JULY 2014

PREDESIGN STUDY
EWU SCIENCE II

EASTERN WASHINGTON UNIVERSITY
BIOLOGY
PROJECT NUMBER 30000466

PREPARED FOR:
STATE OF WASHINGTON OFFICE OF FINANCIAL MANAGEMENT

BY:
EASTERN WASHINGTON UNIVERSITY
CONSTRUCTION AND PLANNING SERVICES

IN COOPERATION WITH LMN ARCHITECTS

1.0 Executive Summary

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1.1 PROBLEM STATEMENT

Eastern Washington University has experienced a twelve percent growth in student population over the last six years and expects that over the next ten years its student population will continue to grow by approximately twenty percent. The biology department has seen even larger growth over the same six year period with a twenty-four percent increase in the number of biology majors. The trend is expected to continue with more EWU students seeking degrees in STEM (Science, Technology, Engineering and Math) fields and healthcare professions. Washington State and the Spokane region have experienced an increased demand for graduates in natural sciences, environmental science, biotechnology research and science education. An increased need for healthcare professionals and growing opportunities for graduate healthcare education in the Spokane region will mean that a large number of students will be seeking healthcare-related degrees. These opportunities are increasing demand for biology courses at all levels at EWU. Without an improvement in the quantity and quality of biology teaching labs, research labs, and lab support space, EWU will not be able to meet the increased demand.

The existing Science Building currently houses all of EWU's biology teaching and research. Lower division biology and anatomy & physiology courses are currently running at or beyond the capacity of the available teaching laboratories in Science Building. There is an insufficient number of teaching labs to offer a full laboratory component to the introductory biology courses, compromising the instructional program. The limited research laboratory space in the existing Science Building is not adequately serving the research needs of the growing numbers of biology majors and faculty. Preparation space for teaching labs as well as space for scientific instruments and equipment are very limited, causing scheduling conflicts with instructional spaces. Specialized resource spaces for student and faculty to work with plants, animals and fish are insufficient to support student and faculty research.

The existing Science Building has serious deficiencies that are at odds with the university's strategies to achieve its mission of fostering excellence in learning through quality academic programs, undergraduate and graduate student research and individual student-faculty interactions. Deficiencies in the Science Building include health and safety issues, accessibility violations, problematic HVAC systems, technology deficiencies, lack of student spaces, high cost of maintenance and repairs, and very high energy costs.

A new Science II building in conjunction with the proposed Science I facility (which will replace chemistry and physics laboratory space in a separate project) is necessary because of increasing demand for sciences at EWU, lack of capacity in the current science facilities, and significant deficiencies in the existing Science Building.

1.2 PROPOSED SOLUTION

EWU proposes that a new biology building is the best alternative to solve biology facility deficiencies and meet the future needs. The building is envisioned to be a new 111,005 gross square foot facility that will house teaching laboratories, research laboratories, lab support facilities, student project and study areas, faculty offices for the biology department and three classrooms with science demonstration capability that will support the lecture needs of the department.

The proposed solution will allow EWU to meet the increasing demand for biology courses. It will provide significant improvements in laboratory quality and accessibility, technology, HVAC, and student spaces. It will expand student and faculty access to research resources, strengthening the academic curriculum and intellectual community. By locating the biology department in an energy-efficient structure, Science II is expected to experience significant savings in energy costs

relative to the existing Science Building. Locating the facility adjacent to Science I will allow efficiency in shared mechanical and instructional resources.

1.3 PROJECT ANALYSIS

State and Regional Context - Washington state and Spokane regional analysis both indicate a need for increased degree production in Health Professions and STEM fields. EWU has responded to this need with significant increases in the number of undergraduate biology majors that feed into growing opportunities for regional STEM jobs, STEM graduate programs, and regional post graduate health care education.

Institutional Context - The mission of Eastern Washington University is to expand opportunities for personal transformation through excellence in learning. The university is focused on student success and strives to create an environment where students succeed at their highest level. The proposed Science II project will contribute very directly to creating this environment, where the goals of attracting, retaining and increasing student access to STEM and healthcare education can be met. It will be a vital part of an excellent student-centered learning environment, providing access to high quality laboratories and technology, research and student focused resources.

The proposed Science II will help EWU to achieve its strategic planning goals and objectives by:

- Providing increased teaching laboratory spaces with up-to-date information technology and audio-video capabilities that will allow for enhanced experiential learning, greater freshman access to biology courses, and greater capacity to provide training for students pursuing undergraduate biology and advanced healthcare degrees;
- Providing increased student access to vital resources supporting research and experimentation, allowing opportunities for higher levels of student engagement in research and active learning; and
- Providing increased research laboratory space, which will provide greater opportunities for faculty research, allow faculty to more readily support integration of student research into the biology curricula, and enhance ongoing efforts to expand strategic partnerships in the community.

Operational Needs - As noted in the problem statement above, a new Science II building is necessary because of increasing demand for sciences at EWU, lack of capacity in the current science facilities, and significant deficiencies in the existing Science Building. Additionally EWU trails significantly behind its peer institutions in the State of Washington in the age, quality and size of science facilities, making it less able to attract students and faculty to the science disciplines.

Alternative Solutions - Three alternatives were considered for addressing the identified need:

- No action;
- An addition and renovation of the existing Science Building; and
- A new building on the existing campus.

Satisfaction of the identified needs can best be achieved through construction of a new building on the campus in Cheney that will serve as a partial replacement for the existing Science Building. The new structure will be designed to provide desired health, safety and functionality without compromise. Sustainable design goals of at least LEED gold will focus on reduced energy use, including use of heat pumps coupled with open loop geothermal wells supplying water for building heating and cooling. The energy saving target included in Section 3.5 of this report is intended to assist the university in meeting the greenhouse gas emissions limits mandated by RCW 70.235.

Method of Delivery - Eastern Washington University proposes to use the Design/Bid/Build method to accomplish this project in the most cost-effective manner.

Project Schedule - A summary schedule is as follows:

Predesign	February 2014 – June 2014
Design	August 2015 – December 2016
Building Permit	December 2016 – March 2017
Bidding	April 2017 - June 2017
Construction	July 2017 – February 2019
Closeout & Commissioning	March 2019 – May 2019
Move In	June 2019 – August 2019

1.4 PROGRAM ANALYSIS

The program for Science II is summarized in the following table:

Program Element	Area (ASF)	Description
Teaching Laboratories	17,280	13 Instructional Labs
Research Laboratories	13,440	26 Faculty Research Labs
Laboratory Support	7,680	Prep Areas
Vivarium & Greenhouse	6,140	Shared Research & Teaching Resources
Faculty Offices & Support	6,255	26 Faculty Offices
Shared Classrooms	5,750	3 Classrooms
Open Labs & Student Study	3,948	Computer Lab and Student Spaces
Other Service Facilities	560	General & Chemical Storage
Total	61,053	

The estimated Net/Gross ratio (Efficiency) is 55%, resulting in a total gross area of 111,005 GSF.

As with any science building for higher education, the technical program requirements for Science II are significant. The inclusive use of fume hoods, biological safety cabinets, environmental control rooms and facilities for live animals, plants and fish creates the need for large HVAC systems, vigorous building management systems, and substantially larger piping systems than typical university buildings. Unique requirements of laboratories such as ADA accessibility at lab benches and equipment, and vibration sensitivity of scientific instruments create the need for special provisions in the design and construction of the building.

1.5 SITE ANALYSIS

Background - The Science I predesign study identified and evaluated six candidate sites on the Cheney campus for the proposed facility. The Reid site was selected and Science I was planned to include space for the development of Science II.

Figure 1.a Six Sites for Science I

This current study evaluated the location and configuration of the Science II facility in relation to the Science I location. Options were initially developed with consideration of such factors as solar orientation, topography, and access to utilities. Key relationships to existing and proposed adjacent facilities, campus pedestrian and ADA circulation, service access and future campus expansion were also considered.

Ultimately an option was generated that provided for future expansion; had the most favorable access to campus utilities, service, and Science I; and responded to the comprehensive master plan goals of enhancing open space and connecting to the larger community.

Figure 1.c
Science II Site development plan

1.6 BUDGET ANALYSIS

Escalated project costs for Science II are summarized as follows:

Acquisition Costs	$0
Consultant Services	$6,858,097
Construction Contracts	$59,173,629
Equipment	$4,681,622
Art Work	$275,225
Other Costs	$191,713
Project Management	$2,082,912
Total Project Request	**$73,331,000**

Detailed project costs have been submitted to OFM through the on-line Capital Budgeting System. A detailed preliminary construction cost estimate is included in the Appendix.

1.7 MASTER PLAN & POLICY COORDINATION

EWU developed a new comprehensive master plan for the campus in 2014. The Master Plan identifies a proposed Science II facility to be built in the 2017-2019 biennium. The proposed Science II project will not require any changes to the Master Plan.

1.8 FACILITY OPERATIONS & MAINTENANCE

Annual operations and maintenance costs for Science II are estimated to be $1,133,361 in 2020, the first year of occupancy. The new building will require an increase in the custodial staff, maintenance staff, goods and services, and utility costs. The current 10-year capitol plan calls for a consolidation of campus facilities and corresponding decrease in overall campus O & M costs. The plan calls for the existing science building to be converted to general academic space with greatly reduced energy costs.

2.0 Project Analysis

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2.1 STATE OF WASHINGTON CONTEXT

Higher Education Objectives

The Washington Student Achievement Council, The State Board for Community and Technical Colleges, and the Workforce Training and Education Coordinating Board have identified a need to significantly increase the number of bachelor's degrees and graduate degrees in professions identified as high employer demand occupations in the State of Washington. Their report, "A Skilled and Educated Workforce 2013 Update", identified employment opportunities for workers with competencies in research, science, technology and health professions as some of the fastest growing occupational categories in the economy.

The projected need for graduates in research, science and technical occupations exceeds 24% by 2021, with the majority of openings in life sciences or materials sciences. This occupational cluster includes jobs in life science, farming, fishing and forestry. EWU's undergraduate biology program provides students a broad background in biology and includes specialized training in wildlife biology, botany/range science, biotechnology, and environmental biology. EWU's field research facility, the Turnbull Laboratory for Ecological Studies, offers a unique opportunity for hands on research in a national wildlife refuge. Many of EWU graduates find employment with regional tribes, resource agencies and private consulting firms in these high demand fields.

The need for graduates in health occupations at the baccalaureate level may be shifting away from a high demand for nursing graduates but continues to remain strong in other healthcare occupations, especially those that require graduate level degrees. The need for health professions at the undergraduate level is difficult to predict but will likely increase dramatically in the near future due to the combined impact of the implementation of the Affordable Care Act and pressures arising from an aging population. EWU's biology program provides undergraduate degrees with a focus in health sciences, including pre-medical and other prerequisite degrees in health related fields, with opportunities for graduate studies at the Riverpoint Campus in Spokane. EWU's biology program is a critical link to fulfilling the need for healthcare professionals at the graduate level by continuing to increase undergraduate degree production.

Regional Objectives

The "Regional Needs Analysis Report 2011" issued by the State of Washington Higher Education Coordinating Board further supports the need for healthcare employees in the Spokane and Northeast region. The following occupations are in the top 50 for growth in the region, each with over 20% growth projected; registered nurses, nursing aides, orderlies and attendants, licensed practical and licensed vocational nurses, physicians and surgeons, radiological technologists and technicians, pharmacists and physical therapists. The report indicates that science educators are also in high demand and EWU's biology program supports science education majors. The table below taken from the report indicates the growth projections for the region to 2020.

Table 63 – Spokane and Northeast Region

Description	2010 Jobs	2020 Jobs	Growth	% Growth	2010 Earnings Per Worker
Agriculture, natural resources, mining	18,617	19,506	889	5%	$29,789
Construction	18,037	18,755	718	4%	$48,992
Education and health services	51,909	63,802	11,893	23%	$44,996
Financial activities	31,200	38,257	7,057	23%	$36,615
Government	54,230	57,740	3,510	6%	$57,940
Information	3,794	3,807	13	0%	$47,974
Leisure and hospitality	26,346	28,490	2,144	8%	$17,050
Manufacturing	22,553	22,964	411	2%	$59,178
Other services	18,890	17,995	-895	-5%	$21,890
Professional and business services	34,321	44,604	10,283	30%	$39,142
Trade, transportation, and utilities	62,960	67,967	5,007	8%	$38,859
Total	**342,857**	**383,889**	**41,032**	**12%**	**$41,498**

Source: EMSI Complete Employment - 3rd Quarter 2010

Regional Initiatives

Regional initiatives are supported by the programs that will be housed in Science II. The WWAMI (Washington, Wyoming, Alaska, Montana, Idaho) regional medical education network, in partnership between the University of Washington and Washington State University, offers two years of medical school training at the Riverpoint Campus. The RIDE (Regional Initiatives in Dental Education) program, a partnership between the University of Washington and EWU to educate first year dentistry students in Spokane, is a second program for EWU biology graduates to continue their interests in health education. These programs offer opportunities for biology program graduates from EWU to continue their education locally and obtain professional degrees in medicine, dentistry, and the health sciences.

The State of Washington Department of Commerce has designated an Innovation Partnership Zone (IPZ) for Greater Spokane for "biomedical research such as computational biology, bioinformatics, systems biology, epigenetics, genomics, chromosomal biology, and drug discovery". This program was created to link private business with universities to foster collaboration and research and many of EWU's biology majors are finding employment in biomedical research. The IPZ has received funding to construct an academic health science center. As an educational partner in this IPZ, EWU's biology program provides graduates with the required prerequisites to study medicine, dentistry, and pharmacy at the graduate level at the new center.

Priorities of Government

The Office of Financial Management's 2011-13 Priorities of Government (POG) lists "Improve the value of postsecondary learning" as one of ten categories of desired statewide results. Within that category, two of the indicators and measures apply directly to EWU's biology program;

Indicator 1: Increase the educational attainment of Washington adults
Measure a: Percentage of adults completing degrees or certificates

Indicator 3: Expand opportunities for Washington students in the new economy
Measure a: Degrees conferred in high-demand fields

The fundamental purpose of EWU Science II will be the provision of quality teaching and research laboratories that serve the increasing instructional and research needs of students and faculty in biology and health science fields. The Science II project will very directly address these two top Priorities of Government by increasing the number of degrees conferred in life sciences, pre-med, biological research, and science education.

2.2 INSTITUTIONAL CONTEXT

EWU's Mission

The mission of Eastern Washington University is to expand opportunities for personal transformation through excellence in learning. Eastern Washington University will achieve its mission by:

- fostering excellence in learning through quality academic programs, undergraduate and graduate student research and individual student-faculty interaction. Students extend their learning beyond the classroom through co-curricular programs, life skills development, internship programs, volunteering and service learning.
- creating environments for personal transformation that enrich the lives of individuals, families, communities and society at large.
- expanding opportunity for all students by providing critical access to first generation students, and other students who may not have the opportunity for higher education.
- developing faculty and staff by growing and strengthening an intellectual community and supporting professional development.

The proposed Science II project is critical to the Universities strategies for achieving its mission. It will provide high quality, modern laboratory, research and office space that will create new opportunities for student-faculty interaction and expand access to critical STEM (science, technology, engineering and math)and health professional programs. It will support faculty and staff development with adequate access to research facilities and will provide an environment that is consistent with the goals of fostering excellence and encouraging personal transformation.

EWU's Strategic Plan

Eastern Washington University's current Strategic Plan was issued in 2013 in association with the operating budget request for the 2012-2013 Biennium. In order to measure how the proposed Science II would meet Eastern Washington University's Strategic Plan, relevant institutional goals, objectives, performance measures and strategies from the Plan are listed below with a description of how the Science II project would support them.

EWU Strategic Plan Goals, Objectives, Performance Measures and Strategies	Science II's Role in Supporting EWU Strategic Plan
Goal I: Student Success	
Objective: To create an environment where students succeed at their highest level.	Science II would provide increased teaching and research laboratory space and will be equipped with up-to-date information technology and audio-video capabilities, allowing opportunities for higher levels of student engagement in research and active learning. Increased introductory teaching laboratory spaces would allow for greater access to science courses for students pursing biology and science education bachelor degrees. Increased anatomy and physiology teaching labs allow for greater student access to pre-med and other health care related fields.
Goal II: Institution of Innovation	
Objective: Build an environment that utilizes research to identify, anticipate and respond to community and societal needs	By increasing the space devoted to research and specialized resources for student experimentation, Science II would allow faculty to more readily support integration of student research into the biology curricula. Spaces that foster student interaction, which are lacking in the existing Science Building, would be included in the Science II program.
Goal III: Community Engagement	
Objective: Increase community engagement through active participation of students, staff and faculty with community groups, business, organizations and government	Improvement of the quantity and quality of existing biology teaching and research space will enhance ongoing efforts to expand strategic partnerships with groups like the Community STEM Initiative and the Spokane University District Development Authority.

Facilities Master Plan

The 2014 EWU comprehensive master plan update, supports the overall values, mission and vision of the university and was created to track and manage campus facility needs. The master plan states that "The condition of these (campus) facilities...are vital to the successful recruitment and retention of EWU students." One of the primary reasons for the development of the Science II project is to address the significant shortfalls in quality and quantity of space in the existing science building essential to providing a safe and accessible learning environment. Without improvement in the existing biology facilities, the program will not be able to continue to attract and retain the growing number of students seeking biology classes.

The master plan identifies the Science II project as part of the construction improvements planned for the campus in the 2017-2019 biennium. It is part of the plan to provide the additional 350,000 GSF required to accommodate the projected student population growth rate of 2% per year from 2013 to 2023.

Peer Institutions in the State

Eastern Washington University's peer institutions in the State of Washington are Western Washington University and Central Washington University. As one benchmark for determining appropriate facility provisions for sciences, an examination of biology buildings at the three universities was undertaken. That examination reveals that EWU lags significantly in biology facilities, both in quality and in size.

Western Washington University – Over three biennia in the mid-1990s, WWU constructed three new science buildings that are dedicated to chemistry, biology and science education, moving these sciences out of the outdated and overtaxed Haggard Hall. The new Biology Building, completed in 1995, is 81,120 gross square feet. A greenhouse was added in 1997 and marine biology facilities located in Anacortes were added to in 2006.

Central Washington University – In 2000 CWU completed construction on a 155,307 gross square-foot Science Building dedicated to biology and chemistry, moving these sciences out of the outdated and overtaxed Dean Hall.

Eastern Washington University - The biology department currently shares Science Building with chemistry, physics and geology. Science Building was constructed in 1962 as a two story 109,000 gross square-foot structure. A 39,200 gross square-foot addition, completed in 1989, increased the total building area to 148,149 gross square feet. The weighted average age of the facility is 47 years. Additional building renovations were undertaken between 1990 and 1994. Biology occupies thirty-eight percent (38%) of the Science Building area, equivalent to 56,296 gross square feet.

Figure 2.a EWU Science Building

Institution	Year Biology Facility was Constructed*	2012-2013 Avg. Student Enrollment (FTE)**	Gross Area of Biology Facility*	Biology Area per Enrolled Student FTE
WWU	1995	12,516	108,035 GSF	8.6 GSF
CWU	2000	9,376	94,700 GSF	10.1 GSF
EWU	1962 with 1988 addition	10,170	56,296 GSF	5.5 GSF

* Source is OFM State Facility Inventory System 2013. CWU biology is assumed to occupy 64% of the CWU biology/ chemistry building. WWU includes 26,915 GSF of remote marine biology laboratories and the biology greenhouse.

** Source is OFM Historical Budget Driver Reports 2014; numbers are State-funded full-time equivalent students

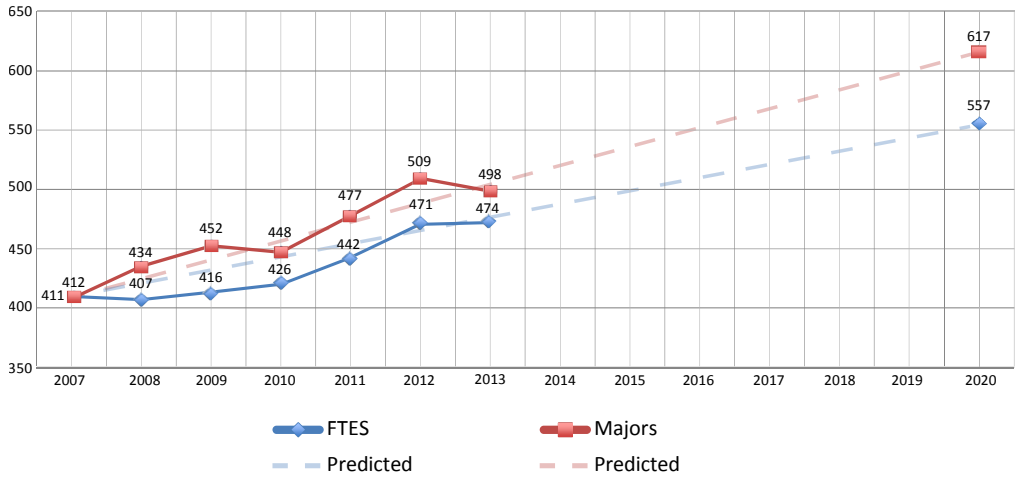
This table reveals that biology at WWU is housed in 56% more space per student than at EWU. At CWU biology is housed in 84% more space per student than at EWU. The table provides one useful benchmark in assessing the appropriate size for a biology building.

2.3 OPERATIONAL NEEDS

Increasing Demand for Biology Programs

EWU has consistently increased degree production in STEM and high demand programs over the course of the last ten years and expects that over the next ten years, this trend will continue. Increased regional demand for environmental science, science education, biomedical research, and growing opportunities for graduate healthcare education at Riverpoint Campus in Spokane has meant that a disproportionately large share of the additional students are seeking biology related degrees. This has translated to a substantial increase in the demand for basic biology courses. It is expected that the current trend of larger increases in biology students compared to the increase in overall campus student population will continue. Growth projections based on the current patterns of growth in biology programs indicate an increase of 24% in biology majors by 2020.

EWU Biology Department Academic Growth



Capacity of Current Science Facilities

The existing Science Building is the only facility at EWU that contains laboratories capable of accommodating biology teaching and research. Lower division general biology and anatomy & physiology courses are currently running at or beyond the capacity of the available teaching laboratories in Science Building. Introductory classes are offered as lecture only, without a full laboratory component, because of lack of space. Additional labs are needed for both introductory biology and anatomy & physiology. Existing labs are currently insufficient in size to accommodate the increased number of students per section. Additionally, the very limited research laboratory space in the existing Science Building is not capable of serving the research needs of additional faculty and science majors. Resources such as the vivarium, aquatics labs and greenhouse are lacking space to accommodate student research projects. Besides the insufficiency of laboratories, the most pressing need is for additional lab support space, including prep space for teaching labs. Lack of prep areas causes lower utilization rates of teaching labs in order to allow time to prepare the lab for each section.

Without an increase in biology teaching labs, research labs, and lab support space, EWU will not be able to meet the increased demand for biology classes and current introductory classes will continue to be offered without a full lab component. Lack of space to accommodate growth will equate to a compromised instructional program and inadequate science training to serve the rapidly growing regional focus on health science programs, life sciences, and science education.

Science Building Condition

In addition to the capacity issues mentioned above, the existing Science Building has serious deficiencies that are at odds with the university's mission to provide an excellent student-centered learning environment and exceptional resources and facilities. Deficiencies in the existing Science Building include:

- Health and safety issues – Health and safety problems include unserviceable and insufficient number of fume hoods, chemical storage areas without proper ventilation and spill containment, an inability to isolate airborne contaminants from laboratory spaces to adjacent areas, and emergency showers without tempered water.
- Accessibility violations – A comprehensive, campus-wide survey identified over 400 separate accessibility deficiencies in the existing Science Building. The majority of deficiencies are related to inaccessible laboratory benches and sinks, doors and rest rooms. The current large aquatic tanks are located in the basement without elevator access or adequate circulation space.

Figure 2.b EWU Science Building Aquatics Lab

- Problematic HVAC – Science buildings typically have extraordinary ventilation requirements associated with laboratory fume hoods and other devices that are used to safeguard students, staff and faculty from potential harmful exposure associated with science materials. The existing Science Building contains inefficient and noisy heating, ventilating and air conditioning (HVAC) systems that cannot effectively maintain the pressure differentials and air change rates demanded by the scientific activities that occur in the building. In some labs, noise levels from the HVAC system exceed acceptable decibel levels for instruction. Areas such as the vivarium are limited in their ability to utilize modern ventilated cages to protect animal health because of inadequate airflow from existing mechanical systems. Insufficient floor-to-floor height and impenetrable beams in ceiling spaces would severely limit the possibility of adding duct work in a renovation of the building. (Note: previous renovations have added large ducts both under and over the building. As a result, the current rooftop features a forest of ducts and fans with multiple roof membrane penetrations, causing frequent leaks, high maintenance costs and damage to experiments and equipment.)

Figure 2.c EWU Science Building Water Damage

Figure 2.d EWU Science Building Roof top mechanical ductwork

Figure 2.e EWU Science Building Biology Teaching Lab

- Technology deficiencies – The existing Science Building is ill-suited for today's educational technology. Wireless internet connectivity is lacking as are suitable audio-video and data facilities.

- Lack of student spaces – The existing Science Building completely lacks the non-classroom spaces that "create an environment where students succeed at their highest level" envisioned in the university's strategic plan. Spaces for informal student gathering, collaboration and study are non-existent. Open computer labs are sparingly provided. Lounges are unheard of. Even the corridors of Science Building, which might otherwise provide nooks and crannies for informal student use, have been retrofitted with large duct shafts that inhibit this opportunity and create overcrowded conditions during class changes.

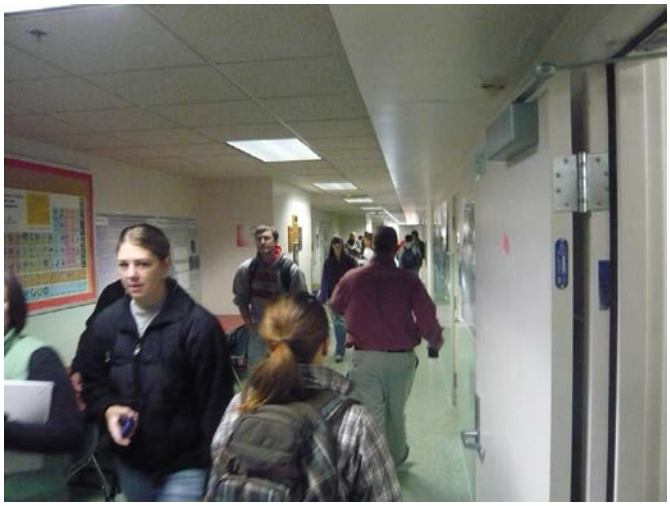


Figure 2.f EWU Science Building Corridor

- Building condition – The 2009 State Facility Inventory System rates the existing Science Building's condition as "Needs Improvement: Limited Functionality". The current physical condition of the existing building is well below that of EWU's peer institutions and its age is more than double that of peer institutions. This puts EWU in the position of being less competitive in the current educational market.
- Cost of maintenance and repairs – Exclusive of custodial and grounds services, the maintenance and repair costs for the existing Science Building average over $366,000 per year. In addition, almost $400,000 is spent from the capital minor works accounts for facility preservation, health and safety code compliance and backlog reduction. The combined cost equates to $4.92 per square foot per year. This is nearly three times the cost per square foot of maintenance and repairs for the 5-year old EWU Computing & Engineering Building, which requires $1.68 per square foot per year. The cumulative effect on the annual operating budget may soon become unaffordable, resulting in increased deferral of critical maintenance and repair, which will lead to further deterioration of the building and its ability to support its science education functions.
- Cost of energy – The existing Science Building is the largest energy user on the EWU campus. Science Building accounts for 13.7% of the total campus energy use, even though it is only 5.4% of the total campus square footage. While it is normal for science buildings to have a disproportionately large use of campus energy, a new energy-conserving Science II, coupled with reuse of the existing Science Building for less energy intensive purposes, would have a very positive impact on campus energy costs.

2.4 ALTERNATIVES EXPLORED

Alternative I: New Building on the Existing Campus

Satisfaction of the program requirements can readily be achieved through construction of a new building on the campus in Cheney that will serve as a partial replacement for the existing Science Building. The new structure can be designed to provide desired health, safety and functionality without compromise. The new building can be located adjacent to the proposed Science I

facility, allowing resources and common lab utility requirements to be shared. The current site of the Robert Reid Lab School, located on the EWU campus, was identified in the Science I Predesign Report as the desired site. A new three-story building connected to Science I on this site will help to consolidate the science commons that is envisioned in the master plan – that commons would be surrounded by the existing Science Building, the new Science I, the new Science II, the Computing & Engineering Building, and the JFK Library. The building would be a student centered environment that would provide a high quality science teaching environment that is responsive to the needs of science education.

Program Developments - During the Science II predesign study options were examined to determine the optimal approach to meeting the programmatic needs of the science departments at a reasonable project cost. These options were studied as cost-loaded variations on the program. Options considered (with preliminary project costs in parentheses) included:

1) Biology-Geology Replacement ($121M): This scheme encompassed all program requirements of the biology and geology departments. It also included seven classrooms, and space for faculty offices.
2) Biology Only Replacement ($74M): This option located the full biology program in a new building along with three classrooms.

Although the original intent was to develop Science II for both biology and geology, the project budget for a combined facility was deemed to be larger than feasible, so the biology-only option was chosen.

Alternative II: Addition and Renovation of Existing Science Building
An alternative for addressing the deficiencies of the existing Science Building with a major addition and renovation of the existing building generates additional expense and creates operational inefficiencies. The existing structure is not compatible with the needs of science education. The ventilation demands and laboratory support systems in a biology facility require above-average floor-to-floor heights that allow clear ceiling space for large duct work and laboratory plumbing and electrical systems. The existing Science Building is not adequate in this regard and cannot be made so without complete demolition and reconstruction of the superstructure, so the addition would need to contain all of the programmed lab space. Office and classroom space could be accommodated in a renovation of the existing building. This results in an addition of approximately 90,725 GSF. Additional cost would be incurred to bring the entire Science Building up to meet current ADA codes.

Alternative III: No Action
The consequences of taking no action may have an extremely negative impact on the university and the region. EWU would not be able to address increased demand for biology courses due to growing enrollment. Student access to and success in undergraduate science programs could not be ensured. And the university would not be able to provide the science prerequisites associated with the growing regional focus on healthcare education and enterprise.

Additionally, the current Science Building would continue to pose health and safety issues, including code violations. It would continue to have significant deficiencies in technology, HVAC, student spaces and general quality. The current Science Building would also continue to experience high maintenance and repair costs, which if deferred will result in a facility that is not capable of supporting even the current student load.

2.5 SELECTED ALTERNATIVE

Preferred Alternative
EWU proposes that Alternative I – a new biology building on the existing campus - is the best alternative to solve the most pressing science facility deficiencies and meet the future needs of growing programs.

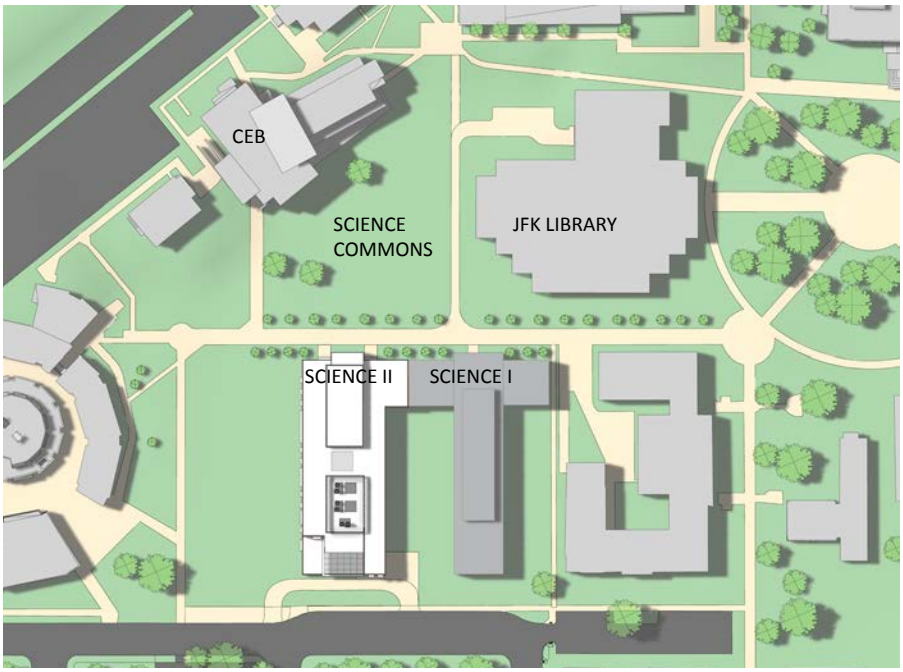


Figure 2.g
Science I & II
Site Plan

Scope of Preferred Alternative
The preferred alternative would construct a new 111,005 gross square foot facility on the EWU campus at Cheney, Washington that will house teaching laboratories, research laboratories, lab support facilities, student study areas, and faculty offices for the biology department; and three classrooms with science demonstration capability.

Anticipated Results
The preferred alternative will allow EWU to meet the increased demand for biology courses due to growing enrollment and the growing regional focus on life sciences, science education, healthcare education and enterprise. It will provide the biology department with significant improvements in laboratory quality, technology, HVAC, and student spaces. By locating the biology department in an energy-efficient structure, Science II is expected to experience significant savings in energy costs relative to the existing Science Building.

Science I and Science II will also allow the future repurposing of the majority of the existing Science Building that will be vacated by biology, chemistry and physics. Moving these programs to a new building will relieve the existing Science Building of some of its most egregious health and safety issues. With reduced demand on mechanical and electrical systems, the current Science Building should require lower maintenance and repair costs and substantially lower energy costs.

2.6 IDENTIFICATION OF ISSUES

Reduction of Greenhouse Gas Emissions
EWU is subject to two mandates that affect its greenhouse gas emissions. The first is state law RCW 70.235 and the second is the American College & University President's Climate Commitment.

Revised Code of Washington RCW 70.235 "Limiting Greenhouse Gas Emissions" requires all state agencies to reduce greenhouse gas emissions as follows:

- By July 1, 2020, to 15% below 2005 levels
- By 2035, To 35% Below 2005 levels
- By 2050, to the greater of 57.5% below 2005 levels or 70% below state government emissions that year.

EWU is signatory to American College & University President's Climate Commitment (ACUPCC), which provides a framework and support for universities to implement comprehensive plans in pursuit of climate neutrality. The Commitment recognizes the unique responsibility that institutions of higher education have as role models for their communities and in educating the people who will develop the social, economic and technological solutions to reverse global warming and help create a thriving, civil and sustainable society. As part of the Commitment, ACUPCC institutions have agreed to take steps to reduce greenhouse gas emissions.

A key part of EWU's strategy toward reducing greenhouse gas emissions is the reduction in the use of fossil fuels for building energy and power. The inclusion of energy-conserving HVAC and electrical systems in the new Science II is the best way for the project to assist in the goal of reducing overall campus use of fossil fuels. Since science buildings are typically the greatest consumers of energy on a campus, discovering ways to make the Science II building a low energy consumer will be especially significant.

Geothermal Potential

Perhaps one of the most exciting issues for this project is the opportunity for EWU to utilize underground aquifers below the campus as a heat source for the building. In 2011 EWU commissioned a study by Pacific Groundwater Group to determine the feasibility of using groundwater as a source of heating and cooling new science buildings at EWU. In the January 2011 report, Pacific Groundwater reported that "Our principal finding is that a ground water heat exchange system appears to be feasible at the proposed Science Buildings site on the Eastern Washington University campus, using groundwater from the upper-most confined aquifer at depths between approximately 350 and 500 feet." EWU intends to capitalize on this finding for both the Science I and Science II facilities. Construction of the well system is expected to be accomplished as part of the Science I project. Since heating will be the primary energy use by a new building, this raises the possibility of profound energy savings over the life of the building.

Systems and Services

The new facility will need to be serviced by campus systems and services including:

- Student technology access;
- Classroom and laboratory technology systems;
- Campus facilities scheduling;
- Campus utility systems;
- Building and grounds maintenance and repair; and
- Technical support and organizational systems.

Future Planning

The EWU master plan indicates the possibility of demolition of Cadet Hall and the Communications Building. This will allow the future expansion of science and engineering programs located around the Science Commons. The planning of Science II takes this into account and leaves room for future adjacent buildings.

2.7 PRIOR PLANNING AND HISTORY

Eastern Washington University requested funding for a Chemistry/Physics Building (Science I) in 2010. Science I was ranked as the top priority in its category but did not receive funding. The report was resubmitted in 2012 and is being updated and resubmitted in 2014 as well.

In July of 2012, Eastern Washington University submitted a Replacement Capital Project Request to the state seeking predesign funding for a Biology/Geology Science Center. Pursuant to that request, predesign funding was appropriated for the 2013-2015 biennium. This report is a result of that action. Through the detailed programming and cost analysis of the predesign study, it was determined that a biology/geology facility would be too ambitious. As a result, the program for the project has evolved from biology/geology to biology only.

2.8 STAKEHOLDERS

Affected groups include the Eastern Washington University students, faculty and staff; the citizens of Washington State; and state, regional and national agencies and organizations. The EWU stakeholders not only include the biology departments within the university, but also the larger campus community and the large number of students that will be accommodated by the proposed building.

Committees established by EWU for the purpose of providing guidance and direction for the project included:

- Executive Committee – University president, provost, chief information officer, vice president of business and finance, associate vice president of facilities & planning, and the dean of the College of Science, Health & Engineering.
- Project Delivery Team – Dean of the College of Science, Health & Engineering, associate vice president of facilities and planning and senior project manager.
- Building Team – Dean of the College of Science, Health & Engineering, biology department representatives, construction & planning representatives.

2.9 PROJECT DESCRIPTION

Project Data

Agency Name:	Eastern Washington University
Agency Code:	370
Project Number:	30000466
Project Title:	Science II
Agency Contact:	Troy Bester, Project Manager Eastern Washington University 101 Rozell Cheney, Washington 99004-2446 (509) 359-2204 tbester@ewu.edu

Building Data

Building Size:	111,005 GSF
Occupants:	Approximately 1,380 (per 2012 IBC)
Uses:	Biology department: • Teaching laboratories • Research laboratories • Vivarium • Greenhouse • Lab support spaces • Faculty and staff offices • Student computer and study space

2.10 IMPLEMENTATION AND MANAGEMENT

Management Organization

The University's Construction and Planning office will manage the design and construction of this project. The Associate Vice President for Facilities and Planning is responsible for overall organization management. Construction and Planning provides oversight of programming; pre-design; cost estimating; design and construction services for building alterations, new construction, and grounds improvements for the Cheney campus.

Project managers organize and administer the work of outside design consultants and public works contractors. They follow projects all the way through construction and work closely with clients, project architects, designers and consultants to ensure projects are on time and within budget.

The following individuals in the Construction and Planning office will oversee the Science II project:

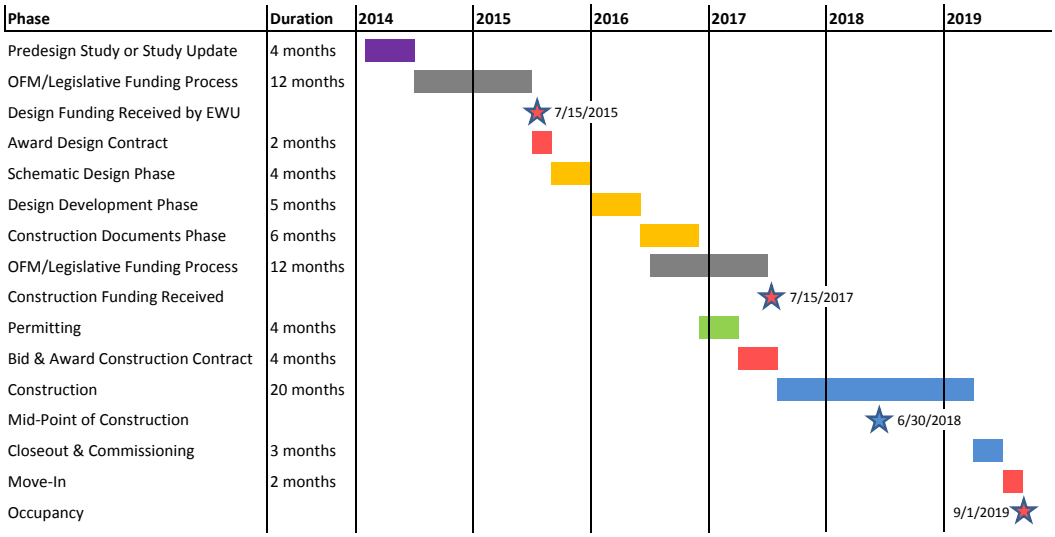
Shawn King	Associate Vice President
Troy Bester	Senior Project Manager

The cost for the University's management of the design and construction is included in the Project Budget Analysis section of this report.

Method of Delivery
Eastern Washington University proposes to use the Design/Bid/Build method to accomplish this project.

2.11 SCHEDULE

A summary schedule is as follows:



3.0 Program Analysis

3.0 Program Analysis

3.1 ASSUMPTIONS & STANDARDS

Assumptions

Programming is the phase in which the project needs are defined, goals are identified and initial budget information is developed. It forms the foundation upon which all subsequent design work is based. The following assumptions were utilized in forming the program requirements for Science II:

- The expected twenty percent growth by 2024 of the student population at EWU and the anticipated increase in students seeking STEM and healthcare-related degrees will cause a disproportionately large increase in the demand for biology courses as well as a significant increase in the number of biology majors.
- The increased number of students (both majors and non-majors) taking biology courses will increase the need for teaching laboratories and classrooms with science demonstration capability.
- Each science major must complete a capstone project in order to graduate. The increased number of biology majors will increase the need for research laboratory space and access to resources to accommodate those capstone projects.
- The university's expectation that each science faculty member should be involved in non-teaching scholarly activity will cause an increased need for research laboratory space.

Programming Standards

Reference materials utilized in programming Science II included:

- Facilities Evaluation and Planning Guide (FEPG), Inter-institutional Committee of Space Officers representing the public four-year colleges and university in the state of Washington, 1994
- Post Secondary Education Facilities Inventory and Classification Manual (FICM), National Center for Education Statistics, 2006

FEPG recommendations for spaces and the corresponding areas used in the Science II program are shown in the following table:

FEPG Room Classification Number	FEPG Room Classification Type	FEPG Recommendation (ASF/station)	Program Area Applied to Project (ASF/station)
110	Classroom	20 (Range = 16 – 22)	21 – 25 (includes space for science demonstration)
210	Class Laboratory – Biological Sciences	65 (Range = 25– 80)	42-50
215	Class Laboratory Service	Depends on need	Based on identified need
230	Computer Laboratory	60	40
250	Research Laboratory	Depends on need	Based on identified need
255	Research Laboratory Service	Depends on need	Based on identified need
311	Faculty Office	140	140
311 & 312	Faculty Chair Office	175	175
313	Student Assistants Office	140 per two minimum	140 per six
316 & 317	Staff & Other Office	120	120
350	Conference Room	Total office area/ 12	Total office area/ 14
760	Hazardous Materials Storage	Depends on need	Based on identified need
770	Hazardous Waste Storage	Depends on need	Based on identified need

Laboratory Module: To provide a baseline planning module for programming of teaching and research laboratories, a standard laboratory module was established based on industry standards and applicability to the types of laboratories included in the Science II project. The proposed laboratory planning module for the Science II building was derived by analyzing the laboratory bench, equipment, and circulation space required for the scientific functions. The module is based on the bench space required for technical work stations, instruments, and procedures. The space required between benches is designed to allow people to work back-to-back at adjacent benches, to allow for accessibility for disabled and still allow for movement of people and laboratory carts in the aisle.

The preliminary planning module utilized for Science II is 10'-8" wide by 30'-0" deep = 320 Assignable Square Feet. This module will provide adequate bench space plus space for floor standing equipment and fume hoods, and can be divided for smaller support spaces such as storage or instrument rooms.

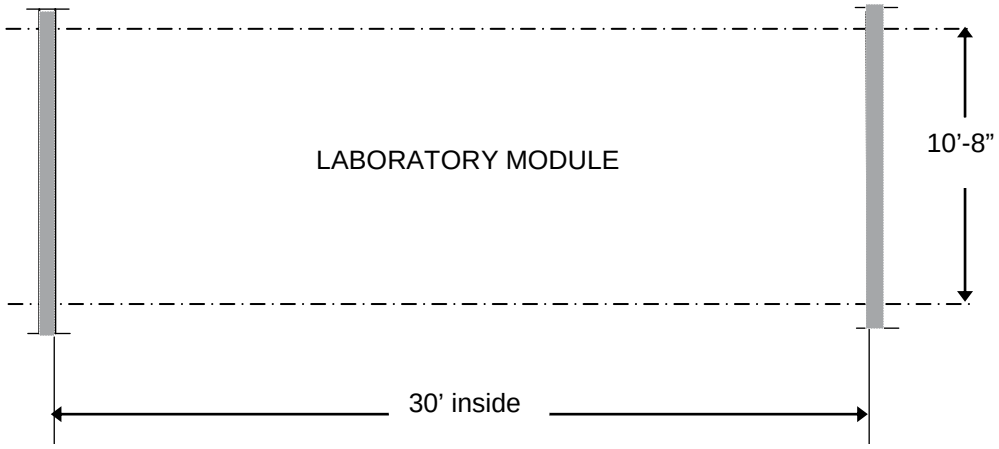


Figure 3a: Laboratory Module

Classrooms: The 40-seat and 60-seat classrooms are to be equipped with moveable tables and chairs. The 150-seat classroom will be tiered and will be equipped with fixed tables and moveable chairs. Classrooms are slightly larger than the FEPG recommendations in order to provide adequate space for science demonstrations.

Class Laboratories: Preliminary areas for teaching laboratories were assigned based on benchmarks developed by Research Facilities Design from similar university laboratory facilities and on discussions with the Building Team. Areas were rounded to the nearest laboratory module.

Research Laboratories: A preliminary allowance of 1.5 lab modules (480 ASF) was assigned to each faculty researcher based on benchmarks developed by Research Facilities Design from similar university laboratory facilities and on discussions with the Building Team.

Laboratory Service: The program size of lab support spaces was based on a comparison of existing spaces to identified needs. Areas were rounded to the nearest laboratory module or appropriate fraction of a module.

Computer Laboratory: The FEPG recommendation of 60 ASF per station for a computer laboratory was determined to be larger than required to meet the needs of the walk-in computer lab in the Science II program. The use of flat-screen monitors allows stations to be smaller than may have been assumed in the FEPG standard. A program size of 40 ASF per station for the computer laboratory was determined to be adequate.

Offices Spaces: Program areas adhered to the recommendations of the FEPG. Conference rooms are slightly smaller than the FEPG recommendation in order to maintain a reasonable sized single conference room. Larger group meetings can be accommodated in other campus spaces.

The sizes of spaces included in the program were validated by the subsequent development of the space diagrams that are included in the Appendix of this report.

3.2 EXISTING FACILITIES INVENTORY

One existing building and one proposed new building on the Eastern Washington University campus at Cheney would be affected by the Science II project – the Science Building and the Science I proposed project.

Science Building
EWU's Biology programs are housed in the existing 148,149 gross square-foot Science Building, which was constructed in 1962 and added to in 1989. Deficiencies of Science Building are the reason that a new Science II building is being proposed. As discussed in Section 2.2 of this report, the deficiencies of Science Building include:

- Inability to meet the increasing demand for teaching and research laboratories
- Health and safety issues
- Accessibility violations
- Problematic HVAC systems
- Technology deficiencies
- Lack of student spaces
- High cost of maintenance and repairs
- High cost of energy

The 2013 State Facility Inventory System (FIS) rates EWU's existing Science Building's condition as "4" – "Needs Improvement: Limited Functionality". It is not registered as historic.

The biology department occupies thirty-eight percent (38%) of the Science Building area. A detailed inventory of the existing biology spaces in Science Building is included in the next section – "3.3 Space Needs Assessment".

Science I (Proposed)
The proposed location of the new Science II building is adjacent to the current site proposed for Science I. The proposal for Science I envisions that the classroom wing of the building will be connected to a future Science II. This connection will allow the two facilities to share classrooms that have demonstration capabilities, provide backup to lab piping systems, and share mechanical utilities such as geothermal wells.

3.3 SPACE NEEDS ASSESSMENT

An analysis of the successes and failures of existing spaces in Science Building led to the following conclusions with regard to the quantity of space needed.

Class Laboratories: The biggest increases in area required are in the lower division teaching labs related to general biology and anatomy & physiology due to the pressing demand for these courses. The current general biology labs are operating at or above capacity, often fitting up to 30 students in labs that meet the minimum space standards for 24 students. Two additional general biology labs, sized to accommodate 30 students each are being added. The two existing anatomy & physiology labs are operating at maximum capacity; their two replacement labs are programmed to accommodate up to 32 students each. A Cell/Embryology Lab has been added to address the increased need for upper division course work focused on biotechnology and research .

Laboratory Service: Prep areas for teaching labs have increased in order to free up the teaching labs for more instructional time.

Faculty Office Area: The department is currently staffed by 20 faculty and is expected to be increased to 26 to keep up with student demand. The research space is increased to match the growth in faculty at a rate of 480 sq ft per faculty.

Special Use Labs: Resource spaces like the vivarium and greenhouse are increased to support growth in both research and teaching functions. In particular, student project areas are being added to increase student access to research for capstone projects. The aquatic tanks support research that is funded, in part, by local Native American initiatives and are linked to field research at the nation's only university research facility in a national wildlife refuge (Turnbull Laboratory for Ecological Studies).

The bar chart below graphically illustrates the difference between the existing biology space and the new program needs.

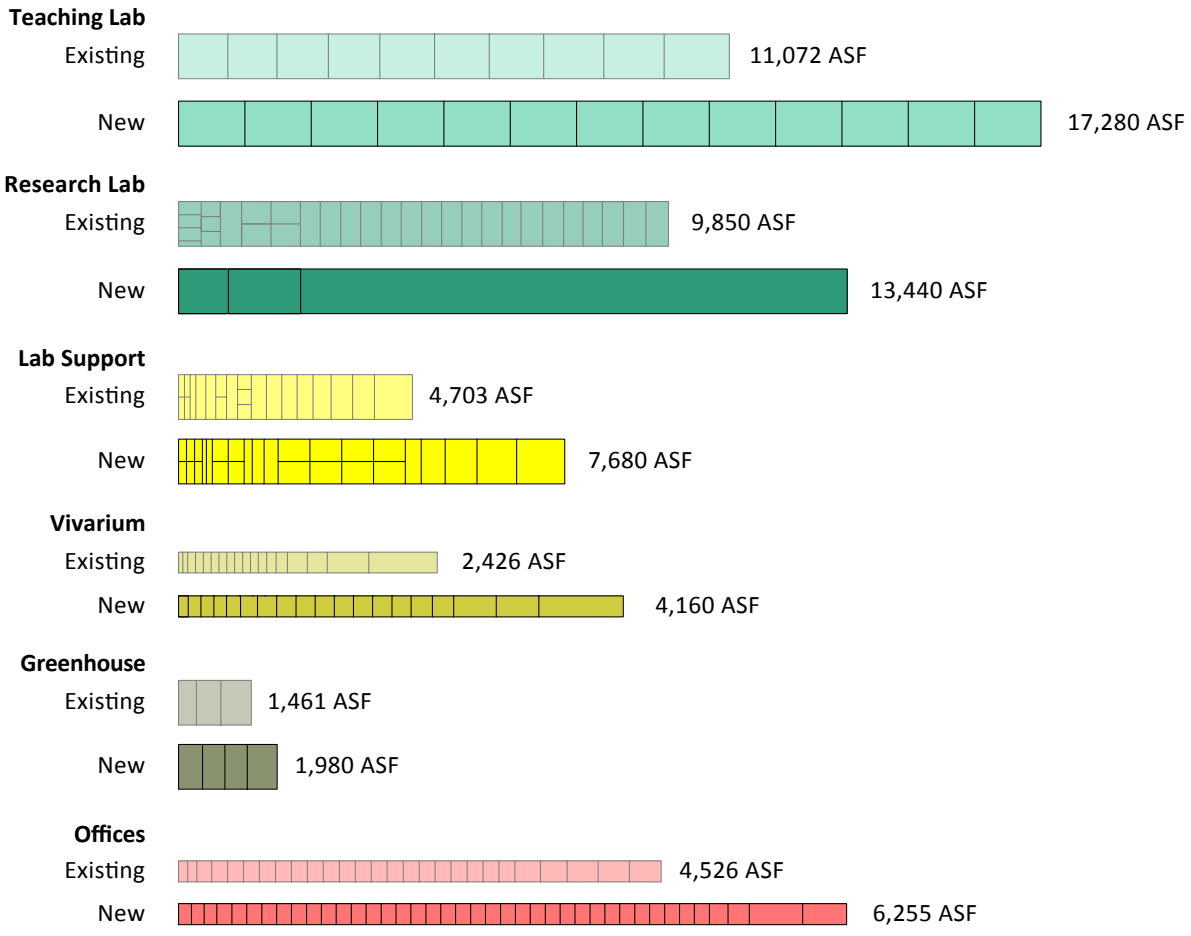


Figure 3b: Program Bar Chart

The following tables compare the biology spaces in the existing Science Building in detail with the programmatic needs identified above.

Biology Inventory compared to Program Needs

	Existing Science Bldg		New Program Needs			
Space Name	Room No	Area (ASF)	ASF	No.	Total Area (ASF)	Difference (ASF)
TEACHING LABORATORY						
Intro/General Biology	247, 244	2,071	1,280	4	5,120	3,049
Anatomy & Physiology	269, 273	1,977	1,600	2	3,200	1,223
Physiology	243	1,208	1,280	1	1,280	72
Plant Sciences	246	1,098	1,280	0	0	-1,098
Ecology	does not exist		1,280	1	1,280	1,280
Vertebrate	274	1,098	1,280	1	1,280	182
Invertebrate	280	1,098	1,280	1	1,280	182
Molecular Biology	292	1,313	1,280	1	1,280	-33
Microbiology	296	1,210	1,280	1	1,280	70
Cell Biology/Embryology	does not exist		1,280	1	1,280	1,280
Subtotal Teaching Laboratories		**11,072**		**13**	**17,280**	**6,208**
RESEARCH LABORATORY						
Research Laboratory (480 sf avg size)	various (18 rms)	7,765	480	23	11,040	3,275
Aquatics - Large Tanks	006, 006A	907	960	1	960	53
Aquatics - Small Tanks	184,190A, 192,194A	1,179	1,440	1	1,440	261
Subtotal Research Laboratories		**9,851**		**25**	**13,440**	**3,589**
LABORATORY SUPPORT						
Cadaver Room	271	764	800	1	800	36
Physiology Prep/Storage	241	441	320	1	320	-121
Herbarium Collections	248	221	320	1	320	99
Herbarium Work Room	246A	307	320	1	320	13
Plant Sciences/Ecology Prep	does not exist		320	1	320	320
Vert/Invert Prep	shared 276		320	1	320	320
Vert/Invert Collections	276	366	320	1	320	-46
Fluorescence Microscopy	does not exist		160	1	160	160
Media Prep/Storage	294D	303	320	1	320	17
Media Pouring	294C	56	80	1	80	24
Glasswash/Autoclave	294	310	480	1	480	170
Cold Rooms	278,294A,294B	277	80	2	160	-117
Micro/Molecular Equipment	does not exist		320	1	320	320
Dry Media Storage	294E	43	80	1	80	37
BSL-2 Tissue Culture w/ vestibule	292A	201	320	1	320	119
Mud Room	does not exist		80	1	80	80
Field Equipment Storage	does not exist		240	1	240	240
Stock:Glassware/Consumables	284	320	640	1	640	320
Stock: Chemical Storage	282	199	160	1	160	-39
Stock: Prep	286	430	280	1	280	-150
Stock: Secure Storage	286A	67	160	1	160	93
Stock: Instrument Storage/Repair	284A	115	160	1	160	45
Stock: AV Storage	286B	67	80	1	80	13
Growth Room Suite	does not exist		960	1	960	960
Beetle Room	does not exist		120	1	120	120
Bulk Chemical Storage	179A, 179B	216	160	1	160	-56
Subtotal Lab Support		**4,703**		**27**	**7,680**	**2,977**
VIVARIUM						
Holding Room	various (9 rms)	661	180	4	720	59
Project Room	does not exist		120	3	360	360
Project Room	does not exist		180	1	180	180
Surgery	176C	107	180	1	180	73
Surgery Scrub	176D	45	120	1	120	75
Clean Storage	176K	390	400	0	0	-390
Bedding Storage	N/A		160	1	160	160
Feed Storage/Cold Room	does not exist		80	1	80	80
Cage Cleaning	176J S176	374	400	1	400	26
Rack Cleaning	within 176J		400	0	0	0
Dirty Cages/Janitor	N/A		400	1	400	400
Waste Rm	176H	80				-80
Vivarium General Storage	does not exist		200	1	200	200
Staff Restroom/Shower	176M	87	90	1	90	3
Animal Receiving	does not exist		120	1	120	120
Vestibule	N176	41	120	2	240	199
Internal Circulation	176	641	850	1	850	209
Bottle Filling	N/A		60	1	60	60
Subtotal Vivarium		**2,426**		**21**	**4,160**	**1,734**

Biology Inventory compared to Program Needs (continued)

	Existing Science Bldg		New Program Needs			
Space Name	Room No	Area (ASF)	ASF	No.	Total Area (ASF)	Difference (ASF)
GREENHOUSE						
Prep Room (Headhouse)	283	359	480	1	480	121
Botany Teaching Collection	283B	490	450	2	900	410
Student Project Area	283A	612	600	1	600	-12
Subtotal Greenhouse		**1,461**		**4**	**1,980**	**519**
FACULTY/STAFF OFFICE						
Faculty Office - Chair	235	298	175	1	175	-123
Faculty Office	various (19 rms)	2,845	140	25	3,500	655
Departmental Office/Waiting	258	251	500	1	500	249
Operations Manager Office	258A	238	140	1	140	-98
Technician Office	286C, 176L	172	120	3	360	188
Graduate/Teaching Assistant Office	190, 194	584	140	6	840	256
Work Room	does not exist		200	1	200	200
Storage	249	138	140	1	140	2
Conference Room	does not exist		400	1	400	400
Subtotal Office		**4,526**		**40**	**6,255**	**1,729**
Total Area		**34,039**			**50,795**	**16,756**

3.4 SPACE REQUIREMENTS

Program - Room List

Tables on the following pages compile the spaces in the proposed Science II project that are assignable areas.

Space ID	Space Name	Occ's/ Space	ASF	No.	Total ASF	Subtotal	Notes
TEACHING LABORATORY							
1.01	Intro/General Biology	30	1,280	4	5,120		Group intro labs together
1.02	Anatomy & Physiology	32	1,600	2	3,200		Near each other and physiology
1.03	Physiology	30	1,280	1	1,280		Near anatomy & physiology
1.04	Ecology/ Plant Sciences	30	1,280	1	1,280		
1.05	Vertebrate	30	1,280	1	1,280		
1.06	Invertebrate	30	1,280	1	1,280		Near ecology & plant science
1.07	Molecular Biology	30	1,280	1	1,280		Near microbiology and cell
1.08	Microbiology	30	1,280	1	1,280		Near molecular and cell
1.09	Cell Biology/Embryology	30	1,280	1	1,280		Near molecular and mircobiology
Subtotal Teaching Laboratories				**13**	**17,280**	**17,280**	
RESEARCH LABORATORY							
1.11	Research Laboratory (480 sf avg size)		480	23	11,040		
1.12	Aquatics - Large Tanks		960	1	960		Shared lab
1.13	Aquatics - Small Tanks		1,440	1	1,440		Shared lab suite with cold room
Subtotal Research Laboratories				**25**	**13,440**	**13,440**	

Room List (Continued)

Space ID	Space Name	Occ's/ Space	ASF	No.	Total ASF	Subtotal	Notes
LABORATORY SUPPORT							
1.21	Cadaver Room		800	1	800		Between anatomy/phys teaching labs
1.22	Physiology Prep/Storage		320	1	320		With physiology teaching lab
1.23	Herbarium Collections		320	1	320		With ecology/plant sci teaching lab
1.24	Herbarium Work Room		320	1	320		With ecology/plant sci teaching lab
1.25	Ecology/Plant Sciences Prep		320	1	320		With ecology/plant sci teaching lab
1.26	Vert/Invert Prep		210	1	210		Adjoining vert/invert teaching lab
1.27	Vert/Invert Collections		430	1	430		With vert/invert teaching lab
1.28	Fluorescence Microscopy		160	1	160		With micro/molecular/cellular labs
1.29	Media Prep/Storage		320	1	320		With micro/molecular/cellular labs
1.30	Media Pouring		80	1	80		With micro/molecular/cellular labs
1.31	Glasswash/Autoclave		480	1	480		With micro/molecular/cellular labs
1.32	Cold Rooms		80	2	160		With micro/molecular/cellular labs
1.33	Micro/Molecular Equipment		320	1	320		With micro/molecular/cellular labs
1.34	Dry Media Storage		80	1	80		With micro/molecular/cellular labs
1.35	BSL-2 Tissue Culture w/ vestibule		320	1	320		Near autoclave
1.36	Mud Room		80	1	80		Adjacent to loading dock
1.37	Field Equipment Storage		240	1	240		With mud room
1.38	Stock:Glassware/Consumables		640	1	640		With teaching labs
1.39	Stock: Chemical Storage		160	1	160		With teaching labs
1.40	Stock: Prep		280	1	280		With teaching labs
1.41	Stock: Secure Storage		160	1	160		With teaching labs
1.42	Stock: Instrument Storage/Repair		160	1	160		With teaching labs
1.43	Stock: AV Storage		80	1	80		With teaching labs
1.44	Growth Room Suite		960	1	960		4 rooms; adjacent research labs
1.45	Beetle Room		120	1	120		Locate away from animal labs
1.46	Bulk Chemical Storage		160	1	160		Locate on ground floor
Subtotal Lab Support				**27**	**7,680**	**7,680**	
VIVARIUM							
1.51	Holding Room		180	4	720		
1.52	Project Room		120	3	360		Exisitng Tecniplast ventilated cages
1.53	Project Room		180	1	180		
1.54	Surgery		180	1	180		4' BSC with exhaust
1.55	Surgery Scrub		120	1	120		
1.56	Feed Storage/Cold Room		80	1	80		
1.57	Bedding Storage		160	1	160		
1.58	Clean Storage		400	1	400		
1.59	Cage & Rack Cleaning		400	1	400		Dump station
1.60	Vivarium General Storage		200	1	200		
1.61	Staff Restroom/Shower		90	1	90		
1.62	Animal Receiving		120	1	120		
1.63	Vestibule		120	2	240		
1.64	Bottle Filling		60	1	60		
1.65	Internal Circulation		850	1	850		Hall access 7' min.
Subtotal Vivarium				**21**	**4,160**	**4,160**	
GREENHOUSE							
1.71	Prep Room (Headhouse)		480	1	480		
1.72	Botany Teaching Collection		450	2	900		
1.73	Student Project Area		600	1	600		
Subtotal Greenhouse				**4**	**1,980**	**1,980**	
FACULTY/STAFF OFFICE							
OFFICE							
1.81	Faculty Office - Chair	1	175	1	175		
1.82	Faculty Office	1	140	25	3,500		
1.83	Departmental Office/Waiting	2	500	1	500		
1.84	Operations Manager Office	1	140	1	140		
1.85	Technician Office	1	120	3	360		
1.86	Graduate/Teaching Assistant Office	4	140	6	840	5,515	24 total stations
OFFICE SUPPORT							
1.91	Work Room		200	1	200		
1.92	Storage		140	1	140		
1.93	Conference Room	20	400	1	400	740	
Subtotal Office				**40**	**6,255**	**6,255**	

Room List (Continued)

Space ID	Space Name	Occ's/ Space	ASF	No.	Total ASF	Subtotal	Notes
CLASSROOMS							
CLASSROOMS							
2.01	Classroom - Large	150	3,150	1	3,150		
2.02	Classroom - Medium	60	1,440	1	1,440		
2.03	Classroom - Small	40	1,000	1	1,000	5,590	
CLASSROOM SUPPORT							
2.11	Vestibules/Storage for Large Classroom		160	1	160	160	
Subtotal Classrooms				**4**	**5,750**	**5,750**	
OPEN FACILITIES							
OPEN LABORATORY							
2.21	Open Computer Lab	24	960	1	960	960	
OTHER OPEN SPACES							
2.31	Collection Display Cases		36	8	288		
2.32	Student Lounge		800	1	800		This might be a room
2.33	Student Study		1,500	1	1,500		This would be open to hallways
2.34	Faculty Lounge		400	1	400	2,988	
Subtotal Open Facilities				**12**	**3,948**	**3,948**	
OTHER SERVICE FACILITIES							
SUPPORT							
2.41	General Storage		320	1	320		
2.42	Hazardous Waste Storage		120	1	120		
2.43	Cylinder Storage		120	1	120	560	
Subtotal Other				**3**	**560**	**560**	

Total Program Area **61,053**

Room List Summary

The table below summarizes the preceding room lists and adds a net/gross ratio to estimate the total building area

Program Element	No. of Spaces	Area (ASF)	Total Area (ASF)
Biology			
Teaching Laboratories	13	17,280	
Research Laboratories	25	13,440	
Laboratory Support	27	7,680	
Vivarium	21	4,160	
Greenhouse	4	1,980	
Office	40	6,255	
Classrooms	4	5,750	
Open Facilities	12	3,948	
Other Service Facilities	3	560	
Totals	**149**		**61,053**

Estimated Net/Gross ratio	55.0%
Estimated Total Building Area GSF	**111,005**

Program-Related Space Allocation

The following table summarizes the assignable areas of the proposed Science II building and calculates the total score, which is a weighted average with a maximum of 6 points possible. Categories and points are per OFM guidelines.

Program Element	Points	Assignable Square Feet	Percentage of Total	Score = Points x Percentage
Instructional Spaces (classroom, lab, computer)	6	53,838	88.2%	5.29
Student Advising/Counseling Services	4	0	0.0%	0.00
Child Care	4	0	0.0%	0.00
Faculty Offices	4	5,515	9.0%	0.36
Administrative	2	1,140	1.9%	0.04
Maintenance/Central Stores/Student Center	2	560	0.9%	0.02
Totals		61,053	100.0%	5.71

Relationships of Functions

Space Relationships: Critical adjacencies and proximities are identified in the "Notes" column of the Room Lists above. In addition, the relationship between teaching labs, research labs, and resources spaces such as the vivarium, aquatics labs, greenhouse and growth suite were explored with the faculty. Three scenarios were proposed;

- Scheme A grouped the teachings labs together, and the research and resource are grouped together
- Scheme B distributed the teaching labs along one side of a single loaded corridor and the research and resource were mixed on the other side.
- Scheme C centralized the resource space providing some separation for research labs from teaching labs, while allowing equal access to the resource spaces for both.

The faculty preferred Scheme C. The location of faculty offices was also discussed and it was determined that the department office should be near the main entry, but the rest of the faculty offices should be distributed on each level of the building.

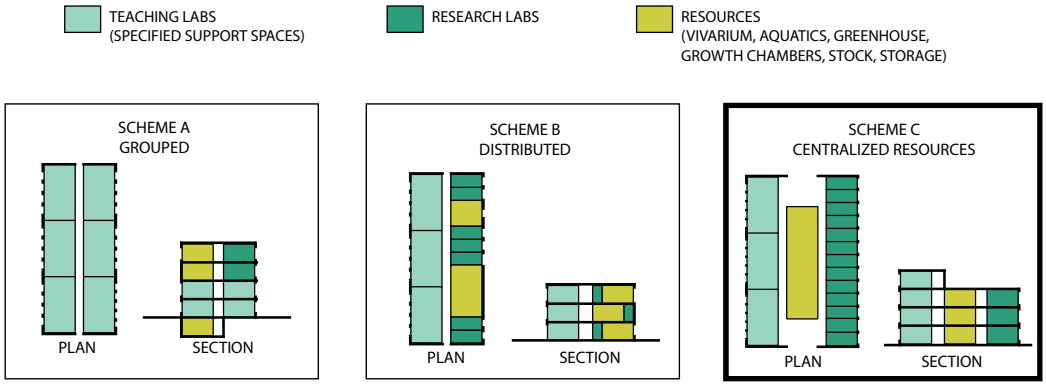


Figure 3c: Adjacency Diagrams

Efficiency

Science buildings, especially laboratory intensive buildings, have an unusually large amount of space devoted to non-assignable functions. Large HVAC plants and the corresponding large duct/pipe shafts, along with special mechanical space devoted to laboratory support systems such as compressed air, vacuum, purified water, and lab gases usually result in building efficiencies on the low end of a campus range. A detailed evaluation of non-assignable spaces for the Science II was conducted in order to determine the appropriate building efficiency factor (net/gross ratio) to utilize in determining the gross area of Science II. Confirmation of this preliminary efficiency was provided through the preliminary concept design scheme that is illustrated in Section 8.0 of this report. The following table shows a summary of the non-assignable evaluation for a 3-story Science II building:

Space Description	Qty	NSF/Unit	Net Area	Notes
Airhandlers	1	6200	6,200 NSF	
Lab Support Systems	1	300	300 NSF	DI water, air, vacuum, gas
Heat Pumps	1	2145	2,145 NSF	
Vertical Shafts			3,219 NSF	2.9% of GSF
Elevator Machine Room	2	100	200 NSF	
Main Electrical Room	1	440	440 NSF	
Electrical Rooms	2	100	200 NSF	1 per floor
MDF Room	1	175	175 NSF	Main Distribution Facility
IDF Rooms	2	120	240 NSF	1 per floor
Toilet Rooms - gender specific	6	190	1,140 NSF	1 per gender per floor
Toilet Rooms - unisex	1	70	70 NSF	1 first floor
Janitor Closets	3	70	210 NSF	1 per floor
Recycle/Trash Alcove	3	50	150 NSF	1 per floor
Bicycle Lockers/Showers	2	150	300 NSF	1 per gender
Elevators, Stairs, Corridors & Vestibules			26,641 NSF	24% of GSF
Walls, Columns & Furred Spaces			8,325 NSF	7.5% of GSF
Total Nonassignable Area			49,956 NSF	
% of total gross area			0 NSF	
Total Assignable			61,049 NSF	
Efficiency			1 NSF	
Gross Building Area			111,005 NSF	

The list of non-assignable spaces does not include indoor space for electrical transformers, emergency generator, central trash collection, or a loading dock. Although these elements will be included in Science II, they are assumed to be located in screened outdoor areas at grade and are therefore not counted as part of the building's gross area.

3.5 TECHNICAL PROGRAM REQUIREMENTS

Room Diagrams and Data Sheets
Detailed preliminary room diagrams and data sheets are included in the Appendix of this report. These documents provide the detailed program requirements for each type of space within the Science II building and help to validate the program size for each space.

Building Systems Requirements
Building systems requirements are outlined in the description of major systems included in the Section 5.0 Project Budget Analysis.

Circulation
Effective circulation will be an important element in the design of Science II. Beyond the human occupants of the building, materials will be delivered to the facility including chemicals, supplies, and equipment. In addition to material delivery, the debris and waste generated by laboratory functions must be safely removed on a periodic basis. General public circulation around the vivarium should be limited. Access to shared resources such as stock areas, greenhouse, aquatic tanks and growth chambers should be apparent to both students and faculty.

Internal building circulation should provide safe pedestrian egress from each individual laboratory and laboratory support space through an uncomplicated path of egress to the building exterior at grade. Features that should be considered in the design of the circulation system include:

- At least one door into each laboratory space should have a minimum 54" wide clear opening. This can be accomplished using openings with 3'-0" active leaf and one 1'-6" inactive leaf.
- Equipment lists should be carefully reviewed to verify that individual pieces of equipment can be transported and maneuvered between spaces. Future equipment should be anticipated.

- Doorways accessing corridors should open into recessed alcoves serving the corridor. The doors should swing out from laboratories, in the direction of exit.
- Wherever possible, circulation and fume hood locations within laboratory spaces should be coordinated to preclude exiting in front of the fume hoods.

Interaction

The program should include areas outside of laboratories that provide opportunities for students to study and interact with one another. 80 percent of EWU students are commuters, so it is vital that new facilities incorporate study spaces and lounge space as well as enhanced technologies to support virtual study.

The building should encourage interaction within each laboratory group, between students, researchers, and faculty, and with the larger campus. This requires that spaces that support interaction be created between laboratories, on each floor, and in public areas of building. Areas for formal and, in particular, informal interaction should be linked to the circulation schemes. Formal interaction spaces should include conference rooms and lounges. Informal interaction spaces should include student study areas, casual meeting spaces for short duration interaction, display/announcement boards, and possibly outdoor gathering spaces.

Accessibility

The principles of universal design should be entirely incorporated to provide an accessible environment to all of its users throughout both the building and the site. Ramps and grading should allow easy access to the building from campus buildings and parking. All spaces within the building should incorporate the ADA guidelines to allow for an easily accessible environment for all of the building occupants. Early consideration should be given to the following accessibility aspects:

- Accessible work stations and fume hoods should be provided in the laboratories based on code requirements.
- Location of accessible work stations should be as close as possible to eyewashes and safety showers.
- An 18” clearance on the pull side and 12” clearance on the push side of doors opposite the hinged side is required.

Some guidelines for accessible work stations in laboratories include:

- Work surfaces 30” - 34” above floor with wheelchair clearance below. Adjustable work surfaces can provide a range of possible height adjustments.
- Laboratory service controls, equipment, and equipment controls within easy reach for persons with limited mobility. Controls should have single-action levers or blade handles for easy operation.
- Aisle widths and clearances adequate for maneuvers of wheelchair bound individuals. Aisles 5’-0” wide are recommended with turnaround areas.

Vibration Control

Some of the research equipment that will be used in Science II is sensitive to vibration. The most common sources of vibration are footfall (walking) and mechanical equipment. Some Scientific instruments such as high-powered microscopes, are very sensitive to vibration. In addition, specific equipment for cell imaging, including a scanning electron microscope, may be included in a research lab on the ground floor with an isolated concrete slab.

The building structure should be designed to moderate vibration to acceptable levels. In the laboratories and lab support spaces, the vibration design velocity should be limited to 2000 micro-inches/second. According to ISO 2631, this limit is appropriate for optical balances and microscopes up to 400x magnification, which are common in many labs. In order to achieve best economy for Science II, only the laboratory area should meet the above criteria. The classroom and office areas should be designed to meet the standard classroom and office criteria of 0.5% g (g = the force of gravity).

Footfall-induced vibrations on elevated slabs should be reduced by:

- Confining heavily traveled areas to regions near column lines,
- Placing sensitive equipment near columns,
- Placing the equipment away from heavily traveled areas,
- Minimizing the length of spans.
- Selecting structural systems less likely to transmit vibration.

Air handling equipment and ductwork should be designed to minimize vibration. Supply and exhaust air fans, compressors, pumps, and other noise and vibration producing equipment should be located in mechanical rooms with protective wall construction. Equipment should be isolated from supporting structure with resilient mounts. Vibration isolators should be selected based on floor stiffness, span extension, equipment power and operating speed.

Building Management Systems

Science II should be provided with a micro-processor based direct digital control building automation/energy management system. This system should provide environmental and energy management controls in all spaces and monitoring of the laboratory controls. All data from the Science II energy management system should report into the existing campus energy management control system to allow for reporting of space and system status, reporting of alarms, scheduling of preventative maintenance functions, and trending of data for energy conservation purposes.

Monitoring of critical parameters of the ventilation system will be important for safe operation and effective maintenance and management of the building. Status of HVAC operations for laboratories, fume hoods, and other critical spaces, should be reported and alarmed when outside of established operational criteria.

Besides providing a high level of control and functionality in an integrated building control system, it is also desirable to have the capability of remote data reporting on consumption of water, gas, steam, chilled water, electrical, etc. for use by engineering courses at EWU. Trending of these basic systems is now required by Washington State law. As the campus works toward reductions of campus emissions to meet the President's Commitment to Climate Change, it would be highly beneficial for electrical energy use to be further separated to allow monitoring of energy by building components - HVAC (fans/pumps), receptacle loads, lighting, and process loads.

Technology

Spaces in Science II should be flexibly designed to support changing technologies and dynamic laboratory environments. Teaching laboratories should feature the latest technological tools to support teaching goals and science demonstrations. Technology infrastructure should be designed to meet the current needs of each lab space, while remaining flexible enough to accommodate future potential changes to lab equipment and lab functions. Wireless internet access should be provided throughout the building.

Sustainable Design

Sustainable strategies to reduce and enhance the buildings' impact on the environment and lower its energy demand will ultimately have a beneficial effect on its longevity. It is the university's goal that the Science II embodies a new campus standard for sustainable design.

Under RCW 39.35D Science II will be designed to achieve a Leadership in Energy and Environmental Design (LEED®) certification at the Silver level or higher. During the predesign study the faculty and administration were engaged in a discussion to determine potential sustainable strategies for the project. Using LEED® NC 3.0, an initial checklist was established to determine the LEED® credits that might be achieved through sustainable strategies. The checklist is included in the Appendix of this report and the total of anticipated credits from that checklist is as follows:

Y	?	N		
56	38	16	Total LEED Points	Possible Points: 110

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

The LEED® checklist reveals that Silver certification is well within reach of the project and that with the many Maybe Yes ("?") credits a higher level of certification is also achievable. It is recommended that LEED® Gold certification be established as a goal for Science II.

Energy Conservation

As part of the sustainable design initiative on Science II, it is recommended that a primary focus be on achievement of reduced energy consumption. As discussed in Section 2.0 – Project Analysis, the inclusion of energy-conserving HVAC and lighting systems in the new Science II building is the best way for the project to assist in the goal of reducing overall campus use of fossil fuels. Since science buildings are typically the greatest consumers of energy on a campus, discovering ways to make the Science II a low energy consumer will be especially significant.

Supporting this theme, the campus has ambitious goals for energy conservation to reduce operational costs and greenhouse gas emissions. The energy saving target for this project is intended to assist the university in meeting the greenhouse gas emissions limits mandated by RCW 70.235. The tables below tables illustrate baseline heating consumption for the existing Science Building and the energy target for Science II.

The aggressive energy target for Science II will need to be met through reduction in load by way of creative design and technology solutions. The building will also require a more efficient heating delivery system than the campus steam distribution network. Serious consideration should be given to the use of heat pumps for building heating and cooling. Coupling a heat pump system with well water shows great potential for substantial energy savings. Preliminary studies show that such a ground-coupled heat pump system could provide 100 percent of the building's cooling capacity and 80 percent of the heating capacity.

Existing Science Building Energy Use: The existing Science Building is nearly 50 years old and underwent a series of upgrades in the period 1988-1992. The building represents less than 5.4% of the campus building area but it currently utilizes 14% of the campus steam load and 12.9% of the campus electricity load due to the required volumes of ventilation air, fan energy and research equipment that supports the laboratory environment.

The following table shows actual energy use of the existing Science Building for a typical year:

Building	Area (sq ft)	Heating Use per Building (kBTU /yr)	Heating Use per Sq. Ft. (kBTU /sq ft /yr)	Notes
Existing Science Building (actual performance)	148,149	44,295,000	**299**	2007 data adjusted by 5.4% for mild winter

Science II Energy Target: The following table establishes the energy goal for the new Science II building:

Building	Area (sq ft)	Heating Use Goals per Building (kBTU /yr)	Heating Use Goals per Sq. Ft. (kBTU /sq ft /yr)	Notes
Science II - Biology	111,005	9,102,410	**82**	72.6% more efficient than the existing Science Building

3.6 FUTURE REQUIREMENTS

Potential Future Development of the Campus

It is important to anticipate reasonable growth in the southern academic core of EWU. Several issues are identified that should be considered in the design of Science II:

- Science II is to be located adjacent to and connected with Science I. Space for eventual expansion of laboratory sciences or engineering programs on the campus should be left adjacent to and connected with Science II.
- A central spine of circulation space adjacent to the Art walk connecting all future buildings on the Reid site should be considered. Efforts should be made to coordinate service and pedestrian access to the group of buildings.
- The design of the Science II should allow for connection of services and utilities to the current utility tunnel, facilitating sharing of services between all buildings on the Reid site.

Design to Adapt to Changes

Planning a building that can adapt to change is particularly important and challenging when designing science buildings because they both need to keep up with technological advancement in the field and are laden with significant scientific and safety equipment. The design of a science facility also commences so far in advance of actual construction that the design team must emphasize flexibility in all aspects of the project. Measures to accommodate change may include:

- Planning the structural layout such that partitions can easily be deconstructed or relocated to create larger or smaller spaces as needed.
- Providing adequate floor to floor heights to accommodate future increases in ventilation requirements due to future unforeseen equipment needs.
- Avoiding the use of systems that are difficult to modify or work with.
- Selection of building systems that require little and easy maintenance and are easily accessible and adaptable.
- Selection of moveable furniture and equipment that can be easily stored.

3.7 CODES/ REGULATIONS

Applicable Codes

EWU Science II is expected to comply with the following codes:

Building	International Building Code, latest edition with Washington State amendments, WAC 51-50
Fire	International Fire Code, latest edition with Washington State amendments, WAC 51-54 NFPA 13 Standard for the Installation of Sprinkler Systems
Mechanical	International Mechanical Code, latest edition with Washington State amendments, WAC 51-52 NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems
Plumbing	Uniform Plumbing Code, current Washington State-required edition with amendments, WAC 51-56 & 57
Electrical	National Electric Code, current Washington State-required edition, WAC 296-46B
Energy	Washington State Non-Residential Energy Code, latest edition, WAC 51-11
Accessibility	Accessible and Usable Buildings and Facilities, ICC/ANSI 117.1, current Washington State-required edition
Air Quality	Washington State Ventilation and Indoor Air Quality Code, WAC 51-13
Elevators	American Society of Mechanical Engineers (ASME) A17.1, current Washington State-required edition

Sustainability	High Performance Public Buildings, RCW 39.35D
Seismic	American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures ASCE 7-02

EWU Science II is expected to comply with the following standards:

American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
ASHRAE Standard 62.1 – Ventilation for Acceptable Indoor Air Quality
ASRHAE Standard 55 – Thermal Comfort
Sheet Metal Contractors Association of North America (SMACNA)
American Society of Plumbing Engineers (ASPE)
Eastern Washington University, Design and Construction Guidelines

Preliminary Building Code Analysis
The following code analysis identifies critical issues in the 2012 International Building Code that must be addressed during the design process; however, it is not intended as a complete investigation of relevant code requirements.

Use and Occupancy Classification (Chapter 3): The building occupancy will be classified as Group B, with Group A-3 Assembly for large classrooms, Group S-2 spaces for low-hazard general storage and possibly Group H-2 or H-3 spaces for hazardous chemical storage.

Construction Type (Chapter 5): Type II-A, fully sprinklered construction is assumed for this report.

Building Height and Area (Chapter 5): Predesign concept plans have determined that the Science II building will be 3 stories in height, with total size of about 111,005 gross square feet. The largest single floor will be approximately 37,000 square feet. Type II-A fully sprinklered buildings with Group B occupancies are allowed to be up to 112,500 square feet per story, up to 85 feet in height, and a maximum of 6 stories tall. H-2 and H-3 occupancies are allowed on any floor up to the third floor.

Fire Resistive Construction (Chapter 6 & 7): Per IBC 602.2, all building elements are to be of noncombustible construction.

Building Element	Required Rating
Structural Frame	1-hour
Exterior Bearing Walls	1-hour
Interior Bearing Walls	1-hour
Exterior Non-bearing Walls	Unrated with greater than 30-foot separation
Int. Non-bearing Partitions	Unrated unless providing required separation
Floors	1-hour
Roofs	1-hour
Shaft Enclosures	2-hour
Exterior Openings	Unprotected with no limit if over 20-foot separation

Note: The provision of an automatic fire sprinkler system through the building may eliminate the requirement for 1-hour fire resistive construction in some building elements.

Occupant Load (Table 1004.1.1):

Area	Occupant Load Factor
Classrooms	20 sf/ occupant
Laboratories	50 sf/ occupant
Offices	100 sf/ occupant
Assembly Areas	15 sf/ occupant
Storage	300 sf/ occupant
Mechanical Rooms	300 sf/ occupant

Egress Requirements (Chapter 10):

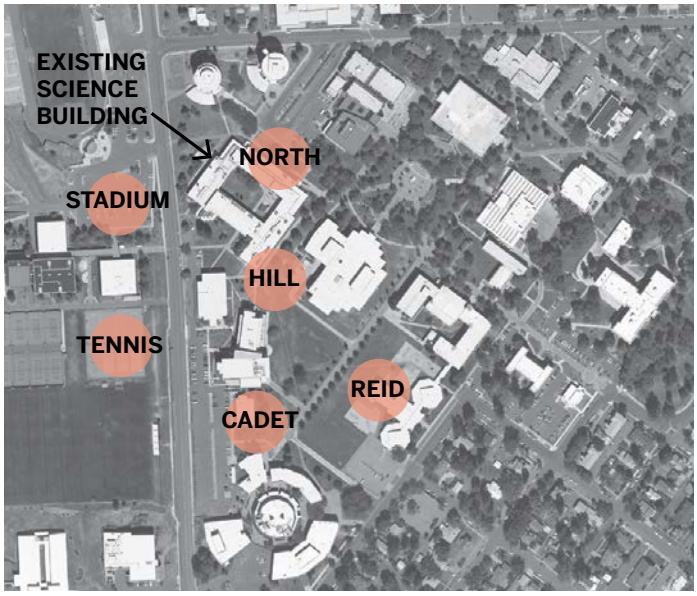
Egress Element	Requirement
Exit Width	Stairs: 0.3”/ occupant, minimum 44” wide
Door Width	0.2”/ occupant, minimum 32” wide clear opening
Exit Corridors	Minimum 44” wide for occ. load > 50
Number of Exits	2 when occupant load > 50
Exit Location	Exits shall be located at a distance apart equal to not less than one third of the length of the maximum diagonal dimension of the building or area served.
Travel Distance	Travel distance shall not exceed 300’ in a sprinklered Group B occupancy. Group A travel distance shall not exceed 250’. H-2 and H-3 occupancies are limited to shorter allowable travel distances.

4.0 Site Analysis

4.0 Site Analysis

4.1 SITE SELECTION

The predesign study for Science I identified the intent to locate Science II immediately adjacent to it for the purposes of sharing resources and encouraging interaction between science disciplines. This intention has remained intact through a study of several options for the location of Science II. Six sites on the Cheney campus were initially evaluated to determine a preferred site for Science I: and are illustrated below.



4.a Six Evaluated Sites in Science I predesign study

Based on the matrix of criteria below, the Science I predesign study concluded that the Reid Site was the most appropriate site for the new building. This site is the current location of the Robert Reid Lab School. Demolition of the Reid building will be accomplished in the Science I project. This site is located within the boundaries of the Eastern Washington University's Cheney campus and is owned by the State of Washington.

EWU Science I - Site Selection Analysis Matrix

Weighting Factor
"5" = Most Important
"1" = Least Important
Rating Value
"3" = Significant advantage
"0" = Signficant disadvantage

Evaluation Criteria	Weighting Factor	Candidate Sites 1 Reid Rating	Reid Weighted Value	2 North Rating	North Weighted Value	3 Stadium Rating	Stadium Weighted Value	4 Tennis Rating	Tennis Weighted Value	5 Cadet Rating	Cadet Weighted Value	6 Hill Rating	Hill Weighted Value
Proximity to Science Bldg	5	0	0	3	15	2	10	0	0	1	5	3	15
All-Weather Connection to Science	5	0	0	3	15	0	0	0	0	0	0	2	10
Disruption to Existing Building(s)	4	3	12	1	4	3	12	3	12	3	12	2	8
Favorable Topography	4	3	12	2	8	3	12	3	12	1	4	1	4
Supports Campus Circulation	4	3	12	1	4	2	8	2	8	1	4	1	4
Supports Campus Open Space	4	3	12	2	8	3	12	3	12	0	0	0	0
Favorable Solar Orientation	3	3	9	2	6	3	9	3	9	2	6	1	3
Ease of Service Access	3	3	9	3	9	3	9	3	9	2	6	1	3
Located within Academic Core	2	3	6	3	6	0	0	0	0	3	6	3	6
Utilities Availability/ Rerouting	2	3	6	2	4	3	6	3	6	2	4	1	2
Disruption to Existing Parking	1	3	3	1	1	0	0	3	3	2	2	3	3
Allows Future Science Growth	2	3	6	0	0	1	2	2	4	2	4	1	2
Total Score:			**87**		**80**		**80**		**75**		**53**		**60**

4.2 CAMPUS RELATIONSHIPS

Campus Organization

EWU's Cheney campus is currently organized around two major pedestrian circulation routes and 4 major open spaces. The Reid Site is located adjacent to the campus boundary and the main circulation route "Art Walk". The informal open lawn area adjacent to the Art Walk has been identified as a potential "Science Commons".

LEGEND

- CAMPUS BOUNDARY
- PEDESTRIAN PATHS
- OPEN SPACE

OPEN SPACE LEGEND

1 FORMAL CAMPUS QUAD
2 FORMAL AXIAL ENTRANCE
3 INFORMAL GROVE
4 INFORMAL OPEN LAWN (Science Commons)

N

0 100 200 300

4.b Major Campus Organizing Elements

Campus Circulation and Open space

The four major open spaces on campus each have a unique character that is beneficial for a diversity of uses. The Science Commons area represents the largest open lawn area on the campus and is used by students for informal activities such as playing frisbee, however, the space lacks definition at the edges and is not fully integrated into campus life because of the lack of destinations around it. The major open spaces are supplemented by a large number of smaller open spaces, giving the campus a park-like feel.

The major campus circulation routes are supplemented by minor routes that link into the surrounding city grid. The major exception to this pattern of development occurs at the current location of the Reid School. Building entries are generally grouped around open spaces and major pedestrian routes. There are essentially no building entries fronting on the Science Commons open space.

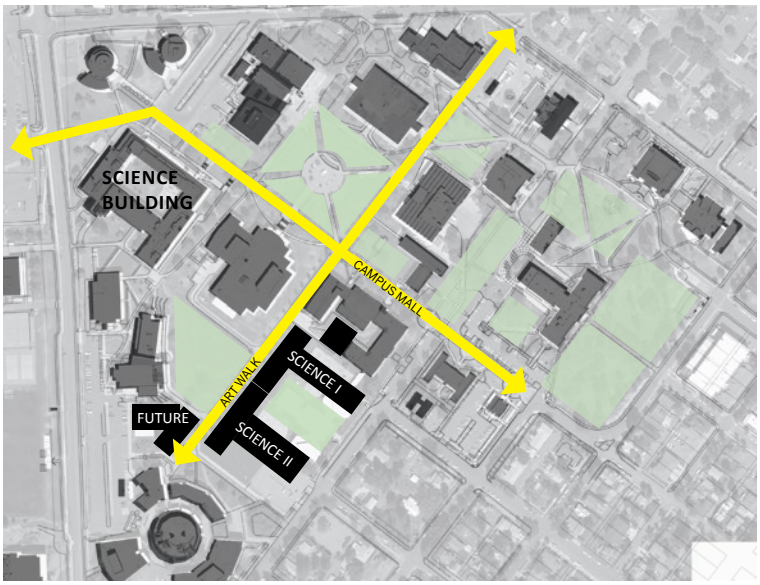
4.c Campus Circulation and Open Space

4.3 POTENTIAL ALTERNATIVES

Three options for the location and layout of Science II at or around the Reid site were studied. Each option evaluated the relationships of the building to the campus and to Science I. Key site relationships include:

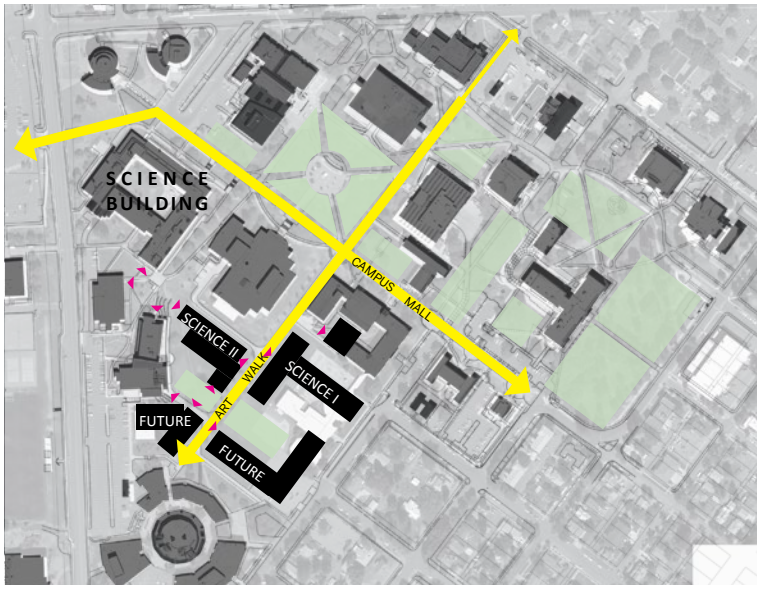
- Proximity to Science I for pedestrian access and shared resources;
- Contribution to formation of a "Science Commons" for the campus, established through proximity to the Computing & Engineering Building, the proposed Science I Building and the JFK Library.
- Convenient service access for loading;
- Proximity to the campus steam tunnel system for connection of steam, chilled water, electricity and telecommunications utilities; and
- Future campus expansion.

Option A: This scheme provides a direct connection between Science I and Science II. It allows the use of classrooms provided with demonstration capabilities to be shared by both facilities without requiring the movement of materials across exterior campus circulation routes. It also reinforces the edge of the Science Commons along the Art Walk, provides convenient service access from Seventh Street, and provides a simple connection to the utility tunnel. Future expansion is limited to the replacement of Cadet Hall.



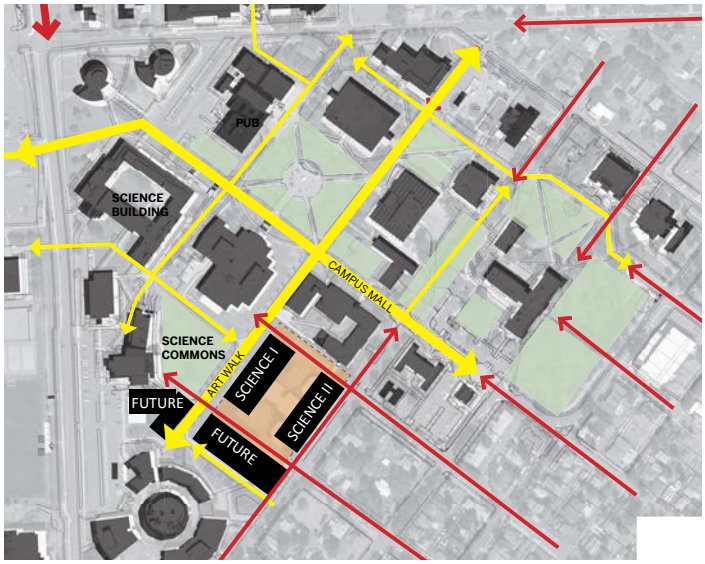
4.d Option A

Option B: This scheme locates Science II directly across the Art Walk from Science I. This creates a tighter link to the existing Science Building, creates tighter nodes of circulation around the Computer Science Building and Cheney Hall and activates the Art Walk with dense, street like development. This scheme allows for future development of another pair of buildings at the southern terminus of the Art Walk, furthering the sense of dense street development. A direct connection to Science I from Science II would take the form of a bridge over the Art Walk and the scale of open space at Science Commons would be changed to relate to other minor open space on the campus. Proximity to the campus steam tunnel is maintained. Service access requires driving across the Art Walk and pedestrian path between the library and Science II.



4.e Option B

Option C: This scheme orients Science I and Science II parallel to the Art Walk to allow a third building on the Reid site and captures the continuation of the street grid into the campus circulation. A direct connection between Science I and Science II could be provided by a bridge. Service access could be provided along the new pedestrian paths linking to the city grid. Both the Art Walk and Science Commons are reinforced with active building entries along the edge of Art Walk. Access to campus utilities for Science II would be accomplished with a tunnel spur.

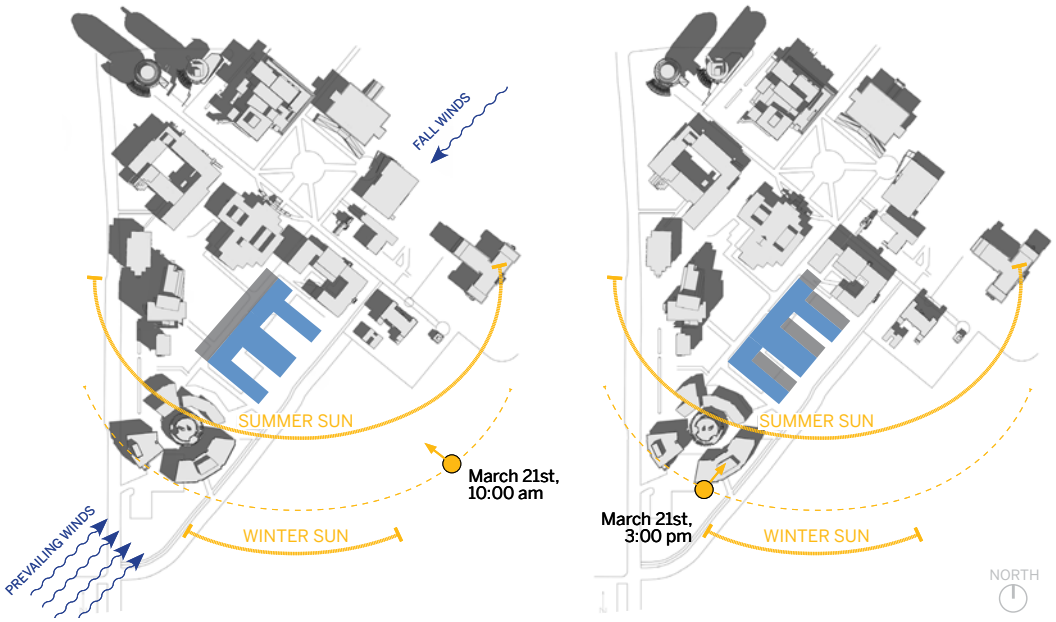


4.f Option C

4.4 SITE EVALUATION – PHYSICAL ISSUES

Climate/ Solar Orientation

The site is oriented at a 45 degree angle to true north. Solar access for the greenhouse and related plant science research require direct solar access which is available at the southeastern edge of the building. Future additions should be kept to three stories to maintain solar access for Science II.



4.g Campus Sun & Wind

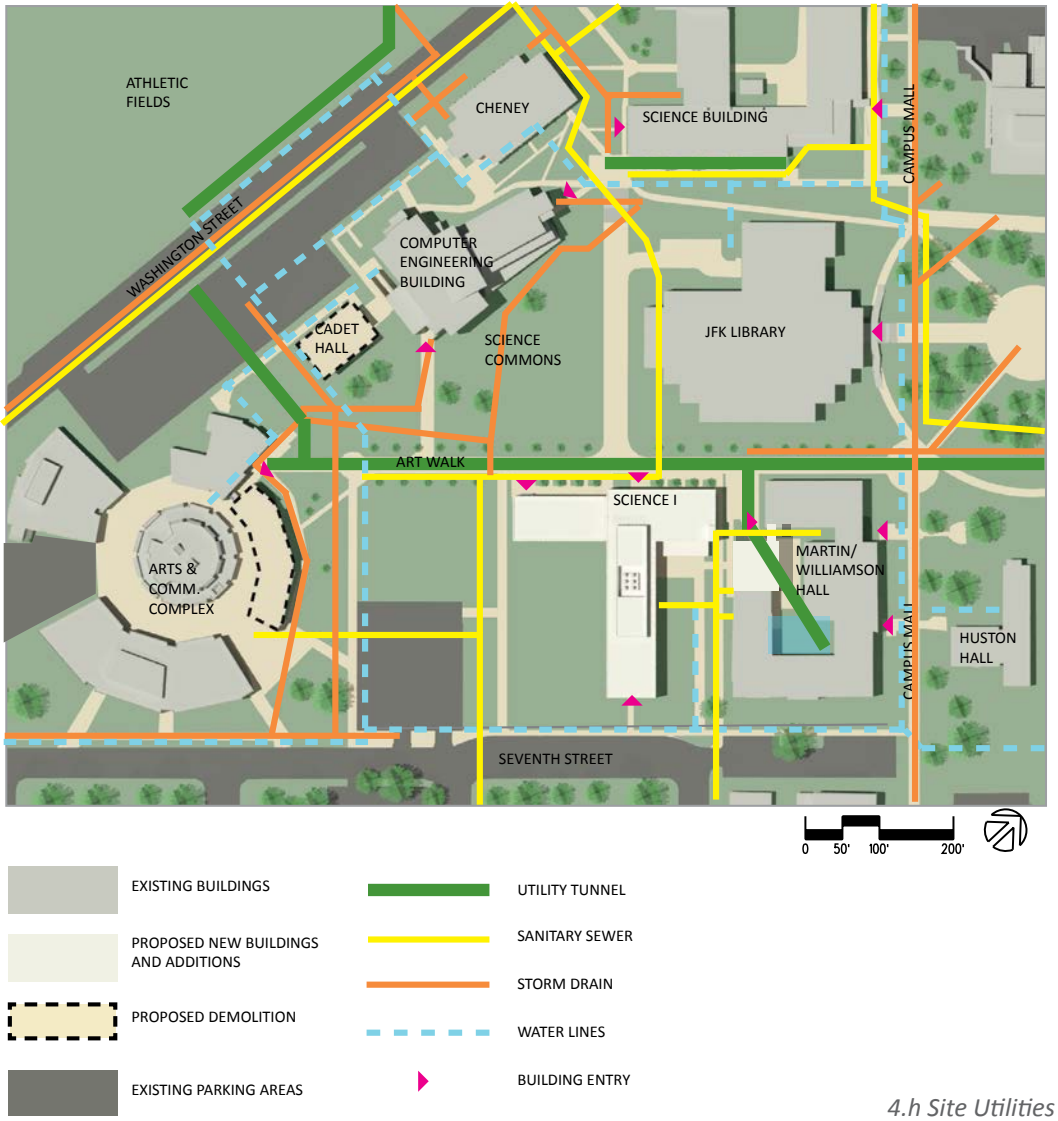
Geotechnical and Environmental Conditions

Historical geotechnical reports for the Computing & Engineering Building and the JFK Library were reviewed in order to gain a preliminary understanding of subsurface conditions in the area of campus near the candidate sites. Those geotechnical reports show that subgrade soils are generally comprised of soft to medium stiff clayey soils underlain by basalt bedrock. Pilings or geopiers supported on the basalt bedrock are generally recommended for foundations. Perched groundwater is found at various depths, sometimes near the surface, and will likely require a building to be equipped with sub-floor and perimeter drainage with collected water pumped to a disposal system or to a cistern for reuse in landscape irrigation. Since a preliminary geotechnical report on is beyond the reach of this predesign study, it is not possible to conclude that any of the alternatives would provide superior foundation and/or drainage conditions.

The topography of the site is relatively level and there are no known environmentally sensitive conditions. Wetlands, shorelines, flood zones, endangered species, and contaminated soils are not present at the site. The site has no known or suspected archaeological significance.

Utilities

The campus tunnel system runs beneath the adjacent Art Walk and provides direct access to steam, chilled water, telecommunications and electricity to the Science II site. Water, sanitary sewer, storm drainage, and natural gas are separate, direct-buried utilities and are accessible to all sites. The Science II site will require relocation of a sanitary sewer line in Option A & C.



4.h Site Utilities

Energy Conservation

Factors that may affect energy conservation in a Science II building are:

- Solar orientation, both for daylighting of interior spaces and solar access for greenhouse and plant science research laboratories;
- Access to well water for use in conjunction with heat pumps for building heating and cooling;
- Openness to prevailing winds, both for use of energy-generating wind mills and natural ventilation in non-laboratory portions of the building; and
- Adjacency to the campus tunnel system, which would allow the use of centrally generated steam and chilled water.

All the options for Science II would accommodate these factors.

Hazardous Materials Inventory

Since no facilities will be demolished, hazardous materials abatement is not expected.

4.5 SITE EVALUATION – REGULATORY ISSUES

Local Jurisdiction
Buildings on EWU's campus are subject to the governing codes of the City of Cheney. It is anticipated that during the design process, the university and design team will meet periodically with officials of the City to ascertain that building plans are in conformance to the City's requirements.

Zoning and Local Requirements
Zoning and local land use regulations are not expected to significantly affect the preferred site. The City of Cheney designates the campus of Eastern Washington University as a unique zone called "P" (Public). The Cheney Zoning Code has no specific restrictions on the use of property within a P zone. EWU maintains a good working relationship with the City of Cheney and discusses each project with the City prior to implementation.

Environmental Regulations
All sites are compatible with SEPA and LEED requirements.

Building Code Requirements
The International Building Code as amended by the State of Washington has been adopted by the City of Cheney and will govern the design and construction of Science II. Section 3.7 of this report contains a preliminary building code analysis. Building code requirements are not expected to rule out or have a profound impact on the use of any of the proposed alternatives.

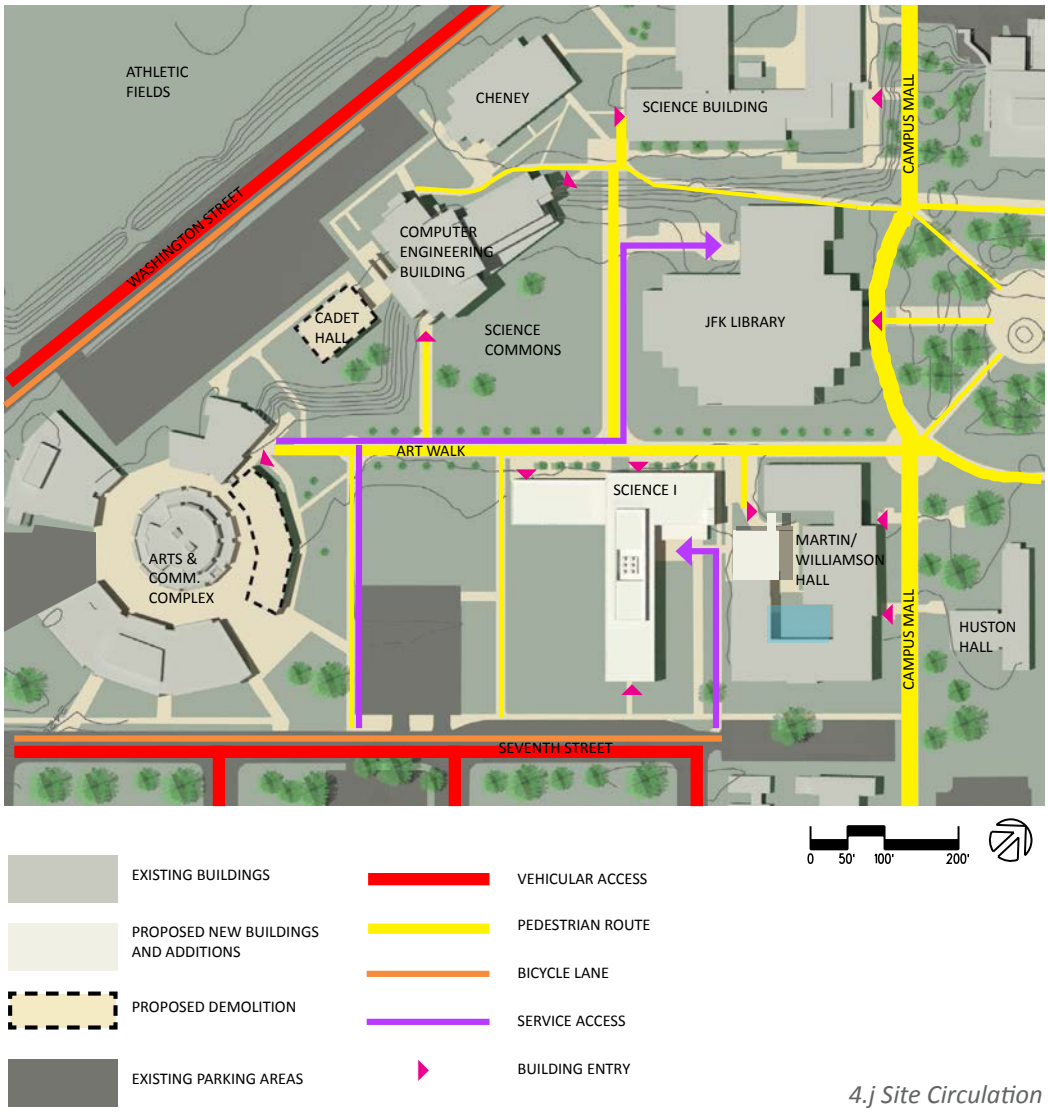
4.6 SITE EVALUATION – ACCESS ISSUES

Pedestrian Access
Pedestrian circulation should be concentrated around the Science Commons and on the Art Walk to stay within existing campus organization. Pedestrian access between Science I and Science II is best served in Option A.

Service Access
Service access to the site can be provided via Seventh Street for Options A & C or the Art Walk for Option B. Both routes are currently used to service other buildings on the campus. If access is provided via the Art walk, the conflict between pedestrian circulation and service vehicles will be increased.

ADA Access
Primary circulation routes around the Art Walk and Science Commons are generally accessible due to the relatively flat topography. The primary exception to this occurs along the area to either side of the Computer Engineering Building and around Cadet Hall. Option B bridges this section of topography and should provide public entries at an upper level as well as a ground floor level to facilitate wheelchair access from the higher elevation.

Parking
Parking at EWU is provided on a campus wide basis, with assigned surface parking lots and on-street parking. Parking is not specifically provided for individual buildings. A parking study completed in 2013 revealed that current parking supply exceeds demand by over 500 spaces. The parking area adjacent to the Reid School will be effected by options A and C, however, the loss of approximately 64 stalls will not adversely effect the overall campus parking situation. Accessible parking will need to be added adjacent to the building in all three options.



4.j Site Circulation

4.7 SITE EVALUATION – SCHEDULE AND BUDGET

Schedule

Coordination with the construction of Science I will be the primary challenge to any of the options presented above. Option A requires the most careful consideration because of the direct connection to Science I.

Budget

Site factors that increase the project cost due to construction complexity/scope and construction duration were considered in this qualitative evaluation of budget impacts. A number of differentiating factors have been identified that would cause increase construction costs for the options:

- Construction access to Option B will require construction vehicle access along existing pedestrian paths, as well as maintenance of the existing service drive to the Library. This complication will have a minor impact on the cost of option B.
- The requirement for a bridge connecting Science I and Science II will increase the construction costs of both option B and C.
- The required extension of the utility tunnel in option C will increase construction costs.
- The complexity of connecting directly to Science I in scheme A will be somewhat offset by the reduction in exterior wall area required to enclose the building.

4.8 PREFERRED ALTERNATIVE

Ultimately a fourth scheme was developed that incorporates the best ideas of the three options presented in section 4.3 above. Option A forms the fundamental idea because the relationship it provides with Science I is the most direct and beneficial, service and utility access is immediately adjacent and it reinforces both the Art Walk and Science Commons.

The scheme is modified to tighten the distance between Science I and Science II, allowing the development of a third building on the site. The spacing of the three buildings also allows campus routes and open spaces to be aligned with the city grid. It will be possible to create a route through the open space to the south of Science II that will connect to future expansion, a Cadet Hall replacement and the existing Computer Science Building

4.k Option A.1
Preferred Option

5.0 Project Budget Analysis

5.0 Project Budget Analysis

5.1 BUDGET ASSUMPTIONS

The following assumptions have been made as the basis for the Science II project budget:

- The building will be constructed as a single phase.
- The construction start date will be August 2017
- The construction period will be 23 months.
- Design/Bid/Build delivery method will be utilized.
- The building will be designed to achieve a minimum LEED silver rating.
- The building will be designed to comply with the codes and standards sited in Section 3.0 of this report.
- New mechanical, plumbing and electrical services will be provided complying with local building codes and campus standards.
- A utility tunnel connection will bring campus steam, electrical and telecommunications to the building.
- A hybrid heat pump/campus steam system will be utilized for heating and cooling the building. Central heat pumps will be coupled with a geothermal system currently undergoing feasibility analysis under separate consultant services contract by the university. Wells required for this system are included in the proposal for Science I and will be shared with Science II.
- The building will be sprinklered throughout.
- No new parking will be constructed as part of this project. A new loading zone along Seventh Street will be provided.
- Subgrade soil conditions are expected to be similar to those at nearby buildings. A geotechnical investigation for the site has not been completed. Soils reports from the adjacent JFK Library and the nearby Computer Engineering Building (CEB) indicate that site soils consist of a thin stratum of topsoil over medium stiff clayey silt or clay (Palouse formation) over stiffer Saprolite clays over basalt bedrock.
  - ❖ At CEB the clays extend down to as deep as 40 feet with groundwater encountered at 10 to 15 feet deep, and foundations consist of spread footings over rock bearing pads, which are located in stiffer Saprolite clays below the Palouse formation layer.
  - ❖ At JFK the site is clayey silt over basalt bedrock at depths ranging from 12-17.5 feet below grade with ground water present, and the foundations are taken to bedrock utilizing concrete piers, and there is a foundation de-watering system.
  - ❖ The adjacent campus utility tunnel has dewatering sumps that pump to the stormwater system.
  - ❖ The presence of groundwater is expected on the project site, moving from west to east, necessitating the inclusion of a permanent dewatering system for the utility tunnel connection and basement area.

5.2 OUTLINE SPECIFICATIONS

The following outline specifications form the basis for the Science II construction costs:

A Substructure

A10 Foundations

Foundations: According to preliminary information obtained from existing geotechnical reports, the bearing capacity of the soils will be less than 2,000 psf . The at grade bearing capacity is very poor, therefore, soil improvements or deep foundations are recommended. Soil improvement such as Geopiers could be employed to increase bearing capacity to 6,000 psf which would transfer loads to competent rock at an elevation of approximately 10 feet below grade. With

Geopier soil improvement conventional spread footings would be utilized. Should a basement be included, spread footings would likely prove the most economical solution located at the lower bearing strata.

Slabs on Grade: The level 1 slab will be located at grade elevation 0'-0" except where a basement is indicated. The slab on grade will be 4 inches thick and lightly reinforced on subgrade prepared in accordance with geotechnical recommendations. Elevator pits and mechanical areas will be 12 inches thick slab on grade. Dewatering of the site will be required for excavations below grade and a drained condition with no hydrostatic loading is assumed for all structural schemes.

A20 Basement
Partial Basement: Partial basement construction will require excavation, dewatering and backfill with suitable material, 12" reinforced concrete basement walls and 4" slab on grade with below grade waterproofing, exterior insulation and drainage.

Elevator Pits and Mechanical Areas: Concrete elevator pits will be 12" thick slab on grade and will be provided with below grade waterproofing and exterior insulation.

B Shell

B10 Superstructure
Floor to Floor Height: A height of 15'-0" floor to floor is established to accommodate mechanical and electrical systems serving the laboratories and large classrooms.

Floor & Roof Construction: The combined gravity and lateral system will consist of 24-inch x 24-inch concrete columns, 24-inch x 24-inch moment frame beams at each bay in the east west direction and 24-inch x 24-inch moment frame beams oriented north south on the exterior perimeter. Supplemental structural steel will be included at two story spaces and glass enclosed stairs.

Penthouse Construction: Construction will be structural steel columns and bracing, and steel roof framing.

B20 Exterior Enclosure
Exterior Walls:

- The brick wall system will include; an air cavity, rigid insulation, air barrier, sheathing, steel framing, batt insulation, a vapor barrier, and interior drywall.
- Steel framing will support curtain walls and window systems, and metal panel and louvered penthouse enclosure walls.

Exterior Windows, Doors and Louvers:

- Punched aluminum frame windows at laboratories, operable aluminum frame windows at offices, curtain walls at classrooms and corridor paralleling the Art Walk, and glazed entrance doors, all will be aluminum with anodized finish. All glazing will be insulated low-E performance glass.
- Hollow metal exterior doors and interior doors at mechanical spaces.
- Painted hollow metal doors and frames at mechanical spaces, service entrances, and emergency exits.
- Louvers will be painted aluminum, fixed and drainable.

B30 Roofing
Roofing materials will include the following: thermoplastic membrane roofing over tapered rigid insulation, roof walkway pads, painted sheet metal coping at parapets, and roof stanchion tie-offs.

C Interiors

C10 Interiors Construction

Partitions: Typical interior partitions will be metal studs with 5/8" type 'x' gypsum wallboard, impact resistant gypsum wallboard on all corridor walls, and acoustic insulation where required. All demising walls will be built to underside of structure. Fire and smoke stopping will be provided at all rated wall and floor penetrations.

Doors: Interior doors will be of formaldehyde free solid core particle board, or mineral cores at labeled doors, with stained hardwood veneer faces. Doors will have satin stainless steel finish hardware with required accessories. Interior door and relight frames will be of hardwood or painted hollow metal, with fire rated glass where required.

C20 Stairs

The main circulating feature stair at the building entries will have steel structure with architectural detailing including precast concrete treads. The two egress stair serving the teaching labs and research labs will be pre-engineered steel construction with cast-in-place treads.

C30 Interior Finishes

Floor Finishes: Interior floor finishes will include stained retroplate concrete in circulation areas with slate in the lobby paralleling the art walk, resilient tile in teaching laboratories and research spaces; welded seam sheet vinyl at the tissue culture room, a combination of low VOC carpet and resilient flooring for the offices and classrooms, ceramic tile at restrooms, resilient flooring at service or support areas, epoxy flooring with integral base at the Vivarium, Aquatics tanks, glasswash and hazardous chemical storage rooms, sealed concrete at the greenhouse, on-grade mechanical and electrical spaces, and a durable traffic coating in the penthouses.

Wall Finishes: Interior wall finishes will include painted gypsum wallboard, ceramic tile at restrooms, acoustic wall panels in classrooms and at circulation paralleling the art walk, hardwood architectural detailing in the large classroom and open student study areas, and corner guards as required.

Ceiling Finishes: Interior ceiling finishes include exposed structure, painted gypsum wallboard, suspended acoustical ceiling systems, and wood slat ceiling clouds in public circulation areas.

Interior specialties: Specialties will include stainless steel toilet accessories, baked enamel on steel toilet partitions, recessed steel fire extinguisher cabinets, entrance mats and anodized aluminum louvers and grills.

Vivarium Finishes: Floors will be epoxy with integral base. Walls will be a combination of epoxy paint and fiberglass wall panels to 8' height. Ceiling will be epoxy painted gypsum wallboard.

D Services

D10 Conveying Systems

One 3 stop and one 5 stop MRL passenger elevator will be provided, one standard passenger size and one hospital size, with ladders to the elevator pits.

D20 Plumbing

D2010 Plumbing Fixtures:

- Restroom wall hung water closets, urinals and lavatories will be constructed of commercial grade vitreous china. Lavatory traps and supplies will be insulated per accessibility requirements.
- Hands free sensor operated electric faucets with integral thermostatic mixing controls will be provided on toilet room lavatories. Sensor operated electric flush valves will be used for water closets and urinals.
- Non-Lab sinks will be stainless steel, with single lever faucets of cast brass

construction. Custodial sinks will be provided with wall faucet and lever handles.

- Emergency showers and eyewash stations within the laboratories, as provided under E10, will be serviced from a centralized tempered water system that delivers potable tepid water between 60 and 95 degrees to the safety stations.
- Laboratory fume hoods and other air containment units, as provided under E10, will be pre-piped with utility connections at the top and rear of hood.
- Water Conservation - The following items will be reviewed by the design team and Eastern Washington University for Water Conservation and Long Term Campus Standardization /Maintenance considerations; dual flush (1.6/1.0 GPF) water closets, ultra-low flow water closets (1.28 GPF), pint flow urinals, and 1.5 GPM showers, lavatory faucets to deliver 0.5 GPM, and demonstration composting toilets.

D2020 Domestic Water Distribution:

- Domestic cold water and 120°F hot water distribution systems will be provided throughout the building.
- A hot water recirculation system controlled through the campus energy management system (EMS) will be provided and distributed at low velocities, using "in-line" all-bronze circulating pumps.
- Water heaters will be instantaneous steam to hot water, utilizing the campus steam and heat exchangers.
- Double check valve backflow prevention assemblies will be provided for the system.
- Valves will be provided at all branch take-offs to individual fixture groups, and zone valves will also be provided. Balancing valves will be placed in return loops at connections of the hot water piping.
- Materials:
  - ❖ Water Piping: Copper type L

D2030 Sanitary Waste System

- A gravity sanitary drainage system will be provided to serve all plumbing fixtures and equipment (see also Lab Waste and Vent System under Section D2090).
- Materials:
  - ❖ Drain, Waste, Vent Piping (above grade) : Cast Iron
  - ❖ Waste Piping (below grade): PVC, ABS, or Cast Iron

D2040 Rainwater Drainage

- Gravity primary and overflow storm drainage systems will be provided to serve the roof levels with each system piped separately outside of the building. Rain leaders will be located within the heated portion of the building to prevent freezing of the pipe and will be insulated to prevent condensation from developing on the pipe. Overflow drains will terminate at grade level on splash blocks.
- Basement areas will be protected with dewatering systems at the foundation perimeter. Dewatering systems will be piped to duplex gray water pumps located in the basement areas which will discharge to the site storm drainage system.
- Materials:
  - ❖ Storm Drain Piping (above grade): Cast Iron
  - ❖ Storm Drain Piping (below grade): PVC, ABS, Cast Iron

D2090 Other Plumbing Systems

Compressed Air System: A central compressed air system with duplex compressors for redundancy, air drier and receiver storing 100 psig air will be provided to deliver compressed air to the laboratories. Lab air will be delivered at 80-100 psig and be piped through dual filters to provide the required purity, with regulators at each lab to reduce pressure as needed. Areas requiring non-lab quality compressed air at 100 psig will be piped direct from the receiver to the associated labs.

Lab Vacuum System: A central vacuum system will be provided to deliver vacuum air to the labs

from a central dual vacuum pump (for redundancy) and receiver controlling to 24" mercury. The exhaust from the pump will route through a muffler system and discharge above the roof so as to minimize the noise pollution to the surrounding environment and recirculation of biohazards from the vacuum system.

Lab Natural Gas System: Natural gas will be piped to the labs from the building gas service at low pressure (4-7" WC). Each lab space will be equipped with an accessible local emergency gas shut-off valve

Lab Specialty Gas Systems: Nitrogen and specialty gases will be piped from Owner furnished cylinders to designated outlets and equipment.

Industrial Water Systems: Cold and 120°F hot non-potable water distribution systems will be provided throughout the building to selected equipment and lab faucets. The systems will be isolated from the domestic water system with a double check backflow preventer assembly. Hot water heaters and storage tanks will be the same as described in Section D2020.

Industrial Hot Water Recirculation System: A recirculation system will be provided and distributed at low velocities to ensure fixtures and equipment requiring hot water will have hot water readily available through the use of "in-line" all-bronze circulating pumps.

Tempered Water System: Potable cold water will be tempered by mixing domestic cold water and domestic hot water at a master mixing valve located in the mechanical room to deliver tempered water to the emergency showers and eyewashes stations throughout the building.

Lab and Animal Waste and Lab Vent System: Laboratory sinks in case work, chemical fume hood cup sinks and floor drains in chemical use areas will be piped in a dedicated waste system that will allow for future monitoring by regulatory authorities for possible discharges. Outside the building, after the monitoring point, the lab waste system will combine with the building sanitary sewer. Waste and vent piping will be chemical resistant.

Snow Melt System: A hydronic snowmelt system will be provided for exterior walkways at main entrances and site stairs that are difficult to access with mechanical snow removal equipment. Heat for the snowmelt system will be generated from a steam to hot water heat exchanger connected to the campus steam/condensate system.

Pure Water System: A central pure water system will be provided to deliver 5-7 meg ohm quality water to dedicated pure water outlets in the labs. This continuously circulating system will consist of reverse osmosis unit, carbon filters, re-pressurization tanks, ultra-violet lights, resistivity/ conductivity meter, pressure switches and monitor lights. High purity water will be generated from owner furnished local "polishers" in the individual labs.

Greenhouse RO System: Water for the greenhouses will be specially treated with carbon filters and a reverse osmosis unit.

Vivarium (non aquatic) RO Water System: A purified water system will be provided for animal water and the rinsing phase of cage washing. The system will include a storage tank, a reverse osmosis unit, bacterial treatment (such as chlorination, ozonation or acidifying) and re-pressurization pumps but will not have deionization post-treatment process. An automated drinking water system if requires will be Owner provided.

Aquarium Water System: Water for the large fish tank system will be treated with carbon filters to remove the chlorine and piped to the Owner furnished tank system (tanks, pumps, filters, chillers etc.)
Process Cooling System: A dedicated distribution piping loop from the heat pump chillers will be piped through the facility to provide cooling water to lab research equipment such as environmental growth chambers, low temperature freezers and other process loads. The loop

will be provided with dual pumps for redundancy.

Process Steam: Process steam will be piped to autoclaves, cage washing and other lab equipment. Process steam will be obtained from the campus steam system.

Zone Valves: Each plumbing system serving the laboratory module will be isolated by zone valves, to facilitate service and maintenance.

Materials:

Compressed Air Piping: Copper
Lab Air Piping: Copper
Lab Vacuum Piping: Copper
Lab Natural Gas Piping: Black steel
Lab Specialty Gas Piping: Copper or as required.
Pure Water Piping: High purity polypropylene or PVDF (in return air plenums)
RO Water: PVC, PEX, High purity polypropylene or PVDF (in return air plenums)
Industrial Hot/Cold Water/Tempered Water Piping: Copper
Lab Waste Piping: Polypropylene
Snowmelt Piping (buried in slab): Polypropylene
Process Cooling: Steel or copper

D30 HVAC Systems - General

Campus Chilled Water Plant: The campus has a central chilled water plant that distributes chilled water to the buildings on campus through an underground tunnel system. The plant does not have sufficient capacity to service the needs of Science I so more localized and efficient cooling systems will be utilized.

Water Wells: Two water wells will be provided to service Science I (and a planned future Science II). The well water will be an indirect energy supply for the heat pumps, and will not be considered consumptive since it will be re-injected back into the aquifer. The services of a hydro-geologist will be required in design to determine the flows and capacities of the underground aquifer.

Heating and Cooling System: Primary heating and cooling will be provided from central heat pumps located within the building; in the cooling and heating mode the heat pumps will reject and extract heat from the aquifer via a condenser loop. The condenser loop will be decoupled from the untreated open ground water system through plate and frame stainless steel heat exchangers. Supplemental heat, in peak winter conditions, will be provided from the campus steam system.

Ventilation Requirements: Labs with chemical use will be ventilated 24 hours per day with a minimum of 6 air changes per hour in accordance with the detailed space requirements. Ventilation rates may exceed 6 air changes per hour when dictated by process exhaust. Vivarium areas may require ventilation rates of 10-12 air changes per hour depending upon species and caging methods.

Acoustic Considerations: Acoustic isolation of the following mechanical systems will be included; vacuum pumps, air compressors, and heat pumps or chillers. Limiting duct velocities through ductwork, terminal units and air inlets/outlets to achieve space NC, use of sound attenuators in the duct systems, and vibration isolation of mechanical equipment with spring isolators and flexible connections will also be employed.

Outdoor Design Conditions: Heating Systems will be sized for the ASHRAE median of extremes for Cheney, Washington which is -9°F. Cooling systems will be sized for the ASHRAE 0.1% design condition temperature for Cheney, Washington which is 99°F dry bulb and 69°F wet bulb.
Indoor Design Conditions:

- When occupied, laboratories and support spaces will be maintained between 68

and 72°F, laboratory equipment rooms will be maintained between 68 and 75°F and office spaces will be maintained between 68 and 75°F. Telecommunication rooms will control to 68-75°F 24 hours per day, 7 days per week. Mechanical and electrical spaces will control to 55-85°F. Dehumidification and humidification are not anticipated unless specifically noted.

- Spaces with rodents, reptiles, or birds will be designed to operate between 65 and 80°F depending upon species with humidity ranges between 40 and 70% RH with individual zone level humidity control. Food and bedding storage will be maintained between 65 and 70 °FAV
- Aquarium space temperature and space humidity will be designed to correlate with the tank water temperature to minimize large amounts of condensation on the tanks.
- The greenhouse will be provided with packaged heating and cooling systems. Supplemental humidification will provide winter humidification that is not available from the greenhouse manufacturer.

Exterior Envelope Requirements: Components of the building envelope will meet or exceed the following minimum values:

• Roofs	R-30 Insulation entirely over deck
• Wall-above grade, steel framed insulation	R-13 metal stud plus R-10 continuous rigid
• Wall-above grade-mass wall	R-9.5 continuous rigid insulation
• Wall-below grade	Same as above grade
• Slab on Grade	R-10 rigid for 24 inch min. (with thermal break)
• Opaque Doors	U-0.37
• Glazing Assembly	U-0.40 for metal framing, windows U=0.60 for metal framing, entrance door SHGF=0.40 on all glazing

D3010 Energy Supply

- Electrical service to the EWU Campus primary distribution system is provided by the City of Cheney.
- Well water will be the indirect energy supply for a ground source heat pump system.
- Campus high pressure steam from the central heating plant natural gas fired boilers will be delivered to the building via the campus utility tunnel distribution network.

D3020 Heat Generation

A hybrid plant with ground source heat pumps and steam heat will be provided. This system will use central heat pumps that reject and extract heat from the aquifer via a condenser loop as required to meet the building heating and cooling needs. The heat pump system will be reduced to meet the building peak cooling loads and summer reheat loads, and possibly domestic hot water loads, allowing campus steam to be shut-off in the summer. When the building heating loads exceed the heat pumps heating capacity, supplemental heat will be provided from a hot water steam to hot water convertor piped in parallel with the heat pumps. Steam for the convertor will originate from the campus high pressure steam after reduction to lower pressure at a steam reduction station.

D3030 Refrigeration

The same ground source heat pump system used for heat generation will also provide the building cooling. Modular heat pumps will be piped and controlled to allow them to direct hot water or chilled water to the heating and cooling system based upon the season and respective building heating and cooling demands.

D3040 HVAC Distribution

Lab Supply: Lab areas that require 100% outside air and 24 hour ventilation will be serviced from dedicated supply systems.

Lab Exhaust: Exhaust will be manifolded to a central exhaust system consisting of multiple fans

with N+1 redundancy that automatically adjust exhaust air volumes from the lab spaces based upon lab occupancy, fume hood demand and cooling needs. Laboratory fume exhaust needs will be provided via Greenheck Vektor type dilution up-blast laboratory exhaust fans with operable bypass plenum dampers. It is recommended that an independent wind consultant specialist evaluate during design the site airflow probabilities.

Lab Exhaust Capacity: This system will approach 80,000 cfm assuming 80% coincident lab utilization. Four (4) 27,000 cfm fans will be provided, allowing the system to deliver 80,000 cfm with N+1 redundancy with some reserve capacity should utilization occasionally exceed 80%.

Lab Make-up Air: Make-up air units will be a central station variable air volume type that tracks the lab exhaust fans minus an offset for space pressurization control. Units will contain supply fans, filters, chilled water cooling coils and hot water heating coils. Coils in the lab exhaust system will capture waste heat from the exhaust air stream. Waste energy from the exhaust conditioned air will be piped to coils in the make-up air units to preheat or pre-cool the outside air introduced into the building. Terminal units in the labs will be variable air volume type with hot water reheat or chilled beam induction units.

Lab Fume Hood Exhaust: Chemical fume hoods will be duct exhausted.

Vivarium Air Systems: The vivarium will be serviced by dedicated, fully redundant, 100% outside air systems that operate 24 hours per day to maintain fixed temperature and pressure relationships required in the animal holding, procedure, and cage washing areas. The system will be the same as provided for the lab make up air except that, air supply shall be filtered with 95% efficient filters, unit and zones will have humidifiers. Diffusers in the vivarium and support areas shall be stainless steel. Procedure rooms shall have laminar airflow distribution. The supply and exhaust system capacity will be 13-14,000 cfm.

Aquarium Air Systems: The large fish tank spaces will be supported with an independent fan system equipped with dehumidification controls to minimize condensation on the large tanks and piping.

Greenhouse Air Systems: The greenhouses will include heating and cooling systems provided by the greenhouse manufacturer and integrated into the greenhouse construction. Supplemental humidification will be provided to provide humidity controls in the dry winter months.

Office Areas: Non-lab areas will be serviced from central variable volume style air handling units that have supply fans, return fans, filters, chilled water cooling coils, hot water heating coils and mixing boxes for minimum outside and economizer cooling capabilities. Local space temperature control will be provided from variable air volume terminal units with hot water heating coils. Systems serving these areas will be sized for 40,000 cfm.

Materials:

- Supply/return and non fume hood exhaust ductwork: Galvanized steel
- Chemical fume hood exhaust ductwork: Stainless steel.
-

D3050 Terminal and Packaged Units

Packaged terminal cooling units will be utilized for isolated areas that have 24 hour process cooling loads such as the main telecommunication rooms.

D3060 HVAC Instrumentation and Controls

Direct Digital Control (DDC): The project will utilize a Direct Digital Control (DDC) for the control of the HVAC systems, providing for heating and cooling control, peak load demand limiting and start/stop optimization. Damper and valve actuators will be electronic. Room thermostats will be electronic adjustable type with override switch for occupant activation to occupied mode during unoccupied periods. Operable windows in the offices will have sensors linked to the DDC system for efficient balance of natural ventilation with mechanical systems.

Energy Management System (EMS): The EMS controls will be compatible with EWU's campus BACnet system, and interface and communicate with this network and front end operator's terminal for the purpose of remote operation and maintenance. The EMS will include display and reporting of real-time building systems performance data, for use by engineering courses and as a feature of science-on-display within the building.

Chemical Fume Hood Controls: Specialty control devices for the lab environment will be provided for the operation of the chemical fume hood exhaust and make-up air, to assure the high reliability required for life safety and energy management. The system will include; make-up air valves, chemical resistant fume hood exhaust valves, general exhaust valves, fume hood face velocity sensors and software integrated with the EMS.

Vivarium Environmental Monitoring and Control System: In addition to EMS control, a dedicated environmental monitoring system would be independent of the facility EMS system and would consist of controls for monitoring of temperature, humidity, lighting, airflow and electric door locks. System would collect data for research and produce standardized reports to satisfy regulatory requirements.

D3070 Testing, Adjusting and Balancing
Air systems (supply, return, and exhaust), hydronic and domestic hot water recirculation systems will be completely balanced in accordance with Associated Air Balance Council or National Environmental Balancing Bureau.

D40 Fire Protection
General System: The fire department pump connection will be mounted on the exterior of the building. Double check valve backflow prevention assemblies will be provided for the fire systems in the utility room. Fire department connections, post indicator valve and backflow prevention will be in accordance with the City of Cheney requirements.

Sprinklers: The building light hazard areas (office, lecture rooms, circulation spaces) will be sprinkled to light hazard requirements. Electrical, mechanical and non-chemical use labs will be sprinklered to ordinary hazard group 1 requirements. Chemical use labs and other higher hazard areas will be sprinklered to ordinary hazard group 2 requirements. The fire system will be divided into multiple zones by floor for identification and annunciation at the central fire alarm panel.

Standpipe: A fire protection standpipe will be required as the highest occupied level of the building will exceed 30 feet above grade. A standpipe will be located in each exit stairwell.

D50 Electrical Systems
The building electrical systems will be designed in accordance with the latest revised edition of the following codes:

- National Electrical Code
- International Building Code (IBC)
- International Fire Code (IFC)
- Regulations of the State Fire Marshal
- Electrical Safety Order of the Washington State Department of Labor and Industries
- Washington Administrative Code
- Americans with Disabilities Act (ADA)
- Washington State Energy Code
- Requirements of Washington State Industrial Safety & Health Administration (WISHA)

The building electrical systems will be designed in accordance with the following standards:

- Illuminating Engineers Society of North America (IESNA)
- Eastern Washington University Construction Standards

D5010 Service and Distribution

Site Electrical: Power will be provided from the existing campus 13.2KV primary electrical distribution system. A new 13.2KV primary feeder will be installed from existing 13.2KV Switch #5 to Science I pad mount transformer locations. Existing 13.2KV Switch #5 currently has one spare switch compartment, and one existing switch which feeds the former Robert Reid Lab School on this project site that is scheduled for demolition.

Building Normal Electrical Service: Two three-phase four-wire electrical services will be provided, consisting of one 480/277V outdoor pad mount transformer and one 208/120V outdoor pad mount transformer, both connected to the EWU campus 13.2KV primary electrical distribution system. Two main switchboards will be located in a grade level dedicated main electrical room, in close proximity to the outdoor pad mount transformers.

NEC Article 700 Emergency Electrical Distribution System: The emergency electrical distribution system will consist of (1) 150KW, 480/277V engine driven propane fueled generator. NEC 700 generator will be installed as part of Science Phase 1 project. The emergency electrical distribution system will be provided with an automatic transfer switch in order to automatically switch loads between normal EWU campus power and generator backed power. The emergency electrical distribution system will supply power to all life safety systems within the building such as egress lighting, exit lighting and the fire alarm system.

NEC Article 702 Optional Standby Electrical Distribution System: An NEC 702 Optional Standby electrical distribution system shall be provided for the building. This optional standby electrical distribution system will consist of (2) 150KW, 480/277V propane fueled engine driven propane fueled generators. The standby electrical distribution system will be provided with an automatic transfer switch in order to automatically switch loads between normal EWU campus power and generator backed power. The primary intent of the optional standby power system is to provide generator backed power to non-life safety loads within the new building, such as fume hoods, freezers, department computer servers, telecommunications rooms (and associated cooling) and important research equipment which is deemed critical by EWU staff.

UPS Backed Standby Electrical Distribution System: It is possible that centralized or distributed uninterruptible power supplies may be needed in order to support specific computer work stations, department servers and critical research equipment. Specific UPS requirements will need to be closely coordinated with EWU as the project design progresses.

Building Distribution: The building electrical distribution will originate from a main electrical room in the basement and smaller stacked electrical rooms located on each floor. The building electrical distribution will be designed to provide separation of lighting, mechanical and computer equipment loads. Lab and special equipment power distribution will be separate from general building power panels. Because the building is being provided with separate 480/277 and 208/120V electrical services, it will not be necessary to distribute dry type step down transformers throughout the building. Multi-stage surge suppression shall be provided by installing transient voltage surge suppressors at the main switchboard, distribution switchboards and appropriate panelboard locations.

Switchboards: Switchboards will be free-standing dead-front style. Main devices will be equipped with ground fault protection. Distribution devices will be factory-installed, group-mounted circuit breakers. Each main switchboard will have owner metering and integral TVSS protection. Switchboards will be mounted on a 2” concrete housekeeping curb. All bus bars will be copper.

Panelboards: Circuit breaker panelboards will be provided throughout the building as required to adequately serve the associated building loads. Lab spaces will receive dedicated power panels located outside each lab room. Panelboards will be dead-front circuit breaker type with proper interrupting capacity. All panelboards will be provided with 42 available circuits and door in door construction. All bus bars will be copper. Where appropriate, panelboards will be provided with

integrally mounted TVSS units.

Mechanical Equipment: Refer to mechanical narrative for proposed mechanical systems and possible equipment. Motor loads ½ HP and larger will be 480V three phase. Motor starters and disconnects will typically be located in close proximity to each associated piece of mechanical equipment. Motor control centers will be utilized when several pieces of mechanical equipment which require motor starters are located in close proximity to one another. Variable frequency drives will be provided by the mechanical contractor and installed by electrical contractor for various pieces of mechanical equipment.

Disconnect Switches: Safety switches will be heavy duty type with interlocking door and spring loaded contacts. Safety switches used as motor disconnects will be fused. Outdoor safety switches will be NEMA 3R.

Motor Controllers / Motor Control Centers: Motor controllers will be magnetic motor starters with fused control power transformers, and will include pilot lights and auxiliary contacts as required for control functions. They will be free-standing, dead-front style, mounted on 2" concrete housekeeping curbs.

Engine/Generator: Emergency and standby power generation shall be provided by means of engine driven propane fueled generator sets. Generators shall be sized to supply emergency and standby loads. Generators shall include a weather proof sound attenuating enclosure for outdoor installation. Generators shall be provided with concrete pad that elevates the generator skid a minimum of 6-inches above adjacent grades and finishes for ease of access to oil & coolant drain lines. Operation of generators will be monitored on a multi function system designed to report most normal failures such as low cooling fluid temperature, low starting batteries, overcrank, overload, high water temperature, etc.

Automatic Transfer Switch: The automatic transfer switches shall be 4-pole, switched neutral, open transition type.

Medium Voltage Pad Mount Transformers: Transformers shall contain a dead front loop feed primary compartment. Provide transformers with integral secondary disconnect switch located within the transformer secondary compartment. Provide external oil sampling valve system extended to lockable box on exterior of transformer.

Medium Voltage Cabling: 15KV medium voltage cables will be shielded, copper MV-90 single conductors. 15KV cables will be sized in accordance with EWU campus standards and the National Electric Code, and will be installed with a 600V insulated equipment grounding conductor. 15KV cables will be installed in continuous runs without splices.

Medium Voltage Elbows: 15KV medium voltage cables will be terminated by 200 amp rated load-break elbows manufactured by Cooper.

Grounding: Grounding materials shall be copper, except ground rods shall be copper-clad steel. Grounding electrode shall be provided per code requirements. Equipment grounding conductors shall be run with all feeders and branch circuits. Separate grounding conductors shall be provided for isolated ground branch circuits. Equipment ground bars shall be provided within all electrical rooms and telecommunications rooms.

D5020 Lighting and Branch Wiring
General Interior Lighting: Lighting throughout the interior building spaces will respond to the primary use of each space while maintaining a level of flexibility to react to future use of each space. Uniform ambient lighting will establish a basic minimum lighting level throughout each individual space with task, display and accent lighting used to establish contrast and interest.

Specific attention will be given to the lighting for areas with computer workstations in order to minimize glare. Lighting within the building will be primarily fluorescent and LED dependent on the application. Fluorescent lamps shall be primarily T8, T5 and compact fluorescent. The use of incandescent lamp sources will be minimized and used only in special instances and as required for unique spaces or functions. Lighting system design foot candle levels will be in accordance with IES standards and EWU standards. In general, areas within the building will be illuminated to the following light levels:

Building Area	Foot-Candles
General Classrooms	40-50
Labs	60-75
Offices	40-50
Conference Rooms	40-50
Restrooms	10-20
Corridors	5-10
Janitor Rooms	10-20
Storage Rooms	5-10

Egress & Exit Lighting: Exit lighting will be LED type with integral battery backup. Emergency egress lighting will be provided throughout the path of egress, and will be supplied with power from the emergency generator system in the event of a failure on the normal power system.

General Lighting Controls: Within normally occupied spaces, multi-level switching will be provided in conjunction with occupancy sensors, and will utilize two or more manual wall switches. Manually dimmable lighting controls shall only be utilized within appropriate areas where specifically requested, such as conference rooms or social spaces. Automatically dimmed lighting controls shall be provided for the purpose of daylight harvesting where required by the energy code. A programmable low voltage lighting control system shall be provided for automatic control of lighting in corridors / common areas and exterior site lighting. The low voltage lighting control system shall also be interfaced to the campus energy management system (EMS) to allow EMS control of the exterior lighting.

Programmable Low Voltage Lighting Control System: Provide programmable, low voltage relay based lighting control system with building management system interface. The programmable low voltage lighting control system shall be used to control lighting within interior corridors and large common areas. This will allow the building lighting to be automatically turned on and off at pre-programmed times. The low voltage lighting control system shall be manufactured by Nexlight in accordance with EWU campus standards.

Occupancy Sensors: Occupancy sensors will be utilized to automatically shut off the lighting within offices, conference rooms, restrooms and classrooms when these spaces are unoccupied. Occupancy sensors shall be dual technology type. Either ceiling mounted or wall mounted occupancy sensors will be utilized depending on the physical size and specific geometry of the room being controlled.

Sustainable Design Considerations: All sustainable design measures considered will be evaluated completely with regards to their associated sustainable and economic aspects. Many opportunities are currently available to construct a building that is a model of sustainable design. The following is a brief list of items related to the building lighting and lighting control systems which are being considered for this project:

- Energy efficient fluorescent and LED lighting will be utilized as the primary light source within the building in order to reduce the energy consumption associated with the lighting system to the fullest extent possible.
- Occupancy sensors will be utilized to automatically shut off the lighting when spaces are unoccupied. This will allow the interior lighting within these spaces to be automatically turned off during unoccupied times, thereby increasing the available energy savings associated with the interior lighting system.
- Within normally occupied spaces, multi-level switching will be provided in

conjunction with occupancy sensors, and will utilize two or more manual wall switches. The utilization of multi-level switching within these spaces will allow the user to manually reduce the light levels within their spaces if desired, further increasing the available energy savings associated with the interior lighting system.

- Automatic dimming lighting controls shall be provided for the purpose of daylight harvesting within areas where required by the energy code. The utilization of automatic dimming or step-dimming and daylight harvesting will allow EWU to take advantage of the natural available daylight to the fullest extent possible. This will result in additional available energy savings associated with the interior lighting system.
- A programmable low voltage lighting control system shall be used to control both the exterior lighting system and portions of the interior lighting system. This will allow both the interior and exterior lighting systems to be automatically turned on and off at pre-programmed times, thereby increasing the available energy savings associated with the interior and exterior lighting systems.

Exterior Lighting: Exterior entry lighting which illuminates the path of egress will be supplied with power from the emergency generator system in the event of a failure on the normal power system. Exterior lighting will utilize full cut off light fixtures in order to avoid light trespass and meet associated dark sky lighting requirements. It is suggested that solar LED site lighting be considered during design, to eliminate electricity cost for site lighting and significantly reduce maintenance costs with the long life span of LED bulbs. Exterior areas will be illuminated to the following light levels:

Exterior Entry	5
Exterior Walkways	2
Parking Areas	1

General Branch Wiring: Provide complete raceway and wiring systems in conformance with code requirements and campus standards.

Conduit: Galvanized steel metal conduit shall be used inside building. Non-metallic conduit shall be used underground, except at transitions. Metal conduit shall be rigid metal conduit, intermediate metal conduit, electrical metallic tubing, or flexible metal conduit. Non-metallic conduit shall be schedule 40 PVC. Conduit shall be concealed wherever possible. Minimum conduit size is 3/4" unless otherwise noted. Conduits installed within utility tunnels shall be rigid metal conduit.

Building Wire: All wiring shall be copper, minimum size #12 AWG. All feeder conductors shall be installed in conduit. Aluminum conductors are not allowed on the EWU campus. All 480/277V and 208/120V building wire shall be color coded in accordance with EWU campus standards.

Wiring Devices: Switches and receptacles outlets shall be specification grade. GFI type outlets shall be provided where outlets are mounted within 6 feet of a sink. Trim plates shall be color coordinated with architect.

D5030 Communication and Security
Telecommunications Building Distribution: A complete telecommunications distribution pathway and cabling system will be provided by the contractor in accordance with the EWU construction standards. Pathways, cabling, outlets and passive equipment will be provided by the contractor. Active equipment will be provided by EWU. Telecommunications rooms will be located throughout the facility in accordance with EIA/TIA 568 and 569. The main telecom room will be located on the first floor of the building, in a centralized location. Secondary communication rooms are to be located on each floor and stacked above the main telecommunication room. Horizontal station cable pathways will be provided and routed to the telecommunications rooms located on each floor. Each telecommunications room shall be provided with a dedicated 120/208V standby power panelboard and an equipment ground bar. Selected areas will be equipped with cabling provisions for owner furnished wireless local area networking.

Telecommunications riser cabling and pathways will be provided from the entrance location to the telecommunications room on each floor. Cable trays will be installed down corridors with conduits provided at hard (inaccessible) ceilings and were wall and floor penetrations are required.

Telecommunication Outlet Distribution: Telecommunications devices will typically be located at instructor's podiums, ceiling mounted projector locations, computer work stations and required student locations. Offices shall typically be provided with two telecommunication outlet locations per room.

WiFi Systems: WiFi system pathways, cabling and outlets will be provided by the contractor. Required locations for WiFi network routers will be closely coordinated with EWU. All WiFi network routers will be provided and installed by EWU.

Closed Circuit Television (CCTV) System: CCTV System pathways and cabling will be provided by the contractor. Required locations for CCTV devices will be closely coordinated with EWU. All CCTV cameras, power supplies and active electronic equipment will be provided and installed by EWU.

Access Control System: A complete access control system will be provided by the contractor. Required locations for miscellaneous access control devices will be closely coordinated with EWU. Typical spaces which will include access controls are main entries, enhanced classrooms, office suites and utility rooms.

D5090 Other Electrical Systems
Audio / Video Systems: AV system pathways, cabling and outlets will be provided by the contractor. Required locations for AV devices and equipment will be closely coordinated with EWU, but will typically include classrooms and auditoriums. Video projectors, sound reinforcement systems and all passive/active electronic AV equipment will be furnished and installed by EWU.

Distance Learning: Where required, distance learning system pathways and cabling will be provided by the contractor. Distance learning equipment will be furnished and installed by EWU.

Fire Alarm: A complete battery backed addressable fire alarm system with manual pull stations, automatic detection and ADA compliant speaker/strobes will be provided throughout the facility. Smoke detector and heat detectors will be installed as required by the governing codes, and in accordance with EWU campus standards. The building fire sprinkler system will be monitored by the fire alarm system for system flow and shutoff valve tampering. Central reporting capabilities will be provided with the fire alarm system, and shall be compatible with the existing Edwards FireWorks EWU campus fire alarm monitoring system. Fire alarm system pathways and wiring will be provided by the contractor. All fire alarm system devices and equipment will be provided and installed by EWU. The fire alarm system shall be manufactured by Edwards System Technology (EST) Model EST-3 in accordance with EWU campus standards.

Clock System: Clock System pathways, cabling and outlets will be provided by the contractor. Required locations for clocks will be closely coordinated with EWU. All clocks and clock equipment will be provided and installed by EWU.

Room Scheduling: Room Scheduling System pathways, cabling, outlets and passive equipment will be provided by the contractor. Required locations for room scheduling will be closely coordinated with EWU. All room scheduling displays and active equipment will be provided and installed by EWU.
Community Antenna Television (CATV) System: CATV system pathways, cabling and outlets will be provided by the contractor. Required locations for CATV will be closely coordinated with EWU. All CATV distribution equipment will be provided and installed by EWU.

E Equipment and Furnishings

E10 Equipment

E1010 Laboratory Fume Hoods and Other Air Containment Units

Bench-Mounted Chemical Fume Hoods: Restricted bypass type / variable air volume (VAV) extraction hoods at 100 fpm (0.51 m/s) face velocity with a vertical rising sash will be provided. Exhaust air volume will be based on 18" open sash position. Fume hood work surface will be dished epoxy resin.

Wet Process Acid Fume Hood: Wet Process Fume Hood shall be constant volume extraction at 100 fpm face velocity with vertical rising sash. All hood and exhaust system components shall be constructed to resist high concentration acid use.

Fume Extractor Arms (Snorkels): Snorkels will be 3 inch (75 mm) diameter, hinged, self-supporting air extractor arm assembly with 14" diameter clear acrylic hood.

Low Slot Exhaust: These will be custom fabricated stainless steel.

Biological Safety Cabinets: Cabinets will be Class II, Type A2, and designed to operate with an intake air velocity of 100 fpm (0.5 m/s), re-circulating the air through the supply HEPA filter into the work area.

Laminar Flow Hoods: Laminar Flow Hoods shall be equipped with supply HEPA filter and reusable prefilter to maintain Class 100 standard at work area.

Canopy Hood: Canopy Hood shall be an exhausted stainless steel canopy enclosure with all hangers and miscellaneous hardware, including damp location light fixture.

E1020 Laboratory Service Fittings and Fixtures

Service Fittings: Service fittings shall be chromium plated with an acid- and solvent-resistant, clear epoxy coat finish specifically designed for laboratory use. All service fittings shall be of the tapered body design with four arm handles, except for ADA accessible fittings which shall have lever handles as described below.

High Purity Water Valves: Chromium plated cast brass valves will be provided with polypropylene liner. Valve stem and bonnet will be brass.

Fittings and fixtures: These are designated to be accessible to persons with disabilities (ADA) with operable parts shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 5 pounds (22.2 N), maximum.

Safety Stations: Safety station shall be barrier-free with emergency shower actuation valve in stainless steel cabinet for recess mounting and wall-mounted eyewash with stainless steel skirt.

Hand held eye wash: These shall be dual-purpose eye wash/drench hose, deck mounted.

Cup Sinks: Cup sinks will be epoxy and set flush with work surface, except for any cup sinks at fume hoods which will have ¼" raised rim.

Laboratory Sinks: Laboratory sinks will be epoxy for drop-in installation in work surfaces.

Stainless steel sinks: Stainless steel sinks will be Integral one piece construction with stainless steel work surface. 18 gauge (1.3 mm thick) steel unless otherwise noted.

Scrub-up sink: These shall be wall mounted 14 gauge (2.0 mm thick) Type 304 stainless steel sink with knee action control and HWCW mixing valve.

E1030 Laboratory Sterilizers And Washers
Laboratory Glassware Washers: These shall be tall, floor mounted, front loading single door units programmable for multiple wash cycle and drying cycle duration, with purified water rinse capability. Unit shall have mounting hardware and finish pieces for mounting through architectural wall.

Laboratory Medium Steam Sterilizers: These shall be prevacuum/gravity models with interior chamber dimensions of 20: x 36" x 48". Steam source should be provided to operate all sterilizers and Cage/Bottle Washer. Freestanding single door unit shall be cabinet enclosed. Recessed single door unit shall have mounting hardware and finish pieces for mounting though architectural wall. Pass-through double door unit shall have mounting hardware and finish pieces for mounting one end through an architectural wall.

Cage/Bottle Washer: These shall be tall, floor mounted pass through double door unit, programmable for multiple wash cycle and drying cycle duration, with purified water rinse capability and multiple wash/rinse agent capability.

E1040 Controlled Environment Rooms
Controlled temperature rooms: These shall be of modular, "sandwich panel", construction. Each panel shall consist of interior and exterior metal skins with a solid core of insulation and shall incorporate an integral mechanical method of fastening and sealing the joints to provide a vapor tight seal. Construction shall allow disassembly for possible relocation or expansion at a later date. Each controlled environment room shall be complete with all necessary environmental conditioning controls, heating, refrigeration and air conditioning systems, lighting systems and all necessary mechanical and electrical components to provide the environmental conditions herein specified and as shown on the construction documents.

Door: Doors shall have insulated vision panel with insulated door, and insulated entry ramp.

Instruments, Controls Major Electrical Components: These shall be located in surface mount control console. Provide LCD color touchscreen microprocessor based temperature and humidity (where applicable) controller with real-time and archive trending. Each room shall be provided with reset type personnel emergency alarm with electrically powered audible and visual alarm system.

Environmental conditioning system consisting of blower(s), evaporator coil(s), heaters, humidifier (as required), refrigeration piping system and drain pans, shall be housed in modular enclosure(s) suspended from the room ceiling and shall be factory prewired to the control cabinet.

Refrigerant: Utilize non-ozone depleting refrigerants R-134a, R-404A, or approved equal; CFC type refrigerant shall not be acceptable.

Operation: Each system shall be designed and furnished in such a manner as to allow the motor compressor to operate continuously with a modulating bypass system to maintain specified temperature ranges.

Defrost: System shall incorporate an automatic defrost system.

Refrigerant Piping: All refrigeration piping required shall be furnished and installed by the controlled temperature room contractor. Provide ACR type, hard drawn, cleaned and capped Type L copper tubing with silver brazed joints.

Compressor-Condensing Unit: Compressor-condensing unit to be complete in all respect including base and cabinet and all associated piping, components, safeties and controls. Compressor shall be a hermetic or semi-hermetic unit designed for on-site maintenance with integral suction and discharge refrigerant service isolation valves. Condenser shall be top-of-room mounted water-

cooled or remotely located air cooled as indicated in Controlled Environment Room equipment schedule in Laboratory Furnishings drawings.

Ventilation: provide make-up air from the laboratory space at the rate of 0.25 CFM per square foot (4.57 m³/h per square meter) unless otherwise indicated on the drawings. No ventilation air provisions shall be made for freezer rooms operating at or below 0°C.

E20 Furnishings

E2010 Laboratory Casework and Other Furnishings

Wood Casework: Wood casework shall comply with all requirements of AWI Section 400 Custom Grade architectural cabinets. Lumber shall be plain sawn maple; veneer shall be plain sliced maple. Wood casework shall be flush overlay design.

Metal Casework: Metal casework shall be of modern design and shall be constructed in accordance with the recommended practices of the Scientific Equipment and Furniture Association. All units shall be of flush overlay construction. Door and drawer heads shall be of welded, double walled steel construction, 3/4" (18 mm) thick, filled with sound deadening material.

Corrosive Storage Cabinets: Cabinets shall be vented with corrosion resistant liner designed and labeled specifically for the storage of acids and other corrosive substances, to meet code requirements

Flammable Liquid/Solvent Storage Cabinets: Cabinets shall be metal designed and labeled specifically for the storage of flammable liquids and other volatile substances, to meet code requirements.

Ventilated Storage Cabinets: Cabinets shall have perforated metal adjustable shelving, vent louvers inset on the lower portion of the door, and a 2" diameter PVC connection to the building exhaust system.

Laboratory work surfaces: These shall be 1" thick chemically resistant modified epoxy resin.

Stainless steel work surfaces: These shall be 16 gauge (1.6 mm thick), type 304, #4 finish with heavy mastic coating underside and perimeter timber fixing frame.

Adjustable reagent shelves: These shall be ¾ inch thick, 7-ply shop sanded exterior grade veneer plywood shelving with K+ face veneers with chemical resistant plastic laminate on all surfaces on book-end brackets mounted on double-slotted 2 inch x 2 inch fully welded square steel tube support frame. All shelves shall have 1-1/2" high safety edging.

Adjustable wall shelves: These shall be ¾ inch thick, 7-ply shop sanded exterior grade veneer plywood shelving with K+ face veneers with chemical resistant plastic laminate on all surfaces on book-end brackets mounted on double-slotted standards. All shelves shall have 1-1/2" high safety edging.

Heavy-duty shelving: These shall be 1 inch thick, 7-ply hardwood plywood with chemical resistant plastic laminate on all surfaces and edges on heavy-duty shelf standards and brackets. All shelves shall have 1-1/2" high safety edging.

Stainless steel shelving: These shall be Super Erecta stainless steel shelf system, post supported, floor mounted or wall mounted, and floor mounted high density configuration, and shall include all accessories required for function.

Open industrial metal shelf units: These shall be premium grade 20 gauge steel shelf units comprised of 5 shelves adjustable on 1" increments, 85" high 14 gauge angle post supports, and side and rear cross-bracing.

Cylinder Restraints: These shall be fabricated with Unistrut, Powerstrut or equal.

Overhead service carriers: These shall be fabricated with unistrut channels supported from structure above at 48" on center maximum and include a 14 gauge metal channel at bottom for mounting of piped services and electrical raceways.

Suspended metal channel grid: Purpose designed to support 200 lb. (0.89 kN) point load at any position and 50 lb./ft. (0.73 kN/m) uniformly distributed load. All brackets, channels, etc. (galvanized metal).

Pipe drop enclosures: These shall be an 18 gauge galvanized steel sheet enclosure with removable cover panels and epoxy paint finish.

Drying racks: These shall have a stainless steel body with white polypropylene pegs and integral drain trough with welded stainless steel trough ends.

Blackout curtain: These shall be flame-retardant or made of non-combustible materials, with front and rear light-trap valances of the same material as the curtain. Curtain track shall be satin anodized extruded aluminum, with two-wheel roller assemblies.

Surgical light fixture: These shall be wall mounted articulating arm adjustable examination light.

E2015 Non-Laboratory Casework and Other Specialties
Casework: Typical casework provided in the work rooms will consist of plastic laminate millwork cabinets, countertops and shelving. Plastic laminated shelving will be provided at all offices. Fixed plastic laminate tables will be provided at the Large and Medium Classrooms.

Visual Display Boards: Tack boards and whiteboards will be provided in classrooms and offices.

Toilet Compartments: Provide heavy duty stainless steel toilet compartments that are wall and floor supported.

*Modular Shower Units: M*odular shower units will be provided at bicycle locker rooms.

Metal Lockers: Painted metal lockers will be provided at bicycle locker rooms.

Window Blinds: Roller blind window coverings will be provided throughout the building, with blackout shades at classrooms and conference rooms having video projection.

Projections Screens: Roll down projection screens

Signage: Interior way-finding and room identification signage, and exterior building signage will be provided.

Bicycle Racks: Stainless steel bicycle racks will be provided.

Fire Extinguisher Cabinets: Provide stainless steel fire extinguisher cabinets.

Toilet Accessories: Provide stainless steel toilet accessories.

F Other building construction
No requirements.

G Site work

G10 Site Preparation

Site Preparation and Excavation: It is assumed that the existing Robert Reid Lab School will have been demolished for the construction of the Science I building. Site preparation for the Science II building will include removal of the existing asphalt parking lot (approx. 23,000 sf) and removal of miscellaneous site features such as two light poles, some parking bumpers and parking meters. The topsoil and vegetative material will be removed, screened and saved for re-use in landscaped areas. The subgrade will be prepared prior to placing structural fill or building foundations, per future geotechnical recommendations. Structural fill will be approved imported material. Native silty or clayey material is not be acceptable for use as structural fill and will be hauled off site.

Temporary Sediment and Erosion Control: All temporary erosion and sedimentation control systems will be designed and constructed in accordance with the Eastern Washington Regional Stormwater Manual Best Management Practices (BMP's), to protect off site properties as well as minimize the quantity of sediment-laden water from entering the City of Cheney's public storm system. The site will be graded to drain to sediment control ponds adjacent to Seventh Street. Catch basin protection should be used on existing and future catch basins to reduce sediment-laden water from entering the existing storm conveyance system during construction.
Temporary Construction Features: The project will include a construction access ramp with quarry spalls, and silt fencing placed around the downhill portion of the site. Soil stockpiles will be erosion protected.

Construction Debris: The contractor will implement BMP's to prevent demolition and construction debris, waste, material, fuel, oil, lubricants, and other fluids from entering the public right of way and the existing storm conveyance system.

Foundation Subdrainage: A footing and slab drainage system will be incorporated, and discharge will be pumped either into a stormwater detention system described under G30 or directly into the City's stormwater system in 7th Street . Slab drainage will be a layer of washed, free draining aggregate underlain by a filter fabric. Perforated drain pipes in the free-draining layer will drain to a sump pump system. In the event that a basement is incorporated into the design, a below-grade wall waterproofing and drainage system will need to be incorporated into the design.

G20 Site Improvements

Site Development: The building will be accessed by a walkway from Seventh Street, and a main entrance plaza off the campus Art Walk to the northwest of the building. A driveway will be provided off of 7th Street to allow for delivery and pick-up of small boats without the need to back into or from 7th Street.

Landscaping: A combination of xeriscape plantings, grass lawns, biofiltration swales (described under G30), and trees will be provided. A green roof will be considered during design.

Irrigation: An irrigation system will be provided, and will be supplemented by water collected in the stormwater detention system described under G30.

Fire Truck Access: Fire truck access will be provided by Seventh Street, the campus sidewalk system on the north and west, and by the new service drive to Science I. The sidewalks adjacent to the project will be constructed to accommodate service vehicles. There are three existing fire hydrants within a 300 foot radius of the proposed building.

G30 Civil and Mechanical Utilities

Water Supply: A single combined fire and domestic water service will be provided to the building from the 10-inch University system water line that loops around the southwest and southeast side of the site, which has a static pressure in this area of approximately 91 psi. It will be split once inside the building.

Water Meter: A building water meter will be provided to measure the domestic water use in

the new building for the purpose of; reporting trends in building systems consumption required by WA State law, reporting of meeting LEED criteria, and real-time display of building systems performance data for use by engineering courses at EWU.

Sanitary Sewer: All floors at existing grade and above will drain by gravity to the campus sanitary sewer system located to the northwest of the site. Any drains in the basement will be pumped up to a higher elevation to drain by gravity to the adjacent line. The proposed site of Science I will require rerouting of an existing 12" sanitary sewer line from manhole ess-39 to manhole ess-50 located northwest of the building. It is expected that the Science II building will be served off of this re-routed line constructed for Science I, which would entail a 6" service line with a length of 50 lineal feet or less.

Stormwater Treatment and Disposal: The University's stormwater system drains to the City of Cheney's street storm system, and Science II will to conform to the City's development manual which specifies stormwater design standards. The City has adopted the Spokane Regional Stormwater Manual, April 2008, which also governs stormwater design for Spokane County, the City of Spokane and the City of Spokane Valley. Stormwater that runs off the vehicular service drives will be treated by a bioinfiltration swale system adjacent to the service drive that will feed into a detention system. Pretreatment of stormwater runoff from the anticipated thermoplastic membrane roofing system is not required.

Bioinfiltration Swale: The swale to treat vehicular pavement runoff will have a 12" layer of medium to well-draining soil at the surface and a 48-inch thick subgrade infiltrative layer that has an infiltration rate of .15 inch per hour. The swale will be designed to pond to a depth of 6 inches before overflowing into the detention facility.

Stormwater Detention System: The soils on the EWU campus are typically fine-grained and not suitable for infiltration as the sole source of stormwater disposal. Stormwater runoff, from the roof and excess from the bioinfiltration swale, as well as the foundation subdrainage system, will be captured in an underground storage system for pumping to the irrigation system on demand, or to the City stormwater system. This storage system may be comprised of a stacked array of rectangular polypropylene modules with a geotextile liner allowing for some amount of percolation. Overflow will be pumped to the 12" campus storm drain line west of the project site from EST-30 to EST-34, rather than the shorter route out to the City's 12" line in Seventh Street to limit the number of connections to the City's system.

Connection to Campus Utility Tunnel: A branch utility tunnel will be provided connecting the campus utility tunnel under the Art Walk to a mechanical basement along the north side of the building, to route campus steam, electrical and telecommunications utilities to Science II.

Gas Distribution: A new natural gas service for laboratory use will be provided by Avista Utilities, to include a meter, pressure reducing valve, and manifold located at the exterior of the building. This service will be supplied from a 2-inch pipe residential grid system in the alley between 6th and 7th Streets. If demand increases to support mechanical systems, then gas will then be extended down 7th Street from the 4" intermediate-pressure main about 800 feet southwest of the site on 7th Street.

<u>G40 Electrical Utilities</u>

G4010 Electrical Distribution

The EWU Campus currently receives electrical utility power via two separate 13.2KV electrical service feeders from the City of Cheney. These two 13.2KV electrical service feeders are terminated within the EWU Rozell Substation at Campus Switchgear Bus #1 and Campus Switchgear Bus #2. Four separate 13.2KV campus feeders are routed from the Campus Switchgear to a system of 13.2KV switches located throughout the EWU campus in order to provide increased redundancy and flexibility to the campus electrical distribution system.

G4020 Site Lighting

Site lighting will be selected in conformance with EWU campus standards, and will utilize full cut off light fixtures in order to avoid light trespass and meet associated dark sky lighting requirements. Site lighting which illuminates the path of egress will be supplied with power from the emergency generator system in the event of a failure on the normal power system. Site lighting will be controlled via a programmable low voltage lighting control system which will allow the site lighting to be automatically turned on and off at pre-programmed times and automatically controlled by the campus EMS system.

G4030 Site Communication/Data
Data/Communication service is typically provided to each building on the EWU Campus from the EWU owned data/com distribution system. Fiber optic cabling is typically routed throughout the EWU Campus via a system of cable tray that is located within the existing campus utility tunnel system. Building telecommunications service pathways will be provided and installed by the contractor. Building service pathways will be routed from the existing campus utility tunnel system into the main telecom room. Building telecommunications service cabling will be provided and installed by EWU.

G4090 Other Site Electrical Utilities
Building CATV service pathways will be provided and installed by the contractor. Building service pathways will be routed from the existing campus utility tunnel system or designated service point into the main telecom room. Building CATV service cabling will be provided and installed by EWU.

5.3 CONSTRUCTION COST

A detailed construction cost estimate for a new Science II building was prepared by a professional cost estimator in order to accurately determine the predicated costs for the project. The detailed estimate is included in the Appendix to this report. The estimated construction cost for the building and site improvements is summarized as:

Facility Construction:

A10	Foundations	$1,401,377
A20	Basement Construction	$280,546
B10	Superstructure	$4,320,459
B20	Exterior Closure	$3,419,986
B30	Roofing	$981,518
C10	Interior Construction	$3,392,036
C20	Stairs	$265,100
C30	Interior Finishes	$2,651,764
D10	Conveying	$374,000
D20	Plumbing Systems	$2,624,597
D30	HVAC Systems	$8,571,001
D40	Fire Protection Systems	$457,896
D50	Electrical Systems	$5,189,484
	Equipment (built in)	$4,166,005
	Furnishings (built in)	$752,792
	Sub-Total Facility Construction	$38,848,560

Site Construction:

G10	Site Preparation	$298,553
G20	Site Improvements	$442,259
G30	Site Civil / Mechanical Utilities	$297,223
G40	Site Electrical Utilities	$121,000
	Sub-Total Site Work	$1,159,036
	General Requirements	$3,382,500
	Contractor's Overhead & Profit	$2,386,455
	Unescalated Maximum Allowable Construction Cost (MACC)	$45,776,551
	Escalated Maximum Allowable Construction Cost (MACC)	**$51,843,404**

5.4 REASONABLENESS OF COST

The detailed construction cost estimate for Science II, escalated to the mid point of construction (6/30/2018), predicts the cost to be $51,843,404 which equates to a unit cost of **$467 per gross square foot.** This falls slightly below OFM's expected cost of $468 per gross square foot for escalated construction cost as calculated in the table below.

	A	B	C	D	E
Facility Type	Construction Cost/GSF Best Fit (7/1/2008)*	Cost Index to Mid-Construction (6/30/2018)**	Expected Construction Cost/GSF	Percentage of Total Program	Weighted Value
			A x B		C x D
Classrooms	$297	1.375	$408	11.0%	$45
Science Labs (Teaching)	$309	1.375	$425	37.3%	$158
Research Facilities	$440	1.375	$605	36.0%	$218
Administrative Buildings	$218	1.375	$300	15.7%	$47
Total				100.0%	**$468**

* Reference: OFM's "2013-15 Capital Projects Evaluation System" page 25

** Reference: OFM's replacement "Construction Cost Index Global Insight May 2012 Forecast"

5.5 PROJECT REQUEST

Science II funds are requested per biennium as follows:

Funding Phase	Biennium	Amount
Predesign	2013 - 2015	$350,000
Design	2015 - 2017	$5,690,700
Construction	2017 - 2019	$67,290,000
Total		$73,330,700

5.5 FUNDING SOURCE

Science II will be a State funded project.

5.6 BENEFIT AND LIFE CYCLE COST ANALYSIS SUMMARY

Description of existing program and facilities
EWU's biology program is housed in the existing 148,149 gross square-foot Science Building, along with the chemistry, physics and geology departments.

The existing Science Building will not be able to meet the demands of anticipated growth in enrollment over the next 10 years. There are significant concerns with the existing building, including health, safety and accessibility issues, lack of adequate teach, research and laboratory support space, problematic HVAC systems, outdated technology, and the high cost of maintenance and energy usage.

Most appropriate alternative
Alternative I: Construction of a new building to house the biology program is the preferred alternative. Satisfaction of the program requirements can readily be achieved through construction of a new building, Science II, on the campus in Cheney that will serve as a partial replacement for the existing Science Building.

The other alternatives explored were as follows (see section 2.3 for additional information):

- Alternative II: Addition and Renovation of Existing Science Building – An alternative for addressing the deficiencies of the existing Science Building with a major addition and renovation of the existing building generates additional expense and creates operational inefficiencies. For comparison purpose, the Life Cycle Cost Analysis assumes that a new addition of 90,725 SF would be constructed to serve the laboratory needs of the program and will be connected to the science building via bridges, that the 24,280 SF portion of the existing Science Building occupied by biology would be renovated to house non-lab spaces such as office area and classrooms, and that the remaining 123,869 SF of the existing Science Building would receive ADA upgrades.
- Alternative III: No Action – This alternative will leave the biology department in the existing science building. The department will not be able to continue to increase the number of science degrees conferred and will remain in a facility ill equipped to provide students and faculty an accessible, safe and interactive environment that supports the university mission of excellence through learning.

On the following page, the Life Cycle Cost Analysis evaluates the life cycle costs for Alternatives I, II and III.

EWU Science I
Predesign Life Cycle Cost Analysis (Present Worth Method)

				Alternate I - Preferred New Building		Alternate II Addition + Renovation		Alternate III Do Nothing	
Project Life Cycle (Years)			50	111,005		238,874			
Discount Rate (%)			2.10%	95		90,725 new; 24,280 renov; 123,869 ADA		102,573 new; 10,000 renov	
				Est.	PW	Est.	PW	Est.	PW
Initial Cost				**45,776,551**	**45,776,551**	**57,736,291**	**57,736,291**	**0**	**0**
Construction Cost									
A)	Shell			12,962,136	12,962,136	13,572,482	13,572,482		0
B)	Interiors			9,032,585	9,032,585	14,339,718	14,339,718		0
C)	Equipment & Vertical Transportation			4,789,705	4,789,705	4,847,315	4,847,315		0
D)	Mechanical & Electrical			17,769,342	17,769,342	23,476,776	23,476,776		0
E)	Site			1,222,783	1,222,783	1,500,000	1,500,000		0
	TOTAL			45,776,551	45,776,551	57,736,291	57,736,291	0	0
Other Initial Costs									
A)	Other Costs (EWU soft costs)				28,839,227		36,373,863		0
B)	Surge costs				0		5,000,000		
Total Initial Cost Impact (IC)					74,615,778		99,110,154		0
Initial Cost PW Savings							(24,494,375)		
			Mark-up	1.2540		1.4500		0.0000	
Replacement / Salvage Costs		Year	Factor						
A)	Clean & seal exterior	5	0.9013					0	0
	Clean & seal exterior	10	0.8123	103,741	84,274	258,134	209,695	0	0
	Clean & seal exterior	20	0.6599	103,741	68,460	258,134	170,346	0	0
	Clean & seal exterior	30	0.5361	103,741	55,613	258,134	138,380	0	0
	Clean & seal exterior	40	0.4355	103,741	45,177	258,134	112,413	0	0
	Clean & seal exterior	50	0.3538	103,741	36,700	258,134	91,318	0	0
B)	Tuck point (50%)	5	0.9013					0	0
	Tuck point (50%)	25	0.5948	70,999	42,229	176,665	105,077	0	0
	Tuck point (50%)	50	0.3538	70,999	25,117	176,665	62,498	0	0
C)	Reroof - Membrane	5	0.9013					0	0
	Reroof - Membrane	15	0.7322	919,847	673,487	2,288,823	1,675,815	0	0
	Reroof - Membrane	30	0.5361	919,847	493,109	2,288,823	1,226,987	0	0
	Reroof - Membrane	45	0.3925	919,847	361,041	2,288,823	898,367	0	0
D)	Floor finish	7.5	0.8557	0	0	0	0	0	0
	Floor finish	15	0.7322	1,308,713	958,205	3,256,427	2,384,269	0	0
	Floor finish	22.5	0.6265	0	0	0	0	0	0
	Floor finish	30	0.5361	1,308,713	701,572	3,256,427	1,745,698	0	0
	Floor finish	37.5	0.4587	0	0	0	0	0	0
	Floor finish	42.5	0.4134	1,558,745	644,438	3,256,427	1,346,317	0	0
	Floor finish	50	0.3538	0	0	0	0	0	0
E)	Interior paint	10	0.8123	271,441	220,505	675,417	548,674	0	0
	Interior paint	20	0.6599	271,441	179,127	675,417	445,715	0	0
	Interior paint	30	0.5361	271,441	145,513	675,417	362,076	0	0
	Interior paint	40	0.4355	271,441	118,208	675,417	294,132	0	0
	Interior paint	50	0.3538	271,441	96,026	675,417	238,938	0	0
F)	Controls	5	0.9013					0	0
	Controls	12.5	0.7712	1,183,202	912,509	2,944,122	2,270,565	0	0
	Controls	25	0.5948	1,183,202	703,745	2,944,122	1,751,105	0	0
	Controls	37.5	0.4587	1,183,202	542,742	2,944,122	1,350,487	0	0
	Controls	50	0.3538	1,183,202	418,574	2,944,122	1,041,523	0	0
G)	AHU	5	0.9013					0	0
	AHU	25	0.5948	1,841,707	1,095,411	4,582,657	2,725,673	0	0
	AHU	50	0.3538	1,841,707	651,528	4,582,657	1,621,176	0	0
J)	Lighting upgrades	5	0.9013					0	0
	Lighting upgrades	12.5	0.7712	1,392,003	1,073,540	3,463,673	2,671,254	0	0
	Lighting upgrades	25	0.5948	1,392,003	827,936	3,463,673	2,060,124	0	0
	Lighting upgrades	37.5	0.4587	1,392,003	638,520	3,463,673	1,588,809	0	0
	Lighting upgrades	50	0.3538	1,392,003	492,440	3,463,673	1,225,321	0	0
K)	Fire alarm upgrades	5	0.9013					0	0
	Fire alarm upgrades	12.5	0.7712	417,601	322,062	1,039,102	801,376	0	0
	Fire alarm upgrades	25	0.5948	417,601	248,381	1,039,102	618,037	0	0
	Fire alarm upgrades	37.5	0.4587	417,601	191,556	1,039,102	476,643	0	0
	Fire alarm upgrades	50	0.3538	417,601	147,732	1,039,102	367,596	0	0
L)	Seismic upgrade	5	0.9013	0	0	0	0	0	0
M)	Elevator upgrade	5	0.9013	0	0	0	0	0	0
	Elevator upgrade	30	0.5361	426,360	228,562	1,060,897	568,723	0	0
N)	ADA upgrade	5	0.9013	0	0	0	0	0	0
O)	Other MEP upgrades	10	0.8123	0	0	0	0	0	0
P)	Other architectural upgrades	5	0.9013		0		0	0	0
	Other architectural upgrades	20	0.6599	0	0	0	0	0	0
Q)	Landscape upgrades	15	0.7322	271,961	199,123	676,712	495,470	0	0
R)	Hazmat abatement	5	0.9013	0	0	0	0	0	0
	Sub-total			25,306,576	13,643,160	62,347,346	33,690,596	0	0
	Other EWU Soft Costs			0	0	0	0	0	0
Total Replacement / Salvage PW Costs					13,643,160		33,690,596		0
Operational / Maintenance Cost		Escl. 00%	PWA						
A)	Maintenance & Operations - New	3.00%	63.0435	895,810	56,475,015	1,927,713	121,529,775	0	0
Total Operation / Maintenance (PW) Costs					56,475,015		121,529,775		0
Total Present Worth Life Cycle Costs					**144,733,953**		**254,330,525**		**0**
Life Cycle (PW) Savings							**(109,596,571)**		

PW - Present Worth ***PWA - Present Worth of Annuity***

Assumptions
1. Renovation and Renovation/Addition cost assumes a building of approximately same program, and massing with similar quality levels as new
2. Operation cost is assumed to be $8.07/SF for each new/renovated option based on calculations provided by EWU.

6.0 Master Plan and Policy Coordination

6.0 Master Plan and Policy Coordination

6.1 IMPACTS TO THE MASTER PLAN

2014 Comprehensive Campus Master Plan

In 2014 the University developed a comprehensive master plan for the EWU campus. The Science II project supports the following vision and goals of the 2014 master plan:

- Support access, opportunity and personal transformation;
- Respond to changes in technology, pedagogy and student demographics;
- Facilities must align with the academic purpose and need;
- Need to accommodate growth of programs;
- Strengthen the relationship between EWU and the surrounding community through visibility and outreach;
- Recognize that existing exterior spaces are beautiful.

Master Plan Key Planning considerations

Science II will contribute to the following master planning issues and opportunities identified in the Comprehensive Plan:

- *Improve the condition of campus edges:* Planning for Science II improves the relationship of the southeastern edge of campus to the connecting city grid as discussed in Section 4 of this report.
- *Support and improve existing patterns of open space and primary pedestrian circulation:* Science II improves both the pedestrian experience of the Art Walk, as well as the Science Commons open space.

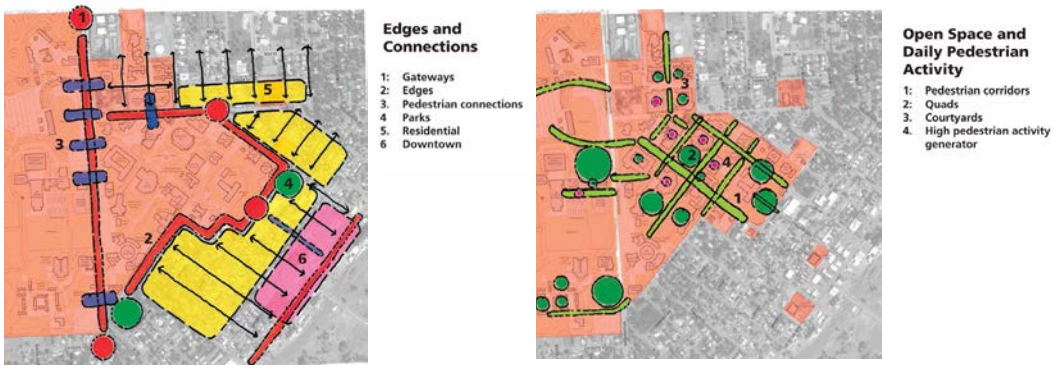


Figure 6a: 2014 Comprehensive Master Plan Diagrams

FTE and Growth: The Master Plan indicates that the campus is expected to accommodate 2% enrollment increases each year for the next ten years. By 2023 FTE's are projected to increase to approximately 11,500. The state benchmark for square footage per FTE indicates that an additional 350,000 square feet of space may be needed at the Cheney campus by 2023. The square footage added to the campus through the Science II project is part of the master plan to accommodate this expected growth.

Master Plan Implementation

The Science II project has been planned to coordinate with five planning principles outlined in the comprehensive plan:

1. Carefully evaluate each project with regard to renovation vs. replacement opportunities. As previously discussed, renovation of the existing Science Building is fundamentally inappropriate for laboratories sciences, due to existing building superstructure.

2. Locate and size all new or replacement building to optimize site utilization. The location of the new Science II building makes accommodations around Science Commons for future science and/or engineering buildings.
3. Improve the overall character of the campus with the implementation of each project. The location of the complex of science buildings enhances both the Art Walk pedestrian experience and the Science Commons open space.
4. Create and follow a framework that welcomes neighbors and accommodates future expansion beyond existing boundaries. The integration of the city grid into the campus welcomes the neighbors and accommodates future expansion.
5. Reinforce and improve the overall cohesion of campus, specifically linkages across Washington Street, whenever possible. The science complex improves the cohesion of science commons by forming the final edge of the open space and creates a series of smaller open spaces that are consistent with the patterns of development throughout the campus. The three story buildings are scaled to match existing buildings on the campus.

EWU's Ten Year Capital Plan
The construction of a new University Science Center (Science I and Science II) will address numerous deficiencies in the existing Science Building by resulting in a high performance, energy efficient building meeting the science teaching and research needs. It will also ensure that the science programs operate as a model of the University's commitment to sustainable communities and environmental stewardship. Both of these projects are identified in EWU's Ten Year Capital Plan.

Science I and II: The proposed Science I will house the Chemistry/Biochemistry and Physics departments. Science II will house the Biology department. Science II is envisioned to complete the contributions of Science I in a companion project located immediately adjacent and linked to Science I. Once completed, these two new science buildings will front on the emerging Science Commons and form another component in the University Science and Technology area of campus.

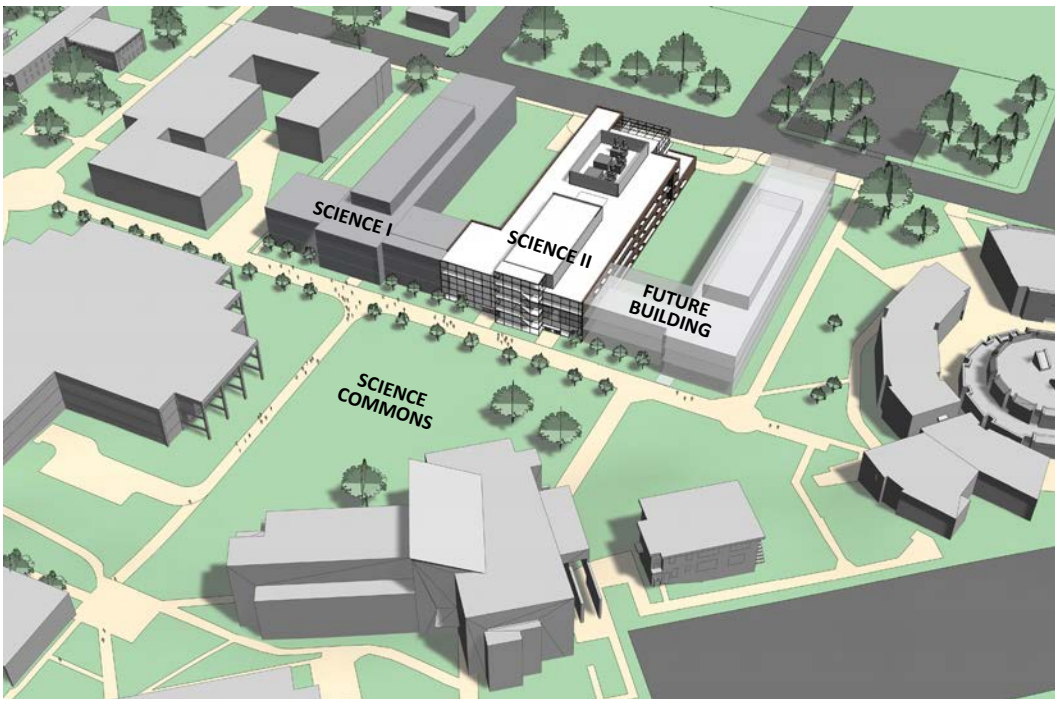


Figure 6b: Science I and II Ariel Site Plan

Campus Consolidation: The eventual move of the Chemical, Physical and Biological sciences out of the existing Science Building, after Science I and II come on line, will allow for programs that are part of the larger campus consolidation effort to be relocated a renovated Science Building.

Sustainable Infrastructure Upgrade: Reducing energy consumption, which is the primary focus of the sustainable design initiative on Science II, will play a key role in EWU's strategies towards reducing dependence on the use of fossil fuels for campus building energy and power. This is discussed in detail in Sections 2.0 and 3.0 of this report.

Science II Impacts

Science II will not require any changes to be adopted in the 2014 Comprehensive Campus Master Plan. This project will require modifications to the Ten year Capital Plan to include the Geology Department relocation/renovation. Science II will be compatible with and enhance the campus built environment in the following ways:

- Extend and reinforce the continuity of the campus context and the overall master plan.
- Embody barrier free, universal design that provides access for all users.
- Promote environmentally conscious building design and technologies.
- Provide flexibility in the building layout to achieve optimum adaptability.
- Utilize materials and systems that are appropriate to function, durable and that are easily maintainable.

6.2 POLICY COORDINATION

Science II will adhere to all relevant state requirements, including:

- Leadership in Energy and Environmental Design (LEED) Gold;
- WA State 70.235 RCW Limiting greenhouse gas emissions;
- WA State 70.94 RCW Washington clean air act (Clean Air Act of 1991);
- WA State 39.35 RCW Energy conservation in the design of public facilities; and
- State Environmental Policy Act

Figure 6c: Existing Science Commons Ariel Photograph

7.0 Facility Operations and Maintenance Requirements

7.0 Facilities Operations and Maintenance Requirements

7.1 ASSUMPTIONS

The following estimates of operations and maintenance costs for Science II are based on the "EWU's Annual Cost per Gross Square Foot" for FY14. Costs are escalated at an inflation rate of 4.0% per year.

7.2 OPERATIONS AND MAINTENANCE COSTS

Current campus operations and maintenance costs for FY14 are shown in Table 1. For Science II, the projected operations and maintenance costs for the first full year of occupancy are shown in Table 2.

Table 1 - Operations and Maintenance - Current Campus

Operations	Operating Costs GSF/YR	
Component:	FY14	
091 - Utilities	$2.39	
092 - Bldg & Utilities Maintenance	$1.65	
093 - Custodial & Grounds Services	$1.59	
094 - Ops & Maintenance Support	$2.44	
Total Annual Cost Per GSF	$8.07	

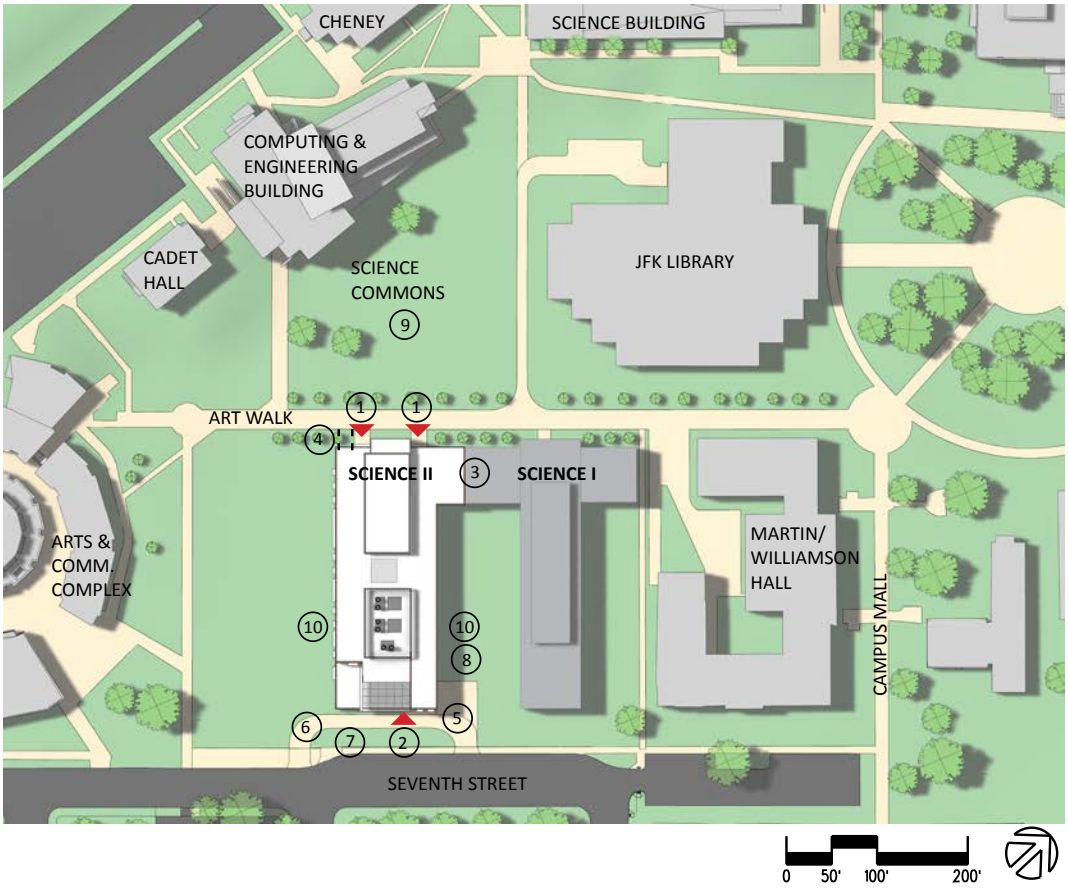
Table 2 - Operations and Maintenance - Projected Science II

Operations	Operating Costs GSF/YR	GSF	Cost June 2020	Cost June 2025
Component:	FY20			
091 - Utilities	$3.03			
092 - Bldg & Utilities Maintenance	$2.09			
093 - Custodial & Grounds Services	$2.01			
094 - Ops & Maintenance Support	$3.09			
Total Annual Cost Per GSF	$10.21	111,005	$1,133,361	$1,379,570

7.3 STAFFING PLAN

The Science II project will result in an increase to operations and maintenance costs for the campus. The new building will require an increase in the custodial staff, maintenance staff, goods and services, and utility costs.

8.0 Project Drawings



Site Features:

1) Northwest Entrance Plaza - The primary building entry is located off the Art Walk and faces the Science Commons.

2) Southeast Entrance **-** This entry provides access from Seventh Street.

3) Common wall and connection with Science I.

4) Utility Tunnel - A branch utility tunnel connects a partial mechanical basement with the existing campus utility tunnel that runs under the Art Walk.

5) Service Yard - Located adjacent to the Vivarium , field equipment and bulk storage, this loading area provides delivery and service access.

6) Service Drive - This drive from Seventh Street is planned to connect to Science II and provide drive through access for vehicles with trailers for field equipment

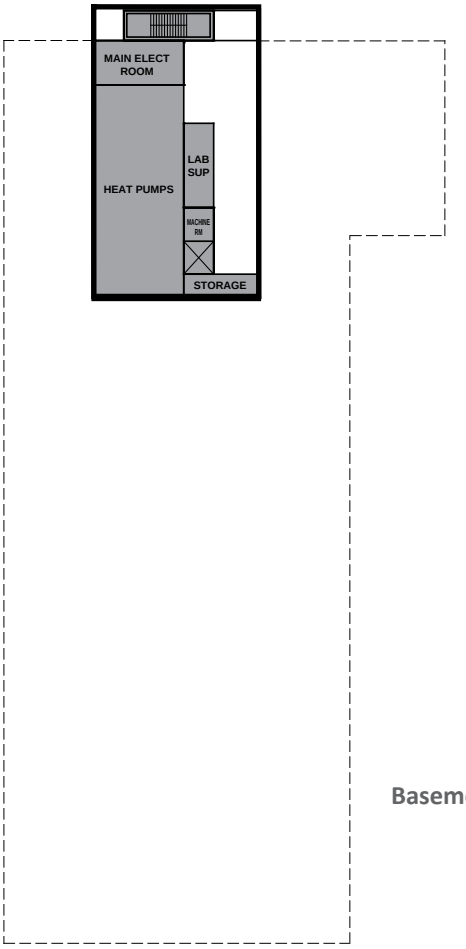
7) Bioinfiltration Swale - A vegetative system will hold stormwater and treat stormwater from the vehicular drive.

8) Electrical Equipment - A screen enclosure will house an emergency generator and transformers.

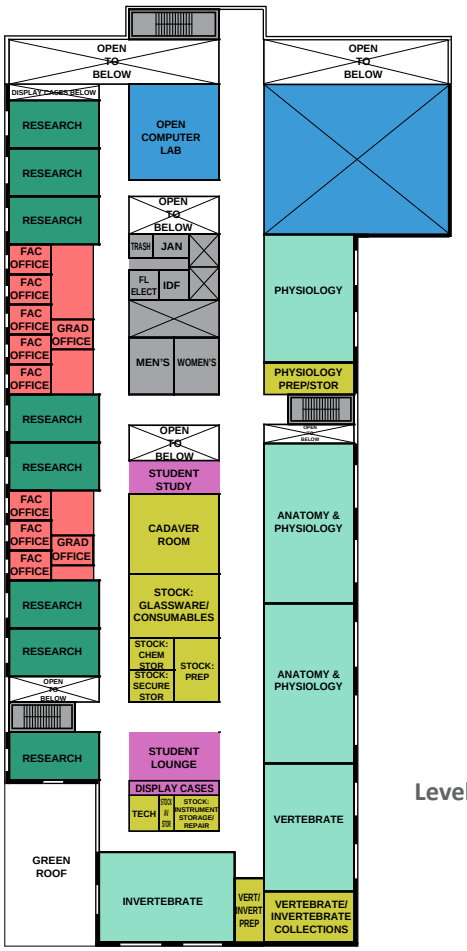
9) Science Commons - This existing lawn is emerging as a shared outdoor focal point for the disciplines within the College of Science, Health & Engineering.

10) Landscaping - Plantings, plaza trees and lawn areas.

SITE CONCEPT PLAN



Basement

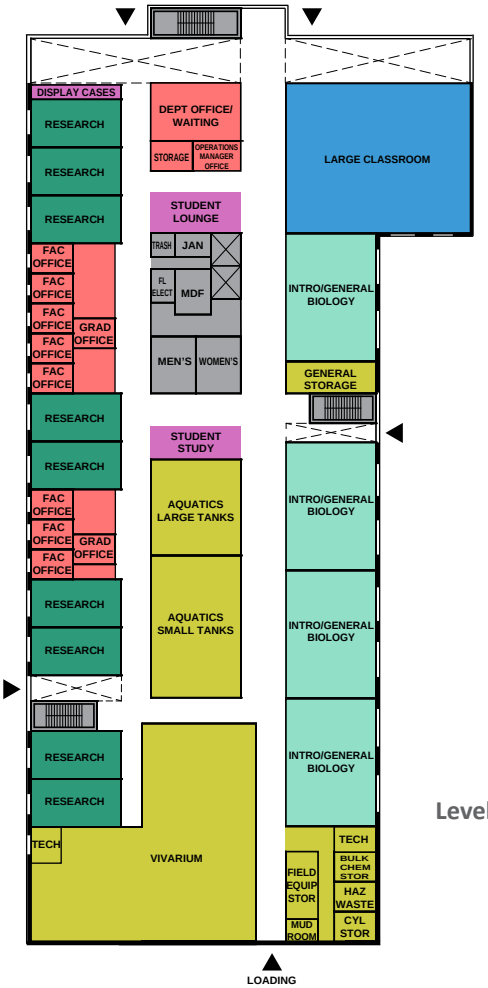


Level 2

Biology Program Legend:

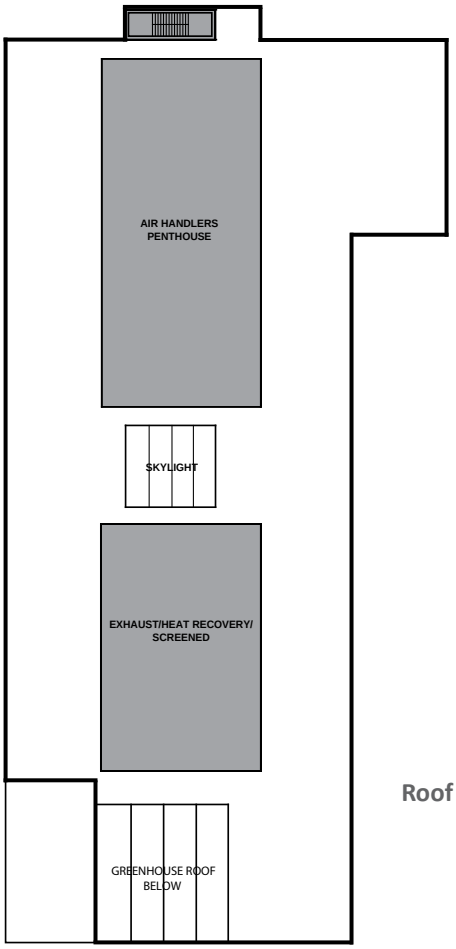
- Teaching Laboratories
- Research Laboratories
- Resources
- Faculty/ Administration
- Classrooms
- Building Support

0 16' 32' 64'

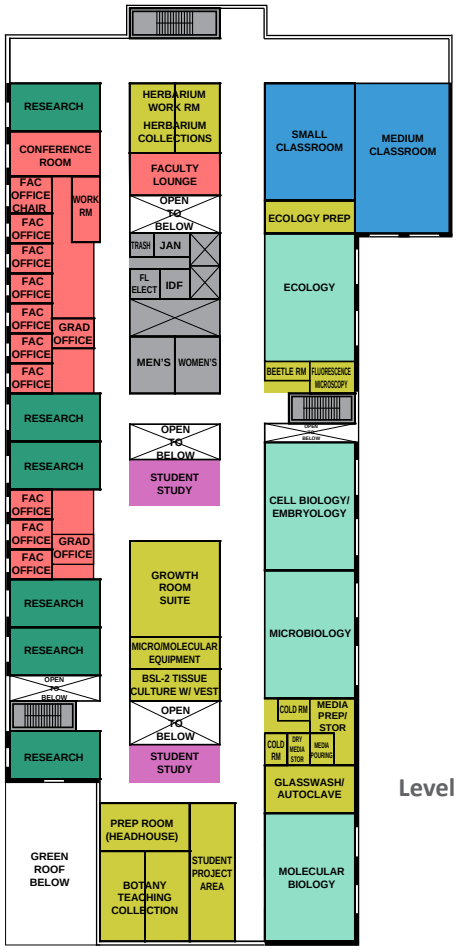


Level 1

BUILDING PLANS

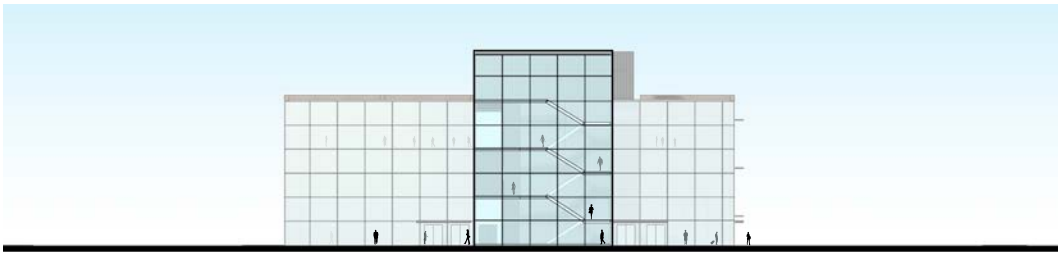


Roof



Level 3

BUILDING PLANS



Northwest Elevation

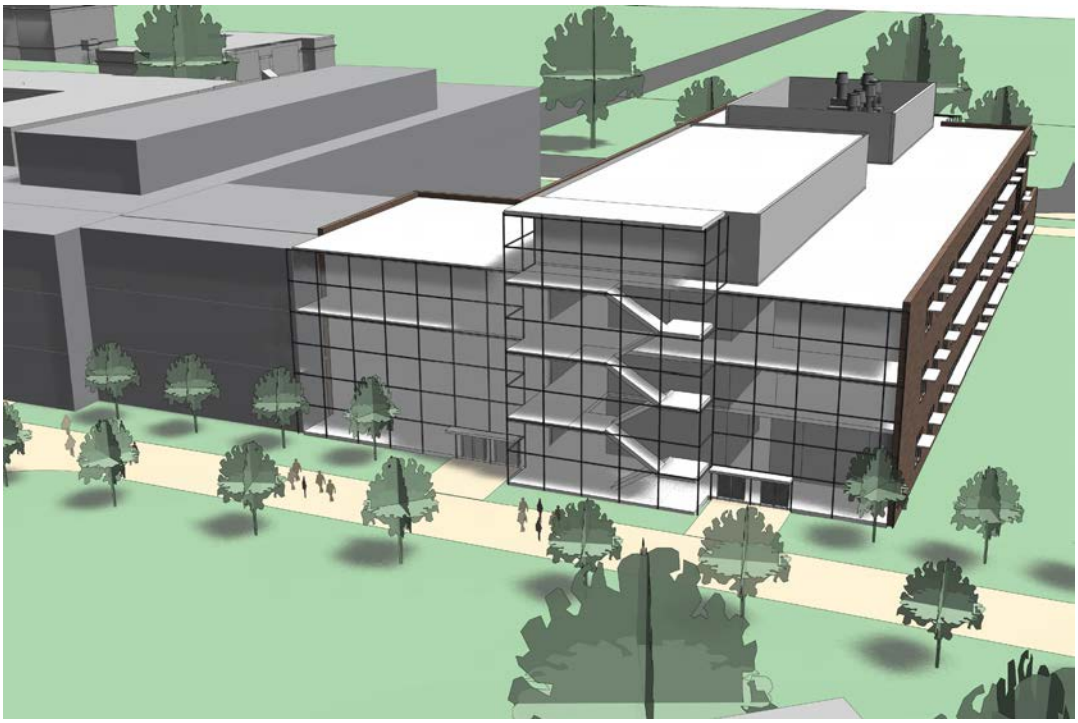
Southwest Elevation

Southeast Elevation

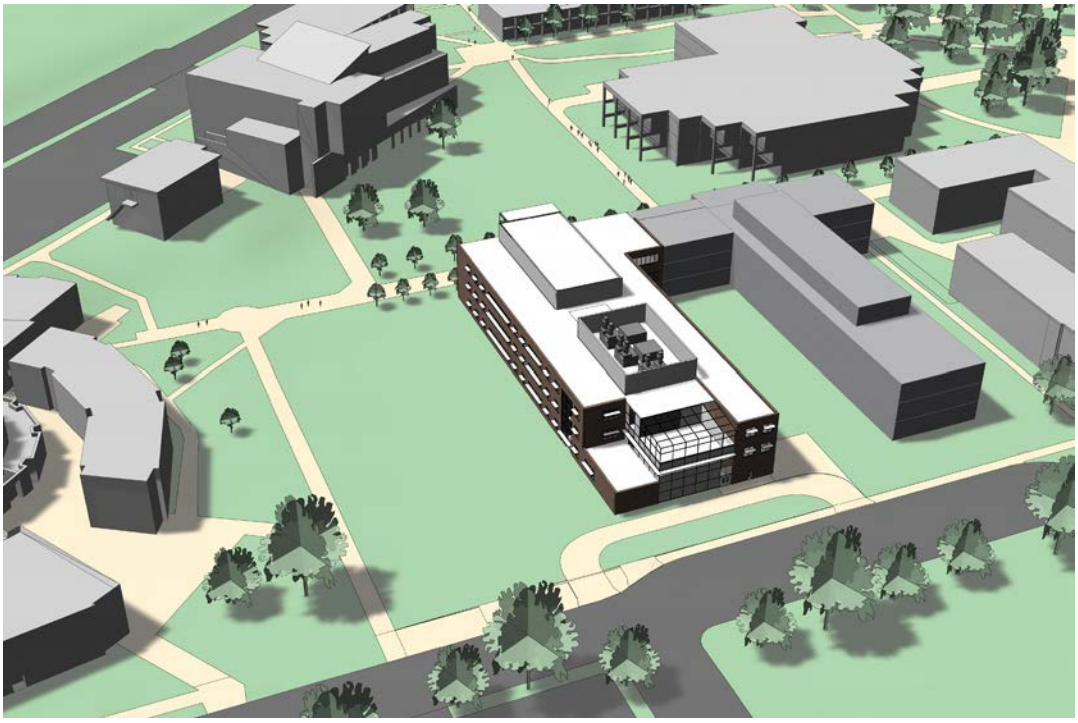
Northeast Elevation

CONCEPTUAL ELEVATIONS

0 12' 24' 48'

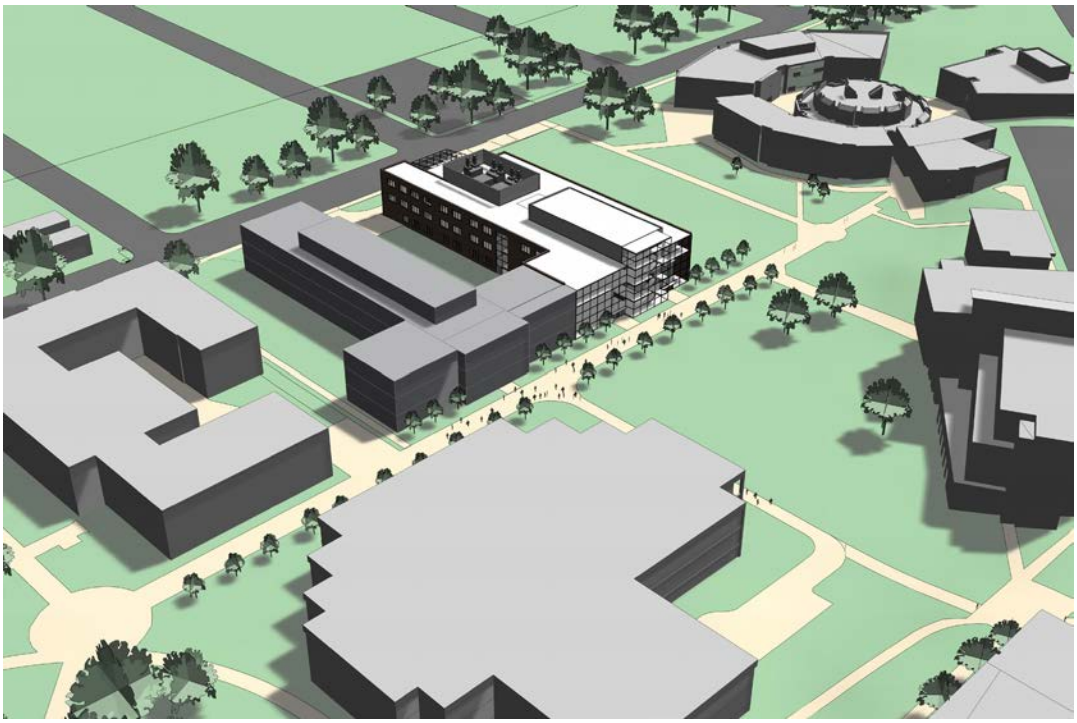


Science II view from the northwest.

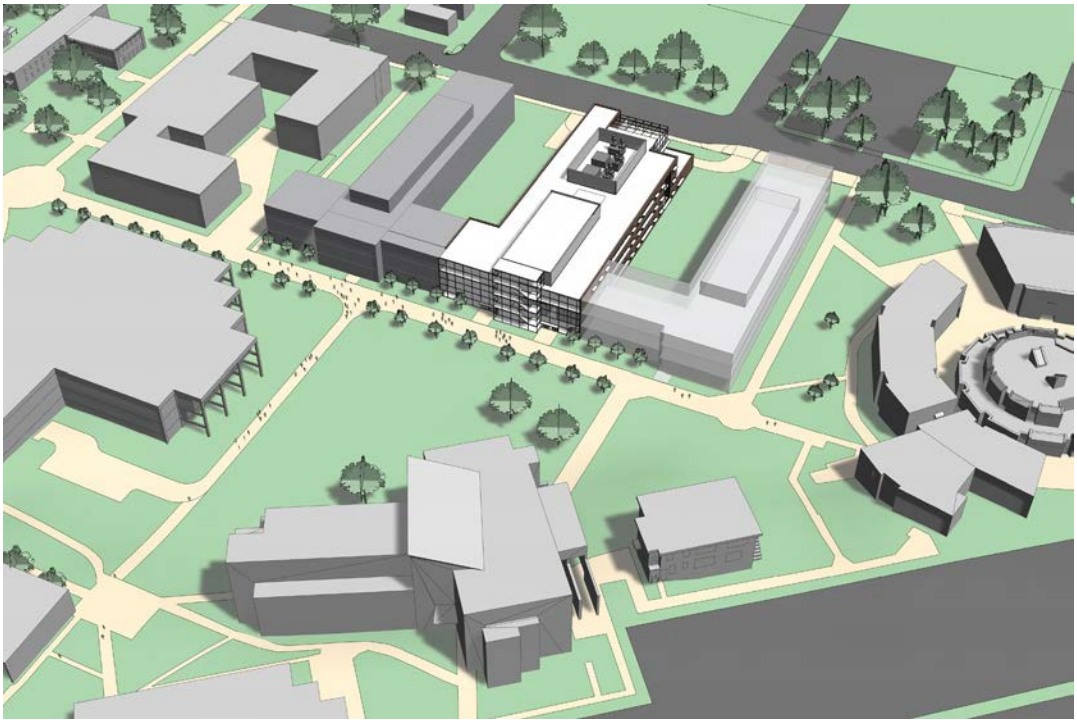


Science II view from the southeast.

SITE MASSING



Science II view from the North.



Science II + Potential Expansion

SITE MASSING

9.0 Appendix

Predesign Checklist

Predesign Study Process Participants

Sustainable Design Charrette Summary

Energy Modeling Recommendations

Space Diagrams/Detailed Requirements

Preliminary Construction Cost Estimate

APPENDIX A

PREDESIGN CHECKLIST

PREDESIGN CHECKLIST

The predesign checklist should be completed by the agency and submitted to OFM with the predesign.

Are the following in the predesign? If not, the item should be noted "not applicable."
Suggestion: Put boxes instead of checks. The intent is for the agency to use a checklist and check of items as they are completed.

- ☑ Executive Summary
- ☑ Project Analysis
  - ❑ Discussion of operational needs
  - ❑ Discussion of alternatives
  - ❑ Discussion of selected alternative
  - ❑ Identification of issues
  - ❑ Prior planning and history
  - ❑ Stakeholders
  - ❑ Project description
  - ❑ Implementation approach
  - ❑ Project management
  - ❑ Schedule
- ☑ Program Analysis
  - ❑ Assumptions
  - ❑ Functions and FTEs
  - ❑ Spatial relationships between the facility and site
  - ❑ Interrelationships and adjacencies of functions
  - ❑ Major equipment
  - ❑ Special systems such as environmental, information technology, etc.
  - ❑ Future needs and flexibility
  - ❑ Sustainability, energy use and greenhouse gas emission reduction
  - ❑ Applicable codes and regulations
- ☑ Site Analysis
  - ❑ Potential sites
  - ❑ Building footprint
  - ❑ Site considerations such as physical, regulatory and access issues
  - ❑ Acquisition process
- ☑ Project Budget Analysis
  - ❑ Assumptions
  - ❑ Detailed estimates
  - ❑ Funding sources
  - ❑ Project cost estimate
  - ❑ Funding methods

- ❑ Sign-off by agency

☑ Master Plan and Policy Coordination
- ❑ Impacts to existing plans
- ❑ Adherence to significant state policies

☑ Facility Operations and Maintenance Requirements
- ❑ Assumptions
- ❑ Operating costs in table form
- ❑ Staffing plan (capital and operating)

☑ Project Drawings/Diagrams
- ❑ Site plans
- ❑ Building plans
- ❑ Building volumes
- ❑ Elevations

☑ Appendix
- ❑ Predesign checklist
- ❑ Project budget unit cost detail
- ❑ Sustainable design charette summary
- ❑ Copy of policies adopted in accordance with RCW 70.235.020 on the state's limits on the emissions of greenhouse gases
- ❑ A letter from DAHP on the impact of potential sites on cultural resources
- ❑ Additional information as needed

EWU Science II Predesign Study
List of Participants

Eastern Washington University

EWU Administration
Dr. Rodolfo Arevalo, President
Dr. Rex Fuller, Provost & Vice Pres for Academic Affairs
Dr. Gary Pratt, Chief Information Officer
Mary Voves, Vice President, Business & Finance
Neil Woolf, Assoc Vice Pres, Enrollment Management
Erin Morgan, Director of Registrar

EWU College of Science Health & Engineering
Dr. Judd Case, Dean

EWU Biology Department
Dr. Margaret O'Connell, Chair & Professor
Dr. Prakash Bhuta, Professor
Dr. Ross Black, Professor
Dr. Karen Carlberg, Professor
Andrea Castillo, Associate Professor
Dr. Joanna Joyner-Matos, Associate Professor
Dr. Robin O'Quinn, Associate Professor
Dr. Rebecca Brown, Professor
David Daberkow, Assistant Professor
Dr. Charles Herr, Professor
Dr. Camille McNeely, Associate Professor
Dr. James Hallett, Adjunct Professor
Dr. Luis Matos, Assistant Professor
Dr. Krisztian Magori, Assistant Professor
David French, Technician
John Shields, Technician
Dr. Mike Satterwhite, Technician
Dr. Justin Bastow, Part-time Faculty
Jenni Probert, Operations Manager
Lisa Williams, Department Secretary

EWU Facilities & Planning
Shawn King, Assoc Vice Pres, Facilities & Planning
Troy Bester, Senior Project Manager

Design Team

LMN Architects (Architect)
Dean Clark
Mary Anne Smith
Mark Reddington
Sam Miller
Stephen Van Dyck
Mark Lo

Research Facilities Design (Laboratory Planner)
Richard Heinz
Leslie Ashor

Magnusson Klemencic Assoc. (Structural Engineer)
Mike Jewsbury

Taylor Engineering (Civil Engineer)
Mark Switzer

MW Consulting Engineers (Mech/Elec Engineer)
Kjersten Kuhta
Jim Moore
Joel Enevold

The Robinson Company (Cost Estimator)
Sharon Kennedy

Sustainable Design Goals

LEED® Certification: Under RCW 39.35D Science II will be designed to achieve a Leadership in Energy and Environmental Design (LEED®) certification at the silver level or higher. During the predesign study the faculty and administration were engaged in a discussion to determine potential sustainable strategies for the project. Using LEED® 3.0 NC, an initial checklist was established to determine the LEED® credits that might be achieved through sustainable strategies. The following table represents how the project can meet or exceed the minimum LEED® silver standard.

Yes	?	No			Possible Points: 26
16	9	1		**Sustainable Sites**	
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	
	5		Credit 2	Development Density & Community Connectivity	
		1	Credit 3	Brownfield Redevelopment	
6			Credit 4.1	Alternative Transportation - Public Transportation Access	
1			Credit 4.2	Alternative Transportation - Bicycle Storage & Changing Rooms	
3			Credit 4.3	Alternative Transportation - Low-Emitting & Fuel-Efficient Vehicles	
2			Credit 4.4	Alternative Transportation - Parking Capacity	
	1		Credit 5.1	Site Development - Protect or Restore Habitat	
	1		Credit 5.2	Site Development - Maximize Open Space	
	1		Credit 6.1	Stormwater Design - Quantity Control	
	1		Credit 6.2	Stormwater Design - Quality Control	
1			Credit 7.1	Heat Island Effect - Non-Roof	
1			Credit 7.2	Heat Island Effect - Roof	
1			Credit 8	Light Pollution Reduction	

Yes	?	No			Possible Points: 10
4	6			**Water Efficiency**	
Y			Prereq 1	Water Use Reduction - 20% Reduction	
2	2		Credit 1	Water Efficient Landscaping	
	2		Credit 2	Innovative Wastewater Technologies	
2	2		Credit 3	Water Use Reduction	

Yes	?	No			Possible Points: 35
12	15	8		**Energy & Atmosphere**	
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
8	7	4	Credit 1	Optimize Energy Performance	
	3	4	Credit 2	On-Site Renewable Energy	
2			Credit 3	Enhanced Commissioning	
2			Credit 4	Enhanced Refrigerant Management	
	3		Credit 5	Measurement & Verification	
	2		Credit 6	Green Power	

Yes	?	No			Possible Points: 14
5	2	7		**Materials & Resources**	
Y			Prereq 1	Storage & Collection of Recyclables	

		3	Credit 1.1	Building Reuse - Maintain Existing Walls, Floors & Roof
		1	Credit 1.2	Building Reuse - Maintain 50% of Interior Non-Structural Elements
2			Credit 2	Construction Waste Management
		2	Credit 3	Materials Reuse
2			Credit 4	Recycled Content
1	1		Credit 5	Regional Materials
		1	Credit 6	Rapidly Renewable Materials
	1		Credit 7	Certified Wood

12 | 3 | | Indoor Environmental Quality — Possible Points: 15

Yes	?	No		
Y			Prereq 1	Minimum IAQ Performance
Y			Prereq 2	Environmental Tobacco Smoke Control
1			Credit 1	Outdoor Air Delivery Monitoring
1			Credit 2	Increased Ventilation
1			Credit 3.1	Construction IAQ Management Plan - During Construction
1			Credit 3.2	Construction IAQ Management Plan - Before Occupancy
1			Credit 4.1	Low-Emitting Materials - Adhesives & Sealants
1			Credit 4.2	Low-Emitting Materials - Paints & Coatings
1			Credit 4.3	Low-Emitting Materials – Flooring Systems
1			Credit 4.4	Low-Emitting Materials - Composite Wood & Agrifiber Products
1			Credit 5	Indoor Chemical & Pollutant Source Control
1			Credit 6.1	Controllability of Systems - Lighting
	1		Credit 6.2	Controllability of Systems - Thermal Comfort
1			Credit 7.1	Thermal Comfort - Design
1			Credit 7.2	Thermal Comfort - Verification
	1		Credit 8.1	Daylight & Views - Daylight
	1		Credit 8.2	Daylight & Views, Views

6 | | | Innovation & Design Process — Possible Points: 6

Yes	?	No		
1			Credit 1.1	Innovation in Design: Green Housekeeping
1			Credit 1.2	Innovation in Design: Specific Title TBD
1			Credit 1.3	Innovation in Design: Specific Title TBD
1			Credit 1.4	Innovation in Design: Specific Title TBD
1			Credit 1.5	Innovation in Design: Specific Title TBD
1			Credit 2	LEED® Accredited Professional

6 | | | Regional Priority Credits — Possible Points: 4

Yes	?	No		
1			Credit 1.1	Regional Priority – SSc1
	1		Credit 1.2	Regional Priority – WEc1
	1		Credit 1.3	Regional Priority – WEc3
	1		Credit 1.4	Regional Priority – MRc7

56 | 38 | 16 — Total — Possible Points: 110

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

Energy Modeling Recommendations

Energy modeling of various alternatives will be provided in the design phase of the project to analyze the operational and energy costs associated with the different mechanical and electrical options over the life of the building. The following is a list of recommended options for study:

Water Heaters: Campus standard instantaneous steam to hot water forms the basis of the cost estimate. This approach capitalizes on the campus steam network with high quality heat exchangers, has the least maintenance and does not require combustion air or venting of combustion products. Should the campus convert to bio-fuels in the future, this would also be a sustainable and energy efficient solution. The fuel efficiency at the source for using steam from the campus natural gas fired boilers is expected to be no more than 70% efficient.

- Option #1 - high efficiency gas fired water heater with sealed combustion (96% efficient): This approach would utilize natural gas at the building for domestic hot water and would reduce fuel costs and fuel emissions for the energy use associated with this building.
- Option #2 - heat pump water heater: This option provides domestic hot water from heat pump water heaters that extract heat from the aquifer via a condenser loop as required to meet the building domestic hot water needs. The condenser loop will be decoupled from the untreated open ground water system through plate and frame stainless steel heat exchangers, as previously described under section D30.

Heat Generation: A hybrid plant with ground source heat pumps and supplemental steam heat forms the basis of the cost estimate. It is anticipated that the heat pump system will be able to meet 70-80% of the building heating needs for a lower installed cost than option #1 below. The supplemental steam heat provided from the central plant additionally has the added benefit of allowing heat to be delivered to the building in the event of a power outage without introducing large loads to the standby generator. The campus central heating plant has dual fuels as well as emergency power allowing the campus to maintain a modest level of heat in the event of a power outage.

- Option #1 - Ground source heat pump: This option would provide hot water from central heat pumps as described under the basis of cost. This system would be designed for a maximum of 120 degree supply water which is the warmest water that can be reasonably expected from a heat pump. This system has the advantage of improved heating performance with a coefficient of performance (COP) of approximately 3 (300% efficient) by using the aquifer as a building heating/cooling source. This will assist the project to meet the energy saving goals. The peak heating load is significantly greater than the building peak cooling load, resulting in excess cooling capacity. This would allow the central building heat pumps to serve as a satellite chiller plant and supplement the campus chilled water system
- Option #2 - High efficiency hot water: This option would provide hot water through modular high efficiency condensing boilers located in the building. This system would be designed with lower supply and return water temperatures to allow the boilers to operate at their highest efficiencies at condensing temperatures. It is assumed that this system would average 90-92% efficient.
- Option #3 - Steam: This option is the primary heating system used on campus; it reduces high pressure campus steam to low pressure steam. Low pressure steam is piped to the air handling units for pre-heating and to convertors that convert steam to hot water to be used for space heating. The convertors provide heating water that is pumped to individual terminal heating units (variable air volume terminal heating units and unit heaters) for space heating. It is assumed this system is no more than 70% efficient when central plant boiler efficiencies, steam condensate loss and pipe losses between the central plant and the building are considered.

Refrigeration: The same ground source heat pump system that is used for heat generation provides the building cooling, forming the basis of the cost estimate. In addition to their superior heating efficiencies, these heat pumps will also have improved cooling efficiencies over cooling option #3 and campus chilled water.

- Option #1 - Ground source heat pump: This option would utilize the same heat pump system as described under Heat Generation option #1 above. Modular heat pumps would be piped and controlled to allow them to direct hot water or chilled water to the heating and cooling system based upon the season and respective building heating and cooling demands. The peak heating load in this option is significantly greater than the building peak cooling load, resulting in excess cooling capacity from the heat pumps. This would allow the central building heat pumps to serve as a satellite chiller plant and supplement the campus chilled water system. In addition to their superior heating efficiencies, these heat pumps will also have improved cooling efficiencies over cooling option #3 and campus chilled water.
- Option #2 - Absorption chiller: This chiller would utilize campus steam for thermal vapor compression in lieu of mechanical vapor compression used in electric chillers. This would only make economic sense if the boilers at the central plant were converted from natural gas fired boilers to a bio-mass boiler that would fire from a waste by-product such as low-grade wood chips. Alternately, newer technologies are emerging that utilize solar heat exchangers for thermal vapor compression. This technology can be quite expensive and since the cooling represents approximately 7-10% of the building energy use, a technology that can provide heating and cooling savings such as option #2 would be preferred.
- Option #3 - Local water cooled chiller/cooling tower: This option would provide local water cooled electric chillers to the building with heat rejection from the condenser loop to open cooling towers. This system would have comparable energy features to the central plant with reduced pumping energy.

Lab Make-up Air: Central station variable air volume make-up air units that track the lab exhaust fans minus an offset for space pressurization control form the basis of the cost estimate. The warmer supply air temperatures from the make-up air unit significantly reduces summer reheat which is a notable energy consumer in lab spaces.

- Option - Chilled beams: Chilled beam induction units in the lab environment would offer an energy saving advantage over 100% outside air systems by reducing volumes of outside air in high cooling load areas that have low fume hood/exhaust densities.
- Option - Air quality monitoring: An Air Quality Monitoring system, such as that manufactured by Aircuity, would allow reduced air change exhaust rates in the chemical use laboratory spaces when chemicals present within the air are within acceptable levels, contributing to energy savings.

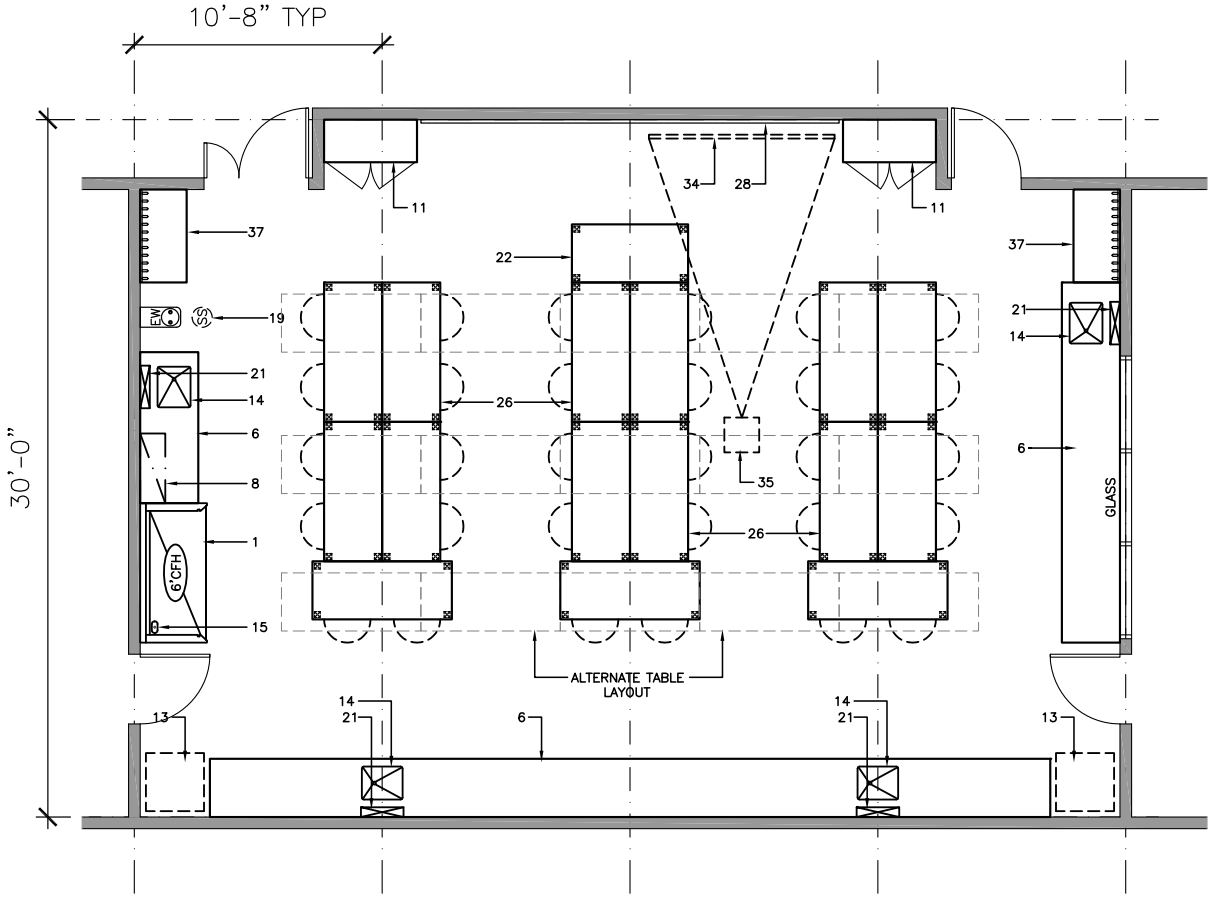
Non-Lab Areas: For non-lab areas, central variable volume style air handling forms the basis of cost the cost estimate.

- Option – Dedicated outside air system: This option would utilize dedicated outside air systems with heat recovery and local temperature control provided by chilled beam induction units equipped with heating and cooling coils. Systems and associated ductwork would be approximately 30-35% of the size of conventional air systems since only the ventilation air is ducted through the building.

DEPARTMENT: BIOLOGY
SPACE NAME: INTRO/GENERAL BIOLOGY

SPACE ID NO.: 1.01
AREA NSF: 1,280

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



0 1' 2' 4' 8'

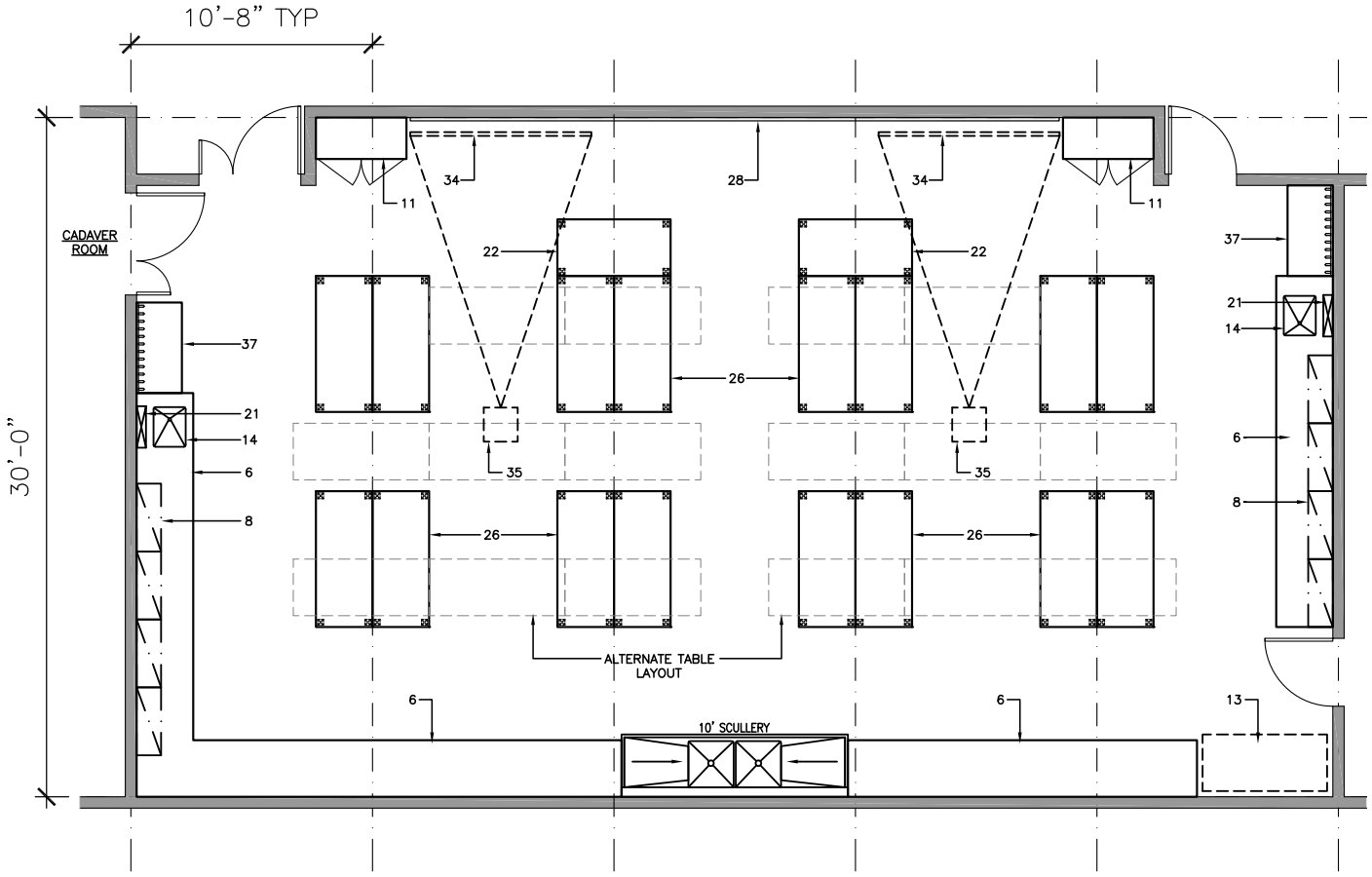
FURNISHINGS

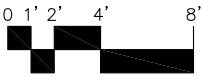
1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: ANATOMY & PHYSIOLOGY

SPACE ID NO.: 1.02
AREA NSF: 1,600

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





FURNISHINGS

1. Chemical Fume Hood
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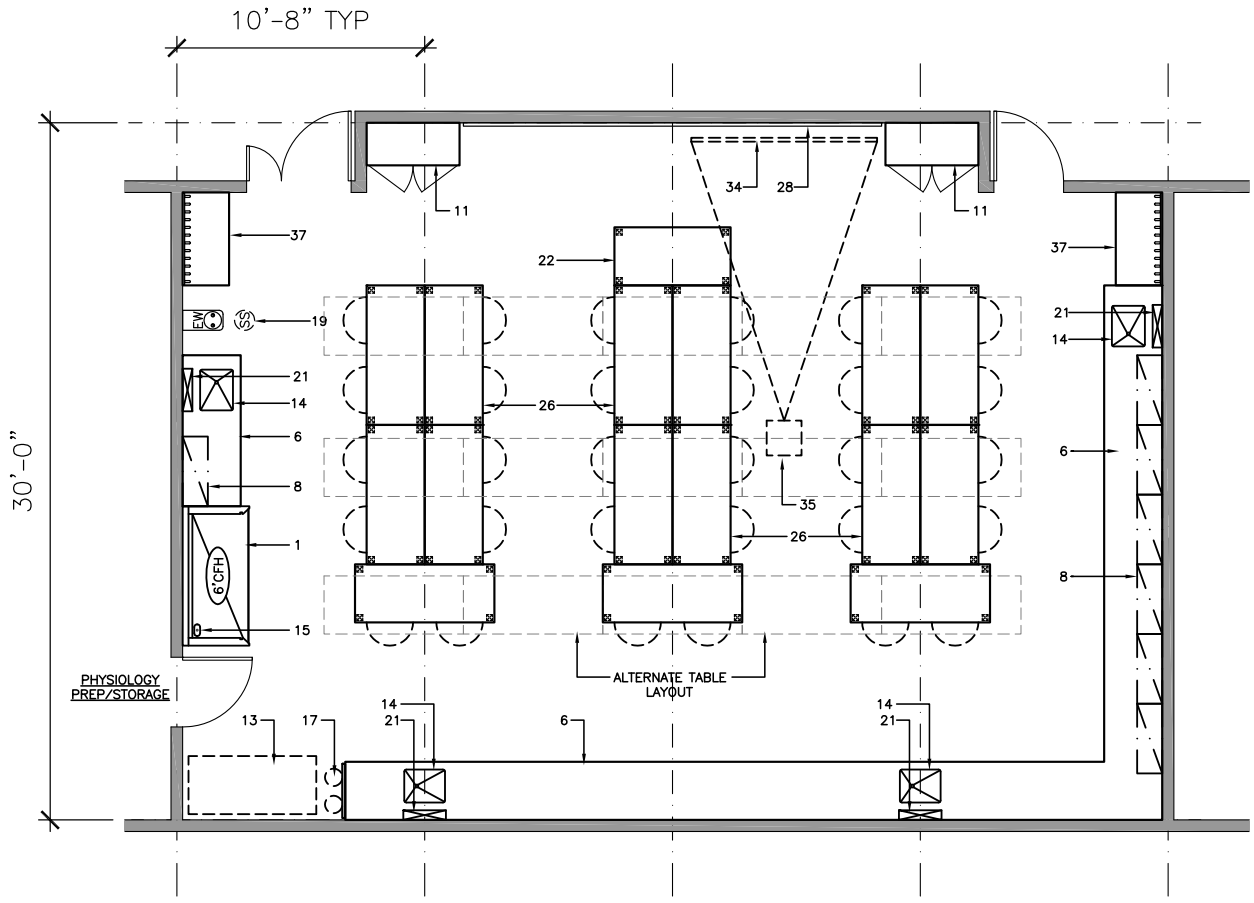
DEPARTMENT: BIOLOGY
SPACE NAME: PHYSIOLOGY

SPACE ID NO.: 1.03
AREA NSF: 1,280

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



0 1' 2' 4' 8'

FURNISHINGS

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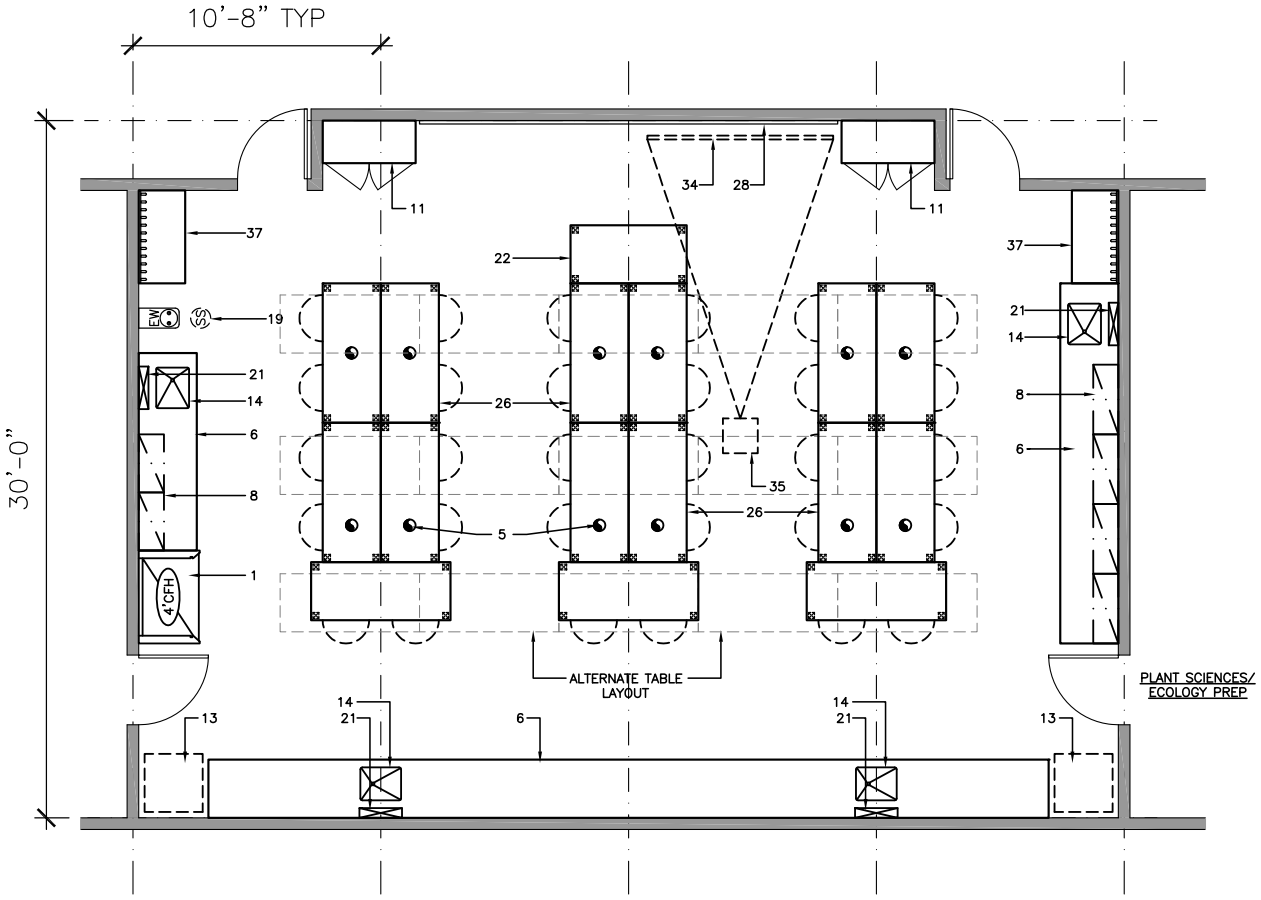
DEPARTMENT: BIOLOGY
SPACE NAME: ECOLOGY / PLANT SCIENCES

SPACE ID NO.: 1.04
AREA NSF: 1,280

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



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DEPARTMENT: BIOLOGY
SPACE NAME: VERTEBRATE

SPACE ID NO.: 1.05
AREA NSF: 1,280

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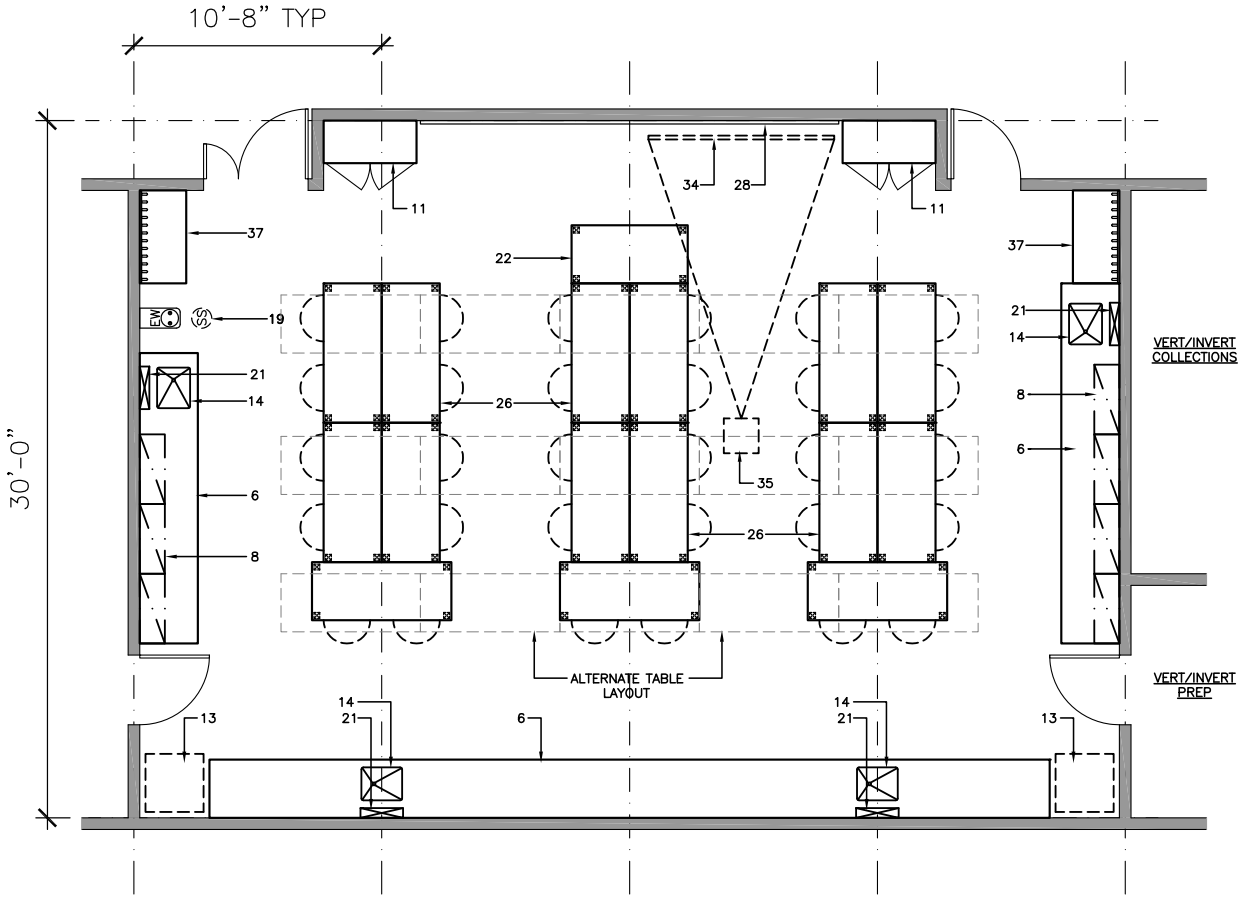

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DEPARTMENT: BIOLOGY
SPACE NAME: INVERTEBRATE

SPACE ID NO.: 1.06
AREA NSF: 1,280

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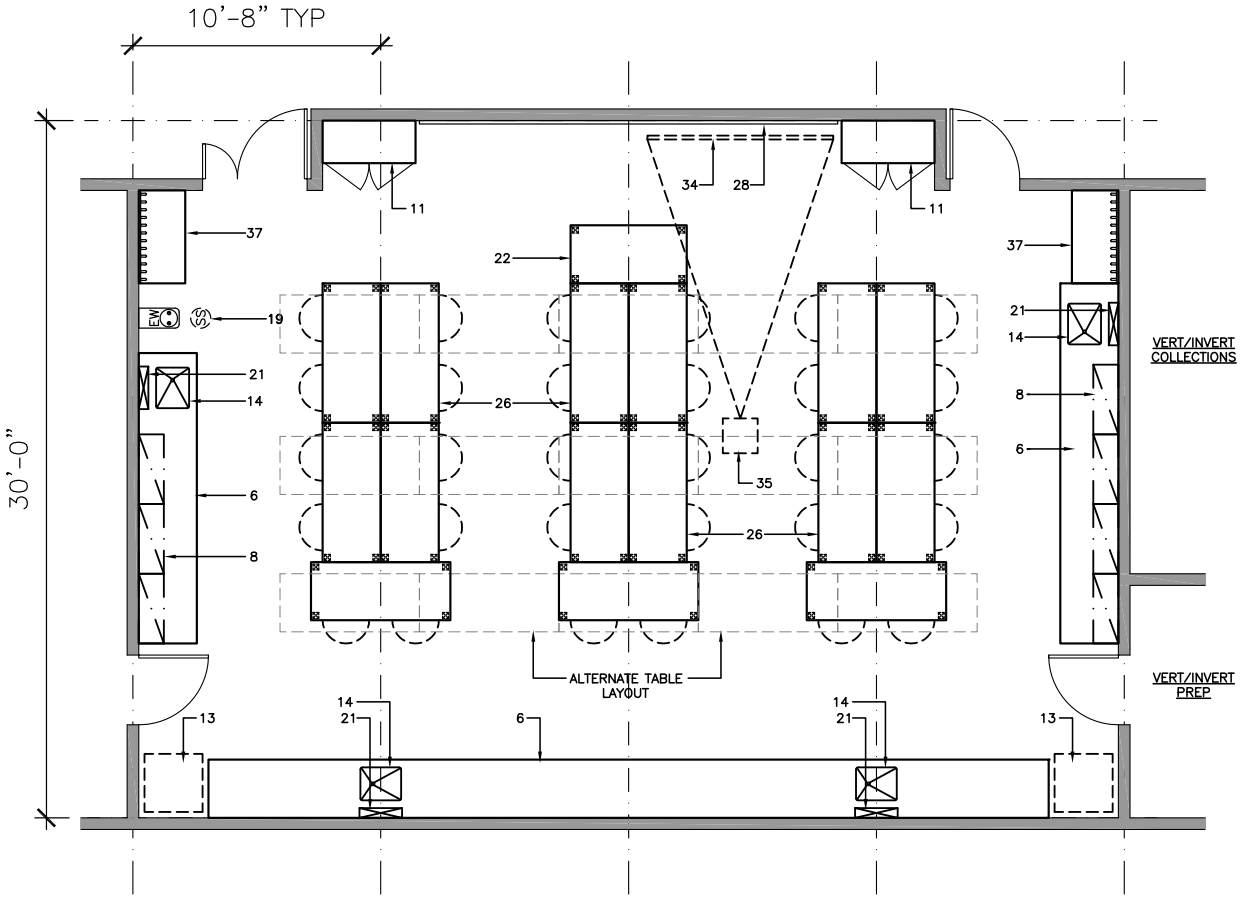

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DEPARTMENT: BIOLOGY
SPACE NAME: MICROBIOLOGY

SPACE ID NO.: 1.08
AREA NSF: 1,280

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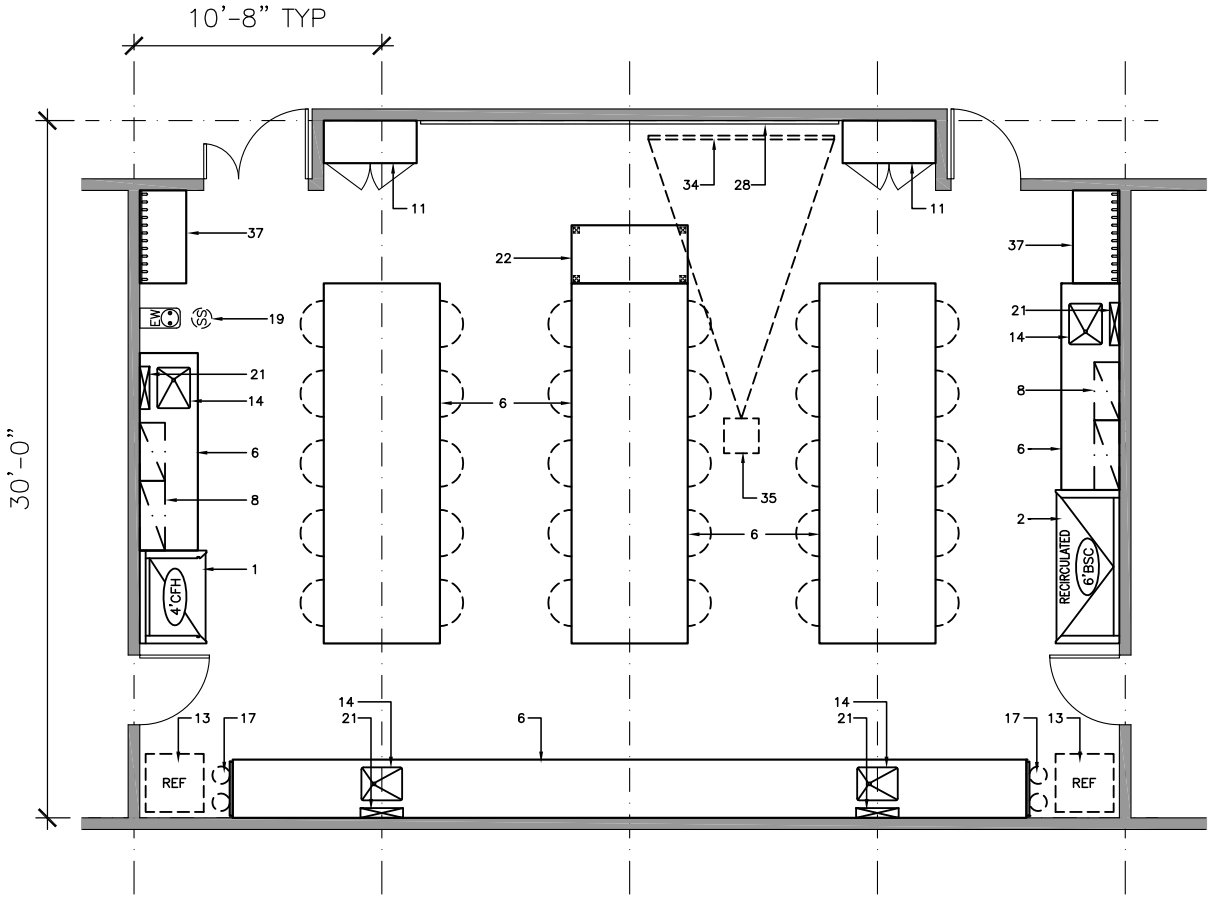

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DEPARTMENT: BIOLOGY
SPACE NAME: MOLECULAR BIOLOGY

SPACE ID NO.: 1.07
AREA NSF: 1,280

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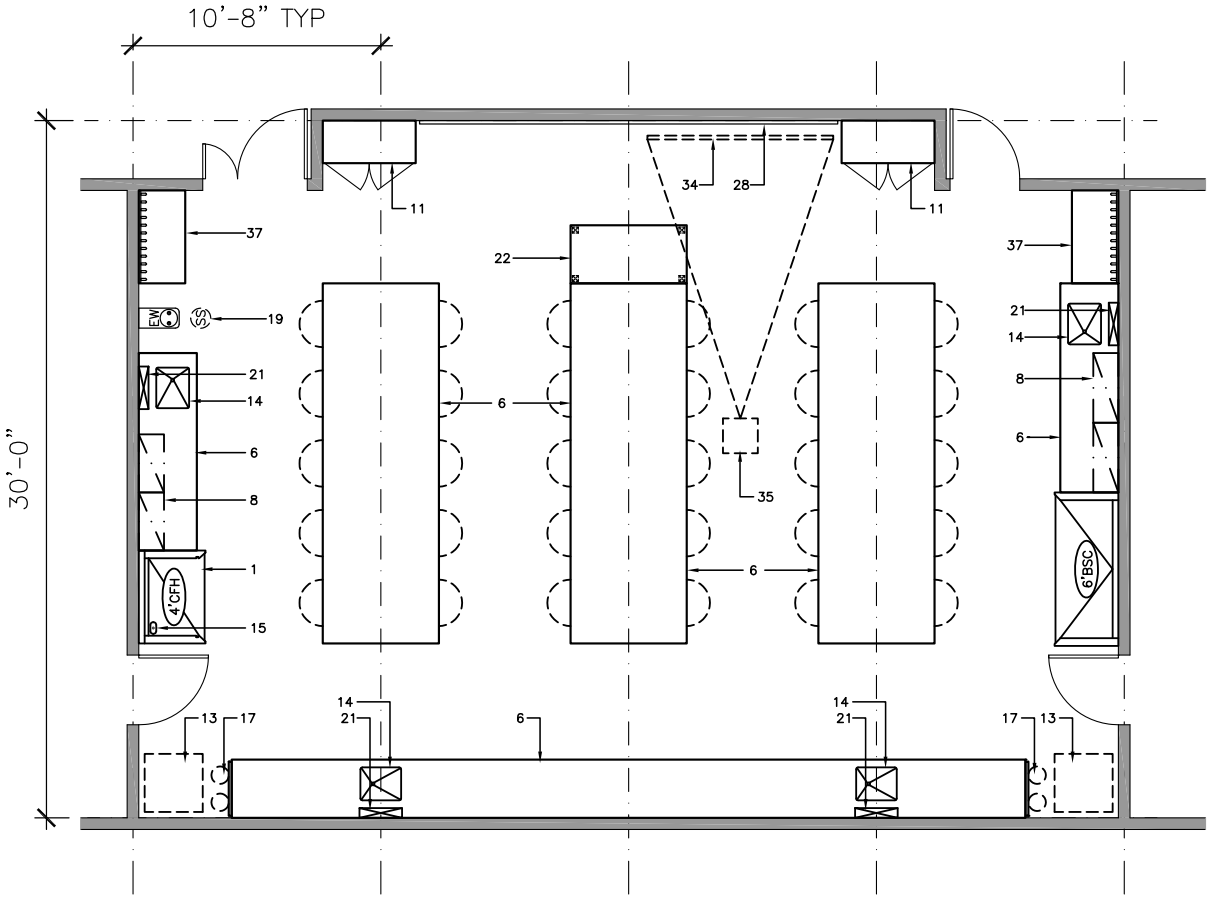

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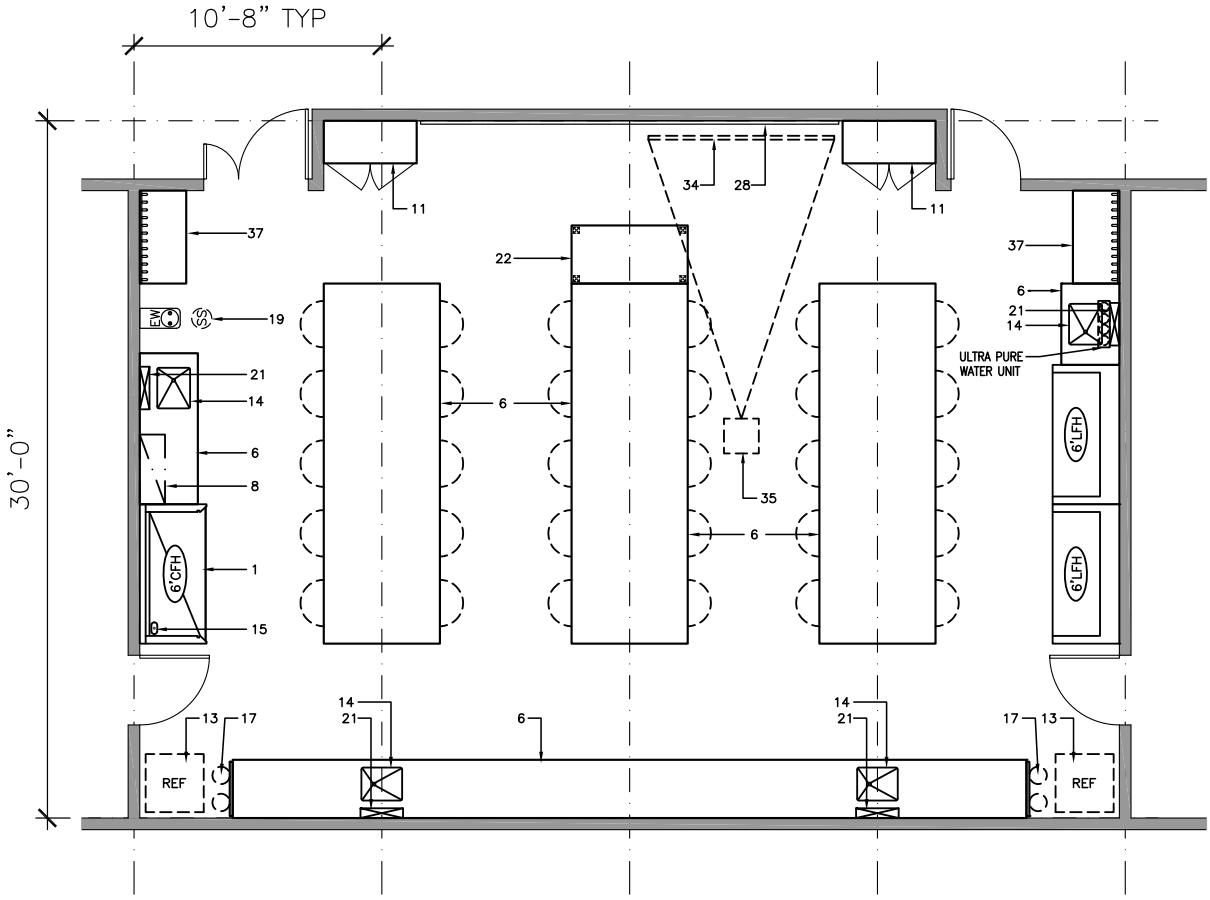
DEPARTMENT: BIOLOGY
SPACE NAME: CELL BIOLOGY/EMBRYOLOGY

SPACE ID NO.: 1.09
AREA NSF: 1,280

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



0 1' 2' 4' 8'

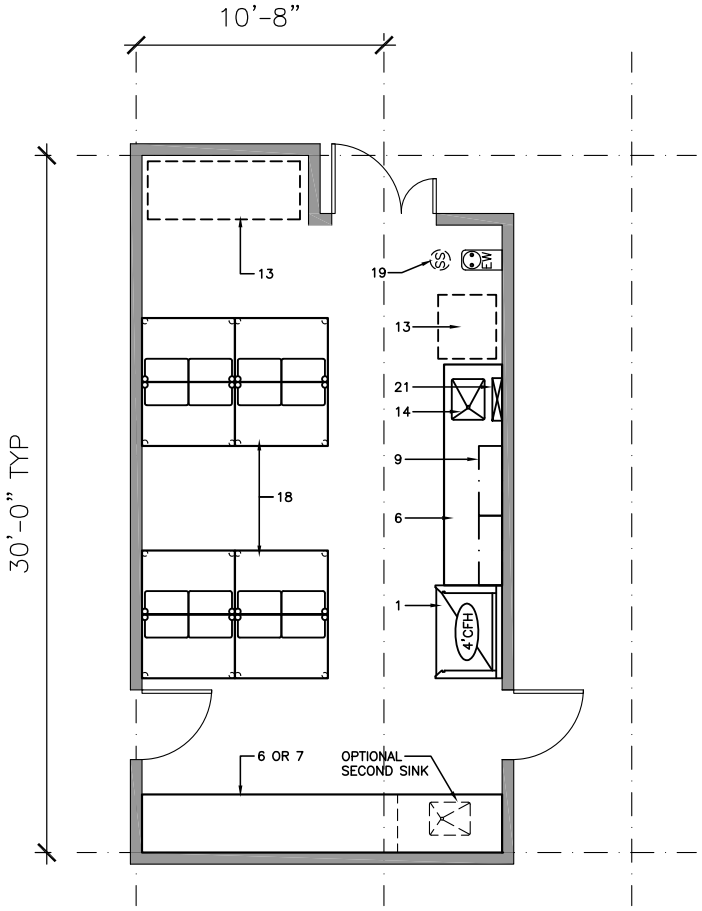
FURNISHINGS

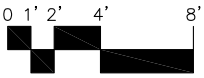
1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: RESEARCH LABORATORY

SPACE ID NO.: 1.11
AREA NSF: 480

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





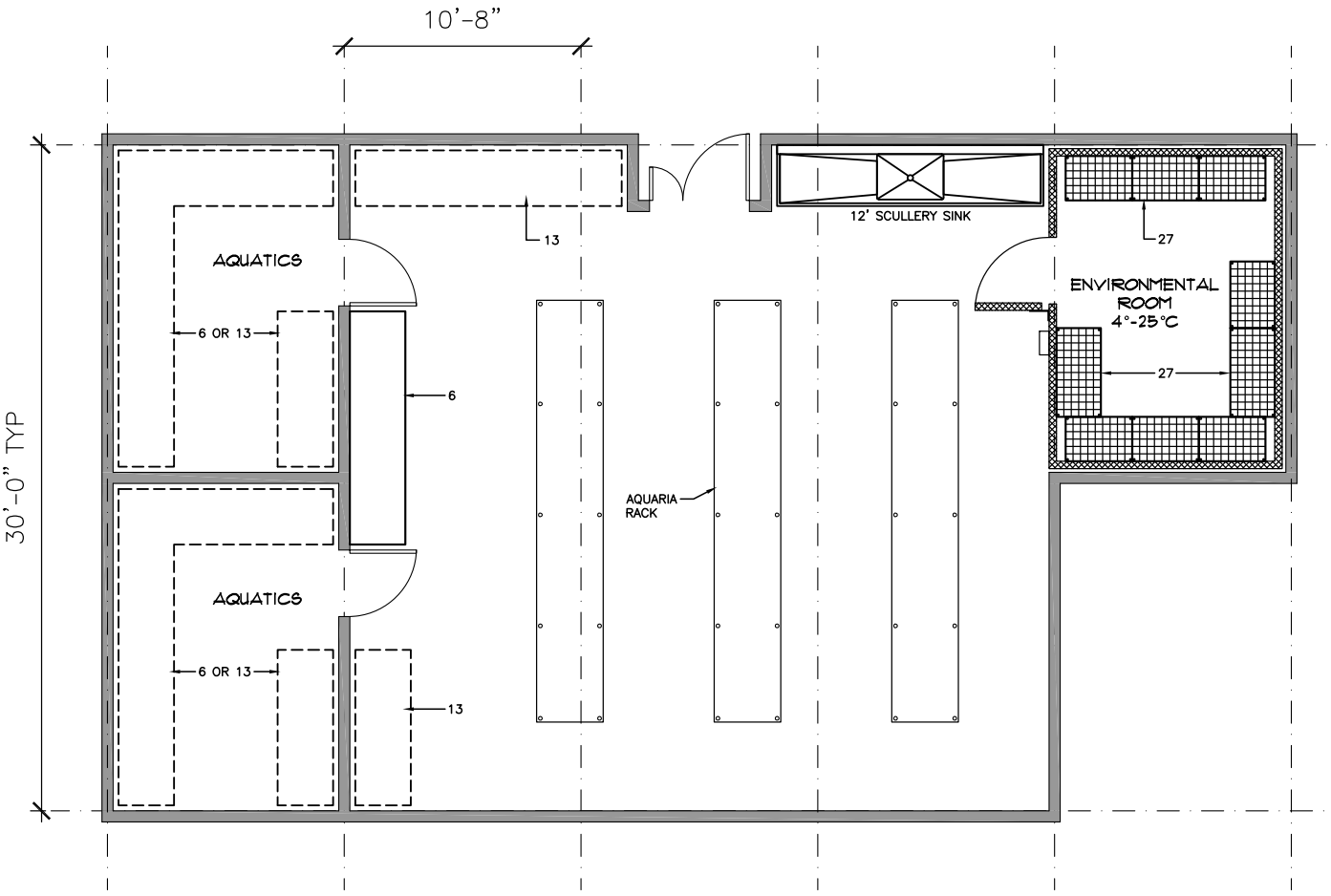
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: AQUATICS - SMALL TANKS

SPACE ID NO.: 1.13
AREA NSF: 1,440

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



0 1' 2' 4' 8'

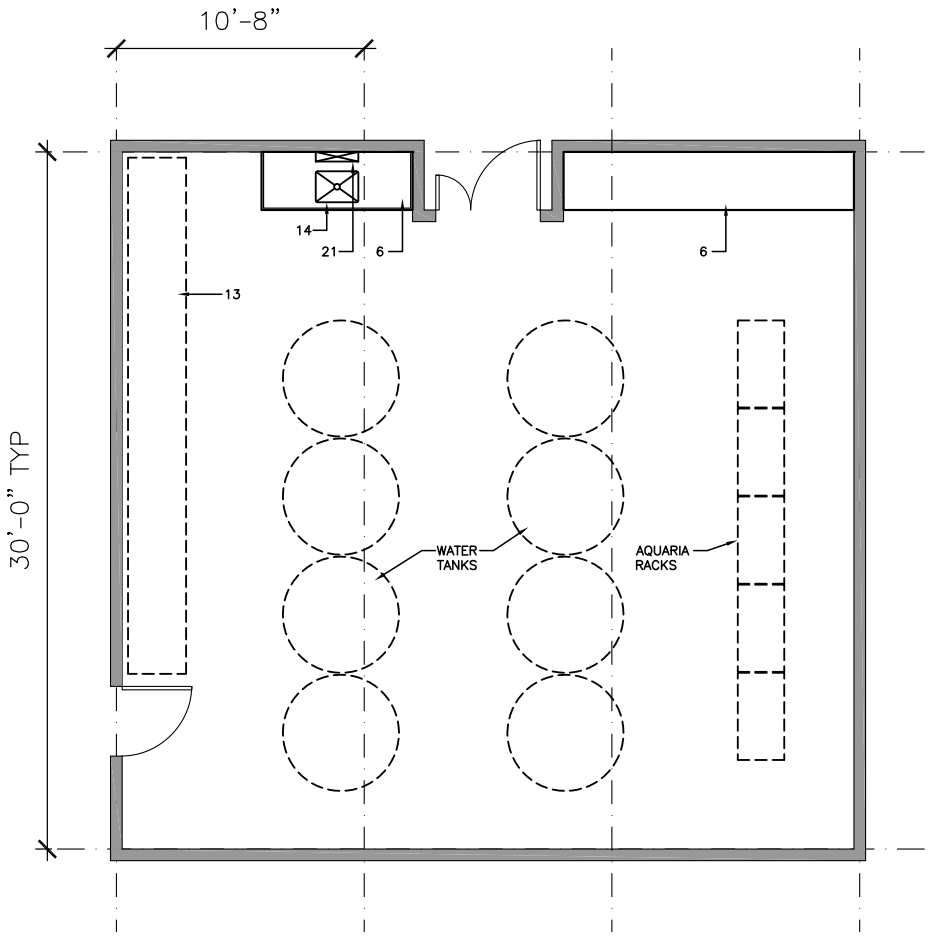
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: AQUATICS - LARGE TANKS

SPACE ID NO.: 1.12
AREA NSF: 960

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



0 1' 2' 4' 8'

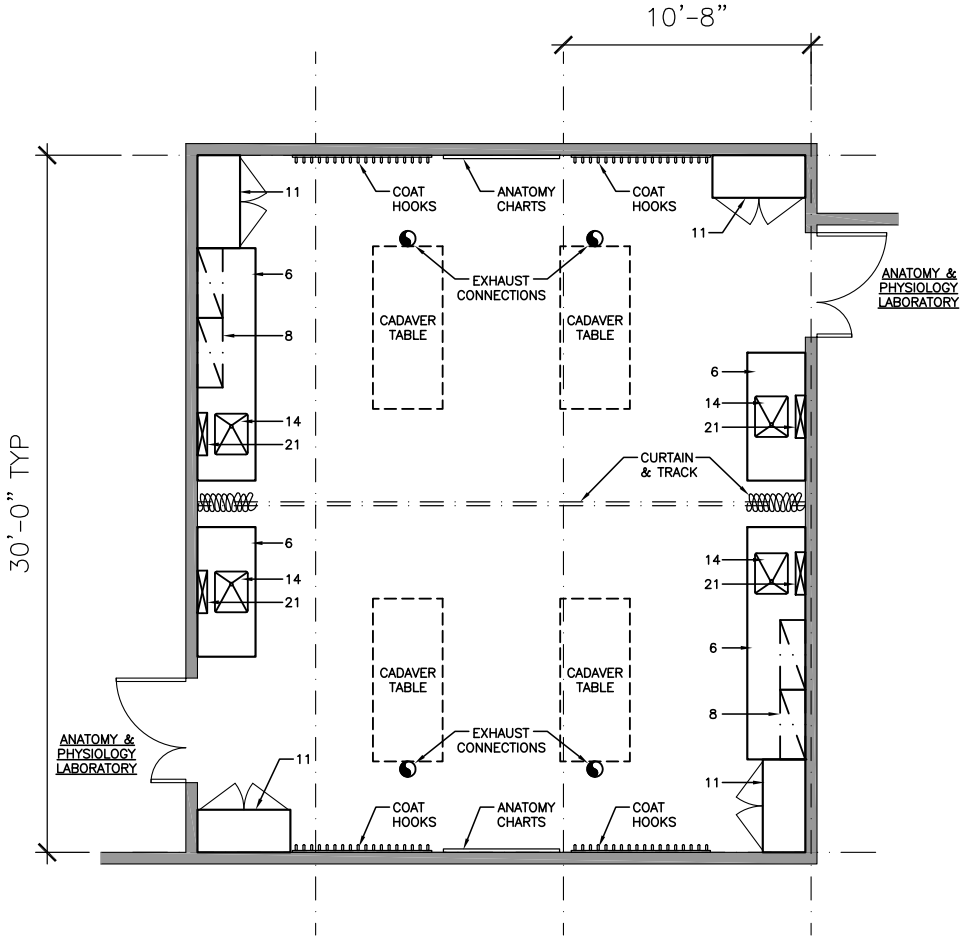
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: CADAVER ROOM

SPACE ID NO.: 1.21
AREA NSF: 800

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



0 1' 2' 4' 8'

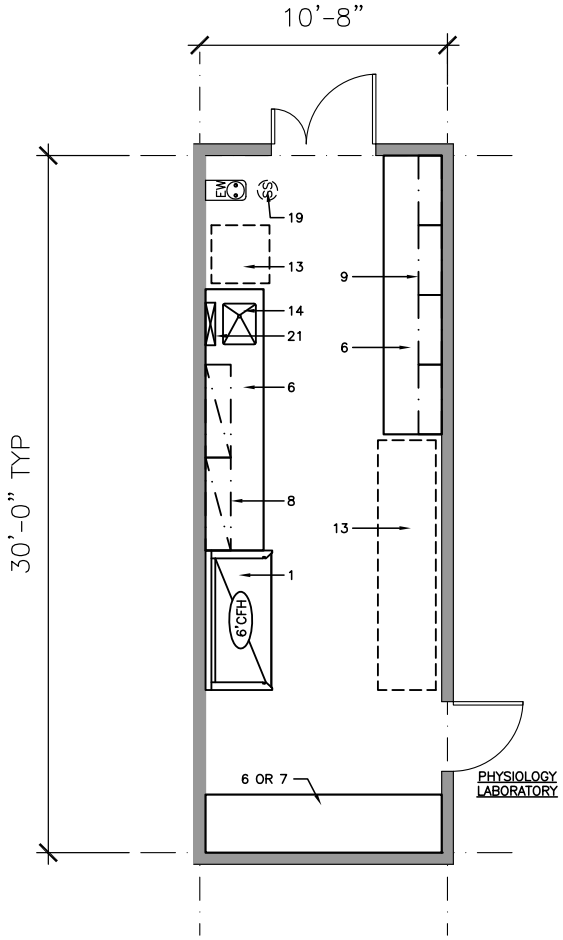
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: PHYSIOLOGY PREP/STORAGE

SPACE ID NO.: 1.22
AREA NSF: 320

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



0 1' 2' 4' 8'

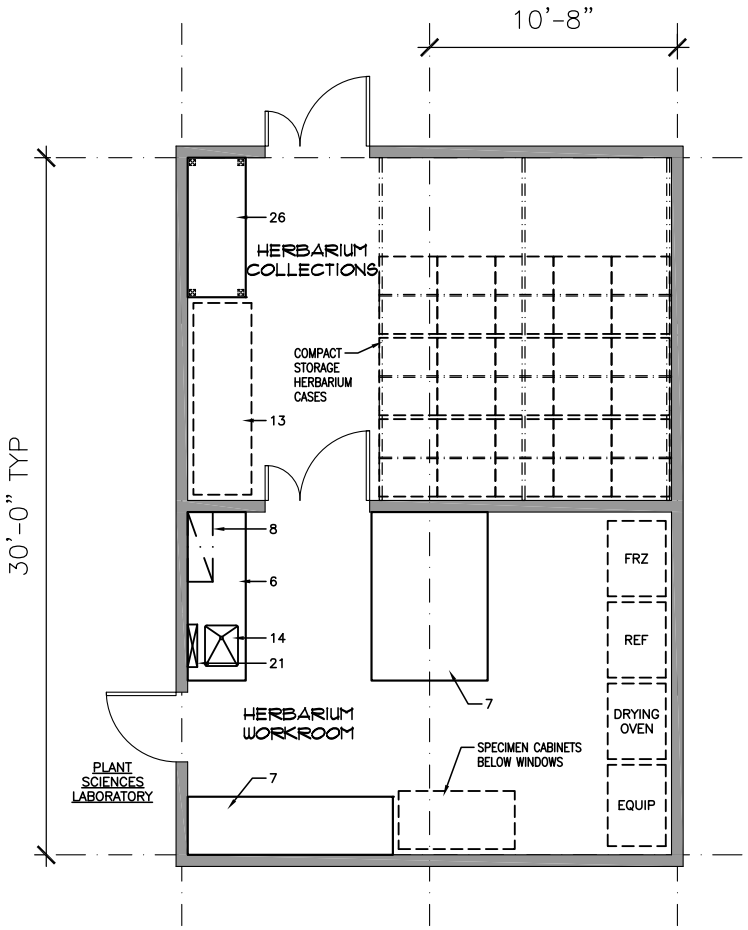
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: HERBARIUM COLLECTIONS / HERBARIUM WORK ROOM

SPACE ID NO.: 1.23 - 1.24
AREA NSF: 320 / 320

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



0 1' 2' 4' 8'

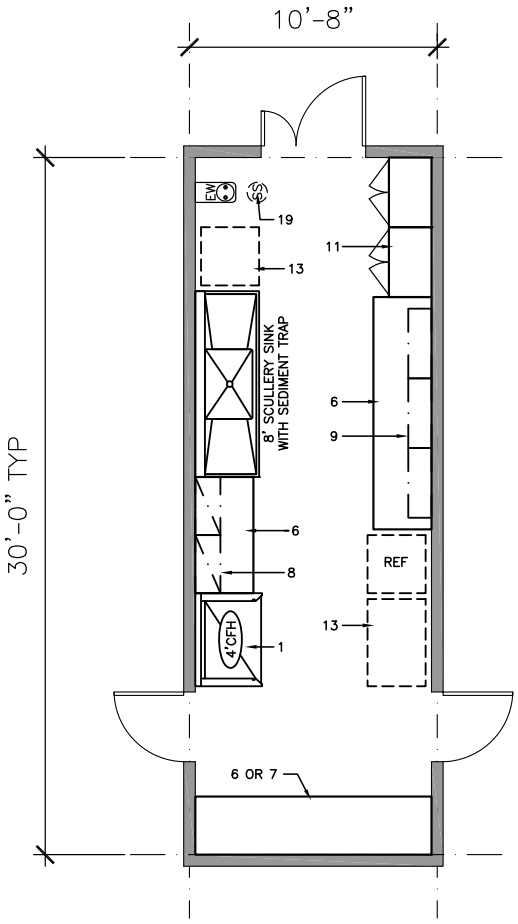
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: ECOLOGY PREP / PLANT SCIENCES

SPACE ID NO.: 1.25
AREA NSF: 320

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



0 1' 2' 4' 8'

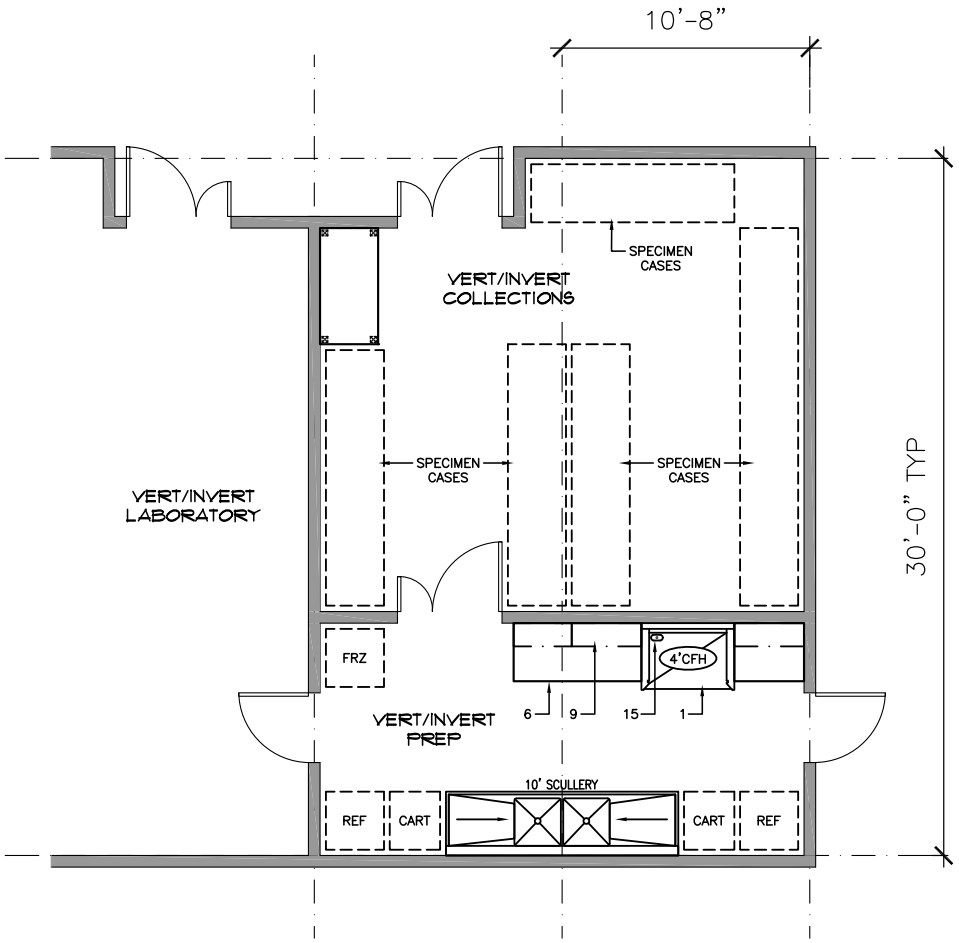
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: VERTEBRATE/INVERTEBRATE PREP/COLLECTIONS

SPACE ID NO.: 1.26 - 1.27
AREA NSF: 210 / 430

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



0 1' 2' 4' 8'

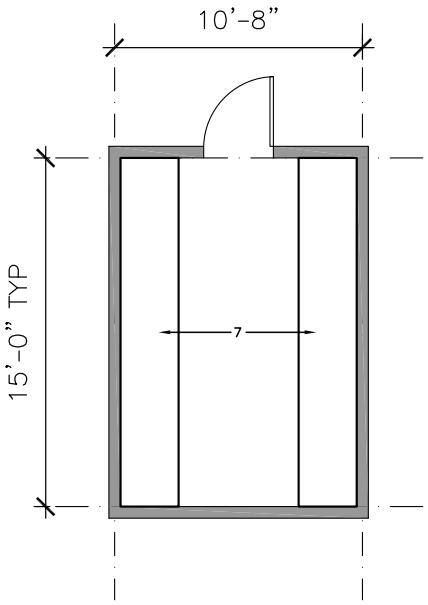
FURNISHINGS

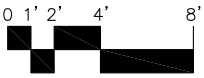
1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: FLOURESCENCE MICROSCOPY

SPACE ID NO.: 1.28
AREA NSF: 160

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





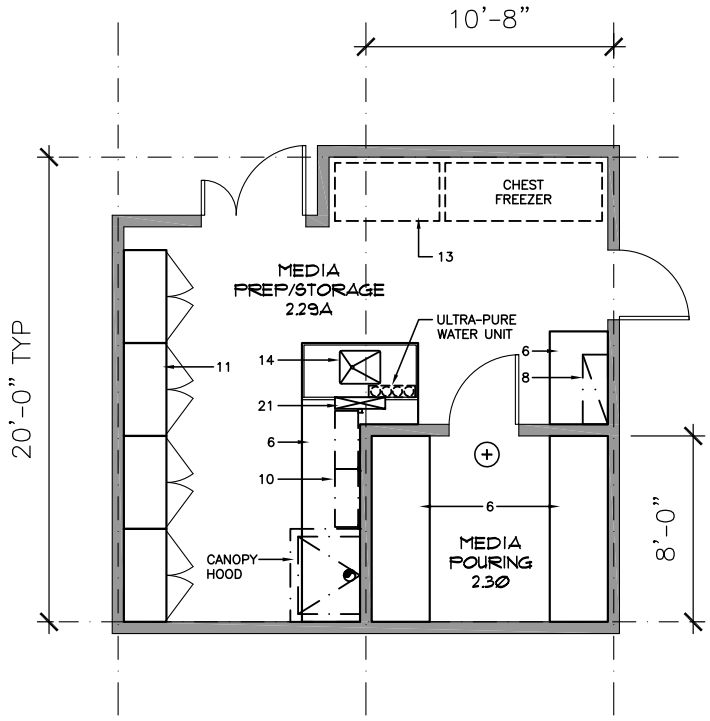
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: MEDIA PREP/STORAGE & MEDIA POURING

SPACE ID NO.: 1.29 - 1.30
AREA NSF: 320 / 80

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



0 1' 2' 4' 8'

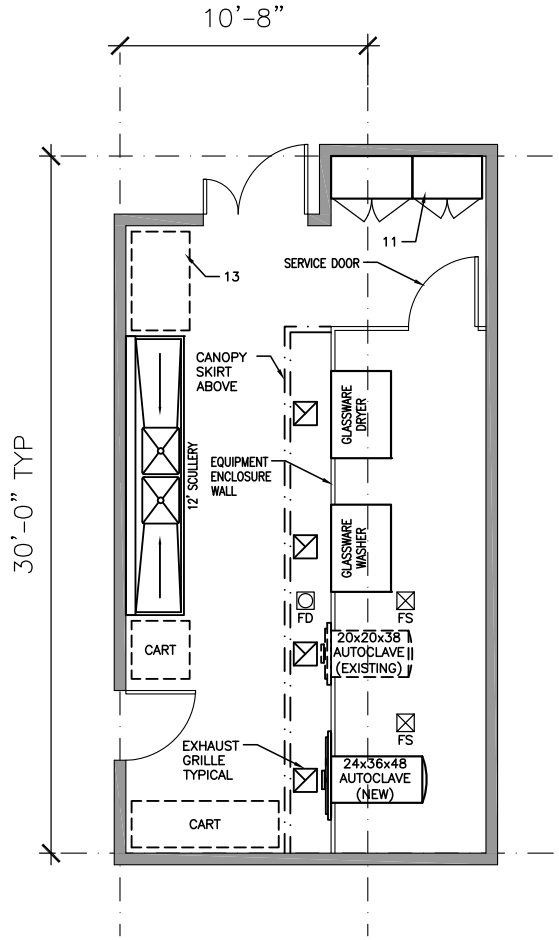
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: GLASSWASH/AUTOCLAVE

SPACE ID NO.: 1.31
AREA NSF: 480

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



0 1' 2' 4' 8'

FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
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20. Overhead Service Carrier
21. Pipe Drop Enclosure
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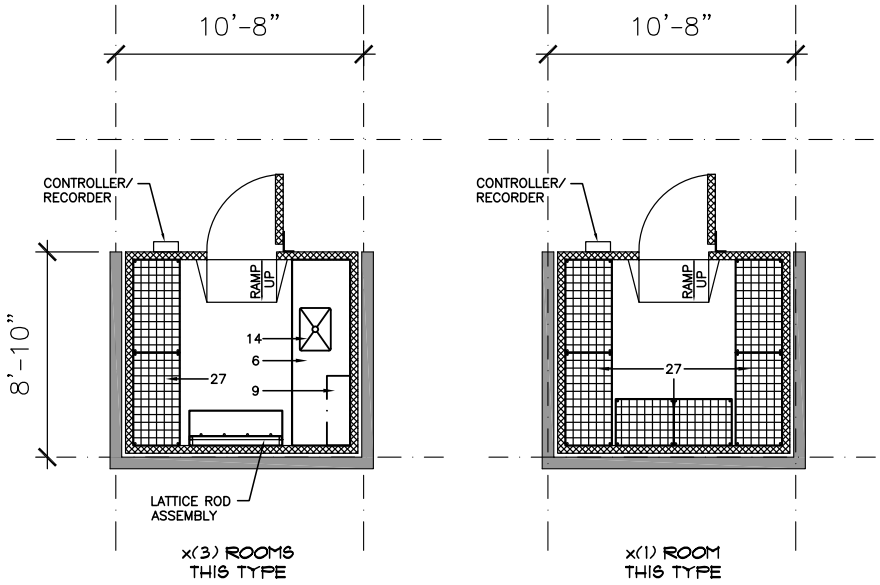
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: COLD ROOMS

SPACE ID NO.: 1.32
AREA NSF: 80 EACH

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



0 1' 2' 4' 8'

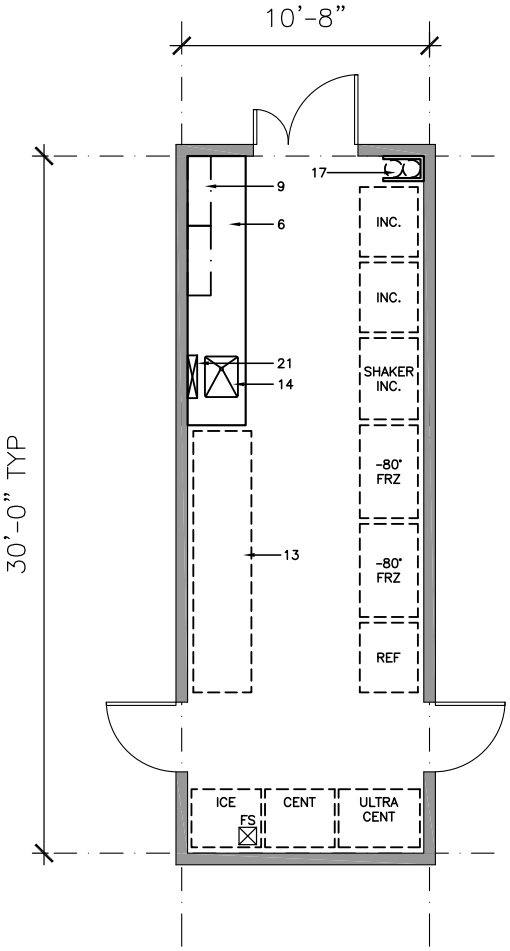
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: MICRO/MOLECULAR EQUIPMENT

SPACE ID NO.: 1.33
AREA NSF: 320

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



0 1' 2' 4' 8'

FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
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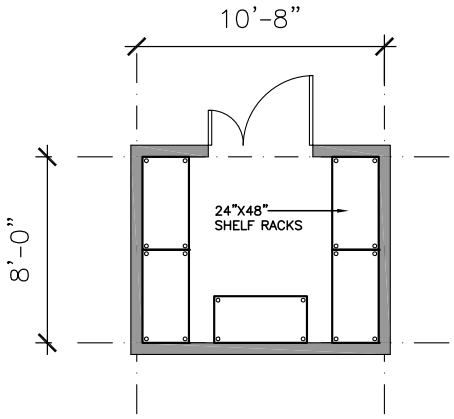
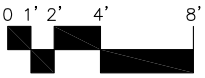
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: DRY MEDIA STORAGE

SPACE ID NO.: 1.34
AREA NSF: 80

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





FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
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17. Cylinder Rack
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23. Glassware Washer
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25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
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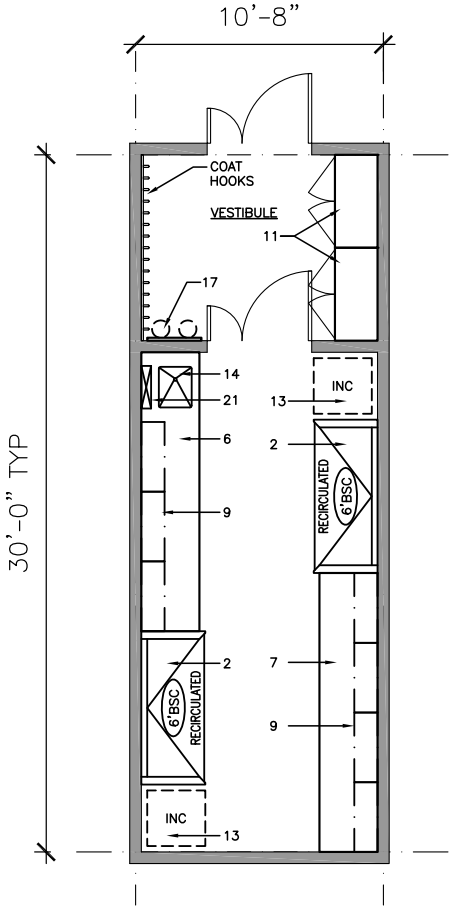
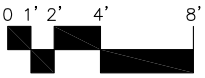
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: TISSUE CULTURE ROOM

SPACE ID NO.: 1.35
AREA NSF: 320

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





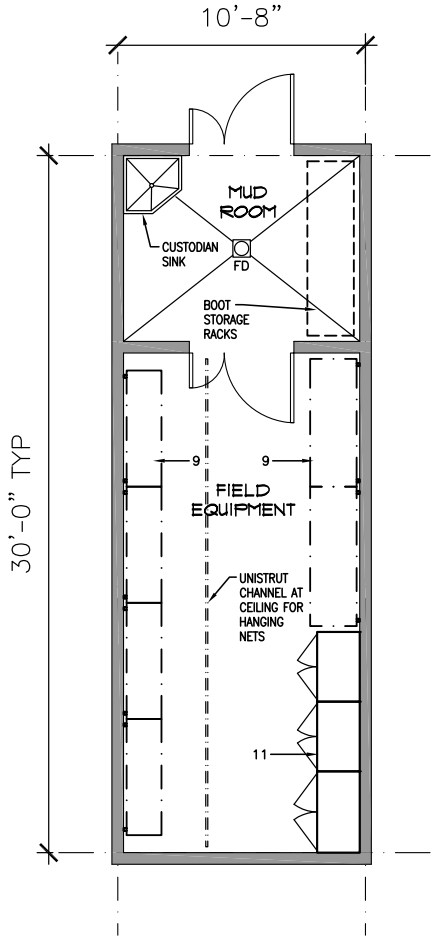
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: MUD ROOM/FIELD EQUIPMENT ROOM

SPACE ID NO.: 1.36 - 1.37
AREA NSF: 80 / 240

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



0 1' 2' 4' 8'

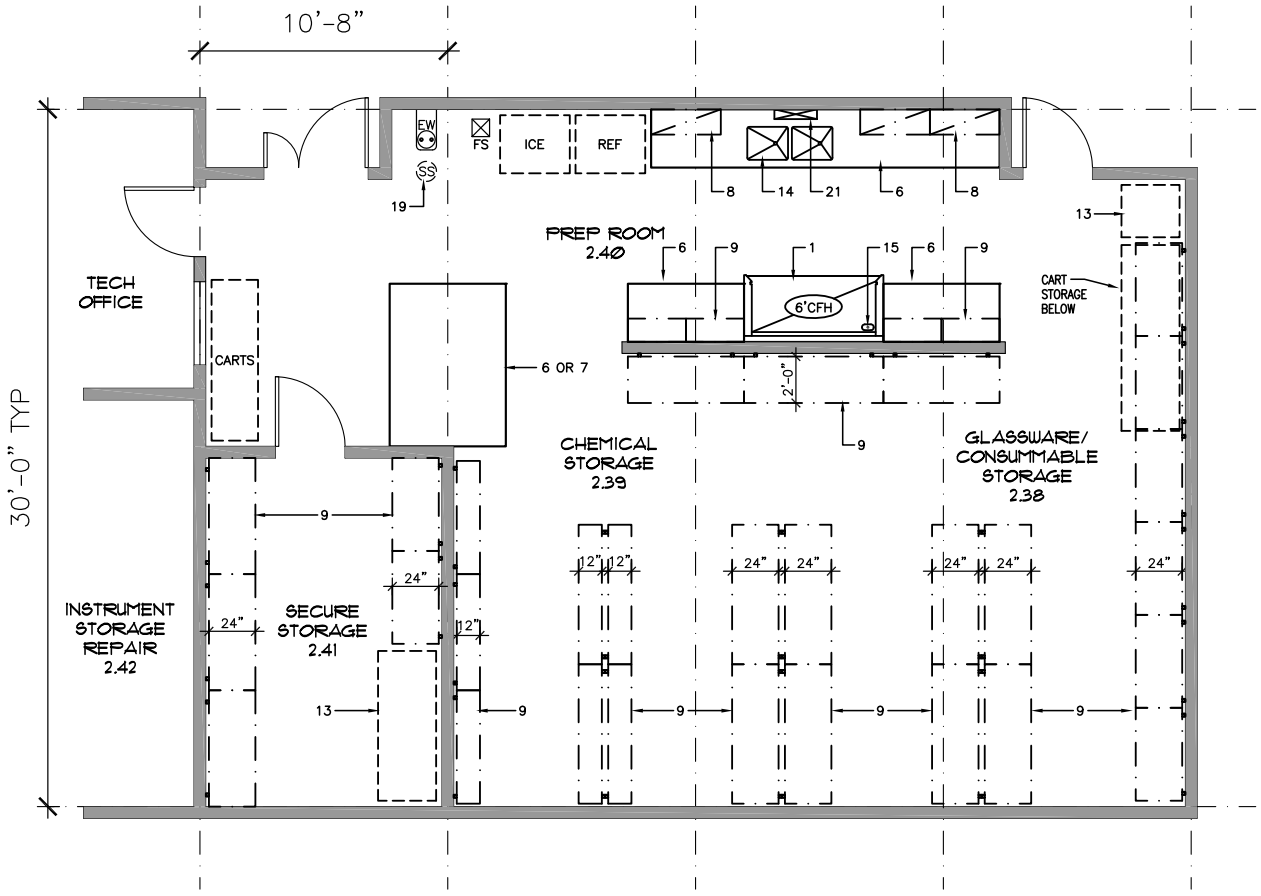
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: BIOLOGY STOCK SUITE

SPACE ID NO.: 1.38-1.41
AREA NSF: 1,280 TOTAL

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



0 1' 2' 4' 8'

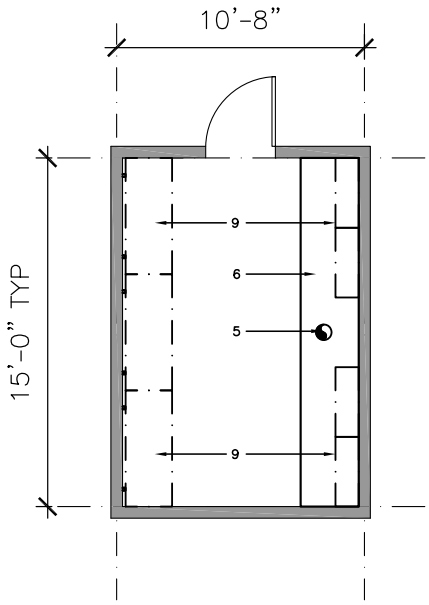
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: INSTRUMENT STORAGE/REPAIR

SPACE ID NO.: 1.42
AREA NSF: 1,60

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



0 1' 2' 4' 8'

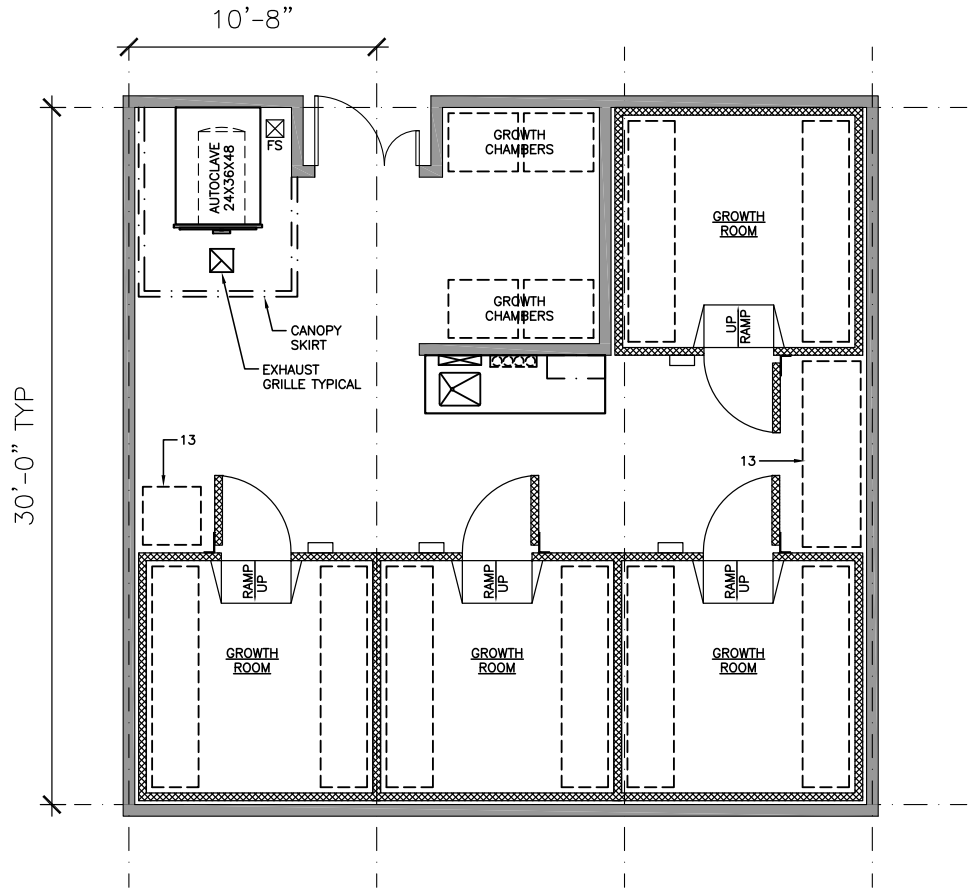
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: GROWTH ROOM/CHAMBER SUITE

SPACE ID NO.: 1.44
AREA NSF: 960

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



0 1' 2' 4' 8'

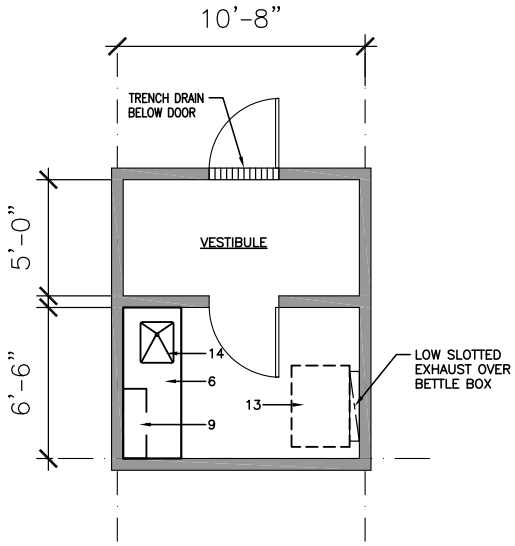
FURNISHINGS

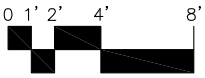
1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: BEETLE ROOM

SPACE ID NO.: 1.45
AREA NSF: 120

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





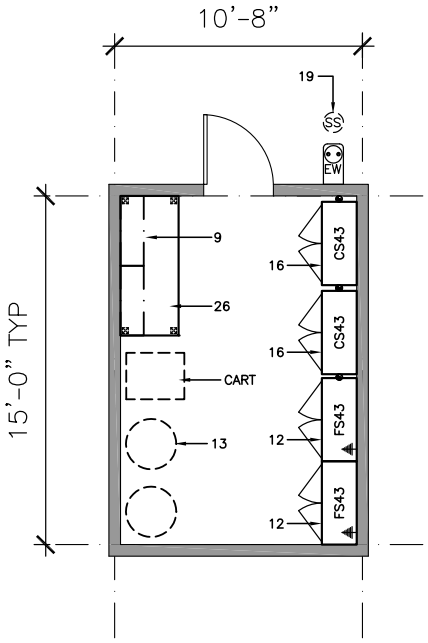
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY
SPACE NAME: BULK CHEMICAL STORAGE

SPACE ID NO.: 1.46
AREA NSF: 160

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



0 1' 2' 4' 8'

FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

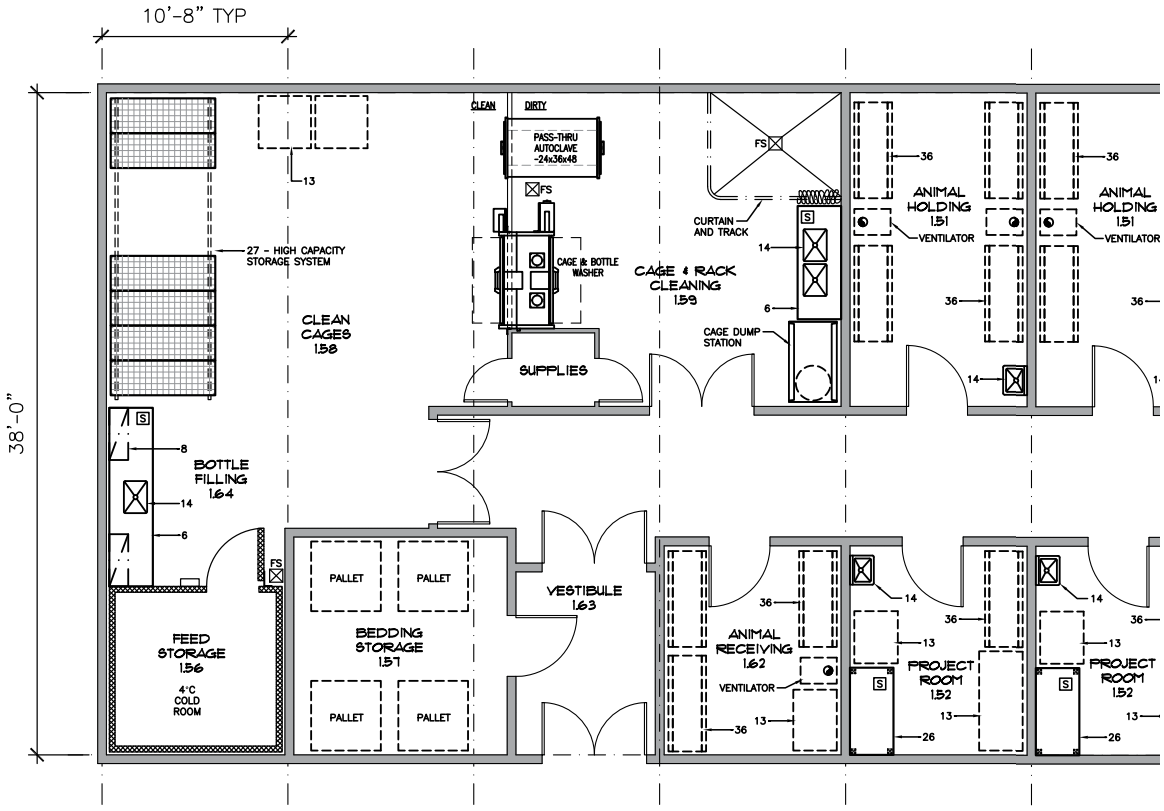
SPACE DIAGRAM

Eastern Washington University Science II

DEPARTMENT: BIOLOGY

SPACE NAME: VIVARIUM SUITE

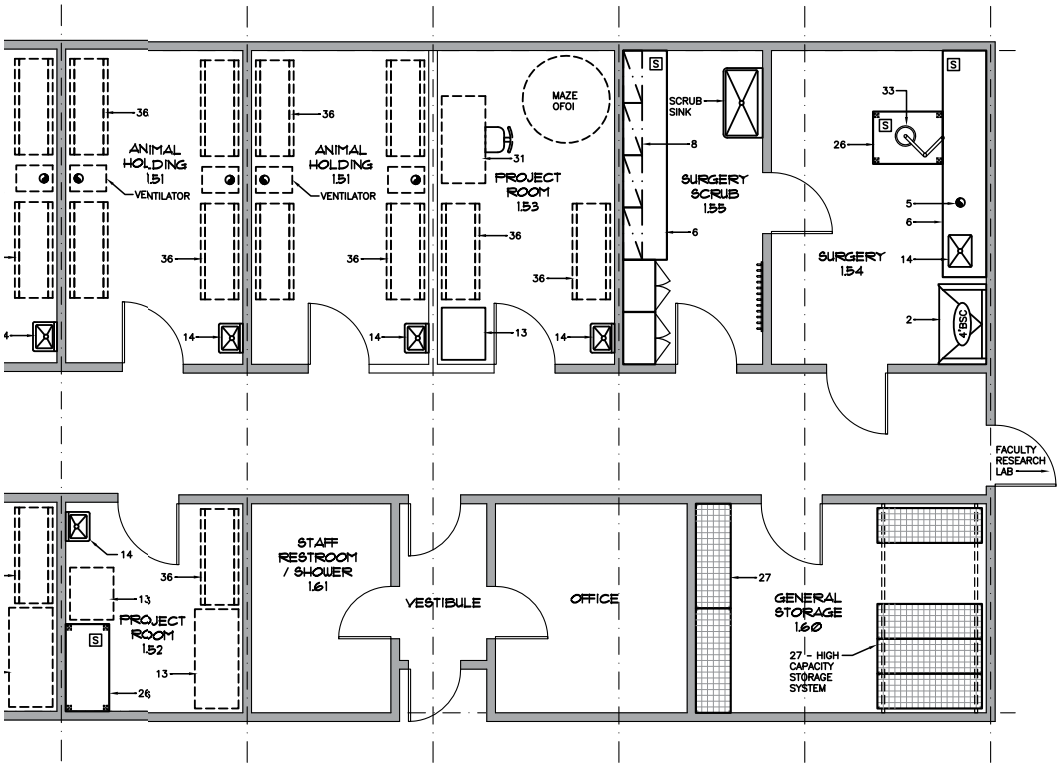
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.

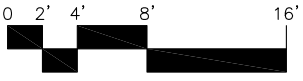


FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System

SPACE ID NO.: 1.51 - 1.64
AREA NSF: 4,160



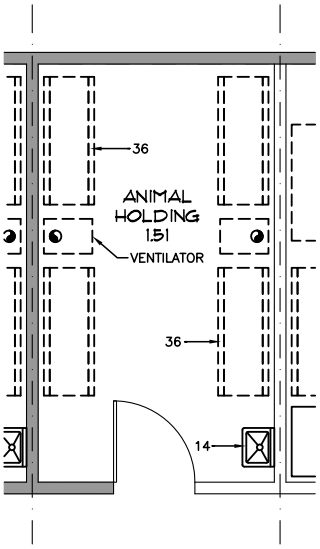


19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: ANIMAL HOLDING

SPACE ID NO.: 1.51
AREA NSF: 180

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



0 1' 2' 4' 8'

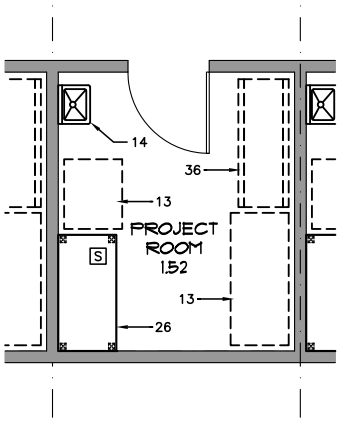
FURNISHINGS

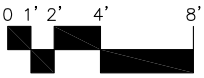
1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: PROJECT ROOM (SMALL)

SPACE ID NO.: 1.52
AREA NSF: 120

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





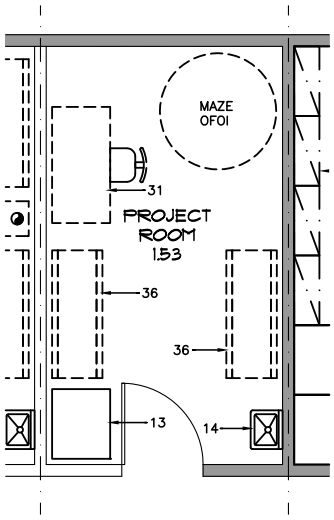
FURNISHINGS

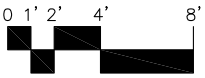
1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: PROJECT ROOM (LARGE)

SPACE ID NO.: 1.53
AREA NSF: 180

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





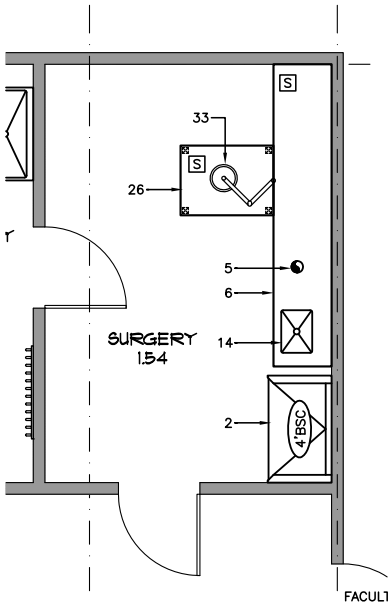
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: SURGERY

SPACE ID NO.: 1.54
AREA NSF: 180

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



0 1' 2' 4' 8'

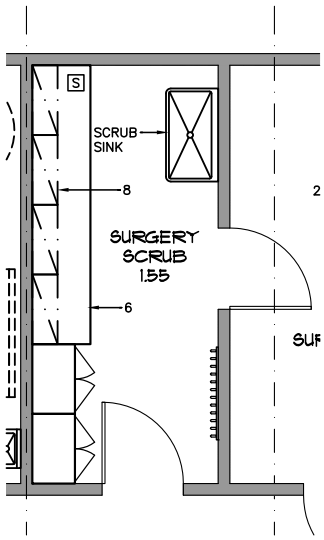
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: SURGERY SCRUB

SPACE ID NO.: 1.55
AREA NSF: 120

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



0 1' 2' 4' 8'

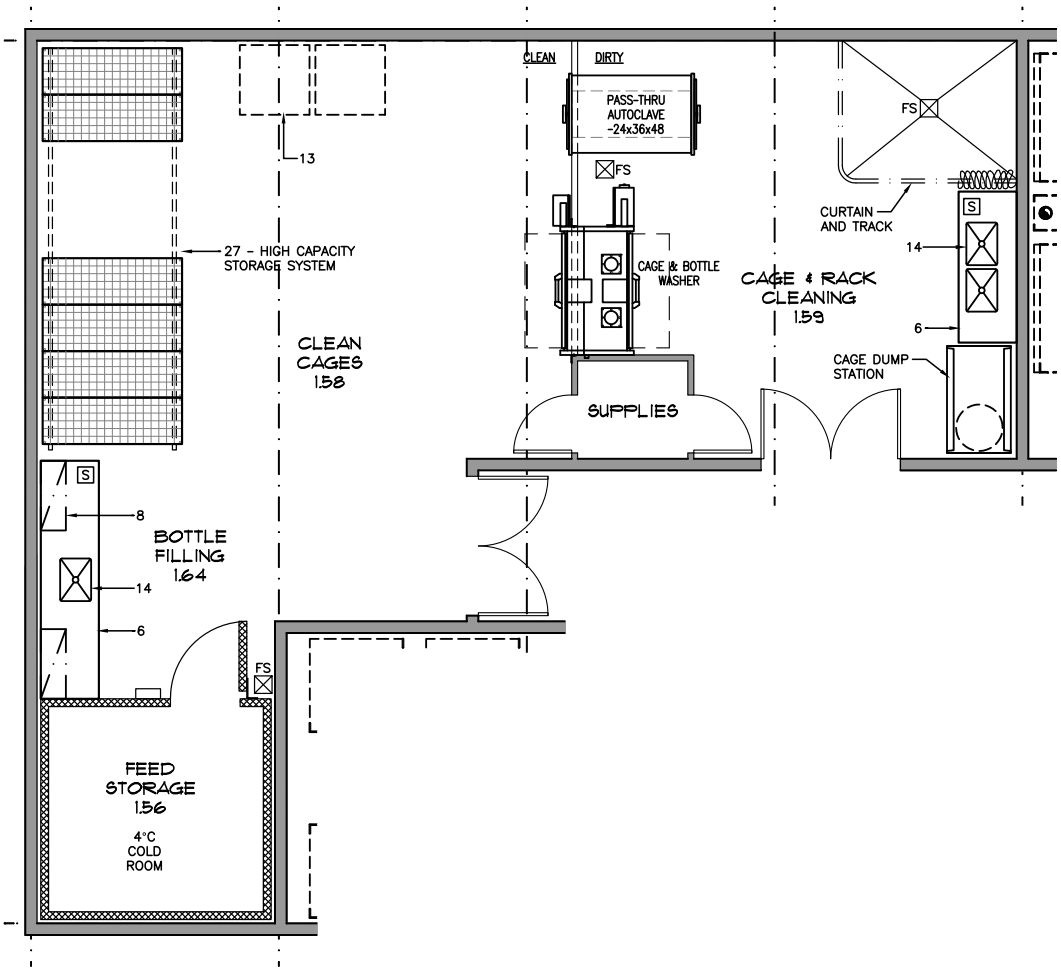
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: FEED STORAGE / COLD ROOM, CLEAN CAGES, CAGE & RACK CLEANING, BOTTLE FILLING

SPACE ID NO.: 1.56, 1.58, 1.59, 1.64
AREA NSF: 400 / 400

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



0 1' 2' 4' 8'

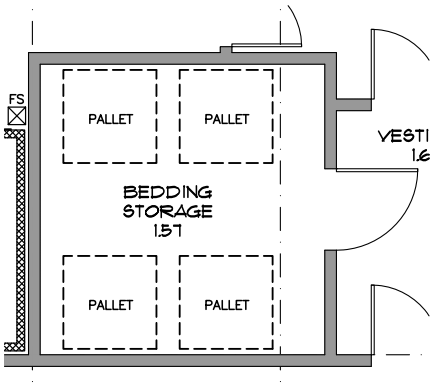
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: BEDDING STORAGE

SPACE ID NO.: 1.57
AREA NSF: 160

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



0 1' 2' 4' 8'

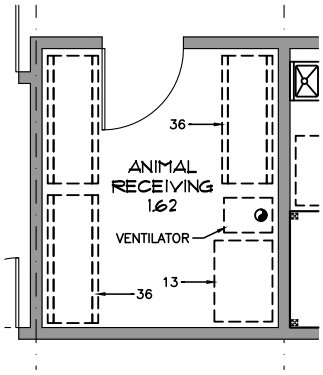
FURNISHINGS

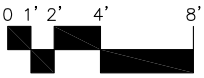
1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: ANIMAL RECEIVING

SPACE ID NO.: 1.62
AREA NSF: 120

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





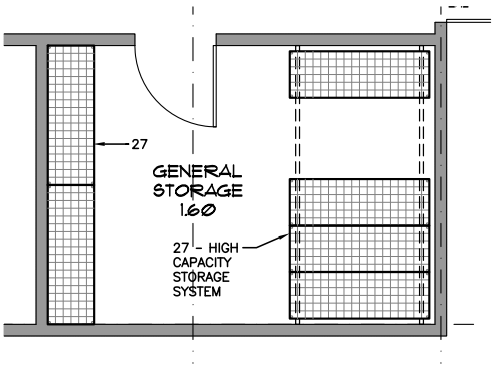
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: VIVARIUM GENERAL STORAGE

SPACE ID NO.: 1.60
AREA NSF: 200

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



0 1' 2' 4' 8'

FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Laminar Flow Hood
4. Slot Exhaust
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Flexible Bench System
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. Cage Rack
37. Coat/Book Bag Storage Unit

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.01**
SPACE NAME: INTRO / GENERAL BIOLOGY — **OCCUPANCY: 30**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	Note 1
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
75 fc at bench/desk	■
Safe light	
Special Lighting	
Darkenable	Note 2
Zoned Lighting	Note 2
Other	

CHEMICALS	
Bases	
Acids	
Solvents	■
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	■
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. (1) 6' Chemical fume hood
2. Suitable for A/V presentations

DETAILED SPACE REQUIREMENTS

Eastern Washington University Science II

LMN Architects/RFD

Cheney, Washington

DEPARTMENT: BIOLOGY

SPACE NAME: ANATOMY & PHYSIOLOGY

SPACE ID NO: 1.02

OCCUPANCY: 32

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	Note 1
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	■
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	■

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	
100 fc at bench/desk	
75 fc at bench/desk	■
Safe light	
Special Lighting	
Darkenable	Note 2
Zoned Lighting	Note 2
Other	

CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. Minimum 6 air changes/ hour when occupied, ability to switch on to 12 air changes/hour during dissection activities
2. Suitable for A/V presentations

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.03**
SPACE NAME: PHYSIOLOGY — **OCCUPANCY: 30**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	Note 1
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	■
Inert	■
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
75 fc at bench/desk	■
Safe light	
Special Lighting	
Darkenable	Note 2
Zoned Lighting	Note 2
Other	

CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. (1) 6' Chemical fume hood
2. Suitable for A/V presentations

DETAILED SPACE REQUIREMENTS

Eastern Washington University Science II

LMN Architects/RFD

Cheney, Washington

DEPARTMENT: BIOLOGY

SPACE NAME: ECOLOGY / PLANT SCIENCES

SPACE ID NO: 1.04

OCCUPANCY: 30

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	Note 1
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	Note 2
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	■
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
75 fc at bench/desk	■
Safe light	
Special Lighting	
Darkenable	Note 3
Zoned Lighting	Note 3
Other	

CHEMICALS	
Bases	■
Acids	■
Solvents	■
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	■
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. (1) 4' Chemical fume hood
2. Snorkels over student tables (12)
3. Suitable for A/V presentations

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.05**
SPACE NAME: VERTEBRATE — **OCCUPANCY: 30**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	■
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	Note 1
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	■
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
75 fc at bench/desk	■
Safe light	
Special Lighting	
Darkenable	Note 2
Zoned Lighting	Note 2
Other	

CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. Snorkels over student tables (16)
2. Suitable for A/V presentations

DEPARTMENT: BIOLOGY
SPACE NAME: INVERTEBRATE
SPACE ID NO: 1.06
OCCUPANCY: 30

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	■
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	Note 1
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	■
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
75 fc at bench/desk	■
Safe light	
Special Lighting	
Darkenable	Note 2
Zoned Lighting	Note 2
Other	

CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. Snorkels over student tables (16)
2. Suitable for A/V presentations

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.07**
SPACE NAME: MOLECULAR BIOLOGY — **OCCUPANCY: 30**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	Note 1
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	Note 2
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	■
Inert	■
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
75 fc at bench/desk	■
Safe light	
Special Lighting	
Darkenable	Note 3
Zoned Lighting	Note 3
Other	

CHEMICALS	
Bases	
Acids	
Solvents	■
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. (1) 4' Chemical fume hood
2. (1) 6' Biological Safety Cabinet (recirculating)
3. Suitable for A/V presentations

DETAILED SPACE REQUIREMENTS

Eastern Washington University Science II

LMN Architects/RFD

Cheney, Washington

DEPARTMENT: BIOLOGY

SPACE NAME: MICROBIOLOGY

SPACE ID NO: 1.08

OCCUPANCY: 30

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 Filtration	
Additional Exhaust Air Filtration	

HOODS

Chemical Fume Hood	Note 1
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	Note 2
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	■
Inert	■
Flammable	O_2
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
75 fc at bench/desk	■
Safe light	
Special Lighting	
Darkenable	Note 3
Zoned Lighting	Note 3
Other	

CHEMICALS

Bases	
Acids	
Solvents	■
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	■
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. (1) 4' Chemical fume hood
2. (1) 6' BSC - Recirculating
3. Suitable for A/V presentations

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.09**
SPACE NAME: CELL BIOLOGY / EMBRYOLOGY — **OCCUPANCY: 30**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	Note 1
Radioisotope Hood	
Laminar Flow Hood	Note 2
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	■
Inert	■
Flammable	O_2
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
75 fc at bench/desk	■
Safe light	
Special Lighting	
Darkenable	Note 3
Zoned Lighting	Note 3
Other	

CHEMICALS	
Bases	■
Acids	■
Solvents	■
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	Note 4
Biological Storage	■
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	Note 5
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. (1) 6' Chemical fume hood
2. (2) 6' Horizontal laminar flow hood
3. Suitable for A/V presentations
4. Stains
5. Washable ceiling tiles (non-flaking)

DEPARTMENT: BIOLOGY
SPACE NAME: FACULTY RESEARCH LABORATORY
SPACE ID NO: 1.11
OCCUPANCY: 4-6

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	Note 1
Radioisotope Hood	
Laminar Flow Hood	■
Biological Safety Cabinet	■
Snorkel	■
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	■
Inert	■
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	■

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. Assume (1) 4' chemical fume hood per each 1-1/2 module increment.

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.12**
SPACE NAME: RESEARCH LABORATORY - AQUATICS (LARGE TANKS) — **OCCUPANCY: 12**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	■
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	■
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	■
Acoustic Tile	
Gyp Board, Epoxy Paint	
Height	
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

DEPARTMENT: BIOLOGY
SPACE NAME: RESEARCH LABORATORY - AQUATICS (SMALL TANKS)
SPACE ID NO: 1.13
OCCUPANCY: 12

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	■
24 hours/day	

MECHANICAL	
Temperature	
68°-75° ± 2°F	■
Other	
Humidity	
Uncontrolled	■
Other	Note 1
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	■
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	■
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	■
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	■
Acoustic Tile	
Gyp Board, Epoxy Paint	
Height	
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. 4°C - 25°C +/- 1°C at walk-in Environmental Room

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.21**
SPACE NAME: CADAVER ROOM — **OCCUPANCY: 16-24**

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	Note 1
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	■
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	■
Equipment Exhaust	■
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	■
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	■

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	■
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	Note 2

REMARKS:

1. Minimum 6 air changes/ hour when occupied, ability to switch on to 12 air changes/hour during dissection activities
2. Controlled daylight. Avoid exterior viewing into Cadaver Room.

DEPARTMENT: BIOLOGY
SPACE NAME: PHYSIOLOGY PREP / STORAGE
SPACE ID NO: 1.22
OCCUPANCY: 1-2

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	Note 1
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	■
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	■
Inert	■
Flammable	
Toxic	
Floor Drain (FD)	■
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	■

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:
1. (1) 6' Chemical fume hood

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.23**
SPACE NAME: HERBARIUM COLLECTIONS — **OCCUPANCY: 1-2**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:
1. All wall penetrations sealed for fumigation

DEPARTMENT: BIOLOGY
SPACE NAME: HERBARIUM WORK ROOM
SPACE ID NO: 1.24
OCCUPANCY: 2-3

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:

- Drying oven (flr.)
- Freezer
- Refrigerator
- Plant presses (b.t.)

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.25**
SPACE NAME: ECOLOGY /PLANT SCIENCES PREP ROOM — **OCCUPANCY: 1-2**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	Note 1
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	■
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	■
Inert	■
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	■

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:
1. (1) 4' Chemical fume hood

DEPARTMENT: BIOLOGY
SPACE NAME: VERTEBRATE / INVERTEBRATE PREP
SPACE ID NO: 1.26
OCCUPANCY: 1-2

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	Note 1
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	■
Inert	■
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	Note 2
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	■

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:

1. (1) 4' Chemical fume hood
2. May use safety shower/eyewash in teaching laboratory

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.27**
SPACE NAME: VERTEBRATE / INVERTEBRATE COLLECTIONS — **OCCUPANCY:**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:
1. All wall penetrations sealed for fumigation

DEPARTMENT: BIOLOGY
SPACE NAME: FLUORESCENCE MICROSCOPY
SPACE ID NO: 1.28
OCCUPANCY: 2-3

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

REMARKS:

- Need dimmable lighting

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.29-1.30**
SPACE NAME: MEDIA PREP / STORAGE & MEDIA POURING — **OCCUPANCY: 2**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	Note 1.
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	■
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:

- -80°C Chest Freezer

1. Over fermenter

DEPARTMENT: BIOLOGY
SPACE NAME: GLASSWASH / AUTOCLAVE
SPACE ID NO: 1.31
OCCUPANCY: 2

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	8
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	■
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	■
Low Slotted Exhaust	
Equipment Exhaust	■
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	■
Condensate Return	■
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	■
Floor Sink (FS)	■
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	■

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	■
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	
Gyp Board, Epoxy Paint	■
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:

- (1) Glassware washer
- (1) Glassware dryer
- Autoclaves: (1) 20" x 20" x 38" Sterilizer, (1) 24" x 36" x 48" Sterilizer

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.32**
SPACE NAME: COLD ROOMS — **OCCUPANCY: NA**

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	■

MECHANICAL	
Temperature	
68°-75° ± 2°F	
4°C	■
Humidity	
Uncontrolled	■
Other	
Minimum Air Changes/Hour	
Air Recirculation	■
Air Pressure Positive	
Air Pressure Negative	
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	■
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	■
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	■
Other	Note 1
Base	
4" Resilient	
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	■
Epoxy/Fiberglass System	
Other	Note 1
Ceiling	
Open	■
Acoustic Tile	
Gyp Board, Epoxy Paint	
Height	Note 1
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:

1. Walls, floor, ceiling and door are prefabricated, panelized system. Provide 2" slab recess for ADA accessibility.

DETAILED SPACE REQUIREMENTS

Eastern Washington University Science II

LMN Architects/RFD
Cheney, Washington

DEPARTMENT: BIOLOGY
SPACE NAME: MICRO / MOLECULAR EQUIPMENT

SPACE ID NO: 1.33
OCCUPANCY: 1-2

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 Filtration	
Additional Exhaust Air Filtration	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	■
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	■
Inert	■
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	Note 1
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL

Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9'min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:

1. Ice machine
- PCR Laminar flow hood (OFOI)

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.34**
SPACE NAME: DRY MEDIA STORAGE — **OCCUPANCY: NA**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:

DEPARTMENT: BIOLOGY
SPACE NAME: TISSUE CULTURE ROOM
SPACE ID NO: 1.35
OCCUPANCY: 4

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 Filtration	Note 1
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	Note 2
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	■
Inert	■
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	■
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	
Gyp Board, Epoxy Paint	■
Height	
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:

1. HEPA-filtered supply air
2. (2) 6' BSC's - recirculating type with UV-lights

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.36**
SPACE NAME: MUD ROOM — **OCCUPANCY: NA**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	Note 1
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	■
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	■
Acoustic Tile	
Gyp Board, Epoxy Paint	
Height	
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:
1. Floor drain with sediment trap

DEPARTMENT: BIOLOGY
SPACE NAME: FIELD EQUIPMENT STORAGE
SPACE ID NO: 1.37
OCCUPANCY: NA

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	Note 1
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	■
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	■
Acoustic Tile	
Gyp Board, Epoxy Paint	
Height	
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:
1. Floor drain with sediment trap

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.38-1.41**
SPACE NAME: BIOLOGY STOCKROOM SUITE — **OCCUPANCY: 2-3**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	Note 1
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	■
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	■

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:
1. (1) 6' Chemical fume hood

DEPARTMENT: BIOLOGY
SPACE NAME: INSTRUMENT STORAGE / REPAIR
SPACE ID NO: 1.42
OCCUPANCY: 1

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	■
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.44**
SPACE NAME: GROWTH ROOM SUITE — **OCCUPANCY: 3-4**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	■
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	■
Steam	■
Condensate Return	■
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	■
Inert	■
Flammable	
Toxic	
Floor Drain (FD)	■
Floor Sink (FS)	■
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:

1. Provisions for water cooled units and CO2 backup
   - (2) Walk-in rooms @ 4°C - 20°C ± 1°C
   - (2) Walk-in rooms @ 15°C - 30°C ± 1°C
   - Humidity setpoint and range for each Growth Room TBD by faculty during design.

DEPARTMENT: BIOLOGY
SPACE NAME: BEETLE ROOM
SPACE ID NO: 1.45
OCCUPANCY: 1

UTILIZATION

Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	

MECHANICAL

Temperature	
68°-75° ± 2°F	Note 1
Other	
Humidity	■
Uncontrolled	
Other	
Minimum Air Changes/Hour	10
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	■
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	■
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL

Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	■
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	
Gyp Board, Epoxy Paint	■
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

REMARKS:

1. Maintain temperature in range of 75-78°F

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.46**
SPACE NAME: BULK CHEMICAL STORAGE — **OCCUPANCY: NA**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	Note 1

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	■

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:
1. Exhausted chemical storage

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: HOLDING ROOMS
SPACE ID NO: 1.51
OCCUPANCY: NA

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	■

MECHANICAL	
Temperature	
68°-75° ± 2°F	Note 1
Other	
Humidity	
Uncontrolled	
Other	Note 1
Minimum Air Changes/Hour	10
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	■
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	Note 2
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

ELECTRICAL	
110V, 20A, 1 Phase	Note 3
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	
100 fc at bench/desk	
75 fc at bench/desk	
Safe light	
Special Lighting	Note 4
Darkenable	■
Zoned Lighting	
Other	

CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	■
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Epoxy/Fiberglass System	■
Other	
Ceiling	
Open	
Acoustic Tile	
Gyp Board, Epoxy Paint	■
Height	9' min
Doors	
3'-6" x 7'	■
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	Note 5
Natural Daylight	

REMARKS:

1. Maintain 40-80% RH +/- 5%. Provide separate temperature and humidity control for each Holding Room.
2. Floor drain with sealed cap.
3. Waterproof electrical receptacles mounted at +48" on standby power.
4. Lighting on separate programmable diurnal timer for each Holding Room @ 30 fc with step-up lighting to 70fc for housekeeping.
5. Viewing window with light-tight hinged cover.

* Ventilated cage racks - Techniplast "Greenline Plus". (4) racks per Holding Room.

DEPARTMENT: BIOLOGY - VIVARIUM SUITE — **SPACE ID NO: 1.52-1.53**
SPACE NAME: PROJECT ROOMS — **OCCUPANCY: 2-4**

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	■

MECHANICAL	
Temperature	
68°-75° ± 2°F	Note 1
Other	
Humidity	
Uncontrolled	
Other	Note 1
Minimum Air Changes/Hour	10
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	■
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	Note 2
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

ELECTRICAL	
110V, 20A, 1 Phase	Note 3
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	
100 fc at bench/desk	
75 fc at bench/desk	
Safe light	
Special Lighting	Note 4
Darkenable	■
Zoned Lighting	
Other	

CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	■
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Epoxy/Fiberglass System	■
Other	
Ceiling	
Open	
Acoustic Tile	
Gyp Board, Epoxy Paint	■
Height	9' min
Doors	
3'-6" x 7'	■
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	Note 5
Natural Daylight	

REMARKS:

1. Maintain 40-60% RH +/- 5%. Provide separate temperature and humidity control for each Project Room.
2. Floor drain with sealed cap.
3. Waterproof electrical receptacles mounted at +48"
4. Lighting on separate programmable diurnal timer for each Project Room @ 30 fc with step-up lighting to 70fc for housekeeping.
5. Viewing window with light-tight hinged cover.

* Standard cages & racks.

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: SURGERY
SPACE ID NO: 1.54
OCCUPANCY: 2-4

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	■

MECHANICAL	
Temperature	
68°-75° ± 2°F	■
Other	
Humidity	
Uncontrolled	
Other	40-60%
Minimum Air Changes/Hour	10
Air Recirculation	
Air Pressure Positive	■
Air Pressure Negative	
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	Note 1
Snorkel	■
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
75 fc at bench/desk	■
Safe light	
Special Lighting	Note 2
Darkenable	
Zoned Lighting	
Other	

CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	■
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Epoxy/Fiberglass System	■
Other	
Ceiling	
Open	
Acoustic Tile	
Gyp Board, Epoxy Paint	■
Height	9' min
Doors	
3'-6" x 7'	■
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:

1. (1) 4' Class II Biological Safety Cabinet (exhausted).
2. Surgery light.

DEPARTMENT: BIOLOGY - VIVARIUM SUITE — **SPACE ID NO: 1.55**
SPACE NAME: SURGERY SCRUB ROOM — **OCCUPANCY: 2**

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	■
24 hours/day	

MECHANICAL	
Temperature	
68°-75° ± 2°F	■
Other	
Humidity	
Uncontrolled	
Other	40-60%
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	■
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	■
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Epoxy/Fiberglass System	■
Other	
Ceiling	
Open	
Acoustic Tile	
Gyp Board, Epoxy Paint	■
Height	9' min
Doors	
3'-6" x 7'	■
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:
1. Hands-free scrub sink.

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: FEED/BEDDING STORAGE
SPACE ID NO: 1.56
OCCUPANCY: NA

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	■

MECHANICAL	
Temperature	
68°-75° ± 2°F	■
Other	Note 1
Humidity	
Uncontrolled	
Other	<70%
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	■
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	■
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	■
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Epoxy/Fiberglass System	■
Other	
Ceiling	
Open	
Acoustic Tile	
Gyp Board, Epoxy Paint	■
Height	9' min
Doors	
3'-6" x 7'	■
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

REMARKS:

1. 4 degrees C. at small Cold Room within Feed/Bedding Storage Room

DEPARTMENT: BIOLOGY - VIVARIUM SUITE — **SPACE ID NO: 1.58**
SPACE NAME: CLEAN STORAGE — **OCCUPANCY: NA**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	■
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Epoxy/Fiberglass System	■
Other	
Ceiling	
Open	
Acoustic Tile	
Gyp Board, Epoxy Paint	■
Height	9' min
Doors	
3'-6" x 7'	■
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

REMARKS:

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: CAGE & RACK CLEANING
SPACE ID NO: 1.59
OCCUPANCY: 2-4

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	■
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	■
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	■
Floor Sink (FS)	■
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	■
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Epoxy/Fiberglass System	■
Other	
Ceiling	
Open	
Acoustic Tile	
Gyp Board, Epoxy Paint	■
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	Double
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

DEPARTMENT: BIOLOGY - VIVARIUM SUITE — **SPACE ID NO: 1.60**
SPACE NAME: VIVARIUM GENERAL STORAGE — **OCCUPANCY: NA**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	■
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Epoxy/Fiberglass System	■
Other	
Ceiling	
Open	
Acoustic Tile	
Gyp Board, Epoxy Paint	■
Height	9' min
Doors	
3'-6" x 7'	■
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

REMARKS:

DEPARTMENT: BIOLOGY - VIVARIUM SUITE
SPACE NAME: ANIMAL RECEIVING
SPACE ID NO: 1.62
OCCUPANCY: 1

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	Note 2
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

ELECTRICAL	
110V, 20A, 1 Phase	Note 3
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	
100 fc at bench/desk	
75 fc at bench/desk	
Safe light	
Special Lighting	Note 4
Darkenable	■
Zoned Lighting	
Other	

CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	■
Sealed Concrete	
Other	
Base	
4" Resilient	
Integral w/floor	■
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Epoxy/Fiberglass System	■
Other	
Ceiling	
Open	
Acoustic Tile	
Gyp Board, Epoxy Paint	■
Height	9' min
Doors	
3'-6" x 7'	■
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	Note 5
Natural Daylight	

REMARKS:

1. Maintain 40-60% RH +/- 5%. Provide separate temperature and humidity control for each Project Room.
2. Floor drain with sealed cap.
3. Waterproof electrical receptacles mounted at +48"
4. Lighting on separate programmable diurnal timer for each Project Room @ 30 fc with step-up lighting to 70fc for housekeeping.
5. Viewing window with light-tight hinged cover.

* Standard cages & racks.

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.71**
SPACE NAME: GREENHOUSE - PREP ROOM (HEADHOUSE) — **OCCUPANCY: 2-4**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	Note 1
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	■

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	
100 fc at bench/desk	
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	■

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	■
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	■
Acoustic Tile	
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. Floor drain with sediment trap.
2. Sink with sediment trap.

DEPARTMENT: BIOLOGY
SPACE NAME: GREENHOUSE - BOTANY TEACHING COLLECTION
SPACE ID NO: 1.72
OCCUPANCY:

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	■

MECHANICAL	
Temperature	
68°-75° ± 2°F	
Other	Note 1
Humidity	
Uncontrolled	
Other	Note 2
Minimum Air Changes/Hour	
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	Note 3
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
75 fc at bench/desk	
Safe light	
Special Lighting	Note 4
Darkenable	
Zoned Lighting	
Other	

CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	■
Other	
Base	
4" Resilient	
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	Note 5
Ceiling	
Other	Note 5
Acoustic Tile	
Gyp Board, Epoxy Paint	
Height	
Doors	
3'-6" x 7'	■
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. Maintain temperature greater than 70 degrees F. and less than 85 degrees F.
2. Misting system for humidity control as required to maintain minimum 50% RH.
3. Floor drain with sediment bucket.
4. Plant growth lighting on diurnal timers.
5. Glass or polycarbonate wall and roof panels - TBD.

DEPARTMENT: BIOLOGY — **SPACE ID NO: 1.73**
SPACE NAME: GREENHOUSE - STUDENT PROJECT AREA — **OCCUPANCY:**

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	■

MECHANICAL	
Temperature	
68°-75° ± 2°F	
Other	Note 1
Humidity	
Uncontrolled	
Other	Note 2
Minimum Air Changes/Hour	
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	Note 3
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
75 fc at bench/desk	
Safe light	
Special Lighting	Note 4
Darkenable	
Zoned Lighting	
Other	

CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	■
Other	
Base	
4" Resilient	
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	Note 5
Ceiling	
Other	Note 5
Acoustic Tile	
Gyp Board, Epoxy Paint	
Height	
Doors	
3'-6" x 7'	■
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. Maintain temperature greater than 70 degrees F. and less than 85 degrees F.
2. Misting system for humidity control as required.
3. Floor drain with sediment bucket.
4. Plant growth lighting on diurnal timers.
5. Glass or polycarbonate wall and roof panels - TBD.

DEPARTMENT: SHARED FACILITIES
SPACE NAME: HAZARDOUS WASTE STORAGE
SPACE ID NO: 2.42
OCCUPANCY: NA

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	15
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	■
Additional Supply Air Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	Note 1
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	■
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	■
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	■
Gyp Board, Epoxy Paint	
Height	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

REMARKS:
1. (1) 6' chemical fume hood.

DEPARTMENT: SHARED FACILITIES — **SPACE ID NO: 2.43**
SPACE NAME: CYLINDER STORAGE — **OCCUPANCY: NA**

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 Filtration	
Additional Exhaust Air Filtration	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

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 (PW)	
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Drench Hose (DH)	

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	
100 fc at bench/desk	
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	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	■
Other	
Base	
4" Resilient	■
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	■
Gyp Board, Paint	
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	■
Acoustic Tile	
Gyp Board, Epoxy Paint	
Height	
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

REMARKS:

Department:	**Biology**
Space ID:	**1.81**
Space Name:	**Faculty Office Chair**
Occupants/space:	**1**
ASF:	**175**
No of spaces:	**1**

GENERAL:

Function	**Department head office**
Adjacencies	**Departmental office/waiting, workroom and conference**
Ceiling Height	**10’**
Windows	**Exterior with interior relites**
Daylight Control	**Blinds**
Lighting	**Ambient office levels, motion sensor control**

FINISHES:

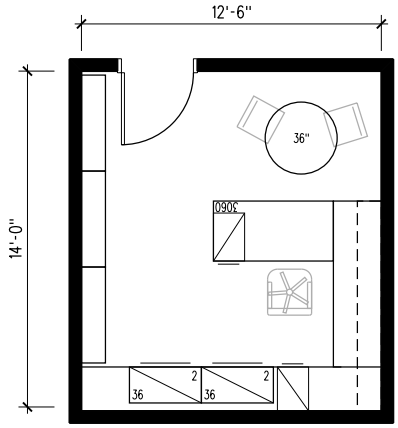
Floor	**Carpet**
Base	**Resilient**
Walls	**Painted GWB**
Ceiling	**ACT**

UTILITIES:

Plumbing	**None**
Electrical	**Duplex at selected locations**
Floor Boxes	**None**
Data/Telecom	**Yes**
Audio-Visual	**None**
HVAC/Controls	**Demand controlled ventilation, operable windows**

EQUIPMENT:

Fixed	**Built-in book shelves, tack/white board, coat hooks**
Moveable	**Owner-furnished desk, credenza, filing cabinets, meeting table & chairs**



SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	**Biology**	**Biology**
Space ID:	**1.82**	**1.84**
Space Name:	**Faculty Office**	**Operations Manager Office**
Occupants/space:	**1**	**1**
ASF:	**140**	**140**
No of spaces:	**25**	**1**

GENERAL:

Function	**Faculty and staff offices**
Adjacencies	**Departmental office/waiting, workroom and conference**
Ceiling Height	**10’**
Windows	**Operable exterior and interior relites**
Daylight Control	**Blinds**
Lighting	**Ambient office levels, motion sensor control**

FINISHES:

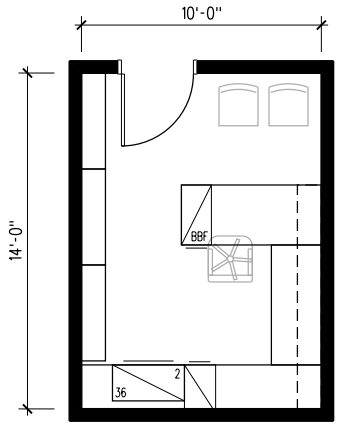
Floor	**Carpet**
Base	**Resilient**
Walls	**Painted GWB**
Ceiling	**ACT**

UTILITIES:

Plumbing	**None**
Electrical	**Duplex at selected locations**
Floor Boxes	**None**
Data/Telecom	**Yes**
Audio-Visual	**None**
HVAC/Controls	**Demand controlled ventilation, operable windows**

EQUIPMENT:

Fixed	**Built-in book shelves, tack/white board, coat hooks**
Moveable	**Owner-furnished desk, credenza, filing cabinets, chairs**



Department: Biology

Space ID: 1.83
Space Name: Departmental Office/Waiting
Occupants/space: 2
ASF: 500
No of spaces: 1

GENERAL:

Function	Faculty and student support
Adjacencies	Workroom
Ceiling Height	10’
Windows	Exterior and interior relites
Daylight Control	Blinds
Lighting	Ambient office levels, motion sensor control

FINISHES:

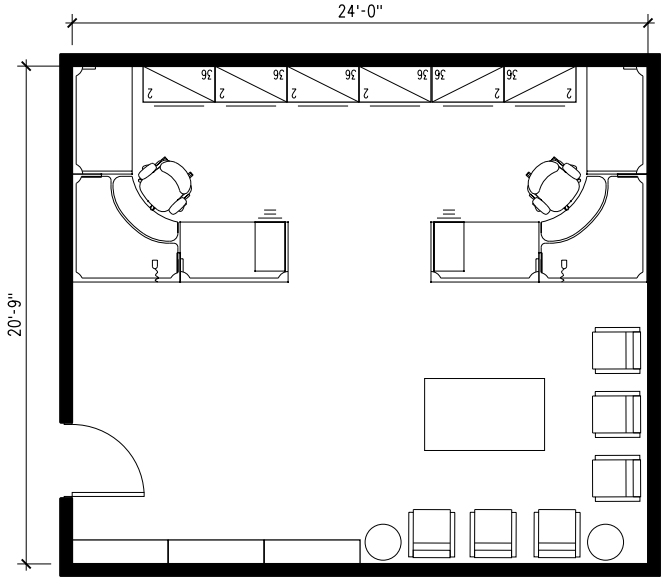
Floor	Carpet
Base	Resilient
Walls	Painted GWB
Ceiling	ACT

UTILITIES:

Plumbing	None
Electrical	Duplex at selected locations
Floor Boxes	None
Data/Telecom	Yes
Audio-Visual	None
HVAC/Controls	Demand controlled ventilation

EQUIPMENT:

Fixed	None
Moveable	Owner-furnished desks, credenzas, filing cabinets, chairs, shelves



SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	**Biology**
Space ID:	**1.85**
Space Name:	**Technician Office**
Occupants/space:	**1**
ASF:	**120**
No of spaces:	**3**

GENERAL:

Function	**Staff office**
Adjacencies	**Stock rooms, prep rooms, teaching labs**
Ceiling Height	**10’**
Windows	**Window into stock room**
Daylight Control	**None**
Lighting	**Ambient office levels, motion sensor control**

FINISHES:

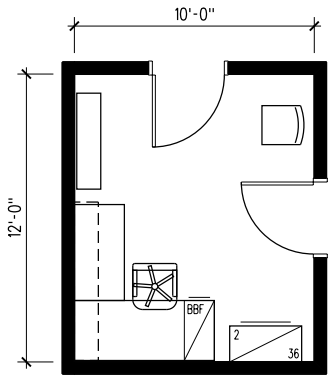
Floor	**Resilient**
Base	**Resilient**
Walls	**Painted GWB**
Ceiling	**ACT**

UTILITIES:

Plumbing	**None**
Electrical	**Duplex at selected locations**
Floor Boxes	**None**
Data/Telecom	**Yes**
Audio-Visual	**None**
HVAC/Controls	**Demand controlled ventilation**

EQUIPMENT:

Fixed	**Tack/white board, coat hooks**
Moveable	**Owner-furnished desk, credenza, filing cabinets, chairs**



Department:	**Biology**
Space ID:	**1.86**
Space Name:	**Graduate/Teaching Assistant Office**
Occupants/space:	**4**
ASF:	**140**
No of spaces:	**6**

GENERAL:

Function	**Student work stations**
Adjacencies	**Teaching and research labs**
Ceiling Height	**10’**
Windows	**Relites, exterior window optimal**
Daylight Control	**Blinds**
Lighting	**Ambient office levels, motion sensor control**

FINISHES:

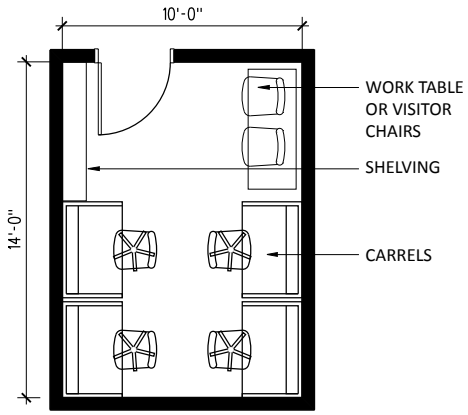
Floor	**Carpet**
Base	**Resilient**
Walls	**Painted GWB**
Ceiling	**ACT**

UTILITIES:

Plumbing	**None**
Electrical	**Duplex at selected locations**
Floor Boxes	**None**
Data/Telecom	**Yes**
Audio-Visual	**None**
HVAC/Controls	**Demand controlled ventilation, operable windows**

EQUIPMENT:

Fixed	**Tack/white board, coat hooks**
Moveable	**Owner-furnished carrels and chairs**



SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	**Biology**
Space ID:	**1.91**
Space Name:	**Work Room**
Occupants/space:	**n/a**
ASF:	**140**
No of spaces:	**1**

GENERAL:

Function	**Office support**
Adjacencies	**Department Office/Waiting**
Ceiling Height	**10’**
Windows	**Optimal but not required, relites**
Daylight Control	**As needed**
Lighting	**Ambient office levels, motion sensor control**

FINISHES:

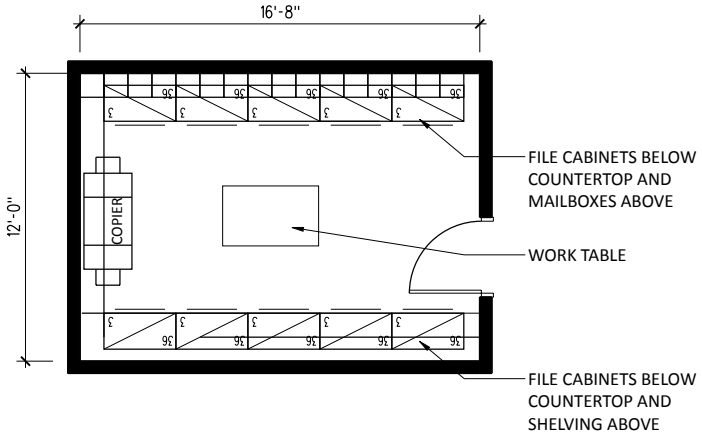
Floor	**Resilient**
Base	**Resilient**
Walls	**Painted GWB**
Ceiling	**ACT**

UTILITIES:

Plumbing	**None**
Electrical	**Duplex at selected locations**
Floor Boxes	**None**
Data/Telecom	**Yes**
Audio-Visual	**None**
HVAC/Controls	**Demand controlled ventilation**

EQUIPMENT:

Fixed	**Built-in casework, shelving, mailboxes, tack/white board**
Moveable	**Owner-furnished file cabinets, table**



Department:	**Biology**
Space ID:	**1.93**
Space Name:	**Conference**
Occupants/space:	**20**
ASF:	**400**
No of spaces:	**1**

GENERAL:

Function	**Department support**
Adjacencies	**Department Office/Waiting**
Ceiling Height	**10’**
Windows	**Exterior with interior relites**
Daylight Control	**Blinds, room darkening and blackout**
Lighting	**Indirect with focused lighting, motion sensor control**

FINISHES:

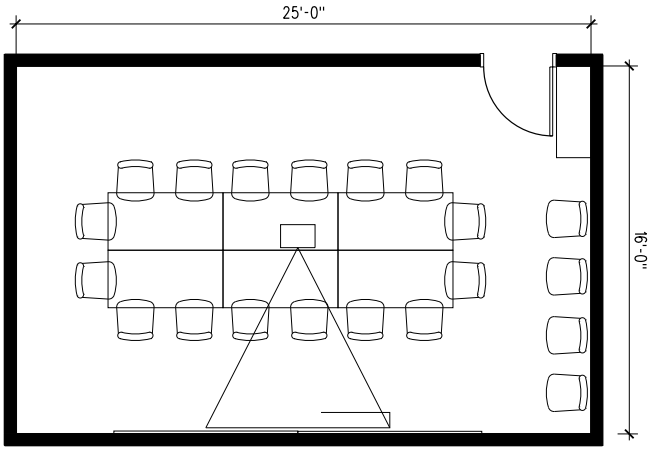
Floor	**Carpet**
Base	**Resilient**
Walls	**Painted GWB, wood wainscot and chair rail, and acoustic wall panels**
Ceiling	**ACT and GWB**

UTILITIES:

Plumbing	**None**
Electrical	**Duplex at selected locations**
Floor Boxes	**Yes**
Data/Telecom	**Yes**
Audio-Visual	**Yes**
HVAC/Controls	**Demand controlled ventilation, operable windows**

EQUIPMENT:

Fixed	**Projector screen and ceiling mounted projector support, white board**
Moveable	**Owner-furnished conference table and seating, AV rack and projector**



SPACE DIAGRAMS / DETAILED REQUIREMENTS

SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	**Shared**
Space ID:	**2.01**
Space Name:	**Classroom - Large Tiered**
Occupants/space:	**150**
ASF:	**3,150**
No of spaces:	**1**

GENERAL:

Function	**Biology, Chemistry and Physics lectures with demonstrations**
Adjacencies	**Other classrooms**
Ceiling Height	**Varies**
Windows	**Yes**
Daylight Control	**Yes**
Lighting	**Indirect/direct, motion sensor control**

FINISHES:

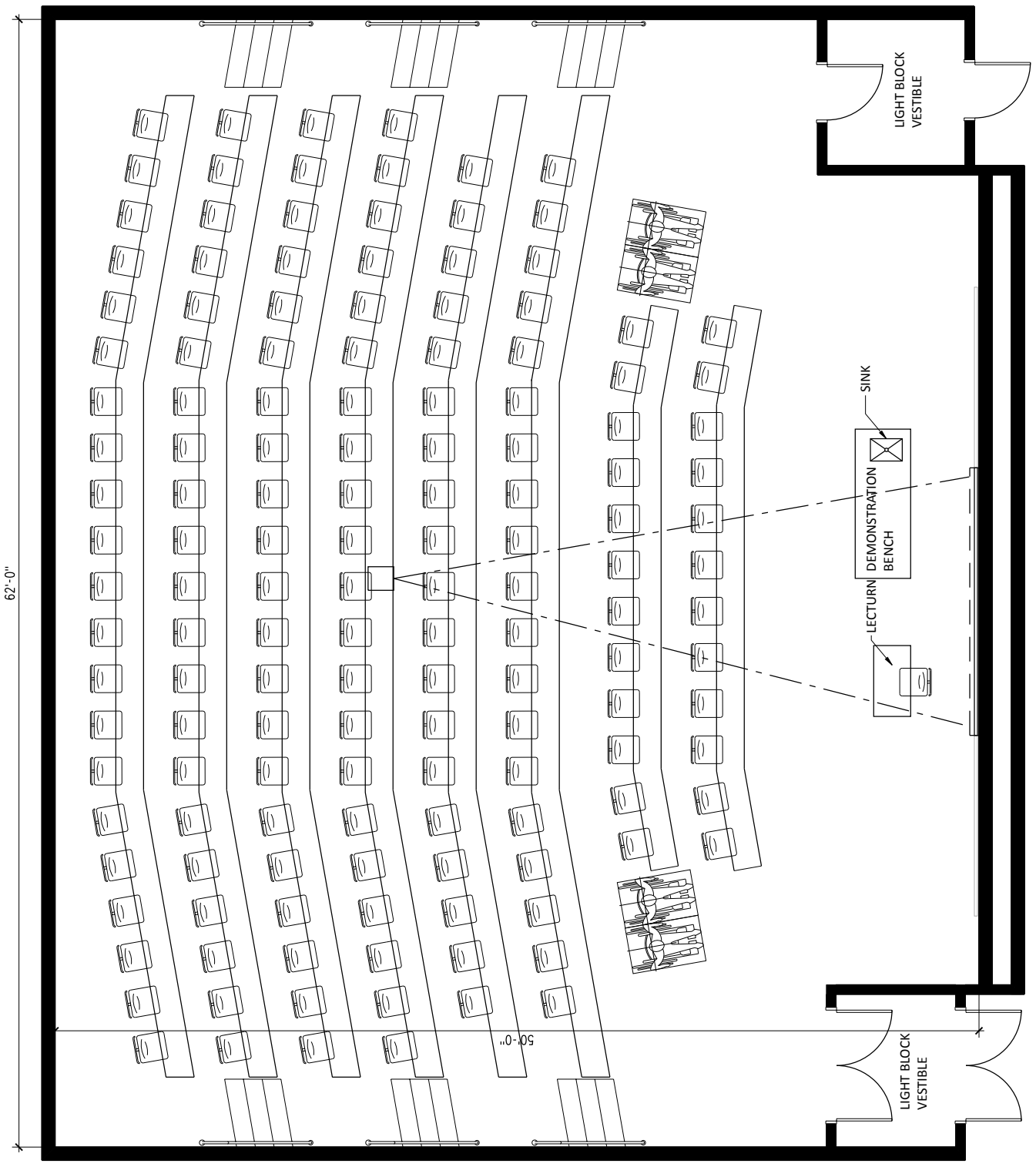
Floor	**Resilient tile, carpet**
Base	**Resilient**
Walls	**Painted GWB, acoustic treatment**
Ceiling	**Painted GWB/ACT**

UTILITIES:

Plumbing	**Sink, lab gas, vacuum and air**
Electrical	**Duplex at selected locations**
Floor Boxes	**Yes**
Data/Telecom	**Yes**
Audio-Visual	**Yes**
HVAC/Controls	**Demand controlled**

EQUIPMENT:

Fixed	**Sliding whiteboard, projection screen, demonstration bench with sink, fume hood, tables**
Moveable	**Owner-furnished podium and chairs**



0 2' 4' 8' 12'

SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	**Shared**
Space ID:	**2.02**
Space Name:	**Classroom – Medium Tiered**
Occupants/space:	**60**
ASF:	**1,440**
No of spaces:	**1**

GENERAL:

Function	**Biology, Chemistry, and Physics lectures**
Adjacencies	**Other classrooms**
Ceiling Height	**Varies**
Windows	**Yes**
Daylight Control	**Yes**
Lighting	**Indirect/direct, motion sensor control**

FINISHES:

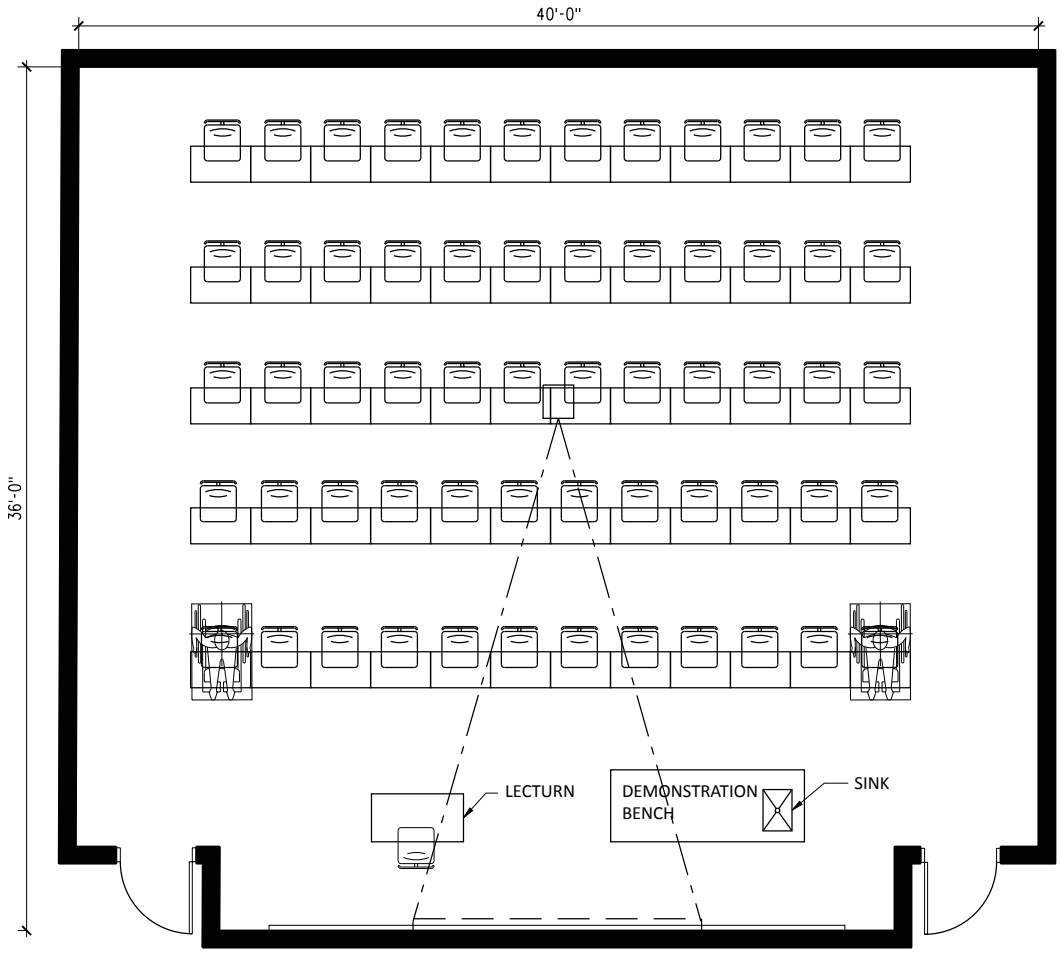
Floor	**Carpet**
Base	**Resilient**
Walls	**Painted GWB, acoustic treatment**
Ceiling	**Painted GWB/ACT**

UTILITIES:

Plumbing	**Sink, lab gas, vacuum and air**
Electrical	**Duplex at selected locations**
Floor Boxes	**Yes**
Data/Telecom	**Yes**
Audio-Visual	**Yes**
HVAC/Controls	**Demand controlled**

EQUIPMENT:

Fixed	**Sliding whiteboard, projection screen, demonstration bench with sink, tables**
Moveable	**Owner-furnished podium and chairs**



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SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	**Shared**
Space ID:	**2.03**
Space Name:	**Classroom – Small**
Occupants/space:	**40**
ASF:	**1,000**
No of spaces:	**1**

GENERAL:

Function	**Biology, Chemistry and Physics lectures**
Adjacencies	**Other classrooms**
Ceiling Height	**12’**
Windows	**Yes**
Daylight Control	**Yes**
Lighting	**Indirect/direct, motion sensor control**

FINISHES:

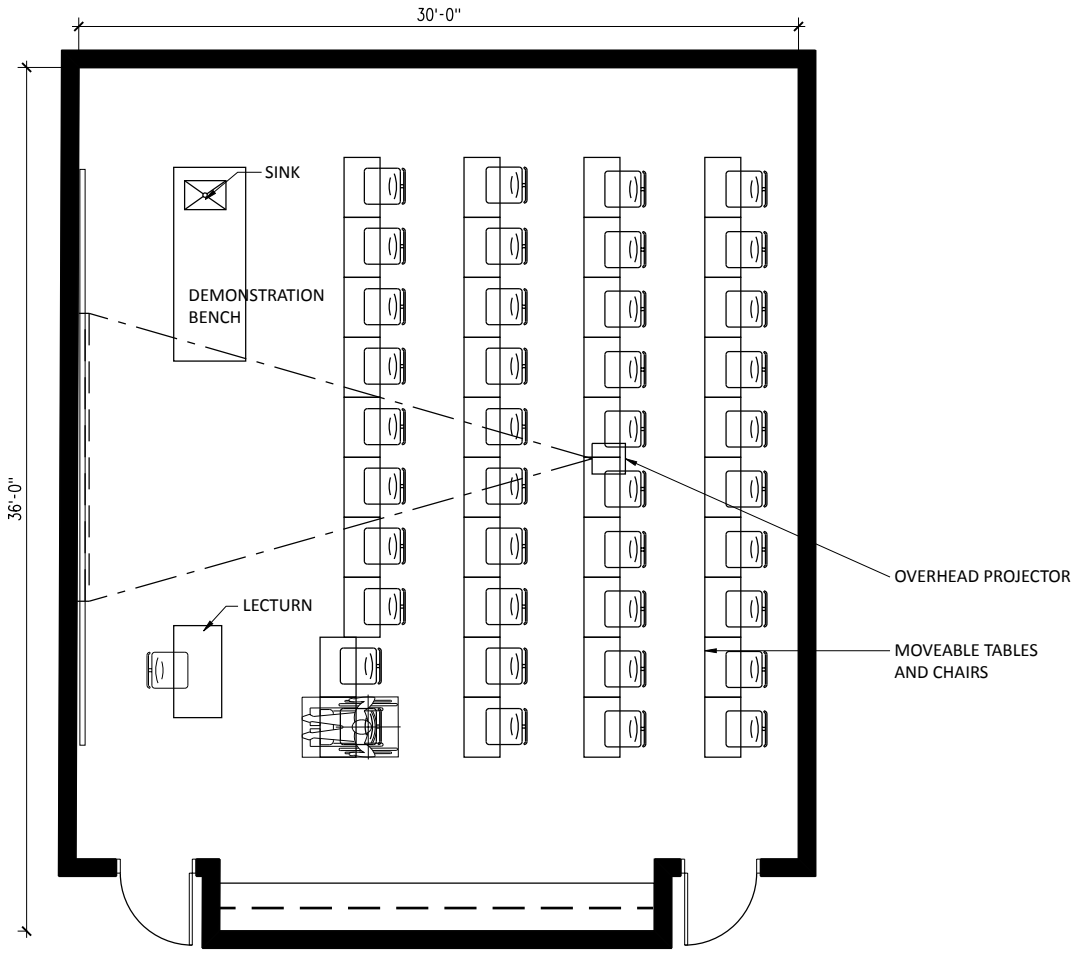
Floor	**Carpet**
Base	**Resilient**
Walls	**Painted GWB, acoustic treatment**
Ceiling	**Painted GWB/ACT**

UTILITIES:

Plumbing	**Sink, lab gas, vacuum and air**
Electrical	**Duplex at selected locations**
Floor Boxes	**Yes**
Data/Telecom	**Yes**
Audio-Visual	**Yes**
HVAC/Controls	**Demand controlled**

EQUIPMENT:

Fixed	**Sliding whiteboard, projection screen, demonstration bench with sink, tables**
Moveable	**Owner-furnished podium, tables and chairs**



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SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	**Shared**
Space ID:	**2.21**
Space Name:	**Open Computer Lab**
Occupants/space:	**24**
ASF:	**960**
No of spaces:	**1**

GENERAL:

Function	**Student projects and study**
Adjacencies	**Centrally located**
Ceiling Height	**12’**
Windows	**Exterior with interior relites**
Daylight Control	**Blinds**
Lighting	**Ambient lighting, motion sensor control**

FINISHES:

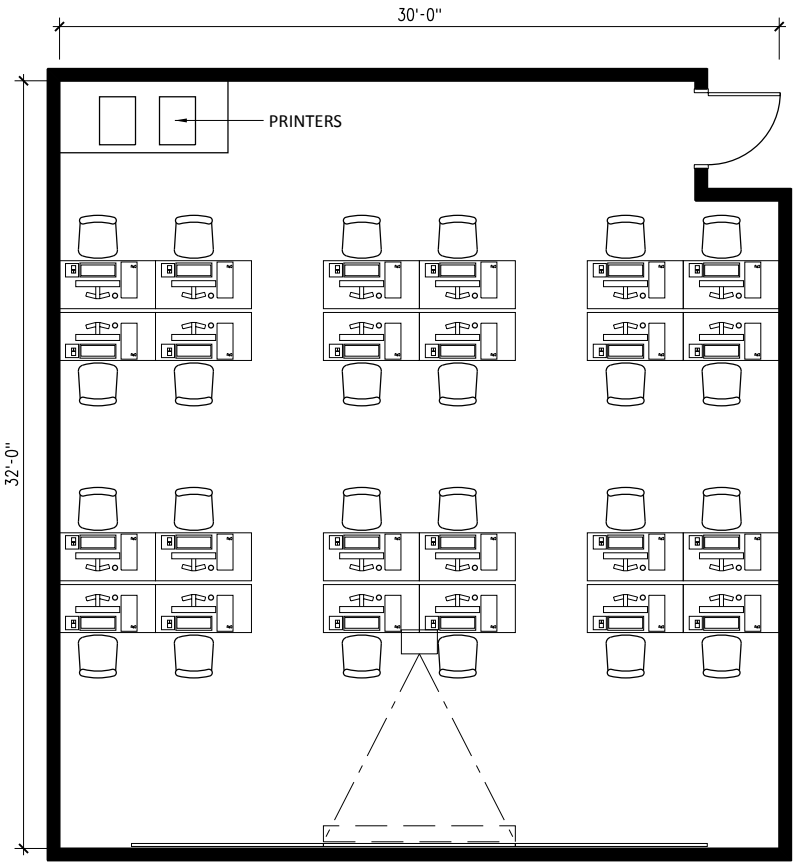
Floor	**Carpet**
Base	**Resilient**
Walls	**Painted GWB and acoustic wall panels**
Ceiling	**ACT and GWB**

UTILITIES:

Plumbing	**None**
Electrical	**Duplex at selected locations**
Floor Boxes	**Yes**
Data/Telecom	**Yes**
Audio-Visual	**Yes**
HVAC/Controls	**Demand controlled**

EQUIPMENT:

Fixed	**Sliding whiteboard and tackboard**
Moveable	**Owner-furnished carrels, tables and chairs**



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SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	**Shared**	**Shared**
Space ID:	**2.32**	**2.34**
Space Name:	**Student Lounge**	**Faculty Lounge**
Occupants/space:	**n/a**	**n/a**
ASF:	**800**	**400**
No of spaces:	**1**	**1**

GENERAL:

Function	**Interactive**
Adjacencies	**Centrally located**
Ceiling Height	**10’**
Windows	**Exterior with interior relites**
Daylight Control	**Blinds**
Lighting	**Ambient lighting, motion sensor control**

FINISHES:

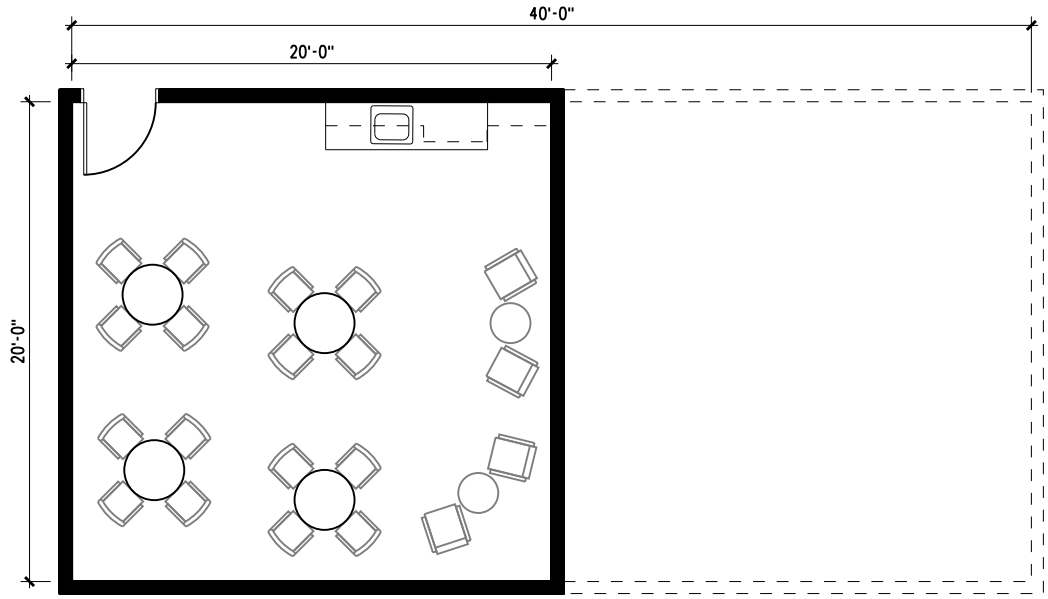
Floor	**Carpet**
Base	**Resilient**
Walls	**Painted GWB and acoustic wall panels**
Ceiling	**ACT and GWB**

UTILITIES:

Plumbing	**Yes**
Electrical	**Duplex at selected locations**
Floor Boxes	**Yes**
Data/Telecom	**Yes**
Audio-Visual	**None**
HVAC/Controls	**Yes**

EQUIPMENT:

Fixed	**Casework, sink, tackboard/whiteboard**
Moveable	**Owner-furnished microwave and refrigerator**



SPACE DIAGRAMS / DETAILED REQUIREMENTS

THE ROBINSON COMPANY

EASTERN WASHINGTON UNIVERSITY
NEW SCIENCE BUILDING II
PRE-DESIGN ESTIMATE
JUNE 18, 2014

New Science Building	111,005	SF	$ 401	$	44,553,769
Site Development	1	LS	$ 1,222,783	$	1,222,783
Total Construction/MACC - June. 2014				**$**	**45,776,551**

EXCLUSIONS:

Washington State Sales Tax
Architect/Engineer Fees
Construction Contingency
Testing & Inspection
Permits
1% for Art
Legal
Builders Risk Insurance
Moving/Relocation Costs
Off-Site Work (Streets/Signalizaton)
Toxic Soil/Hazardous Materials Removal
Construction Management/Administration/Pre-Construction Services
Escalation - Refer to State Budget Form

THE ROBINSON COMPANY

PROJECT: EASTERN WASHINGTON UNIVERSITY SCIENCE 2 - BUILDING
LOCATION: CHENEY, WA
BLDG SF: 111,005
ESTIMATE: 2014112
EST TYPE: PREDESIGN

DIVISION	DESCRIPTION		Total w/o Design Contingency TOTAL	Total w/o Design Contingency $/SF	Total with Design Contingency TOTAL	Total with Design Contingency $/SF
A10	FOUNDATIONS		1,273,979	11.48	1,401,377	12.62
A20	BASEMENT CONSTRUCTION		255,042	2.30	280,546	2.53
B10	SUPERSTRUCTURE		3,927,690	35.38	4,320,459	38.92
B20	EXTERIOR CLOSURE		3,109,079	28.01	3,419,986	30.81
B30	ROOFING		892,289	8.04	981,518	8.84
C10	INTERIOR CONSTRUCTION		3,083,669	27.78	3,392,036	30.56
C20	STAIRS		241,000	2.17	265,100	2.39
C30	INTERIOR FINISHES		2,410,694	21.72	2,651,764	23.89
D10	CONVEYING SYSTEMS		340,000	3.06	374,000	3.37
D20	PLUMBING		2,385,998	21.49	2,624,597	23.64
D30	HVAC		7,791,819	70.19	8,571,001	77.21
D40	FIRE PROTECTION		416,269	3.75	457,896	4.13
D50	ELECTRICAL		4,717,713	42.50	5,189,484	46.75
E10	EQUIPMENT		3,787,278	34.12	4,166,005	37.53
E20	FURNISHINGS		684,356	6.17	752,792	6.78
Z10	GENERAL REQUIREMENTS		3,075,000	27.70	3,382,500	30.47
	ESTIMATE SUBTOTAL		**38,391,873**	**345.86**	**42,231,060**	**380.44**
	DESIGN CONTINGENCY @	10.00%	3,839,187			
	SUBTOTAL		42,231,060		42,231,060	
	GENERAL CONTRACTOR'S OH & P @	5.50%	2,322,708		2,322,708	
	SUBTOTAL		44,553,769		44,553,769	
	ESCALATION-SEE STATE BUDGET FORM TO 01-FEB-18 (0.00%/YR) @					
	TOTAL		**44,553,769**	**401.37**	**44,553,769**	**401.37**

EXCLUSIONS:
SEE ESTIMATE SUMMARY

PROJECT: EASTERN WASHINGTON UNIVERSITY SCIENCE 2 - BUILDING
LOCATION: CHENEY, WA
BLDG SF: 111,005
ESTIMATE: 2014112
EST TYPE: PREDESIGN

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
A10	**FOUNDATIONS**					
02000	FOUNDATION DEWATERING SYSTEM	930	SFA	15.00	13,950	
02000	GEOPIER FOUNDATIONS	37,000	SFA	8.25	305,250	
02000	UNDERSLAB DRAINAGE SYSTEM	37,000	SFA	5.00	185,000	
02315	FOUNDATION EXCAV/BACKFILL	37,000	SFA	1.50	55,500	
02620	FOOTING DRAINS @ BLDG	930	LF	9.50	8,835	
02720	GRAVEL @ CONC S.O.G 6" DEEP	37,000	SF	0.65	24,050	
03000	FOUNDATIONS/GRADEBEAMS/PILE CAPS	37,000	SFA	12.50	462,500	
03000	PREM STEPPED FOUNDATION/RAMPS/STAIR	37,000	SFA	0.54	19,980	
03310	ELEVATOR PIT	2	EA	7,500	15,000	
03310	SLAB ON GRADE	37,000	SF	4.50	166,500	
03330	VAPOR BARRIER @ SLAB	37,000	SF	0.35	12,950	
07210	RIGID INSUL @ SLAB PERIMETER	2,790	SF	1.60	4,464	
A10	**FOUNDATIONS**			**DIVISION TOTAL**	**1,273,979**	**11.48**
A20	**BASEMENT CONSTRUCTION**					
02000	BACKFILL BASEMENT WALLS	2,702	CY	18.00	48,636	
02000	BASEMENT EXCAVATION/HAUL	5,763	CY	12.00	69,156	
03000	BASEMENT CONC WALLS - ASSUME 15'	3,660	SF	32.00	117,120	
07000	MEMBRANE/INSUL/DRAINAGE AT WALLS	3,660	SF	5.50	20,130	
A20	**BASEMENT CONSTRUCTION**			**DIVISION TOTAL**	**255,042**	**2.30**
B10	**SUPERSTRUCTURE**					
03200	ADDITIONAL FORMING/TIE-IN FOR OPENINGS IN FLOOR	7,500	SF	12.00	90,000	
03200	CONC PADS @ ROOF FOR MECH EQUIP	4,465	SF	3.50	15,628	
03200	CONCRETE FLOOR STRUCTURE - BEAMS/COL/SLAB	74,000	SF	29.00	2,146,000	
03200	CONCRETE ROOF STRUCTURE - BEAMS/COL/ROOF	34,930	SFA	26.00	908,180	
05000	BRACE/MOMENT FRAMES - ROOF	34,930	SFA	5.00	174,650	
05000	BRACE/MOMENT FRAMES-FLOORS	74,000	SFA	5.00	370,000	
05260	MISC STEEL/METALS/RAILS	56	TON	3,500	196,000	
	1 LB/SF					
07840	FIRESTOPPING ALLOWANCE-FLOOR	74,000	SFA	0.25	18,500	
07840	FIRESTOPPING ALLOWANCE-ROOF	34,930	SFA	0.25	8,733	
B10	**SUPERSTRUCTURE**			**DIVISION TOTAL**	**3,927,690**	**35.38**
B20	**EXTERIOR CLOSURE**					
04200	BRICK-VENEER	17,421	SF	22.00	383,262	
04500	PRECAST SILLS/COPING ALLOWANCE	2,520	LF	52.00	131,040	
05530	SUN SHADES - WEST AND SO ELEV	650	LF	130	84,500	
05810	SEISMIC/EXPANSION JOINT @ EXTERIOR WALLS	102	LF	75.00	7,650	
07000	MECHANICAL SCREEN -	4,050	SF	35.00	141,750	
07000	METAL PANEL SYSTEM @ BLDG	10,315	SF	35.00	361,025	
07000	PENTHOUSE WALL FRAME/METAL SIDING	5,100	SF	37.00	188,700	
08110	EXT.DOORS,FRAM,HDWRE-PER LEAF	12	EA	3,000	36,000	

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
08500	ALUM CURTAIN WALL/SPANDREL PANELS	7,788	SF	80.00	623,040	
08500	ALUM WINDOWS	5,738	SF	55.00	315,590	
09110	EXT WALL DETAILING/TRIMS/REVEALS	111,005	SFA	1.75	194,259	
09110	EXT. MTL STUD WALL SYSTEM	33,474	SF	15.75	527,216	
	EXCLUDES CURTAIN WALL AREA					
09900	SEAL MASONRY VENEER/CONC	17,421	SF	1.30	22,647	
10720	ALUM LOUVERS-ALLOW	1,540	SF	60.00	92,400	
B20	**EXTERIOR CLOSURE**			**DIVISION TOTAL**	**3,109,079**	**28.01**
B30	**ROOFING**					
02930	PREM GREEN ROOF SYSTEM	1,700	SF	27.00	45,900	
06120	ROOFING ROUGH CARPENTRY	37,000	SFA	0.65	24,050	
07000	SKYLIGHT - CUSTOM	850	SF	95.00	80,750	
07210	GREENHOUSE ROOFING	2,070	SF	65.00	134,550	
07220	RIGID INSULATION/COVER BOARD	34,930	SF	5.50	192,115	
07220	TAPERED INSULATION ROOF/ CRICKETS	34,930	SF	0.30	10,479	
07540	MEMBRANE ROOFING	34,930	SF	6.50	227,045	
07580	CANOPY-ALLOW	600	SF	75.00	45,000	
07600	EXPANSION JOINT COVER AT ROOF	70	LF	120	8,400	
07620	MISC FLASHING/SHEET METAL	37,000	SFA	1.85	68,450	
07700	FALL PROTECTION/WINDOW WASH DAVITS	1	LS	50,000	50,000	
07700	MISC ROOF ACCESSORIES	37,000	SFA	0.15	5,550	
B30	**ROOFING**			**DIVISION TOTAL**	**892,289**	**8.04**
C10	**INTERIOR CONSTRUCTION**					
06000	ROUGH CARPENTRY/WALL SUPPORT/BACKING	111,005	SFA	0.40	44,402	
08210	INT. DOOR/FRM/HDWRE-PER LEAF	220	EA	1,500	330,000	
08330	PREM FIXED LEAF DBL DOORS	80	EA	2,000	160,000	
08330	SPECIAL DOORS/SLIDERS/OPERABLE	1	LS	30,000	30,000	
	ALLOWANCE					
08500	INTERIOR GLAZING/RELITES	5,280	SF	48.00	253,440	
	ALLOWANCE					
08710	CARD KEY ACCESS SYSTEM	1	LS	75,150	75,150	
08710	MISC HDWRE/RATINGS/ADA	1	LS	10,050	10,050	
09110	INT PARTITIONS BASIC- COMPLETE	162,558	SF	9.80	1,593,068	
09130	ADDITONAL LAYERS GWB,WALL TYPES	111,005	SFA	1.20	133,206	
	ALLOWANCE					
10000	MISC SPECIALTIES/FITTINGS	111,005	SFA	3.50	388,518	
10100	AV SCREENS	18	EA	900	16,200	
10110	MARKER BOARDS	2,870	SF	10.50	30,135	
10145	SLIDING WHITE BOARDS	5	EA	3,500	17,500	
10190	CURTAINS W/ TRACK	40	LF	50.00	2,000	
C10	**INTERIOR CONSTRUCTION**			**DIVISION TOTAL**	**3,083,669**	**27.78**
C20	**STAIRS**					
03000	INTERIOR FEATURE/MAIN STAIR	2	FLT	35,000	70,000	
05500	INTERIOR GUARDRAILS (OPEN TO BELOW)	450	LF	180	81,000	
05500	INTERIOR STAIRS	6	FLT	15,000	90,000	
C20	**STAIRS**	June 2010		369.21	37,871	**2.17**

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
C30	**INTERIOR FINISHES**					
06200	MISC. FINISH CARPENTRY	111,005	SFA	1.40	155,407	
09000	PREM ACOUSTIC UPGRADE	4	EA	3,500	14,000	
	CLASSROOMS/COMP					
09000	WALL FINISHES	111,005	SFA	4.20	466,221	
09310	CERAMIC TILE FLOOR/WALLS/BASE	3,550	SF	11.50	40,825	
	CORE RR'S					
09500	EXPOSED CEILINGS TO STRUCTURE - PAINT/SEAL	13,321	SF	1.25	16,651	
09500	GWB CEILINGS/SOFFITS	16,651	SF	6.50	108,232	
09510	SUSPENDED ACOUSTIC CEILINGS	50,543	SF	3.65	184,482	
09570	WOOD SLAT CEILING	10,000	SFA	22.00	220,000	
	ALLOWANCE QUANTITY					
09610	AQUATICS LAB FINISHES	2,375	SF	15.65	37,169	
09610	EPOXY FLOORING	3,000	SF	15.00	45,000	
09610	LOBBY/ENTRY SLATE FLOORING	5,500	SF	25.00	137,500	
09610	RESILIENT/POLISHED FLOORING	72,905	SF	8.50	619,693	
	LABS/RES/CORRIDORS					
09650	CARPET AT OFFICES/CLASS	17,295	SF	4.75	82,151	
09650	SEALED CONC (MECH/ELECT/STORAGE)	9,380	SF	0.75	7,035	
09650	TRAFFIC COATING @ MECH SCREENED ROOF	4,428	SF	6.00	26,568	
09650	WOOD/RESILIENT BASE ALLOWANCE	111,005	SFA	0.30	33,302	
09900	INTERIOR PAINTING	111,005	SFA	1.95	216,460	
C30	**INTERIOR FINISHES**			**DIVISION TOTAL**	**2,410,694**	**21.72**
D10	**CONVEYING SYSTEMS**					
14240	ELEVATOR - 5 STOP OVERSIZED	1	EA	220,000	220,000	
	BSMT TO ROOF					
14240	PASSENGER ELEVATOR/3-STOP	1	EA	120,000	120,000	
D10	**CONVEYING SYSTEMS**			**DIVISION TOTAL**	**340,000**	**3.06**
D20	**PLUMBING**					
15000	PLUMBING PREMIUM-BIOLOGY/LABS/RESEARCH	81,363	SFA	15.00	1,220,445	
15000	PLUMBING-BASIC	111,005	SFA	10.50	1,165,553	
D20	**PLUMBING**			**DIVISION TOTAL**	**2,385,998**	**21.49**
D30	**HVAC**					
15000	GEOTHERMAL WELLS					
	INCLUDED IN SEP FUNDING ESTIMATE					
15000	HVAC SYSTEM-BASIC	111,005	SFA	52.00	5,772,260	
15000	PREM HEAT RECOVERY	111,005	SFA	5.00	555,025	
15000	PREM HVAC -BIOLOGY/LABS	81,363	SFA	18.00	1,464,534	
D30	**HVAC**			**DIVISION TOTAL**	**7,791,819**	**70.19**
D40	**FIRE PROTECTION**					
15300	FIRE PROTECTION	111,005	SFA	3.75	416,269	
D40	**FIRE PROTECTION**			**DIVISION TOTAL**	**416,269**	**3.75**
D50	**ELECTRICAL**					
16000	ELECTRICAL	111,005	SFA	32.00	3,552,160	

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
16000	SPECIAL SYSTEMS AV/SECURITY/CCTV	111,005	SFA	10.50	1,165,553	
	EQUIPMENT IN FFE					
D50	**ELECTRICAL**			**DIVISION TOTAL**	**4,717,713**	**42.50**
E10	**EQUIPMENT**					
11600	AQUARIA RACKS	57	LF	500	28,500	
11600	AUTOCLAVE	3	EA	60,000	180,000	
11600	BIOLOGICAL SAFETY CABINET 4'	1	EA	8,250	8,250	
11600	BIOLOGICAL SAFETY CABINET 6'	4	EA	14,000	56,000	
11600	CAGE MAINTENANCE EQUIPMENT	1	LS	50,000	50,000	
11600	CONTROLED ENVIRONMENT ROOMS	1	LS	470,000	470,000	
	2 COLD RMS/4VARIABLE TEM					
11600	CORROSIVE STORAGE CABINET	2	EA	3,200	6,400	
11600	CYLINDER RACK (2)	8	EA	2,000	16,000	
11600	EMERGENCY SHOWER/EYEWASH	38	EA	1,250	47,500	
11600	FLAMMABLE STORAGE CABINET	2	EA	3,200	6,400	
11600	FLEX BENCHES	161	EA	3,500	563,500	
11600	FUME HOODS 4'	24	EA	7,000	168,000	
11600	FUME HOODS 6'	8	EA	12,500	100,000	
11600	GLASSWARE WASHER/DRYER	1	LS	7,500	7,500	
11600	HIGH CAPACITY STORAGE	1	LS	15,000	15,000	
11600	LAB BENCH SITTING HEIGHT	65	LF	425	27,625	
11600	LAB BENCH STANDING HEIGHT	1,998	LF	450	899,100	
11600	LAMINAR FLOW HOODS 6'	2	EA	15,000	30,000	
11600	MISC EQUIPMENT-DIV 11	111,005	SFA	0.50	55,503	
11600	MOVABLE DEMO BENCH 5' X 2'6"	15	EA	5,000	75,000	
11600	MOVABLE LAB TABLES	157	EA	2,800	439,600	
11600	REAGENT SHELVES	740	LF	650	481,000	
11600	SNORKEL EXHAUST	47	EA	1,200	56,400	
E10	**EQUIPMENT**			**DIVISION TOTAL**	**3,787,278**	**34.12**
E20	**FURNISHINGS**					
12000	BOOKSHELVING	480	LF	75.00	36,000	
12000	BUILT IN DESKS	40	EA	6,500	260,000	
12000	COAT/BOOK BAG STORAGE UNIT	75	LF	120	9,000	
12000	COUNTERS	480	LF	75.00	36,000	
12000	LOW SHELVING	20	LF	85.00	1,700	
12000	MISC CASEWORK	29,642	SFA	2.50	74,105	
12000	TALL STORAGE CABINETS	129	LF	195	25,155	
12000	WALL CABINETS	599	LF	125	74,875	
12300	WIRE SHELVING	182	LF	125	22,750	
12300	WORKROOM SHELVING	196	LF	100	19,600	
12320	PIPE DROP ENCLOSURES	82	EA	250	20,500	
12500	WINDOW COVERINGS-ROLLER SHADES	11,018	SF	9.50	104,671	
E20	**FURNISHINGS**			**DIVISION TOTAL**	**684,356**	**6.17**
Z10	**GENERAL REQUIREMENTS**					
01000	BLDG FLOOR AREA	111,005	SF			
01000	CONTRACTOR TAXES/BOND/INS	1	LS	1,125,000	1,125,000	
01000	GENERAL CONDITIONS-REIMBURSEABLES	20	MO	95,000	1,900,000	
01000	MOCK-UPS	1	LS	50,000	50,000	

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
Z10	GENERAL REQUIREMENTS			DIVISION TOTAL	3,075,000	27.70
				ESTIMATE SUBTOTAL	38,391,873	345.86

THE ROBINSON COMPANY

PROJECT: EASTERN WASHINGTON UNIVERSITY SCIENCE 2 - SITE DEVELOPMENT
LOCATION: CHENEY, WA
BLDG SF:
ESTIMATE: 2014112
EST TYPE: PREDESIGN

DIVISION	DESCRIPTION		Total w/o Design Contingency TOTAL	$/SF	Total with Design Contingency TOTAL	$/SF
G10	SITE PREPARATION		271,412		298,553	
G20	SITE IMPROVEMENTS		402,054		442,259	
G30	SITE CIVIL / MECHANICAL UTILITIES		270,203		297,223	
G40	SITE ELECTRICAL UTILITIES		110,000		121,000	
	ESTIMATE SUBTOTAL		**1,053,669**		**1,159,036**	
	DESIGN CONTINGENCY @	10.00%	105,367			
	SUBTOTAL		1,159,036		1,159,036	
	GENERAL CONTRACTOR'S OH & P @	5.50%	63,747		63,747	
	SUBTOTAL		1,222,783		1,222,783	
	ESCALATION-SEE STATE BUDGET FORM TO 01-FEB-18					
	TOTAL		**1,222,783**		**1,222,783**	

EXCLUSIONS:
SEE ESTIMATE SUMMARY

PROJECT: EASTERN WASHINGTON UNIVERSITY SCIENCE 2 - SITE DEVELOPMENT
LOCATION: CHENEY, WA
BLDG SF:
ESTIMATE: 2014112
EST TYPE: PREDESIGN

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
G10	**SITE PREPARATION**					
02000	DEWATERING DURING CONSTRUCTION	1	LS	50,000	50,000	
02000	SITE AREA - AFFECTED	78,000	SF			
02000	STRIP SITE/DEMO SURFACING	78,920	SF	0.75	59,190	
	MINIMAL					
02200	EARTHWORK/GRADING CUT & FILL	7,222	CY	10.00	72,222	
	ALLOW 2' BALANCED SITE					
02220	SITE MOBILIZATION	1	LS	50,000	50,000	
02370	EROSION CONTROL	1	LS	40,000	40,000	
G10	**SITE PREPARATION**			**DIVISION TOTAL**	**271,412**	
G20	**SITE IMPROVEMENTS**					
02750	ASPHALT DRIVE AT 7TH	4,500	SF	3.75	16,875	
02750	DRIVE ENTRY/CURB CUTS	2	EA	3,500	7,000	
02750	UTILITY/DUMPSTER PADS	331	SF	10.00	3,310	
02770	CURBING/STRIPPING/SIGNAGE	4,500	SFA	1.50	6,750	
02775	CONCRETE WALKS/PAVING	3,500	SF	6.50	22,750	
02800	MISC SITE IMPROVEMENTS/FURNISHINGS	1	LS	15,000	15,000	
02900	LANDSCAPE/IRRIGATION - LAWN/SEEDED	14,724	SF	2.50	36,810	
02900	LANDSCAPE/IRRIGATION - PLANTINGS	22,086	SFA	6.50	143,559	
03000	LOADING DOCK	1	LS	150,000	150,000	
G20	**SITE IMPROVEMENTS**			**DIVISION TOTAL**	**402,054**	
G30	**SITE CIVIL / MECHANICAL UTILITIES**					
02000	SANITARY SEWER REROUTE	650	LF	75.00	48,750	
02510	DETECTOR CHECK IN VAULT	1	LS	15,000	15,000	
02510	FIRE/DOMESTIC TO BLDG FROM 7TH ST	1	LS	7,500	7,500	
02530	SANITARY PIPING TO BLDG	100	LF	50.00	5,000	
02630	BIOSWALE ALONG NEW DRIVE	1,700	SF	9.50	16,150	
02630	STORM COLLECTION/DETENTION/PUMPING	45,690	SFA	2.25	102,803	
	BLDG ROOF & PAVING					
03000	UTILITY TUNNEL EXTENSION	50	LF	1,500	75,000	
G30	**SITE CIVIL / MECHANICAL UTILITIES**			**DIVISION TOTAL**	**270,203**	
G40	**SITE ELECTRICAL UTILITIES**					
16000	EMERGENCY GENERATOR	1	LS	75,000	75,000	
16000	SITE ELECTRICAL/LIGHTING	1	LS	35,000	35,000	
G40	**SITE ELECTRICAL UTILITIES**			**DIVISION TOTAL**	**110,000**	
				ESTIMATE SUBTOTAL	**1,053,669**	

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
C20. Stairways				
C 2010 Stair Construction				
C2011 Regular stairs including guardrails				
Exit stairs - per flight	2	EA	12,000.00	24,000
Architectural stairs - per flight	6	EA	25,000.00	150,000
Feature stair main lobby	1	LS	30,000.00	30,000
				204,000
C30. Interior Finishes				
C 3010 Wall Finishes				
C3011 Wall finishes to inside face of exterior walls				
Drywall on steel studs	36,931	SF	5.00	184,655
C3012 Wall finishes to interior walls				
Epoxy paint	33,803	SF	3.18	107,555
Paint	143,943	SF	0.65	93,563
Wood wainscot	890	SF	31.82	28,318
Acoustic wall panels	7,335	SF	21.82	160,036
Ceramic tile	4,820	SF	16.36	78,873
C 3020 Floor Finishes				
C3023 Hardeners and sealers				
Sealed concrete	6,870	SF	1.00	6,870
Concrete retroplating at circulation	25,130	SF	7.27	182,764
C3024 Flooring				
Resilient tile	35,571	SF	3.64	129,349
Vinyl dissipating tile	200	SF	4.55	909
Welded seam sheet vinyl	100	SF	5.45	545
Epoxy coating	120	SF	6.36	764
Ceramic tile	1,510	SF	16.36	24,709
Slate	3,178	SF	22.73	72,225
No finish (shafts, partitions, etc.)	11,206	SF		
C3025 Carpeting				
Carpet	18,688	SF	4.09	76,451
C3026 Bases, curbs and trim				
4" resilient base	18,920	LF	2.00	37,840
Integral epoxy cove	45	LF	7.50	338
Integral welded seam cove	45	LF	4.50	203

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
C 3030 Ceiling Finishes				
C3032 Suspended ceilings				
Acoustic tile	73,364	SF	4.09	300,125
Gypsum board, painted	4,751	SF	8.64	41,031
Open to structure	18,396	SF		
Gypsum board, epoxy coated	100	SF	13.64	1,364
Wood slat ceiling clouds	5,000	SF	31.82	159,091
C3033 Other ceilings				
Planetarium dome metal panel outer "skin"	962	SF	45.45	43,727
				1,731,305

D10. Conveying Systems

D 1010 Elevators and Lifts				
D1011 Passenger elevators				
Oversized	1	LS	150,000.00	150,000
Regular	1	LS	125,000.00	125,000
				275,000

D20. Plumbing Systems

Sanitary fixtures and connection piping				
Plumbing fixtures	92	EA	1,187.50	109,250
Institutional fixtures				
Installation of lab sinks, emergency showers etc. and local connection pipework	150	EA	570.00	85,500
Sanitary waste, vent and service piping				
Floor drains and sinks	18	EA	950.00	17,100
Hose bibbs/wall hydrants	7	EA	950.00	6,650
Rough in to plumbing fixtures	92	EA	2,470.00	227,240
Sewer discharge pump station	1	LS	20,000.00	20,000
Water treatment, storage and circulation				
Steam fired semi-instantaneous water heaters and pumps (domestic and labs)	1	LS	76,929.75	76,930
Expansion tanks and air separators	1	LS	10,257.30	10,257

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
Laboratory service equipment				
Compressed air/vacuum/DI equipment & central nitrogen generator - allowance	34,660	SF	5.95	206,227
Laboratory and service piping				
Industrial H&CW/nat gas/N2/Vac/CA/DI piping, valves and insulation	34,660	SF	19.18	664,779
Laboratory wastes				
Waste and vent piping	34,660	SF	8.40	291,144
Surface water drainage				
Roof and overflow drains	52	EA	380.00	19,760
Drain pipework; insulated	1,300	LF	45.00	58,500
				1,793,337

D30. Heating, Ventilation & Air Conditioning

Heat generation and chilling				
Incoming steam and condensate mains connected to existing utility tunnel supplies.	300	LF	142.50	42,750
Valves and specialties including metering, PRV's and safety valves	1	LS	50,000.00	50,000
Utility tunnel extension	150	LF	1,425.00	213,750
Steam to HHW heat exchangers, steam piping and ancillaries	2,300	MBH	20.90	48,070
Cooling equipment HX and ancillaries	180	TN	475.00	85,500
Heat pumps; water-to-water	3,900	MBH	76.00	296,400
Geothermal well field; (320 TN), including manifolds and connections	35,200	VLF	15.00	528,000
Water treatment	1	LS	20,500.00	20,500
Thermal storage and circulation pumps				
Expansion tanks and air separators	1	LS	5,400.00	5,400
HW primary pumps	2	EA	7,200.00	14,400
HW secondary pumps	2	EA	5,400.00	10,800
CW primary pumps	2	EA	7,200.00	14,400
CW secondary pumps	2	EA	5,400.00	10,800
Condensate pumps	2	EA	12,000.00	24,000
Variable speed drives	36	HP	250.00	9,000
Vibration isolation to pumps	10	EA	1,000.00	10,000

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
Piping, fittings, valves and insulation				
HHW piping, valves and insulation to AHU, and VAV boxes	102,573	SF	5.94	609,027
Steam and condensate piping, PRVs, metering, valves and insulation	102,573	SF	1.28	131,550
Chilled water piping, valves and insulation	102,573	SF	1.43	146,167
Air handling equipment				
Central air handling units	195,000	CFM	5.70	1,111,500
Variable frequency drives	313	HP	213.75	66,904
VAV boxes with hydronic reheat	100	EA	1,092.50	109,250
Cooling to elevator machine rooms/data rooms etc	1	LS	16,625.00	16,625
Sound attenuation	195,000	CFM	0.50	97,500
Air-to-air heat recovery system including glycol pumps, and piping	1	LS	80,000.00	80,000
Air distribution and return				
Galvanized steel ductwork	236,000	LB	6.18	1,457,300
Specialty fume exhaust ductwork to lab spaces	19,000	LB	13.30	252,700
Generator exhaust	120	LF	190.00	22,800
Flexible ducting	4,650	LF	12.50	58,125
Duct volume dampers	930	EA	80.00	74,400
Duct fire dampers	80	EA	1,200.00	96,000
Duct insulation	141,600	SF	2.60	368,160
Diffusers and return air grilles				
Ceiling/wall diffusers and return air grilles	930	EA	150.00	139,500
Controls, instrumentation and balancing				
DDC control system	102,573	SF	3.80	389,777
Laboratory controls (Phoenix valves)	140	EA	2,375.00	332,500
Testing and commissioning	2,000	HR	95.00	190,000
Heaters and coolers without ductwork				
Perimeter finned tube radiators	280	LF	100.00	28,000
Independent exhaust ventilation				
Miscellaneous fans	20,500	CFM	0.85	17,425

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
Laboratory exhausts	120,000	CFM	1.85	222,000
				7,400,980

D40. Fire Protection Systems

Fire sprinkler systems				
Automatic wet sprinkler system	102,573	SF	3.25	333,362
Premium for pre-action system to specific areas	10,257	SF	2.00	20,514
				353,876

D50. Electrical Systems

Main service and distribution etc.				
Primary switchgear, transformers, secondary distribution, switchboards, MCC's and feeders	2,600	KW	403.75	1,049,750
Emergency power				
Standby generator, switchgear, transfer switches, and feeders (propane fuel)	400	KW	997.50	399,000
Machine and equipment power				
Connections and switches	102,573	SF	2.99	306,950
User convenience power				
Panelboards, feeders and receptacles including conduit and wire	1,571	EA	285.00	447,735
Wiremold	34,660	SF	2.85	98,781
Lighting				
Panelboards, feeders and lighting fixtures including conduit and wire and including exit lighting	2,050	EA	475.00	973,750
Exterior lighting including control	102,573	SF	0.35	35,901
Lighting and power specialties				
Grounding system	1	LS	16,250.00	16,250
Lighting controls	102,573	SF	1.00	102,573
Central clocks system rough-in only	50	EA	350.00	17,500
CATV system rough-in only	102,573	SF	0.15	15,386
AV systems rough in	102,573	SF	0.64	65,236
Rough-in services to planetarium	1	LS	35,000.00	35,000
Rough-in for distance learning capability	1	LS	50,000.00	50,000

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
Telephone and communications systems				
MDF/IDF rough-in	1	LS	24,000.00	24,000
Cable trays	1,000	LF	40.00	40,000
Telephone/data outlets including conduit only	680	EA	250.00	170,000
Alarm and security systems				
Fire alarm control panel and annunciator	1	LS	71,801.10	71,801
Fire alarm devices including conduit and wire	400	EA	498.75	199,500
CCTV system rough-in	10	EA	850.00	8,500
Access control including devices and wiring	60	EA	2,800.00	168,000
Third party testing	1	LS	42,000.00	42,000
				4,337,613

E10. Equipment

E 1020 Institutional Equipment				
E1025 Audio-visual equipment				
Projector brackets	21	EA	450.00	9,450
Projector screens	21	EA	2,500.00	52,500
E1027 Laboratory equipment				
Chemical fume hood - 8'	26	EA	12,000.00	312,000
Chemical fume hood - 6'	69	EA	8,000.00	552,000
Chemical fume hood - 5'	1	EA	7,500.00	7,500
Chemical fume hood - 4'	6	EA	6,000.00	36,000
Emergency shower/eyewash	28	EA	450.00	12,600
Cylinder rack (4)	4	EA	350.00	1,400
Cylinder rack (2)	3	EA	250.00	750
Multiple cylinder storage racks	1	LS	2,500.00	2,500
Pipe drop enclosures	68	EA	500.00	34,000
Overhead service carrier	215	LF	50.00	10,750
Overhead cable tray	20	LF	50.00	1,000
Snorkel exhaust	11	EA	700.00	7,700
E 1031 Other Equipment				
Planetarium dome - perf aluminum	962	SF	150.00	144,300
				1,184,450

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
E20. Furnishing				
E 2010 Fixed Furnishings				
E2012 Fixed casework				
Lab casework				
Lab bench, standing	947	LF	275.00	260,425
Lab bench, sitting	267	LF	250.00	66,750
Lab bench, standing - island	556	LF	500.00	278,000
Lab bench, standing - island - single width	28	LF	375.00	10,500
Lab bench, sitting - island	25	LF	450.00	11,250
Epoxy countertop	2,432	LF	125.00	304,000
Wall cabinet	22	LF	200.00	4,400
Tall storage cabinet	22	EA	1,500.00	33,000
Flammable/Corrosive storage cabinet	14	EA	2,000.00	28,000
Lab sinks	96	EA	550.00	52,800
Cup sinks	75	EA	250.00	18,750
Coat/book bag storage unit	21	EA	1,500.00	31,500
Adjustable wall shelving	393	LF	150.00	58,950
Adjustable full height shelving	435	LF	275.00	119,625
Reagent shelving	102	LF	175.00	17,850
Other casework				
Built in bookshelves	84	LF	300.00	25,200
Mailboxes	36	EA	100.00	3,600
Countertops	70	LF	75.00	5,250
Base cabinets with countertop	32	LF	275.00	8,800
Wall cabinets	18	LF	125.00	2,250
Open shelving	43	LF	100.00	4,300
Classroom tables	446	LF	350.00	156,100
E2013 Blinds and other window treatments				
Interior glazing blinds	1,000	SF	5.00	5,000
Blackout shades	204	SF	15.00	3,060
Exterior glazing roller blinds	5,845	SF	8.00	46,760
E2014 Fixed floor grilles and mats				
Fiberglass grating over floor recess at haz chem room	1	LS	2,500.00	2,500
Floor mats & grilles at entrances	324	SF	45.00	14,580

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
E2015 Fixed multiple seating				
Reclining seating for planetarium	60	EA	450.00	27,000
				1,600,200
F10. Special Construction				
				0
F20. Selective Demolition				
F 2020 Site Demolition and Relocations				
F2021 Building demolition				
Demolish existing building	29,000	SF	7.50	217,500
F2022 Demolition of site components				
Strip and remove existing hard and soft landscaping	124,200	SF	0.75	93,150
				310,650

SITEWORK COMPONENT SUMMARY

			Gross Area: 138,701 SF	
			$/SF	$x1,000
G10.	Site Preparation		0.23	32
G20.	Site Improvements		5.57	773
G30.	Site Civil/Mechanical Utilities		2.06	285
G40.	Site Electrical Utilities		2.61	362
TOTAL BUILDING & SITE			**10.47**	**1,452**
	General Conditions	10.00%	1.05	145
	Contractor's Overhead & Profit or Fee	3.00%	0.35	48
PLANNED CONSTRUCTION COST		***June 2010***	**11.86**	**1,645**
	Contingency for Development of Design	12.50%	1.49	206
RECOMMENDED BUDGET		June 2010	13.35	1,851

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
G10. Site Preparation				
G 1010 Site Clearing				
G1011 Clearing and grubbing				
Debris removal	1	LS	10,000.00	10,000
G1012 Tree removal and thinning				
Remove existing trees	6	EA	250.00	1,500
G 1030 Site Earthwork				
G1037 Erosion control				
Erosion control	138,700	SF	0.15	20,805
				32,305
G20. Site Improvements				
G 2010 Roadways				
G2012 Paving and surfacing				
Service drive - asphalt	3,756	SF	1.75	6,573
Loading dock apron - concrete	2,625	SF	6.00	15,750
G 2030 Pedestrian Paving				
G2031 Paving and surfacing				
Entry plaza paving	1,700	SF	6.00	10,200
Site walkway paving	6,027	SF	4.00	24,108
Enhanced site walkway paving	8,000	SF	6.00	48,000
G2033 Exterior steps				
Site stair	800	SF	30.00	24,000
Site stair railing	120	LF	125.00	15,000
G 2040 Site Development				
G2044 Signage				
Exterior building signage	1	LS	10,000.00	10,000
G2045 Site furnishings				
Allow for fencing and miscellaneous site furnishings	1	LS	25,000.00	25,000
G2049 Miscellaneous structures				
Planter curbs, seating walls and benches	1	LS	50,000.00	50,000
New utility connection - reroute campus utility tunnel	100	LF	2,500.00	250,000

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
G 2050 Landscaping				
G2054 Seeding and sodding				
Lawn - 75% of softscape	58,803	SF	2.00	117,606
G2055 Planting				
Planting - 25% of softscape	19,601	SF	5.00	98,005
G2057 Irrigation system				
Irrigation to lawn and planting	78,404	SF	1.00	78,404
				772,646

G30. Site Civil/Mechanical Utilities

Water mains; domestic and fire				
Underground piping; combined water and fire	250	LF	50.00	12,500
Valves and specialties	1	LS	15,000.00	15,000
Connections to existing	1	LS	3,000.00	3,000
Natural Gas				
Underground piping	150	LF	70.00	10,500
Valves and specialties	1	LS	5,000.00	5,000
Connections to existing	1	LS	3,000.00	3,000
Sewer piping; incoming connections				
Underground piping	150	LF	40.00	6,000
Connections to existing	1	LS	4,000.00	4,000
Sanitary sewer relocation allowance	1	LS	60,000.00	60,000
Storm water piping; incoming connections				
Underground piping	300	LF	95.00	28,500
Connections to existing	1	LS	3,500.00	3,500
Stormwater detention allowance	1	LS	100,000.00	100,000
Drainage				
Drainage from hardscape	22,908	SF	1.50	34,362
				285,362

G40. Site Electrical Utilities

Electrical main service; incoming connections				
Underground feeders; 13.2 KV to	300	LF	450.00	135,000
Connections to existing	1	LS	5,000.00	5,000

Item Description	*Quantity*	*Unit*	*Rate*	*Total*
Lighting				
Lighting to hard and softscape	101,312	SF	1.50	151,968
Telephone and signal systems; incoming connections				
Underground conduit only	150	LF	120.00	18,000
Connections to existing	1	LS	2,000.00	2,000
LV campus systems - allow	1	LS	50,000.00	50,000
				361,968