DRAFT ARCHITECTURAL PROGRAM | 17 JUNE 2013

NEW SCIENCE BUILDING

WEBER STATE UNIVERSITY

VCBO ARCHITECTURE

ACKNOWLEDGEMENTS

College of Science

Rick Ford
Afshin Ghoreishi
Sue Harley
Colin Inglefield
Barry Lloyd
Dave Matty
Barb Trask
Laine Berghout
Matt Domek

Weber State University

Norm Tarbox
Kevin Hansen
Mark Halverson
Bruce Daley

Division of Facilities and Construction Management

Matthias Mueller

VCBO Architecture

Derek Payne
Celestia Carson
Justin Heppler
Whitney Ward

Research Facilities Design (RFD)

Rick Heinz
John Lewis

Consulting Engineers

Nolte Vertical 5 - Ryan Cathey
ARW Engineers - Jeremy Achter
Colvin Engineering Associates - Steve Connor
Electrical Consulting Engineers - Akbar Matinkhah
GSH Geotechnical Consultants - Alan Spilker
ArcSitio Design Inc. - Steven Gilbert

draft

draft

APPROVALS

Norm Tarbox — Date
Vice President, Administrative Services

Mark Halverson — Date
Director , Campus Planning and Construction

Kevin Hansen — Date
Associate Vice President for Facilities and Planning

Jacob Cain — Date
Energy and Sustainability Manager

David Matty — Date
Dean, College of Science

Matthias Mueller — Date
DFCM Project Manager

Bruce Daley — Date
WSU Project Manager

draft

draft

TABLE OF CONTENTS

Tab 1	**Executive Summary**	**1**
	College of Science Mission Statement	1
	Project Objectives	3
	Programming Process	3
	Student Survey	5
	Program Summary	6
	Cost Estimate	7
	Proposed Design and Construction Schedule	8
Tab 2	**Site Analysis**	**9**
	Project Site	9
	Existing Science Facilities	15
	Proposed Site	16
Tab 3	**Site Design Requirements**	**19**
	Soils Conditions	19
	Phasing and Demolition	21
	Utilities and Infrastructure	21
	Landscape design	29
Tab 4	**Building Design Requirements**	**31**
	Architectural Design	31
	Life Safety Analysis	43
	Sustainable Design	46
	Energy Analysis	51

draft

	Structural Design	63
	Mechanical Design	65
	Electrical Design	81
	Building Commissioning	87
Tab 5	**Space Requirements**	**89**
	Space Summary	89
	Shared Spaces	**91**
	Dean's Suite	**125**
	Advising	**133**
	Center for science and math education (CSME)	**139**
	Math	**145**
	Developmental Math	**157**
	Botany	**165**
	Chemistry	**191**
	Geosciences	**219**
	Microbiology	**243**
	Physics	**267**
	Zoology	**293**
Tab 6	**Appendix**	**329**
	Cost Estimate	329
	State of Utah Utilization Study Excerpt	333
	LEED Checklist	337
	Geotechnical Study	343
	Meeting and Workshop Minutes	359
	Student Survey Results	379

draft

EXECUTIVE SUMMARY

The College of Science at Weber State University provides first-rate math and science instruction to its active core student majors, and plays a critical role in enhancing the success of the science disciplines in not only Davis County, but to all of Utah. That science instruction is also vital to many other professional fields including Health Sciences (Nursing), Engineering, Pre-Med Studies and computer science (to name just a few). The College of Science at Weber State University is particularly renowned for its ability to engage its undergraduate science students in research activities.

The existing science laboratory building at WSU, however, is hindering the instruction of modern science methodologies. The existing (nearly window-less) science building and its antiquated, non-flexible teaching and research laboratory spaces is limiting the science faculty's ability to take that science instruction to an even higher level, and makes it difficult to recruit students to join the scientific fields of study. With the State of Utah's commitment to furthering STEM (Science, Technology, Engineering and Math) curricula, the investment into a new building for Science and Math is a perfect vehicle to demonstrate that commitment.

COLLEGE OF SCIENCE MISSION STATEMENT

The College of Science provides quality education in the natural sciences and mathematics. The college offers majors and minors in seven departments (Botany, Chemistry, Geosciences, Mathematics, Microbiology, Physics, and Zoology). The college also supports students through its Developmental Mathematics Program. The departments and programs of the College of Science support professional and graduate school preparatory programs, and contribute significantly to the general education of students by improving scientific understanding of the natural world and quantitative literacy. Education is provided through formal classes, laboratory and field experiences, and undergraduate research projects. Student learning is also supported by departmental clubs and professional preparatory organizations. The college promotes science and mathematics teaching through the Center for Science and Mathematics Education, and community outreach through such facilities as the Layton P. Ott Planetarium and Museum of Natural Science.

draft

flexible
beauty
green
collaboratory
classroom
module
pedagogy
dream
physics
learning
utilities
attractive
student
collaborative
oriented
fume-hood
display
energy-savings
wifi
wow-factor
durable
link
quality
building
science
art
lines
collaboration
lab
technology
math
adaptable
chemistry
water
data-analysis
experiment
tool
views
controllability
active-learning
nature
research
transparency
safety
human
functional
accessibility
clean
greenhouse
quiet
livable
connect
inviting
teaching
daylight
lab-support
inspirational
fireplace
occupants
community
environment
garden
biology
security
daylighting
value
students
efficient
organic
bee-hive
comfort
demonstrate
study

PROJECT OBJECTIVES

The primary objective of the New Science Building on the WSU campus is to provide state of the art teaching and research laboratory environments and collaborative support spaces, that are flexible, safe and engaging. The new building will not only house the sciences, but will serve as a learning tool to enhance the learning experience and educational opportunities of its users.

PROGRAMMING PROCESS

The programming process for the New Science Building that was begun in February of 2013, has been guided by a Steering Committee that is comprised of a representative from each of the science disciplines and from the math department at Weber State University. Also on the committee is a representative from Weber State administration as well as representatives from the Facilities Planning Department and from the State of Utah's DFCM (Division of Facilities Construction and Management). This group has met weekly to discuss and define the parameters of the new facility. These weekly meetings have been supplemented by three, two-day workshops whereby the Design Team's Laboratory Consultant has met with faculty from each of the science departments to define the teaching and research laboratories required, and the proper equipping of those spaces.

There have also been a series of meetings between the Design Team's structural, mechanical and electrical consultants and WSU's Facilities and Planning personnel to discuss the utility distribution both to the Lind Lecture Hall and to the New Science Building. In those meetings, there has also been discussion on types of building systems that would be most appropriate for the facility.

A major focus of this programming study has been to "right-size" the building so that all of the instructional spaces are being efficiently utilized as recommended in the 2011 Utah System of Higher Education, Higher Education Space Study Standards by Paulien Associates. After much deliberation, negotiation, and positive compromise, the Steering Committee has determined that the proper size of the building is approximately 172,000 square feet (see final space summary).

draft

The programming process began with a series of workshops, meeting with the entire College of Science faculty and staff as well as each individual department to discuss the building vision and needs.

STUDENT SURVEY

A student survey was administered to potential users of the New Science Building to glean information related to student and public spaces within the building.

The survey was developed and administered via the internet using Surveymonkey.com. In order to obtain a sample of student participants who were likely to use the new science lab building, science and math faculty were asked to announce the survey in their classes and provide a web link to the survey. Students were encouraged by faculty to participate in order to provide feedback and guide the program of the new building.

The survey consisted of approximately 30 questions developed to better understand how students currently interact with and behave in the existing buildings that math and science majors are currently housed, as well as provide a forum for student perspectives regarding features that would make the new science building as useful, satisfying and intellectually stimulating for the students that are likely to frequent it.

A complete summery of the survey responses are provided in the appendix.

Findings

The results of the survey assisted the Steering Committee in addressing design criteria for the student commons spaces, student study space and collaborative areas within the new building. It is clear that student study space is a critical program element and that a variety of study space types needs to be provided. Students majoring in the sciences spend long periods of time in the building, and amenities such as access to food, comfortable seating, collaborative space, access to internet and computer access are all critical features to be provided in the new building.

draft

PROGRAM SUMMARY

The New Science Building is truly, a mixed-use academic building that will enhance and facilitate the study of Science and Math at Weber State University. The functions provided in this proposed new building include, teaching laboratories, research laboratories, lab support space, classrooms, student study spaces, office suites and administrative functions necessary for the oversight and support of the science programs at Weber State University. The functions and their respective areas are as listed below:

Function	Net Square Footage	Percentage of Total
Teaching Laboratories	32,765 square feet	32%
Research Laboratories	13,790 square feet	13%
Laboratory Support	17,902 square feet	17%
Student Study	4,700 square feet	5%
Classrooms	9,800 square feet	9%
Offices	14,670 square feet	14%
Administrative Areas	2,700 square feet	3%
Building Support	7,187 square feet	7%
Total Net Square Footage	103,514 square feet	

A net/gross ratio of .60 has been designated for this project. This factor takes into account circulation space, wall thickness, restroom facilities, electrical and data closets, janitor's closets, and miscellaneous lab support spaces not listed in the building program.

draft

COST ESTIMATE

An estimate of probable construction costs for this facility has been carefully considered and compiled based on the programmatic information that the Programming Team has assembled. The programmed square footage, level of finish materials (interior and exterior) anticipated for the building, structural, mechanical, and electrical systems, sitework and utility construction projected for the facility. These projected construction costs for this facility have been derived using today's construction dollars as a baseline. A factor to include escalation will need to be projected and added to this budget in order to more accurately reflect the construction dollars required for the facility when the construction is anticipated to begin.

Of special note for the programmatic estimate for this facility is the fact that the Programming Team for this project included a well-known and highly regarded, local mechanical sub-contractor. Their expertise was solicited for input on the mechanical system recommendations and for participating in the definition of the probable mechanical/plumbing costs of the facility. In laboratory construction, it is often times the mechanical/plumbing systems cost assessment that is not adequately accounted for in the final program estimate. Their laboratory experience and extensive data base of mechanical/plumbing system costs for every laboratory job bid in the State of Utah for the last 15 years was most helpful in assessing a project budget for this proposed new building.

Building Cost Summary Table

Building Cost Summary	Unit Quantity	Unit Cost	Subtotal
Construction Subtotal	172,523 SF (gross)	$284.56	$ 49,093,986.00
General Conditions	5%	$14.23	$2,454,699.00
Overhead & Profit	3.5%	$9.96	$1,718,289.00
Design Contingency	12.5%	$35.57	$6,136,748.00
Construction Total		**$344.32/sq. ft.**	**$59,403,723.00**

**Note: These costs are inclusive of the hard construction costs for the facility. The soft costs will need to be added to the construction budget by DFCM to arrive at the final Capital Budget Estimate (CBE). This estimate is in today's construction dollars. The final number will need to be adjusted to reflect an accurate cost of inflation from now until the time that the project is bid.*

**A comprehensive analysis of the work by construction division is included in the Appendix of this document.*

draft

PROPOSED DESIGN AND CONSTRUCTION SCHEDULE

Weber State University and DFCM have determined that the design contract for the building shall run from July 2013 through March of 2014. The design and construction documents for the building will be ready for contractor bidding in April of 2014. The Contractor with the successful bid will have approximately twenty-four (24) months to construct the building, with the completion of the facility slated for May, 2016. This will allow the building to be equipped and moved into in the summer of 2016 and ready for classes to begin in the fall of 2016.

draft

SITE ANALYSIS

The following site analysis will provide insight to the project site, neighborhood and Ogden City.

PROJECT SITE

The proposed Weber State Science Building will be located on the beautiful Weber State University campus is Ogden Utah.

"Weber State University was founded in Ogden, Utah as Weber Stake Academy in 1889. "Weber" comes from the name of the county where the university is located. Weber County was named after John Henry Weber, an early American fur trapper.

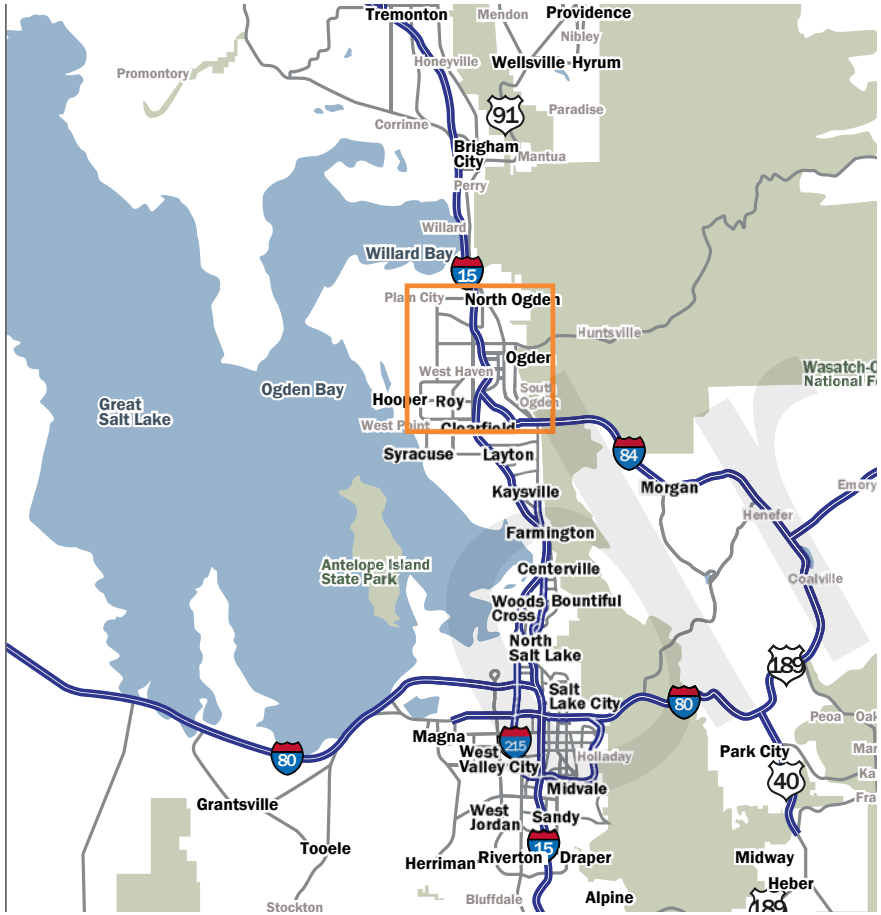
In 1933, the academy was made a state junior college. Following World War II, the college outgrew its downtown campus and moved to the present site on the foothills of the Wasatch Mountains overlooking Ogden and the Great Salt Lake.

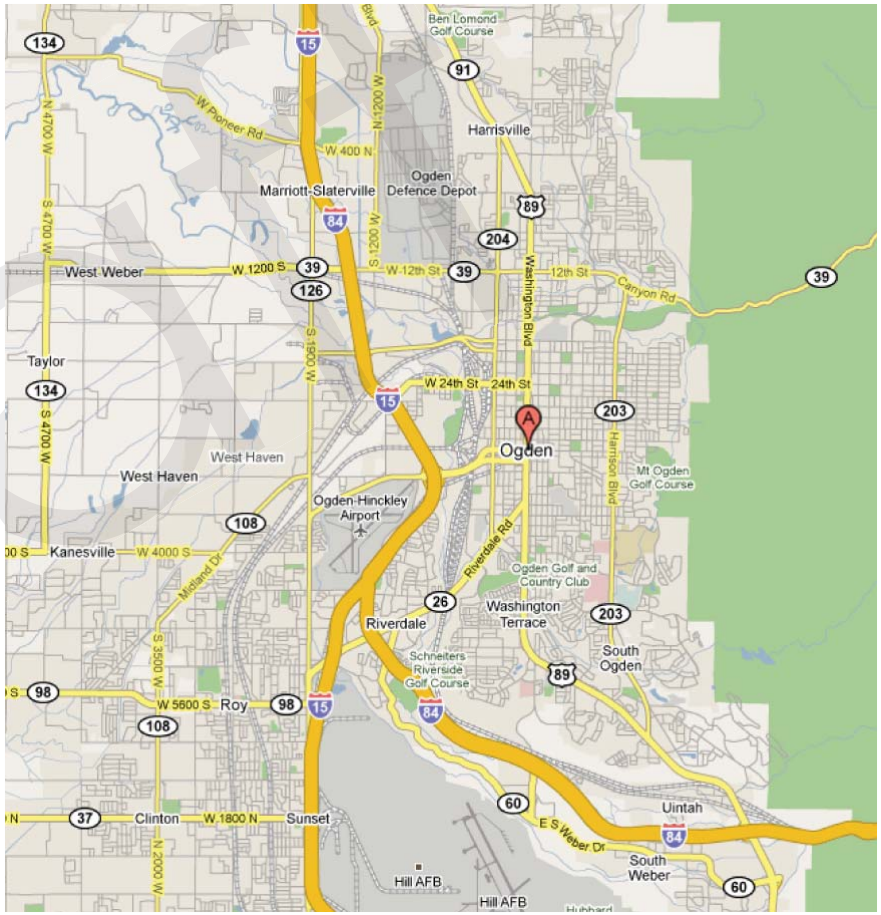
Weber State College awarded its first baccalaureate degree in 1964. In 1991, the college became Weber State University, appropriately symbolizing its role as Utah's first comprehensive regional university that also retains a community college mission." http://www.weber.edu/aboutwsu/history.html

When Weber State College transitioned from a lower division college to a four year college, in 1964, the campus began an era of growth.

" WSU now has a 400-acre campus in Ogden, Utah, with 89 percent of the buildings constructed since 1960." www.weber.edu/aboutus/indepthhistory.html

draft





An area map of the Wasatch Front is to the left and an Ogden City map is to the right.

WEBER STATE UNIVERSITY

WEBER STATE UNIVERSITY - OGDEN

Building Directory

Name	Location	Code
Building 3	B-3	B3
Building 4	B-3	B4
Browning Center	C-4	BC
Campus Services	A-3	CS
Davidson Track Locker Rooms	C-3	TR
Dee Events Center	E-2	DC
Elizabeth Hall	B-3	EH
Engineering Technology	B-3	ET
Facilities Management	B-1	FM
Heat Plant	A-3	HP
Hurst Center for Lifelong Learning	D-5	HC
Information Booth	B-5	IN
Kimball Visual Arts Center	C-4	KA
Lampros Hall	C-3	LP
Lind Lecture	B-2	LL
Lindquist Alumni Center	D-5	AL
Marriott Health	C-3	MH
McKay Education	B-3	ED
Miller Administration	B-4	MA
Receiving and Distribution Services	B-1	RD
Residence Hall I	E-4	R1
Science Lab	B-2	SL
Shepherd Union	B-3	SU
Social Science	B-4	SS
Stewart Bell Tower	B-3	ST
Stewart Library	C-3	LI
Stewart Stadium Sky Suites	C-2	SK
Stewart Wasatch Hall	E-4	R2
Stromberg Center	C-3	SB
Stromberg Stadium Offices	C-2	SD
Stromberg Strength Training	C-2	WR
Student Services Center	B-4	SC
Swenson Building	C-3	SW
Technical Education	B-2	TE
University Village	E-3	V1-5
Village Community Center	E-3	VC
Wattis Business	B-3	WB
Wildcat Village	E-4	R1-2

Annex Directory

Annex 2	Fatigue Studies Lab
Annex 4	Police
Annex 5	Parking and Environmental Health & Safety
Annex 9	Outdoor Program
Annex 10	Upward Bound
Annex 11	ROTC
Annex 12	Veteran's Upward Bound
Annex 13	Athletics

Parking Lots

A1	A1 Permit and Visitor Meters
A2	A2 Permit and Visitor Meters
A3	A3 Permit
A4	A4 Permit
A5	A5 Permit
A6	A6 Permit
A7	A7 Permit
A8	A8 Permit
A9	A9 Permit
A10	A10 Permit
A11	A11 Permit
A12	A12 Permit
A13	A13 Permit
DC	Dee Center A,W and R Permits (*Shuttle Available*)
PPL	Public Pay Lot
R2	Residence Halls/RW and A Permits
R3	Residence Halls/RW and A Permits
R4	Residence Halls/RW and A Permits
S1	Children's School Permit
S4	Special Use Permit
W1-10	W, R/W and A Permits

Non-campus Buildings

CU	Weber State Credit Union
OI	Ogden LDS Institute
NC	Newman Center
IS	Ice Sheet

Disabled Access

AED (*Automated External Defibrillator*)
**Latest known AED locations*

Ride the Wildcat Express Shuttle.

All Weber State University parking is by permit only. You can buy a $22 pass and always find a place to park in one of the 3,000 available spaces at the Dee Events Center. The shuttle runs from the Dee Events Center to the bus stop in the loop south of the Stewart Library and back to the Dee Events Center.

The shuttle runs at 7-minute intervals from 6:30 a.m. until 2 p.m. and about every 14 minutes from 2 p.m. until 8:30 p.m.

If you have questions you may call (801) 626-7220 or (801) 626-6294.

Weber State University
3848 Harrison Blvd.
Ogden, UT 84408
801-626-6000

weber.edu

Updated 05/12

Climate Data

Solar Access

The project is oriented east / west which is ideal for solar orientation. There are currently no tall buildings to the south of the site that would cast shadows on the site. The following table provides solar altitude and azimuth information for Ogden City and should be used to establish solar orientation and sun shading devices for the building.

	Summer Solstice			Winter Solstice		
	Time	Altitude	Azimuth	Time	Altitude	Azimuth
Sun Rise	05:00	.4	58	08:00	11	122.6
Peak Sun	12:30	72.2	180	12:30	25.4	180.8
Sun Set	20:00	0.4	302	17:00	.1	238.5

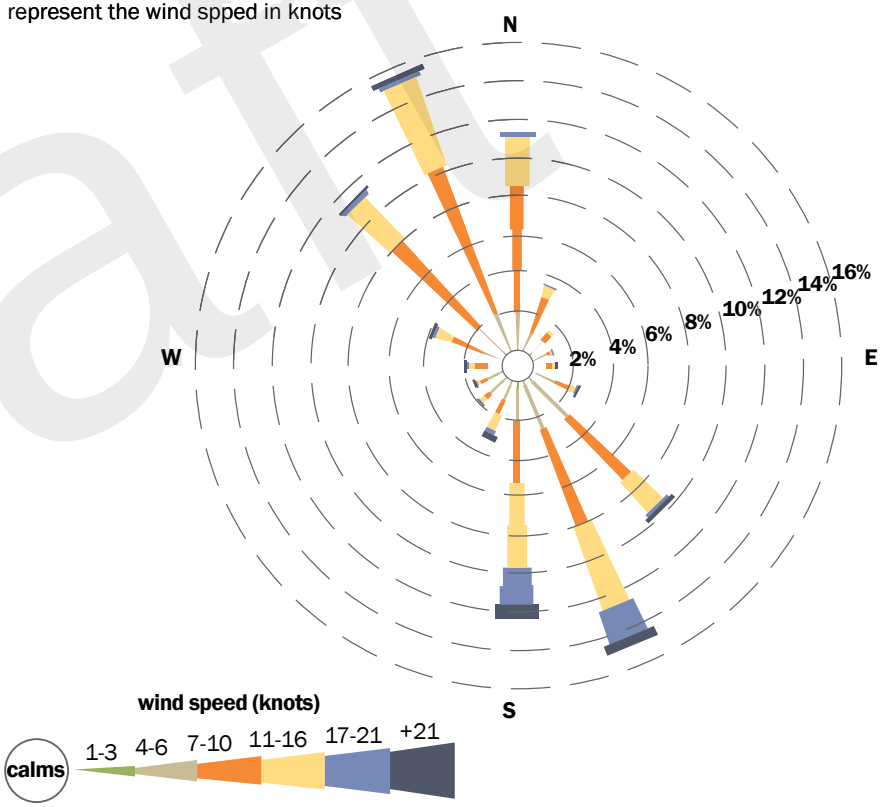
In addition, Ogden City has the potential to generate between 5. and 5.5 kilowatt hours per square meter per day with a photovoltaic array.

Prevailing Winds

Winds tend to be difficult to pinpoint and incorporate into the design of a project. A wind rose is presented below to help define the wind speeds and directions typical for the Wasatch Front. The specific wind conditions at the site cannot be known without site specific altimeter data.

Wind Rose for Salt Lake City and Ogden, Utah

The circles indicate the frequency the wind blows from a certain direction and the bars represent the wind spped in knots



draft

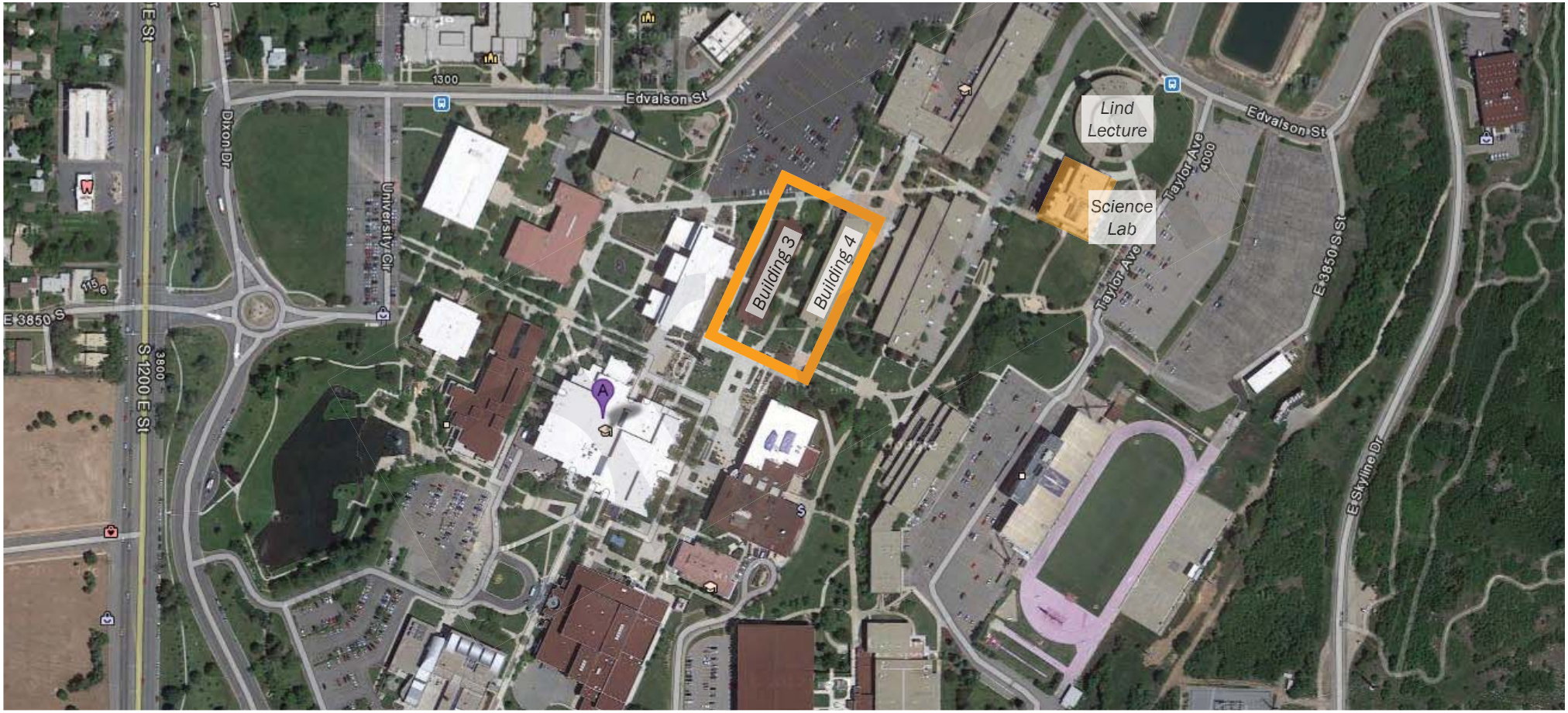
Temperature, Precipitation and Degree Days

The following data is from the National Weather Service Regional Climate Center. It presents the 30 year averages for maximum temperatures, minimum temperatures, precipitation and heating and cooling degree days for Ogden City.

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Maximum Temperatures	36.8	43.2	53	61.9	71.2	82.2	90.5	88.9	78.2	65.2	48.8	38.4	63.2
Minimum Temperatures	20.9	24.6	32.6	39.3	47.2	55.8	62.9	61.7	52.1	41.2	30.4	22.3	40.9
Precipitation (inches)	2.32	2.16	2.44	2.49	2.9	1.47	0.91	1.02	1.75	2.27	2.01	1.96	23.71
HDD (base 65)	1096	872	674	428	207	50	2	4	89	362	752	1065	5603
CDD (base 65)	0	0	0	6	40	177	371	330	102	5	0	0	1031

Data from the National Weather Service Regional Climate Center, information reflects 30 year averages.

draft



Science Lab building to be demolished

Project Site

EXISTING SCIENCE FACILITIES

Science Building

The current Science Lab Building was constructed in 1969 and has 109,260 gross square feet over six stories. The Science Lab Building is located directly south of the Lind Lecture Hall. The two buildings were built in tandem to support one another and foster scientific education at Weber State University.

The existing Lab Building does not meet the modern laboratory needs for the science department. The existing laboratory spaces do not have any access to daylight and many have not been updated since the building was constructed in the 44 year life of the facility.

MHTN Architects completed a feasibility study for the new Science Building that stated, " Early in the feasibility study process, the assessment concluded that the existing Science Lab building is not suitable for reuse as a science laboratory building, primarily due to its tight floor-to-floor height of approximately 13 feet. This distance does not provide sufficient space for the utilities and infrastructure necessary for a modern science laboratory building." In addition, the study recommended that the existing Science Lab Building be demolished as it is not suitable for a classroom building due to basic system and building space deficiencies.

Lind Lecture Hall

Lind Lecture hall serves the current lecture needs for the College of Science and will continue to be used in conjunction with the new Science Building. The academic and physical connectivity between the new Science Building and Lind Lecture will need to be maintained and even enhanced as the physical proximity will be extended.

draft

> “THE MOST BEAUTIFUL THING WE CAN EXPERIENCE IS THE MYSTERIOUS. IT IS THE SOURCE OF ALL TRUE ART AND SCIENCE.”
>
> *Albert Einstein*

PROPOSED SITE

The new Weber State University Science Building will be located north of the Stewart Library and the Shepherd Union, and east of Elizabeth Hall, where Buildings 3 and 4 currently sit. The new Science Building will be three and a half stories tall and will have a building footprint of approximately 48,000 square feet.

The site for the proposed building slopes downward from east to west and drops approximately eight (8) feet. This site slope should be taken advantage of by stepping the building down a full level as it traverses the site. This strategy allows the new building to take advantage of two very important assets. First, both the main and lower levels of the building will have on-grade floor area and can house vibration sensitive laboratory spaces. Secondly, the lower level will have the advantages of a below grade space but will also have very good access to daylight on the west side.

draft

Access

Pedestrian

The site for the New Science Building is in the center of campus. The site will have direct and convenient pedestrian access to and from the Bell Tower plaza, the Shepherd Union, Elizabeth Hall, Stewart Library and the Engineering Technology Buildings. In addition it is a short walk from the project site to the Lind Lecture Hall.

Vehicular

The new building will also front onto the A2 parking lot, to the north, which will provide convenient access for building users driving to camps.

Service

The facility will require a service access/loading dock area. It would be most feasible if that service was located on the northwest corner of the proposed building. The area should be screened so that service trucks and the loading dock cannot be viewed from the parking area to the north.

Orientation and Views

From the site of the new building there will be views available in every direction. To the north and east, there are spectacular, near views of the Wasatch Mountains and the foothills. To the south are the close views of the bell tower and the rest of the campus. To the west is a sweeping panorama of the Ogden Valley below and the Great Basin beyond. Allowing views from as many of the spaces in this building should be an important priority.

The grid of the main campus is approximately 25 degrees off of a direct north/south orientation. If wings of the proposed building were oriented to align with the campus grid, that configuration would not be oriented with an ideal east/west alignment and would be unable to gain true north and south solar exposures to capture the most efficient daylight. A solar orientation study that aligns the long wings of the building with a true east/west axis should be attempted to see the effects caused by attempting to align with the ideal solar orientation for the building.

Taking full advantage of the daylight and views available from this site is an opportunity not to be missed. This becomes especially relevant when considering the fifty year old building that the Science Department is moving from has a distinct lack of windows.

draft

Site Constraints

The site of the new Science Building, where buildings 3 and 4 are currently located, is bound by existing site conditions on all sides. To the west of building 3 is an existing fire lane/sidewalk that runs from the A2 parking lot at the north to the Bell Tower Plaza on the south. This fire lane must be maintained and not disturbed by the new building footprint or construction. To the east of building 4 is a sidewalk that separates building 4 and Engineering Technology to the east. A reasonable landscape buffer between the new building and this sidewalk should be maintained. To the north is the sidewalk along the A2 parking lot and to the south is the Bell Tower Plaza.

A campus utility tunnel runs under buildings 3 and 4. The elevation of the tunnel, where it meets the west edge of the new science building, will need to be considered in determining the final elevation of the new building.

Site Opportunities

The site of the new Science Building is a prime location in the heart of the Weber State Campus. Proximity to a major student pedestrian hub, the Bell Tower Plaza, and the student union provides opportunities for a significant presence on campus.

draft

SITE DESIGN REQUIREMENTS

SOILS CONDITIONS

The following soils conditions and summary of finding sections are excerpts from the site geotechnical study that is located, in full, in the appendix of this program.

Surface

The site is currently occupied by Buildings 3 and 4 located on the WSU campus, immediately east of the existing Elizabeth Hall in the north central area of the campus. The ground surface across the site slopes downward toward the west, with roughly 20 feet of elevation difference from the east to west sides of the proposed building. The site is bordered on the north by an existing parking lot, on the east by the Engineering Technology Building, on the south by Stewart Library, and on the west by Elizabeth Hall.

Subsurface Soil And Groundwater

The soil conditions encountered in the borings, to the depths penetrated, consisted of about 1.5 to 4.0 feet of fill (considered to be non-engineered fill) overlying natural silt and silty clay with fine sand containing interbedded lenses of silty clay or silty fine sand, extending to the maximum depths explored of about 16 to 41 feet below the existing ground surface. The silt and silty clay soils typically contained fine sand and trace gravel, were slightly moist, light brown in color, and are anticipated to exhibit moderate strength and low to moderate compressibility characteristics under the anticipated loading range. The lines designating the interface between soil types on the boring logs generally represent approximate boundaries. In-situ, the transition between soil types may be gradual.

Groundwater was encountered in 5 of the 6 the borings during drilling operations at depths of 9.5 to 14.5 feet. Slotted 1.25-inch diameter PVC pipe was placed in the 6 borings in order to provide a means of monitoring the groundwater fluctuations. Subsequent measurements were taken, with the results shown in the table on the next page.

draft

Seasonal and longer-term groundwater fluctuations on the order of 1 to 2 feet are projected, with the highest seasonal levels generally occurring during the late spring and early summer months.

Boring	Groundwater Depths	
	May 17, 2013	May 31, 2013
B-1	9.5	7.2
B-2	13.0	6.3
B-3	9.0	7.9
B-4	Not Encountered	9.8
B-5	11.0	10.1
B-6	13.5	13.2

Discussions And Recommendations

Summary Of Findings

The proposed building may be supported upon conventional spread and continuous wall foundations placed on suitable natural soils and/or structural fill soils.

The most significant geotechnical aspect of the site is the presence of non-engineered fill and groundwater near anticipated excavation depths. Any non-engineered fill should be removed, perhaps at the same time as the demolition of the existing buildings, but at least during the course of construction. GSH must be contacted to observe that any fill/problematic soils have been removed prior to footing construction.

Our drilling and water level measurements occurred during a time when groundwater is typically at the highest stage throughout the year. It is our understanding that the east side of the proposed building will be at least 8 feet below existing grade. Groundwater levels on the eastern side of the site (in Borings B-1 through B-4) were about 6.3 to 9.8 feet below existing grade. Thus, it is recommended that permanent drainage and underdrains be installed.

draft

PHASING AND DEMOLITION

Buildings 3 and 4

Buildings 3 and 4 are to be demolished as part of the project construction to make way for the New Science Building. Abatement of both buildings will be complete prior to the start of the project.

Science Building

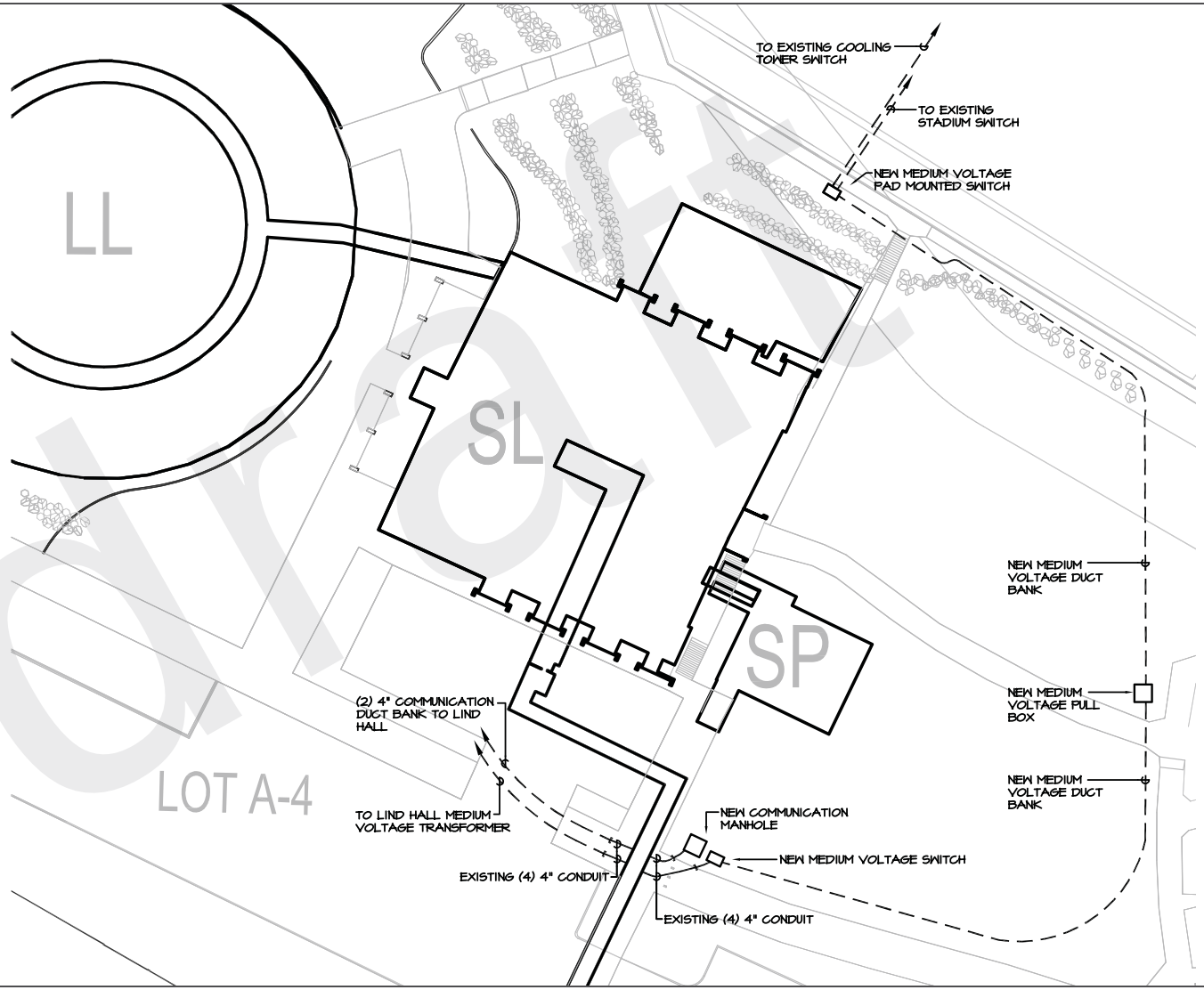
The existing Science Lab Building will remain in operation throughout the construction of the new Science Building. Upon completion of the new building Weber State University will need time to move into the new facility. After the building is vacated, abatement of the existing building will occur. Coordination of the Lind Lecture utility work reconfiguration will need resolved in the project construction schedule. Once the building is vacated and abated it can be demolished as part of the construction project

UTILITIES AND INFRASTRUCTURE

The new science lab building is located in one of the oldest parts of Weber State University campus. The new building will be on the 4.5 acre site of the existing Buildings 3 and 4. Buildings 3 and 4 will be demolished to make way for the new facility. The site slopes generally to the northwest. There is approximately 12-20' of fall from east to west and approximately 2-10 feet of fall from south to north. Existing site improvements include Buildings 3 and 4, landscaping and sidewalks. Landscaping on the side is generally turf, trees and shrubbery.

There are many existing utilities throughout the site. Subgrade utilities have been installed for several different developments on the site. Therefore, there is a high likelihood of unknown, unidentified or incorrectly located utilities. In addition, there are utility tunnels that extend from the west side of the site to the east terminating with Building 4 and branching south east through the corner of the site. These utility tunnels will be preserved in the development of the new facility. Known utilities in the site include pressurized water systems such as culinary, secondary, irrigation, and high temperature. Additional known utilities include sanitary sewer, storm drain, communications, electrical and natural gas. New improvements will require revisions to almost all utility systems on the site.

draft



Existing Site Electrical and Communications Infrastructure

Power Distribution

The existing campus medium voltage loop that goes through the existing Science Lab Building (which will be demolished under this project) and houses medium voltage switches needs to be rerouted. Refer to the attached schematic Electrical Site Utility Plan.

New medium voltage switches and duct bank will need to be installed to reroute existing lines out of the Science Lab and also provide a protected switch to feed power to existing Lind Hall building.

The existing 277/480 volt and 120/208 volt switchboards in the science lab are currently utilized to feed power to existing Lind Hall. Under this project, power to the Lind Hall building will need to be rerouted and be tied to new medium voltage transformers.

The existing medium voltage loop will be utilized to reduce the length of power outages to Lind Hall and Stadium. The rest of the buildings on campus shall not be effected.

One of the new medium voltage switches will be utilized to provide power to the existing medium voltage switch by the Stadium.

The existing medium voltage switch west of Elizabeth Hall provides power to the transformer in the utility tunnel under building 4. Distribution switchboard in the utility tunnel provides power to building 3 and 4. Under this project the medium voltage transformer and switchboard will be removed to allow demolition of building 3 and 4.

The Existing medium voltage switch west of Elizabeth Hall will be utilized to provide power to a new transformer for the new Science Building. The existing tunnel is to be utilized to run medium voltage conductors to new transformer.

Communications

The existing Science Lab and Lind Hall are tied to the campus network via fiber and copper cables. The existing fiber and copper lines run through the utility tunnel west of the Science Lab.

Lind Hall fiber cable and copper run through the Science Lab. Under this project, Lind Hall will need to be tied directly to the campus network.

Two (2) 4” conduits will need to run from existing utility tunnel west of the Science Lab to the Link Hall for fiber and copper cables. Provide three (3) 1” inter-duct in one of the 4” conduit for fiber cable.

Four (4) 4” conduits will need to run from the existing utility tunnel east of Elizabeth Hall to MDF Room in the new Science Building.

The Existing fiber and copper cables need to be rerouted and extended to the Lind Hall.

draft

Exisiting Chilled Water

The campus chilled water distribution system is routed through the existing Science Building in two locations (north plant, under the building, and south plant, buried in a berm south of the building). Both rooms are scheduled for demolition. The following accommodations need to be made:

Lind Lecture Hall

Lind Lecture Hall is served from the north plant. Reference Option 1 and Option 2 for location of connection between existing 18" chilled water line that is currently abandoned but available, and the existing 6" line the exists the north plant and routes south along the east side of the project.

Another option is to extend a 6" line along the west side of the existing Science building from the valve vault. This has the advantage of being further from the potential future construction zone, but is more expensive

Skybox

In order to prevent the elevation of the Skybox from imposing static head on the chilled water system, it is separated from the chilled water loop with a heat exchanger currently located in the north chiller.

Relocate the existing heat exchanger, pump, air separator and expansion tank from the north plant to a new vault, in the approximate location shown on the illustration.

Bypass

A modulating control valve is located in the south plant to provide minimum flow through the chiller plant. Relocate it to new Science Building.

Relocation of Chilled Water Lines

Two options exist:

Option 1: Bypass the south plant and connect the lines from the central plant to the campus distribution system in a location east of Engineering Tech. Approximately 45'.

Option 2: Bypass the south plant and stay clear of the entire site by extending south, on the west side of the stadium, the turn west on the north side of Allied Science. Approximately 600'

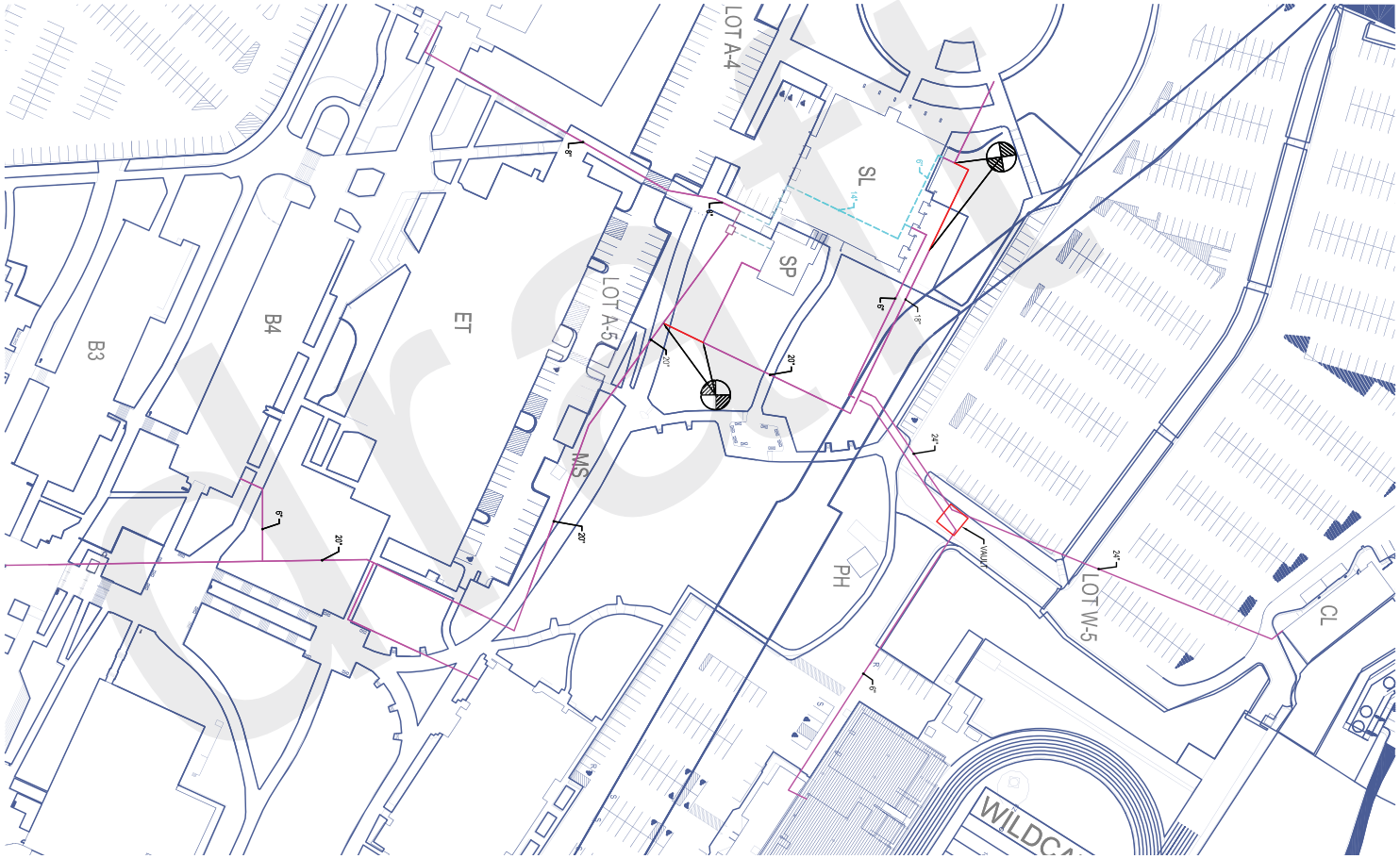
Staging

This work will require shutdown of the campus chilled water distribution system for an extended period of time. This work should be scheduled for winter, when the system is normally shut down.

draft

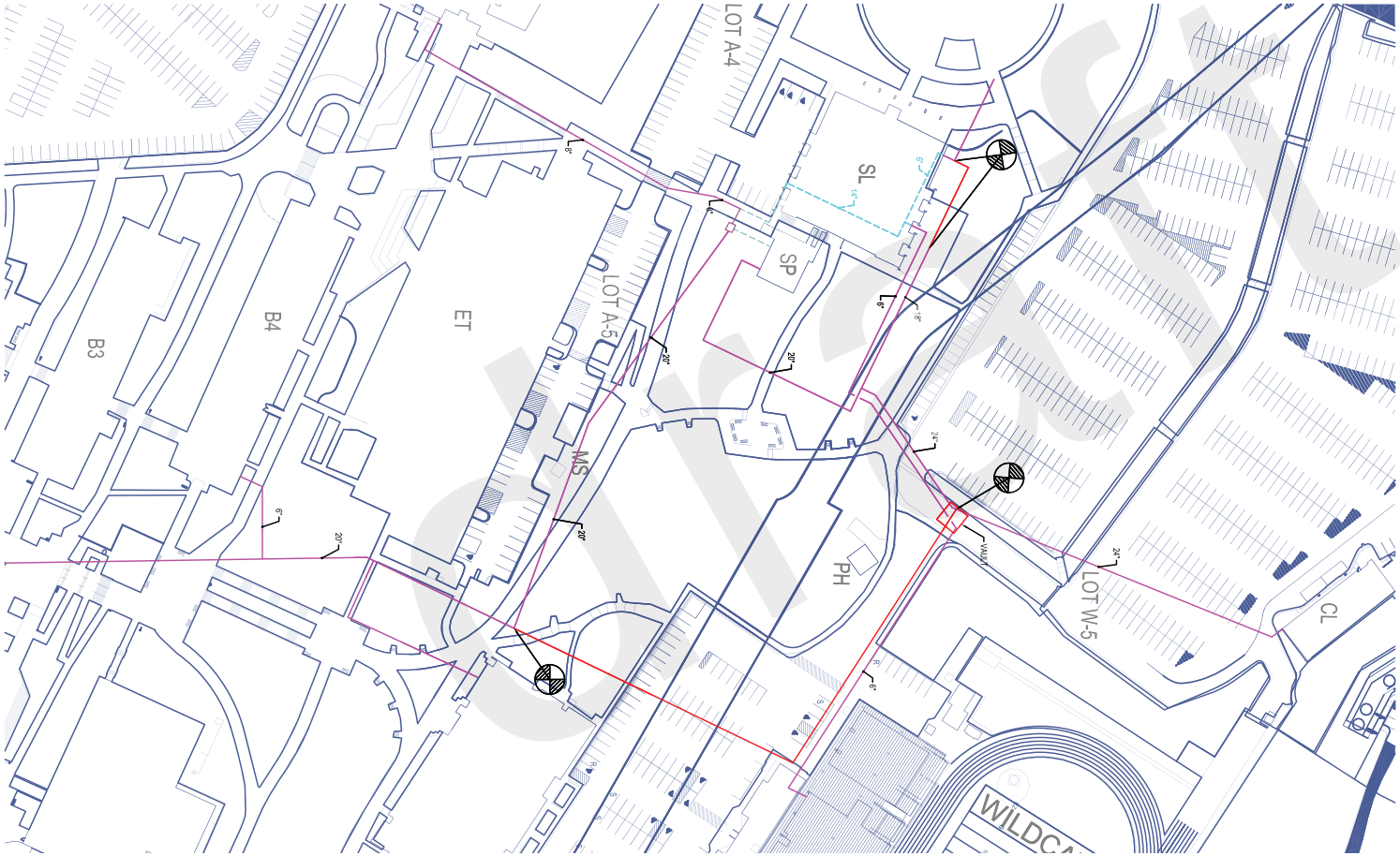
N

Existing Site water distribution system
Pink = existing
Blue = demolish
Red = reroute



N

Option 1
Pink = existing
Blue = demolish
Red = reroute



Option 2
Pink = existing
Blue = demolish
Red = reroute

Available Utilities

Steam

Steam is available at 80 psig from the central campus system. Anticipated peak demand is 8,000 lbh

Chilled Water

Anticipated demand is 300 tons, and anticipated service size is 6".

Install a new service from existing tunnel, and remove existing 6" service.

Culinary Water

Extend a 4" culinary line and an 6" fire protection line to the project site from a new 8" line.

It is anticipated that the water pressure is approximately 80 psig.

Sanitary sewer

Sanitary sewer size will be 6"

Sanitary sewer will be routed to the south

The University sewer drains into the Ogden City Sanitary Sewer System; coordinate and comply with system requirements.

Storm Sewer

Storm water will be routed to the south.

Natural Gas

Natural gas is available at the building.

draft

LANDSCAPE DESIGN

Creating a Living Laboratory

The new Science Building at Weber State has a rare opportunity to truly engage the building faculty and staff through the landscape design. Many of the faculty and staff would work in and study the landscape elements as an extension of the science building curriculum. The landscape, if designed correctly, can become a living laboratory for the College of Science.

Key features of this living laboratory would be outdoor classroom and study spaces that are located adjacent to key gardens or landscaped areas. These landscaped areas can be designed to reflect our local climate through the use of native vegetation, or they can be designed with specific teaching goals in mind. An example of this would be a pollination garden or succulent garden.

Another extension of this living laboratory could be located on the roof of the building. This would provide habitat area, increase the learning opportunities for the students and compliment the goal of integrating nature into the building design.

draft

Landscape Requirements

Planting material should be of native or drought tolerant species with a good history of thriving in the Ogden area. Turf areas should be limited to small areas and should use a drought tolerant turf grass that requires less water and maintenance. Landscape edging shall be durable using material that will hold up to abuse and be low maintenance.

The landscape design shall meet both the Weber State University Landscape Standards and the State of Utah Landscape Design Criteria, located in the DFCM Design Standards. The water used for landscape should be a minimum of 50% below the baseline landscape design, presented in the LEED Reference Guide.

Irrigation Guidelines

Use an automatic irrigation system with the ability to turn irrigation system on only when watering is needed by plant material. Use high quality material for long lasting maintenance free system. Drip irrigation systems should be used in lieu of sprinkler systems where feasible.

draft

BUILDING DESIGN REQUIREMENTS

ARCHITECTURAL DESIGN

Introduction/Basic Architectural Concept

The New Science Building is one of the largest architectural building projects that Weber State University has undertaken on its main campus since the original Student Union was renovated in 2008. The New Science Building project is also, arguably, the most important academic building project in the University's history and holds the promise to provide a world class science learning facility that will help educate Utah's next generation of science professionals and other allied fields of study. A successful design process will provide Weber State University with a hub for the sciences where the community of science learners can come together to learn, study and research science topics of interest in a flexible and safe building that will facilitate these scientific collaborations.

Building Theming

It is the desire of WSU for the New Math and Science Building itself to serve as a learning tool to its students, demonstrating concepts of science through the building design. These concepts may manifest in all elements of the building, such as building organization, structure, geometry, material patterns and textures, and finishes. The design team is encouraged to pursue creative strategies to integrate the desired building theme.

draft

Science on Display

The inclusion of science demonstration exhibits integrated throughout the building are encouraged in the design of the new building. This application of 'science on display' allows the building to further become a learning tool where science and math curricula taught in the building is linked to the scientific phenomena demonstrated in the exhibits. These exhibits are not anticipated to be associated with the 'one percent for the arts' program sponsored by the State of Utah, but are considered critical to the success of the building.

One Percent for the Arts

As required by the State of Utah, the New Math and Science Building project will include an art installation with a budget equalling one percent of the construction costs of the building. This art installation presents an opportunity to further integrate the theming concepts desired by WSU. The process for arts proposals should be encouraged to occur as early in the design process as possible so that it may be fully integrated into the overall project design.

The installed art shall be interactive and provide a link to the math and science curriculum of the University. This approach to selecting a unique blend of science and art may require a more comprehensive search for participants that may include opportunities for scientists, engineers, designers and artists to form collaborative teams to compete for the commission.

draft

Building Siting Issues

The new building will be situated on the site where existing Buildings 3 and 4 are located. Elizabeth Hall will be to the west and the Engineering Technology up the hill to the east. This prime campus location is directly north of the Bell Tower Plaza, the most active, well-used and highly-traveled open space on WSU's campus. The primary entry of the building shall be oriented to the south from the plaza. The north end of the proposed site is adjacent to the north parking lot and the building will have an entry that will be directly accessible from this busy parking area. Therefore, the proposed building will not have a side that could be considered a back door.

Per the site analysis section, the project site is sloped downward from the west to the east, allowing access to two on-grade floor areas and enhanced access to daylight for the lowest level. The project site is also fortunate to have views in every direction. The massing and orientation of the building should take advantage of both the near views to the campus common areas as well as the views over the Ogden Valley and toward the Wasatch Mountains.

draft

Building Organization

The New Science Building is truly, a mixed-use academic building that will enhance and facilitate the study of Science and Math at Weber State University. The functions provided in this proposed new building include:

Teaching Laboratories - Each of the science disciplines will have both dedicated labs for their curricula as well as shared labs that will be configured and equipped so that they are able to teach multiple courses and be shared amongst several of the different science departments.

Research Laboratories - There is lab space assigned to each department where their faculty members can involve WSU students in undergraduate research. These labs are equipped as requested by each department and are configured to be as flexible as possible to facilitate many types of research. There are also ten (10) research spaces that are intended for future faculty research within the building. These spaces are referred to as Dean's Reserve Research in the space summary.

Classroom - There is classroom space in the building for both math instruction and for science lectures. These spaces are outfitted for lecture only with whiteboards and audio/visual capabilities. There is no capacity for laboratory coursework in these spaces.

Student Study - Within the proposed building there are several programmed spaces that are meant to encourage student collaboration, interaction and study. There are small study rooms where four or five students can gather and have access to audio-visual equipment and the web. Also, each department in the building has a student room where their students can gather for group activities or to study in larger groups. In the design of the building the program also encourages that found spaces be incorporated to facilitate small impromptu student gatherings. Learning can occur everywhere in the building and the incorporation of these happenstance spaces is strongly encouraged.

Office Suites - Each of the departments within the building will have individual offices for their faculty members as well as a space for their adjunct faculty to land and store their belongings when they come to the building to teach. The office suites include the offices, a reception/waiting area, workroom and storage area. It is anticipated that there would be an office suite on each floor of the building. There are also ten (10) future faculty offices programmed into the facility.

Administrative Areas - The administrative functions within the building include the Dean's Suite, CSME (C) and Advising. Each of these entities will have significant interaction with the general public and their position in the building will need to address that responsibility.

draft

Separating Building Uses and Their Systems

There is a clear distinction between the building systems necessary to support the laboratory spaces and the systems serving the other spaces in the facility. The laboratories and the laboratory support spaces will have a specialized mechanical system where there the spaces are aggressively ventilated with numerous air changes per hour. The classrooms, offices, study spaces and administrative areas do not require such a robust mechanical system. The labs are also served by a complex system of specialty gases, and the floors of the labs will be constructed more stiffly for increased vibration control of these environments. All of these additional design considerations for the lab spaces require additional budget that are not required in the other spaces. Therefore, it is recommended that a building solution be studied that has the ability to isolate separate structural and mechanical systems for the more intensive lab spaces and would allow less rigorous building systems for the classroom and office spaces. This isolation is only appropriate in terms of building systems. It is not the intent of the Science Department to "isolate" the laboratories from the rest of the building. Visual accessibility and a close proximity is important for the labs from the building's public spaces.

Critical Adjacencies

Spaces that require a specific adjacency to another room are listed on the individual room sheets. There are some adjacencies, however, that are more general in nature and are listed here. These requested adjacencies include:

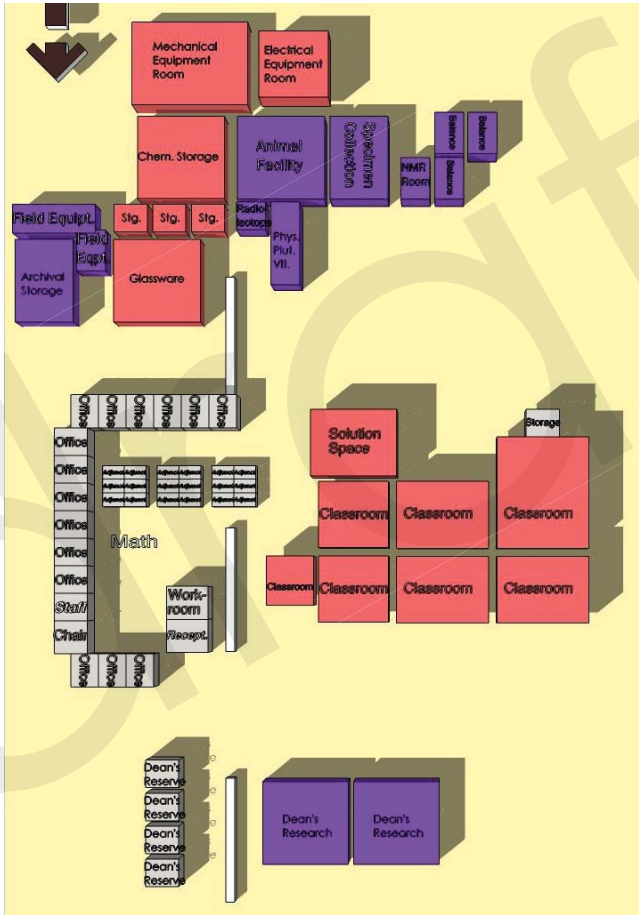
Service Access: There are several spaces in the building that need to be located near the loading dock/receiving of the building. The archival storage, chemical stores, and field equipment storage should all be proximate to the loading dock so that shipments can be conveniently moved to storage

CSME and Advising: CSME and Advising are both departments that will have a significant amount of interaction with the general public entering the building. Therefore, it would be advantageous that these two spaces are easily accessible from the Main Lobby of the building.

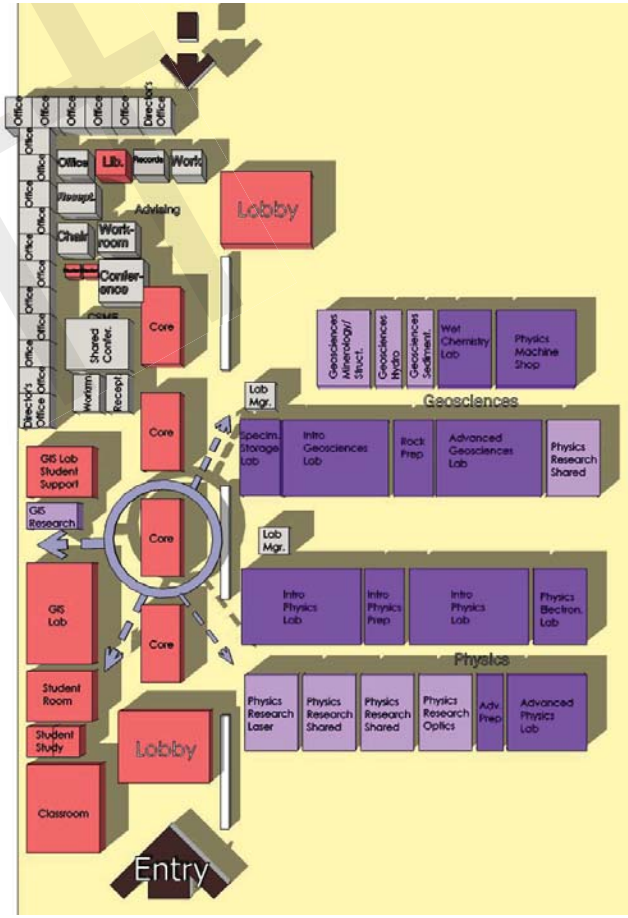
Developmental Math: Developmental Math has their office suite located in the building. There are no dedicated classrooms for Developmental Math but this building should be considered the home base for their students. The office suite and the faculty for Developmental Math should be located proximate to the Lobby so as to provide reasonably easy access from the main building entry. A high volume of students visit this department, requiring the reception area to be visible from the public space.

Draft

Scheme 1 - Cohesive Department Adjacencies

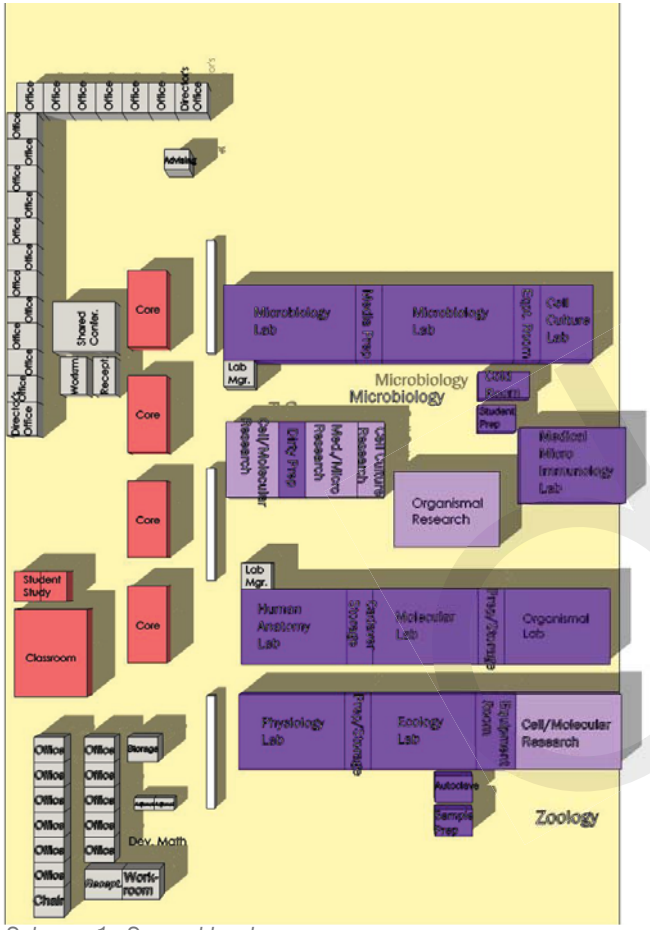


Scheme 1 - Lower level

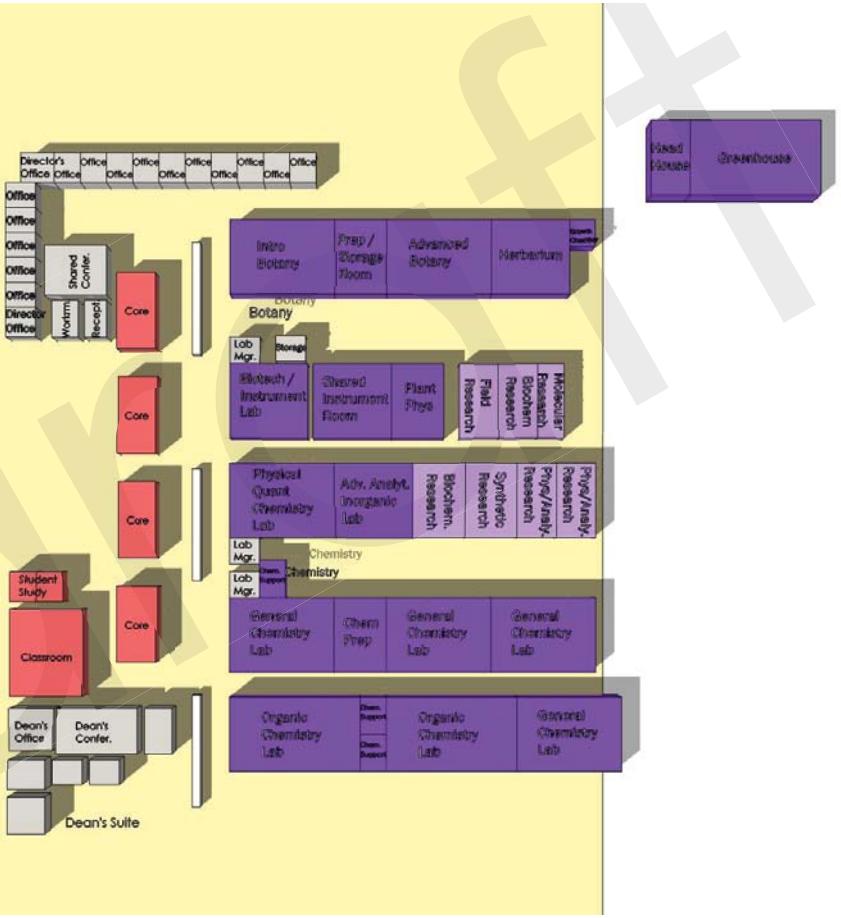


Scheme 1 - Main level

draft

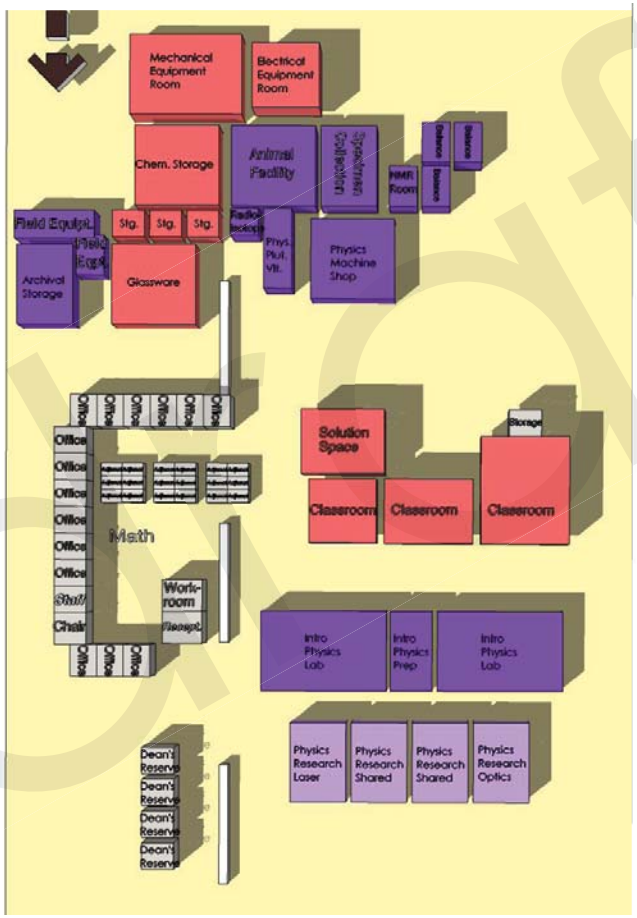


Scheme 1 - Second level

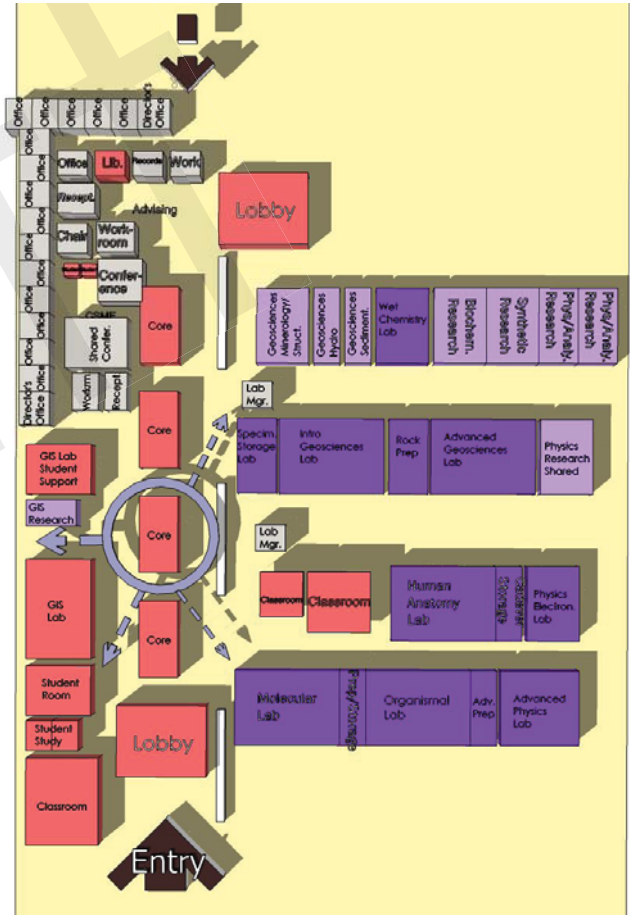


Scheme 1 - Third level

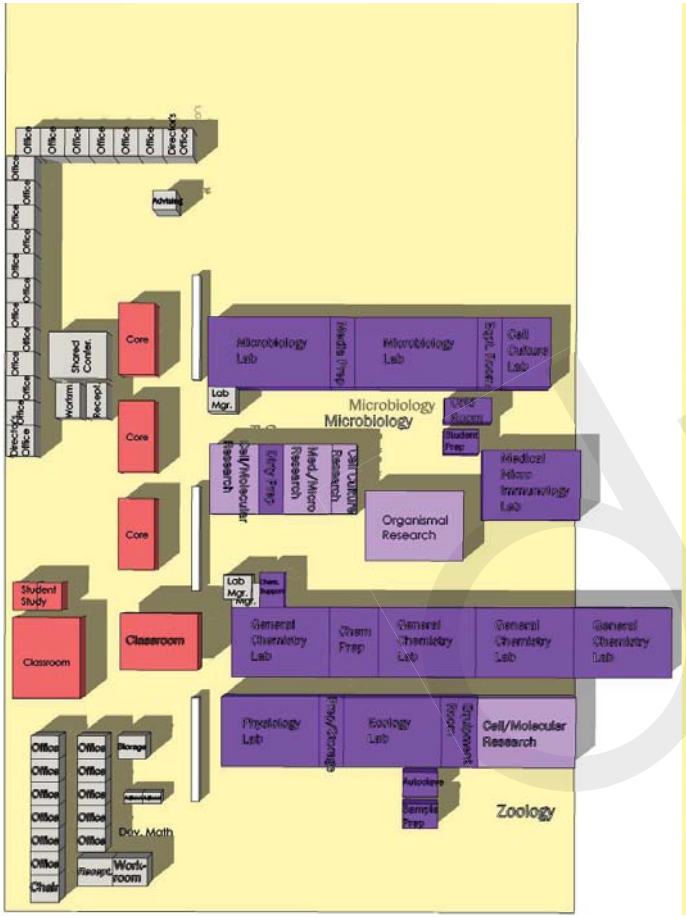
Scheme 2 - Varied Department Adjacencies



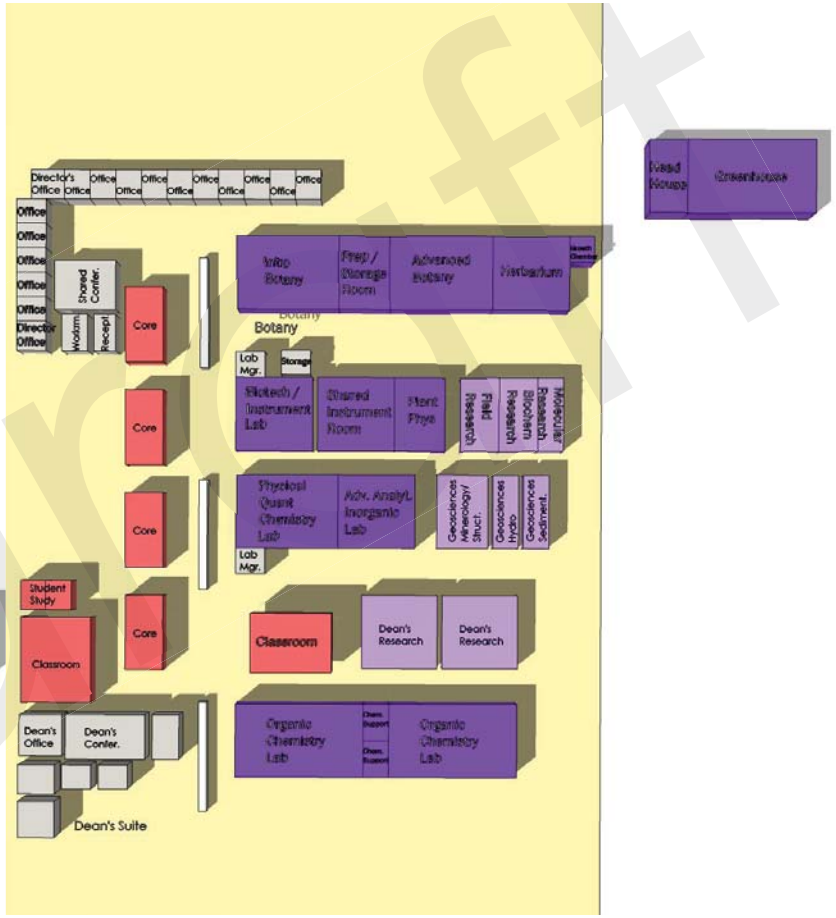
Scheme 2 - Lower level



Scheme 2 - Main level



Scheme 2 - Second level



Scheme 2 - Third level

draft

Departmental Adjacencies: Although certain departments have a natural affinity with one another because of their similar academic focus, it is not the intent of the WSU Sciences to strictly adhere to locating entire departments in one area or, for instance, the life sciences (Zoology and Microbiology) together. It is the desire for the building to locate spaces so as to facilitate collaboration and encourage cross-pollination of the science disciplines. There are two adjacency diagrams in the appendix that demonstrate this idea. The first diagram places like departments in their entirety on a floor. The second diagram (preferred diagram) does not place entire departments all on one level, but rather mixes different departments on various floor levels.

Shared Spaces

There are several areas that have been identified through the programming workshops that can be shared amongst the departments. The areas are as follow:

Classrooms - Three (3) of the classrooms in the building have been designated as shared classrooms for use by all of the departments within the building. These classrooms are not controlled by any of the science disciplines and will give all the departments a greater degree of flexibility to schedule their teaching laboratories. Several types of classroom layouts have been discussed during the programming phase of the project, however, the exact configuration and layout of these classroom spaces is to be determined in the design phase of the project.

Computer Lab - The Geosciences GIS Lab forms the basis of this room. It will be a traditional desktop computer lab for thirty (30) students. The room will be used primarily for scheduled classroom activity. The computer lab will be shared by all the departments who will schedule classes in the space. There is an adjacent walk-in computer space that students can go to when the larger computer lab is tied up with a class occurring.

Instrument Room - The Laboratory Instrument Room is the result of several departments combining their own instrument spaces into one space. This aggregation of smaller spaces into one larger space allows a greater floor efficiency of the room and less equipment required to furnish .

Chemical Stores - The storage for each of the department's chemicals , and disposable equipment will be combined into one large storage area that is easily accessible to the rest of the building. This space should be located near the loading dock and in close proximity to a freight elevator..

Archival Storage - Several of the departments have requested that their individual storage areas used for dead storage be combined into a larger archival storage area that would utilize more efficient storage systems (ie. mobile shelving systems) and thus requiring less total dedicated storage area for the building. This space should be located near the loading dock and in close proximity to a freight elevator.

draft

Shared Office Reception, Workroom and Storage - It has been decided in the programming phase that two departments will share a reception space, workroom and storage area in order to more efficiently utilize space within the building. In these discussions, there will be one of these shared office areas on each level of the building

Special Building Features

Lobby - The lobby of the building is intended to have many functions occur. There shall be student study/hang-out space, vending/eating space, but perhaps most importantly there needs to be visual access to science learning taking place. Several critical lab spaces (with demonstrative science activities) should be adjacent to the lobby and be transparent enough so as to give visitors a sense of science on display immediately upon entry into the building. A portion of the lobby should also remain open to above whereby upper levels of the building can be seen from this lower vantage point of the lobby.

Science on Display - Throughout the building it is desired to have demonstrative exhibits of science, particularly lessons that have a theme compatible with the faculty's chosen theme for the building. These demonstrations could occur in the building's structural system, in the building's finishes and colors, or in actual exhibits throughout the building.

Roof - The facility shall have an elevator stop and a stairway to the roof because the roof figures prominently in the plans of the WSU's Science Departments. They would like to locate a future Observatory on the roof. This activity will require that a certain degree of structural isolation occur at the proposed Observatory location. Science would also like to put a Weather Station on the roof as well as have a green roof who's plants could become part of the science curriculum.

Exterior Image of Building (Materiality)

The main campus of Weber State University surrounding the site for the proposed New Science Building has an eclectic charm that derives its character from a mix of buildings built in the 1960's and 70's along with newer adjacent buildings constructed recently. The new buildings combine locally produced brick and metal panel systems while the older buildings use brick and concrete. The surrounding buildings are between two and three stories above grade and step naturally down the hillside that Weber State University is set upon. Both the older and especially the newer buildings on the campus have significant amounts of glass in their facades.

The exterior image of the New Science Building, shall seamlessly integrate into the existing campus material palette of brick, metal panel, concrete and glass. It may be entirely appropriate, however, that the building imbues a more

draft

technical look, reflecting it's scientific functions occurring on the inside of the building.

Because of its sophisticated laboratory functions, the New Science Building will have elements that are not found on other buildings on the WSU campus. The stacks that will rise from the exhaust fans, depending on how they are configured, may have a more industrial look than the neighboring buildings. The greenhouse that will likely be visible from the south on the Bell Tower Plaza will have a significant influence on the Science Building's appearance.

Of course, glass should also play an important role for this building. Transparency into the New Science Building will be extremely important because not only does Science want to invite people freely in to the facility, but they also want scientific phenomena to be on full display and be completely interactive for everyone walking by their new facility.

The architecture of this new building provides the opportunity for WSU to further activate the Bell Tower plaza with an engaging, lively and interactive front door. It also will provide an opportunity to create a uniform scale, building massing, enclosure and a consistent material palette that will make for an even better plaza experience at the Bell Tower.

draft

LIFE SAFETY ANALYSIS

Codes and Standards

The new Weber State University New Science Building will need to meet all applicable codes and standards. The Design Team shall be responsible to verify the latest revisions, updates, or State of Utah amendments to any of these applicable codes and standards. The following list of governing codes for the project is current at the time of this writing:

- International Building Code 2012 (with any applicable State of Utah Amendments)
- International Fire Code 2012
- International Mechanical Code 2012
- International Plumbing Code 2012
- National Electric Code 2011
- NFPA 101 (2012 edition with State of Utah Amendments)
- Laws, Rules and Regulations of the Utah State Fire Marshall
- Design Guidelines - Weber State University
- Design and Construction Standards for Architects, Engineers and Contractors -
- Facilities Management/Weber State University
- Americans with Disabilities Act, Title III, (with 2013 updates)
- ANSI 117-119-2003
- ANSI – Accessible and Usable Buildings and Facilities 2009
- Planning and Design Criteria to Prevent Architectural Barriers for Aged and Physically Handicapped
- State of Utah DFCM High Peformance Building Criteria
- USGBC LEED Green Building Rating System 2009
- NIH Laboratory Design Standard Guidelines (2013 revisions)
- Nuclear Regulatory Commission Regulations (Title 10, 2013 updates)

A preliminary life safety code analysis has been done on the proposed new learning and research laboratory facility, using the 2012 International Building Code. For the purposes of this study the new facility has been assumed to be three (3) stories above grade with a lower level that will be below grade to the east with windows available to the west. This lower level will be categorized as a basement for analysis purposes.

The results of this life safety review may be found in the appendix of this program study.

International Building Code Review Summary - (International Building Code 2012)

draft

Project Description:

This three story multiple use facility will house classrooms, teaching laboratories, research laboratories, student study space, conference space, offices and storage areas. The following building occupancy types will occur within the building:

A3	Assembly	The lobby of the facility
B	Offices/Classrooms/Labs	Teaching spaces with less than 50 occupants
H2	Hazardous Occupancy	This occupancy is the central chemical storage
S2	Storage	These spaces are the common lab storage areas

The A3, H2, and S2 areas of the building are anticipated to be less than 10% of the total square footage of the level that they are located upon; therefore, the areas will be considered accessory uses and will not need to be factored into a mixed use occupancy calculation for the building.

For purposes of this preliminary code review, laboratory spaces that are over 1,000 square feet will not contain more than 30 students and would not technically qualify as an A3 assembly occupancy. We would, however, recommend that two exits be designed from these laboratory learning environments, and that this approach be verified with the DFCM and WSU governing code authorities before design begins.

Control Areas

Specific areas or rooms within the facility will need to be designated as "Control Areas." These areas are allowed by the building code to be repositories for chemically hazardous materials within the facility. The amount of chemical quantities able to be stored within the building varies by floor according to the distance that floor is above the grade level of the building. Control areas may be defined as storage rooms or they may be specified to be an entire floor of a building, if chemicals are being distributed and used with great frequency on a floor level of the building. There may be multiple control areas on each level of the building and the number of control areas per floor is defined by the International Building Code. These control areas will need to be fire separated from the rest of the spaces within the facility. A summary of number of control areas allowed per building level and the amounts of hazardous chemicals allowed per control area can be found in the appendix of this study.

draft

Required Fire Separations

Fire separations will need to occur between the different occupancy groups in the building. The building will be analyzed with separated uses.

Building will be analyzed with non-separated uses since the other occupancies are considered accessory uses.

Project Assumptions

- Assume a Type IIB Construction Type
- Building is to be equipped with an automatic fire sprinkling system

Basic Allowable Areas and Height: (From Table 503)

B – Construction Type IIB

Allowable Area	-	23,000 square feet
Height	-	3 stories (above grade)

Allowable Area Increases

Frontage Increase (If)

If = 100(F/P - .25) x W/30 =

If = 100(584/584 - .25) x 30/30 = 75%

Fire Sprinkler Increase 200%

Multi-Story Increase (For total building)

(2 stories maximum) Area x 3

Allowable Area (after increases) per floor

Aa (B) = 23,000 sf + (23,000 x 75/100) + (23,000 x 200/100)

B allowable = 86,250 square feet

The total square footage on the largest level of the building is approximately 48,570 square feet. The facility square footage on this level does not exceed the allowable area per floor of the allowable B area of 86,205 square feet. OK

Allowable Areas (after multi-story increase) – entire building

B 86,250 sf x 3 stories = 258,750 square feet

The total square footage of the building is approximately 159,600 square feet. The facility square footage does not exceed the allowable area of a B area of 258,750 square feet.

Entire building may be classified as a B occupancy and is within the allowable building area for that occupancy. OK

draft

SUSTAINABLE DESIGN

Sustainable Goals

Sustainable design priorities for this building include the integration of nature into the user experiences, resource consumption reduction and increased environmental awareness. All of the faculty and users of the new building have a high level of respect for and information about the state of our planet and want a building that has a reduced impact on the environment, and fosters environmental stewardship.

Integration of nature

Engaging the natural world and incorporating nature within the building highlights the sciences and engages users, allowing an enhanced to appreciation of the natural world. In addition the integration of plant life within the building, exterior windows for daylight and views and functional outdoor learning environments improve the health and well being of building users. The incorporation of a green roof area can also expand the functional space of the building while providing habitat and reducing the urban heat-island effect for the building.

The incorporation and engagement with the natural environment ultimately results in a higher respect for nature, thus fostering enhanced environmental stewardship through design.

draft

Resource Consumption Reduction

Laboratory buildings use a tremendous amount of energy due to the ventilation needs of the equipment and safety requirements as well as the need to directly exhaust laboratory return air and provide 100%outdoor air for the ventilation of the spaces. In addition, lighting levels tend to need to be higher due to the need for accuracy within the task that occur in a laboratory.

The New Science Building will be designed to reduce energy consumption through effective building and system designs and efficient laboratory equipment and systems.

The building envelope should be designed to exceed the 2012 IECC prescriptive insulation and performance levels and incorporate a continuous building air barrier system. The envelope should be designed with the minimum performance levels listed in the table below.

Envelope Component	Performance Requirements	Notes
Exterior Wall	R-20 assembly insulation value	
Roof	R-30 continuous Insulation	
Below Grade Wall	R-8 continuous insulation	
Slab on Grade	R-10 continuous insulation	For 24” below slab
Fixed Fenestration	U-.38 and SHGC - .36	Assembly performance
Skylight	U-.454 and SHGC - .36	Assembly performance
Building Air Infiltration	.10 cfm/sf	at .3 inches water gauge

Building envelope commissioning will be integrated into the design and construction processes to ensure a high level of building envelope thermal and infiltration performance.

The building mechanical and electrical systems will also be designed to exceed the energy code standards. These system requirements and goals are identified In the following Energy Analysis Section.

draft

Once the building envelope and energy using systems are designed to optimize efficiency, the laboratory equipment and user behaviors become driving forces for the energy performance of the building. Some key design strategies to reduce consumption through equipment choices and design strategies are as follows:

- Reduce the overall number of fume hoods to those necessary to meet program needs.
- Plan for the "right" fume hood, using lower flow hoods or vent-less hoods where feasible.
- Incorporate occupant sensing technologies into fume hood systems, such as alarms or automatic sash reduction when no one is standing at the fume hood.
- Purchase new, more energy efficient equipment when feasible.
- Co-locate high heat output equipment such as refrigerators, freezers, growth chambers, etc... to reduce the overall cooling load distribution within the building.
- Integrate occupancy sensors on outlets in offices and non-critical power outlets to ensure items such as monitors, task lighting and other personal devices are not drawing power when an occupant is not present.

The overall building energy efficiency goal is to exceed the ASHRAE 90.1 - 2007 by a minimum of 30%, or exceed a projected EUI of XX.

In addition, Weber State University is currently pursuing funding for a renewable energy system to be placed on the roof of the New Science Building. This array will help offset the energy consumption of the building and should be planned for in the structural and electrical design of the new facility. In addition, the roof area for the array should be accessible to students and staff to provide learning opportunities for the campus.

draft

Water efficiency

The building water consumption is projected to be focused at the mechanical cooling system and laboratory processed water systems. Occupant water use at restrooms and break areas will not be the driving water consumption for the building.

Key strategies to reduce water consumption are as follows:

- Collect cooling water flush for use at the landscape irrigation
- Create a closed-loop process cooling water loop for laboratory use
- Collect the water from the de-ionization process for use as landscape irrigation or grey-water reuse within the building.

Secondary strategies such as integrating low flow toilets and lavatory faucets should also be incorporated into the base building design.

An overall water consumption reduction of 50% at the landscape irrigation and 35% at the building level should be achieved through the design of the facility and systems.

Sustainable Materials

The building materials should be chosen to be durable, healthy and have a reduced environmental impact. Key building materials that should be considered for use in the building structure and shell include:

- Locally sourced brick and block products
- Structural steel with regional and recycled content
- Locally sourced wood products (ideally these would be FSC certified as well)
- Locally sourced stone products as applicable

Additionally, durable and low or zero emitting finishes should be included within the building envelope. These may include, but are not limited to:

- Highly durable and low-emitting flooring systems in common and laboratory spaces
- Low emitting paints and coatings
- Flooring and ceiling materials that have a high level of recycled content and low emissions
- Laboratory casework that contains recycled content and low-emitting finishes

draft

Increased awareness and behaviors

The most sustainable and far-sighted impact the building can have is through the increased awareness of resource consumption, and the impact everyday decisions have on our environment. To this end, creating awareness through signage, transparency of systems and integration of curriculum with the building can enhance the general knowledge of building users. This can also result in more sustainable behaviors that carry beyond the building use and into the everyday actions of the users.

Examples of systems that may increase awareness and can impact behaviors include:

- The integration and prominent positioning of the building dashboard system.
- Providing access to and tracking the energy generation of the photovoltaic system, and comparing this to the building energy consumption, weather conditions and average household energy consumption.
- Installing vacancy sensors on ambient lighting systems and integrating task lighting to allow natural light to reduce energy consumption.
- Tracking the water consumption and re-use of the mechanical cooling system.
- Integrating a living wall or large planted area within the building to allow everyday interactions between users and plant life.
- Using the building and its systems as a living laboratory for the sciences.

draft

ENERGY ANALYSIS

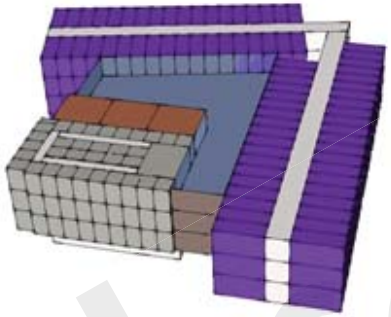
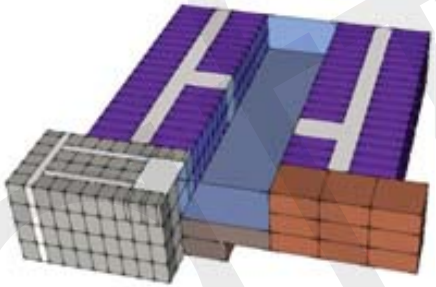
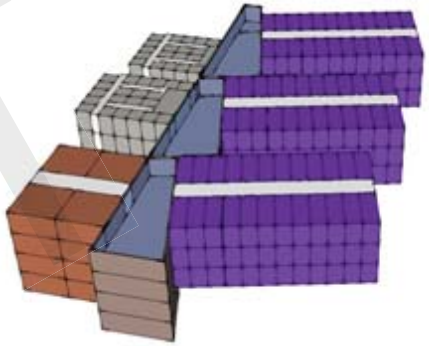
At this time, the most stringent of energy efficiency requirements applied to the project are related to the Utah State High Performance Building Standard prerequisites. These prerequisites include a requirement for the project to achieve LEED Silver. As a prerequisite to achieve any LEED certification, the project must reduce energy cost by 10% when compared to an ASHRAE 90.1-2007 Baseline model. Additional points under EAc1: Optimize Energy Performance may be required, after all other possible points are considered in conjunction with energy related credits. The design team will be required to demonstrate the issues related to reaching each energy efficiency goal and benchmark the feasibility of each goal, for consideration by the appropriate performance rating authority, in the event that the project cannot meet the energy efficiency goals, within the project scope and budget.

Massing Options

During the programming phase the design team is evaluating several different massing options for the WSU Science Building. The design team has provided three different massing options. The purpose is to evaluate the relative energy performance of the massing options. The results of this analysis will be used as an additional piece of information while designing a general layout of the building.

Due to the purpose of this programmatic phase of modeling being used to evaluate massing options, all assumptions for envelope, lighting, and HVAC, have been kept identical between all of the design options. All the massing option definitions are based on ASHRAE 90.1-2007 Baseline requirements, as per Appendix G. Glazing is assumed to be 40% window-to-wall ratio for all exposures. No assumptions were made for systems that do not affect the relative performance of the building, such as exterior lighting, and domestic hot water.

draft

Massing Option Results	Option A	Option B	Option C
			
Relative Annual Energy Consumption	100%	102%	115%
Relative Annual Energy Cost	100%	109%	115%
Relative EUI (kbtu/FT2/yr)	100%	84%	109%
Building Area (FT2)	148,403	179,790	156,066
Perimeter Area (FT2)	61,748	60,219	93,662
Lab Area(FT2)	72,437	73,761	66,282

draft

The three design options vary in annual energy consumption for two primary reasons. First, the building areas vary, most significantly the lab spaces, which leads to a difference in lighting power, plug load, and required ventilation air, which are all defined on a per square foot basis. Second, the building envelope area of option C is significantly greater than the other two options, causing a large variation in heating and cooling energy consumption.

Due to the high air change rates required for the lab spaces, which vary based on the lab type, and the high plug load required for these spaces, which also varies by lab type, comparing the results on a per square foot basis is not necessarily appropriate.

The results from the massing options show that the lab spaces are the most significant users of energy in the building. The second most significant consumption of energy is a function of the building perimeter area, specifically, the glazing. During the design of the building, emphasis should be put on reducing the lab space areas/number of hoods to that which is required by the university. Extra lab space increases the outside air required to meet the air change rates, which is relatively costly to condition. Reducing the lab space area will provide the owner with energy cost savings, but will not contribute towards earning LEED points. Consideration should also be taken to reduce building envelope area, and selecting high performance glazing, to ensure both occupant comfort, as well as improved energy efficiency. Reducing glazing areas to 40% or lower, as well as selecting high performance glazing will both, provide the owner with energy cost savings, and contribute to LEED points.

The results of modeling any massing options will not be realized in LEED, due to modeling protocol, but does provide benefit to the owner towards designing an energy efficient building.

Massing option A has been selected to evaluate potential energy efficiency measures (EEM) for this project, due to massing option A having the lowest annual energy consumption & costs. It's important to note that regardless of which massing option is selected for the final design, the EEMs proposed for this project will have equal relative performance impacts on the project. Once a final massing option is selected, each of the EEMs, particularly the envelope and HVAC options, can be fine tuned for that specific scenario.

Campus Thermal Energy Considerations

WSU is willing to consider alternatives to connecting the new WSU Science building to the existing central plant chilled water and steam systems, however these alternatives would need to be presented with compelling evidence for the alternatives to be considered. Due to the project's ability to utilize indirect/direct evaporative cooling (IDEC) the required chilled water load will be low.

draft

Putting in a new chiller system to handle the relatively low chiller load, would not likely be cost effective. Because of the low cost of natural gas, the additional cost to the project to add onsite boilers, would not payback in a significant time frame. Additionally, because WSU Facilities Maintenance is already familiar with existing chilled water and steam systems, there is no compelling evidence at this time to provide on-site equipment.

Each of the energy efficiency goals or objectives associated with the project (LEED, HPBS, and ENERGY STAR) are evaluated appropriately through the use of the Performance Rating Method of ASHRAE 90.1-2007, Appendix G. Because the WSU Science Building is intended to utilize chilled water (CHW) and steam, from the existing campus district energy plants, special consideration has been made toward the modeling protocol. Specifically, per the USGBC document Treatment of District or Campus Thermal Energy in LEED v2 and LEED 2009 - Design & Construction - August 2010 (LEED DES.)

A brief discussion of each of the LEED DES options, as well as and the implications to energy modeling & reported results, are offered below.

LEED DES Performance Path Options

The second major release of guidance for district/campus thermal energy in LEED (August 2010) is a set of guidance, where under the Performance Paths, the project team chooses either Option 1 or Option 2, to demonstrate compliance with EAp2, and to assess energy performance under EAc1. Toward EAp2/EAc1, the points available under the Performance Paths are restricted, as shown below, in Figure 3.

Under the LEED DES document, use of actual district energy system (DES) efficiency performance is preferred, based on current operation of existing DES's, or based on design documents for new DES's. If the efficiency performance of an existing DES cannot be obtained, for instance, due to lack of metering/sub-metering, it is acceptable to use default average performance values, specified in the LEED DES document (Section 2.4.1.2.3.), as follows.

- DES Heating - 70% Higher Heating Value (HHV.)
- DES Cooling - COP- 4.4 (includes primary pumping and heat rejection.)
- Distribution Thermal Loss - 5% for chilled water district cooling.
- Distribution Thermal Loss - 15% for closed loop steam systems.

During schematic and design development phases of the project, the energy analyst, will coordinate with WSU Facilities Management to determine if sufficient data or metering is available for determining the actual system energy efficiency performance, per the LEED DES document protocol. Otherwise, the default performance values listed above will be required to be used for the

draft

analysis. It is important to note, here, that the actual realized performance of the project, and the actual realized combined performance of the project and the DES's, will be different, and presumably better, than can be reported by the energy modeling results. The difference between the actual realized performance, and the energy modeling predicted performance of the project, cannot be quantified, and if it could, the use of default performance values would be mute.

	Points available	DES Option 1	DES Option 2
	in Rating System	points cap	points floor
LEED v2009			
LEED-NC	19	10	6

DES Option 1

DES Option 1 is a stand-alone building scenario (streamlined), where the energy model scope accounts primarily for downstream equipment. The energy sources are modeled as purchased energy in both the Proposed and Baseline buildings, in order to create a cost-neutral DES condition between the Baseline and Proposed buildings.

Energy rates for equipment used downstream of the DES's are applied according to local utilities, however, the energy supplied to the building by the DES's is not modeled using actual purchased energy rates paid to the DES's. Instead, virtual energy rates, as calculated from the downstream energy consumption and cost, are modified, per the LEED DES document, into DES virtual rates, which are then applied to the DES supplied energy, for each fuel type. These DES virtual rates also account for distribution energy and thermal transport losses.

Additionally, where required by the LEED DES document, the Baseline HVAC system type(s) from Tables G3.1.A&B are modified to be compatible with the purchased energy source(s) specified by the Proposed building. For the WSU Science Building, under Option 1, the Baseline HVAC system for zones that fall within the exceptions per section G3.1.1 of ASHRAE 90.1-2007 will be required to change from System #3 (packaged rooftop air conditioner) to 4-pipe constant volume air handler unit. This change to the Baseline system decreases the ability to demonstrate energy & energy cost savings associated with space cooling, which is a predominant opportunity for energy savings, given the local climate.

DES Option 2

DES Option 2 is an aggregate building scenario (full accounting) that considers both downstream equipment and DES (upstream) equipment. DES supplied energy is not modeled as cost-neutral for Option 2, where DES equivalent plants are defined for the Proposed building, code compliant/on-site equipment is

draft

defined for the Baseline, and utility structures are assigned using the same utility rates as normally applied to the project, and DES plants, by the applicable utility company.

Because Option 2 requires virtual equivalent modeling of existing DES plants, the discussion above, related to plant efficiency performance inputs where DES data is unavailable, is of particular importance, under Option 2.

DES Conclusions

As previously noted, the Proposed and Baseline buildings have been assessed under DES Option 2. While further discussion of the modeling results is given in later sections, it is important, here, to offer some results that are relevant to the discussion of both DES scenarios.

The Proposed and Baseline models should be created without the consideration of the LEED DES document (independent), so that the design team and owner can compare relative performance of the project "downstream" of the district energy plants, relative to results that would be anticipated from previous project experience, which do not include the influence of the LEED DES document.

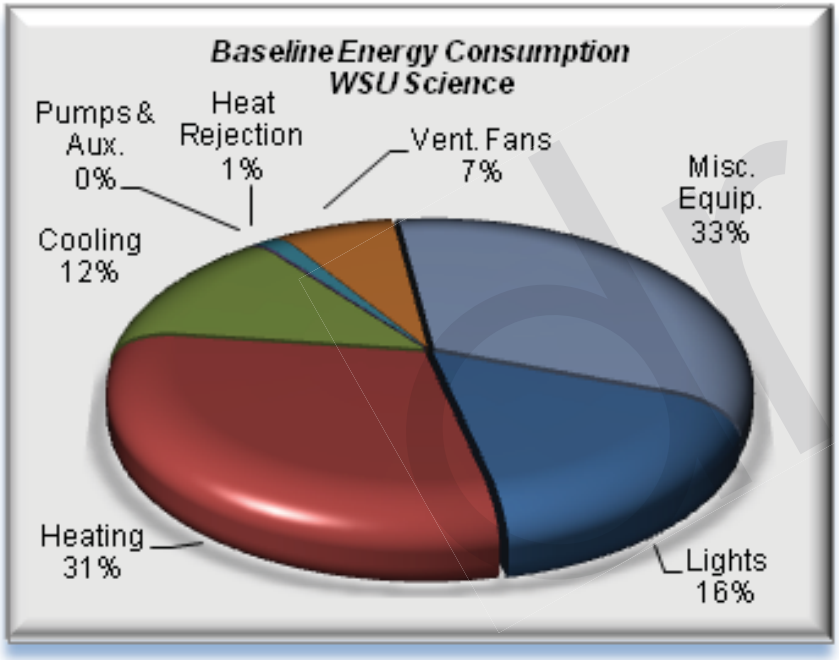
Under the full scope of the initial energy modeling activities, evaluating the energy performance of WSU Science under DES Option 2, using massing option A as noted previously, resulted in a 23.4% energy cost improvement, over the applicable Baseline building. This percentage equates to six EAc1 point, under LEED NC v3. As indicated in Figure 2, a minimum of six EAc1 points must be demonstrated under DES Option 2, in order to pursue the credit under this option. The primary factors contributing to the limited energy performance that can be reported under Option 2 are related to the default DES efficiencies that are required to be used without existing plant efficiency data, and the fact that Option 2 requires comparing a central plant (with accounting of transport energy and thermal losses), in the Proposed building, to on-site plants in the Baseline building.

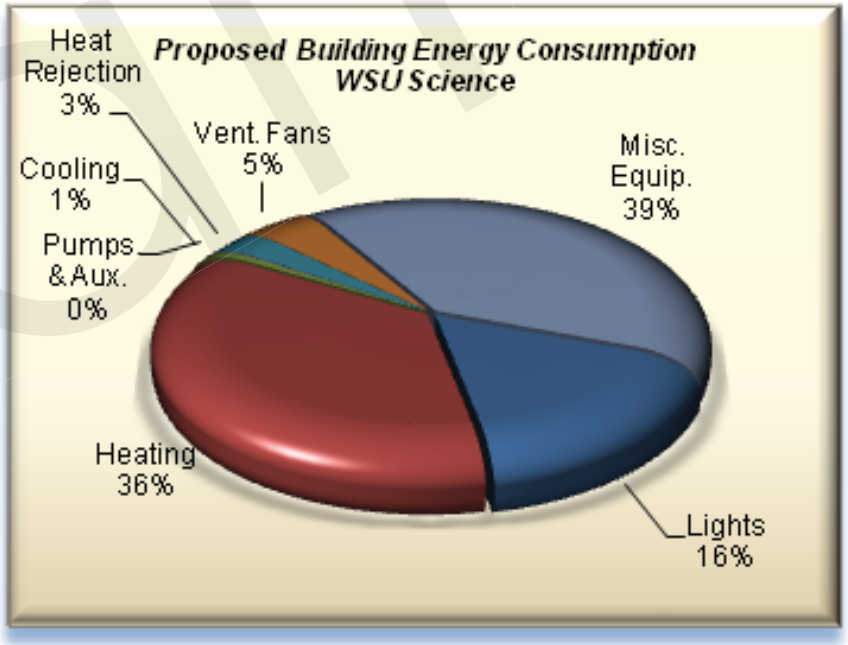
ANALYSIS OF PROPOSED ENERGY EFFICIENCY MEASURES

In order to evaluate the project's potential EAc1 points and, to establish a credible Baseline energy cost and Proposed energy cost, a preliminary energy analysis has been performed in accordance with LEED Reference Guide for Green Building Design and Construction – 2009 Edition: EAc1. Results of the analysis, preformed on massing option A are summarized below. It is also important to note that the preliminary energy analysis does not include any assessment of simple payback or life-cycle cost analysis. The design team may be required to demonstrate life-cycle cost effectiveness, in the event that the energy efficiency measures applied to the project interfere with the project budget and how it relates to the energy efficiency requirements, for the project.

draft

Much of the approach or consideration to design, for all disciplines, will be heavily tied to the results and implications of the energy analysis. As such, additional evaluation of EEM effectiveness is recommended through life cycle cost analysis (LCCA).





draft

Because the energy analysis was performed at such an early stage of the project, some of the assumptions and definitions used for the preliminary energy analysis may be obsolete or require revision, by the time the program document is released, and/or during the design process. Therefore, it should be noted that, in part, the analysis was used to demonstrate the relative feasibility of reaching the energy efficiency goals/requirements of the project, particularly LEED EAc1, and to develop a preliminary group of energy efficiency measures that may be appropriate for the project. The analysis is not intended to constrain the design team to prescriptive EEM criterion, as applied here, which may or may not be appropriate, as the project advances.

As stated in the body of the program document, the primary intent of the energy analysis was to establish a reliable Baseline energy cost for the project's Baseline Design and, to itemize the Baseline energy consumption by end-use category. This provided the basis for establishing a reasonable Proposed design energy cost and list of potentially suitable EEM's, for the Proposed design, to reach the State's energy efficiency standards.

A general description of modeling inputs and EEM's applied to the Proposed design model, to achieve a annual energy cost savings of 23%, are summarized below.

Envelope

	Baseline	Proposed
Walls:	R-15.6	R-20
Roof:	R-20.8	R-30
Window to wall ratio:	40%	40%
Fenestration Assembly U-factor	0.45	0.353
(Solarban 70xl w/		
Kawneer 1600U framing)		
Fenestration SHGC	0.40	0.29
(Solarban 70xl w/		
Kawneer 1600U framing)		
Fenestration Shading	N/A	Horizontal light shelves on the south and louvers or screen on west facade.

draft

Occupancy Schedules		
Lab Spaces	M-F 0800 – 1700 Sat Closed Sun/Holiday Closed	Same as Baseline
Office Areas	M-F 0800 – 1700 Sat Closed Sun/Holiday Closed	Same as Baseline
Classrooms	M-F 0800 – 1700 Sat Closed Sun/Holiday Closed	Same as Baseline
Process Equipment		
Lab Spaces	Per the Detailed Space Requirements prepared by VCBO and RFD. Received on April 30, 2013. Additional estimates based on Lab21.	Same as Baseline
Office Areas	0.75 watts/FT2	Same as Baseline
Classrooms	0.75 watts/FT2	Same as Baseline

Lighting		
Lab Spaces	1.4 watts/FT2	Overall Reduced Lighting Power density by 15% (includes reduced lighting power densities, occupancy sensors, and daylighting controls)
Office Areas	1.1 watts/FT2	
Classrooms	1.4 watts/FT2	
Ventilation Requirements		
Lab Spaces	Per the Detailed Space Requirements prepared by VCBO and RFD. Received on April 30, 2013	Same as Baseline
Office Areas	Per ASHRAE 62.1-2007 with 30% increased ventilation per LEED IEQc2	Same as Baseline
Classrooms	Per ASHRAE 62.1-2007 with 30% increased ventilation per LEED IEQc2	Same as Baseline

draft

HVAC Equipment		
Lab Spaces	ASHRAE 90.1-2007 Table G3.1.1B System #3. Packaged rooftop air conditioner. DX cooling and gas furnace heating.	Central IDEC VAV with hot water reheat. Utilizes central plant chilled water and steam. Energy recovery on lab exhaust to pre-treat the ventilation air. 50% effectiveness in both cooling and heating mode.
All other areas	ASHRAE 90.1-2007 Table G3.1.1B System #7. Packaged VAV with hot water reheat. Onsite chiller and boiler	Central IDEC VAV with hot water reheat, separate from the lab air handler. Utilizes central plant chilled water and steam.

Source equipment efficiencies	Chiller: 4.45 COP Boiler: 82% thermal efficiency	LEED DES Option 2 default efficiencies, including distribution losses. Chiller: 4.18 COP Boiler: 55% thermal efficiency
Pump power	Chilled water: 22 watt/GPM Condenser water: 19 watts/GPM Heating water: 19 watts/GPM	Same as Baseline

draft

Additional EEM's that were not applied to the preliminary analysis, but may be considered by the design team include, but are not limited to the following.

- Improved supply air fan efficiency
- Improved hydronic pump efficiency
- Demand control ventilation (DCV) - Particularly in the lab spaces
- On-Site Renewable Energy

Domestic hot water was not included in the programming energy model, due to feedback from the owner and the design team that the hot water load for this building is expected to be low. However, if during the design of the building, domestic hot water loads are significant, the design team should consider a solar hot water system.

Process equipment represents approximately 32% of the total building energy. The LEED modeling protocol limits taking credit for process equipment in the Proposed design to Energy Star certified equipment, and equipment that can be documented as exceeding current industry standards for energy efficiency. Energy Star only certifies a few categories of products, none of which are specific to laboratory equipment, therefore, the potential to reduce process load by using Energy Star equipment in lab spaces, is low. There is no known current industry standards for energy efficient laboratory equipment, and therefore no way of documenting exceeding a standard. Energy Star equipment should be specified in office and classroom spaces, whenever possible. If an itemized list of equipment is provided by the design team, for the office and classrooms space equipment, the plug load could be reduced in these areas by up to 30%, depending on the extent of the Energy Star certified products utilized.

Ventilation represents approximately 25% of the total HVAC energy consumption and is a large area of opportunity to demonstrate energy savings. As indicated above, demand control ventilation was not included in the programming models, because it is largely dependent on a varying occupancy schedule, and what is an allowable reduction in ventilation rates for the lab spaces. It is anticipated the occupancy schedule, and therefore ventilation load required in the building will vary on a daily, weekly, and monthly basis, throughout the year. Therefore, DCV could be an effective energy efficiency measure. Coordination with the building officials to develop an appropriate occupancy schedule will be required to appropriately model DCV.

Occupancy schedules that accurately reflect the usage of the building will be need to be defined during schematic design. As mentioned previously, this will have considerable impact on the assessment of DCV, as well as the performance of the building as a whole.

draft

Key performance indicators, such as energy use index (EUI) and energy cost index (ECI), have not been included in this report, because not all components of the building have been modeled, such as exterior lighting, and domestic hot water. Additionally, the occupancy schedules have not been explicitly defined, with input from the end user. Once these issues have been resolved, EUI/ECI can be established and used towards defining energy goals.

Because of the building use type, several energy efficiency measures that may be applied to other types of building projects are not necessarily appropriate or may not be given credit under the modeling protocol found in ASHRAE 90.1 Appendix G and, add to the challenge of meeting the various energy efficiency goals/requirements.

The following bullets offer additional miscellaneous comments regarding the preliminary energy analysis.

- Thirty percent increased ventilation rates have been applied to the analysis, consistent with LEED IEQc2.
- No exterior lighting has been included in the analysis.

draft

STRUCTURAL DESIGN

Codes and Standards

International Building Code 2012 and all referenced standards, including, but not limited to;

- ASCE 7-10,
- AISC 341-10 and 360-10,
- ACI 318-11
- ACI 530-11

General Design Criteria:

Dead Loads-	As required.
Floor Live loads	Per IBC 2012 unless greater loads are desired by the owner
Snow load	40 psf per WSU design guide
Wind load	115 mph, exposure C.
Seismic criteria-	As defined in the project soils report compliant with IBC 2012.
Floor vibration criteria	As required for sensitive lab/imaging equipment

Structural Design Considerations

The new science building at Weber State University will be a 3-story, 200,000 square foot building located in the heart of the Ogden campus. The building will house many different departments and must be adaptable for use by several different departments. The structure must be efficient while adhering to unique structural performance criteria that some departments will demand.

The structure supporting the science labs and imaging suite that will be located within this building must comply with strict vibration criteria. It is important to understand that floor vibrations will likely originate from occupants or machinery within the building but also that building drifts and lateral stiffness will be affected by external influences such as wind and seismic loads. Because of the latter, a stiff lateral force resisting system should be suggested to not limit the use of sensitive equipment and labs during wind storms, for example. Effectively addressing these issues while providing an economical and life safe structural system will be the most important responsibility of the structural engineer.

Because of the many different departments with unique needs that will be using this building, it may be beneficial to separate the building into 2-3

draft

separate structures. With the effective use of expansion joints, the structure can economically be separated into pieces to provide areas that meet strict vibration criteria for lab uses while more conventional and economical systems can be provided at less critical areas such as offices and classrooms. In terms of floor plan layout, if labs and suites can be located on lower levels and near columns, vibrations will be more easily addressed.

Laboratory Structure

In lab areas, where vibration and drifts are of particular concern, a concrete structural system may be the best structural system. Special Reinforced Concrete Shear walls used in conjunction with cast-in-place concrete floors and thoughtful placement of concrete columns could provide a very stiff structural system. This type of structural system would be fairly standard and could be successfully built by any one of many large local contractors. These areas could also be supported on concrete slabs on metal deck supported on composite steel beams. It is anticipated that the cast-in-place concrete structure would be more expensive than the steel option but will provide superior vibration control. The cost difference between the two systems becomes less dramatic once the vibration characteristics are considered. Cast-in-place concrete would be preferred to pre-cast because vibration characteristics are easier to control and floor-to-floor heights could be smaller.

Classroom and Office Structure

In classroom/office areas, where vibrations and drifts aren't as critical, structural systems considered typical in this area such as concrete slabs on metal deck supported by composite steel beams could be utilized. For this type of system, lateral force resisting systems could consist of steel braced frames, moment frames, or concrete or masonry shear walls.

Additional Structure

Other areas of the building that will require special consideration of the structural engineer will be the observatory and garden that are expected to occur on the roof. The observatory will have stringent vibration and drift requirements and the garden will require special loading considerations.

Footing and Foundation Considerations

Based on experience at adjacent sites on campus, it is anticipated that foundations will be a combination of conventional shallow footings and deep foundations. Deep foundations, if required, will likely be helical piers or micro-piles and will occur at building footings adjacent to the utility tunnel

MECHANICAL DESIGN

Applicable Codes And Standards

Conform to the latest edition of the following codes and standards, or the requirements defined in this program, whichever is more restrictive:

- 2012 IBC
- 2012 IMC
- 2012 IPC
- 2012 IFC
- 2012 IECC
- ANSI/AIHA Z9.5-2009– Laboratory Ventilation
- LEED-NC 2009
- Weber State University Design and Construction Standards, October 2009, with section revisions as available

GENERAL REQUIREMENTS

Temperature

Outdoor design temperatures:	winter	12.2 oF
(ASHRAE 99%, Hill AFB)	summer	93.3DB/61.2WB oF
	cooling tower	64WB oF

draft

Indoor Design Conditions

Room Type	Temperature				Noise
	Summer		Winter		RC Mark II RC(N)
	Occupied	Unoccupied	Occupied	Unoccupied	
Open Public Areas	75	85	72	65	35 – 40
Private Offices	75	85	72	65	30 – 35
Open Offices/Shared Space	75	85	72	65	35 – 40
Conference Rooms	75	85	72	65	25 – 30
Classrooms	75	85	72	65	25 - 30
Teaching Laboratories	75	85	72	65	35 - 40
Research Laboratories	75	75	72	72	35 - 40
Restrooms	75	85	72	65	n/a
Storage	80	85	60	55	n/a
Copy Rooms	75	85	72	65	n/a
Mechanical Rooms	80	80	55	55	n/a
Elevator Rooms	80	85	60	55	n/a

Hours of Operation

Day of Week	Occupied
M-F	0700 – 2200
Sat	0800 - 1600
Sun/Holiday	0800 - 1600

draft

Humidity

Humidification is not required in normally occupied spaces, but the spaces should be maintained at 45% maximum in the summer.

Local humidification is required – reference room data sheets. Use local compressed air driven fogging humidifier.

Measurement And Verification

Energy meters to provide local as well as remote readouts, using Modbus RTU protocol

Install continuous metering equipment for the following uses:

Condensate: BTU building metering instrumentation on steam condensate line with local pen recording and capabilities of providing 4-20MA Signal to Central Automation system for remote readout, providing the following information: condensate flow rate and temperature, instantaneous energy flow rate, totalized energy flow rate

Chilled Water: Ultrasonic digital flow meter, Fluxus ADM 7407, providing the following information: Chilled water flow rate, supply and return temperature, instantaneous energy flow rate, totalized energy flow rate

Domestic Hot Water Provide a plumbing temperature, pressure and flow meter in automation system

Additionally, coordinate with electrical engineer for electrical panel submetering for lighting and plug circuits.

Project Documentation

Provide a design narrative that includes the following:

- Basis of design, including all information required to prepare the design
- Sequence of operation of all systems, as well as their interaction with other systems
- System description, including operating parameters and assumptions
- A description of the methods used by the design team to achieve sustainability, including the integrated design process; and a description of the results, i.e. a description of the sustainable elements included in the design. Include in this section how the requirements of this program were met.
- Results of the energy simulation, with a design energy performance standard for the building.

draft

Internal Loads

Room Type	ASHRAE 62.1 – 2010 Classification	People (Pers/ft2)	OSA Rate (cfm/ft2)	OH Lights (Watts/ft2)	Equip (Watts/ft2)	Other
Open Public Areas (Circulation, Lobbies)	General: Corridors	0.000		0.5	0.00	
Private Offices	Office Building: Office Space	0.008		1.1	0.85	
Open Offices/Shared Space	Office Building: Office Space	0.005		1.1	0.75	
Conference Rooms	General: Conference/meeting	0.050		1.3	0.25	DCV
Classroom	Education: Classroom (age 9 plus)	0.050		1.4	0.25	DCV
Public Restroom	Table 6-4: Toilets-public	0.000		0.9	0.00	Exhaust at 75 cfm/fixture
Private Restroom	Table 6-4: Toilets-private	0.000		0.9	0.00	Exhaust at 50 cfm/fixture
Storage	General: Storage	0.000		0.8	0.10	
Copy Rooms	Table 6.4: Copy, printing rooms	0.000		1.5	5.00	Exhaust at 0.50 cfm/ft2
Mechanical Rooms/ Penthouse	Misc: Electrical equipment rooms	0.000		1.5	tbd	
Elevator Rooms	Misc: Elevator Machine Rooms	0.000		1.5	tbd	Ventilate for temp/odor control
Teaching Lab	University/College Laboratories	0.025	0.430	1.2	2	Exhaust @ 1/cfm2 (6 ACH @ 10' ceiling)
Labs: Open workbenches	Science Laboratories	0.025	0.430	1.2	1.5	
Labs: Microscopy	Science Laboratories	0.025	0.430	1.5	0.5	
Labs: Cold Room	Science Laboratories	0.025	0.430	1.5	40	
Labs: Tissue Culture	Science Laboratories	0.025	0.430	1.5	20	
Labs: Special Procedures	Science Laboratories	0.025	0.430	1.5	20	
Labs: Fume Hood	Science Laboratories	0.025	0.430	1.5	10	
Glasswash/Sterilization	Science Laboratories	0.025	0.430	1.5	150	

draft

Notes:

- Demand Controlled Ventilation (DCV) in zones with significant variation in occupant loading, or ventilation rates >0.30 cfm/ft2
- Ventilation rate per ASHRAE 62.1-2007, with additional 30% to comply with LEED EQ Credit 2 Ventilation Credit
- Lighting Power Density per ASHRAE 90.1-2007
- Equipment Density per standard design practice

People: 250 Btuh, sensible
200 Btuh, latent

Equipment: 1 laptop PC @ 50 W each per person in lecture halls and classrooms
1 desktop PC @ 125 W per seat in office
1 copier @ 300 W per 10 people in office groups

Laboratory Specific Requirements

Open Work Bench	
Temperature Range, Occupied	
Unoccupied	
Relative Humidity	
Hours of Operation	
Commissioning Requirement	
Alarm Requirements	
Containment	
Differential Pressure	
Sash Velocity	
Room Exhaust Rates	

draft

Energy Efficiency

As a DFCM project, LEED Silver must be achieved.

The following are goals, but are not required

- Provide as much on-site renewable energy as is cost-effective, based on life cycle cost analyses under the FEMP rules based on 10 CFR 436.
- Reduce CO2 emissions related to building energy consumption by 50%, compared to current Campus standard

Potential strategies to achieve this goal are:

	Baseline	Proposed
Walls	R-15.6	R-20
Roof	R-20.8	R-30
Window to wall ratio	40%	40%
Fenestration Assembly U-factor	0.450	0.434
Fenestration SHGC	0.400	0.268

Electrical Systems & Process Loads

- Overall Reduced Lighting Power annual energy consumption of 25% (includes reduced lighting power densities, occupancy sensors, and daylighting controls)
- Lighting occupant sensor controls
- Daylighting controls in public areas
- Regenerative elevator drives
- Energy Star rated office equipment for all computers, monitors, copiers, printers, and laptops. (30% reduction assumed for office spaces)

	Baseline	Proposed
Average Lighting	1.36 w/ft2	1.01 w/ft2
Regenerative Elevator	74 kW	52 kW
Average Plug load	0.59 w/ft2	0.50 w/ft2

draft

HVAC & Plumbing Systems

- Indirect/Direct Evaporative Cooling
- Chilled beams HVAC system in areas with high sensible load
- Improved Supply Air Fan Efficiency
- Improved Hydronic Pump Efficiency

	Baseline	Proposed
Average Supply Air Fan Efficiency	1.05 w/cfm	0.746 w/cfm
Average Hydronic Pump Efficiency	74 kW	52 kW
(Chilled Water)	n/a	10.9 w/gpm
Average Hydronic Pump Efficiency (Heating Water)	19 w/gpm	19 w/gpm

Additional strategies to consider

Envelope

- Improve air barrier and leakage control

Electrical Systems & Process Loads

- Reduce lighting power densities, both general and task/accent
- Increased occupant sensor controls for lighting
- Increased day lighting controls

HVAC & Plumbing Systems

- Solar thermal (water)
- Increased demand controlled ventilation
- Low Flow Plumbing Fixtures

Occupant Measures

(Note that occupant measures cannot generally help to achieve LEED EA c1 points, but can affect EUI):

- Attend integrated design workshops
- Sub-metering/competitions
- Thermostat control (wider temperature range)
- Plug load control (Energy Star, shut down)

draft

This analysis also assumes that both designs will utilize the existing central plants to provide chilled water and steam to the building. The LEED modeling protocol for central plants detailed in the document, "Treatment of District or Campus Thermal Energy in LEED V2 and LEED 2009 - Design & Construction" dated August 13, 2010 should be used. The central plant equipment is to be assumed to be ASHRAE 90.1-2007 minimum efficiencies, selected per ASHRAE 90.1-2007 appendix G, and assumed to serve this project only.

Ventilation/Indoor Air Quality

Comply with ASHRAE Standard 62.1-2007, Ventilation for Acceptable Indoor Air Quality, as well as LEED IEQ Credit 2 (30% increased ventilation) for minimum ventilation requirements. Reset the outdoor air intake flow and/or space or zone airflow as operating conditions change, in accordance with Section 6.2.7 of the Standard, for the zones noted as DCV in the space summaries.

Design a ventilation system that results in an air change effectiveness greater than or equal to 0.9 as determined by ASHRAE 129-1997. Follow recommended design approaches in ASHRAE 2012 Fundamentals, Chapter 32.

Develop and implement an IAQ Construction Management Plan that includes the use of high efficiency filters (Minimum Efficiency Reporting Value (MERV) = 8, as determined by ASHRAE 52.2-1999), at each return air grille for systems used during construction.

Provide MERV 5 pre-filters and MERV 13 final filters at central air handlers upon completion of project.

In addition to toilet exhaust, provide separate exhaust system for janitor closets and dedicated copy rooms at the rate of 0.5 cfm/ft2, and demonstrate that the rooms are maintained at a negative pressure of 0.03" wg relative to adjoining spaces.

Commissioning

Reference DFCM Design Requirements for commissioning.

Coordinate with commissioning agent retained for the project, and comply with requirements for building commissioning detailed in DFCM Solicitation for Commissioning Services

Draft

Lind Lecture Hall

Chilled Water

Provide new direct-buried, pre-insulated pipe from existing vault at the west side of the existing science building to the existing mechanical room in Lind Lecture Hall ,and re-connect.

Heating Water

Provide 2 new exterior condensing boilers, mounted on grade, 1,000 mbh each, with glycol system and heat exchanger, and connect at current hot water connection in Lind Lecture Hall

Domestic Water

No change

Fire Protection

No change

SYSTEMS

General Description

Use central station air handlers with cooling and heating coils as required to meet minimum ventilation standards. Use backward-inclined centrifugal fans with variable speed control. Locate air handling equipment indoors in basement or penthouse mechanical room with adequate service clearance.

Provide variable volume supply to offices, classrooms and laboratories

Provide single duct air distribution to VAV boxes in all zones. Use variable speed return/relief fans.

At a minimum, use constant volume primary, variable volume secondary pumping for the heating water system, variable volume primary only pumping for chilled water, and constant volume primary only pumping for condenser water. Use redundant pumps for all systems.

Provide HOA switches on all pumps and fans

Classroom/Teaching Lab Air Handlers

- 2” double wall construction
- 4.0” TSP
- MERV 7 filter bank, face velocity = 375 fpm
- Multiple backward inclined, 12 blade direct drive plenum fans
- Heating coil: 5/8” diameter 0.035” thick tubes, 2 rows, 6 fpi, 450 fpm face velocity
- Chilled water coil: 5/8” diameter 0.035” thick tubes, 4 rows, 10 fpi, 450 fpm face velocity
- Provide pressure relief door in supply main

draft

Research Laboratory Air Handler

- 100% outside air
- Emergency power
- 2” double wall construction
- 5.0” TSP
- MERV 7 filter bank, face velocity = 375 fpm
- Multiple backward inclined, 12 blade direct drive plenum fans
- Heating coil: 5/8” diameter 0.035” thick tubes, 2 rows, 6 fpi, 450 fpm face velocity
- Chilled water coil: 5/8” diameter 0.035” thick tubes, 4 rows, 10 fpi, 450 fpm face velocity
- Energy Recovery (Runaround) Coil: 40% propylene glycol, 5/8” diameter 0.035” thick tubes, 6 rows, 10 fpi, 450 fpm face velocity
- Provide pressure relief door in supply main

Laboratory Exhaust Systems

- Provide a continuous exhaust to the laboratory fume hood system under fire alarm and loss of primary building power.
- Do not return air from laboratories. Re-circulated air from other areas of the building may be used

Laboratory Ventilation	Occupied	Unoccupied	Emergency
Research Laboratory	6 ACH	4 ACH	3 ACH
Teaching Laboratory	6 ACH	0 ACH	3 ACH
Sash Face Velocity	100 fpm	60 fpm	As req’d

- Use variable volume exhaust and supply to reduce airflow when possible while maintaining required pressure differential.
- Manifold duct horizontally as possible/practical on a floor. It is also permissible to manifold between floors
- Use Type 316 welded stainless steel throughout, horizontal and vertical.
- Size duct for 2,000 fpm maximum.
- Provide redundant exhaust fans for each exhaust riser, located in rooftop

draft

penthouse.

- Discharge exhaust at least 10 feet above roof surface, at a minimum velocity of 3,000 fpm.
- Design supply air diffusers to maintain design airflow at hood face, and avoid airflow disturbances
- No perchloric acid or hoods are planned.

Heating

- Provide two new steam-to-water convertors, each sized to heat 350 gpm from 150 to 180, with 30 psig steam.
- Locate building service isolation valves and heat exchanger in interior room.
- Generate building heating hot water through a plate and frame, semi-instantaneous heat exchanger.
- Design heating water transport energy consumption (in the building, exclusive of central plant transport) as follows:

	Maximum Water Transport Energy	
	(bhp/mmbh)	(W/gpm)
Full Load	2.50	19.0
50% Load	1.15	10.7

- Use steam pressure-powered condensate return pumps
- Make provision for future change-over to local boiler an disconnection from central plant, by designating space for future boiler (potentially in the space occupied by the heat exchangers), and providing natural gas piping sized for future boilers.

Cooling

- Chilled water will be provided from the campus chilled water system at 45oF.
- Design the building side chilled water for 18oF temperature rise at design wet-bulb hour, using variable volume primary-only pumping and two-way valves.
- Design the chilled water transport energy consumption (in the building, exclusive of central plant transport) as follows:

Load	Maximum Water Transport Energy	
	(bhp/ton)	(W/gpm)
Full Load	0.05	10.9
50% Load	0.04	8.7

Evaporative Cooling

- Use two-stage indirect-direct evaporative cooling, with cooling tower on roof
- Provide cooling tower with stainless steel wetted surfaces.

draft

Air Distribution

- Document fan sizing calculations with zone by zone load calculations
- Document critical path supply duct pressure loss, and show process used to review fittings and duct sizing in order to minimize fan pressure requirements.
- Use automatic dampers on exhaust fans in lieu of barometric dampers.
- Document that transport energy consumption meets the following criteria:

Load	Maximum Air Transport Energy (bhp/1,000 cfm)
Full Load	0.75
50% Load	0.30

- Require pressure testing of all duct systems in accordance with 2012 IMC
- Provide each space with individual room temperature control. Provide zoning plan during schematic design review that indicates proposed zoning plan for review and approval by Campus Planning staff.

Controls

- Provide Direct Digital Control (DDC) system. Reference Weber State Design Standards, for general DDC requirements
- Integrate the mechanical and electrical systems. Provide microprocessor to microprocessor communication between the DDC and variable frequency drives, air handler(s), electrical distribution, lighting, emergency generators, UPS system and building power. Additional points shall be made available for non-mechanical/electrical monitoring that may be required by the engineering department.
- Provide written sequence of operation on drawings for all systems controlled by the DDC system. Provide graphical representation of sequence of operations on the Building Automation System graphics.
- Label the areas served by air handlers and other fan systems on the BAS graphics.
- Provide temperature sensors at airside inlet and outlet of all terminal units.
- All controls should be able to monitor, control, and adjust all set points and control points.
- All DDC controls and PLC's should interface with the current Automation system.
- The campus data network system is used to communicate with the supervisory controllers. The supervisory controllers communicate with the individual DDC and PLC.
- Critical PLC's should be stand alone operational if they are disconnected from the Head-end.
- DDC and PLC should be N2 compatible.

draft

PLUMBING

Domestic Water Supply

Install water meter, pressure regulator, and two full sized reduced pressure principle backflow preventers, piped in parallel, at building service entry.

Provide water softener for all chilled water and heating water makeup, as well as for domestic hot water.

Use type L hard drawn copper with wrought copper fittings and lead free solder pipe for all distribution. PEX piping is not permitted.

Provide isolation valves external to each laboratory for each utility provided to that laboratory

Domestic Hot Water

- Generate hot water using electric water heaters.
- Generate water at 140 deg F and distribute at same temperature
- Use only softened water.
- Generate tempered water for shower and eyewash stations locally, with electric point-of-use water heaters

Laboratory Water (Industrial Water)

- Provide a separate hot water system, with backflow prevention at point of cross-connection, and circulate at 140 deg F.
- Provide a separate cold water system, with backflow prevention at point of cross-connection.

Natural Gas

Distribute gas at 4 oz throughout in screwed black pipe.

Treated/Purified Water

Generate laboratory Type I ultrapure water (18 Megohm-cm) using a reverse osmosis process. Circulate water to benchtops using unpigmented virgin polypropylene, in conformance with ASTM D2146, without additives.

Water shall have the following attributes:

bacterial count	
TOC (total organic carbon)	
pyrogen	
endotoxin	
R-Nase	
D-Nase	

draft

Compressed Air

Provide a compressed air system to deliver air at point of use at 100 psig, using a single stage, oil-free, positive displacement, non-pulsating liquid ring compressor

Store compressed air in ASME certified tanks with automatic electronic drains, piped to floor drains.

Distribute compressed air in Type L hard drawn copper with wrought copper solder fittings and lead free solder.

Provide each laboratory with an accessible filter/drier.

Vacuum

Provide a laboratory vacuum system to deliver vacuum at 18" Hg, using a single stage, oil-free positive displacement, non-pulsating liquid ring vacuum pump.

Use Type L hard drawn copper with wrought copper solder fittings and lead free solder

Sanitary Sewer/Waste/Roof Drains

Use cast-iron pipe and no-hub fittings

Minimum size for roof drain piping is 3", buried piping is 4"

Provide floor drains with deep seal traps at all safety showers and eyewash stations.

LABORATORY WASTE

Use acid resistant tailpiece and piping at all horizontal waste piping from laboratory sinks.

Allowable materials include tempered and annealed borosilicate glass, schedule 40 flame retardant polypropylene, or CPVC

Plumbing Fixtures

Use wall-hung water closets, urinals and lavatories. Use manual flush valves on water closets and lavatories, battery powered sensor valves on urinals

Use swing down eye wash stations, not deck mount

Provide floor drain at eye wash stations and emergency showers

Use deep seal traps, not trap primers.

Fire Protection

Provide fire sprinkler protection throughout building. System to comply with

draft

NFPA, Weber State fire marshal, and IBC requirements and State of Utah Fire Marshal requirements.

A fire pump is not anticipated, because the flow and pressure requirements can likely be met from the campus system. Conduct a fire flow analysis per DFCM criteria during the design phase to confirm this assumption.

Provide individual floor control assembly, including zone check assembly, at each floor.

Sprinkler Occupancy Hazard Classifications are as follows:

Office and Public Areas:	Light Hazard.
Service Areas:	Ordinary Hazard, Group 1.
Mechanical Equipment Rooms:	Ordinary Hazard, Group 1.
Building Service Areas:	Ordinary Hazard, Group 1.
Electrical Equipment Rooms:	Ordinary Hazard, Group 1.
General Storage Areas:	Ordinary Hazard, Group 1.
Laboratories:	Ordinary Hazard, Group 1.

Minimum Density for Automatic-Sprinkler Piping Design: As follows: (Reduce Design areas with quick response heads when applicable and increase design area as required for pitched ceilings.

Light-Hazard Occupancy:	0.10 gpm over 1500 ft2. area.
Ordinary-Hazard, Group 1 Occupancy:	0.15 gpm over 1500 ft2. area.
Maximum Protection Area per Sprinkler: As follows (except as modified by authorities having jurisdiction)	
Office Space:	225/400 ft2.
Storage Areas:	130/400 ft2.
Mechanical Equipment Rooms:	130 ft2.
Electrical Equipment Rooms:	130 ft2.
Other Areas:	According to NFPA 13 recommendations, unless otherwise indicated.

Components and Installation: Capable of producing piping systems with 175-psig minimum working-pressure rating, unless otherwise indicated. All piping and components are Schedule 40 minimum, and of domestic manufacture.

Class I, standpipe system design shall be designed assuming 150 psi available at fire department connection. Pressure and required flow shall be provided by fire pumper truck.

draft

draft

ELECTRICAL DESIGN

The work and material for the proper completion of the electrical project covered by the specifications and drawings under this contract will consist of, but not necessarily be limited to the following items:

- Codes and Standards
- A spare switch in existing 12470 volt pad mounted medium voltage switch located to the west of Elizabeth Hall will be utilized to provide power to new 12470 volt pad mounted transformer for new science building. Existing tunnel will be utilized.
- Two new pad mounted 12470 volt medium voltage switches will be installed by existing science lad to reroute the medium voltage power around existing science lab. This will allow the demolition of existing science lab.
- One of the new medium voltage switch by the science lab will be utilized to provide power to a new pad mounted transformer for existing LIND Lecture Hall.
- Low voltage distribution system, which will consist of 277/480 volts and 120/208 volts distribution system, distribution panel, branch disconnect, panelboard and Circuit breakers and feeders.
- Surge protection device will be provided for 277/480 volt and 120/208 volt main distribution switchboard.
- Emergency power distribution system, a new diesel engine generator will be provided for life safety equipment, outlets for network equipment, A/C unit for MDF/IDF rooms and selected duplex outlets for research equipment.

Lighting System

The building lighting systems will include the following fixture types:

- Pendant mounted direct and indirect
- Recessed mounted
- Surface mounted

The lamps will typically be one of the following:

- LED

The ballasts will either be electronic or hybrid. The lighting control system will include light switches, motion sensors, timers and photocell daylight controls as applicable.

Communication system

The communications system will include conduit for Cat 6 distribution system, conduit and cable trays for copper distribution system, outlet boxes (j-box and

draft

conduit only) and an integrated media system (j-box and conduit only).

Fire alarm system

The fire alarm system will include Initiation devices and indication devices. The initiation devices will be photo electric smoke detectors, heat detectors, pull stations and duct detectors.

The indication devices include horns/strobes.

Security system

The building will have a card access system and the raceway will be provided as part of the electrical contract. Raceway and boxes will be provided for an intrusion detection system. The final system components will be provided by the owner.

Code And Standards

- ADA - Americans with Disabilities ACT
- Weber State University special requirements and Design Criteria
- EIA/TIA - Electronics Industries Association/Telecommunications Industry Association
- IBC 2009 - International Building Code
- IESNA - Iluminating Engineering Society of North America
- NFPA 70 2008 - National Fire Protection Association, National Electrical Code
- NFPA 72 - National Fire Alarm Code (International Fire Code).
- IFC 2006 - International Fire Code

Power System

The secondary power distribution system will include:

- New three-phase, four-wire main distribution switchboard, 277/480 volts systems will be installed to distribute power to branch lighting panel boards, outlets, mechanical equipment, step down transformer, etc.
- A dry type step down transformer with primary voltage of 480 volt and secondary voltage of 120/208, 3 phase will be provided to provide power to a 120/208 volt main distribution switchboard.
- New 3 phase, four wire 120/208 volt main distrubution switchboard will be installed to provide power to branch panelboards, small mechanical equipment, lad equipment, etc.
- Branch panelboards with automatic thermal magnetic circuit breakers with 20% extra spare capacity will be installed.
- Branch panelboards will be installed in large labs.
- 20 amps duplex receptacles will be installed in the entire facility to comply

draft

with the building program.

- Ground fault protected outlets will be installed in all wet locations as required by National and International electrical codes.
- Special outlets will be installed for Owner's equipment with specific power requirements.
- Transient voltage surge suppressors will be installed for main distribution switchboard.

All three phase motor controllers will be equipped with circuit breaker type protection and phase loss protection.

Emergency Diesel Engine Generator

- An emergency diesel engine generator will be installed to provide power to life safety equipment, security system, network equipment in MDF and IDF rooms, A/C units for MDF and IDF rooms, selected research lab equipment, mechanical equipment, and specific refrigerators and freezer farms.
- Life safety equipment will be on its own automatic Transfer switch.
- Additional automatic transfer switches will be installed for proper emergency load regulation.

Grounding System

- Copper grounding bus bars will be installed in the following locations:
- MDF and IDF Communication room.

Photovoltaic System

- Provision must be made to add in future photovoltaic panels on the entire roof. Conduit and boxes will be installed for this system to prevent future penetration through the roof.

Lighting System

Luminiars

- LED light fixtures will be installed in the entire building.
- The exact type of the fixtures will be coordinated with the WSU and Architect for all areas of the building. Appropriate type fixtures and controls suitable for the area will be selected.
- The light fixtures will consist of, but not limited to, 2'X2', 2'X4', down light fixtures, pendent mounted LED, and indirect suspended LED fixtures.

Lamps

- LED.

draft

Ballasts

- LED light fixtures will be used for exterior and parking . Walk way light fixture will be campus lot standards, outdoor fluorescent light fixtures.
- Lighting control system
- Ceiling mounted occupancy sensor light switches will be installed in all labs, and classroom with override switches, in the restrooms to turn off the lights when they are not occupied to save energy.
- Wall mounted occupancy sensor light switches will be installed in the utility areas.
- Exterior light fixtures will be tied to building automatic system for automatic control.
- Photo sensor will be installed to maximize on daylight harvesting in all public areas.
- Photo sensors will be provided in all light fixtures near the windows to maximize on daylight harvesting.
- GTD Transfer switches are to be used for emergency lights.

TELECOMMUNICATION SYSTEM

- Under this project the raceway system and cable tray, will be provided for Telecommunication system.
- Raceway for backbone network system
- Four (4) 4" conduit with interduct will be provided to tie this building to campus network system. Three (3) 1" interduct conduit will be installed in one of the 4" conduit for fiber cables
- Two (2) 4" conduit with interduct will be provided between existing utility tunnel west of the science lab and LIND Lecture Hall. Three (3) 1" interduct conduit will be installed in one of the 4" conduit for fiber cables.
- Raceway for horizontal network system
- Cable trays will be installed in the ceiling of corridors to manage cables.
- Two (2) 1" conduit will be extended from each voice/data outlets to the cable tray.
- Conduit and boxes will be provided for wireless antenna throughout the building including mechanical rooms.

FIRE ALARM SYSTEM

Fire alarm control panels

- A new addressable fire alarm system will be installed in the facility. .
- Detection system
- Detection will be accomplished by installation of photoelectric smoke detectors, beam smoke detectors and duct detectors.
- Beam detectors will be installed in areas with ceiling height of 22 feet and higher.

draft

- Voice communication system will be installed in areas of refuge.
- Conduit and J-boxes for fire alarm system will be red.

Annunciation system

- Annunciation will be made throughout the building by the horn/strobe installed in the entire building.

Security System

Access control system

- Raceway for card access system will be provided per WSU instruction.
- Dual technology proximately smart card reader will be used.
- Magnetic door opener will be provided for labs and classrooms.

Intrusion detection system

- Raceway for all exterior parameter doors will be provided for future door positioning.
- Multiple security level will be provided for inside of the building.
- Increase security protection will be provided in animal research labs and sensitive chemical storage spaces.
- Security protection will be provided for all labs, classrooms, auditorium, etc..

IP tv system

- Raceway and boxes will be installed for cameras.
- Power will be provided to monitors, computers dedicated for security system, and other equipment.
- Security cameras will be provided to all building exits, corridors, and sensitive spaces.
- Security cameras to monitor building exits.
- Security cameras to monitor corridors in sensitive areas.
- In some specific areas schedule is required for access system during the time of day

A/V System

Labs

- Ceiling Mount document projector will be provided.
- Ceiling Mount speakers will be provided.
- Movable multimedia cabinet will be provided for specific area.
- Capability of capturing video during presentations in classes and rebroadcast them to be considered.

draft

Classrooms/Auditoriums

- Ceiling mount projectors will be provided.
- Ceiling mount speakers are required, dont want wall mount speakers
- Minimum two or three projectors are required based on the room size.
- Capturing video during presentations or classes and rebroadcast them later for students for better follow-ups.
- Smart boards will be considered.

draft

BUILDING COMMISSIONING

The state of Utah will hire a Commissioning Agent (CxA) as a part of the project team. The CxA will be engaged in the project from design development through construction and final training and be available to the owner through the one year warranty period, after substantial completion. The initial role of the CxA is to verify that the project design meets the Owners Project Requirements (OPR), as outlined in this document and subsequent owner documents, as well as the building systems Basis of Design (BOD). This will be completed through reviews of the construction documents at the design development and construction document phases of the project design. The CxA does not have the power to make or approve changes to the design, but they will suggest modifications and clarifications to be made to the project design, which will be coordinated and implemented by the project team.

The Commissioning Agent will also observe and track the installation of building systems to provide the owner verification that the building systems are installed and functioning efficiently and properly prior to building occupancy. According to the State of Utah Preamble for Commissioning, "The CxA is not to replace the design architect and engineers in verifying that the work is constructed per the plans and specifications. They are to supplement the efforts of the design team. Close communication and coordination between the design team, the CxA and DFCM is required. It is the intent for the design team to continue to do both interim and final inspections noting items that do not comply with code or with the contract documents."

Commissioned Systems

- Per the State of Utah Requirements, the following systems will be commissioned.
- Electrical Systems
- Mechanical and Plumbing Systems
- Operable Building Control Systems
- Audio and Visual Systems
- Telephone and Data Systems
- Building Security Systems
- Elevators and Conveyance Systems
- Scheduled or Occupancy Sensor Lighting Controls
- Daylight Dimming Controls
- Refrigeration Systems
- Emergency Power Generators and Automatic Transfer Switching
- Uninterruptible Power Supply Systems
- Life Safety Systems (fire alarm, egress pressurization, fire protection, smoke evacuation)

Draft

- Domestic and Process Water Pumping and Mixing Systems
- Equipment Sound Control Systems and Testing
- Paging Systems
- Renewable Energy Generating Systems
- Building Envelope Systems

In addition to the above systems, the court security systems, emergency systems and hardware systems will all be commissioned to guarantee the systems perform as designed.

draft

SPACE REQUIREMENTS

DEPARTMENT SUMMARY

Department		Teaching	Research	Support	Non-Lab	Total
1	Botany	3,150	1,199	3,884	990	9,223
2	Chemistry	11,340	2,204	2,674	1,590	17,808
3	Geosciences	3,150	1,460	1,206	870	6,686
4	Microbiology	4,410	1,575	1,942	1,070	8,997
5	Physics	4,415	2,360	1,680	1,470	9,925
6	Zoology	6,300	2,520	3,711	1,590	14,121
7	Math				10,630	10,630
8	Developmental Math				2,030	2,030
9	CSME				690	690
10	Advising				630	630
11	Shared				21,394	21,394
12	Dean's Suite				1,380	1,380
	Total NSF	**32,765**	**11,318**	**15,097**	**44,334**	**103,514**
						0.60
	Estimated Building Area GSF					**172,523**

draft

draft

SHARED SPACES

Space			NSF	No.	Total NSF	Remarks/Comments
Student Support						
SH	01	Lecture/Classroom	1,000	3	3,000	Geoscience, Lifesciences, Physics
SH	02	Computational Lab	1,000	1	1,000	
SH	03	Computer Lab - Support	600	1	600	
SH	04	Student Study/Collaborative Spaces	100	6	600	
SH	05	Student Rooms	300	7	2,100	
Faculty Support						
SH	06	Secretary/Reception	230	3	690	
SH	07	Workroom (Mail Slots)	150	3	450	
SH	08	Adjunct Faculty (1 Staff)	50	10	500	
SH	09	Staff Break Room	300	1	300	
SH	10	Large Shared Conference Room	500	1	500	
SH	11	Small Shared Conference Room	250	2	500	
SH	12	Future Faculty	120	10	1,200	
Laboratory Support						
SH	13	Future Faculty Research Space	200	10	2,000	
SH	14	SEM Room	157	1	157	
SH	15	Microscopy	315	1	315	
SH	16	Cold Room	210	1	210	
SH	17	Archival Storage	787	1	787	Near field storage (157 sf chemistry, 630 sf geo)

draft

page left intentionally blank

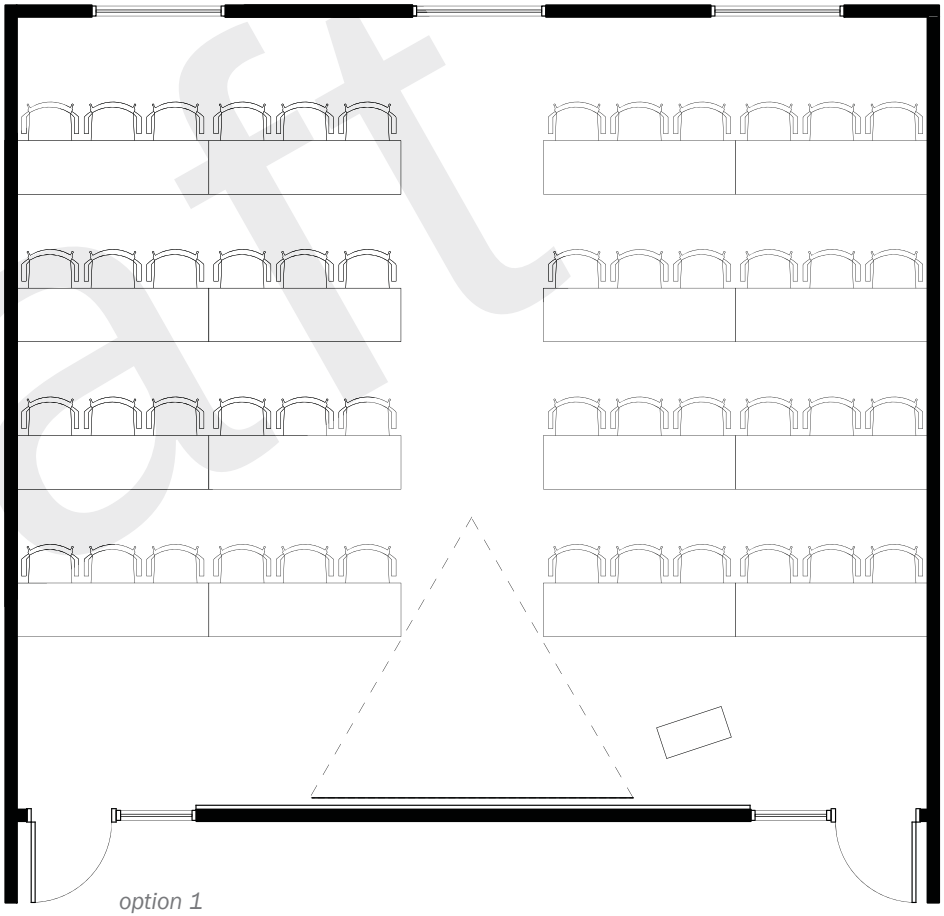
draft

Space			NSF	No.	Total NSF	Remarks/Comments
Building Support						
SH	18	Lobby/Reception Space	2,000	1	2,000	
SH	19	Vending	150	1	150	
SH	20	Personal Health / Mother's Room	80	1	80	
		COS Stores Suite				
SH	21	Bulk Solvent Storage	105	1	105	
SH	22	Cylinder Storage	105	1	105	
SH	23	Glassware and Consumable Storage	945	1	945	
SH	24	Chemical Storage	945	1	945	
SH	25	Water Purification System Room	105	1	105	
SH	26	Custodial Office	120	1	120	
SH	27	Custodial Closets	60	4	240	
SH	28	Maintenance / Storage	200	1	200	
SH	29	Mechanical Equipment	1,200	1	1,200	
SH	30	Electrical Equipment	500	1	500	
		Subtotal				
		Total Shared Space			**21,394**	

draft

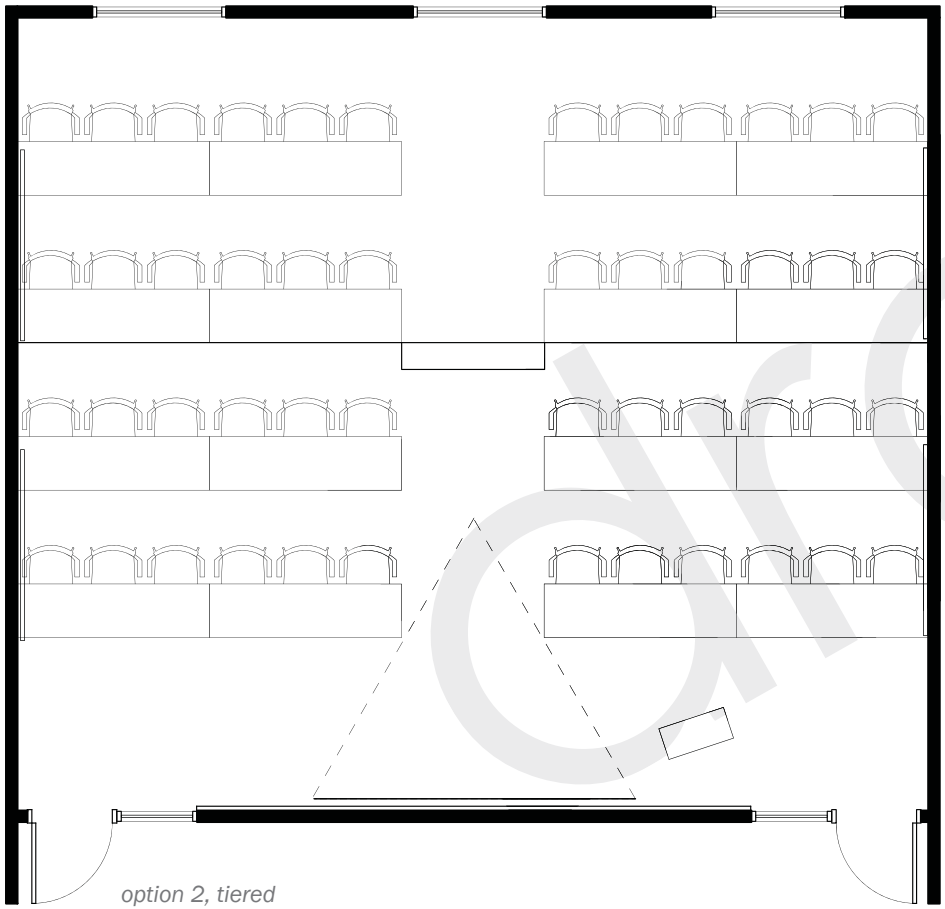
1.01 LECTURE / CLASSROOM

Area	1,000 SF
Quantity	3
Function	Shared flexible classroom
Occupants	50 students 1-2 faculty
Adjacency	Central circulation area, near faculty offices and student study areas
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood with center lite and sidelite
Windows	Exterior window with roller shades
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for presentation and teaching equipment Additional outlets at walls for future furniture tie-in
Lighting	Overhead lighting at 40-45 footcandles with presentation mode, photocell sensors and vacancy sensor
Equipment | Furniture	• Movable tables and chairs for 50 students • Flexible lecturn - tbd • 2 projection screens with overhead projectors • White boards



option 1

draft

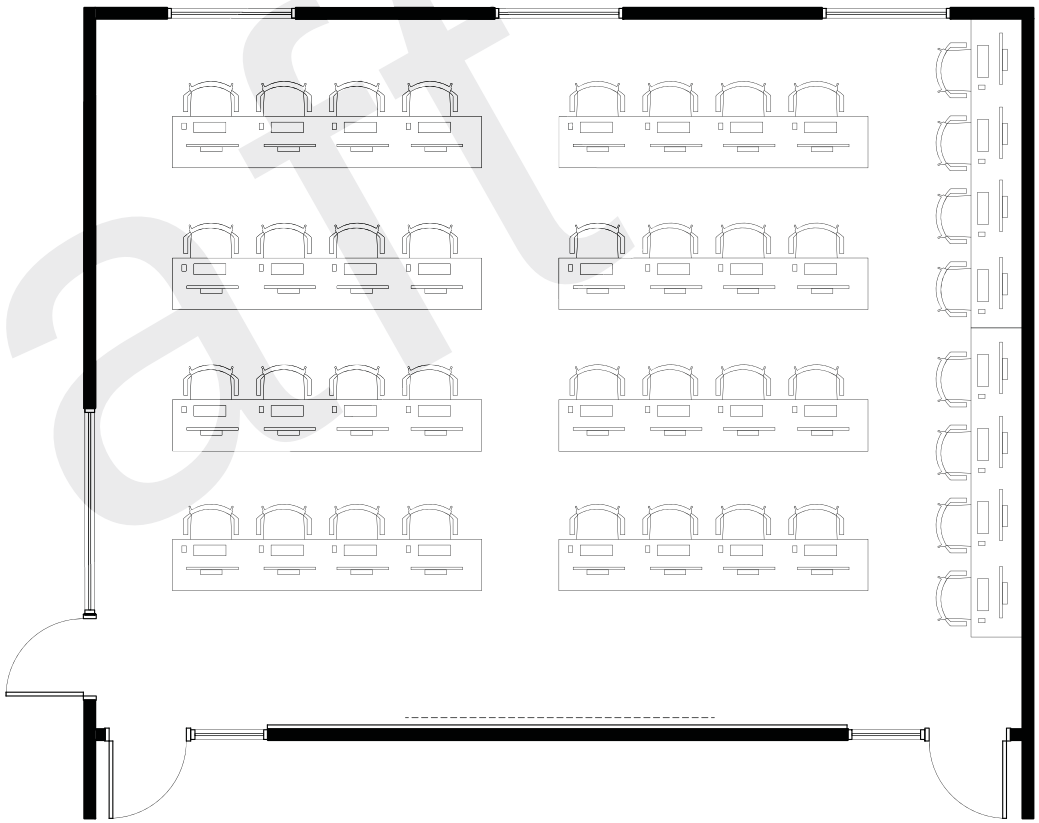


option 2, tiered

draft

1.02 COMPUTATIONAL LAB

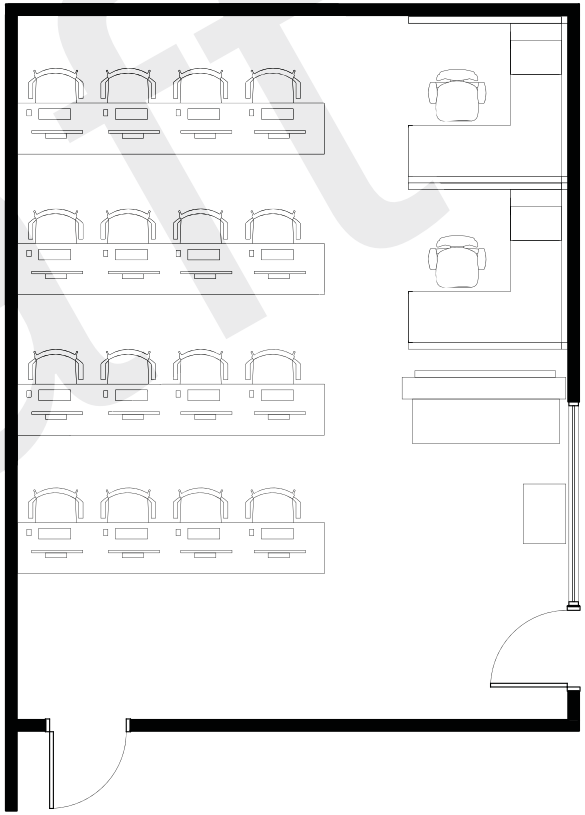
Area	1,000 SF
Quantity	1
Function	Computer classroom for GIS and shared computation courses
Occupants	40 students 1-2 faculty
Adjacency	Central circulation area, near faculty offices and student study areas, adjacent to computer lab support space
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood with center lite and sidelite
Windows	Exterior window with roller shades, interior window to computer lab support
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for presentation and teaching equipment Power and data to all computer work stations, integrated into furniture
Lighting	Overhead lighting at 40-45 footcandles with presentation mode, photocell sensors and vacancy sensor
Equipment | Furniture	• Movable tables and chairs for 50 students • 50 computer stations • Flexible lecturn - tbd • 2 projection screens with overhead projectors • White boards



draft

1.03 COMPUTER LAB SUPPORT

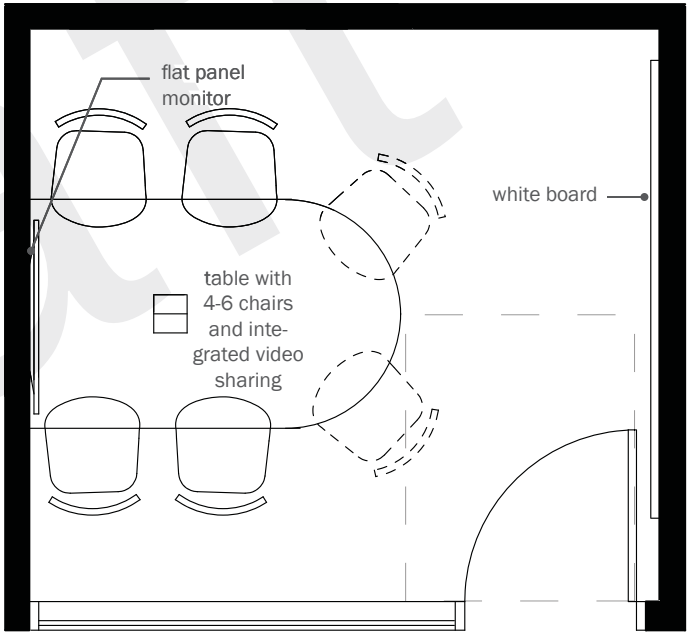
Area	600 SF
Quantity	1
Function	Computational classroom support and student work area
Occupants	20-25 students 1-2 staff
Adjacency	Adjacent to the Computational Lab
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood with center lite and sidelite
Windows	Exterior window with roller shades, interior window to computational lab
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Power and data to all computer work stations, integrated into furniture
Lighting	Overhead lighting at 40-45 footcandles with photocell sensors and vacancy sensor
Equipment | Furniture	• Movable tables and chairs for 50 students • Flexible lecturn - tbd • White board



draft

1.04 STUDENT STUDY / COLLABORATION SPACE

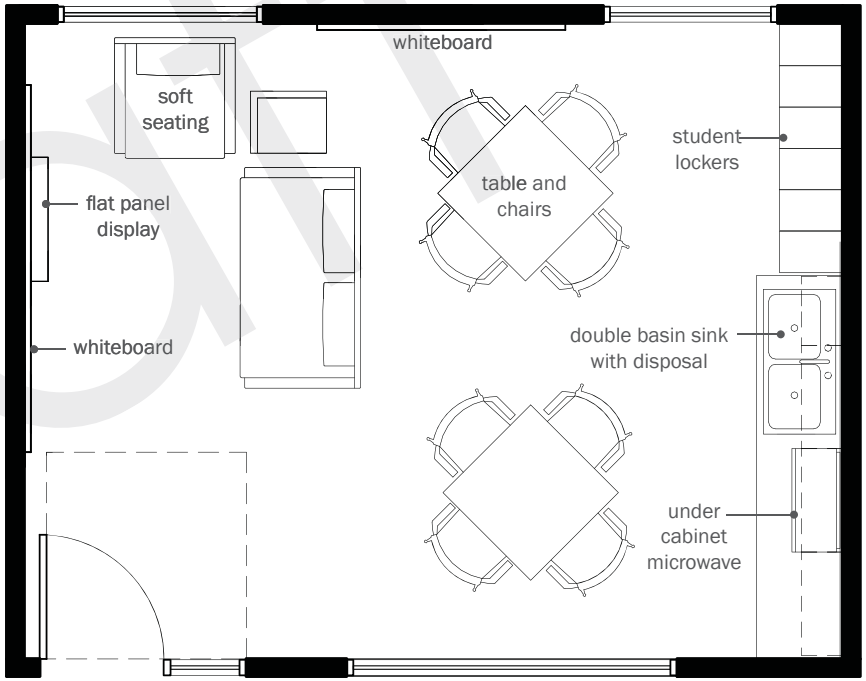
Area	100 SF
Quantity	6
Function	Student group study rooms
Occupants	4-6 students
Adjacency	Central circulation area, near faculty offices and student rooms
Floor	Carpet
Wall	Gypsum board, glass wall toward corridor or common areas
Ceiling	10' high, suspended acoustic ceiling
Doors	Storefront
Windows	As applicable
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	Electrical, video feed and IT integrated into table for presentations and electronic device charging. Convenience outlets at walls
Lighting	Overhead lighting at 40-45 footcandles with presentation mode and vacancy sensor
Equipment | Furniture	• Meeting table and chairs for 4-6 students • Flat panel display • White board



draft

1.05 STUDENT ROOM

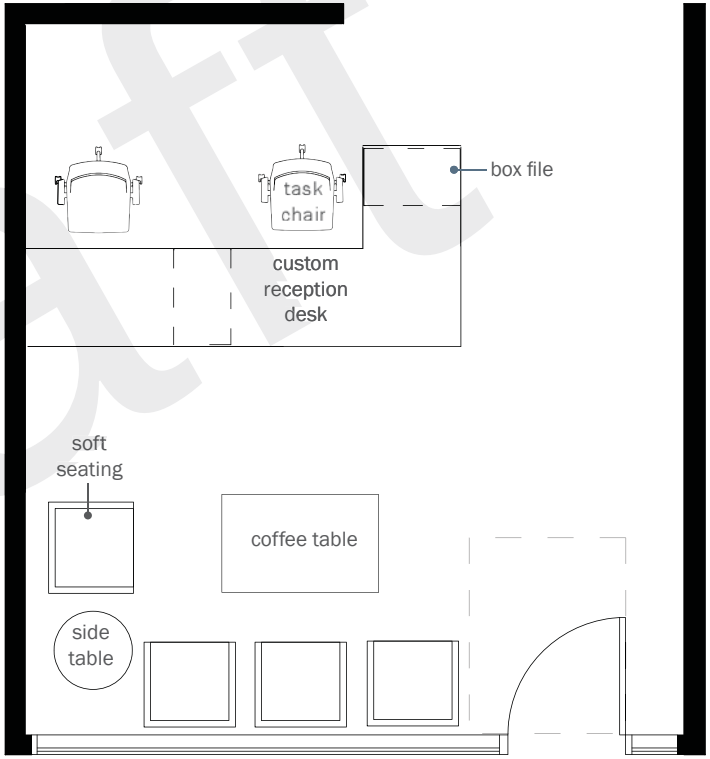
Area	300 SF
Quantity	7
Function	Student study rooms
Occupants	10-20 students
Adjacency	Central circulation area, near faculty offices and student study rooms
Floor	Carpet
Wall	Gypsum board, glass wall toward corridor or common areas
Ceiling	10' high, suspended acoustic ceiling
Doors	Storefront
Windows	Exterior windows with interior roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical, video feed and IT integrated into table for presentations and electronic device charging. Convenience outlets at walls
Lighting	Overhead lighting at 40-45 footcandles with presentation mode and vacancy sensor
Equipment | Furniture	• Meeting tables and chairs • Student lockers • Flat panel display • White board



draft

1.06 SECRETARY / RECEPTION

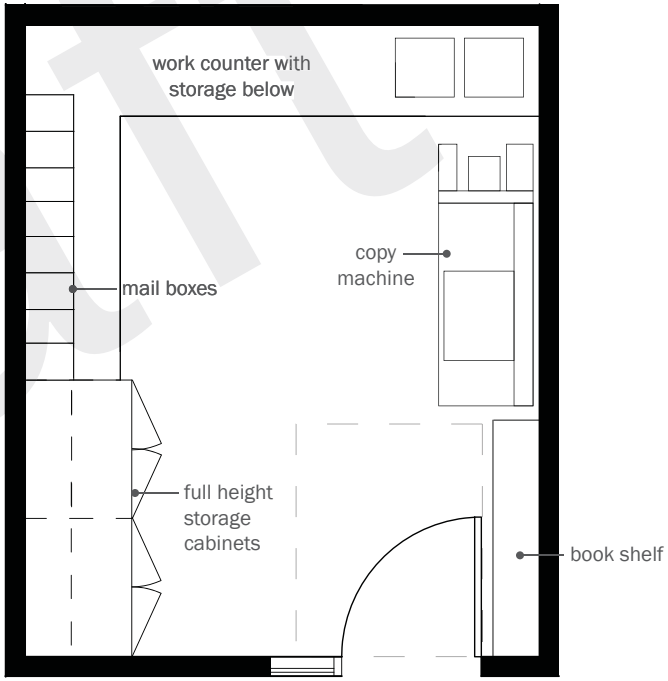
Area	230 SF
Quantity	3
Function	Waiting area for Department visitors and work station for reception staff or secretary
Occupants	6-8 visitors
Adjacency	Entry Lobby, common circulation area
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Storefront
Windows	Windows as feasible Storefront to adjacent common area Roller shades at all exterior windows
Acoustics	NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstations and equipment, convenience outlets at walls of waiting area
Lighting	Overhead fluorescent 30-40 footcandles
Equipment | Furniture	• Reception desk with integrated storage • Task chair • 4 waiting chairs • Coffee table • 2 side tables



draft

1.07 WORKROOM

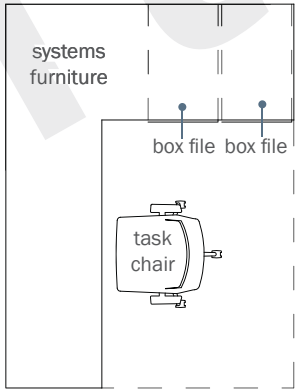
Area	150 SF
Quantity	3
Function	Administrative supply storage and workroom
Occupants	Up to 5 visitors
Adjacency	Department offices
Floor	Resilient Flooring
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	As feasible
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Shared thermostat
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls and floor for work tables
Lighting	Overhead fluorescent with occupancy sensors, 40 footcandles
Equipment | Furniture	• Storage cabinets • Storage drawers • Copy/printer and shredded paper bin • tackable surface



draft

1.08 ADJUNCT FACULTY

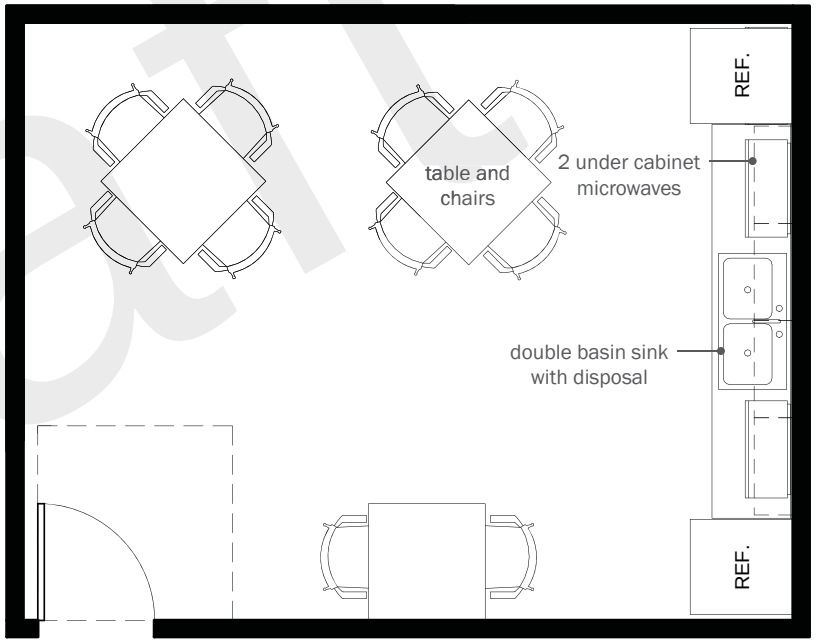
Area	50 SF
Quantity	10
Function	Adjunct faculty work space
Occupants	1 FTE
Adjacency	Department offices, shared workrooms and other faculty support spaces
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	N/A
Windows	Windows as feasible Roller shades at all exterior windows
Acoustics	NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstation and equipment, convenience outlets at walls of waiting area
Lighting	Overhead fluorescent 30 footcandles, task lighting at work stations
Equipment | Furniture	• low reception desk • work surface and storage for 2 part time staff or 1 FTE • 1 task chair • 1 computer • 1 printer



draft

1.09 STAFF BREAK ROOM

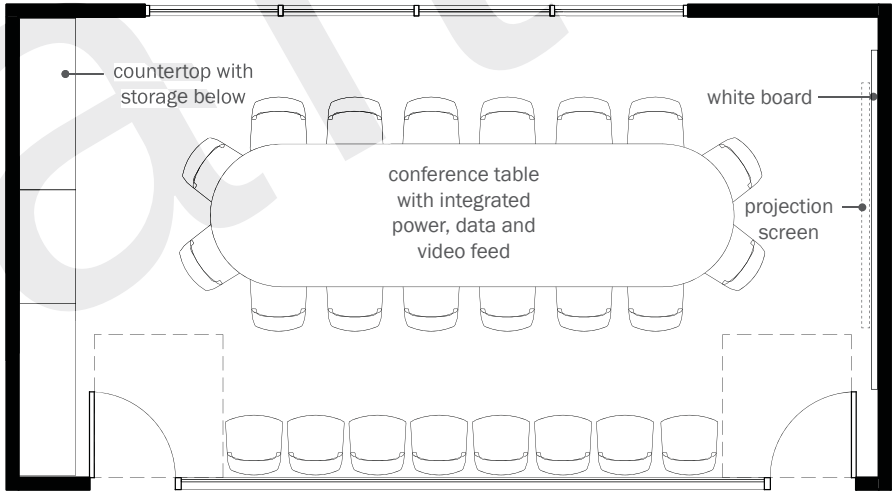
Area	300 SF
Quantity	1
Function	Faculty and staff food prep and break room
Occupants	Up to 14 visitors
Adjacency	Administrative offices, workroom
Floor	Resilient Flooring
Wall	Gypsum board
Ceiling	9' high, suspended acoustic ceiling
Doors	Wood
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Shared thermostat
Plumbing	Kitchen sink with garbage disposal, plumbing to refrigerators for ice and water
Electrical | AV | IT	Electrical and as needed for appliances Convenience outlets at walls for tables
Lighting	Overhead fluorescent with occupancy sensors, 30-40 footcandles
Equipment | Furniture	• tables with chairs • countertop with cabinets below and above • 2 refrigerators • 2 microwaves



draft

1.10 LARGE SHARED CONFERENCE ROOM

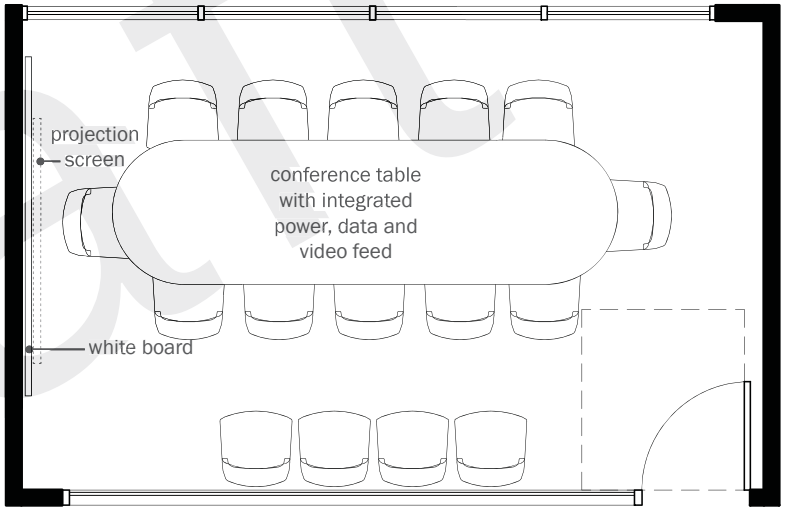
Area	500 SF
Quantity	1
Function	Large shared department conference room
Occupants	24 visitors
Adjacency	Department reception, staff offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with interior shades, black-out shades for presentations,
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT at floor for flexible space layout
Lighting	Variable scenes for presentation or work modes, occupancy sensor, daylight sensors as needed.
Equipment | Furniture	• Large conference table and 24 chairs • Counter top with storage below • Projector and screen • White board



draft

1.11 SMALL SHARED CONFERENCE ROOM

Area	250 SF
Quantity	2
Function	Small shared department conference room
Occupants	16 visitors
Adjacency	Department reception, staff offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with interior shades, black-out shades for presentations,
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT at floor for flexible space layout
Lighting	Variable scenes for presentation or work modes, occupancy sensor, daylight sensors as needed.
Equipment | Furniture	• Conference table and 16 chairs • Counter top with storage below • Projector and screen • White board



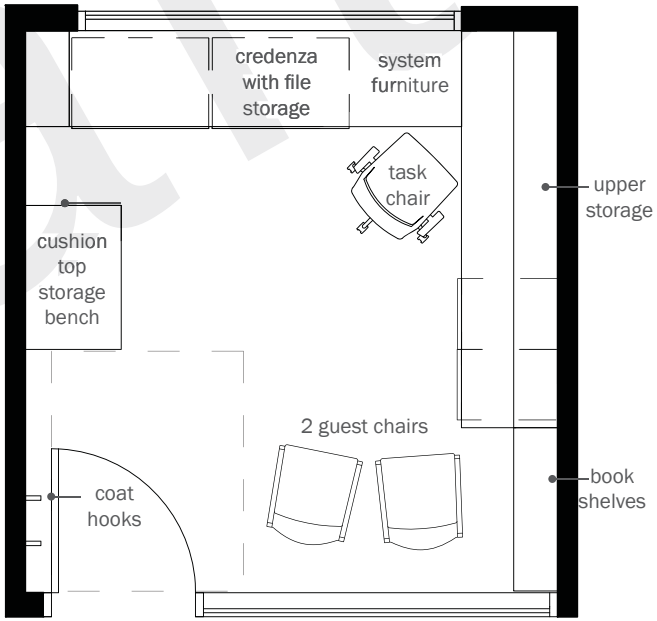
draft

1.12 FUTURE FACULTY OFFICES

Area	120 SF
Quantity	10
Function	Future faculty offices
Occupants	1 FTE, 2 visitors
Adjacency	Department reception, workroom, break room and faculty support areas
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door



office layout based on Natural History Museum model

draft

1.13 FUTURE FACULTY RESEARCH SPACE

Area	200 SF
Quantity	10
Function	Shelled space, reserved for future faculty research space
Occupants	1 FTE, 1-4 visitors
Adjacency	Laboratory support spaces, faculty offices
Floor	Chemical resistant laboratory resilient flooring
Wall	Moisture resistant gypsum board, epoxy painted
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood
Windows	As feasible, shared from adjacent spaces
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Rough in as needed for future laboratory equipment
Lighting	Overhead 50 footcandles with occupancy sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	
Other	●
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	●
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone / Data	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

1.14 SEM ROOM

Area	157 SF
Quantity	1
Function	
Occupants	
Adjacency	
Floor	Chemical resistant laboratory resilient flooring
Wall	Moisture resistant gypsum board, epoxy painted
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	See room data
Lighting	Overhead fluorescent 50 footcandles with occupancy sensors, additional task lighting at benches may be required

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	
Other	●
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	●
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone / Data	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

1.15 MICROSCOPY

Area	315 SF
Quantity	1
Function	Shared microscopy and fluorescent microscopy lab
Occupants	1-3 visitors
Adjacency	General shared use lab support areas
Floor	Chemical resistant laboratory resilient flooring
Wall	Moisture resistant gypsum board, epoxy painted
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	See room data
Lighting	Overhead fluorescent 50 footcandles with occupancy sensors, additional task lighting at benches may be required

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	
Other	●
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	●
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone / Data	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

1.16 COLD ROOM

Area	210 SF
Quantity	1
Function	Shared walk-in cold room for laboratory support and storage
Occupants	1-2 visitors
Adjacency	Shared lab support areas
Floor	Sealed Concrete or cold room flooring
Wall	Insulated metal clad enclosure
Ceiling	Insulated metal clad enclosure
Doors	Insulated metal
Windows	N/A
Acoustics	N/A
Mechanical	4 degree Celsius room
Plumbing	Chilled water at condenser / compressor
Electrical | AV | IT	See room data
Lighting	Overhead fluorescent 50 footcandles with occupancy sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	
Other	●
Humidity	
Uncontrolled	
Other	
Minimum Air Changes/Hour	2
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

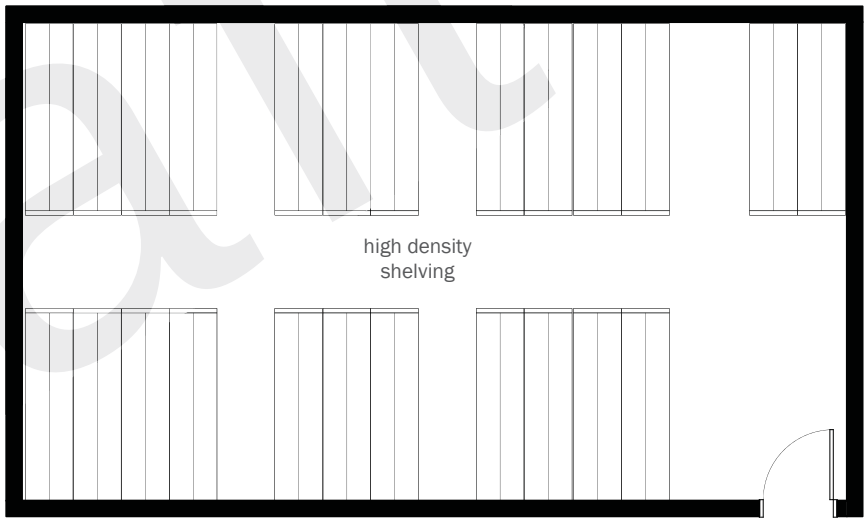
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	●
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone / Data	
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

1.16 ARCHIVAL STORAGE

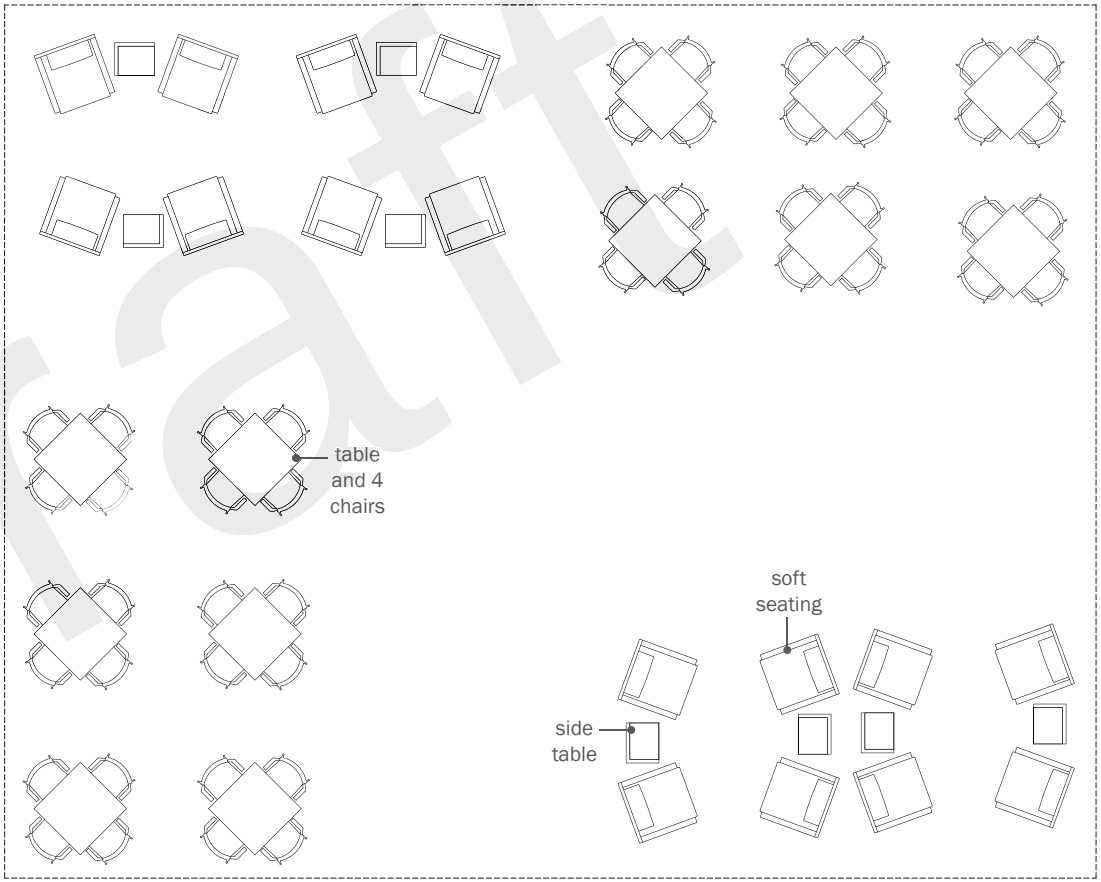
Area	787 SF
Quantity	1
Function	HIgh density storage for various department material and equipment archives. 157 sf dedicated to chemistry, 630 sf dedicated to geosciences.
Occupants	0 FTE, 1-4 visitors
Adjacency	Near elevator for ease of access
Floor	Sealed concrete
Wall	Painted gypsum board
Ceiling	Exposed structure
Doors	Wood
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	Convenience outlets at walls
Lighting	Overhead fluorescent 50 footcandles with occupancy sensors, additional task lighting at shelving may be required
Equipment | Furniture	• High density shelving



draft

1.17 LOBBY / RECEPTION SPACE

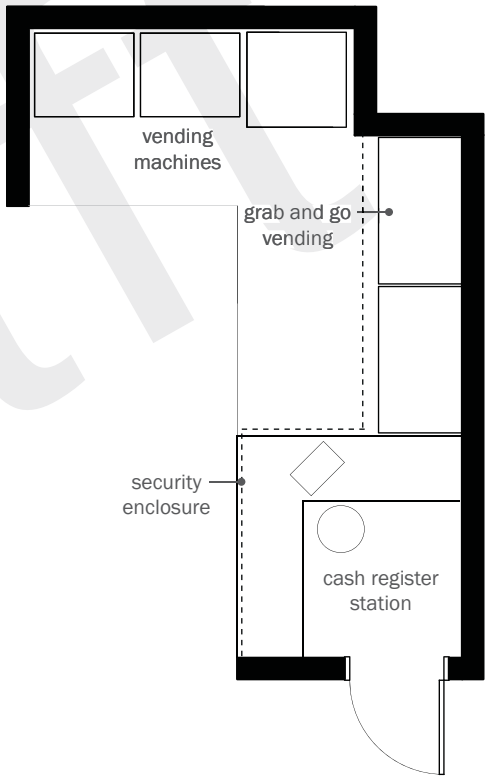
Area	2,000 SF
Quantity	1
Function	Large open circulation and collaboration space
Occupants	varies
Adjacency	Building entry, Math department suites, student study areas
Floor	Tile or high quality flooring
Wall	Gypsum board and glass wall system
Ceiling	High ceiling space, may be open to above
Doors	N/A
Windows	Exterior daylight required
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	Convenience outlets at walls and in-floor near seating areas.
Lighting	Overhead lighting with daylight sensors
Equipment | Furniture	• tables and chairs • soft seating with low collaboration tables



draft

1.18 VENDING

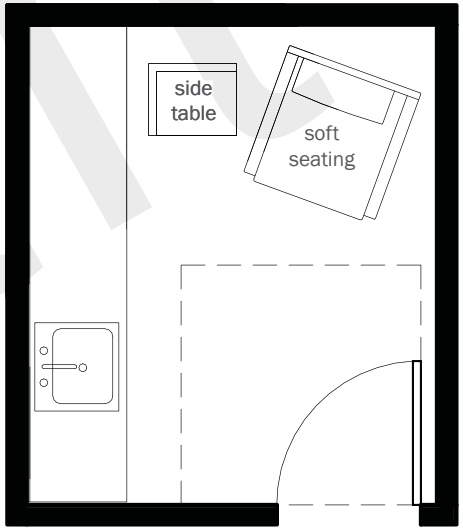
Area	150 SF
Quantity	1
Function	Food and beverage sales area
Occupants	varies
Adjacency	Buiding lobby and student study spaces
Floor	Sealed concrete
Wall	Moisture resistant gypsum board and tile wainscott
Ceiling	Moisture resistant, cleanable acoustic ceiling, minimum height 10'
Doors	N/A - may require security grate depending on extent of food service
Windows	Shared daylight through adjacent spaces
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	As needed, based on extent of food service
Electrical | AV | IT	Outlets as needed for equipment, cash registers and convenience appliances
Lighting	Overhead lighting with occupancy sensors
Equipment | Furniture	• As shown on diagram to the right. • Equipment to be owner furnished and owner installed.



draft

1.19 PERSONAL HEALTH / MOTHER'S ROOM

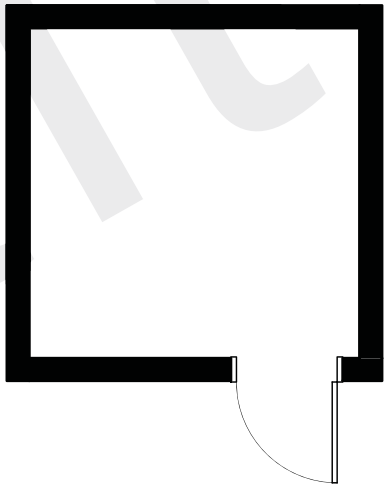
Area	80 SF
Quantity	1
Function	Furniture and material
Occupants	1 visitor
Adjacency	Women's restroom
Floor	Carpet
Wall	Gypsum board
Ceiling	9' high, suspended acoustic ceiling
Doors	Wood
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermostat
Plumbing	Hand sink
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls and work counter
Lighting	30 footcandles overhead with occupancy sensor
Equipment | Furniture	• Soft seating • Side table • Counter top with storage below • Small under-counter refrigerator



draft

1.20 BULK SOLVENT STORAGE

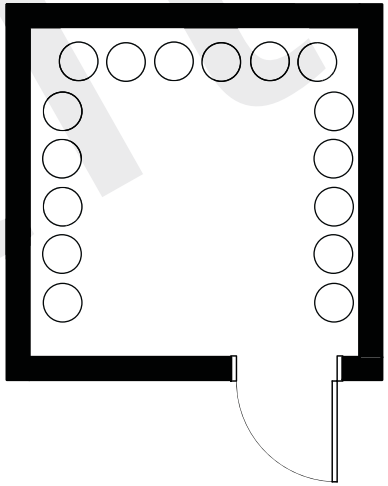
Area	105 SF
Quantity	1
Function	College of Science bulk chemical solvent storage
Occupants	0 FTE, 1-2 visitors
Adjacency	In the College of Sciences Stores suite
Floor	Sealed concrete
Wall	Sealed concrete or concrete masonry walls
Ceiling	Open to structure above
Doors	Metal
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	N/A
Lighting	40 footcandles overhead, integrated occupancy sensor
Equipment | Furniture	• Storage shelves as necessary



draft

1.21 CYLINDER STORAGE

Area	105 SF
Quantity	1
Function	College of Science gas cylinder storage
Occupants	0 FTE, 1-2 visitors
Adjacency	In the College of Sciences Stores suite
Floor	Sealed concrete
Wall	Sealed concrete or concrete masonry walls
Ceiling	Open to structure above
Doors	Metal
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	N/A
Lighting	40 footcandles overhead, integrated occupancy sensor
Equipment | Furniture	• Cylinder racks as needed



draft

1.22 GLASSWARE AND CONSUMABLE STORAGE

Area	945 SF
Quantity	1
Function	College of Science glassware and consumable storage and selling point
Occupants	1-2 FTE, 1-2 visitors
Adjacency	In the College of Sciences Stores suite
Floor	Sealed concrete
Wall	Sealed concrete or concrete masonry walls
Ceiling	Open to structure above
Doors	Metal
Windows	Operable window into corridor at point of sell location
Acoustics	N/A
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	Lab sink, emergency shower and eyewash
Electrical | AV | IT	N/A
Lighting	40 footcandles overhead, integrated occupancy sensor
Equipment | Furniture	• Storage shelves as necessary

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	
Other	
Humidity	
Uncontrolled	
Other	
Minimum Air Changes/Hour	
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	
Data	
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

1.23 CHEMICAL STORAGE

Area	945 SF
Quantity	1
Function	College of Science chemical storage room
Occupants	0 FTE, 1-2 visitors
Adjacency	In the College of Sciences Stores suite
Floor	Sealed concrete
Wall	Sealed concrete or concrete masonry walls
Ceiling	Open to structure above
Doors	Metal
Windows	Operable window into corridor at point of sell location
Acoustics	N/A
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	Emergency shower and eyewash
Electrical | AV | IT	N/A
Lighting	40 footcandles overhead, integrated occupancy sensor
Equipment | Furniture	• Storage shelves as necessary

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	
Other	
Humidity	
Uncontrolled	
Other	
Minimum Air Changes/Hour	
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

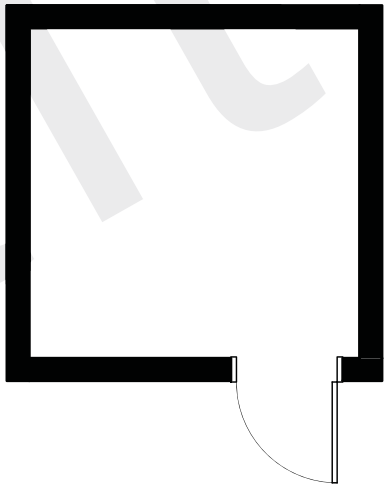
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	
Data	
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

1.24 WATER PURIFICATION SYSTEM ROOM

Area	105 SF
Quantity	1
Function	College of Science bulk chemical solvent storage
Occupants	0 FTE, 1-2 visitors
Adjacency	In the College of Sciences Stores suite
Floor	Sealed concrete
Wall	Sealed concrete or concrete masonry walls
Ceiling	Open to structure above
Doors	Metal
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	N/A
Lighting	40 footcandles overhead, integrated occupancy sensor
Equipment | Furniture	• Storage shelves as necessary



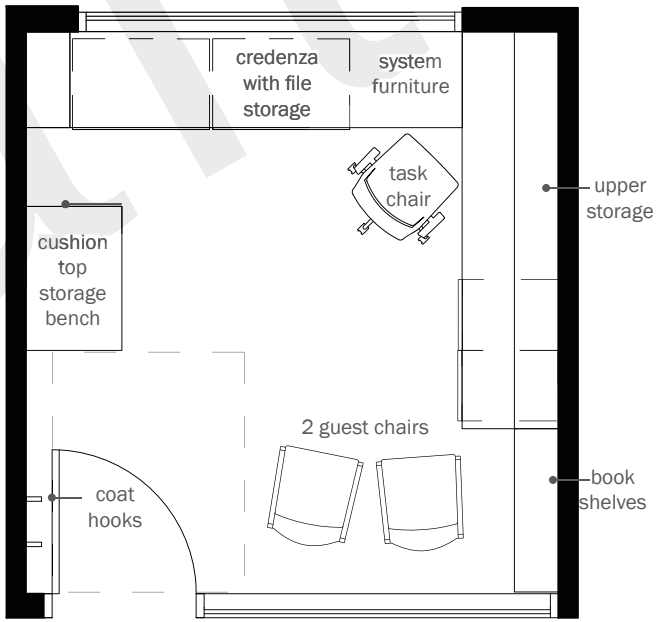
draft

1.25 CUSTODIAL OFFICE

Area	120 SF
Quantity	1
Function	Custodial / building management office
Occupants	1 FTE, 2 visitors
Adjacency	Department reception, workroom, break room and faculty support areas
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door

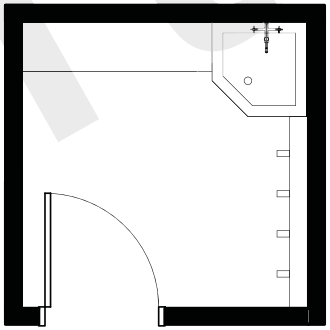


office layout based on Natural History Museum model

draft

1.26 CUSTODIAL CLOSET

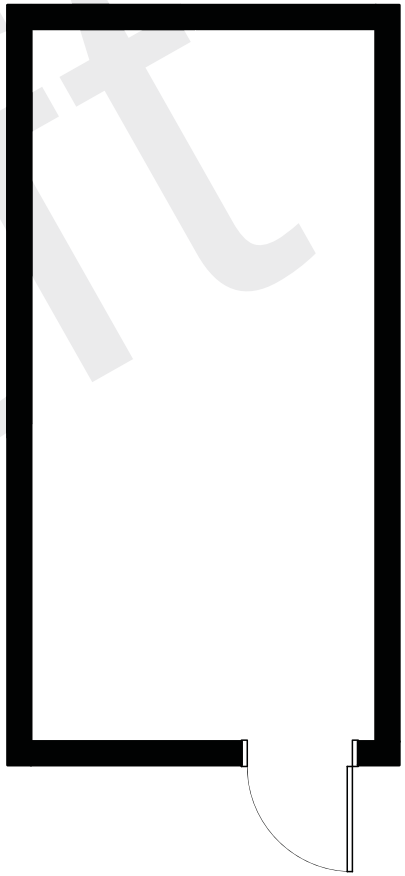
Area	60 SF
Quantity	1
Function	Custodial equipment and supply storage
Occupants	0 FTE, 1 visitors
Adjacency	Adjacent to public restrooms
Floor	Sealed concrete
Wall	Painted gypsum board
Ceiling	Open to structure above
Doors	Wood
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	Floor sink
Electrical | AV | IT	Convenience outlets at walls
Lighting	40 footcandles overhead, integrated occupancy sensor
Equipment | Furniture	• Storage shelves as necessary



draft

1.27 MAINTENANCE / STORAGE

Area	200 SF
Quantity	1
Function	Building maintenance supply and equipment storage
Occupants	0 FTE, 1-2 visitors
Adjacency	Near the custodial office
Floor	Sealed concrete
Wall	Painted gypsum board
Ceiling	Open to structure above
Doors	Metal
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	Convenience outlets at walls
Lighting	40 footcandles overhead, integrated occupancy sensor
Equipment | Furniture	• Storage shelves as necessary



draft

1.28 MECHANICAL EQUIPMENT

Area	1,200 SF
Quantity	1
Function	Building mechanical equipment room
Occupants	0 FTE, 1-2 visitors
Adjacency	Direct exterior access is preferred
Floor	Sealed concrete
Wall	Painted gypsum board, plywood as needed for equipment
Ceiling	Open to structure above
Doors	Metal
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	Convenience outlets at walls
Lighting	40 footcandles overhead, integrated occupancy sensor
Equipment | Furniture	• N/A

draft

1.29 ELECTRICAL EQUIPMENT

Area	500 SF
Quantity	1
Function	Building mechanical equipment room
Occupants	0 FTE, 1-2 visitors
Adjacency	Direct exterior access is preferred
Floor	Sealed concrete
Wall	Painted gypsum board, plywood as needed for equipment
Ceiling	Open to structure above
Doors	Metal
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	Convenience outlets at walls
Lighting	40 footcandles overhead, integrated occupancy sensor
Equipment | Furniture	• N/A

draft

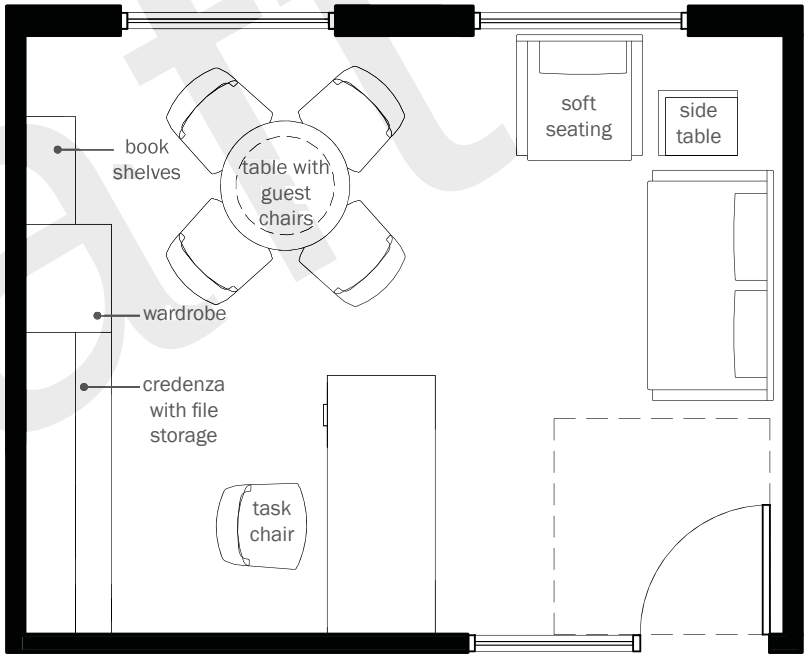
DEAN'S SUITE

Space			NSF	No.	Total NSF	Remarks/Comments
DS	2.01	Dean's Office	240	1	240	
DS	2.02	Assoc. Dean's Office	150	1	150	
DS	2.03	Dean's Secretary / Receptionist	150	1	150	
DS	2.04	Dean's Conference Room	400	1	400	
DS	2.05	Development Director	120	1	120	
DS	2.06	Development Storage	120	1	120	future office
DS	2.07	Workroom / Break Room / Storage	200	1	200	
		Subtotal Non-Lab Space			**1,380**	
		Total Laboratory Space			**1,380**	

draft

2.01 DEAN'S OFFICE

Area	240 SF
Quantity	1
Function	Dean's Office workspace and meeting area for 6 people
Occupants	1 FTE, 2-6 visitors
Adjacency	Reception, Development Offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface..
Equipment | Furniture	• Office desk • Task chair • Computer • Printer • 6 visitor chairs and small conference table • Bookshelves • Coat hook behind door



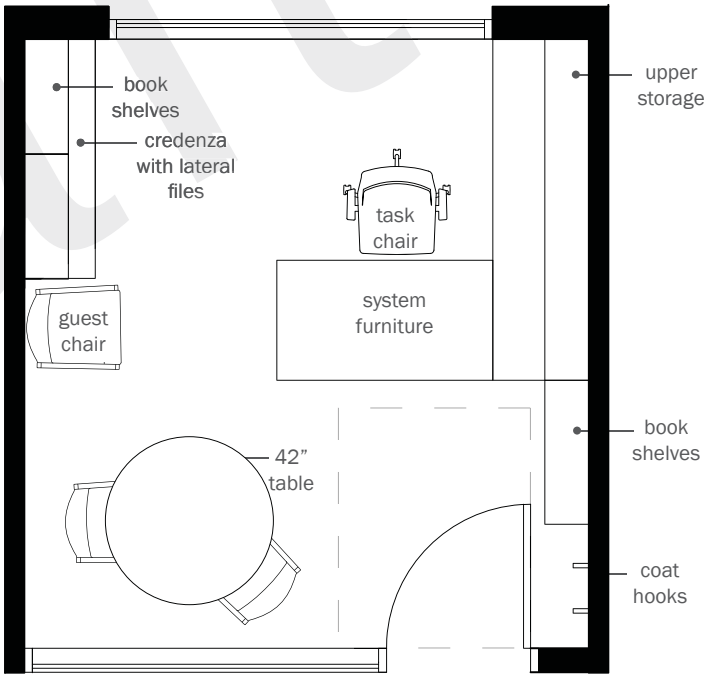
draft

2.02 ASSOCIATE DEAN'S OFFICE

Area	150 SF
Quantity	1
Function	Associate Dean's Office and meeting area
Occupants	1 FTE, 2-3 visitors
Adjacency	Reception, Dean's Office
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

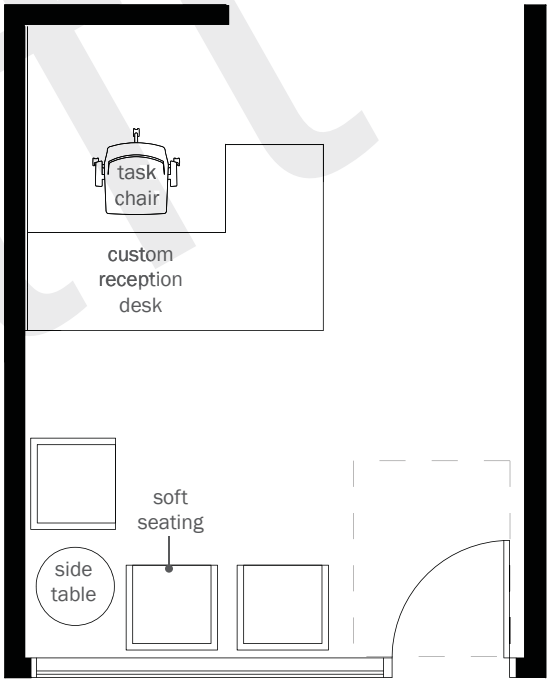
- office desk
- task chair
- computer and printer
- 3 visitor chairs
- small conference table
- bookshelves
- coat hook behind door



draft

2.03 DEAN'S SECRETARY / RECEPTIONIST

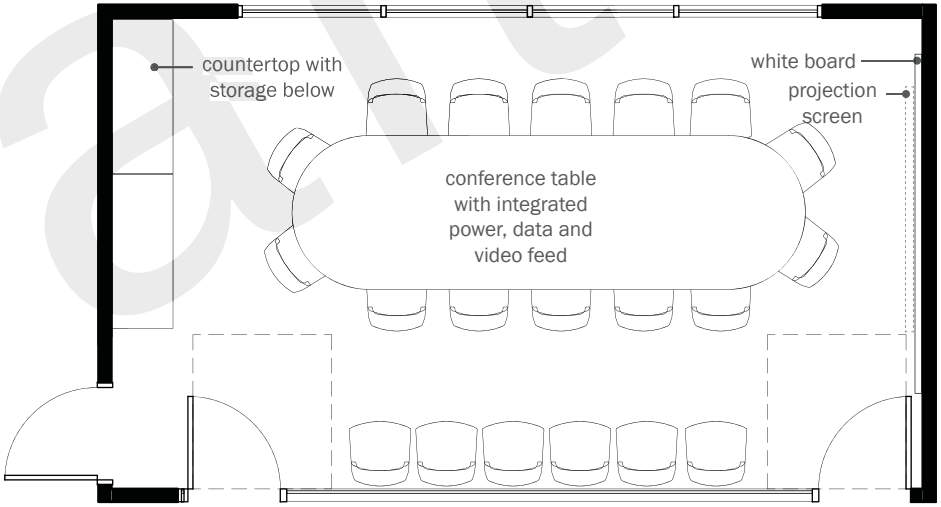
Area	150 SF
Quantity	1
Function	Waiting area for Dean's Office visitors and work station for reception staff or secretary
Occupants	4-6 visitors
Adjacency	Common circulation area
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Storefront
Windows	Windows as feasible Storefront to adjacent common area Roller shades at all exterior windows
Acoustics	NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstations and equipment, convenience outlets at walls of waiting area
Lighting	Overhead fluorescent 30-40 footcandles
Equipment | Furniture	• Reception desk with integrated storage • Task chair • 3 waiting chairs • Side tables



draft

2.04 DEAN'S CONFERENCE ROOM

Area	400 SF
Quantity	1
Function	Large shared department conference room
Occupants	24 visitors
Adjacency	Dean's Reception and Office, direct access to workroom
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with interior shades, black-out shades for presentations,
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT at floor for flexible space layout
Lighting	Variable scenes for presentation or work modes, occupancy sensor, daylight sensors as needed.
Equipment | Furniture	• Large conference table and 24 chairs • Counter top with storage below • Projector and screen • White board



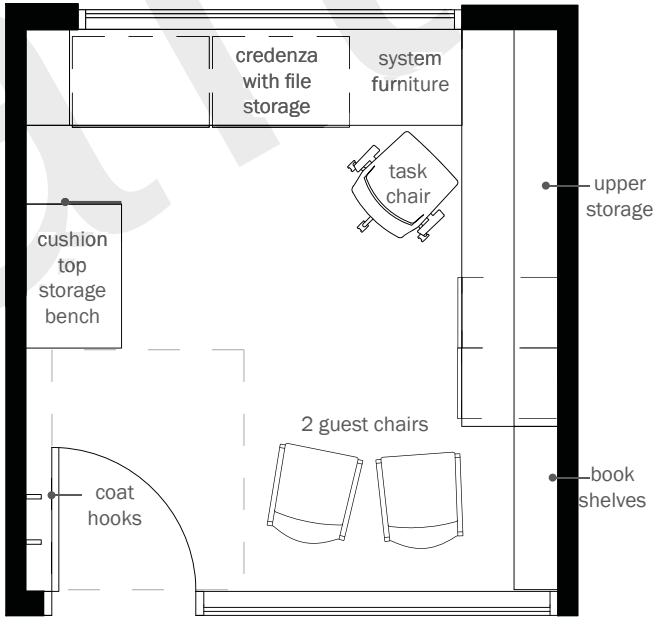
draft

2.05 DEVELOPMENT DIRECTOR

Area	120 SF
Quantity	1
Function	Development Director's office
Occupants	1 FTE, 2 visitors
Adjacency	Department reception, Dean's Conference Room and Development Storage
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door

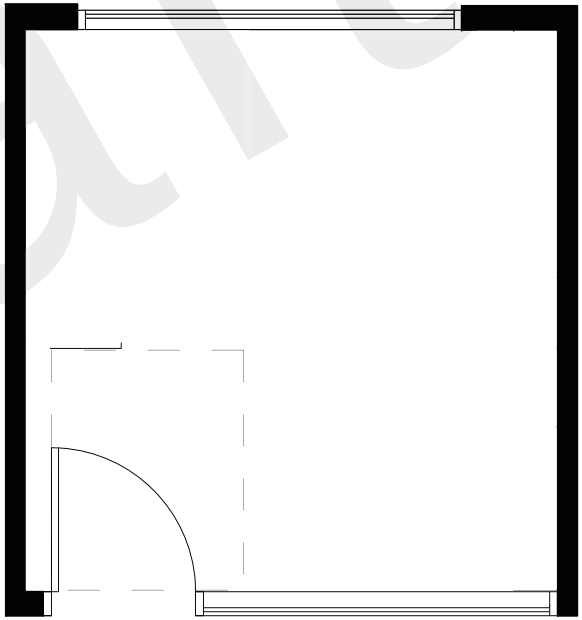


office layout based on Natural History Museum model

draft

2.06 DEVELOPMENT STORAGE

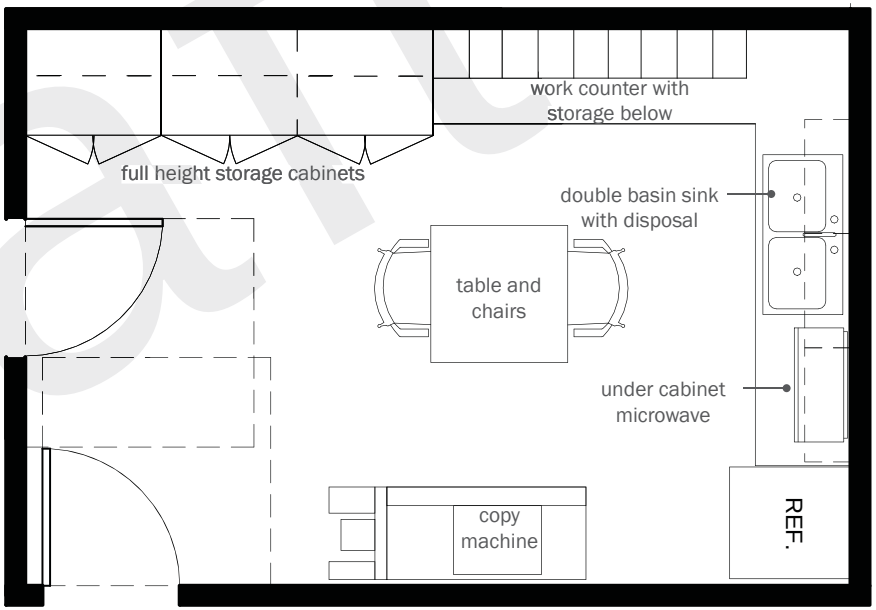
Area	120 SF
Quantity	1
Function	Development storage and future office space
Occupants	0 FTE, 1-2 visitors
Adjacency	Department reception, Dean's Conference Room and Development Storage
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, as feasible
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor,
Equipment | Furniture	• Shelving as needed



draft

2.07 WORKROOM / BREAK ROOM / STORAGE

Area	200 SF
Quantity	1
Function	Faculty and staff food prep and break room
Occupants	Up to 14 visitors
Adjacency	Direct access to Dean's Conference Room
Floor	Resilient Flooring
Wall	Gypsum board
Ceiling	9' high, suspended acoustic ceiling
Doors	Wood
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Shared thermostat
Plumbing	Kitchen sink with garbage disposal, plumbing to refrigerator for ice and water
Electrical | AV | IT	Electrical and as needed for appliances Convenience outlets at walls for tables
Lighting	Overhead fluorescent with occupancy sensors, 30-40 footcandles
Equipment | Furniture	• Tables with chairs • Countertop with cabinets below and above • Refrigerator • Microwave • Copy/printer and shredded paper bin • Tackable surface



draft

ADVISING

Space			NSF	No.	Total NSF	Remarks/Comments
AD	3.01	Advisor's Office	120	1	120	
AD	3.02	Secretary/Reception/Waiting	150	1	150	
AD	3.03	Small Library (3-4 People)	120	1	120	
AD	3.04	Records Space	120	1	120	
AD	3.05	Workroom	120	1	120	
		Subtotal Non-Lab Space			**630**	
		Total Laboratory Space			**630**	

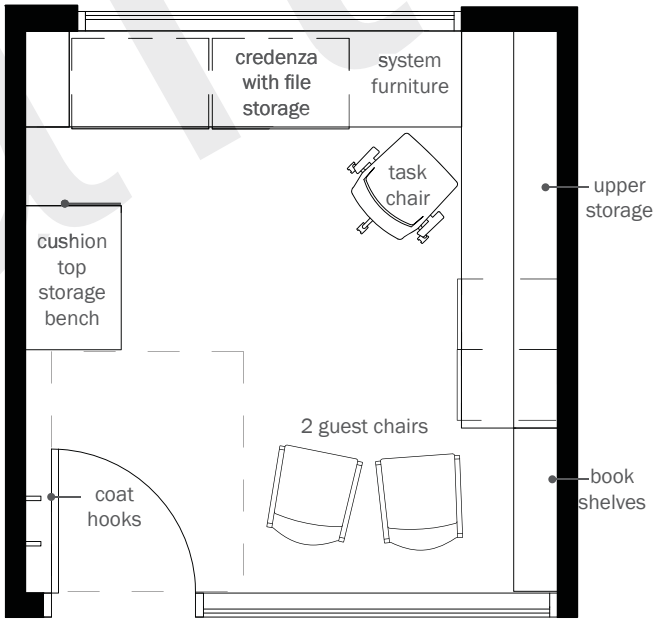
draft

3.01 ADVISOR'S OFFICE

Area	120 SF
Quantity	1
Function	Advisor's office
Occupants	1 FTE, 2 visitors
Adjacency	Department reception, library space
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door

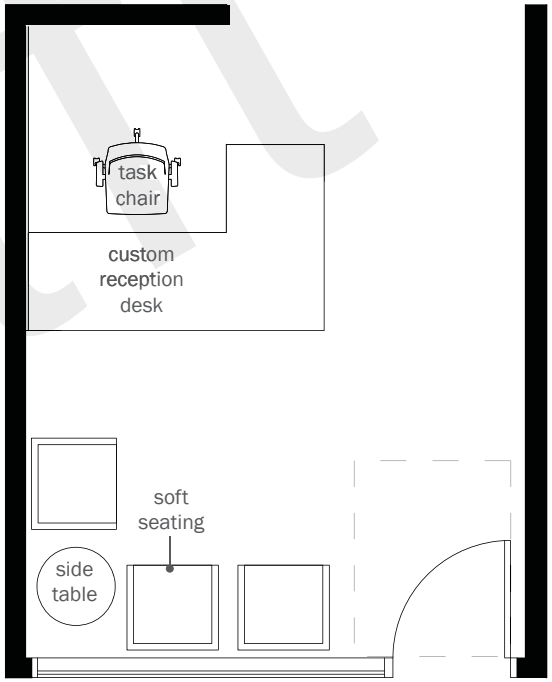


office layout based on Natural History Museum model

draft

3.02 SECRETARY / RECEPTIONIST / WAITING

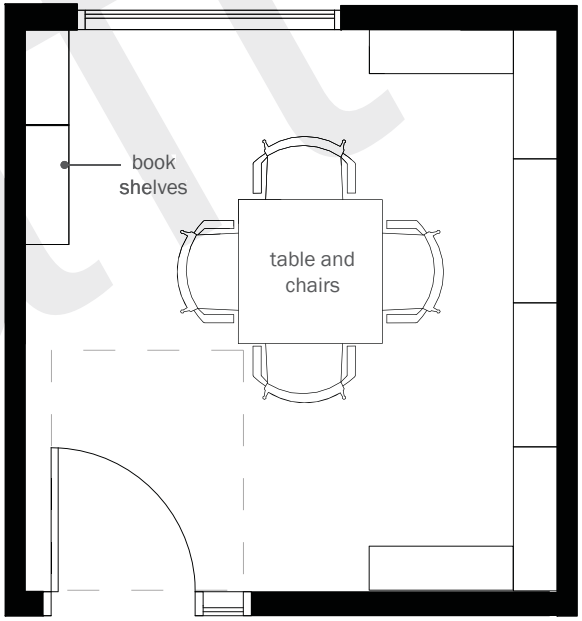
Area	150 SF
Quantity	1
Function	Waiting area for Advising Office visitors and work station for reception staff or secretary
Occupants	4-6 visitors
Adjacency	Common circulation area
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Storefront
Windows	Windows as feasible Storefront to adjacent common area Roller shades at all exterior windows
Acoustics	NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstations and equipment, convenience outlets at walls of waiting area
Lighting	Overhead fluorescent 30-40 footcandles
Equipment | Furniture	• Reception desk with integrated storage • Task chair • 3 waiting chairs • Coffee table • 2 side tables



draft

3.03 SMALL LIBRARY

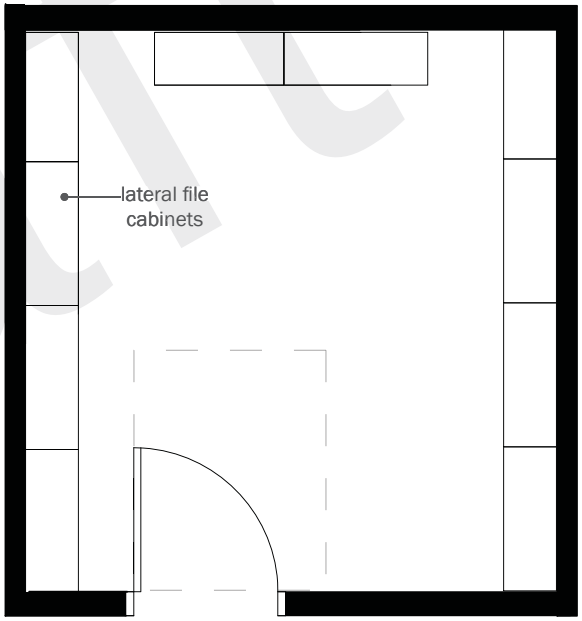
Area	120 SF
Quantity	1
Function	Resource library and meeting area for Advising office.
Occupants	4-6 visitors
Adjacency	Advising Reception
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood with sidelight
Windows	Windows as feasible Storefront to adjacent common area Roller shades at all exterior windows
Acoustics	NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstations and equipment, convenience outlets at walls
Lighting	Overhead 30-40 footcandles
Equipment | Furniture	• Bookshelves • Table with 4 chairs



draft

3.04 RECORD STORAGE

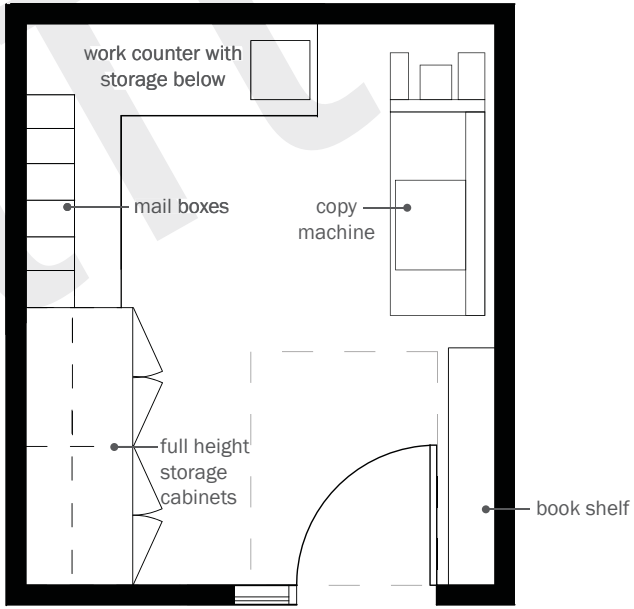
Area	120 SF
Quantity	1
Function	Record storage room
Occupants	1-2 visitors
Adjacency	Advising offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	N/A
Acoustics	N?A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstations and equipment, convenience outlets at walls
Lighting	Overhead 40 footcandles
Equipment | Furniture	• Filing cabinets



draft

3.05 WORKROOM

Area	120 SF
Quantity	1
Function	Administrative supply storage and workroom
Occupants	Up to 5 visitors
Adjacency	Department offices
Floor	Resilient Flooring
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	As feasible
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Shared thermostat
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls and floor for work tables
Lighting	Overhead fluorescent with occupancy sensors, 40 footcandles
Equipment | Furniture	• Storage cabinets • Storage drawers • Copy/printer and shredded paper bin • tackable surface



draft

CENTER FOR SCIENCE AND MATH EDUCATION (CSME)

Space			NSF	No.	Total NSF	Remarks/Comments
CS	4.01	Director's Office	150	1	150	
CS	4.02	Conference Room	300	1	300	
CS	4.03	Student Staff	60	2	120	
CS	4.04	Workroom	120	1	120	
		Subtotal Non-Lab Space			**690**	
		Total Laboratory Space			**690**	

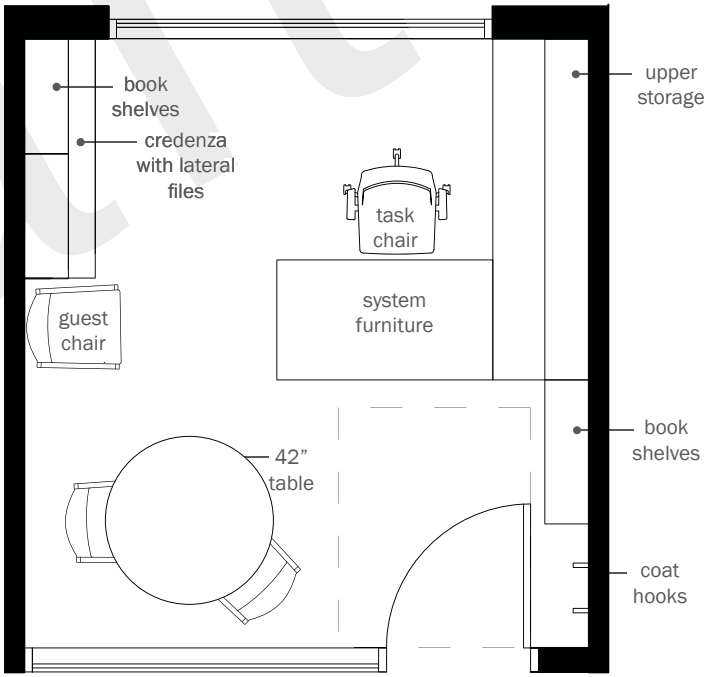
draft

4.01 DIRECTOR'S OFFICE

Area	150 SF
Quantity	1
Function	CSME Director's Office and meeting area
Occupants	1 FTE, 2-3 visitors
Adjacency	Reception, CSME Conference Room
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

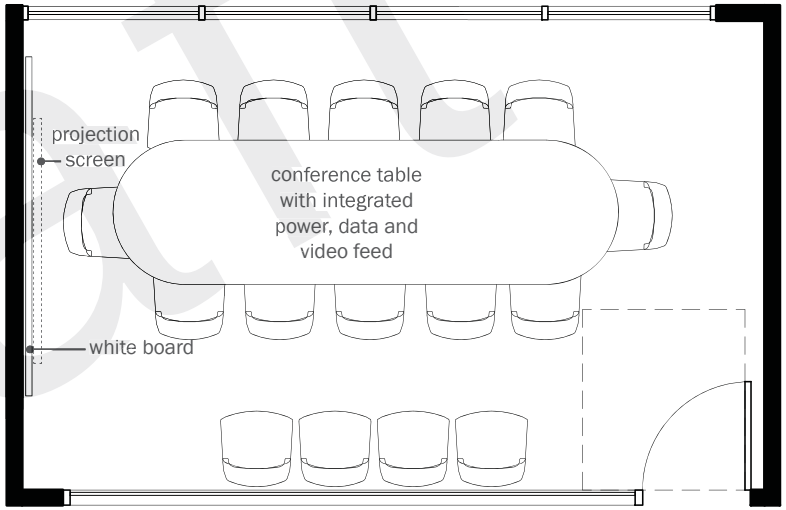
- office desk
- task chair
- computer and printer
- 3 visitor chairs
- small conference table
- bookshelves
- coat hook behind door



draft

4.02 CONFERENCE ROOM

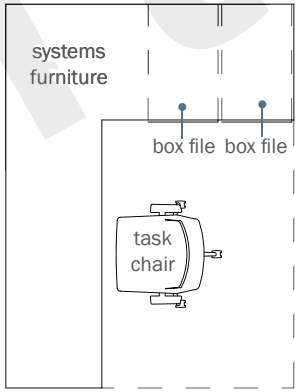
Area	250 SF
Quantity	2
Function	CSME Conference Room
Occupants	24 visitors
Adjacency	Reception and CSME Director's Office
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with interior shades, black-out shades for presentations,
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT at floor for flexible space layout
Lighting	Variable scenes for presentation or work modes, occupancy sensor, daylight sensors as needed.
Equipment | Furniture	• Conference table and 16 chairs • Counter top with storage below • Projector and screen • White board



draft

4.03 STUDENT STAFF

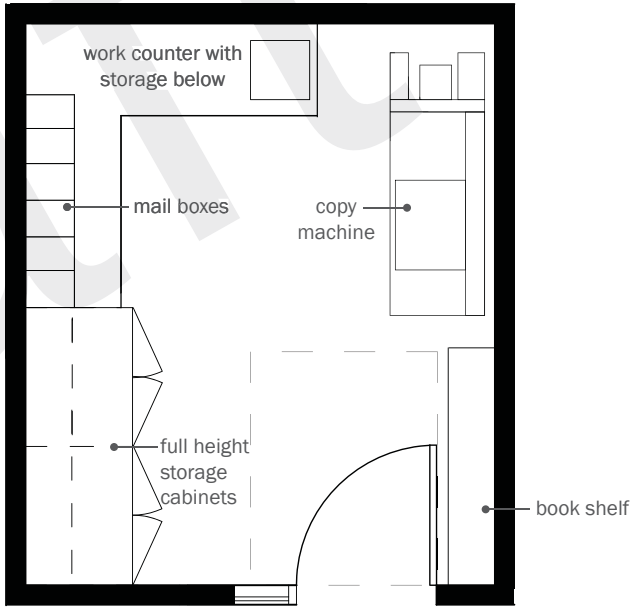
Area	60 SF
Quantity	2
Function	Student staff work space
Occupants	1 FTE
Adjacency	Department offices, workroom and conference room
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	N/A
Windows	Windows as feasible Roller shades at all exterior windows
Acoustics	NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstation and equipment, convenience outlets at walls of waiting area
Lighting	Overhead fluorescent 30 footcandles, task lighting at work stations
Equipment | Furniture	• low reception desk • work surface and storage for 2 part time staff or 1 FTE • 1 task chair • 1 computer • 1 printer



draft

4.04 WORKROOM

Area	120 SF
Quantity	1
Function	Administrative supply storage and workroom
Occupants	Up to 5 visitors
Adjacency	Department offices
Floor	Resilient Flooring
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	As feasible
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Shared thermostat
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls and floor for work tables
Lighting	Overhead fluorescent with occupancy sensors, 40 footcandles
Equipment | Furniture	• Storage cabinets • Storage drawers • Copy/printer and shredded paper bin • tackable surface



draft

Intentionally left blank

draft

MATH

Space			NSF	No.	Total NSF	Remarks/Comments
MA	5.01	Department Chair Office	150	1	150	
MA	5.02	Faculty Office	120	14	1,680	
MA	5.03	Secretary/Reception/Waiting	180	1	180	
MA	5.04	Math Staff	120	1	120	
MA	5.05	Workroom	180	1	180	
MA	5.06	Solution Space	740	1	740	approx. 24 students and 4 computer stations
SH	5.07	Classrooms (Math)	600	2	1,200	Upper division classes
SH	5.08	Classrooms (Math)	800	6	4,800	Math faculty proximate to classrooms
SH	5.09	Math Ed. Classrooms	800	1	800	
SH	5.10	Math Ed Prep./Storage	300	1	300	
MA	5.11	Multi-Purpose Rooms	120	4	480	
		Subtotal Non-Lab Space			**10,630**	
		Total Laboratory Space			**10,630**	

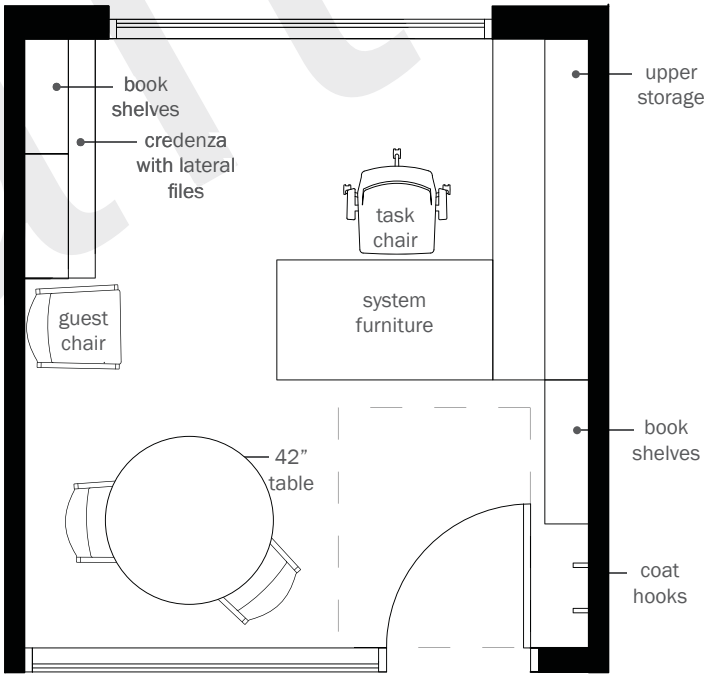
draft

5.01 DEPARTMENT CHAIR OFFICE

Area	150 SF
Quantity	1
Function	Department Chair's Office and meeting area
Occupants	1 FTE, 2-3 visitors
Adjacency	Department reception and offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer and printer
- 3 visitor chairs
- small conference table
- bookshelves
- coat hook behind door



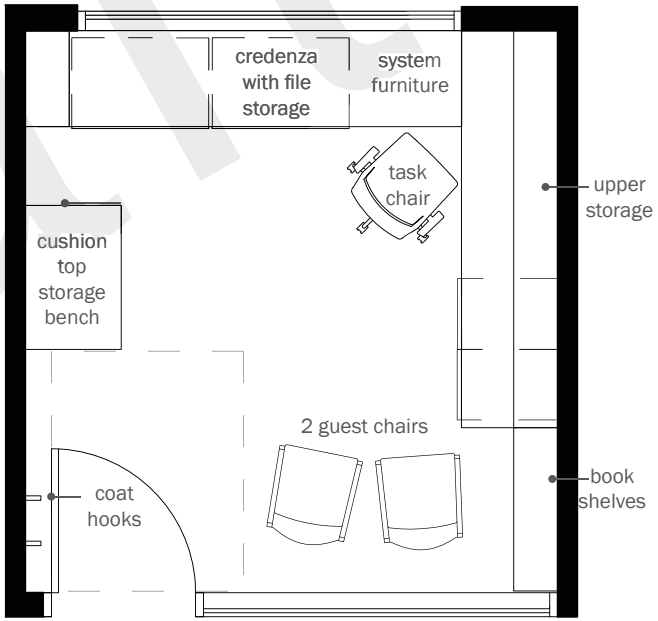
draft

5.02 FACULTY OFFICE

Area	120 SF
Quantity	14
Function	Faculty office and informal meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department reception, Department Chair's office
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door

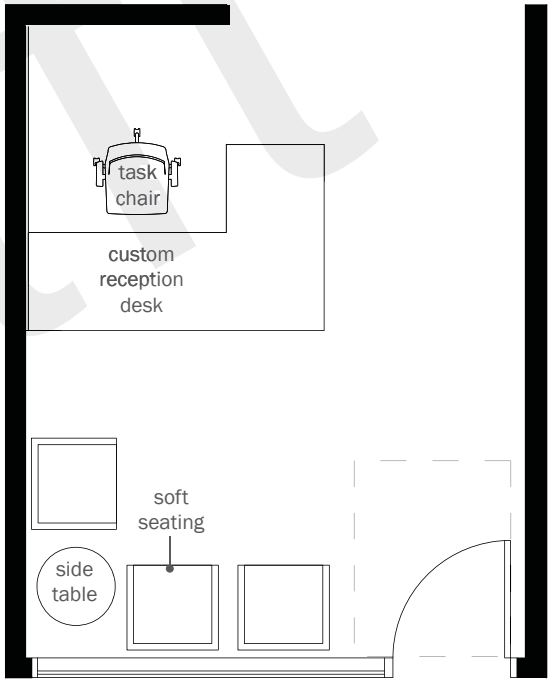


office layout based on Natural History Museum model

draft

5.03 SECRETARY / RECEPTIONIST / WAITING

Area	180 SF
Quantity	1
Function	Waiting area for Math Department visitors and work station for reception staff or secretary
Occupants	4-6 visitors
Adjacency	Common circulation area
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Storefront
Windows	Windows as feasible Storefront to adjacent common area Roller shades at all exterior windows
Acoustics	NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstations and equipment, convenience outlets at walls of waiting area
Lighting	Overhead fluorescent 30-40 footcandles
Equipment | Furniture	• Reception desk with integrated storage • Task chair • 3 waiting chairs • Side table



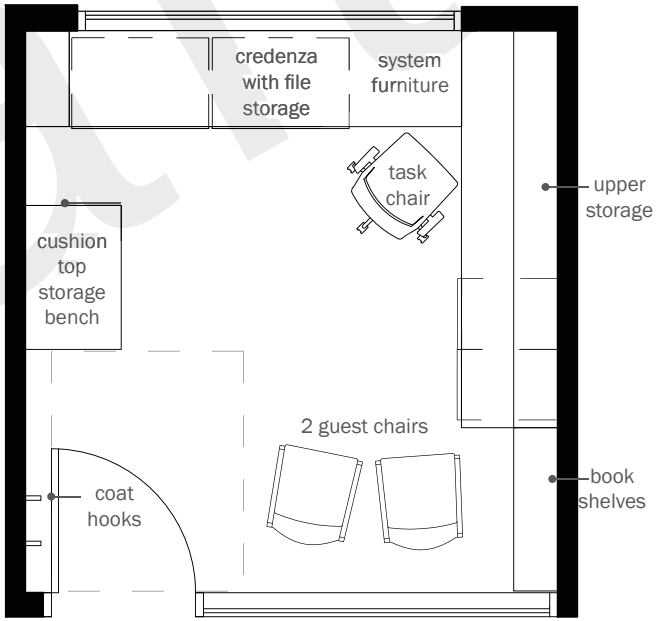
draft

5.04 MATH STAFF

Area	120 SF
Quantity	1
Function	Department staff office and informal meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department reception, Department Chair's office
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door

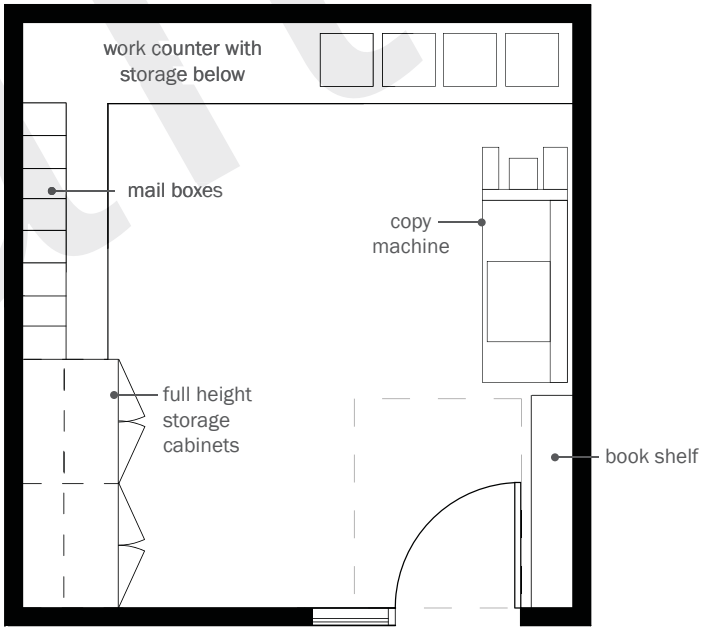


office layout based on Natural History Museum model

draft

5.05 WORKROOM

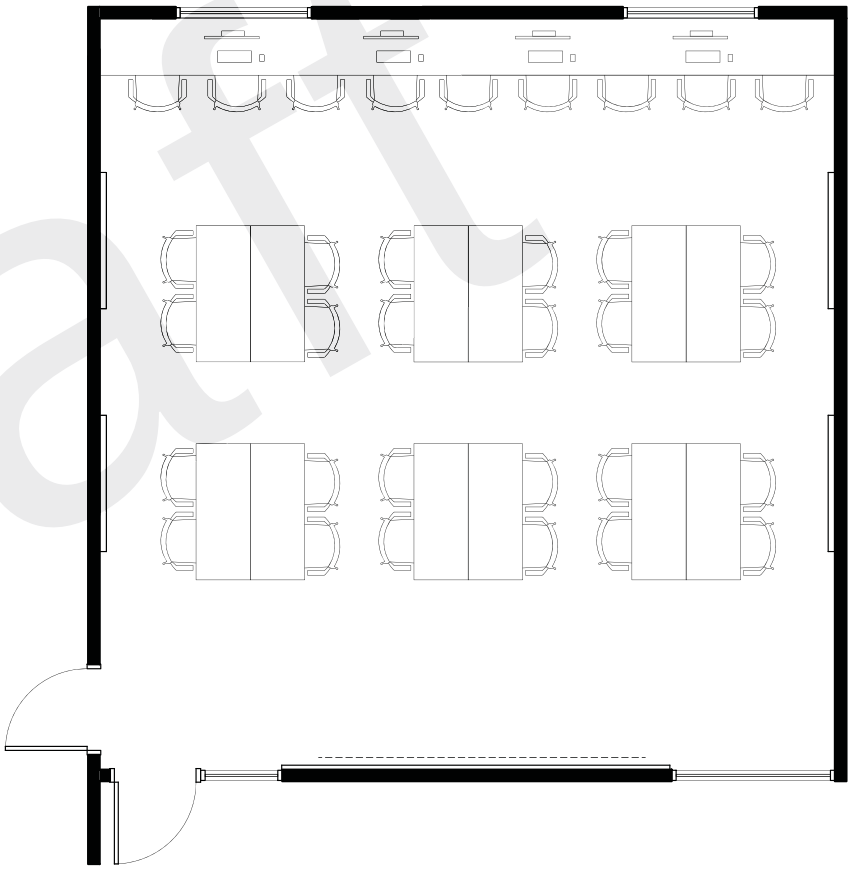
Area	180 SF
Quantity	1
Function	Math Department supply storage and workroom
Occupants	Up to 5 visitors
Adjacency	Department offices
Floor	Resilient Flooring
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	As feasible
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Shared thermostat
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls and floor for work tables
Lighting	Overhead fluorescent with occupancy sensors, 40 footcandles
Equipment | Furniture	• Storage cabinets • Storage drawers • 2 copy machines • 2 reprographic machines • Tackable surface • Mailboxes



draft

5.06 SOLUTION SPACE

Area	740 SF
Quantity	1
Function	Flexible collaboration environment
Occupants	12-24 students
Adjacency	Group study spaces / faculty offices
Floor	Carpet
Wall	Gypsum board
Ceiling	12' high, suspended acoustic ceiling with gypsum soffit
Doors	Storefront
Windows	Windows as feasible with roller shades, Storefront to adjacent circulation spaces
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-78 degrees
Plumbing	N/A
Electrical | AV | IT	Power and data in floor for access and flexibility
Lighting	Overhead 40 footcandles with multiple scenes for presentation and worksessions, occupancy and daylight sensors as needed.
Technology	Integrated technology systems may include flat panel display or projector and screen system.
Equipment | Furniture	• Tables with integrated cable management and casters • 20 chairs • 1 projector and 1 screen or flat panel display • 4 whiteboards • 4 computer stations

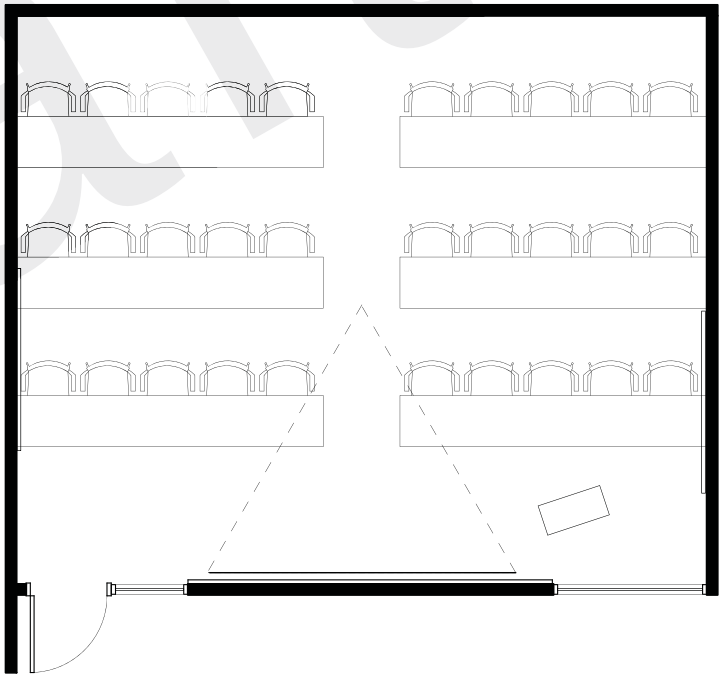


draft

5.07 CLASSROOM

Area	600 SF
Quantity	1
Function	Flexible teaching and learning environment
Occupants	30 students, 1 faculty
Adjacency	Group study spaces / faculty offices
Floor	Carpet
Wall	Gypsum board
Ceiling	12' high, suspended acoustic ceiling with gypsum soffit
Doors	Storefront
Windows	Windows as feasible with roller shades, Storefront to adjacent circulation spaces
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-78 degrees
Plumbing	N/A
Electrical | AV | IT	Power and data in floor for access and flexibility
Lighting	Overhead 40 footcandles with multiple scenes for presentation and worksessions, occupancy and daylight sensors as needed.
Technology	Integrated technology systems may include smart board systems, camera based projection for detail and experiment projection

Equipment | Furniture	• Tables with integrated cable management and casters for flexibility • 30 chairs • Teaching station • 1 projector and 1 screen • 2 whiteboards.



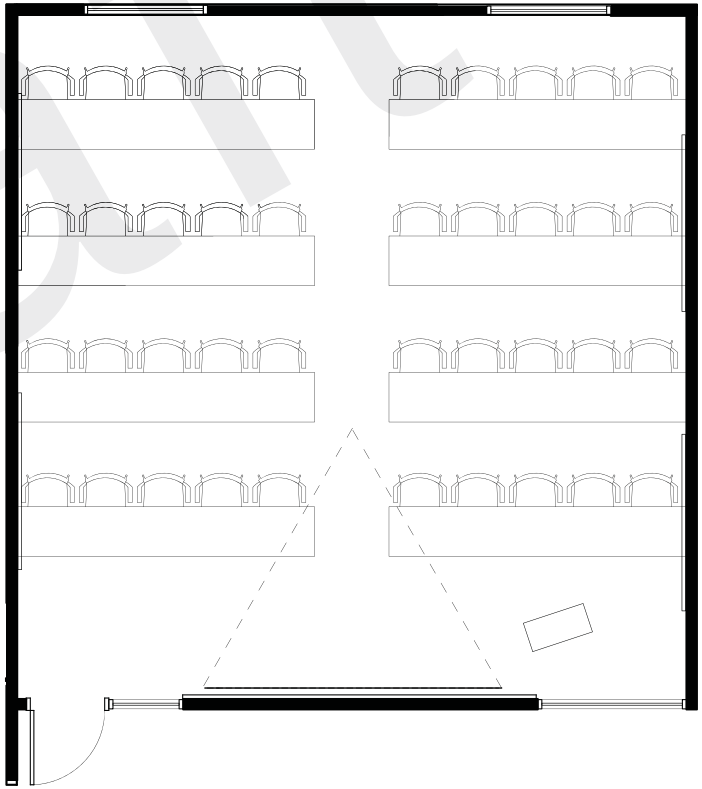
draft

5.08 CLASSROOM

Area	800 SF
Quantity	1
Function	Flexible teaching and learning environment
Occupants	40 students, 1 faculty
Adjacency	Group study spaces / faculty offices
Floor	Carpet
Wall	Gypsum board
Ceiling	12' high, suspended acoustic ceiling with gypsum soffit
Doors	Storefront
Windows	Windows as feasible with roller shades, Storefront to adjacent circulation spaces
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-78 degrees
Plumbing	N/A
Electrical | AV | IT	Power and data in floor for access and flexibility
Lighting	Overhead 40 footcandles with multiple scenes for presentation and worksessions, occupancy and daylight sensors as needed.
Technology	Integrated technology systems may include smart board systems, camera based projection for detail and experiment projection

Equipment | Furniture

- Tables with integrated cable management and casters for flexibility
- 40 chairs
- Teaching station
- 1 projector and 1 screen
- 2 whiteboards.



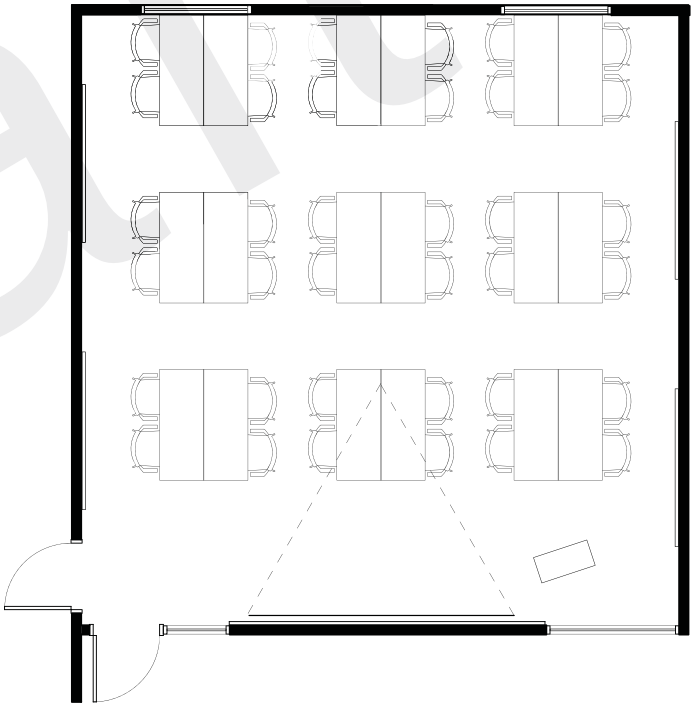
draft

5.09 MATH EDUCATION CLASSROOM

Area	800 SF
Quantity	1
Function	Flexible teaching and learning environment
Occupants	36 students, 1 faculty
Adjacency	Group study spaces / faculty offices
Floor	Carpet
Wall	Gypsum board
Ceiling	12' high, suspended acoustic ceiling with gypsum soffit
Doors	Storefront
Windows	Windows as feasible with roller shades, Storefront to adjacent circulation spaces
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-78 degrees
Plumbing	N/A
Electrical | AV | IT	Power and data in floor for access and flexibility
Lighting	Overhead 40 footcandles with multiple scenes for presentation and worksessions, occupancy and daylight sensors as needed.
Technology	Integrated technology systems may include smart board systems, camera based projection for detail and experiment projection

Equipment | Furniture

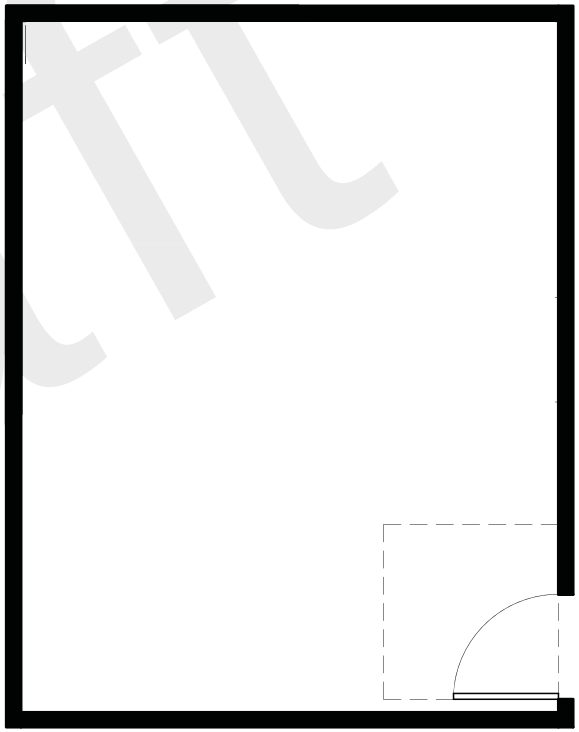
- Tables with integrated cable management and casters for flexibility
- 36 chairs
- Teaching station
- 1 projector and 1 screen
- 2 whiteboards.



draft

5.10 MATH EDUCATION PREP / STORAGE

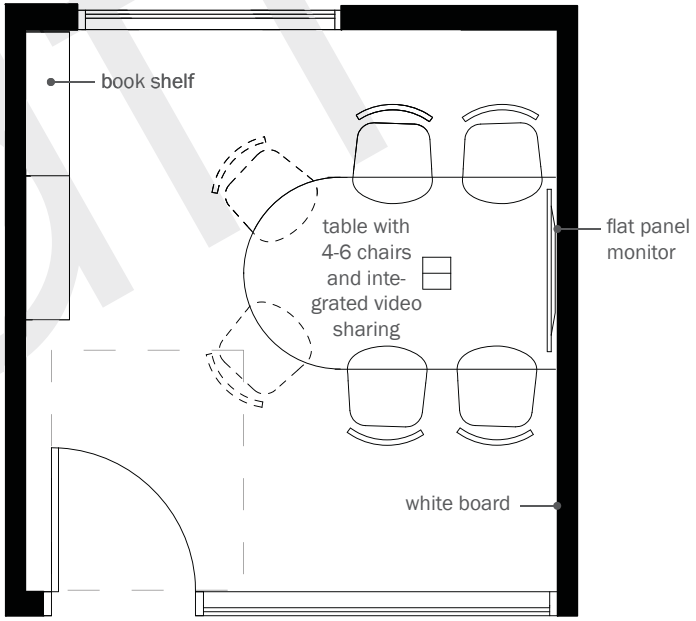
Area	300 SF
Quantity	1
Function	Math education storage room
Occupants	1-2 visitors
Adjacency	Math Education Classroom
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstations and equipment, convenience outlets at walls
Lighting	Overhead 40 footcandles
Equipment | Furniture	• Storage shelves as necessary



draft

5.11 MULTI-PURPOSE ROOM

Area	120 SF
Quantity	1
Function	Multi-purpose study and meeting room for math faculty and students
Occupants	4-6 visitors
Adjacency	Common circulation areas and Math Department
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood with sidelight
Windows	Windows as feasible Storefront to adjacent common area Roller shades at all exterior windows
Acoustics	NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstations and equipment, convenience outlets at walls
Lighting	Overhead 30-40 footcandles
Equipment | Furniture	• Bookshelves • Table with 4 chairs



draft

DEVELOPMENTAL MATH

Space			NSF	No.	Total NSF	Remarks/Comments
MA	6.01	Department Chair Office	150	1	150	
MA	6.02	Full Time Faculty	120	11	1,320	
MA	6.03	Secretary/Reception/Waiting	180	1	180	
MA	6.04	Workroom	180	1	180	
MA	6.05	Adjunct Faculty	40	2	80	Can be in shared adjunct area
MA	6.06	Equipment Storage	120	1	120	
		Subtotal Non-Lab Space			**2,030**	
		Total Laboratory Space			**2,030**	

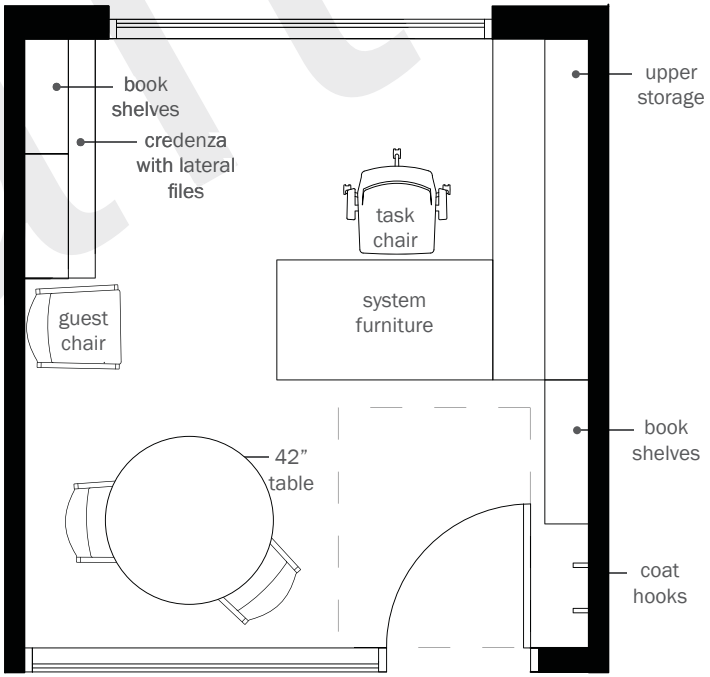
draft

6.01 DEPARTMENT CHAIR OFFICE

Area	150 SF
Quantity	1
Function	Department Chair's Office and meeting area
Occupants	1 FTE, 2-3 visitors
Adjacency	Department reception and offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer and printer
- 3 visitor chairs
- small conference table
- bookshelves
- coat hook behind door



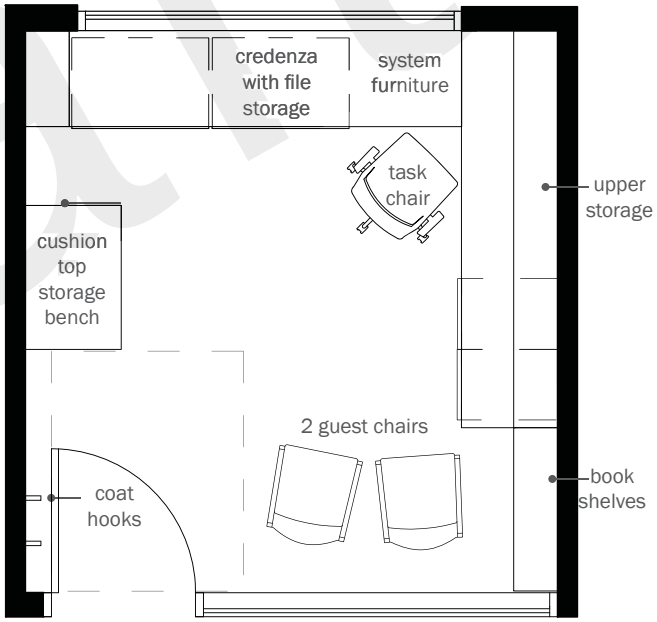
draft

6.02 FACULTY OFFICE

Area	120 SF
Quantity	14
Function	Faculty office and informal meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department reception, Department Chair's office
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door

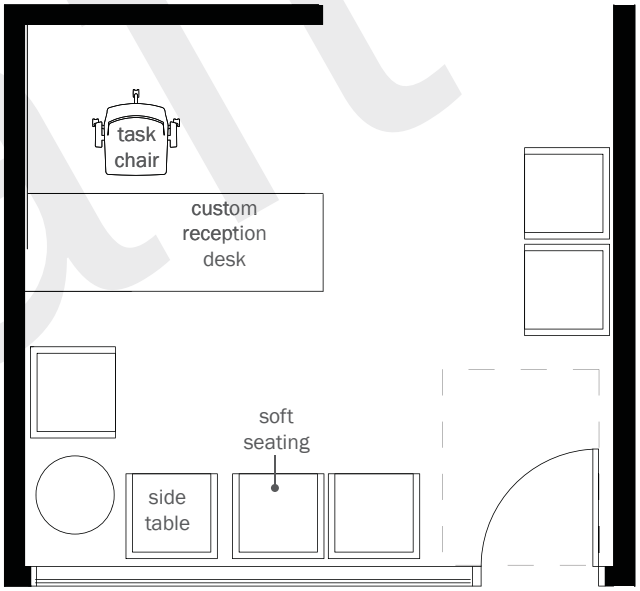


office layout based on Natural History Museum model

draft

6.03 SECRETARY / RECEPTIONIST / WAITING

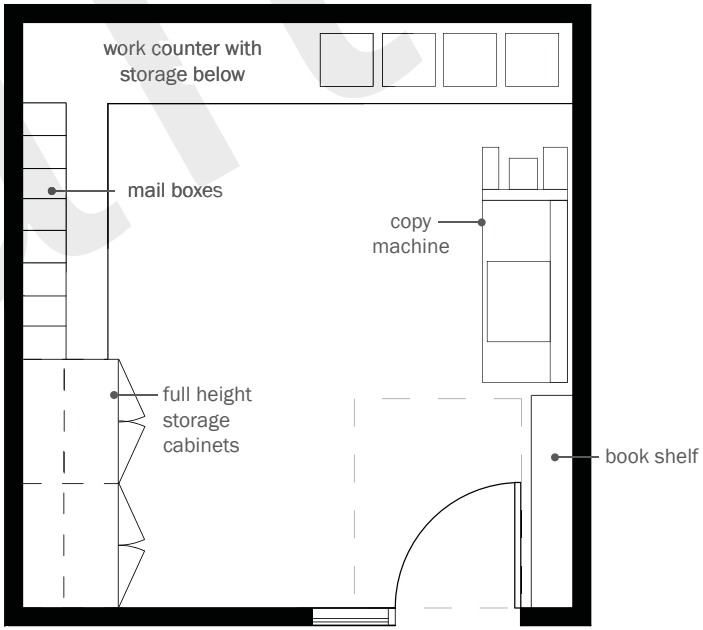
Area	180 SF
Quantity	1
Function	Waiting area for Developmental Math Department visitors and work station for reception staff or secretary
Occupants	4-6 visitors
Adjacency	Common circulation area
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Storefront
Windows	Windows as feasible Storefront to adjacent common area Roller shades at all exterior windows
Acoustics	NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstations and equipment, convenience outlets at walls of waiting area
Lighting	Overhead fluorescent 30-40 footcandles
Equipment | Furniture	• Reception desk with integrated storage • Task chair • 6 waiting chairs • Side tables



draft

6.04 WORKROOM

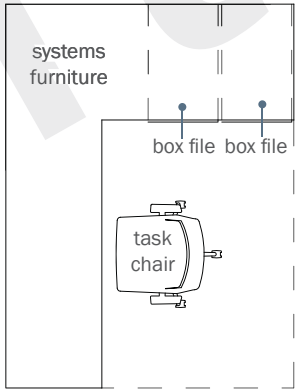
Area	180 SF
Quantity	1
Function	Math Department supply storage and workroom
Occupants	Up to 5 visitors
Adjacency	Department offices
Floor	Resilient Flooring
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	As feasible
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Shared thermostat
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls and floor for work tables
Lighting	Overhead fluorescent with occupancy sensors, 40 footcandles
Equipment | Furniture	• Storage cabinets • Storage drawers • Copy/printer and shredded paper bin • tackable surface



draft

6.05 ADJUNCT FACULTY

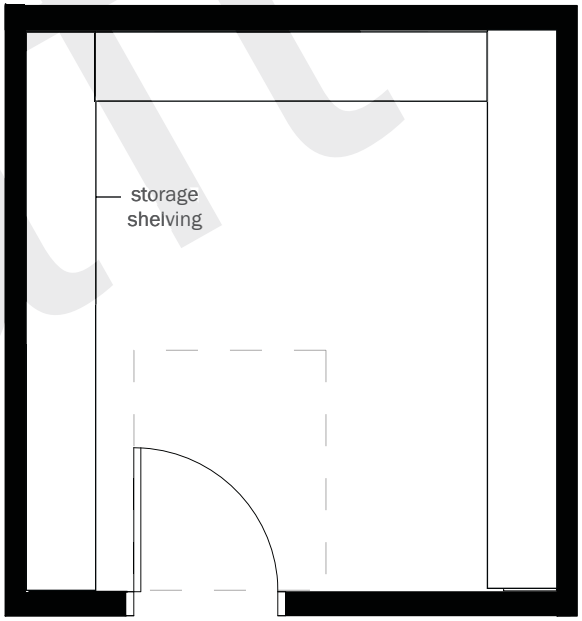
Area	40 SF
Quantity	2
Function	Adjunct faculty work space
Occupants	1 FTE
Adjacency	Department offices, shared workrooms and other faculty support spaces
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	N/A
Windows	Windows as feasible Roller shades at all exterior windows
Acoustics	NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstation and equipment, convenience outlets at walls of waiting area
Lighting	Overhead fluorescent 30 footcandles, task lighting at work stations
Equipment | Furniture	• low reception desk • work surface and storage for 2 part time staff or 1 FTE • 1 task chair • 1 computer • 1 printer



draft

6.06 EQUIPMENT STORAGE

Area	120 SF
Quantity	1
Function	Equipment storage room
Occupants	1-2 visitors
Adjacency	Developmental math classroom and office areas
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstations and equipment, convenience outlets at walls
Lighting	Overhead 40 footcandles
Equipment | Furniture	• Filing cabinets



draft

Intentionally left blank

draft

BOTANY

Space			NSF	No.	Total NSF	Remarks/Comments
TEACHING LABORATORIES						
B	01	Intro Botany Lab	1,260	1	1,260	Flexible, moveable tables, snorkel, math classroom
B	02	Advanced Botany Lab	1,260	1	1,260	Laminar flow hood, moveable tables
B	03	Plant Physiology Lab	630	1	630	Chemical fume hood (3)
		Subtotal Teaching Laboratory Space			**3,150**	
RESEARCH LABORATORIES						
B	11	Research Lab, Molecular	442	1	442	All 6 faculty members, research
B	12	Research Lab, Biochem	315	1	315	90% of students do research
B	13	Research Lab, Field	442	1	442	
		Subtotal Research Laboratory Space			**1,199**	
LABORATORY SUPPORT						
B	21	Prep/Storage Room	630	1	630	
B	22	Herbarium	945	1	945	
B	23	Growth Chamber/Equipment Room	105	1	105	Could be Shared Equipment Room
B	24	Head House	472	1	472	
B	25	Greenhouse	1,575	1	1,575	
B	26	Field Equipment Storage	157	1	157	Can be combined larger shared space
		Subtotal Laboratory Support Space			**3,884**	

draft

page left intentionally blank

draft

Space			NSF	No.	Total NSF	Remarks/Comments
NON-LAB SPACE						
B	31	Department Chair	150	1	150	
B	32	5 Full Time Faculty	120	5	600	
B	33	1 Lab Manager	120	1	120	
B	34	1 Storage	120	1	120	
		Subtotal Non-Lab Space			**990**	
		Total Laboratory Space			**9,223**	

draft

B.01 INTRO BOTANY LAB

Area	1,260 SF
Quantity	1
Function	Flexible Botany teaching laboratory, shared math classroom
Occupants	24 students, 1-2 faculty
Adjacency	Botany prep and storage rooms and Advanced Botany teaching lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

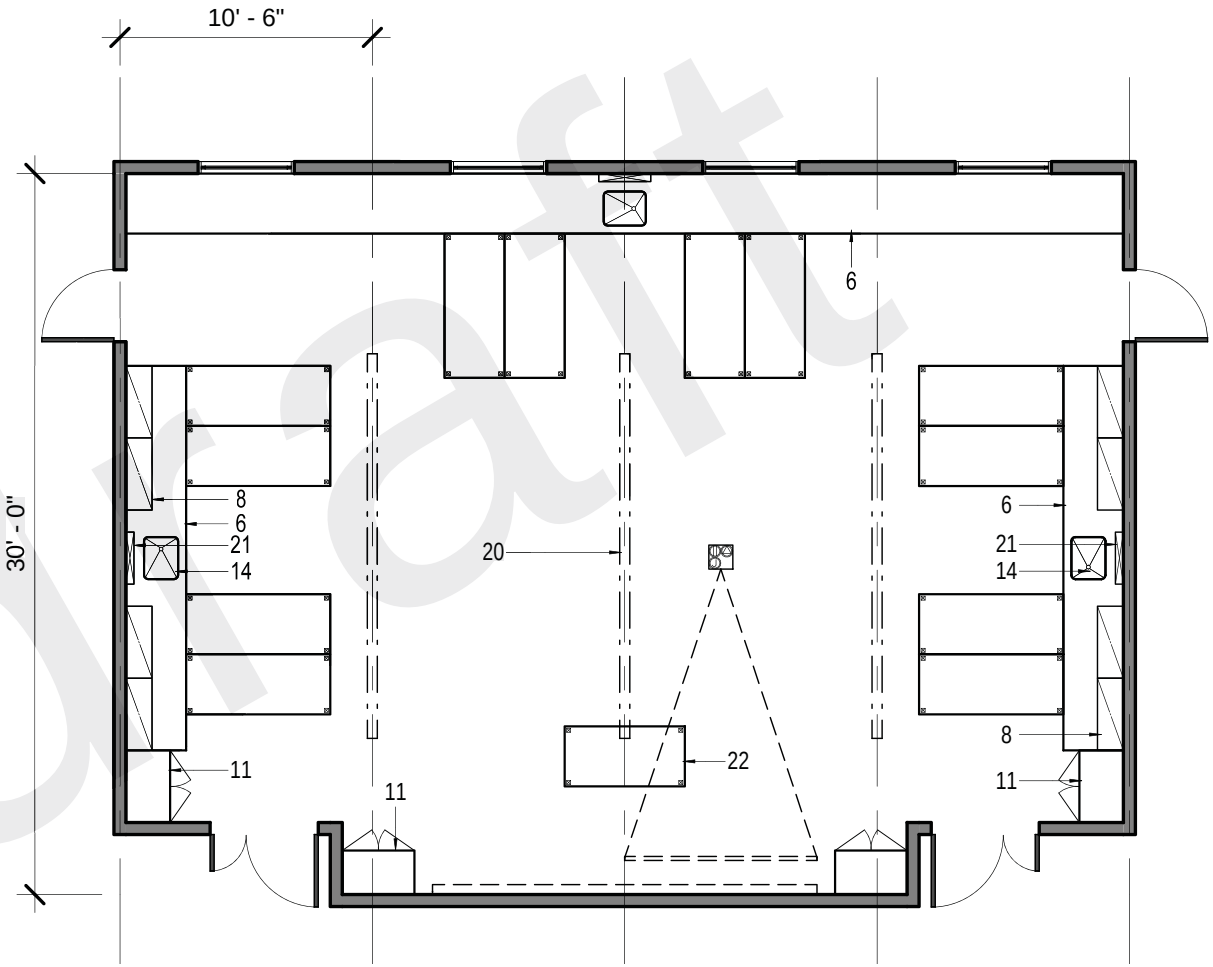
LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

B.02 ADVANCED BOTANY LAB

Area	1,260 SF
Quantity	1
Function	Flexible Botany teaching laboratory
Occupants	24 students, 1-2 faculty
Adjacency	Botany prep and storage rooms and Intro Botany teaching lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	●
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

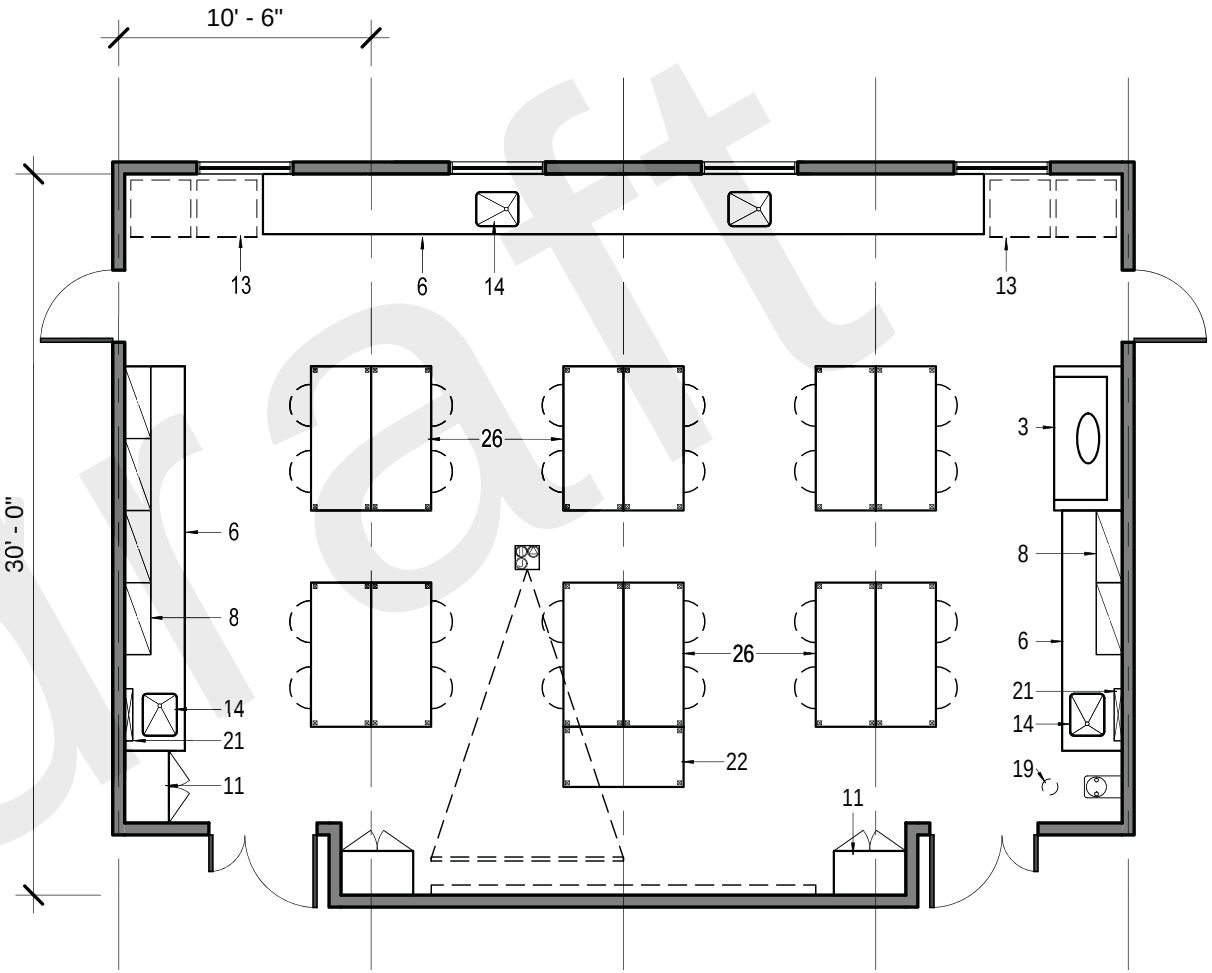
LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

B.03 PLANT PHYSIOLOGY LAB

Area	630 SF
Quantity	1
Function	Plant Physiology teaching laboratory
Occupants	12 students, 1-2 faculty
Adjacency	Botany prep and storage rooms and Intro Botany teaching lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1)6'
Radioisotope Hood	
Laminar Flow Hood	●
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

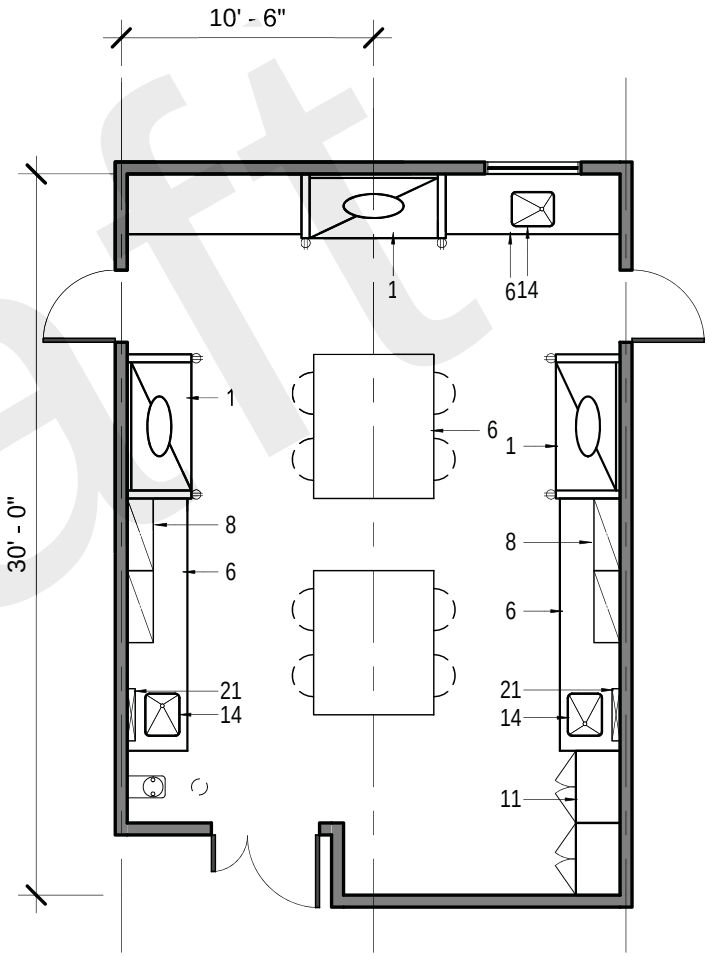
LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	●
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

B.11 RESEARCH LAB - MOLECULAR

Area	442 SF
Quantity	1
Function	Faculty research laboratory
Occupants	6 faculty and student researchers
Adjacency	Botany laboratory support rooms
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	As feasible, may be shared from adjacent spaces
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1)6'
Radioisotope Hood	
Laminar Flow Hood	●
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

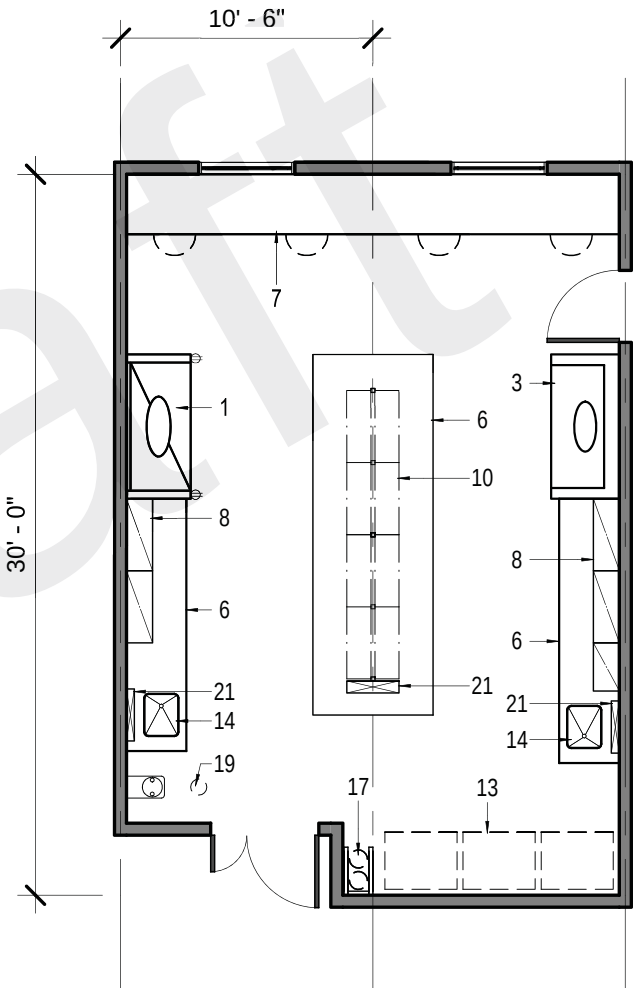
LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

B.12 RESEARCH LAB - BIOCHEM

Area	315 SF
Quantity	1
Function	Faculty research laboratory
Occupants	2-6 faculty and student researchers
Adjacency	Botany laboratory support rooms
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	As feasible, may be shared from adjacent spaces
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1)6'
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

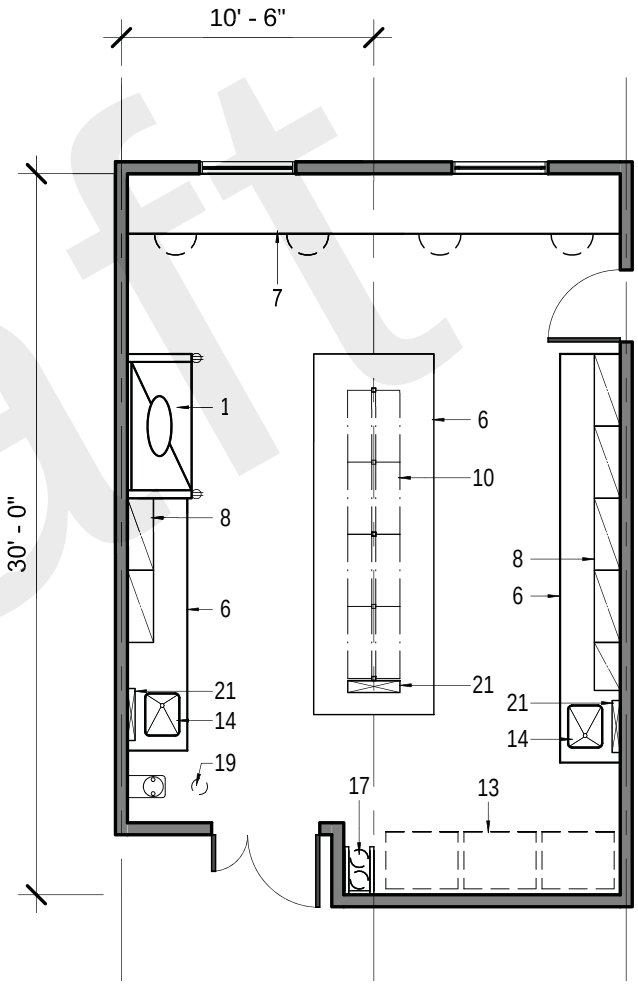
LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

B.13 RESEARCH LAB - FIELD

Area	442 SF
Quantity	1
Function	Faculty research laboratory
Occupants	2-6 faculty and student researchers
Adjacency	Botany laboratory support rooms
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	As feasible, may be shared from adjacent spaces
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

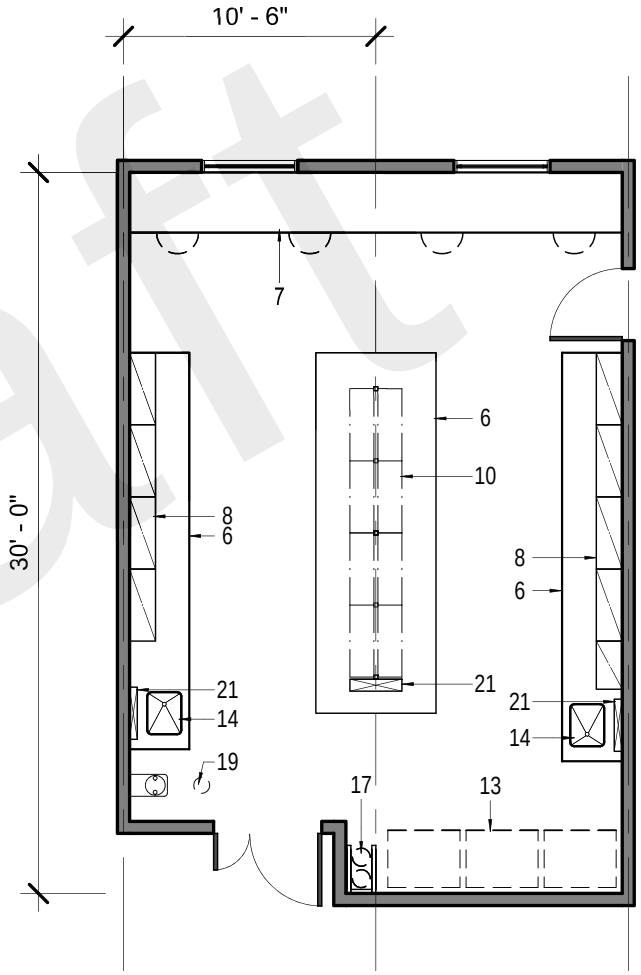
LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

B.21 PREP / STORAGE ROOM

Area	630 SF
Quantity	1
Function	Laboratory prep and material storage room
Occupants	1-4 faculty
Adjacency	Botany teaching laboratories
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf
Windows	As feasible, may be shared from adjacent spaces
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1)4'
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	●
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

draft

B.22 HERBARIUM

Area	630 SF
Quantity	1
Function	Laboratory prep and material storage room
Occupants	1-4 faculty
Adjacency	Botany teaching laboratories
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf
Windows	As feasible, may be shared from adjacent spaces
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	●
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

B.23 GROWTH CHAMBER / EQUIPMENT ROOM

Area	105 SF
Quantity	1
Function	
Occupants	
Adjacency	Near the head house and greenhouse
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf
Windows	As feasible, may be shared from adjacent spaces
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	4
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	●
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

B.24 HEAD HOUSE

Area	472 SF
Quantity	1
Function	
Occupants	
Adjacency	Adjacent to the greenhouse
Floor	Sealed concrete
Wall	Epoxy painted gypsum board
Ceiling	Open
Doors	Wood with lite, 3' leaf
Windows	As feasible, may be shared from adjacent spaces
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment, sediment trap at all waste connections
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	4
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1)4'
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	●
Potable Cold Water (CW)	●
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

Draft

B.25 GREENHOUSE

Area	1,575 SF
Quantity	1
Function	A controlled environment to foster and promote plant growth
Occupants	1-12 faculty and students
Adjacency	Adjacent to the headhouse
Floor	Sealed concrete
Wall	Glazed material
Ceiling	Glazed material
Doors	Wood with lite, 3' leaf
Windows	At walls and roof for optimal plant growth.
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Variable temperature ranges; at least one area should be able to achieve an ambient relative humidity of +20%
Plumbing	As needed for floor drain.
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead as needed for plant growth, integrated photocell sensors.

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	
Other	●
Humidity	
Uncontrolled	
Other	●
Minimum Air Changes/Hour	4
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

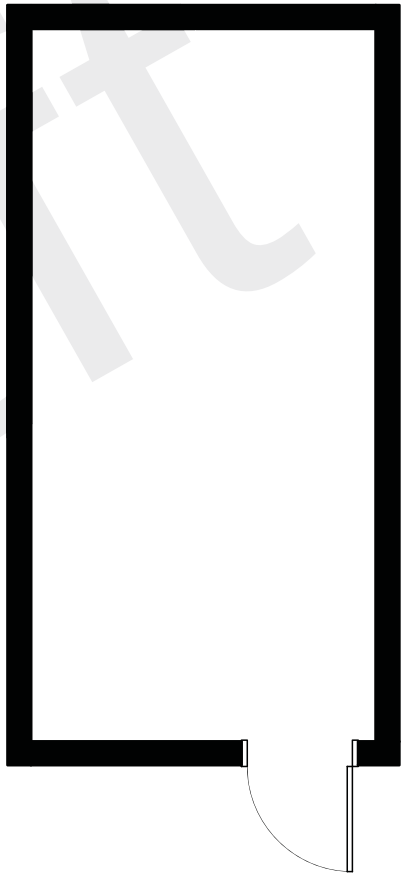
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	●
Potable Cold Water (CW)	●
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	●
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

draft

B.26 FIELD EQUIPMENT STORAGE

Area	157 SF
Quantity	1
Function	Botany field equipment and tool storage
Occupants	0 FTE, 1-2 visitors
Adjacency	Near a building exit, may be shared with other department field storage, with a secured enclosure for Botany
Floor	Sealed concrete
Wall	Epoxy painted gypsum board, or secured fencing
Ceiling	Open to structure above
Doors	Metal
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	Convenience outlets at walls
Lighting	40 footcandles overhead, integrated occupancy sensor
Equipment | Furniture	• Storage shelves as necessary



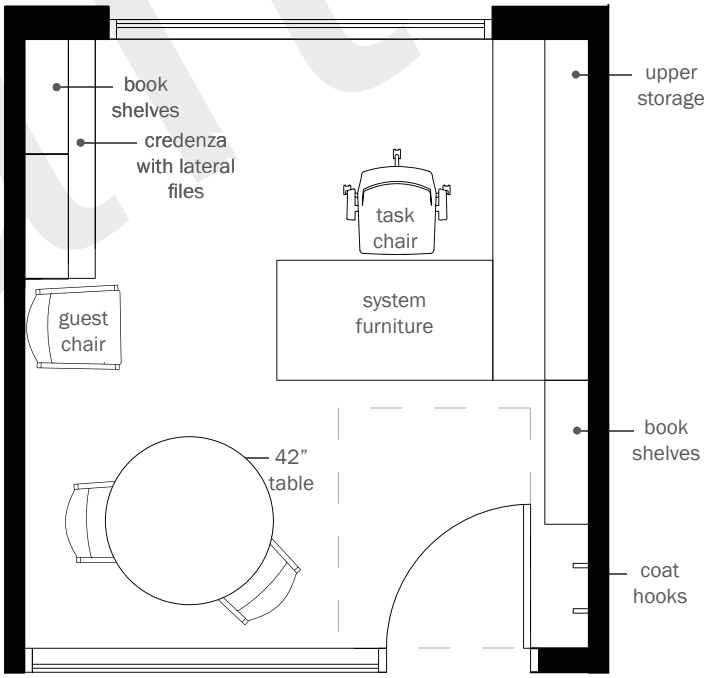
draft

B.31 DEPARTMENT CHAIR OFFICE

Area	150 SF
Quantity	1
Function	Department Chair's Office and meeting area
Occupants	1 FTE, 2-3 visitors
Adjacency	Department reception and offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer and printer
- 3 visitor chairs
- small conference table
- bookshelves
- coat hook behind door



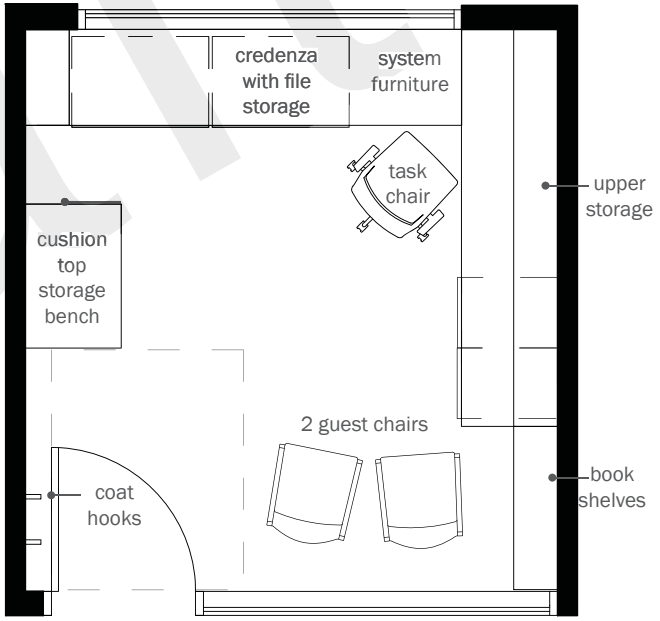
draft

B.32 FACULTY OFFICE

Area	120 SF
Quantity	5
Function	Faculty office and informal meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department reception, Department Chair's office
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door



office layout based on Natural History Museum model

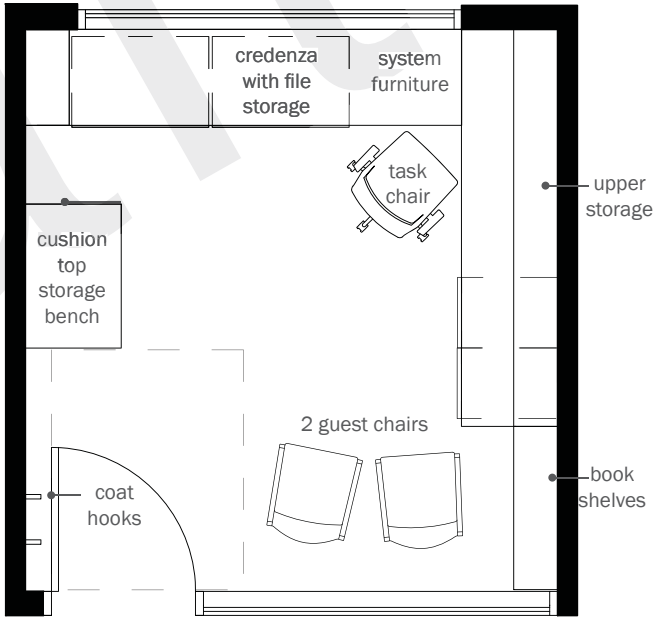
draft

B.33 LAB MANAGER OFFICE

Area	120 SF
Quantity	1
Function	Laboratory Manager office and meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department laboratories and support spaces
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door

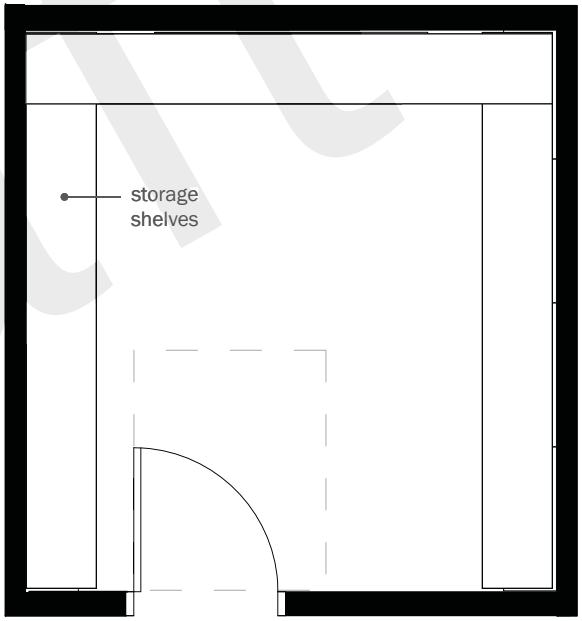


office layout based on Natural History Museum model

draft

B.34 STORAGE

Area	120 SF
Quantity	1
Function	Department storage room
Occupants	1-2 visitors
Adjacency	Faculty offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for workstations and equipment, convenience outlets at walls
Lighting	Overhead 40 footcandles, occupancy sensor
Equipment | Furniture	• Storage shelves



draft

draft

CHEMISTRY

Space			NSF	No.	Total NSF	Remarks/Comments
TEACHING LABORATORIES						
C	01	General Chemistry Lab	1,260	4	5,040	
C	02	Organic Chemistry Lab	1,575	2	3,150	Incl. new Inorganic Lab
C	03	Adv. Analytical/Inorganic Lab	945	1	945	
C	04	Physical/Quant. Chemistry Lab	1,260	1	1,260	Physical chemistry near research space
C	05	Biotech/Instrument Lab	945	1	945	
		Subtotal Teaching Laboratory Space			**11,340**	
RESEARCH LABORATORIES						
C	11	Research Lab, Biochemistry	630	1	630	
C	12	Research Lab, Phys/Analyt.	472	2	944	
C	13	Research Lab, Synthetic	630	1	630	
		Subtotal Research Laboratory Space			**2,204**	
LABORATORY SUPPORT						
C	21	Chemistry Prep Room	630	1	630	Proximate to Lower Division labs
C	22	Chemistry Lab Support	157	3	471	(2) for Gen Chem, (1) for O Chem
C	23	Balance Room	157	3	471	(2) for Gen Chem, (1) for O Chem
C	24	Shared Instrument Room	945	1	945	Includes pump room
C	25	NMR Room	157	1	157	
		Subtotal Laboratory Support Space			**2,674**	

draft

page left intentionally blank

draft

Space			NSF	No.	Total NSF	Remarks/Comments
NON-LAB SPACE						
C	31	Department Chair	150	1	150	
C	32	Full Time Faculty	120	10	1,200	
C	33	Lab Manager	120	1	120	
C	34	Lab Science Store Manager	120	1	120	
		Subtotal Non-Lab Space			**1,590**	
		Total Laboratory Space			**17,808**	

draft

C.01 GENERAL CHEMISTRY LAB

Area	1,260 SF
Quantity	4
Function	General Chemistry teaching laboratory
Occupants	24 students, 1-2 faculty
Adjacency	Chemistry prep rooms and other General Chemistry labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(3)6'
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

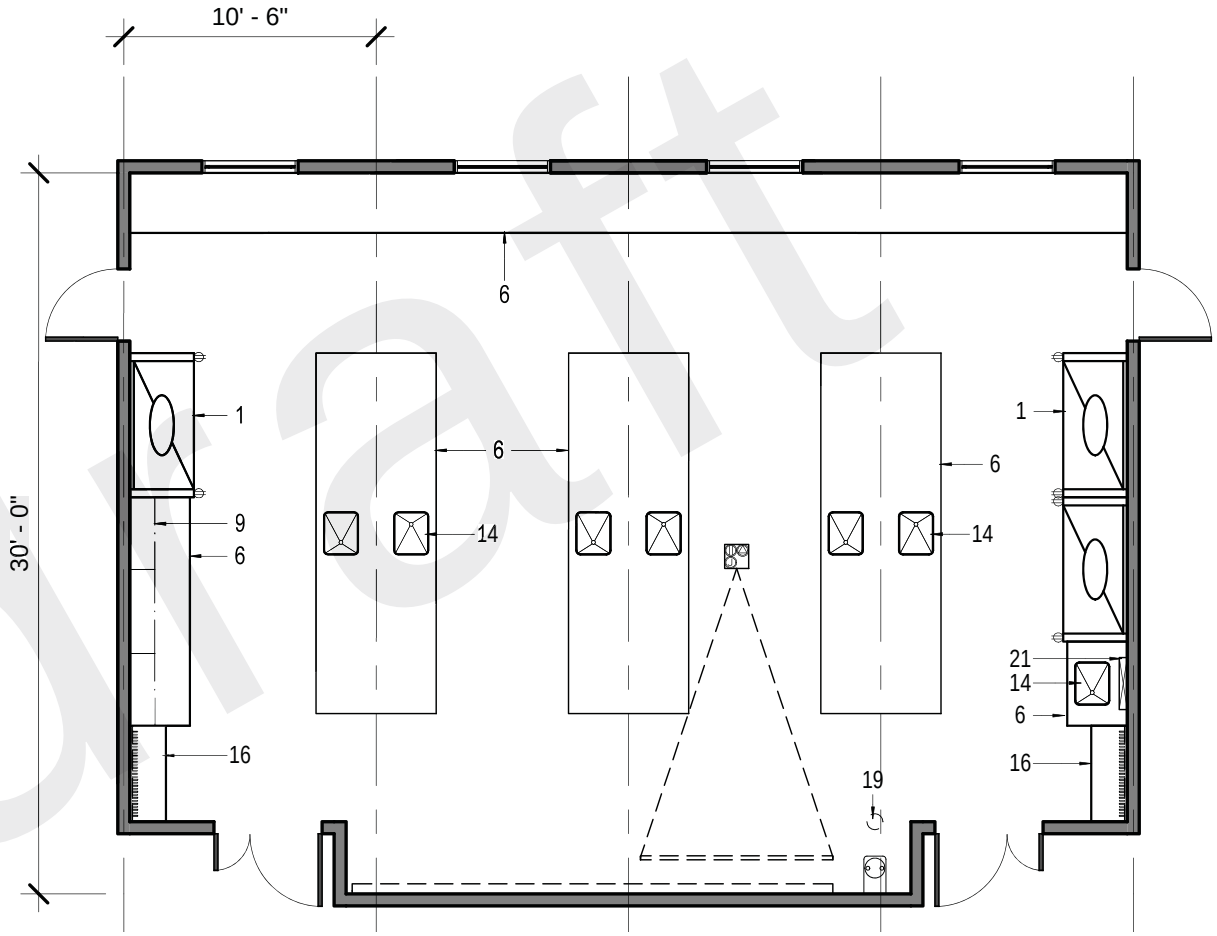
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	●
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

C.02 ORGANIC CHEMISTRY LAB

Area	1,575 SF
Quantity	2
Function	Organic Chemistry teaching laboratory
Occupants	30 students, 1-2 faculty
Adjacency	Chemistry prep rooms and General Chemistry labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(12)6'
Dispensing/Waste Hood	(1) 4'
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

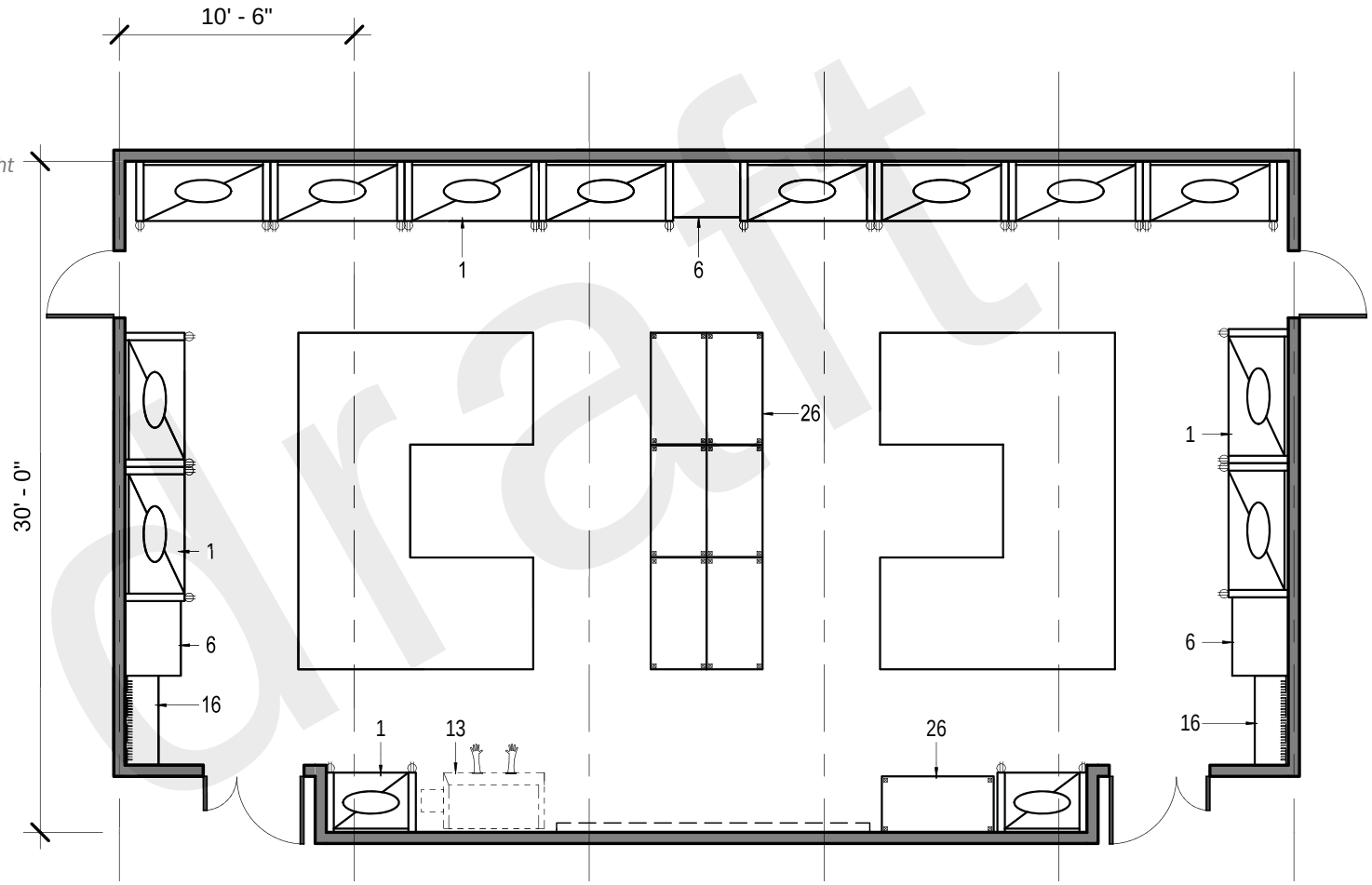
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	●
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	●
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

C.03 ADVANCED ANALYTICAL /INORGANIC CHEMISTRY LAB

Area	945 SF
Quantity	1
Function	Advanced Chemistry teaching laboratory
Occupants	18 students, 1-2 faculty
Adjacency	Chemistry support and research labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(3) 6'
Dispensing/Waste Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

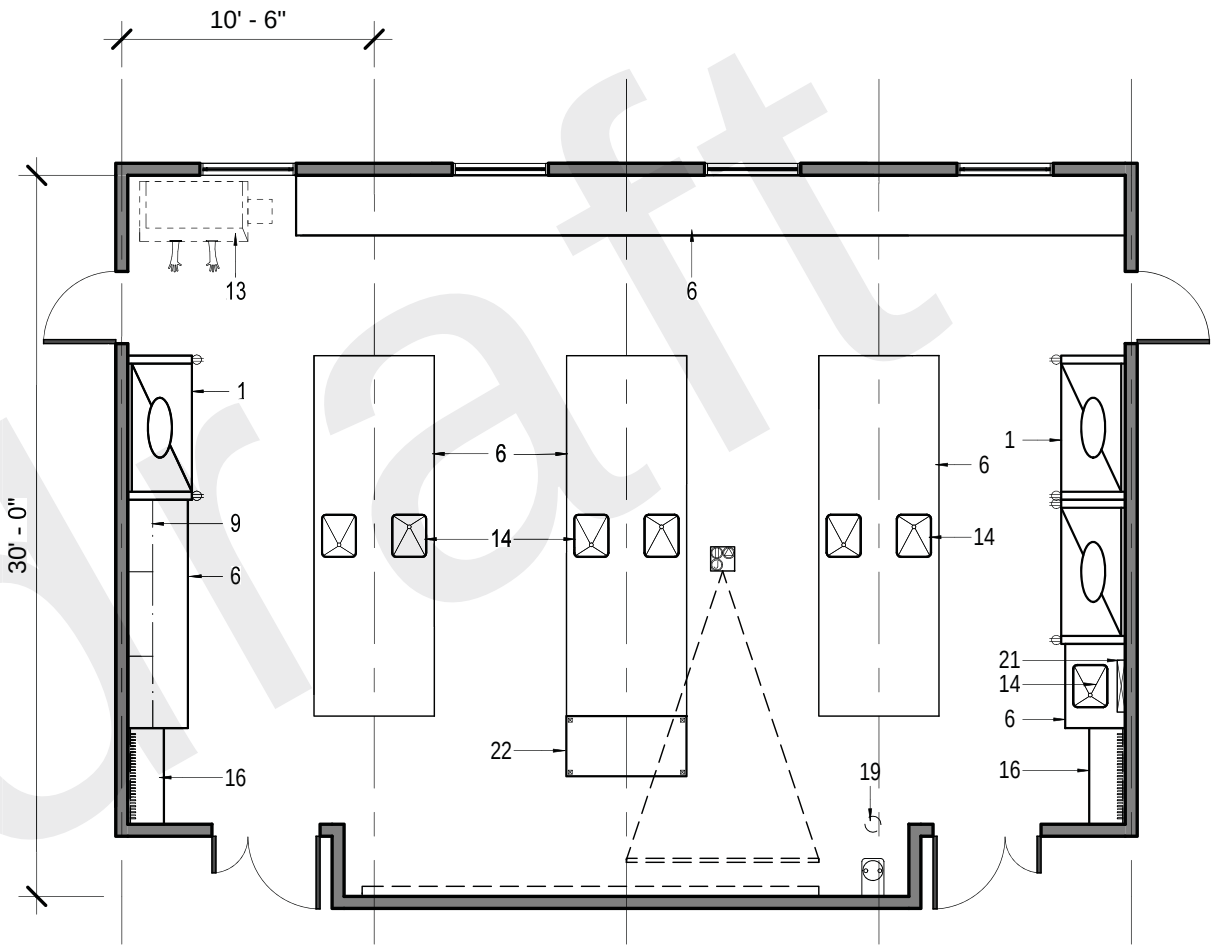
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

C.04 PHYSICAL / QUANT. CHEMISTRY LAB

Area	1,260 SF
Quantity	1
Function	Physical and Quantitative Chemistry teaching laboratory
Occupants	24 students, 1-2 faculty
Adjacency	Adjacent to Chemistry Research Labs, near chemistry support spaces
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 6'
Dispensing/Waste Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

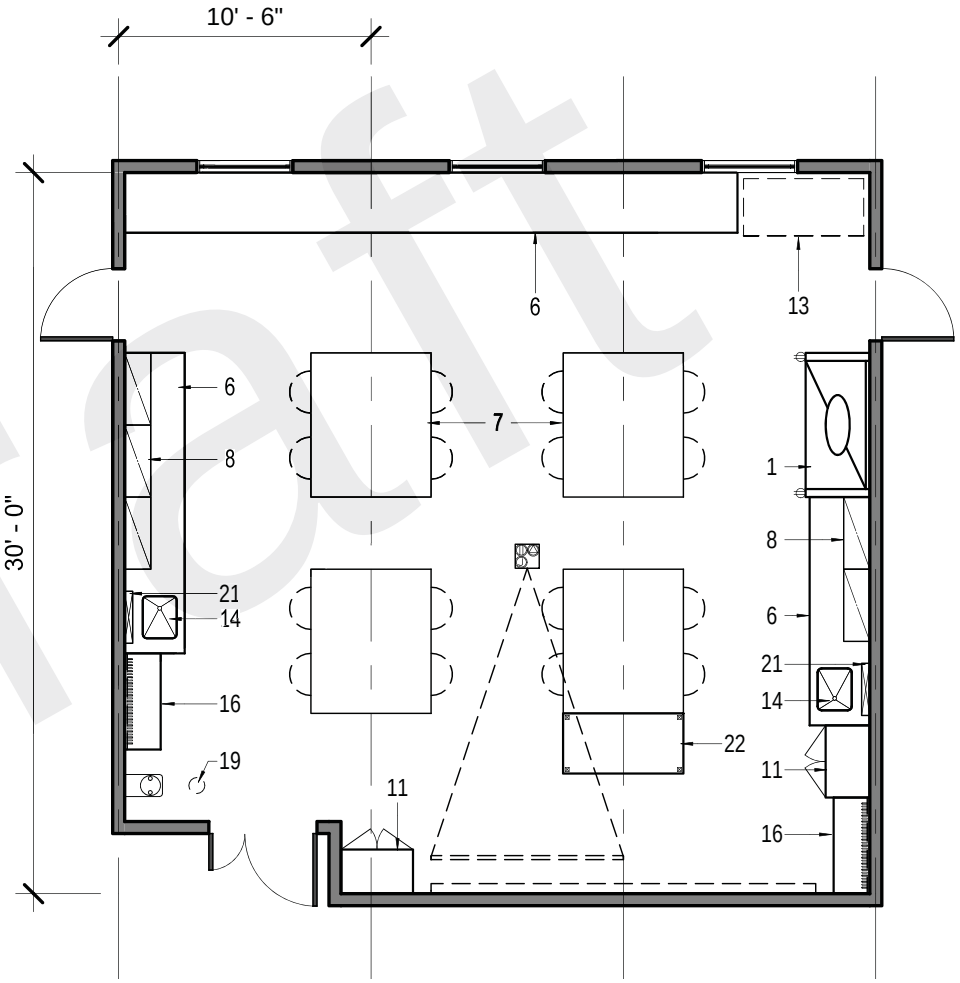
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

Draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

C.05 BIOTECH / INSTRUMENT LAB

Area	945 SF
Quantity	1
Function	Biotech and instrumentation research and teaching laboratory
Occupants	18 students, 1-2 faculty
Adjacency	Adjacent to chemistry research labs, near chemistry support spaces
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 4'
Dispensing/Waste Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

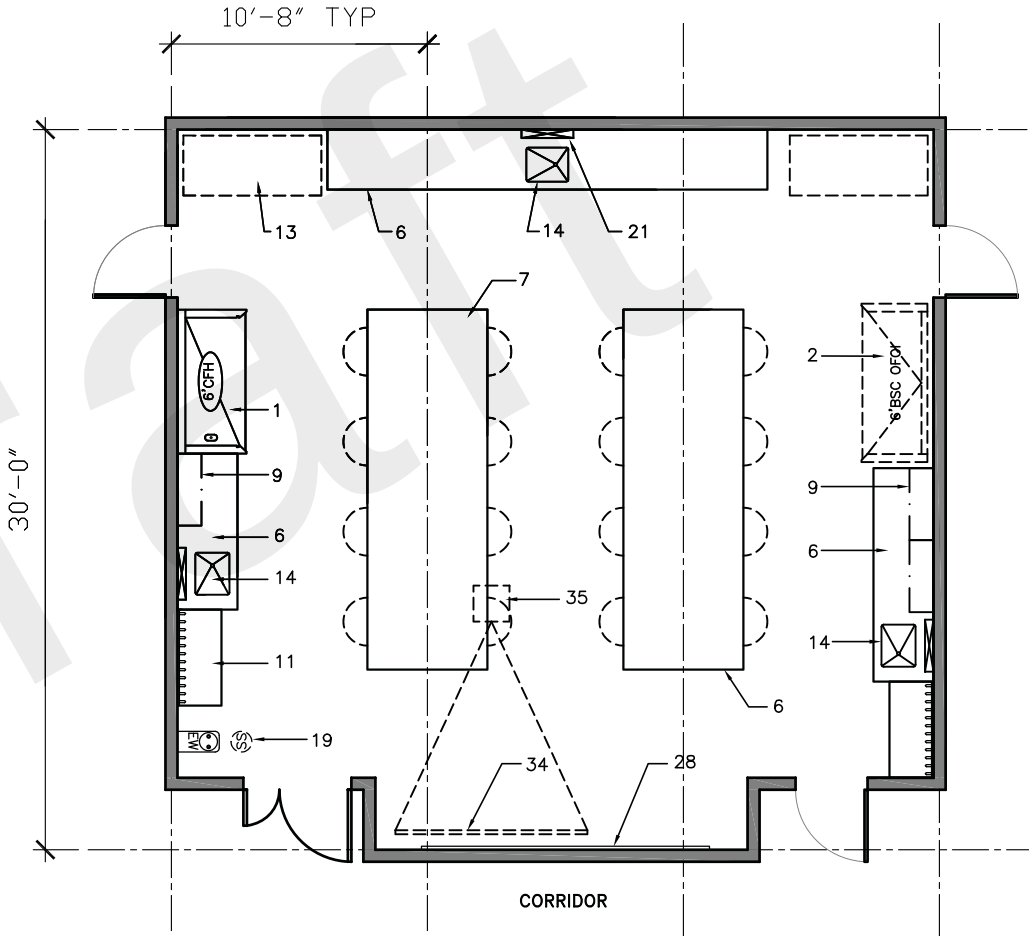
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	●
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

C.11 RESEARCH LAB - BIOCHEMISTRY

Area	630 SF
Quantity	1
Function	Biochemistry focused faculty research lab
Occupants	6-8 faculty and research students
Adjacency	Adjacent to other research labs, near chemistry support spaces
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades, as feasible
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 4'
Dispensing/Waste Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

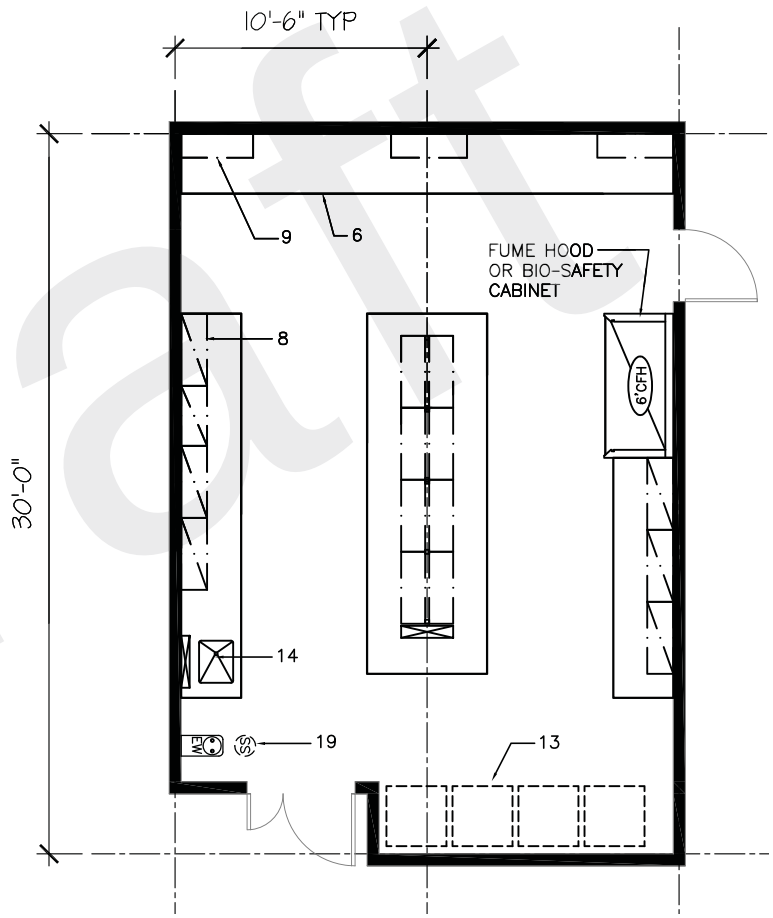
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	●
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

C.12 RESEARCH LAB - PHYSICAL / ANALYTICAL

Area	472 SF
Quantity	2
Function	Biochemistry focused faculty research lab
Occupants	4 faculty and research students
Adjacency	Adjacent to other research labs, near chemistry support spaces
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades, as feasible
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 6'
Dispensing/Waste Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

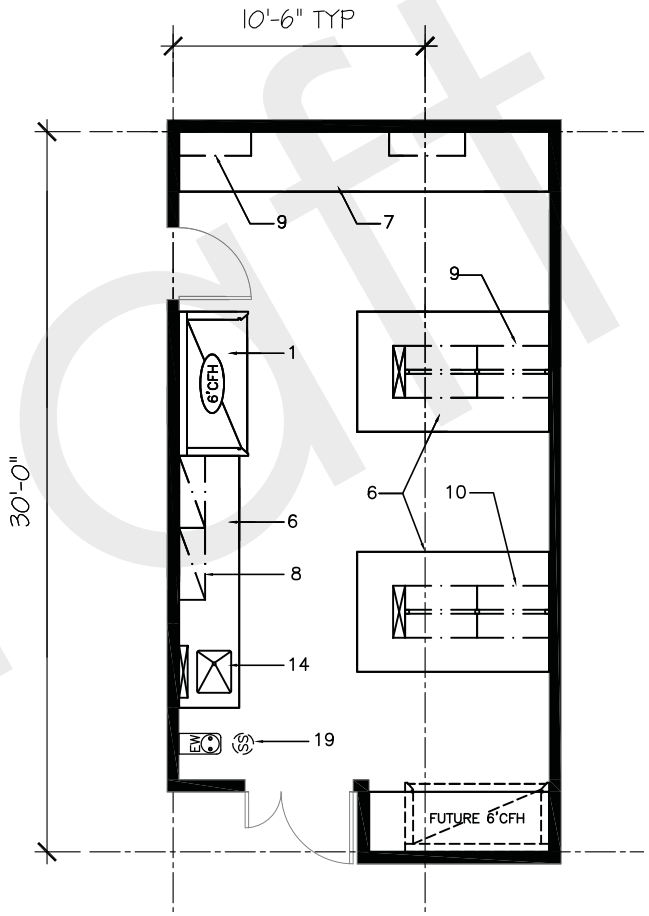
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

C.13 RESEARCH LAB - SYNTHETIC

Area	630 SF
Quantity	1
Function	Biochemistry focused faculty research lab
Occupants	6-8 faculty and research students
Adjacency	Adjacent to other research labs, near chemistry support spaces
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades, as feasible
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(2) 8'
Dispensing/Waste Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	●

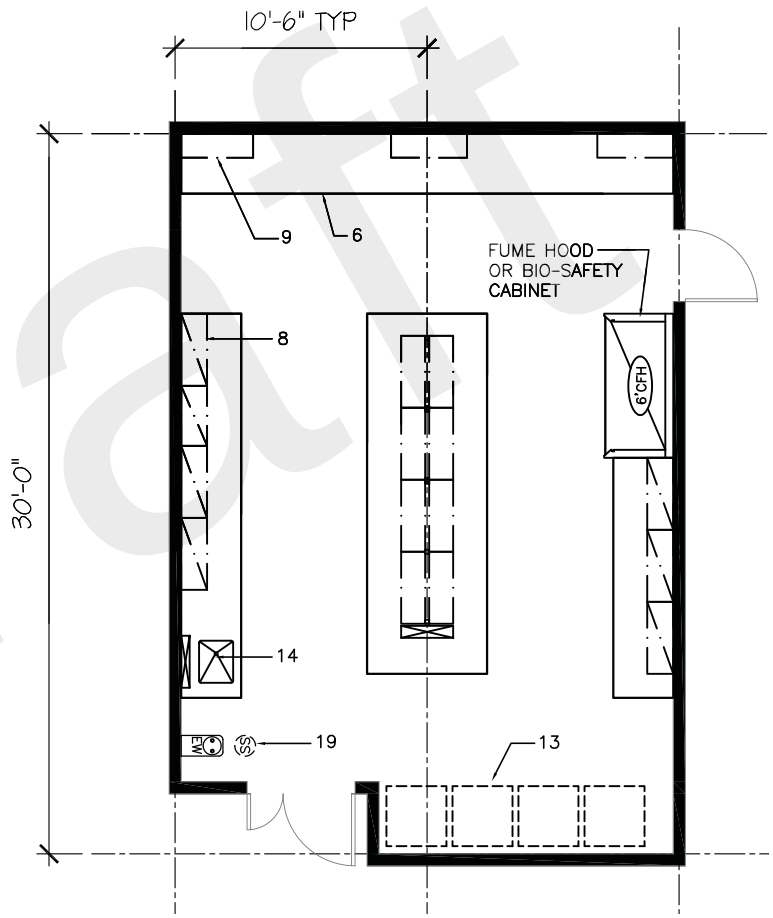
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	●
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

C.21 CHEMISTRY PREP ROOM

Area	630 SF
Quantity	1
Function	Chemistry lab preparation space
Occupants	2-6 faculty and teaching assistants
Adjacency	Adjacent to lower division chemistry labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(2) 8'
Dispensing/Waste Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Vented Storage Cabinets	●

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	●
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

C.22 CHEMISTRY LAB SUPPORT

Area	157 SF
Quantity	3
Function	Chemistry lab storage and support
Occupants	2-6 faculty and teaching assistants
Adjacency	(2) at Gen. Chem labs and (1) for Organic Chem Labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 8'
Dispensing/Waste Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Vented Storage Cabinets	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

C.23 BALANCE ROOM

Area	157 SF
Quantity	3
Function	Chemistry lab balance room
Occupants	1-2 faculty and teaching assistants
Adjacency	(2) at Gen. Chem labs and (1) for Organic Chem Labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Dispensing/Waste Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Vented Storage Cabinets	

LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

C.24 SHARED INSTRUMENT ROOM

Area	945 SF
Quantity	1
Function	Shared instrumentation room for chemistry. Includes a dedicated pump room
Occupants	16
Adjacency	Advanced chemistry teaching and research labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	●
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 8'
Dispensing/Waste Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	●

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

C.25 NMR ROOM

Area	157 SF
Quantity	1
Function	Nuclear Magnetic Resonance Spectroscopy equipment room
Occupants	1-2 faculty and teaching assistants
Adjacency	Advanced chemistry teaching and research spaces
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", Anti-microbial acoustic ceiling tiles
Doors	Wood with lite, 3' leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared), emergency exhaust in case of LN2/LHe quench.
Plumbing	As needed for laboratory sink, emergency shower and eye wash and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Remote ballasts or LED lighting

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Dispensing/Waste Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Emergency Exhaust	●

LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	
Vibration Producing	
Heat Producing	●
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	●
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

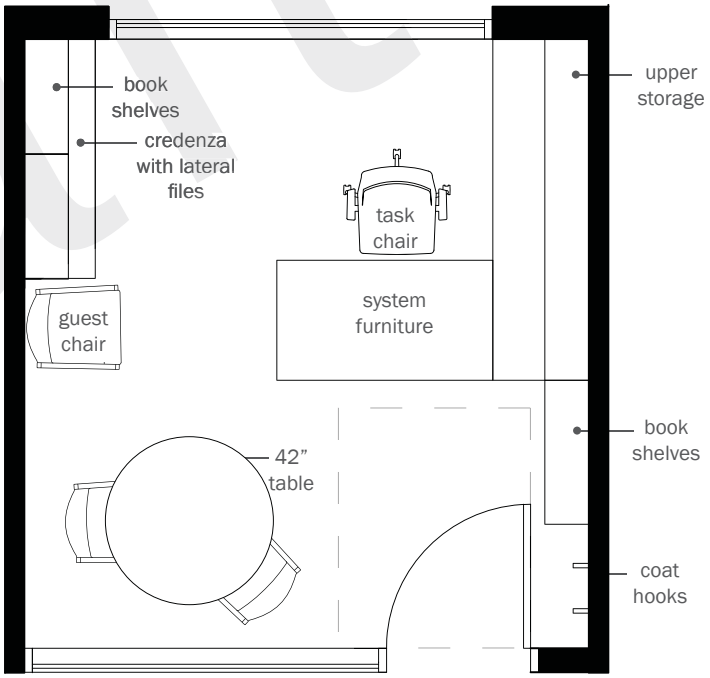
draft

C.31 DEPARTMENT CHAIR OFFICE

Area	150 SF
Quantity	1
Function	Department Chair's Office and meeting area
Occupants	1 FTE, 2-3 visitors
Adjacency	Department reception and offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer and printer
- 3 visitor chairs
- small conference table
- bookshelves
- coat hook behind door



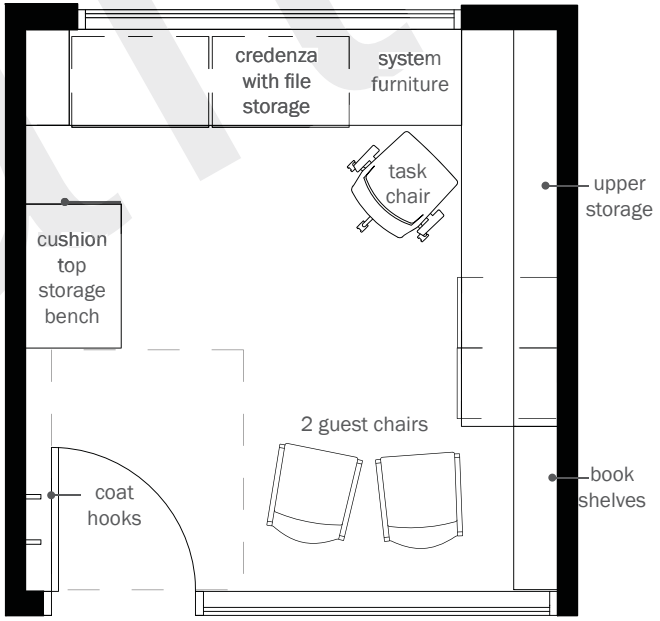
draft

C.32 FACULTY OFFICE

Area	120 SF
Quantity	10
Function	Faculty office and informal meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department reception, Department Chair's office
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door



office layout based on Natural History Museum model

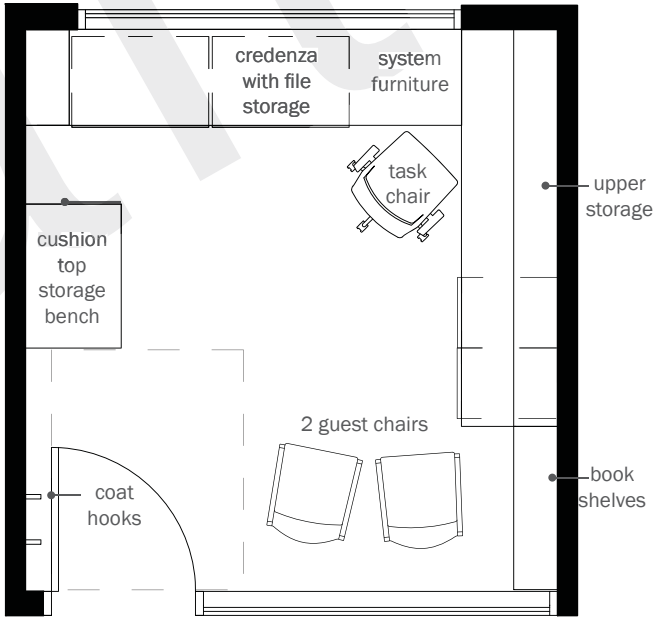
draft

C.33 LAB MANAGER OFFICE

Area	120 SF
Quantity	1
Function	Laboratory Manager office and meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department laboratories and support spaces
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door



office layout based on Natural History Museum model

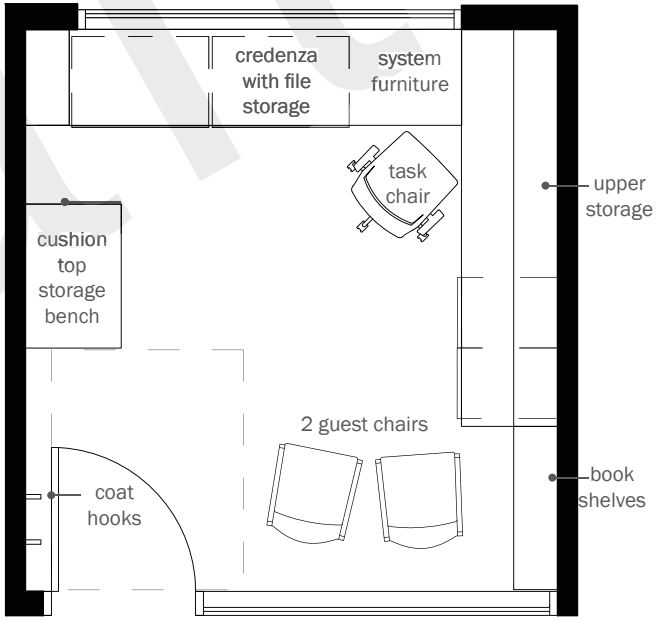
draft

C.34 SCIENCE STORE MANAGER OFFICE

Area	120 SF
Quantity	1
Function	Science Store Manager office and meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department laboratories and support spaces
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door



office layout based on Natural History Museum model

draft

GEOSCIENCES

Space			NSF	No.	Total NSF	Remarks/Comments
TEACHING LABORATORIES						
G	01	Intro Geosciences Lab	1,260	1	1,260	
G	02	Advanced Geosciences Lab	1,260	1	1,260	
G	03	Wet Chemistry Lab	630	1	630	(1) 6' fume hood, (1) 6' (HF) hood mixed acid
		Subtotal Teaching Laboratory Space			3,150	
RESEARCH LABORATORIES						
G	11	Research Lab, Mineralogy	630	1	630	No fume hood, sink, benches
G	12	Research Lab, Hydrology	315	1	315	Sink, no hood, bench space, cabinets
G	13	Research Lab, Sedimentation	315	1	315	
G	14	GIS Research	200	1	200	Adjacent to computational lab
		Subtotal Research Laboratory Space			**1,460**	
LABORATORY SUPPORT						
G	21	Specimen Storage (Lab)	472	1	472	Near teaching labs
G	22	Rock Prep Room	472	1	472	Sink, saw, ventilation, crusher
G	23	XRD Room	105	1	105	
G	24	Field Equipment Storage	157	1	157	Can be combined with other departments
G	25	Weather Station	0	1	0	Located on building roof
G	26	Shared Instrument Room	-	0	0	
		Subtotal Laboratory Support Space			**1,206**	

draft

page left intentionally blank

draft

Space			NSF	No.	Total NSF	Remarks/Comments
NON-LAB SPACE						
G	31	Department Chair	150	1	150	
G	32	Full Time Faculty	120	5	600	
G	33	Lab Manager	120	1	120	
		Subtotal Non-Lab Space			**870**	
		Total Laboratory Space			**6,686**	

draft

G.01 INTRO GEOSCIENCES LAB

Area	1,260 SF
Quantity	1
Function	Flexible Geosciences teaching laboratory, shared math classroom
Occupants	24 students, 1-2 faculty
Adjacency	Geosciences prep and storage rooms and advanced teaching lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	2-4
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

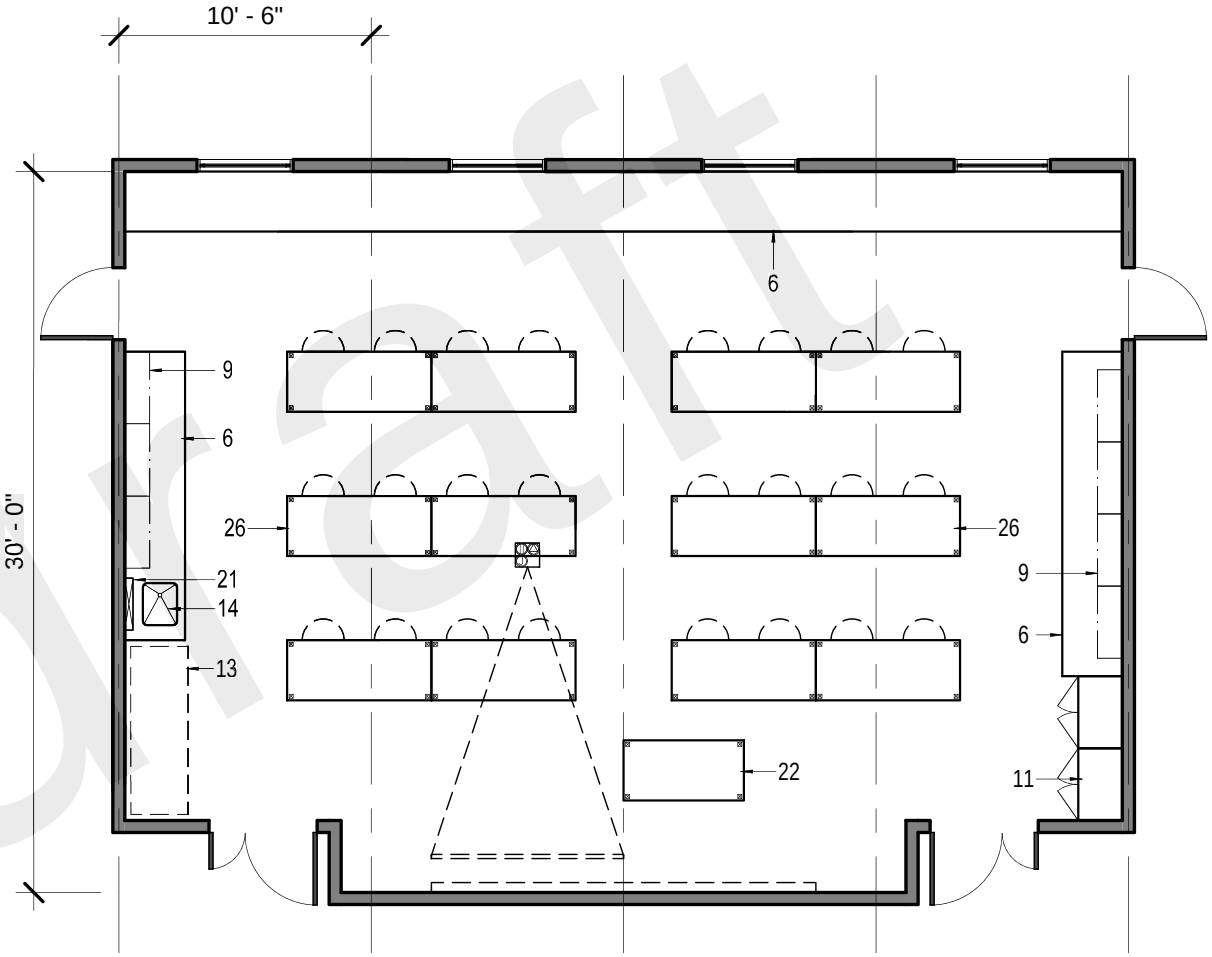
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	●
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

G.02 ADVANCED GEOSCIENCES LAB

Area	1,260 SF
Quantity	1
Function	Flexible Geosciences teaching laboratory
Occupants	24 students, 1-2 faculty
Adjacency	Geosciences prep and storage rooms and Intro teaching lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	2-4
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

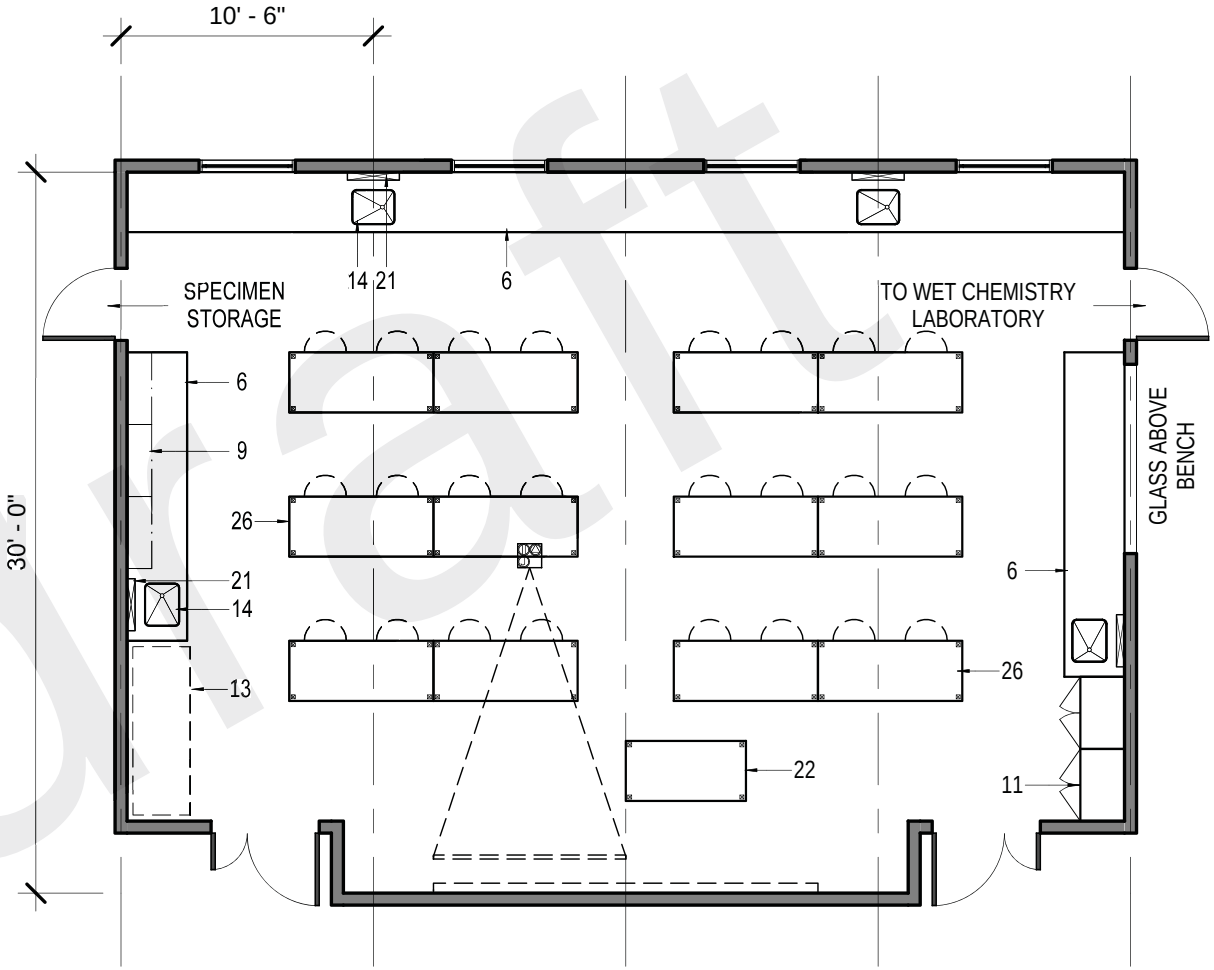
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	●
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

G.03 WET CHEMISTRY LAB

Area	630 SF
Quantity	1
Function	Geosciences wet and chemistry laboratory
Occupants	12 students, 1-2 faculty
Adjacency	Adjacent to the Advanced Lab and near research laboratories
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 6'
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Mixed Acid Fume Hood	(1) 6'

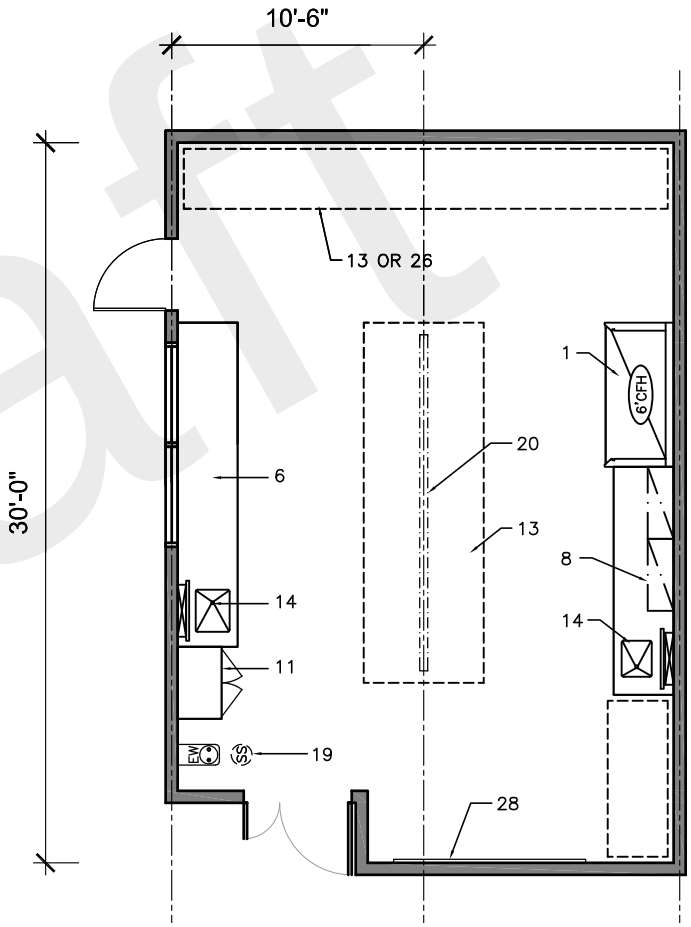
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	●
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

G.11 RESEARCH LAB - MINERALOGY

Area	630 SF
Quantity	1
Function	Geosciences minerlogy research lab
Occupants	6-8 Faculty and research students
Adjacency	Geosciences teaching and support spaces
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Mixed Acid Fume Hood	

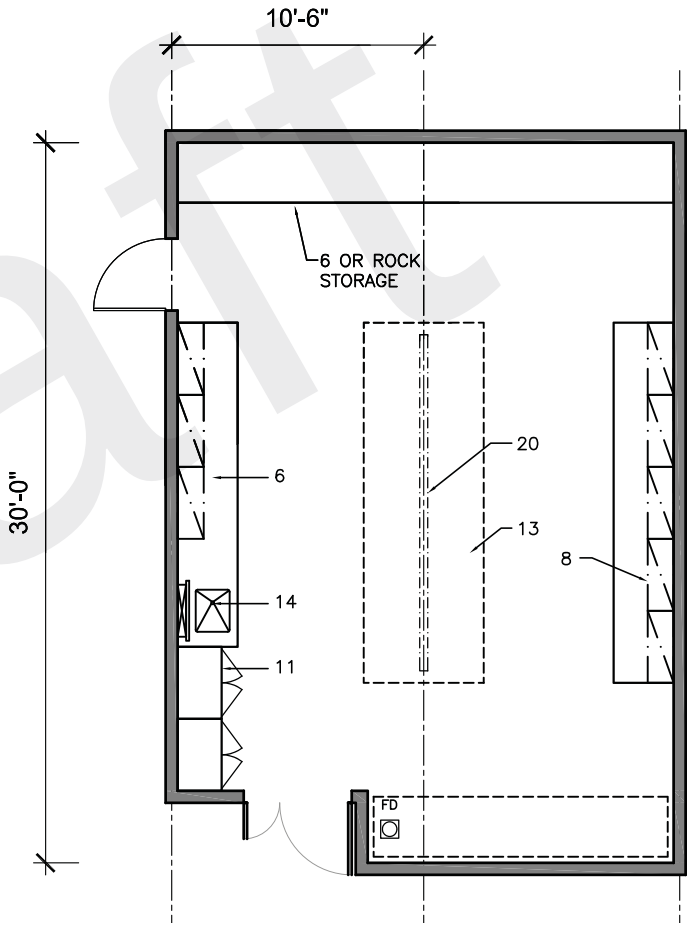
LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

G.12 RESEARCH LAB - HYDROLOGY

Area	315 SF
Quantity	1
Function	Geosciences hydrology research lab
Occupants	3-4 Faculty and research students
Adjacency	Adjacent to Geosciences teaching labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment. Provide sediment traps at all waste connections
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Mixed Acid Fume Hood	

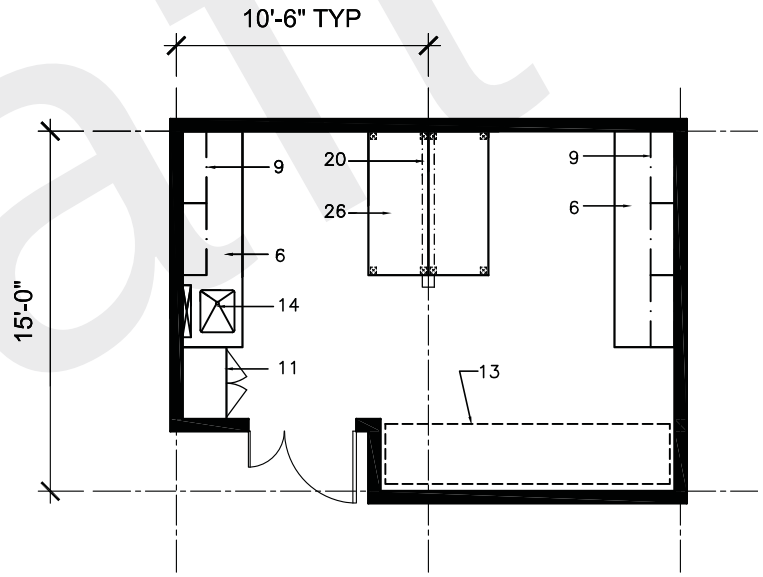
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

Draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

G.13 RESEARCH LAB - SEDIMENTOLOGY

Area	315 SF
Quantity	1
Function	Geosciences sedimentology research lab
Occupants	3-4 Faculty and research students
Adjacency	Geosciences teaching and support spaces
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment, Provide sediment traps at all waste connections
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Mixed Acid Fume Hood	

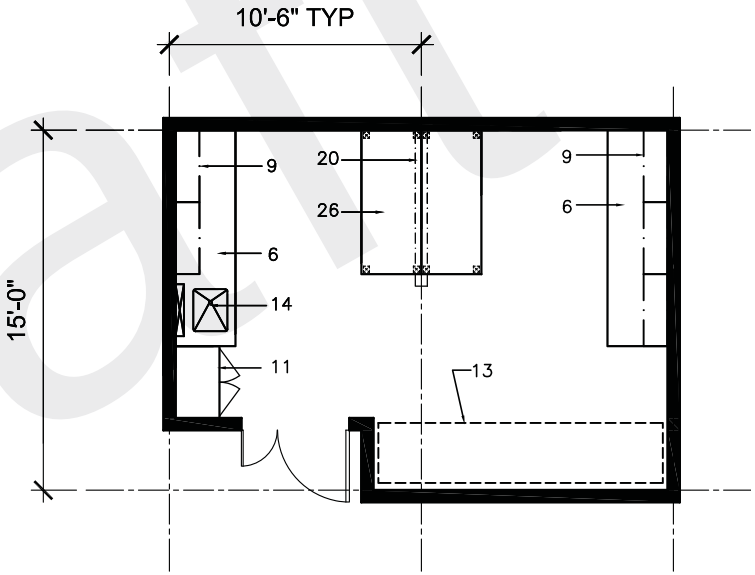
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

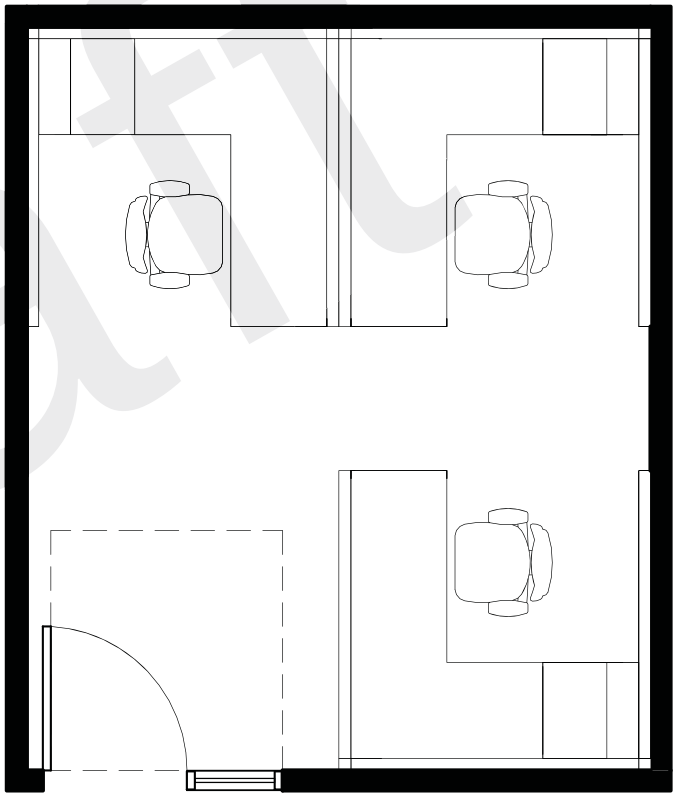
1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

G.14 GIS RESEARCH

Area	200 SF
Quantity	1
Function	GIS research area
Occupants	2-4 faculty and research students
Adjacency	Shared Computational Lab
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with roller shades, as feasible
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment and computing Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.
Equipment | Furniture	• Systems furniture • Task chairs • Large format printer



draft

G.21 SPECIMEN STORAGE (LAB)

Area	472 SF
Quantity	1
Function	Geosciences sedimentology research lab
Occupants	3-4 Faculty and research students
Adjacency	Geosciences teaching labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment, Provide sediment traps at all waste connections
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	2
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Mixed Acid Fume Hood	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

G.22 ROCK PREP ROOM

Area	472 SF
Quantity	1
Function	Geosciences rock cutting and crushing room
Occupants	3-4 Faculty and research students
Adjacency	Near teaching and research labs
Floor	Sealed concrete
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment, Provide sediment traps at all waste connections
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Local Dust Collection	●

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	●
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

Draft

G.23 XRD ROOM

Area	105 SF
Quantity	1
Function	Geosciences x-ray diffraction equipment room
Occupants	3-4 Faculty and research students
Adjacency	Near research labs
Floor	Sealed concrete
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment, Provide sediment traps at all waste connections
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Local Dust Collection	

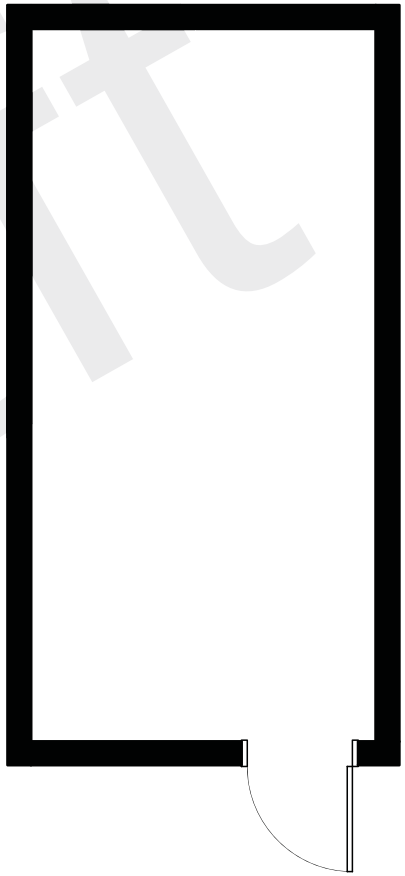
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

G.24 FIELD EQUIPMENT STORAGE

Area	157 SF
Quantity	1
Function	Geosciences field equipment and tool storage
Occupants	0 FTE, 1-2 visitors
Adjacency	Near a building exit, may be shared with other department field storage, with a secured enclosure.
Floor	Sealed concrete
Wall	Epoxy painted gypsum board, or secured fencing
Ceiling	Open to structure above
Doors	Metal
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	Convenience outlets at walls
Lighting	40 footcandles overhead, integrated occupancy sensor
Equipment | Furniture	• Storage shelves as necessary



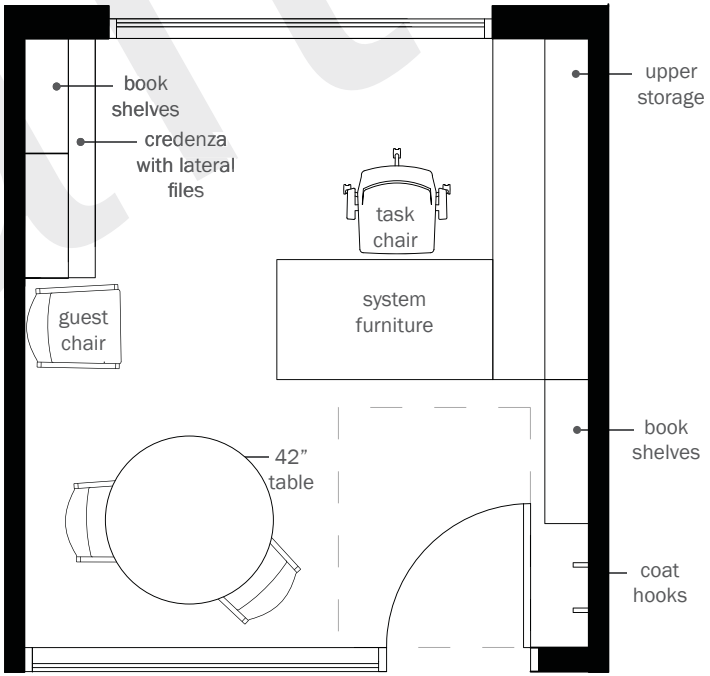
draft

G.31 DEPARTMENT CHAIR OFFICE

Area	150 SF
Quantity	1
Function	Department Chair's Office and meeting area
Occupants	1 FTE, 2-3 visitors
Adjacency	Department reception and offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer and printer
- 3 visitor chairs
- small conference table
- bookshelves
- coat hook behind door



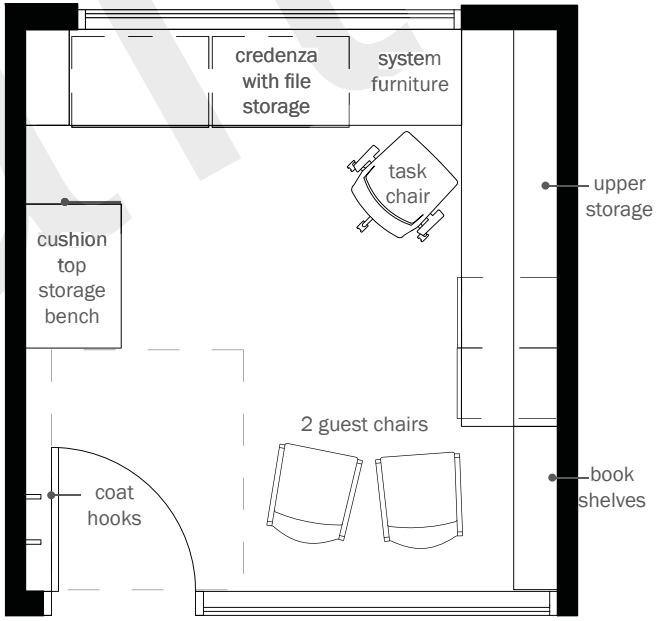
draft

G.32 FACULTY OFFICE

Area	120 SF
Quantity	5
Function	Faculty office and informal meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department reception, Department Chair's office
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door



office layout based on Natural History Museum model

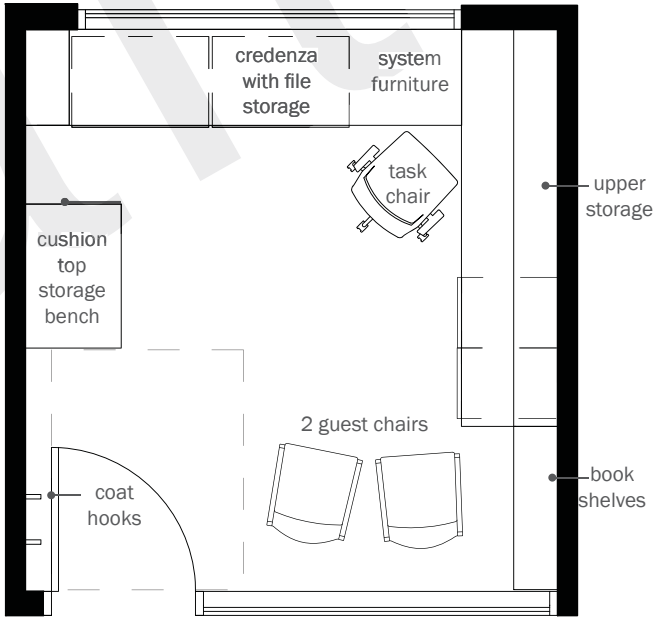
draft

G.33 LAB MANAGER OFFICE

Area	120 SF
Quantity	1
Function	Laboratory Manager office and meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department laboratories and support spaces
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door



office layout based on Natural History Museum model

draft

page left intentionally blank

draft

MICROBIOLOGY

Space			NSF	No.	Total NSF	Remarks/Comments
TEACHING LABORATORIES						
M	01	Microbiology Lab	1,575	2	3,150	(8) 4 person benches, gas
M	02	Medical Micro/Immunology Lab	1,260	1	1,260	(3) 10-person benches, adjacent to cell culture
		Subtotal Teaching Laboratory Space			**4,410**	
RESEARCH LABORATORIES						
M	11	Research Lab, Med. Micro/Immun	630	1	630	
M	12	Research Lab, Cell/Molecular	630	1	630	
M	13	Research Lab, Cell Culture/Virology	315	1	315	
		Subtotal Research Laboratory Space			**1,575**	
LABORATORY SUPPORT						
M	21	Equipment Room	315	1	315	
M	22	Media Prep Lab	315	1	315	Adjacent to General Micro
M	23	Dirty Prep Room	315	1	315	
M	24	Cell Culture Lab (Teaching)	630	1	630	Adjacent to Medical Micro, shared with zoology
M	25	Student Prep	157	1	157	Adjacent to Media Prep
		Subtotal Laboratory Support Space			**1,942**	

draft

page left intentionally blank

draft

Space			NSF	No.	Total NSF	Remarks/Comments
NON-LAB SPACE						
M	31	Department Chair	150	1	150	
M	32	Full Time Faculty	120	6	720	
M	33	Lab Manager	120	1	120	
M	34	Student Advising	80	1	80	
		Subtotal Non-Lab Space			**1,070**	
		Total Laboratory Space			**8,997**	

draft

M.01 MICROBIOLOGY LAB

Area	1,575 SF
Quantity	2
Function	Flexible Microbiology teaching laboratory
Occupants	32 students, 1-2 faculty
Adjacency	Microbiology prep and storage rooms and medical/micro teaching lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 4'
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

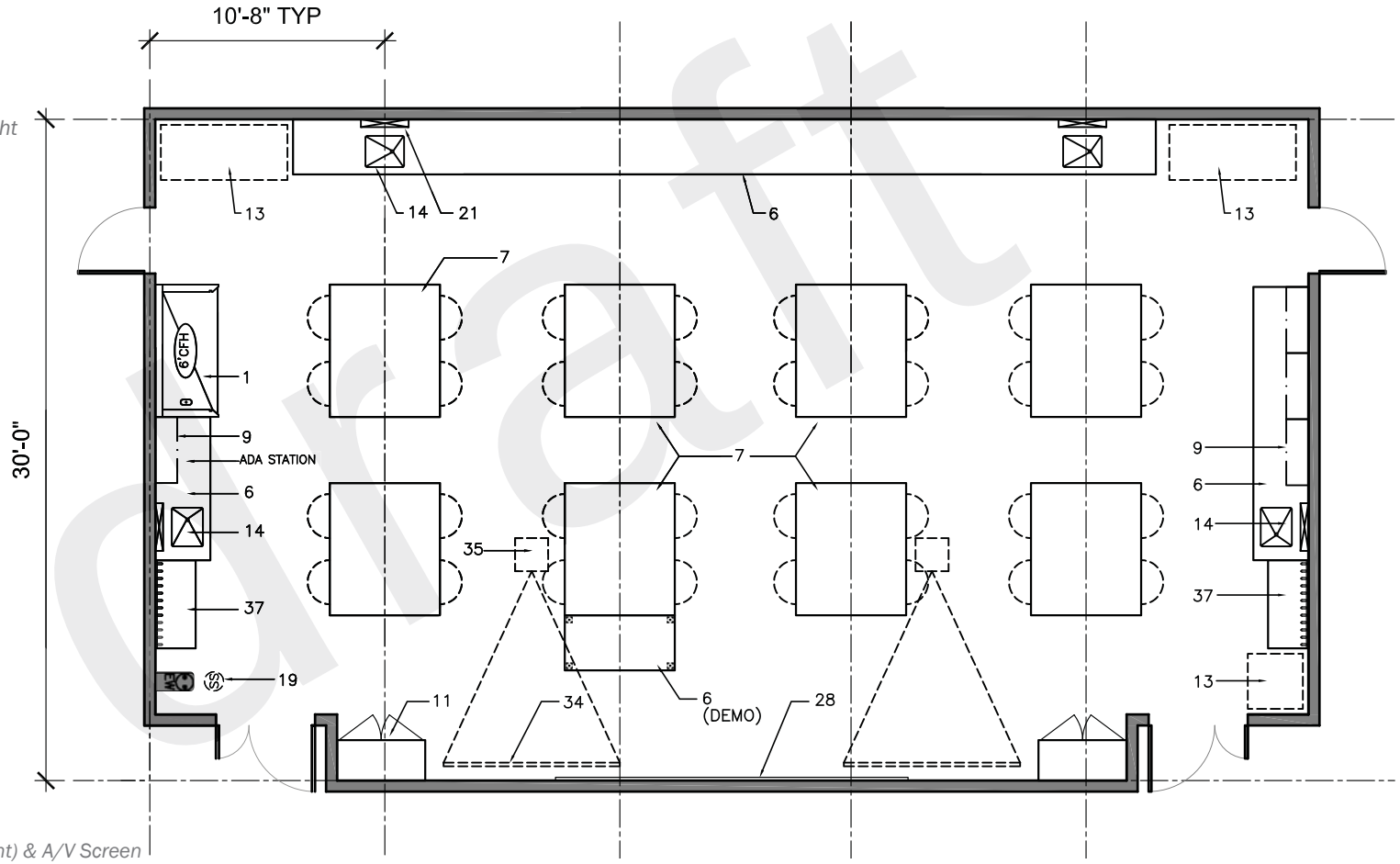
LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

M.02 MEDICAL MICRO / IMMUNOLOGY LAB

Area	1,260 SF
Quantity	1
Function	Medical micro and Immunology teaching laboratory
Occupants	30 students, 1-2 faculty
Adjacency	Adjacent to cell culture lab and cell research lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 4'
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

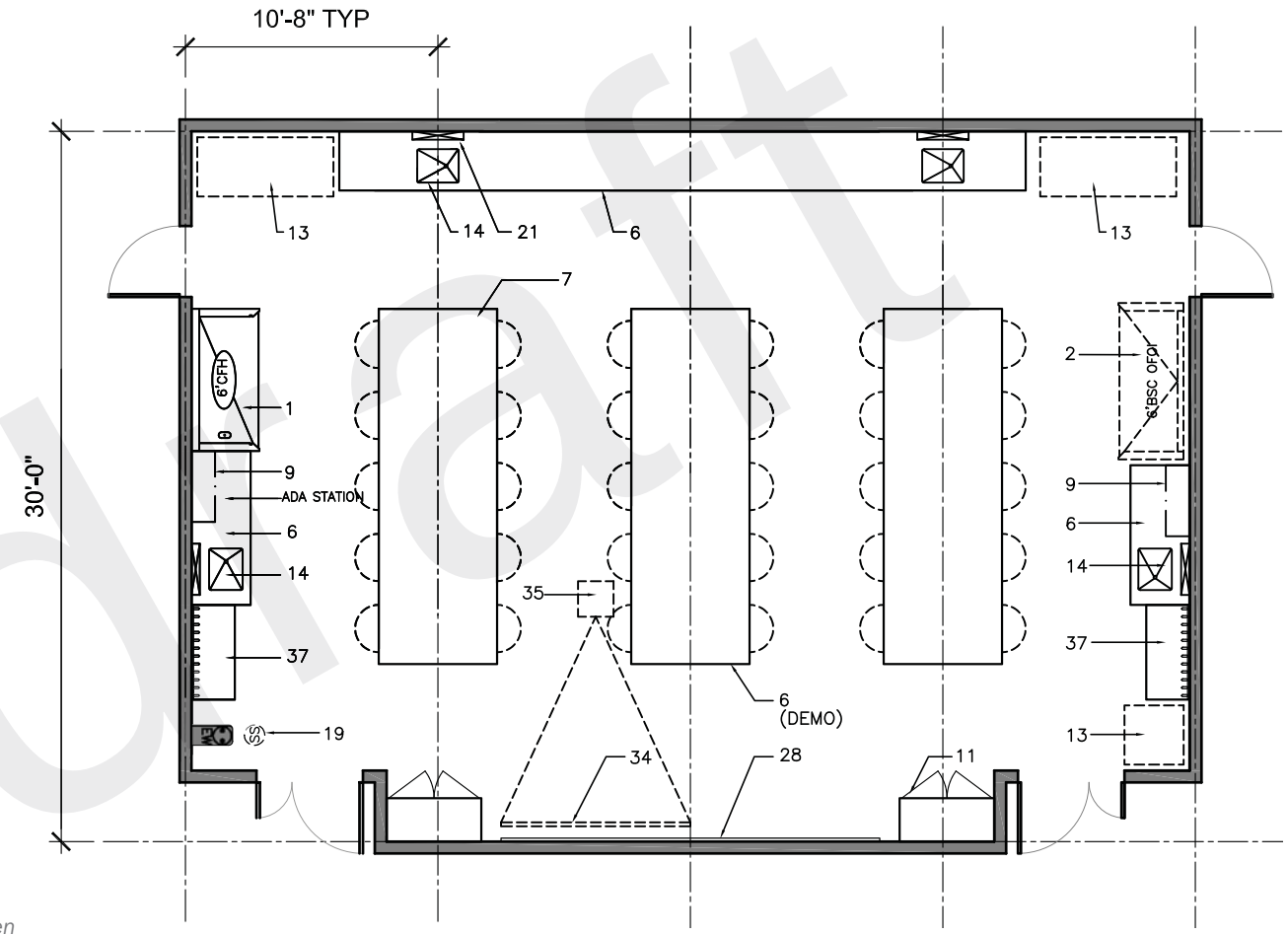
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	●
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

M.11 RESEARCH LAB - MEDICAL MICRO / IMMUNOLOGY

Area	630 SF
Quantity	1
Function	Medical micro and Immunology research laboratory
Occupants	6-8 faculty and research students
Adjacency	Microbiology prep and storage rooms and medical/micro teaching lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades as feasible or shared through interior partitions
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 4'
Radioisotope Hood	
Laminar Flow Hood	●
Biological Safety Cabinet (A2)	(1) 6'
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

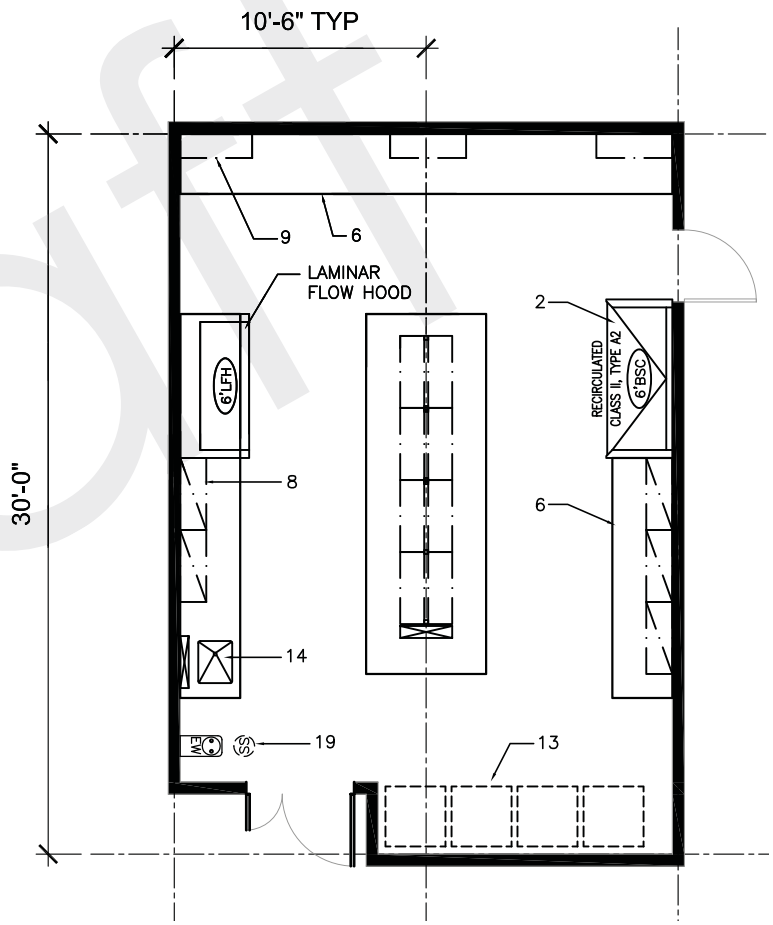
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	●
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

M.12 RESEARCH LAB - CELL / MOLECULAR

Area	630 SF
Quantity	1
Function	Cell and molecular research laboratory
Occupants	6-8 faculty and research students
Adjacency	Adjacent to cell culture lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades as feasible or shared through interior partitions
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	●
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet (A2)	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

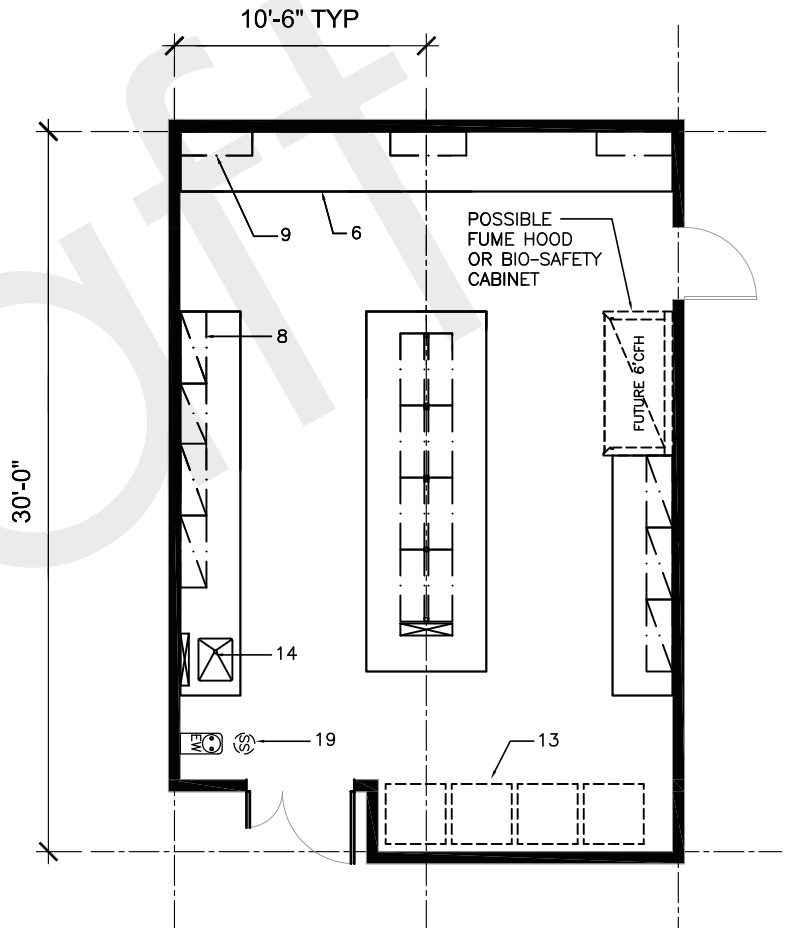
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

M.13 RESEARCH LAB - CELL CULTURE / VIROLOGY

Area	315 SF
Quantity	1
Function	Cell culture and virology research laboratory
Occupants	2-4 faculty and research students
Adjacency	Adjacent to cell culture lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades as feasible or shared through interior partitions
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	●
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet (A2)	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

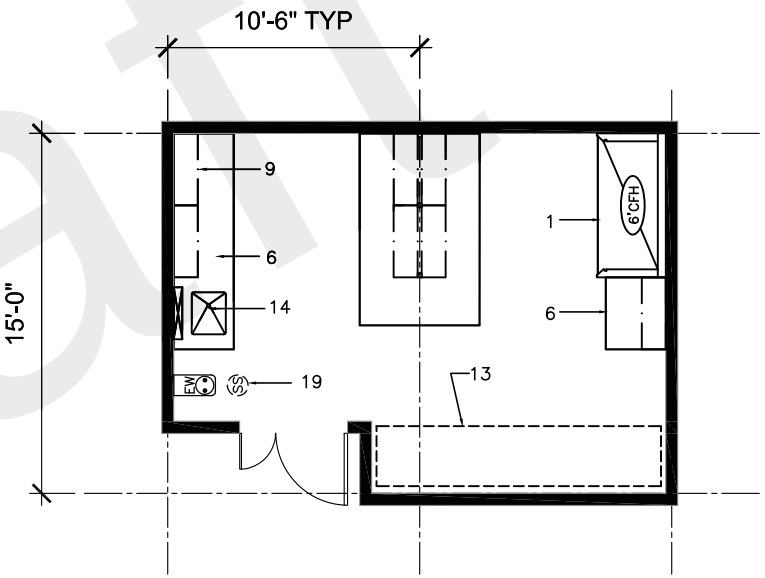
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

M.21 EQUIPMENT ROOM

Area	315 SF
Quantity	1
Function	Microbiology equipment room
Occupants	1-4 visitors
Adjacency	Near teaching labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet (A2)	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	●
Heat Producing	●
Noise Producing	●
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

M.22 MEDIA PREP LAB

Area	315 SF
Quantity	1
Function	Microbiology media preparation laboratory
Occupants	1-4 visitors
Adjacency	Adjacent to Microbiology teaching labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 4'
Radioisotope Hood	
Laminar Flow Hood	●
Biological Safety Cabinet (A2)	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	●
((24x37x36 autoclave)	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

M.23 DIRTY PREP LAB

Area	315 SF
Quantity	1
Function	Microbiology dirty preparation laboratory
Occupants	1-4 visitors
Adjacency	Adjacent to Microbiology teaching labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet (A2)	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	●
(Autoclave and glassware washer)	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

page left intentionally blank

draft

M.24 CELL CULTURE LAB (TEACHING)

Area	630 SF
Quantity	1
Function	Cell culture teaching and research support laboratory, shared with Zoology
Occupants	12 students, 1-2 faculty
Adjacency	Adjacent to Medical Micro teaching and research labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	●
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet (A2)	(6) 6'
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

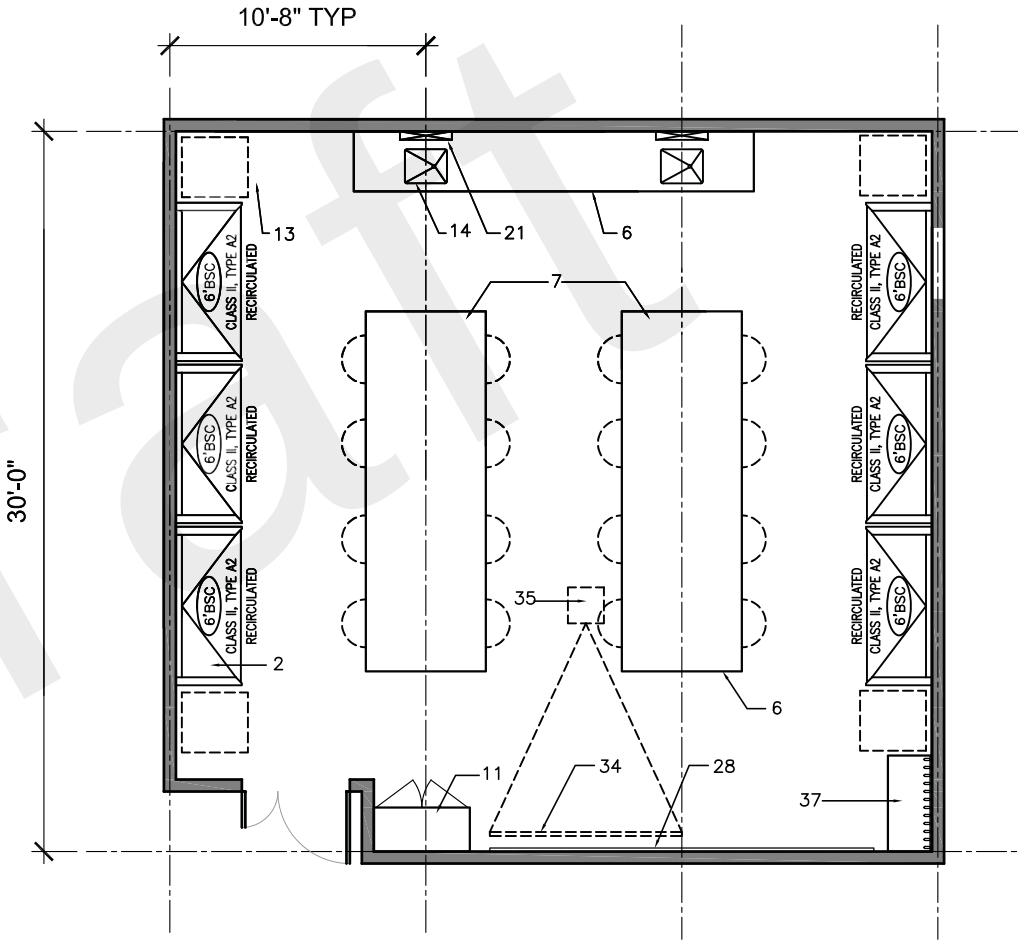
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
(Autoclave and glassware washer)	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	●
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

M.25 STUDENT PREP

Area	157 SF
Quantity	1
Function	Student lab prep area
Occupants	1-2 students
Adjacency	Adjacent to Media Prep
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 4'
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet (A2)	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
(Autoclave and glassware washer)	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

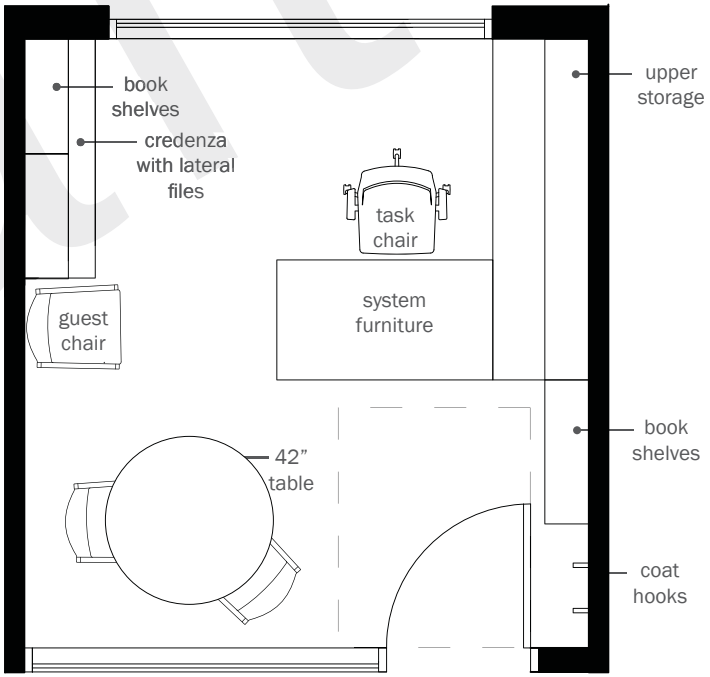
draft

M.31 DEPARTMENT CHAIR OFFICE

Area	150 SF
Quantity	1
Function	Department Chair's Office and meeting area
Occupants	1 FTE, 2-3 visitors
Adjacency	Department reception and offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer and printer
- 3 visitor chairs
- small conference table
- bookshelves
- coat hook behind door



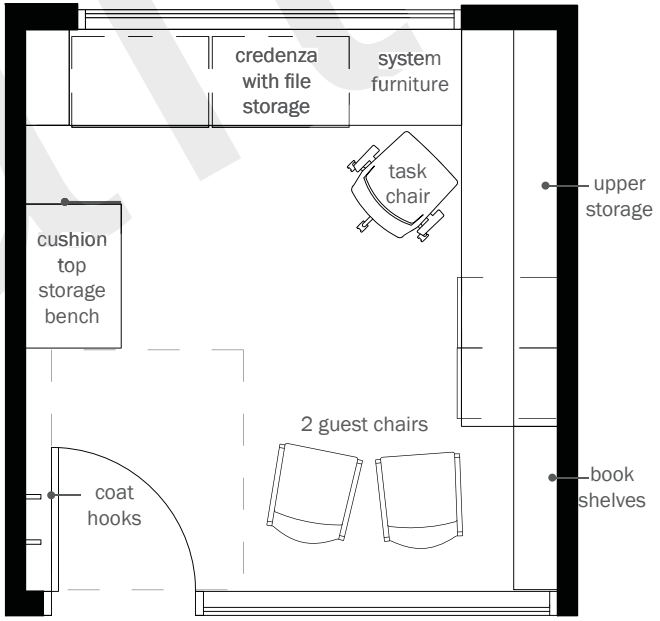
draft

M.32 FACULTY OFFICE

Area	120 SF
Quantity	6
Function	Faculty office and informal meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department reception, Department Chair's office
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door



office layout based on Natural History Museum model

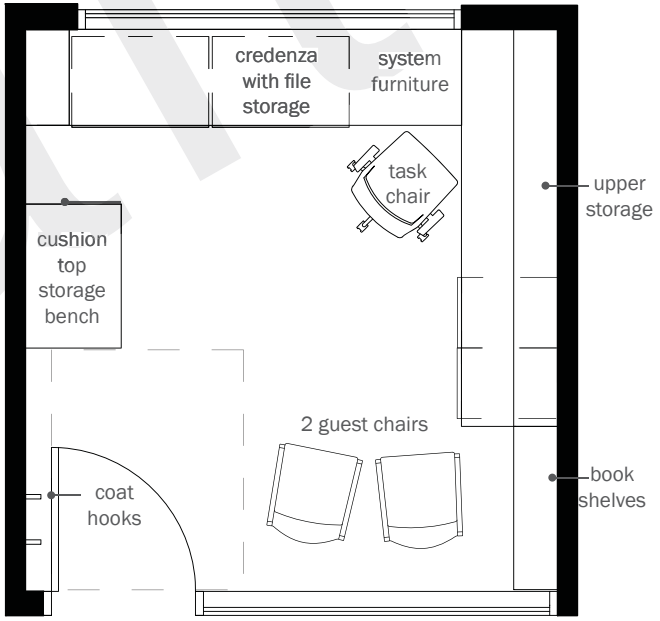
draft

M.33 LAB MANAGER OFFICE

Area	120 SF
Quantity	1
Function	Laboratory Manager office and meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department laboratories and support spaces
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door

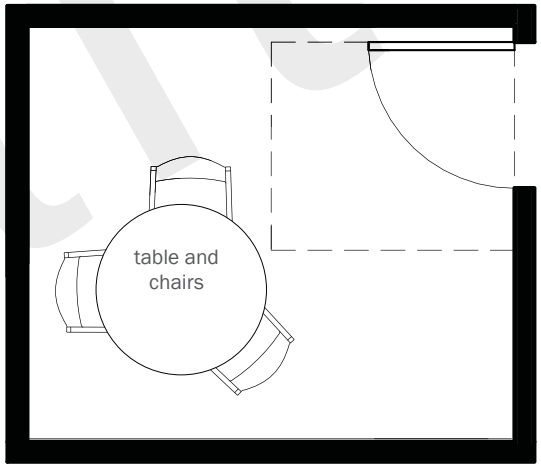


office layout based on Natural History Museum model

draft

M.34 STUDENT ADVISING

Area	80 SF
Quantity	1
Function	Student meeting and advising area
Occupants	2-3 visitors
Adjacency	Department offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood with lite
Windows	Exterior window with roller shades
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.
Equipment | Furniture	• Table and 4 chairs



draft

PHYSICS

Space			NSF	No.	Total NSF	Remarks/Comments
TEACHING LABORATORIES						
P	01	Intro. Physics Lab	1,420	2	2,840	
P	02	Electronics Lab	630	1	630	Black out capabilities - on display from corridor
P	03	Advanced Physics Lab	945	1	945	
		Subtotal Teaching Laboratory Space			**4,415**	
RESEARCH LABORATORIES						
P	11	Student Research Lab, Optics/Electronics, Imaging lab	472	1	472	Near teaching lab, vibration sensitive
P	12	Research Lab, shared	472	2	944	
P	13	Research Lab, Laser	472	1	472	
P	14	Research Lab, Nuclear	472	1	472	Near nuclear barrel (Radio-isotope vault)
P	15	Rooftop Observatory	-	0	0	Concrete pad and structure to foundation
		Subtotal Research Laboratory Space			**2,360**	
LABORATORY SUPPORT						
P	21	Prep/Storage Room (Intro)	630	1	630	
P	22	Prep/Storage Room (Adv.)	315	1	315	Adjacent to Advanced Phys & Elecronics
P	23	Radioisotope Room/Vault (Plutonium Storage)	105	1	105	Concrete shielded
P	24	Machine Shop	630	1	630	
		Subtotal Laboratory Support Space			**1,680**	

draft

page left intentionally blank

draft

Space			NSF	No.	Total NSF	Remarks/Comments
NON-LAB SPACE						
P	31	Department Chair	150	1	150	
P	32	Full Time Faculty	120	10	1,200	
P	33	Lab Manager	120	1	120	
		Subtotal Non-Lab Space			**1,470**	
		Total Laboratory Space			**9,925**	

draft

P.01 INTRO PHYSICS

Area	1,420 SF
Quantity	2
Function	Flexible Physics teaching laboratory
Occupants	30 students, 1-2 faculty
Adjacency	Physics prep and storage rooms and advanced teaching lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

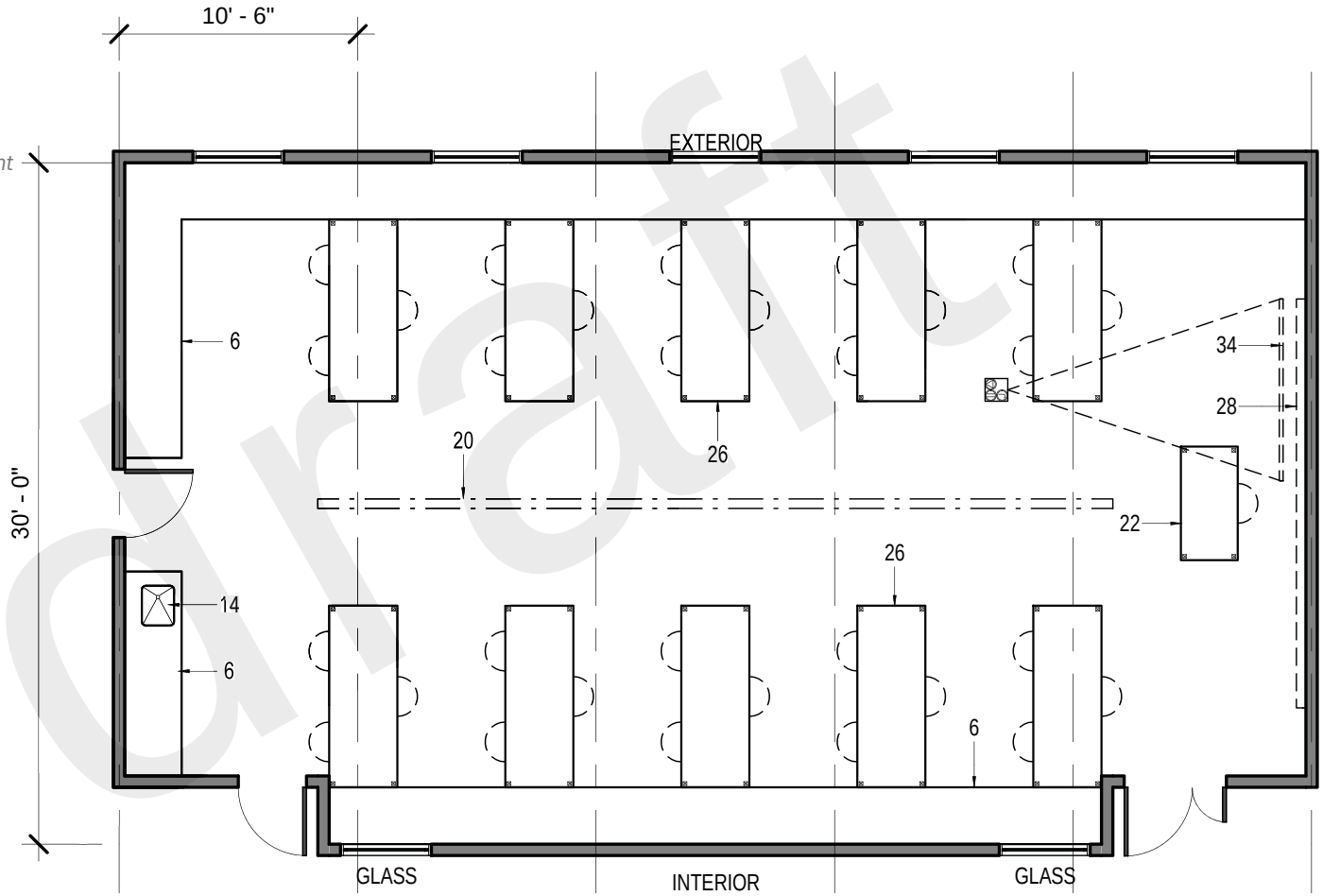
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	●
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

P.02 ELECTRONICS LAB

Area	630 SF
Quantity	1
Function	Physics Electronics teaching laboratory
Occupants	16 students, 1-2 faculty
Adjacency	Adjacent to Optics and Electronics research lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

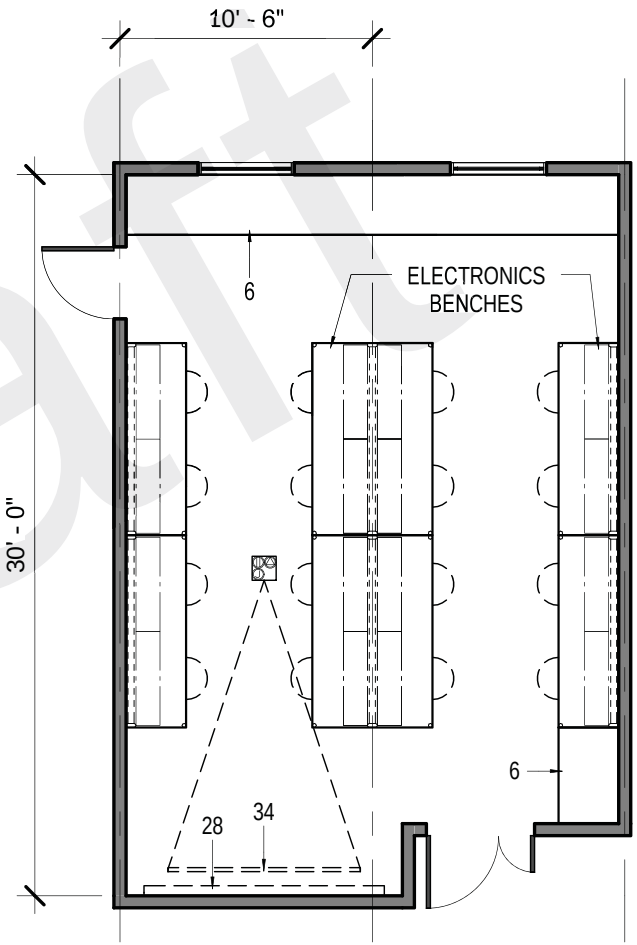
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

P.03 ADVANCED PHYSICS LAB

Area	945 SF
Quantity	1
Function	Flexible Physics teaching laboratory
Occupants	16 students, 1-2 faculty
Adjacency	Physics prep and storage rooms and intro teaching lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

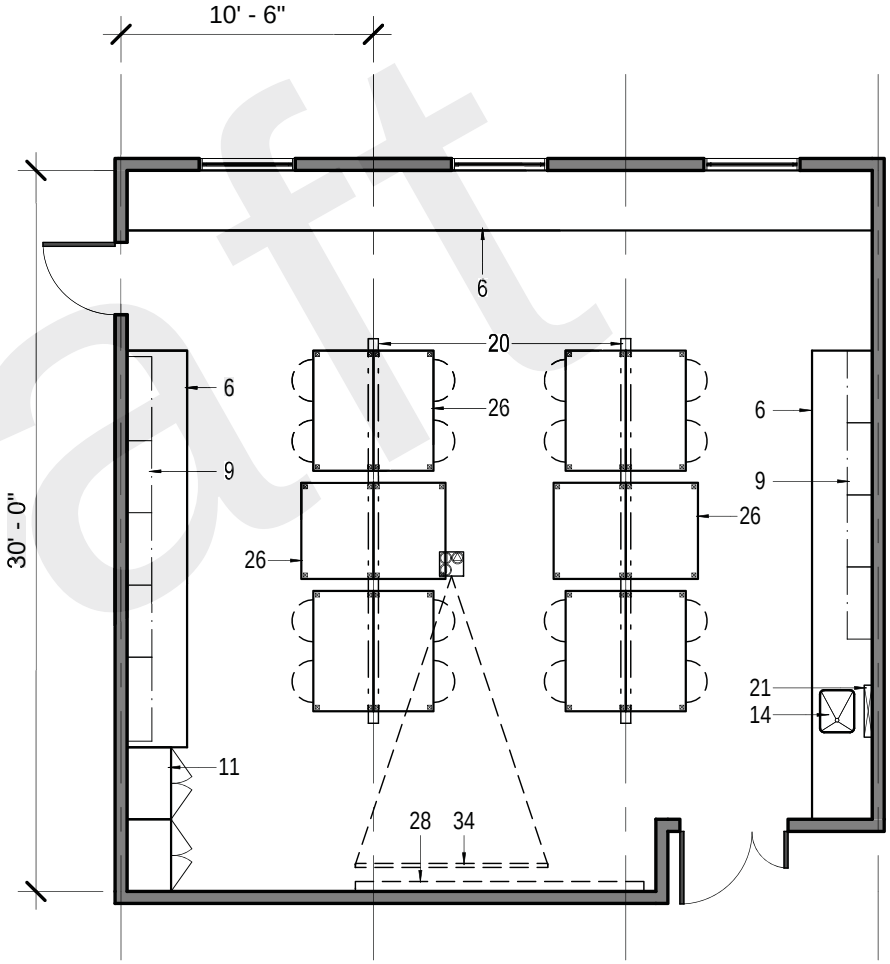
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

P.11 STUDENT RESEARCH - OPTICS / ELECTRONIC IMAGING

Area	472 SF
Quantity	1
Function	Student research and optics laboratory
Occupants	4-8 faculty and research students
Adjacency	Adjacent to Electronics Lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades as feasible or shared through interior partitions
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy sensors, black out capable

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

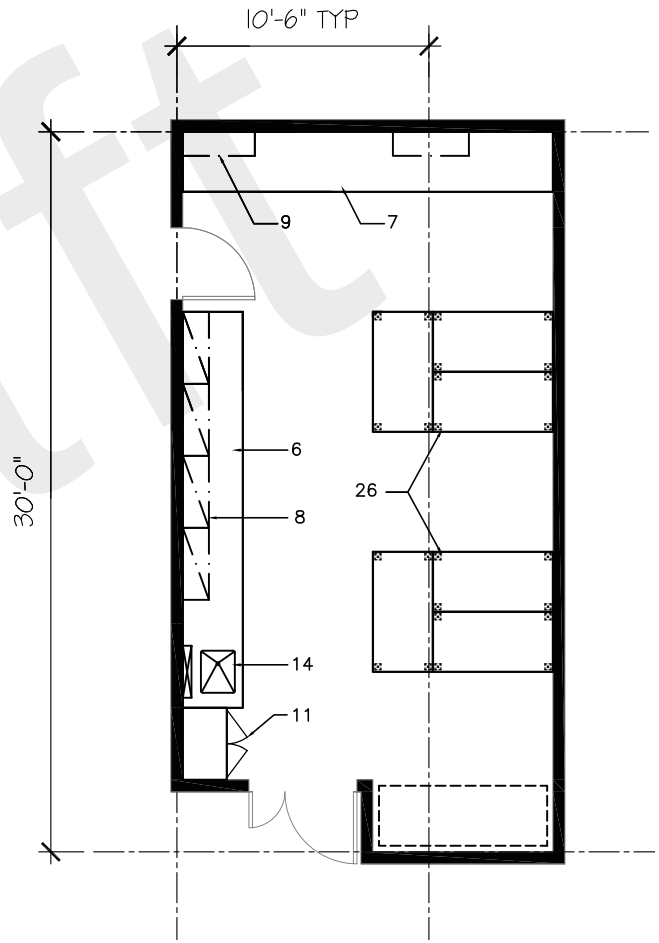
LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	●
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

P.12 RESEARCH LAB - SHARED

Area	472 SF
Quantity	2
Function	Shared flexible physics research space
Occupants	4-8 faculty and research students
Adjacency	Adjacent to prep and storage room
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades as feasible or shared through interior partitions
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 6'
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

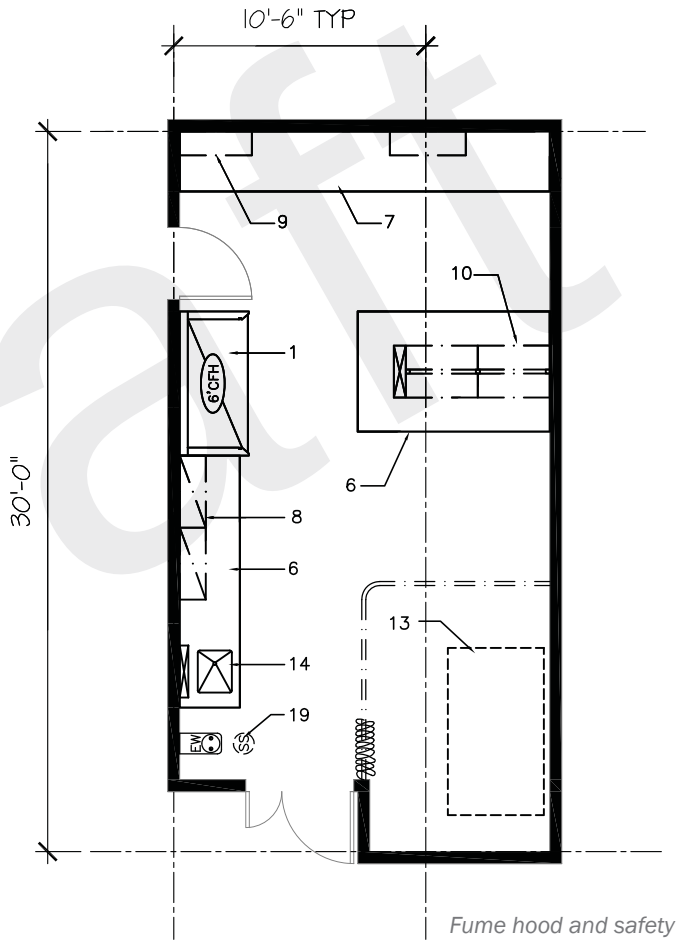
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



Fume hood and safety shower in one of two labs

draft

P.13 RESEARCH LAB - LASER

Area	472 SF
Quantity	1
Function	Shared laser research space
Occupants	4-8 faculty and research students
Adjacency	Adjacent to prep and storage room
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	●

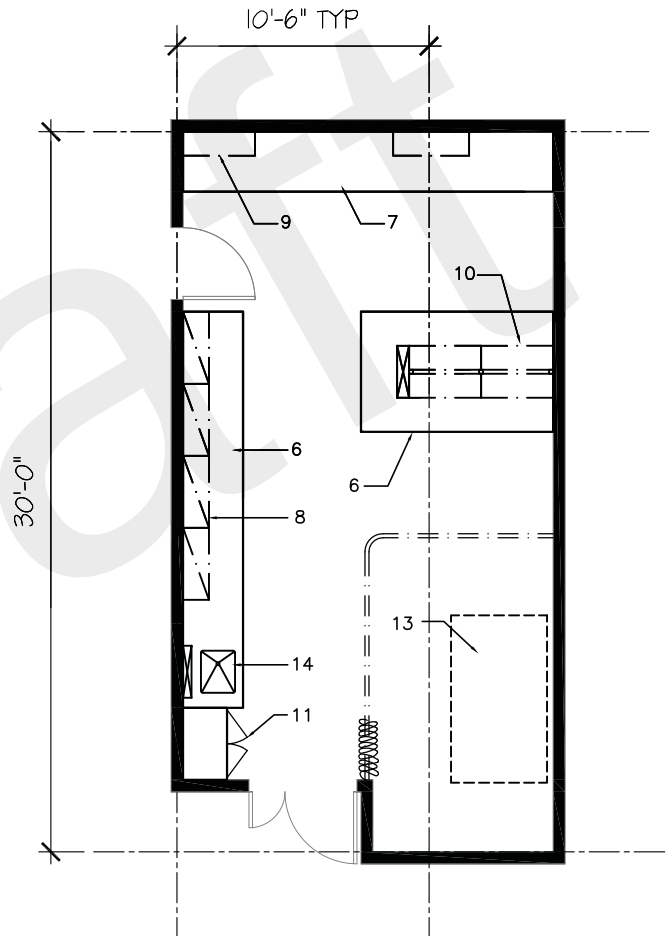
LABORATORY EQUIPMENT	
Vibration Sensitive	●
Light Sensitive	●
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	●
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	●
Toxic	●
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	●
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	●
CHEMICALS	
Bases	
Acids	
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

P.14 RESEARCH LAB - NUCLEAR

Area	472 SF
Quantity	1
Function	Shared nuclear research space
Occupants	4-8 faculty and research students
Adjacency	Near radioisotope room if feasible
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades as feasible or shared through interior partitions
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 4'
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

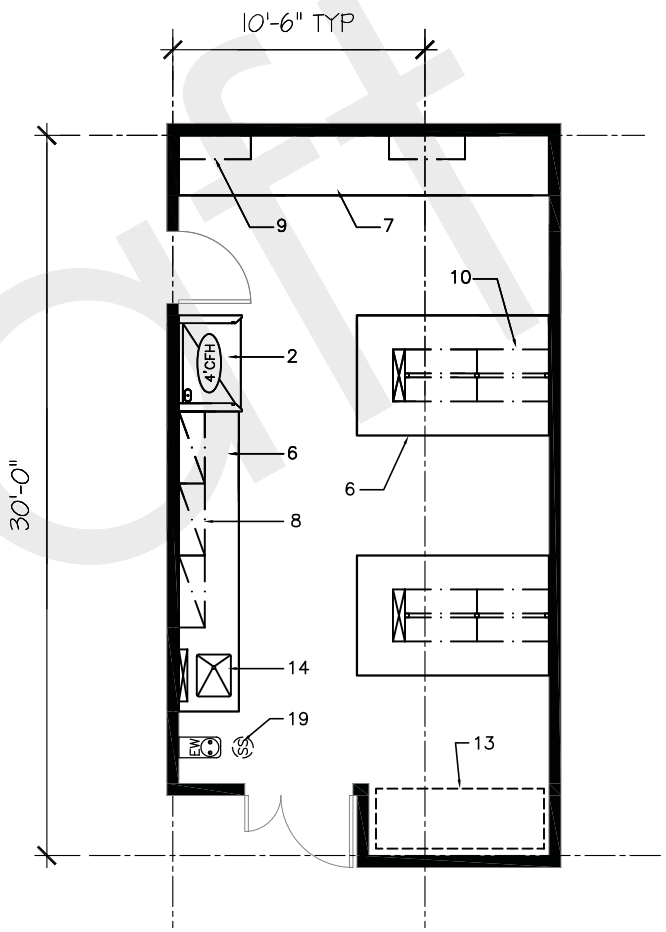
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	●
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

P.15 ROOFTOP OBSERVATORY

Area	0 SF
Quantity	1
Function	Physics rooftop observatory
Occupants	16 students, 1-2 faculty
Adjacency	Located on roof
Notes	Rooftop observatory to be located on a concrete pad on the roof. The structure itself will be provided by the College of science. The building structure shall be designed to provide required vibration control under the concrete pad. Coordinate requirements with Physics faculty.

draft

P.21 STORAGE / PRE ROOM (INTRO)

Area	630 SF
Quantity	1
Function	Teaching laboratory storage and support space
Occupants	1-2 faculty and research students
Adjacency	Introductory teaching laboratory
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Shared thermal environment
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	4
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

P.22 STORAGE / PRE ROOM (ADVANCED)

Area	630 SF
Quantity	1
Function	Advanced laboratory storage and support space
Occupants	1-2 faculty and research students
Adjacency	Advanced teaching laboratory
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	4
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 4'
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

draft

P.23 RADIOISOTOPE ROOM / VAULT (PLUTONIUM STORAGE)

Area	105 SF
Quantity	1
Function	Secured and isolated plutonium storage facility
Occupants	1-2 qualified personnel
Adjacency	Near nuclear research lab
Floor	Welded seam sheet vinyl
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Metal, or as needed for safety and security
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	●
Chemical Storage	

draft

P.24 MACHINE SHOP

Area	630 SF
Quantity	1
Function	Physics department machine shop
Occupants	2-6 visitors
Adjacency	Building support and physics laboratory areas
Floor	Sealed concrete
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for equipment
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	4
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	●
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

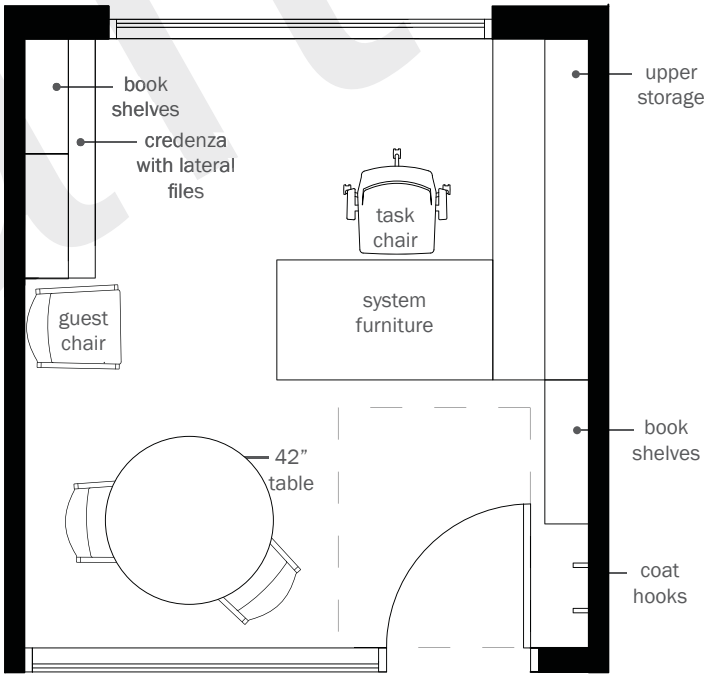
draft

P.31 DEPARTMENT CHAIR OFFICE

Area	150 SF
Quantity	1
Function	Department Chair's Office and meeting area
Occupants	1 FTE, 2-3 visitors
Adjacency	Department reception and offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer and printer
- 3 visitor chairs
- small conference table
- bookshelves
- coat hook behind door



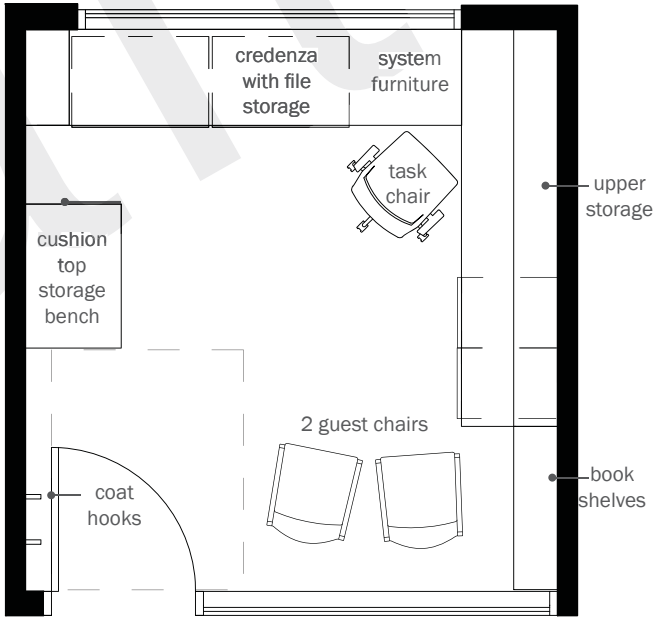
draft

P.32 FACULTY OFFICE

Area	120 SF
Quantity	10
Function	Faculty office and informal meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department reception, Department Chair's office
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door



office layout based on Natural History Museum model

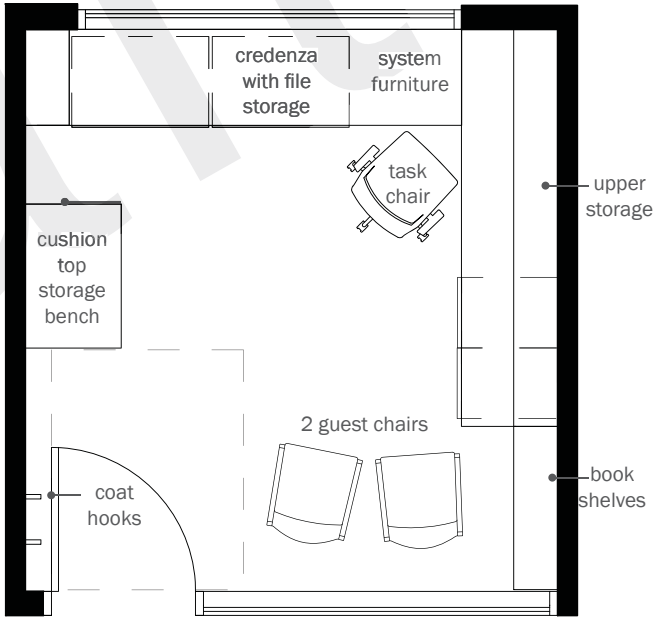
draft

P.33 LAB MANAGER OFFICE

Area	120 SF
Quantity	1
Function	Laboratory Manager office and meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department laboratories and support spaces
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door



office layout based on Natural History Museum model

draft

page left intentionally blank

draft

ZOOLOGY

Space			NSF	No.	Total NSF	Remarks/Comments
TEACHING LABORATORIES						
Z	01	Molecular Lab	1,260	1	1,260	Proximate to Cell Culture Lab shared with microbiology
Z	02	Organismal Lab (Zoology 1&2)	1,260	1	1,260	Includes Ecology & Ornithology
Z	03	Physiology Lab	1,260	1	1,260	
Z	04	Ecology Lab (Mammalogy, ecology)	1,260	1	1,260	Shared with math
Z	05	Human Anatomy Lab	1,260	1	1,260	
		Subtotal Teaching Laboratory Space			**6,300**	
RESEARCH LABORATORIES						
Z	11	Research Lab, Cell/Molecular	1.260	1	630	
Z	12	Research Lab, Organismal	1,260	1	1,260	
		Subtotal Research Laboratory Space			**2,520**	
LABORATORY SUPPORT						
Z	21	Prep/Storage Room	315	2	630	
Z	22	Autoclave Room	157	1	157	Remove if other autoclave is available
Z	23	Specimen Collections	630	1	630	
Z	24	Sample/Specimen Prep Lab	157	1	157	
Z	25	Radioisotope Room	105	1	105	
Z	26	Equipment Room	457	1	457	Can be in a common equipment room area

draft

page left intentionally blank

draft

Space			NSF	No.	Total NSF	Remarks/Comments
Z	27	Cadaver Storage Room	315	1	315	
Z	28	Field Equipment Storage	315	1	315	Shared common storage
Z	29	Animal Facility	945	1	945	
		Subtotal Laboratory Support Space			**3,711**	
NON-LAB SPACE						
Z	31	Department Chair	150	1	150	
Z	32	Full Time Faculty	120	11	1,320	
Z	33	Lab Manager	120	1	120	
		Subtotal Non-Lab Space			**1,590**	
		Total Laboratory Space			**14,121**	

draft

Z.01 MOLECULAR LAB

Area	1,260 SF
Quantity	1
Function	Flexible Zoology teaching laboratory
Occupants	24 students, 1-2 faculty
Adjacency	Adjacent to Microbiology Cell Culture Lab. Near Zoology prep and storage rooms and advanced teaching lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 6'
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

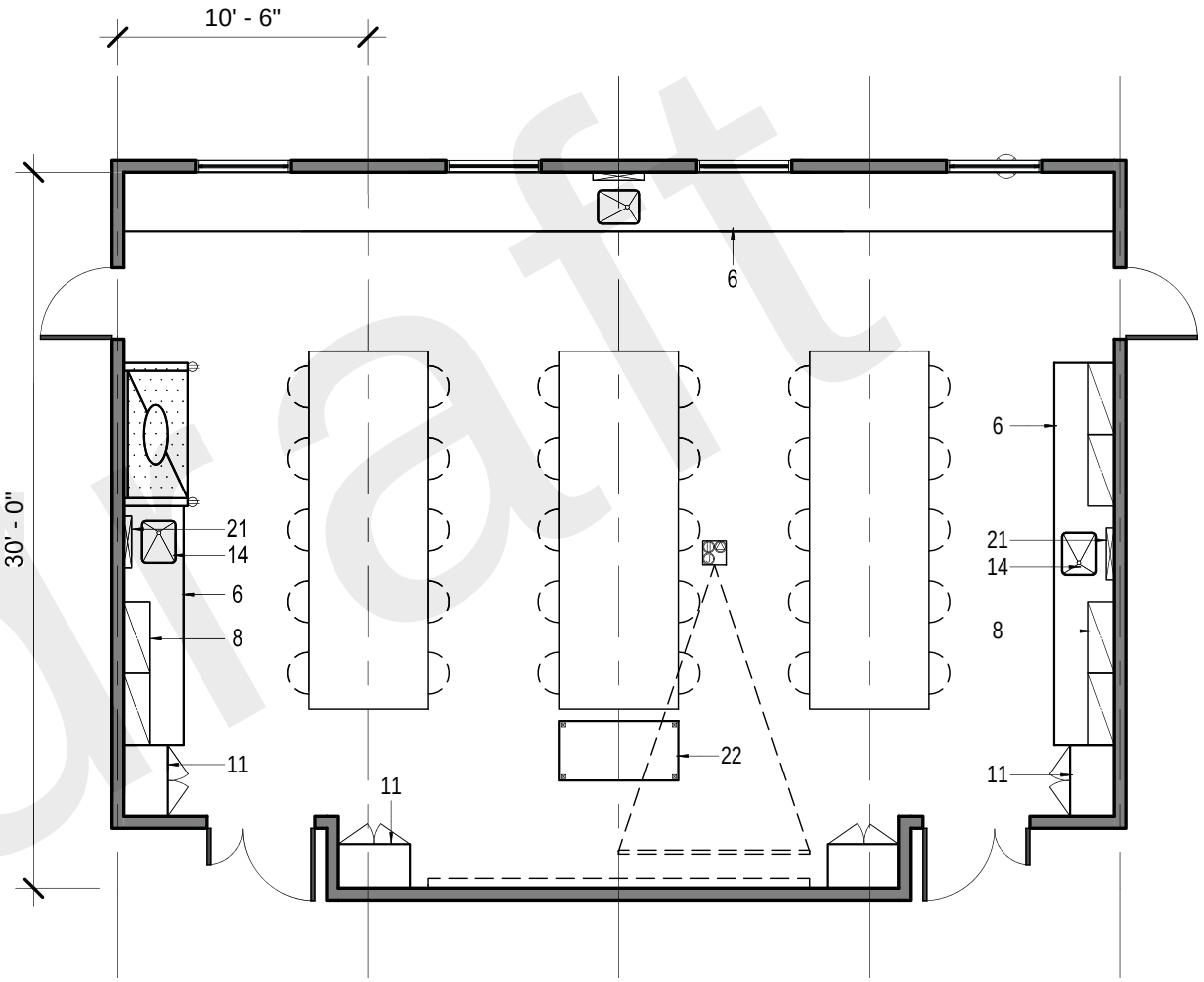
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

Z.O2 ORANISMAL LAB

Area	1,260 SF
Quantity	1
Function	Organismal teaching laboratory
Occupants	24 students, 1-2 faculty
Adjacency	Zoology prep and storage rooms, specimen collections and other support spaces
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

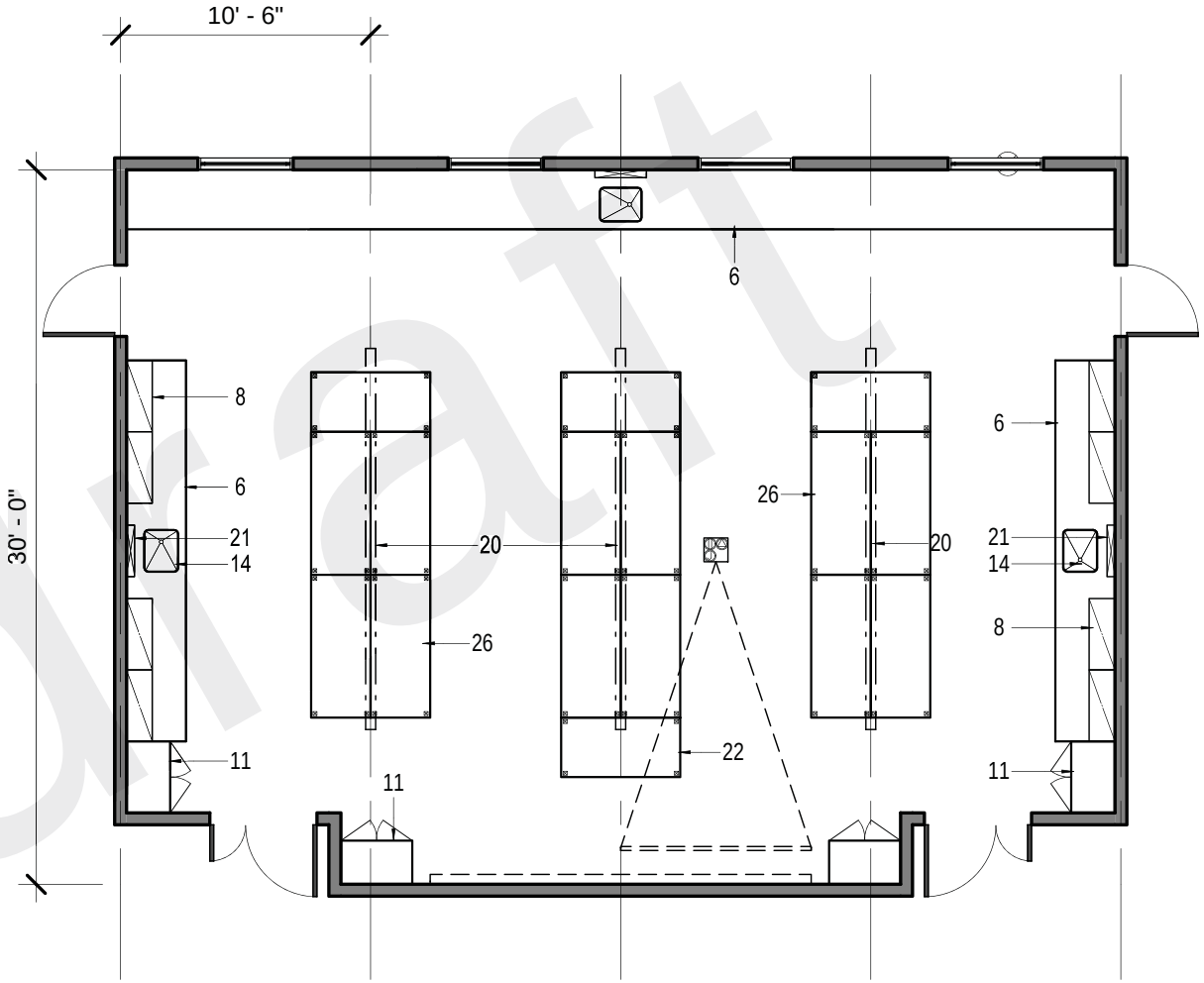
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

Z.O3 PHYSIOLOGY LAB

Area	1,260 SF
Quantity	1
Function	Physiology teaching laboratory
Occupants	24 students, 1-2 faculty
Adjacency	Zoology prep and storage rooms and other support spaces
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared) on demand ventilation is preferred
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6-15
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

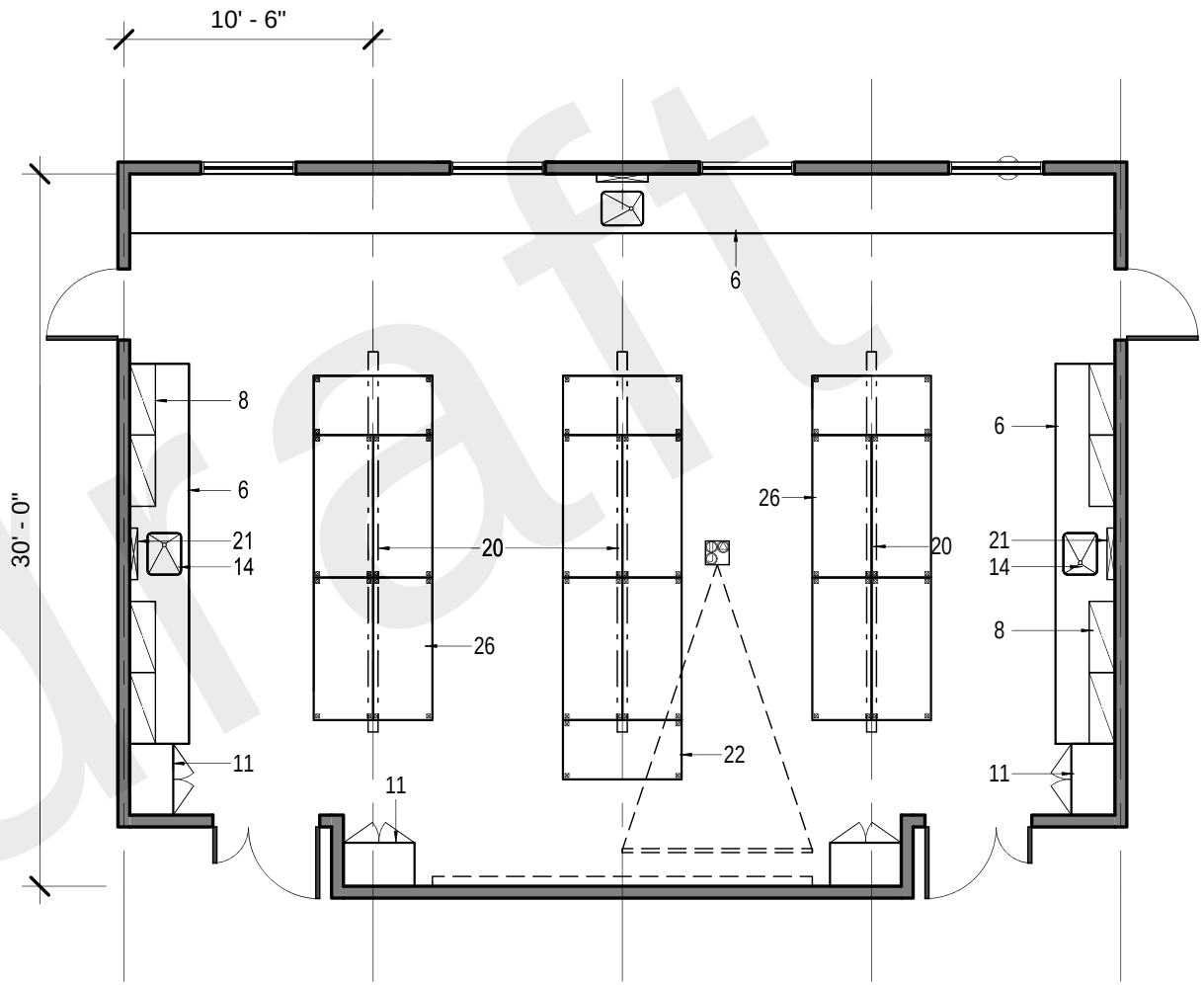
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

Z.04 ECOLOGY LAB

Area	1,260 SF
Quantity	1
Function	Ecology teaching laboratory, may be shared with math
Occupants	24 students, 1-2 faculty
Adjacency	Zoology prep and storage rooms and other support spaces
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared) on demand ventilation is preferred
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6-15
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

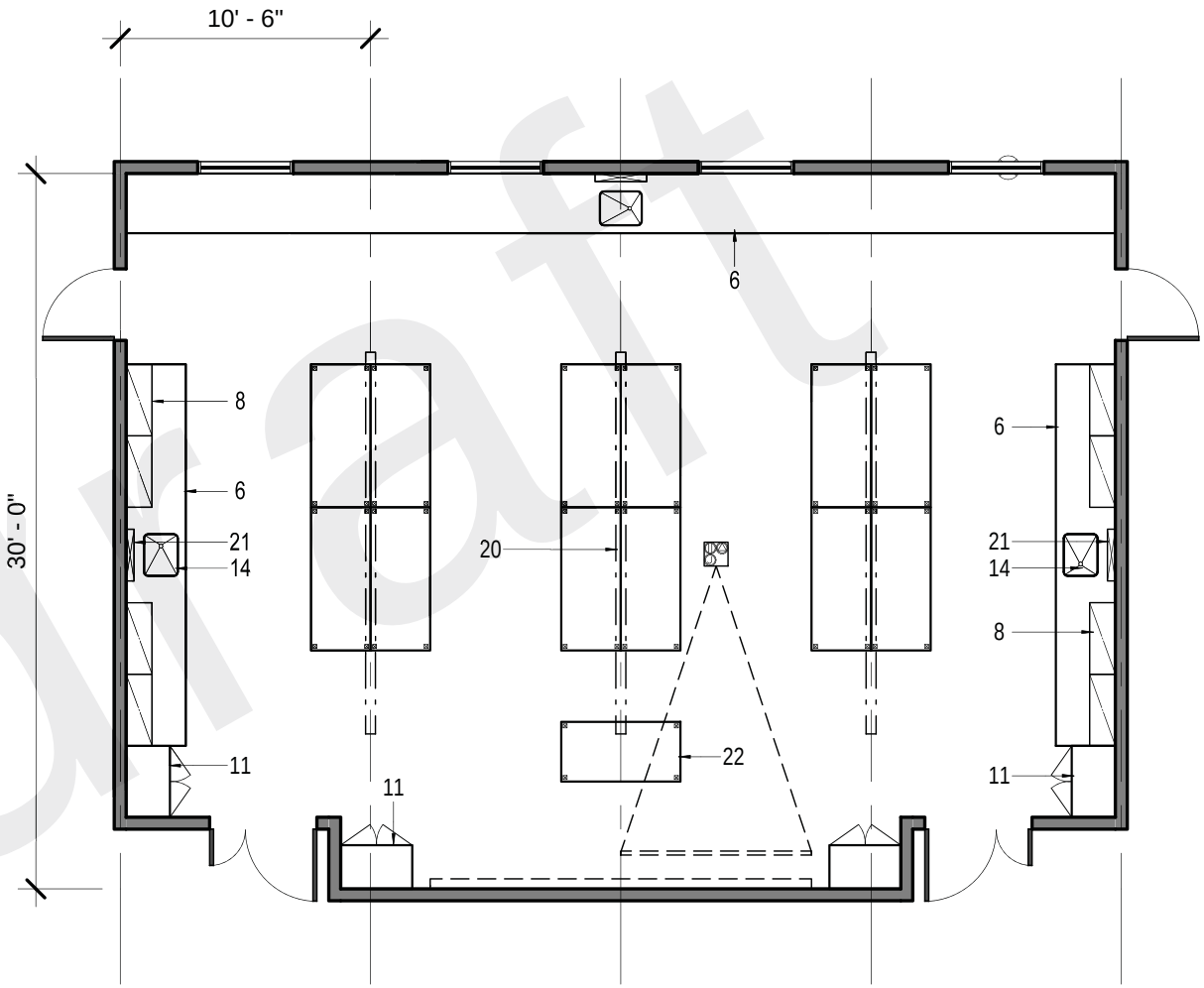
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

Z.05 HUMAN ANATOMY LAB

Area	1,260 SF
Quantity	1
Function	Dedicated human anatomy teaching laboratory
Occupants	24 students, 1-2 faculty
Adjacency	Cadaver storage room and other support spaces
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared) on demand ventilation is preferred
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	10-15
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

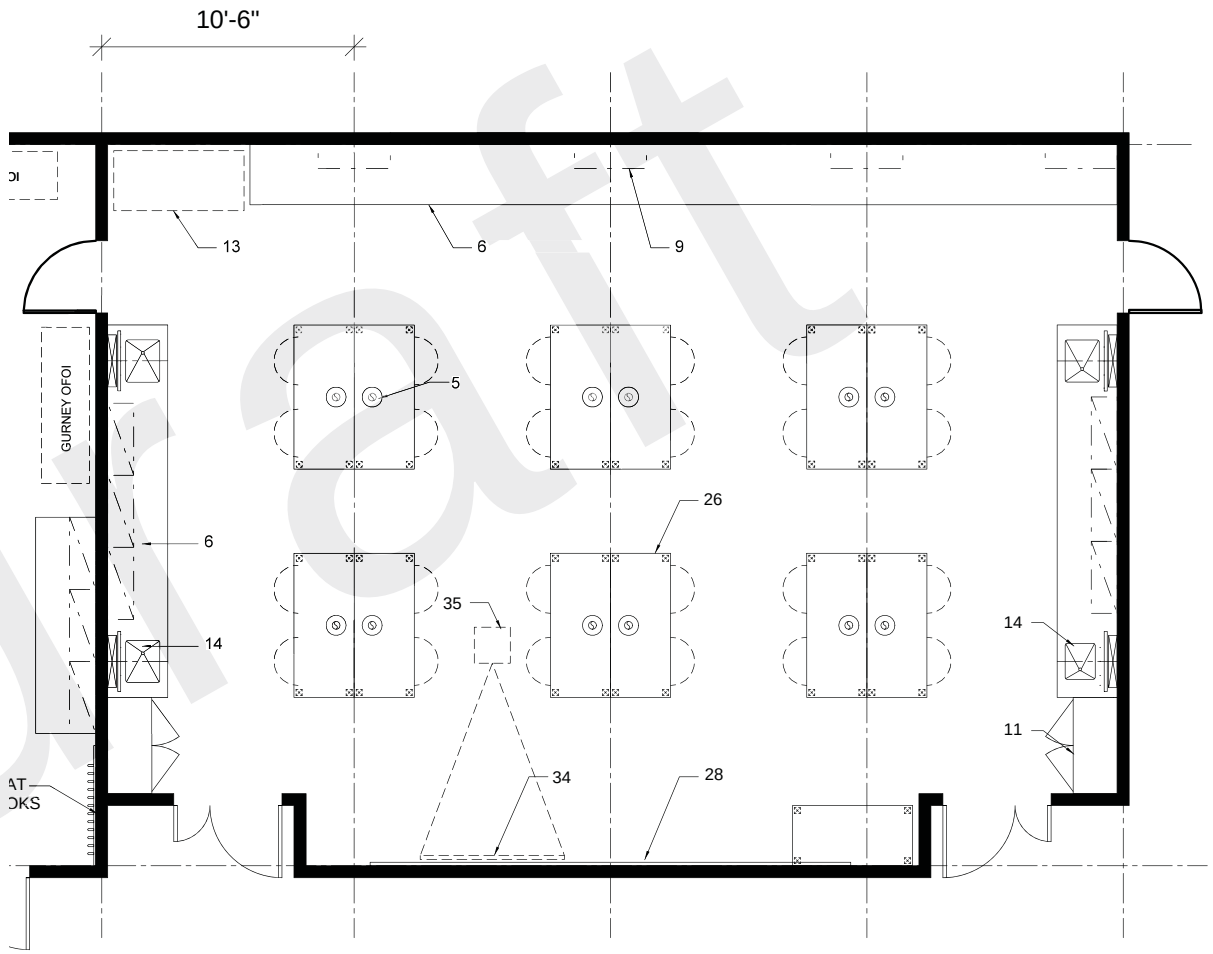
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

Z.11 RESEARCH LAB - CELL / MOLECULAR

Area	1,260 SF
Quantity	1
Function	Shared faculty research laboratory
Occupants	12-16 faculty and research students
Adjacency	Near Microbiology Cell Culture Lab and teaching labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades as feasible or shared through interior partitions
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared) on demand ventilation is preferred
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 6'
Radioisotope Hood	
Laminar Flow Hood	●
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

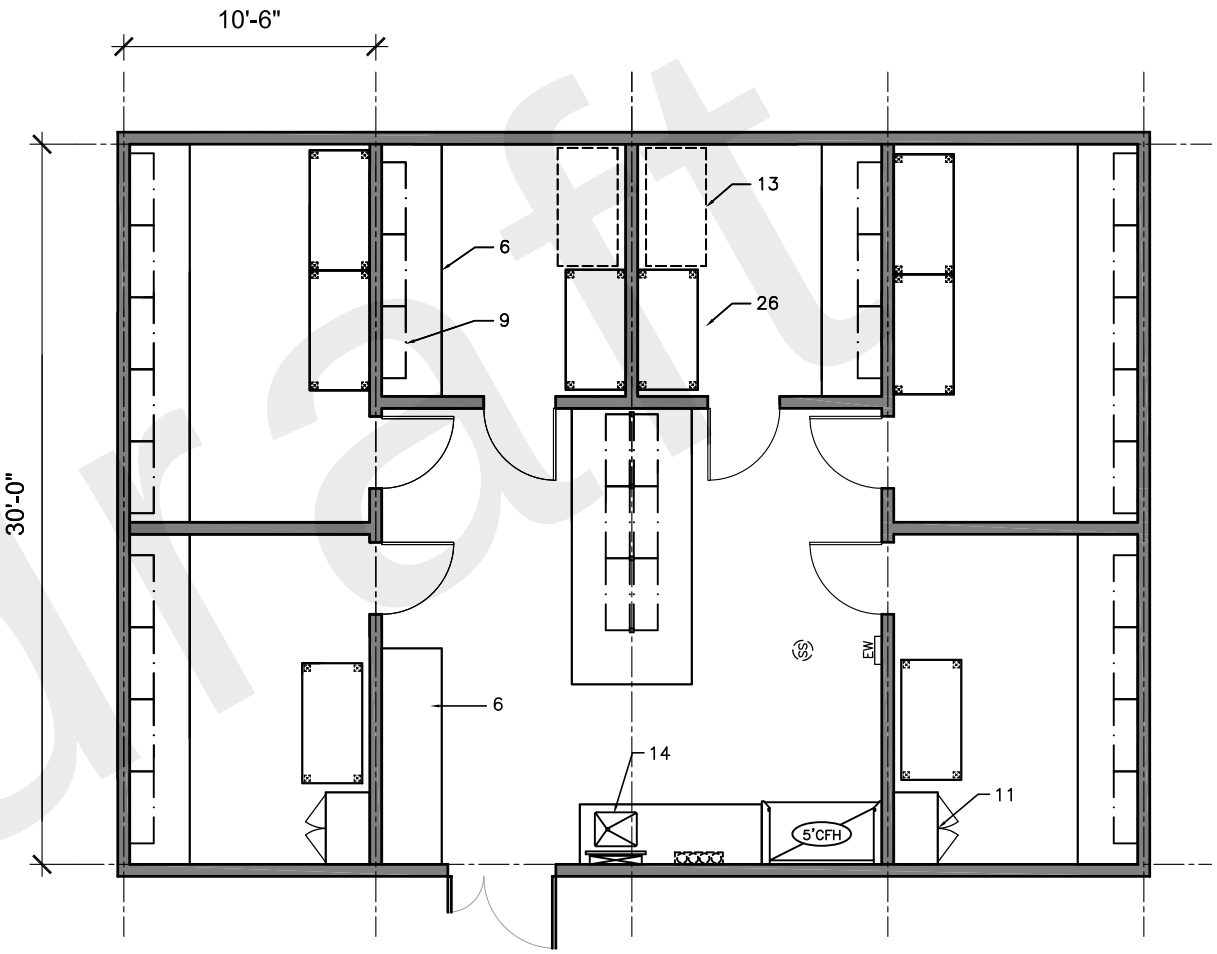
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

Z.12 RESEARCH LAB - ORGANISMAL

Area	1,260 SF
Quantity	1
Function	Shared faculty research laboratory
Occupants	12-16 faculty and research students
Adjacency	Near Zoology lab support areas and Oragnismal teaching lab
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	Exterior window with roller shades as feasible or shared through interior partitions
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared) on demand ventilation is preferred
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 6'
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

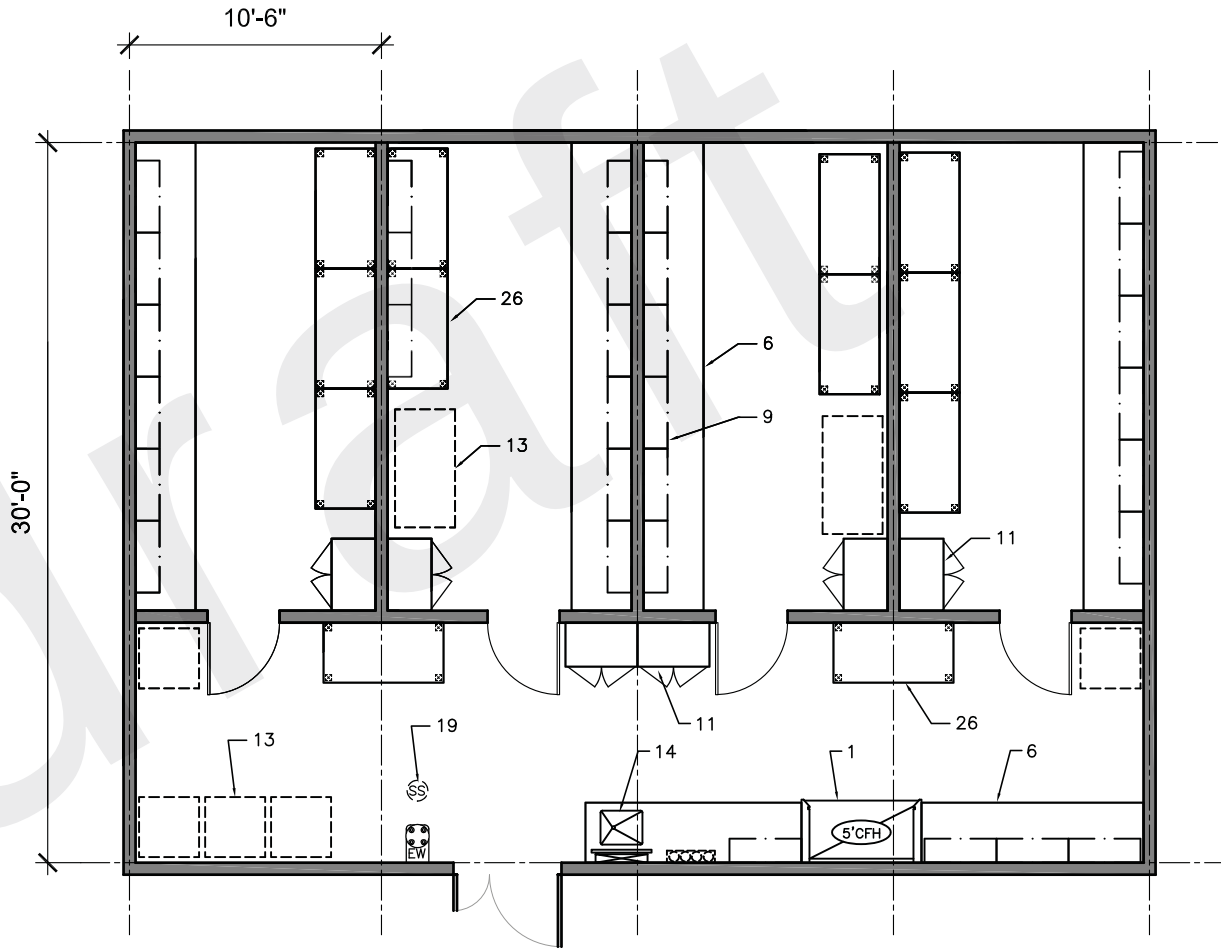
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

Z.21 PREP / STORAGE ROOM

Area	315 SF
Quantity	2
Function	Shared faculty support prep and storage room
Occupants	6-8 faculty and research students
Adjacency	Near Zoology teaching labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Shared thermal environment
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	(1) 6'
Radioisotope Hood	
Laminar Flow Hood	●
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	●
CHEMICALS	
Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

Z.22 AUTOCLAVE ROOM

Area	157 SF
Quantity	1
Function	Autoclave room, may be a shared laboratory support space
Occupants	6-8 faculty and research students
Adjacency	Near other Zoology lab support spaces
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Shared thermal environment
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

Z.23 SPECIMEN COLLECTIONS

Area	630 SF
Quantity	1
Function	Specimen collection storage and research area
Occupants	1-2 faculty and research students
Adjacency	Near Zoology teaching labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Temperature range to be determined with users
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	
Other	TBD
Humidity	
Uncontrolled	
Other	TBD
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Vented Storage	●

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

Draft

Z.24 SAMPLE SPECIMEN PREP LAB

Area	157 SF
Quantity	1
Function	Specimen preparation area
Occupants	1-2 faculty and research students
Adjacency	Accessible to specimen storage, adjacent to teaching labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Shared thermal environment
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Vented Storage	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

Z.25 RADIOISOTOPE ROOM

Area	105 SF
Quantity	1
Function	Secured and isolated radioisotope storage and lab area
Occupants	1-2 qualified personnel
Adjacency	Near lab support areaas
Floor	Welded seam sheet vinyl
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Metal, or as needed for safety and security
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	●
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	●
Chemical Storage	

draft

Z.26 EQUIPMENT ROOM

Area	457 SF
Quantity	1
Function	Zoology equipment room, may be in a common equipment area within the building
Occupants	1-4 visitors
Adjacency	Near teaching labs
Floor	Chemical resistant laboratory resilient flooring
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	As needed for laboratory sink, and laboratory equipment
Electrical | AV | IT	Power and data in walls and electrical raceway in overhead service carrier. Power as needed for specialty and lab equipment as indicated
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet (A2)	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	●
Heat Producing	●
Noise Producing	●
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

Z.27 CADAVER STORAGE ROOM

Area	315 SF
Quantity	1
Function	Human Anatomy cadaver storage room
Occupants	1-4 visitors
Adjacency	Adjacent to Human Anatomy Lab
Floor	Integral epoxy flooring and base
Wall	Epoxy painted gypsum board
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and 1'-6" leaf
Windows	N/A
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 65-70 degrees
Plumbing	Floor drain
Electrical | AV | IT	Convenience outlets at walls
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	
Other	●
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet (A2)	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

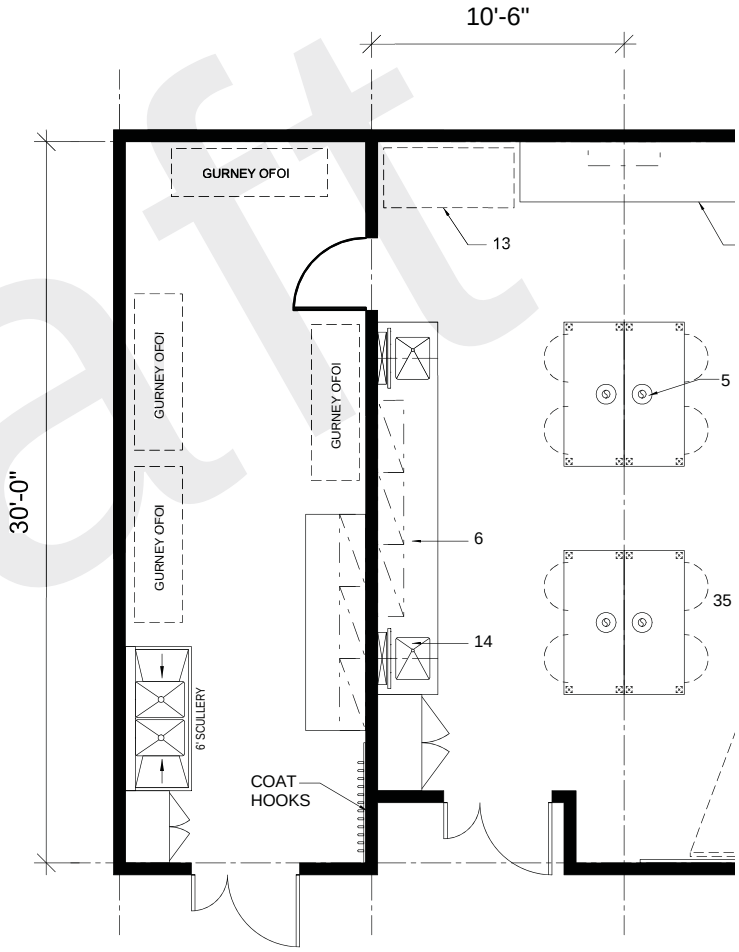
LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	●
Safety Shower/Eyewash (SS)	
Eyewash (EW)	

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Data / Phone	●
In Use Light	
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

draft

This diagram is conceptual and is provided only to indicate required furnishings, equipment and general room proportions. The actual room design may change.

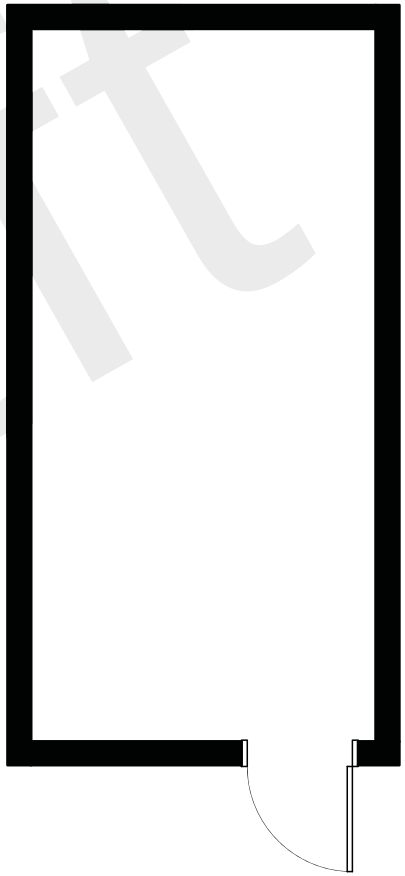
1. *Chemical Fume Hood*
2. *Biological Safety Cabinet*
3. *Laminar Flow Hood*
4. *Vented Workstation*
5. *Snorkel Exhaust*
6. *Laboratory Bench, Standing Height*
7. *Laboratory Bench, Sitting Height*
8. *Wall Cabinet*
9. *Adjustable Wall Shelves*
10. *Island Bench Shelves*
11. *Tall Storage Cabinet*
12. *Flammable Storage Cabinet*
13. *Equipment Space*
14. *Laboratory Sink*
15. *Cupsink*
16. *Processing Sink*
17. *Cylinder Rack*
18. *Gas Cabinet*
19. *Safety Shower/Eyewash*
20. *Overhead Service Carrier*
21. *Pipe Drop Enclosure*
22. *Movable Demonstration Bench*
23. *Glassware Washer*
24. *Glassware Dryer*
25. *Autoclave*
26. *Movable Laboratory Table*
27. *Wire Shelving*
28. *White Markerboard*
29. *Black Chalkboard*
30. *Tackboard*
31. *Desk*
32. *Balance Table*
33. *Writing Table*
34. *Multi-media Projector (Ceiling Mount) & A/V Screen*
35. *File Cabinet*



draft

Z.28 FIELD EQUIPMENT STORAGE

Area	315 SF
Quantity	1
Function	Zoology field equipment and tool storage
Occupants	0 FTE, 1-2 visitors
Adjacency	Near a building exit, may be shared with other department field storage, with a secured enclosure.
Floor	Sealed concrete
Wall	Epoxy painted gypsum board, or secured fencing
Ceiling	Open to structure above
Doors	Metal
Windows	N/A
Acoustics	N/A
Mechanical	Shared thermal environment
Plumbing	N/A
Electrical | AV | IT	Convenience outlets at walls
Lighting	40 footcandles overhead, integrated occupancy sensor
Equipment | Furniture	• Storage shelves as necessary



draft

Z.29 ANIMAL FACIITY

Area	945 SF
Quantity	1
Function	Animal holding and research area
Occupants	1-6 visitors
Adjacency	Near building exit
Floor	Integral epoxy flooring and base
Wall	Epoxy fiberglass partition system
Ceiling	10'-0", suspended acoustic ceiling tile
Doors	Wood with lite, 3' leaf and
Windows	Shared daylight preferred
Acoustics	STC 45 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 65-70 degrees
Plumbing	Floor drain at aquaria space
Electrical | AV | IT	Convenience outlets at walls, as needed for equipment
Lighting	Overhead 50 footcandles with occupancy and photocell sensors

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
MECHANICAL	
Temperature	
68°-75° ± 2°F	
Other	●
Humidity	
Uncontrolled	
Other	●
Minimum Air Changes/Hour	10
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	●
Additional Exhaust Air Filtr.	●
HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Animal Changing Station	(1) 4'
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	
PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Carbon Dioxide (CO2)	
Nitrogen Gas (N2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Data / Phone	●
In Use Light	●
Task Lighting	
Lighting Level	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	●
CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

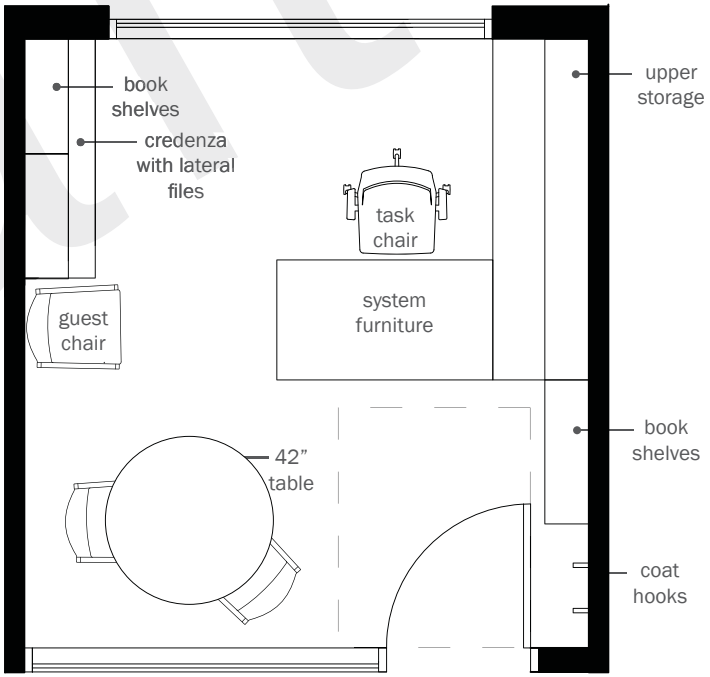
Draft

Z.31 DEPARTMENT CHAIR OFFICE

Area	150 SF
Quantity	1
Function	Department Chair's Office and meeting area
Occupants	1 FTE, 2-3 visitors
Adjacency	Department reception and offices
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling with gypsum soffit
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 55 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer and printer
- 3 visitor chairs
- small conference table
- bookshelves
- coat hook behind door



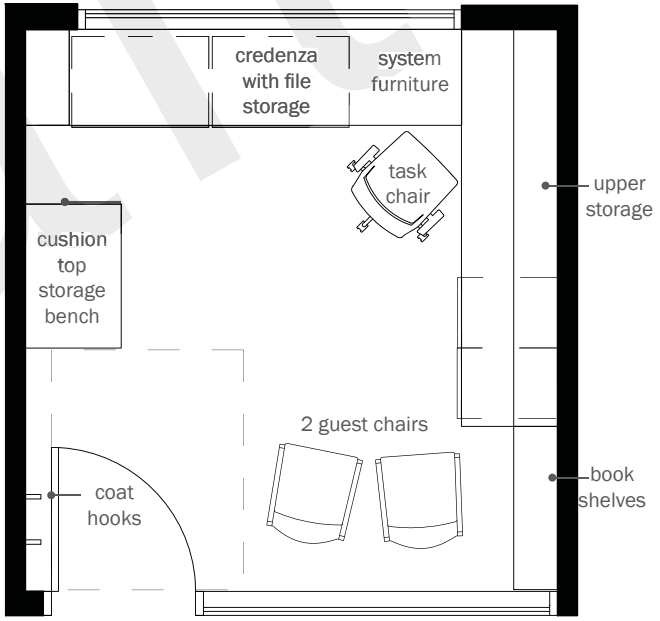
draft

Z.32 FACULTY OFFICE

Area	120 SF
Quantity	11
Function	Faculty office and informal meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department reception, Department Chair's office
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door



office layout based on Natural History Museum model

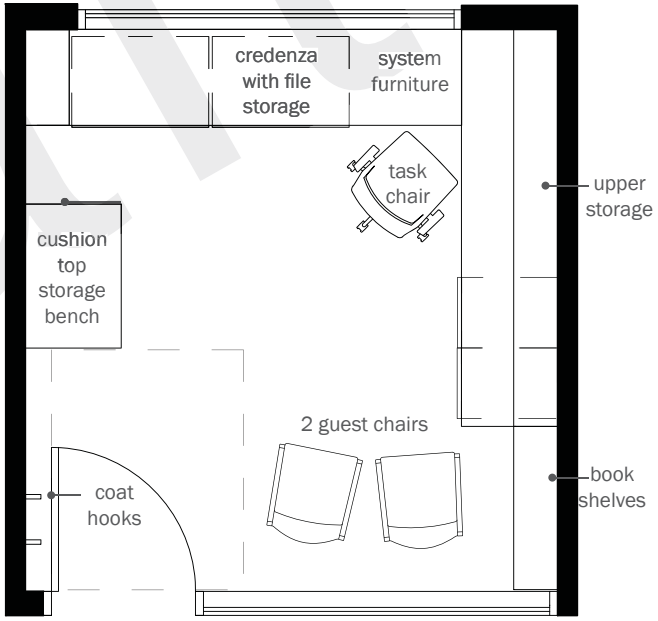
draft

M.33 LAB MANAGER OFFICE

Area	120 SF
Quantity	1
Function	Laboratory Manager office and meeting area
Occupants	1 FTE, 2 visitors
Adjacency	Department laboratories and support spaces
Floor	Carpet
Wall	Gypsum board
Ceiling	10' high, suspended acoustic ceiling
Doors	Wood
Windows	Exterior window with roller shades, interior glass partition at 3'-0" above finished floor.
Acoustics	STC 50 at walls, NRC .60 at ceiling
Mechanical	Thermostat w/ range 68-76 degrees (may be shared)
Plumbing	N/A
Electrical | AV | IT	Electrical and IT as needed for equipment Convenience outlets at walls
Lighting	Overhead fluorescent 30 footcandles with occupancy sensor, task lighting at work surface.

Equipment | Furniture

- office desk
- task chair
- computer & printer
- 2 visitor chairs
- white board or white board paint
- coat hook behind door



office layout based on Natural History Museum model

draft

APPENDIX

COST ESTIMATE

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION			6/12/2013

PROJECT NAME.....WEBER STATE SCIENCES BUILDING
LOCATION.....OGDEN, UTAH
ARCHITECT.....VCBO — Project Size 172,523 SF
STAGE OF DESIGN.....PROGRAMMING

CSI #	DESCRIPTION	UNIT QTY	UNIT COST	
	BUILDING A COST SUMMARY			
02	SITEWORK & DEMOLITION		$ 28.21	$ 4,867,221
03	CONCRETE		$ 10.07	$ 1,737,033
04	MASONRY		$ 5.70	$ 983,462
05	METALS		$ 29.38	$ 5,069,393
06	WOODS & PLASTICS		$ 13.81	$ 2,382,544
07	THERMAL & MOISTURE PROTECTION		$ 14.53	$ 2,507,158
08	DOORS & WINDOWS		$ 17.62	$ 3,039,296
09	FINISHES		$ 27.86	$ 4,807,205
10	SPECIALTIES		$ 3.65	$ 629,709
11	EQUIPMENT		$ 5.39	$ 929,938
12	FURNISHINGS		$ 1.80	$ 310,804
13	SPECIAL CONSTRUCTION		$ 0.72	$ 124,425
14	CONVEYING SYSTEMS		$ 2.96	$ 510,000
15	MECHANICAL		$ 85.87	$ 14,814,172
16	ELECTRICAL		$ 36.99	$ 6,381,626
	SUBTOTAL		$ 284.56	49,093,986
	GENERAL CONDITIONS	5%	$ 14.23	2,454,699
	OVERHEAD & PROFIT	3.5%	$ 9.96	1,718,289
	DESIGN CONTINGENCY	12.5%	$ 35.57	6,136,748
	TOTAL CONSTRUCTION COST		$ 344.32	$ 59,403,723

draft
DRAFT

CSI #	DESCRIPTION	UNIT QTY	UNIT COST	
02	**SITEWORK & DEMOLITION**			
	Demolition			
	Demolish Existing Buildings 3&4	1209600 CF	$ 0.35	$ 423,360
	Demolish Existing Science Buildings	2150000 CF	$ 0.35	$ 752,500
	Site Clearing, Sidewalk Demolition	100000 SF	$ 0.89	$ 89,000
	Subtotal for Demolition			**$ 1,264,860**
	Earthwork			
	Building Excavation	18518 CY	$ 6.00	$ 111,108
	Backfill and Compaction w/ Imported Fills	6370 CY	$ 19.65	$ 125,171
	Remove Spoil	10518 CY	$ 7.00	$ 73,626
	Building Grading	49150 SF	$ 0.69	$ 33,914
	Gravel Under Slab	1951 TNS	$ 30.00	$ 58,543
	Subtotal for Earthwork			**$ 402,361**
	Site Utilities			
	Lind Lecture Utility Relocation	1 LS	$ 2,000,000	$ 2,000,000
	Site Utilities	1 LS	$ 150,000.00	$ 150,000
	High Temp Water Line at Site	1 LS	$ 75,000.00	$ 75,000
	Chilled Water at Site	1 LS	$ 75,000.00	$ 75,000
	Subtotal for Site Utilities			**$ 2,300,000**
	Site Improvements	90000 SF	$ 10.00	**$ 900,000**
	TOTAL SITEWORK & DEMOLITION			**$ 4,867,221**
03	**CONCRETE**			
	Continuous Footings	921 CY	$ 295.00	$ 271,695
	Footings	921 CY	$ 295.00	$ 271,695
	Foundation Wall	14100 SF	$ 24.00	$ 338,400
	Slab on Grade	49150 SF	$ 4.85	$ 238,378
	Topping Slab	123373 SF	$ 5.00	$ 616,865
	TOTAL CONCRETE			**$ 1,737,033**
04	**MASONRY**			
	CMU at Stair Enclosure	10080 SF	$ 15.28	$ 154,022
	Brick Veneer	51840 SF	$ 16.00	$ 829,440
	TOTAL MASONRY			**$ 983,462**
05	**METALS**			
	Miscellaneous Steel	172523 SF	$ 0.38	$ 65,559
	Metal Floor Deck	123373 SF	$ 2.75	$ 339,276
	Metal Roof Deck	49150 SF	$ 1.95	$ 95,843
	Floor Structure (19#/SF)	2344087 LB	$ 1.55	$ 3,633,335
	Roof Structure (7#/SF)	344050 LB	$ 1.55	$ 533,278
	Concrete Filled Stair Pans	1396 SF	$ 59.00	$ 82,364
	Free Standing Railing	384 LF	$ 125.00	$ 48,000
	Wall Mounted Handrail	384 LF	$ 65.00	$ 24,960
	Decorative Stair	804 SF	$ 195.00	$ 156,780
	Decorative Stair Railing	400 SF	$ 225.00	$ 90,000
	TOTAL METALS			**$ 5,069,393**
06	**WOOD & PLASTICS**			
	Carpentry:			
	Wood Plates & Blocking	172523 SF	$0.31	$ 53,483
	Subtotal for Carpentry			**$ 53,483**
	Millwork	172523 SF	$13.50	**$ 2,329,061**
	TOTAL WOOD & PLASTICS			**$ 2,382,544**
07	**THERMAL & MOISTURE PROTECTION**			
	R-19 Insulation at Exterior Walls	51840 SF	$0.72	$ 37,325
	3" Rigid Insulation at Building Exterior	51840 SF	$2.95	$ 152,928
	Rigid Roof Insulation	49150 SF	$3.15	$ 154,823

Page 2

CSI #	DESCRIPTION	UNIT QTY	UNIT COST	
	Sound Batt	466213 SF	$0.48	$ 223,783
	Wall Sheathing	43650 SF	$1.65	$ 72,023
	Weather Barrier	43650 SF	$2.85	$ 124,403
	Single Ply Membrane	49150 SF	$2.95	$ 144,993
	Metal Panel (40% of Exterior)	34560 SF	$35.00	$ 1,209,600
	Metal Flashing	3500 SF	$5.05	$ 17,675
	Wall Cap	1830 LF	$9.65	$ 17,660
	Building Fireproofing	172523 SF	$1.65	$ 284,663
	Fire Stopping/ Caulking	172523 SF	$0.18	$ 31,054
	Caulking & Sealants	172523 SF	$0.21	$ 36,230
	TOTAL THERMAL & MOISTURE PROTECTION			**$ 2,507,158**
08	**DOORS & WINDOWS**			
	Interior Single Doors	554 EA	$1,020.00	$ 565,080
	Storefront Exterior Double Door	6 EA	$3,650.00	$ 21,900
	Overhead Door	2 EA	$2,958.00	$ 5,916
	Exterior Glazing (40% of Exterior)	34560 SF	$65.00	$ 2,246,400
	Interior Glazing	5000 SF	$40.00	$ 200,000
	TOTAL DOORS & WINDOWS			**$ 3,039,296**
09	**FINISHES**			
	Exterior Metal Stud Framing	52290 SF	$3.20	$ 167,328
	Interior Metal Stud Partitions	466213 SF	$1.95	$ 909,115
	Epoxy/Fiberglass Partition System	1845 SF	$4.42	$ 8,155
	Gyp Board Walls	984715 SF	$1.31	$ 1,289,977
	ACT Ceiling	55506 SF	$3.25	$ 180,395
	Mylar Coated ACT Ceiling	472 SF	$3.75	$ 1,770
	Exposed Ceiling, Painted	682 SF	$1.89	$ 1,289
	Gyp Board Ceiling, Epoxy Painted	945 SF	$4.89	$ 4,621
	Non-lab Space Ceiling	44334 SF	$5.65	$ 250,487
	Resilient Tile	53092 SF	$1.95	$ 103,529
	Sheet Vinyl Welded Seam	1312 SF	$4.65	$ 6,101
	Epoxy Floor	1260 SF	$4.00	$ 5,040
	Sealed Concrete	3516 SF	$0.39	$ 1,371
	Other Flooring	104334 SF	$4.25	$ 443,420
	Other Ceiling	104334 SF	$3.25	$ 339,086
	4" Vinyl Base	21804 LF	$1.45	$ 31,616
	Integral Epoxy Base	195 LF	$3.50	$ 683
	Paint Interior Gyp Board walls	660143 SF	$0.42	$ 277,260
	Epoxy Paint Lab Space	324572 SF	$1.89	$ 613,441
	Wall Coverings	172523 SF	$1.00	$ 172,523
	TOTAL FINISHES			**$ 4,807,205**
10	**SPECIALTIES**			
	Specialties	172523 SF	$3.65	$ 629,709
	TOTAL SPECIALTIES			**$ 629,709**
11	**EQUIPMENT**			
	8' Chemical Hood	5 EA	$15,000.00	$ 75,000
	6' Chemical Hood	36 EA	$12,208.00	$ 439,488
	4' Chemical Hood	10 EA	$10,850.00	$ 108,500
	Laminar Flow Hood	4 EA	$12,500.00	$ 50,000
	Dust Collector	1 EA	$30,000.00	$ 30,000
	Biological Safety Cabinet	3 EA	$15,000.00	$ 45,000
	Vented Storage Cabinet	2 EA	$12,000.00	$ 24,000
	Autoclave	1 EA		NIC
	Glassware Washer	1 EA		NIC
	Snorkel	9 EA	$7,550.00	$ 67,950
	Equipment Exhaust	2 EA	$25,000.00	$ 50,000
	Emergency Exhaust	1 EA	$25,000.00	$ 25,000
	Loading Dock Equipment	1 LS	$15,000.00	$ 15,000

Page 3

DRAFT

CSI #	DESCRIPTION	UNIT QTY	UNIT COST	
	TOTAL EQUIPMENT			**$ 929,938**
12	**FURNISHINGS**			
	Walk-Off Mats	400 SF	$29.65	$ 11,860
	Blinds	34560 SF	$8.65	$ 298,944
	4 Person Bench	8 EA		NIC
	10 Person Bench	3 EA		NIC
	Darkening Window Coverings			NIC
	TOTAL EQUIPMENT			**$ 310,804**
13	**SPECIAL CONSTRUCTION**			
	Greenhouse	1575 SF	$79.00	**$ 124,425**
	TOTAL SPECIAL CONSTRUCTION			**$ 124,425**
14	**CONVEYING SYSTEMS**			
	Elevator- 4 Stop	2 EA	$180,000.00	$ 360,000
	Freight Elevator	1 EA	$150,000.00	$ 150,000
	TOTAL CONVEYING SYSTEMS			**$ 510,000**
15	**MECHANICAL**			
	HVAC:	113343 SF	$35.00	**$ 3,967,005**
	Lab Area HVAC	59180 SF	$140.00	**$ 8,285,200**
	Fire Protection:	172523 SF	$2.55	**$ 439,934**
	Plumbing	172523 SF	$9.65	**$ 1,664,847**
	Lab Gas, Vacuum System	172523 SF	$2.65	**$ 457,186**
	TOTAL MECHANICAL			**$ 14,814,172**
16	**ELECTRICAL**			
	Service & Distribution (Including Emergency):	172523 SF	$8.34	**$ 1,438,842**
	Power:	172523 SF	$7.65	**$ 1,319,801**
	Lighting:	172523 SF	$8.00	**$ 1,380,184**
	Telecommunication System:	172523 SF	$4.35	**$ 750,475**
	Fire/Smoke System:	172523 SF	$3.00	**$ 517,569**
	Special Systems:	172523 SF	$5.65	**$ 974,755**
	TOTAL ELECTRICAL			**$ 6,381,626**

draft
DRAFT

draft

STATE OF UTAH UTILIZATION STUDY EXCERPT

STATE OF UTAH
HIGHER EDUCATION SPACE STANDARDS AND UTILIZATION STUDY

Prepared by:
Paulien & Associates, Inc. --Denver, CO

In association with the:
National Center for
Higher Education Management Systems (NCHEMS) – Boulder, CO

JANUARY 1996

PAULIEN & ASSOCIATES
PLANNING CONSULTANTS
899 Logan Street, #508 ◆ Denver, CO 80203 ◆ (303) 832-3272 ◆ FAX (303) 832-3380

draft

STATE OF UTAH
HIGHER EDUCATION SPACE STANDARDS AND UTILIZATION STUDY

Prepared by: Paulien & Associates, Inc. —Denver, CO
In Association with: The National Center for
Higher Education Management Systems (NCHEMS) – Boulder, CO

JANUARY 1996

EXECUTIVE SUMMARY

The charge to the consultants in the space standards and utilization study was to verify existing utilization of classrooms and laboratories, make recommendations regarding the space utilization analysis process, review the coding of rooms in the facilities inventory and make recommendations, and propose to the State of Utah space standards which can be used to determine space needs for a system expected to see significant growth in the near future.

Because the amount of growth has a significant bearing on the findings of the study, the consultants' analysis began with a look at the population growth facing the State of Utah over the next 10 to 15 years. The study then included a complete space utilization analysis for all classrooms and teaching labs in the system, an analysis of the facilities inventory coding of educational and general space, and the proposal of a space needs model. Because the use of alternate delivery systems has received extensive attention, with strong leadership of Utah's Governor, Michael O. Leavitt, an analysis was made of the space implications of teaching a significant portion of the projected growth in enrollment using alternative delivery methods, including broadcast television, two-way live television, computerized course materials, and the use of learning centers, most of which would be located in community settings rather than the main campuses.

KEY FINDINGS AT A GLANCE

The Demographic Context

- A careful analysis of the Utah demographics suggests that the higher education growth will be much less than early indications of a doubling over the next 15 years. Instead, a 30% growth, or approximately 20,000 to 25,000 FTE is more likely to occur.
- Utah's population growth will be concentrated in six counties. These are in the Wasatch Front, plus Washington County in Southwest Utah.
- Much of the growth in higher education is likely to come from the 25 to 49 year old group, rather than the traditional 18 to 24 year old population. This suggests more part-time students and students looking for alternative times and locations for delivery of instruction that are more convenient to them.

Current Utilization and Utilization Targets

- The day utilization of classrooms averages 28 day hours at 58%, compared with a target of 33.75 day hours at 67%. When evening and weekend instruction is included, the statewide average is 35 hours at 56%.

- Most states have a day use expectation of 30 hours at 67% occupancy for classrooms. Three states which had gone to extremely high utilization targets either have lowered them or have received or are receiving strong input from the higher education governance structure to reduce those findings substantially.

- The consultants recommend that the current Utah classroom utilization standard, already more than 10% above the most commonly used target, not be raised.

- Scheduled day laboratory utilization averages 21 hours per week at 64%. The Utah target is 22.5 hours per week at 80%. When evening and weekend instruction is included, the total use is 26 hours at 62%. The Utah guideline is more than 10% higher than the most commonly used one of 20 day hours at 80%. Those states which have gone to higher figures base them on all hours utilization, including evening and Saturday use. The one state which has gone to extremely high laboratory utilization is not achieving it, and its higher education coordinating board is recommending a substantial reduction.

- The consultants recommend that the Utah target for laboratory utilization not be raised.

<u>Facilities Mix</u>

- Classroom and teaching laboratory plus open (self-paced) laboratory space ranges from 25% at the comprehensive universities, to over 50% (at Salt Lake Community College and Utah Valley State College) of the educational and general space at Utah institutions.

- Significant parts of the rest of the education and general space inventory are used for instruction related activities. This includes research laboratories, study spaces, physical education spaces, and assembly and exhibition spaces. Over 40% of the systemwide educational and general space consists of classroom and lab space, with open labs and research labs included.

- The campus space utilization audits found some significant discrepancies. Short courses are not currently being excluded from the utilization. This resulted in one small institution showing utilization numbers which were 33% higher than the actual use when these short courses are excluded. Additional complexities involve instruction taught in short blocks within terms and skills-based instruction where students work through more than one course number during a typical term. Specific recommendations are in the report to address those issues.

- An analysis of the educational and general space per institution (space used in the Quantification and Prioritization process of the Utah System of Higher Education) was done. It shows currently an average of 93 assignable square feet per FTE student, with individual institutional findings ranging from 57 asf per FTE at Salt Lake Community College and Utah Valley State College to 145 asf per FTE at Dixie College. When projects approved for planning but not necessarily funded for construction are factored in and when the 2004 enrollment projections of the Utah System for Higher Education are utilized (enrollment projections based on Fall 1994 enrollment data), the total educational and general finding drops to 88 asf per FTE, with Utah Valley State College being the lowest at 65 asf per FTE, Salt Lake Community College at 67 asf per FTE, and Weber State College at 69 asf per FTE. At the high end, Dixie College and Snow College both show 120 asf per FTE.

draft

3.0 Current Utilization and Facilities Mix

The consultants received from the Utah System of Higher Education a complete facilities inventory file for each of the nine institutions, a complete Fall 1994 course file, and the file known as "Room.dat" which is a file listing the classrooms and teaching laboratories to be included in the instructional space utilization study.

Paulien & Associates ran classroom and teaching laboratory space utilization for all of the campuses, showing findings for day instruction, for total weekly instruction, by size of room, by building, and by time of day. Graphs have been prepared as technical documents to this study, which show the findings for each of the campuses.

Dan Paulien, Project Manager for this study, visited each of the institutions and based on materials from the utilization run conducted an audit checking rooms where the categorizations seemed questionable or the utilization numbers were suspect. These on-site audits involved one day at the smaller institutions and two days at the three institutions with the largest enrollments.

Pie charts were also developed showing the mix of space in the facilities inventory at each campus, and the audit included a verification of room classifications for those rooms where the classification seemed questionable.

From this analysis, a systemwide summary was also done. Those summaries are included in this report.

3.1 Classroom Utilization

The classroom utilization campus-by-campus is as follows:

State of Utah Space Standards and Utilization
Classroom Utilization

	Day Use		All Hours	
School	Weekly Room Hours	Student Station Occupancy %	Weekly Room Hours	Student Station Occupancy %
College of Eastern Utah	22	72%	28	68%
Dixie College	24	61%	28	60%
Salt Lake Community College	31	55%	45	52%
Snow College	25	68%	26	68%
Southern Utah University	28	67%	29	66%
University of Utah	28	51%	35	49%
Utah State University	32	63%	35	61%
Utah Valley State College	33	70%	41	66%
Weber State University	25	55%	29	53%
State of Utah	28	58%	35	56%

Day use ranged from a low of 22 hours at the College of Eastern Utah to a high of 33 hours at Utah Valley State College. The State of Utah utilization target is 34 hours, meaning no institutions currently meet that target with day use only. When all hours are included, the findings range from a low of 26 hours at Snow College to a high of 45 hours at Salt Lake Community College. The statewide average increases to 35 hours when all hours of use are included. The previous table also shows the extent to which evening use takes place at different institutions, with substantial evening use at Salt Lake Community College, Utah Valley State College, and University of Utah, where the differences between day use and total use are at least seven hours per week. At Snow College and at Southern Utah University the evening use is very minimal. Both of these are located in small communities in remote parts of the state.

The student station occupancy target (i.e., the percentage of seats filled on the average when the room is used by scheduled classes) is 67%. Actual day utilization is 58% across the whole system. The institutions which meet or exceed the station occupancy target are College of Eastern Utah, Utah Valley State College, Snow College, and Southern Utah University. The lowest student station occupancy percentage is at the University of Utah, with 51%. Others with low student station occupancy are Weber State University and Salt Lake Community College, at 55%. Adding evening courses tends to reduce the student station occupancy percentage, since those courses often are somewhat smaller than day courses. When all courses are included, only two institutions exceed the 67% target, the College of Eastern Utah and Snow College. The institutions with the lowest student station occupancy are University of Utah at 49%, Salt Lake Community College at 52%, and Weber State College at 53%. The statewide average is 56%.

3.2 Laboratory Utilization

The class laboratory utilization campus-by-campus is as follows:

State of Utah Space Standards and Utilization
Laboratory Utilization

	Day Use		All Hours	
School	Weekly Room Hours	Student Station Occupancy %	Weekly Room Hours	Student Station Occupancy %
College of Eastern Utah	24	56%	27	56%
Dixie College	20	57%	25	53%
Salt Lake Community College	25	58%	32	54%
Snow College	11	63%	11	63%
Southern Utah University	21	76%	23	74%
University of Utah	20	61%	25	60%
Utah State University	20	81%	22	82%
Utah Valley State College	23	71%	29	69%
Weber State University	16	61%	18	61%
State of Utah	20	64%	25	62%

The highest laboratory utilization currently is 25 hours per week at Salt Lake Community College, 24 hours per week at College of Eastern Utah, and 23 hours per week at Utah Valley State College. The lowest utilization is Snow College at 11 hours per week, and Weber State University at 16 hours per week. The utilization target is currently 22.5 hours per week.

Only Utah State University meets the 80% station occupancy goal for labs. The lowest utilization percentage is 56% at College of Eastern Utah, followed by 57% at Dixie College and 58% at Salt Lake Community College.

When all hours of use, including evening and Saturday, are included the highest use figures are 32 hours at Salt Lake Community College, 29 hours at Utah Valley State College, 27 hours at College of Eastern Utah, and 25 hours at Dixie College and University of Utah. The lowest utilization is 11 hours at Snow College, followed by 18 hours at Weber State University. The statewide average is 26 hours. The utilization percentage drops a bit with evening and Saturday courses tending to have somewhat smaller enrollments than those of regular day courses. Utah State University, however, increases its utilization slightly to 82%. The next best figure is Southern Utah University at 74%. The lowest percentages are Dixie College at 53%, Salt Lake Community College at 54%, and College of Eastern Utah at 56%.

The use of short courses and skills-based enrollment with the same student completing multiple courses during a term is fairly extensive at the community colleges. It skews the utilization findings upward. College of Eastern Utah dropped from 32 hours per week to 24 hours per week after a course-by-course analysis removed partial term sections. Start and stop dates on course records are needed. For true open enrollment skills-based learning, where no start and stop dates can be assigned because of the individualized nature of the instruction, it may be necessary to move the room to the Open Lab category. In many cases, an expected sequencing of 2-week, 3-week, or 5-week course completion can be inserted into the records.

3.3 Classroom and Laboratory Utilization Analysis Recommendations

The following specific recommendations regarding classroom and laboratory utilization are made as a result of the analysis by the consultants:

1. The entire system should use similar software in conducting annual utilization and facilities inventory studies.

2. The use of a separate room.dat file (a list of classrooms and labs with their capacities) for the utilization study results in certain institutions calling rooms classrooms or labs which are not so classified in their facilities inventory. We strongly recommend that the programming be put in place so that actual classroom and lab records from the complete facilities inventory are used as the match to the utilization study. Since the facilities inventory also includes the square footage for each room,

this will allow square feet per student station to be calculated for each room which also helps to find problem room classifications.

3. Start and stop dates need to be added to the course records. Short courses labeled "early fall" or "Interim" were included at several institutions. Others use modules and blocks, which meet for less than a whole term. The current system includes all those courses. We have attempted to filter them out through a rerun following the campus audits.

4. Institutions took somewhat different approaches as to whether to include marginal rooms. A common set of definitions should be prepared. The consultant believes that rooms which have partial uses for other purposes, such as conference rooms, student testing areas, and lounges should not normally be counted in the classroom and lab utilization analysis, unless the intention and practice of the institution is that they are available 30 hours or more per week for scheduling as classrooms or laboratories. This does not mean that use of such rooms for scheduled classes should be discouraged, only that such mixed use rooms should not be counted with full-time classrooms and teaching labs for which there is a high utilization expectation.

5. One institution attempted to include all of their instructional work within the utilization study. This resulted in over 20% of their classrooms being rooms that physical observation did not suggest should be considered classrooms, and in the inclusion of outdoor physical education activities as though they were taught indoors.

6. A second institution included all physical education courses as though they were taught in labs and changed room numbers from those that actually are utilized. Several of those spaces should be reclassified as Physical Education.

7. Physical Education courses should be analyzed separately, and while utilization runs can be done, there are significant difficulties in viewing them as laboratories. This study recommends an approach to quantifying the need for indoor physical education space on a different basis than direct course utilization.

8. A common practice needs to be developed as to the inclusion of off-site centers. This varied from institution to institution. Facilities which are leased full-time by the institution and are available for extended day scheduling should be included. Time-based leasing of high schools and municipal facilities should not be included, since their usage potential is much less per week than for full-time facilities.

9. Main campus utilization should be subtotaled separately from that for off-site centers for each institution.

LEED 2009 for New Construction and Major Renovation
Project Checklist

19	0	6	**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
	x		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

Draft

5	0	3	**Water Efficiency**		**Possible Points:**	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction		
2		2	Credit 1	Water Efficient Landscaping		2 to 4
					Reduce by 50%	2
					No Potable Water Use or Irrigation	4
	x		Credit 2	Innovative Wastewater Technologies		2
3		1	Credit 3	Water Use Reduction		2 to 4
					Reduce by 30%	2
					Reduce by 35%	3
					Reduce by 40%	4
11	0	6	**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		
6			Credit 1	Optimize Energy Performance		1 to 19
					Improve by 12% for New Buildings or 8% for Existing Building Renovations	1
					Improve by 14% for New Buildings or 10% for Existing Building Renovations	2
					Improve by 16% for New Buildings or 12% for Existing Building Renovations	3
					Improve by 18% for New Buildings or 14% for Existing Building Renovations	4
					Improve by 20% for New Buildings or 16% for Existing Building Renovations	5
				X	Improve by 22% for New Buildings or 18% for Existing Building Renovations	6
					Improve by 24% for New Buildings or 20% for Existing Building Renovations	7
					Improve by 26% for New Buildings or 22% for Existing Building Renovations	8
					Improve by 28% for New Buildings or 24% for Existing Building Renovations	9
					Improve by 30% for New Buildings or 26% for Existing Building Renovations	10
					Improve by 32% for New Buildings or 28% for Existing Building Renovations	11
					Improve by 34% for New Buildings or 30% for Existing Building Renovations	12

draft

					Improve by 36% for New Buildings or 32% for Existing Building Renovations	13
					Improve by 38% for New Buildings or 34% for Existing Building Renovations	14
					Improve by 40% for New Buildings or 36% for Existing Building Renovations	15
					Improve by 42% for New Buildings or 38% for Existing Building Renovations	16
					Improve by 44% for New Buildings or 40% for Existing Building Renovations	17
					Improve by 46% for New Buildings or 42% for Existing Building Renovations	18
					Improve by 48%+ for New Buildings or 44%+ for Existing Building Renovations	19
1		1	Credit 2	On-Site Renewable Energy		1 to 7
					1% Renewable Energy	1
					3% Renewable Energy	2
					5% Renewable Energy	3
					7% Renewable Energy	4
					9% Renewable Energy	5
					11% Renewable Energy	6
					13% Renewable Energy	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
5	0	2	**Materials and Resources**		**Possible Points:**	**14**
Y			Prereq 1	Storage and Collection of Recyclables		
	x		Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof		1 to 3
					Reuse 55%	1
					Reuse 75%	2
					Reuse 95%	3
	x		Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements		1
2			Credit 2	Construction Waste Management		1 to 2

draft

					50% Recycled or Salvaged	1
					75% Recycled or Salvaged	2
	x		Credit 3	Materials Reuse		1 to 2
					Reuse 5%	1
					Reuse 10%	2
2			Credit 4	Recycled Content		1 to 2
					10% of Content	1
					20% of Content	2
1		1	Credit 5	Regional Materials		1 to 2
					10% of Materials	1
				20% of Materials		2
	x		Credit 6	Rapidly Renewable Materials		1
		1	Credit 7	Certified Wood		1
10	0	4	**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

draft

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
6	0	0	**Innovation and Design Process**		**Possible Points:**	**6**
1			Credit 1.1	Innovation in Design: Building Education Program		1
1			Credit 1.2	Innovation in Design: Low Mercury Lighting		1
1			Credit 1.3	Innovation in Design: Process Water Use Reduction		1
1			Credit 1.4	Innovation in Design: Envelope Commissioning		1
1			Credit 1.5	Innovation in Design: Integration of nature: improved indoor environment quality		1
1			Credit 2	LEED Accredited Professional		1
1	0	0	**Regional Priority Credits**		**Possible Points:**	**4**
1			Credit 1.1	Regional Priority: SSc4.1		1
			Credit 1.2	Regional Priority:		1
			Credit 1.3	Regional Priority:		1
			Credit 1.4	Regional Priority:		1
57	0	21	**Total**		**Possible Points:**	**110**

draft

draft

GSH

REPORT
GEOTECHNICAL STUDY
WEBER STATE UNIVERSITY SCIENCE BUILDING
OGDEN, UTAH

Submitted To:

VCBO Architecture
524 South 600 East
Salt Lake City, Utah 84102

Submitted By:

GSH Geotechnical, Inc.
473 West 4800 South
Salt Lake City, Utah 84123

June 10, 2013

Job No. 0068-016-13

draft

June 10, 2013
Job No. 0068-016-13

VCBO Architecture
524 South 600 East
Salt Lake City, Utah 84102

Attention: Mr. Brent Tippets, AIA

Gentlemen:

Re: Report
Geotechnical Study
Weber State University Science Building
Ogden, Utah

1. INTRODUCTION

1.1 GENERAL

This report presents the results of our geotechnical study performed for the proposed Science Building to be constructed just east of Elizabeth Hall at Weber State University in Ogden, Utah. The general location of the site with respect to major topographic features and existing facilities, as of 1998, is presented on Figure 1, Vicinity Map. A more detailed layout of the site showing the proposed locations of existing facilities is presented on Figure 2, Site Plan. The locations of the borings drilled in conjunction with this study are also presented on Figure 2.

1.2 OBJECTIVES AND SCOPE

The objectives and scope of our study were planned in discussions between Mr. Brent Tippets of VCBO Architecture and Mr. Bill Turner of GSH Geotechnical Consultants, Inc. (GSH).

In general, the objectives of this study were to:

1. Accurately define and evaluate the subsurface soil and groundwater conditions across the building site with an emphasis on the potentially liquefiable soils near the base of the parking garage and the characteristics of the deeper clays and how they are affected by the dewatering at the site.
2. Provide appropriate foundation, earthwork, bracing, floor slab, pavement, and geoseismic parameters necessary for the design and construction of the proposed facility with an emphasis on the parameters discussed above.

In accomplishing these objectives, our scope has included the following:

1. A field program consisting of the drilling, logging, and sampling of 6 borings.
2. A laboratory testing program.
3. An office program consisting of the correlation of available data, engineering analyses, and the preparation of this summary report.

1.3 AUTHORIZATION

Authorization was provided via our Professional Services Agreement No. 13-0303 dated March 11, 2013.

1.4 PROFESSIONAL STATEMENTS

Supporting data upon which our recommendations are based are presented in subsequent sections of this report. Recommendations presented herein are governed by the physical properties of the soils encountered in the borings, projected groundwater conditions, and the layout and design data discussed in Section 2, Proposed Construction, of this report. If subsurface conditions other than those described in this report are encountered and/or if design and layout changes are implemented, GSH must be informed so that our recommendations can be reviewed and amended, if necessary.

Our professional services have been performed, our findings developed, and our recommendations prepared in accordance with generally accepted engineering principles and practices in this area at this time.

2. PROPOSED CONSTRUCTION

It is our understanding that the proposed construction consists of a new 160,000 square foot 3- to 4-story high Science Building on the Weber State University (WSU) campus. We anticipate that the footprint of the proposed building will be approximately 40,000 to 53,000 square feet. Below-grade portions of the building are anticipated to extend up to 8 feet below the ground surface and will be of reinforced concrete construction. Final grade at the site will be similar to the original grade at the site.

GSH Geotechnical, Inc.
473 West 4800 South
Salt Lake City, Utah 84123
Tel: (801) 685-9190 Fax: (801) 685-2990
www.gshgeo.com

3. INVESTIGATIONS

3.1 FIELD PROGRAM

In order to define and evaluate the subsurface soil and groundwater conditions at the site, 6 borings were drilled to depths ranging from 16 to 41 feet below existing grade. The borings were drilled using rubber truck-mounted drill rig equipped with hollow-stem augers. Locations of the borings are presented on Figure 2.

The field portion of our study was under the direct control and continual supervision of an experienced member of our geotechnical staff. During the course of drilling operations, a continuous log of the subsurface conditions encountered was maintained. In addition, relatively undisturbed and small disturbed samples of the typical soils encountered were obtained for subsequent laboratory testing and examination. The soils were classified in the field based upon visual and textural examination. These classifications have been supplemented by subsequent inspection and testing in our laboratory. Detailed graphical representations of the subsurface conditions encountered are presented on Figures 3A through 3F, Log of Boring. Soils were classified in accordance with the nomenclature described on Figure 4, Key to Boring Log (USCS).

A 3.25-inch outside diameter, 2.42-inch inside diameter drive sampler (Dames & Moore) was utilized in the majority of the subsurface sampling at the site. Additionally, a 2.0-inch outside diameter, 1.38-inch inside diameter drive sampler (SPT) was utilized at select locations and depths. The blow counts recorded on the boring logs were those required to drive the sampler 12 inches with a 140-pound hammer dropping 30 inches.

Following completion of drilling operations, 1.25-inch diameter slotted PVC pipe was installed in the borings in order to provide a means of monitoring the groundwater fluctuations.

3.2 LABORATORY TESTING

3.2.1 General

In order to provide data necessary for our engineering analyses, a laboratory testing program was performed. The program included moisture and density, Atterberg Limits, gradation, and consolidation tests. The following paragraphs describe the tests and summarize the test data.

3.2.2 Moisture and Density Tests

To aid in classifying the soils and to help correlate other test data, moisture and density tests were performed on selected undisturbed samples. The results of these tests are presented on the boring logs, Figures 3A through 3F.

3.2.3 Atterberg Limits Testing

Atterberg Limits testing, consisting of Plastic and Liquid Index tests, was performed on representative samples of the fine-grained soils encountered at the site. The results of these tests are presented on the boring logs, Figures 3A through 3F.

3.2.4 Gradation Tests

To aid in classifying the soils and to provide general index parameters, full gradation tests were performed upon representative samples of the soils encountered in the exploration borings. The results of the tests are tabulated below:

	Percent Passing		
Sieve Size	**B-1 @ 24.5 ft**	**B-1 @ 34.5 ft**	**B-3 @ 29.5 ft**
No. 4	100	100	100
No. 8	100	100	100
No. 16	100	100	100
No. 30	100	100	100
No. 50	100	100	100
No. 100	99	99	99
No. 200	86	62	88
Soils Classification	ML	ML	ML

3.2.5 Consolidation Tests

To provide data necessary for our settlement analyses, consolidation tests were performed on representative samples of the silt/clay soils encountered at the site. The data obtained from these tests was used to calculate foundation movements which could occur from anticipated foundation loadings. Based upon data obtained from the consolidation tests, the natural silt/clay soils exhibit low to moderate compressibility characteristics under the anticipated loadings. Detailed results of the tests are maintained within our files and can be transmitted to you, upon your request.

draft

4. SITE CONDITIONS

4.1 SURFACE

The site is currently occupied by Buildings 3 and 4 located on the WSU campus, immediately east of the existing Elizabeth Hall in the north central area of the campus. The ground surface across the site slopes downward toward the west, with roughly 20 feet of elevation difference from the east to west sides of the proposed building. The site is bordered on the north by an existing parking lot, on the east by the Engineering Technology Building, on the south by Stewart Library, and on the west by Elizabeth Hall.

4.2 SUBSURFACE SOIL AND GROUNDWATER

The soil conditions encountered in the borings, to the depths penetrated, consisted of about 1.5 to 4.0 feet of fill (considered to be non-engineered fill) overlying natural silt and silty clay with fine sand containing interbedded lenses of silty clay or silty fine sand, extending to the maximum depths explored of about 16 to 41 feet below the existing ground surface. The silt and silty clay soils typically contained fine sand and trace gravel, were slightly moist, light brown in color, and are anticipated to exhibit moderate strength and low to moderate compressibility characteristics under the anticipated loading range.

The lines designating the interface between soil types on the boring logs generally represent approximate boundaries. In-situ, the transition between soil types may be gradual.

Groundwater was encountered in 5 of the 6 the borings during drilling operations at depths of 9.5 to 14.5 feet. Slotted 1.25-inch diameter PVC pipe was placed in the 6 borings in order to provide a means of monitoring the groundwater fluctuations. Subsequent measurements were taken, with the results shown in the table below. Seasonal and longer-term groundwater fluctuations on the order of 1 to 2 feet are projected, with the highest seasonal levels generally occurring during the late spring and early summer months.

Boring	Groundwater Depths	
	May 17, 2013	May 31, 2013
B-1	9.5	7.2
B-2	13.0	6.3
B-3	9.0	7.9
B-4	Not Encountered	9.8
B-5	11.0	10.1
B-6	13.5	13.2

5. DISCUSSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

The proposed building may be supported upon conventional spread and continuous wall foundations placed on suitable natural soils and/or structural fill extending to suitable natural soils.

The most significant geotechnical aspect of the site is the presence of non-engineered fill and groundwater near anticipated excavation depths. Any non-engineered fill should be removed, perhaps at the same time as the demolition of the existing buildings, but at least during the course of construction. GSH must be contacted to observe that any fill/problematic soils have been removed prior to footing construction.

Our drilling and water level measurements occurred during a time when groundwater is typically at the highest stage throughout the year. It is our understanding that the east side of the proposed building will be at least 8 feet below existing grade. Groundwater levels on the eastern side of the site (in Borings B-1 through B-4) were about 6.3 to 9.8 feet below existing grade. Thus, it is recommended that permanent drainage and underdrains be installed.

In the following sections, detailed discussions pertaining to earthwork, foundations, lateral resistance and pressure, floor slabs, underdrains, pavements, and the geoseismic setting of the site are provided.

5.2 EARTHWORK

5.2.1 Site Preparation

Following demolition of the existing structures, removal of all surface vegetation, topsoil, root bulbs, sod, rubbish, construction debris, non-engineered fill, and any other deleterious materials from areas which will ultimately be structurally loaded, can take place. We estimate that approximately 6 inches of stripping will be necessary to remove major roots, vegetation, and organics. Vegetation and other deleterious materials should be removed from the site. Stripped topsoil will be unsuitable for structural fill but may be stockpiled for subsequent landscaping purposes.

Subsequent to demolition/removal and stripping and prior to the placement of floor slabs, structural site grading fill, and pavements, the exposed subgrade (consisting of disturbed or undisturbed natural soils) must be proofrolled by passing moderate-weight rubber tire-mounted construction equipment over the surface at least twice. If excessively soft or loose soils are encountered, they must be removed to a maximum depth of 2 feet and replaced with structural fill.

draft

Following the above operations, pavements or structural site grading fill may be placed in areas of the proposed structures. All topsoil, vegetation, non-engineered fill, and any deleterious soils or materials must be completely removed from all foundation areas.

5.2.2 Excavations

Temporary construction excavations not exceeding 4 feet in depth and not encountering the groundwater table may be constructed with near-vertical sideslopes. If cohesive soils and groundwater are encountered, near-vertical sideslopes may still be used. If granular soils are encountered below the water table, very flat sideslopes will be required.

Deeper excavations not exceeding 10 feet in depth will require flatter sideslopes, shoring and bracing, and/or dewatering, if necessary. Some sloughing of the silty and sandy soils on the sides of the excavations is anticipated.

To minimize disturbance to the underlying soils, it is our recommendation that footings be excavated with a backhoe equipped with a smooth-lip bucket.

All excavations must be inspected periodically by qualified personnel. If any signs of instability or excessive sloughing are noted, immediate remedial action must be initiated.

5.2.3 Structural Fill

Structural fill is defined as all fill which will ultimately be subjected to structural loadings, such as imposed by footings, floor slabs, pavements, etc. Structural fill will be required as backfill over foundations and utilities, as site grading fill, and in some areas, replacement fill below footings. All structural fill must be free of sod, rubbish, topsoil, frozen soil, and other deleterious materials. Structural site grading fill is defined as fill placed over fairly large open areas to raise the overall site grade. For structural site grading fill, the maximum particle size should generally not exceed 4 inches; although, occasional larger particles, not exceeding 8 inches in diameter may be incorporated if placed randomly in a manner such that "honeycombing" does not occur and the desired degree of compaction can be achieved. The maximum particle size within structural fill placed within confined areas should generally be restricted to 2 inches.

The on-site soils may be utilized as structural site grading fill. However, it should be noted that unless moisture control is maintained, utilization of the natural on-site silty clay soils as structural site grading fill will be very difficult, if not impossible, during wet and cold periods of the year. Only granular soils are recommended as structural fill in confined areas, such as around foundations and within utility trenches.

To stabilize soft subgrade conditions or where structural fill is required to be placed below a level one foot above the water table at the time of construction, a mixture of coarse gravels and cobbles and/or 1.5- to 2.0-inch gravel (stabilizing fill) should be utilized.

Non-structural site grading fill is defined as all fill material not designated as structural fill and may consist of any cohesive or granular soils not containing excessive amounts of degradable material.

5.2.4 Fill Placement and Compaction

Coarse gravel and cobble mixtures (stabilizing fill), if utilized, should be end-dumped, spread to a maximum loose lift thickness of 15 inches, and compacted by dropping a backhoe bucket onto the surface continuously at least twice. As an alternative, the fill may be compacted by passing moderately heavy construction equipment or large self-propelled compaction equipment at least twice. Subsequent fill material placed over the coarse gravels and cobbles should be adequately compacted so that the "fines" are "worked into" the voids in the underlying coarser gravels and cobbles.

All structural fill should be placed in lifts not exceeding 8 inches in loose thickness. Fills must be compacted to the percentage listed in the table below of the maximum dry density as determined by the ASTM[1] D-1557 (AASHTO[2] T-180) compaction criteria:

Location	Total Fill Thickness (feet)	Minimum Percentage of Maximum Dry Density
Beneath an area extending at least 3 feet beyond the perimeter of the structure	0 to 10	95
Outside area defined above	0 to 5	90
Outside area defined above	5 to 10	95

Structural fills greater than 10 feet thick are not anticipated at the site.

Subsequent to stripping and prior to the placement of structural site grading fill, the subgrade should be prepared as discussed in Section 5.2.1, Site Preparation, of this report. In confined areas, subgrade preparation should consist of the removal of all loose or disturbed soils.

Non-structural fill may be placed in lifts not exceeding 12 inches in loose thickness and compacted by passing construction, spreading, or hauling equipment over the surface at least twice.

[1] American Society for Testing and Materials
[2] American Association of State Highway and Transportation Officials

5.2.5 Utility Trenches

All utility trench backfill material below structurally loaded facilities (flatwork, floor slabs, roads, etc.) should be placed at the same density requirements established for structural fill. If the surface of the backfill becomes disturbed during the course of construction, the backfill should be proofrolled and/or properly compacted prior to the construction of any exterior flatwork over a backfilled trench. Proofrolling may be performed by passing moderately loaded rubber tire-mounted construction equipment uniformly over the surface at least twice. If excessively loose or soft areas are encountered during proofrolling, they should be removed to a maximum depth of 2 feet below design finish grade and replaced with structural fill.

Most utility companies and City-County governments are now requiring that Type A-1-a/A-1-b (AASHTO Designation – basically granular soils with limited fines) soils be used as backfill over utilities. These organizations are also requiring that in public roadways the backfill over major utilities be compacted over the full depth of fill to at least 96 percent of the maximum dry density as determined by the AASHTO T-180 (ASTM D-1557) method of compaction. We recommend that as the major utilities continue onto the site that these compaction specifications are followed.

The natural fine-grained cohesive soils are not recommended for use as trench backfill.

5.2.6 Areal Settlements

Areal settlements resulting from site grading fills as much as 5 feet in thickness should be less than 0.5 inch. Such settlements are in addition to settlements induced by foundation and floor slab loads. To reduce the total settlement that the structure will realize, site grading fill must be placed as far in advance of other construction as possible. We estimate that about half of this settlement will occur during placement.

5.3 SPREAD AND CONTINUOUS WALL FOUNDATIONS

5.3.1 Design Data

The proposed structure may be supported upon conventional spread and continuous wall foundations that may be placed directly on natural soils or on properly compacted granular structural fill. If used, structural fill should extend to suitable natural soils and should not be underlain by sod, rubbish, topsoil, non-engineered fill, disturbed soil, or other unsatisfactory materials. For design, the following recommended parameters are provided:

Minimum Depth of Embedment for Frost Protection	- 30 inches
Minimum Depth of Embedment for Non-frost Conditions	- 15 inches
Minimum Width for Continuous Wall Footings	- 18 inches

Minimum Width for Isolated Spread Footings	- 24 inches
Net Bearing Pressure for Real Load Conditions	- 2,000 pounds per square foot*
Bearing Pressure Increase for Seismic Loading	- 50 percent

* This assumes that all footings will be placed on natural soils or on properly compacted granular structural fill.

The term "net bearing pressure" refers to the pressure imposed by the portion of the structure located above lowest adjacent final grade. Therefore, the weight of the footing and backfill to lowest adjacent final grade need not be considered. Real loads are defined as the total of all dead plus frequently applied live loads. Total load includes all dead and live loads, including seismic and wind.

5.3.2 Installation

Under no circumstances should the footings be installed directly upon soft or disturbed soils, construction debris, frozen soil, or within ponded water.

If the natural soils upon which the footings are to be established become loose or disturbed, they must be removed and replaced with granular structural fill. If the natural granular soils or granular structural fill upon which the footings are to be established become disturbed, they should be recompacted to the requirements for structural fill or be removed and replaced with structural fill.

The width of structural replacement fill, as required below footings, should be extended laterally at least 6 inches beyond the edges of the footings in all directions for each foot of fill thickness beneath the footings. For example, if the width of the footing is 2 feet and the thickness of the structural fill beneath the footing is 1 foot, the width of the structural fill at the base of the footing excavation would be a total of 3 feet, centered below the footing.

5.3.3 Settlements

Maximum settlements of foundations designed and installed in accordance with recommendations presented herein and supporting maximum anticipated loads as discussed in Section 2, Proposed Construction, are anticipated to be on the order of less than 1 inch.

Approximately 50 percent of the quoted settlement should occur during construction.

draft

5.4 LATERAL RESISTANCE

Lateral loads imposed upon foundations due to wind or seismic forces may be resisted by the development of passive earth pressures and friction between the base of the footings and the supporting soils. In determining frictional resistance, a coefficient of 0.40 should be utilized. Passive resistance provided by properly placed and compacted granular structural fill above the water table may be considered equivalent to a fluid with a density of 300 pounds per cubic foot. Below the water table, this granular soil should be considered equivalent to a fluid with a density of 150 pounds per cubic foot.

A combination of passive earth resistance and friction may be utilized provided that the friction component of the total is divided by 1.5.

5.5 LATERAL PRESSURES

The lateral pressure parameters as presented within this section assume that the backfill will consist of a drained granular soil placed and compacted in accordance with the recommendations presented herein. The lateral pressures imposed upon subgrade facilities will, therefore, be basically dependent upon the relative rigidity and movement of the backfilled structure. For active walls, such as retaining walls which can move outward (away from the backfill), granular backfill may be considered equivalent to a fluid with a density of 35 pounds per cubic foot in computing lateral pressures. For more rigid basement walls that are not more than 10 inches thick and 12 feet or less in height, granular backfill may be considered equivalent to a fluid with a density of 45 pounds per cubic foot. For very rigid non-yielding walls, granular backfill should be considered equivalent to a fluid with a density of at least 60 pounds per cubic foot. The above values assume that the surface of the soils slope behind the wall is horizontal, that the granular fill has been placed and lightly compacted, not as a structural fill. If the fill is placed as a structural fill, the values should be increased to 45 pounds per cubic foot, 60 pounds per cubic foot, and 120 pounds per cubic foot, respectively. If the slope behind the wall is two horizontal to one vertical, the values for purely active walls and basement walls should increase to 57 pounds per cubic foot and 67 pounds per cubic foot, respectively.

For seismic loading, a uniform pressure of 150 pounds per square foot should be added.

5.6 FLOOR SLABS

Floor slabs may be established upon properly prepared existing near-surface soils, suitable undisturbed natural soils, and/or upon structural fill extending to suitable natural soils or properly prepared existing surface soils. Topsoil and non-engineered fills are not considered suitable. To provide a capillary break, it is recommended that floor slabs be directly underlain by at least 4 inches of "free-draining" fill, such as "pea" gravel or 0.75- to 1.0-inch minus clean gap-graded gravel. Settlements of lightly to moderately loaded floor slabs are anticipated to be minor.

5.7 SUBDRAINS

5.7.1 General

Given the proposed depth of foundations versus groundwater depths measured at this site, it is recommended that permanent subdrains be installed for the Science Building. If proposed floor slabs will be less than 3 feet deep below existing grade, then subdrains will not be necessary. Otherwise, the recommendations provided for foundation subdrains should be implemented in the plans and construction of the building.

5.7.2 Foundation Subdrains

Due to the variable groundwater levels, and to provide additional protection, we recommend the installation of foundation subdrains around footings in partial- and full-basement areas.

Foundation subdrains should consist of a 4-inch diameter perforated or slotted plastic or PVC pipe enclosed in clean gravel. The invert of a subdrain should be at least 2 feet below the top of the lowest adjacent floor slab. The gravel portion of the drain should extend 2 inches laterally and below the perforated pipe and at least 1 foot above the top of the lowest adjacent floor slab. The gravel zone must be installed immediately adjacent to the perimeter footings and the foundation walls. To reduce the possibility of plugging, the gravel must be wrapped with a geotextile, such as Mirafi 140N or equivalent. Above the subdrain, a minimum 4-inch wide zone of "free-draining" sand and gravel should be placed adjacent to the foundation walls and extend to within 4 feet of final grade. The upper 4 feet of soils should consist of a compacted clayey cap to reduce surface water infiltration into the drain. As an alternative to the zone of permeable sand and a prefabricated "drainage board," such as Miradrain or equivalent, may be placed adjacent to the exterior below-grade walls. Prior to the installation of the footing subdrain, the below-grade walls should be dampproofed. The slope of the subdrain should be at least 0.3 percent. The gravel placed around the drain pipe should be clean 0.75-inch to 1.0-inch minus gap-graded gravel and/or "pea" gravel. The foundation subdrains can be discharged into the area subdrains, storm drains, or other suitable down-gradient location.

5.8 PAVEMENTS

The natural near-surface gravel soils will exhibit good pavement support characteristics when saturated or nearly saturated. Considering the natural gravels as the design subgrade soils and the projected traffic conditions, the pavement sections on the following page are recommended.

draft

Flexible Pavements:
(Asphalt Concrete)

(Moderate Volume of Automobiles and Light Trucks
with Occasional Medium and Heavy Trucks)
[3 equivalent 18-kip axle loads per day]

3.0 inches	Asphalt concrete
8.0 inches	Aggregate base course
Over	Properly prepared disturbed and/or natural subgrade soils, and/or structural site grading fill extending to properly prepared disturbed and/or natural subgrade soils

Utilization of a filter fabric, such as Mirafi 500X or equivalent, over soft subgrade may also be advantageous.

Asphalt concrete and base course components should meet the requirements and be placed in accordance with the American Fork City specifications.

5.9 GEOSEISMIC SETTING

5.9.1 General

Utah municipalities have adopted the International Building Code (IBC) 2009. The IBC 2009 code determines the seismic hazard for a site based upon 2002 mapping of bedrock accelerations prepared by the United States Geologic Survey (USGS) and the soil site class. The USGS values are presented on maps incorporated into the IBC code and are also available based on latitude and longitude coordinates (grid points).

The structure must be designed in accordance with the procedure presented in Section 1613, Earthquake Loads, of the IBC 2009 edition.

5.9.2 Faulting

Based on our review of available literature, no active faults pass through or immediately adjacent to the site.

5.9.3 Soil Class

For dynamic structural analysis, the Site Class D - Stiff Soil Profile as defined in Table 1613.5.2, Site Class Definitions, of the IBC 2009 can be utilized.

5.9.4 Ground Motions

The IBC 2009 code is based on 2002 USGS mapping, which provides values of short and long period accelerations for the Site Class B-C boundary for the Maximum Considered Earthquake (MCE). This Site Class B-C boundary represents a hypothetical bedrock surface and must be corrected for local soil conditions. The following table summarizes the peak ground and short and long period accelerations for a MCE event and incorporates a soil amplification factor for a Site Class D soil profile in the second column. Based on the site latitude and longitude (41.1936 degrees north and 111.9429 degrees west, respectively), the ground motion values for this site are tabulated below:

Spectral Acceleration Value, T Seconds	Site Class B-C Boundary [mapped values] (% g)	Site Class D [adjusted for site class effects] (% g)
Peak Ground Acceleration	60.3	60.3
0.2 Seconds, (Short Period Acceleration)	$S_S = 139.3$	$S_{MS} = 139.3$
1.0 Seconds (Long Period Acceleration)	$S_1 = 58.0$	$S_{M1} = 87.0$

The IBC 2009 code design accelerations (S_{DS} and S_{D1}) are based on multiplying the above accelerations (adjusted for site class effects) for the MCE event by two-thirds.

5.9.5 Liquefaction

The site is located in an area that has been identified by Weber County as having “moderate” liquefaction potential. Liquefaction is defined as the condition when saturated, loose, finer-grained sand-type soils lose their support capabilities because of excessive pore water pressure which develops during a seismic event.

Analyses indicate isolated zones of the saturated granular soils could liquefy under a major seismic event. Maximum anticipated settlement resulting from the liquefaction would be on the order of 1 to 2 inches. However, given the depth of the potentially liquefiable soils and their limited thickness, surface manifestations of settlement are not anticipated to occur.

draft

Potentially liquefiable zones are not continuous. Therefore, lateral spread should not be concern. The bedding of the soils encountered in the samples show no signs of distortion. Thi indicates that the soils have not experience lateral spreading since deposition, even though th site has experienced at least 3 magnitude 7 or greater earthquakes.

5.10 SITE OBSERVATIONS

As previously mentioned, we recommend that a qualified geotechnical engineer observe th foundation excavations and identify that suitable soils have been encountered.

If you have any questions or would like to discuss these items further, please feel free to contac us at (801) 685-9190.

Respectfully submitted,

GSH Geotechnical, Inc.

William G. Turner, P.E.
State of Utah No. 171715
Senior Geotechnical Engineer

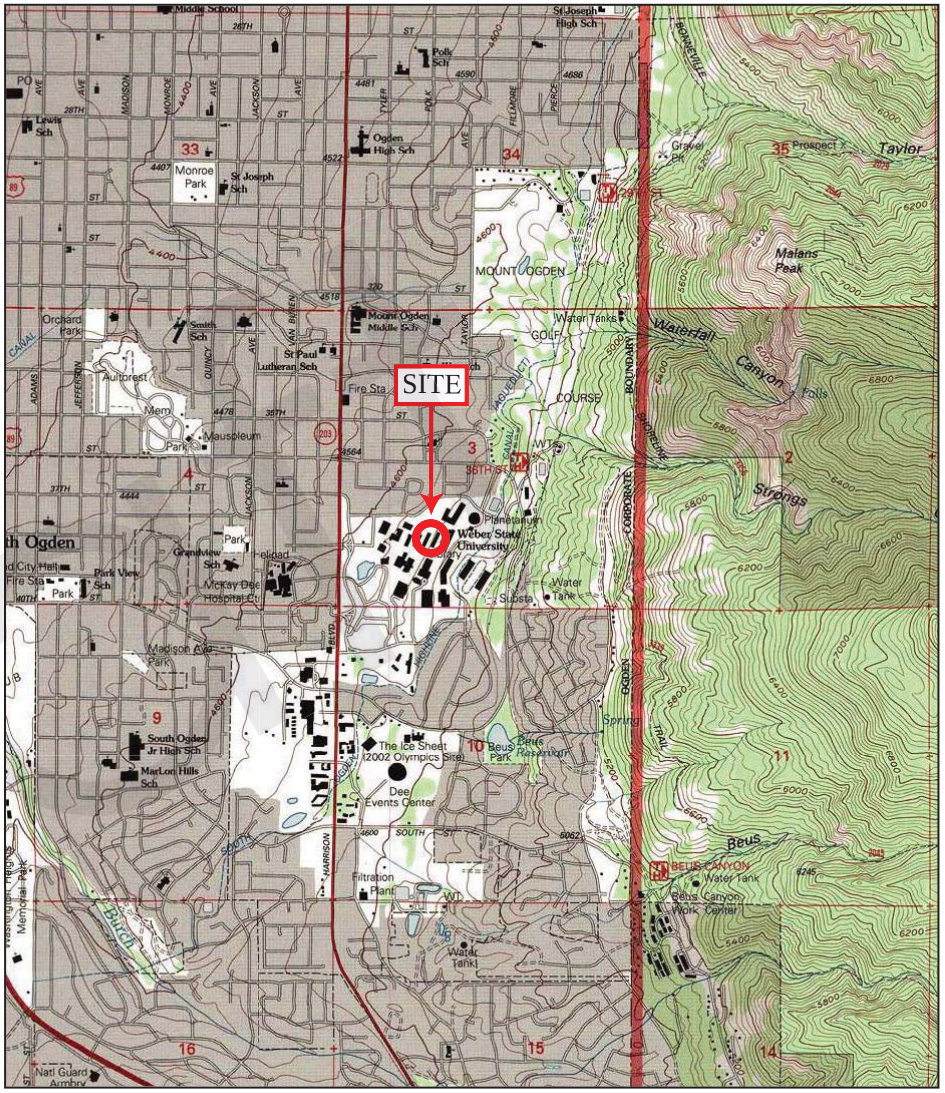
Reviewed by:

Alan D. Spilker, P.E.
State of Utah No. 334228
President/Senior Geotechnical Engineer

WGT/ADS:jlh

Encl. Figure 1, Vicinity Map
Figure 2, Site Plan
Figures 3A through 3F, Boring Log
Figure 4, Key to Boring Log (USCS)

Addressee (3 + email)



SCALE IN FEET
1000 0 1000 2000

FIGURE 1
VICINITY MAP

VCBO ARCHITECTURE
JOB NO. 0068-016-13

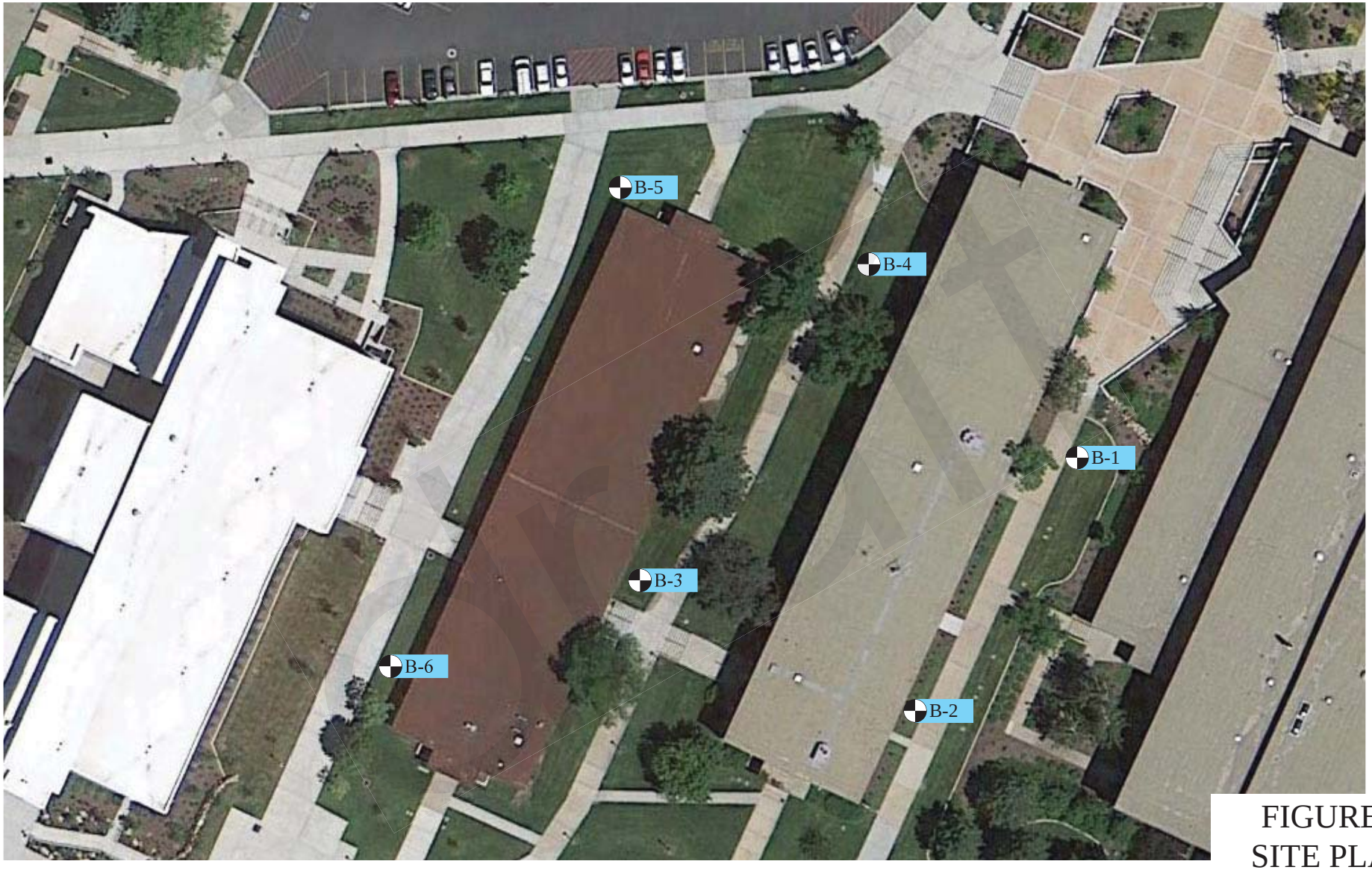


FIGURE 2
SITE PLAN

REFERENCE:
ADAPTED FROM AERIAL PHOTOGRAPH
DOWNLOADED FROM GOOGLE EARTH
IMAGERY DATE: 6/17/2010

APPROXIMATE SCALE IN FEET
0 100 200

GSH

GSH — BORING LOG — BORING: B-1

Page: 1 of 2

CLIENT: VCBO Architecture **PROJECT NUMBER:** 0068-016-13
PROJECT: Proposed Weber State University Science Building **DATE STARTED:** 5/17/13 **DATE FINISHED:** 5/17/13
LOCATION: Weber State University Campus, Ogden, Utah **GSH Field Rep.:** RJG
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger **HAMMER:** Automatic **WEIGHT:** 140 lbs **DROP:** 30"
GROUNDWATER DEPTH: 9.5' (5/17/13) 7.2 (5/31/13) **ELEVATION:** ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL FILL	**SILTY CLAY, FILL** with some fine to coarse sand; major roots (topsoil) to 6"; brown									
	ML	**FINE SANDY SILT** brown		26		23	97				moist very stiff
		grades with some occasional lenses of silty clay	5	23		24	100				
▼				10		32	86				very moist medium stiff saturated
			10	11		35	86				
		grades with some lenses of silty sand	15	10							
			20	5							
	ML	**SILT** with fine sand and alternating layers up to 1" thick of clayey fine sand; gray	25	16			86	NP			

See Subsurface Conditions section in the report for additional information.

FIGURE 3A

GSH — BORING LOG — BORING: B-1

Page: 2 of 2

CLIENT: VCBO Architecture **PROJECT NUMBER:** 0068-016-13
PROJECT: Proposed Weber State University Science Building **DATE STARTED:** 5/17/13

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
			25								saturated stiff
			30	11							
		grades sandy	35	8				62		NP	
			40	18							very stiff
		End of exploration at 41.0'. Installed 1-1/4" diameter slotted PVC pipe to 41.0'.	45								
			50								

See Subsurface Conditions section in the report for additional information.

FIGURE 3A (cont'd)

draft

GSH BORING LOG

Page: 1 of 1

BORING: B-2

CLIENT: VCBO Architecture **PROJECT NUMBER:** 0068-016-13
PROJECT: Proposed Weber State University Science Building **DATE STARTED:** 5/17/13 **DATE FINISHED:** 5/17/13
LOCATION: Weber State University Campus, Ogden, Utah **GSH Field Rep.:** RJG
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger **HAMMER:** Automatic **WEIGHT:** 140 lbs **DROP:** 30"
GROUNDWATER DEPTH: 13.0' (5/17/13) 6.3' (5/31/13) **ELEVATION:** ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL FILL	**SILTY CLAY, FILL** with some fine to coarse sand; 6" ground cover; dark									
	ML	**SILT** with some fine sand; brown									moist very stiff
				32							
		grades with occasional layers up to 1"-2" thick of fine sandy clay	5	25		25	98				
▼											saturated
											stiff
				17							
											very moist
		grades with occasional layers up to 1"-2" thick of silty clay with some fine sand; brown	10	14							
			15	10		31	91				medium stiff
		End of exploration at 16.0'. Installed 1-1/4" diameter slotted PVC pipe to 16.0'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3B

GSH BORING LOG

Page: 1 of 2

BORING: B-3

CLIENT: VCBO Architecture **PROJECT NUMBER:** 0068-016-13
PROJECT: Proposed Weber State University Science Building **DATE STARTED:** 5/17/13 **DATE FINISHED:** 5/17/13
LOCATION: Weber State University Campus, Ogden, Utah **GSH Field Rep.:** RJG
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger **HAMMER:** Automatic **WEIGHT:** 140 lbs **DROP:** 30"
GROUNDWATER DEPTH: 9.0' (5/17/13) 7.9' (5/31/13) **ELEVATION:** ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL FILL	**FINE TO COARSE SILTY CLAY, FILL** with some fine to coarse sand; major roots (topsoil) to 6"; dark brown									
	CL	**SILTY CLAY** with some fine to coarse sand; brown		38		20	98				moist very stiff
			5	31		25	97				
▼	ML	**FINE TO COARSE SANDY SILT** with occasional layers up to 1/2" -1" thick of silty clay with some fine sand; brown		27		26	95				very moist medium dense saturated
			10	27		27	95				
			15	26		30	90				
	CL	**FINE SANDY CLAY** with some silt and layers up to 1/2" thick every 1/2" -2" of silty/clayey fine sand; brown/gray	20	8							saturated stiff
	ML	**SILT** with some fine sand; gray	25	8							

See Subsurface Conditions section in the report for additional information.

FIGURE 3C

draft

GSH BORING LOG

Page: 2 of 2

BORING: B-3

CLIENT: VCBO Architecture **PROJECT NUMBER:** 0068-016-13

PROJECT: Proposed Weber State University Science Building **DATE STARTED:** 5/17/13

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
			25								saturated stiff
		grades with occasional layers to 1/2" thick of silty clay with some fine sand; gray	30	14				88		NP	
			35	8							
			40	10							
		End of exploration at 41.0'. Installed 1-1/4" diameter slotted PVC pipe to 41.0'.	45								
			50								

See Subsurface Conditions section in the report for additional information.

FIGURE 3C (cont'd)

GSH BORING LOG

Page: 1 of 1

BORING: B-4

CLIENT: VCBO Architecture **PROJECT NUMBER:** 0068-016-13

PROJECT: Proposed Weber State University Science Building **DATE STARTED:** 05/17/13 **DATE FINISHED:** 05/17/13

LOCATION: Weber State University Campus, Ogden, Utah **GSH Field Rep.:** RJG

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger **HAMMER:** Automatic **WEIGHT:** 140 lbs **DROP:** 30"

GROUNDWATER DEPTH: No groundwater encountered (5/17/13) 9.8' (5/31/13) **ELEVATION:** ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL FILL	**SILTY CLAY, FILL** with some fine to coarse sand; major roots (topsoil) to 6"; light brown		7		24	97				moist medium stiff
	CL	**FINE TO MEDIUM SANDY CLAY** with some fine sand; brown	5	14							moist stiff
	SM	**SILTY FINE SAND** light brown		27		16	108				moist medium dense
▼	ML	**SILT** with some fine to coarse sand and trace fine gravel; occasional layers up to 1"-2" thick of silty/clayey fine sand; brown	10	29							very moist saturated very stiff
		grades with some fine sand and occasional layers up to 1/2" thick of silty/clayey fine sand; brown	15	11							stiff
		End of exploration at 16.0'. Installed 1-1/4" diameter slotted PVC pipe to 16.0'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3D

draft

GSH BORING LOG

Page: 1 of 1

BORING: B-5

CLIENT: VCBO Architecture **PROJECT NUMBER:** 0068-016-13
PROJECT: Proposed Weber State University Science Building **DATE STARTED:** 5/17/13 **DATE FINISHED:** 5/17/13
LOCATION: Weber State University Campus, Ogden, Utah **GSH Field Rep.:** RJG
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger **HAMMER:** Automatic **WEIGHT:** 140 lbs **DROP:** 30"
GROUNDWATER DEPTH: Between 11.0' (5/17/13) 10.1' (5/31/13) **ELEVATION:** ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL FILL	**SILTY CLAY, FILL** with some fine to coarse sand; major roots (topsoil) to 6"; brown									moist very stiff
	CL	**SILTY CLAY** with some fine to medium sand; dark brown		28		16	112				moist very stiff
		grades light brown/gray	5	30							
	ML	**FINE SANDY SILT** with occasional layers up to 1"-2" thick of silty clay with some fine sand; brown		45		24	99				moist very stiff
▼			10	28							saturated
			15	11							loose
		End of exploration at 16.0'. Installed 1-1/4" diameter slotted PVC pipe to 16.0'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3E

GSH BORING LOG

Page: 1 of 1

BORING: B-6

CLIENT: VCBO Architecture **PROJECT NUMBER:** 0068-016-13
PROJECT: Proposed Weber State University Science Building **DATE STARTED:** 5/17/13 **DATE FINISHED:** 5/17/13
LOCATION: Weber State University Campus, Ogden, Utah **GSH Field Rep.:** RJG
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger **HAMMER:** Automatic **WEIGHT:** 140 lbs **DROP:** 30"
GROUNDWATER DEPTH: 13.5' (5/17/13) 13.2' (5/31/13) **ELEVATION:** ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL FILL	**FINE TO COARSE SANDY CLAY, FILL** major root (topsoil) to 6"; dark brown									moist stiff
	CL	**SILTY CLAY** with some fine to coarse sand; brown		20							moist stiff
			5	13		26	98				very moist
				13							moist
	ML	**FINE SANDY SILT** with occasional layers up to .5"-1" thick of silty clay with some fine sand; brown	10	37		25	98				moist very stiff
▼											saturated
			15	25							
		End of exploration at 16.0'. Installed 1-1/4" diameter slotted PVC pipe to 16.0'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3F

draft

PROJECT: Proposed Weber State University Science Building
PROJECT LOCATION: Weber State University Campus, Ogden, Utah
PROJECT NUMBER: 0068-016-13

KEY TO BORING LOG

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
1	2	3	4	5	6	7	8	9	10	11	12

COLUMN DESCRIPTIONS

1 **Water Level**: Depth to measure groundwater table. See symbol below.

2 **USCS**: Graphic depiction of subsurface material encountered; typical symbols are explaned below.

3 **Description**: Description of material encountered; may include color, moisture, grain size, and density/consistency.

4 **Depth (ft.)**: Depth in feet below the ground surface.

5 **Blow Count**: Number of blows required to advance sampler (12 inches) beyond first. using a 140-lb hammer with a 30 inch drop.

6 **Sample Symbol**: Type of soil sample collected at depth interval shown; sampler symbols are explained below.

7 **Moisture (%)**: Water content of soil sample measured in laboratory; expressed as percentage of dry weight of specimen.

8 **Dry Density (pcf)**: The density of a soil measured in laboratory; expressed as pounds per cubic foot.

9 **% Passing 200:** Fines content of soil sample passing a No. 200 sieve measured in laboratory, expressed as a percentage.

10 **Liquid Limit (%):** Water content at which a soil changes from plastic to liquid behavior.

11 **Placsticity Index (%):** Range of water content at which a soil exhibits plastic properties.

12 **Remarks**: Comments and observations regarding drilling or sampling made by driller or field personnel. Other field and laboratory test results; using the following abbreviations:

CEMENTATION

Weakly: Crumbles or breaks with handling of slight finger pressure.

Moderately: Crumbles or breaks with considerable finger pressure.

Strongly: Will not crumble or break with finger pressure.

MODIFIERS

Trace	<5 %
Some	5 - 12%
With	>12%

MOISTURE CONTENT (FIELD TEST)

Dry: Absence of moisture, dusty, dry to the touch.

Moist: Damp but no visible water.

Saturated: Visible water, usually soil below water table.

Descriptions and stratum lines are interpretive; field descriptions may have been modified to reflect lab test results. Descriptions on the logs apply only at the specific boring locations and at the time the borings were advanced; they are not warranted to be representative of subsurface conditions at other locations or times.

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			SYMBOLS Graph	SYMBOLS Letter	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS More than 50% of No. 200 sieve size.	GRAVELS More than 50% of coarse fraction retained in No. 4 sieve.	CLEAN GRAVELS (little or no fines)		GW	Well-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
				GP	Poorly Graded Gravel, Gravel-Sand Mixtures, Little or No Fines
		GRAVELS WITH FINES (appreciable amount of fines)		GM	Silty Gravels, Gravel-Sand-Silt Mixtures
				GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	SANDS More than 50% of coarse fraction passing through No. 4 sieve.	CLEAN SANDS (little or no fines)		SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
				SP	Poorly Graded Sands, Gravelly Sands, Little or No Fines
		SANDS WITH FINES (appreciable amount of fines)		SM	Silty Sands, Sand-Silt Mixtures
				SC	Clayey Sands, Sand-Clay Mixtures
FINE-GRAINED SOILS More than 50% of material is smaller than No. 200 sieve size.	SILTS AND CLAYS Liquid limit less than 50%			ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
				CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
				OL	Organic Silts and Organic Silty Clays of Low Plasticity
	SILTS AND CLAYS Liquid limit greater than 50%			MH	Inorganic Silts, Micacious or Diatomacious Fine Sand or Silty Soils
				CH	Inorganic Clays of High Plasticity, Fat Clays
				OH	Organic Clays of Medium to High Plasticity, Organic Silts
HIGHLY ORGANIC SOILS				PT	Peat, Humus, Swamp Soils with High Organic Contents

Note: Dual Symbols are used to indicate borderline soil classifications

STRATIFACTION

DESCRIPTION	THICKNESS
Seam	up to 1/8"
Layer	1/8" - 12"

STRATIFACTION

Occasional: One or less per 6" of thickness.

Numerous: More than one per 6" of thickness.

TYPICAL SAMPLER GRAPHIC SYMBOLS

- Bulk/Bag Sample
- Standard Penetration Split Spoon Sampler
- Rock Core
- No Recovery
- 3.25" OD 2.42" ID D&M Sampler
- 3.0" OD 2.42" ID D&M Sampler
- California Sampler
- Thin Wall

LOG KEY SYMBOLS

- Water Level

Draft

FIGURE 4

GSH

draft

MEETING AND WORKSHOP MINUTES

Weber State Science Center
Faculty Workshop
3/20/2013

Introductions:
Dean David Matty introduced the programming team participants and thanked WSU faculty and students for their attendance.
He asked for full faculty involvement and engagement in the project from the outset and stressed that the more effort that they put into the planning and programming the better the building will be when it is built. The Dean asked for a full investment in the process starting now.

Derek Payne introduced the programming team (VCBO Architecture and RFD), and explained what the programming process is all about and what we hope to end up with at the end of the process. Derek showed a sample of a programming document booklet.

Rick Heinz (RFD) introduced his firm and included a summary history of the firm and their laboratory design qualifications.
He discussed the history and the role of Project Kaleidoscope and how they can be useful in the planning of a science facility.

RFD's Presentation on Trends in Science Laboratory Design:
Creating a new science building is about recruitment and retention. Curb appeal is the face of the program. What is the balance between campus aesthetic and college aesthetic.
Transparency allows for building activation, and provides access to daylight and views
Displays allow for access to building work in controlled environments
Integrating scientific art. Through the state sanctioned 1% for the arts.

Integral lab spaces and interaction opportunities were discussed. These include:
Activate learning between labs
Faculty / student collaboration
Informal collaborative areas

The integration of technology should be pervasive throughout all of the laboratory environment.

Sustainable design strategies such as equipment and ventilation strategies were discussed. Sustainable design as an educational feature was presented. LEED silver was identified as the minimum project requirement. This does not limit the project to Silver level certification.

Lab planning process was discussed as well as the concept of a lab module, data sheet and equipment list.

The need and development of multi-use spaces will be discussed and understood through the course of this meeting.

Seismic issues will be addressed in the program document for the new facility.

A *Wordle ™* was developed from key adjectives that were given from the room's participants.

Engage the environment
Display the science happening in the building
Reflect the scientific programs through the architecture

RFD's – Important Issues to Consider

1. Curb appeal – recruitment – what do you want your building to communicate to students and visitors by the way it presents itself?
2. Transparency is key to let people know what is happening within the building
3. 1% public art – This funding is important in getting artwork that will communicate the right message for building?
4. Flipped classroom strategies may be able to be employed to gain flexibility in the program?
5. Places in the building for student study – where do students gather/collaborate?
6. Where do computers go – are they in the lab? Wired or wireless? AV devices? Display devices? How do we accommodate future technologies?
7. Sustainability – can be an important educational feature/tool? Building dashboard is way to engage students and teach them about sustainability.
8. Why only LEED silver? State energy savings requirements are higher than LEED.

Faculty Questions during Visioning

1. Multipurpose facilities – do we deal with that on a department level and then have subgroups to analyze shared spaces? We will have special sessions to deal with shared spaces.
2. Faults running through campus – earthquakes? Yes there are nearby faults that's why we have structural engineers to help design the structural systems for the building.
3. Questions on water flexibility – generally fixed benches for water in teaching labs, quick connections more likely in research labs.
4. Larger areas – open areas for students to come together – maximize lab spaces and lecture rooms – how do we make sure we include those spaces? Workshop just on those informal learning spaces – who is going to represent championing the shared space?
5. Glass wall vs traditional wall costs? Glass is more expensive than solid walls.
6. Classrooms – this building will remain the classroom building – primary lecture building? Yet to be defined? All part of programming decision-making process
7. Parking – where will parking be? Not included in scope of this programming effort.

draft

Important Issues Posed by Workshop Participants

1. Would like the building to recognize that humans work and live in the building; create a building that it is livable, comfortable.
2. Maximize the daylight and views!
3. Has to be adaptable, flexible, labs and offices (not just labs).
4. Scientist enjoy the environment – building connect us to the beauty of the outside rooms so that we see nature – would like artwork to be used as teaching opportunity, the art should be science on display.
5. Consider the WOW factor, stream with fish in it, beehive in window, clean up greywater, fire place powered by natural phenomena?
6. Attractive, inviting, functional, flexible.
7. New looks good breaks after a few months, must be durable, clean quality, looks good in time.
8. Controllability – sometimes, it needs to be dark – control daylight airflow, environment in the space – where are the air vents placed near critical experiments.
9. Collaborative so departments interact more easily – where to people cross paths.
10. Safety issues, flooring – winter needs traction on slick floors.
11. Need more space for student research in chemistry etc.
12. Do we need to consider the outward community? Kids & adult courses?
13. WIFI – more than one printer in the building.
14. Quiet study areas, back corner of library.
15. 2nd floor of physics department.
16. Building will be closer to the library?
17. Surroundings for the building – what can we do to the surrounding aspects of the building to make the building inviting and provide teaching opportunities – outdoor kiva space, botany involved in the landscaping, make it a teaching tool – rooftop garden as a learning lab.
18. Sustainability – promote the idea of how science can be used to promote sustainability – showcase the sustainable features – next opportunity in the next 50 years.
19. Elizabeth hall is not wearing well in faculty's opinion.
20. Really need to listen to support staff as far as improving function space for secretary's and lab managers.
21. Difference between a building that is 40 year building and a 100 year building? The bones, can it be repurposed?
22. Sutton building has a THEME, the Great Salt Lake could be a theme?
23. Tubes on the wall for science experiments?
24. Collaboration – sitting eating lunch – food. Sandwich or coffee shop? Not out of the question?
25. Facility by bell tower – used to this clunky building – square room with CMU walls – good mechanism to inject creativity to their thinking process of the staff.
    a. Group that works on great ideas other than just departments.

GEOSCIENCES
3/20/2013

Whitney Ward	VCBO Architecture	wward@vcbo.com
Derek Payne	VCBO Architecture	dpayne@vcbo.com
John Lewis	RFD	jgl@rfd.com
Rick Heinz	RFD	rmh@rfd.com
Marianne Bischoff	GEO	mariannebischof@weber.edu
Michael Hernandez	GEO	mhernandez@weber.edu
Jim Wilson	GEO	jwilson@weber.edu
Jeff Eaton	GEO	jeaton@weber.edu
Rick Ford	GEO	rford@weber.edu
Marek Matyjasik	GEO	mmatyjasik@weber.edu
Adolph Yowci	GEO	
Bruce Daley	FM	brucedaley@weber.edu
Matt Cain	IT	mattcain@weber.edu

1. (1) 50 lecture hall booked every hour in the am.
2. (3) 24 person labs, one of the 3 is a wet lab, microscope and rock storage.
3. Prep room adjacent to wet lab for rock storage and prep, high ceiling for settling tube, rock saws, etc...
4. Research lab for faculty/students.
5. (1) Computer lab 30 students computational teaching lab.
6. Support spaces, storage, field trip prep and wash room.
7. Equipment storage
8. No open positions, 6 full time faculty, no lab manager (only one without lab manager), 1 secretary, no adjunct.
9. Significant increase in geology majors in the last several years, 100 currently graduating 13 this year, need to be at 15 to 20, currently pressure on intro lab course.
10. Suggest that the college have a queuing space for adjunct professor at some central location?
11. Hot-bunk – plug in location for adjuncts? 4 steady adjuncts, 2 only tech at Davis campus – they have cubicles at Davis.
12. Professors have students that come in and make up an exam, could be in adjunct room, quiet space in view of secretary, incidental seating by secretary's desk. Secretary should not need to feel like she needs to entertain the students.
13. Secretary space should not be cut to tight or there is no flexibility.

draft

SPECIMEN COLLECTIONS

1. Enormous collections, lab manager needs access to the collections, geosciences is specimen based – the size of the collection is s a big problem.
2. Issue with storage of specimens, difference between things that are daily used (stored in classroom labs) and semester/rotating basis, then dead storage that is used rarely (currently in this building) – possibly use high density storage as a solution? Would need work area as specimen prep as it comes in and before it is brought into classroom.
3. 100's of lbs of rock being brought into work area of head researcher.

SPACES

1. Main lab room, seats at tables (maps) 36 people (crowded), last 3 semesters they have been at max capacity at 36-40 or 42 would be nice so they have some flexibility – 2nd session creates staffing issue, expensive in long run. Awful to teach in, no multimedia, 3 size have cabinets.
   a. If room is to be a dedicated lab room it has space issues as a lecture room it works as it is.
   b. Would prefer 16 to 24 as ideal lab size.
   c. Upper division lectures could be in a 24 seat lab (are those big enough for the future)?
   d. Map intensive – need room to spread out a map and have a notebook and specimen on the same table.
2. Need an intro lab (above), and an upper division lab – 2 labs – one intro lab space is not enough because there will be spillover.
3. 320 – up to 40 students, labs without need of sink (lecture room)
4. 332 – most specialized space, microscope use, paleontology (lab 1)
5. 328 – (lab 2)
6. Wet lab – small, used also for intro labs (24 students), currently room 333, extra high ceiling for settling tube.
   a. Needs a rock prep room off of it.
   b. Steam table & settling tube should be in a separate room.
7. Microscopes, would be accessed off of one of the labs.
8. 1 lecture lab – 50 people.
9. Lab intro, lab advanced, lab wet.
10. GIS – remote sensing – 30 people, this computational lab could be shared with other disciplines, super duper computational teaching lab – 3 departments – flexibility (currently room 329)
    a. Large format printer in room to the side, accessible even if class is in main lab, several printers in this room.
    b. Still need wired pathways.
    c. This lab can be centrally located.
    d. VCBO space not RFD space.
    e. 6 hours a week, (2) 3 hour labs.
    f. 1st class computer lab is a possibility for college.
    g. Under graduate research is performed in there throughout the year.
11. Students need to come into the labs off hours (room 328 intro lab is currently used for this), at least 1 lab room with open rescheduling in it.
12. Research? With the labs that are being considered, a lot of the research could take place within the labs and then have accessory space for research materials to be kept – Need to speak with structural geology professor who has most intensive research.
    a. Dedicated space – turn lights down, students could use multipurpose room.
    b. Shared instrument space, could all be in one location and then research materials (space) to lay stuff out – could be in shared area.
    c. Field based research, collecting samples.
    d. Convertible space, movable walls so small can grow to big when a grant is received – would need to be able to darken the space.
13. Avoid rats maze that they currently have.
14. Support space.
    a. 330 – rocks to get access to readily.
    b. SEM – shared with Physics
    c. XRD – Currently small table type
    d. XRF – future
15. Lab storage – in some ways nice to be able to divide up fossils from rocks.
    a. 2 – 1 module storage associated with teaching labs and archival storage of 2 modules elsewhere in building.
    b. Rock prep – good exhaust system, noise issue is significant – 1 module – 300+sf, rotap machine?
    c. Atomic force microscope, shared with physics, combined into equipment suite.
16. 332 room is functioning as majors room, space the students hang out between classes, having a majors lounge is vitally important to building student community, divided up by major, group study space, refrigerator & microwave, student meetings, sink would be helpful.
17. Sharing happens by floor.
18. Play best with all departments.

draft

19. Share field equipment with Botany
20. Place to stage field trips and wash down.

MICROBIOLOGY
3/20/2013

Justin Heppler	VCBO Architecture	jheppler@vcbo.com
Rick Heinz	RFD	rmh@rfd.com
Matt Domek	Microbiology	mdomek@weber.edu
Karen Nakaoka	Microbiology	knakaoka@weber.edu
Jason Fritzler	Microbiology	jasonfritzler@weber.edu
Bill Lorowitz	Microbiology	wlorowitz@weber.edu
Moe Sondossi	Microbiology	msondossi@weber.edu
Michele Culumber	Microbiology	mculumber@weber.edu
Craig Oberg	Microbiology	coberg@weber.edu
Bruce Daley	FM	brucedaley@weber.edu
Matt Cain	IT	mattcain@weber.edu

Plan up to 10 faculty plus 3-5 adjunct faculty. Some adjunct faculty out of the Davis campus.
General education is introduction to microbiology. This is not lab based
Micro 2054 is the intro lab course with 120 students currently
Lab sections are 24 students
Taught in 344 and 345. This has 5-6 sections per semester. these are held in shared labs. There are 4 dedicated teaching labs. There are 24 workstations in each lab.
5 labs are needed with 24 per lab for 4 labs and a larger 48 person lab this could be two smaller labs that are transparent in between with integrated audio visual systems.
2 General microbiology labs
Medical microbiology lab/immunology (30-48 students now)
6-4 person benches
Molecular microbiology
This is a more research oriented environment. This would have 3 - 8 person benches with sinks at the end.
One fume hood
Analytical microbiology / ecology
Equipment at perimeter with student spaces at the center (24 student lab). This is similar to the general labs, but with additional equipment.
Higher level labs are taught in the undergraduate programs here.
A cell culture lab is also needed. This course has 10-14 students per course. May be able to share with zoology.
5-6 two-person bio-safety cabinets with one with glass walls for the instructor would be preferred.
There would be an incubator stack with every fume hood.
A minus 20 refrigerator will also be included.
Ideally there would be a walk in cold room. Whether or not a cold room or refrigerators are preferred is up for discussion.
A small walk in with additional reach in cold rooms may be considered.
The walk in would be a half module.
Sinks are needed in the labs, but the mid-sized cup sinks are fine. Storage cabinets will be discussed later.
Would it better to do a larger lab that can be shared for larger classes? Would this be a single 40 person lab? Microbiology would like to have a collocated lab for these large courses.
Additional labs and unknown courses may be offered in the future. This will add labs.
A multi-media room for bio-informatics. This could be a shared advanced computing lab. 30 work stations would be fine.
An enclosed computational teaching space adjacent to an accessible open computing space is preferred.
Support spaces
Spaces need to be designed to accommodate equipment heat
All labs should have space for refrigerators, centrifuges, etc...
Equipment room
Prep room with glass wash and autoclave is needed adjacent to each teaching lab.
Separate dirty and clean prep work into two rooms, one decontamination and one cleaning and clean prep, both with autoclaves.
Prep room(s) need to be accessible to many if not all labs.
Stock room and media prep room. Chemicals are currently stored in prep, and this is still preferred and would be shared with glassware storage. This space needs a laminar flow hood and a chemical hood as well. These space will need one module each.
These spaces are used for teaching prep and research.
Storage. A department storage space outside the department area is desired. There is both storage and a retail store in the current building.
Florescent microscope would need individual room. Perhaps this could be a combined imaging room shared between departments. Or in a shared microscopy room. This would be a research level space.
A small student work space outside the lab would be nice. Student could plan, wait and study in these areas. A combination of stand up benches and sit down benches would also be nice.
Research. Flexible shared research space is preferred. These can be shared by theme, medical micro/immunology 2-3, molecular/general 2-3, environmental/ecology 2-3, industrial and food microbiology 1-2, cell culture 1-2. 5 double labs seem appropriate.
A lab manager office needs to be programmed, an advising room would also be nice. A student study is also preferred.

draft

ZOOLOGY
3/20/2013

Whitney Ward	VCBO Architecture	wward@vcbo.com
Derek Payne	VCBO Architecture	dpayne@vcbo.com
John Cavitt	Professor	jcavitt@weber.edu
Michele Skopec	Professor	micheleskopec@weber.edu
Chris Hoagstrom	Professor	christopherhoagstrom@weber.edu
Ron Meyers	Professor	rmeyers@weber.edu
John Mull	Professor	jmull@weber.edu
Jonathan Clark	Professor	jclark1@weber.edu
Sam Zeveloff	Professor	szeveloff@weber.edu
Robert Okazaki	Professor	rokazaki@weber.edu
Brian Chung	Asst. Professor	brainchung@weber.edu
Jon Marshall	Asst. Professor	jonmarshall@weber.edu
Barb Trask	Asst. Professor	btrask@weber.edu
Susan Gurr	Lab Manager	sgurr@weber.edu
Rick Heinz	RFD	rmheinz@rfd.com
John Lewis	RFD	jgl@rfd.com
Matt Cain	IT	Matt.cain@weber.edu

Currently there are 12 faculty and 2 staff. They are projected to grow to 16 faculty. Adjunct faculty 3-4, with no dedicated space now. Ideally there would be a shared space for adjunct up to 5 adjuncts.
Graduates vary from 40-70 with a 300-400 majors.
Teaching labs
- Ecology teaching lab in ET building, this may be able to retain. Rematch and office spaces are also located here. This is a huge space in the ET building.
- Human anatomy teaching lab in Lind hall 700-740 students take this lab per year, with 15 sections offered.
  - Adjacent chilled cadaver storage. Ideally it would be refrigerated storage for 4-6 cadavers. Ideally this would be near the loading dock.
  - 24 students per lab. 2 hour labs.
  - 2 cadavers with 12 students each. U-shaped configuration per group.
  - Reduced perimeter storage in this lab.
  - Atomic models could be stored in a prep room.
- Human physiology has 6 sections in room 426. There are also 30 students per section.
  - This is an anatomy lab, needs its own space.
  - Can share with comparative physiology and advance physiology and general endocrinology
  - This can have movable tables with fixed casework around the perimeter.
- Principles of Zoology has a class size of 30
  - Two classes
  - This can share with organismal labs, any animal-ology classes

Molecular labs, genetics and cell biology
- Centrifuges, equipment, lots of outlets, fume hoods.
- Fixed benches and fixed power access and gas if possible.

Specimen labs
Organismal labs
- Ecology, also 30 students per lab
- This should have movable tables with power for scopes.
- Water at the perimeter benches
- Increased ventilation option for specimens, as needed.

Computer lab, shared with physiology lab. This is a cross disciplinary space.
Water and gas can be located at the perimeter, does not need to be at the center benches.
There is currently a large lab prep area that is equal to 2 lab modules, min.the future building needs to maintain adjacent prep to each teaching lab.
- Chemical storage
- Glass wash
- Autoclave
- General stock, store, prep space
- Tissue culture space is needed, bay be shared with botany. .5 to .66 module is sufficient

Mammal and insect collection storage and other specimen storage need to be accommodated. This is shelves and museum like for community outreach. This will be 2 lab modules, min.
Animal holding facility. 3 holding rooms, a washroom and storage. Each room sized for single racks in I shaped configuration. A procedure room is also requested. There may be a required animal evacuation plan, which would guide this department to be located on a lower level, but not have a direct exterior access. There is a ventilating cage rack. This will be approx 4 modules. Water care or aquatic facilities may also want to be considered.
Labs will need to be paired up to share prep rooms, Ecology and principles, Molecular and physiology
Currently there is outdoor space for boat, trailer and AT vehicle storage. A shared field equipment storage would also be used by zoology, at 150 sf. Shelves would also be preferred.
Offices should be near research areas.
Research labs. May be a combination of shared labs and individual work rooms for each faculty and team.
- Cell, molecular, physiology (6 modules)
- Organismal or dissections (5 modules)
- Microscopy lab, may be a support space (4modules)
- Specimen preparation would also be a lab or support space that has a large sink that can accommodate buckets, a drying oven would be preferred.
- Radioisotope lab at 100 sf is needed.

draft

One freezer and refrigerator per researcher, and at least two ultra-colds in the research area. There is also a chromatography fridge.
A cold room for the department or a shared cold room, with space for shelving and aquaria.

A student, faculty collaboration space is requested.

CHEMISTRY
3/20/2013

Derek Payne	VCBO Architecture	dpayne@vcbo.com
John Lewis	RFD	jgl@rfd.com
Tim Herzog	Chemistry	timothyherzog@weber.edu
Laine Berghout	Chemistry	llberghout@weber.edu
Charles Davidson	Chemistry	cdavidson@weber.edu
Colleen Boam	Chemistry	colleenboam@weber.edu
Vicki Britt	Chemistry	vickibritt@weber.edu
Don Davies	Chemistry	ddavies1@weber.edu
Andy Lippert	Chemistry	alippert@weber.edu
Edward Walker	Chemistry	ewalker@weber.edu
Barry Lloyd	Chemistry	blloyd@weber.edu
Todd Johnson	Chemistry	tmjohnson@weber.edu

Demographics

1. 12 faculty should be planned for, 15 would be ideal for the future (10 to 15 years), currently they are 11.
    a. If contact hour load was per industry standard they would have more than 12
2. adjuncts 6 active now, 1 secretary, lab manager, lab supply – science store manager, generally 3-4 adjuncts at a time adjuncts should have a shared space.
3. Two 24 student labs are needed. This is max for organic labs.
    a. 2 students per hood is standard.
    b. Currently each student has a locker. Currently there are approximately 150 in 2310 another 50 in 2320. 200 per semester. 8-9 sections of 24. Most of these students are not Chemistry majors. Own set of glassware.
    c. Can storage be out of the classroom? A combination of in-class storage and storage outside the classroom that is then brought in is an option. Different stacking options can be explored within the classroom as well.
    d. Ideally these labs are transparent and are linked with general shared presentation space for all 48 students. This would be used for a shared introduction, and could be standing room for 10-15 minutes.
    e. Integrated audio and visual equipment may allow for this shared introduction to be broadcast into multiple lab spaces.
    f. Organic stockroom that checks equipment out to the labs.
    g. 20 & 20 or 24 & 24?
    h. Match new organic lab at the U of Wynona State.
    i. Windows at perimeters would be an issue with the hoods around the perimeter.
    j. Instrument room – own instrument room.
    k. Student Study cluster off of lab?
    l. Dual section teaching – one teacher supervises both at once.
    m. Balances need to be kept protected from varying air flows.
    n. Needs to be organic prep & storage.
4. Instruments now kept in? duplication may be necessary so the equipment doesn't' need to be reconfigured for each class.
5. 3 (8 to 10) balances for 2 rooms, dedicated room for organic chemistry.
6. General Chemistry Lab.
    a. 4 labs with 24 stations each, gen chem., bio chem., & GOB (nursing).
    b. Locker issues – 300 students a semester (chemistry majors), there are something like 400 out of major students who attend gen chem..
    c. Biochem is the one that is growing.
    d. Could gen chem. Share with Bio Chem? Only accessibility of certain instrumentation.
    e. GOB students 300
    f. All 4 lab are exactly the same.
    g. Hoods are used for dispensing and some minor exercises – 3 6' hoods in each space.
7. Could inorganic and organic chem. Could mix?
8. What about versatile labs that can accommodate all class types?
9. Current design works well.
10. Could Quantitative be taught in a gen chem lab?
11. Currently have drawer space for 9 courses in the gen chem. Lab.
12. Quant & advanced in-organic could fit in same space.
13. P Chem lab
    a. 1 hood, mostly benches
    b. Could be shared with other upper division lab space.
    c. Currently in Room 515
    d. 24 students is max per semester.
    e. Student rotate through what they are working on.
    f. Fell like 8 students in max.
    g. 3 module size, include a flex frame in the Pchem lab.
    h. Shared resource room now doesn't work because ovens make it too hot-ventilation over the ovens would make a huge difference.
    i. Does it need to be it's own lab? They run individual lab modules
    j. Need more bench space for permanent computers.
14. Advanced WET chemistry area – share resources between that and a Pchem room?
15. Analytical Lab
    a. Close proximity to instrumentation lab.
    b. 24 person
    c. Currently 525
    d. 8 sections – 4 hoods now – 1 hot plate hood.
    e. Glove box hood? Only use once because it could be in another location (research lab).
    f. Steam baths? Don't see them much anymore.
    g. Kiln muffle furnace? 2 different types of furnaces – direct vent or hood?

draft

h. Gold analysis needs to be in secure area.

16. Bio chem. – going in gen chem. Lab, needs different set up for instrumentation
17. Instrumental Shared Space
    a. Currently 512 – goes back into 514, & MMR room
    b. 3 modules
    c. NMR room – specialized shielding – ultrashield, leave the door open for 400 to 600 model – divided space, their footprint is shrinking – ½ module.
    d. Gas supply spaces
    e. Divided space for flame instruments, needs good ventilation.
18. Research
    a. Individual or shared?
    b. 3 different themes? Can you get some pairings?
    c. Radioactive work – needs secure area?
    d. Common resources? Very modular, very flexible
    e. 15 modules, 4, 4, & 3 – bio chem. Is going to grow.
19. Student commons areas – sit together and do things, computer around the edges, willing to share but have concerns about fighting for space – don't need the collaboration spaces in labs – these could occur in the common areas
20. Computational – not needed now.

MISCELLANEOUS

Lind Lecture

1. Planetarium & Museum
2. Center for math & science education – GSME
    a. Want office space in new building for science & math education.
    b. Classroom – space to model what elementary & jr. high teaching would be like.
    c. Center is a focus are for the college for the future – increase the presence in the community.
    d. Needs conference space – teachers from the community gather there
    e. Needs to be accessible to the community, teachers will need to access from parking lot to check out kits and bring back to their car.
    f. Needs presence near parking lot, 1st floor, signage on outside of building.
    g. Need more storage.
    h. Would make sense to have a adjacency to the advising office.
    i. Typically need groups of 20 for teachers groups of 60 – typically on Saturday – ideal classroom would be about 30. Would be ideal to have a classroom that is similar to a high school – similar to physics.
    j. Common space would work for larger groups – in lobby area – the idea of a reception space for donor dinners etc. Would be really useful a lot of the time – adjacent to a lecture /auditorium space.
    k. Conference space for 6 to 12, could share with advising
    l. Directors office, space for several other people, work room.
    m. Need a library
    n. Outdoor space
        i. Public demonstration garden
        ii. Would botany cooperate? They want their own private garden.
        iii. Arboretum – fundraising for that would be possible.
        iv. St. Oloffs – container garden roof, public space, right next to the green houses.
        v. Could be botany, geology.
        vi. 180 kids breaking them down to groups of 60 – garden, planetarium, classroom?
3. Do we need a testing center? Near advising?
4. Planetarium
    a. Seats 60 people
    b. 20k K-12 students through there a year.
    c. The public can come 1 to 2 times a month for science Saturday.
    d. Focus for outreach for college.
    e. Produce planetarium shows that they sell around the world.
        i. Staff & students associated with
        ii. Green screen
        iii. No control room
    f. Will it move or stay? If stays then staff needs to stay, if moves then staff needs to move.
        i. Director office, staff office, undergraduate student space.
    g. It is staying but we don't know what we are doing for programming, if a portion is going to be repurposed?
    h. Do they need space for support in the new building?
    i. Field trip groups are 120 or more, so they have to be broken up.
    j. They would like more classrooms in Lind to stage the kids in.
    k. How often is the planetarium (during normal work week) used – classes every morning – astronomy 140 (Physics), classes at night from 5:30 to 8:30 every night, astronomy.
    l. Beyond the physics classes approximately 50% of time is used for field trips.
    m. Deans? Could larger 120 seat room work better for everything, would cut down on overall use and then leave it open more for other groups. – YES
        i. An intermediate step would be to add another 60 person classroom for helping to stage kids and hold additional classes.

draft

n. Science visualization curriculum and do educational apps in coordination with CSME – "multi-medium visualization theater."
o. Centerpiece of building – put on one end of the building so it could be lopped off if the funding didn't come in?
p. New projector? 3D projection capabilities? Kind of? Strong 3D illusion without glasses, better with glasses.

5. Student Voice
   a. Majors rooms are critical – all majors want one.
   b. Small collaborative spaces – white board, near window get used a lot.
   c. Commuter campus – not true that student go home, often eat all 3 meals of day in this building.
   d. Deaf students – hearingloop.org – induction loop that communicates to hearing aids – great physics question – cheap to do at outset of the building.
6. Advising
   a. Important to be in a highly visible space for students walking by to drop in
   b. Off of common area to take advantage of the seating for students who are waiting.
   c. Secretary for Pre-med, needs to be near advising, has student records.
   d. Records should be in a secure private space.
   e. Needs office for private space in addition to office – possibly in conference room
   f. Will they need to expand the advising office as college grows?
   g. Could use technology in the conference room to do group advising.
   h. Need a library for things, could double as a counseling room – extra office.
   i. Has secretary that would be in reception.
   j. Waiting area to wait to see Susan & the pre-med secretary.
7. Deans discussion:
   a. Deans wants program to show what they need not what fits the budget.
   b. Math people need to be in building for office space – only sure thing
   c. Math could be in repurposed in other buildings on campus.
   d. Currently in building 4.
   e. What is going to happen to math? Hearing different things.
   f. Building manager position? To manage shared support spaces.
   g. Biological Sciences – why all broken up – like silos, why don't they share their core classes that are similar? An opportunity to combine classes & labs ?
      i. Shared life sciences spaces – gain efficiencies
      ii. OK for them to keep all of their department head for now.

BOTANY
3/21/2013

Derek Payne	VCBO Architecture	dpayne@vcbo.com
Justin Heppler	VCBO Architecture	jheppler@vcbo.com
Ron Deckert	Botany	rdeckert@weber.edu
Karen Gaunt	Botany	karengaunt@weber.edu
E Bozniak	Botany	ebozniak@weber.edu
Barbara Wachocki	Botany	bwachocki@weber.edu
Sue Harley	Botany	sharley@weber.edu
Stephen Clark	Botany	sclark@weber.edu
Sonya Welsh	Botany	sonyawelsh@weber.edu
Bruce Daley	FM	brucedaley@weber.edu
Matt Cain	IT	mattcain@weber.edu
Rick Heinz	RFD	rmh@rfd.edu
John Lewis	RFD	jgl@rfd.edu

1. Demographics
   a. 6 ideal full time faculty – currently 4 1/2, 1 secretary, lab manager, generally 1 or 2 adjuncts.
   b. Workroom? Currently have multipurpose hallway that acts as workroom, have a risograph machine in addition to a copy machine.
   c. Mail is handled by department – distributed by Deans office.
   d. Horticulturalist retired – was ultimately in-charge of the greenhouse.
   e. Greenhouse
      i. It would be helpful if the labs were near the greenhouse.
      ii. Dumbwaiter between greenhouse & lab? Plan B
   f. Majors room, cubby holes with study carols may be appreciated, Japanese style wall beds? Currently 80-88 majors, how many in majors room – max is 12 to 15 people? If there was a bigger space there may be more, student club meetings occur. They graduate 6 to 10 a year. They study socializing which helps with retention.
   g. Offices – need min of 8 – definitely
   h. Adjunct space – would be OK with a shared area between the departments.
   i. Emeriti office space available – they suggest a min. of 1 per department.
   j. No place to go eat – staff break room with kitchen – shared between everybody – a place where people can cross paths.
   k. Storage needs
   l. Labs
      i. General Purpose – Introductory Lab

draft

1. Currently don't use water at benches, they would really like it at the perimeter.
2. What style of benches – likely movable table.
3. Utilities at student benches? Need power available, need data
4. Elementary ed class
5. 1 growth chamber

ii. Physiology Lab (looks like a chem. Lab), 16 people.
1. Microscope space along the wall
2. Around edges, balances, centrifuges, spectrometers.
3. Vibration concerns for microscopes
4. Classes – genetics, herbal medicines, plant phys.
5. Fixed tables
6. Hoods
7. 2 growth chambers

iii. Advanced Lab (24)
1. Need hood & water & gas
2. Microscopes
3. Ideally laminar flow hoods – use protection is not as important, samples protection is critical.
4. Currently functions as a seminar space.
5. Sitting height tables.

iv. Undergraduate Research?

v. Outdoor Classroom
1. Space outside with no tables, but a roof, 16 to 20 people under the roof, classes make a mess with branches, etc.
2. A shop aspect to the space would be nice.
3. Just open space, no risers.

vi. Would like a college wide seminar space off of the lobby, 30 to 50, could also be program.

vii. Labs 24 students is a good number.

viii. Support Spaces
1. Prep room (2) intro lab & phys lab have the most prep needs.

MATH (Developmental Math not represented)
3/21/2013

Matt Cain	IT	mattcain@weber.edu
Afshin Ghoreishi	Math	aghoreishi@weber.edu
Paul C. Talaga	Math	ptalaga@weber.edu
Matt Ondrus	Math	mondrus@weber.edu
James Peters	Math	jpeters@weber.edu
Mahmud Akelbek	Math	makelbek@weber.edu
Others attendees from Math did not sign in on registration sheet		
Derek Payne	VCBO Architecture	dpayne@vcbo.com

This discussion was with the Math Department and did not include representatives from Developmental Math.

1. The Math Department (excluding Developmental Math) includes 15 full-time faculty, 18 adjunct faculty members and has approximately 180 Math majors in the department.
2. They currently have two staff workstations with a small waiting area and a Workroom of approximately 150 square feet.
3. The department does have a student's room, with a kitchenette and they want an equivalent space in the new building. The space should have plenty of whiteboard space, computers, printers, coin-operated copier, and facilities for food prep and storage. Space also needs student locker space for their students and would like to have 200 lockers available for their students. Math would like this space to be near the tutoring lab.
4. They discussed their need to have a tutoring lab for students and it would be 600 sf. This lab should be near the student's room and also near the Math offices.
5. Classroom Space – classrooms need to be flexible and be able to adapt to a "flipped" condition, problem-based learning, group work, etc. They must be flexible in their use of technology with consideration of use for projectors or smart boards, internet access, document readers, lecture capture, long runs of white board, daylighting with sunlight control. The spaces required include:
   a. *65 Person classroom* – (2) – Should be tiered where two rows of successive tables are on the same level. Math could use these classrooms four days a week – 60% of the time.
   b. *36 person classroom* – (7) – flat floor, flexible and should be approximately 800 sf. min.
   c. *30 person classroom* – (3) – flat floor, flexible and should be approximately 600 sf. min.

draft

d. *Math Ed. classroom* – (2) – classrooms should be adjacent with a storage area between them. Classroom should have large tables for computers and manipulatives. Three (3) walls of the classroom should have whiteboard. Classroom should have space for 30 students. Classrooms should be approximately 950 sf.

6. Math needs a computer lab with 20 computers. They would be willing to share this space with the other science disciplines. They would like to have approximately ten (10) drop-in computers in an area away from the 20 computers in a class setting.
7. AV integration in classroom: Math is interested in smart boards, in particular the "inner-Write Boards," small teacher station with a computer at the head of the class. Handwriting is still very important in Math instruction and they want whiteboards on at least two walls, especially critical to have a large whiteboard on the front wall.

PHYSICS
3/20/2013

Derek Payne	VCBO Architecture	dpayne@vcbo.com
Justin Heppler	VCBO Architecture	jheppler@vcbo.com
Matt Cain	IT	mattcain@weber.edu
Rick Heinz	RFD	rmh@rfd.edu
John Lewis	RFD	jgl@rfd.edu
Brad Carroll	Physics	bcarroll@weber.edu
Michelle Arnold	Physics	marnold@weber.edu
Stacy Palen	Physics	spalen@weber.edu
John Armstrong	Physics	jcarmstrong@weber.edu
John Sohl	Physics	jsohl@weber.edu
Dan Schroeder	Physics	dschroeder@weber.edu
Colin Inglefield	Physics	cinglefield@weber.edu
Richard Schroeder	Physics	rschroeder@weber.edu
Tabetha Hole	Physics	tabethahole@weber.edu

8. 90 majors on the books, lab managers, secretary reception area, would be open to share a pool of reception secretaries, current faculty 11 to 12, should plan for 15 offices.
9. Major rooms:
   a. They do have a majors room, everyone else wants their major rooms – 370 sf – also has a back room (231A) – library snack room/lockers.
   b. Students have lockers – like elementary school lockers – 15 total, wait list to get one.
   c. They do a combined majors room for the whole college.
      i. Would hate to see it get diluted.
      ii. Big cultural aspect to it.
      iii. Would have to also have study rooms for each department
   d. Once they go the majors room the graduate rates improved.
10. Labs
   a. 2 or 4 labs introductory labs with (similar square footage to what they have now in 3 labs), would want to have 2 (5) module labs which would give them more sf than they have now.
      i. Fixed table down center gets in the way, don't use sinks.
      ii. 3 is their ideal group size, 4 is too big and results in someone not doing work.
      iii. Would like to make all or half of the room dark.
      iv. They are often handling 40 students at a time – it would be conducive to combing the classroom into a larger lab
      v. Connecting door between the two labs with a glass wall between
      vi. Would prefer space to access both labs from the prep room.
      vii. Currently have plenty of storage space, but it is not flexible enough so it goes unused – standard cabinets depth & width doesn't work.
      viii. Transparency for mechanical lab, not transparency for optics lab
      ix. Like the idea of wall talker on the walls (currently have chalkboards).
   b. Electronics Lab
      i. 14 to 16 students
      ii. Storage for general supplies – either in adjacent room or not under table.
      iii. Small storage room.
   c. Optics Lab
      i. It is used on a yearly or bi-yearly basis
      ii. Joint research and project teaching lab
      iii. Vacuum
      iv. 4 optics tables, need to get around all 4 sides
      v. Storage room – benches, optics rails, spectral tubes, spectrometers
   d. Advanced Lab
      i. Equipment needs for advanced, materials & methods have complete change out of equipment for each discipline taught.
      ii. Also have occasional project occurring in corner.
   e. Correctional Lab
      i. Share with other disciplines.
   f. Storage
      i. Central location or an adjacent room?
      ii. Use high density storage if in a central location.
      iii. Currently they have a lot of storage space but it is not used in an efficient way.

draft

g. Currently have no project space for student projects
    i. They currently get assigned space in unused labs.
    ii. Become homeless for a semester when they are kicked out.
    iii. Need dedicated student project room.
        1. Research shop
            a. Fume hood
            b. Circuit boards
            c. Storage for student projects – cubby
            d. Sink
            e. Vacuum chamber
h. Plutonium source in the basement
    i. Concrete vault in radiation lock – concrete roof
    ii. Currently in rm 155 – 144 sf
    iii. Bigger than it needs to be – shielding needs to stay the same
    iv. In big 55 gal barrel – filled with wax
    v. Neutron source, used every semester
    vi. Would be good to be adjacent to physics lab
    vii. Adjacencies to advance lab and lower division lab.
    viii. Logical path with low population – freight elevator
i. Metal shop (machine shop)
    i. Rack at end with pegs.
j. Wood Shop
    i. Saw outside in good weather.
    ii. 16' long min.
    iii. Stock storage
        1. Against wall
k. Research
    i. 1 research lab with vibration isolation (floor)
    ii. 2 research labs adjacent to each other with a common work bench
    iii. Ceiling drops for power
    iv. 8 research rooms that would host 2
        1. 1 radio active
        2. 1 vibration
        3. 1 dirty
        4. 1 clean
l. Observatory
    i. Can we have an observatory on the roof (not a pier all thew ay from the building to the ground)?
    ii. 1 big scope in a dome
    iii. Piers to mount portable scope
    iv. Research instruments on permanent mount.
    v. Storage are for telescopes
    vi. As far away from mechanical unit as possible.
    vii. Needs to be on the south side of fume hood exhaust
    viii. Utah state university has a good example
    ix. Best solution is do a pier – and make it an architectural element.
    x. Public would need to access the roof terrace, elevator & stair.

STEERING COMMITTE
3/21/2013

Justin Heppler	VCBO Architecture	jheppler@vcbo.com
Derek Payne	VCBO Architecture	dpayne@vcbo.com
Rick Heinz	RFD	rmh@rfd.edu
John Lewis	RFD	jgl@rfd.edu
Laine Berghout	Chemistry	llberghout@weber.edu
Afshin Ghoreishi	Math	aghoreishi@weber.edu
Rick Ford	GEO	rford@weber.edu
Bruce Daley	FM	brucedaley@weber.edu
Kevin Hansen	FM	khansen@weber.edu
Norm Tarbox	Admin	ntarbox@weber.edu
Barry Lloyd	Chemistry	blloyd@weber.edu
Matt Domek	Microbiology	mdomek@weber.edu
Barb Trask	Zoology	btrask@weber.edu
Sue Harley	Botany	sharley@weber.edu
Colin Inglefield	Physics	cinglefield@weber.edu

1. Summary report on the two days of workshops with the departments.
    a. The participants found commonalities in their desires for the building.
    b. Many departments voiced a willingness to share computer lab space with approximately twenty (20) computers with a side lab for drop in comp. services.
    c. Instrument space shared amongst labs was also discussed in the workshops.
    d. A "core instrument room" was discussed and could be shared as long as the responsibility and liability for this room was a specific person who was charged with managing the equipment.
2. There was discussion about 'who is your "sister department?'
    a. This discovery could open up other opportunities to share amongst departments including common lab space, classroom, study areas, reception/workroom space.
    b. This idea may suggest co-location of certain groups on certain floors.
    c. Caged field storage was previously in building and remodeled to be cage storage.
    d. Including a shared imaging suite on the ground level (to reduce vibration on slab-on-grade) – for shared department use was discussed.
3. There was a discussion about how the departments could share labs that aren't so instrument or fume hood specific?

draft

a. Question was posed: Could a lab in any moment be used for zoology, physics or general chemistry? This question led to a discussion about the culture of the students at WSU
b. It is difficult to get additional utilization of lab space because of student culture (students like afternoon labs); it is difficult to schedule labs in the morning. Lab times at non-traditional times don't get student support.
    a. The University gets a lot of evening requests for classes – service courses have been scheduling in the evening for a long time.
    b. Some service courses have whole program in the evening.
    c. The WSU-Davis campus has a lot of the graduate programs and those classes typically occur at night.
c. Physics – is there opportunity to do lecture & lab in same course – not in large service courses – 2 (21) courses and 1 (18) course.
d. Quantitative analysis would benefit from being adjacent to the instruments
e. Undergrad research projects are often done in the teaching labs, making them used when not shown to be used – this should be resolved in the future.
f. Physics in the morning and chemistry in the afternoon in the same lab would be difficult.
g. Microbiology
    a. Medical micro – 2 (30) person labs.
h. Lines of communication discussed for funneling the project information. Everything must goes through Bruce, but if the faculty wants to send it through Dave Matty to get to Bruce, that will work also.
i. Schedule for programming effort was discussed. The final programming document is currently scheduled to be delivered to WSU on July 15.
j. Sustainability Charrette – the week of the 1st of April.

4. Programming Schedule Discussion:
    a. March 29th steering committee meeting – shared space workshop – 3-5pm
    b. Sustainability charrette – April 2, 8am – noon, faculty will be invited.
    c. April 5th Steering committee meeting – Audio/visual integration, etc. 2-5pm, start with AV/IT
    d. Next Laboratory Workshop, originally scheduled for April 11, 12 of April w/RFD – was revised to be April 24 to 25, Wed. & Thurs. (Steering Committee lunch on Thursday). Specific schedule of workshop times to be worked out with VCBO, Bruce D., and Dave M.
    e. No meeting will occur on April 11 or on April 26 (commencement).
    f. May 23 & 24 – Final lab workshop
    g. There was interest in involving students in the laboratory discussions in the departments. It was decided that a student questionnaire be developed for student input. VCBO has done successful student surveys on WSU's campus before and will plan on doing one on campus before the end of school.
    h. VCBO will put together a student survey – VCBO will bring a questionnaire to next Friday's steering committee meeting.
        a. Possibly VCBO would hold meeting with students or set up a table in the hall of the Science Building
5. Themes or Guiding Principles for the building.
    a. The committee discussed forming a theming committee for the building?
    b. Internal bulletin board to share ideas? Created by Dave's office.

6. Classroom Accounting in the Program.
    a. Everything should be accounted for in the program, if there is a lecture hall needed it needs to be accounted for. Whether the lecture space stays in Lind Lecture or ends up in the new building will need to be determined and put into the programming document.

    b. WSU Administration stressed that if required spaces are not accounted for in the program document there is little chance that space will get built.
    c. The team will collectively need to decide on appropriate dates for the submission for drafts of program to WSU for review.
    d. Concluding thoughts from Steering Committee.
        a. Dave M. stressed the importance of the faculty commitment during the design process. That commitment will need to be solid and a time for weekly steering committee meetings will need to be found and held to during the course of the project.

        b. WSU would like the programming to be much more than a room list that includes the core information of their mission; this program will be a real recipe book which means more time will need to be put in by this steering committee and programming team to achieve that result.

        c. WSU would like to pursue the construction method of the project as a CMGC. They feel this will still give them a good value for the project, while giving them the ability to engage a construction specialist and their knowledgeable subcontractor base in the design phases of the project. This selection will be made on a value based selection

        d. The workload of the eventual design team for the project will be very heavy early on, in July & August . Design will likely take a year to complete – will start the design process July 15th – role of steering committee will diminish somewhat after the first 2 to 3 months of the design process.
            1. Friday afternoons appear to be a good time for design steering committee meetings.

draft

Weber State - Lab Workshop # 2
04/24/2013

GeoSciences:

1) Intro Lab - right now accommodates 36 students, listed as accommodating 24, with some seating modifications we can fit 30? Yes with smaller tables. Currently teaching 1 lab section of physical geology (2 in new building)
2) Advanced GeoScience Lab - need power at the tables, do tables need to be stationary? Microscope table levels? Do you move the table up or down or the student up or down? Need lots of space for microscope storage, where will that occur? 2 sets of microscopes commonly used, 1 ea. per student - need room for at least 24 of each scope. Microscope cabinets need to be locking. Also includes field methods lab in addition to regularly scheduled labs. Locate 4 sinks around perimeter for student use
3) Space utilization ideas
    1) to combine the wet lab with the upper division lab? How can you have one lab with optical microscopes with another room that you use water in?
    2) to use the intro lab as a hybrid room, use a lecture room all morning long and then use for labs in the afternoon - negative is that this would reduce student access to the lab when it is schedule - possibly double sided cabinets into an ancillary space for access to specimens? Extra scopes and the cost might be a problem
    3) Botany is closest department, micro is to stinky & messy, physics uses a lot of equipment (physics uses their labs 24/7 so they may crowd others out)
    4) Morning labs - no one signs up for classes in afternoon because student works? Overtime people will have to adjust - this issue is across campus (campus would have to make the decision to change culture)
    5) combining wet & microscope - get rid of dust factor - would need really good ventilation, chemical activities could occur in hoods, sive analysis set up would need to be provided for in an adjacent prep room - window into prep room would allow professor to supervise what happens in the space - would need 4 sinks min. for students (1 full size & 4 smaller sinks) or 4 sinks around perimeter of advanced lab replaces the need for 4 in the prep space - 6' fume hood is in prep space, would need marker board. Storage for research data
    6) 2 modules for stream tables, fumes, sedimentology, etc
    7) Need access to type 1 purified water (in wet prep room)
4) Archival Storage - remote & high density
5) Specimen Storage
6) Make rock prep area bigger, sives down there, maybe 480sf? 630sf would be plenty, Need compressed air for crushers, need running water, can be located remote from labs in the building, needs sediment traps, need lab vacuum, need dust vacuum - is there an issue with LEED? (not currently addressed), prefer it vents directly to the outside
7) Research Labs - (4) 2 module labs? Flexibility?
8) Shared Instrument Room - shared with chemistry, need cooled water? compressed air, nitrogen line, laser would need sodiumhexafloride (usually self contained)
9) Small XRD goes in mineralogy research lab? (needs to be in locked area with equipment that requires radiation control), Chemistry is other user of XRD. Needs lock & key because of state radiation control. Can be with other stuff, people who have access to the space need to be trained to use it per state regulations.
10) Need to be able to store propane outside (@ loading dock?)
11) Need science storage area for receiving items - serves whole building
12) Need "BOOM" room - for storing flammables & explosives - concrete bunker (similar to Thatcher Chemistry)
13) Computer Lab - space specific UPS & backup generator, might need more power than 110, 1 circuit should be 220?

Deans Office & Developmental Math:

1) Developmental Mathmatics
    1) currently in buildings 3 & 4
    2) building 4
        1) 2 computer classrooms (1000sf) 516 & 517 with 24 people ea.
    3) 1 classroom in E.T. rm 127 (1039sf) 24 people
    4) 50% of classes to meet 4 days a week in the future - per dean we don't have to program for future growth
    5) shared conference room (currently doesn't work with math) - 16 people
    6) can share mail room / prep room
    7) reception - seats for 4 (overflow into corridor)
    8) Demographics
        1) not expecting faculty to grow
        2) 11 faculty office with 1 directors office (180sf OK) - 12 offices total
        3) 4000 students a semester that they serve
        4) 4 adjunct work stations
        5) 2 Davis count faculty
    9) Computer Classrooms - need instructor projection - no printers, white boards, teachers station (lectern)
    10) mini-form factor computers
    11) IT storage for extra machines - in a closet - around 120sf
    12) should advisor be in department? no
    13) Looking at flipped classrooms as future model without the computers
2) Tutoring spaces within individual departments
3) Do we need a testing center in the new building?
4) Been told by Norm that they currently have to account for all classrooms in buildings 3 & 4
5) Deans Office
    1) It is going to be tough if they end up with 75k of usable sf
    2) sound proof deans office - cannot currently have a private conversation in this building
    3) work room with fridge sink & kitchen with disposal, microwave

Draft

4) needs storage (office size) for deans suite
5) have to have a window - office & conference room with north or north east view
6) 1 conference room on a floor (16 seats) 400sf - use student union spaces for overflow conference rooms

Steering Committee:

1) Dean had a meeting yesterday with Norm
   1) have to account for all space they currently have in buildings 3 & 4, E.T., and don't get any new space in the Library as it is repurposed
   2) currently have 75k sf
   3) we can do better than 50% net utilization - state won't let us proceed unless we can show better efficiently
   4) assuming that undergraduate research space is a priority
   5) we may have to change the way we do things to accommodate these constraints
   6) what we have will be better than what we have now - it is possible that if we do our best to show we are being as efficient as possible then we can possibly get more money but we can't count on it
2) Whitney
   1) usage & usage patterns - looking at better space utilization
   2) keypad entry labs? show when they are currently being used
   3) architects job to make the best use of space within the building
   4) faculty's job to look at scheduling efficiency and maximize it
3) Last week they discussed 3 options of addressing the square footage bust?
   1) meeting the approx. 150k sf (deans direction was that we need to proceed with this one not counting on the other 2)
   2) shelling future growth space
   3) asking the legislature for more money
4) Testing Center?
   1) do we need one?
   2) currently faculty don't seem to be requesting to keep the testing center - it is currently full (during testing week)

Botany

1) Intro to Botany Lab
   1) 24 students, prefer floor boxes to overhead carriers
2) Advanced Botany Lab
   1) movable tables, need to be able to be stable for scopes
3) Plant Physiology Lab
   1) standing height tables, darkenable, purified water (type 2), vibration sensitive
4) are open to sharing their general lab with others, are concerned with how dirty geology is
5) would like the option to move desks around for future flexibility
6) Demographics for faculty should be 6 + 2.
7) every faculty will do some amount of research with students
8) Research space - 3rd space needed that will split between dry & wet, the two wet labs have a fume hood, all 3 have gas, vacuum, air, Field lab has a snorkel, molecular lab has a laminar flow hood - molecular, field, & biochem - all are vibration sensitive for scopes & balances - 2 labs need the level 1 purified water
9) Storage/Prep/Support
   1) Prep room - 1 larger room
      1) chemical fume hood in chemical prep
      2) gas vacuum air, purified water
      3) locate near general botany - could be remote from advanced
      4) Need UPS for the refrigerators
      5) darkenable
   2) Herbarium - need hot 7 cold water
   3) Cold Room - table for microfuge, power in room
   4) greenhouse/headhouse has a growth chamber with european plug
      1) mini refrigerator - in greenhouse
      2) industrial water
      3) chemical storage for the pesticide
   5) Field equipment storage in Lind - don't know whether it stays or goes

Chemistry

1) Some of the lab forms represent possible future labs - which is why some were represented that were not previously discussed
2) 16K sf currently in chemistry department, including teaching space (540), & offices
3) individual storage is currently one of their limiting factors - we would need 240 (with 10 sessions in each lab) drawers in each lab - 8 sessions would need 192 drawers
4) Knee space is desired - could there be smaller drawers for individual items and then bigger items such as beakers could be shared - opens up possibility for growth if every student doesn't need a large drawer - also model where 2 student that share a drawer is a possibility
5) will need support space in each lab
6) 4 labs utilized near fully upon move into building with 5th lab accounting for growth
7) max growth @ 10 sections in each lab then 1100 students per week, @ 8 sections then 980 per week - 2 sections per day in each lab - unlimited storage space would allow 3 sections per day
8) 4hrs for a lab section in an ideal world - is there an open lab need - no, these are cookbook labs
9) Labs (5 types):
   1) General Chemistry Lab - (5) labs, 24 students per lab, 8 to 10 sections at maximum growth
   2) Organic Chemistry Lab - (2) labs, 8 to 10 sections a week
   3) Quantitative/Analytical Lab
   4) Physical Chemistry Lab
   5) New Teaching Lab (to account for growth)

draft

10) Upper division two options
    1) Option 1 - 4 labs -
    2) Option 2 - 3 labs -
11) With lab layouts they want to get the input of those working in them and bring them back to us
12) General Centralized Support Room - not chemical storage - just support
13) They suggest having students help with designing drawer layout and they will bring it back to us
14) Who can they share with, could micro cross over with bio application?
15) The faculty are frustrated by their charger - were they to asses their future growth or just go with their current space represented in this building
16) 1110 course is being farmed out to highschools but will likely need labs to occur @ weber state
17) Accessory spaces:
    1) suggest that we share inventory amongst all departments (each dept has their own account and when they draw from it, it charges their department) - current storage is all over the building - around 1200sf now - should be twice as large as it is now - save significant sf across all departments (they could not do their own purchasing) - open containers should be each departments problem, but when it is in its original state then it lives in the store. No solution prep. Large drums of solvents need a room, and gas cylinders need a room - 10 to 15 on each side and storage space at loading dock is needed for used canisters. Chemical storage needs 2 or 3 good refrigerators.
    2) Prep-room needs to be a lab-like room with several (2) refrigerators and near the chem labs, would prefer to have flammable cabinets in this room
    3) Rooms adjacent to labs are support rooms (just to hand out glassware, thermometers) - approx. 100sf
    4) may need a separate prep room for organic but the main preproom could be designed to accommodate both, but there is a concern that the prep room would then be to far away from the organic chem lab
    5) chem stock room goes away and becomes part of prep-room and science store
    6) Shared Instrumentation Room - not huge but space where specialty gasses can be accessed and be in the instrumentation room only

draft

Weber State University
NEW SCIENCE BUILDING
March 29, 2013

VCBO Architecture

Shared Space Workshop

Attending: Bruce Daley, Mark Halverson, Norm Tarbox, Dave Matty, Rick Ford, Afshin Ghoreishi, Sue Harley, Barry Lloyd, Barb Trask, Celestia Carson, Derek Payne

I. Lab Workshop Summary:
VCBO gave a summary of the lab workshop findings and showed a preliminary spreadsheet of areas that have been accounted for in the program, to date.
There was a discussion of how the classroom areas required by Science to operate their programs would be captured in the Program Document.
It is the understanding of VCBO that the program area of required classroom space be accounted for in the program but that if the location of that classroom space is to remain in the Lind Lecture, then that information needs to be defined/identified in the program.

II. Project Goals:
WSU's science faculty has put together seven core goals for the design and construction of their New Science Building: These seven core goals are:

A. Sustainable: The building both teaches and exemplifies sustainability and environmental integrity.
B. Connected: The building offers easy access to everyone, with all offices and services easily found.
C. Inviting: The building is welcoming and unintimidating
D. Engaging: The building itself teaches as well as facilitates teaching and engaged learning.
E. Nature: The building is connected to nature and the surrounding environment.
F. Comfortable: The building is livable with nice places to sit, stand, work, wait, talk, study, eat, etc.
G. Exploratory: The building inspires students to explore through artwork and interactive displays.

III. Classroom Design:
VCBO Architecture presented several examples of various types of classroom layouts both in tiered formats and flat floor configurations. There will need to be further discussion about what (if any) classroom space is to be programmed inside the new building.

IV. Lobby - Event Space:
There was also discussion about having a classroom space directly off a Lobby space. In this layout, the Lobby can be used for pre- and post-event space where the event is a lecture in the classroom space. It was also determined that a staging/warm-up kitchen would be desirable to be nearby.

V. Student Collaborative Spaces:
Discussion about the "Major's Room" - don't call it a "Major's Room." There was a strong desire among the faculty Steering Committee that all the departments have a room specifically designated for their students in their departments. Each department will work on ways in which these rooms are not exclusionary but will invite freshman level and non-majors into these spaces so that they can be mentored by the older students. There is also interest in giving these student spaces names so that they are less intimidating, for instance the Zoology students reside in the "Zoo", Geo-Sciences students will hang out in the "Grotto." There should be a kitchenette in these spaces and a white board. Each of these spaces should have lockers for the students. It was discussed that lockers should be issued to students who take transit to the campus. It was also discussed that the student lockers from Buildings 3 and 4 could be salvaged and used in the new building. This space is the loud student space; there should be a quieter student space off of the loud student space that can accommodate quiet student study.

Small four (4) person study rooms be developed within the building, perhaps adjacent to the Lobby area that could be reserved by student groups for group projects and student collaborations. The group will need to decide how many of these rooms will be provided.

Nursing Room: There will need to be a nursing room (for student and faculty use) programmed into the building. This is now a governmental requirement for all public buildings.

Food/Drink Choices in the Building:
The faculty on the Steering Committee felt strongly that there should be some food/drink available in the building for students that are spending their entire day in the facility. There was a discussion of what food or drink choices could be made available. Norm T. stated that it would likely be an establishment that was not open at night, because it could not be staffed by Sodexho. Further, the food and drink choice would need to be something that is not offered in the Union and would be something that would complement and supplement the offerings of the Union. A discussion with Sodexho will need to occur to find out what the options may be for this venue.

VI. Faculty Spaces:

Offices:
Two layouts of offices were reviewed and the finer points discussed. The faculty members stated that they wanted bookshelves within any layout of the office. The offices will be 120 square feet.
The Committee discussed how the offices should be situated in the building. A model whereby the offices are in a suite a bit more remote from the labs or a model where the offices are closer to the labs and more easily accessible from a hallway/corridor. The Committee's sense was that they didn't want the offices to be secluded into a suite away from the students. They wanted the offices to feel that they were accessible to the students.

Shared Administrative Space:
To date in the programming, each of the department's has asked for their own reception space and workroom space, and space for adjunct faculty. The ability to share this common administrative space among departments was discussed. The Committee stated that they could share these spaces if the reception duties could be worked out. This method of sharing administrative space could economize square footage within the building. It was also discussed that the adjunct faculty space could be shared within the building, again economizing square footage.

Faculty Break room(s):
The Committee decided not to have a faculty break room for each department. They decided that there should only be one break room in the building for faculty.

draft

Weber State University
NEW SCIENCE BUILDING
April 19, 2013

VCBO Architecture

Building Code and Life Safety Meeting

Attending: Bruce Daley (WSU Facilities), Dennis Montgomery (WSU Fire Marshall), Pat Patitas (WSU Environmental Health & Safety), Celestia Carson, Derek Payne (VCBO Architecture)

I. Building Code Review for Proposed Building:

A. VCBO gave a summary of the preliminary code review of the building. The building footprint (designated for purposes of code review) is 160,000 square feet divided equally on three levels with a basement under 1/2 of that footprint. This translates to approximately 45,000 sq. ft. on each level. The building has been analyzed as a B occupancy and of a Type IIB construction type. This construction type designation allows an additional 40,000 sq. ft. per floor level and is not restricting the ability of WSU to add on to the structure in the future.
WSU Fire Marshall and Environmental Health Safety representatives were in agreement with the recommended designations of construction type and occupancy group, however, they would like to get copies of VCBO's code review so that they may study the issue further.

B. Control Areas: The number of control areas per level and the chemical quantities allowed/level were reviewed. On the third level, two control areas will be allowed with 75% of the chemical quantities allowed in the IBC Table.
WSU Fire Marshall and Environmental Health Safety representatives were in agreement with the chemical control areas allowed in the new building.

II. Site - Fire Access:

The following access items that relate to the proposed building site were discussed:

A. *Water Flows for Hydrants*: A water flow test for all the adjacent fire hydrants will be done by WSU. Craig Blue will be called to perform the tests.
B. *Fire Hydrants*: Dennis wanted a site plan so that he could analyze if any fire hydrants will need to be added to the project site on campus.
C. *Fire Lanes:* The existing fire lane to the west of Building 3 must be maintained. Any new fire lanes will need to be 26' wide (a new IFC requirement due to outriggers on trucks. Fire lanes may have a 10 foot center drive lane with turf block on the outer part.
D. *South of Building*: The turn-around just south of Building 4 will need to be maintained. The current sketch of the massing shows the building overlaid over the existing turn-around. The building will be modified as required.

III. Miscellaneous Lab Design Items:

Several items of concern to WSU safety representatives were discussed:

A. *Fire Alarms*: Fire alarms throughout the facility shall be installed.
B. *Gas Alarms*: Any gases provided in the labs shall have a corresponding alarm that will detect a leak.
C. *Fume Hoods*: Fume hoods shall have a face velocity of 100 CFM at the fume hood opening. The hoods will be tested yearly. WSU will require that a smoke test be performed on all finished ductwork of these hoods.
D. *Containment of Chemicals in Labs*: WSU will require the containment regulations be met in IFC and IBC documents.
E. *Chemical Dilution Tanks:* VCBO will get RFD's recommendation on the chemical dilution tank type, size and location.

IV. **Next Steps:**

A. VCBO to e-mail Dennis and Pat the building code review and the control area listing.

If there are any questions, comments, or revisions to the meeting minutes please contact Derek Payne at ***dpayne@vcbo.com***

draft

Weber State University
NEW SCIENCE BUILDING
May 03, 2013

VCBO Architecture/RFD

Building Systems Review with Facilities Management Team

Attending: Bruce Daley, Sebastian Anderson, Chad Davisson, Jacob Cain, Viron Lynch, Michael Walters (WSU Facilities), Jeremy Achter, Brent White (ARW), Akbar Matinkhah (ECE), Steve Connor (Colvin Engineering), Derek Payne (VCBO Architecture)

I. Structural System Review:

A. Jeremy A. (ARW) gave a summary of two structural systems that may be considered for use in the new Science facility. The two options discussed were the concrete structural frame and a structural steel frame system. The system ultimately chosen will need to respond to the building's vibration sensitivity requirements. The vibration sensitivity for the different departments within the building will need to be identified. This information will need to be analyzed and a system recommendation made.

Some of the advantages of a concrete frame system are:

Superior vibration resistance
Thinner profile structure allowing less floor to floor height
No braces that may reduce floor flexibility

There was discussion that if the building could be divided into lab space that requires greater vibration sensitivity and office or classroom space into another section - it may be practicable to do two different structural systems. Structural steel frame for the office/classroom and concrete frame for the more vibration sensitive labs.

B. Observatory - There will be an observatory slated to go on the roof of the facility. This function will require a vibration reduced environment and will need to have piers that isolate this part of the roof from the rest of the structure - particularly if the roof contains mechanical equipment.

C. Photovoltaic Panels - Loads to the roof structure will need to be added to account for the possible installation of photovoltaic panels. The panels will not be ballasted but will be connected to the building's structural system using 4" diameter pipe supports (connected back to the building's structural frame).

II. Electrical Systems Review:

A. Akbar M. stated that a new switch has already been placed at Elizabeth Hall from which the power for the new facility will come. Fiber for the building will also come from the west.

B. Lind Lecture Hall Utilities Reconnection: Akbar ran through the scenario of how he proposed that Lind Lecture would be re-fed for power when the existing science building is demolished. The following costs were discussed for demolition and the reconnecting of utilities for Lind Lecture Hall:

Power	-	$250,000.00
Chilled Water	-	$500,000.00
Asbestos Abatement	-	$700,000.00
Demolition Costs	-	$300,000.00
TOTAL	-	$1.75 Million + (costs for new boiler systems)

Bruce D. stated that these costs will need to be absorbed by the construction budget for the New Science Building.

C. The following items were discussed to verify that they will be listed in the program document:

1. Security system - connected to Linell System
2. Security cameras - at exterior entrances
3. Security readers at security doors (using electrified panic or electrified locksets)
4. Magnetic hold-opens at lab and classroom doors (tied to the fire alarm system)
5. Color coded conduit for electrical and communication systems
6. EMT will be allowed; MC Cable will not be allowed
7. Label all circuits
8. Copper conductors - no aluminum conductors on project
9. Use campus standard for exterior light pole fixtures
10. A/V control systems to be Extron

Action: *Design Team to include these items in the narratives in the program document.*

III. Mechanical Systems Review:

A. The group discussed the reconnection of utilities to Lind Lecture Hall - it did not seem to make sense to connect the campus steam back to the building. It was discussed that the chilled water lines would be direct buried to serve the building.

B. Lind Lecture Hall: WSU stated that Lind is anticipated to be in service for another twenty to thirty years. There was discussion about how to service Lind with new utilities. It was decided that the best strategy was to run Lind Lecture on stand-alone condensing boilers. The program shall state "Lind Lecture Hall will become a stand-alone heated building (not tied to campus steam). For cooling, it was recommended to consider the bell tower fountains to be a cooling tower of sorts. Steve C. will look at this possibility.

C. The following items were discussed to verify that they will be listed in the program document:

1. Laboratory Fume Hoods - will be important to either cut the flow way back during off hours or shut them off completely in the teaching labs - where chemicals are not stored in the hoods. Colvin Engineering will discuss this strategy with RFD.
2. Consider the use of air sniffers in the teaching labs - especially if the hoods are to be set way back or even considered turned off
3. Modifiable air changes in specific teaching labs (anatomy e.g.) where a button can be pushed to increase air changes in room
4. Ductwork from the fume hoods - Weber State would like to put them in the program as stainless steel ducting from the hood to the exhaust point. It was discussed that this would likely get value engineered out of the project, because it is very expensive.
5. Laboratory piping (from sinks) - Steve C. will discuss with RFD to determine the best course for dilution of laboratory waste
6. RODI (Reverse Osmosis) water in the labs that request it. Colvin to coordinate with RFD
7. Floor drains at emergency shower locations - WSU wants to have floor drains located at the emergency shower drains in the program. It was also discussed that this would also likely get value engineered out of the project.
8. Ceiling access to valves is acceptable

D. An energy modeling meeting will be conducted to determine what level of energy modeling will be done in the programming phase of the project. VCBO to schedule a meeting with John Burningham, the energy modeler for the project, Steve C. (Colvin Engineering) and WSU Facilities to discuss.

If there are any comments or questions regarding the content of these meeting minutes please direct them to Derek Payne at ***dpayne@vcbo.com.***

Weber State University VCBO Architecture/RFD
NEW SCIENCE BUILDING
May 17, 2013

Steering Committee Meeting

Attending: Celestia Carson - VCBO, Whitney Ward - VCBO, Norm Tarbox, Mark Halverson, Kevin Hansen, Dave Matty, Afshin Ghoreishi, Colin Inglefield, Barry Lloyd, Rick Ford, Matt Dome, Bruce Daley

I. Survey Results Review:

A. Celestia presented the preliminary survey results. The results were reviewed by the steering committee. It was requested that the results be analyzed to look at majors only and also some questions by science majors and math majors. The spreadsheet will be shared with the steering committee so each department can pull applicable information for their students.

B. Some of the interesting information discussed from the survey includes:

1. 45% of majors would use a locker, if available.
2. Student and faculty areas should be near each other for collaboration and integration.
3. Common spaces are very important to students.
4. Amenities, such as access to food, are important to students.
5. Group study areas will most likely be used for small groups of 2-3 students.
6. There were mixed comments on the use of and need for student major's rooms. This led to the following discussion.

II. Student Major's Room Discussion:

A. There are mixed comments about these rooms. Some students want a specific major room to collaborate with co-majors, and others feel this segregates the majors and results in reduced collaboration within the building.

B. The major rooms vary in size for each department and are often very large.

C. These rooms should be open and accessible, have no doors, and be located centrally on each floor.

D. These do not have to be assigned by department, but may be shared spaces.

E. The library renovation is beginning. There will be a number of study areas available of different sizes and configurations. These will be very close to the Science Building and should be considered when planning the study spaces in the new building.

III. Action: Design Team to assess the areas dedicated for student study rooms and right-size them per floor rather than per department.

IV. Department Growth:

A. Department growth was discussed. The general growth for faculty across the College of Science should be approx. 10%. The individual departments will need to revise their growth projections to more closely reflect this goal.

B. This will reduce the area needed for offices as well as research within the building.

C. The faculty spaces may want to be located in clusters to allow for an ebb and flow of growth between the departments.

D. The faculty expressed not wanting to be sequestered from the rest of the building, as indicated in the massing models last week.

V. Building Theme and Art Integration:

A. Ideas for the integration of science and art into the experience of the building were presented.

B. The difference between using art and the theme and integrating elements into the building design were discussed.

C. A combination of art and integrated theming will be integrated into the project.

D. The departments will meet to discuss the potential theme and installations for the project next week.

If there are any comments or questions regarding the content of these meeting minutes please direct them to Celestia Carson at ccarson@vcbo.com

draft

draft

Weber State University

Science Lab Building Programming
Student Survey Results

June 2013

VCBO Architecture
524 South 600 East
Salt Lake City, Utah 84102
(801) 575-8800

draft

Science Lab Building Programming Survey

This report provides a brief summary of the results of a web-based survey that was administered to students at Weber State University to elicit feedback from students that would facilitate programming decisions for the new science lab building.

SURVEY DESIGN & METHODOLOGY

The survey was developed and administered via the internet using Surveymonkey.com. In order to obtain a sample of student participants who were likely to use the new science lab building, science and math faculty were asked to announce the survey in their classes and provide a web link to the survey. Students were encouraged by faculty to participate in order to provide feedback and guide the program of the new building.

The survey consisted of approximately 30 questions developed to better understand how students currently interact with and behave in the existing buildings that math and science majors are currently housed, as well as provide a forum for student perspectives regarding features that would make the new science building as useful, satisfying and intellectually stimulating for the students that are likely to frequent it.

Participant Data

A total of 236 participants completed the survey during the survey administration period. Of these participants 124 identified themselves as science or math majors (botany, chemistry, geosciences, microbiology, math, physics, and zoology), or as being non-declared but planning to major in one of the sciences. Based on input from the science and math faculty, the results presented throughout the remainder of this report include the responses of these 124 participants only. By restricting the sample to math and science majors, the information provided will reflect those students who will use the new science lab and math building the most heavily.

The tables below provide a breakdown of the survey participants by major and expected graduation date. Levels of participation were not equal among each of the majors, in particular, the sample was disproportionately comprised of geoscience and math majors (30.6% and 21% of the total sample, respectively), and microbiology and chemistry were the least represented (4.8% and 6.5%, respectively). In terms of anticipated year of graduation, the vast majority of participants expected to graduate between 2013 and 2017, with relatively similar percentages of participants indicating each of those years.

Participation by Major

Major	Frequency	Percent
Botany	12	9.7%
Chemistry	8	6.5%
Geosciences	38	30.6%
Microbiology	6	4.8%
Math	26	21.0%
Physics	12	9.7%
Zoology	14	11.3%
Undeclared-Science	8	6.5%
Total	124	100.0

Participation by Year of Anticipated Graduation

Year of Graduation	Frequency	Percent
2013	21	17.9%
2014	27	23.1%
2015	31	26.5%
2016	27	23.1%
2017	8	6.8%
2018 or later	3	2.6%
Total	117	100.0%

SURVEY ITEM RESPONSES

In this section of the report, descriptive statistics are presented to summarize participants' responses to each item on the survey.

Student Behavior/Interaction with Existing Buildings on Campus

In order to better understand how math and science students currently interact with the existing buildings most associated with their majors, each participants was asked to indicate on how many days (during a typical week) they spend time in: a) the Science Lab Building, b) Lind Lecture Hall, and c) Building 4/Math. More importantly, participants were asked several follow up items regarding how they interact with the Building 4 and the current Science Lab Building[1]. Follow up items included questions about how much time is typically spent in the building, how many trips each day they make to the building, and what types of activities (curricular and extracurricular) they engage in within the building.

"In a typical week, on how many days do you spend time in each of the following buildings on campus?"

Number of Days per Week	Science Lab Building		Lind Lecture Hall		Building 4/Math	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
None	11	10.2%	20	19.8%	29	26.4%
1 day	6	5.6%	7	6.9%	8	7.3%
2 days	13	12.0%	13	12.9%	4	3.6%
3 days	15	13.9%	25	24.8%	17	15.5%
4 days	14	13.0%	17	16.8%	30	27.3%
5 or more	49	45.4%	19	18.8%	22	20.0%
Total	108	100.0%	101	100.0%	110	100.0%

Building 4 Follow Up Questions

"On the days you spend time in Building 4, how many hours (on average) per day do you spend there?"

Response	Frequency	Percent
1 hour	26	22.6%
2 hours	21	18.3%
3 hours	11	9.6%
4 hours	6	5.2%
5 or more	18	15.7%
Do not spend time	33	28.7%
Total	110	100.0%

The responses below reflect only participants who indicating spending time in Building 4 during a typical week (n = 82). All of the math majors responding to the survey indicated that they

[1] Only participants who indicated spending at least one hour or more, in each building, "during a typical week" were included in the follow up questions for that building.

Draft

spend time in Building 4 during a typical week, as did most of the science majors. However, three majors had significant proportions of respondents that indicated that they did not spend time in Building 4 during a typical week: a) Botany (67% of respondents did not spend time in Building 4), b) Geosciences (43%), and c) Zoology (55%).

"On the days you spend time in Building 4, how many of those hours are spent in a Lab or Classroom?"

Response	Frequency	Percent
1 hour	35	42.7%
2 hours	18	22.0%
3 hours	12	14.6%
4 or more hours	17	20.7%
Total	82	100.0%

"On the days you spend time in Building 4, how many trips per day to the building do you typically make?"

Response	Frequency	Percent
1 trip	52	63.4%
2 trips	22	26.8%
3 or more trips	8	9.8%
Total	82	100.0%

"Besides the laboratories and classrooms, in which other spaces of Building 4 do you typically spend time?"

Space	Frequency	Percent
Student Majors Room	23	45.1%
Faculty Offices	12	23.5%
Corridor Study Areas	16	31.4%
Solution Space/Tutoring	29	56.9%
Computer Lab	23	45.1%
Other Spaces (e.g., Empty classrooms or hallways)	4	8.0%
None, I only use the building for classes or labs	31	37.8%

"On the days you spend time in Building 4, how many hours per day (on average) do you spend in these other spaces of the building (i.e., do not include time spent in classrooms or labs)?" (N = 51)[2]

Response	Frequency	Percent
Half hour or less	15	29.4%
Half hour to hour	10	19.6%
1 to 2 hours	8	15.7%
2 to 3 hours	8	15.7%
3 or more	10	19.6%
Total	51	100.0%

"Besides the laboratories and classrooms, in which other spaces of Building 4 do you typically spend time?" (N = 51)

Space	Frequency	Percent
Classwork	44	86.3%
Studying Alone	42	82.4%
Studying in a Group	39	76.5%
Eating (Snack/Lunch/Dinner)	26	51.0%
Computer Work	24	47.1%
Rest/Nap/Relax	16	31.4%
Other (e.g., Work as a tutor, Professor time)	3	6.0%

Science Lab Building Follow Up Questions

[2] This item and the following item include only participants who indicated spending time in spaces of Building 4 other than labs and classrooms.

The responses below reflect only participants who indicating spending time in the Science Lab Building (*SLB*) during a typical week (n = 98). Nearly all of the participants who provided a response to the item above indicated that they spend time in the *SLB*, including all but one science major. All of the other respondents who indicated that they do not spend time in the *SLB* during a typical week were Math majors or undeclared.

"On the days you spend time in the Science Lab Building, how many hours (on average) per day do you spend there?"

Response	Frequency	Percent
1 hour	12	10.7%
2 hours	14	12.5%
3 hours	13	11.6%
4 hours	18	16.1%
5 or more	41	36.6%
Do not spend time	14	12.5%
Total	112	100.0%

"On the days you spend time in the *SLB*, how many of those hours are spent in a Lab or Classroom?"

Response	Frequency	Percent
1 hour	17	17.9%
2 hours	13	13.7%
3 hours	22	23.2%
4 or more hours	43	45.3%
Total	95	100.0%

"On the days you spend time in the *SLB*, how many trips per day to the building do you typically make?"

Response	Frequency	Percent
1 trip	32	33.7%
2 trips	39	41.1%
3 or more trips	24	25.3%
Total	95	100.0%

"Besides the laboratories and classrooms, in which other spaces of the *SLB* do you typically spend time?"

Space	Frequency	Percent
Student Majors Room	58	70.7%
Research Labs	35	42.7%
Faculty Offices	27	32.9%
Prep Rooms	15	18.3%
Corridor Study Areas	43	52.4%
Other Spaces (e.g., Computer Lab, Testing Center)	12	14.6%
None, I only use the building for classes or labs	16	16.3%

"On the days you spend time in the *SLB*, how many hours per day (on average) do you spend in these other spaces of the building (i.e., do not include time spent in classrooms or labs)?" (N = 82)[3]

Response	Frequency	Percent
Half hour or less	7	9.0%
Half hour to hour	17	21.8%
1 to 2 hours	23	29.5%
2 to 3 hours	12	15.4%
3 or more	19	24.4%
Total	78	100.0%

"Besides the laboratories and classrooms, in which other spaces of the *SLB* do you typically spend time?" (N = 82)

Space	Frequency	Percent

[3] This item and the following item include only participants who indicated spending time in spaces of the Science Lab Building other than labs and classrooms.

draft

Classwork	68	82.9%
Studying Alone	71	86.6%
Studying in a Group	61	74.4%
Eating (Snack/Lunch/Dinner)	59	72.0%
Computer Work	59	72.0%
Rest/Nap/Relax	32	39.0%
Other	0	0.0%

New Science Lab Building Amenities

All participants were asked whether several amenities/factors (e.g., food and drink available for purchase) under consideration for the new Science Lab Building would lead them to spend more time in the building. Additionally, participants were asked whether they currently have a locker available to them, and if available in the new Science Lab Building, how likely they would be to use a locker. Reponses to each of the listed amenities are presented below.

"If provided in the NEW Science (and Math) Building that is being designed, would any of the following amenities/factors lead you to spend additional time in the building?"

Amenity/Factor	# Yes	# No	Percent Yes
Food/Beverage for Purchase	87	17	83.7%
Comfortable Lounge Furniture	97	8	92.4%
Presence of Classmates/Friends	101	4	96.2%
Dependable Wi-Fi Access	104	4	96.3%
Group Study Areas	100	5	95.2%
Quiet Study Areas	107	2	98.2%
Computers with Internet Access	96	7	93.2%
Other Amenities (e.g., [Continued Access to] Majors Rooms) – (35 responses provided)			

"If food and drinks were available in the NEW Science (and Math) Building that is being designed, would you likely purchase any of the following items on a regular basis?"

Item	% "Definitely"	% "Probably"	% "Probably Not"	% "Definitely Not"
Baked Goods	21.2%	45.2%	25.0%	8.7%
Sandwiches	30.2%	40.6%	22.6%	6.6%
Grab and Go Items (yogurt, chips, candy)	37.7%	45.3%	11.3%	5.7%
Juice, Coffee, Milk, Tea, Soda, etc.	61.3%	25.5%	8.5%	4.7%
Pre-made Salads or Fresh Fruit	43.6%	33.7%	13.9%	8.9%
Other Items (e.g., Vegetarian items, probars/cliff bars, pizza, etc.) – (20 responses provided)				

Locker Questions

"Do you currently have a locker available to you on campus?"

Response	Frequency	Percent
Yes	24	22.2%
No	84	77.8%
Total	108	100.0%

"If personal lockers were available to students in the NEW Science (and Math) Building, how likely would you be to use one?"

Response	Frequency	Percent
Very Likely	51	47.2%
Somewhat Likely	32	29.6%
Not Very Likely	25	23.1%
Total	108	100.0%

"Per semester, how much would you be willing to pay for the use of a locker? " (N = 85)[4]

Response	Frequency	Percent
I would not be willing to pay	10	11.8%
Less than $10	46	54.1%
$10 -20	22	25.9%
$20-30	5	5.9%
$30-40	2	2.4%
Total	85	100.0%

Collaboration and Student Interaction Items

Several questions were included on the survey to ask students about collaborative work including the likely use of group study areas in the new Science Lab Building. Additionally, students were asked about the extent to which they interact with students from other science majors in the current science building, and if so, the impact of those interactions.

"If available in the NEW Science (and Math) Building, how likely would you be to use student study rooms?"

Response	Frequency	Percent
Very Likely	94	87.0
Somewhat Likely	13	12.0
Not Very Likely	1	.9
Total	108	100.0

"When you study in a group, how many other students (not including yourself) do you typically study with?"

Response	Frequency	Percent
1-2	56	51.9
3-5	49	45.4
5-8	2	1.9
More than 8	1	.9
Total	108	100.0

"To what extent do you spend time interacting with students who are majoring in other science fields while in the current Science Lab Building?"

Response	Frequency	Percent
Never/rarely	25	23.4
Sometimes	47	43.9
Frequently	35	32.7
Total	107	100.0

"When interacting with students from other science fields, how often do you engage in each of the following types of activities?" (N = 82)[5]

Item	% Never/Rarely	% Sometimes	% Frequently
Class or Lab Work	19.5%	43.9%	36.6%
Group Projects	44.4%	40.7%	14.8%
Group Studying	31.7%	43.9%	24.4%
Socializing	12%	50.6%	37.3%
Science Department Events	32.1%	55.1%	12.8%

"Have these interactions been helpful for your understanding of other science fields?" (N = 82)

Response	Frequency	Percent
Yes	66	81.5%

[4] This item excludes participants who indicated they would be "Not very likely" to use a locker if available to them.
[5] This item excludes participants who indicated they "Never/rarely" interact with students from other majors.

No	15	18.5%
Total	81	100.0%

Participants were asked two additional questions about interacting with students majoring in other science fields in an open-ended format. First, they were asked to briefly describe how their interactions with other science majors have helped their understanding of other science fields. Second, they were asked their opinions regarding how the new Science Lab Building could be designed to encourage and facilitate interaction between students across different science disciplines. A summary of the responses provided is described below (Appendix A provides all of the raw responses to these items).

The student responses have indicated that they are very interested in the new building providing amenities that support an active learning and collaborative student culture. Many of them referenced specific types for spaces like study rooms, majors rooms and commons areas. In these spaces students indicated a desire for access to food as well as a variety of seating types from computer tables, to lounge seating.

SUMMARY AND RECOMMENDATIONS

The results of this survey will assist the Steering Committee in addressing design criteria for the student commons spaces, student study space and collaborative areas within the new building. It is clear that student study space is a critical program element and that a variety of study space types needs to be provided. Students majoring in the sciences spend long periods of time in the building, and amenities such as access to food, comfortable seating, collaborative space, access to internet and computer access are all critical features to be provided in the new building.

Appendix A: Responses to Open-ended Survey Questions

The table below presents responses to open-ended items on the survey.

Briefly describe one or two ways these interactions have helped your understanding of other science fields.
-Insight to others ideas and concepts -The current testing center/computer area is great for interacting with other students and has helped by having an open environment that can handle some noise as well as a good community. -It helps keep my mind working, and pushing myself -Nice to have someone who is in the same boat as you (studying science). -Group study sessions. -It has allowed me to open my mind to think like those in other fields of science. It helps me to see that there are many approaches and many hypothesis that can be considered by the depth of your understanding in other subjects. -I find physics fascinating, but I'm not very good with the math. It's fun and interesting to talk about concepts with physics majors. -You just understand more of what the major is about and what it focuses on. -It helps to compare notes on how we did in lab to see what we can improve on. -Helps to understand more specific nature of others fields that I am not studying like Zoology. -Makes me think if the area I am majoring is right for me -Lead to a greater appreciation for these fields. -By bringing out the positive aspects of other science fields and seeing why others want to work in those fields. -Other students having knowledge in physics or botany or math have helped me to understand it better when I am in one of those classes and have needed help -They helped me to recognize all the similarities in between physics, chemistry and geoscience. -Even if I am not studying the same materials, just listening to other majors talking about and explaining different subjects to each other is always a learning experience. -I have developed an appreciation for how different fields intersect and support each other. -Relatability to my field of study -I learn how to understand principles as they are taught in other disciplines. An example being gas properties as understood by chemistry and physics. -They've taken classes I'm interested in and give me study tips. They bring their knowledge to discussions of topics we have in common. -I appreciate the value of zoology, geology, an so forth when I interact with students who are as passionate about their field as I am of mine. -Since most science majors have a minor outside of their field, there is plenty of opportunity to interact with students from other disciplines. Group projects are required for some courses and that requires collaboration between students. -I have learned about anatomy and zoology from taking Marine Biology with Zo and Botany majors. -Learning the similarities and differences of the disciplines and how the relate/support each other. -The physics majors and chemistry majors answer my questions very well when I ask about their fields of study. -New ideas to other career choices -I get my questions answered things explained in student talk -I like talking with people about what they're interested in, and often they're interested in their fields of study. When I talk with them about their fields of study, I get interested in their fields of study, too. -New ideas, clear understanding of new concepts -Co-op learning. If someone understands something I don't (and vice versa) we are able to help each other understand material. -Being together in proximity to each other. They interrelate and so should we -Usually I have classes with students with different majors and are always interacting with each others fields.

draft

-Talking between students helps me understand other fields. The interaction and solization is what helps the most.
-They can give me inside info
-Listening to what other students are doing and them explain how to do it. I learn a lot.
-I feel that I have become more well versed in the sciences.
-Other's knowledge helps me build my own

In your opinion, how can the NEW Science (and Math) Building be designed to encourage and facilitate interaction between students across different science disciplines like biology and chemistry?

-I think that the more we can get our students to see and be around eachother the more they will learn to interact with one another. I think this can be facilitated with monthly seminars open to all students and faculty. Something everyone would be interested in whether that be a guest speaker or a presentation from a professor from one of the departments. I also think eliminating the major rooms would encourage more mingling between students and larger, more open areas of study for students. One idea I had for this, and to accomidate my earlier request for more windows or a more open feel would be to build a type of annex or patio area, like a greenhouse, just a room of windows that would be a quite place for students to study. Much like the quite study room in the union building but outside. Another idea that would promote students to come to the science building as well as be fun for people to bring their families to would be a sort of walk-through terrarium, much like what used to be available at the hogle zoo. This would provide an opportunity for the departments and students to come together to make a place where the botany department could grow and maintain the plant life inside, the zoology department could provide animals for the public to see as they walked through, the geosciences could work on habitats and soil health, and chemistry on maintaining the pH of the systems water and atmosphere. This would not only be a great way to bring the departments together, but it would provide the community with something they could bring their families to walk through and see as well as a strong draw for students who may be considering Weber as their future university of choice and the science department as their future college of choice.
-It is nice for each major to have their own space, but they should be in the same area or something so that students still feel free to interact with other majors. Maybe an open design rather then one with separate rooms.
-Have study rooms that help all of the sciences.
-Maybe eating area and computer lab.
-In any of the science fields, knowledge of different fields of study is needed to succeed at one specific field.
-Each discipline has their own notice board in one, common, lounge area.
-I'm not sure, but I think that having each discipline on its own floor discourages us from interacting. Having our major rooms close to one another or even connected could be good.
-I don't see why not, science is about questions and our professor are more than willing to answer or explore questions raised.
-Each department has similar interest therefor its great for other opinions on things such as class work or majoring options
-Computer lab similar to what is already in place
-Better group study areas.
-Have the majors room all connect to a common foyer/commons/study area
-An equal balance on expenditures on each major. It would be beneficial not to have an emphasis on any one major or department. They are all equally important. A good focus on up-to-date technology. Perhaps, utilization of iPads in classrooms for taking notes and performing labs. Much larger major student rooms. The math and physics major student rooms are not large enough to accommodate those students who wish to study there. Open space does indeed affect students and their mood of study. The student resident halls implore just such healthy open space. This encourages students to come relax and study.
-Main hub with displays
-Maybe putting major rooms closer together (shared kitchen) or providing better group study areas.
-It can't unless the student themself seeks the interaction. I cannot study in the universal computer room right now. If I seek help in one of these subjects, it is through personal interaction with another student in one of those classes and we arrange to meet somewhere quiet.
-They can have a common research room where students of different majors can collaborate on a common project that involves multiple sciences. That would be awesome!
-Easier access to the floors, a more open staircase, more open building layout.
-Well, I think it would make sense to have a certain area of common ground for all the different majors if you are trying to get everyone together. It has to seem inviting to all. But I do think it is important to have smaller rooms available to each of the different science disciplines, for those students who are not exactly social butterflies, who may just want a small familiar group of faces to study and interact with.
-Typically students associate with others in their own majors.
-Open spaces where students can study and socialize together.
-I'm not really sure, it's hard if you don't have the same classes with them.
-Study rooms with large amounts of white board for student use.
-Group similar disciplines on same floor.
-Large common areas where food is served, and people that enjoy that building can actually see one another besides just in the elevator/between classes.
-Open study areas where groups can work at tables, whiteboards, computers in an environment that encourages discussion and active learning.
-Mostly I cross paths with other majors in the computer lab area. I suggest you put the food on a separate floor from the computers and testing center, to maximize cross-major interactions. Then there will be people of various majors on multiple floors.
-Not limiting study areas to 'majors rooms'
-In my experience, students take the initiative to collaborate with students from other majors in the current facility just fine. Since Weber State is a teaching college for undergraduates, the primary focus should be on encouraging students to become proficient in their own disciplines foremost. As they mature in their studies they will seek out other disciplines as they become more exposed to them throughout their coursework. The one thing that has allowed me to do this comfortably and fruitfully has been because of department majors rooms. I've gotten to know and collaborate to Geology and Physics students who frequent their majors rooms, and several extracurricular projects resulted.
-Hold more special guest scientific speakers as well as interdepartamental events.
-Having common areas where students eat lunch or get coffee together.
-Have large study areas where everyone can meet.
-Mixed Seminars.
-Big open area to study together
-Don't put all the Chemistry courses in one part of the building, Mix them up.
-It would be good
-It should have an office where you can go to ask general questions about the school policies and grades and things that might affect our success, like an advisor.
-A general tutoring room which has tutors and students from all science majors
-Have an area (like the room in front of the current testing center) where students from multiple disciplines would enjoy studying or otherwise spending time in. Make it inviting (windows!!, comfortable furniture, breathable design) and rather easy for all students to access. Include amenities for more than just studying in this general use area (food, water, restrooms, etc.).
-Maybe it look like google
-"Meet and greet" type luncheons/finger food activities.
-Build a larger lunch area with more chairs than the current area in Davis campus. It would also be a good idea to separate it from the rest of the building with doors so others arent distracted by the noise.
-Since the current science building has divided each department to a floor, there is no need or little desire to interact with the other departments. One way to encourage students from each department to work together is to have a commons area. What I would like to see is the commons area have open partitions that are not class rooms but have tables and white boards. They can be used by SI instructors and a dedicated place for students to study in.
-LIKE and comingle the spaces
-The flow and interaction would be nice
-Have common areas where all students can congregate.
-I think that it has been beneficial to have a room with students of the same major.