UMBC

AN HONORS UNIVERSITY IN MARYLAND

The Interdisciplinary Life Sciences Building

Part II Facility Program

March 28, 2012

Prepared by

UMBC Facilities Management

University of Maryland, Baltimore County

University System of Maryland

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3300 Metzerott Road
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Section 1 Introduction

University of Maryland, Baltimore County (UMBC)

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Established in 1966, the University of Maryland, Baltimore County is one of twelve institutions that along with two regional centers and one system office constitute the University System of Maryland. UMBC is a public research university, emphasizing graduate programs in the sciences, engineering, public policy, information technology, and human services, building on a strong undergraduate liberal arts and science core.

The founding faculty sought to create a new model for higher education. Their spirit of interdisciplinary inquiry, collaboration and strong sense of shared governance continues to thrive on the campus. The university has propelled itself into the national limelight. In 2003, the university was named by *Newsweek* as one of America's "hot schools." For the last two years, UMBC has been recognized by *U.S. News & World Report's 2010 and 2011 America's Best Colleges Guide* as the nation's **top up-and-coming** national university.

UMBC is also recognized increasingly as a major resource for building the State's economy and addressing its social concerns. More than 70% of UMBC's 53,600 active alumni live and work in Maryland, contributing significantly to the State's economic and social vitality. In Fall 2011, UMBC's 13,199 students hailed from nearly all 50 states and more than 80 other nations, creating a richly diverse student body that enriches the learning and teaching experience. In 2010, the university awarded 1,915 bachelor's degrees, 505 master's degrees, 84 doctorates and 126 graduate certificates.

The last five years has seen a significant rise in the number of students. Student headcount has increased 12% for undergraduate students and over 10% for graduate students during this period.

The campus (excluding bwtech@UMBC and the three parking garages) consists of 3,243,123 gross square feet (GSF) of built space, of which 2,001,628 are net assignable square feet (NASF). The campus occupies 512 acres of mostly former farmland, and some forested areas and streams. The campus has excellent access to both I-95 via I-195 and the Baltimore Beltway (I-695) via Wilkens Avenue. The traffic and noise associated with those major roadways is not felt on campus due to the heavily wooded periphery of the campus site. The forested edges, sloping topography with views to the east, and the low density of surrounding residential development, all work to define a wooded and pastoral setting for the campus.

<u>Academic Programs</u>

For undergraduates, UMBC offers 42 majors, 41 minors and 17 certificate programs in the physical and biological sciences, the social and behavioral sciences, engineering, mathematics, information technology, the humanities, and the visual and performing arts. UMBC's Graduate School offers 37 master's degree programs, 24 doctoral degree programs and 21 graduate certificate programs. Programs are offered in education, engineering, emergency health services, imaging and digital arts,

information technology, aging services, life sciences, psychology, public policy and a host of other fields. In addition, UMBC's Division of Continuing and Professional Studies delivers programs in high demand areas of study that address regional and national workforce shortages.

Inquiry is central to UMBC's curriculum. UMBC faculty and researchers actively seek collaborative research opportunities and consistently encourage students to obtain "real world" experiences via research, internships, co-op experiences and service learning. Undergraduates at UMBC are given the rare opportunity to pursue their own research questions, with the support of faculty mentors.

Research

UMBC, following its rapid development as a major research university, is classified by the Carnegie Foundation as a Research University-High Research Activity, placing it at the top tier of American research universities. In the 2010 classification, only 4.5% (212) of the nation's 4,633 colleges and universities are included in the elite categories of High Research Activity and Very High Research Activity.

UMBC's dynamic faculty members are committed to research, as evidenced by their successes in competing for funding and external support. Grants and contracts for the 2011 fiscal year total over $83 million annually, up from just $8 million in 1990.

1.01 University Mission

UMBC is a dynamic university integrating teaching, research, and service to benefit the citizens of Maryland. As an Honors University, UMBC offers academically talented students a strong undergraduate liberal arts foundation that prepares them for graduate and professional study, entry into the workforce, and community service and leadership. Known for its outstanding faculty and cutting-edge research, UMBC emphasizes science, engineering, information technology, human services, and public policy at the graduate level. UMBC contributes to the economic development of the State and the region through entrepreneurial initiatives, workforce training, K-16 partnerships, and technology commercialization in collaboration with public agencies and the corporate community. UMBC is dedicated to cultural and ethnic diversity, social responsibility, and lifelong learning.

1.02 Purpose of the Part II Facility Program

While the Part I addressed the justification for the project, this Part II Facilities Program defines the environmental, spatial, and physical characteristics of the proposed new Interdisciplinary Life Sciences Building project. The outlined architectural, engineering and planning objectives and detailed space allocation requirements are intended to guide the Consultant to be employed by UMBC to prepare plans and specifications required for contract bidding and construction.

This document:

a. Establishes the site boundaries of the project.

b. Delineates architectural, engineering, and planning objectives to be considered during design.

c. Provides the basis for a detailed cost estimate for use in the State capital budget and capital improvement program.

d. Details the required space allocations in the facility, based on functional requirements.

e. Describes the functional use, requirements, and general performance standards of the space.

f. Presents graphically the desired functional relationships between spaces.

g. Affords the university a planning tool with which to develop project familiarity and assess priorities.

This document is also included as part of the contract of the Consultant with the University of Maryland, Baltimore County for the design of the project and in relation to this function the document will:

- Identify the performance requirements for the site.
- Provide a complete description of the scope.
- Describe the functional use, requirements, and performance standards for the project.
- Identify the general or special engineering and planning objectives and criteria to be incorporated in the design.

The project site which is not within the Chesapeake Bay Critical Area, 1 100-year floodplain or known wetland, will not impact historical and/or cultural resources and will not involve clearing of areas defined as forested by the State of Maryland.

Figure 1.1 The UMBC Campus

Proposed Site of the Interdisciplinary Life Sciences Building

Section 2 Project Scope

2.01 Purpose and Goals

UMBC's new Interdisciplinary Life Sciences Building (ILSB) will provide approximately 131,000 GSF / 70,690 NASF of flexible and adaptable research and education spaces to support on-going and future interdisciplinary life science programs. This building will allow for:

- enhancement and expansion of life sciences programs and teaching facilities;
- addressing shortages in teaching and research space;
- relocation of animal and other core research functions from existing deficient spaces in academic buildings; and
- advancement of retention and recruitment of top quality students and faculty.

To support these goals and to address the current facilities problems the ILSB is planned to:

- make up for a significant portion of the teaching space deficit by providing active-learning classrooms, technologically-equipped seminar rooms, and multi-disciplinary teaching labs estimated to support an additional 1,000 FTE students in support of UMBC's science, technology, engineering, and mathematics (STEM) programs. The university's goal to increase capacity for degree production in STEM disciplines is in alignment with USM and State priorities to promote economic growth in Maryland.
- provide flexible and adaptable research laboratories to support 30 to 40 principal investigators, and more than 100 undergraduate and graduate student researchers and post doctoral fellows. The function and operation of the building will promote interdisciplinary research approaches bridging established disciplines and traditional fields of research to encourage and promote the types of collaborations needed to solve complex challenges. UMBC is well positioned to further support the State's biotechnology industry with the creation of new companies and the associated jobs for Maryland.
- consolidate and replace existing campus animal-based research facilities with a new vivarium to address the critical need to upgrade and expand this essential core research function to support twice as many animal-based research faculty – with only a modest increase in overall space. The quality, condition, and features of the new vivarium will demonstrate UMBC's commitment to the highest standards for care and use of animals in research and open up opportunities for external research funding currently unavailable.
- provide the only research labs on campus configured to allow for Biological Safety Level -2 (BSL-2) research protocols, increasingly necessary for life science research . In conjunction with BSL-2

capable holding and procedure rooms in the vivarium, these facilities will allow the university to expand its capacity for interdisciplinary investigations.

- provide other core research facilities currently unavailable on campus to support a wide array of relevant life sciences research. A Bioprocess and Cell Science Lab will provide specialized core facilities for the growth, harvesting, separation and purification of animal cells, bacteria, fungi, yeast or algae in controlled environments to support the research interests of faculty, doctoral students, and undergraduate researchers from all departments engaged in life science based research.

> *UMBC's Interdisciplinary Life Sciences Building will seamlessly connect teaching and research activities to enhance and further stimulate collaborative approaches to advancing the State's biotechnology industry and increasing the number of STEM graduates.*

The ILSB will continue the evolution of how STEM courses at the university are taught; it will focus on new pedagogies supported by specialized teaching facilities to encourage student engagement, retention and recruitment. The 18 classrooms, seminar rooms and teaching labs will be oriented to STEM-based courses, both at the undergraduate and graduate levels. These facilities, along with a Good Manufacturing Practices (GMP) teaching lab will add 800 seats to the university's teaching space inventory.

The ILSB will be a critical facility to expand and further enhance STEM programs at UMBC. The need for graduating STEM students has been identified by the University System of Maryland and the Governor of Maryland in recognition of the importance of preparing science and mathematics students and investing in research to encourage innovation.

The ILSB will be fully multi-disciplinary, drawing students and faculty from diverse programs, but with common interests in life science program areas such as biochemistry and molecular biology, bioinformatics and computational biology, geography and environmental systems, biochemical engineering, neurosciences and cognitive sciences, and biological sciences. The consolidation of core research facilities and the introduction of interdisciplinary lab settings will promote unique relationships across traditional academic college boundaries.

The Interdisciplinary Life Sciences Building has been conceived as a facility for collaborative participation in learning and research. It will serve both undergraduate and graduate students in diverse STEM programs with team-based classrooms and labs that engage and develop students in new and creative ways. These teaching spaces will be complemented with collaborative project-based study rooms and seminar facilities with video-conferencing capabilities that will promote the sharing of knowledge and increase scientific literacy. The ILSB's project-based research labs will also foster collaboration among researchers and their graduate and undergraduate assistants, fostering interdisciplinary approaches to solving our region's most pressing life science challenges.

2.02 Program Summary

UMBC's new Interdisciplinary Life Sciences Building will provide:

- over **25,500 NASF of classrooms, teaching labs, study rooms**, and support space to support STEM programs. Eight active-learning classrooms, four seminar rooms, and four multi-disciplinary teaching labs will be designed using the latest technology and design approaches. These facilities will address the need for new, yet tested pedagogies to teaching foundation level and upper level courses in biology, chemistry, biochemistry, environmental systems, mechanical and biochemical engineering, physics, and mathematics.

  The new teaching labs will support courses taught in the active-learning classrooms, as well as the campus' more traditional lecture hall settings. The teaching labs will provide for hands-on experiments in a wet lab setting. Seminar rooms will support special undergraduate programs like the First Year Experience (www.umbc.edu/catalog/pages/firstyear.html), graduate level programs, and professional development activities for faculty and students.

- **14 shared, flexible and adaptable research laboratories**, with associated support spaces, that are dedicated to life science research activities involving faculty from multiple departments and colleges. A portion of the research labs will be oriented to animal-based research and the remainder to general life sciences research. The labs and adjoining support facilities will provide interdisciplinary opportunities to make discoveries addressing the diverse array of life science issues facing society.

  The laboratories will be modular in size with flexible options for layout and use, to respond to changes in research foci, and to adjust space assignments to accommodate the specific needs of each research team. Modular planning and flexibility of the physical elements of the laboratory, like casework and utility services, will allow for the ever-changing needs of interdisciplinary life science research.

*Table 2.1 Summary of the Proposed Program for the ILSB**

	Program Totals (NASF)*	Percent of Total
Teaching Facilities	25,570	36%
Interdisciplinary Research Lab Facilities	34,685	49%
Shared Core Research Facilities	8,710	12%
Building Support	1725	3%
TOTAL	**70,690**	**100%**

* Office and office service spaces associated with each functional area are included.

- **8,710 NASF of core research facilities** will be constructed in the ILSB to support an extensive array of research areas. The ILSB will include a new **Vivarium** to replace the campus' existing, deteriorating animal facilities. This new core facility will provide a central resource for all campus research and academic programs involving animal use protocols, capable of AAALAC accreditation to support interdisciplinary animal-based research.

  A **Bioprocess and Cell Science Lab** for the growth, separation, purification and storing of animal, plant and bacterial cells and their products will be developed in the ILSB in support of campus-wide research in the life sciences. Mathematical and statistical consulting support will be provided to researchers by an office for the **Center for Interdisciplinary Research and Consulting (CIRC)**.

Section 3 Instructions to the Consultant

3.01 Overview

It is the intent of UMBC to create a functional, flexible, maintainable, and attractive facility that will serve the university well for many decades. The university requires an innovative design solution conforming to and enhancing the site as described in Section 4.

The Consultant, as a team of professional architects, engineers experts, and other design specialists, will:

- provide specialized studies, architectural and engineering design, energy and life cycle cost analyses, and preparation of appropriate plans and specifications for the construction of a new 131,000 GSF / 70,690 NASF Interdisciplinary Life Sciences Building (ILSB);
- perform all required design functions, including the gathering of data on existing and desired conditions;
- prepare and include in the construction specifications the work schedule for those items of work which are sequential and could unduly disrupt operations; and
- provide any instructions as to scheduling, staging, or similar information needed to achieve optimum construction efficiency.

The design solution for both the site and the building components comprising the new ILSB will address, but not be limited to:

- architectural and space planning solutions for the defined spatial relationships/layouts for the various occupants as set forth in Section 6 Space Requirements;
- design and finish solutions that meet the needs and requirements of the instructional and research programs, as well as housekeeping and maintenance programs;
- a suitable design solution for both the building and the site that responds to issues of building, fire, public safety and security, and ADA regulations, ensuring that all solutions are integral to the desired end result;
- a design solution that meets or exceeds the requirements for LEED Silver Certification and provides energy efficiency in accordance with the International Energy Conservation Code;
- specialized studies as required herein, or reasonably inferred from this Program, to facilitate decisions and the design effort regarding site master planning, massing, scale, and impact of the building;
- specialized studies to ensure the continued operation of all buildings outside of the immediate construction area, including uninterrupted service access to The Commons;
- development of the site surrounding the building as an amenity and as an integral part of the building and design;

- development of a plan for the demolition of the existing building on the proposed site; and
- utilities serving the building through the extension of the campus underground utility tunnel network.

The Consultant is responsible during each phase of design to recommend alternatives that will achieve cost efficiencies to maximize available funding. Creative design solutions are sought rather than reductions in the defined project requirements. If, in the course of design, the Consultant recognizes architectural or engineering solutions more beneficial to the university than those indicated herein from the preliminary surveys, the university expects and solicits this professional advice for its early review.

3.02 Consultant Services

The specific programmatic requirements and design criteria provided in this Program are as complete and accurate as possible at this point in the project. The Consultant will consult with the university during the program validation phase of design to verify and/or refine the programmatic requirements and criteria.

The Consultant will provide the basic architectural and engineering services per the *University System of Maryland's Procedure Manual for Professional Architectural/Engineering Services of University of Maryland Projects*, as well as all requirements outlined in this section and in this document.

Work done under this section will respond to the design criteria, space, equipment requirements, and spatial relationships contained in Section 4 through Section 6 of this document. In addition to basic design and construction administration services, the Consultant will provide the following special services:

- A thorough review and validation of the facility program assumptions and conclusions, to identify any alternative ways of meeting the program objectives in a more cost effective manner.
- The establishment of a site development master plan incorporating the proposed building, service needs, water retention and filtration features, site landscaping and pedestrian amenities, the redevelopment of the adjacent quadrangle to the west, and the redesign of the adjacent plaza to the north. The site development master plan will take into consideration the loading and unloading and additional service needs of The Commons.
- The inclusion of areas outside the specific boundaries of the site that will be impacted by the project and addressed by the Consultant. These include modifications to the equipment within the Central Plant, extensions of the campus utility tunnel, potential access improvements from accessible parking spaces within the Commons Drive Garage, temporary and permanent improvements to Commons Drive, and potential off-site storm water features.
- The development of conceptual building concepts that convey the unique location of the ILSB on the campus, its two front doors facing both north and west, and the creative and multidisciplinary nature of the teaching and research conducted within.

- The provision of estimates and projections of all capital costs connected with the construction of the facility; such as, demolition of existing structure(s), cost of new construction, equipment installation, utility extensions, and site development at each submission (i.e., schematics, design development, and each phase of the construction documents). All estimates will be prepared and presented in Uniformat and DGS formats. Lump sums will not be acceptable. The selected Consultant's independent estimator will provide complete estimates concurrent with the submission of the Schematics and Design Development phases and a review of 50% cost estimate prepared by the university's Construction Management firm. The Consultant will not proceed to the next design phase until the cost estimates are reconciled with the available budget and the Construction Management firm's estimates.
- The development of alternative lab designs, by a certified Lab Planning specialist, incorporating the latest lab planning concepts, equipment and services to meet the stated research goals of the program.
- The preparation of presentation materials, including boards, electronic presentations and 3D models to convey the design concepts to university decision makers and outside review boards.
- Working with campus personnel to identify the specific areas where departure from current campus standards may be appropriate to optimize building systems and achieve or exceed the program intent.
- The preparation of a narrative design and life cycle cost analysis outlining utility options, with advantages/disadvantages considered, and justification for the selected system. The analysis will integrate the cost benefit of alternative energy-saving strategies, including high performance materials and systems, solar panels and high efficiency systems.
- The preparation of a building envelope analysis, highlighting criteria, details, infiltration and coordination with HVAC systems.
- The provision of space tabulations for each phase of design utilizing the Areas, Volume, Efficiency (AVE) Forms, by room, net assignable square footage ("NASF") and total gross square footage (GSF) for the building. Organize each space tabulation submission to include the Postsecondary Education Facilities Inventory and Classification Manual's (FICM) room use code category for each space. Follow the space allocations contained in this document. Indicate programmed net areas and actual along with any difference.
- Test-fit diagrams and style/fabric specifications of all moveable furniture in coordination with the university who will independently procure the moveable furniture. The Consultant will coordinate task or specialty lighting based on the approved test-fit diagrams.
- The provision of complete and integrated interior design package for this project. This includes all services, samples, product information, color presentation boards/renderings of interior spaces, drawings, specifications, and cost estimates for finishes and furnishings based upon programming information provided by UMBC. The package will also provide for the inclusion of all furniture, fixtures, and equipment shown in plan and elevation as necessary to demonstrate that all programmed functions can be accommodated.

- The coordination with the university and outside agencies for the integration of data and telecommunication systems and equipment needs.
- The development of the bid documents to coincide with the construction phasing plan prepared by the Construction Manager. The plan will highlight a safe, ADA compliant pedestrian route along the perimeter of the site limits, during construction, and the continued access of service vehicles to all adjacent buildings.
- The specification and design coordination of any equipment requiring special environmental conditions and/or building system conditions. Identification of methods of installation and connection with building utility services, and provision of necessary clearances for convenient, safe use, and maintenance of equipment will be included. These documents will be fully coordinated with mechanical, electrical, structural, plumbing (i.e., building systems), and all other pertinent construction documents. The Consultant will work with the university to specify all fixed and moveable specialized lab equipment.
- The submittal for university approval the name of an individual, either in his/her own work force or as a Consultant, to act as Energy Analyst for the university's project. The Energy Analyst will have proven experience in energy design analysis and will be a registered engineer or architect. The Energy Analyst will:
    - coordinate disciplines within the design team to achieve energy efficient design;
    - review architectural, mechanical, and lighting submittals for compliance with energy guidelines prior to submission to the university;
    - serve as the primary contact point on energy-related matters for the university's Facilities Management Department;
    - develop a building energy consumption model;
    - perform energy analysis; and
    - assist the university in establishing a desired, achievable energy budget.
- The preparation of all documentation and obtain approval of all permits and licenses as required by all agencies and jurisdictions having authority, which includes but is not limited to: storm water management, Forest Conservation, Maryland State Fire Marshal, fire apparatus accessibility, and installation of new boilers and hot water heaters.
- The provision, during the first twelve months of the Post Construction Stage, of a review of Operations and Maintenance manuals, and record documents, and participation in any commissioning activities that extend beyond the occupancy date. Include/provide at least two full team walk-through inspections at mutually established milestones.

3.03 Deliverables

- The Consultant will submit to the university, nine sets of all drawings and specifications required for review and approval by the university, UMB, and the Maryland State agencies for each phase of the project. Each submission will consist of three full-size drawing sets and six half-size sets unless otherwise stipulated by the university.
- The Consultant will develop a 3D computer model that would be used throughout the early design phases and developed into a final presentation following the completion of the Design Development Phase. The model format will allow it to be integrated into a campus-wide computerized site model in Google SketchUp.
- Following the acceptance of the final Construction Documents Phase drawings by UMBC and UMB, the Consultant will provide the university with:
    1. One reproducible copy of record drawings;
    2. Hard copy plus electronic file of specifications on most current version of Microsoft Word;
    3. Electronic drawing files on most current version of AutoCAD comprising Architectural, Mechanical, Electrical, Plumbing, Structural, Site Civil, Landscape Architecture, and any Specialty Consultant's drawings and details per UMBC's CAD standards.
- Tabulations of Net Assignable Areas in Microsoft Excel with each space identified by FICM space use code.
- Presentation materials, including study models, to satisfy the provisions of Section 3.02 above.
- Studies and reports to satisfy the provisions of Section 3.02 above.

3.04 Information to be Collected or Developed by the Consultant

The Consultant will collect all available information from UMBC regarding planimetrics, topography, utilities and infrastructure. Contracting with required support services, e.g. a surveyor, geotechnical services, etc., will be the responsibility of the selected Consultant.

Available existing building plans, utility plans, site maps, the Stormwater Management Master Plan (latest version), the Facilities Master Plan (2009-2019 or latest version), and the Campus Utility Infrastructure Study (2011) will be given to the Consultant. No assurances, however, are given that these records are complete or accurate. The Consultant will establish the precise location of all underground utilities and/or services in the construction area and show the same in detail on the design drawings.

<u>Referenced Standards</u>

- Where this document references UMBC design standards for building, landscape, site and building furniture, site lighting, paving materials, etc., the Consultant will solicit the current standards from the university.

Field Investigation Requirements

- The Consultant is fully responsible for accurately defining existing conditions and the impact of these conditions on the design. The selected Consultant is required to examine existing drawings, order test borings, test pits, radon tests, infrared tests, electrical load tests, and any other means necessary to ensure accuracy for the design.
- Existing drawings, whether "as built" or construction drawings should only be used as a guide and for reference and under no circumstances be construed as accurate. All conditions will be field verified by the selected Consultant team during the design development of this project.

Bench Marks

- The Consultant, with the approval of the university, will establish a sufficient bench mark for the development of contract documents.

Test Holes

- Where there is a doubt as to the actual location of any existing utility or there is the possibility of interfacing with the alignments of new or existing utilities, and if such information is deemed necessary to prepare an accurate design, the selected Consultant will make test holes either by performing the work or contracting for the work, only after the approval of the university.
- It will be the responsibility of the Consultant to inform the university as to the quantity and location of test holes required and field check the utilities after the test holes are open.

Geotechnical Soil

- Test borings to determine soil conditions will be done under the direction of the Consultant. It will be the responsibility of the Consultant to inform and receive approval from the university as to the quantity and location of the test borings needed.

Survey

- The Consultant will prepare a survey that documents all existing conditions of the site and confirm all information provided by the university. The extent of the information and work required by the survey will include, but not be limited to, all existing topography, utilities, roads and improvements, significant vegetation and natural features, existing utilities, boundaries, easements, and any legal restrictions that are applicable.
- All survey data will be in compliance with Maryland State plain coordinates NAD 83/91 and NAVD 88.

Additional Information

3.05 Responsibility for Compliance in Design

The Consultant is responsible for producing a design that complies with applicable codes, ordinances, statutes, regulations and laws, and all standards and procedures for construction.

3.06 Codes and Regulations

The *University System of Maryland's Procedure Manual for Professional Architectural/Engineering Services of University of Maryland Projects* lists the codes and regulations that the Consultant must design the project to and the permits required.

3.07 Abbreviations Used In This Document

A/E - Architect/Engineer

ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers

CA – Compressed Air

CAD - Computer Aided Design

COMAR - Code of Maryland Regulations

CW – Cold Water

DBM - Department of Budget and Management

DGS - Department of General Services

GPH – Gallons per hour

GSF - Gross Square Feet

HTHW – High Temperature Hot Water

HVAC - Heating, Ventilation Air-Conditioning

HW – Hot Water

ILSB – Interdisciplinary Life Sciences Building

IBC - International Building Code

LEED – U.S. Green Building Council, Leadership in Energy and Environmental Design

MOSHA - Maryland Occupational Safety & Health Administration

MBH – Thousands of British Thermal Units per Hour

NASF - Net Assignable Square Feet

NSF - Net Square Feet

NFPA - National Fire Protection Association

RO – Reverse Osmosis

USGS - United States Geological Survey

V - Vacuum

3.08 Information to be Provided to the Consultant

2009-2019 UMBC Master Plan Update

2011 Campus Utility Infrastructure Study

UMBC Vehicular and Pedestrian Signage Standards

UMBC Site Lighting Standards

UMBC Site Furnishing Standards

Google SketchUp File of UMBC Campus Model

UMBC CAD Model with Campus Utilities, Topography and Buildings

The UMBC Forest Stand Delineation Plan and Forest Preservation Bank Plan

Stormwater Management Master Plan (2002)

UMBC Utility Tunnel Specifications

UMBC's Network Equipment and Cabling Standards

Section 4 Site Development Criteria

Overview and Existing Site Conditions

The purpose of this section is to provide a basic outline of site challenges, assets and project requirements for the Consultant. The information provided in this section is intended to supplement the Consultant's own site evaluation.

The Consultant is responsible for the design of all areas within the project's site limit, including those directly impacted by the site coverage for the building footprint, the utility and drainage infrastructure requirements, the parking and access requirements, the open space requirements and any other required service or special constraint. Imaginative and responsible solutions must be developed to form a cohesive, unified, economical, and aesthetic design solution that is consistent with and advances the 2009 Facilities Master Plan.

4.01 Project Boundaries

Site limits suggested for the building, associated service access, site development and landscaping are illustrated generally in Figure 4.1 Proposed Project Boundaries of the ILSB.

- Site planning, as well as architectural and engineering design of the building, are a part of the scope and services of the selected Consultant. During the initial stages of design, the Consultant is required to assess the impact of all of the site requirements in order to establish the final project boundaries.
- The proposed ILSB site incorporates the footprint of the Theatre / Academic Services Building, as well as the area of the open quadrangle to the west of the building, and the plaza to the north. Vehicular access to the site will be from Commons Drive to the southeast. The site has been selected to encourage a strong nexus between science, technology, engineering, and mathematics (STEM) departments.
- The project boundary extends as well beyond these areas to encompass the Central Plant, the access stairs between the Biological Sciences Building and the Math/Psychology Building, the outflow area to the south of the Commons Drive Garage, and a ribbon of land to the north of the same garage extending to Hilltop Circle.

4.02 Existing Structures on the Site

Construction of the building will require the demolition of the existing 31,667 GSF Theatre / Academic Services Building, a one-story brick structure, built in 1968. The building currently houses a sloped floor theatre, theatre practice rooms, and costume and scenery shops, in addition to offices. The building will be vacated prior to the project start date.

Figure 4.1 Proposed Project Boundaries of the ILSB

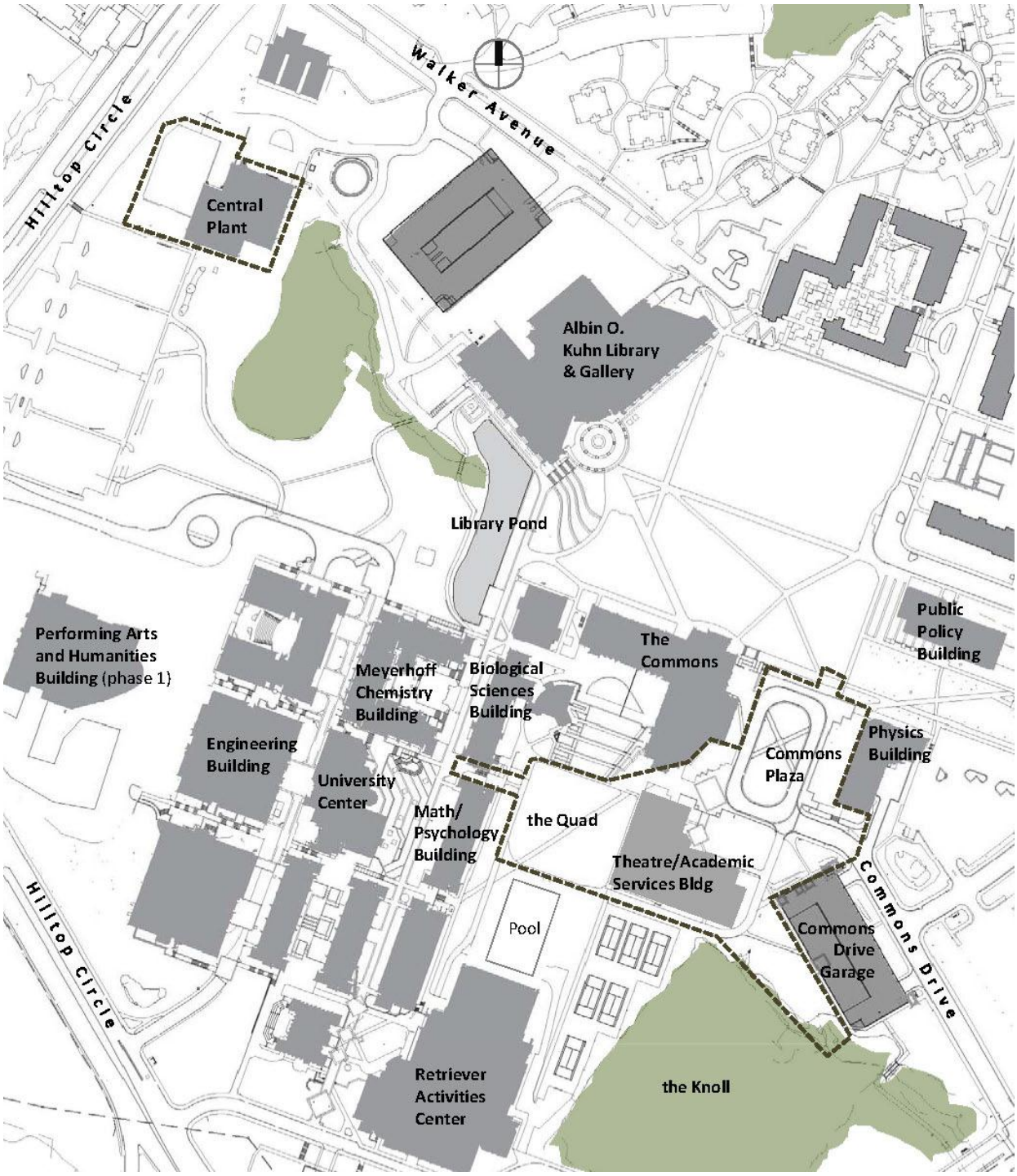


Figure 4.2 Existing Theatre/Academic Services Building

- The existing building was one of the original campus structures and is approaching 44 years. The structure is not connected to the campus' Central Plant and is heated and cooled with gas fired, roof-top air-handlers and dx condensers.
- The A/E will be responsible for securing IH testing to identify and document hazardous materials, and preparing plans and specifications for removal of hazardous materials.
- The campus' Central Plant is a two level structure and adjacent fenced yard housing the main boilers, chillers, pumps, cooling towers and transformers serving the campus academic core. The Central Plant supplies high temperature hot water and chilled water to 21 campus buildings, totaling approximately 1,975,000 GSF, via a network of underground utility tunnels. More details on the Central Plant are available in Sections 4.17 through 4.21.

4.03 Adjacent Facilities

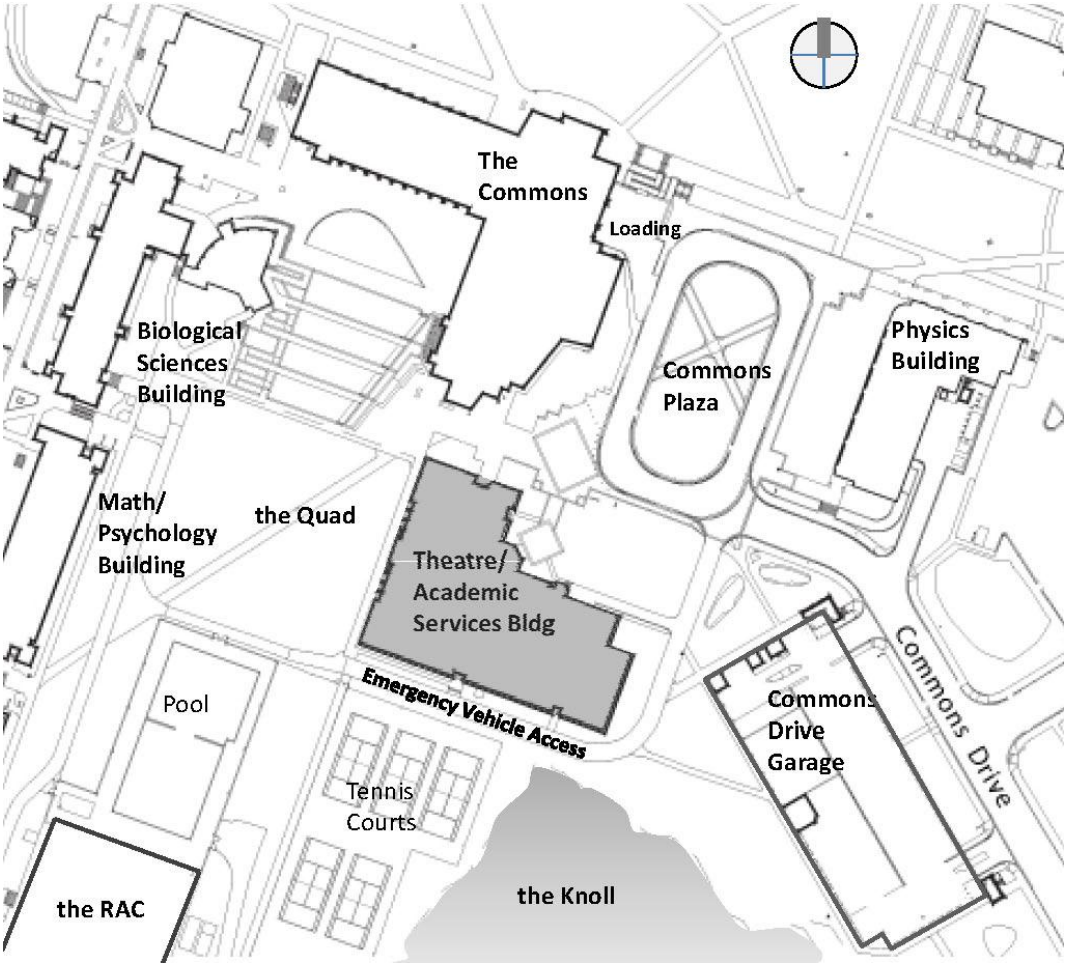
- The project site borders buildings and campus facilities that will be protected during construction. These include The Commons, Commons Drive Garage, Physics Building, Biological Sciences Building, Math/Psychology Building, and the Retriever Activities Center (RAC). Access to these facilities will be maintained throughout the construction period.

4.04 Forested Areas, Streams and Ponds

- The project site is adjacent to the Knoll, a forested hill located to the east of the RAC. This area is particularly venerated by many in the campus community. Successful designs will minimize to the extent possible impact to this area and other forested areas.

- A creek runs along the southeast edge of the project site, south of the Commons Drive Garage. A large, underground pipe from Library Pond outfalls into this creek. Improvements to the storm water management of the project site may impact this creek, requiring remediation efforts.

Figure 4.3 Existing Site Features



4.05 Existing Site Utilities

Figure 4.4 illustrates the topography of the project site. Figures 4.5 through 4.9 illustrate the existing utilities that serve or cross the project area. The university will provide the Consultant with the latest CAD mapping of topography, planimetrics, and all campus site utilities. The Consultant is required to verify all existing utilities.

Utility Tunnel

- The original master plan of the campus incorporated a series of fully-accessible utility tunnels running between and connecting the major buildings on campus. These tunnels allow for the installation, upgrade and maintenance of utility piping, electrical cables and data/communication lines. The tunnels radiate out from the Central Plant. The utility tunnels currently connect all of the major academic buildings, as well as the Albin O. Kuhn Library and Gallery, the RAC, and The Commons. The Theatre/Academic Services Building was originally outside the interconnected campus zone and is not connected to the tunnel system. See Figure 4.5 for the locations of the existing tunnel network.

Domestic Water

- A 12” water line runs from the academic core, east to the project site. This line transitions to a 10” line that runs north and a 6” line feeding the existing Theatre/Academic Services Building. See Figure 4.6.

Fire Protection

- Fire hydrants are located on the northeast and west side of the Quad. Additional hydrants are located along Commons Drive. See Figure 4.6.

Stormwater Management

- There is a reinforced concrete pipe (RCP) that runs under The Commons and crosses the project site. This pipe originates at the campus Pond as a 72” RCP and continues to a large structure near the front of the existing Theatre/Academic Services Building. At this point the invert falls 5.4’ and the size becomes 78”. The pipe continues to another concrete structure to the south of the Commons Drive Garage, where the invert falls 2.2’ and the size becomes 84”. The 84” RCP continues to the existing outfall and empties into a creek at the southeast corner of the garage.
- Smaller concrete pipes carrying storm water from various inlets in Commons Plaza and south of The Commons converge at these concrete underground structures. See Figure 4.7.

Natural Gas

- A 2” cast iron pipe provides natural gas to the Theatre/Academic Services Building from the southeast corner of The Commons. See Figure 4.8.
- The Physics Building is provided with natural gas via a buried 2” line running along the east edge of the project site.

Sanitary Sewer

- A 15” sanitary sewer line traverses the site from the academic core, combining with a line from the north in front of the Theatre/Academic Services Building. These combined lines flow southeast to a 15” gravity main maintained by Baltimore County running in the median of Hilltop Circle at the intersection of Commons Drive. See Figure 4.8.
- The Theatre/Academic Services Building is served by a 6” sanitary line from the east.

Electric

- Buried underground cabling and wires extend through the project area providing power to street lights and other site features. See Figure 4.9.
- A concrete ductbank provides power to the Commons Drive Garage from the Physics Building.

Telecommunication

- A ductbank containing voice/data cables connects the Theatre/Academic Services Building and the Commons Drive Garage.

Figure 4.4 Existing Topography

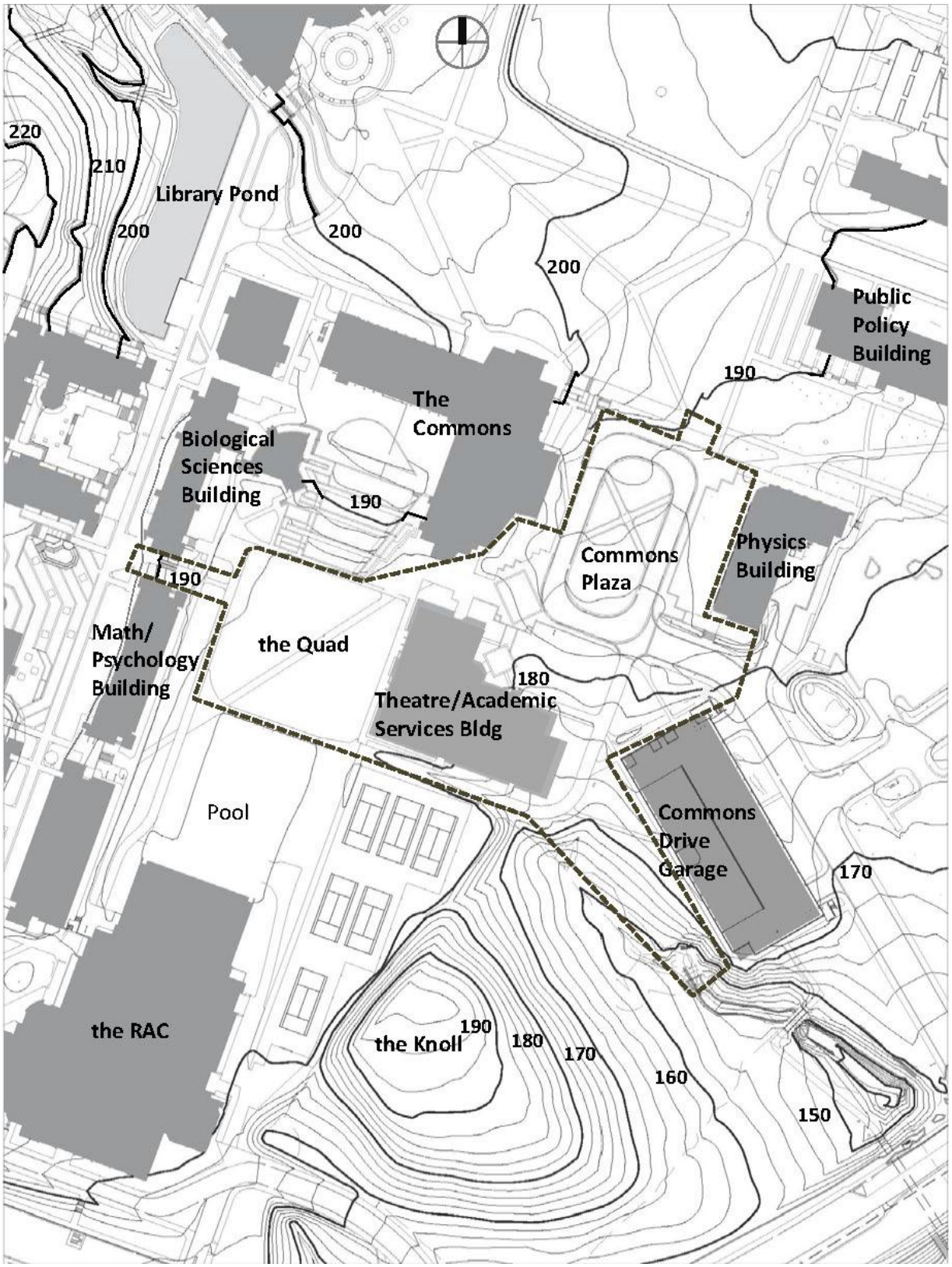


Figure 4.5 Existing Utility Tunnel Network

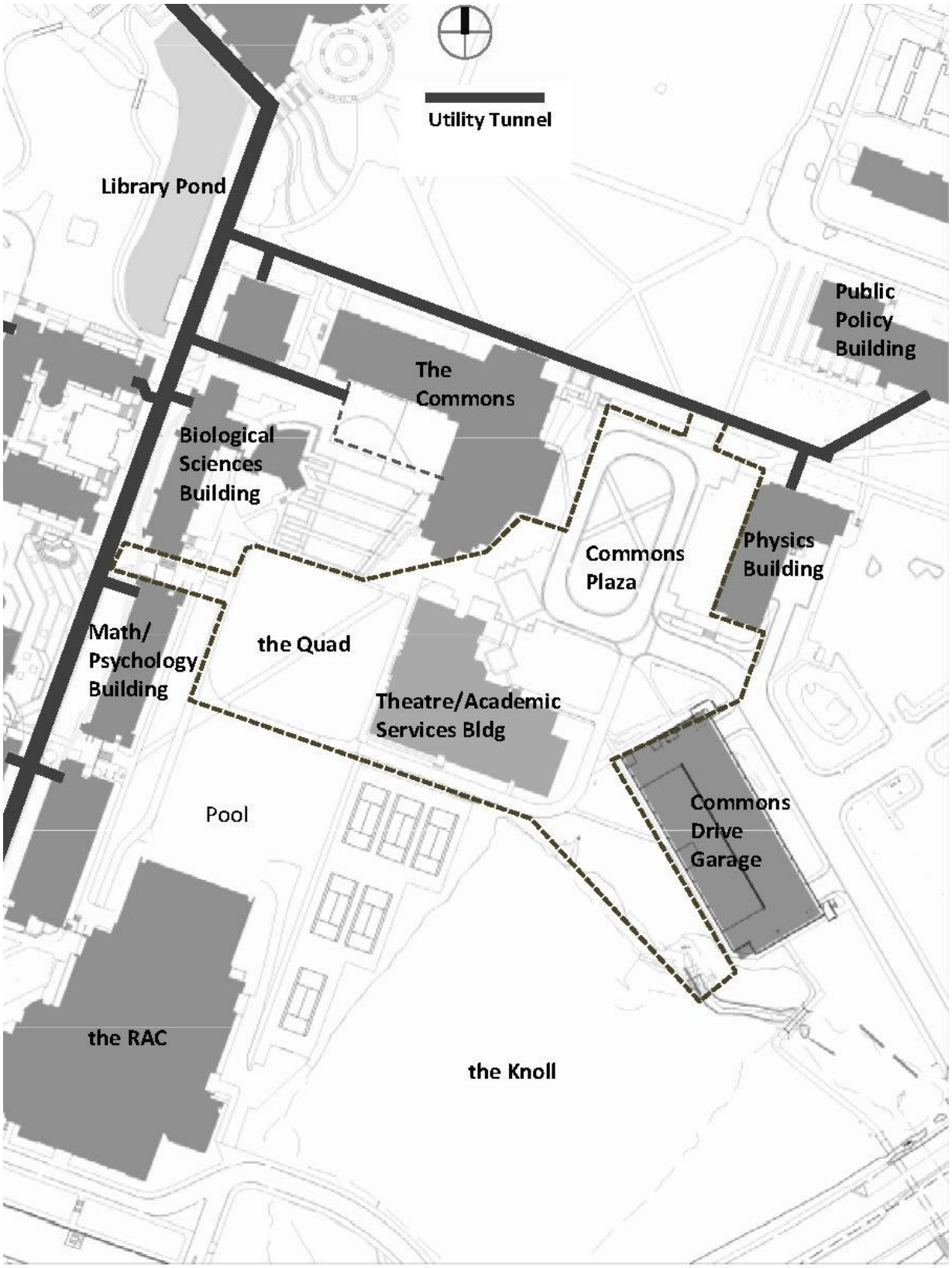


Figure 4.6 Existing Utilities - Water

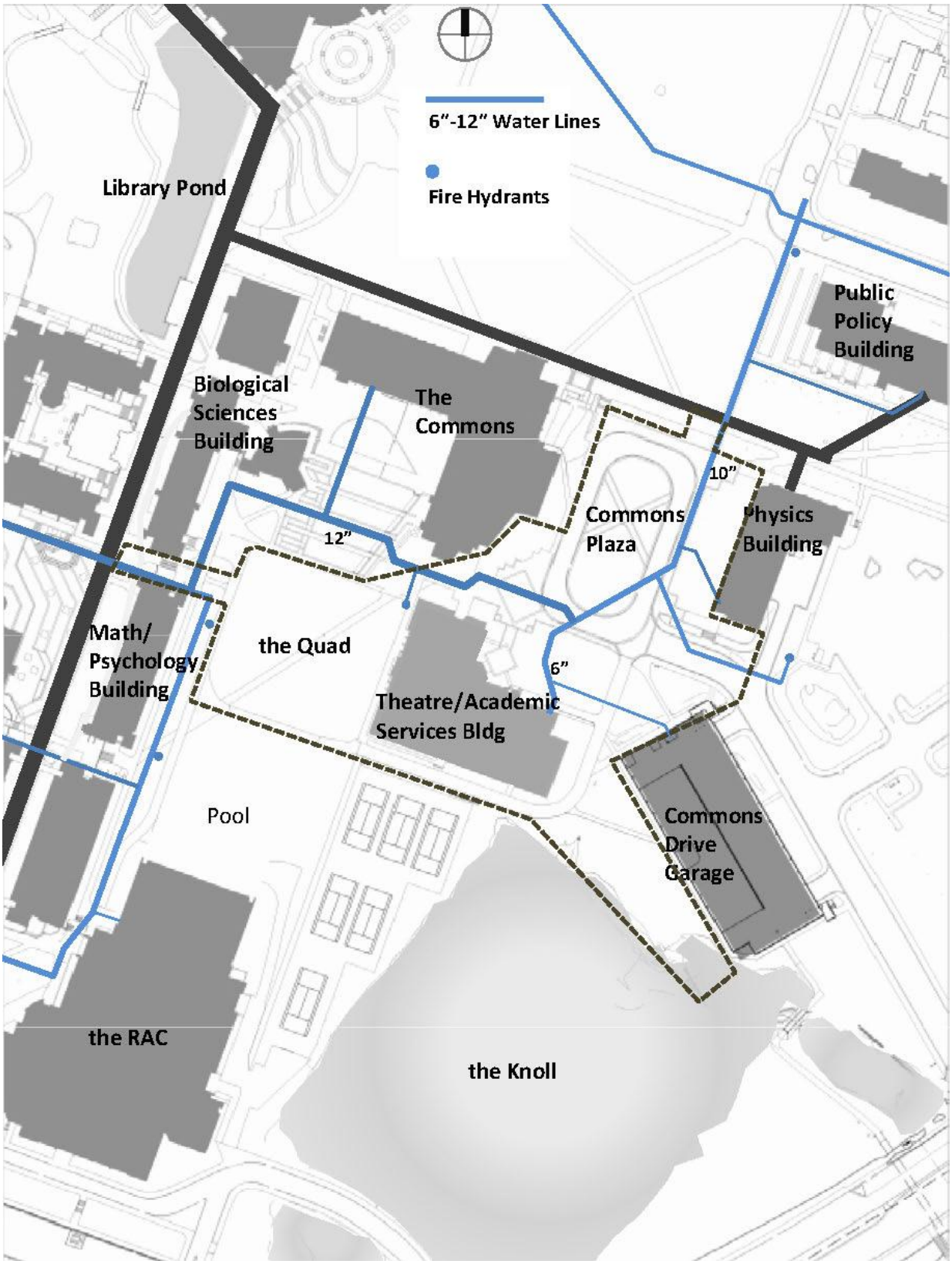


Figure 4.7 Existing Utilities – Stormwater

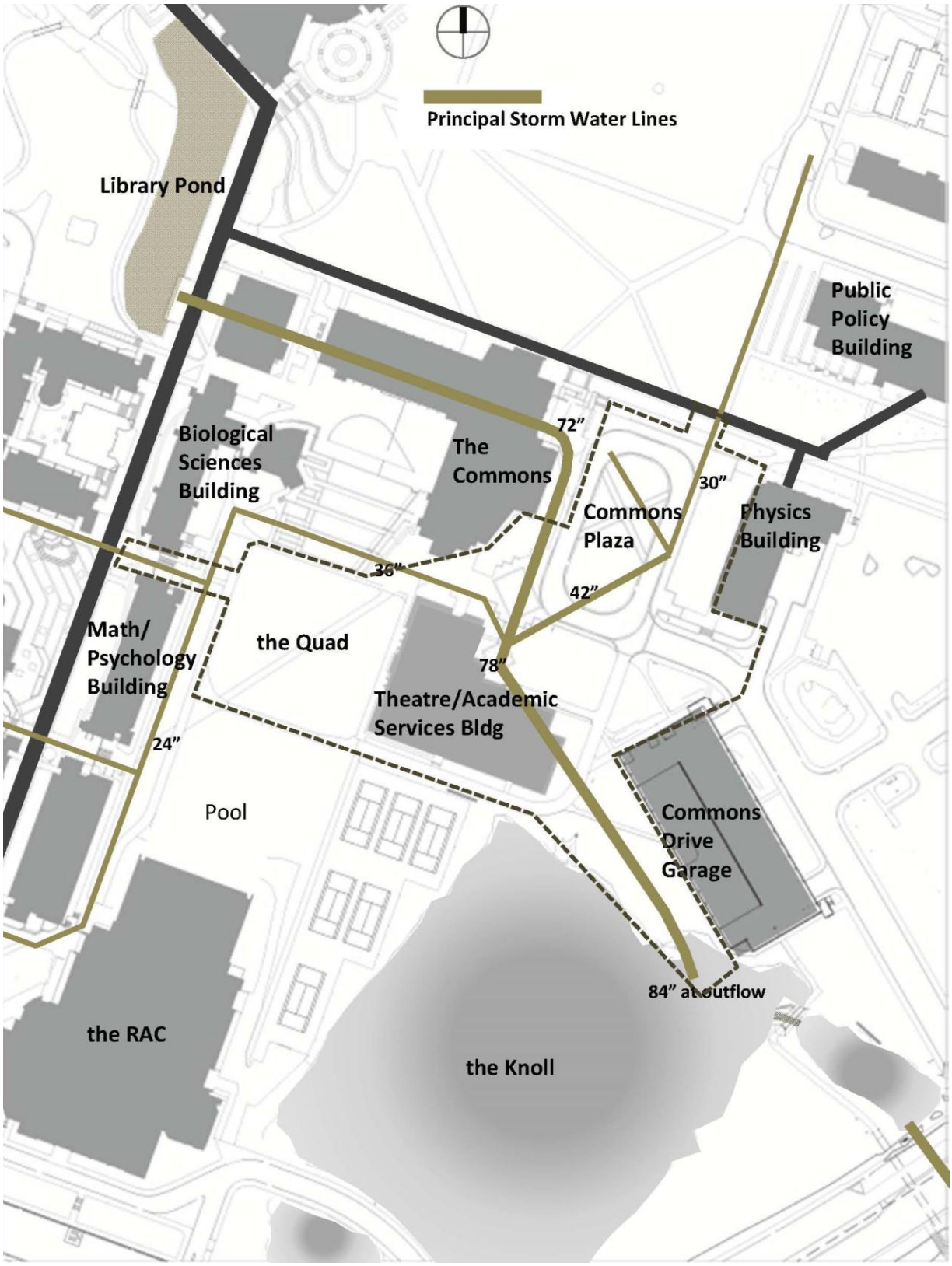


Figure 4.8 Existing Utilities – Sanitary Sewer and Gas

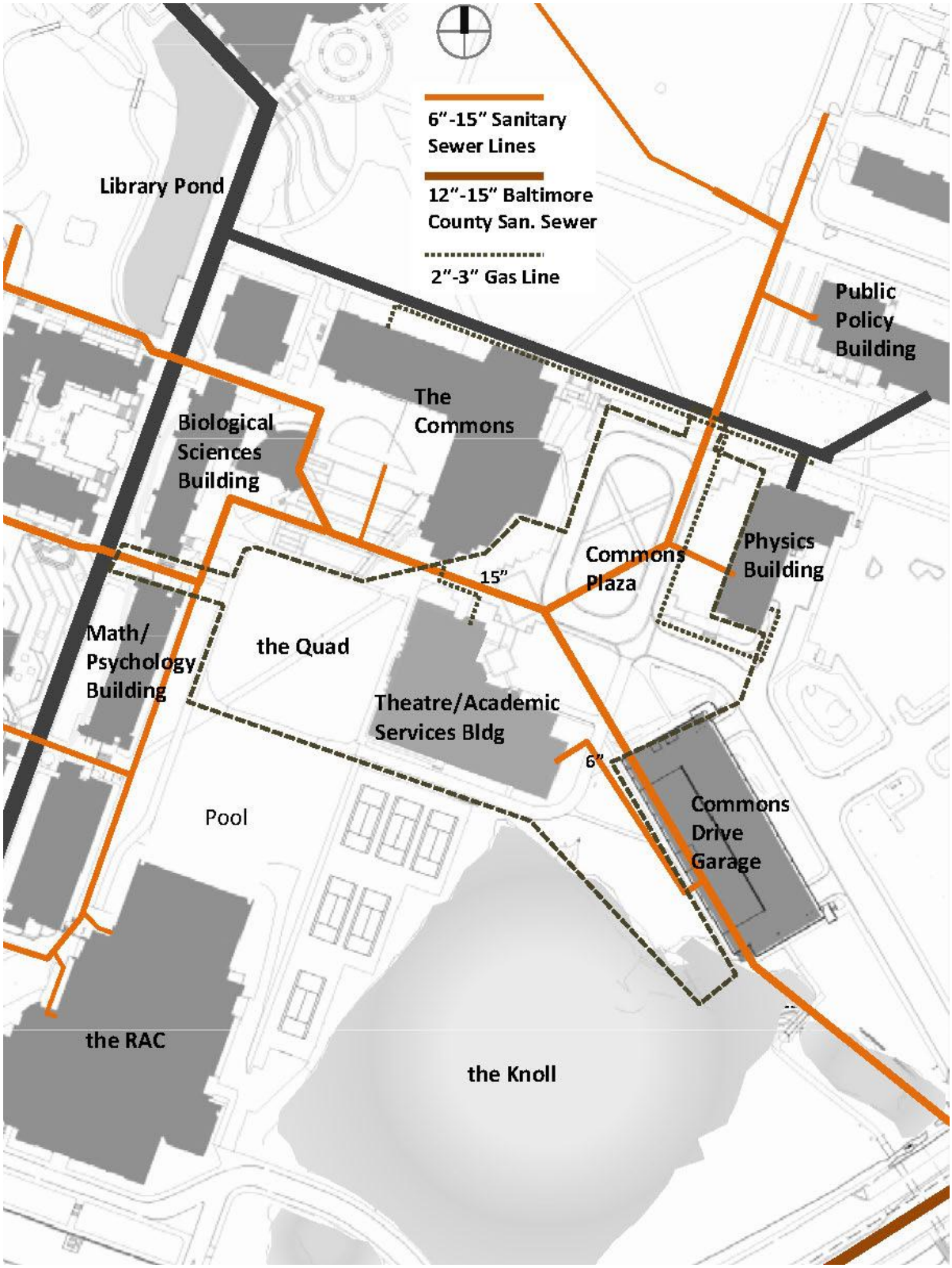
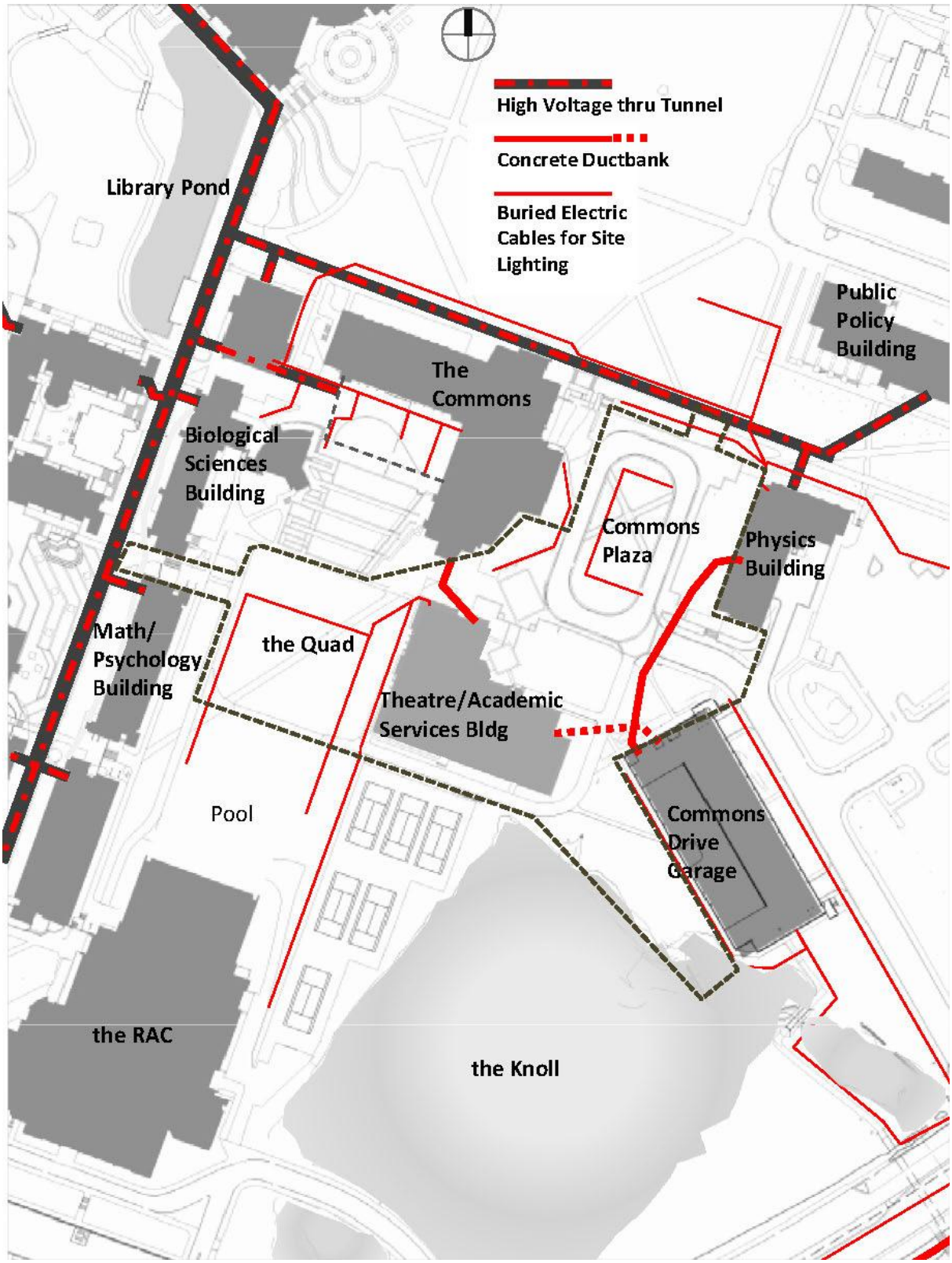


Figure 4.9 Existing Utilities – Electric



Site Design Criteria

4.06 Open Space and Pedestrian Circulation

The Interdisciplinary Life Sciences Building will border three open spaces.

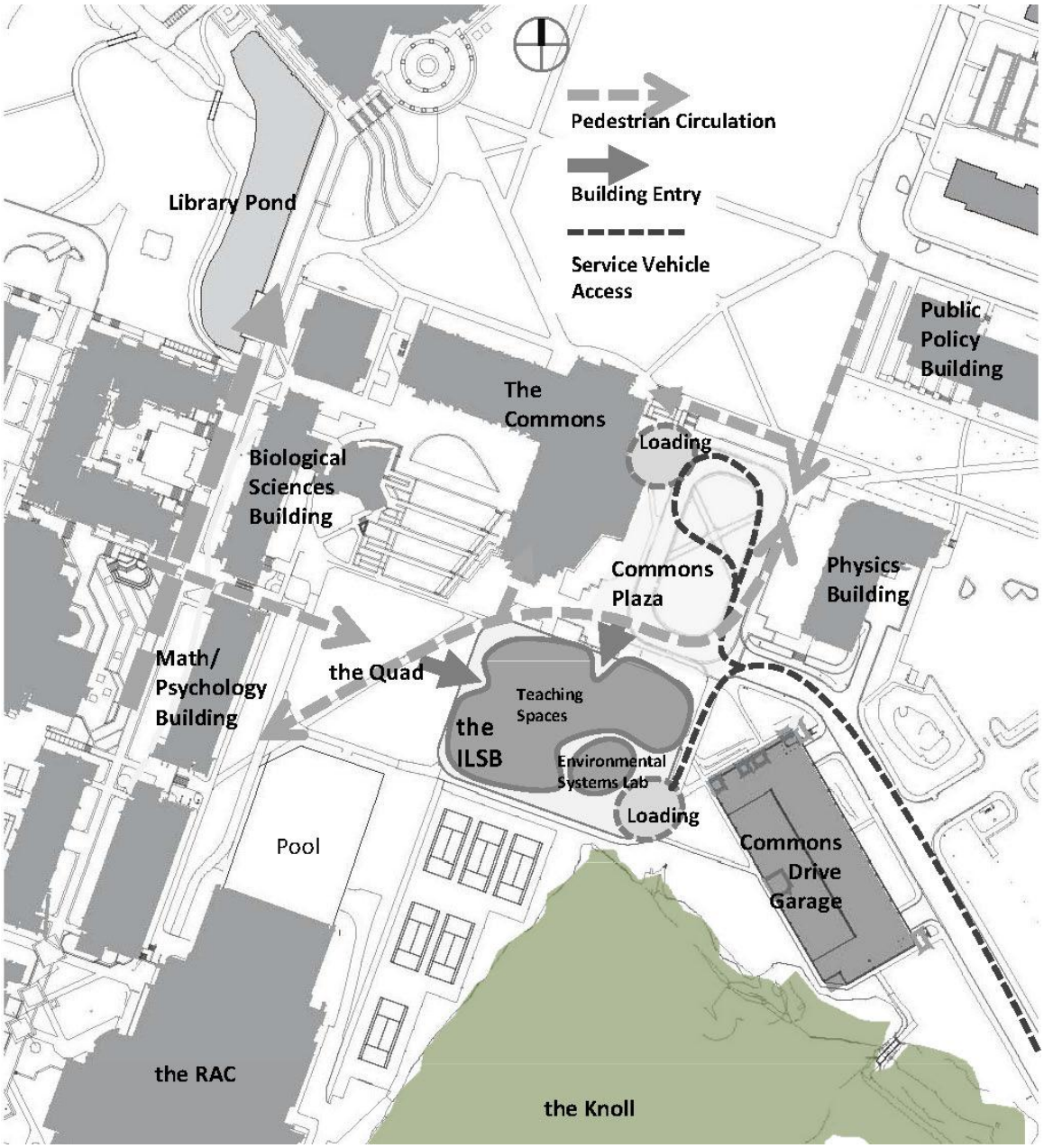
1. To the south is a wooded hill, “the Knoll” separated from the project site by a small stream. The ILSB project will both preserve the Knoll, and take advantage of the views afforded by this campus asset. This area is outside of the ILSB site area and is not expected to be negatively impacted by the project.
2. To the west is a level green space, known on campus as “the Quad”. The Quad is bordered by the Retriever Activities Center’s outdoor pool, the Math / Psychology Building, the Biological Sciences Building and The Commons. There are strong pedestrian paths running through the Quad that need to be respected and enhanced. A principal entrance to the ground floor of the building will be from the west to ensure that the pedestrian connections to the academic core are reinforced. The Consultant is responsible for the site improvements associated with the Quad, including the landscaping, lighting, drainage, circulation paths, and other site features. The project will improve the exterior stairway between the Biological Sciences Building and the Math/Psychology Building to improve the pedestrian circulation between the academic core to the west of the Quad and the ILSB. This pathway will promote the essential linkages of STEM programs located in the Meyerhoff Chemistry Building, Math/Psychology Building, and Biological Sciences Building and the ILSB.
3. To the north of the ILSB site is a large drop off circle and loading area for The Commons. This space, “Commons Plaza”, will play a larger role in the future of the campus as a partially paved plaza, balancing access to the loading area of The Commons with pedestrian safety and improved aesthetics. An entrance to the ground floor of the ILSB will front this open space to ensure future connections to the eastern academic zone of the campus and residential areas beyond. The Consultant is responsible for the revisions to this plaza due to the ILSB, including circulation routes, landscaping, lighting, drainage, vehicular and truck access, gathering areas and site furnishings, and wayfinding signage.

Figure 4.10 Existing Commons Plaza

There are strong pedestrian circulation routes for students, faculty and staff that border the ILSB site. It is imperative that these routes connecting the Retriever Activities Center to both The Commons and the Physics Building be protected and preserved throughout the full construction period.

When complete, the design of the building and adjoining open space will enhance both the north-south and east-west pedestrian circulation routes on campus, with special consideration given to the importance of connecting between STEM programs in adjoining buildings.

Figure 4.11 Proposed Site Layout and Ground Floor Relationships



4.07 Vehicular Circulation, Access, Loading and Parking

The proposed ILSB site incorporates the footprint of the Theatre / Academic Services Building, as well as the open quadrangle to the west of the building and the plaza to the north. Vehicular access to the site will be from Commons Drive to the southeast.

- Provide a loading and unloading zone to the south east of the ILSB, with van and box truck access. This loading zone will include access from Commons Drive, a loading area, trash and recyclable materials handling and disposal, and other applicable building services.
- Ensure that the loading area can accommodate equipment deliveries, potential hazardous materials, and small research animal loading and waste disposal.
- Maintain truck loading and unloading access, as well as emergency vehicle access to The Commons, continuously throughout the construction as well as in the final design. Design the new plaza to accommodate this vehicular access within the new pedestrian-oriented outdoor environment.
- Provide access to the emergency generator and other equipment requiring service.
- Coordinate emergency vehicle access with campus life safety and security personnel and with local jurisdictions.
- Accessible parking will be accommodated in the adjoining Commons Drive Garage. Ensure a clear, safe and appropriate accessible path from the garage to the entrances of the building.
- Provide several service vehicle spaces near the loading area of the building. Specific number to be determined during design in consultation with UMBC staff.

4.08 Excavation and Soils

- Careful consideration of the site character is required in the development of the site, including determining the footprint and placement of the building. Integration of the topographical features with facility orientation and function is required.
- The Consultant is responsible to understand the limitations to the development of the site due to soil condition, impacting the placement and design of on-site building support systems (e.g., tunnels, utilities, storm water management, etc.). Geotechnical information is not available for the proposed site area. The Consultant is expected to secure contract services to provide a soil analysis, determine the condition of existing soil and substrata, and identify any restrictions the soil types or subsurface conditions may place on the development of the building's foundation and/or retaining systems.
- The Consultant will investigate the site for hazardous materials.

4.09 Drainage and Stormwater Management

- The Consultant is responsible to comply with all MDE requirements regarding drainage, storm water management, and erosion and sediment control, including all permits and approvals.

- Create drainage patterns around structures which direct water away from foundations, walks, patios, roadways, and turf areas so as not to interfere with the function of these site elements.
- The existing site comprises an existing building with various paved areas, so the new ILSB project will be classified as “redevelopment” by MDE rule. This typically means that water quality must be managed for 50% of the new/existing impervious areas.
- Water quality management, under the 2009 MDE regulations, calls for Environmental Site Design (ESD) as a primary treatment to the maximum extent possible. Some examples of this technique include:
    - Micro bio-retention
    - Surface filtering
    - Vegetated ‘green’ roofs
    - Grass swales, dry swales
    - Porous pavement for non-vehicular areas
    - Created wetland
- Management of quantity of runoff may also be required. This is because there are turfed green areas on the existing site, (roughly 15%), which may become paved on the proposed design. Explore quantity management measures, such as underground detention structures, that preserve surface land for other uses, such as the pedestrian plaza.
- The general drainage pattern of the site is anticipated to continue toward the southeasterly corner. The existing building roof drains lead to an 18” pipe that outfalls to an open swale and a creek. An open area of about 6,000 square feet, southwest of the Commons Drive Garage is the preferred area for new water quality management practice, of the sort identified above. The area has existing small trees that will have to be transplanted or otherwise mitigated.

4.10 Forest Stand Delineation Plan

- UMBC has a forest stand bank which may be utilized when submitting requirements to the Department of Natural Resources. A Forest Conservation Plan will be required for this project. Forest mitigation plans will be accounted for in the campus’ long-term forest protection plan. In order for the mitigation requirements for reforestation to be reconciled, all forest conservation plans must reference this forest protection plan.
- This project will be developed in accord with the Forest Conservation Act and its pertinent regulations. The Consultant is solely responsible for submitting all requirements of the Forest Conservation Act.
- A thorough review of the statute and the regulations are necessary for a complete understanding of the law. Copies of all documents may be obtained by contacting the Department of Natural Resources.

4.11 Roadways/Drives

- The project will require removal of the existing roadways within Commons Plaza.
- Commons Plaza will allow for both the movement of vehicles (service and emergency) and the use of pedestrians for circulation and congregation. Careful choice of paving materials and site details of the plaza, especially where it transitions from existing roadways and drives, will impact the success of the design solution.
- All paved areas of the project will be designed to support truck traffic unless otherwise approved by the university.
- Successful redevelopment of the plaza, and the required service and emergency access requirements may precipitate modifications to a section of Commons Drive.
- Vehicle access control features may be required to control unwanted or unsafe vehicular movements.

4.12 Emergency Vehicle Access and Coordination

- Paths used for designated emergency vehicle access, regardless if they are roadways, pedestrian paths or green spaces will be designed to accommodate the maneuvering requirements and weight of emergency vehicles. The minimum width of a path accommodating emergency vehicles is twenty feet.
- Approved routes to buildings and spaces adjoining the project site must remain accessible to emergency vehicles throughout the construction phase.
- The Consultant will coordinate emergency vehicle access within the project site and adjoining it with campus life safety and security personnel and with local jurisdictions.
- Emergency vehicle access to The Commons and the buildings adjoining the west side of the Quad must be maintained throughout the construction of the ILSB.

4.13 Plaza/Hardscapes

- Hardscape, including pedestrian paths, roadways, drivable paths, and building entry plazas will be designed in accordance with university preferences and in concert with university input.
- The design solution for exterior spaces will be in accordance with an overall site development plan. This plan must take into consideration vehicular circulation, the overall pedestrian network on campus, UMBC standards for materials, furnishings, plantings and construction details, and existing adjoining building entries.
- The specific patterns, materials, widths and construction of pedestrian pathways will be developed to reinforce the building design and the development of the outdoor space.

4.14 Landscaping and Plantings

- Vegetation is vital to the character, micro-climate, and aesthetic quality of the site. The site development and building design solutions will incorporate appropriate landscaping as a

potential design element. Vegetation and landscape features will have climatic and aesthetic purpose and relate to the prescribed functions of the facility.

- The landscaping design for the whole project area is to be considered as a unified and comprehensive design, coordinated with the university landscape design themes.
- Existing natural elements (trees, terrain, etc.) will be preserved and integrated into the design as much as possible. Construction will be kept a reasonable distance from large, single trees or groups of trees per Maryland DNR's Forest Conservation Manual, to minimize potential damage while still incorporating them into the design concept and the use of outdoor space.
- Plant species selection and planting layout must be designed for aesthetic consideration throughout the year. Special consideration will be given to the use of native indigenous plants, and those that require minimal maintenance.
- Planting beds will not inhibit access to open space, create security concerns or require excessive maintenance requirements, and will be used in conjunction with the requirements of storm water management.
- Landscape soil will be viable medium with minimum 6" screened topsoil.

4.15 Site Security and Lighting

- Lighting will comply with the latest edition of *The Lighting Handbook* from the Illuminating Engineering Society of North America.
- Site lighting design will incorporate a lighting scheme for the building facades and will also consider the use of interior building lighting of lobbies, corridors, and significant interior spaces for the exterior spaces adjacent to the building. Overall design will limit the amount of light transmission off-site and into the atmosphere.
- Develop the standards for site lighting in conjunction with UMBC Facilities Management staff. Acquire from the university the current UMBC site lighting standards.

4.16 Site Furnishings and Exterior Signage

- Site furnishings, including trash receptacles, benches, bike racks, and site lighting will be selected and located per university standards. Placement of furnishings will encourage use of outdoor space for collaboration, social interaction, and study and will not impede use of outdoor space for passive recreation.
- The building site, including adjoining open space, will incorporate UMBC's current wayfinding signage system into its design for pedestrian, vehicular, parking, and accessibility and access signage. The wayfinding system will include provisions for digital signage outside the building as well as within.

Site Utilities

4.17 Energy

The State of Maryland has adopted with modifications, the International Building Code (IBC) and the International Residential Code (IRC) as the Maryland Building Performance Standards, requiring buildings to be designed and constructed in accordance with the International Energy Conservation Code (IECC).

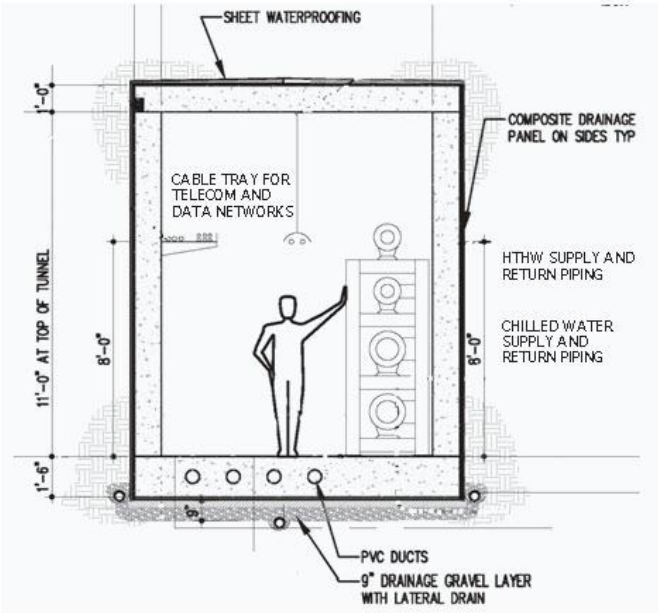
- All facility programs will comply with Executive Order 01.01.2001.02 – Sustaining Maryland's Future with Clean Power, Green Buildings and Energy Efficiency, and all of the regulations and guidelines identified in the Maryland Green Building Council Report entitled Maryland's High Performance Green Building Program.
- All services including chilled water, high temperature hot water, gas, domestic water and electric will be metered for energy management and tied into the UMBC building automation control system.
- LEED Silver certification is required for the building. LEED Gold certification is desired if the budget affords, without compromising the program.
- All utilities to the building will be metered. The following are to be metered for the local utility: domestic water, fire service water, lab water and natural gas. The following are to be sub-metered, that is metered for UMBC with signaling back to Central Plant: BTUs on Chilled Water, BTUs on Secondary Side of HTHW, Electrical Service to Square D Power Logic Main Metering System.

4.18 Utility Tunnel

- Any new development on this site will be connected to the underground utility network to take full advantage of the energy savings afforded by this central utility network. The tunnel system will be used for all applicable central utilities and services.
- The underground tunnel will be designed and constructed to meet or exceed the design for the new utility tunnel connecting the Central Plant to the Performing Arts and Humanities Building. UMBC will provide the design criteria of the tunnel design to the Consultant. The tunnel will have walls and ceiling of reinforced concrete to a minimum of 1'0" in thickness, and have a clear interior height of 11'-0" and clear width of 9'-0".
- The tunnel design will incorporate adequate egress, lighting, ventilation and drainage.
- The tunnel will have sheet waterproofing and composite drainage panels on top and sides with expandable waterstop at all joints. The preferred design has 3' of cover over the tunnel in landscaped areas, but at the locations nearest to the new ILSB, only a foot of cover is expected, so those areas will have to be paved or otherwise hardscaped.
- The new tunnel will connect to the existing utility tunnel to the north of the project site. Isolation valves will be installed at all T-fittings.

- The location of the new tunnel is expected to be against the easterly wall of the ILSB basement. This scheme will allow for future expansion to the south without taking up program space in the building. See Figure 4.13. To maintain adequate piping capacity within these tunnel sections, it is recommended that the pipe for the CHW and HTHW utilities be sized to at least the size of the existing piping. The CHW piping will be at least 14-inches in diameter and the HTHW piping will be at least 8-inches in diameter.
- Utilities in the tunnel will terminate in isolation valves allowing for future extensions without shutdowns.
- The new tunnel will affect existing utilities and may require their redesign/relocation. These systems include storm drains, duct banks, sanitary sewer piping, and water lines.

Figure 4.12 Typical Utility Tunnel Section



- The proposed utility tunnel connection from the north will impact the location of a 78” storm water pipe crossing diagonally across the site. The 78” portion of this pipe system will need to be relocated due to the ILSB footprint and the new utility tunnel, and the size confirmed. Preliminary investigation suggests that the vertical clearance conflict of the tunnel and the large storm drain pipe may be addressed with a non-circular section of drainage pipe to reduce its height.
- The Consultant is responsible for the design, permitting and approval of a solution for relocating the pipe to allow for the successful connection of the ILSB to the tunnel network.
- As part of the relocation of the 78” storm drain line, other storm drain lines within the ILSB site and The Commons area will need to be relocated to tie into the new junction box location.

Figure 4.13 Proposed Utility Tunnel with Storm Drain Relocations

4.19 Chilled Water

The existing chilled water generation of the Central Plant is comprised of five chillers that were installed in the late 1990's and one 2,000 ton chiller to be installed in 2012. With the addition of the latest chiller and a 10,000 gallon thermal storage tank, the total capacity of the chilled water generation system is 8,000 tons with a firm capacity of 6,000 tons. With the addition of the ILSB, the peak cooling load will be beyond the firm capacity of the system. See Figure 4.14 for a layout of the ground floor of the Central Plant.

The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) has identified a typical service life for an electrical centrifugal chiller to be between 20 to 25 years. A major replacement interval of the existing chillers will occur between 2017 and 2024.

Figure 4.14 Existing Central Plant Equipment

The recommended option from the utility master plan analysis, conducted in 2011, is to replace an existing 1,000 ton chiller with a 1,500 ton unit.

- To support the load for the ILSB, one chiller replacement is needed. Due to space limitations, chillers 1 and 2 cannot be replaced with a larger 1,500 ton unit. Therefore, chillers 3, 4 or 5 will need to be chosen for replacement.

- The Consultant will assess the condition of chillers 3, 4 and 5 at the time of design to determine which chiller will be replaced.
- There is enough cooling tower capacity for the additional 500 tons of chiller capacity that would occur with the 1,500 ton chiller replacement.
- The chilled water distribution system that radiates out from the Central Plant is adequately sized to support the addition of the ILSB facility. The required chilled water pipe size to connect the ILSB facility to the distribution system will be at least 8" in diameter. However, piping will be sized for future expansion south of the ILSB site.

4.20 High Temperature Hot Water (HTHW)

The existing hot water generation system located within the Central Plant consists of four HTHW generators with a total capacity of 175,000 MBH. Of the four generators, three are 50,000 MBH and one is 25,000 MBH in capacity. The firm capacity of the HTHW system is 125,000 MBH. The existing peak HTHW peak load (including the Performing Arts and Humanities Facility Phase 1 and 2 loads) will be approximately 58,600 MBH, which is well below the existing firm capacity. With the addition of the ILSB, the peak heating load will be 62,600 MBH, which is still below the firm capacity.

- The existing HTHW generation system is adequate to support the addition of the new ILSB.
- The HTHW distribution system that radiates out from the Central Plant is adequately sized to support the addition of the ILSB facility. It is estimated that the heating load for the ILSB facility is approximately 7,100 MBH. The required HTHW pipe size to connect the ILSB facility to the distribution system will be at least 4" in diameter; however piping will be sized for future expansion south of the ILSB site.

4.21 Site Electric Service

Electric service for the UMBC campus is served from an electric substation located adjacent to the Central Plant. The electric substation is comprised of two pairs of transformers. The first pair of transformers is dedicated to support the 13 kV distribution serving the electric loads of the buildings on campus and the second pair of transformers is dedicated to provide 4.16 kV power supply to the Central Plant. The pair of 13 kV transformers is currently being replaced with larger units with 20,000 kVA (18,000 kW) capacity each. The total capacity of this system is 40,000 kVA with a corresponding firm capacity of 20,000 kVA.

The original 7,500 kVA transformers serving the Central Plant were tested in 2011 and found to be failing and in need of replacement. Transformers serving the Central Plant are being upgraded to 10,000 kVA in 2012 and 2014.

- These 10,000 kVA transformers will be adequately sized for the expected increased load imposed by the ILSB. The Consultant will confirm these loads during design.
- Electric distribution is installed in the tunnel network and will be extended to the future ILSB facility through it.

4.22 Natural Gas

- A 2” gas service is currently available adjacent to the proposed building site, extending from the Commons Building to the north. This 2” natural gas can be continued in to the ILSB and is expected to be sufficient for future needs. Polyethylene gas piping is anticipated.

4.23 Domestic Water

- A 6” water service requirement is anticipated, and can be connected through an existing 12” line to the north of the proposed ILSB. Some relocation of existing lines will be required as part of the construction. The entire campus system is served by Baltimore County/City Water, and is metered before campus-wide distribution. Fire and domestic water are combined in the same piping system. Water piping will be restrained joint, ductile iron pipe (DIP). (Water service will be split into domestic, fire service and lab service prior to entering building and be metered separately.)
- A small, insertion type meter, located in the mechanical room, is preferable to a buried meter vault outside the building footprint. Meters will be connected to the Building Automation Systems.

4.24 Sanitary Sewer

- A 6” sanitary service will be required and is expected to drain to the easterly side of the proposed ILSB. The existing sanitary manhole may be replaced or used as is, and it is drained by an existing 8” sewer, to the southeast. The entire campus system drains to Baltimore County’s sanitary sewer system. Sewer piping will be PVC.

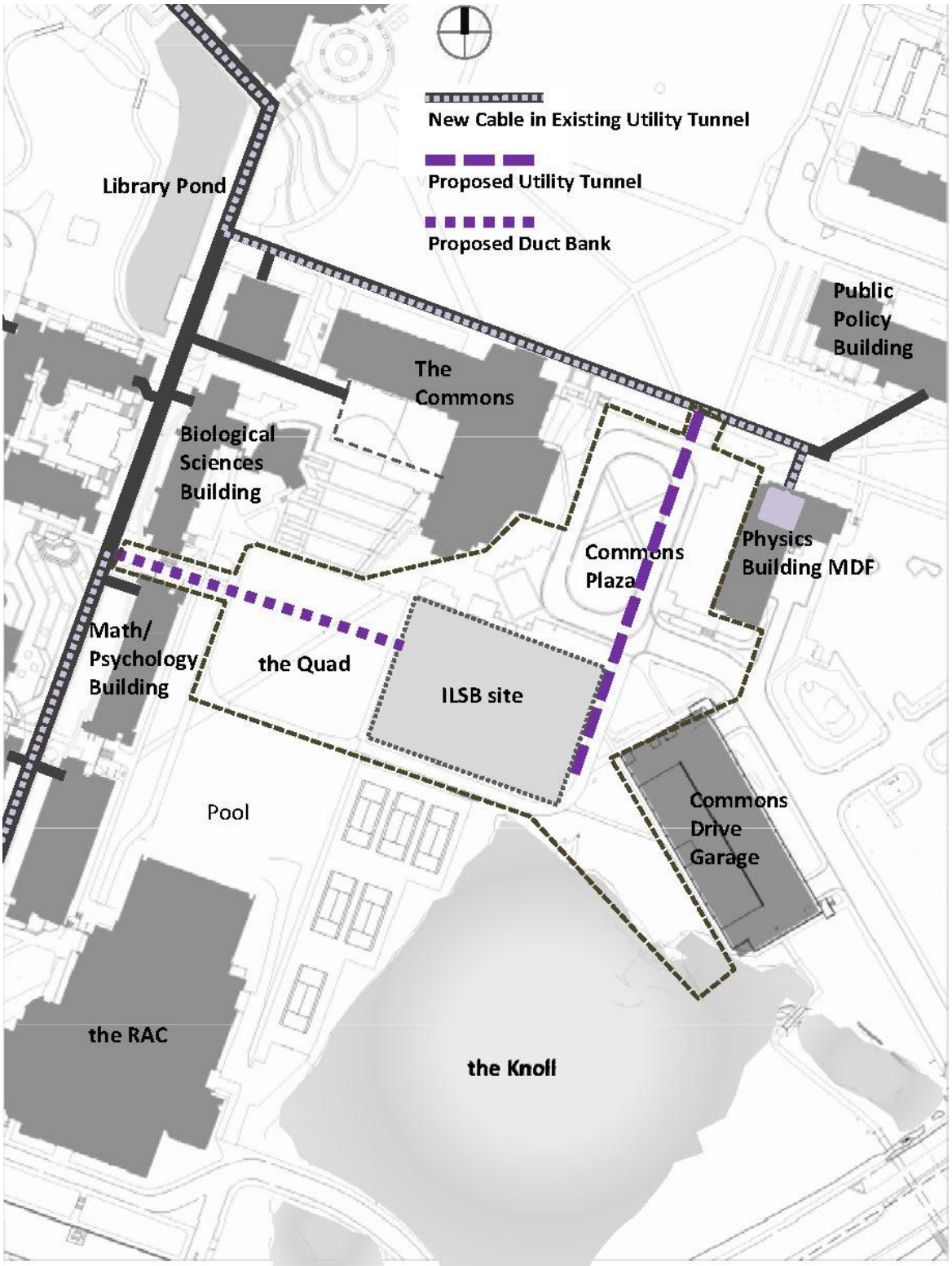
4.25 Data and Telecommunication

- Although most data, telecommunication and electric services on campus utilize the tunnel system, the existing Theater/Academic Services building is fed from The Commons through a 2-way duct bank that will be abandoned as a part of this project.
- The fiber optic Main Distribution Frame (MDF), for the east side of the campus, is currently located in the lower level of the Physics Building. The primary fiber optic feeder for the ILSB will run to the Physics Building’s MDF through the utility tunnel.
- To support the ILSB, the fiber optic trunk between the Physics Building’s and the Performing Arts and Humanities Building’s MDFs will need to be supplemented with a new trunk line.
- Data and telecommunication cabling will be installed in ladder racking within the new utility tunnel. A new cable tray may need to be installed to accommodate the east-west fiber trunk in the existing tunnel.
- A 2-way duct bank connects the Theatre/Academic Services building with the Commons Drive Garage. A communications room inside the garage building utilizes this duct bank. This duct bank is running near where the new utility tunnel will be installed. These ducts will be intercepted and redirected into the tunnel as a part of the tunnel installation. Once the ducts are

terminated in the new utility tunnel, new fiber optic and copper feeder cabling will need to be installed from the garage to the Physics Building's MDF.

- Additionally, the only current pathway between the east and west sides of the campus is through the existing utility tunnel to the Physics Building. As the east side of the campus is developed, a diverse pathway is needed for communications and security trunks between the east and west sides of the campus. Provide a 4-way duct bank from the ILSB to the existing tunnel near the southeast corner of the Meyerhoff Chemistry Building running under the Quad. Provide a new fiber optic trunk in this tunnel between the ILSB and the MDF of the Engineering Building. See Figure 4.15 Proposed Data and Telecommunication Distribution System to the ILSB.

Figure 4.15 Proposed Data and Telecommunication Distribution System to the ILSB



Section 5 Building Design Criteria

Massing and Architectural Expression

The building's scale and massing, and the development of areas surrounding the structure are of critical importance to the preservation of a unified campus environment. The Consultant must provide design solutions that result in a building that is inviting to the user, both as a functional structure and as a newly introduced compatible element in the campus built environment. Design solutions must consider materials, scale, space, light, relationship of outdoor and indoor environments and circulation.

5.01 Massing and Structure

- To minimize increasing the roughly 35,000 square foot footprint of the existing building, the project is envisioned to be between four and five stories in height. This size is consistent with the campus' facilities master plan and in keeping with the scale of the adjoining four to five story buildings.
- The Consultant will consider stacking laboratory spaces in the building to take advantage of the massing and reducing the number of vertical mechanical chases in building.
- The Consultant will vary the building massing to respond to the surrounding buildings and site areas, while accommodating the required functions and activities.
- The structural design for this project will provide a building system that will integrate the program requirements for space layout with the architectural and building service needs, while meeting current code standards for sustaining all vertical and horizontal loads imposed on the building system.
- During the design phase, a thorough coordination of mechanical, electrical, plumbing and civil services with respect to all structural elements is required to avoid any potential conflicts and minimize unplanned penetrations of floors and other structural members.
- The university anticipates that a concrete frame will be employed. The floor to floor height is expected to be 13 to 15 feet. The Consultant, in concert with the construction management team, will test structural systems relative to the current economic situation.
- The building will be designed for dead, live and seismic loads in accordance with all current applicable building codes.
- All equipment on the penthouse floor/roof will be supported on dampening pads to minimize the effects of vibration and noise.

5.02 Exterior Architectural Elements

- The Interdisciplinary Life Sciences Building will be in keeping with the architecture style reflected in the design of the latest buildings on campus, extending the modern vocabulary while providing the warmth and scale of modular clay brick. The architectural elements and materials employed in the construction will be tried, low-maintenance systems with a service expectancy

of over fifty years. The university anticipates that a combination of metals, glazing, brick and precast stone will be employed in the design of the exterior of the building in similar proportion to the adjoining Physics Building, Public Policy Building and The Commons.

- The roofscape, including not only the location of elements, but also their color and shape, will be given design attention throughout the design process to assure that major equipment, stacks, and penthouses are orderly and attractive when viewed from adjoining buildings and open spaces. No exterior ductwork is permitted other than hood exhaust.
- Mechanical equipment will be concealed in a penthouse.
- Consider the inclusion of green roofs if applicable to the overall design of the project.

5.03 Relationship to Exterior Spaces

- An important element of the design will be to engage the exterior spaces to the west (the Quad) and the north (Commons Plaza). By organizing the building to provide direct ground floor access from these important campus open spaces, the building can enhance two important campus outdoor spaces, leveraging the project to further benefit the university.
- Entries will be either at or just above grade with each primary entrance designed for use by individuals with disabilities as well as service deliveries and other general traffic. Weather protection at building entries will be provided by overhangs, canopies, or recessed doorways. Vestibules will be provided at each major entrance.
- Care will be given in the design of roof details and walking paths to avoid hazards from falling ice and snow off of the building.

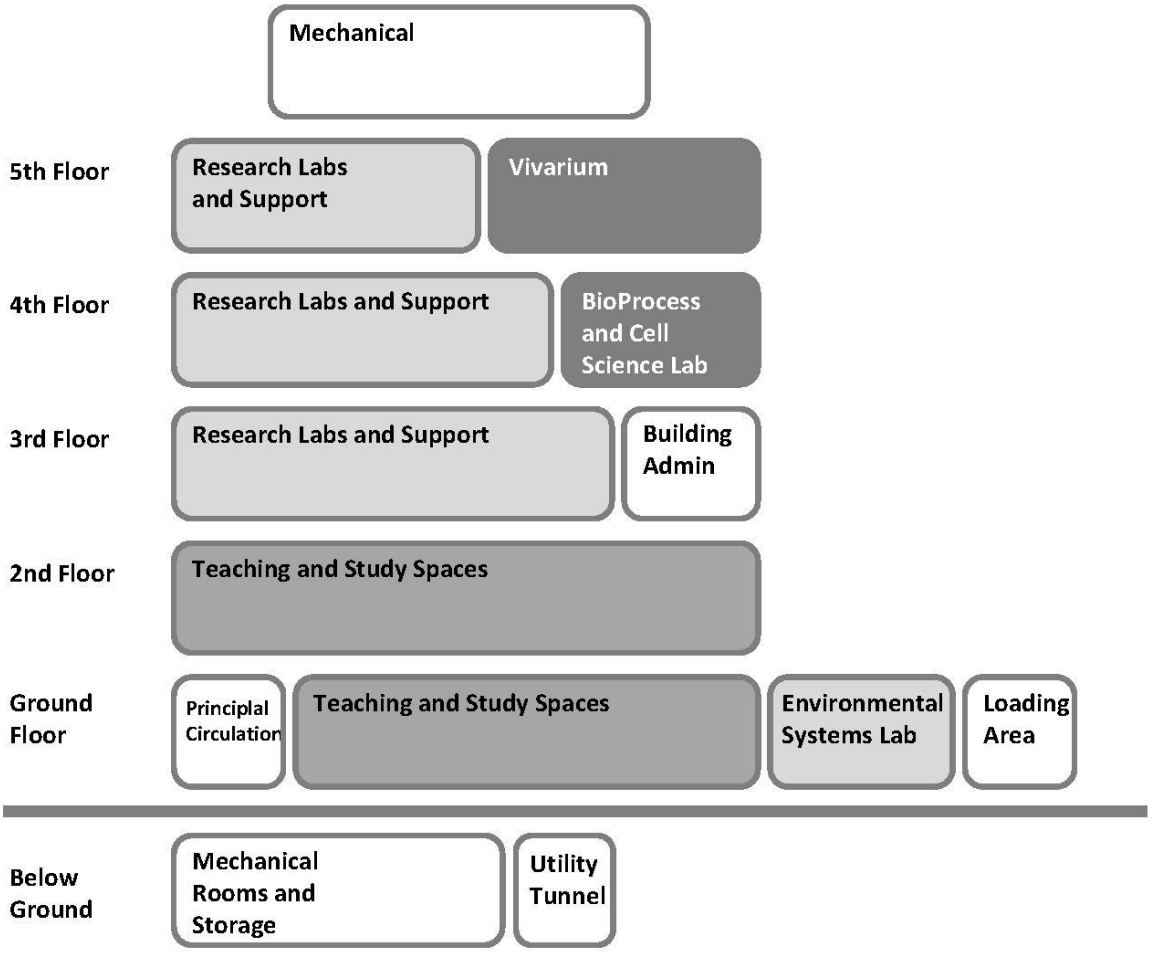
Interior Architectural Planning and Design

5.04 Building Zoning

- The building has several distinct programmatic zones, each with its distinct user groups. The relationship of the spaces to one another, issues of convenience, access and security, and service requirements have led the university to propose a solution for organizing the building by level. Other solutions may be acceptable. As currently envisioned, the illustrative stacking diagrams depicted in Figures 5.2 and 5.3 organize:
    - teaching and student study spaces on the lower two floors for greatest access;
    - research labs on the upper floors;
    - core facilities on the upper two floors, with the vivarium on the upper-most level due to issues of access control and heavy mechanical equipment located in the penthouse adjacent (Figure 5.2) or alternatively with the vivarium below ground for security, connected to the research labs through the service core (Figure 5.3);

- the environmental systems lab on the ground floor for direct access to the loading area; and
- mechanical areas accessed from the utility tunnel, below grade, and within a penthouse.

Figure 5.1 Illustrative Stacking Diagram (upper level vivarium alternative)



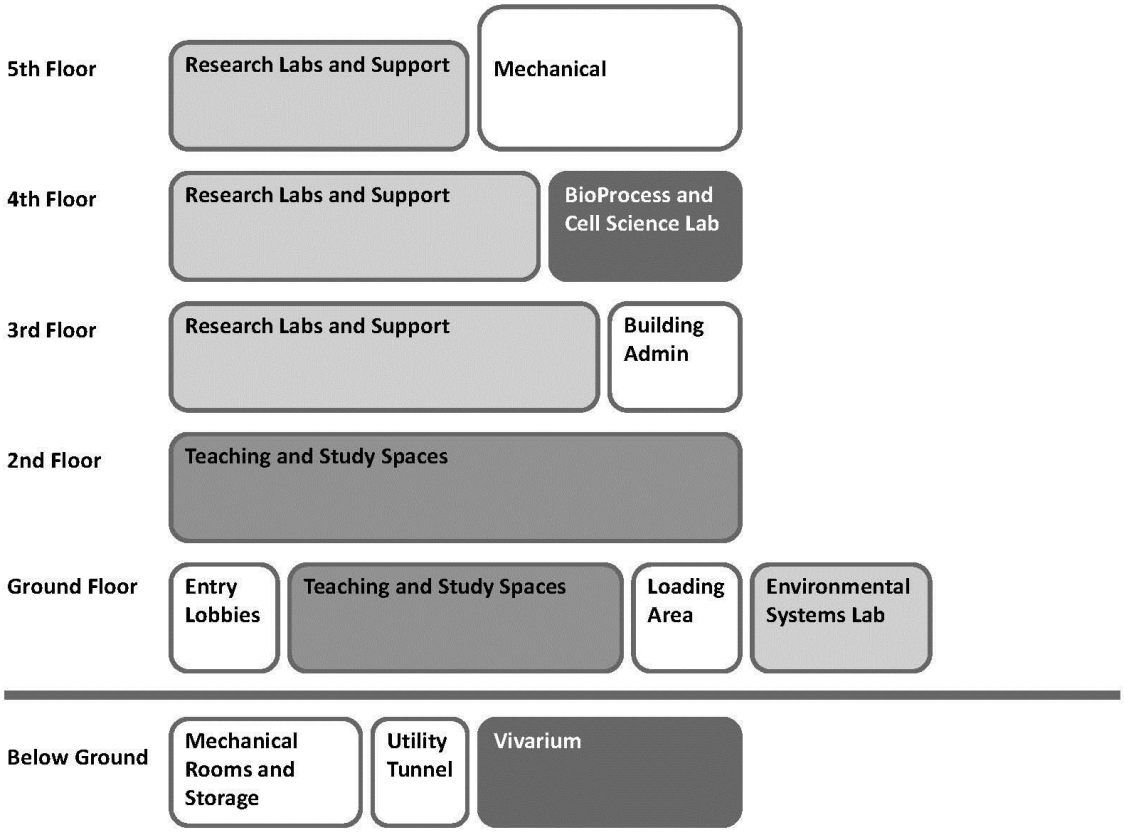


Figure 5.2 Illustrative Stacking Diagram (lower level vivarium alternative)

5.05 Circulation

- In the overall design, careful attention will be given to the circulation patterns for faculty, staff, students and visitors. The relative size of the horizontal and vertical circulation elements, like entrances and corridors, will be appropriately sized to the areas directly served and to the movement of persons from one area to another. These areas will be designed with due consideration to the ratio of net assignable square feet to gross square feet.
- The main entrance to the building will immediately convey a sense of the building and its activities to both the first time visitor and persons well acquainted with the building. The space will be inviting, warm, and of a scale to visually impart a sense of direction to the teaching spaces, located on the lower floors.
- A large staircase directly accessible from the main entrances will link floors containing major teaching spaces.
- The circulation spaces in general will serve double duty as a means to promote spontaneous social interaction, and therefore encourage the exchange of ideas and information. Furnish

alcoves along circulation routes and corridors with appropriate lighting, natural light, furniture and technology to support interaction.

- Effective acoustic treatment of the circulation areas will be of great importance in the success of the floors with teaching spaces. This building will concentrate teaching spaces with a capacity of 800 stations. The design of the corridors accessing these spaces will accommodate up to 1,600 students that can be present during changes between classes.

5.06 Flexibility

- Of paramount importance to the university is that the proposed facility be planned in a modular and flexible manner. A modular approach strongly enhances assignment and re-assignments of space, while maintaining functional and efficient laboratory configurations.
- Design the facilities to embrace future changes in technology. Design for flexible distribution systems that can accommodate changes and additions to the services provided in each laboratory and classroom.
- The research labs will have modular and moveable benches as well as fixed casework. The design of the labs will allow for flexible arrangements of lab benches within each lab, without significant modification of building systems and services.
- Research support spaces will be contiguous with lab bench areas, to allow for the easy adjustment of space allocation for the various lab functions. For example, a particular lab group with a greater need for support and instrumentation space should be able to use some of the standard bench area for support activities, while another group with greater bench needs should have the ability to use some of the support area to accommodate their activities.
- In many instances throughout this document, requisite storage spaces are identified and included. If, however, the Consultant has the opportunity to provide additional storage areas within the specific design NASF, this should be done.

5.07 Accessibility

- The design will provide for the convenient use of the facility by individuals with disabilities.
- Design pertaining to use of the facilities by individuals with disabilities will conform to current ADAAG regulations and Maryland accessibility codes.

5.08 Quality of Light

- The design of lighting systems will include detailed consideration of the normal tasks performed in the room, reflectance of all surfaces, special lighting effects required, normal sight lines, and zone control of larger areas. Unique ergonomic circumstances in spaces where computer monitors are used extensively require special analyses and provision for appropriate lighting quality. For general requirements, refer to the latest edition of The Lighting Handbook from the Illuminating Engineering Society of North America and the criteria in Section 5.33 Lighting. Coordinate this criteria with LEED Silver criteria.

- Multi-story spaces, skylights, and similar monitor fenestration may be used judiciously to accentuate public spaces and provide natural light to interior rooms and corridors.
- Provide direct/indirect natural light to the Environmental Systems Lab. Locate the lab in the building to ensure exposure to direct sunlight.

5.09 Sustainability Issues

- This facility must achieve a minimum LEED Silver certification.
- The Consultant is to incorporate materials and systems into the design that will allow sustainable maintenance and reliability over the fifty year or more life of the facility.
- In addition to creating an environmentally efficient facility, the building will be a showcase for education, community outreach, and environmental awareness.
- The Consultant will provide cost benefit/life cycle analyses for systems having alternative performance criteria which have potential environmental benefits. These criteria include increased thermal comfort zone, lower ASHRAE design temperature criteria and other energy saving strategies.
- Identify energy efficiency opportunities with the Labs for the 21st Century's *Laboratory Energy Efficiency Profiler (LEEP) Tool* and compare the results with the *Labs21 Benchmarking Tool*.

5.10 Interior Materials and Finishes

- Materials and finishes, both interior and exterior, will be selected to meet the following seven criteria: durability, aesthetic considerations, acoustical requirements, ease of maintenance, conservation of energy, sustainable manufacturing processes, and indoor environmental quality.
- Architectural finishes are important in this facility, and consideration for maintainability and durability is a key requirement. Some parts of the facility, like the Environmental Systems Lab and the loading area, will support essentially industrial type functions. All materials, including design details, will be analyzed for their effect on durability and ease of maintenance, and attention will be given to areas of high traffic (corridors), water use, toilets, and the vivarium and research labs.
- Special care will be taken at building entrances to provide for the removal of dirt and sand.
- All building materials will be selected to minimize the absorption and reflection of 802.11a, 802.11g, and 802.11n radio signals. This is especially important when selecting vertical partitions, doors, and ceiling materials.
- Surfaces must be selected to provide a monolithic, scrubbable surface, free of cracks or ridges. Floor-wall joints must be designed to allow easy cleaning.
- Doors will be sealed against pests and vermin and all penetrations of pipe, conduit, etc. will be sealed for sound, fire, smoke, and pest control.

- Floor surfaces will be appropriate to the function of the space. Surface materials will be selected to respond to maintenance needs as well as to the function and acoustical needs of the spaces. Materials will generally be long-lasting and easily cleaned.
- The minimum specifications for any carpet used will include performance requirements for static protection, Radiant Panel and Aminco Smoke Chamber Test passage, Steiner Tunnel Test (ASTM 84) passage, light fastness, tuft bind, delamination, abrasion resistance, compression resistance, and acoustical qualities.
- The Consultant must be aware of potential maintenance problems, and must take special notice of requirements for change in texture of floor surface where potential dangers to persons with disabilities exist.
- The Consultant will develop detailed product and installation specifications, and coordinate the review of these with UMBC prior to adoption.
- In the selection of building materials, the Consultant will take into consideration the off-gassing properties of selected building materials and finishes, especially those of wet pollutant emitters (e.g., paints, mastics/glues, etc.), in relation to maintaining good indoor environmental quality. Selected carpets will carry the Carpet and Rug Institute (CRI) IAO Logo in accordance with OSHA 29 CFR 1910.1001 - Air Contaminants and BOCA 3307 -Health Standards.
- The nature of the facility insures a certain amount of abuse from the movement of equipment. Measures will be taken to protect the building from unnecessary damage, thereby lowering maintenance. The design team must work closely with the university's Department of Facilities Management maintenance staff to benefit from their knowledge and experience in the maintainability of various surfaces and systems. Care in the design of the building will insure significant life cycle cost savings.

5.11 Furniture and Equipment

- Furniture and equipment layouts will be used to illustrate the function of each space. Therefore, the Consultant will show all furniture and equipment at the Design Development phase to insure that the proportion and size of each room provides for the function of the space.
- The selection of movable equipment, except when it is identified as being provided by or installed by the contractor, is not the responsibility of the Consultant but of the institution. However, the Consultant is required to provide a prototypical layout to demonstrate space functionality.
- Primary lists of equipment required to support this program are outlined in Section 6 Space Requirements. These lists are provided within the individual space sheets.
- Existing and new equipment as identified in the program space sheets are categorized as either "built-in equipment" or "moveable furniture". In addition, most space sheets include an equipment list table that documents additional information and specialized equipment, including responsibility for providing the item and for installing it.

- Items identified as "built-in equipment" or "moveable furniture" are items that the Consultant is to include in the contract documents, unless they are identified as *Furnished and installed by Owner*. The Consultant is to specify manufacturer, style, sizes, and location of this equipment and require that the construction contractor provide this equipment as part of the contract.
- The Consultant is equally responsible to specify the moveable furniture, and coordinate manufacturer's, models, finishes and numbers of items. The Consultant Is responsible for providing a design that will accommodate this furniture and will be required to provide floor plans that illustrate how it will be accommodated and how and where utilities will be provided to it.
- The Consultant is responsible to specify manufacturer, style and sizes of lab benches and tables, regardless if they are repositionable, temporarily attached to floors and walls, or permanently fixed to the building. The construction contractor will be required to provide this equipment for the research and teaching labs, and lab support spaces as part of the contract.
- The Consultant will consider ergonomic factors in the selection of furniture and the development of equipment layouts.

5.12 Signage and Graphics

- It is the Consultant's responsibility to design an identification and directional system to communicate information essential to the operation of the new facility. The interior and exterior graphic system is to assist individuals moving to, and within the facility. In accordance with ADA requirements, particular attention must be given to the needs of individuals with disabilities to access the building from adjoining parking areas and walkways, and to circulate effectively throughout the building.
- Coordinate all interior and exterior graphics with UMBC standards. All signs will reflect standards established by UMBC in construction, location, color and lighting.
- The Consultant will coordinate the Room Numbering System with university staff during the Schematic Design Phase and any subsequent design phases necessitating a room numbering change must be reviewed and approved by UMBC.

5.13 Security and Access Control

Building security measures will provide personal safety and security for building occupants, and provide security measures to protect personal and university property. These measures include site lighting, physical deterrents to unauthorized entry, security communications systems and equipment, and emergency power for all electric locks and accessible door equipment.

- Provide appropriate exterior lighting to the building entrances and along all paths in accordance with UMBC standards. Provide lighting at all service entries and the loading area.
- Security cameras will be positioned on entry doors, the loading area and the roof (for recording activities in adjacent open spaces). On the inside, cameras will be positioned at the entries to

the active-learning classrooms, the vivarium, the gamma irradiation room, and the chemical and hazardous waste storage areas.

- All active-learning classrooms must have a fiber optic security system installed to protect the computer hardware installed in the room. The fiber optic security equipment must be tied to the campus security infrastructure with alerts sent to the UMBC Police department.
- A security system, as specified and approved by UMBC, must be installed in the building. Door prop alarms for card controlled doors, fire alarm reporting, alarm signals for high-value / hazardous spaces, and environmental monitoring for critical spaces will be connected to the security system.
- All access control hardware, security system hardware will have a conduit installed from the location of the hardware device to within 18" of the closest communications basket tray.
- Security cameras and respective lighting will be on e-power. Lighting, in corridors and rooms video-monitored, will not be controlled by wall switches at the entrance or exit to the space. To conserve energy not all lights in a monitored space need to be on and interior lights can be controlled by switches.
- Provide emergency phones linked to the university call response system.
- Provide card readers on all shared research spaces, including labs, support spaces and shared storage. There will also be card readers leading from floor lobbies to the corridors accessing research-oriented wings. Provide key overrides for all doors with card access.
- The building will be zoned to allow for public/student access of teaching spaces, group student study rooms, the building administration suite, conference rooms, the CIRC office, collaboration spaces and the GMP Lab. While these spaces may be located on research levels or service levels they will be accessed from a public space and not behind a card reader control point.
- Private spaces, like private offices will be key controlled only. Building service spaces, like data and telecommunication rooms, janitorial closets, building storage, etc. will be both card and key controlled.
- Provide two levels of control for each entry of the vivarium, an entry door and a vestibule or corridor.
- Emergency power is to be provided for all electric locks, and doors equipped with hardware to make the door accessible to persons with disabilities.
- Follow Federal regulations regarding security features to protect regulated spaces and equipment, including the Gamma Irradiation Room.
- Use the upper level of the Commons Drive Garage to mount security cameras observing the loading area. Install additional cameras in the garage to provide overall security.

5.14 Acoustics

Each space in the building will be designed to provide optimal noise reduction within the space. Sound isolation is also of utmost importance. Criteria for noise reduction and sound isolation is provided in the space sheets as a guide – the Consultant will employ "best practices" in this regard. This includes sound generated from equipment and users in adjacent rooms as well as the building mechanical systems.

- Design of the Active Learning Classrooms must provide for a high-quality acoustically-controlled learning environment which facilitates group learning. Sound transmission between classrooms and from corridors must be controlled. Acoustic treatments must be employed to minimize propagation of sound within the room.
- Mechanical system design must attenuate noise generated from air flow through ducts and diffusers, as well as noise generated from system components in all teaching spaces.
- Spaces that contain noise generating equipment will be designed away from spaces requiring quiet, or will be adequately isolated acoustically.
- The ILSB will be designed to meet or exceed specified ambient noise levels and sound transmission criteria (STC) for the following room types, unless called out specifically in the individual space sheets in Section 6.

Type of Space	Room Criteria	STC Rating
Classrooms	RC30-35(N)	STC 55
Seminar Rooms	RC25-30(N)	STC 55
Teaching Lab	RC30-35(N)	STC 55
Offices	RC40(N)	STC 40
Conference Rooms	RC25-30(N)	STC 55
Research Labs	(as noted on space sheets)	
Vivarium	(as noted on space sheets)	
Lobby/ Lounges	RC40(N)	STC 50
Corridors	RC40(N)	STC 50

5.15 Vertical Circulation and Elevators

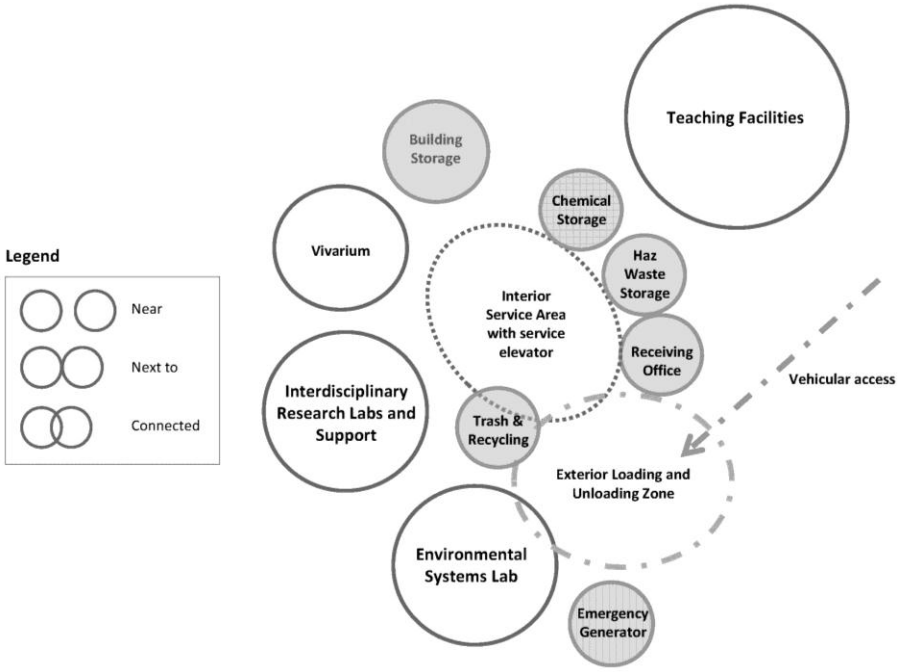
- The building has two main programmatic components: teaching spaces and research spaces. Inviting stairways will link the floors containing the teaching spaces providing access and discouraging elevator use. Similarly inviting stairs will also link the levels containing research spaces to encourage spontaneous interaction between floors. The location and design of the staircases will be deliberate and visible.
- The building will accommodate a fast, flexible, and easy to use elevator system. It is expected that two passenger elevators will service this building. Passenger cabs will be minimum 4000 LB and be well lit. Finishes will be durable and vandal resistant. Elevator wainscots will be reinforced to prevent damage from cart traffic.

- A service elevator will be connected to the loading area by a service vestibule and passage, and sized to accommodate research equipment, pallets, and vivarium animal caging racks. It will have the ability to travel from the basement to the penthouse. The service elevator will be remote from the passenger elevator and provide controlled access to research levels.
- Elevator telephone service and ringdown are provided by the campus telephone system. Elevator telephones must be of the specific model and type stated in the UMBC Communications Services Specifications. The elevator car will house all instruments and equipment compatible with UMBC standards and systems. All keyed switches will match current key systems (H259) except for fire service barrel key EPC 02. Elevators will be equipped with Remote Elevator Monitoring system.
- Provide the service elevator with card key access to the research floors.

5.16 Material Delivery and Removal

- The ILSB will have a loading area accessed from Commons Drive. The drive to the loading area will also allow for access to emergency vehicles accessing buildings along the Quad.
- The loading area will have direct access to the fuel tank of the emergency generator, a trash and recycling room and the Environmental Systems Lab. Doors from this area to the building will be a minimum of 9’-0” in height.
- UMBC does not utilize exterior trash dumpsters for the removal of refuse from buildings. All disposal of trash and waste is deposited in trash rooms adjacent to the loading area.
- Additional areas comprising the service core include a chemical storage room, a hazardous waste storage room, a receiving office, conditioned building storage and a service corridor with the service elevator. See Figure 5.4 for an adjacency diagram of the loading and service area.
- The service elevator will have access to all levels, and be the principal access for distribution of materials and furniture to the research labs, the core facilities and their support spaces.
- Secondary containment will be provided for any fuel tanks associated with the on-site emergency generator.
- Provide a paved apron to allow a mid-sized truck to turn around at the loading area. Design the paving in the loading area to be pervious, if possible.

Figure 5.3 Material Delivery and Removal Adjacencies Diagram



5.17 Maintenance

Life-cycle studies have shown that the cost of maintaining a building over its normal life exceeds the cost of constructing that facility. The Consultant is expected to play a major role in minimizing maintenance problems by obtaining input from UMBC in locating internal spaces, designing and laying out building systems, selecting equipment and finish materials, and designing other areas which directly affect annual maintenance costs. UMBC approval of the systems' design and equipment and material selection is required.

- Based on consideration of the project's available resources (budgets, space, etc.), the Consultant will recommend the best available equipment, but not equipment soon to be obsolete. Some specific requirements the Consultant must meet when designing the facility are:
    - Mechanical spaces must be accessible from public corridors and not require access through private spaces. Mechanical spaces that allow access from the exterior into the remainder of the building will be avoided.
    - UMBC desires that major mechanical chases have spare capacity for future additions and modifications of systems. These spaces need to be blocked out during construction and monitored to prevent unauthorized use.
    - Specification of equipment which requires highly technical skills and procedures or specialized equipment tools for its repair will require thorough evaluation to determine acceptability to UMBC.
    - The ease of maintaining floor coverings is a primary consideration. Durable materials will be specified for high use areas and compatible with area functions.

- The Consultant will be responsible for ensuring accessibility to equipment for its maintenance, repair, removal, and replacement with minimal effort.

- The Consultant will develop an equipment numbering scheme, approved by the university, and use this numbering scheme to identify the equipment on drawings, submittals, name plates, and maintenance management forms. The Consultant will include these comments in the specifications.
- The Consultant will address in the construction specifications the requirements of the contractor to provide detailed and comprehensive operations and maintenance manuals for all equipment and systems in an organized format. The selected Consultant will also stipulate the requirement for attic stock or spare parts allowances for early consumables, e.g. filters for air handling equipment. Discussions with UMBC are required to identify the items and information required.

5.18 Safety

- UMBC's Safety Officer is responsible for inspection and evaluation of safety related problems on the UMBC campus. This department is staffed with professionals trained in the various aspects of fire and life safety and bio-hazardous containment. Campus criteria for installation of fire alarm systems, extinguisher cabinets, sprinkler systems, fire lanes and ventilation will be provided by UMBC. Interconnection of the fire alarm system to the existing campus security monitoring system will be coordinated with the UMBC Department of Communications Services.
- Fire and life safety issues are major design considerations, and the Consultant is directed to investigate all potential fire and life safety problem areas, including those that may be generated by the program requirements. Below is a partial list of requirements:
    - All fire equipment is to be clearly visible and graphically designated. Systems will report locally within the building and to Campus Police’s central reporting center.
    - All materials used in the building are to be selected with regard to flammability and the types of gasses produced by combustion.
    - Emergency access and egress routes are to be clearly identified and physically apparent to the building occupants.
    - Ventilation systems are to minimally comply with the latest standards set by the American Conference of Governmental Industrial Hygienists, BOCA Mechanical Code, ANSI/AIHA Z9.5, OSHA, ASHRAE, and SMACNA, as well as with other applicable codes and standards.
- The energy monitoring system and security and safety systems will be interconnected with the UMBC campus central system. This will include card access as envisioned/used by the university. A copy of UMBC’s Common Card Specifications will be provided to the selected Consultant at the pre-fee negotiation meeting. All components utilizing the campus security monitoring system must match existing equipment, conform to UMBC standards, and be coordinated through the UMBC Department of Communications Services.

- The Consultant will perform a lightning protection analysis to evaluate the requirement for a lightning protection system to be provided. The Consultant will design a lightning protection system around the perimeter of the roof, flat copper conductor cables, and copper coated steel ground rods. This system will be installed by a certified lightning protection installer, be in full compliance with ANSI/UL 96 and ANSI/NFPA 780 or latest editions, and have a UL Master Label when completed.
- A ground point, connected to the building lightning protection system, must be installed at all points where low voltage cabling enters the building. Surge protectors must be installed at any point where conductive cabling enters the building. These surge protectors must be installed in locations that are accessible and serviceable. A ground bar, connected to the building lightning protection system, must also be installed in the data and telecommunication closet on the highest floor of the building. It will be located at the point where the roof conduits enter the communications closet.
- Building alerting hardware will be installed to display emergency messages throughout the building. The displays will work with the UMBC Text Messaging system operated by the UMBC Police Department. Displays will be located at all elevator lobbies, building entrances, stairwell doors, and the loading area.

Mechanical and Plumbing

Following is a summary of HVAC, plumbing and fire protection design criteria for the major spaces in the science complex. These criteria will be used where “Standards” are referenced in the room data sheets. In general the building will be LEED Silver Certified, the level will meet current requirements at the time. It is implied that the referenced codes will be of the current version unless specifically required otherwise by the university. Standards and guidelines are intended to establish the minimum design criteria for the project with final acceptance for potential variation by the university.

All alternative MEP systems will be selected on the basis of life cycle cost analysis (LCCA). The engineer(s) will focus on and provide a design that provides a flexible, maintainable and reliable MEP in building design for UMBC.

5.19 General Criteria and Codes/Standards

The design will adhere to:

- UMB design standards
- IBC
- IMC
- IPC
- IECC
- NFPA 45
- NFPA 101

- NFPA 13/14
- ANSI Z9.5 Laboratory HVAC Sytems
- ANSI 358.1- Emergency safety fixtures
- ANSI 17.1-Elevator Code
- AAALAC- Vivarium Design Guidelines
- ASHRAE Handbooks- HVAC System Design Guidelines
- ASPE Handbooks- Plumbing design Guidelines
- SMACNA- Ductwork Design Guidelines
- ISPE Pharmaceutical Engineering Guidelines- GMP Guidelines
- NIH Design Guidelines- Laboratory Design Guidelines
- LABS 21- Low Energy Design Guidelines
- ASHRAE 62.1-Ventilation Standards
- ASHRAE 90.1-Energy Guidelines

5.20 Design Criteria

Outside Design Conditions:	Summer	ASHRAE 2.5%
	Winter	ASHRAE 97.5%

The engineer shall indicate to the owner the expected duration and temperature variations within the design spaces attributed to not designing to the most stringent ASHRAE design level.

Temperature/ RH (Teaching):	Summer	78 F / 50% RH
	Winter	72 F
Temperature/ RH (Lab):	Summer	76 F / 50% RH
	Winter	72 F
Temperature/ RH (Vivarium):	Summer	68-79 F / 40-50% RH
	Winter	68-79 F / 40-50% RH

Ventilation /Filtration/Pressurization:

100	Classroom, Classroom Service	ASHRAE 62.1 w/MERV 13 filters and demand control ventilation positive by 10%
210	Class Laboratories	100% Outside air 6ACHR w/ MERV 16 filters, negative by 0.02
215	Class Lab Service	100% Outside air 2 ACHR w/ MERV 16 filters, negative by 0.05IWG
250	Research/Non-Class Laboratory	100% Outside air 6 ACHR w/ MERV 16 filters, negative by 0.05IWG*

255	Research/Non-Class Lab Service	100% Outside air 2 ACHR w/ MERV 16 filters, negative by 0.05IWG
300,400	Office & Study Facilities	ASHRAE 62.1 w/MERV 13 filters, positive by 10%
570	Animal Facilities	100% outside air 10 ACHR w/MERV 16 filters, negative by 0.05IWG**
730	Central Storage	2ACHR, neutral
760	Hazardous Materials Storage	10ACHR, negative by 10%
W	Circulation Areas	ASHRAE 62.1 w/MERV 13 filters, positive
X	Building Service Areas	ASHRAE 62.1 w/MERV 13 filters, negative
Y	Mechanical Areas	ASHRAE 62.1 w/MERV 13 filters, negative

*laboratory spaces may be reduced down to 2ACHR in the un-occupied times, tissue culture rooms could be negative or positive

**micro-isolator racks may allow primary room to be design to 6ACHR with proper evaluation, special holding areas may need to be positive.

Equipment cooling loads:

100	Classroom, Classroom Service	1 watt/sf
210	Class Laboratories	4watts/sf*
250	Research/Non-class Laboratory	8 watts/sf peak; operating loads lower*
255	Research/Non-class Lab Service	30 watts/ sf peak; operating loads lower*
310	Office & Study Facilities	2 watts/ sf peak; operating loads lower
570	Animal Facilities	Based on animal, equipment and lights

Support spaces such as cage wash and autoclave rooms shall have required canopy exhaust make-up air and fan coil units to condition heat load and maintain space at 75F.

*****a base load of 6 ACHR i.e. 6w/sf will be carried by the air system, loads above this rate shall be conditioned by fan coil units.

Specific Criteria:

<u>Utilities</u>

Compressed Air	35 psig / 0.5 scfm at final outlet in labs; 100 psig for glass washers & autoclaves
Natural Gas	7" – 10"WC/ 0.5scfm at final outlet

Vacuum	22 in. Hg at 1scfm final outlet
CO2	25 psig distribution from bulk storage tank
Nitrogen	55 psig distribution from bulk storage tank
RO water system	CAP Type II (2 megohm-cm resistivity) provided by central system
Safety	
Fume hood face velocity	100fpm at 18" sash height/ 60fpm for low flow hood applications
Bio-Safety Cabinet	105 fpm at 8" sash height, units will be provide with VFD motors and VAV terminal units to reduce BSC flow by 50% when sash is closed.
Canopy Hoods	100fpm at hood face
Snorkels	100cfm/snorkel
Pressurization	Labs and animal holding rooms negative to corridors by 0.05IWG
Humidification	Only required for the vivarium area
Redundancy	
Exhaust fan redundancy	"N+1" with emergency power
LAB and vivarium AHU:	A single redundant unit will serve as back-up for both systems with emergency power. Units will be connected via manifold ductwork with isolation damper(s).
Pump redundancy	"N+1" with emergency power
Heat Exchanger redundancy	2@ 66% of peak load

5.21 Chilled Water System Design

The building is being fed from the campus chilled water systems with a delivery temperature of 44F. All cooling coils will be designed to achieve a minimum of a 16 degree differentia.

- The design will include a tertiary system inclusive of a de-coupler and central chilled water building control valve.
- Redundant variable speed pumps with pressure independent 2-way control valves will be used in the distribution system. The system will be extended to air handlers and process loads.
- Design system elevation will not exceed the campus chilled water storage tank height - if required a plate and frame HX will be used to isolate the building.
- A secondary, chilled water systems will be created to serve fan coil units throughout the building laboratories. This system will operate at different design temperatures and potentially a different design temperature differential. A de-coupled loop with a mixing valve is anticipated. The system designs will be approved by UMBC

- Vivarium support equipment and air handlers will be provided with an air cooled back up chiller in the event the campus chilled water system is inoperable. This chiller, and associated pumps will be on emergency power.
- Process chillers, with integral pumps will be utilized for data and telecommunication closets and any critical loads such as lasers, imaging equipment or confocal microscopes. The house chilled water system will be used as the condenser loop for the process chillers. The vivarium chiller can serve as a temporary back-up process chiller.
- The data and telecommunication rooms will be on a backup cooling system in the event the campus chilled water system is inoperable. They will be able to operate independent of the rest of the ILSB spaces and energy management schedules.
- All emergency / backup chilling equipment and associated control equipment must be on the same side of a transfer switch as the loads they are cooling / protecting.

5.22 High Temperature Hot Water Campus Utility

The campus utilizes 350F/200psig high temperature hot water distribution system.

- This building will use the UMBC standard shell and tube heat exchanger as the interface between the high temperature water and the building side service. The shell and tube heat exchanger will consist of stainless steel tubes and cupronickel shell; each heat exchanger regardless of service i.e., re-heat, pre-heat, domestic or lab water will be sized at 66% of the peak load.
- As in the chilled water system, redundant distribution pumps for the re-heat system will deliver 180F heating water, at a 40 degree differential, to re-heat coils utilizing pressure independent control valves. Similarly, redundant pre-heat pumps will serve all air-handlers, fitted with 2-way pressure independent control valves. These pumps are envisioned to be end suction type. The pre-heat system will utilize 30% glycol for freeze protection.
- HTHW will also be utilized to generate clean steam for central humidification that will maintain the program required RH for the vivarium air handlers. HTHW will also be utilized for the vivarium cagewash system.
- The intent is to include heat recovery. See Section 5.23.

5.23 Central Air Handling and Exhaust Systems

- Separate air handlers will be utilized for teaching, laboratory and vivarium areas. All units will be equipped with variable frequency drive fans. Unit sections will consist of outside air/mixing box, filters, energy recovery, pre-heat coil, cooling coil, fan section, humidification if required, sound attenuation and discharge plenum. It is suggested that the fans be direct drive plenum type.
- Administrative air handler will be commercial grade modular double wall air handler unit of aluminum construction and 100% economizer abilities with MERV 13 filtration. Include a return air fan.

- Laboratory units will be custom design double wall air handlers of aluminum construction with total enthalpy energy recovery wheels with MERV 16 filtration.
- Vivarium units will be double wall, custom or modular design type with all aluminum construction and contain either glycol run around energy recovery coils or heat pipe energy recovery system. MERV 16 filtration will be used. This unit will also be equipped with a central humidification system manifold.
- A single vivarium grade unit will be used as a redundant air handler for both the laboratory and vivarium systems. This unit will be sized based on the largest required air volume of either the lab or vivarium system.
- Exhaust fan systems for laboratory and vivarium areas will be designed to prevent re-entrainment at outside air intakes into the ILSB and surrounding buildings and will include N+1 sizing criteria. There will be 2 fume hood exhaust fans estimated at 33,000cfm each, 2 bio-safety cabinet exhaust fans at 10,000cfm each, 2 general exhaust fans at 35,000cfm each and 2-vivarium exhaust fans sized at 20,000cfm each. Fans as estimated above include 25% future capacity. It is suggested that these fans be direct drive high dilution fans with variable frequency drives with the ability to modulate stack exhaust velocity based on wind conditions.
- Fume hood systems will be separate from general exhaust systems and will not be circulated through energy recovery wheels.
- Vivarium exhaust system systems will be separate from other exhaust systems.

5.24 Air Distribution System

- The administrative and teaching area systems will be capable of variable volume control. The research labs and vivarium, including fume hoods and bio-safety cabinets will be VAV, as well. Static pressure control and reset will be achievable in all air systems.
- Medium pressure ductwork mains in mechanical rooms and shaft areas will be limited to 2000fpm. Medium pressure ductwork mains outside of shafts and mechanical spaces will be sized at no more than 1500fpm. Room distribution ductwork will be limited to 800fpm.
- Ductwork will be galvanized or stainless steel. Stainless steel is suggested for fume hood or moisture laden air streams, as the air stream dictates, no acoustical lining will be allowed.
- All ductwork will be either sealed, Class A for 4IWG and up, or Class B for all other pressures. Leakage rates will not exceed class 16 for less than 2IWG, class 8 for 3IWG and class 4 for 4IWG and up.
- Commercial VAV terminal units with hot water re-heat coils will be used for administrative areas, teaching areas and research labs and research support. Laboratory grade VAV supply and exhaust terminal units will be utilized for all laboratories and laboratory grade CAV supply and exhaust terminal units will be used for the vivarium areas. These terminal units will be provided with high speed actuators. All terminal units will be provided with sound attenuators, packless attenuators will be used on fume hood and bio safety cabinet terminal units.

- All ductwork will be thermally insulated in accordance with the energy code.
- The vivarium animal holding rooms will utilize a cage rack system. It is anticipated that supply air will be distributed to the room via a supply terminal unit. A HEPA filtered supply blower will distribute this air to each animal cage. A single exhaust terminal unit will be used to exhaust not only the room but the individual cage racks. Each cage rack will be provided with an iris damper to precision balance the exhaust from each rack.
- Fume hoods for the building will be variable air volume, low flow type fume hoods with a face velocity of 60FPM.

5.25 Supplemental Cooling

- Induction units will be considered for large class room areas and fan coil units with secondary drain pans will serve to condition the elevator and Data and telecommunication rooms throughout the building. These systems will be served from the secondary chilled water loop. The loop temperature will be as required to serve the most demanding load on the secondary loop.

5.26 Plumbing

- A complete and separate sanitary and water system will be provided for all potable water systems, including the hot water double wall water heat exchangers. Solar water heating will be evaluated for the potable water sinks.
- Laboratories and vivarium spaces will share a common water system. Laboratory acid waste piping will be acid resistant, underground piping will be glued or heat fused. The incoming water service will be from the UMBC campus.
- Potable, laboratory and fire protection will be separated by backflow prevention devices.
- The storm water and sanitary systems will be no hub cast iron. Below grade it will be hub and spigot.
- Water piping distribution systems will be evaluated based on a risk vs. cost basis.
- Laboratory air and vacuum system will be provided with a 50% redundant compressor/vacuum pump. The air system size is estimated at 70scfm at 100psig. The system will include a duplex 10HP/240 gallon receiver system. The vacuum system will be a triplex 15 HP/ 240scfm at 20IHG with a 200 gallon receiver. An acid neutralization system will be provide to neutralize a flow rate of 200 gallons a day, the domestic water system will be tied into downstream of this system.
- A black steel natural gas system will be extended to fume hoods and bio safety cabinets.
- Specialty gases such as CO2 and N2 will be piped from dewars or high pressure cylinders, automatic change over manifolds will be provided.
- Water saving plumbing fixtures will be utilized as required to achieve LEED certification.

5.27 Water Systems

- An RO (CAP level II) system will be provided for the building with a storage capacity of 250 gallons and an RO system capable of 2gpm. The distribution system will be a polypropylene fusion or solvent system. The system will have recirculating faucets and no dead legs.
- An animal watering system will be provided for 36 racks with 140 cages per rack. The animal watering system will have an independent RO system.
- Environmental labs used for aquatics will be provided with factory packaged circulating systems. These systems will be provided with select building utility systems.
- Storm water/condensate drain/RO system reject storage system will be evaluated from a LCCA perspective to provide lawn irrigation to the landscape.
- A code accepted water supply will be utilized for all emergency eye and showers throughout the building.

5.28 Miscellaneous Pumps

- Elevator sump pumps capable of 3000GPH for each car are required and will be on emergency power.
- Sump pumps or sewage ejectors required for fixtures or drains that cannot drain by gravity will be fully redundant and on emergency power.

5.29 Fire Suppression

- The ILSB will be fully sprinklered. A fire pump –may not be required. Consultant to conduct a fire flow test. The sprinkler system will meet the requirements of NFPA 13 and 14.
- Dry pipe or pre-action systems will be provided where freezing has a potential to occur.

5.30 Building Automation System (BAS)

- A direct digital control system will be provided for the ILSB as manufactured by Siemens Technology. The system will be WEB based and integrated seamlessly into the existing campus system. Actuators will be electronic. All panels will have emergency power connections and UPS modules.
- The laboratory control systems, if different from the host BAS system, will be fully integrated into the host system with all trending, control and alarm functions active. All utilities will be metered through the BAS system with the option of having lighting, security and fire alarm controlled through the BAS.
- The existing, campus-wide Central Control System will be expanded as required to control, monitor, and alarm the DDC and CCMS System.
- Building DDC and energy management controls are to be implemented using the UMBC campus wide standard system. The building system is to be capable of standing alone but is also to be totally integrated into the overall campus wide network. System design is to be coordinated with

UMBC's designated vendor responsible for site management and support. Sequence of Operation will be provided to the selected Consultant. System design is to include:

- Building system configuration drawing
- I/O lists (typicals accepted) include mechanical and electrical systems as follows:
  - Tripped main, tie, or feeder circuit breaker as determined by UMBC.
  - Substation secondary voltage.
  - Substation transformer hot spot temperature.
  - Substation automatic throw over status-automatic, manual.
  - Items listed under Emergency Power System.
  - Major mechanical equipment (chiller, boiler pumps, AHU, etc.).
  - Minor mechanical equipment (VAV, fan coils, etc.).
  - General environmental status (temperature, humidity, etc.).
- Sequence of operation for mechanical equipment.
- Drawing locating all system modules/cabinets.
- Generalized description of desired graphics.
- List of desired reactions to selected alarm conditions.
- Integration with power monitoring system.

5.31 Testing, Adjustment and Balancing and Commissioning

- The Consultant will incorporate the requirements of ANSI/ASHRAE 111-1988 or the most current approved version, *Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air Conditioning, and Refrigeration Systems*, into the construction specifications.
- The building will be commissioned by a third party commissioning agent meeting the LEED certification criteria for scope of services.

Electrical and Communication

Following is a summary of electrical, communication and lighting design criteria for the major spaces in the Interdisciplinary Life Sciences Building. These criteria will be used where “Standards” are referenced in the room data sheets.

In General the building will be LEED Certified, the level will meet current requirements at the time. It is implied that the referenced codes will be of the current version unless specifically required otherwise by the university.

Standards and guidelines are intended to establish the minimum design criteria for the project with final acceptance for potential variation by the university.

5.32 Codes and Standards

- Americans with Disabilities Act (ADA)
- ANSI/ASME A17.1 Safety Code for Elevators and Escalators
- National Electrical Code
- Applicable editions of National Fire Protection Association (NFPA)
- State and local codes and regulations
- American Concrete Institute (ACI)
- American National Standards Institute (ANSI)
- American Society of Mechanical Engineers (ASME)
- Certified Ballast Manufacturers Association (CBM)
- Edison Electric Institute (EEI)
- Electronics Industry Association/ Telecommunications Industry Association (EIA/TIA)
- Environmental Protection Agency Regulations (EPA)
- Illuminating Engineering Society of North America (IESNA)
- Institute of Electrical and Electronics Engineers (IEEE)
- Insulated Power Cable Engineers Association (IPCEA)
- International Building Code (IBC)
- National Electrical Manufacturers (NEMA)
- Underwriters Laboratories, Inc. (UL)
- Maryland Occupational Safety and Health Administration
- ASHRAE/IESNA 90.1
- ANSI: "National Electrical Safety Code" – ANSI C-2 and ANSI C-37
- UM Facilities Management – "Architectural and Engineering Design Standards

5.33 Electrical

- Electrical System: The Consultant will design an electrical distribution system to include unit substation, distribution panels, branch circuit panelboards, disconnect switches, motor starters, raceway, cable, lighting and its controls.
- Power:

Overall Building Normal Load	<15 VA/SF	1845 kVA
Overall Building Emergency Load	<4 W/SF	492 kW

- Service Entrance Power: Provide a unit substation to convert 13200V campus loop feeders to 480/277 Volts for use in the building. The primary will consist of 2 loop switches and a radial fused switch. The unit substation transformer will be liquid filled. The unit substation will be located in an underground vault adjacent to the tunnel. The vault will be mechanically ventilated, but not open to the sky. Consideration will be given to the use of a double-ended unit substation for redundancy, reliability, and maintenance. Other electrical equipment will not

be located in the vault, but in a main electrical room within the building. The secondary will consist of draw-out switchgear with power circuit breakers. Provide local digital metering on the main(s)that are tied directly to Square D Power Logic Main Metering System at Central Plant. Feeder breakers will have ground fault protection and metering on the digital trip units.

- Emergency Loads: The following is a non-comprehensive list of the loads that will be on emergency power.

  Life Safety
  - Life Safety Lighting
  - Fire Alarm System
  - Security System
  - Emergency blue phones

  Equipment
  - Elevator – one only
  - Elevator machine room and IT closet cooling
  - Elevator sump pumps
  - Pre-heat pumps
  - Fume hood exhaust fans
  - AHU supply fans to make up exhaust air
  - Atrium smoke evacuation fans (if required)
  - ATC controls
  - Sump pumps
  - Sewage ejector pumps
  - Building IT servers and server room cooling

  Lab Equipment
  - Lab red receptacles – one duplex outlet per research lab module and two in the research lab equipment rooms, or as specified in space sheets.
  - Process chiller and pumps
  - Freezers
  - Incubators and centrifuges
  - Pumps – Environmental Systems Lab
  - Vivarium AHU
  - Vivarium chiller and pumps
  - Vivarium holding rooms, necropsy, surgery, transgenic facility
  - Vivarium automatic watering system
  - Vivarium central vacuum system
  - Vivarium RO water system

- Environmental rooms

- Generator: The diesel generator location will be evaluated with special consideration given for an on-grade location. The generator will have an in-base tank with 72 hours of fuel capacity at 100% load. The generator will be located such that a fuel delivery truck can easily fill the tank. The generator will be manufactured by Caterpillar, Cummins, Generac, or Kohler. The generator will be sized to meet all of the emergency requirements listed above and have appropriate spare capacity. 20% is recommended for future needs.
- Automatic Transfer Switches: ATS's will be 4 pole for 4 wire systems with bypass as manufactured by Russelectric or approved equal by ASCO.
- Power Distribution: The main service unit substation will feed distribution panelboards to serve branch circuit panelboards up in the building. Laboratories will be provided with a normal panelboard for every 2 labs. The panels will be located convenient to the labs.
- Automatic Transfer Switches: Provide ATS's of suitable rating with 4 pole switching, non-bypass, closed transition for life safety and laboratory ATS's, open transition with in-phase band monitor for equipment ATS.
- Panelboards: will have copper busing, 200% neutral, be fully rated, have 42 poles, and have the optional hinged trim feature (door in door construction).
- Dry type transformers: Transformers will be of the harmonic cancelling type to reduce harmonics in the building and save energy.
- Electrical Closets: Electrical closets will be stacked. Closets will be walk-in with minimum dimensions of 7'-0" by 8'-0" or larger as required for the equipment contained. Provide 1 closet for every 10,000 GSF of floor area. Closets will contain normal and emergency panels. Closets will be mechanically ventilated with the capacity required to remove the anticipated heat load.
- The design engineer will perform a Fault Study, a Coordination Study, and an Arc Flash Study. Require the switchgear manufacturer to perform the same studies and provide the required arc flash signs for each piece of electrical equipment.
- A building flywheel UPS must be installed to protect the data and telecommunication rooms, building automation systems, lighting control systems, and the computer workstations in the teaching spaces. All the control systems for the laboratories, vivarium and GMP area must also be on UPS. This building flywheel UPS will be fed by power service that is backed up by an emergency generator. The UPS will be manufactured from Caterpillar / Active Power.
- An emergency generator status / alarm panel, that monitors the generator that feeds the UPS, will be installed in the room that houses the UPS.

5.34 Lighting

- The Energy Code for Maryland was established under the Energy Conservation Building Standards Act enacted by the Public Service Commission. The adoption of the Energy Code now takes place under the Maryland Building Performance Standards (MBPS).

- The State of Maryland has adopted with modifications, the International Building Code (IBC) 2009 and the International Residential Code (IRC) 2009 as the Maryland Building Performance Standards. These standards require the buildings to be designed and constructed in accordance with the International Energy Conservation Code (IECC) 2009. Local jurisdictions may not modify this standard to a lesser requirement.
- Consolidate and organize all room controls at a convenient wall location adjacent to entry doors, and in Teaching Labs, also on the wall adjacent to the teaching station. In Active-Learning Classrooms controls will be designed into the instructor's station. These include controls for lighting, as well as for projection screens (when power actuated), volume controls for speakers, monitor controls and data ports.
- In general, independently control general room lighting with task lighting.
- Classrooms and other teaching facilities to have controls allowing for 100%, 67% and 33% illumination levels. The lighting controls will be low-voltage and tied to a campus-wide energy management system.
- Install occupancy sensors in all rooms. Install the sensors so that they over-ride energy management systems. Sensors will operate lighting initially to 33% illumination level, when room dimming is provided.
- Lighting levels will be in accordance with ASHRAE Standard 90.1-latest edition or most current approved version.

  Lighting Levels (average maintained):

Classrooms and Seminar Rooms	20-40 fc
Research Labs	50-70 fc
Teaching Lab	50 fc
Vivarium Holding Room	20/40/60 fc (as noted on space sheets)
Offices	30-50 fc
Conference Rooms	30 fc
Lobby/ Lounges	5-10 fc
Corridors	5-10 fc

5.35 Communication

Coordination and Design Criteria

- The Consultant will design a central distribution system for voice, video, and data cabling in the building. Prior to the Design Development phase of the project, the Consultant will meet with the university's Director of Communication and Security to review and discuss the incorporation of the university's requirements for data and telecommunications distribution systems into the project design.
- The Consultant will adhere to UMBC's Network Equipment and Cabling Standards (a copy of which will be provided to the selected Consultant at the pre-fee negotiation meeting) as well as

any subsequent additional requirements communicated by the university to the selected Consultant.

- The Consultant will incorporate all UMBC Telecommunication specifications into the design documents after coordination with UMBC to determine all of the pathway requirements, components and elements that will be incorporated into the project. Data infrastructure and elements will be designed and specified based on UMBC's Pathway Specifications. The wireless network protocols to be supported will be 802.11a, 802.11g, and 802.11n.

Data and Telecommunication Rooms

- A Data and Telecommunication Room must be installed on each floor above the lowest floor and stacked to facilitate wiring. The data and telecommunication closets will be approximately 180-200 square feet and be able to support a minimum of five UMBC standard rack spaces, per the criteria below.
- Data and Telecommunication Rooms must be centrally located in the building to facilitate easy routing of telecommunications basket trays and pathways. All locations in the building must be within 275 feet of a data and telecommunication room as the cable runs and including vertical transitions.
- The ILSB will have a Main Distribution Frame (MDF) at the basement level connected to the campus fiber optic network. The MDF will be approximately 290-300 sf and be able to support eight UMBC standard rack spaces.
- All telecommunications spaces must be accessible from public corridors and not require access through private spaces.
- UMBC standard rack spaces are 116" deep by 40" wide. All data and telecommunication rooms must have a clearance to a minimum height of 10 feet. All deck mounted riser conduits will be kept tight against the data and telecommunication closet walls and outside of the rack spaces. All the wall surfaces in the data and telecommunication rooms must by covered with fire retardant plywood. All walls will provide a 6" buffer space that does not include walkway space or rack space. This 6" buffer is to accommodate the depth of wall mounted hardware.

Distribution Systems

- Basket tray must be installed down all public corridors. Only communications cabling, managed by UMBC Communications Services, will be installed in the basket tray. All building automation and other low voltage cabling will be run through a separate pathway structure, unless the basket trays are designed and installed to accommodate various cabling per UMBC telecommunication requirements, including physical divisions within the tray and unique clearances over and around the tray.
- Access points will be from public corridors with acoustic panel ceiling ceilings. Provide access points in the Active-Learning Classrooms.

- All communications outlets will be mounted in double-gang boxes. A 1 1/2" conduit will need to be installed from all double-gang boxes to within 18" of the closest corridor basket tray and terminate in the public corridor.
- All the pathways, conduits, wall boxes, and other pathway structures must take into account the minimum bend radius of the cabling that could be installed.
- A 4" conduit must be installed from the top floor data and telecommunication room through the roof. The conduit must be installed in such a way as to prevent rain, insects, and animals from entering the building through the conduit.

Additional Data and telecommunication Criteria

- Courtesy phones must be provided at strategic locations in the corridors of the building.
- The unshielded twisted pair cabling will meet a minimum Category 6a certification.
- An In-Building Cellular Distribution Antenna System will be designed and installed to insure cellular coverage in all areas of the building. The minimum carriers to be supported and the system to be installed must be approved by the UMBC Director of Communications and Security.

5.36 Fire Alarm

- Provide a complete manual and automatic, multiplex, addressable, fire detection and alarm-indicating system.
- The consultant will verify the need for a mass communication system with voice communication. The system will be a stand-alone system, which interfaces with the existing campus security monitoring system. This interface must match existing equipment and be coordinated with the Department of Communication Services.
- The preferred manufacturers for this Campus are Edwards and Simplex systems.

Section 6 Space Requirements

The Facilities

6.01 Teaching Facilities

The Interdisciplinary Life Sciences Building will support course redesign with dynamic high-technology classrooms, seminar rooms and teaching labs.

The **Active Learning Classrooms** will transform numerous STEM courses to take advantage of the use of process-oriented, guided-inquiry learning. These eight new classrooms will provide the university with the facilities to propel course redevelopment and impact a large percentage of the university student body. Each classroom will be furnished with specialized, round tables to afford the possibility of working in groups of three or four. Rooms will be equipped with technology including laptops or computer workstations serving each student team. Multiple flat panel screens, located strategically around the classroom, will display problems as they are being solved by students. Mobile white boards at each table will further engage students, a key feature of the active learning pedagogy which has been proven to boost student success and retention.

Students will participate in hands-on experimentation in the **Teaching Labs.** The four labs proposed for the building will seat 32 students each and accommodate a range of wet and dry lab conditions allowing for the most flexibility. Flat panel monitors will be placed at multiple points along the perimeter of each teaching lab to enable more active participatory lab sessions using simultaneous displays from either the instructor's or students' computers. All teaching labs will adjoin a storage and preparation room, with a direct connection between the two spaces. Each "prep" room will serve and adjoin two teaching labs to maximize space efficiency.

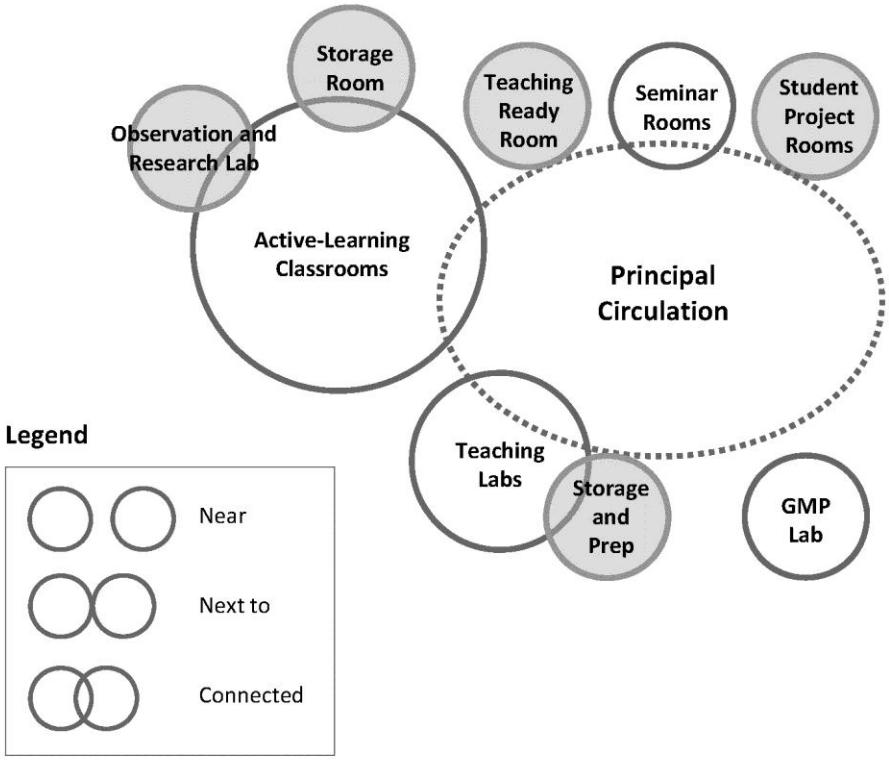
Four **Seminar Rooms** will support graduate level programs, first year experience seminars, professional development, and research collaboration. These spaces will incorporate the latest technology for remote teaching and video conferencing to support both teaching and professional development. Clustering the four rooms will allow flexible configurations of 24, 48, 72 or 96 seats, by retracting into the ceiling acoustical partitions that separate the rooms.

Ancillary spaces will be provided to support the work of the classrooms and labs including a **Teaching Ready Room** with work stations for faculty and teaching assistants to finalize preparation of their course work. An **Active-Learning Observation and Research Lab** with one-way glass for direct viewing and video feeds to the teaching classrooms will allow professors, regional teachers and administrators, potential funders, and prospective students and their parents an opportunity to observe the interaction of the students and the success of the pedagogy. In this way, the classrooms themselves will become a laboratory to constantly learn from and improve pedagogical approaches and course design.

The **Good Manufacturing Practices (GMP) Lab** facility will provide specialized training for UMBC's graduate and undergraduate students, as well as researchers from other universities, federal laboratories and biotechnology companies in Maryland. The GMP Lab will complement existing campus

lecture-only classes and off-campus professional training programs. Understanding the requirements for GMP compliance is a key need for those researchers involved with transitioning basic life sciences discoveries into development activities which result in optimized manufacturing processes. This facility will be fitted out with equipment representative of bioprocessing operations. In this way, the GMP conditions found in clinical and commercial manufacturing facilities will be simulated. It will provide not only training programs for students and researchers but also serve as a bridge between university-based research and development, and the implementation activities that need to occur in the commercial environment of the university's corporate partners.

Figure 6.1 Teaching Space Adjacencies Diagram



6.02 Research Labs

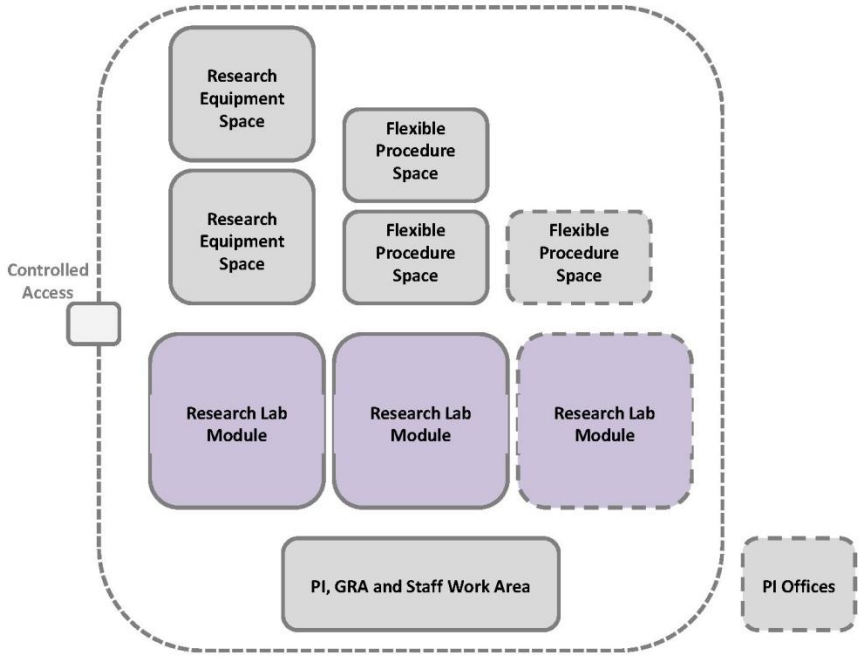
The ILSB is envisioned to include dynamic and cutting-edge research laboratories, designed to encourage academic and professional interchange between disciplines. Modular planning and the flexibility of the physical elements of the laboratory, like casework and utility services, will accommodate the ever-changing needs of interdisciplinary life science research on the UMBC campus for many years to come.

The spaces to support life science related research reflect a strong philosophy of interaction, sharing, efficiency and collaboration. The labs will be designed to be shared, along with equipment rooms and procedure spaces. In this way, the building will invoke not just a spirit of interdisciplinary collaboration, but of efficiency of resources.

The main type of research space is the **Standard Interdisciplinary Research Lab Cluster**, comprised of two to three Standard Research Lab Modules, two to three small Flexible Procedure Rooms, and two Research Equipment Rooms. Each 1,750 NASF lab cluster will accommodate up to three principal investigators (PIs) along with an additional nine graduate student and staff research assistants. Along with a minimum of two fume hoods, one biosafety cabinet (BSC), sinks and fixed, epoxy countertops, each lab cluster will accommodate moveable and reconfigurable benches and cabinets to allow for the needs of specific research lab configurations. Figure 6.2 illustrates the spaces that comprise the Standard Interdisciplinary Research Lab Cluster.

The labs and lab support areas within a research lab cluster should be highly adaptable to different research group needs in terms of allocation of bench versus support areas. Equipment and procedure areas will be adjoining the benches, fume hoods, sinks, and open areas comprising the research lab modules. The cluster is characterized by the ability to easily redefine the boundaries between areas to adjust to research protocols and project team size. Within each research lab cluster are write-up work stations for the PIs, GRA, and research staff serving on the project team(s) supported by their assigned research lab modules.

Figure 6.2 Spaces that Comprise a Research Lab Cluster



In addition, the building will have eight private offices for PI's from multiple departments whose research is so focused on animal-based research that the campus assigns them a main office within the building. These researchers working with lab animal protocols will be assigned to labs with a proximity to the vivarium, tissue culture rooms and other research support spaces.

Research lab clusters will be configured such that a portion of the research labs are designated to support biosafety level 2 (BSL-2) research protocols. Labs specified as BSL-2 research compatible must

be designed to comply with the most current edition of the Centers for Disease Control and Prevention, Biosafety in Microbiological and Biomedical Laboratories (BMBL) manual and the NIH Guidelines for Research Involving Recombinant DNA Molecules.

The ILSB will have two **Hood Intensive Research Lab Clusters** comprised of two Hood Intensive Research Lab Modules and two Research Equipment Rooms. Each lab cluster of this type will have six fume hoods and adjacent fixed countertop space. Researchers may be assigned to these specialized labs when their protocols require greater access to fume hoods to support their research, or the use of noxious chemicals or processes that could interfere with other research activities conducted in a larger, open lab. In these labs, the fume hoods essentially will be the main work bench spaces, with the benches serving as prep areas. As with the Standard Interdisciplinary Research Lab Cluster, the Research Equipment Room will adjoin the main lab area to provide flexibility in the use of the space for additional bench or additional support area.

Located near each research lab cluster will be a variety of research support services: Autoclave / Glasswashing / Distilled Water Room, an Environmental Room, a Gas Storage and Distribution Room, a Conference Room, Administrative Support, Reading Room - Collaboration Space, and a Break Room.

The **Environmental Systems Lab** will provide open wet lab space to accommodate research protocols not requiring traditional lab bench settings. The Environmental Systems Lab will support a variety of research interests, especially those focused on solving problems related to the protection of the natural and economic viability of Maryland's ecosystems. A tall, open bay of 1,200 square feet, with access to the loading area of the building, will support large pieces of specialized equipment to support field research in earth science and environmental systems, such as freshwater aquatic simulations. Within the lab suite, there will be a shared Field Research Storage Room and multiple Field Research Support Rooms supporting research protocols requiring special temperature and/or light control.

6.03 Shared Core Research Facilities

Vivarium

The proposed new Interdisciplinary Life Sciences Building will include a new vivarium designed to satisfy AAALAC accreditation requirements. The core research facility will serve as a central resource for all of the campus' research and academic programs involving animal use protocols.

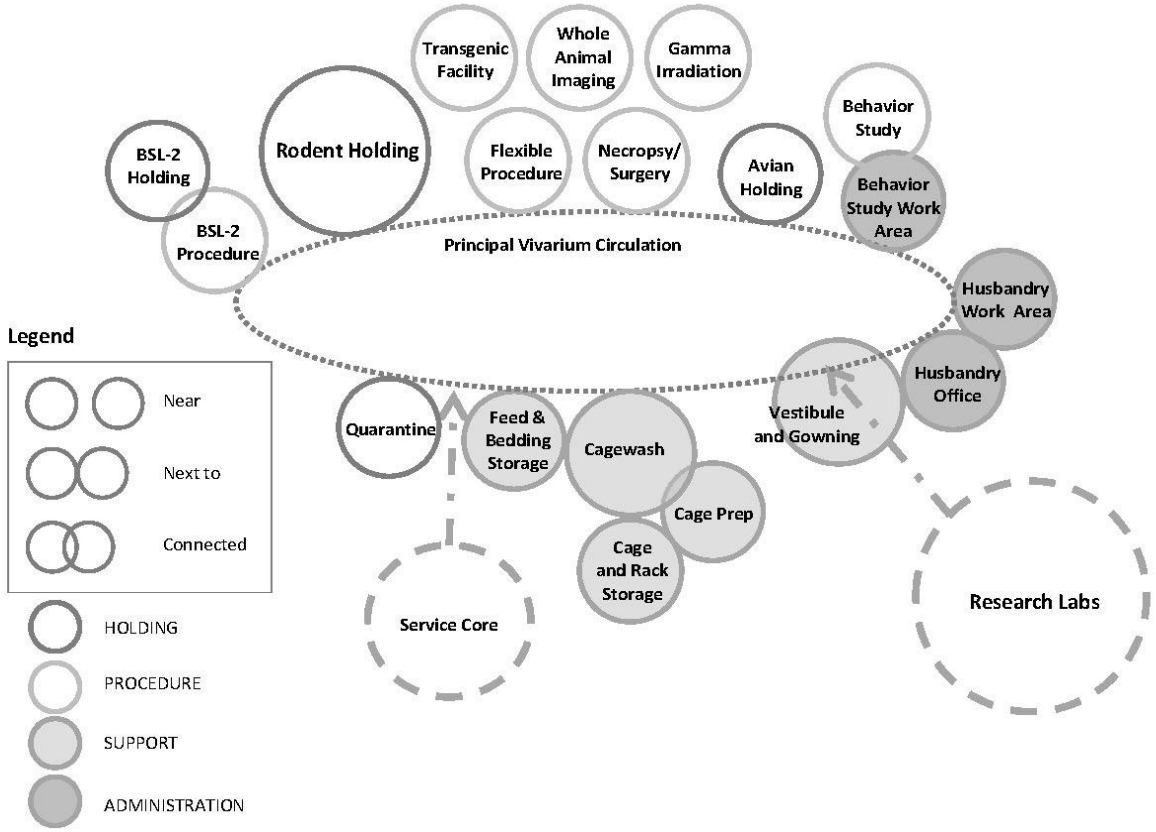
The new vivarium will contain Holding Rooms for rodents and avian species. The rodent holding rooms will take advantage of current trends in high-density housing using direct exhausting of the animal cages and HEPA filtering of air changes to support higher density animal holding in less space. The vivarium will be designed to create a healthy, allergen-free working environment for animal husbandry workers. The enhanced mechanical system will allow for extended periods between cage changing, reducing the labor and energy costs associated with animal transfer and cage cleaning and re-bedding.

Flexible Procedure Rooms will support individual experimentation by animal researchers, with other rooms dedicated for surgery and necropsy, whole animal imaging, transgenic procedures, and gamma irradiation. Behavior Study Rooms will support rodent and avian behavior studies. These flexible spaces

will be able to accommodate anechoic sound chambers, mazes and testing equipment, monitored by an adjacent Behavior Study Work Area.

To allow for expanded research opportunities requiring safeguards from viruses and other contaminants, the vivarium will have a dedicated BSL-2 Procedure Room with an adjoining Small Holding Room.

Figure 6.3 Vivarium - Space Adjacencies Diagram



The facility will be organized with the flow of animals, material and people in mind. Careful attention will be required in the selection of building materials, determining width of corridors, and configuration of rooms to facilitate movement and staging of caging and equipment, durability and maintainability of surfaces, and protection of animals and people.

At a minimum, the facility will include: 8’ minimum width corridors; doors sized for passage of cage racks and other equipment; door and wall protection in all areas in which equipment will be stored or moved; and sealant at all wall openings and intersections of dissimilar materials.

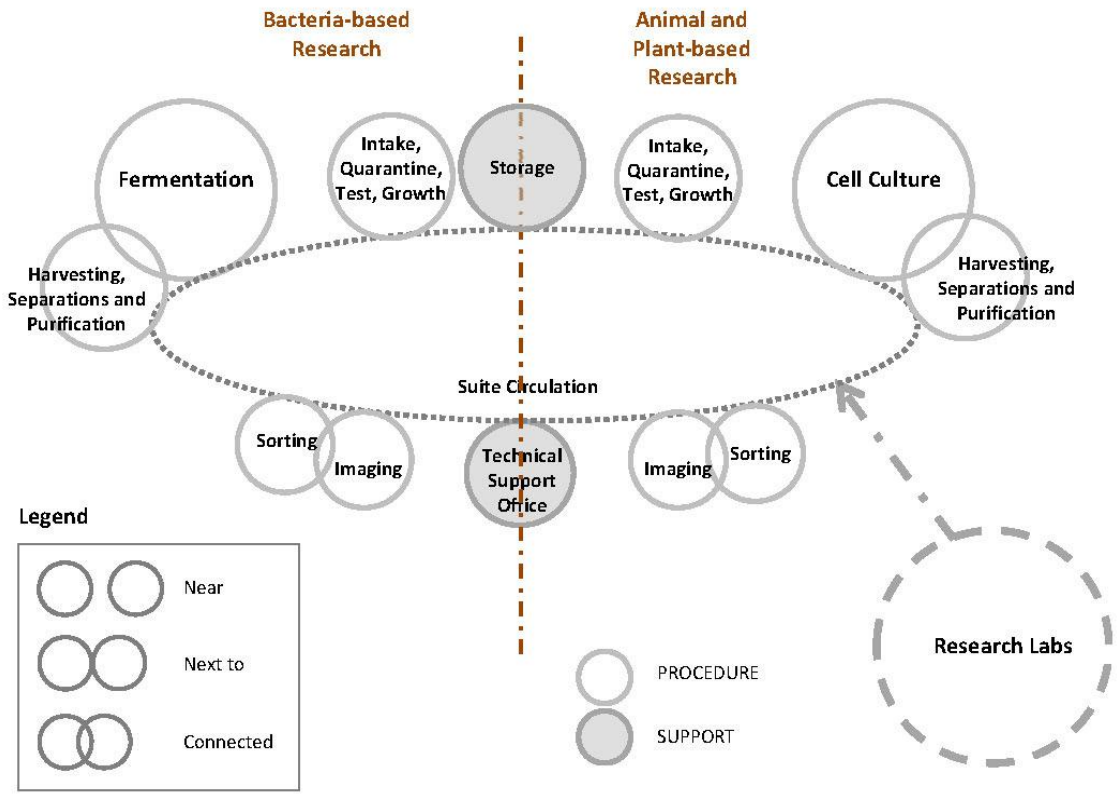
Bioprocess and Cell Science Lab

The **Bioprocess and Cell Science Lab** will allow for the growth of mammalian cells, bacteria, fungi, yeast or algae in controlled environments to support the research in the Interdisciplinary Life Sciences

Building. This core facility will be comprised of various labs allowing for the growth of cell cultures, and their harvesting, separation and purification of the cells and/or the products made by these organisms.

Located near Research Lab Clusters, the Bioprocess and Cell Science Lab will be organized as a suite that enables parallel research tracks for both bacterial based and animal / plant cell based work. Associated imaging spaces will be located adjacent to a technical office and will be available as a shared resource for the research labs in the building and across the campus.

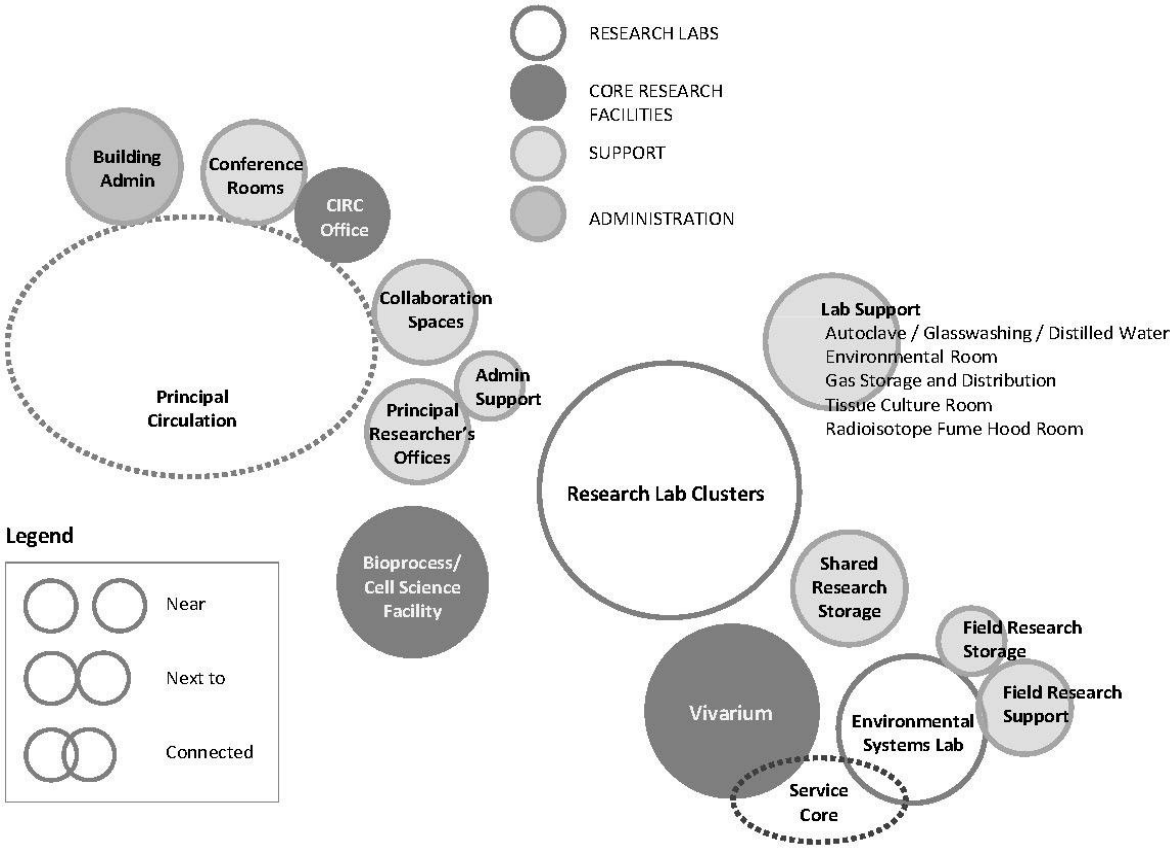
Figure 6.4 Bioprocess and Cell Science Lab - Space Adjacencies Diagram



Center for Interdisciplinary Research and Consulting

The **Center for Interdisciplinary Research and Consulting (CIRC) Office** will house the consulting service provided by the Department of Mathematics and Statistics, supporting interdisciplinary research for both the ILSB and the UMBC campus community. The CIRC supports both individual and teams of researchers. As such, the CIRC Office will be located next to one of the Conference Rooms and easily accessed from the building's principal circulation. Figure 6.5 shows the important inter-relationships of the CIRC Office and the other shared core research facilities with the rest of the building. It also illustrates the spaces that should be accessible from the principal circulation of the building, and those facilities requiring direct access to the service core.

Figure 6.5 Research Spaces - Space Adjacencies Diagram



6.04 Building Support Spaces

A number of ancillary spaces are required to support the research and teaching activities within the building. The **Building Administration Office** will house staff required to manage and administer the research and teaching facilities. **Chemical Storage** and **Hazardous Waste Storage** rooms will facilitate the safe delivery and disposal of materials used in research. The **Receiving Office** will be located adjacent to the loading area and Building Storage to manage deliveries and the **Department of Information Technology Shop** will allow for the maintenance and repair of classroom technology equipment.

Table 6.1 Space Requirements for the Interdisciplinary Life Sciences Building

		SPACE USE CODE	Capacity	Number	NASF	Total	Subtotal
Teaching Facilities							**25,570**
1.01	Active Learning Classroom A	110	**90**	**2**	**2,400**	**4,800**	
1.02	Active Learning Classroom B	110	**92**	**2**	**2,400**	**4,800**	
1.03	Small Active Learning Classroom	110	**48**	**4**	**1,280**	**5,120**	
1.04	Active Learning Storage	115		**4**	**160**	**640**	
1.05	Small Active Learning Storage	115		**4**	**120**	**480**	
1.06	Seminar Room	110	**24**	**4**	**600**	**2,400**	
1.07	Teaching Lab	210	**32**	**4**	**1,300**	**5,200**	
1.08	Teaching Lab Storage and Prep	215		**2**	**300**	**600**	
1.09	GMP-Lab Training Facility	210	**12**	**1**	**550**	**550**	
1.10	GMP-Lab Gowning Room	215		**1**	**80**	**80**	
1.11	Collaborative Project Room	410	**5**	**6**	**100**	**600**	
1.12	Active Learning Observation & Research Lab	250	**4**	**1**	**140**	**140**	
1.13	Teaching Ready Room	310	**4**	**1**	**160**	**160**	
Interdisciplinary Research Lab and Lab Service							**34,685**
2.01	Standard Research Lab Module	250	**4**	**32**	**350**	**11,200**	
2.02	Hood Intensive Research Lab Module	250	**4**	**4**	**450**	**1,800**	
2.03	Research Equipment Area	255		**26**	**200**	**5,200**	
2.04	Flexible Procedure Room	255		**32**	**100**	**3,200**	
2.05	Environmental Systems Lab	250	**8**	**1**	**1,200**	**1,200**	
2.06	Field Research Support Room	255		**3**	**200**	**600**	
2.07	Field Research Storage Room	255		**1**	**200**	**200**	
2.08	Autoclave and Glasswashing Room	255		**3**	**150**	**450**	
2.09	Environmental Room	255		**3**	**150**	**450**	
2.10	Gas Storage and Distribution Room	255		**3**	**25**	**75**	
2.11	Tissue Culture Room	255		**3**	**150**	**450**	
2.12	Radioisotope Fume Hood Room	255		**1**	**100**	**100**	
2.13	Shared Research Storage Room	255		**6**	**150**	**900**	
2.14	Principal Investigator's Office	310	**1**	**8**	**130**	**1,040**	
2.15	Principal Investigator's Workstation	310	**1**	**28**	**65**	**1,820**	
2.16	Graduate Research Assistant & Staff Workstation	310	**1**	**108**	**40**	**4,320**	
2.17	Administrative Support Room	315		**3**	**150**	**450**	
2.18	Conference Room	350	**12**	**2**	**240**	**480**	
2.19	Reading Room - Collaboration Room	350		**3**	**150**	**450**	
2.20	Break Room	355		**3**	**100**	**300**	
Vivarium							**6,430**
Animal Holding							
3.01	Large Holding Room	570		**5**	**360**	**1,800**	
3.02	Small Holding Room	570		**3**	**175**	**525**	
3.03	Avian Holding Room	570		**3**	**110**	**330**	
3.04	Quarantine Room	570		**1**	**110**	**110**	

		SPACE USE CODE	Capacity	Number	NASF	Total	Subtotal
Procedure							
3.05	Behavior Study Room	570		4	100	400	
3.06	Flexible Procedure Room	570		4	120	480	
3.07	BL-2 Procedure Room	570		1	120	120	
3.08	Gamma Irradiation Room	570		1	105	105	
3.09A	Preparation and Surgery Room	570		1	105	105	
3.09B	Necropsy Room	570		1	105	105	
3.10A	Transgenic Facility	570		1	100	100	
3.10B	Transgenic Facility Holding Room	570		1	110	110	
3.11	Whole Animal Imaging	570		1	150	150	
3.12	Behavior Study Work Area	310	4	1	180	180	
Support							
3.13	Cagewash Room	575		1	600	600	
3.14	Cage Prep Room	575		1	400	400	
3.15	Feed and Bedding Storage	575		1	200	200	
3.16	Cage and Rack Storage	575		1	200	200	
3.17	Vestibule, Gowning and Toilet	575		1	200	200	
Administration and Personnel							
3.18	Animal Husbandry Office	310	1	1	120	120	
3.19	Animal Husbandry Work Area	310	2	1	90	90	
Additional Core Research Facilities							**2,280**
Bioprocess and Cell Science Facility							
4.01	Intake, Quarantine, Test, Growth Room	250		2	160	320	
4.02	Cell Culture Room	250		1	320	320	
4.03	Fermentation Room	250		1	400	400	
4.04	Harvesting, Separation & Purification Room	250		2	200	400	
4.05	Sorting Room	250		2	120	240	
4.06	Imaging Room	250		2	100	200	
4.07	Storage Room	255		1	150	150	
4.08	Technical Support Office	310	1	1	120	120	
Center for Interdisciplinary Research and Consulting (CIRC)							
4.09	CIRC Office	310	2	1	130	130	
Support Spaces							**1,725**
5.01	Building Administrative Office	310	1	2	120	240	
5.02	Building Administrative Workroom	310	2	1	100	100	
5.03	Receiving Office	310	1	1	200	200	
5.04	Building Storage	730		1	600	600	
5.05	Chemical Storage	760		1	100	100	
5.06	Hazardous Waste Storage	770		1	100	100	
5.07	Vending	660		1	185	185	
5.08	Division of Information Technology Shop	720	3	1	200	200	
TOTAL							**70,690**

Table 6.2 Space Summary by Space Use Code

Space Use Code	Category	TOTAL NASF
110	Classroom	17,120
115	Classroom Service	1,120
210	Class Laboratory	5,750
215	Class Laboratory Service	680
250	Research/Non-class Laboratory	16,220
255	Research/Non-class Laboratory Service	11,775
310	Office	8,520
315	Office Service	450
350	Conference Room	930
355	Conference Room Service	300
410	Study Room	600
570	Animal Facilities	4,440
575	Animal Facilities Service	1,600
660	Merchandising	185
720	Shop	200
730	Central Storage	600
760	Chemical Storage	100
770	Hazardous Materials Storage	100
		70,690

Teaching Spaces Room Data Sheets

1.01 Active Learning Classroom A

1.02 Active Learning Classroom B

1.03 Small Active Learning Classroom

1.04 Active Learning Storage Room

1.05 Small Active Learning Storage Room

1.06 Seminar Room

1.07 Teaching Lab

1.08 Teaching Lab Storage and Prep

1.09 GMP-Lab Training Facility

1.10 GMP-Lab Gowning Room

1.11 Collaborative Project Room

1.12 Active Learning Observation and Research Lab

1.13 Teaching Ready Room

1 1.01 Active Learning Classroom A

Space Use Category:	**Classroom**	**Area NASF:**	**2,400**
Space Use Code:	**110**	**Quantity:**	**2**
		# of Stations:	**90**
		Total Area, NASF:	**4,800**

Function: These rooms will be used by multiple academic programs to instruct primarily undergraduate students using methodologies that encourage student inquiry, promote student involvement, and improve student success.

Relationships: Locate in close proximity to other Active Learning Classrooms, adjacent to Active Learning Observation and Research Lab, and connected to Active Learning Classroom Storage. Locate to provide easy and visible access from the primary building entrance(s) for the convenience of students.

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	exterior desired, not operable		
	single glazed to adjacent corridor near door		
Window Treatment:	motorized roller shades and blackout shades		
Access:	off of main circulation route	Min. Door Size:	3’-0” x 7’-0“
	provide two interconnecting doors between adjacent classrooms		
Accessibility:	minimum two tables and instructor station to be accessible, refer to ADA guidelines		
Acoustic Treatment:	High-quality acoustical learning environment which facilitates group-based learning. Sound transmission between classrooms and from corridors must be eliminated. Room acoustics to be controlled through wall and ceiling treatment to meet UMBC goals		
Lighting Controls:	at entry to room and instructor station		
Other:	interior windows desired off of corridors ensure clear sight lines from all tables to instructor and screen. No interior columns.		
	8 LF one-way window to view these rooms from the Active-Learning Observation & Research Lab (1.11)		

Built-In Equipment and Casework

Projector:	yes	AV Rack Cabinet:	yes, recess in adjoining Active Learning Storage
Projection Screen:	yes, motorized - recessed in ceiling		
Flat Screen Monitor:	10 – wall mounted with 3D capability 1- additional near entry door	Other Technology:	30 – built-in monitors 3 per student table
Smart Board:	TBD	Digital Doc Camera:	yes, at instructor station
White Board:	32 LF minimum of 48” high marker board	Tack Board:	4 LF by entry door
Coat Hooks:	yes	Clock:	yes, centralized
Speakers:	recessed, ceiling mounted, even distribution		
Instructor’s Station:	centrally located 30”x 60” with computer		
	instructor’s station to have data, power and control over projector and all room monitors via under-floor raceways		
Shelving:	90 – 12”x18” cubbies		

1.01 Active Learning Classroom A 2

Moveable Furnishings and Equipment

Instructor's Station:	see above		
Instructor's Chair:	1 – roller chair	Tables:	10 – 84" diam.
Chairs:	90 – chairs with glides upholstered, distribute equally in three colors	Table Features:	data, power and storage for 3 CPUs and monitors
Trash Can:	waste and recycling - locate outside of room		
Other:	30 – moveable whiteboards (24"x 36")		

Telecommunication

Data:	multiple ports at tables and instructor's station
Phone:	yes, wall mounted
Cameras:	two, viewed from monitors in Active Learning Observation and Research Lab
Intercom:	yes, through phone system
Wi-Fi:	controlled access from instructor's station
Other:	teleconferencing capability

HVAC

Room Pressure:	positive by 10%
CO2 Sensor:	yes

Electrical

Normal Power (volts):	120V
Outlets:	wall
Additional Outlets:	at tables and instructor's station provide electrical and data to all wall mounted monitors

Major Equipment

Item	Status	Qty
projector	2	1
screen	1	1
monitors	1	11
computers	3	30
media controller	2	1
cameras	2	2
speakers	1	*

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

*Speaker quantity based on design

1 1.02 Active Learning Classroom B

Space Use Category:	**Classroom**	**Area NASF:**	**2,400**
Space Use Code:	**110**	**Quantity:**	**2**
		# of Stations:	**92**
		Total Area, NASF:	**4,800**

Function: These rooms will be used by multiple academic programs to instruct primarily undergraduate students using methodologies that encourage student inquiry, promote student involvement, and improve student success.

Relationships: Locate in close proximity to other Active Learning Classrooms, adjacent to Active Learning Observation and Research Lab, and connected to Active Learning Classroom Storage. Locate to provide easy and visible access from the primary building entrance(s) for the convenience of students.

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	exterior desired, not operable		
	single glazed to adjacent corridor near door		
Window Treatment:	motorized roller shades and blackout shades		
Access:	off of main circulation route	Min. Door Size:	3’-0” x 7’-0“
	provide two interconnecting doors between adjacent classrooms		
Accessibility:	minimum two tables and instructor station to be accessible, refer to ADA guidelines		
Acoustic Treatment:	High-quality acoustical learning environment which facilitates group-based learning. Sound transmission between classrooms and from corridors must be eliminated. Room acoustics to be controlled through wall and ceiling treatment to meet UMBC goals		
Lighting Controls:	at entry to room and instructor station		
Other:	interior windows desired off of corridors ensure clear sight lines from all tables to instructor and screen. No interior columns.		
	8 LF one-way window to view these rooms from the Active-Learning Observation & Research Lab (1.11)		

Built-In Equipment and Casework

Projector:	yes	AV Rack Cabinet:	yes, recess in adjoining Active Learning Storage
Projection Screen:	yes, motorized - recessed in ceiling		
Flat Screen Monitor:	10 – wall mounted with 3D capability 1- additional near entry door	Other Technology:	46 – built-in monitors 2 per student table
Smart Board:	TBD	Digital Doc Camera:	yes, at instructor station
White Board:	32 LF minimum of 48” high marker board	Tack Board:	4 LF by entry door
Coat Hooks:	yes	Clock:	yes, centralized
Speakers:	recessed, ceiling mounted, even distribution		
Instructor’s Station:	centrally located 30”x 60” with computer		
	instructor’s station to have data, power and control over projector and all room monitors via under-floor raceways		
Shelving:	92 – 12”x18” cubbies		

1.02 Active Learning Classroom B 2

Moveable Furnishings and Equipment

Instructor's Station:	see above		
Instructor's Chair:	1 – roller chair	Tables:	23 – 42" diam
Chairs:	92 – chairs with glides upholstered, distribute equally in three colors	Table Features:	data, power and storage for 2 CPUs and monitors
Trash Can:	waste and recycling - locate outside of room		
Other:	30 – moveable whiteboards (24"x 36")		

Telecommunication

Data:	multiple ports at tables and instructor's station
Phone:	yes, wall mounted
Cameras:	two, viewed from monitors in Active Learning Observation and Research Lab
Intercom:	yes, through phone system
Wi-Fi:	controlled access from instructor's station
Other:	teleconferencing capability

HVAC

Room Pressure:	positive by 10%
CO2 Sensor:	yes

Electrical

Normal Power (volts):	120V
Outlets:	wall
Additional Outlets:	at tables and instructor's station provide electrical and data to all wall mounted monitors

Major Equipment

Item	Status	Qty
projector	2	1
screen	1	1
monitors	1	11
computers	3	23
media controller	2	1
cameras	2	2
speakers	1	*

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

*Speaker quantity based on design

1 1.03 Small Active Learning Classroom

Space Use Category:	**Classroom**	**Area NASF:**	**1,280**
Space Use Code:	**110**	**Quantity:**	**4**
		# of Stations:	**48**
		Total Area, NASF:	**4,800**

Function: These rooms will be used by multiple academic programs to instruct primarily undergraduate students using methodologies that encourage student inquiry, promote student involvement, and improve student success.

Relationships: Locate in proximity to other Active Learning Classrooms, connected to Small Active Learning Classroom Storage.

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	exterior desired, not operable		
	single glazed to adjacent corridor near door		
Window Treatment:	motorized roller shades and blackout shades		
Access:	off of main circulation route	Min. Door Size:	3’-0” x 7’-0“
	provide two interconnecting doors between adjacent classrooms		
Accessibility:	minimum two tables and instructor station to be accessible, refer to ADA guidelines		
Acoustic Treatment:	High-quality acoustical learning environment which facilitates group-based learning. Sound transmission between classrooms and from corridors must be eliminated. Room acoustics to be controlled through wall and ceiling treatment to meet UMBC goals		
Lighting Controls:	at entry to room and instructor station		
Other:	interior windows desired off of corridors ensure clear sight lines from all tables to instructor and screen. No interior columns.		
	8 LF one-way window to view these rooms from the Active-Learning Observation & Research Lab (1.11)		

Built-In Equipment and Casework

Projector:	yes	AV Rack Cabinet:	yes, recess in adjoining Active Learning Storage
Projection Screen:	yes, power actuated - recessed in ceiling		
Flat Screen Monitor:	6 – wall mounted with 3D capability 1- additional near entry door	Other Technology:	24 – built-in monitors 2 per student table
Smart Board:	TBD	Digital Doc Camera:	yes, at instructor station
White Board:	24 LF minimum of 48” high marker board	Tack Board:	4 LF by entry door
Coat Hooks:	yes	Clock:	yes, centralized
Speakers:	recessed, ceiling mounted, even distribution		
Instructor’s Station:	centrally located 30”x 60” with computer		
	instructor’s station to have data, power and control over projector and all room monitors via under-floor raceways		
Shelving:	48 – 12”x18” cubbies		

1.03 Small Active Learning Classroom 2

Moveable Furnishings and Equipment

Instructor's Station:	see above		
Instructor's Chair:	1 – chair with glides	Tables:	10 – 84" diam.
Chairs:	48 – chairs with glides upholstered, distribute equally in three colors	Table Features:	data, power and storage for 2 CPUs and monitors
Trash Can:	waste and recycling - locate outside of room		
Other:	12 – moveable whiteboards (24"x 36")		

Telecommunication

Data:	multiple ports at tables and instructor's station
Phone:	yes, wall mounted
Cameras:	two, viewed from monitors in Active Learning Observation and Research Lab
Intercom:	yes, through phone system
Wi-Fi:	controlled access from instructor's station
Other:	teleconferencing capability

HVAC

Room Pressure:	positive by 10%
Total Air Changes/hr.:	see section 5.20 Design Criteria
CO2 Sensor:	yes

Electrical

Normal Power (volts):	120V
Outlets:	wall
Additional Outlets:	at tables and instructor's station provide electrical and data to all wall mounted monitors

Major Equipment

Item	Status	Qty
projector	2	1
screen	1	1
monitors	1	7
computers	3	24
media controller	2	1
cameras	2	2
speakers	1	*

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

*Speaker quantity based on design

1 1.04 Active Learning Storage

Space Use Category:	**Classroom Storage**	**Area NASF:**	**160**
Space Use Code:	**115**	**Quantity:**	**4**
		# of Stations:	
		Total Area, NASF:	**640**

Function: Storage space to support teaching in adjoining classroom.

Relationships: Locate adjacent to and connected to Active Learning Classroom.

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	no		
Window Treatment:	motorized roller shades and blackout shades		
Access:	from Active Learning Classroom	Min. Door Size:	3’-0” x 7’-0“

Built-In Equipment and Casework

AV Rack Cabinet: yes, recessed accessible from the Active Learning Classroom

Shelving: yes

Moveable Furnishings and Equipment

Trash Can: waste and recycling - yes

Security

Security Features: keyed entry doors

1.04 Active Learning Storage 2

Telecommunication

Data: at one location

HVAC

Room Pressure: positive by 10%

Total Air Changes/hr.: see section 5.20 Design Criteria

Electrical

Normal Power (volts): 120V

Outlets: wall

Major Equipment

Item	Status	Qty

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 1.05 Small Active Learning Storage

Space Use Category:	**Classroom Service**	**Area NASF:**	**120**
Space Use Code:	**115**	**Quantity:**	**4**
		# of Stations:	
		Total Area, NASF:	**480**

Function: Storage space to support teaching in adjoining classroom.

Relationships: Locate adjacent to the Small Active Learning Classroom

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	no		
Window Treatment:	motorized roller shades and blackout shades		
Access:	from Active Learning Classroom	Min. Door Size:	3’-0” x 7’-0“

Built-In Equipment and Casework

AV Rack Cabinet: yes, recessed accessible from the Active Learning Classroom

Shelving: yes

Moveable Furnishings and Equipment

Trash Can: waste and recycling - yes

Security

Security Features: keyed entry doors

1.05 Small Active Learning Storage 2

Telecommunication

Data: at one location

HVAC

Room Pressure: positive by 10%

Total Air Changes/hr.: see section 5.20 Design Criteria

Electrical

Normal Power (volts): 120V

Outlets: wall

Major Equipment

Item	Status	Qty

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 1.06 Seminar Room

Space Use Category:	**Classroom**	**Area NASF:**	**600**
Space Use Code:	**110**	**Quantity:**	**4**
		# of Stations:	**24**
		Total Area, NASF:	**2,400**

Function: Flexible, general purpose classroom for seminars of various sizes. Movable walls allow for varying sizes and configuration of seating. Each room has the capability for videoconferencing and remote teaching.

Relationships: Locate adjacent to other Seminar Rooms and in proximity to Active Learning Classrooms and principal circulation

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	exterior desired, not operable		
Window Treatment:	motorized roller shades and blackout shades		
Access:	off of main circulation route	Min. Door Size:	3’-0” x 7’-0“
Other:	interior windows desired off of corridors		
	one long wall in each room will be equipped with a motorized, ceiling mounted, acoustical folding partition to allow two, three or all four seminar rooms to be converted into one room		

Built-In Equipment and Casework

Projector:	yes, or equivalent flat screen technology	AV Rack Cabinet:	yes
Projection Screen:	yes, motorized - recessed in ceiling		
Other Technology:	video conference capable		
White Board:	12 LF minimum of 48” high marker board		
Coat Hooks:	yes	Clock:	yes, centralized
Speakers:	recessed, ceiling mounted, even distribution		

Acoustics

Room Criteria:	RC25-30(N)
Sound Transmission:	STC55 (including folding partition)
Acoustic Treatment:	High-quality acoustical learning environment where sound transmission between seminar rooms and from corridors must be eliminated. Room acoustics to be controlled through wall, folding partition and ceiling treatment to meet UMBC goals

1.06 Seminar Room 2

Moveable Furnishings and Equipment

Tables: 12 – 24" x 60"

Table Features: outlets in table – plug into floor outlets

Chairs: 24 – chairs – upholstered back and seat

Trash Can: 1 – tall

Other: Digital Document Camera on cart

Telecommunication

Phone: yes, wall mounted

Intercom: yes, through phone system

Wi-Fi: yes

Other: teleconferencing capability

HVAC

Room Pressure: positive by 10%

Electrical

Normal Power (volts): 120V

Outlets: wall

Additional Outlets: in floor below table

Major Equipment

Item	Status	Qty
projector	2	1
screen	1	1
speakers	1	*

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

*Speaker quantity based on design

1 1.07 Teaching Lab

Space Use Category:	**Class Laboratory**	**Area NASF:**	**1,300**
Space Use Code:	**210**	**Quantity:**	**4**
		# of Stations:	**32**
		Total Area, NASF:	**5,200**

Function: Large, multi-disciplinary wet lab.

Relationships: Locate adjacent to and directly connected to Teaching Lab Storage and Prep room.

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	exterior desired, not operable		
Window Treatment:	motorized roller shades and blackout shades		
Access:	2 doors, off of main circulation route	Min. Door Size:	3’-6” x 7’-0“
Accessibility:	sink, plus student station(s) as required by code		

Built-In Equipment and Casework

AV Rack Cabinet:	yes		
Flat Screen Monitor:	5 - 54”(minimum)		
White Board:	8 LF minimum of 48” high marker board		
Coat Hooks:	yes	Clock:	yes, centralized
Speakers:	recessed, ceiling mounted, even distribution		
Wall Cabinets:	min. 8 LF glass door wood cabinets	Base Cabinets:	wood
Countertops:	min. 30 LF epoxy	Counter Height:	36” nom.
Drawer Units:	min. (2) 4 drawer	Other Bench Casework:	combo door/drawer
Other:	32 storage cubicles		
	provide cylinder rack		

Acoustics

Room Criteria:	RC30-35(N)
Sound Transmission:	STC 55

Moveable Furnishings and Equipment

Instructor’s Station:	yes, made up of two specialized bench sections
Instructor’s Chair:	1
Chairs:	32 stools
Trash Can:	2 - large
Other:	2 - lab bench sections

1.07 Teaching Lab 2

Telecommunication

Phone: yes, wall mounted

Intercom: yes, through phone system

Wi-Fi: yes

HVAC

Room Pressure: negative by 0.02

Total Air Changes/hr.: 100% outside air 6 ACHR w/ MERV 16 filters

Electrical

Normal Power (volts): 120V /220v

Outlets: 1 duplex per student at benches

Additional Outlets: 120V at 24”o.c. in raceway

8 - 120V duplex at open wall areas

2 - 220V outlets at open wall areas

Plumbing

Sinks: 4 – 16x22 Epoxy

Drains: yes

Cold Water: yes

Hot Water: yes

Treated Water: RO

Eye Wash: yes

Other: emergency shower

Water Locations at all wall sinks and hood cupsinks

Piped Gases

Compressed Air, Vacuum, natural gas

Nitrogen, local from tank

Piped Gas Locations

Bench: 16- natural gas

Hood: gas, vacuum, CW

Major Equipment

Item	Status	Qty		Size		Plumbing	Exhaust	
			L	W	H			
BSC - Nominal	1	1	4'			CA,V	N	
Fume Hood	1	1	5'			CW,G,V	Y	
Refrigerator	3	1	54"	32"				
CO2 Incubator	3	2				CO2		

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 1.08 Teaching Lab Storage and Prep

Space Use Category:	**Class Laboratory Service**	**Area NASF:**	**300**
Space Use Code:	**215**	**Quantity:**	**2**
		# of Stations:	
		Total Area, NASF:	**600**

Function: Room for both the preparation of lab courses and the storage of supplies. Each prep room supports two Teaching Labs.

Relationships: Locate between two Teaching Labs

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	none	Interior Signage:	university standard
Window Treatments:	none		
Access:	off corridor and between two teaching labs	Min. Door Size:	3’-6” x 7’-0”
	Solid door to corridor, ½ glazed door to each connecting Teaching Lab		

Built-In Equipment and Casework

Tack Board:	yes		
Coat Hooks:	yes	Clock:	yes, centralized
Wall Cabinets:	min. 16 LF glass door cabinets	Base Cabinets:	wood
Countertops:	min. 32 LF epoxy	Counter Height:	36” nom.
Drawer Units:	4 drawer	Other Bench Casework:	combo door/drawer
Desktops:	none	Shelving:	wall mounted adj plam min. 6 LF, 3 shelves high

Acoustics

Room Criteria:	RC40
Sound Transmission:	STC 45-50

Moveable Furnishings and Equipment

Chairs:	2 stools
Trash Can:	1 - large

1.08 Teaching Lab Storage and Prep 2

Telecommunication

Data: yes, in raceway

Wi-Fi: yes

HVAC

Room Pressure: negative by 0.051WG

Total Air Changes/hr.: 100% outside air 2 ACHR w/ MERV 16 filters

Electrical

Normal Power (volts): 120V

Emergency Power: yes

Additional Outlets: duplex @ 24" O.C. in Raceway

Plumbing

Sinks: 16x22 Epoxy

Cold Water: yes Hot Water: yes

Eye Wash: yes, at sink

Water Locations at sink

Piped Gases

Compressed Air, Vacuum, Natural Gas

Piped Gas Locations

Hood: gas, vacuum, CW

Major Equipment

Item	Status	Qty		Size		Plumbing	Exhaust
			L	W	H		
Fume Hood	1	1	6'			CW,G,V	Y

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 1.09 GMP-Lab Training Facility

Space Use Category:	**Class Laboratory**	**Area NASF:**	**550**
Space Use Code:	**210**	**Quantity:**	**1**
		# of Stations:	**12**
		Total Area, NASF:	**550**

Function: Class lab for training students and researchers in Good Manufacturing Practices with actual laboratory equipment.

Relationships: Locate within proximity of the Bioprocess and Cell Science Facility. Lab to be entered from corridor through GMP-Lab Gowning Room.

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panels that satisfy clean room req.	Min. Ceiling Ht:	9’-0” min
Windows:	exterior desired, not operable interior desired to corridor for viewing		
Window Treatment:	motorized roller shades and blackout shades		
Access:	off of main circulation, through gowning area		
Min. Door Size:	main solid door 3’-0”x7’-0“ side glass door 1’-6” x 7’-0”		
Accessibility:	sink		
Other:	an open area of a minimum of 50sf for equipment to be identified in the future		

Built-In Equipment and Casework

Flat Screen Monitor:	yes, visual display board		
White Board:	min. 4 LF		
Wall Cabinets:	min. 9 LF glass door cabinets	Base Cabinets:	wood; min. (1) knee space
Countertops:	min. 22 LF epoxy	Counter Height:	36” nom.
Drawer Units:	4 drawer	Other Bench Casework:	combo drawer / door
Shelving:	wall mounted adj plam - min. 8 LF, 3 shelves high		
Other:	6’ biosafety cabinet		
	overhead service carrier for power and piped gases above flexible open equipment area		
	cylinder rack and manifold		

Moveable Furnishings and Equipment

Storage Cabinet:	(1) 24”x24”x72”H lockable w/ hinged glass door
Trash Can:	1 - tall
Other:	lab bench/table pegboard for equipment drying above sink

1.09 GMP-Lab Training Facility 2

Acoustics

Room Criteria: RC 30-35 Sound Transmission: STC 55

Telecommunication

Data: 4 (2 bench/2 overhead)

Electrical

Normal Power (volts): 120V / 208V

Outlets: 2 per bench / 4 overhead

Emergency Power: yes (incubator)

Special Considerations: central overhead power to accommodate freestanding equipment in middle of room

HVAC

Room Pressure: negative to gowning

Total Air Changes/hr.: 100% outside air 6 ACHR w/ MERV 16 filters

Plumbing

Sinks: (1)16x22 epoxy, (1) stainless steel

Cold Water: yes Hot Water: yes

Eye Wash: yes

Other: emergency shower

Water Locations at bench

Piped Gases

compressed air, Vacuum, nitrogen, natural gas at bench @ 42” AFF

nitrogen, compressed air, vacuum to BSC @

nitrogen and CO2 from tank

CO2 to incubator as required by equipment or @ 84” AFF

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
BSC	1	2	6'					CA,N2,V	N		
Fume Hood	1	1	4'						Y		
Refrigerator	1	1	54"	32"							
Shaker Incubator	1	1									
CO2 Incubator	1	2						CO2			
monitor	1	1									

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 1.10 GMP-Lab Gowning Room

Space Use Category:	**Class Laboratory Service**	**Area NASF:**	**80**
Space Use Code:	**215**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**80**

Function: Gowning area and airlock for the GMP-Lab Training Facility.

Relationships: Connected to the GMP-Lab Training Facility .

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panels that satisfy clean room req.	Min. Ceiling Ht:	9’-0” min
Access:	off of main circulation		
Min. Door Size:	main solid door 3’-0”x7’-0“ side glass door 1’-6” x 7’-0”		

Built-In Equipment and Casework

Coat Hooks:	yes, above SST bench
	8 LF stainless steel gowning bench
Shelving:	12 – 12”x18” cubbies

Moveable Furnishings and Equipment

Storage Cabinet:	(1) 36”x18”x72”H w/ hinged solid door
Trash Can:	1 - tall

1.10 GMP-Lab Gowning Room 2

Acoustics

Room Criteria: RC 30-35 Sound Transmission: STC 55

Electrical

Normal Power (volts): 120V

HVAC

Room Pressure: positive to corridor

Plumbing

Major Equipment

Item	Status	Qty

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 1.11 Collaborative Project Room

Space Use Category:	**Study Space**	**Area NASF:**	**100**
Room Use Code:	**410**	**Quantity:**	**6**
		# of Stations:	**5**
		Total Area, NASF:	**600**

Function: Collaborative study rooms for small groups of students.

Relationships: Locate within proximity of classrooms and other teaching spaces and with visible and convenient access to main building circulation.

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	activity in rooms should be visible from corridor		
Access:	off of main circulation route	Min. Door Size:	3’-0” x 7’-0“

Built-In Equipment and Casework

Flat Screen Monitor:	wall mounted - 37” minimum		
Other Technology:	small hard drive to access monitor		
White Board:	8 LF minimum of 48” high marker board		
Coat Hooks:	yes	Clock:	yes, centralized

Acoustics

Room Criteria:	RC30-35
Sound Transmission:	STC55

Moveable Furnishings and Equipment

Tables:	1 – 72” x 36”
Table Features:	outlets in table – plug into floor outlets
Chairs:	5 – chairs with glides – poly back and seat
Trash Can:	1 – small

1.11 Collaborative Project Room 2

Telecommunication

Data: port at wall adjacent to monitor

Wi-Fi: yes

HVAC

Room Pressure: positive by 10%

Electrical

Normal Power (volts): 120V

Outlets: wall and at wall monitor

Major Equipment

Item	Status	Qty
monitor	1	1

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 1.12 Active Learning Observation and Research Lab

Space Use Category:	**Research/Non-class Laboratory**	**Area NASF:**	**140**
Room Use Code:	**250**	**Quantity:**	**1**
		# of Stations:	**4**
		Total Area, NASF:	**140**

Function: Room for direct viewing and video feeds from teaching classooms and labs allowing graduate students, faculty, K-12 teachers, administrators, and prospective students and their parents an opportunity to observe and study the instructional methodology.

Relationships: Adjacent to 2 Large Active Learning Classrooms.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	8 LF one-way glass facing each of the classrooms		
Access:	off of main circulation route (not via classrooms)	Min. Door Size:	3’-0” x 7’-0“

Built-In Equipment and Casework

Flat Screen Monitor:	4 - mounted on one wall
Other Technology:	direct feed from cameras in classrooms and teaching labs
Coat Hooks:	yes
Speakers:	yes
Other:	playback of microphones in classrooms and teaching labs

Moveable Furnishings and Equipment

Desks:	2 – 60” x 30”
Chairs:	2 rolling
File Cabinets:	2 under table
Trash Can:	1 small
Other:	1 60” upholstered bench with no back

Acoustics

Room Criteria:	RC30-35
Sound Transmission:	STC55

Lighting

General:	fluorescent, indirect lighting
Lighting Level:	lower lighting levels than adjacent rooms
Task:	at two desks
Dimming:	yes

1.12 Active Learning Observation and Research Lab 2

Telecommunication

Data: along walls

Cameras: in classrooms and teaching labs

Wi-Fi: yes

Other: storage for backup of video and audio feeds

HVAC

Room Pressure: positive by 10%

Electrical

Normal Power (volts): 120V

Outlets: to all monitors and along walls

Major Equipment

Item	Status	Qty
monitor	1	4

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 1.13 Teaching Ready Room

Space Use Category:	**Office**	**Area NASF:**	**160**
Room Use Code:	**310**	**Quantity:**	**1**
		# of Stations:	**4**
		Total Area, NASF:	**160**

Function: A classroom support space with work stations for faculty and teaching assistants to finalize preparation of their course work and run-through presentations.

Relationships: Locate near Active Learning Classrooms

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	exterior desired, not operable		
Window Treatments:	roller shades		
Access:	off of main circulation route	Min. Door Size:	3’-0” x 7’-0“

Built-In Equipment and Casework

Flat Screen Monitor:	1 - mounted on one wall		
White Board:	8 LF minimum	Tack Board:	4 LF
Coat Hooks:	yes	Clock:	yes

Moveable Furnishings and Equipment

Desks:	4 – 48” carrels	Tables:	1 – 48” x 24”
			1 – 48” diameter
Chairs:	4 - rolling		
Storage Cabinet:	36”Wx18”Dx72”H w/ lockable hinged doors		
Trash Can:	1 small		
Other:	networked printer		

Acoustics

Room Criteria:	RC30-35
Sound Transmission:	STC55

1.13 Teaching Ready Room 2

Telecommunication

Data: ports at all work stations

Wi-Fi: yes

HVAC

Room Pressure: positive by 10%

Electrical

Normal Power (volts): 120V

Outlets: wall and at monitor

Major Equipment

Item	Status	Qty
monitor	1	1

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

*Speaker quantity based on design

Research Spaces Room Data Sheets

2.01 Standard Research Lab Module

2.02 Hood Intensive Research Lab Module

2.03 Research Equipment Area

2.04 Flexible Procedure Room

2.05 Environmental Systems Lab

2.06 Field Research Support Room

2.07 Field Research Storage Room

2.08 Autoclave and Glasswashing Room

2.09 Environmental Room

2.10 Gas Storage and Distribution Room

2.11 Tissue Culture Room

2.12 Radioisotope Fume Hood Room

2.13 Shared Research Storage Room

1 2.01 Standard Research Lab Module

Space Use Category:	**Research / Non-Class Laboratory**	**Area NASF:**	**350**
Room Use Code:	**250**	**Quantity:**	**32**
		# of Stations:	**4**
		Total Area, NASF:	**11,200**

Function: These modules will serve as flexible research laboratories to accommodate multiple science research disciplines. The services will be designed to support a variety of specialized equipment that researchers may bring with them. Each module will accommodate four individual research stations, plus shared areas such as a fume hood, sink and emergency shower/eye wash.

Relationships: Locate in close proximity to Research Equipment Rooms, Flexible Procedure Rooms, Principal Investigator's Work Area and GRA and Staff Work Area, Tissue Culture Room, and Environmental Room. See 6.02 Research Labs for more information concerning how the clusters combine Research Lab Modules and support spaces.

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9' clear
Windows:	exterior desired, not operable		
Window Treatments:	roller shades and blackout shades		
Access:	off of main circulation route and clustered - see 6.02 Research Labs		
Min. Door Size:	3'-0" x 7'-0"		
Lighting Controls:	various, depending on room layout independently switch general and task lighting		
Other:	Principal Investigator's Work Area and GRA and Staff Work Area may be incorporated into the lab or separated by interior window walls.		

Built-In Equipment and Casework

White Board:	min. 8 LF	Tack Board:	min. 4 LF
Coat Hooks:	yes		
Wall Cabinets:	min. 5 LF steel frame/wood doors with glass		
Base Cabinets:	steel frames/wood doors - door/drawer combo		
Countertops:	min. 5 LF of fixed epoxy counters		
Counter Height:	36" nominal		
Drawer Units:	1 - 4 drawer unit		

Other Bench Casework: 4 – 7'-0" moveable bench w/ 12" 4-drawer unit, 36" door/drawer combo, 36" knee space, and 7'-0" overhead with SS shelves (not wall mounted)

Moveable Furnishings and Equipment

Chairs:	4– bench ht.
Trash Can:	2 tall

Acoustics

Room Criteria:	RC-30-35 (per lab cluster)	Sound Transmission:	STC 50-55 (per lab cluster)

2.01 Standard Research Lab Module 2

Telecommunication

Data: data ports

Wi-Fi: yes

Electrical

Normal Power (volts): 120V / 220V

Emergency Power: yes

Other: Flexible Bench Area – provide electrical service from overhead ceiling mounted min. 4 120V per station

Outlets: see below

Additional Outlets: one duplex outlet per bench

HVAC

Room Pressure: negative by 0.051WG

Total Air Changes/hr.: 100% outside air 6 ACHR w/ MERV 16 filters

Other: 2 – snorkel exhaust per lab cluster

Plumbing

Sinks: 1 – 16x22 Epoxy

Cold Water: yes

Treated Water: RO

Other: min. (1) emergency shower per cluster

Water Locations at all wall sinks and hood cupsinks

Drains: yes

Hot Water: yes

Eye Wash: yes, min. (1) per cluster

Waste/Vent: yes

Piped Gases

Compressed Air, Vacuum
Nitrogen, from local manifold or tank

Piped Gas Locations

Bench: from overhead utility panel

Hood: yes

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Fume Hood	1	*	5'			120V		CW,A,V, N			provide (1) future
Biological Safety Cab	1	**									
* provide 2 for every 3 modules											
** provide 1 for every 3 modules											

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.02 Hood Intensive Research Lab Module

Space Use Category:	**Research / Non-Class Laboratory**	**Area NASF:**	**450**
Room Use Code:	**250**	**Quantity:**	**4**
		# of Stations:	**4**
		Total Area, NASF:	**1,800**

Function: These modules will serve as flexible research laboratories to accommodate multiple science research disciplines that rely more heavily on fume hoods. The services will be designed to support a variety of specialized equipment that researchers may bring with them. Each module will accommodate four individual research stations, plus shared areas such as a fume hood, sink and emergency shower/eye wash.

Relationships: Locate in close proximity to Research Equipment Rooms, Flexible Procedure Rooms, Principal Investigator's Work Area and GRA and Staff Work Area. See 6.02 Research Labs for more information concerning how the clusters combine Research Lab Modules and support spaces.

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9' clear
Windows:	exterior desired, not operable		
Window Treatments:	roller shades and blackout shades		
Access:	off of main circulation route and clustered - see 6.02 Research Labs		
Min. Door Size:	3'-0" x 7'-0"		
Lighting Controls:	various, depending on room layout independently switch general and task lighting		
Other:	Principal Investigator's Work Area and GRA and Staff Work Area may be incorporated into the lab or separated by interior window walls.		

Built-In Equipment and Casework

White Board:	min. 8 LF	Tack Board:	min. 4 LF
Coat Hooks:	yes		
Wall Cabinets:	min. 18 LF steel frame/wood doors with glass		
Base Cabinets:	steel frames/wood doors - door/drawer combo		
Countertops:	min. 18 LF of fixed epoxy counters		
Counter Height:	36" nominal		
Drawer Units:	2 - 4 drawer unit		
Other Bench Casework:	4 – 7'-0" moveable bench w/ 12" 4-drawer unit, 36" door/drawer combo, 36" knee space, and 7'-0"overhead with stainless steel shelves (not wall mounted)		

Moveable Furnishings and Equipment

Chairs:	4– bench ht.	Trash Can:	2 tall

Acoustics

Room Criteria:	RC-30-35 (per lab cluster)	Sound Transmission:	STC 50-55 (per lab cluster)

2.02 Hood Intensive Research Lab Module 2

Telecommunication

Data: data ports

Wi-Fi: yes

Electrical

Normal Power (volts): 120V / 220V

Outlets: see below

Emergency Power: yes

Additional Outlets: one duplex outlet per bench

Other: Flexible Bench Area – provide electrical service from overhead ceiling mounted min. 4 120V per station

HVAC

Room Pressure: negative by 0.051WG

Total Air Changes/hr.: 100% outside air 6 ACHR w/ MERV 16 filters

Other: 2 – snorkel exhaust per lab cluster

Plumbing

Sinks: 3– 16x22 Epoxy

Drains: yes

Cold Water: yes

Hot Water: yes

Treated Water: RO

Eye Wash: yes, min. (1) per cluster

Other: min. (1) emergency shower per cluster

Waste/Vent: yes

Water Locations at all wall sinks and hood cupsinks

Piped Gases

Compressed Air, Vacuum
Nitrogen, from local manifold or tank

Piped Gas Locations

Bench: from overhead utility panel

Hood: yes

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Fume Hood	1	*	5'			120V		CW,A,V, N			provide (1) future
* provide 5 for every 2 modules											

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.03 Research Equipment Area

Space Use Category:	**Research / Non-Class Laboratory Service**	**Area NASF:**	**200**
Room Use Code:	**255**	**Quantity:**	**26**
		# of Stations:	**2**
		Total Area, NASF:	**5,200**

Function: This space serves as a storage area for equipment to be used in the Research Lab Modules and Hood Intensive Research Lab Modules.

Relationships: Locate either connected to or in close proximity of Standard and Hood Intensive Research Lab Module, Flexible Procedure Rooms, Principal Investigator's Work Area and GRA and Staff Work Area.

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9' clear
Windows:	exterior desired, not operable		
Window Treatments:	roller shades and blackout shades		
Access:	off of main circulation route and clustered - see 6.02 Research Labs		
Min. Doorway Opening:	4'-6" x 7'-0"		

Built-In Equipment and Casework

Shelving: min. 10 LF of SS - adjustable

Moveable Furnishings and Equipment

Tables: 10 LF movable tables - adjustable height

Chairs: 2– bench ht.

Acoustics

Room Criteria:	RC-30-35 (per lab cluster)	Sound Transmission:	STC 50-55 (per lab cluster)

2.03 Research Equipment Area 2

Telecommunication

Data: data ports

Wi-Fi: yes

Electrical

Normal Power (volts): 120V / 220V

Emergency Power: yes

Additional Outlets: provide for all refrigerators, freezers and incubators

Equipment Area - provide 120V duplex outlet at 2 feet on center – 220V at 6 feet on center

HVAC

Room Pressure: negative by 0.051WG

Total Air Changes/hr.: 100% outside air 6 ACHR w/ MERV 16 filters

Plumbing

Eye Wash: located in adj. research lab modules

Other: emergency showers located in adj. research lab modules

Piped Gases

Carbon Dioxide, from local manifold or tank

Major Equipment

Item	Status	Qty	
Refrigerator	1	1	
Shaking Incubator	1	1	
CO2 incubator	1	1	
Freezer	1	1	

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.04 Flexible Procedure Room

Space Use Category:	**Research / Non-Class Laboratory Service**	**Area NASF:**	**100**
Room Use Code:	**255**	**Quantity:**	**32**
		# of Stations:	**2**
		Total Area, NASF:	**3,200**

Function: This space serves as a flexible and adaptable room for conduct of procedures associated with life science research associated with. the Research Lab Modules and Hood Intensive Research Labs.

Relationships: Locate connected to Standard Research Lab Modules and Hood Intensive Research Lab Modules which are also connected to Research Equipment Space**,** and Principal Investigator's Work Area and GRA and Staff Work Area.

Architectural

Flooring:	VCT	Base:	rubber, cove base
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9' clear
Access:	off of main circulation route and clustered - see 6.02 Research Labs		
Min. Door Size:	3'-0" x 7'-0"		

Built-In Equipment and Casework

Wall Cabinets:	min. 10 LF steel frame/wood doors with glass		
Base Cabinets:	steel frames/wood doors - door/drawer combo		
Countertops:	min. 10 LF of fixed epoxy counters	Counter Height:	36" nominal
Drawer Units:	1 - 4 drawer unit		

Moveable Furnishings and Equipment

Chairs:	2– bench ht.
Trash Can:	1 tall

Acoustics

Room Criteria:	RC-30-35 (per lab cluster)	Sound Transmission:	STC 50-55 (per lab cluster)

2.04 Flexible Procedure Room 2

Telecommunication

Data: data ports

Wi-Fi: yes

Electrical

Normal Power (volts): 120V / 220V

Emergency Power: yes

Additional Outlets: at fixed bench area – provide 120V duplex outlet at 2 feet on center

Equipment Area - provide 120V duplex outlet at 2 feet on center – 220V at 6 feet on center

HVAC

Room Pressure: negative by 0.051WG

Total Air Changes/hr.: 100% outside air 6 ACHR w/ MERV 16 filters

Plumbing

Sinks: 1 – 16x22 Epoxy

Drains: yes

Cold Water: yes

Hot Water: yes

Treated Water: RO

Waste/Vent: yes

Eye Wash: located in adj. research lab

Other: emergency showers located in adj. research lab modules

Water Locations

Wall: at all sinks

Piped Gases

Compressed Air and Vacuum

Nitrogen, from local manifold or tank

Major Equipment

Item	Status	Qty	

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.05 Environmental Systems Lab

Space Use Category:	**Research / Non-Class Laboratory**	**Area NASF:**	**1,200**
Room Use Code:	**250**	**Quantity:**	**1**
		# of Stations:	**8**
		Total Area, NASF:	**1,200**

Function: This flexible, high-bay wet lab supports environmental systems research. Separate zones for benchwork and open floor will accommodate a wide array of concurrent research protocols and equipment.

Relationships: Locate in close proximity to Field Research Support Room, Field Research Storage Room and Loading Area.

Architectural

Flooring:	resinous (no joints)	Base:	flashed (no joint at floor)
Walls:	sealed concrete block	Wall Finish:	paint
Ceiling:	open to structure	Min. Ceiling Ht:	12'-16' clear
Windows:	exterior desired, operable		
Window Treatments:	roller shades and blackout shades		
Access:	off of main circulation route and loading/exterior		
Min. Door Size:	main solid door 3'-0"x7'-0"		
Other:	10 LF overhead coiling door to exterior or adjacent loading area		
	motorized, ceiling mounted, acoustical folding partition to allow room to be divided in half		
	(3) overhead service carriers		

Built-In Equipment and Casework

Coat Hooks:	yes	Clock:	yes
Wall Cabinets:	min. 30 LF stainless steel		
Base Cabinets:	stainless steel combo drawer/door		
Countertops:	min. 42 LF stainless steel	Counter Height:	36"
Drawer Units:	2 - 4 drawer stainless steel		
Shelving:	3x10LF adj. stainless steel		

Moveable Furnishings and Equipment

Chairs:	8 – bench ht.
Tables:	6– 30" x 72" adjustable height with epoxy top
Trash Can:	2 tall

Acoustics

Room Criteria:	RC-45-50(N)	Sound Transmission:	STC 50-55

Lighting

General:	full spectrum pendant	Lighting Level:	3 level multizone
Controls:	independently switched zones		

2.05 Environmental Systems Lab 2

Telecommunication

Data:	data ports at perimeter walls and overhead
Wi-Fi:	yes
Phone:	yes
Security Features:	card reader at all doors (including overhead coiling door)

Electrical

Normal Power (volts):	120V / 220V
Emergency Power:	120V/220V
Outlets:	(16) 220V outlets; 8 per side
Additional Outlets:	120V and 220V outlets on overhead carrier
Other:	at casework, place required outlets above counter
	each table to have (2) 120V and (2) 220V outlets available from overhead

HVAC

Room Pressure:	negative by 0.051WG
Total Air Changes/hr.:	100% outside air 6 ACHR w/ MERV 16 filters

Plumbing

Sinks:	(1) scullery and (3) 16x22 stainless steel	Drains:	yes, multiple, (8) min.
Cold Water:	yes	Hot Water:	yes
Treated Water:	RO	Hose bibb:	yes – 8 along walls
Waste/Vent:	yes	Eye Wash:	yes
Other:	spray down hose at sinks emergency shower HW at dishwasher, CW at ice maker		

Piped Gases

compressed air at overhead carriers

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Ice Maker	1	1				120		CW, FD			
Glassware washer	1	1				208		HW, RO			Undercounter
-20c Freezer	1	1				208					Emergency
+4c Refrigerator	1	1				120					
Dryer	1	1							Yes		
Oven	1	1				220					
Recirculating Aquarium rack system	1	1				240	5.1	RO			Aquatic Habitats stand alone or equal

1 2.06 Field Research Support Room

Space Use Category:	**Research / Non-Class Laboratory Service**	**Area NASF:**	**200**
Room Use Code:	**255**	**Quantity:**	**3**
		# of Stations:	
		Total Area, NASF:	**600**

Function: A temperature controlled room to support the Environmental Systems Lab

Relationships: Locate adjacent to the Environmental Systems Lab

Architectural

Flooring:	resinous (no joints)	Base:	by environ room manuf.
Walls:	By environmental room manufacturer	Wall Finish:	by eniron room manuf.
Ceiling:	water resistent	Min. Ceiling Ht:	9’-0”
Access:	solid insulated door	Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Wall Cabinets:	4 LF phenolic resin with adjustable shelving		
Base Cabinets:	4 LF phenolic resin with adjustable shelving		
Countertops:	8 LF including sink	Counter Height:	36”
Shelving:	(3) 6 LF adjustable phenolic resin or stainless steel		

Moveable Furnishings and Equipment

Chairs:	8 – bench ht.
Tables:	6– 30” x 72”
Trash Can:	2 tall

Acoustics

Room Criteria:	RC-45-50(N)	Sound Transmission:	STC 50-55

Lighting

General:	full spectrum pendant	Lighting Level:	70fc/30fc adjustable

2.06 Field Research Support Room 2

Telecommunication

Data:	data ports at perimeter walls and overhead
Wi-Fi:	yes
Phone:	yes
Security Features:	card reader at all doors (including overhead coiling door)

Electrical

Normal Power (volts):	120V x 10; 220v x 2	Outlets:	per code
Emergency Power:	(1) 120V, (1 220V)		

HVAC

Room Pressure:	negative	Temperature:	+5c - +30c
		Relative Humidity:	50%

Plumbing

Sinks:	yes - scullery	Drains:	trench drain
Cold Water:	yes	Hot Water:	yes
Treated Water:	RO	Hose bibb:	yes
Waste/Vent:	yes	Eye Wash:	yes
Other:	pre-rinse sprayer at sink		
Water Locations			
Bench:	yes		
Wall:	yes		

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Recirculating Aquarium rack system	1	1				240	5.1	RO			Aquatic Habitats stand alone or equal

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 2.07 Field Research Storage Room

Space Use Category:	**Research / Non-Class Laboratory Service**	**Area NASF:**	**200**
Room Use Code:	**255**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**200**

Function: A storage room to support environmental field research and exterior hose bibb for cleaning tools and field sampling equipment.

Relationships: Locate near the Environmental Systems Lab and outdoor yard for hosing off tools and samples.

Architectural

Flooring:	Resinous	Base:	Resinous flashed
Walls:	Sealed CMU	Wall Finish:	painted
Ceiling:	water resistant	Min. Ceiling Ht:	9’-0”
Access:	direct access to outdoor yard	Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Other: divide room with four (4) lockable galvanized wire security partitions

Security

Security Features: card reader at all doors (including exterior door)
keyed doors at wire security partition doors.

Electrical

Normal Power (volts): 120V

HVAC

Room Pressure: neutral

Plumbing

Drains: yes

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

2.07 Field Research Storage Room 2

1 2.08 Autoclave and Glasswashing Room

Space Use Category:	**Research / Non-Class Laboratory Service**	**Area NASF:**	**150**
Room Use Code:	**255**	**Quantity:**	**3**
		# of Stations:	
		Total Area, NASF:	**450**

Function: A room for washing glassware and autoclaving materials associated with research.

Relationships: Locate one on each research lab floor, distributed to provide convenient access to all research lab modules.

Architectural

Flooring:	resinous (no joints)	Base:	flashed
Walls:	MR gypsum wall board	Wall Finish:	Epoxy paint
Ceiling:	water resistant panel ceiling	Min. Ceiling Ht:	9’-0”
Min. Door Size:	3’-6” x 7’-0“		

Built-In Equipment and Casework

Countertops:	12LF stainless steel	Counter Height:	3’-0”
Other Bench Casework:	combo drawer/door		
Shelving:	(3) 6 LF adjustable phenolic resin or stainless steel		
	(2) under-counter dishwashers		
	autoclave with 4” curb around and exhaust canopy		
	distilled water or second stage water purification equipment		
	steam generator for autoclave		

Moveable Furnishings and Equipment

Other: Mobile cart

Acoustics

Room Criteria: RC-40(N)

Sound Transmission: STC 40

2.08 Autoclave and Glasswashing Room 2

Electrical

Normal Power (volts): 120V, 208V

Outlets: (2) 120V duplex at bench

HVAC

Room Pressure: negative

Other: exhaust canopy

Plumbing

Sinks: yes - scullery

Drains: floor drain

Cold Water: yes

Hot Water: yes

Treated Water: RO and distilled water

Steam: yes

Waste/Vent: yes

Eye Wash: yes

Water Locations

- Bench: yes
- Wall: yes

Piped Gases

- Compressed Air: yes
- Vacuum: yes
- Natural Gas: yes

Piped Gas Locations

- Bench: yes

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Autoclave	1	1				208		HW, Steam			24"x38"x38" chamber
Dishwasher	1	2				208		HW, RO			
Exhaust canopy	1	1	4'						Yes		
Steam generator	1	1						RO			
Distilled Water*	1	1						RO			
* distilled water or other second stage pure water filtration system											

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.09 Environmental Room

Space Use Category:	**Research / Non-Class Laboratory Service**	**Area NASF:**	**150**
Room Use Code:	**255**	**Quantity:**	**3**
		# of Stations:	
		Total Area, NASF:	**450**

Function: A temperature controlled room to support the research labs.

Relationships: Locate one on each research lab floor, distributed to provide convenient access to all research lab modules.

Architectural

Flooring:	resinous (no joints)	Base:	by environ room manuf.
Walls:	By environmental room manufacturer	Wall Finish:	by environ room manuf.
Ceiling:	water resistent	Min. Ceiling Ht:	9’-0”
Access:	solid insulated door	Min. Door Size:	3’-0” x 7’-0“

Built-In Equipment and Casework

Countertops:	15 LF including sink	Counter Height:	36”
Shelving:	(3) 12 LF adjustable phenolic resin or stainless steel		
	15 LF moveable stainless steel shelf unit		

Lighting

General:	surface mounted fluorescent
Occupancy Sensors:	yes

Telecommunication

Data:	data ports along electrical raceway

2.09 Environmental Room 2

Electrical

Normal Power (volts): 120V

Outlets: 24” OC in raceway

Emergency Power: yes (environmental room)

HVAC

Room Pressure: positive

Temperature: +5c - +30c

Temperature Control: +/-2c

Plumbing

Sinks: yes

Cold Water: yes

Hot Water: yes

Treated Water: RO

Hose bibb: yes

Waste/Vent: yes

Eye Wash: yes

Water Locations

Wall: yes at sink

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.10 Gas Storage and Distribution Room

Space Use Category:	**Research / Non-Class Laboratory Service**	**Area NASF:**	**25**
Room Use Code:	**255**	**Quantity:**	**3**
		# of Stations:	
		Total Area, NASF:	**75**

Function: centralized gas storage with manifold for supporting the research labs

Relationships: one on each research lab floor

Architectural

Flooring:	VCT or sealed concrete	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	paint
Ceiling:	exposed	Min. Ceiling Ht:	9’-0”
Access:	off corridor	Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Other: cylinder restraints

Moveable Furnishings and Equipment

Other: cylinder dolly

HVAC

Room Pressure: neutral

Plumbing

Other: manifold for cylinder

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

2.10 Gas Storage and Distribution Room 2

1 2.11 Tissue Culture Room

Space Use Category:	**Research / Non-Class Laboratory Service**	**Area NASF:**	**150**
Room Use Code:	**255**	**Quantity:**	**3**
		# of Stations:	**2**
		Total Area, NASF:	**450**

Function: Specialized procedure room equipped and configured for tissue culture protocols supporting animal based research.

Relationships: Locate adjacent to the animal-based research labs.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
		Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Base Cabinets:	wood		
Countertops:	16 LF epoxy	Counter Height:	36” Nom.
Drawer Units:	4 Drawer	Other Bench Casework:	combo door/drawer
Shelving:	(3) 13LF adjustable phenolic resin		

Moveable Furnishings and Equipment

Chairs: 3 – bench ht.

Lighting

General: recessed

Telecommunication

Data: yes, 2 at bench

2.11 Tissue Culture Room 2

Electrical

Normal Power (volts): 120V

Outlets: raceway w/ 120v duplexes @ 2”-0” OC

Emergency Power: emergency power typically required for all freezers and incubators

HVAC

Room Pressure: positive

Plumbing

Sinks: 16x22 epoxy

Cold Water: yes Hot Water: yes

Treated Water: RO

Waste/Vent: lab waste

Eye Wash: yes

Other: pre-rinse sprayer at sink

Water Locations

- Sink: yes

Piped Gases

- Compressed Air: yes
- Vacuum: yes
- Carbon Dioxide: yes

Piped Gas Locations

- Wall: @ 84” AFF @ incubator
- Hood: @ 84” AFF

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
4' Biosafety Cabinet	1	1				120		A,V			
Refrigerator	1	1				120					
Incubator	1	1				120		CO2			Emergency power

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.12 Radioisotope Fume Hood Room

Space Use Category:	**Research / Non-Class Laboratory Service**	**Area NASF:**	**100**
Room Use Code:	**255**	**Quantity:**	**1**
		# of Stations:	**1**
		Total Area, NASF:	**100**

Function: A procedure room with a fume hood specially designed for the safe and convenient handling of low-level radioactive material.

Relationships: Locate convenient to the research labs.

Architectural

Flooring:	vinyl sheet	Base:	Integral
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Access:	door w/ glazing	Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Base Cabinets:	10 LF min. – combo door/drawer		
Countertops:	stainless steel	Counter Height:	36” Nom
Drawer Units:	4 drawer unit		
Shelving:	over counter - adjustable stainless steel		
Other:	4 LF fume hood		

Moveable Furnishings and Equipment

Chairs:	1 – bench ht.
Trash Can:	yes

Acoustics

Room Criteria:	NC 45-50	Sound Transmission:	STC 40-45

2.12 Radioisotope Fume Hood Room 2

Telecommunication

Data: yes

Wi-Fi: yes

Electrical

Normal Power (volts): 120V / 208v-220v

Outlets: raceway w/ 120v duplexes @ 2'-0" oc

Emergency Power: yes – fume hood

HVAC

Room Pressure: positive

Plumbing

Sinks: 16x22 integral stainless steel

Cold Water: yes

Hot Water: yes

Treated Water: RO

Eye Wash: yes

Waste/Vent: lab waste

Water Locations

Sink: yes

Piped Gases

Compressed Air: yes

Piped Gas Locations

Hood: yes

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Fume hood	1	1	4'								
Radioisotope Cabinet	1	1									

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.13 Shared Research Storage Room

Space Use Category:	**Research / Non-Class Laboratory Service**	**Area NASF:**	**150**
Room Use Code:	**255**	**Quantity:**	**6**
		# of Stations:	**1**
		Total Area, NASF:	**900**

Function: Storage rooms to support the research labs.

Relationships: Distributed to provide convenient access to all research lab modules.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Access:	off of research level corridor	Min. Door Size:	3’-0” x 7’-0“

Built-In Equipment and Casework

Moveable Furnishings and Equipment

Other: metal industrial shelving lining all walls

Lighting

General:	direct fluorescent industrial fixtures	Lighting Level:	30 fc

2.13 Shared Research Storage Room 2

Research Administrative Spaces Room Data Sheets

2.14 Principal Investigator's Office

2.15 Principal Investigator's (PI)Workstation

2.16 Graduate Research Assistant (GRA) & Staff Workstation

2.17 Administrative Support Room

2.18 Conference Room

2.19 Reading Room – Collaboration Room

2.20 Break Room

1 2.14 Principal Investigator's Office

Space Use Category:	**Office**	**Area NASF:**	**130**
Room Use Code:	**310**	**Quantity:**	**8**
		# of Stations:	**1**
		Total Area, NASF:	**1,040**

Function: Private office for animal-based researchers.

Relationships: Locate near Administrative Support.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9'-0"
Windows:	required	Window Treatment:	roller shades
Access:	from circulation core allowing access without entry to research corridors		
Min. Door Size:	3'-0" x 7'-0"		
Other:	vision panel within or adjacent to entry door		

Built-In Equipment and Casework

Coat Hooks: yes

Moveable Furnishings and Equipment and Equipment

Desks:	1 – 66" L-shaped with drawers and files
Chairs:	1 – rolling – upholstered back and seat
	2 – side chairs
File Cabinets:	1 – 42" wide, 4 drawer
Trash Can:	1 small
Other:	2 – bookcases w/40 LF of adjustable shelving

Lighting

General: fluorescent, indirect lighting

Acoustics

Room Criteria:	RC-40	Sound Transmission:	STC 50

2.14 Principal Investigator's Office 2

Telecommunication

Data: yes

Phone: yes

Wi-Fi: yes

Electrical

Normal Power (volts): 120V

HVAC

Room Pressure: positive

Plumbing

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Computer	3	1									

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.15 Principal Investigator's (PI) Workstation

Space Use Category:	**Office**	**Area NASF:**	**65**
Room Use Code:	**310**	**Quantity:**	**28**
		# of Stations:	**1**
		Total Area, NASF:	**1,820**

Function: Investigator's write-up space to support research activities

Relationships: Locate within or adjacent to the research lab clusters and within proximity to the Graduate Research Assistant & Staff Workstations. See Section 6.02 Research Labs.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9'-0"
Windows:	preferred	Window Treatment:	roller shades
Access:	from research corridor or research lab cluster		
Min. Door Size:	3'-0" x 7'-0" if required		
Other:	vision panel within or adjacent to entry door		

Built-In Equipment and Casework

Coat Hooks:	yes
White Board:	yes
Tack Board	yes

Moveable Furnishings and Equipment and Equipment

Desks:	1 – 60" L-shaped with drawers and files
Chairs:	1 – rolling – upholstered back and seat
File Cabinets:	1 – small two drawer and file
Trash Can:	1 small
Other:	shared networked printer per research lab cluster

Lighting

General: fluorescent, indirect lighting

Acoustics

Room Criteria:	RC-40	Sound Transmission:	STC 50

2.15 Principal Investigator's (PI) Workstation 2

Telecommunication

Data: yes

Phone: yes

Wi-Fi: yes

Electrical

Normal Power (volts): 120V

HVAC

Room Pressure: positive to research lab

Plumbing

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Computer	3	1									

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.16 Graduate Research Assistant (GRA) & Staff Workstation

Space Use Category:	**Office**	**Area NASF:**	**40**
Room Use Code:	**310**	**Quantity:**	**108**
		# of Stations:	**1**
		Total Area, NASF:	**4,320**

Function: Write-up space to support research activities.

Relationships: Cluster to support the number of researchers in each lab. Locate within or adjacent to the research lab clusters. See Section 6.02 Research Labs.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	preferred	Window Treatment:	roller shades
Access:	from research corridor or research lab cluster		
Min. Door Size:	3’-0” x 7’-0“		
Other:	vision panel within or adjacent to entry door		
	A transparent physical separation between the work stations and the research labs is desired		

Built-In Equipment and Casework

Coat Hooks:	yes
White Board:	yes, shared
Tack Board	yes, shared

Moveable Furnishings and Equipment and Equipment

Desks:	1 – 60” desk with drawers and files
Chairs:	1 – rolling – upholstered back and seat
Trash Can:	1 small
Other:	shared networked printer per research lab cluster

Lighting

General: fluorescent, indirect lighting

Acoustics

Room Criteria:	RC-40	Sound Transmission:	STC 50

2.16 Graduate Research Assistant (GRA) & Staff Workstation 2

Telecommunication

Data: yes

Phone: yes

Wi-Fi: yes

Electrical

Normal Power (volts): 120V

HVAC

Room Pressure: positive to research lab

Plumbing

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Computer	3	1									
printer	3	1*									
* one per lab cluster											

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.17 Administrative Support Room

Space Use Category:	**Office Service**	**Area NASF:**	**150**
Room Use Code:	**315**	**Quantity:**	**3**
		# of Stations:	**1**
		Total Area, NASF:	**450**

Function: An area for printing, filing, and copying in support of research offices and workstations.

Relationships: Locate convenient to research lab workstations and offices.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Access:	from research corridor		
Min. Door Size:	3’-0” x 7’-0“		
Other:	vision panel within or adjacent to entry door		

Built-In Equipment and Casework

Tack Board	4 LF

Moveable Furnishings and Equipment and Equipment

Tables:	1 – 24” x 60”
Storage Cabinet:	2 – tall, lockable with adjustable shelves
Trash Can:	1 - large
Other:	shared networked printer
Other:	shared networked copier
Other:	paper recycling container

Lighting

General:	fluorescent, indirect lighting

Acoustics

Room Criteria:	RC-40	Sound Transmission:	STC 50

2.17 Administrative Support Room 2

Telecommunication

Data: yes

Phone: yes

Wi-Fi: yes

Electrical

Normal Power (volts): 120V

HVAC

Room Pressure: positive

Plumbing

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
printer	3	1									
copier	3	1									

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.18 Conference Room

Space Use Category:	**Conference Rooms**	**Area NASF:**	**240**
Room Use Code:	**350**	**Quantity:**	**3**
		# of Stations:	**12**
		Total Area, NASF:	**720**

Function: A room serving researchers and used primarily for project team research meetings.

Relationships: Distribute to provide convenient access to research labs and offices. One conference room must be adjacent to the CIRC Office.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	required		
Access:	from circulation core		
Min. Door Size:	3’-0” x 7’-0“		
Other:	vision panel within or adjacent to entry door		
	blocking for support of wall monitor		

Built-In Equipment and Casework

Window Treatment:	roller shades / room darkening
AV Rack Mount Cabinet:	yes
Flat Screen Monitor:	yes, 50” diagonal image, minimum
Other Technology:	video conference capable
White Board:	min. 8 LF
Coat Hooks:	yes
Clock:	yes

Moveable Furnishings and Equipment and Equipment

Tables:	3 – 42” x 60”
Chairs:	12 – rolling chairs – upholstered back and seat
Table Features:	outlets in table – plug into floor outlets
Trash Can:	1 small

Lighting

General: fluorescent, indirect lighting

Acoustics

Room Criteria:	RC-30-35	Sound Transmission:	STC 55

2.18 Conference Room 2

Telecommunication

Data: yes, serving monitor as well

Phone: yes

Wi-Fi: yes

Electrical

Outlets: standard height along perimeter walls

recessed wall outlet for monitor at monitor height

mid-room floor outlets for tables

HVAC

Room Pressure: positive

Plumbing

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
monitor	1	1									

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.19 Reading Room – Collaboration Room

Space Use Category:	**Conference Rooms**	**Area NASF:**	**150**
Room Use Code:	**350**	**Quantity:**	**3**
		# of Stations:	**6**
		Total Area, NASF:	**450**

Function: Room for informal gatherings of faculty and graduate students to promote collaboration and interaction.

Relationships: Distribute to provide convenient access to research labs and offices.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	preferred		
Access:	from research corridor		
Min. Door Size:	3’-0” x 7’-0“ if necessary		
Other:	walls and door to corridor are optional		

Built-In Equipment and Casework

Window Treatment:	roller shades
Flat Screen Monitor:	yes
White Board:	min. 6 LF

Moveable Furnishings and Equipment and Equipment

Tables:	1 - 60” round
Chairs:	6 – rolling chairs – upholstered back and seat
Bookshelves:	yes
Trash Can:	1 small
Other Technology:	computer station

Lighting

General:	fluorescent, indirect lighting

Acoustics

Room Criteria:	RC-40	Sound Transmission:	STC 50

2.19 Reading Room – Collaboration Room 2

Telecommunication

Data: yes, serving monitor as well

Phone: yes

Wi-Fi: yes

Electrical

Outlets: standard height along perimeter walls

recessed wall outlet for monitor at monitor height

HVAC

Room Pressure: positive to corridor

Plumbing

Major Equipment

Item	Status	Qty
monitor	1	1
computer	3	1

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 2.20 Break Room

Space Use Category:	**Conference Room Service**	**Area NASF:**	**100**
Room Use Code:	**355**	**Quantity:**	**3**
		# of Stations:	**4**
		Total Area, NASF:	**300**

Function: A room containing the elements of a small kitchenette.

Relationships: Distribute to provide convenient access to research labs and offices, and locate near a Conference Room.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Access:	from corridor		
Min. Door Size:	3’-0” x 7’-0“		
Other:	can be adjacent to and partially open to a secure corridor		

Built-In Equipment and Casework

Wall Cabinets:	6 LF of wood wall cabinets
Base Cabinets:	6 LF of cabinets
Drawer Units:	yes
Countertops:	solid surface with integral stainless steel sink
Counter Height:	standard kitchen
Tack Board:	yes
Clock:	yes

Moveable Furnishings and Equipment and Equipment

Tables:	1 – 30” x 60”
Chairs:	4 – chairs on glides – poly back and seat
Trash Can:	1 large
Refrigerator:	yes

Lighting

General: fluorescent, indirect lighting

Acoustics

Room Criteria:	RC-40	Sound Transmission:	STC 50

2.20 Break Room 2

Telecommunication

Data: yes

Phone: yes

Wi-Fi: yes

Electrical

Outlets: 2 GFCI above counter

HVAC

Room Pressure: positive

Plumbing

Sinks: 1- stainless steel built into counter

Cold Water: yes Hot Water: yes

Other: under counter water filter with water bottle filler at sink

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
refrigerator	1	1						ice maker			20 cu.ft.
garbage disposal	1	1									
microwave	3	1									

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

Vivarium Room Data Sheets

Animal Holding

3.01 Large Holding Room

3.02 Small Holding Room

3.03 Avian Holding Room

3.04 Quarantine Room

Procedure

3.05 Behavior Study Room

3.06 Flexible Procedure Room

3.07 BL-2 Procedure Room

3.08 Gamma Irradiation Room

3.09A Preparation and Surgery Room

3.09B Necropsy Room

3.10A Transgenic Facility

3.10B Transgenic Facility Holding Room

3.11 Whole Animal Imaging

3.12 Behavior Study Work Area

Support

3.13 Cagewash Room

3.14 Cage Prep Room

3.15 Feed and Bedding Storage

3.16 Cage and Rack Storage

3.17 Vestibule, Gowning and Toilet

Administration and Personnel

3.18 Animal Husbandry Office

3.19 Animal Husbandry Work Area

1 3.01 Large Holding Room

Space Use Category:	**Animal Facility**	**Area NASF:**	**360**
Room Use Code:	**570**	**Quantity:**	**5**
		# of Stations:	
		Total Area, NASF:	**1,800**

Function: A room housing rodents in cages on mobile racks.

Relationships: Locate within the vivarium, within proximity to procedure and support facilities.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	epoxy painted
Ceiling:	gypsum wall board	Min. Ceiling Ht:	9’-0”
Access:	reinforced Fiberglass Door	Min. Door Size:	3’-6” x 7’-0“
Other:	brushed aluminum crash rail @ 36” AFF		
	door to include window with red film		

Built-In Equipment and Casework

Other: mop rack
document holder

Moveable Furnishings and Equipment and Equipment

6 – double sided ventilated cage racks
biosafety cabinet

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Lighting

General:	recessed, sealed
Lighting Level:	20/40/60 fc
Other Lighting:	red
Dimming:	yes

3.01 Large Holding Room 2

Telecommunication

Data: for monitoring if necessary

Electrical

Normal Power (volts): 120v

Outlets: waterproof

Emergency Power: yes

HVAC

Room Pressure: variable - negative by 0.05IWG

Temperature: 68-79f

Total Air Changes/hr.: 10 ACHR w/MERV 16 filters*

Relative Humidity: 30-70%

Exhaust Air (percent): 100% outside air

Other: temperature and humidity readout

ventilated cage racks

visual room pressure indicator

*micro-isolator racks may allow primary room to be design to 6ACHR with proper evaluation, special holding areas may need to be positive.

Plumbing

Treated Water: RO

Other: automatic animal watering system

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
double sided ventilated cage racks	1	6				120			yes		
BioSafety cabinet	1	1	5'			120					Class II/Type A2

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 3.02 Small Holding Room

Space Use Category:	**Animal Facility**	**Area NASF:**	**175**
Room Use Code:	**570**	**Quantity:**	**4**
		# of Stations:	
		Total Area, NASF:	**700**

Function: A room housing rodents in cages on mobile racks.

Relationships: Locate within the vivarium, within proximity to procedure and support facilities.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	epoxy painted
Ceiling:	gypsum wall board	Min. Ceiling Ht:	9’-0”
Access:	reinforced Fiberglass Door	Min. Door Size:	3’-6” x 7’-0“
Other:	brushed aluminum crash rail @ 36” AFF		
	door to include window with red film		

Built-In Equipment and Casework

Other: mop rack
document holder

Moveable Furnishings and Equipment and Equipment

2 – double-sided ventilated cage racks
biosafety cabinet

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Lighting

General:	recessed, sealed
Lighting Level:	20/40/60 fc
Other Lighting:	red
Dimming:	yes

3.02 Small Holding Room 2

Telecommunication

Data: for monitoring if necessary

Electrical

Normal Power (volts): 120v

Outlets: waterproof

Emergency Power: yes

HVAC

Room Pressure: variable - negative by 0.05IWG

Temperature: 68-79f

Total Air Changes/hr.: 10 ACHR w/MERV 16 filters*

Relative Humidity: 30-70%

Exhaust Air (percent): 100% outside air

Other: temperature and humidity readout

ventilated cage racks

visual room pressure indicator

*micro-isolator racks may allow primary room to be design to 6ACHR with proper evaluation, special holding areas may need to be positive.

Plumbing

Treated Water: RO

Other: automatic animal watering system

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
double sided ventilated cage racks	1	2				120			yes		
BioSafety cabinet	1	1	5'			120					Class II/Type A2

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 3.03 Avian Holding Room

Space Use Category:	**Animal Facility**	**Area NASF:**	**110**
Room Use Code:	**570**	**Quantity:**	**3**
		# of Stations:	
		Total Area, NASF:	**330**

Function: A room housing birds in cages on mobile racks.

Relationships: Locate within the vivarium, within proximity to procedure and support facilities.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	epoxy painted
Ceiling:	gypsum wall board	Min. Ceiling Ht:	9’-0”
Access:	reinforced Fiberglass Door	Min. Door Size:	3’-6” x 7’-0“
Other:	brushed aluminum crash rail @ 36” AFF		

Built-In Equipment and Casework

Base Cabinets:	Stainless steel		
Countertops:	8LF stainless steel	Counter Height:	3’-0”
Other Bench Casework:	combo door/drawer		
Other:	mop rack		
	document holder		

Moveable Furnishings and Equipment and Equipment

open stainless steel cage racks

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Lighting

General:	recessed, sealed
Lighting Level:	20/40/60 fc
Other Lighting:	red
Dimming:	yes

3.03 Avian Holding Room 2

Electrical

Normal Power (volts): 120v
Outlets: waterproof
Emergency Power: yes

HVAC

Room Pressure: variable - negative by 0.05IWG
Temperature: 68-79f
Total Air Changes/hr.: 10 ACHR w/MERV 16 filters
Relative Humidity: 30-70%
Exhaust Air (percent): 100% outside air
Other: temperature and humidity readout
visual room pressure indicator

Plumbing

Sinks: 16X22 Stainless Steel
Drains: Floor Drain
Cold Water: yes
Hot Water: yes
Treated Water: RO
Hose bibb: yes
Waste/Vent: lab waste
Water Locations
Bench: @ sink

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
cage racks		TBD									

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.04 Quarantine Room

Space Use Category:	**Animal Facility**	**Area NASF:**	**110**
Room Use Code:	**570**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**110**

Function: Room for isolating and holding animals to protect transmission of disease and pathogens.

Relationships: Locate within the vivarium, within proximity to the entry to the facility.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	epoxy painted
Ceiling:	gypsum wall board	Min. Ceiling Ht:	9’-0”
Access:	reinforced Fiberglass Door	Min. Door Size:	3’-6” x 7’-0“
Other:	brushed aluminum crash rail @ 36” AFF door to include window with red film		

Built-In Equipment and Casework

Other: mop rack
document holder

Moveable Furnishings and Equipment and Equipment

2 – double sided ventilated cage racks

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Lighting

General:	recessed, sealed
Lighting Level:	20/40/60 fc
Other Lighting:	red
Dimming:	yes

3.04 Quarantine Room 2

Telecommunication

Data: for monitoring if necessary

Electrical

Normal Power (volts): 120v

Outlets: waterproof

Emergency Power: yes

HVAC

Room Pressure: variable - negative by 0.05IWG

Temperature: 68-79f

Total Air Changes/hr.: 10 ACHR w/MERV 16 filters*

Relative Humidity: 30-70%

Exhaust Air (percent): 100% outside air

Other: temperature and humidity readout

ventilated cage racks

visual room pressure indicator

blast gate for vented racks

*micro-isolator racks may allow primary room to be design to 6ACHR with proper evaluation, special holding areas may need to be positive.

Plumbing

Treated Water: RO

Other: automatic animal watering system

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust
			L	W	H	volts	amps		
double sided ventilated cage racks	1	2				120			yes

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 3.05 Behavior Study Room

Space Use Category:	**Animal Facility**	**Area NASF:**	**100**
Room Use Code:	**570**	**Quantity:**	**4**
		# of Stations:	
		Total Area, NASF:	**400**

Function: A room allowing for the study of the behavior of rodents **in** controlled environments.

Relationships: Locate within the vivarium, adjacent to the Behavior Study Work Area.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	epoxy painted
Ceiling:	ACT – cleanroom type	Min. Ceiling Ht:	9’-0”
Access:	from Behavior Study Work Area	Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Other Bench Casework:	SST Storage cabinet
Shelving:	3x6’ adjustable stainless steel

Moveable Furnishings and Equipment and Equipment

Tables:	30”x60” stainless steel w/ epoxy top

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Lighting

General:	recessed, sealed
Dimming:	yes

Telecommunication

Data:	yes

3.05 Behavior Study Room 2

Electrical

Normal Power (volts):	120v
Outlets:	@ 42” AFF
Emergency Power:	yes

HVAC

Room Pressure:	variable - negative by 0.05IWG
Temperature:	68-79f
Total Air Changes/hr.:	10 ACHR w/MERV 16 filters*
Relative Humidity:	30-70%
Exhaust Air (percent):	100% outside air
Other:	temperature and humidity readout
	visual room pressure indicator
	blast gate for local ventilation

Plumbing

Major Equipment

Item	Status	Qty

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.06 Flexible Procedure Room

Space Use Category:	**Animal Facility**	**Area NASF:**	**120**
Room Use Code:	**570**	**Quantity:**	**2**
		# of Stations:	
		Total Area, NASF:	**240**

Function: A room allowing for various types of procedures on animal subjects.

Relationships: Locate within the vivarium, near the animal Holding Rooms.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	painted
Ceiling:	ACT – cleanroom type	Min. Ceiling Ht:	9’-0”
Access:	from vivarium corridor	Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Shelving:	3x8’ adjustable stainless steel
Other:	soap and towel dispenser

Moveable Furnishings and Equipment and Equipment

Tables:	30”x60” stainless steel w/ epoxy top

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Lighting

General:	recessed, sealed

Telecommunication

Data:	yes
Phone:	yes

3.06 Flexible Procedure Room 2

Electrical

Normal Power (volts): 120v
Outlets: @ 42” AFF
Emergency Power: yes

HVAC

Room Pressure: variable - positive
Temperature: 68-79f
Total Air Changes/hr.: 10 ACHR w/MERV 16 filters*
Relative Humidity: 30-70%
Exhaust Air (percent): 100% outside air
Other: temperature and humidity readout
visual room pressure indicator
scavenger arm exhaust

Plumbing

Sinks: 16”x22” stainless steel sink
Cold Water: yes
Hot Water: yes
Treated Water: RO
Waste/Vent: Lab Waste
Eye Wash: yes
Water Locations
Wall: yes, at sink
Piped Gases
Compressed Air: yes, at table
Oxygen: yes, at BSC
Vacuum: yes, at BSC
Natural Gas: yes, at table
Carbon Dioxide: yes, at BSC
Piped Gas Locations
Bench: @ 42” aff
Hood: @ 84” AFF

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Biosafety cabinet	1	1	6'			120		co2, 02 v			Class II- A2

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.07 BL-2 Procedure Room

Space Use Category:	**Animal Facility**	**Area NASF:**	**120**
Room Use Code:	**570**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**120**

Function: A room allowing for various types of procedures on animal subjects, including requiring BL-2 safety protocols.

Relationships: Locate within the vivarium, adjacent to and providing access to one Small Holding Room.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	painted
Ceiling:	ACT – cleanroom type	Min. Ceiling Ht:	9’-0”
Access:	from vivarium corridor	Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Shelving: 3x8’ adjustable stainless steel

Moveable Furnishings and Equipment and Equipment

Tables: 30”x60” stainless steel w/ epoxy top

Storage Cabinet: stainless steel for gloves, masks and gowning supplies

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Lighting

General: recessed, sealed

Telecommunication

Data: yes

Phone: yes

3.07 BL-2 Procedure Room 2

Electrical

Normal Power (volts): 120v
Outlets: @ 42” AFF
Emergency Power: yes

HVAC

Room Pressure: variable - positive
Temperature: 68-79f
Total Air Changes/hr.: 10 ACHR w/MERV 16 filters*
Relative Humidity: 30-70%
Exhaust Air (percent): 100% outside air
Other: temperature and humidity readout
visual room pressure indicator
scavenger arm exhaust

Plumbing

Sinks: 16”x22” stainless steel sink
Cold Water: yes
Hot Water: yes
Treated Water: RO
Waste/Vent: Lab Waste
Eye Wash: yes
Water Locations
Wall: yes, at sink
Piped Gases
Compressed Air: yes, at table
Oxygen: yes, at BSC
Vacuum: yes, at BSC
Natural Gas: yes, at table
Carbon Dioxide: yes, at BSC
Piped Gas Locations
Bench: @ 42” aff
Hood: @ 84” AFF

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Biosafety cabinet	1	1	6'			120		CO2, 02 v			Class II - B2

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.08 Gamma Irradiation Room

Space Use Category:	**Animal Facility**	**Area NASF:**	**105**
Room Use Code:	**570**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**105**

Function: A room housing a cesium irradiator.

Relationships: Locate within the vivarium.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	concrete masonry walls	Wall Finish:	epoxy painted
Ceiling:	steel plate	Min. Ceiling Ht:	9’-0”
Access:	from vivarium corridor		
Door:	reinforced with armor plate	Min. Door Size:	3’-6” x 7’-0“
Other:	card access and ceiling mounted closed circuit video security		

Built-In Equipment and Casework

Moveable Furnishings and Equipment and Equipment

Equipment: animal transfer station

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Lighting

General: 70FC, recessed, sealed

Telecommunication

Data: yes

Phone: yes

Camera: yes, per UMBC and Federal requirements

3.08 Gamma Irradiation Room 2

Electrical

Normal Power (volts): 120v
Outlets: as required by equipment
Emergency Power: yes

HVAC

Room Pressure: positive
Temperature: 68-79f
Total Air Changes/hr.: 10 ACHR w/MERV 16 filters*
Relative Humidity: 30-70%
Exhaust Air (percent): 100% outside air
Sensors radiation
Other: temperature and humidity readout
visual room pressure indicator
secure ductwork with security grilles

Plumbing

Piped Gases
Compressed Air: yes
Piped Gas Locations
Wall: to cesium irradiator

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Cesium Irradiator	2	1				120		CA			
Animal Transfer Statio	1	1				120					

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.09A Preparation and Surgery Room

Space Use Category:	**Animal Facility**	**Area NASF:**	**105**
Room Use Code:	**570**	**Quantity:**	**1**
		# of Stations:	**1**
		Total Area, NASF:	**105**

Function: A space for rodent or avian surgery and preparation for necropsy.

Relationships: Locate within the vivarium, adjacent to and providing access to the Necropsy Room.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	painted
Ceiling:	ACT – cleanroom type	Min. Ceiling Ht:	9’-0”
Access:	from vivarium corridor	Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Base Cabinets:	stainless steel		
Countertops:	10LF stainless steel	Counter Height:	3’-0”
Drawer Units:	4 drawer		
Other Bench Casework:	combo door /drawer		
Shelving:	6x8’ adjustable stainless steel		
Equipment:	biosafety cabinet (BSC)		
	soap and paper towel dispenser		
Other:	visual room pressure differential indicator above door		

Moveable Furnishings and Equipment and Equipment

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Lighting

General: recessed, sealed

Telecommunication

Data: yes

3.09A Prep and Surgery Room 2

Electrical

Normal Power (volts):	120v
Outlets:	as required by equipment
Outlets:	@ 42” AFF
Emergency Power:	yes

HVAC

Room Pressure:	positive
Temperature:	68-79f
Total Air Changes/hr.:	10 ACHR w/MERV 16 filters
Relative Humidity:	30-70%
Exhaust Air (percent):	100% outside air
Other:	scavenger arm exhaust

Plumbing

Sinks:	(1) 16”x22” stainless steel sink		
Cold Water:	yes	Hot Water:	yes
Treated Water:	RO		
Waste/Vent:	lab waste	Eye Wash:	yes
Water Locations			
Bench:	yes, at sink		
Piped Gases			
Compressed Air:		Oxygen:	yes, at BSC
Vacuum:	yes, at BSC	Carbon Dioxide:	yes, at BSC
Piped Gas Locations			
Hood:	@ 84” AFF		

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Biosafety cabinet	1	1	6'			120		CO2, 02, V			Class II - B2

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.09B Necropsy Room

Space Use Category:	**Animal Facility**	**Area NASF:**	**105**
Room Use Code:	**570**	**Quantity:**	**1**
		# of Stations:	**1**
		Total Area, NASF:	**105**

Function: A space specially equipped for performing rodent or avian necropsy.

Relationships: Locate within the vivarium, adjacent to the Preparation and Surgery Room.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	painted
Ceiling:	ACT – cleanroom type	Min. Ceiling Ht:	9’-0”
Access:	from Prep and Surgery Room	Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Base Cabinets:	stainless steel		
Countertops:	10LF stainless steel	Counter Height:	3’-0”
Drawer Units:	4 drawer		
Other Bench Casework:	combo door /drawer		
Shelving:	6x8’ adjustable stainless steel		
Equipment:	soap and paper towel dispenser		

Moveable Furnishings and Equipment and Equipment

Tables:	30”x60” stainless steel surgery table

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Lighting

General:	recessed, sealed
Task:	LED exam light

Telecommunication

Data:	yes

3.09B Necropsy Room 2

Electrical

Normal Power (volts):	120v
Outlets:	as required by equipment
Outlets:	@ 42” AFF
Emergency Power:	yes

HVAC

Room Pressure:	positive
Temperature:	68-79f
Total Air Changes/hr.:	10 ACHR w/MERV 16 filters
Relative Humidity:	30-70%
Exhaust Air (percent):	100% outside air
Other:	scavenger arm exhaust

Plumbing

Sinks:	(1) 16”x22” stainless steel sink		
Cold Water:	yes	Hot Water:	yes
Treated Water:	RO		
Waste/Vent:	lab waste	Eye Wash:	yes
Water Locations			
Bench:	yes, at sink		
Piped Gases			
Compressed Air:	yes, at table	Oxygen:	yes, at table
Vacuum:	yes, at table	Carbon Dioxide:	yes, at table
Piped Gas Locations			
Wall:	@ 84” AFF		

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Biosafety cabinet	1	1	6'			120		CO2, 02, V			Class II - B2

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.10A Transgenic Facility

Space Use Category:	**Animal Facility**	**Area NASF:**	**100**
Room Use Code:	**570**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**100**

Function: A specialized procedure room to support transgenic research protocols.

Relationships: Locate within the vivarium, adjacent to the Transgenic Facility Holding Room.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	painted
Ceiling:	ACT – cleanroom type	Min. Ceiling Ht:	9’-0”
Access:	from Transgenic Facility Holding Room	Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Base Cabinets:	Stainless Steel		
Countertops:	8-10LF Epoxy	Counter Height:	3’-0”
Drawer Units:	4 Drawer	Other Bench Casework:	Combo Door/drawer
Shelving:	3x8’ adjustable stainless steel		

Moveable Furnishings and Equipment and Equipment

Equipment: biosafety cabinet

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Lighting

General: recessed, sealed

Telecommunication

Data: yes

Phone: yes

3.10A Transgenic Facility 2

Electrical

Normal Power (volts): 120v
Outlets: @ 42” AFF at bench
Emergency Power: yes

HVAC

Room Pressure: positive
Temperature: 68-79f
Total Air Changes/hr.: 10 ACHR w/MERV 16 filters
Relative Humidity: 30-70%
Exhaust Air (percent): 100% outside air
Other: temperature and humidity readout
visual room pressure indicator

Plumbing

Sinks: 16”x22” epoxy
Cold Water: yes
Hot Water: yes
Treated Water: RO
Water Locations
Bench: yes
Piped Gases
Compressed Air: yes, at bench @ 42” AFF
Natural Gas: yes, at bench @ 42” AFF
Oxygen: yes, at BSC @ 84” AFF
Vacuum: yes, at BSC @ 84” AFF
Carbon Dioxide: yes, at BSC @ 84” AFF

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Biosafety cabinet	1	1	5'			120		CO2, 02, V			Class II - B2

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.10B Transgenic Facility Holding Room

Space Use Category:	**Animal Facility**	**Area NASF:**	**110**
Room Use Code:	**570**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**110**

Function: Animal holding room for the Transgenic Facility.

Relationships: Locate within the vivarium, adjacent to and providing access to the Transgenic Facility.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	painted
Ceiling:	ACT – cleanroom type	Min. Ceiling Ht:	9’-0”
Access:	from vivarium corridor	Min. Door Size:	3’-6” x 7’-0“
Other:	Brushed aluminum crashrail @ 36” AFF in holding room		

Built-In Equipment and Casework

Other: mop rack
document holder

Moveable Furnishings and Equipment and Equipment

2 – double-sided ventilated cage racks

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Lighting

General: recessed, sealed
Dimming: yes

Telecommunication

Data: yes

3.10B Transgenic Facility Holding Room 2

Electrical

Normal Power (volts):	120v
Outlets:	@ 42” AFF, waterproof outlets in holding area
Emergency Power:	yes

HVAC

Room Pressure:	holding area - negative
Temperature:	68-79f
Total Air Changes/hr.:	10 ACHR w/MERV 16 filters
Relative Humidity:	30-70%
Exhaust Air (percent):	100% outside air
Other:	blast gates for ventilated animal racks
	temperature and humidity readout
	visual room pressure indicator

Plumbing

Treated Water:	RO
Hose bibb:	yes
Other:	auto animal watering system
Water Locations	
Wall:	yes, at watering system

Major Equipment

Item	Status	Qty		Size		
			L	W	H	
dbl sided cage rack	1	1				

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.11 Whole Animal Imaging

Space Use Category:	**Animal Facility**	**Area NASF:**	**150**
Room Use Code:	**570**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**150**

Function: A specially equipped room for conducting whole body imaging on research animals.

Relationships: Locate within the vivarium.

Architectural

Flooring:	resinous	Base:	resinous , flashed
Walls:	IR gypsum wall board	Wall Finish:	painted
Ceiling:	ACT – cleanroom type	Min. Ceiling Ht:	9’-0”
Access:	from vivarium corridor	Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Shelving: 3x8’ adjustable stainless steel

Moveable Furnishings and Equipment and Equipment

Tables: 30”x60” stainless steel w/ epoxy top

Storage Cabinet: stainless steel for gloves, masks and gowning supplies

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Lighting

General: recessed, sealed

Dimming: yes

Other: in use light

Telecommunication

Data: yes

3.11 Whole Animal Imaging 2

Electrical

Normal Power (volts): 120v

Outlets: as required by equipment

Emergency Power: yes

HVAC

Room Pressure: positive

Temperature: 68-79f

Total Air Changes/hr.: 10 ACHR w/MERV 16 filters

Relative Humidity: 30-70%

Exhaust Air (percent): 100% outside air

Plumbing

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
IVIS Spectrum or sim.	1	1									

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 3.12 Behavior Study Work Area

Space Use Category:	**Office Facilities**	**Area NASF:**	**180**
Room Use Code:	**310**	**Quantity:**	**1**
		# of Stations:	**4**
		Total Area, NASF:	**180**

Function: Room providing workstations for faculty and students actively engaged and monitoring behavioral research activities being conducted in adjacent Behavior Study Rooms.

Relationships: Locate within the vivarium, adjacent to and providing access to the Behavior Study Rooms.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	concrete masonry walls	Wall Finish:	epoxy painted
Ceiling:	steel plate	Min. Ceiling Ht:	9’-0”
Windows:	exterior desired, not operable		
Window Treatment:	roller shades		
Access:	from vivarium corridor	Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Coat Hooks:	yes
White Board:	4 LF

Moveable Furnishings and Equipment and Equipment

Desks:	4 - 30”x 60” with lockable overhead storage
Chairs:	4 – rolling
File Cabinets:	4 – mobile pedestal
Trash Can:	4 small
Other:	shared networked printer

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 45-55

Telecommunication

Data:	yes
Phone:	yes

3.12 Behavior Study Work Area 2

Electrical

Normal Power (volts): 120v

HVAC

Room Pressure: positive

Temperature: 68-79f

Total Air Changes/hr.: 10 ACHR w/MERV 16 filters

Relative Humidity: 30-70%

Exhaust Air (percent): 100% outside air

Plumbing

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 3.13 Cagewash Room

Space Use Category:	**Animal Facility Service**	**Area NASF:**	**600**
Room Use Code:	**575**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**600**

Function: A facility for washing of animal holding racks and cages.

Relationships: Locate within the vivarium, adjacent to the Cage Prep Room and Cage and Rack Storage.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	MR gypsum wall board	Wall Finish:	epoxy painted
Ceiling:	ACT – cleanroom type	Min. Ceiling Ht:	9’-0”
Access:	from vivarium corridor	Min. Opening:	6’-0” x 7’-0“
Access:	from service corridor	Min. Opening:	6’-0”x7’-6”
Access:	from Cage Prep Room	Min. Door Size:	3’-6” x 7’-0“

Built-In Equipment and Casework

Equipment:	roll-in cagewasher		
	medium-sized chamber autoclave		
	soiled bedding disposal		
Base Cabinets:	stainless steel		
Countertops:	9LF stainless steel	Counter Height:	3’-0”
Other:	spray down station with hose		

Moveable Furnishings and Equipment and Equipment

Equipment: soiled bedding disposal

Acoustics

Room Criteria:	NC 50-55	Sound Transmission:	STC 50-60

Lighting

General: recessed, sealed

70 FC

Telecommunication

Data: yes, if required by equipment

Phone: yes

3.13 Cagewash Room 2

Electrical

Normal Power (volts): 120v
Outlets: as required by equipment
Outlets: waterproof
Emergency Power: yes

HVAC

Room Pressure: negative
Total Air Changes/hr.: 10 ACHR w/MERV 16 filters
Exhaust Air (percent): 100% outside air
Other: steam capture hood exhaust above door of cage washer and autoclave

Fire Protection

System: recessed, sealed
Detection: high temp heads

Plumbing

Sinks: yes – scullery type
Drains: floor drain
Cold Water: yes
Hot Water: yes
Treated Water: RO
Steam: yes
Hose bibb: yes
Waste/Vent: lab waste
Eye Wash: yes
Other: emergency shower
pre-rinse sprayer at sink

Water Locations
Bench: yes
Wall: yes

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load
			L	W	H	volts	amps			
Autoclave	1	1						HW, CW	YES	TBD
rackwasher	1	1						HW, CW, RO	YES	TBD
Bedding Dump station	1	1								

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.14 Cage Prep Room

Space Use Category:	**Animal Facility Service**	**Area NASF:**	**400**
Room Use Code:	**575**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**400**

Function: A facility for preparing clean cages and racks with new bedding and food.

Relationships: Locate within the vivarium, adjacent to the Cagewash Room, and Cage and Rack Storage.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	painted
Ceiling:	ACT – cleanroom type	Min. Ceiling Ht:	9’-0”
Access:	from vivarium corridor	Min. Door Size:	4’-6” x 7’-6“
Access:	from Cage Prep Room	Min. Opening:	3’-6” x 7’-0“
Other:	brushed aluminum crash rail @ 36” AFF		

Built-In Equipment and Casework

Base Cabinets:	stainless steel		
Countertops:	3LF stainless steel	Counter Height:	3’-0”
Other Bench Casework:	sink base		

Moveable Furnishings and Equipment and Equipment

Equipment: bedding dispenser

Acoustics

Room Criteria:	NC 45-55	Sound Transmission:	STC 50-60

Lighting

General: recessed, sealed
70FC

3.14 Cage Prep Room 2

Electrical

Normal Power (volts): 120v
Outlets: as required by equipment
Outlets: waterproof
Emergency Power: yes

HVAC

Room Pressure: negative
Total Air Changes/hr.: 10 ACHR w/MERV 16 filters
Exhaust Air (percent): 100% outside air
Other: steam capture hood exhaust above door of cage washer and autoclave

Fire Protection

System: recessed, sealed
Detection: high temp heads

Plumbing

Sinks: 16x22 stainless steel
Cold Water: yes
Hot Water: yes
Treated Water: RO
Water Locations
Bench: yes

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Bedding Dispenser	1	1				120v					

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.15 Feed and Bedding Storage

Space Use Category:	**Animal Facility Service**	**Area NASF:**	**200**
Room Use Code:	**575**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**200**

Function: A room for the safe storage of bedding and food for research animals.

Relationships: Locate within the vivarium, adjacent to the Cage Prep Room.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	painted
Ceiling:	ACT – cleanroom type	Min. Ceiling Ht:	9’-0”
Access:	from service core	Min. Opening:	4’-6” x 7’-6“
Other:	brushed aluminum crash rail @ 36” AFF		

Built-In Equipment and Casework

Base Cabinets:	stainless steel sink base		
Countertops:	3LF stainless steel	Counter Height:	3’-0”

Moveable Furnishings and Equipment and Equipment

Equipment:	bedding dispenser
Shelving:	16LF of deep stainless steel wire
Other:	21CF refrigerator

Acoustics

Room Criteria:	NC 45-55	Sound Transmission:	STC 40-45

Lighting

General:	recessed, sealed
	70FC

3.15 Feed and Bedding Storage 2

Electrical

Normal Power (volts): 120v

HVAC

Room Pressure: neutral

Plumbing

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
Refrigerator	1	1				120v					21CF

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.16 Cage and Rack Storage

Space Use Category:	**Animal Facility Service**	**Area NASF:**	**200**
Room Use Code:	**575**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**200**

Function: A room to store a minimum of four clean double-sided racks.

Relationships: Locate within the vivarium, adjacent to the Cagewash Room and the Cage Prep Room.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	painted
Ceiling:	ACT – cleanroom type	Min. Ceiling Ht:	9’-0”
Access:	from vivarium corridor	Min. Opening:	4’-6” x 7’-6“
Other:	brushed aluminum crash rail @ 36” AFF		

Built-In Equipment and Casework

Moveable Furnishings and Equipment and Equipment

Shelving: 12LF of deep stainless steel wire

Acoustics

Room Criteria:	NC 45-55	Sound Transmission:	STC 40-45

Lighting

General: recessed, sealed
70FC

3.16 Cage and Rack Storage 2

Electrical

Normal Power (volts): 120v

HVAC

Room Pressure: neutral

Plumbing

Major Equipment

Item	Status	Qty

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.17 Vestibule, Gowning and Toilet

Space Use Category:	**Animal Facility Service**	**Area NASF:**	**200**
Room Use Code:	**575**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**200**

Function: The main entry into the vivarium, allowing for the transition into a secure and environmentally controlled facility. The suite is divided into two or three distinct spaces, including entry and gowning, restroom, and shower room.

Relationships: Links the ILSB corridor to the main vivarium corridor.

Architectural

Flooring:	resinous	Base:	resinous ,flashed
Walls:	IR gypsum wall board	Wall Finish:	painted
Ceiling:	ACT – cleanroom type	Min. Ceiling Ht:	9’-0”
Access:	from vivarium corridor /outside vivarium	Min. Door Size:	3’-6” x 7’-0“
Access:	from toilet	Min. Door Size:	3’-0” x 7’-0“
Accessibility:	vestibule and toilet/shower to be accessible		
Security:	card readers at both the door to the vivarium and the door to the public building corridor.		

Built-In Equipment and Casework

Coat Hooks:	yes, in shower and gowning area
White Board:	4LF
Clock:	yes
Other:	4 LF folding stainless steel bench in gowning area
Other Bench Casework:	16 plastic laminate lockers

Moveable Furnishings and Equipment and Equipment

Equipment:	soiled/used personal protective equipment (PPE) container
Shelving:	stainless steel wire for PPE storage

Acoustics

Room Criteria:	NC 45-55	Sound Transmission:	STC 40-45

Lighting

General:	recessed, sealed
	70FC
Other:	shower lighting

Telecommunication

Phone:	yes

3.17 Vestibule, Gowning and Toilet 2

Electrical

Normal Power (volts): 120v

Outlets: GFCI in toilet and shower area

HVAC

Room Pressure: positive

Plumbing

Sinks: yes, wall mounted

Floor Drain: yes

Cold Water: yes Hot Water: yes

Waste/Vent: Sanitary

Other: ADA Shower

Water Locations

- Sink: yes
- Shower: yes
- Toilet: yes, CW only

Major Equipment

Item	Status	Qty

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 3.18 Animal Husbandry Office

Space Use Category:	**Office**	**Area NASF:**	**120**
Room Use Code:	**310**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**120**

Function: An office for the animal husbandry manager.

Relationships: Locate within the vivarium, adjacent to the Vestibule, Gowning and Toilet, and the Animal Husbandry Workarea.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	to corridor		
Access:	from vivarium corridor		
Min. Door Size:	3’-0” x 7’-0“		
Other:	vision panel within or adjacent to entry door		

Built-In Equipment and Casework

Coat Hooks:	yes
White Board:	4LF, outside office
Tack Board	4LF, outside office

Moveable Furnishings and Equipment and Equipment

Desks:	1 – 60” L-shaped desk with drawers and files
Tables:	1 – 48” diameter
Chairs:	3– rolling chairs – upholstered back and seat
File Cabinets:	2 – 48” wide, tall
Trash Can:	1 small

Acoustics

Room Criteria:	NC 40	Sound Transmission:	STC 45-55

Lighting

General:	fluorescent, indirect lighting

Telecommunications

Data:	yes
Phone:	yes

3.18 Animal Husbandry Office 2

Electrical

Normal Power (volts): 120V

HVAC

Plumbing

Major Equipment

Item	Status	Qty
Computer	3	1
printer	3	1

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 3.19 Animal Husbandry Work Area

Space Use Category:	**Office**	**Area NASF:**	**90**
Room Use Code:	**310**	**Quantity:**	**1**
		# of Stations:	**2**
		Total Area, NASF:	**90**

Function: Provides workstations for additional animal husbandry staff.

Relationships: Locate within the vivarium, adjacent to the Animal Husbandry Office.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	to corridor		
Access:	from vivarium corridor		
Min. Door Size:	3’-0” x 7’-0“		

Built-In Equipment and Casework

Coat Hooks:	yes
White Board:	4LF

Moveable Furnishings and Equipment and Equipment

Desks:	2 - 30”x 60” with lockable overhead storage
Chairs:	2 – rolling
File Cabinets:	2 – mobile pedestal
Trash Can:	2 small

Acoustics

Room Criteria:	NC 40	Sound Transmission:	STC 45-55

Lighting

General:	fluorescent, indirect lighting

Telecommunications

Data:	yes
Phone:	yes

3.19 Animal Husbandry Work Area 2

Electrical

Normal Power (volts): 120V

HVAC

Plumbing

Major Equipment

Item	Status	Qty
Computer	3	2
printer	3	1

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

Additional Core Research Facilities Room Data Sheets

Bioprocess and Cell Science Facility

4.01 Intake, Quarantine, Test, Growth Room

4.02 Cell Culture Room

4.03 Fermentation Room

4.04 Harvesting, Separation & Purification Room

4.05 Sorting Room

4.06 Imaging Room

4.07 Storage Room

4.08 Technical Support Office

Center for Interdisciplinary Research and Consulting (CIRC)

4.09 CIRC Office

1 4.01 Intake, Quarantine, Test, Growth Room

Space Use Category:	**Research / Non-Class Laboratory**	**Area NASF:**	**175**
Room Use Code:	**250**	**Quantity:**	**2**
		# of Stations:	**2**
		Total Area, NASF:	**350**

Function: A room allowing for the intake, testing, and quarantine of cells admitted to the facility. One room dedicated to bacteria-based research and another to animal and plant based research.

Relationships: Locate within the BioProcess and Cell Science Facility, adjacent to Storage, Cell Culture, Fermentation rooms. Locate adjacent to the entry of the facility.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Access:	provide window in door		
Min. Door Size:	3’-6” x 7’-0“		
Other:	provide equipment zone for refrigerator		

Built-In Equipment and Casework

Coat Hooks:	yes		
White Board:	4LF		
Other:	cylinder restraints		
	soap & paper towel dispenser		
Base Cabinets:	wood combo door / drawer		
Countertops:	5LF epoxy	Counter Height:	3’-0”
Drawer Units:	4 drawer		

Moveable Furnishings and Equipment and Equipment

Chairs:	2 – bench height
Trash Can:	Bio waste / redbag
Other:	supply cart

Acoustics

Room Criteria:	NC 45	Sound Transmission:	STC 45

Lighting

General:	fluorescent, indirect lighting

4.01 Intake, Quarantine, Test, Growth Room 2

Telecommunications

Other: alarm @ Incubators

Electrical

Normal Power (volts): 120V

Outlets: as required by equipment

Emergency Power: yes (incubator)

HVAC

Room Pressure: positive

Plumbing

Sinks: 16x22 epoxy

Cold Water: yes Hot Water: yes

Treated Water: RO

Waste/Vent: lab waste

Eye Wash: yes

Water Locations

Bench: yes

Piped Gases

vacuum to BSC

carbon dioxide from tank to incubators

Piped Gas Locations

Wall: @ 84” AFF

Hood: @ 84” AFF

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
BSC	1	2	6'			120		V			
Incubator	1	4				120		CO2			Stacked, emerg power
refrigerator	1	1									emergency power

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 4.02 Cell Culture Room

Space Use Category:	**Research / Non-Class Laboratory**	**Area NASF:**	**350**
Room Use Code:	**250**	**Quantity:**	**1**
		# of Stations:	**4**
		Total Area, NASF:	**350**

Function: Specially equipped room for the growth of animal and plant cell cultures.

Relationships: Locate within the BioProcess and Cell Science Facility, adjacent to the Storage Room, the Fermentation Room and the Intake, Quarantine, Test and Growth Room.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Access:	provide window in door		
Min. Door Size:	3’-6” x 7’-0“		
Windows:	clerestory to exterior encouraged to provide natural light		

Built-In Equipment and Casework

Other:	cylinder restraints and manifold soap & paper towel dispenser pegboard above sink for drying glassware		
Base Cabinets:	wood combo door / drawer		
Countertops:	14LF epoxy	Counter Height:	3’-0”
Drawer Units:	4 drawer		
Storage Cabinet:	(4)		
Shelving:	3x8LF plastic laminate		

Moveable Furnishings and Equipment and Equipment

Table:	30”x60” with epoxy top
Chairs:	4 – bench height
Trash Can:	bio waste / redbag

Acoustics

Room Criteria:	NC 45	Sound Transmission:	STC 45

4.02 Cell Culture Room 2

Telecommunications

Data: yes

Other: alarm @ Incubators

Electrical

Normal Power (volts): 120V

Outlets: as required by equipment

Other: Duplex 120v at benches

Emergency Power: yes (incubator)

HVAC

Room Pressure: positive

Plumbing

Sinks: 16x22 epoxy

Cold Water: yes

Hot Water: yes

Treated Water: RO

Waste/Vent: lab waste

Eye Wash: yes

Other: Emergency shower

Water Locations

Bench: yes

Piped Gases

vacuum to BSC at BSC @ 84” AFF and bench @ 42” AFF

compressed air at BSC @ 84” AFF and bench @ 42” AFF

nitrogen from local tank at bench@ 42” AFF

carbon dioxide from tank to incubators and BSC

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
BSC	1	4	4'			120		CO2, V			
Incubator	1	8				120		CO2			Stacked, emerg power
extractor arm	1	1							yes		

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 4.03 Fermentation Room

Space Use Category:	**Research / Non-Class Laboratory**	**Area NASF:**	**450**
Room Use Code:	**250**	**Quantity:**	**1**
		# of Stations:	**3**
		Total Area, NASF:	**450**

Function: A room dedicated to the creation of mold, yeast and bacteria cells in large batches.

Relationships: Locate within the BioProcess and Cell Science Facility, adjacent to Storage, Harvesting and Imaging rooms.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Access:	provide window in door		
Min. Door Size:	3’-6” x 7’-0“		
Windows:	clerestory to exterior encouraged to provide natural light		
Other:	Provide 20LF of clear equipment zone with overhead services, if necessary		

Built-In Equipment and Casework

White Board:	4LF		
Other:	cylinder restraints		
	overhead service carrier		
	soap & paper towel dispenser		
Base Cabinets:	wood combo door / drawer		
Countertops:	16LF epoxy	Counter Height:	3’-0”
Drawer Units:	4 drawer		
Shelving:			

Moveable Furnishings and Equipment and Equipment

Chairs:	3 – bench height
Storage Cabinet:	tall
Trash Can:	Bio waste / redbag

Acoustics

Room Criteria:	NC 45	Sound Transmission:	STC 45

Telecommunications

Data:	yes
Other:	alarm @ Incubators

4.03 Fermentation Room 2

Electrical

Normal Power (volts): 120V, 208V

Outlets: as required by equipment
from overhead service carrier

Emergency Power: yes (incubator)

HVAC

Room Pressure: positive

Plumbing

Sinks: (2) 16x22 epoxy

Cold Water: yes

Hot Water: yes

Treated Water: RO

Waste/Vent: lab waste

Eye Wash: yes

Other: Emergency shower

Water Locations

Bench: yes

Piped Gases

vacuum to BSC at BSC @ 84” AFF and bench @ 42” AFF

compressed air at BSC @ 84” AFF and bench @ 42” AFF

natural gas at bench @ 42” AFF

nitrogen from local tank at bench@ 42” AFF

carbon dioxide from tank to incubators

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
BSC	1	2	6'			120		CA,N2,V			Class II/A2
Shaking Incubator	1	4				120		CO2			
Fume Hood	1	1	4'			120			yes		with flammable stor.

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 4.04 Harvesting, Separation & Purification Room

Space Use Category:	**Research / Non-Class Laboratory**	**Area NASF:**	**200**
Room Use Code:	**250**	**Quantity:**	**2**
		# of Stations:	
		Total Area, NASF:	**400**

Function: A room to harvest and purify created cell samples. One room dedicated to bacteria-based research and another to animal and plant based research.

Relationships: Locate within the BioProcess and Cell Science Facility, adjacent to both the Cell Culture and the Fermentation rooms.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Access:	provide window in door		
Min. Door Size:	3’-6” x 7’-0“		
Other:	Provide 12LF of clear equipment zone with power/data raceway		

Built-In Equipment and Casework

Base Cabinets:	wood combo door / drawer		
Countertops:	(min.) 12LF stainless steel	Counter Height:	3’-0”
Drawer Units:	4 drawer		
Shelving:	12 LF of adjustable shelving		

Moveable Furnishings and Equipment and Equipment

Chairs:	2 – bench height
Table:	30”x60” adjustable height with epoxy top
Equipment:	High Performance Liquid Chromatography (HPLC) unit
	Biosafety cabinet (BSC)
	Refrigerator or freezer

Acoustics

Room Criteria:	NC 45	Sound Transmission:	STC 45

Telecommunications

Data:	yes

4.04 Harvesting, Separation & Purification Room 2

Electrical

Normal Power (volts): 120V

Outlets: as required by equipment

24” oc on raceway

Emergency Power: yes

HVAC

Room Pressure: positive

Plumbing

Sinks: 16x22 stainless steel

Cold Water: yes Hot Water: yes

Treated Water: RO

Waste/Vent: lab waste

Eye Wash: yes

Water Locations

Bench: yes, at sink

Piped Gases

vacuum at BSC @ 84” AFF and bench @ 42” AFF

nitrogen from local tank to BSC

carbon dioxide from tank to BSC

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
BSC	1	1	6'			120		CO2, V, N2			Class II/A2
Refrigerator	3	1	4'			120					
HPLC	3	1									

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 4.05 Sorting Room

Space Use Category:	**Research / Non-Class Laboratory**	**Area NASF:**	**120**
Room Use Code:	**250**	**Quantity:**	**2**
		# of Stations:	
		Total Area, NASF:	**240**

Function: Specially equipped room to sort cell samples. One room dedicated to bacteria-based research and another to animal and plant based research.

Relationships: Locate within the BioProcess and Cell Science Facility, adjacent to both the Imaging Room and the Harvest, Separation and Purification Room.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Access:	provide window in door		
Min. Door Size:	3’-6” x 7’-0“		

Built-In Equipment and Casework

Moveable Furnishings and Equipment and Equipment

Chairs:	1 – rolling
Table:	30”x60” with epoxy top
Equipment:	Cell Sorter

Acoustics

Room Criteria:	NC 45	Sound Transmission:	STC 45

Telecommunications

Data: yes

4.05 Sorting Room 2

Electrical

Normal Power (volts): 120V

Outlets: as required by equipment

HVAC

Room Pressure: positive

Plumbing

Piped Gases

compressed air at Cell Sorter @ 42” AFF

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust
			L	W	H	volts	amps		
Cell Sorter	3	1						CA	

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 4.06 Imaging Room

Space Use Category:	**Research / Non-Class Laboratory**	**Area NASF:**	**100**
Room Use Code:	**250**	**Quantity:**	**2**
		# of Stations:	
		Total Area, NASF:	**200**

Function: Specially equipped room for the viewing and documenting of cell samples. One room dedicated to bacteria-based research and another to animal and plant based research.

Relationships: Locate within the BioProcess and Cell Science Facility, adjacent to both the Sorting Room and the Harvest, Separation and Purification Room.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Access:	provide window in door		
Min. Door Size:	3’-6” x 7’-0“		

Built-In Equipment and Casework

Countertops:	10-12LF epoxy	Counter Height:	2’-6”
Shelving:	10-12LF adj. plastic laminate		
Equipment:	in-use indicator above door		

Moveable Furnishings and Equipment and Equipment

Chairs:	1 – rolling
Table:	30”x72” optical air table
Equipment:	imaging equipment

Acoustics

Room Criteria:	NC 40	Sound Transmission:	STC 45

Telecommunications

Data: yes

Lighting

Controls: dimmable

4.06 Imaging Room 2

Electrical

Normal Power (volts): 120V along raceway at bench and table

Outlets: as required by equipment

HVAC

Room Pressure: positive

Plumbing

Piped Gases

compressed air at optical air table

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust
			L	W	H	volts	amps		
Air Table	1	1	6'					CA	

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 4.07 Storage Room

Space Use Category:	**Research / Non-Class Laboratory Service**	**Area NASF:**	**200**
Room Use Code:	**255**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**200**

Function: A storage room for supplies and materials supporting research protocols in the BioProcess and Cell Science Facility.

Relationships: Locate within the BioProcess and Cell Science Facility.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Access:	solid door		
Min. Door Size:	3’-6” x 7’-0“		

Built-In Equipment and Casework

Equipment: cylinder restraints

Moveable Furnishings and Equipment and Equipment

Equipment: freezers and refrigerators

Acoustics

Room Criteria:	NC 45-50	Sound Transmission:	STC 40-45

Telecommunications

Data: yes, in raceway at 42” AFF

Other: Alarm at freezers

4.07 Storage Room 2

Electrical

Normal Power (volts): 120V / 208v-220v

Emergency Power: 208V – 220V

Other: (2) 208/220 outlets per side

Outlets: 24” OC in raceway

HVAC

Room Pressure: neutral

Sensors: O2

Plumbing

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust
			L	W	H	volts	amps		
Freezers	2	6				208/220			

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 4.08 Technical Support Office

Space Use Category:	**Office**	**Area NASF:**	**120**
Room Use Code:	**310**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**120**

Function: An office for staff supporting the BioProcess and Cell Science Facility.

Relationships: Locate within the BioProcess and Cell Science Facility, adjacent to the Intake rooms.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	to facility required to exterior encouraged		
Access:			
Min. Door Size:	3’-0” x 7’-0“		
Other:	vision panel within or adjacent to entry door		

Built-In Equipment and Casework

Coat Hooks:	yes
White Board:	4LF
Tack Board	4LF, outside office
Clock:	yes

Moveable Furnishings and Equipment and Equipment

Desks:	1 – 60” L-shaped desk with drawers and files
Tables:	1 – 24”x 60”
Chairs:	1– rolling chairs – upholstered back and seat
	2- with glides
File Cabinets:	1 – lateral, 1- pedestal
Bookshelf:	yes
Trash Can:	1 small

Acoustics

Room Criteria:	NC 40	Sound Transmission:	STC 45

Lighting

General:	fluorescent – indirect

4.08 Technical Support Office 2

Telecommunications

Data: yes

Phone: yes

Electrical

Normal Power (volts): 120V

HVAC

Plumbing

Major Equipment

Item	Status	Qty
Computer	3	1
printer	3	1

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

1 4.09 CIRC Office

Space Use Category:	**Office**	**Area NASF:**	**120**
Room Use Code:	**310**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**120**

Function: An office for faculty and staff associated with the Center for Interdisciplinary Research and Consulting (CIRC).

Relationships: Locate adjacent or within proximity to one conference room and convenient access to central building circulation.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	yes		
Window Treatment:	roller shades		
Access:	publicly accessible corridor		
Min. Door Size:	3’-0” x 7’-0“		
Other:	vision panel within or adjacent to entry door		

Built-In Equipment and Casework

Coat Hooks:	yes
White Board:	4LF
Clock:	yes
Flat Screen Monitor:	yes, 50” dia. Image minimum

Moveable Furnishings and Equipment and Equipment

Desks:	1 – 60” L-shaped desk with drawers and files
Tables:	1 – 48” diameter
Chairs:	4– rolling chairs – upholstered back and seat
File Cabinets:	1 – lateral, 1- pedestal
Bookshelf:	yes
Trash Can:	1 small

Acoustics

Room Criteria:	NC 40	Sound Transmission:	STC 45-50

Lighting

General:	fluorescent – indirect
Controls:	Dimmable

4.09 CIRC Office 2

Telecommunications

Data: yes

Phone: yes

Electrical

Normal Power (volts): 120V

HVAC

Plumbing

Major Equipment

Item	Status	Qty
Computer	3	1
printer	3	1
monitor	1	1

Status Key

1 – Furnished and Installed by Contractor

2 – Furnished by Owner and Installed by Contractor

3 – Furnished and Installed by Owner

Building Services and Support Room Data Sheets

5.01 Building Administrative Office

5.02 Building Administrative Workroom

5.03 Receiving Office

5.04 Building Storage

5.05 Chemical Storage

5.06 Hazardous Waste Storage

5.07 Vending

5.08 Department of Information Technology Shop

1 5.01 Building Administrative Office

Space Use Category:	**Office**	**Area NASF:**	**120**
Room Use Code:	**310**	**Quantity:**	**2**
		# of Stations:	
		Total Area, NASF:	**240**

Function: An office for staff responsible for the management of the building.

Relationships: Locate adjacent or within proximity to the principal building circulation.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	yes		
Window Treatment:	roller shades		
Access:	publicly accessible corridor		
Min. Door Size:	3’-0” x 7’-0“		
Other:	vision panel within or adjacent to entry door		

Built-In Equipment and Casework

Coat Hooks:	yes
Tack Board:	4LF
Flat Screen Monitor:	yes, 50” dia. Image minimum

Moveable Furnishings and Equipment and Equipment

Desks:	1 – 72” L-shaped desk
Chairs:	1 – rolling chairs – upholstered back and seat
File Cabinets:	1 – lateral, 1- pedestal
Bookshelf:	yes
Trash Can:	1 small

Acoustics

Room Criteria:	NC 40	Sound Transmission:	STC 45

Lighting

General:	fluorescent – indirect

Telecommunications

Data:	yes
Phone:	yes
Wi-Fi:	yes

5.01 Building Administrative Office 2

Electrical

Normal Power (volts): 120V

HVAC

Plumbing

Major Equipment

Item	Status	Qty
Computer	3	1

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 5.02 Building Administrative Workroom

Space Use Category:	**Office**	**Area NASF:**	**100**
Room Use Code:	**310**	**Quantity:**	**1**
		# of Stations:	**2**
		Total Area, NASF:	**100**

Function: Space containing workstations to support the Building Administrative Offices.

Relationships: Locate adjacent to the Building Administrative Offices.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	yes		
Window Treatment:	roller shades		
Access:	publicly accessible corridor		
Min. Door Size:	3’-0” x 7’-0“		
Other:	vision panel within or adjacent to entry door		

Built-In Equipment and Casework

Coat Hooks:	yes
Tack Board:	yes

Moveable Furnishings and Equipment and Equipment

Desks:	1 – 60”
Chairs:	2 – rolling chairs – upholstered back and seat
File Cabinets:	1 – lateral, 2- pedestal
Trash Can:	2 small

Acoustics

Room Criteria:	NC 40	Sound Transmission:	STC 45

Lighting

General:	fluorescent – indirect

Telecommunications

Data:	yes
Phone:	yes
Wi-Fi:	yes

5.02 Building Administrative Workroom 2

Electrical

Normal Power (volts): 120V

HVAC

Plumbing

Major Equipment

Item	Status	Qty
Computer	3	1
printer	3	1

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 5.03 Receiving Office

Space Use Category:	**Office**	**Area NASF:**	**200**
Room Use Code:	**310**	**Quantity:**	**1**
		# of Stations:	**1**
		Total Area, NASF:	**200**

Function: An office for the reception and distribution of building and research supplies.

Relationships: Locate adjacent to Loading Area and service elevator. Adjacent to the Chemical Storage Room.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Windows:	to loading area		
Access:	from loading area		
Min. Door Size:	3’-0” x 7’-0“		
Other:	vision panel within or adjacent to entry door		

Built-In Equipment and Casework

Coat Hooks:	yes
White Board:	yes
Tack Board:	yes
Other:	gas cylinder rack

Moveable Furnishings and Equipment and Equipment

Desks:	1 – 72” L-shaped
Table:	30” x 72” bench height
Chairs:	1 – rolling chairs – upholstered back and seat
Storage Cabinet:	yes
File Cabinets:	1 – lateral
Trash Can:	1 tall
Equipment:	refrigerator

Acoustics

Room Criteria:	NC 40	Sound Transmission:	STC 45

Telecommunications

Data:	yes
Phone:	yes

5.03 Receiving Office 2

Security

Security Features: keyed entry doors, UMBC card key access control system, and alarm

Electrical

Normal Power (volts): 120V

HVAC

Plumbing

Major Equipment

Item	Status	Qty		Size		Electrical		Notes
			L	W	H	volts	amps	
Computer	3	1						
printer	3	1						
refrigerator	1	1						21 cu.ft.

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 5.04 Building Storage

Space Use Category:	**Central Storage**	**Area NASF:**	**600**
Room Use Code:	**730**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**600**

Function: A room for the storage of equipment, moveable lab benches and furniture.

Relationships: Locate near loading area and service elevator.

Architectural

Flooring:	concrete, sealed	Base:	rubber
Walls:	concrete masonry units	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	exposed, 10’-0” min.
Access:	service elevator core / loading area	Min. Door Opening:	6’-0” x 8’-0“

Built-In Equipment and Casework

Moveable Furnishings and Equipment and Equipment

Shelving: heavy industrial

Equipment: pallet dolly

Acoustics

Room Criteria: NC 40 Sound Transmission: STC 40

Telecommunications

Phone: yes

Lighting

General: direct fluorescent industrial fixtures

Lighting Level: 30-50 fc

5.04 Building Storage 2

Electrical

Normal Power (volts): 120V

HVAC

Plumbing

Major Equipment

Item	Status	Qty	Size			Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				
pallet dolly	3	1									

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 5.05 Chemical Storage

Space Use Category:	**Hazardous Materials Storage**	**Area NASF:**	**100**
Room Use Code:	**760**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**100**

Function: Specialized storage room for the temporary storage of chemicals required by research protocols conducted within the building's research lab modules and research procedure rooms.

Relationships: Locate adjacent to Loading Area and service elevator.

Architectural

Flooring:	epoxy	Base:	epoxy integral coved base
Walls:	concrete masonry units	Wall Finish:	painted
Ceiling:	exposed oil gyp wallboard	Min. Ceiling Ht:	9’-0” min.
Access:	from loading area		
Min. Door Size:	3’-0” x 8’-0“		
Other:	explosion proof blow-out panels as required by code		

Built-In Equipment and Casework

Shelving: industrial metal

Moveable Furnishings and Equipment and Equipment

Acoustics

Room Criteria:	NC 40	Sound Transmission:	STC 40

Telecommunications

Data: yes

Cameras: security cameras

Security

Security Features: keyed locks, remote alarm monitoring

5.05 Chemical Storage 2

Lighting

General: explosion proof fluorescent fixtures Lighting Level: 30-50 fc

Electrical

Normal Power (volts): 120V

HVAC

Room Pressure: negative to corridor

Plumbing

Sinks: yes Drains: floor drains

Cold Water: yes Hot Water: yes

Other: Emergency eyewash and shower

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 5.06 Hazardous Waste Storage

Space Use Category:	**Hazardous Waste Storage**	**Area NASF:**	**100**
Room Use Code:	**770**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**100**

Function: Specialized storage room for the temporary storage of chemical waste material created as a by-product of research activities conducted within the building.

Relationships: Locate adjacent to Loading Area and service elevator.

Architectural

Flooring:	concrete, sealed	Base:	rubber
Walls:	concrete masonry units	Wall Finish:	painted
Ceiling:	exposed	Min. Ceiling Ht:	9’-0” min.
Access:	from loading area		
Min. Door Size:	3’-0” x 8’-0“		
Other:	explosion proof blow-out panels as required by code		

Built-In Equipment and Casework

Shelving: industrial metal

Moveable Furnishings and Equipment and Equipment

Acoustics

Room Criteria:	NC 40	Sound Transmission:	STC 40

Telecommunications

Data: yes

Cameras: security cameras

Security

Security Features: keyed locks, remote alarm monitoring

5.06 Hazardous Waste Storage 2

Lighting

General: explosion proof fluorescent fixtures Lighting Level: 30-50 fc

Electrical

Normal Power (volts): 120V

HVAC

Room Pressure: negative to corridor

Plumbing

Major Equipment

Item	Status	Qty		Size		Electrical		Plumbing	Exhaust	Heat Load	Notes
			L	W	H	volts	amps				

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 5.07 Vending

Space Use Code:	**Merchandizing**	**Area NASF:**	**185**
Room Use Code:	**660**	**Quantity:**	**1**
		# of Stations:	
		Total Area, NASF:	**185**

Function: Walk-away vending machine space

Relationships: Not near building entry, but adjacent to classrooms, student spaces and ground floor rest rooms

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Access:	can be open to corridor		

Built-In Equipment and Casework

Moveable Furnishings and Equipment and Equipment

Equipment: vending machines

Telecommunications

5.07 Vending 2

Lighting

General: fluorescent, indirect lighting

Lighting Level: 30-50 fc

Occupancy Sensors: yes, for vending machines as well as lights

Electrical

Normal Power (volts): 120V

Other: outlets at equipment

HVAC

Plumbing

Major Equipment

Item	Status	Qty		Size		Electrical	
			L	W	H	volts	amps
vending machines	3	4					

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner

1 5.08 Division of Information Technology (DoIT) Shop

Space Use Category:	**Shops**	**Area NASF:**	**200**
Room Use Code:	**720**	**Quantity:**	**1**
		# of Stations:	**3**
		Total Area, NASF:	**200**

Function: Computer equipment repair shop.

Relationships: Near service core.

Architectural

Flooring:	VCT	Base:	rubber
Walls:	gypsum wall board	Wall Finish:	painted
Ceiling:	acoustic panel ceiling	Min. Ceiling Ht:	9’-0”
Min. Door Size:	3’-0” x 7’-0“	Access:	off corridor

Built-In Equipment and Casework

White Board:	yes	Tack Board:	yes
Coat Hooks:	yes	Clock:	yes

Moveable Furnishings and Equipment and Equipment

Desks:	1 – 60”
Tables:	2 – 24” x 72” bench height with data and power
Chairs:	1 – roller, 2 bench stools
Storage Cabinet:	yes
File Cabinets:	1 – lateral files
Trash Can:	1- small

Acoustics

Room Criteria:	NC 40	Sound Transmission:	STC 45-55

Telecommunications

Data:	yes
Phone:	yes
Wi-Fi:	yes

Security

Security Features: keyed entry doors, UMBC card key access control system, and alarm

5.08 Division of Information Technology (DoIT) Shop 2

Electrical

Normal Power (volts): 120V

Other: outlets at bench for power and data

HVAC

Room Pressure:

Plumbing

Major Equipment

Item	Status	Qty
computer	3	1
printer	3	1

Status Key
1 – Furnished and Installed by Contractor
2 – Furnished by Owner and Installed by Contractor
3 – Furnished and Installed by Owner