JULY 2014

PREDESIGN STUDY
EWU SCIENCE I

EASTERN WASHINGTON UNIVERSITY
CHEMISTRY/BIOCHEMISTRY & PHYSICS
PROJECT NUMBER 30000001

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

EWU expects that over the next ten years its student population will grow by approximately twenty percent and that a disproportionately large share of the additional students will be seeking healthcare-related degrees. This coupled with new engineering offerings that have mandatory science prerequisites will translate to a substantial increase in the demand for basic science courses, including chemistry/biochemistry and physics. With science facilities already stretched and without an improvement in the quantity and quality of chemistry/biochemistry and physics teaching labs, research labs, and lab support space, EWU will not be able to meet the increased demand for basic sciences.

The existing Science Building is the only facility at EWU that contains laboratories capable of accommodating chemistry/biochemistry and physics teaching and research. Lower division chemistry/biochemistry courses are currently running at or beyond the capacity of the available teaching laboratories in Science Building. The limited research laboratory space in the existing Science Building is not capable of serving the research needs of science majors and faculty. Preparation space for teaching labs, space for scientific instruments, and specialized storage space for science equipment and reagents used in teaching and research are all lacking.

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 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.

1.2 PROPOSED SOLUTION

EWU proposes that a new building on the existing campus is the best alternative to solve the most pressing science facility deficiencies and meet the future needs. The building is envisioned to be a new 102,573 gross square foot facility that will house teaching laboratories, research laboratories, lab support facilities, student study areas, and faculty offices for the chemistry/biochemistry and physics departments; three classrooms with science demonstration capability that accommodate the lecture needs of the two science departments; and a small replacement office suite for the dean of the College of Science, Health & Engineering (CSHE), which is presently located in Communications Building.

The proposed solution will allow EWU to meet the increased demand for chemistry/biochemistry and physics courses due to growing enrollment and the increased focus on healthcare education and engineering. It will provide the two sciences with significant improvements in laboratory quality, technology, HVAC, and student spaces. By locating chemistry/biochemistry and physics departments in an energy-efficient structure, Science I is expected to experience significant savings in energy costs relative to the existing Science Building.

1.3 PROJECT ANALYSIS

EWU's Mission - The mission of Eastern Washington University is to prepare broadly educated, technologically proficient, and highly productive citizens to attain meaningful careers, to enjoy enriched lives, and to make contributions to a culturally diverse society. The proposed Science I project will very directly contribute to preparation of technologically proficient citizens. It will be a vital part of an excellent student-centered learning environment and exceptional resources and facilities. It will lend support to providing high quality, integrated, interdependent programs.

EWU's Strategic Plan – The proposed Science I will help EWU to achieve its strategic planning goals and objectives by:

- Providing increased research laboratory space and up-to-date information technology and audio-video capabilities, allowing opportunities for higher levels of student engagement in research and active learning, providing greater opportunities for faculty research, and allowing faculty to more readily support integration of student research into the chemistry and physics curricula;
- Providing increased teaching laboratory spaces that will allow for enhanced experiential learning, greater freshman access to science courses, and greater capacity to provide science training for students pursuing engineering and science education bachelor degrees;
- Providing spaces that foster student interaction.

Project Necessity - As noted in the problem statement above, a new Science I 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 - Four alternatives were considered for addressing the identified needs:

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

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.

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

Project Schedule - The anticipated schedule is summarized as follows:

Predesign	September 2009 – June 2010
Predesign Update	May 2014 - June 2014
Preparation of Design/Build Criteria	July 2015 – December 2015
Selection of Design/Build Team	January 2016 – July 2016
Completion of Design	August 2016 - May 2017
Construction	March 2017 – October 2018
Construction Closeout	November 2018 - December 2018
Furniture & Equipment Installation	January 2019 - February 2019
Occupancy	March 2019

1.4 PROGRAM ANALYSIS

The program for Science I is summarized in the following table, which describes the program needs in assignable square feet (ASF):

Department	Teaching Lab (ASF)	Research Lab (ASF)	Lab Support (ASF)	Office (ASF)	Classroom (ASF)	Other (ASF)	Total (ASF)
Chemistry/Biochemistry	12,160	7,680	5,480	3,865	0	0	29,185
Physics	5,760	1,860	1,920	2,345	0	2,025	13,910
Administration	0	0	0	1,720	0	0	1,720
Shared Facilities	0	0	0	0	6,230	5,370	11,200
Total Assignable Area	17,920	9,540	7,400	7,930	6,230	7,395	56,415

As with any science building for higher education, the technical program requirements for Science I are significant. The intensive use of fume hoods and laboratory gases in chemistry/ biochemistry 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.

Sustainable design goals for Science I are ambitious. EWU aspires to achieving at least a LEED® gold certification, with an emphasis on reduced energy use. Energy conservation measures include the use of heat pumps coupled with open-loop geothermal wells supplying water for building heating and cooling; this measure has great potential for energy savings. 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.

1.5 SITE ANALYSIS

Six candidate sites on the Cheney campus were identified and evaluated to determine a preferred site for Science I:

Figure 1.a Six Sites

Evaluation of the candidate sites included consideration of numerous issues. Key factors in the site selection were schedule and budget, proximity to the existing Science Building, disruption to existing buildings, topography, impact on campus circulation, impact on campus open space; future growth, climate/ solar orientation, pedestrian and ADA access, service access, location within the campus academic core, utilities availability and relocation, and parking impact.

The site selected for the Science I project is the "Reid Site" – the current location of the Robert Reid Lab School. It lies across the "Science Commons" from the existing Science Building and the Computing & Engineering Building. Schedule and budget impacts are most favorable on the Reid site. The site is virtually level, offers excellent access, and has a good relationship to campus utilities, circulation and open space. It has the capability of accommodating a planned second building, Science II, with immediate adjacency to Science I.

1.6 BUDGET ANALYSIS

Escalated project costs for Science I, which include design and construction of the open-loop geothermal wells, are summarized as follows:

Acquisition Costs	$0
Consultant Services	$7,378,991
Construction Contracts	$57,653,577
Equipment	$4,263,323
Art Work	$238,490
Other Costs	$332,800
Project Management	$2,254,305
Total Project Request	**$72,121,500**

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's Master Plan identifies a proposed Science I building and a planned Science II building in the University's Ten Year Capital Plan. The site proposed for the new Science I building is in line with the master plan. The proposed Science I supports the goals and objectives of the Campus Master Plan and will not require any changes to the Master Plan.

1.8 FACILITY OPERATIONS & MAINTENANCE

The Science I project will result in an initial increase to operations and maintenance costs. The new building will require an increase in the custodial staff, maintenance staff, goods and services, and utility costs. The current 10-year capital plan programs for a consolidation of campus facilities and corresponding decrease in overall campus O&M costs achieved through phased conversion of the existing science building to a general academic building, which will allow for the demolition of selected older, less cost effective facilities. Operations and maintenance costs for Science I are estimated to be $1,047,270 per year in 2020, the first full year of occupancy.

2.0 Project Analysis

2.0 Project Analysis

2.1 INSTITUTIONAL CONTEXT

EWU's Mission

The mission of Eastern Washington University is to prepare broadly educated, technologically proficient, and highly productive citizens to attain meaningful careers, to enjoy enriched lives, and to make contributions to a culturally diverse society. Eastern Washington University will achieve its mission by providing:

- an excellent student-centered learning environment;
- professionally accomplished faculty who are strongly committed to student learning;
- high quality, integrated, interdependent programs that build upon the region's assets and offer a broad range of choices as appropriate to the needs of the university's students and the region; and
- exceptional student support services, resources, and facilities.

The proposed Science I project will very directly contribute to preparation of technologically proficient citizens. It will be a vital part of an excellent student-centered learning environment and exceptional resources and facilities. It will lend support to providing high quality, integrated, interdependent programs.

EWU's Strategic Plan

Eastern Washington University's current Strategic Plan was issued June 13, 2008 in association with the operating budget request for the 2009-2011 Biennium. In order to measure how the proposed Science I 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 I project could support them.

EWU Strategic Plan Goals, Objectives, Performance Measures and Strategies	Science I's Role in Supporting EWU Strategic Plan
Goal I: A rigorous and engaged student learning experience	
Objective 1: Foster more engaged student learning by providing opportunities for student interaction, immersion and integration. Strategy: Expand use of classroom technologies that support more active learning. Strategy: Support higher levels of student engagement in research.	Science I would provide increased 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. Spaces that foster student interaction, which are lacking in the existing Science Building, would be included in the Science I program.
Objective 2: Integrate general education with career preparation. Strategy: Provide support to faculty to support integration of diversity, service learning and student research into new general education curriculum. Strategy: Expand the first year experience course for freshman.	Increased research space would allow faculty to more readily support integration of student research into the chemistry and physics curricula. Increased introductory teaching laboratory spaces would allow for greater freshman access to science courses.
Objective 4: Respond to need for graduates in "high-demand" fields. Performance Measure: Increased numbers of bachelor degrees awarded in engineering, health or life sciences, mathematics, and secondary teacher education in mathematics, life sciences or Spanish.	By increasing the space devoted to teaching labs and research labs, a Science I would allow greater capacity to provide science training for students pursuing engineering and science education bachelor degrees.
Objective 5: Provide an environment supportive of learning and teaching excellence. Performance Measure: Increase the number of classrooms that have been technology-enhanced. Strategy: Complete implementation of campus-wide wireless capability.	Science I should be equipped with building-wide wireless capability. Each teaching laboratory should have up-to-date information technology and audio-video systems.

Goal II: An academic community culture that supports and engages faculty and staff throughout their careers.	
Objective 2: Support teaching, research and service activities Performance Measure: Increase support for faculty, staff and student research/creative works.	By increasing research laboratory space, Science I would provide greater opportunities for faculty, staff and student research.
Goal III: An institution-wide commitment to community engagement that benefits the university, the region and the world.	
Objective 2: Integrate community engagement into learning and discovery. Performance Measure: Increased numbers of faculty and students participating in undergraduate research, service learning, experiential learning and internship programs.	By increasing research laboratory space, Science I would allow for increased numbers of students to participate in undergraduate research. Experiential learning would be enhanced by increased teaching and research laboratories.

Priorities of Government

The Office of Financial Management's 2009-11 Priorities of Government (POG) lists "Deliver increased value from postsecondary learning" as one of ten categories of desired statewide results. Within that category, the top two priorities for Eastern Washington University are identified as follows:

Instruction — Eastern Washington University provides quality undergraduate and graduate students with the knowledge they need to acquire a degree, prepare for a career, and continue learning after they leave the university.

Research — Public and private organizations may purchase or sponsor research, instruction, or consultative services from Eastern Washington University. Federal, state, local, and privately-funded research provides opportunities for faculty and students to maintain and enhance their scholarship and to provide knowledge in areas of concern to the citizens of the state.

The fundamental purpose of EWU Science I will be provision of quality teaching and research laboratories that serve the instructional and research needs of students and faculty. As such, the Science I project will very directly address the top Priorities of Government.

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 chemistry buildings at the three universities was undertaken. That examination reveals that EWU lags significantly in chemistry 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 Chemistry Building, completed in 1993, is 82,014 gross square feet (after current addition).

Figure 2.a WWU Chemistry Building

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 – Chemistry and physics currently share Science Building with biology 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 and primarily utilized by biology, increased the total building area to 148,149 gross square feet. Additional building renovations were undertaken between 1990 and 1994. Chemistry occupies twenty-four percent (24%) of the Science Building area, equivalent to 34,771 gross square feet. Physics occupies fourteen percent (14%) of the Science Building area, equivalent to 20,770 gross square feet.

Figure 2.b EWU Science Building

The following table summarizes the chemistry facilities at peer institutions:

Institution	Year Chemistry Facility was Constructed*	2008-09 Avg. Student Enrollment (FTE)**	Gross Area of Chemistry Facility*	Chemistry Area per Enrolled Student FTE
WWU	1993	12,408	82,014 GSF	6.6 GSF
CWU	2000	9,082	55,910 GSF	6.2 GSF
EWU	1962 with 1988 addition	9,287	34,771 GSF	3.7 GSF

* Source is OFM State Facility Inventory System 2009. Note that CWU chemistry is assumed to occupy 36% of the CWU biology/chemistry building.

** Source is OFM Final 2008-09 Budget Driver Report; numbers are State-funded full-time equivalent students

This table reveals that chemistry at WWU is housed in 78% more space per student than at EWU. At CWU chemistry is house in 68% more space per student than at EWU. The table provides one useful benchmark in assessing the appropriate size for a chemistry building.

2.2 OPERATIONAL NEEDS

Increasing Demand for Sciences

EWU expects that over the next ten years, its student population will grow by approximately twenty percent. Increased regional demand for healthcare and growing opportunities for undergraduate and graduate healthcare education at Riverpoint Campus in Spokane will mean that a disproportionately large share of the additional students will be seeking healthcare-related degrees. This will translate to a substantial increase in the demand for basic science courses that serve as prerequisites to healthcare degrees, including chemistry and physics. It is also expected that in proportion to the increase in student population more students will choose to major in these sciences.

Additionally, a new program in mechanical engineering began in fall quarter of 2010. Mechanical engineering students have mandatory physics prerequisites that will increase the demand on the physics department.

Capacity of Current Science Facilities

The existing Science Building is the only facility at EWU that contains laboratories capable of accommodating chemistry and physics teaching and research. Lower division chemistry courses are currently running at or beyond the capacity of the available teaching laboratories in Science Building, so additional general chemistry laboratories are needed. The current facility lacks both an inorganic/physical chemistry teaching lab and an analytical chemistry teaching lab. Additionally, the very limited research laboratory space in the existing Science Building is not capable of serving the research needs of additional science majors. Besides the insufficiency of laboratories, the most pressing need is for additional lab support space, including prep space for teaching labs, space for scientific instruments, and specialized storage space for science equipment and reagents used in teaching and research.

Without an increase in chemistry and physics teaching labs, research labs, and lab support space, EWU will not be able to meet the increased demand for basic sciences. Lack of space to accommodate growth will equate to inadequate science training to serve the rapidly growing regional focus on health science programs in Spokane and the new engineering programs.

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 gas burners in labs, lack of adequate distribution for inert gases, 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 restrooms. The current planetarium's location on the second level of the existing Science Building is awkward for access by visitors and problematic for wheelchair users.
- Problematic HVAC – Science buildings, particularly those that include chemistry laboratories, 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. Insufficient floor-to-floor height and impenetrable beams in ceiling spaces would severely limit the possibility of adding ductwork 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.)

Figure 2.c Existing Science Building

- 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. The chemistry department lacks space for its informatics servers.
- Lack of student spaces – The existing Science Building completely lacks the non-classroom spaces that enable the "excellent student-centered learning environment" envisioned in the university's mission. 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.
- 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 I, coupled with reuse of the existing Science Building for less energy intensive purposes, would have a very positive impact on campus energy costs.

2.3 ALTERNATIVES EXPLORED

Alternative I: 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 science 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.

Alternative II: Renovation of Existing Science Building
The initial idea for addressing the deficiencies of the existing Science Building was a major renovation of the existing building. This alternative fell short of meeting the need in three major ways:

- There are no facilities available for temporary relocation of chemistry and physics laboratories during the renovation of the existing building.
- The existing structure is not compatible with the needs of science education. The ventilation demands and laboratory support systems in a chemistry facility require above-average floor-to-floor heights that allow clear ceiling space for large ductwork 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.
- The existing building does not allow for the necessary growth of chemistry and physics facilities to serve future needs.

Alternative III: 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 current site of the Robert Reid Lab School, located on the EWU campus, is available since the school is no longer in use and is a candidate for demolition. A new three-story building 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 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.

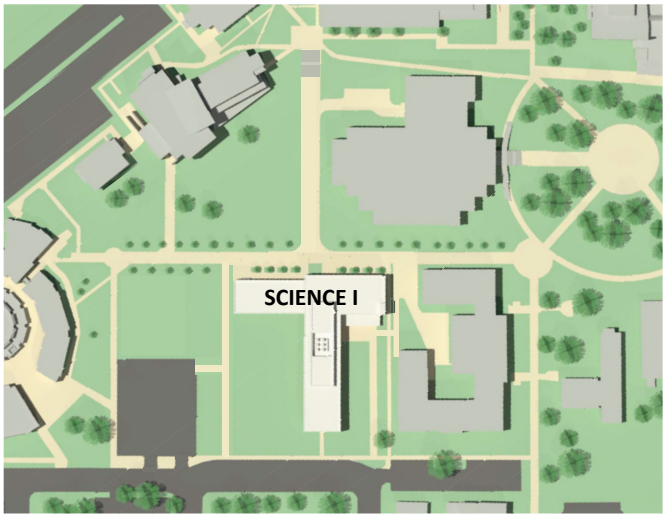


Figure 2.d Alternative III Site Plan

During the Science I predesign study a number of new building 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) Chemistry-Biology Replacement ($114M): This scheme encompassed all program requirements of the chemistry and biology departments. It also included three classrooms, a planetarium that is part of the physics program, and space for the College of Science, Health & Engineering dean's offices.
2) Partial Chemistry-Biology Replacement ($74M): This option located the majority of biology and chemistry spaces in a new building. It selectively left a number of functions in the existing Science Building, including four biology/chemistry teaching labs, two specialized biology research labs, some storage space for the departments, and biology's radioisotope lab, vivarium, and greenhouse. Since significant elements of both programs would remain in the existing Science Building, this option created a physical division in both departments that was deemed to be impractical.
3) Biology Only Replacement ($73M): This option located the full biology program in a new building along with two large classrooms.
4) Chemistry-Physics Replacement ($72M): This scheme encompassed all aspects of the current science program with respect to chemistry and physics. It also included three classrooms and space for the College of Science, Health & Engineering dean's offices.

The Chemistry-Biology Replacement has a larger project budget than was deemed feasible. The Partial Chemistry-Biology Replacement involves a significant compromise to the program for those departments. The Biology Only Replacement doesn't address the department (Chemistry) with the greatest need for safety upgrades and growth. The Chemistry-Physics Replacement was determined to be the best option to satisfy the greatest needs.

Alternative IV: Addition to Existing Science Building

This alternative is similar to Alternative III except that it involves constructing a new building addition immediately adjacent to the existing Science Building. In order to avoid the deficiencies of the existing Science Building, the program for this building would be virtually the same as Alternative III.

This idea was explored at length during the predesign study; however, it was determined that no adequate site was available for such an addition without significant negative impact to the campus. The best location for an adjacent addition is the site to the northeast of Science Building. A four-story Science I addition, with a footprint of approximately 25,700 square feet, would impinge on the future expansion of Pence Union Building that is currently in early planning. It would also require the loss of a portion of the existing parking/transit area that includes the primary bus terminal on campus, which serves over 150 buses each week. Finally, the building addition would sit squarely on the existing campus "mall" that is the most significant pedestrian pathway on campus and a major orienting feature of the central campus plan.

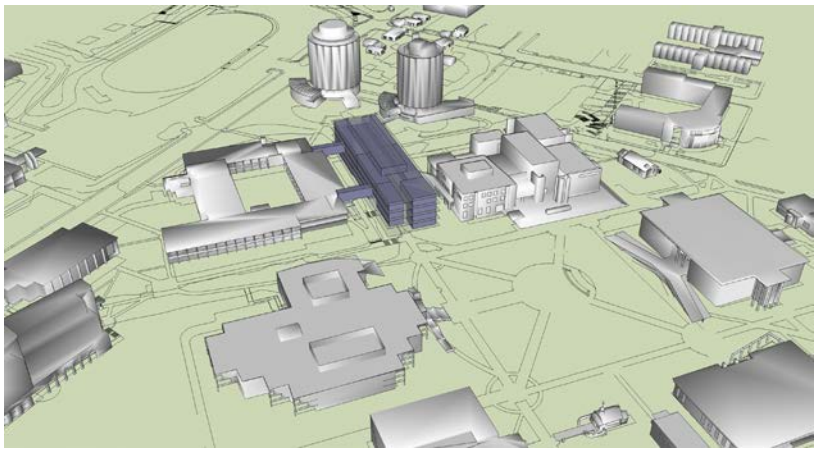


Figure 2.e
Alternative IV
Addition

2.4 SELECTED ALTERNATIVE

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

Scope of Preferred Alternative
The preferred alternative would construct a new 102,573 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 chemistry and physics departments; three classrooms with science demonstration capability; and offices for the dean of the College of Science, Health & Engineering.

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

Science I will also allow the repurposing of the portion of the existing Science Building that will be vacated by chemistry and physics (as a separate project). Moving chemistry and physics 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.

2.5 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 I 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 I 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 in the design and construction of Science I. 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 Science II Project
The EWU master plan indicates the possibility of a Science II building on the site immediately to the south of Science I. Science II is thought to house the department of biology and will move toward consolidating the science disciplines at a single location. The design of Science I should take into account the possibility of making a physical connection with Science II, both to encourage collaboration between the science disciplines and to allow for the classrooms in Science I to be utilized by the occupants of Science II.

2.6 PRIOR PLANNING AND HISTORY

In August of 2008, Eastern Washington University submitted a Replacement Capital Project Request to the state seeking predesign funding for a Biology-Chemistry Science Center. Pursuant to that request, predesign funding was appropriated for the 2009-2011 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 chemistry/biology facility would be too ambitious. As a result, the program for the project has evolved from chemistry/biology to chemistry/physics.

Requests for design funding were submitted for the 2011-2013 bienium and then again for the 2013-2015 biennium. Although it was the top scoring replacement project in the State in the 2011-2013, it has not yet received funding. This report was updated in June 2014 as the basis for a request for Design/Build funding in the 2015-2017 biennium.

2.7 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 chemistry and physics 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, senior project manager, and contract administration specialist.
- Building Team – Dean of the College of Science, Health & Engineering, chemistry department representatives, physics department representatives, construction & planning representatives.•

2.8 PROJECT DESCRIPTION

Project Data

Agency Name:	Eastern Washington University
Agency Code:	370
Project Number:	30000001
Project Title:	Science I
Agency Contact:	Troy Bester, Sr. Project Manager Eastern Washington University 101 Rozell Cheney, Washington 99004-2446 (509) 359-2204 tbester@ewu.edu

Building Data

Building Size:	102,573 GSF
Occupants:	Approximately 1,000 (per 2012 IBC)
Uses:	Chemistry and physics departments: • Teaching laboratories • Research laboratories • Lab support spaces • Faculty and staff offices • Student computer and study spaces • Planetarium College of Science, Health & Engineering dean's office Classrooms with science demonstration capability

2.9 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 I project:

Shawn King	Associate Vice President
Troy Bester	Senior Project Manager

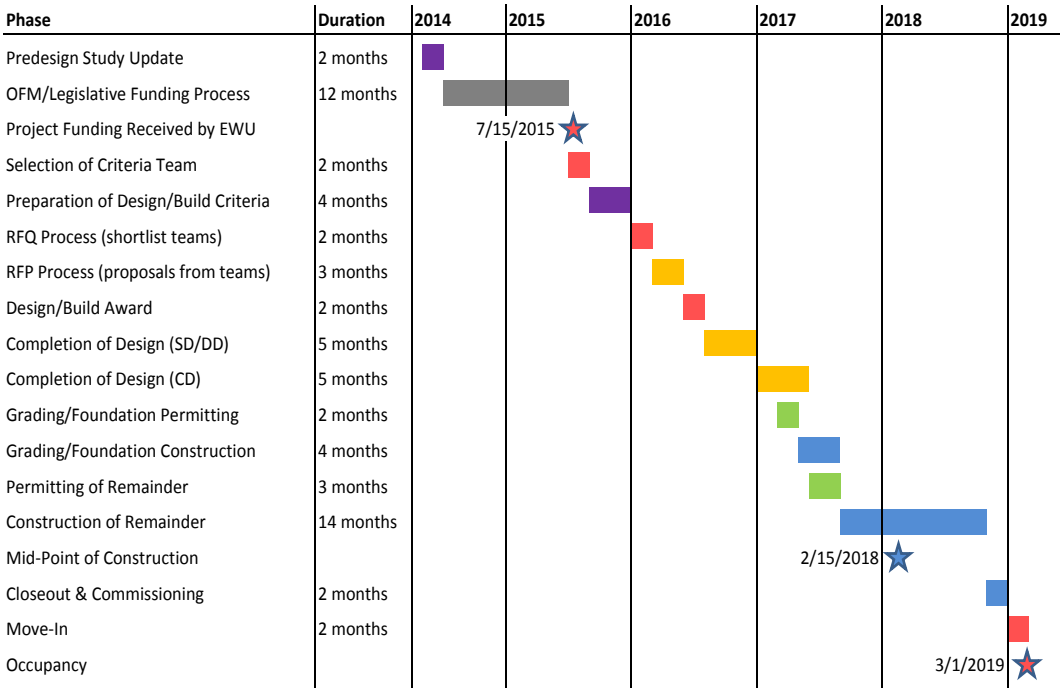
The cost for the University's management of the design and construction is included in the Project Budget Analysis section of this report.

Method of Delivery
Eastern Washington University proposes to use the Design/Build (D/B) method, as authorized by the State Legislature in Title 39 RCW, to accomplish this project in the most cost-effective and timely manner.

Utilizing D/B delivery allows the university to have greater assurance that the project will be delivered on budget and within the projected schedule.

2.10 SCHEDULE

A summary schedule is as follows:



3.0 Program Analysis

3.0 Program Analysis

3.1 ASSUMPTIONS & STANDARDS

Assumptions

Programming is the portion of a project in which the 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 I:

- The expected twenty percent growth of the student population at EWU and the anticipated increase in students seeking healthcare-related degrees will cause a disproportionately large increase in the demand for chemistry/biochemistry courses as well as a significant increase in the number of chemistry majors.
- The growth of the student population and the demand for of a new mechanical engineering degree are causing an increase in the demand for physics courses.
- The increased number of students (both majors and non-majors) taking chemistry/biochemistry and physics 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 chemistry/biochemistry and physics majors will increase the need for research laboratory space to accommodate those capstone projects.
- The university's expectation that each science faculty member should be involved in non-teaching scholarly activity has caused an increased need for research laboratory space.

Programming Standards

Reference materials utilized in programming Science I 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

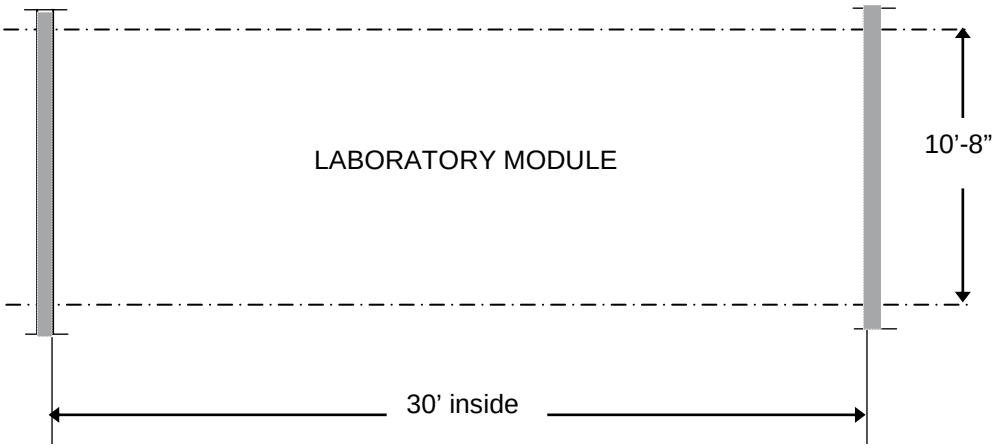
FEPG recommendations for spaces and the corresponding areas used in the Science I program are shown in the following table:

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 – 24 (includes space for science demonstration)
210	Class Laboratory – Physical Sciences	80 (Range = 40 – 90)	53 - 80
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
311 & 312	Dean's Office	200 minimum	250
313	Student Assistants Office	140 per two minimum	140 per six

314	Clerical Office	140	140
315	Office Service, clerical station	100	100
316 & 317	Staff & Other Office	120	120
350	Conference Room	Total office area/ 12	Total office area/ 11
620	Exhibition - Planetarium	Depends on need	30 (includes space for equipment)
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 I project. The proposed laboratory planning module for the Science I 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 I 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.



Classrooms: The 60-seat classroom is to be equipped with moveable tables and chairs. The 80-seat and 120-seat classrooms 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. Research laboratory areas were subsequently refined based on the needs of specific uses.

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 I 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 larger than the FEPG recommendation in order to provide adequate space for AV equipment.

Planetarium: The program size of the planetarium was based on the university's desire to accommodate 60 reclining fixed seats located for viewing images projected on a domed ceiling. The area of the room includes space for projection equipment, computer rack, and control area.

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

Two existing buildings on the Eastern Washington University campus at Cheney would be affected by the Science I project – the Science Building and the Robert Reid Lab School.

Science Building
EWU's chemistry/biochemistry and physics functions 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 primary reason that a new Science I 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.

Together the chemistry/biochemistry and physics departments occupy thirty-eight percent (38%) of the Science Building area. A detailed inventory of the existing chemistry/biochemistry and physics spaces in Science Building is included in the next section – "3.3 Space Needs Assessment".

Robert Reid Lab School
The proposed location of the new Science I building is the current site of the Robert Reid Lab School. The school building would be demolished as part of the Science I project. The Reid School was constructed in 1959 and until its closing was utilized by the EWU Department of Education as a laboratory for future educators. Under an agreement with EWU, it was operated by the Cheney School District as an elementary school with facilities for university students to observe classroom activities. The school was closed in 2009 and the building is currently used for faculty surge space.

The 2013 State Facility Inventory System (FIS) rates the Robert Reid Lab School condition as "4" – "Needs Improvement: Limited Functionality". It is not registered as historic.

3.3 SPACE NEEDS ASSESSMENT

The following tables compare the chemistry/biochemistry and physics spaces in the existing Science Building with the newly identified program needs.

Chemistry/Biochemistry Inventory compared to Program Needs

	Existing Science Bldg		New Program Needs			
Space Name	**Room No.**	**Area (ASF)**	**Area (ASF)**	**No.**	**Total Area (ASF)**	**Difference (ASF)**
TEACHING LABORATORY						
General Chemistry	208 & 298	2,914	1,280	2	2,560	-354
Organic Chemistry	210 & 212	2,084	1,600	2	3,200	1,116
Biochemistry/Forensics	200	1,097	1,280	1	1,280	183
General Chemistry	does not exist	0	1,280	2	2,560	2,560
Analytical Chemistry	does not exist	0	1,280	1	1,280	1,280
Inorganic/Physical Chemistry	does not exist	0	1,280	1	1,280	1,280
Subtotal Teaching Laboratories		**6,095**		**9**	**12,160**	**6,065**
RESEARCH LABORATORY						
Research Laboratory (Physical)	193	466	640	1	640	174
Research Laboratory (Physical)	203	317	640	1	640	323
Research Laboratory (Physical)	204	323	640	1	640	317
Research Laboratory (Synthetic)	206	417	640	1	640	223
Research Laboratory (Synthetic)	207	765	640	1	640	-125
Research Laboratory (Synthetic)	213	320	1,280	1	1,280	960
Research Laboratory (Synthetic)	215	320	1,280	1	1,280	960
Research Laboratory (Biochem)	217	320	960	1	960	640
Research Laboratory (Biochem)	219	320	960	1	960	640
Subtotal Research Laboratories		**3,568**		**9**	**7,680**	**4,112**
LABORATORY SUPPORT						
Stock: Glassware/Consumables	211	550	640	1	640	90
Stock: Chemical Storage	209	400	640	1	640	240
Stock: Prep Room	part of 209	257	320	1	320	63
Hazardous Chemical Storage	179, 179CDE	589	107	3	320	-269
Instrument Room	297	947	1,280	1	1,280	333
NMR Room	299	296	480	1	480	184
Microscopy	279A	89	320	1	320	231
Balance Room	210A	431	320	1	320	-111
XRD Room	202	330	240	1	240	-90
Instrument Storage	does not exist	0	320	1	320	320
Upper Division/Research Prep Room	does not exist	0	320	1	320	320
Nitrogen Room	does not exist	0	80	1	80	80
Server Room	does not exist	0	200	1	200	200
Subtotal Lab Support		**3,889**		**15**	**5,480**	**1,591**
FACULTY/STAFF OFFICE						
Faculty Office - Chair	222	198	175	1	175	-23
Faculty Office	various (14 rms)	2,291	140	15	2,100	-191
Departmental Office/ Waiting	226	317	350	1	350	33
Technician Office	part of 211	100	120	2	240	140
Work Room	226A	115	140	1	140	25
Teaching Assistant Office	does not exist	0	140	2	280	280
Tutoring Office	does not exist	0	280	1	280	280
Conference Room	does not exist	0	300	1	300	300
Subtotal Office		**3,021**		**24**	**3,865**	**844**
Total Chemistry/Biochemistry Area		16,573			29,185	**12,612**

Physics Inventory compared to Program Needs

		Existing Science Bldg	New Program Needs			
Space Name	**Room No.**	**Area (ASF)**	**Area (ASF)**	**No.**	**Total Area (ASF)**	**Difference (ASF)**
TEACHING LABORATORY						
Mechanics Lab	146	1,316	1,280	1	1,280	-36
Instrumentation/ Heat & Optics Lab	144	1,320	1,280	1	1,280	-40
General Physics Lab	172	1,204	1,600	1	1,600	396
Advanced Physics Lab	174	768	960	1	960	192
Quantum Mechanics Lab	163	543	640	1	640	97
Subtotal Teaching Laboratories		**5,151**		**5**	**5,760**	**609**
RESEARCH LABORATORY						
Research Laboratory - Experimental	165, 169	1,001	480	2	960	-41
Research Laboratory - Thin Film	167	310	480	1	480	170
Research Laboratory - Computational	does not exist	0	140	3	420	420
Subtotal Research Laboratories		**1,311**		**6**	**1,860**	**549**
LABORATORY SUPPORT						
Physics Prep Room	144B	647	640	1	640	-7
Radioisotope Room	174B	155	100	1	100	-55
Dark Equipment Room	174A	157	220	1	220	63
Advanced Lab Stock Room	144A	340	320	1	320	-20
Physics Lecture Demo Storage	169A	304	640	1	640	336
Subtotal Research Laboratories		**1,603**		**5**	**1,920**	**317**
Planetarium						
Planetarium	239	767	1,825	1	1,825	1,058
Light Lock Vestibule	does not exist	0	100	2	200	200
Subtotal Research Laboratories		**767**		**3**	**2,025**	**1,258**
FACULTY/STAFF OFFICE						
Faculty Office - Chair	152	244	175	1	175	-69
Faculty Office	varoius (4 rooms)	776	140	5	700	-76
Departmental Office/ Waiting	154	202	250	1	250	48
Technician Office	144C	111	120	1	120	9
Work Room	166	92	140	1	140	48
Reading Room	171	560	480	1	480	-80
Tutoring Office	156	202	280	1	280	78
Conference Room	does not exist	0	200	1	200	200
Subtotal Office		**2,187**		**12**	**2,345**	**158**
Total Physics Area		11,019			13,910	**2,891**
Total Chemistry & Physics Area		27,592			43,095	**15,503**

3.4 SPACE REQUIREMENTS

Program - Room List

The program for Science I is separated into four sections:

1) Spaces devoted to chemistry/biochemistry department functions;
2) Spaces devoted to physics department functions;
3) Spaces devoted to administration offices; and
4) Spaces devoted to functions that will be shared by both academic departments.

Tables on the following pages compile the spaces that are Assignable areas.

Chemistry/ Biochemistry Room List

Space ID	Space Name	Occ's/ Space	ASF	No.	Total ASF	Notes
TEACHING LABORATORY						
LABORATORY						
1.01	General Chemistry	24	1,280	4	5,120	
1.02	Organic Chemistry	20	1,600	2	3,200	
1.03	Inorganic/Physical Chemistry	24	1,280	1	1,280	
1.04	Analytical Chemistry	24	1,280	1	1,280	
1.05	Biochemistry/Forensics	24	1,280	1	1,280	
Subtotal Teaching Laboratories				**9**	**12,160**	
RESEARCH LABORATORY						
LABORATORY						
1.11	Research Lab - Physical/Analytical		640	3	1,920	
1.12	Research Lab - Synthetic		640	2	1,280	
1.13	Research Lab - Synthetic		1,280	2	2,560	
1.14	Research Lab - Biochemistry		960	2	1,920	
Subtotal Research Laboratories				**9**	**7,680**	
LAB SUPPORT						
LABORATORY						
1.21	Stock: Glassware/Consumables		640	1	640	With general chem teaching labs
1.22	Stock: Chemical Storage		640	1	640	With general chem teaching labs
1.23	Stock: Prep Room		320	1	320	With general chem teaching labs
1.24A	Hazardous Chem Storage: Solvents		107	1	107	With upper division prep room
1.24B	Hazardous Chem Storage: Organics		107	1	107	With upper division prep room
1.24C	Hazardous Chem Storage: Inorganics		106	1	106	With upper division prep room
1.25	Instrument Room		1,280	1	1,280	With physical & analytical teaching labs & serves some research labs
1.26	Instrument Storage		320	1	320	With instrument room
1.27	NMR Room		480	1	480	With instrument room
1.28	Microscopy		320	1	320	With biochem/forensics teaching lab
1.29	Balance Room		320	1	320	Adjoining organic/analytic teaching
1.30	XRD Room		240	1	240	With Dr. Manson research lab
1.31	Upper Division/ Research Prep Room		320	1	320	With haz chem storage rooms
1.32	Nitrogen Room		80	1	80	Serves analytical & instrument room
1.41	Server Room		200	1	200	With Dr. Houndonougbo research & serves physical chem teaching lab
Subtotal Lab Support				**15**	**5,480**	
FACULTY/STAFF OFFICE						
OFFICE						
1.51	Faculty Office - Chair	1	175	1	175	
1.52	Faculty Office	1	140	15	2,100	
1.53	Departmental Office/ Waiting	1	350	1	350	
1.54	Technician Office	1	120	2	240	1 tech with stock room
1.55	Teaching Assistant Office	6	140	2	280	
1.56	Tutoring Office		280	1	280	
OFFICE SUPPORT						
1.61	Work Room		140	1	140	
1.62	Conference Room	20	300	1	300	
Subtotal Office				**24**	**3,865**	
	Total Chemistry/Biochemistry Area				**29,185**	

Physics Room List

Space ID	Space Name	Occ's/ Space	ASF	No.	Total ASF	Notes
TEACHING LABORATORY						
LABORATORY						
2.01	Mechanics Lab	24	1,280	1	1,280	
2.02	Instrumentation/ Heat & Optics Lab	24	1,280	1	1,280	Near mechanics lab
2.03	General Physics Lab	56	1,600	1	1,600	
2.04	Advanced Physics Lab	12	960	1	960	
2.05	Quantum Mechanics Lab	20	640	1	640	
Subtotal Teaching Laboratories				**5**	**5,760**	
RESEARCH LABORATORY						
LABORATORY						
2.11	Research Laboratory - Experimental		480	2	960	
2.12	Research Laboratory - Thin Film		480	1	480	
2.13	Research Laboratory - Computational		140	3	420	
Subtotal Research Laboratories				**6**	**1,860**	
LABORATORY SUPPORT						
LABORATORY						
2.21	Physics Prep Room		640	1	640	between mechanics & instrument.
2.22	Radioisotope Room		100	1	100	with advanced lab
2.23	Dark Equipment Room		220	1	220	with advanced lab
2.24	Advanced Lab Stock Room		320	1	320	with advanced lab
2.25	Physics Lecture Demo Storage		640	1	640	adjacent general physics lab
Subtotal Lab Support				**5**	**1,920**	
OTHER						
PLANETARIUM						
2.31	Planetarium	60	1,825	1	1,825	assumes 35' i.s. diam. Dome
2.32	Light Lock Vestibule		100	2	200	
Subtotal Research Laboratories				**3**	**2,025**	
FACULTY/STAFF OFFICE						
OFFICE						
2.41	Faculty Office - Chair	1	175	1	175	
2.42	Faculty Office	1	140	5	700	
2.43	Departmental Office/ Waiting	1	250	1	250	
2.44	Technician Office	1	120	1	120	
2.45	Tutoring Office		280	1	280	
OFFICE SUPPORT						
2.51	Work Room		140	1	140	
2.52	Reading Room		480	1	480	
2.53	Conference Room	12	200	1	200	
Subtotal Office				**12**	**2,345**	

Total Physics Area **13,910**

Administration Room List

Space ID	Space Name	Occ's/ Space	ASF	No.	Total ASF	Notes
FACULTY/STAFF OFFICE						
OFFICE						
3.01	Dean's Office	1	250	1	250	
3.02	Associate Dean's Office	1	175	2	350	
3.03	Staff Office	1	140	2	280	
3.04	Departmental Office/ Waiting	1	300	1	300	
OFFICE SUPPORT						
3.11	Work Room		240	1	240	
3.12	Conference Room	20	300	1	300	
Subtotal Office				**8**	**1,720**	

Total Administration Area **1,720**

Shared Facilities Room List

Space ID	Space Name	Occ's/ Space	ASF	No.	Total ASF	Notes
CLASSROOMS						
CLASSROOMS						
4.01	Classroom - Large	120	2,550	1	2,550	Includes demo table & fume hood
4.02	Classroom - Medium	80	1,760	1	1,760	Includes demo table
4.03	Classroom - Small	60	1,440	1	1,440	Includes demo table
CLASSROOM SUPPORT						
4.11	Prep Room for Large Classroom		320	1	320	
4.12	Vestibule/Storage for Large Classroom		160	1	160	
Subtotal Open Facilities				**5**	**6,230**	
OPEN FACILITIES						
OPEN LABORATORY						
4.21	Open Computer Lab	24	1,280	1	1,280	
OTHER OPEN SPACES						
4.31	Collection Display Cases		20	3	60	
4.32	Student Lounge		800	1	800	Could be semi-open to circulation
4.33	Student Study		1,800	1	1,800	Open to circulation
4.34	Faculty Lounge		400	1	400	
Subtotal Open Facilities				**7**	**4,340**	
OTHER						
SUPPORT						
3.21	General Storage		320	2	640	One space per department
3.22	Hazardous Waste Storage		120	1	120	
3.23	Cylinder Storage		120	1	120	
3.24	Custodial Bulk Storage		150	1	150	
Subtotal Other				**5**	**1,030**	
	Total Shared Facilities Area				**11,600**	

Room List Summary

Department	Teaching Lab	Research Lab	Lab Support	Office	Class-room	Open Facilities	Other	Total
Chemistry/Biochemistry	12,160	7,680	5,480	3,865	0	0	0	29,185
Physics	5,760	1,860	1,920	2,345	0	0	2,025	13,910
Administration	0	0	0	1,720	0	0	0	1,720
Shared Facilities	0	0	0	0	6,230	4,340	1,030	11,600
Total ASF	17,920	9,540	7,400	7,930	6,230	4,340	3,055	56,415

Net/Gross Ratio (Efficiency) 55.0%

Estimated Total Building Area (GSF) **102,573**

Relationships of Functions

Space Relationships: Critical adjacencies and proximities are identified in the "Notes" column of the Room Lists above.

Site Relationships: Key site relationships include:

- Reasonable proximity to the existing Science Building for pedestrian access;
- Contribution to formation of a "Science Commons" for the campus, established through proximity to the Computing & Engineering Building, the proposed Science II Building and the JFK Library.

- Convenient service access for loading; and
- Proximity to the campus steam tunnel system for connection of steam, chilled water, electricity and telecommunications utilities.

Efficiency

Science buildings, especially those containing chemistry facilities, 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 I was conducted in order to determine the appropriate building efficiency factor (net/gross ratio) to utilize in determining the gross area of Science I. 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 I building:

Space Description	Qty	NSF/Unit	Net Area	Notes
Airhandlers	1	6,600	6,600 NSF	
Lab Support Systems	1	300	300 NSF	DI water, air, vacuum
Heat Pumps	1	1,820	1,820 NSF	
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	
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	
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
Mechanical Shafts			3,077 NSF	3% of GSF
Elevators, Stairs, Corridors & Vestibules			24,105 NSF	23.5% of GSF
Walls, Columns & Furred Spaces			7,180 NSF	7% of GSF
Total Non-assignable Area			**46,207 NSF**	
Percentage of Gross Area			45.0%	
Total Assignable Area			**56,366 SF**	
Efficiency			55.0%	
Gross Building Area			**102,573 GSF**	

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 I, 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 I 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 I. 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.

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 departments, 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 the Science I is sensitive to vibration. The most common sources of vibration are footfall (walking) and mechanical equipment. Some scientific instruments that will be utilized in Science I, including high-powered microscopes and NMR, are very sensitive to vibration.

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 I, only the laboratory wing should meet the above criteria. The classroom and office wings 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 I 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 I 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, electricity, 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 I 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 I embodies a new campus standard for sustainable design.

Under RCW 39.35D Science I will be designed to achieve a Leadership in Energy and Environmental Design (LEED®) certification at the Silver level or higher. During the predesign study an eco-charrette was conducted that was intended 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	Total LEED Points	Possible Points: 110
56	38	16		

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 I as a demonstration of the university's commitment to sustainable science in academics and practice.

Energy Conservation

As part of the sustainable design initiative on Science I, 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 I 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 I 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 I.

The aggressive energy target for Science I 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 I Energy Target: The following table establishes the energy goal for the new Science I building:

Building	Area (sq ft)	Heating Use Goals per Building (kBTU /yr)	Heating Use Goals per Sq. Ft. (kBTU /sq ft /yr)	Notes
Science I (Chemistry & Physics)	102,573	8,410,986	**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 I:

- Science I is to be located in the northern portion of the Reid School site. Science II, a future building that is envisioned to house biology, is expected to be located in the southern portion of the same site.
- A direct connection from Science I to Science II should be considered. Pedestrian and vehicular access and location of entrances to the proposed Science I should also take into account a future Science II building.
- The design of Science I should allow for connection of services and utilities to a future adjacent Science II and connection of the vehicular service access to a future Martin-Williamson Hall renovation & addition.

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 walls can easily be deconstructed or relocated to create larger or smaller spaces as needed.
- 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 I 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 I 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 I building will be 3 stories in height, with total size of about 102,573 gross square feet. The largest single floor will be approximately 34,000 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

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):

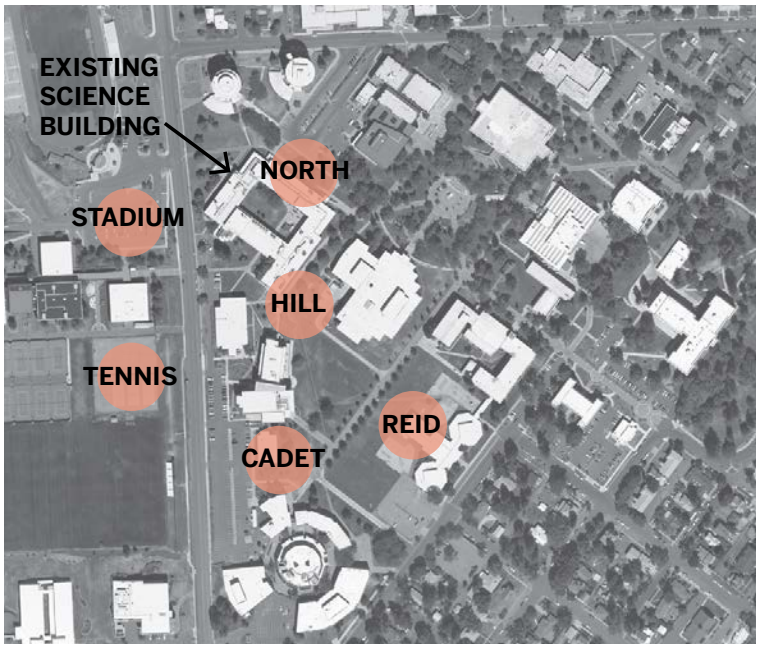
Egress Element	Requirement
Exit Width	Stairs: 0.3”/ occupant, minimum 44” wide
Door Width	0.2”/ occupant, minimum 32” wide clear opening
Exit Corridors	Minimum 44” wide for occ. load > 50
Number of Exits	2 when occupant load > 50
Exit Location	Exits shall be located at a distance apart equal to not less 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 POTENTIAL SITES

Six sites on the Cheney campus were evaluated to determine a preferred site for Science I:



4.a Six Evaluated Sites

1) **Reid Site** - This site is the current location of the Robert Reid Lab School. It lies across the "Science Commons" from the existing Science Building and the Computing & Engineering Building. The site is virtually level and has a good relationship to campus utilities.

2) **North Site -** This site is located between the existing Science Building and the Pence Union Building. It would allow Science I to be directly connected to the Science Building. The most significant pedestrian path on campus, the "mall", would be disrupted by a building in this location. The site slopes down from northwest to southeast.

3) **Stadium Site -** The stadium site is located across Washington Street from the existing Science Building. The site is presently a surface parking lot serving the stadium and physical education facilities. It is virtually flat, but is elevated significantly above the street and the Science Building.

4) **Tennis Site -** This site is located to the south of the stadium site, across Washington Street from the existing Science Building. The site was recently used for modular, portable classroom buildings serving as surge space in support of the renovation of Patterson Hall. The tennis courts are flat but are elevated above the street.

5) **Cadet Site -** This site is the current location of Cadet Hall. It is south of the Computing & Engineering Building. A building at this location could front onto the Science Commons. ROTC facilities housed in Cadet Hall would need to be relocated. The site is fairly steep.

6) **Hill Site -** This site is located immediately adjacent to the existing Science Building and between the JFK Library and the Computing & Engineering Building. A Science I building at this location could have a connection to Science Building. The mass of the building would intrude on the Science Commons and crowd the adjacent buildings. The site is congested with existing utilities and is fairly steep.

4.2 SITE EVALUATION – PHYSICAL ISSUES

Ownership
All of the candidate sites are located within the boundaries of the Eastern Washington University campus in Cheney and are owned by the State of Washington.

Proximity/ Connection to Existing Science Building
Since other science programs will remain in the existing Science Building, a connection between Science I and Science Building would be somewhat desirable. Two sites, the North site and the Hill site, would enable a direct connection with the existing Science Building. The four other sites are located in easy walking distance from Science Building, but would not have an all-weather connection between the two structures.

Disruption to Existing Buildings
Depending on the site chosen, construction of a new Science I building could cause disruption to adjacent buildings and their academic activities. The Reid site, Stadium site, and Tennis site could each avoid significant disruption to existing, utilized buildings. The North site would likely involve major disruption of the north wing of Science Building and would incur costs associated with temporary relocation of classrooms and laboratories during construction of Science I. The Hill site would involve minor disruption of the southeast corner of the existing Science Building. The Cadet site would involve demolition of Cadet Hall and the need to find permanent replacement space for activities housed in that building.

Topography
The Reid site, Stadium site and Tennis site offer favorable, nearly flat topographies. The Cadet and Hill sites are steeply sloped. The North site is moderately sloped. The slopes are not seen as insurmountable obstacles to making successful buildings but do limit a building's configuration and are likely to add costs.

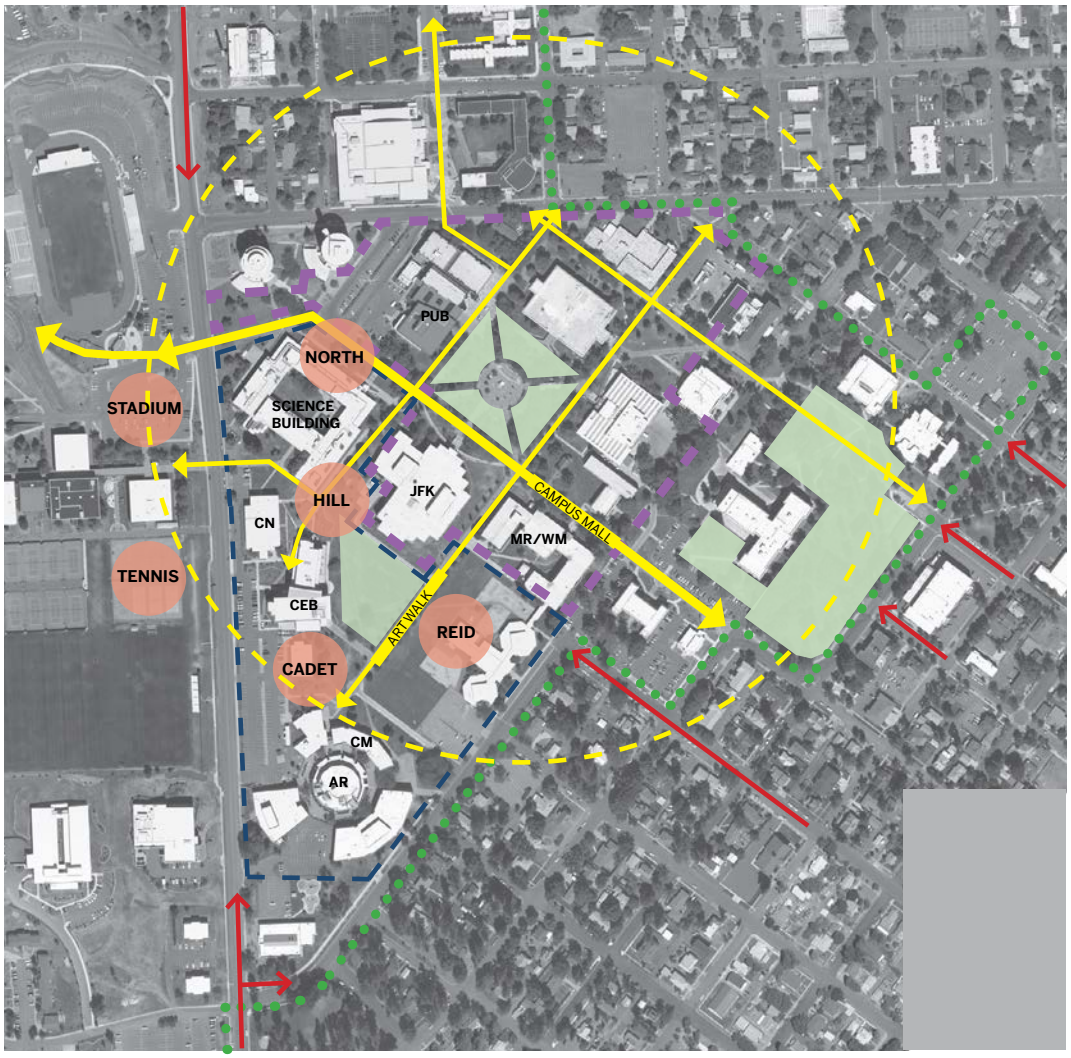
Campus Circulation
The North site has the largest impact on campus circulation. A building at this site will severely disrupt the campus "mall", the most important pedestrian walkway on campus and one that is heavily used on a daily basis. Additionally, the mall plays a ceremonial role during commencement, providing the path for the traditional procession from campus to stadium. Although the mall walkway could possibly be rerouted around a new building, a relocated walkway would adversely impact established pedestrian patterns on the campus. The Cadet site and the Hill site also disrupt existing pedestrian circulation routes but with much less significant impact.

The sites across Washington Street (Tennis site and Stadium site) would both require that a new crosswalk and/or pedestrian bridge be established in order to connect those sites to the academic core and to ensure pedestrian safety.

The Reid site could provide the most favorable impact on campus circulation. The site is immediately adjacent to the pedestrian way (the "Art Walk") that links the humanities complex at the south end of campus to the center of campus. A Science I structure adjacent to that pedestrian way would reinforce that the Art Walk is the major campus thoroughfare.

Campus Open Space
The north academic core of the EWU campus has a comfortable density that is created by locating buildings adjacent to open landscaped spaces. The south academic core has a larger percentage of open space, so a new structure in that part of campus could improve the balance between buildings and open space. Use of the Reid site for Science I would support that balance and would help to define the landscaped "Science Commons" that is currently fronted by the Computing & Engineering Building and the JFK Library. A building at either the Hill site or the Cadet site would severely disrupt the current balance between built and open space.

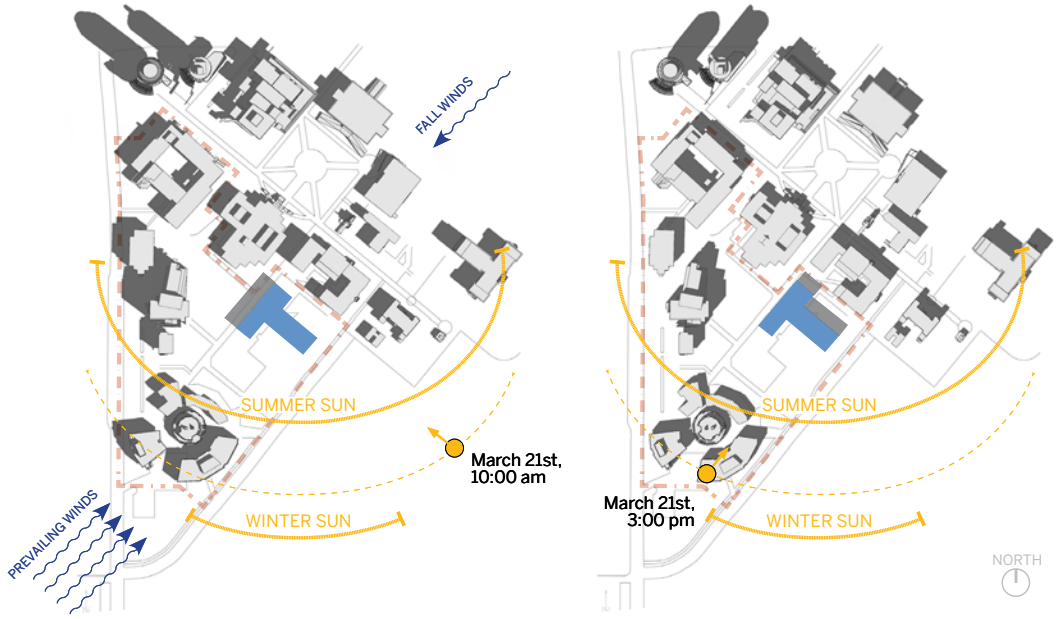
The North site would place a building atop important open space. The Tennis site and Stadium site would not particularly promote a balance between built and open space.



4.b Campus Circulation & Open Space

Climate/ Solar Orientation

Because of their openness, the Reid (shown in diagram below), Stadium and Tennis sites offer the best flexibility to optimize solar and/or wind orientation. Because it is very constricted, the Hill site is not flexible in how a building could be oriented. The Cadet and North sites are slightly less constricted but would not offer much flexibility related to orientation.



4.c Campus Sun & Wind

Location within Academic Core

Science is a central discipline within the EWU academic community. As such, it is important that facilities serving sciences be located within the academic core of the campus. Since Washington Street serves as a strong physical and psychological boundary, a building on the Stadium or Tennis site would be poorly connected to the academic core. The remaining four sites are all located in the academic core.

Utilities

Both utility availability and utility relocation were considered. The campus tunnel system carries steam, chilled water, telecommunications and electricity, so proximity to one of the campus tunnels would be advantageous. Water, sanitary sewer, storm drainage, and natural gas are separate, direct-buried utilities. The Stadium site and Tennis site are located adjacent to a campus tunnel and are clear of direct-buried utilities. The Reid site is located adjacent to a campus tunnel and would require relocation of one sanitary sewer line. The Cadet site would require relocation of several direct-buried utilities. The North site would require a significant extension of a campus tunnel as well as relocation of several direct-buried utilities. The Hill site is very congested with existing direct-buried utilities and is further complicated by the presence of an underground mechanical room and duct tunnel serving the existing Science Building; it would also require significant extension of a campus tunnel.

4.d Campus Utilities

Future Growth

Because EWU has the aspiration to construct a second building (Science II) for sciences in the future, the ability of a site to accommodate future growth is a very serious consideration for this analysis. Because the North site, Hill site, Stadium site and Cadet site will already be relatively constricted by the construction of a single building, there would not be little if any room for growth of science facilities at those sites. The Reid site and the Tennis site are large enough and open enough to accommodate a future second building and are therefore much more desirable for a Science I building.

Energy Conservation
Factors that may affect energy conservation in a Science I building are:

- Solar orientation, both for daylighting of interior spaces and collection of solar energy;
- 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.

Except for utility tunnel adjacency, which is addressed under "Utilities" above, none of these issues are considered to be differentiating factors for the six candidate sites.

Geotechnical
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 preliminary geotechnical reports on each of the sites are beyond the reach of this predesign study, it is not possible to conclude that any of the sites would provide superior foundation and/or drainage conditions.

Environmentally Sensitive Conditions
None of the candidate sites contain known environmentally sensitive conditions. Wetlands, shorelines, flood zones, endangered species, and contaminated soils are not present at any site.

Archaeological Assessment
None of the candidate sites have known or suspected archaeological significance.

Hazardous Materials Inventory
The Reid site and the Cadet site would involve demolition of existing buildings. Both existing buildings have been surveyed for the presence of asbestos and some abatement will be part of the project on either site. Surveying for the presence of lead will need to occur before demolition.

4.3 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/build 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 any of the candidate sites. 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 the candidate 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 I. 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 candidate sites. Maintaining required separations between Science I and existing buildings may be an issue where Science I is attached to or very close to an adjacent building.

4.4 SITE EVALUATION – ACCESS ISSUES

Pedestrian Access
Please refer to "Campus Circulation" in section 4.2 above. As noted in that section, the Reid site is the most favorable for pedestrian access. The sites across Washington Street would require special measures for pedestrian safety. The North site severely disrupts a primary pedestrian pathway. The Cadet and Hill sites disrupt existing pedestrian pathways to a lesser degree.

Service Access
Most of the candidate sites have very good access for service vehicles. The Reid site is immediately adjacent to Seventh Street. The Stadium site and Tennis site potentially have good access from Washington Street. The North site has access to Elm Street via parking lot P-10. The Cadet site would probably be serviced through parking lot P-3 or from the more remote Seventh Street. The Hill site suffers from fairly remote service access. Depending on configuration, a building on the Hill site might also disrupt the service access to the JFK Library.

ADA Access
The evaluation of access for wheelchair-bound and sight-impaired users is similar to that of pedestrian access. The Reid site, with its flat topography, adjacency to a major pedestrian pathway and closeness to the academic core of the campus render it ideal for ADA access. ADA access to the North site would be favorable; however, access around a building on that site would be difficult. The Hill site and Cadet site are situated in the south academic core and a building on either site could be designed to mitigate their steep topographies. The Stadium site and the Tennis site are hampered by the crossing of Washington Street and the rise in elevation from the street to the sites. Both the crossing and the elevation gain would require special provisions for pedestrian and ADA access.

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. The issue around parking is one of disruption to existing surface lots and the need to replace parking stalls that are lost. The Stadium site eliminates most of parking lot P-9, which serves Woodward Field and the physical education complex. The North site significantly disrupts parking lot P-10, which also serves as the main campus terminal for commuter buses. The Cadet site would affect parking lot P-3.

4.e Campus Parking

4.5 SITE EVALUATION – SCHEDULE AND BUDGET

Schedule
In general, the six sites offer fairly good construction conditions that would engender only minor schedule differences. The most significant schedule impact would come at the North site, where working around occupied spaces in the existing Science Building and the necessity of phasing of the construction to accommodate connection from the existing building to the new building is likely to add time to the construction duration.

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.

Complexity/Scope – From the available geotechnical information, it is assumed that subsurface soil and ground water conditions are similar on the six candidate sites. A number of differentiating factors have been identified that would cause increase construction costs for the sites:

- The sloping topography of the Cadet, Hill and North sites offer construction challenges and associated costs greater than the flat topographies of the other sites.
- The North site would involve disruption of the north wing of the existing Science Building and would incur costs associated with temporary relocation of classrooms and laboratories during construction of Science I; no other site would experience this added cost.
- The web of existing underground utilities at the Hill site presents obstacles not encountered to the same degree on other sites.
- A Science I building at either the North Site or the Hill site would require a significant extension of the campus tunnel system; the other sites are in locations conducive to connecting to the tunnel system.
- At the Stadium and Tennis sites, the need to create a safe crossing of Washington Street, possibly by way of a pedestrian bridge, would be a cost not encountered on the other sites.
- Demolition of existing buildings at the Reid and Cadet sites would add cost to the project at those locations.
- Replacement of existing parking at the Stadium, North, and Cadet sites would add cost to a project at any of those sites.

Duration - The extended construction duration of a Science I building at the North site would equate to increased construction cost.

4.6 PREFERRED SITE

Evaluation Matrix

The following utilizes the most significant criteria affecting the six candidate sites in order to assist in the selection of the preferred site. Each of the criteria was given a weighting factor to indicate its importance. Then rating values were assigned to each criterion for each site.

Weighting Factor		Candidate Sites											
"5" = Most Important		**1**		**2**		**3**		**4**		**5**		**6**	
"1" = Least Important													
Rating Value		Reid		North		Stadium		Tennis		Cadet		Hill	
"3" = Significant advantage													
"0" = Significant disadvantage													
Evaluation Criteria	Weighting Factor	Rating	Weighted Value	Rating	Weighted Value	Rating	Weighted Value	Rating	Weighted Value	Rating	Weighted Value	Rating	Weighted Value
Budget Impacts	5	3	15	1	5	2	10	3	15	2	10	2	10
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
Allows Future Science Growth	4	3	12	0	0	1	4	2	8	2	8	1	4
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
Total Score:			**108**		**85**		**92**		**94**		**67**		**72**

Preferred Site

On the basis of the foregoing evaluation, the Reid site was selected for the Science I project.

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 I project budget:

- The building will be constructed as a single phase.
- The construction start date will be May 2017
- The construction period will be 20 months.
- Design/Build delivery method will be utilized.
- The building will be designed to achieve a minimum LEED gold rating.
- The building will be designed to comply with the codes and standards sited in Section 3.0 of this report.
- The project will include the demolition of the existing Robert Reid Lab School on the identified project site.
- 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 constructed under a secondary project contract. Per the recommendations of a feasibility study that was undertaken in 2011, four new wells are included in this secondary project budget, two for extraction and two for reinjection, at locations to be determined.
- The building will be sprinklered throughout.
- An enhanced pedestrian pathway and stairway connecting the existing Science Building to Science I along the Science Commons will be part of this project.
- No new parking will be constructed as part of this project. Existing parking lots P-4 and P-5 provide accessible parking stalls near Science I. An existing loading zone along Seventh Street will be preserved.
- 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.

5.2 OUTLINE SPECIFICATIONS

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

A Substructure

A10 Foundations

Foundations: Soil improvements will be required based on adjacent site conditions. Geopiers

will be used to increase bearing capacity to 6000 psf, which will then transfer loads to competent rock at an elevation of approximately 10 feet below grade. Conventional reinforced concrete spread footings will be provided.

Slabs on Grade: The typical concrete slabs on grade will be 4" thick and lightly reinforced including exterior frost beams. Base will include polyethylene vapor barrier over crushed rock or gravel base course. Under-slab drainage will be required.

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: Concrete elevator pits 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 structural system will consist of reinforced concrete, 10-inch two-way flat slabs, 24 inch square concrete columns, 12 inch concrete shear walls and cast-in-place concrete moment frames, with supplemental structural steel 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.

Building integrated photovoltaics (BIPV) will include crystalline silicone cell panels forming the south penthouse yard screen, supported on structural steel.

Exterior Windows, Doors and Louvers:

- Punched aluminum frame windows at laboratory wing, operable aluminum frame windows at office wing, curtain walls at classroom and office wing, 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 two circulating feature stairs at the building entries will have steel structure with architectural detailing including precast concrete treads. The egress stair serving the office suites and mechanical areas 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 classroom lobby, resilient tile in teaching laboratories and research spaces; welded seam sheet vinyl at selected laboratory support spaces, 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 at the hazardous chemical storage rooms, sealed concrete at 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 classroom wing circulation, hardwood architectural detailing in the large classroom, elevator lobbies and the Dean's Suite, 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.

Planetarium: A 35' diameter pre-manufactured projection dome with a perforated metal powder coated viewing surface will be provided. The outer skin of the dome clad with decorative metal panels will be exposed inside the building envelope and visible through exterior glazing. This will be an exciting feature in the overall building architecture as it helps "display our science". The projection and audio systems will be owner furnished.

D Services

D10 Conveying Systems

Two 3 stop MRL passenger elevators 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 provided from owner furnished cylinders to designated outlets and equipment.

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.

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 Waste and 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.

Process Steam: Process steam will be piped to autoclaves. Process steam will be obtained from the campus steam system.

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.

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)
- Industrial Hot/Cold Water/Tempered Water Piping: Copper
- Lab Waste Piping: Polypropylene
- Snowmelt Piping (buried in slab): Polypropylene

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: Four 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. The chemistry/biochemistry areas have approximately 100 fume hoods located within 25,000 square feet of teaching lbs, research labs and support space. The most fume hood intensive labs vary between 40 and 50 air changes per hour with fume hoods in full use and 15-20 air changes per hour with fume hood sashes closed.

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 systems are not anticipated.

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	R-13 metal stud plus R-10 continuous rigid insulation
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
Opaque Doors	U-0.60
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, including chemistry/ biochemistry laboratories and support spaces and select physics laboratories, will be serviced from dedicated supply and exhaust fan systems. Most physics areas will be serviced from the non lab system since these uses will not require 100% outside air.

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 90,000 cfm assuming an 80% fume hood utilization rate, and the minimum airflow is expected to be 35-45,000 cfm with the fume hood sashes closed. (4) 30,000 cfm fans or (5) 25,000 cfm fans will be provided, allowing the system to deliver 90,000 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.

Non-Lab 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 70-80,000 cfm.

Office Areas: A dedicated office HVAC system will be provided.

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.

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

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: A*n emergency electrical distribution system will consist of a 480/277V engine driven propane fueled generator, which will be pad mounted outdoors in a weather proof sound attenuating enclosure. It will include an automatic transfer switch, allowing the generator to start automatically upon loss of normal EWU campus power. The generator will supply power to all life safety systems within the building such as egress lighting, exit lighting and the fire alarm system. Non-life safety loads may include, department computer servers, telecommunications rooms and associated cooling, and specific laboratory equipment deemed critical.

Building Distribution: 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. Multi- stage surge suppression will 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: Motor loads ½ HP and larger will be 480V three phase.

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.

Medium Voltage Pad Mount Transformers: Transformers will contain a dead front loop feed primary compartment. Provide transformers with integral secondary disconnect switch located within the transformer secondary compartment.

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

D5020 Lighting and Branch Wiring
General Interior Lighting: 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. Lighting within the building will be primarily fluorescent T8 and T5 and compact fluorescent, and LED lighting and limited use of incandescent lamps will be employed where appropriate. Interior areas will be illuminated to the following light levels:

General Classrooms	50 foot-candles
Labs	60-75
Offices	40-50
Conference Rooms	40-50
Restrooms	30
Corridors	10-20
Janitor Rooms	30
Storage Rooms	20

Egress and 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 by the emergency 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 will also be utilized within appropriate areas, such as conference rooms. Automatic dimmable or step-dimmed lighting controls will be considered for the purpose of daylight harvesting within areas where adequate natural daylight is present within the building.

Occupancy Sensors: Dual technology type occupancy sensors will be utilized to automatically shut off the lighting within offices, conference rooms, restrooms and classrooms when these spaces are unoccupied.

Programmable Low Voltage Lighting Control System: A system will be provided for automatic control of lighting in corridors and common areas, and for exterior site lighting. It will interface with the campus EMS, and be manufactured by Nexlight, EWU's campus standards. For exterior lighting, this will allow flexibility for pre-programming of on/off times, photocell control, or EMS control.
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 will be used inside building. Non-metallic conduit will be used underground, except at transitions. Metal conduit will be rigid metal conduit, intermediate metal conduit, electrical metallic tubing, or flexible metal conduit. Non-metallic conduit will be schedule 40 PVC. Conduit will be concealed wherever possible. Minimum conduit size is 3/4" unless otherwise noted. Conduits installed within utility tunnels will be rigid metal conduit.

Building Wire: All wiring will be copper, minimum size #12 AWG. All feeder conductors will be installed in conduit. All 480/277V and 208/120V building wire will be color coded in accordance with EWU campus standards.
Wiring Devices Switch and receptacle outlets will be of a specification grade. GFI type outlets will be provided where outlets are mounted within 6 feet of a sink.

D5030 Communication and Security
Telecommunications Building Distribution: A complete telecommunications distribution pathway system will be provided from the campus utility tunnel to the main telecom room and the secondary telecom rooms located on each floor. Each telecommunications room will be provided with a dedicated 120/208V standby power panel board and an equipment ground bar. Selected areas will be equipped with cabling pathway provisions for wireless local area networking. Telecommunications riser cabling 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. Telecommunications building distribution cabling and devices will be provided and installed by EWU through a separate vendor.

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

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

Access Control System: An access control system will be provided, servicing such spaces as laboratories, classrooms, office suites and utility rooms. The access control system will be furnished and installed by Engineered Control Systems (ECS), EWU's campus standards.

D5090 Other Electrical Systems
Audio / Video Systems: AV system pathways will be provided to all teaching labs, classrooms and conference rooms. Cabling and equipment will be by EWU through a separate vendor.
Fire Alarm: A complete battery backed addressable fire alarm system with manual pull stations, automatic *detection* and ADA compliant horn/strobes will be provided throughout the facility.

Smoke detector and heat detectors will be provided. 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 will be compatible with the existing Edwards FireWoks EWU campus fire alarm monitoring system. The new fire alarm system will be manufactured by Edwards System Technology (EST) Model EST-3 in accordance with EWU campus standards, and will be furnished and installed by Engineered Control Systems (ECS), EWU's campus standards.

Clock System: Pathways will be provided for clocks. Cabling and equipment will be by EWU through a separate vendor.

Community Antenna Television (CATV) System: CATV system pathways will be provided to all telecommunications rooms.

E Equipment and Furnishings

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.

Fume Extractor Arms (Snorkels): Snorkels will be 3 inch (75 mm) diameter, hinged, self-supporting air extractor arm assemblies.

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.

E1090 Laboratory Service Fittings and Fixtures
Service Fittings: These will be chromium plated with an acid and solvent resistant clear epoxy coat finish specifically designed for laboratory use. All service fittings will be of tapered body design with four arm handles, except for ADA accessible fittings which will be operable with one hand and will not require tight grasping, pinching, or twisting of the wrist. The force required to activate accessible operable parts will be 5 pounds (22.2 N), maximum.

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

E2010 Laboratory Casework and Other Furnishings
Wood Casework: Wood casework in flush overlay design will comply with all requirements of AWI Section 400 Custom Grade architectural cabinets. Lumber will be plain sawn maple; veneer will be plain sliced maple.

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

Corrosive Storage Cabinets: Cabinets will be vented with corrosion resistant liner designed and labeled specifically for the storage of acids and other corrosive substances.

Flammable Liquid/Solvent Storage Cabinets: Cabinets will be metal designed and labeled specifically for the storage of flammable liquids and other volatile substances.

Laboratory Work Surfaces: These will be modified epoxy resin, 1" thick and chemically resistant.
Stainless Steel Work Surfaces: These will be 16 gauge (1.6 mm thick), type 304, #4 finish with heavy mastic coating underside and perimeter timber fixing frame.

Adjustable Reagent Shelves: Reagent shelving will 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 will have 1-1/2" high safety edging.

Adjustable Wall Shelves: Wall shelving will 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 will have 1-1/2" high safety edging.

Heavy-Duty Shelves: Heavy-duty shelving will 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 will have 1-1/2" high safety edging.

Stainless Steel Shelves: Super Erecta stainless steel shelf systems will be provided, post supported, floor mounted or wall mounted.
Open Industrial Metal Shelves: Open shelving units will 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 will be fabricated with Unistrut, Powerstrut or equal.

Overhead Service Carriers: These will 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.

Pipe Drop Enclosures: These will be an 18 gauge galvanized steel sheet enclosure with removable cover panels and epoxy paint finish.

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

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: Site preparation will consist of demolishing the existing Robert Reid Lab School, and paving and landscaping areas within the area of proposed construction. The topsoil and vegetative material will be removed, screening and saving it 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 into a stormwater detention system described under G30. 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.

G20 Site Improvements
Site Development: The building will be accessed by three new walkways from Seventh Street,

and a main entrance plaza off the campus Art Walk to the northwest of the building. An enhanced walkway and new site stair between Science I and the existing Science Building will be constructed. A shared service drive will be constructed, providing delivery access to Science I with a planned connection to the adjacent Martin/Williamson Hall.

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 existing parking lot to the southwest, the campus sidewalk system on the northwest, and by the new service drive to the northeast. 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. Drains in the below-grade mechanical space 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. There is also a sewer line between the Robert Reid Lab School and Martin/Williamson Hall that serves these two buildings that will be protected during construction and is a possible alternative to the line on the northwest side of the building.

Stormwater Treatment and Disposal: The University's stormwater system drains to the City of Cheney's street storm system, and Science I will to conform to the City's development manual which specifies stormwater design standards. [Note: As of this report, the City intends to adopt 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 drive 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 proposed 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 will 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 partial mechanical basement along the north side of the building, to route campus steam, electrical and telecommunications utilities to Science I.

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.

See the Appendix for the complete construction cost estimate.

5.3 CONSTRUCTION COST

A detailed construction cost estimate for a new Science I 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, exclusive of the geothermal wells, is summarized as:

Facility Construction:

A10	Foundations	$1,209,142
A20	Basement Construction	$356,651
B10	Superstructure	$3,952,338
B20	Exterior Closure	$4,324,515
B30	Roofing	$599,023
C10	Interior Construction	$2,608,542
C20	Stairs	$269,192
C30	Interior Finishes	$2,733,154
D10	Conveying	$374,000
D20	Plumbing Systems	$2,290,218
D30	HVAC Systems	$7,757,927
D40	Fire Protection Systems	$423,114
D50	Electrical Systems	$4,960,288
E10	Equipment (built in)	$3,387,683
E20	Furnishings (built in)	$477,178
	Sub-Total Facility Construction	$39,121,963

Site Construction:

G10	Site Preparation	$610,515
G20	Site Improvements	$522,200
G30	Site Civil / Mechanical Utilities	$198,506
G40	Site Electrical Utilities	$121,000
	Sub-Total Site Work	$1,452,222
	General Requirements	$3,399,000
	Contractor's Overhead & Profit	$2,028,709
	Unescalated Maximum Allowable Construction Cost (MACC)	$42,602,895
	Escalated Maximum Allowable Construction Cost (MACC)	**$47,697,957**

5.4 REASONABLENESS OF COST

OFM provides guidelines for facility types that are incorporated in Science I. The following table apportions expected costs for each facility type in proportion to their percentage of the total program:

	A	B	C	D	E
Facility Type	Construction Cost/GSF Best Fit (7/1/2008)*	Cost Index to Mid-Construction (2/14/2018)**	Expected Construction Cost/GSF	Percentage of Total Program	Weighted Value
			A x B		C x D
Classrooms	$297	1.365	$405	13.3%	$54
Science Labs (Teaching)	$309	1.365	$422	43.9%	$185
Research Facilities	$440	1.365	$601	21.9%	$132
Administrative Buildings	$218	1.365	$298	20.9%	$62
Total				100.0%	**$433**

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

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

The detailed construction cost estimate for Science I predicts the cost to be $47,697,957 escalated to mid-point of construction (2/14/2018), which equates to a unit cost of **$465 per square foot.** This represents a deviation of 7.4% from OFM's expected construction cost of **$433 per square foot**. This level of deviation is expected in a building that includes significant chemistry laboratories.

Science I is slightly higher than OFM's expected construction cost for a generic lab building because Chemistry requires an abundance of fume hoods in the teaching and research labs in order to provide the appropriate level of safety to the lab users. There are 97 fume hoods proposed for Science I. Since each hood is connected to the building exhaust, the fume hoods also drive up the cost of the HVAC system.

5.5 PROJECT REQUEST

Science I funds are requested per biennium as follows:

Funding Phase	Biennium	Amount
Predesign	2009 - 2011	$400,000
Design/Build (all portions)	2015 - 2017	$71,721,500
Total		$72,121,500

5.6 FUNDING SOURCE

Science I will be a State funded project.

5.7 BENEFIT AND LIFE CYCLE COST ANALYSIS SUMMARY

Description of existing program and facilities

EWU's chemistry and physics functions are housed in the existing 148,149 gross square-foot Science Building, along with the biology and geology departments. The dean of the College of Science, Health & Engineering (CSHE) is presently located in a suite of offices in the Communications Building, which is not part of CSHE.

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 III: Construction of a new building to house chemistry and physics along with offices for the dean of CSHE is the preferred alternative. Satisfaction of the program requirements can readily be achieved through construction of a new building, Science I, on the campus in Cheney that will serve as a partial replacement for the existing Science Building.

The other alternatives explored were as follows:

- Alternative I: No Action – This is not a viable alternative because it does not serve the future needs.
- Alternative II: Renovation of Existing Science Building – The initial idea for addressing the deficiencies of the existing Science Building was a major renovation of the existing building. For comparison purpose, the Life Cycle Cost Analysis assumes that the 55,541 SF portion of the existing Science Building occupied by chemistry/biochemistry and physics would be renovated, that a new addition of 47,032 SF would be constructed to serve the expansion needs of the program, and that the remaining 92,608 SF of the existing Science Building would receive ADA upgrades.
- Alternative IV: Addition to Existing Science Building – This alternative is similar to Alternative III except that it involves constructing a new building addition immediately adjacent to the existing Science Building. In order to avoid the deficiencies of the existing Science Building, the program for this building would be virtually the same as Alternative III.

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

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

		Alternate III - Preferred New Building		Alternate II Addition + Renovation		Alternate IV Addition & Partial Renovation	
Project Life Cycle (Years)	50	102,573		195,181		117,573	
Discount Rate (%)	2.10%	102,573 new		47,032 new; 55,541 renov; 92,608 ADA		102,573 new; 10,000 renov	
		Est.	PW	Est.	PW	Est.	PW
Initial Cost		**42,602,894**	**42,602,894**	**46,004,130**	**46,004,130**	**44,751,099**	**44,751,099**
Construction Cost							
A) Shell		12,758,725	12,758,725	12,108,310	12,108,310	11,778,512	11,778,512
B) Interiors		8,166,444	8,166,444	5,637,685	5,637,685	5,484,130	5,484,130
C) Equipment & Vertical Transportation		3,949,767	3,949,767	4,359,050	4,359,050	4,240,321	4,240,321
D) Mechanical & Electrical		16,203,124	16,203,124	19,781,583	19,781,583	19,242,785	19,242,785
E) Site		1,524,833	1,524,833	4,117,501	4,117,501	4,005,351	4,005,351
TOTAL		42,602,894	42,602,894	46,004,130	46,004,130	44,751,099	44,751,099
Other Initial Costs							
A) Other Costs (EWU soft costs)			26,839,823		28,982,602		28,193,193
B) Surge costs			0		5,000,000		500,000
Total Initial Cost Impact (IC)			69,442,717		79,986,732		73,444,292
Initial Cost PW Savings					(10,544,015)		(4,001,575)
	Mark-up	1.2540		1.4500		1.4500	
Replacement / Salvage Costs	Year Factor						
A) Clean & seal exterior	5 0.9013					0	0
Clean & seal exterior	10 0.8123	142,836	116,032	314,276	255,302	173,212	140,708
Clean & seal exterior	20 0.6599	142,836	94,259	314,276	207,394	173,212	114,304
Clean & seal exterior	30 0.5361	142,836	76,571	314,276	168,476	173,212	92,855
Clean & seal exterior	40 0.4355	142,836	62,202	314,276	136,862	173,212	75,431
Clean & seal exterior	50 0.3538	142,836	50,530	314,276	111,179	173,212	61,276
B) Tuck point (50%)	5 0.9013					0	0
Tuck point (50%)	25 0.5948	99,124	58,957	218,100	129,721	120,205	71,495
Tuck point (50%)	50 0.3538	99,124	35,067	218,100	77,156	120,205	42,524
C) Reroof - Membrane	5 0.9013					0	0
Reroof - Membrane	15 0.7322	805,109	589,480	1,771,454	1,297,011	976,328	714,841
Reroof - Membrane	30 0.5361	805,109	431,601	1,771,454	949,637	976,328	523,387
Reroof - Membrane	45 0.3925	805,109	316,007	1,771,454	695,299	976,328	383,210
D) Floor finish	7.5 0.8557	0	0	0	0	0	0
Floor finish	15 0.7322	1,089,374	797,611	2,396,912	1,754,955	1,321,046	967,234
Floor finish	22.5 0.6265	0	0	0	0	0	0
Floor finish	30 0.5361	1,089,374	583,989	2,396,912	1,284,931	1,321,046	708,183
Floor finish	37.5 0.4587	0	0	0	0	0	0
Floor finish	42.5 0.4134	1,429,522	591,013	2,396,912	990,964	1,321,046	546,165
Floor finish	50 0.3538	0	0	0	0	0	0
E) Interior paint	10 0.8123	225,097	182,857	495,272	402,334	272,967	221,744
Interior paint	20 0.6599	225,097	148,544	495,272	326,836	272,967	180,134
Interior paint	30 0.5361	225,097	120,669	495,272	265,505	272,967	146,331
Interior paint	40 0.4355	225,097	98,026	495,272	215,682	272,967	118,872
Interior paint	50 0.3538	225,097	79,631	495,272	175,209	272,967	96,566
F) Controls	5 0.9013					0	0
Controls	12.5 0.7712	1,093,326	843,194	2,405,606	1,855,251	1,325,837	1,022,512
Controls	25 0.5948	1,093,326	650,288	2,405,606	1,430,807	1,325,837	788,582
Controls	37.5 0.4587	1,093,326	501,515	2,405,606	1,103,466	1,325,837	608,170
Controls	50 0.3538	1,093,326	386,779	2,405,606	851,015	1,325,837	469,033
G) AHU	5 0.9013					0	0
AHU	25 0.5948	1,701,810	1,012,203	3,744,433	2,227,114	2,063,725	1,227,462
AHU	50 0.3538	1,701,810	602,038	3,744,433	1,324,643	2,063,725	730,070
J) Lighting upgrades	5 0.9013					0	0
Lighting upgrades	12.5 0.7712	1,286,265	991,993	2,830,125	2,182,648	1,559,809	1,202,955
Lighting upgrades	25 0.5948	1,286,265	765,045	2,830,125	1,683,302	1,559,809	927,743
Lighting upgrades	37.5 0.4587	1,286,265	590,018	2,830,125	1,298,196	1,559,809	715,494
Lighting upgrades	50 0.3538	1,286,265	455,034	2,830,125	1,001,194	1,559,809	551,803
K) Fire alarm upgrades	5 0.9013					0	0
Fire alarm upgrades	12.5 0.7712	385,880	297,598	849,037	654,794	467,943	360,887
Fire alarm upgrades	25 0.5948	385,880	229,514	849,037	504,991	467,943	278,323
Fire alarm upgrades	37.5 0.4587	385,880	177,005	849,037	389,459	467,943	214,648
Fire alarm upgrades	50 0.3538	385,880	136,510	849,037	300,358	467,943	165,541
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	426,550	228,664	938,524	503,122	517,262	277,293
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	450,164	329,598	990,480	725,203	545,898	399,692
R) Hazmat abatement	5 0.9013	0	0	0	0	0	0
Sub-total		23,403,726	12,630,042	50,745,979	27,480,017	27,968,384	15,145,469
Other EWU Soft Costs		0	0	0	0	0	0
Total Replacement / Salvage PW Costs			12,630,042		27,480,017		15,145,469
Operational / Maintenance Cost	Escl. 00% PWA						
A) Maintenance & Operations - New	3.00% 63.0435	827,764	52,185,142	827,764	52,185,142	868,114	54,728,947
Total Operation / Maintenance (PW) Costs			52,185,142		52,185,142		54,728,947
Total Present Worth Life Cycle Costs			**134,257,901**		**159,651,891**		**143,318,708**
Life Cycle (PW) Savings					**(25,393,990)**		**(9,060,807)**

PW - Present Worth PWA - Present Worth of Annuity

Assumptions
1. Renovation and Renovation/Addition cost assumes a building of approximately same program, massing with similar quality levels.
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

Campus Master Plan History
In 2000 the University developed a master plan for the EWU campus. This master plan was updated in 2005 and 2010. The Science I project supports the goals and objectives of the 2010 master plan to:

- Support growth of the student population;
- Improve the technology in all classrooms;
- Enhance the collegiate identity of the campus, in part by improving its visual appeal; and
- Achieve sustainable objectives, with an emphasis on improving campus system efficiencies and on abiding by the spirit of the American College & University President's Climate Commitment to strive for Climate Neutrality.

A 2014 master plan update is currently in progress and a draft summary has been made available. The Science I project is an integral part of the 2014 master plan, with construction anticipated in the 2015-2017 biennium. Science I specifically supports the master plan's projected growth of the Cheney campus from its current level of 9,600 students to 11,500 students in the year 2023.

Master Plan Findings
Science I will contribute to the following master planning opportunities identified in the 2010 Master Plan:

Campus Attributes: The campus has a compact academic core area that is identified as a strong feature and benefit. The Science I preferred site occupying the present location of the Robert Reid Lab School is within the south academic core, and within the 5 minute walking radius established around the adjacent JFK Library.

Academic Capacity: The Master Plan states that the existing roster of academic buildings has the capacity to accommodate the expected increased enrollment of the near future. However, the existing Science Building contains the only laboratories on campus capable of accommodating science teaching and research, and they are currently operating beyond capacity with outdated infrastructure. For chemistry and physics, Science I will address the existing building's deficiencies.

Master Plan Improvement Projects
Science I will support the following improvement projects identified in the 2010 Master Plan:

Create Art Walk: The primary entrance to Science I will be located fronting on the pedestrian walkway identified as an Art Walk, which runs from the center of campus to the Arts/ Communications Complex. The new building has the opportunity to engage and enhance this amenity as it develops.

Create Science Commons: The grass lawn that exists to the west of the proposed Science I site, to the east of the Computer Engineering Building and down the hill from the Science Building is the Science Commons, will be a common campus space that is shared by the disciplines within the College of Health, Science and Engineering.

Reference figure 6.a on the following page.

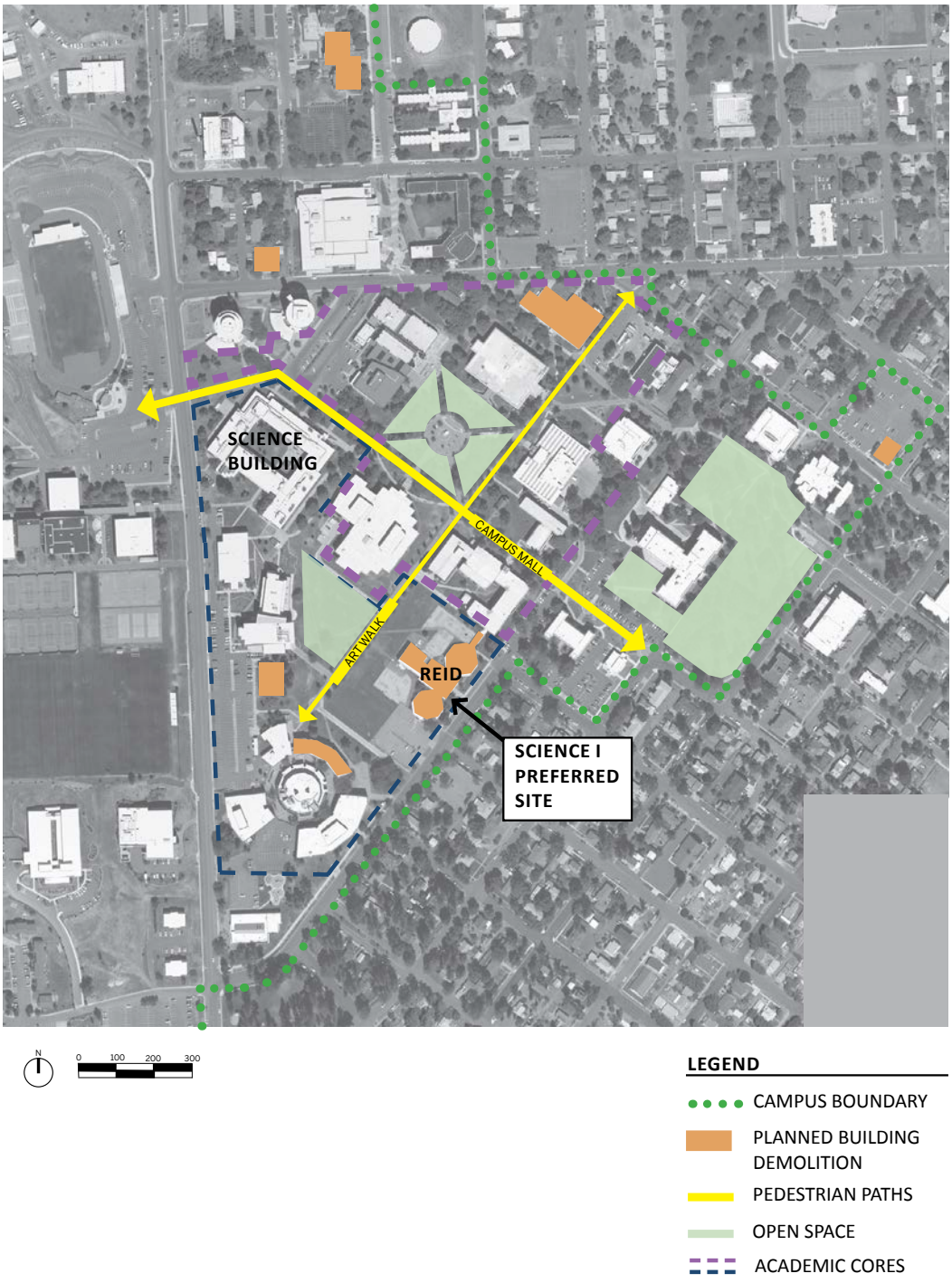


Figure 6.a Campus Master Plan Features

EWU's Ten Year Capital Plan
Science I is identified in the long-range physical development plan, in support of the University's mission and strategic plan.

Proposed Science I: As part of an envisioned University Science Center, Science I to house the Chemistry/Biochemistry and Physics departments is identified in EWU's Ten Year Capital Plan for long-range physical development. Its construction 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.

Planned Science II: A future Science II to house the Biology department is also noted in the Ten Year Plan. It is envisioned to complete the contributions of Science I in a companion project in a proposed location immediately adjacent and linked to Science I. Once completed, these two new science buildings will front on the emerging Science Commons.

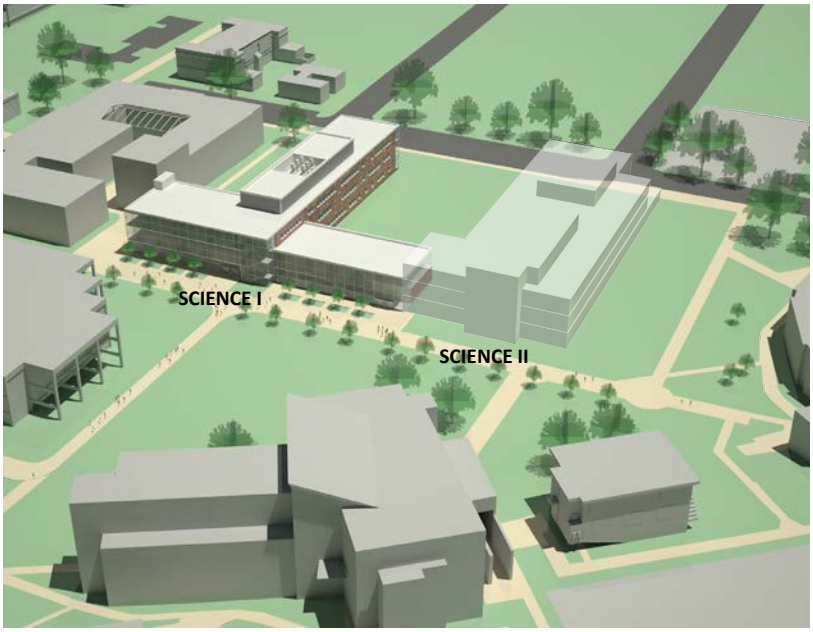


Figure 6.b Science I + Planned Science II

Science I Contributions

Science I will not require any changes to be adopted in the Campus Master Plan. This building 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 I will adhere to all relevant state requirements, including:

- Leadership in Energy and Environmental Design (LEED);
- 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

7.0 Facility Operations and Maintenance Requirements

7.0 Facility Operations and Maintenance Requirements

7.1 ASSUMPTIONS

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

7.2 OPERATIONS AND MAINTENANCE COSTS

Campus operations and maintenance costs for FY14 are shown in Table 1. Projected operations and maintenance costs for FY20, the first full year of occupancy, and FY25 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	

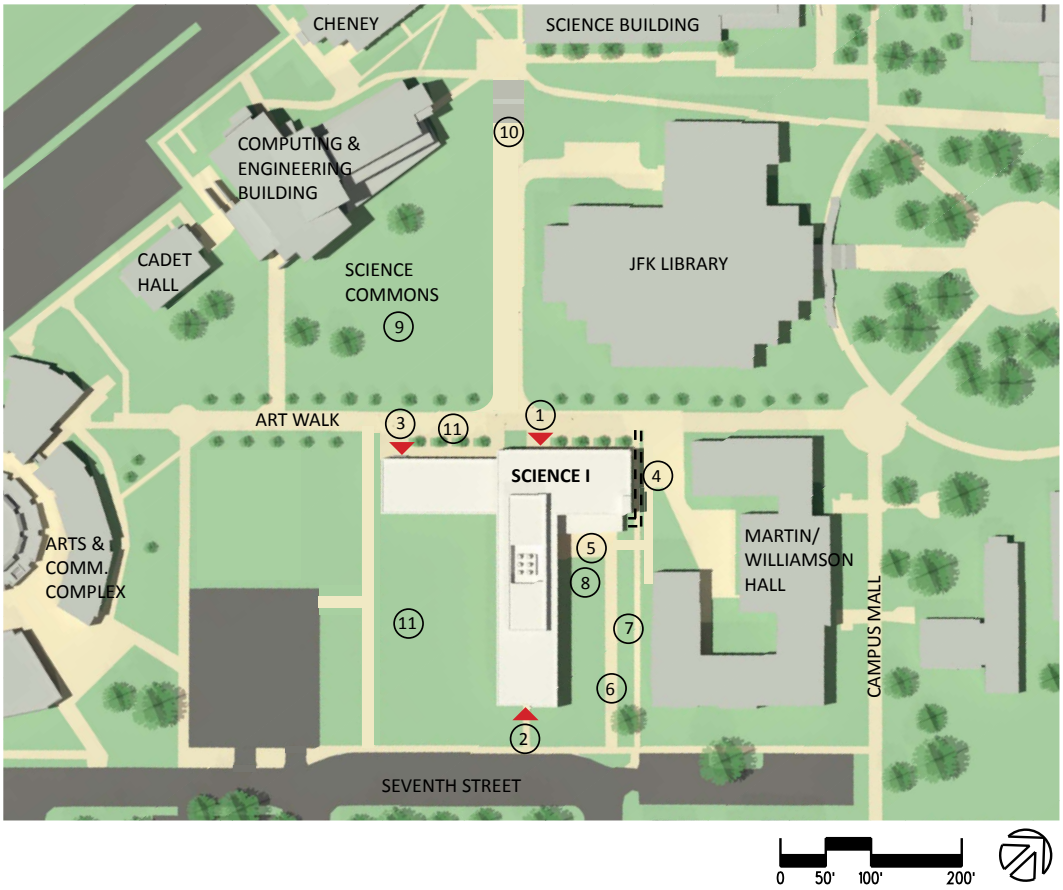
Table 2 - Operations and Maintenance - Projected Science I

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	102,573	$1,047,270	$1,274,777

7.3 STAFFING PLAN

The Science I 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) South East Entrance **-** This entry provides access from Seventh Street.

3) Planetarium Entrance - This entry serves the public for planetarium events that are open to the community and K-12 school children.

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 main mechanical rooms, this loading area provides delivery and service access.

6) Service Drive - This drive from Seventh Street is planned to connect to Science I and Martin/Williamson Hall.

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

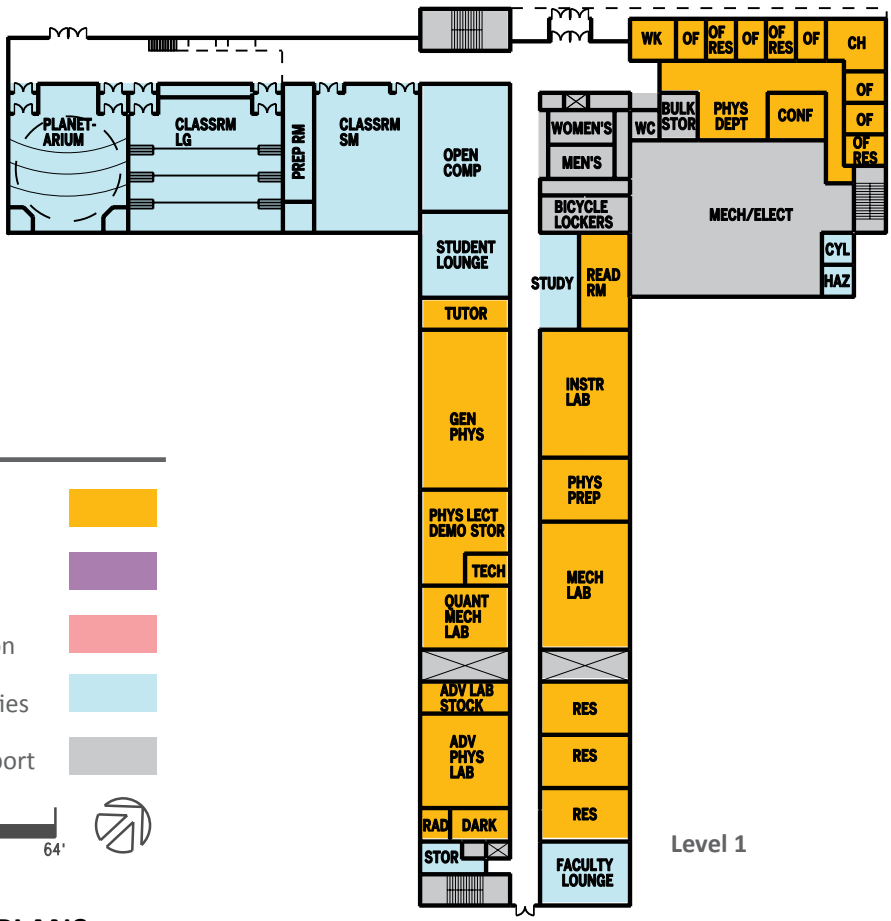
8) Electrical Equipment - A screen enclosure will house an emergency generator and transformers.

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) Walkway - This new walkway provides a direct link between Science I and the existing Science Building and will include a site stair.

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

SITE CONCEPT PLAN

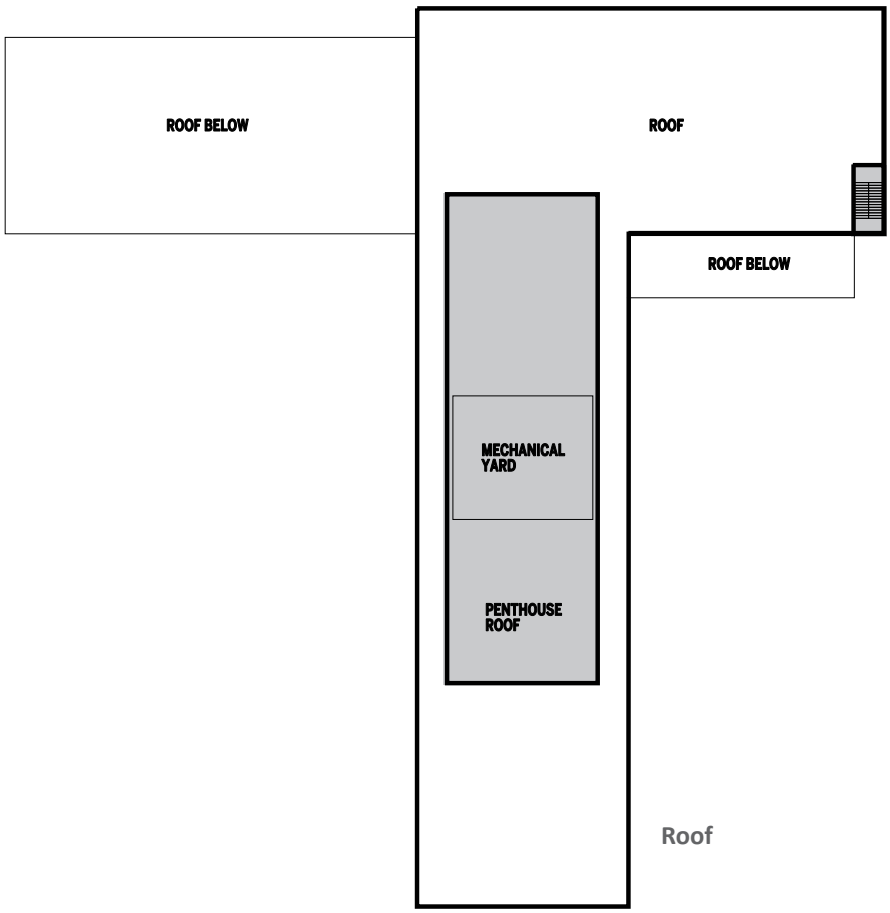


Legend:

- Physics
- Chemistry/ Biochemistry
- Administration
- Shared Facilities
- Building Support

0 16' 32' 64'

BUILDING PLANS

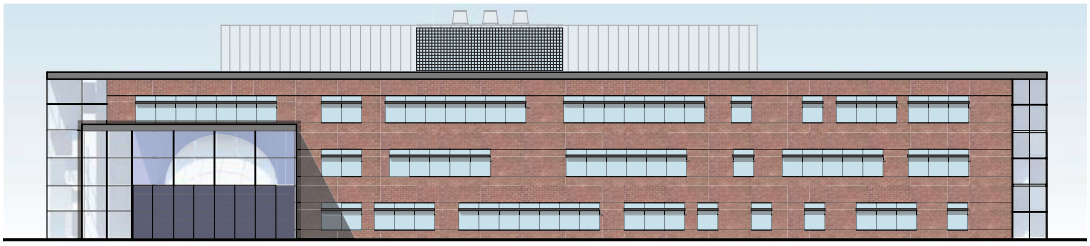


Roof

Level 3

BUILDING PLANS

Northwest Elevation



Southwest Elevation

Southeast Elevation

Northeast Elevation

CONCEPTUAL ELEVATIONS

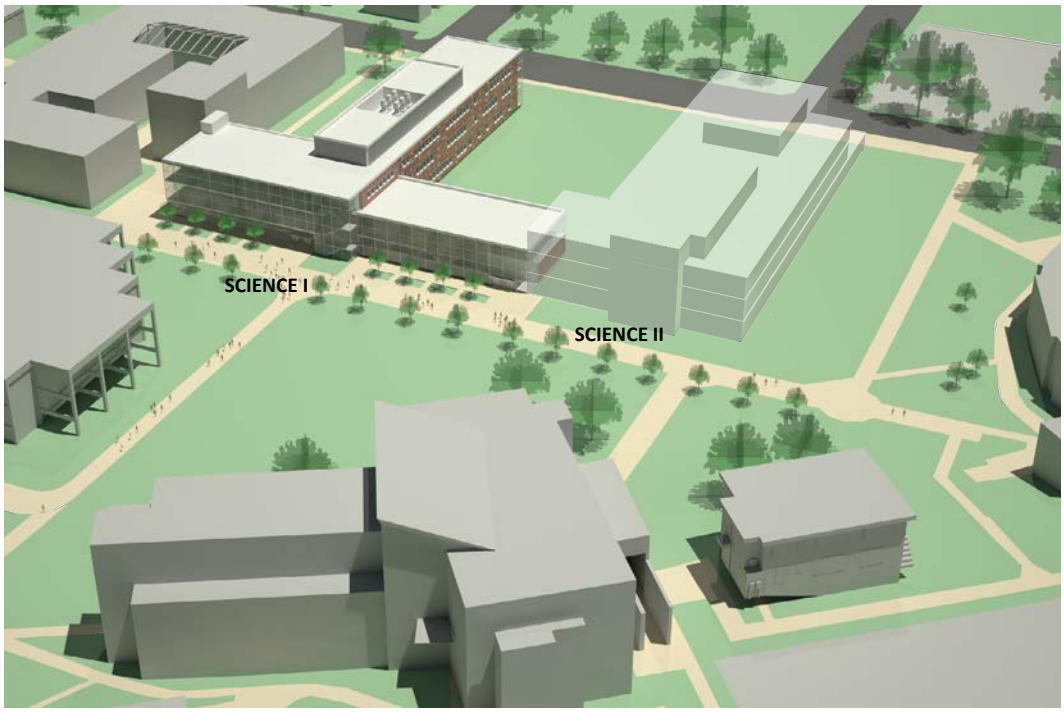
0 12' 24' 48'

Science I view from the Northwest.

Science I view from the Southeast.

SITE MASSING

Science I view from the North.



Science I + Planned Science II

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

The predesign checklist should be completed by the agency and submitted to the Office of Financial Management with the predesign.

Are the following in the predesign? If not, the item should be noted "not applicable."

☑ 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 and energy utilization
- 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
- Form C-3, Benefit and Life-Cycle Cost Analysis Summary
- 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
- Additional information as needed

Ewu Science I Predesign Study
List of Participants

Eastern Washington University

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

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

EWU Chemistry/Biochemistry Department
Dr. Robin McRae, Professor and Chair
Dr. Fred Joslin, Lab Manager
Dr. Wes Steiner, Assistant Professor
Dr. Jamie Manson, Assistant Professor
Dr. Nicholas Burgis, Assistant Professor
Dr. Peter Bilous, Associate Professor
Dr. Travis Denton, Assistant Professor
Dr. Yao Houndonougbo, Assistant Professor
Dr. Jeff Rahn, Professor
Toby Woods, Student
Tashie Dial, Student

EWU Physics Department
Dr. Brian Houser, Professor and Chair
Dr. Robert Ruotsalainen, Professor
Dr. Partha Sircar, Professor
Dr. Achin Sen, Professor
Debbie Moradi, Administrative Staff

EWU Facilities & Planning
Shawn King, Assoc Vice Pres, Facilities & Planning
Troy Bester, Senior Project Manager
Joe Swinyard, Director of Facilities Maintenance
Jim Butler, Plumbing Shop Supervisor
Craig Opsal, Electrical Shop Supervisor
Karen Wichman, Director of Facilities Services

Design Team

LMN Architects (Architect)
Dean Clark
Anne Herrick
Mark Reddington
Sam Miller
Stephen Van Dyck
Wendy Pautz
Alison Greulich

Research Facilities Design (Laboratory Planner)
Richard Heinz

Magnusson Klemencic Assoc. (Structural Engineer)
Shelley Clark
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)
Sharron Kennedy

Sustainable Design Charette Summary

LEED® Certification: Under RCW 39.35D Science I will be designed to achieve a Leadership in Energy and Environmental Design (LEED®) certification at the silver level or higher. During the predesign study an eco-charrette was conducted that was intended 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.

16	9	1	**Sustainable Sites**	Possible Points: 26
Yes	?	No		
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

4	6		**Water Efficiency**	Possible Points: 10
Yes	?	No		
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

12	15	8	**Energy & Atmosphere**	Possible Points: 35
Yes	?	No		
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

5	2	7	**Materials & Resources**	Possible Points: 14
Yes	?	No		
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

Indoor Environmental Quality — Possible Points: 15

12	3		
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

Innovation & Design Process — Possible Points: 6

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

Regional Priority Credits — Possible Points: 4

6		
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.

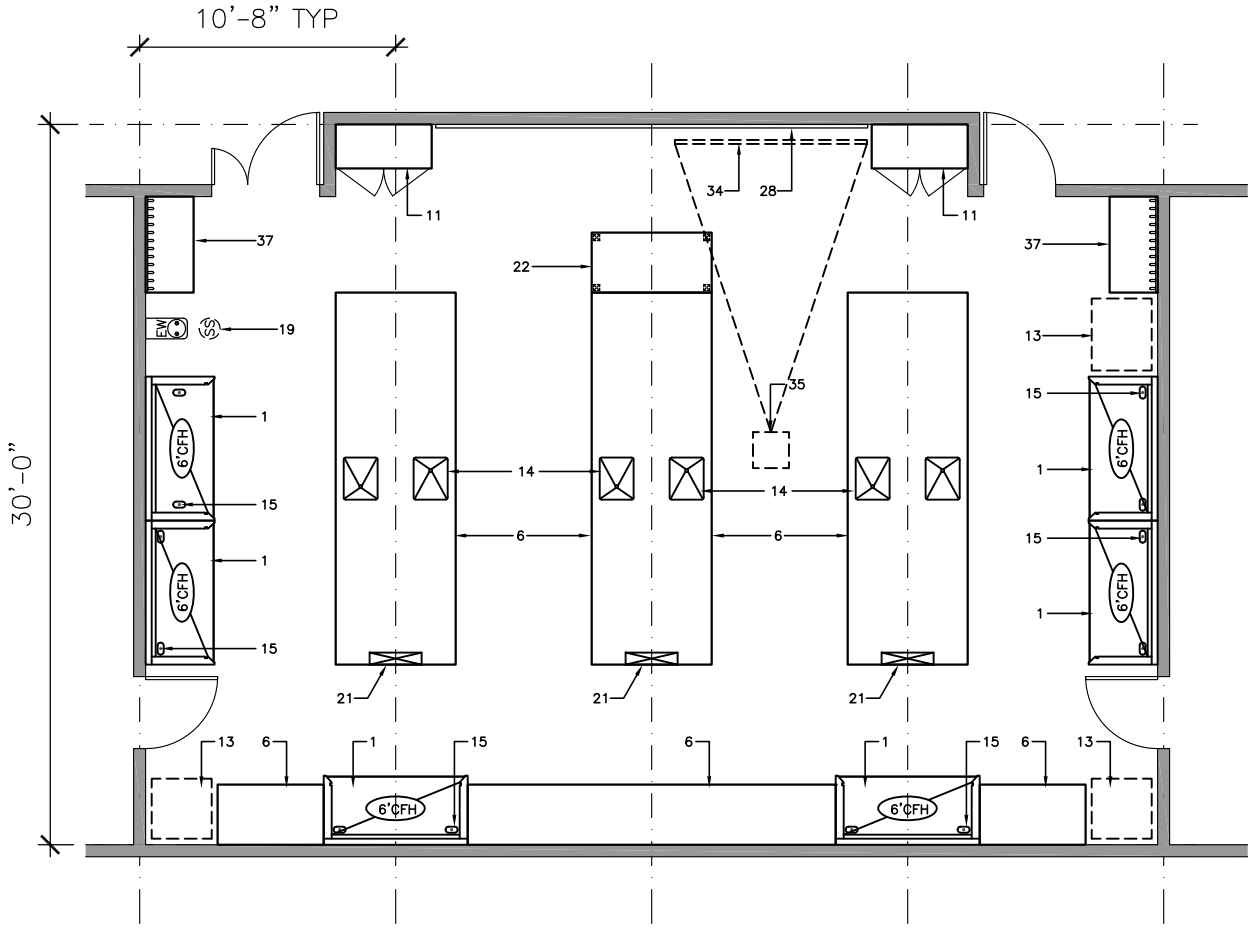
Non-Lab Areas: For non-lab areas, central variable volume style air handling forms the basis of cost the cost estimate.

- 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: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: GENERAL CHEMISTRY

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'

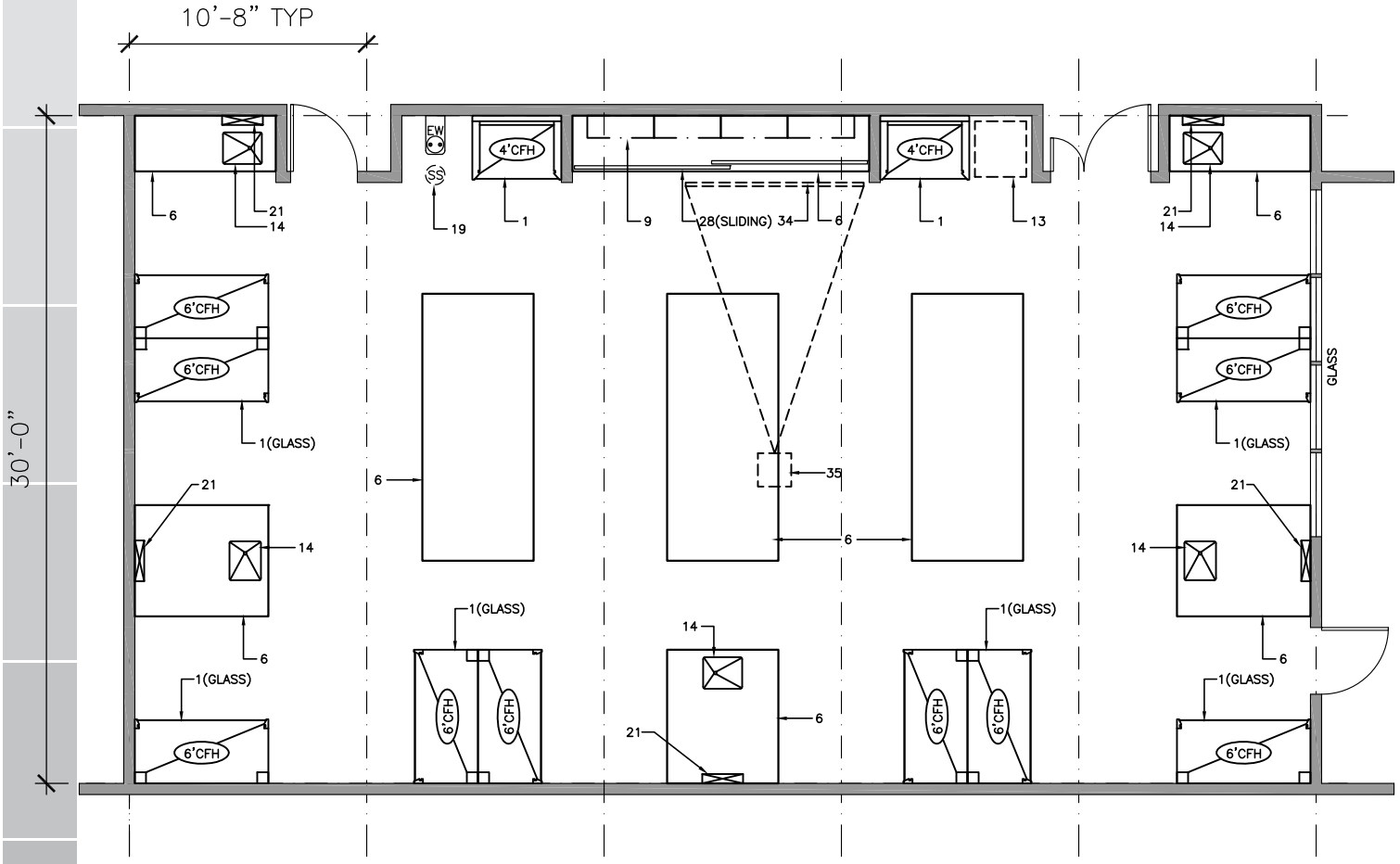
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: ORGANIC CHEMISTRY

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.



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FURNISHINGS

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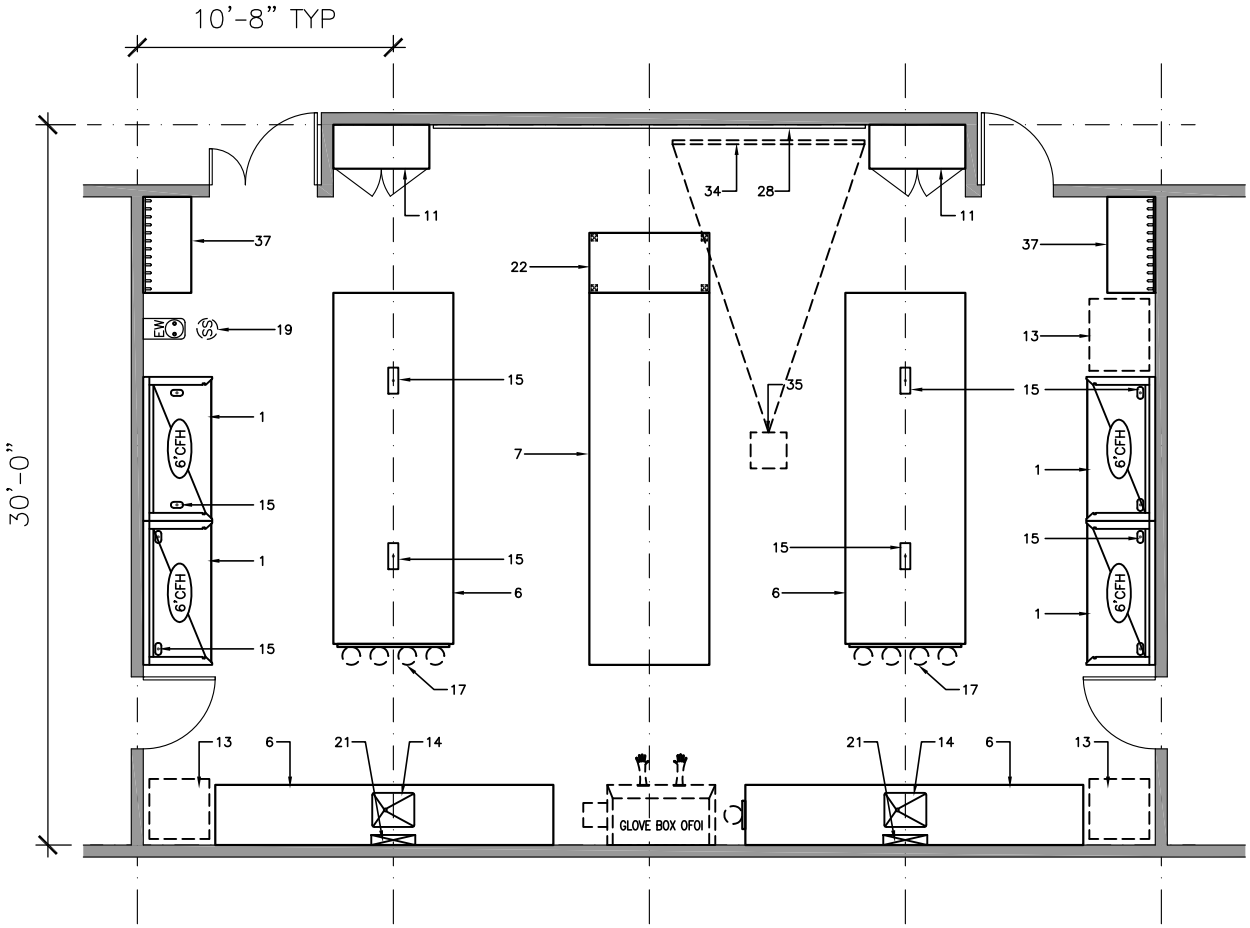
36. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: INORGANIC/PHYSICAL CHEMISTRY

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.



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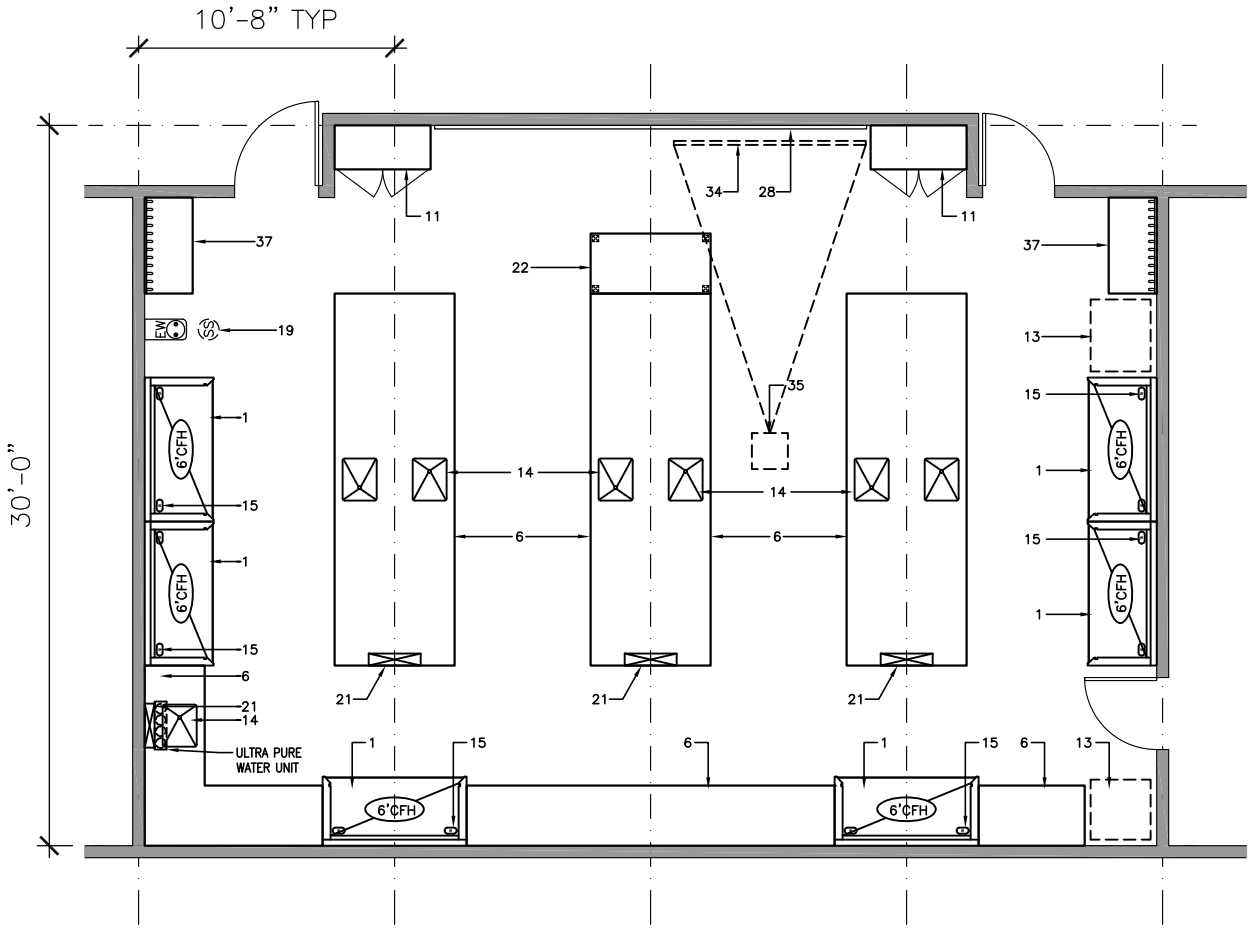
DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: ANALYTICAL CHEMISTRY

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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33. Procedure Light
34. A/V Screen
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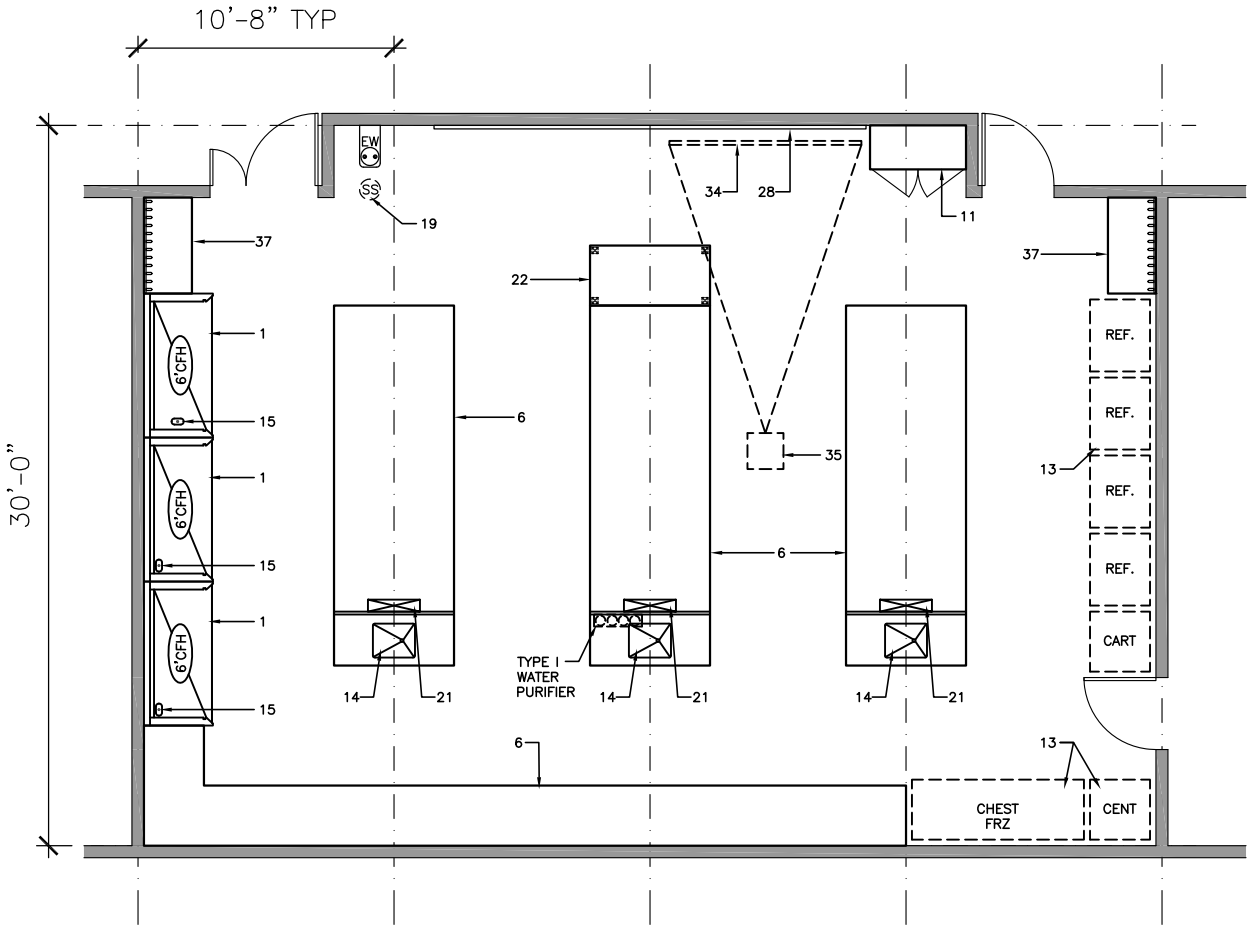
36. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: BIOCHEMISTRY/FORENSICS

SPACE ID NO.: 1.05
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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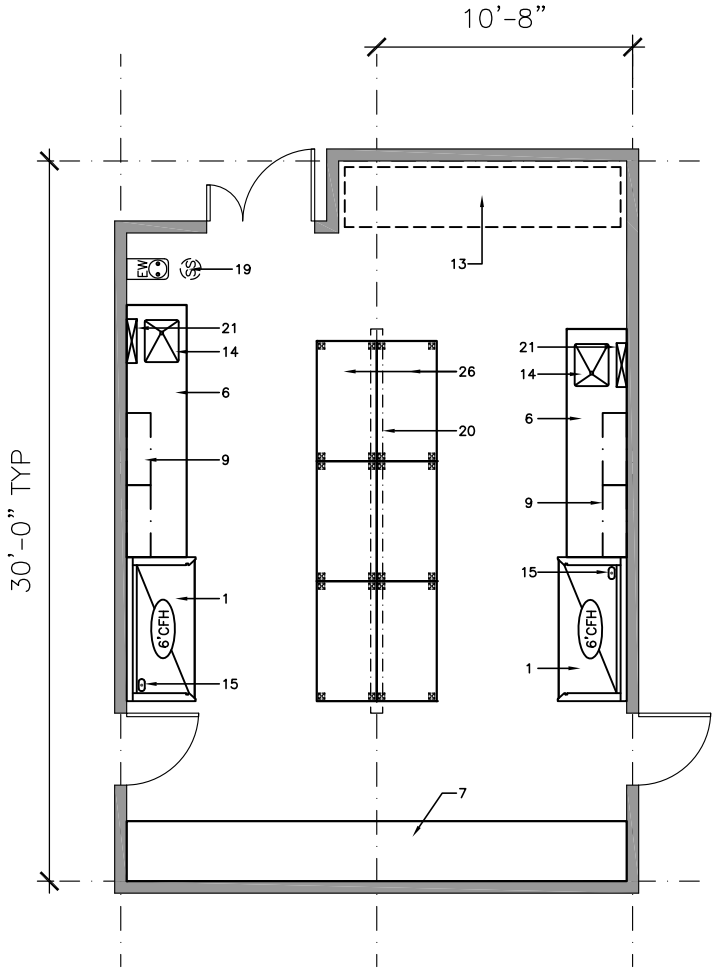
17. Cylinder Rack
18. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. Autoclave
26. Moveable Laboratory Table
27. Wire Shelving Units
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Desk
32. Balance Table
33. Procedure Light
34. A/V Screen
35. Multi-Media Projector (Ceiling Mount)
36. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: FACULTY RESEARCH - TYPE A (PHYSICAL/ANALYTICAL)

SPACE ID NO.: 1.11
AREA NSF: 640

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'

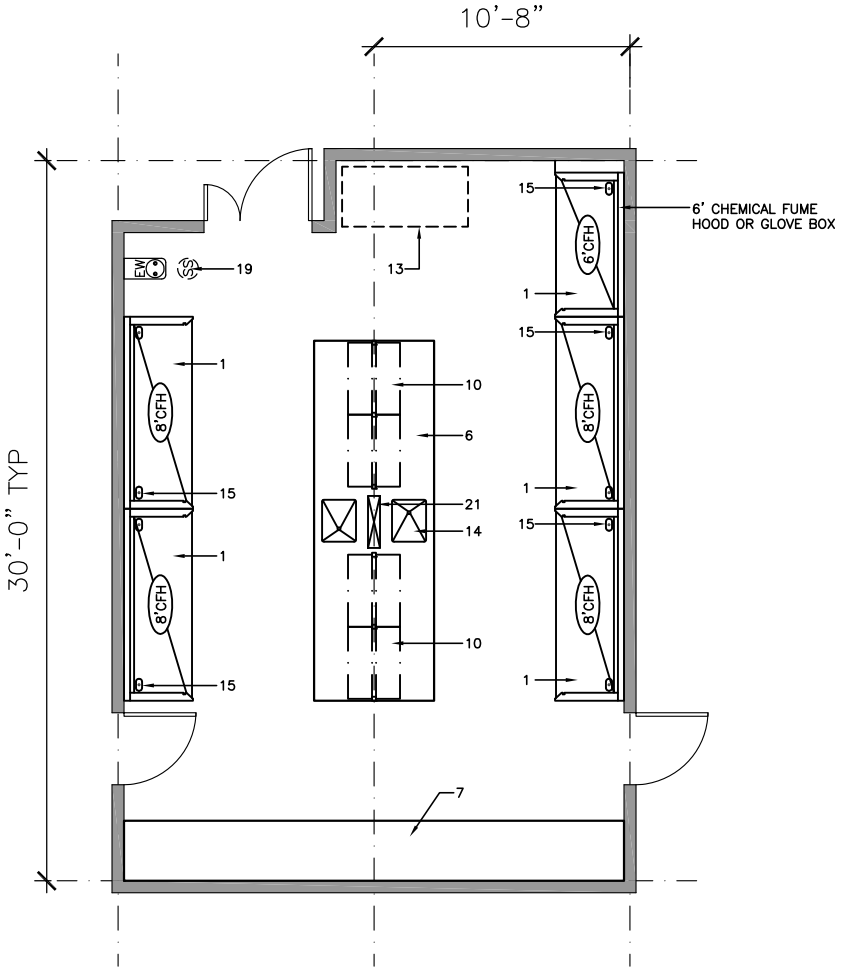
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: FACULTY RESEARCH - TYPE B (SYNTHETIC)

SPACE ID NO.: 1.12
AREA NSF: 640

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'

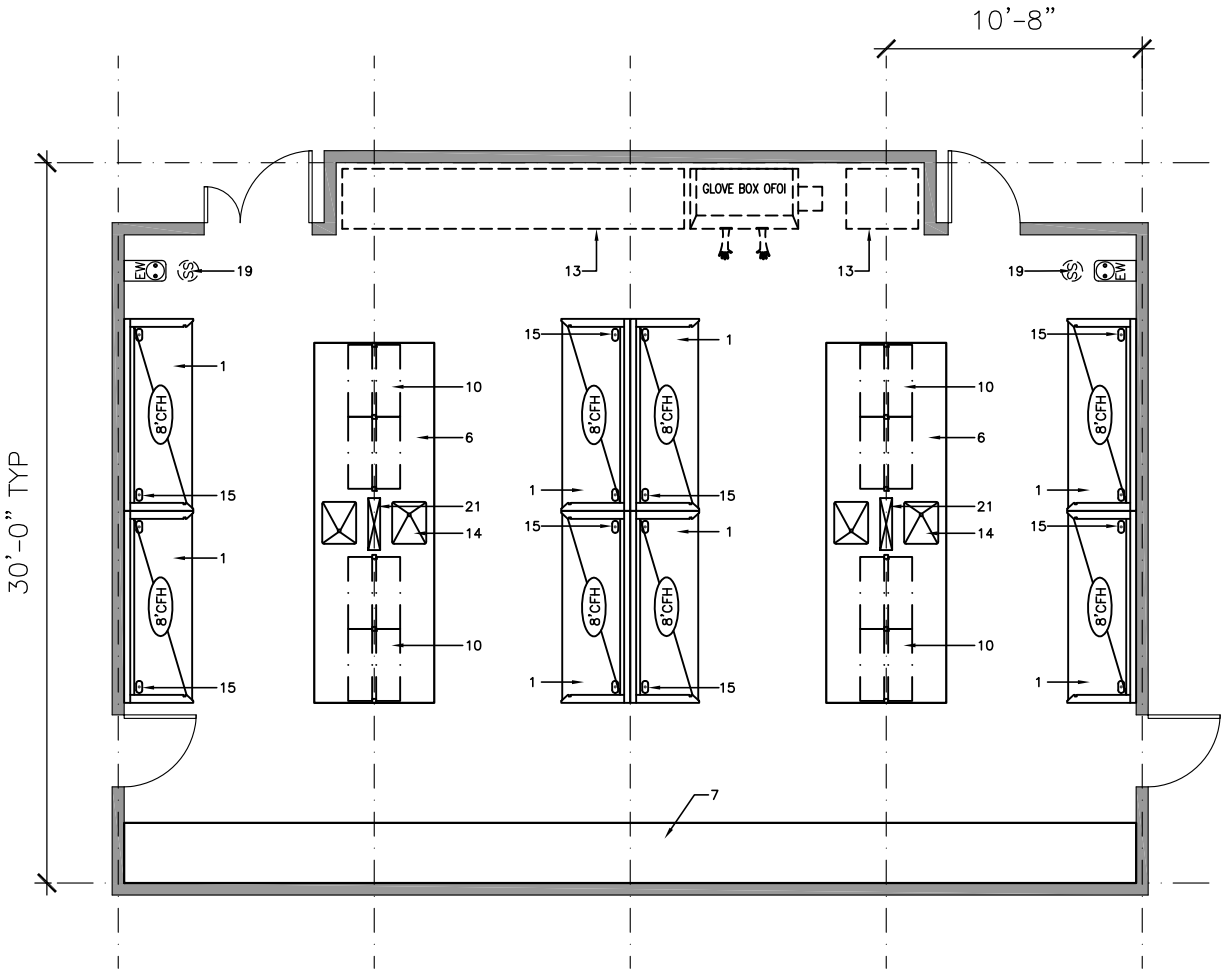
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: FACULTY RESEARCH - TYPE B (SYNTHETIC)

SPACE ID NO.: 1.13
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'

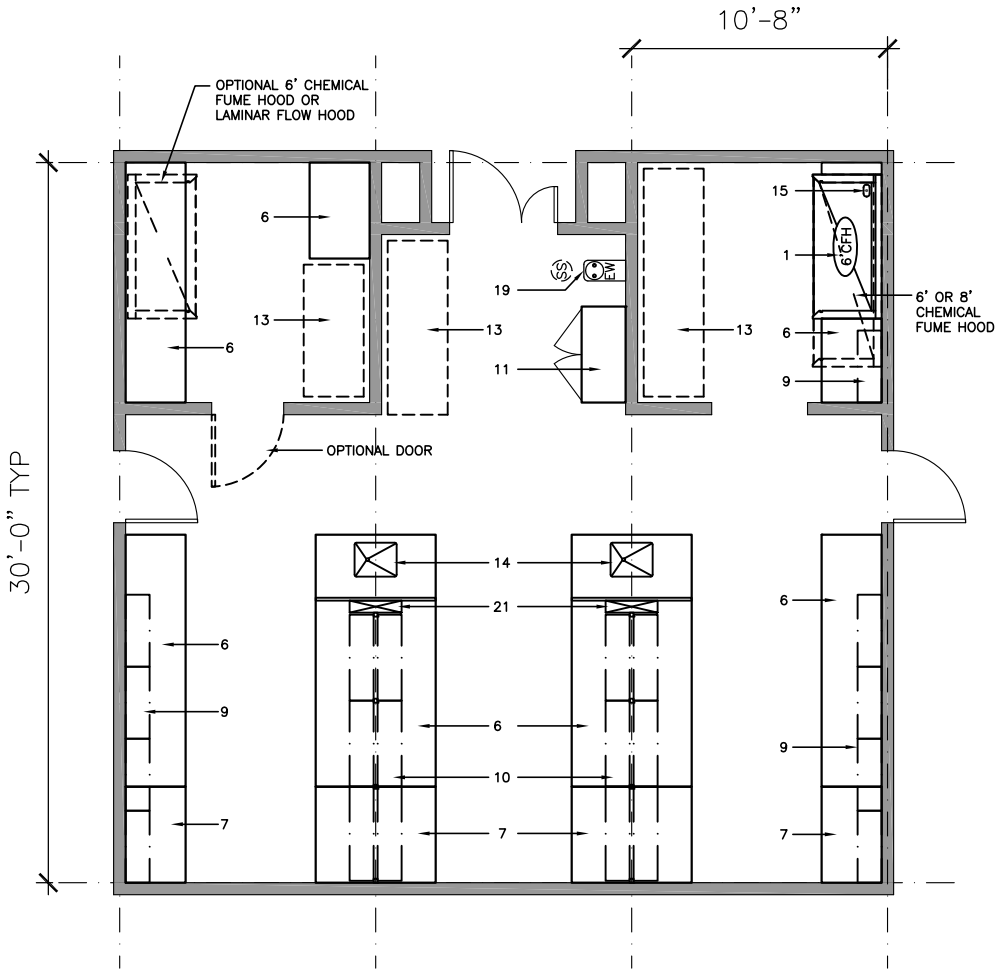
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: FACULTY RESEARCH - TYPE C (BIOCHEMISTRY/FORENSICS)

SPACE ID NO.: 1.14
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'

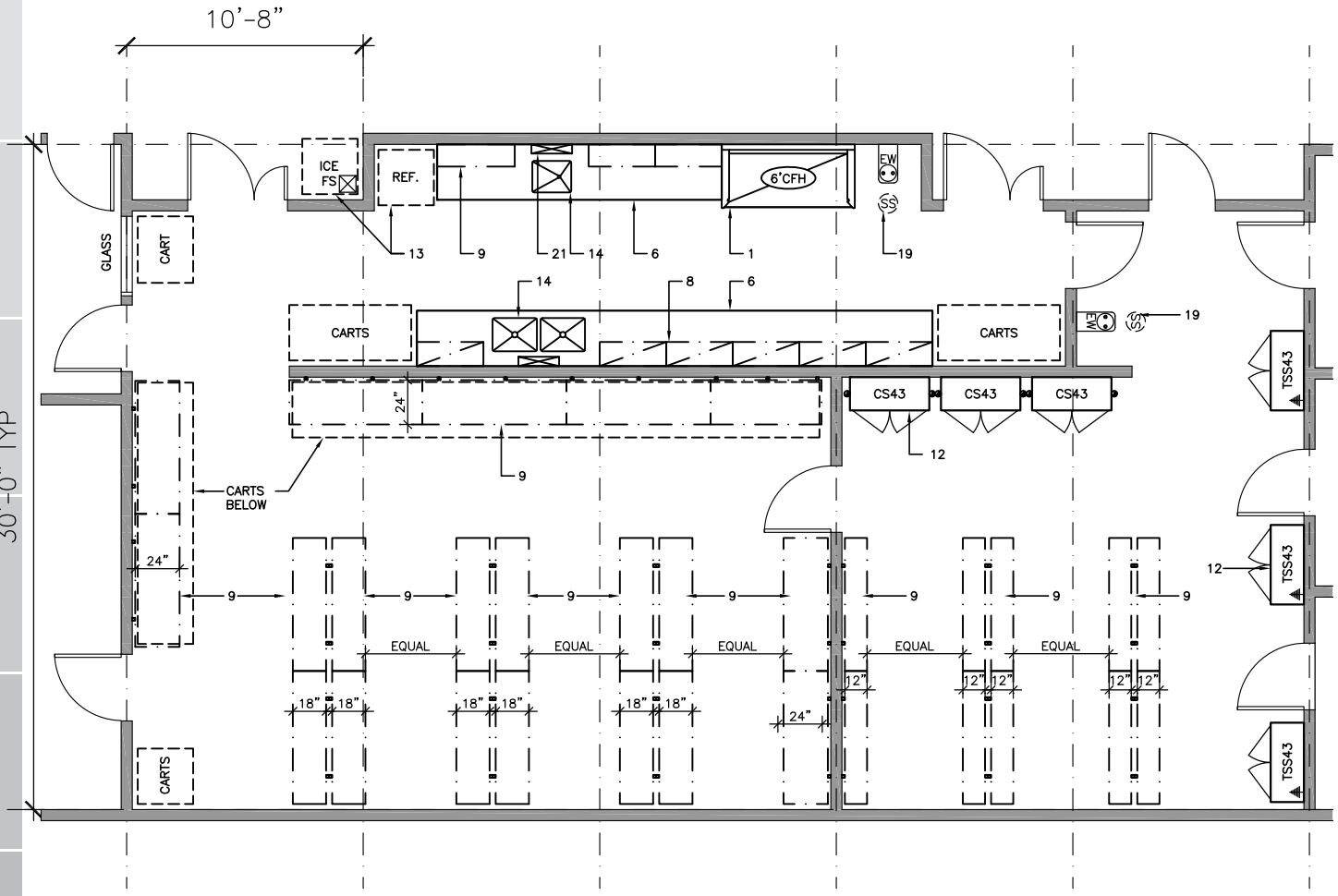
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: STOCKROOM SUITE

SPACE ID NO.: 1.21-1.23
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.



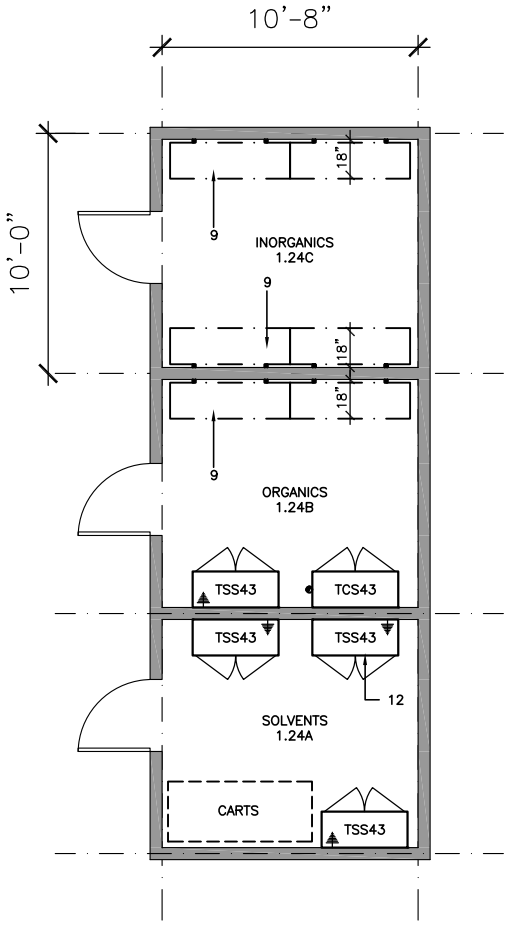
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: HAZARDOUS CHEMICAL STORAGE
SOLVENTS, ORGANICS, INORGANICS

SPACE ID NO.: 1.24A,B,C
AREA NSF: 107 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'

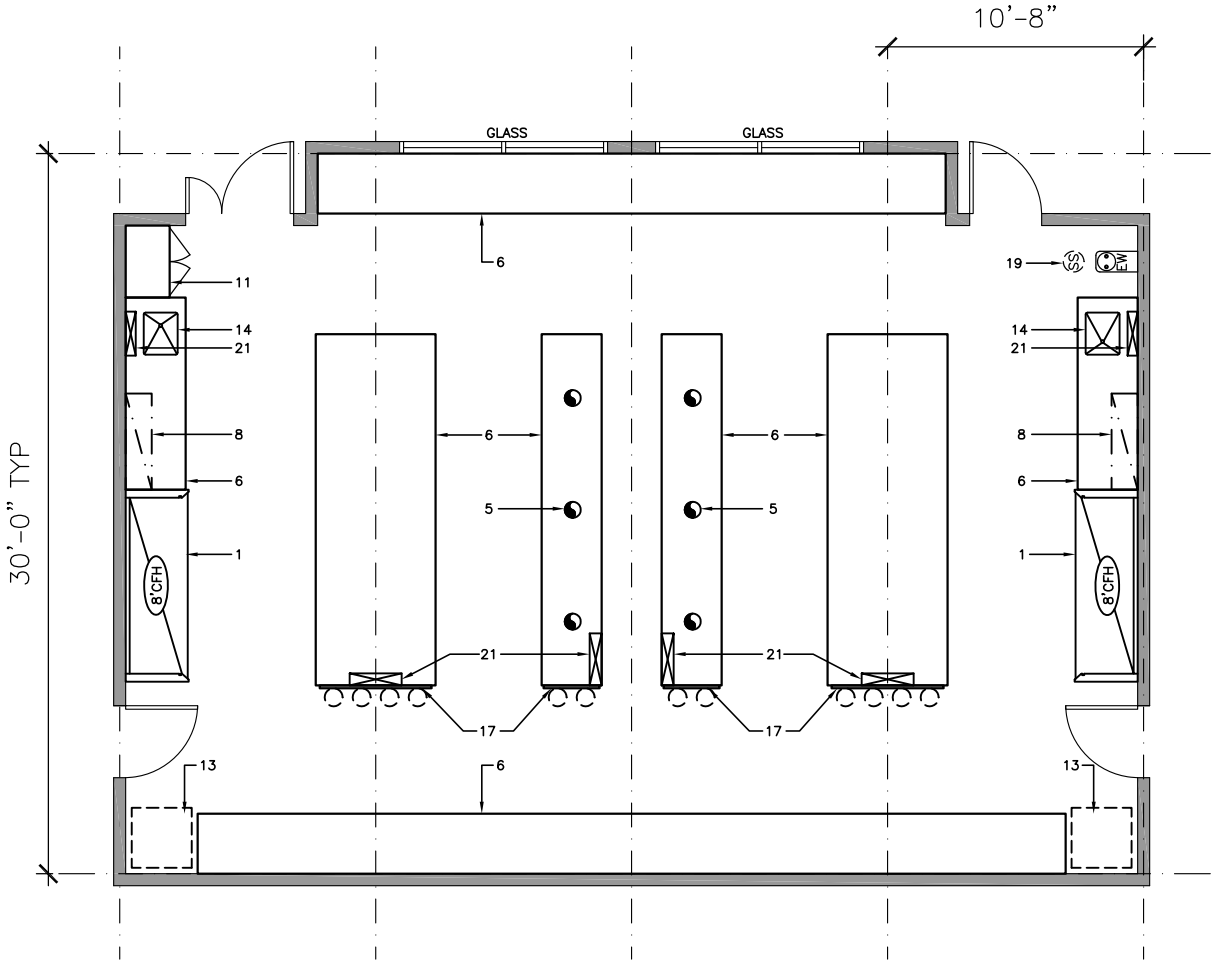
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: INSTRUMENT ROOM

SPACE ID NO.: 1.25
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.



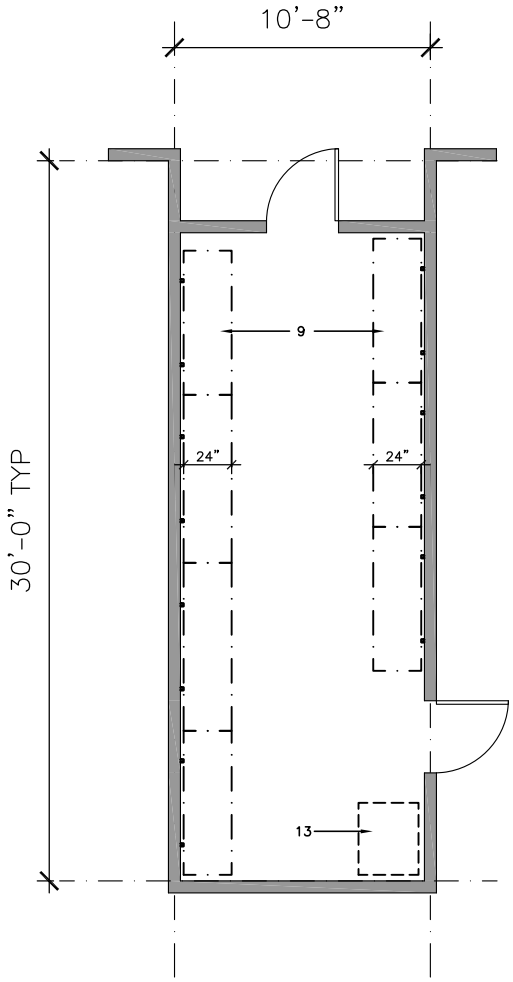
FURNISHINGS

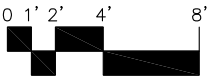
1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: INSTRUMENT STORAGE

SPACE ID NO.: 1.26
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.





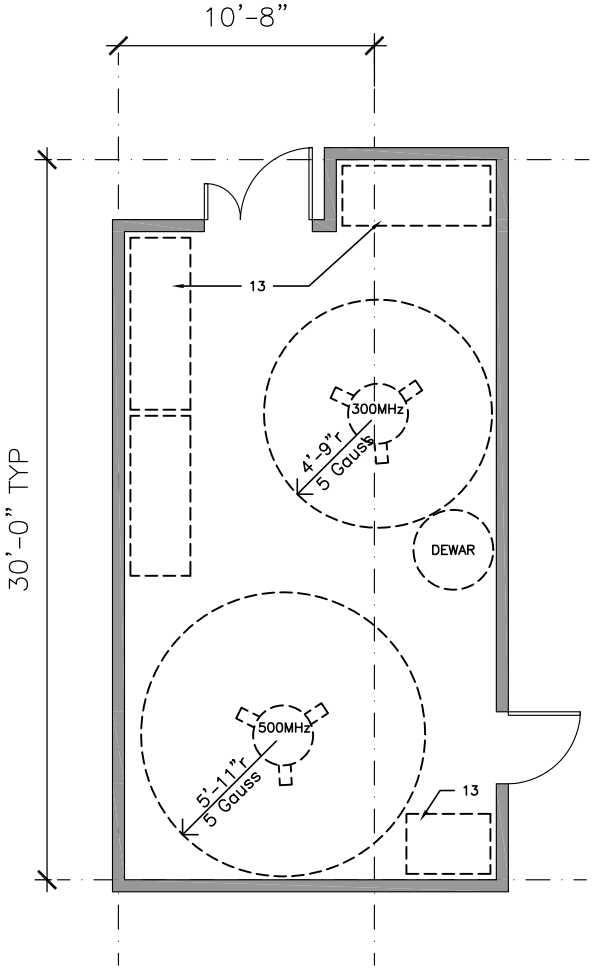
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: NMR ROOM

SPACE ID NO.: 1.27
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'

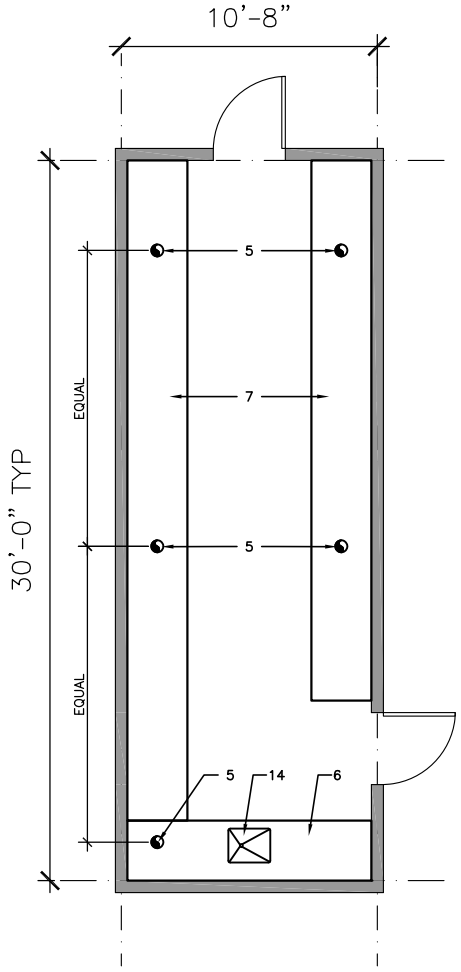
FURNISHINGS

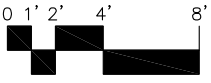
1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: MICROSCOPY LAB

SPACE ID NO.: 1.28
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.





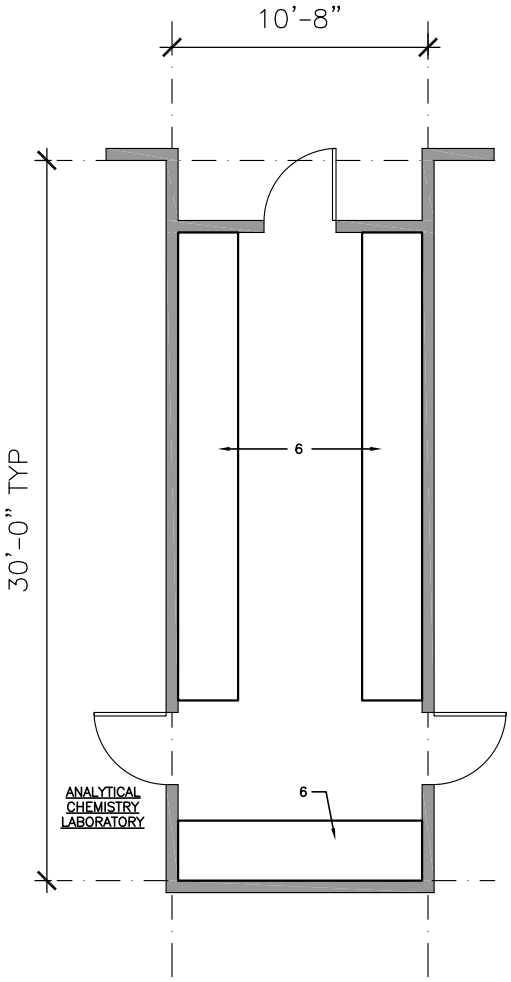
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: BALANCE ROOM

SPACE ID NO.: 1.29
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'

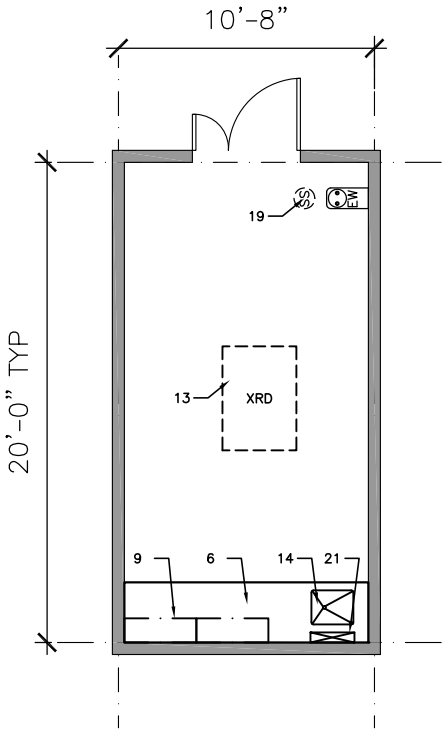
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radiolsotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: XRD ROOM

SPACE ID NO.: 1.30
AREA NSF: 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'

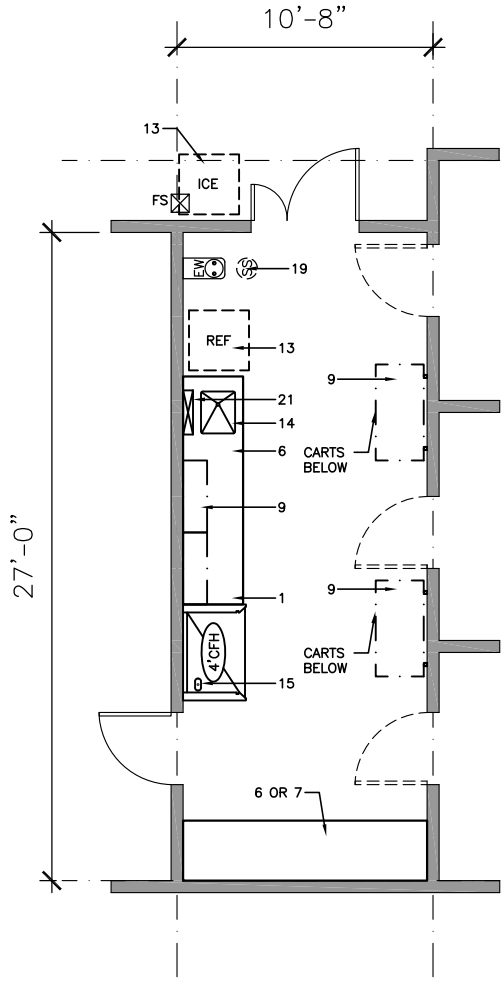
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radiolsotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY/BIOCHEMISTRY
SPACE NAME: UPPER DIVISION / RESEARCH PREP ROOM

SPACE ID NO.: 1.31
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'

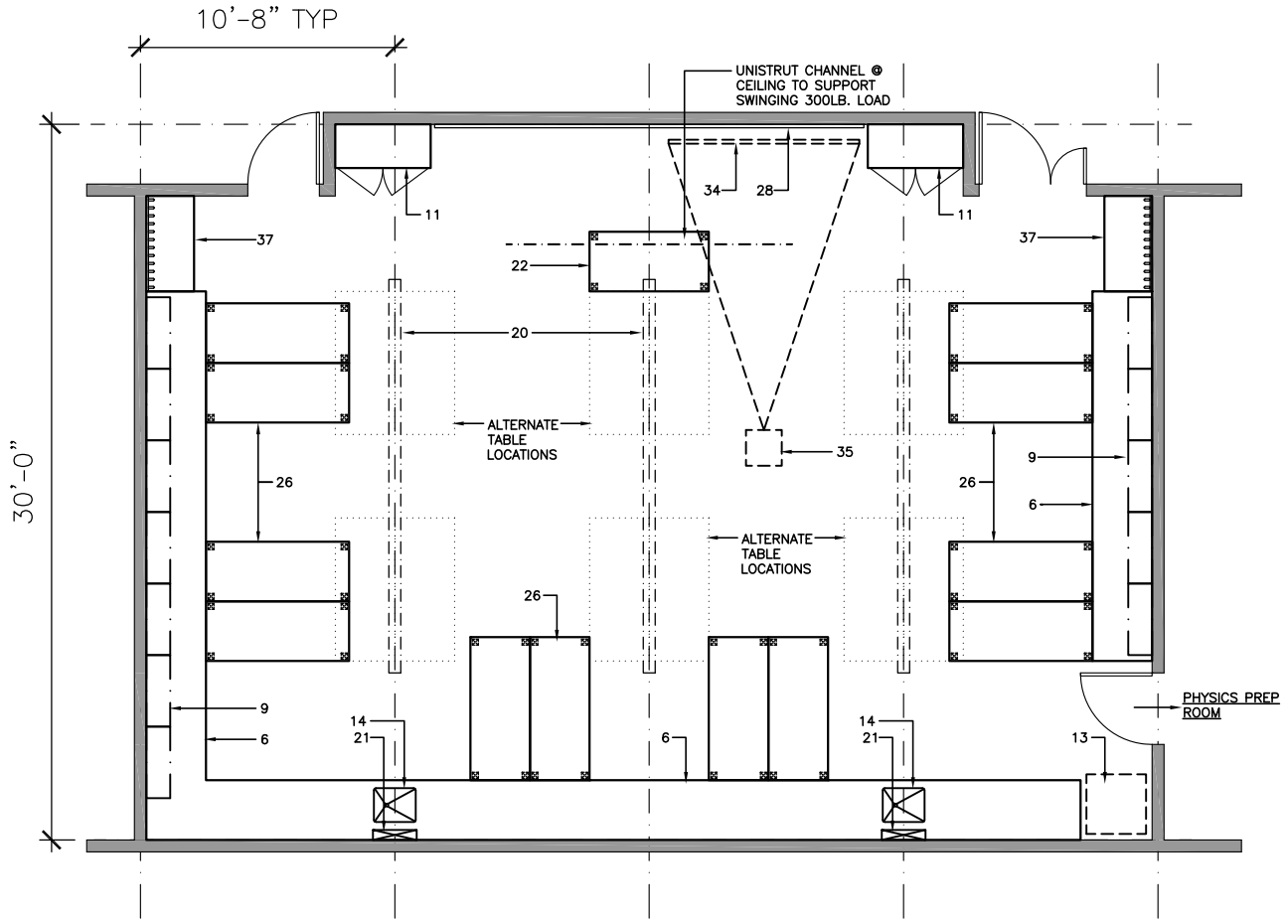
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radiolsotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: PHYSICS
SPACE NAME: MECHANICS LAB

SPACE ID NO.: 2.01
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.



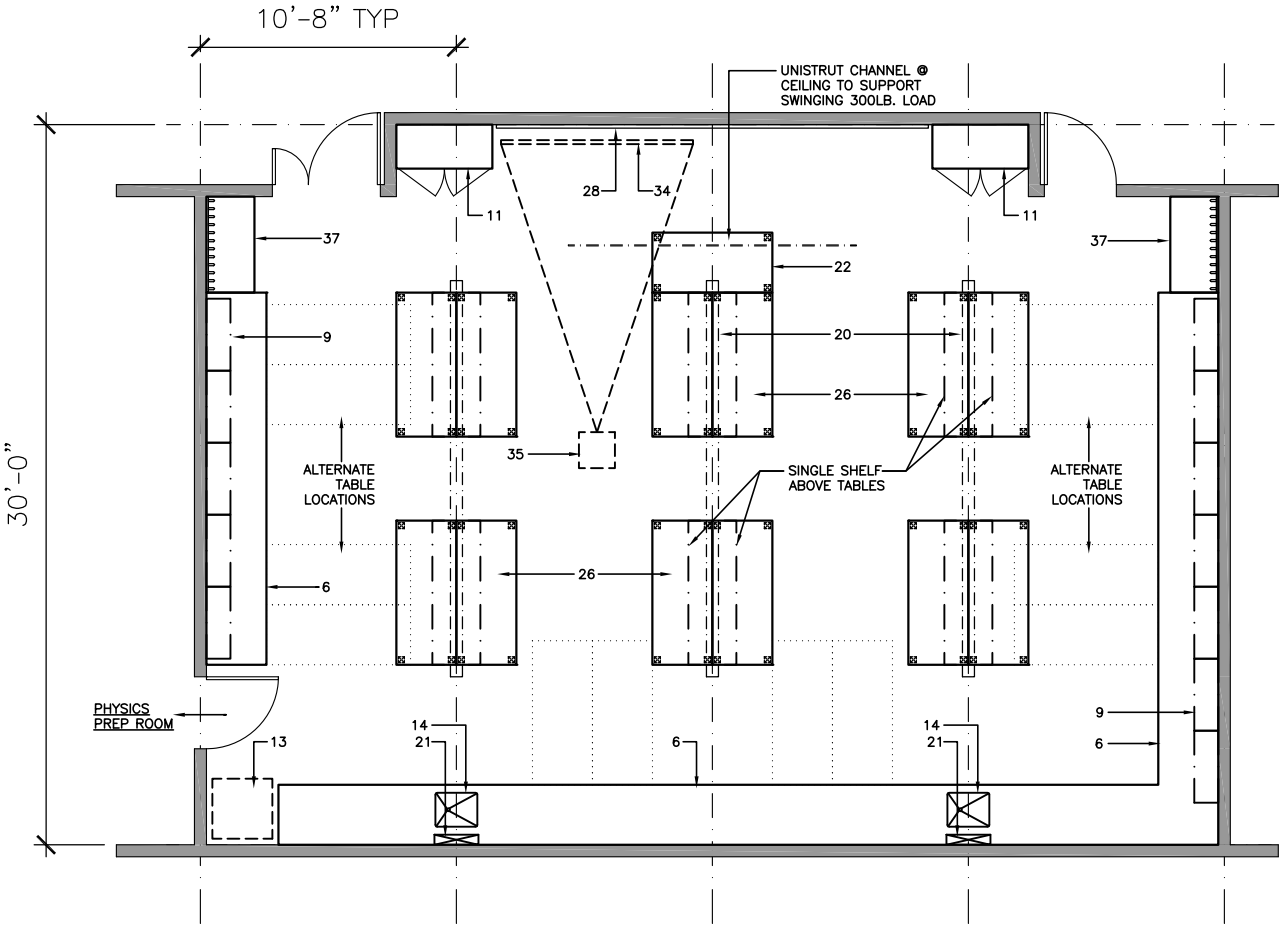
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radiolsotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: PHYSICS
SPACE NAME: INSTRUMENTATION LAB/HEAT & OPTICS LAB

SPACE ID NO.: 2.02
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.



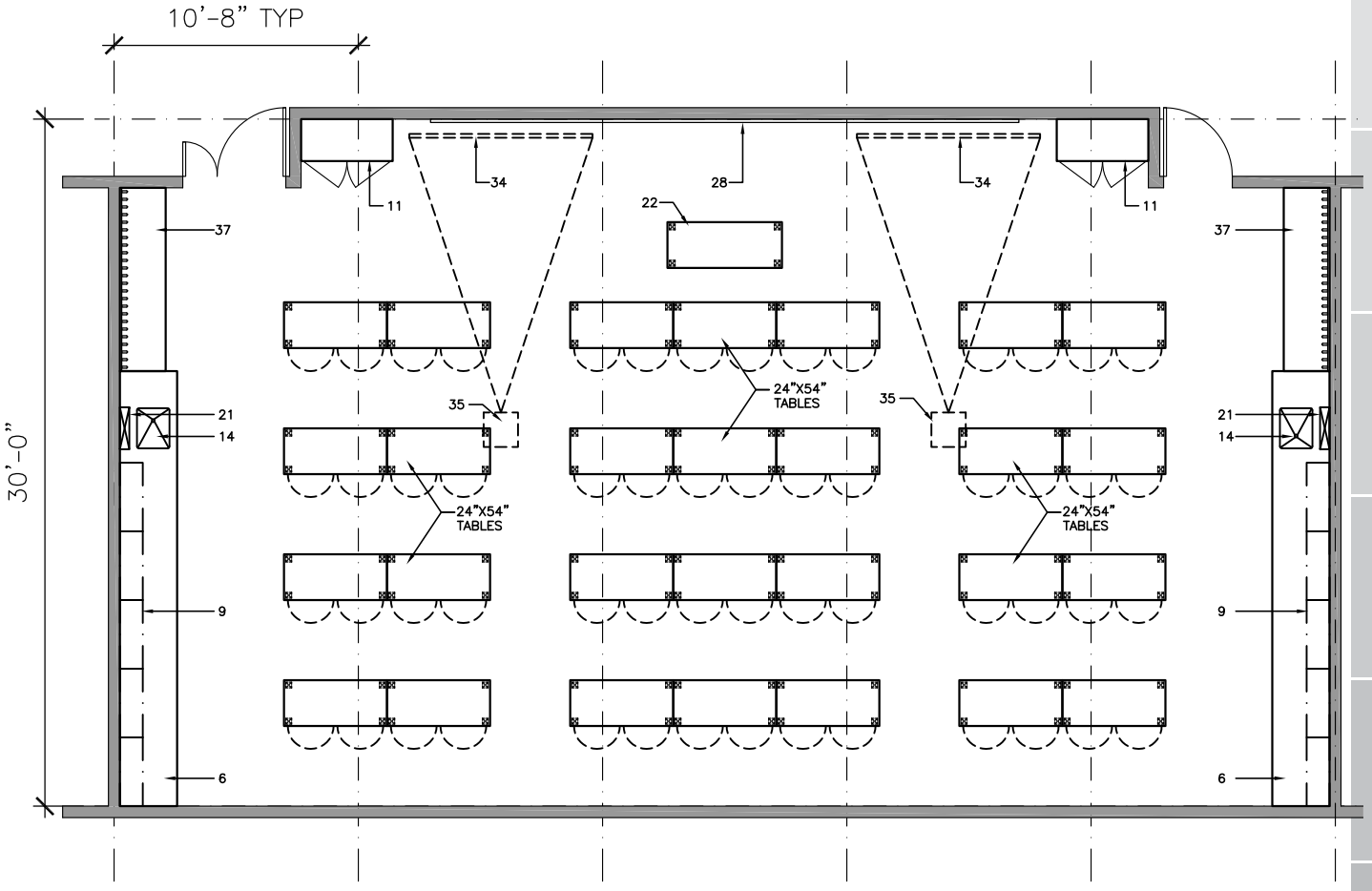
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radiolsotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: PHYSICS
SPACE NAME: GENERAL PHYSICS (56 SEATS)

SPACE ID NO.: 2.03
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.



0 1' 2' 4' 8'

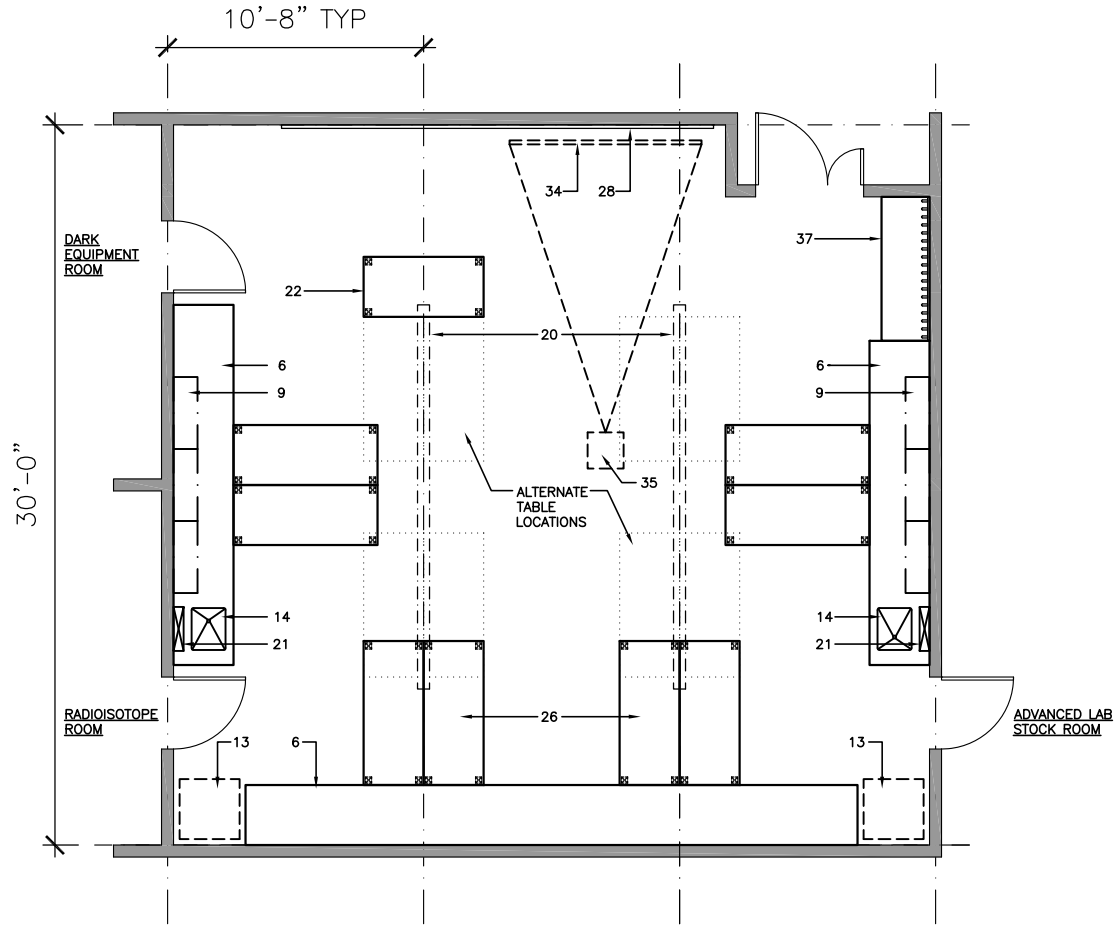
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radiolsotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: PHYSICS
SPACE NAME: ADVANCED PHYSICS LAB

SPACE ID NO.: 2.04
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.



0 1' 2' 4' 8'

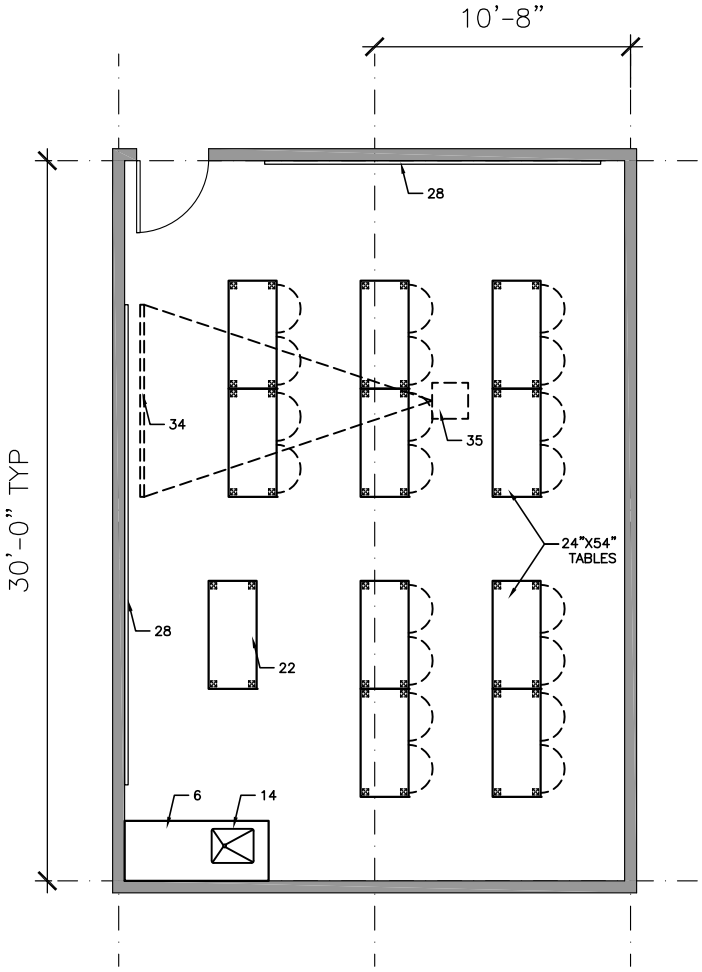
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: PHYSICS
SPACE NAME: QUANTUM MECHANICS LAB

SPACE ID NO.: 2.05
AREA NSF: 640

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'

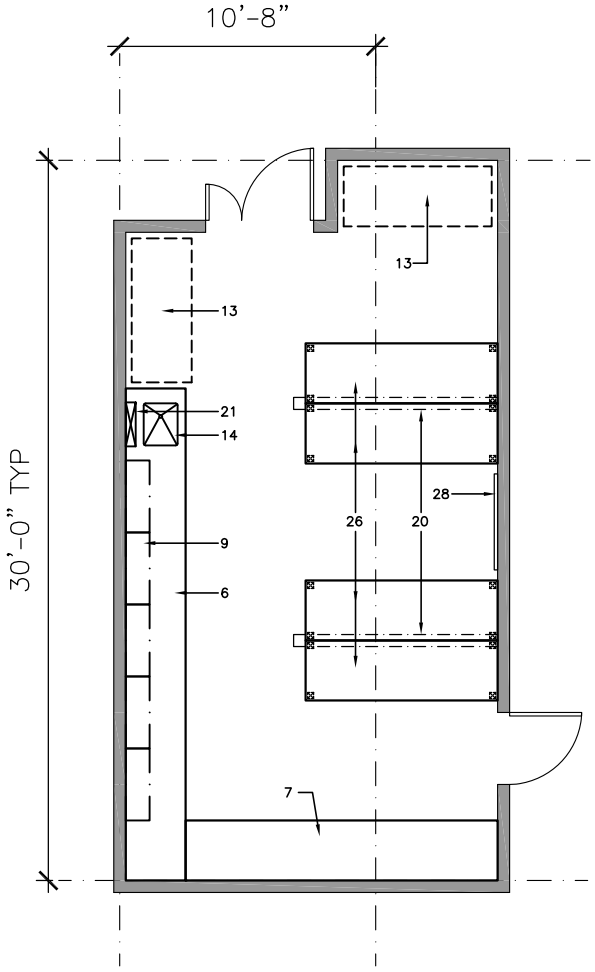
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radiolsotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: PHYSICS
SPACE NAME: PHYSICS RESEARCH (EXPERIMENTAL)

SPACE ID NO.: 2.11
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.



0 1' 2' 4' 8'

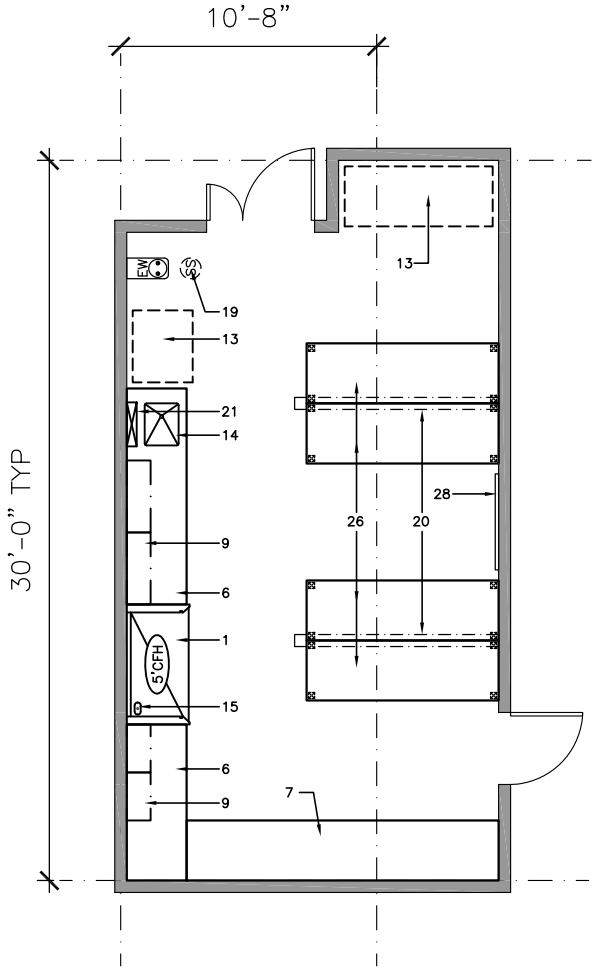
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radlolsotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: PHYSICS
SPACE NAME: THIN FILM RESEARCH

SPACE ID NO.: 2.12
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'

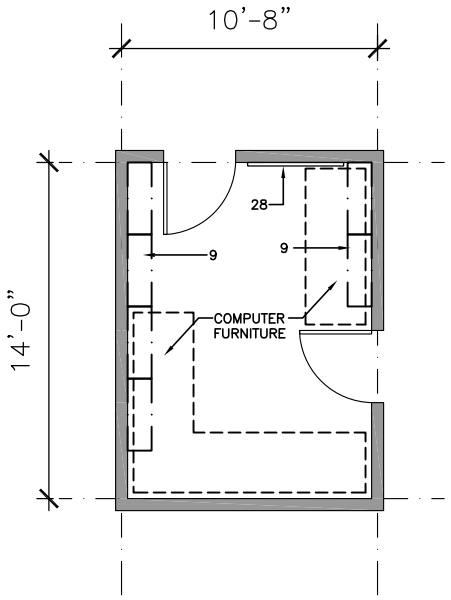
FURNISHINGS

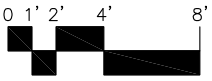
1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radiolsotope Hood
4. Vented Workstation
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: PHYSICS
SPACE NAME: PHYSICS RESEARCH (COMPUTATIONAL)

SPACE ID NO.: 2.13
AREA NSF: 140

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





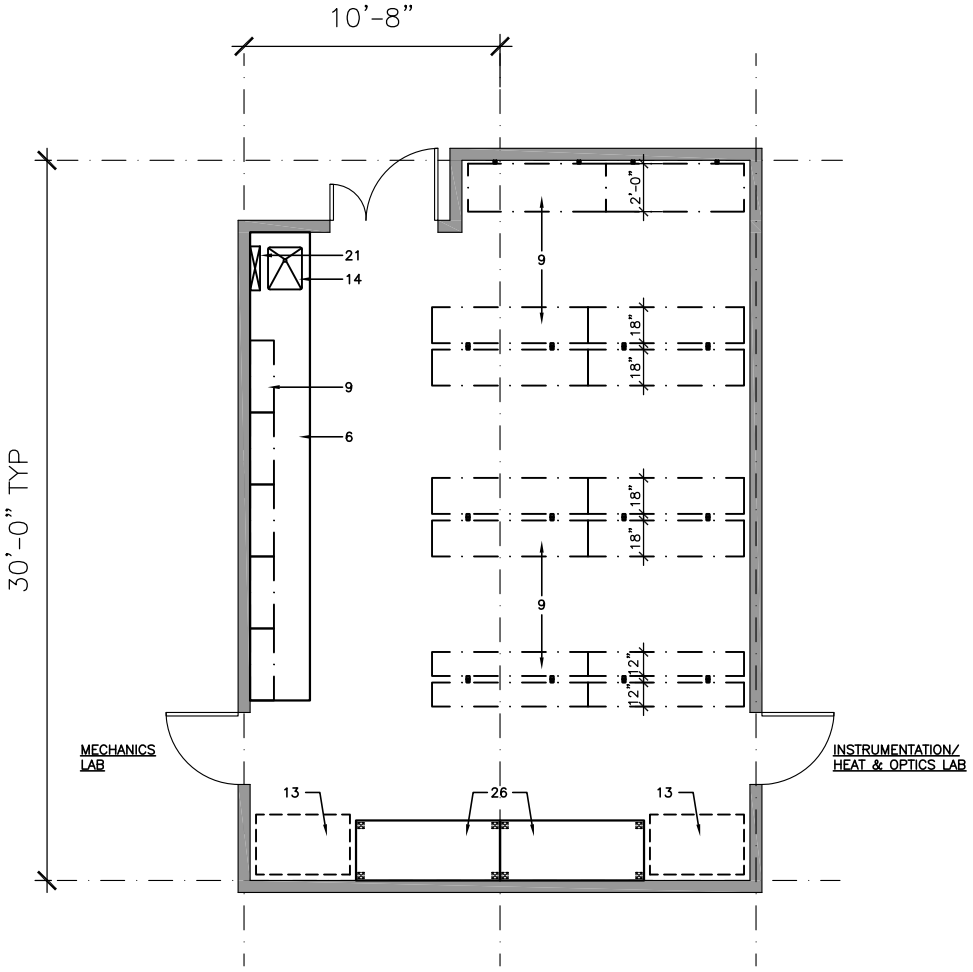
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radlolsotope Hood
4. Vented Workstation
5. Snorkel Exhaust
6. Laboratory Bench, Standlng Helght
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: PHYSICS
SPACE NAME: PHYSICS PREP ROOM

SPACE ID NO.: 2.21
AREA NSF: 640

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'

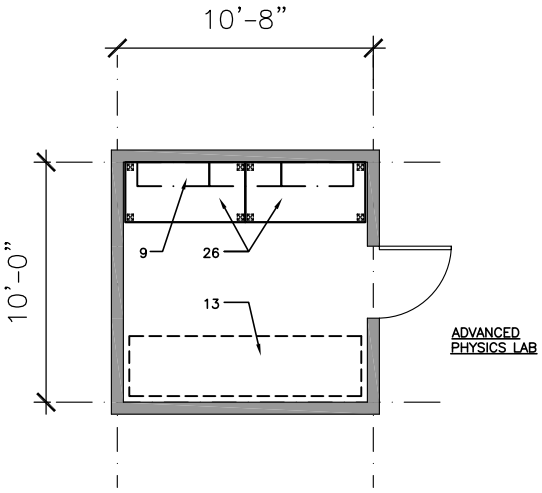
FURNISHINGS

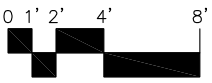
1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radiolsotope Hood
4. Vented Workstation
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: PHYSICS
SPACE NAME: RADIOISOTOPE ROOM

SPACE ID NO.: 2.22
AREA NSF: 100

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





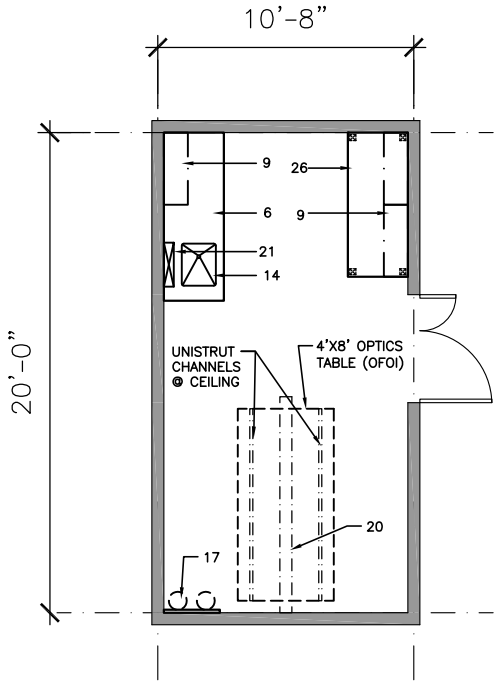
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radiolsotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: PHYSICS
SPACE NAME: DARK EQUIPMENT ROOM

SPACE ID NO.: 2.23
AREA NSF: 220

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'

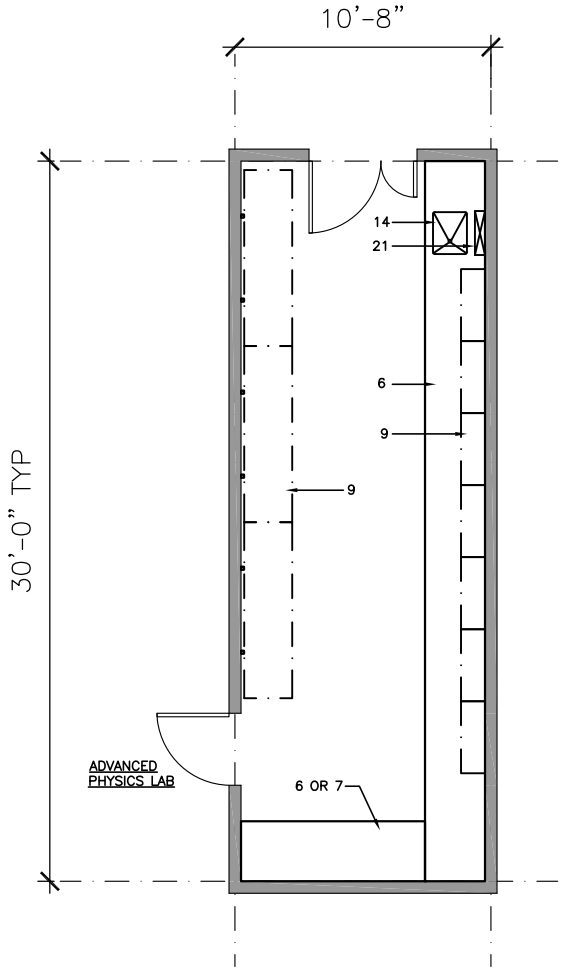
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radiolsotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: PHYSICS
SPACE NAME: ADVANCED LAB STOCK ROOM

SPACE ID NO.: 2.24
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'

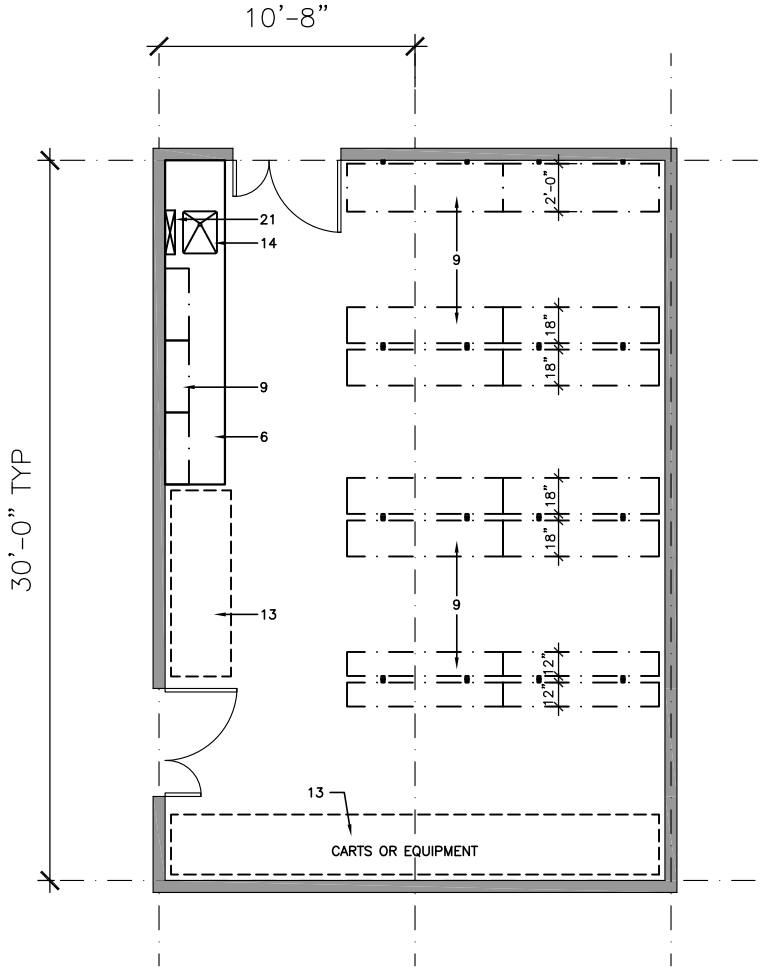
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radlolsotope Hood
4. Vented Workstation
5. Snorkel Exhaust
6. Laboratory Bench, Standing Helght
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: PHYSICS
SPACE NAME: PHYSICS LECTURE DEMO STORAGE

SPACE ID NO.: 2.25
AREA NSF: 640

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'

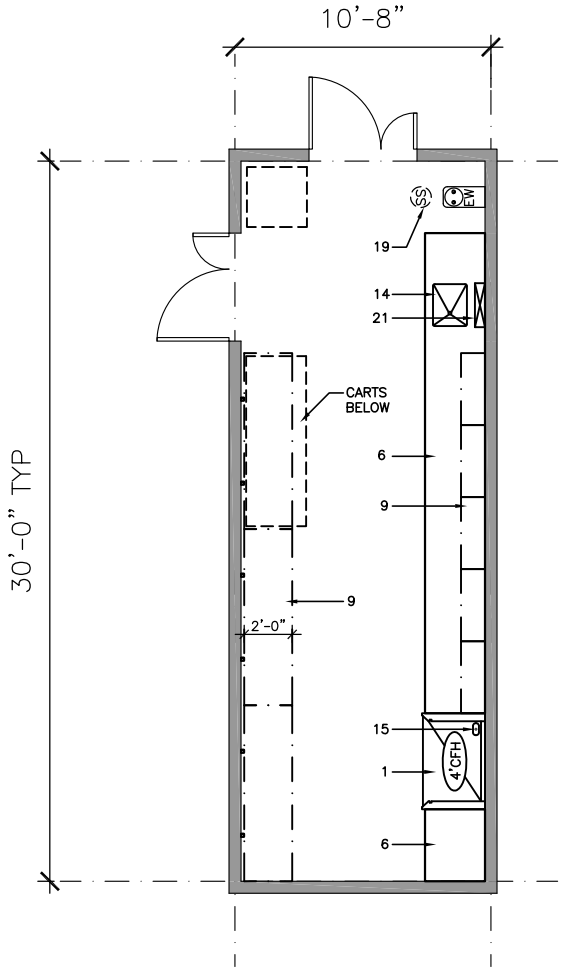
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: SHARED FACILITIES
SPACE NAME: PREP ROOM FOR LARGE CLASSROOM

SPACE ID NO.: 4.11
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'

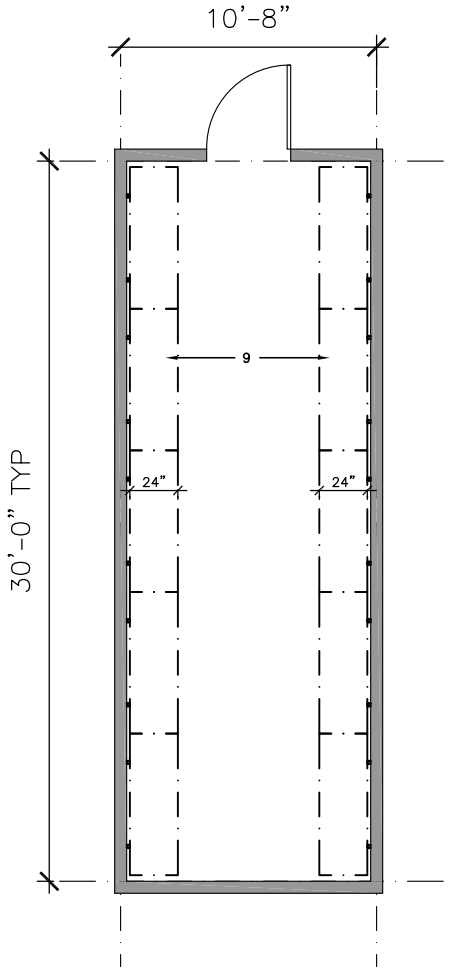
FURNISHINGS

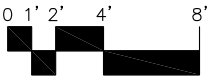
1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radiolsotope Hood
4. Vented Workstation
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Shelves
10. Reagent Shelves
11. Tall Storage Cabinet
12. Flammable / Corrosive Storage
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: SHARED FACILITIES
SPACE NAME: GENERAL STORAGE

SPACE ID NO.: 4.41
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.





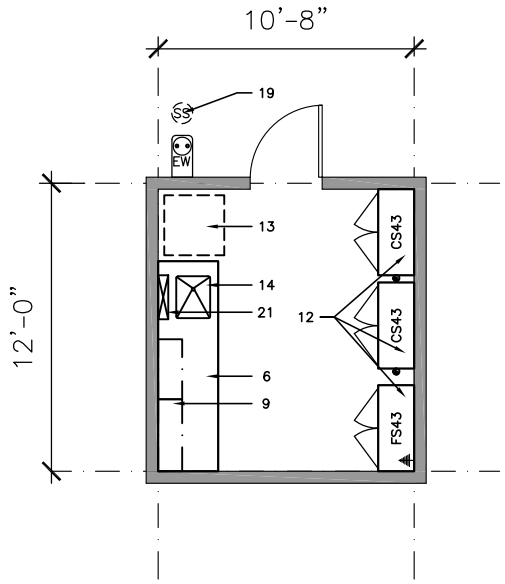
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radiolsotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: SHARED FACILITIES
SPACE NAME: HAZARDOUS WASTE STORAGE

SPACE ID NO.: 4.42
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'

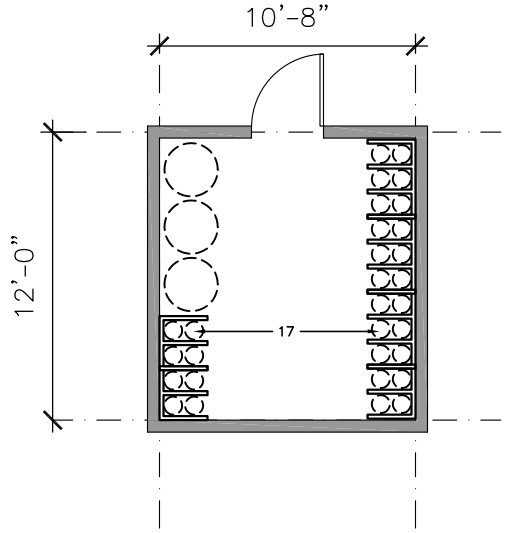
FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radlolsotope Hood
4. Vented Workstation
5. Snorkel Exhaust
6. Laboratory Bench, Standlng Helght
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. Cupslnk
16. Corrosives Storage Cabinet
17. Cylinder Rack
18. Gas Cablnet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cablnet
37. Coat/Book Bag Storage Unit

DEPARTMENT: SHARED FACILITIES
SPACE NAME: CYLINDER STORAGE

SPACE ID NO.: 4.43
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. Radlolsotope Hood
4. Vented Workstation
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. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Moveable 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. File Cabinet
37. Coat/Book Bag Storage Unit

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.01**
SPACE NAME: GENERAL CHEMISTRY — **OCCUPANCY: 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	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. (6) 6' Chemical fume hoods
2. Suitable for A/V presentations

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.02**
SPACE NAME: ORGANIC CHEMISTRY — **OCCUPANCY: 20**

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)	Note 3
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. (10) 6' Chemical fume hoods, full vision style; (2) 4' Chemical fume hoods
2. Suitable for A/V presentations
3. N_2 piped to fume hoods from tank farm

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.03**
SPACE NAME: INORGANIC / PHYSICAL CHEMISTRY — **OCCUPANCY: 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	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	Note 2
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. (4) 6' Chemical fume hoods
2. (1) OFOI glove box with vacuum pump exhaust
3. Suitable for A/V presentations and experimental "black-out"

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.04**
SPACE NAME: ANALYTICAL CHEMISTRY — **OCCUPANCY: 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	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)	Note 2
Cooling Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	Note 3
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 4
Zoned Lighting	Note 4
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. (6) 6' Chemical fume hoods
2. Type I water purifier (owner furnished)
3. N_2 piped to fume hoods from tank farm
4. Suitable for A/V presentations

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.05**
SPACE NAME: BIOCHEMISTRY / FORENSICS — **OCCUPANCY: 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	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)	Note 2
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	Note 3
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 4
Zoned Lighting	Note 4
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. (3) 6' Chemical fume hoods
2. Barnstead Nanopure Type I water unit (OFOI)
3. For chest freezer
4. Suitable for A/V presentations

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.11**
SPACE NAME: FACULTY RESEARCH LAB - TYPE A (PHYSICAL/ANALYTICAL) — **OCCUPANCY: 5-6**

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. (2) 6' Chemical fume hoods

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.12**
SPACE NAME: FACULTY RESEARCH LABORATORY - TYPE B (SYNTHETIC) — **OCCUPANCY: 5-6**

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	Note 2
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) 8' Chemical fume hoods
2. (1) OFOI glove box with vacuum pump exhaust

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.13**
SPACE NAME: FACULTY RESEARCH LABORATORY - TYPE B (SYNTHETIC) — **OCCUPANCY: 10-12**

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	Note 1
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	Note 2
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. (8) 8' Chemical fume hoods
2. (1) OFOI glove box with vacuum pump exhaust

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.14**
SPACE NAME: FACULTY RESEARCH LABORATORY - TYPE C (BIOCHEMISTRY) — **OCCUPANCY: 6-8**

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. (2) 6' or 8' Chemical fume hoods.

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.21**
SPACE NAME: STOCK: GLASSWARE/CONSUMABLES — **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	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: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.22**
SPACE NAME: STOCK: CHEMICAL STORAGE — **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	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 ($C0_2$)	
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: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.23**
SPACE NAME: STOCK: PREP ROOM — **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	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: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.24A**
SPACE NAME: HAZARDOUS CHEMICAL STORAGE: SOLVENTS — **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	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 ($C0_2$)	
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: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.24B**
SPACE NAME: HAZARDOUS CHEMICAL STORAGE: ORGANICS — **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	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	
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

REMARKS:

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.24C**
SPACE NAME: HAZARDOUS CHEMICAL STORAGE: INORGANICS — **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	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:

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.25**
SPACE NAME: INSTRUMENT ROOM — **OCCUPANCY: 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	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	Note 2
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)	Note 3
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. (2) 8' Chemical fume hoods
2. Exhaust for vacuum pump venting at each island bench
3. N_2 piped from tank farm

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.26**
SPACE NAME: INSTRUMENT STORAGE — **OCCUPANCY: 10**

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: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.27**
SPACE NAME: NMR ROOM — **OCCUPANCY: 10**

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	11'-6"
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	■
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	

REMARKS:

1. Oxygen sensors and quench exhaust required
2. N_2 Generator required in adjacent, acoustically treated closet
   - (1) 300-400 MHz NMR for teaching
   - (1) 500 MHz NMR for research

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.28**
SPACE NAME: MICROSCOPY LAB — **OCCUPANCY: 10**

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: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.29**
SPACE NAME: BALANCE ROOM — **OCCUPANCY: 10-12**

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	9' min
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	■
Natural Daylight	■

REMARKS:

1. Low velocity supply air required

DEPARTMENT: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.30**
SPACE NAME: XRD ROOM — **OCCUPANCY: 2-3**

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

MECHANICAL	
Temperature	
68°-75° ± 2°F	
Maintain <65°F	■
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: CHEMISTRY / BIOCHEMISTRY — **SPACE ID NO: 1.31**
SPACE NAME: UPPER DIVISION / RESEARCH 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'-0" Chemical fume hood

DEPARTMENT: PHYSICS — **SPACE ID NO: 2.01**
SPACE NAME: MECHANICS LAB — **OCCUPANCY: 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	
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 1
Zoned Lighting	Note 1
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. Suitable for A/V presentations

DEPARTMENT: PHYSICS — **SPACE ID NO: 2.02**
SPACE NAME: INSTRUMENTATION / HEAT & OPTICS LAB — **OCCUPANCY: 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	
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 1
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. Suitable for A/V presentations and light sensitive experiments - include dimming capabilities
2. Suitable for A/V presentations

DEPARTMENT: PHYSICS — **SPACE ID NO: 2.03**
SPACE NAME: GENERAL PHYSICS — **OCCUPANCY: 56**

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

MECHANICAL	
Temperature	
68°-75° ± 2°F	■
Other	
Humidity	
Uncontrolled	■
Other	
Minimum Air Changes/Hour	
Air Recirculation	■
Air Pressure Positive	
Air Pressure Negative	
Additional Supply Air 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 1
Zoned Lighting	Note 1
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. Suitable for A/V presentations

DEPARTMENT: PHYSICS — **SPACE ID NO: 2.04**
SPACE NAME: ADVANCED PHYSICS LAB — **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	
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 1
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. Suitable for A/V presentations and light-sensitive experiments
2. Suitable for A/V presentations

DEPARTMENT: PHYSICS — **SPACE ID NO: 2.05**
SPACE NAME: QUANTUM MECHANICS LAB — **OCCUPANCY: 20**

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

MECHANICAL	
Temperature	
68°-75° ± 2°F	■
Other	
Humidity	
Uncontrolled	■
Other	
Minimum Air Changes/Hour	
Air Recirculation	■
Air Pressure Positive	
Air Pressure Negative	
Additional Supply Air 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 1
Zoned Lighting	Note 1
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. Suitable for A/V presentations

DEPARTMENT: PHYSICS — **SPACE ID NO: 2.11**
SPACE NAME: PHYSICS RESEARCH (EXPERIMENTAL) — **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	
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: PHYSICS — **SPACE ID NO: 2.12**
SPACE NAME: THIN FILM RESEARCH — **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	Note 1
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	Note 2
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 ($C0_2$)	
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) 5' Chemical fume hood
2. For local vacuum pump venting

DEPARTMENT: PHYSICS — **SPACE ID NO: 2.13**
SPACE NAME: PHYSICS RESEARCH (COMPUTATIONAL) — **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	
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: PHYSICS — **SPACE ID NO: 2.21**
SPACE NAME: PHYSICS PREP ROOM — **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	
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: PHYSICS — **SPACE ID NO: 2.22**
SPACE NAME: RADIOISOTOPE ROOM — **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:

DEPARTMENT: PHYSICS — **SPACE ID NO: 2.23**
SPACE NAME: DARK EQUIPMENT 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	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	Note 1
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. Vacuum pump exhaust vent

DEPARTMENT: PHYSICS — **SPACE ID NO: 2.24**
SPACE NAME: ADVANCED LAB STOCK ROOM — **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	
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: PHYSICS — **SPACE ID NO: 2.25**
SPACE NAME: PHYSICS LECTURE DEMO STORAGE — **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	
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: SHARED FACILITIES — **SPACE ID NO: 4.11**
SPACE NAME: PREP ROOM FOR LARGE CLASSROOM — **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	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: SHARED FACILITIES — **SPACE ID NO: 4.41**
SPACE NAME: GENERAL STORAGE — **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	
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: SHARED FACILITIES — **SPACE ID NO: 4.42**
SPACE NAME: HAZARDOUS WASTE STORAGE — **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	
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

REMARKS:

DEPARTMENT: SHARED FACILITIES — **SPACE ID NO: 4.43**
SPACE NAME: CYLINDER STORAGE — **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	
Doors	
3'-6" x 7'	
3' x 7'	■
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

REMARKS:

Department:	Chemistry
Space ID:	1.41
Space Name:	Server Room
Occupants/space:	n/a
ASF:	200
No of spaces:	1

GENERAL:

Function	Informatics research support
Adjacencies	Inorganic/Physical Chemistry Teaching Lab and associated Research Lab
Ceiling Height	9’
Windows	None
Daylight Control	None
Lighting	Ambient well lit, motion sensor control

FINISHES:

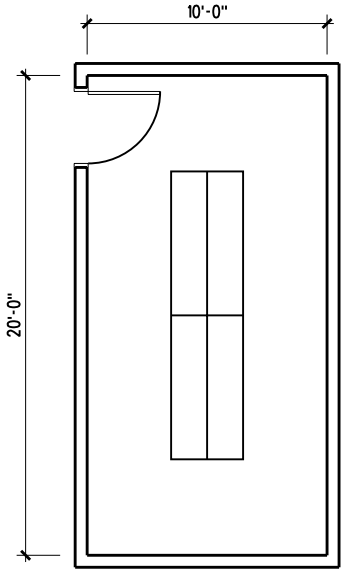
Floor	Vinyl dissipating tile
Base	Resilient
Walls	Painted GWB
Ceiling	None

UTILITIES:

Plumbing	None
Electrical	tbd
Floor Boxes	None
Data/Telecom	tbd
Audio-Visual	None
HVAC/Controls	Room cooling

EQUIPMENT:

Fixed	Overhead cable tray serving owner furnished server racks.
Moveable	None



Department:	Administration
Space ID:	3.01
Space Name:	Dean's Office
Occupants/space:	1
ASF:	250
No of spaces:	1

GENERAL:

Function	Dean's 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:

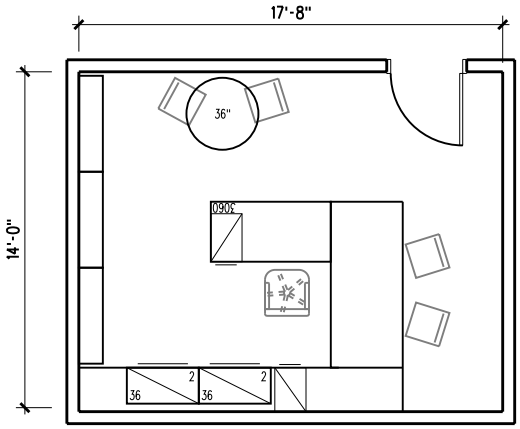
Floor	Carpet
Base	Resilient
Walls	Painted GWB, wood wainscot and chair rail, and acoustic wall panels
Ceiling	ACT

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:	Chemistry	Physics	Administration
Space ID:	1.51	2.41	3.02
Space Name:	Faculty Office Chair	Faculty Office Chair	Associate Dean's Office
Occupants/space:	1	1	1
ASF:	175	175	175
No of spaces:	1	1	2

GENERAL:

Function	Department head offices
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:

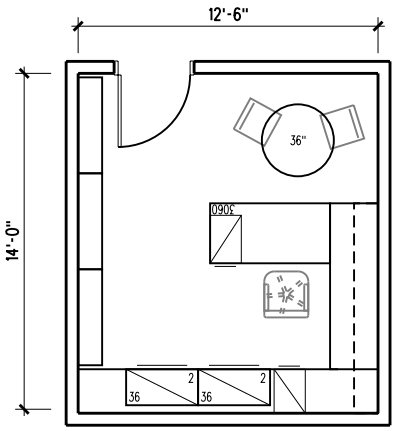
Floor	Carpet
Base	Resilient
Walls	Painted GWB
Ceiling	ACT

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



Department:	Chemistry	Physics	Administration
Space ID:	1.52	2.42	3.03
Space Name:	Faculty Office	Faculty Office	Staff Office
Occupants/space:	1	1	1
ASF:	140	140	140
No of spaces:	15	5	2

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:

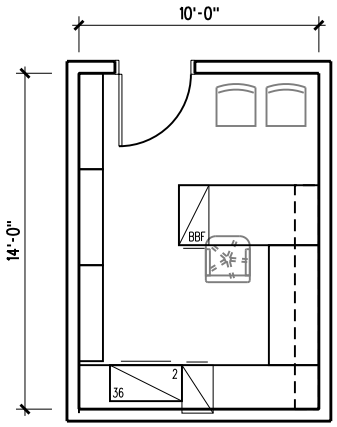
Floor	Carpet
Base	Resilient
Walls	Painted GWB
Ceiling	ACT

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



SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	Chemistry	Physics
Space ID:	1.54	2.44
Space Name:	Technician Office	Technician Office
Occupants/space:	1	1
ASF:	120	120
No of spaces:	2	1

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:

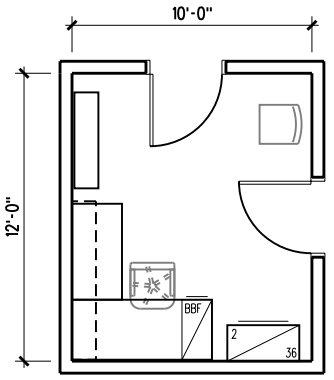
Floor	Resilient
Base	Resilient
Walls	Painted GWB
Ceiling	ACT

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:	Chemistry
Space ID:	1.55
Space Name:	Teaching Assistant Office
Occupants/space:	6
ASF:	140
No of spaces:	2

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:

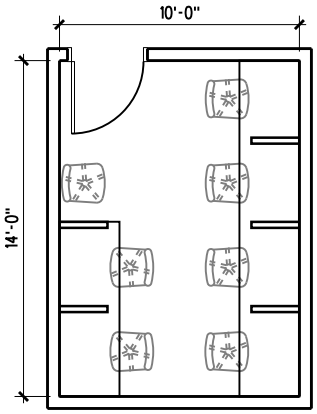
Floor	Carpet
Base	Resilient
Walls	Painted GWB
Ceiling	ACT

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:	Chemistry	Physics
Space ID:	1.56	2.45
Space Name:	Tutoring Office	Tutoring Office
Occupants/space:	12	12
ASF:	280	280
No of spaces:	1	1

GENERAL:

Function	Tutoring
Adjacencies	Teaching and research labs
Ceiling Height	10’
Windows	Relites, exterior window optimal
Daylight Control	Blinds
Lighting	Ambient office levels, motion sensor control

FINISHES:

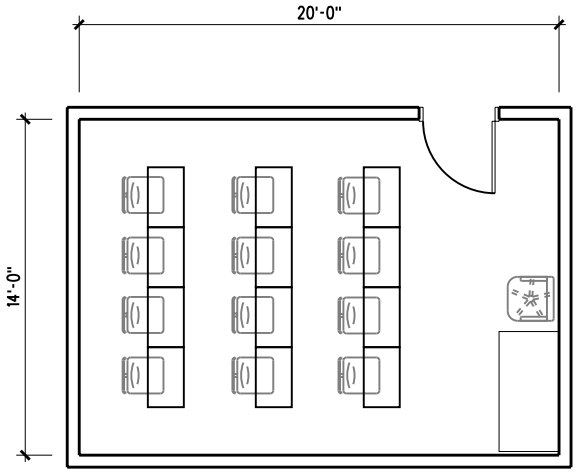
Floor	Carpet
Base	Resilient
Walls	Painted GWB
Ceiling	ACT

UTILITIES:

Plumbing	None
Electrical	Duplex at selected locations
Floor Boxes	None
Data/Telecom	Yes
Audio-Visual	None
HVAC/Controls	Demand controlled ventilation

EQUIPMENT:

Fixed	Tack/white board, coat hooks
Moveable	Owner-furnished tables and chairs



Department:	Chemistry	Physics	Administration
Space ID:	1.53	2.43	3.04
Space Name:	Dept. Office Waiting	Dept. Office Waiting	Dept. Office Waiting
Occupants/space:	1	1	1
ASF:	350	250	300
No of spaces:	1	1	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:

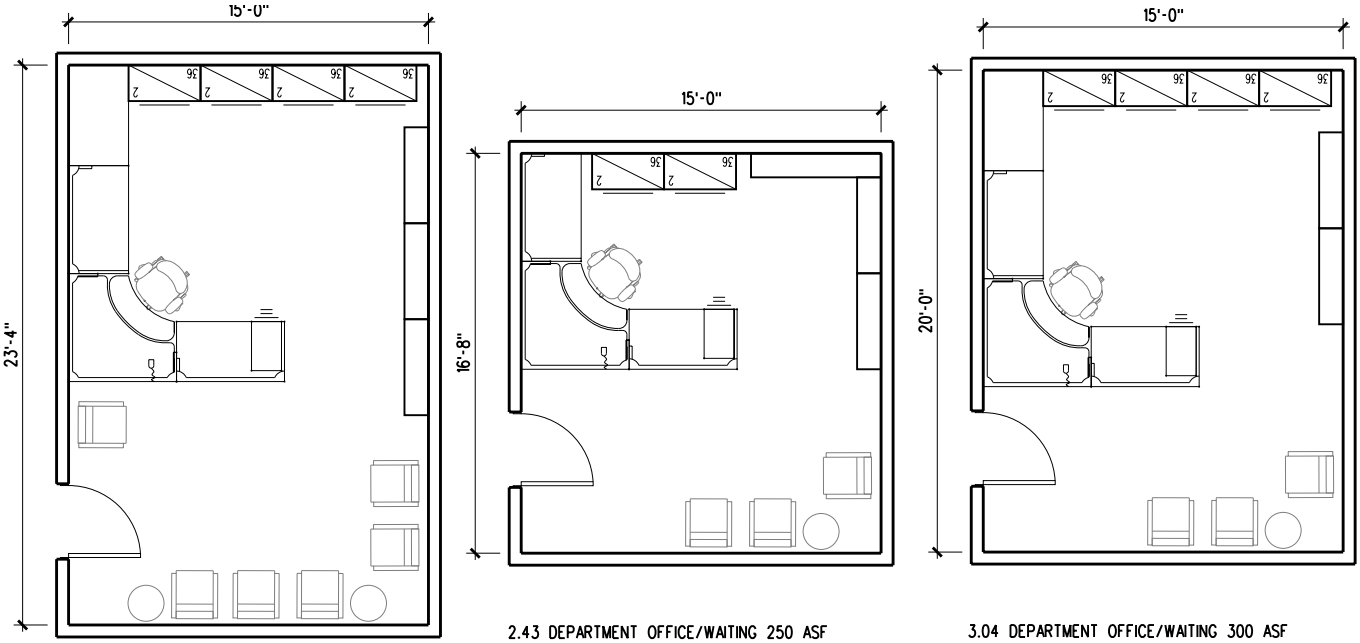
Floor	Carpet
Base	Resilient
Walls	Painted GWB
Ceiling	ACT

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



1.53 DEPARTMENT OFFICE/WAITING 350 ASF

2.43 DEPARTMENT OFFICE/WAITING 250 ASF

3.04 DEPARTMENT OFFICE/WAITING 300 ASF

SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	Chemistry	Physics	Administration
Space ID:	1.61	2.51	3.11
Space Name:	Work Room	Work Room	Work Room
Occupants/space:	n/a	n/a	n/a
ASF:	140	140	240
No of spaces:	1	1	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:

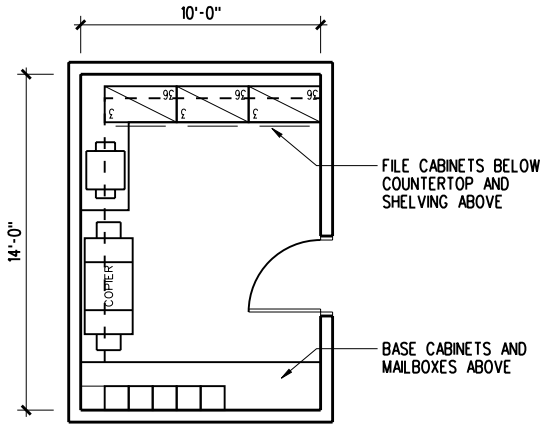
Floor	Resilient
Base	Resilient
Walls	Painted GWB
Ceiling	ACT

UTILITIES:

Plumbing	None
Electrical	Duplex at selected locations
Floor Boxes	None
Data/Telecom	Yes
Audio-Visual	None
HVAC/Controls	Demand controlled ventilation

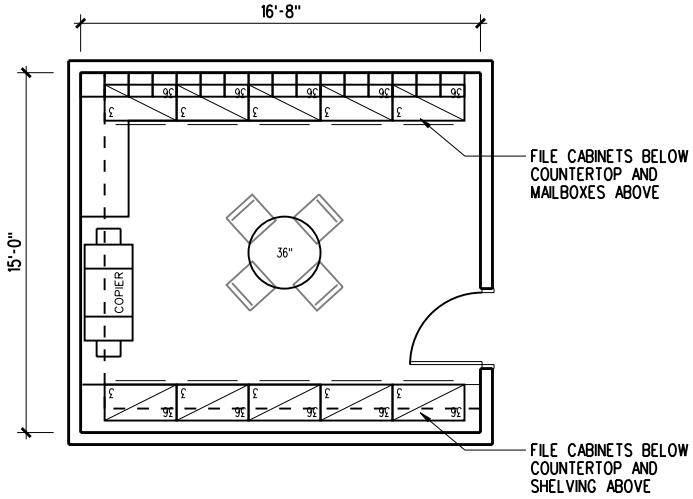
EQUIPMENT:

Fixed	Built-in casework, shelving, mailboxes, tack/white board
Moveable	Owner-furnished file cabinets, table



1.61 WORKROOM 140 ASF

2.51 WORKROOM 140 ASF



3.11 WORKROOM 240 ASF

SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	Chemistry	Physics	Administration
Space ID:	1.62	2.53	3.12
Space Name:	Conference	Conference	Conference
Occupants/space:	20	12	20
ASF:	300	200	300
No of spaces:	1	1	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:

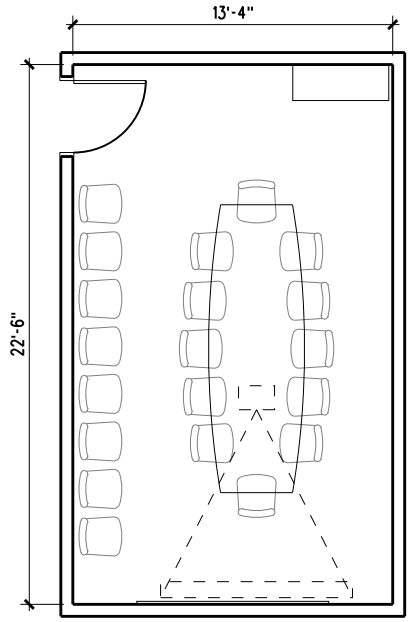
Floor	Carpet
Base	Resilient
Walls	Painted GWB, wood wainscot and chair rail, and acoustic wall panels
Ceiling	ACT and GWB

UTILITIES:

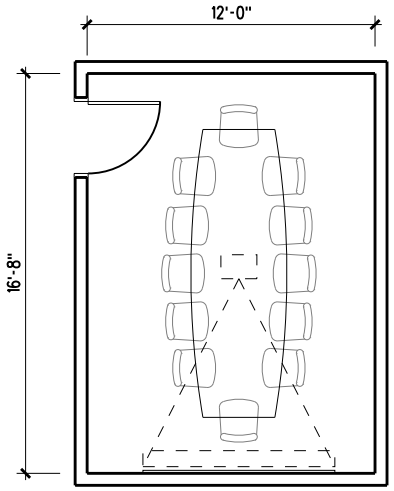
Plumbing	None
Electrical	Duplex at selected locations
Floor Boxes	Yes
Data/Telecom	Yes
Audio-Visual	Yes
HVAC/Controls	Demand controlled ventilation, operable windows

EQUIPMENT:

Fixed	Projector screen and ceiling mounted projector support, white board
Moveable	Owner-furnished conference table and seating, AV rack and projector



1.62 CONFERENCE ROOM 300 ASF
3.12 CONFERENCE ROOM 300 ASF



2.53 CONFERENCE ROOM 200 ASF

SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	Physics
Space ID:	2.52
Space Name:	Reading Room
Occupants/space:	10
ASF:	480
No of spaces:	1

GENERAL:

Function	Quiet study space with reference books
Adjacencies	Teaching Labs
Ceiling Height	10’
Windows	Exterior with interior relites
Daylight Control	Blinds
Lighting	Indirect with focused lighting, motion sensor control

FINISHES:

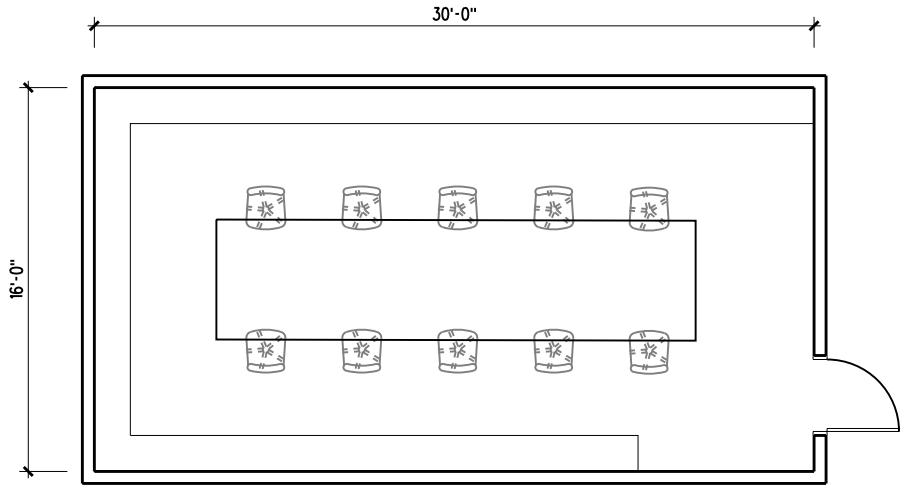
Floor	Carpet
Base	Resilient
Walls	Painted GWB
Ceiling	ACT and GWB

UTILITIES:

Plumbing	None
Electrical	Duplex at selected locations
Floor Boxes	No
Data/Telecom	No
Audio-Visual	No
HVAC/Controls	Demand controlled

EQUIPMENT:

Fixed	Tackboard/white board
Moveable	Owner-furnished table, chairs and shelving



Department:	Physics
Space ID:	2.31
Space Name:	Planetarium
Occupants/space:	60
ASF:	1,825
No of spaces:	1

GENERAL:

Function	Astronomy lectures and public presentations
Adjacencies	Other classrooms
Ceiling Height	8’ at spring of dome
Windows	No
Daylight Control	No
Lighting	Indirect, motion sensor control

FINISHES:

Floor	Carpet
Base	Resilient
Walls	Painted GWB, acoustic treatment
Ceiling	Painted GWB

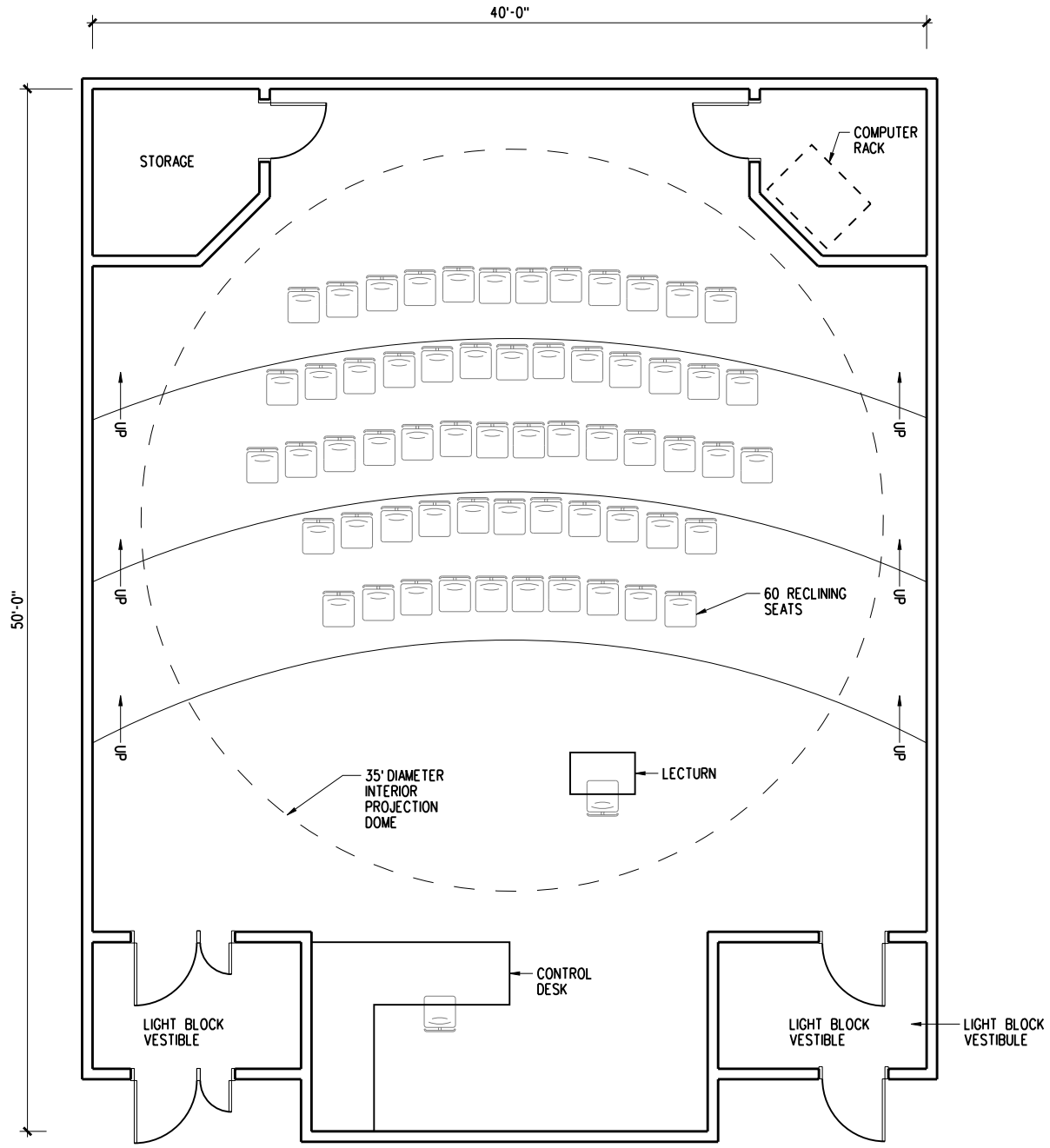
UTILITIES:

Plumbing	None
Electrical	Duplex at selected locations
Floor Boxes	Yes
Data/Telecom	Yes
Audio-Visual	Yes
HVAC/Controls	Demand controlled, room cooling at storage

EQUIPMENT:

Fixed	35’ diameter pre-manufactured dome with powder-coated perforated metal viewing surface and premium joints
	Theatre seating
	Sliding whiteboard/tackboard
Moveable	Owner furnished planetarium projection and audio system
	Owner-furnished podium and chair

SPACE DIAGRAMS / DETAILED REQUIREMENTS



0 2' 4' 8' 12'

SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	Shared
Space ID:	4.01
Space Name:	Classroom - Large Tiered
Occupants/space:	120
ASF:	2,550
No of spaces:	1

GENERAL:

Function	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

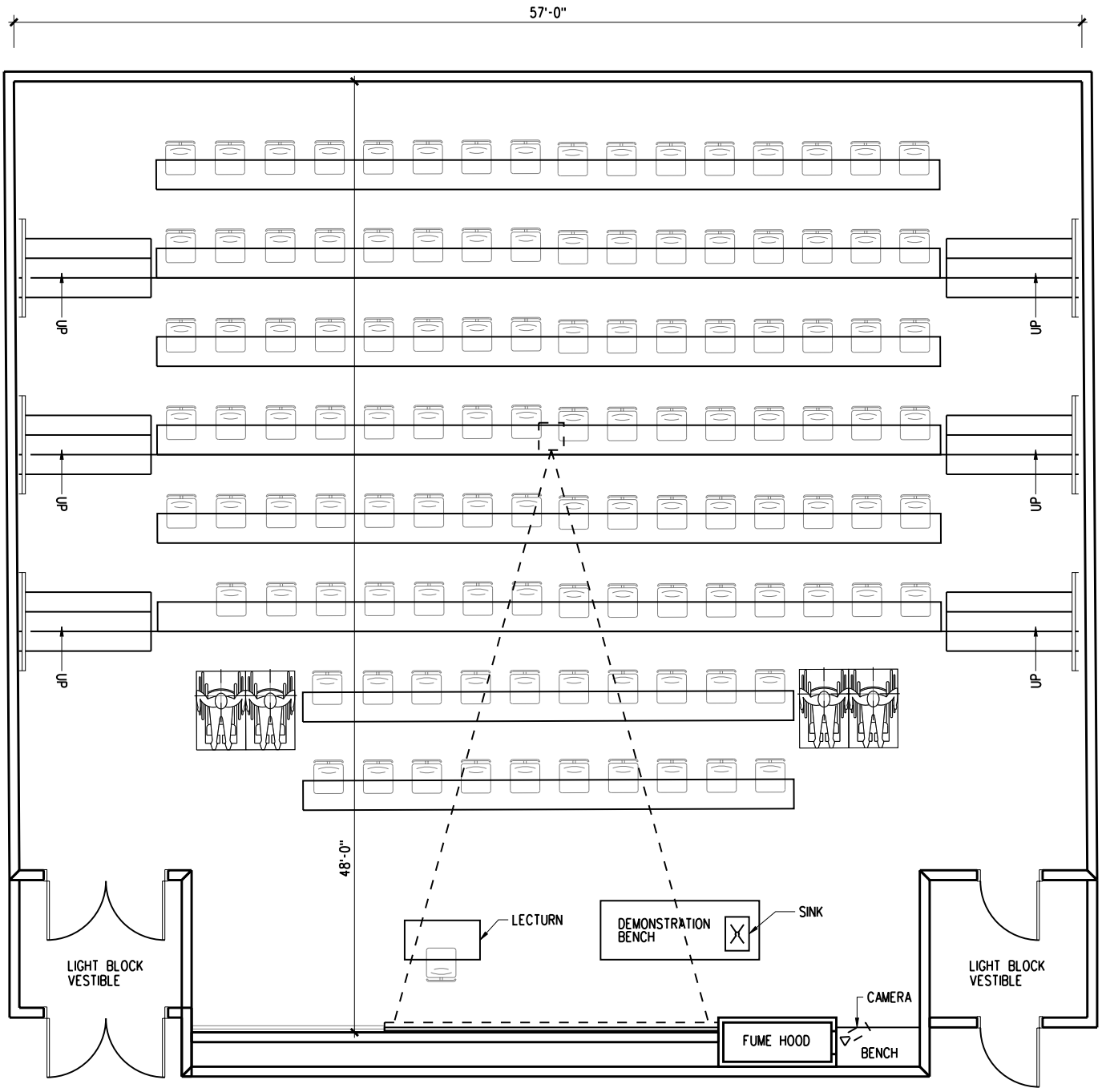
UTILITIES:

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

SPACE DIAGRAMS / DETAILED REQUIREMENTS



(not to scale)

SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	Shared
Space ID:	4.02
Space Name:	Classroom – Medium Tiered
Occupants/space:	80
ASF:	1,760
No of spaces:	1

GENERAL:

Function	Chemistry and physics lectures
Adjacencies	Other classrooms
Ceiling Height	Varies
Windows	Yes
Daylight Control	Yes
Lighting	Indirect/direct, motion sensor control

FINISHES:

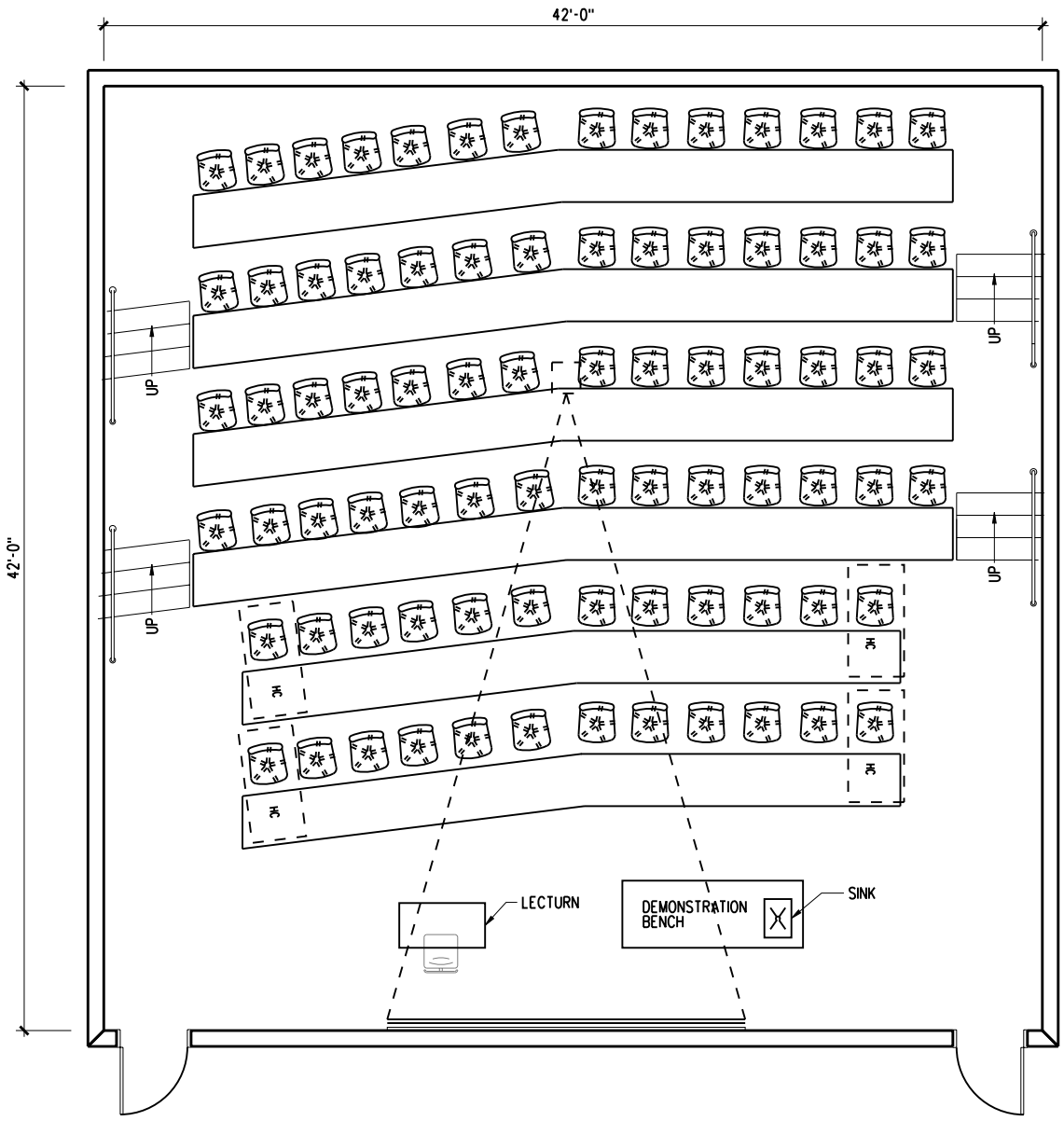
Floor	Carpet
Base	Resilient
Walls	Painted GWB, acoustic treatment
Ceiling	Painted GWB/ACT

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:	4.03
Space Name:	Classroom – Small
Occupants/space:	60
ASF:	1,440
No of spaces:	1

GENERAL:

Function	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

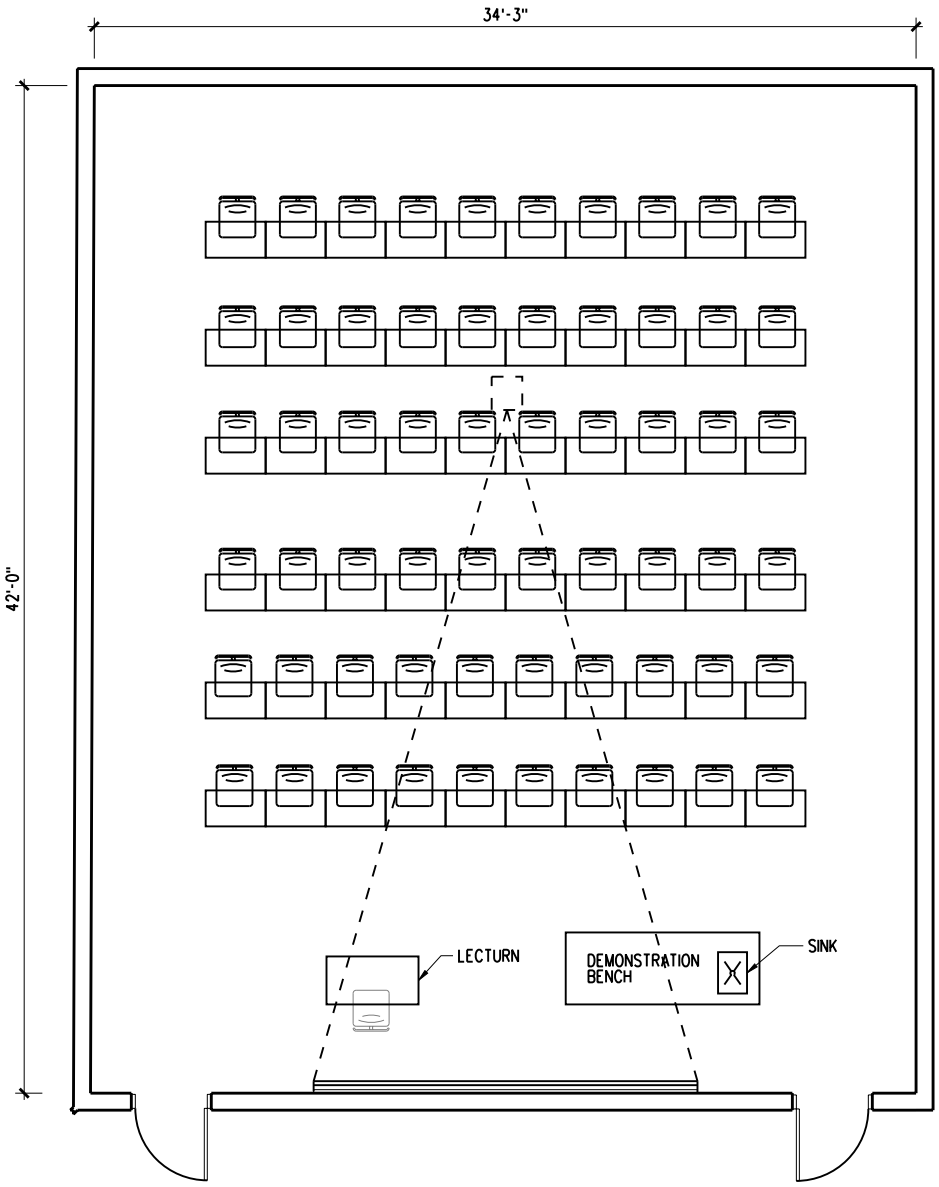
UTILITIES:

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

SPACE DIAGRAMS / DETAILED REQUIREMENTS



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SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	Shared
Space ID:	4.21
Space Name:	Open Computer Lab
Occupants/space:	24
ASF:	1,280
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:

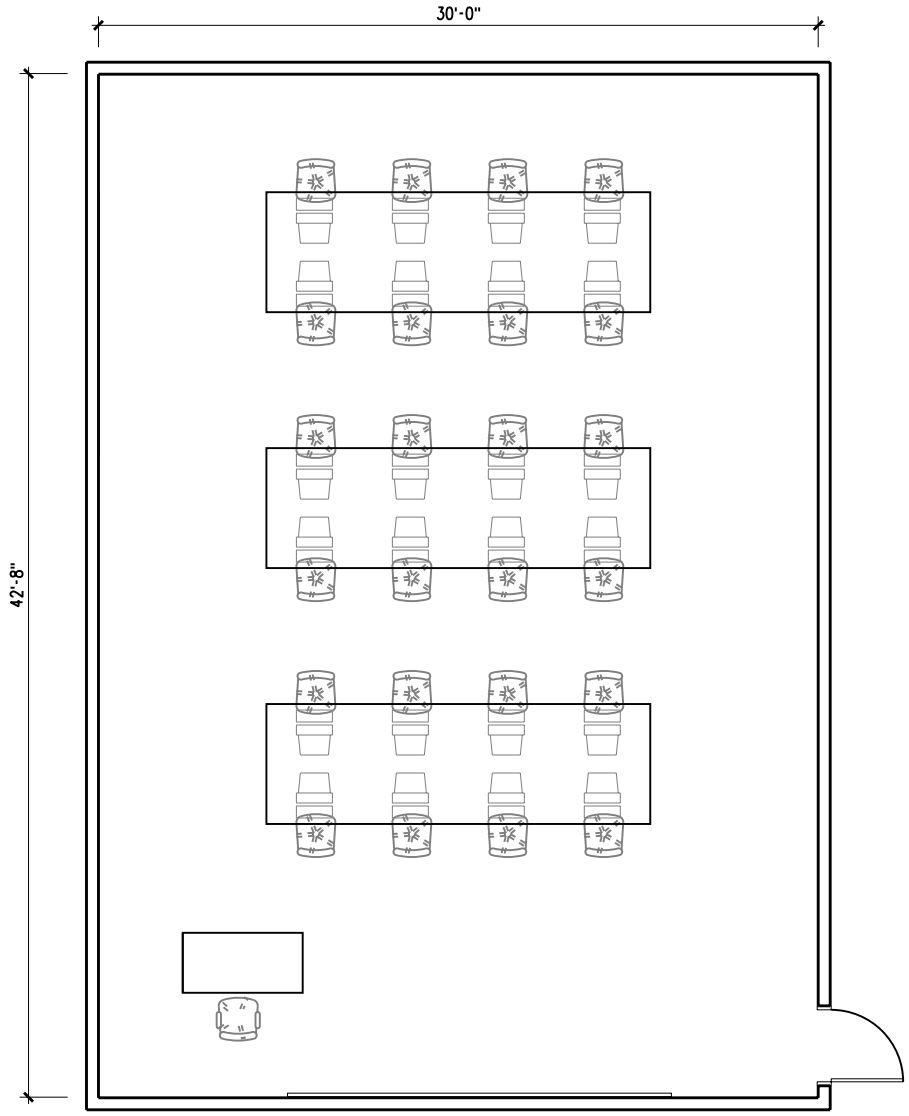
Floor	Carpet
Base	Resilient
Walls	Painted GWB and acoustic wall panels
Ceiling	ACT and GWB

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



0 2' 4' 8' 12'

SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department:	Shared	Shared
Space ID:	4.32	4.24
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:

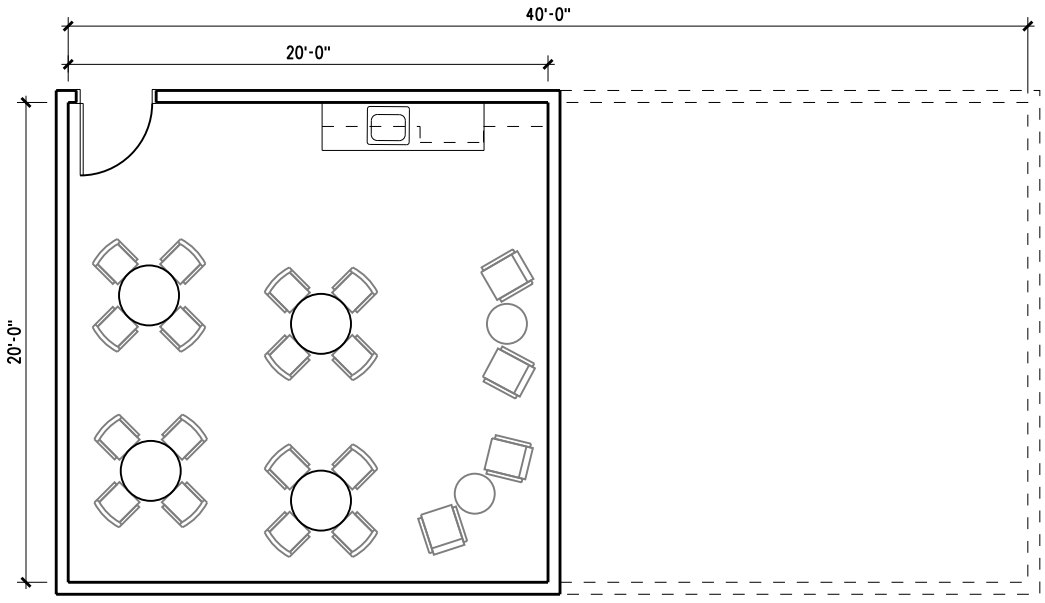
Floor	Carpet
Base	Resilient
Walls	Painted GWB and acoustic wall panels
Ceiling	ACT and GWB

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



4.32 STUDENT LOUNGE 800 ASF
4.24 FACULTY LOUNGE 400 ASF

SPACE DIAGRAMS / DETAILED REQUIREMENTS

Department: Shared
Space ID: 4.44
Space Name: Custodial Bulk Storage
Occupants/space: n/a
ASF: 150
No of spaces: 1

GENERAL:

Function	Bulk storage
Adjacencies	n/a
Ceiling Height	9’
Windows	None
Daylight Control	None
Lighting	General purpose, motion sensor control

FINISHES:

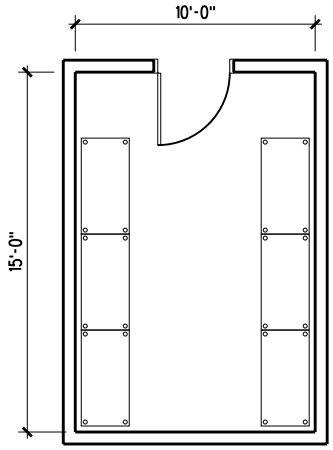
Floor	Resilient
Base	Resilient
Walls	Painted GWB
Ceiling	ACT

UTILITIES:

Plumbing	None
Electrical	Duplex at selected locations
Floor Boxes	None
Data/Telecom	None
Audio-Visual	None
HVAC/Controls	Yes

EQUIPMENT:

Fixed	None
Moveable	Owner-furnished shelving or none



THE ROBINSON COMPANY

EASTERN WASHINGTON UNIVERSITY
NEW SCIENCE BUILDING I
PRE-DESIGN ESTIMATE
JUNE 9, 2014

New Science Building	102,573	SF	$ 400	$	41,078,062
Site Development	1	LS	$ 1,524,833	$	1,524,833
Total Construction/MACC - June. 2014				**$**	**42,602,894**

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
Payment/Performance Bonds
Escalation - Refer to State Budget Form

THE ROBINSON COMPANY

PROJECT: EASTERN WASHINGTON UNIVERSITY SCIENCE 1 - BUILDING
LOCATION: CHENEY, WA
BLDG SF: 102,573
ESTIMATE: 2014106
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		1,099,220	10.72	1,209,142	11.79
A20	BASEMENT CONSTRUCTION		324,228	3.16	356,651	3.48
B10	SUPERSTRUCTURE		3,593,034	35.03	3,952,338	38.53
B20	EXTERIOR CLOSURE		3,931,377	38.33	4,324,515	42.16
B30	ROOFING		544,566	5.31	599,023	5.84
C10	INTERIOR CONSTRUCTION		2,371,402	23.12	2,608,542	25.43
C20	STAIRS		244,720	2.39	269,192	2.62
C30	INTERIOR FINISHES		2,484,686	24.22	2,733,154	26.65
D10	CONVEYING SYSTEMS		340,000	3.31	374,000	3.65
D20	PLUMBING		2,082,017	20.30	2,290,218	22.33
D30	HVAC		7,052,661	68.76	7,757,927	75.63
D40	FIRE PROTECTION		384,649	3.75	423,114	4.13
D50	ELECTRICAL		4,509,353	43.96	4,960,288	48.36
E10	EQUIPMENT		3,079,712	30.02	3,387,683	33.03
E20	FURNISHINGS		433,798	4.23	477,178	4.65
Z10	GENERAL REQUIREMENTS		3,090,000	30.12	3399000	33.14
	ESTIMATE SUBTOTAL		**35,565,421**	**346.73**	**39,121,963**	**381.41**
	DESIGN CONTINGENCY @	10.00%	3,556,542			
	SUBTOTAL		39,121,963		39,121,963	
	GENERAL CONTRACTOR'S OH & P @	5.00%	1,956,098		1956098.17	
	SUBTOTAL		41,078,062		41,078,062	
	ESCALATION-SEE STATE FORM TO 01-FEB-18 (0.					
	TOTAL		**41,078,062**	**400.48**	**41,078,062**	**400.48**

EXCLUSIONS:
SEE ESTIMATE SUMMARY

PROJECT: EASTERN WASHINGTON UNIVERSITY SCIENCE 1 - BUILDING
LOCATION: CHENEY, WA
BLDG SF: 102,573
ESTIMATE: 2014106
EST TYPE: PREDESIGN

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
A10	**FOUNDATIONS**					
02000	FOUNDATION DEWATERING SYSTEM	1,200	LF	15.00	18,000	
02000	GEOPIER FOUNDATIONS	30,000	SFA	8.25	247,500	
02000	UNDERSLAB DRAINAGE SYSTEM	30,000	SFA	5.00	150,000	
02315	FOUNDATION EXCAV/BACKFILL	30,000	SFA	1.50	45,000	
02620	FOOTING DRAINS @ BLDG	1,200	LF	9.00	10,800	
02720	GRAVEL @ CONC S.O.G 6" DEEP	30,000	SF	0.65	19,500	
03000	FOUNDATIONS/GRADEBEAMS/PILE CAPS	30,000	SFA	12.50	375,000	
03000	PREM STEPPED FOUNDATION/RAMPS/STAIR	30,000	SFA	0.54	16,200	
03000	PREM TIERED FLOOR/STAIRS	2	EA	25,000	50,000	
	LG CLASS & PLANETARIUM					
03310	ELEVATOR PIT	2	EA	7,500	15,000	
03310	SLAB ON GRADE	30,000	SF	4.50	135,000	
03330	VAPOR BARRIER @ SLAB	30,000	SF	0.35	10,500	
07210	RIGID INSUL @ SLAB PERIMETER	4,200	SF	1.60	6,720	
A10	**FOUNDATIONS**			**DIVISION TOTAL**	**1,099,220**	**10.72**
A20	**BASEMENT CONSTRUCTION**					
02000	BACKFILL BASEMENT WALLS	3,360	CY	18.00	60,480	
02000	BASEMENT EXCAVATION/HAUL	7,804	CY	12.00	93,648	
03000	BASEMENT CONC WALLS	4,536	SF	32.00	145,152	
07000	MEMBRANE/INSUL/DRAINAGE AT WALLS	4,536	SF	5.50	24,948	
A20	**BASEMENT CONSTRUCTION**			**DIVISION TOTAL**	**324,228**	**3.16**
B10	**SUPERSTRUCTURE**					
03000	RAISED FLOOR/STAIRS @ MED CLASS	2,400	SF	7.50	18,000	
03200	CONC PADS @ ROOF FOR MECH EQUIP	2,000	SF	3.50	7,000	
03200	CONCRETE FLOOR STRUCTURE - BEAMS/COL/SLAB	72,573	SF	29.00	2,104,617	
03200	CONCRETE ROOF STRUCTURE - BEAMS/COL/ROOF	30,573	SFA	26.00	794,898	
05000	BRACE/MOMENT FRAMES - ROOF	30,573	SFA	5.00	152,865	
05000	BRACE/MOMENT FRAMES-FLOORS	72,573	SFA	5.00	362,865	
05260	MISC STEEL/METALS/RAILS	36	TON	3,500	127,003	
	1 LB/SF					
07840	FIRESTOPPING ALLOWANCE-FLOOR	72,573	SFA	0.25	18,143	
07840	FIRESTOPPING ALLOWANCE-ROOF	30,573	SFA	0.25	7,643	
B10	**SUPERSTRUCTURE**			**DIVISION TOTAL**	**3,593,034**	**35.03**
B20	**EXTERIOR CLOSURE**					
04200	BRICK-VENEER	24,322	SF	22.00	535,084	
04500	EXTERIOR COPING/DETAILING	5,100	LF	52.00	265,200	
05530	SUN SHADES - WEST AND SO ELEV	600	LF	130	78,000	
06110	EXTERIOR WALL AREA - GROSS LESS CURTAIN WALL	46,339	SF			
07000	MECHANICAL SCREEN	1,120	SF	35.00	39,200	
07000	METAL PANEL SYSTEM @ BLDG	14,453	SF	35.00	505,855	
07000	PENTHOUSE WALL FRAME/METAL SIDING	6,188	SF	37.00	228,956	

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
08110	EXT.DOORS,FRAM,HDWRE-PER LEAF	17	EA	3,000	51,000	
08500	ALUM CURTAIN WALL/SPANDREL PANELS	10,635	SF	80.00	850,800	
08500	ALUM WINDOWS	8,384	SF	55.00	461,120	
09110	EXT WALL DETAILING/TRIMS/REVEALS	65,088	SFA	1.75	113,904	
09110	EXT. MTL STUD WALL SYSTEM	46,339	SF	15.75	729,839	
	EXCLUDES CURTAIN WALL AREA					
09900	SEAL MASONRY VENEER/CONC	24,322	SF	1.30	31,619	
10720	ALUM LOUVERS-ALLOW	680	SF	60.00	40,800	
B20	**EXTERIOR CLOSURE**			**DIVISION TOTAL**	**3,931,377**	**38.33**
B30	**ROOFING**					
06120	ROOFING ROUGH CARPENTRY	30,573	SFA	0.65	19,872	
07220	RIGID INSULATION/COVER BOARD	30,573	SF	5.50	168,152	
07220	TAPERED INSULATION ROOF/ CRICKETS	30,573	SF	0.30	9,172	
07540	MEMBRANE ROOFING	30,573	SF	6.50	198,725	
07580	CANOPY-ALLOW	500	SF	75.00	37,500	
07620	MISC FLASHING/SHEET METAL	30,573	SFA	1.85	56,560	
07700	FALL PROTECTION/WINDOW WASH DAVITS	1	LS	50,000	50,000	
07700	MISC ROOF ACCESSORIES	30,573	SFA	0.15	4,586	
B30	**ROOFING**			**DIVISION TOTAL**	**544,566**	**5.31**
C10	**INTERIOR CONSTRUCTION**					
06000	ROUGH CARPENTRY/WALL SUPPORT/BACKING	102,573	SFA	0.40	41,029	
08210	INT. DOOR/FRM/HDWRE-PER LEAF	184	EA	1,500	276,000	
08330	PREM FIXED LEAF DBL DOORS	42	EA	2,000	84,000	
08330	SPECIAL DOORS/SLIDERS/OPERABLE	1	LS	30,000	30,000	
	ALLOWANCE					
08500	INTERIOR GLAZING/RELITES	3,360	SF	45.00	151,200	
	ALLOWANCE					
08710	CARD KEY ACCESS SYSTEM	1	LS	75,150	75,150	
08710	MISC HDWRE/RATINGS/ADA	1	LS	10,050	10,050	
09110	FURR BASEMENT WALLS	3,360	SF	6.50	21,840	
09110	INT PARTITIONS BASIC- COMPLETE	117,248	SF	9.80	1,149,030	
09130	ADDITONAL LAYERS GWB,WALL TYPES	102,573	SFA	1.20	123,088	
	ALLOWANCE					
10000	AV SCREENS	21	EA	900	18,900	
10000	MISC SPECIALTIES/FITTINGS	102,573	SFA	3.50	359,006	
10000	SLIDING WHITE BOARDS	3	EA	3,500	10,500	
10110	MARKER BOARDS	2,058	SF	10.50	21,609	
C10	**INTERIOR CONSTRUCTION**			**DIVISION TOTAL**	**2,371,402**	**23.12**
C20	**STAIRS**					
05500	INTERIOR GUARDRAILS (OPEN TO BELOW)	54	LF	180	9,720	
05500	INTERIOR STAIRS	9	FLT	15,000	135,000	
05500	STAIR TO PLANETARIUM	1	FLT	100,000	100,000	
C20	**STAIRS**			**DIVISION TOTAL**	**244,720**	**2.39**
C30	**INTERIOR FINISHES**					
06200	MISC. FINISH CARPENTRY	102,573	SFA	1.40	143,602	
09000	PREM ACOUSTIC UPGRADE	4	EA	3,500	14,000	

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
	CLASSROOMS					
09000	WALL FINISHES	102,573	SFA	4.20	430,807	
09310	CERAMIC TILE FLOOR/WALLS/BASE	11,736	SF	10.50	123,228	
	CORE RR'S					
09500	GWB CEILINGS/SOFFITS	15,386	SF	6.50	100,009	
09510	SUSPENDED ACOUSTIC CEILINGS	53,387	SF	3.75	200,201	
09570	EXPOSED TO ABOVE - PAINTED	17,000	SF	1.50	25,500	
09570	WOOD SLAT CEILINGS @ LOBBY/CORRIDORS	16,800	SF	26.00	436,800	
09610	EPOXY FLOORING (HAZARDOUS STORAGE RMS0	3,000	SF	15.00	45,000	
09610	RESILIENT/POLISHED FLOORING	53,337	SF	8.50	453,365	
	CORRIDORS/LABS/RES					
09610	SLATE FLOORING	7,500	SF	25.00	187,500	
09650	CARPET AT OFFICES/CLASS	21,400	SF	4.75	101,650	
09650	SEALED CONC (MECH/ELECT/STORAGE/PENTHOUSE)	17,000	SF	0.75	12,750	
09650	WOOD/RESILIENT BASE ALLOWANCE	102,573	SFA	0.30	30,772	
09900	INTERIOR PAINTING	102,573	SFA	1.75	179,503	
C30	**INTERIOR FINISHES**			**DIVISION TOTAL**	**2,484,686**	**24.22**
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**	**3.31**
D20	**PLUMBING**					
15000	PLUMBING PREMIUM-CHEM/LABS/RESEARCH	67,000	SFA	15.00	1,005,000	
15000	PLUMBING-BASIC	102,573	SFA	10.50	1,077,017	
D20	**PLUMBING**			**DIVISION TOTAL**	**2,082,017**	**20.30**
D30	**HVAC**					
15000	GEOTHERMAL WELLS					
	INCLUDED IN SEP FUNDING ESTIMATE					
15000	HVAC SYSTEM-BASIC	102,573	SFA	52.00	5,333,796	
15000	PREM HEAT RECOVERY	102,573	SFA	5.00	512,865	
15000	PREM HVAC -CHEM/LABS	67,000	SFA	18.00	1,206,000	
D30	**HVAC**			**DIVISION TOTAL**	**7,052,661**	**68.76**
D40	**FIRE PROTECTION**					
15300	FIRE PROTECTION	102,573	SFA	3.75	384,649	
D40	**FIRE PROTECTION**			**DIVISION TOTAL**	**384,649**	**3.75**
D50	**ELECTRICAL**					
16000	DEMONSTRATION PV	1	LS	150,000	150,000	
16000	ELECTRICAL	102,573	SFA	32.00	3,282,336	
16000	SPECIAL SYSTEMS AV/SECURITY/CCTV	102,573	SFA	10.50	1,077,017	
	EQUIPMENT IN FFE					
D50	**ELECTRICAL**			**DIVISION TOTAL**	**4,509,353**	**43.96**

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
E10	**EQUIPMENT**					
09570	INTERIOR PROJECTION DOME 35' DIA	1	LS	200,000	200,000	
	PERF METAL					
11000	MULTI MEDIA PROJECTORS	21	EA	2,500	52,500	
11030	CYLINDER RACK (2)	17	EA	2,000	34,000	
11030	CYLINDER RACK (4)	4	EA	3,500	14,000	
11030	FUME HOODS 4'	7	EA	7,000	49,000	
11030	FUME HOODS 5'	1	EA	9,000	9,000	
11030	FUME HOODS 6'	67	EA	12,500	837,500	
11030	FUME HOODS 8'	23	EA	17,000	391,000	
11030	MISC EQUIPMENT-DIV 11	102,573	SFA	0.50	51,287	
11030	OVERHEAD SERVICE CARRIER	236	LF	75.00	17,700	
11030	SNORKEL EXHAUST	11	EA	3,500	38,500	
11600	LAB BENCH SITTING HEIGHT	247	LF	425	104,975	
11600	LAB BENCH SITTING HEIGHT ISLANDS	16	LF	425	6,800	
11600	LAB BENCH STANDING HEIGHT	1,080	LF	450	486,000	
11600	LAB BENCH STANDING HEIGHT ISLANDS	570	LF	450	256,500	
11600	MOVABLE DEMO BENCH 5' X 2'6"	19	EA	5,000	95,000	
11600	MOVABLE LAB TABLES	59	EA	2,800	165,200	
11600	PIPE DROP ENCLOSURES	72	EA	250	18,000	
11600	REAGENT SHELVES	208	LF	650	135,200	
11600	TABLES 2' X 4'6" TABLES	39	EA	1,800	70,200	
11600	WORKROOM SHELVING	34	LF	75.00	2,550	
12000	FLAMMABLE STORAGE CABINET	14	EA	3,200	44,800	
E10	**EQUIPMENT**			**DIVISION TOTAL**	**3,079,712**	**30.02**
E20	**FURNISHINGS**					
12000	BUILT IN BOOK SHELVES (ADJUSTABLE SHELVING)	311	LF	75.00	23,325	
12000	COAT/BOOK BAG STORAGE UNIT	92	LF	450	41,400	
12000	COUNTERTOP	63	LF	175	11,025	
12000	MAILBOXES	27	LF	450	12,150	
12000	TALL STORAGE CABINETS-WOOD	88	LF	750	66,000	
12000	WALL CABINETS W/DOORS	25	LF	275	6,875	
12320	BASE CABINETS - WOOD	34	LF	495	16,830	
12350	ADJUSTABLE SHELVING	937	LF	35.00	32,795	
12500	WINDOW COVERINGS-ROLLER SHADES	10,484	SF	9.50	99,598	
	EXT WINDOWS/OFFICES					
12610	LECTURE TABLES - LARGE CLASS	242	LF	400	96,800	
12610	SEATING - RECLINING	60	EA	450	27,000	
12610	SEATING/TABLES - LG/SMALL CLASS		EA			
	OWNER FURNSIHED					
E20	**FURNISHINGS**			**DIVISION TOTAL**	**433,798**	**4.23**
Z10	**GENERAL REQUIREMENTS**					
01000	BLDG FLOOR AREA	102,573	SF			
01000	CONTRACTOR TAXES/INSURANCES	1	LS	540,000	540,000	
01000	GENERAL CONDITIONS-REIMBURSEABLES	20	MO	125,000	2,500,000	
01000	MOCK-UPS	1	LS	50,000	50,000	
Z10	**GENERAL REQUIREMENTS**			**DIVISION TOTAL**	**3,090,000**	**30.12**
				ESTIMATE SUBTOTAL	**35,565,421**	**346.73**

THE ROBINSON COMPANY

PROJECT: EASTERN WASHINGTON UNIVERSITY SCIENCE 1 - SITE DEVELOPMENT
LOCATION: CHENEY, WA
BLDG SF:
ESTIMATE: 2014106
EST TYPE: PREDESIGN

DIVISION	DESCRIPTION		Total w/o Design Contingency TOTAL	$/SF	Total with Design Contingency TOTAL	$/SF
G10	SITE PREPARATION		555,014		610,515	
G20	SITE IMPROVEMENTS		474,728		522,200	
G30	SITE CIVIL / MECHANICAL UTILITIES		180,460		198,506	
G40	SITE ELECTRICAL UTILITIES		110,000		121,000	
	ESTIMATE SUBTOTAL		**1,320,202**		**1,452,222**	
	DESIGN CONTINGENCY @	10.00%	132,020			
	SUBTOTAL		1,452,222		1,452,222	
	GENERAL CONTRACTOR'S OH & P @	5.00%	72,611		72,611	
	SUBTOTAL		1,524,833		1,524,833	
	ESCALATION-SEE STATE FORM TO 01-FEB-18 (0.					
	TOTAL		**1,524,833**		**1,524,833**	

EXCLUSIONS:
SEE ESTIMATE SUMMARY

PROJECT: EASTERN WASHINGTON UNIVERSITY SCIENCE 1 - SITE DEVELOPMENT
LOCATION: CHENEY, WA
BLDG SF:
ESTIMATE: 2014106
EST TYPE: PREDESIGN

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	$/SF
G10	**SITE PREPARATION**					
02000	DEMO REID LAB BLDG	29,000	SF	10.50	304,500	
02000	DEWATERING DURING CONSTRUCTION	1	LS	50,000	50,000	
02000	SITE AREA - AFFECTED	78,920	SF			
02000	STRIP SITE/DEMO SURFACING	49,920	SF	0.75	37,440	
	MINIMAL					
02200	EARTHWORK/GRADING CUT & FILL	7,307	CY	10.00	73,074	
	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**	**555,014**	
G20	**SITE IMPROVEMENTS**					
02750	ASPHALT DRIVE BETWEEN SCI 1 & WR/WM	9,250	SF	3.75	34,688	
02750	UTILITY/DUMPSTER PADS	331	SF	10.00	3,310	
02770	CURBING/STRIPPING/SIGNAGE	9,250	SFA	1.50	13,875	
02775	CONCRETE WALKS/PAVING	3,000	SF	6.50	19,500	
02800	MISC SITE IMPROVEMENTS/FURNISHINGS	1	LS	15,000	15,000	
02900	LANDSCAPE/IRRIGATION	36,670	SFA	6.50	238,355	
03000	LOADING DOCK	1	LS	150,000	150,000	
G20	**SITE IMPROVEMENTS**			**DIVISION TOTAL**	**474,728**	
G30	**SITE CIVIL / MECHANICAL UTILITIES**					
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	60	LF	50.00	3,000	
02630	BIOSWALE ALONG NEW DRIVE	365	LF	16.50	6,023	
02630	STORM COLLECTION/WATER QUALITY	42,250	SFA	1.75	73,938	
	BLDG ROOF & PAVING					
03000	UTILITY TUNNEL EXTENSION	50	LF	1,500	75,000	
G30	**SITE CIVIL / MECHANICAL UTILITIES**			**DIVISION TOTAL**	**180,460**	
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	**1,320,202**	