

## Planning Guidelines for Lehigh University Research Laboratories

January 13, 2020

9/30/2020 REVISION #1

### **Introduction:**

The purpose of these guidelines is to help the Lehigh community recruit and retain productive researchers in the science, engineering, and college of health fields. This document is meant as a guide to help academic departments provide the most relevant information to the Offices of Planning, Design and Construction, and Environmental Health & Safety, for lab development on campus.

The planning time and cost for each laboratory project depends on many variables that include, but are not restricted to the following:

- The removal of any pre-existing hazardous materials.
- Hazards associated with the type of work to be conducted.
- The scale of the lab and proposed operation.
- The complexity of the equipment used in the proposed research.

This in turn determines which codes, regulations, and agencies are pertinent to any renovation. The most commonly applied codes and regulations are:

- The International Building Code (IBC), required of all construction by the City of Bethlehem and needed for permits and occupancy.
- National Fire Safety Code (NFPA) and International Building Code which determine incendiary protective devices such as sprinklers, ventilation, explosion proof refrigerators, and flammable cabinets, etc.
- Lehigh's insurance companies also help determine any additional requirements that may be needed to meet our safety standard due to space use.
- Lehigh University must also meet government guidelines from federal agencies such as the Occupational Safety and Health Administration (OSHA), the Environmental Protection Agency (EPA), the Nuclear Regulatory Commission (NRC), and the Pennsylvania Department of Environmental Protection (PADEP).

Along with the regulatory environment, currently non-code compliant or inadequate infrastructure in existing buildings can be a major cost driver. Retrofitting older buildings can sometimes cost more and be more complicated than building new. Renovations can often

require the proper removal of hazardous materials such as asbestos and lead paint, these incidental requirements of a renovation also impact cost and time. Additionally, there are often requirements to retain outside consultants to design complex project systems (exhaust, electrical, air conditioning, alarms, etc.) involved in a project that may be directly impacted by building codes.

The following checklist is meant to highlight potential items to consider when planning for a new research lab or a lab renovation, it is not meant to be all inclusive. Evaluating these items will help LU facilities provide colleges and departments with a starting point to evaluate the cost associated with new research spaces and new hires prior to making final determinations. We hope you find it of value, and we thank you for your cooperation as we work to accommodate your research needs.

### **Research Laboratory Design Considerations:**

**Please provide information about all of the following components as required for the laboratory design request (please attach additional sheets if necessary):**

**Name:**

**Current Lab (Building/Room):**

### **General Information:**

- What type of work or research will you be doing in the lab (*describe below*):
  - Chemical
  - Biological
  - Nanotechnology
  - Computation
  - Other: \_\_\_\_\_

Description:

- What types of equipment will be used within your lab (*describe all below, include as much information as possible, such as model number, manufacturer, cutsheet, installation guide, etc*) This information will help us determine the infrastructure required for your lab, such as exhaust, air flow, electrical, mechanical and plumbing connections, gas requirements, and other requirements:
  
- Is any of this equipment being relocated from an existing location on campus? If so, where: Building \_\_\_\_\_, Room \_\_\_\_\_ (*list equipment below that is to be moved*)
  
- Will moving any of this equipment require re-calibration, a specialty mover, a consultant and/or equipment representative to be hired (by Department or Facilities) to coordinate and oversee the move? If so, please include information below, including any contact names and numbers
  
- When does your lab need to be operational? (*Note: the timeline you provide may not be feasible based on approvals, funding, equipment lead times, etc. but efforts will be made to meet reasonable deadlines given*)

**Please check the box next to the following components that may be required for the laboratory design request, include any detailed information that may be available:**

**Ventilation:**

- Hazardous gas and ventilated chemical cabinets and manifolds. (flammables, toxic, acids & bases)
  
- Hazardous/Toxic gas leak monitoring and alarm systems. (Note: If gas monitoring system is installed, the cost of installation and maintenance must be covered by the program.)

- Is a direct exhaust/s of the building required?
  
- Laboratory hoods and exhaust systems.
  - Indicate quantity of hoods and size needed: \_\_\_\_\_
  - Indicate what is required in each hood:
    - Gases: \_\_\_\_\_
    - Air
    - Vacuum
    - Nitrogen
    - Helium
    - Other (list all): \_\_\_\_\_
  
- Bio-safety systems and components. (Note: Installation and maintenance of any specialized cabinets are typically the responsibility of the department / lab occupant)
  - BSL-1
  - BSL-2
  
- Intrinsically safe (non-sparking) air handling systems and number of required air changes \_\_\_\_\_ CFM
  
- Emergency generators needed for ventilation systems. (note that emergency generators are not available in all buildings on campus and capacity may be limited where they are available.)

**Chemical Classification and Quantity Inventory:**

- List all chemicals and quantities planned for use in the laboratory and identify those that are particularly hazardous. Please indicate if they require special storage conditions :
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_

- Gas use and classification, check all that apply and indicate type of gas:
  - Flammable: \_\_\_\_\_
  - Pyrophoric: \_\_\_\_\_
  - Oxidizing: \_\_\_\_\_
  - Toxic: \_\_\_\_\_
  - Inert: \_\_\_\_\_
  - Cryogenic: \_\_\_\_\_
  - Other (list all): \_\_\_\_\_
  
- Provide projected chemical and gas inventory per category/location (required for occupancy permit and institutional reporting to regulatory agencies)

**Fire Protection System:**

- Sprinkler system required (*typically determined by the type of research and/or existing building classification.*)

**Emergency Preparedness:**

- Does any equipment require connection to an emergency generator (**Note: Not all buildings on campus have emergency generators and some do not have capacity available for lab equipment to be added**). If requested or required, please indicate which equipment and why: (*Any costs to tie into emergency generator systems are assessed as part of the project*)

- Does your current lab have an emergency plan? If so, please attach a copy to this document.
  
- Does your lab require data protection? If so please indicate requirements.

**Waste Disposal Requirements:** (This is the responsibility of the department, not Facilities or EH&S):

- Bottled gases, chemicals, contaminated materials, radioactive and biological waste, etc. Please give a brief explanation of the departmental procedure for disposal of hazardous materials:

**Standard Equipment:**

- Eyewash stations and/or emergency showers. Give a brief explanation:

**Specialized Equipment:** (May require additional infrastructure such as cooling, emergency power, etc.). Provide cutsheets (specifications) for each item. Specialized equipment may also require review regarding purchasing, installation, and maintenance. Typically specialized equipment is procured and maintained by the user group or Department, not Facilities.

- Ovens, furnaces, freezers, explosion-proof refrigerators and high-voltage equipment
- Clean rooms, Cold rooms, Warm rooms, Microscopy facilities
- Safety and Security systems including gas detection and alarm systems, 24 hr. campus monitoring if required.
- Lasers (special alarm/notification that a laser is in operation)
- Equipment that generates radioactivity
- Equipment that is used in nanotechnology
- Biosafety cabinets and lab equipment
- Other (list all): \_\_\_\_\_

**Environmental Conditions:** *If you check any of these items, please include specific information for what is required.*

- Temperature parameters. Is constant temperature required or a specific temperature range?
- Specialized humidity requirements. Is a specific and/or constant humidity range needed?
- Laboratory cleanliness (Clean room conditions, general laboratory cleaning, etc.?)
- Specialized lighting requirements for lab (General lighting and specialty lighting for experiments)
- Supplemental heating and cooling units, especially if there is a significant amount of equipment in the room and/or required temperature maintenance. (Typically any supplemental HVAC units are the responsibility of the academic department, including maintenance.)

**Office Space Design Considerations:**

- Lab space is needed for my research team consisting of \_\_\_\_\_ number of people.
  - Amount of bench space for each (in linear feet or SF): \_\_\_\_\_
- Office space is needed for my research team. \_\_\_\_\_ number of workstations are required.
  - \_\_\_\_\_ number of private offices needed
  - \_\_\_\_\_ number of grad workstations needed (**Note: these may be in an open work area**)
- I have a current office on campus. Indicate building and office number:
  - If a new Laboratory under your supervision is being requested in a building separate from your existing office, will your office also need to be relocated? (If yes, provide justification and indicate if your vacated office can be reassigned.)



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- I have a current laboratory on campus. Indicate building and room number:
  - If a new laboratory under your supervision is being requested in a building separate from your existing laboratory, will your current lab be relocated? (If yes, indicate if your vacated lab can be reassigned.)

**If there are any questions regarding the content of this document, please contact:**

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