A BUILDING COMPLEX FOR COLLEGE OF ENGINEERING AT KANSAS STATE UNIVERSITY

by

KUNG-WEI LIN

B. Arch., Chung Yuan Christian College
of Science and Engineering, 1966

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARCHITECTURE

Department of Architecture and Design

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1973

Approved by:

Major Professor

TABLE OF CONTENTS

THIS BOOK
CONTAINS
NUMEROUS PAGES
WITH THE ORIGINAL
PRINTING BEING
SKEWED
DIFFERENTLY FROM
THE TOP OF THE
PAGE TO THE
BOTTOM.

THIS IS AS RECEIVED
FROM THE
CUSTOMER.

I. INTRODUCTION

The decision to propose a building complex for the College of Engineering was made because of the convergence of two forces which have been developing in the college for many years. One force is concerned with the rapidly changing technology and directions of the professions, the other with the shortage of necessary space for teaching and research for a long time in the college.

The engineering profession has been seeking a more meaningful role in the society. Since today engineers are involved, not only in the practice of the profession of engineering, but in environmental studies, in medical research, and many other diverse activities in addition to various cultural and community projects outside the realm of their technical training.

The education of engineers has changed rapidly in recent years and is expected to change even more in the future with the creation of many new techniques. Because of the needs to develop specialized experimental, research, and teaching facilities while attempting to achieve a physical integration with the existing campus. Therefore, the design of the College of Engineering is a difficult undertaking, flexibility in the proposed project is needed more now than

ever in the past.

Without question, the physical needs created by these two converging forces, necessitated the need of a new building complex for the College of Engineering at Kansas State University.

II. HISTORICAL BACKGROUND

In order to understand the relationship of Kansas to education and to engineering, it is necessary to review the development which led to the establishment of the Kansas State University and to the curriculum in the College of Engineering. This historical perspective is valuable in understanding the attitude of the people of the state as well as for understanding the basic structural and physical framework of the university.

A. THE KANSAS STATE UNIVERSITY

The Kansas State Agricultural College opened its doors for instruction on September 2, 1863 with 52 students.[1] At that time, the city of Manhattan was only eight years old and was still a frontier town.

Kansas became a state on January 29, 1861. Less than one month later, the trustees of Bluemont Central College, the precursor of Kansas State Agricultural College, attempted to get their school established as the state university of Kansas. A bill providing for this was passed in the Kansas Legislature. On July 2, 1862 Congress approved an act providing

---

[1]Julius Terrass Willard, History of the Kansas State College of Agriculture and Applied Science (College Press, 1940), p. 24.

[2]John D. Walters, History of the Kansas State Agricultural College, 1909, pp. 17-19.

for the establishment of land grant colleges, which was designed to make higher education available to the public. It was introduced by Senator Justin Morrill of Vermont and became law with the signature of President Abraham Lincoln in 1862.[3]

The State of Kansas accepted the Morrill Act on February 3, 1863. The name, Kansas State Agricultural College, was adopted for the new school by an act of the Kansas Legislature on March 2, 1863 shortly before the ownership of the land and college buildings of Bluemont Central College was transferred to the state of Kansas.

There were 52 students enrolled on September 2, 1863. Joseph Denison, who had been educated in the classical tradition, was the first president. In 1871 he moved the campus to the present location from the original Bluemont Central College site, which was approximately one mile west of the current site of the main campus. The new site was a one hundred sixty acre tract of land. The move was undertaken mainly because the old location was not suited for agricultural experiments.

President Denison made an honest effort to incorporate in the curriculum the programs suggested by the Morrill Act. Botany, general and agricultural chemistry, zoology and other natural sciences, together with Liebig's Husbandry, were

---

[3]Kansas: A Guide to the Sunflower State, (New York: Hastings House, 1949), p. 53.

included in the first years course of study along with courses of a liberal nature. A separate three year agricultural course was outlined in 1864.

John Alexander Anderson, a Presbyterian minister from Junction City, Kansas, was elected President after Denison. President Anderson demonstrated his loyalty to practical education in many ways. He was also influential in the founding of the School of Home Economics. The practical views of President Anderson were also directed toward campus development.

After President Anderson, President Will served for two years. During this time he hired several teachers who held the Doctor of Philosophy Degree; the first time in the history of the College.

In 1879, George Fairchild became president of the Kansas State Agrucultural College. Graduate work was formalized in 1886, and the College began extensively investigating agricultural problems with federal funds supplied when the Hatch Act was passed by Congress and approved by President Grover Cleveland.[4]

As a step toward accreditation, admission requirements were raised and the fields of study concentration were designated Divisions to be headed by deans. The six divisions

---

[4]Walters, op. cit., pp. 85-86.

created during the tenure of President Nichols and President Waters were: The Divisions of Agriculture; General Science; Mechanic Arts; Economics; and the College. The Division of Veterinary Medicine was divorced from Agriculture in 1919.

William Jardine, another prominent agriculturist, was chosen for the presidency on March 1, 1918. President Jardine was faced with the problems of the increased enrollment and the expansion of existing programs.

On May 5, 1925, Francis Farrell, who had been acting President since March, became President of the University. He was concerned with the application of the physical and biological sciences to industry.

In 1931, the name of the College was changed from Kansas State Agricultural College to Kansas State College of Agriculture and Applied Sciences.

The administrations of President Milton Eisenhower, (1945-1950), and President James McCain, (1950 to the present), have a number of parallels by which the two are easily identified. Both administrations have been concerned with changing the academic emphasis of the school and both have had to deal with the problem of developing a substantial building program to make up for the years when very little was constructed.

The development of a liberal education to complement professional and practical training began in the Eisenhower administration and culminated with the granting of the first

four Bachelor of Arts degrees in January, 1957. Recognition of the maturity of the College occurred in 1959 when the college was made the Kansas State University of Agriculture and Applied Science. Currently the University consists of the College of Agriculture; Architecture and Design; Arts and Sciences; Commerce; Education; Engineering; Home Economics; Veterinary Medicine; the Graduate School; Engineering Experiment Stations; and the Extension Service.

B. THE COLLEGE OF ENGINEERING*

The Kansas State Agricultural College was granted a charter in 1863 and, in accepting the conditions of the land grant act, four departments--science and literature, mechanic arts, agriculture, and military science--were specified in the charter. As a matter of fact, only one, that of science and literature, was put into effect. It is true that in 1866 a position, professor of mechanics and civil engineering, was created and a curriculum in mechanic arts and civil engineering was mentioned in the school catalog.

The first serious intention toward any real mechanic arts is indicated in the catalog for 1871 in the statement, "A small blacksmith shop and carpenter shop afford a beginning to the department of mechanics." Ambrose Todd was made

---

*This section is based on the address "Engineering at Kansas State" by M. A. Durland at the Engineering Station Luncheon session, April 1961.

superintendent of the shops and instructor in mechanics.

The mechanic arts course was, however, discontinued in 1875 on account of lack of demand after having been in theoretical operation for several years, but in the same year the middle section of the present shop building was built. In addition to the wood shops it housed the following departments: printing, telegraphy, sewing, and instrumental music. The blacksmith shop, consisting of two forges, was in a small building nearby. The total equipment of the mechanical department was listed as 25 sets of carpenter tools and some blacksmith tools.

The appointment of Mr. O. P. Hood as superintendent of the workshops in 1886 was without question the most important event up to that time in the direction of engineering training at the college. Professor Hood, a graduate of Rose Polytechnic Institute, was the first engineer to be given a place on the college faculty and he immediately initiated a program for making the mechanical department something more than a shop.

A curriculum in mechanic arts and civil engineering has been listed in the college catalog of 1866-67, and another in mechanic arts several years later, but had never functioned. Until the year 1896-97, only one course was in actual operation in the whole college which, with the limited substitutions allowed, was expected to fit its graduates for the profession of home economics, agriculture, engineering, or almost any

other. Electives were allowed in the mechanics' option so that architectural design could be taken by those wishing to become architects. Progress along engineering lines has been rapid since that time. In the faculty minutes of November 3, 1897, the following was recorded: "On the motion of Professor Willard the name of the mechanics' course is changed to engineering course." Apparently Doctor Willard introduced in name at least, engineering to the College.

In 1898-99 a four-year course in mechanical engineering was described and one in electrical engineering mentioned. From then on other curriculi have been added as the need appeared--architecture in 1904; civil engineering in 1907; and also printing which was discontinued in 1912; agricultural engineering in 1913; flour-mill engineering in 1916 (discontinued 1933); chemical engineering and landscape architecture in 1924; architectural engineering in 1924; Industrial Arts 1937 (discontinued in 1958); Industrial Engineering 1954; Industrial Technology 1955; and Nuclear Engineering in 1953. Between 1914 and 1930, various short courses of sub-collegiate caliber were offered in such lines as blacksmithing, foundry work, machine shop practice, auto mechanics, and concrete construction.

As a gesture toward winning the World War II, and under pressure from the board of Regents, a two year program in Industrial Technology was set up in 1943. During the war various special programs were set up--ESWT (Engineering

Science War Training) programs, ESMWT (Engineering, Science, Management War Training) programs, ASTP (Army Specialized Training Programs) and later ASTRP (Army Specialized Training Reserve Programs) were set up in rapid succession and were essentially "quickies" for engineers and technicians. The common characteristic of each army program was that if it was successful, it was promptly revised.

The professional work of the whole college was extended very rapidly in the early part of the twentieth century so that it became necessary from the administrative point of view to group the various departments into larger groups called Divisions. The Division of Mechanics and Hydraulics, Architecture and Drawing, Civil Engineering, Electrical Engineering, Mechanical Drawing and Machine Design, Power and Experimental Engineering, Printing, Shop Methods and Practice, and Steam and Gas Engineering.

In 1917 the name of the Division was changed from Mechanic Arts to Engineering to be more in line with common practice, and a General Engineering Department created for the newly required courses: Engineering Lectures and Seminar. In 1939 the word Architecture was added, making it the Division of Engineering and Architecture, and in 1940 the word Division was changed to School, but few major changes were made either in organization or administration of the Division.

In 1913 the Department of Power and Experimental Engineering was discontinued and its work taken over by the

newly created department of Applied Mechanics and Machine Design and the Steam and Gas Engineering Department. Civil Engineering was changed to Civil and Highway Engineering (back to Civil in 1916) and Shop Methods and Practice to Shop Practice, then from Shop Practice to Industrial Engineering and Industrial Arts in 1954, and to simply Industrial Engineering in 1960.

In 1914, the Department of Agricultural Engineering was created under the name Farm Machinery. The name, Agricultural Engineering, was not applied to the Department until 1922. For several years previously there had been an associate professor of Farm Mechanics in the agronomy department.

In 1915 the Department of Printing was removed to the general science division and combined with Industrial Journalism. In 1917 Architecture and Drawing was changed to Architecture.

In 1940 the Department of Chemical Engineering was organized in the School of Engineering and Architecture. Prior to that date its work had been carried on in the Chemistry Department in the School of Arts and Sciences. The departments of Heat and Power, Custodian, and Building and Repair were transferred from the Engineering School to Administration and renamed the Physical Plant Department in January, 1949.

In 1950 the name of the Department of Architecture, in recognition of its increasing work in the field of art,

was changed to Architecture and Allied Arts. Then in 1964, the College of Architecture and Design was made independent from the school of Engineering, and became a new college of the University.

The present organization of the College of Engineering, Applied Mechanics, Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering, Mechanical Engineering, and Nuclear Engineering. The College now offers the Bachelor's and Master's degrees in each of the departments. The Doctor of Philosophy degree has been offered in Applied Mechanics, Mechanical Engineering, Chemical Engineering and Industrial Engineering for several years.

III. BACKGROUND FOR PLANNING AND DESIGN

This chapter is devoted to analyzing the administrative organization, student enrollment, faculty size, and the existing facilities in addition to predicting future needs for the College of Engineering. The material presented here is the background on which the project is based.

A. THE ADMINISTRATIVE ORGANIZATION

The College of Engineering is one of the eight colleges administered by a dean who reports directly to the vice-president for academic affairs. As chief administrative officer, the dean is "responsible for operation and development; for planning and budgeting; and for personnel management and activities in his college."

In 1972, the College of Engineering was structured into eight departments: Agricultural Engineering, Applied Mechanics, Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering, Mechanical Engineering, and Nuclear Engineering. The off-campus service consists of: the Division of Engineering and Industrial Services, the Engineering Experiment Station, and Kansas Industrial Extension Service.

At Kansas State University, the department is a budgetary unit within the University. As such, "it is responsible for internal accounting and reporting in regard to

personnel, equipment and supplies for which it is responsible." The department head is responsible for the administration of the department and is appointed by the Board of Regents on the basis of the recommendations of the president of the University, the dean of the college, and the faculty of the department.

The administrative organization of the College of Engineering structure is probably similar to that in other universities. The reason for studying the organization is, therefore, not to evaluate it but rather to understand it. As with any client, the College of Engineering, and the University of which it is a part, has a set of requirements which the Architect must work with in order to develop a satisfying environment for specific needs. The Architect, therefore, must know as much as possible about the client as he can before attempting to develop the design.

B. STUDENT ENROLLMENT TREND

The enrollment in the College of Engineering has remained more or less constant in the last ten years. The U. S. Office of Education has predicted that the number of Bachelor's degrees in Engineering to be awarded per year will remain essentially constant through 1976. The experience at Kansas State University since 1963 supports this extrapolation. There are two major reasons for this: (1) the public, in general, and high school students, in particular, are not well

informed as to what engineers do, and (2) the severity of the curricula. Engineering like medicine, is probably destined to remain relatively small in numbers because it takes no small degree of talent and a good deal of hard work. However, by 1980, the Engineering Manpower Commission predicts a considerable shortage of engineers. Increasingly, undergraduates recently are electing to spend their first two years at junior colleges and four-year colleges. Accordingly, the undergraduate center of gravity is moving toward the upper division. So it may reasonably expect the undergraduate program at the College of Engineering to saturate at 1400 students, most of them in the upper division, around the turn of the decade. On the other hand, the U. S. Office of Education has predicted that the production of graduate degrees in Engineering will continue to grow at the national long-term rate of 11-12 percent; so it may expect the graduate programs of the College of Engineering to saturate at 600 students in the late seventies. The College will eventually become essentially an upper-division and graduate operation.

C. THE FACULTY

Most members of the teaching faculty are on twelve month contract basis which includes a one month vacation. A faculty member is classified as full-time if he devotes all of his time to teaching, research and service responsibilities. A part-time faculty member is one who is either appointed

jointly with another college or an acting instructor who is engaged on a part-time basis in advanced study.

The present teaching faculty of some 90 Full-Time Equivalent members is minimal to staff the College's currently authorized programs. Although it could accommodate more students in these programs, it is inadequate for 2000 students, divided 1400 undergraduate and 600 graduate. According to a report[1] made by Engineering Deans of the Mid-America State University Association (MASUA), it suggests the following ratios of FTE students to FTE faculty:

Lower-division teaching	12 to 1
Upper-division teaching	9 to 1
Master's program - course work only	8 to 1
Master's program - thesis required	6 to 1
Doctoral Program	4 to 1

Using these recommendations and the premise that the undergraduate effort will eventually be devoted almost entirely to the upper division, that the majority of M. S. candidates will elect the thesis option, and that roughly one-third of graduate students at any given time will be Ph. D. candidates, it reckons the FTE faculty demand to be 272.

---

[1]Max S. Peters, Teaching and Space Requirements for Quality Engineering Education, Engineering Education magazine, April 1971, pp. 840-843.

The College of Engineering recognizes the number is too high to reach, so they resort to a more reasonable estimate based on their own estimate of a full-time teaching load:

12 class credit hrs. of lower division recitation	=	1 FTE faculty
9 class credit hrs. of upper division recitation	=	"
8 class credit hrs. of undergraduate laboratory	=	"
6 class credit hrs. of graduate laboratory	=	"
30 student credit hrs. of problems or research	=	"

On this basis, in 1967, the College accounted 86.5 FTE faculty positions, with an enrollment of some 1200 undergraduates and 200 graduates. It is reasonable to weight graduate instruction by a factor of 1.5, this figure extrapolates to 133 FTE faculty members for 1400 undergraduates and 600 graduate students, and it should be adjusted for the shift of the undergraduate student center of gravity toward the upper division; call it 140.

D. THE EXISTING FACILTY ANALYSES

The eight departments of the College of Engineering are currently located in four separate buildings on the campus of the Kansas State University. This separation interferes with the efficiency of the daily instructional, research and service functions of the departments.

The facilities which house the College of Engineering,

except the newly built Ward Hall, are grossly inadequate with respect to classroom, library, office, and laboratory space; structural design; and location. The following list summarizes the major deficiencies.

1. The structural systems of the Chemical Engineering Building, the Industrial Engineering Building and the old part of Seaton Hall do not permit remodeling for the development of spaces to meet the contemporary needs of the Engineering teaching program. Because of the structure of these three buildings with their thick native stone exteriors and many heavy wood columns, rearrangement of rooms or the addition of rooms by the utilization of excess space is impossible. Most wood floors are beyond repair in many places because of extended wear and the deterioration of supporting wood members. Also, the flooring is oil soaked creating a definite fire hazard. The basic heavy timber structural system also hampers the installation of essential air conditioning and ventilating systems.

2. There is a shortage of classroom space. The existing classrooms are poorly arranged. The acoustics in the classrooms are poor because of high ceilings. And because of a shortage of appropriate classrooms, a number of presentations, no matter how desirable from an educational point of view, have to be limited.

3. The size and numbers of faculty offices are inadequate. Most of the offices are large enough for an instructor's

desk and a small bookshelf, but they do not allow the instructor to assemble minimal necessary materials and equipment for classroom instruction. Some instructors need room in the office for an assistant. Many faculty members do not have private offices.

4. The lack of graduate student offices. The offices used by graduate students now are crowded, poorly equipped, and unsuited for the intensive work required of graduate students. As a result of the necessity of establishing graduate student offices in any space that could be made available, the offices are extremely scattered thereby making graduate student and faculty interaction very difficult.

5. Student laboratories are overcrowded. The existing laboratories are, in most cases, inadequately designed both in size and equipment. This results in poor protection and maintenance of expensive and delicate equipment.

6. None of the three engineering buildings have central air conditioning. Many individual rooms are air conditioned with window units. But because of the outdated power systems, some departments have reached their limit of power usage, thus preventing the addition of sufficient window air conditioners. Consequently, conditioning of environment, with the extreme variability of the Kansas climate, is on a make-shift basis only.

7. As a result of the antiquated steam heat system, satisfactory heating of offices and classrooms cannot be

attained properly in winter time.

E. FUNCTIONAL SPACE REQUIREMENTS

This section contains the analysis of space requirements and functional requirements at the College of Engineering.

1. Space Requirements

Public Circulation

Room Function	Sq. Ft. Per Unit	No. of Unit	Total Sq. Ft.
Central Administrative Offices			
Dean's Office	250	1	250
Associate Dean's Office	250	1	250
Reception and Secretaries	810	1	810
Dean's Secretary	120	1	120
Associate Dean's Secretary	120	1	120
Work Room	160	1	160
Conference	560	1	560
General Offices			
Engineering Experiment Station	130	1	130
Kansas Industrial Extension Service	130	1	130
Division of Engineering and Industrial Service	200	1	200
Secretaries	120	1	120
Conference	560	1	560

Room Function	Sq. Ft. Per Unit	No. of Unit	Total Sq. Ft.
Engineering Library	2,200	1	2,200
Lecture Hall			
Room (20 Students)	480	2	560
Room (120 Students)	1,600	5	8,000
Audio-Visual Preparation and Storage	225	4	900
Engineering Copy Center	300	2	600
Lounge	1,600	2	3,200
Entrance Lobby and Exhibition	5,000	1	5,000
Men's Room	160	12	1,920
Women's Room	140	12	1,680
Storages			
Department of Chemical Engineering			
Administrative Offices			
Department Head	210	1	210
Reception and Secretaries	360	1	360
Work Room	210	1	210
Conference	660	1	660
Faculty Offices	120	16	1,920
Instructor	120	3	360
Secretary Offices	120	2	240
Graduate Student Offices	120	12	1,440
Student Organization Office	240	1	240

Room Function	Sq. Ft. Per Unit	No. of Unit	Total Sq. Ft.
Classrooms			
Room (20 Students)	450	1	450
Room (60 Students)	800	1	800
Analog computer	330	1	330
Digital computer	330	1	330
Instructional Laboratories			
Transport Phenomena	1,200	2	2,400
Unit Operation	1,500	1	1,500
Process Dynamics & Control	1,100	1	1,100
Reaction Engg.	1,100	1	1,100
Thermodynamics & Transport Properties	550		550
Chemical Analysis	550		550
Research Laboratories			
Transport Phenomena	1,200	2	2,400
Process Dynamics and Control and Reaction Engineering	1,200	1	1,200
Thermodynamics and Transport Properties	600	1	600
Biomedical engineering	600	1	600
Biochemical processes	600	1	600
Systems Design and Optimization***	1,400	1	1,400
Office (Bench) Laboratories		10	3,000
Dark Rooms	120	1	120
Instrument and Equipment Shop	240	1	240
Machine Shop	300	1	300

Room Function	Sq. Ft. Per Unit	No. of Unit	Total Sq. Ft.
Storages			
Instrument	300	1	300
Equipment	600	1	600
Chemicals	150	1	150
Glasswares	150	1	150
Department of Industrial Engineering			
Administrative			
Department Head	210	1	210
Reception and Secretaries	360	1	360
Work Room	210	1	210
Conference	660	1	660
Faculty Offices	120	16	1,920
Instructors Offices	120	1	120
Graduate Students Offices	120	10	1,200
Computing	300	2	600
Student Reference	240	1	240
Faculty Reference	240	1	240
Student Organization	240	1	240
Classrooms			
Room (20 Students)	480	1	480
Room (60 Students)	840	1	840
Human Factors Labs.			
Heat	330	1	330

Room Function	Sq. Ft. Per Unit	No. of Unit	Total Sq. Ft.
Physiological	330	1	330
Work	330	1	330
Glare	330	1	330
Illumination	330	1	330
Safety	330	1	330
Experimental Rooms	70	10	700
Instrument Room	440	1	440
Materials Labs.			
Lab. Office	120	1	120
X-Ray Room	240	1	240
Darkroom	150	1	150
Sample Preparation	690	1	690
Sample Testing	560	1	560
Heat Testing	1,200	1	1,200
Micrography	420	1	420
Metallography	330	1	330
Materials Research	560	1	560
Manufacturing Processes			
Shops Office	120	2	240
Machining	3,800	1	3,800
Welding	900	1	900
Forging	600	1	600
Tool Room	480	1	480
Demonstration-gaging	480	1	480
Storages			

Room Function	Sq. Ft. Per Unit	No. of Unit	Total Sq. Ft.
Department of Civil Engineering			
Administrative			
Department Head	210	1	210
Reception and Secretaries	360	1	360
Work Room	210	1	210
Conference	660	1	660
Faculty Offices	120	13	1,560
Graduate Student Offices	120	10	1,200
Student Reference	240	1	240
Faculty Reference	240	1	240
Student Organization	240	1	240
Research Labs.	530	2	1,060
Classrooms			
Room (60 Students)	840	1	840
Hydraulic Lab.	3,000	1	3,000
Sanitary Lab.	600	2	1,200
Soil Mech. Lab.	600	2	1,200
Surveying Lab.	600	1	600
Transportation Labs.	600	2	1,200
Structural Lab.	2,500	1	2,500
Moist. Handling and Preparation	2,500	1	2,500
Moist. Room	600	1	600
Computational Labs.	300	2	600

Room Function	Sq. Ft. Per Unit	No. of Unit	Total Sq. Ft.
Shop	360	1	360
Storages			
Department of Electrical Engineering			
Administrative			
Department Head	210	1	210
Reception and Secretaries	360	1	360
Work Room	210	1	210
Conference	660	1	660
Faculty Offices	120	18	2,160
Graduate Student Offices	120	10	1,200
Computing	300	2	600
Student Reference	240	1	240
Faculty Reference	240	1	240
Student Organization	240	1	240
Classrooms			
Room (20 Students)	480	1	480
Room (60 Students)	800	1	800
Solid State & Thin Film Technology Lab.	3,000	1	3,000
Electric Energy Lab.	2,000	1	2,000
Shop	660	1	660
Anechoic Chamber	400	1	400
Information Processing Labs			
Analog computer	530	1	530

Room Function	Sq. Ft. Per Unit	No. of Unit	Total Sq. Ft.
Digital computer	530	1	530
Instrument Lab.	1,200	1	1,200
Electronic Lab.	1,500	1	1,500
Electronic System Lab.	1,200	2	2,400
Transformer Vault	420	1	420
Research Labs.	530	8	4,240
Accelerator	2,100	1	2,100
Undergraduate Labs.	540	4	2,160
Storages			
Department of Mechanical Engineering			
Administrative			
Department Head	210	1	210
Reception and Secretaries	360	1	360
Work Room	210	1	210
Conference	660	1	660
Faculty Offices	120	21	2,520
Graduate Student Offices	120	23	2,760
Computing	300	2	600
Student Reference	240	1	240
Faculty Reference	240	1	240
Student Organization	240	1	240
Classrooms			
Room (20 Students)	480	1	480

Room Function	Sq. Ft. Per Unit	No. of Unit	Total Sq. Ft.
Room (60 Students)	800	1	800
Undergraduate Lab.	1,200	1	1,200
Research Labs.	900	2	1,800
Machine Engine Lab.	3,000	1	3,000
Shop	1,400	1	1,400
Vibration Lab.	1,400	1	1,400
Fluids Lab.	620	1	620
Heat Transfer Lab.			
Automatic Control Lab.			
Fluid Floor Lab.	1,250	1	1,250
Storages			
<u>Department of Applied Mechanics</u>			
Administrative			
Department Head	210	1	210
Reception and Secretaries	360	1	360
Work Room	210	1	210
Conference	660	1	660
Faculty Offices	120	10	1,200
Instructors	120	1	120
Graduate Student Offices	120	12	1,440
Computing	300	2	600
Student Reference	240	1	240
Faculty Reference	240	1	240
Student Organization	240	1	240

Room Function	Sq. Ft. Per Unit	No. of Unit	Total Sq. Ft.
Classrooms			
Room (20 Students)	480	1	480
Room (60 Students)	800	1	800
Stress Analysis Lab.	530	1	530
Research Labs.	300	5	1,500
Testing Machine Lab.	2,600	1	2,600
Concrete & Aggregate Work Shop	1,200	1	1,200
Cement Lab.	900	1	900
Moisture Lab.	200	1	200
Research Labs.	530	2	1,060
Storages			
<u>Department of Agricultural Engineering</u>			
Administrative			
Department Head	210	1	210
Reception and Secretaries	360	1	360
Work Room	210	1	210
Conference	660	1	660
Faculty Offices	120	21	2,520
Graduate Student Offices	120	10	1,200
Computing	300	2	600
Student Reference	240	1	240
Faculty Reference	240	1	240
Student Organization	240	1	240

Room Function	Sq. Ft. Per Unit	No. of Unit	Total Sq. Ft.
Classrooms			
Room (20 Students)	480	1	480
Room (60 Students)	840	1	840
Engines-power Lab.	2,000	1	2,000
Drying-storage Lab.	1,200	1	1,200
Animal Environment Lab.	1,000	1	1,000
Irrigation-pollution Lab.	1,000	1	1,000
Tillage Dynamics Lab.	1,000	1	1,000
Harvesting-Machinery Lab.	1,000	1	1,000
Electric Power Use	1,000	1	1,000
Hydraulics Lab.	3,400	1	3,400
Research Labs.	530	2	1,060
Shop	2,000	1	2,000
Tractors Lab.	2,500	1	2,500
Storages			

2. General Space Analysis

- Dean's Office
- Assistant Dean's Office
- Department Head Offices

These offices are the administrative headquarters of the College and of the departments. They provide not only space for the Dean, Assistant Dean and Department Heads to carry out their administrative duties, but also space to store

or file permanent and important documents of the College and departments. It should be easy to communicate with staff. These offices should have privacy so that small conferences can be held. In addition there should be provision for book cases, carpeting, drapes and furnishing.

- Reception Rooms

This room houses a receptionist who greets people and answers the telephone. Visitors will wait in this room. This space should be separated from the department Head's office by his secretary's office. The department's mail boxes should be located here. Some office supplies should also be stored in this room.

- Secretary Offices

The secretaries perform the normal functions required in operating a department. These offices should be close to the departmental offices.

- Work Rooms

The work room should have space for ditto machine, Xerox and Thermofax copier, paper punch and cutter, along with a good sized work table. It should have some sound-proofing to reduce the noise. A sink should be installed to clean hands and equipment. Cabinet space should be available to store all the required material.

- Conference Rooms

The conference rooms are used for departmental meetings between small groups of faculty or students or both. Oral examinations and seminars will be held in here. It should be acoustically and visually designed so that audio and video recordings can be made. Some degree of sound-proofing is needed along with good lighting and chalk boards. In addition, a small combination sink-refrigerator with outlets is needed. This will allow for serving coffee, etc.

- Faculty Offices

These spaces will provide each faculty member an office to prepare his lectures, advise undergraduate and graduate students, and conduct research. These offices should be located near the administrative offices and close to the class rooms. One person will be in each office. Each of these offices must accomodate a desk, chair, table, two book cases, and two filing cabinets for the faculty member as well as several chairs for seating students and visitors.

- Instructor Offices

Post-doctoral personnel form an integral part of any strong research program. They are the vehicles for advanced research programs and provide a stimulus to both graduate and undergraduate research. These two-man offices should be located near the department offices along with the faculty offices. Furniture is required such as desks, chairs,

bookcases and cabinets.

- Graduate Student Offices

Graduate students engaged in non-experimental investigations will be stationed in these rooms. Four students will be assigned to a room. Each graduate student must have a desk, a chair, and a book case.

- Student Organization Offices

Students in the College of Engineering are involved in running the activities of the student chapter of the related professional associations. The student organization office is to be used to store properties of the student chapters and to provide a working office for the students involved in projects such as open house.

- Student Reference

This space is for reference and study for students. The room must be isolated and sound dampened to minimize outside noise and to provide a good reading.

- Faculty Reference

This room is the reading and reference room for the faculty. This room should have a cabinet, sink and refrigerator for departmental needs.

- Classrooms

One type of classroom will accomodate 20 students

and be equipped with tables and chairs for students to do graphical constructions, manage large reference books, and work a slide-rule. Another type is the same size but equipped with movable arm-desks. The third type of classroom should be large enough to accomodate 60 students. Adequate blackboards must be provided in all classrooms. Classrooms should also be equipped so that most types of audio-visual equipment can be used conveniently.

- Lecture Hall

The lecture hall should accomodate 120 students and be equipped with movable arm-desks. The following equipment should also be provided: blackboard lighting, fluorescent and dimmable incandescent lighting, P. A. system, rear projection booth with remote controls, step floor, rear exit and front exit.

- Engineering Library

The engineering library serves as an information and resource center for students and faculty members of the college. All text books, basic reference books, handbooks, dictionaries, technical journals and departmental copies of theses will be kept in this room for their use.

F. PARKING

During the 1968-69 school year, a study[2] was undertaken to determine where students, faculty, and staff residences were located. Many interesting points of information were turned up, but most interesting was the fact that 46 percent of the students and about 12 percent of the faculty and staff residences were located within a half mile radius of the center of the campus. It is assumed that a similar situation exists today. A fairly large number of people who are involved with the University are within easy walking distance of the center of the campus. To some extent, this cuts down on the number of people seeking to park while classes are in session.

The 1968-69 study indicated that during that year 2,857 student parking permits were purchased within a student body of approximately 12,500. In addition, 2400 faculty and staff permits were sold that year. Currently the University is able to accomodate almost everyone who would like to park upon the campus. There are by hand count around 4,830 surface parking space available on the main campus. Of the total number of parking spaces listed, there are approximately 1,215 spaces specifically reserved for and used by the residents and staff of the nine dormitories on campus. The remaining

---

[2]Campus Planning - A Case Study of Kansas State University by J. Ritter, Master's Thesis, 1970.

3,315 parking spaces are available for faculty, staff, students and visitors.

It must be pointed out that there will be some relief to the parking situation as a result of the new Veterinary Medical Campus located north of the main campus. There will be about 500-600 surface parking spaces provided with the new facilities. How many students, faculty and staff these parking facilities will actually remove from the main campus is not as yet known.

Since the size of the site for the new College of Engineering is limited, providing parking space for its own members would be a problem. Fortunately, the University parking lots No. 6 and No. 24 lie on the north side of the site, so parking is not a problem needing consideration at this time.

IV. DESIGN CONSIDERATIONS

A. DESIGN CONCEPT

Higher education throughout the country is in a period of transition. In many ways, the glamour and financial support enjoyed during the 60's is lessening, and each college and university is having to become introspective, reconsidering and redefining its role in a dynamic and ever changing society.

What may be necessary for physical facilities today probably will be obsolete tomorrow. How can one see ten, twenty, forty or one hundred years into the future and determine what the facility needs of the academic program, the staff or research needs of the professors, or the demands of the surrounding neighborhood will be?

These circumstances place no easy burden on the proposed project of the new campus for College of Engineering. The need for new approaches, reliable information, and great flexibility becomes apparent.

The abiding purpose in the College of Engineering is to maintain a continuing capability to serve the best interests of students and the engineering profession. The students must be prepared to compete in a dynamic profession on an international basis. The design of the new engineering complex must therefore be such as to permit students and faculty to be sensitive to and responsive to the ever

changing demands of the profession and to re-evaluate and redirect the efforts accordingly.

In view of these objectives, a great deal of consideration was given to the nature of the engineering college as it relates to other institutions. Two concepts were adopted for the proposed project: First, to confront the requirements of flexible space, of a large number of mechanical services, of maximum span, and for economical reasons, the modular structure space frame system seems to be a logical solution; second, the concept of different types of space use--classrooms, offices, and laboratories--in a varying ratio, rather than segregating them in specialized buildings. This arrangement would expose the students to the many different departures in the engineering field and the various benefits of the institution. It would create an extremely desirable atmosphere conducive to "inter-action" of students, faculty, and administrators in their educational ventures.

B. THE SITE

The site selection was accomplished by the suggestions of the Assistant Dean of the College of Engineering, Dr. Cecil H. Best and with Mr. Vincent Cool, the Assistant Vice-president for Planning at Kansas State University.

Because of the complex circulation needs of the Engineering building, it was immediately apparent that the new College of Engineering should be located on the middle

part of the west section of the existing open campus. With 17th Street, Denison Avenue and College Heights Road bordering on the east, west, and south respectively, this proposed site is a square of approximately 7.2 acres of land. It is quite a flat piece of land with a few trees scattered along the east and south edges; it is being used as the football practice field. The university parking lots No. 6 and No. 24 lie on the north side of the site; and the Ahearn Field House on the southern end of the site. To the east of 17th Street there are the Seaton Hall and the Power Plant.

Some advantages of this site arrangement are listed as follows:

1. The proposed site is within ten minutes walking radius from the center of the campus, Farrell Library. It provides easy physical contact with campus activities.

2. The location is convenient to existing utilities, parking lots, university administration and to the Student Union.

3. The Nuclear Engineering Department at Ward Hall, is located approximately 400 feet from the center of the site, and can easily be used as part of the new Engineering complex.

However, the topography and the size of the site do limit the development and future expansion of buildings and open spaces for the College of Engineering.

Apparently, the advantages of the suggested site far outweigh the disadvantage which could, with careful planning in this proposed project, be minimized or totally eliminated.

V. ENVIRONMENTAL TECHNOLOGY

A. CLIMATOLOGY

Kansas is located at the geographical center of the continental United States. This location produces a climate with well defined seasons with rapid weather changes possible.

In general, the winters in Kansas have a great deal of sunshine and mild to cold temperatures. They are generally dry. Summers are sunny with warm to hot temperatures. Most of the annual precipitation falls during the period from May through September. The spring and fall weather is generally moderate.

Cold air masses move into the Manhattan area from a northwesterly direction during the winter while summer breezes are generally from the south to southeast with some winds from the south-southwest. Air pollution in Manhattan is practically non-existant.

The consideration of climatic conditions plays an important role in the proper design of site development and buildings. Climatic conditions for the Manhattan area have been summarized below.

1. Sun

a. Sunrise and sunset

day		MONTH March	June	Sept.	December
1	sunrise	6.59	5.01	5.54	7.28
	sunset	18.19	19.47	18.57	17.03
15	sunrise	6.39	4.59	6.06	7.38
	sunset	18.33	19.54	18.35	17.03

b. Monthly and annual heating degree day normals

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
1097	897	698	303	112	12	0	0	45	248	651	973	5013

c. Sunshine

Monthly percentage of possible sunshine	Jan.	50-60%	Recorded thru 1964
Monthly percentage of possible sunshine	July	70-80%	"
Mean annual % of possible sunshine		65%	"
Mean annual total hours of sunshine		2800-3000 hours	1931-1960

d. Monthly mean total hours of sunshine

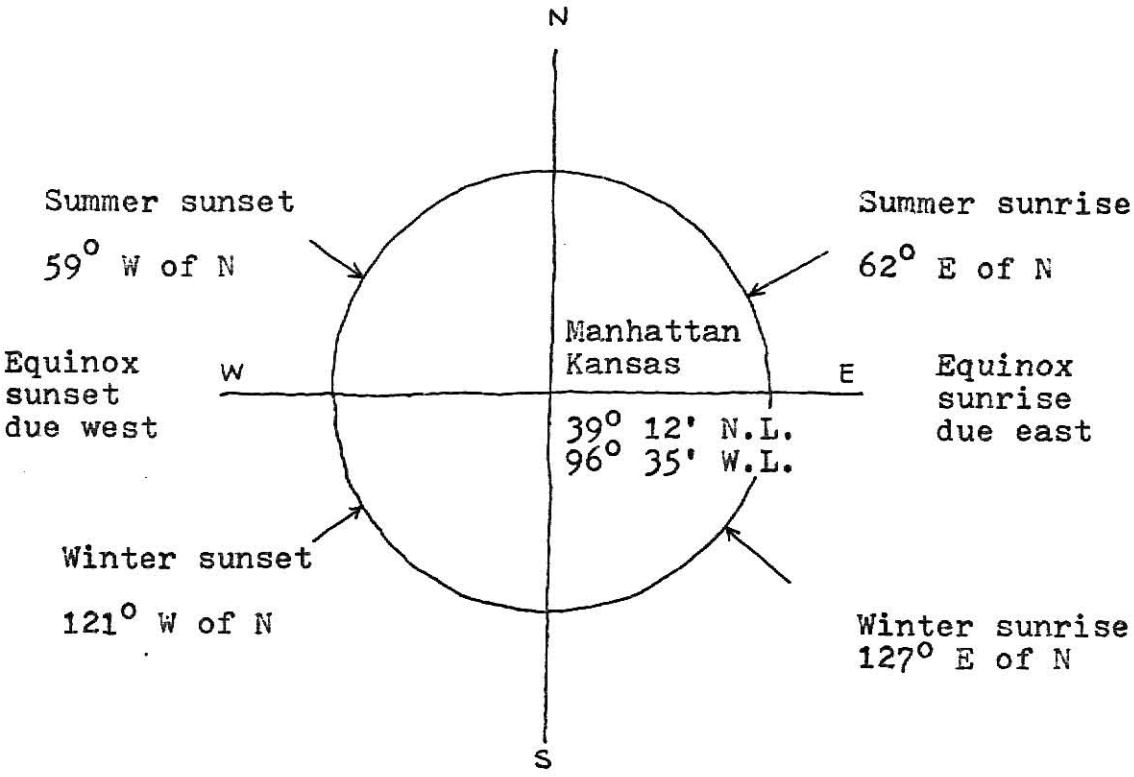
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
160-180	160-180	200-220	240-260	280-300	300-320	340-360	300-320	260-280	220-240	180-200	160-180

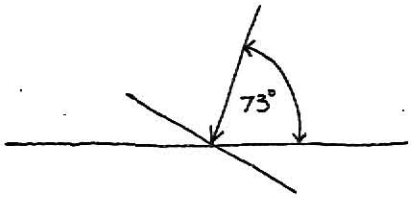
Data based on period, 1931-1960

THIS BOOK CONTAINS NUMEROUS PAGES WITH DIAGRAMS THAT ARE CROOKED COMPARED TO THE REST OF THE INFORMATION ON THE PAGE.

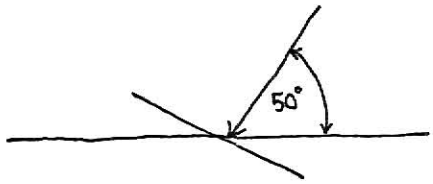
THIS IS AS RECEIVED FROM CUSTOMER.

e. Solar Angles

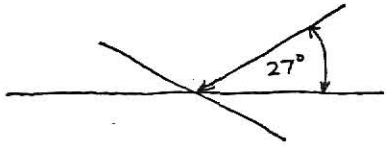




Altitude of Noon
Sun: June 22



Altitude of Noon
Sun at Equinox
March 21 and Sept. 23



Altitude of Noon
Sun: December 22

2. Prevailing winds

	years of record	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Concordia	61	N	N	S	S	S	S	S	S	S	S	S	S	S
Topeka	59	NW	N	N	S	S	S	S	S	S	S	S	S	S
Wichita	57	S	N	S	S	S	S	S	S	S	S	S	S	S

Based on records through 1945

3. Precipitation

a. Normal annual total precipitation (inches) 32" based on period, 1931-1960

b. Monthly mean total precipitation (inches)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
1.15	1.18	2.25	3.47	5.13	4.92	3.78	4.11	3.96	2.48	1.76	1.39	35.58

Data based on period, 1931-1955

c. Mean annual total snowfall (inches)

18"-24"

Data based on period of record through 1960

4. Temperature

Mean monthly temperature

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
29.6	33.8	42.5	55.3	65.0	75.4	80.7	79.7	70.6	59.1	43.3	33.6	55.7

Data based on period 1951-1960

5. Humidity

Mean monthly and annual relative humidity (%)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
70-80	60-70	60-70	60-70	60-70	60-70	60-70	60-70	60-70	60-70	60-70	70-80	60-70

20 years of record through 1959 (1:30, 7:30 A. M. and P. M.)

B. AIR CONDITIONING REQUIREMENTS

1. General Considerations

Heating and air-conditioning, as the terms imply, refer to the heating of a building and the treatment of air supplied and circulated through a ventilating system in order to clean the air and to control the temperature and humidity within the occupied space both in winter and summer.

In the designing of the new college of engineering, as in any application of heating and air-conditioning, the comfort and health of the occupants is a prime consideration. Proper temperatures and humidity levels should be maintained.

A mechanical ventilation system and fresh air supply in excess of normal design should be provided. In fact, the average school classroom, or laboratory often generates enough heat to make the room uncomfortable even though no heat is provided for the room. To avoid this problem of overheating, it is necessary to provide a controlled source of cooler air.

While natural window ventilation is the cheapest type to provide, it permits noise nuisance from adjacent areas and makes temperature, humidity, and dust control difficult.

Ventilating ducts, which are normally constructed of some form of sheet metal, are excellent sound transmitters. To reduce the transmission of sound from room to room the ducts should be lined with fireproof acoustical material or provided with baffles and slight bends, or combinations of

these methods in sufficient quantity to provide the desired absorption.

Some laboratory instruments are especially sensitive to changes in humidity and temperature, and suffer damage if the humidity is too high or too low, the recommended relative humidity for those area is 40-50 percent. The recommended dry bulb temperature range for comfort is from 68° to 72° Fahrenheit.

To satisfy the conditions outlined above, the new engineering complex should be equipped with a heating and air-conditioning system that will provide a constant uniform temperature, supply clean air composed of adequate fresh air, and recirculated air, and maintain the proper humidity in rooms. Various authorities have shown that proper ventilation, uniform temperatures, and humidity play an important part in health, learning and teaching abilities of the occupants of a building.

2. Application of air-conditioning system

The main air-conditioning system applied to this project is either a medium to high pressure dual duct air system, and/or low pressure multi-zone air units located in mechanical equipment areas in the basement of the new engineering complex.

The university power plant carries steam through the tunnel which is along the east boundary of the site. The

mechanical ducts first go through the tunnels to the sub-stations, then go up to different levels and come out into different areas. The returning air ducts which will be combined together with the outlet ducts take the same routes.

Each lecture hall, classroom, laboratory area, or office will be served by an individual terminal air mixing device to deliver the correct temperature of air supply to meet space requirements. Wintertime humidification will be provided in the central air handling units.

The cooling tower is installed in the ground away from the new engineering complex because of the noise problem and to promote architectural aesthetics.

C. LIGHTING

Lighting is related to architecture in two ways: Firstly, in the kind and quality of light produced and how this illuminates the space to express the character of the building. Secondly, in the design of lighting sources and in their integration with the architecture as design elements.

In this proposed project, the main light source will be fluorescent lamps. This light source has two main advantages: it can produce triple the output from a given wattage, and it more than triples the life of the lamp. In the lecture hall the wood baffles hanging from the ceiling are used to limit the view of the mechanics of the lighting system as well as to help control glare and thus become a factor in

visual comfort. Several projector lamps are used above the stage edge to give a broader, softer beam for the person on the stage.

The quality and quantity of light in a comfortable classroom and laboratory are dependent upon three factors: (1) Illumination level of the task, (2) Reflective pattern of the room, and (3) Brightness control of the light sources.

Illumination levels of school tasks have been the subject of extensive research. The American standard practice for school lighting recommends 30 foot candles as a minimum to be maintained in general classrooms.

The reflection pattern of the room influences lighting quantity and quality. Proper choice of colors and finishes within the reflectance range will produce an efficient, comfortable, balanced-brightness environment.

Brightness control of the light sources involves the shielding and optical control features of the windows and lighting equipment.

Exterior lighting is usually introduced to control the area lighting and to complement and enhance surrounding landscapes and architecture. In the daytime, the natural lighting--sun light--brings out the variety in the architectural structure by the contrast of brightness and shadow.

For the area lighting of the main plaza, service parking area, and sidewalks, the combination of the incandescent and mercury vapor lamps are suggested. Flood and spot lighting

are suggested for the illumination of the facades.

D. STRUCTURE

The rigidity and economy of three-dimensional space frame structure, which is the main structural system applied to this proposed project, have long been realized, but only during the last decade have they begun to come into widespread architectural use. In the age of standardization and prefabrication, the simplicity of manufacture, ease of transportation, and the speed of erection of the space frame structure is sufficient recommendation. Even more important, the ratio of weight to area covered can be greatly reduced through its use, and it allows the construction of long span structures with a far smaller number of intermediate supports.

The flat double-layer space grids consist of two-plane parallel grids that are connected by vertical and inclined "web" members in such a way that external loads are rapidly distributed omnidirectionally among numerous bars. Even under the pressures of a heavily concentrated load, members at a considerable distance share the load, so that the network exhibits a remarkably even stress distribution.

The space frame structure system of the new engineering complex is capable of accommodating a large amount of mechanical and electrical services, such as heating, cooling, ventilating and lighting, within the structural depth. The space between the top and bottom grids is ample for the installation and

maintenance of those facilities. This capacity is essential in buildings whose use requires a completely flexible space, unencumbered by structural or mechanical requirements. This is of special importance in engineering education in which the requirements of the profession may change over time.

E. LANDSCAPING

The use of plant materials in this proposed design has two main purposes: the first one is the creation of a natural environment around the structures, and barriers by the planting of trees and shrubs.

There are some good quality trees and shrubs along the south boundary of the proposed site. The trees planted along the pedestrain approaches to the south-east entrance and north-east entrance will give a very attractive and natural feeling to the people who are walking. The fountain in front of the south-east entrance will create an even more attractive visual point.

VI. MISCELLANEOUS CONSIDERATION

Building code and zoning requirement

The campus planning authority of Kansas State University in Manhattan, Kansas, follows the National Building Code whose regulations govern the construction, equipment, use and occupancy, location and maintenance, and the moving and demolition of existing buildings and structures.

This proposed project for a new College of Engineering for Kansas State University will also follow the requirements set forth in the National Building Code.

The proposed new college of engineering will occupy a part of the campus which has already been considered for this use. Therefore, it will not conflict with campus planning.

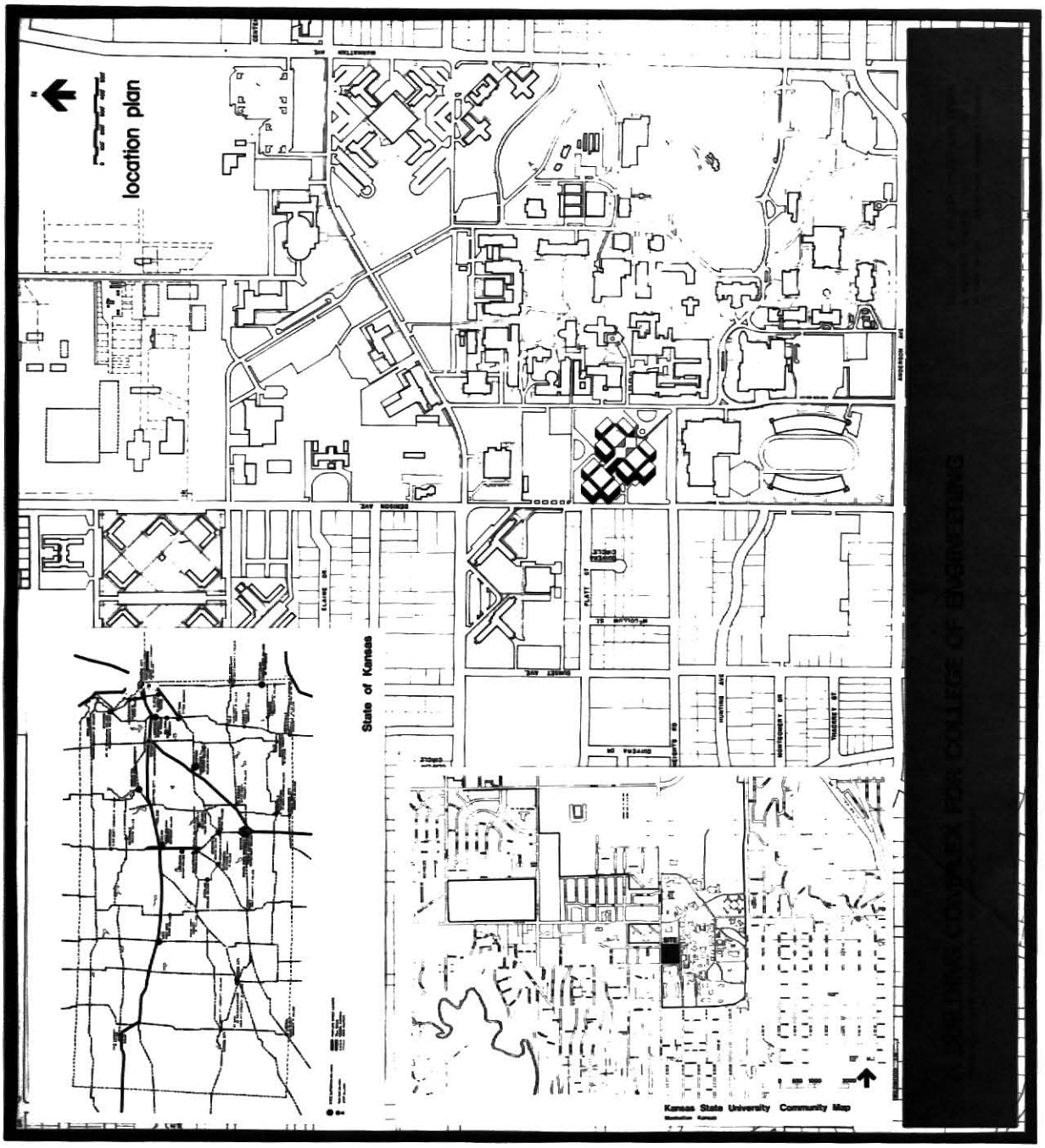
The structures of the new college of engineering must satisfy the conditions of the Building Code. These conditions include the fire-resistive construction type B. According to the fire resistive construction type B in Section 703 of the National Building Code, the main columns, floors, roofs, girders, trusses, and walls must have more than a 3-hour fire rating. Sections 401 and 402 of article IV regulates the height restrictions and floor area limits. In the Table 401 of Section 401, the fire-resistive type B has an 85 feet maximum roof height. But that requirement is no problem for this proposed engineering complex because the maximum roof height is 30 feet at the south-east entrance lobby. Also there is no

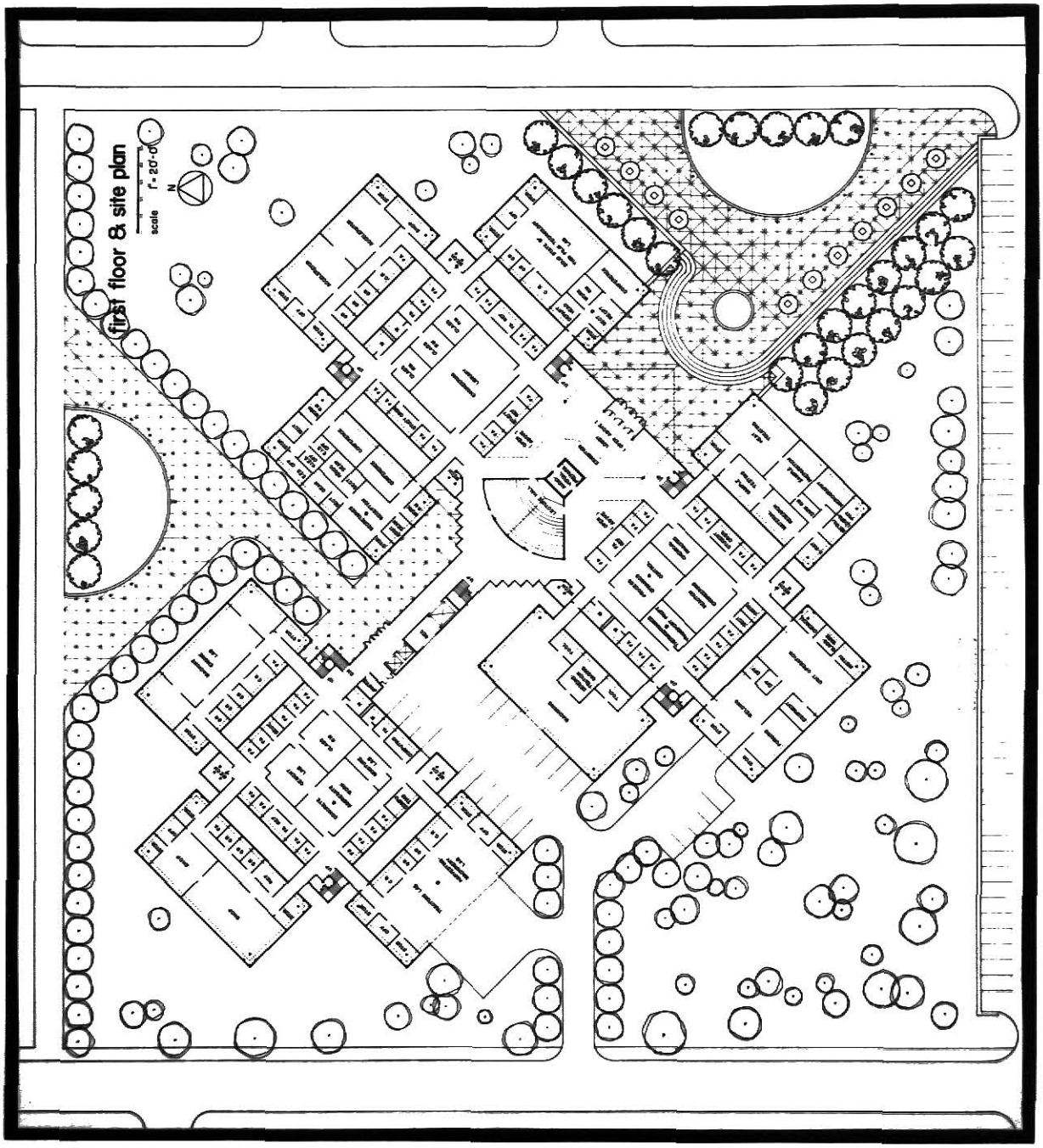
problem in floor area limits because the fire-resistive type B has no limit according to Table 402 of Section 402.

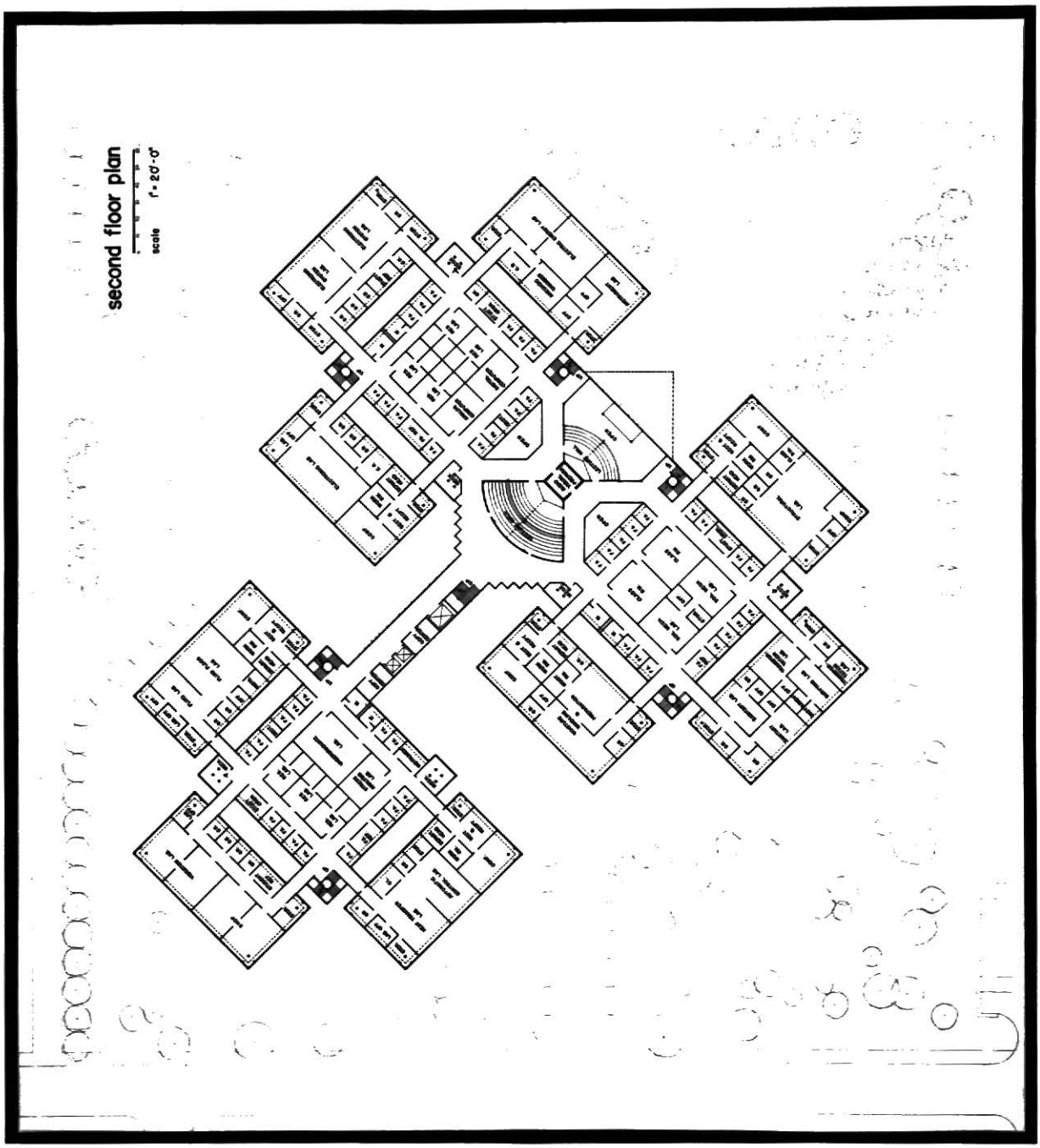
ARCHITECTURAL PRESENTATION

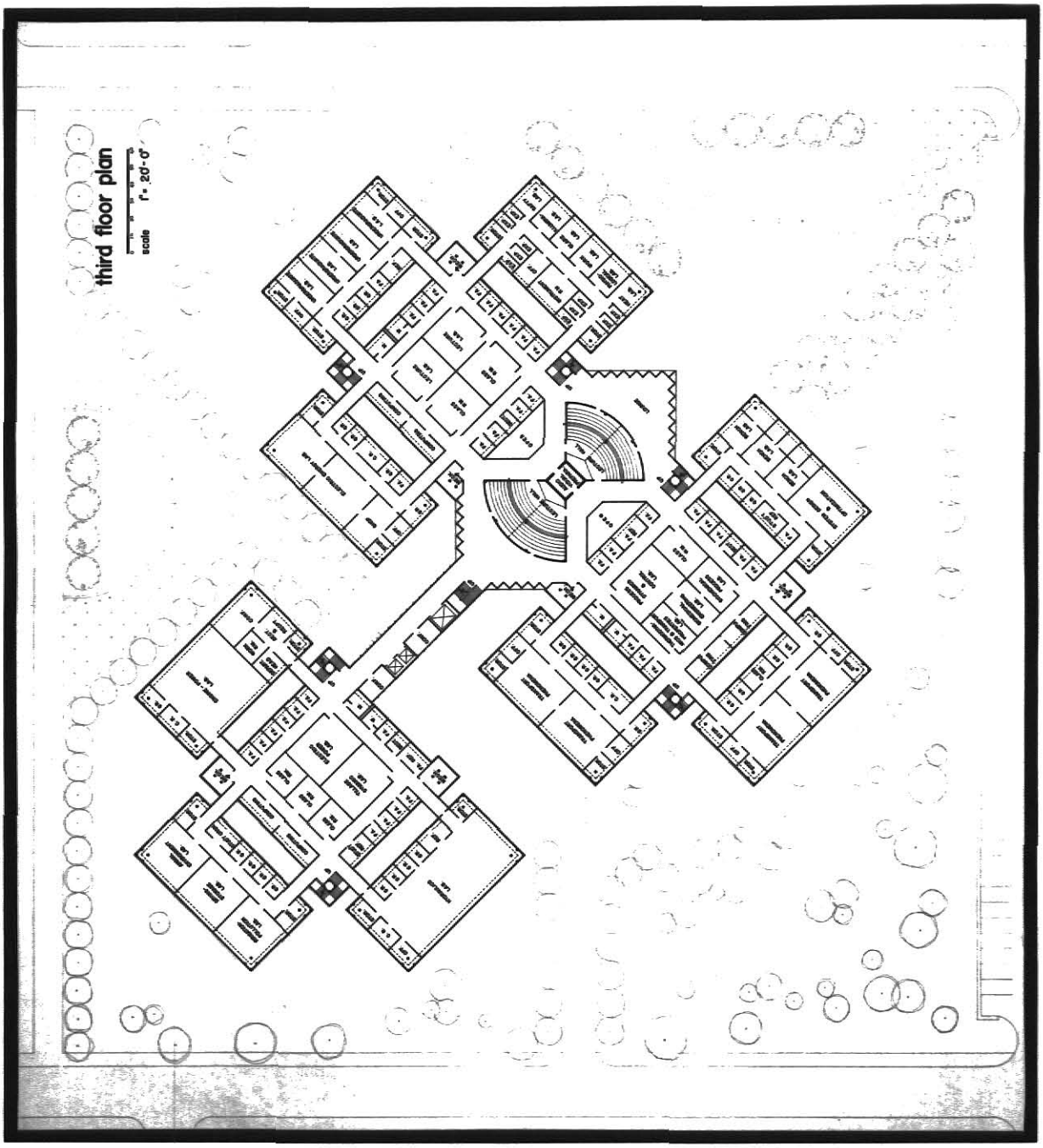
THIS BOOK CONTAINS SEVERAL DOCUMENTS THAT ARE OF POOR QUALITY DUE TO BEING A PHOTOCOPY OF A PHOTO.

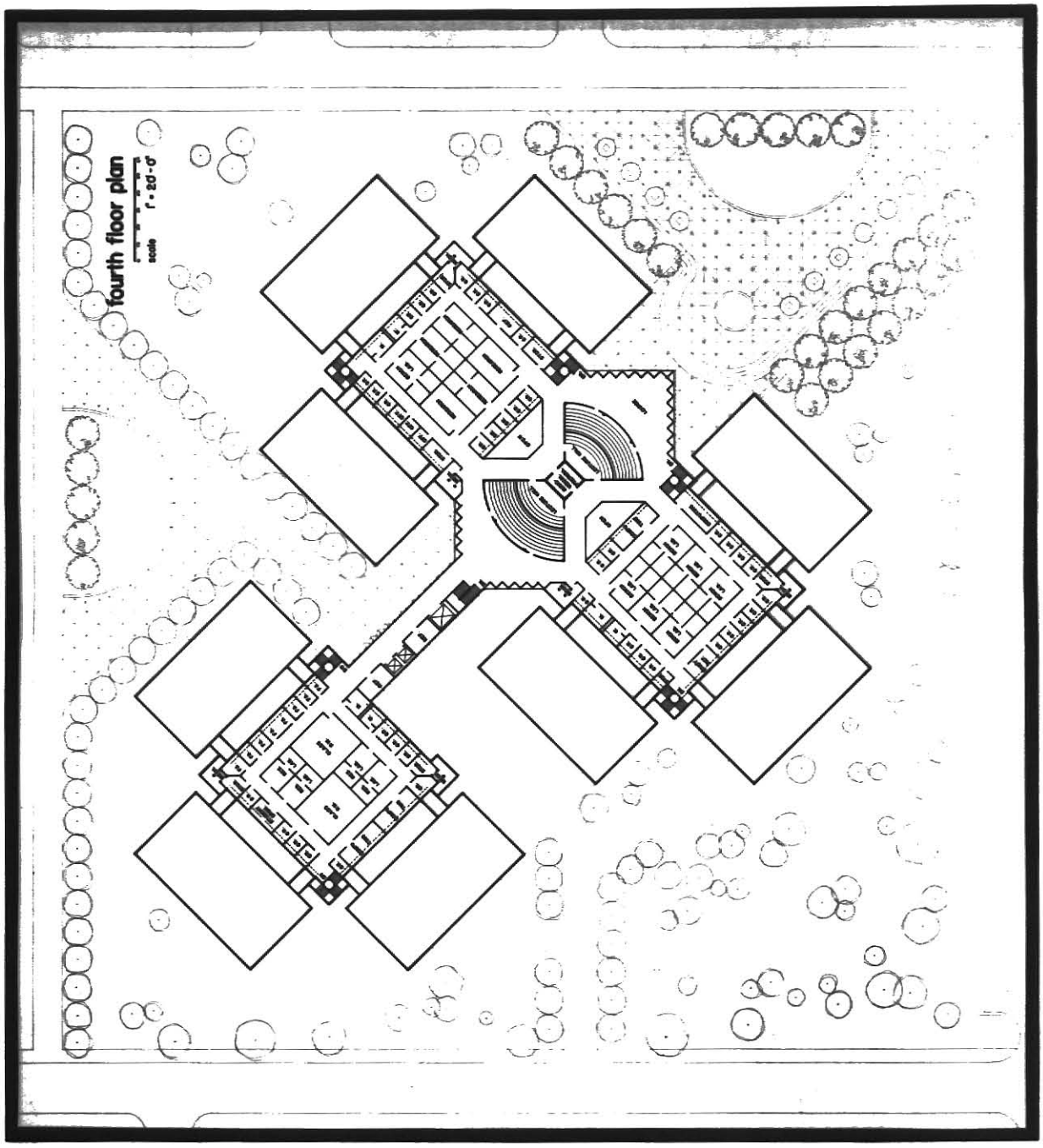
THIS IS AS RECEIVED FROM CUSTOMER.

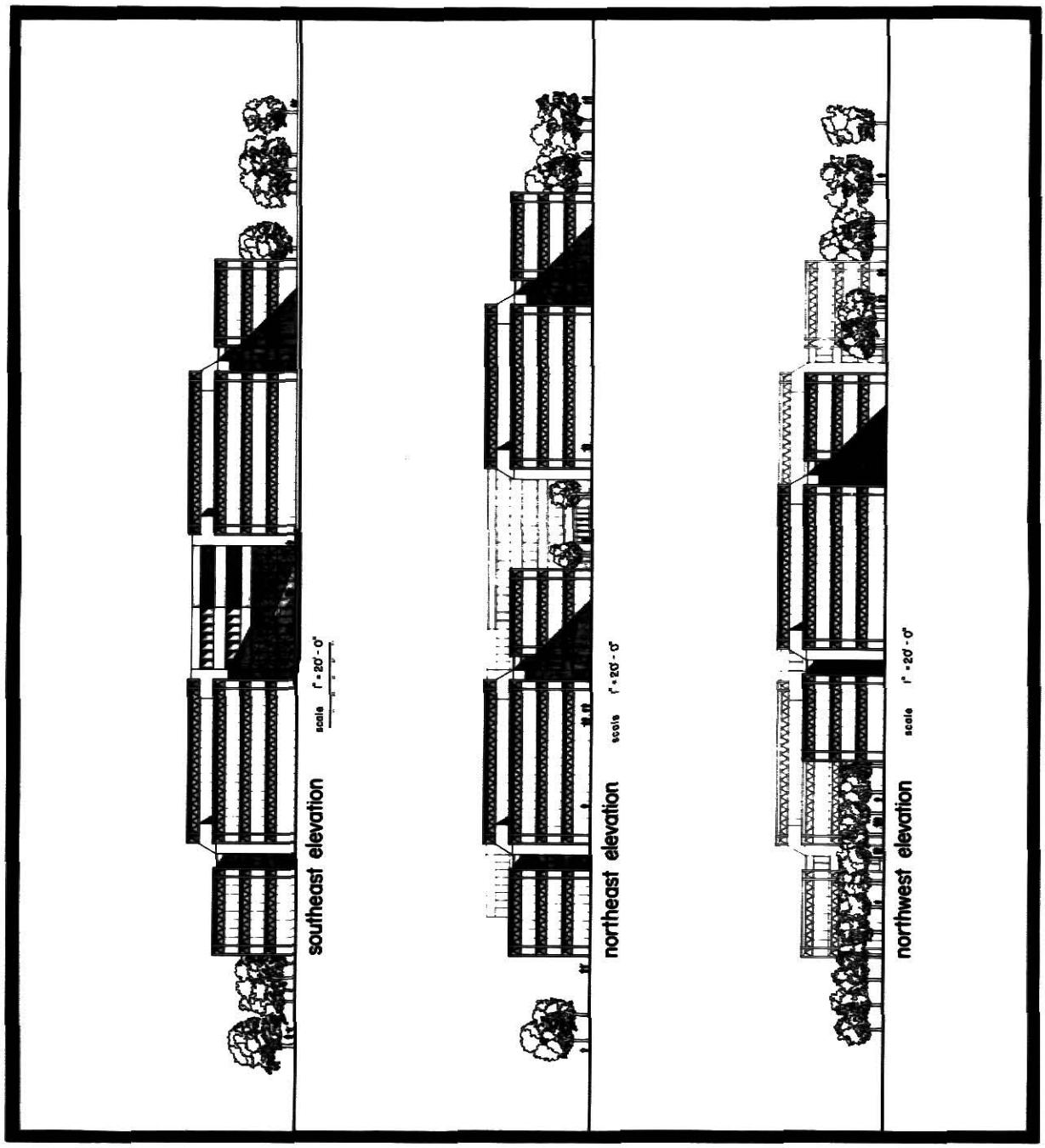

location plan
State of Kansas
Kansas State University Community Map

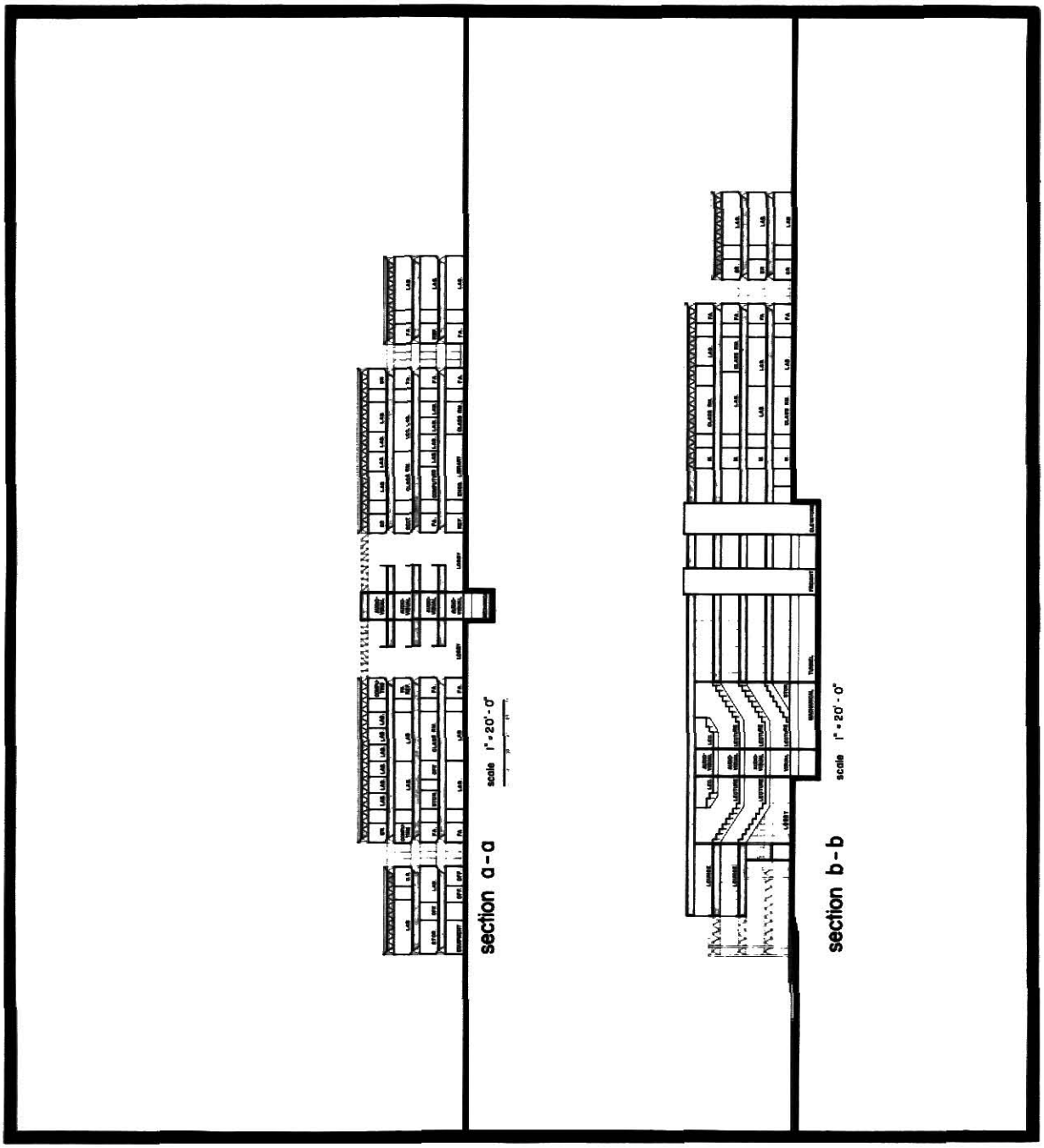

first floor & site plan
scale
N


second floor plan
scale 1"= 20'-0"

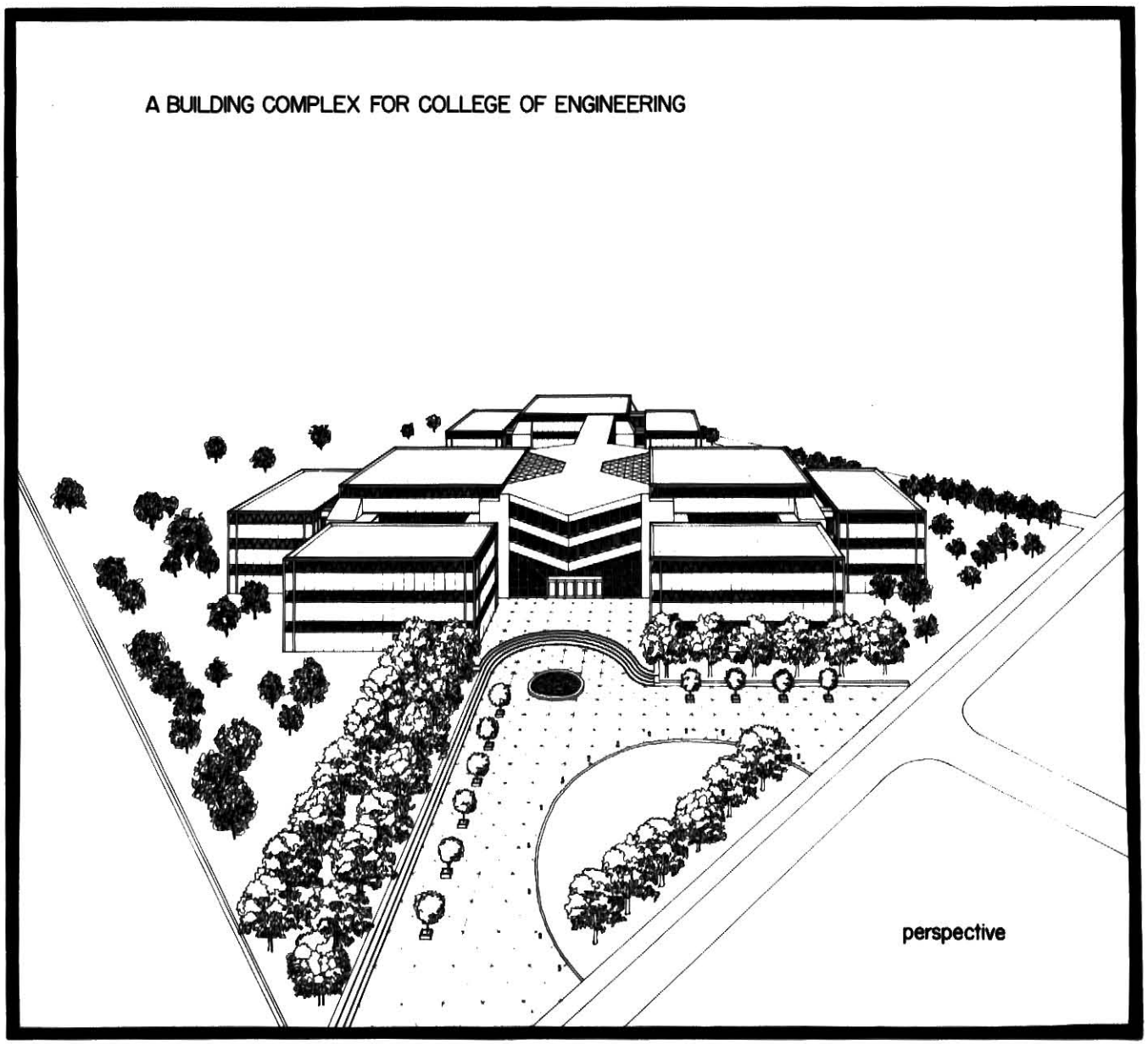

third floor plan
scale 1" = 20'-0"


fourth floor plan
scale 1" = 20'-0"


southeast elevation
scale 1" = 20' - 0"
northeast elevation
scale 1" = 20' - 0"
northwest elevation
scale 1" = 20' - 0"


section a-a
scale 1" = 20'-0"
section b-b
scale 1" = 20'-0"

A BUILDING COMPLEX FOR COLLEGE OF ENGINEERING



perspective

VII. CONCLUSION

This thesis is a study of the College of Engineering of Kansas State University. The proposed project is designed to solve the problems of the existing facilities and the increasing enrollment in this College and the changes in engineering education which have been discussed in the third chapter of this thesis. In order to provide an appropriate environment, for both faculty members and students, in which they will be teaching, learning, and spending a long time together as a family, the author has made an effort to understand and to analyze the nature, the structure, the development, and the possible trend in the future of the engineering field and its every need. This new campus for the College of Engineering should have not only a pleasing architecutre but also a well-treated environment.

ACKNOWLEDGEMENTS

The author wishes to take this opportunity to express his deepest appreciation and acknowledgements to his major advisor, Professor Theodore A. Chadwick of the Department of Architecture, for his helpful advice and efficient suggestions, and to the members of his committee, Professor I. Eugene Thorson of the Department of Construction Science, Professor Emil C. Fischer of the Department of Architecture, and Professor Robert P. Ealy of the Department of Landscape Architecture. The author also wishes to thank Mr. Vincent Cool, the Assistant Vice-President for University Planning, and Professor Cecil H. Best, the Associate Dean of College of Engineering, for their useful information and aids given to me during the preparation of this thesis.

BIBLIOGRAPHY

Bareither, Harlan D., University Space Planning, University of Illinois Press, 1968.

Borrege, John, Space Grid Structure, MIT, 1968.

Building for Research, F. W. Dodge Corporation, 1958.

Chemical Engineering Facilities Program, Department of Chemical Engineering, Kansas State University, 1970.

Cook, Peter, Architecture: Action and Plan, Reinhold Publishing Corporation, 1967.

Faculty Handbook, Kansas State University, 1970.

Industrial Engineering Facilities Program, Department of Industrial Engineering, Kansas State University, 1970.

Kansas: A Guide to the Sunflower State, New York, Hastings House, 1949.

Long Range Development Plan for Veterinary Medical Campus, Kansas State University, Office for University Planning and Capital Construction, 1969.

National Building Code, 1955.

Report of the Kansas State Board of Agriculture, Vol. 1 LXVII June 1948 No. 285, Climate of Kansas.

Willard, Julius Terrass, History of the Kansas State College of Agriculture and Applied Science, College Press, 1940.

A BUILDING COMPLEX FOR COLLEGE OF ENGINEERING AT KANSAS STATE UNIVERSITY

by

KUNG-WEI LIN

B. Arch., Chung Yuan Christian College
of Science and Engineering, 1966

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARCHITECTURE

Department of Architecture and Design

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1973

ABSTRACT

The purpose of this proposed new building complex for the College of Engineering is to provide an adequate academic space for students and faculty to meet the rapidly changing technology and new directions of the professions.

The building complex to house these requirements for its specific facilities was grouped in four areas and connected in a mega-form. The following facilities are basic elements on which this project will be based:

1. The Lecture Hall and Public Service Area.
2. The Departments of Chemical Engineering, Industrial Engineering and Civil Engineering Facilities Area.
3. The Central Administration, Library, and the Department of Electrical Engineering Facilities area.
4. The Departments of Mechanical Engineering, Applied Mechanics and Agricultural Engineering Facilities Area.

The site chosen is near the heart of the campus providing the engineering complex with easy access to parking, Student Union, main library for research and University administration. The power plant is directly across 17th street to the site.

In summary, the author has attempted to solve the complex problem of bringing together so many diverse requirements in one building complex. The needs of the College of Engineering, the relationship to existing buildings, the

landscape, the environment technology as well as the problems of the architecture itself, must be thoroughly considered and resolved in order to produce a satisfactory design.