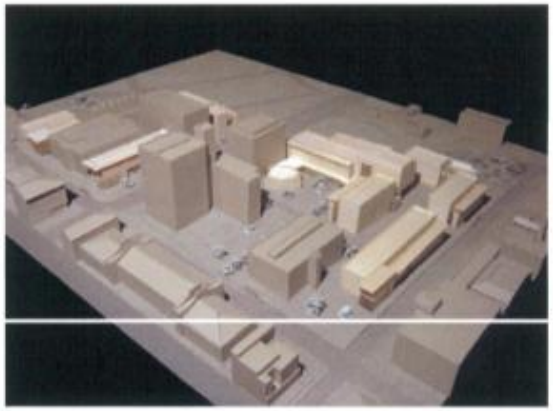
Cockrell School of Engineering
Strategic Master Plan



President William C. Powers, Jr.
Executive Vice President & Provost Steven W. Leslie
Vice President Patricia Clubb
Dean Gregory L. Fenves

Ballinger—Architecture, Engineering, Planning
Terry D. Steelman, FAIA, Principal

Approved by The University of Texas System Board of Regents
February 4, 2010

THE UNIVERSITY OF TEXAS AT AUSTIN
Cockrell School of Engineering

Cockrell School of Engineering at The University of Texas at Austin: Building on the Past, Preparing for the Future

From the industrial revolution to today, economic growth has followed productivity gains, which ultimately are based on technological progress. In Texas in 1888, the year in which the state Capitol Building was dedicated, The University of Texas at Austin awarded its first engineering degree. The school's mission then was to educate the very best engineering talent to create value for Texas and the United States, just as it is now. Over the life of the school, engineering innovation has become a major driver in economic development and improving health and quality of life.

The visionary leaders who created UT's engineering school knew that Texas needed the creativity and productivity of the best engineering talent to develop its natural resources, build its infrastructure, and design its manufacturing facilities. The founders understood the key role of engineering research in creating the technology needed to solve the myriad problems facing the people of this state. Texas leaders recognized that more high-quality engineering graduates would create the innovations to propel the state to greatness and contribute to the growth of the nation.

The Cockrell School of Engineering takes this obligation as seriously now as it did more than 100 years ago. We help grow our economy by placing graduates in industry and creating the knowledge and ideas that start companies. As evidence of our success, the school ranks among the top ten in the nation out of more than 300 engineering programs. We educate more than 7,000 students, with 1,500 of them graduating each year.

Today, the Cockrell School is at a crossroads. Decisions now will determine whether the school's future fulfills the promise and accomplishments of the past. For at least 20 years, the school has not invested in teaching and research facilities, the life-blood of engineering at the university. More than "bricks and mortar," great facilities include laboratories where talented engineers create innovations. They house teaching labs that prepare young engineers for success in a world in which technology changes ever more rapidly. They provide collaboration space where undergraduates explore new ideas and work in teams. Inspirational facilities form the backbone of the eco-system for entrepreneurs and industry leaders who work with students.

The Cockrell School, however, has not moved forward at the pace set by other premier engineering institutions. **UT's engineering facilities significantly lag behind top ranked peer schools at MIT, Stanford, UC Berkeley, Georgia Tech, and the University of Illinois.** These schools, and many that are ranked lower than UT, have marshaled resources to add engineering facilities, enabling them to compete worldwide for talent, ideas, and research funding. In contrast, the **Cockrell School has seen a steady deterioration of its facilities. Some buildings are now obsolete and, in part, not capable of full occupancy**. For example, the highly ranked Department of Electrical and Computer Engineering is in a nearly 50-year-old building constructed during the era of vacuum tubes and includes two floors that cannot be fully used because of inadequate electrical power and cooling for modern computer equipment. Students in the eighth ranked

Department of Aerospace Engineering study and collaborate in the hallways of a building declared obsolete by the university. At the J.J. Pickle Research Center, faculty that includes members of the National Academy of Engineering occupy offices in trailers.

Historically, the Cockrell School has achieved greatness by recruiting the best engineering faculty. Even though our current faculty is one of the best in the world, recruiting the next generation is becoming more difficult because the quality of facilities has fallen far behind peer schools. Recruiting top graduate students is also difficult when prospective students compare the quality of the labs at UT with peer institutions.

Major changes are taking place in the way we educate engineers for the B.S. degree. Project-based learning provides for students, from their freshman year through graduation, courses built around identifying needs, designing solutions, and building and testing technology. This new mode of teaching unleashes the creativity, attracts more diverse students, and better prepares all students for industry employment, post-graduate education, or creating businesses. Student teams working on projects cannot be taught in standard classrooms, nor is distance learning effective for this type of instruction. The lack of modern teaching labs severely limits the Cockrell School in offering comprehensive project-based learning.

To address these urgent needs, the Cockrell School developed a strategic master plan to turn around the long decline in quality of facilities and position the school to achieve a top-five ranking among U.S. engineering programs. The plan calls for a partnership of private philanthropy, the University of Texas System, and the State of Texas. The benefits to the citizens of Texas of having a top-five engineering school are substantial through economic growth and job creation, increased productivity, and the excitement of being a leader in the global economy.

Over the next 13 years, the strategic plan calls for demolition of two engineering buildings, construction of six new buildings, and modernization of three existing buildings. This plan also includes a major effort to maximize the utilization of space in the current facilities.

The first step is demolition of the ENS building, one of the oldest in the engineering complex, replacing it with a transformational interdisciplinary teaching and research facility that will also house the Department of Electrical and Computer Engineering. This new building, the *Engineering Education and Research Center*, will be ready for occupancy in 2015, subject to development of funding for the $290 million project cost. The University of Texas System Board of Regents has approved the strategic plan and authorized this first project.

Efforts are underway to obtain private funding in the range of $100 million, which will be a major portion of the new building's cost. In addition to working with the Board of Regents on PUF Bond financing of $90 million, the university hopes to work with the Texas Legislature for Tuition Revenue Bond authorization of $100 million to fund the project.

Cockrell School of Engineering's Mission

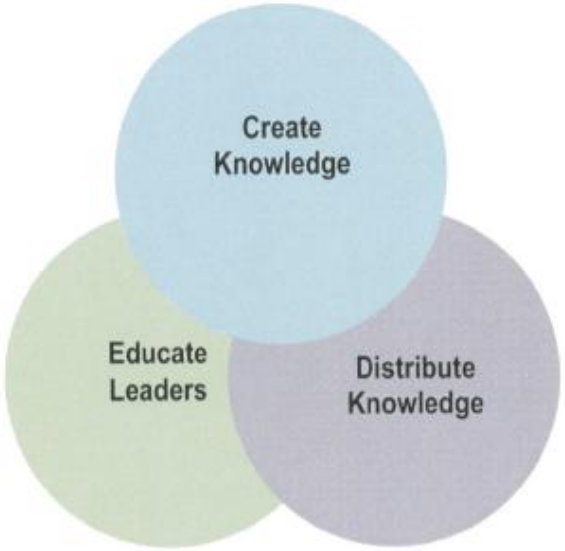
"The University of Texas at Austin can be *the* great public university in America."
— President William C. Powers, Jr.

A Top Ten School of Engineering

- Cockrell School is ranked 9th in undergraduate engineering and 9th in graduate engineering
- 5400 undergraduate students and 2000 graduate students
- 3rd in nation for undergraduate engineering degrees for minority students
- Ranked 7th in number of Ph.D. graduates
- $145 million in research expenditures in 2009

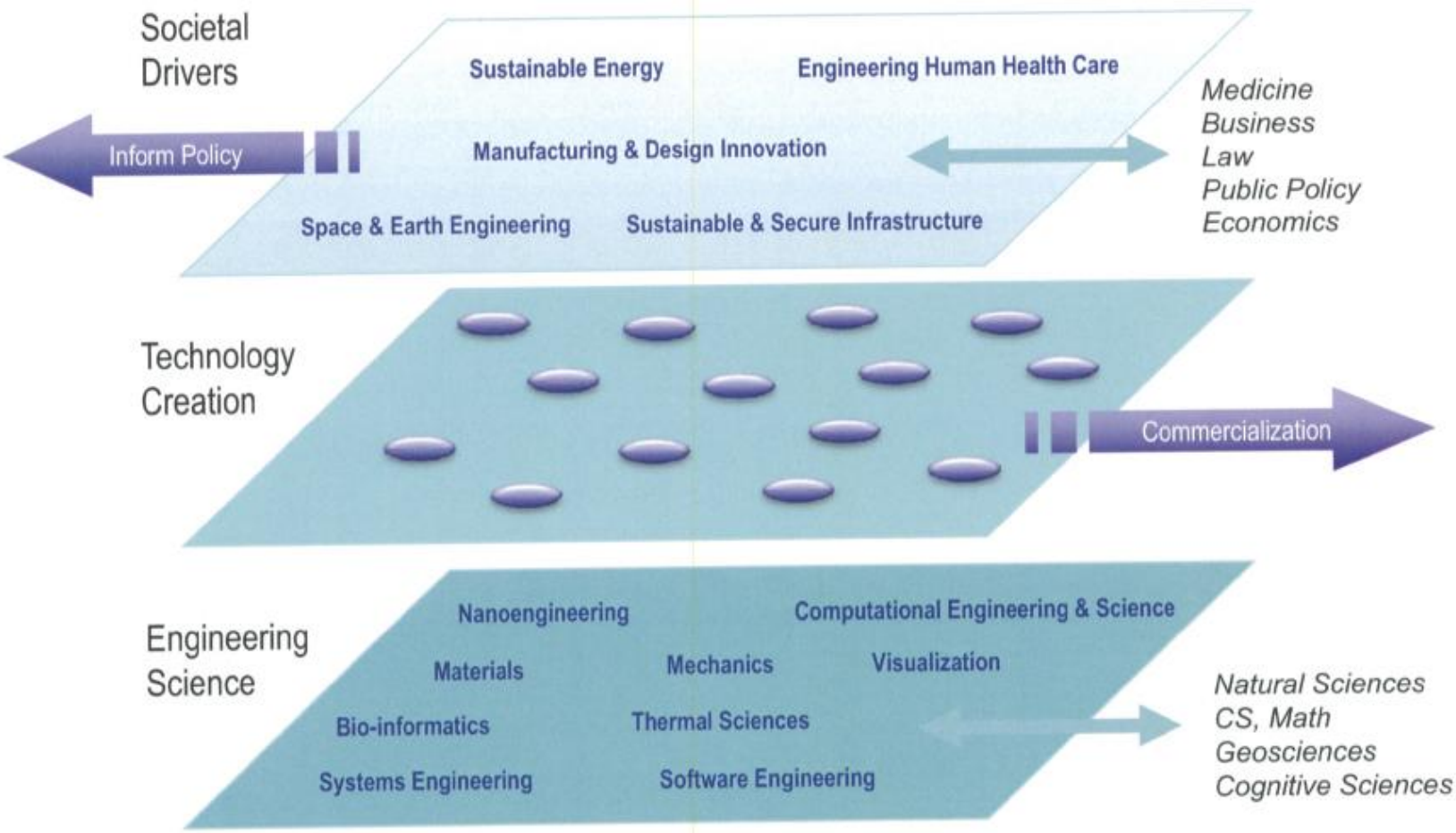
Our Vision for Leadership

- Become a top-five school of engineering
- Educate leaders in engineering and technology creation
- Increase world-leading interdisciplinary research programs addressing major societal needs, including energy, health care, infrastructure, and advanced manufacturing
- Recruit the most talented faculty and students
- Attract major research centers
- Focus on entrepreneurship to improve economic competitiveness of Texas



THE UNIVERSITY OF TEXAS AT AUSTIN
Cockrell School of Engineering

Interdisciplinary Framework for Engineering



Competitive Landscape

- The current facilities are limiting our ability to recruit top faculty and student talent
- Peer engineering schools have each added 600,000 to more than 1 million square feet since 2002 (see next slide)
- The Cockrell School has added one new building on the Main Campus in the past 23 years (144,000 GSF)
- The teaching facilities do not allow modern approaches to engineering education
- Two buildings, Engineering Science (ENS) and Woolrich Lab (WRW), are functionally obsolete

Goals of the Master Planning Process

- Provide the environment for 21st century engineering research and education
- Support interdisciplinary approaches in teaching and research
- Centralize student services and collaborative learning facilities for project-based and experiential teaching
- Engage industry and support technology commercialization
- Establish identity and community for engineering and integrate with the campus according to the UT Austin Master Plan

ENS: Unusable Space

WRW: Over Utilized Labs

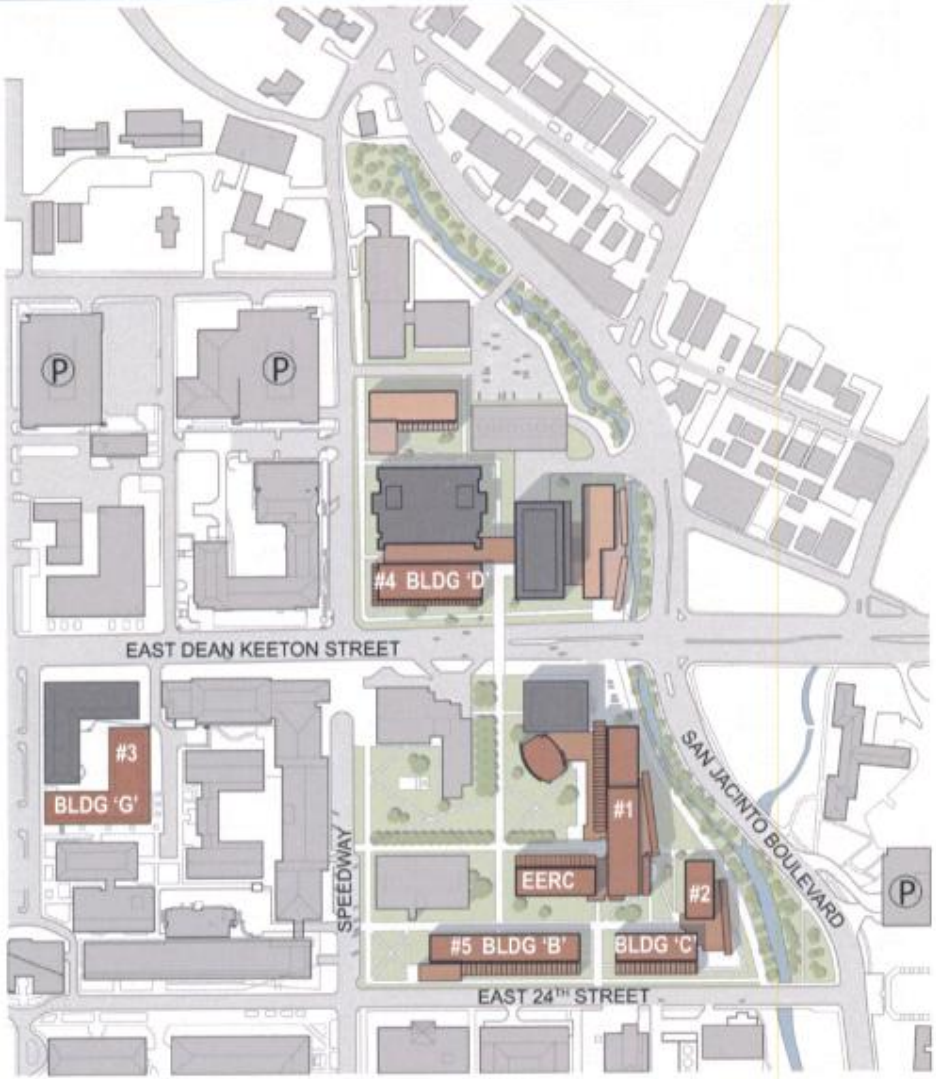
WRW: Inadequate Study Space

New Engineering Buildings Since 2002

USN&WR Rank	Engineering School	New Sq Ft (no. buildings)	New Sq Ft per Faculty
1	MIT	1,080,000 (2)	2950
2	Stanford	621,000 (4)	2600
3	UC Berkeley	426,000 (2)	1730
4	Georgia Tech	1,181,000 (5)	2640
5	Univ. of Illinois	225,000 (1)	540
10	UT Austin	144,000 (1)	540

Source: school web sites

Strategic Master Plan for Engineering Quadrant



- Building Proposed by Strategic Plan
- Existing Engineering Quadrant Building
- Other Buildings
- Future Building, Beyond Strategic Plan
- Ⓟ Parking

Replacement and New Buildings Proposed by Strategic Plan

#1, Engineering Education and Research Center (EERC) Available 2015

#2, Bldg 'C', Available 2017
#3, Bldg 'G', Available 2017
#4, Bldg 'D', Available 2020
#5, Bldg 'B', Available 2023

THE UNIVERSITY OF TEXAS AT AUSTIN
Cockrell School of Engineering

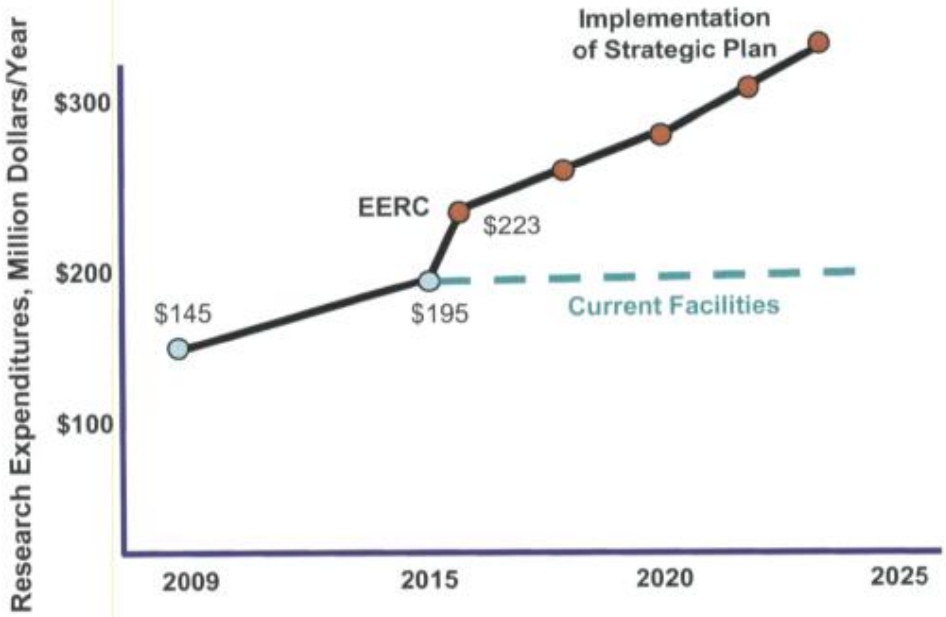
Strategic Plan Phasing

Project	Program	Replacement and New GSF	Renovate GSF	Cost $M	Available
#1, EERC	Teaching, Research, ECE	421,500		$290	2015
CAEE at PRC	Research labs, PRC offices	87,100		$57	2015
#2, Bldg 'C'	ASE-EM, Research	163,000		$127	2017
#3, Bldg 'G'	BME, Life sciences	174,000		$132	2017
ECJ	CAEE, CLEE, School offices		198,150	$105	2018
#4, Bldg 'D'	Teaching, PGE, ChE	83,000		$77	2020
CPE	PGE, ChE		222,000	$98	2020
#5, Bldg 'B'	ECE, TMI, Research	170,000		$177	2023
ETC	ME		225,000	$84	2023
		1,098,600	645,150	$1,063	

GSF=gross square feet
Costs include escalation

Impact of Engineering Facilities

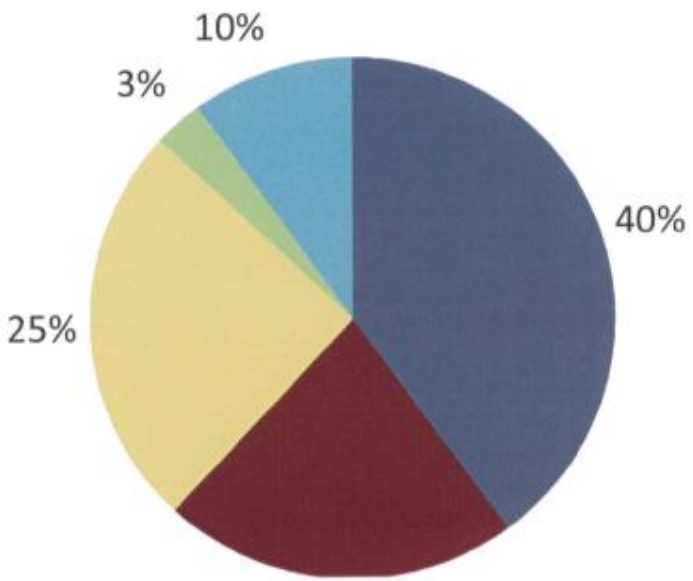
- The Strategic Plan is essential for the Cockrell School to recruit faculty and student talent needed to achieve our goal of becoming a top five school.
- The current per-faculty average research expenditure is $580,000/yr. The plan enables us to increase this to $930,000/yr.
- Facilities in the Strategic Plan support new interdisciplinary research initiatives and major centers of excellence.
- New teaching space will transform engineering education through project-based learning, interdisciplinary collaboration, and undergraduate research.
- The organization of academic programs will create an ecosystem of people, ideas, and entrepreneurship.
- The *Engineering Education and Research Center (EERC)* is the first step and highest priority of the Strategic Plan. It unlocks the Engineering part of the campus for major redevelopment.



The Strategic Plan will enable a doubling of annual research expenditures in the Cockrell School by 2020

Engineering Education and Research Center: Program Summary

247,300 NSF (421,500 GSF)



30% classroom, instructional labs, study space
15% wet/damp lab space

Electrical & Computer Engineering Department
98,180 NSF (40%)

Interdisciplinary Research
55,000 NSF (22%)
Energy Institute research space
Two major research centers

Interdisciplinary Teaching / Student Collaboration Space
61,150 NSF (25%)
Classrooms
Interdisciplinary Teaching Labs
Project Design Labs/Shops
Group Study Facilities
Commons/Dining

Student Services and Library
25,450 NSF (10%)

250-Seat Auditorium
7,500 NSF (3%)

Engineering Education and Research Center
Total Project Cost[a]

Construction Costs[b]	$212,300,000	$504 / square foot
Soft Costs[c]	$77,700,000	$184 / square foot
Total Project Cost	$290,000,000	$688 / square foot

[a]Costs are in 2009 dollars and include escalation.

[b]Includes 15,000 GSF modification of ECJ for connections to EERC at three levels.

[c]Includes surge and swing space of approximately 100,000 NSF; relocation of Services Building and EH&S facility; ITS, networking, electric and utility connections; project contingency; furnishings; A/E fee; OFPC management fee; insurance; capitalized interest.

Total Project Cost: $290 million

PUF
$90M

TRB
$100M

82nd Leg

Engineering Education and Research Center

Gifts
$100M

Feb 5, 2010
Regent approval for Capital Improvement Program

Design and Fundraising

Feb 2012
Regent approval of Design Development

Construction

Sept 2015
Occupancy

Total Annual Impact in Texas

Year	Jobs	Expenditures	Gross Product
2009	15,500	$3.00 B	$1.38 B
2016	19,800	$3.80 B	$1.76 B
2023	26,600	$5.27 B	$2.44 B

Total Annual Impact in United Sates

Year	Jobs	Expenditures	Gross Product
2009	24,400	$5.31 B	$2.29 B
2016	31,200	$6.78 B	$2.92 B
2023	45,900	$10.30 B	$4.39 B

Source: The Perryman Group
All monetary impacts in 2009 dollars

Total Annual Tax Revenue in Texas

Year	State Tax Revenue	Local Tax Revenue
2009	$74.9 M	$34.8 M
2016	$94.0 M	$44.0 M
2023	$127.5 M	$59.3 M

Source: The Perryman Group
Revenue in 2009 dollars

Artistic Representation of EERC and Proposed Buildings in the Strategic Master Plan

Providing a Destination for Collaborative Learning

Conceptual View of Engineering Quad from Proposed EERC Student Commons