SE-410
INVITATION FOR CONSTRUCTION MANAGEMENT AT RISK SERVICES

AGENCY: The Citadel

PROJECT NAME: Engineering Replacement Building

PROJECT NUMBER: H09-9625-ML **CONSTRUCTION COST RANGE:** $45,000,000 **to** $50,000,000

PROJECT LOCATION: The Citadel, 171 Moultrie St., Chas., SC 29409

DESCRIPTION OF PROJECT/SERVICES: *(450 character limit)*

This project includes but is not limited to the demolition of the existing LeTellier Hall and other support buildings onsite, the construction of a new engineering building, and the renovation of portions of Grimsley Hall, as well as associated site and utility work to support the construction. See full advertisement at www.citadel.edu/ofeprojects

SUBMITTAL DUE DATE: 01/31/2024 **TIME:** 02:00 PM **NO. OF COPIES: Printed:** 12 **Electronic:** 1

PROJECT DELIVERY METHOD: Construction Management at Risk (CM-R)

AGENCY PROJECT COORDINATOR: Claire Bowman, Project Manager

EMAIL: cbowman4@citadel.edu **TELEPHONE:** (843) 953-1766

DOCUMENTS MAY BE OBTAINED FROM: Claire Bowman

- Contractor will be required to provide Performance and Labor and Material Payment Bonds, each in the amount of 100% of the contract price.
- **PUBLIC NOTICES:** All notices (Meetings; Intent to Award CM-R Contract) shall be posted at the following location: Facilities & Engineering Lobby, 520 Wilson Ave.
- **LICENSURE:** To be considered for selection, persons or firms must be properly licensed in accordance with the requirements of Title 40 of the SC Code of Laws, as amended at the time of resume submission.
- To submit confidential information, see Appendix I, OSE Manual, https://procurement.sc.gov/manual.
- In accordance with the South Carolina Green Purchasing Initiative, submittals cannot exceed 20 double-sided pages, including covers, which must be soft-no hard notebooks.
- All written communication with parties submitting information will be via email. Agency **WILL NOT** accept submittals via email in response to a Request for Proposals.
- Agency will accept submittals via email above in response to a RFQ (Max 10MB PDF): ○ **Yes** ● **No**
- Any actual bidder, offeror, contractor or subcontractor who is aggrieved in connection with this solicitation or the intended award or award of a contract under this solicitation may protest to the State Engineer in accordance with SC Code § 11-35-4210 at: CPO, Office of State Engineer, 1201 Main Street, Suite 600, Columbia, SC 29201, email: protest-ose@mmo.sc.gov.

A/E NAME: TBD **A/E CONTACT:** TBD

EMAIL: TBD@TBD.TBD **TELEPHONE:** (000) 000-0000

NON-MANDATORY PRE-SUBMITTAL CONFERENCE: ○ **Yes** ● **No**

CONFERENCE DATE: _____ **TIME:** _____

CONFERENCE PLACE: _____

SUBMITTAL DELIVERY ADDRESSES:

HAND-DELIVERY:

Attn: Claire Bowman
520 Wilson Ave.
Charleston, SC 29409

MAIL SERVICE:

Attn: Claire Bowman
171 Moultrie St.
Charleston, SC 29409

APPROVED BY: _____ **DATE:** 01/09/2024

(OSE PROJECT MANAGER)

THE CITADEL

OFFICE OF FACILITIES
AND ENGINEERING

January 9, 2024

Engineering Replacement Building

H09-9625-ML

The Citadel is seeking CM-R services for a new state-of-the-art academic building for the School of Engineering.

The AE selection process has been completed, and The Citadel and successful team are currently in contract negotiations.

A thorough programming study was completed in 2022 to right size the building and confirm the new facility could be located on the existing footprint and in preparation for Phase I. When submitting qualifications, all firms should keep in mind that the programming study is a guide and should not be considered the final answer on exact building size, detailed designs of labs, or aesthetic of the building. A more detailed design will be developed during schematic design through construction documents.

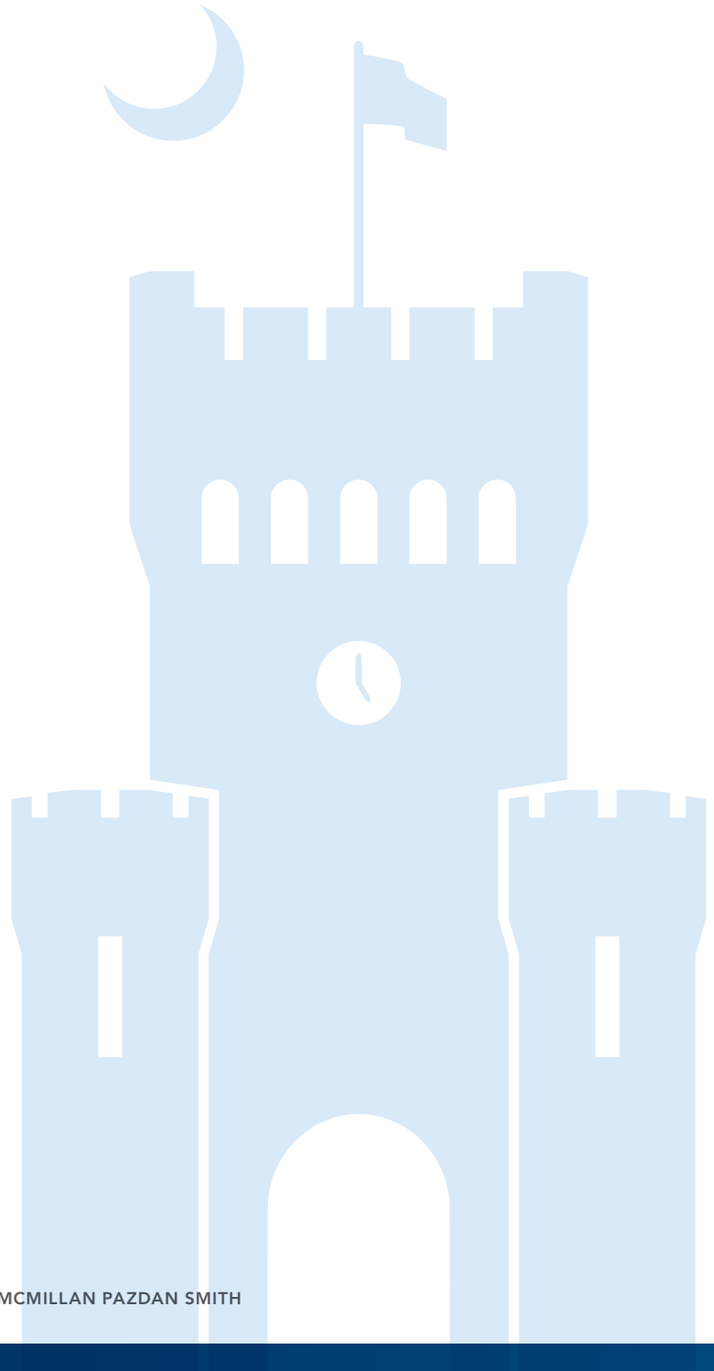
Office of Facilities and Engineering
171 Moultrie Street, Charleston, SC 29409 | 843-953-5304 | **FAX** 843-953-6880 | citadel.edu

THE CITADEL

SCHOOL OF ENGINEERING / PROGRAMMING STUDY

SEPTEMBER 7, 2022

SMITHGROUP | mcmillan | pazdan | smith ARCHITECTURE



CONTENTS

***See separate Appendix** for Cost Estimate, Workbooks, and Existing Building Analysis.

1 PROJECT TEAM

SCHOOL OF ENGINEERING
PROJECT TEAM

THE CITADEL

DR. ANDREW WILLIAMS
Dean of the School of Engineering
The Citadel

DR. KEVIN BOWER, PE
Associate Provost for Academic Affairs
and Dean of General Studies - The Citadel

CAPT. JEFFREY LAMBERSON, USN
Vice President of Facilities & Engineering
The Citadel

KATHLEEN DILLE, RA
Director of Construction Management
The Citadel

CLAIRE BOWMAN, AIA
Construction Project Manager
The Citadel

DESIGN CONSULTANT — SMITHGROUP

DAVID JOHNSON, AIA, LEED AP BD+C
Design Strategist
SMITHGROUP

LORI CAPPUCCIO, AIA, LEED AP
Programming + Planning
SMITHGROUP

DOUGLAS DAHLKEMPER, AIA, LEED AP
Lead Designer
SMITHGROUP

CHRISTOPHER VANNESTE
Lab Planner
SMITHGROUP

JOANNE VALENCIA, RA, LEED AP
Programming + Planning
SMITHGROUP

mcmillan | pazdan | smith ARCHITECTURE — ARCHITECT OF RECORD

KURT LUDWICK, AIA, NCARB
Principal, Project Manager
MCMILLAN PAZDAN SMITH

PAULETTE MYERS, AIA, LEED AP, ALEP
Principal / Charleston Office Dir.
MCMILLAN PAZDAN SMITH

LAURA SLAGEL, AIA, NCARB
Associate, Project Architect
MCMILLAN PAZDAN SMITH

CIVIL + STRUCTURAL — ADC ENGINEERING

MARK DILLON, PE, SE
ADC ENGINEERING

CHRIS COOK, PE, LEED
ADC ENGINEERING

DWG CONSULTING ENGINEERS EMPLOYEE OWNED — MEP / FP ENGINEERING

MARK A. UYAK, PA, LEED AP
DWG ENGINEERS

2 EXECUTIVE SUMMARY

EXECUTIVE SUMMARY
OVERVIEW

THE CITADEL SCHOOL OF ENGINEERING is one of the first five engineering programs in the nation and the first accredited program in South Carolina. In *U.S. News and World Report,* The Citadel is ranked as the #1 top public college in the south for 11 years and the engineering program is ranked in the top 25 nationally for 8 straight years. There is a tremendous amount of pride and discipline within the program with these accolades and it truly is one of America's great public institutions, accessible to all.

While the school of Engineering has continued to thrive during its long history, its infrastructure and spaces are misaligned with the quality of the education provided and it is no longer able to support the increasing enrollment which has doubled in the last five years. The Citadel therefore sought a programming and design team to help with the vision, space program, assessment, and building concept for a new facility with a new model worthy of taking the School of Engineering program into the future.

It became evident very early through review of previous studies by the College and analysis that the existing facility, LeTellier Hall, did not have adequate spaces and infrastructure to develop a robust 21st-century engineering program, nor was it suitable any longer for the types and size of spaces needed for engineering education into the future. The building systems are nearing the end their life span and the infrastructure was built to support instruction space of a different era. Major changes in laboratories, learning environments, technology, and program offerings will require a fresh look at the types of spaces and character that will support the culture and instruction at The Citadel School of Engineering.

The 15-week study documented here focuses on three fundamental components:

01. **Vision, goals, and priorities** of the future of engineering instruction

02. **A comprehensive space program** defining all spaces needed for a successful facility

03. **A building organization, conceptual building design, and a cost model** towards an actionable and implementable plan for the School of Engineering.

ERIK JONSSON SCHOOL OF ENGINEERING & COMPUTER SCIENCE
UNIVERSITY OF TEXAS AT DALLAS

STRATEGIC INITIATIVES + PROJECT GOALS

THE CITADEL SCHOOL OF ENGINEERING VISION:

> We need inspiring, cutting-edge spaces to Educate Innovative Engineers that Impact the World through Principled Leadership.

THE CITADEL 2026 STRATEGIC INITIATIVES:

01. **Educate and develop Principled Leaders**

02. **Enhance the learning environment** through academic programs of distinction and student services

03. **Advance the Citadel as the senior military college** and graduate college of choice

04. **Create and maintain safe and secure campus facilities** to advance student learning, innovation, and campus operations

05. **Ensure the Citadel has the leadership, talent, diversity,** and inclusive culture to accomplish its mission

06. **Enhance the region's social, educational, and economic development** through meaningful community and corporate collaborations

The programming, organization, and building design vision is based on the foundations of the Citadel's strategic plan: Our Mighty Citadel 2026 — honoring the institution's 177-year past, and ensuring it continues to thrive for generations to come. The building program is also motivated by the National Academy of Engineering (NAE) Grand Challenge to educate the next generation of engineers with five specific, less traditional core competencies: multi-disciplinary, talent / research, cultural, social consciousness, and business competencies.

How the building design and program create a facility that address these initiatives is the metric for the project's success when complete. Questions on how the design will contribute to the academic success, an inclusive culture, and enhance the region's development — for example, are actionable items that the physical design can address.

From the strategic initiatives and the original vision statement our project team derived a set of specific project and design goals for the new School of Engineering. Those goals encompass the intended project themes and specific conditions that the design should include. While this exercise incorporates a conceptual design, these principles deliver a structure for further planning and design phases.

EXPERIENTIAL / ENTREPRENEURIAL	• Innovative, reconfigurable teaching spaces with flexible seating for active learning • Discovery and maker spaces for high impact practices such as Project-Based Learning • Undergraduate research, and entrepreneurial endeavors with industry and startups
INTEGRATED / COLLABORATIVE / INTERDISCIPLINARY	• Circulation to encourage movement and casual engagement • "Collision" opportunities for interdisciplinary collaborations / Topical based organization
EQUITABLE / ACCESSIBLE / DIVERSE	• Inclusion, universal design, and accessibility for all modalities (vision, auditory, etc.) • Inspiring student study workspaces, rooms, and lounge areas
INNOVATIVE	• State-of-the-art interactive user interfaces and experience • Futuristic space and facilities for The New Citadel Center for Artificial Intelligence
SUSTAINABLE	• The Building as a Living, Learning Laboratory • Sustainability and Resilience (LEED, Green Globes, WELL, etc.) • A well-planned efficient building that will last

EXECUTIVE SUMMARY

PROCESS / INITIAL PLANNING

There are two broad components to the study process, one centers on the visioning and programming piece and the other on the physical building, assessment, planning, blocking, and context. Both components in the end inform each other with the goals and parameters that were defined through the process. The visioning and programming piece was largely focused on collaboration with stakeholders.

Due to the importance of the project and the need for comprehensive input, the leadership selected the design team as well as key stakeholders from The Citadel Engineering community. The design team created a collaborative process aimed at clarifying the vision, forming a space program, refining space needs, and clarifying the Citadel's vision for transforming the future of engineering, teaching, and research on Campus.

The process centered on a select committee assembled by the Dean and the College and then branched out to engage with specific users, department heads, Engineering students, the Engineering Advisory Board, Alumni, and focus groups on specialty topics. Each interaction was designed to gain input from the groups which was then synthesized and brought back to the building committee for discussion.

As a program starting point, a space needs questionnaire was sent to all department leaders to assemble a list of program requests. That document became the basis of the program to refine and edit based on the priorities and vision for the future of the School of Engineering.

The programming process continued with a series of individual interviews with Faculty, Department Chairs, Deans, and College Leadership. This led to a set of exploratory conversations about the nature of a collaborative program conducted through a series of workshops, meetings, and focus groups:

- **Building Committee Meetings:** A series of meetings defining goals, priorities, and vision for the facility as well as organizational themes for building planning.
- **Focused Department Engagement:** A space needs questionnaire and survey to solicit specific space needs by department.
- **Engineering Community Input:** Ideas from the larger School of Engineering community including, faculty, staff, and students by way of an all-day poster session soliciting ideas on space needs and a prioritization of those needs; A digital version of the MURAL boards were also emailed to the Advisory Board and Alumni for responses.
- **Big Workshop:** A two-day meeting with representatives from the Office of the Provost, the Facilities and Engineering Department, and a dozen leaders from the Engineering Department to discuss the future facility.
- **Focus Groups:** Engagement with lab users and leadership on specific laboratory space needs and equipment including engineering research, instruction labs, and support spaces.

These interactive sessions served as an impetus for gathering the full picture of space needs from various user groups, testing ideal interrelationships, and refining the program. Once all space program requests were assembled, the next task was to refine and edit a final program with the building committee that aligned with The Citadel's mission, values, and future of the School of Engineering.

PROCESS + CONCLUSION

The conceptual design process for the physical building began with an assessment of LeTellier Hall's current use and a review of site parameters to understand the limits of the buildable area, context clues, and access. The building design and organization were greatly influenced by stakeholder input on desired adjacencies, lab requirements, and the strategic vision. The parallel process of visioning and building planning allowed the physical parameters to inform the program and how much could fit within the given site. This analysis allowed the group to determine that some portions of Grimsley Hall would need to be renovated for the engineering program to accommodate the entire required space. This integrated design thinking is a dynamic method that led both the vision and program piece and the physical building planning to go through an iterative process from discovery to resolution.

CONCLUSIONS

The comprehensive study was an extensive look at the vision and future space program to support the Citadel's evolving Engineering program, paired with a conceptual site review and diagrammatic design for a new state-of-the-art facility. The following deliverables constitute the Phase 1 study and will allow the Citadel to proceed with planning and fundraising for a future Engineering building:

DELIVERABLES

01. **Existing Building Analysis:** Multi-disciplinary building review; Code compliance; Feasibility of future renovations

02. **Vision + Programming:** Project Vision, Goals, and Priorities; Space list; Guide plates for key spaces

03. **Site + Context Analysis:** Site constraints; Master plan considerations; Adjacent buildings; Summerall Field façade

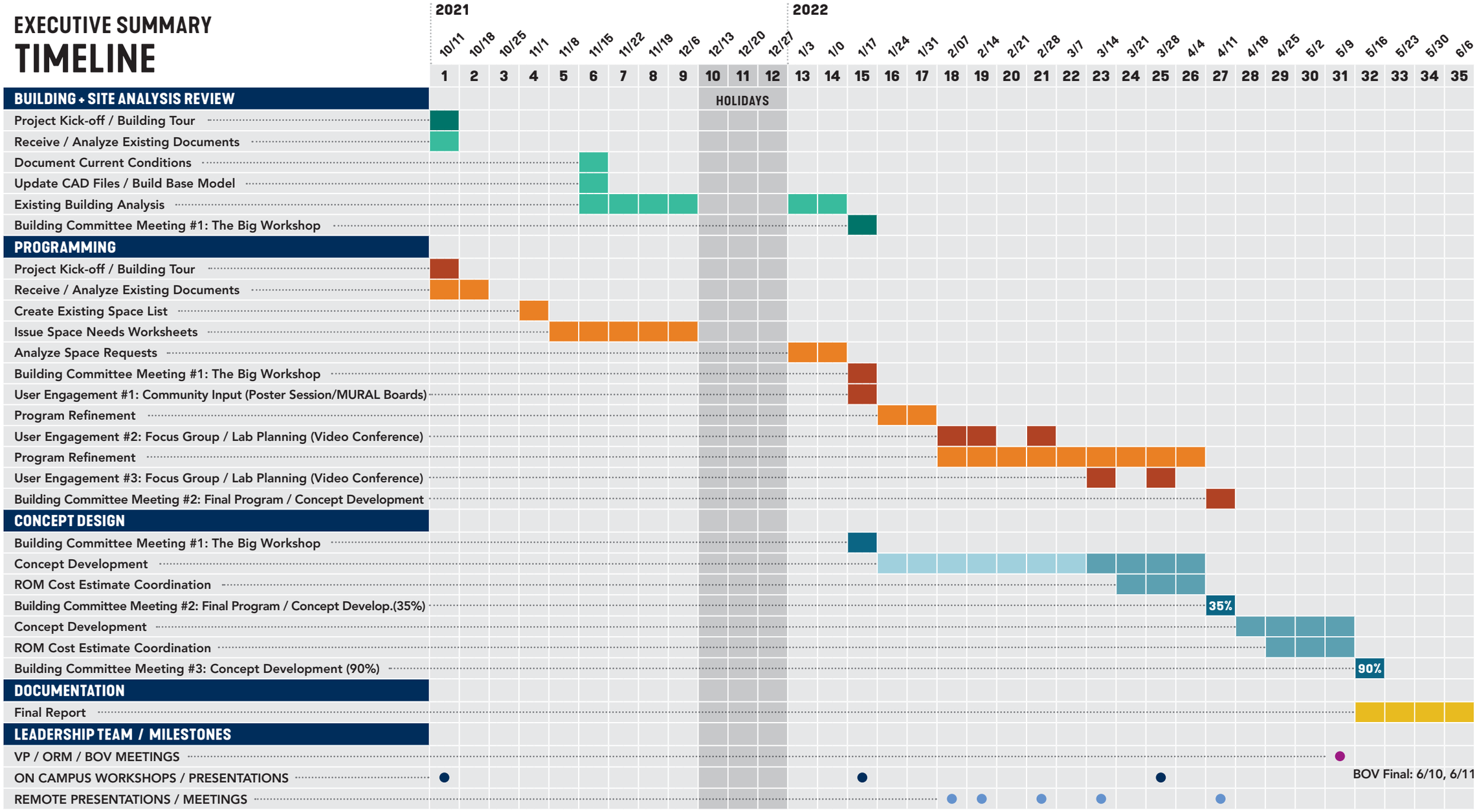
04. **Concept Design:** Block and stack diagrams; Site plan; Floor plans; Interior and exterior concept renderings; ROM cost estimate

The study represents a collaborative and unique Citadel vision that was spearheaded by the Engineering Department Dean, leadership, faculty, and users. Their experience and insight was the key ingredient to a successful study, from defining the challenges and opportunities to evaluating the most appropriate design solutions. The design team served as the facilitator, listener, and planner to receive and interpret the vision into programming documents and architectural diagrams for future use.

Throughout the study, the collective team embraced the critical task of right-sizing the building for the site, the Engineering program, and the potential future budget. The final space program reflects an iterative process of gathering, distilling, reviewing, and refining the future building needs. It includes a depth of information such as guiding characteristics, furniture layouts, proposed equipment, adjacency requests, storage needs, and technology requirements. Stakeholders worked through many detailed discussions to identify spaces with flexibility for shared-use, as well as those with dedicated needs.

The resulting conceptual block and stack diagrams embody the vision for a "Collaboratory" — a learning, living Laboratory with Engineering at the core. The organizational strategy includes clear circulation through an Engineering "main street" that offers prospective students, outreach groups, industry partners, and the current faculty and students a dynamic way to experience the school. In addition to casual encounters for engagement, the conceptual design is organized to celebrate the capstone projects with a hub for collaboration and presentation. The diagrammatic plans also include careful placement of programs in the new multi-story building or renovated third floor of Grimsley Hall, with consideration about how to bridge the two into a united facility. Finally, the conceptual building is arranged with "neighborhoods" — a user idea to co-locate labs, classrooms, offices, and study space as a direct nod to the student-centered, teaching-focused culture that is unique to the Citadel.

EXECUTIVE SUMMARY
TIMELINE



The schedule illustrates defined tasks within a 35-week parallel track exercise which examined the existing building analysis, vision, program, site, and physical parameters of the conceptual building design.

3

EXISTING
BUILDING ANALYSIS

EXISTING BUILDING ANALYSIS

LETELLIER HALL / EXECUTIVE SUMMARY

VISUAL + CODE ANALYSIS

01. Site and Utilities

02. Architectural Components, Interior Environment

03. Structural Systems

04. Mechanical Systems

05. Electrical Systems

06. Plumbing Systems

07. Fire Protections

ASSUMPTIONS

01. Renovation of existing building

02. Addition to accommodate future program needs

03. Occupancy and use will remain the same

04. Work Area will be greater than 50% of floor area

Level 3 Alteration per IEBC and IBC

PROJECT OVERVIEW

The Citadel enlisted McMillan Pazdan Smith Architecture and the SmithGroup, along with consultants ADC Engineering and DWG Engineers, to evaluate the existing LeTellier Hall. The following narratives record the design team's findings on the existing structure, building systems, interior environment, and general code compliance.

This study also serves as a benchmark to determine the feasibility of a future renovation or addition for continued use of the building. For the purpose of this evaluation, the design team assumes the occupancy will not change and the work area will include over 50% of the building area in a future renovation. This would be classified as a Level 3 Alteration per the International Existing Building Code with extensive code requirements comparable to new construction. Any future alterations would be reviewed and permitted by the South Carolina Office of State Engineer (OSE).

BUILDING OVERVIEW

LeTellier Hall is the Citadel's primary facility for the Civil and Environmental Engineering programs. Located at the Northwest corner of Summerall Field, the building is directly adjacent to Grimsley Hall which also houses some of the Engineering offices and classrooms. The first two floors of LeTellier Hall were constructed in 1937, with a series of renovations including a rear addition and a third floor addition. A significant modernization was completed in the 1980's, with ongoing work to the present time.

There are additional storage and support buildings that serve LeTellier Hall, including Himelright Hall. This small concrete masonry structure is located behind the main building and serves as a student workshop and collaboration space for projects. The facility was constructed to honor Engineering Department head Col. Loring K. Himelright and serves as a reminder of his dedication to the school. In addition to Himelright Hall, there is a metal building behind LeTellier and Grimsley Hall that serves as the Mechanical Fabrication Shop. Students use it as a work space for projects, such as the Baja car challenge.

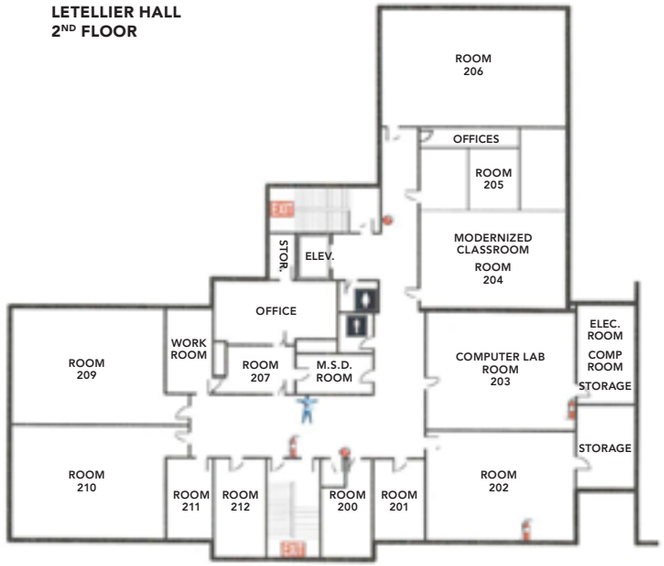
SUMMARY OF SIGNIFICANT DESIGN TEAM FINDINGS

The following is a summary of the design team's findings; please refer to each discipline's narrative for a more in-depth evaluation of the building and its systems.

LETELLIER HALL / FLOOR PLANS

LETELLIER HALL
1ST FLOOR

LETELLIER HALL
2ND FLOOR



LETELLIER HALL
3RD FLOOR

EXISTING BUILDING ANALYSIS

ARCHITECTURAL FINDINGS

01. The building does not meet current ANSI and ADA accessibility requirements in regards to:

- Site Access and Egress
- Circulation Throughout the Facility
- Built-In Furnishings
- Interior Finishes
- Plumbing Fixtures

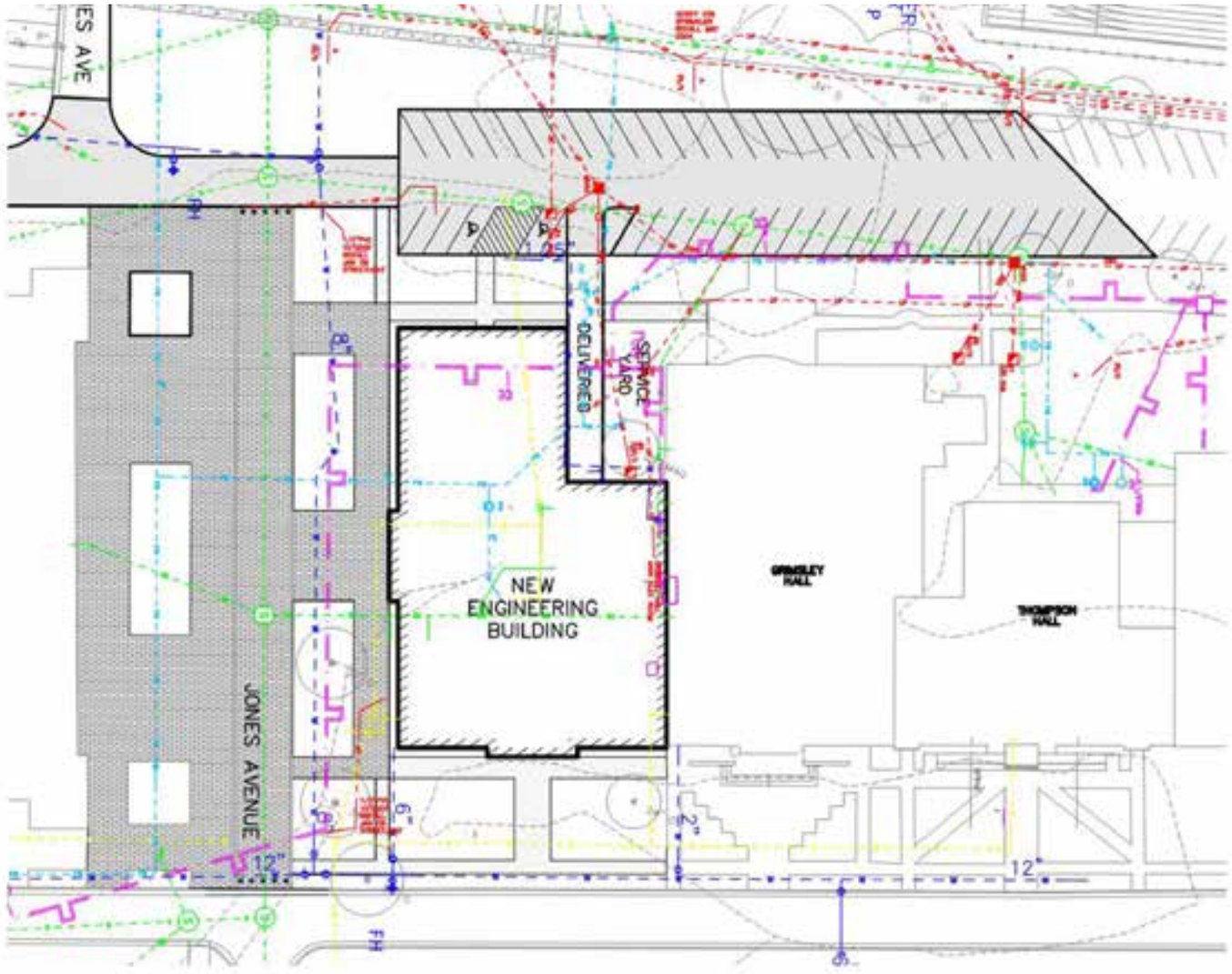
02. Existing toilet facilities do not accommodate an equal number of male and female occupants.

03. The building finishes pose a health and safety concern.

CIVIL FINDINGS

04. A building expansion to the West and/or North will likely require relocations of steam, dedicated fire protection, and gas utilities. The Citadel Master Plan includes plans for Jones Avenue adjacent to LeTellier Hall to be converted to a plaza, which will also influence the locations.

05. Potable water is immediately adjacent to the site and will not require extensive effort to connect.



STRUCTURAL FINDINGS

06. The existing structure can continue to function with periodic maintenance, but it will continue to be code deficient in terms of life safety. There have been no significant seismic events during the building's lifespan, but it is predicted that a code level seismic event would likely lead to a catastrophic failure of this building.

07. A Level 3 Alteration would trigger a substantial structural alteration; the resulting design would need to comply with ASCE 41 with a seismically robust design that provides for life safety of the occupants. Even with these substantial and important improvements, the building would not be as strong, as ductile, or as well-connected as a completely new building. A Level 3 Alteration will not result in a current code compliant structure. The resulting building would remain standing after a major event, but likely be greatly damaged.

08. A substantial structural alteration or an Owner driven voluntary code upgrade will result in a current code compliant structure that is nearly as robust as a new structure.

09. There are some minor masonry cracks in the building but nothing that indicates a significant structural issue such as settlement. There is one crack in the entry turret that should be periodically monitored to ensure it does not enlarge. The cracks can be repaired during a renovation.

BUILDING SYSTEMS FINDINGS

10. A substantial renovation or expansion to LeTellier Hall will require an upgrade to the HVAC system to meet ventilation requirements.

11. The electrical system could potentially support a substantial expansion if a central source of chilled water is routed to the building.

12. The existing plumbing infrastructure would not support a major renovation.

13. The fire protection service size could potentially support expansion or major renovations.

CONCLUSIONS

14. In a comprehensive consideration of the building's construction, age, current condition, current code requirements, and each discipline's analysis, the design team recommends the demolition of the existing building, and construction of a new and fully code compliant Engineering building.

15. In anticipation of the building's renovation needs and the associated cost of a Level 3 Alteration, the design team recommends a complete building replacement for the best value and investment of funds in a state capital project.

* The full report will be in the Appendix.

4

USER ENGAGEMENT

USER ENGAGEMENT
MURAL BOARDS

The design team provided faculty, staff, students, alumni, and the Advisory Board an opportunity to contribute their thoughts at the beginning of the programming and design process. Prompt questions helped the responders focus on Space Prioritization and Desired Characteristics of the new facility. Students had access to an all-day poster-session, with many faculty members encouraging them to participate in the dialogue with design team members. A digital version was distributed to faculty and others located off-campus for a diverse reach of stakeholders. The input fell into two major categories: 1: Visionary ideas for a flexible, collaborative, and technologically advanced education, and 2: Practical suggestions for the physical building to improve the user experience.

Key themes and takeaways that arose from student interaction include:

01. **A learning laboratory** with transparent infrastructure, built-in sensors, virtual reality, AI, and other hands-on learning tools.

02. **Flexible and versatile environment** for active learning.

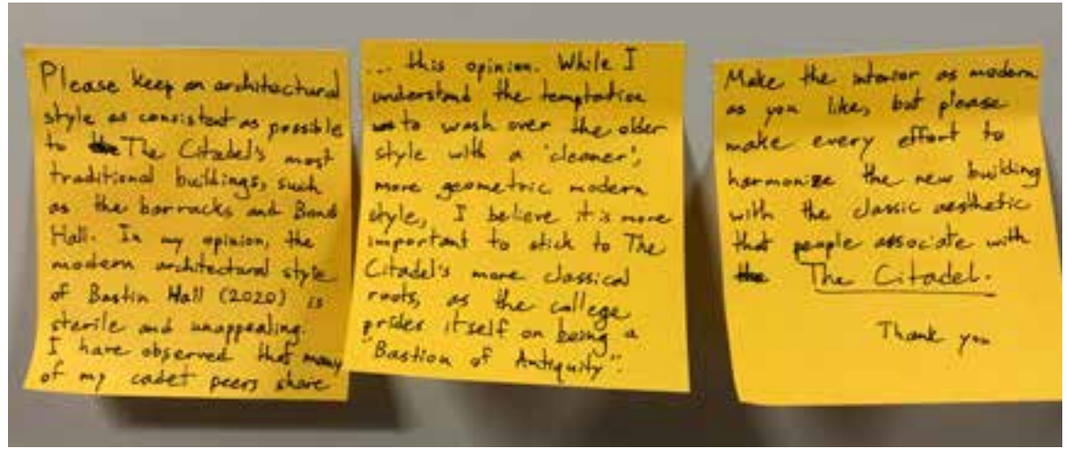
03. **State-of-the-art technology** for hands on learning and high impact practice.

04. **Industry partnerships** for learning, outreach, and entrepreneurial opportunities.

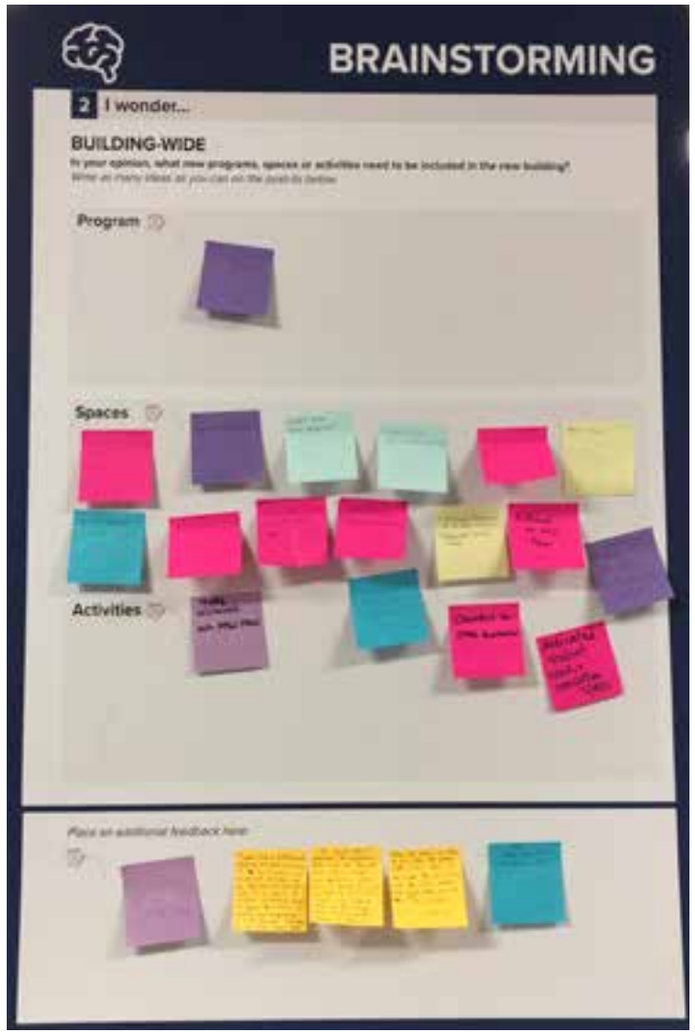
05. **Dedicated study space** with the tools and technology to collaborate.

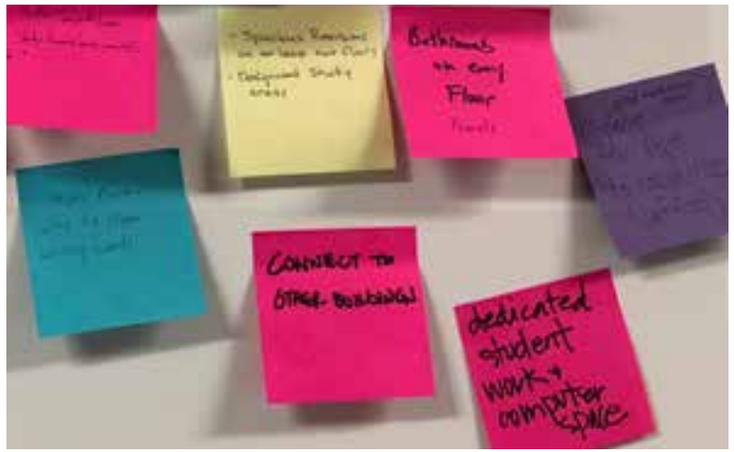
06. **Prioritize daylight** and open space.

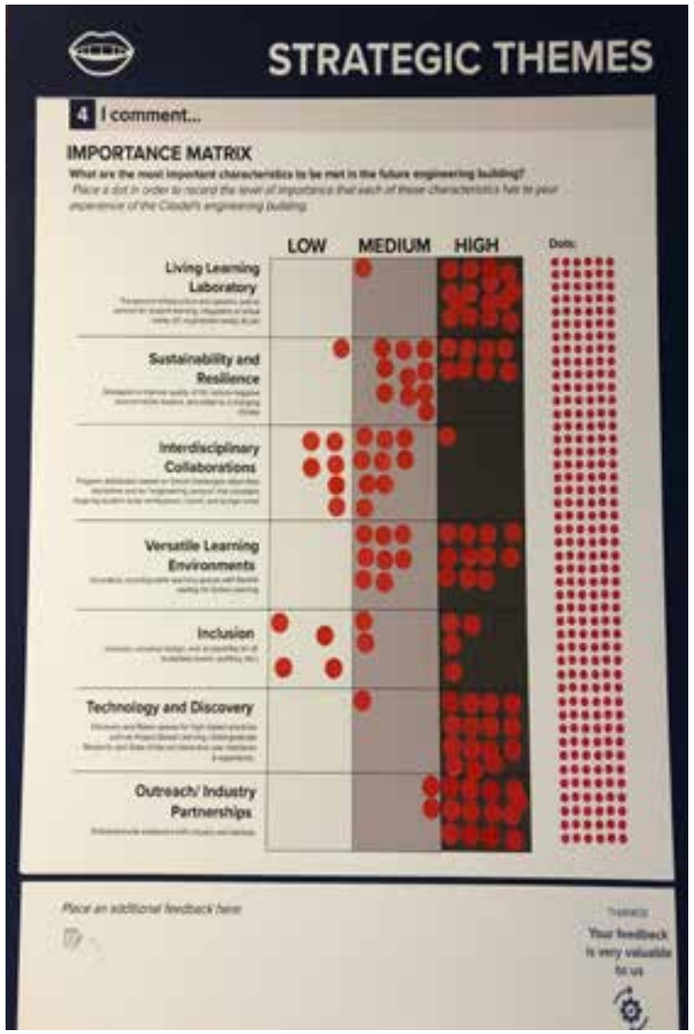
07. **Amenities** for socialization, food, and drink.



MURAL BOARDS + WORKSHEET







USER ENGAGEMENT
THE BIG WORKSHOP

> **“Our strength is the diversity of us together.**
>
> **– DR. KEVIN BOWER, PE** / Associate Provost for Academic Affairs + Dean of General Studies

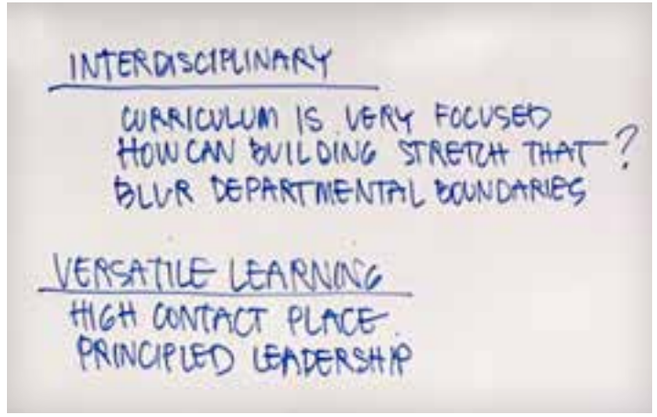
Several themes emerged from workshops that informed the programming and overall building planning.
Big picture questions guided the conversations, including: What is the local and global impact of the School of Engineering? How can collaboration space function in the new building? What elements form an interdisciplinary “neighborhood”? How can spaces for making ideas and things create new organizational adjacencies?

The Design team facilitated a two-day meeting, the “Big Workshop,” with representatives from the Office of the Provost, the Facilities and Engineering Department, and about a dozen leaders from the Engineering Department. McMillan Pazdan Smith and SmithGroup led the team through a series of presentations, case studies, program analysis, and hands-on brainstorming activities to discuss the future of Citadel Engineering and the appropriate facility to support their growth. The Engineering leadership provided valuable feedback on the space program as well as drivers for the evolution of education and curriculum.

During the Big Workshop, key themes were fleshed out as two teams brainstormed building organizational ideas in the “perfect diagram” exercise. This activity involved key leadership working with the design team to create diagrams representing the most important adjacencies and connections in the building; the design team later used these as the basis of conceptual planning iterations.

Key themes that arose in the workshop included the following:

- **Capstone hub** creation
- **Assembling engineering “neighborhoods”** consisting of office, laboratory, collaboration space, and classroom spaces
- **The idea of creating an engineering “collaboratory”** that merges the making of ideas and things
- **Ideas on identity** and history of the program
- **Telling the story of engineering** through a living, learning lab
- **Developing spaces and programs that are inclusive** and equitable to all learners



5

PROGRAM DEVELOPMENT

PROGRAM DEVELOPMENT
OVERVIEW

The numeric program development began with a survey of existing spaces in the School of Engineering and an electronic space needs questionnaire to create the wish list for the new facility. This was complemented with user group meetings and discussions with the building committee as a part of the prioritization process. Further refinement of the program happened with user group calls and focus groups for the laboratory spaces.

In parallel, The design team completed benchmarking exercises to look at engineering programs nationally and begin to understand the big picture range of program targets as an audit of the space need requests from various departments. Benchmarking the latest engineering buildings also informed other program pieces such as collaboration space and net square feet (NSF) per student totals for an academic focused engineering program. This provided a target range of NSF overall that was used as a check and balance for site planning.

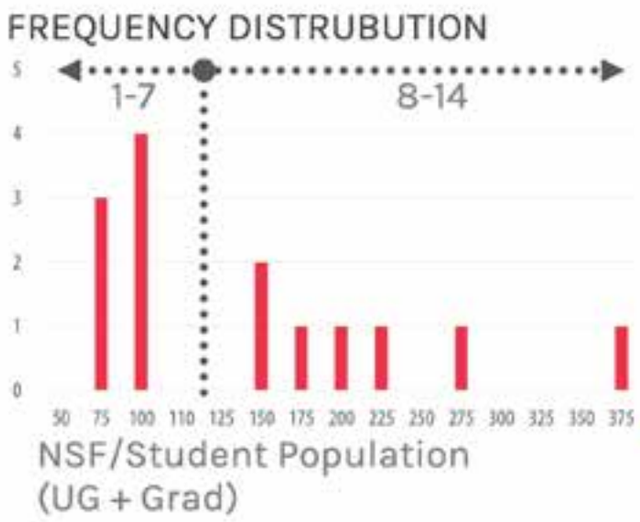
The following section illustrates the early benchmarking of engineering programs across the country, the final numeric program along with descriptions of various spaces, and detailed laboratory function and plans.

ERIK JONSSON SCHOOL OF ENGINEERING & COMPUTER SCIENCE
UNIVERSITY OF TEXAS AT DALLAS

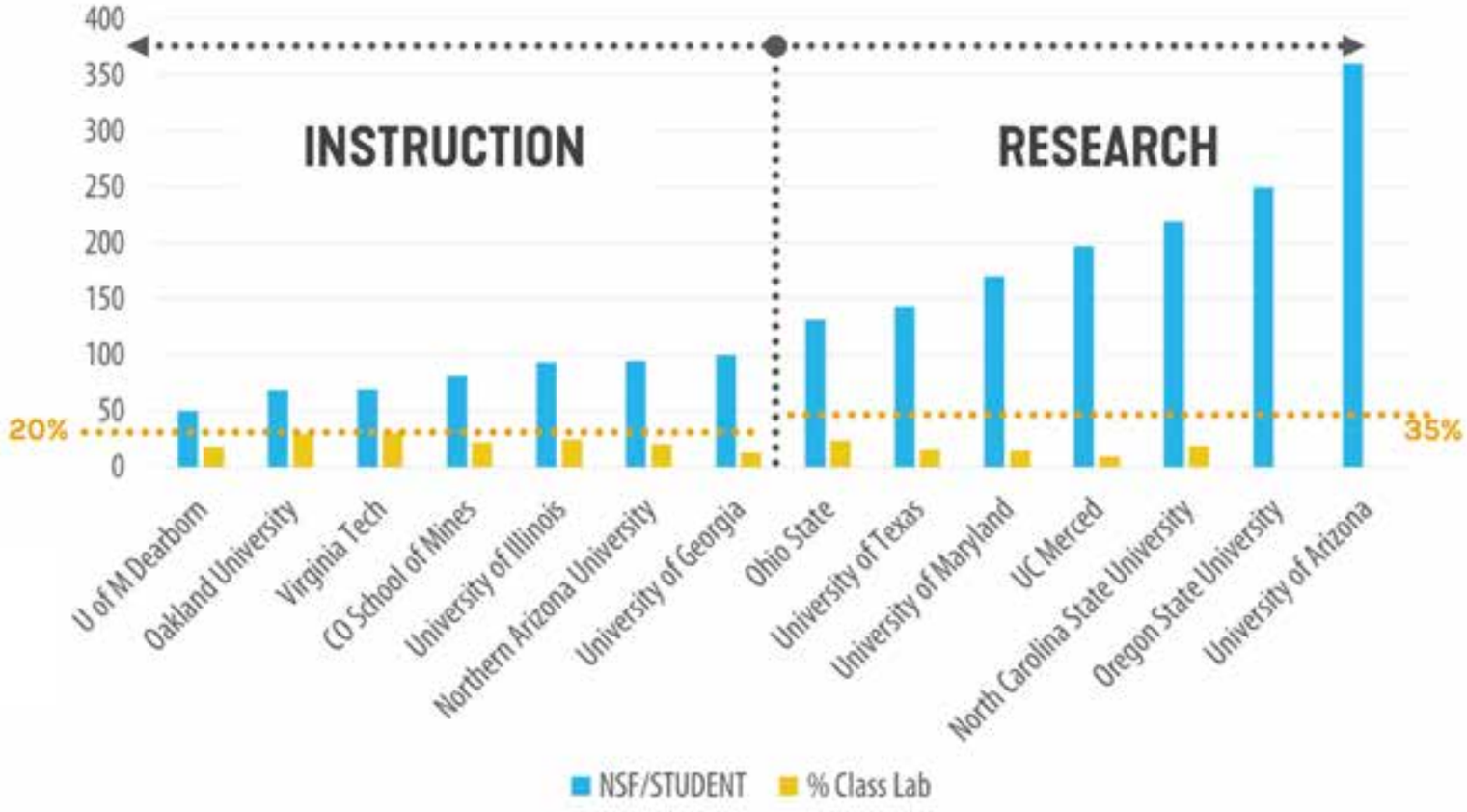
BUILDING RIGHT-SIZING

STUDENT METRICS

***TARGET 70–100 SF / STUDENT**



1–7: AVERAGE 70 NSF / STUDENT
8–14: AVERAGE 175 NSF / STUDENT



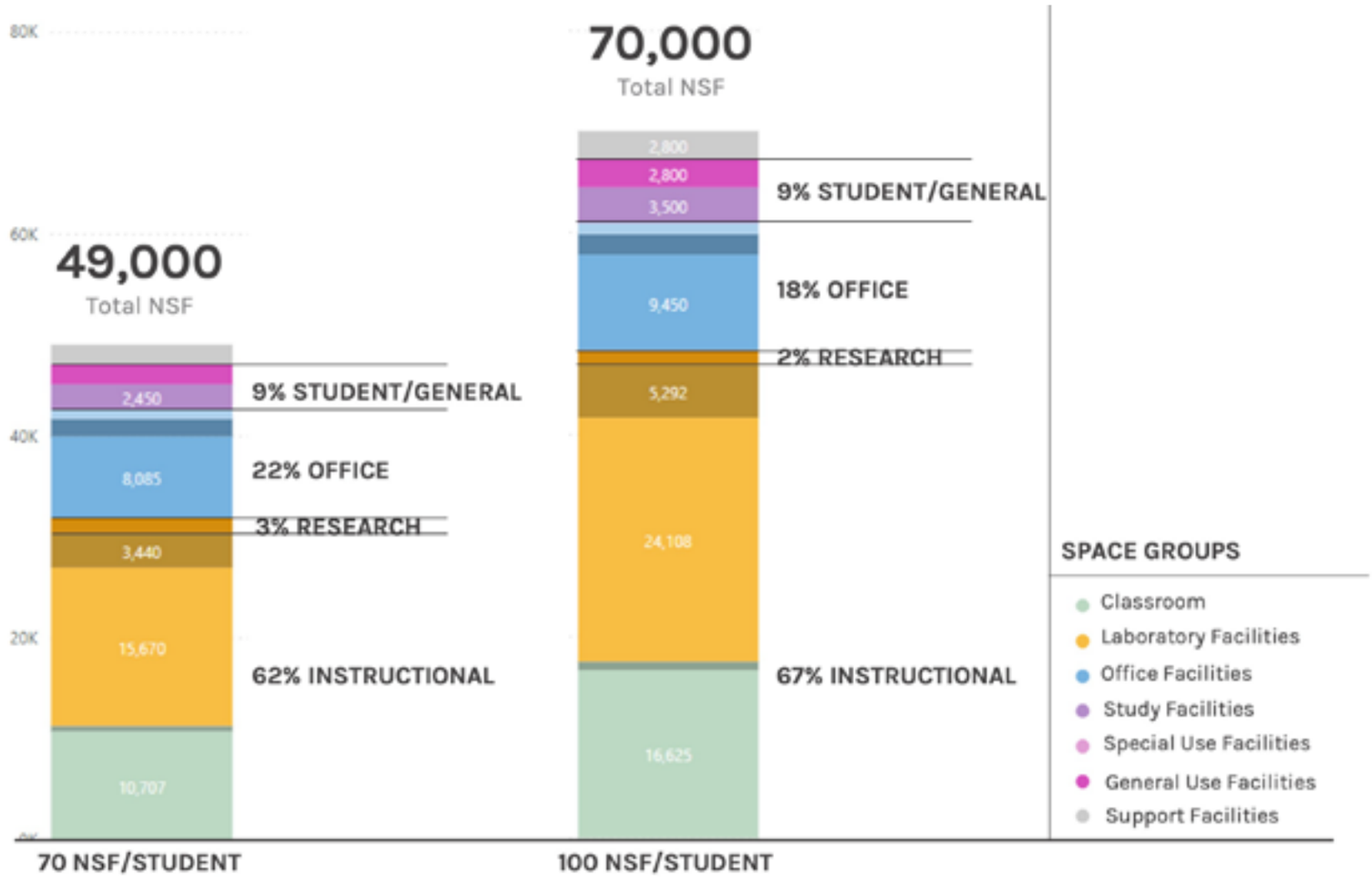
PROGRAM DEVELOPMENT

MODEL PROGRAMS / INSTRUCTIONAL FOCUS

TARGET 70 – 100 SF / STUDENT
@700 STUDENTS*

*693 students per 2020 master plan

The following graphs illustrate the range of NSF and space types for an instructionally focused engineering education building for 700 students from the benchmarking exercise. Grossing factor for an engineering building fall anywhere between 55% and 62% typically.



NUMERIC SPACE PROGRAM

The final program areas are shown here as total net program space for each type. The final program included 67,090 NSF with an expected GSF of building between 110,000 – 120,000 GSF. **(The following pages capture the full space program by room for each category).*

EXECUTIVE SUMMARY

CLASSROOM SPACE

10,440

TOTAL NSF

LABORATORY SPACE

36,482

TOTAL NSF

OFFICE SPACE

13,163

TOTAL NSF

STUDY SPACE

3,360

TOTAL NSF

GENERAL USE SPACE

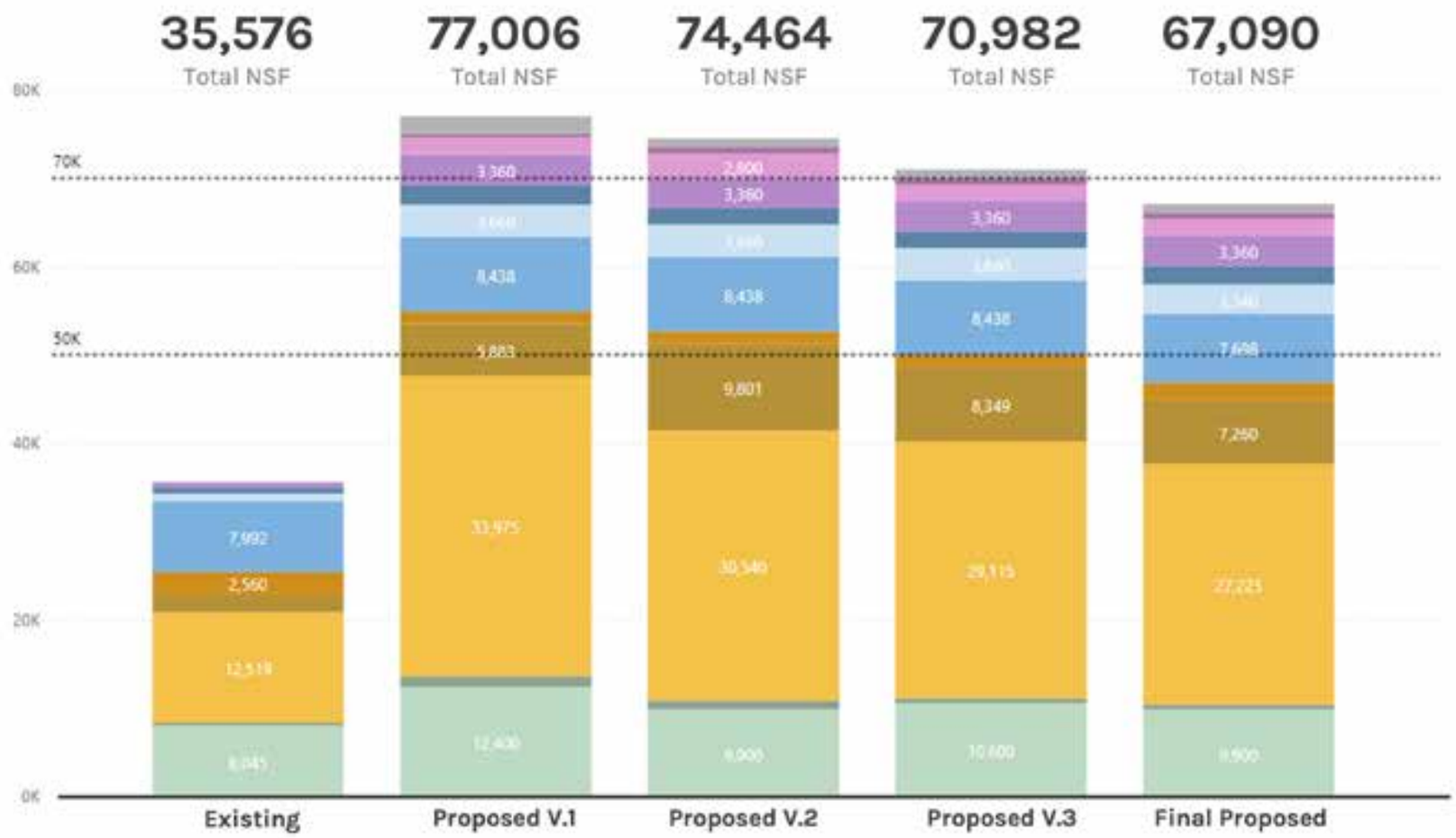
2,645

TOTAL NSF

SUPPORT SPACE

1,000

TOTAL NSF



PROGRAM DEVELOPMENT
SPACE PLAN BY ROOM

SHARED CLASSROOMS

CLASSROOMS

DEPARTMENT	OCCUPANT/NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SHARED	30 Seat Classroom	30	900	11	9,900	minimum of (4) additional classrooms 3rd fl Grimsley. (1) classroom as potential AI Lab (shown on plans)
Total				**11**	**9,900**	

CLASSROOM SUPPORT

DEPARTMENT	OCCUPANT/NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SHARED	Classroom Storage/Support	0	540	1	540	
Total				**1**	**540**	

10,440

SPACE PLAN BY ROOM

CE-CONE

INSTRUCTIONAL LABS

DEPARTMENT	OCCUPANT/NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
CE-CONE	Concrete/Asphalt Lab	18	1452	1	1,452	
CE-CONE	Environmental Engineering Lab	18	1452	1	1,452	
CE-CONE	Geotechnical Engineering Lab	18	1452	1	1,452	
Total				**3**	**4,356**	

INSTRUCTIONAL LAB - SUPPORT

DEPARTMENT	OCCUPANT/NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
CE-CONE	Concrete/Asphalt Lab - Curing Room	0	121	1	121	
CE-CONE	Concrete/Asphalt Lab - Dry Goods Storage	0	726	1	726	
CE-CONE	Environmental Engineering Lab Storage	0	242	1	242	
CE-CONE	Geotechnical Engineering Lab Storage	0	363	1	363	
CE-CONE	Surveying/Geomatics Lab - Storage Room	0	363	1	363	OUTFITTED WITH NUMEROUS CHARGING STATIONS
Total				**5**	**1,815**	

6,171

ECE

INSTRUCTIONAL LABS

DEPARTMENT	OCCUPANT/NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
ECE	Sophomore/Junior Lab	16	726	1	726	combine sophomore/junior lab per round 1 meeting
Total				**1**	**726**	

INSTRUCTIONAL LAB - SUPPORT

DEPARTMENT	OCCUPANT/NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
ECE	EQUIPMENT STORAGE	0	1452	1	1,452	benchmark from IU ECE
Total				**1**	**1,452**	

2,178

PROGRAM DEVELOPMENT
SPACE PLAN BY ROOM

ME

INSTRUCTIONAL LABS

DEPARTMENT	OCCUPANT/NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
ME	Manufacturing	20	1815	1	1,815	equip. shared between mnfctr & Capstone
ME	Measurements / Instrumentation	20	1452	1	1,452	
Total				**2**	**3,267**	

3,267

SPACE PLAN BY ROOM

SHARED

INSTRUCTIONAL LABS

DEPARTMENT	OCCUPANT/NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SHARED	Fluids/Hydraulics Lab	18	1452	1	1,452	Shared between CE-CONE and ME
SHARED	Freshmen Lab	24	1089	1	1,089	Shared between CE-CONE and ECE
SHARED	General Purpose Computer Lab	30	1452	2	2,904	Shared with Surveying, ME, and ECE
SHARED	Materials Lab	18	1452	1	1,452	Shared between CE-CONE and ME
SHARED	Thermodynamics Lab	20	1089	1	1,089	Shared between CE-CONE and ME
Total				**6**	**7,986**	

INSTRUCTIONAL LAB - SUPPORT

DEPARTMENT	OCCUPANT/NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SHARED	Fluids/Hydraulics Special Equipment and Storage	0	363	1	363	Shared between CE-CONE and ME
SHARED	Materials Lab Autoclave	0	363	1	363	Shared between CE-CONE and ME
SHARED	Materials Lab Special Equipment	0	363	1	363	Shared between CE-CONE and ME
SHARED	Thermodynamics Lab Special Equipment and Storage	0	363	1	363	Shared between CE-CONE and ME
Total				**4**	**1,452**	

11,435

SPACE PLAN BY ROOM

CAPSTONE / STUDENT PROJECT SPACE

INSTRUCTIONAL LABS

DEPARTMENT	OCCUPANT/NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
CE-CONE	CE Capstone Lab	30	1452	1	1,452	
CE-CONE	CONE Capstone Lab	30	1452	1	1,452	ADJOINING CE CAP LAB
CE-CONE	STUDENT PROJECT SPACE	15	1089	1	1,089	
ECE	Day/Evening Senior Lab	72	2541	1	2,541	
ME	Senior Design Project Space	72	4356	1	4,356	
Total				**5**	**10,890**	

INSTRUCTIONAL LAB - SUPPORT

DEPARTMENT	OCCUPANT/NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SHARED	Capstone Lab - 3d Printing	0	363	1	363	
SHARED	Capstone Lab - Project Storage	0	363	1	363	
SHARED	Capstone Lab - Shop (Wood & Metal)	0	1089	1	1,089	
SHARED	Capstone Lab - Tool Storage	0	363	1	363	
SHARED	Capstone Lab - Welding	0	363	1	363	
Total				**5**	**2,541**	

13,431

SPACE PLAN BY ROOM

RESEARCH SPACE

INSTRUCTIONAL LABS

DEPARTMENT	OCCUPANT/NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SHARED	Anachoic Chamber Research Lab	1	726	1	726	Dry lab
SHARED	Flexible Research Lab	3	1271	1	1,271	3 identified PI's: John, Ryan, Bob. Damp lab
Total				**2**	**1,997**	

1,997

SPACE PLAN BY ROOM

CE-CONE

OFFICE SPACE

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
CE-CONE	William J. Davis	Department Head	OFFICE	1	180	1	180	
CE-CONE	Ege C Arslaner	Engineering Lab Technician	OFFICE	1	120	1	120	
CE-CONE	GRADUATE ASSISTANT	Graduate Assistant	WORKSTATION	1	64	2	128	ROTATES ON SEMESTER/ACADEMIC YEAR BASIS
CE-CONE	GRADUATE ASSISTANT/GRADUATE RESEARCH	Graduate Assistant	WORKSTATION	1	64	2	128	
CE-CONE	Research Gradute student	Graduate Assistant	WORKSTATION	1	64	2	128	
CE-CONE	Dan D Nale	Professor	OFFICE	1	120	1	120	
CE-CONE	Dimitra Michalaka	Professor	OFFICE	1	120	1	120	
CE-CONE	Dr. Ron Welch	Professor	OFFICE	1	120	1	120	
CE-CONE	John Ryan	Professor	OFFICE	1	120	1	120	
CE-CONE	Kweku T. Brown	Professor	OFFICE	1	120	1	120	
CE-CONE	Mary Katherine Watson	Professor	OFFICE	1	120	1	120	
CE-CONE	Mostafa Batouli	Professor	OFFICE	1	120	1	120	
CE-CONE	Nandan Shetty	Professor	OFFICE	1	120	1	120	
CE-CONE	NEW HIRE	Professor	OFFICE	1	120	2	240	
CE-CONE	Rebekah Burke	Professor	OFFICE	1	120	1	120	
CE-CONE	Ryan K Giles	Professor	OFFICE	1	120	1	120	
CE-CONE	Simon Ghanat	Professor	OFFICE	1	120	1	120	
CE-CONE	Stephanie Laughton	Professor	OFFICE	1	120	1	120	
CE-CONE	Timothy A. Wood	Professor	OFFICE	1	120	1	120	
CE-CONE	Timothy Mays	Professor	OFFICE	1	120	1	120	
CE-CONE	STUDENT CLUB	STUDENT CLUB	OFFICE	1	120	1	120	
CE-CONE	Jennifer K Welch	Student Services Program Coordinator II	OFFICE	1	120	1	120	
CE-CONE	UNDERGRADUATE STUDENT WORK STUDY	STUDENT WORK STUDY	WORKSTATION	1	64	1	64	
Total						**27**	**2,908**	

SPACE PLAN BY ROOM

CE-CONE

OFFICE SUPPORT

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
CE-CONE	ABET ASSESSMENT	NA	ABET RESOURCE/DOCUMENT STORAGE ROOM	0	120	1	120	
CE-CONE	SHARED USE	SHARED USE	FILE/GENERAL STORAGE	0	100	1	100	
CE-CONE	SHARED USE	SHARED USE	FACULTY STORAGE	0	500	1	500	
CE-CONE	SHARED USE	SHARED USE	RECEPTION/WAITING AREA	4	200	1	200	
Total						**4**	**920**	

3,828

SPACE PLAN BY ROOM

ECE

OFFICE SPACE

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
ECE	Mark McKinney	Department Head	OFFICE	1	180	1	180	
ECE	Bart Knapp	Engineering Lab Technician	OFFICE	1	120	1	120	
ECE	Greg Mazzaro	Professor	OFFICE	1	120	1	120	
ECE	NEW HIRE	Professor	OFFICE	1	120	2	240	
ECE	Replacement for John Peeples	Professor	OFFICE	1	120	1	120	
ECE	Robert Barsanti	Professor	OFFICE	1	120	1	120	
ECE	Ron Hayne	Professor	OFFICE	1	120	1	120	
ECE	Ryan Integlia	Professor	OFFICE	1	120	1	120	
ECE	Siripong Potisuk	Professor	OFFICE	1	120	1	120	
ECE	Kristin Sigalas	Student Services Program Coordinator II	OFFICE	1	120	1	120	Shared between ME & ECE
Total						**11**	**1,380**	

OFFICE SUPPORT

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
ECE	SHARED USE	SHARED USE	FILE/GENERAL STORAGE	0	100	1	100	
ECE	SHARED USE	SHARED USE	RECEPTION/WAITING AREA	4	200	1	200	
Total						**2**	**300**	

1,680

SPACE PLAN BY ROOM

ELPM

OFFICE SPACE

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
ELPM	Dr. David Greenburg	Department Head	OFFICE	1	180	1	180	
ELPM	Dr. Michael Shick	Professor	OFFICE	1	120	1	120	
ELPM	Dr. Nahid Vesali	Professor	OFFICE	1	120	1	120	
ELPM	NEW HIRE	Professor	OFFICE	1	120	1	120	
Total						**4**	**540**	

OFFICE SUPPORT

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
ELPM	SHARED USE	SHARED USE	FILE/GENERAL STORAGE	0	100	1	100	
ELPM	SHARED USE	SHARED USE	RECEPTION/WAITING AREA	4	200	1	200	
Total						**2**	**300**	

840

PROGRAM DEVELOPMENT

SPACE PLAN BY ROOM

ME

OFFICE SPACE

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
ME	Robert Rabb	Department Head	OFFICE	1	180	1	180	
ME	Lab Tech - hire 23	Engineering Lab Technician	OFFICE	1	120	1	120	
ME	Graduate Asst - TBD	Graduate Assistant	WORKSTATION	1	64	2	128	
ME	Adam DeVoria	Professor	OFFICE	1	120	1	120	
ME	Asst Prof to be hired 25-26	Professor	OFFICE	1	120	1	120	
ME	Asst Prof vacant - hire Aug 22	Professor	OFFICE	1	120	1	120	
ME	Deirdre Ragan	Professor	OFFICE	1	120	1	120	
ME	Emily Bierman	Professor	OFFICE	1	120	1	120	
ME	Gafar Elamin	Professor	OFFICE	1	120	1	120	
ME	James Righter	Professor	OFFICE	1	120	1	120	
ME	Kevin Skenes	Professor	OFFICE	1	120	1	120	
ME	Monika Bubacz	Professor	OFFICE	1	120	1	120	
ME	Nathan Washuta	Professor	OFFICE	1	120	1	120	
ME	Pooya Niksiar	Professor	OFFICE	1	120	1	120	
Total						**15**	**1,748**	

OFFICE SUPPORT

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
ME	SHARED USE	SHARED USE	ABET RESOURCE/DOCUMENT STORAGE ROOM	0	100	1	100	
ME	SHARED USE	SHARED USE	FILE/GENERAL STORAGE	0	100	1	100	
ME	SHARED USE	SHARED USE	TRAINING AIDS/DEMO STORAGE ROOM	0	200	1	200	
ME	SHARED USE	SHARED USE	RECEPTION/WAITING AREA	4	200	1	200	ASKED FOR 3, BUT STANDARDIZE TO 4
Total						**4**	**600**	

2,348

SPACE PLAN BY ROOM

SOE

OFFICE SPACE

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SOE	Jayne Martinko	Assistant Dean for Development for Engineering	OFFICE	1	120	1	120	
SOE	Andrew Williams	Dean	OFFICE	1	250	1	250	
SOE	Dean Admin - hire Feb 22	Director Student Services and Special Projects	OFFICE	1	120	1	120	
SOE	Director of Innovation and Education - hire 23-24?	Director Student Services and Special Projects	OFFICE	1	120	1	120	
Total						**4**	**610**	

OFFICE SUPPORT

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SOE	SHARED USE	SHARED USE	COPY/MAIL AREA	0	100	1	100	
SOE	SHARED USE	SHARED USE	FILE/GENERAL STORAGE	0	100	1	100	
SOE	SHARED USE	SHARED USE	BREAK ROOM	0	120	1	120	
SOE	SHARED USE	SHARED USE	RECEPTION/WAITING AREA	1	300	1	300	
Total						**4**	**620**	

CONFERENCE SPACE

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SOE	SHARED USE	SHARED USE	CONFERENCE ROOM	25	625	1	625	
Total						**1**	**625**	

1,855

SPACE PLAN BY ROOM

BUILDING SHARED SPACE

OFFICE SUPPORT

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SHARED	Adjunct Professors	Adjunct Professor	WORKSTATION	1	64	8	512	
Total						**8**	**512**	

OFFICE SUPPORT

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SHARED	SHARED USE	SHARED USE	COPY/MAIL AREA	0	120	3	360	1 PER FLOOR
SHARED	SHARED USE	SHARED USE	BREAK ROOM	0	240	1	240	
Total						**4**	**600**	

CONFERENCE SPACE

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SHARED	SHARED USE	SHARED USE	CONFERENCE ROOM	15	375	4	1,500	15 @ TABLE, 10 CHAIRS ON WALL(S)
Total						**4**	**1,500**	

2,612

SPACE PLAN BY ROOM

SHARED

STUDENT SPACE

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SHARED	SHARED USE	SHARED USE	STUDY CUBBIE	1	40	9	360	ASSUME 3 PER FLOOR
SHARED	SHARED USE	SHARED USE	4 PERSON STUDY ROOM	4	100	12	1,200	ASSUME 4 PER FLOOR
SHARED	SHARED USE	SHARED USE	6 PERSON STUDY ROOM	6	150	6	900	ASSUME 2 PER FLOOR
SHARED	SHARED USE	SHARED USE	OPEN COLLABORATION	6	150	6	900	ASSUME 2 PER FLOOR
Total						**33**	**3,360**	

GENERAL USE SPACE

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SHARED	SHARED USE	SHARED USE	EXHIBIT/LEARNING THEATER STORAGE	0	700	1	700	
SHARED	SHARED USE	SHARED USE	EXHIBIT/LEARNING THEATER	100	1945	1	1,945	
Total						**2**	**2,645**	

BUILDING SUPPORT SPACE

DEPARTMENT	OCCUPANT/NAME	ROLE	SPACE NAME	OCC. (EA.)	NSF (EA.)	QTY	TOTAL NSF	NOTES
SHARED	SHARED USE	SHARED USE	CENTRAL BUILDING SUPPORT	0	1000	1	1,000	
Total						**1**	**1,000**	

PROGRAM DEVELOPMENT
MAJOR PROGRAM SPACES

Classrooms
The new engineering building will contain 11, 30-seat classrooms, each sized to accommodate a variety of teaching and learning styles. At 30 NSF/seat, the classrooms will be flexible enough for active learning, demonstrations, and traditional lecture formats. Movable tables and chairs will allow users to easily transform the space as needed.


OAKLAND UNIVERSITY
ENGINEERING BUILDING

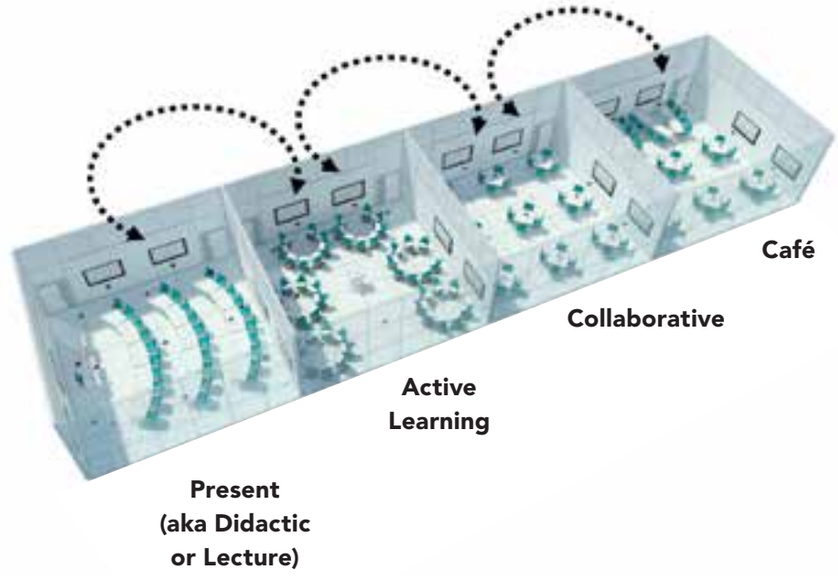

UNIVERSITY OF UTAH
COLLEGE OF LAW

EVOLVING PEDAGOGY

PROGRAM DEVELOPMENT
INTEGRATED / COLLABORATIVE / INTERDISCIPLINARY

GEORGIA STATE UNIVERSITY
ACTIVE LEARNING CLASSROOM

LOYOLA UNIVERSITY
FLEX ENGINEERING BUILDING



PROGRAM DEVELOPMENT
MAJOR PROGRAM SPACES

Laboratories
The building will contain a variety of labs for Electrical, Mechanical, Civil, and Construction Engineering, as well as shared computer labs and research space. The labs will be planned on a standard module to promote future flexibility.

Several of the labs will be dedicated to the School's Capstone program. These spaces will also be flexible and collocated as much as possible to promote a collaborative senior design culture in the building. Other important adjacencies are indicated in the following diagrams.

UNIVERSITY OF TEXAS AT DALLAS
ENGINEERING & COMPUTER SCIENCE WEST

MAJOR PROGRAM SPACES

Offices
Faculty and staff offices will be provided for all four departments in the building, as well as the Dean's suite and all necessary office support spaces. Offices will be distributed throughout the building, with a goal to keep faculty and staff near the labs, but still accessible by students.

Shared Use
Several group study and collaboration spaces have been included in the program for the new engineering building. These spaces will be distributed throughout the building and encourage groups of varying sizes to work together. Study cubbies for quiet, individual work are also included.

Learning Theater
The Learning Theater is a large multi-purpose gathering space ideally located on the first floor of the building. To maximize its use, it will be designed to accommodate lectures, exhibitions, a student commons, and a variety of events.


OAKLAND UNIVERSITY ENGINEERING CENTER


AUBURN UNIVERSITY BROWN-KOPEL ENGINEERING STUDENT ACHIEVEMENT CENTER


AUBURN UNIVERSITY BROWN-KOPEL ENGINEERING STUDENT ACHIEVEMENT CENTER

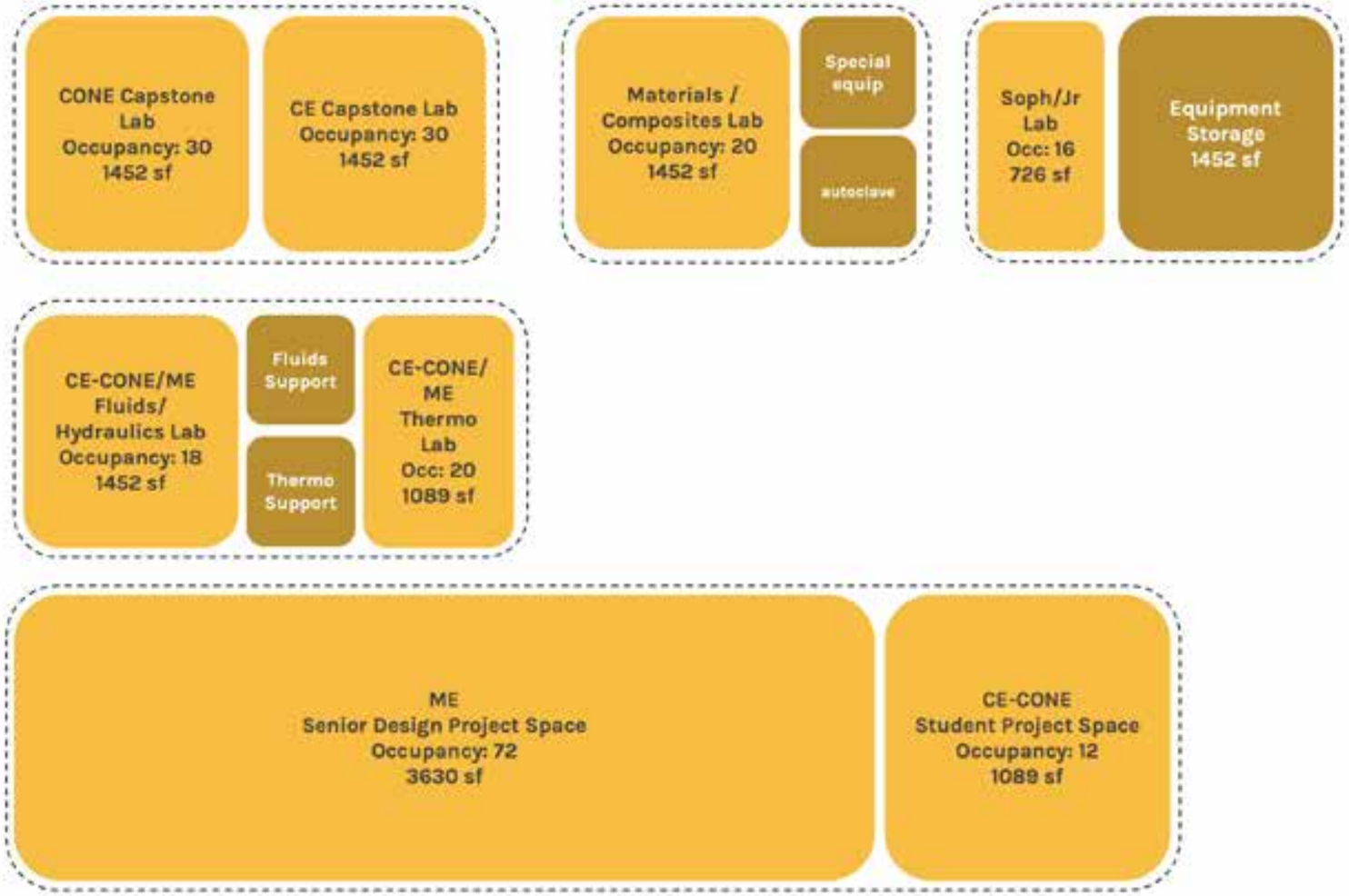

OAKLAND UNIVERSITY ENGINEERING CENTER


VIRGINIA TECH HOLDEN HALL

PROGRAM DEVELOPMENT

BUBBLE DIAGRAM

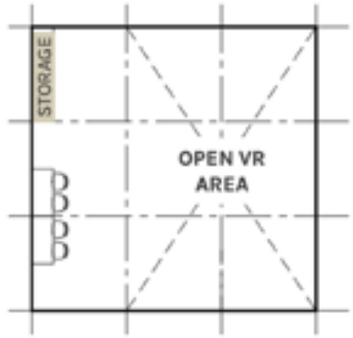
Laboratory Adjacencies



AUGMENTED + VIRTUAL REALITY HCI LAB

AR/VR HCI Lab – 900 sf

Student Seats	4
Layout	(4) Workstations with large open VR area
Schedule	TBD – future need
Equipment	Blackout curtains with modular ceiling mounted structure (pipe grid) Wall mounted monitors and/or projection Movable work table
Storage	Tall cabinet storage
Adjacencies	
Additional Info	

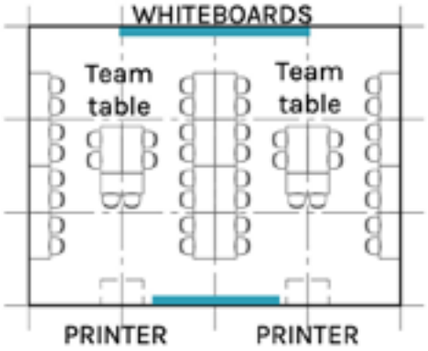


PROGRAM DEVELOPMENT

GENERAL COMPUTER LAB + FRESHMAN LAB

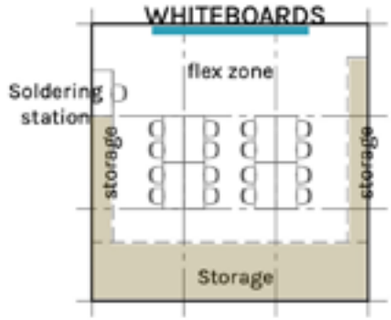
General Purpose Computer Lab – 1452 sf (2)

Student Seats	**30**
Layout	Moving to laptops, but dedicated desktop stations needed for licensing issues. **Open table workspace needed for group work: (2) groups of 4-6 students**
Schedule	Not for scheduled classes - used for homework assignments 24-hour access ideal
Equipment	Printer Future 3d printer possible Whiteboards
Storage	
Adjacencies	Near entry
Additional Info	



Freshman Lab – 1089 sf

Student Seats	**24**
Layout	24 seats + 4x8 game board zones Flexible. Flexible middle area.
Schedule	Don't have this lab now, but needed Fall and Spring (confirm schedule assumptions)
Equipment	Soldering station
Storage	board storage
Adjacencies	Storage (for game boards)
Additional Info	**Showcase opportunity**



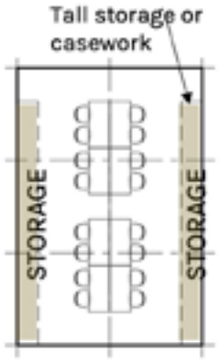
ECE SOPHOMORE / JUNIOR LAB + ECE SENIOR CAPSTONE LAB

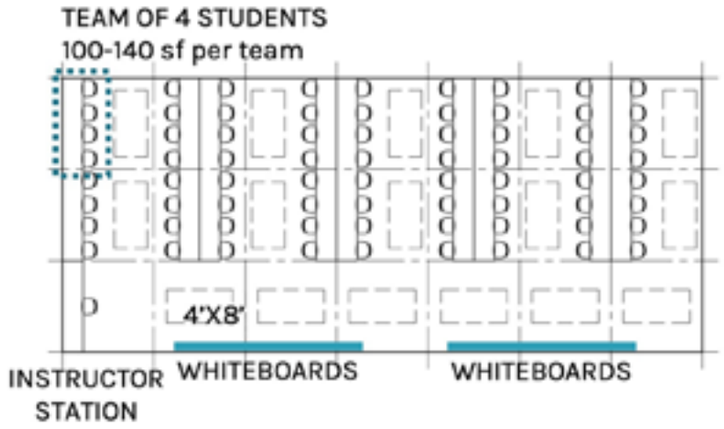
ECE Sophomore/Junior Lab – 726 sf

Student Seats	16
Layout	(8) Groups of 2 + lab volt modules
Schedule	Fall and Spring (confirm schedule assumptions)
Equipment	Lab volt modules
Storage	Lab volt modules Cart storage
Adjacencies	Larger storage area for spare equipment
Additional Info	

ECE Day/Evening Senior Capstone Lab – 2541 sf

Student Seats	**72**
Layout	**18 Groups of 4 students**, plus one instructor station. Bench seating with space in between for 4'x8' testing areas.
Schedule	
Equipment	Whiteboards
Storage	Storage for projects is done at the work station
Adjacencies	Nearer to shop / maker space
Additional Info	Originally planned 2 labs at 40, now combined.

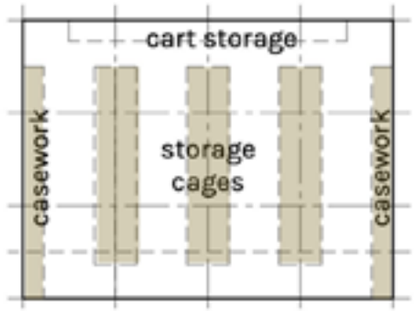




ECE EQUIPMENT STORAGE + MANUFACTURING LAB

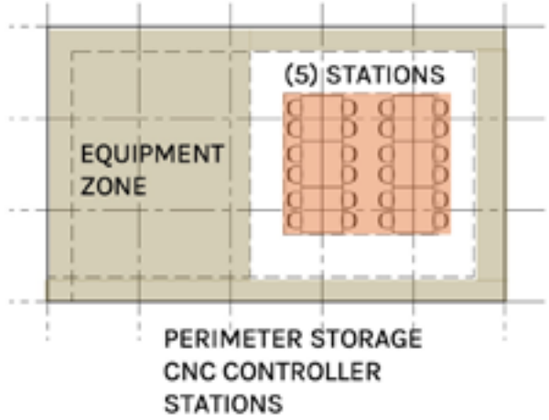
ECE Equipment Storage – 1452 sf

Student Seats	**N/A**
Layout	Cart access
Schedule	N/A
Equipment	Consumables Equipment Admin Supplies Soph/Jr lab volt equipment Carts Student project storage?
Storage	
Adjacencies	Lab Tech Office, ECE Sophomore/Junior Lab
Additional Info	



Manufacturing Lab – 1815 sf

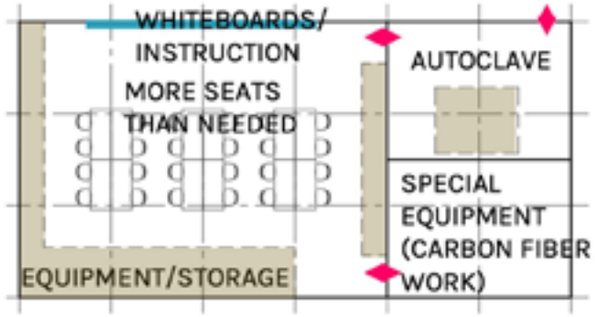
Student Seats	**20**
Layout	(5) stations: lathe, drill press, hand mill, CNC mill, bandsaw Adequate space for equipment, clearances and workspace
Schedule	Confirm schedule and courses
Equipment	Lathe Drill press Hand mill CNC mill Bandsaw (3) CNC controller stations
Storage	Small material requirements: ½" d rod, ¼" alum sheets, etc. Large quantities of small stuff
Adjacencies	Loading dock or service elevator (could be on upper floor) Welding station (one-off use as needed) Classroom for teaching component
Additional Info	Access to laser cutter – perhaps better located in Capstone space?



MATERIALS LAB + MEASUREMENTS / INSTRUMENTATION LAB

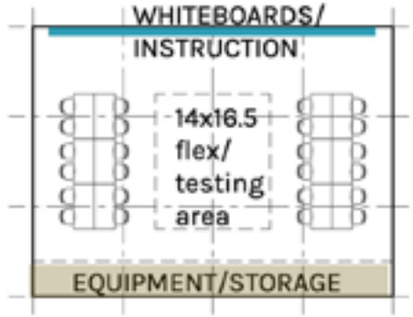
Materials Lab – 1452 sf

Student Seats	18
Layout	Integrate class with lab Make lab experience for students, not demonstration Rotate through equipment stations, work at tables Space for equipment
Schedule	4-5 sections currently Taught to ME and CE-CONE CONE would use more if available Confirm schedule assumptions
Equipment	Universal testing machine, Surface hardness tester, Polisher, Individual set-ups for material testing, 10x8 autoclave (separate room), Heat treatment oven Cut, finish, sand materials with good extraction, Ability to mechanically cut and polish carbon fiber – very dirty and complicated process
Storage	Heavy equipment need
Adjacencies	Lower level preferred (vibrations), Lab tech office
Additional Info	Access to laser cutter – near Capstone space?



Measurements/Instrumentation Lab – 1452 sf

Student Seats	20
Layout	Computers at tables Benchtop equipment Testing area / large flex space in the middle
Schedule	Confirm schedule and courses Fall only?
Equipment	Slightly more sensitive equipment Soldering station (1-2 snorkels)
Storage	Plenty of storage for valuable equipment
Adjacencies	
Additional Info	



PROGRAM DEVELOPMENT

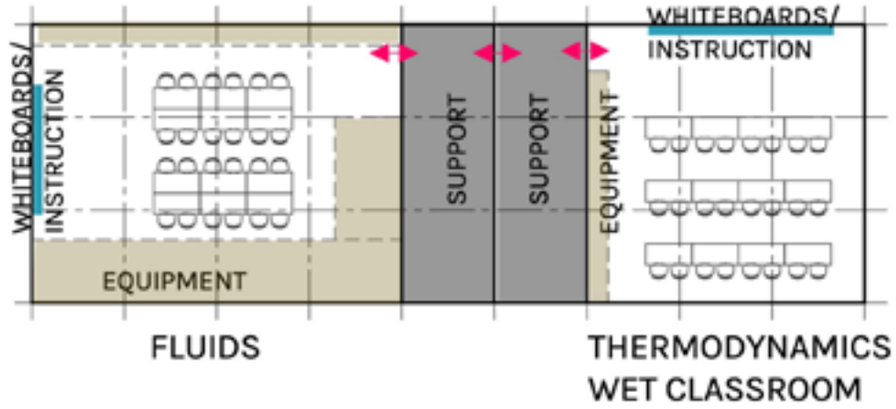
FLUIDS & HYDRAULICS LAB + THERMODYNAMICS LAB

Fluids & Hydraulics Lab – 1452 sf

Student Seats	**18**
Layout	4-5 student groups - group size depends on experiment Integrate class with lab Computer stations in lab or adjacent for quick data analysis Flexible
Schedule	Up to (4) sections: 3 day, 1 evening
Equipment	Heavy need - 10 experiments
Storage	Equipment for varied experiments
Adjacencies	Thermodynamics Lab Support/storage space Classrooms (if not integrated with lab) Computer lab (if not integrated with lab)
Additional Info	Can share with ME. ME has clarified that they could share the Fluids portion of the lab. A separate Thermodynamics lab is needed.

Thermodynamics Lab – 1089 sf

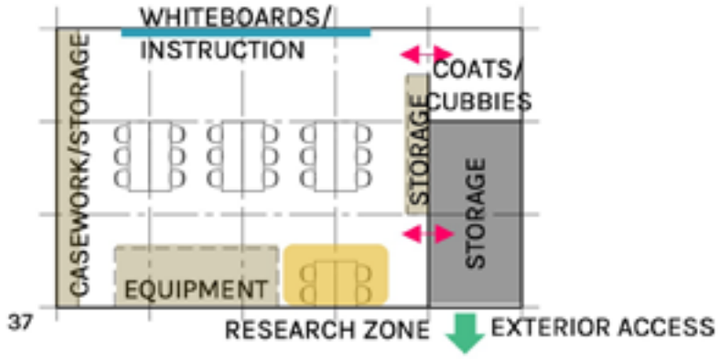
Student Seats	**20**
Layout	Integrate class into lab
Schedule	3 sections: 2 Fall, 1 Spring Fluid can share with CE-CONE Create Thermo specific lab
Equipment	Fluids: need more equipment: pumps, hydrostatic bench, etc. Thermo: mechanical-specific equipment: engines, exhaust systems, storage
Storage	Equipment
Adjacencies	Fluids & Hydraulics Lab Support/storage space Classroom if instruction not accommodated in lab Computer lab
Additional Info	



ENVIRONMENTAL ENGINEERING LAB + GEOTECHNICAL LAB

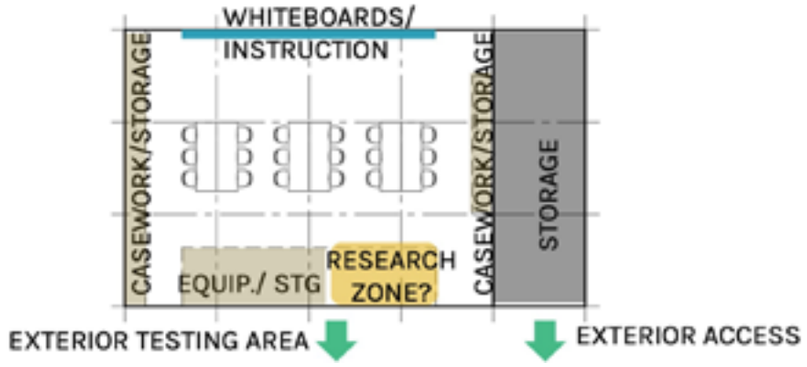
Environmental Engineering Lab – 1452 sf

Student Seats	18
Layout	4-5 groups of 3 students max Integrate class with lab Provide space for research on the side Flexible
Schedule	3-4 daytime sections, 1 evening section Spring semester only Research in off semester?
Equipment	4-5 Ph meters per station 2 spectrometers (1 is a furnace) Refrigerator, Incubator Future small autoclave for research
Storage	Glassware, Lab coats, overcoats, and packs Small qty for research
Adjacencies	Secure chemical storage room 4 cylinders max Exterior access - delivery of wastewater and cylinder samples
Additional Info	



Geotechnical Lab – 1452 sf

Student Seats	18
Layout	Teams of 3 ideal Integrate class with lab Flexible
Schedule	Heavy Spring use: CONE Soils and Geotech Geotech: 2 daytime sections + 1 evening CONE: 1 Soils class with 2 sections shares this lab but used intermittently; may move to Fall. Still need to accommodate evening students
Equipment	Whiteboard, AV (4) Lab sinks
Storage	Storage room needed Manage soil samples - lots of buckets
Adjacencies	Exterior access Exterior testing area (concrete pad or grass) Storage room CONE classroom
Additional Info	Showcase lab - Geotech historically important



PROGRAM DEVELOPMENT

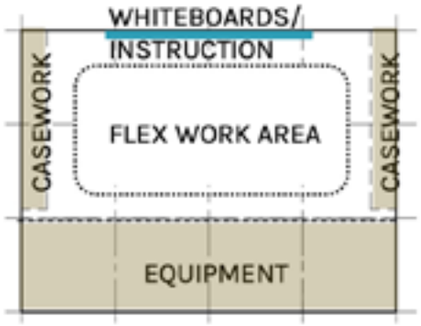
CONCRETE / ASPHALT LAB + CONE CAPSTONE LAB

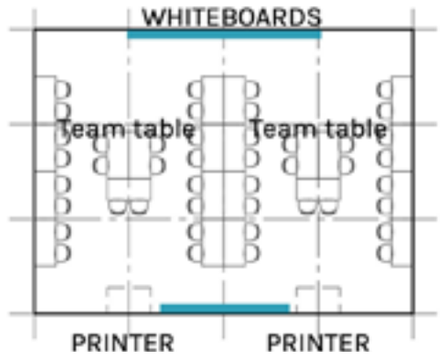
Concrete/Asphalt Lab – 1452 sf

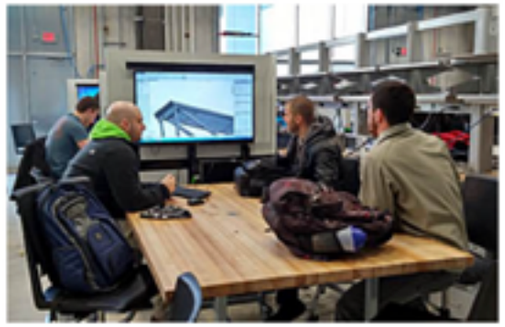
Student Seats	18
Layout	Large, open space Change from demonstration to participatory lab Wet lab CONE would like to do more in this lab - more equipment, more space for year-long projects
Schedule	Spring semester
Equipment	Solid material and wastewater disposal Curing area
Storage	Project storage
Adjacencies	First floor
Additional Info	Concrete canoe will be moved to student project space

CONE Capstone Lab – 1452 sf

Student Seats	30
Layout	Computer lab with plenty of teaming space: 4-6 groups of 3-5 students. Additional worktables for laying out large drawings. Storage for large drawings.
Schedule	
Equipment	Printer Whiteboards
Storage	Large drawing storage
Adjacencies	CE Capstone Lab if possible
Additional Info	Need for Teaming space around computers. No fabrication, material work is done in another lab. VR use will increase and use of 3D active imaging is possible.



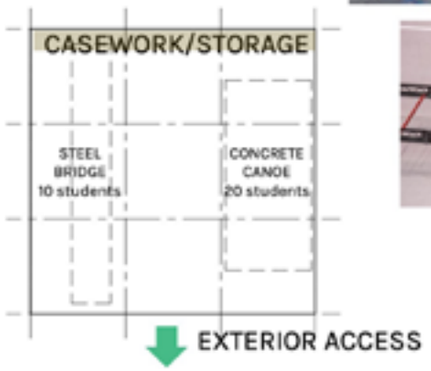




CONE STUDENT SPACE + CE CAPSTONE LAB

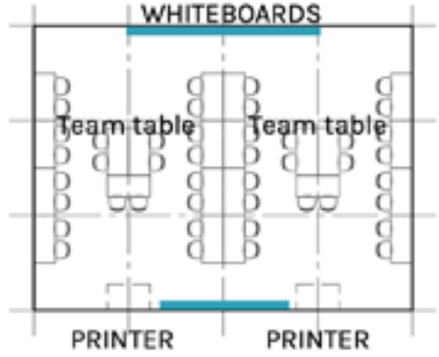
CE-CONE Student Project Space – 1089 sf

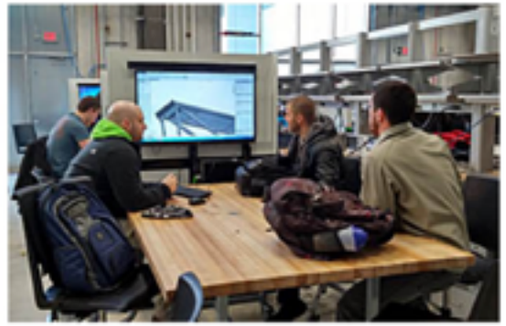
Student Seats	15
Layout	Open workspace for concrete canoe and steel bridge projects
Schedule	Day/evening
Equipment	
Storage	
Adjacencies	Concrete/Asphalt Lab. Capstone/Capstone Support spaces
Additional Info	Showcase opportunity



CE Capstone Lab – 1452 sf

Student Seats	30
Layout	Computer lab with plenty of teaming space: 4-6 groups of 4-5 students. Teaming/collaboration space. Mock presentation space.
Schedule	Day/evening
Equipment	Printer Whiteboards (fixed and movable) Projection capability
Storage	
Adjacencies	CONE Capstone Lab if possible
Additional Info	No Built project now. Working on real world civil projects



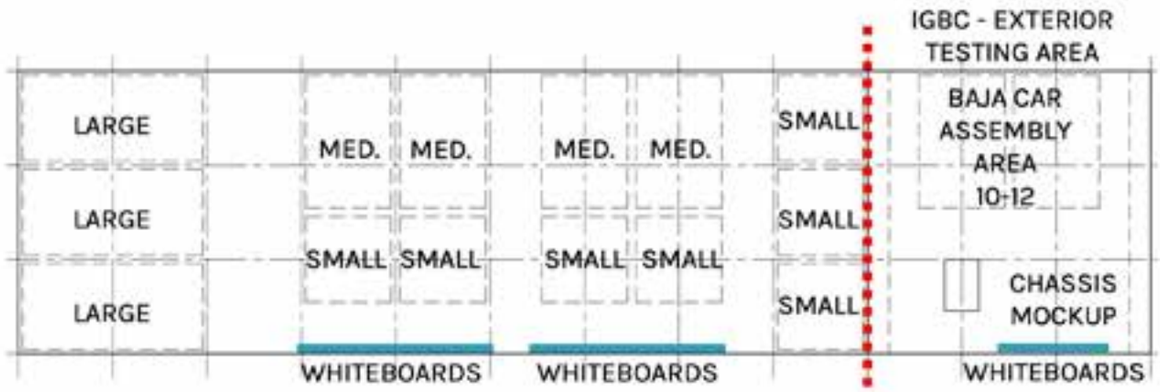


PROGRAM DEVELOPMENT

ME SENIOR DESIGN SPACE

ME Senior Design Project Space – 4356 sf

Student Seats	**72**
Layout	Open/flexible space for dedicated large, medium and small project work areas. Separate Baja car work area.
Schedule	Day/evening
Equipment	Whiteboards (fixed and movable) Baja car equipment
Storage	Tool storage
Adjacencies	Capstone support spaces: Wood and metal shop, welding, 3d printing, project storage and tool storage. Baja car area needs access to exterior testing area.
Additional Info	Ground floor – CE/CONE need plotters – 3D printing



CAPSTONE DESIGN SPACE

UNIVERSITY OF MICHIGAN-DEARBORN
MANUFACTURING SYSTEMS ENGINEERING LAB / PROFESSIONAL + STUDENT SHOPS *(this photo and two photos, upper right)*

UNIVERSITY OF MICHIGAN-DEARBORN
MANUFACTURING SYSTEMS ENGINEERING LAB

UNIVERSITY OF MICHIGAN-DEARBORN
MANUFACTURING SYSTEMS ENGINEERING LAB

GEORGIA SOUTHERN UNIVERSITY
CENTER FOR ENGINEERING AND RESEARCH

6
SITE
AND CONTEXT

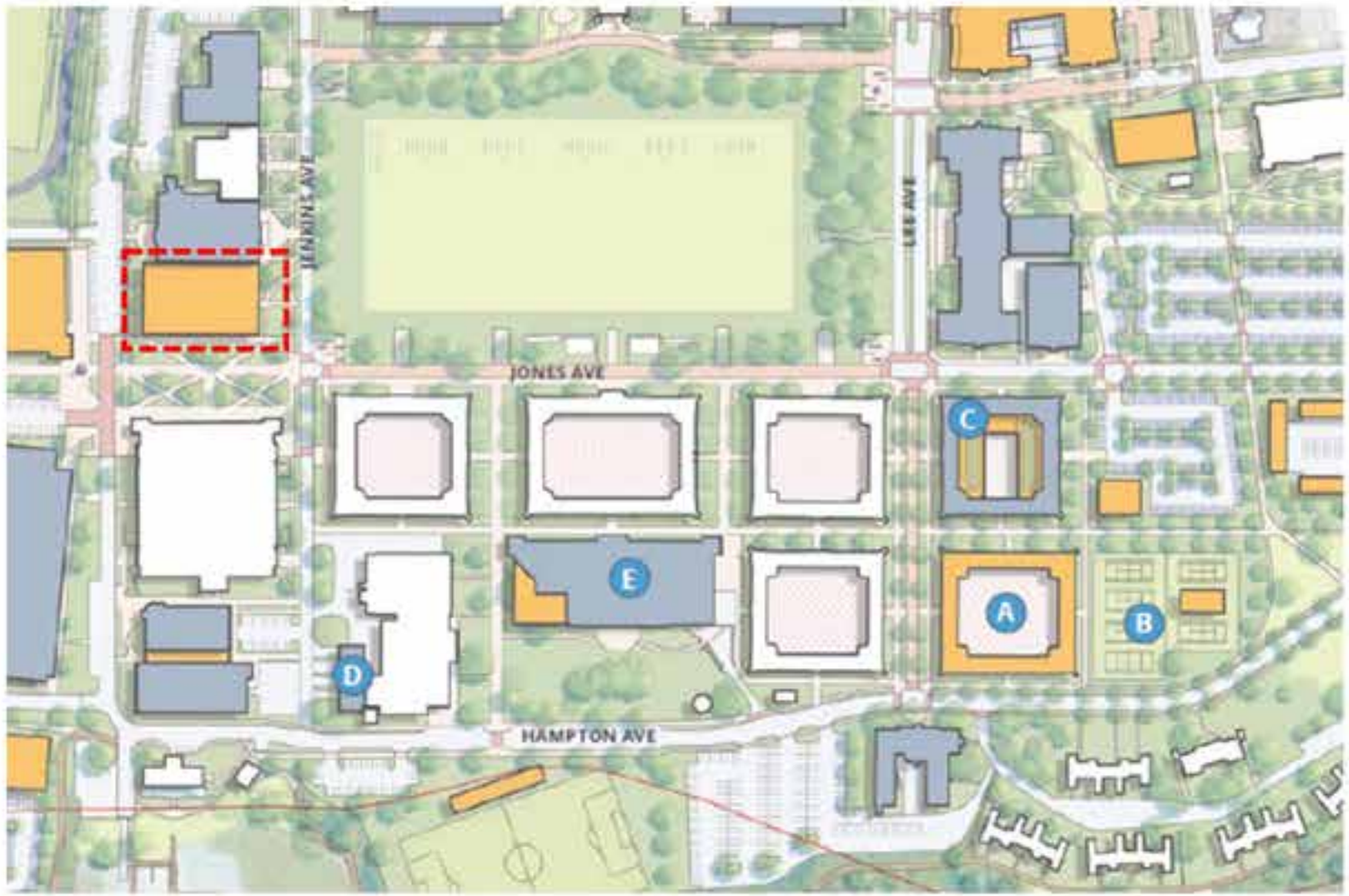
MASTER PLAN GUIDANCE SUMMARY

Not to be confused with the college's strategic plan, Our Mighty Citadel 2026, the campus master plan will establish a long-term vision for the physical campus and guide near-term decisions about facilities investments. It will serve as the road map for the college's capital projects.

01. **The new engineering building will replace LeTellier Hall** and be connected to the other buildings facing the drill field. This will establish a direct context for the new building and a character in keeping with the facades of those buildings.

02. **The area directly south of the building project is envisioned as an enhanced plaza space** where Jones Avenue intersects Jenkins Avenue. This new campus space between the new engineering building and McAlister Field House will be an opportunity for the building to engage the exterior.

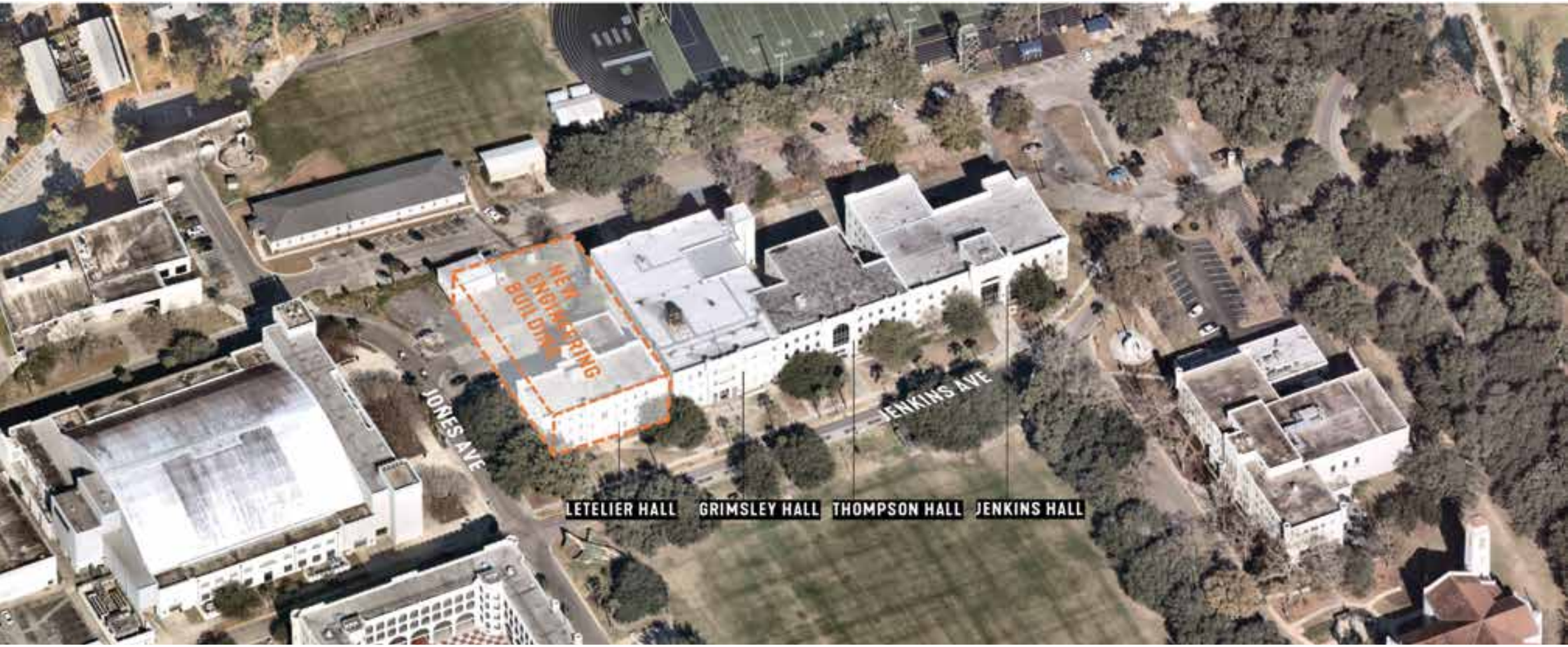
03. **New development is envisioned to the west of the engineering building** and the road is realigned on that side of the building. The Development to the west creates an opportunity for a second building front on the west side to which the new design could respond in planning and exterior development.



Introduction text above: https://today.citadel.edu/creating-an-atlas-for-the-future-the-citadel-campus-master-plan/. **IMAGE FROM THE DECEMBER 2020 MASTERPLAN DOCUMENT**

SITE AND CONTEXT

ELEVATION + MASSING

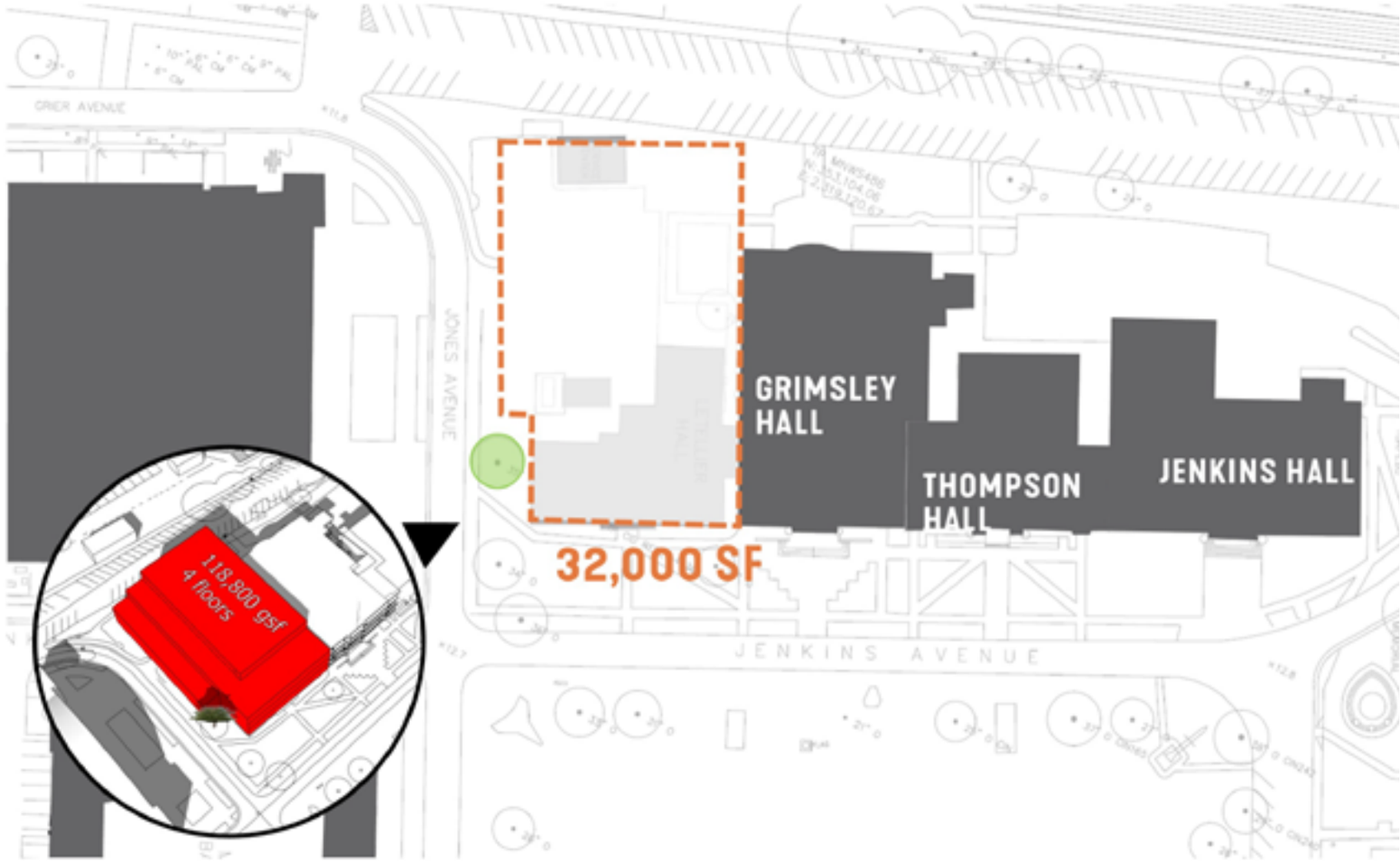


MASSING + TOTAL SITE AREA

The site is restricted on all sides by various conditions that limit the ground floor area to an approximate 32,000 GSF floor plate. The ground floor is maximized since many of the labs require at-grade access; however, the massing can step back and provide relief against its large base as the building goes up.

The fourth floor is needed to accommodate the total program and will share a roof with the mechanical penthouse. This top level will set back from the Summerall Field façade, so the main façade will remain three floors similar to Grimsley, Thompson, and Jenkins Halls. The roof could also be used as an outdoor lab.

The total building area achievable in this massing is 118,000 GSF. The program's net square feet is 67,090 NSF and the building's gross square feet is 118,800 GSF, including the penthouse. The building grossing will be between 56% and 62% efficiency once the penthouse size is determined, which is within average range for recent engineering buildings nationally.

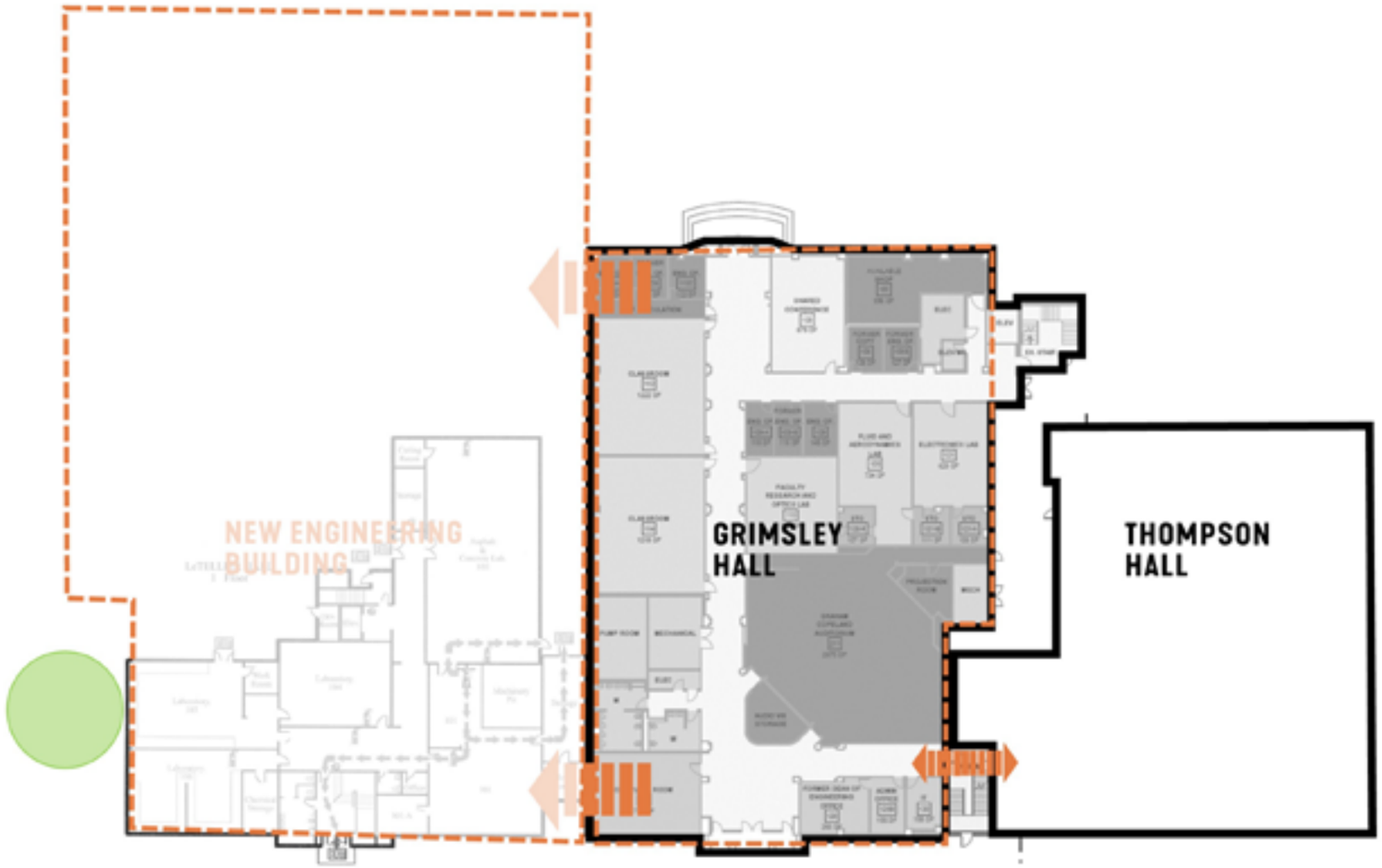


SITE AND CONTEXT

ADJACENT BUILDINGS

The new engineering building will likely be placed directly against the west wall of Grimsley due to a need to maximize the site area and accommodate the programming. This creates the opportunity to connect with Grimsley on the ground floor and the third floor.

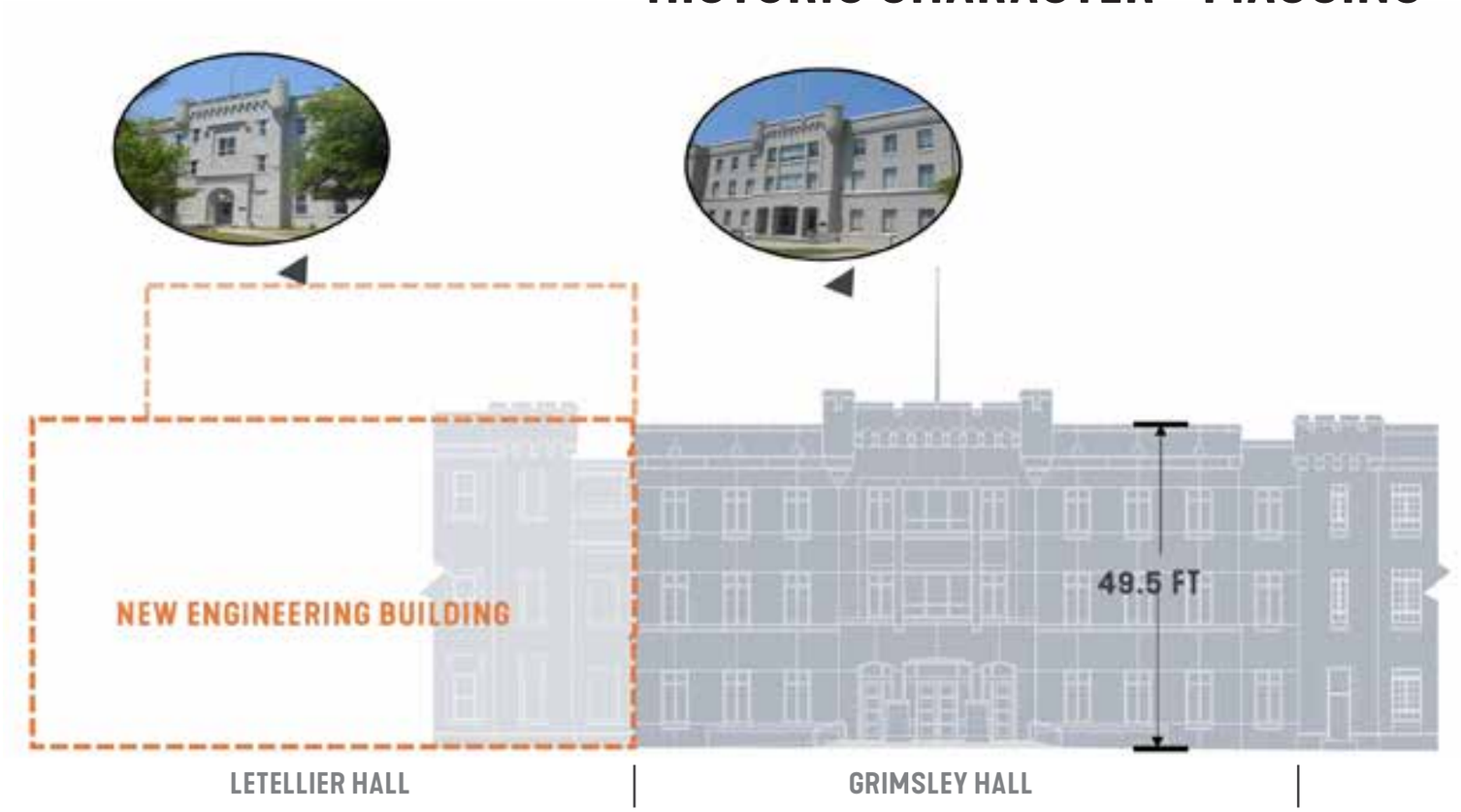
It was determined that the third floor of Grimsley would be required to fulfill the total NSF of on-site programming since the site size was so restrictive in terms of the building footprint.



HISTORIC CHARACTER + MASSING

The south façade of the new engineering building faces the parade ground and is directly in line with Grimsley, Thompson, and Jenkins Hall façades — all of which have a consistent frontage and set the basis for the character and massing of the new building.

The new building façade will follow the rhythm and proportion of existing façades. The building height will be set by the tallest parapet along the existing façade. While the buildings along the Summerall Field are three stories, the available land area and total program will require the building to have a partial fourth floor. The fourth floor should be set back in order to keep the south façade consistently within three stories.

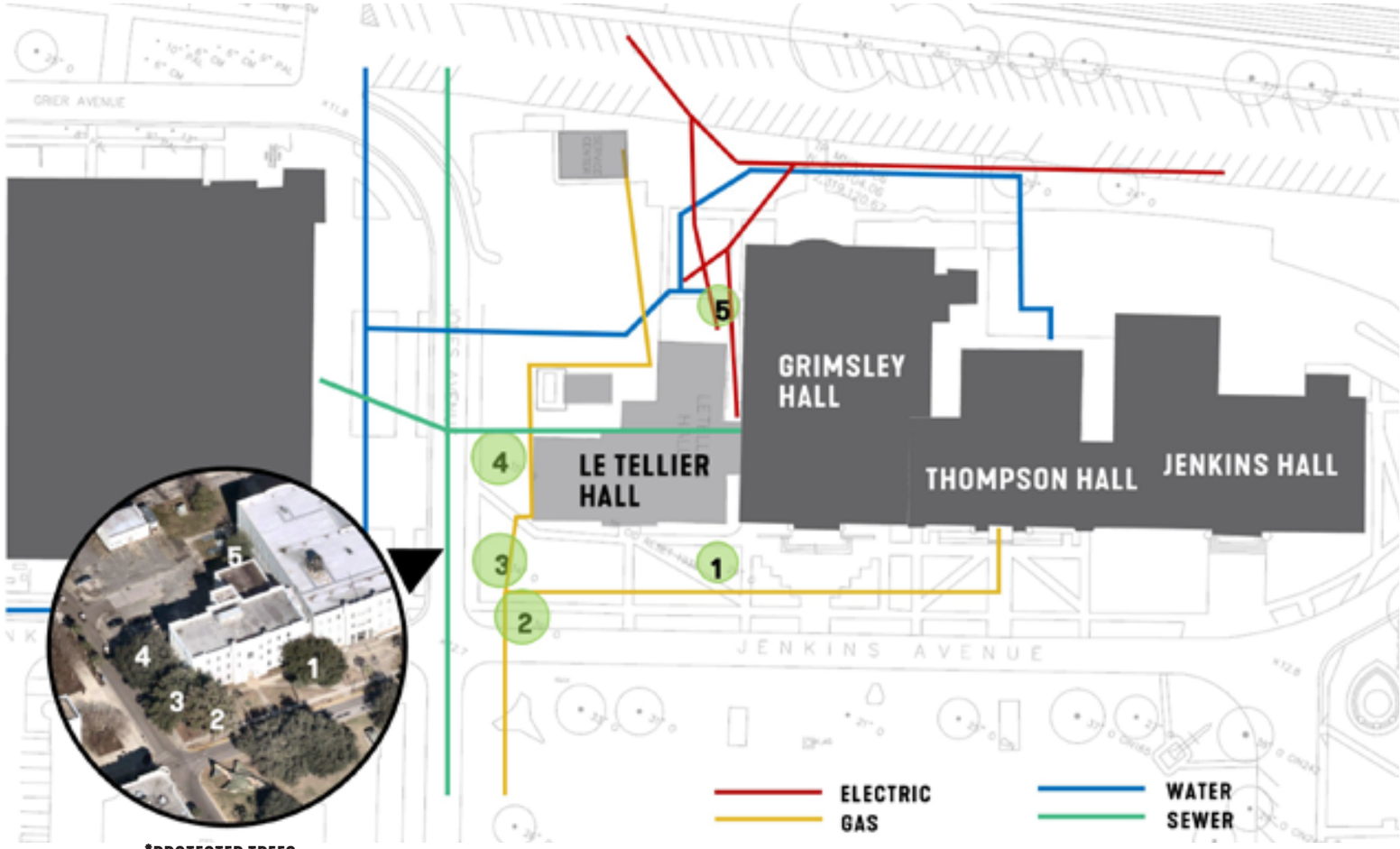


SITE AND CONTEXT

PARAMETERS / UTILITIES + TREES

There are several utility lines running through the site which will be affected by the new building including electric, gas, water, and sewer lines. Many of these are serving the existing building, but the water line and existing steam vault to the west of the building will connect to more than one building. As a result, these will be more complicated to relocate.

Grand trees on campus are designated as those over 24-inches in diameter. There are several grand trees on site which development will take into consideration. Saving the trees to the south and west are a priority as they are a part of the overall campus framework.



*PROTECTED TREES

7

CONCEPTUAL DESIGN

All floor plans and architectural renderings are conceptual and will be developed during the design process.

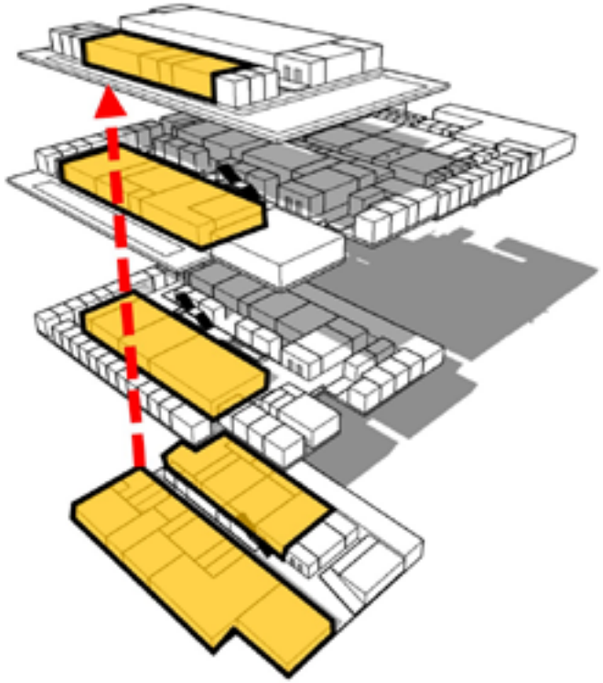
CONCEPTUAL DESIGN

BUILDING ORGANIZATION

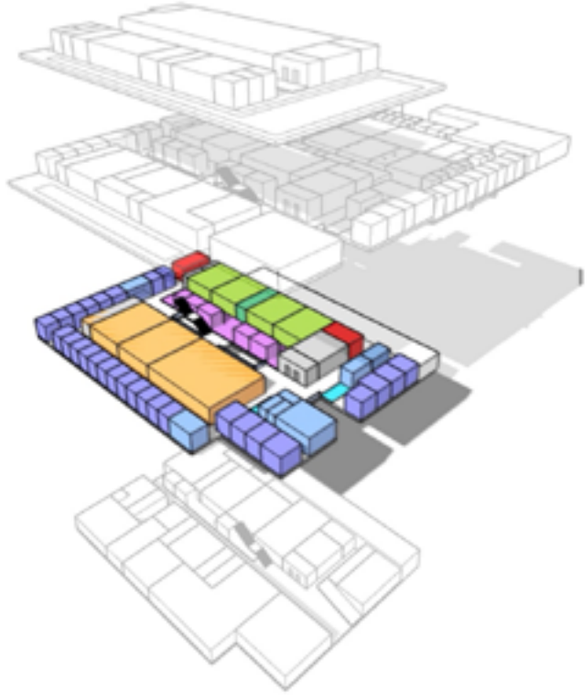
The building organization was developed through an iterative process of testing and critique with the building committee. Several variations of the circulation, program placement, and adjacencies were tested against the goals of the project from the visioning portion of the project. For example, the idea of circulation to encourage movement and casual engagement was the basis of a double-loaded, wide corridor or a kind of engineering "main street" for interdisciplinary collision.

The Idea of the building as a living learning lab was the generative concept of a capstone hub that stacks vertically through the building with the other labs connected by an interior stair. The concept of "neighborhoods" was born out of the perfect diagram exercise and consists of office, labs, classrooms, and collaboration space creating the ingredients for a dynamic and engaged engineering environment.

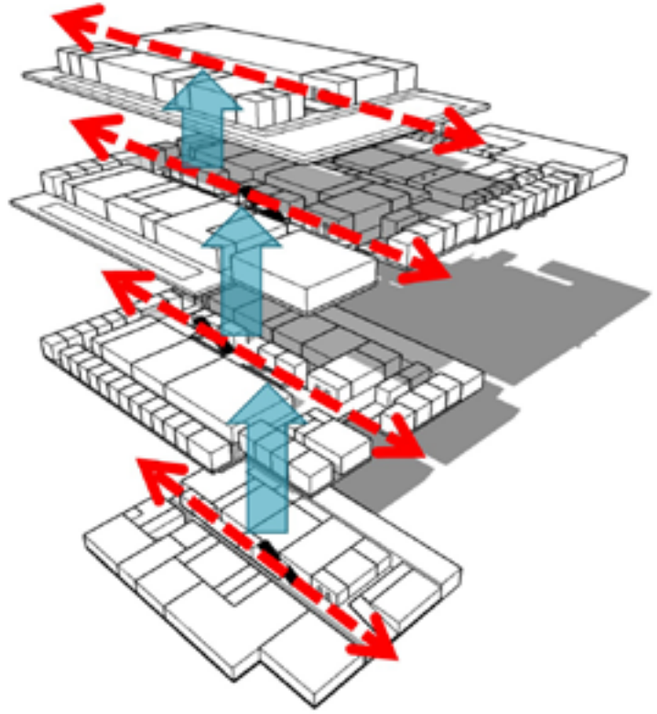
For this report, the planning was taken to what is referred to as block and stack. This layout of the program pieces in relative planning proportions for the given site area allows our design team to create building organization in the right size and mass required for accurate planning. The driving principles of the blocking and stacking exercises are the basis for future iterations and more detailed planning.



LIVING LEARNING LAB / ENGINEERING AT THE CORE



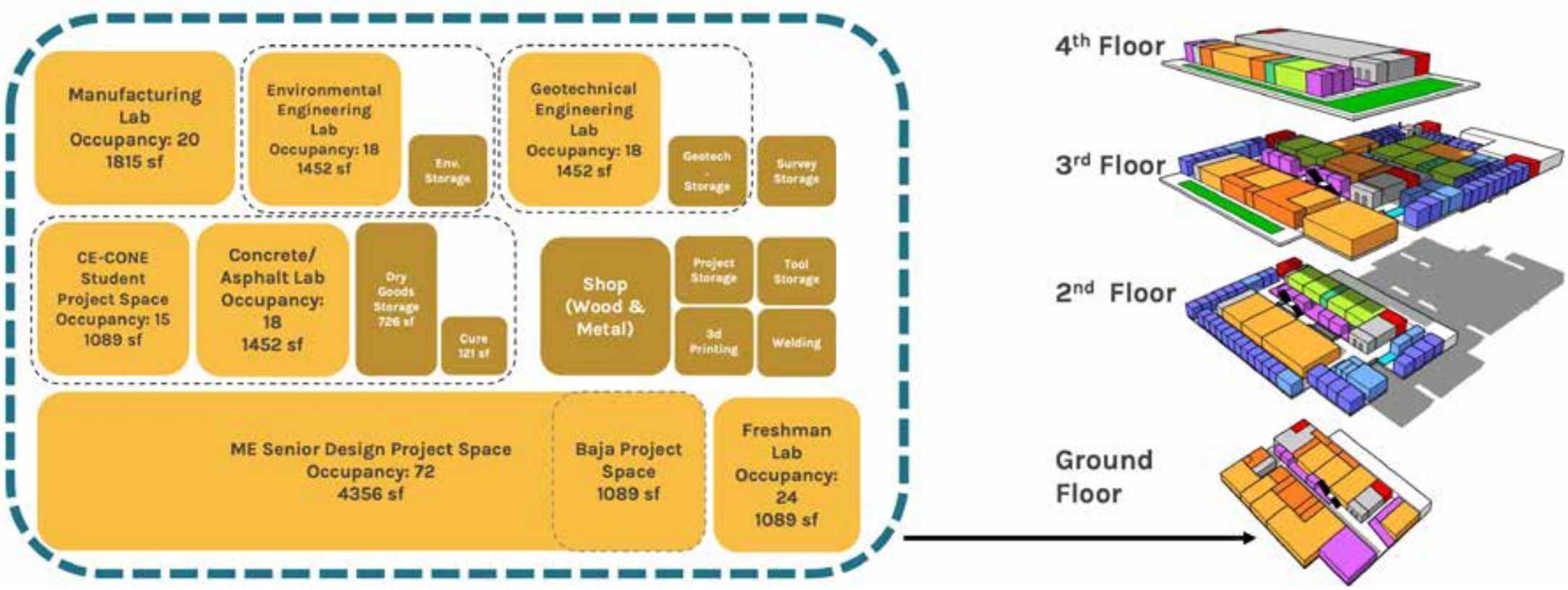
CREATE "NEIGHBORHOODS" OF
LAB + COLLABORATION + OFFICE + CLASSROOM



CLARITY OF ORGANIZATION + CIRCULATION AS
AN ENGINEERING "MAIN STREET"

PROGRAM DRIVERS

The site limitations and requirements for the number of labs needing at-grade access drives the ground floor planning. The bubble diagram below illustrates the program that needs ground floor access. While this access requirement limits the ability to place other program elements on the ground floor, it creates an engineering immersion and 'engineering on display.' Large blocks of laboratory and support shown in orange on the diagrams create flexibility for the future to change uses, expand, or reduce lab space by moving walls when necessary. The design team developed an idea to create a vertical connection with daylighting from above through the building's center supporting the idea of engineering at the core.

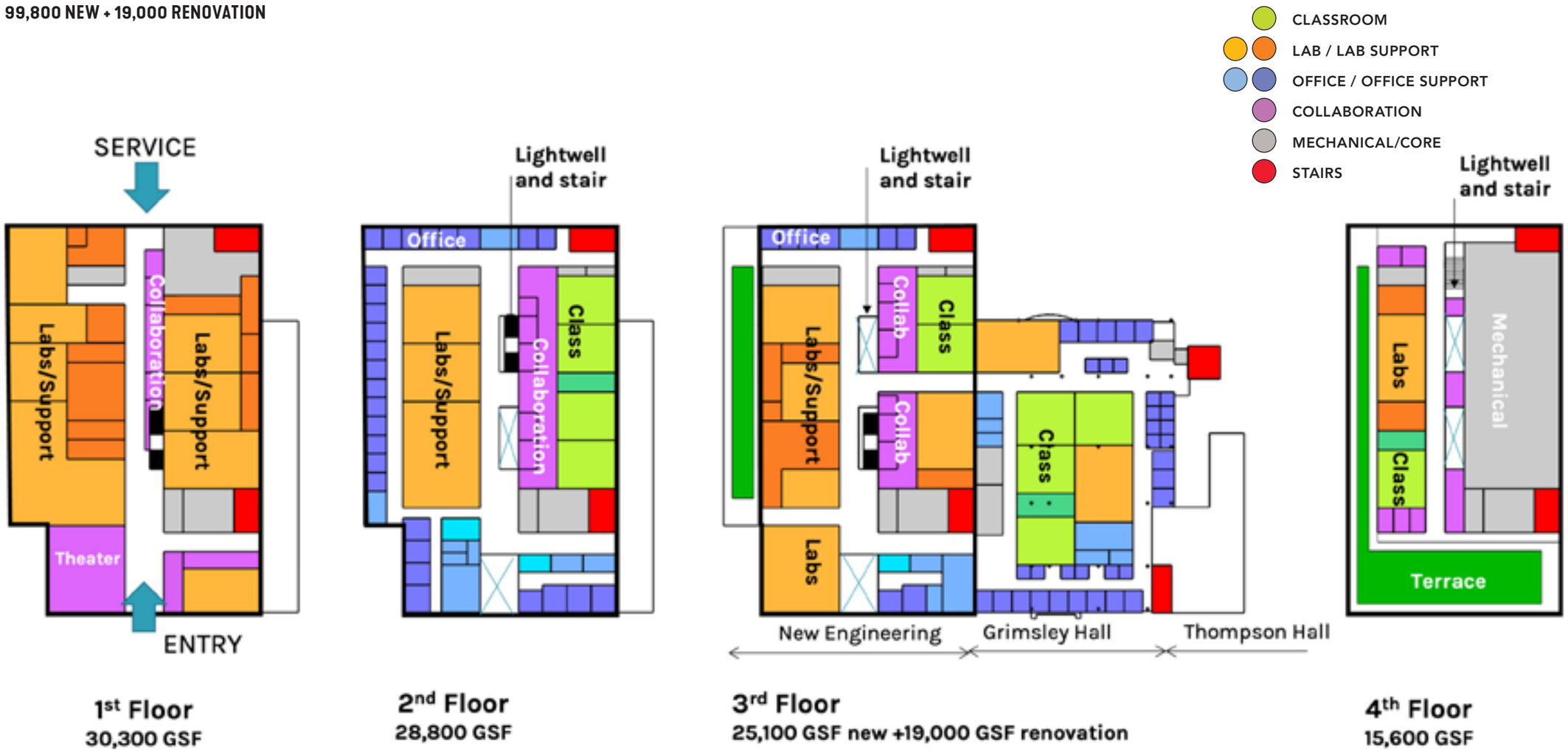


BUBBLE DIAGRAM: GROUND FLOOR LABS

CONCEPTUAL DESIGN

118,800 TOTAL GSF / 67,090 NSF

99,800 NEW + 19,000 RENOVATION



All floor plans and architectural renderings are conceptual and will be developed during the design process.

CONCEPTUAL DESIGN
1ST FLOOR

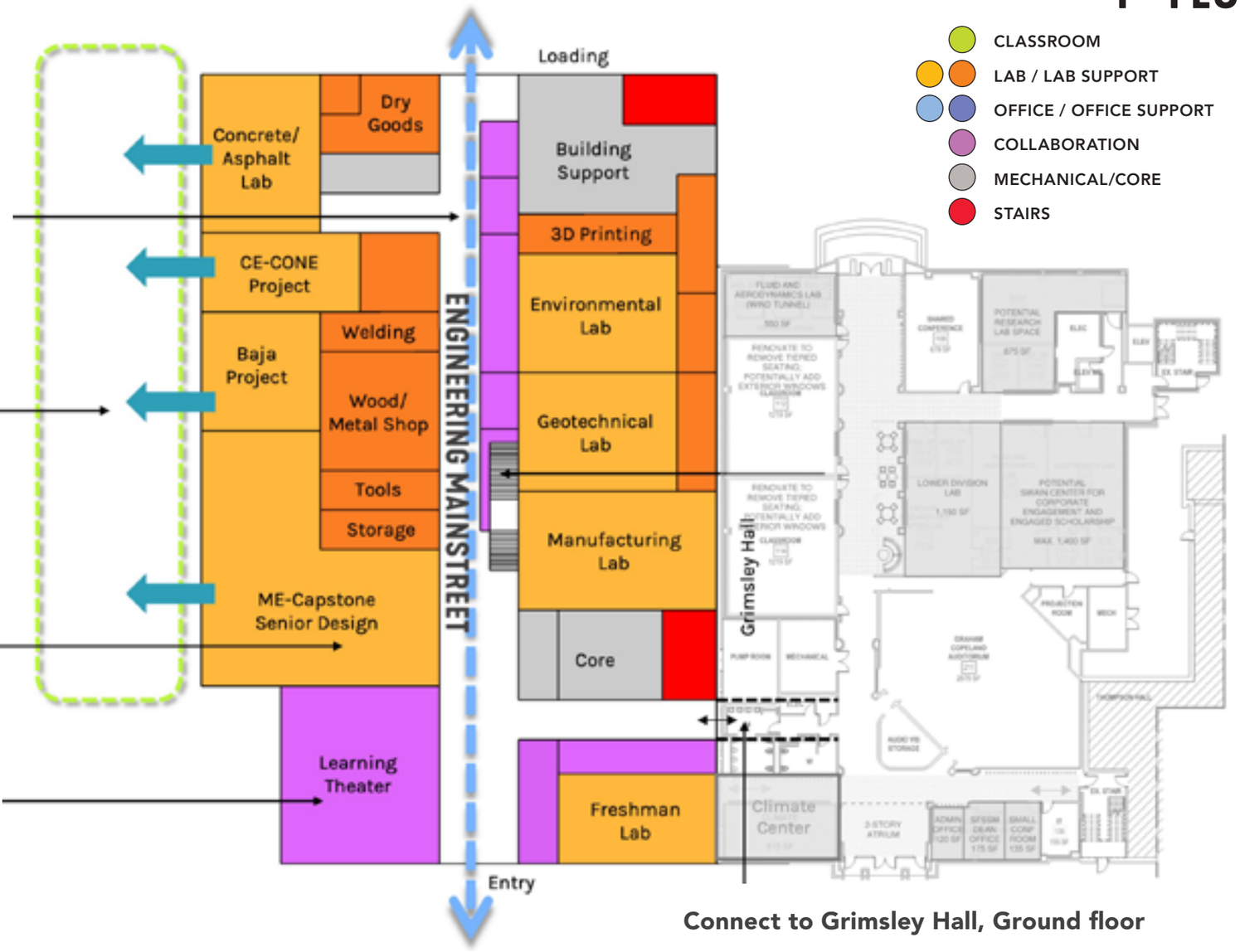
Central spine to access all ground floor labs; Vertical connection, collaboration, and breakout space

Outdoor proving ground

12-foot wide corridor, 10-foot wide collaboration and stair opening

Potential to connect vertically to ECE Capstone space above

Marquee spaces at entry: Engineering Immersion, Learning Theater, and Freshman Lab



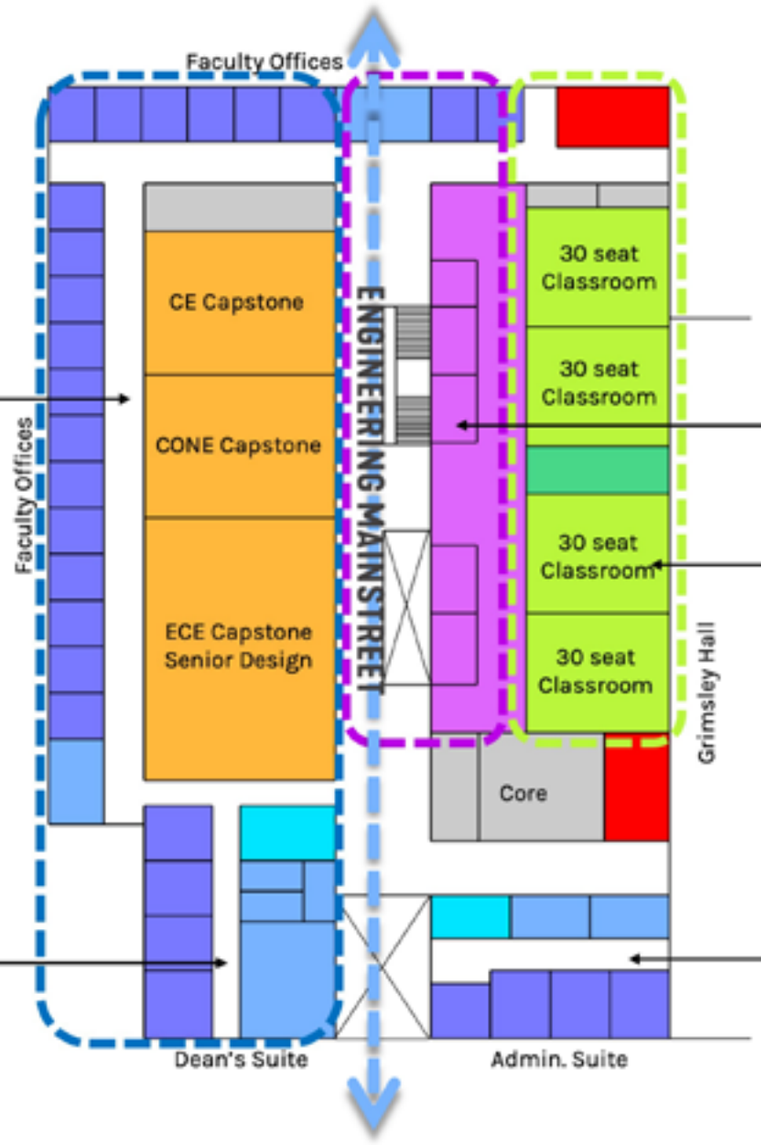
Connect to Grimsley Hall, Ground floor

CONCEPTUAL DESIGN
2ND FLOOR

"The Neighborhood"

Office perimeter, Lab core

Dean's suite, view to parade grounds



- CLASSROOM
- LAB / LAB SUPPORT
- OFFICE / OFFICE SUPPORT
- COLLABORATION
- MECHANICAL/CORE
- STAIRS

Interdisciplinary center, Collaboration and breakout

Student zone with classrooms and collaboration spaces

Shared office reception / support

CONCEPTUAL DESIGN
3RD FLOOR

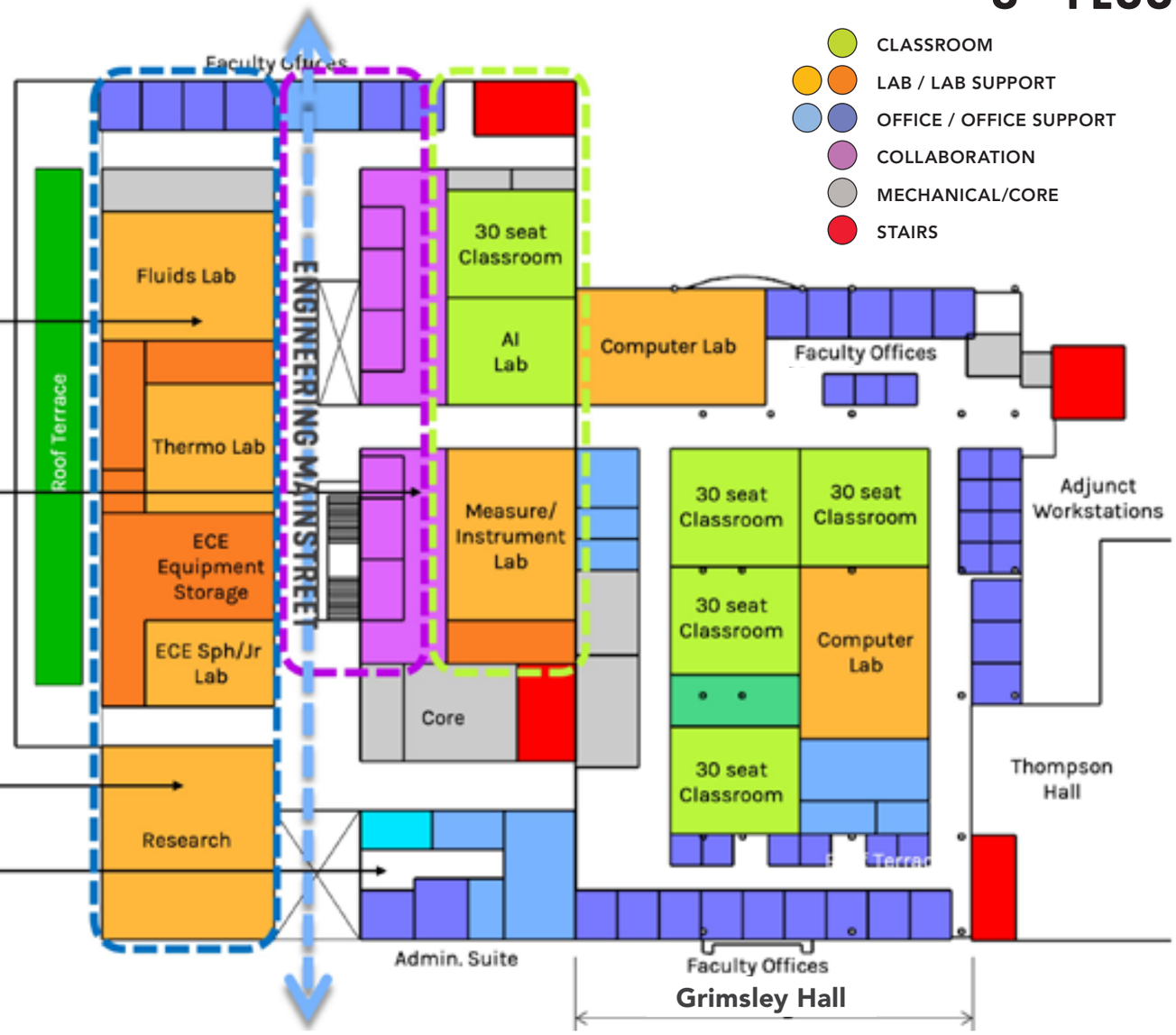
"The Neighborhood"

Office perimeter, Lab core

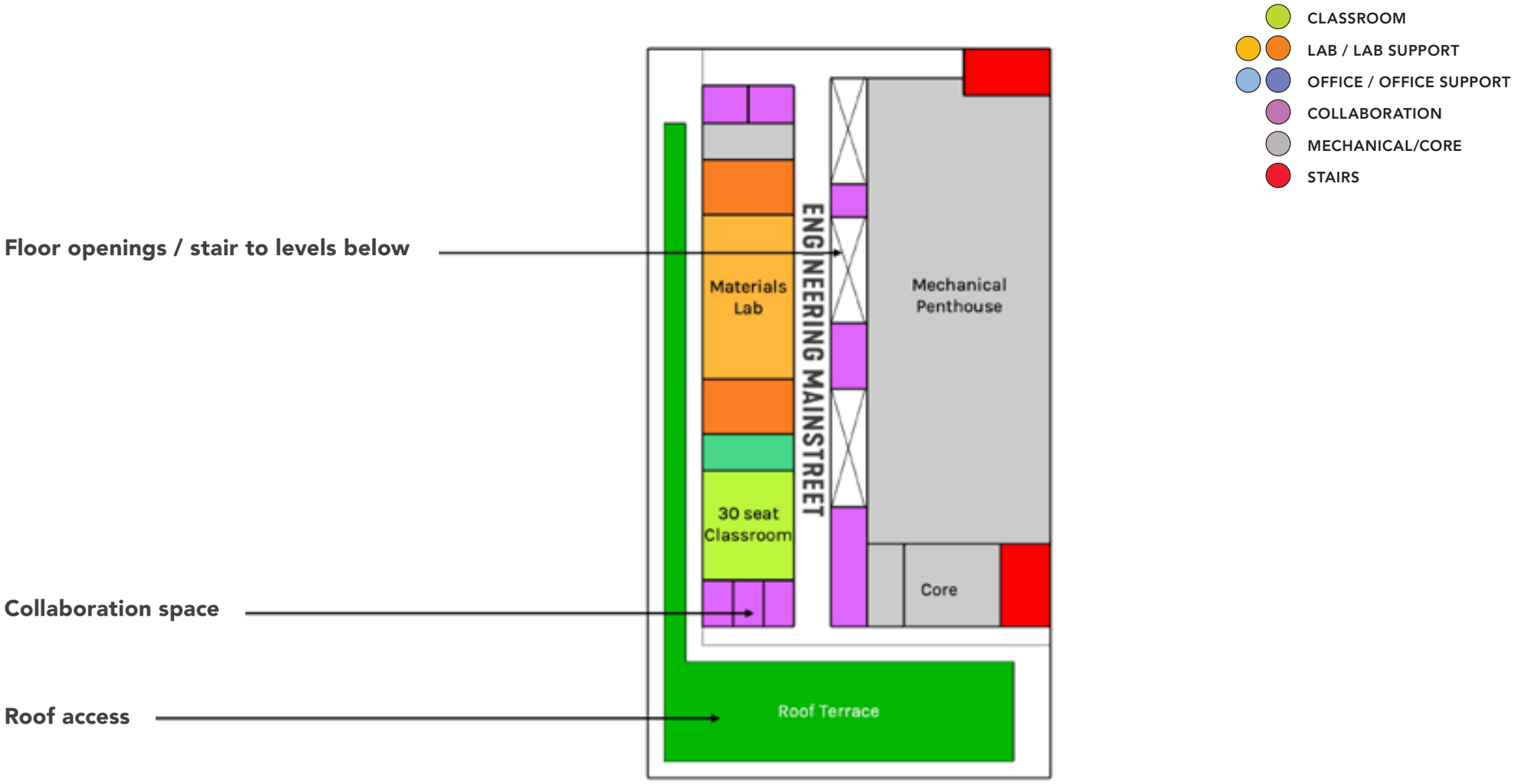
Student zone with classrooms and collaboration spaces

Visible Research

Shared office reception / support



CONCEPTUAL DESIGN
4TH FLOOR



CHARACTERISTICS

Innovation Corridor

Connected and engaged center

Engineering on display

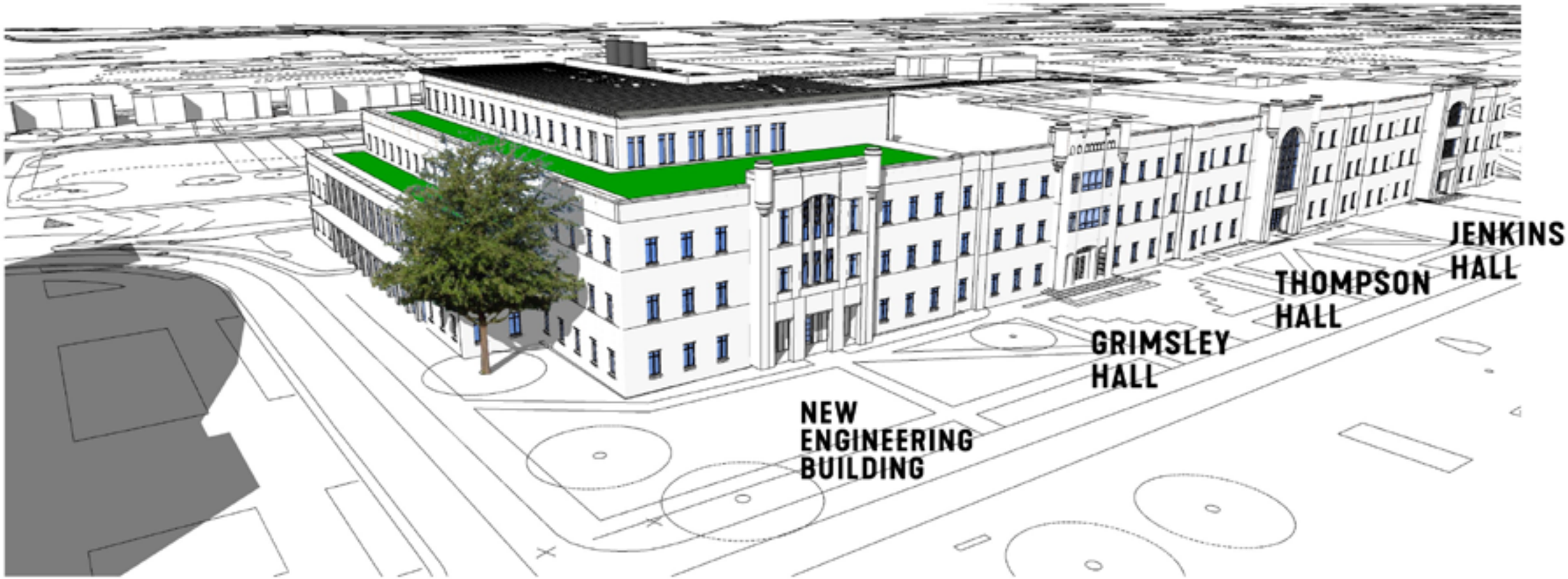
Outdoor access

Learning is everywhere

CONCEPTUAL DESIGN

EXTERIOR / AERIAL VIEW, SOUTHWEST

The following perspectives are meant to show the massing and general character of the new engineering building in reference to the other buildings along the Summerall Field. The three-story massing of the new building blends with the façades of Grimsley, Thompson, and Jenkins Halls making it feel like a seamless part of the group. The massing steps down along the west side providing a lower massing towards McAlister Field House and setting up a new campus space according to the master plan.



All floor plans and architectural renderings are conceptual and will be developed during the design process.

EXTERIOR / AERIAL VIEW, NORTHWEST

The view from the Northwest illustrates the terraced roofs more clearly along the western façade. The large bays on that side of the building at ground level are meant to give the labs direct access to the outdoors. The rooftop is shown with Solar PV panels covering the penthouse level and a green roof to control water run off.

CONCEPTUAL DESIGN

EXTERIOR ELEVATION

MAIN ENTRY / INTERIOR VISION

SMITHGROUP

mcmillan | pazdan | smith
ARCHITECTURE