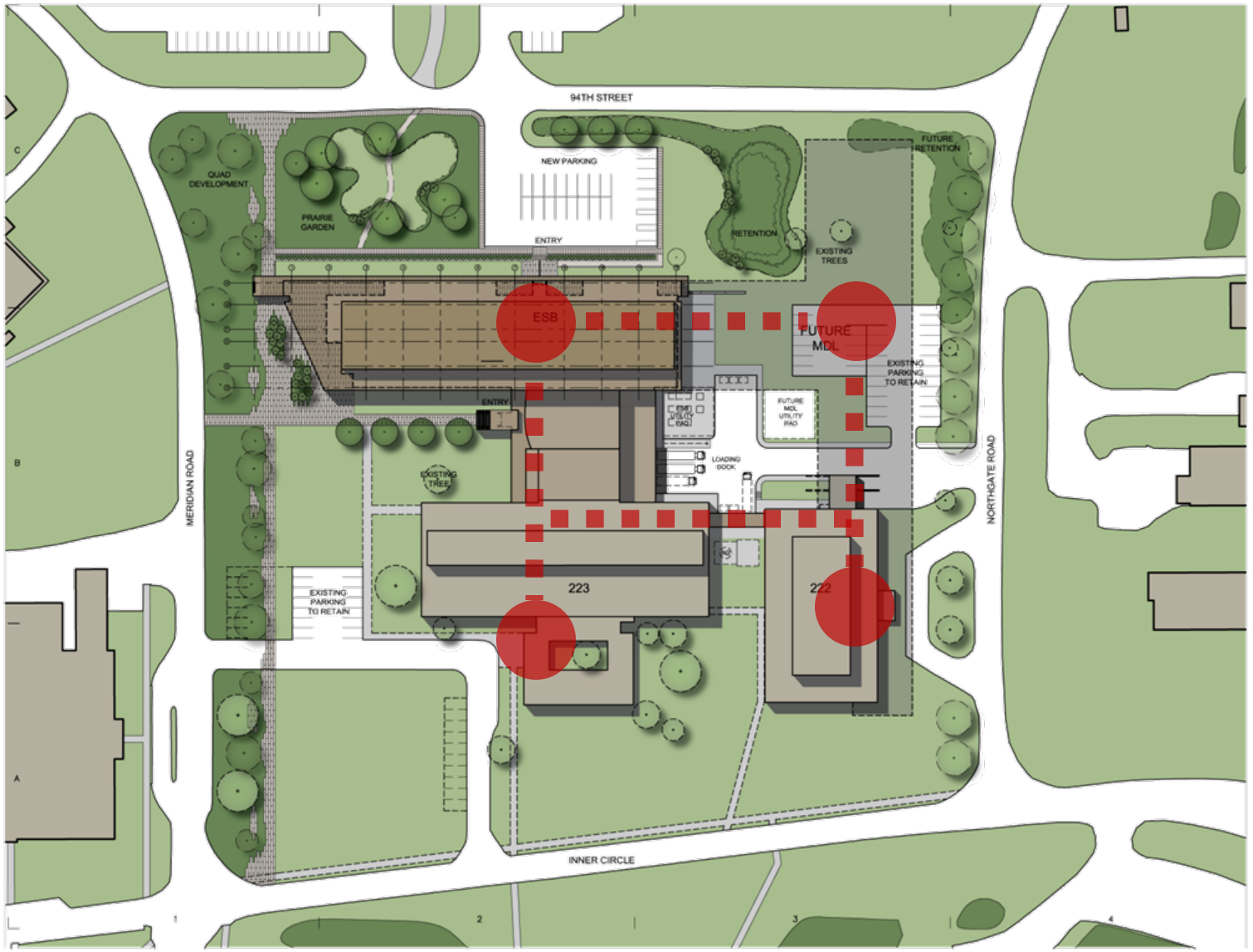
Energy Sciences Building Project Schedule

- Final Design Review — Jan 2011
- Final Design Complete — Feb 2010
- Critical Decision 3 Approval — May 2011
- Begin Construction — Jul 2011
- Construction Complete — Fall 2013 (FY2014)

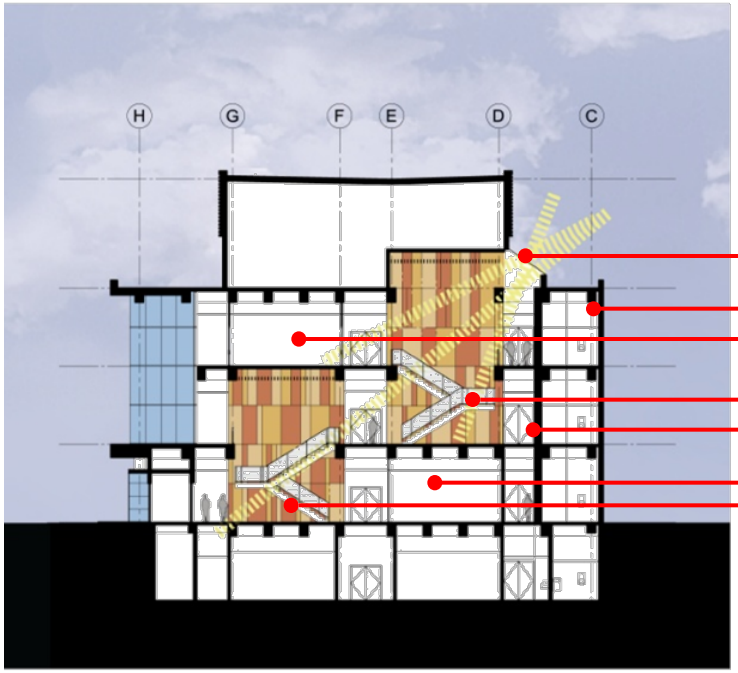
200 Area

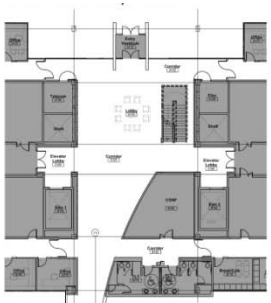


Unified Energy Quad

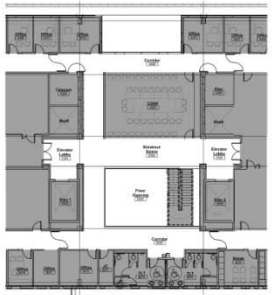


Collaboration

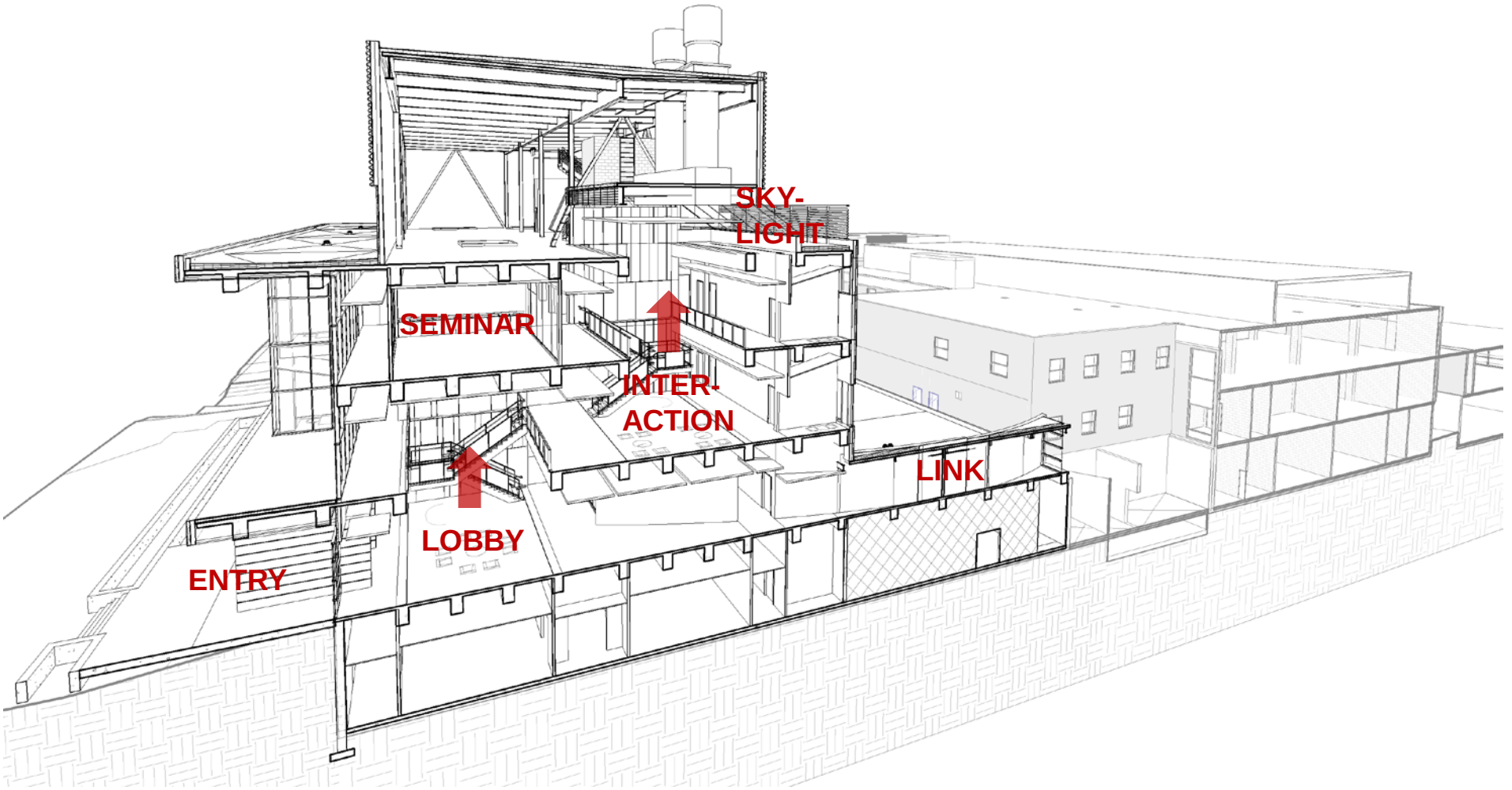



First Floor


Second Floor


Third Floor

Section - Lobby



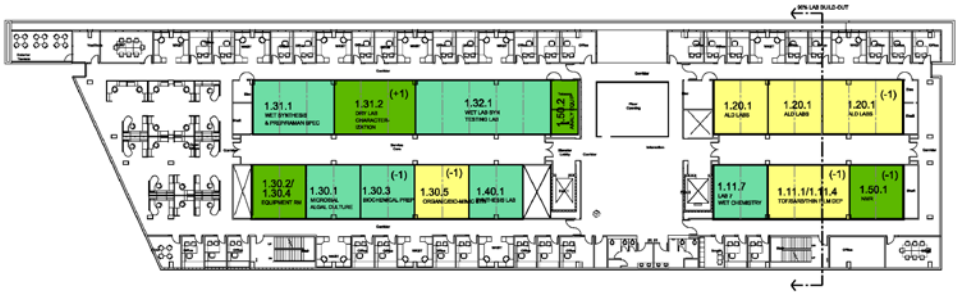
Centralized Service Court

Planning by Research Type

First floor

Third floor

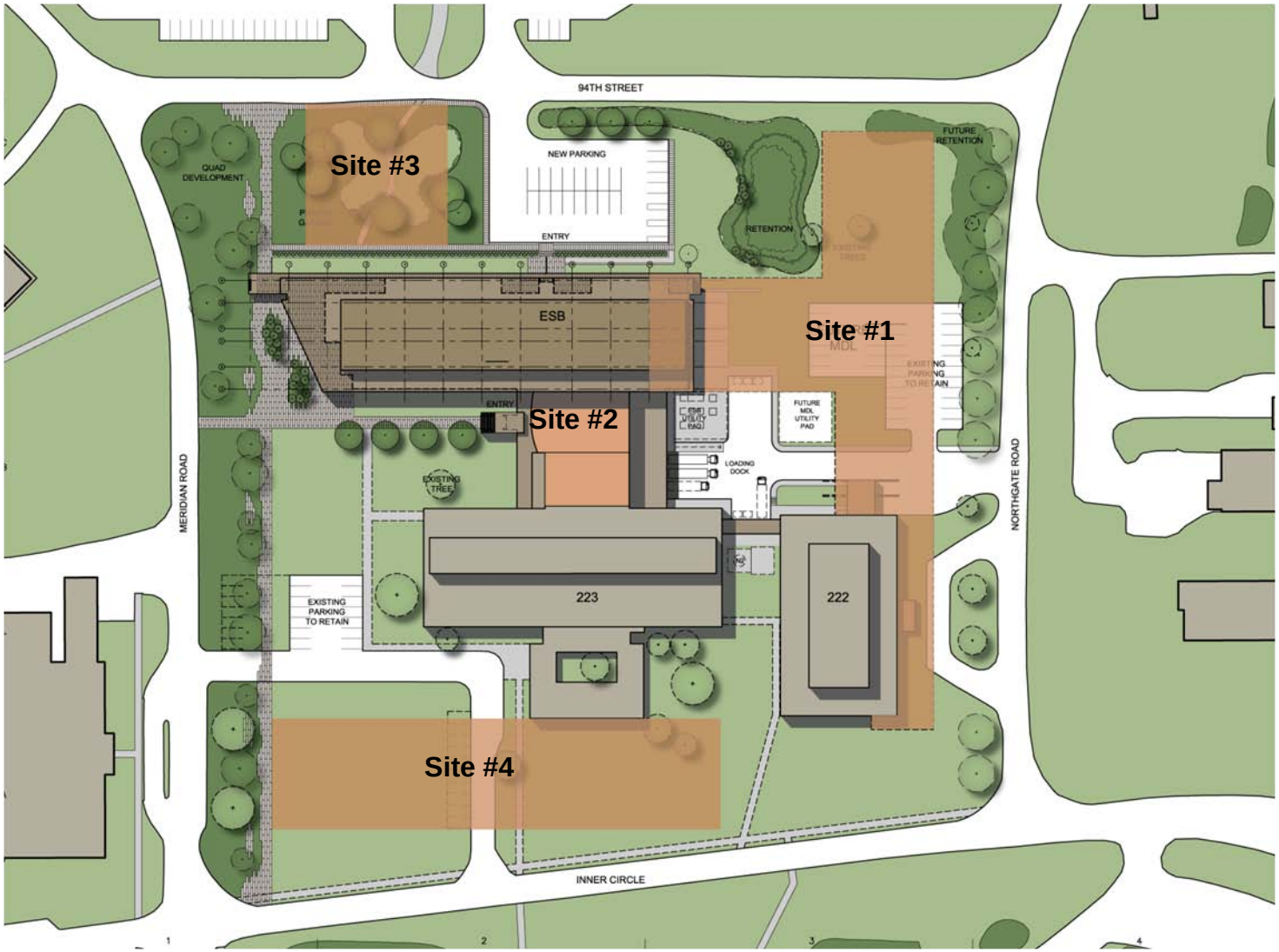
Ground floor



Second floor

- Wet Chemistry
- Instrumentation
- Synthesis
- Characterization
- Laser/Microscopy

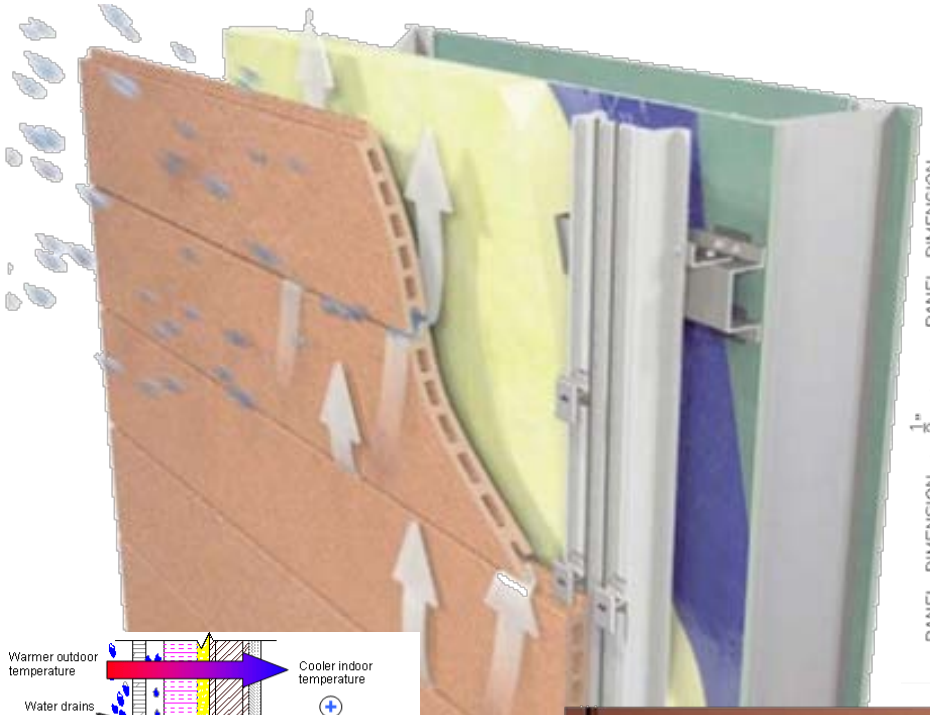
Expansion Strategy

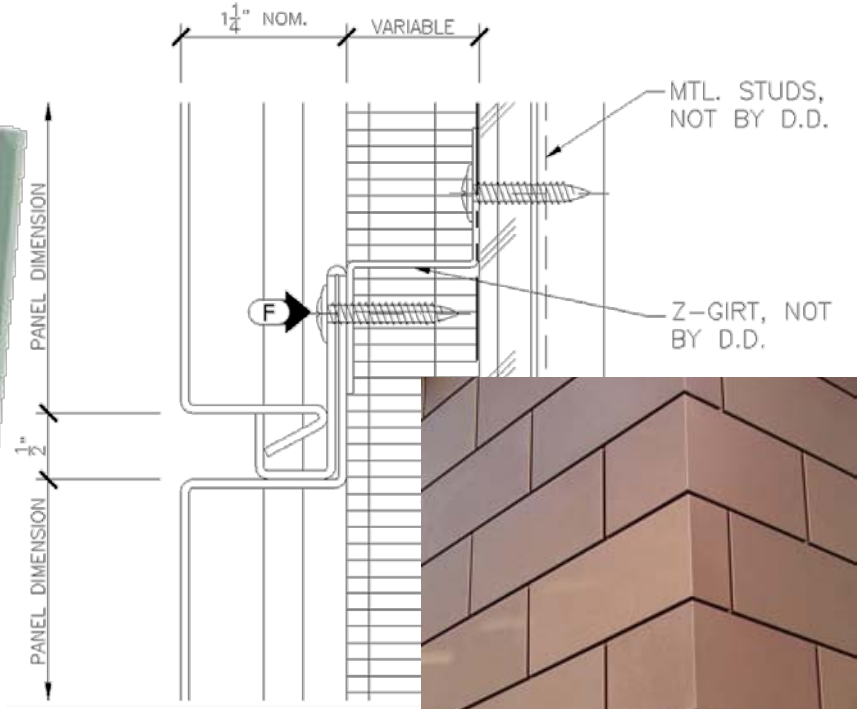


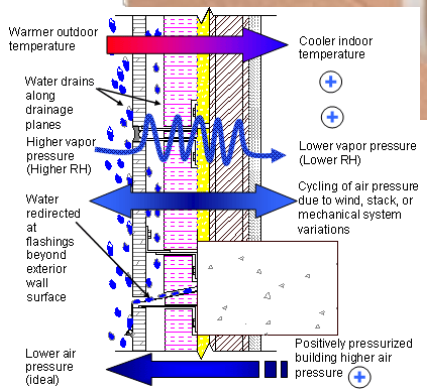
Arrival

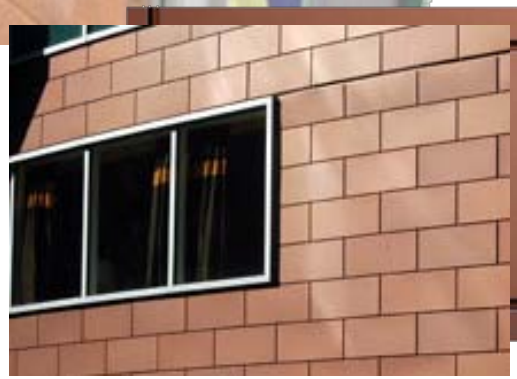
View from 200 Core Area

Rainscreen Facade

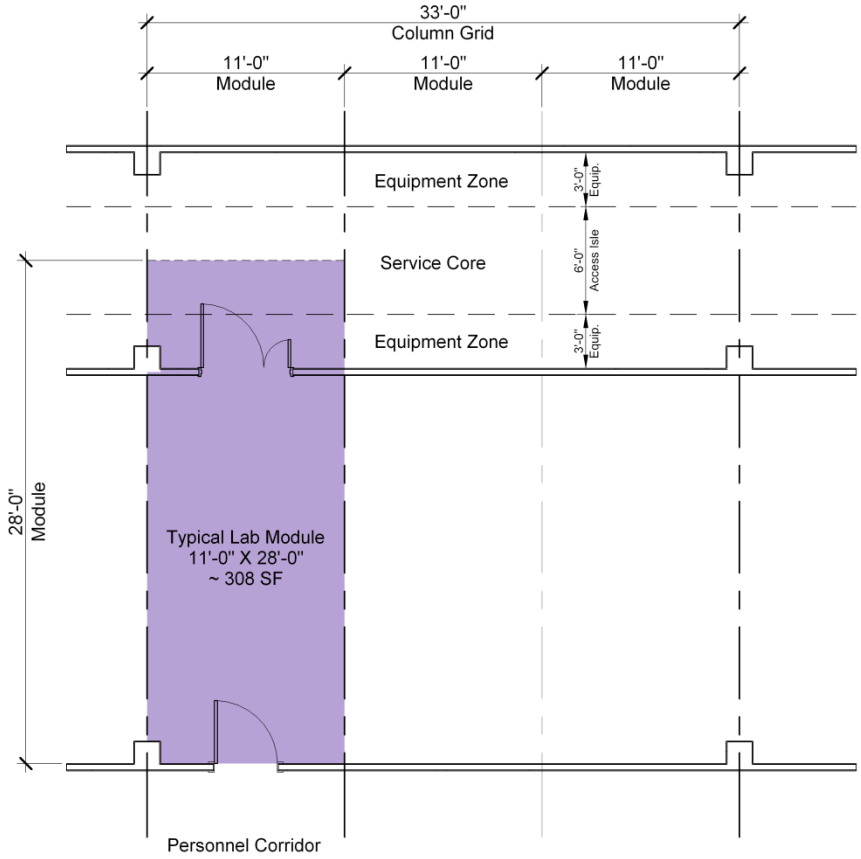


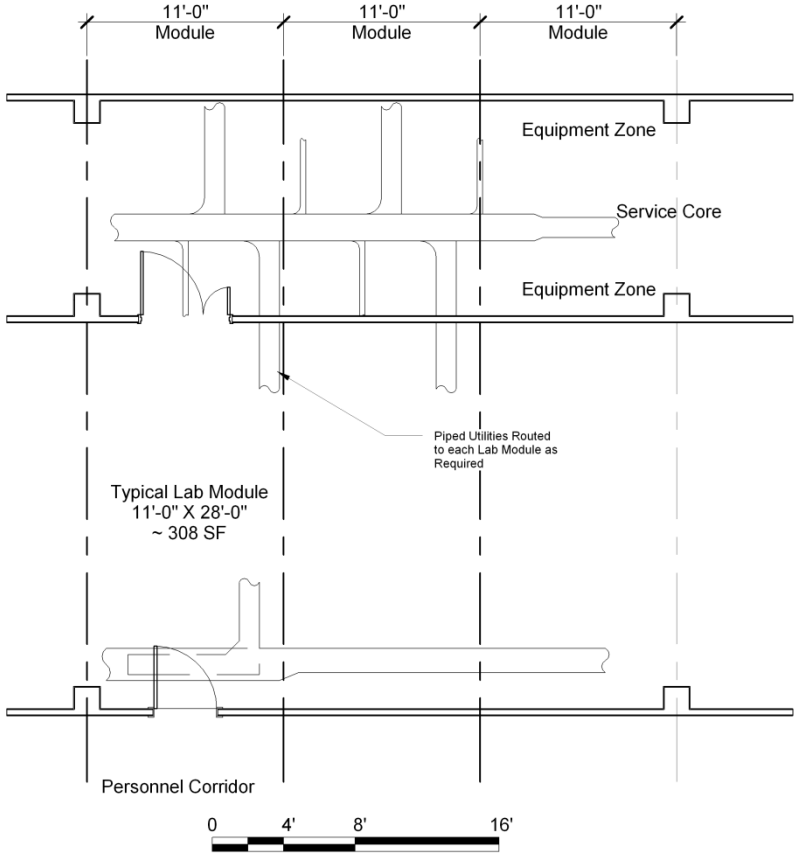




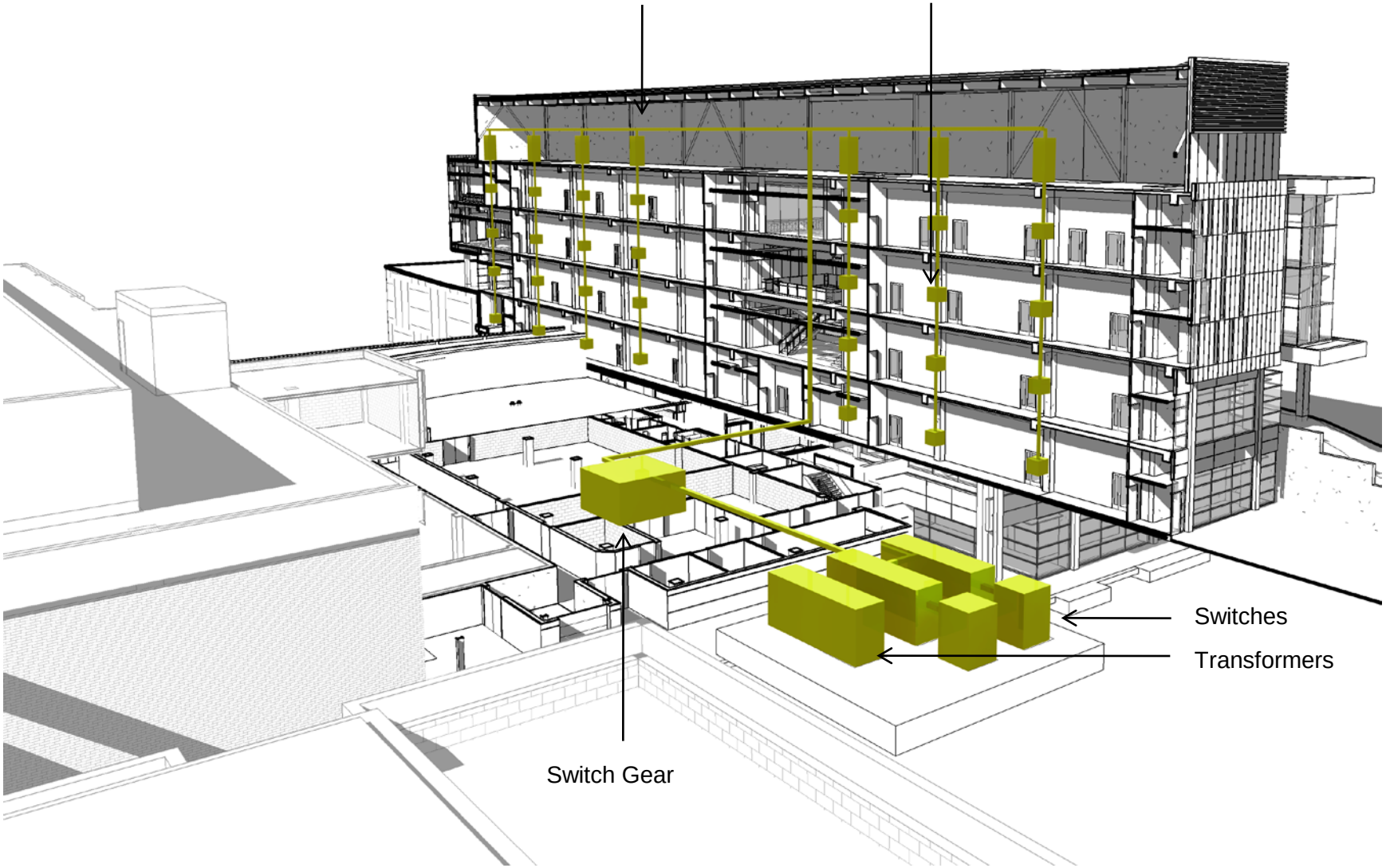


Lab Modularity Concept

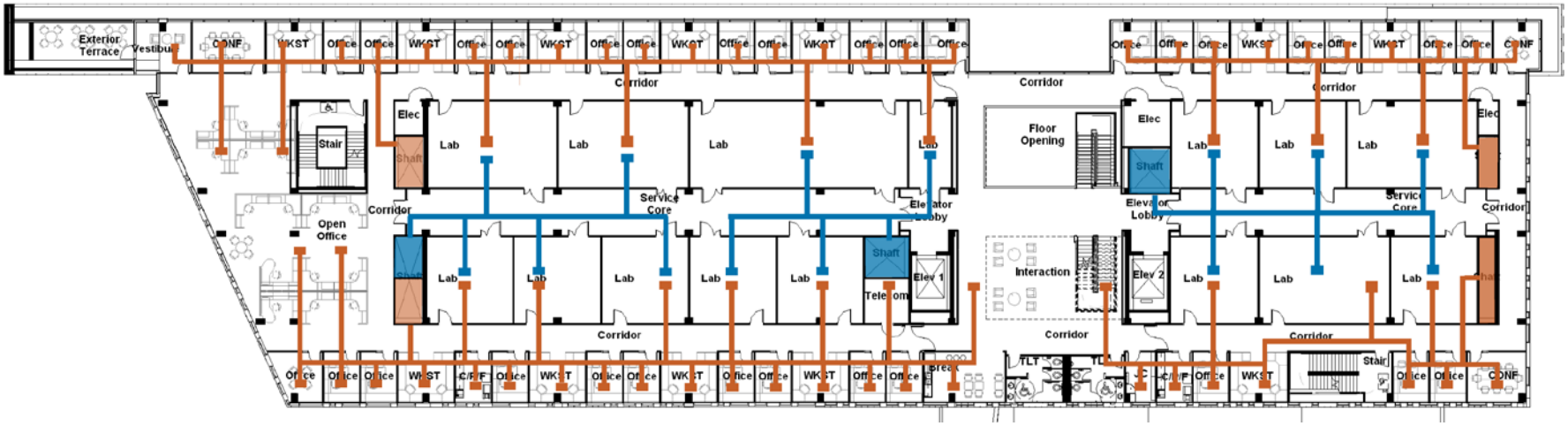




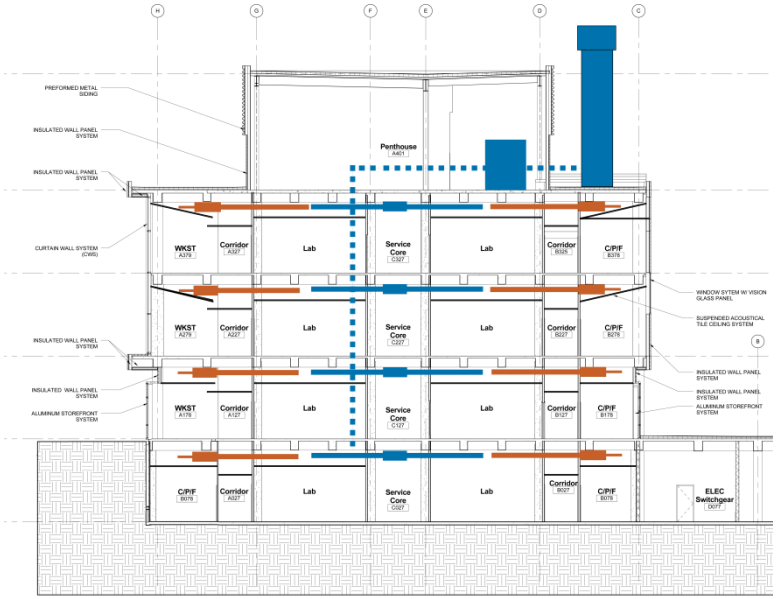
Electrical System Modularity



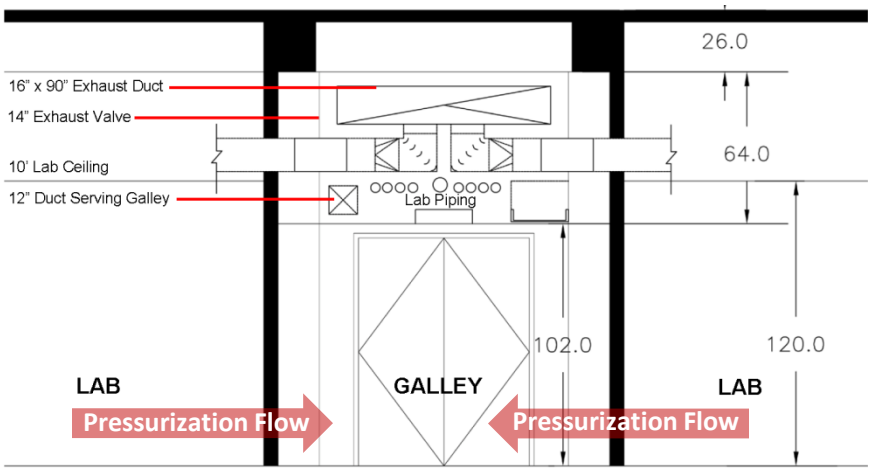
HVAC Distribution (plan concept)



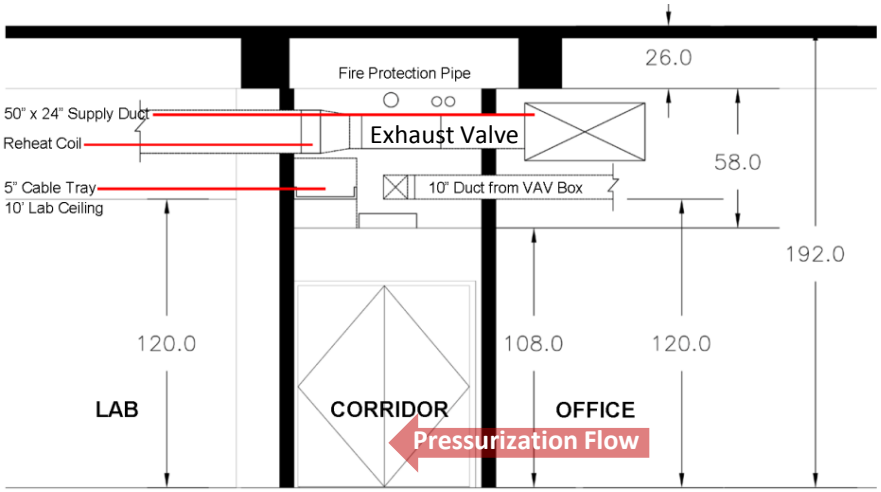
- Lab Office
- Lab Exhaust / Heat Recovery



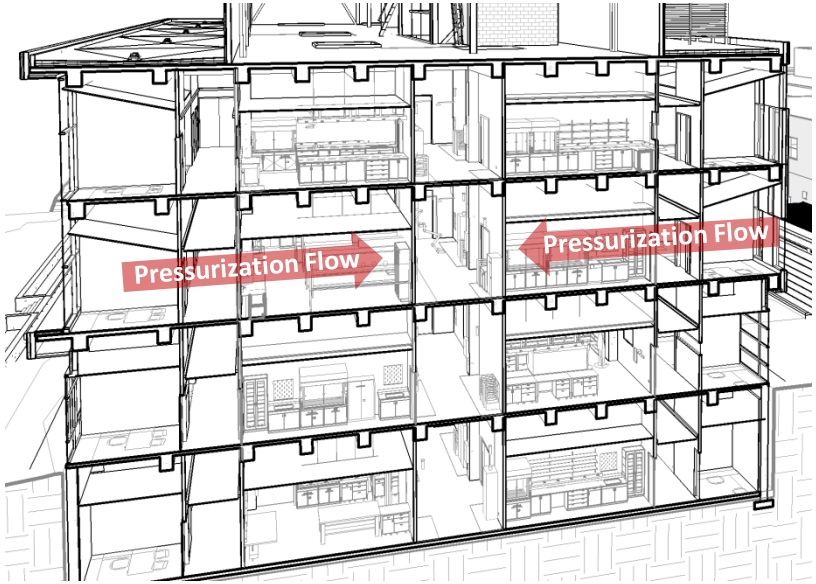
Sections at Public and Lab Corridors



Section at Lab Corridor

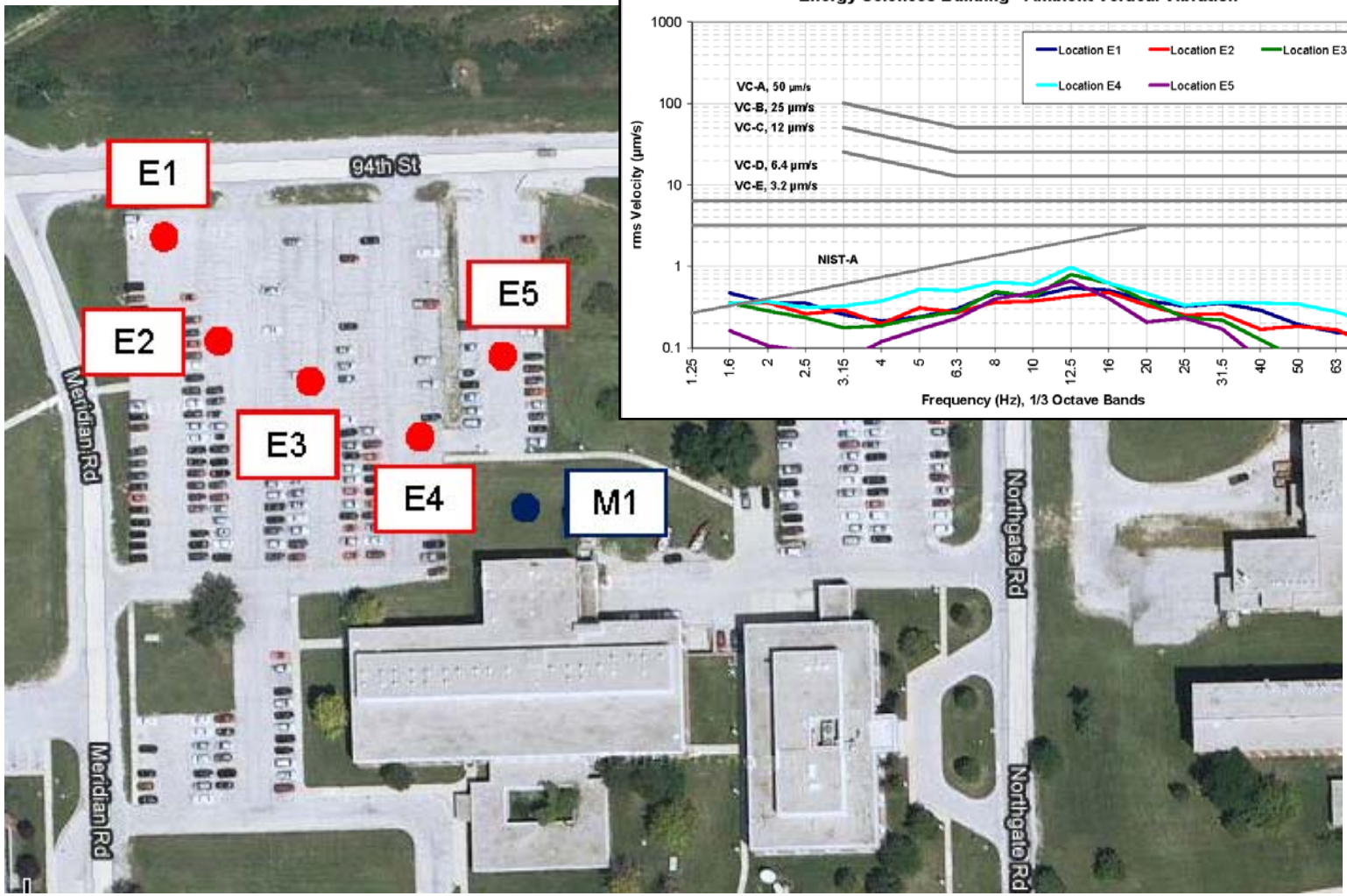


Section at Public Corridor



Section at Typical Lab Bay

Vibration Analysis



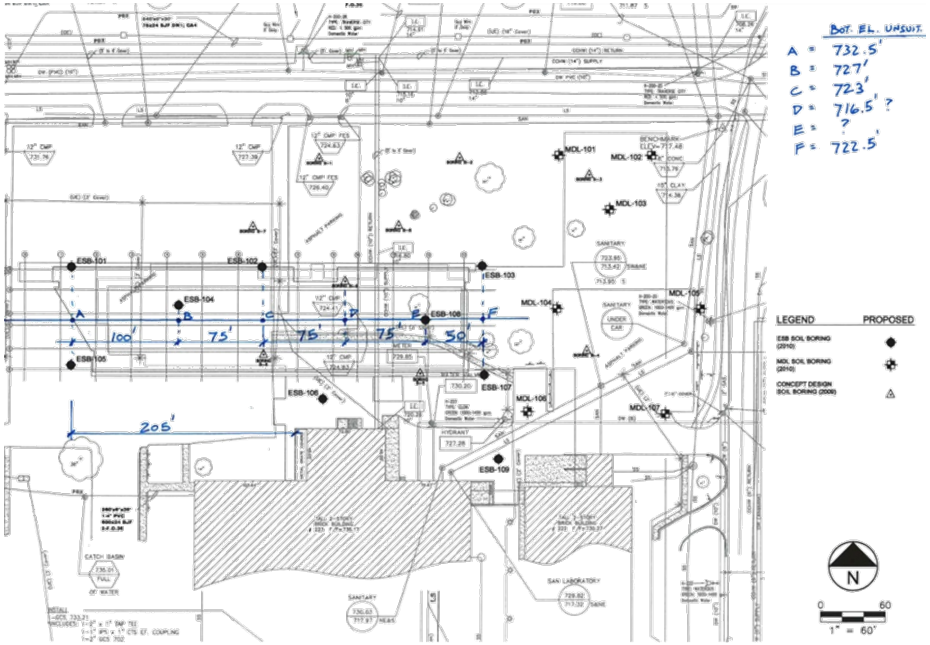
Soil Analysis

Summary of Unsuitable Soil From Geotechnical Report

Boring #	Grade Elevation	Depth of Unsuitable Soil	Bottom Elevation of Unsuitable Soil	Comments
B1	727.5′	5 ft	722.5′	Boring to 10 ft
B2	723′	2.5 ft	721.5′	Boring to 10 ft
B3	717′	8 ft	**709′**	Boring to 10 ft
B4	723.5′	2.5 ft	721′	Boring to 10 ft
B5	728′	1 ft	727′	Boring to 30 ft
B6	730′	7.5 ft	**722.5′**	Boring to 30 ft
B7	729.5′	10 ft	**719.5′**	Boring to 30 ft
B8	725.5′	10 ft	**715.5′**	Boring to 30 ft
B9	726.5′	10 ft	**716.5′**	Boring to 50 ft
ESB-101	735′	2.5 ft	**732.5′**	Boring to 40 ft
ESB-102	729′	5 ft	**724′**	Boring to 40 ft
ESB-103	723.5′	5 ft	**718.5′**	Boring to 40 ft
ESB-104	732′	5 ft	**727′**	Boring to 25 ft
ESB-105	735′	2.5 ft	**732.5′**	Boring to 40 ft
ESB-106	729′	1.5 ft	**727.5′**	Boring to 25 ft
ESB-107	728′	1.5 ft	**726.5′**	Boring to 40 ft
MDL-106	728′	5 ft	**723′**	Boring to 25 ft
MDL-107	723′	2.5 ft	**720.5′**	Boring to 40 ft

Note:

1. Groundwater elevation at approximately 711′ to 714′.

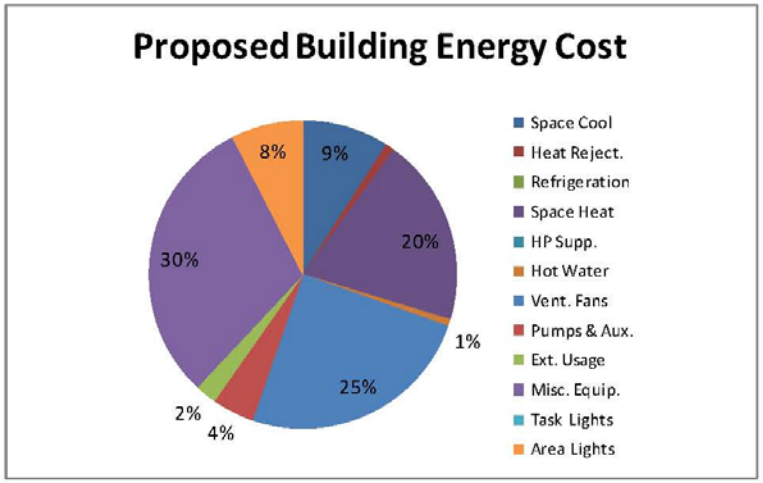


LEED Gold Analysis

Yes	?	No		
10	2	2	Sustainable Sites	14 Points
4	0	1	Water Efficiency	5 Points
6	2	5	Materials & Resources	13 Points
10	4	1	Indoor Environmental Quality	15 Points
5	0	0	Innovation & Design Process	5 Points
42	11	16	LEED Project Totals (pre-certification estimates)	69 Points

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

Energy Model



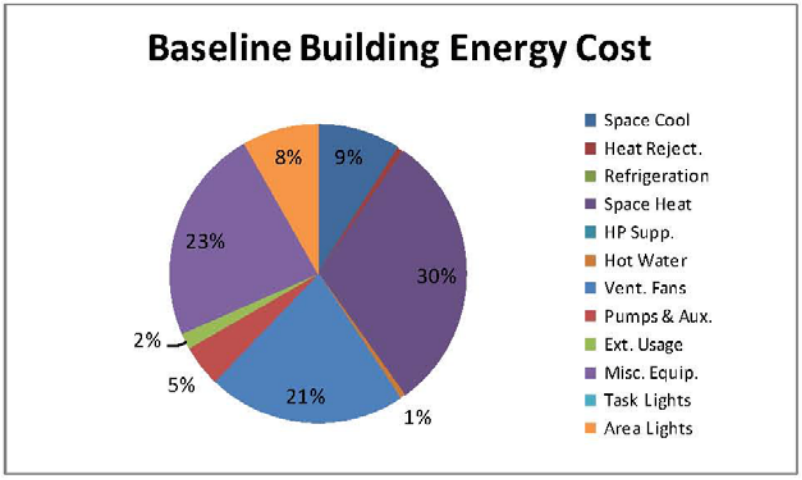


Table 1 Energy Consumption and Cost Summary

Energy Use	Annual Energy Consumption		Annual Energy Cost ($)	
	ASHRAE	Proposed	ASHRAE	Proposed
Electricity, kWh	4,279,100	3,565,200	$385,119	$322,651
Natural Gas, therms	298,970	186,690	$173,403	$108,280
Hot Water, therms	0	0	$0	$0
Chilled Water, MMBtu	0	0	$0	$0
Total (MMBtu or $)	44,501	30,837	$558,522	$430,931
Total Regulated (MMBtu or $)	39,551	25,886	$427,242	$299,652
Savings (MMBtu or $)	Baseline	13,665	Baseline	$127,591
Regulated Energy Savings (%)	Baseline	34.5%		
Total Energy Cost Savings (%)			Baseline	22.8%

* Energy Model Calculations shown are based on design scheme prior to area reductions and mechanical system revisions.

Questions