



PROGRAM FOR THE PSU TYLER PROVE-OUT FACILITY

12 20 2023

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ACKNOWLEDGEMENTS

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INTRODUCTION

As technology across the Globe continues to expand at an accelerated rate, Pittsburg State University will help drive innovation, grow applied research, and expand course offerings and degree programs to support business and industry with graduates that are educated in the cutting-edge technologies that are growing the US and global economy. This will allow Pittsburg State to attract additional students and support the growth of future-focused and industry-aligned research, degree, and workforce development programs and initiatives. The construction of this unique and interdisciplinary project will also better position Pittsburg State for federal, state, and industry partnership funding for basic and applied research grants to further expand its technology base, support essential growth of its research enterprise and drive development of a technology-based economy.

The University's division of Economic Development and Community Engagement (EDCE) has acquired state and federal funding to build the National Institute for Materials Advancement's (NIMA) Prove-Out Facility, to accommodate local and regional entrepreneurs and businesses, to assist in moving conceptual products from proof-of-concept to pilot-scale within the research center currently housed at PSU.

NIMA's Prove-Out Facility will provide the region with the ability to produce materials and products locally, and provide regional businesses with a skilled workforce to accomplish small-scale runs and prototyping for larger-scale production. A partnership with Kansas State University's Technology Development Institute and the Great Plains Technology & Manufacturing Cluster affords PSU the opportunity to have local, regional, and national impact.

The Covid-19 pandemic exposed cracks in communities nationally, as some vulnerable groups have borne the brunt of the pandemic's impact. Low-socioeconomic communities, such as those in Southeast Kansas, have struggled to keep businesses afloat with the resources available. Manufacturing industries that could provide economic diversity to the region need help in developing and producing new ideas that will allow them to grow and become self-sustaining. NIMA's Prove-Out Facility will enhance regional growth and economic diversity as it will be used by start-up businesses, as well as existing businesses, to create market development quantities of products locally that are currently being outsourced overseas for pilot-scale manufacturing. The ability to create within the region will allow for business growth, expansion of existing facilities, and creation of new facilities, along with recruiting and development of a more skilled workforce.

INTRODUCTION

A strong partnership exists between EDCE, the City of Pittsburgh, the Pittsburgh Area Chamber of Commerce, local and regional businesses, and economic development associations. Industry leaders and entrepreneurs continue to seek an entity that allows for small-scale production runs showing economic feasibility and meeting market demands. Leaders in regional manufacturing have expressed a need and are actively engaged in ensuring the success of the NIMA Prove-Out facility. With the help of regional businesses, EDCE will lead the effort to determine market needs and assist in the development process from idea creation to prototyping. The planned Prove-Out facility will allow these efforts to move to fruition.

The NIMA Prove-Out Facility will be constructed on state land and located within the approximate 9 acres of Research Park with shared access with the City of Pittsburgh. It will be directly adjacent to the existing Tyler Research Center, which houses NIMA and the Kansas Polymer Research Center (KPRC). It is anticipated that by promoting regional innovation and making pilot-scale manufacturing accessible to local entrepreneurs, over the next ten years, 200 new high paying technology-based jobs will be added to the area, along with an estimated \$100M in capital investment, including satellite support businesses.

This new addition to the Tyler Research Center will provide state of the art research and advanced manufacturing space for academic, industry, and broader community use. Existing space to accommodate the type of large bay manufacturing functions, large equipment and delivery needs on the Pittsburgh State campus does not exist. The addition's design will expand on the Center's reach and will provide broader access to research for student learning. Making this an addition will also leverage opportunities for sharing space, creating more efficient use of space, and providing flexible environments that can serve multiple needs.

Cost of Servicing the Building

Annual projected maintenance costs for the building are \$174,913 and annual projected operations costs are \$433,611. The programs and entities housed in the facility will be responsible for these costs.

Project Delivery

Construction Management at Risk is the preferred project delivery method. The desire to be operational as soon as possible, the complexity of materials and equipment procurement, the technical requirements for laboratory construction are reasons for this preference.

PROJECT GOALS

- Build the space and infrastructure to **support advanced manufacturing, research and design thinking**
- Provide an architecturally **graceful addition** to the existing Tyler Research Center
- Make a **functional connection** between the space in the existing facility and the new spaces
- Plan a design that is **flexible, adaptable, changeable and expandable** enabling growth and change over time and allowing for “strategic serendipity”
- Create a **collaborative place**, bringing together faculty, students, researchers, and industry
- Design a building that models and **expresses the focus of sustainability** found in the research and development science

NUMERIC PROGRAM

This program includes two phases. The First Phase is intended to move into the design and construction immediately as shown on the Project Schedule. The Second Phase represents a potential future phase.

The programming process included the planning team touring the existing Tyler Research facility spaces looking at how each space currently functions. To determine future space, the programming committee took benchmark visits to numerous facilities to observe the practices in like-research space, while also studying educational pedagogies and approaches and construction types. The planning team then created the numerical program creating space sizes that will be functional and over time allow for future change, use and growth.

First Phase	Proposed Program			Notes
	Quantity	NSF	NSF Total	
Space Name				
RESEARCH LABS				
Analytical Labs	4	242	968	11 x 22 lab modules
Wet Chemistry Labs	4	242	968	11 X 22 lab modules, 2 fume hoods, one sink each
Testing Labs	1	242	242	11 X 22 lab modules, no built-ins
SUBTOTAL:			2,178	
SHARED LAB RESOURCES				
Clean Room	1	375	375	
Xray	1	225	225	
Laser	1	375	375	
Microscopy	1	225	225	
Chemical Storage	1	700	700	
General Storage	1	150	150	
Grinding/Recycling	1	300	300	Double doors, palettes
SUBTOTAL:			2,350	
DESIGN AND TESTING				
Production Labs- High Bay	1	8,600	8,600	Large open area divisable into modules
Program Manager Office	1	120	120	
Itinerant Office	1	90	90	
Project Rooms	2	140	280	
Discovery Space	1	500	500	
Small Meeting Room	1	168	168	Seats 6-8
Large Meeting Room	1	500	500	Seats 14 - 16, divided for flexibility
Storage	1	120	120	
SUBTOTAL:			10,378	
OFFICES				
Reception/Waiting			0	Located in the existing Tyler Facility
Facility Manager Office	1	120	120	
Lab Manager	1	120	120	
Researcher Offices	3	120	360	
Work/Copy Room	1	120	120	Copier/Printer, Supplies, etc.
Break Room	1	200	200	Microwave, sink, fridge, water filter
SUBTOTAL:			920	
SUPPORT				
Flex Space	1	350	350	
Circulation, Mech, Jan, Restrooms			0	Included in the Net to Gross factor
SUBTOTAL:			350	
SUMMARY				
RESEARCH LABS			2,178	13%
SHARED LAB RESOURCES			2,350	15%
DESIGN AND TESTING			10,378	64%
OFFICES			920	6%
SUPPORT			350	2%
TOTAL NET SF:			16,176	
N/G FACTOR			1.3	
TOTAL GROSS SF:			21,029	

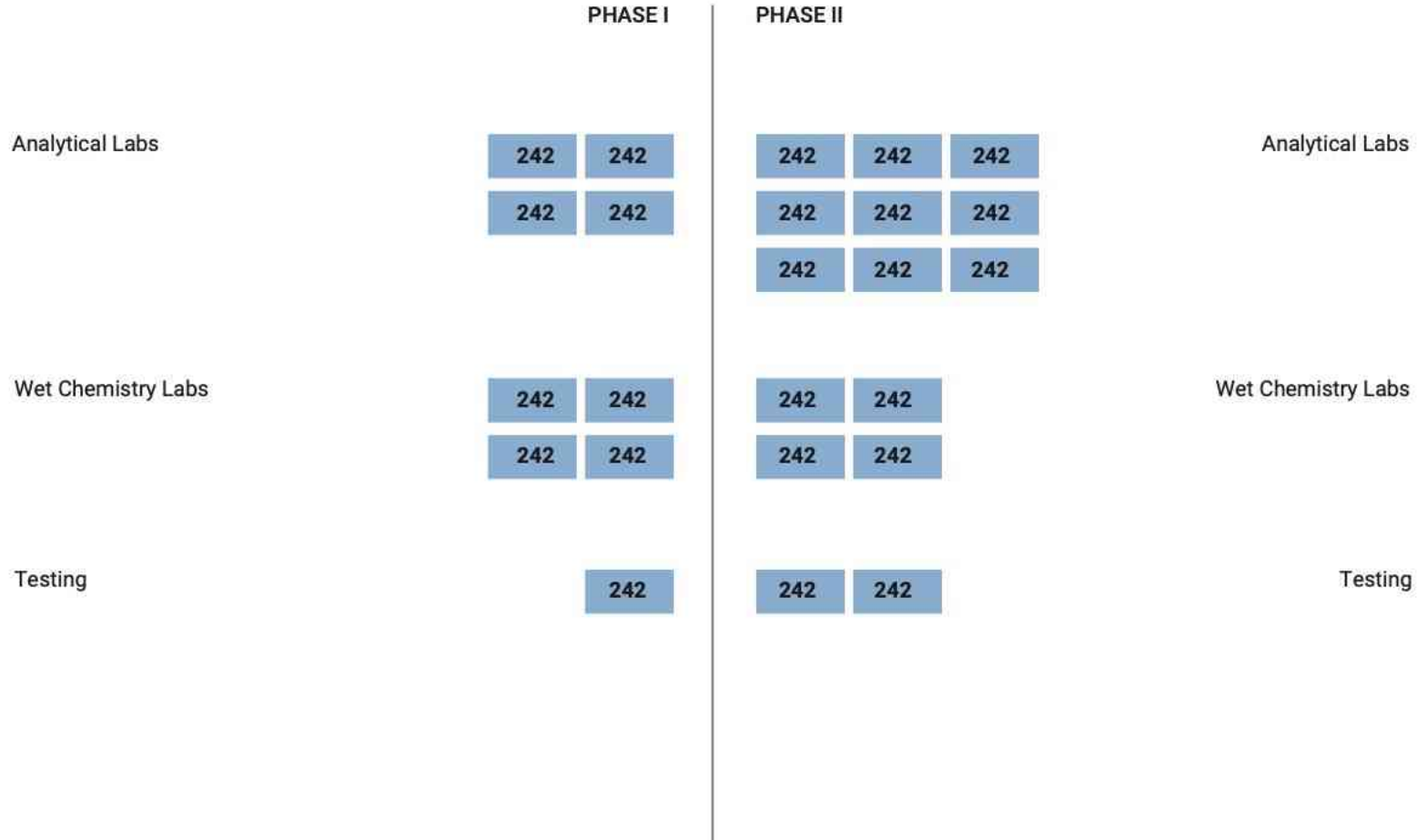
Second Phase	Proposed Program			Notes
	Quantity	NSF	NSF Total	
Space Name				
RESEARCH LABS				
Analytical Labs	9	242	2,178	11 x 22 lab modules
Wet Chemistry Labs	4	242	968	11 X 22 lab modules, 2 fume hoods each
Testing	2	242	484	11 X 22 lab modules, no built-ins
SUBTOTAL:			3,630	
DESIGN AND TESTING				
Production Labs	1	5,500	5,500	
Itinerant Office	1	90	90	
Small Meeting Room	1	168	168	Seats 6-8
Large Meeting Room	1	500	500	Seats 14 - 16, divided for flexibility
SUBTOTAL:			6,258	
OFFICES				
Researcher Offices	5	120	600	
SUBTOTAL:			600	
SUPPORT				
Circulation, Mech, Jan, Restrooms			0	Included in the Net to Gross factor
SUBTOTAL:			0	
SUMMARY				
RESEARCH LABS			3,630	35%
DESIGN AND TESTING			6,258	60%
OFFICES			600	6%
SUPPORT			0	0%
TOTAL NET SF:			10,488	
N/G FACTOR			1.3	
TOTAL GROSS SF:			13,634	

NUMERIC PROGRAM

This second phase represents future expansion of key areas of the research and Prove-Out spaces of the project. It is intended that these areas are located in proximity to like spaces in the phase one facility.

GRAPHIC PROGRAM

RESEARCH LABS



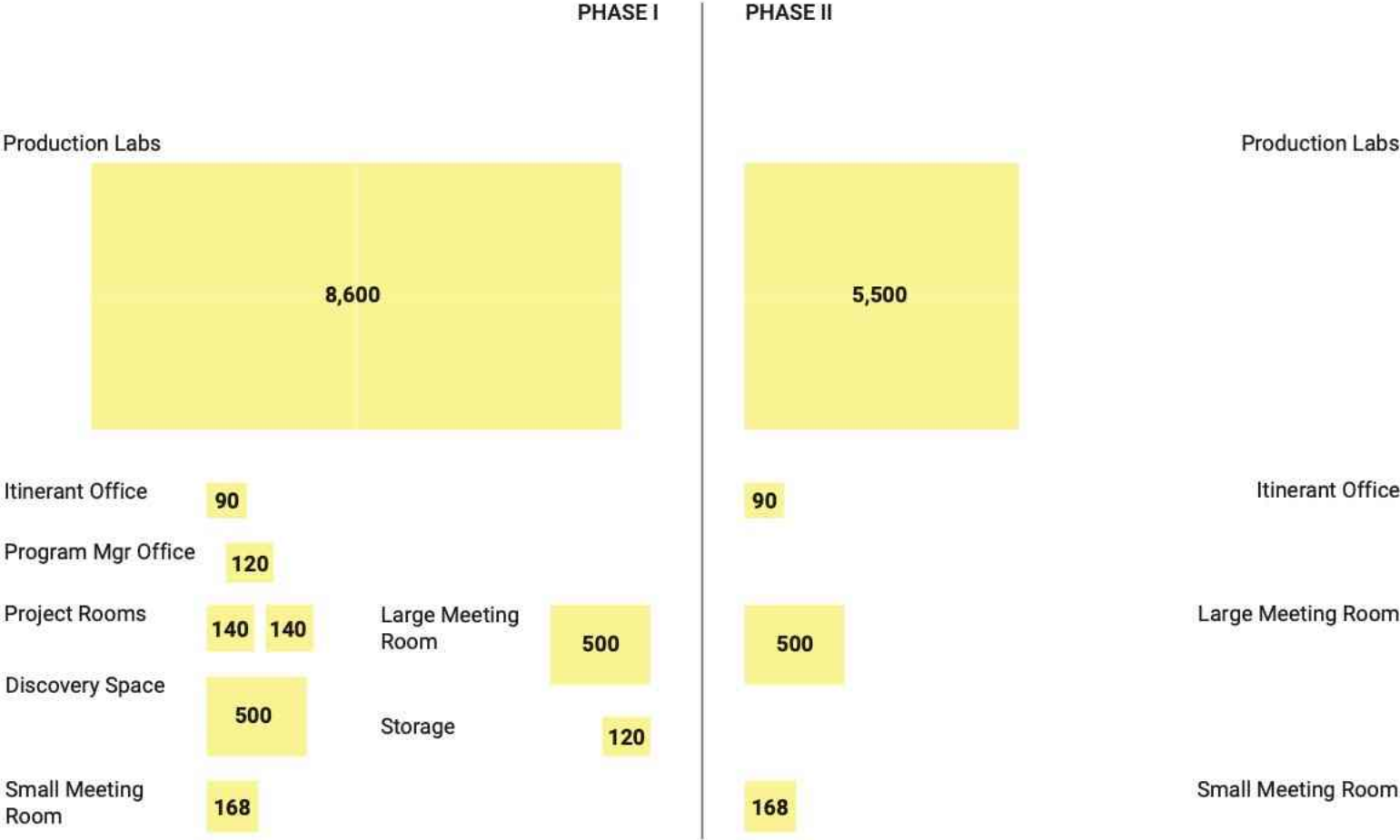
GRAPHIC PROGRAM

SHARED LAB RESOURCES



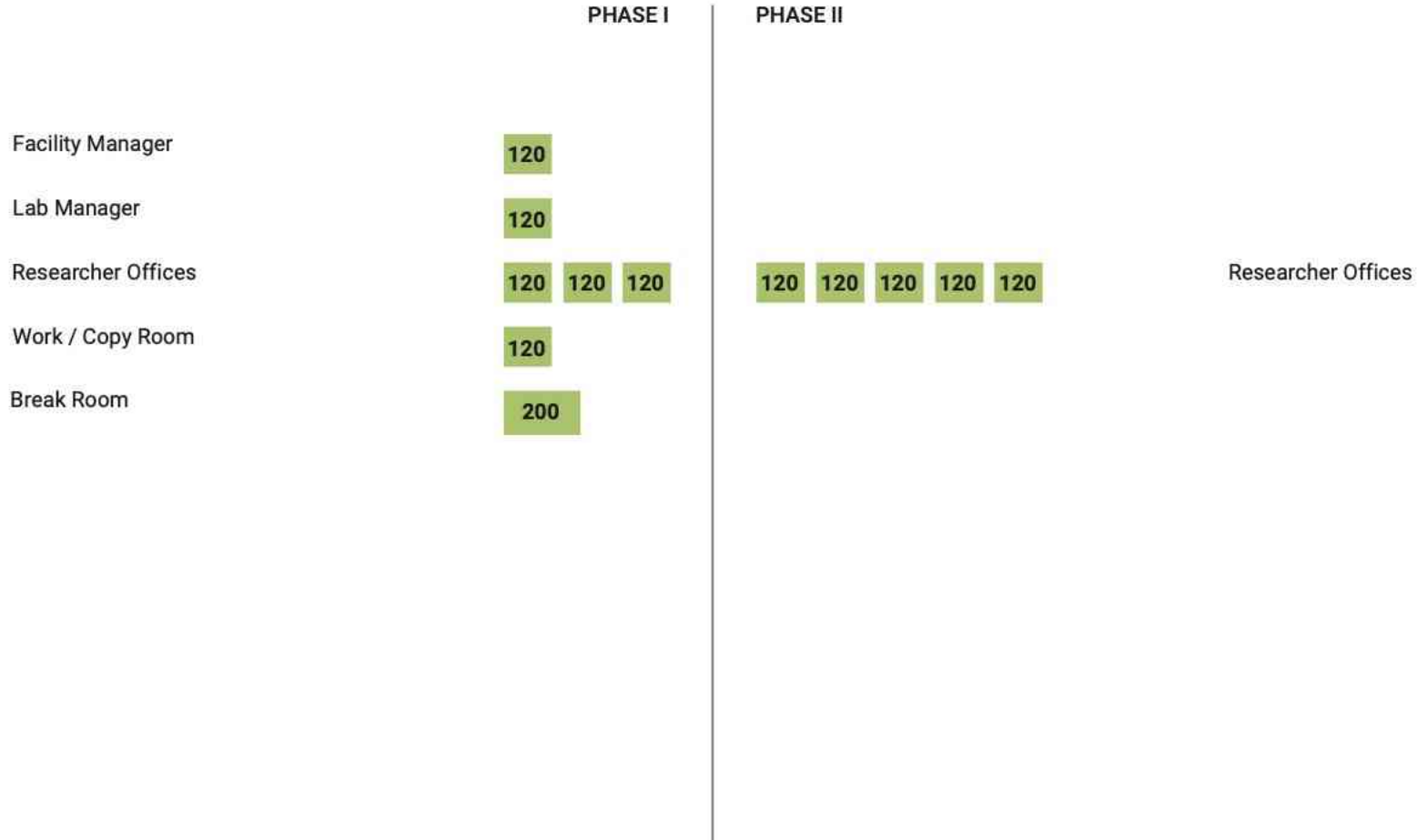
GRAPHIC PROGRAM

DESIGN AND TESTING



GRAPHIC PROGRAM

OFFICES



GRAPHIC PROGRAM

SUPPORT

PHASE I

PHASE II

Shower / Changing Area

100

Wellness

250

LAB PLANNING

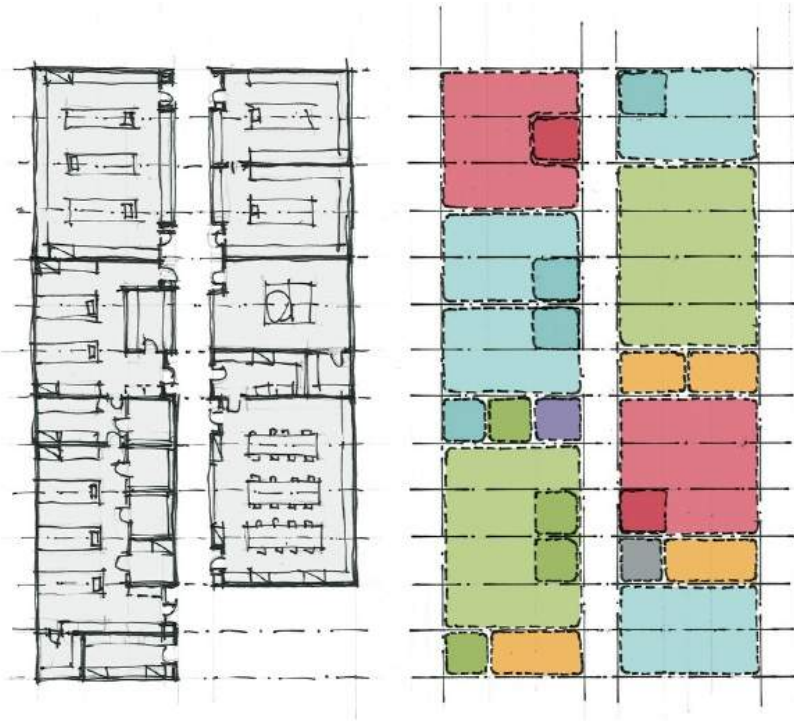
Laboratories of all types, from research to instructional, must have the flexibility to adapt to future changes in technology and scientific processes. For the wet labs, analytical labs, and the shared lab support, a lab module is planned to guide the layout of the floor plans. A modular plan provides two main benefits:

Flexibility. The lab module will enable change within the building. Academic institutions typically change the layout of 5 to 10 percent of their labs annually. Research is changing all the time, and buildings must allow for reasonable change.

Expansion. Lab planning modules allow the building to adapt easily to expansions or contractions without sacrificing facility functionality.

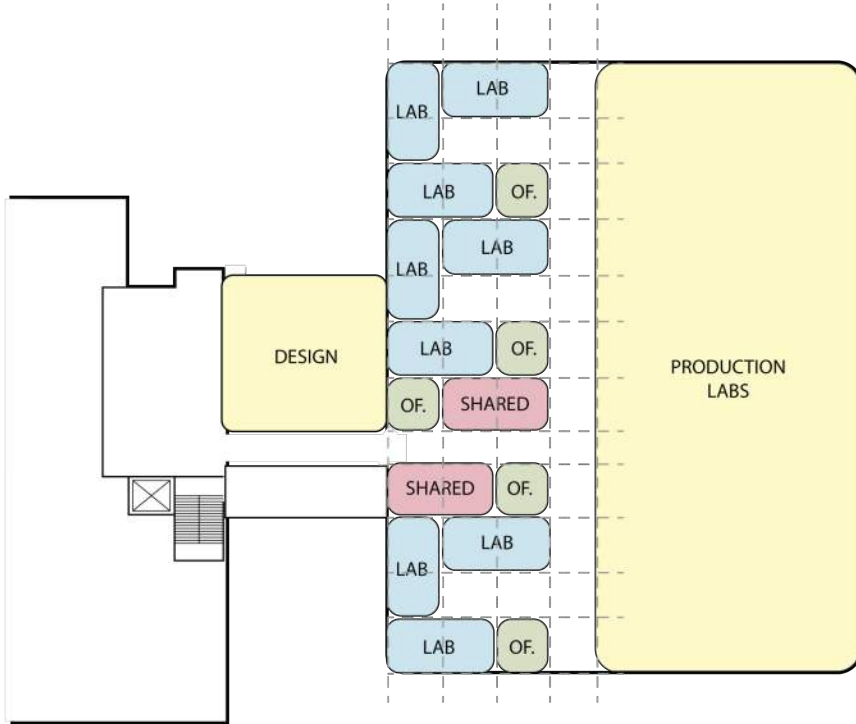
Two-Directional Module

Flexibility increases with a lab module that works in two directions. Employing the common width of 11' and a depth of 22' allows casework to be organized in either direction. A two-directional grid allows varied lengths of run for casework, which if movable, can be rearranged to create various workstation types and sizes based on research needs. Utility drops, if necessary, should occur at the intersection of the 11' modules.

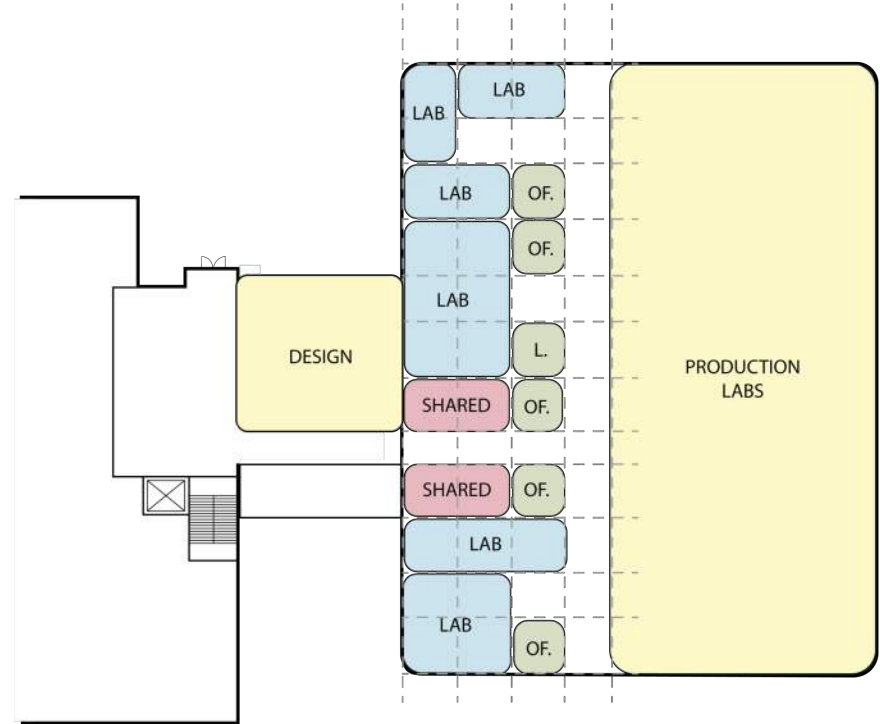


One Directional Lab Module

LAB DIAGRAMS



Initial Program Buildout - Two Directional Lab Module



Example Future Response to Program Changes

EQUIPMENT PLANNING

Item	Size (sq.ft)	Work area (sq.ft)	Qty	Possible Room
Initial instrument				
Dryer	15	5X6=30	1	Production lab
CNC	48	10X12=120	1	Production lab
Battery Manufacturing	150	15X20=300	1	Analytical Labs
Benchtop Extruder	24	6X10=60	1	Production lab
Benchtop Injection mold	24	5X8=40	1	Production lab
Granulator 12X14 500 lb. /hr cap	12	8X8=64	1	Production lab
Glove Box	40	8X8=64	2	Analytical Labs
Hot press for making test samples	5	3X3=9	1	Production lab
Phase 2				
Pulsed Laser Deposition System	100	10X14=140	1	Analytical Labs
Sputtering Units	50	10X10=100	1	Analytical Labs
Chemical Vapor Deposition System	25	4X7=28	1	Analytical Labs
Raman Spectroscope	5	3X3=9	1	Analytical Labs
Transmission Electron Microscope	100	10X10=100	1	Analytical Labs
X-Ray Photoelectron Spectroscopy	100	10X10=100	1	Analytical Labs
Confocal Microscopes	5	3X3=9	1	Analytical Labs
Semiconductor Characterizations	4	3X3=9	1	Analytical Labs
Phase 3				
Injection Molder 110 Ton Clamp	120	28X15=420	1	Production lab
Extruder: Twin-Screw 35mm dia	40	16X10=160	1	Production lab
X-Ray Diffraction Spectroscopy	40	6X10=60	1	Analytical Labs
Atomic Force Microscope	5	3X3=9	1	Analytical Labs
Other small lab instruments			1	Wet/Analytical
Dielectric instrument	5	3X3=9	1	Analytical Labs
Shuttle Thermoformer	36	8X10=80	1	Production lab

A model list of potential equipment has been developed to inform the sizing of utilities and services for the building. This approach is necessary given the unknowns of future needs and development of laboratory approaches to meet new needs of research, industry and academics. This equipment would be purchased and installed over time and the phases noted represent phases of equipment purchase, rather than building expansion phases.

Each buildout and equipping of future labs will provide distribution of HVAC, power and other utilities as needed by connecting to established service line locations in the building.

BUILDING SYSTEMS REQUIREMENTS

Architectural Systems

The addition to the Tyler Research Center will utilize exterior materials that fit with the existing building. These include precast concrete, brick, and anodized aluminum window framing and detailing. Insulated concrete wall panels and membrane roofing, insulated high-bay doors, and select areas of storefront glazing and brick masonry veneer will provide an energy efficient building envelope and visually relate to the existing building.

High performance insulation and detailing will help the building reduce energy consumption and meet the State of Kansas energy performance requirements. Interiors for the labs and corridors will be durably finished with sealed concrete floors, painted concrete block walls and overhead translucent glazing to reduce lighting energy usage. Gypsum walls on metal studs and acoustic ceiling systems will also be utilized in areas with lower durability needs.

The building will be designed to meet or exceed the code requirements as adopted by the State of Kansas as referenced in the State of Kansas Building Design and Construction Manual.

Structural

The structural system will be steel beams and columns on concrete foundations. In the production laboratory the structure will be long span beams on steel columns. The long spans will be utilized to reduce the number of columns to achieve flexibility and facilitate future changes and large equipment.

The steel structure of all the other laboratories will support a mezzanine for mechanical equipment and support space needs. Areas of the floor slab will be thickened to support the weight of specialized equipment. Other areas of the floor slab will be isolated to support the need of vibration control for specialized equipment.

BUILDING SYSTEMS REQUIREMENTS

Heating, Ventilating, and Air conditioning Systems

The HVAC system shall be designed to meet or exceed minimum requirements of ASHRAE Standard 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings and the International Energy Conservation Code (adopted by the State of Kansas).

The primary heating source will be a hydronic heating loop. The system will consist of two condensing boilers each sized for 2/3 of the building load and two recirculating pumps. The system pumps (two, operating lead/lag) shall be on VFDs. Each boiler will include a boiler pump for a primary/secondary system. System will utilize glycol for freeze protection. Heating hot water will provide heating to the building air handling units, reheat coils and vestibule heaters. Note that the system shall be sized and installed to account for the future addition.

The primary source of cooling will be a single air-cooled chiller. The chiller shall have an integral pumping system. System pumps (two, operating lead/lag) shall be on VFDs. System will utilize glycol for freeze protection.

Chilled water will provide cooling to the building air handling units. Note that the system shall be sized and installed to account for the future addition.

The research labs, wet labs, offices, restrooms and common area spaces shall be served by a single variable air volume roof-mounted air handling unit (AHU) with filter bank, natural gas preheat coil, heating hot water coil and chilled water coil. The air handling unit will utilize airside economizer. The unit will serve terminal units for individual space control with hot water reheat.

The Production Lab will be served by two suspended air handling units. Each unit will have a filter bank, heating coil, cooling coil and supply fan. Exposed ductwork will route through the space. Each air handling unit will utilize an airside economizer. A gas-fired steam humidifier and water softening system in the mechanical room will be required to maintain humidity levels in winter. It is expected the humidity will be served via dispersion grid into the ductwork.

A lab exhaust system with redundancy will be extended to each wet lab fume hood along with a general exhaust grille.

BUILDING SYSTEMS REQUIREMENTS

Each room exhaust duct will be controlled by an air valve to modulate flow based on hood operation. A corresponding air valve will be connected on the supply to modulate flow for pressurization control.

Communications room with servers and other data/communications equipment shall be served by individual mini-splits.

All HVAC systems shall be integrated into the current campus building automation system. Interactive graphics and floorplans shall be provided for all equipment and spaces.

All HVAC equipment shall be seismically braced dependent on a structural / seismic analysis.

Plumbing Systems

General Plumbing requirements to meet current code requirements. Domestic hot water for the building is proposed to utilize a central domestic hot water heating system. Recirculation is expected and recirculation pump sized appropriately for the head and flow.

Hot water delivery shall be within 15 seconds.

Each wet lab will include a sink, eye-wash station and RO water to the hood. The Production Lab will have hose bibbs around the perimeter, emergency eyewash and shower.

A common area restroom bank will provide for the minimum facility water closets, urinals and lavatories. All fixtures to be wall-hung with automatic flush valves and sensors. Fixtures to meet PSU standards.

Specialty Systems:

Compressed Air: Two separate compressed air systems shall be provided. One system will be dedicated to the labs and will have a single compressor, filter, heatless desiccant dryer and storage tank. All distribution piping to be stainless steel. A piped compressed air system will extend to each lab space. A second system will be dedicated to the Production Lab space and will have a dual compressor, filter, refrigerated dryer and storage tank. All distribution piping to be copper. A piped compressed air system will route on a looped grid basis below the structure within the bay. Pipe drops along the perimeter will be spaced appropriately with a valve, regulator and quick-connect.

BUILDING SYSTEMS REQUIREMENTS

Valved tees to be provided for future connections in the upper loop.

RO Water System: A reverse osmosis system capable of 10gpm shall be piped to each wet lab. System to include tanks, filters, treatment and pumps.

Piped Gas System: A common gas cylinder room shall house tanks for nitrogen, carbon dioxide and argon. Manifold piping will be extended to each wet lab to a ceiling mounted gas manifold.

Electrical Systems

Power Distribution:

This building will be served by a pad mounted utility transformer. It is anticipated that the proposed service will be an 1600-Amp, 480Y/277-Volt, 3-Phase, 4-Wire electrical service (with a main breaker) served from the proposed pad mounted transformer. Surge suppression devices shall be installed on the main service. The service will be separate from the existing building.

This main distribution service will be centrally located and from this location, power will be distributed throughout the facility at the higher voltage and be transformed to 208Y/120-Volt, 3-Phase, 4-Wire at strategic locations as needed. The 480Y/277-Volt service is intended to serve large HVAC loads, lighting, Production Lab equipment and low voltage transformers. Conversely, the 208Y/120-Volt distribution is intended to serve common receptacle loads, smaller HVAC loads, controls and miscellaneous equipment. A standalone UPS system shall be provided for the 208Y/120-Volt distribution within the labs.

Distribution within the Production Lab will consist of a bus duct grid will be provided at both 480Y/277-Volt and 208Y/120-Volt. The grid will be spaced on approx. 40' spacing. Buss duct shall be finger-safe power distribution track with corresponding power activations (in each voltage) to allow for flexibility of the space.

A backup generator shall be provided to support all emergency lighting, life safety systems and the lab loads fed from the UPS.

BUILDING SYSTEMS REQUIREMENTS

All feeders will be sized based on copper and sized for the full ampacity of the overcurrent device from which it is fed. Aluminum feeders will be allowed for any feeders greater than 200-Amps or #3/0 AWG. Below grade conduits shall be PVC. All panelboards and associated circuit breakers shall be fully rated. Distribution gear shall be rated for the environment where it is to be installed. In all cases, NEC required working clearances shall be maintained. Receptacles shall be "specification grade" and shall be 15-Amp and 20-Amp as required; all dedicated receptacles shall be 20- Amp. All receptacles located within 6-feet of a sink, or as otherwise prescribed by NEC Article 210, shall be GFCI protected, whether locally protected or at the circuit breaker. Devices located exterior of the building or in wet locations shall be listed as "weather-resistant" and be provided with a weatherproof "in-use" covers.

Interior Building Lighting:

All lighting shall utilize solid state LED technology and shall be capable of 0-10-Volt dimming. General interior lighting will consist of a mixture of recessed/surface mounted light fixtures and recessed downlights where applicable.

In locations where the architect/designer desires a higher aesthetic, fixtures will be coordinated and specified accordingly. Utility spaces, such as janitors' rooms, will be provided with strip utility lighting fixtures. Illumination levels will follow IES recommendations and meet or exceed all requirements for egress illumination per the NFPA 101.

Lighting Controls:

Lighting controls will follow PSU standards and the IECC. Where applicable, multiple levels of control will be provided to allow for space flexibility. In spaces such as electrical/mechanical rooms or other such utility spaces, manual toggle switches with no dimming capabilities will be used.

Throughout the facility, all light fixture circuits will be controlled with occupancy sensors or schedule-based controls that can be altered by the end user via network interface (if desired). Spaces that have electrical or mechanical equipment will not have occupancy or time-based control.

BUILDING SYSTEMS REQUIREMENTS

All controls will be based on Legrand/Wattstopper products. In spaces with audio-visual needs, lighting and lighting controls will be coordinated and integration will be investigated to simplify system usage for the End User.

Exterior/Site Lighting:

Building mounted and site lighting shall consist of LED fixtures to accent the architectural elements as needed, while providing adequate lighting for the safety of occupants and visitors.

Exterior lighting shall be controlled by an astronomical timeclock/photocell located on the building. Exterior lighting will all be 3000K (or as agreed upon otherwise during design) color temperature and shall be controlled as needed to adhere to any restrictions regarding light spill or otherwise due to the location of the facility.

Telephone / Data Systems:

The building will have an MDF located on the main level and from equipment within these room(s) be distributed throughout the building. An extension of conduit and fiber shall extend from the existing building to the addition.

All low voltage cabling installation will adhere to BICSI standards. Telephone and data systems will be coordinated with PSU personnel during design for desired locations and other standards.

CCTV / Security / Access Controls:

It is anticipated that the following systems will be required for this building fire alarm, CCTV, access controls and building security system. System design, including architecture, device specification, etc. will need to be by the appropriate system vendor (as selected by the Owner) during this design process.

Fire Protection Systems

Fire Sprinkler:

The sprinkler system protection system in the lab area shall be piped on a wet pipe sprinkler system and hydraulically designed to provide a 0.20 gpm/sq. ft. density over the most remote 1,500 sq. ft., plus a 250-gpm hose stream allowance. Sprinklers shall be arranged to cover a maximum of 130 sq. ft. per sprinkler, with the maximum distance between sprinklers not to exceed 15 ft. with NFPA 13.

BUILDING SYSTEMS REQUIREMENTS

Sprinklers shall be minimum K-5.6, upright or pendant, standard response and ordinary temperature rated (155°F to 175°F). It shall be designed and installed in accordance with NFPA 13.

The sprinkler system protecting the Production Lab area shall be piped on a wet pipe sprinkler system and hydraulically designed to provide a 0.20 gpm/sq. ft. density over the most remote 1500 sq. ft., plus a 250- gpm hose stream allowance. Sprinklers shall be arranged to cover a maximum of 130 sq. ft. per sprinkler, with the maximum distance between sprinklers not to exceed 15 ft. Sprinklers shall be minimum K-5.6, upright or pendant, standard response and ordinary temperature rated (155°F to 175°F). It shall be designed and installed in accordance

The sprinkler system protecting the office, restrooms and common areas shall be piped on a wet pipe sprinkler system and hydraulically designed to provide a 0.10 gpm/sq. ft. density over the most remote 1,500 sq. ft., plus a 100-gpm hose stream allowance. Sprinklers shall be arranged to cover a maximum of 225 sq. ft. per sprinkler, with the maximum distance between sprinklers not to exceed 15 ft.

Sprinklers shall be minimum K-5.6, upright or pendant, quick response and ordinary temperature rated (155°F to 175°F). It shall be designed and installed in accordance with NFPA 13.

Fire Alarm: An addressable fire alarm system shall be provided. Devices such as horns, pull stations, heat detectors, smoke detectors, visual devices (strobes), duct detectors, and fan shutdown shall be provided. The fire alarm system shall be a voice notification system per PSU standards.

Initiating and detection devices will all be addressable. When in alarm mode, the system will annunciate the type and location of each initiating device. The system will transmit alarm, supervisory, and trouble signals to the main 24-hour staffed location as well as the fire department per NFPA 72 methods. The FACP will be placed at the main entry so the fire department may utilize it as an annunciator.

An automatic photo-electric smoke detector shall be installed above the FACP. Smoke and fire/smoke dampers (if required) will have duct detectors installed adjacent to the damper. accessible areas

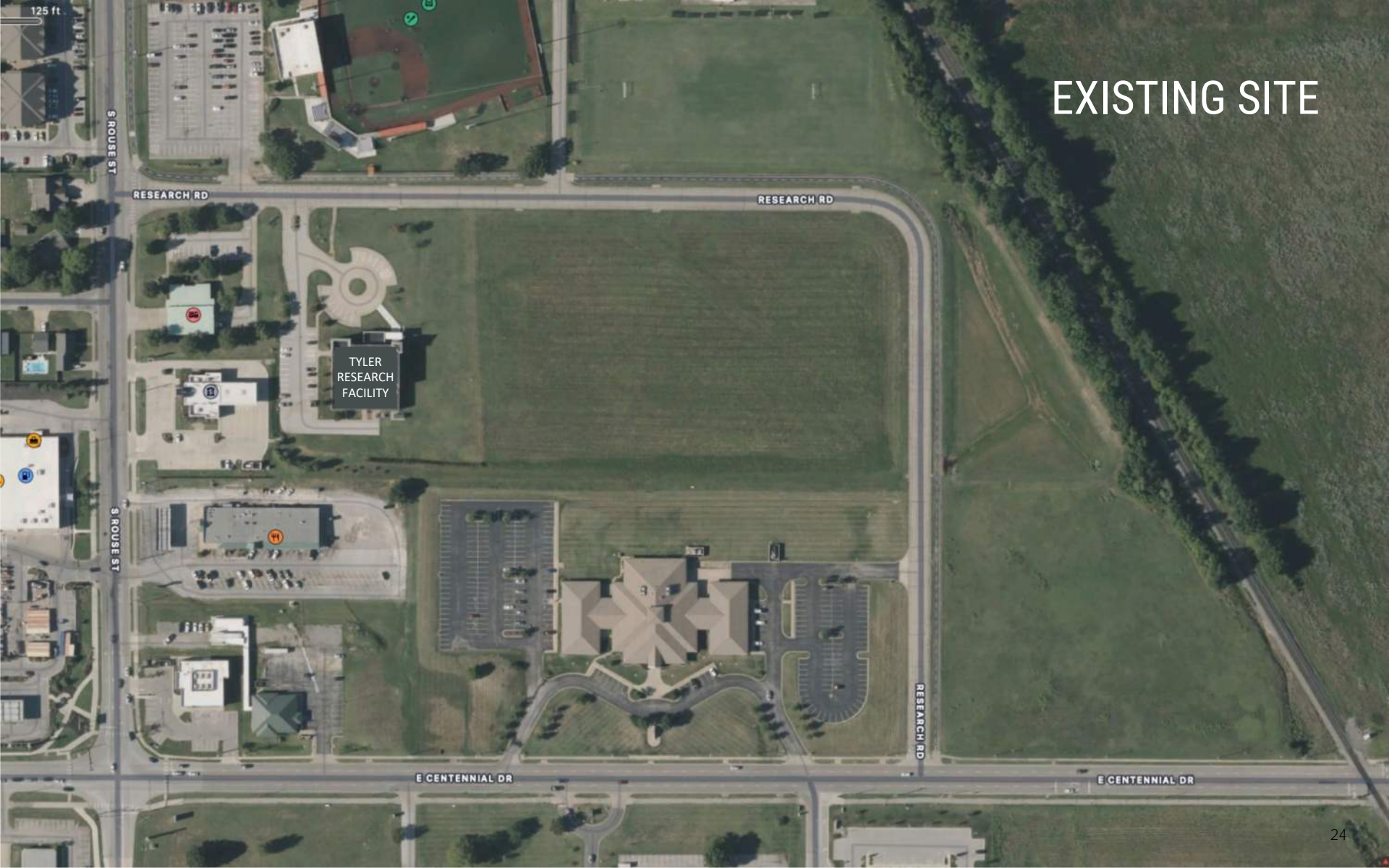
BUILDING SYSTEMS REQUIREMENTS

Duct mounted photo-electric smoke detectors will be installed in the supply and return air ducts for all air handling units 2,000 CFM and larger to provide for automatic shutdown of air handling equipment in the event of smoke detection.

The system will use white/clear strobes in red or white housing for fire alarm notification devices. All strobes within view of other strobes will be synchronized. Audible voice notification will be provided such that all locations throughout the building receive notification. Visual notification is provided in all publicly

CONCEPTS

The following site plans and concept plans illustrate initial placement and arrangement of the project. These site and concept plans show a layout that should be seen as a starting point for the building committee when moving forward into the building design phase. Changes and improvements are common when Schematic Design begins. Preliminary adjacencies describing which spaces should be located next to each other and entry, loading, primary access and circulation are shown.

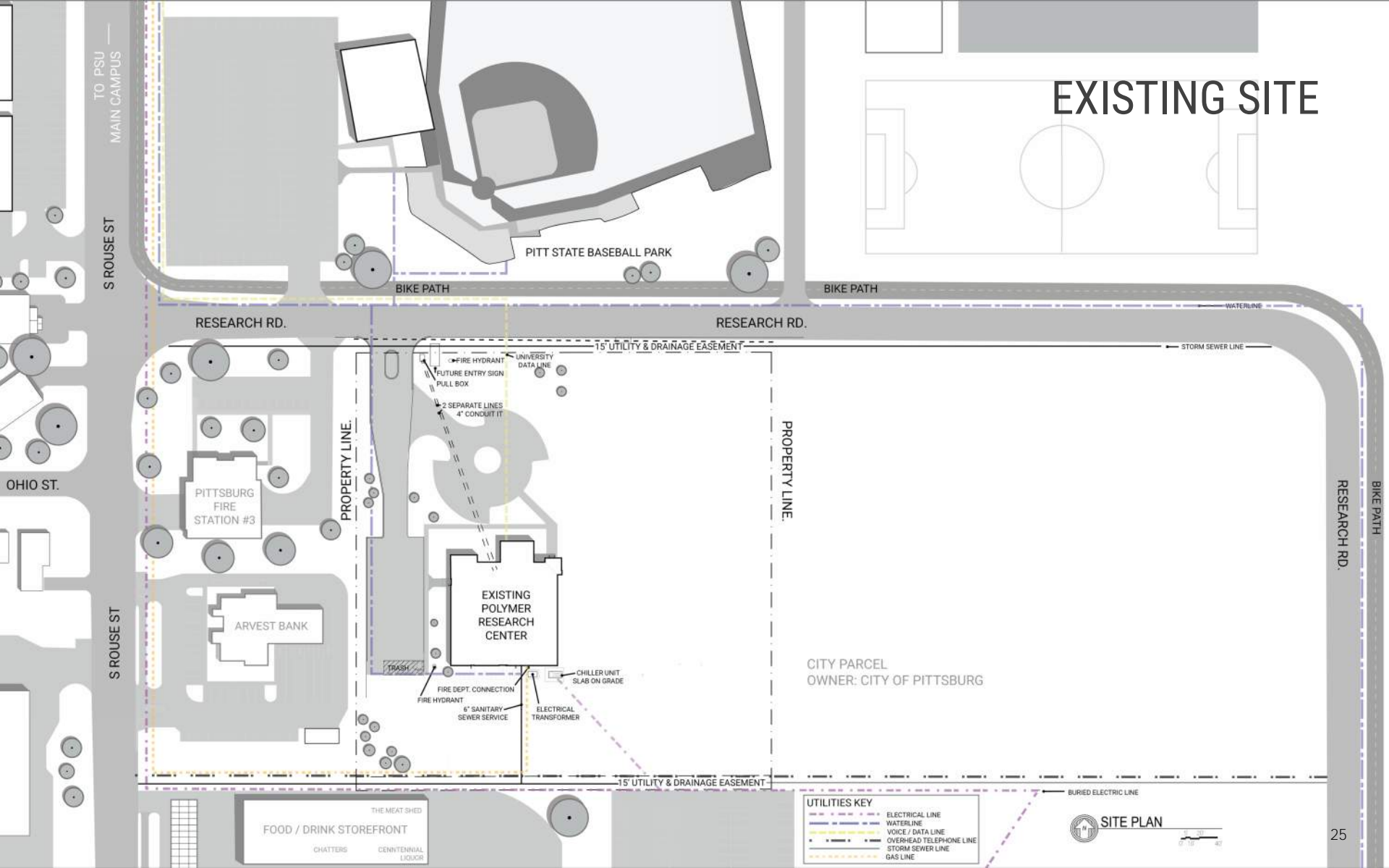


EXISTING SITE

TYLER
RESEARCH
FACILITY

E CENTENNIAL DR

E CENTENNIAL DR



EXISTING SITE

RESEARCH RD.

RESEARCH RD.

PITTSBURG
FIRE
STATION #3

ARVEST BANK

EXISTING
POLYMER
RESEARCH
CENTER

CITY PARCEL
OWNER: CITY OF PITTSBURG

FOOD / DRINK STOREFRONT

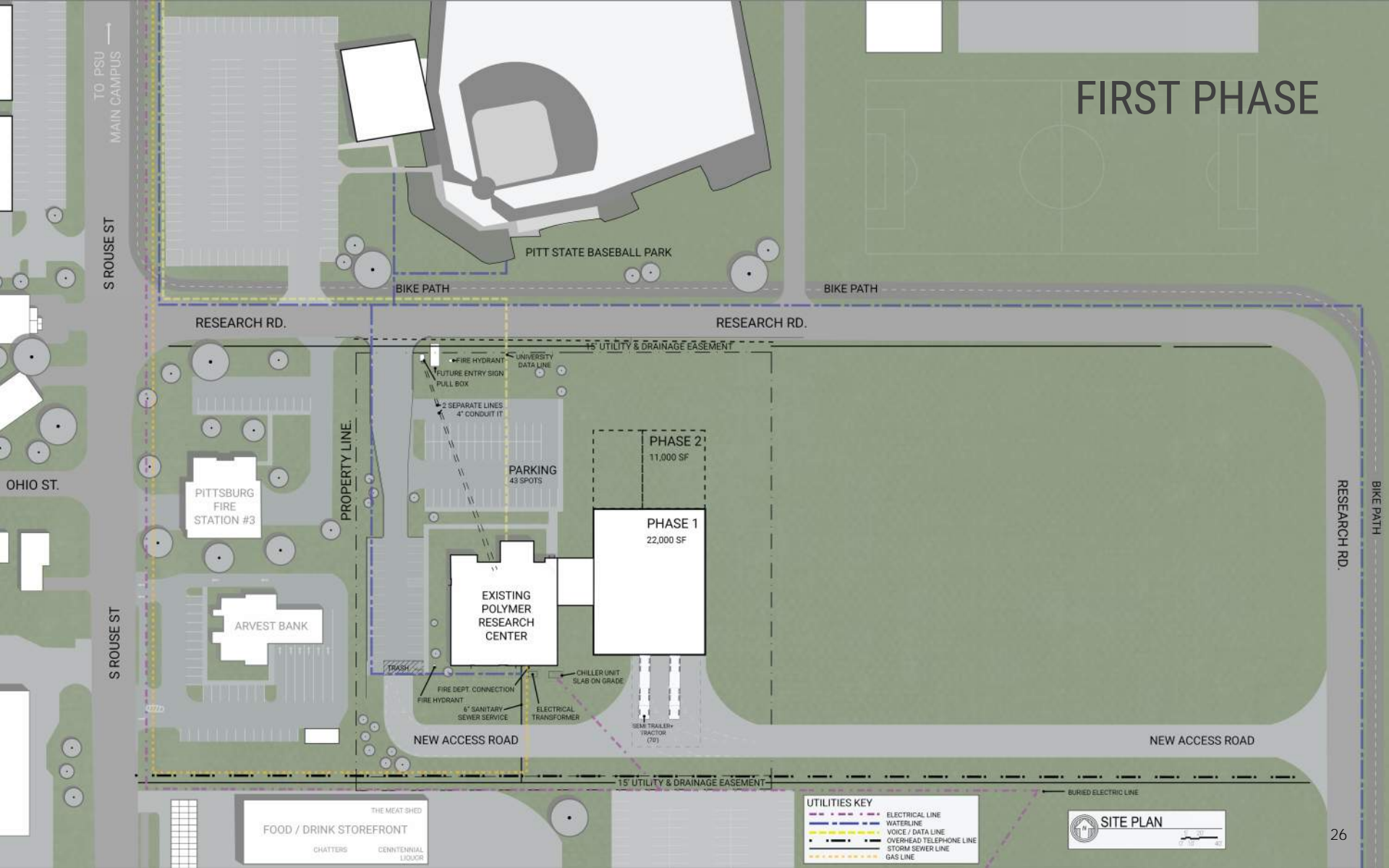
CHATTERS CENNTENNIAL LIQUOR

UTILITIES KEY	
	ELECTRICAL LINE
	WATERLINE
	VOICE / DATA LINE
	OVERHEAD TELEPHONE LINE
	STORM SEWER LINE
	GAS LINE

**SITE PLAN**



FIRST PHASE



UTILITIES KEY

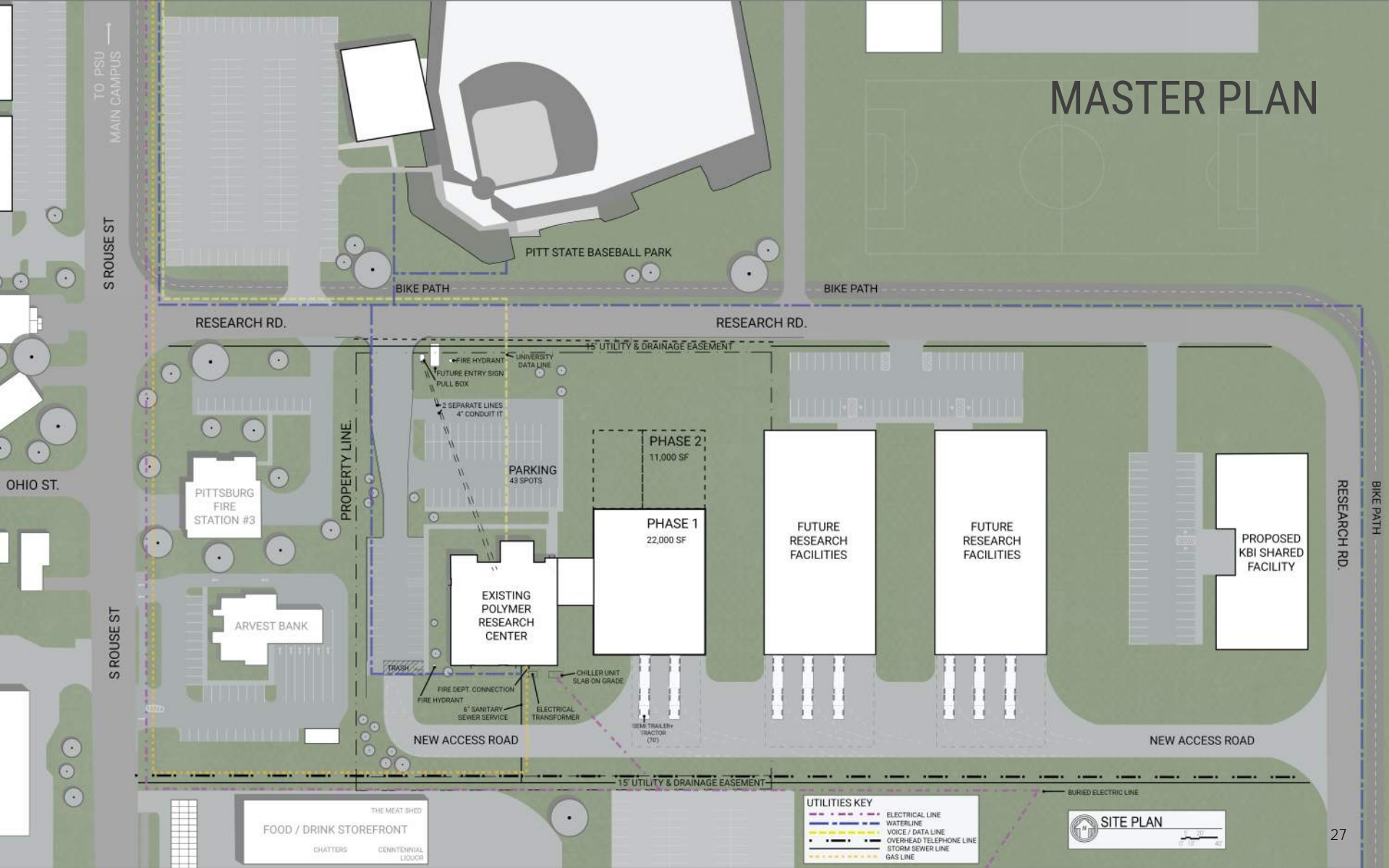
	ELECTRICAL LINE
	WATERLINE
	VOICE / DATA LINE
	OVERHEAD TELEPHONE LINE
	STORM SEWER LINE
	GAS LINE



SITE PLAN

0' 20' 40'

MASTER PLAN



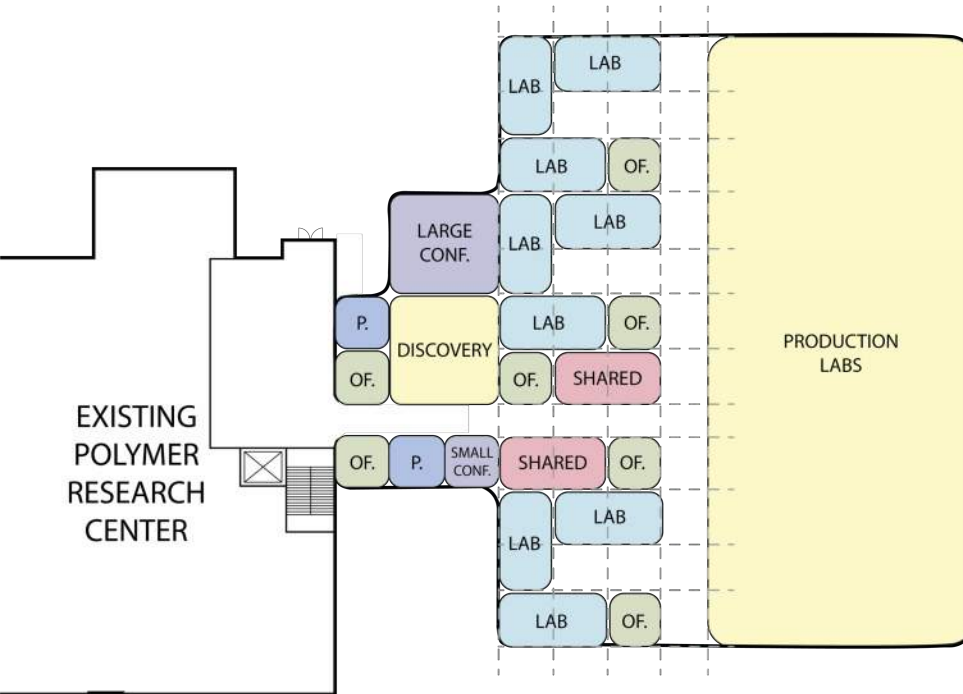
UTILITIES KEY

	ELECTRICAL LINE
	WATERLINE
	VOICE / DATA LINE
	OVERHEAD TELEPHONE LINE
	STORM SEWER LINE
	GAS LINE

SITE PLAN

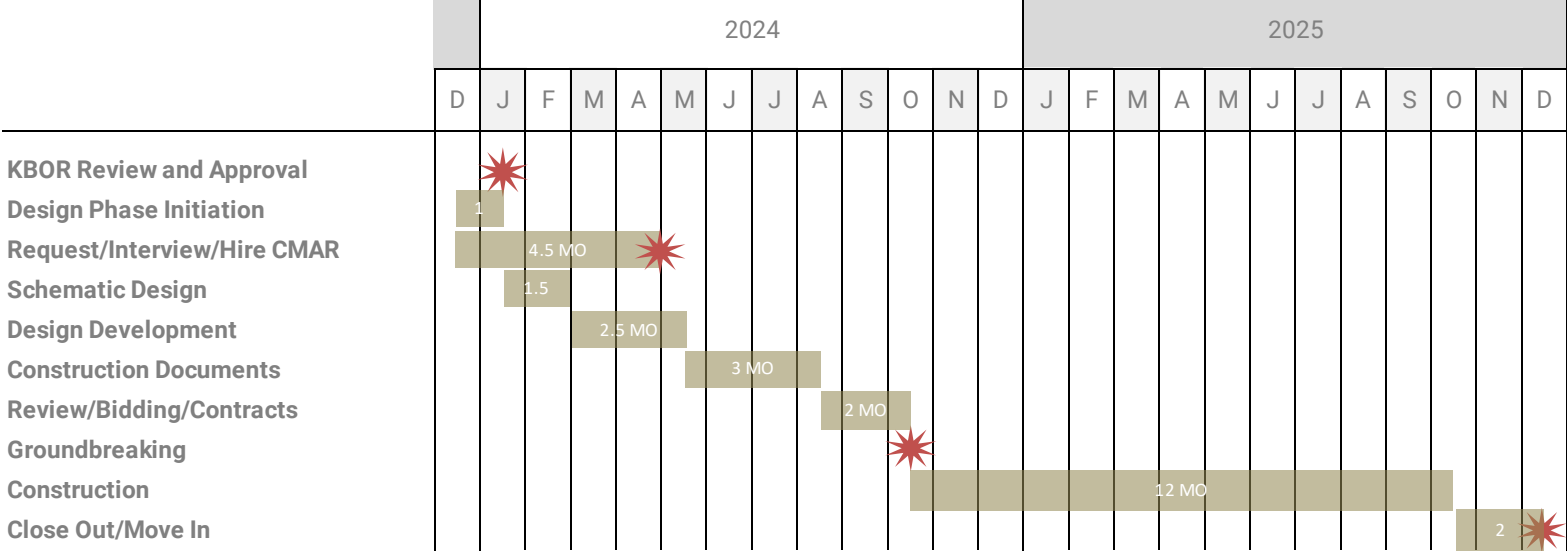
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PLAN DIAGRAM



This diagram adds the Discovery Area programmed space to the plan. Entry to the building and addition is shown through the current main entry and lobby, sharing the reception function with the existing Tyler Research Center. The main Discovery space provides the center of the suite upon entry into the addition with the other spaces arranged around the edges. The Large Conference Room has access to large windows. And the Project Rooms are placed along circulation paths and could have windows for display and branding for the Project Teams.

PROJECT SCHEDULE



BUDGET

An overall project budget was prepared that identifies known and expected costs. It includes contingencies for items that are unforeseen as well. The budget was prepared anticipating level of design quality, durability, and building systems that would be used, etc. It is comprehensive in nature including items such as anticipated finishes, mechanical, electrical and energy systems, and furnishings. The budget numbers for the site will need to be fine tuned in investigating the site's specific conditions. Some of these can be the existence of hazardous materials and/or the need for utility extensions.

Historical cost records from like-sized structures of the same or similar type of function and quality were used as a basis for projecting the future cost of this facility. Benchmark examples are chosen based on the following three primary criteria:

1. Building Use Type Similarity (Complexity)
2. Overall Square Footage (Quantity)
3. Construction Type Similarity (Quality)

The numbers include an adjustment to today's construction costs and the budget includes an escalation line item for escalation to the third quarter of 2024.

For Phase 1, the total project cost for the construction and outfitting of the building represented in this study is projected to be approximately \$11,872,996. Phase 2 is projected at \$7,868,961.

Given the duration of the design, documentation and construction process, and the phasing, adjustments to the program and individual budget line items may need to occur due to potential additional escalation of construction costs, market conditions, etc.

PROJECT BUDGET

			First Phase	Second Phase		
1.0 Construction Costs:			BUDGET			BUDGET
	GSF	COST/SF		GSF	COST/SF	
New Building Construction	21,029	\$325.00	\$6,834,425	13,654	\$325.00	\$4,437,550
Fixed Equipment	8%		\$546,754	10%		\$443,755
Sitework	LS		\$500,000	LS		\$150,000
Design & Estimating Contingency	15%		\$1,182,177	15%		\$754,696
Subtotal Construction Contract			\$9,063,356			\$5,786,001
2.0 Project Soft Costs:						
Fixtures, Furnishings & Moveable Equipment						
IT/Telecommunications						
Audio/Visual Technology						
Security Systems						
Architectural and Engineering Fees (incl. survey & geo.)						
Construction Testing & Commissioning						
Hazardous Material Analysis and Abatement						
Owner's Construction Contingency						
Owner's Project Contingency						
Agency and State Fees						
Subtotal Development Costs	25%		\$2,265,839	30%		\$1,735,800
3.0 Summary:						
Construction Costs			\$9,063,356			\$5,786,001
Project Soft Costs			\$2,265,839			\$1,735,800
Total Project Costs			\$11,329,195			\$7,521,801
Escalation to 3rd Qtr 2024 (10 month construction beginning Oct 2024)	6.00%		\$543,801	6.00%		\$347,160
Escalated Project Costs			\$11,872,996			\$7,868,961

APPENDIX

Benchmarking
Observations
Facility Images
Floor Plans

BENCHMARKING

The following information represents example research facilities in educational settings that were visited by representatives of the program committee and the planning team. The photos and plans are visual displays of the types of spaces and their design to serve some of similar functions included in this program.

The benchmarking visits were to the following facilities:

University of Tennessee

- Zeanah Engineering Complex
- Fibers and Composites Manufacturing Facility
- IAMM Headquarters Building
- Diffraction Facility/Electron Microscopy Center
- Tennessee Made

University of Colorado Boulder

- Idea Forge/FLEMING Building
- Engineering Center/ ITLL
- The ATLAS Institute

A summary of some of the observations from the visits were:

Overall

- Flexibility was a topic many of the directors and tour guides mentioned as very important in the research field given the degree of change they have experienced since constructing their facilities.
- Some facilities were good examples of machinery spaced appropriately for safety and some were examples of undesirably cramped and crowded spaces.
- A number of times the group noticed that the different programs and spaces visited seemed disconnected from other programs and resources demonstrating potential risk of duplication and lack of efficiency.

University of Tennessee

Zeanah Engineering Complex

- The maker space had a good example of machinery access control and safety.
- They utilized a trench duct for power and data access.
- It was a good example of modular lab design.
- They utilized overhead service panels and quick connects for access to utilities.
- The openness and views into the labs was good.

BENCHMARKING

Fibers and Composites Manufacturing Facility

- Good example of a facility incorporating high bay extrusion and molding machine space with low bay testing labs.

IAMM Headquarters

- Excellent displays in the main lobby of inventions and work going on behind the scenes.
- Good example of supportive and collaborative space with large areas of whiteboards designed in and other shared resources available in public areas.

Diffraction Facility/Electron Microscopy Center

- Good example of structural slab isolation for vibration control and the necessary microscopy supporting infrastructure such as cooling.

Tennessee Made

- This was a good example of flexible high bay production labs with its wide-open space, free span structure, and lots of natural daylight.
- Support spaces were accommodated in the bay space utilizing a mezzanine to create two-story space.
- Space was allocated to a large loading and staging space.

- This was also a good example of how to section off separate work, project areas and machinery.
- The spacious arrangement of work areas allowed for both visibility and safety.

University of Colorado Boulder Idea Forge/FLEMING Building

- Good example showing use of moveable furniture and overhead utilities.
- Integrated social and collaborative space.
- Support for a variety of work areas for prototyping and maker space.

Engineering Center/ ITLL

- Nice project team rooms.
- Good shared project team storage.

The ATLAS Institute

- Unique and wide spectrum of facilities from black box and movement to 3D printing to fiber research.
- Attempts were being made to connect researchers for more collaboration and crosspollination. Labs were isolated and individual.



ZEAHNA ENGINEERING COMPLEX
UNIVERSITY OF TENNESSEE

BINDING EDGE

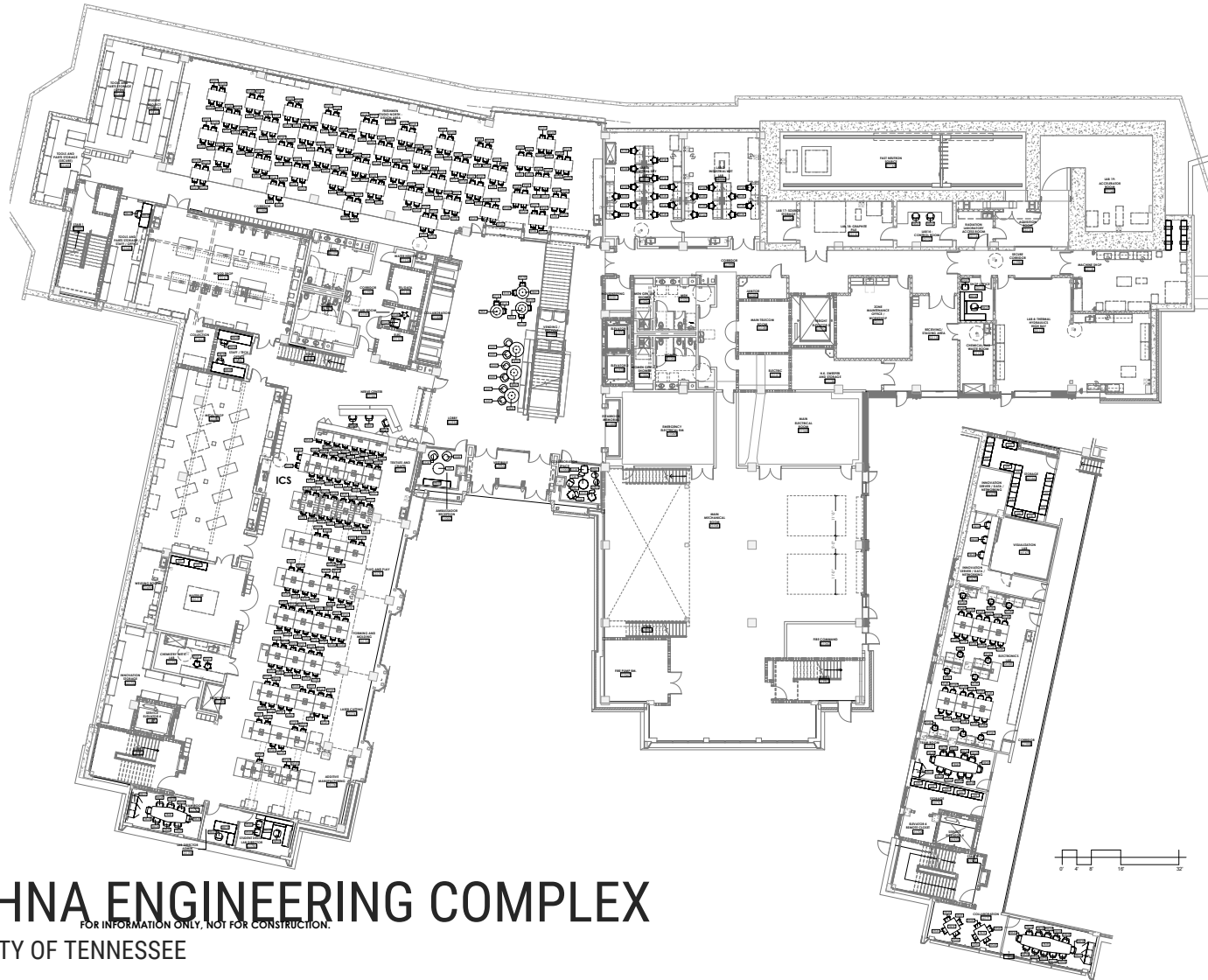
BINDING EDGE

BINDING EDGE

ZEAHNA ENGINEERING COMPLEX

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UNIVERSITY OF TENNESSEE



MCCARTY
HOLLAUB
MCCARTY
MHM
ARCHITECTS
A FORT WORTH FIRM

SMITHGROUPJJR

BOARD 1700A

ENGINEERING SERVICES
FACILITY



GROUND &
MEZZANINE LEVEL
FURNITURE PLAN

I 100



ZEAHNA ENGINEERING COMPLEX

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MCCARTY HOLDINGS
MCCARTY
MHM
A FURNITURE
MANUFACTURER

SMITHGROUPJJR

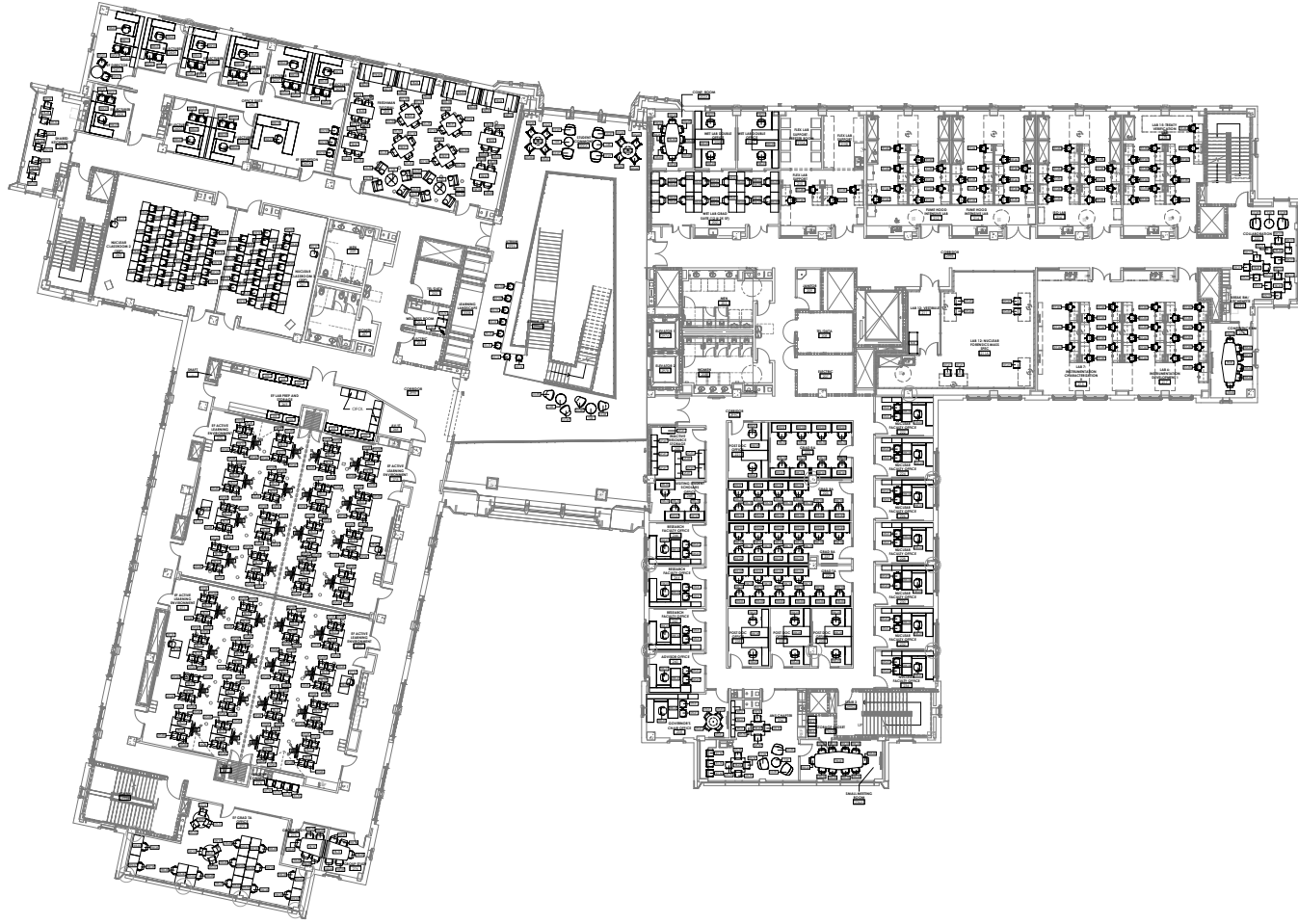
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ENGINEERING SERVICES
FACILITY

UNIVERSITY OF TENNESSEE

LEVEL 1 FURNITURE
PLAN

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ZEAHNA ENGINEERING COMPLEX

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MCCARTY
HOLLAND
MCCARTY
MHM
ARCHITECTS
PLLC
MEMPHIS, TN

SMITHGROUPJJR

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DATE: 10/27/2016

PROJECT: ZEAHNA ENGINEERING COMPLEX

LOCATION: 10/27/2016

SCALE: 1/8" = 1'-0"

DATE: 10/27/2016

PROJECT: ZEAHNA ENGINEERING COMPLEX

LOCATION: 10/27/2016

SCALE: 1/8" = 1'-0"

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PROJECT: ZEAHNA ENGINEERING COMPLEX

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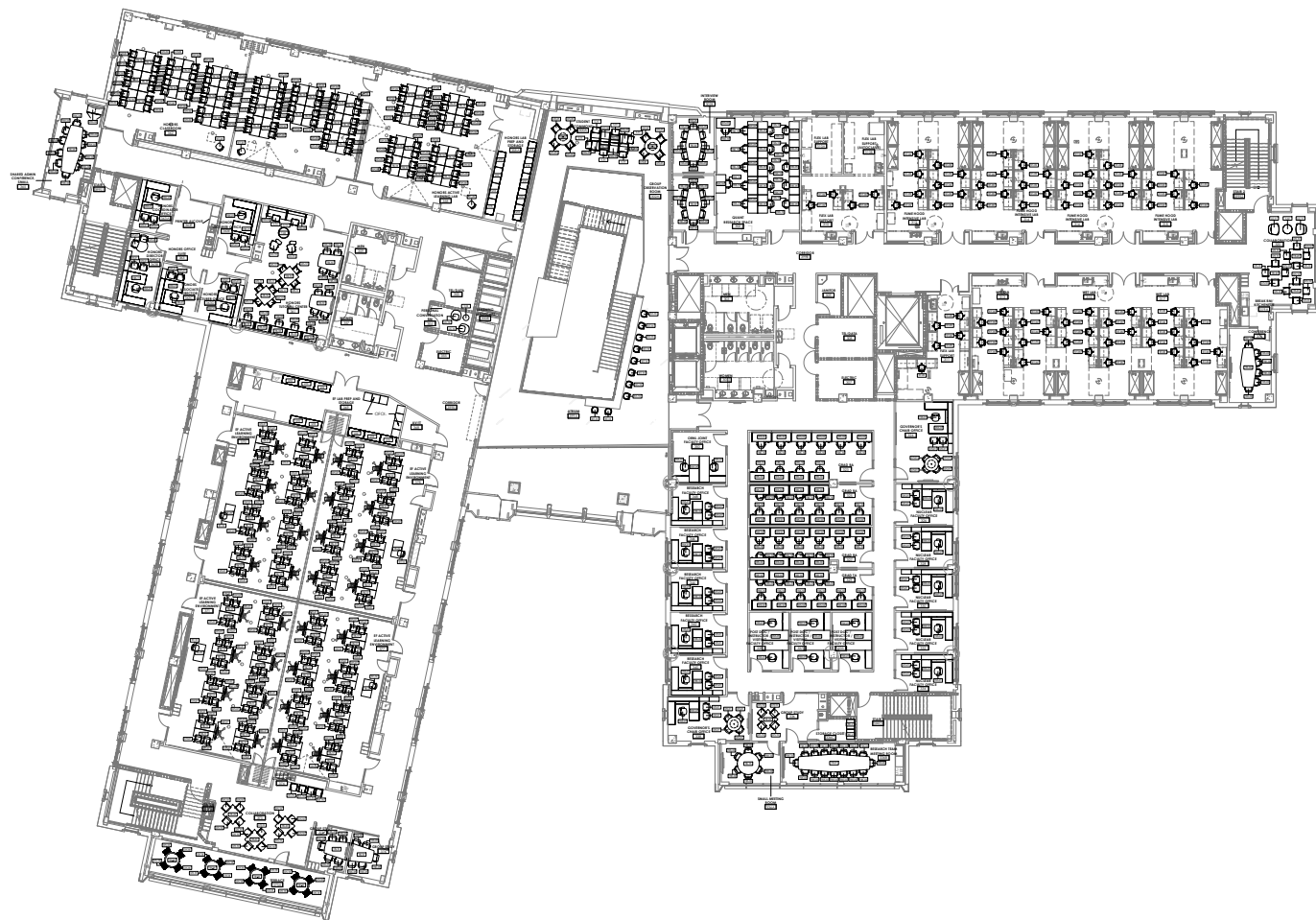
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LEVEL 2 FURNITURE
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BINDING EDGE



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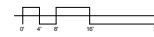
PROJECT NORTH

TRUE NORTH

LEVEL 3 FURNITURE
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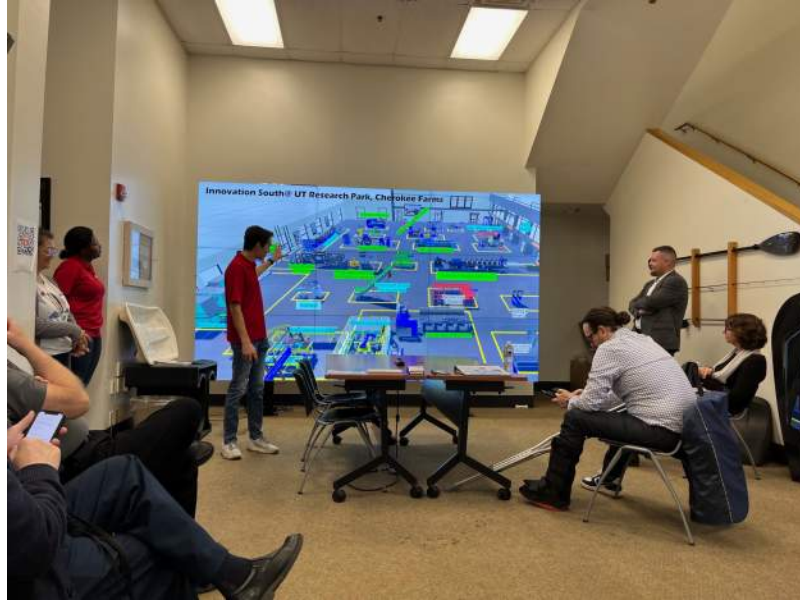
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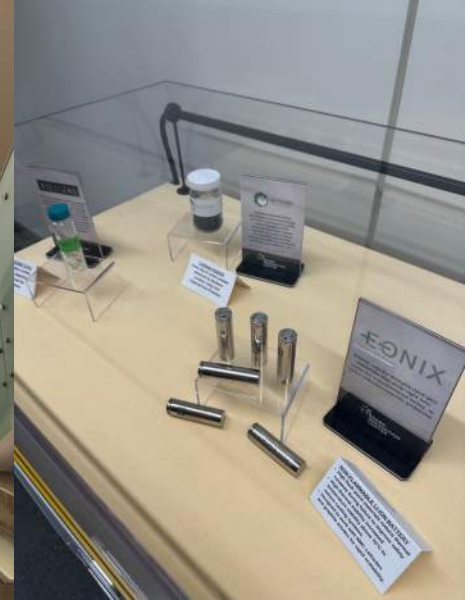
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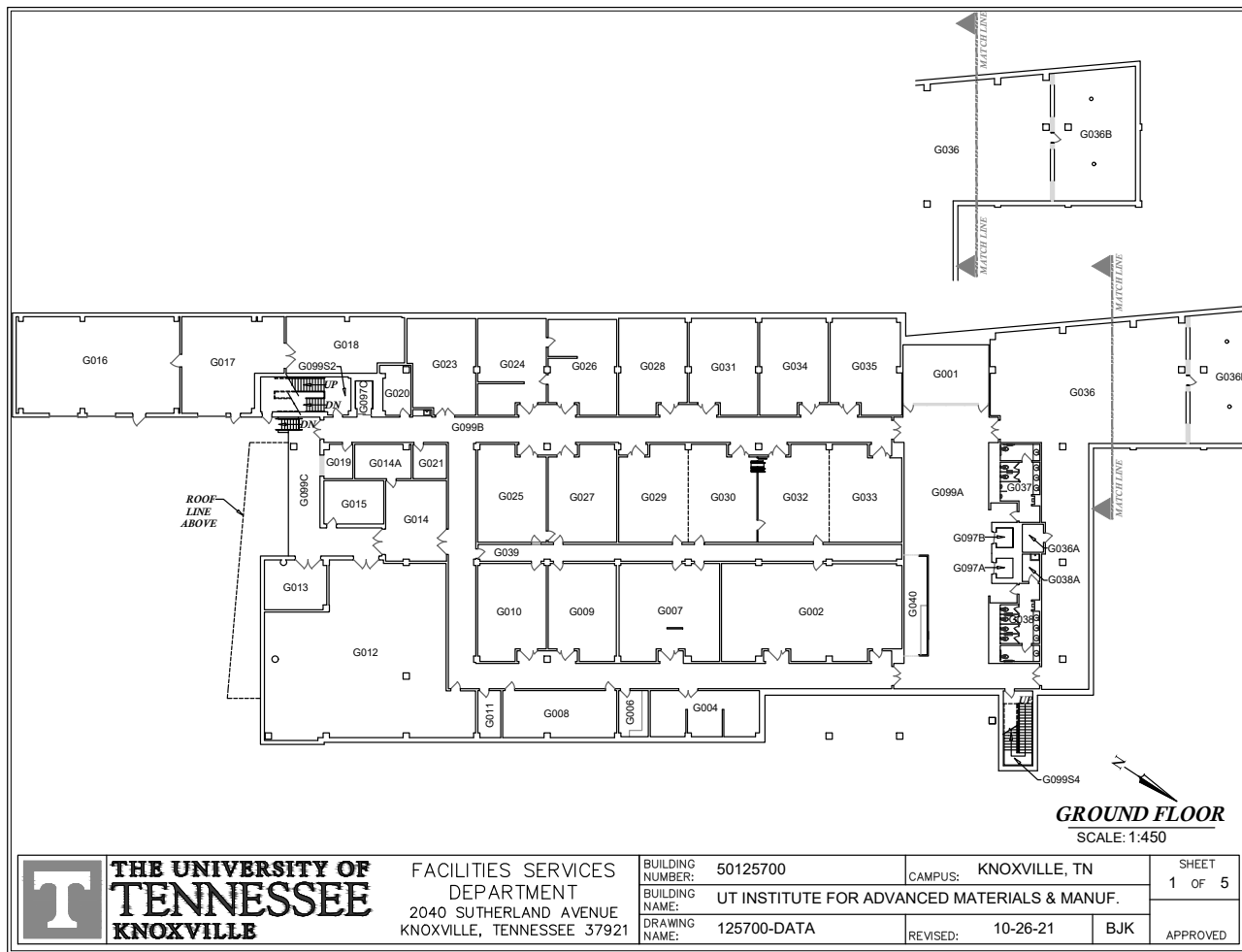


FIBERS AND COMPOSITES MANUFACTURING FACILITY

UNIVERSITY OF TENNESSEE

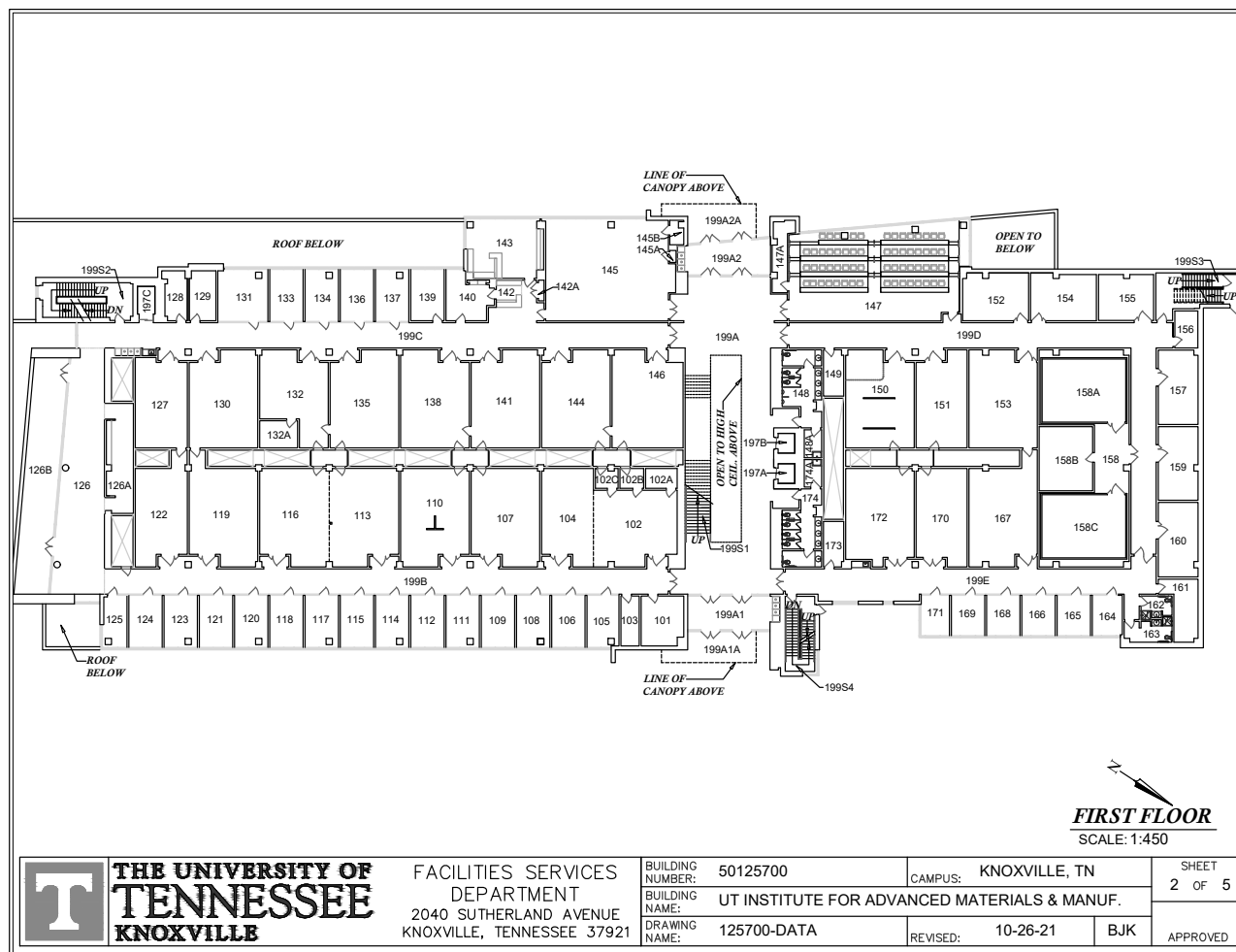


IAMM HEADQUARTERS BLDG
UNIVERSITY OF TENNESSEE



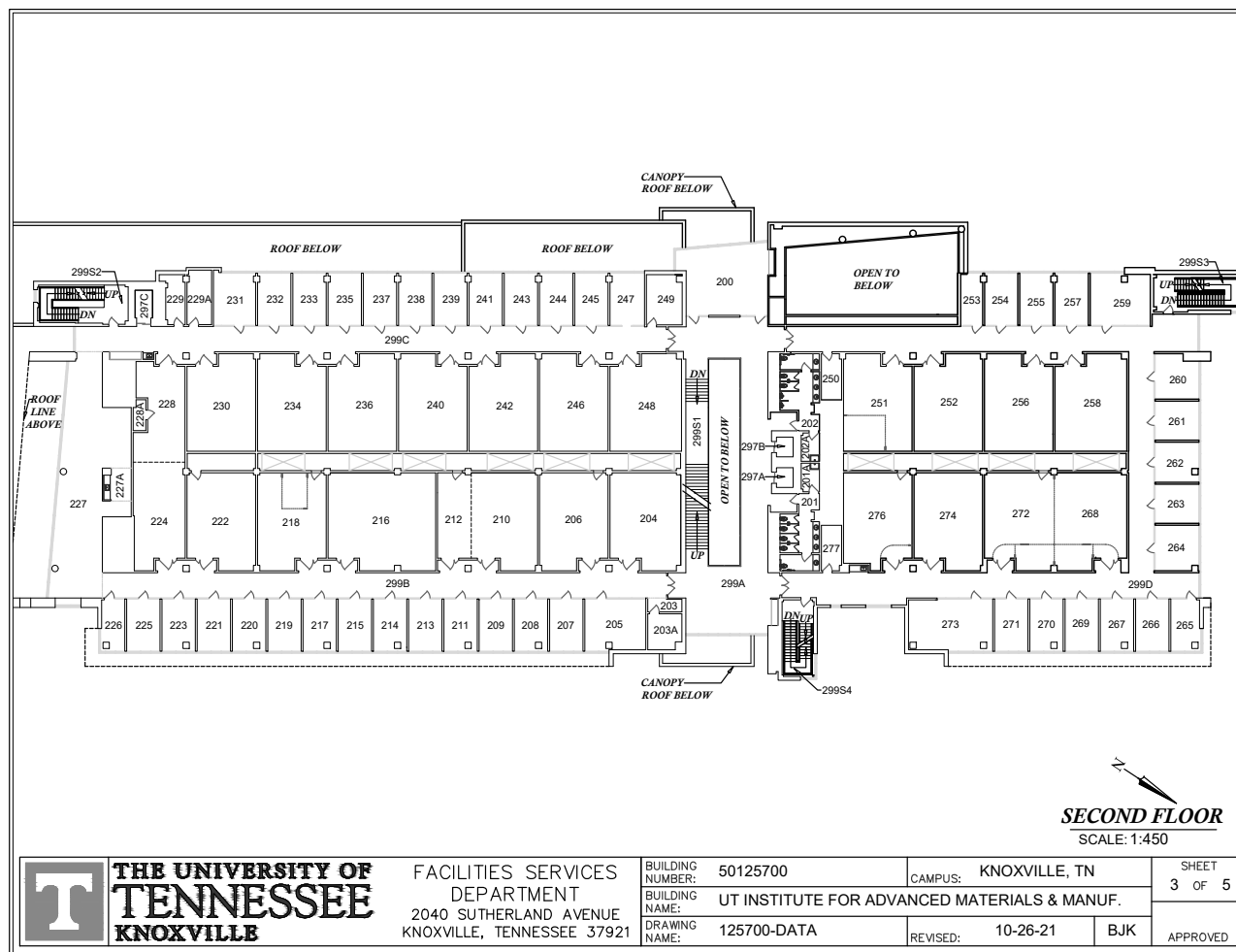
INSTITUTE FOR ADVANCED MATERIALS AND MANUFACTURING

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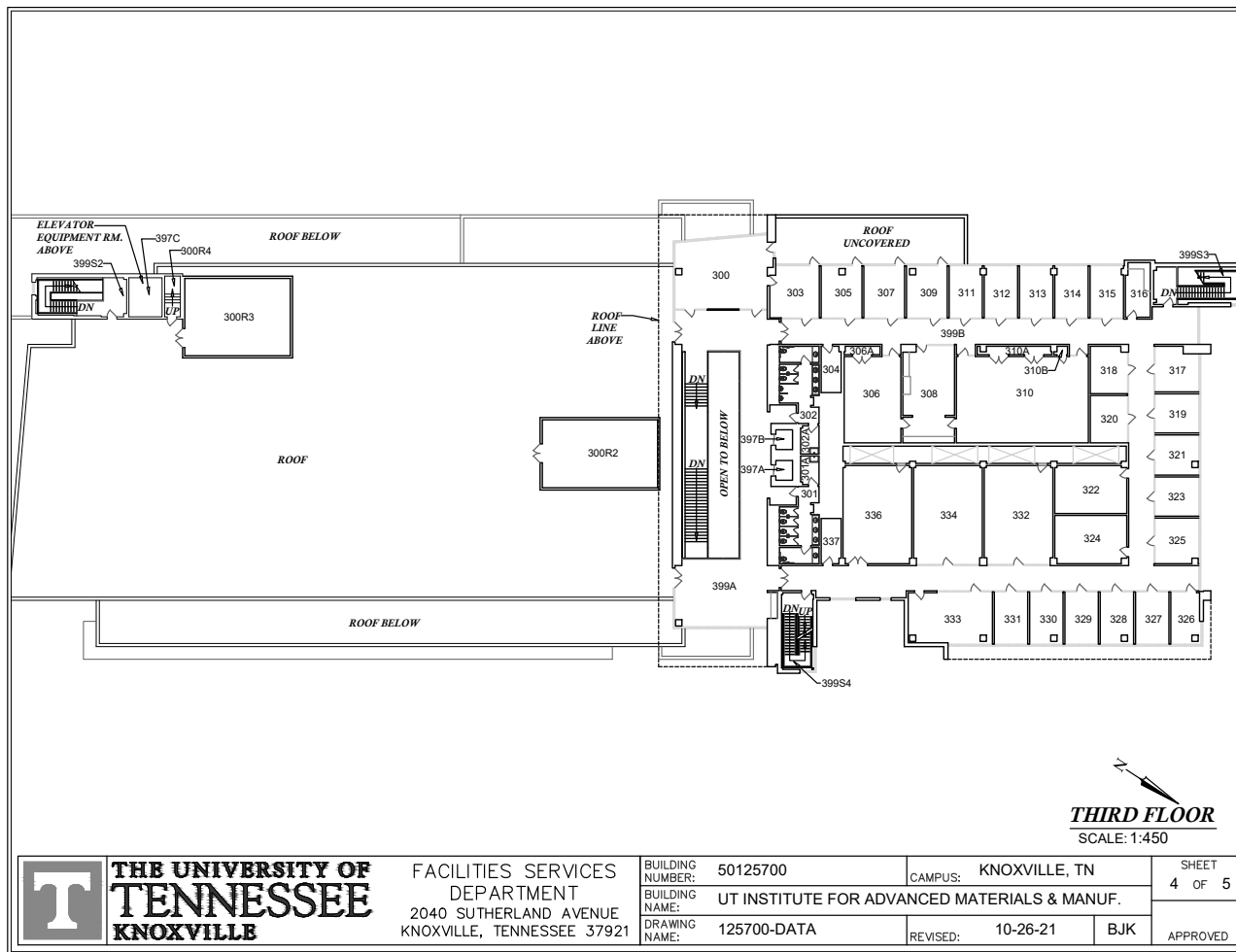
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INSTITUTE FOR ADVANCED MATERIALS AND MANUFACTURING

UNIVERSITY OF TENNESSEE



DIFFRACTION FACILITY/ ELECTRON MICROSCOPY CENTER

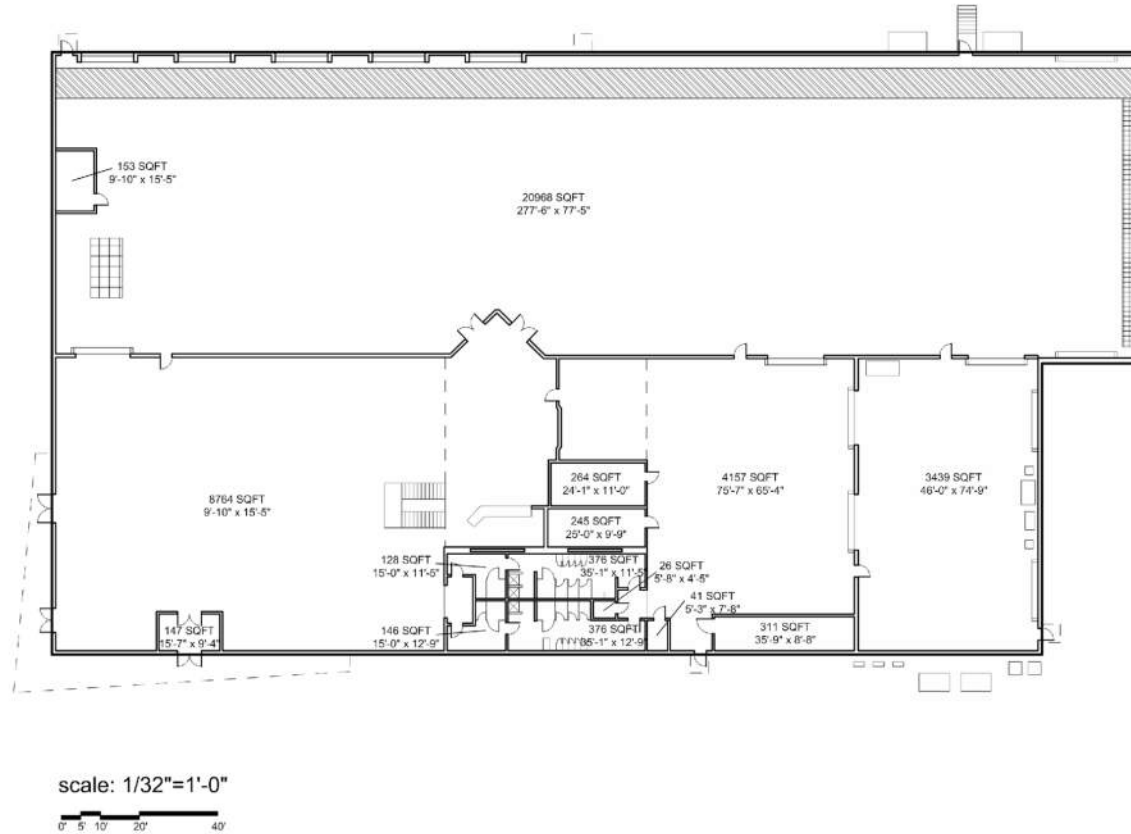
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IDEA FORGE/FLEMING BUILDING
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IDEA FORGE/FLEMING BUILDING
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ITLL 2B40

Manufacturing Center

Here you will find:

Machining Machinery
CNC & Manual

Machines

Woodworking Machinery
CNC & Manual

Manufacturing Consultation

Hand Held Power Tools

Manual Tools

Design Consultation



John not here?

Mark not here?

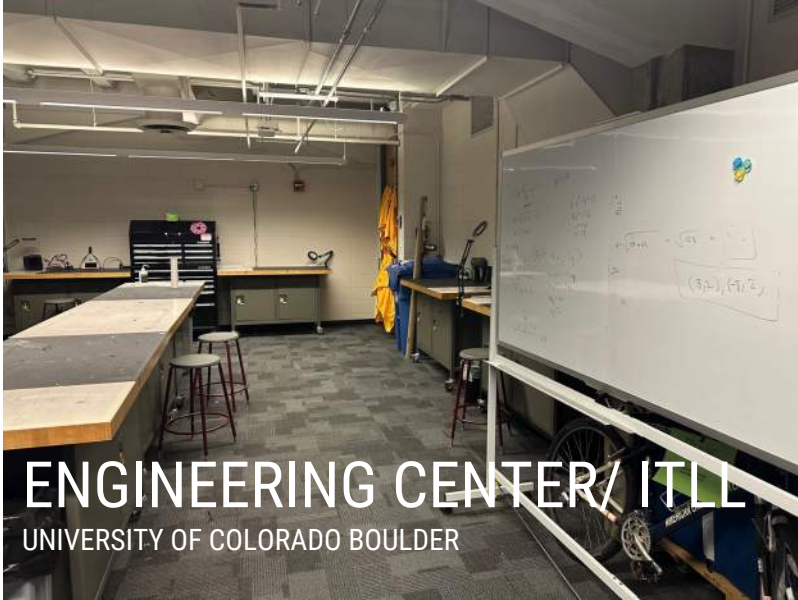


john@engr.coloboulder.edu mark@engr.coloboulder.edu

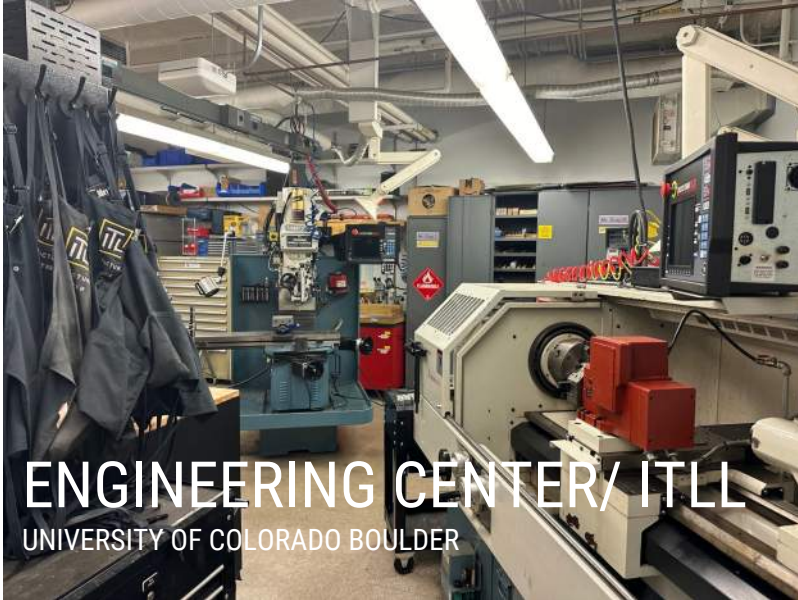
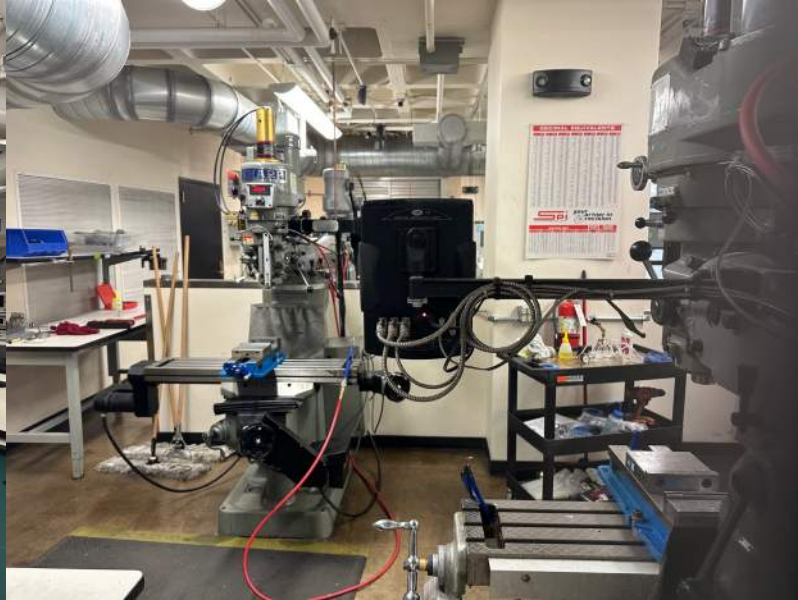
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9am - 7pm



ENGINEERING CENTER/ ITLL
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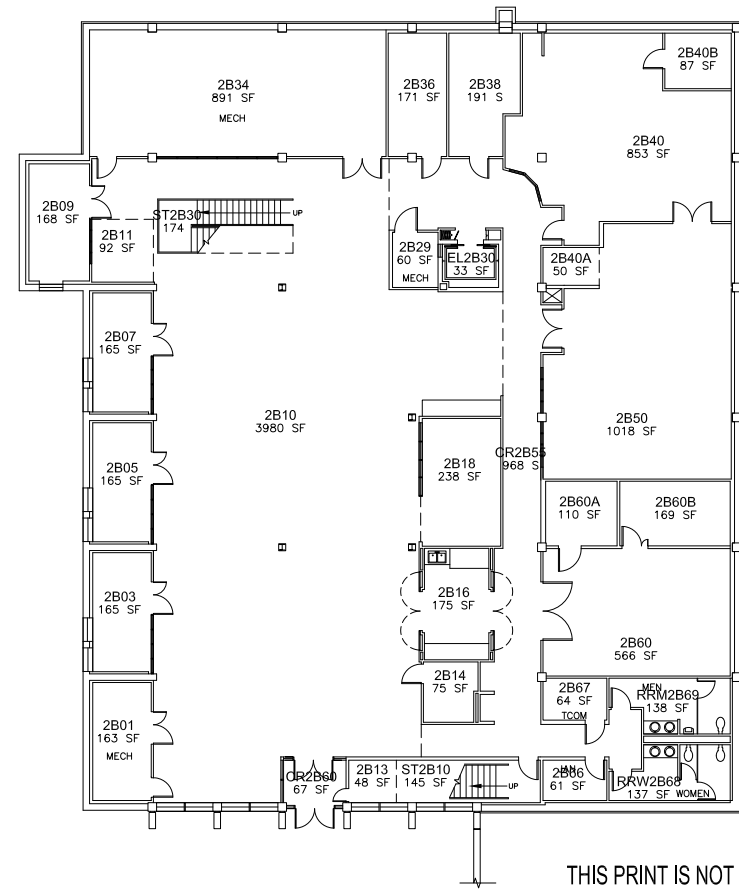
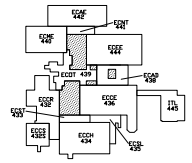
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SECOND BASEMENT LEVEL



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07/13/05	SRW BLDG SURVEY EDITS
10/16/03	NMH EDIT PER WO 184588 ADD 2B11 & 2B10A
11/30/00	WNO REMODEL 2B40 & 2B50B M.B. 445-5



Building Name: Drescher Undergraduate Engineering Integrated Teaching & Learning Lab
 Address: Main Campus
 Phone: 303-492-5511
<http://fm.colorado.edu/cad>
 Colorado University of Colorado at Boulder

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INTEGRATED TEACHING AND LEARNING LAB

UNIVERSITY OF COLORADO BOULDER

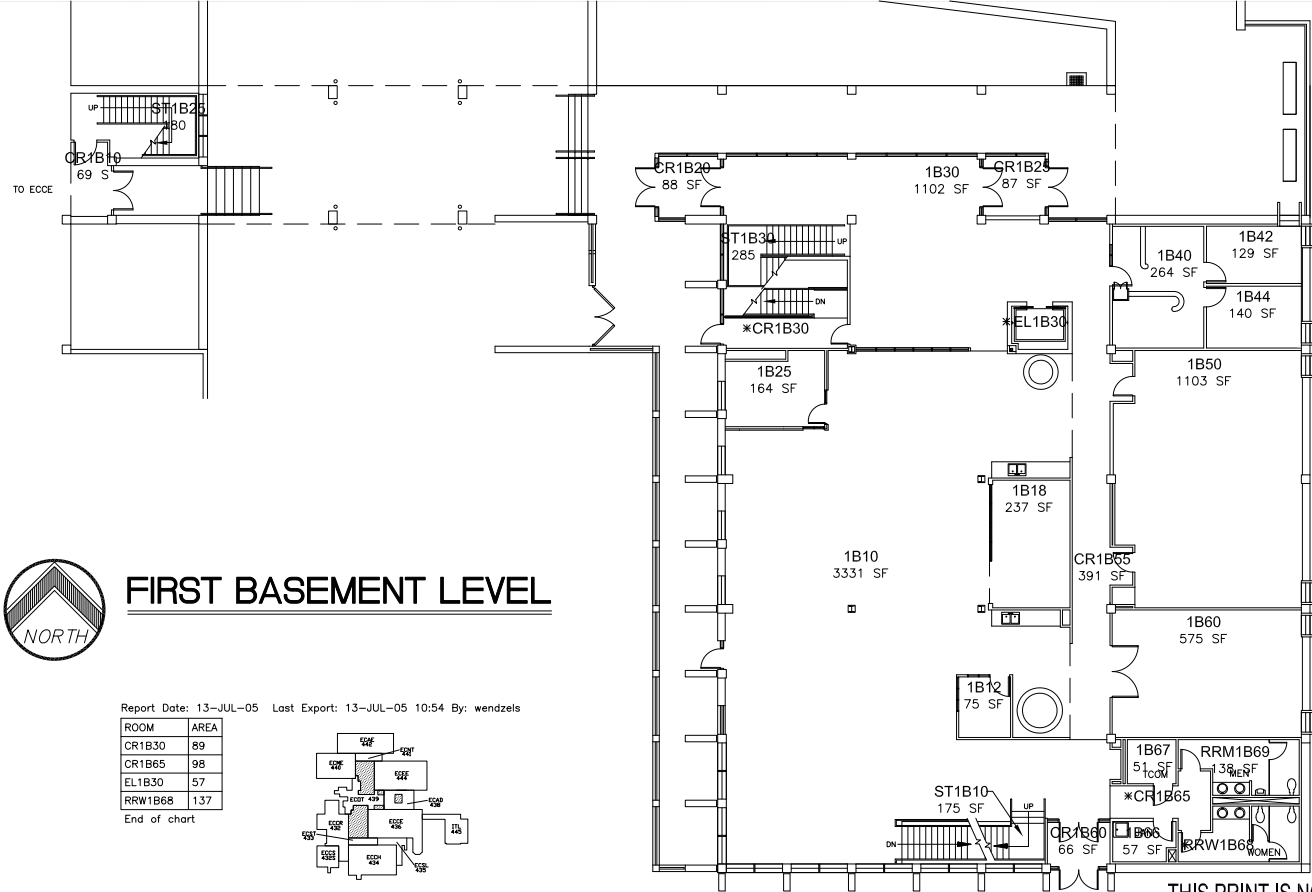
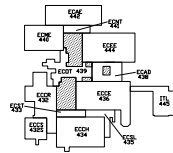


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Building Name: Drescher Undergraduate Engineering Integrated Teaching & Learning Lab

Address: Main Campus

Phone: 303-492-5511

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Colorado

University of Colorado at Boulder

1ST BASEMENT
FLOOR LEVEL
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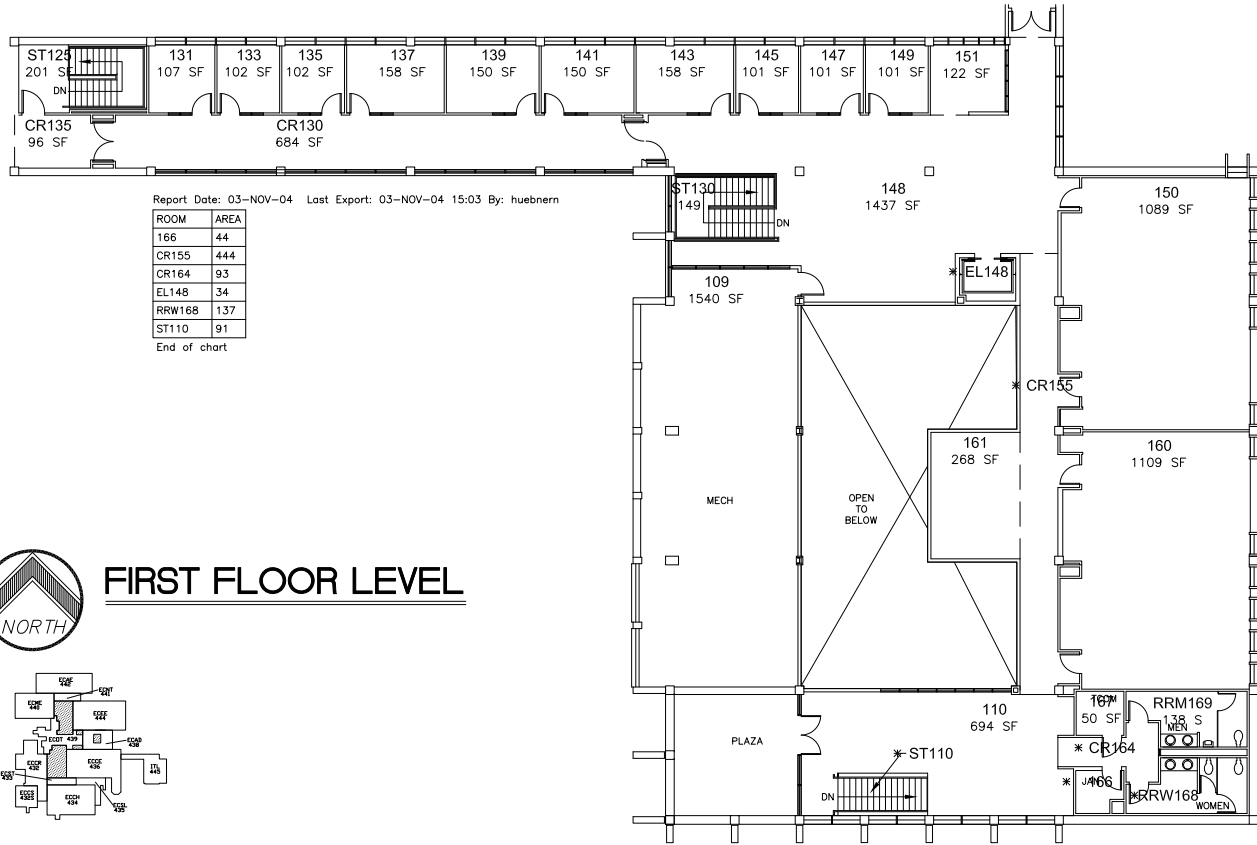
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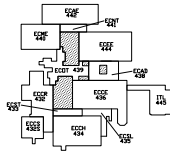
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FIRST FLOOR LEVEL



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07/13/04	SRW BLDG SURVEY EDITS
10/16/03	NMH EDIT 148, 151 PER F.V.
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Address: Main Campus

Phone: 303-492-5511

<http://fm.colorado.edu/cad>

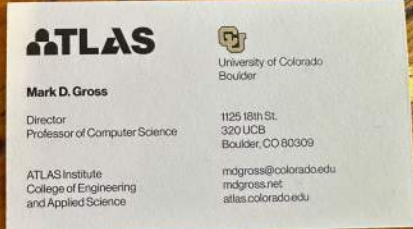
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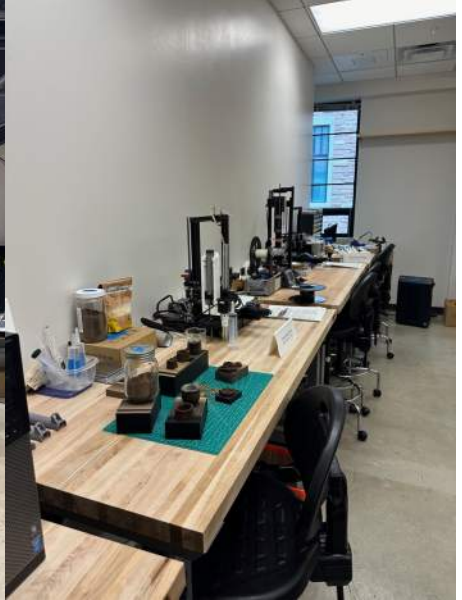
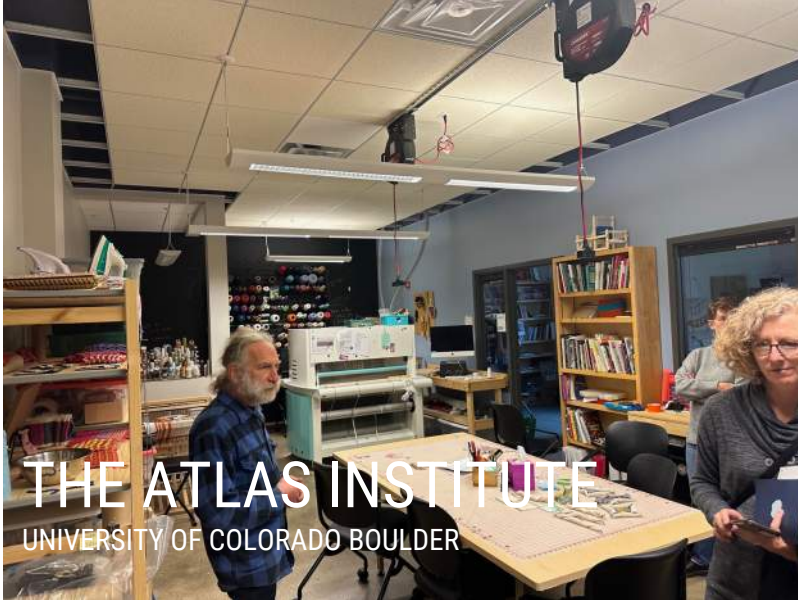
University of Colorado at Boulder

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THE ATLAS INSTITUTE
UNIVERSITY OF COLORADO BOULDER



Report Date: 05-01-2007 Local Export: 05-01-2007, windows

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2ND BASEMENT

REVISIONS

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04/17/07 SWN BLDG SUBMIT E-005 101 18 28200
03/19/07 SWN INITIAL FLOOR PLAN CREATION



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Phone: 303-492-5511

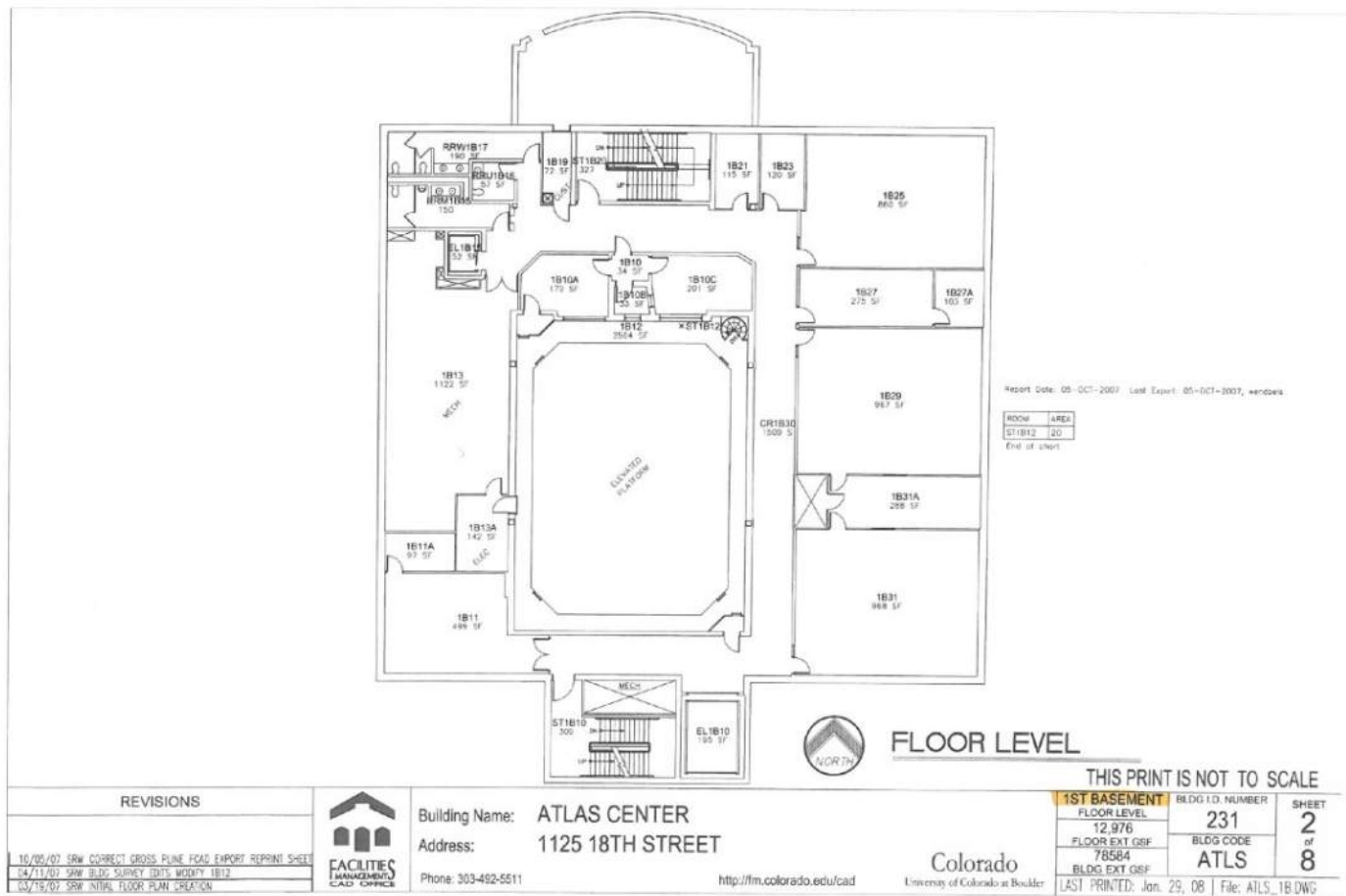
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Colorado
University of Colorado at Boulder

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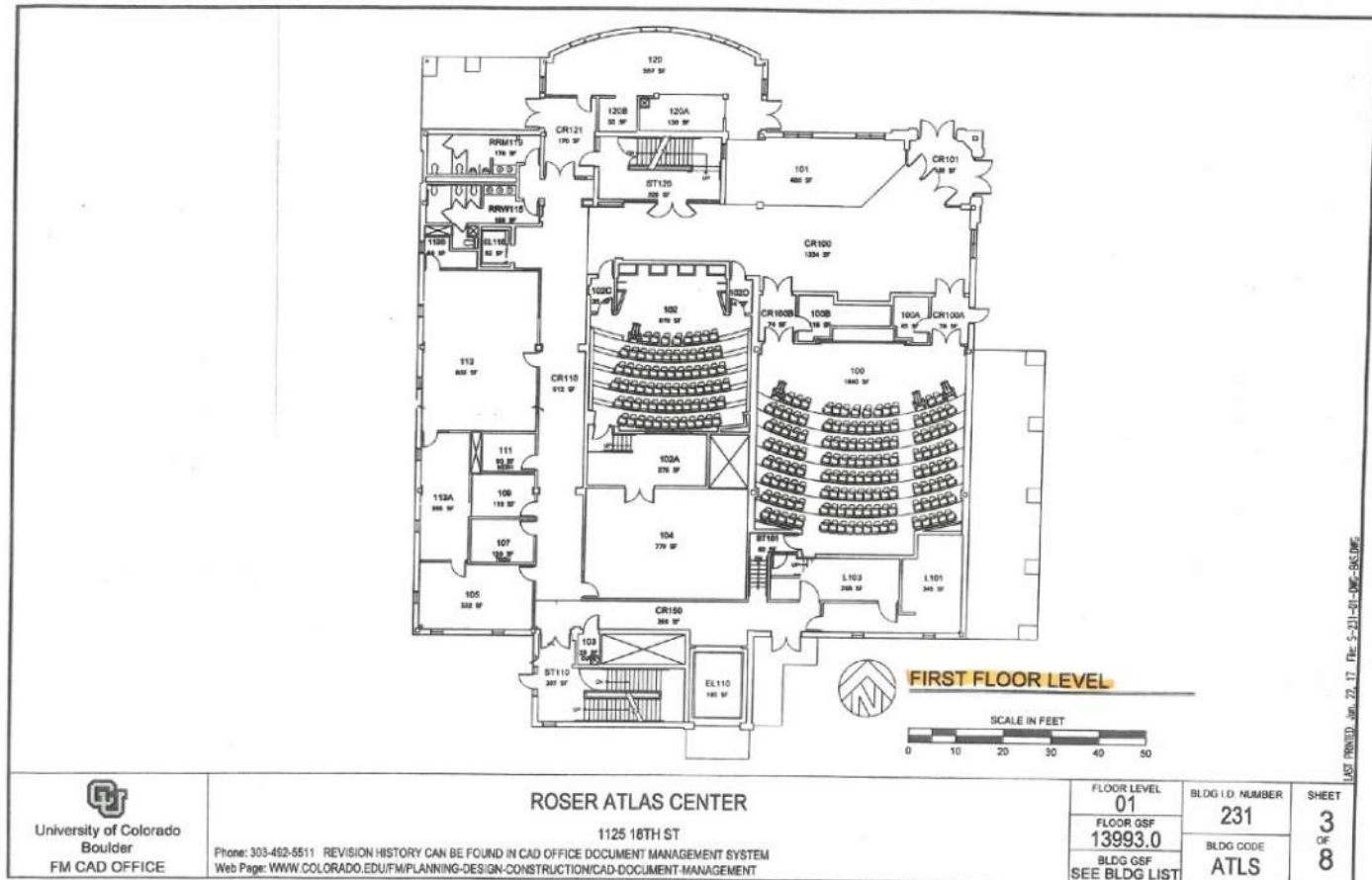
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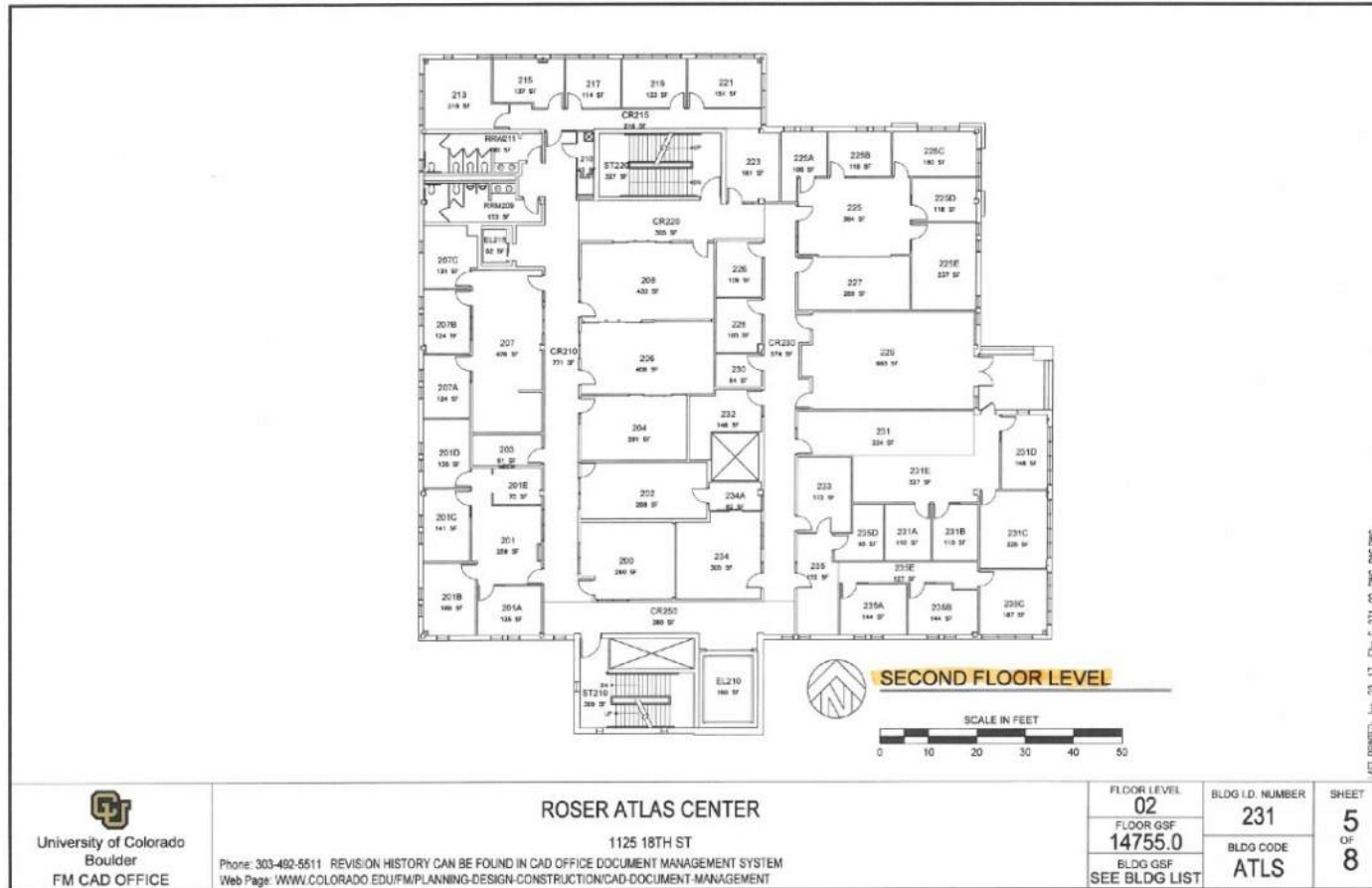
THE ATLAS INSTITUTE

UNIVERSITY OF COLORADO BOULDER



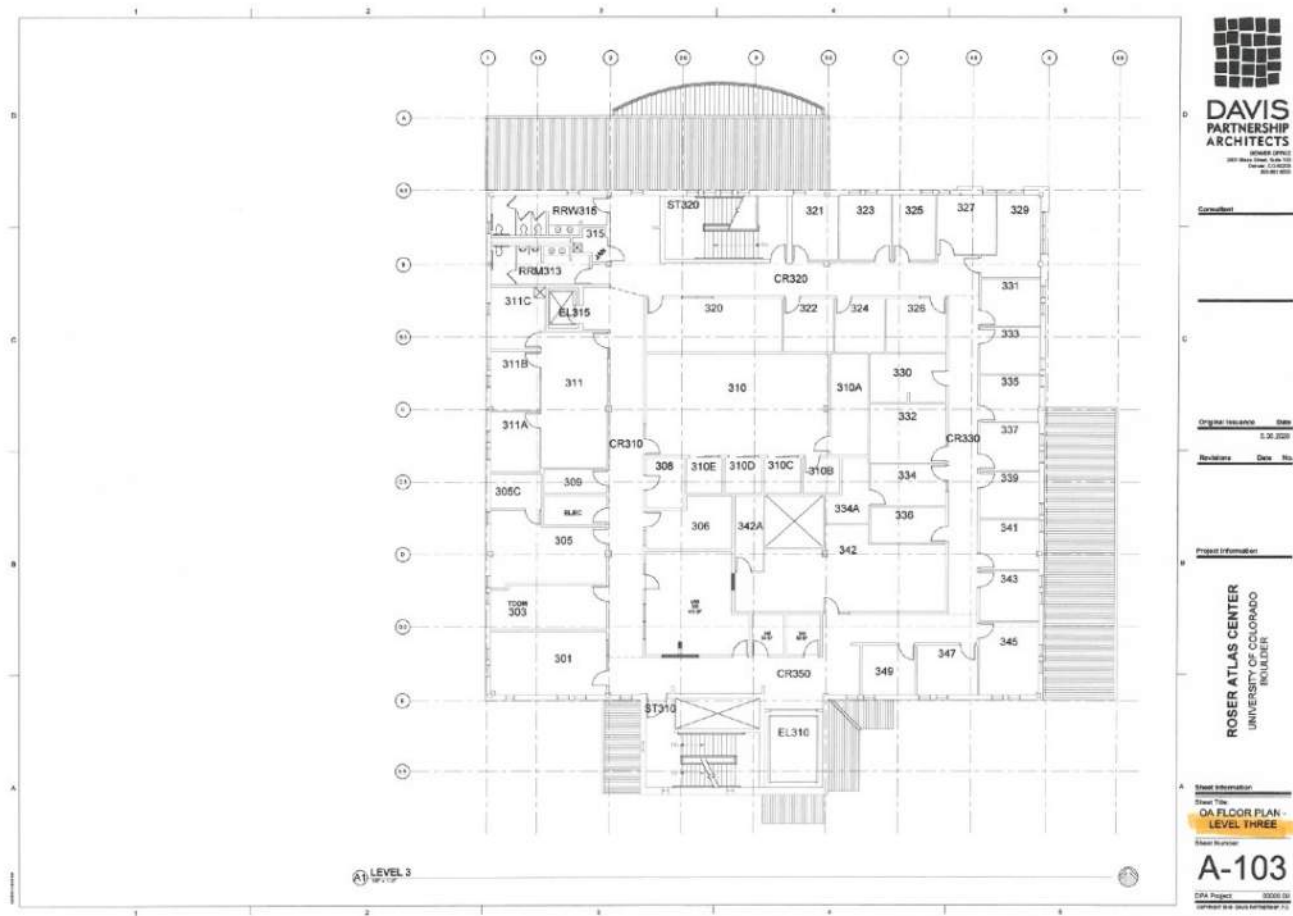
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