

Program Statement

Project Name: Scott Engineering Center Renovation and Link Replacement
Campus: UNL City Campus
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1. Introduction

A. Background and history

Since its inception in 1877, the College of Engineering (COE) has been the sole academic entity in the state of Nebraska charged with providing engineering education and leading technology-based economic development. It does this by delivering affordable, high quality undergraduate and graduate education, and by conducting cutting edge research in the construction, computing, and engineering disciplines. The COE has seven academic units with 13 ABET accredited undergraduate engineering degree programs, 12 masters programs, and 11 doctoral programs. In Fall 2017, the COE had 205 tenured/tenure-track faculty and 42 other faculty who provide educational experiences and professional mentoring to over 3,700 undergraduate students and over 650 full time graduate students. Research expenditures have increased to approximately \$35 million and the college is currently ranked 82nd among 205 engineering colleges in the US News & World Report undergraduate rankings. Enrollments, research expenditures and rankings all represent a consistent ten-year trend of growth and improvements in the college.

The COE is uniquely structured across three campuses, City Campus and East Campus in Lincoln and Scott Campus in Omaha. The Scott Campus houses the Durham School of Architectural Engineering and Construction (DURHAM) and the Peter Kiewit Institute (PKI). The University completed a renovation of the Peter Kiewit Institute building in 2012 and the COE added an additional 30,000 square feet of space in the Scott Technology Center in 2015. East Campus houses Biological Systems Engineering (BSE) which also includes Agricultural Engineering. City Campus is home to the remainder of the academic units and degree programs in COE. Both Civil Engineering (CIVIL) and Electrical and Computer Engineering (ECE) have a presence and deliver undergraduate and graduate programs on both City Campus and Scott Campus.

In 2011, the COE joined the Big Ten Plus Engineering Consortium that, in addition to the Big Ten colleges of engineering, includes MIT, Cornell, Carnegie Mellon, Georgia Tech, Berkeley, Stanford and the University of Texas at Austin. This is, without question, the single best collection of colleges of engineering in the world and most are significantly larger than Nebraska. All but one are ranked in the top fifty by US News & World Report and many are in the top twenty. This represents a dramatic change in peer group when compared to the Big 12 colleges of engineering. The COE endeavors to become a top fifty college within ten years.

A facilities survey conducted by the University of Nebraska in 2015/2016 found that the buildings in the engineering complex on City Campus were among the very worst in the entire University of Nebraska system. This led the President's office and the UNL Chancellor's office to allocate \$70,000,000 of funds from LB957 to the improvement of those engineering facilities. The primary COE complex includes four buildings that are all connected. From north to south, they are:

- Nebraska Hall, which was originally constructed in 1931, is a three story, 218,000 GSF building. Two floors were added to the structure in 1951 and the structure grew to be about 364,000 GSF. The University of Nebraska purchased the building in 1958 and renovated the structure for classrooms and laboratories in 1965. The COE currently occupies around 10% of the building with office space for faculty and support staff and some small classrooms.
- The Scott Engineering Center Link (Link) between Nebraska Hall and the Scott Engineering Center added about 25,000 GSF in 1984. The Link primarily houses faculty from CIVIL and the ECE.
- Scott Engineering Center (originally called the Nebraska Engineering Center), was completed in 1971 and has about 177,000 GSF over four stories. It provides high bay space for CIVIL and DURHAM

Scott Engineering Center Renovation and Link Replacement

Program Statement

as well as undergraduate and research laboratories to support ECE and Mechanical and Materials Engineering (MME).

- Othmer Hall was added to the south side of the engineering complex, north of Vine Street, in 2003 and became the formal entrance to the COE. Othmer Hall is about 150,000 GSF and houses Chemical and Biomolecular Engineering (CBE) and the Office of the Dean.

In response to the facilities survey that highlighted the poor conditions of the engineering facilities on City Campus, the University completed a COE Master Plan with the assistance of the Clark Enersen Partners. This Master Plan offered four options for the renovation and expansion of the COE complex in order to improve undergraduate and graduate education, support a larger research enterprise, and address the lack of space on City Campus. The cost estimates ranged from \$152 to \$173 million.

At the direction of the Dean of the COE, a ten member faculty task force carefully studied the facility needs of the college. The task force reviewed engineering buildings at peer and aspirational institutions. Members of the task force also visited new engineering facilities at UCLA, the University of Texas at San Antonio, and the University of Texas at Austin. The task force determined that in addition to the need for new space to accommodate current and future growth in the number of faculty and students in the college, there is a need for higher quality space that supports modern pedagogies and research paradigms and attracts and retains student and faculty talent. The state of the current facilities is limiting growth, hindering student recruitment and success efforts, and creating faculty retention issues.

B. Project description

The proposed project would consist of demolition of the Scott Engineering Center Link and construction of a new building in its place, limited improvements to Nebraska Hall, and renovation of Scott Engineering Center. The Link replacement would be approximately 87,000 gross square feet on the north side of SEC with a new mechanical service tower on the east side to serve SEC. The new Link building would provide the college additional research lab space, specialized research space, instructional laboratories, a new more prominent and transparent entry to the college on the west side, and modern classrooms that support research based instructional strategies and facilitate the delivery of classes and programs between City Campus and Scott Campus. The new building would connect to SEC and Nebraska Hall.

Improvements to Nebraska Hall would be focused on the correction of ADA and other code deficiencies. The renovation would include two new accessible entrances on the north side, elevator upgrades, accessibility upgrades to public restrooms, and fire suppression sprinklers for the entire building.

A majority of the Scott Engineering Center would be renovated to primarily support the college's research enterprise and undergraduate instructional laboratory needs. The renovated building would have state of the art research laboratories that are easily reconfigurable, modern undergraduate instructional laboratories, associated laboratory support, and offices. Mechanical and electrical systems would be replaced to support the demands of modern laboratories and interdisciplinary research efforts. The existing data center would remain and receive HVAC system upgrades. Recently remodeled laboratories and classrooms would also receive HVAC and electrical upgrades. About 50,000 sf would be prepared as lab space for future development with research funds and private donations.

Due to limited temporary laboratory space, the SEC renovation project would be phased. This work would occur after the construction of the new Link building to help with space limitations and minimize disruptions to the college's teaching and research efforts.

C. Purpose and objectives

Consistent with the goals of the University of Nebraska system and the state of Nebraska, the COE must expand its educational, research, and outreach missions if it is to serve as a driver of economic development. Existing industries in the state and region need a larger pipeline of highly qualified engineers and the state's existing agricultural sector and emerging high technology and biomedical sectors need a robust engineering

Scott Engineering Center Renovation and Link Replacement

Program Statement

research enterprise. The size and condition of the college's existing facilities on City Campus do not support the needs of the state or allow the college to fully deliver on its tripartite mission. This project is a necessary first phase to enable the COE to meet the needs of the state and to achieve the growth goals established by the university. Specific objectives for the project include the following:

- Develop state-of-the-art facilities to improve recruitment and retention of faculty, staff, and students.
- Provide spaces for interactive learning and collaboration.
- Improve classroom spaces to support modern pedagogies that have been proven to improve student learning outcomes, retention, and graduate rates.
- Create a facility that is flexible and able to be economically modified to meet the future needs of the college's educational and research programs and enable higher utilization rates of all spaces.
- Improve and expand departmental and faculty space to provide better communication and collaboration among faculty within departments, across departments, and across campuses through strategic placement of offices, conferencing areas, student support services, and technology support.
- Improve and expand technology support to allow the college to stay on the cutting edge of advances in technology in teaching, learning, and research.
- Develop a sense of place for students, partners and other visitors, faculty, and staff.
- Improve research laboratories to support modern research paradigms, including large scale interdisciplinary research.

2. Justification of the Project

A. Data that supports the funding request

Over the last ten years, the COE has experienced consistent growth in its undergraduate enrollment, from 2,700 students to 3,700 students; its graduate enrollment, from 550 to 650 students; and research expenditures, from \$31,000,000 to \$35,000,000. Though this growth is significant, much more rapid growth is required if the college is to meet the needs of the state and the nation. In the last three years, the college has hired 56 new faculty across all three campuses and these faculty conduct interdisciplinary research that requires modern research laboratories and collaboration tools not supported by the current facilities on City Campus. The COE is committed to long term growth to 5,000 undergraduate students and 1,200 graduate students; and \$110,000,000 in research expenditures. These growth goals are the key to the college becoming a top 50 college of engineering and a larger driver of economic development in the state. To achieve this, the college must expand its undergraduate and graduate programs and its research enterprise, all of which require improved and additional space to current facilities.

The project is the impetus for a transformational change for the students, staff, and faculty of the COE and for the Nebraska engineering industry. As the COE works to attract new students and nationally known faculty, a more modern facility is essential. The administration and faculty of the College are committed to creating a learning environment that encourages students to work together, much like they will be expected to do when they enter the engineering profession. The COE's goal is to allow students to attend class, study, work on group assignments, interact with the engineering community, develop life and career skills, and participate in engineering student organizations *all in one space*. The sense of community that a new and renovated engineering complex will offer will enhance the experience of any UNL student who enters the building. Finally, the complex will be a space to be shared with the business and engineering community of Nebraska. It will be a welcoming space to all who enter it, showcase the work being done by academic units and student groups, and foster an intellectual community that engages everyone.

B. Alternatives considered

The COE Facility Master Plan explored options of building a new facility to house all of COE. The size of such a complex created a very large project cost and required relocation to a less central site. Removing

Scott Engineering Center Renovation and Link Replacement

Program Statement

and replacing portions of the existing complex, like Nebraska Hall, were also considered. The square footage of Nebraska Hall was similarly very costly to replace and were found to be prohibitive.

Nebraska Hall in large part and Scott Engineering Center to a lesser extent are shared with other occupants. One alternative would be to relocate all others and assign the full complex to COE. That would be a disruptive and costly option with the provision of other facilities for all the non-COE uses.

Initially the project explored a new facility adjacent to the existing complex and renovation of the existing buildings. The total cost of all the improvements did not allow for work to begin immediately so the renovation portion was prioritized. A new building is still being considered for the future.

Replacing SEC was not considered and a total cost of ownership was not conducted due to the logistics to keep enough labs operational. In order to replace it, all current occupants would have to be moved out of the building. The lack of lab swing space would require that a new space be built first and the cost would be too much to replace the full facility. The data center has explored options of moving before and found the cost to be too great as well. Additionally, SEC is a sound building and it is appropriate for its intended use so it is a good candidate for renovation.

The Link is not in good condition and is limited in use. Its removal and replacement with a lab building that can house a significant portion of SEC creates needed swing space for a more efficient renovation of SEC. The mechanical tower allows phasing of mechanical systems with less disruption. All together the new construction minimizes phasing and shortens the renovation time, thus reducing construction cost.

3. Location and site considerations

A. County: Lancaster

B. Town or campus: University of Nebraska-Lincoln City Campus

C. Proposed site



Scott Engineering Center Renovation and Link Replacement

Program Statement

D. Statewide building inventory:

Nebraska Hall	51ZZ0051900B
Scott Engineering Center Link	51ZZ0051801B
Scott Engineering Center (SEC)	51ZZ0051800B

E. Influence of project on existing site conditions

1) Relationship to neighbors and environment

The site is located in the northeast corner of City Campus between 16th and 17th Streets. Abel Hall, the Abel-Sandoz Welcome Center, and Sandoz Hall are across 17th Street. A privately-owned parking lot of approximately 68 parking stalls is also on the east side of 17th Street and is leased for university parking. The Courtyards, Greek housing, and recreation fields are located to the south across Vine Street. Jorgensen Hall is on the west side across 16th St.

The proposed project would provide opportunity to create a new welcoming and transparent entry to the COE complex along 16th Street. The proposed new entry would establish a better-defined relationship between the COE and Jorgensen Hall. It should also be an identifying component that provides a prominent point of entry. The intent is to make the building inviting to all students and visitors while emphasizing the COE brand.

The project would enhance the outdoor area between the new Link Replacement and Nebraska Hall to a pedestrian and gathering environment that is welcoming, comfortable, collaborative, and safe. Improvements could incorporate specialty paving, seat walls, pedestrian scale lighting, site amenities, and landscaping that provide gathering space for students and faculty.

The design of the facility and site improvements on the east side should consider the possible closing of 17th Street to public vehicular traffic and incorporate design elements that would support the potential future development of 17th Street into a highly interactive and engaging outdoor student environment.

2) Utilities

Existing utilities between Nebraska Hall and the Link would either be relocated or worked around to maintain services to the existing buildings in the area. Utilities anticipated to be impacted by building construction include:

- Storm and sanitary sewer
- Gas service
- Electrical and fiber duct banks

3) Parking & circulation

The replacement Link would be planned to maintain pedestrian access from 16th to 17th as well as allow service and emergency vehicle access. Vehicle access would be one-way from 16th Street to 17th Street. All pavement would be designed to adequately support the loaded service vehicles expected at the buildings.

Service access to all loading docks would be maintained, reconfigured, or replaced. The layout of the service drives should, to the maximum extent possible, minimize conflicts and/or crossings of separated pedestrian paths. Enhancement of the aesthetics of the Nebraska Hall dock should be considered.

The project would take into consideration its relationship with the existing 17th Street

Scott Engineering Center Renovation and Link Replacement

Program Statement

alignment and explore options to improve access such as an additional driveway connection to 17th Street. This would reduce the necessity for vehicles to back-up or turn-around within the parking and loading area.

4. Comprehensive Plan Compliance

A. Compliance with the University of Nebraska Strategic Framework, Campus Roles and Mission and Campus Strategic Plan.

This project aligns with the goals outlined in the University of Nebraska Strategic Planning Framework 2014-2016. Specifically, the following goals are most pertinent:

2. The University of Nebraska will build and sustain undergraduate, graduate and professional programs of high quality with an emphasis on excellent teaching.
 - a. Recruit and retain exceptional faculty and staff, with special emphasis on building and sustaining diversity.
3. The University of Nebraska will play a critical role in building a talented, competitive workforce and knowledge-based economy in Nebraska in partnership with the state, private sector and other educational institutions.
 - a. Work to stem and reverse the out-migration of graduates and knowledge workers.
 - c. To attract talent to the state, increase the number of nonresident students who enroll at the university.
 - i. *Increase enrollment of nonresident undergraduate students at UNL, UNO and UNK.*
 - e. Encourage and facilitate the commercialization of research and technology to benefit Nebraska.
 - h. Pursue excellence in educational attainment aligned with the long-term interests of the state.
 - i. *Analyze areas of future workforce demand, including job and self-employment opportunities in non-growth rural communities and economically disadvantaged urban areas, and strengthen or develop curricula and programs appropriate to the university in alignment with those areas.*
4. The University of Nebraska will pursue excellence and regional, national and international competitiveness in research and scholarly activity, as well as their application, focusing on areas of strategic importance and opportunity.
 - a. Increase external support for research and scholarly activity.
 - ii. *Inventory and forecast infrastructure (physical facilities, information technology, equipment) necessary to support continued growth in research activity and secure private and public support to eliminate deficiencies.*
 - b. Increase undergraduate and graduate student participation in research and its application.
 - c. Encourage and support interdisciplinary, intercampus, inter-institutional and international collaboration.
 - d. Improve the quantity and quality of research space through public and private support.
5. The University of Nebraska will serve the entire state through strategic and effective engagement and coordination with citizens, businesses, agriculture, other educational institutions, and rural and urban communities and regions.
 - c. Support Nebraska's economic development.
6. The University of Nebraska will be cost effective and accountable to the citizens of the state.
 - a. Support the development of a sustainable university environment.
 - ii. *Implement the second phase of LB 605 to repair, renovate and/or replace specific university facilities.*

Scott Engineering Center Renovation and Link Replacement

Program Statement

iii. Campuses shall pursue energy efficiency.

b. Maintain a safe environment for students, faculty, staff and visitors.

c. Allocate resources in an efficient and effective manner.

i. Use best practices in procurement and construction and other business engagement.

B. Consistency with the agency comprehensive capital facilities plan (year of plan and updates or revisions)

Plan Big was adopted by the Board of Regents in 2013. Plan Big addresses both City and East Campuses, the connections between them, and between the university and its surroundings. Plan Big builds on the unique character of each campus and offers recommendations to improve and enhance each, while maintaining the elements that are valued by the campus community. With its proximity to downtown, City Campus is envisioned as an urban campus that capitalizes on connections beyond its edges, has increased density within the core to provide space for new development, and creates a welcoming, vibrant landscape.

Plan Big provides a flexible framework for future development. The plan describes future campus development sites; yet, it does not prescribe building uses or land uses. Rather, the plan allows the university to make incremental decisions within the context of broader goals. This encourages UNL to site future buildings or expansions in locations that best enhance desired programmatic adjacencies and relationships.

Plan Big depicts 17th Street as a pedestrian oriented mall that accommodates service needs. A new building site is shown at the northeast corner of 17th and Vine Streets. The architectural principles propose that the 17th Street district be developed with a strong sense of identity and scale. The design principles that this project would embrace include:

- Buildings must relate to and define outdoor campus spaces.
- Places should ... express UNL's place as a premier, forward-looking institution where high levels of achievement are the standard.
- Places should create spaces that inspire social and intellectual collaboration.
- Design of facilities should respect the existing campus fabric yet allow for exceptions that create landmark focus.

C. Consistency with the current version of the CCPE Project Review Criteria/Statewide Plan

The project is consistent with Nebraska's Coordinating Commission for Postsecondary Education Comprehensive Statewide Plan for Postsecondary Education, Chapter 6: Statewide Facilities Plan; specifically as follows:

Nebraskans will advocate a physical environment for each of the state's postsecondary institutions that: supports its role and mission; is well utilized and effectively accommodates space needs; is safe, accessible, cost effective, and well maintained; and is sufficiently flexible to adapt to future changes in programs and technologies.

Individual capital construction projects will support institutional strategic and comprehensive facilities plans; comply with the Comprehensive Statewide Plan for Postsecondary Education, which includes the Statewide Facilities Plan; and not unnecessarily duplicate other facilities.

5. Analysis of existing facilities

A. Function and purpose of existing programs as they relate to the proposed project

The existing COE is housed in a complex of four connected structures (Nebraska Hall, Scott Engineering Center Link, Scott Engineering Center, and Othmer Hall). The primary departments occupying spaces in

Scott Engineering Center Renovation and Link Replacement

Program Statement

the affected buildings are Mechanical and Materials Engineering, Electrical and Computer Engineering, and Civil Engineering. Some spaces are also assigned to Computer Science and Engineering, Chemical and Biomolecular Engineering, and the COE. These groups would continue to occupy spaces in the complex during and after the project.

B. Square footage of existing areas:

Nebraska Hall

Space Code	Description	NSF
	Total Net Square Feet	331,488
	Total Gross Square Feet	363,781

Scott Engineering Center Link

Space Code	Description	NSF
100	Classroom	699
200	Laboratory	1,740
300	Office Facilities	11,574
	Building Services, Circulation, and Restrooms	8,257
	Total Net Square Feet	22,270
	Total Gross Square Feet	25,307

Scott Engineering Center

Space Code	Description	NSF
100	Classroom	5,862
200	Laboratory	16,261
250	Research (Non-Class) Laboratory	52,704
300	Office Facilities	11,681
500	Special Use Facilities	8,073
600	General Use Facilities	1,353
700	Support Space	236
710	IS Space	8,204
	Building Services, Circulation, and Restrooms	55,811
	Total Net Square Feet	160,185
	Total Gross Square Feet	177,282

C. Utilization of existing space by facility, room and/or function

The four existing buildings include classrooms, laboratories, offices, study spaces, general use and support areas that are outdated and unsuited to the desired use in many ways. These spaces are used to the extent possible and COE is successful despite the deficiencies. Improvement of the spaces would allow for more efficient use with better results.

D. Physical deficiencies

The primary physical deficiencies of each building are:

NEBRASKA HALL:

Scott Engineering Center Renovation and Link Replacement

Program Statement

- Insufficient number of ADA accessible entries
- Non-compliant interior doors
- Non-compliant public restrooms
- Elevator equipment beyond its useful life and with ADA compliance issues
- Air Handling Units beyond their useful lives and in need of replacement
- Electrical service panels and equipment past their useful lives
- Portions of the plumbing systems near the end of their useful lives
- Existing structure not well suited for research labs
- Incomplete fire suppression system
- Outdated finishes
- Inconsistent and confusing interior circulation

SCOTT ENGINEERING CENTER LINK:

- Non-compliant interior doors
- Elevator equipment beyond its useful life and with ADA compliance issues
- Building envelope in poor condition
- Existing structure not well suited for research labs

SCOTT ENGINEERING CENTER:

- Non-compliant interior doors
- Elevator equipment beyond its useful life and with ADA compliance issues
- Non-compliant public restrooms
- Air Handling Units beyond their useful lives
- Undersized mechanical systems which limit research hoods
- Exhaust system fans near the end of their useful lives
- Portions of the HVAC piping systems near the end of their useful lives
- Roof at the end of its useful life
- Outdated finishes
- Inconsistent and confusing interior circulation

E. Programmatic deficiencies

The primary programmatic deficiencies are:

NEBRASKA HALL/ LINK / SCOTT ENGINEERING CENTER:

- Lack of space to accommodate student enrollment in several engineering departments
- Lack of quality research space
- Lack of student-focused space

Scott Engineering Center Renovation and Link Replacement

Program Statement

F. Replacement cost of existing building

The replacement costs listed below are from the most recent Facilities Management Information Report (FMIR) dated June 30, 2017 (calculated for insurance purposes).

Nebraska Hall	\$ 95,815,463
Scott Engineering Center Link	\$ 5,452,049
Scott Engineering Center	\$ 55,912,273
Othmer Hall	\$ 53,922,473

The cost of a replacement facility for all of the COE space in the complex was considered during planning and would be about \$200 million.

6. Facility Requirements and the Impact of the Proposed Project

A. Functions and purpose of the proposed program

1) Activity identification and analysis

The proposed program addresses a number of deficiencies and issues. The COE is experiencing aggressive growth and lack of space. This is an opportunity to meet the space requirements with 21st century engineering college facilities. Both teaching and research laboratories would be configured to maximize adaptability and utilization. The program would bring clarity of circulation throughout the complex and expose the innovative and unique activities in the college.

2) Projected occupancy/use levels

Projections were developed for all of the COE based on historical data, recent enrollment trends, and comparison to other Big 10 and like-sized institutions' colleges of engineering.

- **Personnel projections**

	2013	2017	2022 (projected)
Tenured/ Tenure Track Faculty	167	205	210
Non - Tenured Faculty (Lecturer / POP)	23	42	50
Research Faculty	45	57	60
Staff	173	199	190
Graduate Students	606	655	723
Undergraduate Students	3127	3739	4128

- **Describe/justify projected enrollments/occupancy**

Several drivers of growth were identified during strategic planning for the COE-educational and economic. STEM fields are being promoted in elementary schools and more youth are recognizing engineering fields as career opportunities. There are insufficient qualified persons for current positions in the state in multiple engineering fields and the projected increase in research will expand the demand. Over the last five years, COE has experienced annual increases in undergraduate enrollment and seen an increase in graduate enrollment recently. The COE is positioning itself to continue with similar growth and meet the needs of the university and state.

B. Space requirements

1) Square footage by individual areas and/or functions

Scott Engineering Center Renovation and Link Replacement

Program Statement

Space Description	Room Use Code	SEC	SEC	Link
		Renovated NSF	Minor Remodel NSF	New NSF
Classroom Facilities		1,300	2,881	3,750
COE Shared	110	1,300	2,881	3,750
Laboratory Facilities		35,820	24,875	35,432
Civil Class Laboratory Facilities	210	3,600		
ECE Class Laboratory Facilities	210	1,920		
MME Class Laboratory Facilities	210	3,360	6,162	
General Class Lab Support	215	180		
Civil Laboratory Facilities	250	1,580	8,073	10,147
ECE Laboratory Facilities	250	6,500	6,908	5,292
MME Laboratory Facilities	250	9,780	3,732	19,993
Research Lab Service	255	8,900		
Office Facilities		12,770	0	4,440
Civil Office Facilities	310	5,430		1,480
Civil Office Service	315	850		
Civil Conference Room	350	450		
ECE Office Facilities	310	4,890		1,480
ECE Office Service	315	700		
ECE Conference Room	350	450		
MME Office Facilities	310			1,480
General Use Facilities		400	0	1,800
COE Assembly	610	400		
COE Exhibit	620			1,000
COE Lounge Space	650			800
Support Facilities		950	8,204	0
COE Storage	730	950		
Data Processing	710		8,204	
4th floor & Basement Shell Space	070		36,400	
Circulation	WWW	9,252	13,065	10,910
Custodial	XXX	683	964	805
Mechanical & Utilities	YYY	5,232	7,389	21,170
Total Net Square Feet		66,407	93,778	78,307
Total Gross Square feet		73,532	103,750	87,008
Efficiency		90%	90%	90%

Scott Engineering Center Renovation and Link Replacement

Program Statement

2) Basis for square footage/planning parameters

The programming of the new and renovated spaces was developed by the growth projections in faculty and students. Space allocations for workplace and educational spaces incorporate best practices and University guidelines. Square footage for research laboratories is based on a national Engineering Research Benchmarking Study specific to each academic unit.

3) Square footage difference between existing and proposed areas (net and gross)

Building	Existing (SF)	New (SF)	Total Proposed	Difference
Scott Engineering Center	160,185		160,185	0
Scott Engineering Center Link	22,270			(22,270)
Link Replacement (New Construction)		78,307	78,307	78,307
Total Net Square Feet	182,455	78,307	238,492	56,037
Total Gross Square Feet	202,589	87,008	264,290	61,701

C. Impact of the project on existing space

1) Reutilization and function(s)

Specific improvements would be made in Nebraska Hall to address code issues which would benefit all of the occupants of the building. SEC would be renovated primarily to provide state of the art research laboratories and undergraduate instructional laboratories.

2) Demolition

The Link would be demolished in preparation for the new Link. SEC would have complete interior demolition except for the IS area and a few classrooms and research labs that were recently remodeled.

3) Renovation

The majority of SEC would have a complete renovation of the interior spaces for teaching and research labs and associated support spaces. The existing face brick and precast skin would remain. Existing exterior doors and windows would be replaced with new, energy efficient exterior doors and windows. The space would also be reconfigured to improve wayfinding.

7. EQUIPMENT REQUIREMENTS

A. List of available equipment for reuse

All major equipment currently in active use in the engineering complex would be accommodated within the new COE complex footprint. Computers and ancillary office equipment would be reused where possible. Office, classroom, and computer lab furnishings may not be suitable for reuse.

B. Additional Equipment

1) Fixed equipment

New fixed equipment would include base and wall cabinets, built in shelving, and lecture hall

Scott Engineering Center Renovation and Link Replacement

Program Statement

seating. Depending on classroom configuration, fixed tables/counters may be provided. A detailed list of fixed equipment would be developed during the project.

2) Movable equipment

New moveable equipment would include office, classroom, teaching laboratories, and student support space furniture, furnishings, and equipment. This would include lounge, study, conference, and office furniture. Depending on classroom configuration, moveable tables and movable chairs may be provided. A detailed list of new moveable equipment would be developed during the project.

3) Special or technical equipment

Existing special and technical equipment, including laboratory equipment, would be reused in existing and renovated spaces to the greatest extent reasonable. New laboratory equipment has not been budgeted for in this project, however structure, utilities and service connections would be provided to accommodate future lab equipment. New and renovated classrooms and teaching labs would have technology for video conferencing /distance education. Security cameras would be added for appropriate coverage. Room schedulers would be provided for classrooms and selected meeting rooms.

8. SPECIAL DESIGN CONSIDERATIONS

A. Construction Type

The construction type for the new building would be non-combustible in conformance with the International Building Code, Type I Construction.

B. Heating and Cooling Systems

Scott Engineering Center and the new Link would be served by hot water heating and chilled water cooling systems. All fans and pumps would be provided with variable frequency drives. System control would be by direct digital control (DDC) provided by UNL. Each office and classroom would be provided with its own DDC sensor and variable air volume (VAV) box connected to room lighting occupancy sensors. In addition, each classroom and auditorium space would have CO₂ sensors and controls to maintain safe CO₂ levels.

Hot Water would be made in the SEC basement mechanical room using steam from the campus central plant. Steam condensate would be pumped to the campus condensate return system. Hot water and chilled water would be provided to SEC and the Link Replacement from the SEC basement mechanical room.

The new Link would be served by multiple air handling units (AHUs) which would be located in penthouses or mechanical rooms on each level. Raised floor air distribution systems could be considered in auditorium areas and other locations where raised floors are installed.

SEC would have multiple new AHUs located in a proposed new mechanical tower with two units serving each floor. This new mechanical chase and equipment structure would be constructed to allow for a phased mechanical renovation to coincide with remodeling by mechanical service zones. A detailed sequencing plan will be developed with the contractor during design to keep the existing IS space operational during construction.

Energy recovery units would be evaluated on a life-cycle cost basis for installation on exhaust ductwork systems to pretreat incoming ventilation air.

C. Sustainability

The overall design of the site and improvements would be developed to maximize the opportunity for

Scott Engineering Center Renovation and Link Replacement

Program Statement

sustainable design. The project would be designed to LEED Certification at a minimum. Application for LEED certification would not be pursued.

The project would explore opportunities to use the building systems as a living laboratory. Equipment could be visible and dashboards could display system graphic, heat transfer, and energy use.

D. Life Safety/ADA

All new construction would be made accessible per the ADA Accessibility Guidelines and Nebraska Accessibility Guidelines and would comply with all current life safety standards. Renovated buildings and portions of buildings would comply with current standards. Fire suppression sprinkler systems would be provided in SEC and Nebraska Hall. Two new ADA compliant entries are planned for the north side of Nebraska Hall.

E. Security

The existing complex security system will be evaluated during design and additional controls and monitoring points would be added as warranted. Access control systems would be provided at each exterior door and at selected interior doors. Card access rough-ins would be provided at all labs and classrooms if card readers are not installed. Security cameras would be provided at recommended locations.

F. Historic or architectural significance

Nebraska Hall is a brick and concrete terminal warehouse with very little brick ornament or detail. The Link is a minimalist mid-century structure. SEC is another minimalist mid-century modern building. Othmer is a four story brick and limestone example of the post-modern architectural style.

The project could leverage the 16th street exposure by building transparency into spaces that exhibit leading edge engineering accomplishments and student engagement. It is a primary face for the COE and should develop a cohesive look with the existing buildings that could be extended to future additions. The exterior space between the proposed Link and Nebraska Hall could display and celebrate engineering. The project could express engineering by highlighting design innovations that follow the “Building as a Lab” concept. Interior transparency could be used to celebrate integrated design that elevates student intrigue and identity that this is a place of engineering learning and investigation.

G. Artwork

Art would be provided in compliance with the 1% for Art requirement.

H. Phasing

Work would be coordinated around activities and existing occupants. A detailed phasing plan would be developed with the Construction Manager during design. Preliminary planning outlines the following:

Design Phase	10/2018 to 7/2019
Link Demolition	6/2019
Link Construction	6/2019 to 12/2020
NE Hall entries addition	6/2019 to 12/2019
NE Hall ADA entries minor remodeling and sprinkler	6/2019 to 11/2020
Scott Engineering Center remodel and renovation, multiple phases	1/2021 to 9/2022

I. Future expansion

A future expansion building at 17th and Vine was studied during planning. The new building construction estimate was approximately \$58,000,000 for about 175,000 square feet. The vacated 17th Street site would

Scott Engineering Center Renovation and Link Replacement

Program Statement

allow for re-purposing the streetscape into a courtyard that could be used as both an active learning space for the COE and a passive recreation space for Abel and Sandoz Residence Halls. Many programmatic needs of the COE would be met with the addition of such a building to the complex.

J. Other

Electrical Power Distribution System

- Scott Engineering Center: All switchboards and panel boards throughout the building would be replaced except for the IS area and recently remodeled spaces. In order to accomplish this, a new electrical distribution system would be installed in the mechanical tower addition. Panelboards would be located throughout the renovated spaces, as required.
- Link Replacement: Preliminary calculations indicate a 3000 amp, 480Y/277-volt switchboard would be required.

Lightning Protection System

- A lightning protection system would be evaluated for each building.

Generator

- Nebraska Hall: The existing 600 kW generator would be evaluated to confirm the capacity is adequate for any renovations.
- Scott Engineering Center: Two existing generators serve this building; one for the data center and support spaces, one for the rest of the building. Both generators should be able to be retained. The building generator would be evaluated for capacity in conjunction with the Link.
- Link Replacement: A new generator would be provided to serve life safety systems and optional standby systems.

Lighting

- All lighting would be designed to comply with the standards contained in the latest edition of the Illumination Engineering Society (IES).
- New light fixtures would utilize LED's.
- All lighting controls would be designed to comply with the current state energy code.
- Emergency lighting would be by generator backed circuits.

Special Systems

- A fire alarm system compliant with NFPA 72, NFPA 101 and university standards would be designed for the facility.
- Communications cabling and equipment rooms would be designed to university standards with spare capacity for future growth. Special care and consideration would be required to provide uninterrupted service to the data centers located within Nebraska Hall and SEC.
- A distributed antenna system would be provided for rebroadcasting of emergency services radio as required.

Building Utilities

A process chilled water system and other building utility systems would be investigated. Currently there are numerous stand-alone systems at SEC that reject heat to the surrounding space.

Site Amenities

Bike racks and site furnishings should be integrally incorporated into the design of the pedestrian corridor.

Scott Engineering Center Renovation and Link Replacement

Program Statement

Special consideration should be taken to strategically locate site amenities near existing and new building entries.

9. PROJECT BUDGET & FISCAL IMPACT

A. Cost Estimate Criteria

1) Identify recognized standards, comparisons and sources

The estimated probable costs of construction were developed by Building Cost Consultants with reference to costs of similar recent local projects in size, scale, and type. UNL-provided services and non-construction costs were estimated by University staff.

2) Identify year and month on which estimates are made and inflation factor used

The estimate was prepared in May 2018 and escalated at 3% per year to the midpoint of construction.

3) Net and gross square feet

	<u>SEC and New Link</u>	<u>Nebraska Hall</u>
Net Square Feet	238,492 NSF	331,488 NSF
Gross Square Feet	264,290 GSF	363,781 GSF

4) Project cost per net and gross square foot

SEC and New Link portion total project cost	\$71,329,000
Nebraska Hall portion total project cost	\$ 4,127,000
SEC and New Link	\$299 / NSF
Nebraska Hall	\$12 / NSF
	\$270 / GSF
	\$11 / GSF

5) Construction cost per gross square foot

SEC and New Link portion construction cost	\$60,527,000
Nebraska Hall portion construction cost	\$ 3,699,000
SEC and New Link.	\$229/GSF
Nebraska Hall	\$10/GSF

Scott Engineering Center Renovation and Link Replacement

Program Statement

B. Total project cost

Construction	
General Construction	56,359,000
Site Work/Utilities	967000
Fixed Equipment	265,000
In-House Construction	3,755,000
Construction Contingency	2,880,000
TOTAL CONSTRUCTION COSTS	\$64,226,000

Non-Construction	
Project Planning	580,000
Professional Consultant Fees	6,161,000
Professional In-house	1,285,000
Equipment - Capital	1,059,000
Equipment - Special/Technical	249,000
Land Acquisition	0
Artwork	605000
Other	774,000
Non-Construction Contingency	517,000
TOTAL NON-CONSTRUCTION COSTS	\$11,230,000

TOTAL PROJECT COST	\$75,456,000
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C. Fiscal impact based on first full year of operations

1) Estimated additional operational and maintenance costs per year

Additional operating and maintenance costs are anticipated to be \$1,097,000 per year.

2) Estimated additional programmatic costs per year

Additional programmatic costs are anticipated to be approximately \$200,000 per year, primarily to support the maintenance and replacement of equipment in the new and renovated undergraduate laboratories and classrooms. These costs would be paid for using the college’s differential tuition budget.

10. FUNDING

A. Total funds required: \$ 75,456,000

Scott Engineering Center Renovation and Link Replacement

Program Statement

B. Project Funding Sources:

Funding Sources	Amount	% Total
State Funds	70,000,000	93%
Private donations	5,456,000	7%
Total	\$ 75,456,000	100%

C. Fiscal year expenditures

Fiscal Year	Expenditures
FY2016-2017	386,915
FY2017-2018	291,501
FY2018-2019	3,032,965
FY2019-2020	14,484,307
FY2020-2021	35,135,487
FY2021-2022	20,160,465
FY2022-2023	1,964,361
Total	\$75,456,000

11. TIMELINE

BOR approves Program Statement	August 3, 2018
A/E and CM selection	October 2018
Intermediate Design Review	May 2019
CM Guaranteed Maximum Price approved	May 2019
Start construction	June 2019
Complete design	July 2019
Complete construction	September 2022
Occupy Project	October 2022

12. HIGHER EDUCATION SUPPLEMENT

A. Coordinating Commission for Postsecondary Education (CCPE) Review

- 1) CCPE review is required.

A copy of the project program statement and architectural program will be forwarded to the Coordinating Commission for Post-secondary Education for review following approval by the Board of Regents.

B. Method of Contracting

1) Identify method

Construction Manager at Risk (CMR)

- **Provide rationale for method selection**

2) Provide rationale for method selection

Due to the complex nature of this project, Construction Manager at Risk delivery has been selected. This method offers pre-construction services during design (estimating, scheduling, design assistance, and constructability reviews) to help deliver the project on time and within budget. The CMR can also provide early work packages and pre-ordering of long lead critical path items which can shorten the overall project duration.