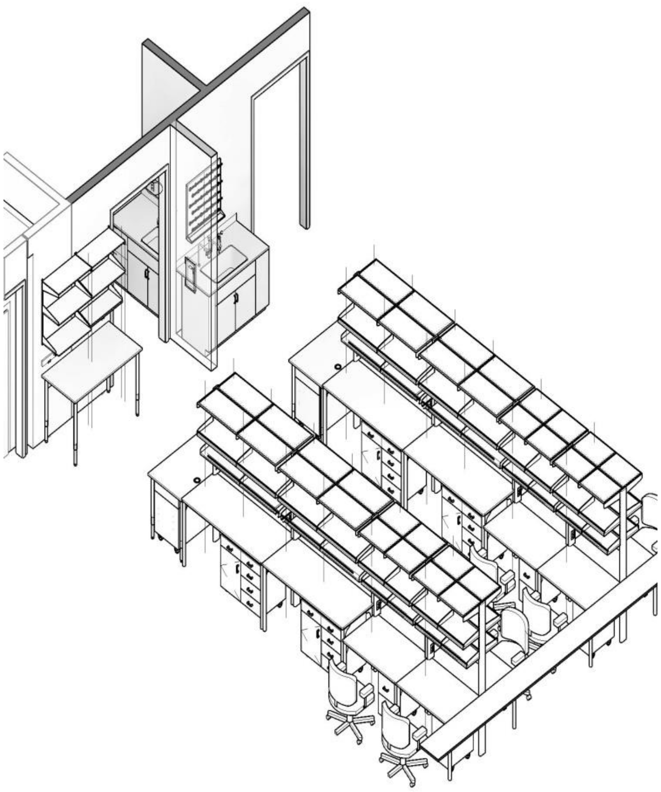

University of California Riverside

Batchelor Hall

Detailed Project Program Update

August 10, 2017

Project Number: 950464
Batchelor Hall Building Systems Renewal

Project Number: 950531
Batchelor Hall Interior Improvements

Acknowledgements

This Detailed Project Program Update was a collaborative effort across many organizational units within the University.

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Contents

1 Introduction

1.1 Executive Summary

The purpose of this document is to update the Detailed Project Program for the Batchelor Hall Remodel dated April 21, 2006, UCR Project Number 950464. There are a number of factors that drive the need for the update of the 2006 document. Some of these factors include:

- The University's needs and allocation of research space has evolved
- Building codes have change especially related to building performance and energy efficiency
- The practice of research itself has changed to a more multi-disciplinary and collaborative nature.
- Modern research requires an increased need for specialized laboratory support space as compared to general wet laboratory bench space.
- The emergence of computational or "dry laboratory" research within or in proximity to traditional wet laboratory research groups.

This program update incorporates these evolutions and provides an overall planning strategy for phased implementation.

These updates are not intended to replace entirely the 2006 DPP as much of that report is still valid today such as those sections related to existing conditions and hazardous material abatement. However, this document provides a long-term plan to renovate the building. It informs current projects and can serve as a reference to secure funding for future tenant improvement projects.

1.2 Planning Goals

The principle intent is to renovate Batchelor Hall to provide as efficient and interactive research laboratories as possible given the constraints imposed by the existing building conditions and financial resources available.

As Research Laboratories and related spaces are renovated, there will be opportunities to make the spaces more efficient, larger and open to support team-focused, inter-disciplinary, interactive work.

Building flows and the general quality of assignable spaces can be improved and brought up to current code and UCR requirements.

Mechanical, Electrical and Plumbing (MEP) services and systems throughout will be brought up to current, more energy-efficient and low-maintenance standards while addressing shortcomings of the existing systems.

Telecommunications and data service backbones will be upgraded to current standards with provision for reasonably anticipated future trends.

1.3 Scope

The initial build-out, known as the Building Systems Renewal, will focus on infrastructure, utility and service upgrades. This will improve the environmental quality of the entire building, reduce maintenance, improve energy efficiency and remove hazardous materials (asbestos and lead-based paint) in areas upgraded.

Subsequent renovations, to be performed as funding becomes available, will use areas freed by the initial work to expand and make more efficient all user occupied spaces within the building. The first subsequent renovation project is recommended to be the full renovation of the 2nd Floor of the Building, excluding Keen Hall and the Metabolomics Core being implemented under a separate project.

Remaining hazardous materials will be removed with each phase and each space renovated will be brought into full compliance with the disabled access provisions of California Title-24.

1.4 Building Systems Renewal

The building systems renewal portion of the project will upgrade the existing aging infrastructure with new, modern, efficient and code compliant systems to extend the effective life of Batchelor Hall.

The mechanical systems for Batchelor Hall shall provide ventilation, heating, cooling and exhaust for new office spaces, laboratories and support areas. Mechanical HVAC systems consist of an HVAC system for the Office, Laboratories and Laboratory Support Areas as well as a General and Laboratory/Fume Hood Exhaust system.

The plumbing systems shall provide domestic hot and cold water, sanitary waste and vent, laboratory waste and vent, laboratory air, laboratory vacuum and natural gas for laboratories and support areas. Deionized water will be provided and will serve laboratories.

The electrical infrastructure will be upgraded from the current 4.14kV service to 12kV. In addition to the existing 208/120V distribution within the building, a new 480/277V distribution will be provided for the heavier mechanical loads.

With the building systems renewal project, the building's public areas will be brought up to code for accessibility and safety. All four of the building's stairs will be modernized with compliant handrails and guardrails. New restrooms will be constructed at every level to provide modern, accessible and water efficient facilities. The building's single elevator will be replaced with a code-compliant elevator that will double as both a passenger and service elevator.

1.5 Construction Estimate Summary

The estimate is based on draft DPP program areas and narratives dated December 19, 2016. Estimated unit costs include average labor rates with prevailing wages and competitive bid conditions. Competitive bid conditions generally occur when bids are received from a minimum of four general contractors and three subcontractors for each trade. The estimate includes allowances and assumptions for materials, building systems, specifications and construction schedule, these assumptions should be confirmed at the next design stage and prior to completion of bid documents. The estimate includes general contractor markups for general conditions, bonds, insurances, profit, contingency and cost escalation to mid-point of construction. Project soft costs are not included. The estimate is based on design, bid, build project delivery.

To facilitate the decision process for best utilizing available funds for tenant improvements, the estimate is segregated by floor and by wing of the building.

Building Systems Renewal	$16,414,000
Tenant Improvements	
Level 1 West Wing	$ 7,222,000
Level 2 West Wing	$ 7,852,000
Level 2 South Wing	$ 1,328,000
Level 3 West Wing	$ 8,618,000
Level 3 South Wing	$ 3,752,000
Level 4 West Wing	$ 8,626,000
Tenant Improvements Subtotal	$37,398,000
Total Estimated Construction Budget	$53,812,000

Table 2-0. Concept Cost Model Construction Estimate Escalated to Mid-Point of Construction 2019.

1.6 Phasing

Batchelor Hall is currently fully occupied. There is no temporary surge space within the building to relocate researchers during the renovations. During construction of the tenant improvements, occupants of the spaces to be renovated will need to be relocated to another building on campus.

For the Building Systems Renewal construction, it is the intent to fully occupy the building during construction. To accommodate this requirement, temporary utilities will be required to maintain operational functions within the building and utility shutdowns must be kept to a minimum. The infrastructure will be upgraded at approximately 25% of the building at a time. The current plan is to upgrade the south wing first. This will provide the required platform for the exhaust fan array to serve the entire building.

The West Wing’s current infrastructure segments the building in thirds. The new mechanical systems follow the same philosophy. Phase 2 will upgrade the eastern third of the West Wing, upgrading the services for levels 2, 3 and 4. Phase 3 will upgrade the western third of the West Wing for levels 1 through 4. And finally, Phase 4 will upgrade the center third of the West Wing for levels 1 through 4.

The preferred first tenant improvement project is level 2 for the West Wing. The completion of this project should correspond with the completion of Phase 4 of the Building Systems Renewal construction.

2 Project Program and Planning

This chapter describes the programming and planning:

1. Affected by the Systems Renewal project, which is aimed to upgrade and renew basic core services and utilities
2. For the building's Interior Improvements over the long-term. Initial Interior Improvements and future projects would follow the strategies contained in this planning "roadmap".

2.1 Definitions

2.1.1 UCOP Space Definitions

This project's space is described using measurement methods and nomenclature defined by The University of California Office of the President (UCOP), two of which, Assignable and Basic Gross Area, are included here. The remaining UCOP area classifications are described in the Appendix of this document.

Assignable Area (ASF)

The sum of all floor or surface areas of a building assigned to, or available for assignment to, an occupant or user, including every type of space functionally usable by an occupant or user...

The Assignable area is computed by…measuring…from the inside faces of surfaces that form the boundaries of the designated areas…

Basic Gross Area (BGSF)

The sum of all areas, finished and unfinished, on all floors of an enclosed structure (that is, within the environmentally controlled envelope), for all stories or areas which have floor surfaces.

Basic Gross Area is computed by…measuring…from the outside faces of exterior walls, disregarding architectural and structural projections.

2.1.2 Principal Investigator Research Group Definitions

For the purposes of this study, the Principal Investigator Research Groups (often shortened to "Research Groups" throughout the remainder of this document) are based on average populations of 8 people:

		Quantity
	Principal Investigators	1
	Post-Doctoral Students	2
	Visiting Scientists	Included in PD Qty
	Graduate Students	4
+	Undergraduate Students	1
=	Total	8

Table 2-1. Principal Investigator Research Group Composition

Visiting Scientists have similar roles to, and are effectively interchangeable with, Post-Doctoral Students, and have been accounted for in the latter's population projections. Undergraduate Students do not require additional space, neither in the laboratory, nor in the office environment, but their relative inexperience should be factored into issues related to safety.

Individual group populations and facility requirements (such as freezer space) are anticipated to vary significantly from group to group and over time, as they do now, and this variability is one of the reasons that space is being planned with significant flexibility and limited fixed boundaries.

2.1.3 Lab Types Based on Fume Hood Quantities

What fundamentally characterizes a Research Group type is the required quantity of fume hoods:

Requested Types	TBD	0%	70-80%	20-30%	0%
	Computation	Wet-1	Wet -2	Wet -3	Wet -4
Fume Hoods (6')	0	0.5	1	2	6
Future Fume Hoods (5')	0	0	1	2	0

Table 2-2. Lab Types Based on Fume Hood Quantities

2.1.4 Existing Building Terminology (Legend)

Batchelor Hall space regions are commonly referred to by "wing". Keen Hall to the North, the South Wing to the South, and the West Wing includes the remainder of the building, as shown in the diagram to the left, below:

The building also has 6 floor levels labeled L1 to 5, as shown in the section to the right, below. These designations match the University's Space Inventory.

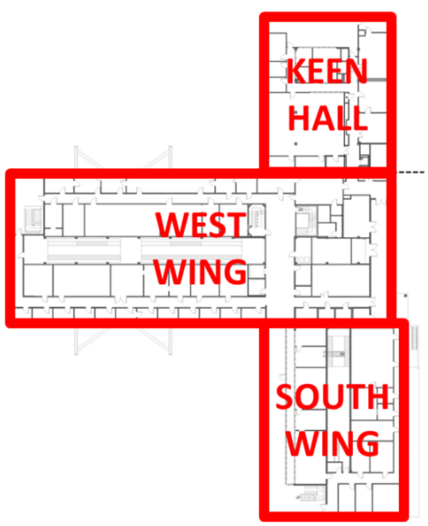


Figure 2-1. Building Wings

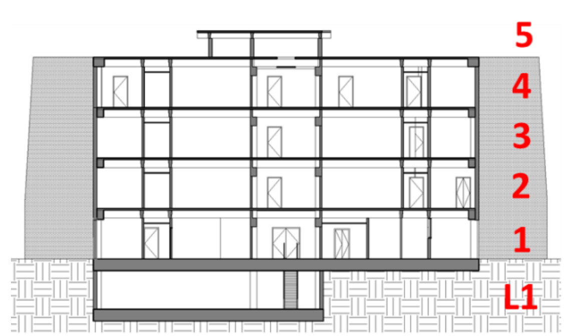
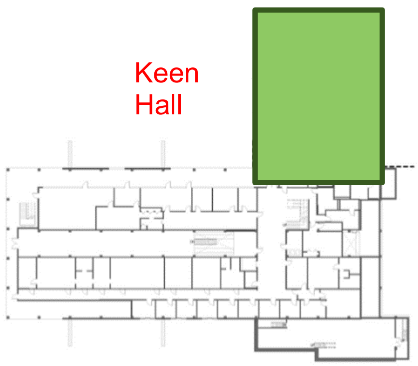


Figure 2-2. Building Levels

2.1.5 Excluded Areas of the Building

Except for certain utility systems described in Section 4, this DPP Update does not include two significant areas of the overall building: Keen Hall and the Metabolomics Core. The former is not within the project scope and roughly aligns with the northernmost wing of the building. The program of the latter was completed prior to the DPP Update, and will be completed via a separate project. The Metabolomics Core program is located in existing rooms 2164, 2205, 2207, 2209 and 2215. At the time of the 2nd Floor, West Wing, Interior Improvements Project, 2164 is anticipated to transition from Metabolomics to Long-Range Programmed space.

The excluded areas must remain operational during both the Systems Renewal and Interior Improvements Project renovations. There will be some necessary interruptions of utilities to connect systems, for instance, but these interruptions should be minimized in duration and scheduled with those affected.



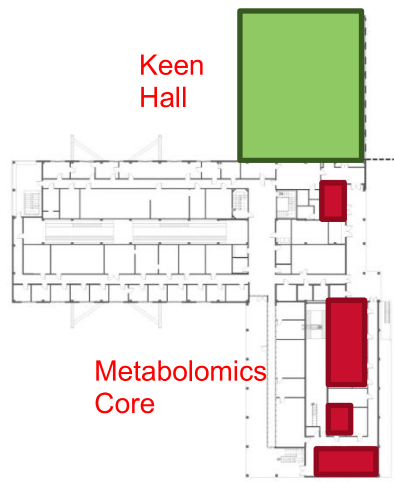


Figure 2-3. Excluded Areas of Floor 1   Figure 2-2. Excluded Areas of Floor 2
Keen Hall [shaded green] is excluded from the North Wings of the 1st floor (left) and 2nd floor (right). The Metabolomics Core [shaded red] is excluded from the 2nd Floor South Wing.

2.2 Existing Area Summary

This chapter contains space area summaries. The Appendix includes additional space area categories and detail.

According to the existing space inventory, the Batchelor and Keen Hall buildings currently have the following areas, producing an overall building efficiency of 49% (Assignable / OGSF100).

	All Floors	
Assignable Area (ASF)	**56,580**	*49%*
Basic Gross Area (BGSF)	**106,248**	
Outside Gross Area (OGSF100)	**114,848**	

Table 2-3. Existing Batchelor + Keen Hall Building Area Summary

	Total	*Keen*	*Batchelor*
	56,580	**7,848**	**48,732**
Research Laboratory	23,710	442	23,268
Laboratory Service	14,234	6,216	8,018
Research Office	1,786	0	1,786
Scholarly Activity	626	0	626
Class Laboratory	687	0	687
Academic Office	8,137	466	7,671
Other Office	3,689	201	3,488
Office Service	1,514	78	1,437
Conference	1,817	285	1,532
Conference Service	109	13	96
Storage	271	148	124

Table 2-4. Existing Assignable Area (ASF) by UC Space Categories

Note: "Service" categories include non-public circulation.

2.3 Systems Renewal Project

2.3.1 Scope

The building systems renewal portion of the project will upgrade the existing aging infrastructure with new, modern, efficient and code compliant systems to extend the effective life of Batchelor Hall.

The mechanical systems for Batchelor Hall shall provide ventilation, heating, cooling and exhaust for new office spaces, laboratories and support areas. Mechanical HVAC systems consist of an HVAC system for the Office, Laboratories and Laboratory Support Areas as well as a General and Laboratory/Fume Hood Exhaust system.

The plumbing systems shall provide domestic hot and cold water, sanitary waste and vent, laboratory waste and vent, laboratory air, laboratory vacuum and natural gas for laboratories and support areas. Deionized water will be provided and will serve laboratories.

The electrical infrastructure will be upgraded from the current 4.16kV service to 12kV. In addition to the existing 208/120V distribution within the building, a new 480/277V distribution will be provided for the heavier mechanical loads.

With the building systems renewal project, the building's public areas will be brought up to code for accessibility and safety. All four of the building's stairs will be modernized with compliant handrails and guardrails. New restrooms will be constructed at every level to provide modern, accessible and water efficient facilities. The building's single elevator will be replaced with a code-compliant elevator that will double as both a passenger and service elevator.

2.3.2 Research Team Capacity

The Systems Renewal project has a minor impact on the Assignable Area in the building, and is not expected to impact the quantity of Research Teams.

2.3.3 Planning

Refer to the diagrams and tables below for the impact to existing space areas.

The strategy for the interior planning associated with the Systems Renewal project is to minimize disruptions to existing, functional space for two reasons: to manage costs, and to minimize disruption to existing research and teaching. Those functional spaces that are affected have been adjusted in alignment with the long-range interior improvements planning where practical, to avoid rework in the future.

	Space	ASF Existing	ASF Systems Ren.	ASF Change	Reason
1147	Janitor	64	57	7	Area needed for larger Elevator , change of program to Storage
1155	Conference	212	89	124	Area needed for Men's Toilet
1159	Cytology Dry Lab	317	283	34	Area needed for Men's Toilet
1159A	Lab Support	313	181	132	Area needed for Women's Toilet
1006	Men's Toilet	139	72	67	Redundant, change of program to Lactation Room
1007	Women's Toilet	410	480	-70	Redundant, change of program to Seminar Room

Table 2-5. Floor 1 Assignable Space Impacts During System Renewal

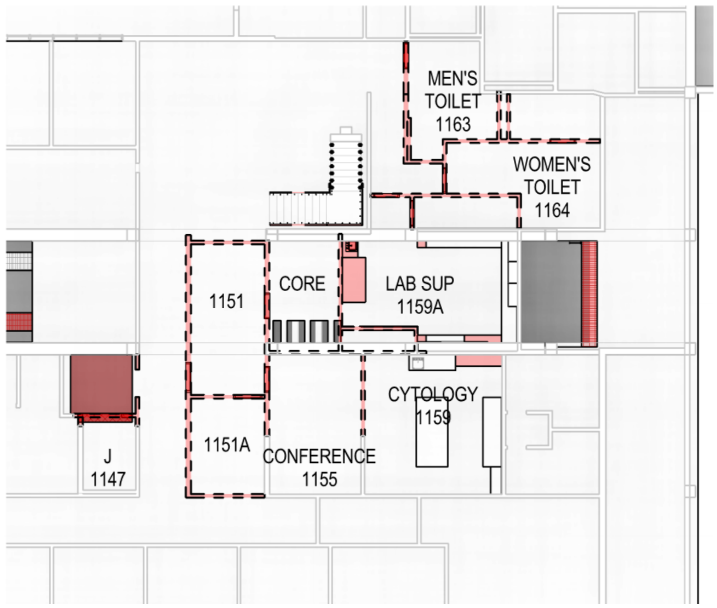


Figure 2-4. Phasing Diagram Demo Floor Plan, Level 1

Figure 2-5. Phasing Diagram New Floor Plan, Level 1

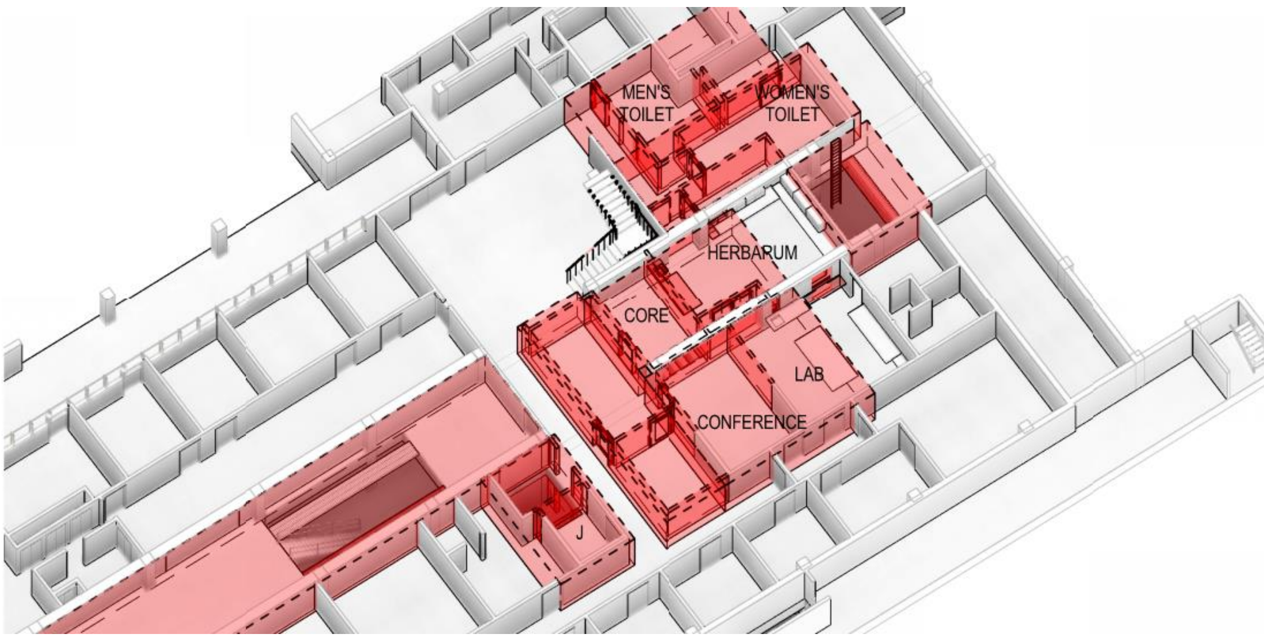


Figure 2-6. Phasing Diagram Demo Floor Plan, Level 1

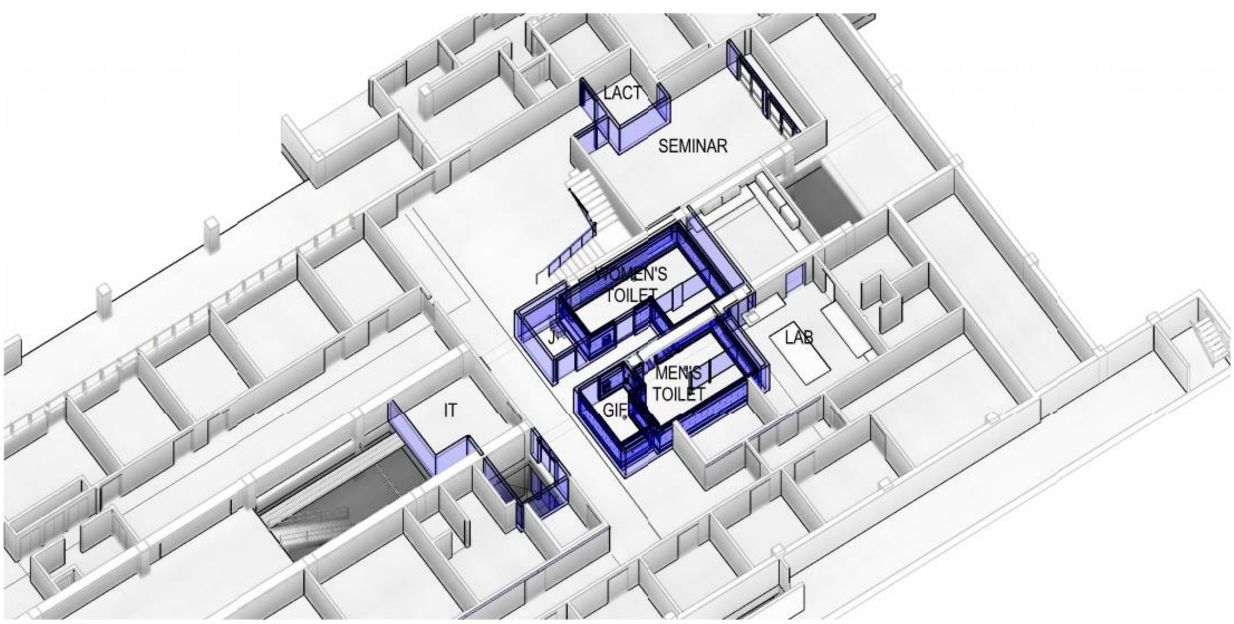


Figure 2-7. Phasing Diagram New Floor Plan, Level 1

	Space	ASF Existing	ASF Systems Ren.	ASF Change	Reason
2156	Women's Toilet	87	79	8	Area needed for larger Elevator, change of program to Storage
2157	Grad. Inst. Room	124	85	39	Area needed for GIF Toilet with Shower
2001	Janitor	52	111	-60	Area needed for new Vending / Toilets Layout
2002	Core	140	229	-89	Area needed for new Vending / Toilets Layout
2003	Men's Toilet	105	171	-66	Area needed for new Vending / Toilets Layout
2162	Dry Lab	930	635	295	Area needed for new Vending / Toilets Layout
2140	Wet Lab	292	204	88	Area needed for Electrical Room 2140A.
2142	Records	119	88	31	Area needed for new Medium Conference Room
2150	Taste Panel	218	253	-36	Change of program to Medium Conference Room
2158	Conference	466	500	-34	Change of layout Large Conference Room

Table 2-6. Floor 2 Assignable Space Impacts During System Renewal

Figure 2-8. Phasing Diagram Demo Floor Plan, Level 2

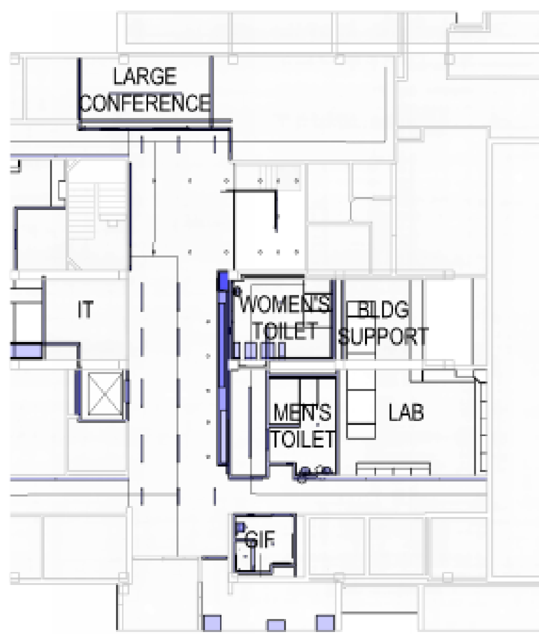


Figure 2-9. Phasing Diagram New Floor Plan, Level 2

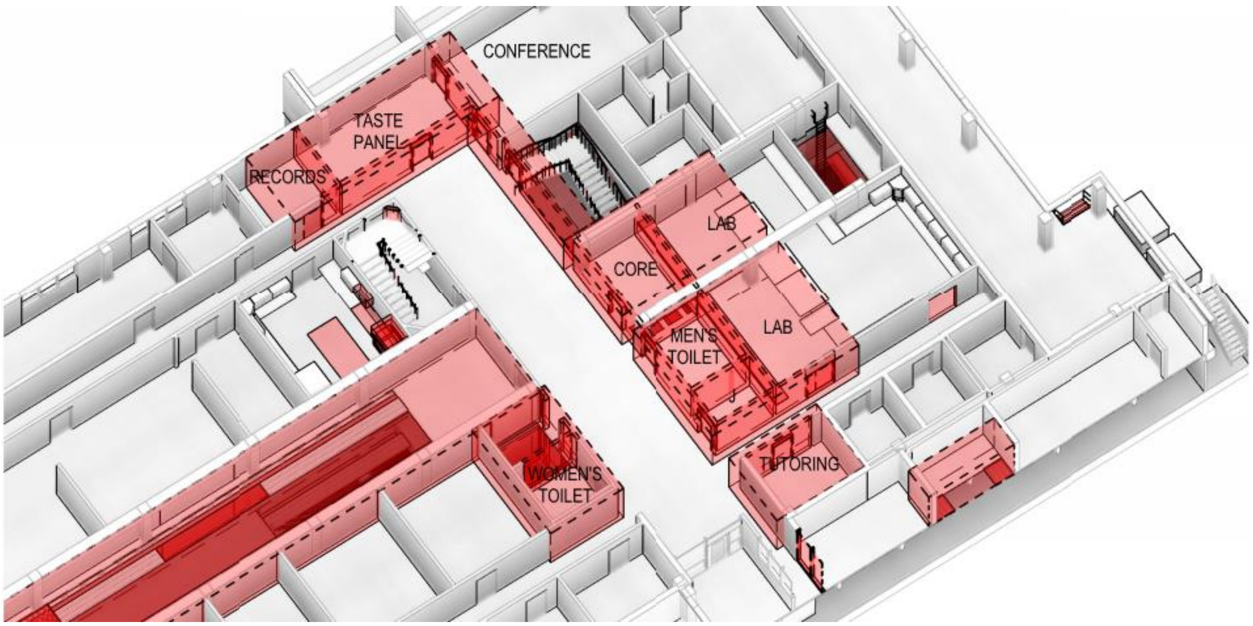


Figure 2-10. Phasing Diagram Demo Floor Plan, Level 2

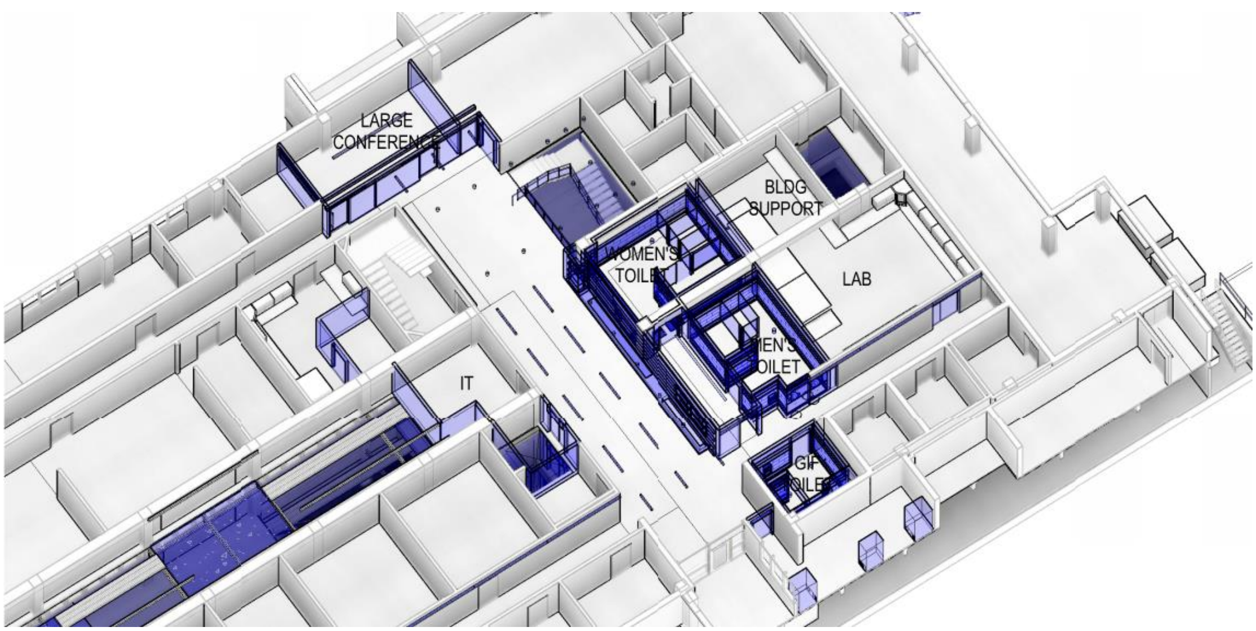


Figure 2-11. Phasing Diagram New Floor Plan, Level 2

	Space	ASF Existing	ASF Systems Ren.	ASF Change	Reason
3147	Women's Toilet	88	79	8	Area needed for larger Elevator , change of program to Storage
3155	Janitor	47	63	-16	Area needed for Men's Toilet, change of program to Storage
3003	Men's Toilet	98	178	-79	Area needed for larger Men's toilet
3163	Dry Lab	512	385	127	Area needed for Men's Toilet
3101M	Core	834	201	634	Area needed for Women's Toilet

Table 2-7. Floor 3 Assignable Space Impacts During System Renewal

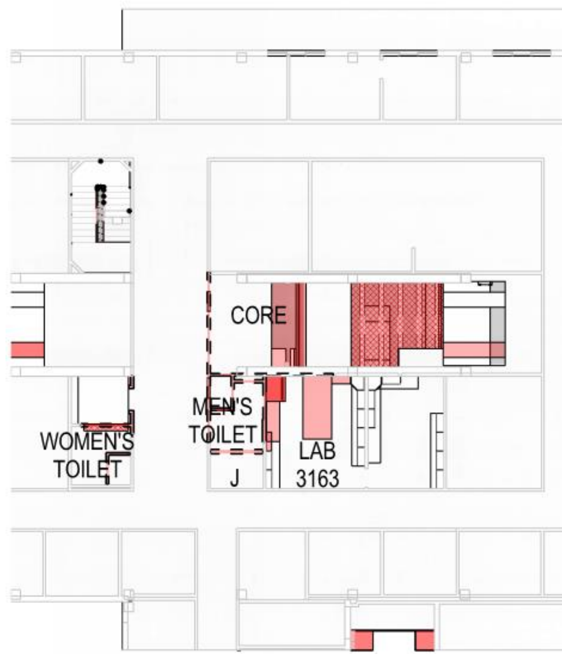


Figure 2-12. Phasing Diagram Demo Floor Plan, Level 3

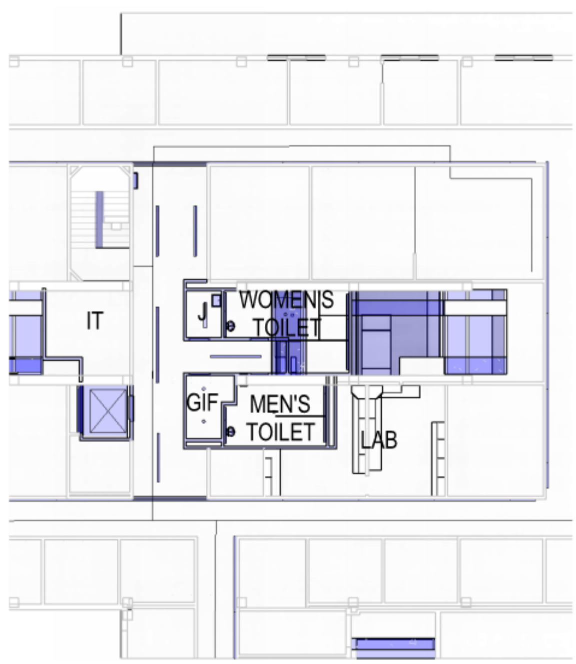


Figure 2-13. Phasing Diagram New Floor Plan, Level 3

Figure 2-14. Phasing Diagram Demo Floor Plan, Level 3

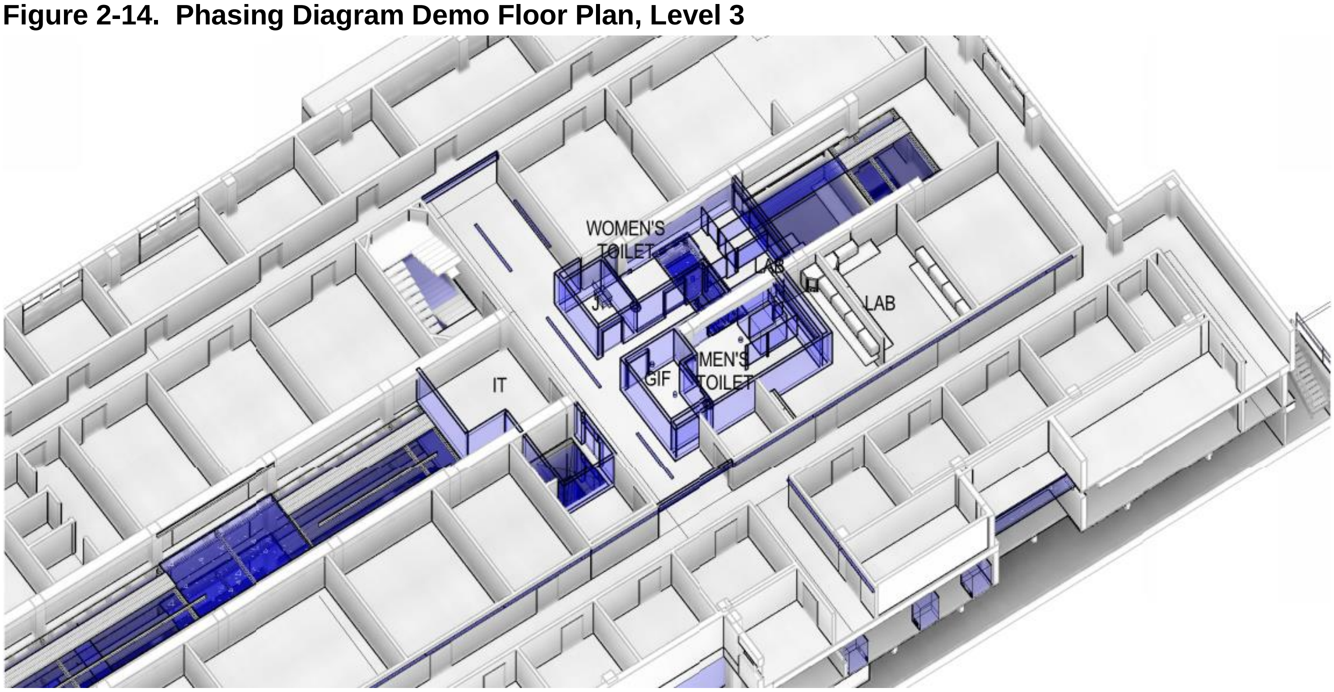


Figure 2-15. Phasing Diagram New Floor Plan, Level 3

	Space	ASF Existing	ASF Systems Ren.	ASF Change	Reason
4747	Women's Toilet	87	79	8	Area needed for larger Elevator , change of program to Storage
4155	Janitor	47	63	-16	Area needed for Men's Toilet, change of program to Storage
4003	Men's Toilet	98	178	-79	Area needed for larger Men's toilet
4159	Wet Lab	307	191	116	Area needed for Men's Toilet
4100A	Core	834	201	634	Area needed for Women's Toilet

Table 2-8. Floor 4 Assignable Space Impacts During System Renewal

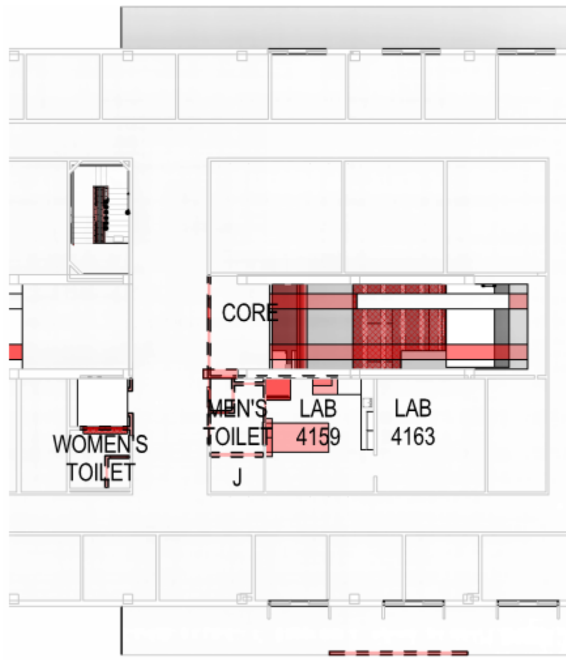


Figure 2-16. Phasing Diagram Demo Floor Plan, Level 4

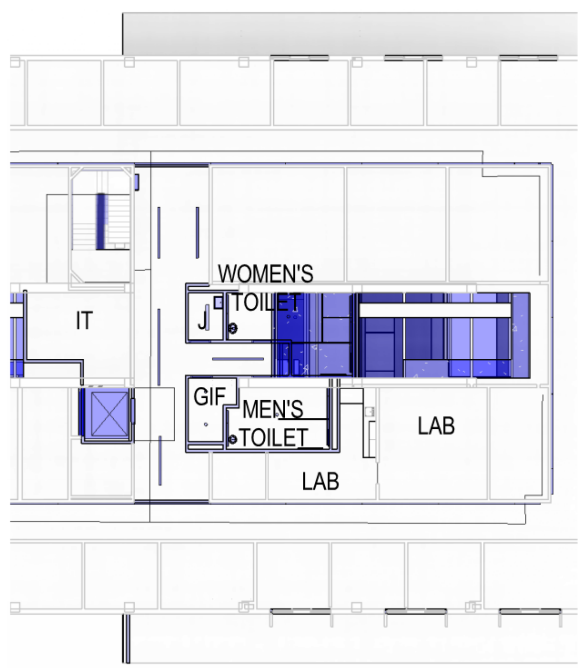


Figure 2-17. Phasing Diagram New Floor Plan, Level 4

Figure 2-18. Phasing Diagram Demo Floor Plan, Level 4

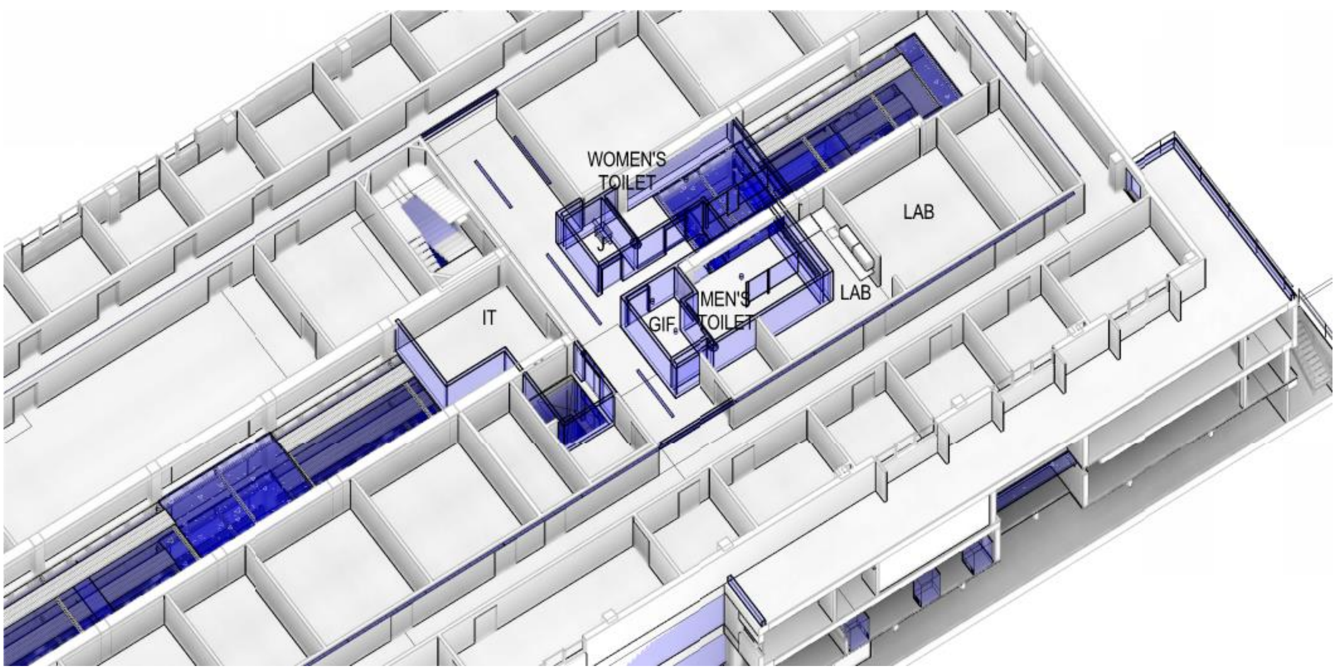


Figure 2-19. Phasing Diagram New Floor Plan, Level 4

2.4 Interior Improvements Roadmap

2.4.1 Scope

The full implementation of the Interior Improvements project is characterized in this document as a roadmap for a series of projects that can be implemented over time as funds become available.

The scope of each phase will depend upon the number of phases and locations in which they are implemented. Generally, each phase will benefit from capital renewal and other work already completed, and will avoid where possible areas to be renovated at a later date. However, there will be rework required in some of areas as a consequence of implementing the project in phases.

2.4.2 Project Overview

The Interior Improvements roadmap was developed to address principles that improve the quality, safety, and accessibility of space in support of undergraduate and graduate laboratory-based programs. The primary transformation is from an assemblage of individual laboratories and offices bounded by solid walls, to a standardized, open laboratory and office environment with sufficient, customizable laboratory support space.

A significant existing problem is that insufficient lab space has resulted in laboratory support equipment (such as refrigerators, freezers and growth chambers) being located in the public corridors. This has significantly restricted the corridor's width, and detracts from the first impression given to any visitor or potential recruit. This problem has been addressed in the program and planning by sizing laboratory support aisles appropriately for both traffic and equipment, and providing significant laboratory equipment and storage space in a central location not considered particularly desirable for laboratories.

Additional laboratory support space is created by converting utility chase areas to assignable space.

2.4.3 Research Team Capacity

The following table describes the quantity of average-sized research teams that can be accommodated in the building after the Interior Improvements for each floor are completed. The projected quantity of Research Teams are based on an average size as described in the Definitions Section at the beginning of this chapter:

		Floor				
		1	2	3	4	Total
	Wet Lab Research Groups	3	6	12.5	8.5	30
+	Computational Research Groups	0	4	2	0	6
=	Total Research Groups	3	10	14.5	8.5	36

Table 2-9. Proposed Research Team Capacity

2.4.4 Program Areas

This chapter contains space area summaries. The Appendix includes additional space area categories and detail.

The following table describes the proposed changes in area after the Interior Improvements strategy has been fully implemented. Keen Hall area remains unchanged. Outside Gross Areas increase by 634 GSF as a result of extending the center stair and elevator to the roof. Building efficiency (Assignable / OGSF100) increases from 49% to 63%. The efficiency improvement is even larger when just considering Batchelor Hall.

Existing Inventory: Batchelor + Keen	*All Floors*	
Assignable Area (ASF)	**56,580**	*49%*
Basic Gross Area (BGSF)	**106,249**	
Outside Gross Area (OGSF100)	**114,848**	

DPP: Batchelor + Keen	*All Floors*	
Assignable Area (ASF)	**73,022**	*63%*
Basic Gross Area (BGSF)	**109,254**	
Outside Gross Area (OGSF100)	**115,481**	

Table 2-10. Existing and Proposed Building Space Summary

Full implementation of the Interior Improvements strategy for all levels is projected to have the following Assignable Areas. This is an increase of 16,442 ASF (65,174-48,732), or an increase of 33% (16,442 / 48,732) of existing Bachelor Hall Assignable Area.

	Total	*Keen*	*Batchelor*
	73,022	**7,848**	**65,174**
Research Laboratories			17,656
Research Laboratory Support			20,448
Computational Lab			1,405
Class Laboratory			1,413
Office & Collaboration			22,175
Metabolomics Core			2,077

Table 2-11. Proposed Assignable Areas (ASF) Summary
This table includes the Metabolomics Core.

2.4.5 Program: Lab Types

The University has determined that Batchelor Hall is best suited to facilitate Research and to accommodate a small Teaching component in the building, both in a classroom setting (Class Laboratory and Seminar Space) and embedded within active research projects (undergraduates identified in average Research Group composition). As a result of this goal to maximize research capacity, the programming and planning for the Interior Improvements has been developed to address the needs of the University's primary research unit, the Principal Investigator Research Group. The different Lab Types are defined at the beginning of this chapter.

The University has also determined that Batchelor Hall should attempt to maximize Wet Laboratory Research Groups, and this has been requested at a ratio of approximately 70-80% Wet Laboratory Type 2, and 20-30% Wet Laboratory Type 3. However, there is a portion of the building that should accommodate two different types of computational researchers: individuals that are embedded within wet laboratory research groups, and groups that are entirely computational. The former is a result of the evolution of science discovery, which has taken advantage of computing power to facilitate simulation, and has touched nearly every field of study. The latter is a result of the fact that certain locations within Batchelor Hall are not very conducive to locating wet laboratory infrastructure, primarily the West side of the South Wing of Floor 2 which can accommodate approximately four average-sized Computational Principal Investigator Research Groups.

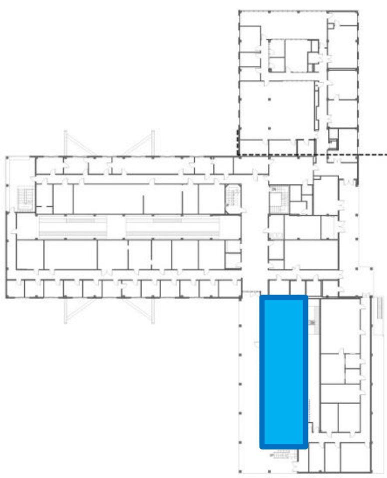


Figure 2-20. Location of Purely Computational Research Groups on 2nd Floor

Principal Investigators are requested to have Private Offices, but may require laboratory bench space. Wet Laboratory Post-Doctoral students and Graduate Students both require laboratory bench space and should have identical office environment workstations. Workstation parity reflects similar functional needs and allows for flexibility in space assignments. The University does not want to create a space hierarchy solely for the purpose of reflecting status.

2.4.6 Program: Research Group Allocations

Research Groups should be allocated space and equipment according to their need, but can be extrapolated proportionally from their population size for project planning purposes. In addition to the allocation of initial and future Fume Hoods that determine a Research

Group's wet laboratory type, the average-sized, Wet Laboratory Research Group is requested to be allocated the following DEDICATED resources:

	Quantity	per PI Group
Laboratory Support Room	200	ASF
Open Lab Sink & Dishwasher	1	Each
Worksurfaces*	135	LF
Equipment Aisle**	40	LF
Storage Aisle***	16	LF

Notes for table above:

- LF = Lineal Feet, the distance from left to right when facing the component. Aisles generally have equipment or storage on both sides, providing twice the lineal footage of its length.
- * Combination of Open Laboratory, and Laboratory Support, working surfaces including sinks, Fume Hoods and Biological Safety Cabinets
- ** Equipment aisles accommodate 3-foot deep items (front-to-back), with access to Power, Data, Standby Power, Process Cooling Water and structural fastening support (backing) inside the walls.
- *** Storage Aisles can accommodate 1-foot deep items (front-to-back), with access to structural fastening support (backing) inside the walls, but no access to utilities.

Items typically located in the equipment aisles are: -80dC Freezers, -20dC Freezers, Box and Deli-Style Refrigerators, Non-Sharable Environmental Chambers, and Shaking Incubators. Items typically located in the storage aisles are: Tall Storage Cabinets and Inert Gas Cylinders (Rolling Cryogenic Dewars are not anticipated to be typically used in Batchelor Hall).

The requested allocations above are reliant upon Wet Laboratory Research Groups having access to the following shared space and equipment ON EACH FLOOR:

	Quantity	per floor
Floor-Standing Centrifuge	1	
Autoclave (Including sink/cart)	1	
Gel Documentation System	1	
Nano-Drop	1	
Ice Machine	1	
Dry Ice Chest	1	
6- or 8-foot Specialty Fume Hood	1	
Cold Procedure Room	1	
2-foot Flammable Supply Cabinet	1	
2-foot Flammable Waste Cabinet	1	
2-foot Corrosive Supply Cabinet	1	
2-foot Corrosive Waste Cabinet	1	
Plant Growth Rooms	2	

The requested allocations above are reliant upon Wet Laboratory Research Groups having access to the following shared space and equipment CENTRALLY LOCATED within the building

	Quantity per building
Central Plant Growth Rooms	2
Central Cold Storage Rooms	2
Dirty Plant Prep Laboratory	1
Plant Tissue Culture Storage	2
Plant Tissue Transfer Vestibule	1
X-Ray Developer	1
Plant Potting	1
LN2 Storage Room	1
Gas Cylinder Storage Area	1

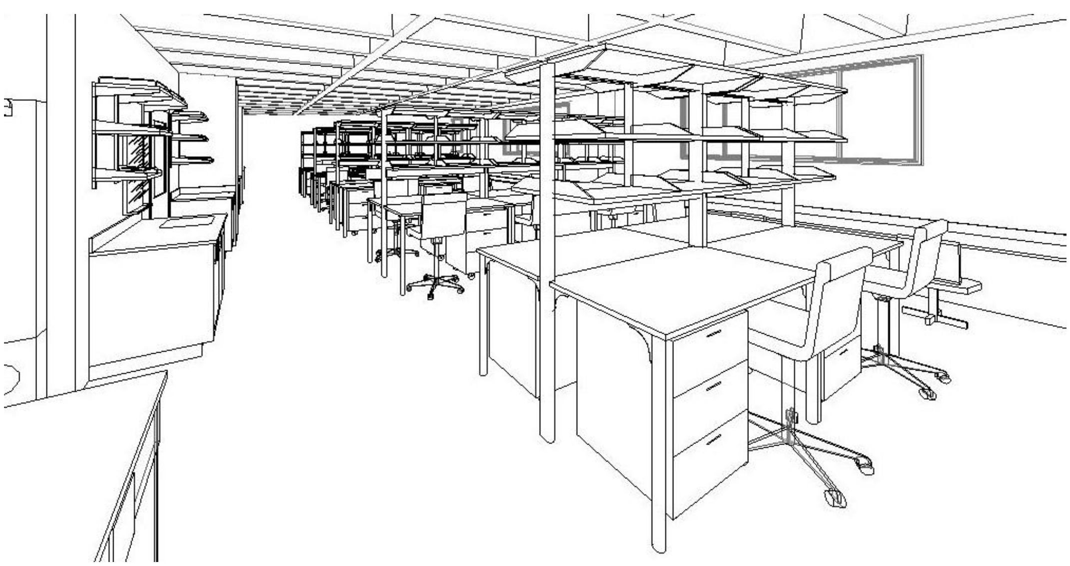
2.4.7 Planning: Wet Research Laboratories

Existing Research Laboratories

The existing research laboratories are configured as individual, atypically-shaped rooms located on the interior of the floor plates, backing up to the central utility chases. Many of the laboratories are narrow, with workbenches and aisles that do not meet accessibility requirements and safety best practices. Very few laboratories have access to natural light or views, since they are surrounded by a solid-walled ring corridor and perimeter offices.

Proposed Research Laboratory Concept

The proposed planning strategy converts the closed laboratories into BioSafety Level 2 (BSL-2) open laboratory planning on the south side of the Main Wing and 3rd floor of the west side of the South Wing. Enclosed support laboratories will provide environmentally-controlled, customizable rooms dedicated to the individual needs of Research Groups and segregation from other potentially contaminating research. These support rooms will allow the majority of the remainder of the laboratory space to be open, contiguous and standardized so that research groups of different sizes can be allocated proportional, dynamic, and contiguous resources without significant customization. Open planning and shared resources also encourage creative collisions that lead to increased collaboration.



Open Laboratory Planning

Laboratory equipment (freezers, refrigerators, growth chambers, etc.) and storage (tall cabinet) aisles will double as walking connections between the laboratories and associated researcher office areas, crossing the multi-story shafts that currently separate sides of the building, and also recovering valuable Assignable Area. The new laboratories and adjacent fume hood alcoves will have direct access to natural light and views. Laboratory Support rooms will generally have access to borrowed light through glass doors, or be solid for light-sensitive work.

Laboratory Planning Module

The existing building was designed with a 9-foot planning module, half the 18-foot structural spacing. This was not atypical of laboratory buildings of its day, when fume hoods were shallower and accessibility clearances were not mandated. The proposed research laboratory space is based on a 10.5-foot laboratory planning module that accommodates a 2.5-foot deep work surfaces and 5.5-foot clear space between work surfaces (as illustrated in the following diagram).

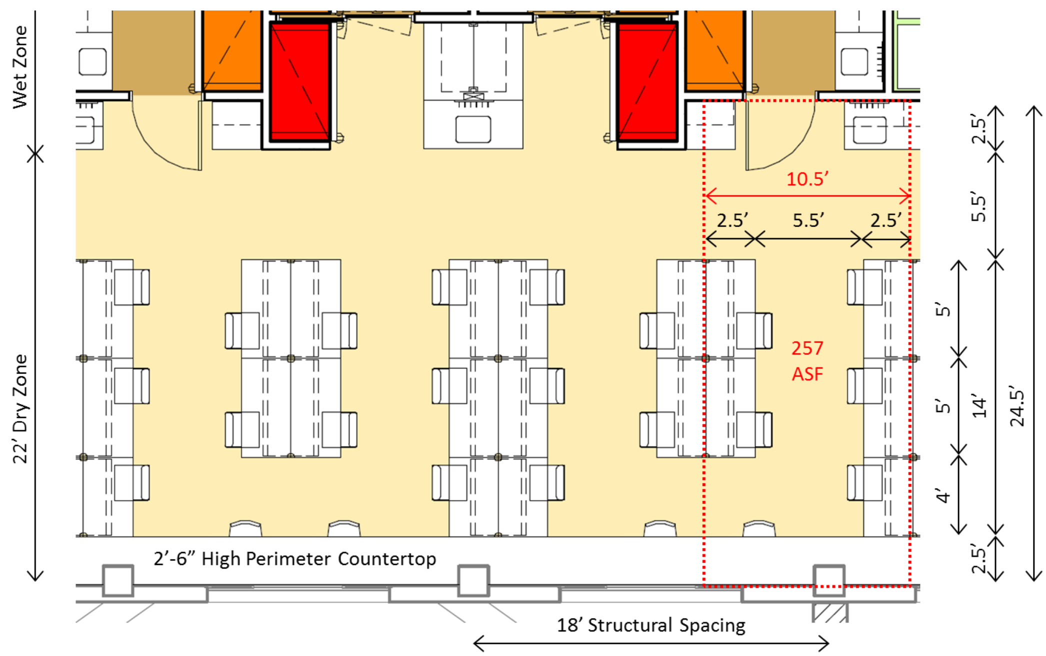


Figure 2-21. Typical Lab Planning Module

Since this module is 18-inches greater than the perimeter window spacing, the island and peninsula laboratory benches have varying alignments to the windows. Therefore, a countertop abutting, and parallel to, the exterior wall is proposed to allow the island and peninsula benches to be pulled away from the windows without sacrificing valuable working surface. This increases access to light and views that would otherwise be blocked by upper shelving directly in front of the windows.

For flexibility, the perpendicular benches are proposed to be adjustable-height tables, independent of the shelving and utilities above and initially configured for standing height (36" above the floor). Conversely, the perimeter countertop are proposed to be built-in and at sitting height (30" above the floor) where shared measurement equipment and write-up is expected to occur segregated from wet work and spills.

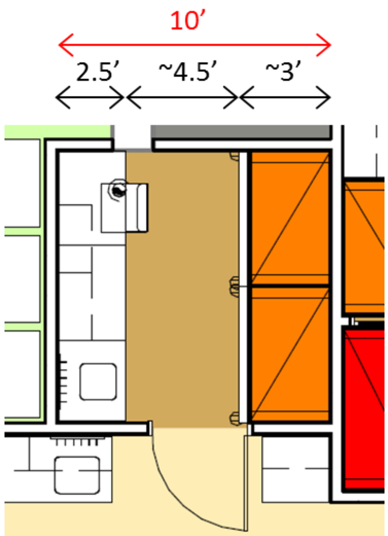


Figure 2-22. Typical Lab Support Space Module

The 10.5-foot laboratory planning module results in enclosed laboratory spaces 10-feet wide (the difference being wall thickness). This provides just enough depth for a modern fume hood (37-38”) a standard 2.5-foot worksurface across from it, and handicapped accessible clearances inside the room. (see illustration at left).

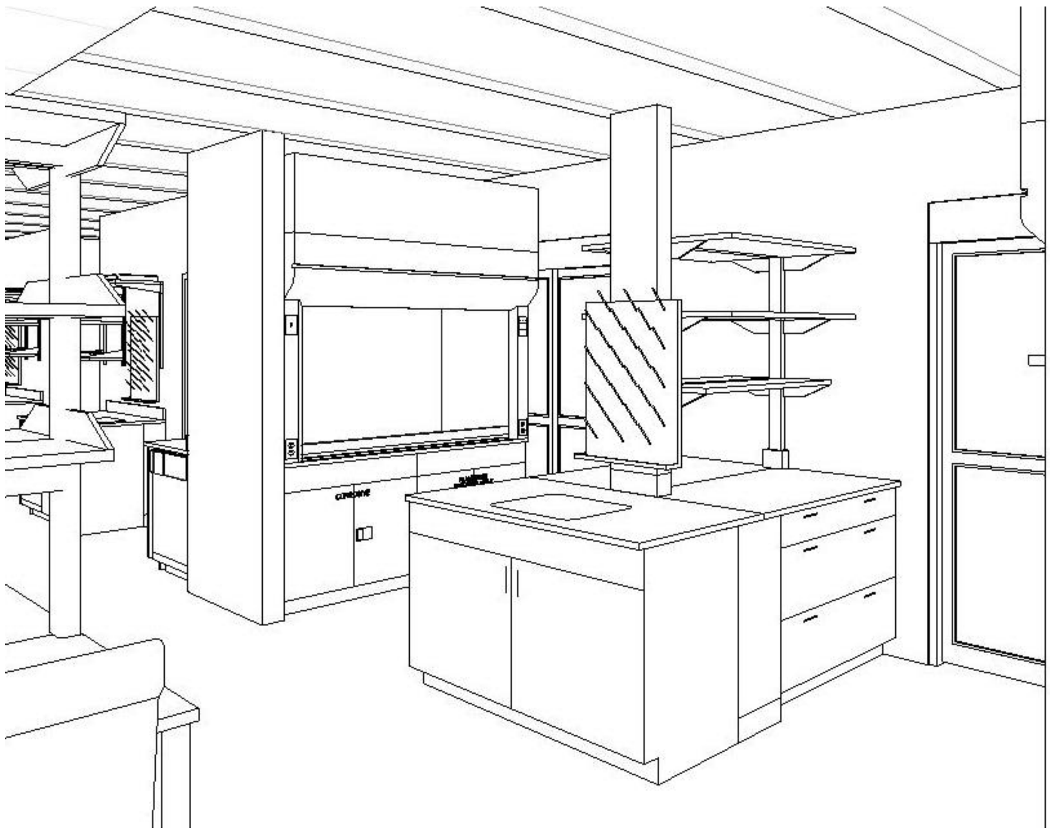
In order to distribute utilities efficiently in a building with shallow floor-to-floor heights, the 22-feet of open laboratories closest to the exterior wall are proposed to be “dry” (power, data, compressed air and vacuum only). This concentrates piping, exhaust ductwork and drains near the mechanical cores. It also allows significant flexibility for arrangements within the open laboratory modules.

Each laboratory module is therefore 10.5’ x 24.5’ or approximately 257 Assignable Square Feet (ASF). The average Wet Laboratory Research Group would be assigned two of these modules, but larger and smaller groups would be allocated bench space proportional to their team size.

Fume Hood Alcoves

The strategic planning includes a concept for integrating chemical fume hoods into the open laboratory environment which retains the goals of flexibility, convenience and visibility. The concept is to create fume hood alcoves between the main lab aisles and the closed support spaces. This location provides a measure of hazardous material isolation and safety from the more highly trafficked portions of the lab, removes large obstacles from blocking the contiguous sightlines throughout the open lab, allows a smaller area to be covered in highly robust flooring where chemical spills are more likely to occur, and is also consistent with the goal of concentrating the distribution of utilities around the utility cores.

Every average-sized Wet Laboratory Type in Batchelor Hall is intended to be assigned a minimum of one, 6-foot wide fume hood (colored in red in the plan diagram above), under-hood hazardous storage cabinets, a sink, and undercounter space for a dishwasher. The alcoves provide a quantity of hoods across the lab in proportion to the average team sizes. Larger teams would be allocated more bench space, and would proportionally be allocated more hood and alcove space. Additional and future hoods are proposed to be 5-feet wide, and accommodated within Laboratory Support Rooms up to a capacity that the new HVAC system and ductwork can support. All of these hoods are facilitized with power, compressed air and vacuum, but no cup sinks, distillation racks or process cooling water. Research processes requiring hoods with these excluded capabilities are intended to be performed in the Common Laboratory Support room, which will have a specialty hood with additional features.



Fume Hood Alcove

Laboratory Circulation

As tenant improvements are implemented, the existing enclosed exit corridors will be removed where possible in favor of more space-efficient aisle-ways (also known as Ghost Corridors) within the open laboratory, while preserving the Code-required and accessible means of egress. Two structural bays within the Main Wing and one structural Bay within the South Wing utility shafts will be in-filled with a floor slab to provide additional connections between the laboratory and office areas. These pathways significantly reduce worst-case travel distances that exist currently. The new connections will also double as access to valuable laboratory equipment (freezer, refrigerators, etc.) and laboratory storage (cabinets) space, increasing travel convenience without reducing space efficiency.

Equipment Move-In

Open laboratory planning eases equipment move-in, but the remaining doors must still permit the passage of equipment at installation. Except as noted in the Space Data Sheets, laboratory doors shall be not less than 3.5-feet wide to allow the passage of a modern fume hood (typically between 37 and 38 inches deep) without having to remove door jamb stops or hardware. The existing elevator will be upgraded to current Code which dictates the accommodation of a stretcher without having to be tipped vertically. This will consequently increase the size of equipment that can be easily moved in to the 3rd and 4th floors. The 1st and 2nd floors have direct exterior access.

Adjacencies

For efficiency, equipment and environmental space is expected to be shared for certain commonly- or infrequently-performed functions. The proposed typical floor plate therefore includes a centrally-located Autoclave Room with biomedical waste cabinets, Cold Procedure Room and Common Laboratory Support Room. The latter would provide the following:

- Prep for the Cold Procedure Room
- Floor-Standing Centrifuge
- Flammable Storage Supply and Waste Cabinets
- Corrosive Storage Supply and Waste Cabinets
- 8-foot (2-person) chemical hood with additional cup sinks, distillation racks, process cooling water and vacuum pump cabinet for dispensing and bulking of chemicals and uncommon procedures. (This hood allows all other hoods to be simpler.)
- Nano-drop System
- Gel Documentation System
- Sink with RO and shelf for Water Polisher (Water Purification Type TBD)
- Undercounter Dishwasher
- Dry Ice Chest

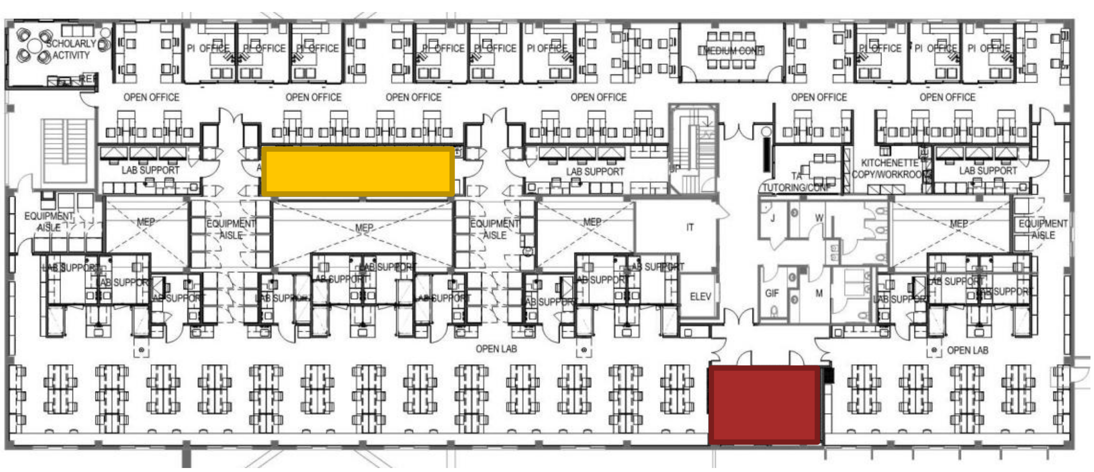


Figure 2-23. Location of Shared Laboratory Support Rooms (gold) and Plant Growth Rooms (brown) on a Prototypical Floor

Each floor also includes (2) shared Plant Growth Rooms (adjacent to, but segregated from each other, in order to isolate pest infestations).

Additional sharing efficiency occurs at a building level in locations that don't require researchers to access them by traveling through other laboratories:

- Laboratory Equipment (Freezers, Refrigerators, Growth Chambers, etc.)
- Laboratory Storage (Tall Storage Cabinets)
- (2) Central Plant Growth Rooms
- (2) Central Cold Storage Rooms
- (2) Plant Tissue Storage Rooms
- Plant Tissue Transfer Vestibule
- X-Ray Development Room
- Dirty Plant Prep Laboratory
- Plant Potting
- LN2 Storage Room
- Gas Cylinder Storage

Contamination Control:

Certain groups have researchers that spend time in the field, and therefore represent a potential source of soil contamination as they travel from the exterior of the building to their respective research spaces. Consequently, Open Wet Laboratories and Plant Growth

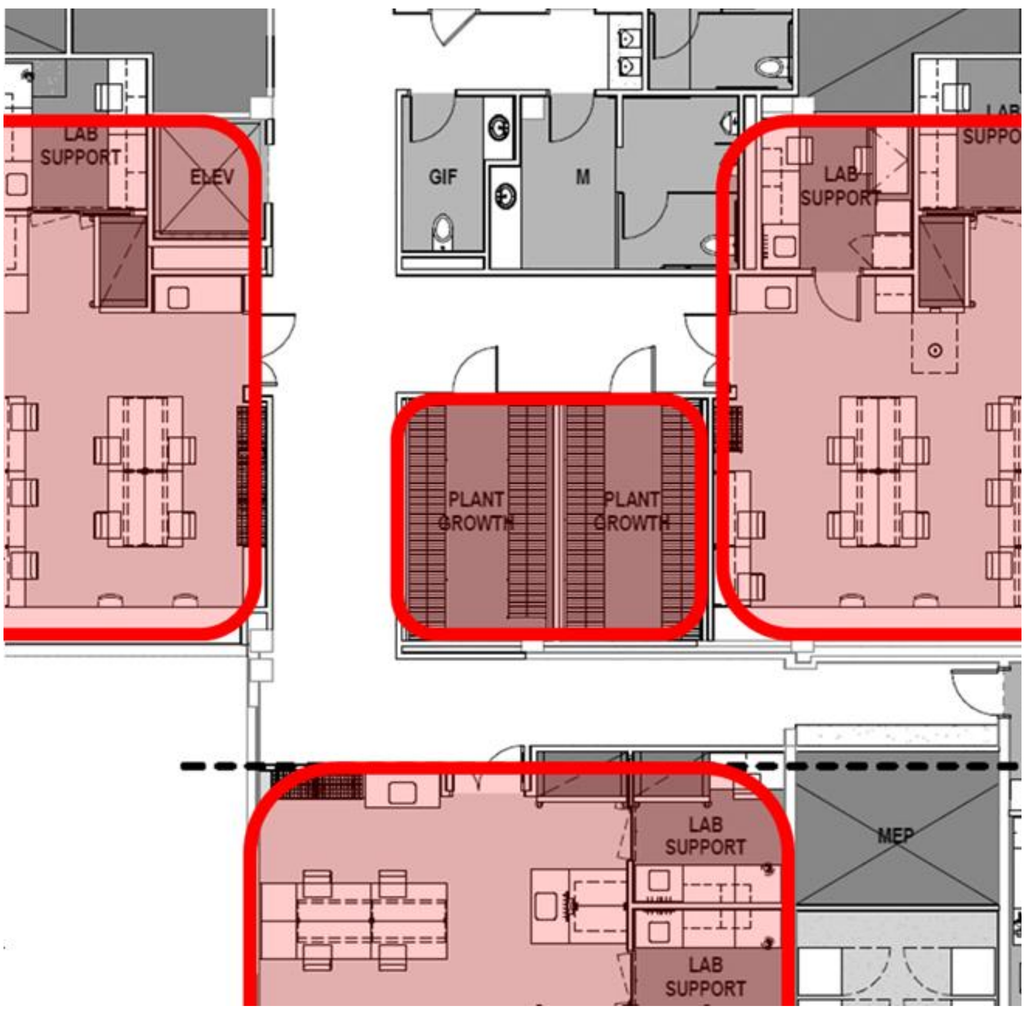


Figure 2.24. 3rd Floor elevator lobby illustrating typical separate access for 3 laboratory areas and 2 plant growth rooms.

Rooms are designed to be segregated at their junction to the Elevator Lobby. This allows personnel and material to move between these spaces and the elevator or main stairs without traveling through another laboratory, in particular Microbiology Laboratories, which are particularly sensitive to contamination. Additional contamination is controlled between the open laboratories and dedicated, enclosed laboratory support spaces.

At a building level, Plant Potting, the Dirty Prep Laboratory and a concentration of Plant Growth rooms are proposed to be located just inside the loading dock on the 2nd Floor, keeping soil away from the primary building entrances. The Gender Inclusive Restroom on this floor includes a shower and is located between the Loading Dock and the Lobby, allowing researchers returning from the field to clean up prior to entering the primary building circulation system.

Hazardous Materials

Biomedical Waste will be collected in the Autoclave Rooms on each floor. Other Hazardous Waste will be collected in appropriate Hazardous Materials storage cabinets in the Common Laboratory Support Rooms on each floor.

Batchelor Hall is not anticipated to require alternate occupancy classifications based on the presence and use of hazardous materials (including the gas cylinders near the Loading Dock) in quantities exceeding control area limitations published in the California Building Code (CBC).

The building will be separated into control areas (CBC 414.2) in which hazardous materials will not exceed the percentages of allowable exempt quantities set forth in Tables 414.2.2, 307.1 (1) and 307.1 (2). The control areas shall be separated from other areas by 1 hour fire barrier wall and/or floor construction, except for the fourth floor which shall be separated by 2 hour barriers.

- Four control areas are permitted on the first floor with 100% of the allowable hazardous materials per control area.
- Three control areas are permitted on the second floor with 75% of the allowable hazardous materials per control area.
- Two control areas are permitted on the third floor with 50% of the allowable hazardous materials per control area.
- Two control areas are permitted on the fourth floor with 12.5% of the allowable hazardous materials per control area. By comparison, this is 1/16 of what is allowed in all categories on the first floor.

As a common example, the University will need to manage their storage and use of Flammable Liquids* on the first floor to the following:

- Class 1A: 120 gallons per control area, with only 20 of those gallons allowed in use outside of approved storage cabinets.
- Class 1B and 1C in aggregate: 480 gallons per control area, with only 60 of those gallons allowed in use outside of approved storage cabinets.

On the fourth floor however, those quantities are reduced as follows:

- Class 1A: 15 gallons per control area, with only 2.5 of those gallons allowed in use outside of approved storage cabinets.
- Class 1B and 1C in aggregate: 60 gallons per control area, with only 7.5 of those gallons allowed in use outside of approved storage cabinets.

* Assumes a fully sprinkled building.

2.4.8 Research Offices

Existing Research Offices

The existing research offices are small, enclosed rooms on the building perimeter, with the private offices for Principal Investigators monopolizing virtually all of the available natural light and views. Graduate and Post-Doctoral students distributed in a range of shared enclosed offices with limited to no spaces for meetings and collaboration.

Proposed Research Office Concept

The proposed concept is to provide a pattern of enclosed offices and open workstations along the window walls on the North side of the Main Building and West side of the 3rd Floor South Wing. By placing some of the open workstations along the perimeter, some daylight will be able to penetrate further into the building. The office layout takes advantage of an open, non-rated “ghost’ corridor between the open workstations and the private offices that is similar to the circulation through the open laboratories. As the interior improvement projects are implemented, it will be necessary to fund complimentary portions of wet laboratory and office space to support both the full range of research functions and the completion of a viable segment of the exiting circulation to meet code.

Open Office

Benching furniture systems with low dividers will be used to create workstations for graduate, post-doctoral and visiting researchers. The conceptual master planning strategy has space to accommodate assignable desks to meet or exceed 2 Post-Doctoral Students, 4 Graduate Students, and potentially an Undergraduate Student and a Visiting Scientist. The contiguous open office environment provides allocation flexibility to research groups of various and dynamic sizes.

Computational Research and Offices

Every wet laboratory research group is expected to incorporate some degree of computational simulation into their scientific discovery process and this has been factored into the data and power capacity. At the same time some researchers will be exclusively computational. These researchers do not spend time in another laboratory, and as a result their environment should be held to a higher standard, including workstation size, and access to natural light and views without glare, but otherwise should follow the basic approach to open and private office on other floors. For this group in particular, workstation sizes should be equal and function driven.

Existing building idiosyncrasies on the West side of the 2nd Floor South Wing are not well-suited for wet laboratory planning, but will work well for a quad of 4 computational research teams. Adjacent to this computational research zone, the master planning strategy proposes the creation of a specialty server room for the specific needs of these researchers separate from the IT infrastructure rooms on every floor. This will require

University approval since the direction has been to move towards shared technology rooms.

Common Areas and Support Functions

Collaboration spaces that support both formal meeting and informal scholarly interactions have been provided within and appropriately sized for each office zone. Every office area has a meeting room that can seat between 12-15 around a central table and as many as 20 with a second row of seats along the edges of the room. Three of the four floors also have a smaller meeting room where teaching assistants can schedule sessions with students without inviting them into the secure research office suites. These smaller rooms can support a meeting of six and can serve as break-out space for researchers when they are not reserved for student consultation sessions. Additionally, both the first and second floor provide a large meeting/seminar space that can support either a flexible teaching furniture arrangement or large meetings. Office support areas with shared printers, storage for office supplies are also provided. Kitchenettes are incorporated in all of the informal scholarly activity rooms and in some of the larger office work rooms.

2.4.9 Planning Common to All Floors

Restrooms are proposed to be enlarged to comply with the California Plumbing Code and California Title 24 disabled access requirements.

The elevator will be replaced and enlarged to comply with current California Building Code.

The existing planning of laboratories, exit corridors and offices, concentrically arranged from inside to out, will be changed to laboratories along one side of each wing and offices on the other. Additionally, open laboratories and workplace will allow nearly every space in the building access to daylight and exterior views. The contiguous and open planning of each space type allows for research groups of different and dynamic sizes to be allocated contiguous space over time, and significantly increases building efficiency by minimizing dedicated corridors.

Meeting spaces are accessible from the public circulation in order to reduce access from individuals not assigned space on a particular floor. Scholarly activity spaces are distributed in desirable locations to promote collaboration, including the enclosure of the northwest exterior stair landing where full-height windows and views are possible.

In accordance with UC policy; a Gender Inclusive Restroom is located near the Gender Specific Restrooms on each floor. Additionally, there is a lactation room provide on the first floor.

2.4.10 First Floor Plan

A Class and Preparation Laboratory appropriately sized for 24 students is located where students can enter directly from the exterior and where chemicals can be delivered without transport through office areas.

A Seminar Room sized for 15-25 students is located near the first floor entrance. This function is currently poorly accommodated in the existing Class Laboratory.

Other office space is provided near the first floor entrance to accommodate the staff required to support the faculty within the building. However, it is sized and configured the same as research office space for future flexibility.

Central Plant Tissue Storage Rooms and a Plant Tissue Transfer vestibule would provide a low-contamination environment to support the work on all floors of the building.

A Central Laboratory Equipment and Storage Room would be provided in a location ill-suited to laboratories or office, and provide remote space and utilities for the approximately 15% of the Laboratory Equipment and Storage needs that cannot be efficiently accommodated on the individual research floors.

A Lactation Room, accessible from the public circulation, would support the entire building.

	1
	10,690
Research Laboratories	2,301
Research Laboratory Support	3,693
Class Laboratory	1,413
Office & Collaboration	3,283

Table 2-12. Batchelor Hall Floor 1 Assignable Area (ASF) Summary

Space	Description	Qty	Avg (sf)	1
	DPP Assignable Area (ASF)			**10,690**
	Research Laboratories			**2,301**
1.01	Open Laboratory Module	7	235	1,645
1.02	Fume Hood Alcove	2	135	270
1.03	Internal Laboratory Circulation Aisles	1	386	386
	Research Laboratory Support			**3,693**
2.01	Laboratory Support - Small	5	100	500
2.02	Laboratory Support - Medium	2	138	276
2.04	Common Laboratory Support	1	180	180
2.05	Laboratory Equipment Aisle (1 LF x 6')	88	6	525
2.06	Central Laboratory Equipment Aisle	85	6	510
2.07	Laboratory Storage / Cylinder Aisle (1 LF x 5')	66	5	330
2.08	Central Laboratory Storage / Cylinder Aisle	89	5	445
2.09	Cold Procedure Room	1	100	100
2.11	Central Plant Tissue Culture Storage	2	96	192
2.12	Central Plant Tissue Culture Transfer Vestibule	1	144	144
2.13	Plant Growth Room	2	160	320
2.15	Autoclave	1	117	117
2.20	Internal Laboratory Circulation Aisles	1	54	54
	Class Laboratory			**1,413**
4.01	Class Laboratory (24 Stations)	1	980	980
4.02	Class Laboratory Vestibule / Storage	1	181	181
4.03	Class Laboratory Prep	1	252	252
	Office & Collaboration			**3,283**
5.01	Principal Investigator Office	3	125	375
5.02	Post Doctoral Workstation	4	36	144
5.03	Graduate Student Workstation	16	30	480
5.04	Seminar Room (15-25 students)	1	422	422
5.05	Small Conference / TA Tutoring	1	127	127
5.06	Medium Conference (8-14 people)	1	195	195
5.08	Scholarly Activity / Kitchenette	1	229	229
5.11	Copy / Workroom	1	56	56
5.12	File Storage	6	25	150
5.13	Mail / Receiving	1	130	130
5.15	Other Office	2	108	216
5.16	Other Workstation	6	36	216
5.17	Internal Office Circulation Aisles	1	543	543

Table 2-13. Batchelor Hall Floor 1 Program Space List *(cont'd on next page)*

DPP Non-Assignable Area (NASF)

		Qty	Avg (sf)	4,250 1
6.01	Restroom - Men	1	176	176
6.02	Restroom - Women	1	198	198
6.03	Gender-Inclusive Restroom	1	66	66
6.04	Lactation Room	1	72	72
6.05	Janitor's Closet	1	41	41
6.06	BDF Room	1	169	169
6.08	MEP Spaces (Systems, Shafts)	1	2,369	2,369
6.09	Public Circulation	1	1,159	1,159

Covered Unenclosed (CUSF)

		Qty	Avg (sf)	3,294 1
7.03	Other Covered Outside Area	1	3,294	3,294

Table 2-14. Batchelor Hall First Floor Program Space Summary

DEPARTMENT LEGEND

- BLDG SUPPORT A
- BLDG SUPPORT B
- COLLABORATION
- FREEZER
- LAB SUPPORT
- OFFICE
- OPEN LAB

Figure 2-25. First Floor Planning Roadmap Diagram

2.4.11 Second Floor Plan

The existing Large Conference Room will be expanded slightly to accommodate the additional research faculty that can be more efficiently accommodated in the building.

The existing gas cylinder staging on the Loading Dock will be relocated, secured, and sheltered from public view to the East. This will be immediately adjacent to the existing Liquid Nitrogen Storage Room.

Four large Plant Growth Chambers would be co-located in a room directly accessible from the Loading Dock. Initially, two of these exist and would continue to be dedicated to their individual researchers. The other two would be new and shared by the entire building. Two existing, inadequate Plant Growth Rooms located amongst the Metabolomics Core, would be converted to shared, Central Cold Storage Rooms, also supporting the research of the entire building. A Dirty Prep Laboratory and Plant Potting Room would be accessible off of a corridor to the Loading Dock, limiting the distance that soil and contaminants are likely to get tracked into the building. A Gender Inclusive Restroom between the dock and the public circulation would contain a shower for these field researchers.

An X-Ray Development Room would be located near the public exterior entrance since it is available to multiple departments.

A vending area will be located off the public circulation.

The East side of the South Wing will continue to accommodate the newly-renovated Metabolomics Core. However, the West side of the South Wing is ill-suited to accommodate Wet Laboratories and hence will be renovated for four purely Computational Research Groups that don't require Wet Laboratory space. These groups can take advantage of the floor-to-ceiling, exterior glass wall with large, shading overhangs, to enhance the environment of those that work full-time on their computers.

	2
	15,957
Research Laboratories	3,731
Research Laboratory Support	5,716
Computational Lab	1,093
Office & Collaboration	5,417

Table 2-15. Batchelor Hall Floor 2 Assignable Area (ASF) Summary

Note: This table excludes Metabolomics Assignable Space.

Space	Description	Qty	Avg (sf)	2
	DPP Assignable Area (ASF)			**15,957**
	Research Laboratories			**3,731**
1.01	Open Laboratory Module	14	235	3,290
1.02	Fume Hood Alcove	3	135	405
1.03	Internal Laboratory Circulation Aisles	1	36	36
	Research Laboratory Support			**5,716**
2.01	Laboratory Support - Small	10	100	1,000
2.03	Laboratory Support - Large	2	251	501
2.04	Common Laboratory Support	1	180	180
2.05	Laboratory Equipment Aisle (1 LF x 6')	160	6	960
2.07	Laboratory Storage / Cylinder Aisle (1 LF x 5')	45	5	225
2.09	Cold Procedure Room	1	100	100
2.10	Central Cold Storage	2	226	452
2.13	Plant Growth Room	2	203	406
2.14	Central Plant Growth Room	2	203	406
2.15	Autoclave	1	117	117
2.16	X-Ray Developer	1	107	107
2.17	Liquid Nitrogen (LN2) Storage	1	95	95
2.18	Plant Potting	1	103	103
2.19	Dirty Prep Laboratory	1	448	448
2.20	Internal Laboratory Circulation Aisles	1	616	616
	Computational Lab			**1,093**
3.01	Computational Post Doctoral Workstation	10	36	360
3.02	Computational Graduate Student Workstation	16	30	480
3.03	Computational Server Room	1	253	253
	Office & Collaboration			**5,417**
5.01	Principal Investigator Office	10	125	1,250
5.02	Post Doctoral Workstation	12	36	432
5.03	Graduate Student Workstation	22	30	660
5.06	Medium Conference (8-14 people)	2	241	482
5.07	Large Conference (40 people)	1	500	500
5.08	Scholarly Activity / Kitchenette	1	231	231
5.09	Scholarly Activity	1	160	160
5.10	Copy / Workroom / Kitchenette	1	209	209
5.12	File Storage	9	25	225
5.14	Vending Alcove	1	116	116
5.17	Internal Office Circulation Aisles	2	576	1,152

Table 2-16. Batchelor Hall Floor 2 Program Space List *(cont'd on next page)*

DPP Non-Assignable Area (NASF)

		Qty	Avg (sf)	5,082 2
6.01	Restroom - Men	1	166	166
6.02	Restroom - Women	1	233	233
6.03	Gender-Inclusive Restroom	1	92	92
6.07	IDF Room	1	169	169
6.08	MEP Spaces (Systems, Shafts)	2	727	1,453
6.09	Public Circulation	2	1,485	2,969

Covered Unenclosed (CUSF)

		Qty	Avg (sf)	2,933 2
7.01	Gas Cylinder Storage (Exterior)	1	130	130
7.02	Loading Dock (Exterior)	1	911	911
7.03	Other Covered Outside Area	1	1,892	1,892

Metabolomics Core (ASF)

		Qty	Avg (sf)	2,077 2
8.01	Metabolomics Core Laboratories	5	285	1,423
8.02	Metabolomics Core Office	2	166	332
8.03	Metabolomics Core Conference	1	322	322

Table 2-17. Batchelor Hall Second Floor Program Space Summary

DEPARTMENT LEGEND

- BLDG SUPPORT A
- BLDG SUPPORT B
- COLLABORATION
- FREEZER
- LAB SUPPORT
- OFFICE
- OPEN LAB

Figure 2-26. Second Floor Planning Roadmap Diagram

2.4.12 Third Floor Plan

The Third floor nearly represents the prototypical floor (see the Fourth floor for the purest representation of the planning concepts) in the Main Wing of the building. However, the two Plant Growth Rooms are shifted to the East to allow access to the South Wing.

The South Wing structure and exterior are similar to the Main Wing, except that the interior structure is vertically supported by concrete shear walls, not columns. This allows more of the existing shafts to be in-filled for Laboratory Equipment and Storage Aisles, but limits penetrations through the walls since they are also the lateral resisting components of this wing.

A consequence of these shear wall limitations is that East side of the South Wing is difficult to facilitize as wet laboratories. The concept proposes to use the resulting additional office space to accommodate two average-sized, purely computational research groups.

	3
	21,864
Research Laboratories	6,619
Research Laboratory Support	6,496
Computational Lab	312
Office & Collaboration	8,437

Table 2-18. Batchelor Hall Floor 3 Assignable Area (ASF) Summary

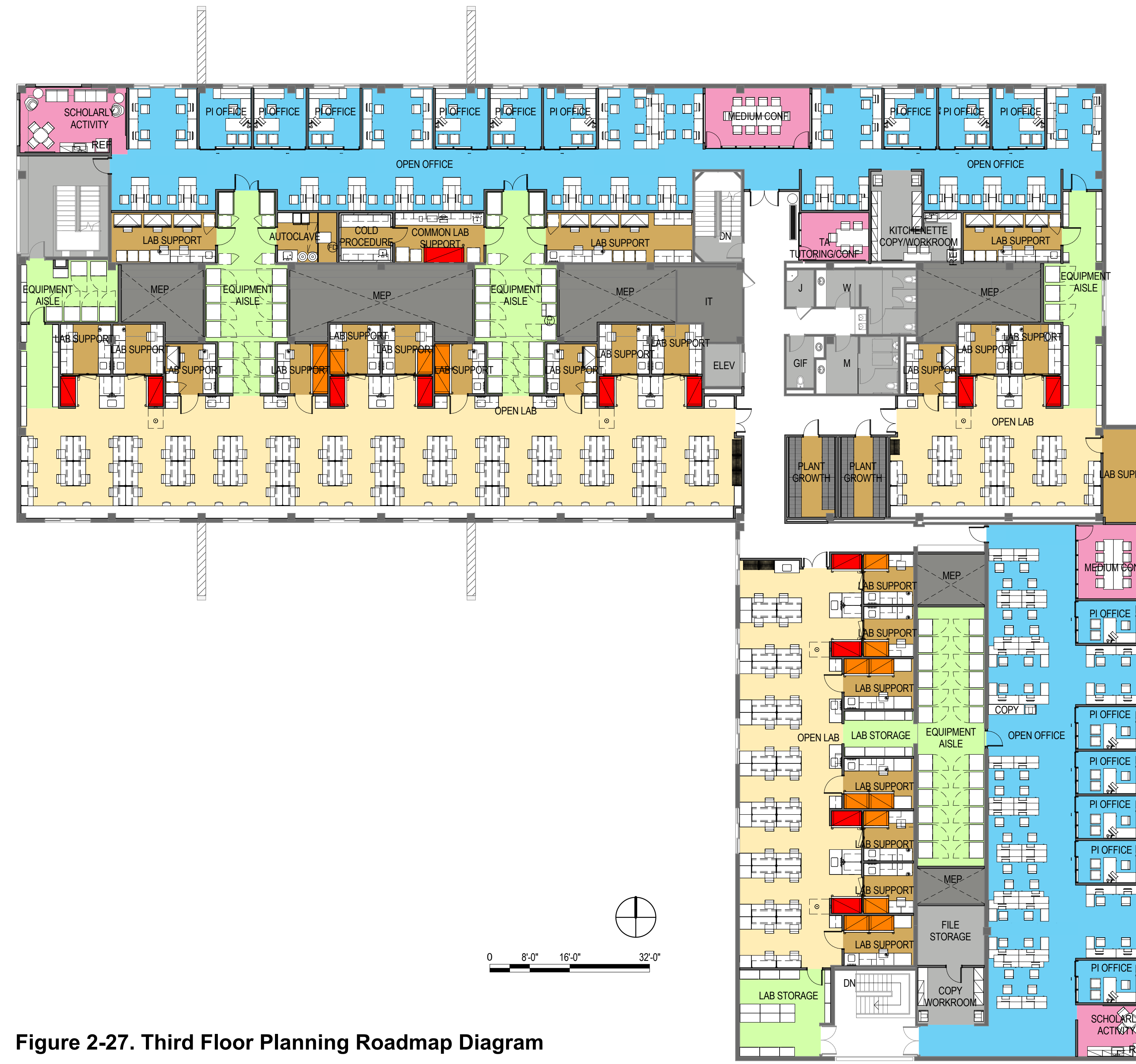
DPP Assignable Area (ASF)

Space	Description	Qty	Avg (sf)	3
	Research Laboratories			**6,619**
1.01	Open Laboratory Module	26	218	5,670
1.02	Fume Hood Alcove	6	135	810
1.03	Internal Laboratory Circulation Aisles	2	70	139
	Research Laboratory Support			**6,496**
2.01	Laboratory Support - Small	17	100	1,704
2.02	Laboratory Support - Medium	3	140	420
2.03	Laboratory Support - Large	3	230	691
2.04	Common Laboratory Support	1	180	180
2.05	Laboratory Equipment Aisle (1 LF x 6')	268	6	1,605
2.07	Laboratory Storage / Cylinder Aisle (1 LF x 5')	183	5	915
2.09	Cold Procedure Room	1	100	100
2.13	Plant Growth Room	2	160	320
2.15	Autoclave	1	117	117
2.20	Internal Laboratory Circulation Aisles	2	222	444
	Computational Lab			**312**
3.01	Computational Post Doctoral Workstation	2	36	72
3.02	Computational Graduate Student Workstation	8	30	240
	Office & Collaboration			**8,437**
5.01	Principal Investigator Office	15	123	1,845
5.02	Post Doctoral Workstation	32	36	1,152
5.03	Graduate Student Workstation	49	30	1,470
5.05	Small Conference / TA Tutoring	1	135	135
5.06	Medium Conference (8-14 people)	2	230	460
5.08	Scholarly Activity / Kitchenette	2	210	419
5.10	Copy / Workroom / Kitchenette	1	259	259
5.11	Copy / Workroom	2	107	213
5.12	File Storage	16	33	534
5.17	Internal Office Circulation Aisles	2	975	1,950
	Total			**21,864**

DPP Non-Assignable Area (NASF)

Space	Description	Qty	Avg (sf)	3
6.01	Restroom - Men	1	176	176
6.02	Restroom - Women	1	198	198
6.03	Gender-Inclusive Restroom	1	66	66
6.05	Janitor's Closet	2	41	82
6.07	IDF Room	1	169	169
6.08	MEP Spaces (Systems, Shafts)	2	764	1,528
6.09	Public Circulation	2	879	1,757
	Total			**3,976**

Table 2-19. Batchelor Hall Floor 3 Program Space List



DEPARTMENT LEGEND

- BLDG SUPPORT A
- BLDG SUPPORT B
- COLLABORATION
- FREEZER
- LAB SUPPORT
- OFFICE
- OPEN LAB

Figure 2-27. Third Floor Planning Roadmap Diagram

2.4.13 Fourth Floor Plan

The Fourth floor is the prototypical floor, the purest representation of the planning concepts for the building. Consequently, there are no unique features on this level except that the west side laboratories also have access to daylight and views.

	4
	14,586
Research Laboratories	5,005
Research Laboratory Support	4,543
Office & Collaboration	5,038

Table 2-20. Batchelor Hall Floor 4 Assignable Area (ASF) Summary

DPP Assignable Area (ASF) 14,586

Space	Description	Qty	Avg (sf)	4
	Research Laboratories			**5,005**
1.01	Open Laboratory Module	19	235	4,465
1.02	Fume Hood Alcove	4	135	540
1.03	Internal Laboratory Circulation Aisles	1		
	Research Laboratory Support			**4,543**
2.01	Laboratory Support - Small	13	100	1,300
2.03	Laboratory Support - Large	3	230	691
2.04	Common Laboratory Support	1	180	180
2.05	Laboratory Equipment Aisle (1 LF x 6')	172	6	1,029
2.07	Laboratory Storage / Cylinder Aisle (1 LF x 5')	99	5	495
2.09	Cold Procedure Room	1	100	100
2.13	Plant Growth Room	2	160	320
2.15	Autoclave	1	117	117
2.20	Internal Laboratory Circulation Aisles	1	311	311
	Office & Collaboration			**5,038**
5.01	Principal Investigator Office	9	125	1,125
5.02	Post Doctoral Workstation	18	36	648
5.03	Graduate Student Workstation	34	30	1,020
5.05	Small Conference / TA Tutoring	1	135	135
5.06	Medium Conference (8-14 people)	1	251	251
5.08	Scholarly Activity / Kitchenette	1	276	276
5.10	Copy / Workroom / Kitchenette	1	176	176
5.12	File Storage	15	25	375
5.17	Internal Office Circulation Aisles	1	1,032	1,032

DPP Non-Assignable Area (NASF) 3,156

Space	Description	Qty	Avg (sf)	4
6.01	Restroom - Men	1	176	176
6.02	Restroom - Women	1	198	198
6.03	Gender-Inclusive Restroom	1	66	66
6.05	Janitor's Closet	1	41	41
6.07	IDF Room	1	207	207
6.08	MEP Spaces (Systems, Shafts)	1	1,218	1,218
6.09	Public Circulation	1	1,250	1,250

Table 2-21. Batchelor Hall Floor 4 Program Space List

DEPARTMENT LEGEND

- BLDG SUPPORT A
- BLDG SUPPORT B
- COLLABORATION
- FREEZER
- LAB SUPPORT
- OFFICE
- OPEN LAB

Figure 2-28. Fourth Floor Planning Roadmap Diagram

2.5 Program Space Summary

The following represents the recommended quantity and average sizes of the spaces that are shown in the Interior Improvements Roadmap diagrams. These areas exclude Keen Hall and the Metabolomics Core. The originally-requested space sizes are located in the Space Data Sheets of Chapter 3.

	Batchelor
	63,097
Research Laboratories	17,656
Research Laboratory Support	20,448
Computational Lab	1,405
Class Laboratory	1,413
Office & Collaboration	22,175

Table 2-22. Batchelor Hall Program Assignable Area (ASF) Summary
Note: These areas exclude Metabolomics Core.

Space	DPP Assignable Area (ASF) Description	Qty	Avg (sf)	All Floors 63,097
	Research Laboratories			**17,656**
1.01	Open Laboratory Module	66	228	15,070
1.02	Fume Hood Alcove	15	135	2,025
1.03	Internal Laboratory Circulation Aisles			561
	Research Laboratory Support			**20,448**
2.01	Laboratory Support - Small	45	100	4,504
2.02	Laboratory Support - Medium	5	139	696
2.03	Laboratory Support - Large	8	235	1,883
2.04	Common Laboratory Support	4	180	720
2.05	Laboratory Equipment Aisle (1 LF x 6')	687	6	4,119
2.06	Central Laboratory Equipment Aisle	85	6	510
2.07	Laboratory Storage / Cylinder Aisle (1 LF x 5')	393	5	1,965
2.08	Central Laboratory Storage / Cylinder Aisle	89	5	445
2.09	Cold Procedure Room	4	100	400
2.10	Central Cold Storage	2	226	452
2.11	Central Plant Tissue Culture Storage	2	96	192
2.12	Central Plant Tissue Culture Transfer Vestibule	1	144	144
2.13	Plant Growth Room	8	171	1,366
2.14	Central Plant Growth Room	2	203	406
2.15	Autoclave	4	117	468
2.16	X-Ray Developer	1	107	107
2.17	Liquid Nitrogen (LN2) Storage	1	95	95
2.18	Plant Potting	1	103	103
2.19	Dirty Prep Laboratory	1	448	448
2.20	Internal Laboratory Circulation Aisles			1,425
	Computational Lab			**1,405**
3.01	Computational Post Doctoral Workstation	12	36	432
3.02	Computational Graduate Student Workstation	24	30	720
3.03	Computational Server Room	1	253	253
	Class Laboratory			**1,413**
4.01	Class Laboratory (24 Stations)	1	980	980
4.02	Class Laboratory Vestibule / Storage	1	181	181
4.03	Class Laboratory Prep	1	252	252

Table 2-23. Batchelor Hall Program Space List *(cont'd on next page)*

DPP Assignable Area (ASF) — 63,097

Space	Description	Qty	Avg (sf)	All Floors
	Office & Collaboration			**22,175**
5.01	Principal Investigator Office	37	124	4,595
5.02	Post Doctoral Workstation	66	36	2,376
5.03	Graduate Student Workstation	121	30	3,630
5.04	Seminar Room (15-25 students)	1	422	422
5.05	Small Conference / TA Tutoring	3	132	397
5.06	Medium Conference (8-14 people)	6	231	1,388
5.07	Large Conference (40 people)	1	500	500
5.08	Scholarly Activity / Kitchenette	5	231	1,155
5.09	Scholarly Activity	1	160	160
5.10	Copy / Workroom / Kitchenette	3	215	644
5.11	Copy / Workroom	3	90	269
5.12	File Storage	46	28	1,284
5.13	Mail / Receiving	1	130	130
5.14	Vending Alcove	1	116	116
5.15	Other Office	2	108	216
5.16	Other Workstation	6	36	216
5.17	Internal Office Circulation Aisles			4,677

DPP Non-Assignable Area (NASF — 21,886

Space	Description	Qty	Avg (sf)	All Floors
6.01	Restroom - Men	4	174	694
6.02	Restroom - Women	4	207	827
6.03	Gender-Inclusive Restroom	4	73	290
6.04	Lactation Room	1	72	72
6.05	Janitor's Closet	4	41	164
6.06	BDF Room	1	169	169
6.07	IDF Room	3	182	545
6.08	MEP Spaces (Systems, Shafts)			11,508
6.09	Public Circulation			7,617

Covered Unenclosed (CUSF) — 6,227

Space	Description	Qty	Avg (sf)	All Floors
7.01	Gas Cylinder Storage (Exterior)	1	130	130
7.02	Loading Dock (Exterior)	1	911	911
7.03	Other Covered Outside Area			5,186

Table 2-24. Batchelor Hall Program Space List *(cont'd on next page)*

The Metabolomics Core is currently under renovation outside of the scope of this project. This project will include Infrastructure Renewal for Metabolomics. These assignable areas however are included in the Bachelor Hall building totals.

	Metabolomics Core (ASF)		Total	All Floors
				2,077
8.01	Metabolomics Core Laboratories	5	285	1,423
8.02	Metabolomics Core Office	2	166	332
8.03	Metabolomics Core Conference	1	322	322

Table 2-24. Batchelor Hall Program Space List *(cont'd from previous page)*

3 Room Data Sheets & Space Justification Sketches

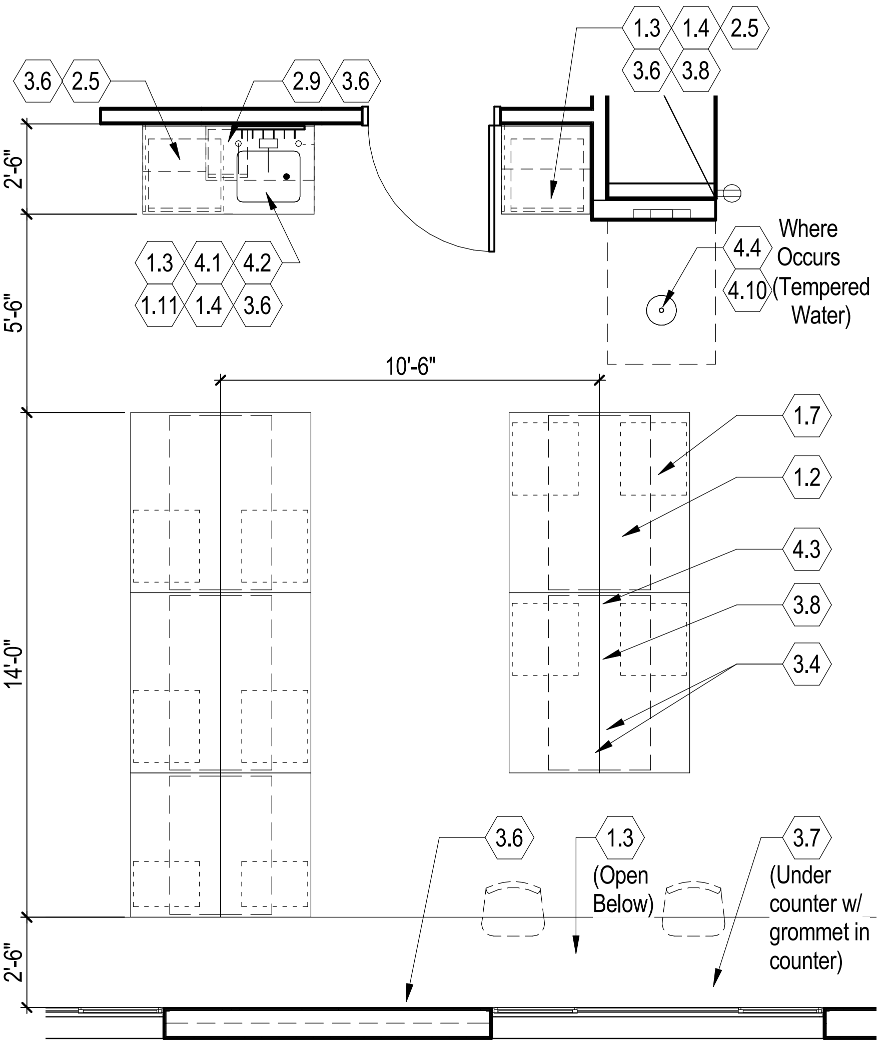
Diagrams illustrated on the following pages represent programming information appropriate for the purposes of this DPP, but should not be construed to represent fully-researched schematic design configurations. As initial and future Batchelor Hall tenant improvements are designed, the information in these diagrams will be used to inform and layout actual building areas. Consequently, dimensions and component relationships will need to be adjusted to suit specific conditions within the existing building and developing design.

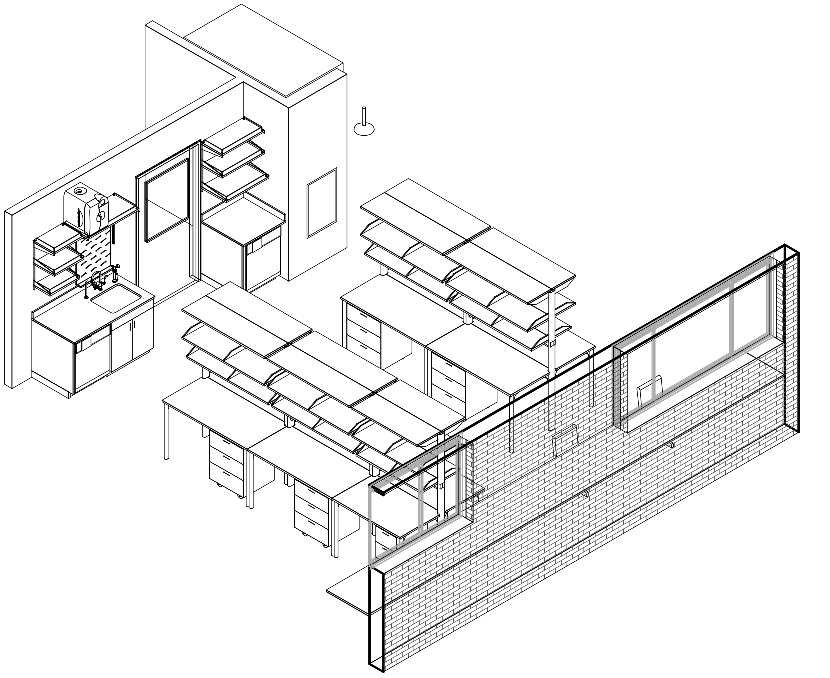
Certain spaces do not benefit from separate Room Data Sheets and/or Space Justification Sketches. These are listed and explained at the end of this section.

Space	***1.01 Open Laboratory Module***					
Functional Description	*Bio-Safety Level 2 Open Benchtop work.*					
Critical Adjacencies	*Fume Hood Alcoves, Laboratory Support, Equipment and Storage Aisles*					
	Architectural & Structural					
Size	Avg (sf):	*228*	Request (sf):	*228*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*6*	Width (ft):	*3*	Height (ft):	*5*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Glass + 2*	Door Height (ft):	*7*
Finishes	Floors:	*Chem Res. Sheet*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Mylar-wrapped Ceiling Tile*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*Preferred*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Note (1)*	Hot:	*Note (1)*	Process Cooling:	*No*
	Purified Water:	*Note (1)*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*1/Bench*	Lab Vacuum:	*1 / Bench*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*Note (2)*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*80%*		
Telcom & Security	Tel/Data (boxes):	*4-Port 5' OC*	Paging:	*Yes*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*< 55' & <10s*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Sinks to receive Industrial Hot, Cold and Type I Purified Water. No wet utilities elsewhere except to dishwashers. Laboratory Air and Vacuum at work benches. Tepid, Domestic Water to Safety Shower / Eye Wash. Eye Washes at all sinks. Note (3) One 120V-20A-1Ø duplex standby power outlet per PI group at window wall.





KEY LEGEND:

1.0 CASEWORK STORAGE

- 1.1 Movable Table, Adjustable Height
- 1.2 Movable Work Bench w/ Shelving
- 1.3 Countertop
- 1.4 Adjustable Shelving
- 1.5 Knee Opening
- 1.6 Fixed Base Cabinets
- 1.7 Mobile Cabinets
- 1.8 Flammable Storage Cabinet
- 1.9 Corrosive Storage Cabinet
- 1.10 Cylinder Storage Rack
- 1.11 Drying Rack
- 1.12 Tall Storage Cabinets
- 1.13 Upper Cabinets
- 1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

- 2.1 Fume Hood
- 2.2 Biological Safety Cabinet
- 2.3 Snorkel
- 2.4 Autoclave: Air, Industrial Water, Steam, RO
- 2.5 Dishwasher: Industrial Water
- 2.6 Incubator (OFOI)
- 2.7 Refrigerator (OFOI)
- 2.8 Freezer (OFOI)
- 2.9 Water Polisher (OFOI): RO
- 2.10 Ice Machine: Industrial Water, Drain
- 2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

- 3.1 Overhead Outlet(s): Power and/or Data
- 3.2 Video Projector
- 3.3 Projection Screen
- 3.4 Wire Mold or Pedestal: Power and/or Data
- 3.5 Floor Outlet(s): Power and/or Data
- 3.6 Wall Outlet(s): Power and/or Data
- 3.7 Standby Outlet(s)
- 3.8 Task Lighting (Under Shelf)
- 3.9 Flat Panel Monitor

4.0 PLUMBING

- 4.1 Laboratory Sink or Cupsink
- 4.2 Industrial Hot/Cold Water, Drench Hose & DI
- 4.3 Laboratory Gases: Air & Vac
- 4.4 Recessed Safety Shower & Eyewash Combo
- 4.5 Pipe Drop Enclosure
- 4.6 Process Cooling Water
- 4.7 Floor Drain
- 4.8 Floor Sink
- 4.9 Stainless Steel Sink
- 4.10 Domestic Hot/Cold Water
- 4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

- 5.1 Marker Board
- 5.2 Tack Board
- 5.3 Printer/Copier
- 5.4 Blackout Curtains
- 5.5 Acoustical Panel
- 5.6 Clearstory Window

6.0 MECHANICAL

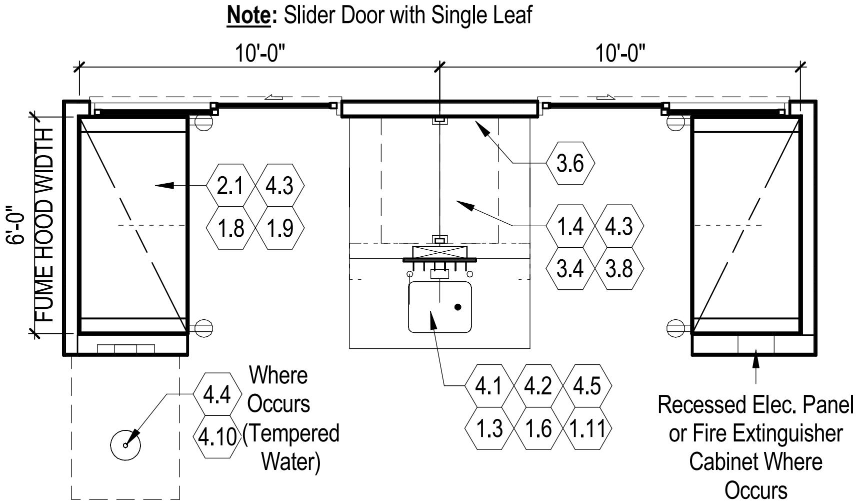
- 6.1 Exhaust Connection (Future Tie-in)

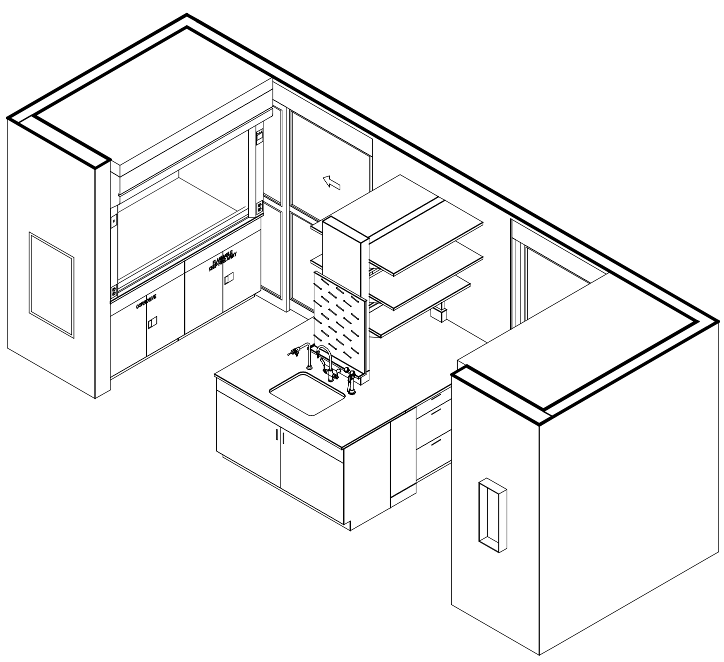
Space	***1.02 Fume Hood Alcove***
Functional Description	*Bio-Safety Level 2 Fume Hood work contiguous with open Laboratory. Alcoves are typically paired to accommodate 2 hoods.*
Critical Adjacencies	*Open Laboratory, "Ghost Corridor"*

	Architectural & Structural					
Size	Avg (sf):	*135*	Request (sf):	*135*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*6*	Width (ft):	*3*	Height (ft):	*5*
	Live Load (psf):	*Existing*	Door Width (ft):	*n/a*	Door Height (ft):	*n/a*
Finishes	Floors:	*Note (1)*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Mylar-wrapped Ceiling Tile Preferred*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*Yes*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Note (2)*	Hot:	*Note (2)*	Process Cooling:	*No*
	Purified Water:	*Note (2)*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*At Hood*	Lab Vacuum:	*At Hood*	Lab (Natural) Gas:	*At Hood*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*80%*		
Telcom & Security	Tel/Data (boxes):	*(1) 4-Port*	Paging:	*Yes*	Security:	*n/a*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*< 55' & <10s*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Chemical Resistant, Coved Sheet. Note (2) Sinks to receive Industrial Hot, Cold and Type I Purified Water. Fume Hoods to receive Laboratory Air, Vacuum and Gas. Tepid, Domestic Water to Eye Wash. Eye Washes at all sinks.





KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space	***2.01 Laboratory Support - Small***
Functional Description	*Bio-Safety Level 2, Closed, Secure Space for Specific Functions such as Tissue Culture.*
Critical Adjacencies	*Open Laboratory*

Architectural & Structural

Size	Avg (sf):	*100*	Request (sf):	*100*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*5*	Width (ft):	*3*	Height (ft):	*5*
	Live Load (psf):	*Existing*	Door Width (ft):	*3.5, Solid*	Door Height (ft):	*7*
Finishes	Floors:	*Note (1)*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Mylar-wrappec Ceiling Tile*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*40*

Mechanical

HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*Yes*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*

Utilities

Water	Cold:	*Note (2)*	Hot:	*Note (2)*	Process Cooling:	*No*
	Purified Water:	*Note (2)*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*Yes*	Lab Vacuum:	*Yes*	Lab (Natural) Gas:	*Yes*

Electrical

Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*Yes, 1*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*(1)120V-20A-*	UPS:	*by User*
	Equip. Load (w/sf):	*4*	Equip. Demand	*80%*		
Telcom & Security	Tel/Data (boxes):	*4-Port 5' OC*	Paging:	*Yes*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*

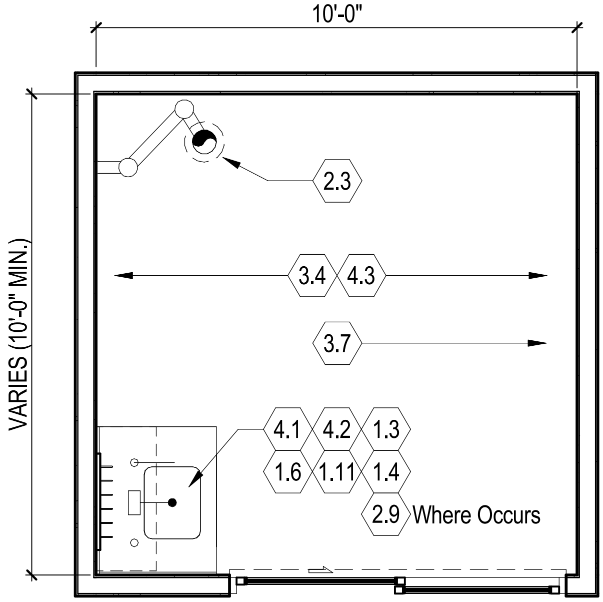
Safety & Security

Safety	Shwr/Eye Wash:	*< 55' & <10s*	Fume Hood:	*No*	Exhausted BSC:	*No*

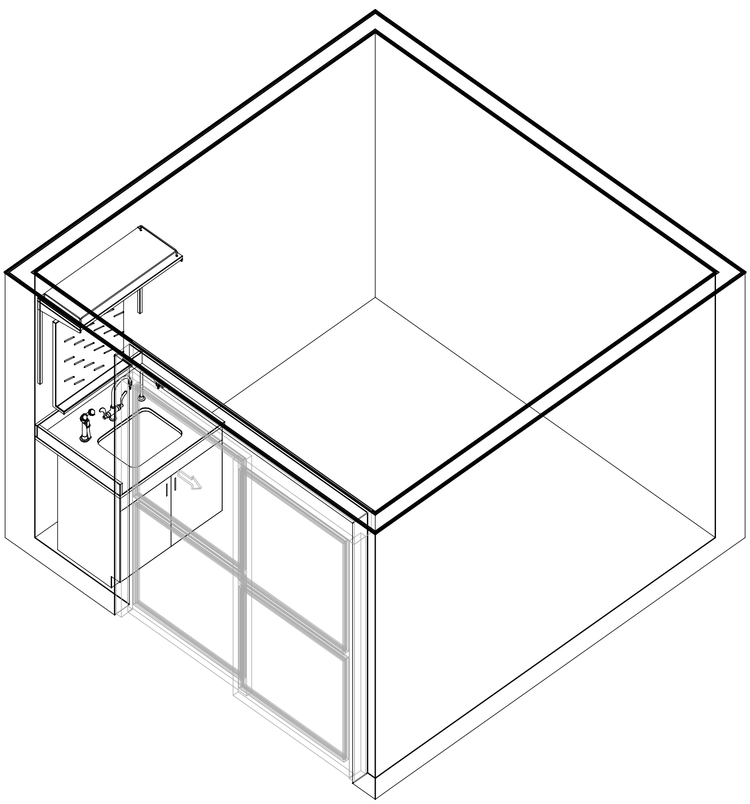
Special Requirements & Outstanding Issues

Note (1) Chemical Resistant, Welded-Seam, Coved Sheet. Note (2) Sinks to receive Industrial Hot, Cold and Type I Purified Water. Fume Hoods to receive Laboratory Air, Vacuum and Gas. Tepid, Domestic Water to Eye Wash at sink.

Note: Additional Snorkel For Rooms Over 15'-0"



NOTE: See Plan For Door Type



KEY LEGEND:

1.0 CASEWORK STORAGE

- 1.1 Movable Table, Adjustable Height
- 1.2 Movable Work Bench w/ Shelving
- 1.3 Countertop
- 1.4 Adjustable Shelving
- 1.5 Knee Opening
- 1.6 Fixed Base Cabinets
- 1.7 Mobile Cabinets
- 1.8 Flammable Storage Cabinet
- 1.9 Corrosive Storage Cabinet
- 1.10 Cylinder Storage Rack
- 1.11 Drying Rack
- 1.12 Tall Storage Cabinets
- 1.13 Upper Cabinets
- 1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

- 2.1 Fume Hood
- 2.2 Biological Safety Cabinet
- 2.3 Snorkel
- 2.4 Autoclave: Air, Industrial Water, Steam, RO
- 2.5 Dishwasher: Industrial Water
- 2.6 Incubator (OFOI)
- 2.7 Refrigerator (OFOI)
- 2.8 Freezer (OFOI)
- 2.9 Water Polisher (OFOI): RO
- 2.10 Ice Machine: Industrial Water, Drain
- 2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

- 3.1 Overhead Outlet(s): Power and/or Data
- 3.2 Video Projector
- 3.3 Projection Screen
- 3.4 Wire Mold or Pedestal: Power and/or Data
- 3.5 Floor Outlet(s): Power and/or Data
- 3.6 Wall Outlet(s): Power and/or Data
- 3.7 Standby Outlet(s)
- 3.8 Task Lighting (Under Shelf)
- 3.9 Flat Panel Monitor

4.0 PLUMBING

- 4.1 Laboratory Sink or Cupsink
- 4.2 Industrial Hot/Cold Water, Drench Hose & DI
- 4.3 Laboratory Gases: Air & Vac
- 4.4 Recessed Safety Shower & Eyewash Combo
- 4.5 Pipe Drop Enclosure
- 4.6 Process Cooling Water
- 4.7 Floor Drain
- 4.8 Floor Sink
- 4.9 Stainless Steel Sink
- 4.10 Domestic Hot/Cold Water
- 4.11 Porcelain/Solid Surface Lavatory

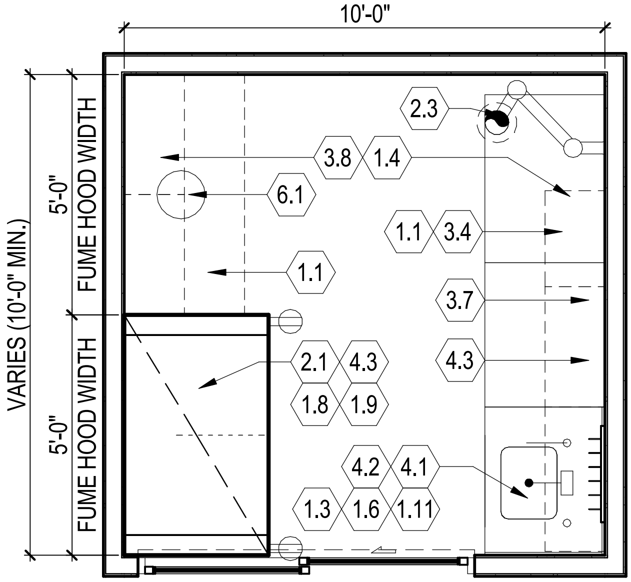
5.0 OTHER

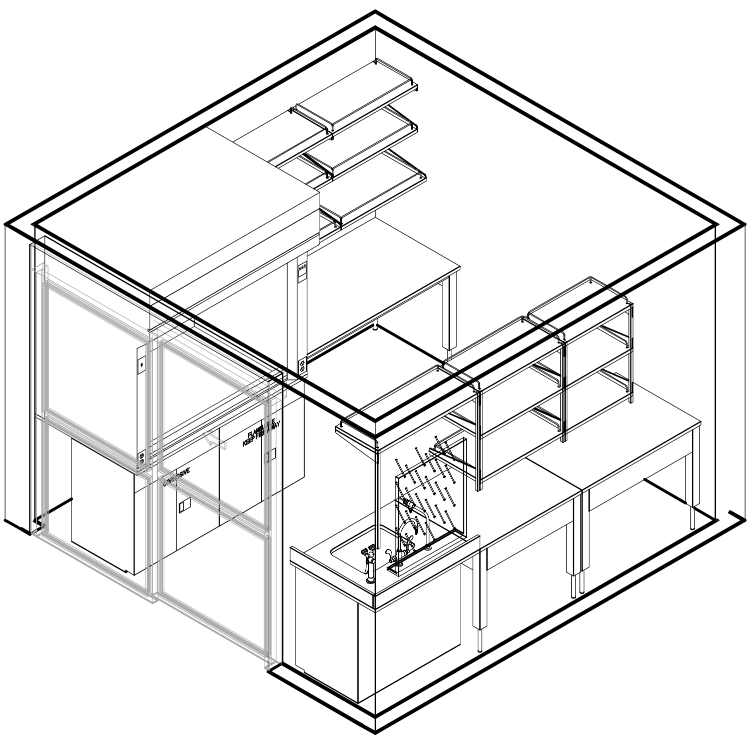
- 5.1 Marker Board
- 5.2 Tack Board
- 5.3 Printer/Copier
- 5.4 Blackout Curtains
- 5.5 Acoustical Panel
- 5.6 Clearstory Window

6.0 MECHANICAL

- 6.1 Exhaust Connection (Future Tie-in)

Note: Fume Hood At 6.1 Where Beam Does Not Occur





KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

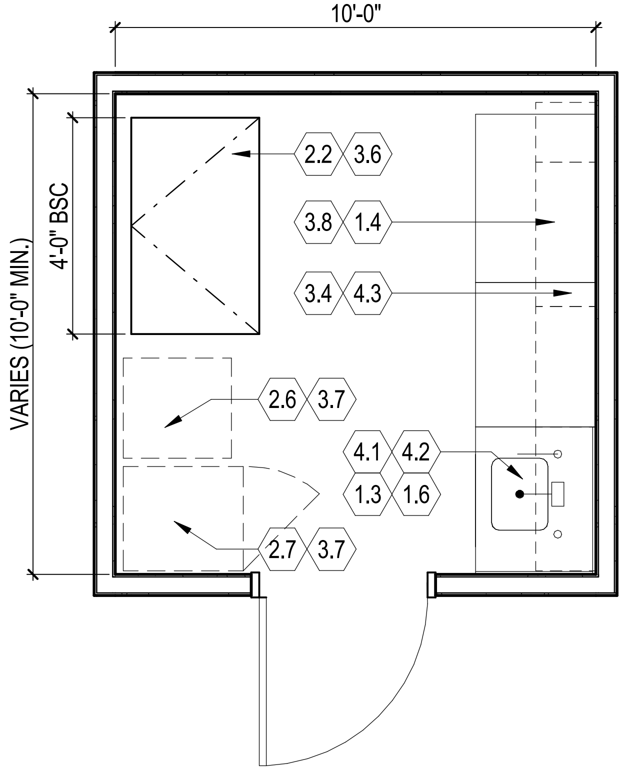
4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

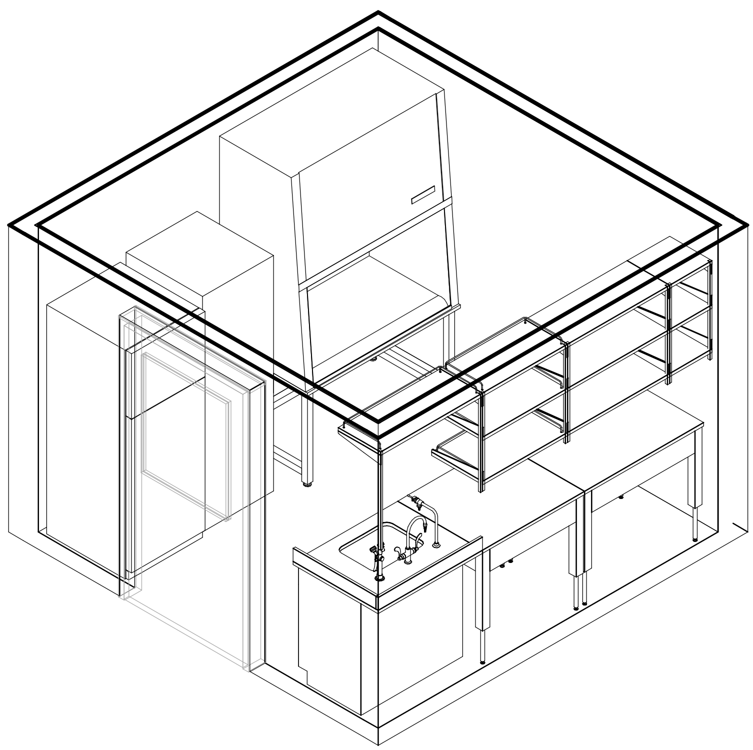
5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)



Note: See Plan For Door Type



KEY LEGEND:

1.0 CASEWORK STORAGE

- 1.1 Movable Table, Adjustable Height
- 1.2 Movable Work Bench w/ Shelving
- 1.3 Countertop
- 1.4 Adjustable Shelving
- 1.5 Knee Opening
- 1.6 Fixed Base Cabinets
- 1.7 Mobile Cabinets
- 1.8 Flammable Storage Cabinet
- 1.9 Corrosive Storage Cabinet
- 1.10 Cylinder Storage Rack
- 1.11 Drying Rack
- 1.12 Tall Storage Cabinets
- 1.13 Upper Cabinets
- 1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

- 2.1 Fume Hood
- 2.2 Biological Safety Cabinet
- 2.3 Snorkel
- 2.4 Autoclave: Air, Industrial Water, Steam, RO
- 2.5 Dishwasher: Industrial Water
- 2.6 Incubator (OFOI)
- 2.7 Refrigerator (OFOI)
- 2.8 Freezer (OFOI)
- 2.9 Water Polisher (OFOI): RO
- 2.10 Ice Machine: Industrial Water, Drain
- 2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

- 3.1 Overhead Outlet(s): Power and/or Data
- 3.2 Video Projector
- 3.3 Projection Screen
- 3.4 Wire Mold or Pedestal: Power and/or Data
- 3.5 Floor Outlet(s): Power and/or Data
- 3.6 Wall Outlet(s): Power and/or Data
- 3.7 Standby Outlet(s)
- 3.8 Task Lighting (Under Shelf)
- 3.9 Flat Panel Monitor

4.0 PLUMBING

- 4.1 Laboratory Sink or Cupsink
- 4.2 Industrial Hot/Cold Water, Drench Hose & DI
- 4.3 Laboratory Gases: Air & Vac
- 4.4 Recessed Safety Shower & Eyewash Combo
- 4.5 Pipe Drop Enclosure
- 4.6 Process Cooling Water
- 4.7 Floor Drain
- 4.8 Floor Sink
- 4.9 Stainless Steel Sink
- 4.10 Domestic Hot/Cold Water
- 4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

- 5.1 Marker Board
- 5.2 Tack Board
- 5.3 Printer/Copier
- 5.4 Blackout Curtains
- 5.5 Acoustical Panel
- 5.6 Clearstory Window

6.0 MECHANICAL

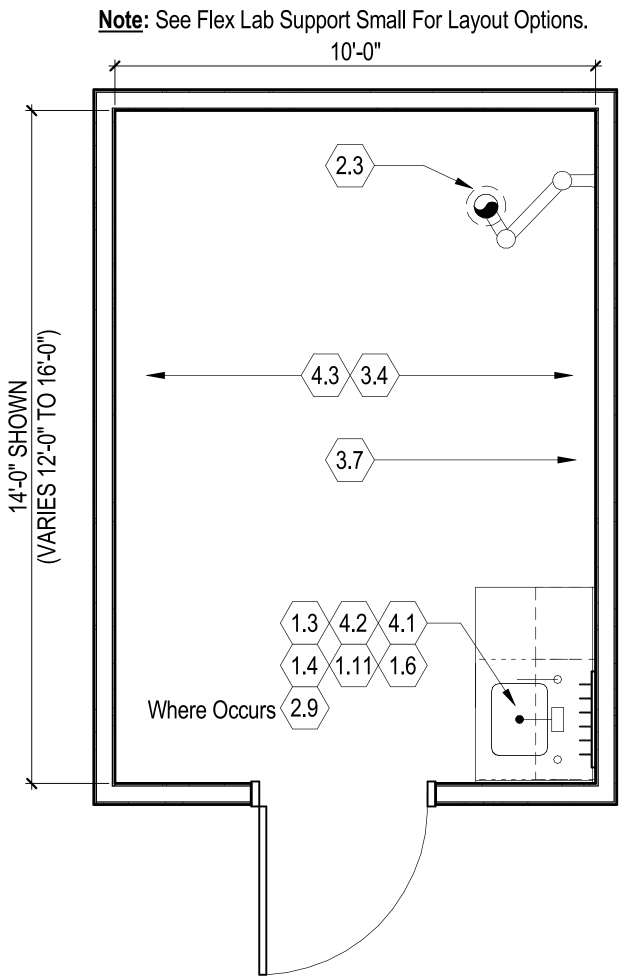
- 6.1 Exhaust Connection (Future Tie-in)

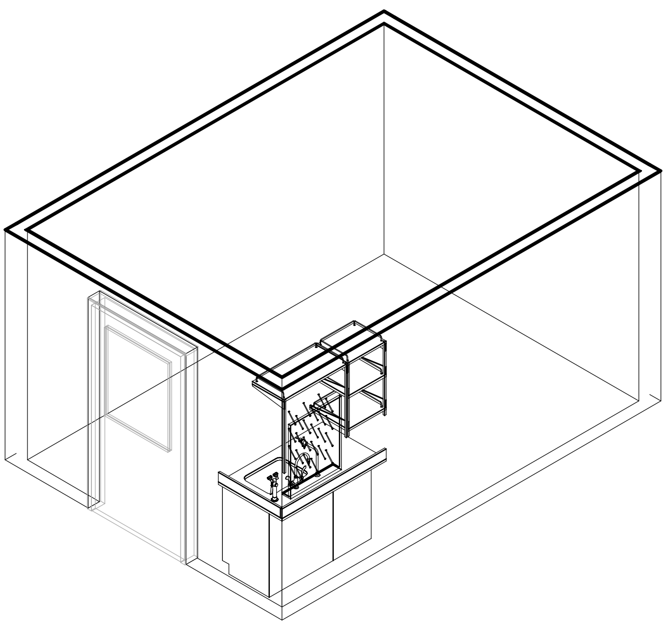
Space	***2.02 Laboratory Support - Medium***
Functional Description	*Bio-Safety Level 2, Closed, Secure Space for Specific Functions such as Tissue Culture.*
Critical Adjacencies	*Open Laboratory*

	Architectural & Structural					
Size	Avg (sf):	*139*	Request (sf):	*140*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*5*	Width (ft):	*3*	Height (ft):	*5*
	Live Load (psf):	*Existing*	Door Width (ft):	*3.5, Solid*	Door Height (ft):	*7*
Finishes	Floors:	*Note (1)*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Mylar-wrappec Ceiling Tile*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*40*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*Yes*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Note (2)*	Hot:	*Note (2)*	Process Cooling:	*No*
	Purified Water:	*Note (2)*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*Yes*	Lab Vacuum:	*Yes*	Lab (Natural) Gas:	*Yes*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*Yes, 1*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*(1)120V-20A-*	UPS:	*by User*
	Equip. Load (w/sf):	*4*	Equip. Demand	*80%*		
Telcom & Security	Tel/Data (boxes):	*4-Port 5' OC*	Paging:	*Yes*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*< 55' & <10s*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Chemical Resistant, Welded-Seam, Coved Sheet. Note (2) Sinks to receive Industrial Hot, Cold and Type I Purified Water. Fume Hoods to receive Laboratory Air, Vacuum and Gas. Tepid, Domestic Water to Eye Wash at sink.





KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

2.03 Laboratory Support - Large

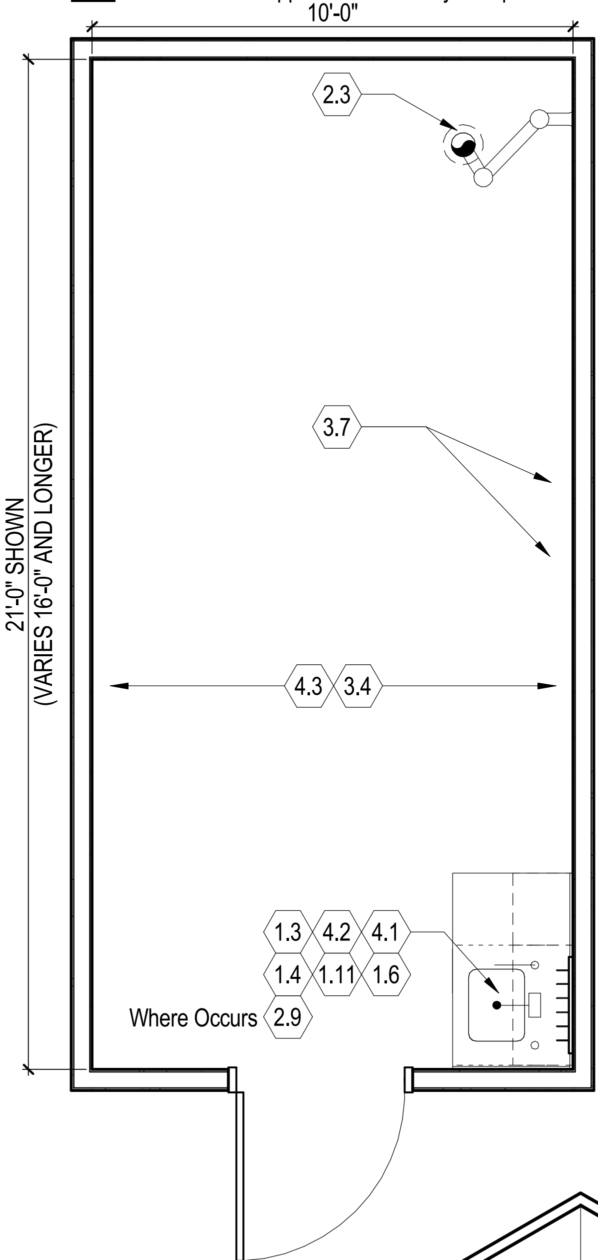
Space	*2.03 Laboratory Support - Large*
Functional Description	*Bio-Safety Level 2, Closed, Secure Space for Specific Functions such as Tissue Culture.*
Critical Adjacencies	*Open Laboratory*

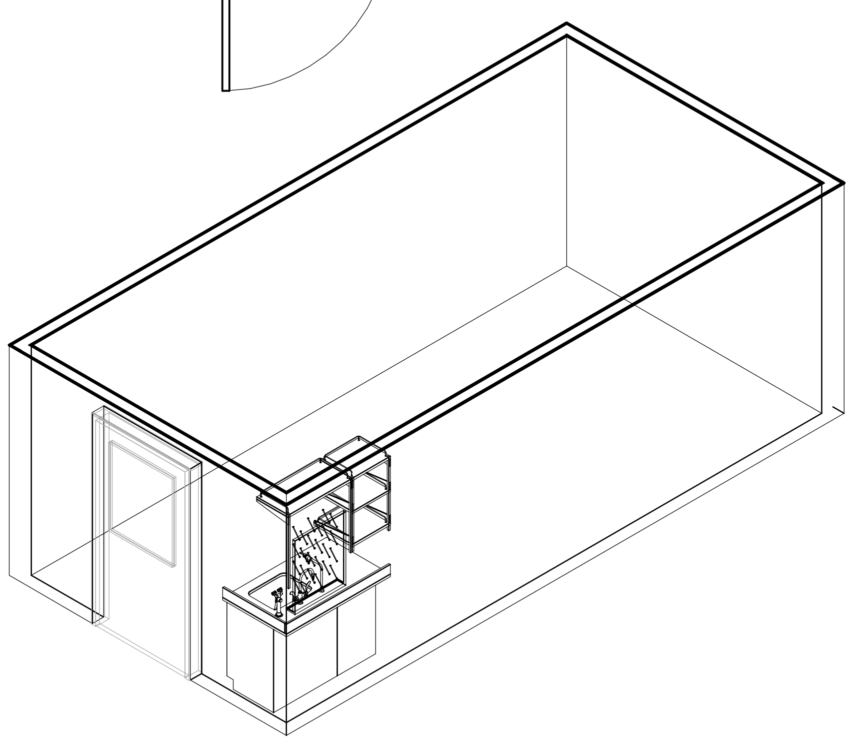
	Architectural & Structural					
Size	Avg (sf):	*235*	Request (sf):	*200*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*5*	Width (ft):	*3*	Height (ft):	*5*
	Live Load (psf):	*Existing*	Door Width (ft):	*3.5, Solid*	Door Height (ft):	*7*
Finishes	Floors:	*Note (1)*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Mylar-wrapped Ceiling Tile*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*40*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*Yes*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Note (2)*	Hot:	*Note (2)*	Process Cooling:	*No*
	Purified Water:	*Note (2)*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*Yes*	Lab Vacuum:	*Yes*	Lab (Natural) Gas:	*Yes*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*Yes, 1*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*(1)120V-20A-*	UPS:	*by User*
	Equip. Load (w/sf):	*4*	Equip. Demand	*80%*		
Telcom & Security	Tel/Data (boxes):	*4-Port 5' OC*	Paging:	*Yes*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*< 55' & <10s*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Chemical Resistant, Welded-Seam, Coved Sheet. Note (2) Sinks to receive Industrial Hot, Cold and Type I Purified Water. Fume Hoods to receive Laboratory Air, Vacuum and Gas. Tepid, Domestic Water to Eye Wash at sink.

Note: See Flex Lab Support Small For Layout Options





KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

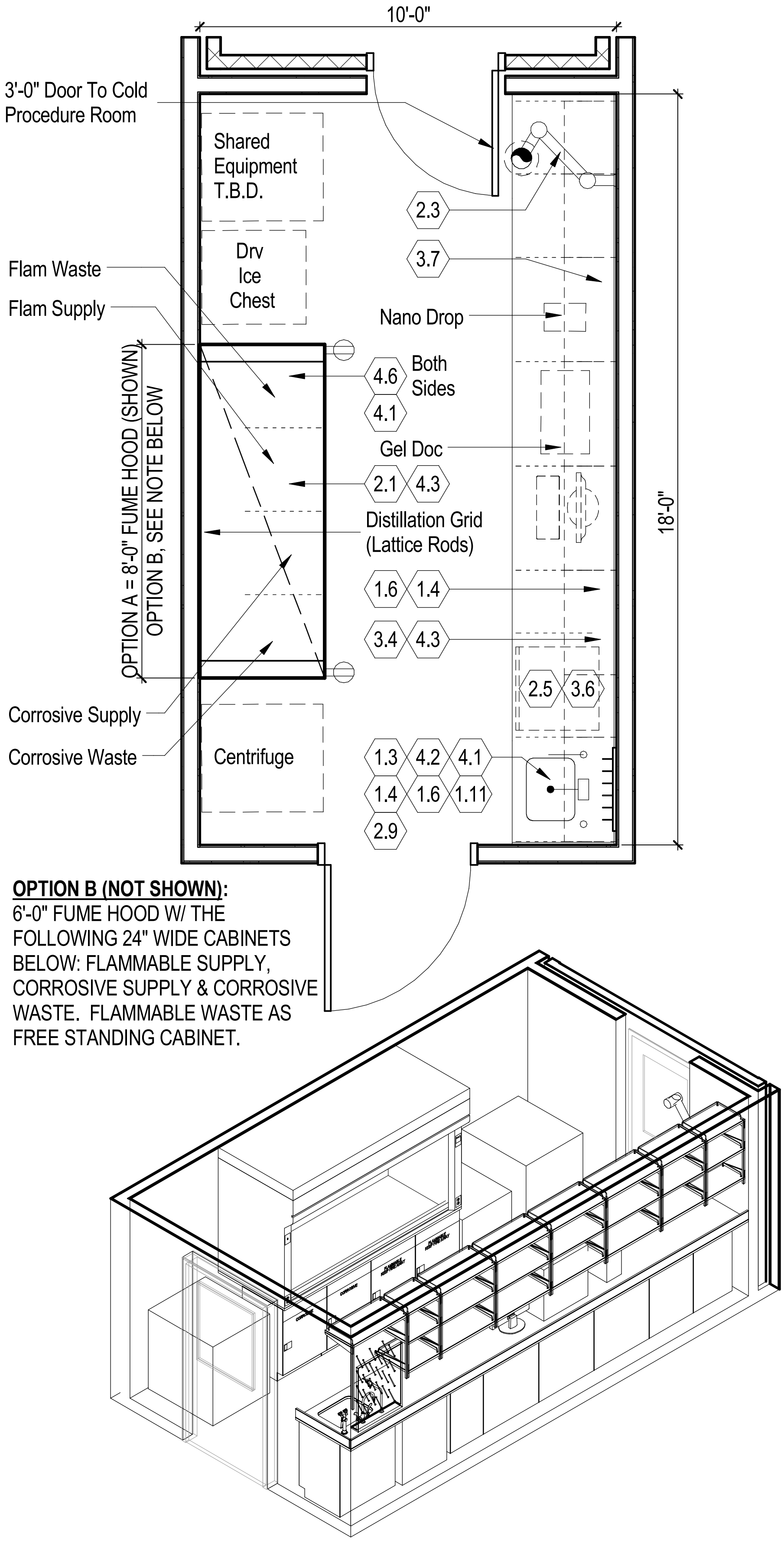
6.1 Exhaust Connection (Future Tie-in)

Space	***2.04 Common Laboratory Support***
Functional Description	*Bio-Safety Level 2, Closed space for Laboratory Support Items Shared Once Per Floor, including a shared hood with Process Cooling Water, and collection of Hazardous Waste.*
Critical Adjacencies	*Cold Procedure Room, Open Labs*

	Architectural & Structural					
Size	Avg (sf):	*180*	Request (sf):	*180*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*8*	Width (ft):	*3*	Height (ft):	*5*
	Live Load (psf):	*Existing*	Door Width (ft):	*3.5 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Note (1)*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Mylar-wrapped Ceiling Tile*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*Yes*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Note (2)*	Hot:	*Note (2)*	Process Cooling:	*No*
	Purified Water:	*Note (2)*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*Yes*	Lab Vacuum:	*Yes*	Lab (Natural) Gas:	*Yes*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*Yes, 1*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*(1)120V-20A-*	UPS:	*by User*
	Equip. Load (w/sf):	*4*	Equip. Demand	*80%*		
Telcom & Security	Tel/Data (boxes):	*4-Port 5' OC*	Paging:	*Yes*	Security:	*Note (2)*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*< 55' & <10s*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Chemical Resistant, Welded-Seam, Coved Sheet. Note (2) Check whether 8-foot fume hood can enter building and travel to space. Where not feasible, 6-foot hood is acceptable. Note (1) Sinks to receive Industrial Hot, Cold, and Type I Purified Water. 8-foot Fume Hoods to receive Laboratory Air, Vacuum, Gas and Process Cooling Water. Tepid, Domestic Water to Eye Wash at sink. Note (2) No lock on door, but accessible only through open Laboratory which has card key access.



KEY LEDGEND:

1.0 CASEWORK STORAGE

- 1.1 Movable Table, Adjustable Height
- 1.2 Movable Work Bench w/ Shelving
- 1.3 Countertop
- 1.4 Adjustable Shelving
- 1.5 Knee Opening
- 1.6 Fixed Base Cabinets
- 1.7 Mobile Cabinets
- 1.8 Flammable Storage Cabinet
- 1.9 Corrosive Storage Cabinet
- 1.10 Cylinder Storage Rack
- 1.11 Drying Rack
- 1.12 Tall Storage Cabinets
- 1.13 Upper Cabinets
- 1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

- 2.1 Fume Hood
- 2.2 Biological Safety Cabinet
- 2.3 Snorkel
- 2.4 Autoclave: Air, Industrial Water, Steam, RO
- 2.5 Dishwasher: Industrial Water
- 2.6 Incubator (OFOI)
- 2.7 Refrigerator (OFOI)
- 2.8 Freezer (OFOI)
- 2.9 Water Polisher (OFOI): RO
- 2.10 Ice Machine: Industrial Water, Drain
- 2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

- 3.1 Overhead Outlet(s): Power and/or Data
- 3.2 Video Projector
- 3.3 Projection Screen
- 3.4 Wire Mold or Pedestal: Power and/or Data
- 3.5 Floor Outlet(s): Power and/or Data
- 3.6 Wall Outlet(s): Power and/or Data
- 3.7 Standby Outlet(s)
- 3.8 Task Lighting (Under Shelf)
- 3.9 Flat Panel Monitor

4.0 PLUMBING

- 4.1 Laboratory Sink or Cupsink
- 4.2 Industrial Hot/Cold Water, Drench Hose & DI
- 4.3 Laboratory Gases: Air & Vac
- 4.4 Recessed Safety Shower & Eyewash Combo
- 4.5 Pipe Drop Enclosure
- 4.6 Process Cooling Water
- 4.7 Floor Drain
- 4.8 Floor Sink
- 4.9 Stainless Steel Sink
- 4.10 Domestic Hot/Cold Water
- 4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

- 5.1 Marker Board
- 5.2 Tack Board
- 5.3 Printer/Copier
- 5.4 Blackout Curtains
- 5.5 Acoustical Panel
- 5.6 Clearstory Window

6.0 MECHANICAL

- 6.1 Exhaust Connection (Future Tie-in)

2.05 Laboratory Equipment Aisle (1 LF x 6')

Space

Functional Description: *Deep storage zone for freezers, refrigerators, environmental chambers. Facilitized with Emergency Power and Cooling Water. Centralized version is remote, possibly in the basement.*

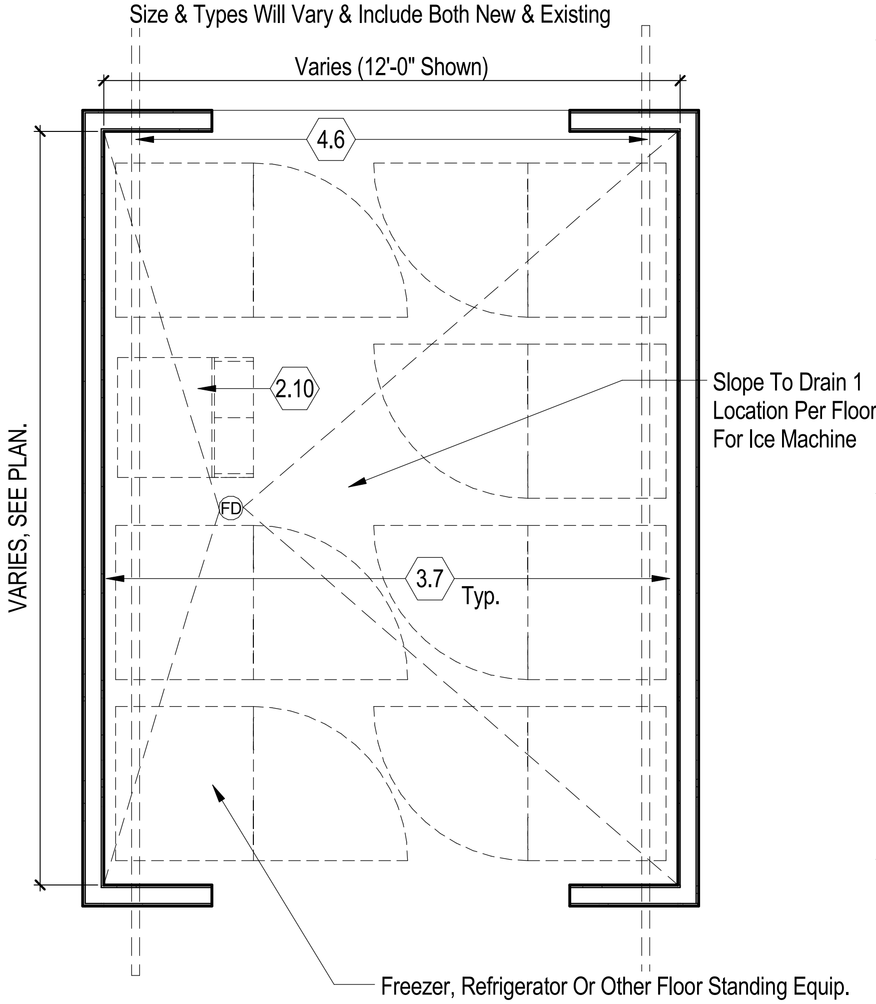
Critical Adjacencies: *Laboratories, Laboratory Support Rooms*

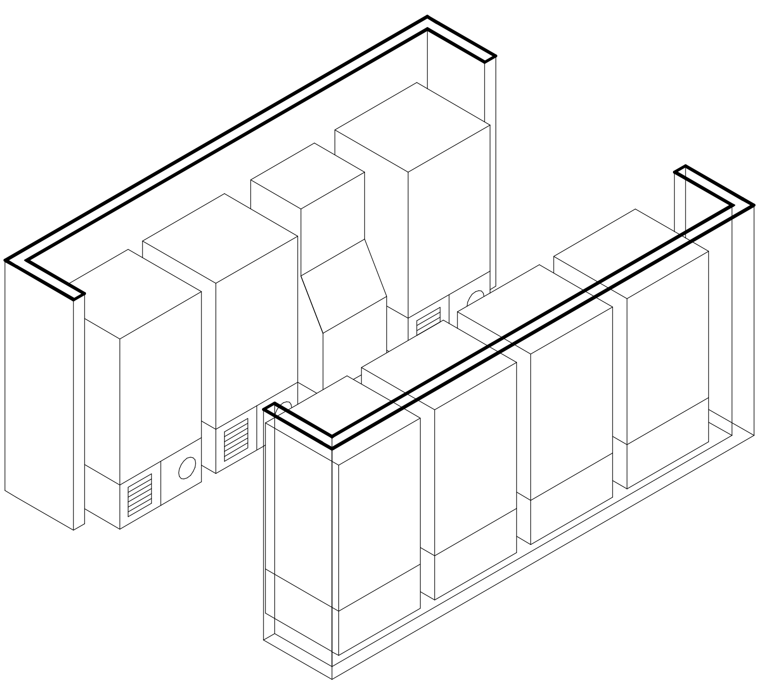
	Architectural & Structural					
Size	Avg (sf):	*6*	Request (sf):	*6*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*4*	Width (ft):	*3*	Height (ft):	*7*
	Live Load (psf):	*Existing*	Door Width (ft):	*n/a*	Door Height (ft):	*n/a*
Finishes	Floors:	*Chem Res. Sheet*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Hi-Gloss Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*Note (1)*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*Note (2)*	UPS:	*by User*
	Equip. Load (w/sf):	*10*	Equip. Demand	*1*		
Telcom & Security	Tel/Data (boxes):	*4-Port 10.5' O*	Paging:	*Yes*	Security:	*n/a*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*< 55' & <10s*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Equipment shown on plans are representational only. Equipment sizes and types will vary, and include both new and existing. Note (1) Process Cooling Water Supply and Return Taps with valves at 10'-6" on center. Note (2) One 120V-20A-1Ø Duplex Standby Power Outlet at 5' on center plus one 208V-30A-3Ø Simplex Standby Power outlet at 10' on center.

Note: Equip. Shown On Plans Are Representational Only.
Size & Types Will Vary & Include Both New & Existing





KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space	***2.06 Central Laboratory Equipment Aisle***					
Functional Description	*Deep storage zone for freezers, refrigerators, environmental chambers. Facilitized with Emergency Power and Cooling Water. Potentially co-located with Central Laboratory Storage.*					
Critical Adjacencies	*Remote location within the building is acceptable.*					
	Architectural & Structural					
Size	Avg (sf):	*6*	Request (sf):	*6*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*4*	Width (ft):	*3*	Height (ft):	*7*
	Live Load (psf):	*Existing*	Door Width (ft):	*n/a*	Door Height (ft):	*n/a*
Finishes	Floors:	*Chem Res. Sheet*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Hi-Gloss Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*Note (1)*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*Note (2)*	UPS:	*by User*
	Equip. Load (w/sf):	*10*	Equip. Demand	*1*		
Telcom & Security	Tel/Data (boxes):	*4-Port 10.5' O*	Paging:	*Yes*	Security:	*n/a*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*< 55' & <10s*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

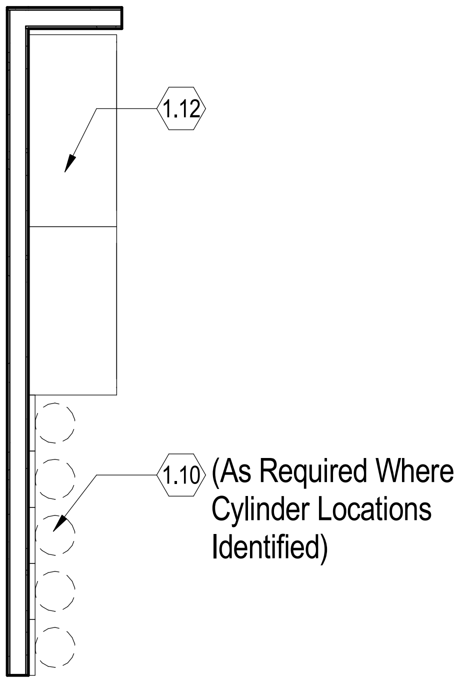
Equipment shown on plans are representational only. Equipment sizes and types will vary, and include both new and existing. Note (1) Process Cooling Water Supply and Return Taps with valves at 10'-6" on center. Note (2) One 120V-20A-1Ø Duplex Standby Power Outlet at 5' on center plus one 208V-30A-3Ø Simplex Standby Power outlet at 10' on center.

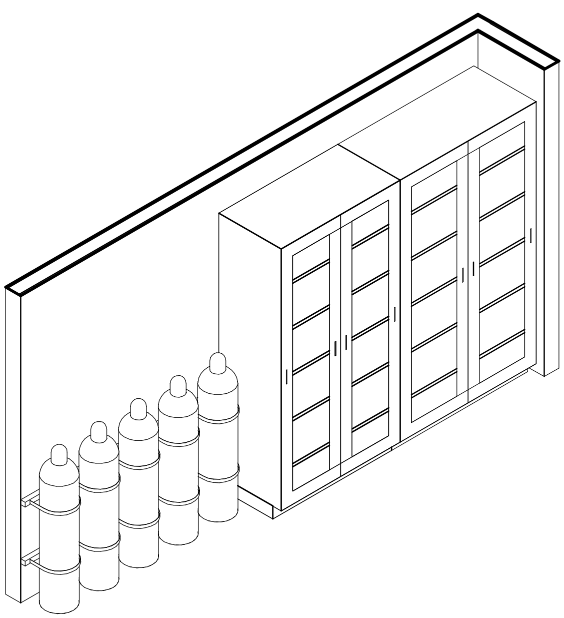
Space	***2.07 Laboratory Storage / Cylinder Aisle (1 LF x 5')***
Functional Description	*Shallow storage space, typically for 18" deep cabinets. No utilities. Portions of this space to have gas cylinder racks. Centralized version is remote, possibly in the basement.*
Critical Adjacencies	*Laboratories, Laboratory Support Rooms*

	Architectural & Structural					
Size	Avg (sf):	*5*	Request (sf):	*5*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*4*	Width (ft):	*1.5*	Height (ft):	*7*
	Live Load (psf):	*Existing*	Door Width (ft):	*n/a*	Door Height (ft):	*n/a*
Finishes	Floors:	*Chem Res. Sheet*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Hi-Gloss Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*2*	Equip. Demand	*1*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*Yes*	Security:	*n/a*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

No utilities necessary. Carefullly locate Code-minimum duplex outlets so as to maximize wall space for storage cabinets and cylinders. Provide horizontal Unistrut channels on walls where identified by University for restraint of cylinders.





KEY LEGEND:

1.0 CASEWORK STORAGE

- 1.1 Movable Table, Adjustable Height
- 1.2 Movable Work Bench w/ Shelving
- 1.3 Countertop
- 1.4 Adjustable Shelving
- 1.5 Knee Opening
- 1.6 Fixed Base Cabinets
- 1.7 Mobile Cabinets
- 1.8 Flammable Storage Cabinet
- 1.9 Corrosive Storage Cabinet
- 1.10 Cylinder Storage Rack
- 1.11 Drying Rack
- 1.12 Tall Storage Cabinets
- 1.13 Upper Cabinets
- 1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

- 2.1 Fume Hood
- 2.2 Biological Safety Cabinet
- 2.3 Snorkel
- 2.4 Autoclave: Air, Industrial Water, Steam, RO
- 2.5 Dishwasher: Industrial Water
- 2.6 Incubator (OFOI)
- 2.7 Refrigerator (OFOI)
- 2.8 Freezer (OFOI)
- 2.9 Water Polisher (OFOI): RO
- 2.10 Ice Machine: Industrial Water, Drain
- 2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

- 3.1 Overhead Outlet(s): Power and/or Data
- 3.2 Video Projector
- 3.3 Projection Screen
- 3.4 Wire Mold or Pedestal: Power and/or Data
- 3.5 Floor Outlet(s): Power and/or Data
- 3.6 Wall Outlet(s): Power and/or Data
- 3.7 Standby Outlet(s)
- 3.8 Task Lighting (Under Shelf)
- 3.9 Flat Panel Monitor

4.0 PLUMBING

- 4.1 Laboratory Sink or Cupsink
- 4.2 Industrial Hot/Cold Water, Drench Hose & DI
- 4.3 Laboratory Gases: Air & Vac
- 4.4 Recessed Safety Shower & Eyewash Combo
- 4.5 Pipe Drop Enclosure
- 4.6 Process Cooling Water
- 4.7 Floor Drain
- 4.8 Floor Sink
- 4.9 Stainless Steel Sink
- 4.10 Domestic Hot/Cold Water
- 4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

- 5.1 Marker Board
- 5.2 Tack Board
- 5.3 Printer/Copier
- 5.4 Blackout Curtains
- 5.5 Acoustical Panel
- 5.6 Clearstory Window

6.0 MECHANICAL

- 6.1 Exhaust Connection (Future Tie-in)

2.08 Central Laboratory Storage / Cylinder Aisle

Space	***2.08 Central Laboratory Storage / Cylinder Aisle***
Functional Description	*Shallow storage space, typically for 18" deep cabinets. No utilities. Portions of this space to have gas cylinder racks. Potentially co-located with Central Laboratory Storage.*
Critical Adjacencies	*Remote location within the building is acceptable.*

	Architectural & Structural					
Size	Avg (sf):	*5*	Request (sf):	*5*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*4*	Width (ft):	*1.5*	Height (ft):	*7*
	Live Load (psf):	*Existing*	Door Width (ft):	*n/a*	Door Height (ft):	*n/a*
Finishes	Floors:	*Chem Res. Sheet*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Hi-Gloss Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*2*	Equip. Demand	*1*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*Yes*	Security:	*n/a*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

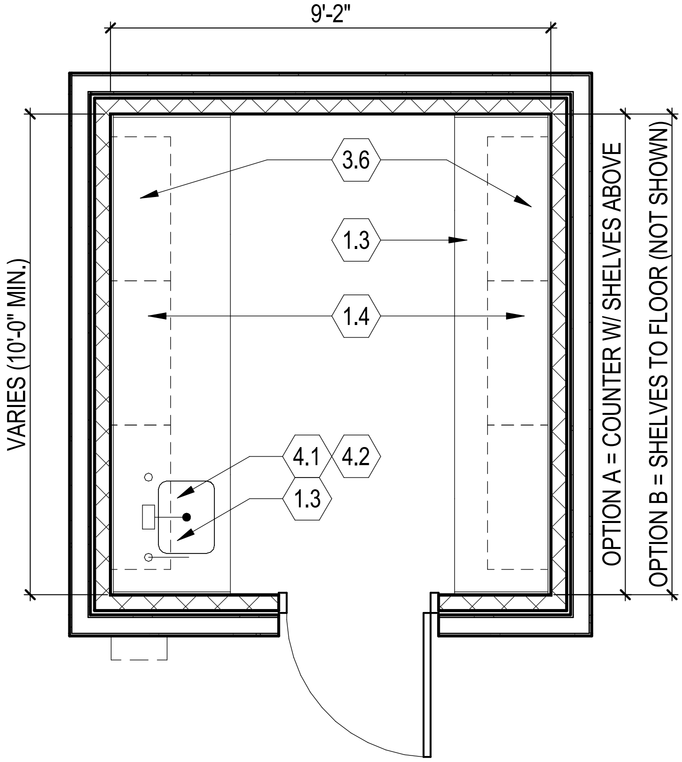
Special Requirements & Outstanding Issues

No utilities necessary. Carefullly locate Code-minimum duplex outlets so as to maximize wall space for storage cabinets and cylinders. Provide horizontal Unistrut channels on walls where identified by University for restraint of cylinders.

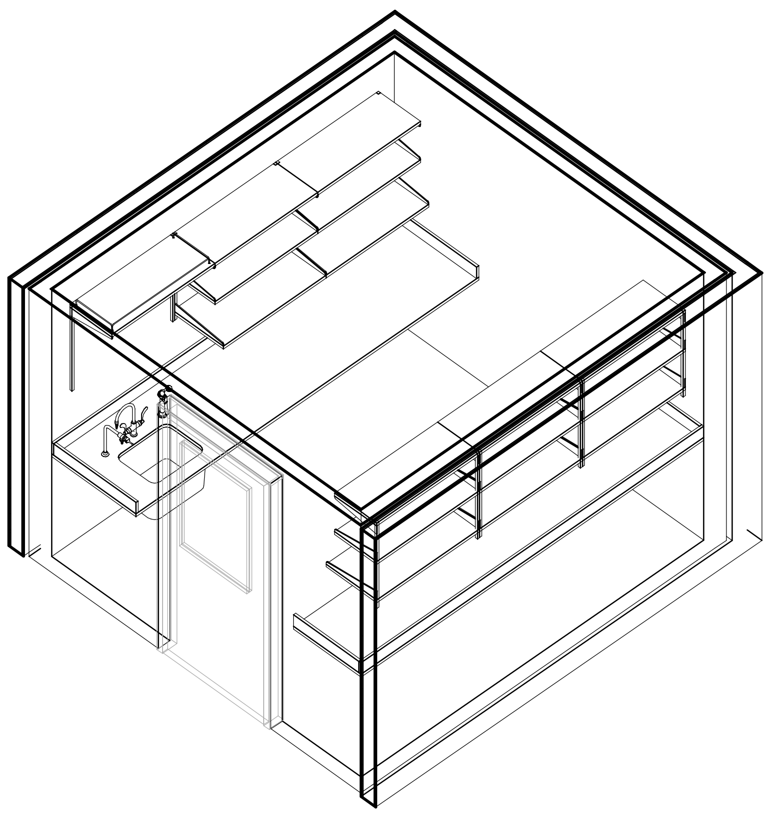
Space	***2.09 Cold Procedure Room***					
Functional Description	*Cold Room. 1 per floor.*					
Critical Adjacencies	*Laboratories, Laboratory Support Rooms*					
	Architectural & Structural					
Size	Avg (sf):	*100*	Request (sf):	*100*	Ceiling Ht. (ft):	*8*
Largest Equipment at move-in	Length (ft):	*TBD*	Width (ft):	*TBD*	Height (ft):	*TBD*
	Live Load (psf):	*125*	Door Width (ft):	*3 Vendor*	Door Height (ft):	*7 Vendor*
Finishes	Floors:	*Vendor Insul. Panels*	Walls:	*Vendor Insul. Panels*	Ceiling:	*Vendor Insul. Panels*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*4°C±1*	Unocc. T (°Fdb):	*4°C±1*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Yes*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*Yes*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*?*	Lab Vacuum:	*?*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Note (1)*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*For Room*	UPS:	*No*
	Equip. Load (w/sf):	*3*	Equip. Demand	*0.5*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*No*	Security:	*None*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*30 (300 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*TBD*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Sink in stainless steel countertop. Confirm need for RO water and purification equipment shelf above. Power outlet spacing to be defined.



Note: Stainless Steel Sink, Counter & Shelving



KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

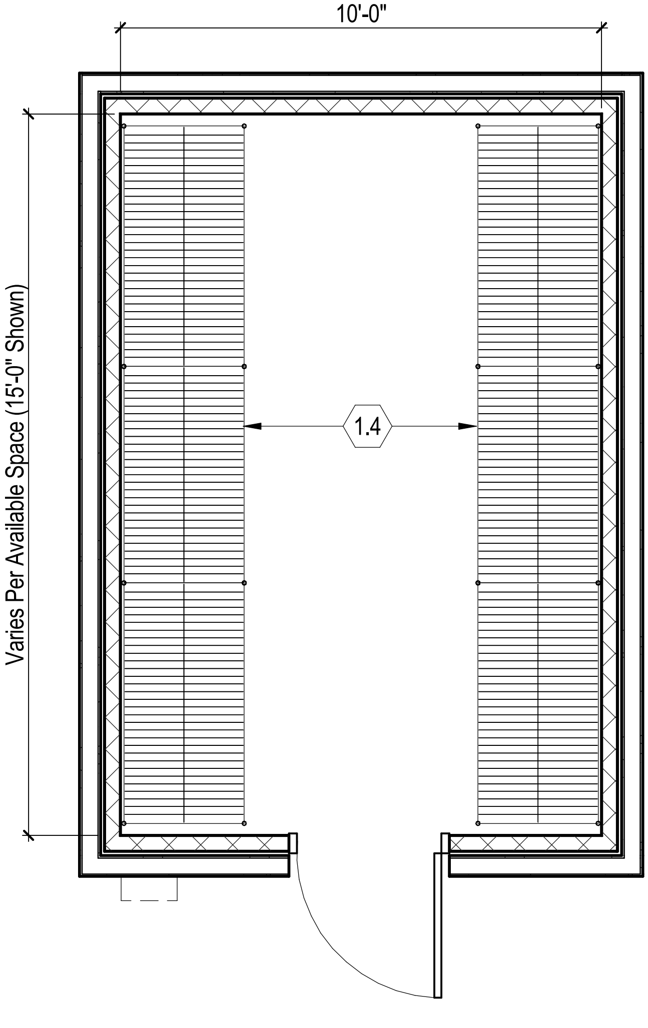
6.0 MECHANICAL

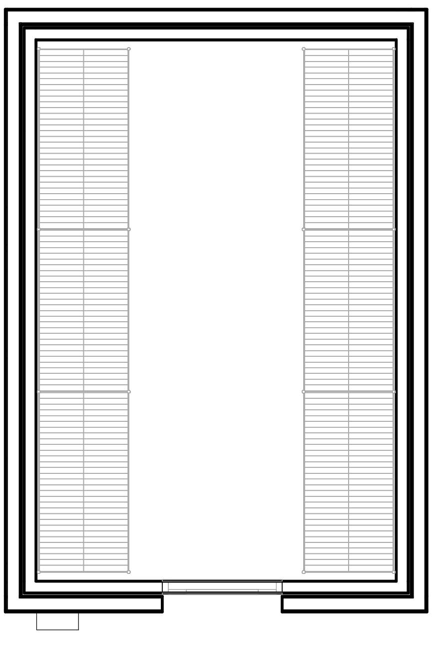
6.1 Exhaust Connection (Future Tie-in)

Space	***2.10 Central Cold Storage***
Functional Description	*Cold Storage Room. 1 per building.*
Critical Adjacencies	*Elevator*

	Architectural & Structural					
Size	Avg (sf):	*226*	Request (sf):	*120*	Ceiling Ht. (ft):	*8*
Largest Equipment at move-in	Length (ft):	*TBD*	Width (ft):	*TBD*	Height (ft):	*TBD*
	Live Load (psf):	*125*	Door Width (ft):	*3 Vendor*	Door Height (ft):	*7 Vendor*
Finishes	Floors:	*Vendor Insul. Panels*	Walls:	*Vendor Insul. Panels*	Ceiling:	*Vendor Insul. Panels*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*4°C±1*	Unocc. T (°Fdb):	*4°C±1*	RH (% ±):	*Note (1)*
	Occupied AC/Hr:	*Minimal*	Unoccupied AC/Hr:	*Minimal*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*No*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*For Room*	UPS:	*No*
	Equip. Load (w/sf):		Equip. Demand			
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*No*	Security:	*None*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*30 (300 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues	*No Sink. Note (1) Humidification will be required. Requirements TBD.*





KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

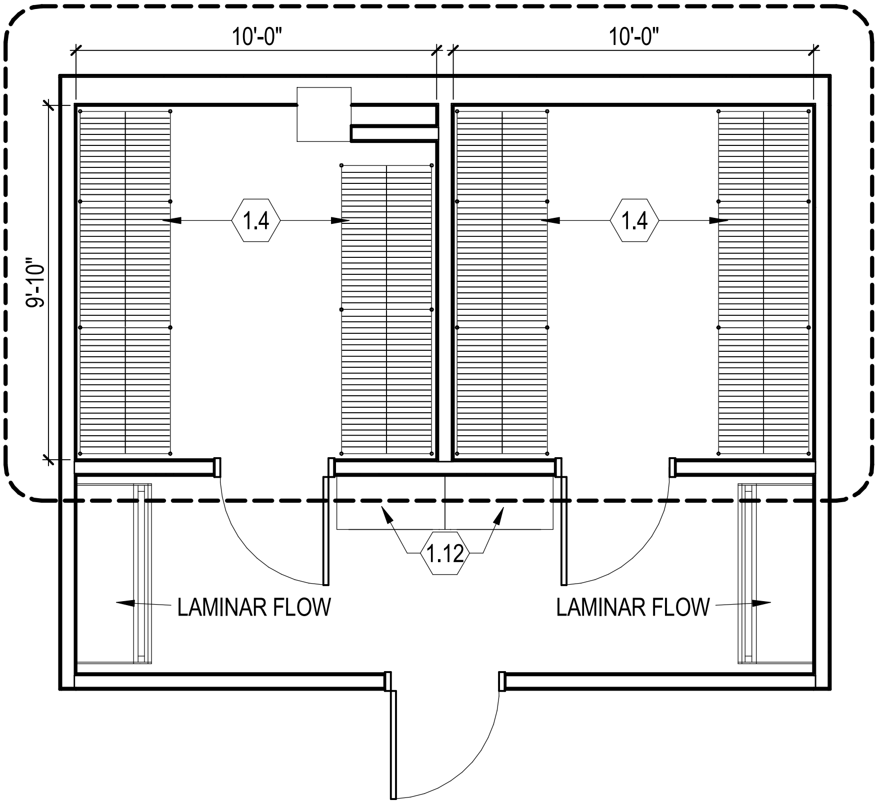
6.1 Exhaust Connection (Future Tie-in)

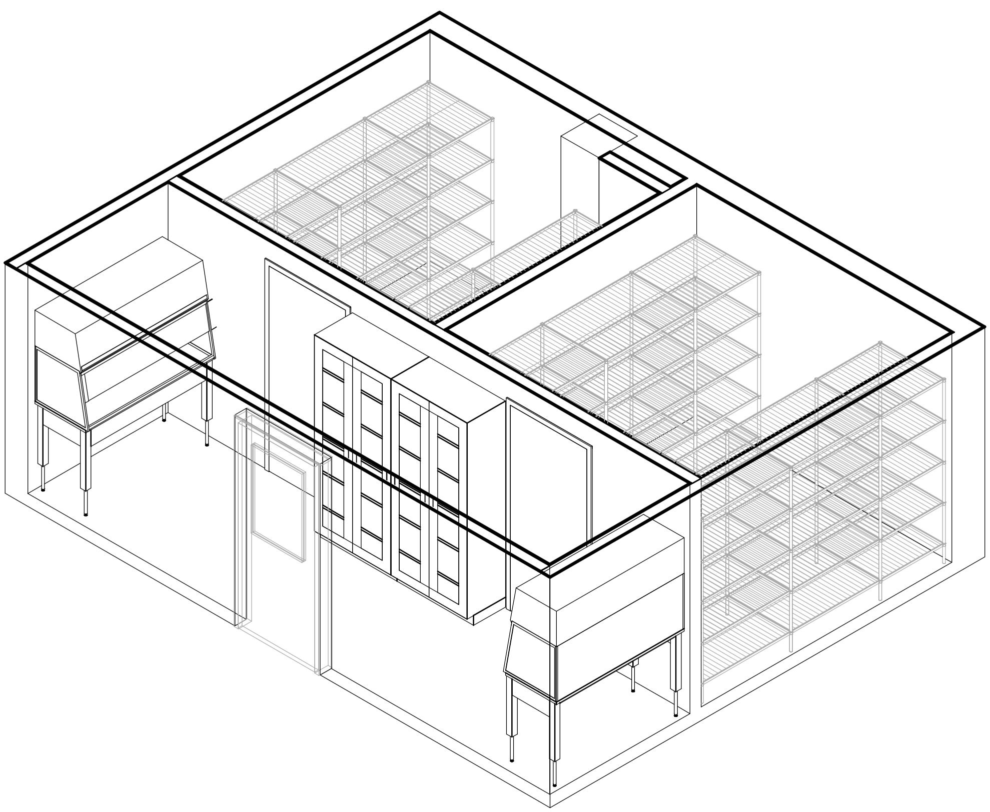
Space	***2.11 Central Plant Tissue Culture Storage***
Functional Description	*Shelved storage for plant Tissue Cultures with LED growth lights above each shelf. Cultures are prepared elsewhere. Positive pressure to Tissue Culture Transfer vestibule.*
Critical Adjacencies	*Nearby Laminar Flow Bench for Culture Transfers, Elevator*

	Architectural & Structural					
Size	Avg (sf):	*96*	Request (sf):	*100*	Ceiling Ht. (ft):	*8*
Largest Equipment at move-in	Length (ft):	*Shelves*	Width (ft):	*Shelves*	Height (ft):	*Shelves*
	Live Load (psf):	*Existing*	Door Width (ft):	*3*	Door Height (ft):	*7 Vendor*
Finishes	Floors:	*Note (1)*	Walls:	*FRP*	Ceiling:	*FRP*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*72s-72w±2*	Unocc. T (°Fdb):	*72s-72w±2*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Minimal*	Unoccupied AC/Hr:	*Minimal*	Pressurization:	*Positive*
	Filtration (F + FF):	*HEPA*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*Yes*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*No*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*For Room*	UPS:	*by User*
	Equip. Load (w/sf):		Equip. Demand			
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*No*	Security:	*None*
Lighting	Special Lighting:	*Note (2)*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Chemical Resistant, Welded-Seam, Coved Sheet. Note (2) LED grow lighting above each shelf similar to Plant Growth Rooms.





KEY LEDGEND:

1.0 **CASEWORK STORAGE**
- 1.1 Movable Table, Adjustable Height
- 1.2 Movable Work Bench w/ Shelving
- 1.3 Countertop
- 1.4 Adjustable Shelving
- 1.5 Knee Opening
- 1.6 Fixed Base Cabinets
- 1.7 Mobile Cabinets
- 1.8 Flammable Storage Cabinet
- 1.9 Corrosive Storage Cabinet
- 1.10 Cylinder Storage Rack
- 1.11 Drying Rack
- 1.12 Tall Storage Cabinets
- 1.13 Upper Cabinets
- 1.14 Microwave Base Cabinet

2.0 **LABORATORY EQUIPMENT**
- 2.1 Fume Hood
- 2.2 Biological Safety Cabinet
- 2.3 Snorkel
- 2.4 Autoclave: Air, Industrial Water, Steam, RO
- 2.5 Dishwasher: Industrial Water
- 2.6 Incubator (OFOI)
- 2.7 Refrigerator (OFOI)
- 2.8 Freezer (OFOI)
- 2.9 Water Polisher (OFOI): RO
- 2.10 Ice Machine: Industrial Water, Drain
- 2.11 Floor Standing Equipment (OFOI)

3.0 **ELECTRICAL/DATA**
- 3.1 Overhead Outlet(s): Power and/or Data
- 3.2 Video Projector
- 3.3 Projection Screen
- 3.4 Wire Mold or Pedestal: Power and/or Data
- 3.5 Floor Outlet(s): Power and/or Data
- 3.6 Wall Outlet(s): Power and/or Data
- 3.7 Standby Outlet(s)
- 3.8 Task Lighting (Under Shelf)
- 3.9 Flat Panel Monitor

4.0 **PLUMBING**
- 4.1 Laboratory Sink or Cupsink
- 4.2 Industrial Hot/Cold Water, Drench Hose & DI
- 4.3 Laboratory Gases: Air & Vac
- 4.4 Recessed Safety Shower & Eyewash Combo
- 4.5 Pipe Drop Enclosure
- 4.6 Process Cooling Water
- 4.7 Floor Drain
- 4.8 Floor Sink
- 4.9 Stainless Steel Sink
- 4.10 Domestic Hot/Cold Water
- 4.11 Porcelain/Solid Surface Lavatory

5.0 **OTHER**
- 5.1 Marker Board
- 5.2 Tack Board
- 5.3 Printer/Copier
- 5.4 Blackout Curtains
- 5.5 Acoustical Panel
- 5.6 Clearstory Window

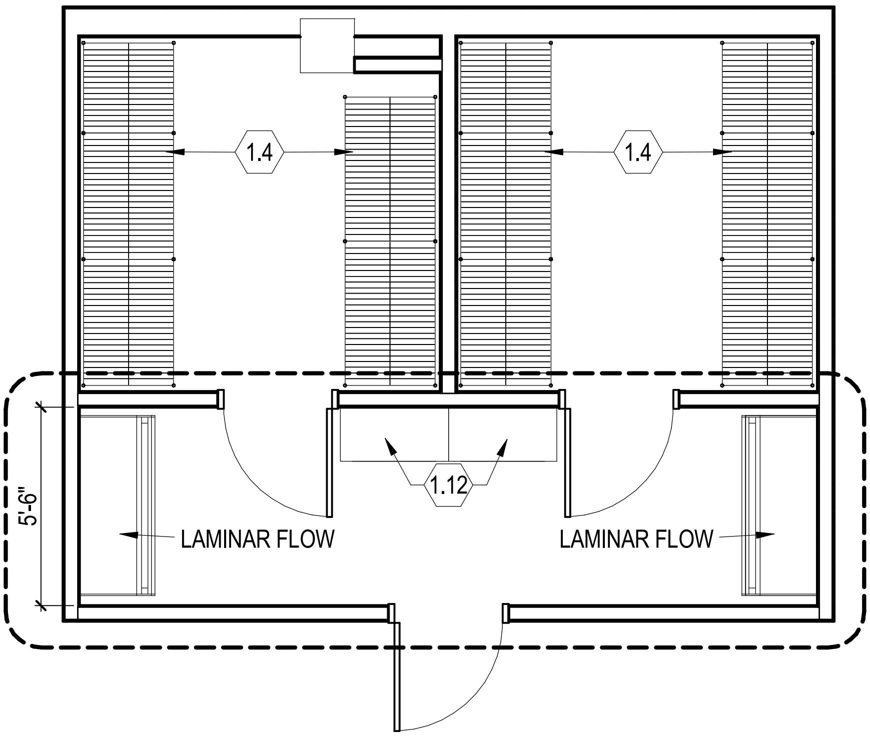
6.0 **MECHANICAL**
- 6.1 Exhaust Connection (Future Tie-in)

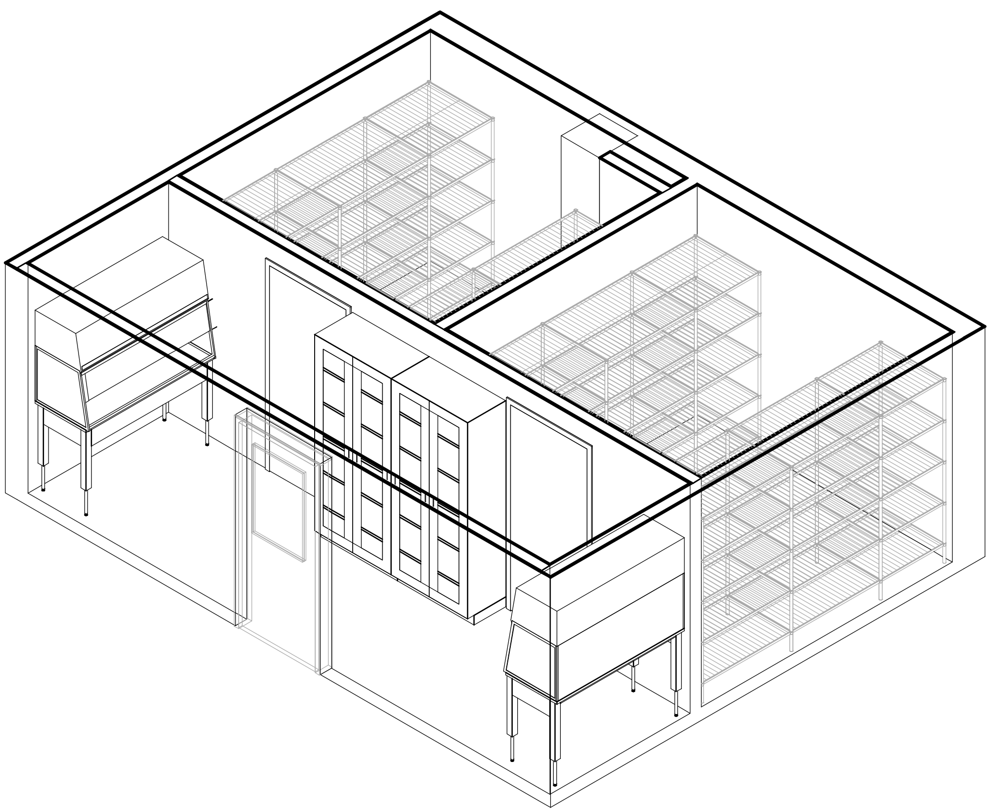
Space	***2.12 Central Plant Tissue Culture Transfer Vestibule***
Functional Description	*Positively-pressurized, HEPA-filtered vestibule for Petri dish culture transfers inside Laminar Flow benches. Negative pressure to Tissue Culture Storage. Positive pressure to Hallway.*
Critical Adjacencies	*Central Plant Tissue Culture Storage, Elevator*

	Architectural & Structural					
Size	Avg (sf):	*144*	Request (sf):	*120*	Ceiling Ht. (ft):	*8*
Largest Equipment at move-in	Length (ft):	*5*	Width (ft):	*2*	Height (ft):	*5*
	Live Load (psf):	*Existing*	Door Width (ft):	*3*	Door Height (ft):	*7*
Finishes	Floors:	*Note (1)*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Mylar-wrapped Ceiling Tile*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*Preferred*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*72s-72w±2*	Unocc. T (°Fdb):	*72s-72w±2*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Minimal*	Unoccupied AC/Hr:	*Minimal*	Pressurization:	*Positive*
	Filtration (F + FF):	*HEPA*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*Yes*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*No*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):		Equip. Demand			
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*No*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Chemical Resistant, Welded-Seam, Coved Sheet.





KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space — ## *2.13 Plant Growth Room*

Functional Description: *Shared, Non-Growth-Research, Plant Growing Room. (2) per 9 researchers.*

Critical Adjacencies: *Laboratories, Laboratory Support Rooms, Freight Elevator.*

Architectural & Structural

Size	Avg (sf):	*171*	Request (sf):	*160*	Ceiling Ht. (ft):	*8*
Largest Equipment at move-in	Length (ft):	*5*	Width (ft):	*3*	Height (ft):	*7*
	Live Load (psf):	*125*	Door Width (ft):	*3*	Door Height (ft):	*7*
Finishes	Floors:	*Note (1)*	Walls:	*FRP*	Ceiling:	*FRP*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*

Mechanical

HVAC	Occ. T (°Fdb):	*72s-72w±2*	Unocc. T (°Fdb):	*72s-72w±2*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*TBD*	Unoccupied AC/Hr:	*TBD*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Note (2)*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*

Utilities

Water	Cold:	*Note (3)*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*Yes*	Ultra Pure (mΩ):	*No*	Floor Drain:	*Yes*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*

Electrical

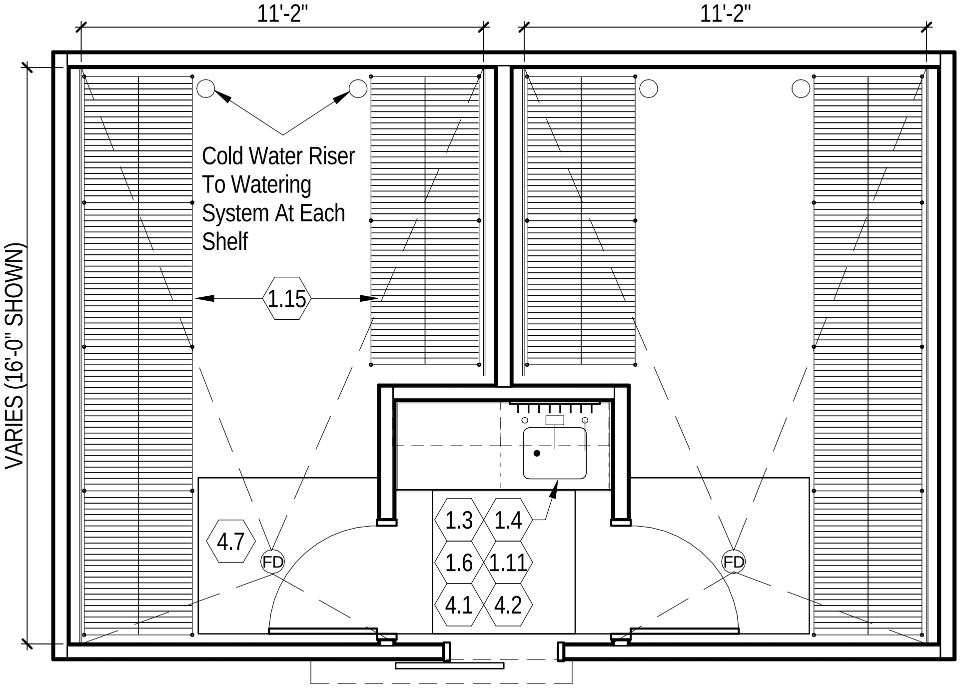
Convenience Power	120V-20A-1Ø:	*Dplx per code*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*3*	Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*No*	Security:	*None*
Lighting	Special Lighting:	*Note (4)*	Light Control:	*Manual*	Level (FC):	*30 (300 lux)*

Safety & Security

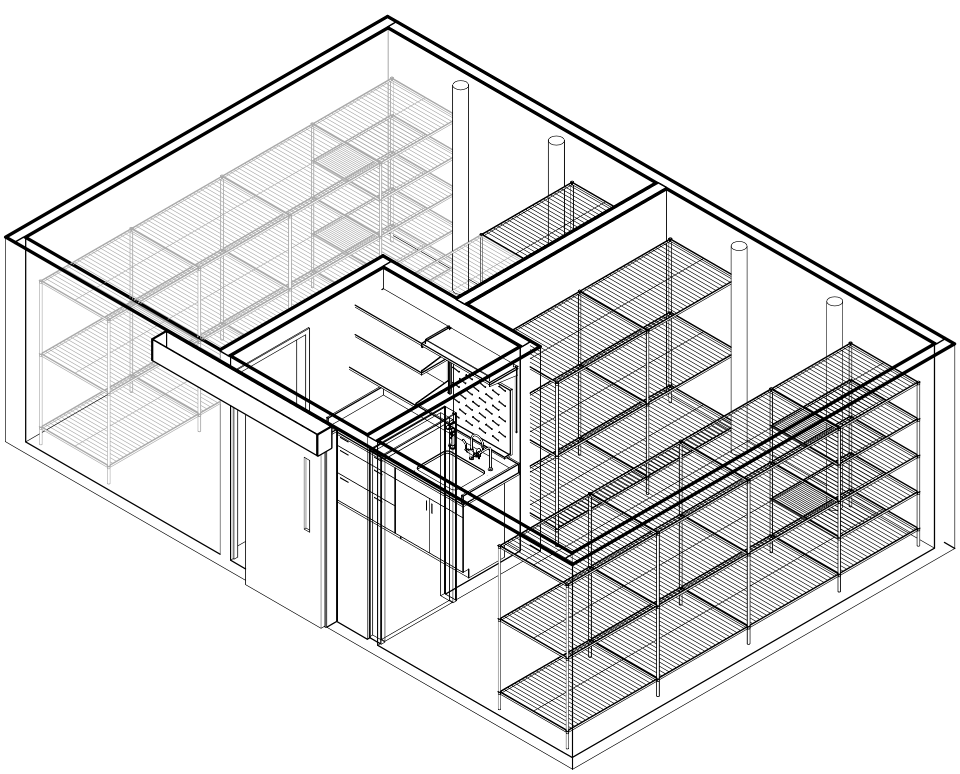
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Provide access to utility sink. Technically-preferred solution is environmental chambers similar to what is in Room 2164. Note (1) Trowled Epoxy with coved bases, sloped to drain with soil trap. Note (2) Plant Growth Rooms need to be 100% exhausted and Negatively Pressurized because of occasional fumigation. Note (3) Preference is for Purified Water to Watering System because Riverside water is hard. Ensure enough room for piping and power to get to bottom shelves. Note (4) Each shelf to have evenlydistributed LED lighting with FC/Lux to be specified by University. Purified water quality, TBD.



Note: Stainless Steel 3-Tier Shelving.



KEY LEGEND:

1.0 CASEWORK STORAGE

- 1.1 Movable Table, Adjustable Height
- 1.2 Movable Work Bench w/ Shelving
- 1.3 Countertop
- 1.4 Adjustable Shelving
- 1.5 Knee Opening
- 1.6 Fixed Base Cabinets
- 1.7 Mobile Cabinets
- 1.8 Flammable Storage Cabinet
- 1.9 Corrosive Storage Cabinet
- 1.10 Cylinder Storage Rack
- 1.11 Drying Rack
- 1.12 Tall Storage Cabinets
- 1.13 Upper Cabinets
- 1.14 Microwave Base Cabinet
- 1.15 Floor-To-Clg, Stainless Stl, Wire Shelving

2.0 LABORATORY EQUIPMENT

- 2.1 Fume Hood
- 2.2 Biological Safety Cabinet
- 2.3 Snorkel
- 2.4 Autoclave: Air, Industrial Water, Steam, RO
- 2.5 Dishwasher: Industrial Water
- 2.6 Incubator (OFOI)
- 2.7 Refrigerator (OFOI)
- 2.8 Freezer (OFOI)
- 2.9 Water Polisher (OFOI): RO
- 2.10 Ice Machine: Industrial Water, Drain
- 2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

- 3.1 Overhead Outlet(s): Power and/or Data
- 3.2 Video Projector
- 3.3 Projection Screen
- 3.4 Wire Mold or Pedestal: Power and/or Data
- 3.5 Floor Outlet(s): Power and/or Data
- 3.6 Wall Outlet(s): Power and/or Data
- 3.7 Standby Outlet(s)
- 3.8 Task Lighting (Under Shelf)
- 3.9 Flat Panel Monitor

4.0 PLUMBING

- 4.1 Laboratory Sink or Cupsink
- 4.2 Industrial Hot/Cold Water, Drench Hose & DI
- 4.3 Laboratory Gases: Air & Vac
- 4.4 Recessed Safety Shower & Eyewash Combo
- 4.5 Pipe Drop Enclosure
- 4.6 Process Cooling Water
- 4.7 Floor Drain
- 4.8 Floor Sink
- 4.9 Stainless Steel Sink
- 4.10 Domestic Hot/Cold Water
- 4.11 Porcelain/Solid Surface Lavatory
- 4.12 Stainless Steel Utility Sink
- 4.13 Industrial Hot/Cold Water & Spray Hose

5.0 OTHER

- 5.1 Marker Board
- 5.2 Tack Board
- 5.3 Printer/Copier
- 5.4 Blackout Curtains

6.0 MECHANICAL

- 6.1 Exhaust Connection (Future Tie-in)

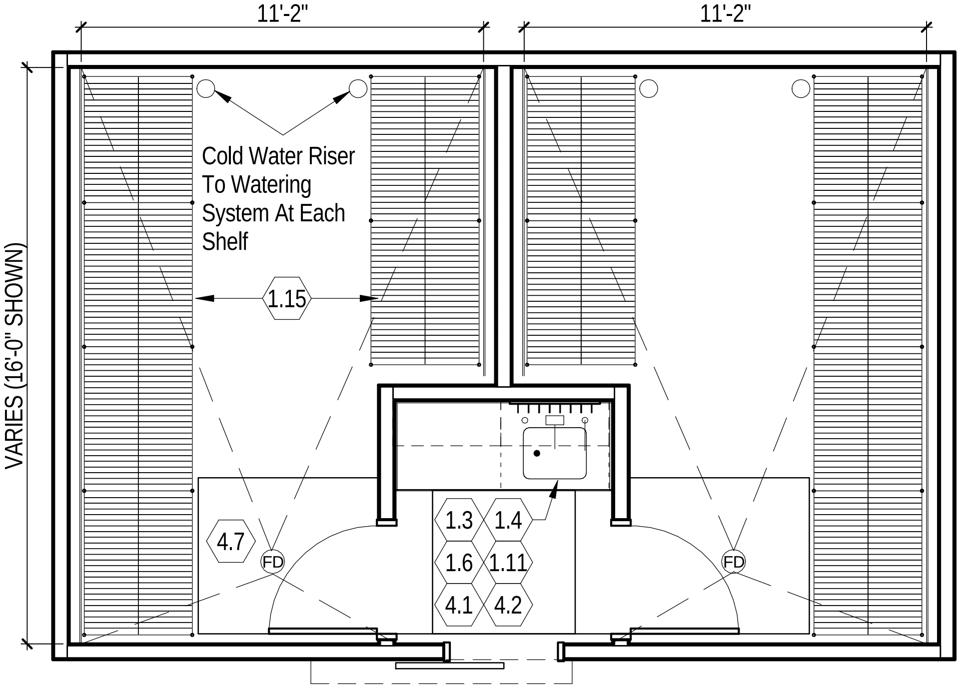
Space — ## 2.14 Central Plant Growth Room

Functional Description — *Shared, Non-Growth-Research, Plant Growing Room. (2) remote, centralized rooms, preferably off the loading dock to keep soil tracking minimized.*

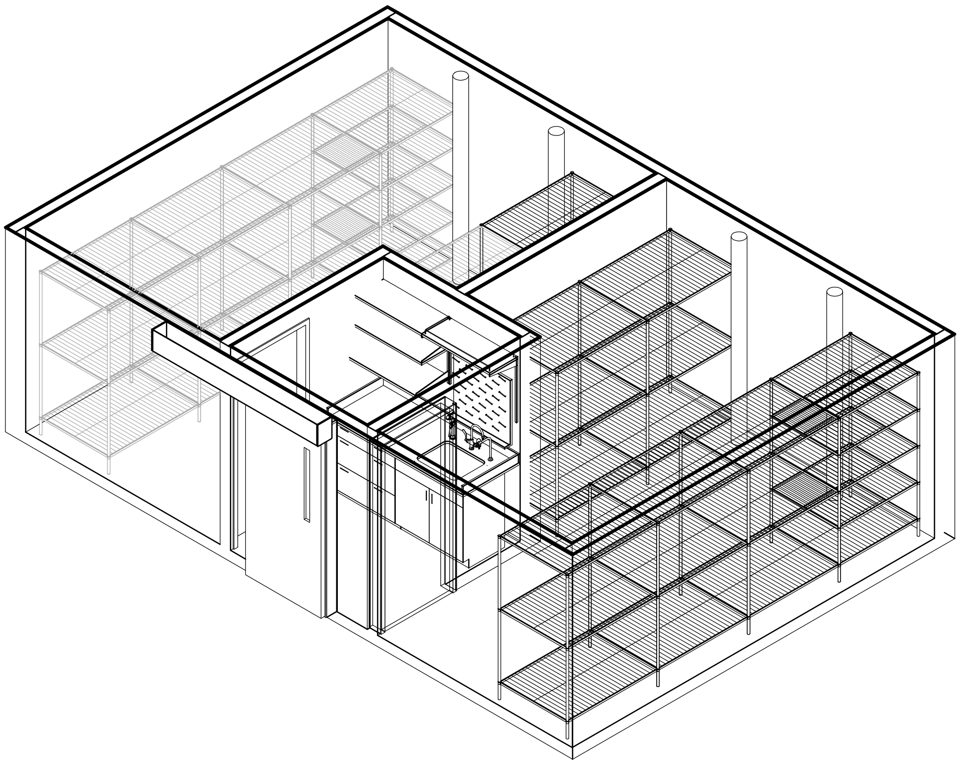
Critical Adjacencies — *Freight Elevator and Loading Dock.*

	Architectural & Structural					
Size	Avg (sf):	*203*	Request (sf):	*250*	Ceiling Ht. (ft):	*8*
Largest Equipment at move-in	Length (ft):	*5*	Width (ft):	*3*	Height (ft):	*7*
	Live Load (psf):	*125*	Door Width (ft):	*3*	Door Height (ft):	*7*
Finishes	Floors:	*Note (1)*	Walls:	*FRP*	Ceiling:	*FRP*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*72s-72w±2*	Unocc. T (°Fdb):	*72s-72w±2*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*TBD*	Unoccupied AC/Hr:	*TBD*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Note (2)*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Note (3)*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*Yes*	Ultra Pure (mΩ):	*No*	Floor Drain:	*Yes*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx per code*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*3*	Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*No*	Security:	*None*
Lighting	Special Lighting:	*Note (4)*	Light Control:	*Manual*	Level (FC):	*30 (300 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues — *Provide access to utility sink. Technically-preferred solution is environmental chambers similar to what is in Room 2164. Note (1) Trowled Epoxy with coved bases, sloped to drain with soil trap. Note (2) Plant Growth Rooms need to be 100% exhausted and Negatively Pressurized because of occasional fumigation. Note (3) Preference is for Purified Water to Watering System because Riverside water is hard. Ensure enough room for piping and power to get to bottom shelves. Note (4) Each shelf to have evenlydistributed LED lighting with FC/Lux to be specified by University. Purified water quality, TBD.*



Note: Stainless Steel 3-Tier Shelving.



KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet
1.15 Floor-To-Clg, Stainless Stl, Wire Shelving

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory
4.12 Stainless Steel Utility Sink
4.13 Industrial Hot/Cold Water & Spray Hose

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains

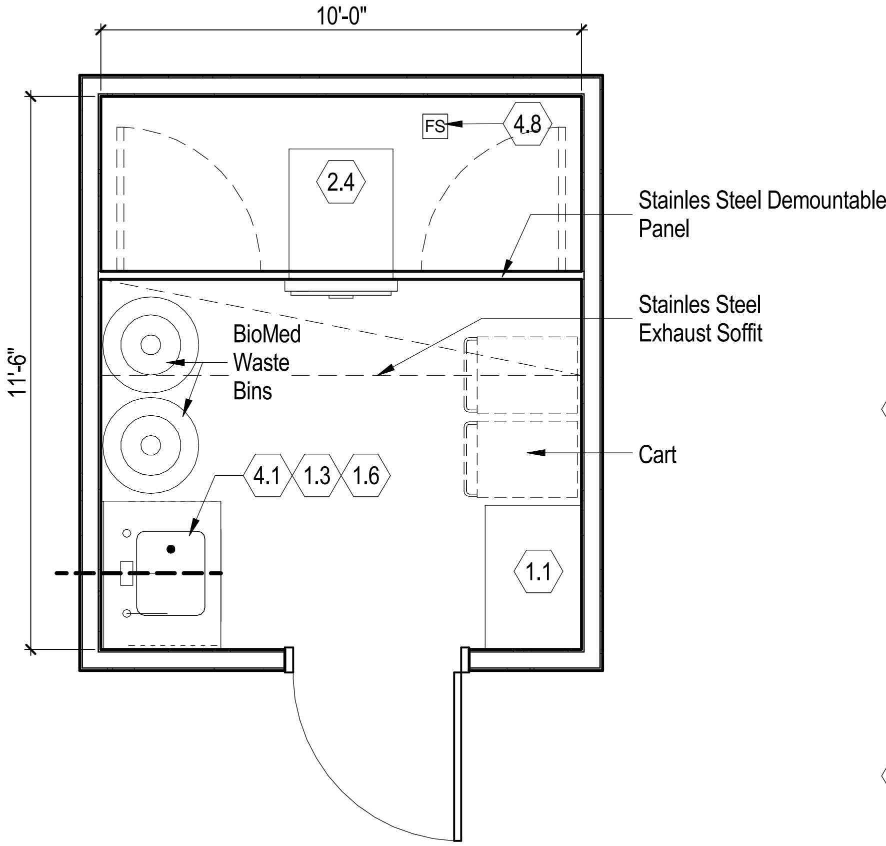
6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

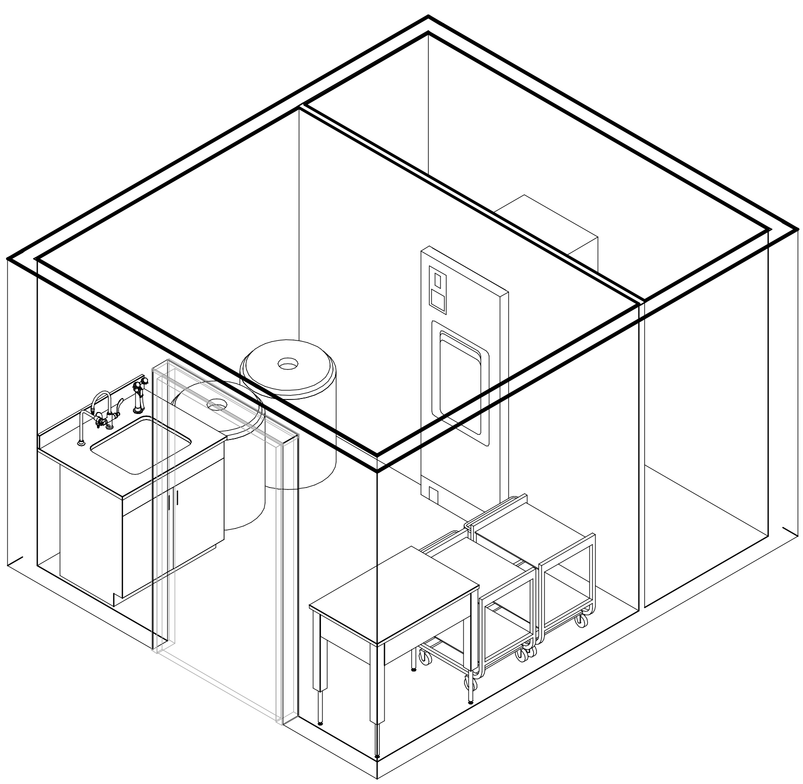
Space	***2.15 Autoclave***					
Functional Description	*Sterilization of Waste. 1 per floor.*					
Critical Adjacencies	*Laboratories, Laboratory Support Rooms*					
	Architectural & Structural					
Size	Avg (sf):	*117*	Request (sf):	*120*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*For Equip*	Width (ft):	*For Equip*	Height (ft):	*For Equip*
	Live Load (psf):	*Existing*	Door Width (ft):	*3.5 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Chem Res. Sheet*	Walls:	*Epoxy Ptd*	Ceiling:	*Hi-Gloss Ptd. GWB*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*Yes*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Domestic*	Hot:	*Domestic*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*for Autoclave*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*4*	Equip. Demand	*80%*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*Yes*	Security:	*None*
Lighting	Special Lighting:	*Note (1)*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Sink is for hand washing and hence requires domestic water source. Water to autoclave per vendor requirements. Exhaust canopy over autoclave. Note (1) For maintenance, locate lighting on both sides of autoclave behind bulkhead panels.



Note: Stainless Steel Sink & Counter & Domestic Water at Sink



KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

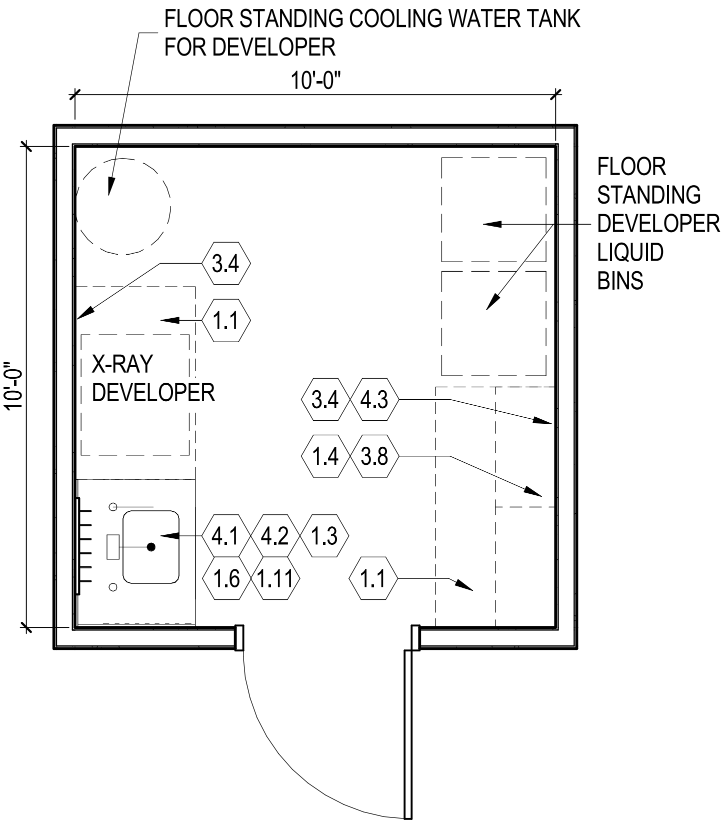
6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

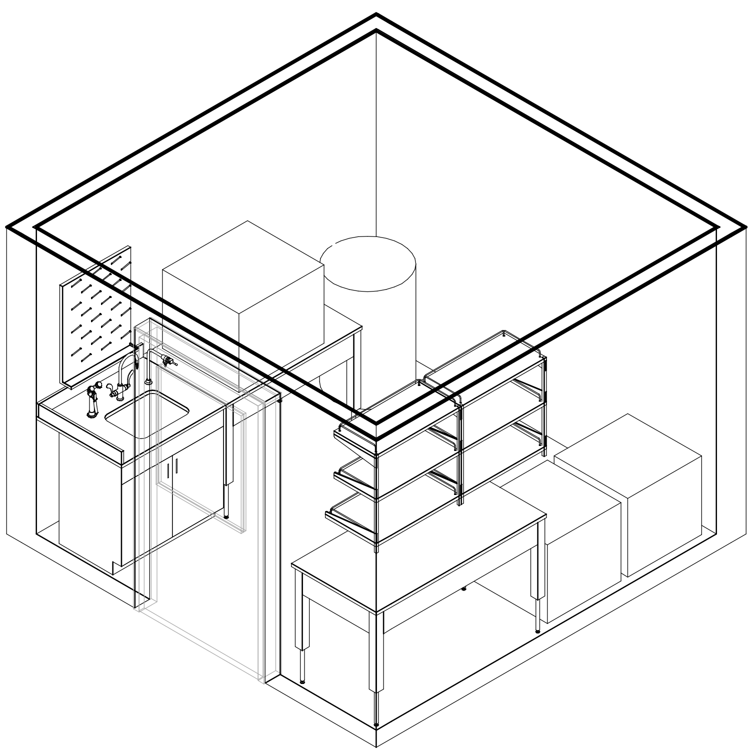
Space	***2.16 X-Ray Developer***					
Functional Description	*Development of X-Ray Films*					
Critical Adjacencies	*None*					
	Architectural & Structural					
Size	Avg (sf):	*107*	Request (sf):	*100*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*TBD*	Width (ft):	*TBD*	Height (ft):	*TBD*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Solid*	Door Height (ft):	*7*
Finishes	Floors:	*Chem Res. Sheet*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Hi-Gloss Ptd. GWB*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*Special Req*	Unocc. T (°Fdb):	*Special Req*	RH (% ±):	*Special Req*
	Occupied AC/Hr:	*TBD*	Unoccupied AC/Hr:	*TBD*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*TBD*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*TBD*	Hot:	*TBD*	Process Cooling:	*No*
	Purified Water:	*TBD*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*4*	Equip. Demand	*80%*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*Yes*	Security:	*Note (1)*
Lighting	Special Lighting:	*TBD*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*Chems?*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Provide card key access and a room "In-Use" light at the corridor side of a light-tight door to avoid accidental exposure of films. This is in lieu of the traditional rotating, light-tight vestibule that are typically no longer allowed because they are not handicapped accessible at reasonable dimensions.



Note: Light-Tight Door With In-Use Light At Hallway Side



KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

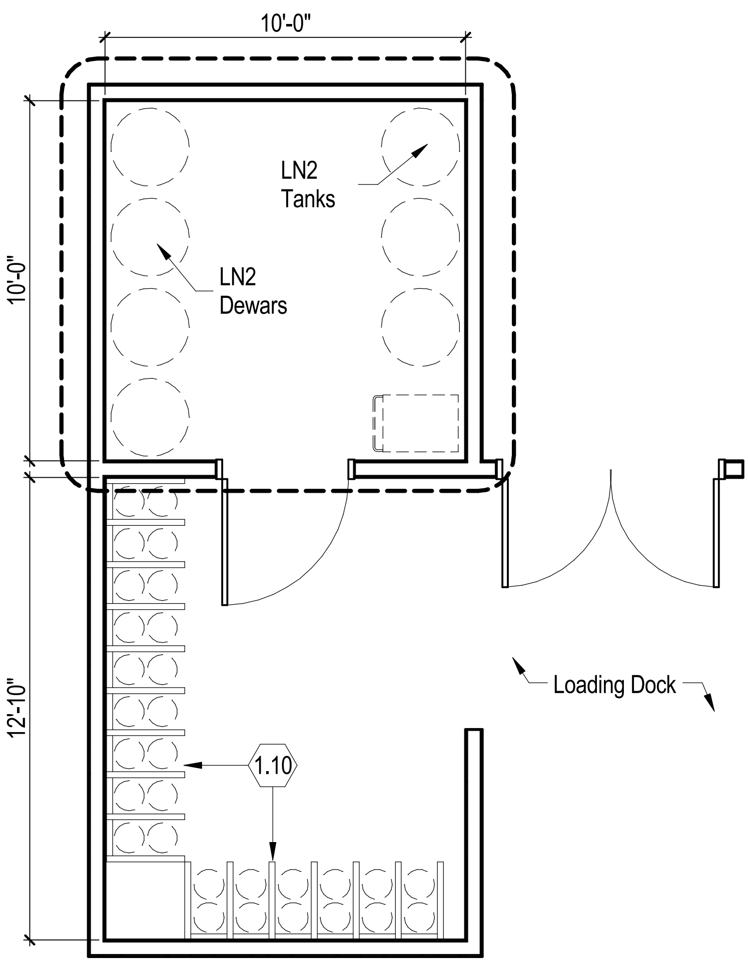
6.0 MECHANICAL

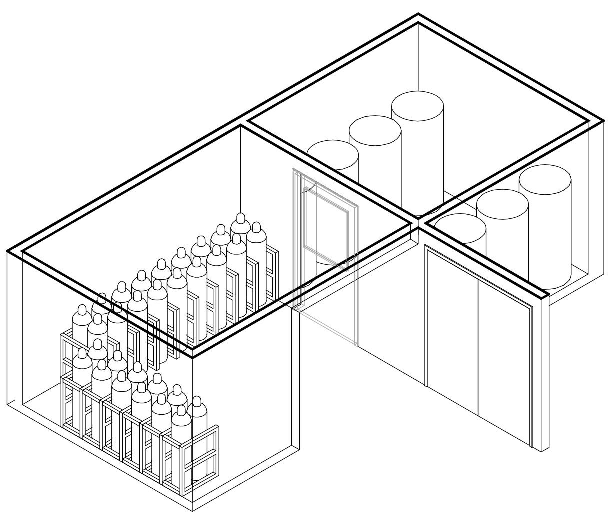
6.1 Exhaust Connection (Future Tie-in)

Space	***2.17 Liquid Nitrogen (LN2) Storage***					
Functional Description	*Storage of Liquid Nitrogen Gas Tanks for dispensing into hand-held dewars. Potential for staging of rolling LN2 Tanks.*					
Critical Adjacencies	*Truck Delivery, Freight Elevator*					
	Architectural & Structural					
Size	Avg (sf):	*95*	Request (sf):	*100*	Ceiling Ht. (ft):	*n/a*
Largest Equipment at move-in	Length (ft):	*3*	Width (ft):	*3*	Height (ft):	*6*
	Live Load (psf):	*125*	Door Width (ft):	*Note (1)*	Door Height (ft):	*7*
Finishes	Floors:	*Sealed Conc.*	Walls:	*Epoxy Ptd*	Ceiling:	*Hi-Gloss Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*TBD*	Unoccupied AC/Hr:	*TBD*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*Note (2)*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*None*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):		Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*No*	Security:	*Card Key*
Lighting	Special Lighting:	*Sparkproof*	Light Control:	*Manual*	Level (FC):	*30 (300 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*< 55' & <10s*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

If LN2 Tanks are in room, asphyxiation hazard needs to be analyzed. Exhaust is recommended as a preventative measure in the event that gas cylinders are inadvertently stored in this room. Note (1) Door width to accommodate proposed LN2 tank and dewar sizes. Note (2) If gas cabinets are included in room.





KEY LEGEND:

1.0 CASEWORK STORAGE
1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT
2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA
3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING
4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

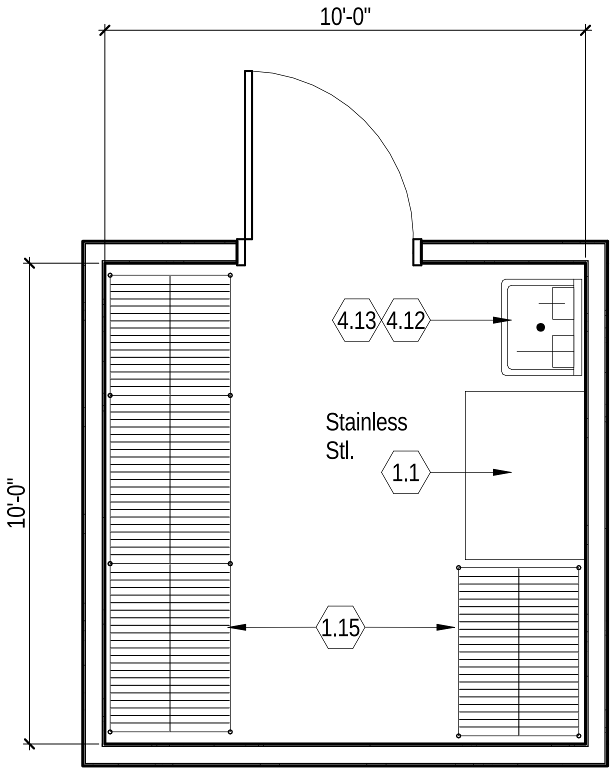
5.0 OTHER
5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

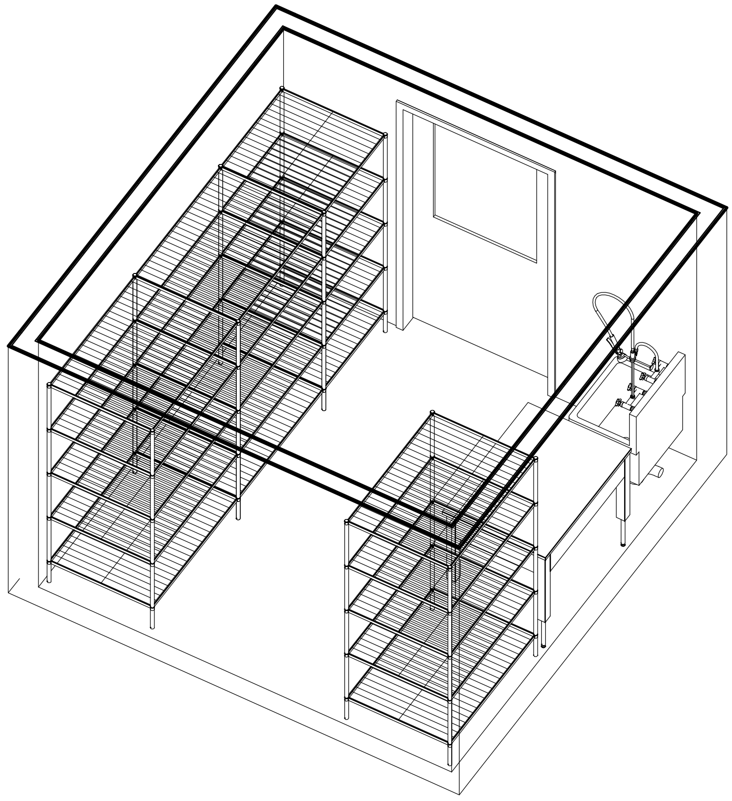
6.0 MECHANICAL
6.1 Exhaust Connection (Future Tie-in)

Space	***2.18 Plant Potting***					
Functional Description	*Space for filling and transfering of plant pots, washing of soil.*					
Critical Adjacencies	*Loading dock, Plant Growth Rooms, Freight Elevator*					
	Architectural & Structural					
Size	Avg (sf):	*103*	Request (sf):	*100*	Ceiling Ht. (ft):	*n/a*
Largest Equipment at move-in	Length (ft):		Width (ft):		Height (ft):	
	Live Load (psf):	*125*	Door Width (ft):	*3*	Door Height (ft):	*7*
Finishes	Floors:	*Sealed Conc.*	Walls:	*FRP*	Ceiling:	*Hi-Gloss Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Note (1)*	Hot:	*Note (1)*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*Utility Tub*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*None*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*3*	Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*(1) 4-port*	Paging:	*No*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*30 (300 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Stainless Steel utility sink to have soil trap, disposal, and receive Industrial Hot, Cold and Type I Purified Water. Heavy-Duty Stainless Steel Shelving floor to ceiling. EHS should be asked about materials potentially going down drain.





KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet
1.15 Floor-To-Clg, Stainless Stl, Wire Shelving

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory
4.12 Stainless Steel Utility Sink
4.13 Industrial Hot/Cold Water & Spray Hose

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

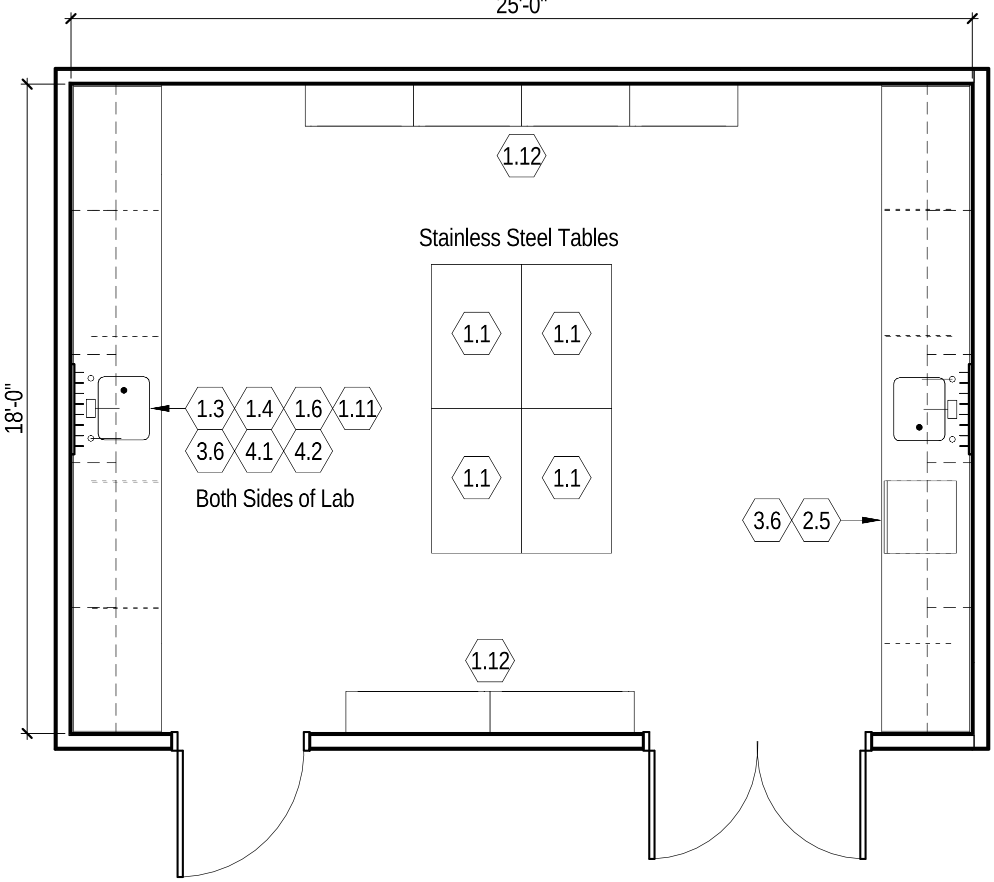
2.19 Dirty Prep Laboratory

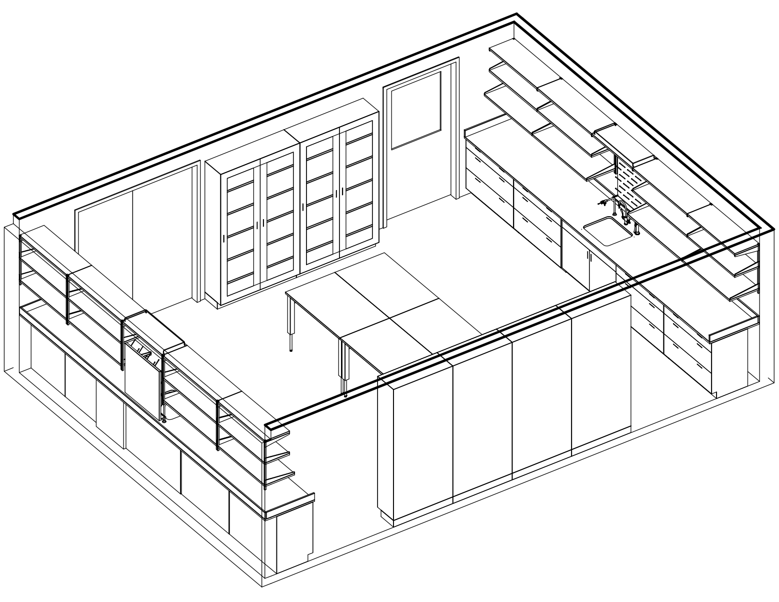
Space	*2.19 Dirty Prep Laboratory*					
Functional Description	*Non-Hazardous Laboratory for preparation of samples coming in from the field.*					
Critical Adjacencies	*Loading dock, Plant Growth Rooms, Freight Elevator, Plant Potting*					
	Architectural & Structural					
Size	Avg (sf):	*448*	Request (sf):	*450*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*6*	Width (ft):	*3*	Height (ft):	*5*
	Live Load (psf):	*Existing*	Door Width (ft):	*3.5 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Chem Res. Sheet*	Walls:	*Epoxy Pt.*	Ceiling:	*Hi-Gloss Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*Preferred*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*Yes*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Note (1)*	Hot:	*Note (1)*	Process Cooling:	*No*
	Purified Water:	*Note (1)*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*Yes*	Lab Vacuum:	*Yes*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*4*	Equip. Demand	*80%*		
Telcom & Security	Tel/Data (boxes):	*4-Port 5' OC*	Paging:	*Yes*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*< 55' & <10s*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Sinks should be oversized with Soil Trap and Disposal and to receive Industrial Hot, Cold and Type I Purified Water.

Note: Stainless Steel Sink & Counter & Domestic Water at Sink





KEY LEGEND:

1.0 CASEWORK STORAGE

- 1.1 Movable Table, Adjustable Height
- 1.2 Movable Work Bench w/ Shelving
- 1.3 Countertop
- 1.4 Adjustable Shelving
- 1.5 Knee Opening
- 1.6 Fixed Base Cabinets
- 1.7 Mobile Cabinets
- 1.8 Flammable Storage Cabinet
- 1.9 Corrosive Storage Cabinet
- 1.10 Cylinder Storage Rack
- 1.11 Drying Rack
- 1.12 Tall Storage Cabinets
- 1.13 Upper Cabinets
- 1.14 Microwave Base Cabinet
- 1.15 Floor-To-Clg, Stainless Stl, Wire Shelving

2.0 LABORATORY EQUIPMENT

- 2.1 Fume Hood
- 2.2 Biological Safety Cabinet
- 2.3 Snorkel
- 2.4 Autoclave: Air, Industrial Water, Steam, RO
- 2.5 Dishwasher: Industrial Water
- 2.6 Incubator (OFOI)
- 2.7 Refrigerator (OFOI)
- 2.8 Freezer (OFOI)
- 2.9 Water Polisher (OFOI): RO
- 2.10 Ice Machine: Industrial Water, Drain
- 2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

- 3.1 Overhead Outlet(s): Power and/or Data
- 3.2 Video Projector
- 3.3 Projection Screen
- 3.4 Wire Mold or Pedestal: Power and/or Data
- 3.5 Floor Outlet(s): Power and/or Data
- 3.6 Wall Outlet(s): Power and/or Data
- 3.7 Standby Outlet(s)
- 3.8 Task Lighting (Under Shelf)
- 3.9 Flat Panel Monitor

4.0 PLUMBING

- 4.1 Laboratory Sink or Cupsink
- 4.2 Industrial Hot/Cold Water, Drench Hose & DI
- 4.3 Laboratory Gases: Air & Vac
- 4.4 Recessed Safety Shower & Eyewash Combo
- 4.5 Pipe Drop Enclosure
- 4.6 Process Cooling Water
- 4.7 Floor Drain
- 4.8 Floor Sink
- 4.9 Stainless Steel Sink
- 4.10 Domestic Hot/Cold Water
- 4.11 Porcelain/Solid Surface Lavatory
- 4.12 Stainless Steel Utility Sink
- 4.13 Industrial Hot/Cold Water & Spray Hose

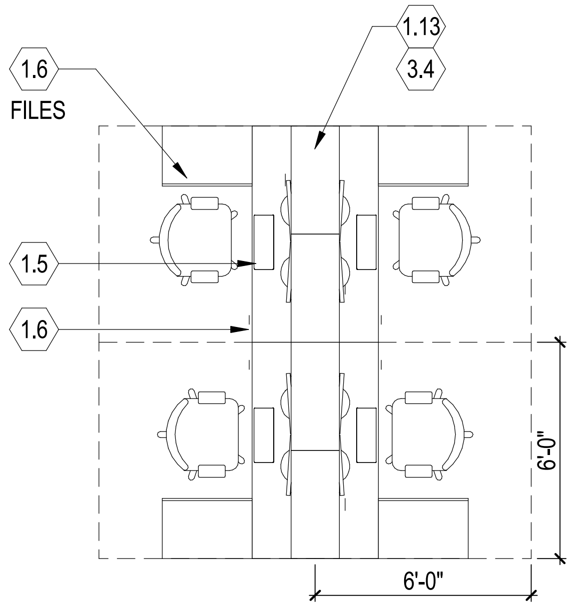
5.0 OTHER

- 5.1 Marker Board
- 5.2 Tack Board
- 5.3 Printer/Copier
- 5.4 Blackout Curtains

6.0 MECHANICAL

- 6.1 Exhaust Connection (Future Tie-in)

Space	***3.01 Computational Post Doctoral Workstation***					
Functional Description	*Secure, Open Office Computational Workstation for Post Doctorates.*					
Critical Adjacencies	*PI Office, Computational Graduate Student Workstations*					
	Architectural & Structural					
Size	Avg (sf):	*36*	Request (sf):	*36*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Carpet*	Walls:	*Ptd GWB*	Ceiling:	*Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*No*	Natural Light:	*Yes*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*40*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*3 Dplx*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*(1) 4-port*	Paging:	*Open Areas*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*
Special Requirements & Outstanding Issues	*Lockable Personal Storage*					



NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/OWNER INSTALLED (SHOWN FOR REFERENCE)

KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

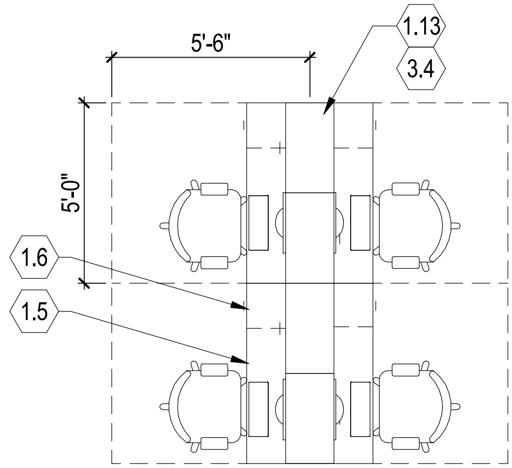
6.0 MECHANICAL

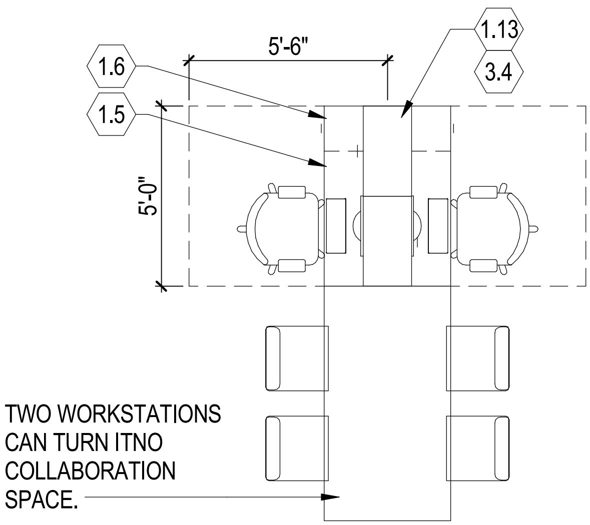
6.1 Exhaust Connection (Future Tie-in)

Space	***3.02 Computational Graduate Student Workstation***
Functional Description	*Secure, Open Office Computational Workstation for Graduate Students.*
Critical Adjacencies	*PI Office, Computational Post Doctoral Workstation*

	Architectural & Structural					
Size	Avg (sf):	*30*	Request (sf):	*30*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Carpet*	Walls:	*Ptd GWB*	Ceiling:	*Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*No*	Natural Light:	*Yes*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*40*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*3 Dplx*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*(1) 4-port*	Paging:	*Open Areas*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues	*Lockable Personal Storage*





NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/OWNER INSTALLED (SHOWN FOR REFERENCE)

KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

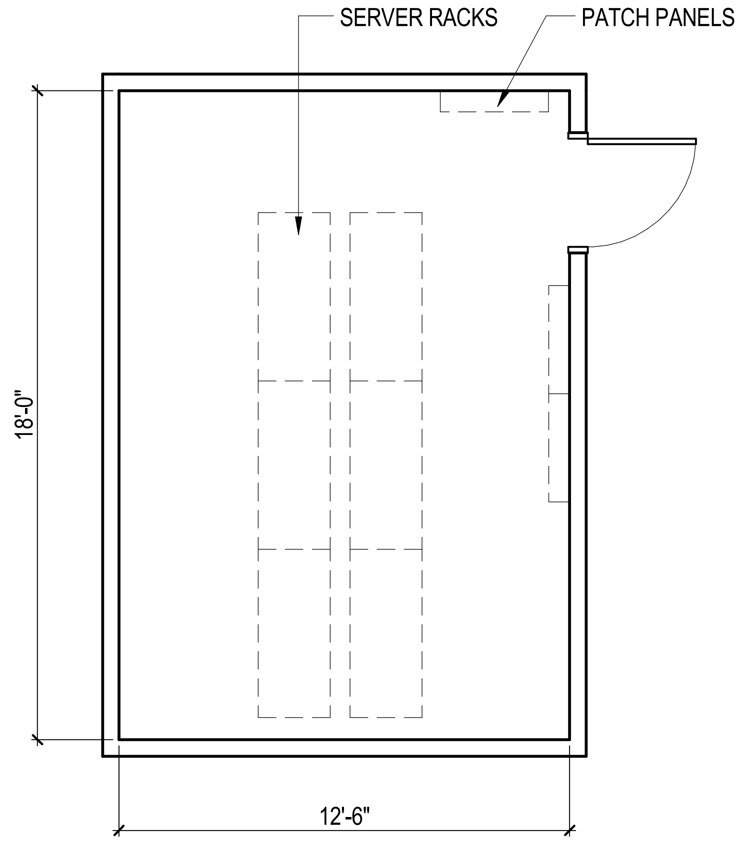
6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space	***3.03 Computational Server Room***					
Functional Description	*Computer server room for (n) co-located racks, serving a group of users.*					
Critical Adjacencies	*None*					
	Architectural & Structural					
Size	Avg (sf):	*253*	Request (sf):	*230*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*for Racks*	Width (ft):	*for Racks*	Height (ft):	*for Racks*
	Live Load (psf):	*Existing*	Door Width (ft):	*3*	Door Height (ft):	*7*
Finishes	Floors:	*Resilient ESD*	Walls:	*Ptd GWB*	Ceiling:	*Hi-Gloss Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*Note (1)*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Note (2)*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*Ground Floori*	Standby Power:	*TBD*	UPS:	*by User*
	Equip. Load (w/sf):	*10*	Equip. Demand	*TBD*		
Telcom & Security	Tel/Data (boxes):	*4-Port/Wall*	Paging:	*No*	Security:	*Note (3)*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

See UCR Communications Infrastructure Planning Guidelines. Front and rear rack access is required. Fire suppression type is to be studied. Keep all wet piping out of room. Note (1): Independent HVAC unit served by Emergency Power to achieve 78s-68w±2. Note (2): (1) Convenience outlet / wall; additional power and data distribution through the space should be identified early in design. Note (3) Card Key not required if access is through secure Computational Open Office Area.



KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

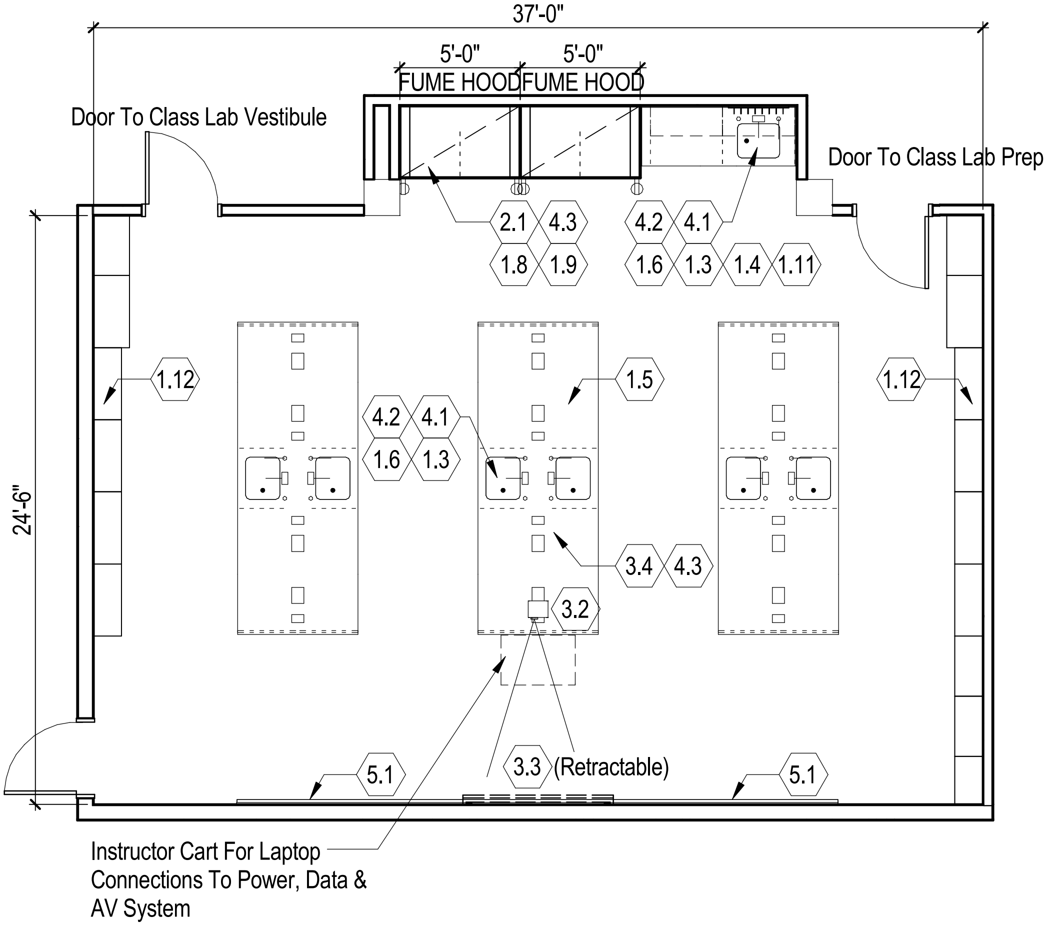
6.0 MECHANICAL

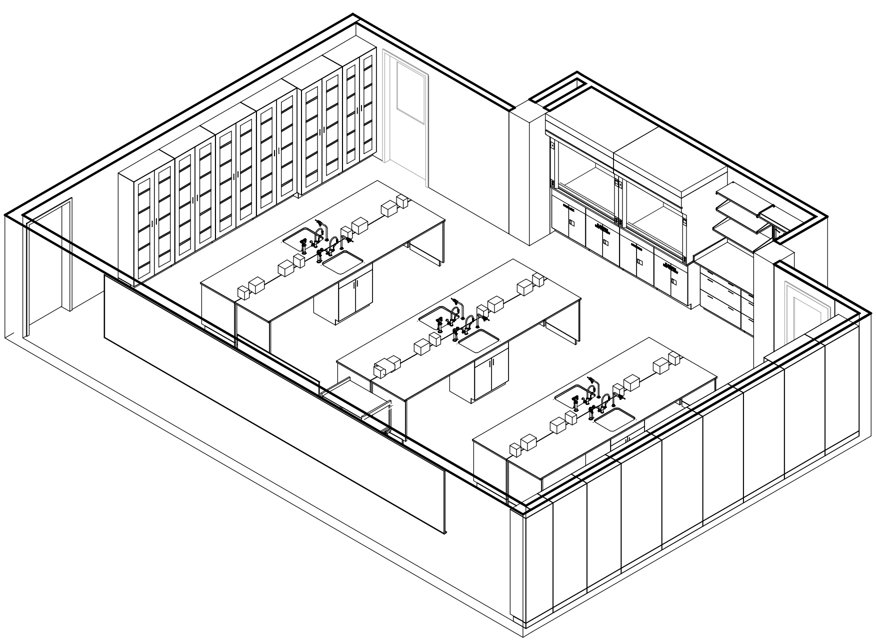
6.1 Exhaust Connection (Future Tie-in)

Space	***4.01 Class Laboratory (24 Stations)***					
Functional Description	*Bio-Safety Level 2 Biological Class Lab*					
Critical Adjacencies	*Class Laboratory Vestibule, Class Laboratory Prep*					
	Architectural & Structural					
Size	Avg (sf):	*980*	Request (sf):	*980*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*6*	Width (ft):	*3*	Height (ft):	*5*
	Live Load (psf):	*Existing*	Door Width (ft):	*3.5 Solid*	Door Height (ft):	*7*
Finishes	Floors:	*Chem Res. Sheet*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Mylar-wrapped Ceiling Tile*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*Preferred*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*Yes*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Note (1)*	Hot:	*Note (1)*	Process Cooling:	*No*
	Purified Water:	*Note (1)*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*Note (2)*	Lab Vacuum:	*Note (2)*	Lab (Natural) Gas:	*Note (2)*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*4*	Equip. Demand	*80%*		
Telcom & Security	Tel/Data (boxes):	*(1) 4-port*	Paging:	*Yes*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*Yes*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Sinks and Fume Hoods to receive Industrial Hot and Cold Water. One sink in room to receive Type I Purified Water. Tepid, Domestic Water to Safety Shower / Eye Wash. Note (2) Laboratory Air and Vacuum at each work bench. Laboratory Gas at Fume Hoods.





KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

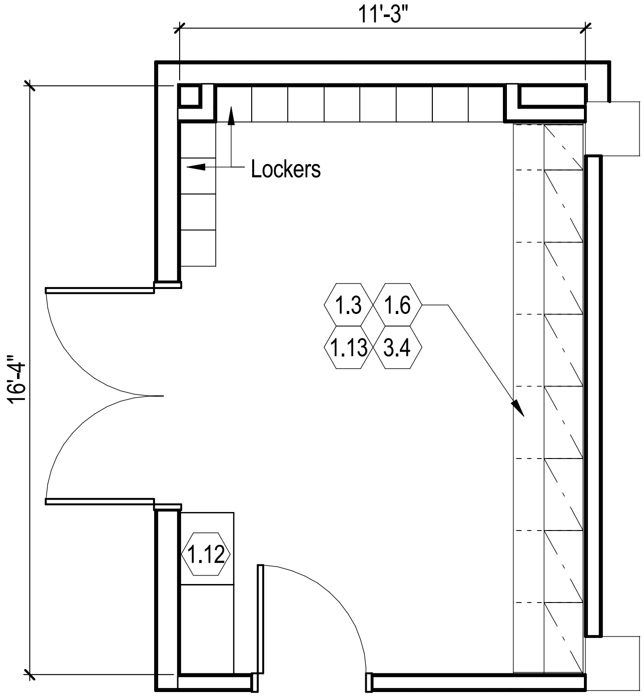
Space — *4.02 Class Laboratory Vestibule / Storage*

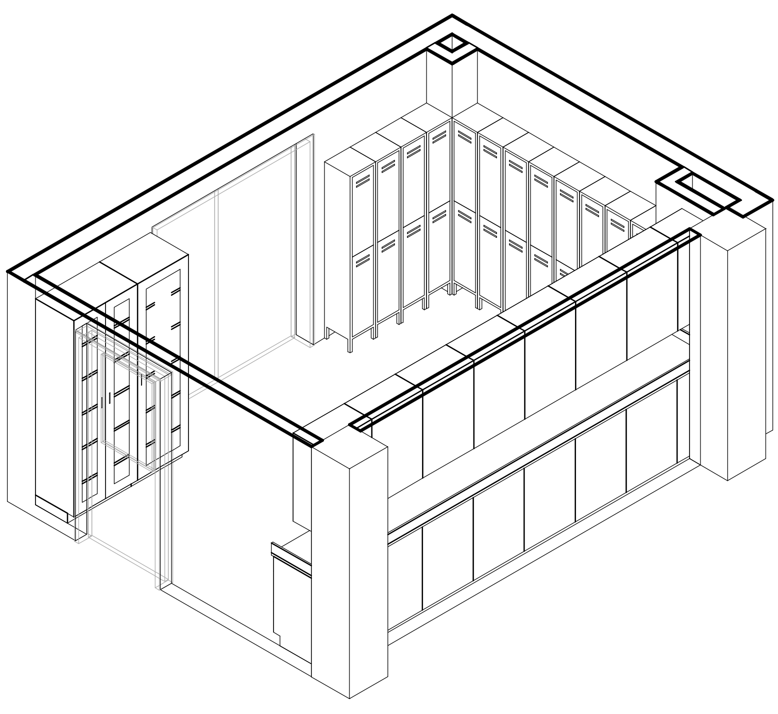
Functional Description — *Location for students to drop off coats, backpacks and personal items.*

Critical Adjacencies — *Class Laboratory, Outdoor Entrance*

	Architectural & Structural					
Size	Avg (sf):	*181*	Request (sf):	*180*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*Existing*	Door Height (ft):	*7*
Finishes	Floors:	*Resilient Sheet*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Hi-Gloss Ptd. GWB*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*Preferred*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*4*	Equip. Demand	*80%*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*No*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues — *Note (2) Card Key not required if access is through secure Computational Open Office Area.*





KEY LEGEND:

1.0 CASEWORK STORAGE

- 1.1 Movable Table, Adjustable Height
- 1.2 Movable Work Bench w/ Shelving
- 1.3 Countertop
- 1.4 Adjustable Shelving
- 1.5 Knee Opening
- 1.6 Fixed Base Cabinets
- 1.7 Mobile Cabinets
- 1.8 Flammable Storage Cabinet
- 1.9 Corrosive Storage Cabinet
- 1.10 Cylinder Storage Rack
- 1.11 Drying Rack
- 1.12 Tall Storage Cabinets
- 1.13 Upper Cabinets
- 1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

- 2.1 Fume Hood
- 2.2 Biological Safety Cabinet
- 2.3 Snorkel
- 2.4 Autoclave: Air, Industrial Water, Steam, RO
- 2.5 Dishwasher: Industrial Water
- 2.6 Incubator (OFOI)
- 2.7 Refrigerator (OFOI)
- 2.8 Freezer (OFOI)
- 2.9 Water Polisher (OFOI): RO
- 2.10 Ice Machine: Industrial Water, Drain
- 2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

- 3.1 Overhead Outlet(s): Power and/or Data
- 3.2 Video Projector
- 3.3 Projection Screen
- 3.4 Wire Mold or Pedestal: Power and/or Data
- 3.5 Floor Outlet(s): Power and/or Data
- 3.6 Wall Outlet(s): Power and/or Data
- 3.7 Standby Outlet(s)
- 3.8 Task Lighting (Under Shelf)
- 3.9 Flat Panel Monitor

4.0 PLUMBING

- 4.1 Laboratory Sink or Cupsink
- 4.2 Industrial Hot/Cold Water, Drench Hose & DI
- 4.3 Laboratory Gases: Air & Vac
- 4.4 Recessed Safety Shower & Eyewash Combo
- 4.5 Pipe Drop Enclosure
- 4.6 Process Cooling Water
- 4.7 Floor Drain
- 4.8 Floor Sink
- 4.9 Stainless Steel Sink
- 4.10 Domestic Hot/Cold Water
- 4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

- 5.1 Marker Board
- 5.2 Tack Board
- 5.3 Printer/Copier
- 5.4 Blackout Curtains
- 5.5 Acoustical Panel
- 5.6 Clearstory Window

6.0 MECHANICAL

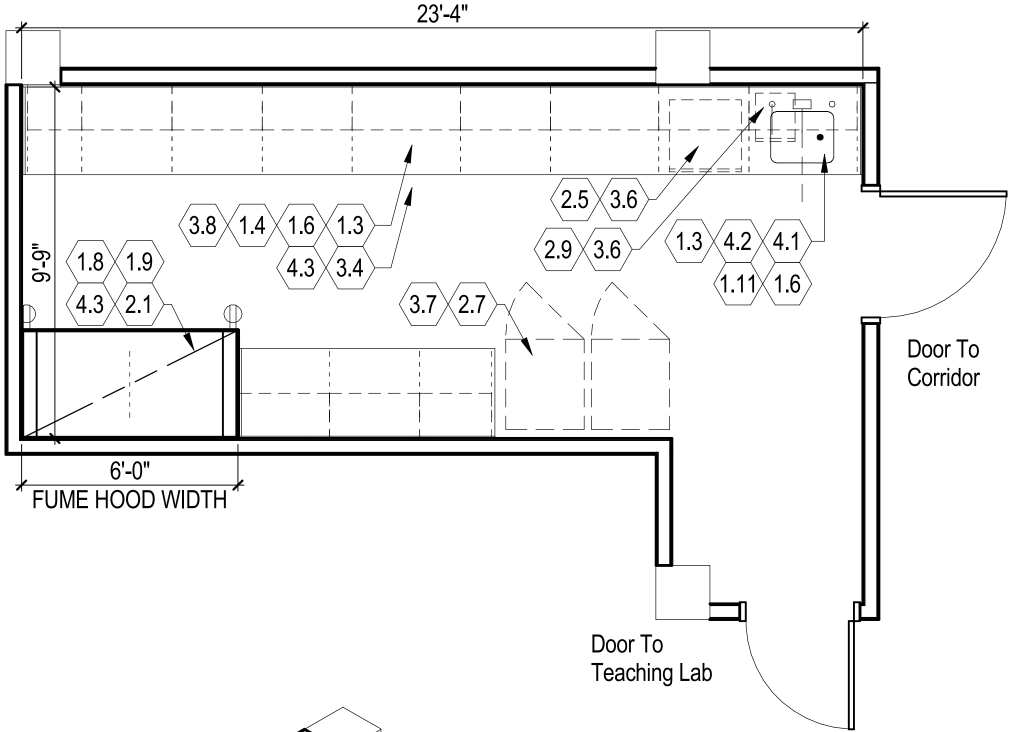
- 6.1 Exhaust Connection (Future Tie-in)

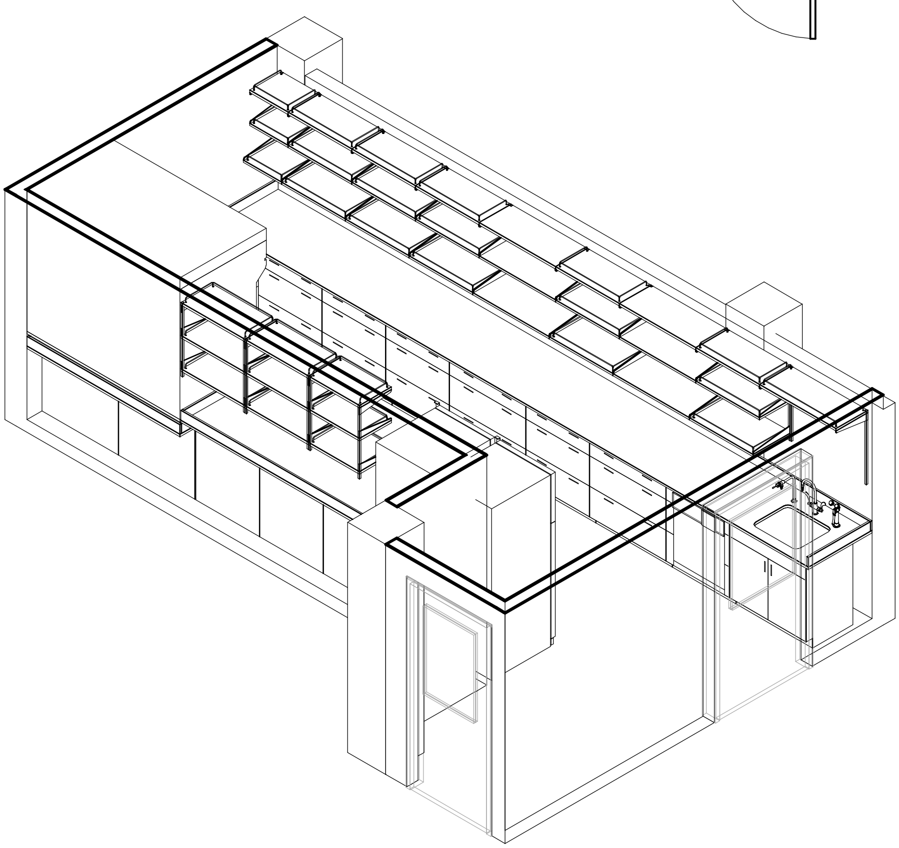
Space	***4.03 Class Laboratory Prep***
Functional Description	*Bio-Safety Level 2 Wet Laboratory for preparation of class materials concurrent with other on-going classes.*
Critical Adjacencies	*Class Laboratory, Chem Delivery Path*

	Architectural & Structural					
Size	Avg (sf):	*252*	Request (sf):	*250*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*6*	Width (ft):	*3*	Height (ft):	*5*
	Live Load (psf):	*Existing*	Door Width (ft):	*3.5 Solid*	Door Height (ft):	*7*
Finishes	Floors:	*Chem Res. Sheet*	Walls:	*Hi-Gloss Pt.*	Ceiling:	*Mylar-wrapped Ceiling Tile*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*Preferred*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*≥8*	Unoccupied AC/Hr:	*≥4*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*Yes*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Note (1)*	Hot:	*Note (1)*	Process Cooling:	*No*
	Purified Water:	*Note (1)*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*Note (2)*	Lab Vacuum:	*Note (2)*	Lab (Natural) Gas:	*Note (2)*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*4*	Equip. Demand	*80%*		
Telcom & Security	Tel/Data (boxes):	*(1) 4-port*	Paging:	*Yes*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*< 55' & <10s*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Sinks and Fume Hoods to receive Industrial Hot and Cold Water. Sink also to receive Type I Purified Water. Tepid, Domestic Water to Safety Shower / Eye Wash. Note (2) Laboratory Air, Vacuum, and Gas at Fume Hood.





KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

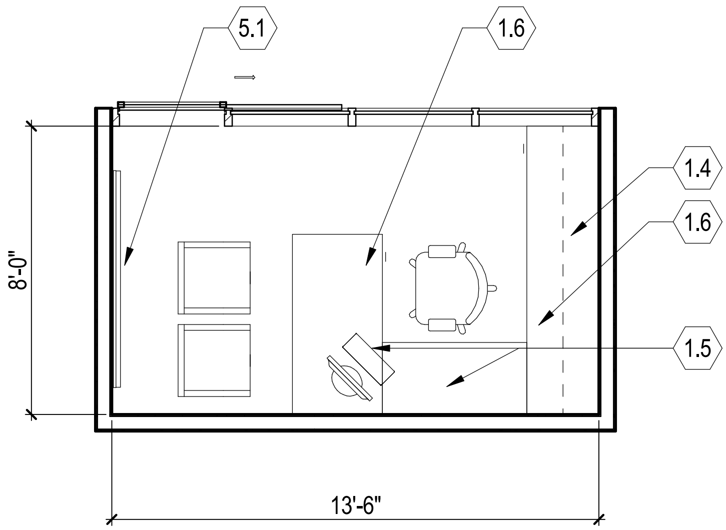
5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space	***5.01 Principal Investigator Office***					
Functional Description	*Enclosed Private Office*					
Critical Adjacencies	*Post Doctoral Workstation, Graduate Student Workstations*					
	Architectural & Structural					
Size	Avg (sf):	*124*	Request (sf):	*125*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Carpet*	Walls:	*Ptd GWB*	Ceiling:	*ACT*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*No*	Natural Light:	*Yes*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*35*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*3 Dplx*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*(1) 4-port*	Paging:	*No*	Security:	*Key*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues



NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/OWNER INSTALLED (SHOWN FOR REFERENCE)

KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

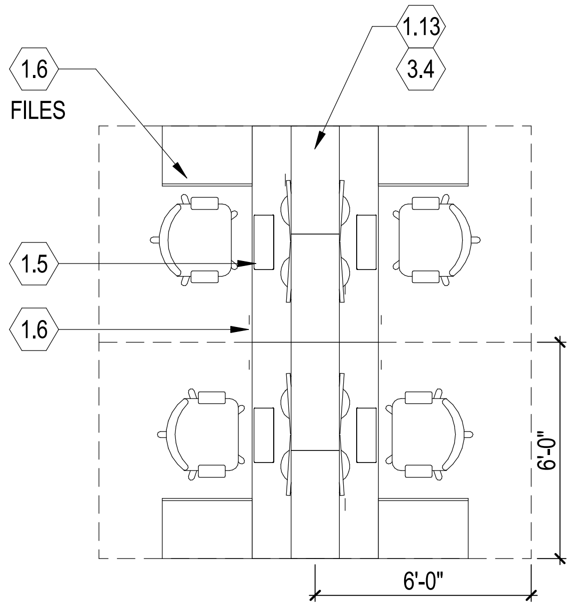
6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space	***5.02 Post Doctoral Workstation***
Functional Description	*Open office workstation with secure storage.*
Critical Adjacencies	*PI Office, Graduate Student Workstations*

	Architectural & Structural					
Size	Avg (sf):	*36*	Request (sf):	*36*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Carpet*	Walls:	*Ptd GWB*	Ceiling:	*Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*No*	Natural Light:	*Yes*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*40*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*3 Dplx*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*(1) 4-port*	Paging:	*Open Areas*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues	*Lockable Personal Storage*



NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/OWNER INSTALLED (SHOWN FOR REFERENCE)

KEY LEGEND:

1.0 **CASEWORK STORAGE**

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 **EQUIPMENT**

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 **ELECTRICAL/DATA**

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 **PLUMBING**

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

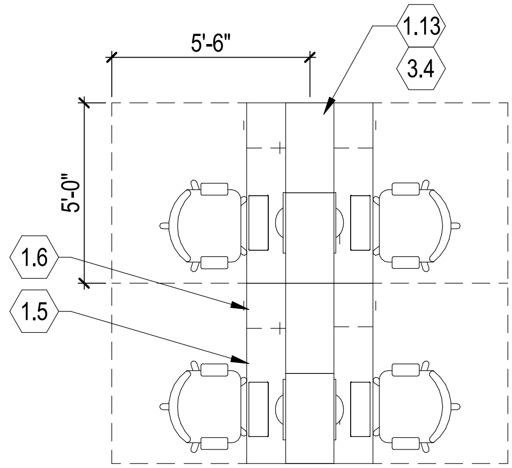
5.0 **OTHER**

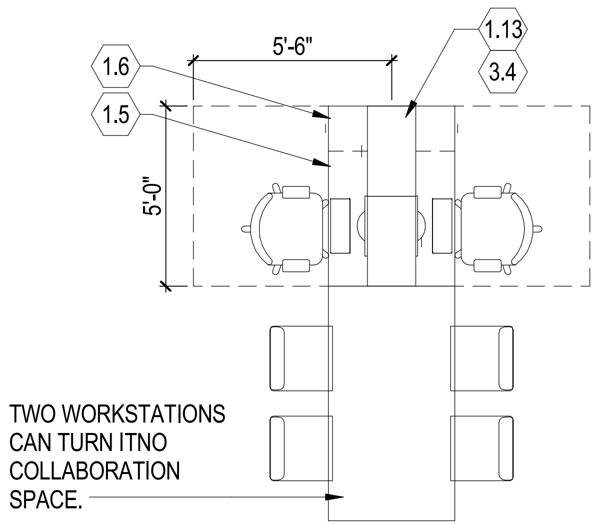
5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 **MECHANICAL**

6.1 Exhaust Connection (Future Tie-in)

Space	***5.03 Graduate Student Workstation***					
Functional Description	*Open office workstation with secure storage.*					
Critical Adjacencies	*PI Office, Post Doctoral Workstation*					
	Architectural & Structural					
Size	Avg (sf):	*30*	Request (sf):	*30*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Carpet*	Walls:	*Ptd GWB*	Ceiling:	*Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*No*	Natural Light:	*Yes*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*40*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*3 Dplx*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*(1) 4-port*	Paging:	*Open Areas*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*
Special Requirements & Outstanding Issues	*Lockable Personal Storage*					





NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/OWNER INSTALLED (SHOWN FOR REFERENCE)

KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

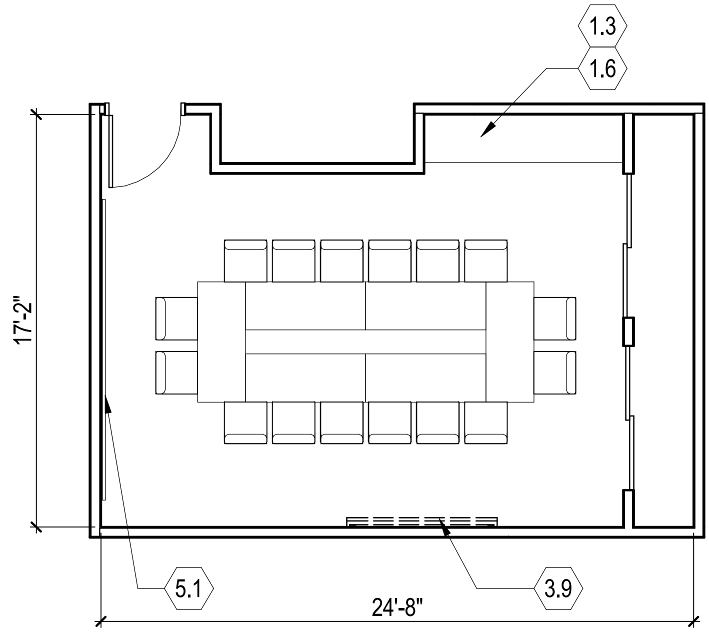
6.0 MECHANICAL

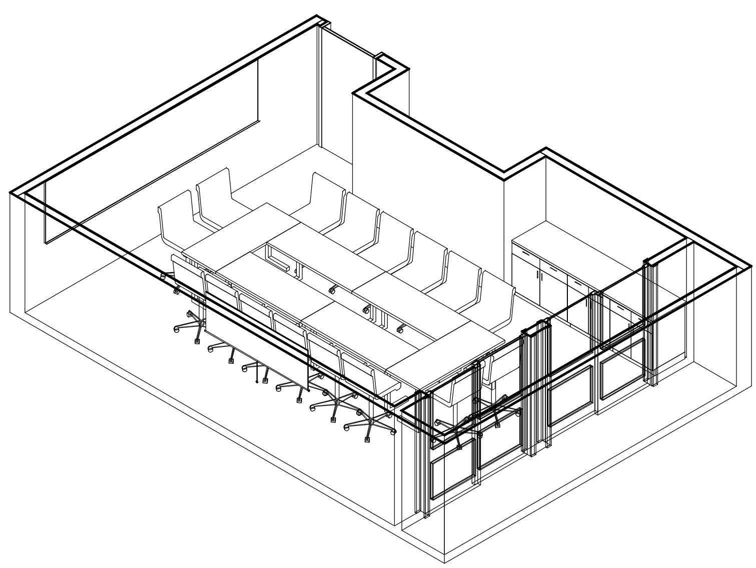
6.1 Exhaust Connection (Future Tie-in)

Space	***5.04 Seminar Room (15-25 students)***					
Functional Description	*Seminar room for 15 students. Schedulable by anyone once academic needs are met.*					
Critical Adjacencies	*Exterior and/or Building Lobby*					
	Architectural & Structural					
Size	Avg (sf):	*422*	Request (sf):	*425*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Vision*	Door Height (ft):	*7*
Finishes	Floors:	*Carpet*	Walls:	*Acoustical*	Ceiling:	*ACT*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*Yes*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*35*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Note (2)*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*3*	Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*Note (2)*	Paging:	*Yes*	Security:	*Note (3)*
Lighting	Special Lighting:	*No*	Light Control:	*Dim/Zoned Occ. Sensor*	Level (FC):	*30 to 50*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Design rooms to keep acoustic noise from permeating to sensitive spaces; see sensitivity criteria for other spaces. Note (2) Floor 120V-20A-1Ø Power Outlets (for tables) in addition to (1) 4-Port and (1) Duplex 120V-20A-1Ø Outlet per Wall. Note (3) Card Key required if accessed directly from outside.





NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/OWNER INSTALLED (SHOWN FOR REFERENCE)

KEY LEGEND:

1.0 **CASEWORK STORAGE**

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 **EQUIPMENT**

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 **ELECTRICAL/DATA**

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 **PLUMBING**

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 **OTHER**

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

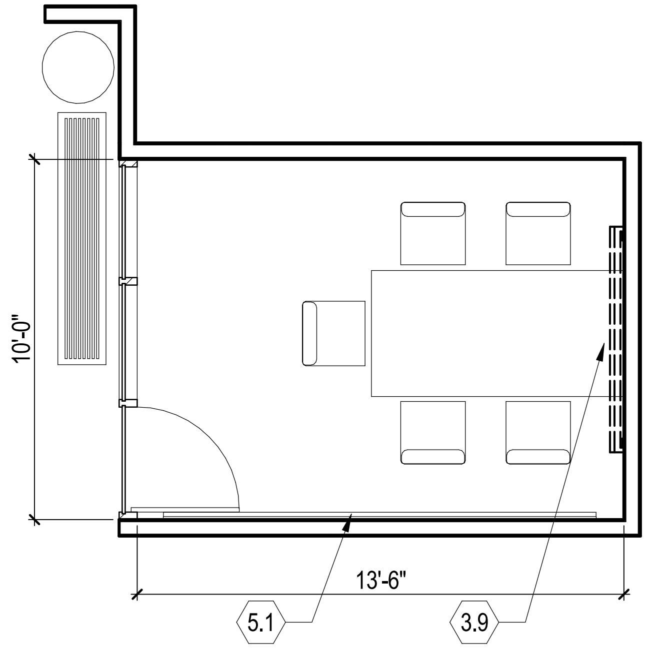
6.0 **MECHANICAL**

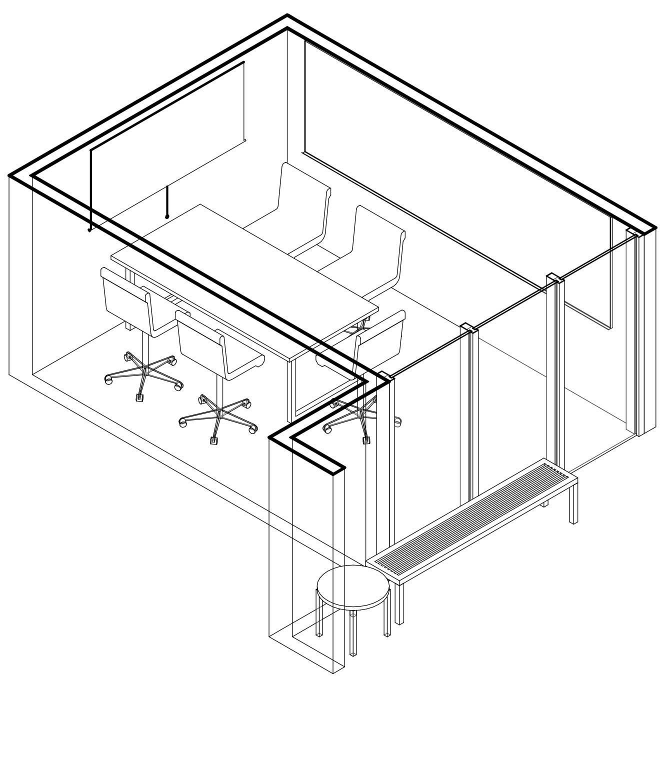
6.1 Exhaust Connection (Future Tie-in)

Space	***5.05 Small Conference / TA Tutoring***
Functional Description	*Schedulable Meeting Room for up to 5 people. Ideally accessed without entering secure office or Laboratory zones. Intended, but not exclusively, for tutoring of undergraduates.*
Critical Adjacencies	*Passenger Elevator*

	Architectural & Structural					
Size	Avg (sf):	*132*	Request (sf):	*135*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*4 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Carpet*	Walls:	*Ptd GWB*	Ceiling:	*ACT*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*Yes*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*35*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*(1) Dplx/Wall*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*3*	Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*(1) 4-port*	Paging:	*No*	Security:	*None*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*30 to 50*
				Occ. Sensor		
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues





NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/OWNER INSTALLED (SHOWN FOR REFERENCE)

KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

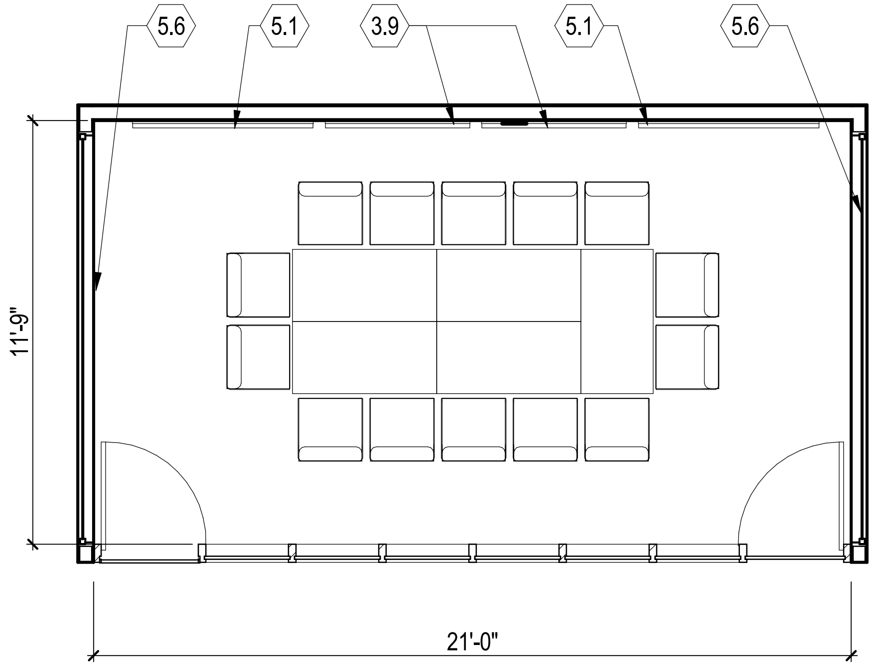
5.0 OTHER

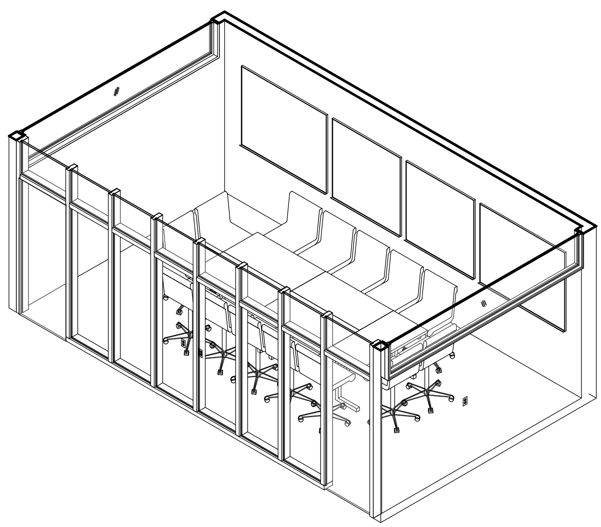
5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space	***5.06 Medium Conference (8-14 people)***					
Functional Description	*Meeting Room Sized for Larger than average PI Group. One per floor. Ideally accessed without entering secure office or Laboratory zones.*					
Critical Adjacencies	*Office Area, Passenger Elevator*					
	Architectural & Structural					
Size	Avg (sf):	*231*	Request (sf):	*250*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*4 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Carpet*	Walls:	*Ptd GWB*	Ceiling:	*ACT*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*Yes*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*35*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Note (2)*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*3*	Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*Note (2)*	Paging:	*Yes*	Security:	*None*
Lighting	Special Lighting:	*No*	Light Control:	*Dim/Zoned Occ. Sensor*	Level (FC):	*30 to 50*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*
Special Requirements & Outstanding Issues	*Note (1) Design rooms to keep acoustic noise from permeating to sensitive spaces; see sensitivity criteria for other spaces. Note (2) Floor 120V-20A-1Ø Power and Data Outlets (for table) in addition to (1) 4-Port and (1) Duplex 120V-20A-1Ø Outlet per Wall*					





LEVEL	AREA	SF
1	A	212
2	A	270
2	B	230
3	A	280
3	B	230
4	A	280
Total Qty		6
Average SF		250

NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/OWNER INSTALLED (SHOWN FOR REFERENCE)

KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

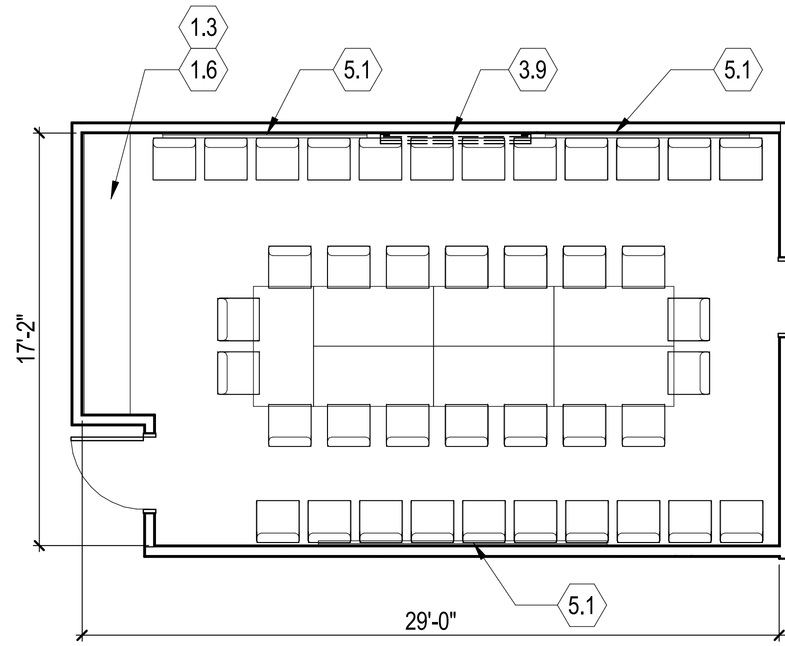
6.0 MECHANICAL

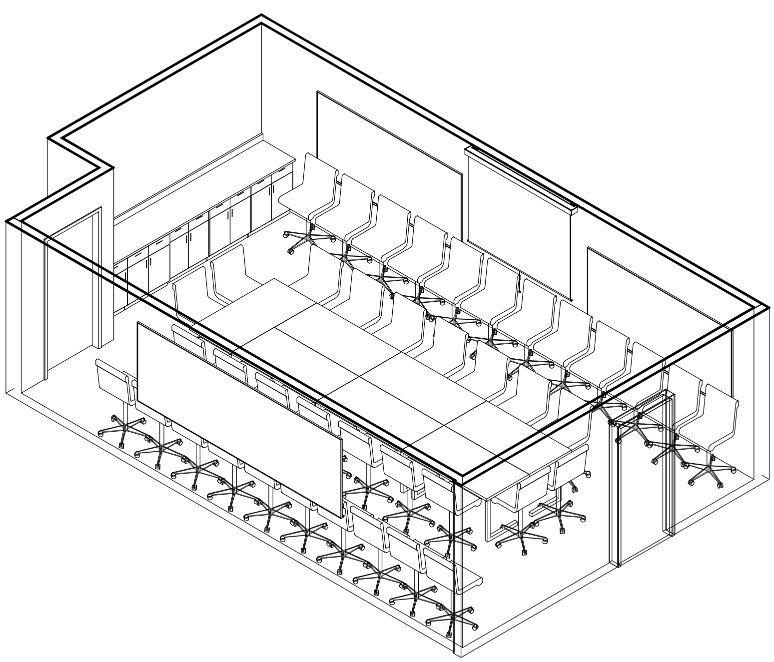
6.1 Exhaust Connection (Future Tie-in)

Space	***5.07 Large Conference (40 people)***
Functional Description	*Seminar room for approximately 40 people. For Faculty, Larger PI Group, and Combined Group Team Meetings. Schedulable by anyone.*
Critical Adjacencies	*Exterior and/or Passenger Elevator*

	Architectural & Structural					
Size	Avg (sf):	*500*	Request (sf):	*500*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Vision*	Door Height (ft):	*7*
Finishes	Floors:	*Carpet*	Walls:	*Acoustical*	Ceiling:	*ACT*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*Yes*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*35*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Note (2)*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*3*	Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*Note (2)*	Paging:	*Yes*	Security:	*Note (3)*
Lighting	Special Lighting:	*No*	Light Control:	*Dim/Zoned Occ. Sensor*	Level (FC):	*30 to 50*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues	*Note (1) Design rooms to keep acoustic noise from permeating to sensitive spaces; see sensitivity criteria for other spaces. Note (2) Floor 120V-20A-1Ø Power and Data Outlets (for table) in addition to (1) 4-Port and (1) Duplex 120V-20A-1Ø Outlet per Wall. Note (3) Card Key required if accessed directly from outside.*





NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/OWNER INSTALLED (SHOWN FOR REFERENCE)

KEY LEGEND:

1.0 CASEWORK STORAGE

- 1.1 Movable Table, Adjustable Height
- 1.2 Movable Work Bench w/ Shelving
- 1.3 Countertop
- 1.4 Adjustable Shelving
- 1.5 Knee Opening
- 1.6 Fixed Base Cabinets
- 1.7 Mobile Cabinets
- 1.8 Flammable Storage Cabinet
- 1.9 Corrosive Storage Cabinet
- 1.10 Cylinder Storage Rack
- 1.11 Drying Rack
- 1.12 Tall Storage Cabinets
- 1.13 Upper Cabinets
- 1.14 Microwave Base Cabinet

2.0 EQUIPMENT

- 2.1 Fume Hood
- 2.2 Biological Safety Cabinet
- 2.3 Snorkel
- 2.4 Autoclave: Air, Industrial Water, Steam, RO
- 2.5 Dishwasher
- 2.6 Incubator (OFOI)
- 2.7 Refrigerator (OFOI)
- 2.8 Freezer (OFOI)
- 2.9 Water Polisher (OFOI): RO
- 2.10 Ice Machine: Industrial Water, Drain
- 2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

- 3.1 Overhead Outlet(s): Power and/or Data
- 3.2 Video Projector
- 3.3 Projection Screen
- 3.4 Wire Mold or Pedestal: Power and/or Data
- 3.5 Floor Outlet(s): Power and/or Data
- 3.6 Wall Outlet(s): Power and/or Data
- 3.7 Standby Outlet(s)
- 3.8 Task Lighting (Under Shelf)
- 3.9 Flat Panel Monitor

4.0 PLUMBING

- 4.1 Laboratory Sink or Cupsink
- 4.2 Industrial Hot/Cold Water, Drench Hose & DI
- 4.3 Laboratory Gases: Air & Vac
- 4.4 Recessed Safety Shower & Eyewash Combo
- 4.5 Pipe Drop Enclosure
- 4.6 Process Cooling Water
- 4.7 Floor Drain
- 4.8 Floor Sink
- 4.9 Stainless Steel Sink
- 4.10 Domestic Hot/Cold Water
- 4.11 Porcelain/Solid Surface Lavatory

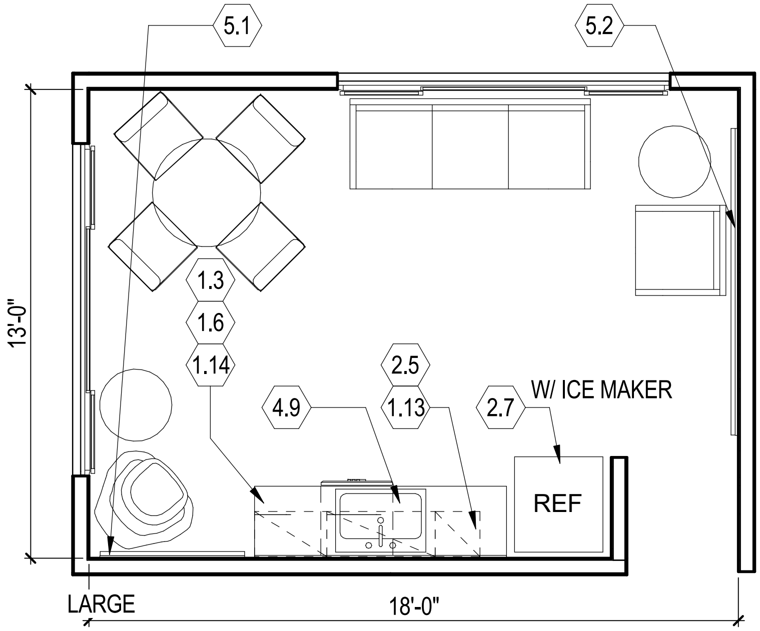
5.0 OTHER

- 5.1 Marker Board
- 5.2 Tack Board
- 5.3 Printer/Copier
- 5.4 Blackout Curtains
- 5.5 Acoustical Panel
- 5.6 Clearstory Window

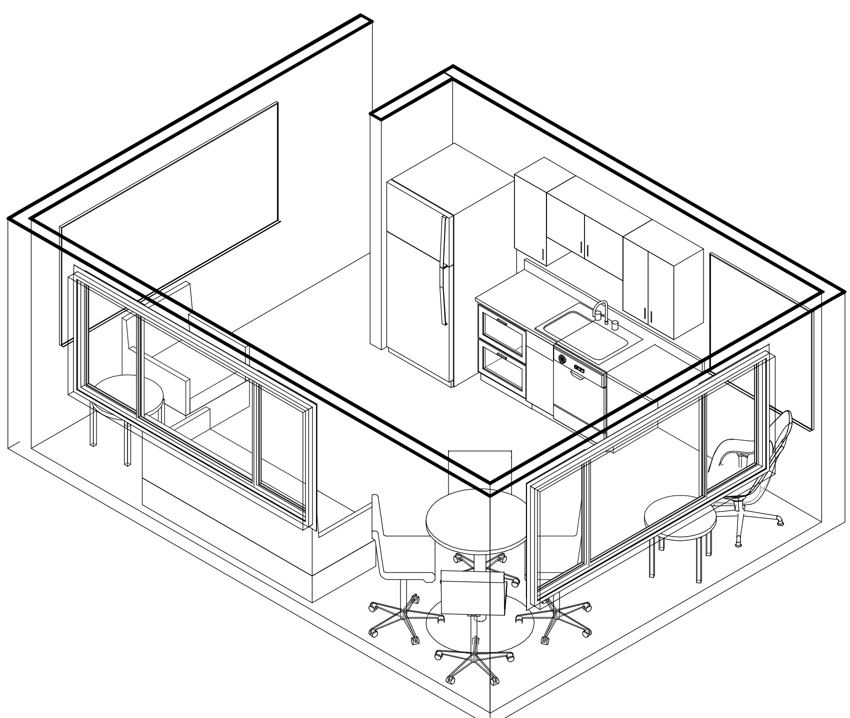
6.0 MECHANICAL

- 6.1 Exhaust Connection (Future Tie-in)

Space	***5.08 Scholarly Activity / Kitchenette***					
Functional Description	*Lounge with funiture and whiteboards for collaboration / break. Includes a kitchenette.*					
Critical Adjacencies	*Office Areas*					
	Architectural & Structural					
Size	Avg (sf):	*231*	Request (sf):	*230*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*None*	Door Height (ft):	*7 Cased*
Finishes	Floors:	*Reslient*	Walls:	*Ptd GWB*	Ceiling:	*Ptd. Open Struct.*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*Yes*	Natural Light:	*Yes*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*40*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Note (1)*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*Open Areas*	Security:	*None*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*
Special Requirements & Outstanding Issues	*Design rooms to keep acoustic noise from permeating to sensitive spaces; see sensitivity criteria for other spaces. Note (1) Floor Power and Data Outlets in addition to (1) 4-Port and (1) Power Outlet per Wall. Consider USB charging.*					



TYPICAL COMPONENTS FOR ALL TYPES OF SCHOLARLY ACTIVITY; SIZE AND QUANTITY MAY VARY.



KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

LEVEL	AREA	SF
1	A	210
2	A	240
2	B	230*
3	A	280
3	B	240
4	A	280
Average		250

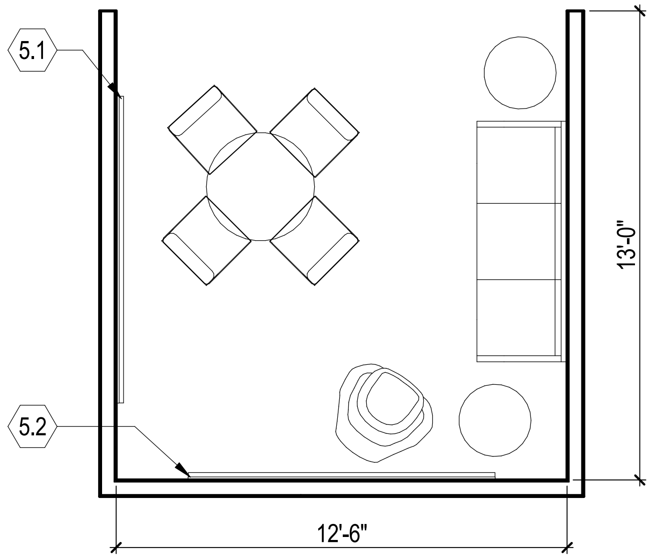
* No Kitchenette

NOTE: ALL OFFICE FURNISHINGS TO BE OWNER FURNISHED/ OWNER INSTALLED (SHOWN FOR REFERENCE)

Space	***5.09 Scholarly Activity***					
Functional Description	*Lounge with funiture and whiteboards for collaboration / break.*					
Critical Adjacencies	*Office Areas, Kitchenette*					
	Architectural & Structural					
Size	Avg (sf):	*160*	Request (sf):	*160*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*None*	Door Height (ft):	*7 Cased*
Finishes	Floors:	*Carpet*	Walls:	*Ptd GWB*	Ceiling:	*Ptd. Open Struct.*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*Yes*	Natural Light:	*Yes*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*40*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Note (1)*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*Open Areas*	Security:	*None*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

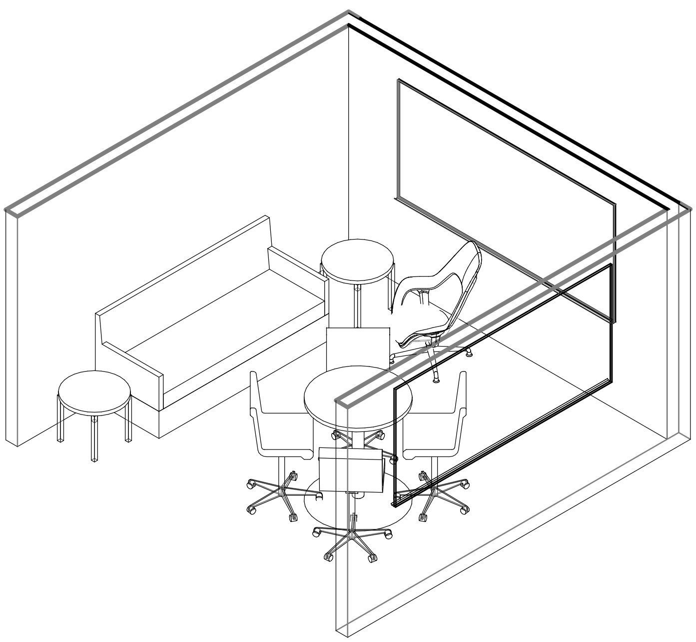
Special Requirements & Outstanding Issues

Design rooms to keep acoustic noise from permeating to sensitive spaces; see sensitivity criteria for other spaces. Note (1) Floor Power and Data Outlets in addition to (1) 4-Port and (1) Power Outlet per Wall. Consider USB charging.



MEDIUM

TYPICAL COMPONENTS FOR ALL TYPES OF SCHOLARLY ACTIVITY;
SIZE AND QUANTITY MAY VARY.



NOTE: ALL OFFICE FURNISHINGS TO BE OWNER FURNISHED/ OWNER INSTALLED (SHOWN FOR REFERENCE)

KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

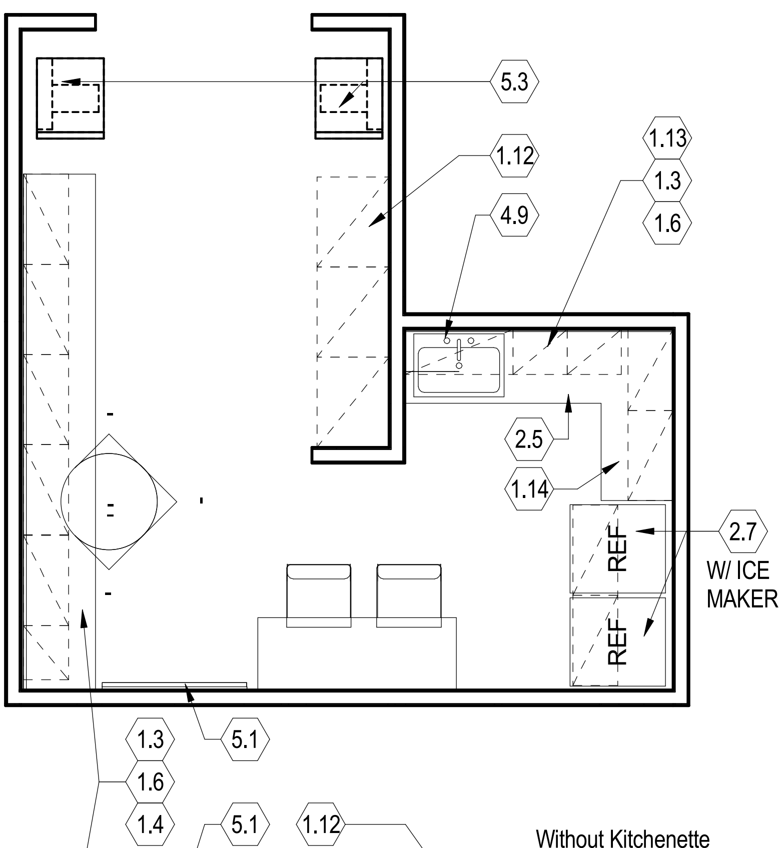
6.0 MECHANICAL

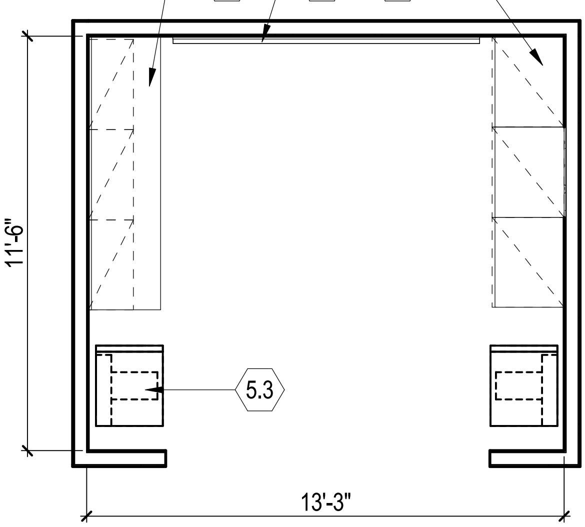
6.1 Exhaust Connection (Future Tie-in)

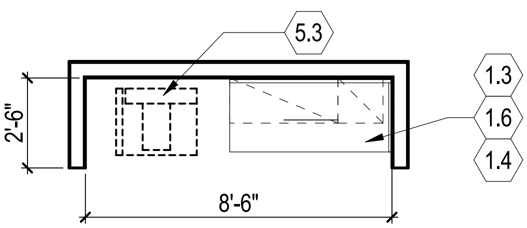
Space	***5.10 Copy / Workroom / Kitchenette***					
Functional Description	*Workroom and Kitchenette to support both Laboratory and Office*					
Critical Adjacencies	*Office Areas*					
	Architectural & Structural					
Size	Avg (sf):	*215*	Request (sf):	*215*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*None*	Door Height (ft):	*7 Cased*
Finishes	Floors:	*Reslient Tile*	Walls:	*Ptd GWB*	Ceiling:	*Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*No*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*40*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*4-Port/Wall*	Paging:	*No*	Security:	*Note (1)*
						Note (1)
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Design rooms to keep acoustic noise from permeating to sensitive spaces; see sensitivity criteria for other spaces. No security required if accessed through secure office area.







NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/ OWNER INSTALLED (SHOWN FOR REFERENCE)

Without Kitchenette

LEVEL	AREA	SF
1	A	105
2	A	110
2	B	60
3	A	-
3	B	200
4	A	-
Total Qty		5
Average SF		95

With Kitchenette

LEVEL	AREA	SF
1	A	-
2	A	-
2	B	225
3	A	260
3	B	-
4	A	280
Total Qty		3
Average SF		250

KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

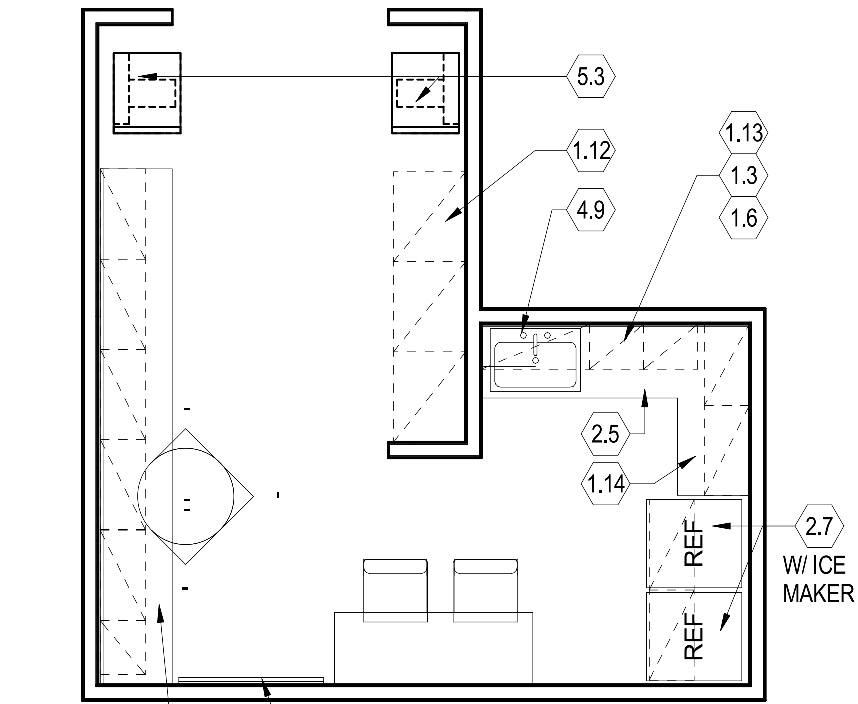
6.0 MECHANICAL

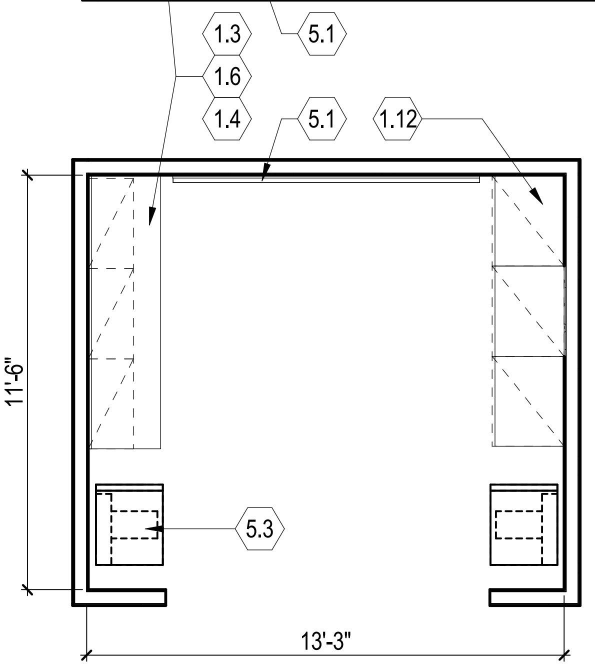
6.1 Exhaust Connection (Future Tie-in)

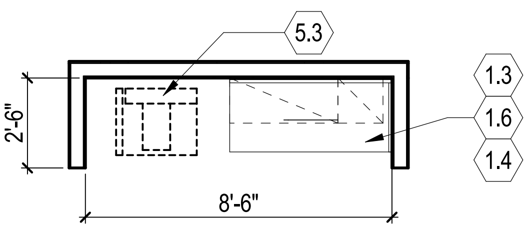
Space	***5.11 Copy / Workroom***					
Functional Description	*Workroom to support both Laboratory and Office*					
Critical Adjacencies	*Office Areas*					
	Architectural & Structural					
Size	Avg (sf):	*90*	Request (sf):	*70*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*None*	Door Height (ft):	*7 Cased*
Finishes	Floors:	*Reslient Tile*	Walls:	*Ptd GWB*	Ceiling:	*Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*No*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*40*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx 2.5' OC*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*4-Port/Wall*	Paging:	*No*	Security:	*Note (1)*
						Note (1)
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Design rooms to keep acoustic noise from permeating to sensitive spaces; see sensitivity criteria for other spaces. No security required if accessed through secure office area.







NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/ OWNER INSTALLED (SHOWN FOR REFERENCE)

Without Kitchenette

LEVEL	AREA	SF
1	A	105
2	A	110
2	B	60
3	A	-
3	B	200
4	A	-
Total Qty		5
Average SF		95

With Kitchenette

LEVEL	AREA	SF
1	A	-
2	A	-
2	B	225
3	A	260
3	B	-
4	A	280
Total Qty		3
Average SF		250

KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space	***5.12 File Storage***
Functional Description	*File room or space in open office to support both Laboratory and Office. Area is averaged from concept plans.*
Critical Adjacencies	*Office Areas*

	Architectural & Structural					
Size	Avg (sf):	*28*	Request (sf):	*20*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Carpet*	Walls:	*Ptd GWB*	Ceiling:	*Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*No*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*40*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx per code*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*None*	Paging:	*Open Areas*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

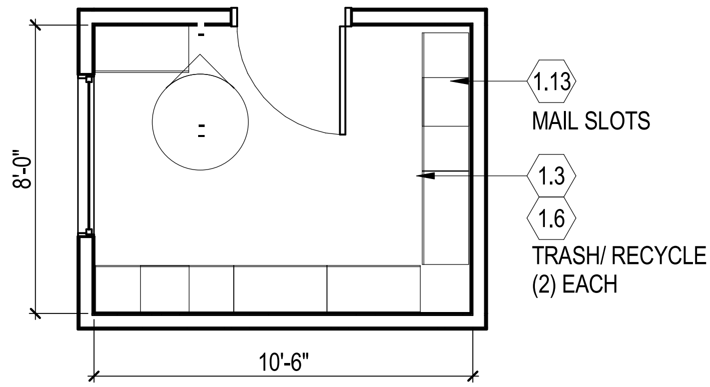
Special Requirements & Outstanding Issues

5.13 Mail / Receiving

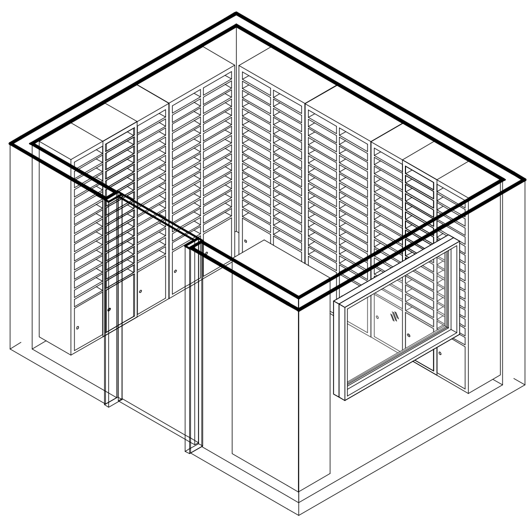
Space	*5.13 Mail / Receiving*					
Functional Description	*Staging of incoming and receiving packages. This is also the mail room for the building. Presumably, there could be some central office storage in this location.*					
Critical Adjacencies	*Faculty Support Offices*					
	Architectural & Structural					
Size	Avg (sf):	*130*	Request (sf):	*84*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Reslient Tile*	Walls:	*Ptd GWB*	Ceiling:	*Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*No*	Natural Light:	*Either*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*35*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Note (1)*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*1*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*(1) 4-port*	Paging:	*No*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) If room evolves to include workroom equipment, then increase power outlets and heat loads appropriately.



224 Mail Slots



KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

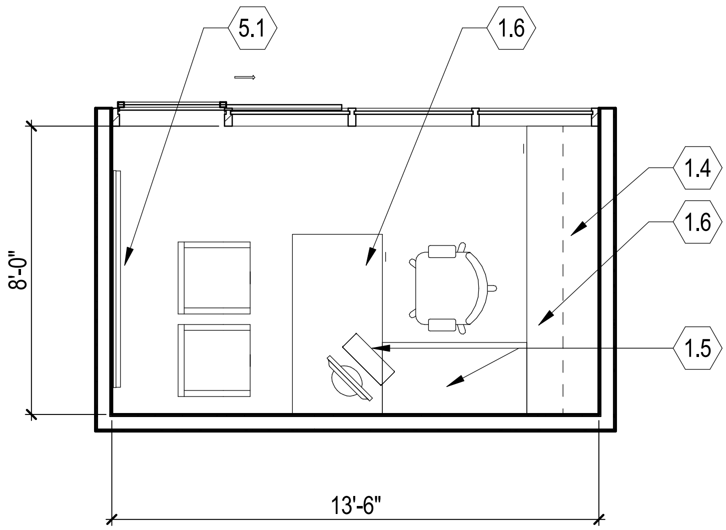
6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space	***5.15 Other Office***
Functional Description	*Enclosed Private Office for Faculty Support Personnel. These should be identical to Principal Investigator offices in case the Faculty Support function relocates in the future.*
Critical Adjacencies	*Main Lobby, B+PS Workstations*

	Architectural & Structural					
Size	Avg (sf):	*108*	Request (sf):	*108*	Ceiling Ht. (ft):	*9*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Carpet*	Walls:	*Ptd GWB*	Ceiling:	*ACT*
Other	Ceiling Insulation:	*Yes*	Full Height Walls:	*No*	Natural Light:	*Yes*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*35*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*3 Dplx*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*(1) 4-port*	Paging:	*No*	Security:	*Key*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues



NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/OWNER INSTALLED (SHOWN FOR REFERENCE)

KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

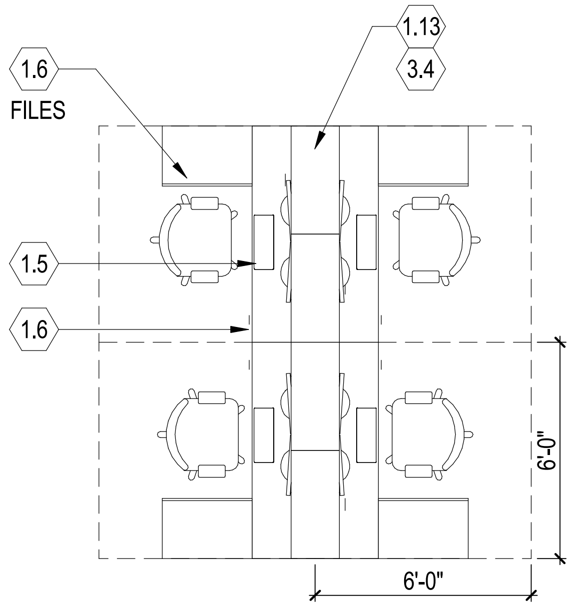
5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space	***5.16 Other Workstation***					
Functional Description	*Open office workstation with secure storage.*					
Critical Adjacencies	*PI Office, Post Doctoral Workstation*					
	Architectural & Structural					
Size	Avg (sf):	*36*	Request (sf):	*36*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Glass*	Door Height (ft):	*7*
Finishes	Floors:	*Carpet*	Walls:	*Ptd GWB*	Ceiling:	*Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*No*	Natural Light:	*Yes*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*40*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*3 Dplx*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*(1) 4-port*	Paging:	*Open Areas*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*
Special Requirements & Outstanding Issues	*Lockable Personal Storage*					



NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/OWNER INSTALLED (SHOWN FOR REFERENCE)

KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space	***6.01 Restroom - Men***					
Functional Description	*Restrooms as required to meet Building and Plumbing Codes. Note that Gender-Inclusive Restrooms are included in plumbing fixture counts.*					
Critical Adjacencies	*Elevator, Janitor's Closet*					
	Architectural & Structural					
Size	Avg (sf):	*174*	Request (sf):	*175*	Ceiling Ht. (ft):	*n/a*
Largest Equipment at move-in	Length (ft):	*per Code*	Width (ft):	*per Code*	Height (ft):	*>8*
	Live Load (psf):	*Existing*	Door Width (ft):	*3*	Door Height (ft):	*7*
Finishes	Floors:	*Porcelain Tile*	Walls:	*Ceramic Tile*	Ceiling:	*Hi Gloss Ptd. GWB*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Domestic*	Hot:	*Domestic*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*Yes*
Gases & Vacuum	Compressed Air:	*Yes*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx per code*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*1*	Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*No*	Security:	*None*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sensor*	Level (FC):	*TBD*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Space	***6.02 Restroom - Women***
Functional Description	*Restrooms as required to meet Building and Plumbing Codes. Note that Gender-Inclusive Restrooms are included in plumbing fixture counts.*
Critical Adjacencies	*Elevator, Janitor's Closet*

	Architectural & Structural					
Size	Avg (sf):	*207*	Request (sf):	*175*	Ceiling Ht. (ft):	*n/a*
Largest Equipment at move-in	Length (ft):	*per Code*	Width (ft):	*per Code*	Height (ft):	*>8*
	Live Load (psf):	*Existing*	Door Width (ft):	*3*	Door Height (ft):	*7*
Finishes	Floors:	*Porcelain Tile*	Walls:	*Ceramic Tile*	Ceiling:	*Hi Gloss Ptd. Ptd. GWB*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Domestic*	Hot:	*Domestic*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*Yes*
Gases & Vacuum	Compressed Air:	*Yes*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx per code*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*1*	Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*No*	Security:	*None*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sensor*	Level (FC):	*TBD*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Space	***6.03 Gender-Inclusive Restroom***					
Functional Description	*Restrooms as required to meet UC Gender-Inclusive (Gender-Neutral) Policy.*					
Critical Adjacencies	*Elevator, Janitor's Closet*					
	Architectural & Structural					
Size	Avg (sf):	*73*	Request (sf):	*100*	Ceiling Ht. (ft):	*n/a*
Largest Equipment at move-in	Length (ft):	*per Code*	Width (ft):	*per Code*	Height (ft):	*>8*
	Live Load (psf):	*Existing*	Door Width (ft):	*3*	Door Height (ft):	*7*
Finishes	Floors:	*Porcelain Tile*	Walls:	*Ceramic Tile*	Ceiling:	*Hi Gloss Ptd. Ptd. GWB*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Domestic*	Hot:	*Domestic*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*Yes*
Gases & Vacuum	Compressed Air:	*Yes*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx per code*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*1*	Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*No*	Security:	*Note (1)*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sensor*	Level (FC):	*TBD*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Manual Dead-Bolt with occupancy indicator on outside.

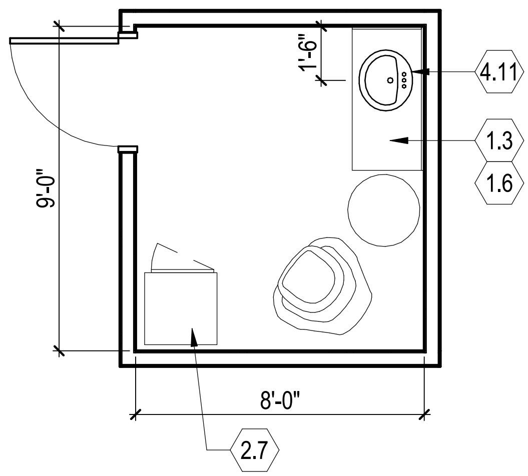
Space *6.04 Lactation Room*

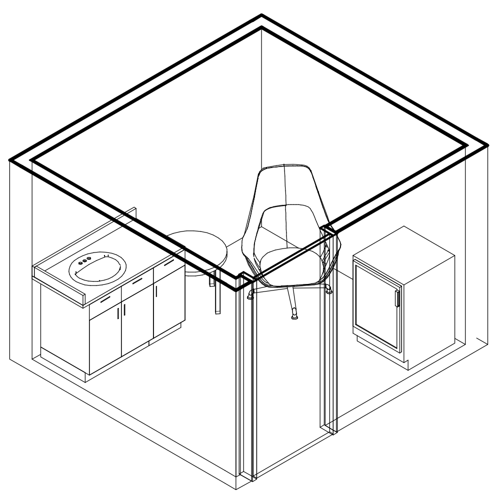
Functional Description *Lactation Room sized for one person at a time.*

Critical Adjacencies *Lobby of one floor, Elevator*

	Architectural & Structural					
Size	Avg (sf):	*72*	Request (sf):	*75*	Ceiling Ht. (ft):	*8*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*Existing*	Door Width (ft):	*3 Solid*	Door Height (ft):	*7*
Finishes	Floors:	*Reslient Tile*	Walls:	*Ptd GWB*	Ceiling:	*Hi Gloss Ptd Ptd. GWB*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*No*	Natural Light:	*Screened*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*35*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*3 Dplx*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*by User*
	Equip. Load (w/sf):	*3*	Equip. Demand	*50%*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*No*	Security:	*Dead Bolt*
Lighting	Special Lighting:	*No*	Light Control:	*Occ. Sens.*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues





KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

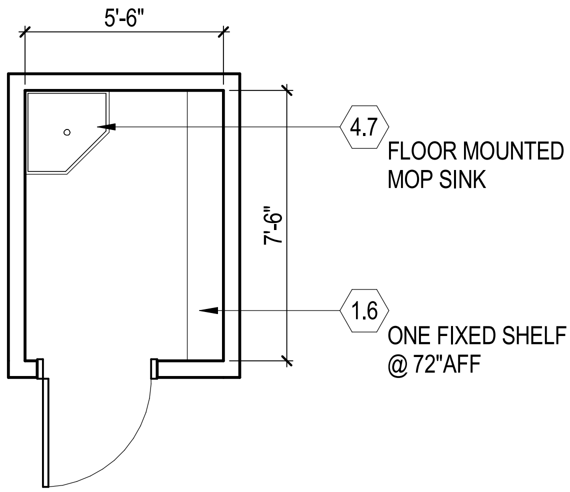
6.1 Exhaust Connection (Future Tie-in)

NOTE: ALL OFFICE FURNISHINGS AND EQUIPMENT TO BE OWNER FURNISHED/ OWNER INSTALLED (SHOWN FOR REFERENCE)

Space	***6.05 Janitor's Closet***					
Functional Description	*Janitor's Closet*					
Critical Adjacencies	*Restrooms*					
	Architectural & Structural					
Size	Avg (sf):	*41*	Request (sf):	*45*	Ceiling Ht. (ft):	*n/a*
Largest Equipment at move-in	Length (ft):	*n/a*	Width (ft):	*n/a*	Height (ft):	*n/a*
	Live Load (psf):	*125*	Door Width (ft):	*3*	Door Height (ft):	*7*
Finishes	Floors:	*Note (1)*	Walls:	*Epoxy Ptd*	Ceiling:	*Hi Gloss Ptd. Structure*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Negative*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*Yes*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Domestic*	Hot:	*Domestic*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*Floor Sink*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx per code*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*3*	Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*No*	Paging:	*No*	Security:	*Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*30 (300 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1) Flooring Material = Sealed Concrete. Design rooms with curbing and leak detection to keep leaks and spills from permeating to other spaces.



KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

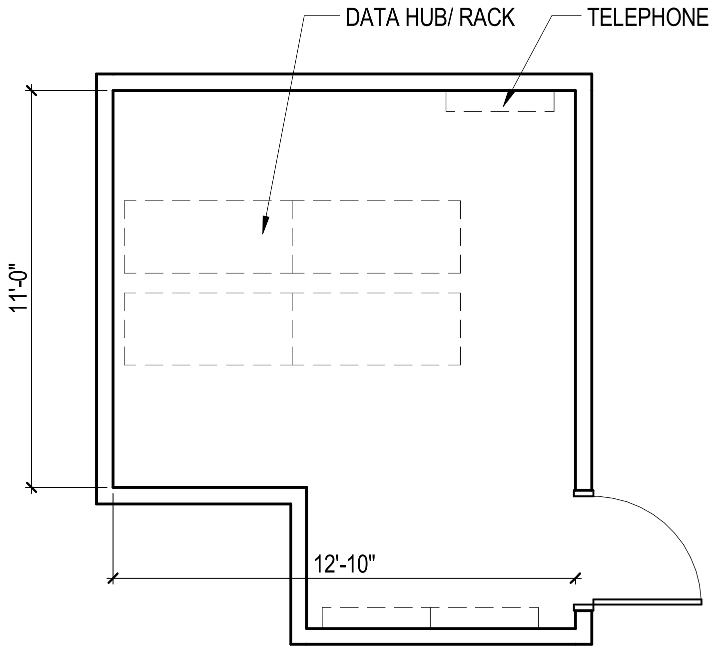
6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space	***6.06 BDF Room***					
Functional Description	*Telecommunications Building Distrubution Frame Space per UCR Communications Infrastructure Planning Guidelines.*					
Critical Adjacencies	*Telecommunications Point of Entry.*					
	Architectural & Structural					
Size	Avg (sf):	*169*	Request (sf):	*170*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*for Racks*	Width (ft):	*for Racks*	Height (ft):	*for Racks*
	Live Load (psf):	*Existing*	Door Width (ft):	*3*	Door Height (ft):	*7*
Finishes	Floors:	*Resilient ESD*	Walls:	*Ptd GWB*	Ceiling:	*Hi-Gloss Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*Note (1)*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Note (2)*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*Ground Floori*	Standby Power:	*TBD*	UPS:	*by User*
	Equip. Load (w/sf):	*5*	Equip. Demand	*TBD*		
Telcom & Security	Tel/Data (boxes):	*4-Port/Wall*	Paging:	*No*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

See UCR Communications Infrastructure Planning Guidelines. Front and rear rack access is required. Fire suppression type is to be studied. Keep all wet piping out of room. Note (1): Independent HVAC unit served by Standby Power to achieve 78s-68w±2. Note (2): (1) Convenience outlet / wall; additional power and data distribution through the space should be identified early in design.



KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

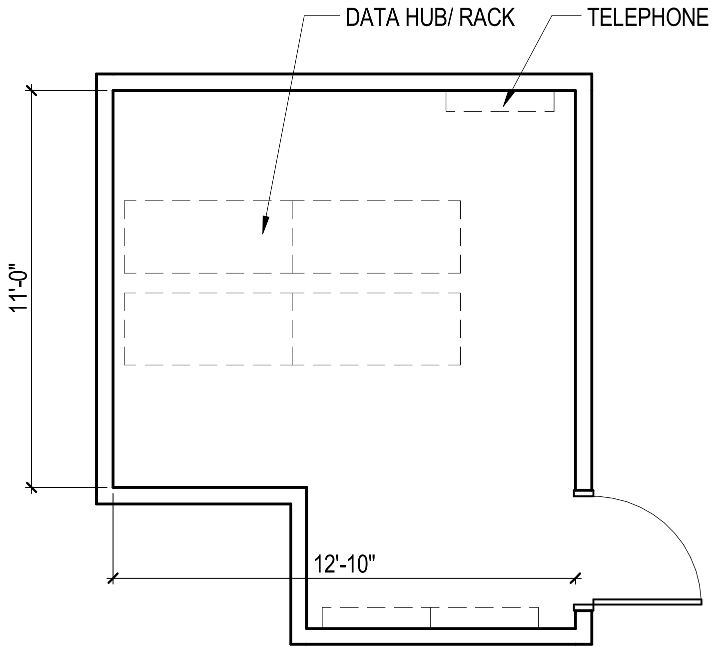
6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space	***6.07 IDF Room***					
Functional Description	*Telecommunications Intermediate Distrubution Frame Space per UCR Communications Infrastructure Planning Guidelines.*					
Critical Adjacencies	*Within 90 meters of all work areas. Vertically stack with other IDFs.*					
	Architectural & Structural					
Size	Avg (sf):	*182*	Request (sf):	*110*	Ceiling Ht. (ft):	*9'-4"*
Largest Equipment at move-in	Length (ft):	*for Racks*	Width (ft):	*for Racks*	Height (ft):	*for Racks*
	Live Load (psf):	*Existing*	Door Width (ft):	*3*	Door Height (ft):	*7*
Finishes	Floors:	*Resilient ESD*	Walls:	*Ptd GWB*	Ceiling:	*Hi-Gloss Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*Note (1)*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Note (2)*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*Ground Floori*	Standby Power:	*TBD*	UPS:	*by User*
	Equip. Load (w/sf):	*10*	Equip. Demand	*TBD*		
Telcom & Security	Tel/Data (boxes):	*4-Port/Wall*	Paging:	*No*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*50 (500 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

See UCR Communications Infrastructure Planning Guidelines. Front and rear rack access is required. Fire suppression type is to be studied. Keep all wet piping out of room. Note (1): Independent HVAC unit served by Standby Power to achieve 78s-68w±2. Note (2): (1) Convenience outlet / wall; additional power and data distribution through the space should be identified early in design.



KEY LEGEND:

1.0 **CASEWORK STORAGE**
1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 **EQUIPMENT**
2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 **ELECTRICAL/DATA**
3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 **PLUMBING**
4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 **OTHER**
5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 **MECHANICAL**
6.1 Exhaust Connection (Future Tie-in)

Space	***6.08 MEP Spaces (Systems, Shafts)***				
Functional Description	*Mechanical, Electrical and Plumbing Spaces*				
Critical Adjacencies	*For efficient design. Equipment replacement paths.*				

Architectural & Structural

Size	Avg (sf):	*11508*	Request (sf):	*n/a*	Ceiling Ht. (ft):	*n/a*
Largest Equipment at move-in	Length (ft):	*for Equip*	Width (ft):	*for Equip*	Height (ft):	*for Equip*
	Live Load (psf):	*250*	Door Width (ft):	*For Equip*	Door Height (ft):	*For Equip*
Finishes	Floors:	*Note (1)*	Walls:	*Epoxy Ptd*	Ceiling:	*Hi-Gloss Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*No*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*

Mechanical

HVAC	Occ. T (°Fdb):	*78s-68w±2*	Unocc. T (°Fdb):	*<80s, >65w*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*Per Code*	Unoccupied AC/Hr:	*Per Code*	Pressurization:	*Neutral*
	Filtration (F + FF):	*30%+85%*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*

Utilities

Water	Cold:	*Domestic*	Hot:	*Domestic*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*Floor Sink*
Gases & Vacuum	Compressed Air:	*Yes*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*

Electrical

Convenience Power	120V-20A-1Ø:	*Note (3)*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*for Equip.*	Equip. Demand	*TBD*		
Telcom & Security	Tel/Data (boxes):	*Note (4)*	Paging:	*No*	Security:	*Card Key*
Lighting	Special Lighting:	*No*	Light Control:	*Manual*	Level (FC):	*30 (300 lux)*

Safety & Security

Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

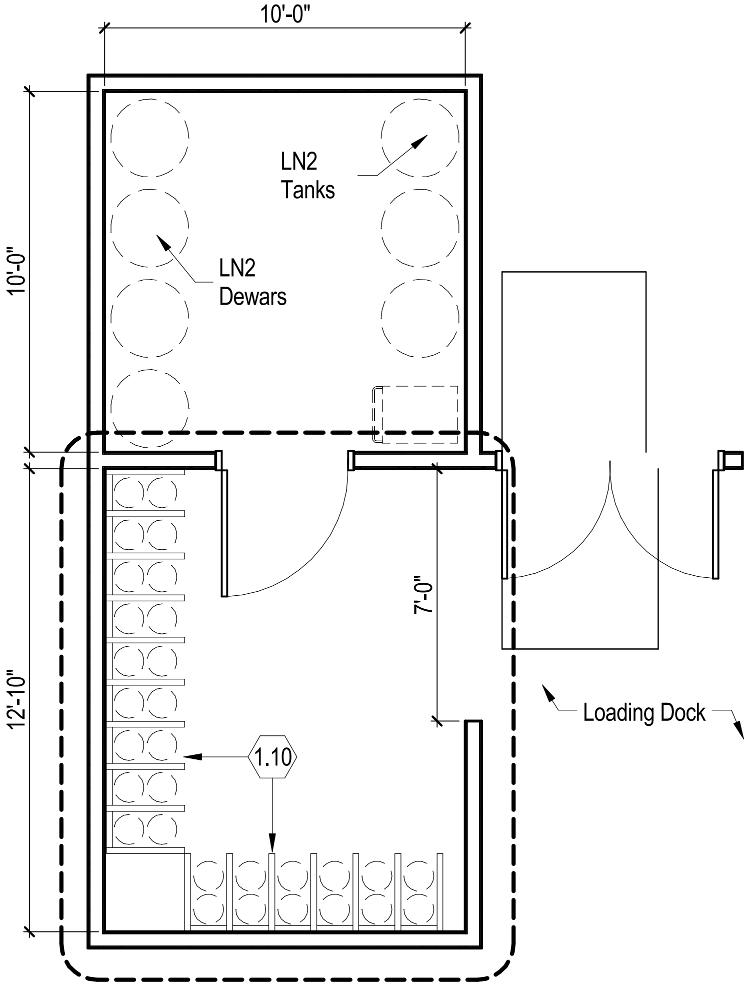
Note (1) Design rooms with curbing, pads, and leak detection to keep leaks from permeating to other spaces. Note (2) Design rooms to keep acoustic noise and vibration from permeating to sensitive spaces; see sensitivity criteria for other spaces. Note (3) Design appropriate quantity of convenience outlets per equipment layout. Note (4) Data outlets as required for control systems and BMS.

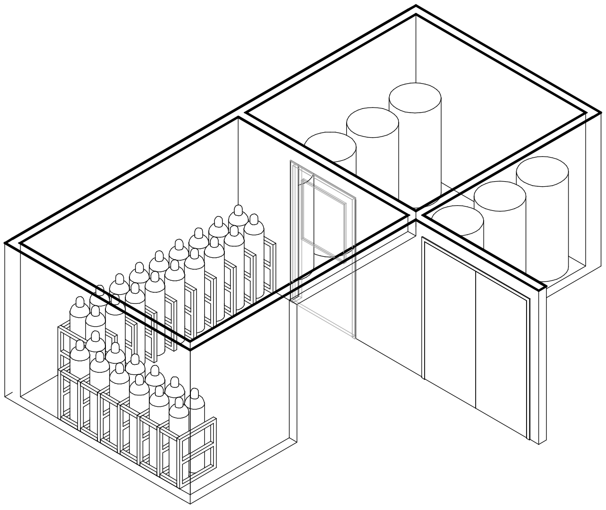
Space	***7.01 Gas Cylinder Storage (Exterior)***
Functional Description	*Dock space with lockable racks for 30 (combined) Full and Empty Gas Cylinders. This quantity matches the existing capacity.*
Critical Adjacencies	*Truck Delivery, Freight Elevator*

	Architectural & Structural					
Size	Avg (sf):	*130*	Request (sf):	*130*	Ceiling Ht. (ft):	*n/a*
Largest Equipment at move-in	Length (ft):		Width (ft):		Height (ft):	
	Live Load (psf):	*125*	Door Width (ft):	*n/a*	Door Height (ft):	*n/a*
Finishes	Floors:	*Sealed Conc.*	Walls:	*n/a*	Ceiling:	*Hi-Gloss Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*n/a*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*n/a*	Unocc. T (°Fdb):	*n/a*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*n/a*	Unoccupied AC/Hr:	*n/a*	Pressurization:	*n/a*
	Filtration (F + FF):	*n/a*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*No*	Hot:	*No*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*No*
Gases & Vacuum	Compressed Air:	*No*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx per code*	208V-30A-3Ø:	*No*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*1*	Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*None*	Paging:	*No*	Security:	*Lockable Racks*
Lighting	Special Lighting:	*Note (1)*	Light Control:	*Manual*	Level (FC):	*30 (300 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*No*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1): If possibility exists of lighter than air gases getting trapped in ceiling areas, provide either sparkproof lighting, or preferrably do not locate lighting where lighter than air pockets can accumulate. L-shaped arrangement of proposed plan put cylinders out of sight while not restricting movement to and from the dock. If this arrangement is determined by EH&S not to be secure enough an arrangement will be proposed that includes a lockable door/gate.





KEY LEGEND:

1.0 CASEWORK STORAGE

1.1 Movable Table, Adjustable Height
1.2 Movable Work Bench w/ Shelving
1.3 Countertop
1.4 Adjustable Shelving
1.5 Knee Opening
1.6 Fixed Base Cabinets
1.7 Mobile Cabinets
1.8 Flammable Storage Cabinet
1.9 Corrosive Storage Cabinet
1.10 Cylinder Storage Rack
1.11 Drying Rack
1.12 Tall Storage Cabinets
1.13 Upper Cabinets
1.14 Microwave Base Cabinet

2.0 LABORATORY EQUIPMENT

2.1 Fume Hood
2.2 Biological Safety Cabinet
2.3 Snorkel
2.4 Autoclave: Air, Industrial Water, Steam, RO
2.5 Dishwasher: Industrial Water
2.6 Incubator (OFOI)
2.7 Refrigerator (OFOI)
2.8 Freezer (OFOI)
2.9 Water Polisher (OFOI): RO
2.10 Ice Machine: Industrial Water, Drain
2.11 Floor Standing Equipment (OFOI)

3.0 ELECTRICAL/DATA

3.1 Overhead Outlet(s): Power and/or Data
3.2 Video Projector
3.3 Projection Screen
3.4 Wire Mold or Pedestal: Power and/or Data
3.5 Floor Outlet(s): Power and/or Data
3.6 Wall Outlet(s): Power and/or Data
3.7 Standby Outlet(s)
3.8 Task Lighting (Under Shelf)
3.9 Flat Panel Monitor

4.0 PLUMBING

4.1 Laboratory Sink or Cupsink
4.2 Industrial Hot/Cold Water, Drench Hose & DI
4.3 Laboratory Gases: Air & Vac
4.4 Recessed Safety Shower & Eyewash Combo
4.5 Pipe Drop Enclosure
4.6 Process Cooling Water
4.7 Floor Drain
4.8 Floor Sink
4.9 Stainless Steel Sink
4.10 Domestic Hot/Cold Water
4.11 Porcelain/Solid Surface Lavatory

5.0 OTHER

5.1 Marker Board
5.2 Tack Board
5.3 Printer/Copier
5.4 Blackout Curtains
5.5 Acoustical Panel
5.6 Clearstory Window

6.0 MECHANICAL

6.1 Exhaust Connection (Future Tie-in)

Space	***7.02 Loading Dock (Exterior)***					
Functional Description	*Spaces to accommodate Mechanical Equipment*					
Critical Adjacencies	*Truck Delivery, Freight Elevator*					
	Architectural & Structural					
Size	Avg (sf):	*911*	Request (sf):	*885*	Ceiling Ht. (ft):	*n/a*
Largest Equipment at move-in	Length (ft):		Width (ft):		Height (ft):	
	Live Load (psf):	*TBD*	Door Width (ft):	*n/a*	Door Height (ft):	*n/a*
Finishes	Floors:	*Sealed Conc.*	Walls:	*n/a*	Ceiling:	*Hi-Gloss Ptd. Open Struct.*
Other	Ceiling Insulation:	*No*	Full Height Walls:	*Yes*	Natural Light:	*n/a*
Sensitivities	EMF (mG):	*No*	Vibration (VC):	*Existing*	Acoustic (NC):	*50*
	Mechanical					
HVAC	Occ. T (°Fdb):	*n/a*	Unocc. T (°Fdb):	*n/a*	RH (% ±):	*No Control*
	Occupied AC/Hr:	*n/a*	Unoccupied AC/Hr:	*n/a*	Pressurization:	*n/a*
	Filtration (F + FF):	*n/a*				
Exhaust	100% Exhaust:	*No*	Process/General:	*No*	Scrubbed:	*No*
	Solvent:	*No*	RadioIsotope:	*No*	Bag In/Out:	*No*
	Utilities					
Water	Cold:	*Domestic*	Hot:	*Domestic*	Process Cooling:	*No*
	Purified Water:	*No*	Ultra Pure (mΩ):	*No*	Floor Drain:	*Trench*
Gases & Vacuum	Compressed Air:	*Yes*	Lab Vacuum:	*No*	Lab (Natural) Gas:	*No*
	Electrical					
Convenience Power	120V-20A-1Ø:	*Dplx per code*	208V-30A-3Ø:	*note (1)*	480V-100A-3Ø:	*No*
	Single-Pt Ground:	*No*	Standby Power:	*No*	UPS:	*No*
	Equip. Load (w/sf):	*1*	Equip. Demand	*60%*		
Telcom & Security	Tel/Data (boxes):	*None*	Paging:	*No*	Security:	*n/a*
Lighting	Special Lighting:	*Note (2)*	Light Control:	*Manual*	Level (FC):	*30 (300 lux)*
	Safety & Security					
Safety	Shwr/Eye Wash:	*Yes*	Fume Hood:	*No*	Exhausted BSC:	*No*

Special Requirements & Outstanding Issues

Note (1): at forklift recharging station. Note (2) Provide security lighting at dock, but designed/directed to minimize site glare and light polution.

3.1 Excluded Spaces

Certain spaces listed in the Program Space Summary don't have associated Space Data Sheets, Justification Sketches, or both:

Neither Space Data Sheets, nor Space Justification Sketches are required for:

- Spaces that are based on a space that differs primarily in assignment only. For instance, if it is decided that Post-Doctoral and Graduate Student Workstations, or Wet and Computation Laboratory Workstations, are desired to be identical, then those space types should share a space data sheets rather than duplicate.

Space Data Sheets are not required for:

- Spaces that are subdivided due to differing UCOP space classifications. For instance, Internal Office Circulation Aisles would be developed based on the materials established for the Open Office environment, and not have a separate set of criteria.

Space Justification Sketches are not required for:

- Spaces that are designed primarily to meet Codes, Design Loads, or otherwise typically designed without significant User input, such as Restrooms, Public Circulation and Mechanical Equipment Rooms.
- Spaces that are typically designed in a later design phase as part of the design solution, such as Building Lobbies and Public Circulation.
- Spaces that primarily exist and are intended to be re-used as-is, such as the Loading Dock.
- Spaces that are primarily a different quantity of another type of space. For instance, the Central Laboratory Storage Aisles, would be similar to the Laboratory Storage Aisles, except that they are intended to accommodate the remaining request for Laboratory Storage Cabinets in a central location. In this case the solution could be an aisle or room.

The following spaces do not have Space Data Sheets or Justification Sketches:

Space	Description	No Space Data		No Justification Sketch	
1.03	Internal Laboratory Circulation Aisles	x	See adjacent space	x	Configurations Shown on Concept Plans
2.06	Central Laboratory Equipment Aisle			x	Remote Version of 2.05
2.08	Central Laboratory Storage / Cylinder Aisle			x	Remote Version of 2.07
2.20	Internal Laboratory Circulation Aisles	x	See adjacent space	x	Configurations Shown on Concept Plans
5.11	Copy / Workroom			x	See Concept Plans & 5.10 Similar
5.12	File Storage			x	See Notes Below
5.14	Vending Alcove	x	See adjacent space	x	Configuration Shown on Concept Plans
5.17	Internal Office Circulation Aisles	x	See adjacent space	x	Configurations Shown on Concept Plans
6.01	Restroom - Men			x	Configurations Shown on Concept Plans
6.02	Restroom - Women			x	Configurations Shown on Concept Plans
6.03	Gender-Inclusive Restroom			x	Configurations Shown on Concept Plans
6.08	MEP Spaces (Systems, Shafts)			x	Engineering Design Dependent
6.09	Public Circulation			x	Configurations Shown on Concept Plans
7.02	Loading Dock (Exterior)	x	Existing Space	x	Existing Space
7.03	Other Covered Outside Area	x	Existing Space	x	Existing Space
8.01	Metabolomics Core Laboratories	x	Existing Space	x	Existing Space
8.02	Metabolomics Core Office	x	Existing Space	x	Existing Space
8.03	Metabolomics Core Conference	x	Existing Space	x	Existing Space

Notes for Space 5.12, File Storage: The majority of File Storage is proposed to be located along Internal Office Circulation Aisles. These are the white rectangles at the end of workstations on the plans. Their space allocation includes drawer pull-out space and standing space for a user. This space is subtracted from Internal Office Circulation Aisles. Due to existing conditions constraints, there is at least one location (Floor 3, South Wing) with a file storage room. That space is measured wall to wall, but is otherwise similar in environment to a Copy/Workroom, except without a significant power load.

4 Building Evaluation

4.1 Accessibility & Egress:

Existing Conditions: The existing building is currently served by accessible parking stalls in Lot 40 located on the east site of Boyce Hall that comply with current California Building Code requirements for accessibility. The path-of-travel leading to the existing entrance on the north side of Batchelor Hall (Level 2) will need to be surveyed to ensure compliance with current code requirements. On the interior of Batchelor Hall, a series of upgrades are aimed at bringing several building elements into compliance with current code requirements.

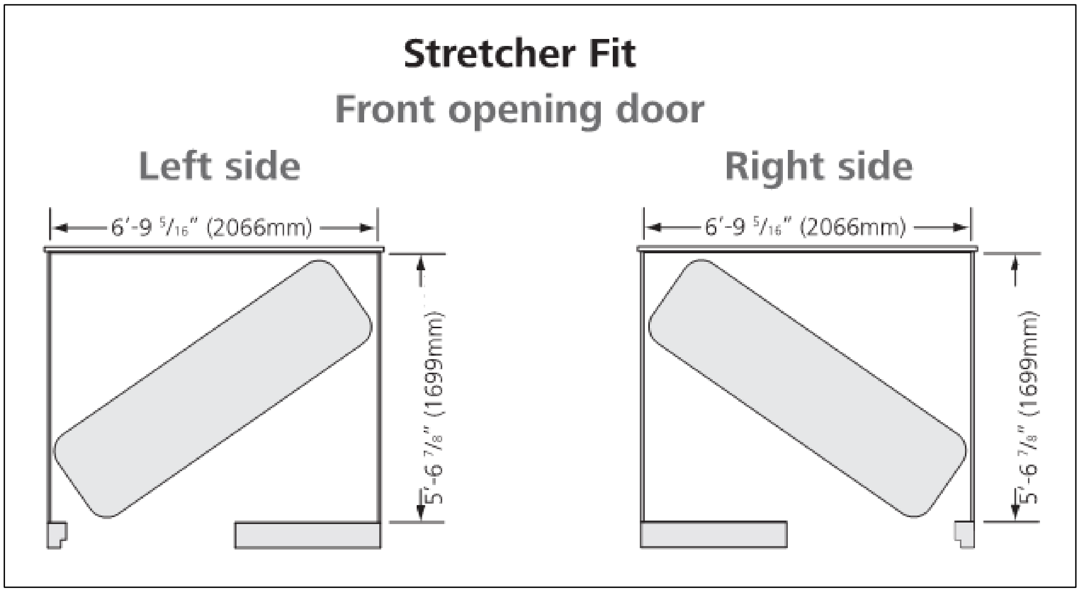
Proposed Upgrade – Elevator: The proposed upgrades include a complete replacement of the existing elevator system including cab and machine equipment. The proposed upgrades will comply with the most recent editions of the California Building and Fire Code, NFPA, ASTM, and UL Standards. The proposed replacement uses the Schindler 3300 MRL Traction Elevator as its basis of design and includes the following:

- Type: general purpose elevator system
- Capacity:
- Passengers (max.): 23
- Speed: 100 fpm
- Number of Stops: 6 (Basement, L1, L2, L3, L4, and Roof)
- Entrances: 6 Front
- Car Dimensions (inside): 6’-9 5/16” W x 5’-6 7/8” D x 7’-9” H
- Door Dimensions: 3’-6” W x 7’-0” H
- Door Type: 2-speed side opening
- Shaft Size (inside): 8’-6” W x 6’-11 1/16” D
- Pit Depth: 5’-0”*
- Shaft Height above Highest Stop: 12’-7”
- Travel Height (max./proposed): 59’-0”** / 57’-6”

  * Current Pit Depth of 4’-10” may be acceptable. Design Team to contact Schindler Sales Representative during Schematic Design Phase to explore options less than 5’-0” in depth.

  ** Max. Travel Height may be increased to 98’-5” with 150 fpm elevator, however, the proposed Shaft Depth of 6’-11” 1/16” would need to increase 7’-7 5/8” and would impact proposed Laboratory Support spaces adjacent to west wall of shaft.

The proposed elevator complies with the latest California Building Code, stating buildings of four or more stories must have at least one elevator capable of accommodating fire department emergency access with an ambulance stretcher. When fully reclined, these stretchers measure 24 inches by 84 inches with radius corners of not less than 5 inches. The proposed elevator meets this code requirement when specified with the 2-speed side opening door noted above.



The planning roadmap includes the reuse of the existing shaft for the new elevator although structural modifications must be made to accommodate the proposed elevator design. First, the existing elevator pit needs to be enlarged by moving the south wall of the pit further to the south by 12 inches. Second, each of the elevator floor decks (L1-Roof) must be enlarged to the south by 12 inches as well. Please refer to the Structural Narrative section for additional information.

The roadmap also includes the reuse of the existing Elevator Machine Room in the basement as the new Elevator Control Room. Although the proposed elevator is categorized as a Machine-Room-Less or MRL elevator, the state of California requires elevator control systems be located within a dedicated space.

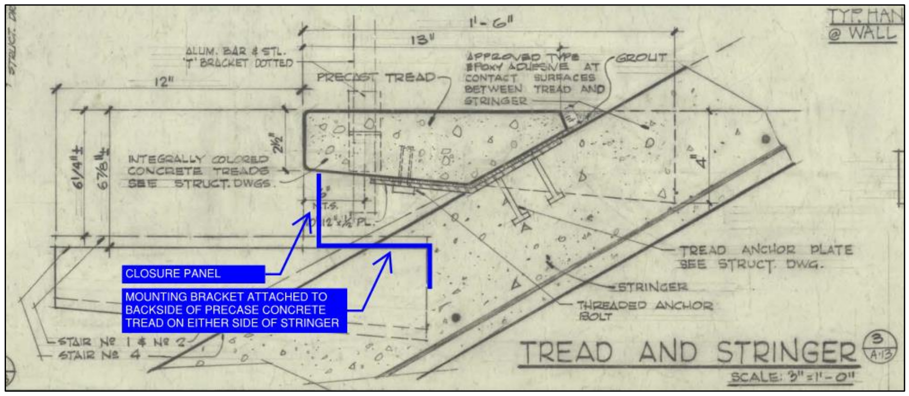
Proposed Upgrade – Stairs: The proposed scope of upgrades will address several deficiencies with current code requirements at each stair.

- Interior Stair #3 (L1 to L2)

  Built as part of the original 1965 construction project, Stair #3 is an internal communicating stair connecting Levels 1 and 2 located off the main building lobbies. Proposed upgrades include:

  - Remove existing non-compliant guardrail, handrails and brackets
  - Remove aluminum support posts
  - Protect in place existing steel knife plate that is embedded into precast treads so as to

support new combination guard/handrail.
- Sandblast existing precast concrete treads and seal
- Provide new surface applied contrasting stripe at top and bottom or each straight stair run
- Fabricate stainless steel closure grille at each stair riser.



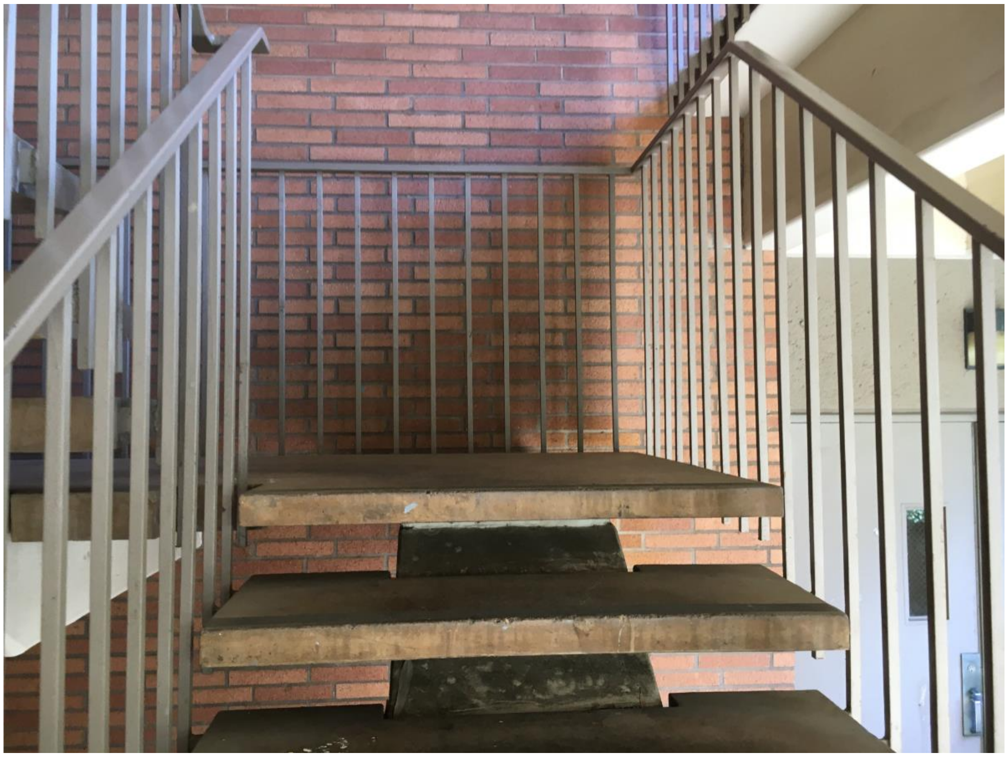
- Fabricate and install steel posts at each stair tread with welded connections to existing knife plates.
- Provide perforated aluminum infill panels mounted to the outside of steel posts with spider type point connections.
- New code code compliant handrails to be provided but non-compliant gooseneck transitions at corners will be required given existing stair layout.

- Interior Stair #2 (L2 to L4 with Roof Access)

  Built as part of the original 1965 construction project, Stair #2 is an internal exit stair connecting Levels 2, 3, and 4 with access up to the Roof Level. Proposed upgrades include:

  - Provide steel guard & Handrail along inside edge of stairs from L2 up to the Roof Level
  - Remove existing “Door to Penthouse” and infill threshold with new wall framed with metal studs

- Exterior Stair #4 (L1 to L4)



Built as part of the original 1965 construction project, Stair #4 is an external exit stair connecting Levels 1, 2, 3, and 4. Proposed upgrades include:

- Remove existing handrails and vertical support posts
- Protect in place existing 2” Knife plate embedded in precast concrete treads for installation of new combination guard/handrail
- Sandblast existing precast concrete treads and seal
- Provide new surface applied contrasting stripe to each tread and leading edge of landings
- Fabricate Stainless steel metal closure grille for each stair riser
- Fabricate new painted steel guardrail ; top of guardrail to be at a height of 43” above line of stair nosings with vertical posts extending 6” below each tread to match the existing deign
- Fabricate new painted 1.5” diameter steel handrails supported off of new vertical guardrail posts

NOTE: existing stringer will be evaluated for structural stability, which may result in the complete replacement of these stairs as the most cost effective solution.

- Exterior Stair #6

Built as part of the 1967 expansion project, Stair #6 is an external exit stair connecting Levels 2 and 3. Proposed upgrades include:

- Remove existing handrails and vertical support posts
- Protect in place existing 2" Knife plate embedded in precast concrete treads for installation of new combination guard/handrail
- Sandblast existing precast concrete treads and seal
- Provide new surface applied contrasting stripe to each tread and leading edge of landings
- Fabricate metal closure grille for each stair tread
- Fabricate new painted steel guardrail; top of guardrail to be at a height of 43" above line of stair nosings with vertical posts extending 6" below each tread to match the existing deign
- Fabricate new painted 1.5" diameter steel handrails supported off of new vertical guardrail posts

NOTE: existing stringer will be evaluated for structural stability, which may result in the complete replacement of these stairs as the most cost effective solution.

Proposed Upgrade – Toilet Facilities: The proposed scope of upgrades will address lack of accessible toilet facilities within the existing Batchelor Hall Building. The existing men's and women's toilet facilities accessed off of the main public lobbies will be replaced with the following:

- Multiple accommodation restrooms for men and women on Levels 1, 2, 3, and 4
- Gender Inclusive Staff Restroom with accessible roll-in shower on Level 2
- Gender Inclusive Public Restroom on Levels 1, 3, and 4

Proposed Upgrade – Drinking Fountains: The proposed scope of upgrades includes the replacement of existing drinking fountains throughout Batchelor Hall with new combination hi-lo accessible drinking fountain on Levels 1, 2, 3, and 4.

Proposed Upgrade – Loading Dock: The proposed scope of upgrades includes the construction of a new exterior exit stair and/or exit ramp providing building occupants with an accessible means of egress off of the existing loading dock located on the east side of Batchelor Hall.

5 Building System Narratives

5.1 MEP General Overview

The mechanical systems for Batchelor Hall shall provide ventilation, heating, cooling and exhaust for new office spaces, laboratories and support areas. Mechanical HVAC systems consist of an HVAC system for the Office, Laboratories and Laboratory Support Areas as well as a General and Laboratory/Fume Hood Exhaust system.

The plumbing systems shall provide domestic hot and cold water, sanitary waste and vent, laboratory waste and vent, laboratory air, laboratory vacuum and natural gas for laboratories and support areas. Deionized water will be provided and will serve laboratories.

5.2 HVAC Narrative

5.2.1 Applicable Codes, Standards and Guidelines

The code review presented below is intended only to highlight currently applicable code issues and should not be construed as a complete review of all the codes. The latest edition of approved year of the following codes and combination codes and guidelines will govern the Mechanical Systems (wet and dry) and associated support system design. The systems will be designed to meet or exceed these standards.

Codes

1. 2016 California Mechanical Code (CMC)
2. 2016 California Energy Code (Title 24 Part 6)
3. 2016 California Fire Code

Standards

4. NFPA 45 - Fire Protection for Laboratories Using Chemicals
5. NFPA 90A - Installation of Air-Conditioning and Ventilating Systems
6. 2012 ANSI Z9.5 - Laboratory Ventilation
7. 2013 ASHRAE 62.1 – Ventilation, as specifically applicable per 2016 CMC
8. 2013 ASHRAE 90.1 – Energy, as specifically applicable per 2016 CMC

Guidelines

9. ASHRAE Design Guidelines
10. SMACNA Design Guidelines

All other local and state codes and UC Riverside standards will be adhered to where applicable.

5.2.2 Climate and Environmental

Outside Design Conditions - 2013 ASHRAE (F), Riverside Muni CA, WMO# 722869

- Summer Cooling: 100.0 °F DB / 69.5 °F WB (0.4%)

- Winter Heating: 36.1 °F DB (99.6%)
- Degree Days: 5575 CDD50 / 1567 HDD65
- Site Elevation: 1,100 Feet Above Sea Level
- Climate Zone: 3B (Riverside County, ASHRAE 90.1-2007)
- Seismic Design Category: D

Indoor Environment

- Offices and Utility
  - Temperature:
    - Summer: 75 ± 2 °F DB
    - Winter: 71 ± 3 °F DB
  - Relative Humidity:
    - In general most spaces shall be uncontrolled with no requirement
    - Room Data Sheets shall indicate requirements for specific space humidity control
  - Relative Pressure to adjacent spaces: Positive pressure
  - Acoustics - target for HVAC design only (i.e. not equipment and people):
    1. Offices: NC<35
    2. Conference rooms: NC<35
- Laboratories and Support
  - Temperature:
    - Summer: 75 ± 2 °F DB
    - Winter: 71 ± 3 °F DB
  - Relative Humidity: Uncontrolled, no requirement
  - Relative Pressure to adjacent spaces
    - Negative pressure relationship for wet laboratories opening to interior corridor
    - Positive pressure relationship for all dry laboratories
    - Positive pressure relationships for all office areas
  - Acoustics:
    - Wet Laboratories: NC<45, target for HVAC design only (i.e. not equipment and people) with noise levels 3 feet from the hoods maintained at a level no higher than NC 55
    - Dry Laboratories: NC<40, target for HVAC design only (i.e. not equipment and people)

5.2.3 Laboratory Design Criteria

One hundred percent of the air supplied to both the wet and dry laboratory areas shall be exhausted. There shall be no recirculating of laboratory air. Supply air quantities shall be based upon heat loads (i.e. equipment, people, lighting, and envelope), minimum dilution/ventilation requirements (i.e. air change per hour (ACH)) or required make-up air for exhaust systems; whichever is greatest. For load and energy calculations, the following criteria were utilized.

Item	Description	Value	Units
Height of Room	Ceiling height	9.5[a]	Feet
Roof Construction	4" Light Weight Concrete 2" Rigid Insulation	0.095	$Btu/h*ft^2*F$
Wall Construction	10" Brick	0.303	$Btu/h*ft^2*F$
Window Construction	1/2" Single Clear		
Window Construction	U-Factor Thermal Resistance	1.04	$Btu/h*ft^2*F$
Window Construction	SC Shading Coefficient	0.88	
Miscellaneous Load	Wet Laboratory Equipment	3.0	W/SqFt
Miscellaneous Load	Dry Laboratory Equipment	6.0	W/SqFt
Lighting Load	Lights	1.5	W/SqFt
Air Change Rate	Occupied Wet Laboratory Minimum	8	ACH
Air Change Rate	Vacant Wet Laboratory Minimum	6	ACH
Air Change Rate	Dry Laboratory Minimum	4	ACH
Operating Schedule	HR per Day / Days per Week	24/7	

[a] Virtual ceiling if no ceiling reinstalled

Table 5-1. HVAC Load Assumptions

5.2.4 Sizing Criteria

Airside – maximum values

Diffuser/Register/Grille — Maximum of: 700 fpm, 0.10 INWG or 25 NC

Supply Air Ductwork

- Air Handler to Air Valve/Terminal: 2,000 FPM or 0.2 INWG/100 FT; Medium Pressure Class 4 INWG
- Air Valve/Terminal to Diffuser: 1,500 FPM or 0.1 INWG/100 FT; Low Pressure Class 2 INWG

Return Air Ductwork: 1,500 FPM or 0.1 INWG/100 FT; Low Pressure Class 2 INWG

Laboratory Exhaust Air Ductwork

- Room Grille to Air Valve: 1,500 FPM or 0.1 INWG/100 FT; Low Pressure Class 2 INWG
- Fume Hood to Air Valve: 2,000 FPM or 0.2 INWG/100 FT; Medium Pressure Class 4 INWG

Air Valve to Exhaust Air Plenum:		2,000 FPM or 0.2 INWG/100 FT Medium Pressure Class 4 INWG
Air Handler Coil and Filter Face Velocity:		500 FPM
Air Terminal Unit Sizing:		Maximum 2000 CFM and no more than 3 spaces of same usage
Fume Hood Face Velocity:	Occupied Occupied Unoccupied	100 FPM at 18 IN sash height & below 60 FPM at 28 IN sash height 60 FPM at 28 IN sash height & below
Laboratory Snorkel:		50 CFM, 3 IN size
Waterside – maximum values		
Piping:		8 FPS or 4 FTWG/100 FT
Air Coil Water Pressure Drop:		20 FTWG
Cooling Coil Selection:		40 °F EWT
		20 °F DT (per original documents)
		30 °F DT (new per UCR Bldg Stds)
Heating Coil Selection:		180 °F EWT & 40 °F DT

5.2.5 System Description

Supply Air (SA)

The West Wing is currently served by twelve (12) constant volume Air Conditioner Units (AC) and two (2) constant volume 100% Fresh Air Units (FA). These AC and FA units shall be replaced with variable air volume Air Handling Units (AHU) to provide ventilation, heating, and cooling for the existing and renovated wet laboratories, dry laboratories, offices and support spaces.

The South Wing is currently served by one (1) constant volume AC and one (1) constant volume 100% FA unit. This AC and FA unit shall be replaced with a variable air volume AHU to provide ventilation, heating, and cooling for the existing and renovated wet laboratories, dry laboratories, offices and support spaces.

Currently, the twelve (12) West Wing constant volume AC units are distributed throughout the wing at three (3) per floor while the South Wing has one (1) constant volume AC unit. Each AC unit is configured in a constant air volume, multi-zone, dual-duct arrangement. The dual-duct arrangement requires two supply air ducts (one cold air duct down to 58°F supply air temperature and one hot air duct up to 100°F supply air temperature) ducted to mixing boxes that blend the hot and cold air streams for zone temperature control. The West Wing is a mix of once-through air stream for the laboratories and recirculation air with return air from non-laboratory areas ducted back to the units. The South Wing is a once-through air system with all supply air being exhausted.

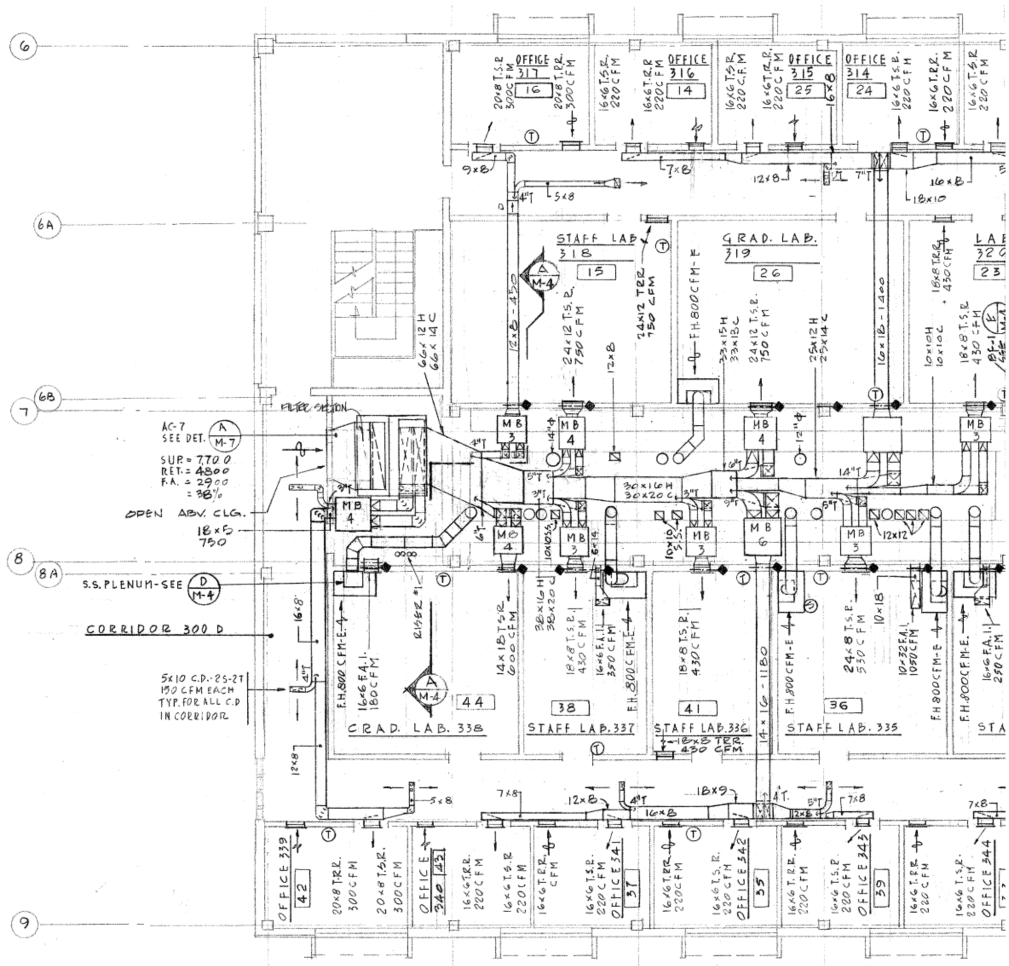


Figure 5-1. Snapshot of West Wing AC Unit and dual-duct distribution

Air Handlers

The Infrastructure Renewal will remove the three (3) constant volume FA units and thirteen (13) constant volume AC units and replacing them with four (4) new variable volume AHUs, providing once-through air stream for the laboratories and recirculation from non-laboratory spaces. Three (3) Outdoor AHUs shall be installed on the West Wing Roof at 30,000 CFM, 35,000 CFM and 35,000 CFM (from east to west) to serve the West Wing while one (1) new 25,000 CFM Indoor AHU shall be installed on the First Floor of the South Wing to serve it. The Infrastructure Renewal shall not provide any redundant air handling equipment. The AHUs shall be sized with 10% spare capacity and utilize fan arrays for fault tolerance.

Refer to **Appendix 1** for renderings and concept mechanical floor plans.

The West Wing AHUs shall consist of the following configuration:

- Return air plenum with access and isolation damper
- Return air fan array, variable volume with VFD & redundant VFD, access section
- 100% OSA economizer section

- Filter section – 30% (MERV 8) pre-filters and 85% (MERV 13) final filters, access section
- Hot water heating coil, access section
- Chilled water cooling coil, access section
- Supply air fan array, variable volume with VFD and redundant VFD, access section
- Sound attenuator, if deemed applicable
- Discharge air plenum with access

The South Wing AHU shall consist of the following configuration:

- Return air plenum with access and isolation damper
- Filter section – 30% (MERV 8) pre-filters and 85% (MERV 13) final filters, access section
- Hot water heating coil, access section
- Chilled water cooling coil, access section
- Supply air fan array, variable volume with VFD & redundant VFD, access section
- Sound attenuator, if deemed applicable
- Discharge air plenum with access

Infrastructure Renewal HVAC System

The West Wing Infrastructure Renewal supply air (SA) and return air (RA) ducting shall route, vertically from the roof, in the existing MEP Core in three locations and distribute horizontally on each floor. Each riser location is similar as to where the AC units were stacked that served respective thirds of each floor. All existing supply air, dual-duct, pneumatically controlled, mixing boxes shall be replaced with single duct, Direct Digital Control (DDC), variable volume (VAV) terminal units with hot water reheat coils that, to the extent possible, shall reconnect to the existing distribution ductwork. All existing return air ductwork shall be reconnected where applicable to current code.

The South Wing Infrastructure Renewal SA and RA ducting shall route, vertically from the First Floor, in the existing MEP Core in one location. The selected location is where the existing dual-duct risers were located. All existing supply air dual-duct, pneumatically controlled, mixing boxes shall be replaced with single duct, Direct Digital Controlled (DDC), variable volume (VAV) terminal units with hot water reheat coils that, to the extent possible, shall reconnect to the existing distribution ductwork.

All Wet Labs (labs containing a chemical fume hood) in South and West Wings, will be converted to variable air volume. Makeup air shall be delivered to the laboratories by DDC, variable air volume, pressure independent, high speed electronically actuated, aluminum body venturi air valves with reheat coils. The air valves shall be sized to supply air as needed to offset fume hood exhaust, cool the heat load requirements or to provide a minimum once-through ventilation rate air changes per hour while occupied and unoccupied.

Ducting

Supply air shall be distributed through medium pressure and low pressure, galvanized, sheet metal ductwork designed and constructed as per ASHRAE guidelines and SMACNA duct construction standards. Isolation dampers to be provided at all branch ductwork and diffuser/register/grille ductwork connections. Duct insulation shall be external glass fiber wrap with vapor barrier. HVAC unit supply duct smoke detectors shall be provided as required by NFPA.

The South Wing Infrastructure Renewal SA and RA ducting shall route, vertically from the First Floor, in the existing MEP Core in one location. The selected location is where the existing dual-duct risers were located. All existing supply air dual-duct, pneumatically controlled, mixing boxes shall be replaced with single duct, Direct Digital Controlled (DDC), constant volume (CV) terminal units with hot water reheat coils that, to the extent possible, shall reconnect to the existing distribution ductwork.

Tenant Improvement HVAC System

Office area and non-laboratory support space supply air shall be provided from the Infrastructure Renewal SA main and ducted to VAV terminal units with hot water reheat coils that each supply a zone for ventilation and temperature control. Supply air shall be delivered through ceiling diffusers or sidewall registers selected to maintain temperature control and minimize drafts and noise. Office return air shall be collected through sidewall grilles at multiple location in the Open Office.

Laboratory and laboratory support area supply air shall be provided from the Infrastructure Renewal SA main and ducted to each laboratory. To accommodate the variation, adaptability and flexibility in the laboratory performance criteria required by the science, all newly renovated laboratories shall be provided with the same performance configuration. Makeup air shall be delivered to the laboratories by DDC, variable air volume, pressure independent, high speed electronically actuated, aluminum body venturi air valves with reheat coils. The air valves shall be sized to supply air as needed to offset fume hood exhaust, cool the heat load requirements or to provide a minimum once-through ventilation rate air changes per hour while occupied and unoccupied. The reheat coil in the terminal unit shall be individually controlled to maintain space set point temperature. Supply air shall be delivered through ceiling diffusers selected to maintain temperature control and minimize drafts and noise.

Ducting

Supply air shall be distributed through medium pressure and low pressure, galvanized, sheet metal ductwork designed and constructed as per ASHRAE guidelines and SMACNA duct construction standards. Isolation dampers to be provided at all branch ductwork and diffuser/register/grille ductwork connections. Duct insulation shall be external glass fiber wrap with vapor barrier. HVAC unit supply duct smoke detectors shall be provided as required by appropriate codes.

5.2.6 Laboratory Exhaust Air (LE)

The West Wing is currently served by approximately seventy-five (75) constant volume exhaust fans and the South Wing is currently served by approximately twenty-five (25) constant volume exhaust fans. These multiple fans shall be replaced with one variable air volume exhaust system that shall serve all spaces requiring exhaust in the South and West Wings.

Laboratory Exhaust Fans

The new laboratory exhaust shall be provided by five (5) 25,000 CFM fans, each at 25% of the design capacity. The fans shall be provided with N+1 redundancy. This system provides common exhaust/fume removal from all offices, general support spaces, laboratory spaces and laboratory support spaces including all fume hoods and localized exhaust devices (i.e. equipment, gas cabinets) in the spaces and maintains the laboratory space pressure differential. New laboratory exhaust fans basis of design is MK Plastics Axijet FSW with FRP casing, stack, stack extension and windband. All new exhaust fans shall be provided with premium efficiency inverter duty motor and variable frequency drive to provide variable air volume airflow control.

Infrastructure Renewal Ducting

All Transite ductwork shall be abated and replaced. Exhaust air shall be collected in medium pressure galvanized sheet metal exhaust mains. The duct mains shall be routed from the MEP Core up to the roof. The ductwork shall continue to run on the roof from the West Wing down onto the roof of the South Wing to the LE plenum. The suction side of the exhaust fans shall be manifolded together at a factory manufactured plenum that is provided with a bypass damper. Refer to **Appendix 1** for renderings and concept mechanical floor plans.

All fume hoods shall be provided with stainless steel ductwork with welded longitudinal seams that shall connect to the galvanized duct mains. Fume hood exhaust shall be provided via variable air volume, pressure independent, high speed electronically actuated, heresite coated aluminum venturi air valves.

For the Infrastructure Renewal project, all Wet Labs shall be converted to variable volume exhaust to maintain space pressurization, air change requirements, and exhaust from fume hoods and equipment.

All fume hoods will be modified such that the fume hood exhaust air volume shall vary to match the sash position. Proximity sensors at each fume hood shall monitor local proximity of occupants to each individual fume hood. During instances when the hood sash is opened, but no user has been within the proximity detected by the hood proximity sensor, exhaust from the chemical fume hood shall be reduced to maintain 60 feet per second face velocity. When the proximity sensors detect activity within the proximity sensors range, exhaust from the open sash hood shall be increased to achieve a face velocity of 100 feet per second.

The general room exhaust air flow from each laboratory shall be controlled to maintain the space pressure differential via linear offset control. Laboratory exhaust air calculations are based on the ceiling height for the air change requirements. If the ceiling is omitted we have assumed that the space above the 9.5 foot "virtual ceiling" does not affect the air quality of the breathing zone. The volume above the ceiling or virtual ceiling is not included in the airflow calculations, but shall be exhausted as a part of the room exhaust flow.

At this time the project does not include provisions for highly corrosive exhaust streams. Any highly corrosive exhaust would be abated prior to discharge into the exhaust duct or a separate duct system provided outside of this project.

All non-corrosive exhaust shall be collected through galvanized sheet metal ductwork. General room exhaust and equipment/snorkel laboratory exhaust shall be via variable air volume pressure independent, electronically actuated (high speed where appropriate), aluminum body, venturi air valves.

Tenant Improvement Laboratory Exhaust System

Exhaust from the laboratory spaces is provided to maintain space pressurization, air change requirements, and exhaust from fume hoods and equipment.

The fume hood exhaust air volume shall vary to match the sash position. Proximity sensors at each fume hood shall monitor local proximity of occupants to each individual fume hood. During instances when the hood sash is opened, but no user has been within the proximity detected by the hood proximity sensor, exhaust from the chemical fume hood shall be reduced to maintain 60 feet per second face velocity. When the proximity sensors detect activity within the proximity sensors range, exhaust from the open sash hood shall be increased to achieve a face velocity of 100 feet per second.

The general room exhaust air flow from each laboratory shall be controlled to maintain the space pressure differential via linear offset control. Laboratory exhaust air calculations are based on the ceiling height for the air change requirements. If the ceiling is omitted we have assumed that the space above the 9.5 foot "virtual ceiling" does not affect the air quality of the breathing zone. The volume above the ceiling or virtual ceiling is not included in the airflow calculations, but shall be exhausted as a part of the room exhaust flow.

Tenant Improvement Ducting

All fume hoods shall be provided with stainless steel ductwork with welded longitudinal seams that shall connect to the galvanized duct installed in the Infrastructure Renewal. Fume hood exhaust shall be provided via variable air volume, pressure independent, high speed electronically actuated, heresite coated aluminum venturi air valves.

At this time the project does not include provisions for highly corrosive exhaust streams. Any highly corrosive exhaust would be abated prior to discharge into the exhaust duct or a separate duct system provided outside of this project.

All non-corrosive exhaust shall be collected through galvanized sheet metal ductwork. General room exhaust and equipment/snorkel laboratory exhaust shall be via variable air volume pressure independent, electronically actuated (high speed where appropriate), aluminum body, venturi air valves.

5.2.7 Title 24 Implications

5.2.8 In order for this project to achieve full the benefit of 20% savings beyond T24 the entire building upgrades described within this DPP must be implemented. The Infrastructure Renewal phase of the project will be unable to achieve the desired UC requirements as all existing fume hoods would have to be retrofitted to operate as variable air volume which is unachievable due to the vintage of the existing hoods. The new AHUs and EFs being installed are designed to operate as variable air volume per 2016 Title 24 Section 140.9(c). Chilled Water (CHW)

The West Wing is currently served by two existing entrances into the Batchelor Hall basement. The existing configuration has the campus plant generating and pumping the chilled water through the building while controlling the chilled water return temperature back to the plant with a bridge tender. The chilled water return is then pumped back to the plant from existing chilled water pumps in the basement.

The South Wing is currently served by one existing entrance into the Batchelor Hall basement. The existing configuration is the same as the West Wing.

Infrastructure Renewal Chilled Water

All chilled water supply and return (CHWS/CHWR) piping beginning at the building entrance isolation valves to distribution throughout shall be new and serve both wings of Batchelor Hall. The two CHWS services shall combine and feed into three (3) new 275 GPM variable flow chilled water pumps (each at 50% of the building maximum load for an N+1 configuration) that shall distribute to all new AHUs and any other new chilled water coils. The new pumps shall be equipped with VFDs and control to building CHWS pressure demand. All new Chilled Water equipment shall be selected to support the campus standard of a 30°F chilled water temperature differential.

The Chilled Water piping system shall utilize copper or threaded carbon steel for pipe up to 2 IN and welded carbon steel piping for sizes above 2 IN. All chilled water piping shall be insulated.

5.2.9 Heating Hot Water (HHW)

The West Wing is currently served by a steam-to-water heat exchanger in the Batchelor Hall basement. The HHW is then pumped throughout the wing.

The South Wing is currently served by a steam-to-water heat exchanger in the wing's first floor. The HHW is then pumped throughout the wing.

Infrastructure Renewal Heating Hot Water

All heating hot water supply and return (HHWS/HHWR) piping shall be new and serve both wings of Batchelor Hall. All heating water coils shall be supplied from a new 5000 lbs/hr heating water system with high efficiency vertical flooded steam-to-water heat exchanger skid in the Batchelor Hall basement. New vertical flooded steam-to-water heat exchanger basis of design is MaxiTherm. A new heating water distribution system shall be provided by three (3) new 175 GPM variable flow pumps (each at 50% of the building maximum capacity each for an N+1 configuration). The new pumps shall be equipped with VFDs and control to building HHWS pressure demand. All new Heating Water equipment shall be selected to support the campus standard of a 40°F heating hot water temperature differential.

The Heating Hot Water piping system shall utilize copper or threaded carbon steel for pipe up to 2 IN and welded carbon steel piping for sizes above 2 IN. All Heating Hot Water piping shall be insulated.

5.2.10 Additional Systems Evaluated but Not Selected

AHUs in Basement with Overhead Distribution

Pros:

- Limit roof modifications to exhaust fans and ductwork only.
- Replace FA units in place while eliminating AC units per floor.

Cons:

- Can only connect to the proposed center and east MEP shafts in the West Wing.
- Can only connect to the proposed north MEP shaft in the South Wing.
- Renovate outside air intakes on the east side of the building.
- Challenged with space constraints in basement to route ductwork.

Dedicated Outdoor Air System (DOAS) in Basement with Distributed AC Units

Pros:

- If DOAS units are in basement, limits roof modifications to exhaust fans and ductwork only.
- Replace AHUs in place with smaller DOAS.
- Minimize distribution to OSA or Makeup Air requirements to AC Units.

Cons:

- Temperature control becomes very difficult without completing building at once.
- Can only connect to the proposed center and east MEP shafts in West Wing.
- Can only connect to the proposed north MEP shaft in the South Wing.
- Imposes a required footprint in the MEP shafts for equipment and maintenance.
- Renovate OSA intakes on east side of building.
- Challenged with space constraints in basement to route ductwork.

Dedicated Outdoor Air System (DOAS) on Roof with Distributed AC Units

Pros:

- Provides access to all proposed MEP shafts.
- Minimizes distribution ducting to OSA or Makeup Air requirements to AC Units.
- Provides multiple options for phasing consideration.
- OSA intake is away from Parking Lot and Loading Dock.

Cons:

- Temperature control becomes very difficult without completing building at once.
- Imposes a required footprint in the MEP shafts for equipment and maintenance.

Dedicated Outdoor Air System (DOAS) in Basement with Active Chilled Beams

Pros:

- If DOAS units and basement, limits roof modifications to exhaust fans and ductwork only.
- Replaces AHUs in place with smaller DOAS and eliminating AC units distributed per floor.
- Limits overhead distribution ducting to OSA or Makeup Air requirements.

Cons:

- Temperature control becomes very difficult without completing building at once.
- Can only connect to the proposed center and east MEP shafts in the West Wing.
- Can only connect to the proposed north MEP shaft in the South Wing.
- Renovate OSA intakes on east side of building.
- Challenged with space constraints in basement to route ductwork.
- Distributed chilled water throughout.
- Control of moisture mitigation and condensation.
- Phasing becomes difficult without completing building at once.

Dedicated Outdoor Air System (DOAS) on Roof with Active Chilled Beams

- Provides access to all proposed MEP shafts.
- Limits overhead distribution ducting to OSA or Makeup Air requirements.
- Provides multiple options for phasing consideration.
- OSA intake is away from Parking Lot and Loading Dock.

Cons:

- Temperature control becomes very difficult without completing building at once.
- Distributed chilled water throughout.
- Control of moisture mitigation and condensation.

- Phasing becomes difficult without completing building at once.

5.3 Energy Management System (EMS)

The control of the Mechanical systems shall be performed by local DDC that shall be integrated with the energy management control system network. The campus standard for building automation and control systems is Johnson Controls, Inc. (JCI), Metasys system.

All existing and new building mechanical controls shall be included and incorporated into the existing UCR JCI controls system. Local DDC panels shall be connected to sensors and control devices locally for the general HVAC requirements, i.e. air handling units, laboratory exhaust fans, hydronics, steam, etc. It is expected that these local DDC panels shall be connected to the network for reporting to a central monitoring point located in the Steam Plant.

Building sub-metering shall be provided for all utilities (electric, domestic water, chilled water, steam). All new electrical panels to be metered with connections to EMS.

5.3.1 Laboratory HVAC Controls

For Tenant Improvement, all local flow and temperature variables shall be reported through a new digital/electronic Laboratory Control System (LCS) including Fume Hood Controllers (FHC), and monitored by the existing EMS. The labs with new air valves, fume hoods and DDC controls shall tie into the EMS via a gateway.

5.4 Plumbing Narrative

5.4.1 Applicable Codes, Standards and Guidelines

The code review presented below is intended only to highlight currently applicable code issues and should not be construed as a complete review of all the codes. The latest edition of approved year of the following codes and combination codes and guidelines will govern the Plumbing Systems (wet and dry) and associated support system design. The systems will be designed to meet or exceed these standards.

Codes

1. 2016 California Plumbing Code (CPC)
2. 2016 California Energy Code (Title 24 Part 6)
3. 2016 California Fire Code

Standards

4. 2015 NFPA 45 - Fire Protection for Laboratories Using Chemicals
5. 2013 ASHRAE 90.1 – Energy, as specifically applicable per 2016 CPC

Guidelines

6. ASPE Design Guidelines

All other local and state codes and UC Riverside standards will be adhered to where applicable.

5.4.2 Existing Services

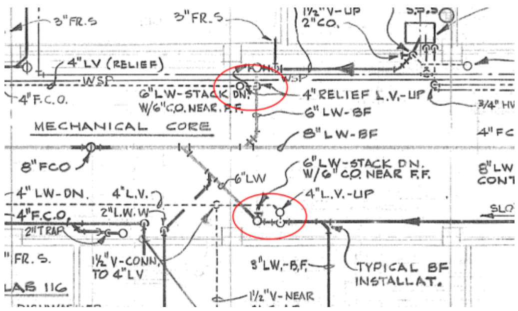
Existing Conditions Waste and Vent System

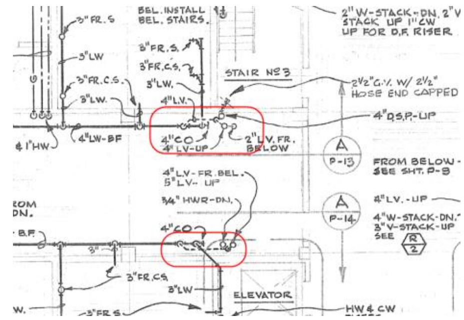
There are two main 6” waste stacks located in the center of the mechanical shaft (image below). The waste stacks are located along the east and west side of the shaft (screen shot). There are 2” and 4” wastes and vent stacks at the ends of the shaft on each side (see below).

Center of building stacks 6” waste and 4” vents

4” and 2” waste and vent stacks at each end of mechanical shaft

Laboratory waste piped to sanitary waste and vent system using acid waste piping

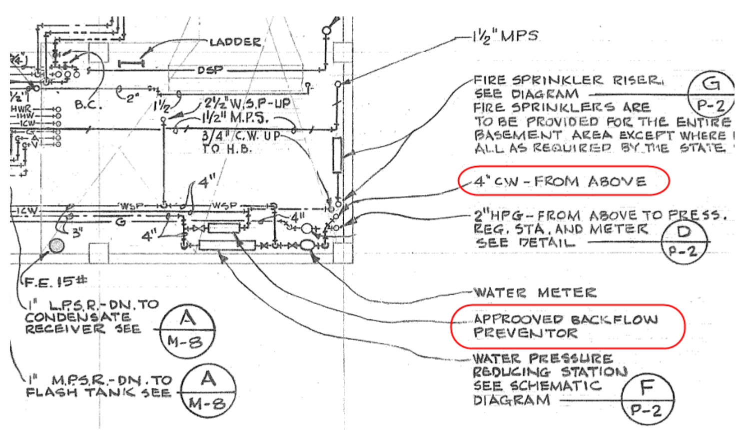




Laboratory waste and vent are tied into the sanitary waste and vent system as UCR practices “chemical controls” with no discharge of chemicals down drains.

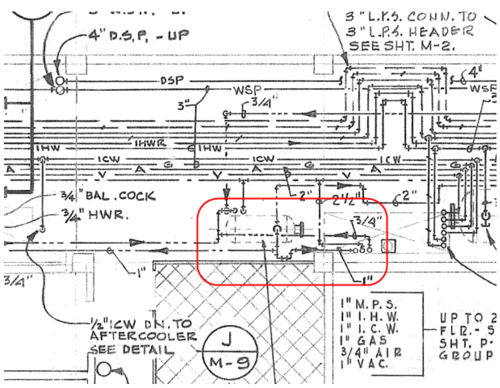
Water Piping Systems

4” Domestic water enters at the East side of the building at 85-90 psi, and routed through PRV, water meter and backflow preventer in basement. Off the 4” domestic water line before the backflow preventer is a 4” water line to serve the wet fire protection standpipe system. The 4” domestic water line also serves the Industrial Cold Water (screen shot below).

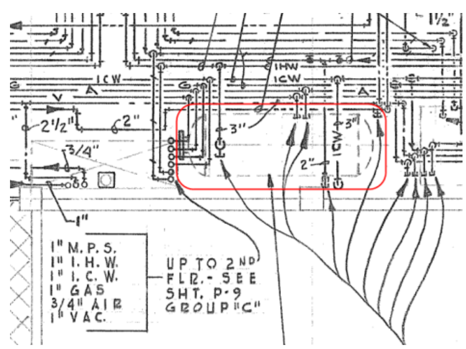


Domestic water serves the entire building from this location. There are multiple risers up through the buildings to serve each floor from multiple locations. Domestic cold water serves all the lavatories for building. A cold water line splits off in the basement at service entry to serve industrial cold water for the building, which has its own backflow preventer.

Domestic cold water serves the 30 gallon electric water heater and 100 gallon storage tank. Electric water heater in the basement serves all the non-lab related plumbing fixtures from here. Hot water has multiple risers throughout the building and returns back to the basement through a recirculation pump. Hot water serves all bathroom lavatories and a few sinks throughout the building. This hot water does not serve the lab sinks. The lab type plumbing fixtures are handled by the industrial hot water system located in the basement by steam water to water heat exchanger and 1,000 gallon storage tank.

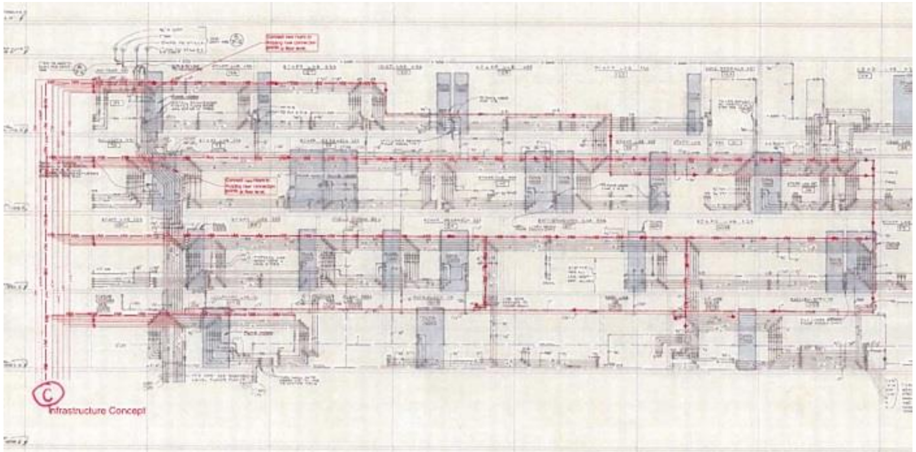


Domestic Water Heater and Recirculation pump location



Industrial Water Heater and Recirculation pump location

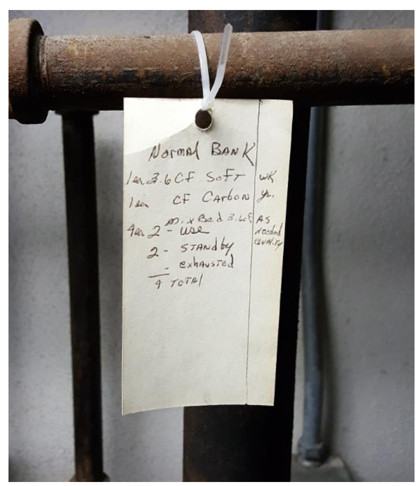
The industrial hot water return system is handled in a vertical configuration within the mechanical shaft as shown in screen shot below. The screen is showing how the industrial hot water supply can be intercepted (in red) and reconnected to existing system using new risers.



There is no house water softening system installed, but industrial water serves local water softening tanks and deionization tanks at multiple locations in the mechanical shaft. These softeners and deionization tanks serve a bank of laboratories and will be evaluated further in design. There is an old distillation 800 gallon storage tank located in the penthouse mechanical space which is no longer in service, the tank is the only portion of that old system that remains.

Typical softening system for bank of laboratories

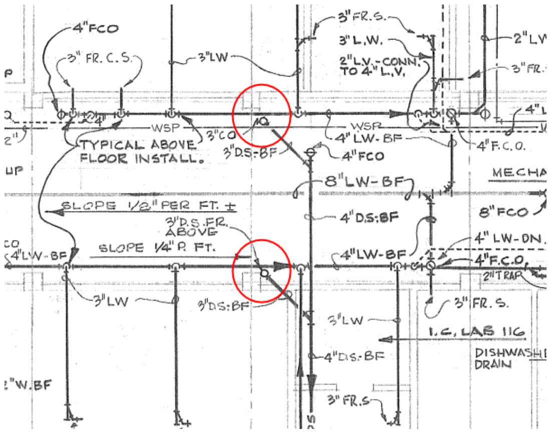
Typical Deionizer system for bank of laboratories



Typical softening system usage

Storm Drainage

Storm drains located on the roof are handled through curb type drains. The 3” drain lines on both sides of the mechanical shaft and routed down the building and down through the floor. The lines exit the south side of the building at two locations.

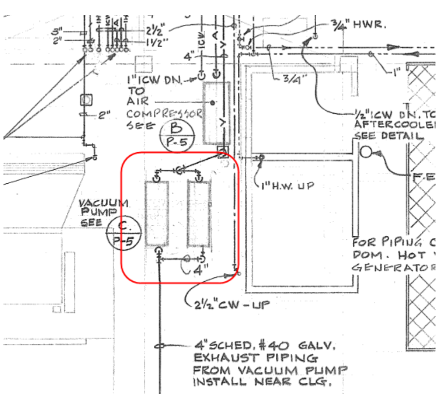


Laboratory Gas

The 2 psi natural gas line enters the building on the East side into the basement where the gas meter and earthquake valve is located. The gas is reduced to 14” water column and distributed throughout the buildings in multiple risers. Differential gas meter equal to Rockwell large capacity no. 750. The gas meter capacity range is from 750 cfh at ½” w.c. to 1,600 cfh at 2” w.c. differential. This will be verified during design.

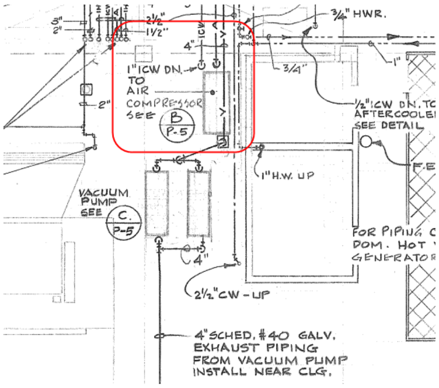
Laboratory Vacuum

Laboratory vacuum is produced by a duplex vacuum system in the basement. The vacuum is piped throughout the buildings through multiple risers. There are no receiver tanks associated with the 15 horsepower vacuum pumps at maximum of 21” Hg.



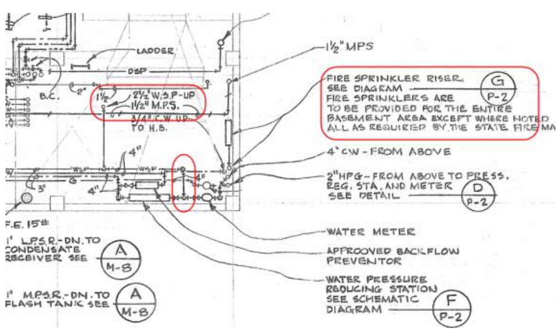
Laboratory Air

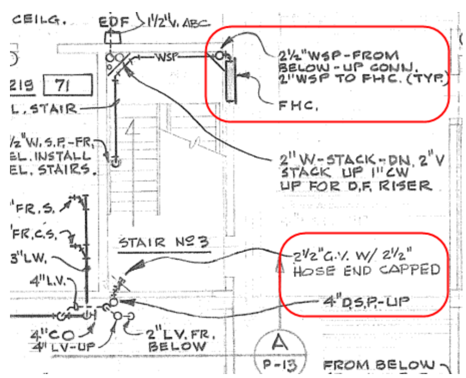
Laboratory air is produced by a 1965 water cooled Gardner Denver air compressor in the basement on 75 gallon storage tank which will be verified in DD. System delivery pressure 100 psi to the building.



Fire Protection

Fire protection is served by a 6” cold water line to the building. The fire line enters the building in the basement and is routed through a backflow preventer and then distributed to the sprinkler system in the basement and the standpipes. The wet standpipes are served off the 4” domestic water service line to the building. The 4” Wet Standpipe takes off just before the domestic water backflow preventer and routed to the wet standpipe in the stairwell. There is a 3” drain standpipe that is routed up the building adjacent to the fire standpipe in stairwell.





5.4.3 Plumbing – New Work

General

All Plumbing and Fire Protection Systems will be designed in accordance with listed applicable Codes, Standards and Authorities having jurisdiction and in accordance with current good engineering practices.

Sanitary / Storm / Laboratory Drainage and Vent Systems

Plumbing fixtures will be connected to the 4” soil, waste and vent stacks, which connect to existing 8” sanitary main running through center of building east to west (below basement). We will reduce the quantity of existing waste and vent stacks where possible. We will relocate existing waste and storm from both sides of shafts to the south side where most of the plumbing will be located adjacent to the potential new lab configuration. The new 4” waste and vent stacks will connect to the existing stacks and also provide connections for future connections based on future lab build out.

Laboratory sinks and cup sinks will continue to be drained through corrosion resistant polypropylene waste and vent piping and connected to existing sanitary waste stacks in shafts. The existing exterior sampling manhole will remain intact. Statements obtained from the user indicated that the PH level of the effluent waste will be maintained within acceptable PH levels as required by the City of Riverside which will be verified in Design. Acceptable PH levels without neutralization are between 5.5 PH and 11 PH.

Domestic Water Supply Systems

Existing 4” domestic water service will remain as is in the basement. A new water meter will be installed. The domestic cold water backflow prevention device shall be replaced with new reduced pressure zone type backflow device with a flood control device on the cold water.

System will be designed to maintain a maximum velocity of 8 fps at design flow condition. Lower velocities will be provided to minimize sound transmission in acoustically sensitive areas.

Existing pressure reducing valve in the basement will be replaced with new to limit water working pressure to 80 psi. A minimum of 30 psi will be provided at the highest connected plumbing fixture and to all emergency shower stations.

System will be designed to prevent water hammer conditions by providing shock arrestors for flush valve fixtures, and for quick closing valves.

ANSI Z358.1 states that tepid water shall be delivered to emergency equipment. City of Riverside water is generally assumed to be 60- 65 degrees F per ANSI Z358.1-2004 (page 28) indicates that a temperature of 60°is suitable for the lower parameter for tepid flushing fluid without causing hypothermia.

Existing domestic electric storage type water heater will be replaced with one new Maxi-Therm heat exchanger capable of delivering 20 gpm. All non-lab type plumbing fixtures will be served by the new domestic hot water and return system mains connected to by the new mains in the basement and first floor.

Hot water temperature will be maintained throughout the system by replacing the existing recirculating pump and using the existing piping system incorporating new in-line circulating 5 gpm pump.

Hot water will be provided at fixtures at the following temperatures:

- Laboratory Sinks - 120 deg F.
- Lavatories in Public Restrooms - 120 deg. F.
- Chilled drinking water will be provided by drinking fountains with bottle filler and integral chillers.

Sub-metering will be provided per floor level for domestic cold water.

Industrial Cold Water and Hot Water (IHW, ICW)

Just after the 4” domestic backflow preventer device at the service entry in the basement, there is a 4” line taken off for industrial cold water which also has a 4” backflow prevention device installed. This industrial cold water serves all the laboratory plumbing fixtures and industrial hot water system. The industrial cold water backflow prevention device shall be replaced with new reduced pressure zone type backflow device with a flood control device on the cold water.

Industrial cold water will serve the new Maxi-Therm heat exchanger for industrial hot water use capable of delivering 30 gpm. All lab type fixtures will be served by existing industrial hot water and return system connected to by the new mains in the basement and first floor. New risers will provide valved and capped branch lines for future laboratory TI at each floor.

Sub-metering will be provided per floor level for industrial cold water.

Purified Water (RO/DI)

Purified demand needs will be handled through a centralized water conditioning system which includes a water softening system to serve deionized water equipment to serve the laboratories requiring deionized water.

Sub-metering will be provided per floor for deionized water.

Laboratory Air System

Compressed air will be provided by a new duplex oil-less compressor system complete with outside air intake, filter, muffler, duplex air dryers and receiver to deliver 100 psi air. The Laboratory Air equipment will be located in the basement. Air quality levels will be verified in design with user group.

Pressure regulating stations will be provided to reduce air pressures as required in other areas of the laboratory. A branch with PRV will be provided where 13 psig Laboratory Air is required.

Compressed air alarm system will be connected to and monitored by the energy management system of the building or at alarm stations designated by the user.

Existing piping will be re-used throughout where possible.

Laboratory Vacuum System

Laboratory vacuum air will be provided for all required inlets in accordance with Standard No. 45 of NFPA.

Vacuum will be supplied through new mains, risers and branches and connected to existing floor level mains in the mechanical shaft.

The new system will include new duplex rotary vane oil free type vacuum pumps, receiver tank, controls, and distribution piping providing 19” Hg negative pressure at the vacuum service. If deeper vacuum is required, it will be generated locally by special vacuum pumps in the laboratories or in laboratory support areas.

Existing piping will be re-used throughout where possible.

Specialty Gas System

There is no Central Specialty Gas system. If Specialty Gas is required – it will be provided by bottles (cylinders) by owner service provider.

Laboratory Gas (LG)

Natural gas will be supplied at low pressure, typically 7-14 inches of water column. A new main and riser will be installed with valved stub-outs provided on each floor for future phases.

Insulation

All piping, components, and equipment will be insulated in accordance with State Energy Code with appropriate thickness of insulation.

Plastic piping outside fire rated enclosures will be insulated with fire-rated insulation.

Vibration Isolation

All motor operated equipment will be provided with vibration isolation and flexible connections where required to prevent transmission of vibration or noise to the building.

Piping connecting to motor operated equipment will be provided with vibration isolation hangers for a distance of 50 feet from equipment.

Seismic Restraints

Piping and components will be provided with restraints and anchorage consistent with the seismic zone.

Plumbing Fixtures

Water closets will be vitreous china siphon jet wall hung, back outlet water conserving 1.1 / 1.6 gallon flushometer piston-type with dual flush manual operation.

Urinals will be vitreous china, wall hung, siphon jet water conserving 0.125 gallon flushometer piston-type with manual operation.

Public lavatories will be vitreous china with faucets having 0.5 gpm flow restrictors using electric infrared faucets.

Water Coolers will be provided with integral chiller units.

Appropriate 'barrier free' fixtures will be provided in accordance with the "Americans with Disabilities Act" (A.D.A.).

The laboratory equipment consultant will provide laboratory equipment with corrosion-resistant coated brass supply trim and corrosion-resistant traps and piping as required.

Emergency drench showers and eye washers will be provided as required. All stations will be provided with domestic water per ANSI recommendations (20 gpm for 15 minutes at 30 psi for showers).

Sinks and other equipment supplied by laboratory equipment contractor and/or owner will be provided pre-piped with all trim items including combination supply fixtures and traps. Division 22 Plumbing, will provide utility points of connections in the proximity of all laboratory sinks and equipment.

Floor drains and floor sinks for general use will be provided with removable gratings and electronic trap primers.

Fire Protection

There is an existing Fire Protection system in the building which will be modifiedimprovementto meet NFPA requirements. Existing stand-pipes will be utilized in the building as required. a complete fire sprinkler system will be installed per NFPA. Existing hose valve cabinets in the hallways will be removed as fire spinklers are installed at each floor. Existing wet standpipe in main stairwell will remain and serve as a combination riser to serve both sprinklers per floor and hose valve connections in the stairwell. Sprinkler system shall be designed to Light Hazard for office side of the building and Ordinary Hazard group 1 for Lab side of the building unless chemical storage or use requires a higher classification, which will be determined in hydraulic and plan review.

Materials

Interior Sanitary/Vent, underground:

> Service weight hub and spiggot cast iron pipe and fittings with neoprene push-on gaskets, similar to Tyler Tyseal joints.

Interior Sanitary/Vent, aboveground:

> Service weight hubless cast iron pipe with no-hub stainless steel mechanical couplings and neoprene type gaskets.
>
> DWV copper hard drawn with wrought and cast DWV fittings.

Laboratory Waste/Vent, aboveground:

> Polypropylene (“Rionfuse”)
>
> Polypropylene (“Socket Fusion”)

Interior - Domestic / Industrial Water, aboveground:

Type L hard copper tubing, cast bronze or wrought type copper fittings.

Interior - Domestic / Industrial Water, underground:

Cold water, Type K hard copper tubing, cast bronze or wrought type copper fittings, wrapped with 20 mil polyvinyl tape with 50% overlaps.

Purified Type II Water

Polypropylene Schedule 40, socket type, electrically fused fittings.

High density polyethylene, Schedule 40, socket type fittings with electrically fused joints.

Laboratory gas, aboveground:

Black carbon steel in accordance with ASTM A53/A53M, schedule 40, threaded ends for sizes 2 inches and smaller; otherwise, plain end beveled for butt welding.

Laboratory purified water, aboveground:

Polyvinylidene fluoride (PVDF) homopolymer.

Recommended Manufacturers

Drainage Products:

J.R. Smith, Zurn, or equal.

Laboratory Waste Products:

Nalgene, Enfield, or equal.

Isolation Valves (domestic water):

Milwaukee, Nibco, or equal.

Backflow Preventers:

Watts, Cla-Val, or equal.

Pressure Reducing Valves (Water):

Watts, Wilkins, or equal.

Pressure-Balancing Valves:

Symmons, Leonard, or equal.

Purified Water Units:

Barnstead, Culligan, or equal.

Fire Protection Equipment:

Grinnell, Potter-Roemer, or equal.

Instrument Grade Air Compressors:

Squire-Cogswell, Medaes, or equal.

Laboratory Vacuum Pumps:

Busch, Intervac, or equal.

Insulation:

Owens Corning, Imcoa, or equal.

Plumbing Fixtures:

American-Standard, Eljer, or equal.

Drinking Fountains/Coolers:

Sunroc, Haws, or equal.

Laboratory Fixtures:

Chicago Faucet, Water Saver, or equal.

Flushometers:

Sloan (piston-type), Marchant, or equal.

Mop Receptors:

Florestone, Stern-Shalliams, or equal.

Stainless Steel Sinks:

Just, Elkay, or equal.

Emergency Eye/Shower Units:

Water-Saver, Haws, or equal.

Energy and Maintenance

Control Systems

Basic systems that can be monitored within the Energy Management System are as follows:

Fire sprinkler flow switches

Fire protection valve tamper switches

Specialty gases alarms by owner

All status readouts

Emergency Systems

Existing and new Basic Plumbing and Fire Protection systems will be maintained in operation under emergency conditions due to loss of power, low-fuel, maintenance operations, etc., include:

Laboratory gases, standby cylinders by owner.

Hot water circulator pumps and controls.

Laboratory Vacuum pumps, controls and alarms.

Instrument (Laboratory) Air Compressor controls and alarms.

All Laboratory gas pressure switches and alarms.

Deionization cylinders and filters

5.5 Electrical Narrative

5.5.1 Applicable Codes, Guidelines and Standards

The latest edition of the approved year of the following codes or combination codes and guidelines will govern the Electrical Systems and associated support design. The systems will be designed to meet or exceed these standards.

Codes

- 2016 California Electrical Code
- 2016 California Energy Code (Title 24 Part 6)
- 2016 California Fire Code

Standards

- NFPA 45 - Fire Protection for Laboratories Using Chemicals
- 2016 ASHRAE 90.1 – Energy

Guidelines

- IES Lighting Handbook 10^{th} addition
- All other local and state codes and UC Riverside standards will be adhered to where applicable

5.5.2 Existing Power Distribution System

The building's existing electrical distribution system is served from a 3-way gas selector switch located in existing campus central plant. One 4.16kV circuit, with 15kV, 500 kcmil, EPR copper cables in conduit, runs in the utility tunnel to feed (1) 1000kVA transformer and (1) 300kVA transformer through a duplex 15kV load interrupted (LI) switch. The south wing of the building is served by the 300kVA, 4.16kV-208V/120V transformer substation located in the basement. This substation provides power for all lighting, laboratory, and building loads in this portion of this building. The north and east/west wings of the building are served by the 1000kVA transformer, 4.16kV-208Y/120V transformer located in the basement. This substation provides power for all lighting, laboratory, building loads and supply and exhaust air systems.

At present, the building is only served with 208V/120 volt system and there is no 480V/277 system available.

5.5.3 East/West Wing 120/208V Distribution

The existing 1000kVA, 120/208V transformer located in this substation and medium voltage disconnect switch was recently replaced. The substation secondary section contains two (2) 2000A main circuit breakers. Each circuit breaker serves a 2000A rated distribution board which in turn provides 120/208V to individual panelboards serving the east/west wing. A 600A circuit breaker is also located in the substation secondary section and provides 120/208V to Keen Hall via conduit and cable. One of two 2000A distribution boards is located adjacent to the 1000 kVA substation in the basement. The second distribution panel is located in the first floor core area and fed via a 2000A busway. The majority of building panelboards are located in the core area. Typically a pair of panels are wired in series and fed from a single circuit breaker. The majority of the existing electrical equipment is in excess of 30 years old.

Refer to one-line diagram in Appendix 1.

EXISITING EAST/WEST WING SUBSTATION

EXISITING EAST/WEST WING DISTRIBUTION BOARD

5.5.4 12.47kV campus loop upgrade.

As discussed the exiting service to the building is 4.16 kV. It is the intent of the University to upgrade the service to Batchelor Hall onto the campus 12.47 kV loop under a separate contract. The 12.47 kV is backed up with standby generation and is sized to support the entire Batchelor hall demand.

5.5.5 South Wing 120/208V Distribution

The existing 300kVA, 120/208V transformer located in this substation was recently replaced. This substation contains a medium voltage disconnect switch and 1000A rated distribution board. This substation distribution board feeds the building panelboards. The majority of building panelboards are located in the core area. Typically a pair of panels are wired in series and fed from a single circuit breaker. The majority of the existing electrical equipment is in excess of 30 years old.

Refer to one-line diagram in Appendix 1.

EXISITING SOUTH WING SUBSTATION

5.5.6 East/West Wing 120/208V Replacement Distribution

The existing 1000kVA, 120/208V transformer located in this substation and medium voltage switch will be re-used.

The two (2) existing 2000A circuit breakers located in the 1000kVA substation will also be replaced with new. The two (2) existing 2000A distribution boards will be replaced with new boards and circuit breakers. The new distribution panelboards will be supplied with new circuit breakers to serve the new laboratory and building support panelboards. The final quantity and size of the new breakers and distribution panels to be determined during the initial design phase.

The core panelboards will be replace with new. Each panelboard will contain a main circuit breaker and be connected to a dedicated feeder breaker located in the distribution panel. Panels will not be series wired.

As a part of the fit out phases, laboratory panelboards will be located within the laboratory area that they serve. Office/lighting/life safety/optional standby will be located in MEP support areas on each floor.

All new panels shall have sub metering with connection to EMS.

Refer to one-line diagram in Appendix 1.

5.5.7 South Wing 120/208V Replacement Distribution

The 300kVA 120/208V transformer located in this substation will be re-used. The medium voltage disconnect and 1000A distribution board will be replaced with new.

The core panelboards will be replace with new. Each panelboard will contain a main circuit breaker and connected to a dedicated circuit breaker located in the substation distribution board. Panels will not be series wired.

As part of the fit out phases, Laboratory panelboards will be located within the laboratory area that they serve. Office/lighting/life safety/optional/standby will be located in MEP support areas on each floor.

All new panels shall have sub metering with connection to EMS.

Refer to one-line diagram in Appendix 1.

5.5.8 East/West and South Wing 277/480V New Power Distribution

A new 15kV; 480/277, 3PH, 4W transformer will be installed on grade near the building. This will provide 480/277, 3PH, 4W service to a new main distribution board to be located in the basement mechanical room. This distribution board will provide power to new 480V HVAC equipment and 277V lighting. The new transformer will be fed from a new triplex 15kV load interrupter switch that is fed from the Campus 15kV system.

Refer to one-line diagram in Appendix 1.

5.5.9 Emergency Power Existing

An existing 120/208V 7.5 kW diesel emergency generator currently sits on the roof of the south wing. Presently, it provides support for life safety building loads and will be re-used in the project. In order to coordinate with the proposed mechanical equipment it will be removed from the roof and taken out of service.

5.5.10 Emergency Power New

The campus 12.47kV campus loop power is backed up with generation sized to support the entire Batchelor Hall electrical demand load. This power is intended for optional stand-by only.

The existing rooftop generator will be replaced using integral battery egress lighting. The rooftop generator will be removed from service.

The existing life safety power will be replace with integral battery exit lighting and the existing automatic transfer switch,panelboard, and branch circuits to life safety loads will be removed.

All new panels shall have sub metering with connection to EMS.
Refer to one-line diagram in Appendix 1.

5.5.11 Life Safety Emergency Power and Distribution System

Life Safety power will be provided for the following:

Egress and exit lighting using integral batteries.

Fire alarm system will be supported from code required 90 minute battery back-up

5.5.12 Emergency Generator

The existing 12.kV, 2,500kW campus emergency generator will be utilized for the project. This will require installing a new 12kV feeder from the emergency switchgear to the Bachelor Hall. This will be completed as a part of this project. The entire Batchelor Hall will be support by the stand-by power along with multiple other buildings.

The campus stand by generators start upon a loss of utility power and provide power to the buildings connected to emergency loop.

5.5.13 Distribution Panelboards

Distribution panelboards will be dead front, totally enclosed in NEMA 1 enclosure. Copper bussing will be provided for all distribution panelboards. Main circuit breaker will be equipped with solid state, true RMS reading trip unit. All 480V/277 panelboards shall be provided with hinged lockable wireway covers and hinged lockable circuit breaker covers. Feeder circuit breakers will be group mounted front accessible bolt-on thermal-magnetic molded case with adjustable trip settings.

Transient voltage surge suppressors (TVSS) shall be provided at the 480V/277 volt secondary distribution switchboards.

5.5.14 Lighting and Receptacle Panelboards

All Lighting and Receptacle panelboards will have 42 poles per section. Minimum interrupting capacity will be 10,000 AIC for 120/208 volts and 14,000 AIC for 277/480 volts. Copper bussing will be provided. Main circuit breakers will be proved in select panelboards. Circuit breakers will be molded case quick-make, quick break, with thermal magnetic trip, bolt-on type. All panel boards and feeders will be sized for full capacity to support future expansion.

5.5.15 Conductors

All low voltage conductors will be copper, THHN/THWN, 600 volt insulation. All medium voltage conductors will be 15kV, MV-105, 1/C, 133% rated EPR insulation, PVC jacket, copper tape shield.

5.5.16 Transformers

There are no distribution step down transformers, except as needed for the emergency system.

5.5.17 Motor Control

Motor control will consist of either Variable Frequency Drives or across-the-line combination motor starters as dictated by mechanical design requirements. Across-the line motor control will feature either motor circuit protectors (MCP), full-voltage or solid-state reduced type motor starters, control transformers, thermal-magnetic molded-case feeder circuit breakers, auxiliary contacts and other accessories as required to make the units complete. Each motor starter will have a separate fused control transformer (480 – 120V) rated to supply connected loads plus 100 percent spare capacity, three (3) thermal overloads, surge suppressor across the coil, and two (2) normally-open and normally-closed auxiliary contacts. Operator interface devices will include H-O-A selector switches, red “run” and “green” ready pilot lights.

Each starter and circuit breaker will be pad-lockable in the “off” position.

Each VFD to contain a bypass feature allowing for the continuous operation of the equipment load in the event of a VFD failure.

5.5.18 Reserve Capacity and Redundancy

The normal power service equipment is sized and configured to serve the anticipated demand load of the building plus:

35% spare ampacity for branch panelboards serving receptacles
25% spare ampacity for branch panelboards serving lighting
35% spare ampacity for distribution panels

5.5.19 Uninterruptible Power Supply System (UPS)

There will be no central UPS system. Any sensitive laboratory equipment requiring UPS backup will be furnished as part of Laboratory furnishings.

5.5.20 Renewable Energy Sources

The south portion of the central building roof and east portion of the south building roof are reserved for future photovoltaic installation. A portion of the penthouse equipment room wall has also been reserved for future photovoltaic controls equipment. The new 277/480V distribution panel will be sized to accommodate the anticipated PV installation. The photovoltaic design will be part of the PV contractor’s scope of work.

5.5.21 Grounding System

All parts of the power distribution system will be provided with an equipment ground conductor compliant with CEC. This system will extend from the building service transformer to the branch circuit load or device.

A wall mounted copper ground bus will be located in the each telephone/data closet. The ground bus will be connected to the building grounding electrode system, building steel and the building main grounding bus. All ground busses will be interconnected using # 4/0 bare copper.

All parts of the normal and emergency power distribution system will be provided with a wired equipment ground conductor. This system will extend through all conduit and raceways from building service transformer to the branch circuit load or device.

5.5.22 Placing Electrical Systems in the Buildings

In order to achieve system flexibility and thorough integration between building architecture and engineering systems, a concept for the distribution of electrical and communication systems will be established during the architectural schematic design. The locations of horizontal elements of electrical and communications distribution equipment shall be established before the architectural concept is finalized.

Main Electrical Room East/West Wing:

This room is located in the basement in the center portion of the building. It is not an enclosed room, but consists of fencing on three sides and one foundation wall.
Power at 208V/120V will be distributed from this main distribution board.
New equipment will be located outside of this fenced area in the available space.

Laboratory panelboards will be located in the laboratory served to minimize branch circuit length. Laboratory panelboards will be a part of the laboratory renovation scope of work.

Lighting and general receptacle panelboards will be located in shared MEP spaces located on each floor. Lighting and receptacle panelboards will not be part of the initial project scope.

Main Electrical Room South Wing:

The main electrical service is located in an open area in the basement. New equipment will be located adjacent to this area in the available space.

Laboratory panelboards will be located in the laboratory served to minimize branch circuit length. Laboratory panelboards will be a part of the laboratory renovation scope of work.

Lighting and general receptacle panelboards will be located in shared MEP spaces located on each floor. Lighting and receptacle panelboards will not be part of the initial project scope.

Layout of Conduit: Generally, conduit will not cross building expansion joints or seismic joints. Where this is unavoidable, expansion fittings will be provided in the conduit joint. Separate grounding will be provided at each side of the joint. All branch circuits and feeders will be in conduits.

Electrical Rooms on Laboratory Levels: Electrical will share space within the MEP support area located on each floor.

5.5.23 Lighting Systems

All areas programmed to be renovated will have the lighting replaced.

Interior lighting shall be accomplished with energy efficient LED luminaires. LED lamps light color temperature to be identified during design.. The targeted watt per square foot will follow ASHREA 90.1.

Egress and exit lighting shall be provided in accordance with NFPA 101.

5.5.24 Lighting Control

- Lighting control will be compliant will Title 24 2016.
- Spaces will be provided with multi-level switching, with one level being between 50% and 70%.
- Spaces furnished with day lighting shall also be provided with photocell control.
- Dimming shall be provided as defined in the Room Data Sheets.
- Dual technology occupancy sensors (ultrasonic and passive infrared) will be provided for shut off in each laboratory.
- Occupancy sensors shall be provided with relay and photocell (RP) option for potential connection to the Energy Management System to control HVAC.
- Emergency lighting shall be control by an emergency bypass/shunt relay. In normal operation, the lighting can be switched on/off using individual control. When normal power drops out, the relay switches to emergency power regardless the position of the individual control scheme.

5.5.25 Lighting Wiring Devices

- Toggle switches will be specification grade, quiet-operating with back and side wiring, rated 120-277 volts, AC only, 20 amps.
- Wall box dimmers will be 120 or 277 volt, thin profile, preset type with preset slider and tap-on tap-off control and suitable for use with fluorescent and LED lamps.

5.5.26 Characteristics of Automatic Lighting Control

- Automatic on when room or space is occupied or in use.
- Automatic off when occupancy ends.
- No false on/off switching.
- Local override.
- Return to automatic operation without user action when occupancy in overridden areas.
- Daylight sensing and override where appropriate. The control shall be placed so that some or all of the lights are turned off during such periods.

5.5.27 Illumination Levels

Lighting levels for interior spaces will be according to values indicated in below. For those areas not listed, the IES Lighting Handbook will be used as a guide.

Average Maintained Foot-candles:	40FC
Telecommunication Closets	40FC

Mechanical Areas	20FC
Electrical Areas	20FC
Corridors	10FC
Storage rooms	10FC
Restrooms	20FC

5.5.28 Lighting Fixture Types

- Circulation; Recessed LED luminaries or wall mounted compact LED sconces.
- Storage; Surface or pendant mounted LED luminaries.
- Mechanical/Electrical Areas/Communication Closets; LED, surface or pendant mounted, strip luminaries.
- EXIT signs will be State Fire Marshal approved LED type, located in all paths of egress in accordance with the requirements of the Life Safety Code.

5.5.29 Fire Alarm System

The existing Fire Alarm Control Panel will be replaced to accommodate new devices consistent with overall campus upgrades. Final phasing and installation requires further definition.

Reserve Capacity and Redundancy: Fire alarm system reserve capacity will be identified during detail design.

5.5.30 Telecommunications

The Building Renovation Project will design and install the entire structured cabling system to the University requirements including all pathways, (conduits, cable trays, sleeves, etc.) spaces and grounding shall be included in the scope under building renovation.

Per the University the existing copper wire in the building is of sufficient quantity to accommodate the new project requirements. Additional fiber optic cabling will need to be added from an adjacent tunnel vault on the east side of the building into the first floor BDF room. New underground conduits will need to be installed from this vault into the building to accommodate the new fiber cable.

Building Distribution Frame (BDF) Room

One (1) 10’ X 11’ BDF shall be installed and be the new point of distribution for the voice and data circuits. The BDF will be provided in the first floor of the building. All walls shall be lined with 4’ X 8’ X ¾” trade size fire resistance plywood painted with fire retardant paint.

Each telecommunications room will be equipped with emergency power outlets that are dedicated for use by telecommunication equipment. Rooms shall also be equipped with standard power outlets for use with non-telecommunication equipment. A home run 50-Pair Copper Cable will need to be added from Basement Telephone Terminal Backboard (TTB 0.1) to each IDF and BDF 48 Port Patch Panel.

The BDF shall be equipped with a Telecommunication Main Ground Bus Bar (TMGB). The TMGB will be 2” wide, ¼” thick and no less than 12” in length. This grounding bar will be an extension of the building main grounding electrode system and dedicated to the telecom infrastructure.

EXISTING I/T SERVER RACK

EXISTING TELCOMM SERVICE ENTERANCE BOARD

Intermediate Distribution Frame (IDF) Room

One (1) 10’ X 11” IDF room will be provided on each floor to support voice and data distribution. The telecommunication rooms will be centrally located and meet the EIA/TIA 569 standard for space requirements containing no outside walls or windows. Three (3) 4” sleeves will be provided in every room for vertical riser cables. Rooms shall not be co-located with any type of electrical room, mechanical room or closet.

All walls shall be lined with trade size Fire Resistant A/C Plywood.

The telephone/data system should consist of wall or raceway-mounted outlets in all occupied spaces, such as offices, laboratories, and laboratory support rooms. These outlets shall then be connected to distribution blocks, in communications rooms via conduit, or a cable tray system in accessible ceiling spaces or catwalk, with open wiring. A single conduit shall be run from each outlet box to a location above accessible ceiling. No sharing of conduits (daisy chaining) between outlet boxes will be allowed, one dedicated conduit per Tel/Data outlet box. Where conduits are run back to telephone closets, cabinets, or backboards, one homerun conduit shall serve a maximum of one outlet boxes. For open wiring in ceilings, provide a separate conduit riser from each outlet to the accessible ceiling.

All pathways (conduits, cable tray cables, etc.) passing through rated assembles/partitions (walls/floors/ceiling) shall be fire-stopped with an approved fire-stop system. Sleeves are required for all pathways passing through non-rated and rated assembles/partitions.

The Building Renovation Project shall provide, to include design to UCR Telecom Standards; all the Telephone and Data wiring (cabling). Network Electronics (switches) shall be provided and installed by the University.

In the east/west wing, IDF rooms will be located on each floor and stacked vertically. These IDF rooms will also serve the south wing.

Refer to the riser diagram in Appendix 1.

5.5.31 Security System

Security system design and wiring are not in the scope of this contract. Card readers to be located at all lab entrances and all office area entrances. Surveillance camera requirements will be discussed during the detailed design phase.

5.5.32 Electrical Campus standards

Low Voltage Switchboards & Panel Boards	General Electric, Square D or equal.

Wire and Cable	Anaconda, General Wire, or equal
Motor Controllers and Motor Control Centers	Square D, General Electric, or equal.
Devices	Hubbell, Arrow Hart, or equal.
Fire Alarm System	Notifier, Simplex, or equal.
Lighting Control	Square D, Watt Stopper, or equal.
Tel/Data Cabling, jacks patch panels, etc.	AVAYA, Chatsworth, or equal.

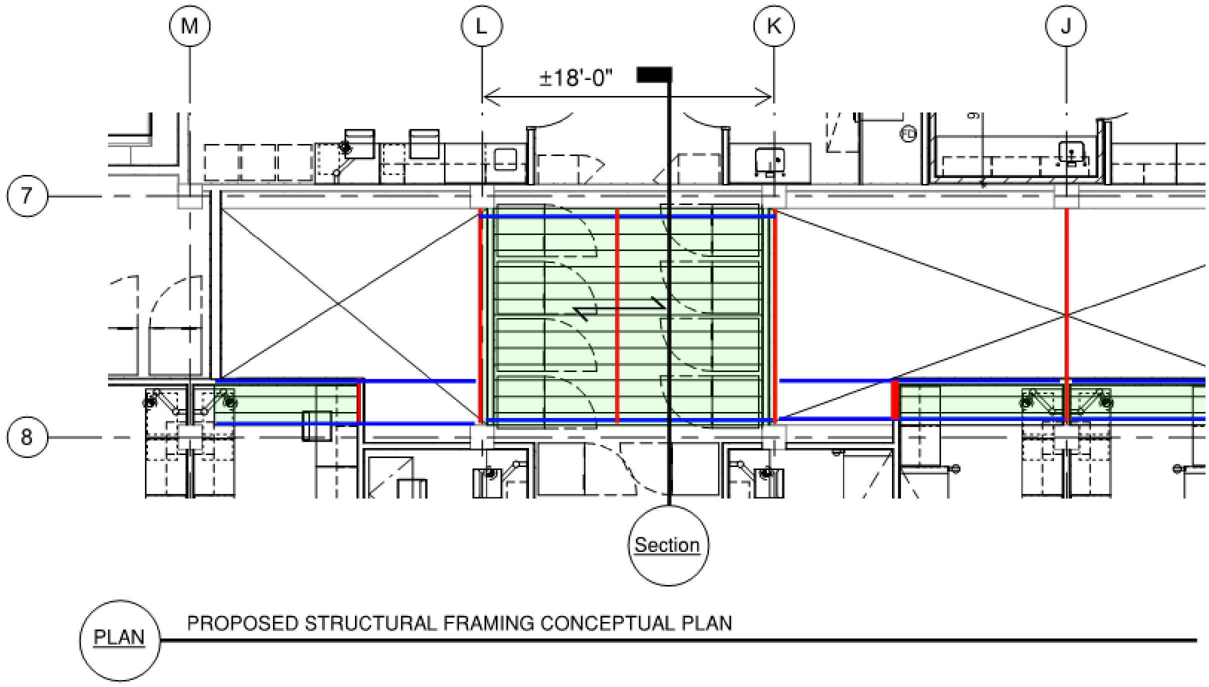
5.6 Structural Narrative

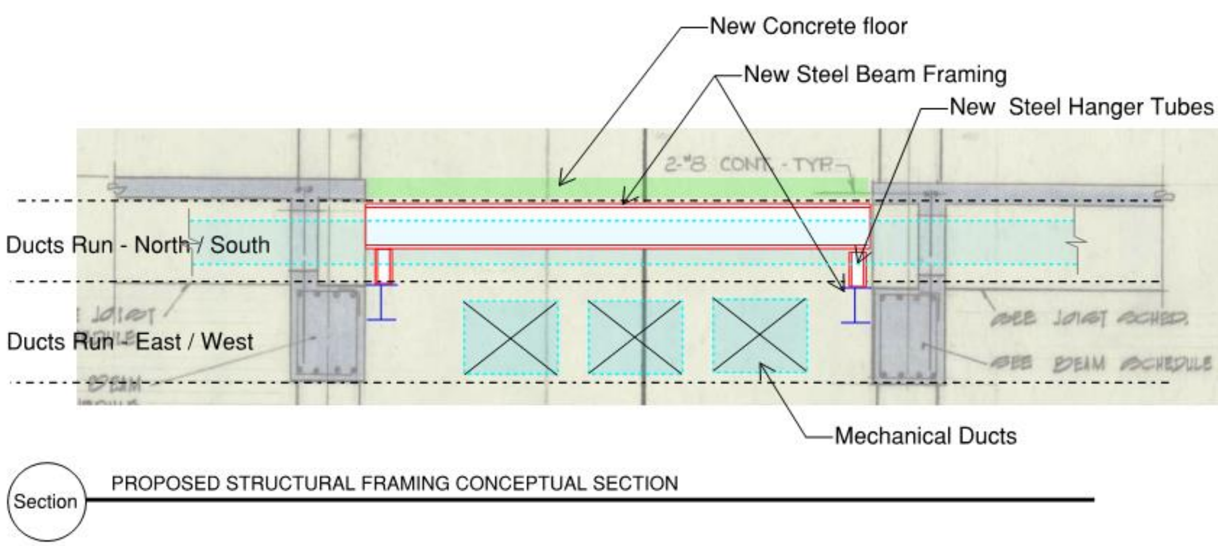
5.6.1 Materials of Construction

- Steel Beams: ASTM A992, Fy= 50 ksi
- Steel HSS Tubes ASTM A500 Gr-B, Fy= 46 ksi
- Concrete at Deck: Light Weight F'c = 3,500 psi
- Concrete at Roof: Normal Weight F'c = 4,000 psi
- Reinforcing Steel ASTM A615 Fy=60 ksi
- Corrugated Deck – Verco W3 x 16 GA

5.6.2 Main Wing Proposed Framing Plan

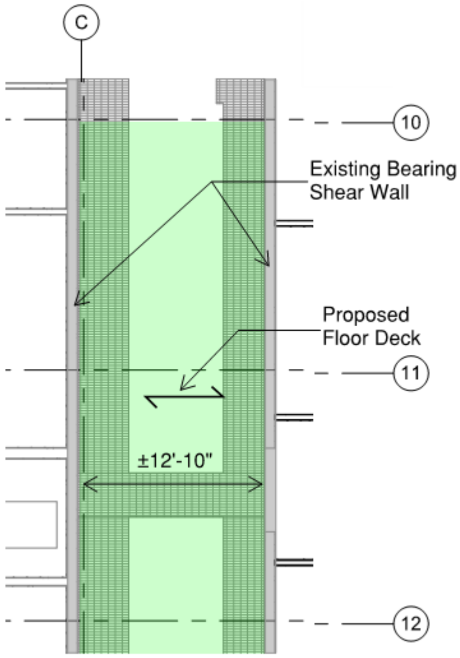
The center bay of the floor plate was originally designed with a large whole down the middle of the building. To facilitate the proposed Architectural floor planning the framing concept shown below has been prepared. All red and blue beams are anticipated to be W12x. The red beams will be located directly under the floor at a higher elevation than the blue beams. Blue beams will be located at a lower elevation connected to the red beams with HSS tubes. The beams are strategically identified in elevation to accommodate the proposed mechanical ducts. The structural floor is anticipated to be comprised of W3 corrugated deck with 3.25" thick light weight concrete with a total thickness of 6.25 inches. The steel beams will be designed as composite beams with shear studs spaced no further than 12" on center. The beams will connect to existing concrete structure with shear plates and post installed epoxy anchors. The framing plan shown below occurs at multiple locations and floors. See Architectural drawings for a comprehensive floor plan.





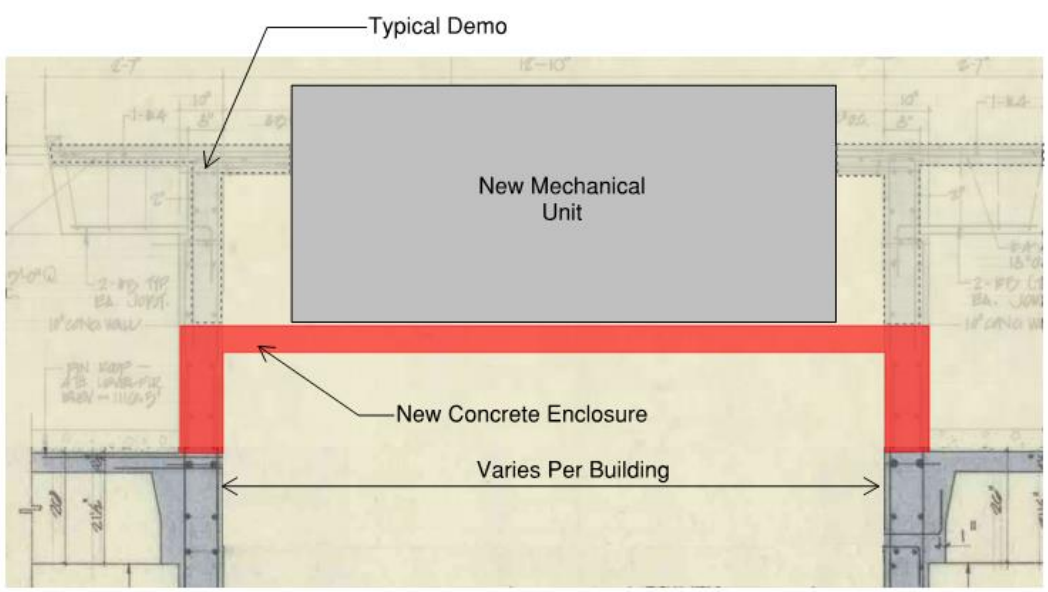
5.6.3 South Wing Proposed Framing Plan

The South wing is designed similar to the main building with the middle bay having a long continuous opening on the floor plate. However, structurally there are significant changes between the buildings. The south wing utilizes full height concrete walls that frame the opening at the center of the building. See below for the structural proposed floor framing. It is anticipated that the proposed deck will the span the opening without steel supports and connect to the bearing shear walls with a ledger. Deck is anticipated to be comprised of W3 corrugated deck with 3.25" thick light weight concrete with a total thickness of 6.25 inches. The framing plan shown occurs at multiple locations. See Architectural drawings for a comprehensive floor plan.



5.6.4 Proposed Roof Framing Plan

The main building and the south wing both have an extruded penthouse that is scheduled to be removed. The extruded penthouse is located directly on top of the floor plate openings on both buildings. See below for proposed framing to accommodate new mechanical units while sealing the building envelope. The new concrete enclosure will be connected to the existing structure with post installed epoxy deformed bars. The concrete enclosure is anticipated to be 10 inches thick.



6 Sustainable Design

The University of California system is committed to minimizing the University's impact on the environment and reducing the University's dependence on non-renewable energy. The 2017 sustainable Practices Policy establishes minimum goals in nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice and sustainable water systems. The goals set forth are in alignment with the requirements of the LEED rating system and the Regent's requirement for all projects to obtain LEED silver, in addition to exceeding Title 24 requirements by 20%.

Systems Renewal

The following three LEED certification options were evaluated for the Systems Renewal project and based on the findings LEED will not be pursued:

1. ID+C: CI certification of the 2nd floor TI area only
2. BD+C: NC certification for the whole building
3. O+M certification for the whole building.

The building systems renewal portion of the project does not meet the minimum criteria for LEED certification under ID+C or BD+C as 40% of the building as a contiguous space with clear boundaries is required to be renovated. UCR could determine that it is desirable to certify under LEED O+M which would require UCR operations and maintenance to record performance data for at least one year prior to the renovation design/construction activities. Updated performance data would then be required after the renovation to verify improvement in building efficiency. Subsequent tenant improvement phases after the infrastructure renewal would be eligible under LEED for Commercial Interiors v4.

Tenant Improvements

The following LEED scorecard was developed to evaluate potential points under the LEED for Commercial Interiors rating system that would be required in order to meet the minimum LEED Silver rating. Depending on the size and scope of the TI credits will have to be confirmed by the design team conducting the work.

Batchelor Hall (TI)

LEED for Commercial Interiors v4 8/10/2017

Silver

52	41	15	2
Y	M	A	N

Y	M	A	N			INTEGRATIVE PROCESS	Possible Points 2
2				Credit		Integrative Process	2

9	7		2			LOCATION & TRANSPORTATION	Possible Points 18
Y	M	A	N				
			n/a	Credit		LEED for Neighborhood Development Location *Option 1 = 3-16 pts*	18
5	3			Credit		Surrounding Density and Diverse Uses	8
3	4			Credit	E	Access to Quality Transit	7
1				Credit		Bicycle Facilities	1
			2	Credit	E	Reduced Parking Footprint	2

4	5	3				WATER EFFICIENCY	Possible Points 12
Y	M	A	N				
Y				Prereq		Indoor Water Use Reduction	
4	5	3		Credit	E	Indoor Water Use Reduction	12

14	17	7				ENERGY & ATMOSPHERE	Possible Points 38
Y	M	A	N				
Y				Prereq		Fundamental Commissioning and Verification	
Y				Prereq		Minimum Energy Performance	
Y				Prereq		Fundamental Refrigerant Mgmt	
	5			Credit		Enhanced Commissioning	5
9	9	7		Credit	E	Optimize Energy Performance	25
1	1			Credit		Advanced Energy Metering	2
2	1			Credit	E	Renewable Energy Production	3
	1			Credit		Enhanced Refrigerant Management	1
2				Credit		Green Power and Carbon Offsets	2

7	5	1				MATERIALS & RESOURCES	Possible Points 13
Y	M	A	N				
Y				Prereq		Storage and Collection of Recyclables	
Y				Prereq		Construction and Demolition Waste Mgmt Planning	
1						Long Term Commitment	1
1	2	1		Credit	E	INTERIORS Life-cycle Impact Reduction	4
1	1			Credit	E	Bldg Product Disclosure & Optimization–EPD	2
1	1			Credit	E	Bldg Product Disclosure & Optimization–Sourcing Raw Materials	2
1	1			Credit	E	Bldg Product Disclosure & Optimization–Material Ingredients	2
2				Credit	E	Construction and Demolition Waste Mgmt	2

6	7	4				INDOOR ENVIRONMENTAL QUALITY	Possible Points 17
Y	M	A	N				
Y				Prereq		Minimum Indoor Air Quality Performance	
Y				Prereq		Environmental Tobacco Smoke (ETS) Control	
		2		Credit	E	Enhanced IAQ Strategies	2
2	1			Credit	E	Low-Emitting Materials	3
1				Credit		Construction IAQ Mgmt Plan	3
1	1			Credit		IAQ Assessment	2
1				Credit		Thermal Comfort	1
1	1			Credit		Interior Lighting	2
	2	1		Credit		Daylight	3
		1		Credit	E	Quality Views	1
	2			Credit		Acoustic Performance	2

6					INNOVATION	Possible Points 6
Y	M	A	N			
1				Credit	ID: Green Cleaning Policy	1
1				Credit	ID: Integrated Pest Management	1
1				Credit	ID: Green Building Education	1
1				Credit	PC: Green Training: Contractors, Trades, Operators, & Service	1
1				Credit	Exemplary: Construction & Demolotion Waste Management	1
1				Credit	LEED Accredited Professional	1

4				REGIONAL PRIORITY	Possible Points 4
Y	M	A	N		
1				Regional Priority 1: Renewable Energy Production	1
1				Regional Priority 2: Optimize Energy Performance	1
1				Regional Priority 4: Surrounding Density and Diverse Uses	1
1				Regional Priority 5: Access to quality transit	1

52	41	15	2	TOTAL	Possible Points 110
Y	M	A	N		

Certified: 40-49 points **Silver**: 50-59 points **Gold**: 60-79 points **Platinum**: 80+ points

Y = Yes; M = Maybe Pending; A = Alternate; N = No

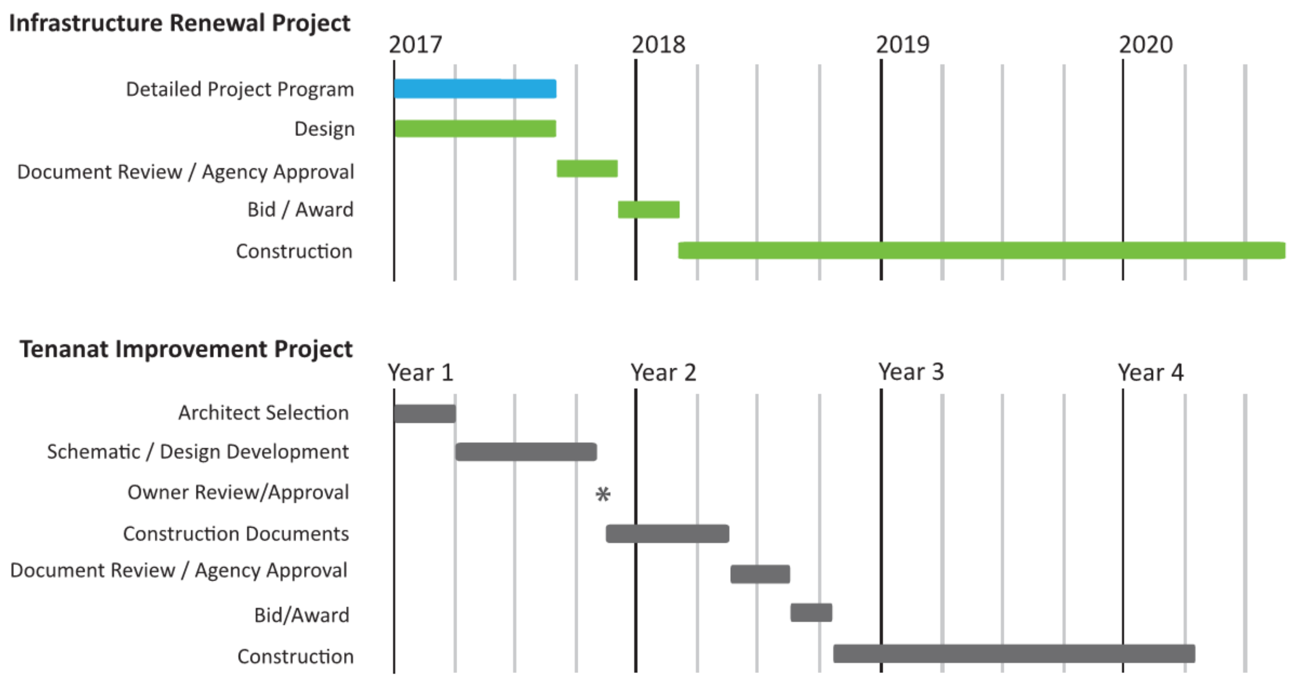
E = Exemplary Performance possible for an Innovation & Design credit

This Scorecard is based on HDR's analysis of potential LEED credit attainment given the current proposed design and information provided by the owner. HDR will perform its services with the degree of skill and care normally exercised by similarly situated members of the profession performing similar services at the same time and in the same locale as the Project. Credits and points may move from Yes to Likely or Unlikely or No throughout the design and construction

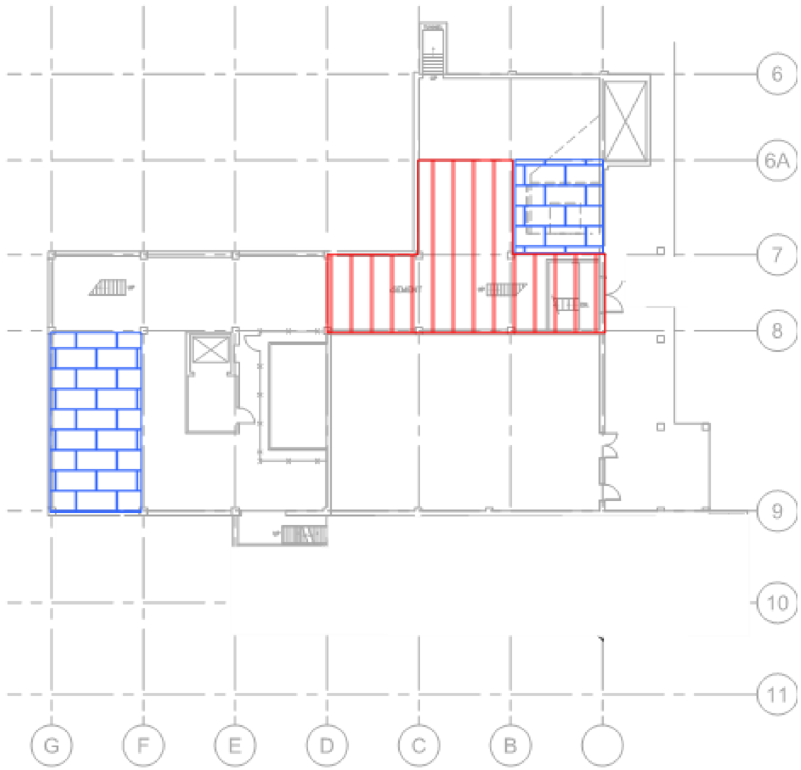
7 Schedule, Phasing and Cost Estimates

7.1 Schedule

The schedule shown below anticipates that the Systems Renewal project will be constructed in four phases of approximately 6-9 months each for each zone of the building. Subsequent tenant improvements could be designed and constructed as a single project or per floor depending on University needs and funding. Approximate schedule is shown below for planning purposes.



7.2 Mechanical Phasing



BASEMENT

Phase 1

- Replace existing chilled water, heating hot water and steam condensate return pumps.
- Replace existing steam-to-water heating hot water heat exchanger(s).
- Reconfigure chilled water pumping/piping from pull through to push through.
- Install new piping mains for re-feed of existing AHUs.
- Provide any temporary chilled/heating hot water generation and pumping to existing distribution mains.

Phase 5

- Remove existing basement FA Units and associated ducting/utilities.

FIRST FLOOR

Phase 2

- Remove existing FA Units and AC Units and associated ducting/utilities within the MEP Core.
- Install new AHU and new distribution ductwork within the MEP Core, reconnecting to the existing.
- Install bottom of shaft to enclose return air path in a MEP shaft.

Phase 3

- Install temporary ventilation air barrier to isolate phase zone.
- Remove existing AC Unit and associated ducting/utilities within the MEP Core.

Phase 4

- Install temporary ventilation air barrier to isolate phase zone.
- Remove existing AC Unit and associated ducting/utilities within the MEP Core.

Phase 5

- Remove existing AC Unit and associated ducting/utilities within the MEP Core.

SECOND FLOOR

Phase 2

- Remove existing FA Units and AC Units and associated ducting/utilities within the MEP Core.

Phase 3

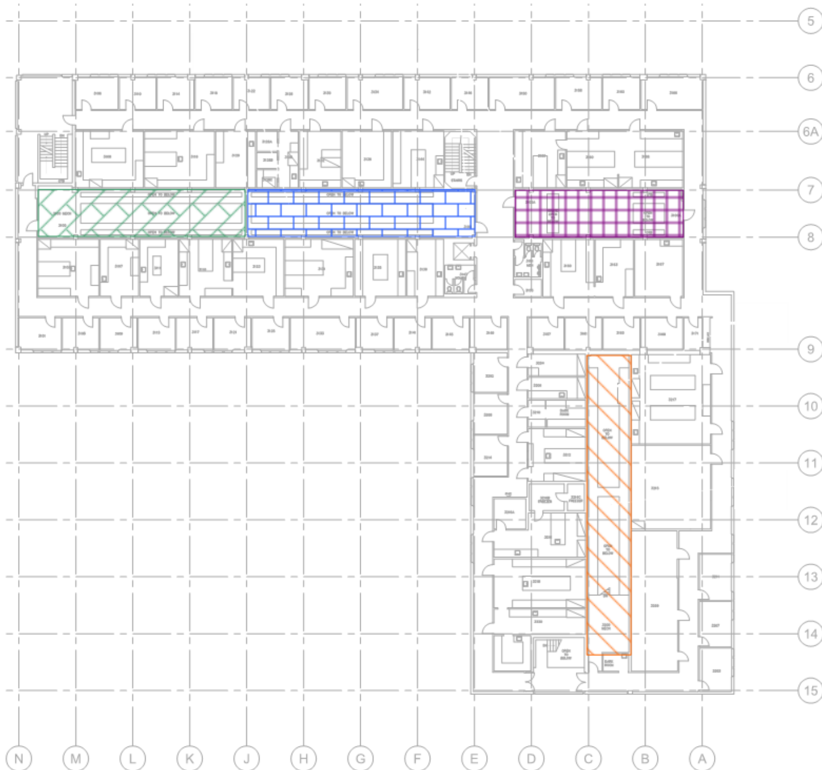
- Install temporary ventilation air barrier to isolate phase zone.
- Remove existing AC Unit and associated ducting/utilities within the MEP Core.

Phase 4

- Install temporary ventilation air barrier to isolate phase zone.
- Remove existing AC Unit and associated ducting/utilities within the MEP Core.

Phase 5

- Remove existing AC Unit and associated ducting/utilities within the MEP Core.



THIRD FLOOR

Phase 2

- Remove existing FA Units and AC Units and associated ducting/utilities within the MEP Core.

Phase 3

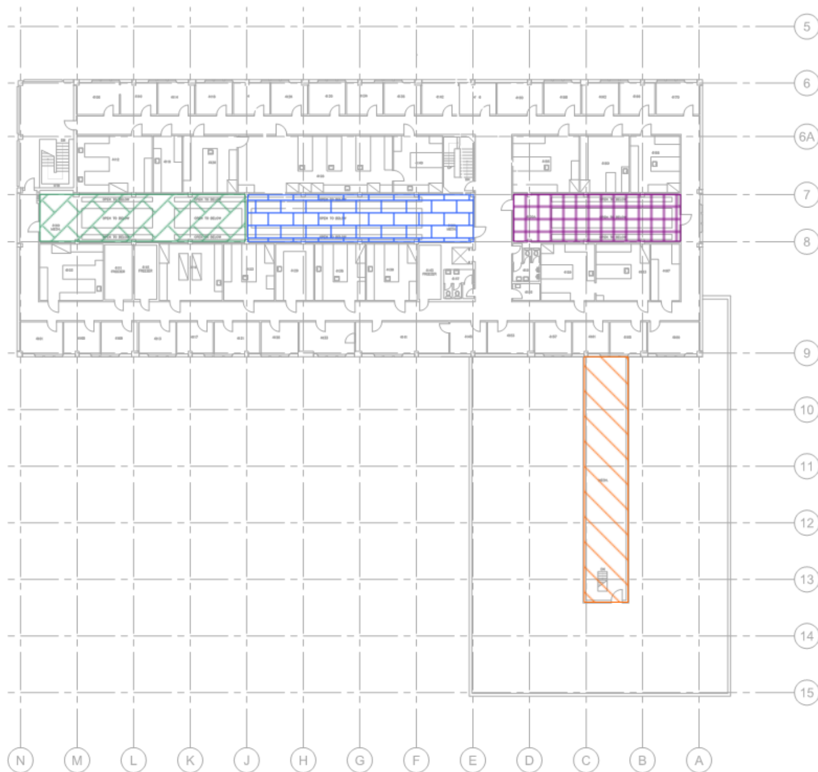
- Install temporary ventilation air barrier to isolate phase zone.
- Remove existing AC Unit and associated ducting/utilities within the MEP Core.

Phase 4

- Install temporary ventilation air barrier to isolate phase zone.
- Remove existing AC Unit and associated ducting/utilities within the MEP Core.

Phase 5

- Remove existing AC Unit and associated ducting/utilities within the MEP Core.



FOURTH FLOOR

Phase 2

- Remove existing exhaust fans within the Penthouse and associated ducting within the MEP Core.
- Install new exhaust fans on the roof and new ducting/devices within the MEP Core, reconnecting to the existing.

Phase 3

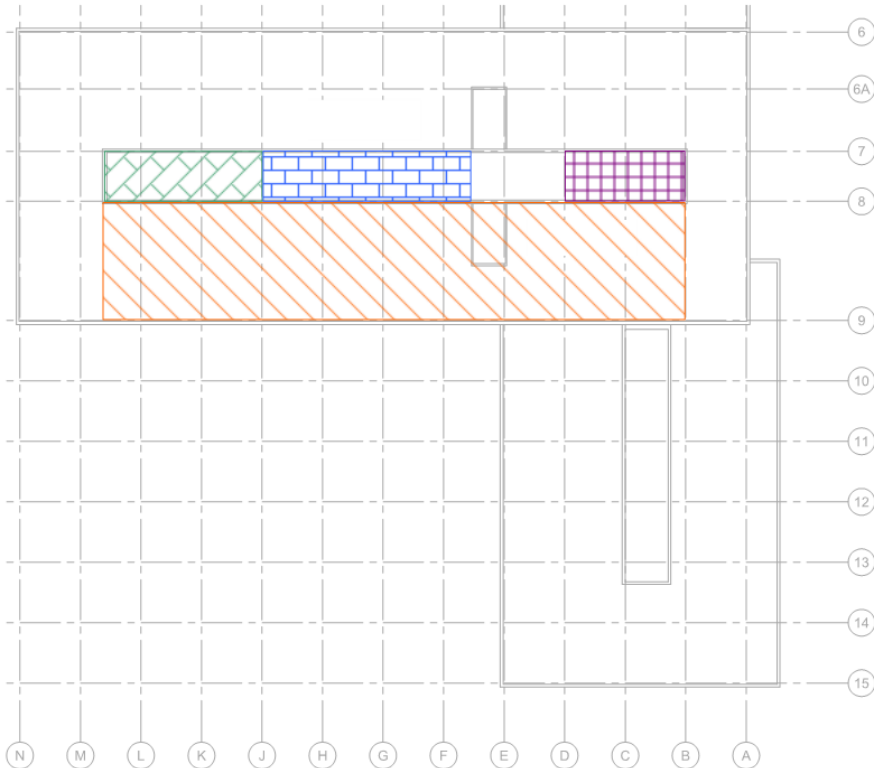
- Install temporary ventilation air barrier to isolate phase zone.
- Remove existing AC Unit and associated ducting/utilities within the MEP Core.

Phase 4

- Install temporary ventilation air barrier to isolate phase zone.
- Remove existing AC Unit and associated ducting/utilities within the MEP Core.

Phase 5

- Remove existing AC Unit and associated ducting/utilities within the MEP Core.



ROOF

Phase 2

- Install new exhaust distribution ductwork on the roof and down into the MEP Core.

Phase 3

- Remove existing exhaust fans within the Penthouse and associated ducting within the MEP Core.
- Install new AHU and new distribution ductwork within the MEP Core, reconnecting to the existing.
- Install new piping risers for new rooftop AHUs.

Phase 4

- Remove existing exhaust fans within the Penthouse and associated ducting within the MEP Core.
- Install new AHU and new distribution ductwork within the MEP Core, reconnecting to the existing.

Phase 5

- Remove existing exhaust fans within the Penthouse and associated ducting within the MEP Core.
- Install new AHU and new distribution ductwork within the MEP Core, reconnecting to the existing.

7.3 Electrical Phasing

The replacement of the building electrical infrastructure must minimize the quantity and length of outages as the building will remain in operation throughout the renovations. The phasing of the electrical replacement must also accommodate the mechanical and architectural phasing.

The following is not intended to provide an all-encompassing phasing plan but rather a general approach that will need significant detail coordinated with the actual field conditions and phasing plans of the other disciplines.

Electrical Phase 1 (mechanical loads in basement replaced):

- Install new 480/277 service and distribution board in the basement.
- Provide new feeds to the Mechanical Phase 1 loads.

Electrical Phase 2 (East Core demolished and new mechanical systems installed):

- Provide a temporary feed to the existing 208/120 V distribution board located in the E/W core areaway. Install new 480/277 distribution on roof to support new mechanical loads
- Install a new 208/120V distribution board in the level 2 E/W Mechanical/Electrical core areaway.
- Install new 208/120 branch panels in core as needed to support new mechanical loads.
- Demolish existing circuits as loads are eliminated.

Electrical Phase 3 (West Core demolished and new mechanical systems installed)

- Provide a temporary feed to the existing 208/120 V distribution board located in the basement.
- Provide feeds to new mechanical loads using new 480/277 distribution on roof installed in phase 2.
- Install a new 208/120V distribution board in the level 2 E/W Mechanical/Electrical core areaway.
- Install new 208/120 branch panels as needed to support new mechanical loads.
- Demolish existing circuits as loads are eliminated.

Electrical Phase 4 (Center of E/W Core demolished and new mechanical systems installed)

- Install new 208/120 branch panels as needed to support new mechanical loads.
- Demolish existing circuits as loads are eliminated.

Electrical Phase 5 (South Building Renovation)

- Provide a new 208/120V distribution board in the basement being served from the existing 300kVA transformer.
- New 480/277 panel board from the new 480/277V service.
- Install new 208/120 branch panels as needed to support new mechanical loads.
- Demolish existing circuits as loads are eliminated.

Electrical Phase 6 (Laboratory/Classroom Tenant Improvements (TI))

- Demolish existing circuits that are a part of the TI phasing.

- Install 208/120 V branch panels being fed from the 208/120V distribution panels installed in the earlier phases.
- Provide branch circuiting to TI renovation
- Install 480/277 V lighting panels fed from the new 480/277 service.
- Replace lighting/circuits per the TI phasing.

Electrical Phase 7 (Final demolition)
- Demolish the original 208/120V distribution panels and temporary feeders when all circuits have been demolished off of each floor.

7.4 Tenant Improvement Phase 1 Recommendation

Understanding that construction funds are limited at this time for Tenant Improvements, the Working Group discussed the 6 options presented by the Design Team for the first phase of Tenant Improvements. These included:

- Option 1A: Renovation of Floor 1
- Option 1B: Option 1A, except outfit Class Lab for PIs initially
- Option 2: Renovation of Floor 2, East-West Wing. Existing administrative space would be relocated to Floor 1, Graduate Student Services would leave the building.
- Option 3: Renovation of Floor 3, East-West Wing
- Option 4: Renovation of Floor 4
- Option 5: Renovation of South Wing, all floors
- Option 6: Renovation of East-West Wing, East of the Lobby, all floors

The Working Group created a short list eliminating Options 3, 5 and 6 for the following reasons:

- Option 3: There appeared to be no advantage of this option over option 4. It also created discontinuous construction (existing space above and below) and mixed construction and on-going research on the same floor.
- Option 5: This floor is the least “supportive” of the remainder of the program. It does not support itself very well, lacking Plant Growth Rooms and Common Lab Support.
- Option 6: This option is too “support-heavy” and does not improve the space for enough PI’s.

The Working Group created evaluated the remaining 3 options in the following table:

Values	1A	1B	2	4
Meets Project Principles	--	0	+	+
New Recruitment Space	-	+	+	++
1st Phase Functionality	+	?	+	0
Supports Laboratories	+	+	+	0
Showcase for Future Donors	-	-	++	+
Relocation of Existing PIs (rank)	0	0	0	-
Relocation of Existing PIs (quantity)	3	3	4	7
Constructability	0	0	-	+
Ease of Future TIs	+	+	+	0
Metrics	**1A**	**1B**	**2**	**4**
Construction Cost	$7.2M	$7.2M	$7.9M	$8.6M
ASF	10,857	10,857	12,343	14,797
GSF	16,694	16,694	17,551	18,853
$/ASF	$663/ASF	$663/ASF	$640/ASF	$581/ASF
$/GSF	$431/GSF	$431/GSF	$450/GSF	$456/GSF
PIs	3	5	6	9
$/PI	$2.4M/PI	$1.4M/PI	$1.3M/PI	$1.0M/PI

Legend:
"+" positive attribute relative to other options
"0" neutral attribute
"-" negative attribute

The Working Group eliminated Options 1A and 1B after completing the table. Both options 1A and 1B provide balance between new lab space and laboratory support. However, they are not as balanced as option 2 in this regard.

Option 2 was generally considered the strongest option. Option 2 provides a balance of maximizing new laboratory space while providing essential lab support functions like the central plant growth rooms and cold storage functions near the loading dock.

Option 4 was a close contender. It provided the most new laboratory space. However, it lacked the essential lab support functions that supported the entire building.

7.5 Cost Estimate

The following cost estimate provides the detailed construction cost development that supports the information contained within the body of the report per the Concept Cost Model Construction estimate dated January 19, 2017.

C. P. O'HALLORAN ASSOCIATES INC.
CONSTRUCTION COST MANAGEMENT

CONCEPT COST MODEL
CONSTRUCTION ESTIMATE

for

Batchelor Hall Renovation
University of California Riverside

Prepared for :

HDR Architecture, Inc.
251 South Lake Avenue, Suite 1000
Pasadena, CA 91101

January 19, 2017

 # 17-2496

Concept Cost Model Construction Estimate

Basis of Estimate

The estimate is based on draft DPP program areas and narratives dated December 19, 2016. Estimated unit costs include average labor rates with prevailing wages and competitive bid conditions. Competitive bid conditions generally occur when bids are received from a minimum of four general contractors and three subcontractors for each trade. The estimate includes allowances and assumptions for materials, building systems, specifications and construction schedule, these assumptions should be confirmed at the next design stage and prior to completion of bid documents. The estimate includes general contractor markups for general conditions, bonds, insurances, profit, contingency and cost escalation to mid-point of construction. Project soft costs are not included. The estimate is based on design, bid, build project delivery.

The estimated construction cost represents our best judgment as a professional consultant familiar with the construction industry. We have no control over the cost or supply of labor, materials and equipment, a contractor's methods of determining bid prices and market conditions. We cannot and do not warranty or represent that bids or negotiated prices will not vary from the estimated construction cost.

Estimate Exclusions

Professional design, testing, inspection and management fees.
Fire and all risk insurance.
Legal and financing costs.
Building permits and fees.
Construction, project, owner and staging contingencies.
Communications, security and technology equipment and cabling.
Furnishings, workstations and moveable equipment.
Owner furnished equipment.
Moving, furnishings and equipment relocation.
12.5 KV electrical upgrade.
Central UPS system.

		INFRASTRUCTURE		TENANT IMPROVEMENTS												TOTAL	
Concept Cost Model Construction Estimate		Infrastructure, Utility and Service Upgrades		Level 1		Level 2 EW		Level 2 S		Level 3 EW		Level 3 S		Level 4		Total	
		91,068 GSF		16,694 GSF 10,857 ASF		17,551 GSF 12,343 ASF		4,493 GSF 2,761 ASF		19,025 GSF 14,424 ASF		8,668 GSF 7,376 ASF		18,853 GSF 14,797 ASF		91,068 GSF 62,558 ASF	
COMPONENT SUMMARY		$/GSF	$	$/GSF	$	$/GSF	$	$/GSF	$	$/GSF	$	$/GSF	$	$/GSF	$	$ / GSF	$
1. Foundations		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Vertical Structure		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Floor and Roof Structure		9.57	871,320	-	-	-	-	-	-	-	-	-	-	-	-	9.57	871,320
4. Exterior Cladding		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. Roofing and Waterproofing		8.09	736,767	-	-	-	-	-	-	-	-	-	-	-	-	8.09	736,767
Shell (1 - 5)		17.66	1,608,087	-	-	-	-	-	-	-	-	-	-	-	-	17.66	1,608,087
6. Interior Partitions and Doors		7.98	726,842	27.38	457,163	27.10	475,561	34.12	153,315	27.13	516,152	27.91	241,922	26.86	506,476	33.79	3,077,432
7. Interior Finishes - Floors, Walls, Ceilings		4.69	427,000	18.69	311,992	19.08	334,806	17.38	78,088	19.39	368,932	19.77	171,340	19.58	369,088	22.63	2,061,245
Interiors (6 - 7)		12.67	1,153,842	46.07	769,155	46.17	810,367	51.50	231,403	46.52	885,084	47.68	413,262	46.44	875,564	56.43	5,138,677
8. Fixed Equipment, Casework and Specialties		1.42	129,267	76.42	1,275,793	83.18	1,459,925	14.45	64,907	86.15	1,638,931	75.80	657,037	88.07	1,660,397	75.62	6,886,257
9. Stairs and Elevators		5.84	531,500	-	-	-	-	-	-	-	-	-	-	-	-	5.84	531,500
Equipment, Stairs and Elevators (8 - 9)		7.26	660,767	76.42	1,275,793	83.18	1,459,925	14.45	64,907	86.15	1,638,931	75.80	657,037	88.07	1,660,397	81.45	7,417,757
10. Plumbing		8.71	792,889	36.34	606,724	38.89	682,610	6.90	31,002	39.26	746,933	35.68	309,251	40.28	759,317	43.14	3,928,724
11. Heating, Ventilation, Air Conditioning		42.26	3,848,266	55.70	929,842	56.26	987,376	49.25	221,280	56.34	1,071,831	55.55	481,535	56.56	1,066,333	94.51	8,606,463
12. Electrical		17.51	1,594,655	54.22	905,149	54.22	951,615	54.22	243,610	54.22	1,031,536	54.22	469,979	54.22	1,022,210	68.29	6,218,754
13. Fire Protection		2.00	182,136	4.00	66,776	4.00	70,204	4.00	17,972	4.00	76,100	4.00	34,672	4.00	75,412	5.75	523,272
Mechanical and Electrical (10 - 13)		70.47	6,417,946	150.26	2,508,490	153.37	2,691,805	114.37	513,864	153.82	2,926,399	149.45	1,295,437	155.06	2,923,271	211.68	19,277,213
14. Site Preparation and Demolition		8.50	774,078	19.00	317,186	19.00	333,469	19.00	85,367	19.00	361,475	19.00	164,692	19.00	358,207	26.29	2,394,474
15. Site Development		2.20	200,000	-	-	-	-	-	-	-	-	-	-	-	-	2.20	200,000
16. Site Utilities		2.80	255,000	-	-	-	-	-	-	-	-	-	-	-	-	2.80	255,000
Sitework (14 - 16)		13.50	1,229,078	19.00	317,186	19.00	333,469	19.00	85,367	19.00	361,475	19.00	164,692	19.00	358,207	31.29	2,849,474
SUBTOTAL		121.55	11,069,721	291.76	4,870,624	301.72	5,295,566	199.32	895,541	305.49	5,811,889	291.93	2,530,428	308.57	5,817,440	398.51	36,291,209
General Conditions, General Requirements	9.5%	11.55	1,051,623	27.72	462,709	28.66	503,079	18.94	85,076	29.02	552,129	27.73	240,391	29.31	552,657	37.86	3,447,665
Bonds and Insurances	2.0%	2.66	242,427	6.39	106,667	6.61	115,973	4.37	19,612	6.69	127,280	6.39	55,416	6.76	127,402	8.73	794,777
Overhead and Profit	4.0%	5.43	494,551	13.03	217,600	13.48	236,585	8.90	40,009	13.65	259,652	13.04	113,049	13.79	259,900	17.80	1,621,346
SUBTOTAL		141.19	12,858,322	338.90	5,657,600	350.48	6,151,202	231.52	1,040,239	354.85	6,750,951	339.10	2,939,285	358.43	6,757,398	462.90	42,154,997
Design / Estimate Contingency	15.0%	21.18	1,928,748	50.84	848,640	52.57	922,680	34.73	156,036	53.23	1,012,643	50.86	440,893	53.76	1,013,610	69.43	6,323,250
TOTAL CONSTRUCTION 01/2017		162.37	$14,787,070	389.74	$6,506,240	403.05	$7,073,882	266.25	$1,196,274	408.07	$7,763,594	389.96	$3,380,178	412.19	$7,771,008	532.33	$48,478,246
Cost Escalation to Construction Mid Point	11.0%	17.86	1,626,578	42.87	715,686	44.34	778,127	29.29	131,590	44.89	853,995	42.90	371,820	45.34	854,811	58.56	5,332,607
TOTAL CONSTRUCTION ESCALATED		180.24	$16,413,648	432.61	$7,221,927	447.38	$7,852,009	295.54	$1,327,865	452.96	$8,617,589	432.86	$3,751,997	457.53	$8,625,819	590.89	$53,810,854

Areas	ASF	GSF
Gross Building Area		
Basement Mechanical Space	-	5,469
Floor 1	10,857	16,694
Floor 2 EW	12,343	17,551
Floor 2 S	2,761	4,493
Floor 3 EW	14,424	19,025
Floor 3 S	7,376	8,668
Floor 4	14,797	18,853
Roof	-	315
TOTAL GROSS BUILDING AREA	62,558	91,068
	69%	

Assignable Areas	Research Lab	Research Lab Support	Comp Lab	Class Lab	Office / Collaboration	Total ASF
Floor 1	2,301	3,714	-	1,410	3,432	10,857
Floor 2 EW	3,731	4,751	-		3,861	12,343
Floor 2 S			998		1,763	2,761
Floor 3 EW	4,799	4,501	-		5,124	14,424
Floor 3 S	1,820	1,948	384		3,224	7,376
Floor 4	5,005	4,500	-		5,292	14,797
TOTAL ASF	17,656	19,414	1,382	1,410	22,696	62,558
	28%	31%	2%	2%	36%	100%

Utility, Infrastructure and Service Upgrades

Component Description	Quantity		Unit Cost	$
1. Foundations				
			$	-
2. Vertical Structure				
			$	-
3. Floor and Roof Structure				
Infill existing floor shaft openings				
Floor 1				-
Floor 2 EW	612	SF	66.00	40,392
Floor 2 S				-
Floor 3 EW	612	SF	66.00	40,392
Floor 3 S	910	SF	66.00	60,060
Floor 4	612	SF	66.00	40,392
Infill existing roof shaft openings, with raised slab	3,640	SF	77.55	282,282
Enlarge elevator shaft, 4 stops	1	LS	240,000.00	240,000
Equipment pads	1,200	SF	26.00	31,200
Miscellaneous metals, concrete and anchorage	91,068	SF	1.50	136,602
			$	871,320
4. Exterior Cladding				
			$	-

Utility, Infrastructure and Service Upgrades

Component Description	Quantity		Unit Cost	$
5. Roofing and Waterproofing				
Roofing				
Roof insulation and cover board	27,693	SF	6.75	186,928
Membrane roofing	27,693	SF	11.50	318,470
Walkway pads	27,693	SF	0.30	8,308
Roofing upstands and sheet metal	27,693	SF	6.58	182,081
Caulking and sealants	91,068	SF	0.45	40,981
			$	736,767
6. Interior Partitions and Doors				
Shaft walls at mechanical shafts	17,864	SF	25.50	455,532
Toilet room, interior walls				
Multiple accommodation (8 EA)	8,120	SF	21.50	174,580
Gender neutral staff (1 EA)	725	SF	21.50	15,588
Gender neutral public (3 EA)	2,175	SF	21.50	46,763
Interior doors, frames and hardware	12	EA	2,865.00	34,380
			$	726,842
7. Interior Finishes - Floors, Walls, Ceilings				
Toilet room				
Multiple accommodation (8 EA)	1,400	SF	75.00	105,000
Gender neutral staff (1 EA)	400	SF	75.00	30,000
Gender neutral public (3 EA)	1,200	SF	75.00	90,000
Repairs at drinking fountains	8	EA	6,500.00	52,000
Repairs - allowance	1	LS	150,000.00	150,000
			$	427,000

Utility, Infrastructure and Service Upgrades

Component Description	Quantity		Unit Cost	$
8. Function Equipment, Casework and Specialties				
Toilet partitions and accessories	3,000	SF	17.50	52,500
Casework and countertops				
Toilet rooms	12	EA	4,500.00	54,000
Code signage	91,068	SF	0.25	22,767
			$	129,267
9. Stairs and Elevators				
Staircase flights, floor to floor				
ADA upgrades, riser closure, handrails and nosings				
Stair #2 L1 to L2	1	EA	29,000.00	29,000
Stair #3 L2 to Roof	1	EA	87,000.00	87,000
Stair #6 L2 to L3	1	EA	29,000.00	29,000
Elevators				
Replace 6 stop passenger elevator	1	EA	348,000.00	348,000
Cab finishes	1	LS	38,500.00	38,500
			$	531,500
10. Plumbing				
Sanitary fixtures and connection piping				-
Multiple accommodation toilets (8 EA)	48	EA	1,965.00	94,320
Gender neutral staff toilet (1 EA)	4	EA	1,965.00	7,860
Gender neutral public toilet (3 EA)	12	EA	1,965.00	23,580
Drinking fountains	8	EA	2,865.00	22,920
Sanitary waste, vent and service piping and pumps	91,068	SF	4.25	387,039
Water heating equipment, pumps and tanks	91,068	SF	1.00	91,068

Utility, Infrastructure and Service Upgrades

Component Description	Quantity		Unit Cost	$
10. Plumbing				
Natural gas piping				
Earthquake valve	1	EA	11,270.00	11,270
Gas regulator assembly	1	EA	6,090.00	6,090
Piping	400	LF	52.00	20,800
Valves and connections	1	LS	5,000.00	5,000
Laboratory gas piping and equipment				-
Rainwater drainage				-
Trade demolition	91,068	SF	0.50	45,534
Sub-contractor commissioning	91,068	SF	0.40	36,427
Testing and sterilizing	91,068	SF	0.45	40,981
			$	792,889
11. Heating, Ventilating and Air Conditioning				
Heat generation and cooling equipment and pumps				
Chilled water pumps	4	EA	8,500.00	34,000
Heating hot water pumps	4	EA	7,500.00	30,000
Steam condensate return pumps	4	EA	6,400.00	25,600
Steam to water heating hot water heat exchangers	1	LS	90,000.00	90,000
Dirt and air separator, Armstrong DAS 3-R	1	EA	5,035.00	5,035
Expansion tank, Wessels NLA130	2	EA	3,650.00	7,300
Processed cooling water tank, 300 gals	1	EA	9,960.00	9,960
Variable frequency drives	12	EA	7,839.33	94,072
Piping and insulation	91,068	SF	5.75	523,641
Air handling equipment				
Air handling equipment 35,000 CFM	3	EA	367,500.00	1,102,500
Air handling equipment 28,000 CFM	1	EA	287,000.00	287,000
Vibration isolation	1	LS	80,000.00	80,000

Utility, Infrastructure and Service Upgrades

Component Description	Quantity		Unit Cost	$
11. Heating, Ventilating and Air Conditioning				
Ventilation equipment				
General exhaust	91,068	SF	0.75	68,301
Laboratory exhaust 125,000 CFM	91,068	SF	3.77	343,750
Valves included with TI				-
Air distribution	91,068	SF	5.25	478,107
Diffusers, registers and grilles				-
Controls	91,068	SF	3.00	273,204
Temporary equipment, ducting and air barrier	91,068	SF	2.20	200,000
Trade demolition	91,068	SF	1.10	100,175
Sub-contractor commissioning	91,068	SF	0.45	40,981
Testing and balancing	91,068	SF	0.60	54,641
				$ 3,848,266
12. Electrical				
Main power and distribution				
Substation circuit breakers	2	EA	37,500.00	75,000
Distribution switchboard	5,000	AM	46.90	234,500
Modify existing distribution	1	LS	150,000.00	150,000
Feeder conduit and wire	350	LF	495.00	173,250
New 15KV transformer on grade outside building, load interrupter switch and distribution board	1	LS	185,000.00	185,000
Emergency and UPS power				
Relocate existing generator	1	LS	45,000.00	45,000
New automatic transfer switch, distribution boards and feeders	1	LS	90,000.00	90,000

Utility, Infrastructure and Service Upgrades

Component Description	Quantity		Unit Cost	$
12. Electrical				
Equipment connections and switches	91,068	SF	0.55	50,087
Power, panel boards, feeders and outlets				
Toilet rooms	3,000	SF	22.00	66,000
Power for mechanical loads	1	LS	100,000.00	100,000
Lighting				
Toilet room fixtures, conduit and cable	3,000	SF	22.00	66,000
Switches, conduit and wire	3,000	SF	2.00	6,000
Occupancy sensors	3,000	SF	1.50	4,500
Daylight sensors and lighting controls	3,000	SF	2.75	8,250
Audio visual conduit				-
Communications conduit and cable				-
Fire alarm system				-
Security system				-
Temporary power and equipment	91,068	SF	2.75	250,000
Trade demolition	91,068	SF	0.80	72,854
Sub-contractor commissioning	91,068	SF	0.20	18,214
				$ 1,594,655

13. Fire Protection				
Automatic fire sprinkler system - allowance	91,068	SF	2.00	182,136
				$ 182,136

Utility, Infrastructure and Service Upgrades

Component Description	Quantity		Unit Cost	$
14. Site Preparation and Selective Demolition				
Site protective construction, dust and noise control	91,068	SF	2.00	182,136
Selective interior demolition	91,068	SF	3.00	273,204
Hazardous material, spot abatement	91,068	SF	3.50	318,738
			$	774,078
15. Site Development				
New accessible stair and ramp at loading dock.	1	LS	200,000.00	200,000
			$	200,000
16. Site Utilities				
Medium voltage emergency power ductbank	300	LF	450.00	135,000
Communications conduit from tunnel to BDF room	1	LS	120,000.00	120,000
			$	255,000

Level 1 - Tenant Improvements

Component Description	Quantity		Unit Cost	$
1. Foundations				
			$	-
2. Vertical Structure				
			$	-
3. Floor and Roof Structure				
			$	-
4. Exterior Cladding				
			$	-
5. Roofing and Waterproofing				
			$	-
6. Interior Partitions and Doors				
Interior walls	14,257	SF	19.75	281,569
Interior windows, sidelights and transoms	1,212	SF	68.00	82,404

Level 1 - Tenant Improvements

Component Description	Quantity		Unit Cost	$
6. Interior Partitions and Doors				
Interior doors, frames and hardware	30	EA	2,765.00	82,950
Elevator smoke curtains - none				-
Access panels walls and ceilings	6	EA	565.00	3,390
Card reader door hardware	10	EA	685.00	6,850
			$	457,163
7. Interior Finishes - Floors, Walls, Ceilings				
Laboratory and lab support program	7,425	SF	22.00	163,350
Offices	3,432	SF	19.50	66,924
Circulation and building support areas	5,837	SF	14.00	81,718
			$	311,992
8. Function Equipment, Casework and Specialties				
Protective wall guards and protection	16,694	SF	1.35	22,537
Toilet partitions and accessories				-
Casework	9,269	SF	8.50	78,787
Laboratory casework and equipment	7,425	SF	125.00	928,125
Fume hoods				
Fume hoods 5'	2	EA	14,900.00	29,800
Fume hoods 6'	8	EA	15,750.00	126,000
Fume hoods 8'	1	EA	18,650.00	18,650

Level 1 - Tenant Improvements

Component Description	Quantity		Unit Cost	$
8. Function Equipment, Casework and Specialties				
Code signage	16,694	SF	0.45	7,512
Fire extinguishers	4	EA	445.00	1,780
Fixed building equipment	16,694	SF	3.75	62,603
				$ 1,275,793
9. Stairs and Elevators				
				$ -
10. Plumbing				
Sanitary fixtures and connection piping				
Laboratory fixtures and equipment hook-ups	7,425	SF	2.20	16,335
Sanitary waste, vent and service piping	16,694	SF	5.50	91,817
Water heating equipment, pumps and tanks				-
Natural gas piping				-
Laboratory gas piping and equipment	7,425	SF	64.00	475,200
Rainwater drainage				-
Sub-contractor commissioning	16,694	SF	1.00	16,694
Testing and sterilizing	16,694	SF	0.40	6,678
				$ 606,724

Level 1 - Tenant Improvements

Component Description	Quantity		Unit Cost	$
11. Heating, Ventilating and Air Conditioning				
Heat generation and cooling equipment and pumps				-
Piping and insulation	16,694	SF	16.50	275,451
Air handling equipment	16,694	SF	3.50	58,429
Ventilation equipment	16,694	SF	2.50	41,735
Air distribution	16,694	SF	14.50	242,063
Diffusers, registers and grilles	16,694	SF	2.50	41,735
Controls				
Building	9,269	SF	7.50	69,518
Laboratory	7,425	SF	22.00	163,350
Sub-contractor commissioning	16,694	SF	1.25	20,868
Testing and balancing	16,694	SF	1.00	16,694
			$	929,842
12. Electrical				
Main power and distribution				-
Emergency and UPS power				-
Equipment connections and switches	16,694	SF	0.22	3,673
Power, panel boards, feeders and outlets	16,694	SF	17.00	283,798
Lighting				
Fixtures, conduit and cable	16,694	SF	18.50	308,839
Switches, conduit and wire	16,694	SF	2.00	33,388
Occupancy sensors	16,694	SF	1.15	19,198
Daylight sensors and lighting controls	16,694	SF	2.25	37,562

Level 1 - Tenant Improvements

Component Description	Quantity		Unit Cost	$
12. Electrical				
Audio visual conduit	16,694	SF	1.00	16,694
Communications conduit	16,694	SF	4.50	75,123
Fire alarm system	16,694	SF	5.45	90,982
Security system	16,694	SF	1.35	22,537
Sub-contractor commissioning	16,694	SF	0.80	13,355
			$	905,149
13. Fire Protection				
Automatic fire sprinkler system	16,694	SF	4.00	66,776
			$	66,776
14. Site Preparation and Selective Demolition				
Site protective construction, dust and noise control	16,694	SF	2.00	33,388
Selective interior demolition	16,694	SF	10.00	166,940
Hazardous material abatement	16,694	SF	7.00	116,858
			$	317,186

Level 2 EW - Tenant Improvements

Component Description	Quantity		Unit Cost	$
1. Foundations				
				$ -
2. Vertical Structure				
				$ -
3. Floor and Roof Structure				
				$ -
4. Exterior Cladding				
				$ -
5. Roofing and Waterproofing				
				$ -
6. Interior Partitions and Doors				
Interior walls	14,743	SF	19.75	291,171
Interior windows, sidelights and transoms	1,253	SF	68.00	85,214

Level 2 EW - Tenant Improvements

Component Description	Quantity		Unit Cost	$
6. Interior Partitions and Doors				
Interior doors, frames and hardware	32	EA	2,765.00	88,480
Elevator smoke curtains - none				-
Access panels walls and ceilings	6	EA	565.00	3,390
Card reader door hardware	11	EA	685.00	7,307
			$	475,561
7. Interior Finishes - Floors, Walls, Ceilings				
Laboratory and lab support program	8,482	SF	22.00	186,604
Offices	3,861	SF	19.50	75,290
Circulation and building support areas	5,208	SF	14.00	72,912
			$	334,806
8. Function Equipment, Casework and Specialties				
Protective wall guards and protection	17,551	SF	1.35	23,694
Toilet partitions and accessories				-
Casework	9,069	SF	8.50	77,087
Laboratory casework and equipment	8,482	SF	125.00	1,060,250
Fume hoods				
Fume hoods 6'	13	EA	15,750.00	204,750
Fume hoods 8'	1	EA	18,650.00	18,650

Level 2 EW - Tenant Improvements

Component Description	Quantity		Unit Cost	$
8. Function Equipment, Casework and Specialties				
Code signage	17,551	SF	0.45	7,898
Fire extinguishers	4	EA	445.00	1,780
Fixed building equipment	17,551	SF	3.75	65,816
				$ 1,459,925
9. Stairs and Elevators				
				$ -
10. Plumbing				
Sanitary fixtures and connection piping				
Laboratory fixtures and equipment hook-ups	8,482	SF	2.20	18,660
Sanitary waste, vent and service piping	17,551	SF	5.50	96,531
Water heating equipment, pumps and tanks				-
Natural gas piping				-
Laboratory gas piping and equipment	8,482	SF	64.00	542,848
Rainwater drainage				-
Sub-contractor commissioning	17,551	SF	1.00	17,551
Testing and sterilizing	17,551	SF	0.40	7,020
				$ 682,610

Level 2 EW - Tenant Improvements

Component Description	Quantity		Unit Cost	$
11. Heating, Ventilating and Air Conditioning				
Heat generation and cooling equipment and pumps				-
Piping and insulation	17,551	SF	16.50	289,592
Air handling equipment	17,551	SF	3.50	61,429
Ventilation equipment	17,551	SF	2.50	43,878
Air distribution	17,551	SF	14.50	254,490
Diffusers, registers and grilles	17,551	SF	2.50	43,878
Controls				
Building	9,069	SF	7.50	68,018
Laboratory	8,482	SF	22.00	186,604
Sub-contractor commissioning	17,551	SF	1.25	21,939
Testing and balancing	17,551	SF	1.00	17,551
			$	987,376
12. Electrical				
Main power and distribution				-
Emergency and UPS power				-
Equipment connections and switches	17,551	SF	0.22	3,861
Power, panel boards, feeders and outlets	17,551	SF	17.00	298,367
Lighting				
Fixtures, conduit and cable	17,551	SF	18.50	324,694
Switches, conduit and wire	17,551	SF	2.00	35,102
Occupancy sensors	17,551	SF	1.15	20,184
Daylight sensors and lighting controls	17,551	SF	2.25	39,490

Level 2 EW - Tenant Improvements

Component Description	Quantity		Unit Cost	$
12. Electrical				
Audio visual conduit	17,551	SF	1.00	17,551
Communications conduit and cable	17,551	SF	4.50	78,980
Fire alarm system	17,551	SF	5.45	95,653
Security system	17,551	SF	1.35	23,694
Sub-contractor commissioning	17,551	SF	0.80	14,041
				$ 951,615
13. Fire Protection				
Automatic fire sprinkler system	17,551	SF	4.00	70,204
				$ 70,204
14. Site Preparation and Selective Demolition				
Site protective construction, dust and noise control	17,551	SF	2.00	35,102
Selective interior demolition	17,551	SF	10.00	175,510
Hazardous material abatement	17,551	SF	7.00	122,857
				$ 333,469

Level 2 S - Tenant Improvements

Component Description	Quantity		Unit Cost	$
1. Foundations				
				$ -
2. Vertical Structure				
				$ -
3. Floor and Roof Structure				
				$ -
4. Exterior Cladding				
				$ -
5. Roofing and Waterproofing				
				$ -
6. Interior Partitions and Doors				
Interior walls	5,032	SF	19.75	99,385
Interior windows, sidelights and transoms	403	SF	68.00	27,375

Level 2 S - Tenant Improvements

Component Description	Quantity		Unit Cost	$
6. Interior Partitions and Doors				
Interior doors, frames and hardware	8	EA	2,765.00	22,120
Elevator smoke curtains - none				-
Access panels walls and ceilings	3	EA	565.00	1,695
Card reader door hardware	4	EA	685.00	2,740
			$	153,315
7. Interior Finishes - Floors, Walls, Ceilings				
Computational lab	2,761	SF	19.50	53,840
Circulation and building support areas	1,732	SF	14.00	24,248
			$	78,088
8. Function Equipment, Casework and Specialties				
Protective wall guards and protection	4,493	SF	1.35	6,066
Toilet partitions and accessories				-
Casework	4,493	SF	8.50	38,191
Laboratory casework and equipment				-
Fume hoods				-

Level 2 S - Tenant Improvements

Component Description	Quantity		Unit Cost		$
8. Function Equipment, Casework and Specialties					
Code signage	4,493	SF	0.45		2,022
Fire extinguishers	4	EA	445.00		1,780
Fixed building equipment	4,493	SF	3.75		16,849
				$	64,907
9. Stairs and Elevators					
				$	-
10. Plumbing					
Sanitary fixtures and connection piping					
Laboratory fixtures and equipment hook-ups					-
Sanitary waste, vent and service piping	4,493	SF	5.50		24,712
Water heating equipment, pumps and tanks					-
Natural gas piping					-
Laboratory gas piping and equipment					-
Rainwater drainage					-
Sub-contractor commissioning	4,493	SF	1.00		4,493
Testing and sterilizing	4,493	SF	0.40		1,797
				$	31,002

Level 2 S - Tenant Improvements

Component Description	Quantity		Unit Cost	$
11. Heating, Ventilating and Air Conditioning				
Heat generation and cooling equipment and pumps				-
Piping and insulation	4,493	SF	16.50	74,135
Air handling equipment	4,493	SF	3.50	15,726
Ventilation equipment	4,493	SF	2.50	11,233
Air distribution	4,493	SF	14.50	65,149
Diffusers, registers and grilles	4,493	SF	2.50	11,233
Controls				
Building	4,493	SF	7.50	33,698
Laboratory				-
Sub-contractor commissioning	4,493	SF	1.25	5,616
Testing and balancing	4,493	SF	1.00	4,493
			$	221,280
12. Electrical				
Main power and distribution				-
Emergency and UPS power				-
Equipment connections and switches	4,493	SF	0.22	988
Power, panel boards, feeders and outlets	4,493	SF	17.00	76,381
Lighting				
Fixtures, conduit and cable	4,493	SF	18.50	83,121
Switches, conduit and wire	4,493	SF	2.00	8,986
Occupancy sensors	4,493	SF	1.15	5,167
Daylight sensors and lighting controls	4,493	SF	2.25	10,109

Level 2 S - Tenant Improvements

Component Description	Quantity		Unit Cost		$
12. Electrical					
Audio visual conduit	4,493	SF	1.00		4,493
Communications conduit and cable	4,493	SF	4.50		20,219
Fire alarm system	4,493	SF	5.45		24,487
Security system	4,493	SF	1.35		6,066
Sub-contractor commissioning	4,493	SF	0.80		3,594
				$	243,610
13. Fire Protection					
Automatic fire sprinkler system	4,493	SF	4.00		17,972
				$	17,972
14. Site Preparation and Selective Demolition					
Site protective construction, dust and noise control	4,493	SF	2.00		8,986
Selective interior demolition	4,493	SF	10.00		44,930
Hazardous material abatement	4,493	SF	7.00		31,451
				$	85,367

Level 3 EW - Tenant Improvements

Component Description	Quantity		Unit Cost	$
1. Foundations				
				$ -
2. Vertical Structure				
				$ -
3. Floor and Roof Structure				
				$ -
4. Exterior Cladding				
				$ -
5. Roofing and Waterproofing				
				$ -
6. Interior Partitions and Doors				
Interior walls	15,981	SF	19.75	315,625
Interior windows, sidelights and transoms	1,358	SF	68.00	92,370

Level 3 EW - Tenant Improvements

Component Description	Quantity		Unit Cost	$
6. Interior Partitions and Doors				
Interior doors, frames and hardware	35	EA	2,765.00	96,775
Elevator smoke curtains - none				-
Access panels walls and ceilings	6	EA	565.00	3,390
Card reader door hardware	12	EA	685.00	7,992
			$	516,152
7. Interior Finishes - Floors, Walls, Ceilings				
Laboratory and lab support program	9,300	SF	22.00	204,600
Offices	5,124	SF	19.50	99,918
Circulation and building support areas	4,601	SF	14.00	64,414
			$	368,932
8. Function Equipment, Casework and Specialties				
Protective wall guards and protection	19,025	SF	1.35	25,684
Toilet partitions and accessories				-
Casework	9,725	SF	8.50	82,663
Laboratory casework and equipment	9,300	SF	125.00	1,162,500
Fume hoods				
Fume hoods 6'	17	EA	15,750.00	267,750
Fume hoods 8'	1	EA	18,650.00	18,650

Level 3 EW - Tenant Improvements

Component Description	Quantity		Unit Cost	$
8. Function Equipment, Casework and Specialties				
Code signage	19,025	SF	0.45	8,561
Fire extinguishers	4	EA	445.00	1,780
Fixed building equipment	19,025	SF	3.75	71,344
				$ 1,638,931
9. Stairs and Elevators				
				$ -
10. Plumbing				
Sanitary fixtures and connection piping				
Laboratory fixtures and equipment hook-ups	9,300	SF	2.20	20,460
Sanitary waste, vent and service piping	19,025	SF	5.50	104,638
Water heating equipment, pumps and tanks				-
Natural gas piping				-
Laboratory gas piping and equipment	9,300	SF	64.00	595,200
Rainwater drainage				-
Sub-contractor commissioning	19,025	SF	1.00	19,025
Testing and sterilizing	19,025	SF	0.40	7,610
				$ 746,933

Level 3 EW - Tenant Improvements

Component Description	Quantity		Unit Cost	$
11. Heating, Ventilating and Air Conditioning				
Heat generation and cooling equipment and pumps				-
Piping and insulation	19,025	SF	16.50	313,913
Air handling equipment	19,025	SF	3.50	66,588
Ventilation equipment	19,025	SF	2.50	47,563
Air distribution	19,025	SF	14.50	275,863
Diffusers, registers and grilles	19,025	SF	2.50	47,563
Controls				
Building	9,725	SF	7.50	72,938
Laboratory	9,300	SF	22.00	204,600
Sub-contractor commissioning	19,025	SF	1.25	23,781
Testing and balancing	19,025	SF	1.00	19,025
				$ 1,071,831
12. Electrical				
Main power and distribution				-
Emergency and UPS power				-
Equipment connections and switches	19,025	SF	0.22	4,186
Power, panel boards, feeders and outlets	19,025	SF	17.00	323,425
Lighting				
Fixtures, conduit and cable	19,025	SF	18.50	351,963
Switches, conduit and wire	19,025	SF	2.00	38,050
Occupancy sensors	19,025	SF	1.15	21,879
Daylight sensors and lighting controls	19,025	SF	2.25	42,806

Level 3 EW - Tenant Improvements

Component Description	Quantity		Unit Cost		$
12. Electrical					
Audio visual conduit	19,025	SF	1.00		19,025
Communications conduit and cable	19,025	SF	4.50		85,613
Fire alarm system	19,025	SF	5.45		103,686
Security system	19,025	SF	1.35		25,684
Sub-contractor commissioning	19,025	SF	0.80		15,220
				$	1,031,536
13. Fire Protection					
Automatic fire sprinkler system	19,025	SF	4.00		76,100
				$	76,100
14. Site Preparation and Selective Demolition					
Site protective construction, dust and noise control	19,025	SF	2.00		38,050
Selective interior demolition	19,025	SF	10.00		190,250
Hazardous material abatement	19,025	SF	7.00		133,175
				$	361,475

Level 3 S - Tenant Improvements

Component Description	Quantity		Unit Cost	$
1. Foundations				
				$ -
2. Vertical Structure				
				$ -
3. Floor and Roof Structure				
				$ -
4. Exterior Cladding				
				$ -
5. Roofing and Waterproofing				
				$ -
6. Interior Partitions and Doors				
Interior walls	7,585	SF	19.75	149,794
Interior windows, sidelights and transoms	645	SF	68.00	43,838

Level 3 S - Tenant Improvements

Component Description	Quantity		Unit Cost	$
6. Interior Partitions and Doors				
Interior doors, frames and hardware	15	EA	2,765.00	41,475
Elevator smoke curtains - none				-
Access panels walls and ceilings	6	EA	565.00	3,390
Card reader door hardware	5	EA	685.00	3,425
			$	241,922
7. Interior Finishes - Floors, Walls, Ceilings				
Laboratory and lab support program	3,768	SF	22.00	82,896
Offices	3,608	SF	19.50	70,356
Circulation and building support areas	1,292	SF	14.00	18,088
			$	171,340
8. Function Equipment, Casework and Specialties				
Protective wall guards and protection	8,668	SF	1.35	11,702
Toilet partitions and accessories				-
Casework	4,900	SF	8.50	41,650
Laboratory casework and equipment	3,768	SF	125.00	471,000
Fume hoods				
Fume hoods 6'	6	EA	15,750.00	94,500

Level 3 S - Tenant Improvements

Component Description	Quantity		Unit Cost		$
8. Function Equipment, Casework and Specialties					
Code signage	8,668	SF	0.45		3,901
Fire extinguishers	4	EA	445.00		1,780
Fixed building equipment	8,668	SF	3.75		32,505
				$	657,037
9. Stairs and Elevators					
				$	-
10. Plumbing					
Sanitary fixtures and connection piping					
Laboratory fixtures and equipment hook-ups	3,768	SF	2.20		8,290
Sanitary waste, vent and service piping	8,668	SF	5.50		47,674
Water heating equipment, pumps and tanks					-
Natural gas piping					-
Laboratory gas piping and equipment	3,768	SF	64.00		241,152
Rainwater drainage					-
Sub-contractor commissioning	8,668	SF	1.00		8,668
Testing and sterilizing	8,668	SF	0.40		3,467
				$	309,251

Level 3 S - Tenant Improvements

Component Description	Quantity		Unit Cost	$
11. Heating, Ventilating and Air Conditioning				
Heat generation and cooling equipment and pumps				-
Piping and insulation	8,668	SF	16.50	143,022
Air handling equipment	8,668	SF	3.50	30,338
Ventilation equipment	8,668	SF	2.50	21,670
Air distribution	8,668	SF	14.50	125,686
Diffusers, registers and grilles	8,668	SF	2.50	21,670
Controls				
Building	4,900	SF	7.50	36,750
Laboratory	3,768	SF	22.00	82,896
Sub-contractor commissioning	8,668	SF	1.25	10,835
Testing and balancing	8,668	SF	1.00	8,668
			$	481,535
12. Electrical				
Main power and distribution				-
Emergency and UPS power				-
Equipment connections and switches	8,668	SF	0.22	1,907
Power, panel boards, feeders and outlets	8,668	SF	17.00	147,356
Lighting				
Fixtures, conduit and cable	8,668	SF	18.50	160,358
Switches, conduit and wire	8,668	SF	2.00	17,336
Occupancy sensors	8,668	SF	1.15	9,968
Daylight sensors and lighting controls	8,668	SF	2.25	19,503

Level 3 S - Tenant Improvements

Component Description	Quantity		Unit Cost		$
12. Electrical					
Audio visual conduit	8,668	SF	1.00		8,668
Communications conduit and cable	8,668	SF	4.50		39,006
Fire alarm system	8,668	SF	5.45		47,241
Security system	8,668	SF	1.35		11,702
Sub-contractor commissioning	8,668	SF	0.80		6,934
				$	469,979
13. Fire Protection					
Automatic fire sprinkler system	8,668	SF	4.00		34,672
				$	34,672
14. Site Preparation and Selective Demolition					
Site protective construction, dust and noise control	8,668	SF	2.00		17,336
Selective interior demolition	8,668	SF	10.00		86,680
Hazardous material abatement	8,668	SF	7.00		60,676
				$	164,692

Level 4 - Tenant Improvements

Component Description	Quantity		Unit Cost	$
1. Foundations				
			$	-
2. Vertical Structure				
			$	-
3. Floor and Roof Structure				
			$	-
4. Exterior Cladding				
			$	-
5. Roofing and Waterproofing				
			$	-
6. Interior Partitions and Doors				
Interior walls	15,837	SF	19.75	312,771
Interior windows, sidelights and transoms	1,346	SF	68.00	91,535

Level 4 - Tenant Improvements

Component Description	Quantity		Unit Cost	$
6. Interior Partitions and Doors				
Interior doors, frames and hardware	33	EA	2,765.00	91,245
Elevator smoke curtains - none				-
Access panels walls and ceilings	6	EA	565.00	3,390
Card reader door hardware	11	EA	685.00	7,535
			$	506,476
7. Interior Finishes - Floors, Walls, Ceilings				
Laboratory and lab support program	9,505	SF	22.00	209,110
Offices	5,292	SF	19.50	103,194
Circulation and building support areas	4,056	SF	14.00	56,784
			$	369,088
8. Function Equipment, Casework and Specialties				
Protective wall guards and protection	18,853	SF	1.35	25,452
Toilet partitions and accessories				-
Casework	9,348	SF	8.50	79,458
Laboratory casework and equipment	9,505	SF	125.00	1,188,125
Fume hoods				
Fume hoods 6'	17	EA	15,750.00	267,750
Fume hoods 8'	1	EA	18,650.00	18,650

Level 4 - Tenant Improvements

Component Description	Quantity		Unit Cost	$
8. Function Equipment, Casework and Specialties				
Code signage	18,853	SF	0.45	8,484
Fire extinguishers	4	EA	445.00	1,780
Fixed building equipment	18,853	SF	3.75	70,699
				$ 1,660,397
9. Stairs and Elevators				
				$ -
10. Plumbing				
Sanitary fixtures and connection piping				
Laboratory fixtures and equipment hook-ups	9,505	SF	2.20	20,911
Sanitary waste, vent and service piping	18,853	SF	5.50	103,692
Water heating equipment, pumps and tanks				-
Natural gas piping				-
Laboratory gas piping and equipment	9,505	SF	64.00	608,320
Rainwater drainage				-
Sub-contractor commissioning	18,853	SF	1.00	18,853
Testing and sterilizing	18,853	SF	0.40	7,541
				$ 759,317

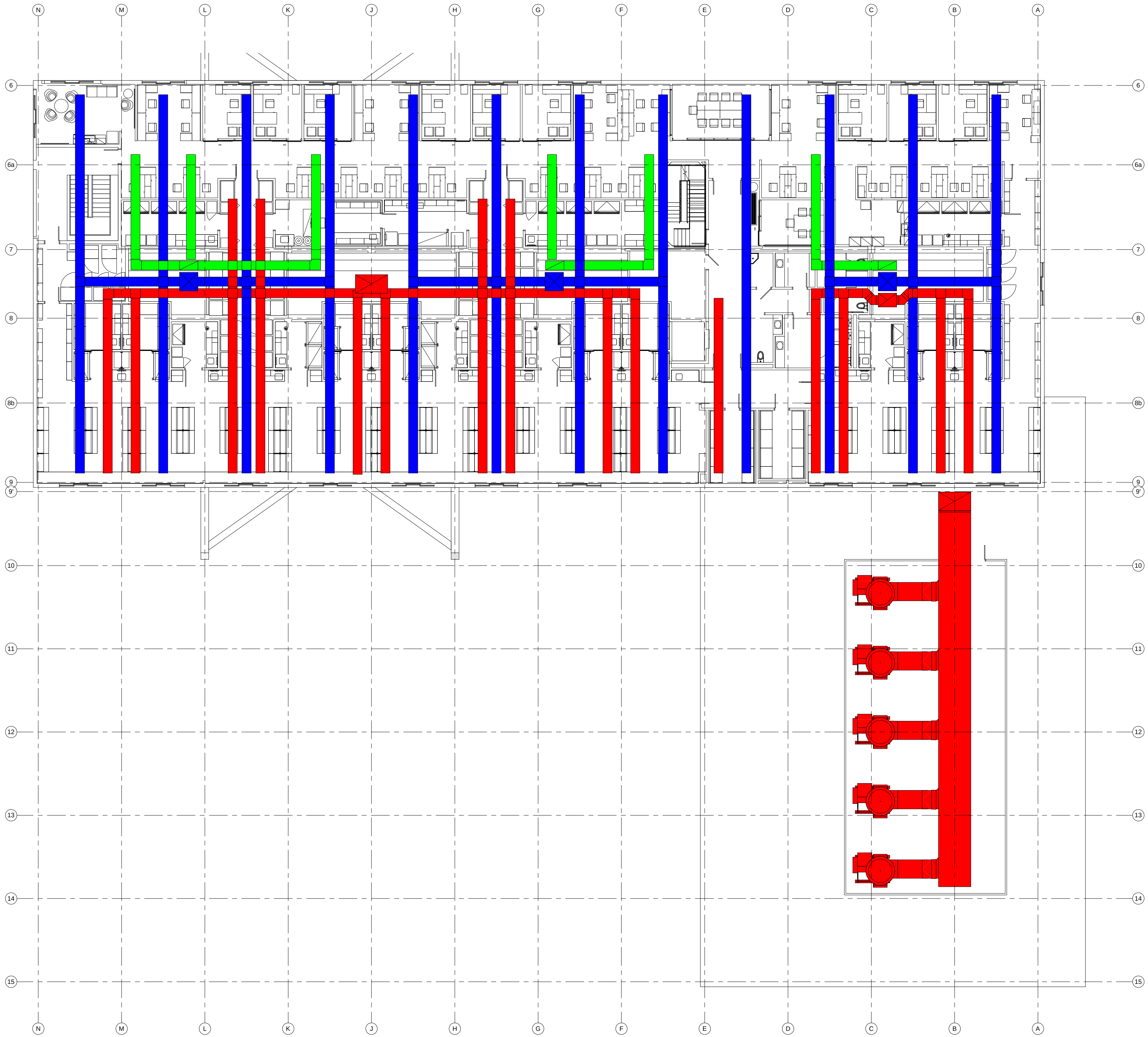
Level 4 - Tenant Improvements

Component Description	Quantity		Unit Cost	$
11. Heating, Ventilating and Air Conditioning				
Heat generation and cooling equipment and pumps				-
Piping and insulation	18,853	SF	16.50	311,075
Air handling equipment	18,853	SF	3.50	65,986
Ventilation equipment	18,853	SF	2.50	47,133
Air distribution	18,853	SF	14.50	273,369
Diffusers, registers and grilles	18,853	SF	2.50	47,133
Controls				
Building	9,348	SF	7.50	70,110
Laboratory	9,505	SF	22.00	209,110
Sub-contractor commissioning	18,853	SF	1.25	23,566
Testing and balancing	18,853	SF	1.00	18,853
				$ 1,066,333
12. Electrical				
Main power and distribution				-
Emergency and UPS power				-
Equipment connections and switches	18,853	SF	0.22	4,148
Power, panel boards, feeders and outlets	18,853	SF	17.00	320,501
Lighting				
Fixtures, conduit and cable	18,853	SF	18.50	348,781
Switches, conduit and wire	18,853	SF	2.00	37,706
Occupancy sensors	18,853	SF	1.15	21,681
Daylight sensors and lighting controls	18,853	SF	2.25	42,419

Level 4 - Tenant Improvements

Component Description	Quantity		Unit Cost	$
12. Electrical				
Audio visual conduit	18,853	SF	1.00	18,853
Communications conduit and cable	18,853	SF	4.50	84,839
Fire alarm system	18,853	SF	5.45	102,749
Security system	18,853	SF	1.35	25,452
Sub-contractor commissioning	18,853	SF	0.80	15,082
				$ 1,022,210
13. Fire Protection				
Automatic fire sprinkler system	18,853	SF	4.00	75,412
				$ 75,412
14. Site Preparation and Selective Demolition				
Site protective construction, dust and noise control	18,853	SF	2.00	37,706
Selective interior demolition	18,853	SF	10.00	188,530
Hazardous material abatement	18,853	SF	7.00	131,971
				$ 358,207

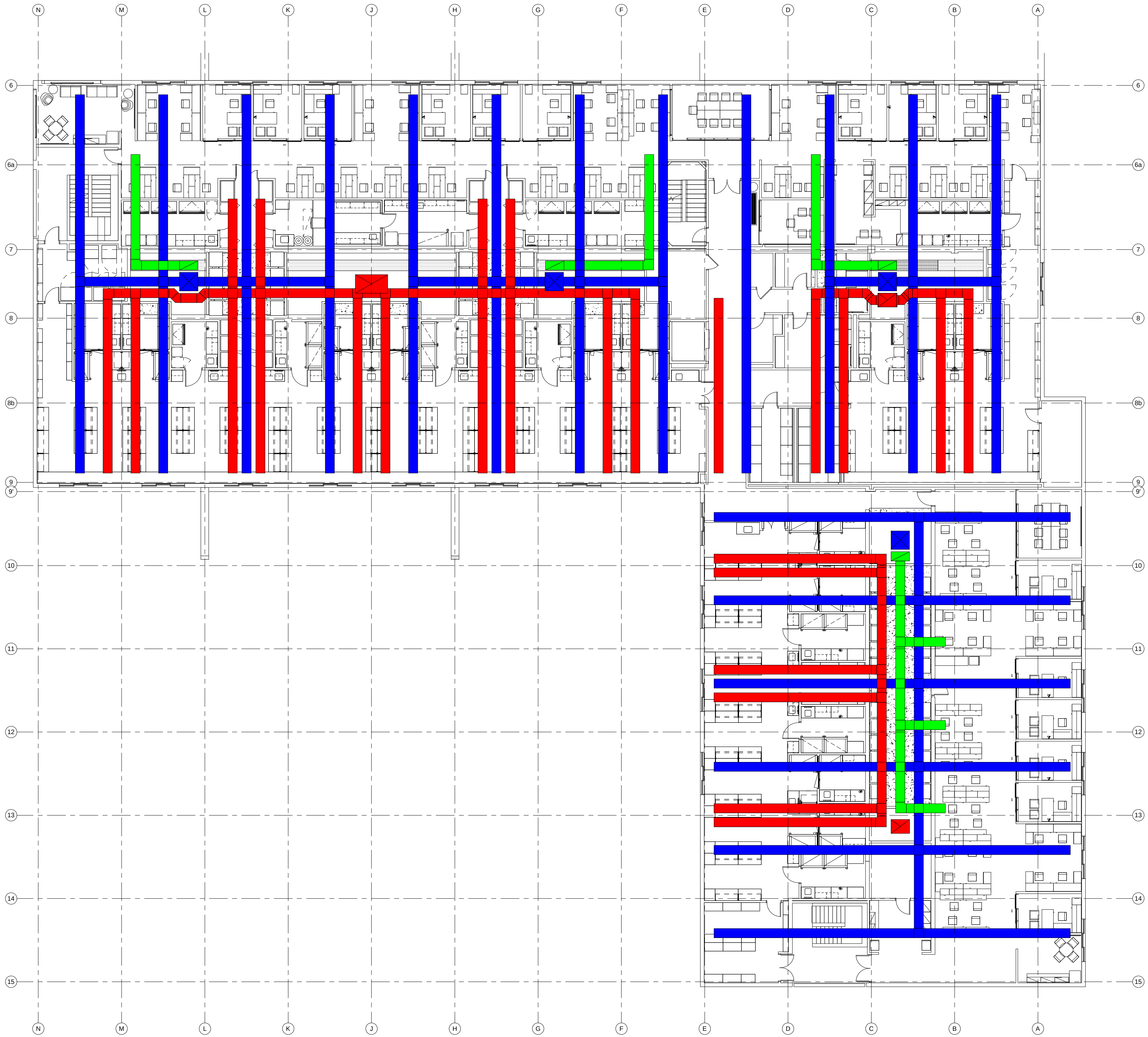
Appendix 1 – Engineering Drawings



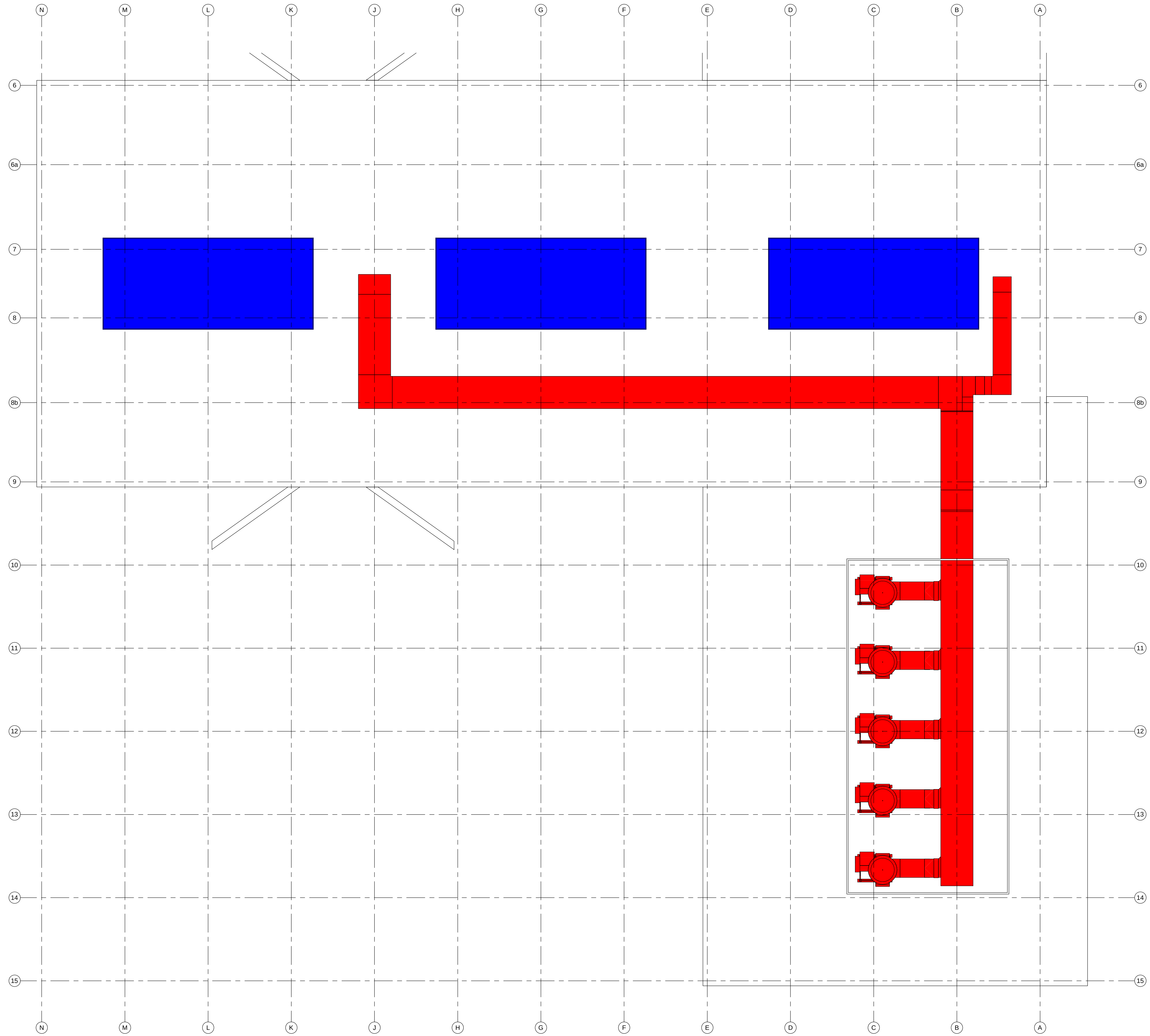
BATCHELOR HALL - PROPOSED 4TH FLOOR MODULAR HVAC DISTRIBUTION

BATCHELOR HALL - PROPOSED 1ST FLOOR MODULAR HVAC DISTRIBUTION

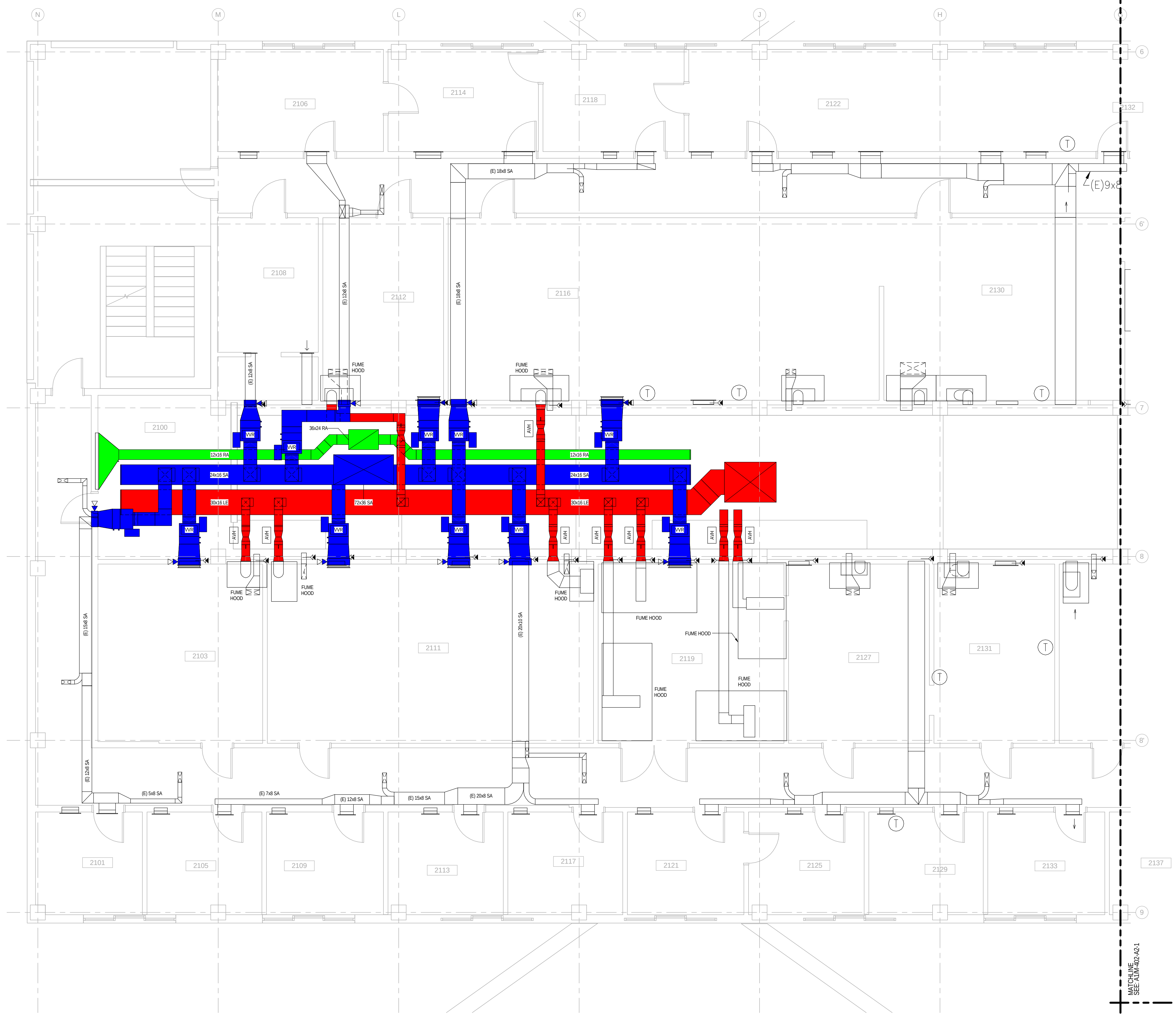
BATCHELOR HALL - PROPOSED 2ND FLOOR MODULAR HVAC DISTRIBUTION



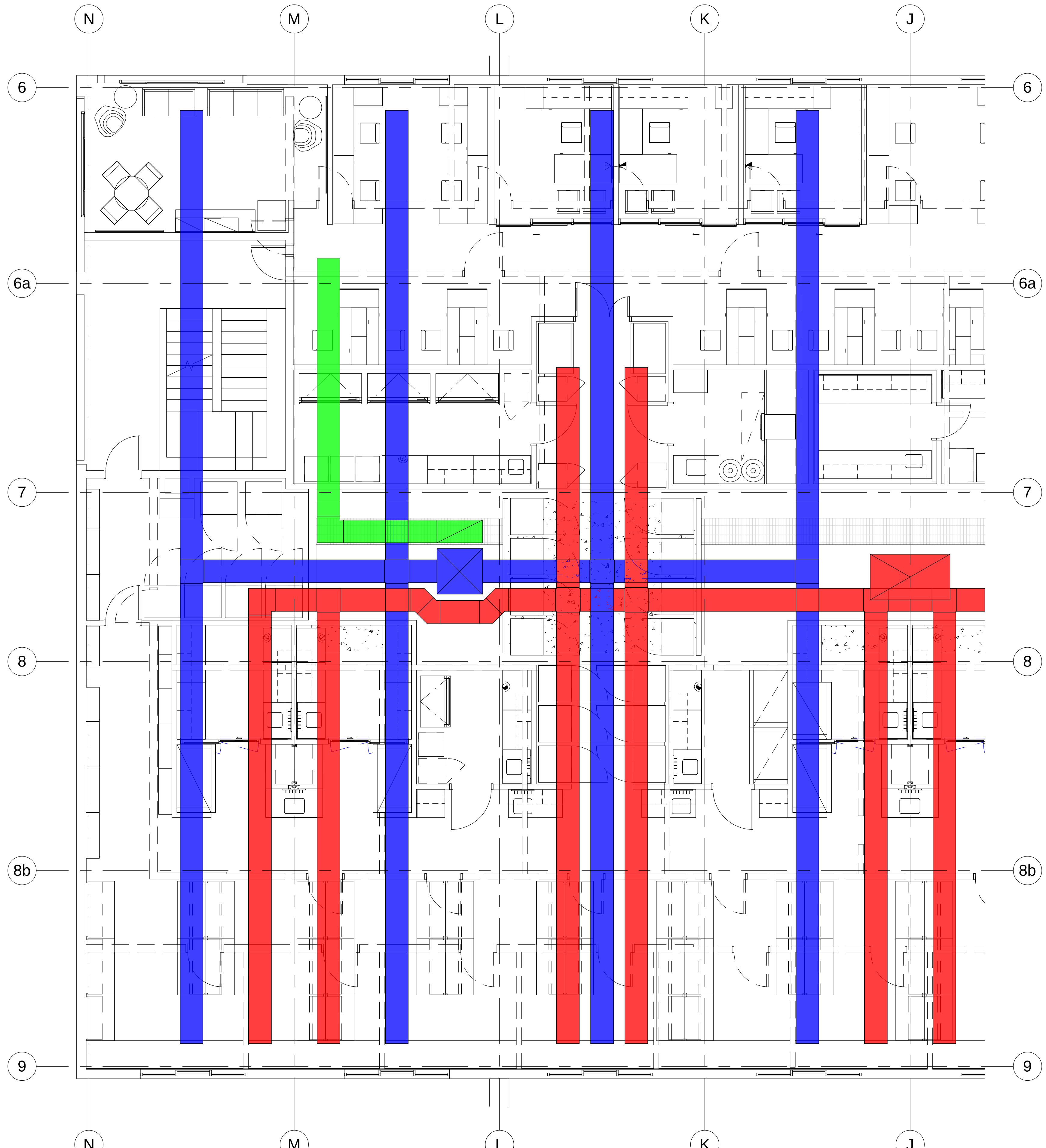
BATCHELOR HALL - PROPOSED 3RD FLOOR MODULAR HVAC DISTRIBUTION



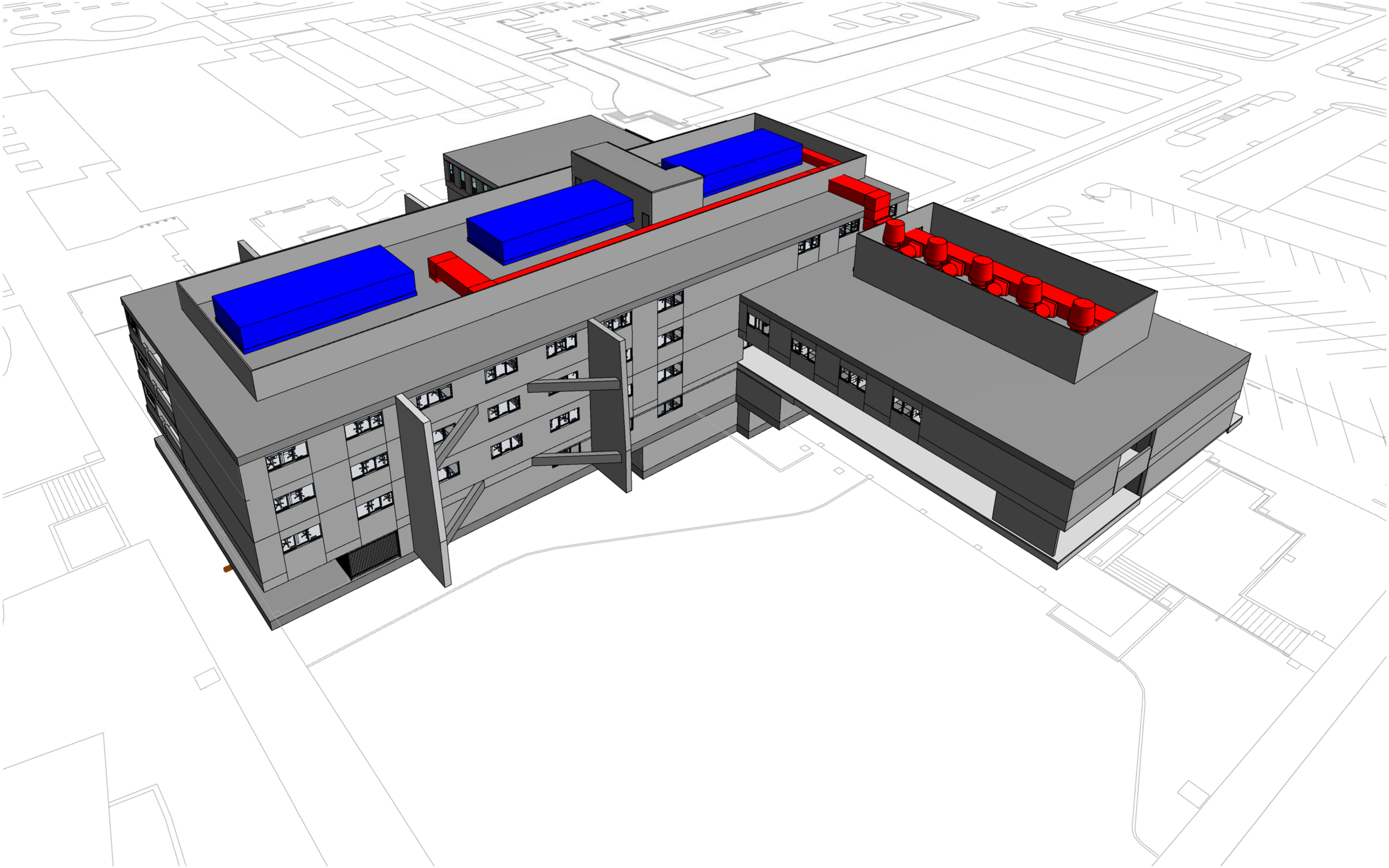
BATCHELOR HALL - PROPOSED ROOFTOP EQUIPMENT PLAN



BATCHELOR HALL - EXAMPLE OF PROPOSED INFRASTRUCTURE HVAC DISTRIBUTION



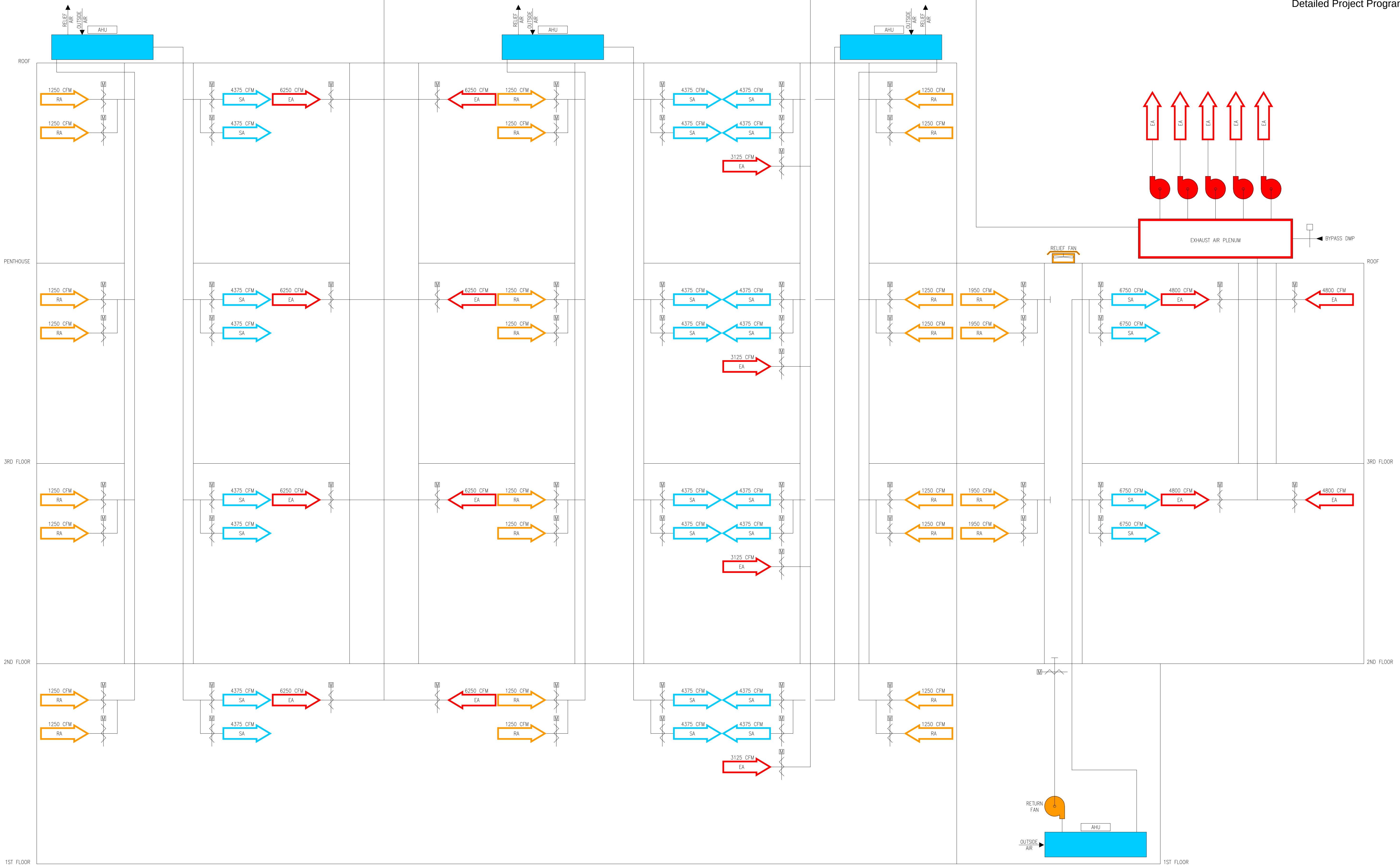
BATCHELOR HALL - EXAMPLE OF PROPOSED MODULAR TENANT IMPROVEMENT HVAC DISTRIBUTION



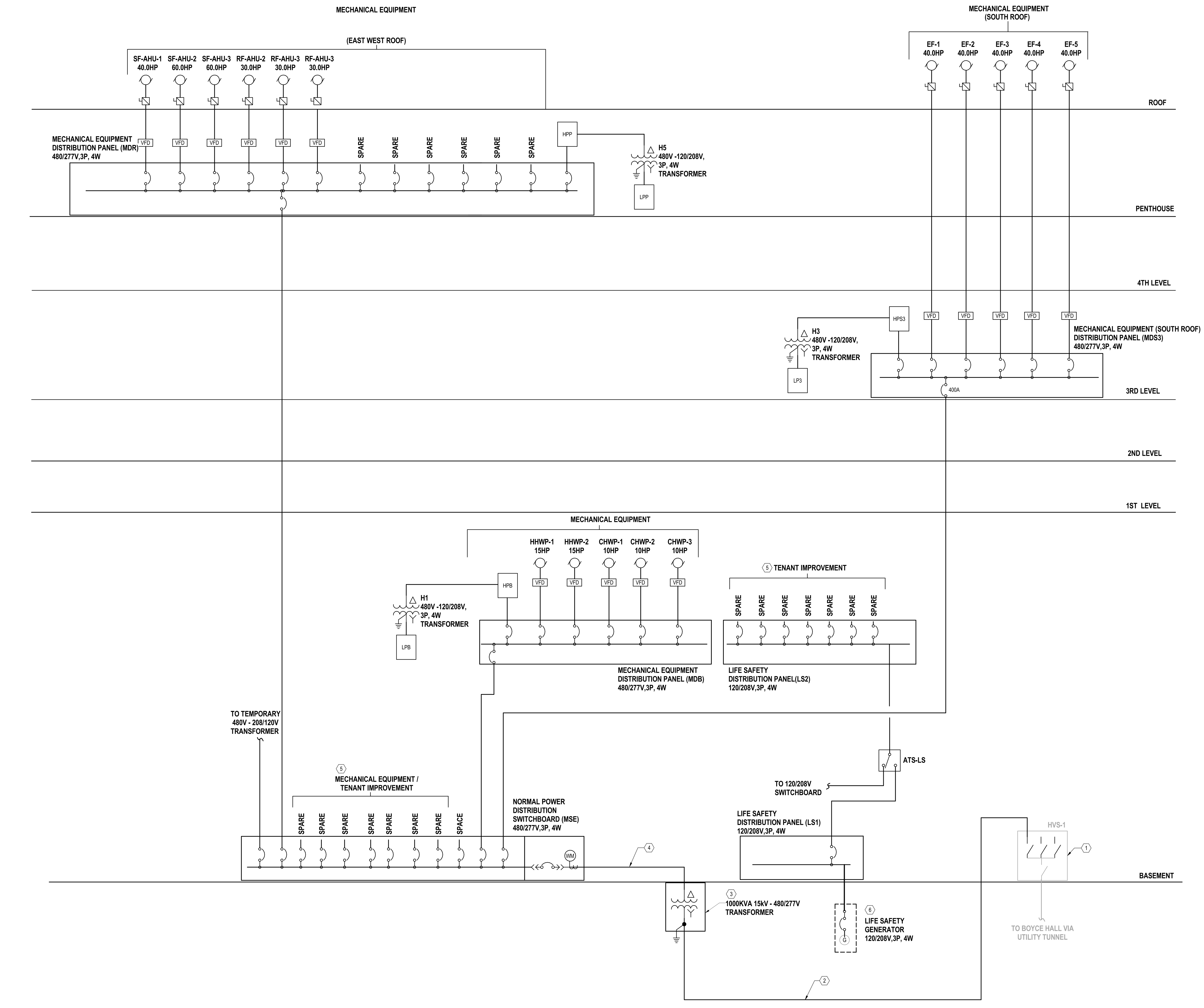
BATCHELOR HALL - AXONOMETRIC WITH PROPOSED ROOFTOP EQUIPMENT

BATCHELOR HALL - NORTH ELEVATION WITH PROPOSED ROOFTOP EQUIPMENT

BATCHELOR HALL - SOUTH ELEVATION WITH PROPOSED ROOFTOP EQUIPMENT



BATCHELOR HALL - PROPOSED TENANT IMPROVMENT AIRFLOW DIAGRAM



1 ELECTRICAL ONE - LINE DIAGRAM 480V
NOT TO SCALE

GENERAL NOTES

A. FOR ELECTRICAL SYMBOLS AND ABBREVIATIONS REFER TO DRAWING SHEETS E-001 AND E-002.

B. REFER TO SHEET E-701 FOR TRANSFORMER AND FEEDER SCHEDULES.

C. ELECTRICAL WORK SHALL BE DONE IN CONFORMANCE WITH CONSTRUCTION DOCUMENTS, ALL APPLICABLE CODES, ISSUED DRAWINGS AND SPECIFICATIONS.

SHEET KEYNOTES

1. EXISTING 3WAY 12KV LOAD INTERRUPTER SWITCH. FOR LOCATION REFER TO SHEET EP-100-1.
2. PROVIDE NEW 4" C W/3#250 KCMIL 12KV & 1 #1/0 GROUND FROM EXISTING 3 WAY SWITCH TO NEW TRANSFORMER VIA DUCTBACK. FOR ROUTING REFER TO SHEET ES-101.
3. PROVIDE NEW 1000KVA, 12KV-480V TRANSFORMER. FOR LOCATION REFER TO SHEET ES-101.
4. ROUTE SECONDARY FEEDER FROM TRANSFORMER TO NEW 480V SWITCHBOARDVIA DUCT BANK. REFER TO SHEET ES-101 FOR ROUTING.
5. SPARE BREAKERS TO FACILITATE POWER PANELS IN THE TENANT IMPROVEMENT PACKAGE. REFER TO SHEET E-601-2 FOR ADDITIONAL INFORMATION.
6. RELOCATED LIFE SAFETY GENERATOR. FOR LOCATION REFER TO SHEET ES-101.

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Architect's Stamp:
PRELIMINARY
NOT FOR CONSTRUCTION

Engineer's Stamp:

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Package #1 Infrastructure Upgrades

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Riverside, CA 92507

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DATE_______________________

Project Manager	Trip Grant
Project Architect	Mike Alamo
Structural Engineer	Vartan Chilingaryan
Mechanical Engineer	James Wermes
Electrical Engineer	Kelly Hartshorn
Interior Designer	Susan Suhar
Laboratory Planner	Ken Filar

MARK	DATE	DESCRIPTION

Project Number	268471
Original Issue	03/22/17 -

UCR Project Manager: Blythe Wilson

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Drawn By:	Author	**--% CD Approval:**	---
Checked By:	Checker	**--% CD Approval:**	---
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DSA Number:	--- ------		

Sheet Name
ELECTRICAL ONE - LINE DIAGRAM 480V

Sheet Number
E-601-1

Project Status
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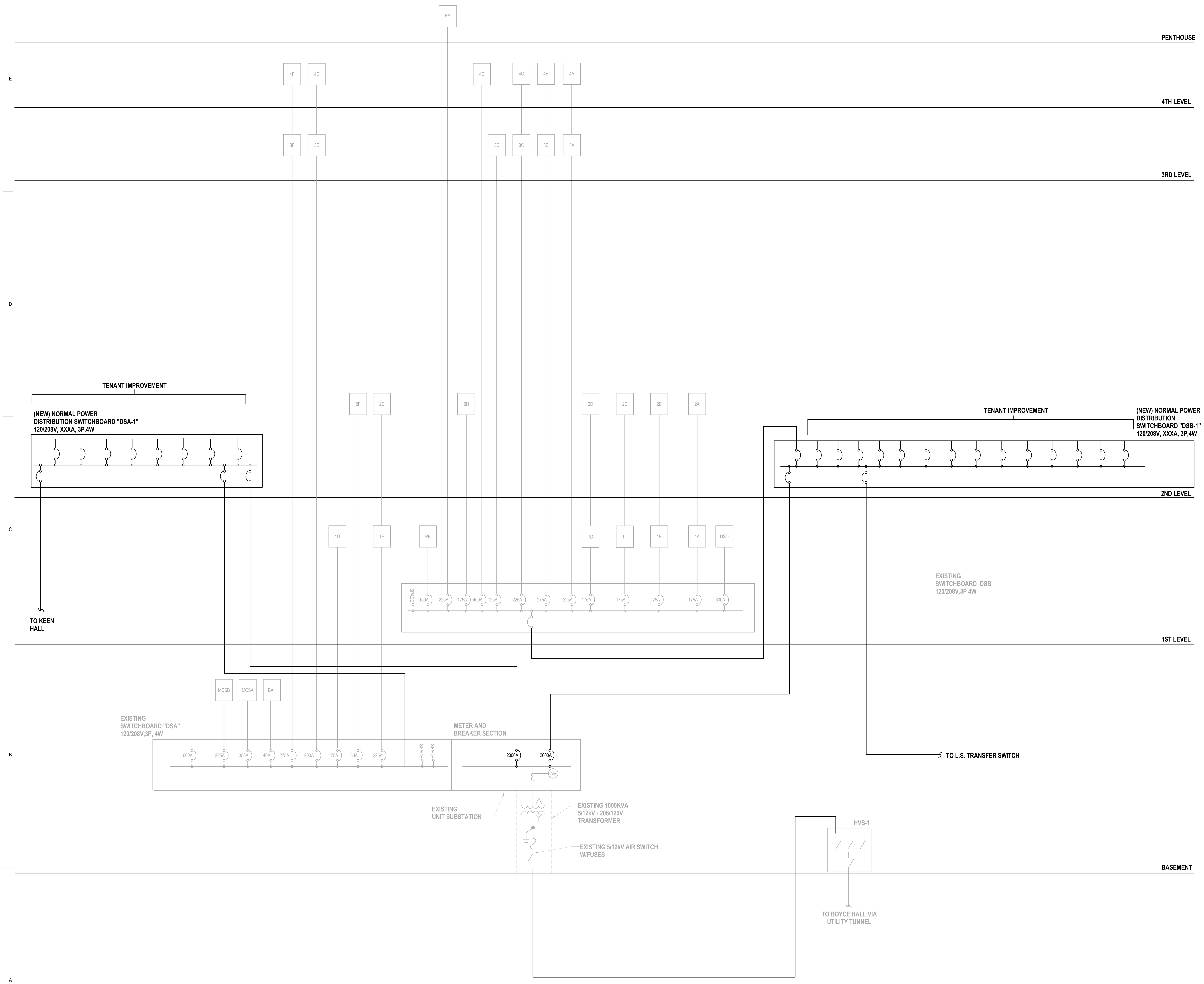

1 ELECTRICAL ONE - LINE DIAGRAM EAST/WEST CORE

NOT TO SCALE

GENERAL NOTES

A. FOR ELECTRICAL SYMBOLS AND ABBREVIATIONS REFER TO DRAWING SHEETS E-001 AND E-002.

B. REFER TO SHEET E-701 FOR TRANSFORMER AND FEEDER SCHEDULES.

C. ELECTRICAL WORK SHALL BE DONE IN CONFORMANCE WITH CONSTRUCTION DOCUMENTS, ALL APPLICABLE CODES, ISSUED DRAWINGS AND SPECIFICATIONS.

SHEET KEYNOTES

1. xx

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MARK	DATE	DESCRIPTION

Project Number 268471
Original Issue 03/22/17 -

UCR Project Manager: Blythe Wilson

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DSA Number:	--- ------		

Sheet Name

ELECTRICAL
ONE - LINE DIAGRAM
EAST/WEST CORE

Sheet Number

E-602-1

Project Status

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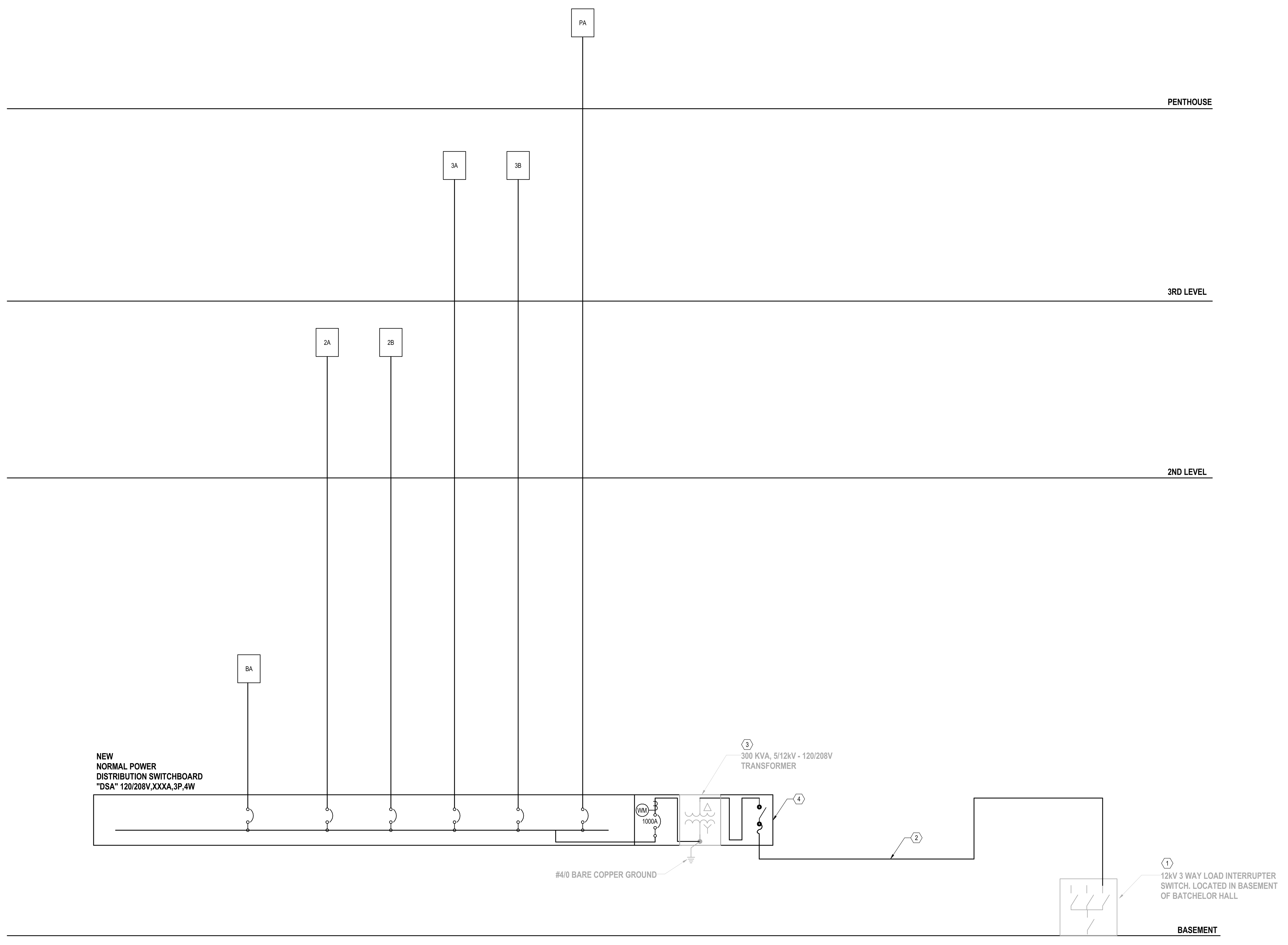

1 ELECTRICAL ONE - LINE DIAGRAM SOUTH WING
NOT TO SCALE

GENERAL NOTES

A. FOR ELECTRICAL SYMBOLS AND ABBREVIATIONS REFER TO DRAWING SHEETS E-001 AND E-002.

B. REFER TO SHEET E-701 FOR TRANSFORMER AND FEEDER SCHEDULES.

C. ELECTRICAL WORK SHALL BE DONE IN CONFORMANCE WITH CONSTRUCTION DOCUMENTS, ALL APPLICABLE CODES, ISSUED DRAWINGS AND SPECIFICATIONS.

SHEET KEYNOTES

1. EXISTING 3WAY 12KV LOAD INTERRUPTER SWITCH FROM PHASE 1.
2. NEW 4" CONDUIT WITH 3#250KCMIL 12KV AND 1#1/O GROUND.
3. EXISTING TRANSFORMER.
4. PROVIDE NEW 12KV LOAD INTERRUPTER SWITCH SECTION.

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DATE____________________

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Project Architect	Mike Alamo
Structural Engineer	Vartan Chilingaryan
Mechanical Engineer	James Wermes
Electrical Engineer	Kelly Hartshorn
Interior Designer	Susan Suhar
Laboratory Planner	Ken Filar

MARK	DATE	DESCRIPTION

Project Number	268471
Original Issue	03/21/17 -

UCR Project Manager: Blythe Wilson

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Project Number:	268471	**Construction Release:**	---
DSA Number:	--- ------		

Sheet Name

ELECTRICAL
ONE - LINE DAIGRAM
SOUTH WING

Sheet Number

E-604-1

Project Status

30% SUBMITTAL

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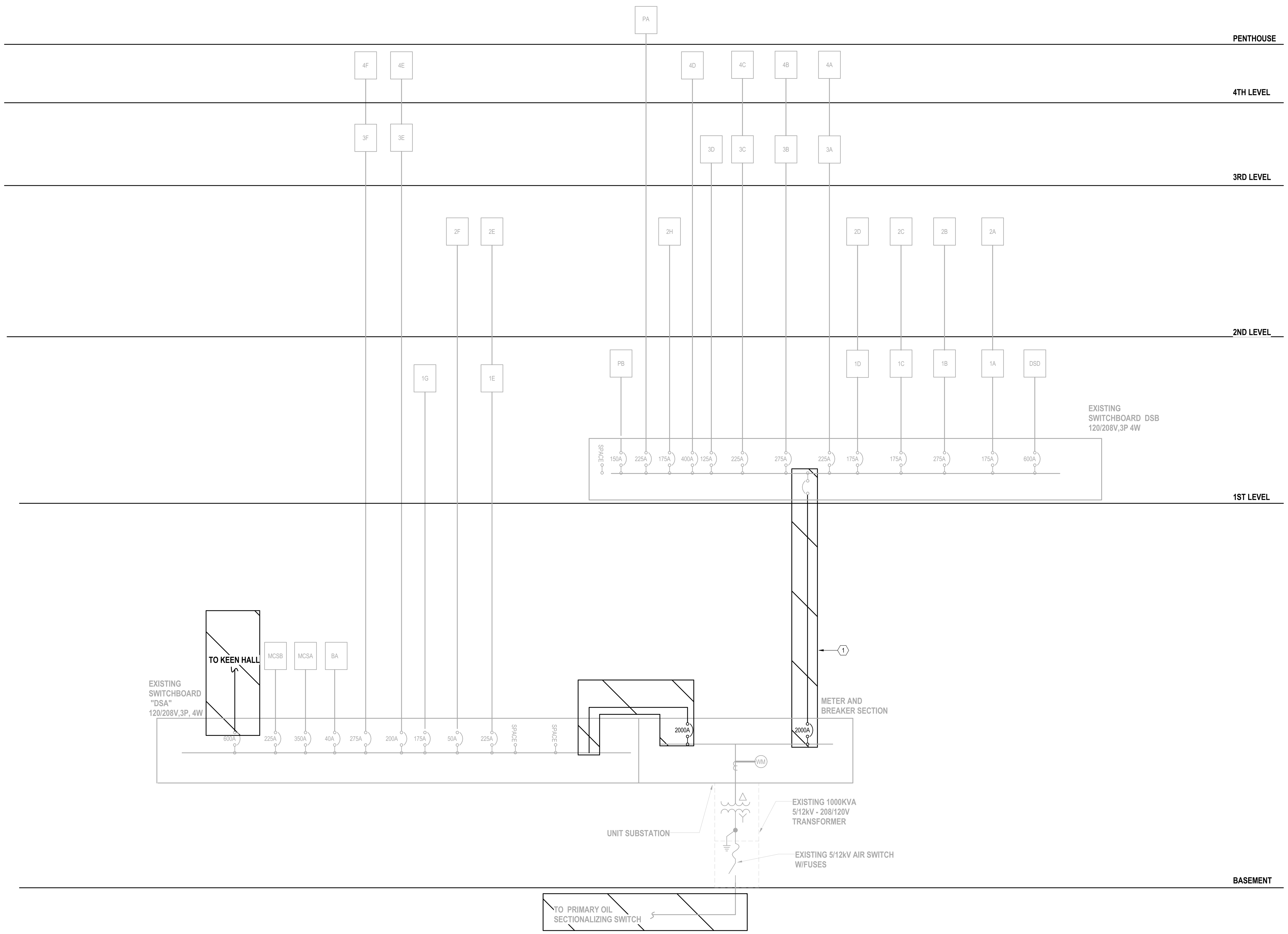

1 ELECTRICAL ONE - LINE DIAGRAM EAST/WEST CORE DEMOLITION
NOT TO SCALE

GENERAL NOTES

A. FOR ELECTRICAL SYMBOLS AND ABBREVIATIONS REFER TO DRAWING SHEETS E-001 AND E-002.

B. REFER TO SHEET E-701 FOR TRANSFORMER AND FEEDER SCHEDULES.

C. ELECTRICAL WORK SHALL BE DONE IN CONFORMANCE WITH CONSTRUCTION DOCUMENTS, ALL APPLICABLE CODES, ISSUED DRAWINGS AND SPECIFICATIONS.

SHEET KEYNOTES

1. REMOVE EXISTING FEEDER TO SWITCH BOARD AND REFEED AS PER SHEET E-602-1.

2. DEMOLITION OF DISTRIBUTION SWITCHBOARD AND BREAKER POWER PANELS SHALL BE DONE BASED ON INFRASTRUCTURE AND TENANT IMPROVEMENT CONSTRUCTION PHASING.

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Engineer's Stamp:

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DATE______________________

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Project Architect	Mike Alamo
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Mechanical Engineer	James Wermes
Electrical Engineer	Kelly Hartshorn
Interior Designer	Susan Suhar
Laboratory Planner	Ken Filar

MARK	DATE	DESCRIPTION

Project Number	268471
Original Issue	03/22/17 -

UCR Project Manager: Blythe Wilson

Scale:		**--% CD Approval:**	---
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Project Number:	268471	**Construction Release:**	---
DSA Number:	--- ------		

Sheet Name

ELECTRICAL
ONE - LINE DIAGRAM
EAST/WEST CORE

Sheet Number

ED-602-1

Project Status

30% SUBMITTAL

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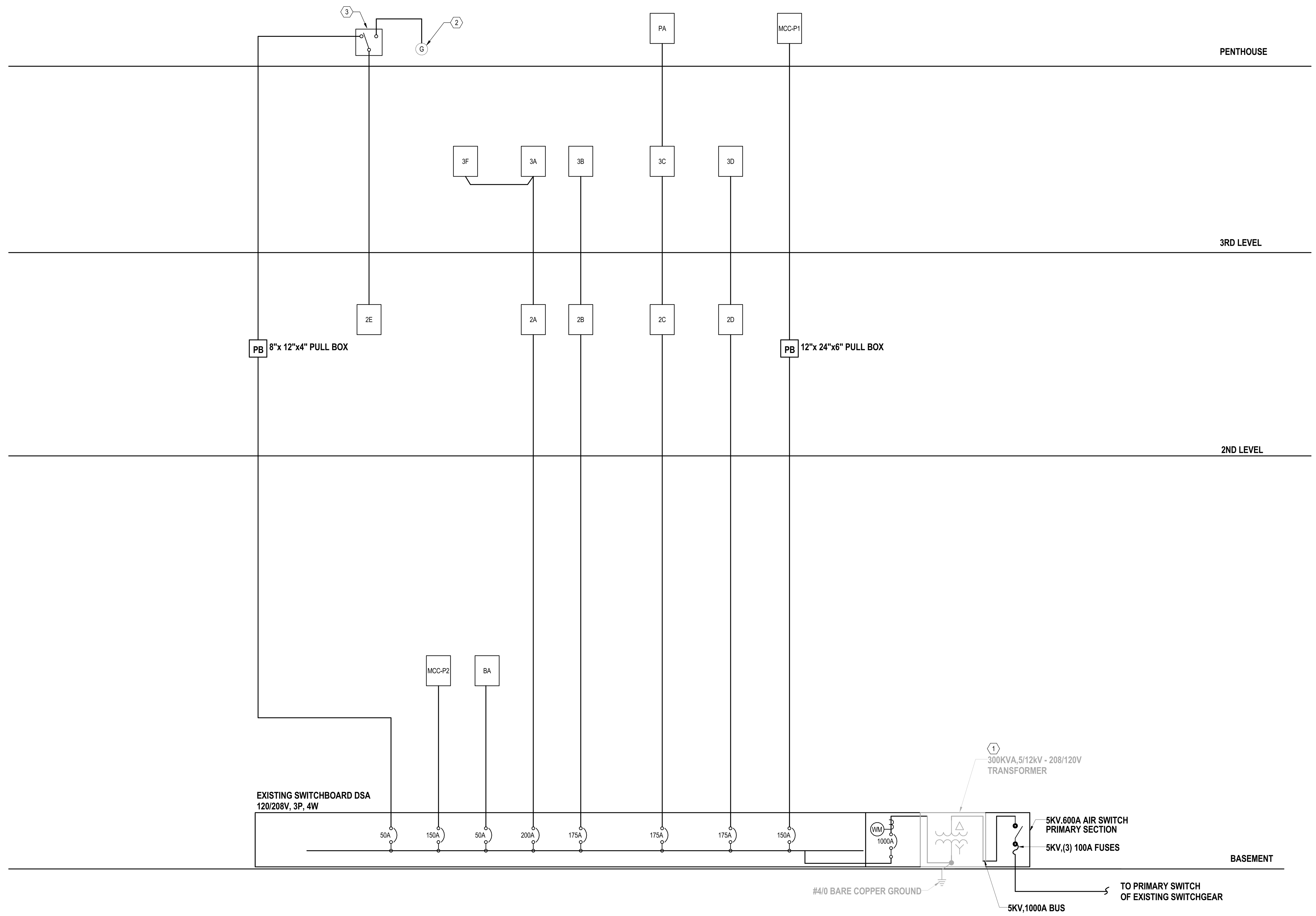

1 ELECTRICAL ONE - LINE DIAGRAM SOUTH WING DEMOLITION
NOT TO SCALE

GENERAL NOTES

A. FOR ELECTRICAL SYMBOLS AND ABBREVIATIONS REFER TO DRAWING SHEETS E-001 AND E-002.

B. REFER TO SHEET E-701 FOR TRANSFORMER AND FEEDER SCHEDULES.

C. ELECTRICAL WORK SHALL BE DONE IN CONFORMANCE WITH CONSTRUCTION DOCUMENTS, ALL APPLICABLE CODES, ISSUED DRAWINGS AND SPECIFICATIONS.

SHEET KEYNOTES

1. EXISTING TRANSFORMER TO REMAIN.
2. RELOCATE GENERATOR REFER TO SHEET ES-01 FOR NEW LOCATION.
3. RELOCATE ATS REFER TO SHEET EP-100-1 FOR NEW LOCATION.

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DATE______________________

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Mechanical Engineer	James Wermes
Electrical Engineer	Kelly Hartshorn
Interior Designer	Susan Suhar
Laboratory Planner	Ken Filar

MARK	DATE	DESCRIPTION

Project Number	268471
Original Issue	03/21/17 -

UCR Project Manager: Blythe Wilson

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Project Number:	268471	**Construction Release:**	---
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Sheet Name
ELECTRICAL ONE - LINE DIAGRAM SOUTH WING

Sheet Number
ED-604-1

Project Status
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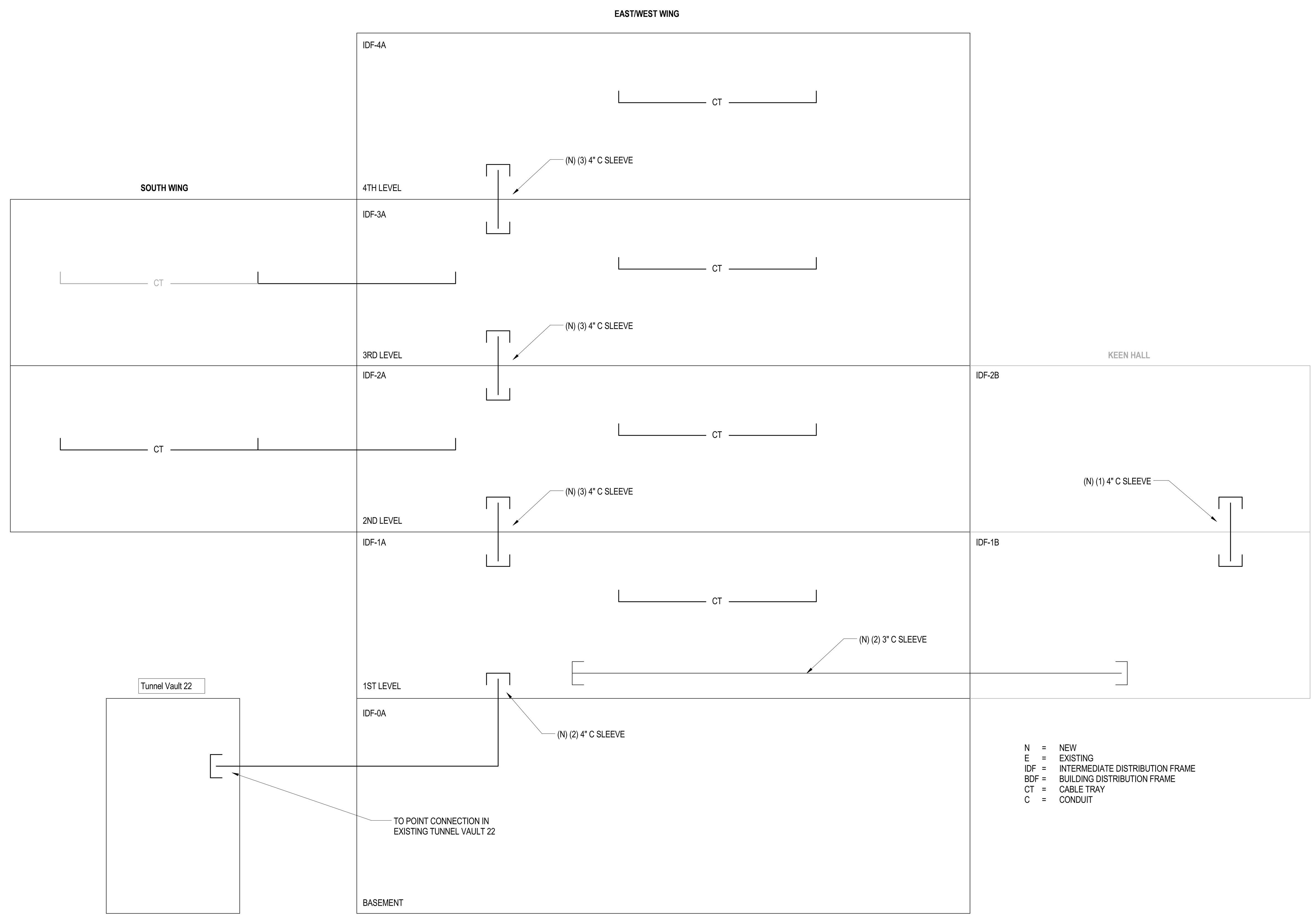

N = NEW
E = EXISTING
IDF = INTERMEDIATE DISTRIBUTION FRAME
BDF = BUILDING DISTRIBUTION FRAME
CT = CABLE TRAY
C = CONDUIT

1 Communication Pathway Detail
1/2" = 1'-0"

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DATE___________________________

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Mechanical Engineer	James Wermes
Electrical Engineer	Kelly Hartshorn
Interior Designer	Susan Suhar
Laboratory Planner	Ken Filar

MARK	DATE	DESCRIPTION

Project Number	268471
Original Issue	05/18/16 -

UCR Project Manager: Blythe Wilson

Scale:		**--% CD Approval:**	---
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Project Number:	268471	**Construction Release:**	---
DSA Number:	--- ------		

Sheet Name

ELECTRICAL
PLAN
COMMUNICATION DETAIL

Sheet Number

ET-601

Project Status

30% SUBMITTAL

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Appendix2 – Area Summaries

A2.1 Area Summaries

For Space Category Definitions and Measurement Methods, see the end of this chapter.

A2.1.1 Existing Inventory Areas

The existing building inventory documents the following areas. Note that while there is Non-Assignable area documented for Level 5 (primarily mechanical penthouses), the existing inventory does not contain any Outside Gross Area (OGSF for this level). Also, the existing inventory neither identifies BGSF, nor OGSF, for Batchelor Hall that doesn't also include Keen Hall. Therefore, this table necessarily includes the entire building.

Existing Inventory: Batchelor + Keen	*All Floors*	*L1*	*1*	*2*	*3*	*4*	*5*
Assignable Area (ASF)	**56,580**	**0**	**12,968**	**18,304**	**15,144**	**10,163**	**0**
Non-Assignable Area (NASF)	41,788	4,924	6,821	10,666	9,304	7,368	2,705
Net Usable Area (NUSF)	98,367	4,924	19,789	28,970	24,448	17,531	2,705
Basic Gross Area (BGSF)	**106,249**	**5,003**	**24,803**	**31,268**	**26,267**	**18,908**	**0**
Covered Unenclosed (CUSF)	8,598	405	2,007	2,530	2,126	1,530	0
Outside Gross Area (OGSF100)	**114,848**	**5,408**	**26,810**	**33,798**	**28,393**	**20,438**	**0**

Table A2.1. Existing Inventory Building Space Summary

The existing building inventory also includes the following Assignable Area itemization by UC space categories.

	All Floors			**Batchelor Hall**			
	Total	*Keen*	*Batchelor*	*1*	*2*	*3*	*4*
	56,580	**7,848**	**48,732**	**9,635**	**13,789**	**15,144**	**10,163**
Research Laboratory	23,710	442	23,268	2,382	7,231	8,231	5,424
Laboratory Service	14,234	6,216	8,018	3,153	1,709	2,277	879
Research Office	1,786	0	1,786	117	189	977	502
Scholarly Activity	626	0	626	0	138	0	488
Class Laboratory	687	0	687	687	0	0	0
Academic Office	8,137	466	7,671	370	1,737	3,227	2,337
Other Office	3,689	201	3,488	1,956	1,532	0	0
Office Service	1,514	78	1,437	514	691	0	232
Conference	1,817	285	1,532	331	467	432	302
Conference Service	109	13	96	96	0	0	0
Storage	271	148	124	30	94	0	0

Table A2.2. Existing Inventory Assignable Areas

Notes: "Service" categories include non-public circulation. There is no Assignable Area on Floors L1 and 5. Metabolomics is included in the Bachelor Hall areas.

A2.1.2 Interior Improvements Roadmap Areas

Once the Interior Improvements have been completed for all levels, the building is projected to have the areas shown below. While the systems renewal project eliminates nearly all the penthouse level area, the Level 5 Outside Gross Area indicates an increase because the existing inventory did not include Level 5 OGSF. Other than Level 5, the Basic Gross Area (BGSF) remains identical after the improvements are completed. This is due to the fact that outside stairs are included in Non-Assignable Area, and not Covered Unenclosed Area.

DPP: Batchelor + Keen	All Floors	L1	1	2	3	4	5
Assignable Area (ASF)	73,022	0	14,023	22,549	21,864	14,586	0
+ Non-Assignable Area (NASF)	24,486	4,924	5,302	6,630	3,976	3,156	498
= Net Usable Area (NUSF)	97,508	4,924	19,324	29,179	25,840	17,742	498
+ Construction Area	11,746	484	4,192	1,686	2,553	2,696	136
= Basic Gross Area (BGSF)	109,254	5,408	23,516	30,865	28,393	20,438	634
+ Covered Unenclosed (CUSF)	6,227	0	3,294	2,933	0	0	0
= Outside Gross Area (OGSF100)	115,481	5,408	26,810	33,798	28,393	20,438	634
Outside Gross Area (OGSF50)	112,368	5,408	25,163	32,332	28,393	20,438	634

Table A2.3. Proposed Building Space Summary

Full implementation of the Interior Improvements strategy for all levels is projected to have the following Assignable Areas. This is an increase of 16,442 ASF (65,174-48,732), or an increase of 33% (16,442 / 48,732) of existing Bachelor Hall Assignable Area.

	All Floors			Batchelor Hall			
	Total	*Keen*	*Batchelor*	*1*	*2*	*3*	*4*
	73,022	**7,848**	**65,174**	**10,690**	**18,034**	**21,864**	**14,586**
Research Laboratories			17,656	2,301	3,731	6,619	5,005
Research Laboratory Support			20,448	3,693	5,716	6,496	4,543
Computational Lab			1,405	0	1,093	312	0
Class Laboratory			1,413	1,413	0	0	0
Office & Collaboration			22,175	3,283	5,417	8,437	5,038
Metabolomics Core			2,077	0	2,077	0	0

Table A2.4. Proposed Assignable Areas

Note: There is no Assignable Area on Floors L1 and 5. These totals include the Metabolomics Core.

Full implementation of the Interior Improvements strategy for all levels is projected to have the following Assignable Areas itemization by space type and floor level:

	DPP Assignable Area (ASF)			63,097	10,690	15,957	21,864	14,586
Space	*Description*	*Qty*	*Avg (sf)*	*All Floors*	*1*	*2*	*3*	*4*
	Research Laboratories			**17,656**	**2,301**	**3,731**	**6,619**	**5,005**
1.01	Open Laboratory Module	66	228	15,070	1,645	3,290	5,670	4,465
1.02	Fume Hood Alcove	15	135	2,025	270	405	810	540
1.03	Internal Laboratory Circulation Aisles			561	386	36	139	
	Research Laboratory Support			**20,448**	**3,693**	**5,716**	**6,496**	**4,543**
2.01	Laboratory Support - Small	45	100	4,504	500	1,000	1,704	1,300
2.02	Laboratory Support - Medium	5	139	696	276		420	
2.03	Laboratory Support - Large	8	235	1,883		501	691	691
2.04	Common Laboratory Support	4	180	720	180	180	180	180
2.05	Laboratory Equipment Aisle (1 LF x 6')	687	6	4,119	525	960	1,605	1,029
2.06	Central Laboratory Equipment Aisle	85	6	510	510			
2.07	Laboratory Storage / Cylinder Aisle (1 LF x 5')	393	5	1,965	330	225	915	495
2.08	Central Laboratory Storage / Cylinder Aisle	89	5	445	445			
2.09	Cold Procedure Room	4	100	400	100	100	100	100
2.10	Central Cold Storage	2	226	452		452		
2.11	Central Plant Tissue Culture Storage	2	96	192	192			
2.12	Central Plant Tissue Culture Transfer Vestibule	1	144	144	144			
2.13	Plant Growth Room	8	171	1,366	320	406	320	320
2.14	Central Plant Growth Room	2	203	406		406		
2.15	Autoclave	4	117	468	117	117	117	117
2.16	X-Ray Developer	1	107	107		107		
2.17	Liquid Nitrogen (LN2) Storage	1	95	95		95		
2.18	Plant Potting	1	103	103		103		
2.19	Dirty Prep Laboratory	1	448	448		448		
2.20	Internal Laboratory Circulation Aisles			1,425	54	616	444	311
	Computational Lab			**1,405**		**1,093**	**312**	
3.01	Computational Post Doctoral Workstation	12	36	432		360	72	
3.02	Computational Graduate Student Workstation	24	30	720		480	240	
3.03	Computational Server Room	1	253	253		253		
	Class Laboratory			**1,413**	**1,413**			
4.01	Class Laboratory (24 Stations)	1	980	980	980			
4.02	Class Laboratory Vestibule / Storage	1	181	181	181			
4.03	Class Laboratory Prep	1	252	252	252			
	Office & Collaboration			**22,175**	**3,283**	**5,417**	**8,437**	**5,038**
5.01	Principal Investigator Office	37	124	4,595	375	1,250	1,845	1,125
5.02	Post Doctoral Workstation	66	36	2,376	144	432	1,152	648
5.03	Graduate Student Workstation	121	30	3,630	480	660	1,470	1,020
5.04	Seminar Room (15-25 students)	1	422	422	422			
5.05	Small Conference / TA Tutoring	3	132	397	127		135	135
5.06	Medium Conference (8-14 people)	6	231	1,388	195	482	460	251
5.07	Large Conference (40 people)	1	500	500		500		
5.08	Scholarly Activity / Kitchenette	5	231	1,155	229	231	419	276
5.09	Scholarly Activity	1	160	160		160		
5.10	Copy / Workroom / Kitchenette	3	215	644		209	259	176
5.11	Copy / Workroom	3	90	269	56		213	
5.12	File Storage	46	28	1,284	150	225	534	375
5.13	Mail / Receiving	1	130	130	130			
5.14	Vending Alcove	1	116	116		116		
5.15	Other Office	2	108	216	216			
5.16	Other Workstation	6	36	216	216			
5.17	Internal Office Circulation Aisles			4,677	543	1,152	1,950	1,032

Table A2.45. Proposed Assignable Area (ASF) by Floors

Note: There is no Assignable Area on Floors L1 and 5

Full implementation of the Interior Improvements strategy for all levels is projected to have the following Nonassignable and Covered Unenclosed Areas itemization by space type and floor level. Note that exterior stairways are included in Nonassignable Area, not Covered Unenclosed Area:

	DPP Non-Assignable Area (NASF)	Qty	Avg (sf)	All Floors 21,886	L1 4,924	1 4,250	2 5,082	3 3,976	4 3,156	5 498
6.01	Restroom - Men	4	174	694		176	166	176	176	
6.02	Restroom - Women	4	207	827		198	233	198	198	
6.03	Gender-Inclusive Restroom	4	73	290		66	92	66	66	
6.04	Lactation Room	1	72	72		72				
6.05	Janitor's Closet	4	41	164		41		82	41	
6.06	BDF Room	1	169	169		169				
6.07	IDF Room	3	182	545			169	169	207	
6.08	MEP Spaces (Systems, Shafts)			11,508	4,756	2,369	1,453	1,528	1,218	184
6.09	Public Circulation			7,617	168	1,159	2,969	1,757	1,250	314

	Covered Unenclosed (CUSF)		Total	All Floors 6,227	L1 0	1 3,294	2 2,933	3 0	4 0	5 0
7.01	Gas Cylinder Storage (Exterior)	1	130	130			130			
7.02	Loading Dock (Exterior)	1	911	911			911			
7.03	Other Covered Outside Area			5,186		3,294	1,892			

Neither the Systems Renewal nor Interior Improvements projects are projected to have an impact on the Metabolomics Core Assignable Area in the South Wing of Level 2; however, , all located on Level 2:

	Metabolomics Core (ASF)	Qty	Avg (sf)	All Floors 2,077	2 2,077
8.01	Metabolomics Core Laboratories	5	285	1,423	1,423
8.02	Metabolomics Core Office	2	166	332	332
8.03	Metabolomics Core Conference	1	322	322	322

Keen Hall area is not projected to change after full implementation of the Interior Improvements strategy:

	Keen Hall	Total All Floors 10,448	1 4,384	2 6,063
.	Keen Hall Assignable Area (ASF)	7,848	3,333	4,515
.	Keen Hall Non-Assignable Area (NASF)	2,600	1,052	1,548

A2.2 UCOP Space Definitions

This project's space is described using measurement methods and nomenclature defined by The University of California Office of the President (UCOP). Significant, relevant excerpts include:

Assignable Area (ASF)

The sum of all floor or surface areas of a building assigned to, or available for assignment to, an occupant or user, including every type of space functionally usable by an occupant or user...

The Assignable area is computed by…measuring…from the inside faces of surfaces that form the boundaries of the designated areas…Deductions should not be made for architectural and structural projections and freestanding columns.

(Note: Internal circulation, where the public is not free to roam, whether secured or not, is assignable area. Multi-story spaces are counted once, at the floor level.)

Nonassignable Area (NASF)

Custodial Service, Public (General Access) Toilet, Circulation (Public), Mechanical, and Private Vehicle Parking are Nonassignable Areas, and are measured using the same method as Assignable Areas.

(Note: Shafts are considered Mechanical Area and are counted at each floor level. Vertical Circulation Area, such as stairs and elevators, are also counted at each floor level, regardless of whether inside the building envelope or not.)

Net Usable Area (NUSF)

Assignable + Nonassignable Area.

Construction Area (Construction SF) also known as "Structural Area".

Basic Gross Area – Net Usable Area.

(Note: The bulk of this area is typically the space consumed by interior and exterior walls. Columns are generally not included in structural area because they typically either protrude into a space, which is defined above as Assignable, or are already counted inside wall areas.)

Basic Gross Area (BGSF)

The sum of all areas, finished and unfinished, on all floors of an enclosed structure (that is, within the environmentally controlled envelope), for all stories or areas which have floor surfaces.

Basic Gross Area is computed by…measuring…from the outside faces of exterior walls, disregarding architectural and structural projections.

Covered Unenclosed Gross Area (CUSF)

The sum of all covered or roofed areas of a building located outside of the …environmentally controlled envelope, for all stories or areas which have floor surfaces. The exception is space already accounted for in Basic Gross Area, such as covered, exterior stairs. These measurements also disregard architectural and structural projections and freestanding columns.

Outside Gross Area (Federal) (OGSF100)

Basic + Covered Unenclosed Gross Area

Outside Gross Area (California) (OGSF50)

Basic + ½ Covered Unenclosed Gross Area

Appendix 3 – 2006 DPP Section

The following sections from the 2006 Detailed Project Program for the Batchelor Hall Renovation are included for reference:

Appendix VII – Asbestos and Lead-Based Paint Removal Report

Appendix VII - Asbestos and Lead-Based Paint Removal Report

Note: *This document was prepared independently from the Batchelor Hall DPP and contains its own internal numbering system and appendices. Any references within the document to other sections apply only to those integral to this report*

CONFIDENTIAL AND PRIVILEGED

ASBESTOS AND LEAD BASED PAINT SURVEY

FOR

THE PROPERTY LOCATED AT:

1. Batchelor Hall Renovations
2. UCR Project # 950464

University of California, Riverside
Riverside, California

Prepared for:

The University of California, Riverside
Office of Design and Construction
3615A Canyon Crest Drive
Riverside, California 92507
Attn: George MacMullin

Prepared by:
Ambient Environment, Inc.
1709 Rimpau Avenue Suite 109
Corona, California 92881

January 4, 2006

Ambient Environmental Inc. Project #05-2163

John L. Payne
CAC #93-1226

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

The University of California, Riverside Office of Design and Construction retained Ambient Environmental Inc to conduct an Asbestos Containing Building Material (ACBM) and Lead Containing Paint (LCP) inspection of the interior of the Batchelor Hall Building located on the University of California, Riverside Campus.

Mr. John L. Payne, a Certified Asbestos Consultant and a United States Environmental Protection Agency (USEPA) certified building inspector for Asbestos-Containing Building Materials (ACBM) and Mr. Todd Hill a DHS Certified Lead Inspector/Assessor conducted the re-inspection December 19, thru December 21, 2005.

The purpose of the asbestos and lead containing paint inspection was to locate and identify accessible friable and non-friable suspect ACBM and the presence of LCP that will be impacted during the renovation project. Once a visual inspection was performed, representative asbestos bulk samples were obtained from each homogenous building material. Lead containing paint samples were obtained from each homogenous paint color utilizing an X-Ray Fluorescence (XRF) lead-containing paint analyzer. The sample location, material type, friability, condition of material, and quantity were also documented.

Asbestos bulk sampling was obtained in accordance with the USEPA established guidelines document, "Guidance for Controlling Asbestos-Containing Materials in Buildings" (USEPA 560/5-85-024, 1985) and USEPA 40 CFR Part 763 "Asbestos-Containing Materials in Schools, Final Rule" (AHERA). Each bulk sample was analyzed for asbestos content by Polarized Light Microscopy (PLM). Forensic Analytical is the accredited laboratory that performed the analysis for Asbestos.

Lead-containing paint readings were collected in accordance with Chapter 7 of the HUD Guidelines for Evaluation and Control of Lead-Based Paint Hazards in Housing and U.S. Environmental Protection Agency (EPA) 40 CFR part 745 and Title X of the 1992 Housing and Community Development Act. A total of 40 XRF readings were obtained during the survey.

All areas of the buildings were visually inspected. Asbestos-containing building materials and lead containing paint not identified in this report may be present within hidden and/or concealed areas of the buildings. Locations, amounts, and conditions of each building material and lead-containing paint assessed and sampled can be found in the inventory (Tables).

Appendices

2.0 SURVEY PROCEDURES

Ambient Environmental Inc. conducted asbestos containing building material and lead containing paint inspection for the interior of the Batchelor Hall building located on the University of California, Riverside Campus. All areas of the interior of the building were inspected for asbestos and lead containing paint. Asbestos containing building materials or lead containing paint not identified in this report may be present within hidden or concealed areas of the buildings.

Asbestos containing building material identification was performed by entering each functional space, assessing all structural/mechanical components and architectural finishes. The physical conditions, friability, accessibility, activity and damage of suspect asbestos containing building materials was also assessed and documented.

Lead containing paint was identified by entering each functional space and assessing all structural/mechanical compounds and architectural finishes. The physical conditions, accessibility, activity and damage of suspect lead containing paint was also assessed and documented.

For reporting purposes, space designations were assigned each functional space within the facilities using the pre-existing designation on doors or as indicated on the floor plans. Where neither was available, the space was labeled by the inspector as indicated in the report. The following procedures were performed:

1. A visual assessment to identify the location, type and quantity of lead containing paint and friable and non-friable asbestos building materials.

2. Obtain representative bulk samples of from suspect asbestos containing building materials.

3. Obtain representative XRF reading from suspect paints.

4. Asbestos samples were analyzed by an independent accredited laboratory for the presence of asbestos by PLM.

5. Present all survey results in a written report including recommendation, locations, quantities, and laboratory results.

All findings, recommendations, and analytical data presented in this report are based on the information (assessment and sampling data) obtained by our inspector during the survey.

3.0 BULK SAMPLING PROCEDURES FOR ASBESTOS

Each suspect ACBM identified was sampled in accordance with sampling guidelines established by the USEPA. The following summarizes the sampling procedures utilized:

1. Building materials were categorized into homogeneous materials. A homogeneous material is defined as being uniform in texture, color, and date of application.

2. A sampling scheme was developed based upon the location and quantities of the various homogeneous materials.

3. Bulk samples were collected by extracting a representative section of the selected material, placing it in a sampling container and assigning a unique sample number. The samples were placed into a sealed shipping container for delivery to an accredited laboratory for analysis by PLM.

4. The personnel performed proper decontamination procedures to prevent the spread of secondary contamination.

5. Each bulk sample was recorded on a bulk sample log and possession of the samples was tracked by a chain of custody record.

The reported laboratory results in this report are a visual estimate by area of Asbestos concentration. Results for heterogeneous samples examined by component are reported as a composite. The lower limit of reliable detection for this method is 1%. Samples that contain more than 1% of Asbestos are reported in 5% ranges. Samples which contain Asbestos in a concentration lower than the limit of reliable detection (<1%) are considered "Trace."

All bulk samples were analyzed by PLM in accordance with the "Interim Method for the Determination of Asbestos in Bulk Insulation Samples EPA - 600/M4-82-020" dated December 1982 and adopted by the National Voluntary Laboratory Accreditation Program (NVLAP) Title 15, part 7 of the Code of Federal Register as affiliated with the National Institute for Standards and Testing (NIST).

Fifty-five bulk samples were obtained at the subject buildings and analyzed for Asbestos content by Forensic Analytical of Rancho Dominguez, California. Forensic Analytical is accredited by the American Industrial Hygiene Association (AIHA), National Voluntary Laboratory Accreditation Program (NVLAP), National Institute of Standards and Testing (NIST), and is a successful participant in the Proficiency Analytical Testing Program (PAT).

Appendices

4.0 X-RAY FLUORESCENCE SAMPLING PROCEDURES FOR LEAD-BASED PAINT

Sampling was accomplished by entering each room equivalent. A room equivalent is an identifiable part of a building such as a room, office, hallway, staircase, foyer and exterior. X-Ray Fluorescence (XRF) lead-based paint analyzer readings were collected of each testing combination in each room equivalent. A testing combination is a unique combination of room equivalent building component type, and substrate. Visible color may not be an accurate predictor of painting history and is not included in the definition of a testing combination. The sample locations and condition of the paint were documented.

Lead-based paint readings were collected in accordance with Chapter 7 of the HUD Guidelines for Evaluation and Control of Lead-Based Paint Hazards in Housing and U.S. Environmental Protection Agency (EPA) 40 CFR part 745 and Title X of the 1992 Housing and Community Development Act. A total of 40 XRF readings were obtained during the survey.

LA County Department of Health Services standard for definition of LBP is .7 mg/cm^2 or 600 parts per million (ppm), however OSHA requires that all workers be properly protected when working with materials containing any level of lead in accordance with Title 8 CCR Section 1532.1.

5.0 HAZARDOUS ASSESSMENT PROCEDURES

During the comprehensive Asbestos and Lead Containing Paint re-inspection, Ambient also conduct a visual hazardous assessment to identify the presence of any hazardous waste such as (PCB's, Freon, waste drums, sink traps, storage areas, lights ballasts, fume hoods, radioactive contamination, thermostats, fluorescent lamps, etc.). During the assessment Ambient observed the following:

- No visible radioactive contamination
- No waste drums
- No Freon
- All sink traps were clean and working (Not Sampled)
- No visible contamination in Storage Areas
- No Mercury Thermostats
- Light Ballast had no PCB's
- Fume Hoods consists of Asbestos Containing Transite Board
- No Perchloride Testing Was Conducted

Appendices

6.0 POSITIVE ASBESTOS SAMPLE RESULTS AND LOCATIONS

1st FLOOR BATCHELOR HALL

Material	Asbestos Content	Location of Material	Square Footage	Friable	Damage
9X9 White Floor Tile & Associated Mastic	3% Chrysotile	Rooms 1140, 1140A, 1140B, 1140C, 1140D, 1140E, 1140F, 1140G, 1151, 1153, 1149, 1145, 1141, 1137, 1133, 1129, 1125 & Hallways	6090 Sq Ft	No	No
Brown Baseboard Mastic	Trace Anthophylite	Throughout Offices Hallways & Laboratories	Through out	No	No
Speckled Tan Sheet Flooring	70% Chrysotile	Rooms: 1113, 1107	4500	No	No
Spray on Acoustic Ceilings	5% Chrysotile	Lobby	2523	No	No
Thermal Pipe Insulation	10% Chrysotile	Mechanical Core, Above Ceiling & Inside Wall Cavities	3000 LFT	No	No
2 x 4 Ceiling Tiles	2% Chrysotile	Hallways	870	No	No
Tan Sheet Flooring	2% Chrysotile	Rooms: 1117, 1123, 1131, 1139, 1143 & 1147	1000	No	No
Yellow Floor Tile & Mastic	5% Chrysotile	Room 1157	400	No	No
Transite Duct Work	Assumed	Laboratories	500 LFT	No	No
Transite Fume Hood	Assumed	Laboratories	8 fume hoods	No	No

2nd FLOOR BATCHELOR HALL

Material	Asbestos Content	Location of Material	Square Footage	Friable	Damage
9X9 White Floor Tile & Associated Mastic	3% Chrysotile	Rooms 2101, 2105, 2109, 2113, 2117, 2121, 2125, 2129, 2133, 2137, 2141, 2145, 2202, 2204, 2206, 2208, 2210, 2203, 2205, 2207, 2209, 2157, 2161, 2165, 2169, 2106, 2114, 2118, 2122, 2132, 2138, 2142, 2156, 2158 & Hallways	9,090 Sq Ft	No	No
Brown Baseboard Mastic	Trace Anthophylite	Throughout Offices Hallways & Laboratories	Through out	No	No
Speckled Tan Sheet Flooring	70% Chrysotile	Rooms: 2103, 2111, 2121, 2135, 2139, 2211, 2213, 2215, 2163, 2140, 2136, 2130, 2116, 2112, 2108	4500	No	No
Spray on Acoustic Ceilings	5% Chrysotile	Lobby	2523	No	No
Thermal Pipe Insulation	10% Chrysotile	Mechanical Core, Above Ceiling & Inside Wall Cavities	3000 LFT	No	No
2 x 4 Ceiling Tiles	2% Chrysotile	Hallways	870	No	No
Tan Sheet Flooring	2% Chrysotile	Rooms: 2119, 2127	900	No	No
Transite Duct Work	Assumed	Laboratories	400 LFT	No	No
Transite Fume Hood	Assumed	Laboratories	16 fume hoods	No	No
Transite Sinks & Counter Tops	Assumed	Laboratories	560 SF	No	No

3rd FLOOR BATCHELOR HALL

Material	Asbestos Content	Location of Material	Square Footage	Friable	Damage
9X9 White Floor Tile & Associated Mastic	3% Chrysotile	Rooms 3109, 3113, 3117, 3121, 3125, 3133, 3137, 3141, 3145, 3149, 3202, 3208, 3214, 3157, 3161, 3165, 3169, 3171, 3160, 3110, 3114, 3118, 3122, 3128, 3130, 3134, 3142, 3146, 3150, 3158, 3162, 3166 & Hallways	10,040 Sq Ft	No	No
Brown Baseboard Mastic	Trace Anthophylite	Throughout Offices Hallways & Laboratories	Through out	No	No
Speckled Tan Sheet Flooring	70% Chrysotile	Rooms: 3105, 3107, 3111, 3113, 3123, 3131, 3135, 3139, 3108, 3116, 3120, 3128, 3132, 3136, 3144, 3220, 3218, 3216, 3212, 3210, 3206, 3204	4500	No	No
Spray on Acoustic Ceilings	5% Chrysotile	Lobby	2523	No	No
Thermal Pipe Insulation	10% Chrysotile	Mechanical Core, Above Ceiling & Inside Wall Cavities	3000 LFT	No	No
2 x 4 Ceiling Tiles	2% Chrysotile	Hallways	870	No	No
Tan Sheet Flooring	2% Chrysotile	Rooms: 3156, 3160, 3168, 3167, 3163, 3159	190	No	No
Transite Duct Work	Assumed	Laboratories	300 LFT	No	No
Transite Fume Hood	Assumed	Laboratories	16 fume hoods	No	No
Transite Sinks & Counter Tops	Assumed	Laboratories	1040 SF	No	No

4th FLOOR BATCHELOR HALL

Material	Asbestos Content	Location of Material	Square Footage	Friable	Damage
9X9 White Floor Tile & Associated Mastic	3% Chrysotile	Rooms 4101, 4105, 4109, 4113, 4117, 4121, 4125, 4133, 4141, 4145, 4153, 4157, 4161, 4165, 4169, 4106, 4110, 4114, 4118, 4122, 4126, 4130, 4134, 4138, 4142, 4146, 4150, 4158, 4162, 4166, 4170& Hallways	7,090 Sq Ft	No	No
Brown Baseboard Mastic	Trace Anthophylite	Throughout Offices Hallways & Laboratories	Through out	No	No
Speckled Tan Sheet Flooring	70% Chrysotile	Rooms: 4103, 4111, 4115, 4119, 4123, 4129, 4135, 4139, 4112, 4116, 4120, 4128, 4140	4500	No	No
Spray on Acoustic Ceilings	5% Chrysotile	Lobby	2523	No	No
Thermal Pipe Insulation	10% Chrysotile	Mechanical Core, Above Ceiling & Inside Wall Cavities	3000 LFT	No	No
2 x 4 Ceiling Tiles	2% Chrysotile	Hallways	870	No	No
Tan Sheet Flooring	2% Chrysotile	Rooms: 4155, 4159, 4163, 4167, 4102, 4156, 4160, 4168	3200	No	No
Transite Duct Work	Assumed	Laboratories	200 LFT	No	No

Appendices

Transite Fume Hood	Assumed	Laboratories	23 fume hoods	No	No
Transite Sinks & Counter Tops	Assumed	Laboratories	480 LF	No	No

PART 2 * Approximation only insulation and fittings may be hidden in walls and inaccessible areas above the ceiling

8.0 POSITIVE LEAD BASED PAINT SAMPLE RESULTS AND LOCATIONS

a.

Sample Numbers	Paint Description	Component	Location	Side	Substrate	Results Pbl mg/cm^2	Condition
1	Calibration	---	---	---	---	1.0	---
14	Tan	Ceramic Tile	1st Floor Men Restroom	A	Tile	2.0	Good
19	Tan	Ceramic Tile	1st Floor Women Restroom	A	Tile	1.35	Good
21	Tan	Ceramic Tile	2nd Floor Men Restroom	A	Tile	1.85	Good
22	Tan	Ceramic Tile	2nd Floor Women Restroom	A	Tile	1.05	Good
23	Tan	Ceramic Tile	3rd Floor Men Restroom	A	Tile	3.2	Good
27	Tan	Ceramic Tile	3rd Floor Women Restroom	A	Tile	1.70	Good

Detection Limit Guidelines for the Housing and Urban Development (HUD) is 1.0 mg/cm^2. As per the OSHA Guidelines the concentration is .7mg/cm^2.

10.0 RECOMMENDATIONS

It is Ambient Environmental Services, Inc.'s professional opinion that all Asbestos Containing Building Materials (ACBM) can be managed in place. An Asbestos Management Program should be implemented for as long as Asbestos-Containing Building Material (ACBM) remains at the facility. Notification requirements in accordance with AB3713 and AB1564, and posting requirements in accordance with Proposition 65 should also be implemented and maintained.

Maintenance, construction, and repair personnel should be made aware of the presence of ACBM and instructed not to disturb or damage the ACBM. Current federal and state regulations require that repair, renovation, or demolition of any ACBM must be conducted only by workers and contractors who have been properly trained in the correct handling of ACBM. All asbestos work should proceed under the guidance or direction of an independent State Certified Asbestos Consultant with oversight performed by a State Certified Site Surveillance Technician.

The ACBM identified during this survey are in good condition, and are not likely to pose an environmental and/or public health risk provided that the material is maintained in its present condition.

Ambient Environmental Services, Inc. warrants that our services are performed within the limits prescribed by our client with the usual thoroughness and competence of the engineering profession.

The recommendations in this report are professional opinions solely based on visual observations and analytical analyses, as described in this report. Therefore, the scope of services was limited to accessible ACBMs and lead containing paints and destructive, intrusive investigative techniques were not contracted. However, it is possible that unrecognized ACBMs and LBP may exist in the facilities.

Opinions and recommendations presented herein apply to site conditions existing at the time of our investigation and those reasonably foreseeable, cannot necessarily apply to site changes of which this office is not aware and has not had the opportunity to evaluate.

APPENDIX A

ASBESTOS CHAIN OF CUSTODY AND BULK SAMPLE LOG

Ambient Environmental, Inc.
Asbestos and Lead/Field Services
Indoor Air Quality Study
Phase I Site Assessments
Lab Services

1709 Rimpau Avenue, Suite 109
Corona, California 92881
*Tel: 951-272-4730
*Fax: 951-272-4731

ASBESTOS BULK SAMPLE LOG Page 6 of 6

CLIENT ADDRESS: UCR
PROJECT NUMBER: 05-2163
TECHNICIAN: T. Hill
BUILDING ADDRESS: Batchelor Hall
PRIORITY: ASAP 24-HR 3-DAY 5-DAY
DATE COLLECTED: 12-22-05

SAMPLE NUMBER	SAMPLE LOCATION	MATERIAL DESCRIPTION	LAB RESULTS
49	1st ~~Ceilin~~ Rm #1159	cieling tile	
50	1st Elevator Hallway	int. plaster	
51	1st Rm# 1153	"	
52	1st S.W. Hallway		
53	1st Elevator Hallway	basecove	
54	1st floor Rm 1159 -	BRN/SPECKED. Linoleum	
55	1st floor Rm 1161 -	Linoleum	

SAMPLE METHOD: PLM ✓ TEM ______ OTHER ______

CHAIN OF CUSTODY

Sampled By:		Date:	Time:
Relinquished By:		Date:	Time:
Received By:		Date: 12/27	Time: 11:15

Appendices

Ambient Environmental, Inc.
Asbestos and Lead/Field Services
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Phase I Site Assessments
Lab Services

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*Fax: 951-272-4731

ASBESTOS BULK SAMPLE LOG

Page 5 of 6

CLIENT ADDRESS: UCR
PROJECT NUMBER: 05-2163
TECHNICIAN: T. Hill
BUILDING ADDRESS: Batchelor Hall
PRIORITY: ASAP 24-HR 3-DAY 5-DAY
DATE COLLECTED: 12-22-05

SAMPLE NUMBER	SAMPLE LOCATION	MATERIAL DESCRIPTION	LAB RESULT
41	4th floor N/E Hallway	Base cove	
42	4th floor Soft mix Carbon Rm.	T.S.I	350/F
	Transite is Present		
	Not Tested!		
43	By West Elevator	Ceiling Tile	
44	N/E Hallway		
45	N/W Hallway		
46	R# 1157	Yellow linoleum floor tile	
47	1st floor by East Elevator	ceiling tile	
48	1st floor SE. Hallway		

SAMPLE METHOD: PLM ✓ TEM ____ OTHER ____

CHAIN OF CUSTODY

Sampled By:		Date:	Time:
Relinquished By:		Date:	Time:
Received By:		Date: 12/23	Time: 11:15

Ambient Environmental, Inc.
Asbestos and Lead/Field Services
Indoor Air Quality Study
Phase I Site Assessments
Lab Services

5697-1468
1709 Rimpau Avenue, Suite 109
Corona, California 92881
•Tel: 951-272-4730
•Fax: 951-272-4731

ASBESTOS BULK SAMPLE LOG

Page 1 of 6

CLIENT ADDRESS: UCR

PROJECT NUMBER: 05-2163

TECHNICIAN: C.M. JOHNSON

BUILDING ADDRESS: BATCHELOR HALL

PRIORITY: ASAP 24-HR 3-DAY 5-DAY

DATE COLLECTED: 12-22-05

SAMPLE NUMBER	SAMPLE LOCATION	MATERIAL DESCRIPTION	LAB RESULT.
1	Rm# 2145	9x9 w floor tile	
2	Rm# 2125	9x9 w floor tile	
3	Rm# 2113	9x9 w floor tile	
4	Rm# 2133	Drywall	
5	Rm# 2121	Drywall	
6	Rm# 2109	Drywall	
7	2145	BROWN BASEBOARD + MASTIC	
8	2145	INT. PLASTER	
9	2129	BROWN BASEBOARD + MASTIC	
10	2117	PLASTER	

SAMPLE METHOD: PLM X TEM ____ OTHER ____

CHAIN OF CUSTODY

Sampled By:	[signature]	Date:	Time:
Relinquished By:		Date:	Time:
Received By:	[signature]	Date: 12/27	Time: 11:15

Appendices

Ambient Environmental, Inc.
Asbestos and Lead/Field Services
Indoor Air Quality Study
Phase I Site Assessments
Lab Services

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ASBESTOS BULK SAMPLE LOG

Page 2 of 6

CLIENT ADDRESS: UCR

PROJECT NUMBER: 05-2143

TECHNICIAN: C.M. JOHNSON

BUILDING ADDRESS: BATCHELOR HALL

PRIORITY: ASAP 24-HR 3-DAY 5-DAY

DATE COLLECTED: 12-22-05

SAMPLE NUMBER	SAMPLE LOCATION	MATERIAL DESCRIPTION	LAB RESULT
11	Rm # 2139	speckle beige lunolium	
12	Rm # 2119	speckle beige lunolium	
13	Rm # 2103	lunolium speckle beige	
14	Lobby area 2nd floor	accoustical	
15	Lobby area 2nd floor	accoustical	
16	Lobby area 2nd floor	accoustical	
17	Lobby area 2nd floor	accoustical	
18	Mechanical 2nd floor	TST	
19	Mechanical 2nd floor	TSI	
20	Mechanical 2nd floor	TSI	

SAMPLE METHOD: PLM X TEM ____ OTHER ____

CHAIN OF CUSTODY

Sampled By:		Date:	Time:
Relinquished By:		Date:	Time:
Received By:		Date: 12/27	Time: 11:15

Ambient Environmental, Inc.
Asbestos and Lead/Field Services
Indoor Air Quality Study
Phase I Site Assessments
Lab Services

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ASBESTOS BULK SAMPLE LOG

Page 3 of 6

CLIENT ADDRESS: UCR

BUILDING ADDRESS: BATCHELOR HALL

PROJECT NUMBER: 05-2163

TECHNICIAN: C.M. JOHNSON

PRIORITY (ASAP) 24-HR 3-DAY 5-DAY

DATE COLLECTED: 12-22-05

SAMPLE NUMBER	SAMPLE LOCATION	MATERIAL DESCRIPTION	LAB RESULTS
21	Hallway 2nd floor	ceiling tile	
22	Hallway 2nd floor	ceiling tile	
23	Hallway 2nd floor	ceiling tile	
24	Hallway 3rd floor	9x9 white floor tile mastic	
25	Rm# 3125	9x9 white floor tile and mastic	
26	Rm # 3166	9x9 white floor tile & mastic	
27	Room # 3218	int plaster	
28	Room # 3195	int plaster	
29	Room #3122	int plaster	
30	Hallway 3rd floor	Baseboard & (light green) mastic	

SAMPLE METHOD: PLM X TEM ____ OTHER ____

CHAIN OF CUSTODY

		Date:	Time:
Sampled By:		Date:	Time:
Relinquished By:		Date:	Time:
Received By:		Date: 12/27	Time: 11:15

Appendices

Ambient Environmental, Inc.
Asbestos and Lead/Field Services
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ASBESTOS BULK SAMPLE LOG

Page 4 of 4

CLIENT ADDRESS: UCR

BUILDING ADDRESS: BATCHELOR HALL

PROJECT NUMBER: 05-2163
TECHNICIAN: T. Hill
PRIORITY: ASAP 24-HR 3-DAY 5-DAY
DATE COLLECTED: 12-22-05

SAMPLE NUMBER	SAMPLE LOCATION	MATERIAL DESCRIPTION	LAB RESULTS
31	3rd floor By Elevator	Baseboard & mastic (light green)	
32	3rd floor by N/exit	Baseboard & mastic (light green)	
33	Ext. accoustic 3rd floor Outside stairway	Ext. accoustic	
34	3218 3rd floor	Lonolium & mastic	
35	3216 3rd floor	Lonolium	
36	4th floor elevator hallway	Floor Tile / mastic	
37	4th floor southeast hallway		
38	4th floor NW Hallway		
39	4th floor #4135	Spec ~~floor tile~~ lonolium	
40	4th floor #4123	Spec lonolium	

SAMPLE METHOD: PLM_____ TEM_____ OTHER_____

CHAIN OF CUSTODY

Sampled By:		Date:	Time:
Relinquished By:		Date:	Time:
Received By:		Date: 12/27	Time: 11:15

APPENDIX B

ASBESTOS LABORATORY CERTIFICATES OF ANALYSIS

Forensic Analytical

Final Report

Bulk Asbestos Analysis

(EPA Method 600/R-93-116, Visual Area Estimation)

Ambient Environmental Inc
J.Payne/J.Lumpkin

1709 Rimpau Ave., Suite 109
Corona, CA 92881

Client ID: 5697
Report Number: B079987
Date Received: 12/27/05
Date Analyzed: 12/27/05
Date Printed: 12/27/05
First Reported: 12/27/05

Job ID/Site: 05-2163, Batchelor Hall

Date(s) Collected: 12/22/2005

FASI Job ID: 5697-1468
Total Samples Submitted: 55
Total Samples Analyzed: 55

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
1	50298149						
Layer: Off-White Tile		Chrysotile	**3 %**				
Layer: Black Mastic		Chrysotile	**5 %**				
Total Composite Values of Fibrous Components:		**Asbestos (3%)**					
Cellulose (Trace)							
2	50298150						
Layer: Off-White Tile		Chrysotile	**3 %**				
Layer: Black Mastic		Chrysotile	**5 %**				
Total Composite Values of Fibrous Components:		**Asbestos (3%)**					
Cellulose (Trace)							
3	50298151						
Layer: Off-White Tile		Chrysotile	**3 %**				
Layer: Black Mastic		Chrysotile	**5 %**				
Total Composite Values of Fibrous Components:		**Asbestos (3%)**					
Cellulose (Trace)							
4	50298152						
Layer: White Plaster			**ND**				
Layer: Beige Plaster			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (ND)**					
Cellulose (Trace)							
5	50298153						
Layer: White Plaster			**ND**				
Layer: Beige Plaster			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (ND)**					
Cellulose (Trace)							
6	50298154						
Layer: White Plaster			**ND**				
Layer: Beige Plaster			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (ND)**					
Cellulose (Trace)							

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Appendices

Forensic Analytical

Client Name: Ambient Environmental Inc

Report Number: B079987
Date Printed: 12/27/05

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
7	50298155						
Layer: Brown Non-Fibrous Material			**ND**				
Layer: Brown Mastic		Anthophyllite	**Trace**				
Layer: White Plaster			**ND**				
Layer: Beige Plaster			**ND**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (Trace)**					
8	50298156						
Layer: Beige Plaster			**ND**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (ND)**					
9	50298157						
Layer: Brown Non-Fibrous Material			**ND**				
Layer: Brown Mastic		Anthophyllite	**Trace**				
Layer: White Plaster			**ND**				
Layer: Beige Plaster			**ND**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (Trace)**					
10	50298158						
Layer: Tan Non-Fibrous Material			**ND**				
Layer: Brown Mastic		Anthophyllite	**Trace**				
Layer: White Plaster			**ND**				
Layer: Beige Plaster			**ND**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (Trace)**					
11	50298159						
Layer: Tan Sheet Flooring			**ND**				
Layer: Fibrous Backing		Chrysotile	**70 %**				
Total Composite Values of Fibrous Components: Cellulose (5 %)		**Asbestos (25%)**					
12	50298160						
Layer: Tan Sheet Flooring			**ND**				
Layer: Fibrous Backing		Chrysotile	**70 %**				
Total Composite Values of Fibrous Components: Cellulose (5 %)		**Asbestos (25%)**					
13	50298161						
Layer: Tan Sheet Flooring			**ND**				
Layer: Fibrous Backing		Chrysotile	**70 %**				
Total Composite Values of Fibrous Components: Cellulose (5 %)		**Asbestos (25%)**					
14	50298162						
Layer: Beige Semi-Fibrous Material		Chrysotile	**5 %**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (5%)**					

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Forensic Analytical

Client Name: Ambient Environmental Inc

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Date Printed: 12/27/05

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
15	50298163						
Layer: Beige Semi-Fibrous Material		Chrysotile	**5 %**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (5%)**					
16	50298164						
Layer: Beige Semi-Fibrous Material		Chrysotile	**5 %**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (5%)**					
17	50298165						
Layer: Beige Semi-Fibrous Material		Chrysotile	**5 %**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (5%)**					
18	50298166						
Layer: White Semi-Fibrous Material		Amosite	**10 %**	Chrysotile	**2 %**		
Layer: Off-White Woven Material			**ND**				
Total Composite Values of Fibrous Components: Cellulose (15 %)		**Asbestos (10%)**					
19	50298167						
Layer: White Semi-Fibrous Material		Amosite	**10 %**	Chrysotile	**2 %**		
Layer: Off-White Woven Material			**ND**				
Total Composite Values of Fibrous Components: Cellulose (15 %)		**Asbestos (10%)**					
20	50298168						
Layer: White Semi-Fibrous Material		Amosite	**10 %**	Chrysotile	**2 %**		
Layer: Off-White Woven Material			**ND**				
Total Composite Values of Fibrous Components: Cellulose (15 %)		**Asbestos (10%)**					
21	50298169						
Layer: Beige Fibrous Material		Chrysotile	**2 %**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components: Cellulose (35 %) Fibrous Glass (45 %)		**Asbestos (2%)**					
22	50298170						
Layer: Beige Fibrous Material		Chrysotile	**2 %**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components: Cellulose (35 %) Fibrous Glass (45 %)		**Asbestos (2%)**					
23	50298171						
Layer: Beige Fibrous Material		Chrysotile	**2 %**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components: Cellulose (35 %) Fibrous Glass (45 %)		**Asbestos (2%)**					

Appendices

Forensic Analytical

Client Name: Ambient Environmental Inc

Report Number: B079987
Date Printed: 12/27/05

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
24	50298172						
Layer: Off-White Tile		Chrysotile	**2 %**				
Layer: Black Mastic		Chrysotile	**2 %**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (2%)**					
25	50298173						
Layer: Off-White Tile		Chrysotile	**2 %**				
Layer: Black Mastic		Chrysotile	**2 %**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (2%)**					
26	50298174						
Layer: Off-White Tile		Chrysotile	**2 %**				
Layer: Black Mastic		Chrysotile	**2 %**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (2%)**					
27	50298175						
Layer: Beige Plaster			**ND**				
Layer: Paint			**ND**				
Layer: Beige Skimcoat/Joint Compound			**ND**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (ND)**					
28	50298176						
Layer: Beige Plaster			**ND**				
Layer: Paint			**ND**				
Layer: Beige Skimcoat/Joint Compound			**ND**				
Layer: White Plaster			**ND**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (ND)**					
29	50298177						
Layer: Beige Plaster			**ND**				
Layer: Paint			**ND**				
Layer: Off-White Skimcoat/Joint Compound			**ND**				
Layer: White Plaster			**ND**				
Layer: White Skimcoat/Joint Compound			**ND**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (ND)**					
30	50298178						
Layer: Tan Non-Fibrous Material			**ND**				
Layer: Brown Mastic		Anthophyllite	**Trace**				
Layer: White Plaster with Paint			**ND**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (Trace)**					

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Forensic Analytical

Client Name: Ambient Environmental Inc

Report Number: B079987
Date Printed: 12/27/05

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
31	50298179						
Layer: Tan Non-Fibrous Material			**ND**				
Layer: Brown Mastic		Anthophyllite	**Trace**				
Total Composite Values of Fibrous Components:		**Asbestos (Trace)**					
Cellulose (Trace)							
32	50298180						
Layer: Tan Non-Fibrous Material			**ND**				
Layer: Brown Mastic		Anthophyllite	**Trace**				
Total Composite Values of Fibrous Components:		**Asbestos (Trace)**					
Cellulose (Trace)							
33	50298181						
Layer: Tan Semi-Fibrous Material		Chrysotile	**10 %**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (10%)**					
Cellulose (Trace)							
34	50298182						
Layer: Beige Sheet Flooring			**ND**				
Layer: Fibrous Backing			**ND**				
Layer: Beige/Black Mastic		Chrysotile	**2 %**				
Total Composite Values of Fibrous Components:		**Asbestos (Trace)**					
Cellulose (20 %) Fibrous Glass (5 %)		Synthetic (10 %)					
35	50298183						
Layer: Beige Sheet Flooring			**ND**				
Layer: Fibrous Backing		Chrysotile	**70 %**				
Total Composite Values of Fibrous Components:		**Asbestos (25%)**					
Cellulose (5 %)							
36	50298184						
Layer: Beige Tile		Chrysotile	**3 %**				
Layer: Black Mastic		Chrysotile	**5 %**				
Total Composite Values of Fibrous Components:		**Asbestos (3%)**					
Cellulose (Trace)							
37	50298185						
Layer: Beige Tile		Chrysotile	**3 %**				
Layer: Black Mastic		Chrysotile	**5 %**				
Total Composite Values of Fibrous Components:		**Asbestos (3%)**					
Cellulose (Trace)							
38	50298186						
Layer: Beige Tile		Chrysotile	**3 %**				
Layer: Black Mastic		Chrysotile	**5 %**				
Total Composite Values of Fibrous Components:		**Asbestos (3%)**					
Cellulose (Trace)							

Appendices

Forensic Analytical

Client Name: Ambient Environmental Inc

Report Number: B079987
Date Printed: 12/27/05

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
39	50298187						
Layer: Beige Sheet Flooring			**ND**				
Layer: Fibrous Backing		Chrysotile	**70 %**				
Total Composite Values of Fibrous Components: Cellulose (5 %)		**Asbestos (25%)**					
40	50298188						
Layer: Beige Sheet Flooring			**ND**				
Layer: Fibrous Backing		Chrysotile	**70 %**				
Total Composite Values of Fibrous Components: Cellulose (5 %)		**Asbestos (25%)**					
41	50298189						
Layer: Tan Non-Fibrous Material			**ND**				
Layer: Brown Mastic		Anthophyllite	**Trace**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (Trace)**					
42	50298190						
Layer: White Fibrous Material		Amosite	**10 %**	Chrysotile	**2 %**		
Layer: Beige Woven Material			**ND**				
Total Composite Values of Fibrous Components: Cellulose (20 %)		**Asbestos (10%)**					
43	50298191						
Layer: Beige Fibrous Material			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components: Cellulose (35 %) Fibrous Glass (45 %)		**Asbestos (ND)**					
44	50298192						
Layer: Beige Fibrous Material			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components: Cellulose (35 %) Fibrous Glass (45 %)		**Asbestos (ND)**					
45	50298193						
Layer: Beige Fibrous Material			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components: Cellulose (35 %) Fibrous Glass (45 %)		**Asbestos (ND)**					
46	50298194						
Layer: Beige Tile		Chrysotile	**3 %**				
Layer: Black Mastic		Chrysotile	**5 %**				
Layer: Tan Mastic			**ND**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (3%)**					

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6 of 8

Forensic Analytical

Client Name: Ambient Environmental Inc

Report Number: B079987
Date Printed: 12/27/05

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
47	50298195						
Layer: Beige Fibrous Material			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components: Cellulose (35 %) Fibrous Glass (45 %)		**Asbestos (ND)**					
48	50298196						
Layer: Beige Fibrous Material			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components: Cellulose (35 %) Fibrous Glass (45 %)		**Asbestos (ND)**					
49	50298197						
Layer: Beige Fibrous Material			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components: Cellulose (35 %) Fibrous Glass (45 %)		**Asbestos (ND)**					
50	50298198						
Layer: Beige Plaster			**ND**				
Layer: Light Yellow Plaster			**ND**				
Layer: Off-White Plaster			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (ND)**					
51	50298199						
Layer: Beige Plaster			**ND**				
Layer: Light Yellow Plaster			**ND**				
Layer: Off-White Skimcoat/Joint Compound			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (ND)**					
52	50298200						
Layer: Beige Plaster			**ND**				
Layer: Light Yellow Plaster			**ND**				
Layer: Off-White Skimcoat/Joint Compound			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (ND)**					
53	50298201						
Layer: Brown Non-Fibrous Material			**ND**				
Layer: Brown Mastic		Anthophyllite	**Trace**				
Layer: White/Beige Plasters			**ND**				
Total Composite Values of Fibrous Components: Cellulose (Trace)		**Asbestos (Trace)**					

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Appendices

Forensic Analytical

Client Name: Ambient Environmental Inc

Report Number: B079987
Date Printed: 12/27/05

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
54	50298202						
Layer: Beige Sheet Flooring			**ND**				
Layer: Fibrous Backing		Chrysotile	**70 %**				
Total Composite Values of Fibrous Components: Cellulose (5 %)		**Asbestos (25%)**					
55	50298203						
Layer: Beige Sheet Flooring			**ND**				
Layer: Fibrous Backing		Chrysotile	**70 %**				
Total Composite Values of Fibrous Components: Cellulose (5 %)		**Asbestos (25%)**					

Steven Takahashi, Laboratory Supervisor, Rancho Dominguez Laboratory

Note: Limit of Quantification ('LOQ') = 1%. 'Trace' denotes the presence of asbestos below the LOQ. 'ND' = 'None Detected'.

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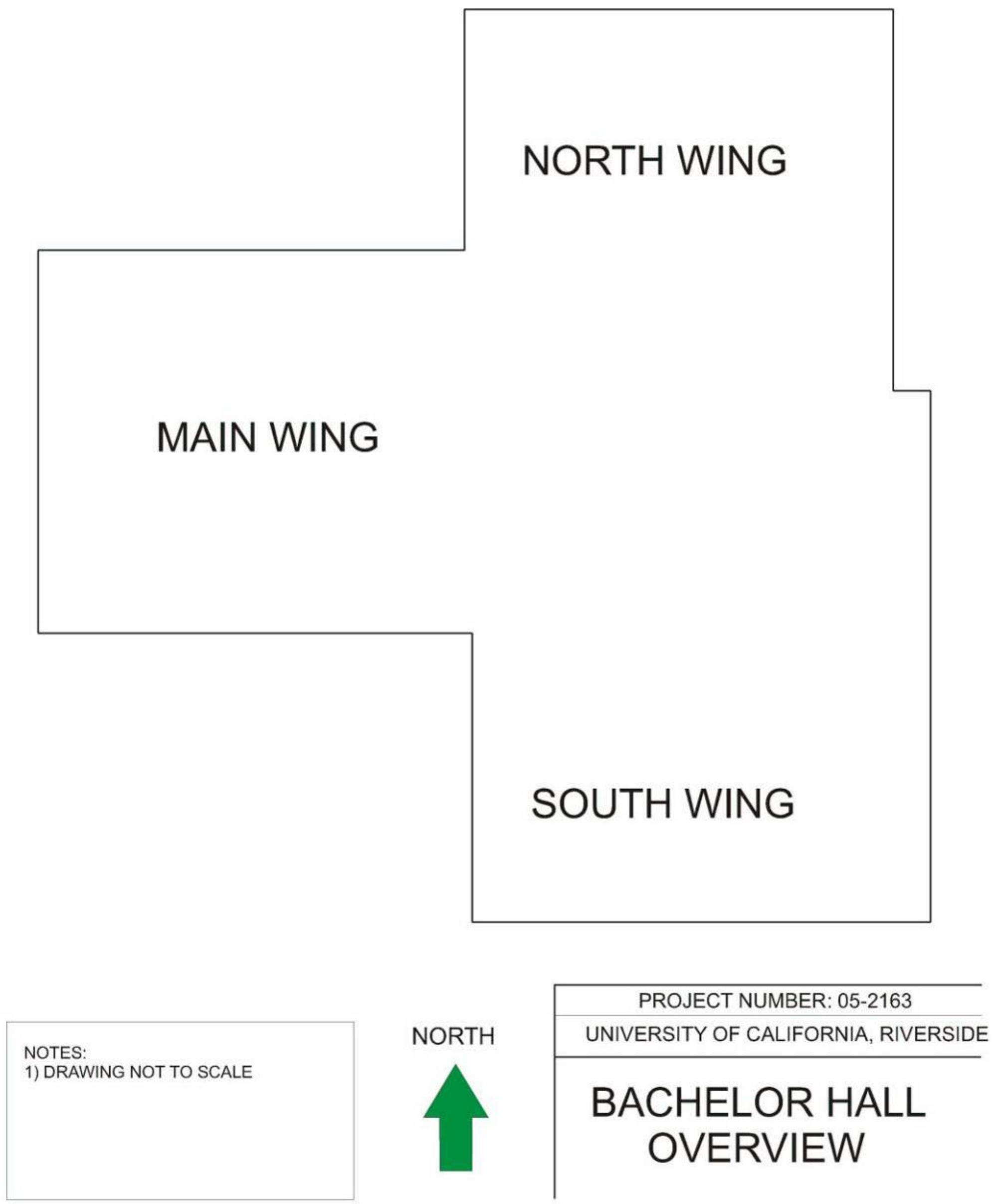
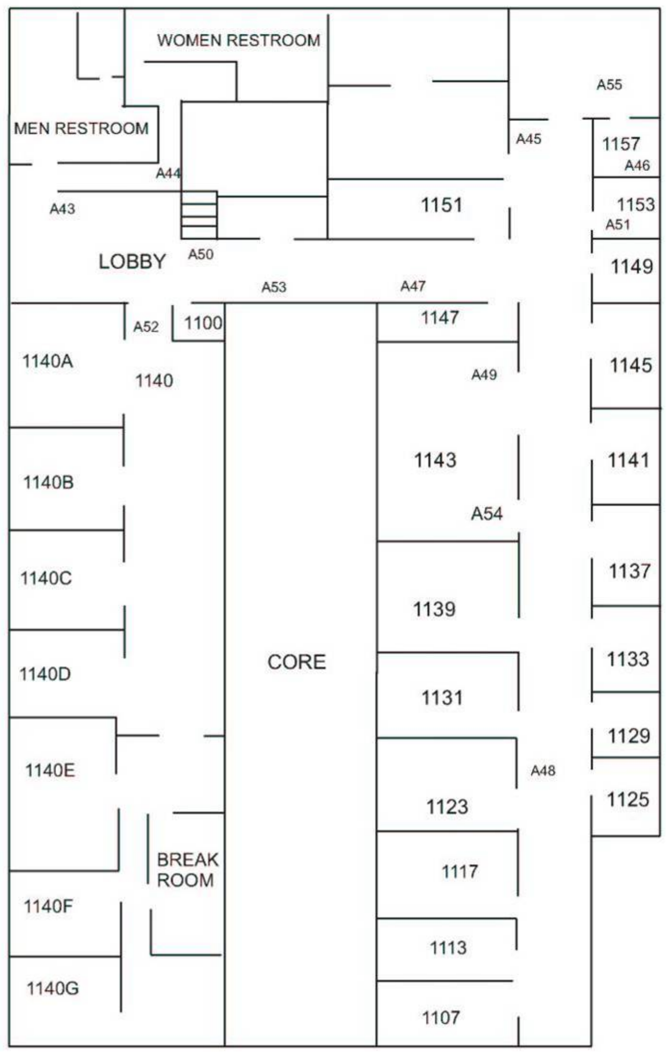
APPENDIX C

SITE DRAWING WITH SAMPLE LOCATIONS



Appendices

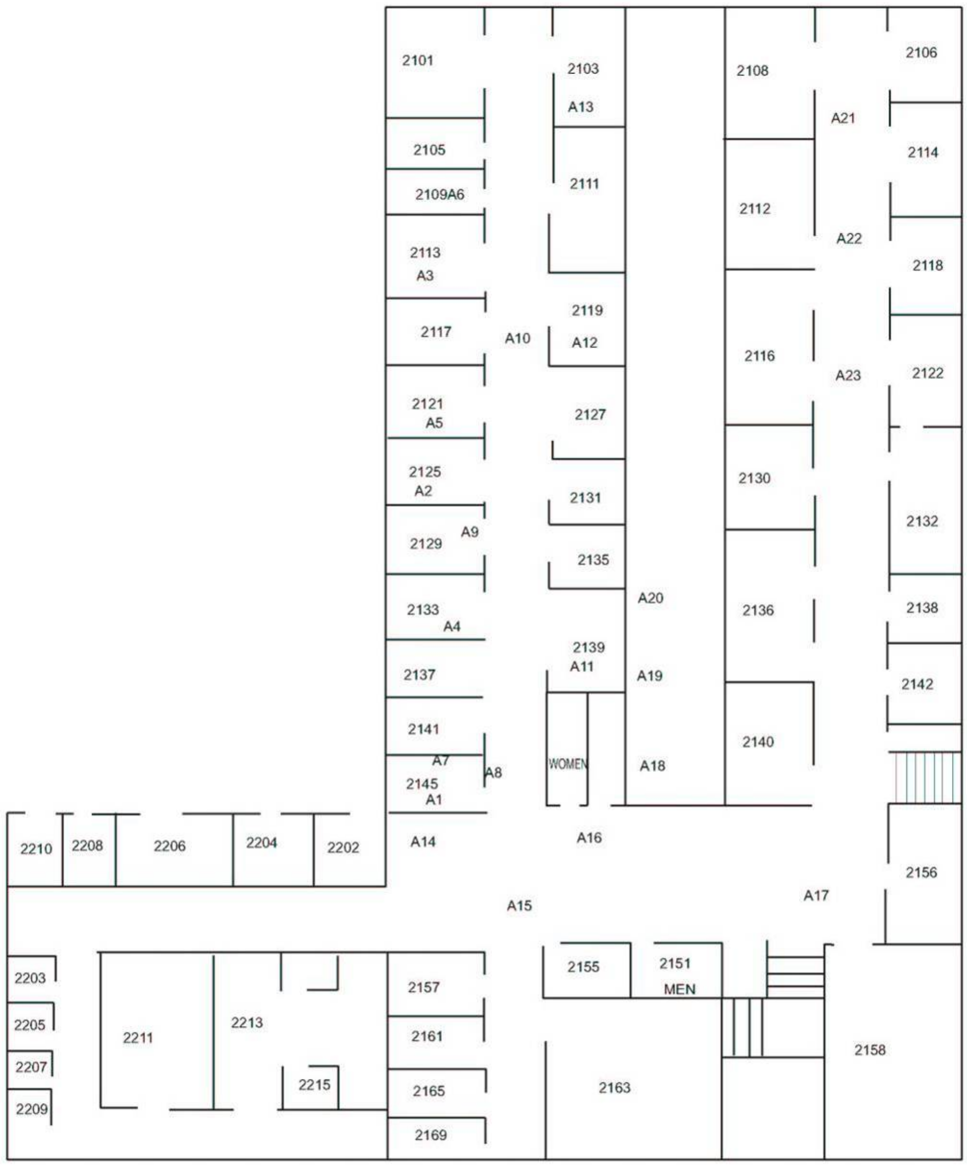


NOTES:
1) DRAWING NOT TO SCALE

NORTH

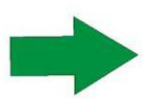
PROJECT NUMBER: 05-2163
UNIVERSITY OF CALIFORNIA, RIVERSIDE

BATCHELOR HALL
1ST FLOOR



NOTES:
1) DRAWING NOT TO SCALE

NORTH

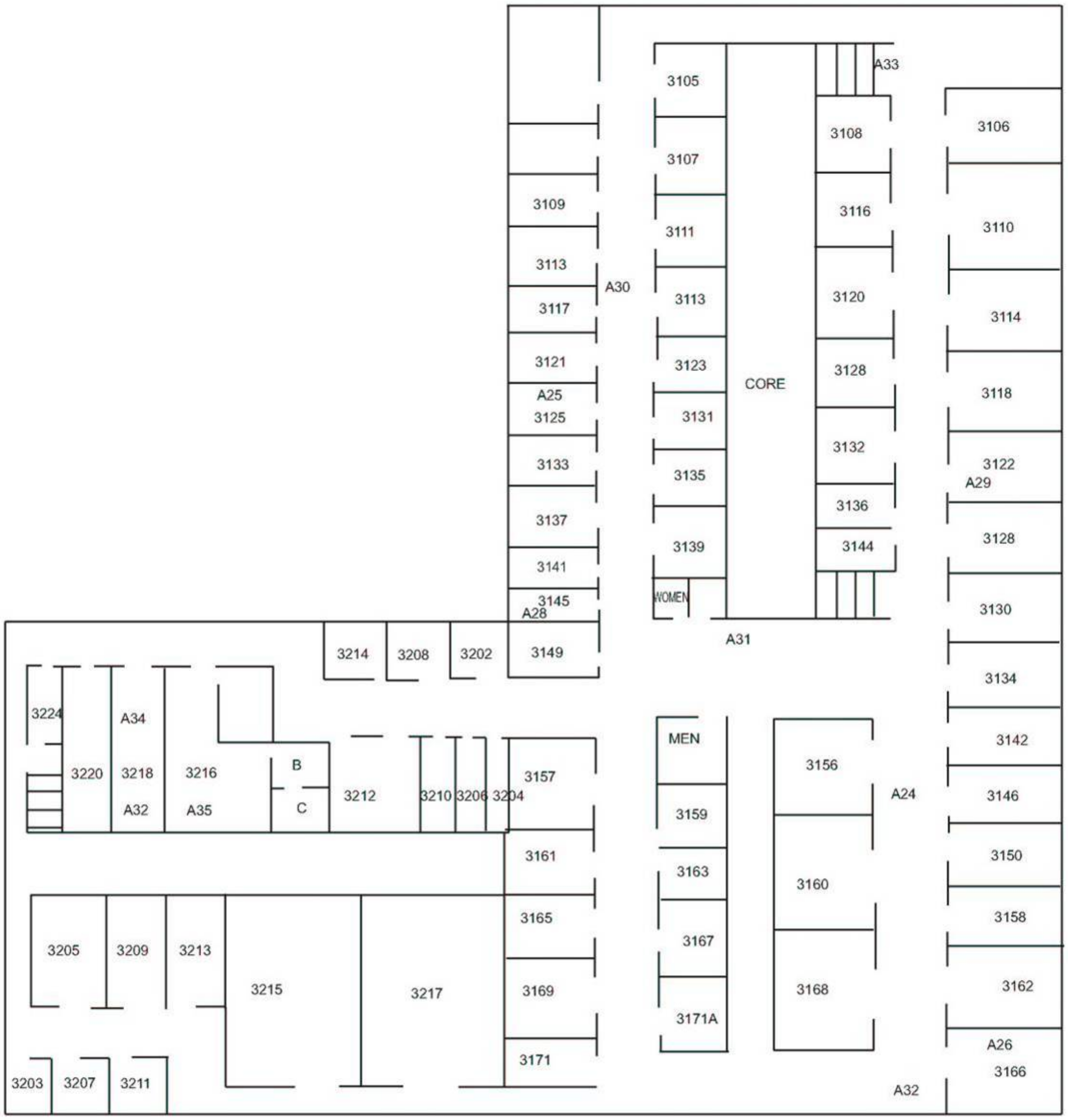


PROJECT NUMBER: 05-2163

UNIVERSITY OF CALIFORNIA, RIVERSIDE

BATCHELOR HALL 2ND FLOOR

Appendices

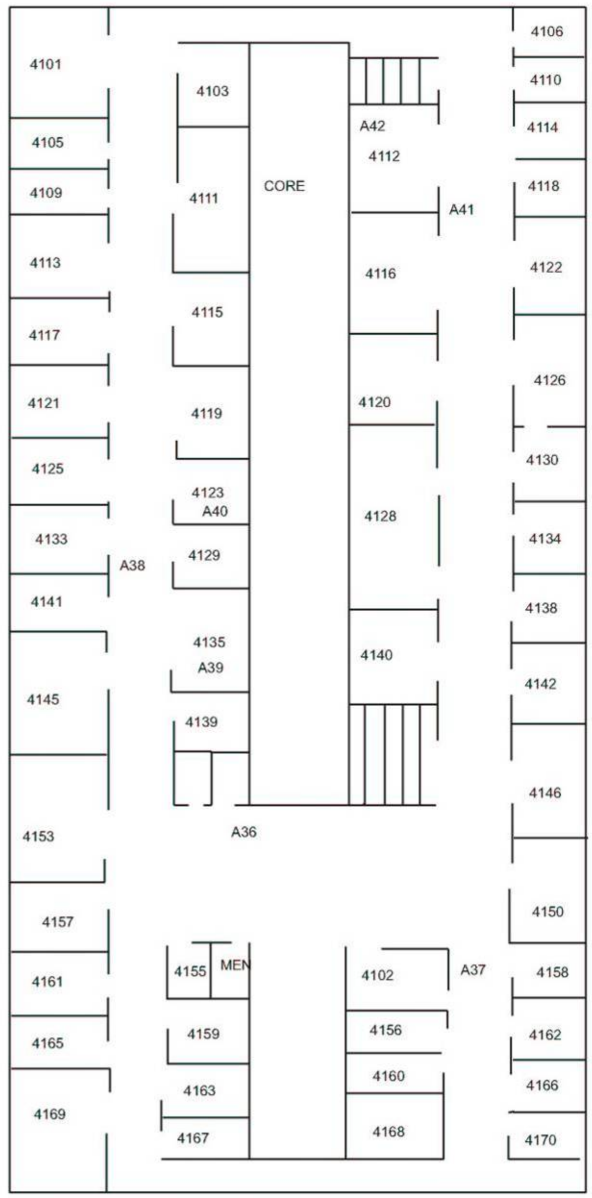


NOTES:
1) DRAWING NOT TO SCALE

NORTH

PROJECT NUMBER: 05-2163
UNIVERSITY OF CALIFORNIA, RIVERSIDE

BATCHELOR HALL
3rd FLOOR



NOTES:
1) DRAWING NOT TO SCALE

NORTH

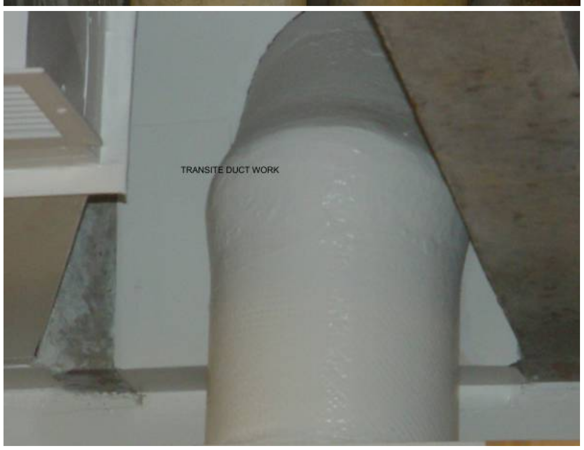
PROJECT NUMBER: 05-2163

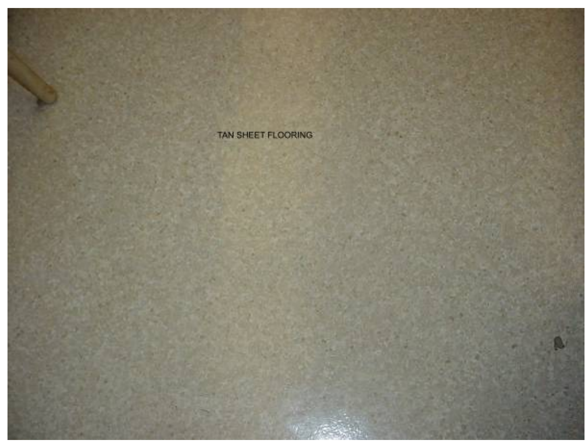
UNIVERSITY OF CALIFORNIA, RIVERSIDE

BATCHELOR HALL
4th FLOOR

APPENDIX D

PHOTO OF ASBESTOS CONTAINING BUILDING MATERIALS





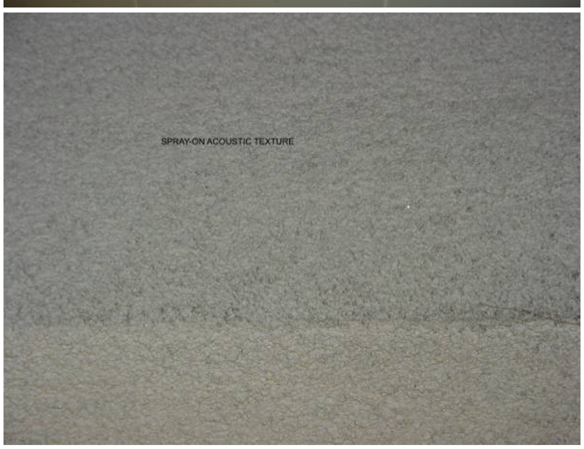
Appendices


TRANSITE FUME HOOD
OUT OF SERVICE
NOTICE


BROWN BASEBOARD & MASTIC


CERAMIC TILE


BROWN BASEBOARD AND MASTIC


SPRAY-ON ACOUSTIC TEXTURE


WHITE 9X9 FLOOR TILE

Appendix 4 – Meeting Minutes

Meeting minutes and presentations that informed the DPP Update process are included for reference. These include:

	Date of Meeting
Working Group Workshop #1	September 28, 2016
Engineering Data collection of Existing Building	October 11, 2016
Botany + Plant Sciences Existing Lab Tour	October 11, 2016
Working Group Meeting #2	October 19, 2016
Working Group Meeting #3	November 8, 2016
MEP Meeting #1	December 7, 2016
Working Group Meeting #4	December 14, 2016
Facilities (MEP) Overview	February 3, 2017
Working Group Meeting #5	February 3, 2017

Meeting Minutes

Project:	Batchelor Hall Renewal Project
Subject:	Programming Workshop #1
Date:	Wednesday, September 28, 2016
Location:	Hinderaker Hall B-154

Attendees:

John White – UCR	Jeff Kaplan – UCR
Peter Atkinson – UCR	Melissa Garrety – UCR
Meera Nair – UCR	Sharyl Murdock – UCR
Eric Chronister – UCR	Patty Springer – UCR
Mike Roose - UCR	Jingsong Zhang – UCR
Deborah McWilliams – UCR	Trip Grant – HDR
George MacMullin - UCR	Kate Diamond – HDR
Blythe Wilson – UCR	Ken Filar – HDR
Jon Harvey – UCR	Terry McCarthy – HDR

	Topic	*Responsibility*
1	**Intended Building Purpose / Planning Principles** • All space in the building is Provost Space. • The purpose of the renovation is to improve the quality of research environments • The greatest space need is wet laboratories followed by dry laboratories • Office space assignment will to go faculty who are assigned laboratories in Batchelor Hall • The project funding will not allow for the complete interior renovation • Project resources are limited and fixed	Info
2	**Intended Building Users** The program should also be developed as generically as possible to easily allow a variety of research to potentially occupy the building in the future. However, the initial tenants, will most likely be the existing occupants, the Department of Botany and Plant Sciences (B+PS). A range of flexibility will be explored. But it is not anticipated that significantly different disciplines, such as Chemistry, would be planned.	Info
3	**Impending Renovation on Floor 2** A renovation on the West side of the South Wing of Floor 2 is being designed to accommodate a new Principal Investigator working in Metabolomics. This renovation will be taken into consideration, and will likely require tenant improvements renewal much further into the future than other portions of Batchelor Hall. UCR to send HDR drawings for the renovation project.	Info UCR
4	**Botany and Plant Sciences (B+PS)** B+PS is distributed across 3 major buildings, with 2 major distinctions: the users engaged in more biomedical-related research have been moved to the Genomics Building. The users remaining in Batchelor Hall are engaged in more Ecological and Physiological research.	Info

5	**Renovation "Master Plan"** HDR proposed that a program fit concept should be developed to represent a renovation "Master Plan" illustrating the end state upon its ultimate implementation. The implementation will occur progressively as funds for incremental renovation projects become available. The first phase is the replacement/renewal of the entire building systems, and a portion of the building for tenant improvements as allowed by current funding.	Info
6	**Renovation Funds and Logistics** There is no additional budget of money for the project, such as logistics (temporary relocations). Consequently, there is a trade-off between logistics and renovation scope. Concepts that require more logistical steps and/or more expensive logistical steps, would result in less of the concept that could be initially implemented. The design team to take the cost-benefit analysis into consideration with proposed design solutions.	Info
7	**Building Systems Support of Keane Hall** Keane Hall, the building wing to the North of Batchelor Hall is not part of the project scope. However, if building systems in Keane Hall are reliant upon building systems in Batchelor Hall, the capacities and tie-ins for those systems must be accommodated.	Info
8	**Systems Capacities** The University would not like the building's systems capacities designed only for opening day operation. There should be some additional capacity to accommodate future changes to the building's program mix or changes in technology. This future capacity increase could take the form of space for future equipment or ductwork to support additional fumehoods.	Info
9	**Accessibility Upgrades** HDR mentioned that the scope of the project will require a significant number of accessibility upgrades that must be included in the project per Code and Law: • Restrooms • Elevator • Stairways • Doors in Paths of Travel to Exits from the Building	Info
10	**Sacred Functions** No particular labs were identified that must not be relocated as part of the initial project. All current lab functions would prefer not to be relocated. As a result, the design team's task is to present the most efficient phasing scheme, and then the University will review the implications to the effected labs and then explore with the design team options for avoiding disruption to the highest priority operations.	Info
11	**Lab Module Width** The previous DPP assumed an open lab configuration with a 9-foot lab module width, a logical multiple of the 18-foot structural spacing. HDR believes this to be too narrow for safe, modern lab work, as this results in 4-foot clear aisles between lab benches and approximately 3-foot 6-inch aisles between fume hoods and lab benches. The University concurred that a 10-foot 6-inch module (the same as programmed for MRB1), would be prudent.	Info
12	**Lab Bench Width** The MRB1 BOD included a dedicated lab bench width of 6-feet per lab occupant. The building width of Batchelor Hall may not efficiently accommodate this bench width, and	Info

therefore HDR is preliminarily recommending a 5-foot lab bench width. Anticipate further discussion on the size will occur.

13	**Research Group Size** The following average Research Group Size was confirmed, though it was stressed that there will be larger and smaller groups that should be easily accommodated. This matches the Research Group sizes developed for the MRB1 Basis of Design (BOD), with the exception of any mention of Undergraduates. Inclusion of undergraduates in the lab groups is an important component of the University's programs. Undergraduates would not require office space: • Principal Investigator (PI): 1 • Post Doctoral Student (PD): 2 • Graduate Student (GS): 4 • Lab Bench Researchers: 6 (these are the same PD's and GS's above) • Undergraduates: 0 to 2 depending on the group.	Info
14	**Lab Type Nomenclature** UCR would prefer that this project use the lab space type definitions being standardized for the University: • Wet 1: Low Fume Hood Density (BSL2 with 1 hood per PI group) • Wet 2: Medium Fume Hood Density (BSL2 with 2-3 hoods per PI group) • Wet 3: High Fume Hood Density (BLS2 with 4 or more hoods per PI group) (Designation to be confirmed) • Flex 1: Instrument Intensive (Non-BSL2 labs such as Imaging and other spaces without fume hoods) • Flex 2: Procedure Intensive (Same as Flex 1, but performed within environmentally controlled rooms, BSL levels to be confirmed). • Dry 1: Computation Intensive (office space with enhanced power and data)	Info
15	**Lab Type Allocations** B+PS estimated that 70 to 80 percent of the existing labs in Batchelor Hall were Wet Lab Type 1 (1-hood per research group). This is a significantly higher percentage than what was programmed for MRB1, a facility intended to accommodate multi-disciplinary research. As result, some additional capacity for increased hood density (Wet lab types 2 and possibly 3) should be provided to accommodate other departments in the future. The quantity of this additional capacity is to be determined. It was confirmed that included in the program should be some quantity of Dry 1: Computational Intensive research groups (groups without true lab space outside of office workspace). HDR is assuming that the quantity of this space be determined based upon the ability to efficiently create wet lab space, the University's highest priority, in a particular building location.	Info
16	**Program Components** The Batchelor Hall program's mission should be to maximize wet lab space, then dry lab space, and what is absolutely necessary within the building to support those activities. The following were suggested as being efficiently provided in one location on each floor (incomplete list): • Some Scholarly Activity space in a more informal setting with white boards for scientific discussion. • A conference room for approximately the largest PI group size.	Info

- Plant growth rooms. It was suggested that one plant growth room be shared between each of two wet lab research groups. B+PS estimates that approximately 20% of plants need to be isolated/quarantined from the general plant population. Further discussions required to consider alternatives.
- One cold room.
- Gender-neutral Restroom.

The following were suggested as being efficiently provided in one location in the building (incomplete list):

- A significantly-sized, remote plant growth room, with some chambers isolated for quarantined plants. The remote location will preserve space that can be better utilized to maximize the quantity of PI research groups.
- One freezer room for temporary relocation of items from any freezer that is malfunctioning or otherwise needing to be taken offline.
- One large conference room that could accommodate the weekly faculty meetings up to 40 people.
- Lactation Room

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17 **Classroom Space** — Working Group

There is one existing instructional laboratory in the building, located in the Northwest corner of the first floor. The University's Working Group will review the utilization of this laboratory to determine if additional instructional space is required.

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18 **B+PS Administration Space** — Info

Currently, B+PS Department Administration is located in the building. Administration space is not one of the missions of the building, but it may be able to remain for a significant period due to the inability of the project to renovate all of the building interiors.

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19 **Non-Included Functions** — Info

B+PS does not believe that the following should be included in the program for the Building:

- Vivarium
- Robotic Bio-Repository
- Non-lab Classrooms
- Lecture Hall
- Centralized Glass Wash
- Additional Genomics, Proteomics, etc.
- UCR Core Space
- Additional microscopy and characterization space, except for instruments individual researchers may want to invest in or share with other researchers.
- Centralized Glass Wash. Users provide their own under-counter dishwashers. (Funding source to be confirmed)

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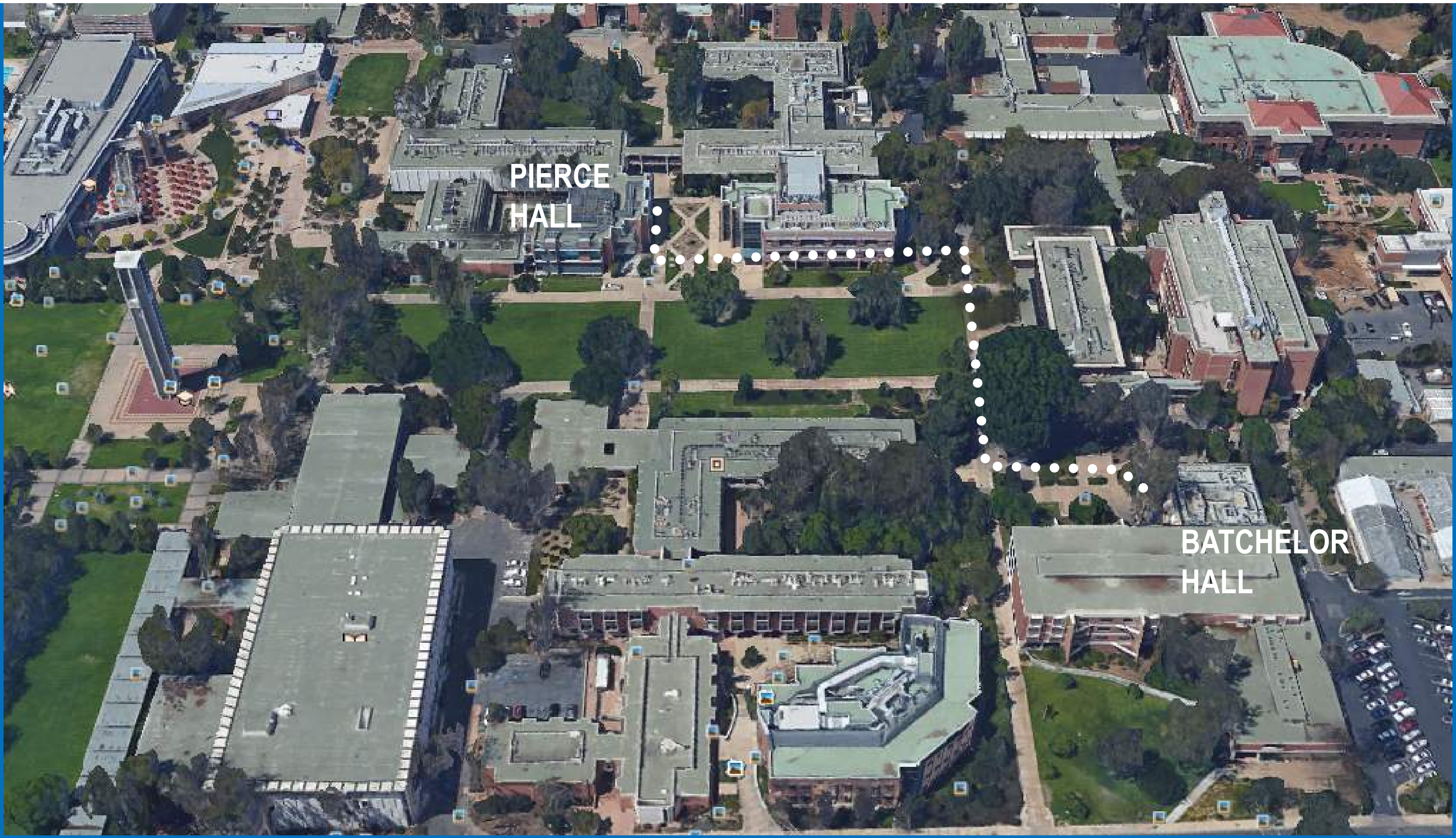
20 **Conceptual Plan Starting Point** — Info

HDR presented an initial plan concept to foster tangible dialog between HDR and the Working Group. This plan attempted to map the wet and flex lab and associated office planning concepts from the recent UCR planning activities onto the Batchelor Hall as efficiently as possible. HDR proposed locating open labs along the full southernmost length of the original 1964 construction, and office space on the full northernmost length. This contiguous space type configuration allows flexible allocation of research group sizes, systems distribution efficiency, and both major space types access to daylight and views. It is anticipated that the new building systems renewal will allow pathways across the current shaft space, reducing travel distances and reclaiming some floor space for research functions.

The Working Group confirmed that the current best practice at the University for lab to lab support space ratio is 50-50, which aligns with the concept presented.

The fourth floor was used as the typical application of the proposed planning template, with increasing deviations from that template on lower floors. The template accommodates 9 Wet/Flex Research Groups on floor 4. Floor 3 would accommodate more groups, Floor 1 would accommodate fewer, and Floor 2 is yet to be determined.

21	**Open Labs vs. Closed** The Working Group mentioned that the type of open lab space being promoted in modern lab buildings, may not work for all lab users. In particular there is concern about being able to quarantine or otherwise segregate research environments. HDR suggested that the purpose of the Lab Support rooms was primarily to provide segregation where required, in addition to a research group's allocated open lab space. The Working Group did believe that this approach would satisfy the functional requirements of many (possibly most) of the groups. There was also concern that segregation was necessary between BSL1 and BLS2 space, but the University mentioned that the labs were likely all to be designated BSL2.	Info
22	**Bio-Safety Cabinets** Botany and Plant Sciences did not believe that they currently have any Bio-Safety cabinets that are ducted to the building exhaust system. In other words, all of the cabinets exhaust air is recirculated to the room. The department does not conceive of a future need for Bio-Safety cabinets that are exhausted to the building exhaust system. This has a significant beneficial impact on the exhaust, and potentially supply air and cooling, systems because exhausted Bio-Safety cabinets require four times the flow of a comparable fume hood due to static pressure differences. Presumably there should be some consideration for a future lab group outside of B+PS that could require exhausted Bio-Safety Cabinets.	Info
23	**Recapture Outdoor Space** The Working Group was interested in converting existing outdoor arcade space on the first and second floors into usable indoor space. This will be explored.	Info
24	**Windows** The University noted that the existing windows are single-paned, and hence not very energy efficient. B+PS noted that the grills covering the windows to reduce solar gain significantly hinder views. Replacement of the windows will be considered as one strategy of meeting the energy targets for the building, including a 20% improvement over Title 24, and the EUI Benchmarks for Complex UC Buildings.	Info



UCR Batchelor Hall – Kick Off Meeting 9/28/16

00 Agenda

00 Agenda

01 Introductions

02 Project Goals

03 Understanding the DNA of Batchelor Hall

04 Lab Planning Concepts Inform Batchelor Hall

05 Specialty and/or Shared Functions

06 Phasing / Defining what needs to stay

07 Schedule & Next Steps

01 Introductions

02 Project Goals

WHAT WE HEARD – Planning Principles:

- All space is Provost Space
- The purpose is to improve the quality of research environments
- The greatest space need is wet laboratories followed by dry laboratories
- Office space assignment will go to faculty who are assigned laboratories in Batchelor
- The project funding available will not allow for the complete interior renovation
- This working group will set the priority for research programs within the fixed budget
- Project resources are limited and fixed

OTHER CONSIDERATIONS

- Is there anything from the 2006 DPP that needs to be recaptured?
- Up-dates from Pierce Hall planning effort?
- Other priorities?

SAVE FOR LATER IN THE MEETING

- What needs to stay in place and remain operational throughout the renovation?
- Are there specialty functions or shared functions that need to be located in the building?
- Phasing priorities?
- Other?

03 Understanding the DNA of Batchelor Hall

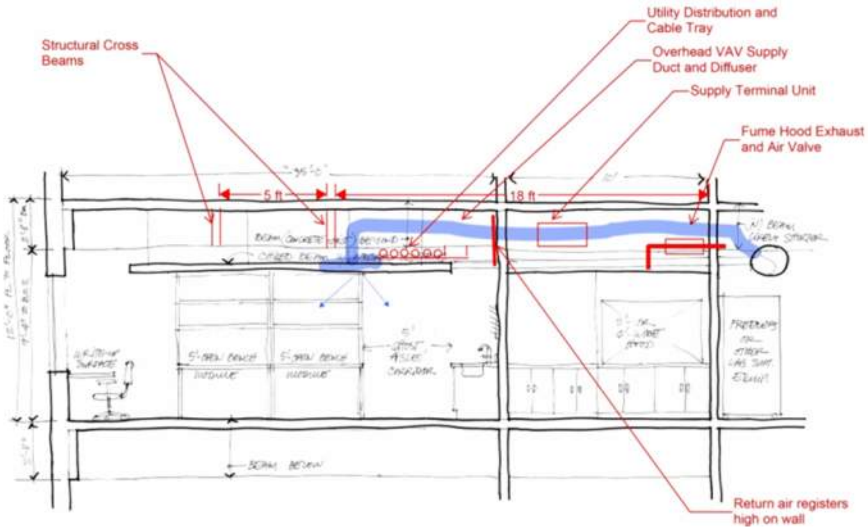
HDR RENOVATION BEST PRACTICES

1. **Survey Existing Conditions**
   "Know what you've got"
2. **Survey Existing Equipment**
   "Know your limitations"
3. **Understand Applicable Codes**
   "Know your constraints"
4. **Consider the Impact on Operations**
   "Know who you are going to Affect"
5. **Develop a Communications Strategy**
   "Plan how and when to communicate"
6. **Document Demolition with Photography**
   "One picture is worth a thousand words (or drawings)"
7. **Estimate Realistically**
   "Know what it's going to take"
8. **Bring the Builder into the Process Early**
   "Partner with the folks who will be building your design"
9. **Identify Potential Hazardous Materials**
   "Know what you're up against"
10. **Look for Opportunities to Innovate**
    "Know how to think outside the box"

REALITIES OF BATCHELOR HALL TODAY:

- Aging and inadequate infrastructure of Building Systems requires replacement
- Very Low Floor to Floor Height for a Laboratory Facility
- Not ADA Compliant
- Daylight Challenged
- Circulation is long and inefficient
- Ratio of Lab to Office is low
- Ratio of Lab Support to Lab seems low
- Flexibility to adapt to new lab requirements is constrained – hard to grow or shrink or add new technology
- Collaboration and interaction is not supported by the spatial configuration

CHALLENGES


Structural Cross Beams
Utility Distribution and Cable Tray
Overhead VAV Supply Duct and Diffuser
Supply Terminal Unit
Fume Hood Exhaust and Air Valve
5 ft
18 ft
Return air registers high on wall

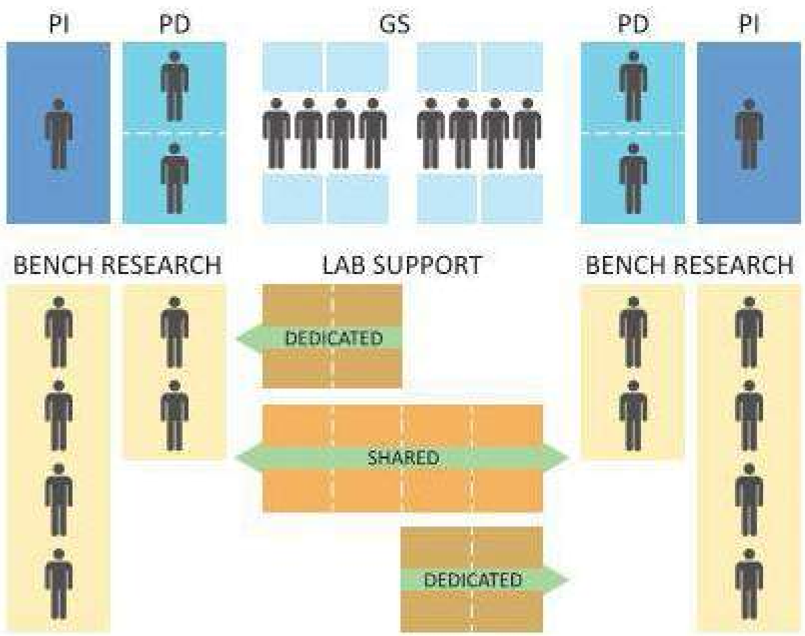

SEISMIC RESTRAINT BUTTRESSES

EXISTING PLAN

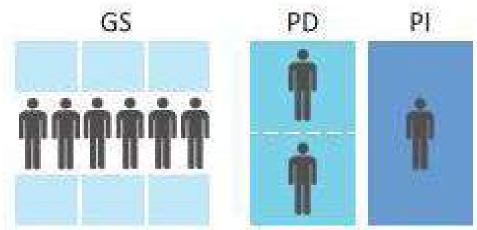
04

03 Lab Planning Concepts Inform Batchelor HaLL

WET BENCH / FLEX RESEARCH GROUP



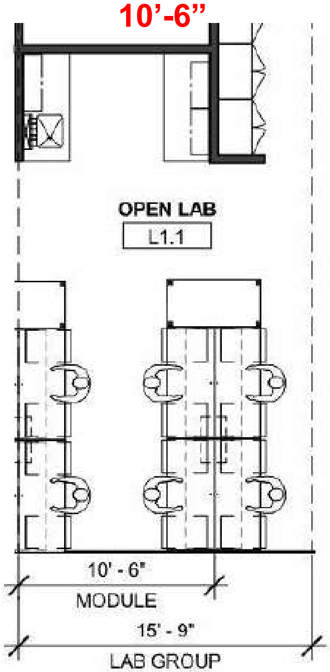
COMPUTATIONAL RESEARCH GROUP



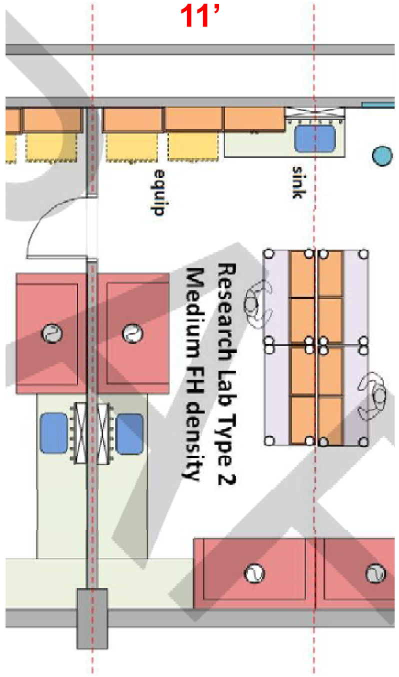
DESIGNING FOR FLEXIBLE RESEARCH GROUPS

SPACE TYPE PROTOTYPES: LAB WIDTH

+ Ideal Life Science Width
10’-6”

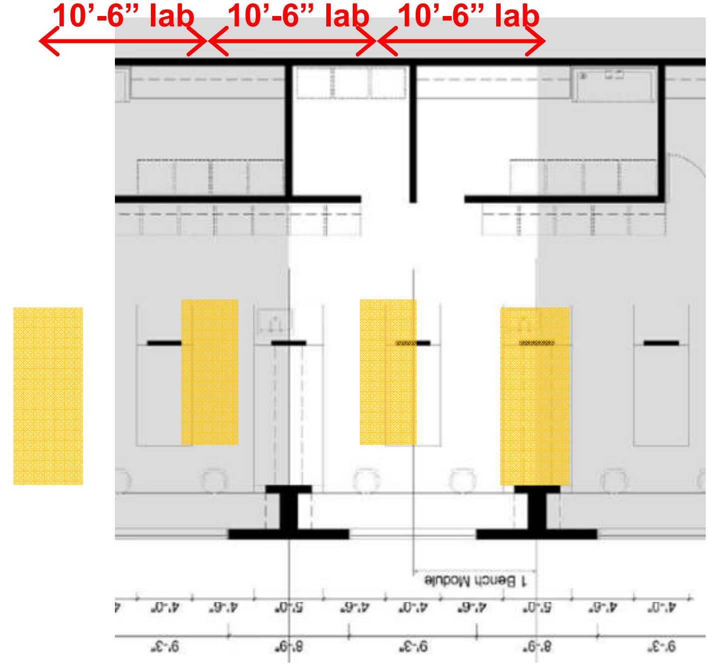


+ Good Width
11’



18’ structure ÷ 2 = 9’ lab module = too narrow!

10’-6” lab
10’-6” lab
10’-6” lab

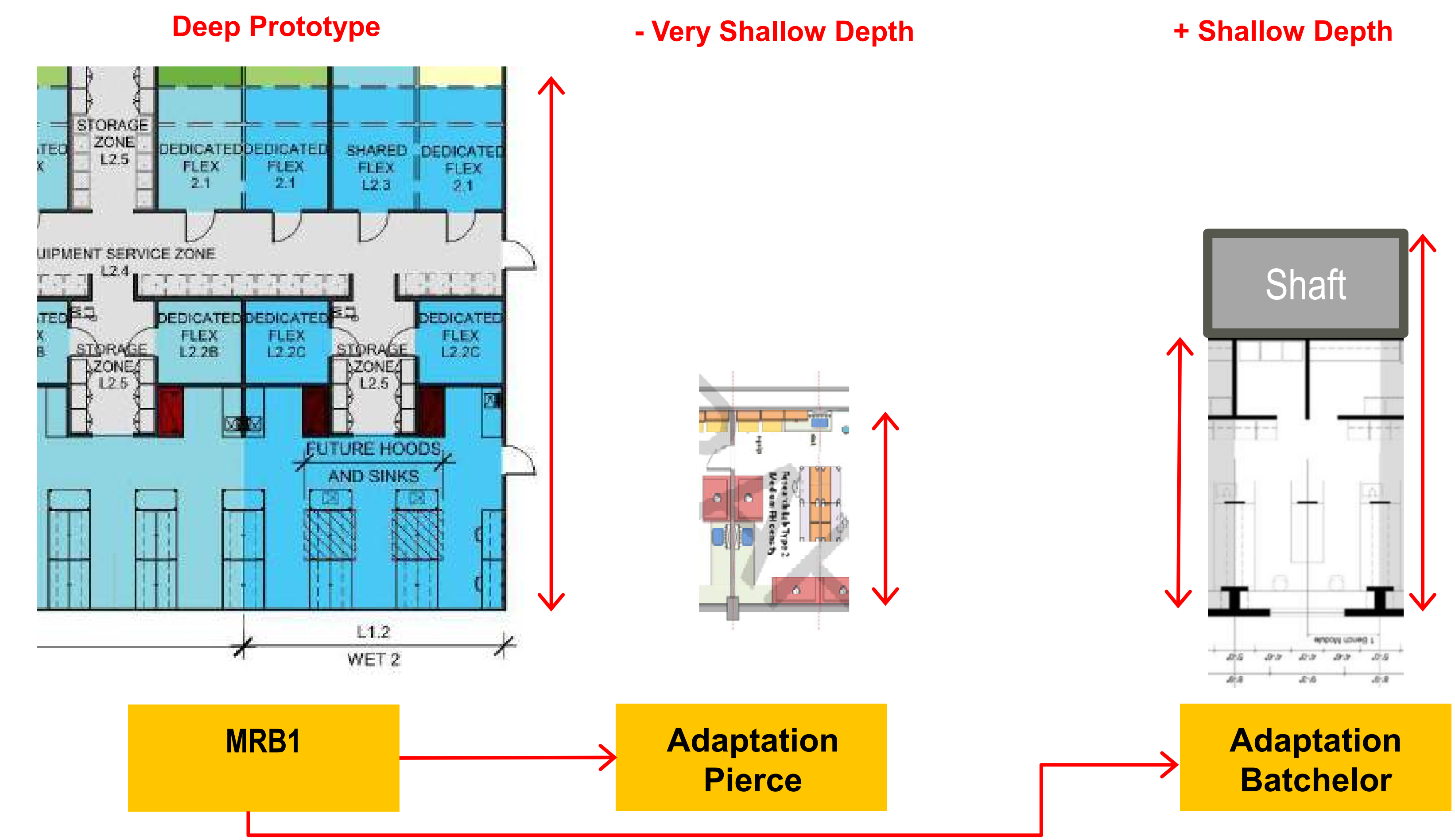


MRB1 Example

Adaptation Pierce

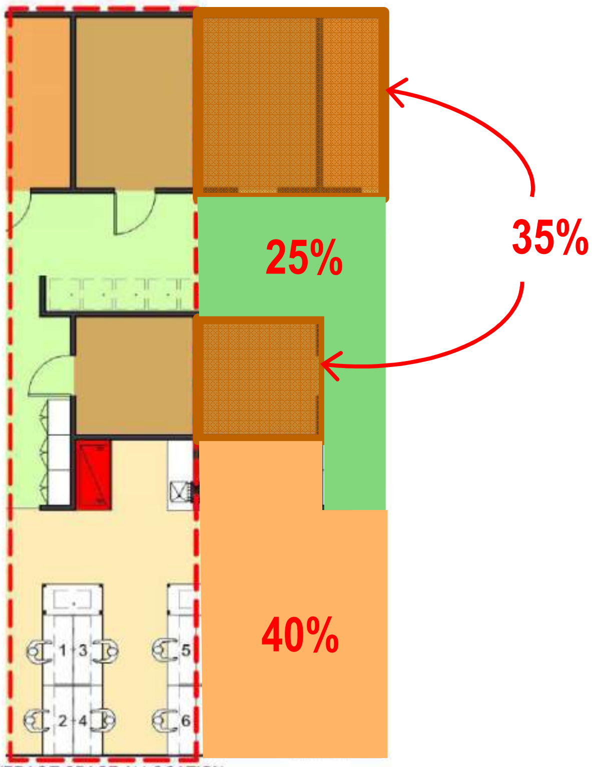
Adaptation Batchelor

SPACE TYPE PROTOTYPES: LAB DEPTH



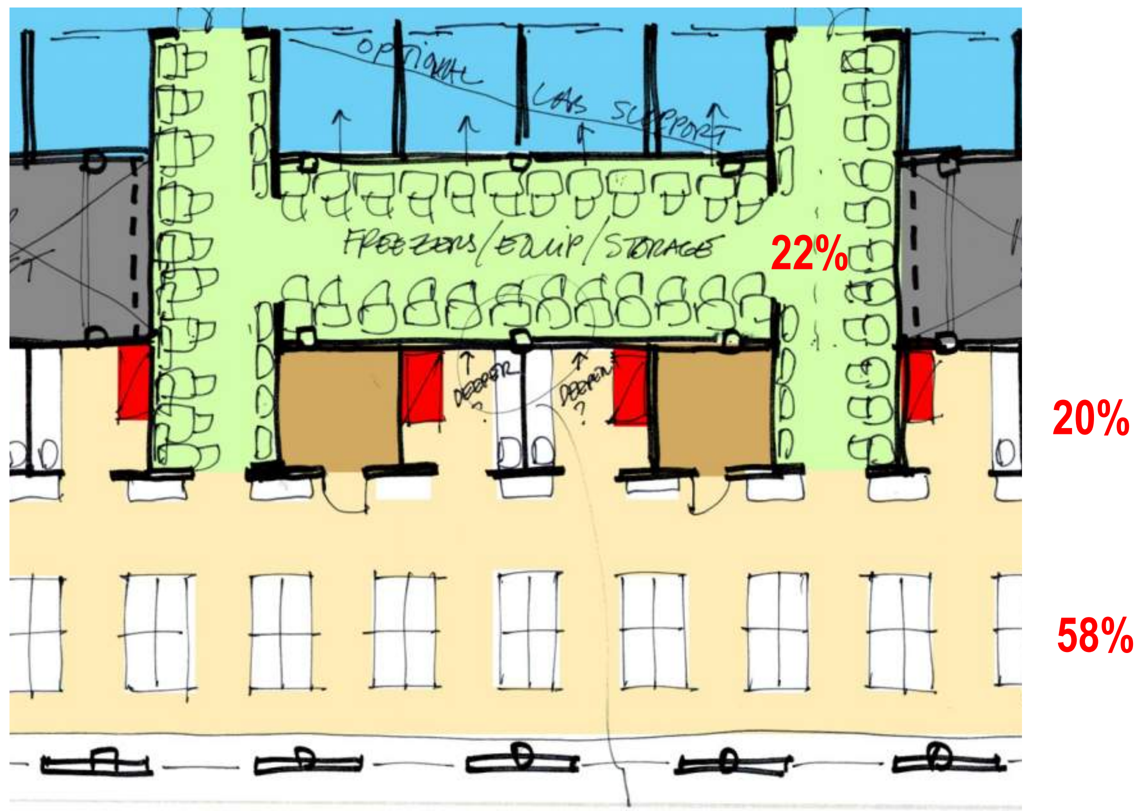
LAB SPACE TYPE RATIOS: FUME HOODS IN ALCOVES

SEE ROOM DATA SHEETS FOR SPECIFIC REQUIREMENTS
FOR SPECIFIC LABORATORY TYPES



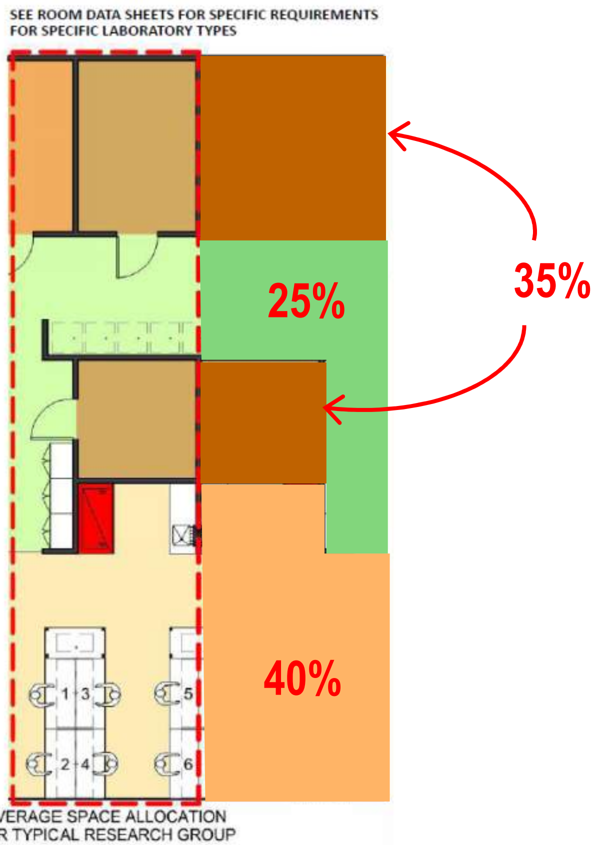
AVERAGE SPACE ALLOCATION
PER TYPICAL RESEARCH GROUP

60% Lab Support - 40% Lab

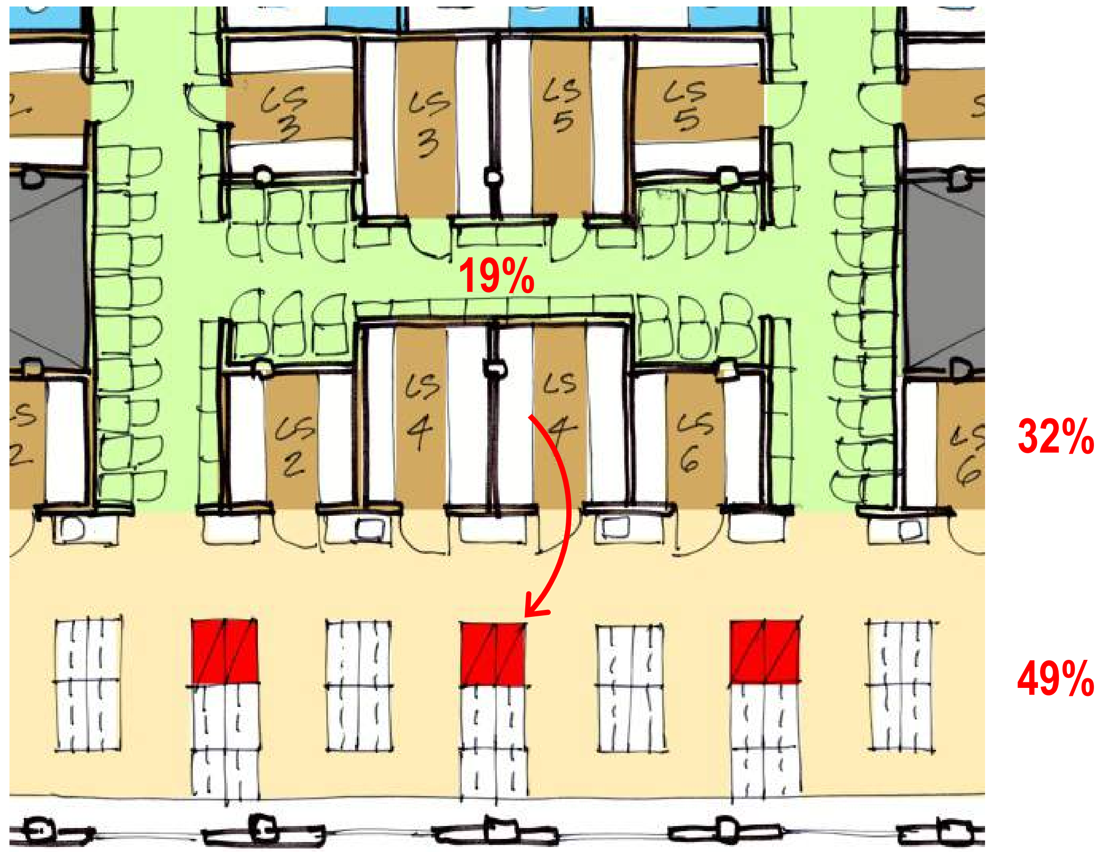


42% Lab Support - 58% Lab

LAB SPACE TYPE RATIOS: MAX LAB SUPPORT



60% Lab Support - 40% Lab

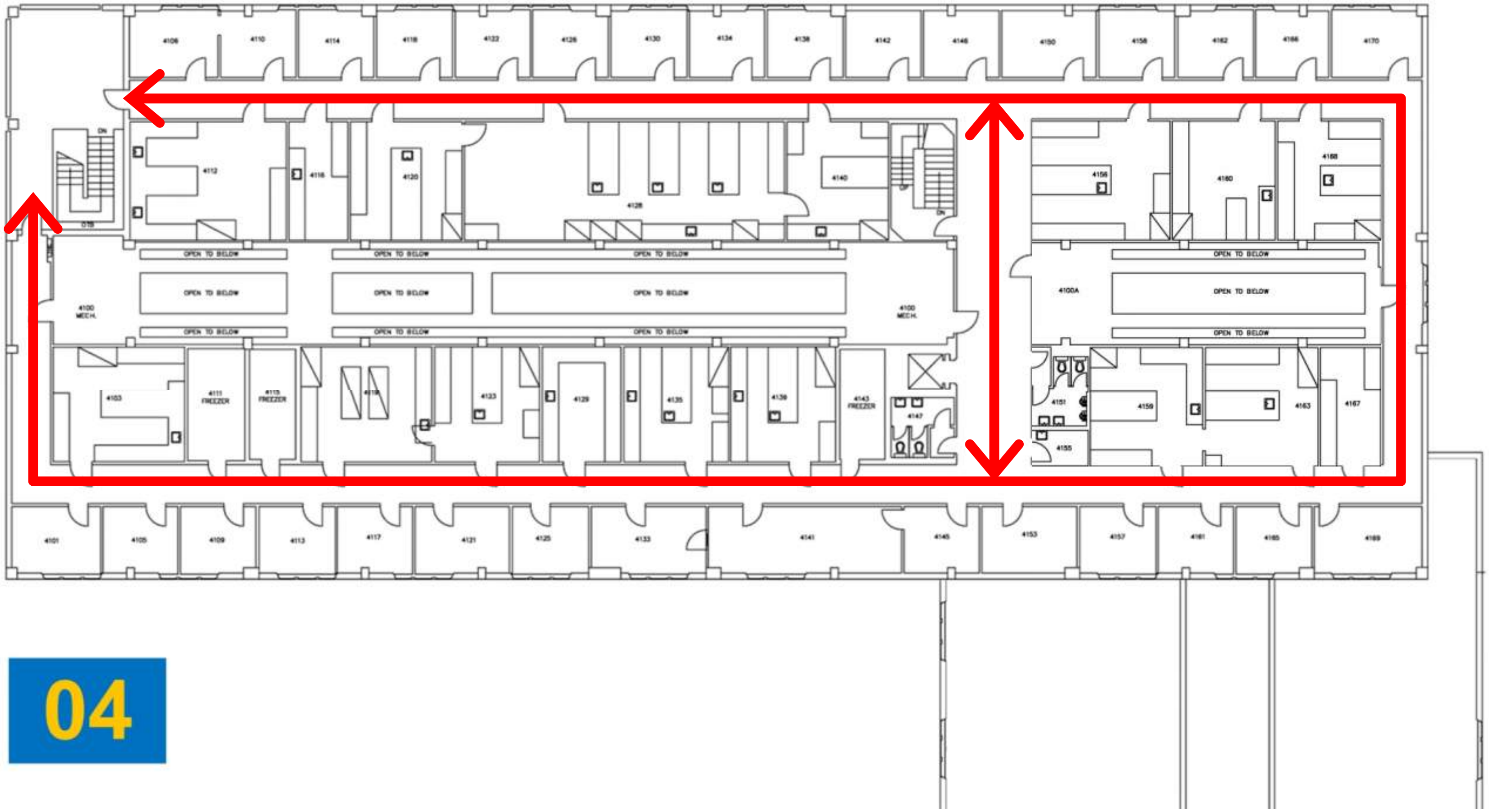


51% Lab Support - 49% Lab

POSSIBLE APPLICATION OF TEMPLATE / DNA

04

EXISTING PATHWAYS

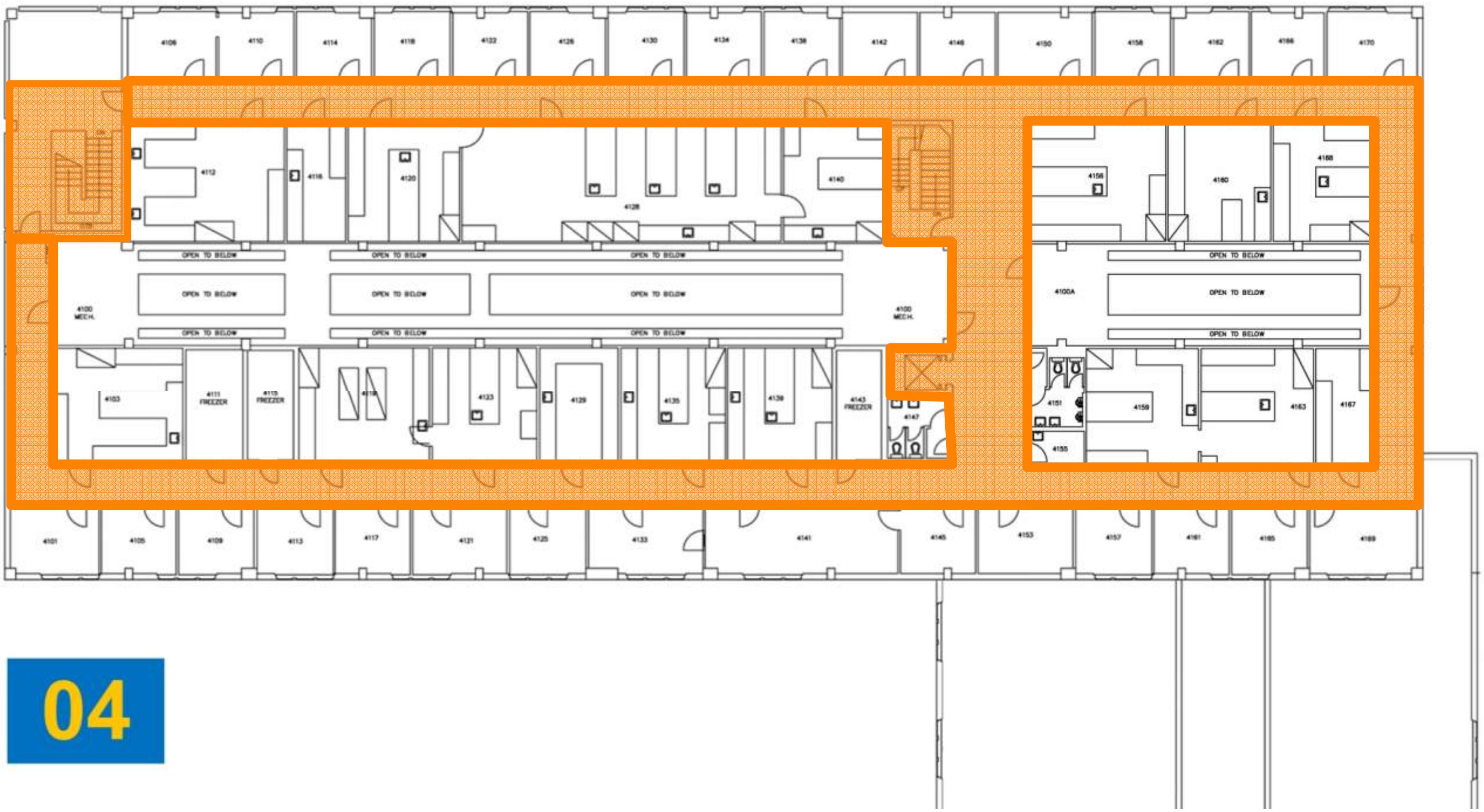


04

POSSIBLE PATHWAYS

04

EXISTING PATHWAY EFFICIENCY



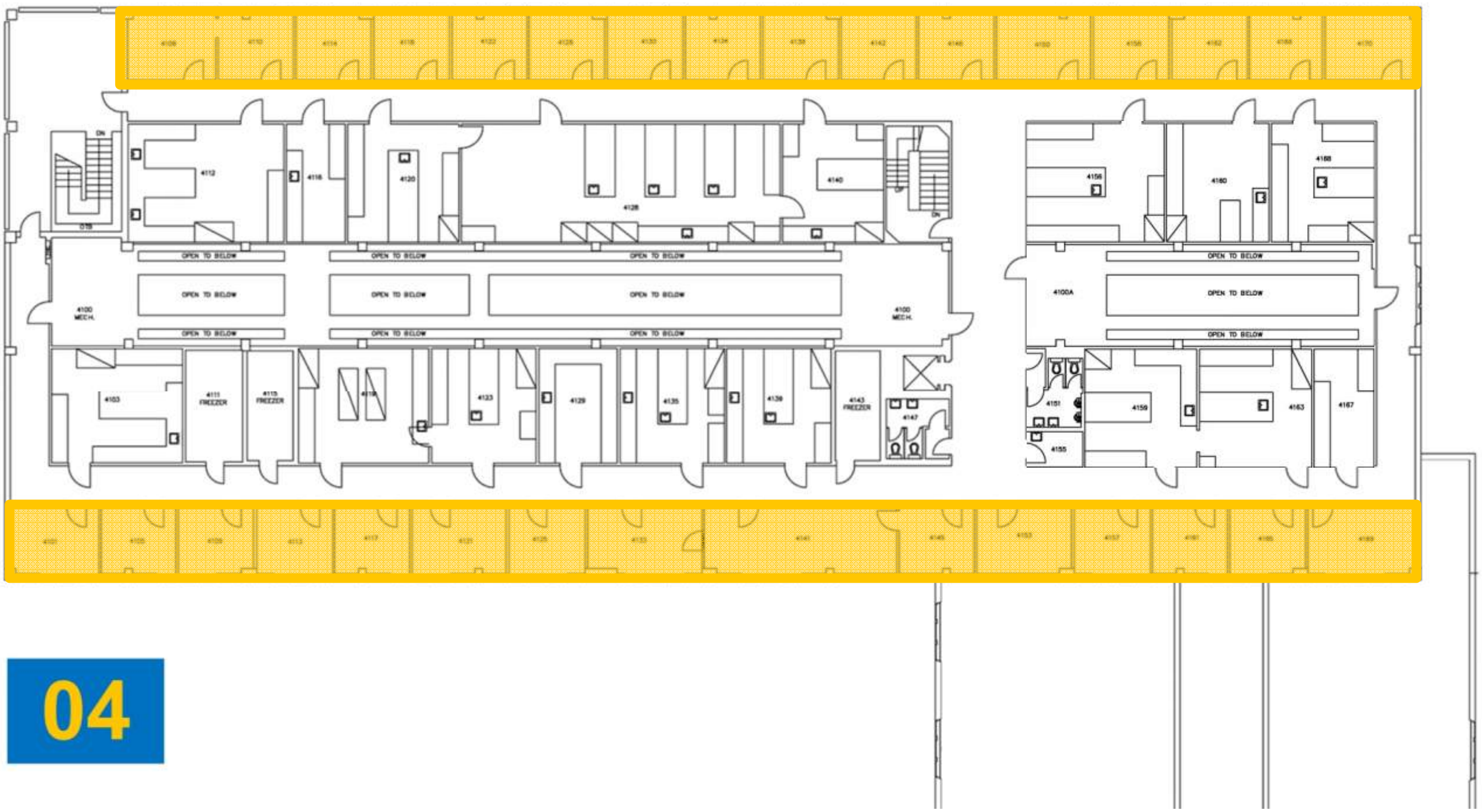
04


FLAMMABLE
GHOST CORRIDOR INCREASES
SPACE UTILIZATION AND EFFICIENCY

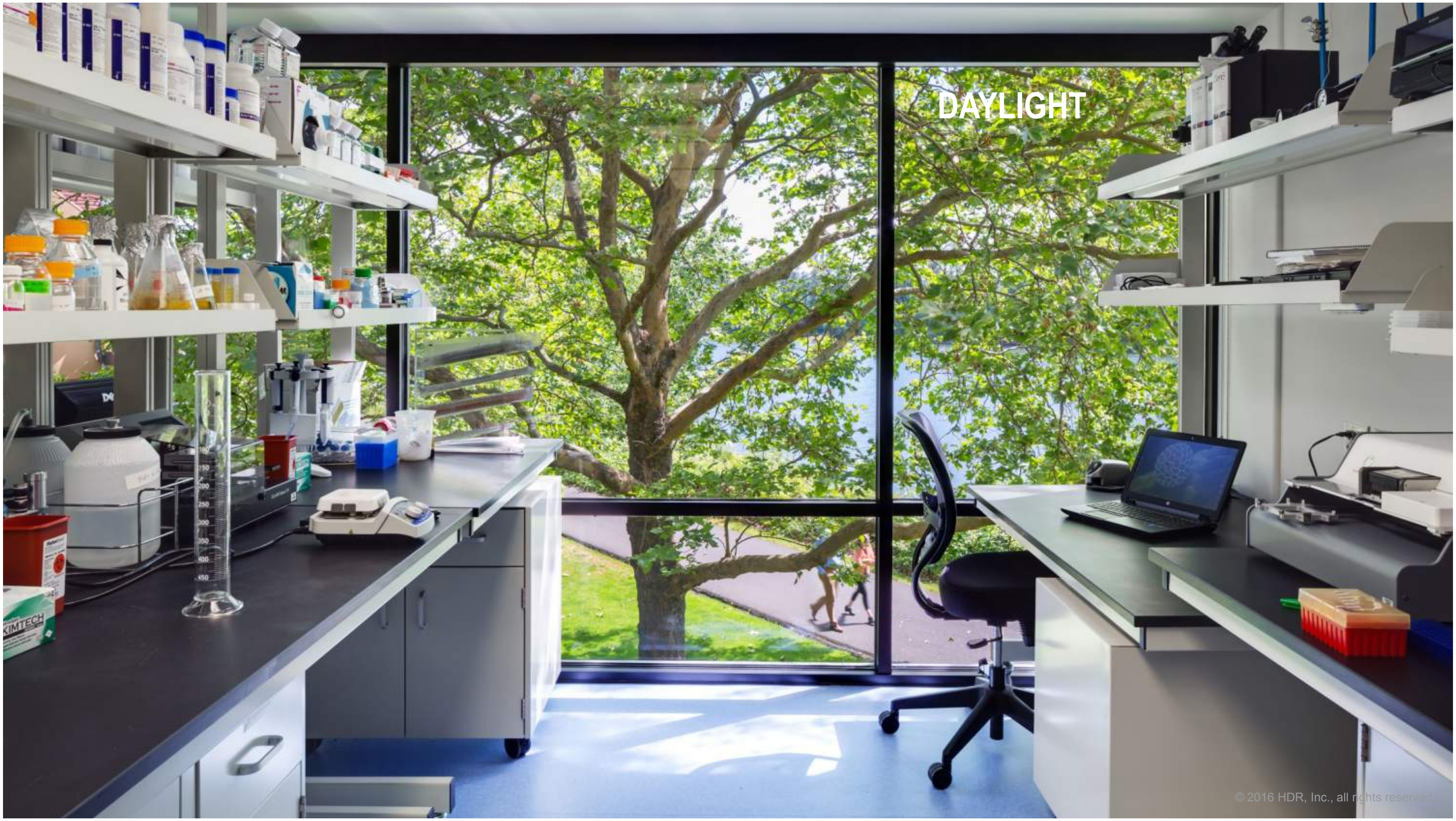
POSSIBLE PATHWAY EFFICIENCY

04

EXISTING DAYLIGHTING + VIEWS



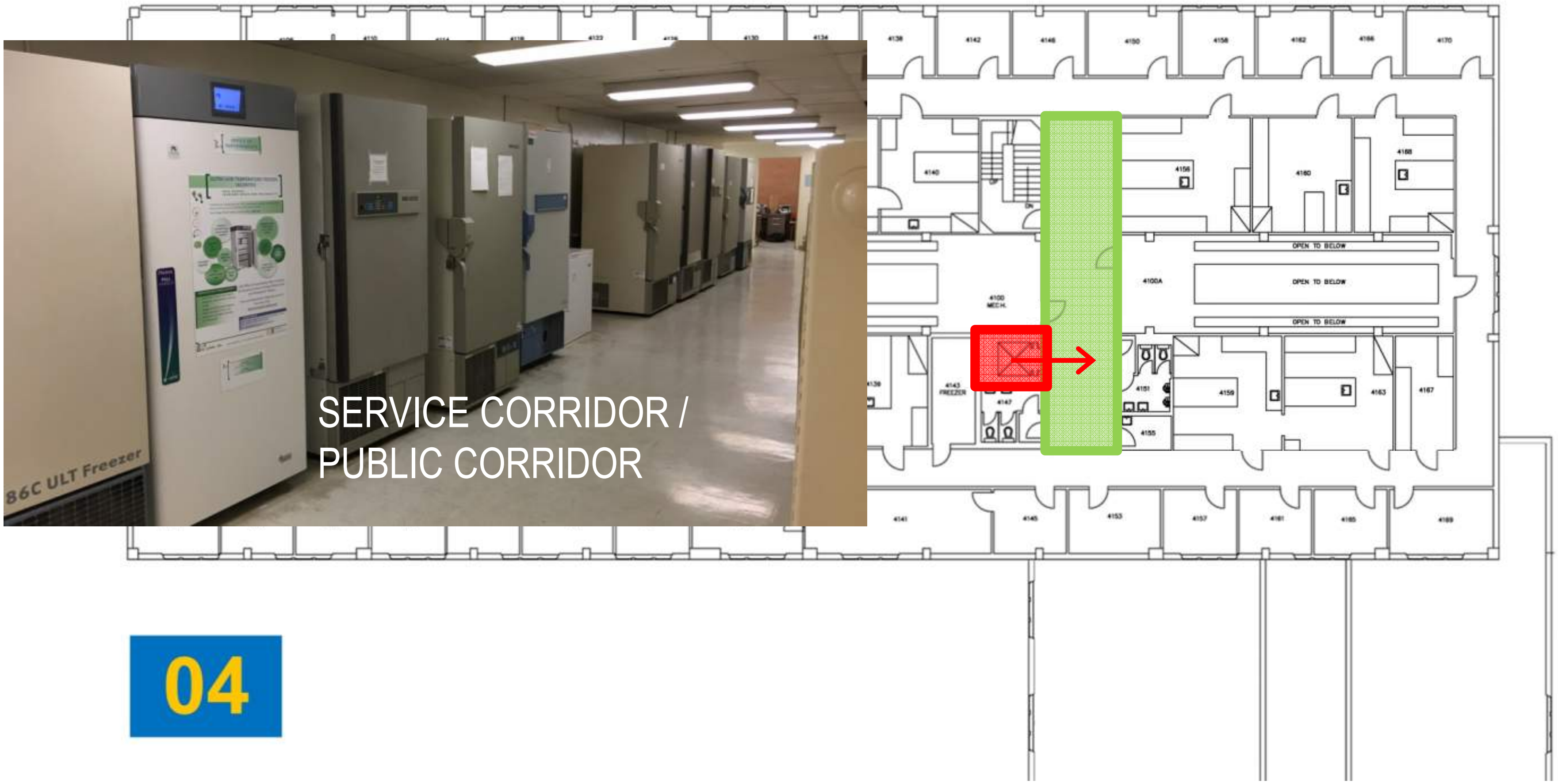
04


DAYLIGHT
KIMTECH

POSSIBLE DAYLIGHTING + VIEWS

04

EXISTING LINEAR EQUIPMENT CORRIDOR = VISITOR ARRIVAL

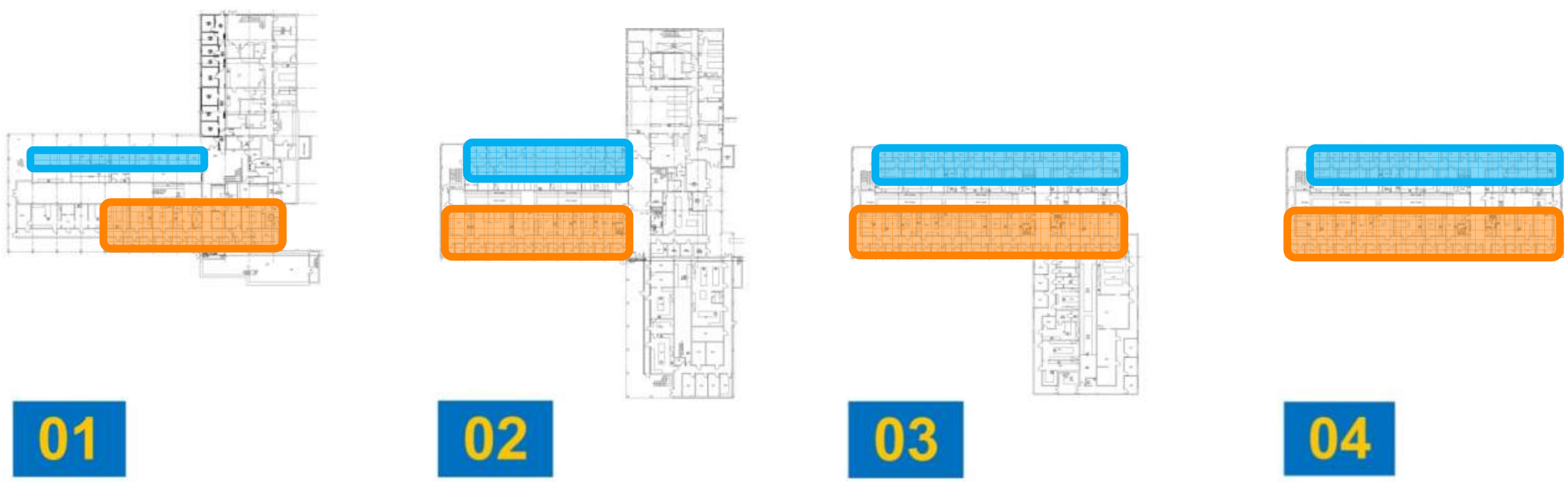


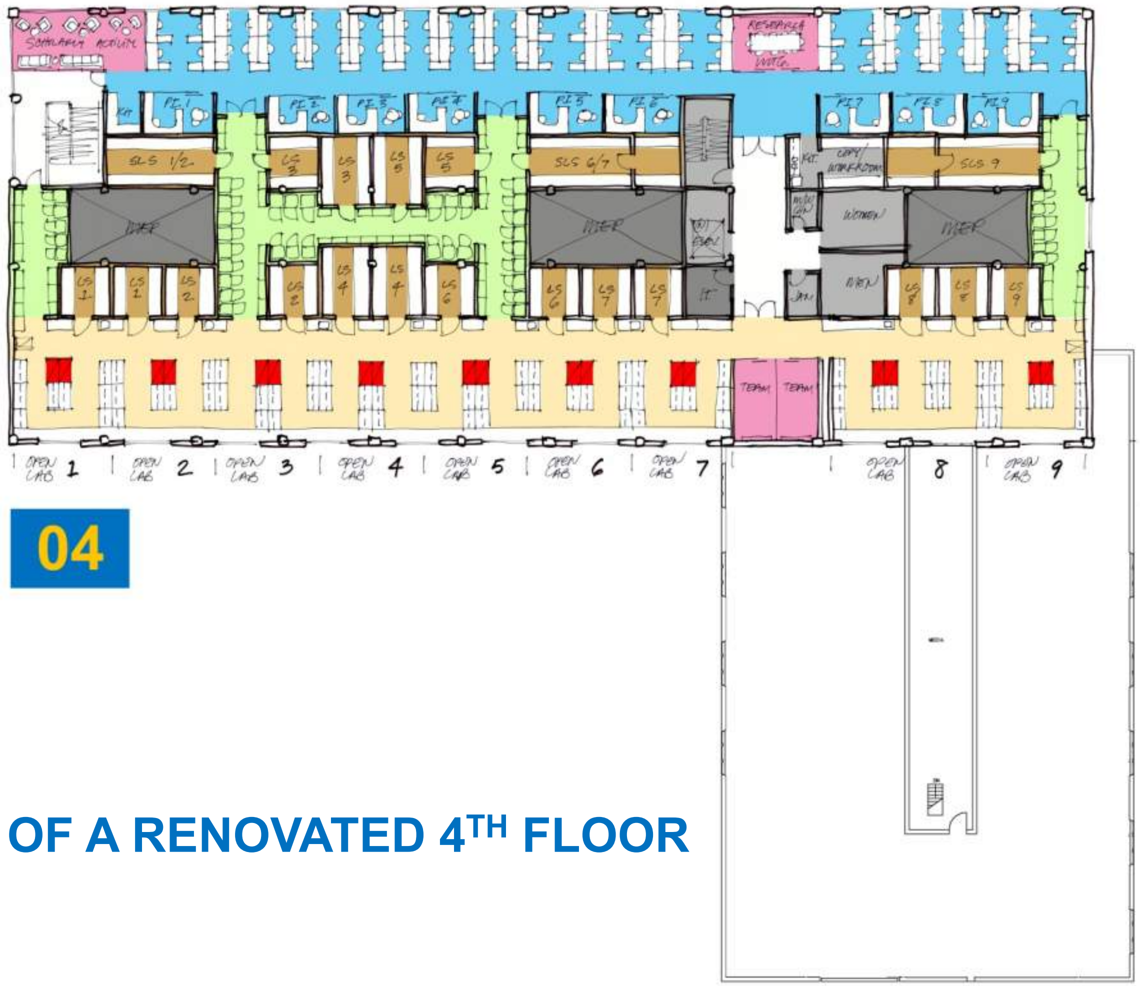
04

POSSIBLE LINEAR EQUIPMENT CORRIDORS

04

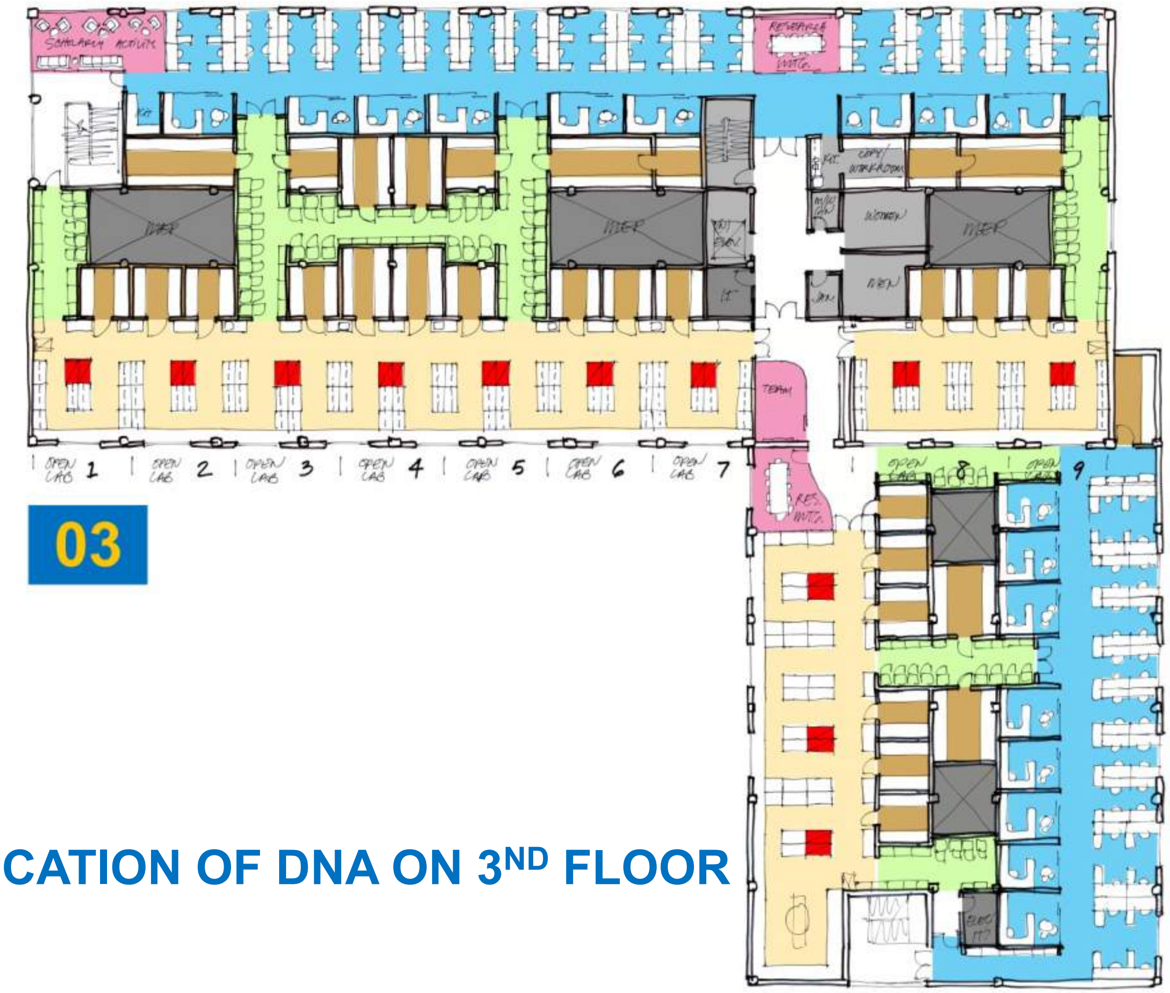
EXPLORING THE 4TH FLOOR LOGIC ON ALL LEVELS





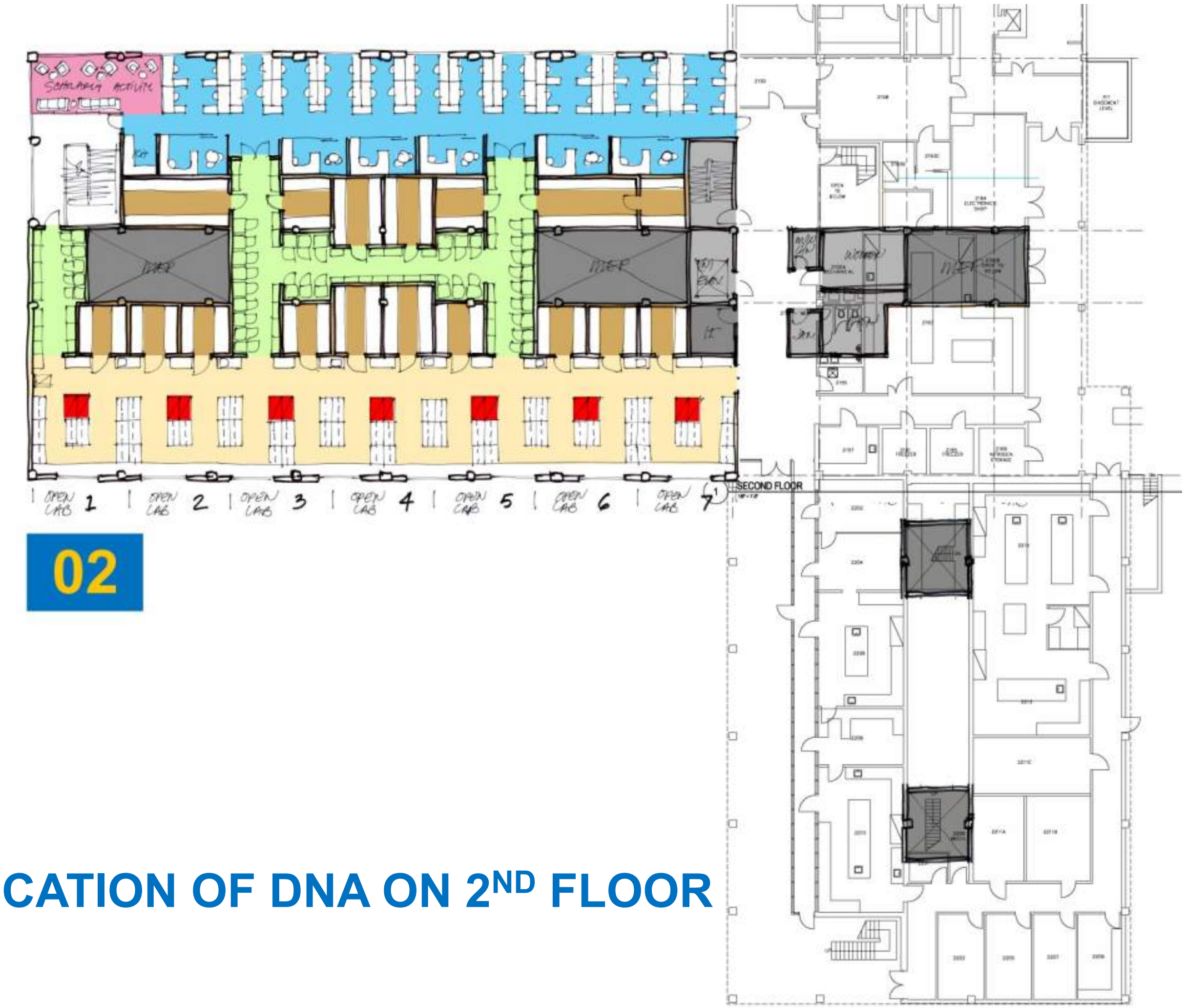
04

CONCEPTUAL DNA OF A RENOVATED 4TH FLOOR



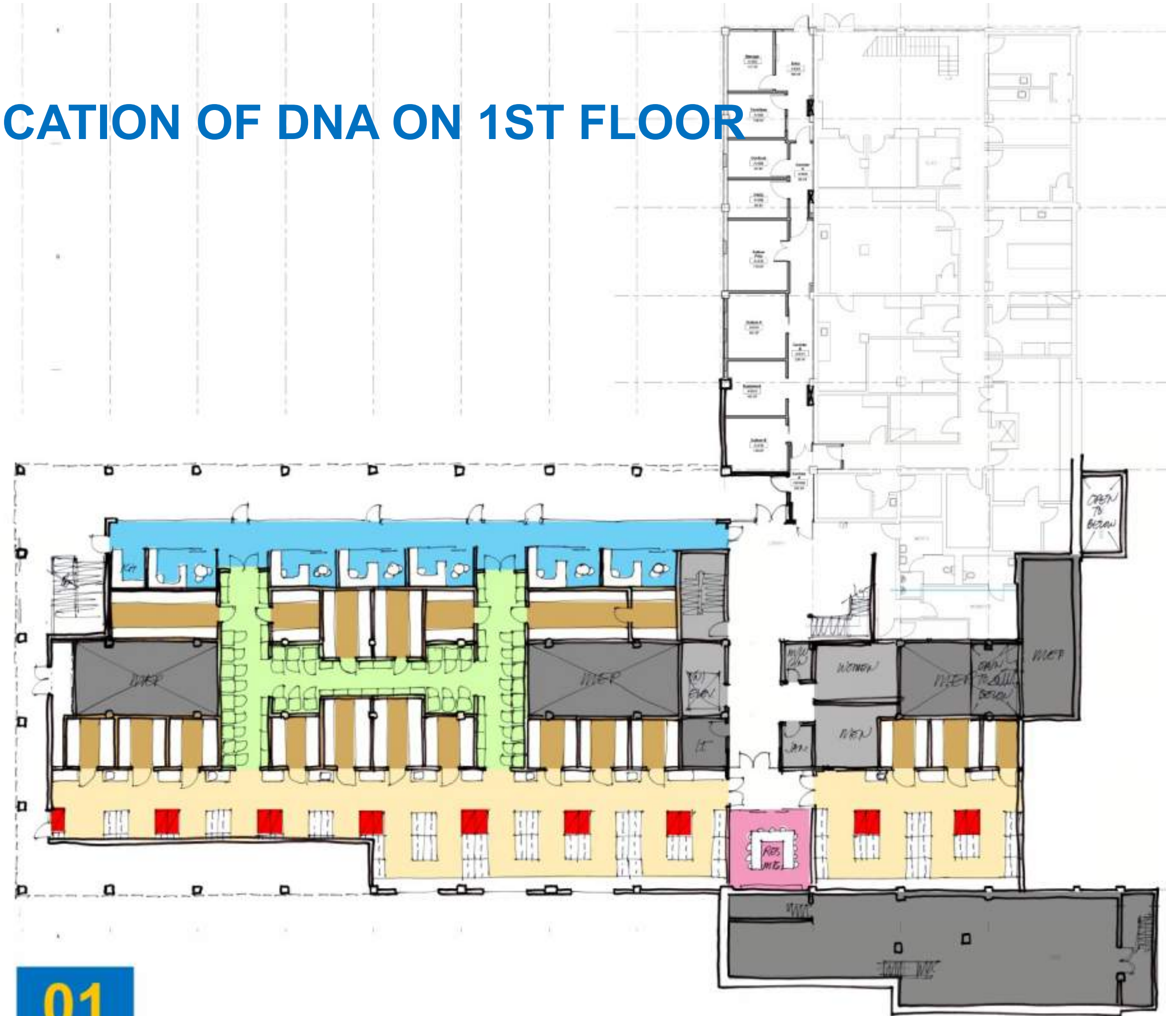
03

CONCEPTUAL APPLICATION OF DNA ON 3ND FLOOR



CONCEPTUAL APPLICATION OF DNA ON 2ND FLOOR

CONCEPTUAL APPLICATION OF DNA ON 1ST FLOOR



01

05 Specialty and/or Shared Functions

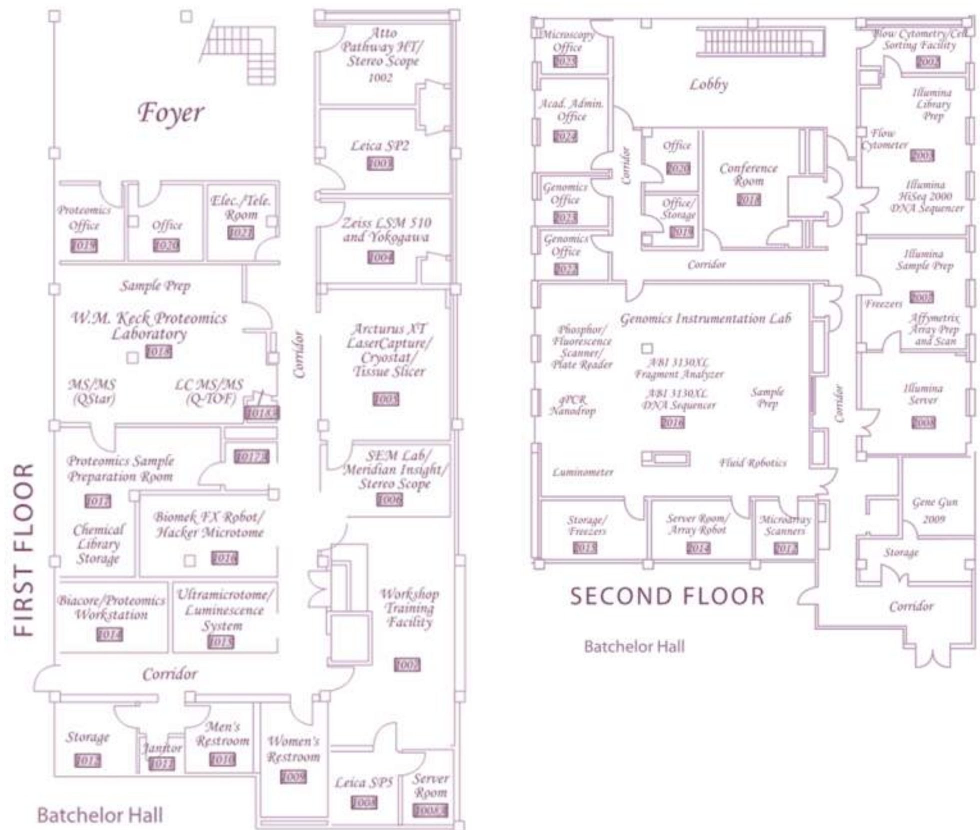
CONFIRMATION OF SPECIALTY/SHARED FACILITIES

- Existing Microscopy (reduce /expand)
- Existing Proteomics (reduce /expand)
- Existing Genomics (reduce /expand)
- Additional Imaging, Characterization
- Vivarium (species, holding quantity, surgery)
- Cage Wash
- Other?

- Classrooms?

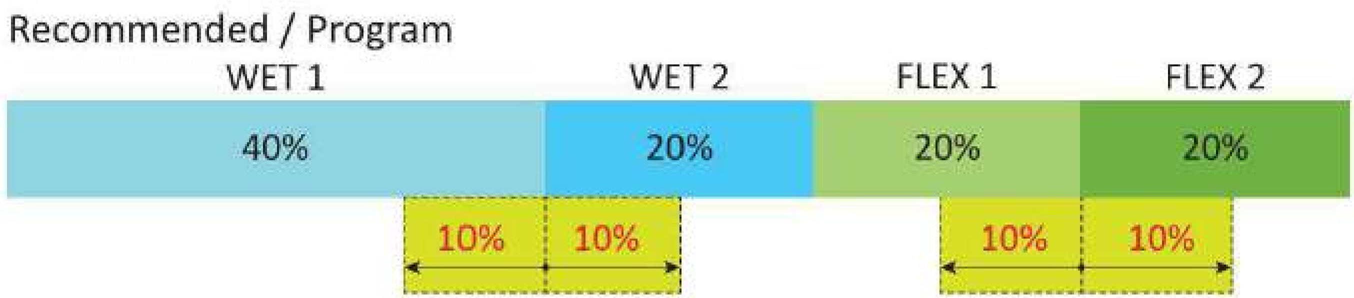
- Large Conference / Lecture?

- Administration?



RATIO OF LAB TYPES

- Wet 1: Low Fume Hood Density
- Wet 2: Medium Fume Hood Density
- Flex 1: Instrument Intensive
- Flex 2: Procedure Intensive
- Dry 1: Computation Intensive (not shown, but 1/8 of other lab types, including PI Off)



07 Schedule, Wrap-up and Next Steps

Meeting Minutes

Project:	Batchelor Hall Renewal Project
Subject:	1) Engineering Data Collection of Existing Building 2) Botany + Plant Sciences (B+PS) Existing Lab Tour
Date:	Tuesday, October 11, 2016
Location:	Batchelor Hall B-154
Attendees:	Blythe Wilson – UCR Chris Flanders – UCR Dan Martin - UCR Chris Duwel - UCR Ken Filar – HDR Mike Alamo - HDR Ivan Avila – HDR Kelly Hartshorn – HDR Phil Beadle – HDR Jeff Wurmlinger - HDR David Danielson – HDR

	Topic	*Responsibility*
1	**Laboratory Exhaust** Currently the laboratory exhaust utilizes individual/dedicated exhaust fan per fume hood, resulting in multiple fans within the exhaust penthouse. *Renewal preference would be to replace the multiple small fans with a central laboratory exhaust system using few large fans.*	Info
2	**Abatement Requirements** Most insulation has asbestos and the majority of the laboratory exhaust duct risers are fabricated using Transite (cement-asbestos product) ducting.	Info
3	**Chilled Water** There are two CHW entrances from the campus distribution – one each on the west and east ends of the basement. The pumping configuration is a “pull though” arrangement, with the building tertiary pumps on the return piping back to the campus loop. This arrangement is not effective with significant pressure problems at the coils. Variable frequency drives have been added to the tertiary pumps. There is a Process CHW System that supports laboratory equipment cooling. *Renewal preference would be to reconfigure the CHW pumping to provide a “push through” arrangement with pumping on the supply directly off the campus loop.*	Info
4	**Airflow** Building is low on airflow in regard to required air changes per hour. The Fresh Air (makeup air) units are short on coil capacity, with elevated supply air temperatures upon high outside air temperatures. The Stem Cell AHU-1 supporting the adjacent Keen Hall is provided preconditioned makeup air from the Fresh Air units, and as selected based upon these units supply air temperature, the Keen Hall space has temperature control issues upon high outside air temperatures.	Info
5	**Environmental Rooms** Preference for air cooled condensers versus water cooled. Air cooled are dedicated per	Info

individual equipment, with water cooled reliant on a reliable pumping system.
Users require a three month notification to be able to appropriately empty the existing rooms.

Meeting Minutes

Project:	Batchelor Hall Renewal Project
Subject:	1) Engineering Data Collection of Existing Building 2) Botany + Plant Sciences (B+PS) Existing Lab Tour
Date:	Tuesday, October 11, 2016
Location:	Batchelor Hall B-154
Attendees:	Blythe Wilson – UCR Peter Atkinson – UCR Mikeal Roose - UCR Patty Springer – UCR Linda Walling – UCR Blythe Wilson – UCR Amanda Hathaway– UCR Ken Filar – HDR Mike Alamo Ivan Avila – HDR Kelly Hartshorn – HDR Phil Beadle – HDR David Danielson – HDR

	Topic	*Responsibility*
1	**Research Group Sizes** Mikeal Roose's research group with 20 individuals is one of the largest, but possibly not THE largest associated with the existing building. Mikeal pointed out that joint group meetings often occur when groups team together on projects. This could bring the largest joint group to somewhere around 40, or roughly the average expected attendance of a faculty meeting. (Subsequent lab planning note upon reflection: It might make sense to size the typical meeting room on a floor for a single research group, but that there be one meeting room sized for about 40 to accommodate joint group and faculty meetings. The frequency of these larger meetings should be documented so the University can determine the need for whether a space this large is required in Batchelor Hall or a nearby building.)	Info
2	**Hood Working Surface** B+PS did not recommend sinks in the new hoods. P.Springer disliked worksurface lips in hoods because they tend to create spills when containers are placed on them. Ironically, the lip is there to contain hazardous liquid spills within the hood rather than spilling to a location that's not adequately exhausted.	Info
2	**Hood Size** B+PS suggested that 5'-wide hoods were too narrow for their purposes. This is based on working in existing hoods with integral sinks. There was a 6-foot hood in the lab we met in, and this hood had an interior working width of 4'-10" due to 14" used for side enclosures to accommodate piping, etc. Modern hoods typically come in 1-foot increments, lose only 10" to the side walls, and have depths over 27", depending on the models selected. 6'- wide hoods are requested by B+PS at this time.	Info
2	**Plant Growth Rooms** B+PS believes Plant Growth Rooms are essential functional provisions for attracting B+PS Principal Investigators (PIs) to the University. 2 Plant Growth Rooms are requested per floor to minimizing losses due to pests, in particular. We toured Room 2211C, which measured approximately 11.5' x 24.5' or 282 ASF, with one extra deep utility shelving row on each long wall, holding plant trays with automated watering. The rooms were not	Info

insulated at floors, walls or ceiling and the paint was peeling (epoxy paint might have solved this, but increased humidity levels in the room should be seriously addressed by the room architecture). The rooms did have supply air plenums behind the shelving and extensive fluorescent lighting above each shelf. B+PS stated that LEDs should be the standard moving forward. The rooms are requested to be targeted at 70-degrees F, +/- 5-degrees F (at another point in the meeting +/- 10-degrees was stated as acceptable, to be reconciled). Humidity Control is not essential. All researchers should be able to work with these criteria. Researchers with different temperature and humidity requirements would perform these in Plant Growth Chamber Equipment. B+PS requested sloped floors to drain with some method for capturing and easily accessing collected soil at the drain. Do not return air from Plant Growth Rooms, occasionally they need to be fumigated.

2	**Floor Drains in Labs** B+PS (M. Roose) agreed that floor drains were not required in labs, but floor drains are mandatory in Plant Growth Rooms.	Info
3	**Renovation Down Time** B+PS stated that most users could operate effectively without a fume hood for up to a week while work was being done. Users would need access to at least one autoclave in the building. This quantity seems small and HDR believes that it should get confirmed.	Info
3	**Surge Space Accommodation** B+PS stated that B+PS stated that very little to no money would need to be invested in surge space to accommodate temporary lab user moves. Most researchers could make do in another lab of comparable size. Money would be better spent on new construction than temporary accommodation.	Info
3	**Surge Space Availability** B+PS stated that there was essentially no available surge space within the areas where the department currently resides (Batchelor Hall, Boyce Hall and the Genomics Building). Identification of surge space, if required for construction logistics will likely be identified by the Provost's Office.	Info
4	**Lab Gas** Batchelor Hall currently has Lab Natural Gas distributed throughout the labs. This was also included in the MRB1 Basis of Design. However, HDR would like the University to consider the omission of Lab Natural Gas distribution throughout the building, as this is no longer considered best practice in similar Life Sciences buildings. HDR believes the users would realize more value from other project budget investments, and presumes the University Fire Marshal would look favorably on removing the general distribution of this flammable gas from the building. HDR will attempt to find a white paper describing the operational adjustments required when lab natural gas is not provided in typical life sciences labs.	Info
5	**LN2 Dewars** B+PS does not currently use large, roll-around LN2 dewars that might be a challenge for move-in, move-out damage. LN2 dewars are small (in the range of a few gallons). However, HDR would like to check with the University whether the building should be designed with future users in mind to resist the significant wear and tear associated with large LN2 dewar transport.	Info
6	**Emergency Power** There is currently no emergency power available to B+PS users. HDR is to propose a format for collecting approximate existing Freezer electrical loads from the users. The new building should have adequate Emergency Power capacity for:	Info

- Existing Freezer Load
- Future Projected Freezer Load (B+PS stated that -80C freezers are increasing in proportion to other freezer temperatures)
- No Refrigerators
- Plant Growth Rooms Lighting and Watering????? (was not discussed in meeting) (Note that all lab exhaust will be on E Power, so room exhaust will be operational.)
- One 120 and 208(240)V outlet per lab support room.
- One 120 V outlet every other lab module 21' on center (spacing proposed subsequently by KFilar for feedback) along perimeter open lab benches for equipment that will be plugged into user-supplied UPS that will be plugged into Emergency power outlet, like a Mass Spectrometer running extended-duration data collection.
- A logical density of outlets where there is anticipated to be a high concentration of Freezers like the "Green H" shown on the Lab Template Plans in Workshop 1.

7	**Metabolomics Plant Growth Room** The planned renovation of the 2nd Floor South Wing is to create a Metabolomics Core facility. Associated with this core is a planned new Plant Growth Room in the Existing Electrical Shop. HDR believes it should review this location, and potentially other plans for the Metabolomics Core to identify any new work that will be a critical obstacle to creating an efficient plan for the larger renovation project. HDR would like to review the details of the new Plant Growth Room for clues as to how Plant Growth Rooms might be cost effectively implemented in the larger renovation. New Plant Growth Rooms are relatively expensive if delivered turnkey from a vendor.	Info
8	**Existing Exterior Northwest Stair Landing** Mikeal Roose confirmed that the existing stair landings in the northwest corner of Batchelor Hall are not highly utilized for scholarly activity. They primarily get used for eating lunches outdoors.	Info

Meeting Minutes

Project:	Batchelor Hall Renewal Project
Subject:	Working Group Meeting #2
Date:	Wednesday, October 19, 2016
Location:	Bannockburn J-102
Attendees:	Jon Harvey – UCR Blythe Wilson – UCR Peter Atkinson – UCR Mikeal Roose - UCR Patty Springer – UCR Deborah McWilliams – UCR Mary Droser – UCR Sharyl Murdock – UCR Dan Martin – UCR Frank Porter – UCR Chris Flanders – UCR Melissa Garrety – UCR Trip Grant – HDR Ken Filar – HDR Terry McCarthy – HDR Mike Alamo - HDR Phil Beadle – HDR

	Topic	*Responsibility*
1	**General Introduction of Planning Principals** 1. Renovation to fit within the existing building framework or morphology. 2. The MEP improvements set the stage for the companion interior improvement project and future interior renovation projects. 3. Realities of Batchelor Hall: floor-to-floor height is 9 feet 4 inches' clear; 18 foot structural bays; elevator is not ADA compliant and there is no service elevator. 4. Existing conditions limit options. The 18-foot structural bay does not evenly divide into a safe and efficient lab planning module. Consequently, a 10'-6" lab planning module is proposed which aligns with every other structural joist/space. 5. The goal of the building program is to support various types of research and not prohibit other research disciplines from using the facility (e.g. pharmacy). 6. Project needs to balance MEP capacity capabilities with available funding. Do not want to over design systems. 7. Phasing strategy assumes that floors will be vacated when renovated. Surge space to house displaced programs is not known at this time. 8. Planning could consider if the first floor arcade area can be enclosed to increase ASF. 9. This project does not include any scope within Keen Hall. However, some Keen Hall utilities are routed from Batchelor Hall and will cause impacts, which need to be considered. 10. The Working Group assumes all biosafety cabinets will be recirculation type.	
2	**Research Group Sizes** Confirmation of AVERAGE research group size: (1) PI (private office) (2) Post Docs (workstation) (4) Graduate Students (workstation) Additional team members may include (2) Undergraduates (no office or dedicated laboratory space) (1) Visiting Professor (accommodation TBD)	HDR: Provide Combined Average Lineal Feet of Working Surface metric in future.

HDR's initial planning indicates the Batchelor Hall infrastructure optimally accommodate 5' wide x 30" deep tables, which is within the range of HDR's best practices. For programming and planning purposes, HDR will provide data on the quantity of lineal feet of working surface per research group including lab and lab support, since lab and lab support working surface quantities are somewhat fungible. It was mentioned that increasingly work is being done less on lab benches and more in lab support space.

Equipment aisles ("green space") on the template plans should be considered lab support when calculating lab to lab support ratios.

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3 **Lab Type Definitions** — Info

HDR presented the current understanding of fume hood allocations per University-standard lab types:

- Wet 1: 1 Hood / 2 Groups
- Wet 2: 1 Hood + 1 Future Hood (F) / Group
- Wet 3: 2 Hoods + (2F) / Group
- Wet 4: 1 Hood per Lab User
- Flex 1: 1 Hood + (F) / 4 Groups
  Instrument Intensive
- Flex 2: 1 Hood + (F) / 4 Groups
  Procedure Intensive
- Dry 1: 0 Hoods

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4 **B+PS Lab Type Requests** — Info

Based on the lab types above, Working Group requests 80% Wet Lab 2 and 20% Wet Lab 3, with a yet-as-to-be-determined quantity of purely computational research groups.

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5 **Allocations per Average Research Group (Lab Support Room equipment is additional to this except for hood space)** — Info

Wet Lab Type 1:
(1) 6'-wide Hood shared between 2 groups

Wet Lab Type 2:
(1) 6'-wide Hood
(1) Capacity for future 5'-wide hood in allocated lab support space.

Wet Lab Type 3:
(1) 6'-wide Hood
(1) 5'-wide Hood
(2) Capacity for future 5'-wide hoods in allocated lab support space.

Wet Lab Type 4:
(1) 6'-wide Hood
(1 / lab user) Capacity for future 5'-wide hoods in allocated lab support space.

Regardless of Wet Lab Type:
(1) Sink and sink cabinet with RO Water connection for water purifier.
(1 / hood) Flammable Storage Cabinet under hood (half the hood width)
(1 / hood) Corrosive Storage Cabinet under hood (half the hood width)
(1) -80C Freezer Space (+ Emergency Power)
(2) -20C Freezer Spaces (+ Emergency Power)
(1) +4C Refrigerator Space

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(1) +4C Double-Door (Deli-style) Refrigerator Space
(1) Under counter Dishwasher (Space will be provide; equipment purchased by Project TBD)
(1) Shaking Incubator Space
(1) Plant Growth Chamber Space
(4) Tall Storage Cabinets (4'-wide x 7'-high)
(TBD) Chase space for Inert Gas Cylinders (N2, Argon, CO2 etc.), and Hazardous Gas Cylinders (O2, etc.) depending on Fire Code limits and Fire Marshal approval

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6 **Allocations per Floor** Info

(1) Autoclave (24" x 24")
(1) Sink at Autoclave with HW, CW, RO and Type III water polisher
(1) Ice Machine
(1) Large, floor-standing Centrifuge
(1) Gel Documentation system with computer
(1) Nano-Drop system
(2) Plant Growth Rooms (additional capacity in greenhouses to be investigated by UCR)
(1) Meeting Room sized larger than the average research group
(?) TA-Undergraduate Meeting Space could be on floor or in another location
(1) Scholarly Activity area (lounge)
(1) Team or small meeting space on each floor was viewed as beneficial but seen as a lower priority

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7 **Allocations per Building** Info

(1) Scientific Server Room (to be determined)
(1) X-Ray Developer
(1) Plant Growth Room (larger, TBD, part of greenhouse complex?)
(1) Conference / meeting room for the building that has approximately 20 to 30 seats; larger meetings will use a location (TBD) outside of building

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8 **Security** Info

Security in the office areas is a concern. There was recently a major theft of laptops in a UCR Earth Science Building, where the thieves were able to get through 2 locked doors. The PI office should be lockable, and all open workstations should include locked storage.

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9 **Fume Hood Size** Info

The preference is to provide one 6'-wide hood without a cup sink for a research group. Subsequent hoods would average 5'-wide in order to fit in a typical 10' x 10' lab support room, and would be placed in that research group's allocation of lab support space. Modern hoods typically come in 1-foot increments, lose only 10" to the side walls, and have depths over 27", depending on vendors and models selected. The existing fume hood in Room 2211 loses approximately 14" due to the side walls.

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10 **Lab Planning Template** Info

(3) lab planning template options were presented:

A. Fume hood alcoves consuming a 10'x10' lab support module.
B. Fume hoods embedded in the open lab bench islands.
C. 6'-deep x 20.5'-wide fume hood alcoves (referred to as the hybrid scheme).

Option C had been developed in response to information obtained at Working Group Mtg. #1 and HDR's design engineers. The Working Group vastly preferred option C, the hybrid scheme, and did not feel it was meaningful to continue to consider options A and B.

Option C only results in a small amount of traffic (to get to a 10' x 10' support room) passing through the hood alcove. The arrangement of moving through a hood alcove to get to another space was viewed as acceptable.

A sliding door is proposed between the alcove and support space to eliminate the possibility that a door would swing into someone working with hazardous materials, and to allow full disabled access to the support room.

The lab support room behind the fume hood alcoves would be the designated space to support additional fume hood capacity. Each of the (8) locations could accommodate either (1) or (2) 5'-wide fume hoods. This is how furnishing the number of fume hoods for Wet Lab 3 space would be achieved; however, additional hood space is substituted for, not additive to, a group's allocation of lab support space.

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11 **Computational Space** — Info

The need for server space somewhere in the building to support the building's computational researchers was discussed. HDR suggested that the University develop a strategy for user server locations that may or may not include cloud or other server capacity not located in the building. M. Droser also requested lockable, hard-walled space to accommodate high-intensity computational users with an average group size of (4) to (6), and stated that these types of users are not appropriately located in open office workstations.

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12 **Plant Growth Rooms** — Info

(3) floor-dedicated, plant growth room location options were presented:

A. At the two ends of the existing East-West Wing MEP core spaces.
B. Within the existing East-West Wing MEP core spaces, outboard of the "freezer aisles" (green 'H' on the colored plans).
C. To the south of the elevator lobby (note: there is no exterior window currently in this location).

Options A and B were developed because of the potential to create sloped floors to drain, since these are locations with either no floor or short spans. These options would reduce important MEP shaft chase space and are both potentially unfeasible. Option C is located above floor long-spanned with concrete 'T's, the webs of which should not be cut into for structural reasons. However, HDR showed how some sloping to drain could be achieved without creating disabled-access ramping, primarily by sloping back from a drain near the door to the rear and side walls with epoxy flooring, providing the maximum 0.5" lip at the door, and cutting into the flanges of the 'T's at the drain.

Working Group preferred Option C, which has the potential to put plant growth on display at the elevator lobbies. There is, however, a concern about being able to black the rooms out at night. B. Wilson expressed his feeling that there should be a technical solution to the blackout criterion. HDR later mentioned that the Option C Plant Growth Rooms location is only fully available on floors 1 and 4. However, there are locations outside of the "templatable" areas on floors 2 and 3; namely on the 2nd Floor East of the Elevator Lobby, and the South Wing of both floors 2 and 3.

A concern for dirt being tracked out of the Plant Growth Rooms was raised. A benefit of Option C is the room location has direct access to the elevator without having to track dirt through any of the lab space. Planning to consider using walk-off mats to control dirt moving through the floor.

The previous meeting minutes (from the User tour of October 11, 2016) describe additional user-requested criteria for the rooms.

13	**Lab Gas (Natural Gas)** HDR once again raised the potential elimination of lab gas because of its very infrequent inclusion in newly designed life science lab buildings, and for fire safety concerns. The Working Group thought that for some molecular biology functions, such as culture spreading, lab gas is essential. As a compromise, HDR is looking to limit lab gas to certain locations, such as in the hoods, hood alcoves and lab support spaces, and neither at the open lab island benches nor along the window walls. The users are also concerned about fire safety, particularly as it relates to inexperienced lab users, therefore the project should probably develop a list of procedures that it will be assumed to be performed with and without lab gas.	Info
14	**Process Cooling Water** The building will be connected to the campus chilled water system, which is very reliable. A process cooling water supply will be provided through a heat exchanger for heat rejection from user equipment (e.g. water cooled freezers, refrigerators, etc.). The process cooling water would be limited to equipment aisles only.	Info
15	**Lab Utility Locations** The proposed lab planning scheme limits the distribution of utilities to the center section to preserve valuable project resources and reduce the cost of future tenant improvements. The scheme decongests utility routing in a constrained building structure. Utilities limited to the lab support and fume hood alcove zones would be: all wet utilities and drains, exhaust, and natural gas.	Info
16	**Dark Room Lab Support Space** Lab support spaces to have the capability to be darkened. Some of these would become infrastructure-appropriate (not Electron, for example) microscopy rooms, and possibly shared.	Info
17	**Emergency Power** The Working Group was comfortable with the proposed scheme to distribute Emergency "Standby" Power throughout the lab planning template. The proposal places a dense allocation of outlets behind potential freezer locations, (1) per lab support room, and (1) outlet every 36-feet along the lab window wall. The users requested a change to (1) outlet per average research group along the lab window wall. A request was made for emergency power to support computer systems in office areas. However, HDR pointed out that small, user-provided Uninterruptable Power Supplies (UPS) would be required to bridge the time gap between outage and Emergency Generator startup. This is generally in the range of (8) to (60) seconds depending on the generator and whether it started up on the first attempt.	Info
18	**TA Space** There is a need to identify a location for TA meetings with undergraduates outside the open office area. Open office workstations are neither large enough for a 2-person conference, nor isolated enough to not be distracting for others.	Info
19	**Teaching Lab** Capital Planning will investigate the utilization of the current teaching lab to determine if a teaching lab should be included in the building program.	UCR
20	**IT Closets** A 10'x 11' IT closet is needed on each floor.	Info

21	**B+PS Administration** The Project Planning Principles place a higher priority on wet laboratory space than office space. The long-term program (space list) for Batchelor Hall may include a small administrative office area. However, B+PS Administration presumably would remain in their existing location until that area of the building could afford tenant improvements. Working Group needs to understand trade-offs of keeping administrative space in the building or placing this space outside the building in a TBD location.	HDR
22	**Existing HVAC Configuration** HDR presented an overview of the existing HVAC configuration. The basement and all MEP shafts are part of an “open” ventilation air system. Fresh air units in the basement dump pre-conditioned outside air into these spaces and the recirculating air conditioning units draw “fresh” air from the surrounding space. Configuration of current recirculating AC ducting within MEP shafts poses road blocks for parallel ducting arrangements. Current recirculating AC system is “dual-ducted” which means each unit has a cold and hot coil and distributes cold and hot air in parallel supply air ducts. These two air streams are mixed via Mixing Boxes to supply varying temperature air to each zone to satisfy thermal comfort. No questions or issues raised by users at this time.	Info
23	**Proposed HVAC Design** An overview of the proposed HVAC design was presented that places new air handlers up on the roof. The idea was highly supported and the concept was viewed as an excellent alternative. Further discussion on humidity needs for the building/programs is required, although the Campus does not prefer ducted humidification there are no current UCR standards for humidity control. There was agreement that spaces requiring humidification should be handled locally. A request was also made that “reheat” be minimized as much as possible and that the Working Group forthcoming with freezer farm needs. New fan coil units (FCU’s) should rely on the campus chilled water supply with local pumps and heat rejection as needed to increase feasibility ILO of DX units.	HDR to update scope descriptions accordingly.
24	**Temperature Control** The standard temperature control is that open labs are broken down into modular temperature zones to improve system efficiency. Individual occupants will not have thermostat control over the system. Smaller groups of offices and individual conference areas can be outfitted with a thermostat, but that would only allow for +/- two degrees Fahrenheit of variability. No further action is required by the Design Team at this time.	Info
25	**Open Ceilings** Open labs and “green” spaces (see plan diagrams presented for reference) are expected to have NO ceilings. Working group asked whether open ceiling concept would be compatible with BSL2 lab classification. HDR to research and respond during next workshop.	Info
26	**Existing Drain Lines and Tree Root Damage** A potential problem with an existing drain line was mentioned. It appears that the building may have been impacted by an existing tree roots. Further investigation that could include sending a camera through the drain lines to identify exact sections that need to be repaired. No further action by the Design Team is required at this time.	Info

END OF MEETING

Meeting Minutes

Project:	Batchelor Hall Renewal Project
Subject:	Working Group Meeting #3
Date:	Tuesday, November 08, 2016
Location:	Hinderaker Hall B-154

Attendees:

John White – UCR	Frank Porter – UCR
Jon Harvey – UCR	Trip Grant – HDR
Blythe Wilson – UCR	Ken Filar – HDR
Peter Atkinson – UCR	Kate Diamond – HDR
Mikeal Roose - UCR	Terry McCarthy – HDR
Patty Springer – UCR	Mike Alamo - HDR
Deborah McWilliams – UCR	David Danielson – HDR
Sharyl Murdock – UCR	Jeff Wurmlinger – HDR

	Topic	*Responsibility*
1	**Project Goal Update** The Planning Principles direct the project to provide space for additional faculty. This was expanded to create an environment that maximize productivity and efficiency.	Info
2	**Structural Engineering Analysis on Building** HDR's preliminary investigations into the building structure indicate that the central columns may not be capable of carrying the vertical weight of infilling the central chases with usable floor space. As a consequence, HDR presented a variation of the planning template that reduced equipment aisle space. This alternative is internally referred to as the "Double I" scheme as opposed to the previous "H" scheme, both of which refer to the shape of the "freezer" and lab storage aisles in the west wing of the building, colored in light green on the colored plans. The completed analysis may result in the accommodation of a mix of "Double I" and "H" floors.	HDR to continue to analyze.
3	**Vibration Performance of Building** The vibration performance of the existing building is not anticipated to be improved. Sensitive instruments are assumed to be allocated to the slab on soil locations on the first floor. As a consequence, the vibration criteria on the data sheets will be revised from "VC-A" to "existing".	HDR to modify data sheets.
4	**Research Group Lab Type Ratios** It was reconfirmed that the ratio of non-computational research groups should be: 80% Wet Lab 2 (1 initial fume hood + capacity for 1 future) and 20% Wet Lab 3 (2 initial fume hoods + capacity for 2 future) It was reconfirmed that there should be no:	Info

	Wet Lab 1, Wet Lab 4, Flex 1 Lab and Flex 2 Lab.	
5	**Computational Research Groups** The working group acknowledged that the program should include some number of computational research groups, depending on the quantity of locations in the building that are not ideally suited to wet lab space. Each computational PI would support 6 additional people, comprised of some combination of Graduate Students and Post Docs. Unlike the wet lab groups, these researchers do not split their work time between their workstations and lab or bench space. As a consequence of this duration and the larger monitors and equipment, both the Graduate Students and the Post Docs should have the same size workstations as the Wet Lab Post Docs. This also helps with managing space assignments. The computational groups should have access to a Scholarly Activity space that is dedicated to their groups and located within their open office area in such a way as to not be disruptive to others.	HDR to incorporate into plans.
6	**Computational Server Room** The need for a computational server room needs to be deliberated at the Campus level.	UCR to investigate
7	**Lab Equipment and Storage Aisles** The following allocation requests per wet lab PI were reconfirmed with certain exceptions: In Open Lab Space and Fume Hood Alcoves: (1) Sink and sink cabinet with RO Water connection for water purifier. (1 / hood) Flammable Storage Cabinet under hood (half the hood width) (1 / hood) Corrosive Storage Cabinet under hood (half the hood width) (1) Under counter Dishwasher (Space will be provided; equipment purchased by Project TBD) In Lab Equipment Aisles (3’ to 4’-deep zone with power, standby (emergency) power, and process cooling water): (1) -80C Freezer Space (+ Emergency Power) (2) -20C Freezer Spaces (+ Emergency Power) (1) +4C Refrigerator Space (1) +4C Double-Door (Deli-style) Refrigerator Space (1) Shaking Incubator Space (1) Plant Growth Chamber Space In Lab Storage Aisles (18”-deep zone without power or utilities): (4) Tall Storage Cabinets (4’-wide x 7’-high)	HDR to investigate feasibility of putting storage in the basement.

(1/3) Space for Inert Gas Cylinders (N2, Argon, CO2 etc.) (This was not technically a change since no quantity had been requested previously, but it is a significant reduction from HDR assumptions.)

The consequence of these requests are approximately 194 lineal feet of Lab Equipment Aisle (one side of aisle) space, and 147 (after cylinder space reduction) lineal feet of Lab Storage Aisle (one side of aisle) space. However, in the "H" scheme only 190 lineal feet of Lab Equipment Aisle and 107 lineal feet of Lab Storage Aisle is currently accommodated. In the "Double II" scheme only 166 lineal feet of Lab Equipment Aisle and 74 lineal feet of Lab Storage is currently accommodated. Lab Storage can be located in Lab Equipment Aisles, but because of the depth differences, not vice versa.

The working group decided neither to reduce the average number of PI groups per floor nor lab support rooms. The working group also stated that the worst-case, "Double II" scheme is workable as long as the remainder of the equipment and storage requests are located somewhere in the building. HDR will investigate the feasibility, including Code compliance, of locating some portion of these items in the basement.

8	**Updated Researcher Allocations per Floor (see updated Space Request List)** (1) Autoclave (24" x 24") (1) Handwashing Sink at Autoclave with domestic HW, CW (1) Ice Machine (1) Large, floor-standing Centrifuge (1) Gel Documentation system with computer (1) Nano-Drop system (2) Plant Growth Rooms (1) Cold Procedure Room (1) Meeting Room sized larger than the average research group (1) Scholarly Activity Space (aka Break Room) (1) Kitchenette (1) Copy/Work space (1) TA-Undergraduate Meeting Space	Info
9	**Updated Researcher Allocations per Building (see updated Space Request List)** (1) Scientific Server Room (to be determined) (1) X-Ray Development Room (1) Central Cold Storage Room (TBD) Central Lab Equipment Storage Space (Remote Freezer Farm) (TBD) Central Lab Storage Space (Remote Tall Storage Cabinets) (2) Central Plant Growth Rooms near Loading Dock (2) Central Plant Tissue Culture Storage Rooms with nearby Laminar Flow Bench for Culture Transfers (1) Conference / Meeting room for 40-50 people. Larger meetings will be hosted in another building. (1) 24-Student Class Lab and Class Lab Prep Room (1) 15-Student Seminar Room	Info
10	**Gas Cylinders** The working group stated that CO2 is not a commonly utilized gas for botany work, and that their incubators rarely utilize CO2 like it is utilized in other types of biological research. The typical average floor allocation of gas cylinders is to	Info

	be assumed to be 3 per 9 Wet Lab PIs.	
11	**Plant Growth Rooms** (2) Centralized plant growth rooms should be located off the loading dock in addition to the (2) plant growth rooms dedicated to the PIs on each floor. The plant growth rooms on each floor can be somewhat smaller than room 2211C. The request for multiple rooms is to limit the extent of infestations. The rooms should be 100% exhausted and negatively pressurized because the rooms are periodically fumigated to eliminate infestations. Infestations are also limited by having more, smaller rooms, as currently identified in the space list. A current renovation is underway to convert the existing Electronics Shop to a plant growth room for a particular existing PI.	Info
12	**Cold Rooms** A central cold storage room (approximately 10' x 15') is requested somewhere in the building. A Cold Procedure Room (approximately 10' x 10') with stainless steel sink and counter is requested on each floor.	Info
13	**Central Plant Tissue Culture Labs** In addition to having the ability to outfit a PI Support Lab for Tissue Culture, the working group requests (2) Central Plant Tissue Culture Storage Rooms. The functional requirements for this room need to be discussed further.	Info
14	**Lab Support Room Flexibility** The working group confirmed the desire for flexibility in accommodating researcher needs. It was therefore agreed that the PI-controlled Lab Support spaces should be designed with (1) fixed, 3-foot-wide sink cabinet with drying rack and shelf above for OFOI water purification unit. The remainder of the room should be fitted out with power, data, standby power, air, vacuum and snorkel exhaust to enable work on movable equipment and tables. The small and medium sized rooms will be designed to support (1) or (2) 5-foot fume hoods at areas designated as Wet Lab 3. The fume hood capacity of the larger Lab Support rooms will be determined after further engineering analysis.	Info
15	**Shared Nanodrop and Gel Documentation Systems** The working group confirmed that these are both small footprint, benchtop devices, requested at (1) system each per floor. The working group prefers that these are located in space that is relatively isolated and not located in a particular PI's allocated space. The working group discouraged the idea of locating these systems near the open lab windows.	Info
16	**Central Lab Support Rooms** The working group identified a need for certain features that would be shared once per floor. HDR would like the working group to consider co-locating the following in a Common Lab Support Room with a closable door: (1) Nano Drop (1) Gel Documentation System (1) Sink cabinet with Hot, Cold and RO Water, drying rack and shelf for owner furnished owner installed (OFOI) water purification system above (in lieu of water purification unit previously identified at autoclave). (1) Additional work surface adjacent to sink cabinet. (1) Laminar flow Bench (at 1 floor adjacent to Central Plant Tissue Culture Rooms)	HDR will develop data sheet and justification sketch and locate on plan.

	(1) Floor-Standing Centrifuge (1) Ice machine The end of this room would have a door to the floor's Cold Procedure Room, and would consequently provide prep for this space.	
17	**Autoclaves** The working group recommends the autoclaves should be located in closed room space, because of the nature of the materials, potential steam, and the noise (e.g., end of cycle alarms). Prefer a table at the autoclave instead of one of the carts shown on the Space Justification sketch. At least one autoclave have its own steam generator so users have autoclave capability during the annual steam system maintenance shutdown period.	Info
18	**Central X-Ray Development Room** A small, centralized, X-Ray Development Room was reconfirmed. HDR recommends a room "In-Use" light at the corridor side of a light-tight door to avoid accidental exposure of films. This is in lieu of the traditional rotating, light-tight vestibule that are typically no longer allowed because they are not handicapped accessible at reasonable dimensions.	Info
19	**Class Lab** HDR recommended a Class Lab Vestibule for multiple reasons: to allow a place for students to drop apparel and backpacks without interfering with workspace or traffic; to facilitate air pressurization control of the room (this second rationale was not mentioned in the meeting, but is important); and potentially as a place for additional storage capacity. The Class Lab was requested to support 24 students at a time, ideally all at island benches, and include (2) 5-foot fume hoods without cup sinks. The justification sketch will be redrawn to reflect an actual location in the building and include a white board for presenting to the class.	Info
20	**Lab Gas (Natural Gas)** HDR recommends not including a Lab Natural Gas distribution system through the building because this is no longer common practice. Eliminating the system saves money and improves safety. HDR presented and sent information on one alternate procedural solution, "Bacticinerators", an approximately $400 table-top, electrical heater designed to sterilize loops for culture spreading. In combination with other electrical heating devices and small butane torches, the working group will re-evaluate the need for a Lab Gas system.	Info
21	**Reverse Osmosis (RO) Water** HDR explained that the current template plans include (1) sink cabinet per PI group (total of 9) with drying rack and shelf above for a user-furnished purification unit. This will also be the case in each of the Lab Support rooms. Consequently, there is only one common sink, located at the Autoclave for hand washing. The proposal is that this sink also has facilities-provided RO water and a shelf above for an OFOI water purification unit, where a PI can access purified water despite very infrequent use. This RO supply and shelf could migrate to another location if another common sink is included on each floor.	Info

22	**Large Conference Room** The request for a Large Conference Room was reconfirmed and will support between 40 and 50 people.	Info
23	**Seminar Room** A (15)-student seminar room (confirm that the instructor makes 16) was requested. This space should be directly accessible from the outside or through one of the main building entrances. Primary use is to support non-laboratory instruction that currently uses the class laboratory. Relocating these uses allows the space to be used as a class laboratory. Space may replace room 4169 which is listed as a Scholarly Activity space.	Info
24	**TA Instruction Space** HDR showed TA instructional space located directly off the elevator lobby of each floor. The working group appreciated the fact that undergraduates would not need to enter the open office area, improving security, and that this type of private space would potentially be highly valuable to support open office workplace, and also potentially to support certain test taking.	Info
25	**Biology and Plant Sciences Administration** The department requests needs in the building for department offices to support faculty research. The space should support 8 to 9 people. Further discussions required to determine functional requirements and justification.	Info
26	**Operable Partitions** The University does not prefer dividable rooms with movable partitions. In the University's experience the position of the partitions rarely get changed for multiple reasons.	Info
27	**1st Floor** HDR presented a 1st Floor Plan that located the Class Lab on the "lab" side of the template with direct access from the exterior, reserving the north side of Batchelor Hall for office functions with good access to light and views. The East end of the 1st Floor will be planned after the requests for central support facilities are further developed. The first floor is a location where vastly better vibration stability can be achieved than any of the locations not directly supported by earth.	Info
28	**2nd Floor South Wing** The second floor south wing is currently being renovated such that the East side can become the Metabolomics Core. The working group suggested that the two existing plant growth rooms in this area be turned over to Metabolomics for future functions because they were poorly designed. The MEP chase space in this 2nd Floor wing would no longer be required to support the proposed infrastructure upgrades. Most of the space can be converted to usable space, but is bounded by long, north-south, concrete shear walls that are relatively easy to cut out for a few doorways. There is existing access to this space from the corridor on the South end by the existing stairs. The west side of the 2nd Floor South Wing does not have a direct relationship to the Metabolomics Core. The size of the space and the large overhang that blocks direct sunlight makes this space ideally suited to computational research space. Another potential well-suited use for this space would be the large	Info

	Meeting Room, also because of its well-sunlight-blocked windows, direct access from the outside .	
29	**3rd Floor South Wing** The ratio of PI Offices and open offices does not match the wet lab size it supports. This will be adjusted going forward.	Info
30	**Equipment Aisles, Ghost Corridors and Exit Corridors** HDR clarified that equipment aisles and ghost corridors are parts of rooms, and not part of an exit corridor. They are treated very differently by the Building Code.	Info
31	**Keen Hall** HDR is to clearly delineate the project boundary as it relates to the boundary with Keen Hall, particularly on the 1st Floor.**3rd Floor South Wing** The ratio of PI Offices and open offices does not match the wet lab size it supports. This will be adjusted going forward.	Info
32	**Follow-Up** HDR is to follow up with University Project Management, Facilities, Maintenance, Custodial and EHS to determine requests for additional building support functions and space, such as mail delivery. The working group is to review and comment on the Updated Space List, Data Sheets and Justification Sketches.	HDR to send review materials. UCR to return review materials by 11/23/16.
33	Meetings with UCR facilities stakeholders to be scheduled. Meetings to include: Campus Fire Marshall, Computing & Communications, EH&S, and Facilities Services.	UCR to schedule
34	Preference is to preserve 2nd Floor fFoyer space and incorporate encroaching functions in another location. Comment was made following review of either the first or second floor plan.	

END OF MEETING

Working Group Meeting 2

November 8, 2016

Batchelor Hall Interior Improvements
And Building System Renewal




Agenda

8:45	Working Group Meeting 2 program updates
9:00	Linear Equipment Room – quantity and space allocation
9:45	Planning Template floor by floor
10:45	Space List Finalization
11:35	Detailed Room Requirements – room data sheets
12:00	Summary and Action Items

Planning

Search for Maximum Template Application

Office
Lab +
Lab Support

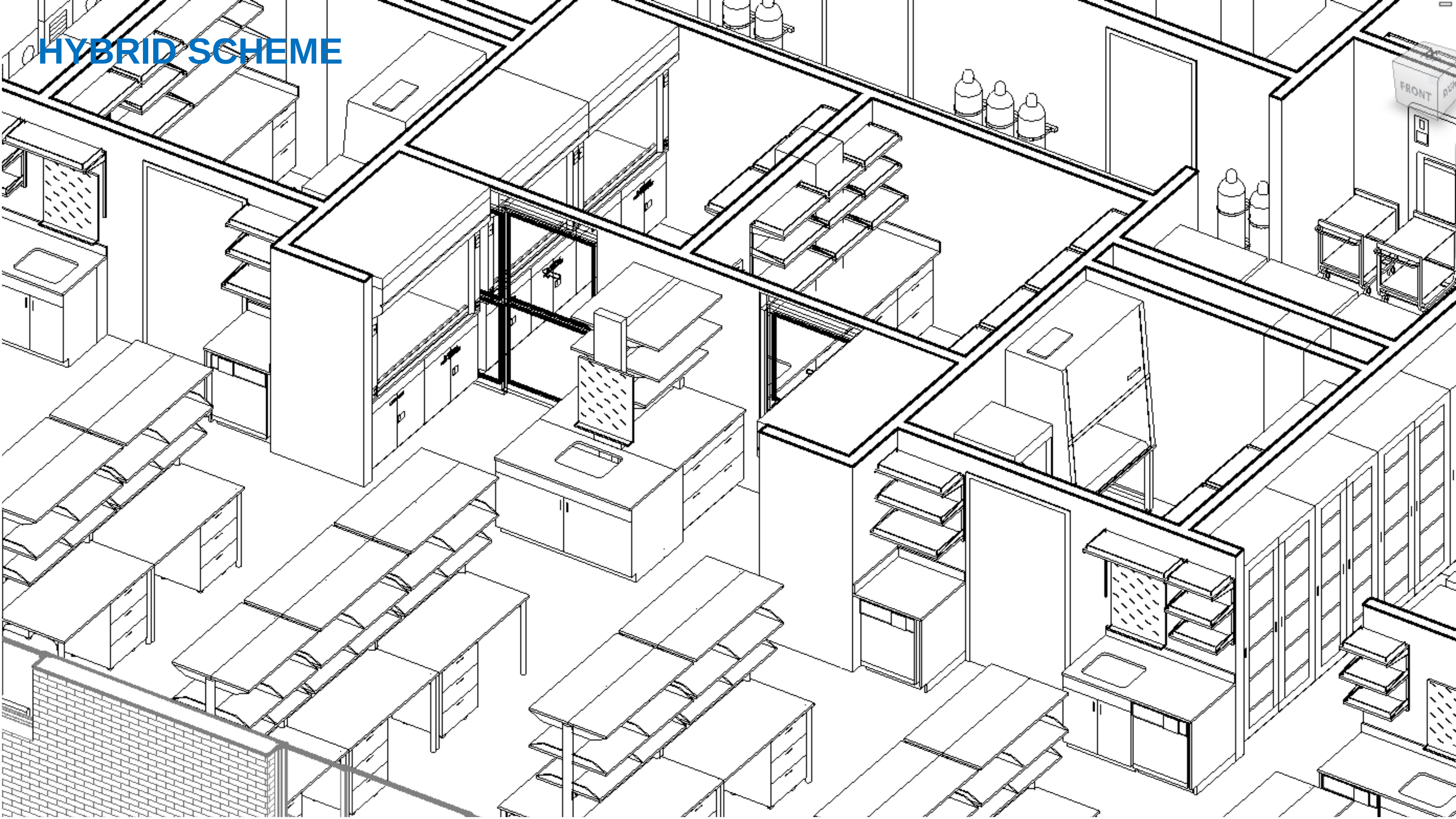
3 TEMPLATE OPTIONS

	1. Hoods in Support Rooms	*2. Hoods in Open Lab*	*3. Hybrid Alcoves*
HVAC	Good	**Diffiicult to get Air to Hoods**	Good
Open Lab : Lab Support	**58% : 42%**	49% - 51%	54% - 46%
Open Lab Sightlines	Good	**Blocks**	Good
Hood Safety - Spills	Best, no traffic behind hood	**Frequent traffic behind hood**	Infrequent traffic behind hood
Hood Safety - Containment	Litlte disruption to airflow, away from traffic	**Frequent airflow disruption, very exposed to traffic**	Infrequent airflow disruption, near traffic
PI Groups per Floor	10 primary benches / group	**7 primary benches / group**	9 primary benches / group

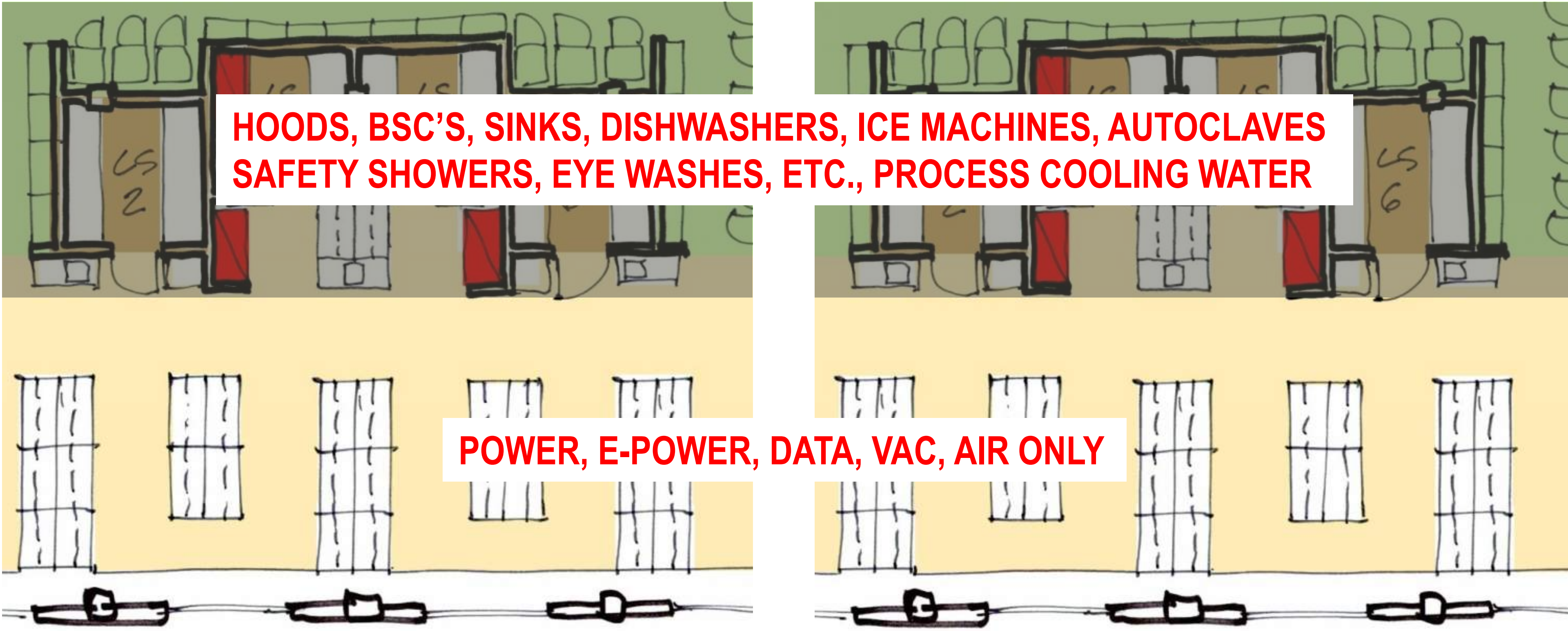
PREFERRED TEMPLATE: SHALLOW ALCOVES, SUPPORT BEHIND

04

HYBRID SCHEME

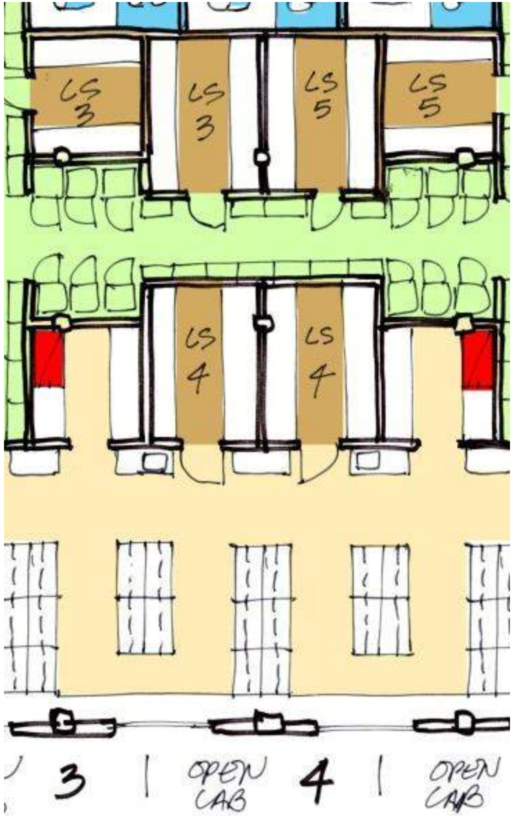


HYBRID SCHEME: EXHAUST, POTABLE + LAB WATER, & DRAIN-FREE ZONE FOR MEP DECONGESTION + COST SAVINGS + PLANNING FLEXIBILITY

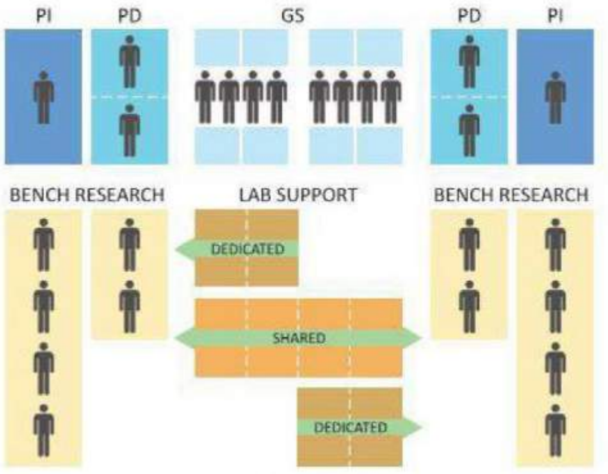


LAB TYPES: HOODS
(NOTE: ONLY FIRST HOOD IS 6', REMAINDER 5')

	Wet 1:	1 Hood / 2 Groups
80%	Wet 2:	1 Hood + (F) / Group
20%	Wet 3:	2 Hoods + (2F) / Group
	Wet 4:	1 Hood per Lab User
	Flex 1:	1 Hood + (F) / 4 Groups
	Flex 2:	1 Hood + (F) / 4 Groups
?%	Dry 1:	0 Hoods

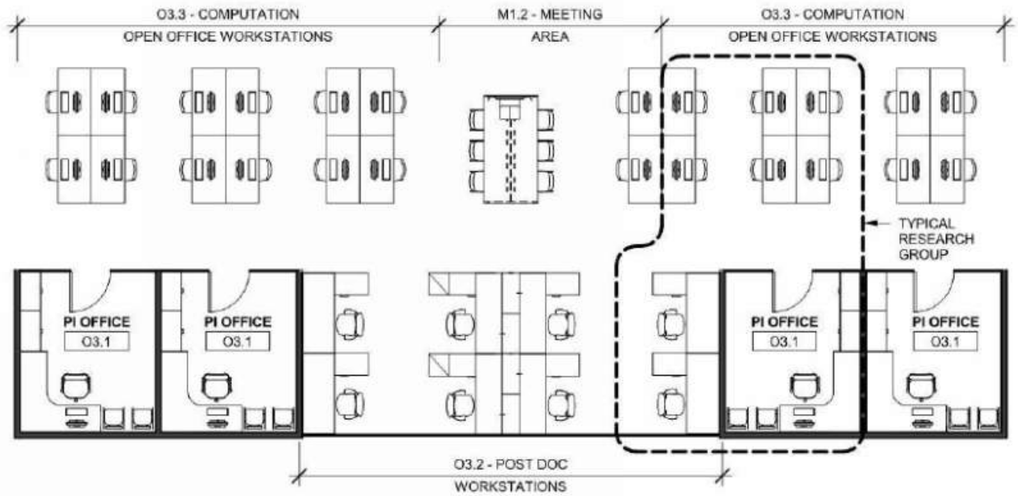


LAB TYPES: COMPUTATIONAL



Computational Group Size Assumptions

- (6) GS instead of 4
- Open office working sizes identical to wet lab groups



ALLOCATIONS PER WET LAB GROUP

(1)	Sink and sink cabinet with RO Water connection for water purifier.
(1 / hood)	Flammable Storage Cabinet under hood (half the hood width)
(1 / hood)	Corrosive Storage Cabinet under hood (half the hood width)
(1)	-80C Freezer Space (+ Emergency Power)
(2)	-20C Freezer Spaces (+ Emergency Power)
(1)	+4C Refrigerator Space
(1)	+4C Double-Door (Deli-style) Refrigerator Space
(1)	Undercounter Dishwasher (Space Only or Purchased by TI Project?)
(1)	Shaking Incubator Space
(1)	Plant Growth Chamber Space
(4)	Tall Storage Cabinets (4’-wide x 7’-high)
(TBD)	Chase space for Inert Gas Cylinders (N2, Argon, CO2 etc.), and Hazardous Gas Cylinders (O2, etc.) depending on Fire Code limits and Fire Marshal approval

ALLOCATIONS PER FLOOR

(1) Autoclave (24” x 24”)
(1) Sink at Autoclave with HW, CW, RO and Type III water polisher
(1) Ice Machine
(1) Large, floor-standing Centrifuge
(1) Gel Documentation system with computer
(1) Nano-Drop system
(2) Plant Growth Rooms (additional capacity in greenhouses to be investigated by UCR)
(1) Meeting Room sized larger than the average research group
(?) TA-Undergraduate Meeting Space

NanoDrop 2000c
UV-Vis Spectrophotometer

Enhance the limit of detection for DNA, RNA and protein with the Thermo Scientific NanoDrop 2000c UV-Vis spectrophotometer featuring both microvolume pedestal and cuvette measurement options.
The cuvette station is ideal for measuring dilute nucleic acid and protein assays, includes heating and microstirring capabilities, and allows users to perform kinetics and cell culture readings (600nm).

NanoDrop 2000c Spectrophotometer features:

- Wide spectral range (190-840nm) for measuring a variety of samples types:
  - Peptides (205nm)
  - DNA and RNA (260nm)
  - Purified protein (280nm)
  - Toxicology assays and industrial dyes (490nm)
  - Gold nanoparticles (520nm)
  - Colorimetric protein assays (BCA 562nm, Bradford 595nm, Modified Lowry 650nm, Pierce 660 660nm)
  - Optical Density measurements (600nm)

Gel Doc™ EZ Gel Documentation System

STAIN-FREE ENABLED

The Scientist TOP TEN INNOVATIONS 2010

Description | Specifications | Ordering | Accessories | Documents

The Gel Doc EZ System is a compact and automated gel imaging instrument designed to yield publication-quality images and analyzed results with just the push of a button. The Gel Doc EZ System provides unparalleled flexibility with the use of four application-specific trays:

What Is Stain-Free Technology?

Find out more »

- UV tray for ethidium bromide staining of DNA gels and fluorescence imaging
- White tray for Coomassie, copper, silver, and zinc stains
- Blue tray for nucleic acid applications with SYBR® stains
- Stain-free tray for stain-free imaging with Bio-Rad stain-free gels

ALLOCATIONS PER BUILDING

(1) Scientific Server Room (to be determined)

(1) X-Ray Developer

(1) Larger Plant Growth Room (Greenhouse Capacity?)

(1) Meeting Room sized for largest Research Group, Faculty Meetings or some Research Group Team (2-groups) Meetings (this may or may not be practical within this building)

LINEAL FEET OF EQUIPMENT AND STORAGE REQUESTS

	Shallow (18")				Deep (36")		
Space for Equipment	Width (ft)	Qty	Total		Width (ft)	Qty	Total
Floor-Standing Centrifuge					3	1	3
Ice Machine					3	1	3
Autoclave (including sink/cart)					8	1	8
-80c Freezer					4	9	36
-20c Freezer					2.5	18	45
Refrigerator in Lab Sup (TC)					0	9	0
Refrigerator (Deli-style)					4	9	36
Plant Growth Chamber					4	9	36
Other Equip (Shaking Incubator)					3	9	27
Undercounter Dishwasher					0	9	0
Sink Cabinet					0	9	0
Gel Doc					0	9	0
Nano-Drop					0	9	0
Tall Storage Cabinet	4	36	144				
Gas Cylinders	3	9	27				
Total			171				194

MAXIMIZATION OF DEEP EQUIPMENT AISLE

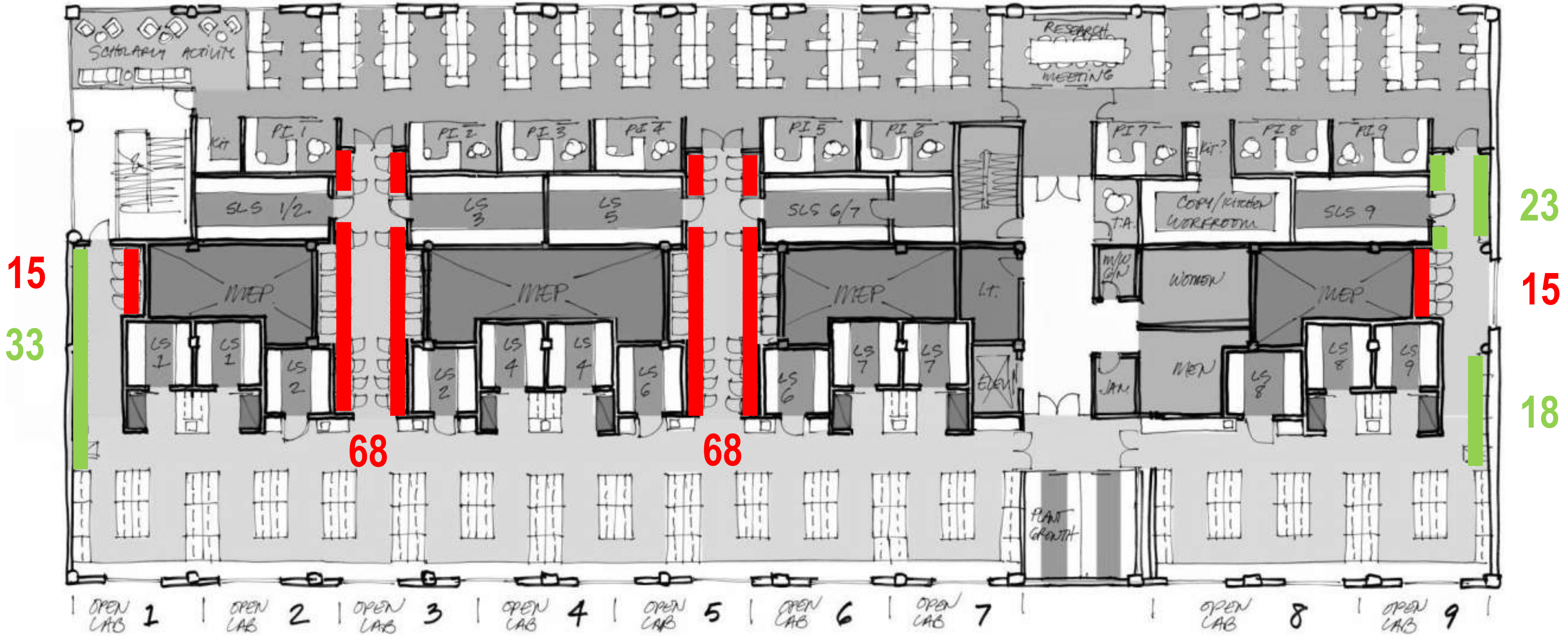
04

STORAGE + EQUIPMENT: 107 (171) + 190 (194)

TEMPLATE ADJUSTMENTS: STRUCTURAL INSUFFICIENCY

04

STORAGE + EQUIPMENT: 74 (171) + 166 (194)



LINEAL FEET OF EQUIPMENT AND STORAGE REQUESTS

	Shallow (18")				Deep (36")		
Space for Equipment	Width (ft)	Qty	Total		Width (ft)	Qty	Total
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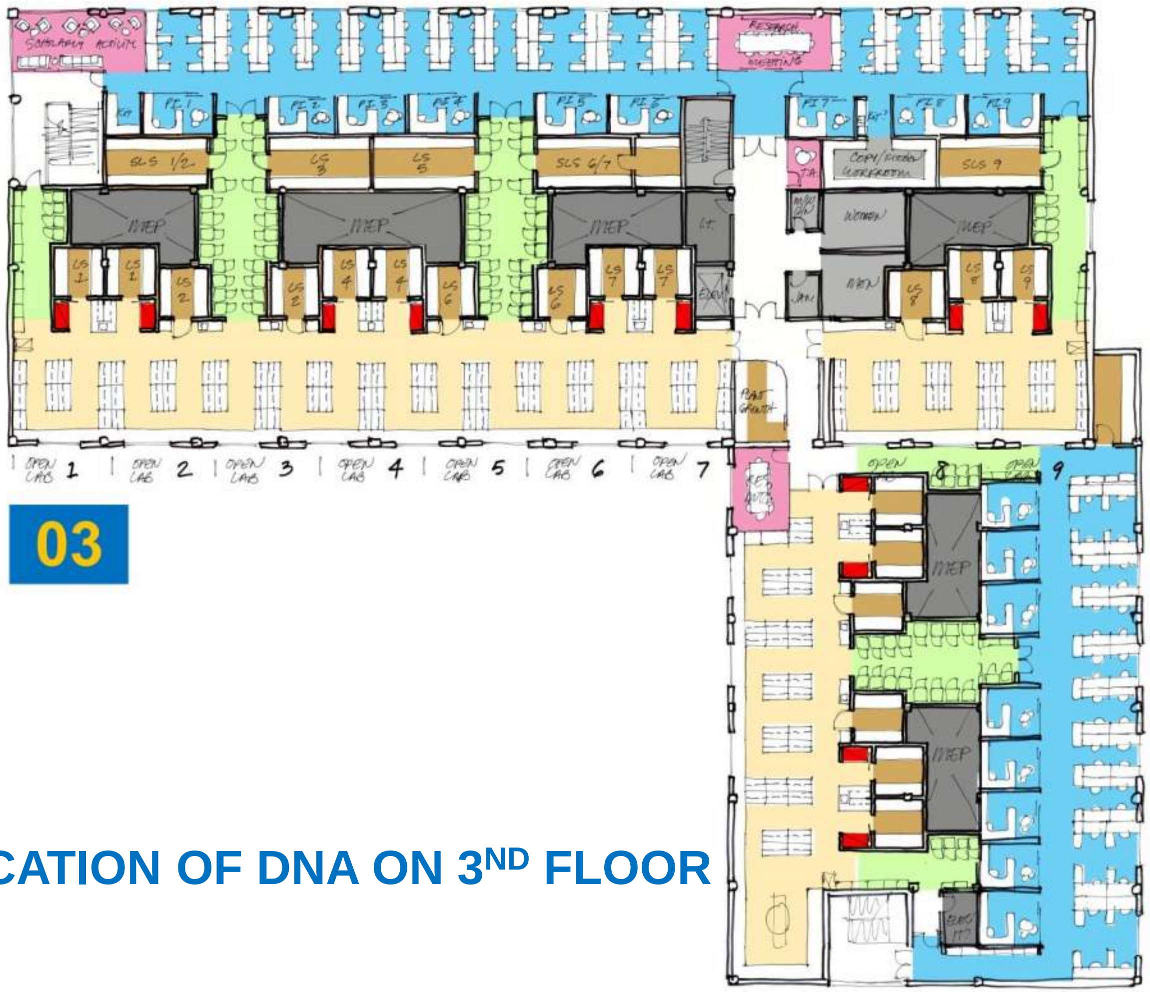
Undercounter Dishwasher					0	9	0
Sink Cabinet					0	9	0
Gel Doc					0	9	0
Nano-Drop					0	9	0
Tall Storage Cabinet	4	36	144				
Gas Cylinders	3	9	27				
Total			171				194

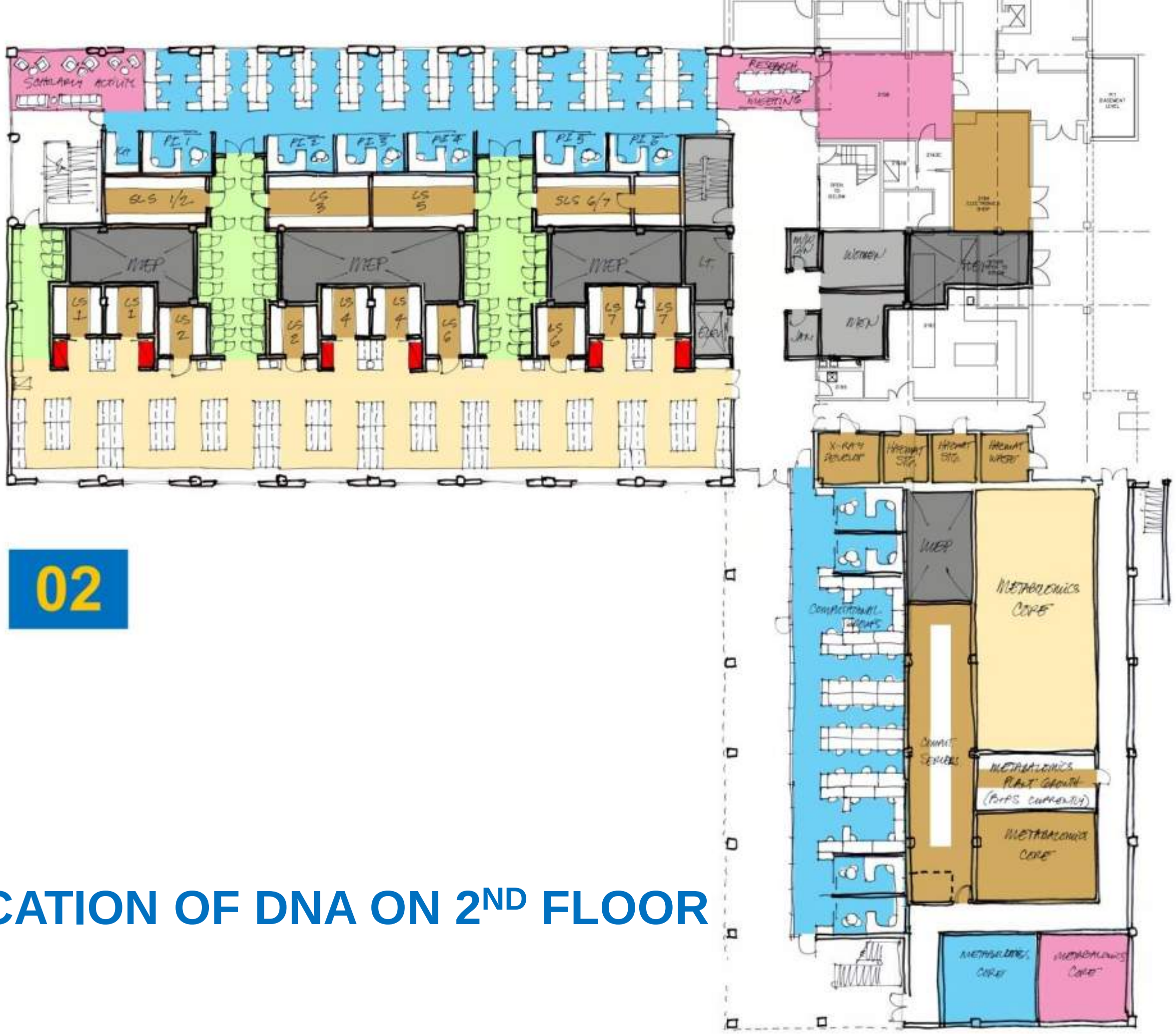
Application to All Floors

CONCEPTUAL DNA OF A RENOVATED 4TH FLOOR



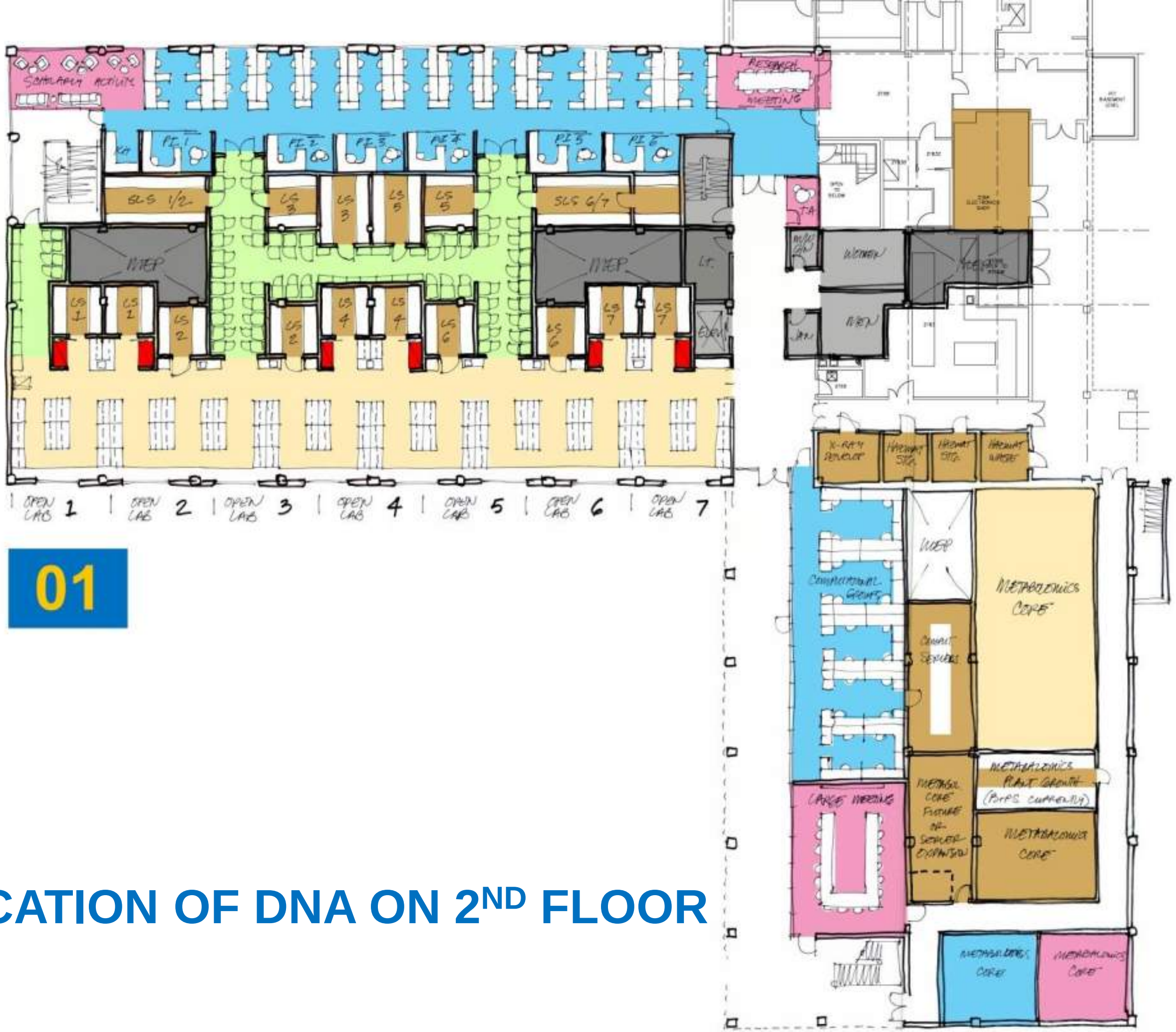
03

CONCEPTUAL APPLICATION OF DNA ON 3ND FLOOR



02

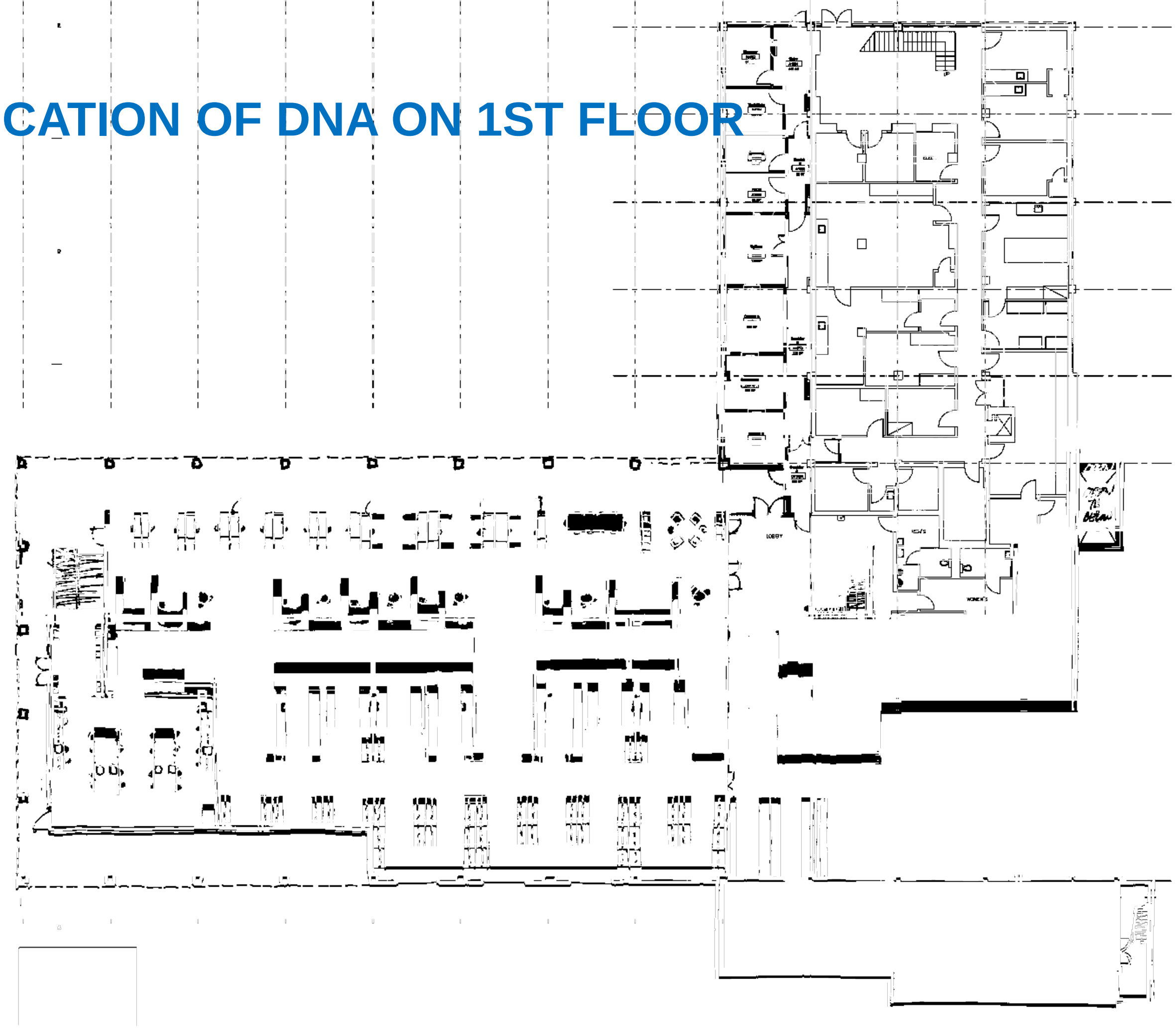
CONCEPTUAL APPLICATION OF DNA ON 2ND FLOOR
OPTION A



01

CONCEPTUAL APPLICATION OF DNA ON 2ND FLOOR OPTION B

CONCEPTUAL APPLICATION OF DNA ON 1ST FLOOR



COLD ROOM LOCATION OPTIONS

04

Space List

Space	Description (*= No Space Data, for SF only)	Qty	SF	SF Total
	Research Labs			**21,380**
1.01	Open Laboratory Module	72	250	18,000
1.02	Fume Hood Alcove	26	130	3,380
	Research Lab Support			**3,081**
2.01	Lab Support - Small	1	100	100
2.02	Lab Support - Medium	1	140	140
2.03	Lab Support - Large	1	205	205
2.04	Lab Equipment Aisle	1	6	6
2.05	Lab Storage / Cylinder Aisle	1	5	5
2.06	Environmental Control (Cold) Room	4	175	700
2.07	Plant Growth Room	7	175	1,225
2.08	Autoclave	4	100	400
2.09	X-Ray Developer	1	100	100
2.10	(Existing) Freezer Room (?)	2	100	200
2.11	Non-Public Lab Aisles*	1		
	Computational Lab			**217**
3.01	Computational Lab - Post Doc	1	42	42
3.02	Computational Lab - Graduate Student	1	25	25
3.03	Computational Server Room	1	150	150
	Class Lab			**1,185**
4.01	Class Lab	1	1,000	1,000
4.02	Class Lab Vestibule	1	80	80
4.03	Class Lab Prep	1	105	105

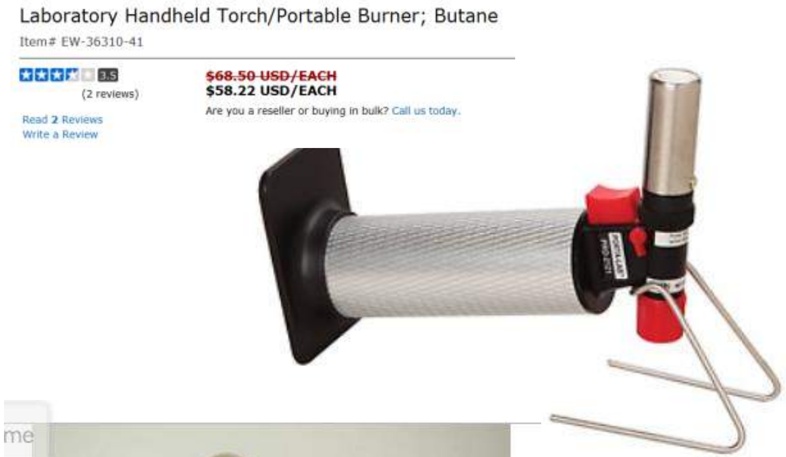
Space	Description (*= No Space Data, for SF only)	Qty	SF	SF Total
	Office & Collaboration			**4,719**
5.01	Principal Investigator Office	0	120	12
5.02	Post Doctoral Workstation	0	42	4
5.03	Graduate Student Workstation	0	25	3
5.04	Small Conference / TA Tutoring	4	100	400
5.05	Medium Conference (15 people)	4	330	1,320
5.06	Large Conference (30 people)	1	560	560
5.07	Scholarly Activity	4	215	860
5.08	Kitchenette	8	70	560
5.09	Copy / Workroom	4	250	1,000
5.10	Department Administration (?)	1		
5.11	Non-Public Office Aisles*	1		
	Building Support			**1,152**
6.01	Hazardous Storage	1	150	150
6.02	Hazardous Waste	1	120	120
6.03	Janitor's Closet	4	60	240
6.04	BDF Room	1	200	200
6.05	IDF Room	4	110	440
6.06	MEP Spaces	1	1	1
6.07	Public Circulation*	1	1	1
	Exterior Spaces			**203**
7.01	Central Gas Storage / Empties (Exterior)	1	200	200
7.02	Loading Dock (Exterior)	1	1	1

Space List Considerations

- Freezer Rooms
- Freezer Farm
- Department Administration
- Shipping / Receiving
- Delivery Office / Manager
- Mail Room
- Hazmat Storage
- Hazmat Waste
- Cylinder Storage on Loading Dock
- Freezer Farm
- X-Ray Developer (1)
- Lactation Room (1)
- Gender Neutral Restrooms (4)
- General Building Storage
- Maintenance Equipment (Secure Outdoor)
- Trash Compactors
- Recycling Compactors
- Compost Bins
- Recycling Sorting
- Medical Waste
- BMS Manager Office?
- Maintenance Office
- Custodial Office
- Maintenance & Custodial Locker Room
- Showers & Bike Storage
- Vending Area
- ATM

PROCEDURES IN LIEU OF LAB GAS SYSTEM (HDR BEST PRACTICE)

- Electric block heaters for many reactions and for warming / temperature stabilization for samples
- Hot plates
- Heating mantles with Variac (variable voltage transformers – pretty old tech)
- Water baths (electrically heated) for even heating
- Hand-held butane torch with replaceable fuel cans for flame source for sterilization and some limited glass forming
- Batcti-Cinerator for Culture Spreading



Bacti-Cinerator™ IV Sterilizer GSA/VA

Safely sterilizes loops and needles by infrared heat

Manufacturer: Technical Products International Inc 39004002

EMERGENCY (STANDBY) POWER LOCATIONS

1 PER PI GROUP AT SOUTH WALL

PANEL BOARDS, FIRE EXTINGUISHERS, EYE WASH / SAFETY SHOWERS

04

Electrical

- Existing 120/208V distribution to be replaced with new in both east/west and south sections.
- New 12.47kV-277/480V distribution to be installed to support new mechanical and lighting.
- New emergency generator and emergency power distribution to be installed to support life safety and mechanical optional standby loads.
- Temporary 120/208V transformer to be installed to support existing building loads during construction.
- Removal of existing 120/208V distribution on all floors back to each unit substation.
- New 120/208V distribution to be installed to support labs and general power requirements.

Meeting Minutes

Project:	Batchelor Hall Renewal Project
Subject:	MEP Meeting #01
Date:	Wednesday, December 07, 2016
Location:	University Village Suite 240-10
Attendees:	John White – UCR Jon Harvey – UCR Blythe Wilson – UCR Dan Martin (Via Phone) – UCR Scott Corrin (Via Phone) - UCR Russ Vernon – UCR Trip Grant – HDR Mike Alamo - HDR David Danielson – HDR Jeff Wurmlinger – HDR

	Topic	*Responsibility*
1	**Communications**	For Info

Recipients: John W. (UCR), Jon H. and Blythe W. (UCR), Dan M. (UCR), Trip, Mike, David, Jeff

- HDR provided a general overview of the project scope of work
- HDR provided an overview of 4th floor and idealized master plan for tenant improvements and infrastructure upgrades
- Overview of each floor followed highlighting central and stacked location of Telecomm Room on each floor
- DD asked about quantity of existing copper and fiber wires within the building
- Tunnel vault on east side has conduits that need to be extended to L1 BDF room
- Copper to be extended from basement 8x8 backboard to L1 BDF room
- Fiber to get new pathway from existing vault on east side
  - (4) 4" conduits generally required as pathway in a 2x2 duct bank configuration with provisions for fire alarm and building management systems
  - Dan confirmed UCR security runs on either their private fiber network of general university data network
  - Bob Slater or Chris Slanders to confirm which network to host BMS — UCR
- Dan noted that entrance copper/fiber may be paid for by separate project/funds
  - Pathways to be built as part of infrastructure project
  - Dan to provide estimate to Jon H. for this scope and clarify current or future dollars — UCR
  - No new copper required; Replace existing fiber optic cable with new.
    - Dan noted that there is a hand drawn riser diagram sent via email dated 10/21
  - Jeff W. confirmed this information has been received
  - Included in that riser is the need to bring new copper and fiber to Keen Hall as well
  - Dan confirmed Keen Hall has its own IDF rooms which need to be fed from new BDF room in Batchelor Hall
- Dan confirmed (4) 4" sleeves ok for routing cable between floors
- Dan confirmed south wing can be served by single BDF/IDF rooms

- **Jon H. stepped out of meeting and Blythe W. joined meeting
- Trip confirmed open ceilings in some rooms; Dan accepts cable trays in open ceiling areas
- Cable tray is the preferred horizontal pathway from IT room for each floor. Provide conduit stub-out from tray transitioning to J-Hooks to outlet device. Provide a single cable tray run in each of the main corridors of the east/west wing (18" width minimum) and in each of the main corridors in the north/south wing (12" width minimum).
- Blythe asked distance of j-hooks acceptable to Dan; Dan ok with roughly 20'
- Dan good with Mitsubishi HVAC split system for each BDF/IDF room
- Dan confirmed building needs to have complete wireless coverage
- Roughly 30' between WAP
- John White wants exterior site areas that promote interaction to be served by Wi-Fi; HDR to review and propose exterior site areas where we would propose Wi-Fi coverage
- Trip asked about if UCR has any standards about lab equipment monitoring system
- John White suggested speaking with Chris Flanders to see if UCR has a preferred system; HDR to check with Chris Flanders for more information — HDR
- Dan asked about security cameras and clarified that the building security system should be specific to the building and connected back to the BDF; Blythe commented that typically 30-day record may need to be reduced to 14 or 15 days due to smaller size of the building
- Dan previously sent some info on Edstrom security systems to Blythe for the Vivarium
- Blythe suggested meeting with faculty to confirm extent of security system needed
- Blythe noted that freezer farm areas may end up with (3) rows of wire molds for data, 220 power, and 110 power or just 3 receptacles serving
- Data for freezer monitoring system may need to be wireless to avoid over building infrastructure
- Dan noted that offices, labs, storage and copy rooms typically are monitored.
- Infrastructure improvements to provide rough-in for future card reader and CCTV cabling. CCTV cameras are to be connected and powered thru data style outlets which will connect back to the IT rooms. Head-end unit to be a stand-alone system.

2 **Fire Marshall** — For Info

Recipients: John W. (UCR), Jon H. and Blythe W. (UCR), Trip, Mike, David, Jeff, Scott C. (Fire Marshal), Russell Vernon (UCR EH&S)

- Blythe provided a general overview of the project scope of work
- Scott noted existing sprinkler system in the basement and separate riser and system for Keen Hall portion of the building; in Boyce Weber noted that riser located in open exterior stairs noting that proposed improvements will require new risers to serve Bachelor Hall that are tapped into to serve renovated areas as tenant improvement occur in the future
- HDR provided an overview of the idealized 4th floor master plan for tenant improvement and clarified scope of both the infrastructure upgrades and TI projects
- John White and Blythe Wilson noted that the entire building needs to be upgraded with backbone infrastructure for new wet-pipe fire sprinkler system regardless of any other tenant improvements; infrastructure funding was intended to cover a whole building sprinkler system with a wet piped

sprinkler riser system; Scott noted that the existing dry stand pipe can be converted into an automatic wet pipe sprinkler pipe.

- UCR states that no Class 4 chemicals allowed prior to sprinkling; HDR to note this requirement in DPP
- Building has existing automatic fire alarm system that may just require smoke detection and notification appliances that meet current code requirements
- Scott confirmed existing Simplex should be expanded and not branch off with a different manufacturer. UCR will assist HDR in researching the existing FACP and its ability to support the new infrastructure work.
- Scott confirmed no duct detection required; area detection only with software shutdown. Need to bring the existing F.A. devices into compliance. Additional F.A. devices may require additional power supplies.
- Blythe and Scott noted the core are shafts and fire protection of shaft wall openings will need evaluated
- Scott noted that the scope of this project would not be seen as a change of use and hence new code requirements may not apply
- Scott confirmed existing B-occupancy would be appropriate; HDR needs to document existing occupancy in DPP with a description of acceptable use(s)
- Scott noted concern over existing exterior stairs and single center stringer
- Trip and Blythe noted that complete replacement of stairs may be best approach
- Scott expects exiting from loading dock needs to be addressed as part of this project

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3 **EH&S** For Info

Recipients: John W. (UCR), Jon H. and Blythe W. (UCR), Trip, Mike, David, Jeff, Russell Vernon (UCR EH&S)

- HDR provided a general overview of the project scope of work
- Russell noted preferred VAV system is phoenix, which has been installed extensively on campus
- Russell noted automatic sash positioners integrated into fume hoods directly ILO separate phoenix sensors
- UC policy to have physically separate area for eating, BSL2 work.
- UC policy to have space allocated for lab coats and safety glasses
- Hand wash sinks required near exits
- Russell noted flammable storage cabinets outside of fume hoods should be provided ILO just relying on storage below fume hoods
- Russell noted that location of waste receptacles need to be considered as well
- Russell noted each researcher is responsible for taking out waste out to the dumpster so it is important to make sure they don't need to travel through office areas
- EH&S team picks up bio-hazard waste directly from the labs
- Russell noted that benches need to be labeled; HDR to include language in DPP accordingly
- HDR provided an overview of enlarged fume hood alcove and lab support
- Russell noted that sliding doors into Lab Support need to be reviewed and approved by the Fire Marshal
- Russell confirmed no need for chemical storage waste room near loading dock since they take out that waste directly to their trucks

---

- Currently store compressed gas cylinders at loading dock; Russell recommends enclosing that as space within the building to prevent storage though UC policies only touch on how they need to be secured to adjacent wall

4	**Facilities** Facilities personnel was a no show. The MEP concept overview was present by HDR to the group listed below.	For Info
5	**MEP Concept Overview** <u>Recipients:</u> John W. (UCR), Jon H. and Blythe W. (UCR), Trip, Mike, David, Jeff • Jeff W. provided an overview of existing HVAC system, upgrade options considered with pros and cons, and proposed HVAC configuration • Blythe noted concern with sweating of rooftop AHU onto open plenum below. Jeff W explained that won't be a concern as the units will be made of 4" double wall insulated plenum. • Blythe ok with just screening exhaust fans on lower roof only • UCR noted some (if not all) labs should be ready for BSL2, which may not be compatible with open ceilings proposed for lab spaces; basis of DPP should be to plan for BSL2 being built out day one because it is easier to exclude ceiling within individual TI projects versus trying to add ceilings in later; EH&S comment about hand wash sinks at lab entrances/exits need to be accounted for now • Dave D. provided an overview of proposed electrical configuration • UCR to provide documentation on existing standby power system, which should have been sized to serve this building • Jon H. noted there is a 2011 document available on their website covering survey of existing systems available. • HDR needs infrastructure phasing diagrams that are overlaid. onto existing floor plans	For Info

END OF MEETING

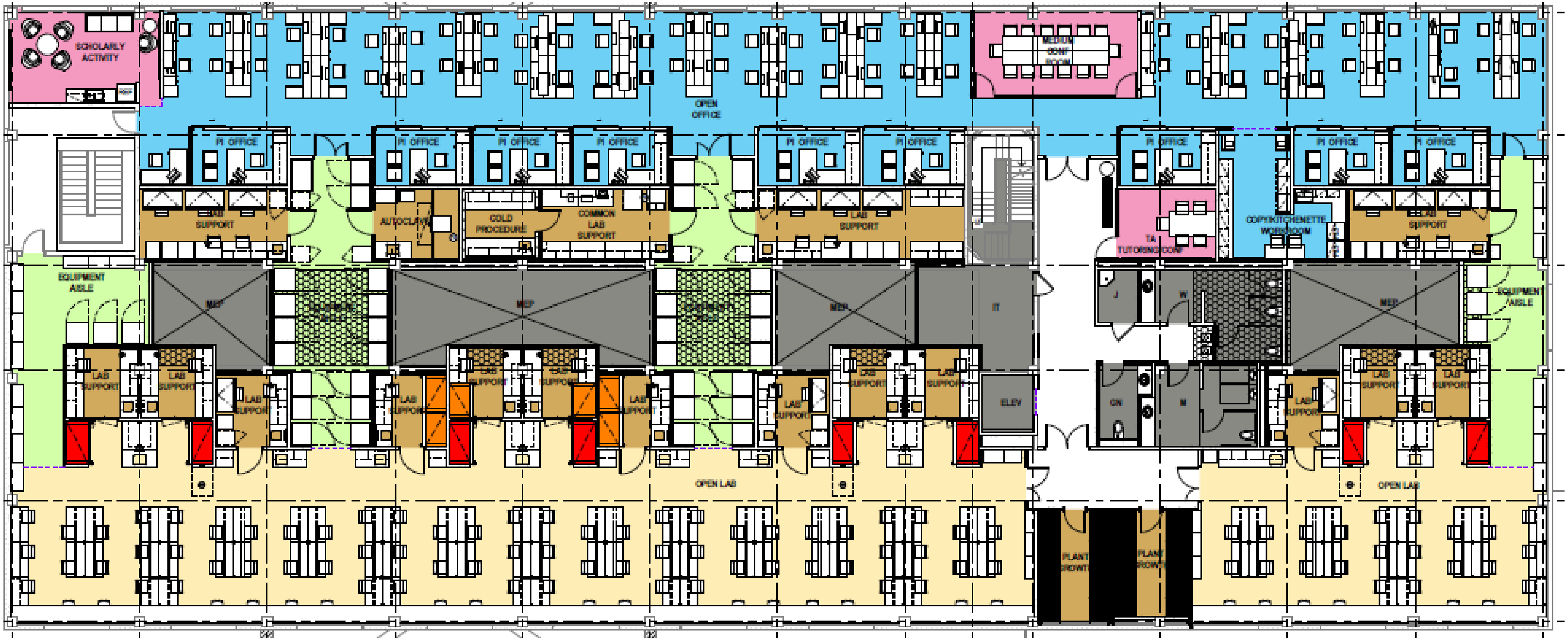
Facilities Planning Meeting

December 7, 2016

Batchelor Hall Interior Improvements
And Building System Renewal




Level 4



SCHOLARLY ACTIVITY
OPEN OFFICE
MEDIUM CONF ROOM
PI OFFICE
PI OFFICE
PI OFFICE
PI OFFICE
PI OFFICE
PI OFFICE
PI OFFICE
PI OFFICE
PI OFFICE
LAB SUPPORT
AUTOCLAVE
COLD PROCEDURE
COMMON LAB SUPPORT
LAB SUPPORT
TA TUTORING/CONF
COPY/KITCHENETTE WORKROOM
LAB SUPPORT
EQUIPMENT AISLE
MEP
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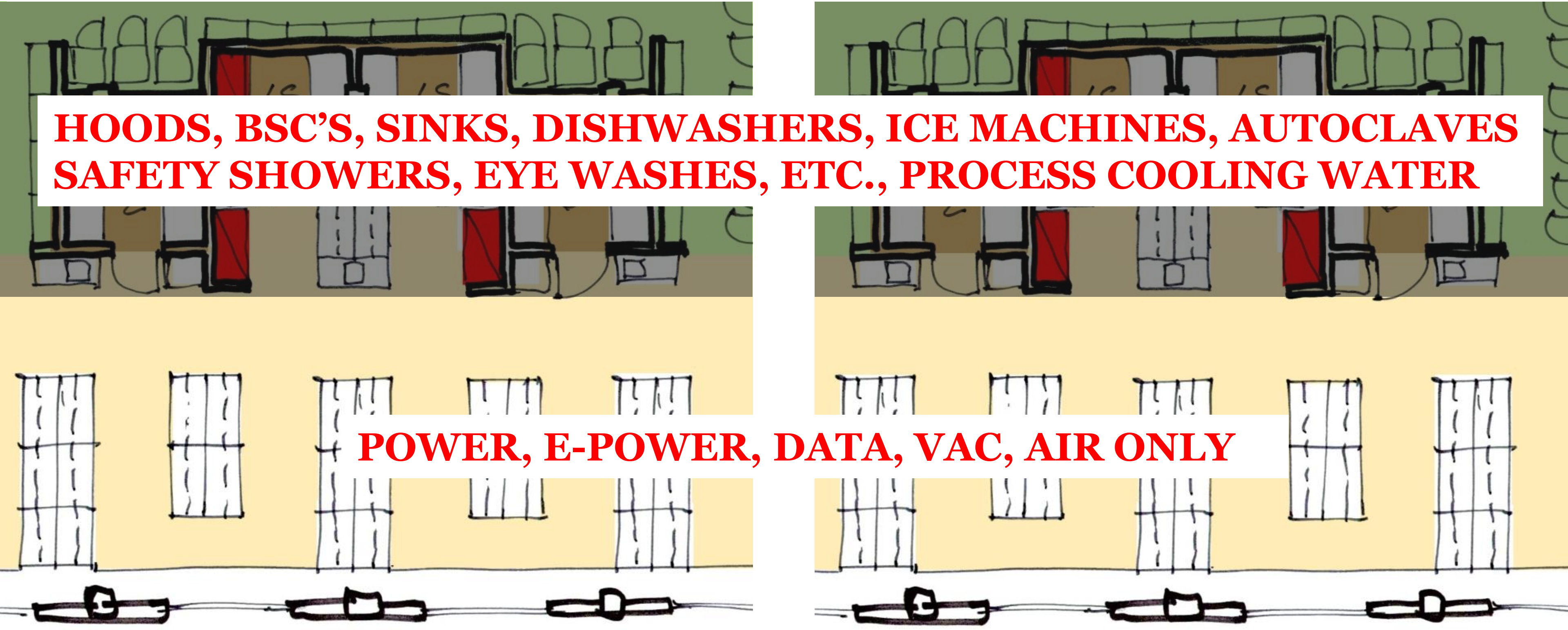
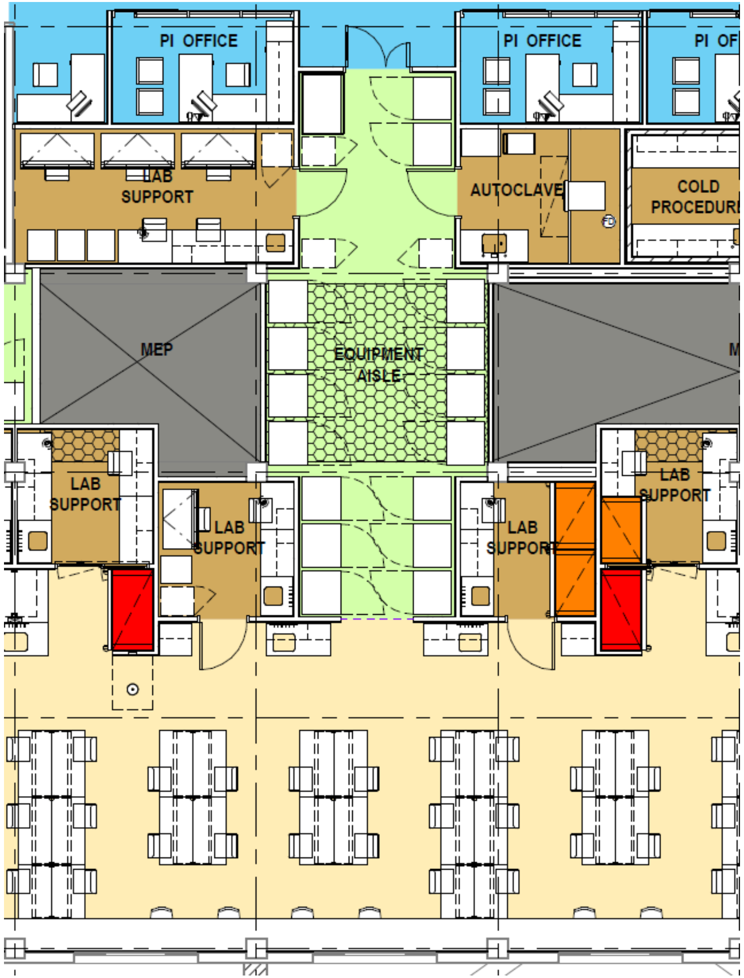
LAB SUPPORT
OPEN LAB
OPEN LAB
PLANT GROWTH
PLANT GROWTH

HYBRID SCHEME: EXHAUST, POTABLE + LAB WATER, & DRAIN-FREE ZONE FOR MEP DECONGESTION + COST SAVINGS + PLANNING FLEXIBILITY

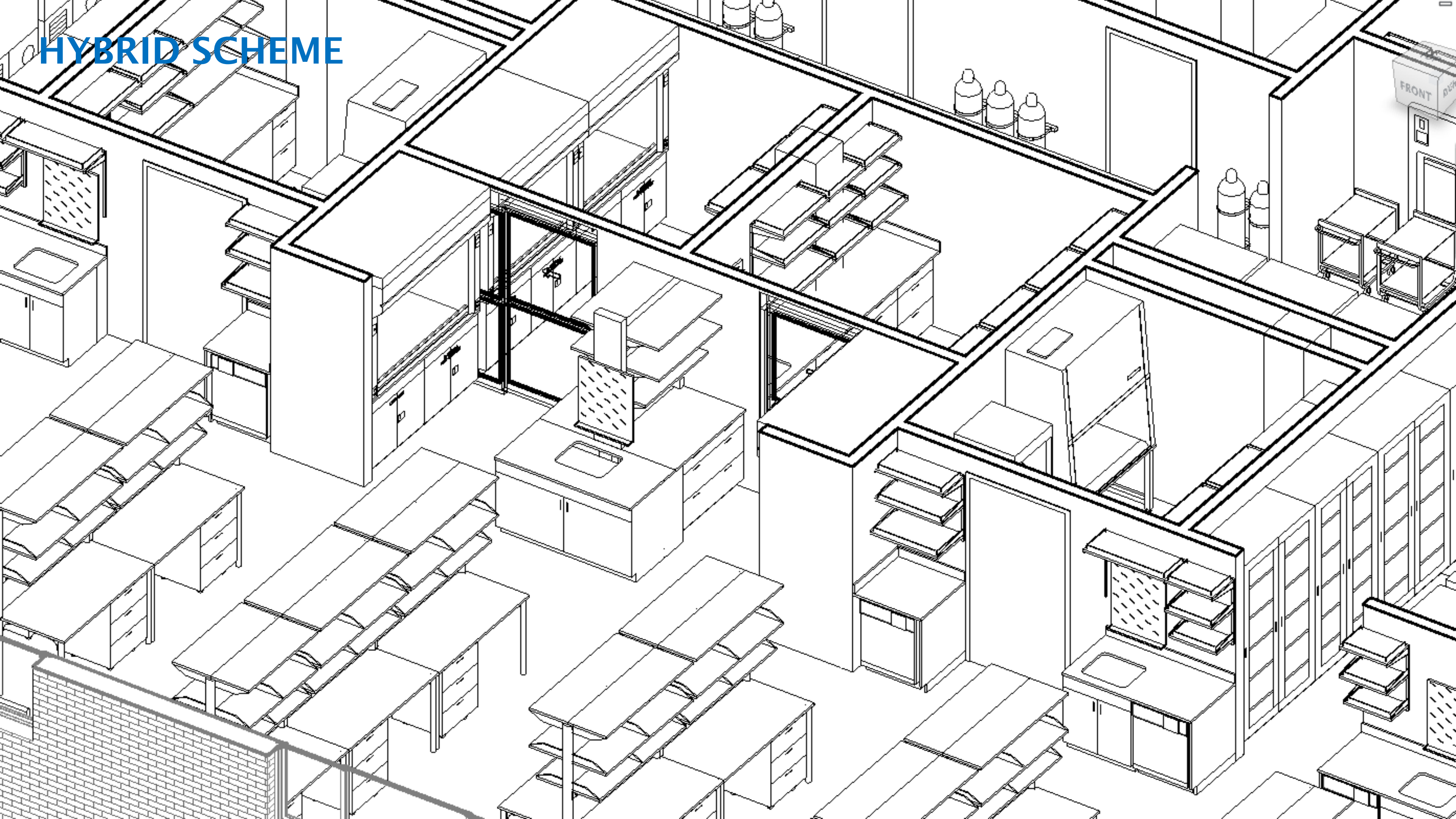


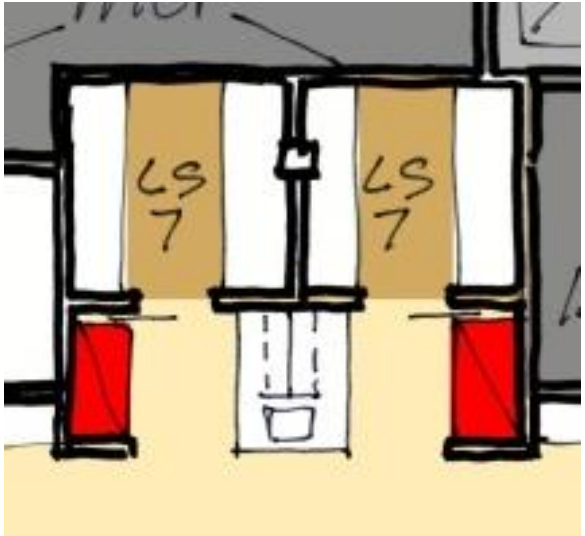
Lab Types: Hoods

	Wet 1:	1 Hood / 2 Groups
80%	Wet 2:	1 Hood + (F) / Group
20%	Wet 3:	2 Hoods + (2F) / Group
	Wet 4:	1 Hood per Lab User
	Flex 1:	1 Hood + (F) / 4 Groups
	Flex 2:	1 Hood + (F) / 4 Groups
?%	Dry 1:	0 Hoods



HYBRID SCHEME

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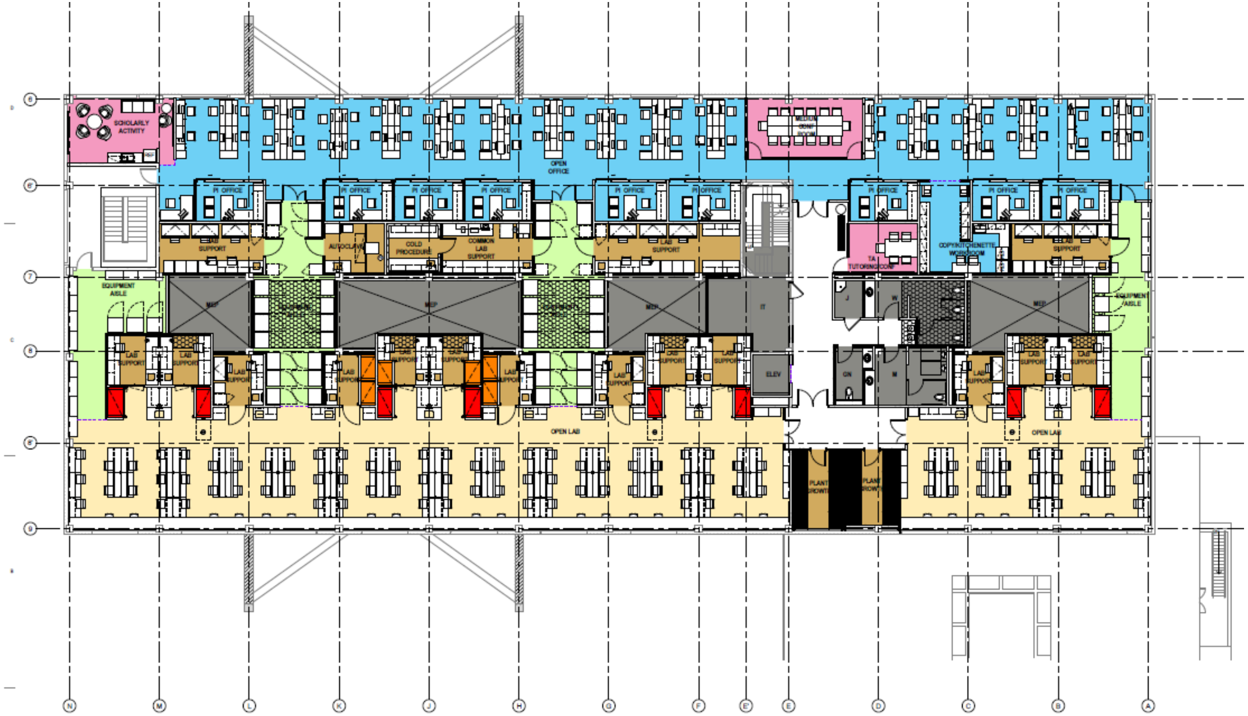
STANLEY


STANLEY

Level 4


SCHOLARLY ACTIVITY
OPEN OFFICE
PI OFFICE
LAB SUPPORT
COLD PROCEDURE
COMMON LAB SUPPORT
EQUIPMENT AISLE
MEP
IT
ELEV
OPEN LAB
N
M
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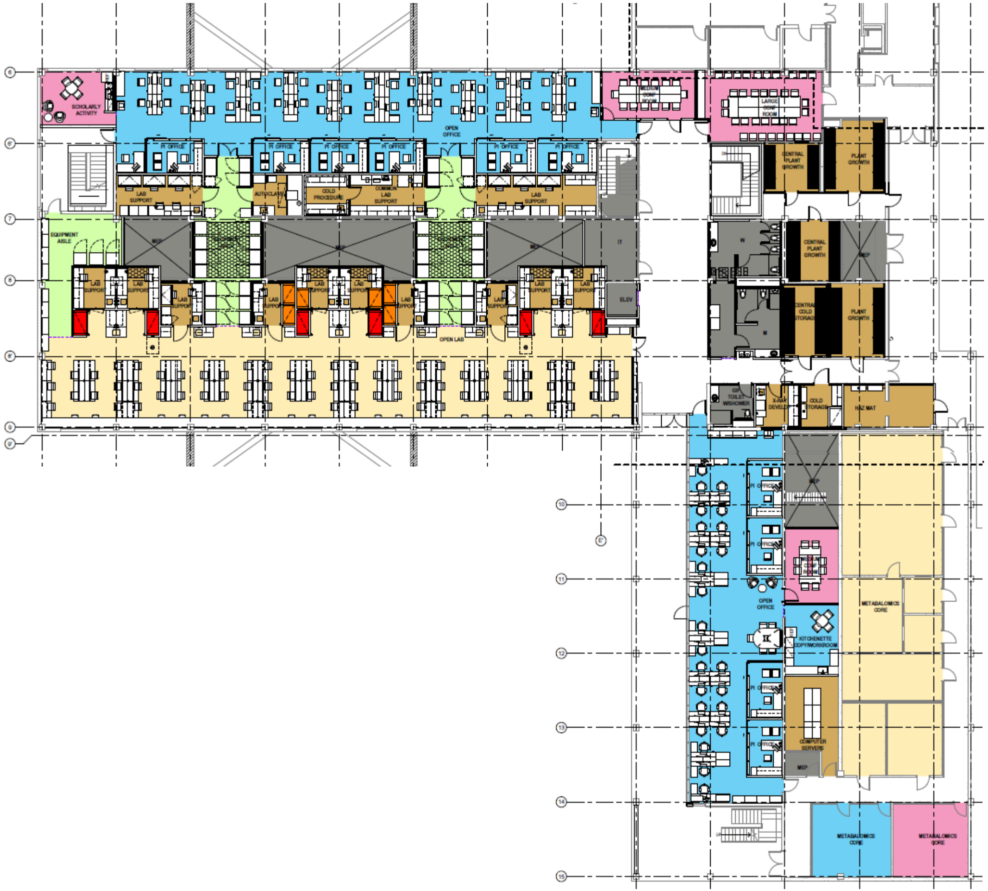
C
B
A

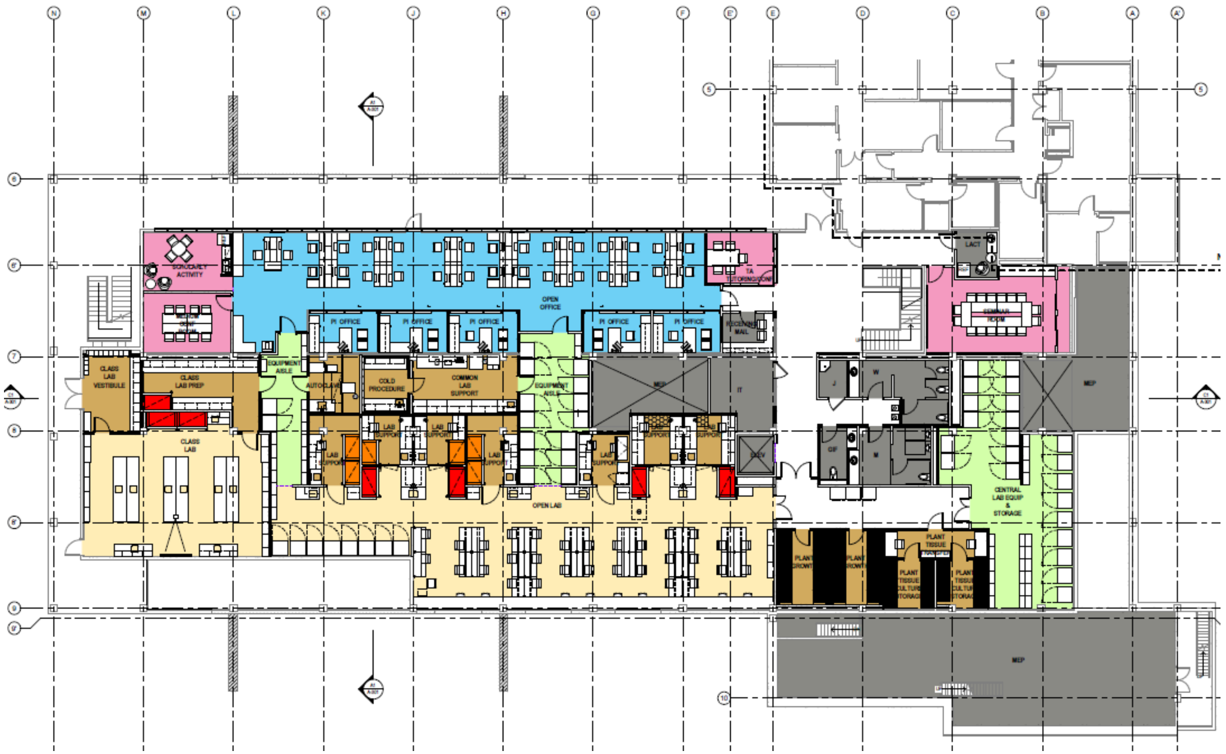
Level 3


SCHOLARLY ACTIVITY
OPEN OFFICE
PI OFFICE
LAB SUPPORT
COLD PROCEDURE
COMMON LAB SUPPORT
EQUIPMENT AISLE
MEP
ELEV
OPEN LAB
LAB STORAGE
COPY WORKROOM

Level 2


SCHOLARLY ACTIVITY
OPEN OFFICE
PI OFFICE
LAB SUPPORT
AUTOCLAVE
COLD PROCEDURE
COMMON LAB SUPPORT
EQUIPMENT AISLE
MEP
IT
ELEV
OPEN LAB
CENTRAL PLANT GROWTH
PLANT GROWTH
CENTRAL COLD STORAGE
COLD STORAGE
HAZ MAT
KITCHENETTE COPY/WORKROOM
METABALOMICS CORE
COMPUTER SERVERS

Level 1



OPEN OFFICE
PI OFFICE
CLASS LAB VESTIBULE
CLASS LAB PREP
CLASS LAB
EQUIPMENT AISLE
AUTOCLAVE
COLD PROCEDURE
COMMON LAB SUPPORT
LAB SUPPORT
OPEN LAB
MEP
IT
CENTRAL LAB EQUIP & STORAGE
PLANT TISSUE
LACT

PANEL BOARDS, FIRE EXTINGUISHERS, EYE WASH / SAFETY SHOWERS

04

Building Infrastructure - Mechanical

Existing HVAC Configuration

- Basement and all MEP shafts are “open” ventilation air system.
  - ➢ Basement Fresh Air units dump pre-conditioned outside air into these spaces and the recirculating Air Conditioning units draw “fresh” air from the surrounding space.

- Configuration of the recirculating Air Conditioning ducting really fill out the MEP shafts and this poses road blocks for parallel ducting arrangement.

- Configuration of the recirculating Air Conditioning ducting is “dual-duct”.
  - ➢ Unit has a cold and hot coil and distributes cold and hot air in parallel supply air ducts. These two air streams are mixed via Mixing Boxes to supply varying temperature air to each zone to satisfy thermal comfort.

HVAC Configuration Concepts

- Air Handlers in Basement with Overhead Distribution – similar to KAA/Syska Hennessy Group Design from 2008
  - Pros:
    - Limit roof modifications to exhaust fans and ductwork only.
    - Replaces OSA units in place while eliminating AC units per floor.
  - Cons:
    - Can only connect to the proposed center and east MEP shafts in the West Wing.
    - Can only connect to the proposed north MEP shaft in the South Wing.
    - Renovate outside air intakes on east side of building.
    - Challenged with space constraints in basement to route ductwork.

HVAC Configuration Concepts

- Dedicated Outdoor Air System (DOAS) in Basement with Distributed AC Units
  - Pros:
    - If DOAS units in basement, limits roof modifications to exhaust fans and ductwork only.
    - Replaces AHUs in place with smaller DOAS.
    - Minimizes distribution ducting to OSA or Makeup Air requirements to AC Units.
  - Cons:
    - Temperature control becomes very difficult without completing building at once.
    - Can only connect to the proposed center and east MEP shafts in the West Wing.
    - Can only connect to the proposed north MEP shaft in the South Wing.
    - Imposes a required footprint in the MEP shafts for equipment and maintenance.
    - Renovate outside air intakes on east side of building.
    - Challenged with space constraints in basement to route ductwork.

HVAC Configuration Concepts

- Dedicated Outdoor Air System (DOAS) on Roof with Distributed AC Units
  - Pros:
    - Provides access to all proposed MEP shafts.
    - Minimizes distribution ducting to OSA or Makeup Air requirements to AC Units.
    - Provides multiple options for phasing consideration.
    - OSA intake is away from Parking Lot and Loading Dock.
  - Cons:
    - Temperature control becomes very difficult without completing building at once.
    - Imposes a required footprint in the MEP shafts for equipment and maintenance.

HVAC Configuration Concepts

- Dedicated Outdoor Air System (DOAS) in Basement with Active Chilled Beams
  - Pros:
    - If DOAS units in basement, limits roof modifications to exhaust fans and ductwork only.
    - Replaces AHUs in place with smaller DOAS and eliminating AC units distributed per floor.
    - Limits overhead distribution ducting to OSA or Makeup Air requirements.
  - Cons:
    - Temperature control becomes very difficult without completing building at once.
    - Can only connect to the proposed center and east MEP shafts in the West Wing.
    - Can only connect to the proposed north MEP shaft in the South Wing.
    - Renovate outside air intakes on east side of building.
    - Challenged with space constraints in basement to route ductwork.
    - Distributed chilled water throughout.
    - Control of moisture migration and condensation.

HVAC Configuration Concepts

- Dedicated Outdoor Air System (DOAS) on Roof with Active Chilled Beams
  - Pros:
    - Provides access to all proposed MEP shafts.
    - Limits overhead distribution ducting to OSA or Makeup Air requirements.
    - Provides multiple options for phasing consideration.
    - OSA intake is away from Parking Lot and Loading Dock.
  - Cons:
    - Temperature control becomes very difficult without completing building at once.
    - Distributed chilled water throughout.
    - Control of moisture migration and condensation.
    - Phasing becomes difficult without completing building at once.

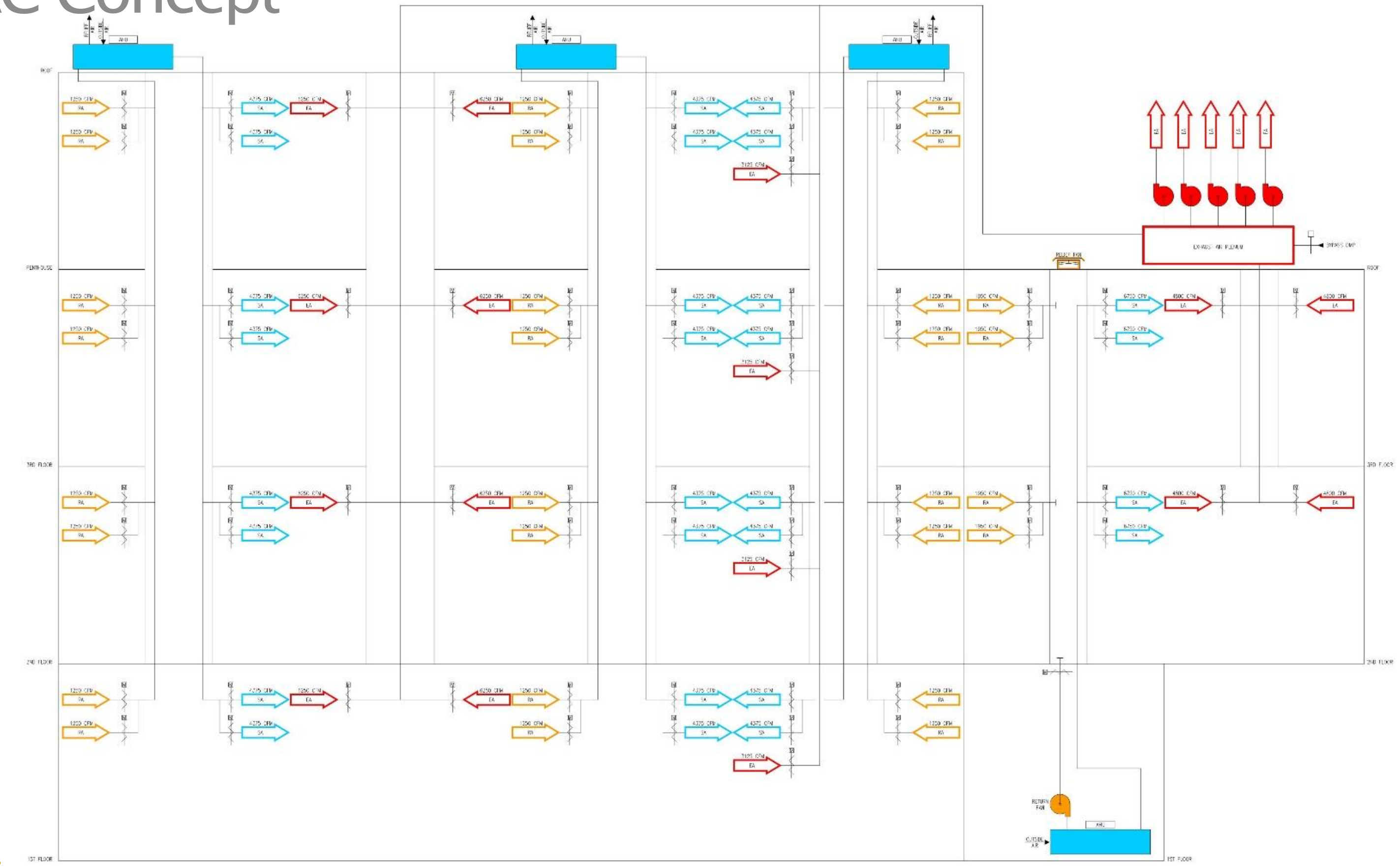
Proposed HVAC Configuration

- West Wing Roof top Air Handlers, providing both ventilation air and cooling.
  - ➢ Variable air volume, incorporates office return air with air-side economizer.
  - ➢ Correct the outside air distribution such that it is fully ducted to occupied spaces.
- South Wing Indoor Air Handler, providing both ventilation air and cooling.
  - ➢ Variable air volume, incorporates office return air with air-side economizer.
  - ➢ Correct the outside air distribution such that it is fully ducted to occupied spaces.
- Roof top Laboratory Exhaust Fans.
  - ➢ Variable air volume, with bypass air plenum to maintain minimum stack velocity.
- Vertical supply/return/exhaust duct mains in each MEP shaft zone.
  - ➢ Provide single cold supply duct configuration with local air terminal units with hot water reheat. Requires new hot water distribution.

Proposed HVAC Configuration

- Possible use of supplemental cooling with Fan Coil Units for high heat load and/or critical spaces.
  - Apply dedicated refrigerant direct expansion cooling units to align with Emergency Power sourced equipment (i.e. freezers).

HVAC Concept

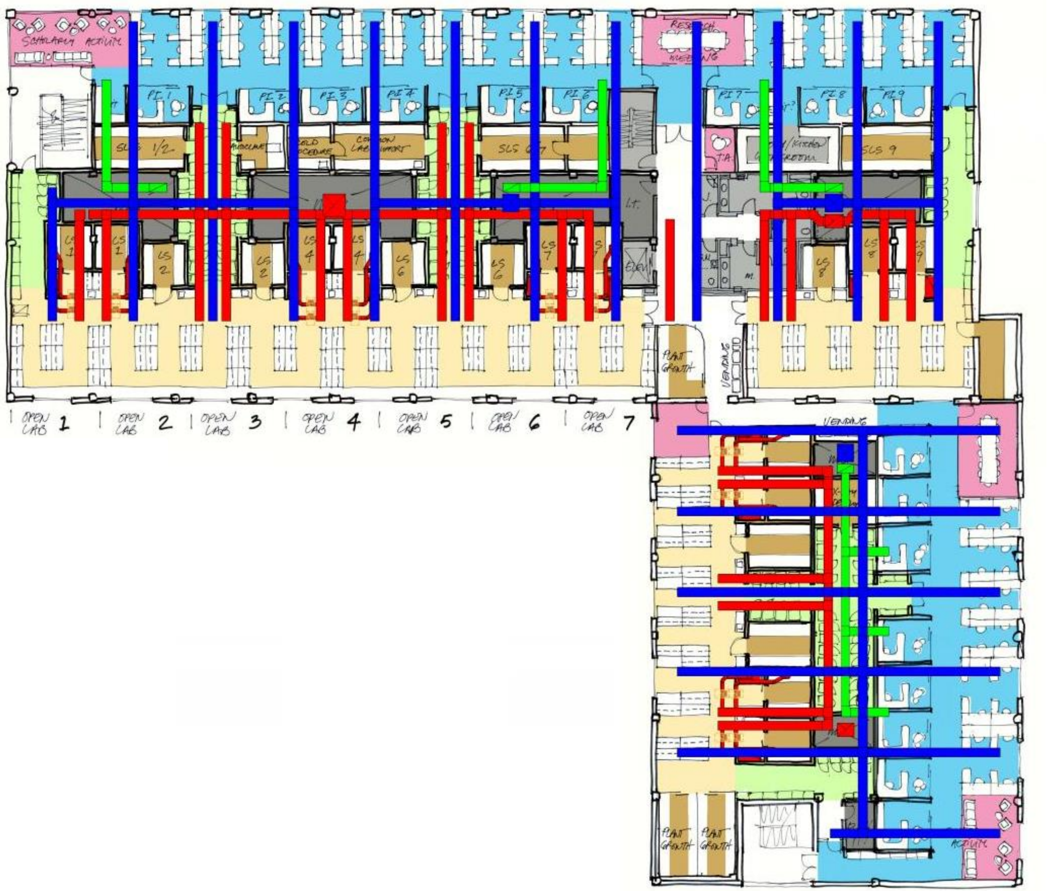


HVAC Concept

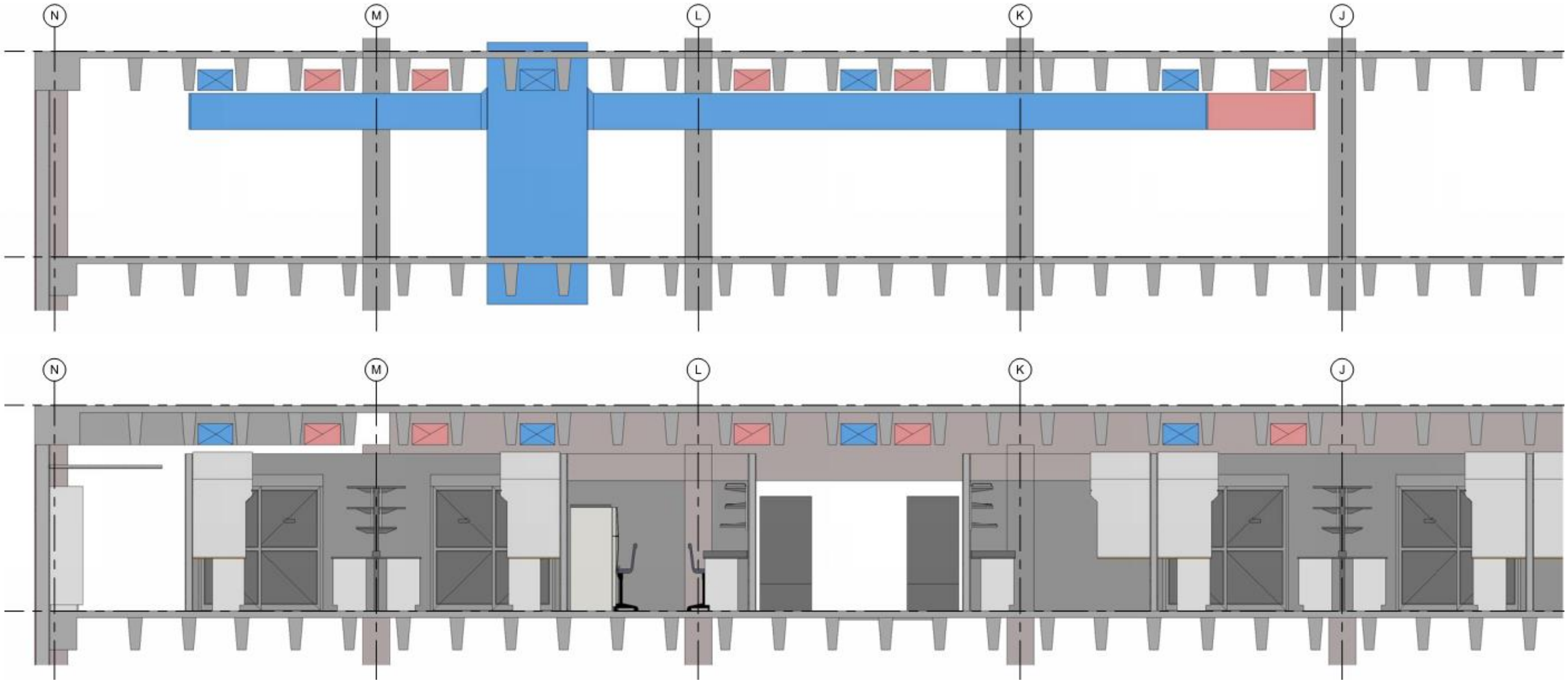
HVAC Concept

HVAC Concept

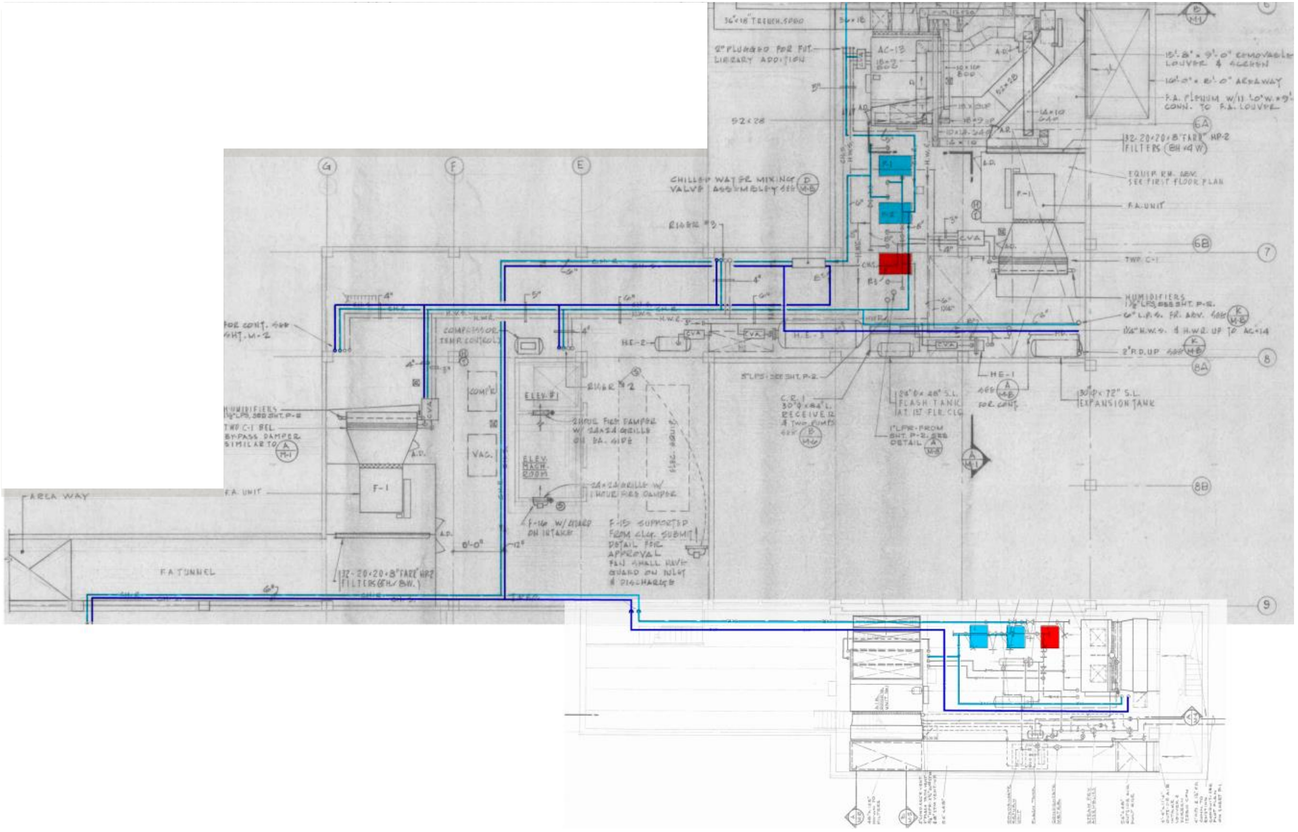
HVAC Concept



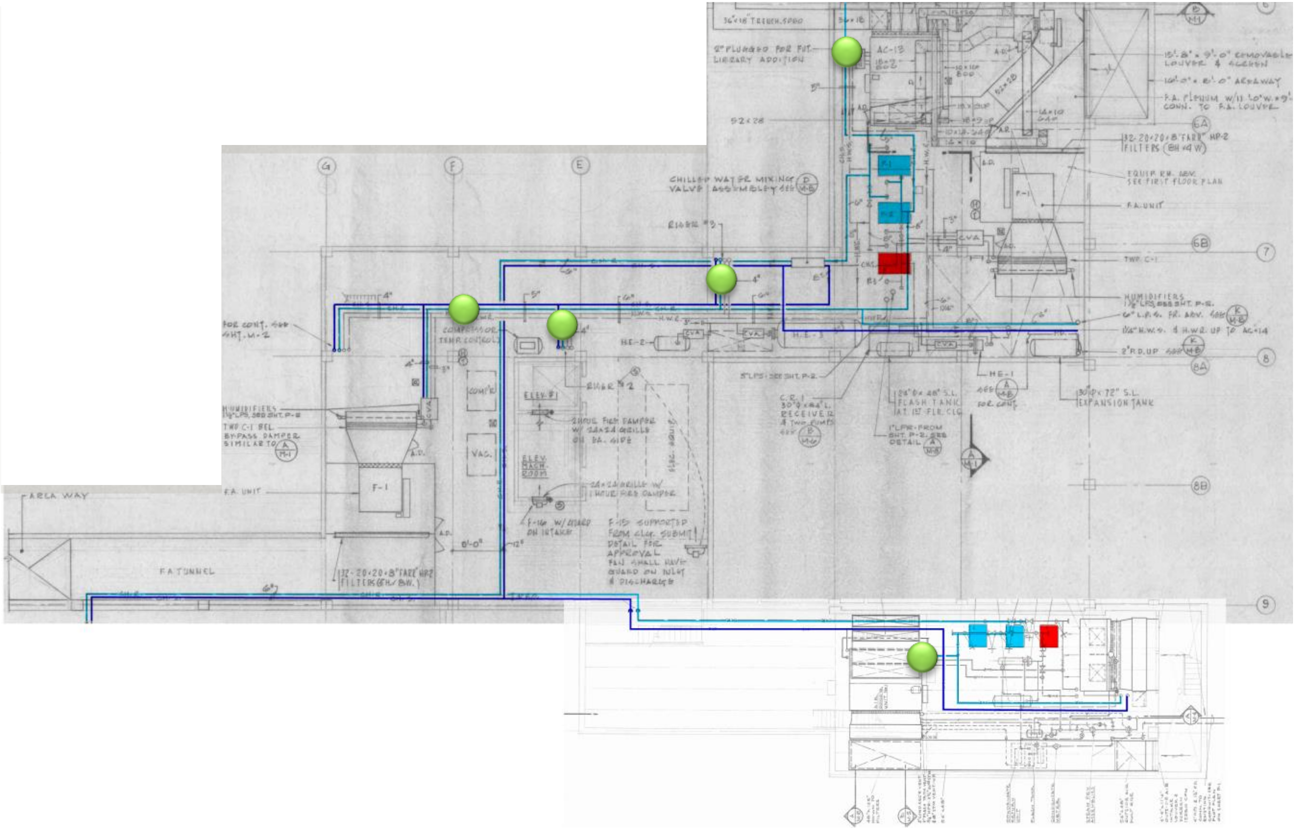
HVAC Concept



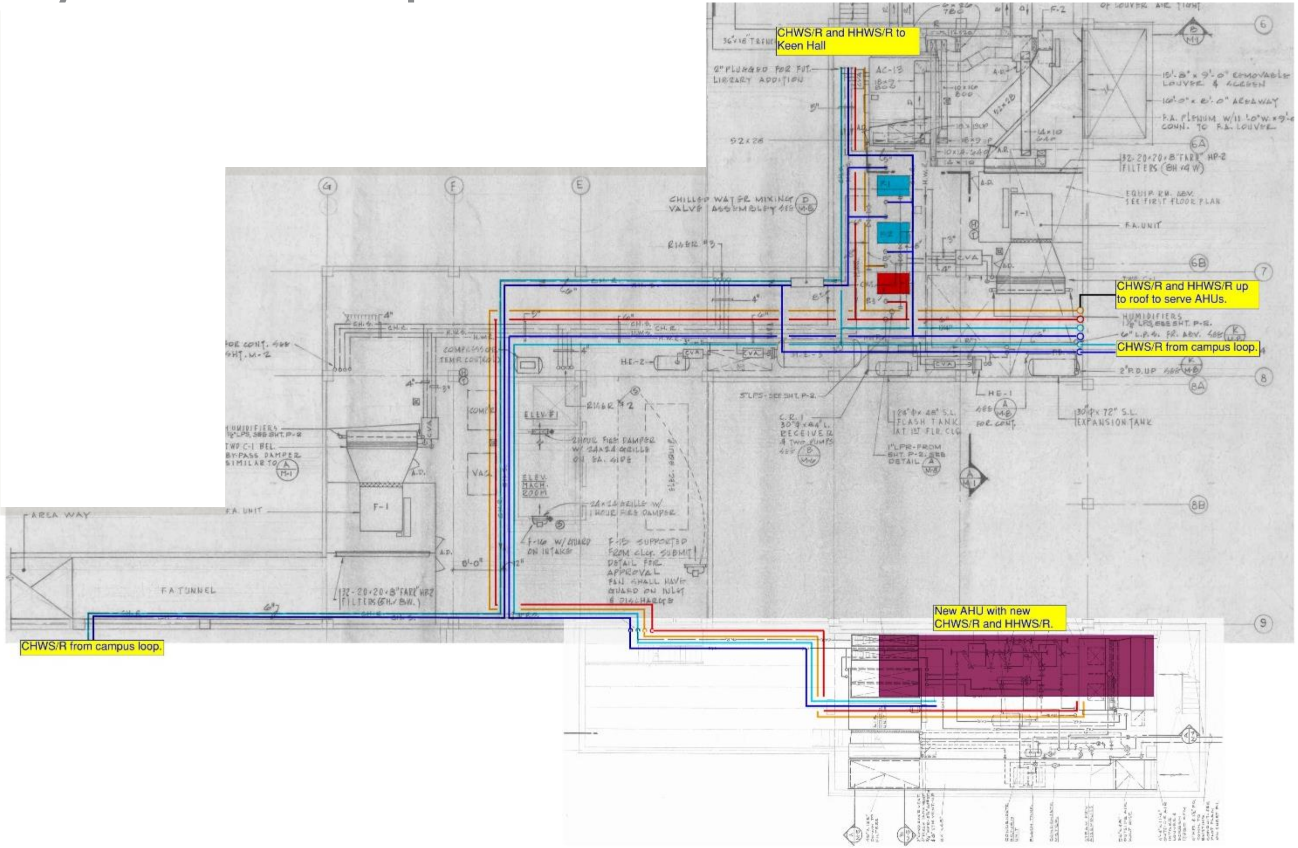
Existing Chilled Water System



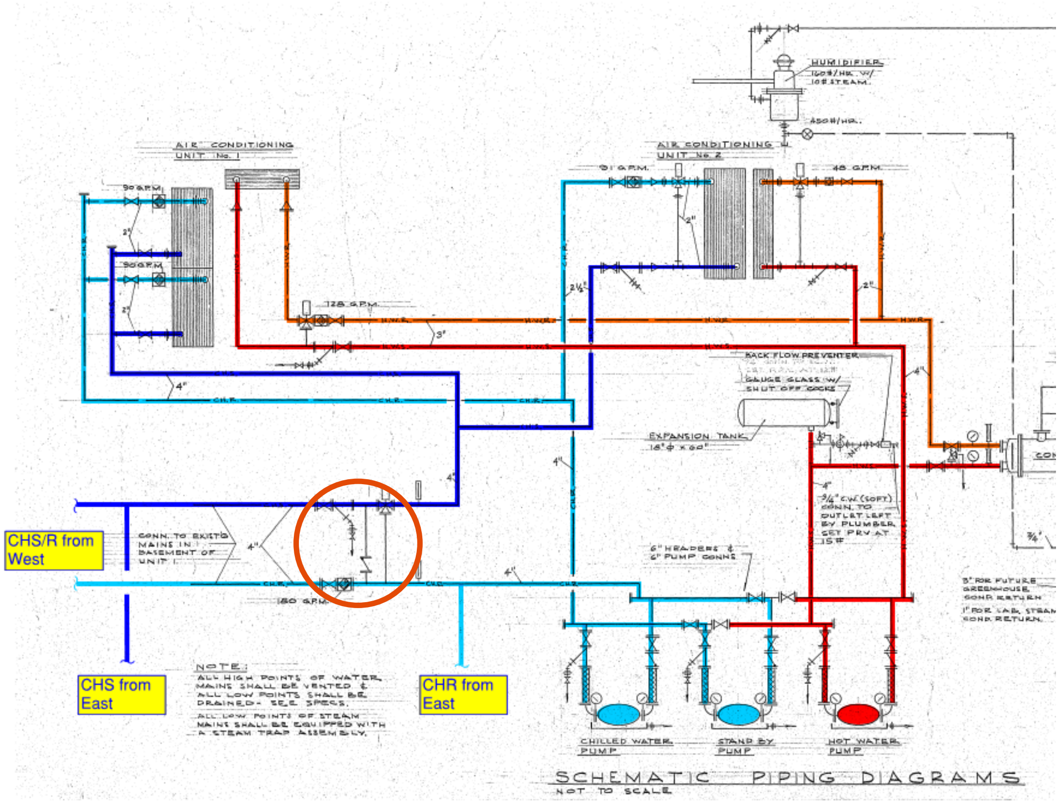
Existing Chilled Water System



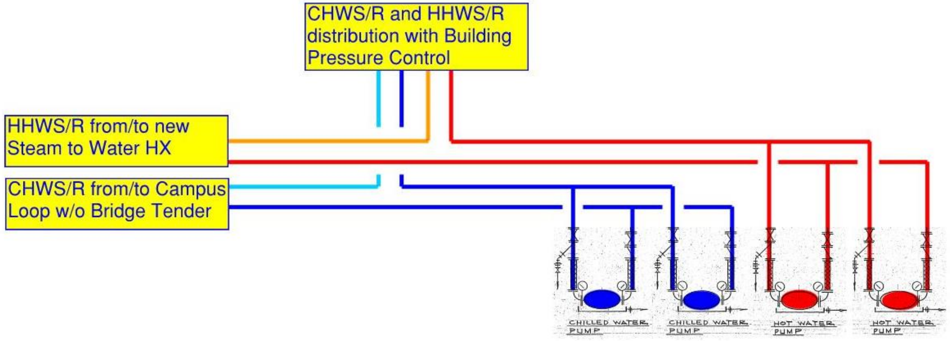
Hydronic System Concept



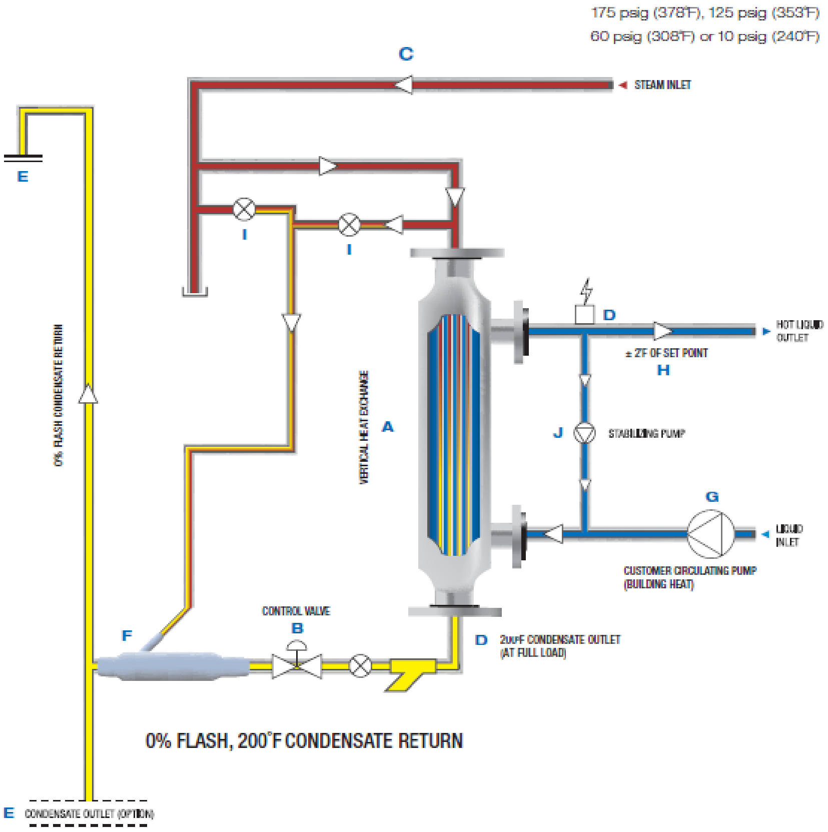
Existing Hydronic System



Hydronic System Concept

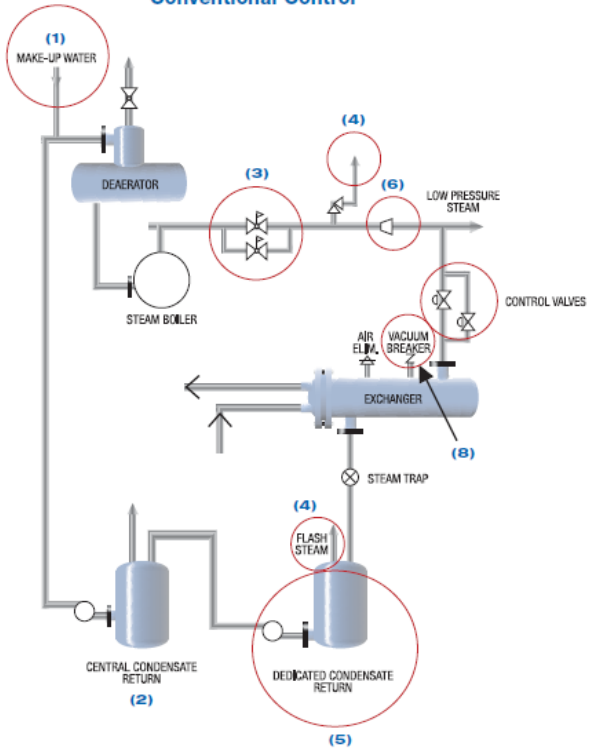


Hydronic System Concept



0% FLASH, 200°F CONDENSATE RETURN

Conventional Control



(1) LESS MAKE-UP WATER

The boiler gets back more condensate so you use less fresh water. This also means less softening, chemical treatment, and surface blowdown.

(2) CONDENSATE PUMPS LAST LONGER

Condensate that is "too hot" causes pump cavitation and seal leaks.

(3) NO STEAM PRV STATION

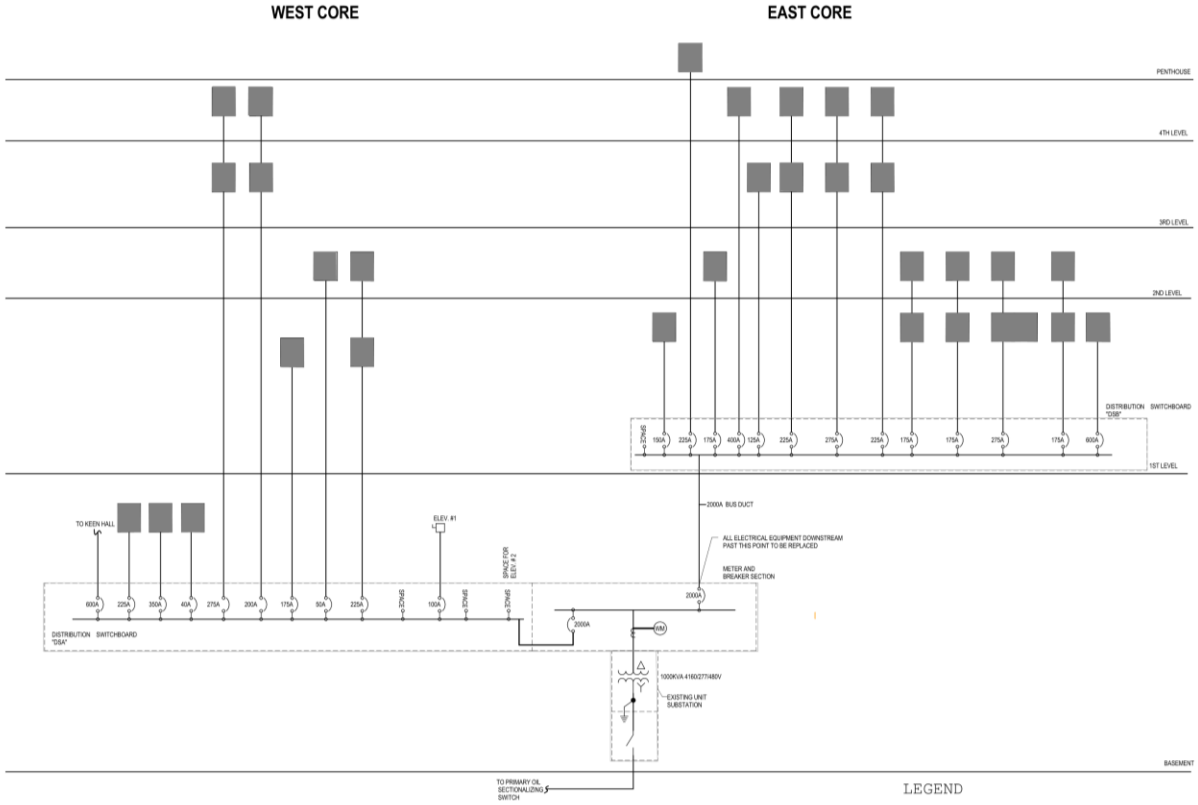
The Maxi-Therm can use high, medium or low pressure steam directly.

(4) NO STEAM SAFETY RELIEF TO ROOF

Many times the vent piping is the most expensive part of the entire system. Maxi-Therm can eliminate the need for both the pressure relief and condensate receiver vent.

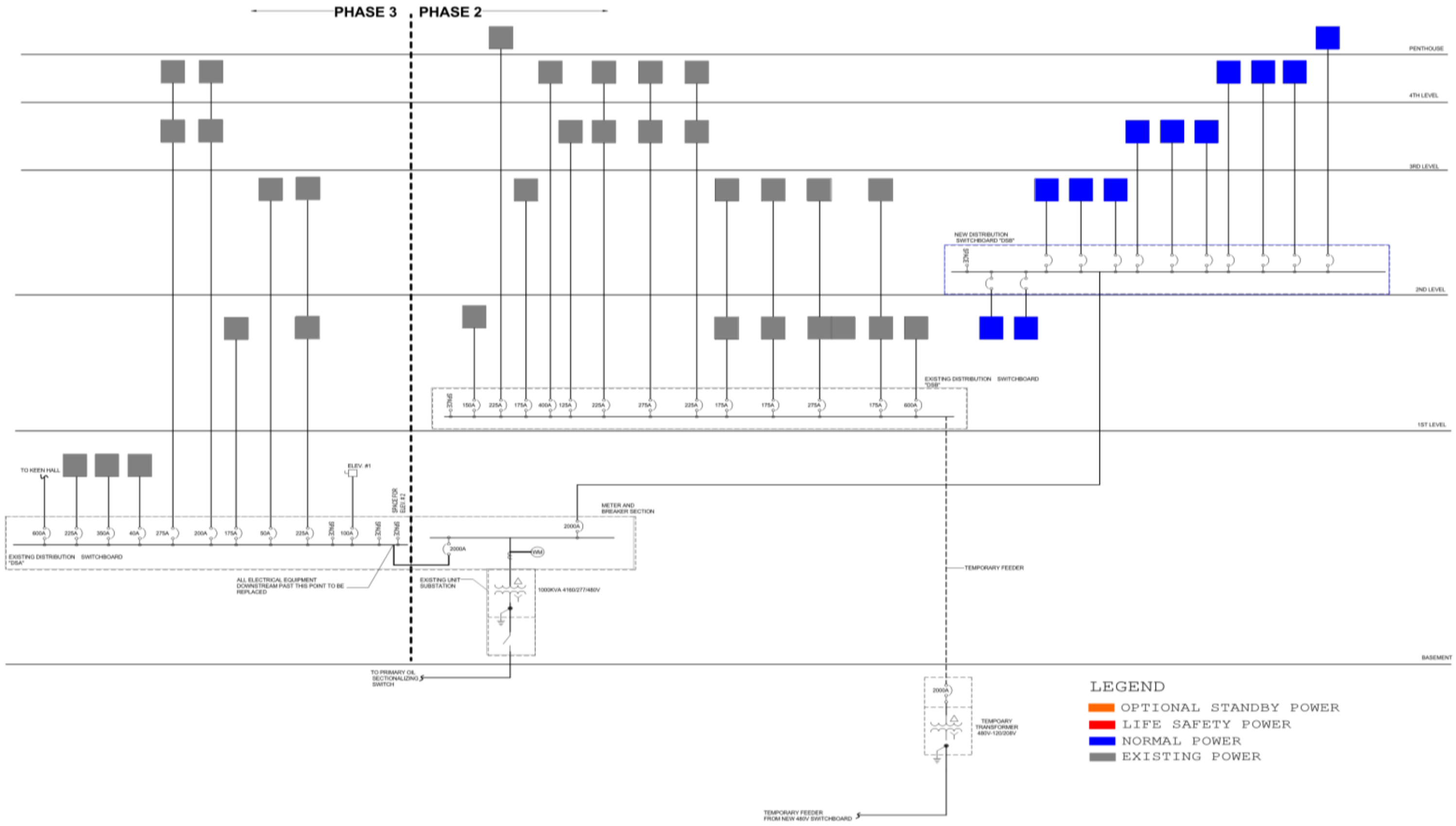
Electrical

- Existing 120/208V distribution to be replaced with new in both east/west and south sections.
- New 480V distribution to be installed to support new mechanical and lighting.
- New emergency generator and emergency power distribution to be installed to support life safety and mechanical optional standby loads. Two options:
  - *Utilized existing campus generator for optional standby loads.*
  - *Provide new stand alone generator for life safety & optional standby loads.*
- Temporary 120/208V source using existing distribution to support building loads during the construction.
- Replace existing lighting with LED fixtures.
- Removal of existing 120/208V distribution on all floors back to each unit substation.
- Provide new 120/208V distribution to be installed to support labs and general power requirements.
- Update Fire Alarm Control Panel (FACP) and FA devices.
- IT closets to support future TI improvements.
- Future security system requirements. (i.e. card access, CCTV etc.)

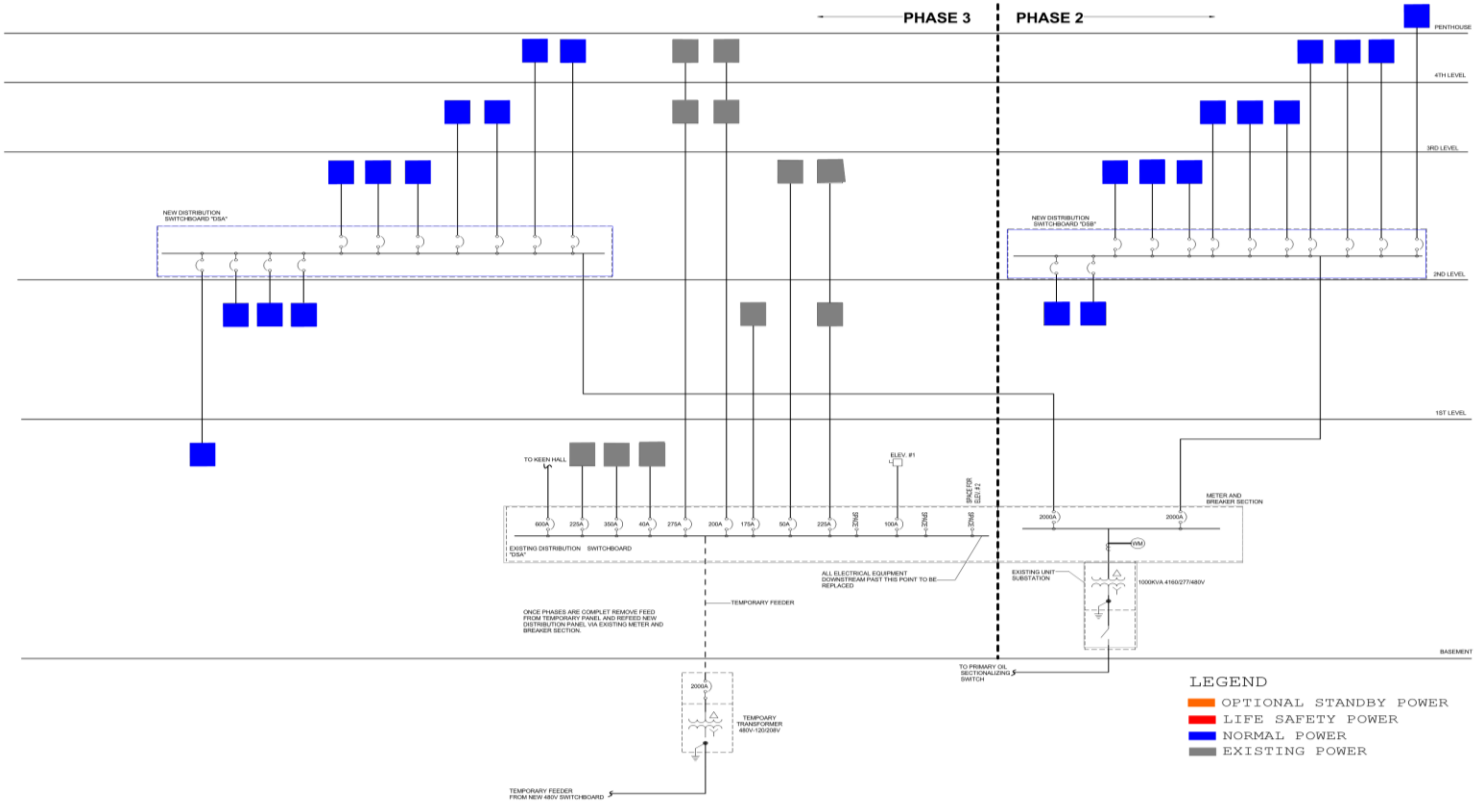


EAST/WEST SECTION EXISTING 120/208V ELECTRICAL ONE LINE DIAGRAM

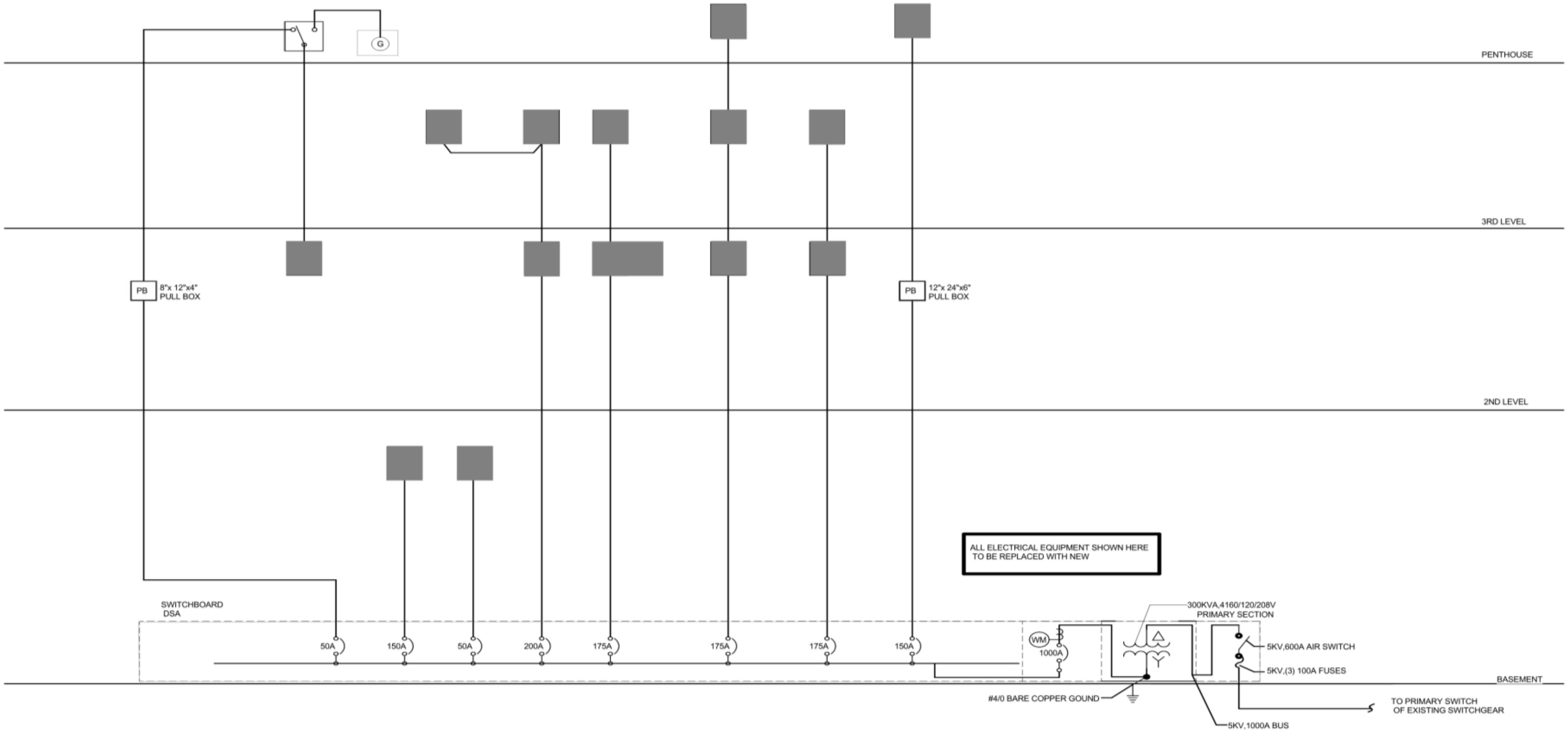
LEGEND
- OPTIONAL STANDBY POWER
- LIFE SAFETY POWER
- NORMAL POWER
- EXISTING POWER



EAST/WEST SECTION 120/208V ELECTRICAL ONE LINE DIAGRAM PHASE 2 AND 4

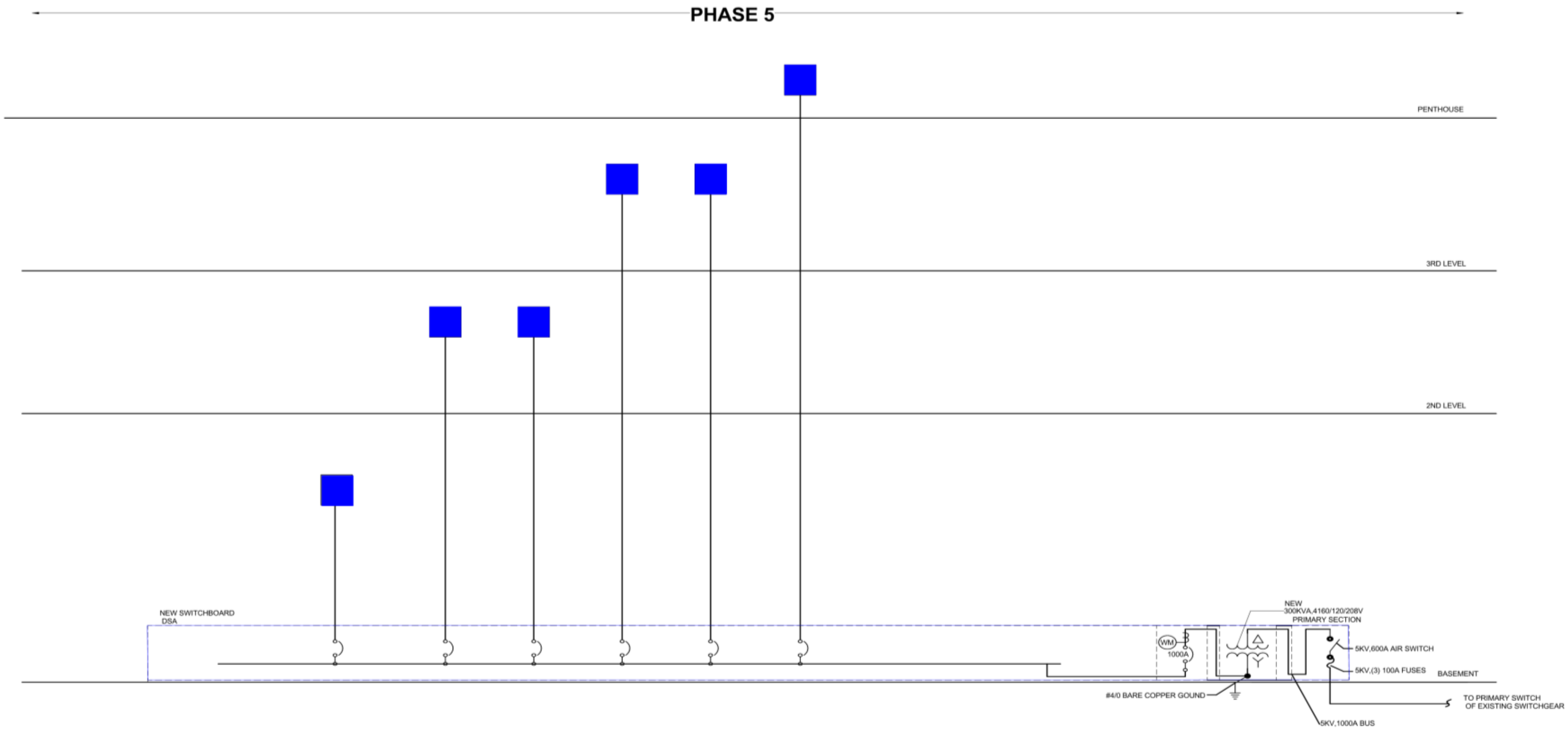


EAST/WEST SECTION 120/208V ELECTRICAL ONE LINE DIAGRAM PHASE 3



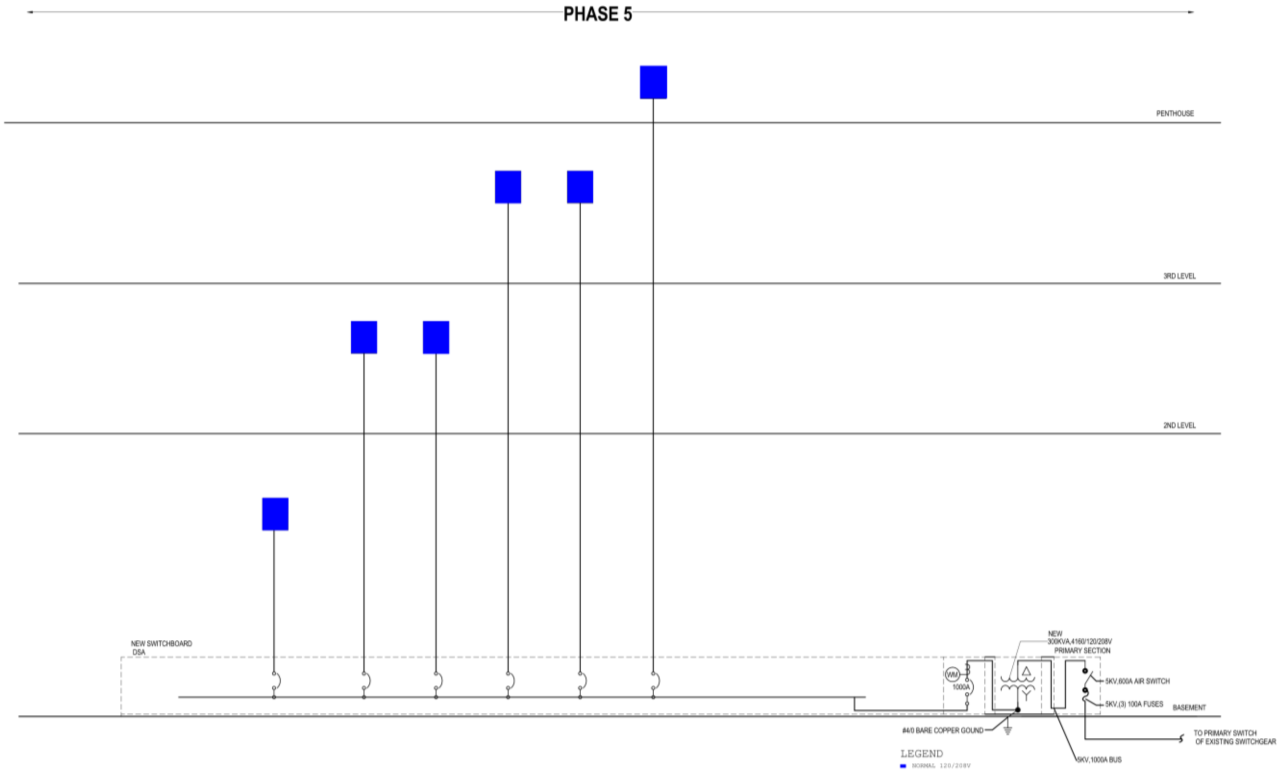
SOUTH SECTION EXISTING ONE LINE DIAGRAM

LEGEND
OPTIONAL STANDBY POWER
LIFE SAFETY POWER
NORMAL POWER
EXISTING POWER



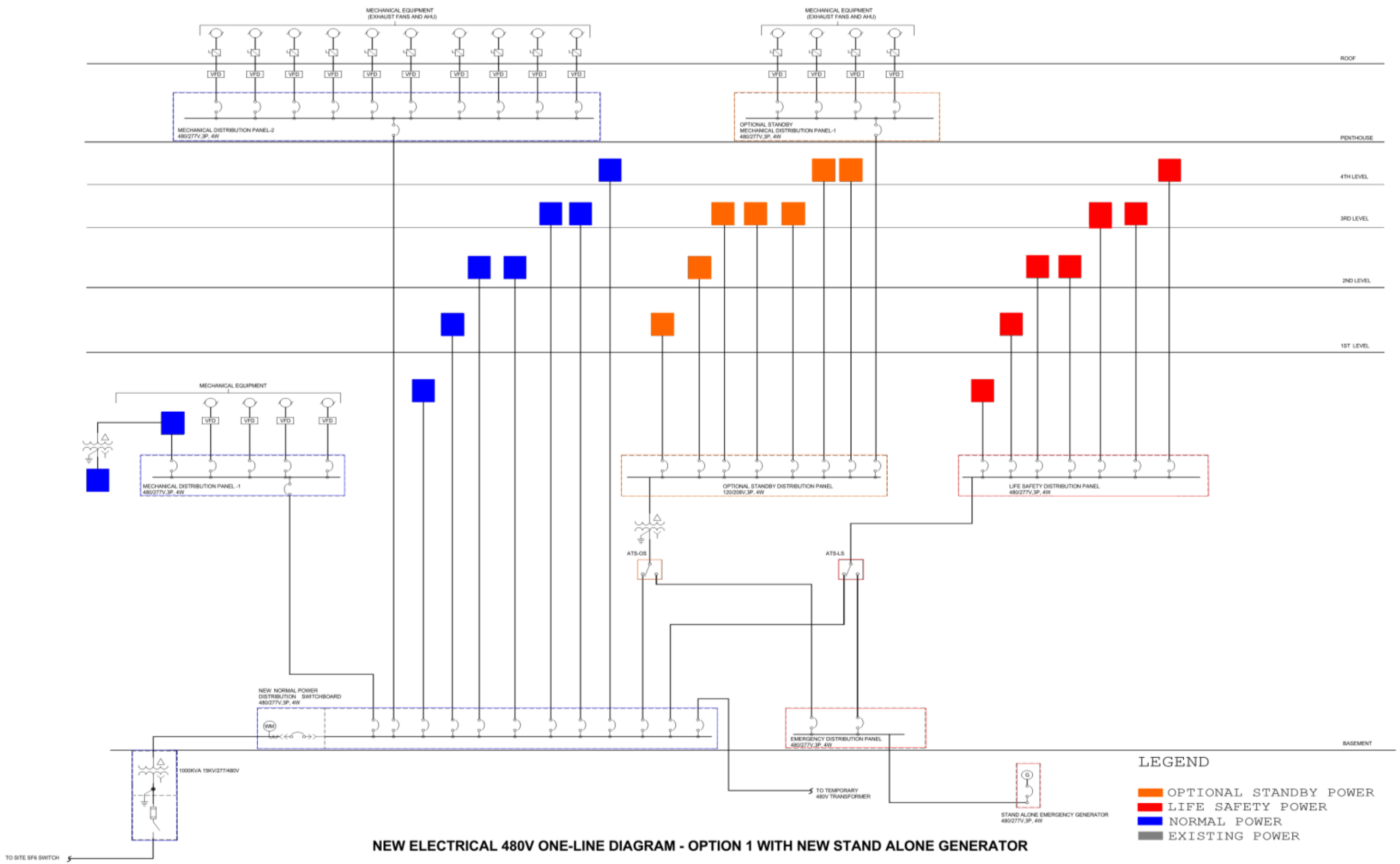
SOUTH BUILDING NEW 120/208V ELECTRICAL ONE LINE DIAGRAM

OPTIONAL STANDBY POWER
LIFE SAFETY POWER
NORMAL POWER
EXISTING POWER

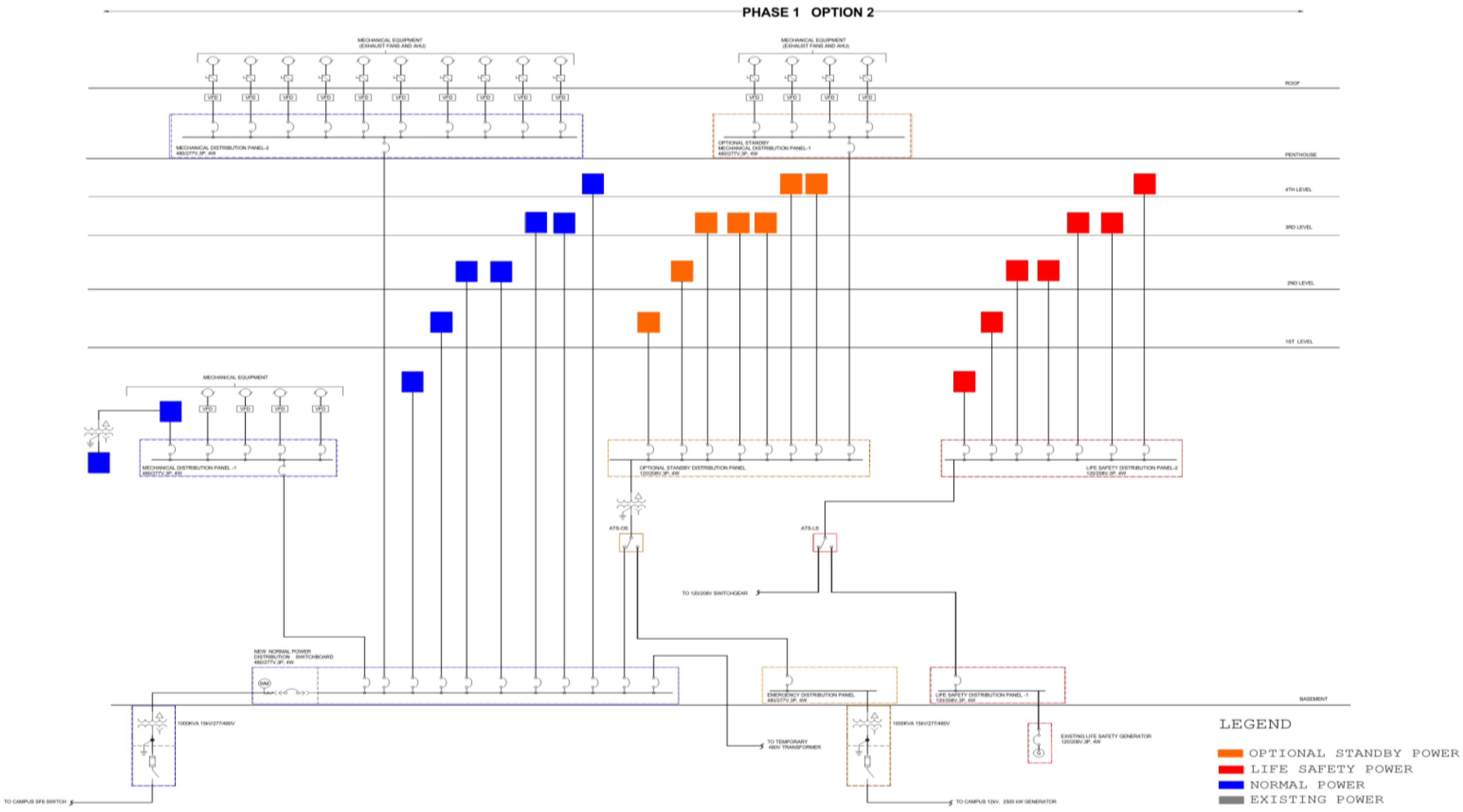


SOUTH SECTION NEW 120/208V ELECTRICAL ONE LINE DIAGRAM

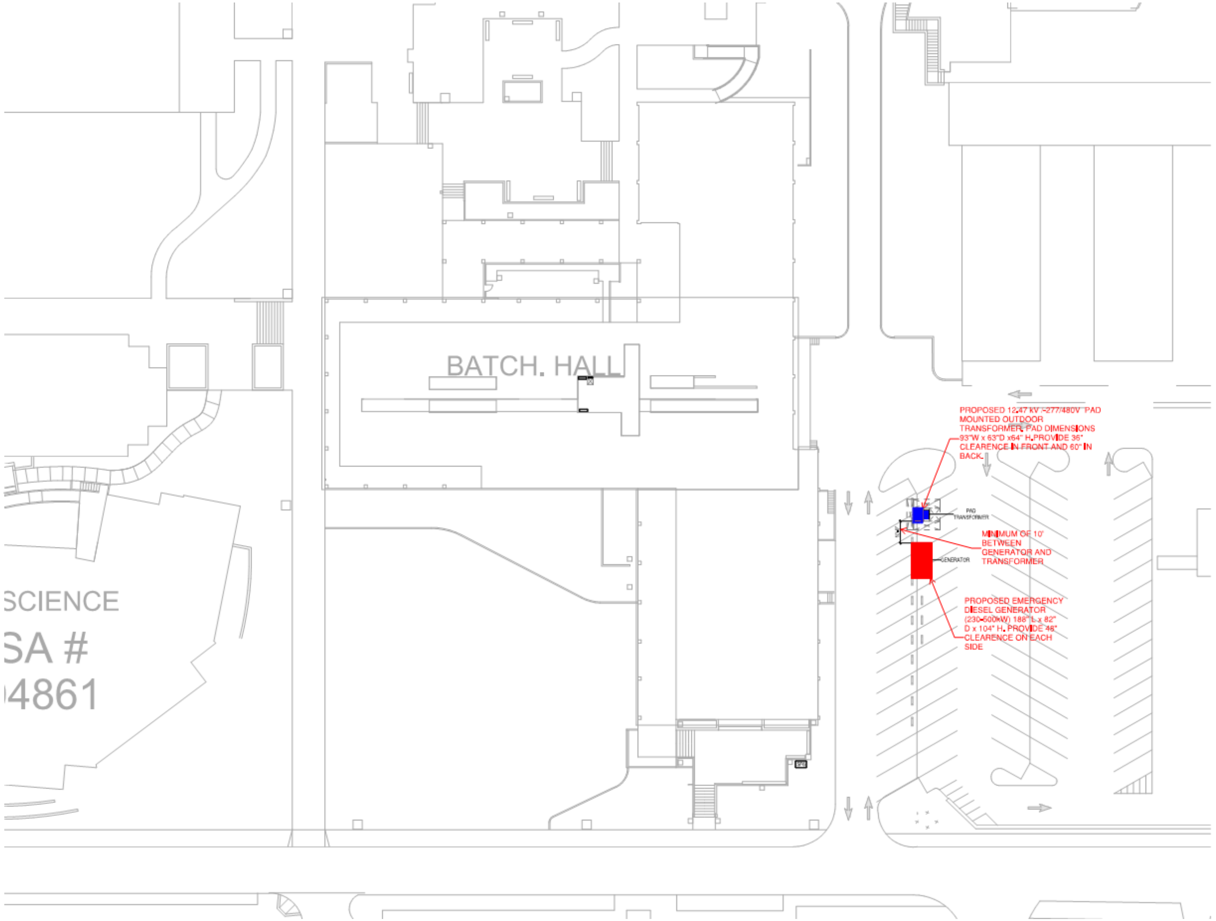
PHASE 1 OPTION 1

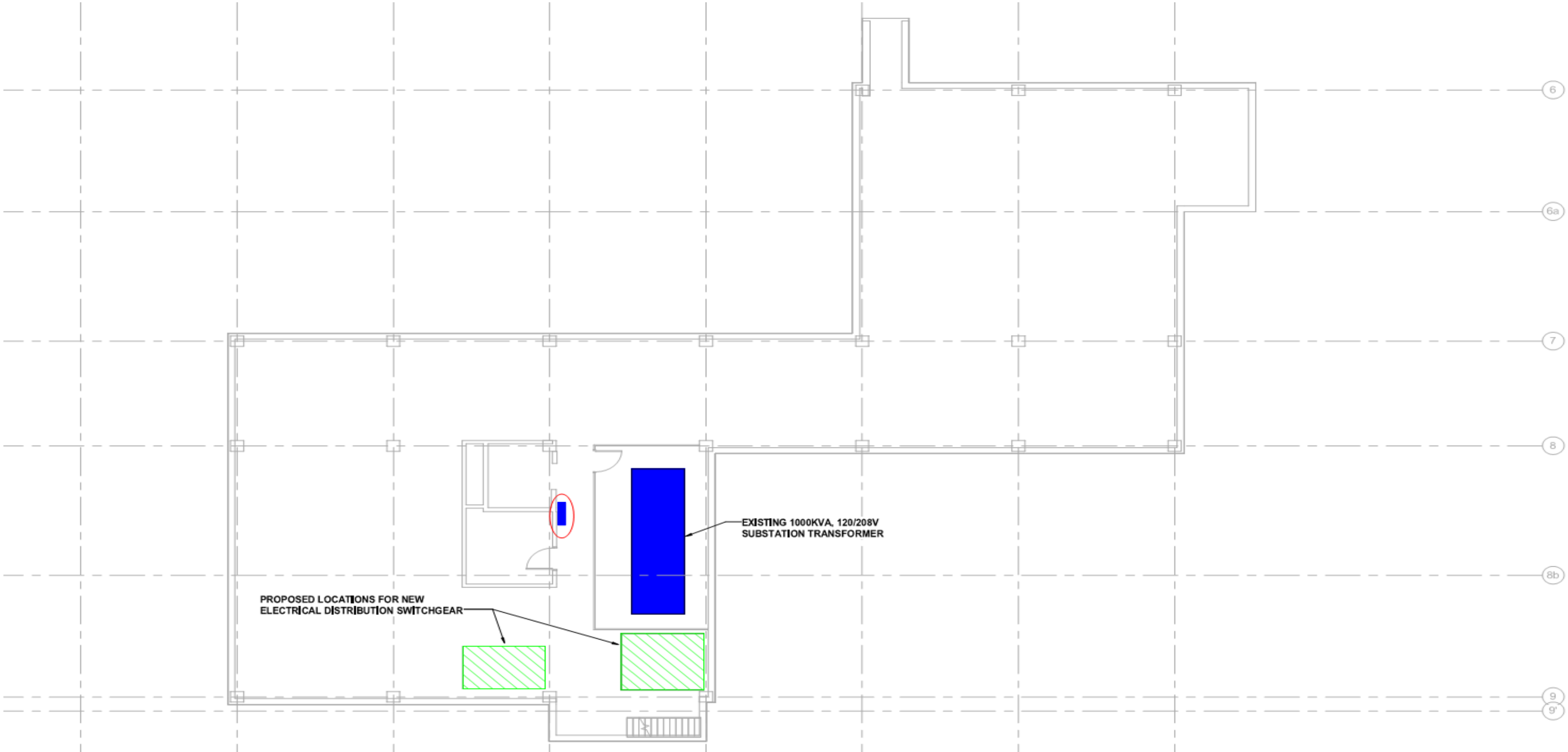


NEW ELECTRICAL 480V ONE-LINE DIAGRAM - OPTION 1 WITH NEW STAND ALONE GENERATOR



NEW ELECTRICAL 480V AND 120/208 ONE-LINE DIAGRAM - OPTION 2 WITH EXISTING SITE GENERATOR


BATCH. HALL
SCIENCE
SA #
4861
PROPOSED 12.47 kV /-277/480V PAD MOUNTED OUTDOOR TRANSFORMER. PAD DIMENSIONS 93"W x 63"D x64" H.PROVIDE 36" CLEARENCE IN FRONT AND 60" IN BACK.
PAD TRANSFORMER
MINIMUM OF 10' BETWEEN GENERATOR AND TRANSFORMER
GENERATOR
PROPOSED EMERGENCY DIESEL GENERATOR (230-500kW) 188" L x 82" D x 104" H. PROVIDE 48" CLEARENCE ON EACH SIDE



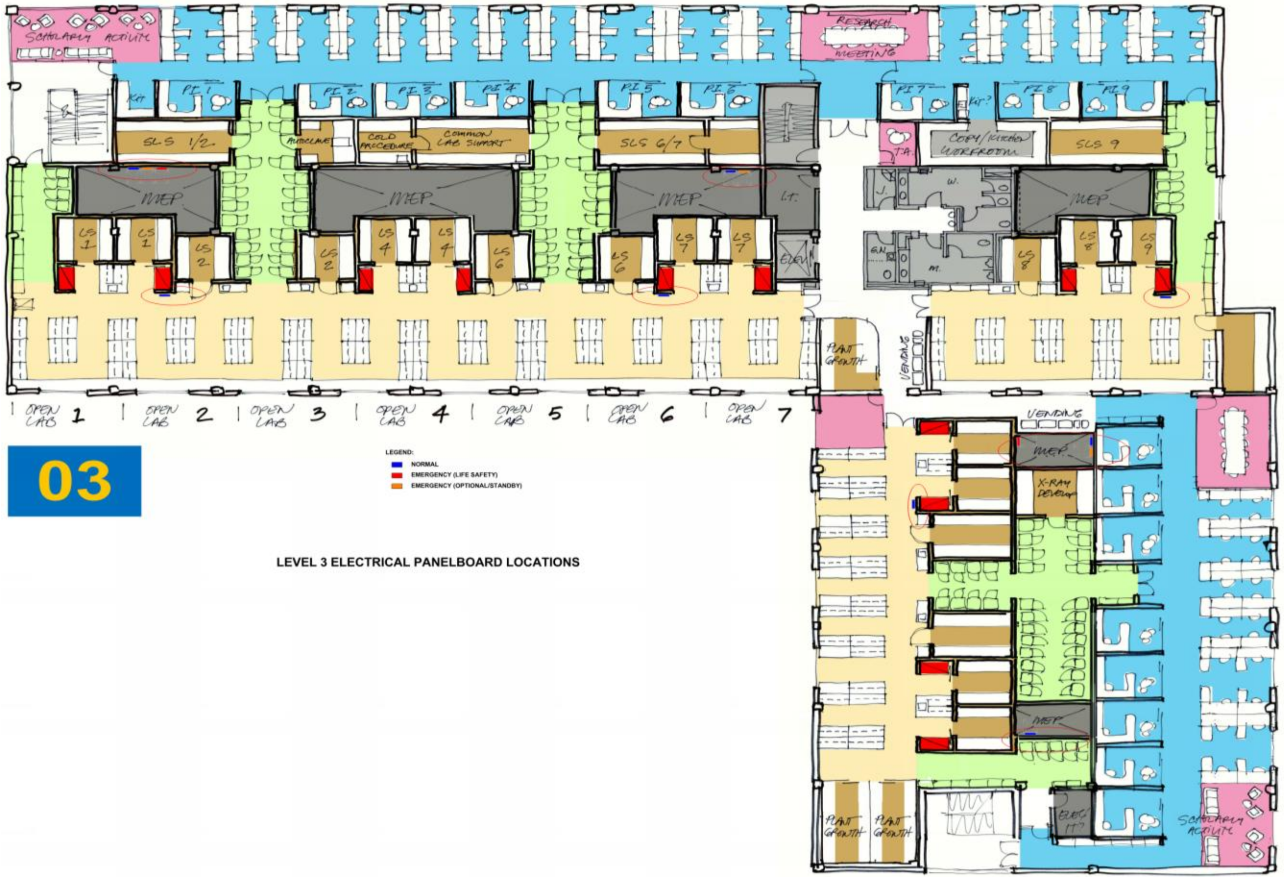
EAST/WEST SECTION BASEMENT, EXISTING 120/208V SUBSTATION

LEVEL 1 EAST/WEST SECTION ELECTRICAL PANELBOARD LOCATIONS

02

LEGEND:
- NORMAL
- EMERGENCY (LIFE SAFETY)
- EMERGENCY (OPTIONAL/STANDBY)

LEVEL 2 ELECTRICAL PANELBOARD LOCATIONS



03

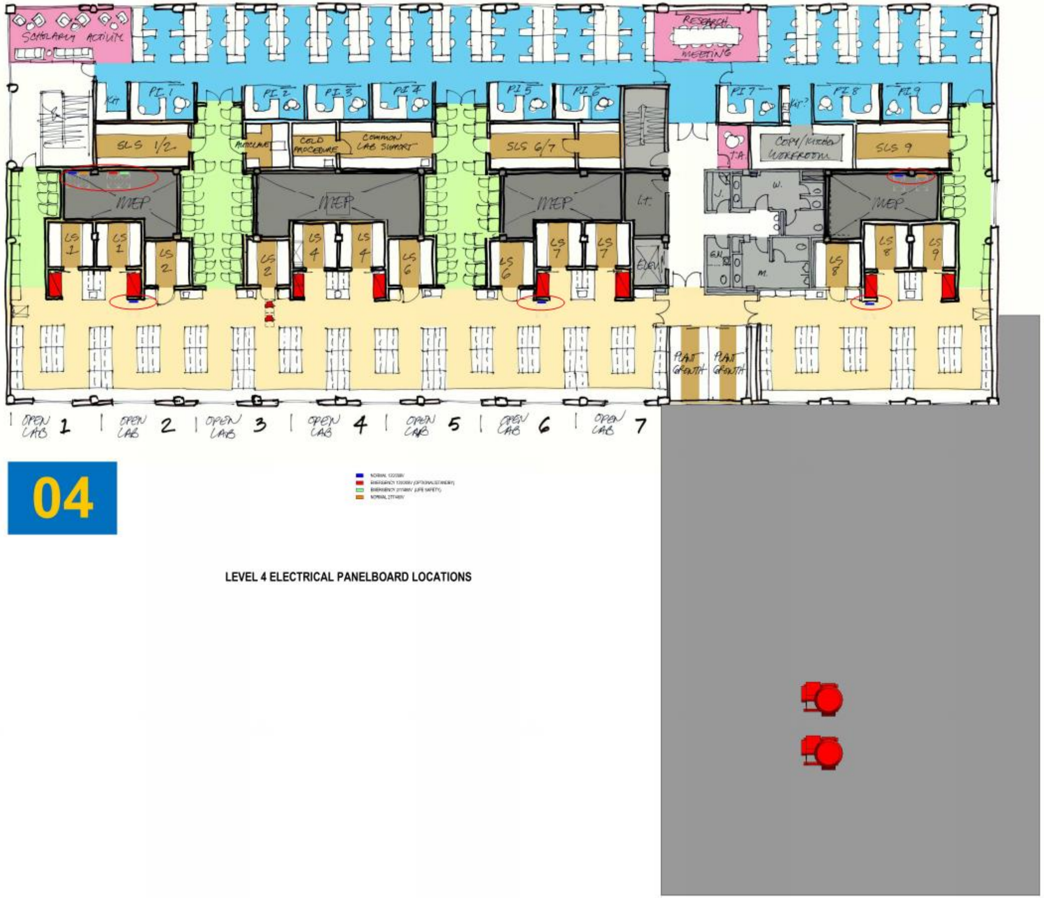
LEVEL 3 ELECTRICAL PANELBOARD LOCATIONS

04

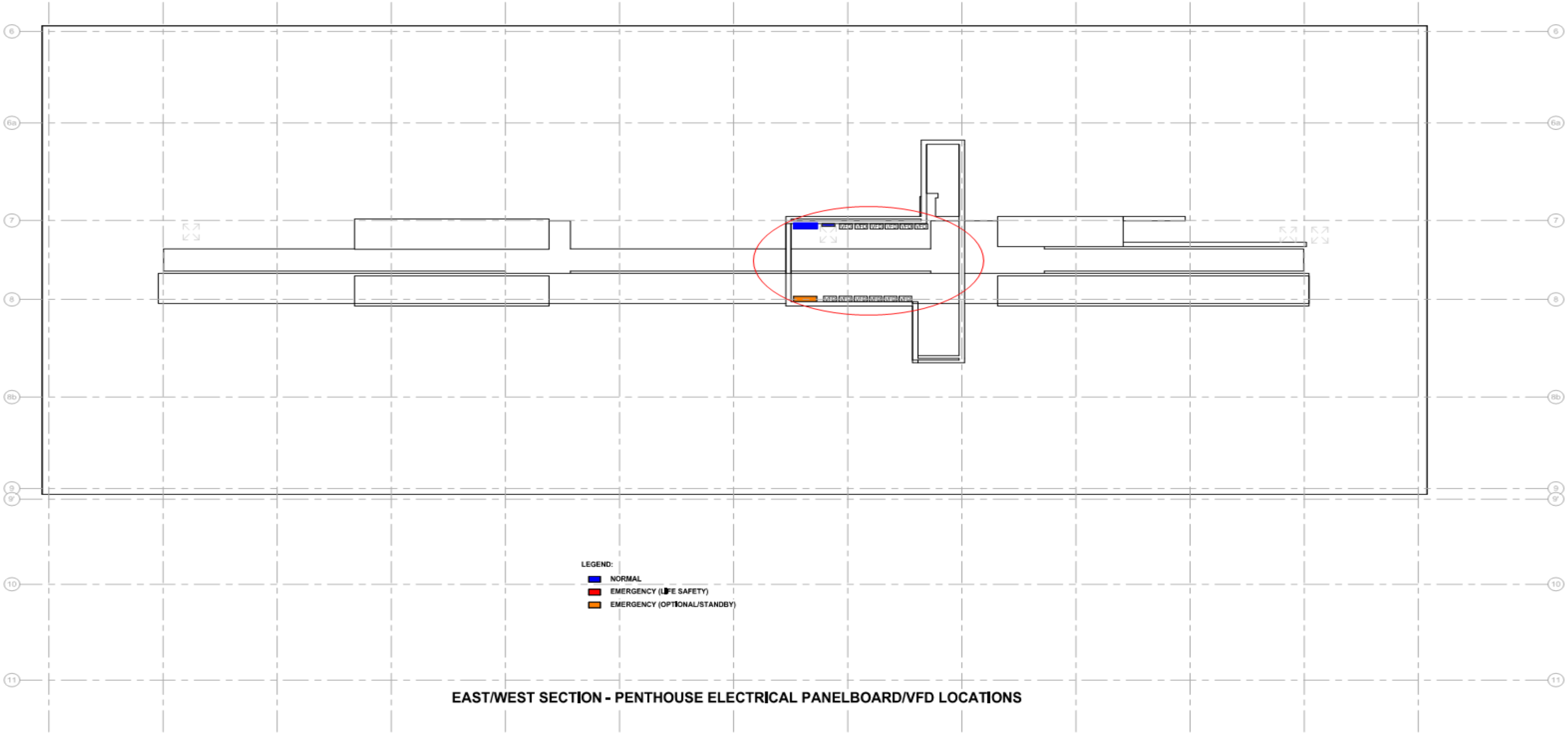
LEGEND:
- NORMAL
- EMERGENCY (LIFE SAFETY)
- EMERGENCY (OPTIONAL/STANDBY)

LEVEL 4 ELECTRICAL PANELBOARD LOCATIONS

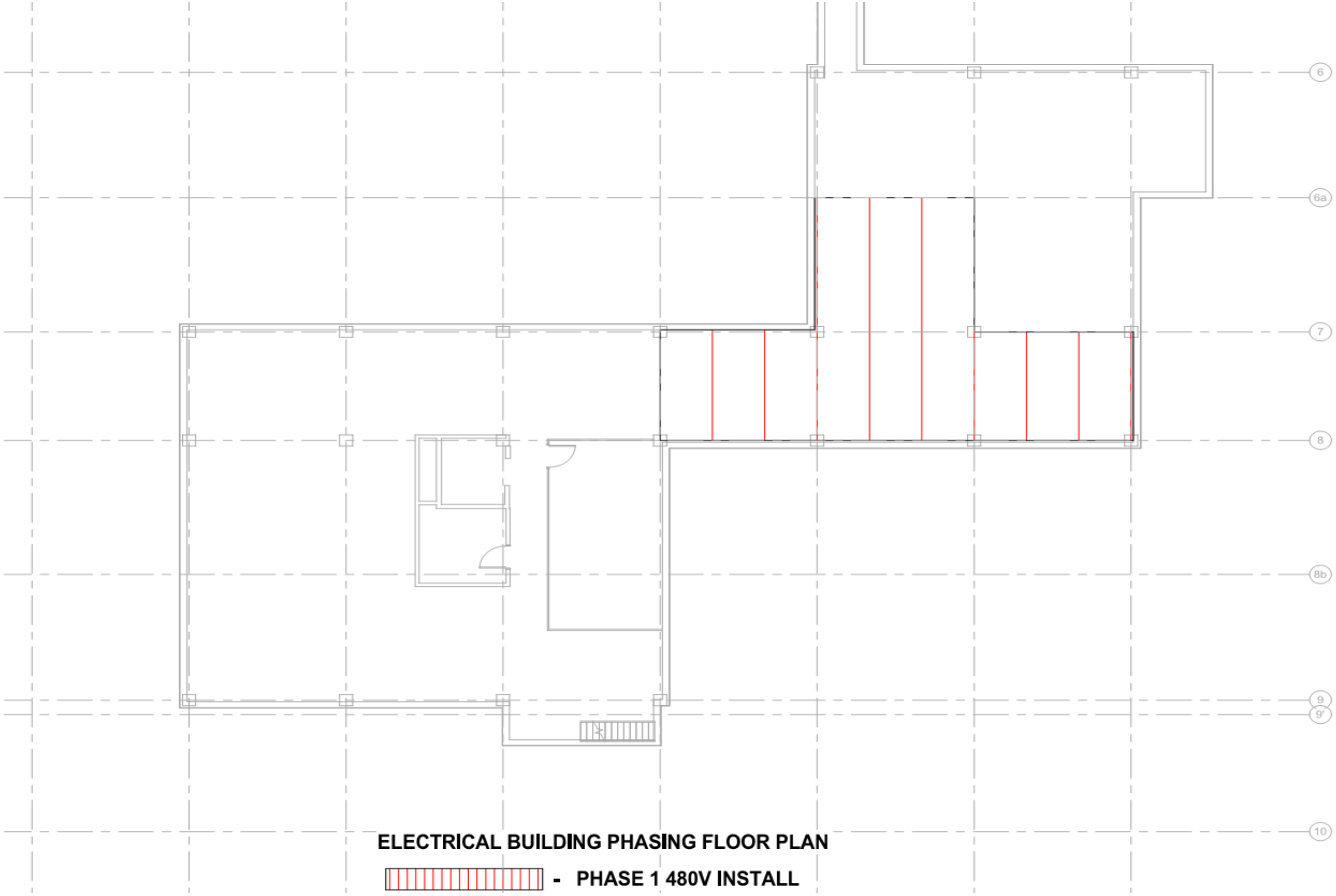
04



LEVEL 4 ELECTRICAL PANELBOARD LOCATIONS

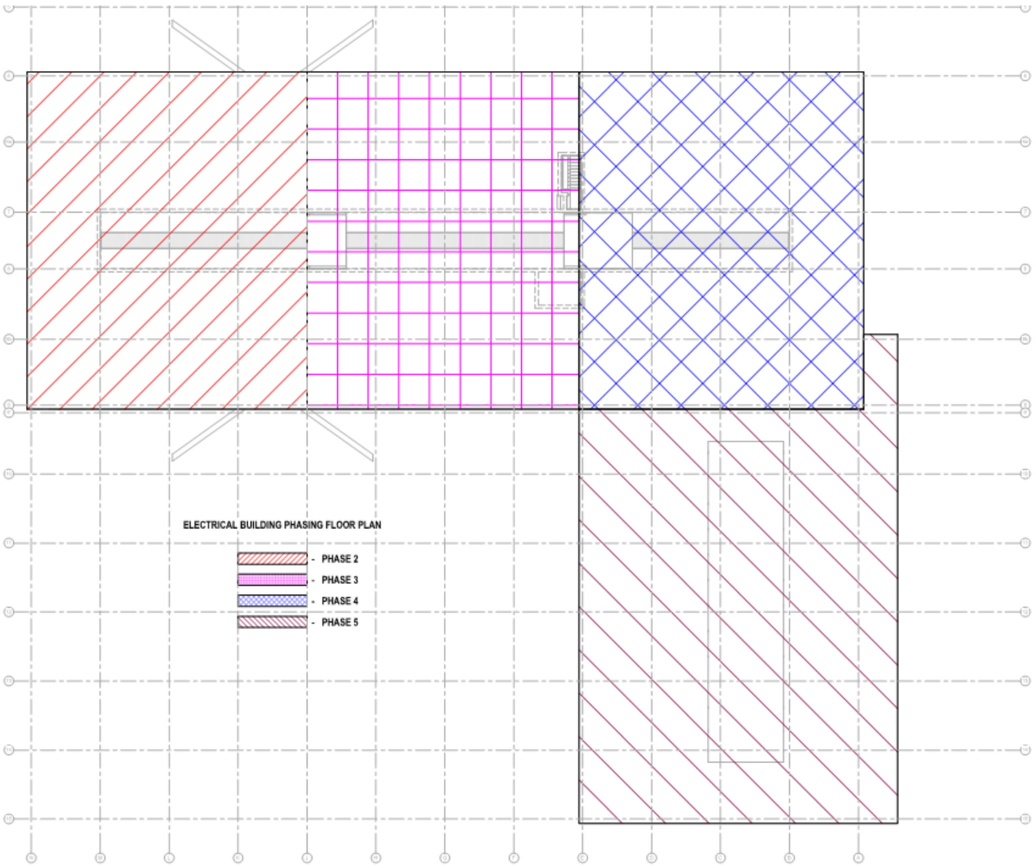


EAST/WEST SECTION - PENTHOUSE ELECTRICAL PANELBOARD/VFD LOCATIONS



ELECTRICAL BUILDING PHASING FLOOR PLAN

- PHASE 1 480V INSTALL


ELECTRICAL BUILDING PHASING FLOOR PLAN
- PHASE 2
- PHASE 3
- PHASE 4
- PHASE 5

Usable Square Footage Per Floor

East/West Section

1st Floor 9301 sq.ft.

2nd Floor 3721 sq.ft.

3rd Floor 4295 sq.ft.

4th Floor 4319 sq.ft.

South Section

2nd Floor 1987 sq.ft.

3rd Floor 2580 sq.ft.

Meeting Minutes

Project:	Batchelor Hall Renewal Project
Subject:	Working Group Meeting #4
Date:	Wednesday, December 14, 2016
Location:	University Village 240-12

Attendees:

John White – UCR
Jon Harvey – UCR
Blythe Wilson – UCR
Peter Atkinson – UCR
Mikeal Roose - UCR
Patty Springer – UCR
Deborah McWilliams – UCR
Sharyl Murdock – UCR
Frank Porter – UCR
Trip Grant – HDR
Ken Filar – HDR
Kate Diamond – HDR
Mike Alamo - HDR

	Topic	*Responsibility*
1	**Program Summary** 32 Principal Investigators in Wet Labs (80% Type 2, 20% Type 3)* 6 Computational Principal Investigators 38 Faculty Offices* 209 Post-Doc and Graduate Student Workstations (~6:1 ratio to P.I.'s) 62 Laboratory Support Rooms (~2:1 ratio to P.I.'s) Laboratory Support Ratio (~1:1 ratio to Laboratory Space) The Working Group was satisfied with the above target populations. * Includes P.I. and office for Metabolomics Core on Level 2, south wing.	Information
	Faculty Offices The Working Group requested that the design team explore alternate office configurations to place faculty PI offices along the perimeter of the building to allow offices to have windows to the exterior. HDR will examine options and provide alternative layouts for review. **Mail Room** The Working Group suggested that the mail room on the ground floor was too small and need a place to store packages. HDR to explore options and present alternatives.	
2	**Plan Review: Class Laboratory** The Working Group was satisfied with the configuration and size of the Class Laboratory, Class Laboratory Prep Room and the Class Laboratory Vestibule. Comments: do not include cabinets at the front of the room; include an instructor's laptop presentation table/cart at the end of the middle island; and increase the length of the whiteboards.	HDR to modify plans.

	Confirmed that both Class Lab fume hoods should remain for future flexibility, but the Working Group will consider the appropriate size of each hood and comment in the near future.	
3	**Plan Review: Common Laboratory Support Spaces** The Working Group was satisfied with the approach of collecting certain shared functions and equipment into the middle of each floor. This allows the majority of equipment and space assigned to researchers to be facilitized for the predominance of work, rather than every conceivable research process. The Laboratory Support Spaces include: • Autoclave Room including Biomedical Waste (EH&S Collection Location) • Cold Procedure Room • Common Lab Support Room The Common Lab Support Room provides: • Prep for the Cold Procedure Room • Floor-Standing Centrifuge • Flammable Supply and Waste Cabinets (EH&S Delivery Location) • Corrosive Supply and Waste Cabinets (EH&S Collection Location) • 8-foot (2-person) chemical hood with additional cup sinks, process cooling water, distillation racks, and other facilitization for infrequent processes (except NOT vacuum pump cabinet). (This hood allows all other hoods to be simpler.) • Nanodrop System • Gel Documentation System • Sink with RO and Type 3 Water Polisher • Dry Ice Chest • Other Shared Equipment as Research Evolves. • Undercounter Dishwasher Note: The common Ice Machine is proposed to be located in the adjacent Equipment Storage Aisle where the new floor slab can be sloped to a floor drain.	HDR to modify plans.
4	**Plan Review: Seminar Room** The Working Group was satisfied with the location (near the 1st Floor Entrance). Available space can support 25 to 30 stations, and is very generous for a 15 station Seminar Room. The room will include storage for tables and chairs for other instructional arrangements. The room is not large enough to be considered space for 50 or more people. Consequently, the room can have one door that swings into the space.	Information
5	**Plan Review: Plant Tissue Culture Storage Room and Vestibule** The Working Group was satisfied with the location (1st Floor off the lobby), configuration, and size of the Plant Tissue Culture Storage Rooms and Vestibule. The Working Group confirmed the need for HEPA-filtered air and the direction of pressurization that should keep contaminants away from samples: Storage Room-->Vestibule-->Corridor (from high to low pressure). The Working Group	Information

confirmed the need for (2) Laminar Flow Hoods because Plant Tissue Culture Transfer (between Petri dishes or other similar containers under the clean hood) can last an entire day.

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6 **Plan Review: TA Tutoring Room Size** — Information

The TA Tutoring Rooms averaging 135 ASF are suitable for tutoring groups of 3 or 4 students. Additionally, the room can double as a small conference room for department uses.

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7 **Plan Review: Elimination of 3rd Floor South Wing Equipment Aisle** — Information

Due to existing shear wall limitations in the South Wing, the previously-proposed lab equipment aisle on the South end of the 3rd Floor is recommended to be eliminated. Like the planning at the West side exterior stair, circulation between lab and office can occur through the existing exterior stair landing. This reclaims space for an additional Lab Support Room. A vestibule is also proposed so that there is a pressurization buffer between the Open Lab and the Exterior Stair. This vestibule location is not easily facilitized for laboratory functions, but can be useful for lab storage.

---

8 **Plan Review: Laboratory Equipment (Freezers, etc.) and Storage** — Information

The Working Group was satisfied with the locations, sizes and configurations of laboratory equipment and storage aisles. The proposed plans accommodate approximately 100% of the Working Group's request for Laboratory Equipment and Storage, with approximately 85% located on the associated floors and 15% located remotely in a room on the East end of the 1st Floor. It was noted that grouping freezers in one location is more energy efficient than dispersing equipment throughout the building. The latter requires the primary HVAC system to cool the freezers, requiring larger air handlers. The former can be cooled with recirculating spot coolers in the equipment aisles without impact to ductwork and air handlers.

Average EQUIPMENT AISLE space assumed to be required for EACH PI:

- (1) -80c Freezer
- (2) -20c Freezers
- (1) Deli-Style Refrigerator
- (1) Plant Growth Chamber (Freezer-Sized)
- (1) Other Floor-Standing Equipment (eg. Shaking Incubator)

Shared Equipment space assumed on EACH FLOOR:

- (1) Floor-Standing Centrifuge
- (1) Autoclave
- (1) Gel Documentation System
- (1) Nano-Drop System
- (1) Dry Ice Chest
- (1) Ice Machine

Average STORAGE AISLE space assumed to be required for EACH PI:

- (4) 4-foot wide Tall Storage Cabinets (or equivalent wall space (16LF))
- (0.33) Gas Cylinders

Note: An additional sink and undercounter refrigerator space are assumed to be required for the average-sized research group and located in the open lab. An additional refrigerator space in one lab support space and sinks in each lab

	support space are assumed to be required for each PI, or are included for future researcher flexibility.	
9	**Plan Review: Loading Dock and Centralized Lab Support Spaces** The Working Group was satisfied with the locations, sizes and configurations of the spaces to the West of the 2nd Floor Lobby with the following exceptions: • EH&S has requested that the Gas Cylinder Staging area be relocated behind walls. HDR will propose a solution with the goal of not consuming interior building space. The Working Group stated that space for approximately thirty cylinders are required. This includes both full and empty cylinders. None of these are connected with piping to spaces within the building. • The existing Liquid Nitrogen Storage Room should remain in place, instead of locating tanks off the Loading Dock as shown in the plans. Lower temperatures preserve Liquid Nitrogen, and this location eliminates the risk of vehicular impact to the tanks. • Facilities may require a space near the Loading Dock. If they do, the space the Working Group is most willing to part with is one Central Plant Growth Room. • The X-Ray Development Lab is in a good location off the main lobby since it is shared by multiple departments. • The University is reluctant to reconfigure the newly-renovated Plant Growth Chamber room, impacting the ability to implement the optimized master planning for this area. This will be considered as part of the phasing of the project.	HDR to propose plan changes as suggested. University to consider need for additional Building Support space near the Loading Dock.
10	**Emergency Power for Keen Hall** It was brought to HDR's attention that there was a recent back-up generator project that sized the generator for Boyce Hall, Keen Hall and Batchelor Hall. However, Batchelor and Keen were not connected at the time. HDR to work with UCR to review capacities and improvements necessary to bring back-up power from the newly installed generator.	HDR / UCR
11	**Laboratory Support Space** The Working Group requested that researcher-assigned laboratory support spaces (as opposed to common laboratory support spaces) have the ability to support confocal microscopes and laser equipment by incorporating the ability to be darkenable. It has not been suggested that the structure be upgraded to provide a more stable floor that might be required for more sensitive versions of these instruments.	HDR to note request and consider solutions.
12	**Draft DPP Review** The Draft DPP will be distributed next week for Working Group review.	Information.

END OF MEETING

Pierce – Batchelor Working Group
Contact List

Name	Affiliation	Phone	Email
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TRIP GRANT	HDR		

Working Group Meeting 4

December 14, 2016

Batchelor Hall Interior Improvements
And Building System Renewal




Agenda

3:00 – 3:30 Program Summary Overview

3:30 – 4:30 Shared Spaces and Functions review

- Ground floor class lab, vestibule and prep lab
- Common Lab Support space for autoclave, cold procedure room, chemical and bio-waste collection, etc.
- Seminar Room on ground floor
- Common Plant Tissue Culture Storage Room
- Central Freezer and Lab Storage Room
- Building Support spaces around the loading dock
- T.A. room and adjacent Copy/Kitchen/Workroom
- Entry at the south end of the south wing at level 3

Program Summary

Citrus Experiment Station Dedication circa 1918

Program Summary

32	Principal Investigators in Wet Labs*
6	Computational Principal Investigators
38	Faculty Offices*
209	Post-Doc and Graduate Student Workstations (~6:1 ratio to P.I.'s)
62	Laboratory Support Rooms (~2:1 ratio to P.I.'s)

* Includes P.I. and office for Metabolomics Core on Level 2, south wing.

Program Summary

	Existing	2006 DPP	Proposed
Assignable Square Feet	48,200	56,600	59,600
Open Wet Laboratories	24,100	23,000	19,300
Laboratory Support	8,100	13,000	19,000
Lab : Lab Support Ratio	3:1	1.75:1	1:1
Teaching Laboratory	900	1,500	1,400
Computational Dry Lab	0	0	1,400
Office and Collaboration	15,177	19,100	18,500

Program Summary

Space Program Summary

	Total
ASF	56,966

Code	Space	Description (*= No Space Data, for SF only)	Qty	Avg (sf)	ASF
		Research Labs			**18,525**
210-W	1.01	Open Laboratory Module	66	250	16,500
210-W	1.02	Fume Hood Alcove	15	135	2,025
		Research Laboratory Support			**17,989**
210-W	2.01	Laboratory Support - Small	45	100	4,500
210-W	2.02	Laboratory Support - Medium	5	140	700
210-W	2.03	Laboratory Support - Large	8	205	1,640
210-W	2.04	Common Laboratory Support	4	180	720
225-E	2.05	Laboratory Equipment Aisle	687	6	4,119
225-E	2.06	Central Laboratory Equipment Aisle*	85	6	510
225	2.07	Laboratory Storage / Cylinder Aisle	393	5	1,965
225	2.08	Central Laboratory Storage / Cylinder Aisle*	89	5	445
210-D	2.09	Cold Procedure Room	4	100	400
225-C	2.10	Central Cold Storage	2	120	240
225	2.11	Central Plant Tissue Culture Storage	2	100	200
225	2.12	Central Plant Tissue Culture Transfer Vestibule	1	120	120
225-G	2.13	Plant Growth Room	8	175	1,400
225-G	2.14	Central Plant Growth Room*	2	175	350
225-E	2.15	Autoclave	4	120	480
225-D	2.16	X-Ray Developer	1	100	100
225	2.17	Gas Cylinder Storage	1	100	100
		Computational Lab			**1,382**
310-P	3.01	Computational Post Doctoral Workstation	12	36	432
211-G	3.02	Computational Graduate Student Workstation	24	30	720
225-S	3.03	Computational Server Room	1	230	230

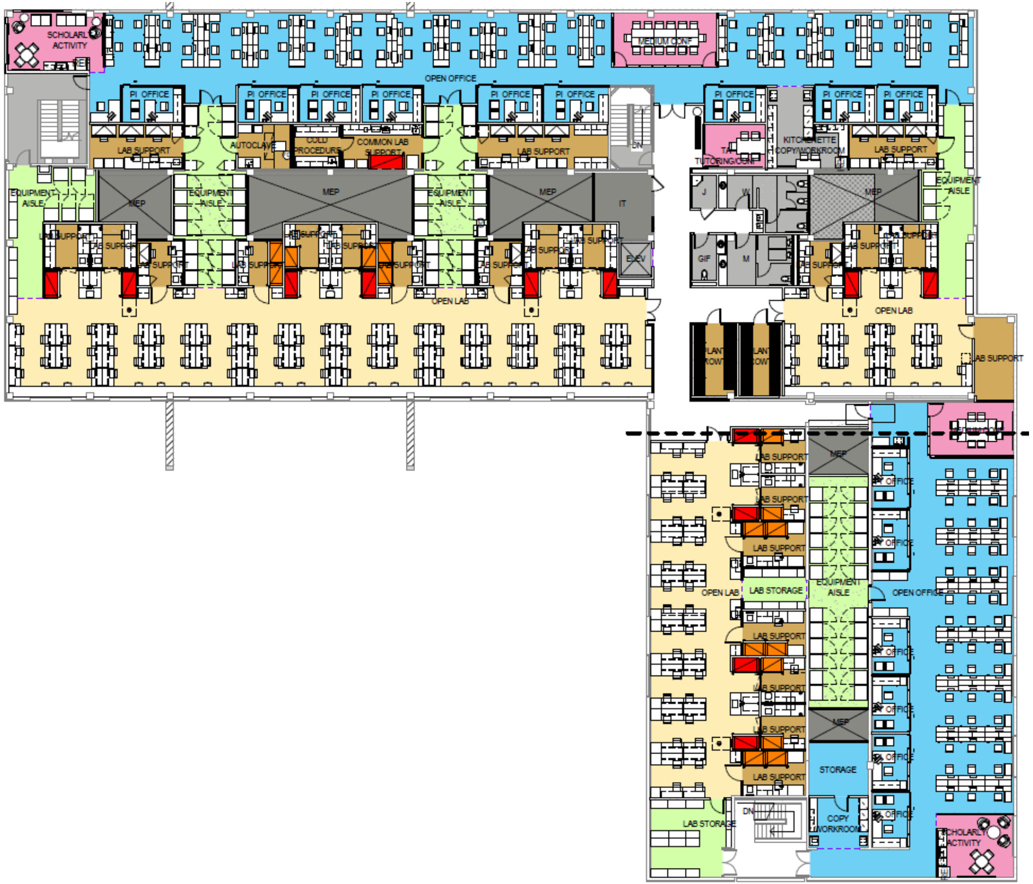
Code	Space	Description (*= No Space Data, for SF only)	Qty	Avg (sf)	ASF
		Class Lab			**1,410**
260-W	4.01	Class Laboratory	1	980	980
265	4.02	Class Laboratory Vestibule / Storage	1	180	180
265-W	4.03	Class Laboratory Prep	1	250	250
		Office & Collaboration			**17,660**
310-F	5.01	Principal Investigator Office	37	108	3,996
310-P	5.02	Post Doctoral Workstation	63	36	2,268
211-G	5.03	Graduate Student Workstation	146	30	4,380
130	5.04	Seminar Room (15 students)	1	525	525
270	5.05	Small Conference / TA Tutoring	3	135	405
340	5.06	Medium Conference (15 people)	6	250	1,500
340	5.07	Large Conference (40 people)	1	560	560
250-C	5.08	Scholarly Activity / Kitchenette	5	250	1,250
250-C	5.09	Scholarly Activity	1	230	230
226	5.10	Copy / Workroom / Kitchenette	3	255	765
226	5.11	Copy / Workroom	5	95	475
226	5.12	File Storage	35	20	700
226	5.13	Mail / Receiving	1	84	84
226	5.14	Vending Alcove*	1	54	54
320	5.15	Other Office*	2	108	216
320	5.16	Other Workstation*	7	36	252

Note: Metabolomics Core spaces not included at this time.

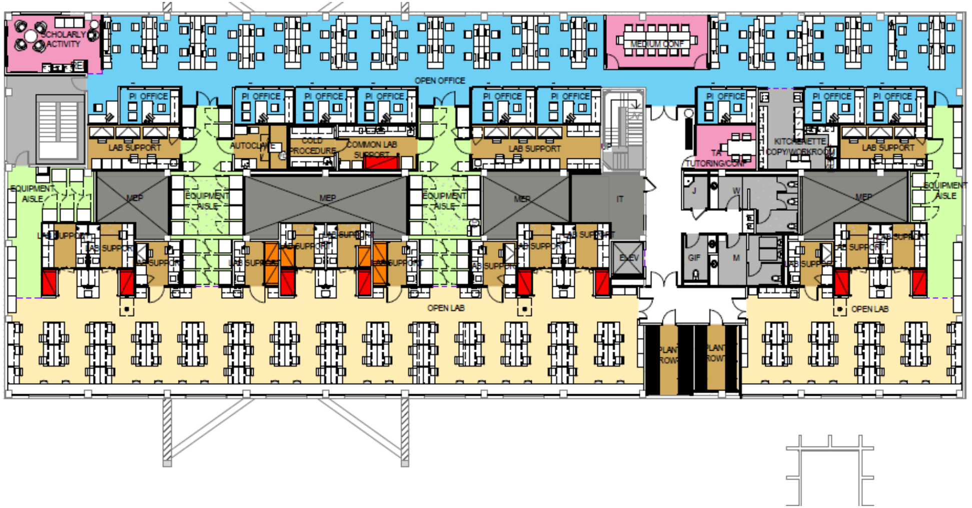
Plan Updates

Plan Updates

Plan Updates



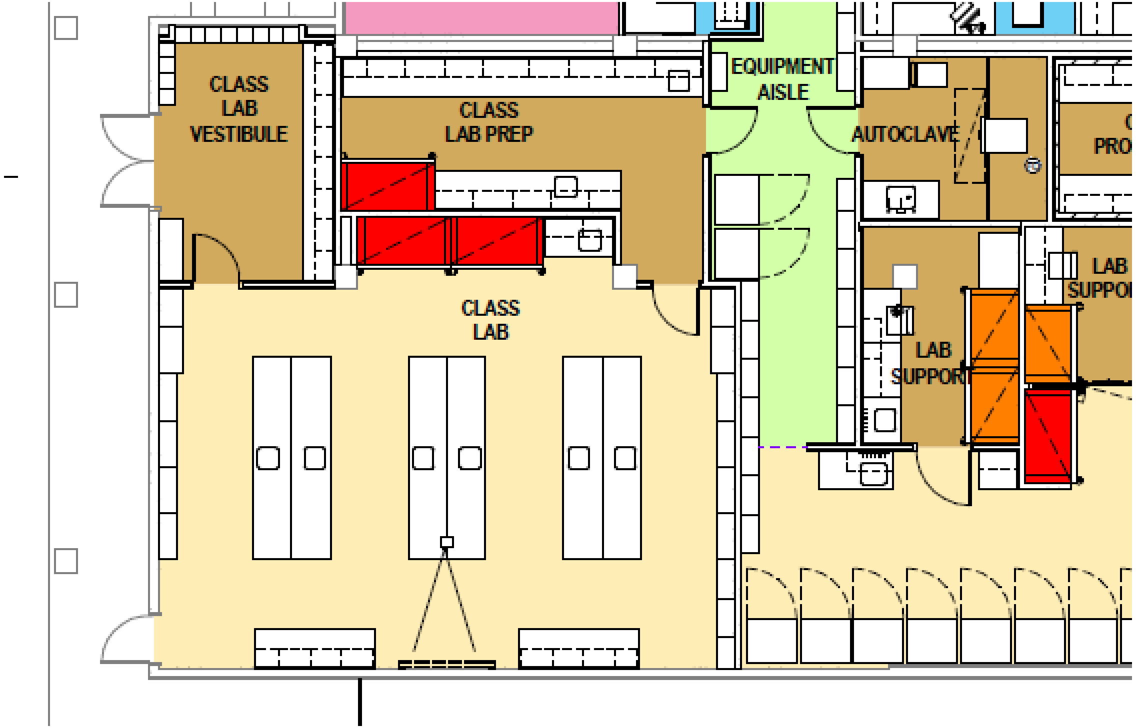
Plan Updates



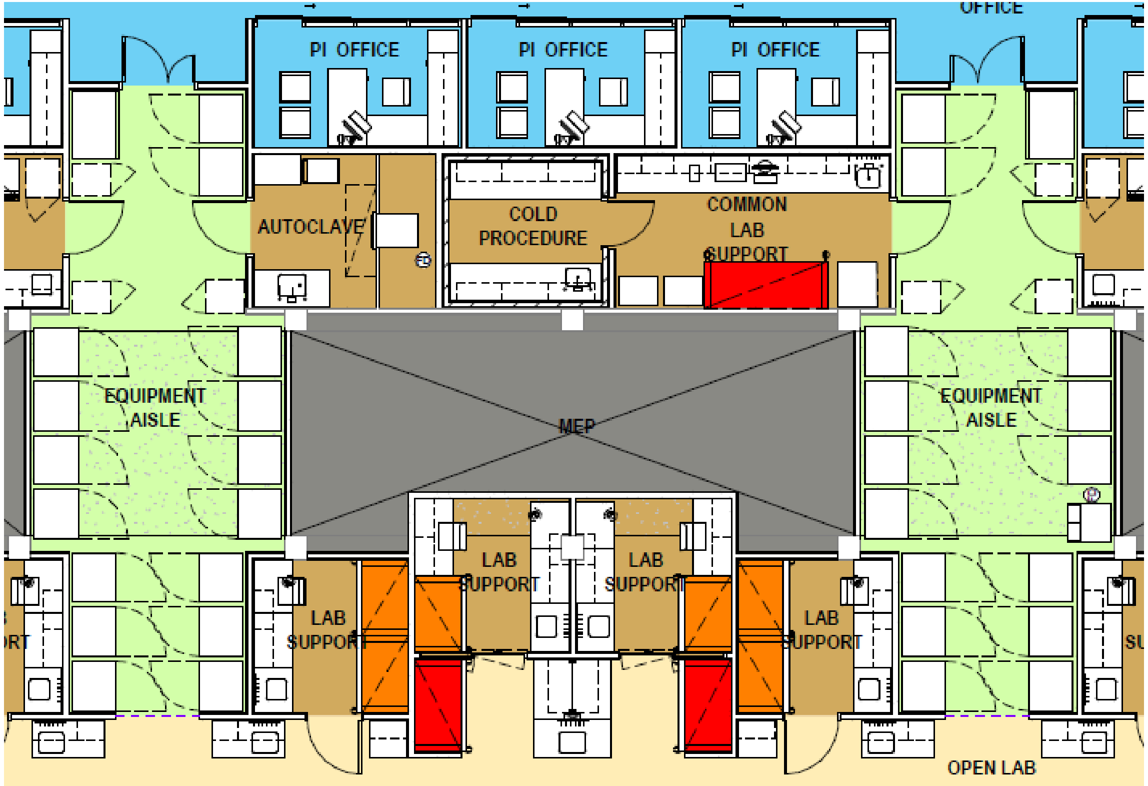
Shared Spaces and Functions

Citrus Experiment Station circa 1907

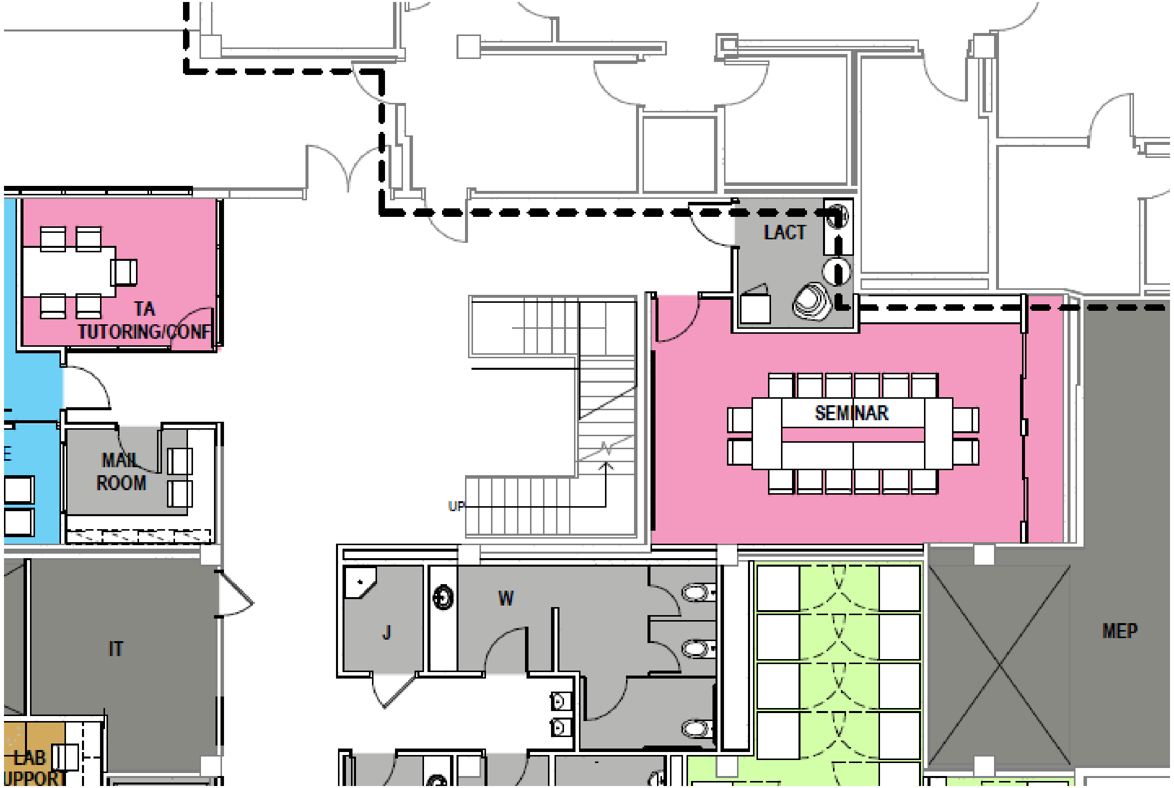
Classroom Laboratory



Common Laboratory Support Functions

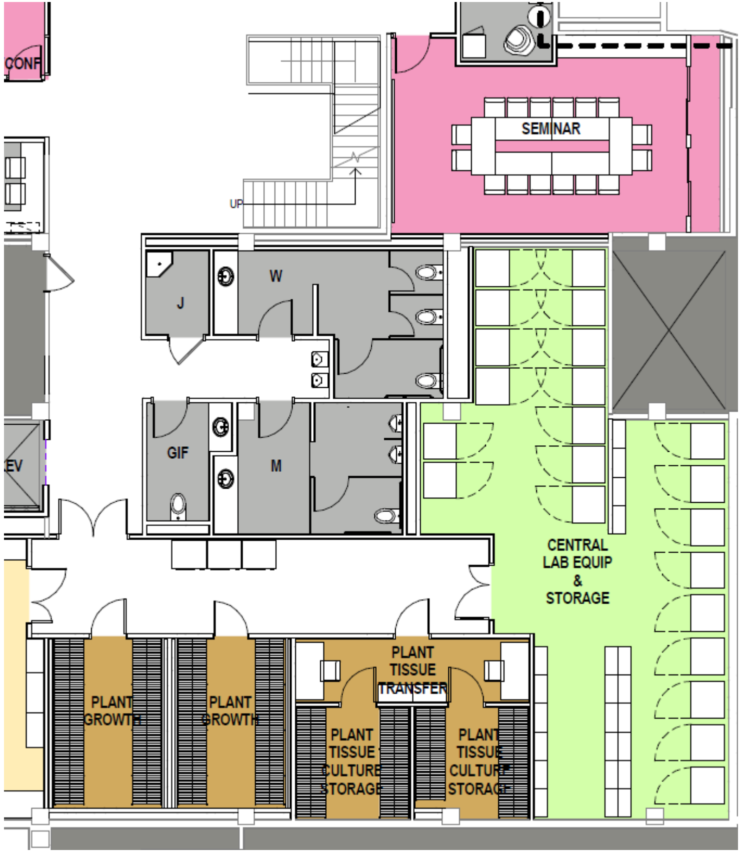


Seminar Room

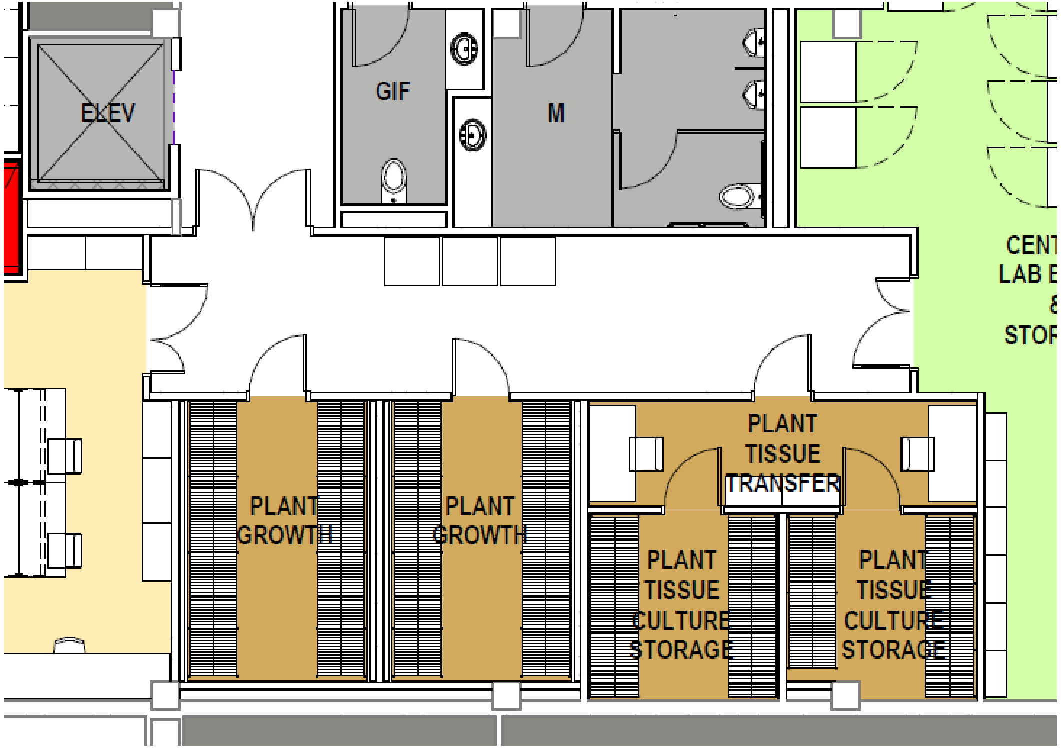


Central Freezer and Storage Room

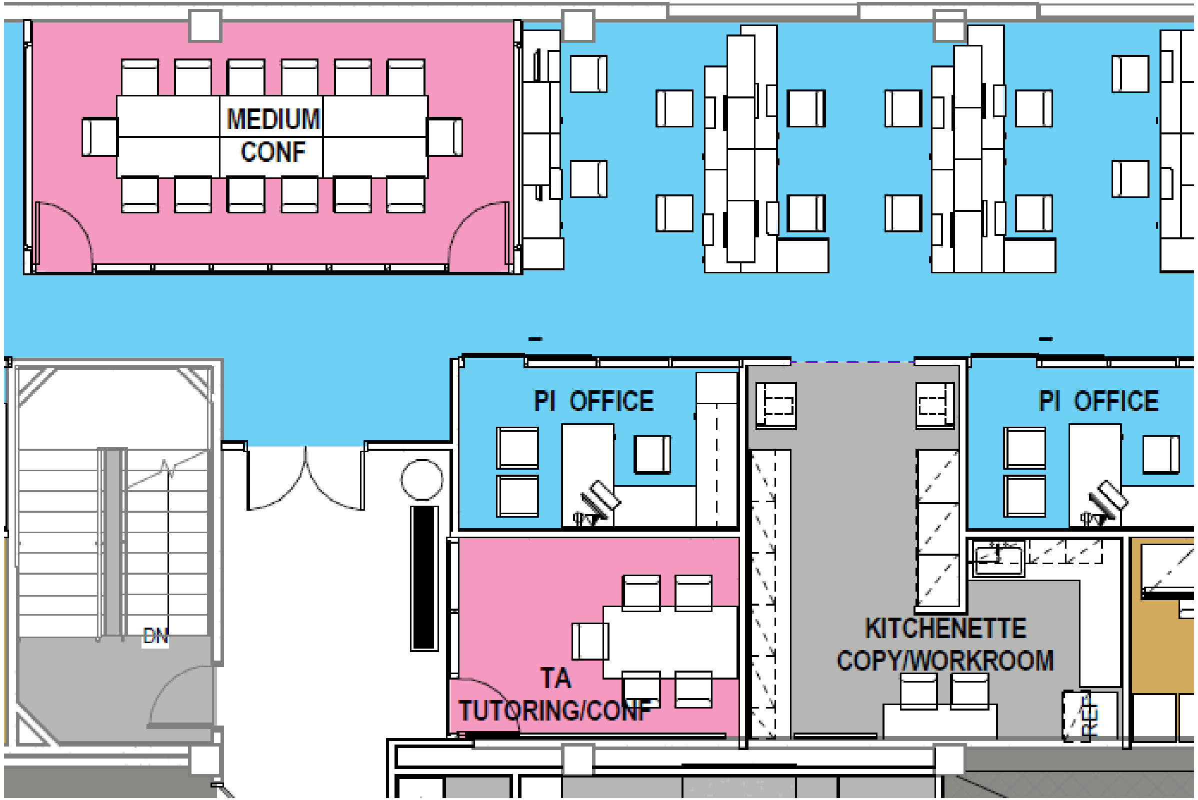
Space for Equipment	Shallow (18") Qty	Shallow (18") Total (ft)	Deep (36") Qty	Deep (36") Total (ft)	Both Total (ft)
Located in "Green" Aisles					
-80c Freezer			1 / PI	132	132
-20c Freezer			2 / PI	165	165
Ice Machine			1 / Flr	10	10
Dry Ice Chest			1 / Flr	10	10
Refrigerator (Deli-style)			1 / PI	132	132
Plant Growth Chamber			1 / PI	132	132
Other Equip (Shaking Incubator)			1 / PI	99	99
Tall Storage Cabinet	4 / PI	528			528
Gas Cylinders	0.33 / PI	11			11
Request Total		**539**		**680**	**1219**
Lab Aisles		393		687	1080
Central Storage (1st Floor)		89		85	174
Plans Total		**482**		**772**	**1254**
% in Lab Area		82%		89%	86%
% in Central Location (Remote)		18%		11%	14%



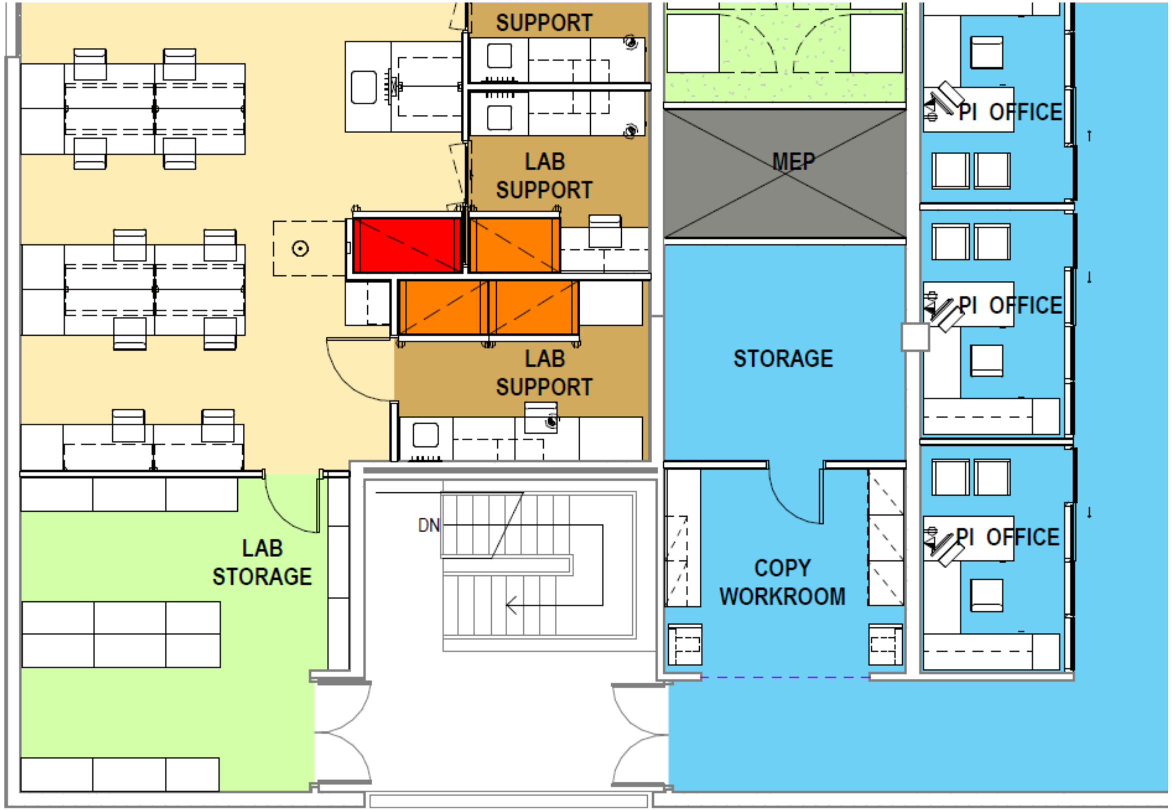
Common Plant Tissue Culture Storage



Teaching Assistant Tutoring Rooms



Entry Vestibule and Storage



Loading and Staging Area

Meeting Minutes

Project:	Batchelor Hall Renewal Project
Subject:	Facilities Overview
Date:	Friday, February 03, 2017
Location:	University Village 210-16
Attendees:	Jon Harvey – UCR Blythe Wilson – UCR Frank Porter– UCR Daryl Koroluck - UCR Trip Grant – HDR

	Topic	*Responsibility*
1	**General** HDR presented a general project overview with a specific focus on the building systems renewal. See attached presentation.	Information
2	**Facilities Questions** HDR informed that the project is at the conceptual stage and that further detailed review meetings will take place as the design develops. Based on the information presented, a few specific questions were raised and subsequently responded to by the design team: 1. Is the AHU for the south wing a new AHU? Yes, the intent is that the AHU in the south wing first floor replaces both the existing fresh air unit and the recirculating unit in the same location. As the design progresses, the design team will need to review the spatial arrangement to physically fit the new AHU and the outside air path with regards to the adjacent loading dock. 2. Some buildings on campus have “pull-thru” chilled water. The preference for Batchelor is for a “push-thru” system. This would affect Keen Hall as well and hope that Keen can be a push-thru system as an outcome of our project. Yes, the intent is to change the buildings chilled water system from pull to push through, including supply to Keen Hall. At this time the system change would require complete shutdown for demo/install – the intent is for contractor to provide temporary cooling to reduce outage impacts (especially Keen Hall). 3. The DP sensor for the chilled water should be up at the roof level with the AHU’s, not in the basement level where it enters the building. Concur, the chilled water DP sensors for building pump speed control would be remote from the pumps. 3. Our specifications need to follow the campus standards for copper pipe and coil thicknesses and standards for purity. Understood - we shall review the standards and incorporate into the documents.	Information

5. Steam heat exchangers should be no higher than 10psi.
The design team would like to discuss this further with the University. Our intent is to replace the existing steam/hot water exchangers (both for mechanical and plumbing) with Maxi-Therm vertical flooded steam heat exchanger. This type of heat exchanger can accommodate high pressure steam inlet without the need for any pressure reducing valves, and has analysis to show savings in operational cost compared to conventional installation.

END OF MEETING

Meeting Minutes

Project:	Batchelor Hall Renewal Project
Subject:	Working Group Meeting #5
Date:	Friday, February 03, 2017
Location:	University Village 210-16
Attendees:	John White – UCR Jon Harvey – UCR Blythe Wilson – UCR Peter Atkinson – UCR Mikeal Roose - UCR Patty Springer – UCR Deborah McWilliams – UCR Melissa Garrety – UCR Bob Slater – UCR Trip Grant – HDR Ken Filar – HDR

	Topic	*Responsibility*
1	**DPP Comments from the Working Group** It is expected that the comments the Working Group provided to HDR can be incorporated either in the DPP or during design through a collaborative process of working with the University.	Information
2	**New Soil/Plant/Fruit Prep Laboratory** The Working Group discussed potential locations for a newly identified need for a Soil/Plant/Fruit Prep Laboratory. This is a multipurpose prep room for dirty materials. The concept that the Working Group appeared to favor was to locate the Central Cold Storage rooms at the current location of the existing Plant Growth Room spaces south of the Main Metabolomics Laboratories. These existing Plant Growth Rooms are in poor condition, and their functions would be accommodated in Plant Growth Rooms identified in the DPP plans. Moving the planned Cold Storage Rooms would free up space near the loading dock for the new Soil/Plant/Fruit Prep Laboratory. The change would keep the Metabolomics Core Corridor relatively clean.	Information
3	**Plant Potting** The Working Group noted that the Plant Potting function would not be ideal on the loading dock as shown in the current plans. Like the Soil/Plant/Fruit Prep Laboratory, this space request is to accommodate dirtier operations, and therefore its best location would be in an interior space near the loading dock.	Information
4	**Utilization of Basement Space** The Working Group raised the question as to whether basement space could be used for research storage. The answer to this question will likely have to wait until there is better definition of the systems configurations in the basement that will happen during design. However, it was noted that the basement space is challenged by a lack of code-compliant egress that would need to be corrected to contain other than strictly building systems.	Further investigatio n in design phase.

5	**DPP Program Composition Justification** Planning assumed that the laboratory space will continue to support plant science programs. Placing research laboratory space in close proximity with greenhouse facilities is viewed as plus. Long-term development of the area as presented in the *2016 Physical Master Plan Study* shows Batchelor Hall will be in close proximity to the existing and future plant growth environment facilities on the east side of East Campus Drive. The Working Group would like this justification included in the DPP.	HDR to modify DPP narrative.
6	**Phasing Option Considerations** • **MEP improvements requires closing sections of the building vertically.** • **Renovation to support both existing and future faculty.** • **Best to complete interior renovation in big blocks.** • **Consider building functionality if this is the only space renovated for a long period of time.** • **Completing interior infill structural work with the first phase requires further review. Cost may not be in the current budget.** **DPP Decisions** The Working Group would like the major decisions made during the update to the DPP to be identified in the DPP as useful information for users of the document in the future. HDR recommends this would be best as a summary list easily discoverable by a casual reader.	
7	**Tenant Improvements (TI) Options Evaluation** The Working Group discussed the 6 options that HDR believed were logical TI project scopes, and added a 7th, now called Option 1B. These are in addition to the work that's covered in the separate infrastructure project to renew the building systems and correct deficiencies with handicapped accessibility, for instance. The infrastructure scope is building-wide. • Option 1A: Renovation of Floor 1 • Option 1B: Option 1A, except outfit Class Lab for PIs initially • Option 2: Renovation of Floor 2, East-West Wing. Existing administrative space would be relocated to Floor 1, Graduate Student Services would leave the building. • Option 3: Renovation of Floor 3, East-West Wing • Option 4: Renovation of Floor 4 • Option 5: Renovation of South Wing, all floors • Option 6: Renovation of East-West Wing, East of the Lobby, all floors The Working Group created a short list eliminating Options 3, 5 and 6 for the following reasons: • Option 3: There appeared to be no advantage of this option over option 4. It also created discontinuous construction (existing space above and below) and mixed construction and on-going research on the same floor. • Option 5: This floor is the least "supportive" of the remainder of the program. It does not support itself very well, lacking Plant Growth Rooms and Common Lab Support. • Option 6: This option is too "support-heavy" and does not improve the space for enough PI's.	?

The Working Group created evaluated the remaining 3 options in the following table:

Values	**1A**	**1B**	**2**	**4**
Meets Project Principles	--	0	+	+
New Recruitment Space	-	+	+	++
1st Phase Functionality	+	?	+	0
Supports Laboratories	+	+	+	0
Showcase for Future Donors	-	-	++	+
Relocation of Existing PIs (rank)	0	0	0	-
Relocation of Existing PIs (quantity)	3	3	4	7
Constructability	0	0	-	+
Ease of Future TIs	+	+	+	0
Metrics	**1A**	**1B**	**2**	**4**
Construction Cost	$7.2M	$7.2M	$7.9M	$8.6M
ASF	10,857	10,857	12,343	14,797
GSF	16,694	16,694	17,551	18,853
$/ASF	$663/ASF	$663/ASF	$640/ASF	$581/ASF
$/GSF	$431/GSF	$431/GSF	$450/GSF	$456/GSF
PIs	3	5	6	9
$/PI	$2.4M/PI	$1.4M/PI	$1.3M/PI	$1.0M/PI

Legend:
"+" positive attribute relative to other options
"0" neutral attribute
"-" negative attribute

The Working Group eliminated Options 1A and 1B after completing the table. Both options 1A and 1B provide balance between new lab space and laboratory support. However, they are not as balanced as option 2 in this regard.

Option 2 was generally considered the strongest option. Option 2 provides a balance of maximizing new laboratory space while providing essential lab support functions like the central plant growth rooms and cold storage functions near the loading dock.

Option 4 was a close contender. It provided the most new laboratory space. However, it lacked the essential lab support functions that supported the entire building.

END OF MEETING

Working Group Meeting

February 3, 2017

Batchelor Hall Interior Improvements
And Building System Renewal




Agenda

8:30 – 8:45	Current Project Status
8:45 – 9:15	Cost / Budget Review
	• Total Construction Cost
	• Floor by floor TI
9:15 – 11:15	Cost / Budget Discussion
	• Review 6 Tenant Improvement Options for Phase 1
	• Evaluate and Rank Options
11:15 – 11:30	Schedule and Next Steps

Construction Budget Summary

	INFRASTRUCTURE		TENANT IMPROVEMENTS												TOTAL	
oncept Cost Model Construction Estimate	Infrastructure, Utility and Service Upgrades		Level 1		Level 2 EW		Level 2 S		Level 3 EW		Level 3 S		Level 4		Total	
	91,068 GSF		16,694 GSF 10,857 ASF		17,551 GSF 12,343 ASF		4,493 GSF 2,761 ASF		19,025 GSF 14,424 ASF		8,668 GSF 7,376 ASF		18,853 GSF 14,797 ASF		91,068 GSF 62,558 ASF	
OMPONENT SUMMARY	$/GSF	$	$/GSF	$	$/GSF	$	$/GSF	$	$/GSF	$	$/GSF	$	$/GSF	$	$ / GSF	$
Shell (1 - 5)	17.66	1,608,087	-	-	-	-	-	-	-	-	-	-	-	-	17.66	1,608,087
Interiors (6 - 7)	12.67	1,153,842	46.07	769,155	46.17	810,367	51.50	231,403	46.52	885,084	47.68	413,262	46.44	875,564	56.43	5,138,677
Equipment, Stairs and Elevators (8 - 9)	7.26	660,767	76.42	1,275,793	83.18	1,459,925	14.45	64,907	86.15	1,638,931	75.80	657,037	88.07	1,660,397	81.45	7,417,757
Mechanical and Electrical (10 - 13)	70.47	6,417,946	150.26	2,508,490	153.37	2,691,805	114.37	513,864	153.82	2,926,399	149.45	1,295,437	155.06	2,923,271	211.68	19,277,213
Sitework (14 - 16)	13.50	1,229,078	19.00	317,186	19.00	333,469	19.00	85,367	19.00	361,475	19.00	164,692	19.00	358,207	31.29	2,849,474
SUBTOTAL - Direct Work	121.55	11,069,721	291.76	4,870,624	301.72	5,295,566	199.32	895,541	305.49	5,811,889	291.93	2,530,428	308.57	5,817,440	398.51	36,291,209
SUBTOTAL - Including GC's &OH/P	141.19	12,858,322	338.90	5,657,600	350.48	6,151,202	231.52	1,040,239	354.85	6,750,951	339.10	2,939,285	358.43	6,757,398	462.90	42,154,997
Design / Estimate Contingency	21.18	1,928,748	50.84	848,640	52.57	922,680	34.73	156,036	53.23	1,012,643	50.86	440,893	53.76	1,013,610	69.43	6,323,250
TOTAL CONSTRUCTION 01/2017	162.37	$14,787,070	389.74	$6,506,240	403.05	$7,073,882	266.25	$1,196,274	408.07	$7,763,594	389.96	$3,380,178	412.19	$7,771,008	532.33	$48,478,246
Cost Escalation to Construction Mid Point	17.86	1,626,578	42.87	715,686	44.34	778,127	29.29	131,590	44.89	853,995	42.90	371,820	45.34	854,811	58.56	5,332,607
TOTAL CONSTRUCTION ESCALATED	180.20	$16,410,000	432.49	$7,220,000	447.27	$7,850,000	296.02	$1,330,000	453.09	$8,620,000	432.63	$3,750,000	457.75	$8,630,000	590.88	$53,810,000

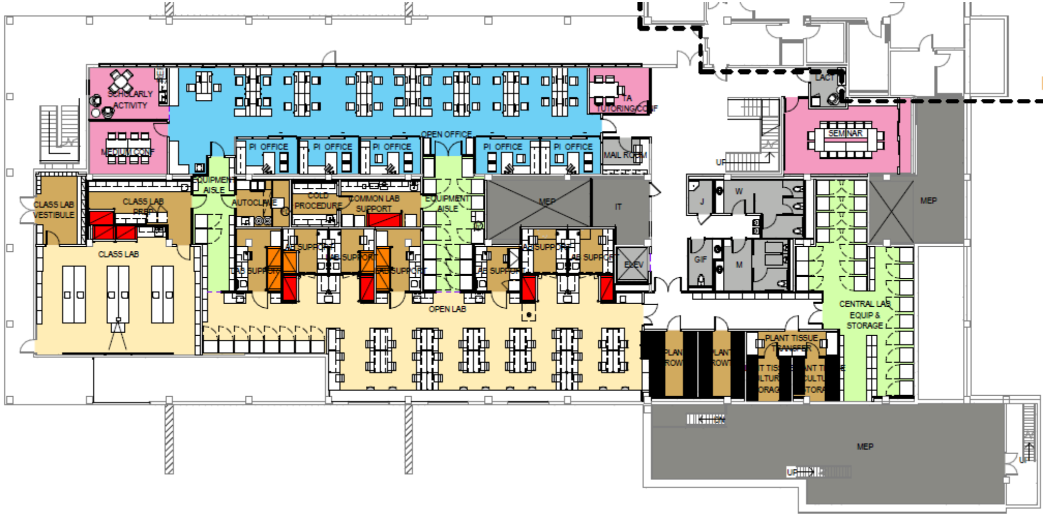
Construction Budget Summary

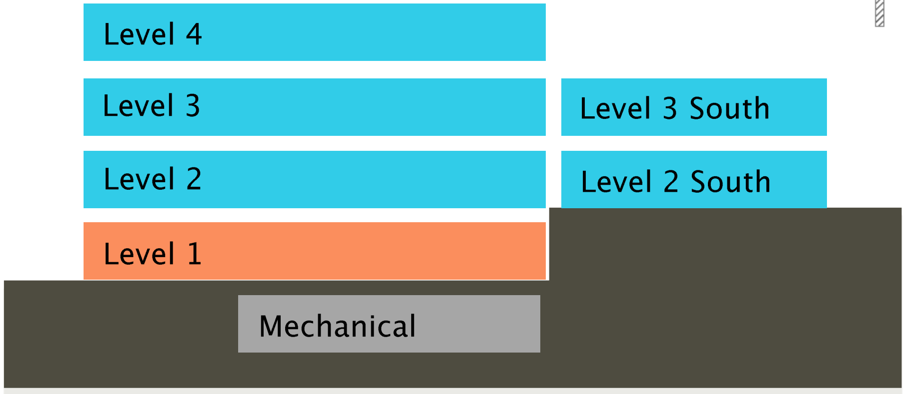
	Construction Budget	Principal Investigators	Other Amenities
Infrastructure	$ 16,400,000		
Tenant Improvements			
Level 1	$ 7,200,000	3	Class Lab, Seminar Room, Central Freezer Room and Plant Tissue Storage
Level 2 East-West	$ 7,900,000	6	Loading Dock, Large Conference Room, X-Ray, Central Plant Storage Rooms and Cold Rooms
Level 2 South	$ 1,300,000	4 computational	Metabolomics Core to remain
Level 3 East-West	$ 8,600,000	8 to 9	
Level 3 South	$ 3,800,000	4 wet, � computational	
Level 4	$ 8,600,000	8 to 9	
Total Construction Budget	$ 54,000,000	35 to 37	

Note: Figures shown are construction budget, not total project costs

Level 1

3 Principal Investigators
Class Lab
Seminar Room
Central Freezer Room
Central Plant Storage
Tenant Improvement Budget
$7,200,000*

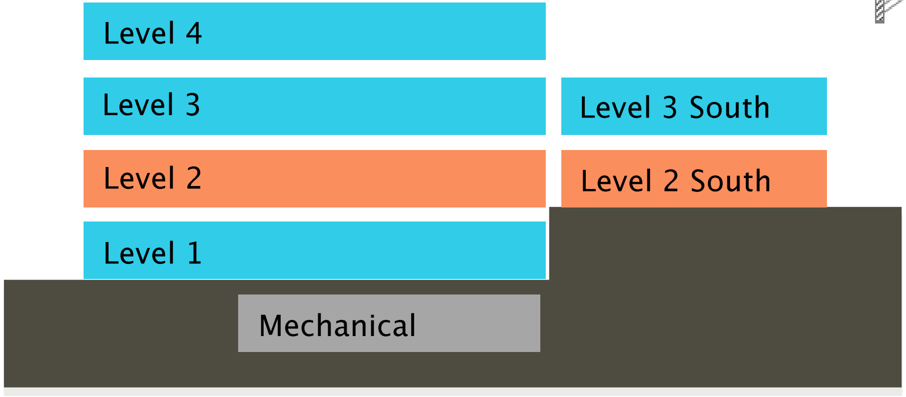


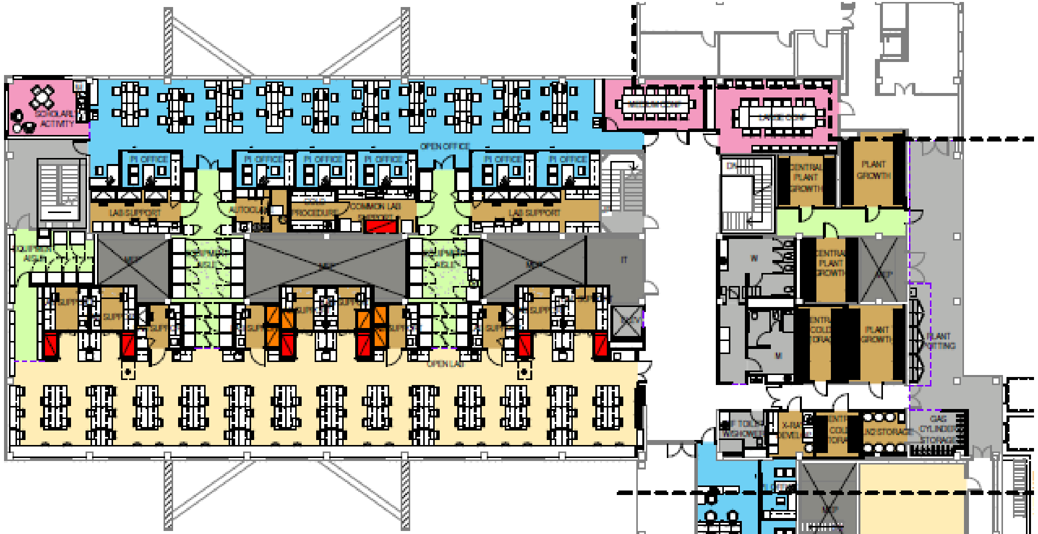


*Note: Figures shown are construction budget, not total project costs

Level 2

East-West Wing
6 Principal Investigators
Loading Dock
Large Conference Room
Dark Room
Central Plant Storage Room
Central Cold Storage
Tenant Improvement Budget
$7,900,000

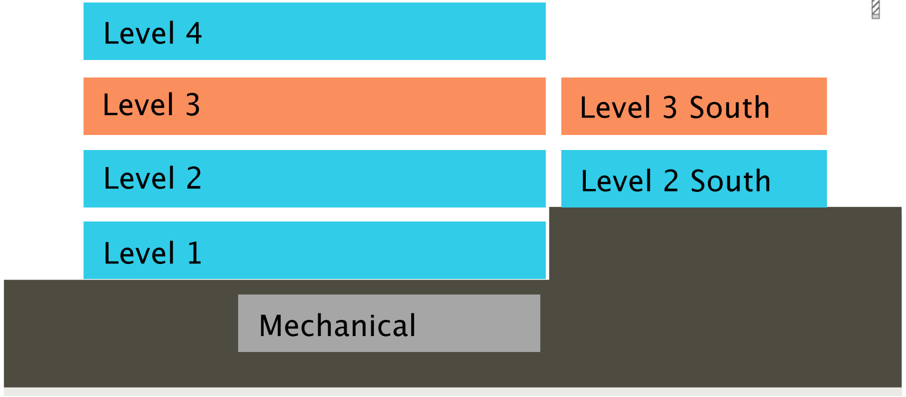


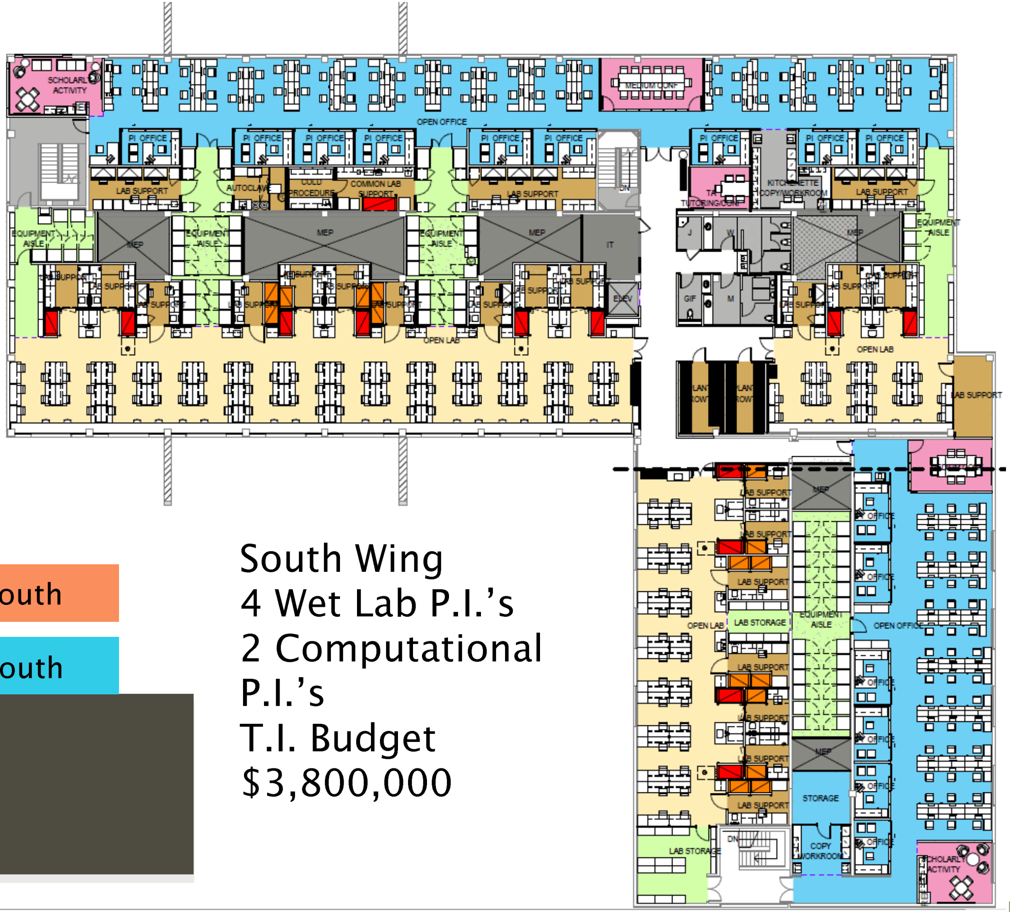


South Wing
4 Computational
P.I.'s
TI Budget
$1,300,000

Level 3

East-West Wing
8 – 9 Principal Investigators
Tenant Improvement Budget
$8,600,000

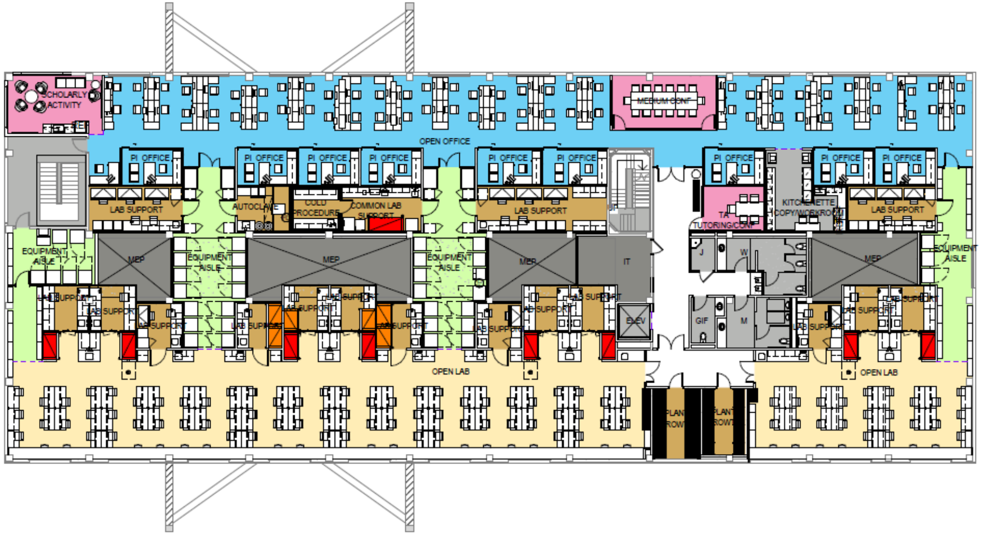


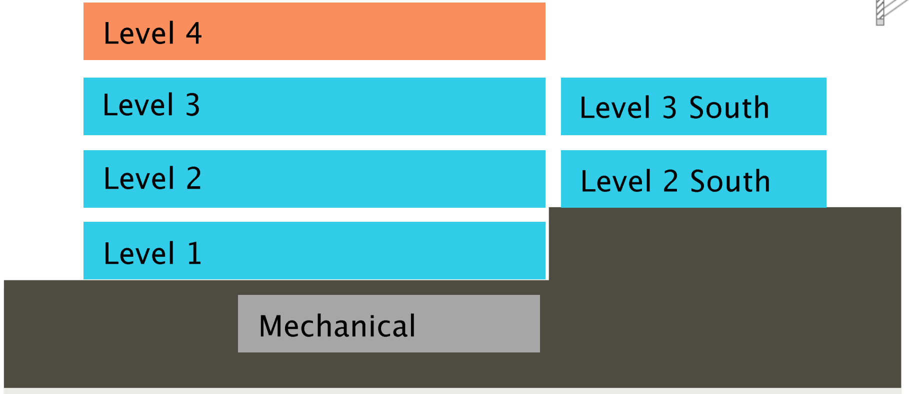


South Wing
4 Wet Lab P.I.'s
2 Computational P.I.'s
T.I. Budget
$3,800,000

Level 4

East-West Wing
8 – 9 Principal Investigators
Tenant Improvement Budget
$8,600,000





Options Exploration

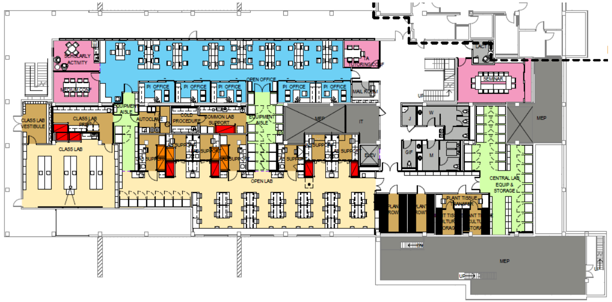
Guiding Principles

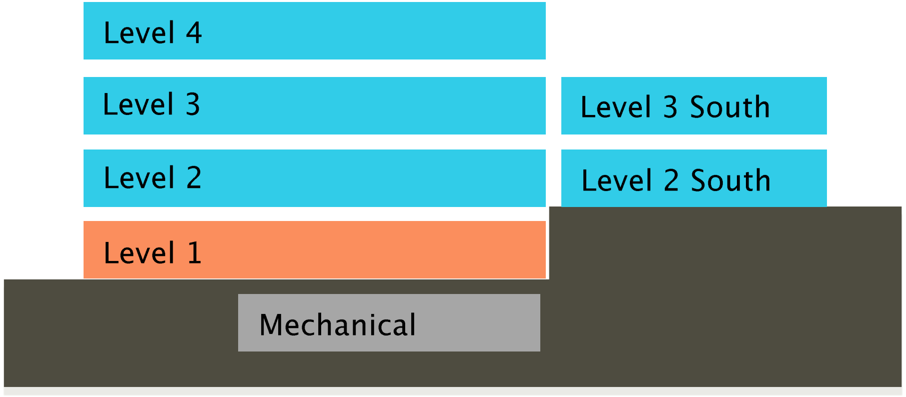
- Provide instruction and research laboratories and associated support spaces
- Greatest need is for wet laboratory and dry laboratory spaces
- Project resources are limited and fixed. The budget will not allow for the complete interior renovation of the building.
- Plan to create cost effective solutions to balance short-term needs while supporting long-term facility plans

Options Exploration

Option 1

Level 1 East-West Wing
3 Wet Lab P.I.'s
Class Lab, Seminar Room
Freezer and Tissue Storage
Budget $7,200,000

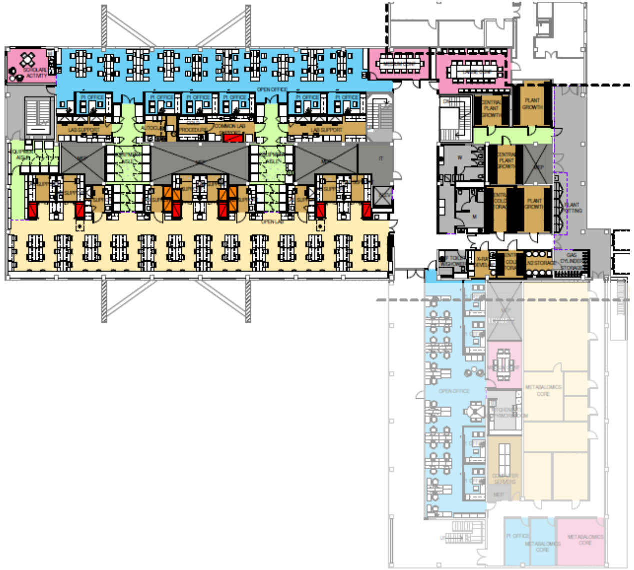


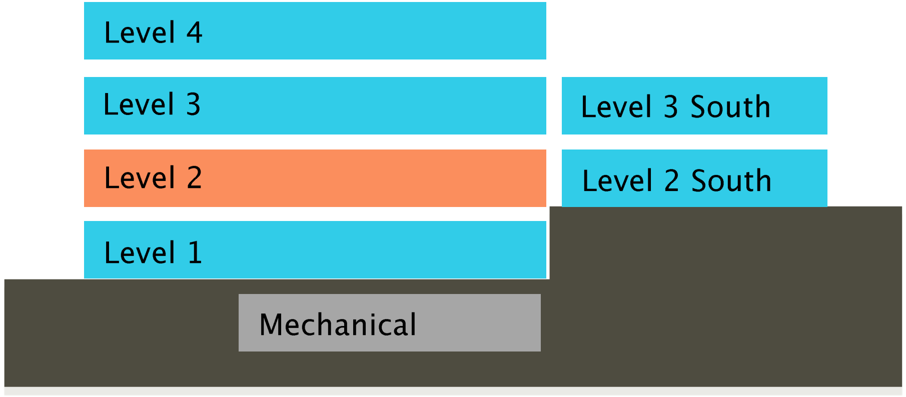


Options Exploration

Option 2

Level 2 East-West Wing
6 Wet Lab P.I.'s
Loading / Lab Support
Budget $7,900,000

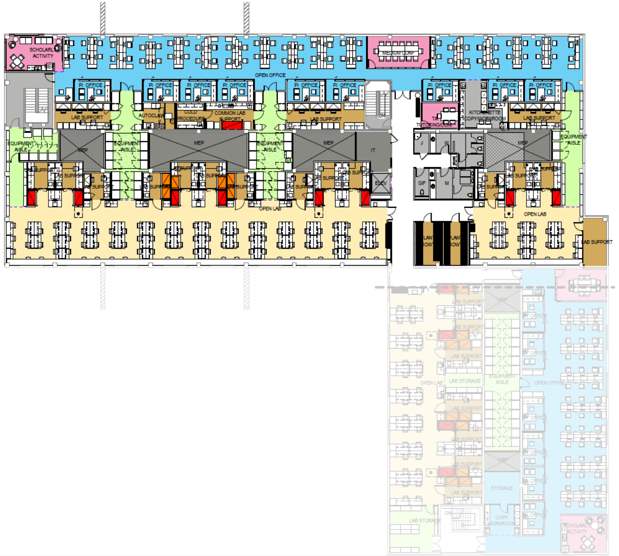


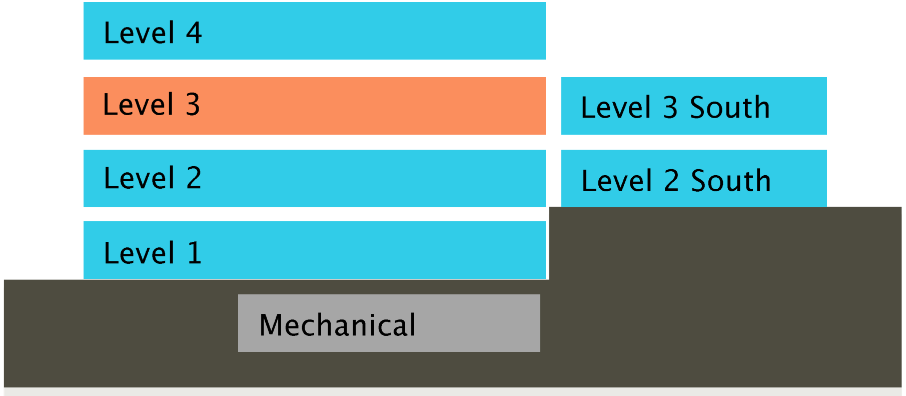


Options Exploration

Option 3

Levels 3 East-West Wing
8 – 9 Wet Lab P.I.'s
Budget $8,600,000

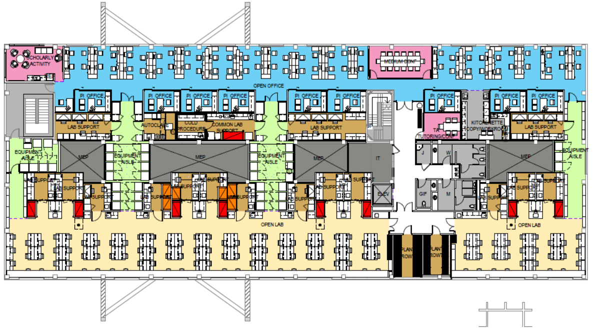


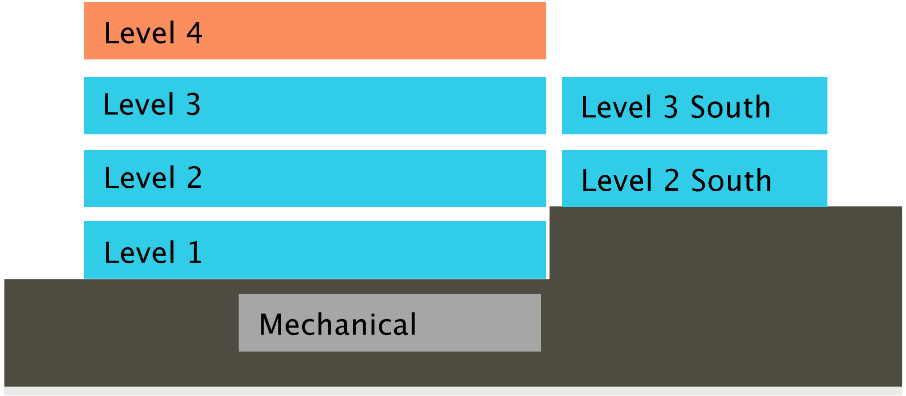


Options Exploration

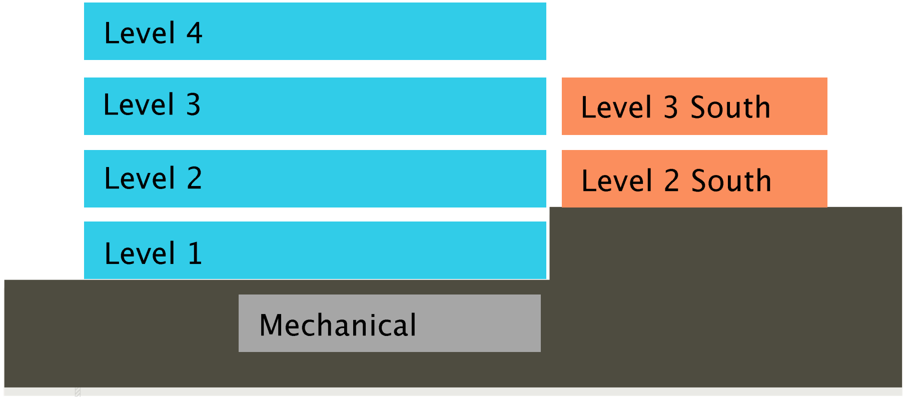
Option 4

Level 4 East-West Wing
8 - 9 Wet Lab P.I.'s
Budget $8,600,000





Options Exploration

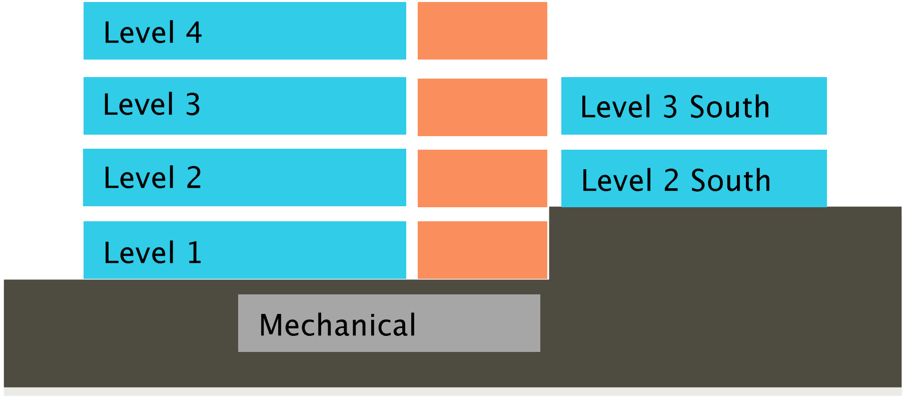


Option 5

Levels 2 & 3 South Wing
4 Wet Lab P.I.'s
6 Computational P.I.'s
Budget $5,100,000

Options Exploration

Option 6
Levels 1, 2, 3 & 4 East of Lobby
4 Wet Lab P.I.'s
Freezer and Tissue Storage
Loading and Lab Support
Budget $TBD



Options Exploration

Option		# P.I.'s	Budget	Initial Desgin Team Rank*	Pros	Cons
1	Level 1 East-West Wing	3	$7.2M	6	Mid-range budget, class lab, ample freezer storage	Fewest wet labs, by itself this option does not meet the goals of the project.
2	Level 2 East-West Wing	6	$7.9M	2	Main floor of building, building loading and services, large contiguous lab area follows template, mid-range budget	Moderate amount of wet labs, future renovations above and below
3	Level 3 East-West Wing	8-9	$8.6M	4	Most wet labs, template floorplate	Highest Budget, future renvoations above, below and to south
4	Level 4 East-West Wing	8-9	$8.6M	1	Most Wet Lab, least disruptive, renovate top-down, template floorplate	Highest Budget
5	Levels 2 & 3 South Wing	4 wet 6 comp.	$5.1M	3	Reno entire wing, less disruption now and in future	Lowest budget, few wet labs
6	Levels 1, 2, 3 & 4 East of Lobby	4	$tbd	5	Reduces impacts for new restrooms, each floor sees direct improvements	Few wet labs

* 1 Most recommended, 6 least recommended

Options Exploration

Option		# P.I.'s	Meet Goals for New Labs	Least Disruptive Initial Construction	Least Disruptive Future Renovations	Balanced Mix of Spaces after First Phase	Other	Other
1	Level 1 East-West Wing	3						
2	Level 2 East-West Wing	6						
3	Level 3 East-West Wing	8-9						
4	Level 4 East-West Wing	8-9						
5	Levels 2 & 3 South Wing	4 wet 6 comp.						
6	Levels 1, 2, 3 & 4 East of Lobby	4						