

SALT LAKE COMMUNITY COLLEGE SCIENCE & INDUSTRY BUILDING MASTER PLANNING



SCIENCE & INDUSTRY BUILDING MASTER PLANNING

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1. EXECUTIVE SUMMARY

1. EXECUTIVE SUMMARY

The purpose of this study is to conduct a strategic assessment of the Science and Industry (SI) Building at Salt Lake Community College's Taylorsville Redwood Campus with a focus on space planning and remodeling of targeted spaces within the building. The primary objective is to enhance the functionality and efficiency of the facility, ensuring it meets the current and future pedagogical needs of all resident academic departments, including the critical School of Science, Mathematics, and Engineering.

2. Infrastructure and Efficiency (Targeted Remediation): The study also addresses critical building infrastructure. A core component involves rectifying identified mechanical and electrical deficiencies in specific systems or areas to enhance building performance, support sensitive lab operations, reduce maintenance costs, and improve overall safety and energy efficiency.

KEY DRIVERS AND OPPORTUNITIES

A significant catalyst for this study is the upcoming availability of substantial floor area vacated by Union Pacific as well as the need for additional lab space for anatomy and other high demand courses. In particular the courses that support the Health Sciences. This presents a unique opportunity to reclaim and re imagine valuable space for direct academic and student use, allowing for crucial facility enhancements without requiring a full-scale building renovation or reliance solely on new construction.

SCOPE OF PROPOSED IMPROVEMENTS

The plan focuses on two critical areas: Programmatic Enhancement of Re-purposed Space and Operational Stability of Deficient Systems.

1. Academic & Student Experience Enhancement (Focused Remodeling): The work is centered on strategically modifying select areas of the building, primarily utilizing the newly vacated tenant space, to improve instruction and student life. Key planned enhancements include:

- **Modern Labs and Classrooms:** Designing new and reconfigured classrooms and laboratories equipped with better and more updated equipment to support high-demand STEM fields, especially within the newly vacated spaces.
- **Enhanced Engagement:** Improving the student interaction with the building by creating more engaging collaborative zones, informal study areas, and optimizing departmental adjacencies within the remodeled zones.
- **Improved Entry Experience:** Upgrading the building's main entry to be more welcoming, intuitive, and representative of the important functions housed within.

2. VISION

2. VISION

The remodeled and potentially expanded SI building will serve as the premier, dedicated Science, Technology, Engineering, and Mathematics (STEM) learning facility for the college. This project aims to resolve critical safety and capacity issues while fostering interdisciplinary collaboration, supporting program growth, and ensuring a modern, functional environment for both students and faculty.

CORE PILLARS OF THE VISION

1. Safety and Functional Excellence (Chemistry & Biology Focus)

The primary goal is to address immediate and critical safety failures across all laboratories.

- **Dedicated, Safe Laboratories:** Update existing spaces and create dedicated Chemistry and Anatomy labs that meet or exceed ACS and fire marshal safety standards, including a minimum of 50 sq. ft. per student.
- **Infrastructure Overhaul:** Eliminate hazards by fixing the electrical system, replacing non-functional utilities (air/vacuum lines), and installing essential safety infrastructure, such as safety showers, eyewash stations, and VOC venting in prep and stockrooms.
- **Specialized Environment:** Implement high-capacity HVAC specifically designed to pull out fumes from dissection (Anatomy) and chemical work, ensuring clean, safe air in all instructional spaces.

2. Enhanced Capacity and Program Growth

The renovation will transform current underutilized and scattered spaces into functional areas that allow programs to consolidate and grow.

- **Specialized Instructional Space:** Create dedicated labs for key growth areas, including Materials Science, Environmental Science, Nanotechnology/Microscopy, and a modern GIS/Computer Lab.
- **Dedicated Lecture Core:** Consolidate instructional continuity by establishing a core of 4-5 dedicated lecture rooms for Chemistry and a central suite of 4-5 lecture-only classrooms for Engineering/Math, all equipped for demonstration and technology.
- **Relocation and Consolidation:** Move the Math faculty offices out of the basement and consolidate all Math and Physics classes near their respective storage and support areas to improve faculty-student access and reduce travel time.

3. Interdisciplinary Collaboration and Student Success

The building will be designed to encourage cross-disciplinary interaction, research, and collaborative learning.

- **Maker Hub and Research:** Establish a visible, well-equipped Maker Space (with CNC, 3D printers, etc.) That acts as a hub for Engineering, Physics, and the community. Create multiple restricted-access research labs to move student and faculty investigation out of stockrooms.
- **Shared Instrumentation:** Create a common Instrumentation Space to house high-value equipment (e.g., Chemistry instruments, ICP) that can be shared across multiple departments (Chemistry, Geo, etc.).
- **Modern Common Space:** Design a variety of welcoming student common areas, including a large, consolidated club meeting space (supporting all 6 clubs), open office hour zones with whiteboards, and a potential third-floor gathering space with exterior elements (e.g., beehive/greenhouse).

4. Operational and Accessibility Modernization

The building structure and access points will be updated for security and inclusivity.

- **Optimized Chemical Transport:** Implement a system of internal hallways or adjoining doors between stockrooms, labs, and classrooms to ensure chemicals are never transported through public, carpeted corridors.
- **Flexible Classrooms:** Install whiteboards on all walls and technology (dual screens, hybrid/Zoom capabilities) in all lecture rooms. Eliminate fixed seating and install ceiling-mounted electrical outlets to improve safety and flexibility.
- **Accessibility and Flow:** Improve lock systems to replace physical keys, streamlining access for faculty outside of normal hours.

3. ARCHITECTURAL SYSTEMS

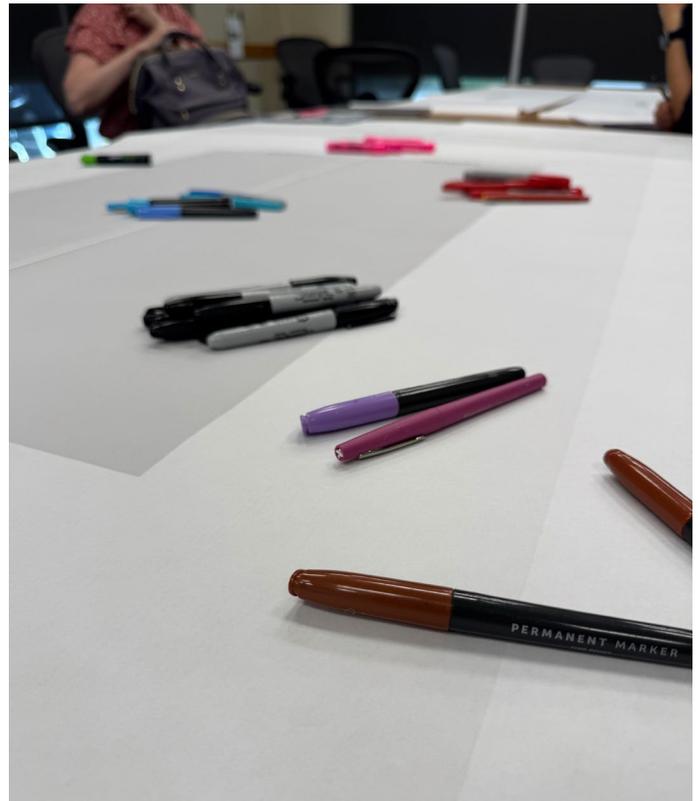
3. ARCHITECTURAL SYSTEMS

3.1 PROJECT APPROACH AND PRIORITIES

WORKSHOPS

The planning process started by a series of design workshops aimed at directly engaging faculty, staff and students from every core STEM department. These workshops were structured as focused listening sessions, where participants were encouraged to use collaborative brainstorming boards to capture their present-day challenges, future operational needs, and visionary requirements for specialized instructional, research and common spaces. This approach ensured that all departments and stakeholder groups—from Geo-science and Chemistry to Engineering and Computer Science—was heard, resulting in a rich and complete inventory of necessary upgrades. The discussions highlighted crucial needs across safety, functionality, and collaboration, including urgent calls for improved HVAC systems, dedicated student research space, flexible instructional seating, and the consolidation of related labs, classrooms, and faculty offices to optimize workflow and accessibility.

The output from these highly productive workshops directly informed the strategic planning and design phases. By analyzing the collective data—including the pervasive demand for functional Maker Spaces, expanded Computer Science infrastructure, and modernized biology/anatomy labs with proper ventilation—the project team was able to move beyond simple square-footage requests to address the quality and safety of the learning environment. The result is a design that incorporate essential features like increased electrical capacity, dedicated hybrid classrooms, and visible, welcoming common areas for student clubs and tutoring.



WORKSHOP 1

Area	Present Issues	Future Needs
Anatomy & Dissection Labs	Cabinets are hard to open/clean. No stainless steel tables. Ventilation is noisy and insufficient to pull out cadaver fumes. Poor waste handling (odor issues). Only one anatomy lab (SI 365).	Two anatomy labs (SI 365 and another), preferably near each other (adjoining or across the hall). Joining storage area for supplies, body donor buckets, and dissection specimens. Stainless steel tables. Improved HVAC specifically to extract cadaver fumes.
Lab Functionality & Safety	Tables are fixed. Cords hang, creating a tripping hazard. Poor electrical, leading to overloaded outlets. Whiteboard and screen can't be used simultaneously. Seating is too rigid. Labs are overcrowded (SI 365 may exceed fire marshal capacity). Unsafe food/drink storage outside labs.	Moving tables (continuous piece preferred). Outlets from the ceiling to eliminate floor cords. Better electrical system. More lab rooms to allow for set-up/take-down time between classes. Dedicated storage area for chemical waste.
Storage & Supplies	Current food/water storage is wobbly and inadequate. Not enough shelving for quizzes. Receiving of lab supplies is centralized to a cramped lab coordinator's office. Stockroom has rolling shelves, but general organization is difficult.	Better storage for food and water. More central location for receiving lab supplies. Organized shelving for lab supplies to simplify setup. Dedicated storage/prep room between labs (e.g., between SI 397 & SI 398).
Student & Research Space	Student research is currently crammed into the stockroom. SI 398 holds three different labs that should be separated.	More, separate space for student research, distinct from classes and prep rooms (small, lockable, restricted access). Dedicated classroom space for Biology with hybrid/Zoom capabilities, in addition to labs.
Building & Access	HVAC temperature is inconsistent. Middle entrance (west side/parking lot) is pull-open door (ADA issue). Auto-lock timing disrupts instruction. Physical key locks for inter-room access prevent tracking.	Consistent HVAC. Automatic door for the middle west-side entrance. Gathering space outside on the third floor (potential greenhouse/beehive). Better wayfinding signage. Max occupancy signs for rooms. Modernized door locks to track off-hours access.
Math Faculty Offices	Located in the basement (poor daylight, noise); scattered, especially adjuncts who lack dedicated space. Labor costs are high for "flip office" alternative.	Move all faculty offices to the 1st or 2nd floor (out of the basement). Dedicated office space for adjuncts (SI 84 proposed).
Classrooms & Scheduling	Math classes are scattered across different buildings (CT, AAB), making it "hard for teacher." Scheduling is complex (room availability prime time). SI-192 is too big and needs to be split. Developmental Math classes cap at 25.	Consolidate Math classes. Split oversized classrooms to smaller, functional rooms. Classrooms should scale up to 30-35 students for activities.
Classroom Modernization	Only one whiteboard and monitor on an easel in some rooms (e.g., SI-80). Projector screens block whiteboards. Ventilation is poor (rooms get hot).	Whiteboards everywhere (ideally whiteboard paint or large boards). Projector screens should not block whiteboards. Improved ventilation. World posters for decor. Hybrid classroom capabilities (recording, flexibility for sick students/remote work). No rolling desks.
Student & Support Spaces	Student club spaces (Rocketry) and symposiums (Technicum Auditorium) are used. Need space for office hours and small group work (quizzes) that is open, connected to offices, and has whiteboards. Broken room/shared space idea is messy.	Shared open space for office hours/quizzes with whiteboards, good lighting (daylighting), and less noise. Dedicated work room with a copy machine on every floor (SI-80 proposed as too big).
Budget & Logistics	Budget questions around materials (whiteboard paint) and labor (staff, people on budget, \$4/plastic). Construction plans need to address the impact on classes.	Clear budget for room improvements (whiteboards, decor, G4 projection). A plan for scheduling classes during construction.

WORKSHOP 2

Department/Area	Present Issues	Future Needs
Chemistry	Insufficient, overbooked, and non-functional lab spaces (e.g., non-working hoods, insufficient electrical, poor airflow, safety issues with stools). Lectures often occur far from labs and demo materials (53% of classes off-site). Vacuum lines vent to mechanical room (safety issue). Stockroom lacks safety features (shower, eyewash, venting).	More functional lab space (e.g., 4 labs for 20 students each). Dedicated lecture space near labs and storeroom, equipped for demos. Proper venting for VAC lines and VOC cabinets. Chemistry in the basement is an option.
Engineering	Labs are small and specialized (e.g., one lab for 14 students for electrical, one for soldering). Maker space is borrowed. Only two "dedicated" lecture rooms.	Dedicated maker space (with CNC machine, padded tool room, 3D printers, mill/lathe, visibility). Increased capacity for electrical engineering labs (25-30 students) with outlets/Ethernet. New materials science lab (25 people, potentially combined with concrete mixing). 4-5 lecture-only classrooms for 30 students, with whiteboards on all walls.
Physics	Labs lack necessary modern features (e.g., fixed front podium in SI 285). Insufficient electrical outlets for equipment/computers. Projector screens cover whiteboards.	Movable tables & chairs in labs. Water & gas hookups in labs/classrooms for demos. More electrical outlets. Bigger offices to meet with students. Planetarium room and roof space for astronomy (long shots). Dedicated lab for long-term astronomy use.
Geo Science	Small dedicated GIS mapping lab. Good but small fossil/mineral analysis lab.	Dedicated GIS/Computer Lab. Maintain and potentially align fossil/mineral analysis with chemical analysis. Storage for fossil/mineral collections. Need a lab space for new environmental science program.
Nanotech/Microscopy	No dedicated space; equipment and fume hood space taken over by other labs/departments.	Dedicated Nanotech/Microscopy area (as planned for Wes Sander's program).
Computer Science (CS)	Will grow at least three times its size. No infrastructure for growth. Labs could be shared.	Dedicated Classrooms & Computer Labs (at least 2 shared labs, a larger CS tutoring center with 20+ computers).



3. ARCHITECTURAL SYSTEMS

WORKSHOP 3

Category	Current Issues / Constraints	Future Requirements / Needs	Goals / Mission
STEM Learning	Workshop rooms are loud and dirty (due to use for classes/events).	A New Home for Students' STEM Learning Space.	Foster active collaboration b/w students and faculty.
	Carpet in work rooms requires expensive deep clean.	Space needs to be "future proof" with support from tutors/coaches.	Keep students engaged and inspired through hands-on learning.
Club & Prep Space	NO SPACE for clubs currently.	A larger, functional Common Space for staff and students.	Encourage participation in events that develop academic & professional skills.
	Old prep lab turned into a club room for 5 clubs under ACS.	A Club Meeting Area for → 6 Clubs (including ACS, Pre-Med, etc.).	
		Need to store chemicals/equipment and a FRIDGE!	
Administrative / Staff	No dedicated, quiet, functional break area.	A Faculty break room.	
		Dedicated space for Administrative Assts.	
General Facility	Bathrooms can tend to Smell.	Gender-Neutral Bathrooms (like the new science center hallway).	
	STEM Learning is BAD / The space is not welcoming.	MORE WINDOWS and Natural Lighting.	
	Ran out of space for all the ways students use it.	Perfect temperature control.	
Outdoor Space	Existing outdoor space (tables & chairs) is UNUSED on nice days.	More outdoor space for study/happy hours, usable year-round (balcony amenities).	
Tutoring / Office	Tutoring currently in hallway, pulling outside air.	Rework Office Space 160 Suite for more faculty/TA/LUK offices/hours.	
	General issues: excessive setup, wasted space, not welcoming due to space limitations.	Better space for computers and storage.	
Other Needs		Meeting Space for course groups (8-10) with A/V, SmartBoard, dividable/flexible structure.	
		Parking for guest speakers.	

3.2 SPACE PLANNING

The core purpose of this strategic assessment was to address the space planning and remodeling of targeted spaces within the (SI) Building at Salt Lake Community College. The primary objective is to enhance the functionality and efficiency of the facility, ensuring it meets the current and future pedagogical needs of all resident academic departments, particularly the School of Science, Mathematics, and Engineering. A significant opportunity driving this study is the upcoming availability of substantial floor area following the departure of Pacific Union. This allows the College to reclaim and re-imagine valuable space for direct academic and student use, facilitating crucial facility enhancements without relying solely on new construction or a full-scale building renovation.

COLLABORATIVE WORKSHOP APPROACH

To understand existing space utilization and future needs, the planning process began with a series of design workshops that directly engaged faculty, staff, and students from every core STEM department. These workshops were structured as listening sessions to capture:

- Present-day challenges.
- Future operational needs.
- Visionary requirements for specialized instructional, research, and common spaces.

The output from these workshops directly informed the planning and design phases.

KEY SPACE PLANNING GOALS AND OUTCOMES

By analyzing the collective data and needs, the project team developed a new proposed space list and layout that addresses critical department requirements:

1. Faculty Relocation: A key goal was to move all faculty offices out of the basement to the first or second floor, consolidating all Math and Physics classes near their respective storage and support areas to improve accessibility and reduce travel time.

- The proposed basement plan reflects this change, replacing many offices with classrooms and labs, and proposing a dedicated Environmental Science Lab (849 SF) and a new ACS Clubs space (1445 SF and 195 SF).

2. Safety and Lab Capacity: The design incorporates requirements for dedicated, safe Chemistry and Anatomy labs that meet or exceed safety standards, including specialized high-capacity HVAC to pull fumes.

- The proposed Level 3 plan includes a New Anatomy Lab (1435 SF) and an adjacent Anatomy Prep/Storage room (600 SF), directly addressing the need for a second anatomy lab and proper specimen storage/venting.

3. Student and Research Space: The new plan addresses the urgent need for dedicated student research and club meeting areas.

- The proposed Level 1 plan includes a Machine Shop (1031 SF) and a Maker Space (1441 SF).
- The basement plan adds spaces for Student Research (295 SF) and multiple Individual Study rooms.

4. Classroom Modernization: The plan incorporates converting classrooms to be flexible and modern.

- For Math, this includes splitting oversized rooms into two smaller, functional rooms.

Overall, the space planning effort utilized the newly vacated tenant space and strategic shuffling of internal offices to create a proposed layout that comprehensively addresses the faculty's identified needs for safety, capacity, and student experience enhancement.

The floor plans presented on the following sheets are sequentially organized to show the building's transformation for each level, including the Existing Plan, the Demolition Plan, and the Proposed New Plan. Accompanying these drawings are the detailed Space Lists for both the existing and new layouts, enabling a direct comparison of occupancy types.

3. ARCHITECTURAL SYSTEMS

3.2 SPACE PLANNING

SPACE LIST

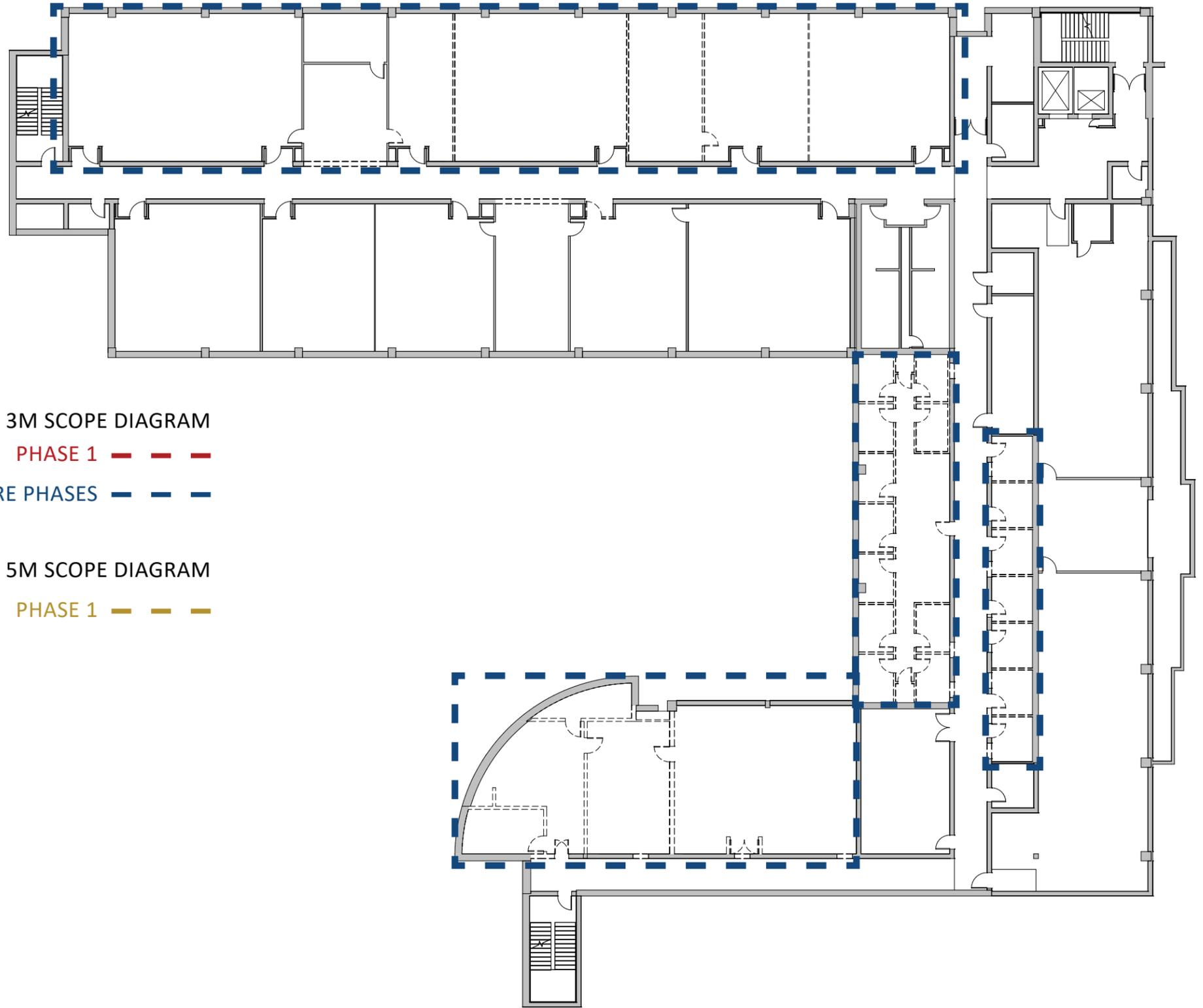
NAME	NUMBER	AREA	OCCUPANCY
BASEMENT			
GENERAL CLASSROOM	91	959 SF	CLASSROOM
GENERAL CLASSROOM	77	734 SF	CLASSROOM
COMPUTER SCIENCE	75	766 SF	CLASSROOM
COMPUTER SCIENCE	67	751 SF	CLASSROOM
GENERAL CLASSROOM	92	1529 SF	CLASSROOM
MATH CLASSROOM	80	1142 SF	CLASSROOM
ELEC. ENGINEERING CLASSROOM	60	924 SF	CLASSROOM
COMPUTER SCIENCE	65	1072 SF	CLASSROOM
ENGINEERING CLASSROOM	54	1209 SF	CLASSROOM
MICROSCOPY LAB	88	370 SF	LAB
ELEC. ENGINEERING LAB	62	680 SF	LAB
STOCK ROOM FOR ELEC. ENGINEERING	062A	499 SF	LAB - STOCK ROOM
STOCK ROOM ENGINEERING INSTRUMENTATION	56	501 SF	LAB - STOCK ROOM
STOCK ROOM	058A	109 SF	LAB - STOCK ROOM
ADJUNCT STUFF	84	406 SF	OFFICE
OFFICE	19	84 SF	OFFICE
OFFICE	21	84 SF	OFFICE
OFFICE	23	84 SF	OFFICE
OFFICE	29	84 SF	OFFICE
OFFICE	31	84 SF	OFFICE
OFFICE	35	84 SF	OFFICE
OFFICE	37	84 SF	OFFICE
OFFICE	22	505 SF	OFFICE
OFFICE	022A	74 SF	OFFICE
OFFICE	022B	75 SF	OFFICE
ROOM	022C	16 SF	OFFICE
OFFICE	022D	77 SF	OFFICE
OFFICE	022E	76 SF	OFFICE
OFFICE	022F	74 SF	OFFICE
OFFICE	022G	77 SF	OFFICE
OFFICE	022H	74 SF	OFFICE
OFFICE	022J	76 SF	OFFICE
OFFICE	022K	76 SF	OFFICE
ROOM	022L	15 SF	OFFICE
OFFICE	022M	69 SF	OFFICE
OFFICE	022N	69 SF	OFFICE
OFFICE	058B	162 SF	OFFICE
OFFICE	58	433 SF	OFFICE



Room Legend

- BATHROOM
- BUILDING SERVICES
- CLASSROOM
- LAB
- LAB - STOCK ROOM
- OFFICE

BASEMENT EXISTING PLAN



PHASE 1 3M SCOPE DIAGRAM

PHASE 1 - - - -

FUTURE PHASES - - - -

PHASE 1 5M SCOPE DIAGRAM

PHASE 1 - - - -

BASEMENT DEMOLITION PLAN

3.2 SPACE PLANNING

SPACE LIST

NAME	NUMBER	AREA	OCCUPANCY
BASEMENT			
STORAGE	91	71 SF	
ENGINEERING CLASSROOM 291	80	1186 SF	CLASSROOM
ELEC. ENGINEERING CLASSROOM	62	974 SF	CLASSROOM
ENGINEERING CLASSROOM 054	60	945 SF	CLASSROOM
GENERAL CLASSROOM	54	669 SF	CLASSROOM
GENERAL CLASSROOM	56	634 SF	CLASSROOM
GENERAL CLASSROOM	58	643 SF	CLASSROOM
GENERAL CLASSROOM	184	959 SF	CLASSROOM
GENERAL CLASSROOM	185	734 SF	CLASSROOM
COMPUTER SCIENCE	186	766 SF	CLASSROOM
COMPUTER SCIENCE	189	751 SF	CLASSROOM
COMPUTER SCIENCE	190	1072 SF	CLASSROOM
GENERAL CLASSROOM	92	821 SF	CLASSROOM
ACS CLUBS	22	1286 SF	CLUB
ACS CLUBS	21	195 SF	CLUB
ELEC. ENGINEERING LAB	88	689 SF	LAB
STOCK ROOM FOR ELEC.	84	312 SF	LAB - STOCK ROOM
STOCK ROOM ENGINEERING INSTRUMENTATION 056	060A	340 SF	LAB - STOCK ROOM
OFFICE FOR INSTRUMENTATION COORD. 058B	060B	184 SF	LAB - STOCK ROOM
WORK ROOM (COPY)	33	77 SF	OFFICE
IND. STUDY	37	61 SF	STUDY ROOM
IND. STUDY	35	61 SF	STUDY ROOM
IND. STUDY	31	61 SF	STUDY ROOM
IND. STUDY	29	61 SF	STUDY ROOM
IND. STUDY	23	61 SF	STUDY ROOM
STUDENT RESEARCH	058B	295 SF	STUDY ROOM



BASEMENT NEW PLAN

3.2 SPACE PLANNING

SPACE LIST

LEVEL 1			
FACULTY RESOURCE	197	189 SF	BREAKROOM
FACULTY RESOURCE	191A	288 SF	BREAKROOM
BREAKROOM	150	83 SF	BREAKROOM
CLASS	196	556 SF	CLASSROOM
CLASS	198	510 SF	CLASSROOM
CLASS	192	437 SF	CLASSROOM
CLAB	188	979 SF	CLASSROOM
CLAB	184	461 SF	CLASSROOM
GENERAL CLASSROOM	154	728 SF	CLASSROOM
MATH CLASSROOM	151	1311 SF	CLASSROOM
TUTORING	137	845 SF	CLASSROOM
CLASS	101A	404 SF	CLASSROOM
CLASS	101B	518 SF	CLASSROOM
CLAB	191	2006 SF	LAB
MICROSCOPY	156	1666 SF	LAB
MACHINE SHOP	159	1050 SF	MAKER SPACE, MACHINE SHOP
OFFICE	180	137 SF	OFFICE
OFFICE	160	722 SF	OFFICE
OFFICE	160A	131 SF	OFFICE
OFFICE	160B	101 SF	OFFICE
OFFICE	160C	227 SF	OFFICE
OFFICE	160E	257 SF	OFFICE
OFFICE	160F	188 SF	OFFICE
OFFICE	160G	198 SF	OFFICE
OFFICE	160H	184 SF	OFFICE
OFFICE	160J	188 SF	OFFICE
OFFICE	160K	201 SF	OFFICE
OFFICE	160L	251 SF	OFFICE
OFFICE	165	134 SF	OFFICE
OFFICE	165A	100 SF	OFFICE
OFFICE	165B	150 SF	OFFICE
OFFICE	165C	170 SF	OFFICE
OFFICE	167	64 SF	OFFICE
OFFICE	122	93 SF	OFFICE
OFFICE	124	75 SF	OFFICE
OFFICE	126	94 SF	OFFICE
OFFICE	128	134 SF	OFFICE
OFFICE	130	75 SF	OFFICE
OFFICE	143	88 SF	OFFICE
OFFICE	135	86 SF	OFFICE
OFFICE	133	86 SF	OFFICE
OFFICE	131	86 SF	OFFICE
OFFICE	127	86 SF	OFFICE
OFFICE	123	92 SF	OFFICE
OFFICE	101D	86 SF	OFFICE
OFFICE	101E	81 SF	OFFICE
OFFICE	101F	70 SF	OFFICE
OFFICE	109	84 SF	OFFICE
OFFICE	111	86 SF	OFFICE
OFFICE	112	74 SF	OFFICE
OFFICE	113	86 SF	OFFICE
OFFICE	114	133 SF	OFFICE
OFFICE	115	86 SF	OFFICE
OFFICE	116	94 SF	OFFICE
OFFICE	118	75 SF	OFFICE
OFFICE	119	96 SF	OFFICE
OFFICE	120	93 SF	OFFICE
OFFICE	101H	30 SF	OFFICE
CLABS	188A	32 SF	STORAGE
CLABS	137A	169 SF	STORAGE
CLASSs	101A-A	79 SF	STORAGE
VACANT/ UNFINISHED	187	655 SF	VACANT
VACANT/ UNFINISHED	179	81 SF	VACANT
VACANT	175	399 SF	VACANT
VACANT	171	537 SF	VACANT
VACANT	132	377 SF	VACANT
VACANT	132A	40 SF	VACANT

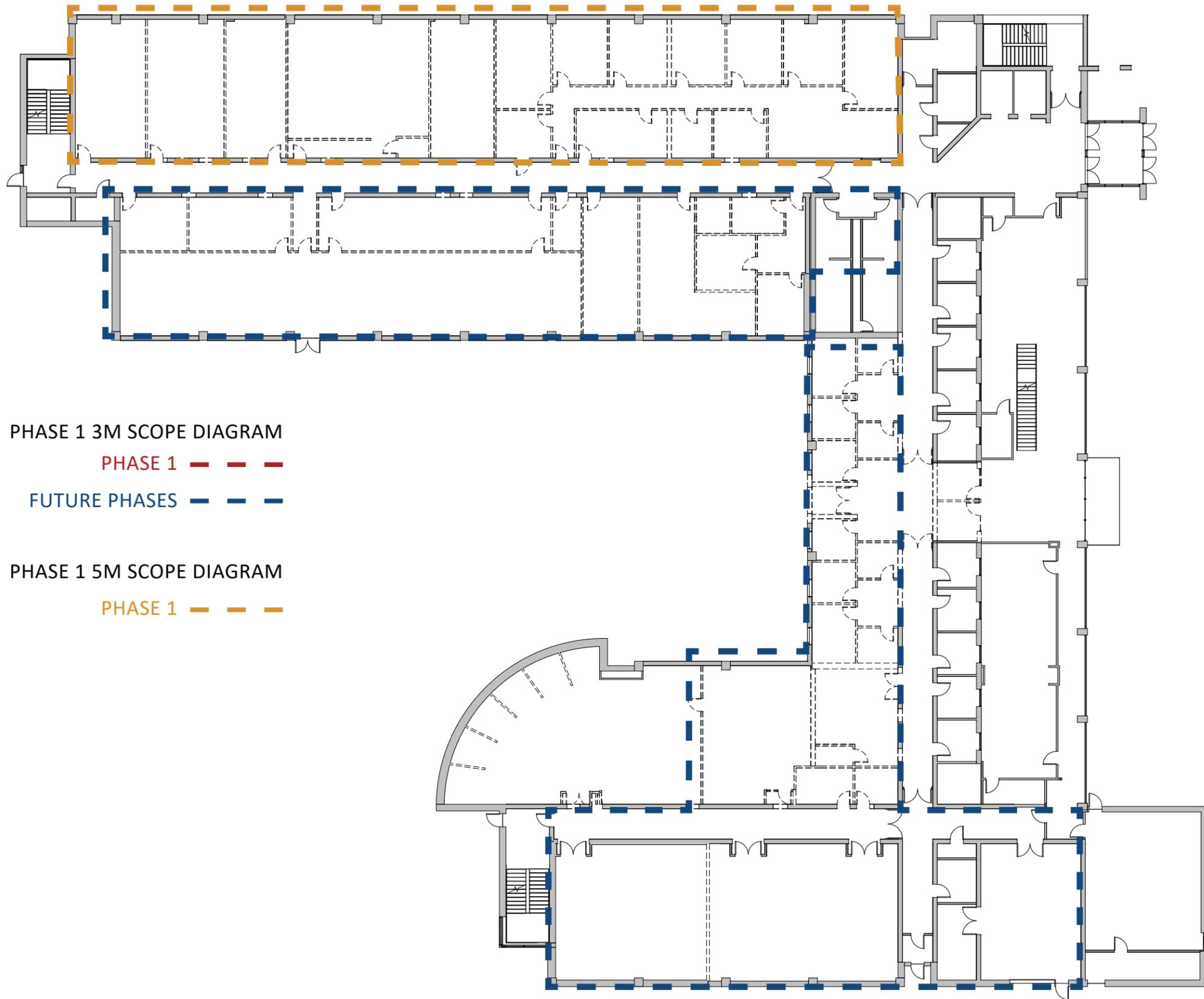


Room Legend

- BATHROOM
- BREAKROOM
- CLASSROOM
- LAB
- MAKEER SPACE, MACHINE SHOP
- OFFICE
- STORAGE
- VACANT

VACANT
 Some areas are being used "temporarily",
 but they have not been updated since
 Union Pacific vacated the spaces.

LEVEL 1 EXISTING PLAN



PHASE 1 3M SCOPE DIAGRAM

PHASE 1 - - - -

FUTURE PHASES - - - -

PHASE 1 5M SCOPE DIAGRAM

PHASE 1 - - - -

LEVEL 1 DEMOLITION PLAN

3.2 SPACE PLANNING

SPACE LIST

LEVEL 1			
FACULTY BREAKROOM	197	490 SF	BREAKROOM
GENERAL CLASSROOM 154	154	620 SF	CLASSROOM
TUTORING	137	845 SF	CLASSROOM
CLABS	137A	169 SF	CLASSROOM
CLASSs	101A-A	79 SF	CLASSROOM
CLASS	101A	404 SF	CLASSROOM
CLASS	101B	518 SF	CLASSROOM
GENERAL CLASSROOM	156	616 SF	CLASSROOM
GENERAL CLASSROOM	174	622 SF	CLASSROOM
GENERAL CLASSROOM	191	868 SF	CLASSROOM
GENERAL CLASSROOM	153	874 SF	CLASSROOM
GENERAL CLASSROOM	155	865 SF	CLASSROOM
MICROSCOPY 088	154A	870 SF	LAB
PHYSICS CLASS / LAB 295	179	1282 SF	LAB
PHYSICS CLASS / LAB 296	171	1280 SF	LAB
MACHINE SHOP	159	719 SF	MAKEER SPACE MACHINE SHOP
MAKER SPACE	151	1441 SF	MAKEER SPACE MACHINE SHOP
MATERIAL SCIENCE LAB +	199c	924 SF	MAKEER SPACE MACHINE SHOP
OFFICE	135	86 SF	OFFICE
OFFICE	131	86 SF	OFFICE
OFFICE	127	86 SF	OFFICE
OFFICE	123	92 SF	OFFICE
OFFICE	109	84 SF	OFFICE
OFFICE	111	86 SF	OFFICE
OFFICE	113	86 SF	OFFICE
OFFICE	115	86 SF	OFFICE
OFFICE	119	96 SF	OFFICE
OFFICE	101F	70 SF	OFFICE
OFFICE	128	174 SF	OFFICE
OFFICE	124	110 SF	OFFICE
OFFICE	126	110 SF	OFFICE
OFFICE	130	89 SF	OFFICE
OFFICE	114	104 SF	OFFICE
OFFICE	133	86 SF	OFFICE
OFFICE	122	89 SF	OFFICE
OFFICE	058C	88 SF	OFFICE
OFFICE	116	86 SF	OFFICE
OFFICE	112	85 SF	OFFICE
OFFICE	118	84 SF	OFFICE
COLLAB ROOM	101D	175 SF	OFFICE
OFFICE	120	84 SF	OFFICE
COLLAB ROOM	146	90 SF	OFFICE
COLLAB ROOM	143	81 SF	OFFICE
COLLAB ROOM	142	81 SF	OFFICE
OPEN OFFICE	147	2543 SF	OFFICE
COLLAB ROOM	141	83 SF	OFFICE
STOCK ROOM 297	175	723 SF	STOCK
IND. STUDY	196	104 SF	STUDY ROOM
IND. STUDY	200	103 SF	STUDY ROOM
GROUP STUDY	202	204 SF	STUDY ROOM
WORK ROOM (COPY)	197A	71 SF	WORK ROOM



Room Legend

- BATHROOM
- BREAKROOM
- CLASSROOM
- LAB
- MAKEER SPACE, MACHINE SHOP
- OFFICE
- STOCK
- STUDY ROOM
- WORK ROOM

LEVEL 1 NEW PLAN

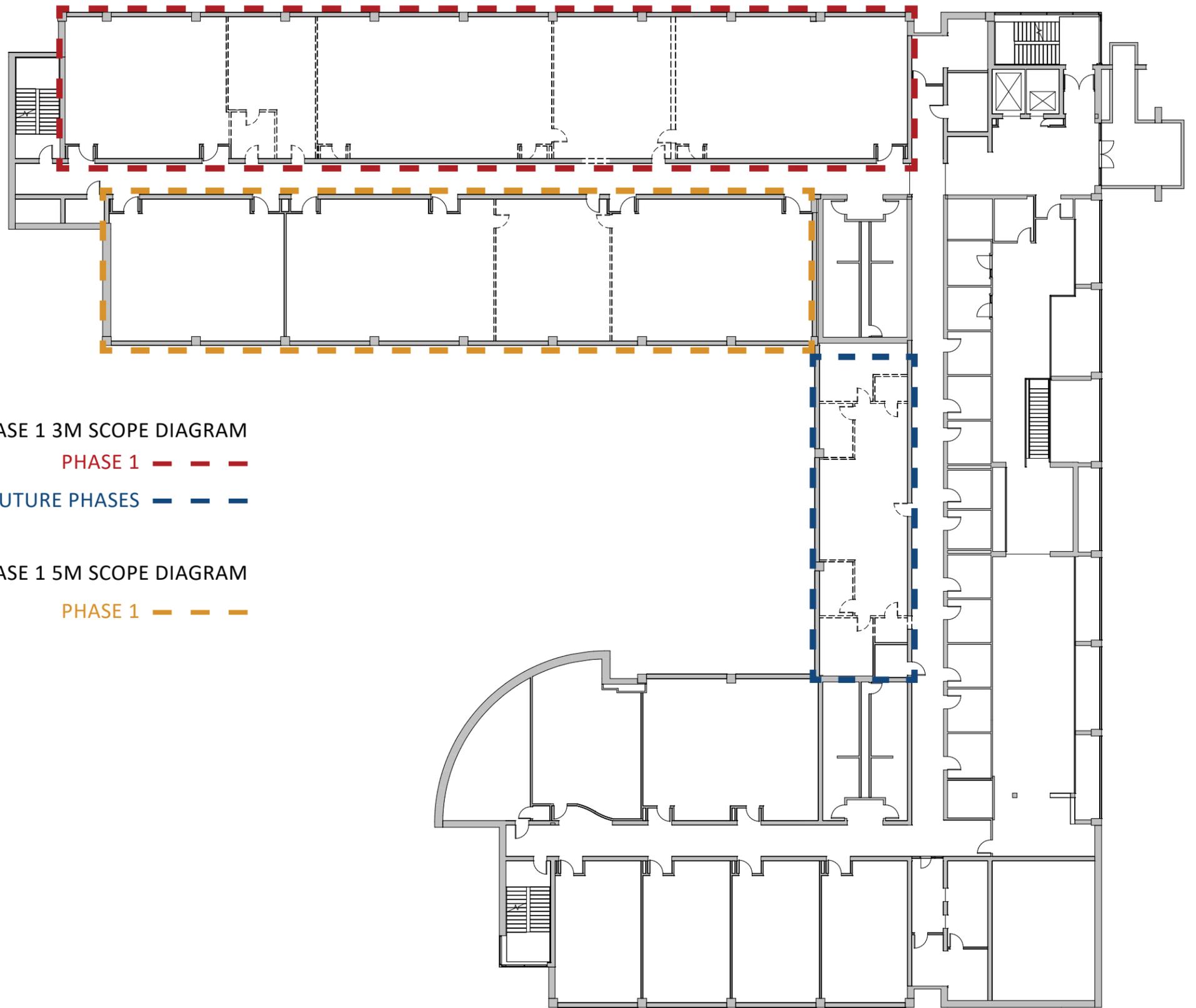
3.2 SPACE PLANNING

SPACE LIST

LEVEL 2			
ENGINEERING CLASSROOM	291	1185 SF	CLASSROOM
CLASS	201	1618 SF	CLASSROOM
CLASS	201A	1573 SF	CLASSROOM
MATH CLASSROOM	254	1196 SF	CLASSROOM
GENERAL CLASSROOM	256	737 SF	CLASSROOM
MATH CLASSROOM	259	589 SF	CLASSROOM
MATH CLASSROOM	255	598 SF	CLASSROOM
MATH CLASSROOM	253	598 SF	CLASSROOM
MATH CLASSROOM	251	589 SF	CLASSROOM
RESEARCH CHEMISTRY	298	1105 SF	LAB
ORGANIC CHEMISTRY LABS			
GENERAL CHEM LAB	280	1616 SF	LAB
GENERAL CHEM LAB	260	1598 SF	LAB
PHYSICS CLASS / LAB	285	1427 SF	LAB
PHYSICS CLASS / LAB	265	1382 SF	LAB
STOCK ROOM	270	832 SF	LAB - STOCK ROOM
CLASSs	292	103 SF	LAB - STOCK ROOM
STOCK ROOM	275	808 SF	LAB - STOCK ROOM
ACS CLUB JUST A SOCIAL SPACE	290	501 SF	CLUB
OFFICE	205	186 SF	OFFICE
OFFICE	201D	84 SF	OFFICE
OFFICE	201C	95 SF	OFFICE
OFFICE	201B	91 SF	OFFICE
OFFICE	213	93 SF	OFFICE
OFFICE	215	93 SF	OFFICE
OFFICE	217	93 SF	OFFICE
OFFICE	219	83 SF	OFFICE
OFFICE	221	83 SF	OFFICE
OFFICE	223	93 SF	OFFICE
OFFICE	225	93 SF	OFFICE
OFFICE	227	93 SF	OFFICE
OFFICE	229	93 SF	OFFICE
OFFICE	231	97 SF	OFFICE
OFFICE	220E	211 SF	OFFICE
OFFICE	220G	89 SF	OFFICE
OFFICE	220D	41 SF	OFFICE
OFFICE	220	739 SF	OFFICE
OFFICE	220C	89 SF	OFFICE
OFFICE	220A	41 SF	OFFICE
OFFICE	220B	157 SF	OFFICE
OFFICE	241	120 SF	OFFICE
OFFICE	241A	177 SF	OFFICE
OFFICE	241B	192 SF	OFFICE
CLASS	258A	13 SF	STORAGE



LEVEL 2 EXISTING PLAN



PHASE 1 3M SCOPE DIAGRAM

PHASE 1 - - -

FUTURE PHASES - - -

PHASE 1 5M SCOPE DIAGRAM

PHASE 1 - - -

LEVEL 2 DEMOLITION PLAN

3.2 SPACE PLANNING

SPACE LIST

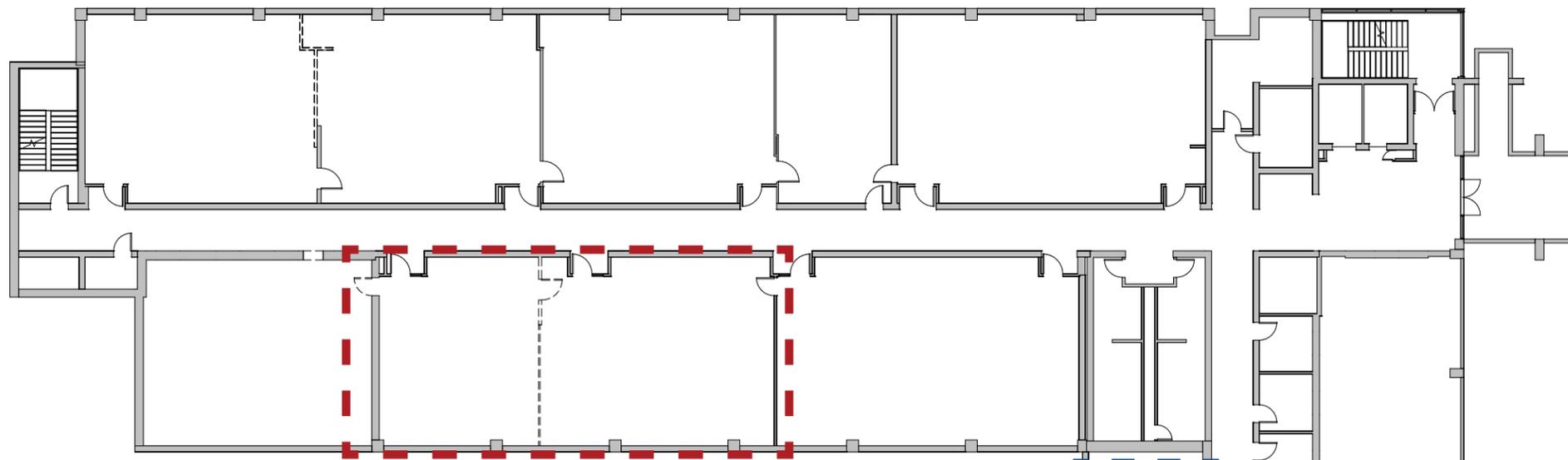
LEVEL 3			
GENERAL LECTURE SPACE	353	1198 SF	CLASSROOM
GEOLOGY CLASSROOM	358	965 SF	CLASSROOM
WOMEN IN ENGINEERING	359A	531 SF	CLUB
CLASSROOM	398	1189 SF	LAB
BIOLOGY	390	1166 SF	LAB
ORGANISMAL LAB	360	1597 SF	LAB
ANATOMY LAB	365	1571 SF	LAB
PHYSIOLOGY LAB	379	1220 SF	LAB
BIOLOGY	380	1218 SF	LAB
ENVIRONMENTAL SCIENCE LAB	354	589 SF	LAB
COMPUTER LAB FOR GEO SCIENCES	359B	643 SF	LAB
LAB STOCK ROOM	370	610 SF	LAB - STOCK ROOM
LAB STOCK ROOM	385	824 SF	LAB - STOCK ROOM
INSTRUMENTATION ICP/OES	358A	343 SF	LAB - STOCK ROOM
LOUNGE	335	258 SF	LOUNGE
OFFICE	305	216 SF	OFFICE
OFFICE	309	84 SF	OFFICE
OFFICE	311	86 SF	OFFICE
OFFICE	313	86 SF	OFFICE
OFFICE	315	86 SF	OFFICE
OFFICE	317	86 SF	OFFICE
OFFICE	319	86 SF	OFFICE
OFFICE	321	86 SF	OFFICE
OFFICE	323	86 SF	OFFICE
OFFICE	325	86 SF	OFFICE
OFFICE	327	86 SF	OFFICE
OFFICE	329	86 SF	OFFICE
OFFICE	331	86 SF	OFFICE
OFFICE	341A	174 SF	OFFICE
OFFICE	341B	192 SF	OFFICE
OFFICE	341	117 SF	OFFICE
ANATOMY MODEL STORAGE	358B	443 SF	STORAGE



Room Legend

- CLASSROOM
- CLUB
- LAB
- LAB - STOCK ROOM
- LOUNGE
- OFFICE
- STORAGE

LEVEL 3 EXISTING PLAN



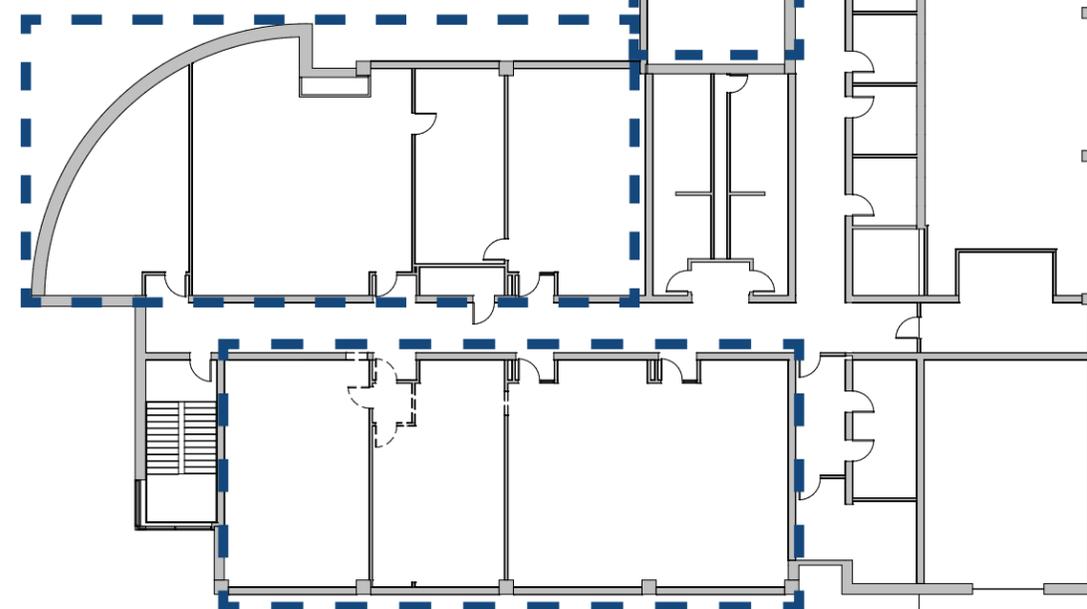
PHASE 1 3M SCOPE DIAGRAM

PHASE 1 - - - -

FUTURE PHASES - - - -

PHASE 1 5M SCOPE DIAGRAM

PHASE 1 - - - -



LEVEL 3 DEMOLITION PLAN

3.2 SPACE PLANNING

SPACE LIST

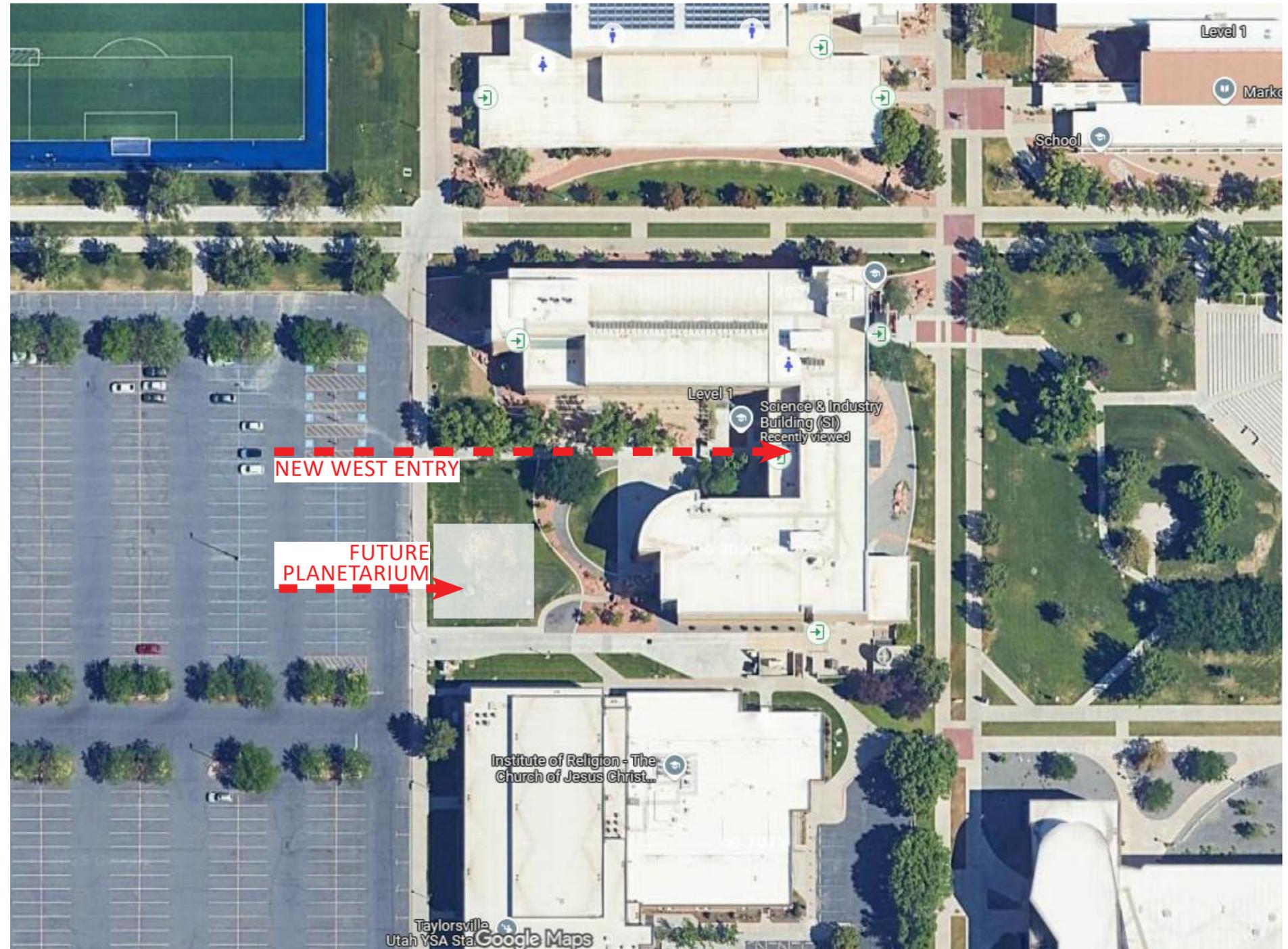
LEVEL 3		
BREAKROOM	335 258 SF	BREAKROOM
GENERAL CLASSROOM	398 1215 SF	CLASSROOM
RESEARCH SPACE	176 443 SF	CLASSROOM
GEOLOGY CLASSROOM	358 918 SF	CLASSROOM
COMPUTER LAB FOR GEO	359B 643 SF	LAB
BIOLOGY	390 1140 SF	LAB
ORGANISMAL LAB	360 1597 SF	LAB
BIOLOGY	380 1218 SF	LAB
ANATOMY LAB 365	365 1571 SF	LAB
NEW ANATOMY LAB	72 1435 SF	LAB
ENVIRONMENTAL SCIENCE LAB	354 589 SF	LAB
PHYSIOLOGY LAB	353 1198 SF	LAB
LAB STOCK ROOM	370 610 SF	LAB - STOCK ROOM
ANATOMY PREP/ STORAGE	365B 600 SF	LAB - STOCK ROOM
INSTRUMENTATION ICP/OES	358A 343 SF	LAB - STOCK ROOM
LAB STOCK ROOM	359A 566 SF	LAB - STOCK ROOM
OFFICE	309 84 SF	OFFICE
OFFICE	311 86 SF	OFFICE
OFFICE	315 86 SF	OFFICE
OFFICE	317 86 SF	OFFICE
OFFICE	319 86 SF	OFFICE
OFFICE	321 86 SF	OFFICE
OFFICE	323 86 SF	OFFICE
OFFICE	325 86 SF	OFFICE
OFFICE	327 86 SF	OFFICE
OFFICE	329 86 SF	OFFICE
OFFICE	331 86 SF	OFFICE
OFFICE	341A 174 SF	OFFICE
OFFICE	341B 192 SF	OFFICE
OFFICE	341 117 SF	OFFICE
OFFICE	305 216 SF	OFFICE
OFFICE	313 86 SF	OFFICE
OUTDOOR GREEN HOUSE	393 1423 SF	OUTDOOR



LEVEL 3 NEW PLAN

3.2 SPACE PLANNING

The exterior improvements focus primarily on enhancing accessibility and improving the flow of student traffic. A significant proposed modification is improving existing approach on the west side of the building. This new entrance is strategically located to be closer to the adjacent west parking lot, acknowledging that many students approach the building from that direction. Functionally, this entry is designed to connect directly inside to the STEM Center, providing immediate access for students utilizing that resource. Furthermore, accessibility will be addressed at all entrances. Lastly, the site plan also designates the future location for a planetarium, a key facility that has been specifically requested by the faculty.



SITE PLAN

RENDERINGS

This rendering showcases the newly designed West Entrance, establishing a direct and intuitive connection to the STEM Center. The redesign emphasizes a more open and inviting space featuring abundant daylight and ample casual seating. To enhance student productivity, we have incorporated a variety of individual and group student workspaces on either side of the entrance. This entry point is strategically connected to the west parking area via a newly designed pathway, ensuring easier and more accessible entry into the building for all students and visitors.



RENDERINGS

Images below illustrate the proposed upgrades to the building's main corridors, transforming these essential pathways into a modern, higher-education environment. The most significant visual change involves covering the existing block walls (CMU) with new, refined finishes that are more appropriate for a college setting.

This concept includes an upgrade to the light fixtures and interior lighting type. This strategic lighting improvement is designed to visually increase the perceived ceiling height, creating a more open and airy atmosphere, despite the physical limitations imposed by overhead equipment.

The design introduces newly integrated student nooks throughout the corridors. These comfortable, dedicated areas will serve as informal waiting spaces, eliminating the current issue of students having to stand or sit on the floor while waiting for classes.



3.3 CODE REVIEW

BUILDING ANALYSIS AND OCCUPANT LOAD

The Science and Industry Building is a three-story structure with a basement, completed in 1996.

- Original Code/Type: Constructed under the 1991 UBC as a Type II-1 hour building.
- Original Fire Rating: Included 1-hour fire ratings for the structural frame, floor/ceiling assembly, and interior/exterior load-bearing walls. The roof/ceiling assembly was non-rated.
- Current Code Analysis: Due to the existing non-rated roof/ceiling assembly, the current code analysis uses 2018 IBC Type IIB.

Group and occupancy	B
Change in Use	No
Mixed Occupancy	No
Type of Construction	IIB
Sprinklers	NFPA 13

EXISTING OCCUPANT LOAD

Basement	464
Level 1	453
Level 2	762
Level 3	589
Level 4	12
TOTAL	2,280

NEW OCCUPANT LOAD

Basement	588
Level 1	385
Level 2	815
Level 3	439
Level 4	12
TOTAL	2,239

The new occupant load did not change so the plumbing fixtures are adequate. We are adding two extra non-gendered bathrooms in the new layout on level 1.

EXISTING PLUMBING FIXTURES REQUIRED

Water Closets	47
Lavatories	30

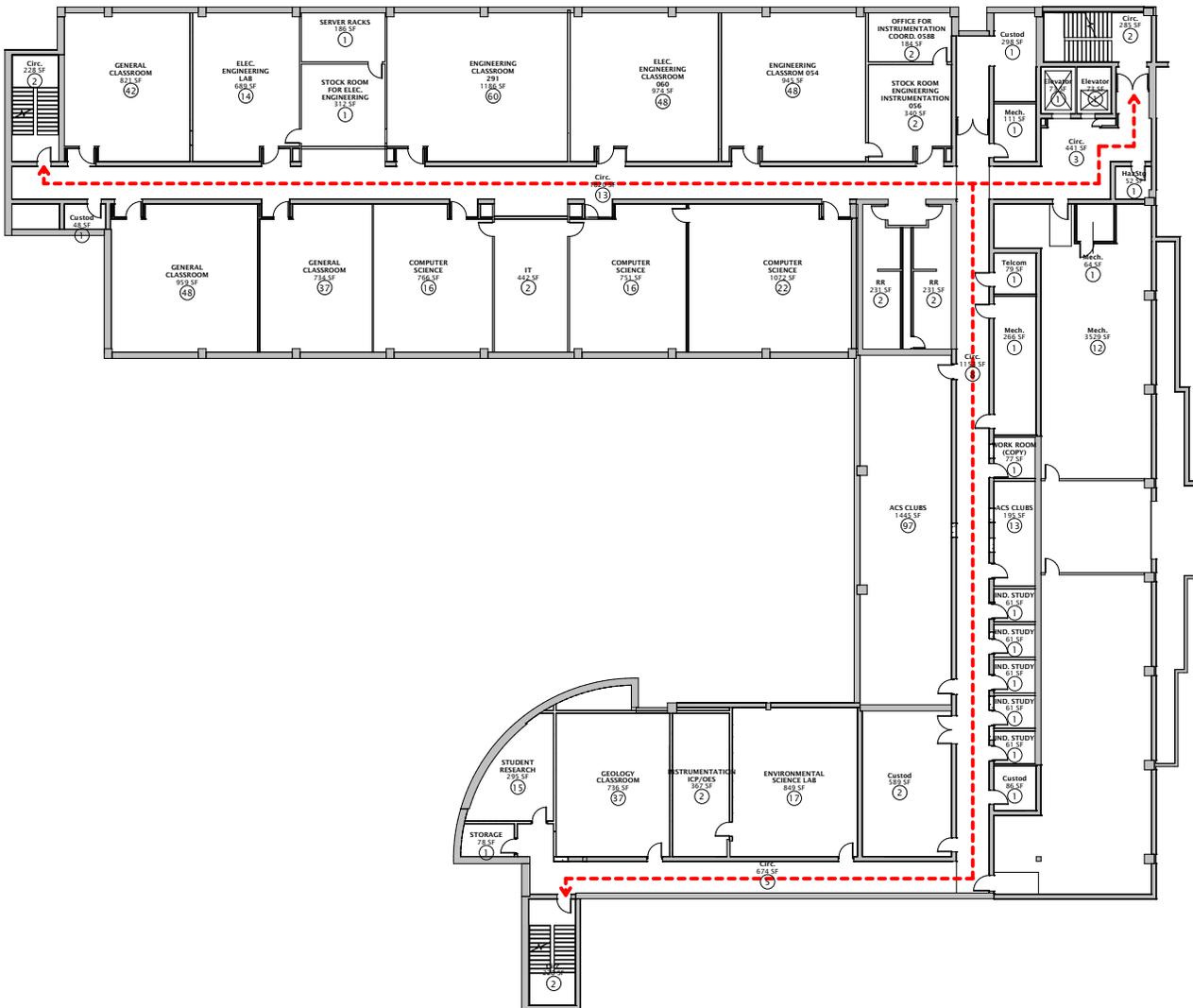
Existing Plumbing Fixtures Provided

Women	
Water Closets	30
Lavatories	24
Men	
Water Closets	12
Urinals	24
Lavatories	24
Total	
Water Closets	42
Urinals	24
Lavatories	48

3.3 CODE REVIEW - EGRESS

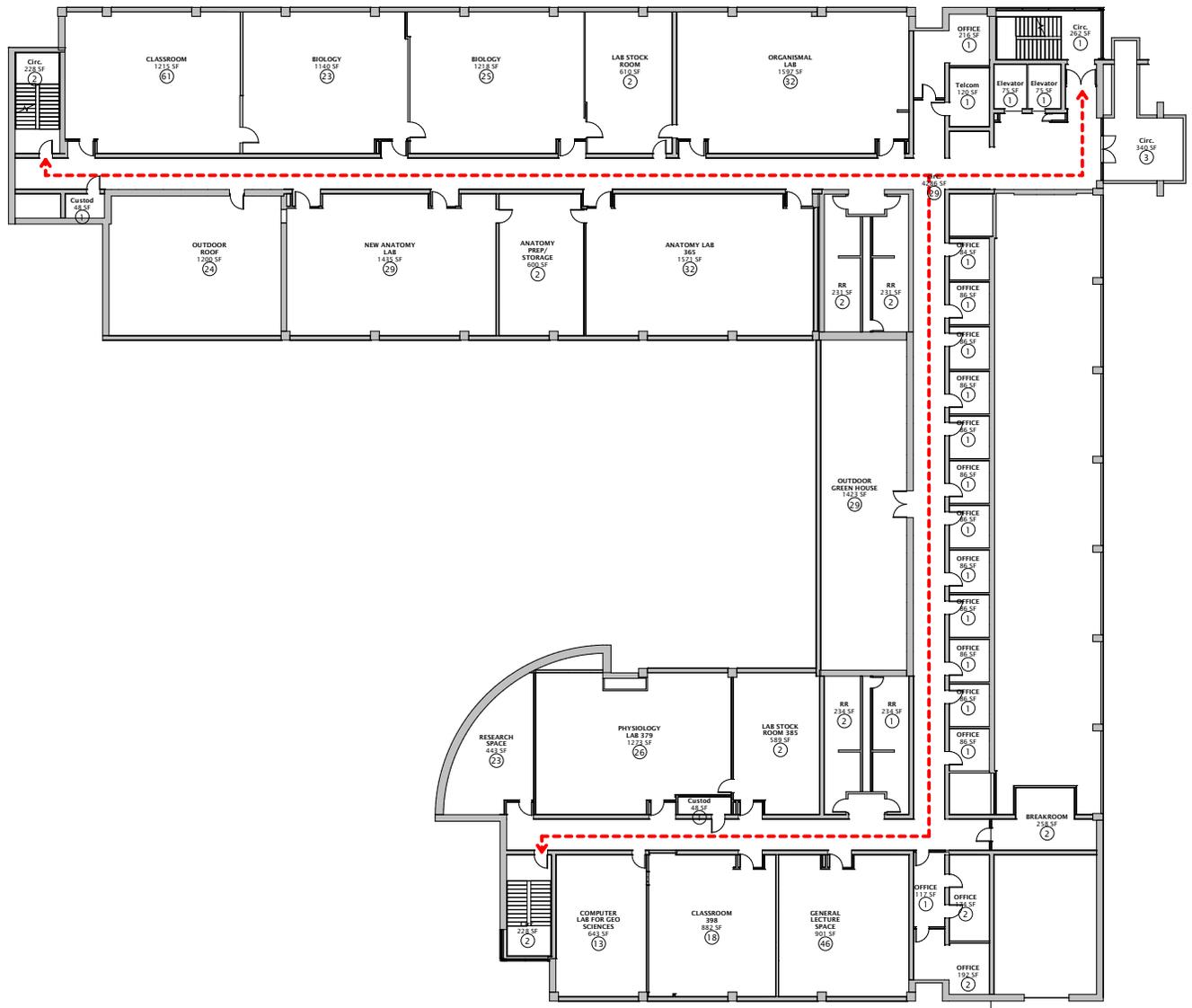
The building is currently equipped with three exits which are sufficient to handle the total occupant load, encompassing both existing and new occupants. It is critical that these exits remain unobstructed and operational throughout all phases of construction to ensure a safe and immediate means of egress from the building in the event of any emergency. Furthermore, a comprehensive study of the egress paths will be conducted, and detailed documentation for each phase of construction will be provided during the design and subsequent construction processes.

BASEMENT EGRESS PLAN



3.3 CODE REVIEW - EGRESS

LEVEL 3 EGRESS PLAN



3. ARCHITECTURAL SYSTEMS

3.2 FINISHES

durability, simplicity, and easier maintenance and cleaning.

Although detailed finish selection was not the primary focus of this study, we recommend dedicating one or two workshops during the programming phase for Phase One. This will allow the design team to pinpoint finishes for the entire building, ensuring a more cohesive and updated look that aligns with the vision of a premier STEM facility.

Our core recommendations prioritize durability, simplicity, ease of cleaning and maintenance, and enhanced acoustical performance throughout the Building.

For corridors and public spaces, which receive the heaviest foot traffic, we recommend changing all corridor flooring from carpet to Vinyl or another durable hard surface. This surface should ideally possess some acoustic properties and must be significantly easier to clean and maintain than the existing carpet. The ceilings in these areas will be acoustic tile with a good Noise Reduction Coefficient (NRC) rating.

For the informal study and waiting nooks being created in these corridors, we propose using felt panels or other soft acoustic treatments to improve the localized acoustical environment.

Critically, we propose to fur out all existing brick walls in the corridors, as this addresses feedback from students and faculty that the existing brick evokes a “prison feeling”. The new wall finish will feature a nice tile up to 4 feet for enhanced durability in high-traffic areas, transitioning to a nice paint finish up to the ceiling.

For interior administrative and instructional spaces, finishes must balance comfort, acoustics, and maintenance based on the specific function of the room. All offices will have carpet and acoustic tile ceiling, and wall finishes can remain paint for simplicity. If better acoustics are required and budget allows, consider felt or some other acoustic wall treatments.

Classrooms will have carpet and acoustic ceiling tile and painted walls. Where necessary tackable felt surfaces are recommended for better acoustics and functionality in classrooms.

Finally, labs will have Vinyl flooring, acoustic ceiling tiles, and painted walls. In all areas, pick finishes for

3. ARCHITECTURAL SYSTEMS

3.2 SUSTAINABILITY

Sustainability and Resilience Outcomes

The Science & Industry (SI) Building Master Planning project focuses on necessary upgrades and remediation, resulting in numerous inherent benefits related to energy efficiency, environmental quality, and long-term resilience, though the project may not be pursuing formal sustainability certifications.

Energy Efficiency & Cost Savings

Optimizing the performance of outdated mechanical and electrical systems is a big part of this master planning effort, leading to measurable energy savings.

1. **Optimized Mechanical Systems:** Replacing aged, end-of-life mechanical systems with modern, highly efficient equipment will drastically reduce energy consumption for heating and cooling.
2. **Lighting Efficiency:** All new spaces will be equipped with energy-efficient LED lighting with dimming capability and controlled by occupancy sensors and time-of-day relays in common areas and classrooms.

Indoor Environmental Quality and Safety

A primary driver of the planning is improving safety equipment and infrastructure of the instructional and working environment, especially in labs.

1. **Enhanced Ventilation and Fume Control:** The renovation is designed to implement high-capacity HVAC specifically to pull out dangerous fumes from chemical work and dissection (Anatomy), ensuring clean, safe air in all instructional spaces. Lab supply and exhaust terminals, which are critical for protecting occupants from exposure to fumes, are slated for immediate replacement.
2. **Thermal Comfort Control:** Replacing the aged VAV terminals, which directly impact occupant comfort, with new systems will provide better and more localized temperature control, addressing historical issues of inconsistent HVAC temperature.
3. **Improved Daylighting.**

Materials and Longevity

The proposed modifications focus on modernization and extending the functional life of the facility.

1. **Equipment Lifespan:** Most existing mechanical equipment is past its median service life. The replacement timeline prioritizes removing and replacing old equipment with modern, more efficient alternatives, ensuring the building can operate safely for decades.
2. **Electrical System Upgrades:** The electrical system will be designed to accommodate the new mechanical system and upgrades, sizing all distribution for future demands. The aged emergency generator will also be replaced.

Resilience & Operational Continuity

The architectural updates focus on security, accessibility, and operational flow.

1. **Security and Access Modernization:** The plan calls for implementing modern, trackable lock systems to replace physical keys, which will streamline after-hours access for faculty and improve security.
2. **Accessibility Improvements:** Improving ADA access is a priority, and preparing the site for a New ADA entry.

4. MECHANICAL & PLUMBING NARRATIVE

5. MECHANICAL NARRATIVE

EXECUTIVE SUMMARY

This report was commissioned to help determine the condition of mechanical, plumbing and fire protection systems at the SLCC SI building. Most equipment in the building is 29 years old as of the year 2025 and is past the median service life or can be replaced with modern and more efficient equipment. The following timeline is recommended for systems replacement:

1. Immediate:

a. Terminals:

- i. Replace all general terminals (VAVs).
- ii. Replace all laboratory supply and exhaust terminals.

b. Cooling tower CT-1:

- i. Refurbish the cooling tower with clean fill. Clean the tower basin.

c. Sump pump:

- i. Replace the sump pump and correct the lid sewer gas leak.

d. Plumbing fixtures:

- i. Replace the plumbing fixtures and branch piping if an architectural remodel is planned.

e. BMS:

- i. Replace the BMS in its entirety.

f. VFDs:

- i. Replace all VFDs.

g. Waste main:

- i. Inspect the waste main with a camera to ensure its longevity.

h. Water main:

- i. Inspect the waste main with a camera to ensure its longevity.

2. 2-5 years:

a. Air Handlers AH-1, AH-2, AH-3, AH-4:

- i. Replace the fan sections.

b. Chiller CH-1:

- i. Replace the chiller.

c. Pumps P-1 through P-9:

- i. Replace all pumps.

d. Exhaust fans:

- i. Replace all general exhaust fans.

e. Steam equipment:

- i. Replace heat transfer packages HTP-1 and 2.

f. Minor equipment:

- i. Replace all unit heaters and fan coils.
- ii. Replace all controls on louvers and hoods.

3. 6-10 years:

a. Air Handlers AH-1, AH-2, AH-3, AH-4:

- i. Replace the air handlers in their entirety.

b. Laboratory equipment:

- i. Replace the lab vacuum pump.
- ii. Replace the lab air compressor.
- iii. Replace the

c. Domestic PRV:

- i. Replace the domestic PRV system.

d. Fire riser:

- i. Replace the fire riser.

DESCRIPTION OF EXISTING BUILDING ENVELOPE (PICTORIAL)

A proper building envelope provides for comfort, saves energy, and protects building elements. Based on the above wall section, the following deficiencies may exist on this project:

1. Lack of a continuous air or vapor barrier.

This may result in excess air infiltration to the building causing the following issues:

1. Mechanical equipment and systems must be sized larger to overcome thermal losses and gains resulting in higher than normal first costs.
2. Mechanical equipment will expend excess energy to properly heat and cool spaces resulting in long term energy costs.

DESCRIPTION OF EXISTING MECHANICAL SYSTEMS

Existing systems description

Air systems

1. ID: AH-1

- Location: Basement
- Serves: Basement
- Type: Central Station AH-unit
- Supply air: 35,500 CFM
- Return air: 27,300 CFM
- Economizer: Air-side Economizer
- Condition: Fair
- Capacity:
 - a. Cooling 907.2 MBH
 - b. Pre-Heat 375,000 BTUH

2. ID: AH-2

- Location: Basement
- Serves: Floor 1, 2 & 3
- Type: Central Station AH-unit
- Supply air: 33,500 CFM
- Return air: 29,600 CFM
- Economizer: Air-side Economizer
- Condition: Fair
- Capacity:
 - a. Cooling 784.1 MBH
 - b. Pre-Heat 50,000 BTUH

3. ID: AH-3

- Location: Basement
- Serves: Floor 1, 2 & 3
- Type: Central Station AH-unit
- Supply air: 46,000 CFM
- Return air: 38,000 CFM
- Economizer: Air-side Economizer
- Condition: Fair
- Capacity:
 - a. Cooling 1110.9 MBH
 - b. Pre-Heat 255,000 BTUH

4. ID: AH-4

- Location: Basement
- Serves: Laboratories
- Type: Central Station AH-unit
- Supply air: 43000 CFM
- Return air: 25800 CFM
- Economizer: Air-side Economizer
- Condition: Fair
- Capacity:
 - a. Cooling 1788.1 MBH
 - b. Pre-Heat 2,200,000 BTUH

Heating systems

1. ID: HTP-1, 2

- Location: Basement
- Serves: Building
- Type: Steam to hot water/glycol from campus plant:
 - a. Heat transfer package HTP-1 which includes EX-1 and 2 and convert plant steam to hot water and serve the building reheat terminals. Includes pumps P-6 and 7.
 - b. Heat transfer package HTP-2 which includes EX-3 and 4 and convert plant steam to water/glycol serving the pre-heat coils for air handlers 1 through 4. Includes pumps P-8 and 9.

2. Converters: EX-1, 2, 3, 4

- Condition: Fair

3. Steam components:

- PRV, piping.
- Condition: Fair

4. Pumps: End Suction Pumps P-6, 7, 8, 9

- Condition: Fair

Cooling systems

1. ID: Campus CHW

- Location: Basement
- Serves: Building
- Type: Campus plant CHW

2. ID: CH-1

- Location: Basement
- Serves: Building
- Type: Building central chiller
- Capacity: CH-1, 300 T
- Condition: Fair

3. ID: CT-1

- Location: Basement
- Serves: Building
- Type: Building tower system
- Tower: CT-1, 300 T
- Condition: Fair

4. Pumps:

- ID: Pump P-2, P-3 (CHW)
- Type: End suction
- ID: P-4 (CW)
- Type: Vertical turbine
- Condition: Fair

5. Capacity: 379.5 tons

Terminal systems

- Location: Non-lab areas
- Type: VAV reheat
- Condition: Poor

Lab supply terminal systems

- Location: Lab areas
- Type: VAV reheat
- Condition: Poor

Lab exhaust terminal systems

- Location: Lab areas
- Type: VAV
- Condition: Poor

Lab exhaust heat recovery systems

- Type: Run around coil.
- Condition: Fair

Exhaust fans

- Type: Exhaust
- Condition: Fair

Lab exhaust fans

- Type: Exhaust
- Condition: Fair

Lab specialty gas systems

- Type: Air, vacuum, gas
- Condition: Good

Domestic water heater

- Location: Basement
- Type: Electric
- Condition: Excellent

PRV

- Location: Basement
- Condition: Fair

Sewage ejector

- Location: Basement
- Condition: Poor

Laboratory vacuum pump system

- Location: Basement
- Condition: Fair

Laboratory air compressor system

- Location: Basement
- Condition: Fair

DESCRIPTION OF EXISTING SYSTEMS (PICTORIAL)

	Photo	Observation
1		<p>Equipment: Fire Sprinkler Location: Entire building Age: 29 years Condition: Fair Recommendations: RETAIN (no visible corrosion)</p>
2		<p>Equipment: Supply Grilles Location: Various locations Type: Ceiling Louver Age: 29 years Condition: Fair Recommendations: RETAIN except where spaces are remodeled</p>
		<p>Equipment: Fire Protection Line & Fire Sprinklers Location: Main Level Condition: Good Recommendation: RETAIN</p>

DESCRIPTION OF EXISTING SYSTEMS (PICTORIAL)

<p>3</p>		<p>Equipment: CHW piping Location: Main Level Age: 29 years Condition: Good Recommendations: RETAIN</p>
<p>4</p>		<p>Equipment: VAV terminals Location: Main Level Age: 29 years Condition: Poor Recommendations: REPLACE (past median service life)</p>
<p>5</p>		<p>Equipment: Ductwork Location: Main Level Age: 29 years Condition: Good Recommendations: RETAIN</p>

DESCRIPTION OF EXISTING SYSTEMS (PICTORIAL)

6		<p>Equipment: HW reheat piping Location: Main Level Age: 29 years Condition: Good Recommendation: RETAIN mains, replace branches with terminal replacements</p>
7		<p>Equipment: Johnson Controls BMS Location: Main Level Age: Unknown, > 10 years Condition: Fair? Recommendation: REPLACE (owner input needed)</p>
8		<p>Equipment: AH-4 Carrier 39 MK 92 Location: Basement Age: 29 years Condition: Fair/poor Recommendation: RETAIN cabinet, coils, REPLACE fans, all controls devices, humidifier section</p>

DESCRIPTION OF EXISTING SYSTEMS (PICTORIAL)

<p>9</p>		<p>Equipment: Heat recovery pump P-5 Location: Basement Age: 29 years Condition: Poor Recommendation: REPLACE, (past median service life)</p>
<p>10</p>		<p>Equipment: AH-2 Carrier 39 MK 74 Location: Basement Age: 29 years Condition: Fair/poor Recommendation: RETAIN cabinet, coils, REPLACE fans, all controls devices</p>
<p>11</p>		<p>Equipment: AH-2 Fan Interior Location: Basement Age: 29 years Condition: Poor Recommendations: REPLACE (beyond median service life)</p>

DESCRIPTION OF EXISTING SYSTEMS (PICTORIAL)

<p>12</p>		<p>Equipment: Sump Pump Location: Basement Age: 29 years Condition: Poor Recommendations: Replace (past median life, replace pump)</p>
<p>13</p>		<p>Equipment: Condensate Pump Location: Basement Age: 29 years Condition: Poor Recommendations: REPLACE (past median service life)</p>
<p>14</p>		<p>Equipment: Piping Location: Basement Age: 29 years Condition: Fair Recommendations: RETAIN (owner input needed)</p>

DESCRIPTION OF EXISTING SYSTEMS (PICTORIAL)

<p>15</p>		<p>Equipment: Heat transfer package Location: Basement Age: 29 years Condition: Fair Recommendations: REPLACE (past median service life)</p>
<p>16</p>		<p>Equipment: AH-1 Location: Basement Age: 29 years Condition: Fair Recommendation: RETAIN cabinet, coils, REPLACE fans, all controls devices</p>
<p>17</p>		<p>Equipment: Chiller CH-1 Location: Basement Age: 29 years Condition: Poor Recommendations: REPLACE (past median service life)</p>

DESCRIPTION OF EXISTING SYSTEMS (PICTORIAL)

<p>18</p>		<p>Equipment: Air Compressor Location: Basement Age: 29 years Condition: Fair Recommendations: REPLACE (if no significant loss is seen on performance. Past median service life, place in the next 5-10 years)</p>
<p>19</p>		<p>Equipment: AO Smith Water Heaters 1 & 2 Location: Basement Age: > 1 Year Condition: Excellent Recommendations: RETAIN</p>
<p>20</p>		<p>Equipment: Laboratory vacuum pump Location: Basement Age: 29 years Condition: Fair Recommendations: REPLACE (owner input needed)</p>

DESCRIPTION OF EXISTING SYSTEMS (PICTORIAL)

<p>21</p>		<p>Equipment: Laboratory air compressor Location: Basement Capacity: Age: 29 years Condition: Fair REPLACE (owner input needed)</p>
<p>22</p>		<p>Equipment: Piping Location: Basement Age: Assumed to be new Condition: Good Recommendation: RETAIN</p>
<p>23</p>		<p>Equipment: Hot Water Recirc. Pump Location: Basement Age: Assumed to be new Condition: Excellent Recommendation: RETAIN</p>

DESCRIPTION OF EXISTING SYSTEMS (PICTORIAL)

<p>24</p>		<p>Equipment: Waste and vent piping Location: Basement Age: Assumed to be original Condition: Good Recommendation: RETAIN (owner input needed)</p>
<p>25</p>		<p>Equipment: Duct Insulation Location: Basement Age: Assumed to be original Condition: Good Recommendation: RETAIN</p>
<p>26</p>		<p>Equipment: Fume hood Vent Ducts Location: Various location Age: 29 years Condition: Good Recommendation: RETAIN</p>

DESCRIPTION OF EXISTING SYSTEMS (PICTORIAL)

<p>27</p>		<p>Equipment: Lab gas piping Location: Various location Age: 29 years Condition: Good Recommendation: RETAIN, (copper piping is exposed, provide insulation to enhance performance and cost savings.)</p>
<p>28</p>		<p>Equipment: Lab terminal Location: Lab Age: 29 years Condition: Poor Recommendation: REPLACE</p>
<p>29</p>		<p>Equipment: Exhaust fans Location: Roof Age: 29 years Condition: Fair Recommendations: REPLACE</p>

DESCRIPTION OF EXISTING SYSTEMS (PICTORIAL)

<p>30</p>		<p>Equipment: Laboratory exhaust fans Location: Penthouse Age: 29 years Condition: Fair Recommendations: REPLACE</p>
<p>31</p>		<p>Equipment: VFDs Location: Lab Age: 29 years Condition: Poor Recommendations: REPLACE (past median service life)</p>
<p>32</p>		<p>Equipment: Heat Recovery Water Piping Condition: Good Recommendations: RETAIN</p>

EQUIPMENT MEDIAN SERVICE LIFE

The American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) lists the following life expectancy. Equipment exceeding the median service life in the below chart is generally recommended for replacement. ASHRAE Median Service Life Chart:

Equipment Item	Median Years	Equipment Item	Median Years	Equipment Item	Median Years
Air conditioners		Air terminals		Air-cooled condensers	20
Window unit	10	Diffusers, grilles, and registers	27	Evaporative condensers	20
Residential single or Split Package	15	Induction and fan coil units	20	Insulation	
Commercial through-the wall	15	VAV and double-duct boxes	20	Molded	20
Water-cooled package	15	Air washers	17	Blanket	24
Heat Pumps		Ductwork	30	Pumps	
Residential air-to-air	15	Dampers	20	Base-mounted	20
Commercial air-to-air	15	Fans		Pipe-mounted	10
Commercial water-to-air	19	Centrifugal	25	Sump and well	10
Roof-top air conditioners		Axial	20	Condensate 15	
Single-zone	15	Propeller	15	Reciprocating engines	20
Multi-zone	15	Ventilating roof-mounted	20	Steam turbines	30
Boilers, hot water (steam)		Coils		Electric motors	18
Steel water-tube	24 (30)	DX, water, or steam	20	Motor starters	17
Steel fire-tube	25 (25)	Electric	15	Electric transformers	30
Cast iron	35 (30)	Heat Exchangers		Controls	
Electric	15	Shell-and-tube	24	Pneumatic	20
Burners	21	Reciprocating compressors	20	Electric	16
Furnaces		Packaged chillers		Electronic	15
Gas- or oil-fired	18	Reciprocating	20	Valve actuators	
Unit heaters		Centrifugal	23	Hydraulic	15
Gas or electric	13	Absorption	23	Pneumatic	20
Hot water or steam	20	Cooling towers		Self-contained	10
Radiant Heaters		Galvanized metal	20		
Electric	10	Wood	20		
Hot water or steam	25	Ceramic	34		

CONCLUSIONS

A. Most of the existing equipment is past the median service life or can be replaced with modern and more efficient equipment.

1. Air handlers AH-1, 2, 3, 4:

- The air handler cabinets appear to be in fair condition. Air handler fans and controls are showing wear due to age. Internal corrosion was not observed on the cabinet. The fans have been in continuous operation for 29 years. Bearings and motors can be replaced. Eventually the fan itself needs to be replaced. Better technology such as fan wall systems are available.

2. Chiller CH-1:

- The chiller is beyond its service life. More efficient equipment is available. The chiller uses HFC-134a and will be phased out in 2028.

3. Cooling tower CT-1:

- The cooling tower is a ceramic type tower in good physical condition. Ceramic towers require maintenance but tend to have very long service life spans. Tower fill and sumps tend to get dirty over time.

4. Pumps P-1 through P-9:

- Heating and cooling pumps are showing wear and are beyond their service life.

5. Terminals:

- Supply terminals are showing wear and are beyond their service life. Dampers and control components tend to wear over time. The terminals directly impact occupant comfort.
- Lab supply and exhaust terminals are showing wear and are beyond their service life. Dampers and control components tend to wear over time. The terminals directly impact occupant comfort. Lab terminals are critical in that they protect building occupants from exposure to fumes.

6. Exhaust fans:

- Exhaust fans are beyond their service life.
- Laboratory exhaust fans are beyond their service life.

7. Steam equipment:

- Steam heat transfer packages are beyond their service life. Because the steam equipment was provided as a package, components are inaccessible and are difficult maintain.

- Condensate pumps and traps are showing wear and is beyond its service life. Steam condensate pumps and traps are key to a steam system proper operation.

8. Laboratory equipment:

- The laboratory vacuum pump, laboratory air compressor, and general air compressor are beyond their service life. It is likely that this equipment has additional life however newer equipment that is more serviceable is available.

9. Water heater:

- The steam water heater and storage tank have been replaced with electric water heaters.

10. Sump pump:

- The sump pump leaks sewer gas and is beyond its service life.

11. Minor equipment:

- Unit heaters are beyond their service life.
- Hoods, and louvers tend to last a long time. BMS components on this equipment tends to wear out with other BMS devices.

12. Plumbing fixtures:

- Plumbing fixtures should be replaced with architectural upgrade.

13. Domestic PRV:

- The domestic PRV is showing age and is beyond its life span.

14. Fire riser:

- The fire rise is showing age and is beyond its life span.

15. BMS:

- The building management system is being maintained but is aging. The electronics which are part of Building Management Systems tend to last about 12 years. Over time control devices get replaced but the conductors and physical equipment such as control valve bodies and damper bodies do not. Upgrading Building Management software can result in energy savings and better occupant comfort.

16. VFDs:

- VFDs serving fans and pumps are outdated. VFD technology has improved significantly.

B. The ductwork and piping are past their median service life spans but are generally in good condition:

1. Steam piping systems show some external corrosion.
2. The ductwork appears to be in good condition.
3. The chilled and hot water piping appear to be in good condition.
4. Domestic hot, cold, and recirculation piping appear to be in good condition. Recirculation piping tends to leak over time. Water mains can be critical failure points.
5. Waste, vent and roof drain piping appear to be in good condition. Waste mains can be critical failure points.
6. Laboratory piping appears to be in good condition.
7. Fire sprinkler piping appears to be in good condition. Fire riser technology tends to change over time.

RECOMMENDATIONS

The following timeline is recommended for systems replacement:

1. Immediate:

- a. Terminals:
 - i. Replace all general terminals (VAVs).
 - ii. Replace all laboratory supply and exhaust terminals.
- b. Cooling tower CT-1:
 - i. Refurbish the cooling tower with clean fill. Clean the tower basin.
- c. Sump pump:
 - i. Replace the sump pump and correct the lid sewer gas leak.
- d. Plumbing fixtures:
 - i. Replace the plumbing fixtures and branch piping if an architectural remodel is planned.
- e. BMS:
 - i. Replace the BMS in its entirety.
- f. VFDs:
 - i. Replace all VFDs.
- g. Waste main:
 - i. Inspect the waste main with a camera to ensure its longevity.
- h. Water main:
 - i. Inspect the waste main with a camera to ensure its longevity.

2. 2-5 years:

- a. Air Handlers AH-1, AH-2, AH-3, AH-4:
 - i. Replace the fan sections.
- b. Chiller CH-1:
 - i. Replace the chiller.
- c. Pumps P-1 through P-9:
 - i. Replace all pumps.
- d. Exhaust fans:
 - i. Replace all general exhaust fans.

- e. Steam equipment:
 - i. Replace heat transfer packages HTP-1 and 2.

- f. Minor equipment:
 - i. Replace all unit heaters and fan coils.
 - ii. Replace all controls on louvers and hoods.

3. 6-10 years:

- a. Air Handlers AH-1, AH-2, AH-3, AH-4:
 - i. Replace the air handlers in their entirety.
- b. Laboratory equipment:
 - i. Replace the lab vacuum pump.
 - ii. Replace the lab air compressor.
 - iii. Replace the
- c. Domestic PRV:
 - i. Replace the domestic PRV system.
- d. Fire riser:
 - i. Replace the fire riser.

5. ELECTRICAL NARRATIVE

6. ELECTRICAL NARRATIVE

CODES AND STANDARDS

1. Latest edition of NFPA codes including:
 - NFPA 70; National Electrical Code
 - NFPA 72; National Fire Alarm & Signaling Code
 - NFPA 101; Life Safety Code
 - NFPA 110; Standard for Emergency and Standby Power Systems
 - NFPA 111; Standard on Stored Electrical Energy Emergency and Standby Power System
2. 2021 International Building Code (IBC)
3. 2020 International Energy Conservation Code (IECC)
4. 2021 International Fire Code (IFC)
5. 2011 IESNA (Illuminating Engineering Society of North America)
6. DFCM Standards

The electrical system will be designed in reference to the following standards:

1. ASTM – American Society of Testing and Materials
2. IEEE – Institute of Electrical and Electronic Engineers
3. IESNA – Illuminating Engineering Society of North America
4. NEMA – National Electrical Manufacturers Association
5. NFPA – National Fire Protection Association
6. UL – Underwriters Laboratories
7. ADA – Americans with Disabilities Act

SITE UTILITY DISTRIBUTION

The building's current electrical service is 2500Amps/3000Amps and, it is anticipated the existing service and existing transformer will be able to feed the new Electrical loads that will be added as per new floor plan changes. Current existing transformer is being fed from existing high voltage primary feed throughout the campus. The transformer is feeding the HMDP panel located in the basement level Main Electrical room.



6. ELECTRICAL NARRATIVE

INTERIOR DISTRIBUTION SYSTEM

1. The HMDP panel and LMDP panels located in the basement level are feeding the sub panels located in the Electrical/Telecom rooms located in the north side of the buildings on all levels and the panels are in the room along with Telecom racks.



2. The new distribution system will be sized to accommodate the needs of the new mechanical system and upgrades.
3. With the new floor plans, it is anticipated to have Electrical and Telecom rooms on both north and south wings to accommodate the voltage drop for branch circuits. New Electrical panels will be added on all levels on south side of the building. Existing panels on north side can be re used to feed the new Electrical loads on north side. The existing panels will be freed up after demolition. New Electrical panels will be added on both north and South side of the building on Level 3.
4. A Dedicated 120/208Volts, 3phase panel to be added in each of the labs to accommodate the Electrical loads in the labs and to avoid long branch circuit runs to the Electrical rooms.
5. All switchboards, distribution, and branch panels need to be fully rated and consist of copper bussing and will be sized to provide a minimum of 25% spare capacity as per SLCC standards and to accommodate future demands.

6. All main feeders will be aluminum and conductors sized at #12 AWG up to #1 AWG will be provided as copper. MC cable is not acceptable as per SLCC standards.
7. All neutral conductors will be fully sized to allow for all non-linear or single-phase loads including but not limited to computers, video monitors, fax machines, copiers, PLC electronics, telecommunications equipment, etc. Since this equipment is single phase, the sinusoidal currents have a phase shift between them and therefore are not able to cancel each other out like they do with linear loads. Rather the values add together and create a load on the neutral conductors. This value is summarized as the Total Harmonic Distortion (THD). Having an electrical system with a large THD value increases maintenance costs and reduces the power quality of the entire electrical system.

EMERGENCY DISTRIBUTION

1. Existing generator is approximately 30yrs old and needs to be replaced.



2. The transfer switches are in the basement level Main Electrical room and can be re-used. Capacity of existing transfer switches need to be evaluated and verified if they can withstand the new emergency loads.
3. All life safety loads (Lighting etc.), Optional (Any outlets, UPS etc.) And legally required loads (Elevators) will be separated with dedicated transfer switches as per NEC and NFPA 101.

POWER OUTLET LAYOUTS

1. Power outlets will be placed in all classrooms with 2 outlets on each wall. Teaching wall to get more outlets to accommodate any special AV equipment.
2. All labs will be having power outlets, cord drops outlets, Floor boxes as per equipment layouts and requirements.
3. Outlets will be placed for every 50ft in the hallways for cleaning purposes.
4. A Quad outlet and data outlet will be located at the desk with one outlet on other walls in all closed office spaces.
5. Outlet face plate style TBD.

LIGHTING

1. Lighting in the existing hallways is very dull, and additional lighting needs to be added. Below is the reference showing the current lighting in the existing hallway.



2. It is anticipated to add wall sconces in the hallway as there is no space above the ceiling to add any ceiling mount light fixtures. All new spaces will be having new LED lighting. All LED light fixtures will be designed at 3500 Kelvin color temperature and be provided with standard 0-10V dimming technology, allowing for dimming of the luminaries. All lighting in the common spaces shall be fed from lighting control panel, via relay, occupancy sensors, for 50% reduction when area is not occupied. Lighting in large open space will be designed with ceiling sensors, relay for time-of-day control and local on/off/dim low voltage switches. Lighting in all classrooms/Labs will be controlled by a local wall station and occupancy sensor to turn off the lights if there is no motion detected for

more than 20 minutes. Lighting in the classrooms/Labs can be dimmed up to 10% through local wall station. Teaching wall lighting will be on different zones and can be dimmed separately. Lighting in small offices, conference rooms will have local wall mounted occupancy/vacancy sensors with on/off/dim options. Storage, closets and custodial rooms will all have wall mounted occupancy/vacancy sensors for on/off control. All restrooms will have dual technology ceiling sensors. Mechanical, telecommunication, data and electrical rooms will have local on/off controls.

3. All new lighting will be designed with energy efficient, high level performing LED light fixtures, complying with UL Standard 8750.
4. All light fixtures shall be used as per latest SLCC and DFCM standards.

STRUCTURED CABLING/COMMUNICATIONS SYSTEM

1. The existing telecom service entrance equipment is located in the basement. The existing Racks are sharing the same room along with Electrical panels. The Telecom racks need to be separated from Electrical panels as per DFCM standards.
2. Telecom rooms shall be statistically placed in each level to have the CAT-6 cable lengths within 100meters (290ft).
3. All telecom cabling shall be raceway only. 1" conduit will be provided from the Telecom rack to data outlet locations. Cable trays shall be provided wherever possible with accessible ceilings. All cabling shall be by SLCC IT team.
4. Power outlets shall be provided to power the UPS and PDUs located in the data racks.
5. Telecom racks shall be grounded to ground bus bar.

FIRE ALARM SYSTEM

1. The existing fire alarm panel and fire alarm device have been recently replaced and can be re used during renovation.
2. Horn strobes will be added in the classrooms, labs conference rooms etc. Any new devices that are added during renovation shall be added to the existing loop. All fire alarm cables shall be installed in conduit.

SECURITY SYSTEM, ACCESS CONTROL SYSTEM, AUDIOVISUAL SYSTEM

Security, Access control and AV systems shall be raceway only. All cabling will be by SLCC team.

6. SCHEDULE AND PHASING APPROACH

6. COST ESTIMATE