CAMPUS PLAN PROGRESS REPORT NO. I Development Potential of the Core Campus

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May 1, 1965

PROJECT STAFF

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LANDSCAPE ARCHITECTURE . SITE PLANNING . ARCHITECTURE . PLANNING . 23 MAIN STREET WATERTOWN MASS 02172 . 1617-926 1160

May 1, 1965

Dr. Howard R. Bowen, President University of Iowa Iowa City, Iowa

Dear Dr. Bowen:

We are pleased to submit Campus Plan Progress Report No. 1, "Development Potential of the Core Campus." This report quantifies the physical implications of the expected University growth by testing rough estimates of building space and land needs against alternate teaching core development concepts.

The present teaching core with Old Capitol at the center does not contain sufficient buildable land to meet the probable future growth requirements for teaching functions. We have concluded that additional teaching space would best be developed in a five block area south of the Pentacrest bounded by Washington Street, Burlington Street, Clinton Street and the C. R. &I. C. railroad tracks. As you know, this land is included in the City-University urban renewal project which may greatly facilitate its acquisition and development by the University. Without question, Iowa City's renewal program will be of far-reaching benefit to both the University and the Community.

We wish to point out that the projections of building space contained in the report are very rough estimates made primarily to determine the overall order of magnitude of future needs. Assumptions regarding space standards and enrollment mix will require testing and refinement. The figures do not represent established policies either of the University or of the individual Colleges and Schools.

A sketch campus plan will soon be prepared, based on the preliminary findings and development concept of this report, plus the findings of Progress Report No. II, "Housing Program Accommodation Study."

Very truly yours,

Sasaki, Dawson, DeMay Associates, Inc.

John Adelberg

I. PHYSICAL RELATIONSHIPS AFFECTING DEVELOPMENT

Land Use and Circulation

The campus of the University of Iowa has developed on both sides of the Iowa River. The College of Medicine, Hospitals, Men's Dormitories, the School of Art and the Colleges of Law, Nursing, and Pharmacy comprise the West Campus. The College of Liberal Arts, the Graduate College, the Colleges of Business Administration and Engineering and Women's Dormitories form the East, or Main Campus. The Old Capitol and its adjacent buildings comprise both the symbolic and academic focal point of the Main Campus and the University.

The Main Campus is contained between the Iowa River on the north and west and downtown Iowa City on the east. The only possible areas for expansion lie to the northeast and to the south, although it is certainly problematical whether any large quantity of contiguous land could be assembled quickly. However, an urban renewal project, encompassing the Central Business District and the area immediately south of the Main Campus, will be undertaken by the City. Current plans are for the University to participate in the renewal process and acquire land within the project area. The added land would be of great benefit to the University while the City would receive credits toward it's share of project costs in an equal amount to University expenditures for land recently purchased near the project area.

The West Campus is bounded on the north and east by the Veterans' Hospital, U.S. Routes 6 and 218, Riverside Drive, and the river bluff. University land extends a considerable distance to the west but is bisected west of the stadium by the Rock Island Railroad. Single family residential development borders the University's southern edge. A number of non-University owned land parcels exist between Grand and Melrose and Melrose and Myrtle Avenues. The University would find it advantageous to consolidate the land holdings as soon as possible.

Three elements, the river, Riverside Drive and the west bluffs, physically separate the two campuses. By itself, the six to seven minute walk necessary to traverse these three elements is not an obstacle, but relative to a class change interval of ten minutes it is an effective barrier. On the other hand, the river provides the means to achieve the visual unification of the two campuses. Incorporated as an element in an overall plan, the river can become a focal point by developing the banks and by relating buildings and open spaces to the water. One impediment to the proper development of the river area is the presence of the C.R. & I.C. R.R. which crosses the campus, partially on railroad right-of-way and partially on University property. The tracks, especially the elevated portions, are visually incompatible with the rest of the campus. Aside from the aesthetic consideration, there is the practical consideration of dirt, noise and vibration which accompanies the operation of trains. As new development occurs adjacent to the tracks, the objectionable features of the railroad will have a greater effect on the University.

The Iowa City Comprehensive City Plan has called for the removal of the rail line¹ from the University area. Adoption of gas-fired equipment for the Power Plant, as recommended by the University's Consulting Engineer, ² would lessen the University's need for the rail line and constitute the first step toward its de-emphasis. On the other hand, continued use of coal will increase railroad traffic.

Circulation planning on the East Campus must deal with two problems. The first is an inadequate number of bridges over the Iowa River. Second, is the number of conflicting points of pedestrian and vehicular flow. The University has an interest in the location and number of bridges since 40% of the 1954 bridge traffic was generated by the University. By comparison, the second largest generator, the Central Business District, accounted for 25% of the total traffic. On the West Campus, existing internal circulation problems will intensify with the growth of the University and the development of the western portion of Iowa City and of Coralville. The medical complex and sports facilities are accessible to the regional highway network, but it would be desirable to remove through traffic from Newton Road to facilitate hospital access and reduce congestion. Another serious problem is traffic flow at the Burlington Street Bridge in relation to business district access and the concentrated traffic generated by athletic events.

¹Comprehensive City Plan, Iowa City, Iowa, prepared for the City Planning and Zoning Commission, February 1961, Harland Bartholomew & Associates.

²Heat and Power Requirements, 1964-1965. Sargent and Lundy, Consulting Engineers.

In summary, although the University has a large land reserve in its western extension, the use of the reserve is limited because of distance from the campus core. The existence of a strong center on the banks of the river makes for continued pressure for expansion of academic and dormitory uses close by, where land, however, is at a premium. It appears inevitable, therefore, that the University will eventually have to grow into the areas east of the Women's Dormitories and south of the College of Engineering, around the physical plant area. On the west bank, the same pressures for concentric growth implies the future development of land along the river from Park Road on the north to Myrtle Avenue on the south for academic and dormitory uses. The outlying western areas are best allocated to lower density, non-teaching uses such as married student housing and University support facilities. The decentralization of large numbers of married students, faculty and staff housing will place severe demands for parking on the Main Campus area. Alternative modes of transportation to move students between housing and teaching areas require investigation if the University is to avoid enormous expenditures for the construction of parking facilities.



DEVELOPMENT CONSTRAINTS



UNIVERSITY BUILDINGS AND LAND

NON-UNIVERSITY USES

MAJOR SLOPES

WANNAM

. HEAVY TRAFFIC

STATE UNIVERSITY of IOWA Iowa City Iowa

CALE IN PEET



SASAKI DAWSON DEMAY ASSOCIATES INC ANDREAM ARCHITECTURE ANNUM ARCHITECTURE PLANNING 23 MAIN STREET WATERTOWN HASSACHUSETTS OF 78



GENERAL FUNCTIONAL AREAS



GROUPINGS OF SIMILAR ACTIVITIES

WALKING DISTANCE DETERMINED BY ALTERNATE CLASS CHANGE INTERVAL

STATE UNIVERSITY of IOWA Iowa City Iowa

400



SASAKI. DAWSON DEMAY ASEOCIATES INC LANDEAGE AND TETLING BIE PLANNING AND TETLIS PLANNING 23 MAIN STREET WATRETOWN NASEACHUSETTS 02178

II. PRELIMINARY ESTIMATES OF BUILDING SPACE AND LAND NEEDS

In order to quantify the impact of the University's physical expansion, rough projections of building space requirements were made and then translated into total land requirements. Various untested assumptions concerning enrollment mix, teaching loads (Full-time Equivalent), space standards, and so forth, were made while interpreting this material. As firm policies regarding these factors are formulated by the faculty and administration these projections must be refined and made more accurate to provide a consistent and thorough basis for preparing new building programs and capital outlay requests.

A. Building Space Requirements

Population

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The estimates of space requirements are based on a population model of 30,000 students. The enrollment mix by College is derived from a 24,000 student enrollment model prepared by the Division of Student Services in November 1964 while the overall undergraduate-gradutate enrollment is based on the latest enrollment assumptions being used by the University. The models for 24,000 and 30,000 students and the current enrollments are compared in Appendix Table A-1.

Academic Building Space

The procedure for determining the space demand at the 30,000 student enrollment level is outlined below. Since the University currently does not tabulate Full-Time Equivalent enrollment it was necessary to assume that the 30,000 student enrollment model, grouped by department, represented Full-Time Equivalent (F. T. E.) enrollments (i. e., departmental teaching load). However, this is not likely to be true in all cases and, as such, is one of a number of assumptions requiring that the preciseness of these projections be strongly qualified.

The first step was to translate enrollment projections into building space quantities. Space standards which have proved valid at institutions similar to the University of Iowa were used to calculate the total amount of floor area for teaching, laboratory, research and office space required for an enrollment of 30,000 students. Space for supporting facilities was estimated similarly. The total amount of space required to accommodate 30,000 students is expressed in square feet per student. These projections are tabulated in Appendix Tables A-2, A-3 and A-4.

It was then assumed that existing and under-construction space at the University would be sufficient to accommodate an enrollment of 15,000 students under present standards of utilization and efficiency. The next step was to calculate the space required for an additional 15,000 students by using the square feet per student indices derived from the 30,000 student model. The results of these calculations are listed in Table 1.

TABLE 1

BUILDING SPACE NEEDS FOR AN ADDITIONAL 15,000 STUDENTS

Use	Gross Square Feet Per Student ¹	Additional Gross Square Feet
Classrooms and Teaching Labs	75	1.125.000
Research Space and Offices for Faculty		-, ,
and Administration	33	495,000
Supporting Facilities	87	1,305,000
TOTAL		2,925,000

¹See Summary in Appendix Tables A-2, A-3 and A-4.

Parking

During the fall of 1964, 5,500 persons were issued reserved or restricted parking permits. Assuming that the parking demand is a function of the enrollment and would retain the same proportion in the future as existed this past fall, then 11,400 persons would be issued permits when the University enrolls 30,000 students. Secondly, it was assumed that about 70% of the persons with permits will park during the same hour. Therefore, approximately 8,000 spaces should be available at any one time. Related to enrollments, 70% of the spaces should be available on the East Campus while the remaining 30% should be located on the West Campus.

In addition to the 8,000 spaces for faculty, staff and commuting students, there will be a parking requirement for visitors, especially to the medical area, and dormitory residence storage parking. For the purposes of an initial estimate a requirement of 800 visitors' parking spaces is assumed (300 normal University and 500 hospital visitors) while 2,760 storage spaces are allotted for single student residents, or about 30% of future dormitory capacity.

Table 2 gives the land requirements for the different categories of parking based on a standard of 110 spaces/acre which allows for a minimum of landscaping. Accurate inventories and estimates of supply and demand must be made in subsequent phases of planning.

TABLE 2

PARKING REQUIRED AT THE 30,000 ENROLLMENT LEVEL

Category	Peak Demand (In Spaces)	Area Required (In Acres)
Faculty, Staff, and Commuters		
East Campus	5,600	51.0
West Campus	2,400	22.0
Visitors	300 ¹	2.5
Hospital Visitors	600 ²	4.5
Student Storage	5,100 ³	46.5

 $\frac{1}{2}1\%$ of enrollment.

²0.5 visitors' space per hospital bed. 30% of single resident students.

Playfields

A survey of Big Ten Universities was conducted in 1958-1959 and a report entitled "Sports and Physical Play Areas" was published. In this survey, the University of Iowa estimated that 96.4 square feet per student would be required in the future for outdoor teaching stations. This space standard includes an allocation for general outdoor sodded areas (e.g., soccer, touch football, softball, etc.) and court type areas (e.g., tennis, volleyball, handball, etc.) but excludes athletic areas used only for one type of activity (e.g., track and field, archery, golf, varsity football and baseball, etc.) and space reserved solely for intramural or general outdoor recreation areas. With proper scheduling the areas provided for outdoor teaching stations can also serve for the latter two activities.

Assuming that these playfield requirements are generated predominantly by the undergraduate student body this space standard was applied to the 15,000 undergraduate student enrollment, resulting in a space requirement of approximately 1,500,000 square feet, or 35 acres for outdoor teaching stations. At present, approximately 18 acres are developed as outdoor teaching stations.

B. Total Land Requirements

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Land requirements for the various categories of additional building space are summarized in Table 3A. The amount of ground area occupied by buildings was determined by assuming an average number of floors for each category of space. The amount of land required to give light, air and landscaped open space was determined by assuming a land coverage ratio (ground floor area/total site area). Two alternative assumptions are illustrated: a 40% land coverage and a 30% land coverage. For comparison, the land coverage of the Old Capitol complex is 18%, Burge Hall covers 50% of its property while Calvin Hall, Dentistry, Parking Ramp and the Women's Gym cover 67% of the block they occupy.

Street right-of-ways were not included when calculating land coverage. Street closures where possible would increase the amount of land available for open space and reduce the land coverage for any given building complex.

It has been assumed that classroom and teaching laboratory space normally would occupy the first four floors of new structures, the ground floor being half a level below grade. Research space and faculty, administrative and departmental offices would occupy an average of two floors above the classrooms and teaching laboratories. The space for additional supporting facilities would occupy structures averaging four stories.

The playfield and parking land requirements are summarized in Table 3B.

The land required for faculty, staff, commuting students and visitor parking has been calculated for surface lots as well as two, three and four level structures. Land requirements for hospital visitor parking has been calculated for surface lots and two level structures.

TABLE 3A

LAND REQUIRED TO ACCOMMODATE BUILDING SPACE FOR ADDITIONAL 15,000 STUDENTS

	Total Gross Area	Developed in Structures	Land Covered by Buildings	Land Required at a Cove	for Development rage of:		
Function	Required	With	or Facilities	30%	40%		
Classrooms & Teaching Labs	1,125,000 sf	4 floors	281,250 sf. or 6.5 ac.	21.7 ac.	16.2 ac.		
Research Space & Offices for Faculty & Admin.	495,000 sf	2 floors	247,250 sf. or 5.7 ac.	(Assumed to be point of the classrooms and	placed above teaching labs)		
Supporting Facilities	1,305,000 sf	4 floors	326,250 sf. or 7.5 ac.	25.0 ac.	18.8 ac.		
Housing	(See Campus Plan Progress Report No. 11)						

TABLE 3B

LAND REQUIRED FOR PARKING AND PLAYFIELDS FOR 30,000 STUDENTS

Parking

Faculty, Staff,		(surface	75.0 ac.
Commuters &	75.0 ac.	(2 levels	37.5 ac.
Visitors		(3 levels	25.0 ac.
		(4 levels	18.7 ac.
Hospital Visitors	4.5 ac.	(surface	4.5 ac.
		(2 levels	2.2 ac.
Student Storage	46.5 ac.	surface	46.5 ac.
Playfields	35.0 ac.		35.0 ac.

III. DEVELOPMENT POTENTIAL OF TEACHING CORE

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The estimated land area required for academic functions has been compared to the amount of land potentially available within a core delineated by the ten and fifteen minute class change interval. Potentially available land includes unbuilt University property and property which the University may be able to acquire.

Two possible developments have been tested. Alternate A assumes that the teaching core will remain in its present location. Alternate B explores the consequences of shifting the teaching core to the south. Both alternatives assume that the Old Armory, Electrical Engineering Building and Close Hall (Printing Service) could eventually be replaced.

A. Core Campus Expansion - Alternate A

In Alternate A the teaching core, as defined by a ten minute class change interval, is located to intercept the majority of buildings containing general assignment classrooms (See Figure 3). Controlling buildings are the under-construction English classroom building, the new Business Administration Building, the Chemistry-Botany Building and the Communications Building. The area thus defined contains approximately 13 acres of potential building sites. The University presently owns 9 of the 13 acres. However, the University will need slightly more than 16 acres of land for future classrooms and teaching laboratories even if development is executed at 40% land coverage.

The Alternate A land shortage could be partially alleviated by converting non-teaching space, presently located in the academic core, to classroom use. For example, the administrative space in University and Gilmore Halls could be transferred to a new administration building adjacent to the academic core. Space vacated by Archeology in McBride. Hall and the College of Dentistry Building could be modified for use as classrooms due to their central location under Alternate A.

Another method of adding land for teaching needs would be to extend the class change interval to 15 minutes. This would not only add an additional 44.6 acres to the potential size of the teaching core but would enable the Fine Arts Center to be within the academic core as shown in Figure 3. Of the 44.6 additional acres, 18.8 acres are now owned by the University. Sufficient land is also available within the 15 minute zone for projected support facility needs.

B. Core Campus Expansion - Alternate B

The teaching core is again defined by a ten minute class change interval, however, the circle has been shifted southward so that the northern limit no longer intercepts the Chemistry-Botany Building (See Figure 4). Burlington Street, a major traffic carrier, was selected as the logical southern limit of their teaching core. Business Administration and the new English building continue to be intercepted by the ten minute circle.

The teaching core is shifted to the south, primarily to capitalize on the probable availability of urban renewal land. The teaching core in Alternate B contains 23.5 acres of potentially developable land, which is more than enough to accommodate the future building construction at the lower 30% coverage figure. Further, the contiguous land parcels in the urban renewal area lend themselves to an integrated development of buildings and open space. Conversions of non-academic space within the core as described under Alternate A is still feasible and also desirable. However, the College of Dentistry Building might best be used as an office building and/or supporting facility rather than for classroom use as proposed under Alternate A.

The Fine Arts Center continues to lie outside the ten minute class change interval. An academic core based on a fifteen minute interval would probably overcome this problem and would include the Chemistry-Botany Building. Land within a fifteen minute interval incorporates an additional 29.8 acres, with 12.3 acres of the property already in University ownership and 9.5 acres in the urban renewal area.

C. Synthesis and Conclusions

Insufficient developable land is the fundamental liability of Alternate A. The shortage will remain even if it were possible to convert some existing buildings from non-academic to academic uses. It is technically possible to construct all future academic buildings on available land, however, a high density level would have to be established and maintained. Functionally, the development would be less than satisfactory since vertical movements of large numbers of students within the class change interval is difficult. Aesthetically, the small or medium size noncontiguous parcels lend themselves to the construction of single buildings covering large portions of the site. Some parcels are such that 75% coverage would yield floor areas too small for efficient development. The location of the classroom core under Alternate A places pressure on the area north of Old Capitol and the Student Union. Available land in this area is already limited.

Alternate B places the Pentacrest slightly off-center in the classroom core, resulting in a concentration of developable land immediately to the south. The total land area available within this core allows for further academic expansion, the introduction of non-academic use, and permits varied development intensities. The available land parcels are adjacent to one another, which will increase the design potential by encouraging planning of integrated building complexes. The assembly of land in a single unit also permits a comprehensive approach to traffic circulation.

Shifting of the core toward the south lessens the land demands north of Old Capitol and may permit the introduction of open space or sports areas around the dorms. At the same time, usefulness of land south of Burlington Street is improved. If land south of Burlington Street were acquired by the University, the existing homes, after rehabilitation, could be used for low rent student housing until the property was needed for new construction.

The southern shift, relative to Alternate A, theoretically places the Chemistry-Botany Building outside the classroom core, and increases the distance from the Fine Arts Center. Adjustments in the scheduling of laboratory periods could probably overcome any difficulty. Similar adjustments would be required to overcome the separation of the Fine Arts Center.

Both alternates recognize the continued existence and expansion of the Science Research area east of the teaching core. It is probable that some portions of the projected space for teaching laboratories and faculty research space will be located here, but general assignment classrooms in this area would be outside the ten minute class change interval under either assumption. If further expansion of this area is necessary, then the only discernable direction for this growth would be to the north across Jefferson Street.

Alternate B, the southern expansion concept, appears to offer the greatest development potential, both functionally and aesthetically. The feasibility of its implementation, of course, is dependent on the urban renewal process to make the land available.

Even if the University expands the class change interval to fifteen minutes, Alternative B remains more advantageous because of the freer land situation to the south. The impact of an increased class change interval on available instructional time and room utilization would have to be carefully evaluated by the University prior to such a step.

While this evaluation has dealt only with the concept of a single academic core, other forms of development are possible. A 1964 report of the Campus Planning Committee on selected campus facility needs proposed the eventual development of a lower division complex, combining dormitory and classroom functions on the West Campus in the Grand Avenue - Melrose Avenue area. To function properly such a complex should be quite self-contained for the students it serves so that long and frequent trips to the Main Campus for additional classes and other activities are eliminated. Such a development could become a necessity if expansion areas did not become available on the East Campus or if the University should eventually grow beyond the 30,000 student enrollment.



LAND WITHIN TEN MINUTE INTERVAL WITHOUT

ADDITIONAL LAND WITHIN FIFTEEN MINUTE

INTERVAL WITHOUT PERMANENT UNIVERSITY

DEVELOPMENT

CENTRAL BUSINESS DISTRICT

AREA

BOUNDARY OF PROPOSED URBAN RENEWAL

SASAKI. DAWSON, DEMAY ASSOCIATES, INC. LANDECAPE ARCHITECTURE SITE PLANNING ARCHITECTURE PLANNING 23 MAIN STREET WATERTOWN MASSACHUSETTS 02172

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> WALKING DISTANCE DETERMINED BY CLASS CHANGE INTERVAL

PERMANENT UNIVERSITY DEVELOPMENT

LAND AREA IN ACRES

0.0 LAND WITHIN TEN MINUTE INTERVAL WITHOUT

CENTRAL BUSINESS DISTRICT

BOUNDARY OF PROPOSED URBAN RENEWAL AREA

STATE UNIVERSITY of IOWA Iowa City Iowa

SCALE IN FEET

ADDITIONAL LAND WITHIN FIFTEEN MINUTE INTERVAL WITHOUT PERMANENT UNIVERSITY DEVELOPMENT

SASAKI, DAWSON, DEMAY ASSOCIATES INC. E SITE PLANE 23 MAIN STREET WATERTOWN. MASSACHUSETTS 08172

IV. ACCOMMODATION OF OTHER FUNCTIONS

A. Land Allocation for Supporting Facilities

The location of supporting facilities will vary according to specific requirements. Certain supporting facilities such as library expansion or student union expansion may require location within the teaching core under both alternates; but, in general, supporting functions can be accommodated adequately in areas dictated by their locational requirements. There appears to be sufficient land in secondary zones of the campus to accomplish this. Further planning will be required to focus on individual program needs and locations.

B. Land Allocation for Parking

The preliminary estimate of parking requirements suggest that radical changes may be necessary in University policies regarding the use of automobiles. Even allowing for some possible reductions in the demand levels through more precise inventories and analyses of parking requirements, there will be a very serious problem. The estimated faculty staff and commuter peak parking demand of 8,000 spaces would require something like 56 acres of surface parking lots on the East Campus and 19 acres of surface parking lots on the West Campus. Parking structures reduce the land area requirements as indicated in Table ³B; however, even if the parking requirement for the East Campus were housed entirely in four level structures, they would occupy 14 acres of land, or about 31/2 city blocks. As a "guesstimate," curb parking might reduce the overall requirement by 20%. In addition, hospital visitor parking would occupy 4.5 acres and storage parking areas for student cars would require 46.5 acres.

This preliminary study makes no attempt to allocate possible areas to accommodate the parking land requirements. Further analysis is required to develop precise estimates of demand, as well as to investigate possible means of scaling down the level of demand.

C. Land Allocation for Playfields

The land requirement of 35 acres in playfield space represents an increase of about 20 acres over existing areas. By expanding the existing playfield area west and north of the stadium, plus developing the riverfront for informal recreation areas, the additional playfield needs probably can be accommodated.

In addition to outdoor field space, the University expects to construct major indoor facilities for men and women students. Space needs for these facilities are included as part of the overall estimates of space and land for supporting functions. These facilities would probably be located adjacent to major dormitory concentrations.

D. Land Allocation for Dormitories

A more detailed review of the University's housing program is forthcoming as a separate report. In the meantime, an identification of possible housing areas can be made in light of existing conditions and the previous assumptions regarding the academic core.

The river, varied topography, and the relation to the proposed Fine Arts complex makes the land north of the University Theater suitable for dormitory development. Housing in this location would benefit the Fine Arts development by increasing student movement across the river and through the complex.

The area south of the core would provide another desirable dormitory site. The river and the relation to the Library and the Central Business District provide a unique set of amenities. The southern location would border on the teaching core making this area highly convenient for students. High priority ought to be placed on acquisition of this land.

The area south of the existing men's dormitory complex on the West Campus is a third logical dormitory location. The proposed Melrose Avenue dormitory is a first step in this development. Under Core Concept "B," this area would be well positioned in relationship to academic development across the river.

The fourth major housing area would be the expansion to the east of the present women's dormitory area. This area is not now owned by the University and its acquisition will be a long-range process. This area could provide housing for single graduate students closed to the Science Research Area.

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APPENDIX

COMPARISON OF ENROLLMENT MODELS

	24, 000 Model ¹	30,000 Model ² (used for space projections	Existing Enrollment Fall 1964	Gain ³
Undergraduates				
Liberal Arts	13,640 (57.0)	12,845 (43.0)	8,111 (56.0)	4,734
Business Admin.	625 (2.5)	625 (2.0)	47.8 (3.3)	147
Engineering	750 (3.0)	750 (2.5)	567 (3.9)	183
Nursing	530 (2.0)	530 (1.5)	428 (3,0)	102
Pharmacy	250 (1.0)	250 (1.0)	185 (1.3)	65
Subtotal	15,795 (66.0)	15,000 (50.0)	9,769 (67.5)	5, 231
Professional and Graduate Colleges				
Graduate	6,700 (28.0)	13, 395 (44. 5)	3, 332 (23. 0)	10,063
Dentistry	265 (1.0)	265 (1.0)	248 (1.7)	17
Law	550 (2.0)	650 (2.0)	437 (3.0)	2 13
Medical	690 (3.0)	690 (2.5)	692 (4.8)	-2
Subtotal	8,205 (34.0)	15,000 (50.0)	4,709 (32.5)	10, 291
GRAND TOTAL	24,000 (100)	30,000 (100)	14, 478 (100)	15, 522

¹Projected for achievement by 1972 by Division of Student Services, November 1964. ²Projected for achievement by 1985, Gain in enrollment of 30,000 Model over Existing Enrollment.

GROSS SPACE REQUIRED FOR CLASSROOMS, TEACHING LABORATORIES AND GRADUATE RESEARCH

Enrollment Model - 30,000 Students

	Enroll- ment by Majors	Space Standards in sq.ft./ Student ¹	Usable Space in Net sq.ft.	Total Net sq.ft. (incl. 10% Aux. Space)	Gross sq. ft. (1.5X Net sq.ft.)
Undergraduates					
Liberal Arts (12 845)					
Science $(14, 0)$	1 800	45	81 000	89 100	133,650
Fine Arts $(12, 0)$	1,540	70	107,800	118,580	177.870
Others (74.0)	9,505	15	142.575	156.832	235,250
Business Admin.	625	13	8,125	8,937	13,400
Engineering	750	85	63,750	70,125	105,190
Nursing	530	60	31,800	34, 980	52,470
Pharmacy	250	60	15,000	16,500	24,750
TOTAL	15,000				742,580
Professional or					
Graduate School					
Graduate (13, 395)					
Science (26.0)	3,480	130	452,400	497,650	746,500
Fine Arts (6.0)	805	100	80,500	88,550	132,800
Others (68.0)	9,110	30	273, 300	300,630	450,000
Dentistry	265^{2}_{2}	45	11,925	13, 117	19,680 ³
Law	650 ²	13	8,450	9,300	$13,900^{3}_{3}$
Medical	690 ²	60	41,400	45,540	68,300
TOTAL	15,000				1,431,180
SUMMARY - Classroom	n, Teach	ning Labora	tories and	Research Sp	ace

Undergraduate	742, 580	gross sq.	ft.	=	49.5	sq.	ft.	per	undergraduate
Graduate	1,431,180	gross sq.	ft.	=	95.5	sq.	ft.	per	graduate
TOTAL	2, 173; 760	gross sq.	ft.	=	72.5	sq.	ft.	per	student

¹For Undergraduate students this includes space for classrooms and teaching laboratories. For Graduate students this includes space for classrooms and research space. The Space Standard used is based on those developed for other institutions of similar size.

²Enrollment controlled. ³Does not include support facilities.

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GROSS SPACE REQUIRED FOR FACULTY, DEPARTMENTAL OFFICES AND RESEARCH

Enrollment Model - 30,000 Students

	Faculty ¹	Space Standards in sq.ft. / Faculty Member ²	Usable Space in Net sq.ft.	Total Net sq. ft. (incl. 10% Aux. Space)	Gross sq.ft (1.5 X Net sq.ft.)
Undergraduates					
Liberal Arts (12,845)					
Sciences	120	400	48,000	52,800	79,200
Fine Arts	100	265	26,500	28,160	42, 240
Others	640	215	137,600	151, 360	227,040
Business Admin.	40	300	12,000	13,200	19,800
Engineering	50	450	22,500	24,750	37, 125
Nursing	35	300	10, 500	11,550	17, 325
Pharmacy	15	300	4, 500	4,950	7, 425
TOTAL	1,000				430, 155
Professional or Graduate School					
Graduate (13, 395)					
Science	29 0	400	116,000	127,600	191,400
Fine Arts	65	265	17,225	18,950	28, 425
Others	7 60	215	163,400	179,740	269,610
Dentistry	20	300	6,000	6,600	9,900 ³
Law	5 5	300	16,500	18,150	27, 225 ³
Medical	60	300	18,000	19,800	29,700 ³
TOTAL	1,250				556,260
SUMMARY - Faculty O	ffice, Dep	partmental	Offices and	Research Sp	ace

Undergraduate	430, 155 gross sq.	ft. or 28.7 sq.	ft. /undergraduate
Graduate	556, 260 gross sq.	ft. or 37.1 sq.	ft./graduate
TOTAL	986, 415 gross sq.	ft. or 32.9 sq.	ft./student

¹Faculty was estimated as a ratio of the Graduate and Undergraduate Enrollment by Majors (refer to Table A-2). The assumed ratio of students to faculty was 15:1 for undergraduates and 12:1 for graduates.

²Based on space standards developed at other institutions of approximately equal size. Includes space for offices for faculty, departmental offices and research space.

³Does not include support facilities.

	Net sq. ft. per Student ¹	Net sq. ft. at 30,000 Enrollment Level	Total Net sq. ft. (incl. 10% Aux. Space)	Gross sq. ft. (1.5 X Net sq.ft.)
Libraries	20.0	600,000	660,000	990,000
Museum	4.0	120,000	132,000	198,000
Auditorium and Theatre	1.5	45,000	49,500	74, 250
General Admin.	3.0	90,000	99,000	148,500
Phys. Plant	7.0	210,000	231,000	346,500
Student Center	6.5	195,000	214,500	321,750
Health Service	2.5	75,000	82,500	123,750
Gymnasia	7.0	210,000	231,000	346,500
Military Science	1,5	45,000	49,500	74, 250
TOTAL				2,623,500

GROSS SPACE REQUIRED FOR GENERAL AND SUPPORTING FACILITIES

SUMMARY - General and Supporting Facility Space

TOTAL - 2,623,500 Gross sq. ft. or 87.4 sq. ft. per student

¹Based on standards developed for other institutions of approximately equal size.