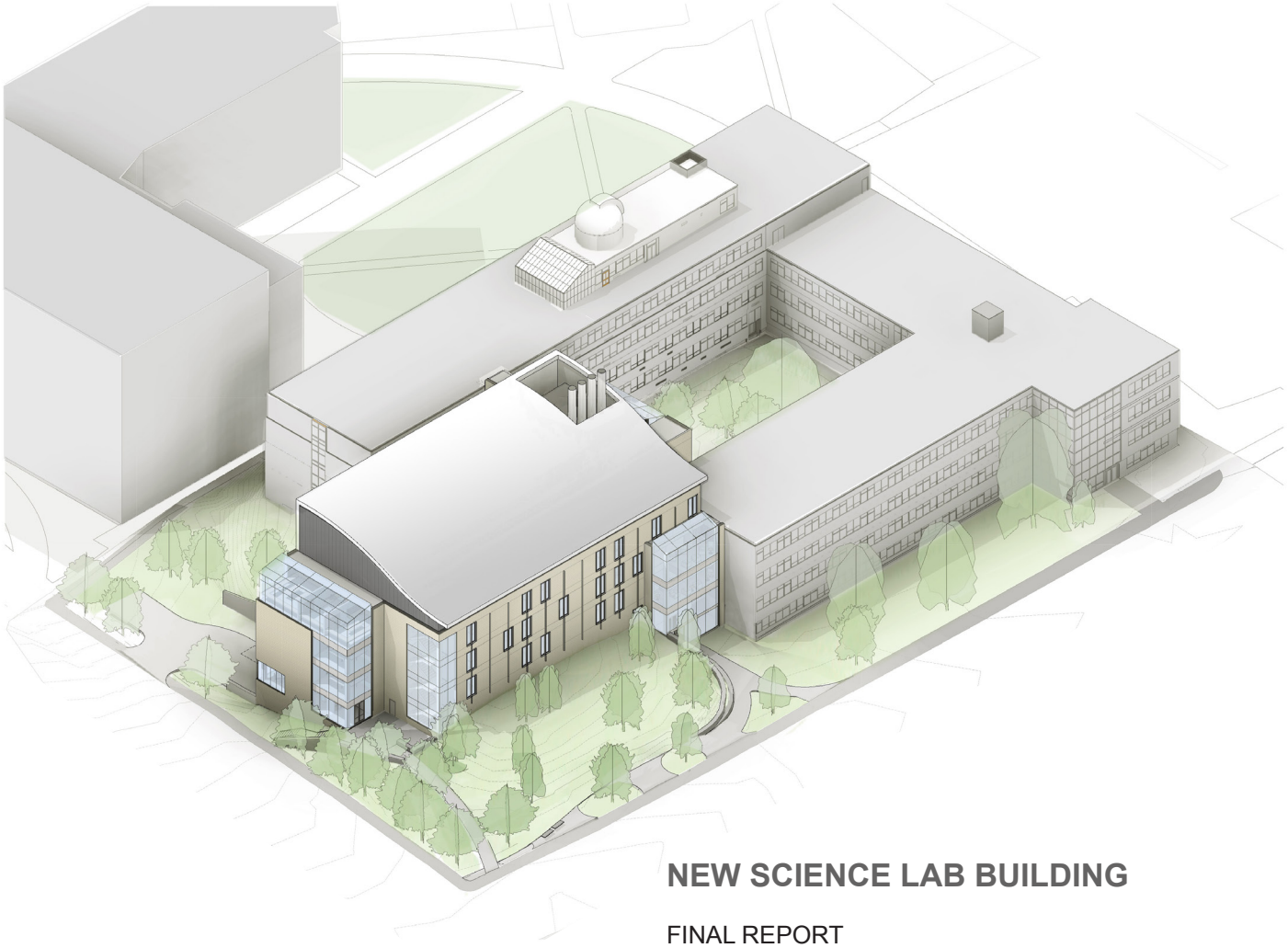
Salem | STATE UNIVERSITY



NEW SCIENCE LAB BUILDING

FINAL REPORT
DCAMM PROJECT NO. SSA1401 ST1
PAI PROJECT NO. 23500.00

Please note that this report has not been certified by DCAMM.

PREPARED FOR THE OFFICE OF PLANNING
DIVISION OF CAPITAL ASSET MANAGEMENT
AND MAINTENANCE

Division of Capital Asset Management and Maintenance
D·C·A·M·M

OCTOBER 2015
VOLUME I

PAYETTE

Salem State University

Division of Capital Asset Management and Maintenance
D·C·A·M·M

NEW SCIENCE LAB BUILDING

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PREFACE

This study was prepared for the Office of Planning, Design and Construction of the Division of Capital Asset Management, Commonwealth of Massachusetts, in accordance with Massachusetts General Laws, Chapter 29, Sections 7K and 26A. It is intended to present a consensus solution for the predesign phase for the New Science Building at Salem State University in Salem.

The study provides a clear and detailed frame of reference for the design and implementation process and recommends a solution that can be accomplished within the appropriation or authorization for that project. It includes a space program which reflects the school's needs, a description of the project requirements, an accurate estimate of capital and operating costs, and an implementation schedule.

Conceptual building designs, where included, are not intended to constrain the final design but rather to illustrate functional relationships, demonstrate the practical operation of design criteria and conformance with applicable codes and standards, and serve as the basis for developing an accurate cost estimate.

Before DCAMM can enter into a contract for final design services, this study must be certified by the Commissioner of DCAMM. Thereafter no substantial changes can be made to the program during the implementation process. In no event shall the design work be such as would result in a change in the number of gross square feet to be constructed in the project of more than ten percent from the number specified in this study.

ACKNOWLEDGEMENTS

Salem State University

Executive Committee
Dr. Patricia Meservey, President
John Keenan, Vice President for Administration
Ben Szalewicz, Assistant Vice President, Campus Planning and Facilities Management
Amie Goodwin, Assistant Provost, Academic Affairs
Michelle Sweeney, Interim Dean, College of Arts and Sciences
Amy Everitt, Assistant Provost, Administration & Faculty
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Amy Sprenkle, Biology
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Alejandra Menchaca, PhD, Building Scientist
Brian Carlic, ASLA, Director of Landscape Architecture

A. EXECUTIVE SUMMARY

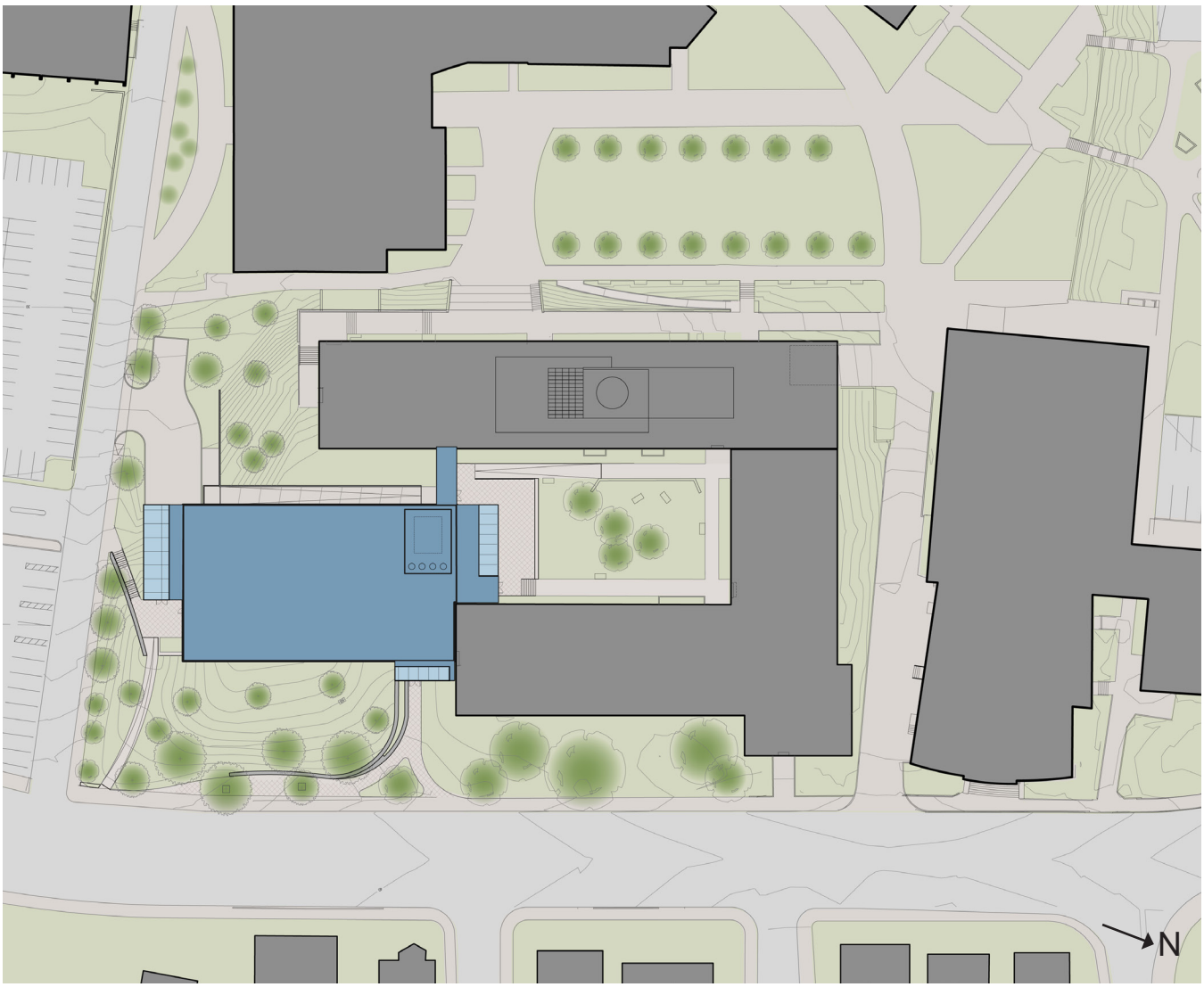
EXECUTIVE SUMMARY

Project Summary

Program Description

Construction of a new science facility which includes teaching labs and lab support spaces for the Biology, Chemistry and Geology departments, a Greenhouse, and informal student gathering spaces.

Total Project Cost:	$55,000,000
Estimated Construction Cost:	$40,200,000
Consensus Solution SF:	70,610 GSF / 37,985 NSF



Consensus Solution Site Plan - New construction shown in Blue

Process

This report documents the final phase of the building study and describes the additional information studied for the Consensus Solution, which represents the agreed-upon final conceptual design approach to the programmatic needs outlined in earlier phases of the project.

Consensus Alternative

Based upon review of three alternatives with the Administration and the Biology, Chemistry and Geology departments, and following a cost analysis of each alternative for budget feasibility, Option 2 was selected for further development. Option 3 was eliminated from consideration since it was 13% over budget. Option 1 was not favored by the Administration or Faculty since the scheme only connected to the south end of the west wing of Meier Hall whereas Option 2 connects to both the east and west wings of Meier Hall. This preferred option allows for ease of flow between the teaching labs in the new building and classroom and faculty space in Meier Hall, while providing student space for the entire Meier Hall community. As part of this phase, the design team developed additional information with respect to programming, accessibility, building systems, landscape approach and project cost.

The full study scope of work is documented in two reports. The Interim Report detailed findings on the existing conditions, program development, and the concept alternatives. This report covers all aspects of the Consensus Solution:

- Final Building Program
- Development of architectural and site approaches
- Development of floor plans
- Systems Narratives
- Cost Estimate
- Schedule for design and construction

To meet the available budget, minor programmatic reductions were required, and arrived at by allowing some program elements to remain within Meier Hall (Anatomy & Physiology labs and associated prep; Biology Research space). This allowed for a reduced Greenhouse program, a smaller research component, and a Biochemistry Lab to be retained in the new construction.

Programmatically, the consensus solution is distributed as follows:

Level 1	5,920	GSF
	Loading Dock, Mechanical Space	
Level 2	12,900	GSF
	Geology Teaching Labs, Student Space, Building Support	
Level 3	14,700	GSF
	Chemistry Teaching Labs, Student Space	
Level 4	14,900	GSF
	Upper Level Biology and Chemistry Labs, Student Space	
Level 5	14,300	GSF
	Intro / Upper Level Biology Labs, Greenhouse, Student Space	
Level 6	7,890	GSF
	Mechanical Penthouse	
Total GSF:	**70,610**	

This represents 7 Biology Teaching Labs and associated prep spaces, 2 Biology Research Labs, 8 Chemistry Teaching Labs and associated prep spaces, 2 Chemistry Research Labs, 3 Geology Labs and associated prep spaces, 3 Lab Technician offices, a Greenhouse and Student Space on each floor.

Levels 1 and 2 do not utilize the full building footprint. This is due to the rock ledge that closely follows the contour of the hill on the site. To minimize the amount of excavation required, the first two levels of the building will have a smaller footprint.

Although science buildings typically consume the most energy of any academic building type, this project is currently on track to achieve LEED Silver certification. Further refinements in schematic design will strive to make this project as sustainable as possible. An additional area of study for the sustainable aspects of this building came in the form of a grant from the Massachusetts Department of Energy Resources for Payette to study opportunities in “Getting to Net Zero” for the New Science Building at Salem State University. A draft of this report is included in the Appendix of this report.

COST

The total project budget available for this project is $55,000,000. The cost model for the Consensus Solution is on target with estimated construction cost of $40.2M. This assumes a CM at Risk project delivery method. The detailed estimate is included in Section F of this report.

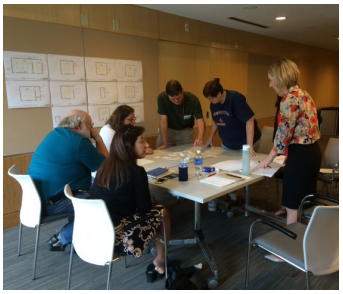
SCHEDULE

The schedule duration for design and construction of this building is estimated to be approximately 3 years. This includes one year for design and two years for construction.

View from College Drive and Lafayette Street

B. BUILDING PROGRAM

BUILDING PROGRAM



Programming Meeting working session

Introduction

In November 2014, the design team presented a program which represented the highest and best use for the new construction. This included Biology, Chemistry, Geology teaching labs, research labs, and a greenhouse. (Refer to the Interim Report, Program Section, for more details on the initial building program for the concept alternatives.) This program was used to develop three alternatives for evaluation.

Once initial cost information was received on the concept alternatives, it was apparent that some programmatic elements needed to be removed from the project in order for it to align with the budget. Preliminary cost modeling using $550 / SF indicated an estimated construction cost (ECC) of $40.2M, which allowed for a building of approximately 73,000 GSF. In pricing the concept alternatives, the construction cost per SF was higher at approximately $570 / SF. With an established budget of $55M, the overall GSF needed to be reduced in order for the project to be on budget.

At the same time, the Chemistry and Biology faculty also worked together to incorporate programmatic elements into the project that they felt were currently lacking. These trades would come at the expense of a program slated for the new construction.

Summary / Narrative

On the following page is a graphic representation of the various cost reduction strategies undertaken to bring the project back on budget. Three items were identified as potential elements to remain back in Meier Hall:

- Greenhouse
- Research Labs
- Anatomy and Physiology Labs and Prep Labs

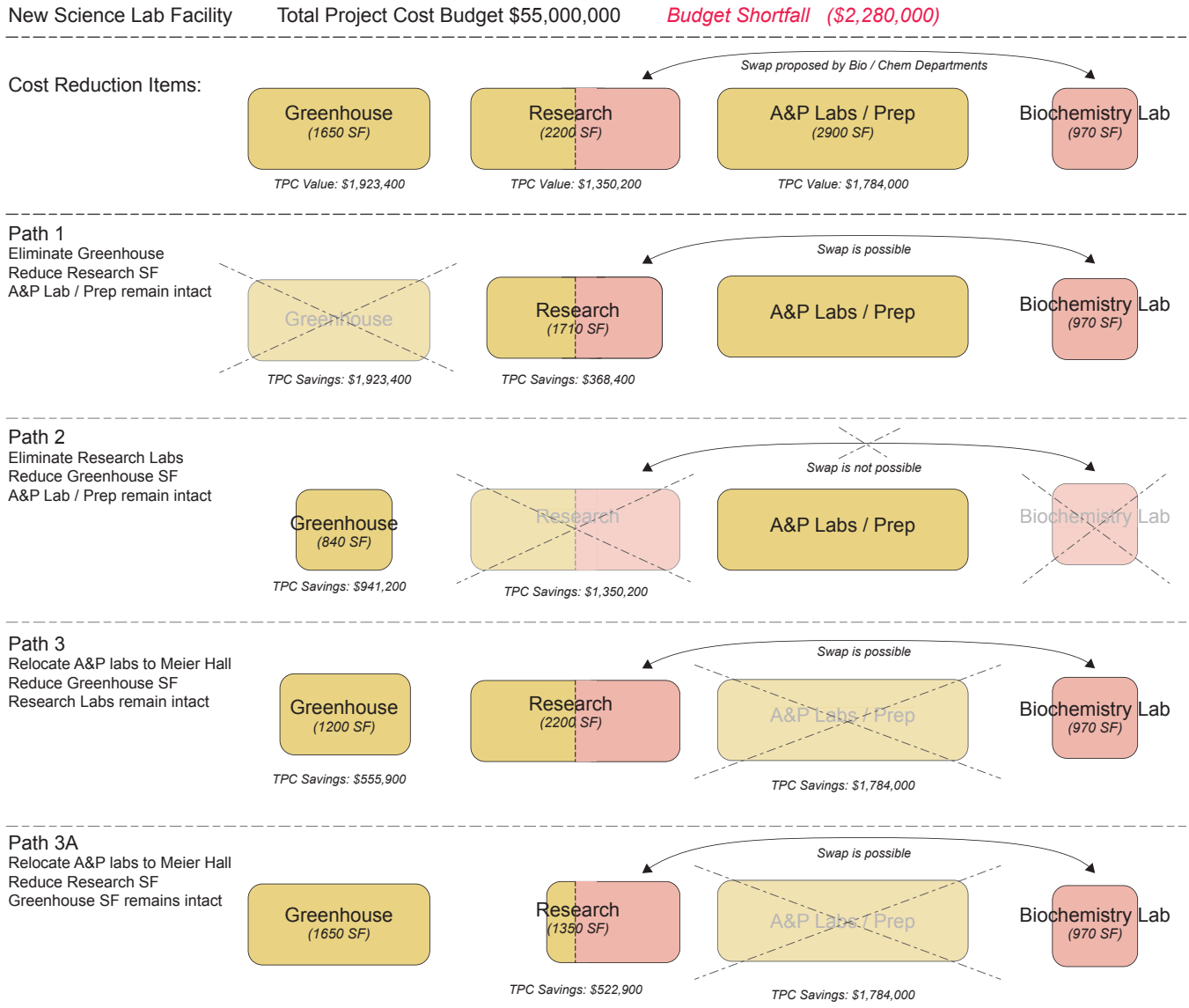
Given that SSU had recently invested funds in the renovation of the Biology labs on the 4th floor (summer 2013), the Administration favored moving ahead with Path 3, where the A&P labs / prep would remain in Meier Hall (MH-429, 431, 433). This would allow the accommodation of a smaller Greenhouse and Research Lab component in the new construction. The faculty and Administration were in favor of swapping half of the research in order to create a Biochemistry Lab. For this swap, the Biology department will also be retaining MH-440 and 450 for the Research Lab component that could not be accommodated in the new construction.

The other programmatic change agreed upon by the Faculty and Administration was the elimination of one Introductory Biology teaching lab. In its place, an

Instrumentation Lab and associated teaching area for the Chemistry department was included in the program. On the following page is the breakdown of the program by departments for the Consensus Solution.

All of these changes were vetted by the Administration and approved by the Executive Committee headed by President Meservey.

Cost Reduction Strategies for Concept Alternatives



As indicated by the comparative table below, it is apparent that the Chemistry department gained sizable square footage from what was originally programmed for the concept alternatives. This is due to the changes discussed on the previous pages:

- A&P Labs / Preps will remain in Meier Hall and a Biochemistry Lab is added to the program. The Biochemistry Lab is shared between the Biology and Chemistry departments, but for accounting purposes is grouped under the Chemistry department SF.
- An Intro Biology Lab was swapped for an Instrumentation Lab and Teaching Area for Chemistry.

The other change to note in the programmed square footage below is the increased square footage allotted for student space. The original concept alternatives program included 1,400 SF of student space. With the development of the concept alternatives, the student space became a defining characteristic of the schemes. With the lack of student space in Meier Hall, the Administration felt it was important to keep the student space as designed. Reducing student space square footage was also considered as a cost reduction strategy, but again, the Executive Committee felt it was a priority, and therefore it remained intact through the cost reduction exercises.

On the following pages B.6 - B.7 is the detailed Program for Biology, Chemistry, and Geology. The programmatic elements that were eliminated from Concept Alternatives to Consensus Solution are shown with a strike-through. The Room Data Sheets for the Consensus Solution Program begin on page B.10.

Program Change from Concept Alternatives to Consensus Solution

Department	Program SF Concept Alternatives	Program SF Consensus Solutions
Biology	18,285	13,285
Chemistry	11,835	13,410
Geology	2,600	2,995
Total Departmental NASF	**32,720**	**29,690**
Student Space	1,400	2,900
Building Shared	5,395	5,395
NASF Sum	**39,515**	**37,985**
Grossing Factor**	1.85	1.85
GSF	**73,100**	**70,270**

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Biology

ID Number		Qty	Unit Nasf	Room Capacity	NASF Total	Notes
Teaching Lab						
1.10	Intro Biology Lab	3	1,300	24	3,900	
~~1.11~~	~~Anatomy & Physiology Laboratory~~	~~0~~	~~1,300~~	~~24~~	~~0~~	to remain in Meier Hall
1.11	Zoology Lab	1	980	16	980	
1.12	Ecology / Oceanography Lab	1	980	16	980	
1.13	Cell / Molecular Biology	1	980	16	980	
1.14	Microbiology Lab	1	980	16	980	
Research Lab						
1.20	Research - Bench Lab	1	650		650	half SF in Bio / half in Chem
1.21	SEM / Microscopy Suite	1	835		835	
Lab Support						
1.30	Intro Prep Room	1	850		850	
~~1.31~~	~~A & P Prep~~	~~0~~	~~280~~		~~0~~	to remain in Meier Hall
1.31	Ecology / Oceanography & Zoology Prep Lab	1	280		280	for Ecology / Zoology
1.32	Cell / Molecular & Microbiology Prep Lab	1	560		560	Larger prep for Cell / Molecular & Microbio
1.33	Tissue Culture	1	280		280	
1.34	Incubator Room	1	210		210	
1.35	Cold Room	1	110		110	One cold room for bio / one for Geo
1.36	Glasswash / Autoclave	1	250		250	needs to be near Microbio
Office						
1.40	Office - Lab Technician	2	120		240	
Specialty Space						
1.50	Greenhouse	1	1,200		1,200	Reduce SF per cost reduction strategies
					13,285	**NASF Total**

Chemistry

ID Number		Qty	Unit Nasf	Room Capacity	NASF Total	Notes
Teaching Lab						
2.10	General Chemistry Lab	3	1,300	24	3,900	General Chemistry / Nursing Chemistry
2.11	Organic Chemistry Lab	2	1,300	16	2,600	
2.12	P Chemistry Lab	1	970	16	970	
2.13	Instrumentation Lab	1	970	12-16	970	
2.14	Biochemistry Lab	1	970	16	970	Shared between Biology & Chemistry
Research Lab						
~~2.21~~	~~Instrumentation Lab cold~~	~~0~~	~~275~~		~~0~~	Initial programming split Instrumentation lab into 2 spaces
2.20	Bio Science Grant Lab	1	650		650	
2.21	NMR	1	250		250	
2.22	Research Lab	1	650		650	Remainder research SF accounted for in Bio
Lab Support						
2.30	General Chemistry Lab Prep	1	850		850	
2.31	Organic Chemistry Prep	1	560		560	
2.32	P Chem Prep	1	275		275	
2.33	Teaching Area	1	275		275	Needs black-out capabilities
~~2.32~~	~~Balance Room~~	~~0~~	~~500~~		~~0~~	balances to go in Gen Chem Lab
2.34	Chemical Waste Storage	1	250		250	
Office						
2.40	Office - Lab Technician	2	120		240	

13,410 **NASF Total**

Geological Sciences

ID Number		Qty	Unit Nasf	Room Capacity	NASF Total	Notes
Teaching Lab						
3.10	Intro Lab	1	1,300	24	1,300	
Lab Support						
3.20	Water /Sediment Lab - Dirty	1	650		650	
3.21	Analytical Lab - Clean	1	650		650	
3.22	Prep / Storage	1	275		275	Additional request
3.23	Cold Room	1	120		120	Currently two cold rooms vs. one large

2,995 **NASF Total**

Building Shared

ID Number		Qty	Unit Nasf	Room Capacity	NASF Total	Notes
Building Shared						
4.10	Lobby	1	2,000		2,000	dispersed between level 1 and 2
4.11	Loading Dock / Receiving Area	1	2,000		2,000	
4.12	Stockroom / Store Room	1	800		800	
4.13	Janitor's Closet w/ Mopsink	1	50		50	
4.14	IT Server Room	1	200		200	
4.15	IT Closet - distributed	3	50		150	
4.16	Maintenance Equipment Storage	1	75		75	
4.17	Outdoor Equipment Storage					Maintain in Meier Hall?
4.18	Trash / Recycling	4	30		120	Recycling / Trash stations at each floor
	Bicycle Storage					Exterior of building?
5.10	Student Space	N/A	2,900		2,900	dispersed over all floors

8,295 **NASF Total**

Departmental + Buiding Shared **37,985** **NASF**

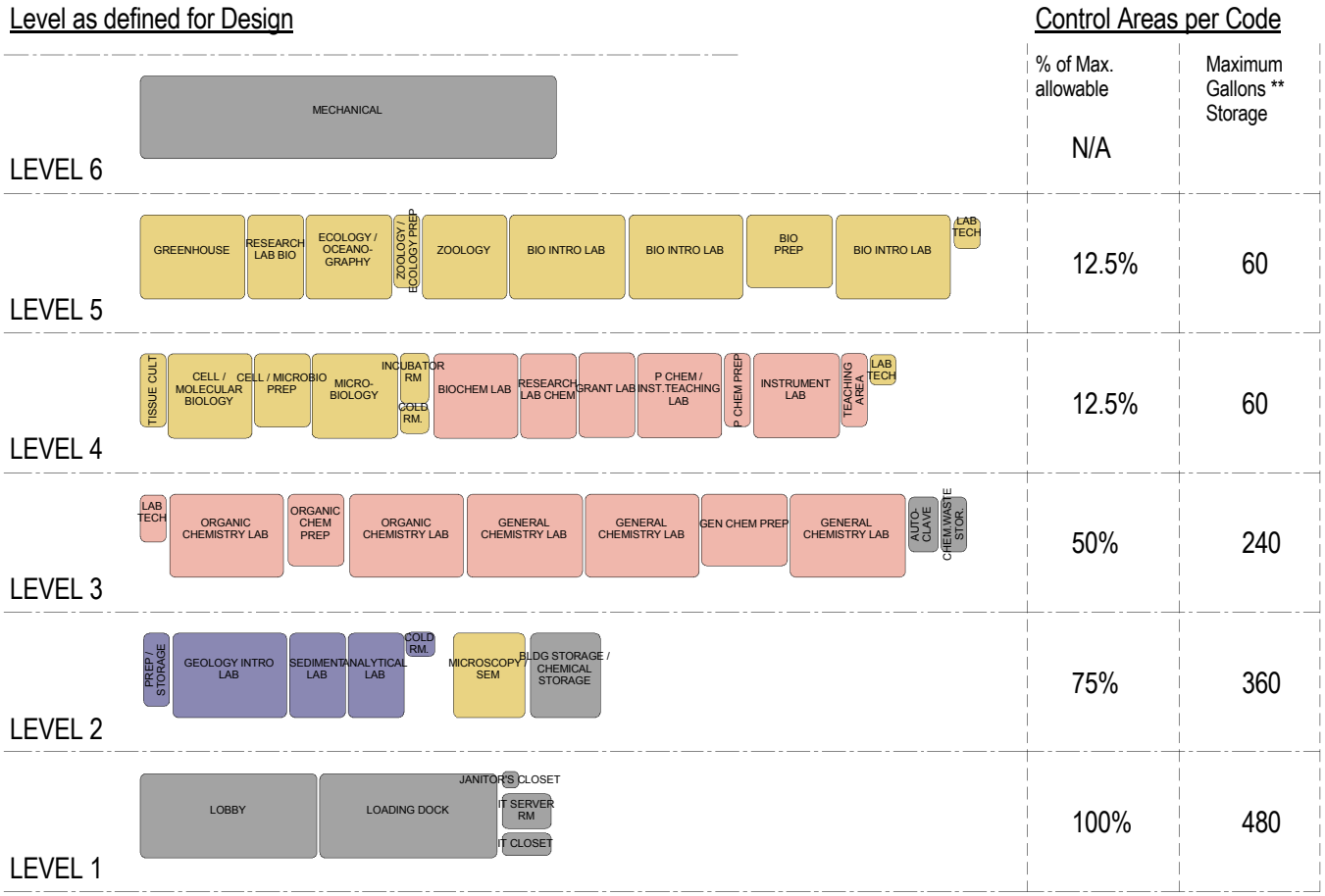
Space Program

Stacking Diagram & Room Data Sheets

The stacking diagram also evolved from the concept alternatives to the consensus solution. By removing approximately 3,000 GSF from the project, the Greenhouse is able to be located on Level 5 versus as originally planned for Level 6 (on the roof level). This makes it more accessible and visible to a larger population than its original location. The greenhouse placement on Level 5 also allows for classes to utilize the greenhouse and return to a teaching lab to complete lab work.

The other issue confronting the stacking diagram are the code requirements surrounding control areas. The International Building Code stipulates the amount of flammable chemicals that can be located on upper levels within a building (see the Building Code Report Section E.8 for more information). The diagram below illustrates that starting at Level 4, the amount of chemical permitted becomes more restrictive. Therefore, placing Organic Chemistry and General Chemistry

Code Requirements: Control Areas



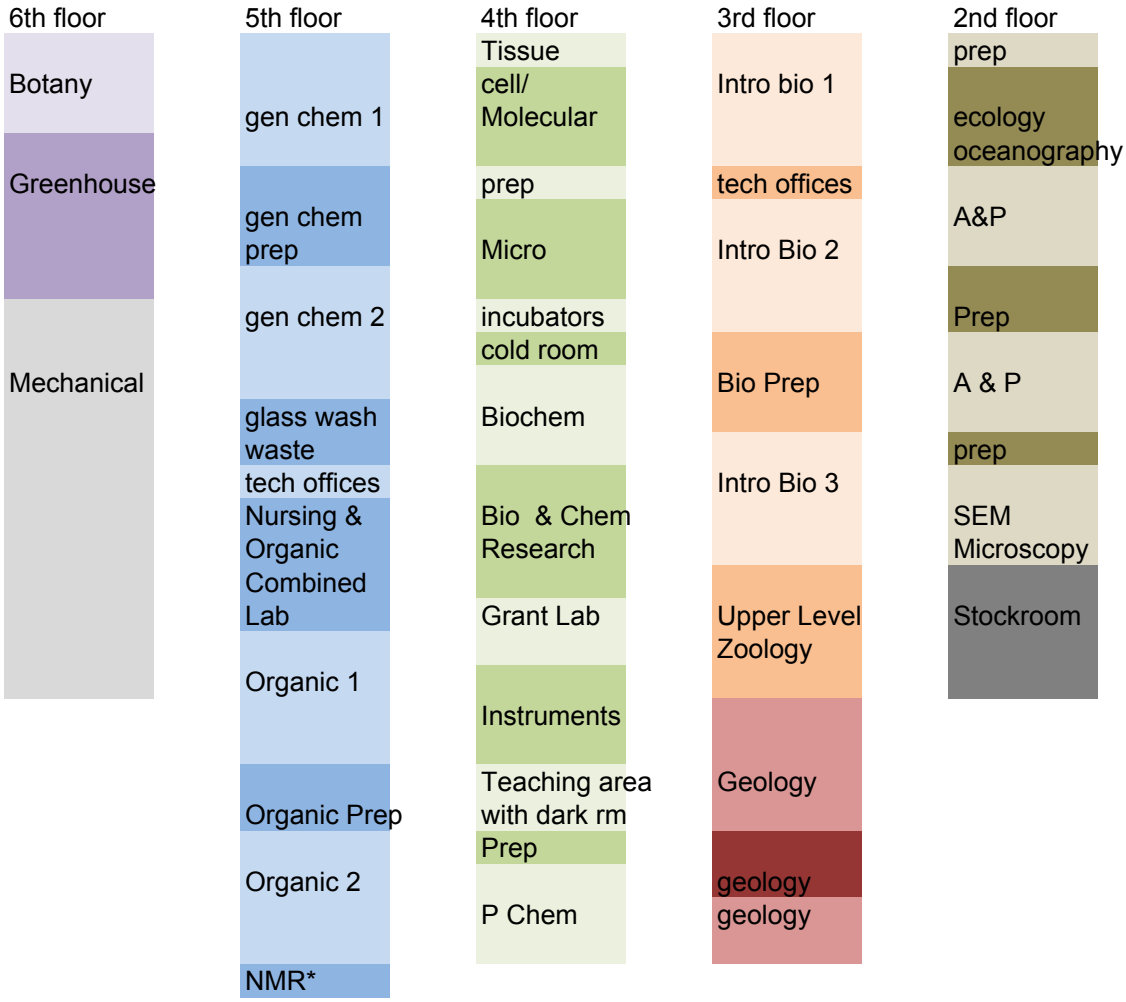
** for Combustible Liquid, Class II.

Labs at Level 3 allows for a larger amount of chemicals to be used on these floors.

The design team also received input from the users on the stacking diagrams. The Chemistry and Biology departments completed a stacking diagram (see below) to express how they would like to see proximity and adjacency. The consensus solution stacking diagram as shown on the previous page did strive to incorporate the user's feedback in conjunction with the code requirements on Control Areas.

Room data sheets for each of the proposed spaces follow on the next pages. The Building Concept Plans in the Consensus Solution section of the report indicate the direct adjacencies between labs on the various floors.

User Group Stacking Diagram



* If NMR does not fit on 5th floor it will be combined w/ dark room segment taken from instrumental space

Room Data Sheet
1.10 Intro Biology Lab

Department: Biology
Issue Date: 04/16/15

NCES Code: *210*

Area /Occupancy
Target Area : *1300*
Actual Area : *1307 SF* *
Occupants : *24*
Quantity: *3*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height: *?*
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36", UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *Yes*
Desks: *No*
Chairs: *Stools*
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies
Proximity to Intro Bio Lab Prep

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *No*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste:
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power: *120 V or as noted*
Features:
Elec. Outlets: *As shown*
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *No*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

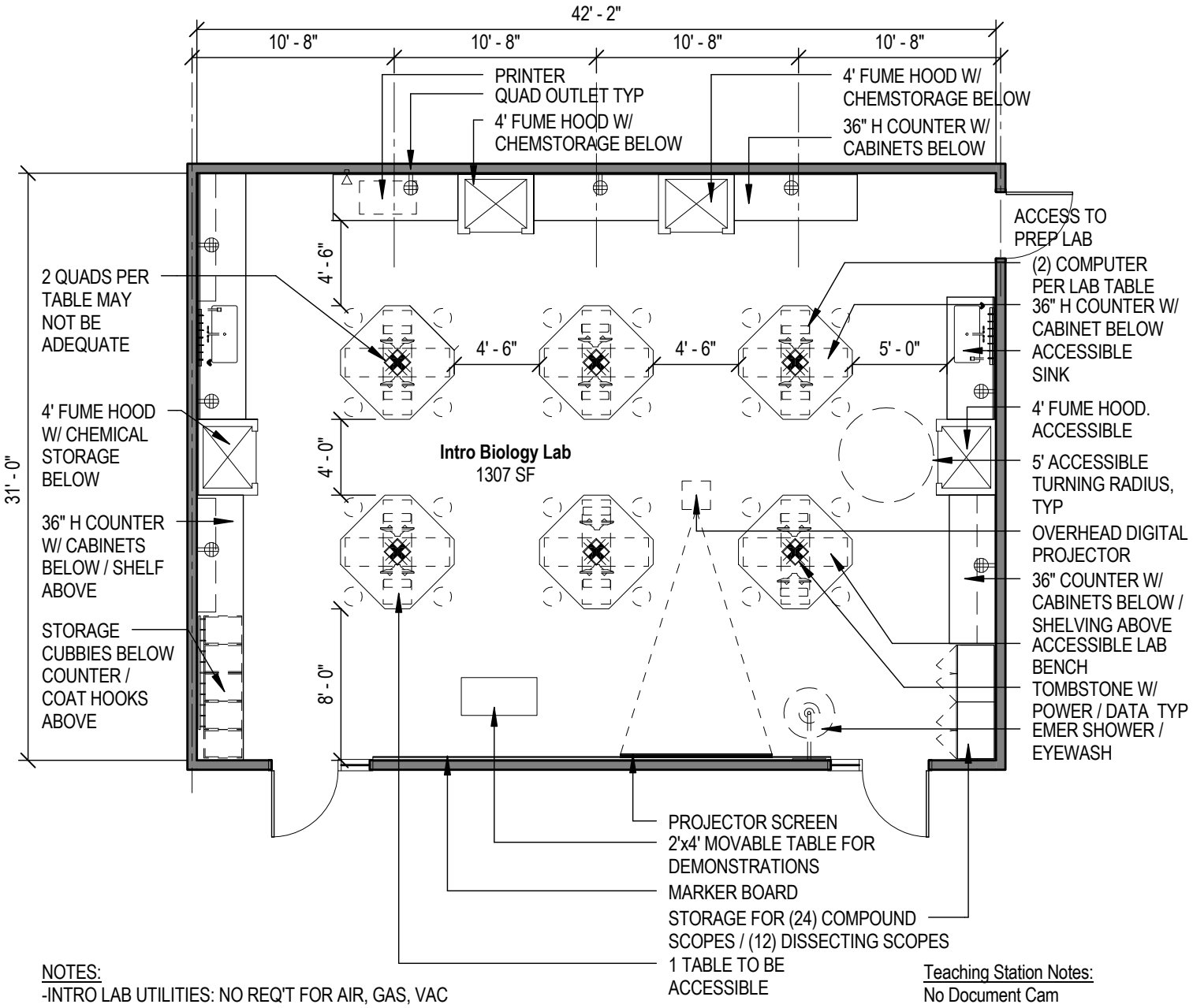
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			
4'-0" FUME HOOD	?	4' - 0"	3' - 1 1/2"	12' - 0"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Intro Biology Lab 1.10

Scale: 1/8" = 1'-0"



NOTES:
-INTRO LAB UTILITIES: NO REQ'T FOR AIR, GAS, VAC
- POWER REQ AT LAB TABLES: 2 HOT PLATES, 2 COMPUTERS, 2 SCOPES, 2 SPECTROPHOTOMETER (UNLIKELY TO HAVE SCOPE/SPECTROPHOTOMETER OUT AT SAME TIME)
-4 F.H. MINIMUM
-LAPTOPS AT LAB TABLES
-TEACHING STATION - SMALL RANGE OF MOVEMENT
-GROUP LIKED MCLA LECTURE HALL TEACHING STATION

Teaching Station Notes:
No Document Cam
Laptop Docking Station - Yes
PC @ teaching station

Room Data Sheet
1.11 Zoology Lab

Department: Biology
Issue Date: 04/16/15

NCES Code: *210*

Area /Occupancy
Target Area : *980*
Actual Area : *976 SF* *
Occupants : *16*
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height: *?*
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *Yes*
Desks: *No*
Chairs: *Stools*
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies
Direct adjacency to Prep

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy - 3' wide*
Pure Water: *No*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *No*
Emer. Eyewash: *No*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power: *120 V, UNO*
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

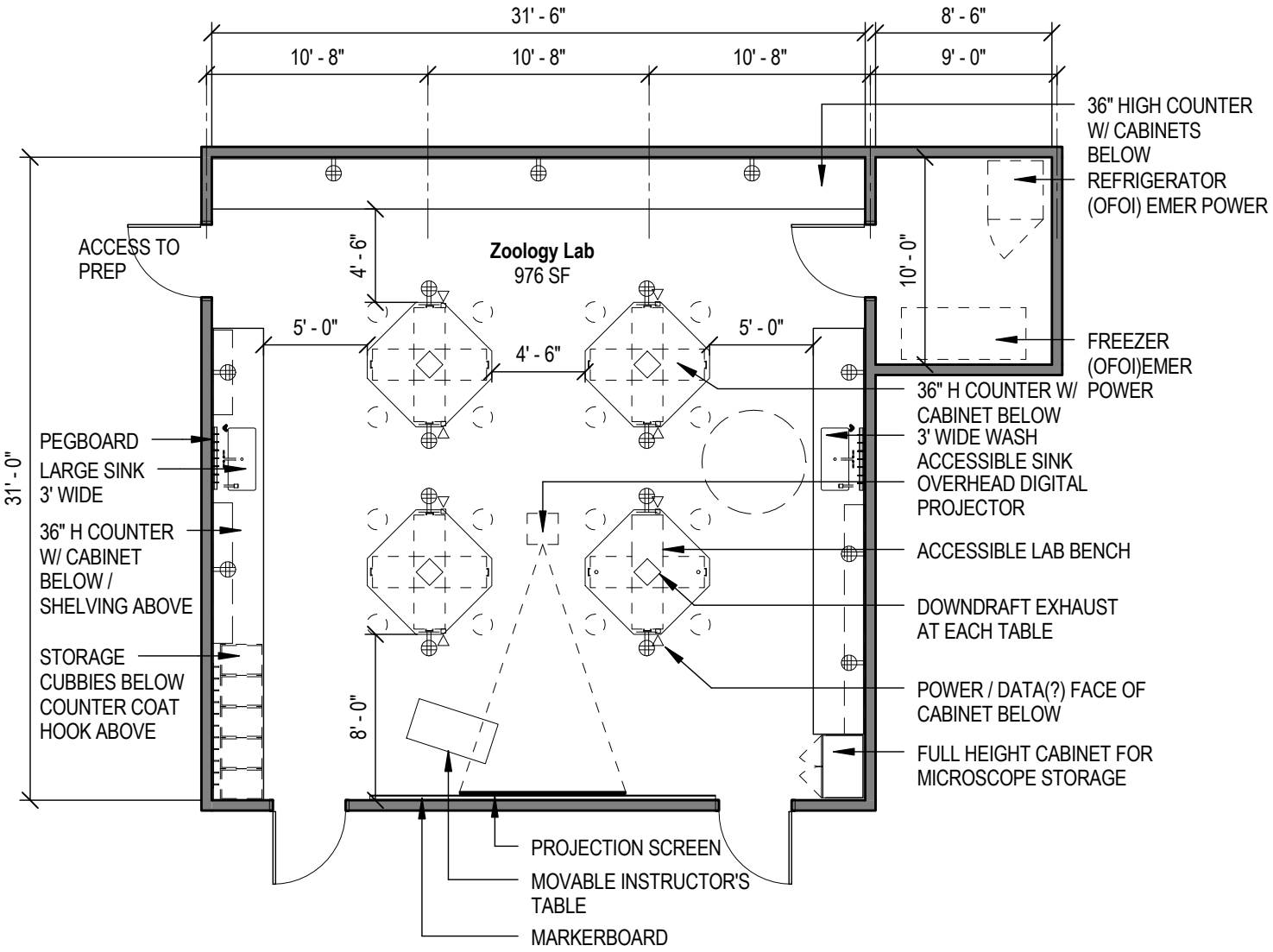
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Zoology Lab 1.11

Scale: 1/8" = 1'-0"



NOTES:
- NO PLINTH FOR DOWNDRAFT.
- NEED TABLE SPACE FOR MODELS
- NEED CLOSET FOR SKELETONS OUT IN LAB

Room Data Sheet
1.12 Ecology & Oceanography

Department: Biology
Issue Date: 04/16/15

NCES Code: *210*

Area /Occupancy
Target Area : *980*
Actual Area : *977 SF* *
Occupants : *16*
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36", UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *Yes*
Desks: *No*
Chairs: *Stools*
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies
Direct adjacency to Prep

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *No*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste:
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power: *120V, UNO*
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

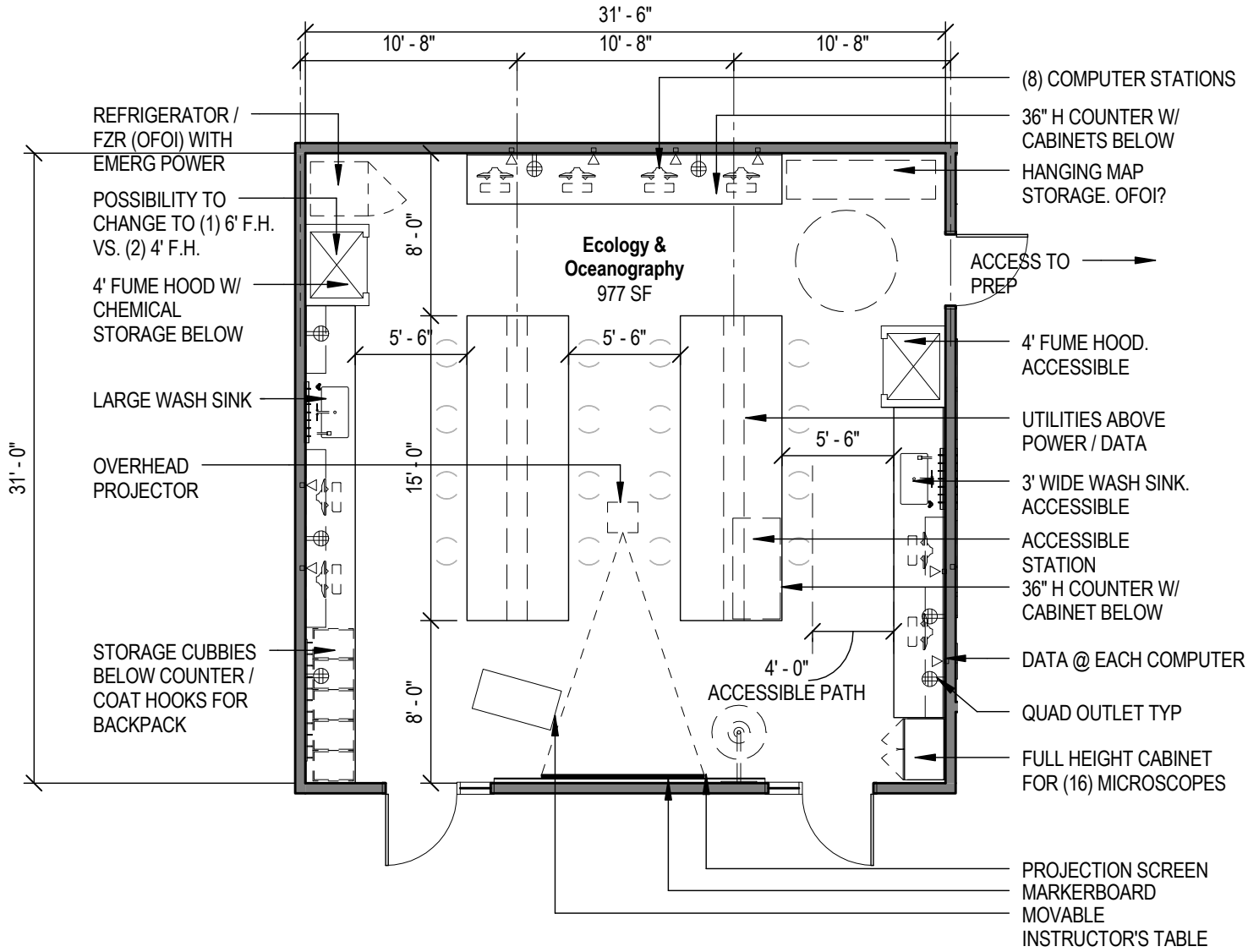
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			
4'-0" FUME HOOD	?	4' - 0"	3' - 1 1/2"	12' - 0"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Ecology & Oceanography 1.12

Scale: 1/8" = 1'-0"



NOTES:
- MAP STORAGE TAKING A LOT OF REAL ESTATE
  POSSIBILITY OF GOING DIGITAL?
- NEED TO DEFINE STANDARD OF EMERGENCY POWER.
  WILL PROVIDE IN EVERY ROOM, BUT NEED AN
  UNDERSTANDING OF EQUIPMENT THAT NEEDS POWER

Room Data Sheet
1.13 Cell / Molecular Biology Lab

Department: Biology
Issue Date: 04/16/15

NCES Code: *210*

Area /Occupancy
Target Area : *980*
Actual Area : *976 SF* *
Occupants : *16*
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36", UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *Yes*
Desks:
Chairs: *Stools*
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies
Direct adjacency to Prep

Notes
Confirm no Biosafety Cabinet is required?

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas: *Yes*
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

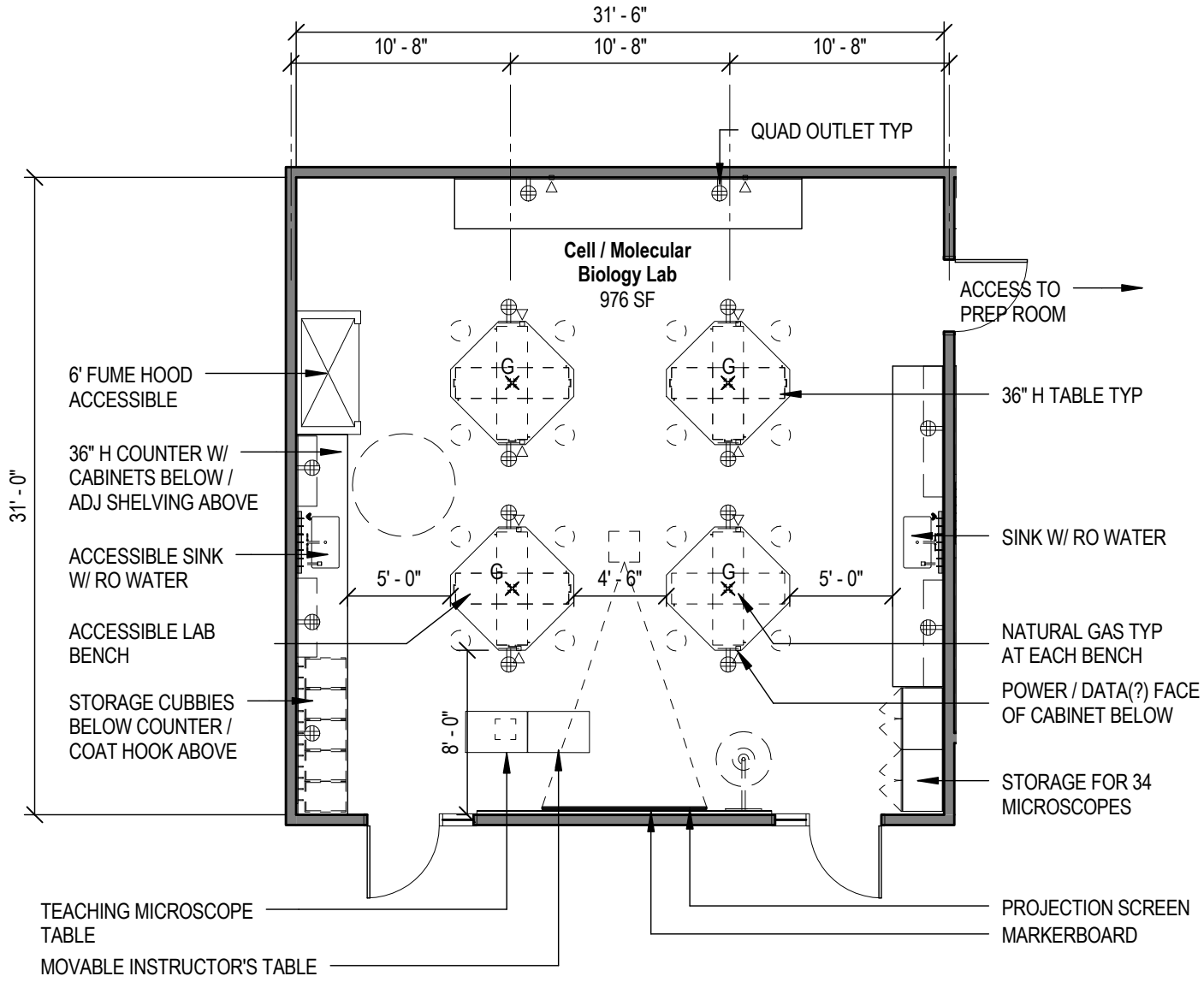
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			
6'-0" FUME HOOD	?	6' - 0"	3' - 1 1/2"	11' - 4"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Cell / Molecular Biology Lab 1.13

Scale: 1/8" = 1'-0"



NOTES:
- HIGH QUALITY WATER NEEDED - MILLAPORE SYSTEM
- EMERGENCY POWER NEEDED

Room Data Sheet
1.14 Microbiology Lab

Department: Biology
Issue Date: 04/16/15

NCES Code: *210*

Area /Occupancy
Target Area : *980*
Actual Area : *977 SF* *
Occupants : *16*
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36", UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *Yes*
Desks: *No*
Chairs: *Stools*
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies
Direct adjacency to Prep

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas: *Yes*
- Vacuum: *Yes*
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust: *As per program req*
Air Filtration: *30% pre, 95% final*
O2 Sensor: *No*
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power: *120 V UNO*
Features:
Elec. Outlets: *As noted and by code*
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

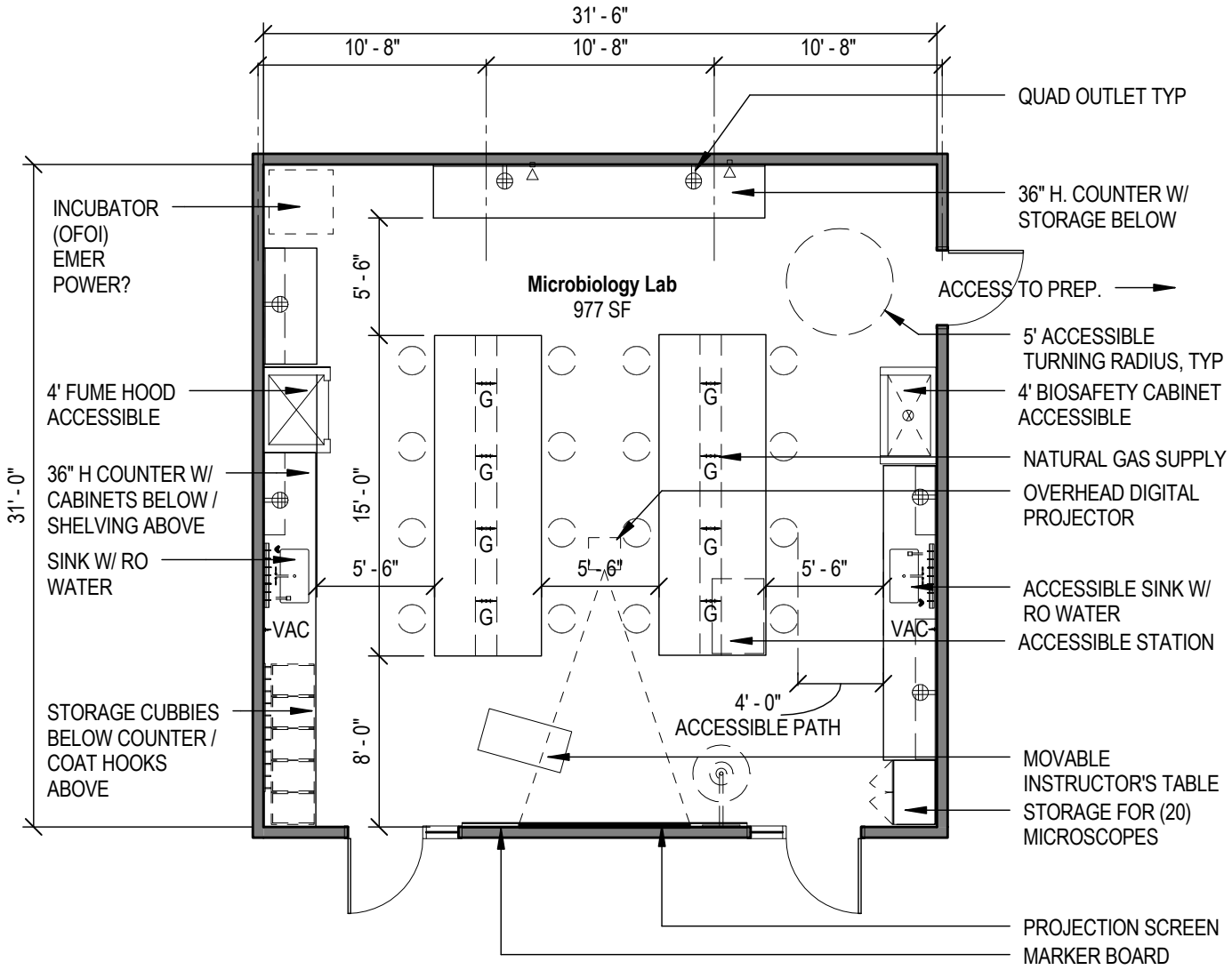
Equipment

DESCRIPTION	OFOI	SIZE W	SIZE D	SIZE H	SIZE Wt	ELECTRIC V	ELECTRIC AMP	ELECTRIC EM	PLUMBING	HEAT LOAD	NOTES
4'-0" FUME HOOD	?	4' - 0"	3' - 1 1/2"	12' - 0"	?	?	?	?	?		?
BSC6	?	4' - 6 5/16"	2' - 7 3/16"	7' - 11 5/16"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Microbiology Lab 1.14

Scale: 1/8" = 1'-0"



NOTE:
- TABLE CONFIG COULD BE MODELED AS (4) 4 STUDENT.
- HIGH QUALITY WATER NEEDED - MILLAPORE SYSTEM?
- NEED FOR BOTH 4' BSC + 4' F.H.

Room Data Sheet
1.20 Biology Research Lab

Department: Biology
Issue Date: 04/16/15

NCES Code: *210*

Area /Occupancy
Target Area : *650*
Actual Area : *641 SF* *
Occupants : *6*
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *No*
Desks: *No*
Chairs: *Stools*
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies
Proximity to Greenhouse

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Needed?*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *No?*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks: *N/A*
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

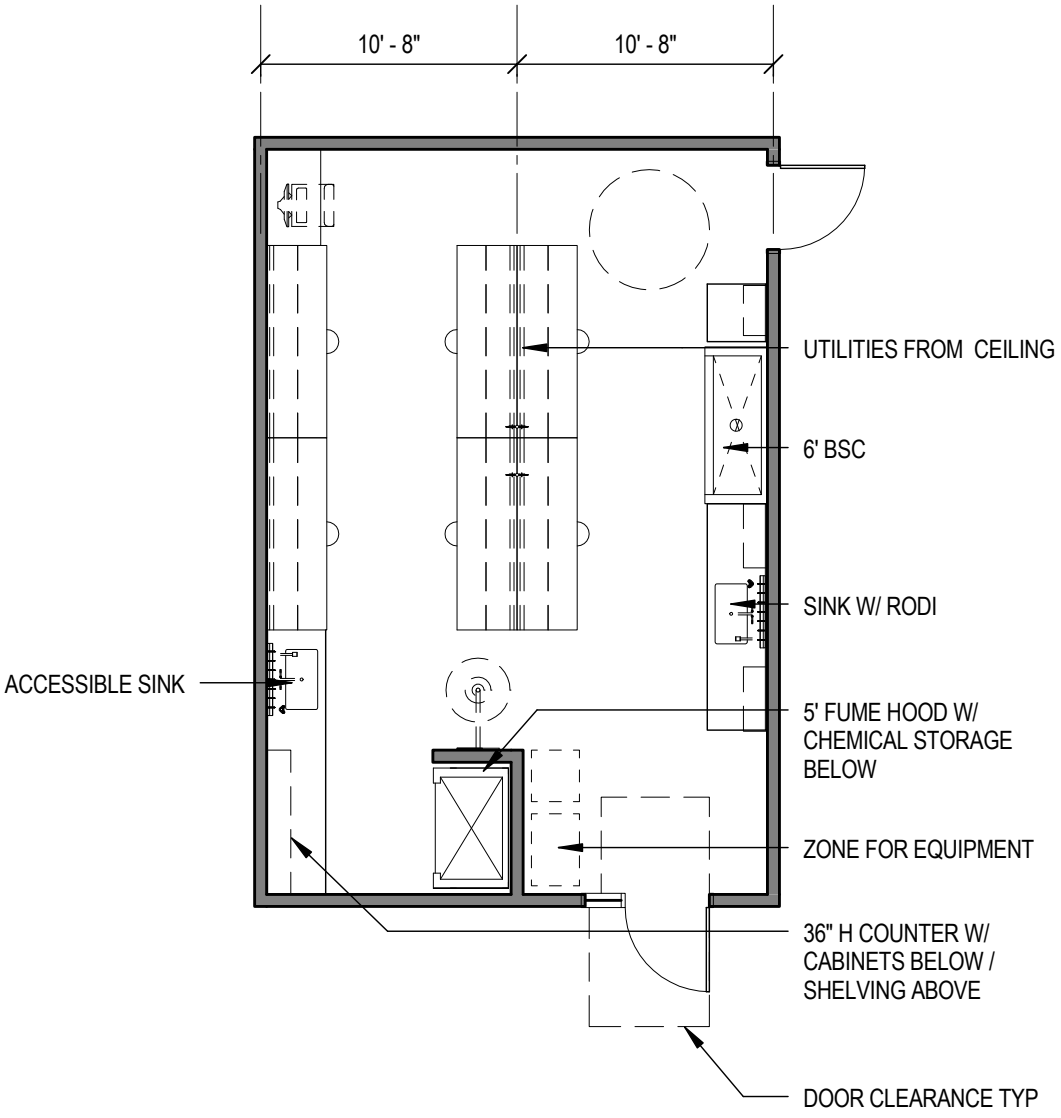
Equipment

DESCRIPTION	OFOI	SIZE W	SIZE D	SIZE H	SIZE Wt	ELECTRIC V	ELECTRIC AMP	ELECTRIC EM	PLUMBING	HEAT LOAD	NOTES
5'-0" FUME HOOD	?	5' - 0"	3' - 1 1/2"	11' - 4"	?	?	?	?	?		?
BSC6	?	6' - 6 5/16"	2' - 7 3/16"	7' - 11 5/16"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Biology Research Lab 1.20

Scale: 1/8" = 1'-0"



Room Data Sheet
1.21 SEM / Microscopy Suite

Department: Biology
Issue Date: 04/16/15

NCES Code: *250*

Area /Occupancy
Target Area : *835*
Actual Area : *835 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *No*
Desks: *No*
Chairs: *Yes*
Tables: *Yes*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste:
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching:

Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

Notes

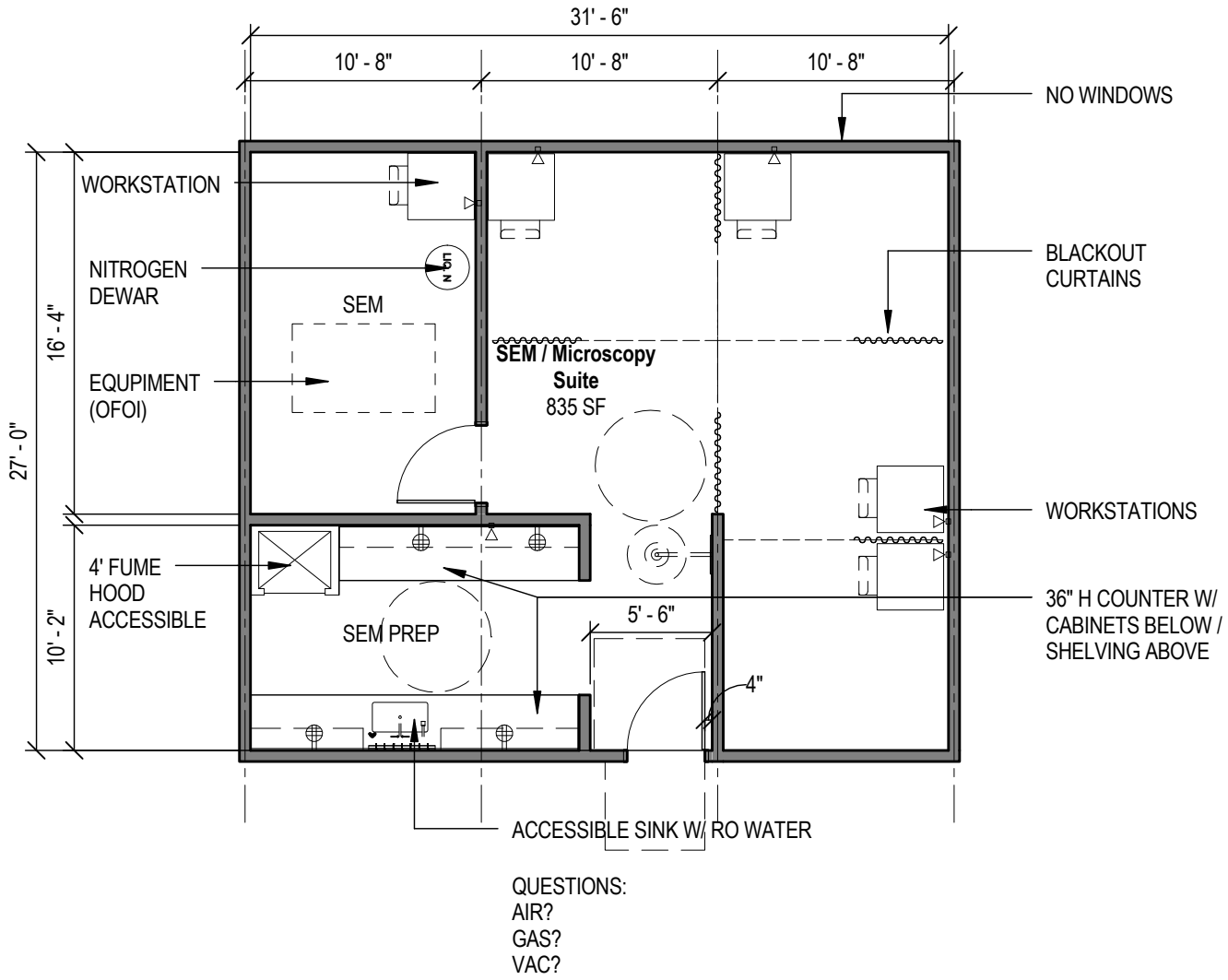
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			
4'-0" FUME HOOD	?	4' - 0"	3' - 1 1/2"	12' - 0"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

SEM / Microscopy Suite 1.21

Scale: 1/8" = 1'-0"



Room Data Sheet
1.30 Intro Bio Lab Prep

Department: Biology
Issue Date: 04/16/15

NCES Code: *215*

Area /Occupancy
Target Area : *850*
Actual Area : *851 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *Yes*
Desks: *No*
Chairs:
Tables: *No*
Files: *No*
White Boards: *No*
Tack Boards:
Other Furn:

Adjacencies
Proximity to Intro Bio Labs

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas: *Yes*
- Vacuum: *Yes*
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Neg to corridor / labs*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor: *No*
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

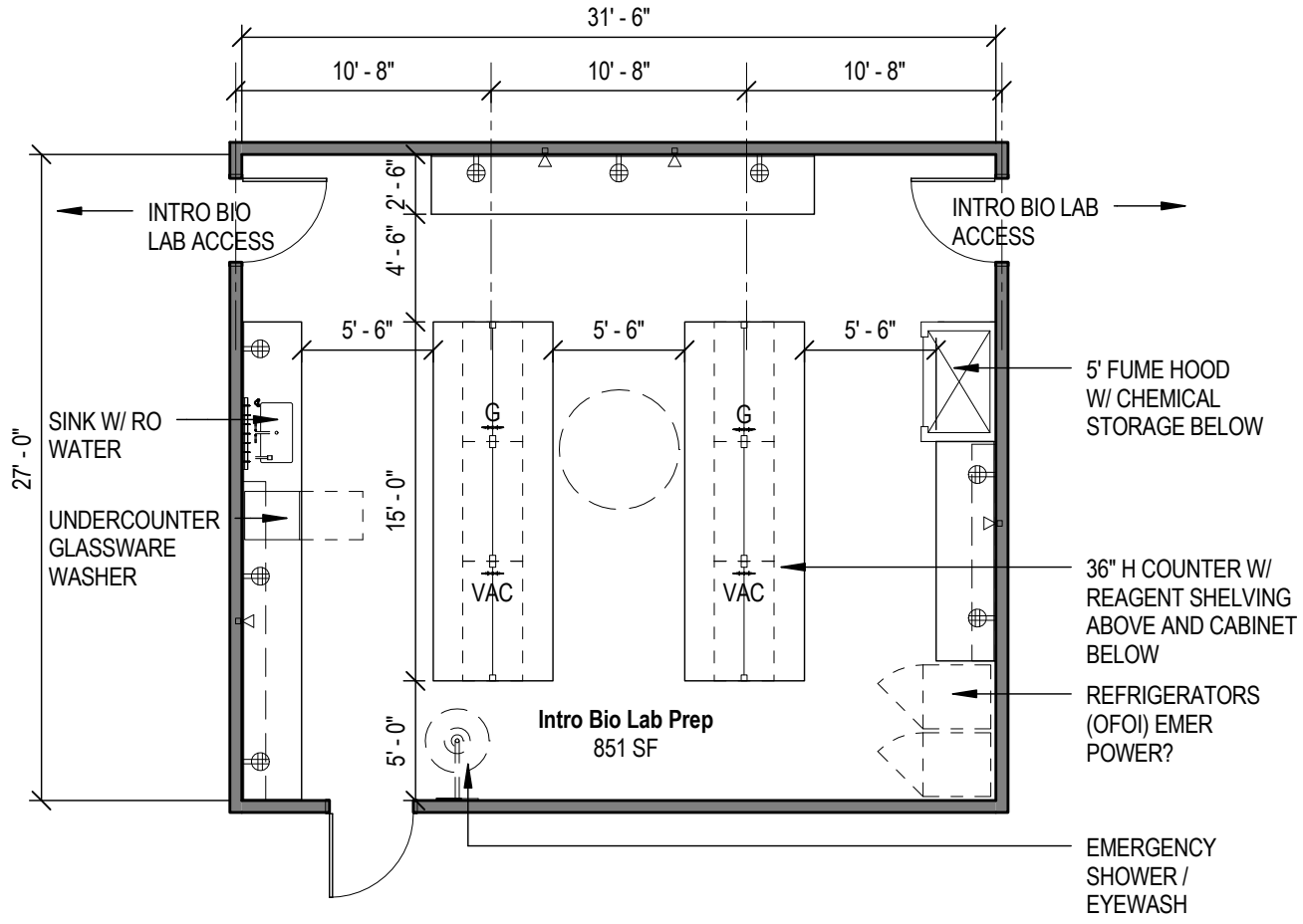
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			
5'-0" FUME HOOD	?	5' - 0"	3' - 1 1/2"	11' - 4"	?	?	?	?	?		?
GLASSWASHER	?	2' - 0 3/16"	2' - 3 1/2"	2' - 10"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Intro Bio Lab Prep 1.30

Scale: 1/8" = 1'-0"



Room Data Sheet
1.31 Ecology / Oceanography Prep

Department: Biology
Issue Date: 04/16/15

NCES Code: *215*

Area /Occupancy
Target Area : *280*
Actual Area : *275 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *No*
Desks: *No*
Chairs:
Tables: *No*
Files: *No*
White Boards: *No*
Tack Boards:
Other Furn:

Adjacencies
Direct adjacency to lab

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Neg to corridor / lab*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes?*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

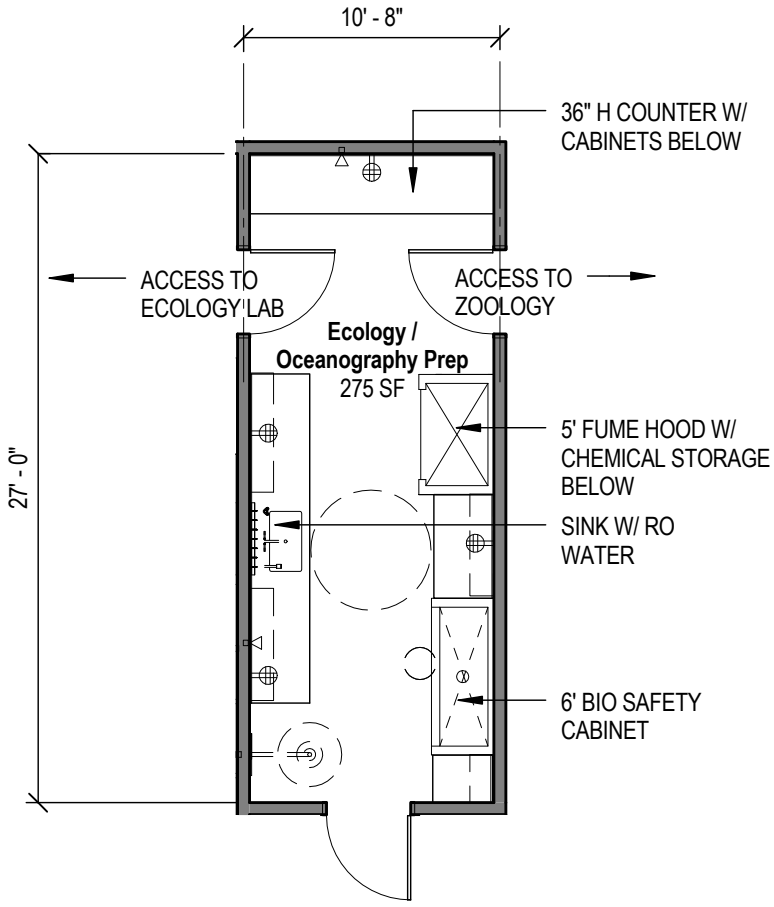
Equipment

DESCRIPTION	OFOI	SIZE W	SIZE D	SIZE H	Wt	ELECTRIC V	ELECTRIC AMP	ELECTRIC EM	PLUMBING	HEAT LOAD	NOTES
5'-0" FUME HOOD	?	5' - 0"	3' - 1 1/2"	11' - 4"	?	?	?	?	?		?
BSC6	?	~~6' - 6 5/16"~~	~~2' - 7 3/16"~~	~~7' - 11 5/16"~~	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Ecology / Oceanography Prep 1.31

Scale: 1/8" = 1'-0"



Room Data Sheet
1.32 Cell / Molecular Biology / Microbiology Prep

Department: Biology
Issue Date: 04/16/15
NCES Code: *215*

Area /Occupancy
Target Area : *280*
Actual Area : *275 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *No*
Desks: *No*
Chairs:
Tables: *No*
Files: *No*
White Boards: *No*
Tack Boards:
Other Furn:

Adjacencies
Direct adjacency to lab

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Neg to corridor / lab*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor: *No*
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

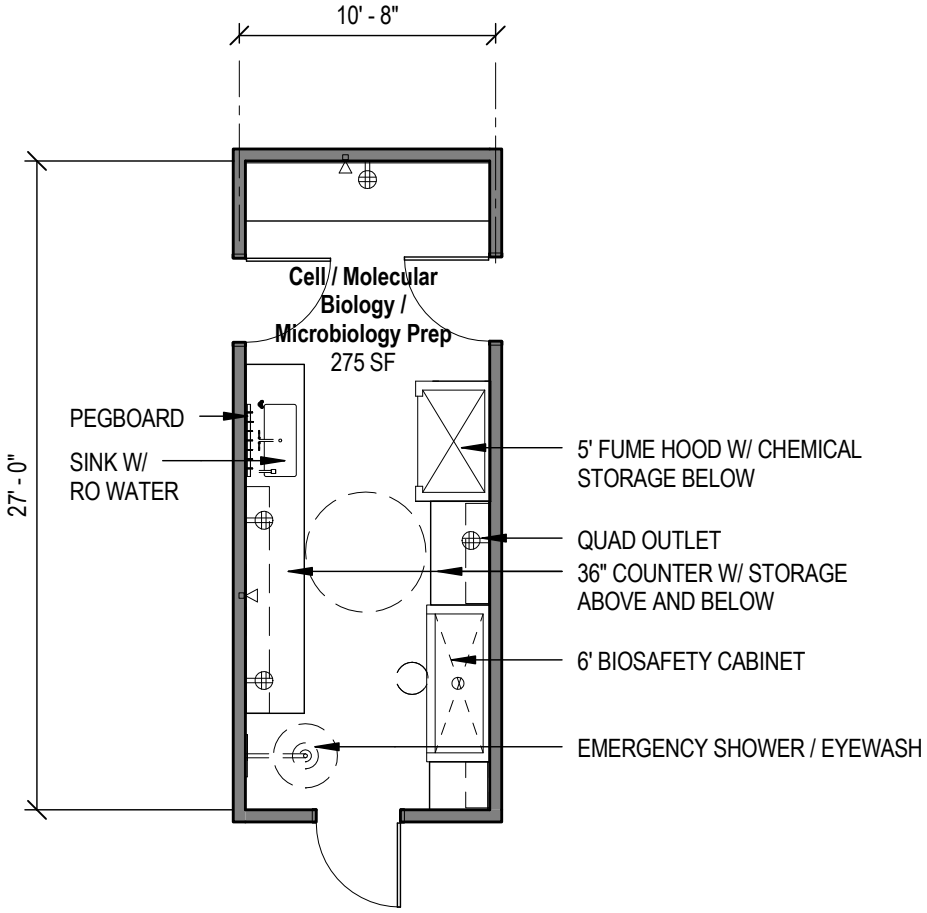
Equipment

DESCRIPTION	OFOI	SIZE W	SIZE D	SIZE H	SIZE Wt	ELECTRIC V	ELECTRIC AMP	ELECTRIC EM	PLUMBING	HEAT LOAD	NOTES
5'-0" FUME HOOD	?	5' - 0"	3' - 1 1/2"	11' - 4"	?	?	?	?	?		?
BSC6	?	~~6' - 6 5/16"~~	~~2' - 7 3/16"~~	~~7' - 11 5/16"~~	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Cell / Molecular Biology / Microbiology Prep 1.32

Scale: 1/8" = 1'-0"



Room Data Sheet
1.33 Tissue Culture

Department: Biology
Issue Date: 04/16/15

NCES Code: *215*

Area /Occupancy
Target Area : *280*
Actual Area : *275 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling:
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height:
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *No*
Desks:
Chairs:
Tables: *No*
Files: *No*
White Boards: *No*
Tack Boards:
Other Furn:

Adjacencies
Near Cell / Molecular Biology Lab

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *No*
Emer. Eyewash:
Emer. Station:
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor: *No*
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching:

Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

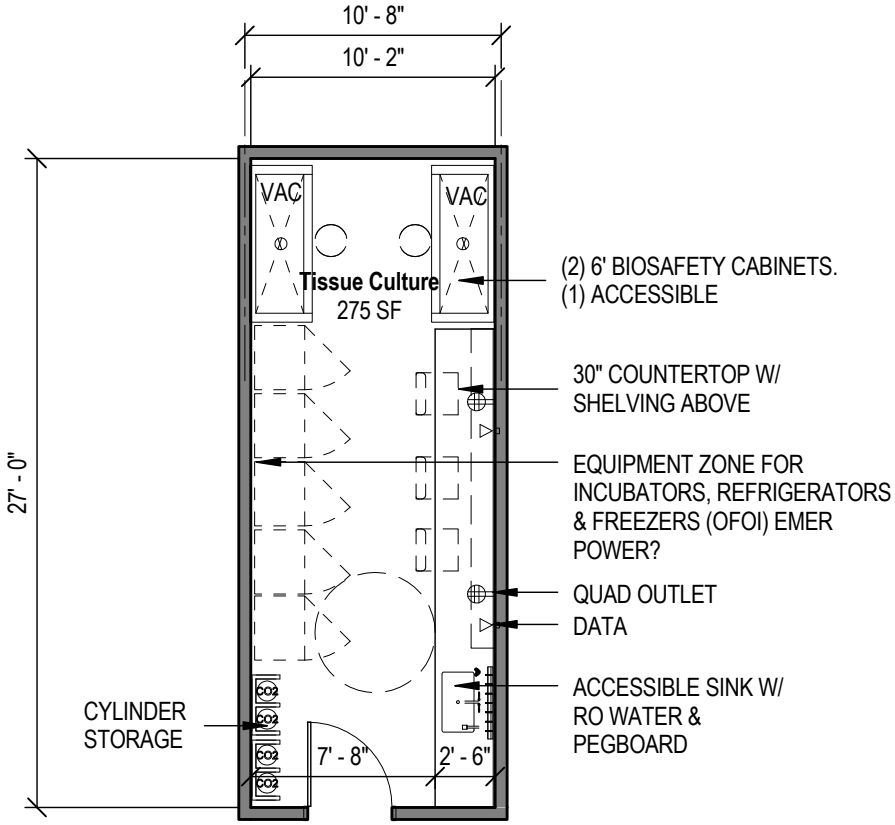
Equipment

DESCRIPTION	OFOI	SIZE W	SIZE D	SIZE H	SIZE Wt	ELECTRIC V	ELECTRIC AMP	ELECTRIC EM	PLUMBING	HEAT LOAD	NOTES
BSC6	?	6' - 6 5/16"	2' - 7 3/16"	7' - 11 5/16"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Tissue Culture 1.33

Scale: 1/8" = 1'-0"



Room Data Sheet
1.34 Incubator Room

Department: Biology
Issue Date: 04/16/15

NCES Code: *215*

Area /Occupancy
Target Area : *210*
Actual Area : *214 SF* *
Occupants : *N/A*
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling:
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat:
Proj. Screen: *No*
Desks: *No*
Chairs: *No*
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *No*
Pure Water:
Hot/Cold Water:
Floor Drain: *No*
Waste: *No*
Emer. Eyewash: *No*
Emer. Station: *No*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching:

Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

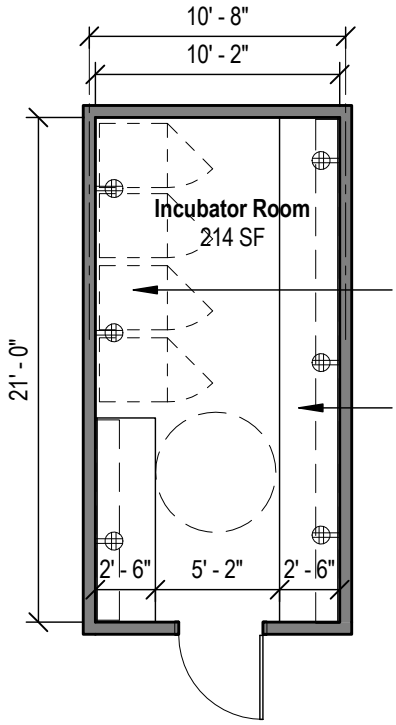
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Incubator Room 1.34

Scale: 1/8" = 1'-0"



INCUBATORS
EMER POWER,
OFOI

COUNTER W/
ADJUSTABLE
SHELVES ABOVE

QUESTION:
PROGRAMMATIC REQUEST, BUT
ARE NEEDS BEING MET BY TISSUE
CULTURE ROOM?

Room Data Sheet
1.35 Cold Room

Department: Biology
Issue Date: 04/16/15

NCES Code: *215*

Area /Occupancy
Target Area : *210*
Actual Area : *214 SF* *
Occupants : *N/A*
Quantity: *1*

* SF value is NASF

Architectural
Floor:
Base:
Walls:
Wall Finish:
Ceiling:
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Stainless Steel*
Base Cabinets: *Stainless Steel*
Counter Tops: *Stainless Steel*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *N/A*
Proj. Screen: *No*
Desks: *No*
Chairs: *No*
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Stainless Steel*
Pure Water:
Hot/Cold Water:
Floor Drain: *No*
Waste:
Emer. Eyewash:
Emer. Station:
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes:
Air Circulation:
Natural Vent: *No*
Pressure:
Temperature: *TBD*
Rel. Humidity:
Local Exhaust:
Air Filtration:
O2 Sensor:
Distribution:
Other HVAC:

Electrical
Power:
Features:
Elec. Outlets:
Illumination:
Fixtures: *LED*
Fixt. Mounting:
Occ. Sensors: *Yes*
Dim Switch:
Switching:

Task Light:
Emerg. Power:

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

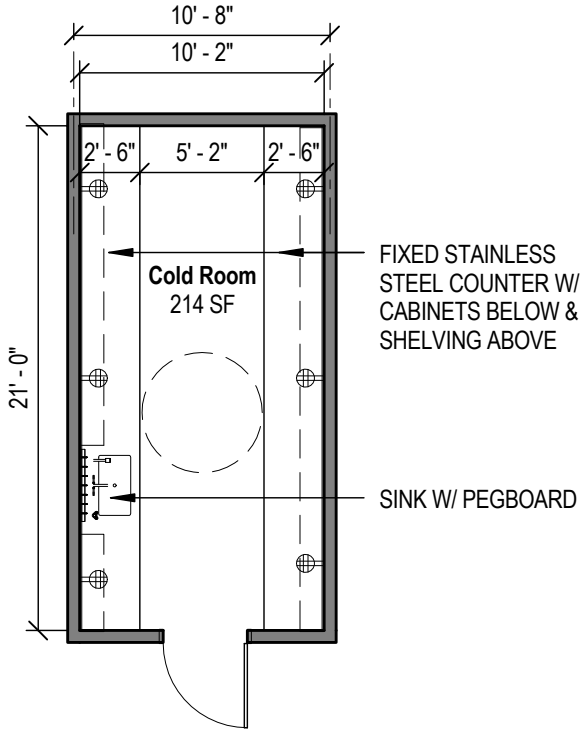
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Cold Room 1.35

Scale: 1/8" = 1'-0"



QUESTIONS:

- NEED TO DEFINE TEMPERATURE RANGE.
- SCALE OF COLD ROOM SEEMS LARGE FOR PROGRAMMATIC NEEDS

Room Data Sheet
1.40 Shared Office

Department: Bio / Chem
Issue Date: 04/16/15

NCES Code: *310*

Area /Occupancy
Target Area : *120*
Actual Area : *120 SF* *
Occupants : *2*
Quantity: *4*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling:
Ceiling Height:
Door Size: *3'-0" single leaf*

Casework
Wall Cabinets: *No*
Base Cabinets: *No*
Counter Tops: *No*
Counter Height: *No*
Shelving: *No*
Drawer Units: *No*

Furnishings
Window Treat:
Proj. Screen: *No*
Desks: *Yes*
Chairs: *Yes*
Tables: *?*
Files: *?*
White Boards: *Yes*
Tack Boards: *Yes*
Other Furn:

Adjacencies

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *No*
Pure Water: *No*
Hot/Cold Water: *No*
Floor Drain:
Waste:
Emer. Eyewash:
Emer. Station:
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *Ventilation req'ts only*
Air Circulation: *Air may be returned*
Natural Vent: *Yes, TBD*
Pressure: *Positive to corridor*
Temperature: *See below*
Rel. Humidity: *55% max, no min*
Local Exhaust: *N/A*
Air Filtration:
O2 Sensor: *No*
Distribution:
Other HVAC:

Electrical
Power:
Features:
Elec. Outlets:
Illumination:
Fixtures:
Fixt. Mounting:
Occ. Sensors:
Dim Switch:
Switching:

Task Light: *Yes*
Emerg. Power: *No*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

Notes
This room data sheets also applies to 2.40 Lab Technician Office for the Chemstry Department.
Cooling: occ 75 F, unocc 80F Heating: occ 70 F, unocc 65 F

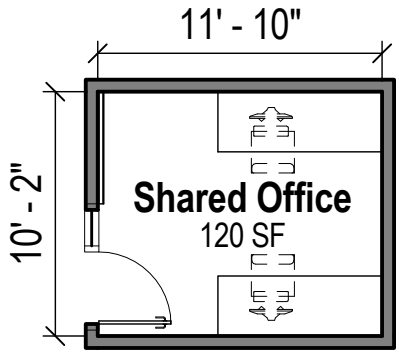
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Shared Office 1.40

Scale: 1/8" = 1'-0"



Room Data Sheet
1.50 Greenhouse

Department: Biology
Issue Date: 04/16/15

NCES Code: *580*

Area /Occupancy
Target Area : *1700*
Actual Area : *1042 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor:
Base:
Walls:
Wall Finish:
Ceiling: *N/A*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets:
Base Cabinets:
Counter Tops:
Counter Height:
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat:
Proj. Screen: *No*
Desks: *No*
Chairs: *No*
Tables: *No*
Files: *No*
White Boards:
Tack Boards:
Other Furn:

Adjacencies

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks:
Pure Water:
Hot/Cold Water:
Floor Drain: *Yes*
Waste:
Emer. Eyewash:
Emer. Station:
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes:
Air Circulation:
Natural Vent:
Pressure:
Temperature: *TBD*
Rel. Humidity:
Local Exhaust:
Air Filtration:
O2 Sensor:
Distribution:
Other HVAC:

Electrical
Power:
Features:
Elec. Outlets:
Illumination:
Fixtures: *LED*
Fixt. Mounting:
Occ. Sensors: *Yes*
Dim Switch:
Switching:

Task Light:
Emerg. Power:

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

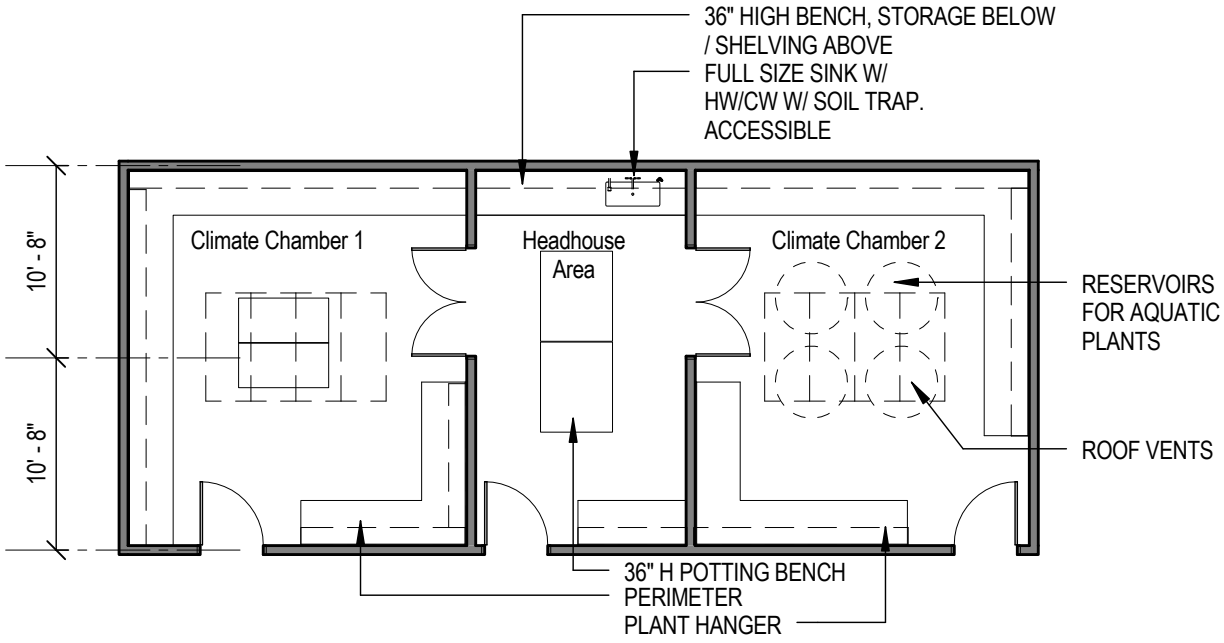
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Greenhouse 1.50

Scale: 3/32" = 1'-0"



QUESTIONS:

- NEED TO DEFINE 2 CLIMATE CHAMBERS.
- LIGHTS?
- MISTING?
- SHADING?
- TIMERS?

Room Data Sheet
2.10 General Chemistry Lab

Department: Chemistry & Physics
Issue Date: 04/16/15
NCES Code: *210*

Area /Occupancy
Target Area : *1300*
Actual Area : *1288 SF* *
Occupants : *24*
Quantity: *3*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36", UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *Yes*
Desks: *No*
Chairs: *Yes*
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *No*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas: *Yes*
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor: *No*
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

Notes **WATER:** IN GENERAL, CHEMISTRY NEEDS HIGH QUALITY WATER. MILLAPORE SYSTEM AT EACH LAB. GROUP LIKED THE IDEA OF A MORE CENTRALIZED SYSTEM AS IT'S EASIER TO MAINTAIN
AIR: GROUP LIKED THE IDEA OF BEING ABLE TO OPEN WINDOWS.
ARCHITECTURAL: REQUESTED 12"X12" VCT (NO LINOLEUM BECAUSE OF STAINING).

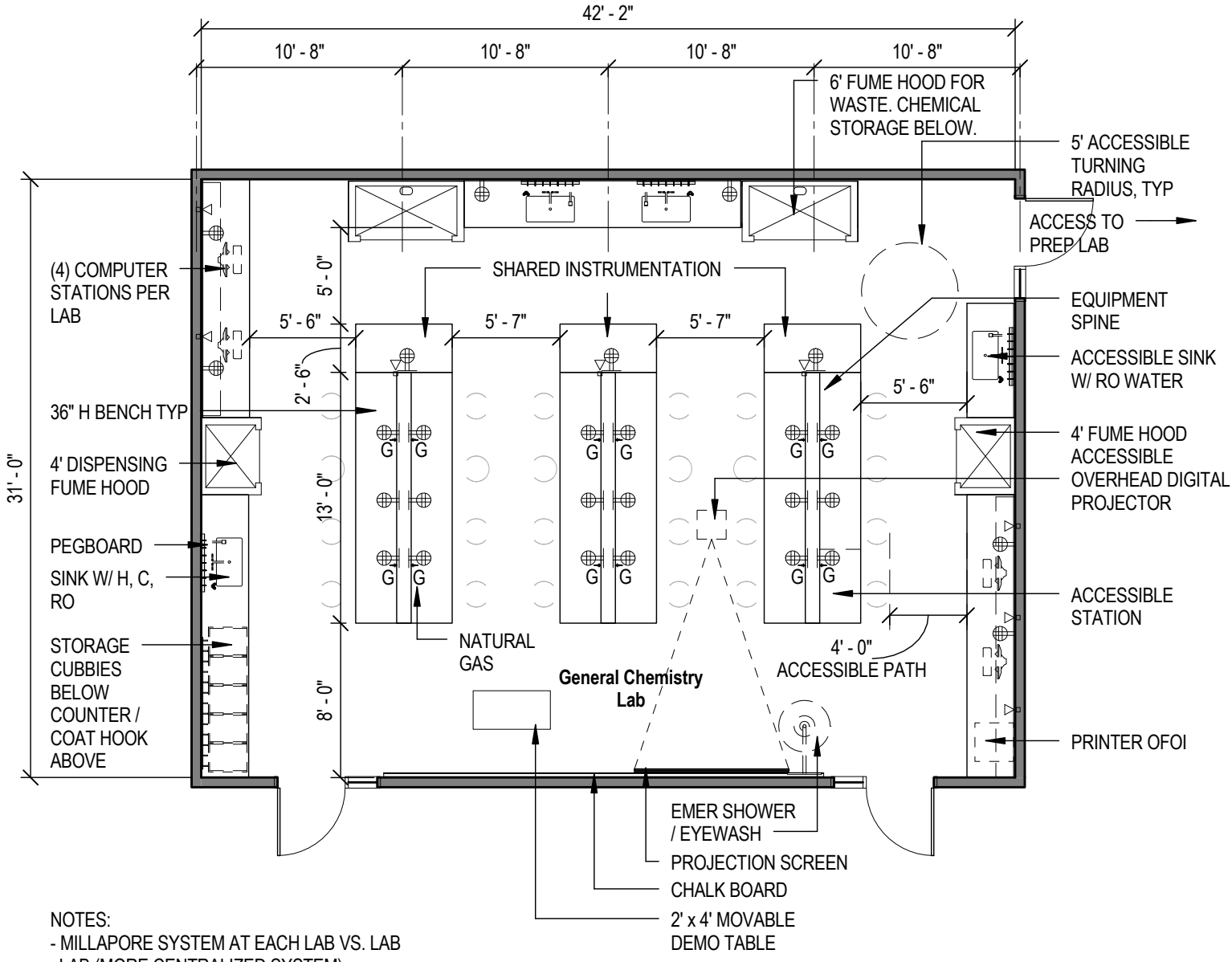
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			
4'-0" FUME HOOD	?	4' - 0"	3' - 1 1/2"	12' - 0"	?	?	?	?	?		?
6'-0" FUME HOOD	?	6' - 0"	3' - 1 1/2"	11' - 4"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

General Chemistry Lab 2.10

Scale: 1/8" = 1'-0"



NOTES:
- MILLAPORE SYSTEM AT EACH LAB VS. LAB LAB (MORE CENTRALIZED SYSTEM)
- ASKED ABOUT OPERABLE WINDOWS
- REQUESTED H2O AT BENCH WHERE STUDENTS WASH GLASSWARE
- CONCERN ABOUT SINKS FOR WASHING GLASSWARE
- OPTION: UNDERCOUNTER GLASSWARE WASHER. VERY RELIABLE STERIS/AMSCO
- SSU NOTED THAT NEW EQUIP LIKE U.C. DISHWARE WASHER NEEDS A SERVICE CONTRACT

Room Data Sheet
2.11 Organic Chemistry Lab

Department: Chemistry & Physics
Issue Date: 04/16/15
NCES Code: *210*

Area /Occupancy
Target Area : *1300*
Actual Area : *1307 SF* *
Occupants : *16*
Quantity: *2*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *Yes*
Desks: *No*
Chairs: *Yes*
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Needed?*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *No*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas: *Yes*
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor: *No*
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

Notes

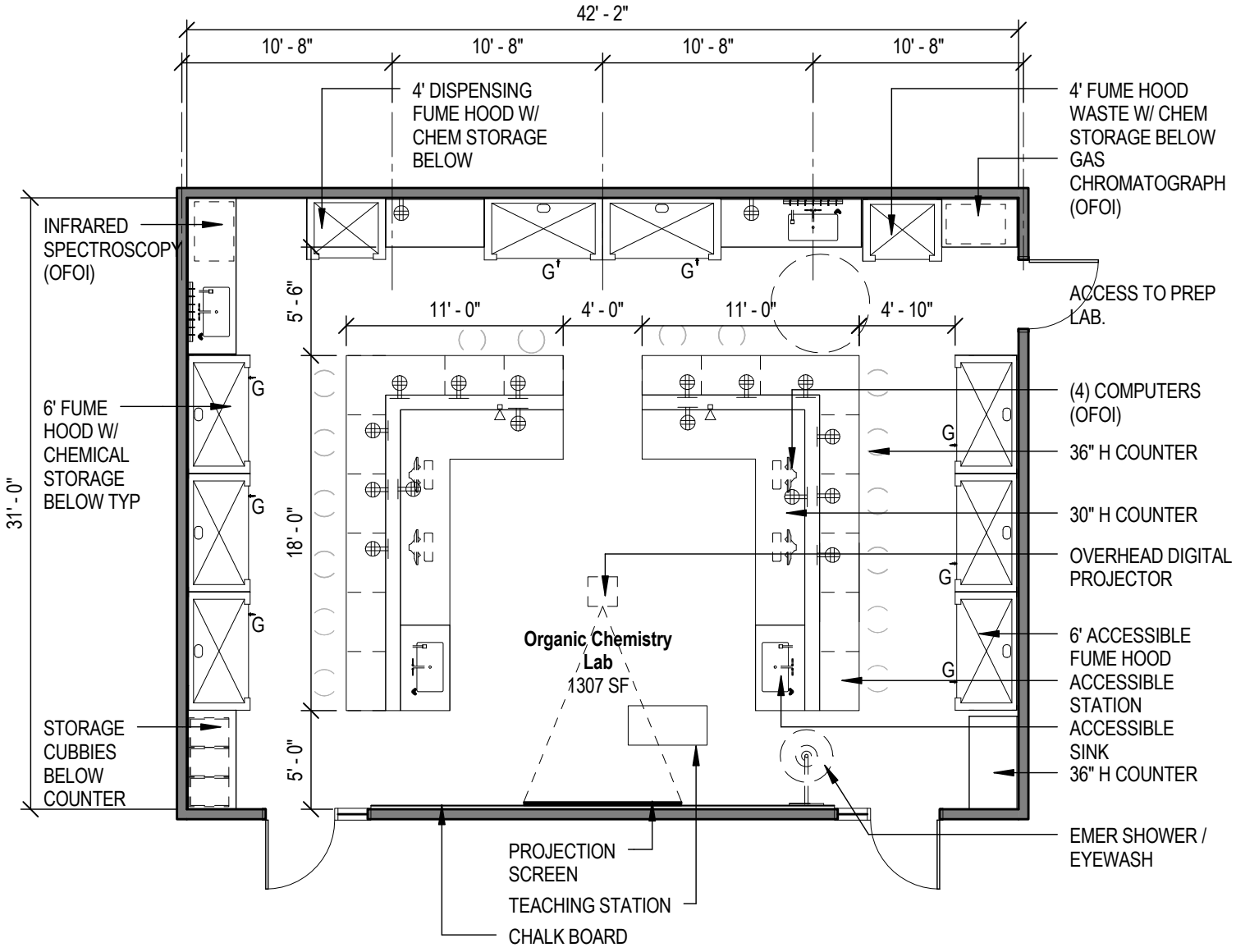
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			
6'-0" FUME HOOD	?	6' - 0"	3' - 1 1/2"	11' - 4"	?	?	?	?	?		8 hoods total
4'-0" FUME HOOD		?	4' - 0"	3' - 1 1/2"	12' - 0"	?	?	?	? ?		2 hoods total

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Organic Chemistry Lab 2.11

Scale: 1/8" = 1'-0"



NOTES:
- REQUEST: GAS + CUP SINK AT EVERY HOOD - DEPT WILL SEE IF NECESSARY FOR EVERY STUDENT HOOD
- NEED TO PLACE GC'S. THERE WILL BE 4/LAB

Room Data Sheet
2.12 P Chem Teaching Lab

Department: Chemistry & Physics
Issue Date: 04/16/15
NCES Code: *210*

Area /Occupancy
Target Area : *970*
Actual Area : *977 SF* *
Occupants : *16*
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height:
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *Yes*
Desks: *No*
Chairs: *Yes*
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies
Direct access to Instrumentation Labs

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *No*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas: *Yes*
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation:
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

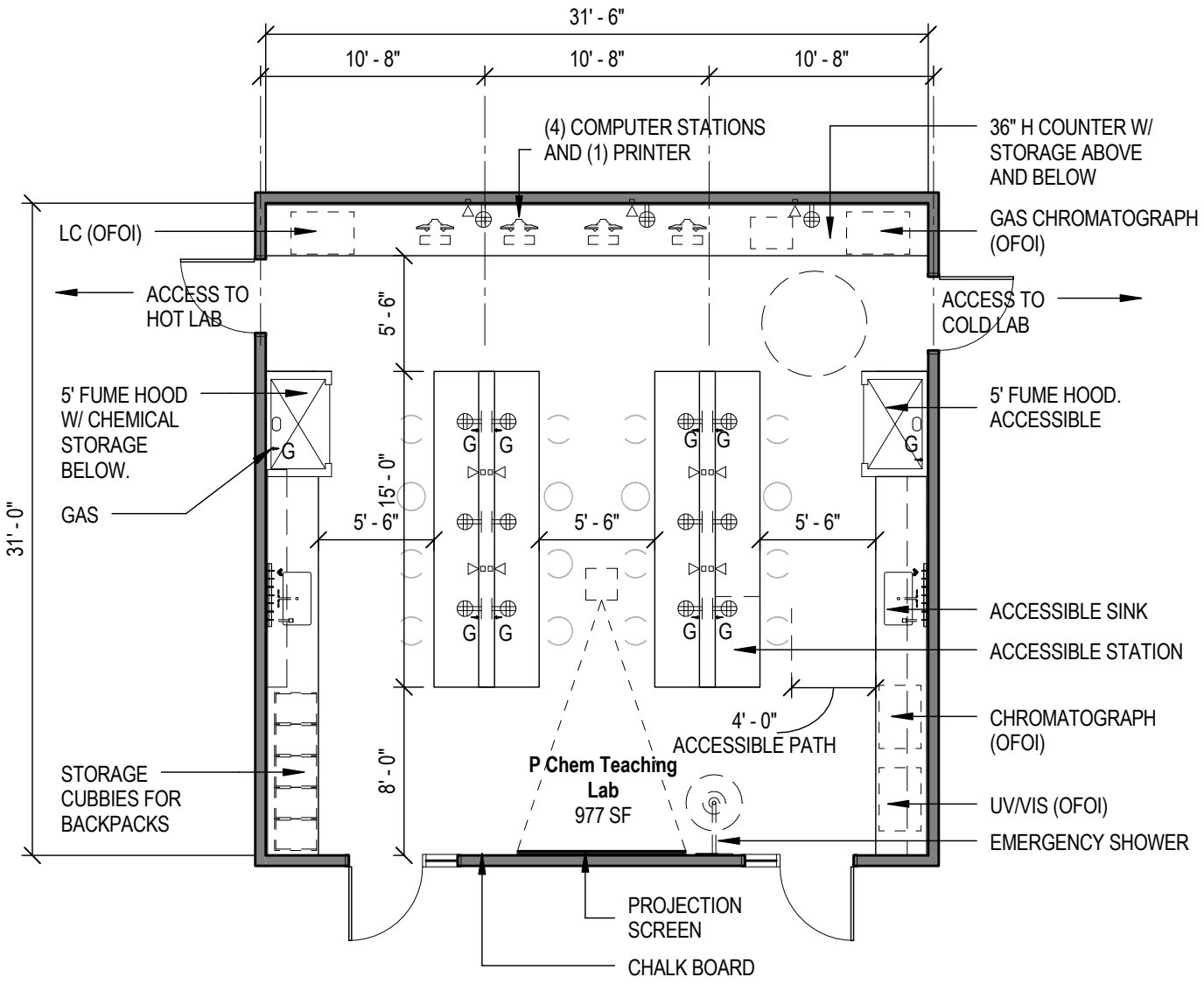
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			
6'-0" FUME HOOD	?	5' - 0"	3' - 1 1/2"	11' - 4"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

P Chem Teaching Lab 2.12

Scale: 1/8" = 1'-0"



Room Data Sheet
2.13 Instrumentation Lab

Department: Chemistry & Physics
Issue Date: 04/16/15
NCES Code: *250*

Area /Occupancy
Target Area : *275*
Actual Area : *977 SF* *
Occupants : *12*
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *Yes*
Desks: *No*
Chairs: *Stools*
Tables: *No*
Files: *No*
White Boards: *No*
Tack Boards:
Other Furn:

Adjacencies
Direct access to P Chem Lab and Bioscience Grant Lab

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

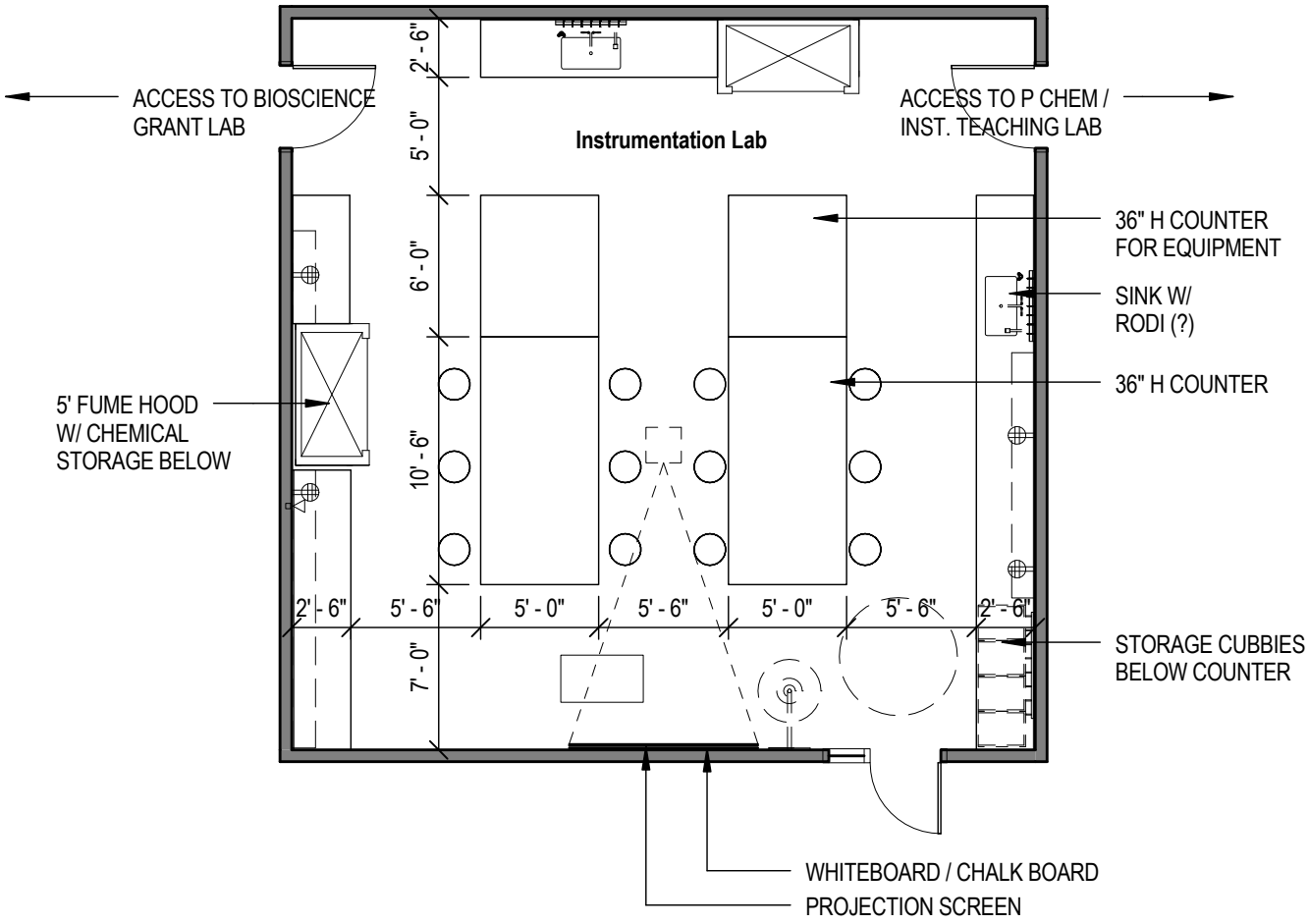
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Instrumentation Lab 2.13

Scale: 1/8" = 1'-0"



Room Data Sheet
2.14 Biochemistry Teaching Lab

Department: Chemistry & Physics
Issue Date: 04/16/15
NCES Code: *210*

Area /Occupancy
Target Area : *980*
Actual Area : *977 SF* *
Occupants : *16*
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Stainless Steel*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *Yes*
Desks: *No*
Chairs: *Stools*
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies
Proximity to Prep Space

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Needed?*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *No?*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

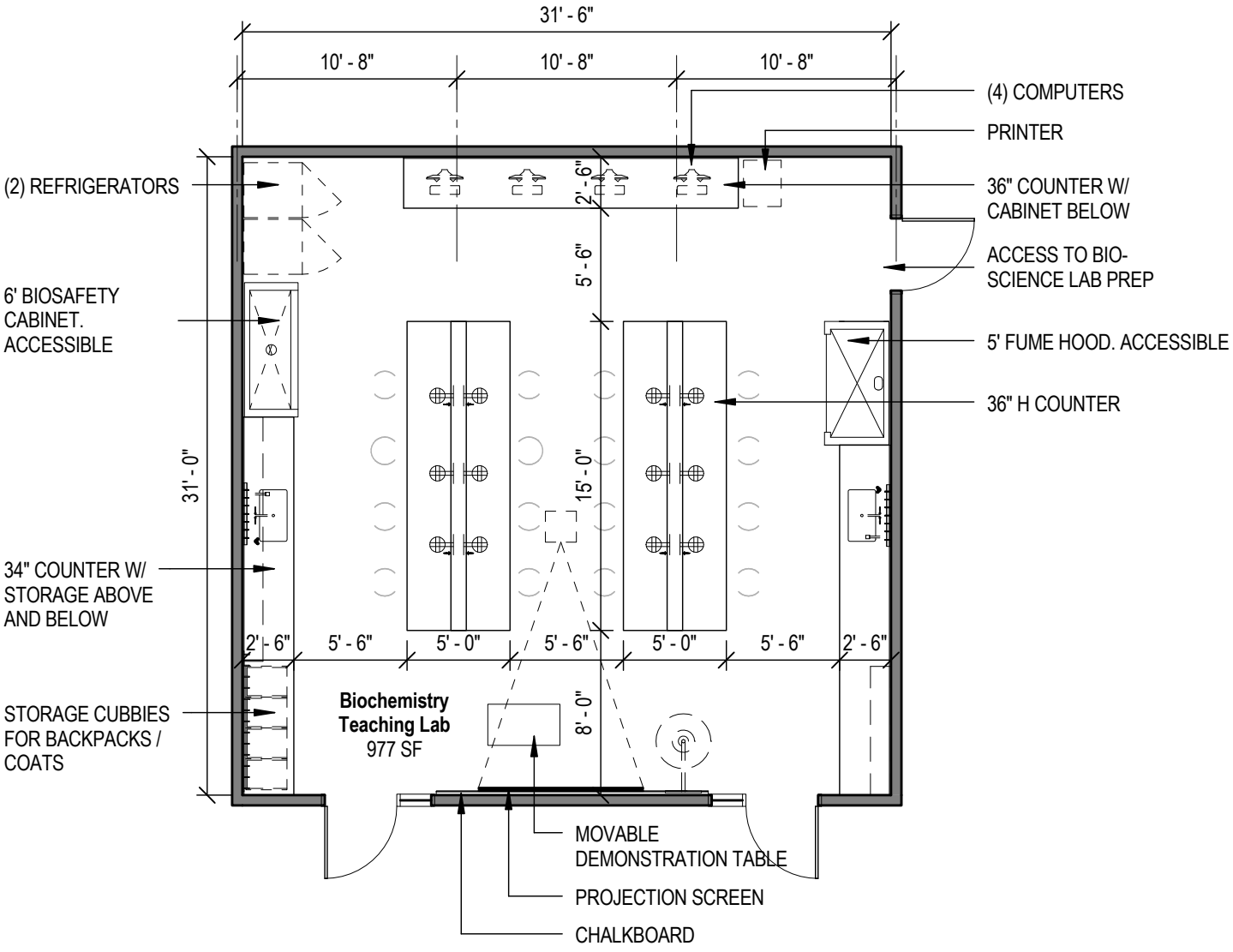
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Biochemistry Teaching Lab 2.14

Scale: 1/8" = 1'-0"



Room Data Sheet
2.20 Bio-Science Grant Lab

Department: Chemistry & Physics
Issue Date: 04/16/15
NCES Code: *250*

Area /Occupancy
Target Area : *275*
Actual Area : *646 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *No*
Desks: *No*
Chairs: *Stools*
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

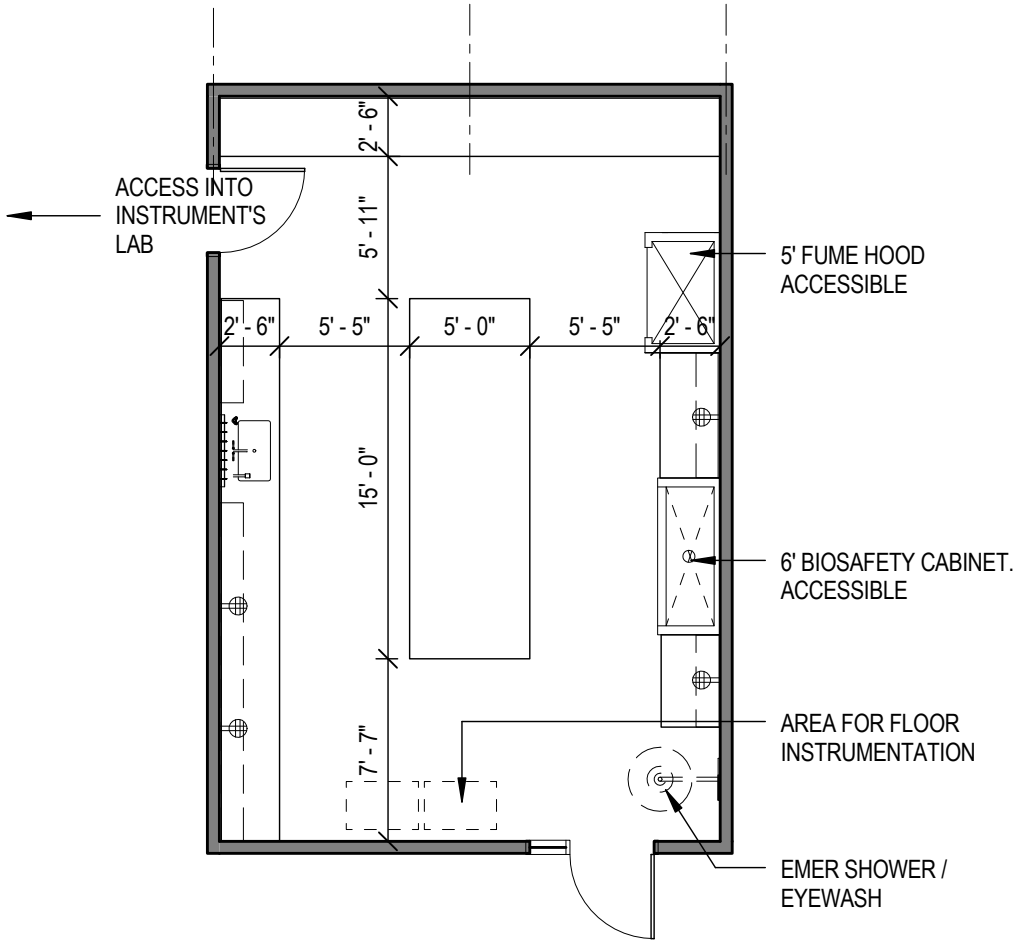
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Bio-Science Grant Lab 2.20

Scale: 1/8" = 1'-0"



Room Data Sheet
2.21 NMR

Department: Chemistry & Physics
Issue Date: 04/16/15
NCES Code: *250*

Area /Occupancy
Target Area : *250*
Actual Area : *250 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *No*
Desks:
Chairs:
Tables: *Yes*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *No*
Pure Water:
Hot/Cold Water:
Floor Drain: *No*
Waste:
Emer. Eyewash:
Emer. Station:
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation:
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting:
Occ. Sensors: *Yes*
Dim Switch:
Switching:

Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

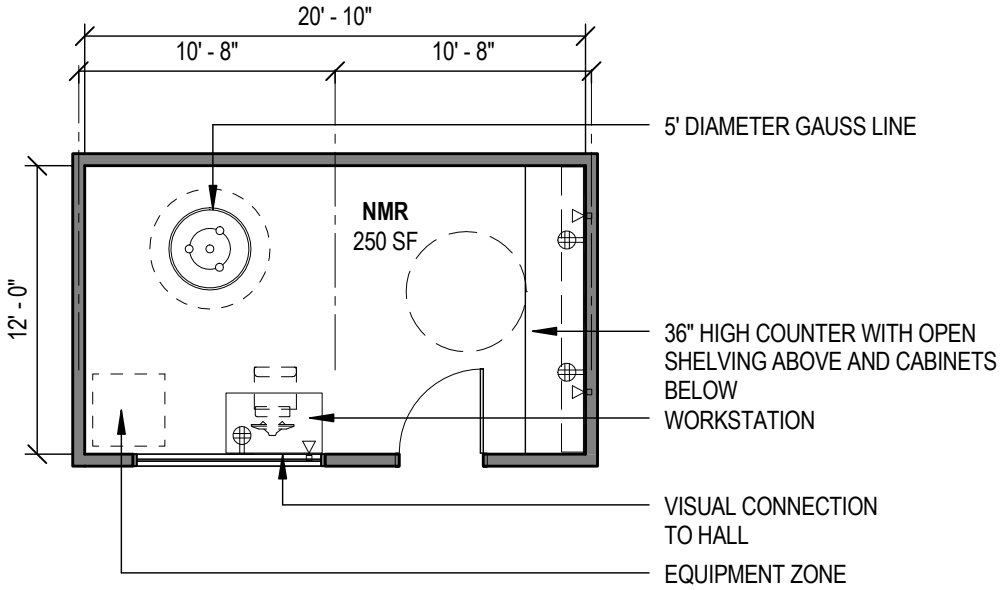
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			
600 NMR	?	3' - 0"	3' - 0"	8' - 0"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

NMR 2.21

Scale: 1/8" = 1'-0"



NOTES:
- NMR IS FAIRLY NEW. PURCHASED FROM SECONDARY VENDOR.
- DEPT BELIEVES IT'S SHIELDED. DEPT TO CONFIRM

Room Data Sheet
2.22 Chemistry Research Lab

Department: Chemistry & Physics
Issue Date: 04/16/15
NCES Code: *210*

Area /Occupancy
Target Area : *650*
Actual Area : *641 SF* *
Occupants : *6*
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *No*
Desks: *No*
Chairs: *Stools*
Tables: *Yes*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks:
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes?*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

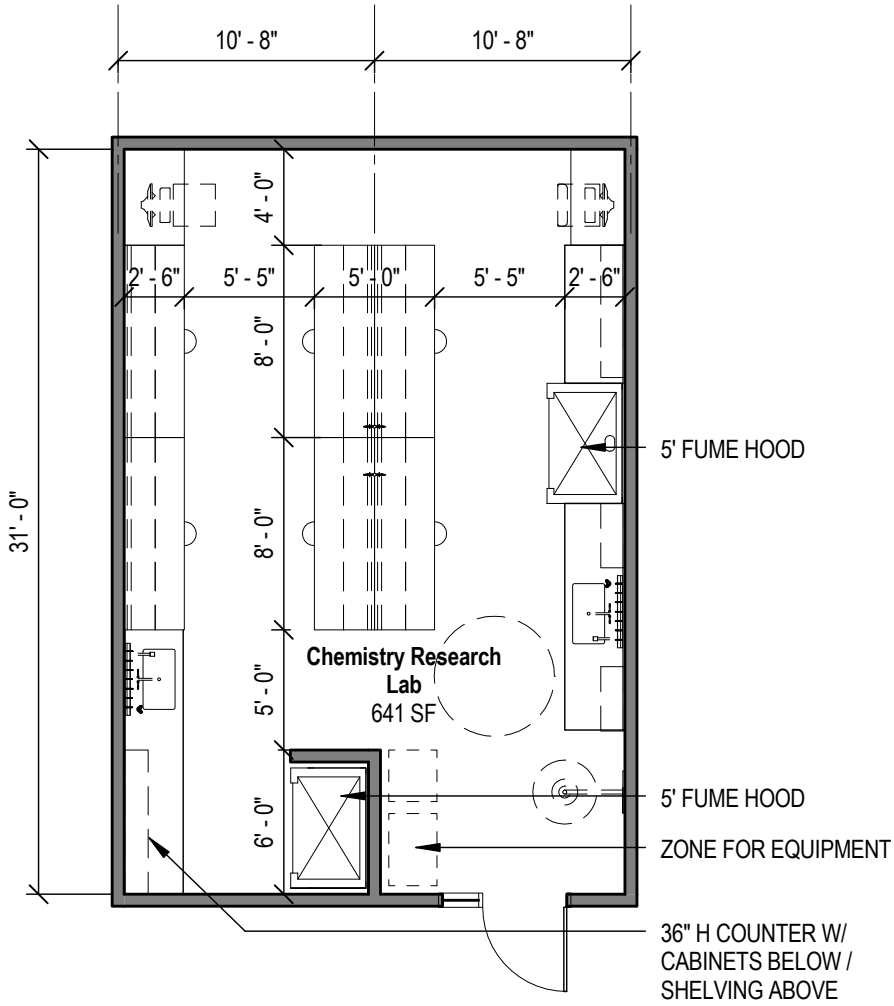
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Chemistry Research Lab 2.22

Scale: 1/8" = 1'-0"



NOTES:
- QUICK DISCONNECTS FOR UTILITIES AT CEILING
- 8' BENCH IS VERY GENEROUS. CAN DECREASE SIZE TO ACCOMMODATE MORE RESEARCH STATIONS
- CHEM DEPT TO COMMENT.

Room Data Sheet
2.30 General Chemistry Prep Lab

Department: Chemistry & Physics
Issue Date: 04/16/15
NCES Code: *215*

Area /Occupancy
Target Area : *850*
Actual Area : *850 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *No*
Desks: *No*
Chairs:
Tables: *No*
Files: *No*
White Boards: *Yes?*
Tack Boards: *Yes?*
Other Furn:

Adjacencies

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water:
Hot/Cold Water:
Floor Drain: *No*
Waste:
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation:
Natural Vent: *No*
Pressure: *Neg to corridor / lab*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

Notes

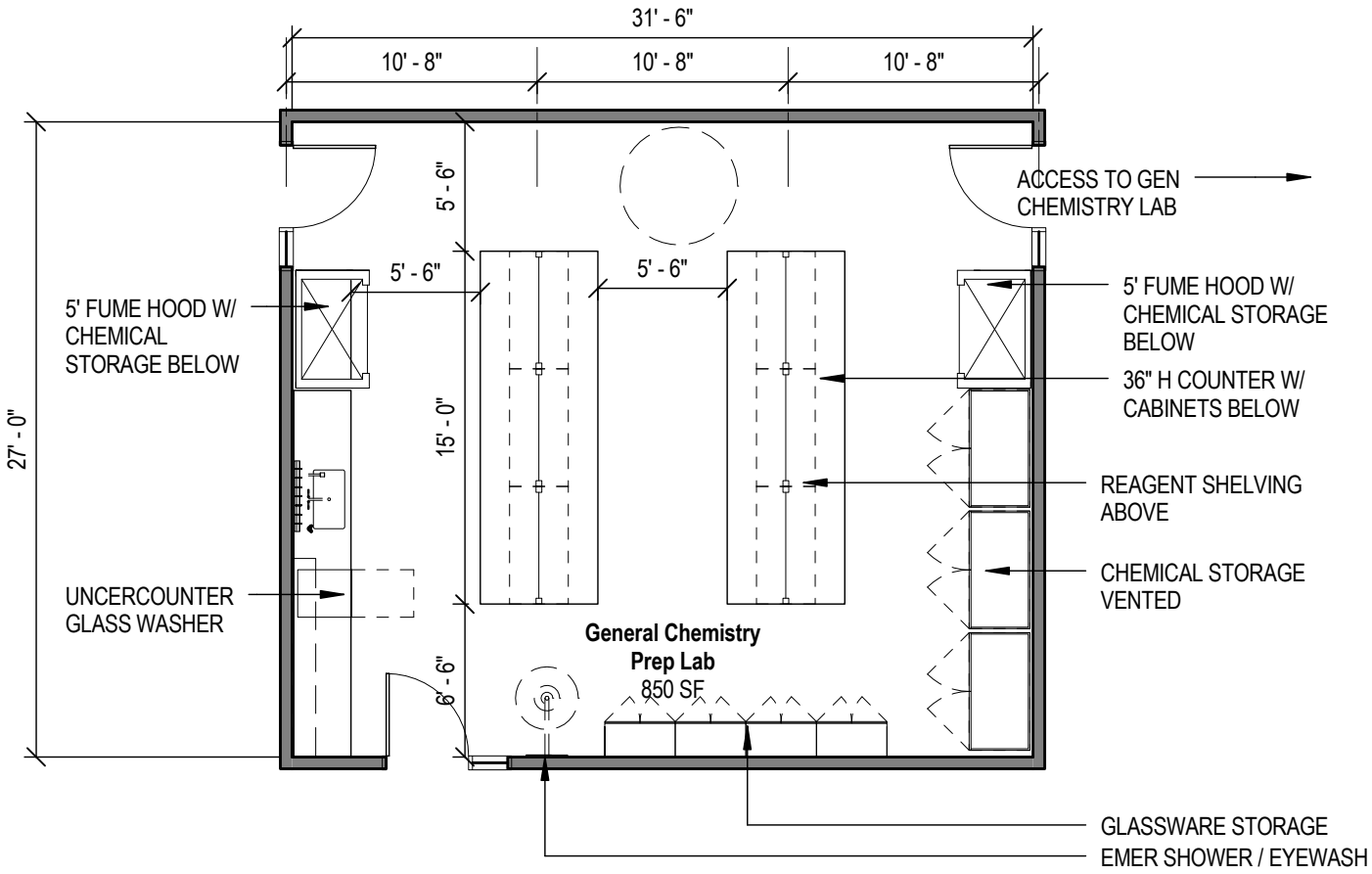
Equipment

DESCRIPTION	OFOI	SIZE W	SIZE D	SIZE H	SIZE Wt	ELECTRIC V	ELECTRIC AMP	ELECTRIC EM	PLUMBING	HEAT LOAD	NOTES
5'-0" FUME HOOD	?	5' - 0"	3' - 1 1/2"	11' - 4"	?	?	?	?	?		?
GLASSWASHER	?	2' - 0 3/16"	2' - 3 1/2"	2' - 10"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

General Chemistry Prep Lab 2.30

Scale: 1/8" = 1'-0"



NOTES:
- IF UNDERCOUNTER GLASSWARE WASHER IS IN LAB, IS IT NEEDED IN PREP?
- (2) F.H. COUNT CORRECT?
- LOCATION FOR WHITEBOARD OR TACKBOARD?

Room Data Sheet
2.31 Organic Chemistry Prep

Department: Chemistry & Physics
Issue Date: 04/16/15
NCES Code: *215*

Area /Occupancy
Target Area : *320*
Actual Area : *646 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height:
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *No*
Desks: *No*
Chairs:
Tables: *No*
Files: *No*
White Boards: *Yes*
Tack Boards: *Yes*
Other Furn:

Adjacencies
Direct adjacency to Organic Chem Lab

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water:
Hot/Cold Water:
Floor Drain: *No*
Waste:
Emer. Eyewash:
Emer. Station:
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Neg to corridor / lab*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

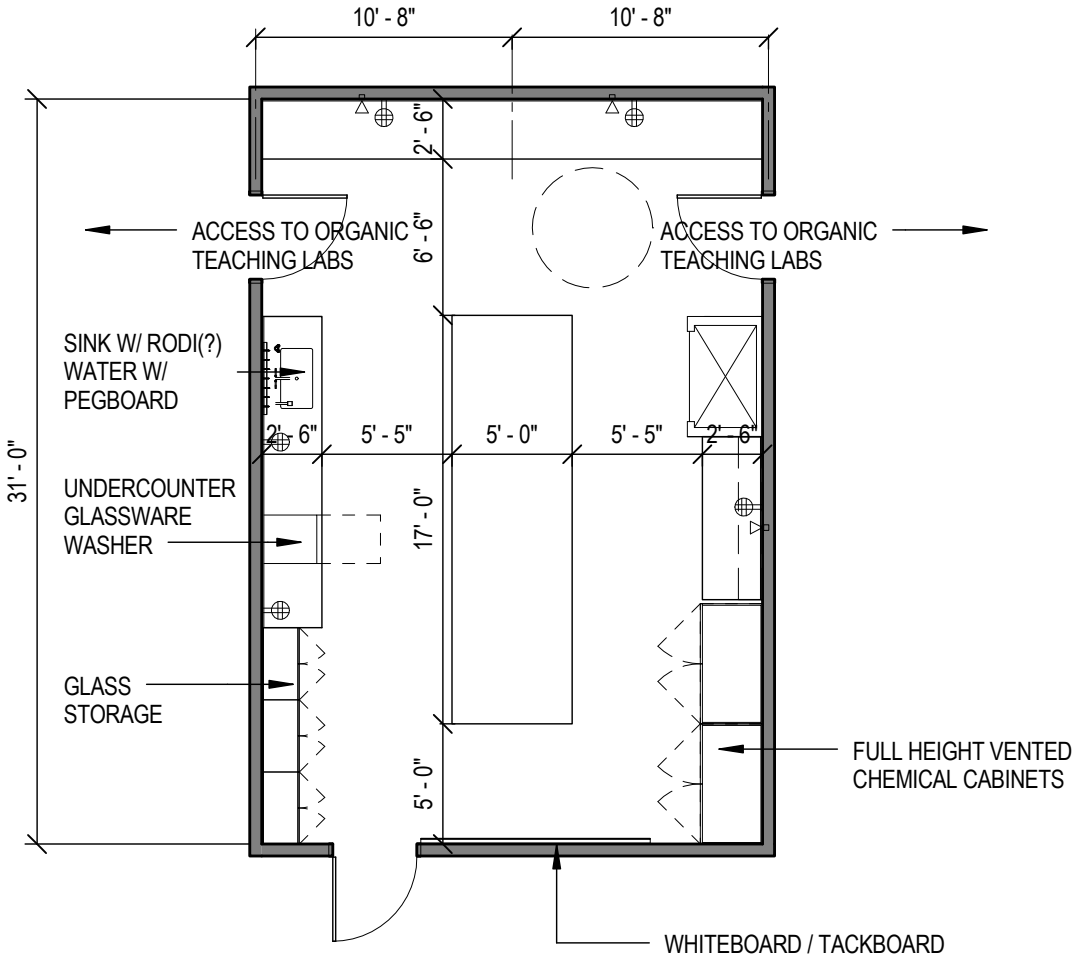
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Organic Chemistry Prep 2.31

Scale: 1/8" = 1'-0"



Room Data Sheet
2.32 P Chem Prep

Department: Chemistry & Physics
Issue Date: 04/16/15
NCES Code: *215*

Area /Occupancy
Target Area : *275*
Actual Area : *275 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height:
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *No*
Desks: *No*
Chairs:
Tables: *No*
Files: *No*
White Boards: *No*
Tack Boards: *Yes*
Other Furn:

Adjacencies
Direct Access to P Chem Lab

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Yes*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Neg to corridor / lab*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

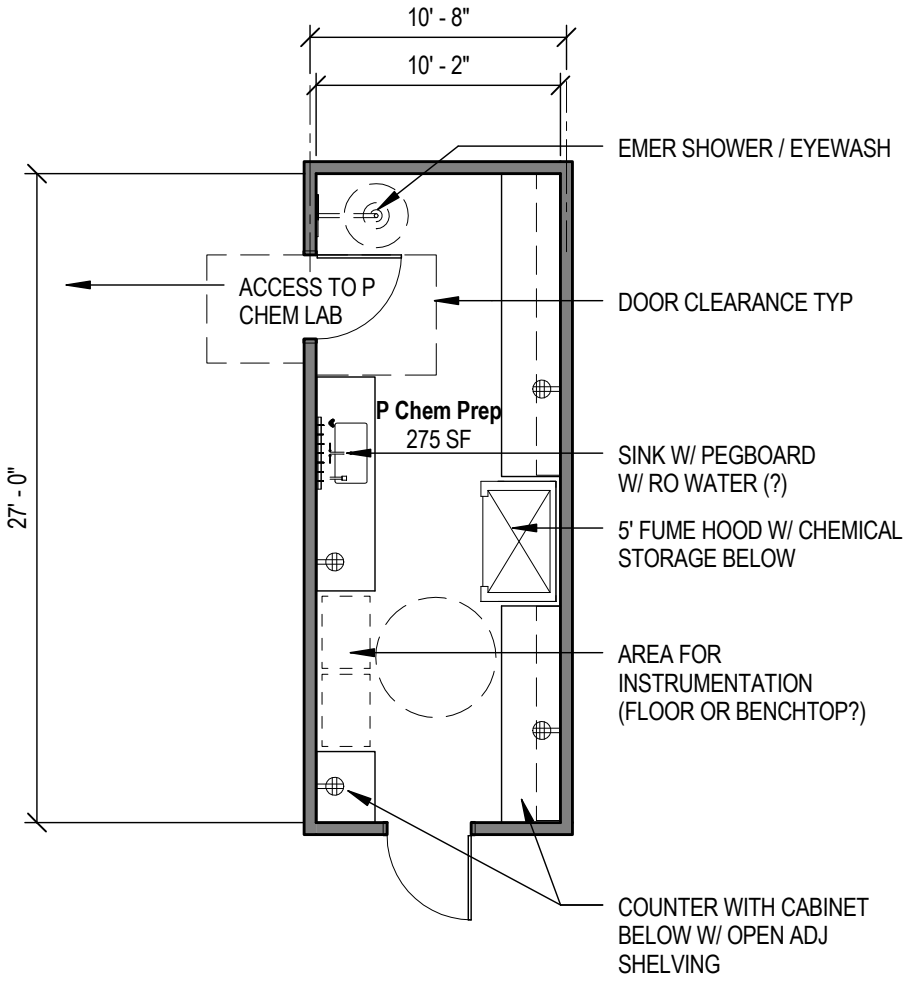
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			
5'-0" FUME HOOD	?	5' - 0"	3' - 1 1/2"	11' - 4"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

P Chem Prep 2.32

Scale: 1/8" = 1'-0"



Room Data Sheet
2.33 Teaching Area

Department: Chemistry & Physics
Issue Date: 04/16/15

NCES Code: *250*

Area /Occupancy
Target Area : *275*
Actual Area : *311 SF* *
Occupants : *12*
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height:
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *Yes*
Desks: *No*
Chairs: *Yes*
Tables: *Yes*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies
Direct Access to P Chem Lab

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Yes*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *Ventilation req'ts only*
Air Circulation: *Air my be returned*
Natural Vent: *No*
Pressure: *Positive to corridor*
Temperature: *cool:75F occ, heat:70F occ*
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor: *Yes*
Distribution:
Other HVAC:

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

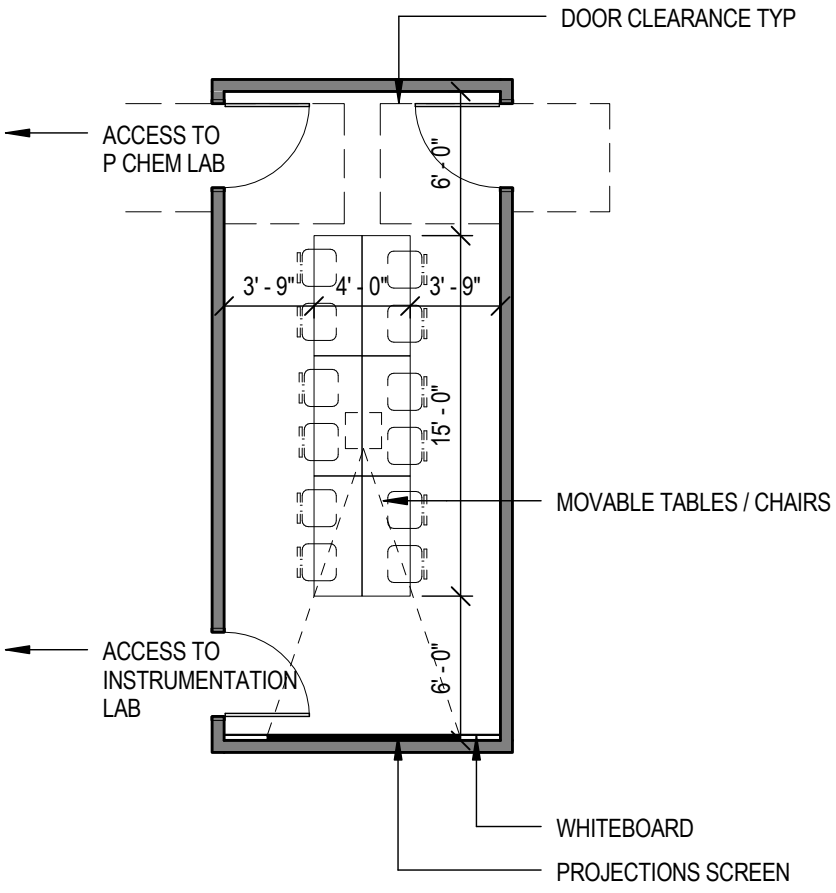
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Teaching Area 2.33

Scale: 1/8" = 1'-0"



Room Data Sheet
2.45 Chem Waste Storage

Department: Chemistry & Physics
Issue Date: 04/16/15
NCES Code: *730*

Area /Occupancy
Target Area : *250*
Actual Area : *250 SF* *
Occupants : *N/A*
Quantity: *1 or 2*

* SF value is NASF

Architectural
Floor:
Base:
Walls:
Wall Finish:
Ceiling:
Ceiling Height:
Door Size:

Casework
Wall Cabinets:
Base Cabinets:
Counter Tops:
Counter Height:
Shelving:
Drawer Units:

Furnishings
Window Treat: *N/A*
Proj. Screen:
Desks:
Chairs:
Tables:
Files:
White Boards:
Tack Boards:
Other Furn:

Fire Protection
FP System:
FP Detection:

Plumbing
Sinks:
Pure Water:
Hot/Cold Water:
Floor Drain:
Waste:
Emer. Eyewash:
Emer. Station:
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *N/A*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity:
Local Exhaust:
Air Filtration:
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination:
Fixtures:
Fixt. Mounting:
Occ. Sensors:
Dim Switch:
Switching:

Task Light:
Emerg. Power:

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

Adjacencies
Smaller chem waste can be on Chemistry Lab Level. Larger one should be on level with loading dock.

Notes

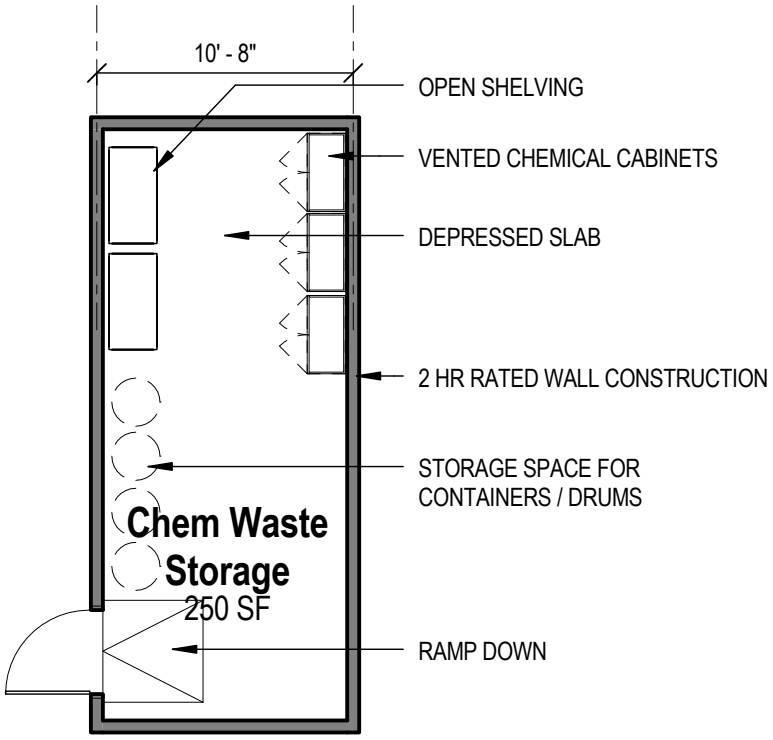
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Chem Waste Storage 2.45

Scale: 1/8" = 1'-0"



Room Data Sheet
3.10 Geology Intro Lab

Department: Geology
Issue Date: 04/16/15

NCES Code: *210*

Area /Occupancy

Target Area : *1300*
Actual Area : *1307 SF* *
Occupants : *24*
Quantity: *1*

* SF value is NASF

Architectural

Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework

Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36", UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings

Window Treat: *Light Filtering or as noted*
Proj. Screen: *Yes*
Desks: *No*
Chairs: *Yes*
Tables: *Yes*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies

Notes

Fire Protection

FP System: *Yes*
FP Detection: *Yes*

Plumbing

Sinks: *Epoxy*
Pure Water: *No*
Hot/Cold Water:
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
Comp. Air:
Lab Gas:
Vacuum:
CO^2:
Nitrogen:
Oxygen:
Other Gas:

HVAC

Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor: *No*
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical

Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *No*

Communications

Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements

Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

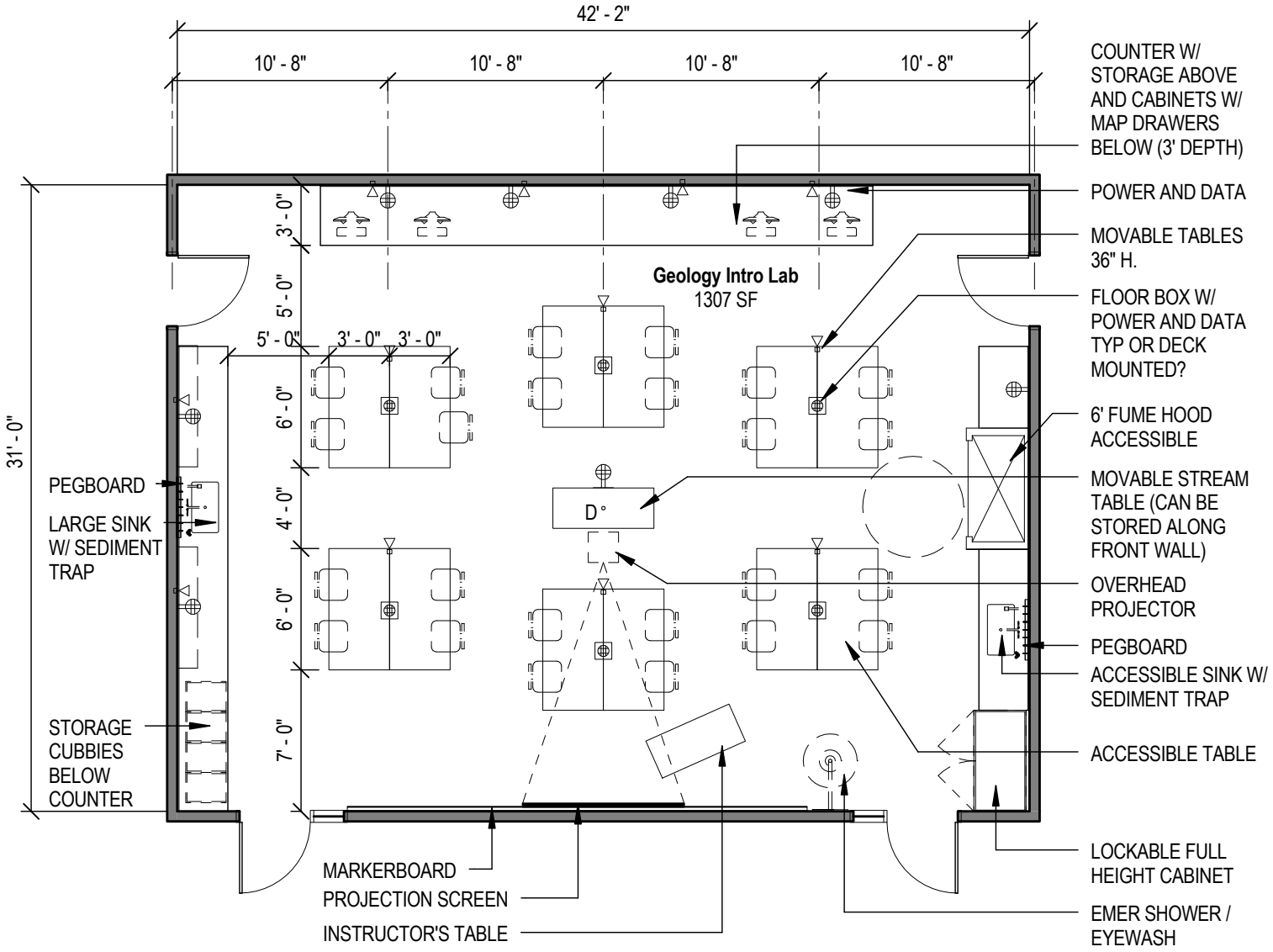
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			
6'-0" FUME HOOD	?	6' - 0"	3' - 1 1/2"	11' - 4"	?	?	?	?	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Geology Intro Lab 3.10

Scale: 1/8" = 1'-0"



NOTES:
- STORAGE FOR ROCKS?
- DEPT TO SEND PAI L.F. OF SHELVING NEEDED FOR ROCKS.
TEACHING STATION - REQUESTS DOC CAM. NEEDS TO BE BIG ENOUGH FOR COMPUTER, ETC.
- STREAM TABLE IS SELF CONTAINED. NEEDS POWER SOURCE TO RUN PUMP. NEEDS DRAIN AFTER DEMO TO DRAIN WATER.

NOTES FOR LOADING DOCK PERTAINED TO GEOLOGY DEPT:
- POWER
- HOSE SPIGOTS (BIBS) - HOSE OFF PONTOON BOATS
- NEEDS HT CLEARANCE FOR STD BOX TRUCK

Room Data Sheet
3.20 Sediment Lab

Department: Geology
Issue Date: 04/16/15

NCES Code: *215*

Area /Occupancy
Target Area : *650*
Actual Area : *646 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height:
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *No*
Desks: *No*
Chairs: *No*
Tables: *No*
Files: *No*
White Boards: *No*
Tack Boards:
Other Furn:

Adjacencies
Proximity to Analytical Lab

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust: *Yes*
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

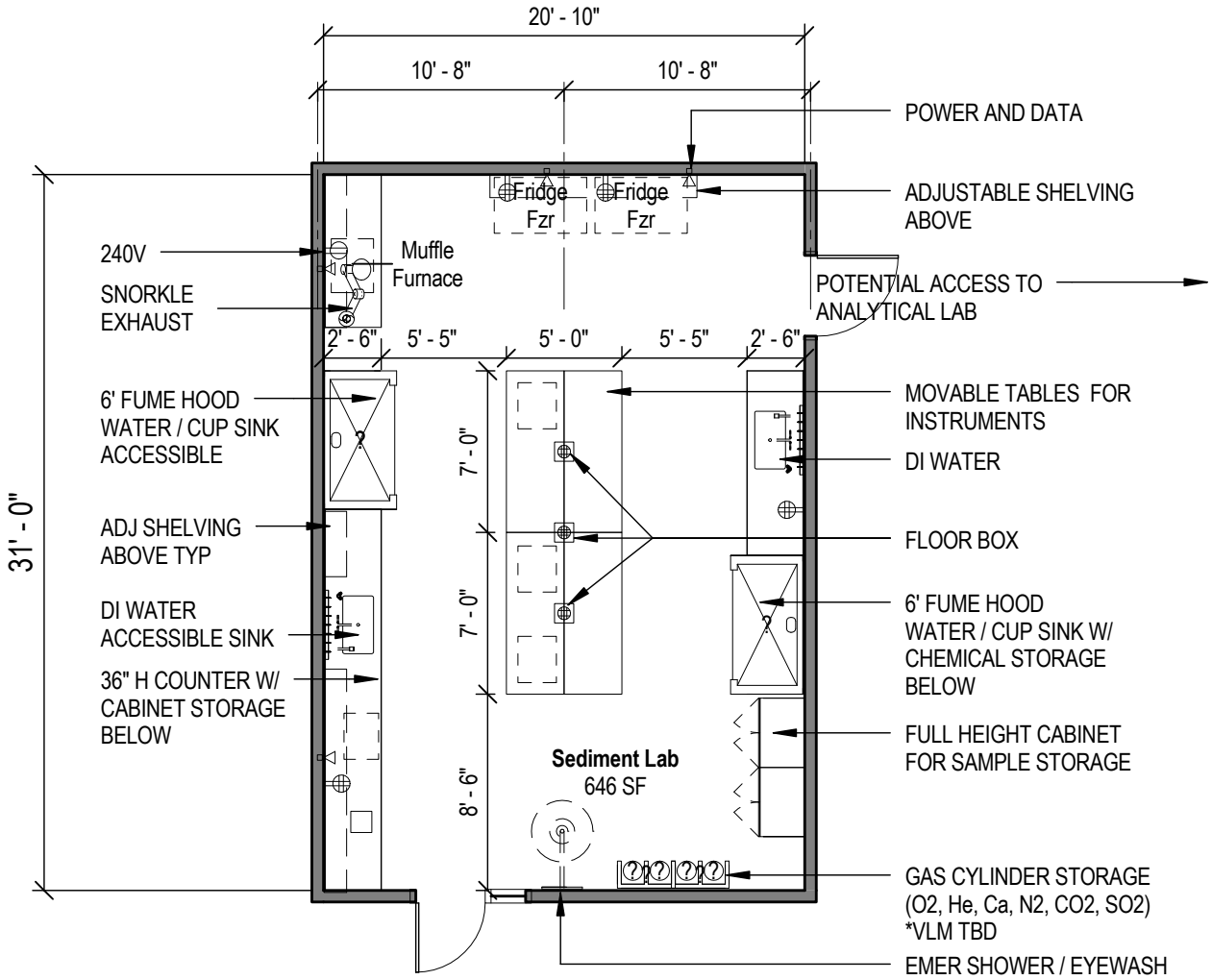
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			
Muffle Furnace	Y	2' - 4"	1' - 10"	1' - 8"	888	240	?	N	?		?
Working Core Fridge Frzr	Y	4' - 0"	2' - 5"	3' - 1"	777	120	?	Y	?		?
Freeze / Dryer	?	1' - 6"	2' - 0"	2' - 0"	555	115	?	N	?		?

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Sediment Lab 3.20

Scale: 1/8" = 1'-0"



QUESTION:
UTILITIES AT HOOD?

NOTES:
- GAS CYLINDER STORAGE COULD BE BACK UP FOR ANALYTICAL LAB
- SAMPLE STORAGE REQ. - 2 full height cabinets?
- CUP SINKS REQUESTED
- DI WATER REQ'D IN LAB?

Room Data Sheet
3.21 Analytical Lab

Department: Geology
Issue Date: 04/16/15

NCES Code: *215*

Area /Occupancy
Target Area : *650*
Actual Area : *646 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low v.o.c.*
Ceiling: *ACT*
Ceiling Height:
Door Size: *3'-6" single leaf*

Casework
Wall Cabinets: *Wood*
Base Cabinets: *Wood*
Counter Tops: *Epoxy Resin*
Counter Height: *36" UNO*
Shelving: *Yes, as noted*
Drawer Units: *Yes, as noted*

Furnishings
Window Treat: *Light Filtering or as noted*
Proj. Screen: *No*
Desks: *No*
Chairs:
Tables: *No*
Files: *No*
White Boards: *No*
Tack Boards:
Other Furn:

Adjacencies
Proximity to Sediment Lab

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Epoxy*
Pure Water: *Yes*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste: *Yes*
Emer. Eyewash: *Yes*
Emer. Station: *Yes*
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Negative to corridor*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust:
Air Filtration: *30% pre, 95% final*
O2 Sensor:
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination: *50 FC at Bench*
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching: *Perimeter zone, teaching wall, daylight*
Task Light:
Emerg. Power: *Yes*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req: Yes, specific to equipment
Other Spec Req:

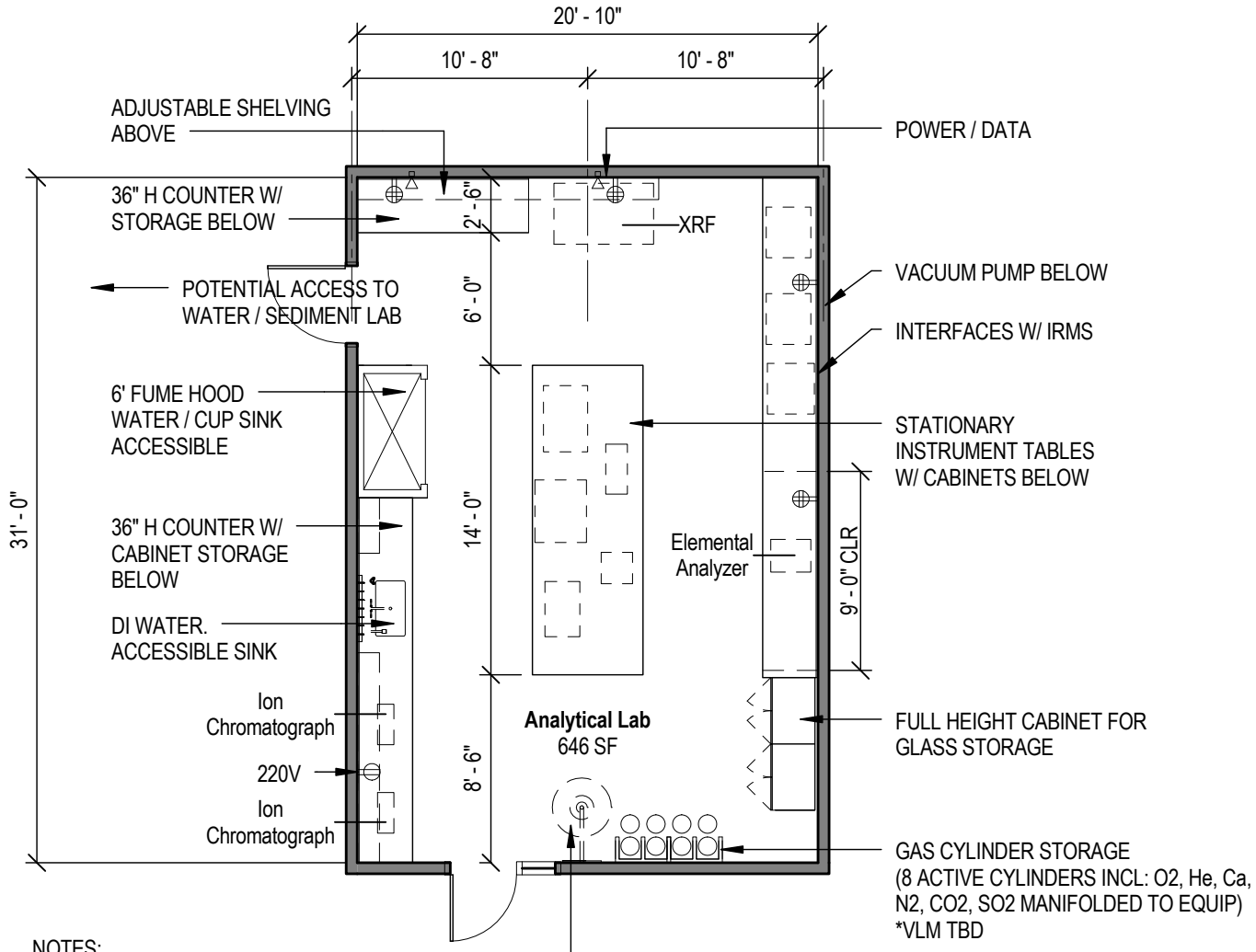
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			
Isotope Ratio Mass Spec	?	4' - 6 1/8"	2' - 9 1/8"	3' - 5"	?	208	?	N	?		Floor equipment

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Analytical Lab 3.21

Scale: 1/8" = 1'-0"



NOTES:

- MASS SPEC - (6) COMPRESSED GAS CYLINDERS
- REFRIGERATOR
- ACCESS OFF-HOURS
- STORAGE - GLASSWARE / GLOVES / EQUIPMENT SUPPLY
- SULFUR DIOXIDE IS AN ISSUE
- NEED SNORKLE FOR MASS SPEC?

QUESTION:
UTILITIES AT HOOD?

Room Data Sheet
3.22 Geology Prep / Storage

Department: Geology
Issue Date: 04/16/15

NCES Code: *215*

Area /Occupancy
Target Area : *275 SF*
Actual Area : *275 SF* *
Occupants : *N/A*
Quantity: *1*

* SF value is NASF

Architectural
Floor:
Base:
Walls:
Wall Finish:
Ceiling:
Ceiling Height:
Door Size:

Casework
Wall Cabinets:
Base Cabinets: *Yes*
Counter Tops: *Epoxy*
Counter Height: *36" UNO*
Shelving:
Drawer Units:

Furnishings
Window Treat:
Proj. Screen: *No*
Desks: *No*
Chairs: *No*
Tables: *No*
Files:
White Boards: *TBD*
Tack Boards:
Other Furn:

Adjacencies

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *Yes*
Pure Water: *TBD*
Hot/Cold Water: *Yes*
Floor Drain: *No*
Waste:
Emer. Eyewash: *No*
Emer. Station:
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *1 CFM / SF Min*
Air Circulation: *Air must be exhausted*
Natural Vent: *No*
Pressure: *Neg to corridor / lab*
Temperature: *74 cool / 72 heat**
Rel. Humidity: *55% max, no min*
Local Exhaust: *n/a*
Air Filtration:
O2 Sensor: *No*
Distribution:
Other HVAC:

*SSU has requested 75 F cool and 70 F heat

Electrical
Power:
Features:
Elec. Outlets:
Illumination:
Fixtures:
Fixt. Mounting:
Occ. Sensors:
Dim Switch:
Switching:

Task Light:
Emerg. Power: *No*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

Notes

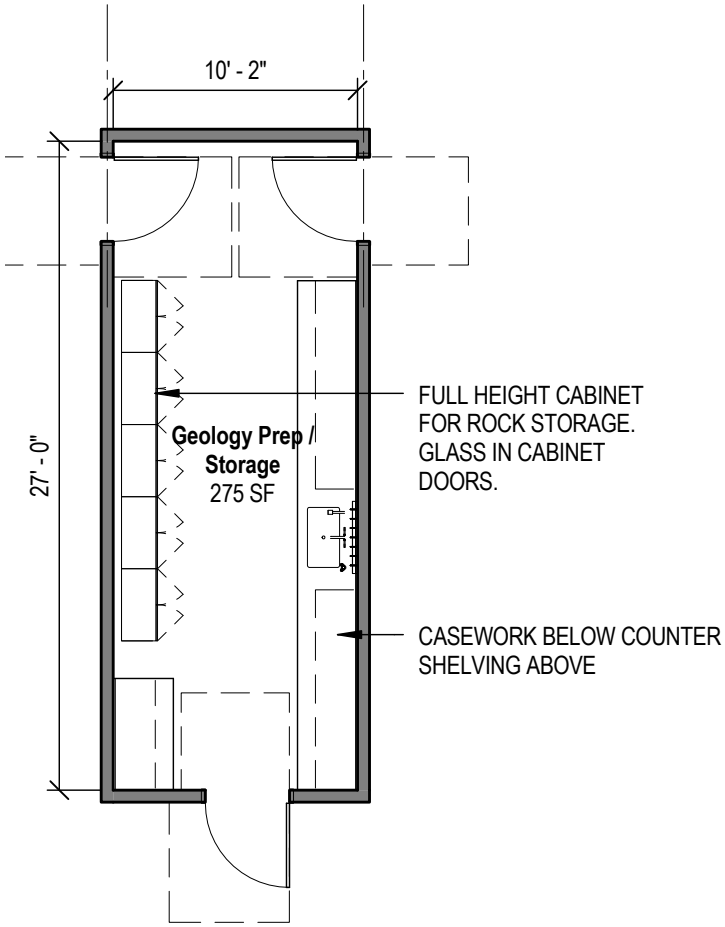
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Geology Prep / Storage 3.22

Scale: 1/8" = 1'-0"



Room Data Sheet
4.11 Loading Dock

Department: Building Shared
Issue Date: 04/16/15

NCES Code: *730*

Area /Occupancy
Target Area : *2000 SF*
Actual Area : *1863 SF* *
Occupants :
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Concrete*
Base:
Walls:
Wall Finish:
Ceiling:
Ceiling Height:
Door Size:

Casework
Wall Cabinets:
Base Cabinets:
Counter Tops:
Counter Height:
Shelving:
Drawer Units:

Furnishings
Window Treat: *No*
Proj. Screen: *No*
Desks: *No*
Chairs:
Tables:
Files:
White Boards:
Tack Boards:
Other Furn:

Adjacencies
Proximity to Building Stockroom / Storage

Notes

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks:
Pure Water:
Hot/Cold Water:
Floor Drain:
Waste:
Emer. Eyewash:
Emer. Station:
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *Ventilation req'ts only*
Air Circulation: *Air should be exhausted*
Natural Vent:
Pressure:
Temperature: *cool:85F max, heat:60F min*
Rel. Humidity: *55% max, no min.*
Local Exhaust: *N/A*
Air Filtration:
O2 Sensor: *No*
Distribution:
Other HVAC:

Electrical
Power:
Features:
Elec. Outlets:
Illumination:
Fixtures:
Fixt. Mounting:
Occ. Sensors:
Dim Switch:
Switching:

Task Light:
Emerg. Power:

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

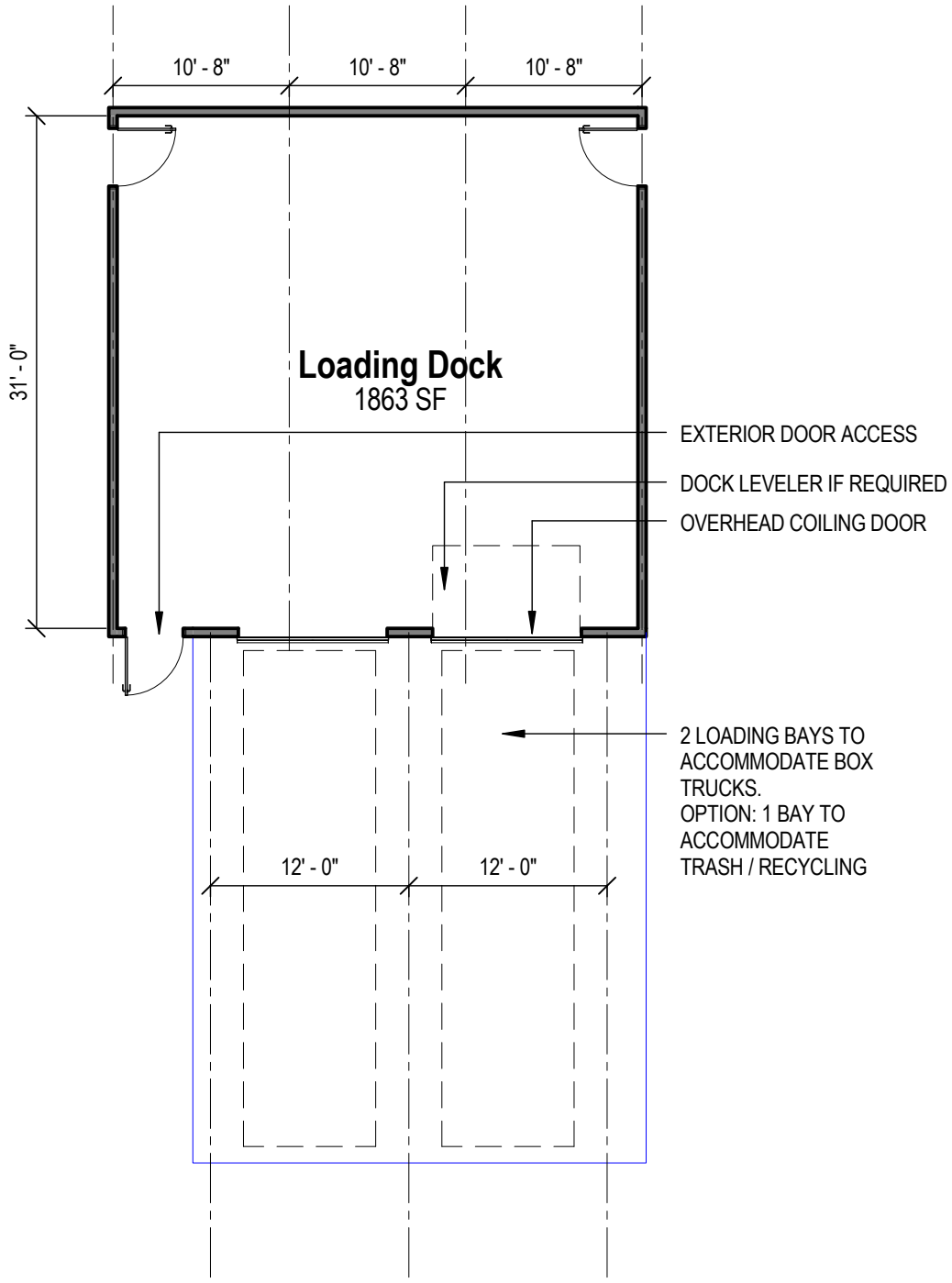
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Loading Dock 4.11

Scale: 3/32" = 1'-0"



Room Data Sheet
4.12 Stockroom / Storage

Department: Building Shared
Issue Date: 04/16/15

NCES Code: *730*

Area /Occupancy
Target Area : *800 SF*
Actual Area : *791 SF* *
Occupants : *N/A*
Quantity: *1*

* SF value is NASF

Architectural
Floor: *Linoleum / Polished Concrete*
Base: *Vinyl*
Walls:
Wall Finish:
Ceiling:
Ceiling Height:
Door Size:

Casework
Wall Cabinets:
Base Cabinets:
Counter Tops:
Counter Height:
Shelving:
Drawer Units:

Furnishings
Window Treat:
Proj. Screen:
Desks:
Chairs:
Tables:
Files:
White Boards:
Tack Boards:
Other Furn:

Adjacencies

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks:
Pure Water:
Hot/Cold Water:
Floor Drain:
Waste:
Emer. Eyewash:
Emer. Station:
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *Ventilation req'ts only*
Air Circulation: *Air should be exhausted*
Natural Vent: *N/A*
Pressure: *Negative to corridor*
Temperature: *cool:85F max, heat:60F min*
Rel. Humidity: *55% max, no min.*
Local Exhaust: *N/A*
Air Filtration:
O2 Sensor:
Distribution:
Other HVAC:

Electrical
Power:
Features:
Elec. Outlets:
Illumination:
Fixtures:
Fixt. Mounting:
Occ. Sensors:
Dim Switch:
Switching:

Task Light:
Emerg. Power:

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

Notes
Chemical storage room will require air changes at 1 CFM / SF min

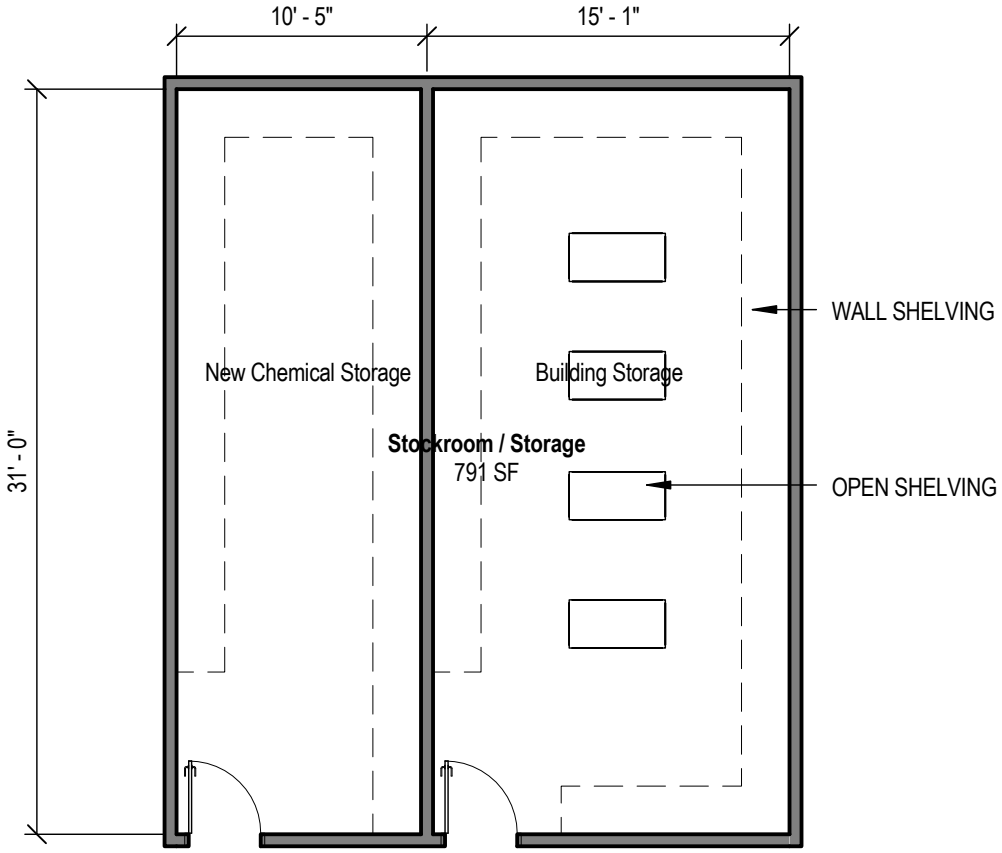
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Stockroom / Storage 4.12

Scale: 1/8" = 1'-0"



Room Data Sheet
5.10 Student Space

Department: Building Shared
Issue Date: 04/16/15

NCES Code: *610*

Area /Occupancy
Target Area : *Varies*
Actual Area : *945 SF* *
Occupants : *Varies*
Quantity: *3 per floor*

* SF value is NASF

Architectural
Floor: *Carpet / polished concrete*
Base: *Vinyl*
Walls: *Gypsum*
Wall Finish: *Paint - low VOC*
Ceiling: *ACT / open*
Ceiling Height: *TBD*
Door Size: *N/A*

Casework
Wall Cabinets: *No*
Base Cabinets: *No*
Counter Tops: *No*
Counter Height: *No*
Shelving: *Glass displays*
Drawer Units: *No*

Furnishings
Window Treat:
Proj. Screen: *No*
Desks: *No*
Chairs: *Yes*
Tables: *Yes*
Files: *No*
White Boards: *Yes*
Tack Boards:
Other Furn:

Adjacencies

Fire Protection
FP System: *Yes*
FP Detection: *Yes*

Plumbing
Sinks: *No*
Pure Water:
Hot/Cold Water:
Floor Drain:
Waste:
Emer. Eyewash:
Emer. Station:
Gases:
- Comp. Air:
- Lab Gas:
- Vacuum:
- CO^2:
- Nitrogen:
- Oxygen:
- Other Gas:

HVAC
Air Changes: *Ventilation req'ts only*
Air Circulation: *Air may be returned*
Natural Vent: *TBD*
Pressure:
Temperature: *cool:75F occ, heat:70 Focc*
Rel. Humidity: *55% max, no min*
Local Exhaust: *N/A*
Air Filtration:
O2 Sensor:
Distribution:
Other HVAC:

Electrical
Power: *Yes*
Features:
Elec. Outlets:
Illumination:
Fixtures: *LED*
Fixt. Mounting: *Pendant*
Occ. Sensors: *Yes*
Dim Switch:
Switching:

Task Light: *No*
Emerg. Power: *No*

Communications
Phone Outlets:
Data Outlets:
Network:
Clocks:
Paging System:
Monitor/Alarm:
Other:

Special Requirements
Lighting Controls:
Visual Controls:
Acoustic Req:
STC Rating:
Structural Req:
Security:
Shielding:
Vib / Iso Req:
Other Spec Req:

Notes
The student space will have movable furniture, both group meetings and individual study. Whiteboards will be provided in certain locations for collaboration. Natural light will be utilized. A permeable boundary line will be created to the circulation space.

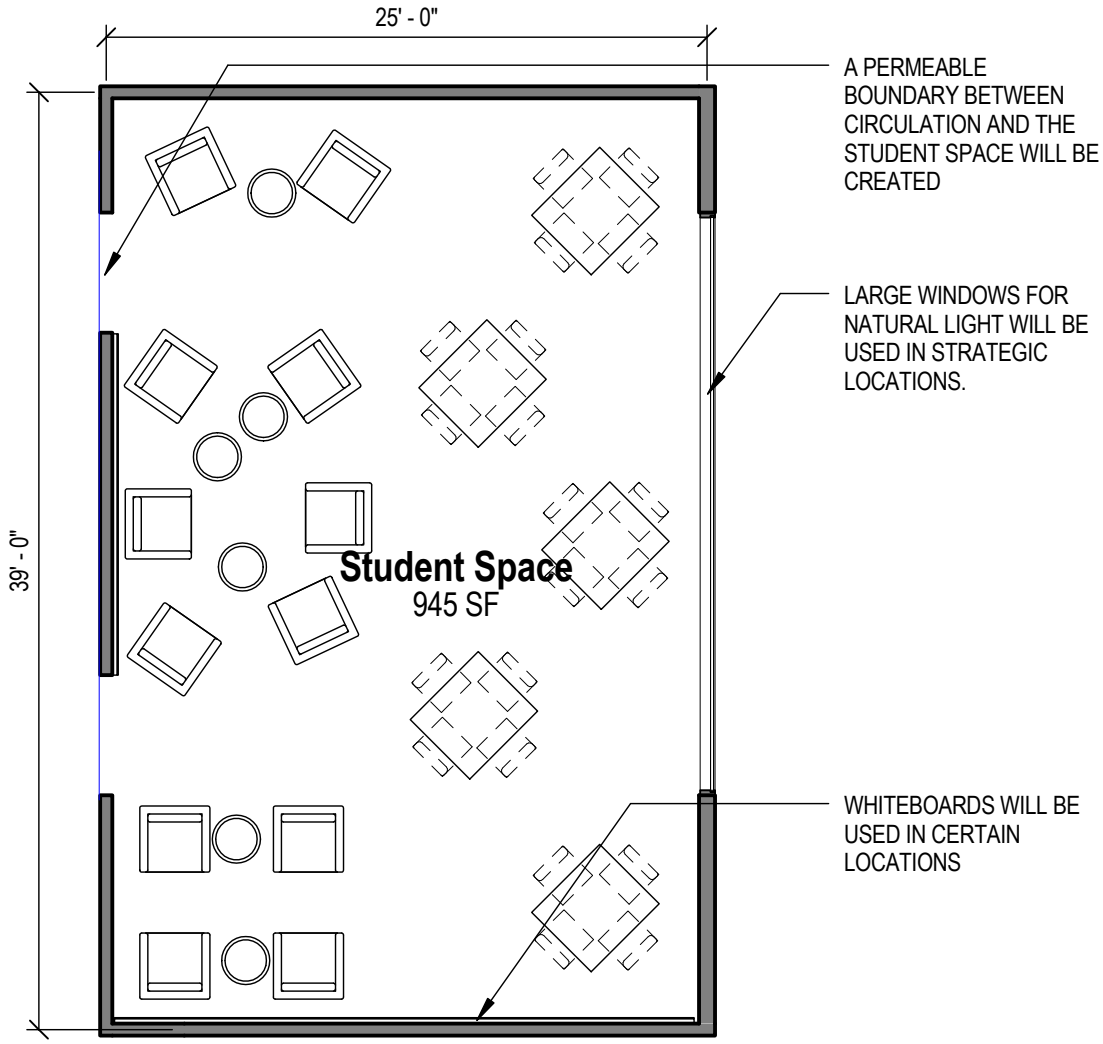
Equipment

DESCRIPTION	OFOI	SIZE				ELECTRIC			PLUMBING	HEAT LOAD	NOTES
		W	D	H	Wt	V	AMP	EM			

General Notes:
1. 50% of all coat hooks to be located no higher than 48" AFF.
2. Base of all markerboards to be located no higher than 42" AFF.
3. All environmental controls (lights, thermostates, A/V) to be located to no higher than 48" AFF.

Student Space 5.10

Scale: 1/8" = 1'-0"



C. CONSENSUS SOLUTION

1. PREFERRED ALTERNATIVE SUMMARY
2. SITE PLAN / CAMPUS PLAN
3. ARCHITECTURAL APPROACH
    - A. PLANS
    - B. SECTIONS
    - C. EXTERIOR PERSPECTIVES
    - D. INTERIOR PERSPECTIVES
4. LANDSCAPE APPROACH
5. ACCESSIBILITY / UNIVERSAL DESIGN
6. SUSTAINABILITY: ANALYSIS AND STRATEGIES / LEED / EO484
7. REGULATORY ANALYSIS
8. PRELIMINARY IT STRATEGY
9. OUTSTANDING ISSUES FOR FINAL DESIGN

CONSENSUS SOLUTION

Preferred Alternative Summary

After working through the cost reduction strategies, the project team chose to have the design team proceed with the development of Concept Alternative #2, the “Infill Scheme”, as the Consensus Solution. This scheme most closely aligned to the goals for the project in terms of connectivity to Meier Hall. It locates the amenities of the new construction such as student space in close proximity to Meier Hall. This will enable the new building to serve the Meier Hall population at large.

The building is approximately 70,610 GSF of new construction. It ties into the existing Meier Hall along the West wing and the south end of the East wing. There is no construction scope associated with renovation of Meier Hall aside from the various tie-in locations, and the code construction requirements between the new and existing building (please refer to the Regulatory Analysis in this section of the report).

Site Plan / Campus Plan

On the following page is the Consensus Solution Site Plan. The building is oriented just off of a north - south axis following the axis established by Meier Hall and aligns with Lafayette Street. (See Section C - Existing Conditions Site Analysis from the Interim report for a full description of the site constraints and opportunities.) The topography provides one of the greatest challenges of the site in terms of accessibility and access. The site plan on the following page lists some of the elevations for the various site entry points and sidewalk locations.

The loading dock location is a function of the vehicular traffic on College Drive and Lafayette Street. The loading dock is located at the southwest corner of the new construction. The loading dock hammerhead will allow for a truck to pull off of College Drive and back into the loading dock. There is also an equipment access ramp from the loading dock to the Level 2 elevation at 47’-9” on the west side of the new construction. (This is currently under review for further refinement.)

There are 2 pedestrian entries located along Lafayette Street. One entry is at Level 1 (elevation +38’-0”) and one at Level 2 (elevation +47’-9”). The entry at Level 1 ties into the south end of the east wing of Meier Hall, and the Level 2 entry is accessed by a sloped walkway from the corner of College Dr and Lafayette St or a stair along College Drive.

The placement of the building also allows for the courtyard to be fully accessible. Level 2 is at 47’-9”, and there is a sloped walkway down to the courtyard level of approximately 44’-6”.

Site Plan - Consensus Solution

Architectural Approach

Student Spaces

This scheme provides the greatest degree of integration with the existing Meier Hall. The larger student spaces are located at the intersection of the pathway between the east and west wings of Meier Hall where a broader student population will be able to use the amenity. Given the scarcity of student space in Meier Hall, these new student spaces at Levels 2 through 5 have the potential to become the social heart of Meier Hall and the new construction. There are also different types of student space within the new building. The space at the courtyard is more public and will have a different character and feel than the student space at the south end of the building. The courtyard is also seen as an underutilized space therefore by placing student space and an outdoor plaza in this location will help to activate the space.

Massing

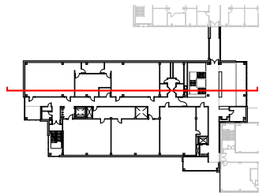
In terms of the overall massing of the building, the building is 5 levels with a mechanical penthouse. Level 1 is almost entirely below grade aside from the entry off of Lafayette Street and the loading dock. Level 2 is also not a full floor plate and contains entry points to the courtyard and the corner of Lafayette and College Drive. Levels 3 through 5 are primarily similar layouts as a double-loaded corridor with teaching labs on both sides.

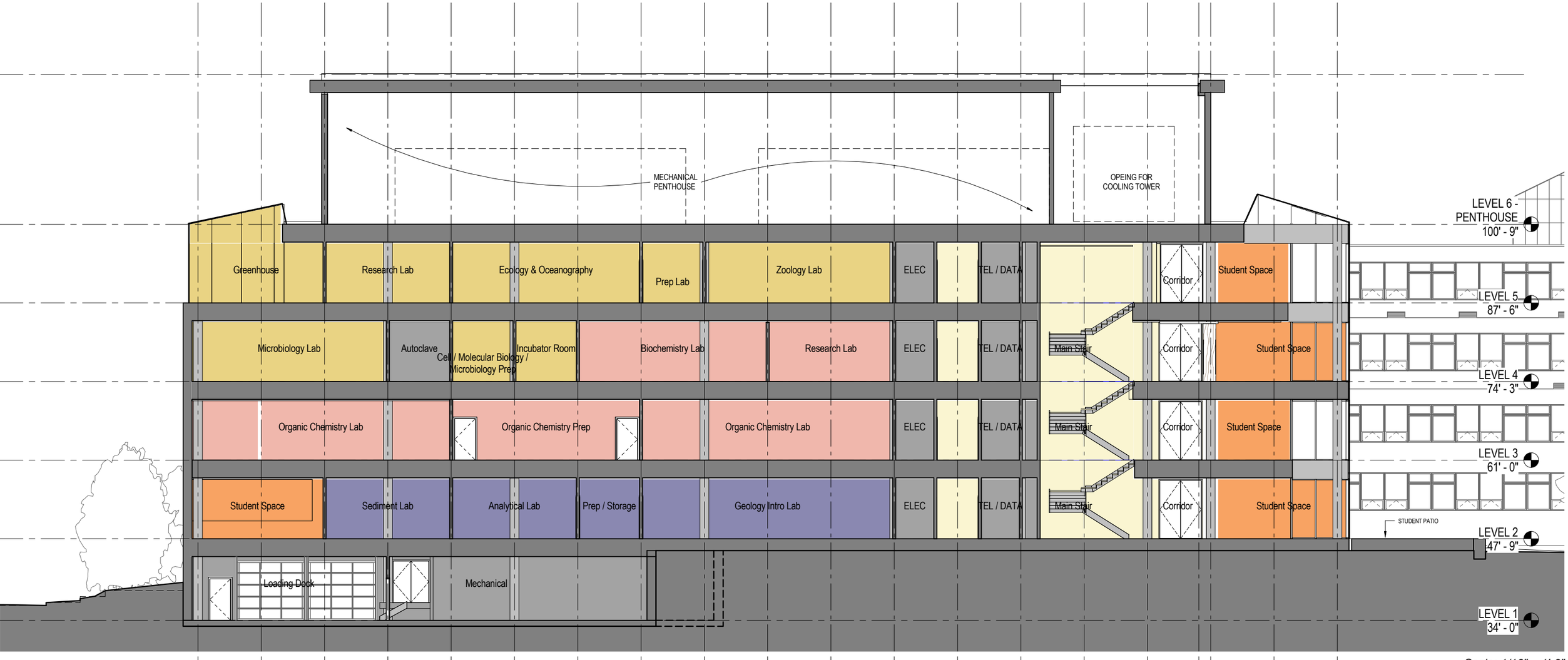
Building Scale

The current approach to the roof is an outcome of a few design challenges facing the project (see building sections on the following 2 pages). By sloping the roof from the highpoint along the west side to the low point at the east places the lowest point of the roof adjacent to the neighborhood. This breaks down the scale of the building, and from the neighborhood meeting held in January, many people were concerned about the height of the building. The sloping roof also aids in keeping the average height of the roof lower than the height classified as high-rise construction. If the building is considered a high-rise, there are additional cost implications, such as pressurized egress stairs. This is an outstanding item for design. The design team must meet with the building official for approval in using this approach to calculate the building height.

The concept level floor plans are found on the following pages. The first page of each level shows the plan in relation to Meier Hall; the second page is a larger scale plan of new construction only. Following the floor plans, massing axons as well as 3-D views from the courtyard and Lafayette Street are shown.

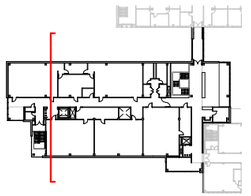
Building Section - N-S looking West





Scale: 1/16" = 1'-0"

Building Section - E-W looking North



Scale: 1/16" = 1'-0"

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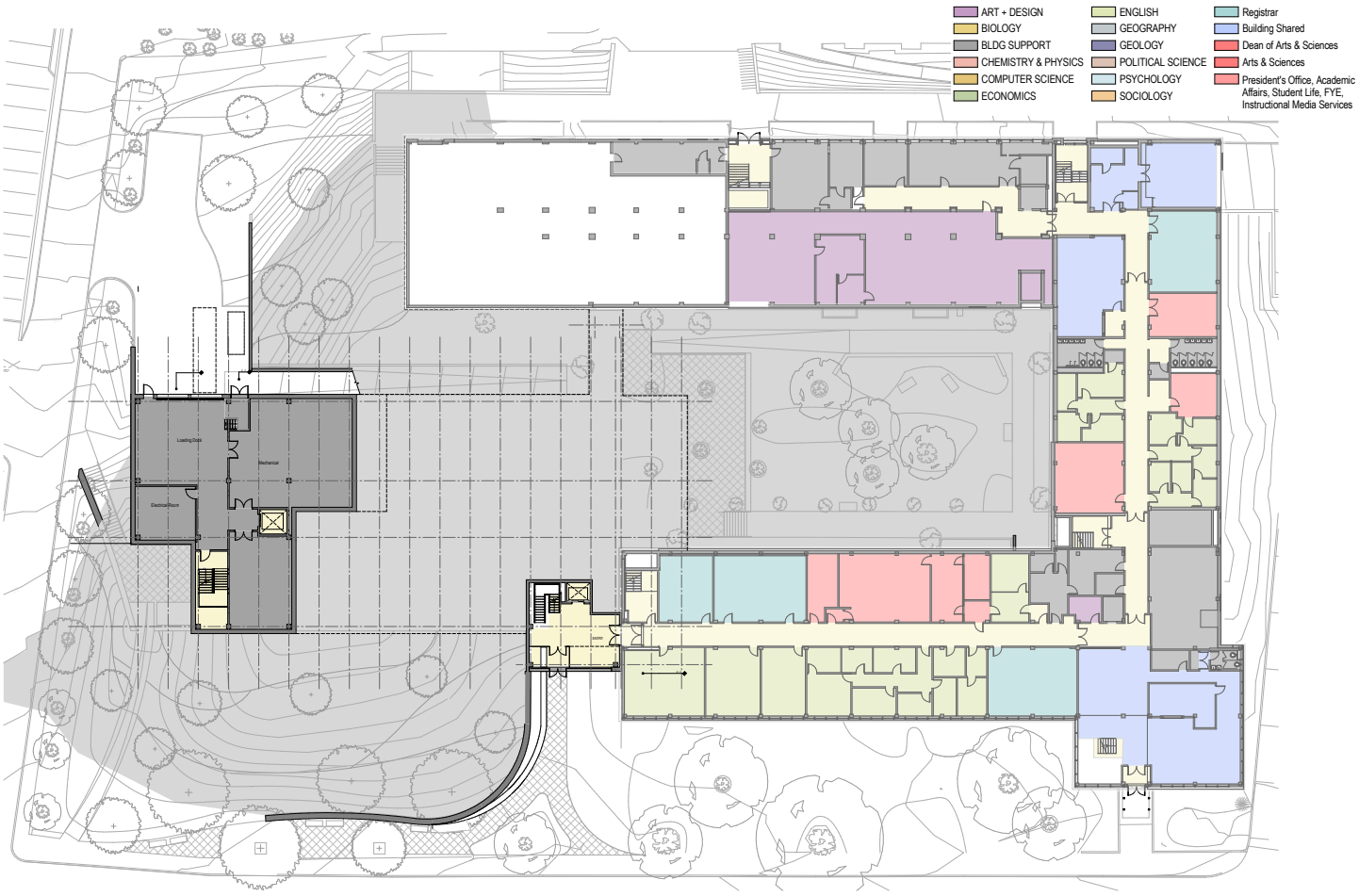
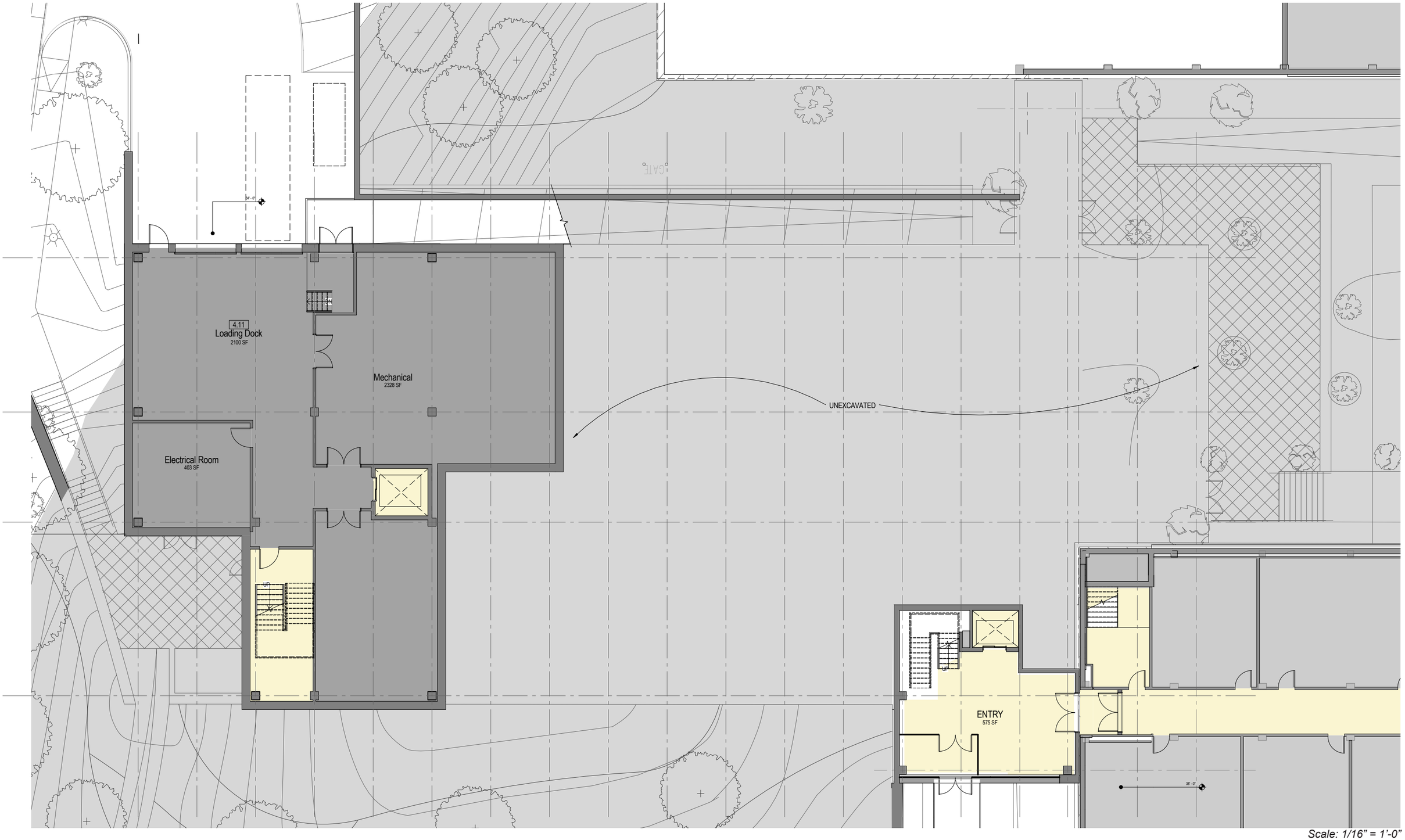
LEVEL 1

5,920 GSF

- Loading Dock
- Electrical Room
- Mechanical Room
- Entry along Lafayette Street at same elevation of existing Meier Hall, Level 1




4.11
Loading Dock
2100 SF
Mechanical
2328 SF
Electrical Room
403 SF
UP
DN
UNEXCAVATED
ENTRY
575 SF
38'-0"

Scale: 1/16" = 1'-0"

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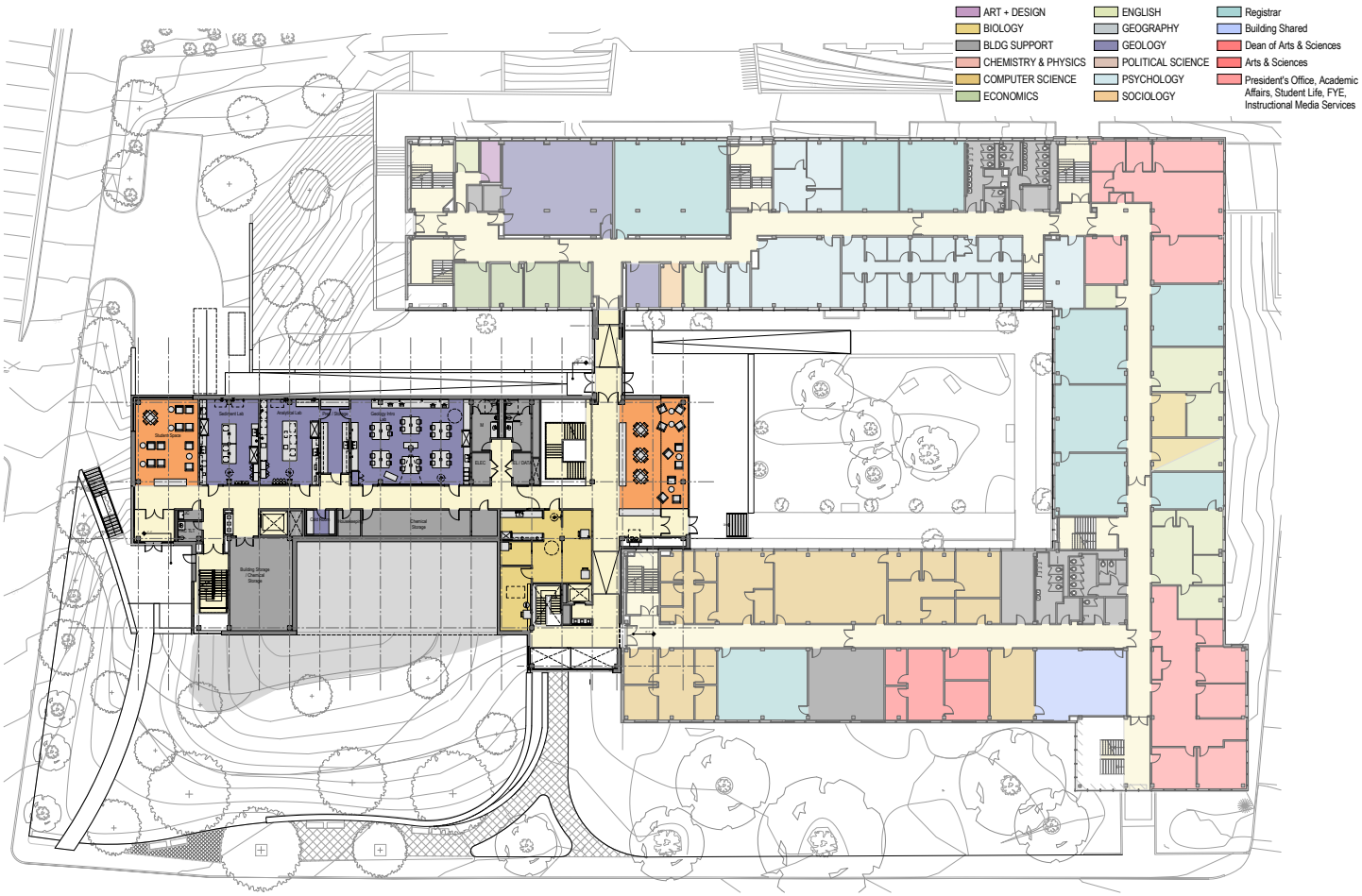
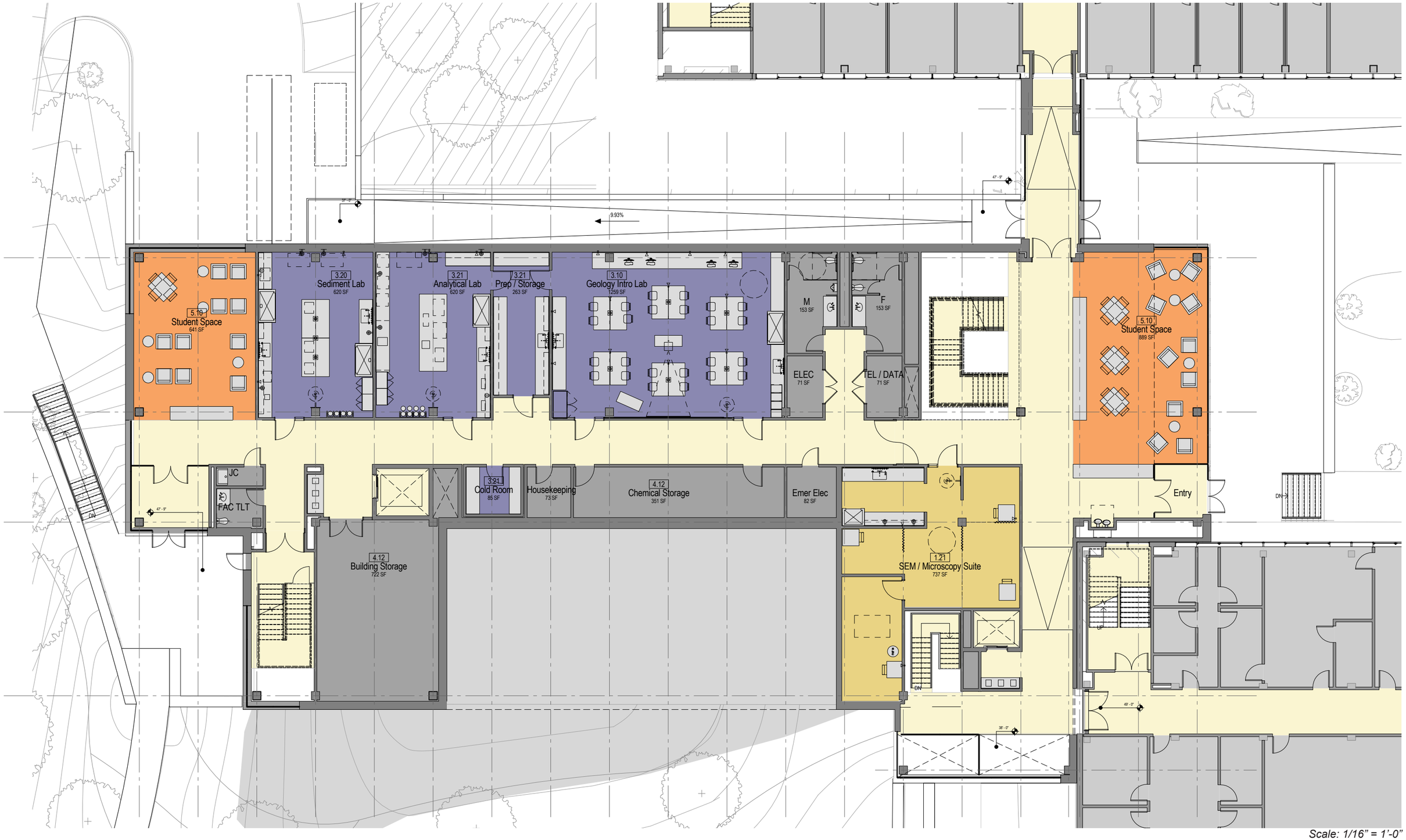
LEVEL 2

12,900 GSF

- Student Space
- Geology teaching labs
- Building Storage / Support
- Chemical Storage
- SEM / Microscopy suite




5.10
Student Space
641 SF
3.20
Sediment Lab
620 SF
3.21
Analytical Lab
620 SF
3.21
Prep / Storage
263 SF
3.10
Geology Intro Lab
1259 SF
M
153 SF
F
153 SF
ELEC
71 SF
TEL / DATA
71 SF
5.10
Student Space
889 SF
JC
FAC TLT
4.12
Building Storage
722 SF
3.21
Cold Room
85 SF
Housekeeping
73 SF
4.12
Chemical Storage
351 SF
Emer Elec
82 SF
1.21
SEM / Microscopy Suite
737 SF
Entry
9.93%
47' - 9"
49' - 0"
38' - 0"
DN
UP

Scale: 1/16" = 1'-0"

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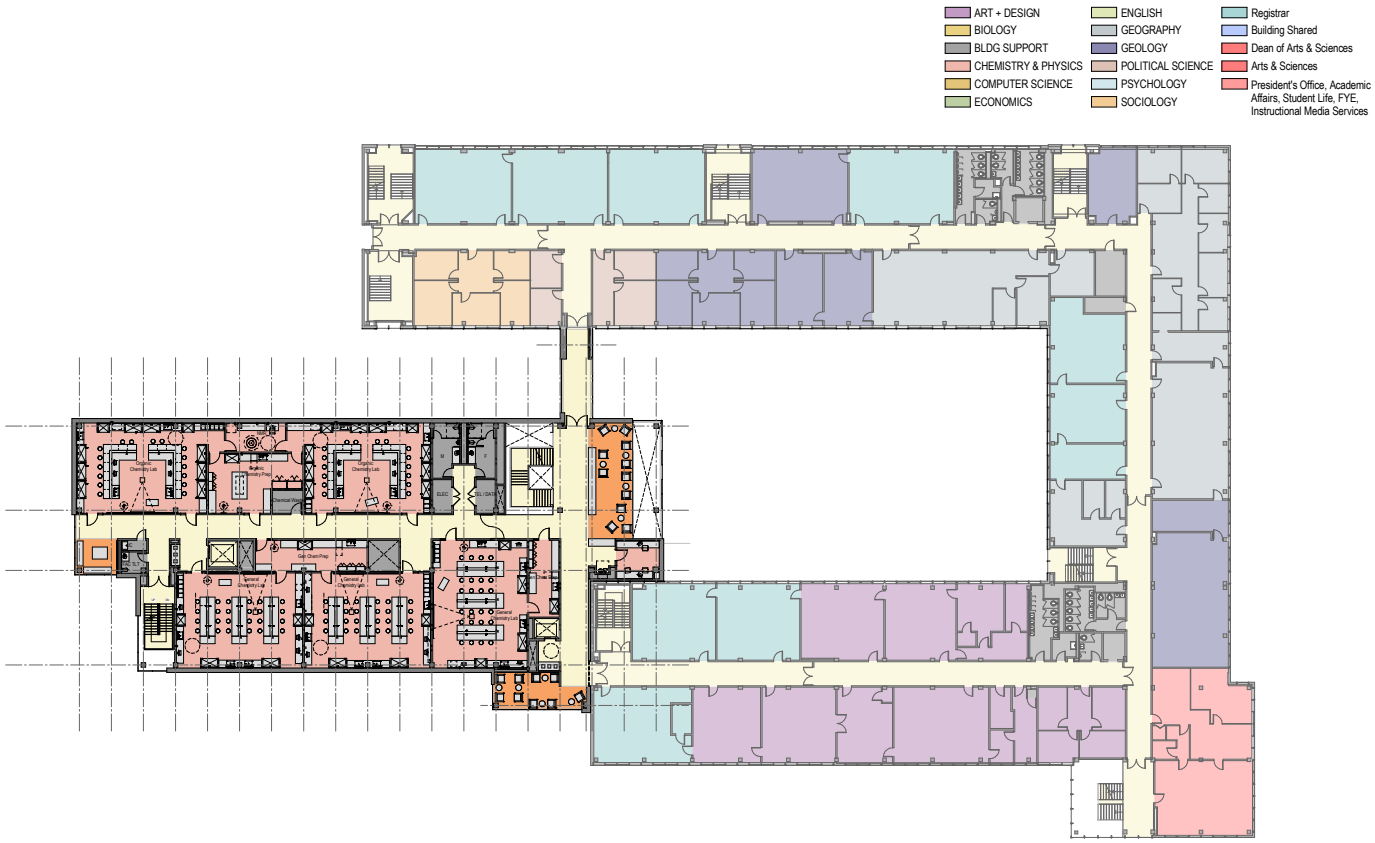
LEVEL 3

14,700 GSF

- Student Space
- Chemistry Teaching Labs - Organic and Intro Labs
- Lab Tech Office




2.11
Organic Chemistry Lab
1319 SF
2.21
NMR
189 SF
2.31
Organic Chemistry Prep
537 SF
2.34
Chemical Waste
77 SF
2.11
Organic Chemistry Lab
1314 SF
M
153 SF
F
153 SF
ELEC
71 SF
TEL / DATA
71 SF
5.10
Student Space
501 SF
5.10
Student Space
167 SF
JC
FAC TLT
UP
DN
2.30
Prep Lab
384 SF
2.10
General Chemistry Lab
1329 SF
2.10
General Chemistry Lab
1329 SF
2.10
General Chemistry Lab
1334 SF
2.30
Prep Lab
259 SF
5.10
Student Space
335 SF
2.40
Lab Tech Office
173 SF
UP
DN

Scale: 1/16" = 1'-0"

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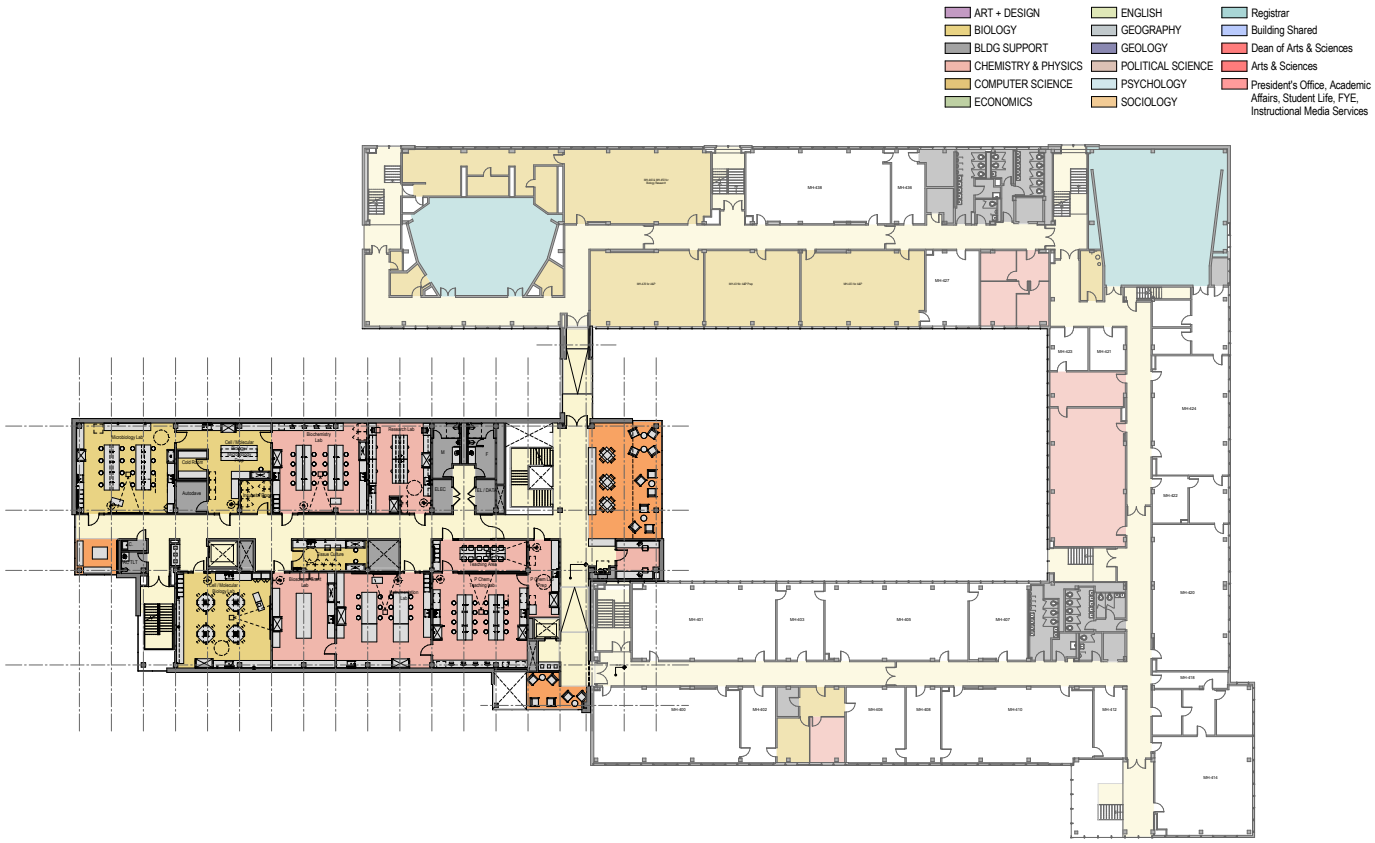
LEVEL 4

14,900 GSF

- Student Space
- Upper Level Biology and Chemistry Labs
- Lab Tech Office




1.14
Microbiology Lab
976 SF
1.32
Prep Lab
592 SF
1.35
Cold Room
88 SF
Autoclave
105 SF
1.34
Incubator Room
110 SF
2.14
Biochemistry Lab
940 SF
2.22
Research Lab
619 SF
M
153 SF
F
153 SF
ELEC
TEL / DATA
5.10
Student Space
899 SF
5.10
Student Space
167 SF
J.C.
FAC TLT
1.33
Tissue Culture
254 SF
2.33
Teaching Area
326 SF
2.32
Lab Prep
259 SF
2.40
Lab Tech Office
173 SF
1.13
Cell / Molecular Biology Lab
993 SF
2.20
Bioscience Grant Lab
656 SF
2.13
Instrumentation Lab
993 SF
2.12
P Chem Teaching Lab
992 SF

Scale: 1/16" = 1'-0"

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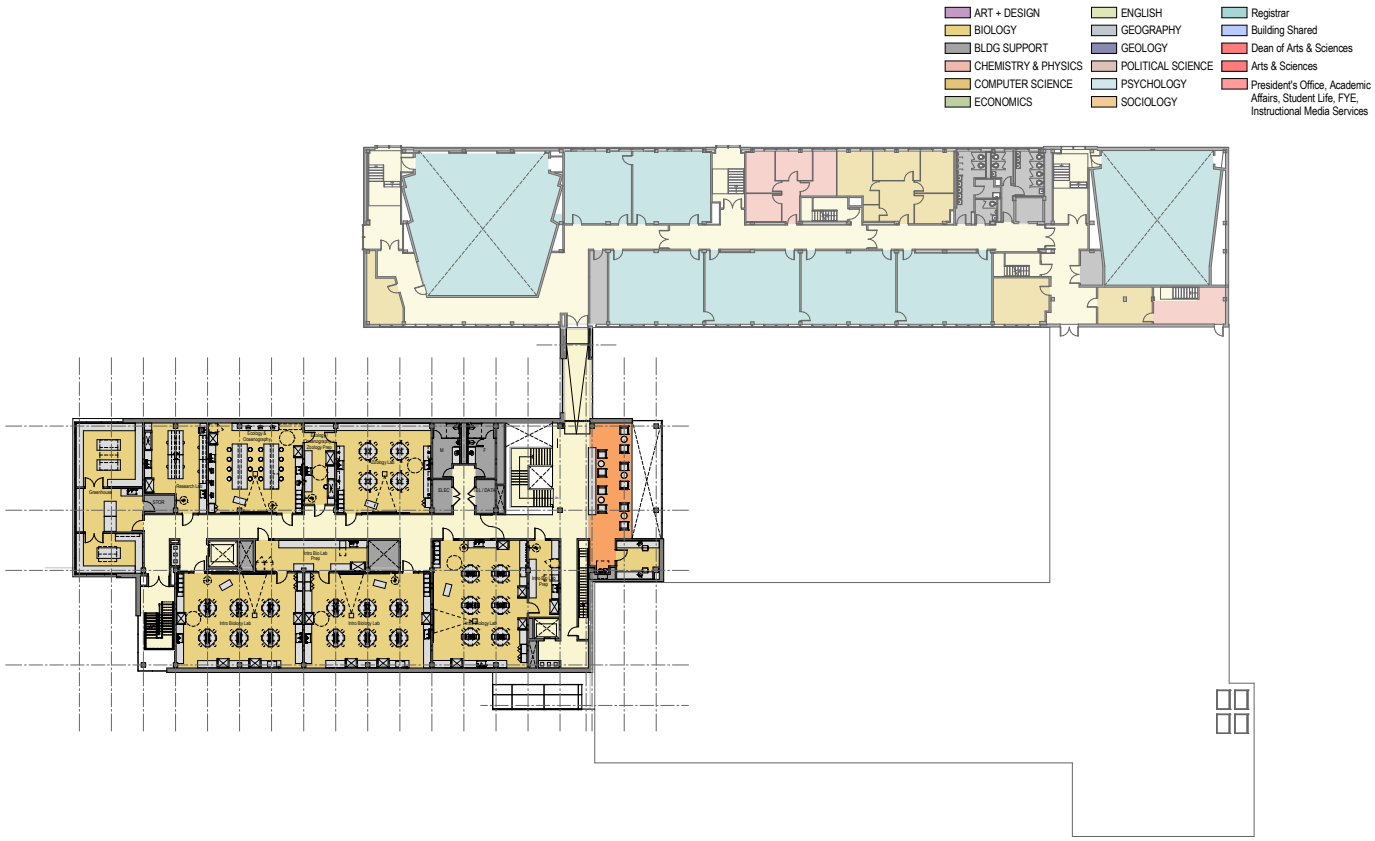
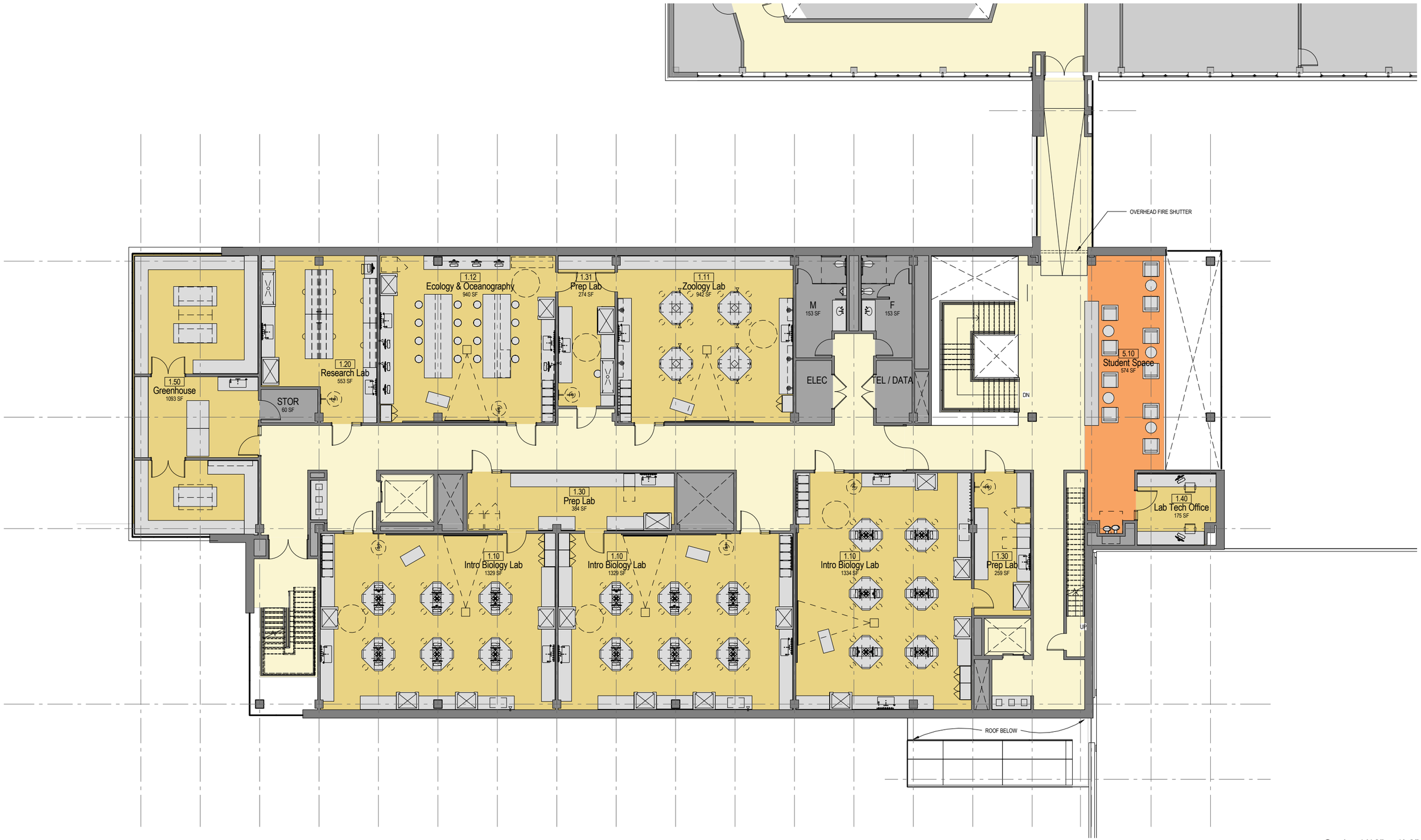
LEVEL 5

14,300 GSF

- Student Space
- Greenhouse
- Lab Tech Office
- Upper Level Biology Labs
- Intro Biology Lab




OVERHEAD FIRE SHUTTER
1.50
Greenhouse
1093 SF
STOR
60 SF
1.20
Research Lab
553 SF
1.12
Ecology & Oceanography
940 SF
1.31
Prep Lab
274 SF
1.11
Zoology Lab
942 SF
M
153 SF
F
153 SF
ELEC
TEL / DATA
DN
5.10
Student Space
574 SF
1.30
Prep Lab
384 SF
1.10
Intro Biology Lab
1329 SF
1.10
Intro Biology Lab
1329 SF
1.10
Intro Biology Lab
1334 SF
1.30
Prep Lab
259 SF
1.40
Lab Tech Office
175 SF
UP
ROOF BELOW

Scale: 1/16" = 1'-0"

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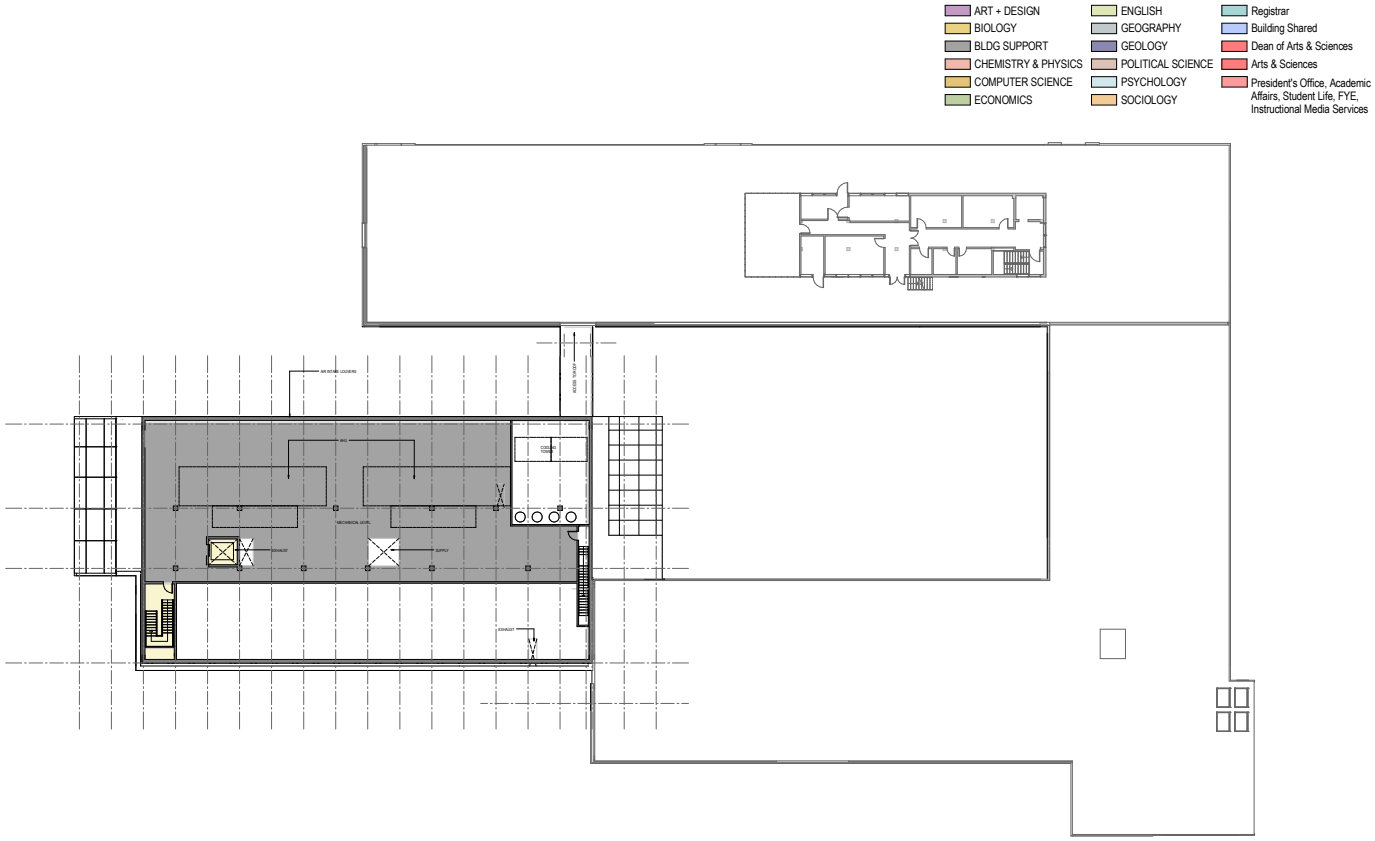
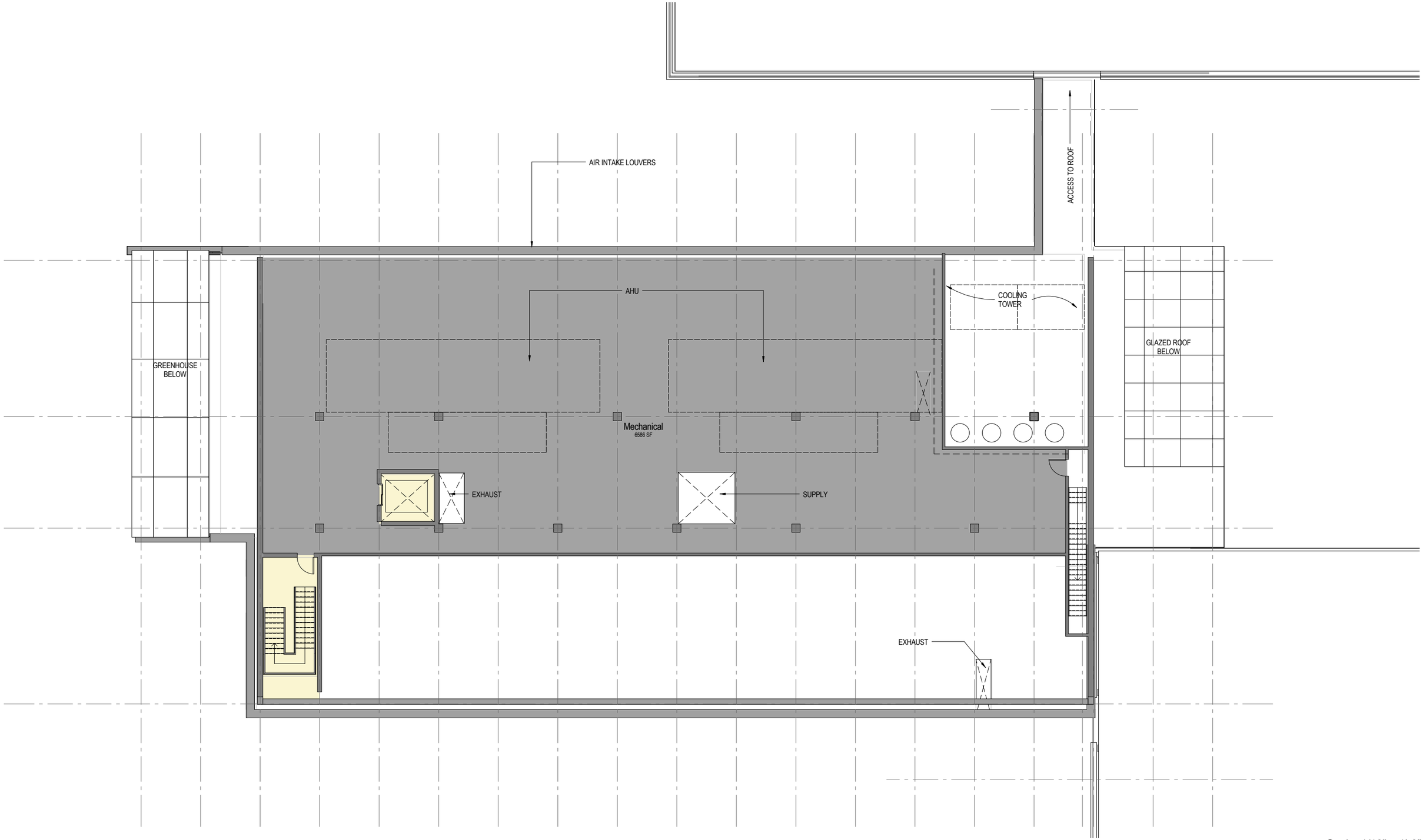
LEVEL 6

7,890 GSF

- Mechanical Penthouse




AIR INTAKE LOUVERS
ACCESS TO ROOF
AHU
COOLING TOWER
GREENHOUSE BELOW
GLAZED ROOF BELOW
Mechanical
6586 SF
EXHAUST
SUPPLY
EXHAUST

Scale: 1/16" = 1'-0"

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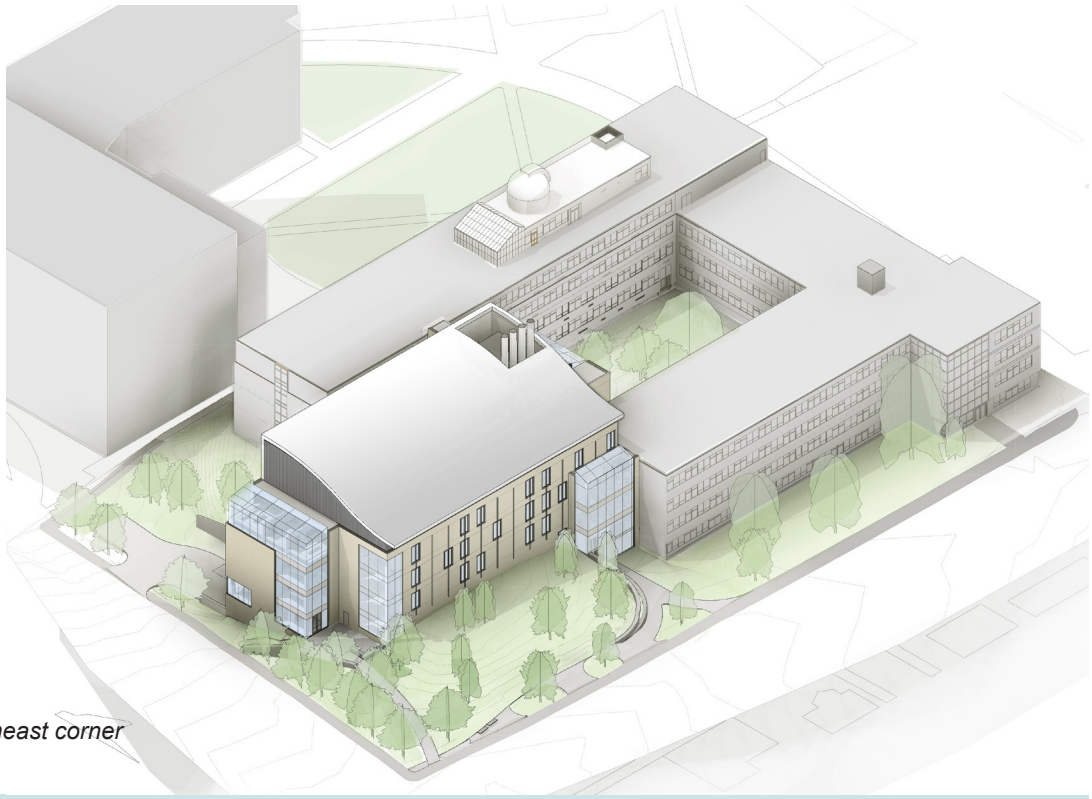
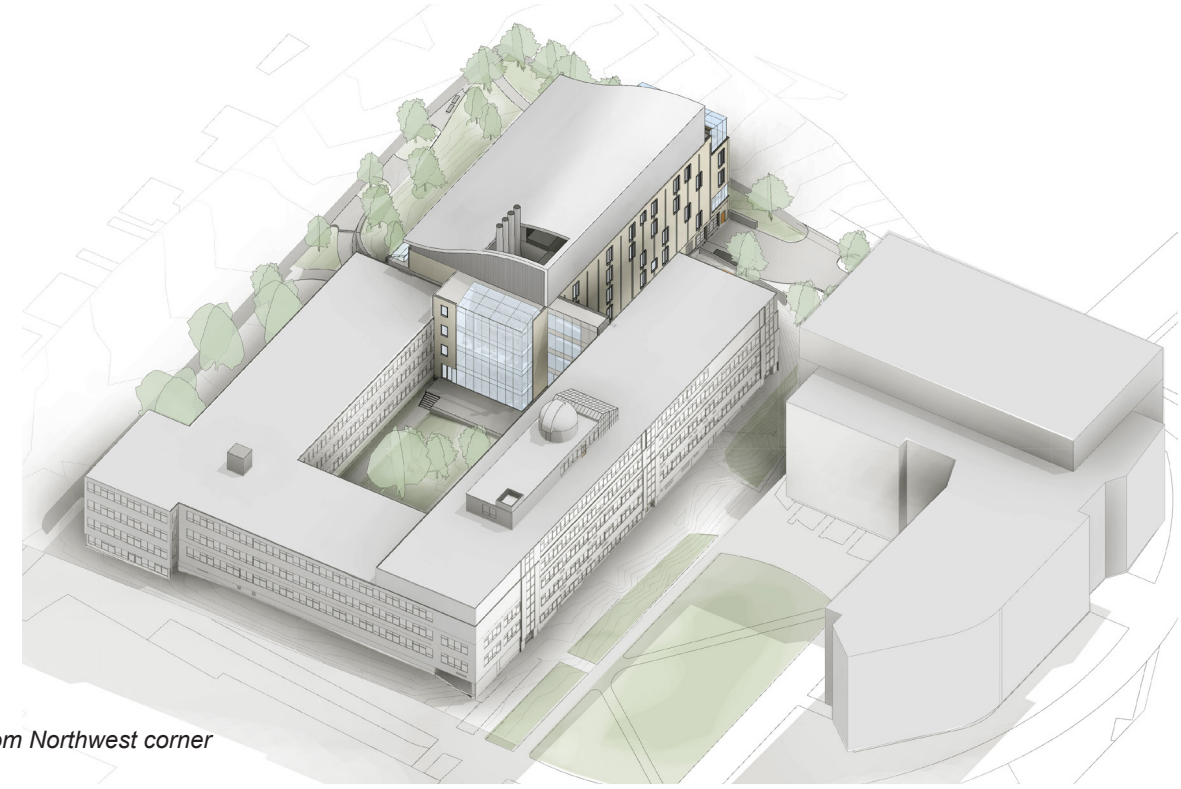
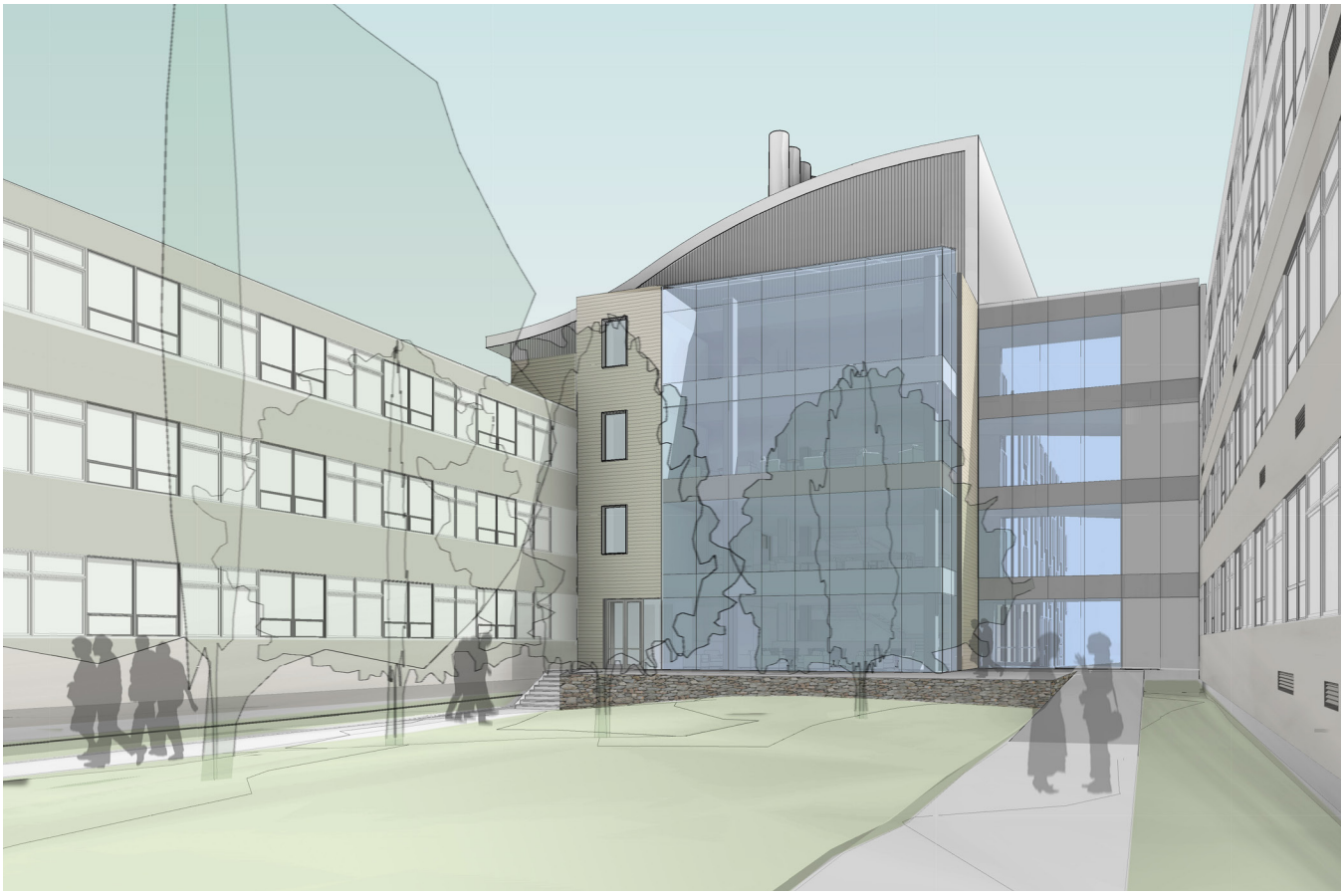


Axonometric from Southeast corner

View from corner of Lafayette Street and College Drive



Axonometric from Northwest corner



View from Courtyard

Exterior Architectural Approach

The exterior envelope will be a combination of terracotta rainscreen with punched openings and fully glazed curtainwall, similar to that which was used at the Berry Library and Learning Commons. Terracotta provides an easily maintainable facade without the need for caulk joints required of a typical brick facade. Terracotta also comes in many colors and surface patterns. The color choice of the terracotta can compliment the coloring of Meier Hall; though the overall architectural approach to the building is modern and not imitate the architecture of Meier Hall.

Full height curtainwall will be judiciously used in places where greater openness in the facade is needed. This occurs at the student space and possibly in portions of the egress stair. The egress stairs will have hold open doors to the hallway and therefore will be an open and light-filled staircase for students to move between the various floors.

Interior Architectural Approach

Each floor is a double loaded corridor with teaching labs and prep spaces on both sides. At each end of the corridor are student spaces. Some spaces are larger and more public in nature, while others are more intimate to allow for more focused study. Whiteboards will be located within these spaces in certain locations to aid in collaboration.

The top image on the next page illustrates one of the larger student spaces looking over the courtyard. There will be display cases at the axes of circulation. The central location and openness of the communicating stair is intended to encourage people to use the stairs between the various floors. The curtainwall in this space is north facing and will give even light throughout the year. Given the orientation, glare should not be a concern.

Daylight is a primary focus in the design of the teaching lab. We are exploring the alignment of glazed entry doors with full height windows, creating a sense of transparency and bring natural light deeper into the building. A combination of direct and indirect ceiling fixtures will bounce light and illuminate the space. This approach is illustrated in the image of the organic chemistry lab (following page).

View of Student Space at Level 4

View of Organic Chemistry Lab

Landscape Approach

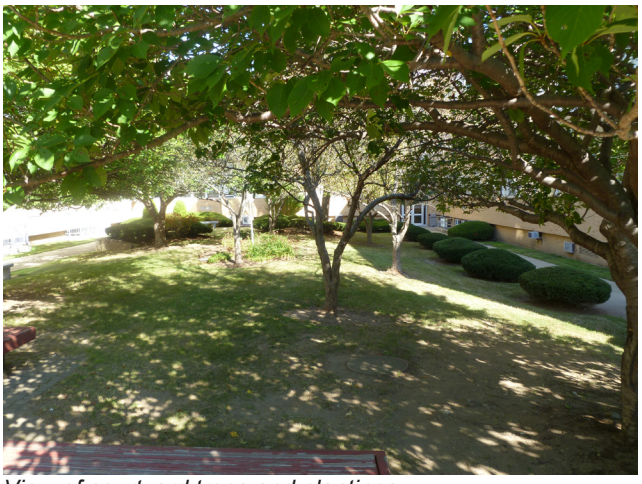
The landscape design for the New Science Building at Meier Hall is formed around three distinct landscape types: the Lafayette Streetscape pedestrian zone, the Hillside landscape, and the Meier Hall Courtyard.

Meier Hall Courtyard is a quiet cloistered space with existing ornamental fruit trees and a few shade trees covering a shaded lawn with benches (see photos next page). Evergreen hedges along the sidewalks further enclose the lawn area for privacy. The New Science Building will form the southern edge of the courtyard and a student terrace extends into the courtyard as an extension of the student commons area in the building. This terrace is intended to be multi-purposed for casual use and perhaps serve as an informal performance and art display area to engage the campus with the courtyard space. The New Science Building will provide a universally accessible path into the Meier Hall Courtyard allowing all students, faculty and visitors full access.

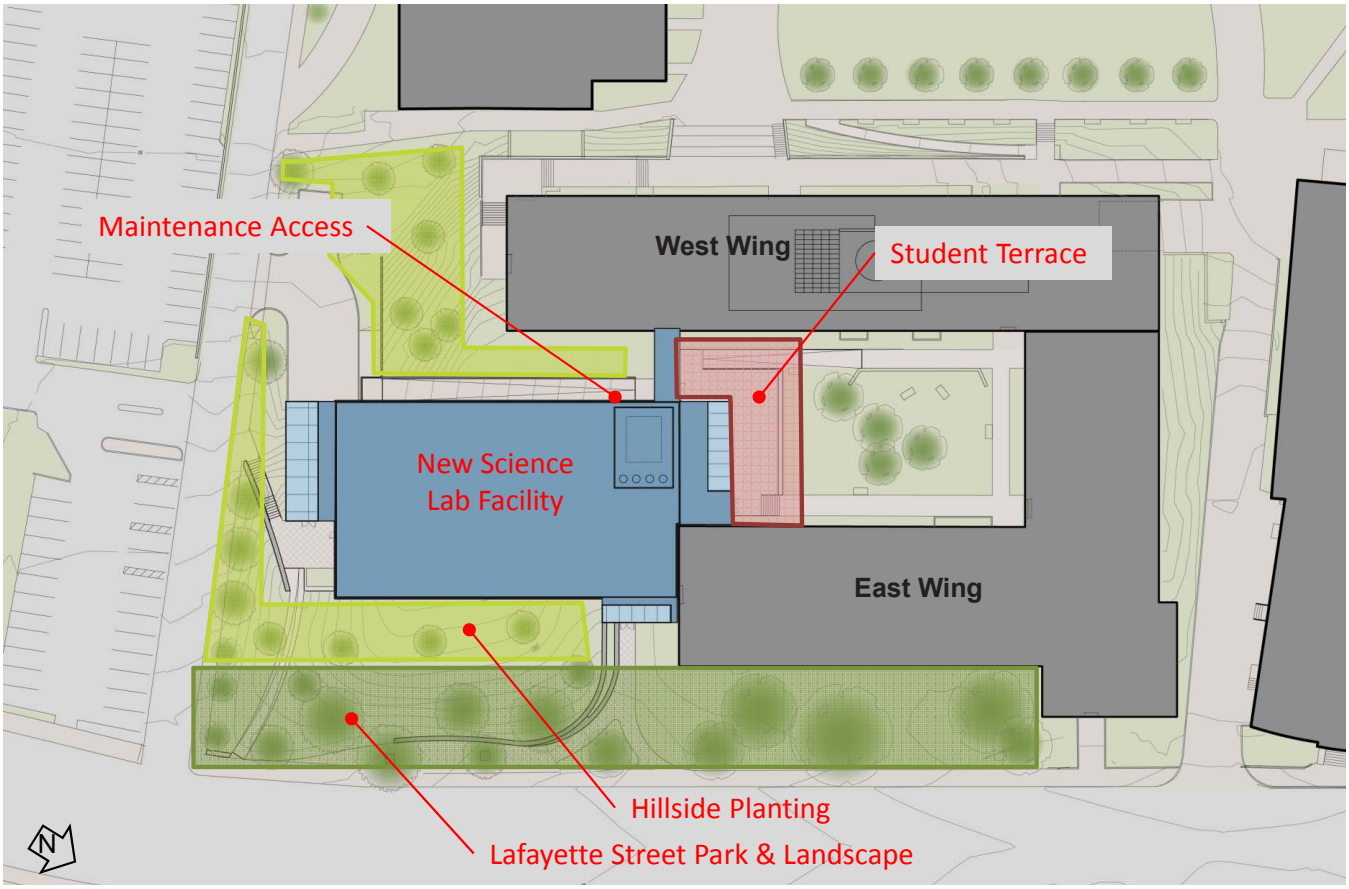
The existing topography of the site and the shallow depth to bedrock is a unique challenge for the landscape design. In consideration of steep slopes and dry soil conditions, the Hillside landscape will be planted with indigenous ornamental grasses, low ornamental shrubs and ground cover adapted to shallow soil conditions. This approach minimizes the need for extensive maintenance and forms an attractive texture of colors and patterns of plantings similar to those found in the waterfront environment.

The majority of the east wing of existing Meier Hall is set back 65-feet from the curb edge of Lafayette Street. The deep set back area will be planted with evergreen shrubs, mature shade trees and lawn. The intent of the landscape design for the street edge along the New Science Building is to emulate the landscape typology of large shade trees, evergreen groundcover and shrubs and extend that character to the corner of Lafayette and College Drive. In addition to matching the planting character of the existing street edge, the sidewalk along the New Science Building is widened and bench seating is provided for general public use.

Collectively these three proposed landscape types will work together to address specific site conditions while provide a collegiate setting for the New Science Building. By addressing public circulation, specific site conditions and expanding student spaces, the landscape design will provide Salem State University a unique campus environment.



View of courtyard trees and plantings



Landscape Concept Plan

Lafayette Street Landscape

Example of Hillside planting landscape

Accessibility / Universal Design

The design team met with Polly Welch, DCAMM's Accessibility Manager, and Emmanuel Andrade, DCAMM's Regional Planner, Statewide Accessibility Initiative to review the accessibility and universal design approach for both the landscape and the programmed elements within the building. From that meeting, the design team worked through various iterations of the landscape and arrived at the approach on the following page. The design team also drafted an accessibility memo for the program components within the building. This has been reviewed and edited by Emmanuel. The memo is on the following page.

DCAMM has undertaken an analysis of the accessibility of North Campus and created a map detailing accessible paths of North Campus (shown on the next page). The New Science Building is located at the corner of Lafayette Street and College Drive on the site of the demolished Lafayette Library.

Below are the pertinent features of the consensus solution accessibility and universal design approach and are noted on the site plan on the next page.

- Along Lafayette Street, the north east entrance into level 1 is accessed by a sloped walk of approximately 2% (1:50). A campus shuttle bus stop and accessible parking is located approximately 200 feet north along Lafayette Street near the entrance to the Gordon Center for Creative and Performing Arts/ Mainstage Theatre (See item 1 on map).

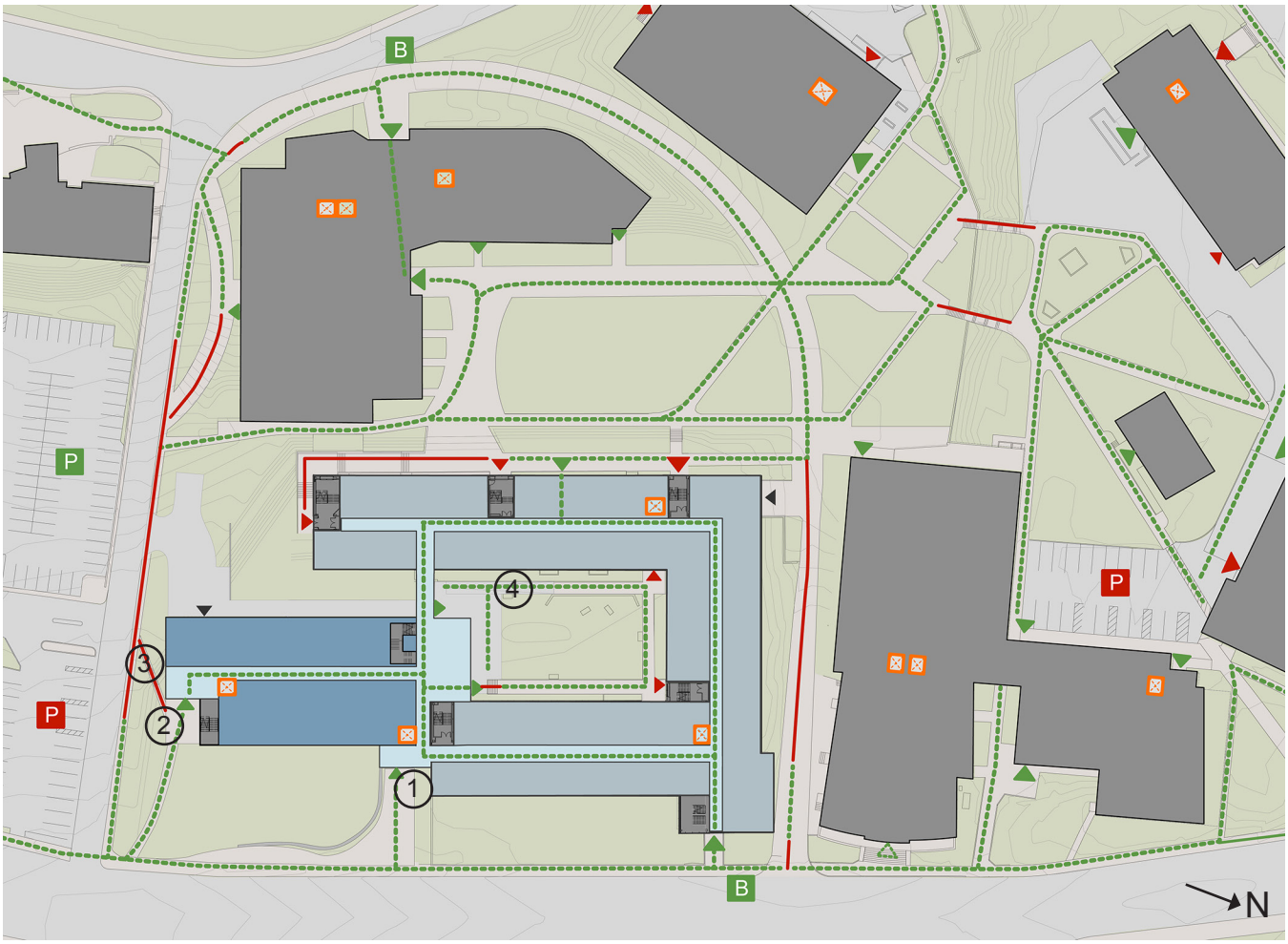
- At the intersection of Lafayette Street and College Drive, a sloped walk of approximately 4.5% (1:22) connects the public sidewalk with Level 2 of the New Science Center (See item 2 on map).

- In addition to the sloped walkway, there is a stair from College Drive connecting to the Level 2 entry (See item 3 on map). Since there is not an accessible ramp (an impossibility due to the grade change) that parallels the stair, a variance from MAAB will be required. DCAMM will aid the design team in requesting this variance.

- The new student plaza in the Meier Hall Courtyard will provide a sloped walk of approximately 4.5% (1:22) to allow circulation from the New Science Building and existing Meier Hall into the courtyard (See item 4 on map).

- These planned pedestrian connections will allow also for accessible circulation to all parts of the existing Meier Hall building.

Accessibility Site Plan



1. Northeast entrance at Level 1, Approximate slope down of 2%
2. Southeast Entrance at Level 2, Approximate slope up at 4.5%
3. Stair from College Drive to Level 2
4. Courtyard Entry at Level 2, Approximate slope down at 4.5%

KEY:

- Inaccessible Entry
- Accessible Entry
- Inaccessible Path of Travel
- Accessible Path of Travel

PAYETTE

Memorandum

Project:	Salem State University New Science Lab Building
Project No:	DCAMM SSA 1401-ST1
Subject:	**Program Review for Accessibility**
Memo By:	Todd C. Sloane (PAI) Emmanuel Andrade (DCAMM)
Date:	April 27, 2015 and May 14, 2015. Revised on June 2, 2015

1.1 **General Information**

SSU New Science Building is currently nearing completion of the study phase of the project. The goal of this memo is to review compliance with both ADA and MAAB. The general design guidelines listed below were arrived at from similar meetings for CCCC which parallel the SSU project.

Accessibility regulations are those regulations required by law (for this project ADA and MAAB). The goal of **Universal Design** is to make designs universally designed beyond minimum compliance to meet the needs of all users, but it is not regulated by law.

Per 521 CMR 12.4: at least 5%, with a minimum of one of each type of element, in each classroom or laboratory must be accessible.

1.2 **Teaching Labs**

Sinks:
Counters with accessible sinks will be no higher than 34" AFF. In a room with a sink(s), a minimum of one sink will be accessible. Per the CCCC meeting, Emmanuel Andrade met with Tom Hopkins at MAAB on April 2, 2015 and confirmed that, in each lab, at least one accessible sink is required by 521CMR 12.4. Deep sinks with side approach are allowed in addition to the accessible sink; however, a variance must be requested to the MAAB. This type of variance for deep sinks is often granted by the MAAB. A clear space of 30" wide by 48" deep will be provided in front of an accessible sink.

Demonstration Tables:
Demonstration tables located near the front of the room will not be used by students. However, all demonstration tables will be accessible. The intention of the design team is to provide a mobile demonstration/presentation table which will include the front end of the AV equipment. This table will have adjustable legs which can accommodate heights of 26" to 36" in height.

Computer Stations & Bench Top Equipment:
When computer stations or bench top equipment (such as balances are required in the teaching lab or other type of equipment used as part of teaching/training) are placed on top of counters, at least one station of each distinct use will be accessible as required by 521CMR 12.4 – on a 34-inch high counter with knee clearance below for forward approach by those using wheeled mobility devices.

Storage:
50% of storage at these accessible work areas will be within the reach ranges and must have compliant hardware.

Fumehoods:
In rooms with student use fume hoods at least one will be accessible. If the fume hood is intended for dispensing and storage, we will not make it forward reach accessible as students will not be working in the hood. Currently, chemical storage/flammable storage is planned for below this hood, and it would reduce the functionality of the lab to replace this vented chemical storage cabinet with knee space. A variance through the MAAB would need to be obtained to use fume hoods intended for dispensing and storage.

Student Bench:
Currently the Design includes multiple student benches in a typical teaching lab. One bench top will be no higher than 34" AFF. Clear space under this bench top will be accommodated. Where utilities such as power/data/vacuum/natural gas turrets/compressed-air are required, these utilities will be accessible at this bench location.

Coat Hooks/Cubbies:
50% of coat hooks and cubbies in each space will be accessible and no higher than 48" AFF.

Safety, Environmental Controls, Visual Display Boards:
All environmental controls (light, thermostats, A/V, etc.), campus telephones, and other controls inside the spaces will be accessible (no higher than 48" AFF);
As best practice, emergency shower/safety should be located near accessible sinks and white boards and will be mounted no higher than 42" AFF to accommodate those using wheeled mobility devices.

1.2 Lab Support Rooms

SSU's Lab Support Rooms are not intended for *student* use: we would propose that one Lab Support Room – a Lab Prep; for each of the 3 disciplines (Biology, Chemistry & Geology) be designed as fully accessible, but all others be designed to be maximally functional for tech staff. The staff-only lab Support Rooms will have a clear accessible aisle and a turnaround space. An area where a staff member could work in a seated position will be included. MAAB will require the design team to provide floor plans of all floor levels with public areas and employee-only areas identified by distinct colors. In addition, an affidavit signed by SSU must state that employee-only areas will never be improperly used by the public (students, volunteers, student/interns, etc.) or improperly converted into public areas in the future. Both drawings and affidavit must be distributed by the design team to MAAB, DCAMM, and the Registry of Deeds.
In addition to the definition of "employee area" under the MAAB, please be aware of the definition of employee area under the ADA.
Tissue culture, instrumentation room and any other specialized learning spaces used by students as part of teaching/training will be fully accessible. For example, the following will be accessible for students with disabilities: accessible sinks, fume hoods, biosafety cabinets, benches, tables, counters with computer stations and equipment used as part of teaching/training, power and data, gas taps, and storage.

1.3 **Research Labs**

The Research Labs in the project will be limited in quantity and will be used by both faculty and students, and therefore will be accessible according to the MAAB and the ADA. The research bench will be designed to provide flexible heights which can accommodate either a low bench 30” up to a 36”. The research lab will include a single hood at a working height of 36”, which will require chemical and flammable storage below. The lab will also accommodate a location for a 4’ accessible mobile fume hood if required for use by the researchers in the lab. Highly specialized equipment such as the NMR and SEM will only be used by highly trained faculty and will be under the observance of the research lab environment.

1.4 **Offices**

There are only 3 offices in the project. These three spaces are for the Lab Technicians only. These rooms will be accessible.

1.5 **Specialty Spaces**

The Greenhouse is a specialty space currently in the building program. We have strategically placed the greenhouse on the 5th floor of the building and instead of the roof so it can be easily accessed by all the students. The greenhouse will be accessible and include compliant sinks and potting benches. Aisle widths and turning radius will be accessible as well.

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Sustainability: Analysis and Strategies / LEED / EO484

On February 5, 2015, the design team held a Sustainable Workshop with DCAMM, SSU, and the design team's consultants. The meeting minutes for this workshop can be found in the Appendix.

Lab buildings historically use a large amount of energy due to the mechanical requirements associated with the equipment, such as fume hoods. Around 70% of the energy use of the building is attributed to the mechanical system - heating, cooling, and fan use. The benchmark in energy usage is EUI (Energy Use Intensity). Average research labs use approximately 300 kBtu / yr / SF. The target for this building is around 110 kBtu / yr / SF, and currently the design team is working with buildings that are tracking energy usage around ~100 kBtu / yr / SF. The design team and consultants are committed to making this an energy efficient building.

In order to achieve this target, the roadmap for the design must follow these steps:

- Reduce demand
- Optimize systems
- Select alternative sources of energy

As an outcome of the Sustainability Meeting, listed below are a few items being pursued for the design of the building that will aid in reducing demand on the energy use.

- Filtered Fume Hoods (EHS Consultant to Review for SSU)
- Low Flow Fume Hoods
- Plug Load Study
- Lighting Load
- Decreased ACH Rates with the use of Aircuity
- Incentives by National Grid for Net Zero Buildings

The project is contractually obligated to obtain LEED Silver. Based on the current LEED scorecard (following page), the project is on track to achieve this certification.

LEED 2009 for New Construction and Major Renovations

Project Checklist

Salem State University

June 1st 2015

Sustainable Sites — Possible Points: 26

Y	?	N			
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
		1	Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
1			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
		3	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
1			Credit 5.1	Site Development—Protect or Restore Habitat	1
1			Credit 5.2	Site Development—Maximize Open Space	1
	1		Credit 6.1	Stormwater Design—Quantity Control	1
	1		Credit 6.2	Stormwater Design—Quality Control	1
1			Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
	1		Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

Y			Prereq 1	Water Use Reduction—20% Reduction	
4			Credit 1	Water Efficient Landscaping	2 to 4
		2	Credit 2	Innovative Wastewater Technologies	2
2	2		Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
10	9		Credit 1	Optimize Energy Performance	1 to 19
	1	6	Credit 2	On-Site Renewable Energy	1 to 7
	2		Credit 3	Enhanced Commissioning	2
2			Credit 4	Enhanced Refrigerant Management	2
	3		Credit 5	Measurement and Verification	3
	2		Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y			Prereq 1	Storage and Collection of Recyclables	
		3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
		2	Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	?	N			
2			Credit 4	Recycled Content	1 to 2
2			Credit 5	Regional Materials	1 to 2
1			Credit 6	Rapidly Renewable Materials	1
1			Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1			Credit 1	Outdoor Air Delivery Monitoring	1
1			Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
		1	Credit 6.2	Controllability of Systems—Thermal Comfort	1
1			Credit 7.1	Thermal Comfort—Design	1
	1		Credit 7.2	Thermal Comfort—Verification	1
	1		Credit 8.1	Daylight and Views—Daylight	1
1			Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

1			Credit 1.1	Innovation in Design: Green Cleaning	1
1			Credit 1.2	Innovation in Design: Green Education	1
1			Credit 1.3	Innovation in Design: Resilience	1
1			Credit 1.4	Innovation in Design: TBD	1
1			Credit 1.5	Innovation in Design: TBD	1
1			Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

		1	Credit 1.1	Regional Priority: Brownfield Redevelopment (SSc3)	1
	1		Credit 1.2	Regional Priority: Stormwater Design, Quantity Control (SSc6.1)	1
1			Credit 1.3	Regional Priority: Heat Island Effect, Nonroof (SSc7.1)	1
1			Credit 1.4	Regional Priority: Heat Island Effect, Roof (SSc7.2)	1

Total — Possible Points: 110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Regulatory Analysis

Introduction

The Salem State University (SSU) Meier Hall Addition project includes construction to the south end of the existing Meier Hall located at 358 Lafayette Street in Salem, MA. Renovation to the existing building will be performed with limited scope and primarily focuses on the connection to the new addition. The addition will contain offices and laboratories. The addition will be constructed as a separated building from the existing Meier Hall. It is our understanding that the proposed roof height of the addition will be less than 70 ft. Thus the addition will not be considered as a high-rise building.

Following this section are a set of building plans that identify some of the code requirements detailed within this report.

Following is a list of applicable codes:

Code Type	Applicable Code (Model Code Basis)
Building	780 CMR: Massachusetts State Building Code, 8th Edition (2009 International Building Code and 2009 International Existing Building Code)[A]
Fire Prevention	527 CMR 1.00: Massachusetts Fire Prevention Regulations (2012 NFPA 1)
Accessibility	521 CMR: Massachusetts Architectural Access Board Regulations
Electrical	527 CMR 12.00: Massachusetts Electrical Code (2014 National Electrical Code)
Elevators	524 CMR: Massachusetts Elevator Code (2004 ASME A17.1)
Mechanical	2009 International Mechanical Code (IMC)[A]
Plumbing	248 CMR: Massachusetts Plumbing Code
Energy Conservation	2012 International Energy Conservation Code[A]

A. The next edition of 780 CMR based on 2015 International Codes is expected to take effect in early 2016.

The proposed addition shall comply entirely with 780 CMR for the new construction and MA IEBC Chapter 10 wherever the addition has any impact on the existing building (MA IEBC 1001.1). The work in the existing building will focus on the connection to the addition. The renovation in the existing building will be classified as Alteration Level 2 and must comply with Chapters 6 and 7 of IEBC.

Since the work on the existing building is minimum, this report focuses on the addition.

1. Occupancy Classification

Group B (Offices, Classrooms/Laboratories < 50 occupants)

Hazardous materials will be used and stored in the new addition. The addition will utilize the control area approach as outlined in Section 3 of this report. A Group H occupancy will not be triggered by using this approach.

2. Minimum Construction Type and Height / Area Limitations

The table below shows the limiting height and area based on the proposed building height/area where the minimum construction type is Type IIA.

Table – Height/Area Limitation for the Addition

Code Reference	Type IIA Use Group B	
	Height	**Area**
780 CMR Table 503: Tabular Value	5 Stories (65 ft)	37,500 ft^2
780 CMR Section 504.2: Sprinkler Height Increase	1 Story (20 ft)	-
780 CMR Section 506.2 Frontage Increase (50% Open)	-	9,375 ft^2
780 CMR Section 506.3: Sprinkler Area Increase	-	750,000 ft^2
Height and Area Allowed	6 Stories (85 ft)	121,875 ft^2
Actual Height and Area	5 Stories	10,420 ft^2

The addition and the existing Meier Hall will be considered as two separated buildings. Therefore, the floor area and building height of the existing Meier Hall were not included in tables above. It should be noted that the addition, on Levels 2 - 5, will be connected to the existing building by a pedestrian walkway and a doorway through a fire wall separating two buildings.

The pedestrian walkway must comply with 780 CMR 3104. The pedestrian walkway must be separated from the building with fire barriers at least 2-hour rated. This protection shall extend vertically from a point 10 feet above the walkway roof surface, down to a point 10 feet below the walkway and horizontally 10 feet from each side of the pedestrian walkway. Openings within the 10 feet horizontal extension shall be provided with opening protective with a rating of a minimum of ¾-hour (780 CMR 3104.5). The width of the walkway shall be maintained with the range of 36 inches to 30 feet (780 CMR 3104.8).

The building will be provided with 30 ft long pedestrian walkways on Levels 2 to 5. The addition will be a fully sprinklered building; however, the existing Meier Hall will not be fully sprinklered. As such, 90-minute rated doors must be provided at both ends of the pedestrian walkway (780 CMR 3104.5). Alternatively, full sprinkler coverage in the addition and the link can potentially allow the use of smoke separation for the link at the addition side while the 2 hour separation with 90-minute rated doors are provided at the existing building side. However, this alternative approach needs the approval from the building official.

Based on the conceptual floor plans, a set of double-leaf doors will be provided at each end of the pedestrian walkway on each level with the exception that a 2-hour rated vertical fire shutter will be provided to separate the pedestrian walkway from the addition on Level 5.

The fire shutter is a permitted method to separate the pedestrian walkway from the connected building. It should be noted that the fire shutter must be an approved assembly for means of egress if the pedestrian walkway is used as the horizontal exit on Level 5. Otherwise, the open stair on Level 5 needs to be used as the required second exit. See Section 8, Means of Egress, of this report for details.

The fire wall between the existing Meier Hall and the addition must be at least 3 hour rated since the assumed construction type of existing building is Type I construction (780 CMR Table 706.4). Openings through a fire wall cannot exceed 156 square feet and the aggregate width of openings at any floor level cannot exceed 25 percent of the length of the wall (780 CMR 706.8).

Fire shutters are provided on Levels 2 – 4 for doorways through the fire wall at the south end of the east wing of Meier Hall. Fire shutter must be an approved assembly for egress purpose if these doorways are used as horizontal exits. See Section 8, Means of Egress, of this report regarding the use of horizontal exits.

3. Hazardous Materials

In order to maintain a Use Group B occupancy classification, all spaces that contain hazardous materials must not exceed the Maximum Allowable Quantities (MAQ) per control area as identified in 780 CMR Table 307.1(1) & 307.1(2) and 527 CMR -NFPA 1, 60.3.2 and 66.9.8 (see attached table). Otherwise, the space must be classified as Use Group H – High Hazard Occupancy, in which case additional more stringent requirements are applicable.

The table on the next page summarize the permitted number of control areas, the quantities in a control area on each floor, and the required fire resistance ratings.

Floor Level	Number of Control Areas Permitted	% of Exempt Amounts Per Control Area	Percentage of Maximum Allowable Quantity			
5	2	12.5%	**12.5%**	**12.5%**		
4	2	12.5%	**12.5%**	**12.5%**		
3	2	50%	**50%**	**50%**		
2	3	75%	**75%**	**75%**	**75%**	
1	4	100%	**100%**	**100%**	**100%**	**100%**

Based on the proposed plans, Levels 2 – 5 are provided with 2 control areas on each level.

The MAQs of each type of hazardous materials are provided in Appendix A at the end of this section of the report. The MAQs are based on the fact that the addition is fully sprinklered and approved storage cabinets, exhausted enclosures, and/or listed safety cans are provided for the storage of hazardous materials.

Specific protection requirements for spaces with hazardous materials are as follows:

Hazardous Exhaust System

In accordance with the provisions in 780 CMR, dedicated hazardous exhaust is not required in a control area where hazardous chemicals are maintained below the MAQ (780 CMR 414.3 & 414.5, IMC 502.9.5). However, according to 527 CMR, liquid storage areas where dispensing is conducted shall be provided with either a gravity system or a continuous mechanical exhaust ventilation system. Mechanical ventilation shall be used if Class I liquids are dispensed within the room (527 CMR –NFPA 1, 66.18.6).

Spill Containment

In accordance with the provisions in 780 CMR, spill control is not required in a control area where hazardous chemicals are maintained below the MAQ (780 CMR 414.5). However, according to 527 CMR, where individual containers for combustible/flammable liquids exceed 10 gal, spill control is required by curbs, scuppers, drains, or other means (527 CMR –NFPA 1, 66.9.13.2).

Explosion Control

Similar to spill containment, 780 CMR does not require explosion control for a control area with chemicals below the MAQ (780 CMR 414.5). However, where Class IA liquids are stored in containers larger than 1 gal, 527 CMR requires the

areas shall be provided with a means of explosion control in accordance with the NFPA 69 (527 CMR-NFPA 1, 66.9.16.1).

Electrical System

If the space involves pouring of flammable and combustible liquids or other similar operations which can release vapors into the atmosphere of the room, the electrical installation must at least comply with Class I Division 2 per NFPA 70 Section 500.5. Class I Division 1 equipment is required in areas where flammable vapors will existing under normal operating conditions.

Emergency Wash System

For areas in every school or building laboratory where corrosive or flammable liquids are handled, chemicals are stored or used, or open flame devices are used, one or more emergency wash systems must be provided (527 CMR – NFPA 1, 10.24; 248 CMR 10.13.(1).(l)). The emergency wash system must include drench/deluge showers, hand held body/face washers and deck mounted drench hose; the permanently mounted showers shall be located as close to the main door of the laboratory as possible, but should not be located more than 50 ft away from the protected area (527 CMR – NFPA 1, 10.24.1).

4. Fire Resistance Ratings

The following fire resistance ratings are required for Type IB and Type IIA constructions in accordance with 780 CMR Table 601 and various sections of the code.

Building Element	Fire Resistance Rating (Hrs)
	Type IIA
Primary Structural Frame[A]	1 [B]
Exterior Bearing Walls	1
Interior Bearing Walls	1
Exterior Non-Bearing Walls	Based on Fire Separation Distance [C]
Interior Non-Bearing Walls	Noncombustible [D]
Floor Construction	2[E]
Roof Construction	1

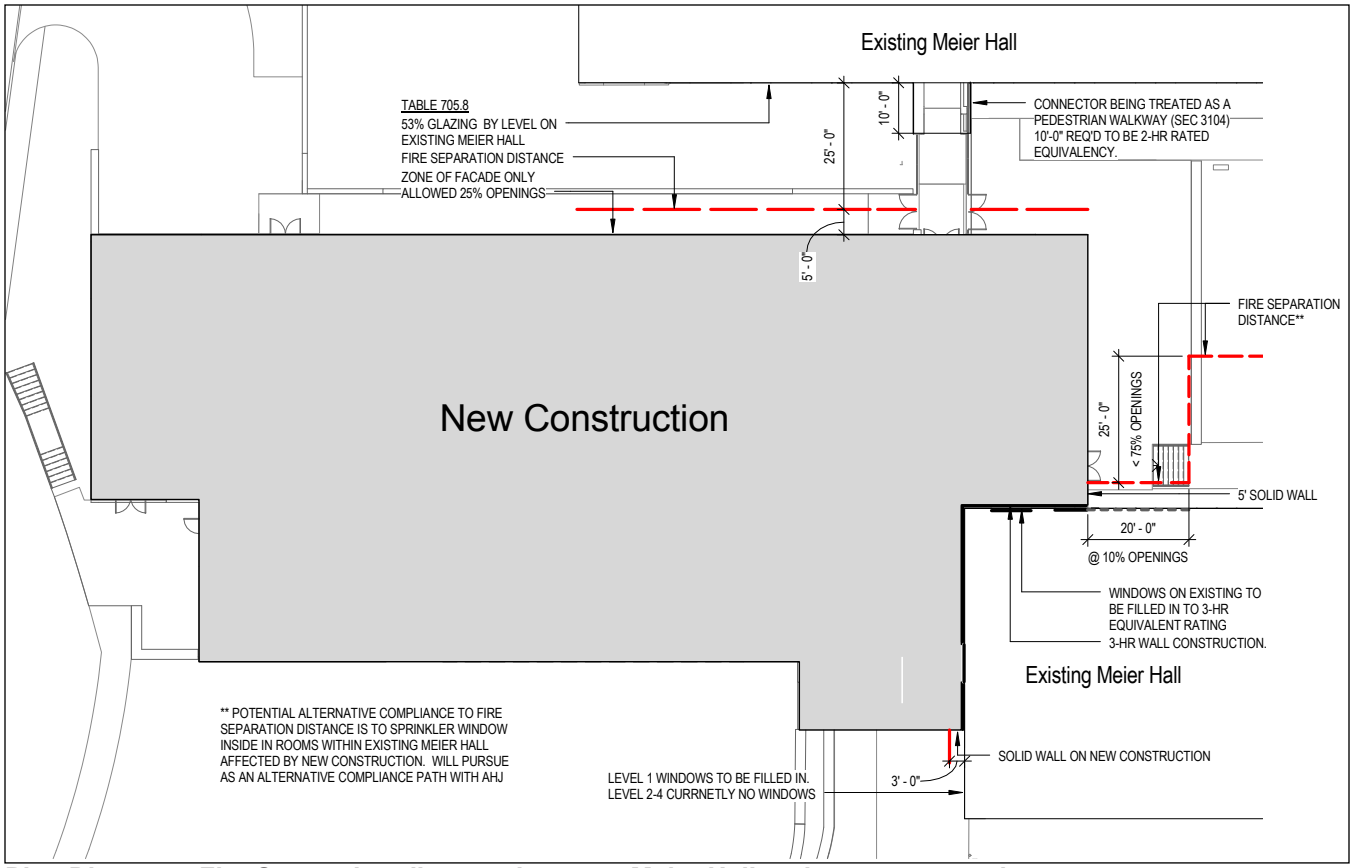
A. Includes beams, trusses, floor members, etc. having a direct connection to the columns (780 CMR 202).
B. Structural supporting the rated assemblies must afford the same rating as the assembly supported (780 CMR 704.1). For example, the structural frame supporting the 2 hour rated floor construction (control area separation) must be 2 hour rated as well.
C. See details in Section 6 of this report.
D. Combustible materials in Type IIA construction must comply with 780 CMR 603.
E. The 2 hour rated floor assembly is required for control area separations per 780 CMR 414.2.2.

Building Element	Fire Resistance Rating (Hrs)	Opening Protectives (Hrs)
Stair Enclosures and Other Shafts ≥ 4 Stories (780 CMR 1022.1 & 708.4)	2	1½
Stair Enclosures and Other Shafts < 4 Stories (780 CMR 1022.1 & 708.4)	1	1
Control Area Wall Separation≥ Level 4 (780 CMR Table 414.2.2)	2	1½
Control Area Wall Separation < Level 4 (780 CMR Table 414.2.2)	1	¾
Control Area Floor Separation (780 CMR 414.2.4)	2	1½
Fire Pump Room, if provided (780 CMR 913.2.1)	1	¾
Elevator Machine Room, if provided (780 CMR 708.14)	2	1½
Emergency Electrical Room (527 CMR 12.00 700-10(D)(2))	2	1½

5. Non-Load Bearing Exterior Wall Fire Resistance Rating

Existing exterior walls are not required to comply with the fire resistance rating and opening limitations for new construction, however any new walls or new openings must comply. For Type IIA construction, exterior walls are required to have a fire resistance rating of 1 hour where the fire separation distance (measured to the centerline of a public road, or to an imaginary line between two buildings on the same lot) is not more than 30 feet (780 CMR Table 602). Where the fire separation distance exceeds 20 ft, the allowable area of openings is not limited (780 CMR Table 602 and Table 705.8). Note that openings are not permitted where the fire separation distance is less than 3 ft. Also, where the fire separation distance is 10 ft or less, the exterior walls must be rated for exposure to fire from both sides (780 CMR 705.5).

The portion of the addition adjacent to the existing Meier Hall do not have a fire separation distance of 30 ft or more. Refer to the diagrammatic drawing on the follow page outlining the fire separation distances. This diagram is for planning purposes only and will need to be studied in more detail by the code consultant and the AHJ during design.



Plan Diagram - Fire Separation distance between Meier Hall and new construction

6. Vertical Floor Openings

New vertical openings are required to comply with 780 CMR 708.2. Unless specifically permitted, all vertical openings shall be enclosed with an appropriate fire resistance rating.

The proposed floor plans show that the addition will provide an open stair connecting Levels 1 - 2 and an second open stair connecting Levels 2 - 5 In addition, two floor openings are provided on Level 3 and Level 5, connecting Levels 2 – 3 and Levels 4 – 5, respectively.

The two open stairs can be permitted by 780 CMR 708.2 Exception 2.1. In order to use this section of this code, the stair opening between stories cannot exceed twice the horizontal projected area of the stairway; and the openings are protected by draft curtains and closely spaced sprinklers. Other two-story floor openings will be protected by horizontal fire shutters in accordance with 780 CMR 712.8 (780 CMR 708.2 Exception 12).

It should be noted that two open stairs must be separated by at least 1 hour rated construction so that it does not create a continuous vertical opening connecting more than four stories (780 CMR 708.2 Exception 2.1).

7. Interior Finishes

All newly installed wall and ceiling finishes, and interior trim materials in both the addition and the existing building must also comply with 780 CMR Table 803.9. The requirements are summarized below:

Minimum Rating for Walls & Ceilings (780 CMR Table 803.9)

Building Component	Fully Sprinklred (Addition)
	B
Exit Enclosures and Passageways	Class B
Corridors	Class B
Rooms and Enclosed Spaces	Class C

8. Means of Egress

The number of exits and the provided egress capacity must be sufficient for the calculated occupant load on each floor (780 CMR Table 1004.1.1, Table 1021.1, and Table 1005.1).

Level 1 is provided with two exterior exits. Level 2 is provided with three exterior exits. In addition Level 2 provides two accesses to the existing building which may be used as horizontal exits. Levels 3 – 5 are provided with two exits on each level where one of them is a horizontal exit. As such, each level can accommodate 500 people.

Fire shutters are proposed at the pedestrian walkway on Level 5. Use of a fire shutter will preclude use of this path for egress, however the open stair on Level 5 will be used as the open exit access stair to reach the required second means of egress. Similarly if fire shutters are used at the opening through the fire wall it cannot serve as a means of egress.

Since the open stair penetrates more than two floors, 780 CMR 1016.1 does not permit the use of open stairs connecting more than two floors as the exit access. If this project will be permitted under the current building code, a variance on using the open stair as the exit access is required. However, this open stair is permitted to be used by the occupants on Level 5 as the exit access to reach the second exit on Level 4 per 2015 IBC Section 1019.3 Exception 4 and Section 1006.3.3.

<u>General Egress Requirements:</u>

- Maximum exit access travel distances must comply with the table on the following page (780 CMR Table 1016.1, 1014.3, and 1018.4).

Egress Travel Distances	Group A-3	Group B
Travel Distance	250 ft	300 ft
Common Path of Travel	75 ft	100 ft
Dead-End	20 ft	50 ft

- All rooms or spaces with an occupant load greater than 50 people, or a common path of travel distance over the value listed in the table above must be provided with two egress doors swinging in the direction of egress and illuminated exit signs at each exit (780 CMR Sections 1015.1, 1008.1.2, & 1011.1). Boiler rooms require two means of egress if the room is greater than 500 ft2. and includes individual fuel-fired equipment greater than 400,000 Btuh input capacity.

- The clear width of all doors must be at least 32” (780 CMR 1008.1.1).

- Doors serving assembly rooms with more than 50 people and doors along the path of egress travel from such rooms must be provided with panic hardware (780 CMR 1008.1.10).

- When horizontal exits are provided, they shall not serve more than one-half of the total number of exits or total exit capacity (780 CMR 1025.1). Refuge area on each side of the horizontal exit to accommodate the anticipated occupants from the adjacent compartment. The refuge area shall be sized based on 3 ft2/person and may include corridors, rooms, etc. (780 CMR 1025.4). It should also be noted that Class I standpipe shall be provided on both side of the horizontal exit unless the horizontal exit can be reached by the 30 feet hose stream from the 100 feet hose connected to the hose connection in the stairway (780 CMR 905.4.2). A pedestrian walkway can also be used as a horizontal exit (780 CMR 1025.2, 3104.7, & 3104.9).

- All means of egress lighting and exit signs throughout the building must be provided with an emergency power supply to assure continued illumination for not less than 1.5 hours in case of primary power loss (780 CMR 1006.1 & 1011.1).

- Remote means of egress must be separated by ⅓ of the diagonal dimension of the room or space they serve (780 CMR 1015.2.1). The distance between exits may be measured along 1-hour fire resistance rated corridors complying with 780 CMR 1018 but must otherwise be measured in a straight line between exit doors.

- A stair or alternating tread device must be provided to any main roof surface four or more stories above grade (780 CMR 1009.13). Roofs and penthouses containing elevator equipment that must be accessed

for maintenance are required to be accessed by a stairway (780 CMR 1009.14). Permanent means of access to any roof containing mechanical equipment must be provided in accordance with the Mechanical Code.

- In buildings with four or more stories, where a required accessible floor is four or more stories above or below a level of exit discharge, at least one accessible means of egress must be an elevator complying with 780 CMR 1007.4 unless a horizontal exit is provided (780 CMR 1007.2.1).

- Standby power must be provided for the elevator to be considered an accessible means of egress (780 CMR 1007.4).

- A two-way communication system is required at each elevator landing on accessible floors that are one or more stories above or below the level of exit discharge (780 CMR Section 1007.8).

- At least one passenger elevator must be sized to accommodate the loading and transportation of an ambulance gurney or stretcher sized 24" wide by 84" long with 5" radius corners (524 CMR 17.40(1)).

9. Required Fire Protection Systems

The addition is required to provide the following fire protection systems:

- NFPA 13 sprinkler system throughout (780 CMR Table 903.2)
- Fire alarm system throughout (780 CMR 903.4.2 & 907.2.2)
- Standpipe system (780 CMR 905.3.1)
  Class I standpipes in exit stair enclosure;
  Class I standpipes on both sides of each horizontal exit.
- Fire extinguishers throughout (780 CMR 906.1)

It should be noted that the addition and the existing Meier Hall are considered as two separate buildings. Therefore the fire area of existing Meier Hall will not increase. Therefore, the existing building is not required to be sprinklered (IEBC 1002.3)

10. Energy Code Provisions

The project is subject to the provisions of the 2012 International Energy Conservation code with Massachusetts Amendments (Massachusetts Energy Code).

11. Plumbing Fixtures

The Massachusetts Plumbing Code (248 CMR) regulates the number of plumbing fixtures required throughout buildings. The minimum number of

plumbing fixtures is established by 248 CMR 10.10(18) Table 1 based on the building use and the expected population as determined by the local Plumbing Inspector per 248 CMR 10.10 (18)(2). The Plumbing Inspector must approve the building population, however, the building population can generally be based on the designer's determination of the actual number of people expected within the building. The Plumbing Code expects that the building population will be divided evenly between male and female for the purpose of determining fixture counts. Any distribution other than 50/50 must be justified to the Plumbing Inspector.

In addition to toilet facilities for students, separated toilet facilities shall be provided for teachers and staff employees (248 CMR 10.10 (18)(18)(h)(iv)). In general, employee or staff toilets are permitted to be provided within branch levels (248 CMR 10.10(18)(i)(ii)).

The table below lists the population of the building in terms of the capacity of the labs and includes additional population numbers for the open student spaces. Not all labs will be in session at exactly the same time frame, therefore these population numbers would represent the worst case scenario for the building. These populations numbers and plumbing fixture counts have been used conceptual planning purposes only, and have not been vetted by the plumbing official. Vetting these numbers will be an outstanding issue during the design phase of the project.

Plumbing Fixture Count for Concept Design

NUMBER OF OCCUPANTS

	Number of Occupants of Labs*	Student Space (Assembly - Non-fixed Tables and Chairs)	Total	Men	Women	Total Staff**
Level 1	N/A	N/A				1
Level 2	56	102	158	79	79	5
Level 3	104	64	168	84	84	10
Level 4	91	84	175	88	88	9
Level 5	121	38	159	80	80	11
Total						36

PLUMBING FIXTURES - STUDENTS

	Educational (post secondary)	Water Closet females *1 per 90*	Water Closet males *1 per 180*	Urinals male *1 per 180*	Lavs each sex *1 per 180*	Drinking Fountain*^ *1 per 75*	Service Sink *1 per floor*
Level 2	Required	1	1	1	1	3	1
	Provided	2	1	1	1	3	1
Level 3	Required	1	1	1	1	3	1
	Provided	2	1	1	1	3	1
Level 4	Required	1	1	1	1	3	1
	Provided	2	1	1	1	3	1
Level 5	Required	1	1	1	1	3	1
	Provided	2	1	1	1	3	1

PLUMBING FIXTURES - STAFF

	Educational (post secondary)	Water Closet females *1 per 20*	Water Closet males *1 per 25*	Urinals male *33%*	Lavs each sex *1 per 40*
	Required	1	1	0	1
	Provided (see note)	1	1	0	1

Note: Staff toilets provided on Level 2 and Level 4. Additional gender neutral toilet provided on Level 3.

*Students = number of seats in labs
**Staff = one per teaching lab / lab support + offices
*^ Supplying drinking fountains + bottle filler

12. Accessibility for Persons with Disabilities

Jurisdictional Analysis

There are two different accessibility regulations that apply to the Meier Hall. The state accessibility regulations, 521 CMR, are part of the State Building code and are enforced by the building inspector and the Massachusetts Architectural Access Board (MAAB). Any feature that is required to be compliant must be modified to meet the regulations unless a variance is requested through DCAMM and granted by the MAAB. Even with an MAAB variance, there may be ADA requirements that must be met.

The federal law governing accessibility in state and municipal buildings is Title II of the Americans with Disabilities Act (ADA). It requires that all programs and services offered to the public be accessible, either structurally or programmatically. Non-structural accommodations can be used to provide access to physically inaccessible facilities, if provided in an equal and integrative way. The architectural requirements for compliance with the ADA are embodied in the ADAAG (American with Disabilities Architectural Guidelines) and are generally, *but not always*, similar to the requirements of the MAAB.

Massachusetts Architectural Access Board Regulations

All areas open to the general public (residents, students, etc.) are required to comply with the requirements of the Massachusetts Architectural Access Board (521 CMR). This section includes the following major provisions:

- All public entrances must be accessible (521 CMR 25.1)
- All public and common use areas must be accessible and provided with an accessible route thereto (521 CMR Section 12.2.2 and 20.1).
- All public toilet room must be accessible toilet rooms (521 CMR 30.1)
- Where tables, study carrels, computer workstations or fixed seating is provided at least 5% with a minimum of one of each item must be accessible (521 CMR Section 12.2.2)
- The maximum slope of a ramp cannot exceed 1:12 (8.3%) in accordance with 521 CMR 24.2.1.

Preliminary IT Strategy

The following text provides a Basis of Design Narrative - Low Voltage Systems covering Telecommunications Cabling, Data Communications System, and Wireless Communications System.

Telecommunications Cabling

- A new telecommunications cabling infrastructure shall be installed in compliance with the latest TIA standards and the latest edition of the Salem State University's Low-Voltage Wiring Standards issued by Information Technology Services Networking Services.

- The media and telephone utility company services and fiber/data lines shall be terminated in a telecommunications entrance facility (EF), fed from a new ductbank located at College Drive to existing fiber, cable and telephone pickup points. The configuration of the ductbank will allow for four (4) empty sleeves for future expansion.

- Fire rated plywood backboards, grounding, equipment racks, 110-type punch down blocks, patch panels, conduit sleeves, and corridor cable tray system shall be provided in the EF, the telecommunications equipment room (TER) and the telecommunications rooms (TR). The pathway system, racks and equipment shall be sized for complete utilization of the service entrance cables and all voice and data outlets plus room for future growth. Voice and data outlets shall be provided in all offices and in the classrooms. Voice and data horizontal cabling shall be Category 6A, unshielded, twisted pair, 8 conductor copper cable from each jack to the nearest telecommunications closet. Each end of each cable shall be labeled; the cables shall be terminated in accordance with TIA-568-B configuration, and tested in accordance with TIA standards.

  a) Surface mounted metal raceway shall be provided by the electrical subcontractor.
  b) Empty conduits to accessible point above ceiling or below floor shall be provided by the electrical subcontractor.
  c) Floor boxes and poke through devices shall be provided by the electrical subcontractor.
  d) Standard device boxes with plaster rings for data and Integrated Security and Communication System shall be provided by the electrical subcontractor.
  e) Card reader system backboxes shall be installed by the electrical subcontractor and furnished by this systems integrator.
  f) Structural blocking to support wall and ceiling mounted televisions/ monitors shall be provided by the General Contractor.
  g) Interface with public utilities telephone service shall be arranged by the owner's service provider, and coordinated with this systems

integrator.

- Material to be supplied for the Horizontal Subsystem include; but are not limited to the following:

  a) Outlets, face plates, and hardware at all locations shown on the Drawings, including power pole interface.
  b) Cross-connect Fields and wiring termination as required for a complete installation.
  c) Wire distribution rings and management systems necessary to meet BICSI and industry standard of installation.
  d) Provide cable tray and supports as necessary to meet BICSI and industry standard of installation.
  e) Fire stopping, as required by the local, State, and NEC Sections 250 codes.
  f) All cables used, must be UL listed and meet requirements for NEC Section 800 for copper and fiber media.

- A minimum of one voice/data outlet shall be provided in each office. One wall phone outlet and a minimum of seven (7) data outlets shall be provided in each classroom. Two (2) data outlets shall be provided in the ceiling in corridors and assembly areas on 40 ft. centers for wireless access points, cabling to wireless data access points shall be shielded Category 6A cables. Media Center and Tech classrooms shall be provided with multiple data drops for workstations, printers, and access points.

- Voice/data outlets shall be provided in multiple service floor outlets or fire rated poke-thru devices for equipment and appliances when the equipment is to be placed on worktables, counters, systems furniture, or cabinets that are not against fixed walls.

- Backbone cables shall be provided between the EF, TER and each TR. Copper backbone cables shall be voice grade Category 3 cable. The cables shall be tested in accordance with ANSI/TIA standards. Optical fiber cables shall be 24-strand (50/125µm) multimode laser optimized cable. The cables shall be terminated in fiber optic patch panels at both ends. The circuits shall be tested for insertion loss at both ends at 1310 and 1550nm. High-resolution Optical Time Domain Reflectivity (OTDR) tests shall be performed on each fiber at one end.

Data Communications System

- Provide a new data communications system. The data communication equipment shall comprise of 10/100/1000 core and edge switches based on HP 5400 series chassis. The switches shall be equipped with PoE

and non-PoE 1-Gigabit copper Ethernet ports and 10-Gigabit fiber optic ports for connection between core and edge switches. The switches shall provide connection of a number of devices together (PCs, servers, printers, etc.) over a wired data system and control access to various parts of the network. The servers and storage farm shall be provided under the FF&E budget.

Wireless Communications System

- Provide a new wireless (Wi-Fi) data communications system. The Wi-Fi data communications equipment shall comprise of a controller and a/b/g/n access points based on HP. The access points shall provide wireless connection of a number of devices together (PCs, servers, printers, etc.) over a Wi-Fi network and control access to various parts of the network.

Outstanding Issues for Final Design

There are outstanding issues that the design team will need to work through when the project begins the design phase. This project will encounter many design questions as the project moves from the conceptual phase. The outstanding design questions include but are not limited to:

- Alternate solution to ramp acess to courtyard from loading dock
- Lab layout - fume hood and biosafety cabinet locations, casework location and types
- Student bench configuration - number of drawers, etc.
- Finalizing utilities per lab
- Design of student space
- Entry sequence for students coming up College Drive from new parking garage and potential entry at Level 1, the Loading Dock Level.
- Determination of the limit of work at the interface between the new construction and Meier Hall.

Aside from all the outstanding design questions, the issues outlined below broadly break down into 3 categories of testing, official/code review, and utility infrastructure outstanding questions.

Testing

- Complete Haz Mat Testing - currently underway
- Complete Soil Testing
- Complete wind tunnel and entrainment study

Utilities & Systems

- Direction between Campus Steam vs. Condensing Boilers
- Verification of utility locations & sizes
- Chilled beams vs. all ducted fan coil units
- Centralized purified water system or decentralized system

Project Review / Regulatory

- Review project with Authority Having Jurisdiction (AHJ), City of Salem Building Code Official, State Plumbing Inspector, Local Fire Official
- Variance on using open stair as exit access
- Approval for the use of smoke separation for the connector between the new construction and Meier Hall
- Approval of project as low-rise construction
- Review project with environmental agencies if required

D. EXISTING CONDITIONS

1. SUMMARY
2. SURVEY
3. GEOTECHNICAL INVESTIGATION
4. UTILITY CAPACITY ANALYSIS

EXISTING CONDITIONS

Summary

SSU's North Campus has undergone significant infrastructure changes in the last 10 years with the demolition of the old Library and the construction of the new Berry Library & Learning Commons (completed in 2013) and adjacent campus green. Due to all of the work done on the campus, a large amount of data documeting site and building conditions was readily available and aided in the development of the Consensus Solution.

Survey

After the demolition of the old library, the hill to the south of Meier Hall was regraded. This portion of the project was surveyed in the fall of 2014 and tied into existing surveys that were completed for the new Library project. All elevation markers are in feet and are referenced to the National Geodetic Vertical Datum (NGVD) of 1929. The survey is an AutoCAD file and is a digital attachment to this report.

Geotechnical

Given the amount of work undertaken on North Campus over the years, there is a wealth of geotechnical information about the site, indicating a large amount of ledge. A significant amount of information dates back to the original construction of Meier Hall in 1962 and 1968. Geotechnical investigation was also completed for portions of the area with the construction of the new Library in 2009. DCAMM hired GEI Consultants to review and consolidate existing data. The complete memo and findings are included in the Interim Report.

That memo detailed the elevations for the rock ledge within the site. This has been used in the concept designs to estimate the amount of rock removal for the various schemes and the consensus solution. A more thorough geotechnical investigation was completed at the conclusion of the consensus solution, and this report begins on the following page. The backup information, such as boring locations, can be found in the Appendix of this report.

The findings from this report will need to be incorporated into the understanding of the foundation systems and the amount of rock excavation required once the project moves into design. A soil characterization report is also included in the Appendix of this report.

GEI Consultants

Consulting Engineers and Scientists

Revised September 24, 2015
September 2, 2015
Project 141266-1

Ms. Gail Rosenberg
Senior Project Manager
Office of Planning Design & Construction
Division of Capital Asset Management and Maintenance
One Ashburton Place
Boston, MA 02108

Dear Ms. Rosenberg:

Re: Geotechnical Recommendations for Preliminary Design
New Science Building
Salem State University
Salem, Massachusetts
DCAMM Project SSA 1401-ST1

This letter report presents the results of our geotechnical exploration program and recommendations for the proposed new science building at Salem State University in Salem, Massachusetts. We performed the following scope of work:

- Performed ten geotechnical borings to observe soil and rock conditions.
- Performed unconfined compressive strength testing on six rock core samples.
- Developed geotechnical recommendations for design and construction.
- Prepared this letter report.

Mr. Ken Lortie authorized our work by issuance of a Notice to Proceed dated June 26, 2015.

Elevations in this report are in feet, and are referenced to the National Geodetic Vertical Datum (NGVD) of 1929.

Our recommendations are based on the 8th Edition of the Massachusetts State Building Code, which consists of the International Building Code 2009 with a package of Massachusetts Amendments (Building Code).

Project and Site Description

The site for the proposed new science building is located on sloping land adjacent to Lafayette Street and College Drive at the Salem State University Campus in Salem, Massachusetts, as shown in Figs. 1 and 2. Existing grades across the site range from El. 29 to El. 56, and across the building footprint from El. 39 to El. 56. The site is covered primarily with grass and is adjacent to the Frederick A. Meier Arts and Sciences Hall. Concrete stairs and landings are located in the

northern portion of the site, allowing egress from the two wings of Meier Hall to Lafayette Street. A concrete walkway cuts across the southwest corner of the proposed building footprint. There is an exposed bedrock outcrop (identified as "ledge" in Fig. 2) in the high ground area adjacent to a stairwell and the east wing of Meier Hall, as shown in Fig. 2.

The proposed building will be a 6-level building (5 floors plus a penthouse) on the site of the former library building and adjacent to and possibly connecting to Meier Hall. The proposed top of slab elevation of the bottom level is El. 34. The proposed building footprint will be about 200 feet by 85 feet. Because of the shallow, sloping rock surface, the building will be stepped to follow, to some extent, the rock surface. However, some amount of rock excavation during project construction is anticipated.

Review of Existing Subsurface Conditions

We reviewed copies of construction drawings for the original Meier Hall (identified on the drawings as the "Business Education Arts and Science Building"), the expansion (identified as the "Addition to Arts and Science Building"), the former library, and the newly constructed library. The boring location plans for the two phases of Meier Hall and for the old library include notations of exposed bedrock, as well as boring locations and logs.

Based on our review, the original top of bedrock in the area of the proposed science building was above the top of floor slab of the former library and the existing ground surface indicating that bedrock was excavated for the former library. Excavation may have been deeper locally for footings and utilities.

Exploration Program

GEI engaged Northern Drill Service, Inc. of Northborough, Massachusetts to perform ten borings (B1 through B10) from August 12 to 17, 2015 at the approximate locations shown in Fig. 2. The borings were advanced to depths of 7 to 20 feet using a track mounted drill rig with an automatic hammer system and rotary wash drilling techniques. Thirteen geoprobes were also performed on the site on August 10, 2015. The results of the geoprobes are discussed in a separate letter addressing soil characterization for off-site soil reuse and disposal.

Standard Penetration Tests (SPTs) with split spoon sampling were performed in the borings at the ground surface and at roughly 5-foot intervals to the top of bedrock. Seven to ten feet of bedrock was cored in B1 through B6. B7 through B10 were drilled to refusal and advanced an additional two feet to confirm the presence of bedrock. Bedrock was cored with NX size coring equipment.

A GEI engineer observed and documented the borings and geoprobes. Boring logs and geoprobes logs are provided in Appendix A.

All explorations were laid out and staked using a hand-held Global Positioning System (GPS) unit, with a horizontal accuracy of about ±5 feet. As-drilled explorations, if shifted from the staked locations, were measured from the stakes or existing features using a tape measure. We estimated the ground surface of each exploration location from the elevation contours on the project site plan.

Laboratory Testing

GEI engaged GeoTesting Express to perform unconfined compressive strength testing on six rock core samples. The results of the tests are presented in the table below and in the laboratory test reports contained in Appendix B.

Boring	Depth (feet)	Compressive Strength (psi)
B1	9.8-10.1	28,474
B2	13.0-13.5	40,482
B3	4.5-5.3	19,059
B4	13.4-13.8	25,092
B5	10.7-11.2	30,907
B6	10.9-11.5	9,378

Subsurface Conditions

The soil layers encountered in the borings are described below, starting at the ground surface. Subsurface profiles are shown in Figs. 3 through 7. The soil conditions are known only at the boring locations. Conditions between borings may differ significantly from those shown in the subsurface profiles and described below.

Silty Sand with Gravel - We encountered soil, generally consisting of silty sand with gravel, from the ground surface to a depth of approximately 0.5 to 11.5 feet in the borings. This layer typically consisted of fine to coarse sand with 15 to 35 percent fines and 10 to 30 percent gravel; however, in some cases the fines and gravel content were as little as 5 percent or less. Based on our review of the existing subsurface information of the site, most of this soil is likely fill placed following demolition of the former library and construction of the new library.

Bedrock - Bedrock was encountered in the borings at depths ranging from about 0.5 to 11.5 feet below the existing ground surface. In six of the ten borings, 7 to 10 feet of bedrock was cored. We identified the bedrock as Salem Gabbro-Diorite. This rock is generally a gray to dark gray hornblende-augite diorite or gabbro varying from fine-grained to medium-grained texture. At the boring locations, the rock was hard, and generally exhibited minimal to moderate weathering and minimal to moderate fracturing. Some portions of the rock appeared to be highly fractured, most notably the second core of B6.

Rock recoveries in the core runs generally ranged from 75 to 100 percent, except in two instances where the recovery was 53 and 58 percent. Rock quality designation (RQD) values of the bedrock cores ranged from 21 to 93 percent and are reported on the boring logs and in the subsurface profiles.

Estimated bedrock contours are presented in Fig. 2 and are based on the results of the geotechnical borings and geoprobes, our review of construction documents as mentioned above, and the grade of current features at the site.

Groundwater was not encountered in the borings, however, we expect that groundwater occasionally perches on top of the bedrock.

Foundation Design

We recommend that the proposed science building be supported on shallow foundations bearing on the bedrock. We recommend a maximum allowable bearing pressure of 16 kips per square foot (8 tons per square foot).

Footings should be at least 2 feet wide, and at least one foot wider (on all sides) than the pier or wall they are supporting. Interior and exterior footings bearing directly on bedrock have no minimum bearing depth requirement. The tops of all footings should be at least 6 inches below the bottom of the overlying floor slabs.

Estimated Settlement

We estimate that total footing settlement will be less than ½ inch and differential settlements will be less than ½ inch. Most of the settlement is expected to occur during construction. This estimate assumes that the foundations are designed and constructed according to the recommendations in this report.

Floor Slab

The bottommost floor slab may be designed as a slab-on-grade. All topsoil and existing fill below the floor slab should be removed and replaced with compacted Structural Fill (Table 1) and/or Pea Stone (Table 2) as recommended in the foundation drainage recommendations below. The existing fill generally contains a high percentage of fines and does not appear to be suitable for re-use as structural fill. The tops of all foundations should be at least 6 inches below the bottom of the overlying floor slab.

We recommend that contraction joints be incorporated between the slab-on-grade and the columns and perimeter walls of the proposed building.

The first-floor slab should not rest directly on bedrock or boulders. Bedrock, including any sharp protrusions, and protruding boulders should be excavated as needed to allow a minimum 12-inch-thick compacted fill “layer” to be placed below the slab. The compacted fill “layer” should consist of 12 inches of pea stone, to satisfy the foundation drainage recommendations below. Eliminating protruding bedrock and boulders will reduce cracking of the slab that may result from stress concentrations.

To design slabs on soil subgrades prepared as described above (i.e., fill over bedrock), we recommend a Westergaard's modulus of subgrade reaction k=400 pounds per cubic inch. This recommendation is based on the design criteria provided in “Slab Thickness for Industrial Concrete Floors On Grade” by the Portland Cement Association.

Seismic Design

We recommend using Site Class B in accordance with Section 1613.5.2 of the Building Code.

The soils below the foundation level are not susceptible to liquefaction, based on the criteria in Section 1806.4.

Lateral Wall Loads

Permanent walls should be designed for the lateral pressures shown in Fig. 8.

Foundation Waterproofing, Dampproofing, and Drainage

We recommend that foundation drains be installed in accordance with Building Code Section 1805.4.2 at the base of all interior and exterior foundation walls to maintain groundwater levels at the base of the walls. We also recommend that at a minimum all foundation walls be dampproofed in accordance with Building Code Section 1805.2. Depending on the use of the below grade space, you may want to consider waterproofing the foundation walls.

We recommend installing a slab underdrain system to remove groundwater that may flow through joints and fractures in the bedrock and accumulate below the slab-on-grade floor slabs. The slab underdrain system should consist of 6-inch-diameter perforated PVC pipes placed with the holes down in a 12-inch-thick layer of Pea Stone meeting the requirements of ASTM D448 No. 8 aggregate as summarized in Table 2. A non-woven filter fabric should be placed between the Pea Stone and the bedrock subgrade to prevent the Pea Stone from raveling into the bedrock joints and fractures. Pipes beneath the floor slab should be located with center-to-center spacings of 30 feet or less. The underdrain pipes should include clean-outs at the end of each branch and at all changes of direction. A sump and pump may be needed to remove the groundwater that enters the underdrain system if the underdrains cannot be drained by gravity.

You should consult with the manufacturer of the proposed flooring system regarding vapor transmission and vapor retarder/waterproofing requirements for the slab-on-grade floor slab.

Permanent Slopes

Based on the existing topography, cuts may be needed to construct portions of the building. We recommend that permanent cut slopes in soil be no steeper than 3H:1V to allow planting and maintenance of lawns. Soil slopes as steep as 2H:1V will be stable, but will require vegetation or other means of erosion control.

Preparation of Subgrades on Rock

If bedrock is encountered above the required footing elevation, the rock surface should be cut to an approximately level surface (within 10 degrees of horizontal). The rock surface can be stepped as necessary to achieve this slope. If desired, minor irregularities in the rock may be filled with crushed stone or lean concrete to provide a level working surface.

Any weathered or loose rock must be removed. If the rock is fractured but the joints are relatively tight and cannot be easily ripped with an excavator bucket, then the rock is satisfactory for foundation construction.

Dewatering

We generally do not expect that groundwater will be encountered during foundation excavation, based on the proposed top of slab elevations. However, perched groundwater may be encountered on the bedrock surface. The contractor should grade the site to direct runoff away from foundation excavations. We anticipate that filtered sumps will be adequate to control any groundwater and stormwater that enters the foundation excavations.

We recommend that each footing excavation be sloped slightly to a sump. Sumps should be located outside the limits of the foundations, and should extend at least 3 feet below the bottom of the excavation. The sump should be a filtered system, such as a perforated pipe surrounded by peastone or other appropriate filter material. The peastone or filter material should be sized to

filter the natural soil and prevent the migration of fines into the sump. The contractor should submit a dewatering plan including details of their proposed sumps before starting the foundation excavations.

Excavation

All excavations should be made in accordance with OSHA standards. Excavations adjacent to existing buildings should not extend below the bottom of the existing footings without evaluation by a registered professional engineer. We do not expect that construction of the proposed foundations will require excessively deep excavations or excavations below groundwater.

Typical construction equipment should be sufficient to excavate the soils. Bedrock was encountered at depths as shallow as 6 inches below ground surface. Additional construction equipment, such as a hydraulic demolition hammers (hoe rams), may be necessary to excavate rock to the required depth (up to 15 feet of rock excavation as shown in Fig. 2). Mechanically splitting with a backhoe-mounted hoe ram can transmit continuous vibrations to nearby buildings. Continuous vibrations should be maintained at levels low enough to avoid damaging nearby buildings.

Backfilling

Any fill placed within the limits of the building should meet the gradation requirements for Structural Fill given in Table 1. Backfill placed outside the building limits but within 20 feet of the building should meet the requirements for Ordinary Fill in Table 3. Excavated soils that do not meet the gradation criteria of Ordinary Fill may be placed in landscaped areas but should be placed and compacted as described for Ordinary Fill. Ordinary Fill may not be appropriate for direct contact with the buried utilities, and we recommend that you confirm backfill requirements with the utility designers.

Ordinary Fill may be susceptible to frost heave. The potential for frost heave can be reduced by grading outside areas for proper drainage and by using Structural Fill rather than Ordinary Fill in the top 1 to 2 feet.

Existing fill may be suitable for reuse as Ordinary Fill provided the material is screened to remove all particles greater than 6 inches (e.g., brick or concrete rubble) and any all organic material. The contractor should be aware that Ordinary Fill can be difficult to compact in wet or cold weather.

Freezing Conditions

The soils at the site are frost susceptible. Therefore, if construction is performed during freezing weather, special precautions will be required to prevent the subgrade soils from freezing. Freezing of the soil during construction may result in heaving and subsequent settlement.

All subgrades should be free of frost before placement of concrete. Frost-susceptible soils that have frozen should be removed and replaced with compacted Structural Fill.

Soil placed as fill should be free of frost, as should the ground on which it is placed.

If slabs-on-grade are built and left exposed during the winter, precautions should be taken to prevent freezing of the underlying soil.

Sidewalks

Sidewalks placed on existing fill or ordinary fill will be susceptible to frost heave. If frost heave of the sidewalks and paved areas is undesirable, the potential for frost heave can be reduced by using Structural Fill in place of the existing fill or ordinary fill. If necessary, we can provide further recommendations to reduce the potential for frost heaving of the sidewalks and paved areas.

Existing Structures and Buried Structures/Utilities

We understand that there are existing utilities (storm drains, manholes, catch basins, electrical and communication conduits) located within the footprint of the proposed building. Where the utilities exist below proposed construction, the utilities and manholes should be removed, and the resulting trenches and open excavations should be backfilled with compacted Structural Fill. Alternatively, the storm drains may be abandoned in place by filling with flowable fill or lean concrete.

Limitations

This letter was prepared for the use of the Division of Capital Asset Management and Maintenance, exclusively. Our recommendations are based on the project information provided to us at the time of this report and may require modification if there are any changes in the nature, design, or location of the proposed structure. We cannot accept responsibility for designs based on our recommendations unless we are engaged to review the final plans and specifications to determine whether any changes in the project affect the validity of our recommendations and whether our recommendations have been properly implemented in the design.

The recommendations in this report are based in part on the data obtained from the subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations from the anticipated conditions are encountered, it may be necessary to revise the recommendations in this report. We therefore recommend that GEI be engaged to make site visits during construction to: a) check that the subsurface conditions exposed during construction are in general conformance with our design assumptions and b) ascertain that, in general, the work is being performed in compliance with the contract documents.

Our professional services for this project have been performed in accordance with generally accepted engineering practices; no warranty, express or implied, is made.

We appreciate the opportunity to work with you on this project. Please call me at 781-721-4022 if you have any questions.

Sincerely,

GEI CONSULTANTS, INC.

Laureen M. Beintum

Laureen M. Beintum, P.E.
Geotechnical Project Manager

LMB/MAY:mrb

Enclosures: Table 1 – Requirements for Structural Fill
Table 2 – Requirements for Pea Stone
Table 3 – Requirements for Ordinary Fill
Fig. 1 – Site Location Map
Fig. 2 – Boring Location and Bedrock Contour Plan
Fig. 3 – Subsurface Profile A-A'
Fig. 4 – Subsurface Profile B-B'
Fig. 5 – Subsurface Profile C-C'
Fig. 6 – Subsurface Profile D-D'
Fig. 7 – Subsurface Profile E-E'
Fig. 8 – Recommended Lateral Pressures
Appendix A – Boring Logs and Geoprobe Logs
Appendix B – Laboratory Test Results

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Utility Capacity Analysis

With the demolition of the old library and the opening of the new Berry Library, utilities have been reworked extensively in the past few years at North Campus. Below is a site plan mapping tie-ins for the various utilities and a written description of each.

Steam Plant & Distribution

The north campus is served by a central steam boiler plant. The boiler plant currently provides high pressure steam for building heating and domestic hot water systems. SSU preference is to utilize high pressure steam supplied from the existing boiler plant to provide heating and domestic hot water for the new Science building. (Please refer to pg. F.33, Alternate 3, for the cost analysis between centralized steam vs. condensing boilers). Recent central steam boiler plant improvements included the replacement of (2) existing watertube boilers with (2) new Cleaver Brooks firetube boilers, one replaced approx. 2 years ago. This info came from 2008 meeting notes. One boiler was replaced around 2006 and the second around 2008. The boilers are approximately 87-88% efficient. Efficiency measures include high turndown ratio and heat recovery of flue gas. Each boiler has a capacity of 800 BHP, 20,000 lbs/hr @ 90 psig. Boilers are intended to provide 100% redundancy. Boilers are dual-fuel, can operate on either No. 2 fuel oil or natural gas. Boiler plant typically runs on gas. At the time of the 2008 meeting, SSU had a third-party 2-year contract with Hess for gas supply.

Due to lock-out devices in the gas trains, only one boiler at a time can run on gas. If necessary, one boiler could run on fuel oil concurrently with the other running on gas. Chemical treatment includes oxygen scavengers at minimum; SSU to contact treatment company to share exact chemicals used. Total load on boiler plant is currently 13,000 lbs/hr at winter design conditions. Safe to assume about 7,000 lbs/hr excess capacity without the tie-in of the New Science Lab Building. Excess capacity is due to Peabody and Bowditch Dorms (total of approx. 150,000 SF) taken off the steam plant and provided with their own boilers.

Boiler plant is manned 24 hours day (per State requirements for high pressure steam plants). The boiler plant only operates from October to April. The plant also shuts down at night during the heating season unless it is very cold out (acceptable since the dorm buildings now have their own boilers). Typical buildings on campus served by steam plant utilize pressure reducing stations (down to 10 psi) and low pressure steam-to-hot water converters for building heat. Condensate parallels steam lines and is generally pumped back to the plant from each building. Steam and condensate lines to existing Library run through Meier Hall. Steam and condensate lines running west out of the existing Library are inactive – these are the lines that fed Peabody and Bowditch Dorms.

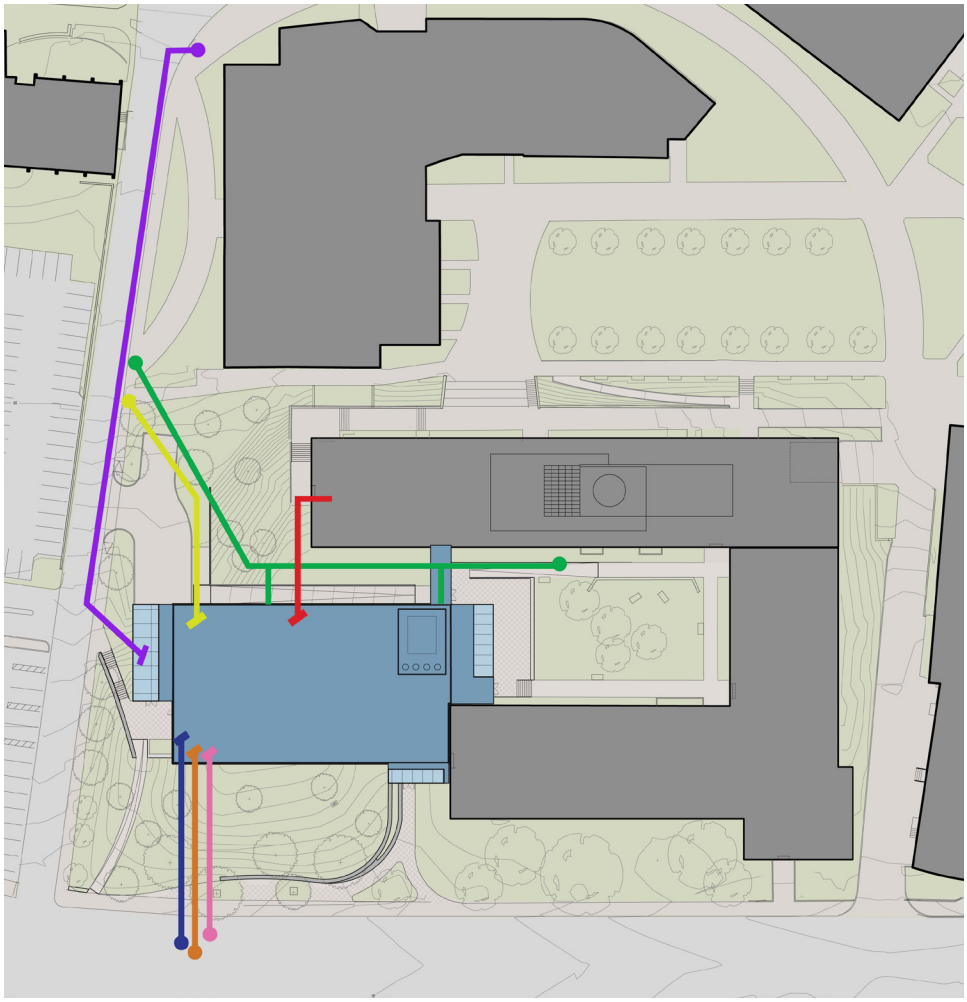
Cooling Plant

No central campus chiller plant exists currently. SSU has indicated that A 10-yr campus master plan includes potential to add a central chiller plant to the existing steam plant (space is already allocated). However, this would not happen before the new Science Building is built. The New Science Building will need to provide its own cooling plant.

Water & Natural Gas

Buildings on campus generally use steam for domestic hot water generation when boiler plant is operating. Separate domestic water heaters (mostly gas-fired, but some electric) are used when boiler plant is not running. Existing Meier-Hall originally used gas-fired water heater but was changed to electric at some point. High and low pressure gas mains existing on Lafayette Street. Keyspan/ National Grid is the gas supplier.

Water pressure in Lafayette Street is typically 70 psig. Meier hall and Bowditch (six stories each) do not have fire pumps or water booster pumps. Peabody (seven stories) has a fire pump. (See the Appendix for Hydrant Flow Test Memo. This test was conducted for the Mainstage Theater Project at the end of 2014.)



Site plan mapping utility tie-in locations

Electrical

The existing duct-bank in College Drive has an existing stub-out which is prepared to connect to the New Science Building.

Low Voltage

In the past the strategy at the SSU campus has been to daisy-chain the buildings for IT/Low Voltage, but this strategy is no longer preferred. A new duct bank will run up College Dr. from the SW corner of the Berry Library where existing fiber, cable, and telephone pickup points are located, and the media and telephone utility company services and fiber/data lines will be terminated in a telecommunications entrance facility (EF) in the new building. The configuration of the ductbank will allow for four (4) empty sleeves for future expansion.

Sewer

There are no reports of existing capacity issues in the sanitary sewer system in the area around the proposed Science Center. Flows generated by the project should be accommodated by the existing system.

Anticipated Utility Usage For the New Science Building

- Storm Drain - 15,000 sf = (3) 8” outfalls
- Sewer - 6,000 GPD approx
- Water - 6,000 GPD approx
- Steam - 8,200 #s at 100 PSIG - 6” line, Condensate 3”
- Electric – TBD
- Gas – TBD / per the number of gas outlets being provided

E. SYSTEMS NARRATIVES

1. INTRODUCTION / APPROACH
2. ARCHITECTURAL - EXTERIOR
3. ARCHITECTURAL - INTERIOR
4. STRUCTURAL
5. MECHANICAL
6. PLUMBING
7. ELECTRICAL
8. CODE AND LIFE SAFETY SYSTEMS
9. CIVIL
10. LANDSCAPE

SYSTEMS NARRATIVE

Introduction / Approach

The New Science Building at Salem State University is 5 story plus a mechanical penthouse at 70,610 GSF requiring an estimated 6,000 cubic yards of ledge removal. The building is currently classified as a “low rise” and does not contain an atrium space, eliminating the need for smoke exhaust systems.

The New Science Building is intended to be a free standing building in terms of separating mechanical requirements from the existing Meier Hall. Options for utilizing space and/or services from Meier Hall are not being considered at this time, but may be explored when developing the design: Items that may be considered would be placement of certain equipment (e.g. cooling tower, generator) on the existing Meier Hall roof structure or placement of mechanical equipment (e.g. heat exchanger and pumps) in the existing crawl space under Meier Hall if deemed to be practical. The new Building’s steam tie-in may also be provided from the existing Meier Hall utility pit.

Building Systems for the New Science Building will include wet sprinkler, central vacuum, natural gas, compressed air, pure water, potable hot and cold water, non-potable (laboratory) hot and cold water, emergency water (tempered), pH neutralization, supply air, exhaust air, hot water heating, chilled water cooling and energy recovery systems.

Please refer to the trade descriptions for a more compressive description of the probable HVAC, Electrical, Plumbing and Fire Protection systems.

The Greenhouse for the project will be designed and procured through a specialty consultant. Since the Greenhouse is located on the 5th floor of the New SSU Science Building and is a very visible component of the massing, integration into the building will be paramount. The cost estimate includes the allowance for the envelope, interior and associated systems all supplied by a single manufacturer. The greenhouse would be assembled from the concrete deck at level 5 and include the super-structure up from this level. Tie-ins for mechanicals where needed would be included as well.

Architectural - Exterior

Exterior Wall Construction

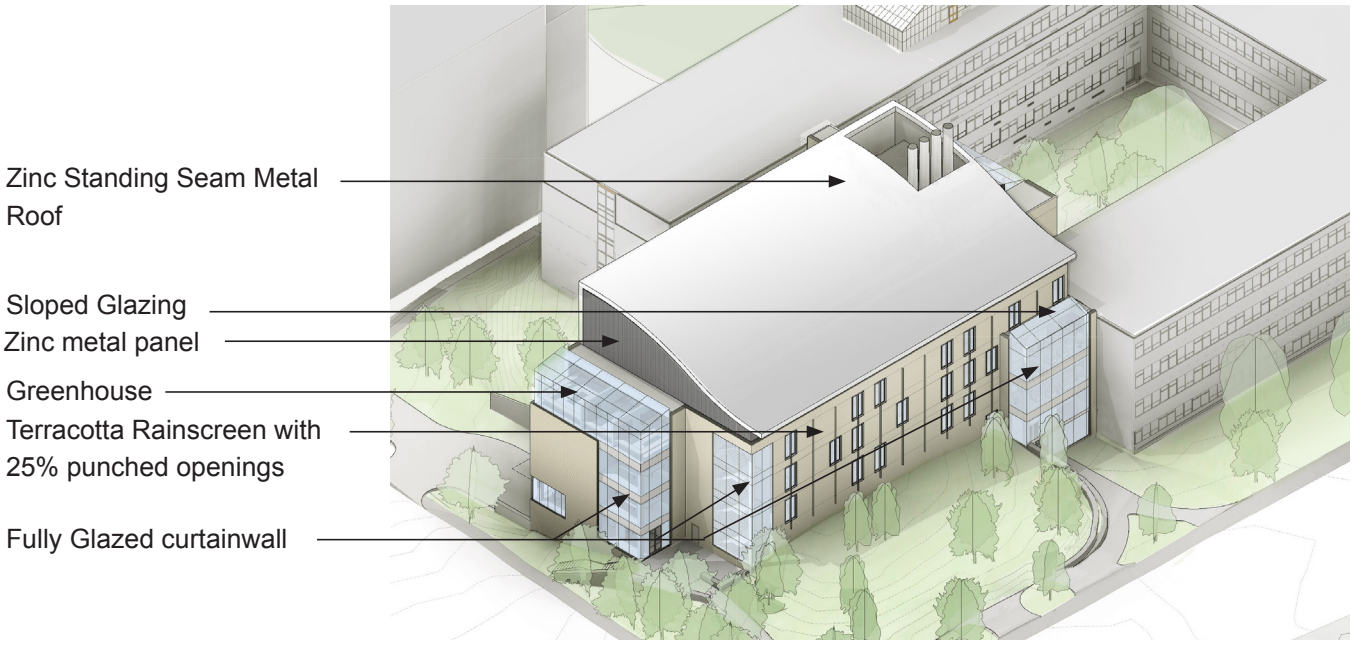
The exterior wall will be composed of a terracotta rainscreen with punched fixed openings (approximately 25% window to wall ratio). The terracotta wall assembly will consist of terracotta panels, air space, mineral wool insulation, Air / Vapor Barrier, Sheathing Board, metal stud, and interior finish. At certain feature locations, such as entries and student space, there will be fully glazed curtainwall.

The punched openings will be thermally broken aluminum window and frame system. All sashes will be fixed throughout the lab and lab support spaces. Operable windows will be considered in the offices. At the punched openings, there will be an anodized shroud that extends to the face of the rain screen. In locations with fully glazed curtainwall, the mullion profiles are thermally broken and approximately 2 ½" x 7 ½" in size and have an anodized finish. In all locations, the insulated glass unit will be 1" (2 lites of ¼" glass, with a low-e coating on the #2 surface and a 1/2" Argon gas filled air space).

At the mechanical penthouse, there will be a zinc metal panel rainscreen system, with insulation on metal stud back-up. There will be louvers for air-intake in certain locations. These louver blades will be 20 gauge rolled frame zinc blades on a 19 gauge frame.

Exterior Doors

Exterior entrance doors will be aluminum entrances and frames with heavy duty institutional hardware with stainless steel finish and will have a dark anodized



finish. At the loading dock, there will be an insulated aluminum overhead coiling doors at loading dock with fluoropolymer 3-coat finish.

Roofing

There are two different types of roofing for the project – flat roofing and curved standing seam metal roofing. Above the mechanical penthouse, there will be Zinc standing seam metal roof over fully covered ice / water shield underlayment board over insulation.

In a few locations at Level 6, there are portions with a flat roof. It will be mechanically fastened 0.06" single play TPO (thermoplastic-polyolefin) membrane, light-colored with hot air welded seams over composite polyisocyanurate insulation (tapered rigid insulation).

Sloped Glazing

Above the student spaces along the courtyard and along Lafayette Street, there will be a small portion of roof that has sloped glazing. This will be a standardized aluminum wall system for sloped glazing (anodized finish) with 1" insulated glass units.

Roof Opening & Exhaust Stacks

Roof Hatches and ladders will have a galvanized finish.
Roof stacks will stainless steel construction with sound attenuation.

View from northwest corner

Architectural - Interior

Core Walls

Walls around mechanical shafts and egress stairs will be gypsum shaft wall assembly rated for 2 hours. Reinforced CMU will be used at the two elevator shafts.

Interior Partitions

Interior fixed partitions (80%) 3 5/8" metal stud & (20%) 6" metal stud, and the partitions extend to bottom side of structural deck above. At the loading dock and chemical handling areas, normal weight concrete masonry unit partitions will be used for durability.

Interior Finishes

Depending on the location, there are a variety of wall finishes:

- Exposed concrete in mechanical rooms in basement: unfinished concrete surface
- Wood paneling: hardwood veneer wood paneling. This will be used minimally in the labs and corridors and student spaces with an allowance of 30 lf per floor
- Gypsum board: painted gypsum board
- Porcelain tile: glazed wall tile (full height and width of wet walls within toilet rooms)
- Acoustical wall treatment: back-mounted, edge-reinforced acoustical wall panels with fabric facing. This will be used minimally in the corridors and student spaces with an allowance of 30 lf per floor.

Stair Construction

The egress stair will be a pan type steel stair and landing with concrete fill, rubber treads, risers and landings with rubber base @ landings, painted steel railing and guardrails. There is an open stair from Level 2 to 5, which will be a custom steel stair, precast terrazzo tread and landing, stainless steel guardrails stanchions with wood handrails and ¾" laminated glass guardrail panels.

Interior Windows & Doors

- Interior Windows: Wood frames with clearstory 7'-0" to 9'-6" elevation, tempered glass where required (30 linear feet per occupied floor).
- Interior swinging doors: Wood frames with clearstory to 9'-6" elevation & 2'-0" sidelite, flush stile and rail hardwood with glazed top and bottom panel. Hardware is heavy duty institutional quality stainless steel or brushed chrome.
- Interior fire-rated doors: flush solid core hardwood veneer with painted custom steel frames. Hardware is heavy duty institutional quality stainless steel or brushed chrome.

- Interior access doors: flush panel cold-galvanized bonderized steel doors factory primed and field painted.
- Total Door Openings into egress stair and pedestrian walkway: flush panel, reverse swung, primed and field painted, held by hold-opens. These door locations will be tied into the fire alarm system.
- Fire Rated Doors: flush panel, hollow metal frames at separation points between existing and new construction.

Special Construction - Code Related Items:

There are currently vertical and horizontal fire shutters in the project that deploy in case of a fire emergency. The vertical fire shutters are located between the new and existing Meier Hall at Level 3 and 4 East Wing and at Level 5, West Wing. The horizontal fire shutters are used to close off the floors at the main student space overlooking the courtyard – one at Level 3 and one at Level 5.

Flooring

There are different types of flooring depending on the function of the space. Here is a list of different types and locations:

- Exposed Concrete: Sealed concrete surface (service & loading dock areas)
- Resinous Flooring: Waterproof Membrane floor finish system with integral base at mechanical room spaces
- Rubber Flooring: Lab and Prep Spaces. Hallway on Levels 3, 4, and 5.
- Terrazzo: Entry and Main Level 2 Hallway & Student Space at Level 2 & Toilet Rooms
- Carpet: Offices & Student Spaces Level 3, 4, and 5.

Casework

There will be both base cabinets and wall cabinets in teaching lab and prep spaces. The cabinets will be made of White Oak plain sliced, brushed chrome hardware and adjustable hinges. Base cabinets will have epoxy tops with integral sinks. Wall cabinets and wall shelving where indicated in room diagrams and floor plans. Wood cubbies and coat hooks will be located all teaching lab entries. All woodwork will be FSC sustainably harvested wood.

Ceilings

There are different types of ceiling used throughout the project:

- Labs –2’ x 6’ acoustical panels with extruded aluminum edge trim
- Public Spaces – Painted Gypsum board (10%) and Acoustical Panel (90%)
- Offices – 2’ x 2’ acoustical ceiling tile with painted steel grid system
- Public Spaces concentrating on Level 2 – Wood slat ceiling @ Entries and Student Spaces.

Specialties

Here is a list of specialty items found within the teaching labs and public spaces:

- Coat Hooks: 24 aluminum hooks on hardwood rail in each lab.
- Glass Display Cases: 80 LF of 2'-0" width cases with 2 tiers of glass shelving. Glass is ½" tempered.
- Visual Display Boards: Markerboards and chalkboards will be found in all teaching labs and in a small number of student spaces.
- Corner guards: Corner guards will be found in high traffic areas in the main corridor. They will be stainless steel.
- Toilet Partitions: Ceiling hung solid phenolic plastic toilet compartments and wall hung screens
- Lavatory Countertops: Solid surface to accept undermount sink. 1 ½" thick, exposed edge at all 4 sides.
- Recycle Centers: Custom millwork for recycling / trash on each level (20 LF for 2'-0" deep veneered plywood cabinets & countertop).
- Guardrail Construction: Cantilevered ¾" laminated glass with aluminum, slab mounted shoe, and wood rail.

Laboratory Equipment

- Fume Hood (Fully ducted) Low –Flow; Meet ASHRAE 110.
  60 fpm with vertical sash at 18" in height.
  Utilities to include power, compressed air, vacuum and gas where indicated on Room Data Sheets.
  Acid storage and Flammable storage below each unit provided.
  Overall size as indicated on Room Data Sheets
- Fume Hood (Filtered)
  60 fpm with vertical sash at 18" in height.
  Utilities to include power, compressed air, vacuum and gas where indicated on Room Data Sheets.
  Erlab will be the proprietary supplier of this hood type.
  Overall size as indicated on Room Diagrams.
- Biological Safety Cabinet (Class II Type A2) Overall size indicated on room data sheets. Recirculating Type.
- Autoclave: Self-contained, free-standing, gravity steam operated single door sterilizer. Chamber size: 20" x 20" x 38"
- Undercounter Glassware Washer: Hydro spray cabinet type washer design to process lab glassware and metal utensils. Overall cabinet size will not exceed 35". Hot air convection dryer unit. Liquid detergent unit to be included. Locations shown in room diagrams.
- Peg Boards: Epoxy backboards with polypropylene pegs. Locations shown in room data sheets:
- Cylinder Storage Racks: Cast aluminum anchored to the floor. Locations indicated on room data sheets.
- Cylinder Brackets: Cast aluminum cylinder wall brackets. Locations indicated on room data sheets.

Equipment

- A/V (Audio-Visual Equipment): Each lab will have a projection screen. Allowance will be $15,000 per lab indicating a projection screen and teaching station.
- Loading Dock Equipment: At the loading dock, there will be a recessed dock leveler.
- Window Washing Equipment: At the roof, there will be roof support davits and stainless steel lifeline system to support window washing from boson's chair.
- Window treatment: Manually operated window shades with light filtering and room darkening as noted on room data sheets.

Special Construction Systems

There are 2 controlled environmental room (Cold Room) in the project - one for Biology and one fo Geology. They will be a prefabricated controlled environmental room with all essential plenums, controls, balanced air circulation and other equipment necessary to attain specified environmental conditions. Insulated wall, roof and door panels consisting of aluminum exterior skin and stainless steel interior skin. Stainless steel countertops, shelving and sinks. Remote condensing units will be located in the mechanical room.

Structural

The New Science Building for Salem State University is proposed as a 70,610 square foot, five story plus mechanical penthouse building sited south of the existing Meier Hall on the north campus. The new building will communicate with the existing building via a pedestrian bridge at the west and a direct connection at the east, but will remain structurally separate.

Soil Conditions and Foundation System

Based on information available, including boring data from Meier Hall original 1962 construction and the 1968 addition as well as documentation from the former Library which occupied a portion of the site, the foundation for the new building is assumed to consist of shallow reinforced concrete footings bearing directly on bedrock or on compacted structural fill over bedrock. A Geotech Report has been completed (Section D of this report). The findings from that report will be incorporated into the foundation system when the project moves into design. Footings are estimated as 8 feet square by 2 feet thick at interior columns and 6 feet square by 1.67 feet thick at exterior columns. The basement walls will be 16 inch thick reinforced concrete and will be supported on continuous strip footings. All perimeter footings will bear a minimum of four feet below grade for frost protection.

In order to complete the foundation construction, it is estimated that the excavation of 6,000 cubic yards of rock will be required. The lowest two floors have partial floor plates, configured to minimize rock excavation.

The lowest level slabs, occurring at levels 1,2 and 3, will be constructed as a 5 inch thick normalweight concrete slab reinforced with WWF 6x6- W2.9xW2.9 and underlain with a 15 mil polyolefin vapor barrier, 3 inches of rigid insulation, and 12 inches of compacted granular fill.

The elevator pit footings will be reinforced concrete 1’-6” thick supporting 1’-0” thick concrete walls and lined with crystalline waterproofing at the interior surface.

Superstructure

The New Science Building will be steel-framed with composite steel deck and concrete slabs supported on composite steel beams and girders at all levels. The floors will be supported on structural steel wide flange columns. Typical floor construction will consist of 3-1/4 inch lightweight concrete on 3 inch deep 18 gage minimum galvanized composite steel deck reinforced with a mix of welded wire fabric and reinforcing bars. Wide flange steel beam and girder depths will generally range from 12 to 18 inches, with deeper members possible at cantilevers adjacent to the existing Meier Hall. Rectangular hollow structural sections (HSS) will be utilized as beams at perimeter bays adjacent to slab openings.

The penthouse floor will support the majority of mechanical equipment and will be constructed similar to the typical floors (3-1/4 inch lightweight concrete on 3 inch deep composite steel deck). The concrete and steel construction will provide additional strength and accommodate much of the equipment without additional dunnage, as well as limiting noise and vibration at the interior spaces. Columns will be a combination of wide flange sections and rectangular tubes in exposed conditions. Connections will be made with a combination of shop welds and field bolts.

The curved penthouse roof will be framed with structural steel wide flange beams bent on their strong axis and 18 gage galvanized steel roof deck curving along its weak axis.

Resistance to wind and seismic loads will be provided with braced frames consisting of diagonal hollow steel sections (HSS) at four inches in each orthogonal direction.

Connections to Meier Hall

The pedestrian bridge will be located at the west side of the new building, connecting to the 1968 wing of Meier Hall. The bridge will be supported at each level at the perimeter of the new building and cantilever beyond columns located approximately 8 feet from the face of Meier. At the northeast corner of the new building, new columns will typically be held back from the face of the existing to avoid foundation conflict, with the floors cantilevering to meet the face of Meier. Expansion joints will be utilized at all intersections of new and existing, ensuring that the New Science Building will be structurally independent.

Basis of Design, Codes and Standards

- Massachusetts State Building Code, Ninth Edition, anticipated (based on International Building Code, 2015, International Code Council
- Minimum Design Loads for Buildings and Other Structures, ASCE 7-10, American Society of Civil Engineers
- Building Code Requirements for Reinforced Concrete and Commentary, ACI 318, American Concrete Institute
- Steel Construction Manual, Thirteenth Edition, 2005, American Institute of Steel Construction (AISC)
- Structural Welding Code – Steel, D1.1-04, American Welding Society

Dead Loads

Design Weight of Building Components

Floor Live Loads

- Public spaces, Lobbies, Corridors, Stairs 100 psf

- Typical Upper Floors (Labs, Offices, Corridors) 80 psf
- Mechanical Rooms 150 psf

Snow Load

Ground Snow	pg = 50 psf

Basic Wind Speed

Three second gust, 10 meters above ground	105 mph

Seismic Design Parameters

Site Soil Classification	Site Class C (assumed)
Short Period Spectral Response Acceleration	Ss = 0.31 g
One Second Spectral Response Acceleration	S1 = 0.071 g
Seismic Force Resisting System	R=3 Steel System Not Specifically Detailed for Seismic Resistance

Mechanical

Air-Handling Units

The estimated air flow for the building is 73,000 cfm, provided by (2) 40,000 cfm custom 100% outside air indoor air handler units (AHUs). The units are sized to provide 10% spare capacity for future load increases. The air handling unit components will be designed for low pressure drop for energy savings. The coils and filters will be designed at 350 fpm under normal operation. This design also provides a level of redundancy where upon failure of any one unit, the remaining units can ramp up in flow to 500 fpm through the coils to provide approximately 70% of the total building airflow requirements.

The air handling units will be located in the building penthouse. The AHUs are proposed to utilize energy recovery wheels located in the AHU and exhaust air stream. This system allows energy to be reclaimed from the building general exhaust systems which is then used to preheat and precool the incoming outdoor air. Fume hood exhaust from the Research Labs and associated support spaces will bypass the wheel to prevent potential cross contamination. The AHUs will utilize variable air volume (VAV) with variable speed fan motors for reduced flow operation and to permit unoccupied set back of airflows. The units will connect to a common supply air header in order to provide maximum redundancy, reliability and flexibility.

The building humidity level will be maintained below 55% RH during the summer months. It is anticipated that humidification will not be provided at the central air handling systems. The air handling unit sections will consist of outside air intake dampers with air flow measurement, electric radiant snow melt system, 30-35% pre-filters (MERV-8), 90-95% final filters (MERV-14), energy recovery wheel, preheat coils, chilled water cooling coils and fan section with multiple fans. Access sections will be provided to ensure proper unit access and maintainability of the unit. The unit exhaust side will have intake dampers, 30-35% pre-filters (MERV-8), energy recovery wheel, and discharge section. The exhaust fans will be separate from the units.

Supply Distribution System

Galvanized steel ductwork will carry the supply air to the building. The supply header and all ductwork upstream of the terminal boxes will be rated for medium pressure. The medium pressure distribution system will supply air to VAV supply air boxes, which will regulate air flow for temperature control and ventilation. Terminal box hot water reheat coils will be provided for space heat and ventilation air reheat. Terminal boxes serving chilled beams will not utilize reheat coils. The ductwork downstream of the terminal boxes will be constructed for low pressure operation. All terminal boxes will have sound attenuators. Diffusers will be selected based upon ceiling finishes and room function. Supply air will also serve the chilled beams. Provide one supply terminal with reheat for each space.

Laboratory and General Exhaust System

The exhaust system will be a headered system consisting of four (4) 29,000 cfm exhaust fans to provide N+1 redundancy. Centrifugal fans shall be utilized in conjunction with exhaust stacks. The fan system shall be designed to maintain a minimum of 3000 fpm discharge stack velocity by staging fans on and off to maintain stack velocity. Fans will have variable speed motors and drives. The fans will share a common header in order to provide maximum redundancy, reliability and flexibility. Discharge sound attenuators will be provided in the stacks. A minimum of one of the exhaust fans will be connected to the buildings emergency generators standby power service to ensure that the building fume hoods can be maintained under negative pressure during a power outage.

An exhaust air entrainment study will be done to determine if lower exhaust air discharge velocities can be utilized, allowing reduced system static pressure resulting in reduced energy use.

Laboratory Exhaust Distribution System

Portions of the headed laboratory exhaust duct system will be constructed of welded 304 stainless. This includes the fan discharge steel stacks, mains in penthouse, risers and run-outs to individual fume hoods. The remainder of the exhaust system will be galvanized steel construction. A separate welded 304 stainless steel exhaust system will be provided to serve the fume hoods (5 total) in the Research Labs and associated support spaces. This system will connect to the laboratory exhaust system downstream of the energy recovery wheels. Either individual risers per floor or common risers with sub-ducts will be required to comply with NFPA 45 shaft penetration protection. The exhaust duct system downstream of the exhaust EV boxes will be constructed to medium pressure classification. Ductwork upstream of the boxes shall be constructed to a low pressure where connecting to ceiling grilles and to a medium class where connecting to fume hoods and miscellaneous laboratory exhaust.

Additional Exhaust Systems

The building exhaust system will also serve toilet exhaust, electric rooms, storage rooms, etc.

Chilled Beams - Basis of Design

Chilled beams will be utilized to provide for space ventilation, heating and cooling in non-densely occupied spaces and laboratories where the airflow does not exceed 6 air changes per hour. The chilled beams will connect to the building air systems to provide for ventilation air. The chilled beams will be connected to the building chilled and hot water systems.

VAV supply terminal with hot water reheat and exhaust terminals will be utilized to maintain space ventilation and pressurization.

Fan Coil Units with Aircuity System – Alternate

In lieu of chilled beams, ducted fan coil units with chilled and hot water coils will be utilized within the labs to provide supplemental heating and cooling.

As an energy savings measure an “Aircuity” airborne chemical monitoring system will be provided in each laboratory utilizing chemicals. This system will permit the lab air change rates to reduce from 6 ACH to 4 air ACH minimum during occupied hours and from 4 ACH to 2 ACH minimum during unoccupied hours when chemicals are at a minimum levels. VAV supply and exhaust terminals will be utilized to maintain space ventilation and pressurization.

Cooling Systems

A new chilled water plant will serve the building. The total cooling load is estimated to be 480 tons. Two (2) 320 ton electric water cooled high efficiency centrifugal chillers will be needed. Each chiller is sized to handle 66% of the total load to provide a minimum level of redundancy and spare capacity for future. Three (3) 550 gpm (at 14 deg. F. delta-T) chilled water pumps (lead, lag & standby) will be needed. Provide chilled water system trim including expansion tank, air separator, and chemical shot feeder.

Two (2) 320 ton cooling towers will be needed. The cooling towers are expected to be induced draft counter-flow type, and located upon the building roof. Three (3) 540 gpm condenser water pumps (lead, lag & standby) will be needed as well as condenser water piping between towers, pumps and chillers. Provide condenser water chemical treatment system.

A 190 ton plate & frame heat exchanger to provide waterside economizer cooling for spaces utilizing chilled beams, fan coil units and other year round air conditioning equipment will be needed. This system permits the use of free or partial free cooling by utilizing cold condenser water when the outside air wet bulb temperatures are below 50 deg. F. Provide (1) 330 gpm chilled water pump and (1) 324 gpm condenser water pump for free cooling.

There will be a 57 degree tempered chilled water system to serve the chiller beams (or fan coil units), and there will need to be main and standby chiller water pumps and distribution piping. It is envisioned that the building will be served by 100% outside air handling units to provide for building cooling and ventilation air.

Heating Systems - Basis of Design

Two (2) 6,000 MBH (net output) packaged gas fired condensing hot water boilers will be needed. Separate gas fired domestic and protected water heaters will be provided under the Plumbing section of the work. Boiler vents to the roof suitable for condensing boilers are needed. Roof vents will also be needed from the gas fired domestic and protected hot water heaters.

Heating Systems - Alternate

Steam from the Campus heating plant will be utilized for the building heat and domestic hot water loads. The peak load is estimated to be 7,200 MBH or 8,200 lbs of steam per hour at 100 psi. The connection point to the campus steam system is anticipated to be at the existing Meier Hall west wing void space. Buried preinsulated steam and steam condensate piping will be utilized to connect from the new building to the campus system.

Per 12/11/14 email sent by John Keenan with SSU: "The steam line already runs through Meier Hall and feeds the new library. There are two new, high efficiency boilers in our main power plant. These boilers are capable of generating 20,000 lbs. of steam/hr each. We currently peak at about 8-10,000. These boilers are more efficient the closer they get to their peak load."

Tying into the campus steam will require approximately a 220 feet length of direct buried preinsulated, Class-A, 6" high pressure steam and 4" condensate return piping. Associated trenching and rock removal to be provided under the Civil work. High pressure steam from the campus plant will be brought to the Level 1 Mechanical Room where it will be reduced to low pressure with a single-stage pressure reducing station. Low pressure steam will be utilized for building heating and domestic hot water. A duplex steam condensate pump with receiver will pump the condensate back to the campus plant.

Two (2) steam to hot water shell and tube heat exchangers at 6,000 MBH input each (main & standby) will be needed.

Heating Systems Pumps and Distribution

Two (2) 400 gpm hot water pumps (main and stand-by) will be needed along with hot water piping distribution to new air handling unit preheat coils.

Tempered Hot Water System

A separate 110 deg. tempered hot water system is needed to serve the chilled beams (or fan coil units).

Plumbing

Fixtures

- Water Closets - Vitreous china, commercial quality 1.6 gallons per flush water saver, wall hung, siphon jet type with dual flush manual flush valve
- Urinals - 0.125, 0.5 or 1.0 gpf water-saver, commercial quality wall-hung washout type with manual or battery operated flush valves.
- Lavatories – Stainless Steel under-mount, countertop or wall hung type units, with restricted flow manual or battery operated sensor faucets. Barrier free controls for use by people with disabilities.
- Laboratory Cup Sinks - Will be specified by Architect. Cup sinks will be furnished with protected cold water, restricted flow faucets and shall drain to lab waste system.
- Laboratory Sinks - Will be specified by Architect. Lab sinks will be furnished with protected hot and cold water, restricted flow faucets and shall drain to lab waste system.
- Service Sinks - Wall-hung, enameled cast iron or stainless steel with hose-end type faucet, complete with vacuum breakers.
- Mop Receptors – stainless steel with hose-end type faucet, complete with vacuum breaker and sand trap.
- Safety Shower/Eyewash - Provide in labs and prep rooms. Water for the safety showers will be supplied from the emergency tempered water system. Safety equipment will be installed in mounting heights for use by people with disabilities.
- Drinking Fountains with Bottle Fillers - Stainless steel wall-hung electric water cooler, barrier free.
- There are fixtures available that use less water than the levels specified by the Energy Policy Act of 1992. The following will be investigated for appropriateness and applicability.

Dual Flush Water Closets	0.8 & 1.6 gallons per flush
Waterless Urinals	0.0 gallons per flush
Kitchen Sink	1.5 gallons per minute
Lavatory Sink	0.5-1.5 gallons per minute

Piping

- **Domestic Water Distribution** will service water closets, lavatories, urinals, electric water coolers, and mop receptors. 120 deg F water will be delivered to plumbing fixtures. If any equipment requires temperature greater than 140 deg C, a built-in booster heater will be needed.

- **Protected Water:** There will be a protected laboratory cold water system. The protected water pipling system will service the laboratories and scientific equipment, such as laboratory sinks, cup sinks, glasswashers, autoclaves sinks and other laboratory equipment.

- **Sanitary Waste:** Where possible, all sanitary waste will drain by gravity

to the site sanitary sewer system. The piping will be made of service weight cast iron soil pipe, asphalt or coal tar pitch coated with neoprene gaskets for buried piping and mechanical couplings for above ground piping.

- **Laboratory Waste** will be piped separately from other building drainage systems. A dual tank automatic, chemical injection pH adjustment system will be provided. The system will connect to the building sanitary system 10' outside the exterior wall. The piping will be made of polypropylene piping and fittings with fusion joints.

- The **Rain Water Drainage** system will convey storm water from roof drains, area drains, and all clean waste to the site storm sewer system. The piping will be service weight cast iron soil pipe, asphalt or coal tar pitch coated with neoprene gaskets for buried piping and mechanical couplings for above ground piping.

- **Lab Compressed Air** will be an oil free compressed The generation system will be located in the mechanical penthouse. Compressed air will be 30-50 psi for lab outlets, and 100 psi for glass washers, autoclaves, and other equipment where needed.

- **Lab Vacuum** will be a centralized system with the vacuum pumps located in the penthouse mechanical room. The piping will be oxygen clean copper tubing, fitting, and valvaes.

- **Natural Gas** will be provided by a new gas service to the building. The natural gas utility company will provide an exterior meter. Piping, fitting, and valves will be schedule 40 carbon steel. Isolation valves will be used for each fixture or piece of equipment.

- **Emergency Tempered Water** will be provided to safety showers and emergency eyewashes.

- **Purified Water System** will be provided by a central ASTM Type II, RODI generation and distribution system. An alternate to be invested in Schematic Design is a de-centralized system.

Electrical

Electrical Service

The electrical power to the building will be supplied by a new 1600A, 277Y/480V, 3-phase, 4-wire service, and will be designed per NFPA 70 National Electric Code (NEC), the Massachusetts Electrical Code (MEC), Federal, State, local and all other applicable codes.

It is assumed that all new associated electrical work will be fed via the duct bank infrastructure running along College Drive. The Utility Capacity Analysis in the Existing Conditions section of this report gives more detailed information on locations.

A digital metering system shall be installed with software, capable of providing electrical consumption data at least daily and measure at least hourly consumption of lighting, general purpose power and HVAC power.

Emergency / Standby Power

A dedicated emergency / standby generator system to handle the life safety loads, fire alarm and heating circulation and standby power to include elevator recall, will be designed. The emergency transfer switch and panelboards will be located in a 2-hour rated room and emergency feeders will also be required have a 2-hour rating.

Provide a new 150kW/187.5kVA, 277Y/480V, 3-Phase, 4-Wire natural gas generator with factory sound attenuated enclosure. The generator fuel source will be sized for 48-hours of back up.

The life safety branch shall power egress and exit lighting, communications systems and the fire alarm system. The optional standby transfer, distribution equipment and feeders shall be located in the main electric room. The standby branch shall provide back power for boilers and associated pumps, IT server room and telecommunications closets, selected fume hood loads and heating loads.

General Purpose Power

A minimum of two double duplex receptacles shall be provided in labs for teacher stations. A double duplex receptacle shall be provided for the projector, access point and media distribution.

A minimum of one duplex receptacle will be provided on each wall in offices. A minimum of one general purpose duplex receptacle shall be provided in utility and storage rooms. Additional general purpose receptacle outlets will be provided per the SSU's programming requirements.

An additional design option offers multiple service floor outlets or fire rated poke

thru devices be provded for equipment of appliances in the common areas where the equipment is to be placed on worktables, counters, system furniture, or cabinets that are not against fixed walls.

Lighting Equipment

Provide high efficiency lighting in all interior spaces as well as on the exterior of the building. The light power density shall not exceed 0.8 W/sq. ft. Linear direct/ indirect fixture lamps shall be LED, recessed downlight fixture lamps shall be LED.

Exterior light lamps shall be LED. Pedestrian walkways shall be designed for an average maintained illuminance value (Eavg) of 0.6 foot-candle horizontal, and 1.1 foot-candle vertical, as measured 6'- 0" above ground, and shall maintain an avg/min illuminance uniformity ratio not to exceed 4:1. (This means that if the average illuminance at the ground plane is 0.6 foot-candles, the minimum illuminance shall not be lower than 0.15 foot-candles).

The interior lighting shall be controlled with an automatic control device to shut off building lighting in all spaces and shall be integrated with the HVAC controls. This automatic control device shall function on either:

- A scheduled basis using a time of day operated control device that turns lighting off at specific programmed times
- An occupant sensor that shall turn lighting off within 30 minutes of an occupant leaving a space.

Emergency Lighting

An emergency lighting system will be provided to allow the safe evacuation of the building in the event of a major emergency leading to a complete loss of electrical power. Exit lights and emergency path of egress lighting will be provided in accordance with all applicable codes. Power for such shall be provided by the Emergency system as designated within this document. Additional "Emergency" lighting will be provided in laboratories or hazardous use areas to assist personnel during a normal utility power outage.

Exit signs shall be red LED type. In addition, battery equipped emergency lighting units will be provided in each electric room.

Emergency power will be provided by local emergency panelboards located in emergency electrical closets strategically located on each floor.

The following are the emergency lighting requirements:

Path of Egress	1FC minimum at floor
Exterior Egress Discharge	1FC minimum
Public Assembly Areas	5 FC minimum at exit doors
Treads of Stairs	2 FC minimum in corridors

Fire Alarm System

A combination audible-visual signaling appliances as required per NFPA 72 shall be provided. The audible-visual notification devices shall be located in all egress pathways, public and common areas. Visual notification devices shall be provided in all offices and toilet rooms. The devices shall be in compliance with the Americans with Disabilities Act (ADA).

The PA system shall be capable of initiating pre-recorded messages upon activation of user defined emergency buttons (intruder alert, lock down, all clear, etc.) located in the administration area. The emergency buttons shall be integrated with the access control and intrusion detection systems.

Manual pull stations shall be located within 5 ft. of each means of egress and mounted at 44 in. above the floor to the activating lever of the box. The pull stations shall mechanically latch upon operation and remain so until manually reset by a key common to all system locks.

Photoelectric smoke detectors shall be located in egress pathways. Smoke detectors shall also be located at the top, bottom of each stairway; mechanical equipment; electrical; transformer; telephone equipment; elevator machine; or similar room.

Elevator recall smoke detectors shall be located in the elevator lobby on each floor. Sprinkler tamper and flow devices shall be wired for trouble and alarm indication respectively into the fire alarm control panel.

Telecommunications & Cabling

A new telecommunications cabling infrastructure will be installed in compliance with the latest TIA and SSU standards. The utility company services will be terminated in a telecommunications entrance facility (EF). Fire rated plywood backboards, grounding, equipment racks, 110-type punch down blocks, patch panels, conduit sleeves, and corridor cable tray system will be provided in the EF, the telecommunications equipment room (TER) and the telecommunications rooms (TR).

The pathway system, racks and equipment will be sized for complete utilization of the service entrance cables and all voice and data outlets plus room for minimum of 50% growth.

Voice and data outlets will be provided in all rooms. Voice and data horizontal cabling will be Category 6, unshielded, twisted pair, 8 conductor copper cable from each jack to the nearest telecommunications closet. Each end of each cable will be labeled; the cables will be terminated in accordance with TIA-568-B configuration T568-A, and tested in accordance with ANSI/TIA/EIA-568-C.

A minimum of two (2) voice/data outlets will be provided in each office; a

minimum of one (1) voice and six (6) data outlets will be provided in each lab; two (2) data outlets will be provided in the ceiling in each classroom, one for interactive whiteboard and one for a wireless access point; one (1) data outlet will be provided in the ceiling in corridors and assembly areas on 40 foot centers for wireless access points; one (1) data outlet will be provided for each computer workstation.

Voice/data outlets will be provided in multiple service floor outlets or fire rated poke-thrus for equipment and appliances when the equipment is to be placed on worktables, counters, systems furniture, or cabinets that are not against fixed walls.

Backbone cables will be provided between the EF, TER and each TR. Copper backbone cables will be voice grade Category 3 cable. The cables will be tested in accordance with the TIA standards. Optical fiber cables will be 24-strand (50/125µm) multimode laser optimized cable.

Access Control, Intrusion Detection & Video Surveillance (CCTV) System

A video surveillance system shall monitor all entry/exits, building perimeter and all corridors. The access control system shall be hardwired for all doors, utility and similar rooms. The intrusion detection system shall monitor all ground floor doors and windows.

An access control system consisting of proximity card readers and key fobs shall be provided at entry/egress doors. Door contacts shall be provided on all exterior doors and motion detectors shall monitor the ground floor for intrusion alerts.

Voice Communications (Telephone) System

Provide a new telephone system. The voice communications equipment shall comprise of a voice-over-IP (VoIP) telephone switching system, distribution infrastructure, and telephone data ports.

Data Communications Systems

Provide a new data communications system. The data communication equipment shall comprise of 10/100/1000 core and edge switches based on HP 5400 series chassis. The switches shall be equipped with PoE and non-PoE 1-Gigabit copper Ethernet ports and 10-Gigabit fiber optic ports for connection between core and edge switches. The switches shall provide connection of a number of devices together (PCs, servers, printers, etc.) over a wired data system and control access to various parts of the network.

Wireless Data Communications System

A new wireless data communications system will be provided. The system will comprise of a controller and a/b/g/n access points based on HP. The access points will provide wireless connection of a number of devices together (PCs,

servers, printers, etc.) over a Wi-Fi network and control access to various parts of the network.

Code and Life Safety Systems

Fire Protection

Sprinklers

A. Provide an automatic sprinkler system as required by the state building code. Install the system in accordance with NFPA 13. The sprinkler system will be fed by the combination standpipe system, with a floor control valve assembly at each interconnection point. Floor control valve assemblies shall include a supervised control valve, pressure gauge, flow switch, inspector's test station and check valve (where interconnecting standpipes).

B. Sprinkler Mains (2 1/2" and larger) - ASTM A53 schedule 10 black carbon steel with malleable iron mechanical fittings (250 psi rated as required)

C. Sprinkler Branches (2" and smaller) - ASTM A53 schedule 40 black carbon steel with cast iron threaded fittings

D. Dry and Preaction - Same as wet except galvanized pipe and fittings.

E. Sprinklers shall be suitable for ordinary hazard (group II) duty.

F. Install sprinklers "center of tile" in finished areas with acoustical ceilings.

G. Install guards when sprinklers are in areas where they may be subject to mechanical damage, such as mechanical rooms.

Laboratory spaces will be sprinklered as Ordinary Group II occupancy, while office areas will be sprinklered at Light Hazard occupancy.

Standpipes

A standpipe system is needed to facilitate manual fire suppression. The standpipe system shall be combination type, serving as both a source of water for manual fire suppression activities as well as supply the building sprinkler systems. Outlets are required at intermediate landings of egress stairs, both sides of horizontal exits and egress/entry points of entrance/exit corridors.

Fire Pump

For pricing purposes provide a fire pump to boost the incoming water pressure. Provide a 1000 gpm, 75 psi boost electric fire pump. Provide a reduced voltage solid state transfer switch. Refer to Appendix VI for Hydrant Flow Test data completed for the Mainstage Theater project. When the New Science Building moves into the design phase, additional testing may be required.

Civil

Site Clearing

Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Protecting existing trees and vegetation to remain, including temporary fencing for trees in close proximity to construction operations.
2. Removing existing trees and vegetation indicated to be removed.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above and below grade site improvements.
6. Disconnecting, capping (sealing) of utilities as required.

Provide control measures to prevent all erosion, siltation and sedimentation of wetlands, waterways, construction area, adjacent areas and off-site areas. The necessary work includes but is not limited to the following:

1. Soil stockpiles and on-site storage and staging areas.
2. Cut and fill slopes and other stripped and graded areas.
3. Constructed and existing swales and ditches.
4. Drain inlets/Catch Basins

Site Utilities

The Existing Conditions section of this report has more detailed information on the tying tnto the existing utilities.

Water Supply: Provide labor, materials and equipment for the installation of the service lines to a point 5 feet from the building. The building will require a 4-inch water service and a 6-inch fire service of pipe material most likely consisting of ductile iron (DI). The work shall include placement of pipe and connection to the service water main in Lafayette Street.

Sanitary Sewer: Provide labor, materials and equipment for the installation of the sanitary service to a point 5 feet outside the building. Discharge pipes from the building shall be a 6-inch diameter polyvinyl chloride pipe (PVC). Work shall include the placement of PVC and service-main connections.

Storm Drainage: Provide the labor and materials required for the installation of the storm drainage system including roof drains on the exterior of the building. Typical stormwater collection system would consist of a catchbasin to drain manhole system connected by 12-inch corrugated plastic pipe (CPP). Stormwater water quality will be provided via a particle separator similar to a Stormceptor 3600. Stormwater quanity control would be provided by a small (25'x50') underground detention/infiltration system that would typically consist of interconnected 24-inch diameter perforated CPP in a crushed stone bed. The new storm drainage system would be connected to the existing on campus

system in close proximity to the project site.

Portions of the existing storm drainage system within the enclosed courtyard created by the new building will have to be reworked, including the installation of an additional catchbasin within the courtyard. Also, portions of courtyard drainage would have to be piped under the new building which would require a new 12-inch diameter ductile iron storm drain line installed by the plumbing subcontractor.

Landscape

Pavements

Pavements around the Science Center will primarily be concrete sidewalks matching the campus standard, similar in character to the Berry Library. Specialty pavements at the student plaza in the Meier Courtyard and the expanded sidewalk area along Lafayette Street will be exposed aggregate concrete. The service drive at the loading dock will be vehicular asphalt pavement with granite curbing as an extension of College Drive. Pedestrian and vehicular pavement markings and signage is provided to control and alert traffic of pedestrian crossings and general traffic safety.

Site Walls

Three types of site walls are planned on the site. The first is a board-formed concrete wall (to match Berry Library) at the loading dock along the exposed surface, and the second is architectural concrete finish along the service ramp access to Meier Hall Courtyard. Along the Lafayette Street landscape, terraced field stone walls retain topography allowing entrance to level one in the northeast corner of the building.

Landscape Plantings

The landscape design is characterized into three distinct zones; Meier Hall Courtyard, Lafayette Streetscape and Hillside Plantings. The Meier Hall landscape plantings will be matching deciduous and evergreen plants found currently in the courtyard. The Lafayette Streetscape is a continuation of the planting types growing along the existing east wing of Meier Hall. Generally this area is consisted of evergreen shrubs and groundcover with larger deciduous shade trees. The hillside plantings will be ornamental grasses, evergreen groundcovers and ornamental deciduous trees adapted to shallow and dry soil conditions.

Permanent irrigation will not be installed on the project. Supplemental watering will be required during the establishment period allowed by LEED, and is to be provided from either off-site water delivered to the site, wall hydrants, and slow-drip irrigation bags installed on trees. Once plantings are established the landscape will not require permanent irrigation.

Site Lighting

Pathway lighting is provided along all walkways to provide a safely illuminated campus environment while minimizing light pollution to the night sky and across the campus's property line. Sitelighting will conform with the SSU standard.

Site Furniture

Contemporary site furnishings of trash and recycling bins, bicycle racks and building signage will be provided at convenient and appropriate locations around

the site. If required by campus security emergency phones will be provided at key locations for safety. Site furniture will comply with SSU standards.

F. COST ESTIMATE

1. INTRODUCTION / NARRATIVE
2. DETAILED COST ESTIMATE
3. OPERATING COST ANALYSIS
4. POTENTIAL UTILITY REBATES

COST ESTIMATE

Introduction / Narrative

The following pages detail the cost estimate for the Consensus Solution. The total project cost (TPC) is $55M and estimated construction costs (ECC) of $40.2M. The cost estimate prepared was based on information from the Uniformat Spec, the room data sheets, and the conceptual floor plans.

The cost estimate's construction cost is on budget at $40,170,291. The cost estimate is currently carrying four alternatives within the design. They are:

- Additional Scope within the courtyard
- HVAC - changing to fan coils with Aircuity
- HVAC - using campus steam heating
- Site Lighting

The alternative with the most cost impact is utilizing condensing boilers instead of campus steam. Campus steam requires additional trenching for the steam line from Meier Hall and a slightly expanded mechanical space in the basement which in turn requires more excavation. This requires further conversation with SSU on the priorities in using campus steam. Utilizing campus steam will add approximately $300,000 addition to the construction cost.

Following the cost estimate is the operating cost analysis provided by DCAMM with input from SSU.

Detailed Cost Estimate

35 Highland Circle, Suite 200 Needham, MA 02494

STUDY ESTIMATE STAGE

DCAMM

SALEM STATE NEW SCIENCE LAB BLDG.

Salem, MA

May 19, 2015

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Salem, MA

May 19, 2015

BASIS OF ESTIMATE

The estimate is based on the STUDY drawings and documents prepared by Payette. dated April 16, 2015.

Qualifications / Clarifications:

1 Labor costs included at local union rates.
2 Foundation system is included as conventional concrete spread & column footing type.
3 No provision for underground gas and vapor mitigation system
4 Structure is included as conventional structural steel type
5 The following mark ups area used:

General Conditions	10.00%
General Requirements	3.00%
Insurance & Bond	1.50%
Building Permit - N/A	0.00%
Contractor's Overhead & Fee	2.50%
Design Contingency	0.00%
Estimating Contingency	10.00%
Construction Contingency	0.00%
Phasing & Temporary work	1.00%
Escalation Contingency (midpoint of construction)	8.83%

Construction mid point is calculation:

Construction bid/start:	August 2016
Construction duration:	22 months
Construction mid-point:	July 2017

6 We assume all required municipal water is available at the property line. The water is to be served from dual services connected to a suitably sized water main that is part of a looped supply system.

7 The estimate assumes all long-lead items can be pre-purchased to meet schedule requirements.

8 The estimate is based on the premise that the design will meet all codes, laws, ordinances, rules, & regulations in effect at the time that the estimate was prepared. The estimate shall be adjusted should any discrepancies between design and the aforementioned codes, laws or ordinances result in, or require, an increase in the cost of the work.

9 We assume footings will bear on and be pinned to ledge

The estimate excludes the following:

1 A-E Fees
2 Overtime
3 Working in contaminated soils
4 Sales Tax
5 Relocation / working around any fiber optic cables
6 Loose furniture and equipment
7 Loose technology equipment (i.e. Computers, Printers, Etc.)
8 Telecom/Security/Equipment devices & wiring excluded. A/V equip. & wiring excluded.
9 Conduits, raceways, back boxes only included for Telecoms/Security.
10 Special seismic requirements
11 Inert gas fire suppression systems
12 Third party commissioning costs

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BASIS OF ESTIMATE

13 Work associated with the removal or remediation of contaminated soils, underpinning of existing foundations, unsuitable soil, unidentified underground obstructions or any other unsuitable materials including the haul in of replacement material.
14 Land Purchase
15 Traffic Impact Fees
16 School Impact Fees
17 Sewer Tap Fees
18 Water Tap Fees
19 Land & Off-Site Improvements
20 Geotechnical engineering
21 Utility company back charges and user fees/surcharges
22 Testing or inspection services, as required by State Building Code or other: concrete, soils, pavement, fireproofing.
23 Costs associated with air monitoring/clearance sampling
24 Tenant relocation costs
25 Blackout curtains
26 Seismic restraint study
27 Solar supplemental hot water heat
28 Photovoltaic system

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SUMMARY

Section	Description	Amount	Cost/SF	%
A	**SUBSTRUCTURE**			
A10	FOUNDATIONS			
A1010	Standard Foundations	817,262	11.57	
A20	SUBGRADE ENCLOSURES			
A2010	Walls for Subgrade Enclosures	366,510	5.19	
A40	SLABS ON GRADE			
A4010	Standard Slabs on Grade	120,460	1.71	
A4040	Pits & Bases	10,000	0.14	
A90	SUBSTRUCTURE-RELATED ACTIVITIES			
A9010	Substructure Excavation	208,926	2.96	
A9020	Construction Dewatering	5,000	0.07	
A9030	Excavation Support	0	0.00	
	SUBTOTAL	**$ 1,528,157**	**$ 21.64**	**3.80%**
B	**SHELL**			
B10	SUPER STRUCTURE			
B1010	Floor Construction	1,872,220	26.51	
B1020	Roof Construction	276,975	3.92	
B1080	Stairs	197,011	2.79	
B20	EXTERIOR VERTICAL ENCLOSURES			
B2010	Exterior Walls	1,505,966	21.33	
B2020	Exterior Windows	1,293,916	18.32	
B2030	Exterior Doors & Grilles	55,312	0.78	
B2070	Exterior Louvers & Vents	30,000	0.42	
B30	EXTERIOR HORIZONTAL ENCLOSURES			
B3010	Roofing	684,668	9.70	
B3020	Roof Appurtenances	128,750	1.82	
B3080	Overhead Exterior Enclosures	25,950	0.37	
	SUBTOTAL	**$ 6,070,768**	**$ 85.98**	**15.11%**

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SUMMARY

Section	Description	Amount	Cost/SF	%
C	**INTERIORS**			
C10	INTERIOR CONSTRUCTION			
C1010	Partitions	835,319	11.83	
C1020	Interior Windows	44,200	0.63	
C1030	Interior Doors	317,100	4.49	
C1040	Interior Grilles & Gates	0	0.00	
C1070	Suspended Ceiling Construction	335,513	4.75	
C1090	Interior Specialties	441,468	6.25	
C20	INTERIOR FINISHES			
C2010	Wall Finishes	279,313	3.96	
C2020	Interior Fabrications	77,000	1.09	
C2030	Floor Finishes	542,906	7.69	
C2040	Stair Finishes	40,070	0.57	
C2050	Ceiling Finishes	8,631	0.12	
	SUBTOTAL	**$ 2,921,521**	**$ 41.38**	**7.27%**
D	**SERVICES**			
D10	CONVEYING			
D1010	Vertical Conveying Systems	457,500	6.48	
D20	PLUMBING			
D2010	Domestic Water Distribution	1,523,764	21.58	
D30	HVAC			
D3000	HVAC Systems, General	5,763,188	81.62	
D40	FIRE PROTECTION			
D4010	Fire Suppression	422,523	5.98	
D50	ELECTRICAL			
D5010	Electrical Power Generation	3,434,424	48.64	
	SUBTOTAL	**$ 11,601,398**	**$ 164.30**	**28.88%**
E	**EQUIPMENT & FURNISHINGS**			
E10	EQUIPMENT			
E1010	Vehicle & Pedestrian Equipment	8,500	0.12	
E1040	Institutional Equipment	2,400,400	34.00	
E20	FURNISHINGS			
E2010	Fixed Furnishings	2,535,118	35.90	
	SUBTOTAL	**$ 4,944,018**	**$ 70.02**	**12.31%**

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Section	Description	Amount	Cost/SF	%
F	**SPECIAL CONSTRUCTION & DEMOLITION**			
F10	SPECIAL CONSTRUCTION			
F1010	Integrated Construction	84,290	1.19	
F20	FACILITY REMEDIATION			
F2010	Hazardous Materials Remediation	0	0.00	
F30	DEMOLITION			
F3010	Structure Demolition	100,000	1.42	
F3030	Selective Demolition	0	0.00	
	SUBTOTAL	**$ 184,290**	**$ 2.61**	**0.46%**
	TOTAL BUILDING	**$27,250,151**	**$385.92**	**67.84%**
G	**BUILDING SITEWORK**			
G10	SITE PREPARATION			
G1010	Site Clearing	11,000	0.16	
G1020	Site Elements Demolition	5,000	0.07	
G1070	Site Earthwork	15,000	0.21	
G20	SITE IMPROVEMENTS			
G2010	Roadways	2,750	0.04	
G2020	Loading Dock Access	31,519	0.45	
G2030	Pedestrian Plazas & Walkways	64,264	0.91	
G2060	Site Development	216,919	3.07	
G2080	Landscaping	226,617	3.21	
G30	LIQUID & GAS SITE UTILITIES			
G3010	Water Utilities	25,956	0.37	
G3020	Sanitary Sewerage Utilities	40,282	0.57	
G3030	Storm Drainage Utilities	118,941	1.68	
G3050	Site Energy Distribution	26,376	0.37	
G3060	Site Fuel Distribution	3,149	0.04	
G40	ELECTRICAL SITE IMPROVEMENTS			
G4010	Site Electrical Distribution Systems	32,500	0.46	
G4050	Site Lighting	66,500	0.94	
G50	SITE COMMUNICATIONS			
G5010	Site Communications Systems	45,000	0.64	
G5020	Other Site Electrical Utilities	2,500	0.04	
	TOTAL SITE	**$934,274**	**$13.23**	**2.33%**

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SUMMARY

Section	Description		Amount	Cost/SF	%
SUBTOTAL BUILDING & SITE			**$28,184,424**	**$399.16**	**70.16%**
	General Conditions	10.00%	2,818,442		
	General Requirements	3.00%	930,086		
	Insurance & Bond	1.50%	478,994		
	Building Permit - N/A	0.00%	0		
	Contractor's Overhead & Fee	2.50%	810,299		
SUBTOTAL ECC BEFORE CONTIGENCIES			**$33,222,246**		**82.70%**
	Design Contingency	0.00%	0		
	Estimating Contingency	10.00%	3,322,225		
	Construction Contingency	0.00%	0		
	Phasing & Temporary work	1.00%	365,445		
	Escalation Contingency (midpoint of construction)	8.83%	3,260,376		
ESTIMATED CONSTRUCTION COSTS			**$40,170,291**	**$568.90**	**100.00%**

ALTERNATE

ALT 1 - Site - ADD Courtyard	$50,961
ALT 2 - HVAC - HVAC - Fan Coil Units with Aircuity	$280,430
ALT 3 - HVAC - HVAC - Campus Steam Heating	$304,700
ALT 4 - Site - Site Lighting	$28,564

STUDY ESTIMATE STAGE
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DETAILS

Section	Description	Qty	Unit	$/Unit	Amount
A	**SUBSTRUCTURE**				
A10	**FOUNDATIONS**				
A1010	**Standard Foundations**				
	Strip footings to exterior walls				
	Excavation	423	CY	12.00	5,077
	Remove off site	423	CY	20.00	8,462
	Backfill with gravel	360	CY	28.00	10,074
	Formwork to exterior wall	1,085	SF	10.00	10,853
	Reinforcement in concrete	4,432	LBS	1.10	4,875
	Concrete material	63	CY	115.00	7,280
	Placing concrete	57	HR	60.00	3,419
	Strip footings to walls at step elevation change				
	Excavation	11	CY	12.00	133
	Remove off site	11	CY	20.00	222
	Backfill with gravel	6	CY	28.00	181
	Formwork to strip footing	80	SF	10.00	798
	Reinforcement in concrete	326	LBS	1.10	358
	Concrete material	5	CY	115.00	535
	Placing concrete	4	HR	60.00	251
	Strip footings to interior loadbearing walls				
	Excavation	25	CY	12.00	295
	Remove off site	25	CY	20.00	492
	Backfill with gravel	18	CY	28.00	508
	Formwork to loadbearing wall	166	SF	10.00	1,660
	Reinforcement in concrete	452	LBS	1.10	497
	Concrete material	6	CY	115.00	742
	Placing concrete	6	HR	60.00	349
	Strip footings to basement walls				
	Excavation	154	CY	12.00	1,853
	Remove off site	154	CY	20.00	3,089
	Backfill with gravel	90	CY	28.00	2,513
	Formwork to strip footing	1,109	SF	10.00	11,092
	Reinforcement in concrete	4,529	LBS	1.10	4,982
	Concrete material	65	CY	115.00	7,441
	Placing concrete	58	HR	60.00	3,494
	Miscellaneous concrete costs (pumping, admixtures etc.)				
	Ledge removal	6,000	CY	100.00	600,000
	Pining to ledge for footing @ level 1, allowance	411	LF	300.00	123,300
	Premium for pump grade concrete mix	139	CY	5.00	696
	Pump & operator	1.7	DAYS	1,000.00	1,739
		Sub-total			**$817,262**
A20	**SUBGRADE ENCLOSURES**				
A2010	**Walls for Subgrade Enclosures**				
	Foundation walls at exterior				
	Formwork to foundation wall @ exterior	3,264	SF	10.00	32,640

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DETAILS

Section	Description	Qty	Unit	$/Unit	Amount
	Reinforcement in concrete	6,528	LBS	1.10	7,181
	Concrete material	84	CY	115.00	9,707
	Placing concrete	76	HR	60.00	4,558
	Waterproofing foundation wall & footing	2,448	SF	2.00	4,896
	Insulation to foundation walls	1,632	SF	2.00	3,264
	Walls at step elevation change				
	Formwork to wall	300	SF	10.00	3,000
	Reinforcement in concrete	600	LBS	1.10	660
	Concrete material	6	CY	115.00	671
	Placing concrete	5	HR	60.00	315
	Waterproofing foundation wall & footing	150	SF	2.00	300
	Insulation to foundation walls	90	SF	2.00	180
	Exterior Pier column footings, 6'x6'x1.67'				
	Excavation	207	CY	12.00	2,489
	Remove off site	207	CY	20.00	4,148
	Backfill with gravel	175	CY	28.00	4,891
	Formwork to exterior column footing	561	SF	10.00	5,611
	Reinforcement in concrete	2,291	LBS	1.10	2,520
	Concrete material	33	CY	115.00	3,764
	Placing concrete	29	HR	60.00	1,768
	Interior column footings, 8'x8'x2'				
	Excavation	229	CY	12.00	2,743
	Remove off site	229	CY	20.00	4,571
	Backfill with gravel	144	CY	28.00	4,030
	Formwork to interior column footing	1,088	SF	10.00	10,880
	Reinforcement in concrete	5,924	LBS	1.10	6,516
	Concrete material	85	CY	115.00	9,732
	Placing concrete	76	HR	60.00	4,570
	Miscellaneous				
	Allow for piers/pilasters	14	EA	600.00	8,400
	Set anchor bolts grout plates	31	EA	40.00	1,240
	Miscellaneous concrete costs (pumping, admixtures etc.)				
	Premium for pump grade concrete mix	208	CY	5.00	1,038
	Pump & operator	3	DAYS	1,000.00	2,595
	Foundation drainage	408	LF	15.00	6,120
	Elevator Pits				
	Excavation for elevator pit	117	CY	12.00	1,400
	Remove off site	117	CY	20.00	2,333
	Backfill with gravel	8	CY	28.00	232
	Elevator pit walls				
	Vapor barrier	864	SF	9.00	7,776
	Reinforcement in concrete wall	1,296	LBS	1.10	1,426
	Concrete material	11	CY	115.00	1,294
	Placing concrete	10	HR	60.00	608
	Elevator Slab				
	Formwork	108	SF	10.00	1,080
	Reinforcement in concrete	473	LBS	1.10	520

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DETAILS

Section	Description	Qty	Unit	$/Unit	Amount
	Concrete material in slab	9	CY	115.00	1,087
	Placing concrete	9	HR	60.00	510
	Cementitious waterproofing to elevator pit	594	SF	12.00	7,128
	Miscellaneous concrete costs pumping, admixtures etc.				
	Premium for pump grade concrete mix	21	CY	7.00	145
	Pump & operator	0.3	DAYS	1,000.00	259
	Basement walls				
	Formwork to basement wall	10,008	SF	10.00	100,080
	Reinforcement in basement walls	25,020	LBS	1.10	27,522
	Concrete material in basement walls	259	CY	115.00	29,764
	Rubbing concrete after stripping formwork	100	HR	60.00	6,005
		1,651	SF	4.50	7,431
	Waterproofing & protection mat to basement walls				
	Rigid insulation to basement walls	1,651	SF	2.50	4,128
	Miscellaneous concrete costs (pumping, admixtures etc.)				
	Premium for pump grade concrete mix	259	CY	5.00	1,294
	Pump & operator	3.2	DAYS	1,000.00	3,235
	Foundation drainage	417	LF	15.00	6,255
	Sub-total				**$366,510**
A40	**SLABS ON GRADE**				
A4010	**Standard Slabs on Grade**				
	Level 1	*5,888*	*SF*		
	Gravel fill	218	CY	25.00	5,452
	Rigid insulation under slab on grade	5,888	SF	1.50	8,832
	Vapor barrier	5,888	SF	0.25	1,472
	Mesh reinforcing 15% lap	6,771	SF	0.85	5,756
	Concrete material	96	CY	115.00	11,060
	Placing concrete	87	HR	60.00	5,193
	Finishing and curing concrete	47	HR	60.00	2,826
	Control joints - saw cut	5,888	SF	0.45	2,650
	Isolation joints at columns	136	LF	3.00	408
	Perimeter joints	408	LF	2.00	816
	Level 2	*7,033*	*SF*		
	Gravel fill	260	CY	25.00	6,512
	Rigid insulation under slab on grade	7,033	SF	1.50	10,550
	Vapor barrier	7,033	SF	0.25	1,758
	Mesh reinforcing 15% lap	8,088	SF	0.85	6,875
	Concrete material	115	CY	115.00	13,210
	Placing concrete	103	HR	60.00	6,203
	Finishing and curing concrete	56	HR	60.00	3,376
	Control joints - saw cut	7,033	SF	0.45	3,165
	Isolation joints at columns	112	LF	3.00	336
	Perimeter joints	408	LF	2.00	816
	Level 3	*2,545*	*SF*		

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DETAILS

Section	Description	Qty	Unit	$/Unit	Amount
	Gravel fill	94	CY	25.00	2,356
	Rigid insulation under slab on grade	2,545	SF	1.50	3,818
	Vapor barrier	2,545	SF	0.25	636
	Mesh reinforcing 15% lap	2,927	SF	0.85	2,488
	Concrete material	42	CY	115.00	4,780
	Placing concrete	37	HR	60.00	2,245
	Finishing and curing concrete	20	HR	60.00	1,222
	Control joints - saw cut	2,545	SF	0.45	1,145
	Isolation joints at columns	32	LF	3.00	96
	Perimeter joints	147	LF	2.00	294
	Miscellaneous concrete costs pumping, admixtures etc.				
	Premium for pump grade concrete mix	211	CY	7.00	1,477
	Pump & operator	2.6	DAYS	1,000.00	2,638
	Sub-total				**$120,460**
A4040	**Pits & Bases**				
	Equipment pads, 6"	1,000	SF	10.00	10,000
	Sub-total				**$10,000**
A90	**SUBSTRUCTURE-RELATED ACTIVITIES**				
A9010	**Substructure Excavation**				
	Basement Excavation				
	Excavate for basement	3,271	CY	12.00	39,253
	Excavate working space to basement wall	1,738	CY	12.00	20,850
	Remove excavated material from site	5,009	CY	20.00	100,172
	Backfill around basement walls with gravel	1,738	CY	28.00	48,650
	Sub-total				**$208,926**
A9020	**Construction Dewatering**				
	Local dewatering	1	LS	5,000.00	5,000
	Sub-total				**$5,000**
A9030	**Excavation Support**				
	No work				
	Sub-total				**$0**
B	**SHELL**				
B10	**SUPER STRUCTURE**				
B1010	**Floor Construction**				
	Concrete Construction				
	Interior concrete shear walls				
	Formwork to wall	1,500	SF	10.00	15,000

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DETAILS

Section	Description	Qty	Unit	$/Unit	Amount
	Reinforcement in walls	3,750	LBS	1.10	4,125
	Concrete material in walls	29	CY	115.00	3,354
	Placing concrete	26	HR	60.00	1,575
		15	HR	60.00	900
	Rubbing concrete after stripping formwork - one side				
	Steel Construction				
		400	TNS	3,115.00	1,246,000
	Steel columns in levels 2 thru 6 - w sections @ 13#/sf including bent plate, façade, bracing & kickers				
	Moment connections	65	EA	600.00	39,000
	Premium for AESS steel @ greenhouse, allow (with greenhouse allowance)				
	Decking systems - levels 2 thru 6				
	Metal decking - floors with sheer studs	61,350	SF	3.50	214,725
	Steel plate, bent in pour stop	2,663	LF	12.00	31,956
	Concrete toppings at flat roof				
	Mesh reinforcement in concrete topping, 15% overlap	70,553	SF	0.75	52,914
	Concrete topping to metal decking	936	CY	115.00	107,658
	Placing concrete	936	HR	60.00	56,169
	Finishing & curing concrete	491	HR	60.00	29,448
	Miscellaneous concrete costs (pumping admixtures etc.)				
	Premium for pump grade concrete mix	936	CY	5.00	4,681
	Pump and operator	12	DAYS	1,000.00	11,702
	Metal Fabrications				
	Elevator lifting beams, angles	2	EA	3,500.00	7,000
	Fireproofing				
	Fireproofing steel columns & brace frames	61,350	SF	0.75	46,013
		Sub-total			**$1,872,220**
B1020	**Roof Construction**				
	Structural Steel - curved roof only				
	Steel beams in curved roof framing - w sections	47	TNS	4,650.00	218,550
	Moment connections	10	EA	600.00	6,000
	Decking systems				
	Metal decking - curved roof	12,600	SF	3.50	44,100
	Concrete Construction				
	No concrete @ curved roof				
	Fireproofing				
		8,580	GSF	0.75	6,435
	Fireproofing floor construction, beams only below 20'H				
	Fire stopping floors	12,600	GSF	0.15	1,890
		Sub-total			**$276,975**
B1080	**Stairs**				

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DETAILS

Section	Description	Qty	Unit	$/Unit	Amount
	Stair Construction				
	Egress staircase to penthouse, including rails & handrails	1	FLT	5,000.00	5,000
	Egress staircase, including rails & handrails	5	FLT	10,000.00	50,000
	Concrete material in pan infill	11	CY	115.00	1,278
	Placing concrete	12	HR	60.00	733
	Open staircase, including rails & handrails	4	FLT	35,000.00	140,000
		Sub-total			**$197,011**
B20	**EXTERIOR VERTICAL ENCLOSURES**				
B2010	**Exterior Walls**				
	Metal stud backup to exterior wall, 6" thick	14,830	SF	7.00	103,810
	Insulation	14,830	SF	3.00	44,490
	Air barrier	14,830	SF	2.00	29,660
		14,830	SF	2.50	37,075
	Den shield or similar to exterior face of stud backup				
	Metal stud backup to exterior wall, Penthouse	5,450	SF	9.00	49,050
	Insulation	5,450	SF	3.00	16,350
	Air barrier	5,450	SF	2.00	10,900
		5,450	SF	2.50	13,625
	Den shield or similar to exterior face of stud backup				
	Drywall lining to interior face of stud backup	14,830	SF	2.10	31,143
	Exterior skin				
	Terra cotta rain-screen system	14,830	SF	50.00	741,500
	Metal panels - Penthouse				
	Metal stud backup to exterior wall, 6" thick	5,400	SF	7.00	37,800
	Metal panels, zinc shingles	5,400	SF	45.00	243,000
	Miscellaneous				
	Lintels - steel	1,298	LF	30.00	38,929
	Scaffolding to exterior wall	33,226	SF	2.00	66,451
	Flashings at sills & lintels	1,298	LF	10.00	12,976
	Flashing, thru wall, at parapet	1,298	LF	18.00	23,357
	Control joints in exterior wall (1#/30lf)	1,170	LF	5.00	5,850
		Sub-total			**$1,505,966**
B2020	**Exterior Windows**				
	Punched window	5,191	SF	85.00	441,193
	Operable 10% of window				N/A
	Anodized shrouds extend to face of rainscreen	0	SF	45.00	
	Curtain wall (not including greenhouse)	7,755	SF	105.00	814,275
	Miscellaneous				
	Backer rod & double sealant	4,272	LF	4.00	17,088
	Wood blocking at openings	4,272	LF	5.00	21,360
		Sub-total			**$1,293,916**

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Section	Description	Qty	Unit	$/Unit	Amount
B2030	**Exterior Doors & Grilles**				
	Doors, hollow metal				
	Doors, single leaf				
	Type A	4	EA	350.00	1,400
	Aluminum Entry doors, glazed, complete				
	Doors, double leaf				
	Type A	5	PR	6,000.00	30,000
	Doors, single leaf				
	Type A	1	EA	3,500.00	3,500
	Frames				
	Frames, hollow metal				
	Type A	4	EA	225.00	900
	Aluminum Frames				
	Aluminum frames included with cost of curtain wall/storefront system				
	Hardware to exterior doors				
	Set 1	4	SET	650.00	2,600
	Door operator	2	EA	1,500.00	3,000
	Specialty Doors				
	Overhead door @ loading dock, 10'x10'	2	EA	6,500.00	13,000
	Miscellaneous				
	Backer rod & double sealant	68	LF	4.00	272
	Wood blocking at openings	68	LF	5.00	340
	Paint doors & frames	4	EA	75.00	300
		Sub-total			**$55,312**
B2070	**Exterior Louvers & Vents**				
	Louvers, allowance	600	SF	50.00	30,000
		Sub-total			**$30,000**
B30	**EXTERIOR HORIZONTAL ENCLOSURES**				
B3010	**Roofing**				
	Slope roofing				
	Zinc sheet metal	11,364	SF	35.00	397,740
	Insulation	11,364	SF	3.00	34,092
	GWB thermal barrier	11,364	SF	3.00	34,092
	Vapor barrier	11,364	SF	1.00	11,364
	ice/water shield underlayment board	11,364	SF	3.50	39,774
	Rough blocking	3,784	LF	3.00	11,353
	Flat roofing				
	TPO roof membrane fully adhered	4,493	SF	7.00	31,451
	Abutment of flat roof with adjacent walls	780	LF	6.50	5,070
	Allowance for working membrane roofing around pipe & duct penetrations	1	LS	3,652.10	3,652
	Insulation tapered	4,493	SF	3.00	13,479
	GWB	4,493	SF	3.00	13,479

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Section	Description	Qty	Unit	$/Unit	Amount
	Fiberboard to roof (or the like)	4,493	SF	2.50	11,233
	Rough blocking	1,496	LF	3.00	4,489
	Miscellaneous Roofing				
	Trim at eaves/fascia to roof				In ext. walls
	SS Flashings	569	LF	30.00	17,070
	Edge trim/stop	569	LF	14.00	7,966
	Parapet zinc coping	569	LF	55.00	31,295
	Expansion joint cover	569	LF	30.00	17,070
		Sub-total			**$684,668**
B3020	**Roof Appurtenances**				
	Roof Openings				
	Elevator vent	2	LS	2,500.00	5,000
	Glass roof (not including greenhouse)	650	SF	175.00	113,750
	Roof stack enclosure	1	LS	10,000.00	10,000
		Sub-total			**$128,750**
B3080	**Overhead Exterior Enclosures**				
	Soffit at building overhang	600	SF	35.00	21,000
	Light gauge metal support	600	SF	7.00	4,200
	Insulation	600	SF	1.25	750
		Sub-total			**$25,950**
C	**INTERIORS**				
C10	**INTERIOR CONSTRUCTION**				
C1010	**Partitions**				
	Interior partitions, drywall	*56,714*	*SF*		$0
	type, 6" mtl. Stud typ., 30%	17,014	SF	11.45	$194,813
	type, 3 5/8" mtl. Stud typ., 70%	39,700	SF	9.45	$375,163
	premium for 1hr rated @ control areas	4,770	SF	1.50	$7,155
	premium for 3hr rated @ exist. Bldg.	2,650	SF	4.00	$10,600
		2,341	SF	18.00	$42,138
	Interior partitions, 8" CMU (chem. Areas/loading dock)				
	Elevator shaft wall	5,247	SF	13.25	$69,523
	GWB column covers	20	EA	1,000.00	$20,000
	Sealants & caulking at partitions	56,714	GSF	0.35	$19,850
	Rough blocking	18,716	LF	5.00	$93,578
	Lintels in masonry partitions	100	LF	25.00	$2,500
		Sub-total			**$835,319**
C1020	**Interior Windows**				
	Glass partitions, wood frame, glazing (30'/occupied flr.)	520	SF	85.00	$44,200

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Section	Description	Qty	Unit	$/Unit	Amount
		Sub-total			**$44,200**
C1030	**Interior Doors**				
	Doors, hollow metal				
	Doors, single leaf				
	type A	19	EA	350.00	$6,650
	Doors, double leaf				
	type A	30	PR	700.00	$21,000
	Premium for fire rated doors	19	EA	100.00	$1,900
	Doors, wood				
	Doors, single leaf				
	type A	69	EA	400.00	$27,600
	Premium for stile & rail w/ glass infills at labs	22	EA	250.00	$5,500
	Glazing to doors	220	SF	35.00	$7,700
	Doors, double leaf				
	type A	0	PR	800.00	
	Premium for fire rated doors	20	EA	100.00	$2,000
	Aluminum Entry doors, glazed, complete				
	Doors, single leaf				
	type A	0	EA	3,500.00	
	Doors, double leaf				
	type A	3	PR	7,000.00	$21,000
	Frames				
	Frames to single door (w/ sidelight & transom)				
	type A, HM	19	EA	325.00	$6,175
	type A, Wood	69	EA	400.00	$27,600
	Glazing to sidelights, 2'x7'	966	SF	35.00	$33,810
	Glazing to transoms, 2.5'x5'	863	SF	35.00	$30,188
	Frames to double door				
	type A, HM	30	PR	300.00	$9,000
	Aluminum Frames				
	Aluminum frames included with cost interior glass partitions				
	Hardware to interior doors				
	set 1	88	SET	650.00	$57,200
	set 2	30	SET	650.00	$19,500
	Specialty Doors				
	Allowance for miscellaneous access doors	28	EA	400.00	$11,298
	Miscellaneous				
	Paint doors & frames	148	EA	75.00	$11,100
	Wood blocking to doors	2,096	LF	5.00	$10,480
	Sealants & caulking	148	EA	50.00	$7,400
		Sub-total			**$317,100**
C1040	**Interior Grilles & Gates**				

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Section	Description	Qty	Unit	$/Unit	Amount
		Sub-total			**$0**
C1070	**Suspended Ceiling Construction**				
	2x2 ACT	15,048	SF	4.00	$60,193
	2x6 ACT @ labs	13,922	SF	7.00	$97,451
	GWB	984	SF	8.00	$7,870
	Vertical drywall soffits	500	LF	20.00	$10,000
	Wood slat ceiling @ main level lobbies, corridors & entries	4,000	SF	40.00	$160,000
		Sub-total			**$335,513**
C1090	**Interior Specialties**				
	Specialties/Millwork				
	Restrooms				
	Toilet Partitions; handicapped	8	EA	1,000.00	$8,000
	Toilet Partitions; regular	16	EA	750.00	$12,000
	Toilet Partitions; urinal screens, wall mtd	8	EA	450.00	$3,600
	Miscellaneous metal to ceiling supported toilet partitions	24	EA	225.00	$5,400
	Vanity counters, solid surface	57	LF	225.00	$12,825
	Toilet Accessories				
	Wall mounted grab bars	11	SET	240.00	$2,640
	Toilet tissue dispenser			NIC	
	Towel dispenser, surface mounted w/ waste receptacle			NIC	
	Soap dispensers	16	EA	90.00	$1,440
	Mirrors, unframed	360	SF	45.00	$16,200
	Sanitary napkin dispenser			NIC	
	Visual display boards				
	Markerboards, 16'	13	EA	2,240.00	$29,120
	Markerboards, 12'	5	EA	1,680.00	$8,400
	Markerboards, 8' @ student areas	6	EA	1,120.00	$6,720
	Janitor Closet				
	Mop & broom holder	4	EA	100.00	$400
	Miscellaneous				
	Backer panels in electrical closets	4	EA	500.00	$2,000
	Projection screen (w/ A/V allowance)				
	Signage/Directories	70,610	SF	0.50	$35,305
	Fire extinguisher cabinets - allowance	12	EA	375.00	$4,500
	Lockers, 3-tier wood	120	LF	350.00	$42,000
	Wood benches	120	LF	100.00	$12,000
	Wall and corner guards				
	Corner guards, SS	48	EA	150.00	$7,200
	Allowance for miscellaneous metals not identifiable at this design stage	70,610	SF	0.50	$35,305
	Miscellaneous sealants throughout building	70,610	SF	0.25	$17,653
	Millwork				

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Section	Description	Qty	Unit	$/Unit	Amount
	Recycle centers	50	LF	500.00	$25,000
	Coat hooks (24/lab)	528	EA	25.00	$13,200
	Hardwood rail for coat hooks	264	LF	40.00	$10,560
	Display cases	80	LF	500.00	$40,000
	Allowance @ student spaces	9	RMS	10,000.00	$90,000
		Sub-total			**$441,468**
C20	**INTERIOR FINISHES**				
C2010	**Wall Finishes**				
	Painted CMU - Elevator shaft	2,341	SF	1.10	$2,575
	Painted GWB	113,428	SF	1.00	$113,428
	Ceramic tile, wet wall only	1,000	SF	12.00	$12,000
	3/4" veneered plywood paneling to walls (30'/occupied flr)	1,200	SF	50.00	$60,000
	Fabric-wrapped acoustical panels, 3/4" tackable (30'/occupied flr)	1,200	SF	35.00	$42,000
	Wood trim				
	Wood trim @ windows	2,595	LF	18.00	$46,715
	Paint/stain to wood trim	2,595	LF	1.00	$2,595
		Sub-total			**$279,313**
C2020	**Interior Fabrications**				
	Rails & Handrails				
	Rail at areas open to below, glass	220	LF	350.00	$77,000
		Sub-total			**$77,000**
C2030	**Floor Finishes**				
	Carpet	539	SY	36.00	$19,412
	Concrete sealer	5,537	SF	1.25	$6,921
	Resinous flooring @ Penthouse	11,797	SF	8.00	$94,376
	Sheet rubber flooring	42,213	SF	7.00	$295,491
	Terrazzo	3,700	SF	25.00	$92,500
	Resilient base	8,102	LF	3.00	$24,306
	Epoxy flooring @ greenhosue	1,100	SF	9.00	$9,900
		Sub-total			**$542,906**
C2040	**Stair Finishes**				
	Finishes				
	Paint & sealer, penthouse stair	1	FLT	1,250.00	1,250
	Rubber	1,185	SF	12.00	14,220
	Precast terrazzo treads & landings	820	SF	30.00	24,600
		Sub-total			**$40,070**

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Section	Description	Qty	Unit	$/Unit	Amount
C2050	**Ceiling Finishes**				
	Exposed structure , paint underside deck & steel members above wood slat ceilings only	3,566	SF	1.50	$5,349
	Paint to GWB ceiling & soffits	2,984	SF	1.10	$3,282
	Sub-total				**$8,631**
D	**SERVICES**				
D10	**CONVEYING**				
D1010	**Vertical Conveying Systems**				
	Elevators & Escalators				
	Service/passenger elevator	11	STOP	40,000.00	440,000
	Elevator cab finish	2	EA	6,000.00	12,000
	Pit ladders	2	EA	350.00	700
	Sill angles	160	LF	30.00	4,800
	Sub-total				**$457,500**
D20	**PLUMBING**				
D2010	**Domestic Water Distribution**				
	Plumbing Fixtures	70,610	GSF	2.82	199,120
	Domestic Water Distribution	70,610	GSF	1.78	125,686
	Protected Water	70,610	GSF	3.02	213,242
	Waste & Vent	70,610	GSF	2.23	157,460
		70,610	GSF	3.89	274,673
	Laboratory Waste & Vent w/ PH Neutralization Tank				
	Rain Water Drainage	70,610	GSF	0.92	64,961
	Compressed Air	70,610	GSF	1.64	115,800
	Laboratory Vacuum	70,610	GSF	1.28	90,381
	Natural Gas	70,610	GSF	0.97	68,492
	Emergency Tempered Water	70,610	GSF	1.01	71,316
	Purified Water	70,610	GSF	2.02	142,632
	Sub-total				**$1,523,764**
D30	**HVAC**				
D3000	**HVAC Systems, General**				
		70,610	GSF	6.08	429,309
	Basis of Design Hot Water Boilers Heating Systems				
	Heating System Pumps & Distribution	70,610	GSF	3.12	220,303
	Tempered Hot Water System	70,610	GSF	2.24	158,166
	Cooling Systems Chillers & Pumps	70,610	GSF	5.18	365,760
	Cooling Towers & Pumps	70,610	GSF	3.52	248,547
	Waterside Economizer	70,610	GSF	1.35	95,324
	Chilled Water Distribution	70,610	GSF	2.98	210,418
	Tempered Chilled Water Distribution	70,610	GSF	3.23	228,070
	Air Handling Units	70,610	GSF	12.16	858,618
	Supply Air Distribution	70,610	GSF	9.34	659,497

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Section	Description	Qty	Unit	$/Unit	Amount
	Labatory & General Exhaust System	70,610	GSF	3.89	274,673
	Laboratory Exhaust Distribution System	70,610	GSF	1.78	125,686
	Additional Exhaust Systems	70,610	GSF	0.52	36,717
	Basis of Design Chilled Beams	70,610	GSF	3.96	279,616
	Student Spaces	70,610	GSF	0.71	50,133
	Spaces Requiring 24/7 Cooling	70,610	GSF	0.68	48,015
	Terminal Heating Equipment	70,610	GSF	0.44	31,068
	Greenhouse - Heat Exchangers, Pumps, & Piping (w/ greenhouse allowance)				
	NMR & SEM	70,610	GSF	0.28	19,771
	Life Safety Systems	70,610	GSF	0.25	17,653
	Stairwell & Elevator Hoistway Pressurization - N/A				
	Emergency Generator (exhaust piping)	70,610	GSF	0.39	27,538
	Insulation	70,610	GSF	4.98	351,638
	Controls & Instrumentation	70,610	GSF	12.00	847,320
	Systems Testing & Balancing	70,610	GSF	0.62	43,778
	Heat Reclaim Chiller	70,610	GSF	1.92	135,571
	Sub-total				**$5,763,188**
D40	**FIRE PROTECTION**				
D4010	**Fire Suppression**				
	Sprinklers	70,610	GSF	4.75	335,398
	Standpipes - Combination	1	LS	35,000.00	35,000
	Fire Pump	1	EA	52,125.00	52,125
	Sub-total				**$422,523**
D50	**ELECTRICAL**				
D5010	**Electrical Power Generation**				
	Normal Power				
	Power monitoring system	1	LS	15,000.00	15,000
	1600A 277/480V switchboard	1	EA	50,000.00	50,000
	Associated, panelboards and transformers	70,610	SF	6.60	466,026
	Feeders to panelboards and transformers	70,610	SF	3.75	264,788
	Emergency Power				
	150kW/187.5kVA, 277Y/480V, 3-Phase, 4-Wire natural gas generator w/factory sound attenuated enclosure	1	EA	118,930.00	118,930
	Remote annunciator	1	EA	2,500.00	2,500
	Generator testing and startup	1	LS	5,000.00	5,000
	100A ATS with isolation by-pass	1	EA	13,000.00	13,000
	200A ATS	1	EA	5,950.00	5,950
	Associated, panelboards and transformers	70,610	SF	1.25	88,263
	Feeders to panelboards and transformers (Including MI cable)	70,610	SF	3.25	229,483
	Coordination/Power system studies	1	LS	10,000.00	10,000

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Section	Description	Qty	Unit	$/Unit	Amount
	Grounding and bonding	1	LS	25,000.00	25,000
	Equipment wiring				
	Fire pump feed and connection	1	EA	6,500.00	6,500
	Jockey pump feed and connection	1	EA	2,500.00	2,500
	Elevator feed and connection	2	EA	4,000.00	8,000
	Elevator cab power feed and connection	2	EA	1,500.00	3,000
	Chiller feed and connection	2	EA	10,500.00	21,000
	Cooling tower feed and connection	2	EA	4,500.00	9,000
	Exhaust fan feed and connection	4	EA	2,500.00	10,000
	AHU feed and connection	2	EA	1,200.00	2,400
	Boiler feed and connection	2	EA	1,500.00	3,000
	Air compressor feed and connection	1	EA	1,200.00	1,200
	Vacuum pump feed and connection	1	EA	1,200.00	1,200
	Pump feed and connection	2	EA	1,500.00	3,000
	DDC controls feed and connection	1	EA	450.00	450
	Auto clave feed and connection	1	EA	2,000.00	2,000
	Misc equipment wiring, feed and connections	70,610	SF	0.50	35,305
	Lighting & Branch Wiring				
	Lighting				
	Biology lighting	13,285	SF	7.00	92,995
	Chemistry lighting	13,410	SF	7.00	93,870
	Geology lighting	2,995	SF	7.00	20,965
	Building shared	5,395	SF	4.75	25,626
	General lighting	35,215	SF	3.75	132,056
	Exit lighting	70,610	SF	0.35	24,714
	Lighting control systems Daylight Harvesting (Occupied area)	70,610	SF	1.50	105,915
	Switches and sensors	70,610	SF	0.50	35,305
	Branch devices and circuitry				
	Lab equipment feed and connection	29	LOC	1,000.00	29,000
	Double duplex receptacle in Lab rooms	240	EA	56.00	13,440
	220V receptacle feed and connection (Lab)	1	LS	350.00	350
	Duplex receptacle (allow)	950	EA	28.00	26,600
	GFI receptacle (allow)	80	EA	44.00	3,520
	Special purpose receptacle (allow)	25	EA	55.00	1,375
	2-gang floor boxes (allow)	9	EA	350.00	3,150
	Device box (allow)	3,700	EA	30.00	111,000
	1" EMT	3,000	LF	10.50	31,500
	3/4" EMT	12,000	LF	8.00	96,000
	#10 THHN	15,000	LF	1.10	16,500
	#12 THHN	60,000	LF	0.88	52,800
	12-2 MC cable	50,000	LF	4.35	217,500
	12-3 MC cable	10,000	LF	5.25	52,500
	Communications				
	Fire Alarm				
	Control panel	1	EA	12,000.00	12,000
	FA terminal cabinet	1	EA	1,200.00	1,200
	Remote LCD annunciator	1	EA	1,500.00	1,500

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Section	Description	Qty	Unit	$/Unit	Amount
	Graphic annunciator	1	EA	4,500.00	4,500
	Beacon	1	EA	225.00	225
	Knox box	1	EA	650.00	650
	Master Box	1	EA	3,750.00	3,750
	Initiating device (allow)	75	EA	140.00	10,500
	Audio/visual (allow)	130	EA	125.00	16,250
	Duct smoke detector with remote test station (allow)	2	EA	425.00	850
	FP connection (allow)	16	EA	150.00	2,400
	Remote indicating light	18	EA	105.00	1,890
	CO detectors (allow)	1	LS	3,000.00	3,000
	Speaker (allow)	17	EA	105.00	1,785
	Visual device (allow)	5	EA	125.00	625
	Visual device WP	1	EA	135.00	135
	Visual amber alert strobe (allow)	34	EA	125.00	4,250
	Modules (allow)	30	EA	140.00	4,200
	Device box	335	EA	30.00	10,050
	3/4" EMT	10,000	LF	8.00	80,000
	FA cable	17,000	LF	1.50	25,500
	Bi-Directional Amplification System				
	BDA system	1	LS	35,000.00	35,000
	Tel/Data				
	PBX system (Provided by owner)				
	Demarc room fitout	1	EA	5,000.00	5,000
	MDF fit-out	1	EA	8,500.00	8,500
	IDF fit-out	5	EA	5,500.00	27,500
	4" conduit (allow)	1,500	LF	29.00	43,500
	4" sleeves	25	EA	150.00	3,750
	Devices and cabling	70,610	SF	1.40	98,854
	Data device and cabling (Lab rooms)	90	EA	275.00	24,750
	Rough-in conduit, backboxes and cable tray	70,610	SF	1.00	70,610
	Grounding	1	LS	2,500.00	2,500
	PA System				
	See FA Mass Notification (Above)			See Above	
	Clock System				
	Head end equipment				NIC
	Clock and cabling				NIC
	AV (Lecture Hall)				NIC
	A/V system and equipment (Rough-in only)				NIC
	Equipment, devices and cabling provided by the AV contractor				NIC
	Security				
	Conduit paths only, allowance	1	LS	15,000.00	15,000
	Cameras, sensors, contacts and cabling	70,610	SF	2.50	176,525
	Other Electrical Systems				
	Lightning protection system	1	LS	30,000.00	30,000
	Seismic restriant study				not req'd.
	Identification	1	LS	3,500.00	3,500

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Section	Description	Qty	Unit	$/Unit	Amount
	Fire stopping	1	LS	10,000.00	10,000
	Coordination & management	1	LS	45,000.00	45,000
	Permit and fees	1	LS	60,000.00	60,000
	Sub-total				**$3,434,424**
E	**EQUIPMENT & FURNISHINGS**				
E10	**EQUIPMENT**				
E1010	**Vehicle & Pedestrian Equipment**				
	Recessed dock leveler	1	LS	7,500.00	7,500
	Dock bumpers	1	LS	1,000.00	1,000
	Sub-total				**$8,500**
E1040	**Institutional Equipment**				
	Audio visual equipment				
	Allowance per rm. (projector, screen & teaching station)	17	EA	15,000.00	255,000
	Laboratory equipment				
	4’ Fumehood (Filtered)	7	EA	22,500.00	157,500
	5’ Fumehood (Filtered)	1	EA	24,000.00	24,000
	6’ Fumehood (Filtered)	23	EA	26,000.00	598,000
	4’ Fumehood (Ducted)	19	EA	8,500.00	161,500
	5’ Fumehood (Ducted)	14	EA	9,000.00	126,000
	6’ Fumehood (Ducted)	4	EA	10,000.00	40,000
	4' Biosafety cabinets	1	EA	10,000.00	10,000
	6' Biosafety cabinets	6	EA	12,000.00	72,000
	Black out curtains, 8' H				NIC
	Pegboard	53	EA	300.00	15,900
	Cold room (10'x10')	2	EA	25,000.00	50,000
	Autoclave/Sterilizer	1	EA	15,000.00	15,000
	Ice Machines	3	EA	7,000.00	21,000
	Glass washers	5	EA	7,000.00	35,000
	Cylinder storage racks	3	EA	1,500.00	4,500
	Incubators (OFOI)				
	Refrigerators (OFOI)				
	Window washing equipment				
	Davit roof supports	20	EA	2,000.00	40,000
	Stainless steel lifeline system	1,000	LF	60.00	60,000
	Davit arms & window washing equip.				NIC
	Greenhouse				
	Greenhouse allowance	1	LS	715,000.00	715,000
	Sub-total				**$2,400,400**
E20	**FURNISHINGS**				
E2010	**Fixed Furnishings**				

STUDY ESTIMATE STAGE
DCAMM
SALEM STATE NEW SCIENCE LAB BLDG.
Salem, MA

May 19, 2015

DETAILS

Section	Description	Qty	Unit	$/Unit	Amount
	Manually operated window shades	5,191	SF	15.00	77,858
	Foot grilles @ vestibules, stainless steel	452	SF	55.00	24,860
	Laboratory casework				
	36" H counter w/ epoxy top	2,500	LF	650.00	1,625,000
	Adjustable Upper Wall Shelving	1,250	LF	250.00	312,500
	Upper Wall Storage with Door	1,250	LF	325.00	406,250
	Full hgt. storage cabinet	22	EA	900.00	19,800
	Lab table w/ cabinet below	32	EA	1,300.00	41,600
	Storage cubbies	109	LF	250.00	27,250
	Sub-total				**$2,535,118**
F	**SPECIAL CONSTRUCTION & DEMOLITION**				
F10	**SPECIAL CONSTRUCTION**				
F1010	**Integrated Construction**				
	Horizontal fire shutter, main student space, lvl 3	390	SF	55.00	$21,450
	Horizontal fire shutter, main student space, lvl 5	390	SF	55.00	$21,450
	Vertical 1 hr rated shutter, east student space lvl 4	162	SF	55.00	$8,927
	Connector east wing, lvl 2-4, 3 hr rated, 8'W	3	EA	7,950.00	$23,850
	Connector west wing, lvl 5, 2 hr rated, 10'W	1	EA	8,612.50	$8,613
	Sub-total				**$84,290**
F20	**FACILITY REMEDIATION**				
F2010	**Hazardous Materials Remediation**				
	Sub-total				**$0**
F30	**DEMOLITION**				
F3010	**Structure Demolition**				
	Demo existing building for new bilding connections	1	LS	100,000.00	100,000
	Sub-total				**$100,000**
F3030	**Selective Demolition**				
	Sub-total				**$0**
G	**BUILDING SITEWORK**				
G10	**SITE PREPARATION**				
G1010	**Site Clearing**				
	Tree protection	1	LS	1,000.00	1,000
	Clearing and grubbing	1	LS	2,500.00	2,500
	Erosion, siltation and sedimentation of wetlands, waterways, construction area	1	LS	7,500.00	7,500
	Sub-total				**$11,000**

STUDY ESTIMATE STAGE
DCAMM
SALEM STATE NEW SCIENCE LAB BLDG.
Salem, MA

May 19, 2015

DETAILS

Section	Description	Qty	Unit	$/Unit	Amount
G1020	**Site Elements Demolition**				
	Disconnecting, capping (sealing) of utilities	1	LS	5,000.00	5,000
	Sub-total				**$5,000**
G1030	**Site Element Relocations**				
	Sub-total				**$0**
G1050	**Site Remediation**				
	Sub-total				**$0**
G1070	**Site Earthwork**				
	Site grading	1	LS	15,000.00	15,000
	Sub-total				**$15,000**
G20	**SITE IMPROVEMENTS**				
G2010	**Roadways**				
	Vertical granite curb	50	LF	35.00	1,750
	Patching pavement, allowance	1	LS	1,000.00	1,000
	Sub-total				**$2,750**
G2020	**Loading Dock Access**				
	Bituminous concrete paving - vehicular				
	Excavate to reduce levels	153	CY	12.00	1,840
	Remove excavated material off site	153	CY	20.00	3,067
	Gravel base	153	CY	35.00	5,367
	Bituminous concrete	53	TNS	150.00	7,935
	Vertical granite curb, new	214	LF	35.00	7,490
		270	LF	15.00	4,050
	Vertical granite curb, reset existing(removed by others)				
	Allowance for new pavement markings				
	Single solid lines, 4" thick	640	LF	0.30	192
	Handicap parking hatching	2	EA	14.50	29
	Crosswalk Hatching	1	EA	50.00	50
	Road signage	1	AL	1,500.00	1,500
	Sub-total				**$31,519**
G2030	**Pedestrian Plazas & Walkways**				
	Concrete paving - Pedestrian				
	Excavate to reduce levels	125	CY	12.00	1,498
	Remove excavated material off site	125	CY	20.00	2,496
	Gravel base	125	CY	35.00	4,369

STUDY ESTIMATE STAGE
DCAMM
SALEM STATE NEW SCIENCE LAB BLDG.
Salem, MA

May 19, 2015

DETAILS

Section	Description	Qty	Unit	$/Unit	Amount
	4" concrete paving	3,370	SF	4.00	13,480
	Exposed Aggregate Concrete				
	Excavate to reduce levels	398	CY	12.00	$4,773
	Remove excavated material & stockpile on-site	398	CY	15.00	$5,967
	Gravel base	199	CY	35.00	6,961
	Exposed Aggregate Concrete, 4"	5,370	SF	4.00	$21,480
	Bituminous concrete paving in patches				
	Excavate to reduce levels	19	CY	12.00	222
	Remove excavated material off site	19	CY	20.00	370
	Gravel base	19	CY	35.00	648
	Bituminous concrete patch	500	SF	4.00	2,000
		Sub-total			**$64,264**
G2060	**Site Development**				
	Concrete retaining footing - brick				
	Footing				
	Excavation	78	CY	12.00	933
	Remove off site	78	CY	20.00	1,556
	Backfill with gravel	69	CY	28.00	1,933
	Formwork to concrete	150	SF	10.00	1,500
	Reinforcement in concrete	613	LBS	1.10	674
	Concrete material	9	CY	115.00	1,006
	Placing concrete	8	HR	60.00	473
	Wall				
	Formwork to wall	1,800	SF	15.00	27,000
	Reinforcement in concrete	4,500	LBS	1.10	4,950
	Concrete material	47	CY	115.00	5,353
	Placing concrete	37	HR	60.00	2,234
	Facing to retaining walls, brick	900	SF	28.00	25,200
	Cap to retaining wall, precast	75	LF	40.00	3,000
	Concrete retaining walls - Stone				
	Footing				
	Excavation	207	CY	12.00	2,489
	Remove off site	207	CY	20.00	4,148
	Backfill with gravel	184	CY	28.00	5,154
	Formwork to concrete	400	SF	10.00	4,000
	Reinforcement in concrete	1,633	LBS	1.10	1,797
	Concrete material	23	CY	115.00	2,683
	Placing concrete	21	HR	60.00	1,260
	Wall				
	Stone wall	1,000	SF	55.00	55,000
	Miscellaneous concrete costs (pumping admixtures etc.)				
	Premium for pump grade concrete mix	79	CY	5.00	393
	Pump & operator	1.0	DAYS	1,000.00	983
	Site Stair				
	Concrete stair	45	RSR	550.00	24,750

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DCAMM
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May 19, 2015

DETAILS

Section	Description	Qty	Unit	$/Unit	Amount
	Aluminum handrails & guardrails	130	LF	65.00	8,450
	Site furnishings				
	Bench, 6' length	5	EA	2,000.00	$10,000
	Café style seating(4) & table(1)				FF&E
	Solar style trash & recycling	4	EA	1,200.00	$4,800
	Contemporary metal bike rack	15	EA	800.00	12,000
	8" dia. bollards	4	EA	800.00	3,200
	Sub-total				**$216,919**
G2080	**Landscaping**				
	Trees				
	3 1/2" cal., deciduous shade tree	13	EA	1,500.00	19,500
	3" cal., ornamental tree	13	EA	1,000.00	13,000
	Shrubs/Ground cover				
	Ornamental shrubs 24"-36"ht	150	EA	100.00	15,000
	2 yr growth flats (8" o.c.)	14,760	EA	3.50	51,660
	Flats ornamental grasses (18" o.c.)	14,548	EA	7.50	109,110
	Mulch	30	CY	55.00	1,650
	Sod lawn	1,445	SF	1.00	1,445
	Loam soil, 6"	439	CY	30.00	13,172
	Seeding to lawn areas - hydro seeded lawn	4,160	SF	0.50	2,080
	Sub-total				**$226,617**
G30	**LIQUID & GAS SITE UTILITIES**				
G3010	**Water Utilities**				
	DI piping 8", fire	65	LF	40.00	2,600
	DI piping 4", domestic	65	LF	35.00	2,275
	Copper piping 1-1/2"	75	LF	22.00	1,650
	Water hydrant	2	EA	2,500.00	5,000
	Connect to existing	2	EA	2,250.00	4,500
	Excavation & trenching	243	CY	12.00	2,916
	Bedding	30	CY	35.00	1,063
	Backfill & compaction	213	CY	28.00	5,953
	Sub-total				**$25,956**
G3020	**Sanitary Sewerage Utilities**				
	Sewer piping 6" (PVC)	65	LF	25.00	1,625
	Manhole	1	EA	3,500.00	3,500
	Connect to existing	1	EA	2,000.00	2,000
	Sewer ejector pump	1	EA	25,000.00	25,000
	Excavation & trenching	77	CY	12.00	924
	Bedding	11	CY	35.00	379
	Backfill & compaction	66	CY	28.00	1,854
	Trench boxes	1	MTH	5,000.00	5,000

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DCAMM
SALEM STATE NEW SCIENCE LAB BLDG.
Salem, MA

May 19, 2015

DETAILS

Section	Description	Qty	Unit	$/Unit	Amount
	Sub-total				**$40,282**
G3030	**Storm Drainage Utilities**				
	Piping; 12" (CPP)	250	LF	22.00	5,500
	Manhole	6	EA	3,500.00	21,000
	Catch basin	6	EA	3,200.00	19,200
	Area drains	6	EA	1,500.00	9,000
	Underground detention/infiltration system	1	EA	20,000.00	20,000
	Water quality unit	1	EA	15,000.00	15,000
	Connect to existing	2	EA	2,000.00	4,000
	Excavation & trenching	296	CY	12.00	3,556
	Bedding	56	CY	35.00	1,944
	Backfill & compaction	241	CY	28.00	6,741
	Trench boxes	1	MTH	5,000.00	5,000
	Modify to existing storm drainage system	1	LS	8,000.00	8,000
	Sub-total				**$118,941**
G3050	**Site Energy Distribution**				
	Steam connection				
	Piping	80	LF	250.00	20,000
	Connect to existing	1	EA	2,500.00	2,500
	Excavation & trenching	95	CY	12.00	1,138
	Bedding	12	CY	35.00	415
	Backfill & compaction	83	CY	28.00	2,323
	Sub-total				**$26,376**
G3060	**Site Fuel Distribution**				
	Gas connection				
	Piping	65	LF		By Utilities
	Connect to existing	1	EA		By Utilities
	Excavation & trenching	77	CY	12.00	924
	Bedding	10	CY	35.00	337
	Backfill & compaction	67	CY	28.00	1,887
	Sub-total				**$3,149**
G40	**ELECTRICAL SITE IMPROVEMENTS**				
G4010	**Site Electrical Distribution Systems**				
	Electrical Distribution				
	Primary service				
		1	LS	5,000.00	5,000
	Make connections at the former Library Building				
	Secondary service				
	1600A Secondary electrical service duct bank from former Library Building (allow)	50	LF	550.00	27,500

STUDY ESTIMATE STAGE
DCAMM
SALEM STATE NEW SCIENCE LAB BLDG.
Salem, MA

May 19, 2015

DETAILS

Section	Description	Qty	Unit	$/Unit	Amount
		Sub-total			**$32,500**
G4050	**Site Lighting**				
	Car park lighting				
	20' Light poles @ parking lots	8	EA	2,750.00	22,000
	Walkway lighting				
	Light bollard @ walkways lots	8	EA	1,200.00	9,600
	Recessed wall	10	EA	450.00	4,500
	Pole base	16	EA	250.00	4,000
	Circuitry	1,760	LF	15.00	26,400
		Sub-total			**$66,500**
G50	**SITE COMMUNICATIONS**				
G5010	**Site Communications Systems**				
	Communication service duct bank	360	LF	125.00	45,000
		Sub-total			**$45,000**
G5020	**Other Site Electrical Utilities**				
	Site Security System				
	Blue phone and circuitry (allow)	1	EA	2,500	2,500
	Cameras and circuitry			NIC	
		Sub-total			**$2,500**
		Total			**$28,184,424**

STUDY ESTIMATE STAGE
DCAMM
SALEM STATE NEW SCIENCE LAB BLDG.
Salem, MA

May 19, 2015

ALTERNATES

Alts.	Description Of Work	Qty	Unit	$/Unit	Amount
ALT 1 - Site	ADD Courtyard				$50,961
ALT 2 - HVAC	HVAC - Fan Coil Units with Aircuity				$280,430
ALT 3 - HVAC	HVAC - Campus Steam Heating				$304,700
ALT 4 - Site	Site Lighting				$28,564
	Total of Alternates:				$664,655
ALT 1 - Site	**ADD Courtyard**				
	Landscape: Lawn Restoration	3,200	SF	0.75	$2,400
	Landscape: Tree Crown Pruning	6	EA	350.00	$2,100
	Landscape: 24" - 36" ht. oprnamental Shrubs	50	EA	25.00	$1,250
	Landscape: Evergreen Groundcover	3,100	EA	5.00	$15,500
	Site Lighting: Bollard Light	10	EA	1,800.00	$18,000
		Sub Total:			**$39,250**
		Mark Ups :		29.84%	$11,711
	ALT 1 - Site Total:				**$50,961**
ALT 2 - HVAC	**HVAC - Fan Coil Units with Aircuity**				
	Add Aircuity to lab space TVOC and particulate monitoring, both room an return air sensing points	29,690	SF	10.00	$296,900
	FCUs in lieu of Chilled Beams	70,610	SF	(1.50)	($105,915)
	Add Electrical	25	EA	1,000.00	$25,000
		Sub Total:			**$215,985**
		Mark Ups :		29.84%	$64,445
	ALT 2 - HVAC Total:				**$280,430**

STUDY ESTIMATE STAGE
DCAMM
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Salem, MA

May 19, 2015

ALTERNATES

Alts.	Description Of Work	Qty	Unit	$/Unit	Amount
ALT 3 - HVAC	**HVAC - Campus Steam Heating**				
	Direct Buried Steam - 6"	220	LF	346.52	$76,234
	Direct Buried Steam Condensate Return - 4"	220	LF	252.48	$55,546
	PRV Station	1	EA	12,500.00	$12,500
	Condensate Pump	1	EA	3,850.00	$3,850
	Heat Exchangers	12,000	MBH	7.50	$90,000
	Mechanical Room Piping	1	LS	100,000.00	$100,000
	Connect to Existing at Campus Heating Plant	1	LS	7,500.00	$7,500
	Excavation, ledge	143	CY	100.00	$14,341
	Backfill	143	CY	28.00	$4,015
	Add'l ledge exc. For incr. in bsmnt size	1,000	CY	100.00	$100,000
	Added bsmnt	1,000	SF	200.00	$200,000
	Basis of Design Hot Water Boilers Heating Systems	(70,610)	GSF	6.08	($429,309)
		Sub Total:			**$234,677**
		Mark Ups :		29.84%	$70,022
			ALT 3 - HVAC Total:		**$304,700**
ALT 4 - Site	**Site Lighting**				
	LED Bollard	10	EA	1,200.00	$12,000
	Base	10	EA	250.00	$2,500
	Circuitry (allow)	500	LF	15.00	$7,500
		Sub Total:			**$22,000**
		Mark Ups :		29.84%	$6,564
			ALT 4 - Site Total:		**$28,564**

OPERATING BUDGET IMPACT WORKSHEET FOR NEW CONSTRUCTION (v2014)

ENTER DATA IN BLUE FIELDS ONLY

updated 10/1/2014

Building Project Name:	**New Science Building / Meier Hall Expansion**		
Facility/Location:	**Salem State University**		
MA State Project No:	**SSA1401 ST1**	ANF ID:	**B222**

SECTION A: Inputs to Calculate Annual Operating Budget Impacts

What **type of building** project is this? (Pick building type from drop down list in orange box)	Science Center, Academic
Is an existing building or facility closing down as a result of this project? (Pick from drop down list)	No
If yes, please provide name and location of building or facility:	
If yes, please enter estimate of total gross square footage being closed:	0
Is an existing **lease** being terminated as a result of this building project? (Pick from drop down list)	No
If yes, please enter annual lease cost:	$0
Enter the **increase in gross square feet** generated by this project:	70,270
What **Fiscal Year** will this building project begin operating (Pick from drop down list)?	2018

Enter the net change in **staff** needed as a result of this project (i.e. all staff related to the building's operation and program/mission which need to be or have been hired as a result of this project)

Type of Staff	Minimum No. of Staff Added:	Optimal No. of Staff Added:
Custodial/maintenance staff including facility managers[1]	0.0	0.0
Programmed staff (i.e. related to the building's "program")		
Administrative	0.0	0.0
Security personnel	0.0	0.0
Mid-level staff	0.0	0.0
Supervisors, managers, directors	0.0	0.0

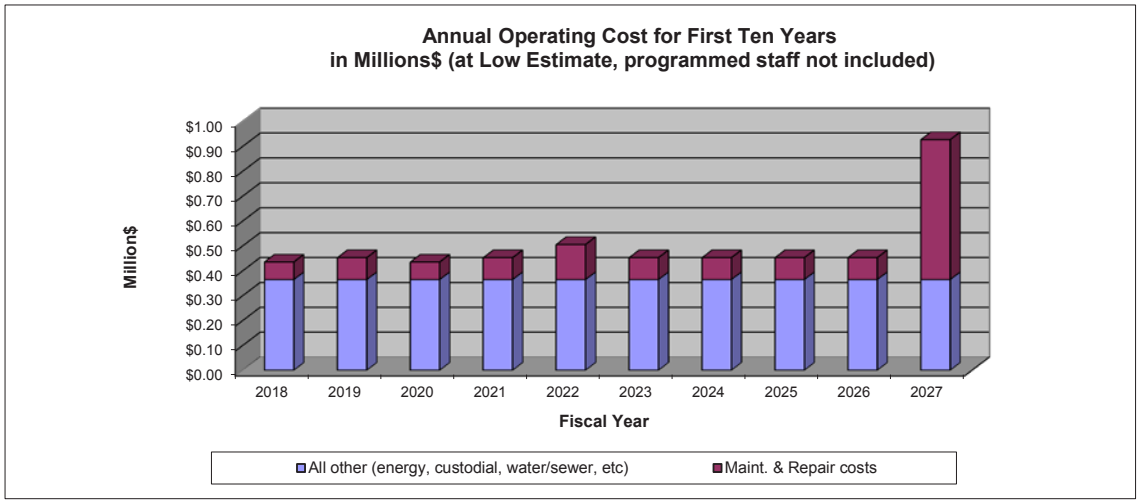
Will this building have significant **capital needs** in its near future above and beyond what is provided in the construction budget? Examples include additional IT or other equipment, capital replacement or repair of major building systems, etc. (Pick from drop down list)	No
If yes, briefly describe nature of capital needs:	
If yes, provide estimate (if possible) of funding needed:	$0
If yes, when do the capital needs need to be addressed (pick from drop down list)	within 5 years
Expected increase in Operatational Costs per annum (BOMA index, CPI or equivalent)	2.00%
Expected increase in Repairs & Maintenance Costs per annum (Construction Escalation)	3.50%

SECTION B: Calculations for Average Annual Operating Budget Impacts (2013 dollars)

Change in Gross Square Feet **70,270**

Costs to Operate and Maintain Building:	**Low**	**Medium**	**High**
Energy Costs[2]	$188,324	$230,486	$285,999
Custodial Service Costs[1]	$82,216	$178,486	$178,486
Water and Sewer Costs[3]	$44,973	$112,432	$179,891
Telecommunications[4]	$41,459	$63,243	$80,108
Security[5]	$4,216	$38,649	$158,810
Refuse[6]	$3,514	$7,027	$15,459
Maintenance and Repair Costs (average over life)[7]	$168,648	$210,107	$288,107
(Approx. Maint. & Repair Cost for 1st Year of Occupancy:	*$70,270)*		
Subtotal Operating Costs for Building	***$533,349***	***$840,429***	***$1,186,860***
Other Operating Budget Impacts:			
Programmed staff salary costs:	$0	$0	$0
Less lease costs (if any)	$0	$0	$0
Subtotal Other Operating Budget Impacts	***$0***	***$0***	***$0***

SECTION C: Summary and Unit Costs	**Low**	**Medium**	**High**
Annual Operating Budget Impacts, 2013 dollars:	**$533,349**	**$840,429**	**$1,186,860**
Annual Impact with Starting Year Escalation, 2018 dollars:	**$602,961**	**$945,468**	**$1,334,477**
Upcoming capital costs to consider:	**$0**	**within 5 years**	



Operating Costs per Square Foot (2013 dollars)
New Science Building / Meier Hall Expansion
(Programmed staff costs not included)

	Minimum Cost per Sq. Ft.	Maximum Cost per Sq. Ft.
Energy Costs[2]	$2.68	$4.07
Custodial Service Costs[1]	$1.17	$2.54
Water and Sewer Costs[3]	$0.64	$2.56
Telecommunications[4]	$0.59	$1.14
Security[5]	$0.06	$2.26
Refuse[6]	$0.05	$0.22
Subtotal	***$5.19***	***$12.79***
Maintenance and Repair Costs (average)[6]	***$2.40***	***$4.10***
Total in 2013 dollars	**$7.59**	**$16.89**
Total at starting year 2018 dollars	**$8.58**	**$18.99**

Footnotes:

1 Custodial service cost calculations include labor and supplies, equipment, and any necessary contract services. If number of new custodial staff is not available, the formula will calculate estimates on a "per square feet" basis. Custodial services include the cleaning of offices, work areas, restrooms and common areas. Trash removal is not included. A "Medium" level of custodial service is substituted in the "High" column since this level of service is not expected in public facilities given budget constraints.

2 Energy includes all expenses related to the purchase, generation, distribution, and conservation of energy and source fuels necessary to operate an asset and its typical programmatic equipment. Not included are utilities maintenance or supervision. Energy costs assume the energy consumption of buildings built to code and do not take into account renewable energy sources or other sustainable design features.

3 Water and Sewer includes potable water, irrigation water, and sewage service.

4 Telecom expenses cover all the services ordinarily associated with commercial activities, such as voice and data equipment lease and service subscriptions, maintenance

5 Security services insure the physical security of assets and occupants, and include monitoring equipment, personnel & patrol svcs

6 Refuse include all costs related to trash collection and disposal, pick-up services, fees, recycling operations and administration, composting, etc. Excludes handling and disposal of HAZMAT materials.

7 Maintenance and Repair (M&R) costs are associated with keeping the asset's appearance and structure in good working order, and they include all labor, material, and contract expenses. Preventative maintenance, unscheduled maintenance, and renewal and replacement costs are part of the M&R function, while restoration and modernization expenses are not included. Maintenance and repair costs for programmatic equipment are also not included.
Grounds & site maintenance is not included in the calculations above, but a rough estimate can be calculated using $0.13 per square foot of building. Snow removal can be calculated using another $.01 per square foot.

All costs are calculated using data and operation cost profiles provided by Whitestone Research in "The Whitestone Facility Operations Cost Reference 2012-2013." Costs are provided in 2013 dollars unless otherwise noted.

Potential Utility Rebates

Utility Company Rebates

Both the local gas and electrical companies present opportunities for owners to upgrade their facilities from “code compliant” to energy savings systems at no and/or reduced capital cost. These upgrades are referred to an Energy Conservation Measures or ECMs. This project should present many opportunities for such measures.

These ECMs generally result in a Comprehensive Design Analysis model, which is prepared by the design team. This analysis compares energy consumption through simulation of the building energy use and the selection of preferred building upgrade alternatives. Through the use of industry accepted computer modeling programs, consultants identify building energy savings and improved system operating efficiencies. The full incremental cost of the approved measures form the basis for the maximum incentive under most programs. The maximum incentive will be determined by a comparative analysis of the proposed system upgrades with the expected case. ECMs typically require a payback period of 2 to 8 years to meet utility company guidelines.

Following is sample listing of ECMs typically pursued on this class of project:

1. Chiller Upgrade: Multiple water cooled chillers would be upgraded to high efficient chillers with variable speed drives.
2. Optimize the Cooling Tower Installation: Oversize the cooling towers by 10%. Equip all cooling tower cells with variable speed drives.
3. Upgrade Exterior Glazing
4. Upgrade Standard Fume Hoods to Low Flow Safety Fume Hoods
5. Upgrade all Motors greater or equal to one (1) Hp to Premium Efficient
6. Upgrade Lighting Control to include Day-light Control and Occupancy Sensors
7. Upgrade Planned Lighting to High Efficient Lighting
8. Variable Speed Drive for Chilled Water Pumps
9. Variable Speed Drive for Hot Water Pumps
10. Upgrade DDC functions for Demand Ventilation
11. Upgrade the system Heat Recovery System
12. Minimize the facility’s ventilation loads through the use of Chilled Beams and an Enthalpy Heat Recovery Wheel
13. Optimize the air delivery configuration with larger AHU coils and oversized ductwork
14. Provide Staged Control of Laboratory Exhaust Fans
15. Upgrade wall and roof insulation
16. Use of Filter Fume Hoods in lieu of ducted where approved by EH&S

It is suggested that the design team meet with the utility companies upon commencement of schematic design to establish guidelines and potential opportunities, then again at the point when systems and materials have been

identified. This is usually at the conclusion of schematic design.

Massachusetts Technology Collaborative

The Massachusetts Technology Collaborative (MTC) Renewable Energy Trust seeks to maximize environmental and economic benefits for the Commonwealth's citizens by pioneering and promoting clean energy technologies and fostering the emergence of sustainable markets for electricity generated from renewable sources.

The Trust provides financial assistance to individuals and businesses for solar panels and wind turbines at their homes and facilities, works with communities to incorporate green design into schools and helps emerging clean energy businesses flourish in the Commonwealth.

There are two potential opportunities for financial assistance for the ISC: Solar Photovoltaics and Wind Power.

Solar - This MTC initiative provides rebates to businesses, nonprofits, public entities, and other organizations on a first-come first-served basis for design & construction of solar photovoltaic (PV) energy projects that are up to 500 kilowatts in size.

Wind - This MTC Incentive Program provides rebate, grant, and loan funding for the installation of wind projects in Massachusetts. Funding is available for residential, commercial, industrial, and public facilities that are customers of investor-owned electric distribution utilities or Municipal Light Plant Departments that pay into the Renewable Energy Trust.

It is suggested that the design team meet with the MTC to evaluate eligibility and possible funding opportunities to enable further renewable energy strategies in the ISC.

G. IMPLEMENTATION APPROACH

IMPLEMENTATION APPROACH

Introduction

The project schedule below is divided in two phases: Design and Construction. It is estimated that it will take 12 months to complete Design and 24 months to complete Construction and Commissioning and Move-in (see Design and Construction schedule below).

Design / Construction Schedule

Design (12 months)

Schematic Design – 3 months

- Review project with Authority Having Jurisdiction (AHJ), City of Salem Building Code Official, State Plumbing Inspector, Local Fire Official
- Neighborhood presentation
- Complete geo-tech investigation *
- Verify survey information
- Complete soil testing *
- Complete Haz Mat testing *
- Cost Estimating by both the Design Team
- Cost estimate / review / approval

Design Development – 4 months

- Complete wind tunnel and entrainment study
- CM to verify utility locations & sizes
- Cost Estimating by both the Design Team & the Construction Manager
- Review project with environmental agencies if required
- Cost estimate / review / approval

Construction Documents – 5 months

- 50% CD cost estimate check-in by both the Design Team & the Construction Manager
- 50& CD Review project with AHJ, City of Salem Building Code Official, State plumbing Inspector, Local Fire Official
- Release Rock Removal/Early Site & Foundation to Grade Package
- Permitting for Rock Removal/Early Site & Foundation to Grade Package

* May occur in Certifiable Study Phase

Construction (24 months)

Rock Removal/Early Site & Foundation to Grade – 3 months

- Under slab utilities
- Formal Building Permit

Steel Erection & Concrete Slabs – 4 months

- Bridges & connections superstructure

Building Enclosure – 6 months

- Tie-ins for utilities

Building Finishes – 7 months

- HVAC start ups
- Testing & balancing

Commissioning – 1 month

- Walk-thru with AHJ, State & Local Code Officials
- SSU Operations/Maintenance Training Sessions

Owner Occupancy & Move-In – 1 month

- Certificate of Occupancy

Design / Construction Schedule