Repositioning Your Building:
Office to Laboratory

Charles Kensky, PE, LEED AP BD+C - Executive Vice President
Scott Davis, PE, LEED AP BD+C, Vice President
Steven Anastasio, PE, SE Director of Structures

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Course Description

With an increase in demand for lab ready spaces, developers and asset managers are looking to reposition their properties to accommodate life science end user requirements. There are several factors that need to be considered when evaluating if an existing building can accommodate life science requirements. These range from the layout of the building and its core, the structure of the building and of course the infrastructure systems that support the building use. The requirements for lab space vastly differ from traditional office space. Certain assets may be better positioned than others for conversion to lab ready use based on existing infrastructure, property agencies and construction type. In this presentation we will discuss how to evaluate current assets to determine if they have the potential for lab conversion and the various MEP/FP and structural systems that will need to be adjusted or supplemented to accommodate future life science requirements.

Learning Objectives

- Participants will learn the building and infrastructure considerations when evaluating an asset for lab conversion.
- Participants will learn about trends in the life science marketplace that have a direct effect on planning for future life science clients.
- Participants will learn the infrastructure requirements for lab spaces and how they differ from common existing office space infrastructure.
- Participants will learn the architectural and structural implications of converting a space for lab ready use.

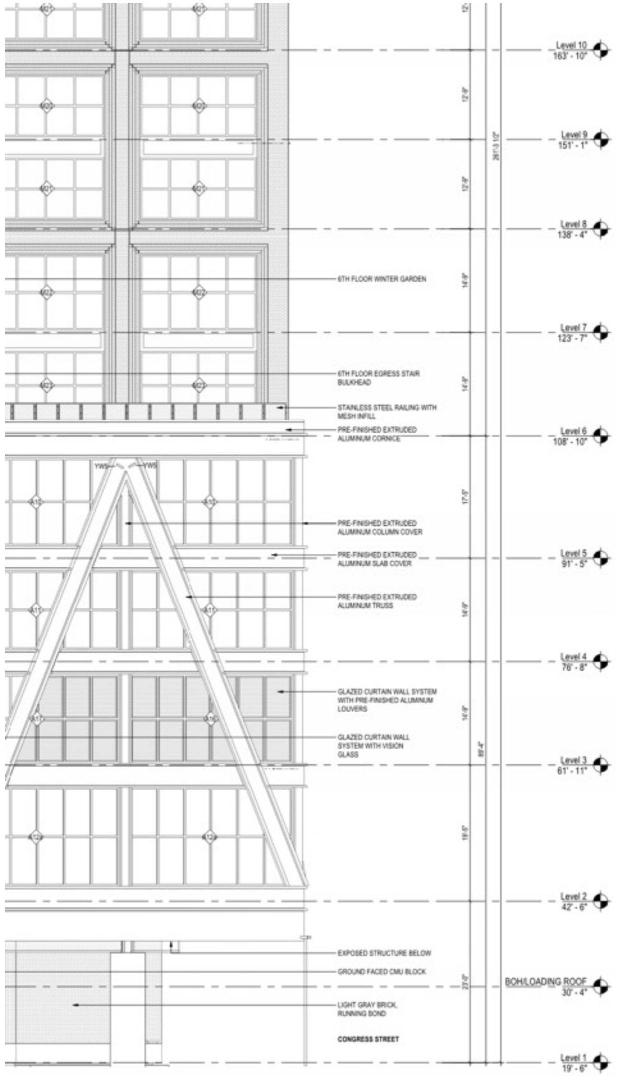
Agenda

- Building Evaluation
- Metrics
- Planning
- Case Studies
- Lessons Learned

Building Evaluation

1. Can my building accommodate lab space?
    - Location
    - High Rise vs Low Rise
    - Property Adjacencies
    - Construction Type

2. Due Diligence
    - Utilities
        - Power
        - Water
        - Sewer
        - Gas
    - Windwake
    - Acoustics
    - Equipment Space and Pathways
    - Structural Framing
    - Floor to Floor Heights
    - Deliveries – Roadways/Loading Dock/Freight



Structural – Construction Types

Construction Type	Era	Infrastructure Support Grade	Vibration Support Grade	Notes
Timber	1880 - 1920	D	D	Water Damage Prevalent/Poor Dunnage Options
Riveted Steel/Cast in Place Concrete	1850 - 1940	A	B	
Terra Cotta	1900 - 1930	C	A	Difficult to modify
Open Web Joists	1960 -	C	F	Light and economical
Waffle Slab	1970 - 1990	D	A	Difficult to modify
Conventional Steel	1950 -	A	B	

Metrics

Category	Office	Lab	Comments
Outside Air / Exhaust	0.10 – 0.15 cfm/sf	1.25 – 2.0 cfm/sf	Geographic Differences
Normal Power	6 W/sf	15 W/sf	For Equipment/Receptacles/Lights
Standby Power	0 W/sf	5 W/sf (Lab Space)	
Fire Protection	Light Hazard	Ordinary Hazard	
Supplemental Shaft Space		6 – 8 sf/floor	
Floor to Floor Height	12’-6”	14’-6”	
Floor Live Loading (Code)	50 PSF	60 PSF	Recommend 100 PSF
Vibration (mips)	16,000	125 (VC-B) to 2000 (VC-A)	Velocity Tolerance MIPS = micro-inch/second

Metrics – cont'd

Category	Clean Space	Vivarium	Comments
Outside Air / Exhaust	1.25 – 2.0 cfm/sf	1.25 – 2.5 cfm/sf	Use of ventilated racks will lower required airflow in vivariums
Normal Power	15 W/sf	15-30 W/sf	For Equipment/Receptacles/Lights
Standby Power	10-15 W/sf	10-20 W/sf	For clean and vivarium spaces, full standby power is ideal, but alternate load shedding is possible
Fire Protection	Ordinary Hazard	Ordinary Hazard	
Supplemental Shaft Space	6 – 8 sf/floor	6 – 8 sf/floor	Shaft space grows to 3x for clean spaces if suite AHUs are located on different floors
Floor to Floor Height	16'-0"	14'-6"	For clean spaces, lower floor to floor possible when floor above utilized as mezzanine space
Floor Live Loading (Code)	60 PSF	60 PSF	Recommend 100 PSF
Vibration (mips)	125 (VC-B) to 2000 (VC-A)	125 (VC-B) to 2000 (VC-A)	Velocity Tolerance MIPS = micro-inch/second

Planning

What Type of Tenants Do I Want to Plan Floor?

- Type of Lab
- Incubator / Hoteling
- Spec
- Anchor
- Specialty Spaces (e.g., Vivarium, Clean Rooms)
- Chemical Storage

How Much Infrastructure Do I Want to Provide?

Minimal
- Utilities
- Equipment Space
- Shaft Space
- Louver and Roof Space

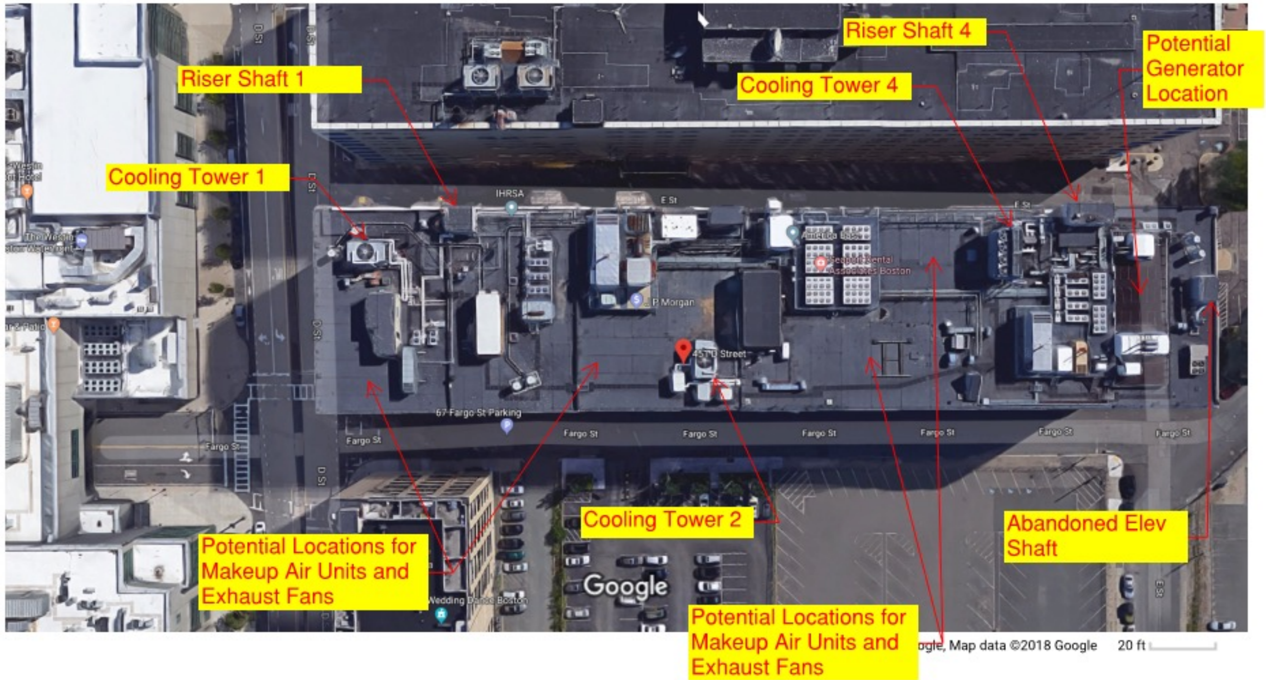
Additional
- Makeup Air / Exhaust
- Standby Power

Enhanced
- Vacuum
- Compressed Air
- Purified Water
- pH Neutralization

Planning cont.

How Much of the Building Do I Want to Covert?

- Cost
- Other Uses
- Control Areas



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CASE STUDY

451 D Street
Boston, MA

Building

- 477,000 RSF
- 9 Stories + Basement
- Entire City Block

Services

- Power
- High Pressure Gas Service
- Multiple Telecom. Service Provider Entrances

Architecture

- Multiple Large Shaftways
- 12’-7” Floor to Floor
- Historic Building

Case Study – 451 D Street, Boston, MA

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Plan

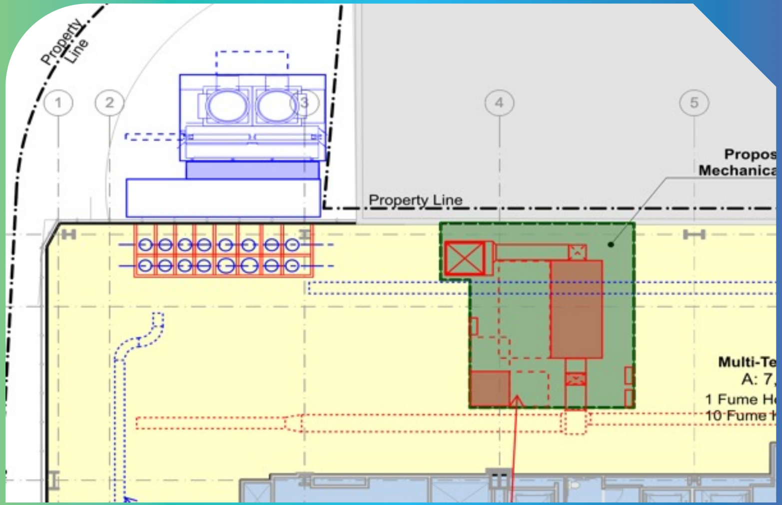
- Convert 150,000 RSF to support Lab Space
- Spaces were spread throughout most of the 9 Floors
- Create Central Chemical Storage Space

Provisions

- Office / Lab Space – 50% Office / 50% Lab
- Makeup Air and Lab Exhaust – 1.5 cfm/sf
- Normal Power – 6 W/sf (Office) / 12 W/sf (Lab)
- Standby Power – 5 W/sf (Lab)
- Two pH Neutralization Rooms

CASE STUDY

High Rise Office Tower



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Building

- 730,000 RSF
- 29 Stories

Services

- Power:
  - Sufficient normal power
  - Standby power was evaluated in multiple avenues
- High Pressure Gas Service
- Multiple Telecom. Service Provider Entrances

Architecture

- New shaftways were required to be created
- 13’-0” Floor to Floor with deep girders

Case Study – Highrise Office Tower

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Plan

- Convert 120,000 RSF to support Lab Space
- Spaces were spread over 8 Floors
- Provide:
    - Makeup Air and Lab Exhaust
    - Standby Power
    - Shaft space for Vertical Piping, Conduit, Supplemental Ductwork

Provisions

- Office / Lab Space – 50% Office / 50% Lab
- Makeup Air and Lab Exhaust – 1.0 cfm/sf
- Normal Power – 20 W/sf
- Standby Power – 5 W/sf through evaluation of upgrading the existing generator or providing new
- Centralized Lab Waste Neutralization system

CASE STUDY

180 3rd Avenue
Waltham, MA

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Building

- 6 Floor Lab/Office Fit Out
- 233,000 RSF
- Client: Boston Properties
- Architect: Stantec

Provisions

- 50% Office / 50% Lab
- Normal Power – 7 W/sf (Office) / 15W/sf (Lab)
- Two pH Neutralization Rooms
- High Rise Classification
- Custom Evaporative Cooled Rooftop Units

Lessons Learned

Planning:

- Help the client understand the market
- Establish criteria
- Consider flexible/modular strategies
- Verify redundancy
- Create a Clear Basis of Design
- Revisit the BOD at every phase
- Flexibility, Flexibility, Flexibility
- Understand the base building structure

Implementation:

- Include Trade Subcontractors in addition to a CM
  - Consideration for how to get material and equipment into and on top of the building

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This concludes The American Institute of Architects Continuing Education Systems Course

Scott M. Davis, PE
Vice President
smd@bala.com

Charles B. Kensky, PE, LEED AP BD+C
Executive Vice President
cbk@bala.com

Steven M. Anastasio, PE
Director of Structures
sma@bala.com

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