


1967

UA12/8 Traffic & Parking Program

WKU Police

Wilbur Smith & Associates

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DRAFT

TRAFFIC AND PARKING PROGRAM
WESTERN KENTUCKY UNIVERSITY

Wilbur Smith and Associates
Consulting Engineers

Chapter 4

FUTURE UNIVERSITY GROWTH AND PARKING CONSIDERATIONS

To accurately assess future traffic and parking requirements relative to current characteristics and demands, it is essential that careful consideration be given to estimates of anticipated University growth and proposed street and highway improvements.

Projected University Growth

The anticipated growth of the University population to the year 1975, is summarized in Table 9.

A steady growth in student enrollment has been projected by University officials, as illustrated in Figure 12. The student body is anticipated to increase by 6,153 persons, or 60 per cent, for a total enrollment of 16,350 in 1975.

It has been assumed that the ratio of faculty and staff members to students will remain at basically the same level as currently exists. Based on this assumption, a growth of about 330 faculty members is projected, resulting in 750 by 1975. The staff is expected to increase by approximately 350 persons for a total of 700 by 1975.

These anticipated increases will result in a total campus population of approximately 18,000 in 1975.

Future Campus Housing

The major physical expansion program currently underway at

Table 9

ANTICIPATED FUTURE CAMPUS POPULATION

Western Kentucky University

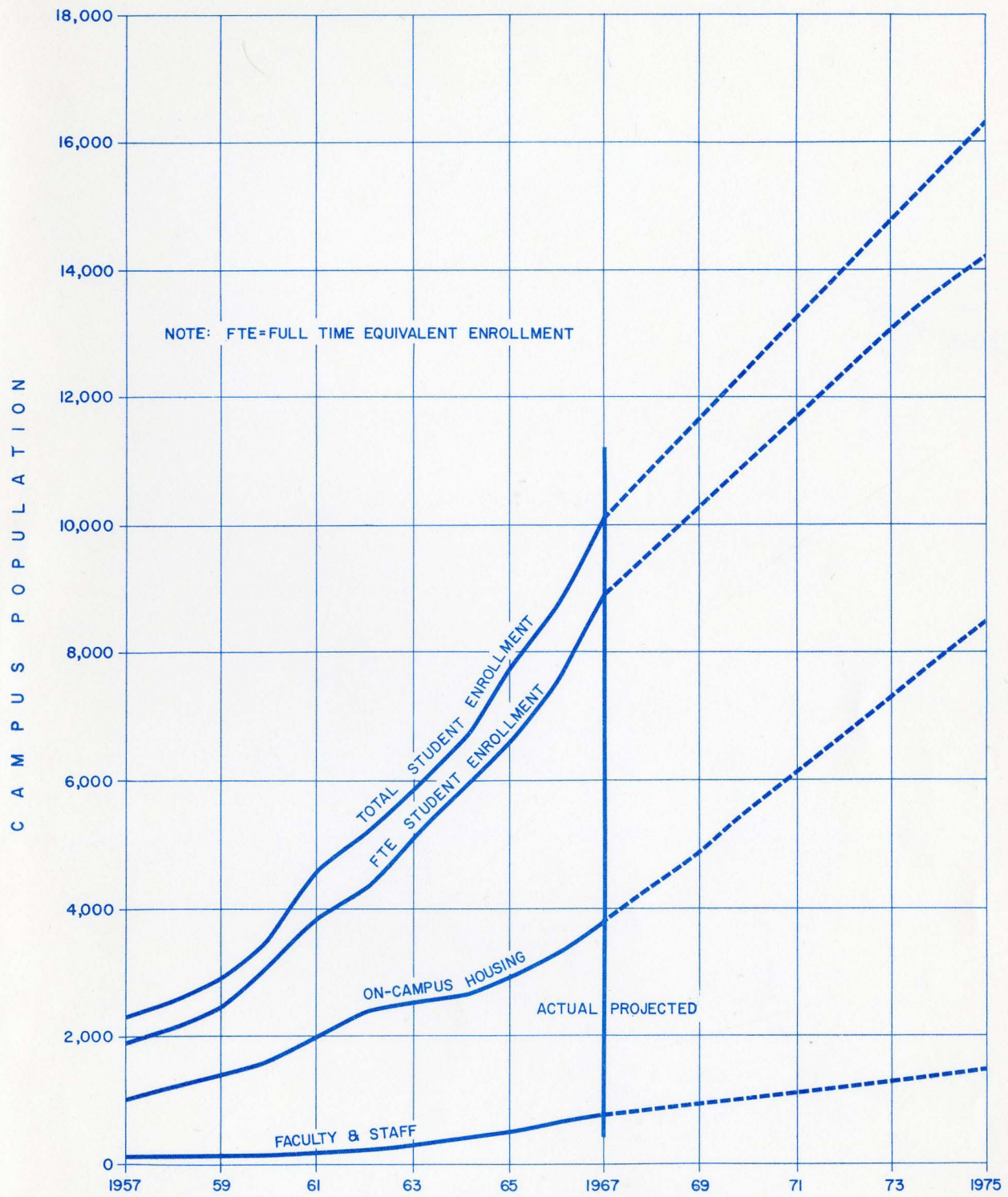
<u>YEAR</u> (1)	<u>PROJECTED</u> <u>STUDENT ENROLLMENT</u>		<u>ESTIMATED</u> <u>FACULTY</u> <u>AND STAFF</u>	<u>TOTAL</u> <u>ANTICIPATED</u> <u>CAMPUS</u> <u>POPULATION</u>	<u>ON-CAMPUS</u> <u>STUDENT</u> <u>HOUSING</u>
	<u>Total</u>	<u>FTE</u> (2)			
1967 (3)	10,197	8,922	763	10,960	3,851
1970	12,500	11,000	1,050	13,550	5,720 (4)
1975	16,350	14,450	1,450	17,800	8,500

(1) Fall semester.

(2) Full time equivalent.

(3) Actual reported values.

(4) Represents completion of programmed dormitories 8 - 10.



PROJECTED UNIVERSITY GROWTH 'H'
WESTERN KENTUCKY UNIVERSITY

the University provides for a substantial increase in the on-campus student housing facilities, as indicated in Table 9. An on-campus housing capacity of 8,500 is projected by 1975, representing an increase in housing accommodations of 120 per cent. This physical expansion program would provide on-campus housing for approximately 52 per cent of the total student population in 1975, as compared to 38 per cent in 1967.

Future Travel Characteristics



The total University population of almost 11,000 persons (faculty-staff and commuter students) currently residing off-campus is the major contributing factor to the demands for vehicular access, circulation, and parking on campus. Despite the projected increase in on-campus housing facilities, the off-campus population traffic and parking demands will continue to predominate. While it is anticipated that the students residing in on-campus housing will total about 8,500 by 1975, the combined off-campus population (faculty-staff and commuter students) is projected to approximate 9,300 persons by that time.

There is little likelihood that any substantial expansion in the intra-urban mass transportation system serving the Bowling Green area will occur during the coming decade. Accordingly, it can be assumed that the off-campus resident commuting segment of the University population will continue to be basically dependent on the private passenger car for regular transportation between residence and campus.

Relative to projecting future traffic and parking requirements, it can be further assumed that the geographical distribution of the University population residing off-campus will continue basically along the same general pattern as now exists.

Every effort should be exerted to encourage greater utilization of group riding and share-the-ride car pools among the commuting campus population, for every increase in these practices reduces the ultimate campus traffic and parking requirements. However, it is doubtful that the current pattern of passenger riding and car pools will change significantly within the next decade, due to the inherent difficulties in developing, on a voluntary basis, satisfactory group riding practices. These basic drawbacks include the wide dispersal of residences over the urban area and the widely fluctuating student schedules of campus arrival and departure times.

Future Parking Demands

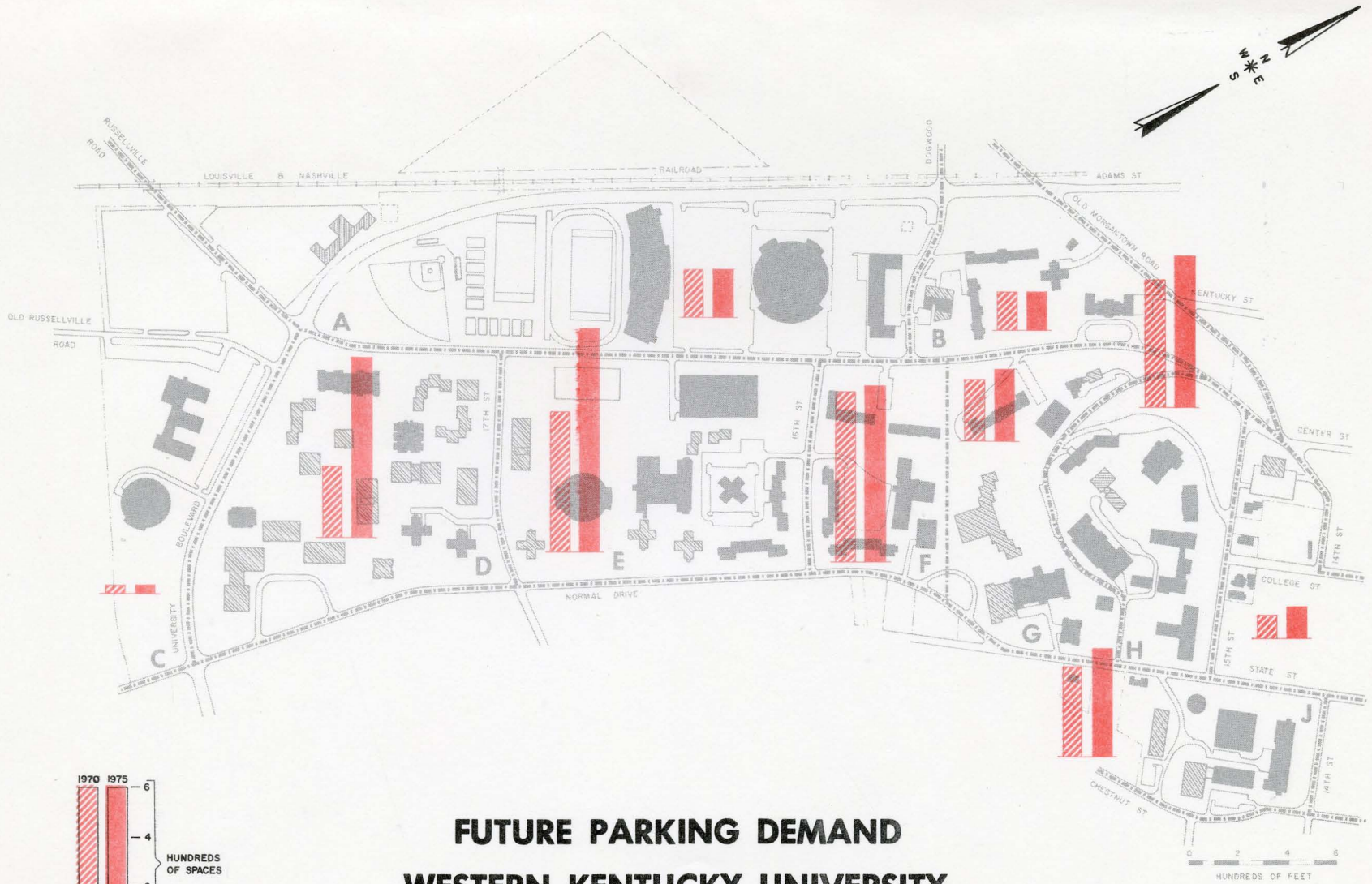
The impact of the anticipated growth in University population and on-campus housing has been carefully evaluated relative to the basic travel characteristics to develop valid projections of future peak campus parking demands. The projected parking demands by campus area for each major segment of the University population for two basic University planning design years, (1970 and 1975) are summarized in Table 10. The projected demands in Table 10 are based on the assumption that no basic changes will occur in the University policies governing automobile usage and parking on campus. These demands by area are illustrated in Figure 13.

Table 10

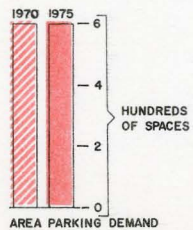
PROJECTED FUTURE CAMPUS PEAK PARKING DEMAND

Western Kentucky University

CAMPUS AREA	NUMBER OF SPACES BY TYPE OF PARKING					
	1970			1975		
	<u>Faculty- Staff- Visitors</u>	<u>Commuter Students</u>	<u>Dormitory Residents</u>	<u>Faculty- Staff- Visitors</u>	<u>Commuter Students</u>	<u>Dormitory Residents</u>
A	105	85		105	85	
B	15	5	135	15	5	135
C	25	10		25	10	
D			290	160	85	490
E	265	200	105	390	275	240
F	170	415	100	180	425	100
G	160	60	25	190	75	25
H	120	415	35	150	430	35
I	60	40		80	50	
J	<u>110</u>	<u>250</u>	<u> </u>	<u>155</u>	<u>285</u>	<u> </u>
TOTAL DEMAND	1,030	1,480	690	1,450	1,725	1,025



FUTURE PARKING DEMAND WESTERN KENTUCKY UNIVERSITY



B --- CAMPUS AREA DESIGNATION

An increase of 600 spaces in peak parking demand is projected for the fall semester of 1970, representing a total campus peak parking demand of 3,200 spaces in 1970, or a 23 per cent increase above the base year demand of 2,600 spaces in the fall semester of 1967. The 1,480 parking spaces estimated to be required for commuter students in 1970 represents 46 per cent of the total campus parking demand. The faculty, staff, and visitor demand in 1970 is projected at 1,030 spaces (32 per cent of the total demand), while the dormitory resident demand is projected at 690 spaces ^{5,720} (22 per cent of the total).

The 4,200 space peak parking demand projected for total campus requirements in 1975 represents an increase in demand of 1,600 parking spaces above the demand in the fall semester of 1967, or an increase of 62 per cent. Over 40 per cent of these spaces (1,725) will be required to accommodate the parking of commuter students. An additional 1,025 spaces will be needed for the cars of dormitory residents, and 1,450 spaces will be required for faculty-staff-visitor parking.

Future Parking Needs

A sound University parking development program should be directed toward the ultimate provision of all parking in off-street facilities, with curb parking along campus roadways completely eliminated. Curb parking on the campus is obviously undesirable from an aesthetic viewpoint, but even more important is its detrimental effect on efficient traffic movement and pedestrian safety. Basic planning efforts are directed toward minimizing locations

of potential vehicular-pedestrian conflicts. Although the pedestrian accident experience on campus has been good, the projected major increases in University population with accompanying greater volumes of pedestrian traffic warrant the ultimate elimination of all curb parking.

Accordingly, in determining the existing on-campus parking supply that is desirable for retention as an integral part of a permanent program of coordinated campus parking, it has been assumed that existing curb parking eventually will be eliminated. However, in view of the magnitude of the parking development program needed to effectively accommodate future requirements, it is contemplated that some curb parking (in locations not interfering with safe and efficient traffic flow) can be continued in the initial years until an otherwise adequate program is developed.

Some presently existing parking will be eliminated due to the current building program, while additional spaces will be developed in conjunction with the programmed physical expansion. These various changes in the existing campus parking program will result in a net supply of 1,730 on-campus parking spaces in 1970.

The relationship between the adjusted supply of parking spaces desirable for inclusion in the permanent parking program and the total campus peak parking demands projected for future years is shown in Table 11. The total 2,275 space supply assumed to be available in 1975 (including continuing availability of approximately 545 curb parking spaces on adjacent urban streets) indicates a

Table 11

FUTURE CAMPUS PARKING DEMAND AND DEFICIENCIES

Western Kentucky University

TYPE OF PARKING	NUMBER OF SPACES					
	1970			1975		
	Parking Demand	Existing Parking Supply ⁽¹⁾	Deficiency ⁽²⁾	Parking Demand	Existing Parking Supply ⁽¹⁾	Deficiency ⁽²⁾
Faculty-Staff-Visitors	1,030	630	-400	1,450	575	-875
Commuter Students	1,480	940	-540	1,725	940	-785
Dormitory Residents	690	265 ⁽²⁾	-425 ⁺	1,025	215	-810 [*]
Undesignated Curb Parking		535 ⁽³⁾	+535		545 ⁽³⁾	+545
TOTAL	3,200	2,370	-830	4,200	2,275	-1,925

- (1) Predicated on programmed and potential implementation of building development program in basic conformance with long-range development plan.
- (2) Prior to development of recommended parking program.
- (3) Assumes continuation of some curb parking on 16th and 17th Streets through 1970.
- (4) Assumes continuation of some curb parking on adjacent urban streets through 1975.

deficiency of over 1,900 spaces that will need to be met through the development of new facilities.

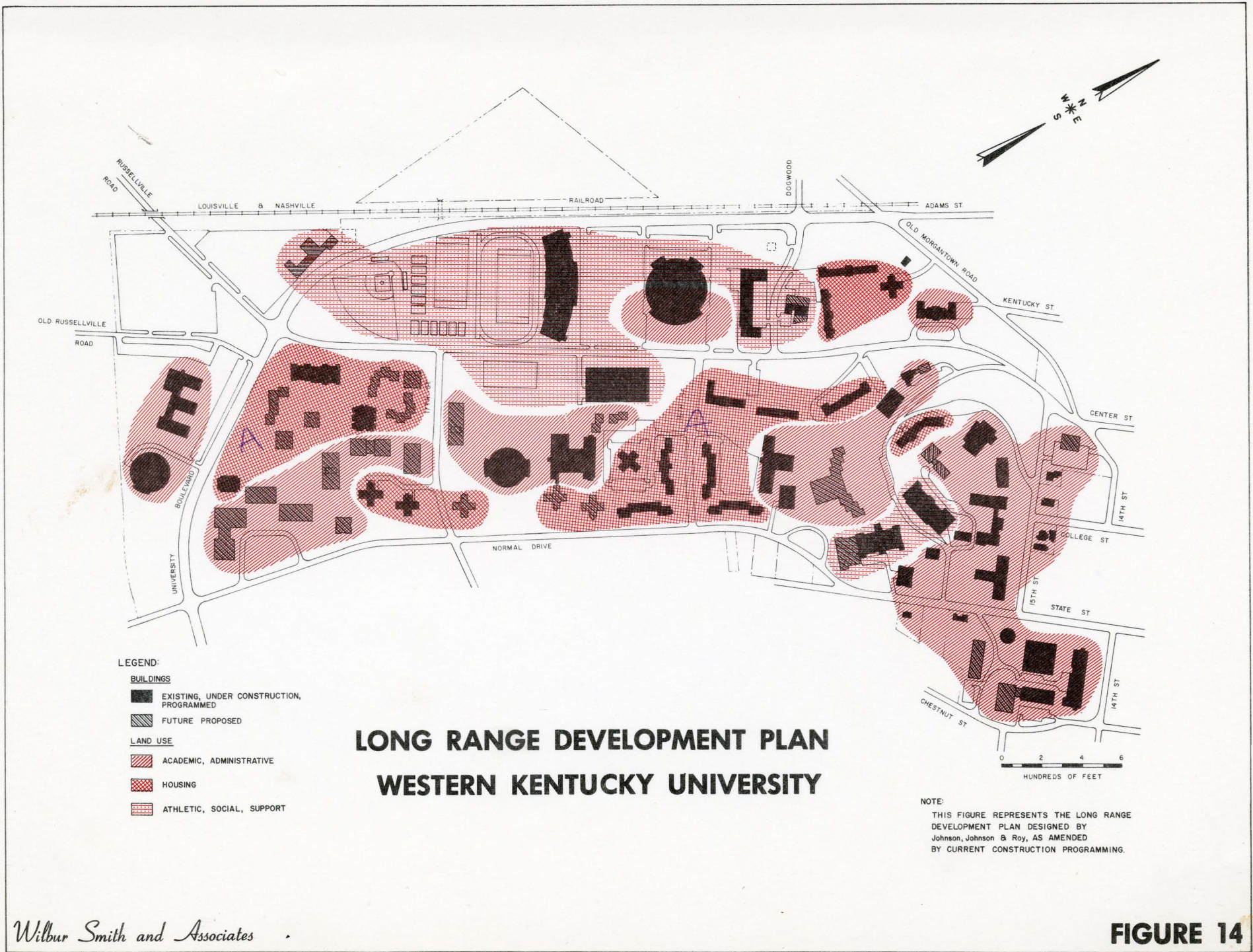
Long Range Development Plan

To provide the general framework to guide the future expansion of the campus in a planned and orderly manner, the University had a Long Range Development Plan prepared by Johnson, Johnson and Roy, Inc., in January 1966.

Definitive goals of modern campus planning include the following basic objectives: (1) minimize conflicts of pedestrian and vehicular traffic, especially within the academic core, (2) strengthen the overall design form of the campus through optimum organization of the land-use pattern, (3) effectively accommodate the projected enrollment, with flexibility for additional future growth, and (4) inspire individual designers to contribute to and reinforce the total campus design structure.



The excellent Long Range Development Plan for Western Kentucky University, as modified by existing and programmed construction, is illustrated in Figure 14. A number of campus facilities are currently under construction or definitely programmed for construction as an integral element in the campus physical expansion program in conformance with the basic campus design concept embodied in the development plan. These facilities, and their scheduled completion dates, are listed in Table 12.

Full consideration has been given in development of the






LEGEND:

BUILDINGS

-  EXISTING, UNDER CONSTRUCTION, PROGRAMMED
-  FUTURE PROPOSED

LAND USE

-  ACADEMIC, ADMINISTRATIVE
-  HOUSING
-  ATHLETIC, SOCIAL, SUPPORT

LONG RANGE DEVELOPMENT PLAN WESTERN KENTUCKY UNIVERSITY

NOTE:

THIS FIGURE REPRESENTS THE LONG RANGE DEVELOPMENT PLAN DESIGNED BY Johnson, Johnson & Roy, AS AMENDED BY CURRENT CONSTRUCTION PROGRAMMING.

Table 12

PHYSICAL EXPANSION PROGRAM SCHEDULE

Western Kentucky University

<u>PROGRAMMED FACILITY</u>	<u>SCHEDULED COMPLETION DATE</u>
Laboratory School	1968
Dormitory 8	1968 * 418
Dormitory 9	1968 * 438
Athletic Complex	1968
Academic Complex	1969
Educational Complex	1970
University Center	1970
Dormitory 10	1970 * 920

development of the recommended traffic and parking program for the campus to the respective impact of these individual facilities.

Highway Improvements

Several major highway improvements directly affecting traffic access to the University are currently approaching completion. These improvements are in basic conformance to the major route plan recommended for Bowling Green in the report on Transportation Needs, Bowling Green Urban Area, 1963, prepared by Wilbur Smith and Associates.

The major improvement is the extension of Adams Street along the railroad to connect with the recent University Boulevard improvement and serve as a bypass route for through traffic around the campus. This modern urban arterial facility, providing for four lanes for through traffic movement separated by a varying width mountable median, will provide excellent access to the campus area and major off-street parking facilities and significantly reduce non-University oriented traffic flow through the campus on Russellville Road.

In conjunction with this Adams Street extension, Dogwood Drive is being rebuilt on a revised alignment which, combined with the closure of Old Morgantown Road immediately west of Adams Street and the designation of Adams and Kentucky Streets as a one-way pair, will provide for overall increased operational efficiency, in the immediate campus area.

These highway improvements are depicted in the modified Long Range Development Plan shown in Figure 14.

Chapter 5

RECOMMENDED TRAFFIC AND PARKING PROGRAM

The detailed analyses of existing and projected future traffic and parking conditions were correlated with a comprehensive review of the highway improvements and the University's Long Range Development Plan. This evaluation permitted development of a traffic and parking program capable of efficiently meeting future campus transportation requirements, including access, circulation, safety, and parking, within the aesthetic design framework of the master plan structure for projected growth.

Basic Concept of Recommended Program

The basic concept embodied in the recommended campus traffic and parking program is oriented toward development of an essentially peripheral roadway system to provide convenient access to the campus from all approaches, yet minimize major intra-campus vehicular traffic movement to permit elimination of principal locations of vehicular-pedestrian conflict, and coordinated with a program of permanent off-street parking facilities primarily oriented to the circumferential roadways. This concept of essentially a pedestrian campus, permitting preservation of the central campus area for academic development and greenery, is deemed desirable to provide effective guidance for University growth and allows maximum fulfillment of its educational and cultural objectives.

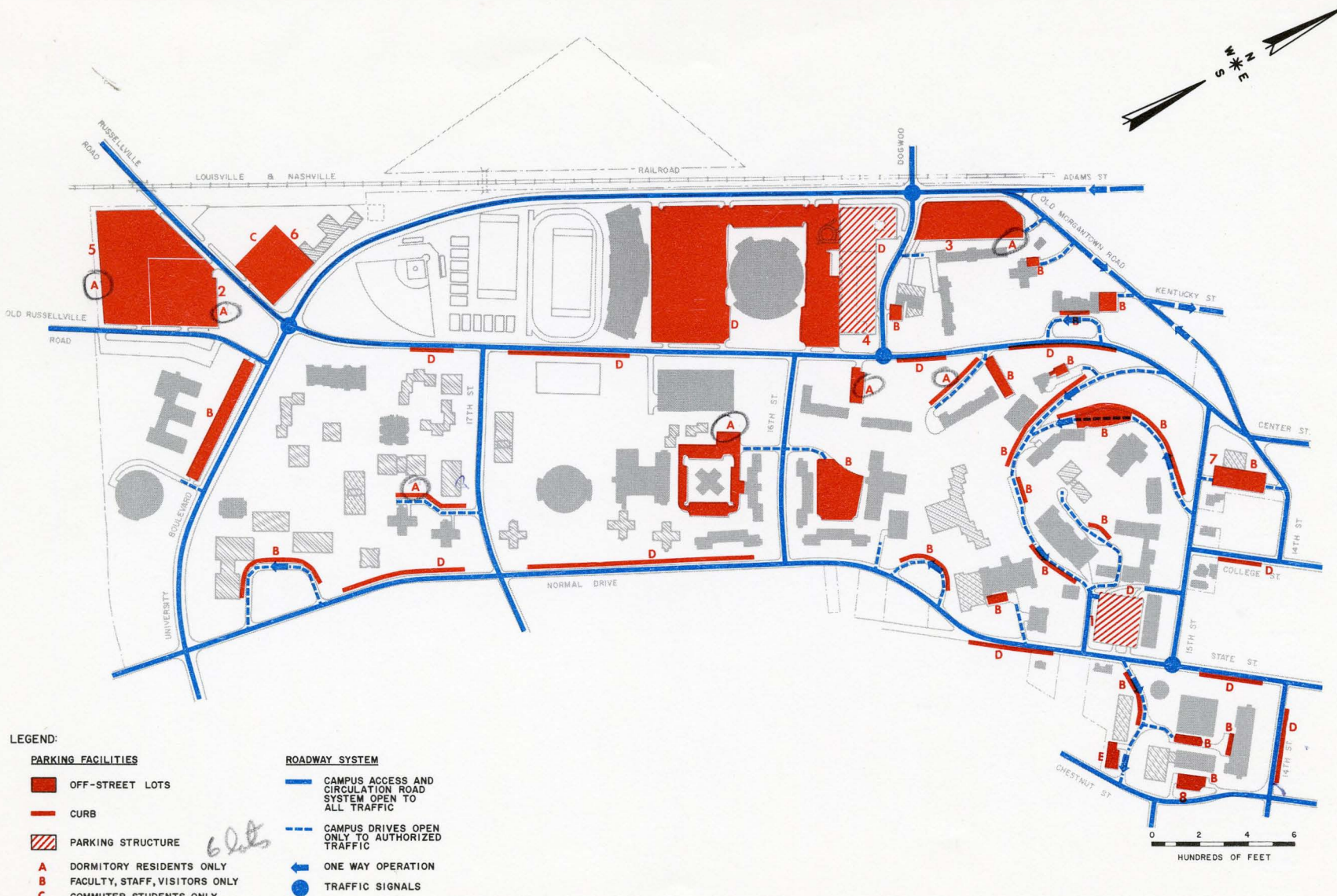
Traffic Program - The primary design goal for the recommended roadway system was the development of a system that would eliminate

major intra-campus vehicular travel, allow optimum efficiency of essential interior circulation and access to parking and service areas, and permit the opportunity to develop the campus to its fullest aesthetic potential. The basic campus roadway system proposed in the development plan, as modified by current improvements, was determined to represent a basically rational and workable scheme to accommodate the projected needs of the expanding University.

The recommended roadway system designed to provide optimum efficiency of vehicular access and circulation to meet the 1975 transportation requirements of the University, as projected in the master plan, is illustrated in Figure 15. This system essentially provides for elimination of non-University oriented traffic through the campus by providing a predominantly peripheral roadway network coordinated with a series of primarily penetration drives for access and service to major campus areas.

The peripheral roadway system would encompass portions of the existing city street system which bounds the campus (with only minimal requisite improvements required in one area to provide a higher level of traffic service in). As delineated in Figure 15, the penetration limited access drives, designed for only essential vehicular access to major university areas of development primarily in the older section of the campus, essentially utilize portions of the existing campus road system.

Portions of the campus roadway system must of necessity be open to all traffic at all times for essential access and circu-



RECOMMENDED TRAFFIC AND PARKING PROGRAM - 1975

WESTERN KENTUCKY UNIVERSITY

Wilbur Smith and Associates

FIGURE 15

lation purposes. However, other sections of the system as indicated in Figure 15, particularly on the Hill, should be restricted to only authorized traffic during weekdays and Saturday morning, in order to minimize undesirable intra-campus vehicular movement. Authorized traffic would basically include faculty, staff, visitors, and service vehicles. It would include only those students whose designated parking areas required access to these areas by a particular section of the campus road system. The optimum time period for restriction of unauthorized travel on these designated limited access roadways and drives will likely require some flexibility in future years due to possible changes in class scheduling. However, it should desirably conform to a time pattern that restricts unauthorized non-essential intra-campus travel during a period ranging from approximately one hour preceding the first major scheduled daily class period to approximately one hour after the ending of the last major scheduled class period.

Inclusion of the basic roadway systems shown in Figure 15, permits development of attractive, essentially vehicular free pedestrian malls linking together the major campus complexes. The long range development plan provides for development of a major pedestrian spine, supported by parallel walkways along the perimeter, running lineally throughout the campus core and linking the major campus area together. The incorporation of minimum basic design features in these walkways will permit their serving in a dual capacity permitting limited usage by service and emergency vehicles in performance of these essential functions.

Roadway Geometric Standards - Existing and projected traffic requirements on the peripheral and internal campus roadway system, including ingress and egress to the proposed major parking facilities developed in coordination with this roadway system, require minimum basic geometric design standards to assure safe and efficient traffic operations.

University Boulevard and the Adams Street improvement, serving as the major elements in the campus peripheral access roadway system, provide for the desirable four effective lanes for traffic movement. The other segments of the access and circulation roadway system, other than those designated for one-way movement, should provide for a minimum cross section of 30 feet, even though only two lanes for traffic movement are contemplated under normal operation.

This design requirement requires the ultimate improvement of Normal Drive between University Boulevard and 17th Street to this minimum cross section with standard curb and gutter sections. Similarly, 17th Street, between Normal Drive and Russellville Road need to be improved to the similar design standards. While Normal Drive between 17th Street and approximately half way between the intersections of 16th and State Streets is slightly below this desirable minimum width, improvement of this section of Normal can be undertaken at a later time. The short section of the Upper Drive between the Home Economics Building and State Street also will need improvement to this minimum cross section to permit two-way operation on this section for facilitation of optimum ingress-egress to the proposed parking structure, as indicated in Figure 15.

The other streets intended to serve as portions of the primary campus access and circulation roadway system, under the proposed method of operation, are currently of an adequate design to effectively handle projected traffic requirements up to the campus planning design year of 1975.

This minimum 30-foot cross section permits smooth, safe, and efficient two-way traffic movement, permits (in initial years under lower traffic volumes) the designation of curb parking along one side at those locations where parking does not restrict sight distance or interfere with effective traffic flow, and provides the capability for designation of special turning lanes in addition to through movement lanes at key intersections.

This minimum width further affords the flexibility to establish special operational techniques essential to accommodation of the abnormally high traffic volumes generated by infrequent special functions. It is not normally economically feasible to design a roadway and parking system that is capable of transporting, with optimum efficiency, the excessive traffic and parking demands generated by special campus events, such as a football game. However, a basic roadway system composed of streets not less than 30 feet in width economically provides the capability and flexibility to reasonably satisfy transportation requirements of this magnitude through specially designated preprogrammed operational measures.

Since intersectional conflicts represent the controlling element relative to efficiency of traffic movement, special turning

movement lanes should be provided through modern pavement markings at all key intersections, on and off campus. The provision of a minimum 30-foot roadway cross section permits effective utilization of these intersectional turning movement lanes. These special turn lanes should be a minimum of 100 feet in length (including the transition section from the normal pavement center-line marking) to provide necessary turning traffic storage space and operational conditions under the traffic volumes anticipated in the campus area.

Traffic Control - The University is fortunate in that prevailing and projected traffic conditions are of a magnitude requiring traffic signalization only at a limited number of intersections. Illustrated in Figure 15 are the intersections which should be continued under signalized control or considered for signalization.

The recently installed traffic signals at the intersection of University Boulevard and Russellville Road and the signals proposed for installation by the State at the intersection of Dogwood Drive with the Adams Street Extension and the railroad tracks are of a modern design meeting minimum desirable standards for safe and efficient operation.

However, the traffic signal at the intersection of State and 15th Streets is antiquated, does not conform to minimum design standards, and does not provide the flexibility to efficiently handle the widely fluctuating traffic movements prevalent to a University campus. This traffic signal installation should be

programmed for modernization with sophisticated traffic signal equipment responsive to rapidly changing vehicular and pedestrian demands in order to provide the capability and flexibility for optimum efficiency of operation under fluctuating traffic conditions.

It is also recommended that consideration be given to the installation of modern traffic responsive signal equipment at the intersection of Dogwood Drive and Russellville Road to provide efficient control over the varying vehicular and pedestrian demands at this location, as indicated in Figure 15.

As the recommended roadway system is developed in conjunction with the campus expansion program and the traffic pattern stabilizes, several additional locations may warrant signalization in future years to afford safe and effective control of conflicting movements. Determination of the need for future traffic signal installations will be a matter for study -- at the appropriate time -- of the generated traffic magnitude and characteristics at individual locations on the developed roadway system and evaluation of these conditions against specific warrants recommended as justifying signalization.

All traffic signal equipment installed under the modernization program of existing installations (and at all future signalized locations) should conform to recommended minimum standards relative to design, location, installation, operation, and maintenance as detailed in the Kentucky Highway Department's Manual on Uniform Traffic Control Devices.

The existing traffic signs installed to regulate, warn, and guide traffic movements on campus are not in complete conformance with the minimum design standards outlined in the Kentucky Highway Department's Manual on Uniform Traffic Control Devices. Standardization, uniformity, and consistency in sign application, color, shape, legend, size, reflectorization, location, and maintenance are essential elements for effective traffic signing in the interest of safe and efficient traffic operations. Accordingly, it is recommended that steps be programmed to modernize the existing traffic sign system in accordance with the basic standards, and further, that all future traffic sign installations conform to the State standards.

Development of sound traffic operational program dictates that - at all non-signalized locations - including intersections of parking facility driveways with the campus road system, the major flow of traffic be afforded protection by the installation of stop signs on the minor intersectional approach.

While basically standard pavement markings exist on the major urban streets adjacent to the campus, only limited usage has been made on the campus roadway system of pavement markings. A comprehensive system of pavement markings should be programmed for the existing roadway system and incorporated as an integral part of the total design of the recommended campus road system.

The basic desirable markings include lane lines, center lines, pavement arrows to designate lane movements, stop lines, parking

stall markings, and cross walks. The latter are of particular importance on the campus at locations of normally heavy pedestrian crossings, both to advise drivers of the pedestrian movement and to encourage increased observance by the pedestrians of crossing only at designated locations.

As in the case of traffic signals and traffic signs, all pavement markings should conform to the basic standards of size, color, design, location, reflectorization, and maintenance prescribed in the State standards on uniform traffic control devices.

Parking Program

The Long Range Development Plan contemplated an off-street parking program primarily oriented to the peripheral roadway system to provide convenient access and minimize intra-campus vehicular traffic. It embraced both a parking structure and open surface lots that were located, designed, and landscaped to attractively blend in with the proposed campus land uses. This basic concept of essentially a pedestrian campus, with the parking provided on the periphery of the central campus area, which can then be preserved for academic development and greenery, is fundamentally sound and should be followed.

A recommended campus parking program has been promulgated which is basically consistent with the 1975 demand requirements, is completely compatible with the proposed land-use development of the campus master plan, and is effectively served by access and circulation facilities provided by the recommended roadway system.

It provides for a combination of multi-level open-deck parking structures and surface parking lots. Located for the most part around the periphery of the campus core, the parking facilities would provide for a generally 5-10 minute maximum walking distance to primary campus destinations. Development of the recommended parking program, in combination with the existing parking facilities programmed to remain, would provide Western Kentucky University with a comprehensive campus parking virtually unmatched by any other major university relative to the convenience of location of the facilities. It would also provide for effective coordination with the access and circulation roadway system and adaptability to the land use and aesthetic development of the campus.

The comprehensive program of campus parking recommended for 1975, including the sites suggested for development, is illustrated in Figure 15. The recommended new development program would consist of 8 separate sites, ranging in approximate size from 25 to 570 parking spaces, as indicated in Table 13.

Two of these proposed facilities are for faculty, staff, and visitors only, providing an additional capacity of 85 spaces. One facility, with a capacity of approximately 380 spaces, is for commuter students only. The two proposed parking structures would provide 1,125 spaces for faculty, staff, visitors, and commuter students. The remaining three proposed facilities would provide an additional 840 spaces for dormitory resident parking. *

The existing and programmed parking facilities that have

Table 13

RECOMMENDED PARKING PROGRAM DEVELOPMENT - 1975

Western Kentucky University

<u>SITE</u>	<u>APPROXIMATE NUMBER OF SPACES</u>	<u>TYPE FACILITY</u>	<u>TYPE OF PARKING</u>
1	555	Combination open-deck and sub-surface garage	Faculty-Staff- Visitors and Commuter Students
2	250	Surface Lot	Dormitory Residents *
3	210	Surface Lot	Dormitory Residents *
4	570	Open deck garage	Faculty-Staff- Visitors and Commuter Students
5	380	Surface Lot	Dormitory Residents *
6	170	Surface Lot	Commuter Students
7	60	Surface Lot	Faculty-Staff-Visitors
8	<u>25</u>	Surface Lot	Faculty-Staff-Visitors
	2,220		

been projected as remaining as part of the total campus parking program in 1975, since they effectively correlate with the overall recommended program, are delineated in Figure 15. It can be noted that a change has been suggested relative to the type of parking that the present Arena-Stadium parking lot should preferably accommodate. Due to the convenient location of the major parking facilities to primary campus destinations and their correlation with the periphery access roadway system, eliminating the need for intra-campus travel to get to them, it is proposed that this lot be designated for joint usage by faculty, staff, visitors, and commuter students as is proposed for the two recommended parking structures.

Proposed for development as Site 1 is a modern split-level self-parking structure providing for approximately 555 convenient angle parking spaces in five and one-half levels, as indicated in Figure 16. (Note: A detailed functional design of this proposed structure - Figure 16 - has previously been provided University officials for review, but is not reproduced at this time in this Draft report.) Development of this site would entail demolition of the old wing of the Training School, which it is understood is acceptable in view of the future campus development program. It would provide for critically needed parking space to most effectively serve the existing major unsatisfied faculty, staff, visitors, and commuter student parking demands in the more intensely developed areas of the campus on and immediately adjacent to the Hill. As indicated in Figure 15, ingress-egress would be provided

from different levels of the structure to 15th Street, State Street, and the Upper Drive.

* Sites 2 and 5 are proposed surface parking lots to accommodate the dormitory parking needs of the residents of the new dormitories under construction and programmed for the future in the southern portion of the campus.

* Site 3 is a proposed surface parking lot to assist in accommodating the presently unsatisfied demand of residents of the existing dormitories.

Proposed for development at Site 4 is a multi-level flat-deck parking structure providing for approximately 570 spaces for faculty, staff, visitor, and commuter parking as shown in Figure 15. In accordance with discussions with University officials, this facility is proposed for development above the existing Physical Plant Building and around the electric substation, as indicated in Figure 17, to aid in the aesthetic development of this area of the campus. (Note: A detailed functional design of this proposed structure - Figure 17 - has previously been provided University officials for review, but is not reproduced at this time in this Draft report.)

The design of the structure at Site 4 provides for one level above the Physical Plant Building and four levels behind the building and around the substation. Due to the elevation requirements of the main deck above the Physical Plant Building, a helical spiral ramp system (with separate one-way ramps) has been designed

to permit optimum efficiency of ingress and egress to the various parking levels. This helical ramp also permits maximum effective utilization of the facility on special abnormally high parking-demand occasions as athletic events through reversal of the ramp directions before and after the event to make all ramps "inbound" before and all ramps "outbound" after. Also, due to the location and design of this helical ramp system, an additional facility could be developed immediately south of and connecting with this parking facility after 1975 (if future demands necessitated) and still utilize the same ramp system. Convenient access to this facility would be afforded from the Adams Street extension, Dogwood Drive, and Russellville Road, as depicted in Figure 15.

Site 6 is proposed for future development as a 170 space surface lot to assist in accommodating the additional commuter student demand that will be generated by proposed academic development south of 17th Street. Sites 7 and 8 are proposed for future development as small surface lots to help in accommodating the additional faculty-staff-visitor demands that will be generated by proposed academic and administrative development in the northern portion of the campus.

Staged Development

It is impossible at this time to establish a precise schedule for development of the recommended traffic and parking program since, of necessity, it must be closely correlated with the planning priorities that will be established for the future campus building

development program. However, a general program for staged development is suggested. It is designed to provide a positive approach toward effectively alleviating, at the earliest possible time, the existing problems of traffic access, circulation, and parking in concert with the objective of realizing the complete recommended campus traffic and parking program by 1975.

Two basic stages of development are suggested for planning purposes: Stage I - 1970*, and Stage II - 1975*. Individual sections of the roadways recommended for improvement and individual parking facilities recommended for development have been assigned to each of these stages. These suggested stages of development reflect full consideration of the impact of the programmed physical expansion scheduled for completion by 1970 as previously delineated in Table 12.

The suggested stage development of the traffic and parking program is illustrated in Figure 18.

Special Events

There will be occasions during the year when both the access and parking capacity of the campus will be stressed and even exceeded. This is to be anticipated. It is not reasonable to expect that the trafficways system should be designed to accommodate 100 per cent of the demand 100 per cent of the time. If this were done, it would mean that for most of the time the system would be underused and inefficient, representing a significant economic loss on the tremendous capital investment in the system.

Special events which are likely to attract visitation in excess of planned capacities are athletic events and certain annual University affairs. The varsity athletic program of the University is based on an expected program of inter-university competition geared to the capacity of the new stadium. Many of these spectators will be persons living in Bowling Green who would approach the immediate stadium site by walking. Much of the visitation involving approach to the campus by automobile could be accommodated in the regular parking areas, which would normally be experiencing lower than average daily levels of usage on days when athletic events were scheduled.

Needs in excess of capacity available in regular parking areas could be accommodated by allowing passenger car parking on open athletic fields or turfed open areas both near and removed from the stadium site. Since the number of events held annually which would require this special treatment of parking would probably not exceed ten in number and would generally occur under fair weather conditions, damage to ground cover in these areas would be minimal. A special parking fee in such areas calculated to recoup the costs of extra maintenance would satisfy the peak demand loads without making a permanent space assignment for this unusual demand.

Pedestrian Facilities

The primary recommendations developed in this study have been largely addressed to the needs of vehicular travel. The reason

for this should be apparent, since the cost of vehicular facilities and the space demands they exert on the long range campus plan far exceed those of the pedestrian. However, the overriding design concept of the vehicular features of the recommended program has been the maximum feasible separation of vehicular traffic from pedestrian traffic, permitting the creation of a good pedestrian climate in accord with the basic campus design concept set forth in the Long Range Development Plan.

Walking will be the principal means of intra-campus travel even in the expanded campus plan. These walking trips will be encouraged and made more pleasant if the danger and nuisance of vehicular conflicts are removed.

Pedestrians are notorious for their individualistic behavior and nowhere is this trait more in evidence than on university campuses. Walkways must be provided in the corridors of directional demand or students will create their own, even at the expense of landscaping features intended to divert traffic into a seemingly more rational scheme based on a design of "plan symmetry."

Landscaped walkways incorporating interesting and attractive amenities will further promote walking on the campus. The recommended traffic and parking program is geared to accommodate and integrate with such a pedestrian-oriented design.

Chapter 6

ECONOMIC ANALYSIS OF THE PARKING PROGRAM

A program to develop over 2,200 permanent off-street parking spaces will require a substantial outlay of funds. Accordingly, an evaluation of the economic aspects of developing a program of this magnitude is essential to ultimate implementation of the parking program.

Current Parking Policies

The policies on parking at Colleges and universities across the country currently range from entirely free parking to a substantial charge for parking imposed on all members of the institutional population. The practice of free on-campus vehicle registration and parking is a carry-over from earlier years when traffic and parking did not represent a problem of significant magnitude on the typical campus. However, the impact of the automobile on campuses in recent years due to rapidly changing social and economic conditions and the resulting accelerating demand for on-campus parking, is rapidly bringing the era of free campus parking to a close across the country.

Studies of current policies of providing and financing adequate on-campus parking at institutions of all sizes and in all geographic locations indicate that this represents one of the most perplexing problems confronting educational system administrators. The current trend, of necessity due to the lack of other available

sources of usable revenues for this purpose, are toward charging for parking on campus, with the income from these parking charges utilized to develop and operate additional needed parking facilities.

Methods currently used for collecting parking facility user charges include parking meters, coin-actuated vehicle gates, and both vehicle registration and parking permit fees designated on a semester, quarter, academic year, or annual basis. There are valid considerations, both pro and con, pertinent to the respective merits of each of these collection methods relative to providing for equitable allocation of parking costs, administration, maintenance, and enforcement. Individual parking charges through these various methods currently range from \$5 to over \$100 annually.

Under current practices at many major educational institutions, the individual parker has no assurance that a parking space will exist for him even after paying for the parking privilege. In terms expressed by some university administrators, the payment of a parking fee only provides the individual with a "hunting license" to look, since the available supply of on-campus parking is significantly less than the demand. This prevalent situation results in the available spaces being rapidly occupied on a first-come, first-served basis, which in turn contributes to substantial additional undesirable vehicular travel on the campus roadway system due to the continuous circulation throughout the different parking areas looking for a space. Under other policies currently in effect, individuals are assigned to park only in a specifically

designated facility. In some instances, individuals are guaranteed upon payment of a higher fee and actual reserved space.

Allocation of Parking Program Charges

The cost of development of modern, parking facilities, particularly parking structures, represents major capital expenditures and substantial annual expenses. Accordingly, the basic policy question revolves about how the development and operation of the campus parking program should and can be financed.

It seems reasonable to expect that direct charges to the parking facility user should represent the major component of parking program financing as long as the fees can be maintained at a reasonable level. Nevertheless, it is equally not unreasonable to expect some support from the institution in financing the parking program, at least in its administration and enforcement aspects, since an adequate traffic and coordinated parking program is an essential element to the daily efficient functioning of the institution.

In addition, the institution as a whole receives numerous benefits from adequate and attractive off-street parking facilities. These normal benefits include protection of the large capital investment in the campus physical plant through attractive facilities enhancing the total campus appearance, reduced vehicular circulation and increased pedestrian safety, and greater likelihood of attracting and retaining top-caliber faculty and staff members.

In addition, the benefits of adequate parking facilities include improved public relations with the many daily visitors to the campus, as well as with the residents of the immediately adjacent urban neighborhood, who are no longer plagued with the vexing problem of university-associated persons regularly parking in front of their property.

Financing the Parking Program

In accordance with these needs, a general economic analysis has been prepared relative to potential financing of the recommended parking program. The parking of dormitory students at Western Kentucky University is generally provided in facilities that have been developed in conjunction with the dormitory construction. Under existing basic policies relative to dormitory development financing, it appears likely that the additional dormitory parking supply required in future years to accommodate the needs of projected additional on-campus housing residents can be financially developed in conjunction with the housing construction. Accordingly the following economic analysis excludes the economic aspects of both existing and projected future dormitory resident parking program requirements.

Development Costs

The estimated total cost of developing the recommended on-campus parking program is projected at \$3,140,000. These projected development costs include estimated construction costs for modern design, high-quality facilities with appropriate architectural treat-

ment and landscaping to fit in concert with the overall campus design and aesthetics. The construction costs also provide allowances for modern lighting and internal traffic control. In addition to the construction cost estimates, the development cost projections provide for architectural, engineering, and administration of construction fees, insurance during construction, legal and financing charges relative to development through bond issues, and an allowance for contingencies to cover unusual or unexpected costs and provide a cushion against the continuing spiral of construction costs.

As indicated in Table 14, the cost of the Stage I (1970) parking program development would be approximately \$1,380,000, which would provide 555 spaces for faculty, staff, visitor, and commuter students. The Stage II development (1975) would cost approximately \$1,760,000 for 825 spaces designed to accommodate the future demands of faculty, staff, visitors, and commuter students.

The parking spaces proposed for development over a seven year period would afford a comprehensive program of modern, attractive campus parking that would be adequate (in combination with some on- and off-campus curb parking assumed to remain during this period) with respect to projected 1975 parking demands and effectively coordinated with the recommended traffic access and circulation roadway system and the design concept embraced in the Long Range Development Plan.

Table 14

ESTIMATED DEVELOPMENT COSTS⁽¹⁾
RECOMMENDED PARKING PROGRAM

Western Kentucky University

<u>FACILITY</u>	<u>TYPE PARKING</u>	<u>DEVELOPMENT COST⁽²⁾</u>
Stage I (1970)		
Site 1	Faculty-Staff-Visitors and Commuter Students	\$ 1,380,000
Subtotal Stage I		<u>\$ 1,380,000</u>
Stage II (1975)		
Site 4	Faculty-Staff-Visitors and Commuter Students	\$ 1,650,000
Site 6		\$ 70,000
Site 7		\$ 30,000
Site 8		<u>\$ 10,000</u>
Subtotal Stage II		<u>\$ 1,760,000</u>
TOTAL		\$ 3,140,000

(1) Exclusive of dormitory resident facilities.

(2) Includes estimated construction costs, architectural-engineering-administration fees, insurance during construction, legal and financing charges, and allowance for contingencies; does not include capitalized interest.

Revenue Bond Financing

This source of financing parking facilities offers a practical and most immediate means of raising needed funds to develop a total campus parking program (exclusive of dormitory parking requirements) needed to accommodate the 1975 parking demands that were projected on the basis that no fundamental changes would occur during the interim period in the basic University policies relative to the privilege of operating and parking of automobiles on campus by any segments of the campus population.

The estimated cost of developing the recommended parking program via the financial avenue of revenue bonds is summarized in Table 15. On the basis of 35-year revenue bonds at an interest rate of 5.5 per cent, the annual debt service (principal and interest) would average about \$96,000 on an issue to finance the recommended 1970 program total development cost (including capitalized interest) of \$1,456,000. As indicated in Table 15, the cost summary evaluations also included consideration of 30- and 40-year revenue bond issues as well as a 35-year issue. However, a revenue bond issue for a period of 35 years appears most logical and practical for consideration relative to development of the recommended Western Kentucky University program comprising both structures and surface lots.

The average annual debt service would approximate \$122,000 on the 35-year revenue bonds at 5.5 per cent interest needed to finance the development of the Stage II program recommendations. The average annual debt service for the issues of revenue bonds

Table 15

ESTIMATED COST SUMMARY⁽¹⁾
RECOMMENDED PARKING PROGRAM DEVELOPMENT

Western Kentucky University

ITEM	STAGE I PROGRAM DEVELOPMENT (1970)	STAGE II PROGRAM DEVELOPMENT (1975)	TOTAL PROGRAM DEVELOPMENT
Development Cost	\$ 1,380,000	\$ 1,760,000	\$ 3,140,000
Capitalized Interest ⁽²⁾	\$ 76,000	\$ 97,000	\$ 173,000
Total Development Cost	\$ 1,456,000	\$ 1,857,000	\$ 3,313,000
Average Annual Operating Cost ⁽³⁾	\$ 25,000	\$ 40,000	\$ 65,000
Average Annual Debt Service: ⁽⁴⁾			
30 years at 5.5 per cent	\$ 102,000	\$ 130,000	\$ 232,000
35 years at 5.5 per cent	\$ 96,000	\$ 122,000	\$ 218,000
40 years at 5.5 per cent	\$ 92,000	\$ 117,000	\$ 209,000
Total Average Annual Cost:			
30 years at 5.5 per cent	\$ 127,000	\$ 170,000	\$ 297,000
35 years at 5.5 per cent	\$ 121,000	\$ 162,000	\$ 283,000
40 years at 5.5 per cent	\$ 117,000	\$ 157,000	\$ 274,000
Average Annual Gross Income Required:			
30 years at 5.5 per cent	\$ 178,000	\$ 235,000	\$ 413,000
35 years at 5.5 per cent	\$ 169,000	\$ 223,000	\$ 392,000
40 years at 5.5 per cent	\$ 163,000	\$ 215,500	\$ 378,000

- (1) Exclusive of dormitory resident facilities.
(2) Interest capitalized for one year at 5.5 per cent to cover interest payments during construction.
(3) Includes only new facilities developed.
(4) Principal and interest on 5.5 per cent revenue bonds for terms indicated.
(5) Average annual gross income required to provide basic 1.50 coverage (ratio of net income to debt service) normally required on parking revenue bond issue.

needed to finance the development of the complete recommended campus parking program for faculty, staff, visitors, and commuter students would total about \$218,000 after 1975.

Operating Costs - In calculating the estimated cost summary detailed in Table 15, estimates of annual operating costs for the proposed facilities were developed. These estimates of operating costs allow for the major expenditures of a continuing high level of parking facility and allied landscape maintenance, as well as utilities and contingencies. The utilities item includes the provision of illumination for those parking facilities subject to usage during hours of darkness. In selecting the lighting for an individual facility, consideration should be given to a design that will harmonize with the aesthetics of the campus, as well as providing the minimum level of illumination essential to prevent accidents and deter pilfering and criminal activities.

As noted from Table 15, the average annual operating costs are estimated at \$25,000 for the Stage I developed facilities and \$40,000 for the Stage II facilities, representing a annual aggregate cost after 1975 of approximately \$65,000.

Direct User Charge Financing - Also shown in Table 15 is the average annual gross income required to finance the individual stages of the parking program development on a revenue bond basis. To make the parking program development self-sustaining financially on the basis of charges imposed on the individual user of the parking facility at the time of parking and meet the basic 1.50 coverage

(ratio of net income to debt service) requirements of parking revenue bond issues, an annual gross income of \$169,000 from direct user charges would be needed for Stage Development, \$223,000 for Stage II, or a total annual gross income of \$392,000 for the complete program after 1975.

These gross income estimates are predicated on a 5.5 per cent 35-year revenue bond issue. An average income per parking space per day of between \$0.50 and \$1.00 (dependent on the number of parking spaces within the total system for which a direct user charge was imposed) would be required to produce these requisite annual gross incomes on this basis. In view of the prevailing supply of free parking that would exist in competition with the fee parking facilities and existing and projected campus parking characteristics, it is not feasible to expect that this average daily income could be realized from direct facility user charges collected through usage of parking meters, coin-actuated gates, attendants, or combinations of these methods. Further, these methods would entail collection of even greater amounts of annual gross income to compensate for increased cost of equipment, maintenance, and personnel.

Alternative Financing Methods - Due to the unlikelihood of the parking program development being economically feasible and self-sustaining solely on the basis of direct parking facility user charges, alternative possibilities of financing the program development were explored. One of the most common approaches being utilized by universities across the nation involves a program of prepaid annual or school term parking permits entitling the permit

holder to self-park in designated facilities. However, since the visitor can reasonably be expected to pay a minimal charge for convenient campus parking, it is anticipated that even under a permit system, a limited number of parking meters would be used in individual faculty-staff and commuter student facilities for regulation of the spaces designated for short-time visitor parking.

Predicated on the proposed operational methods and the average annual gross costs for development and operation, various alternative potential parking fee schedules and combinations were explored to determine the feasibility of financing a program adequate to meet the projected parking needs.

Analysis of the potential income from the alternative fee schedules investigated, the estimated costs of developing and operating the parking system, and normal 1.5 coverage on debt service requirements relative to revenue bonds, indicated that the recommended stage development of the program is financially possible through establishment of a schedule of fees progressively increasing in magnitude over the two stages of development.

The annual income from a fee schedule established at \$50 per year for faculty and staff, \$30 per year for commuter students, \$12 per summer school commuter student not possessing an annual permit, \$0.10 per hour for visitors, and a special event charge of \$0.50 for non-permit holders would provide an estimated \$172,000 annual gross income, which would provide for the basic 1.50 coverage required for development of the Stage I program without additional security being pledged in support of the bonds. A potential fee schedule beginning in 1974 along the lines of \$80 per year for faculty and staff, \$60

per year for commuter students, \$22 per year for summer school commuter students, \$0.10 per hour for visitors, and \$0.75 for special events would provide an estimated gross income capable of providing the basic 1.50 coverage necessary for the total program development, permitting development of Stage II facilities.

While this fee schedule initially appears high to a university population accustomed to free parking, the fee schedule actually is reasonable in terms of the attractive, adequate, and conveniently located recommended parking. In terms of the average daily cost for parking under the maximum fee schedule needed to be initiated in 1974, excellent parking would be provided for the auto-using University population at a minimal cost, compared to normal parking charges in this automobile-oriented economy. In terms of daily parking charges, it represents in the neighborhood of a maximum of \$0.30 per day students (and in the case of commuter students attending summer school, even less).

The cost-income evaluation has been predicated on financing the entire development of the recommended parking program through the issuance of 35-year 5.5 per cent revenue bonds, with the issues guaranteed only by income from the sources indicated. Other possible approaches and financial sources for consideration could result in a reduction or modification of the fee schedules indicated as a possible avenue for this financing approach. A lowering in the prevailing market rate for revenue bonds, a longer term issue of bonds, a lower debt service coverage ratio requirement on the bonds, or assumption by the University of the complete operating costs of the parking program, all represent potential means of developing and operating the

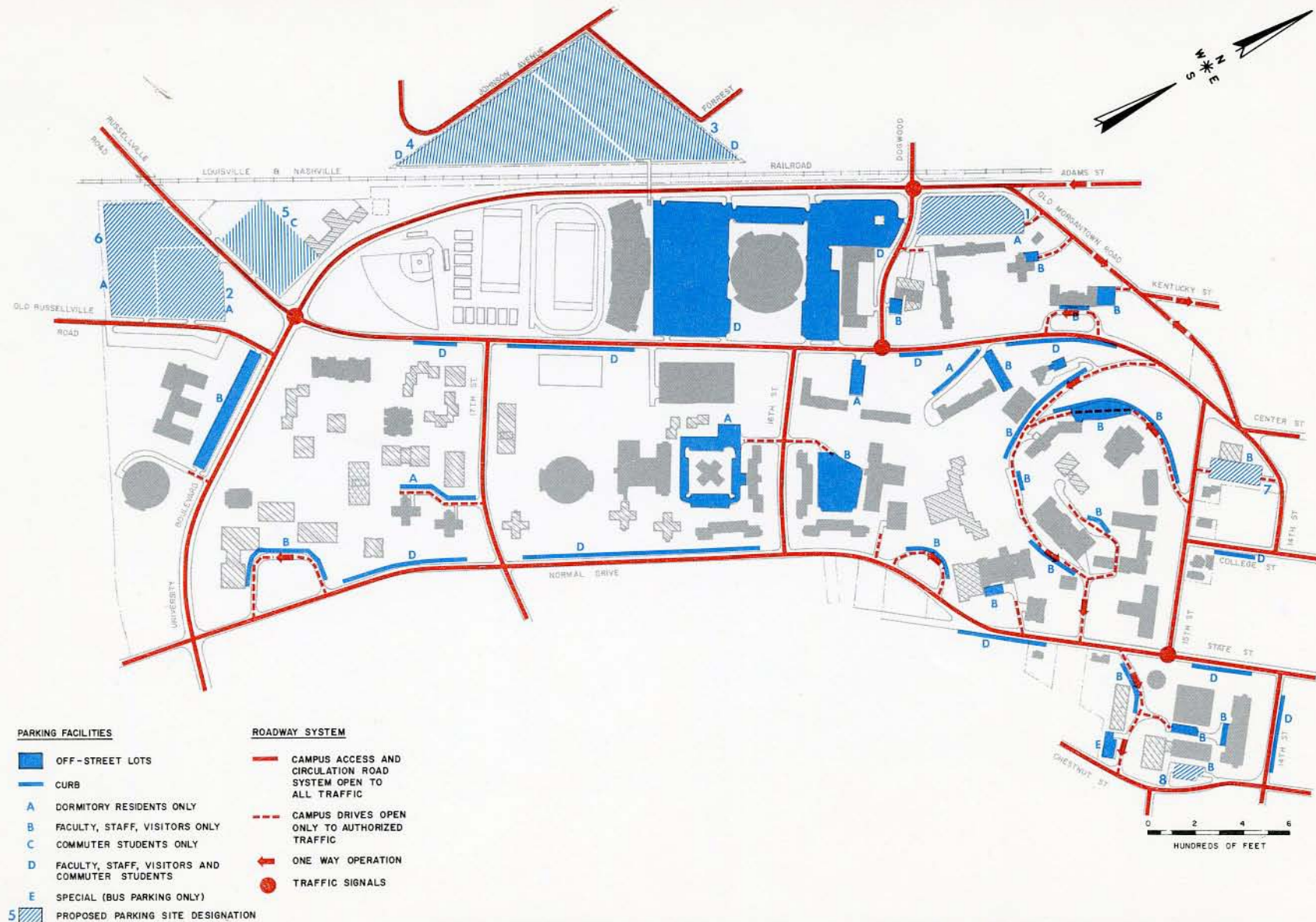
parking program on a sound financial basis with an even lower basic fee schedule.

An Alternative Parking Program

Although the potential fee schedules required to make the recommended parking program entirely self-sustaining actually appear reasonable in magnitude relative to the design, adequacy, and location of the total parking system they would permit developing, an alternative parking program and its economic aspects were explored to provide the University with the maximum possible background data upon which to base future program policy.

An alternative parking and correlated traffic program are illustrated in Figure 19. This program would provide for the stage development of eight surface parking lots ranging in size from 25 to 750 spaces. The capacity, suggested type of parking, and proposed stage development of each of these sites is listed in Table 16. The locations and suggested type of parking for all facilities in this alternate campus parking program are shown in Figure 19.

It can be readily noted from Figure 19 that, in order to provide entirely in surface lots the required parking to meet projected 1975 campus parking demands, it would be essential to utilize the University property on the west side of the railroad. This places the major parking facilities situated on this site significantly farther in walking distance (even with the pedestrian overpass shown) from the primary campus destinations, especially relative to aiding in accommodation of the existing unsatisfied major parking demands generated by the more intensely developed northeast section of the campus. In addition, the combination of terrain, the railroad, and land-use



ALTERNATE TRAFFIC AND PARKING PROGRAM - 1975
WESTERN KENTUCKY UNIVERSITY

Table 16

ALTERNATE PARKING PROGRAM DEVELOPMENT - 1975

Western Kentucky University

<u>SITE</u>	<u>APPROXIMATE NUMBER OF SPACES</u>	<u>TYPE FACILITY</u>	<u>TYPE OF PARKING</u>
1	210	Surface Lot	Dormitory Residents *
2	250	Surface Lot	Dormitory Residents *
3	500	Surface Lot	Faculty-Staff-Visitors and Commuter Students
4	750	Surface Lot	Faculty-Staff-Visitors and Commuter Students
5	250	Surface Lot	Commuter Students
6	380	Surface Lot	Dormitory Residents *
7	60	Surface Lot	Faculty-Staff-Visitors
8	25	Surface Lot	Faculty-Staff-Visitors

development are not conducive to providing an urban street system permitting optimum access ease to parking facilities located west of the railroad.

Economic Aspects - The estimated development costs of the faculty, staff, visitor, and commuter student parking facilities included in this alternate program to meet 1975 needs are shown in Table 17. Since this alternate program provides all parking in surface lots, rather than a combination of surface lots and parking structures, the development costs of the program are substantially less. As shown in Table 17, the Stage I development would cost approximately \$210,000 and Stage II would cost in the neighborhood of \$470,000, representing a total program (exclusive of dormitory resident parking facilities) of \$680,000. It should be noted that this alternate parking program provides for handling the entire 1975 campus parking demands in the facilities and locations indicated in Figure 19 and does not contemplate counting on the continuing usage of approximately 350 curb spaces on city streets removed from the immediate campus boundaries.

The estimated cost summary evaluation in Table 18 indicates that on the basis of 25-year revenue bonds at 5.5 per cent interest, the average annual debt service for Stage I development would approximate \$17,000, while the Stage II debt service would be \$38,000. This would make a total program debt service requirement after 1975 of \$55,000.

The annual operating cost estimates in Table 18 for the Alternate program include the assumption in Stage I of the annual operating costs of all existing parking facilities that would remain in the program (exclusive of dormitory resident facilities). On this basis, the

Table 17

ESTIMATED DEVELOPMENT COSTS⁽¹⁾

ALTERNATE PARKING PROGRAM

Western Kentucky University

<u>FACILITY</u>	<u>TYPE PARKING</u>	<u>DEVELOPMENT COST⁽²⁾</u>
Stage I (1970 Site 3	Faculty-Staff-Visitors and Commuter Students	\$ 210,000 ⁽³⁾
Subtotal Stage I		\$ 210,000
Stage II (1975) Site 4	Faculty-Staff-Visitors and Commuter Students	\$ 320,000
Site 5	Commuter Students	\$ 110,000
Site 7	Faculty-Staff-Visitors	\$ 30,000
Site 8	Faculty-Staff-Visitors	\$ 10,000
Subtotal Stage II		\$ 470,000
TOTAL		\$ 680,000

(1) Exclusive of dormitory resident facilities.

(2) Includes estimated construction costs, architectural-engineering-administration fees, insurance during construction, legal and financing charges, and allowance for contingencies.

(3) Includes pedestrian overpass.

Table 18

ESTIMATED COST SUMMARY⁽¹⁾
ALTERNATE PARKING PROGRAM DEVELOPMENT

Western Kentucky University

ITEM	STAGE I PROGRAM DEVELOPMENT (1970)	STAGE II PROGRAM DEVELOPMENT (1975)	TOTAL PROGRAM DEVELOPMENT
Development Cost	\$ 210,000	\$ 470,000	\$ 680,000
Capitalized Interest ⁽²⁾	\$ 12,000	\$ 261,000	\$ 38,000
Total Development Cost	\$ 222,000	\$ 496,000	\$ 718,000
Average Annual Operating Cost	\$ 32,000	\$ 18,000 ⁽⁴⁾	\$ 50,000
Average Annual Debt Service ⁽⁵⁾	\$ 17,000	\$ 38,000	\$ 55,000
Total Average Annual Cost	\$ 49,000	\$ 56,000	\$ 105,000
Average Annual Gross Income Required ⁽⁶⁾	\$ 58,000	\$ 75,000	\$ 133,000

- (1) Exclusive of dormitory resident facilities.
 (2) Interest capitalized for one year at 5.5 per cent to cover interest payments during construction.
 (3) Includes existing facilities as well as new facilities developed.
 (4) Includes only new facilities developed.
 (5) Principal and interest on 25-year revenue bonds at 5.5 per cent interest.
 (6) Average annual gross income required to provide basic 1.50 coverage (ratio of net income to debt service) normally required on parking revenue bond issue.

average annual operating costs in Stage I would total \$32,000, increasing by \$18,000 annually with Stage II development, making a total annual cost after 1975 of \$50,000.

The average annual gross income required on a normal revenue bond issue of 25 years at 5.5 per cent interest to make the parking system self-sustaining financially was also calculated. Since only surface parking lots are included in this Alternate program, a 25-year revenue bond term is the most appropriate to be considered. The Stage I development would necessitate \$58,000 in annual gross income and the Stage II development would require \$75,000 annually. The total program development would need an annual gross income of approximately \$133,000 after 1975.

On the basis of a University wide parking fee system, a potential fee schedule of \$16 annually for faculty and staff, \$9 per year for commuter students, \$4 per summer session for non-permit holding commuter students, \$0.10 per hour for visitors, and \$0.50 per event for special event parking by non-permit holders would make the Stage I program development self-sustaining on a revenue bond issue. On a similar basis, a potential fee schedule ranging from \$30 annually for faculty and staff, \$18 annually for commuter students, \$7 for summer school commuter students, \$0.10 per hour for visitors, and \$0.50 for special event parking would permit Stage II and thus the total Alternate program development on a 25-year 5.5 per cent revenue bond issue.

Chapter 7

ADMINISTRATIVE AND POLICY CONSIDERATIONS

Several basic administrative and policy proposals should be considered as support in implementing the recommended traffic and parking improvement program. Certain modifications in the administrative structure will be necessary to successfully carry out the immediate or initial stage recommendations, while others can be considered as long-range.

The current University policy is to prohibit all Freshmen students and all Sophomore students with less than a "B" average from possessing or operating vehicles, except under certain circumstances. This basic policy should be continued in order for the University to maintain effective control over the magnitude of the traffic and parking situation, and to enhance the academic atmosphere of a pedestrian-oriented campus.

Parking Permits

In accordance with the previously discussed methods of financing the campus parking program, it is suggested that a combination vehicle registration and parking permit be issued on an annual basis to faculty and staff members and authorized commuter students to operate a vehicle and park on campus. The current basic policies relative to the use of decals should be continued. The permits (decals) issued for affixing to the registered vehicle should be of different distinct designs and colors for faculty-staff and commuter students, should be numbered consecutively for effective control, and should expire on a fixed date at the beginning of the fall semester of the following school year.

Persons desiring to register vehicles subsequently during the school year or only for the summer session should be issued distinctive decals at the time they register the vehicle.

A different design and color decal should be issued to students residing in on-campus housing who are authorized to operate a vehicle and park in designated on-campus facilities. To provide revenues needed for continuing maintenance of the dormitory resident parking facilities, it is believed that these students can be expected to pay a reasonable annual fee for this purpose.

In the case of those students permitted to use their vehicles only for weekend travel from campus to their homes due to limited availability of public transportation, a portion of the dormitory resident parking facilities located south of University Boulevard should be designated for the reserved storage of these vehicles.

Universities successfully operating their parking program on the parking permit basis have found that it is normally more effective to collect the student fee at registration time, together with payment of other university fees. In the case of faculty and staff, some universities collect the fee at registration time, while others have established a procedure of collection over an extended period through a payroll withholding plan. Both plans appear to work satisfactorily with the decision being within the purview of the basic administrative organization and policy of the individual university.

For those persons registering more than one vehicle on campus for alternate use, additional permits can be issued for each additional permit for the second or third car on a nominal fee basis.

Parking Facility Assignment

Previous indications are that certain facilities in the recommended parking program were suggested for designation as reserved for faculty-staff-and visitors, some would be reserved for commuter students, some for dormitory residents, and others for faculty-staff-visitors and commuter students.

It is not contemplated that actual reserved spaces should be assigned to individuals, other than the few key university officials requiring special consideration. The practice followed by a few universities of assigning a limited number of reserved spaces, normally at a much higher parking fee, can result in inefficient usage of valuable parking space.

It is suggested that consideration be given to the assignment of individuals to specifically designated parking facilities in order to eliminate undesirable vehicular traffic constantly circulating throughout the most advantageously located facilities searching for parking space. Designation of individual parking facilities by letter or numeral and then assigning a permit holder to a specific facility, is the most effective means of jointly enforcing intended parking facility usage and equitably distributing the parking demand. Those universities following this basic type of facility assignment procedure generally utilize an assignment allocation essentially based on parking area proximity to primary campus destination correlated with priority of preference according to relative student class or faculty and staff ranks. In any event, careful consideration must be given in making individual facility assignments and not to "over book" through

making assignments in excess of the estimated facility peak capacity-demand.

Some faculty and staff personnel may have a need to regularly utilize parking facilities in different areas of the campus in order to fulfill their university function. These persons can be assigned to more than one facility and issued appropriate decals for the respective assigned facilities.

It is recommended that a limited number of conveniently located parking spaces be designated for visitor use in each of the faculty-staff and faculty-staff-commuter student parking facilities. As previously mentioned, parking meters can be installed in these spaces to collect a reasonable fee for short-time parking. The location of these reserved visitor spaces within a particular facility should be prominently indicated to facilitate easy location by visitors unfamiliar with the campus and to discourage the improper use of these visitor spaces by permit holders due to the desirable location of the spaces within the facility.

Each of the campus parking facilities should be clearly marked by attractive, distinctive signs that unmistakably indicate facility identification letter or numeral. This is essential to minimize confusion and unnecessary circulation on the access roadway system and to insure usage only by properly authorized personnel.

Traffic and Parking Rules and Regulations

It is recommended that in conjunction with development of the proposed traffic and parking program, consideration be given to a comprehensive review of the established University traffic and parking

rules and regulations to insure that they cover all pertinent elements. It is important that all basic policies and regulations, including definitions, administrative authority and powers, vehicular traffic regulations, campus roadways on which student vehicular travel is prohibited, parking regulations registration and permits, enforcement and permits, enforcement and adjudication procedures, and penalties and disciplinary action for violations, are thoroughly covered.

After approval of the revised rules and regulations by University officials and/or Board of Regents, an attractive leaflet (or possibly separate leaflets for faculty-staff, students, and visitors) should be prepared for distribution. These leaflets should provide a simple, concise digest of the basic established rules and regulations, and include a map of the campus clearly indicating location of the various designated parking facilities.

Intra-Campus Mass Transportation

In recent years, several universities have experimented with various forms of intra-campus shuttle bus systems in an attempt to provide frequent, rapid, convenient, and inexpensive transportation between far-removed campus areas, particularly between fringe area surface parking and housing facilities and major campus destinations, in order to reduce intra-campus vehicular travel and vehicular-pedestrian conflicts to a minimum. In the majority of cases to date these shuttle bus systems have been provided by local transit companies operating under contract with the university. The university normally has guaranteed the company a predetermined fee on the basis of the number of buses assigned, driver wages, and a fixed sum per mile of travel.

The systems basically operate on a combination of a flat fee fare per individual ride, on a pass basis available for purchase at an annual or term fee, or on an unlimited ride basis available to all persons. At those universities having a large campus area beyond a reasonable walking distance for major concentrations of university population and where a frequent and dependable schedule has been maintained, bus patronage has reportedly been good. However, none of the shuttle bus operations are apparently self-sustaining and are financially operable only through some form of subsidization.

The experience of institutions that have experimented with intra-campus shuttle bus systems would indicate that an effective system for a campus area and population size projected for Western Kentucky University in 1975 would likely entail an operating expense of \$25,000 - \$40,000 per semester when operated under contract by a local firm. An effective system encouraging maximal usage by the campus population would likely require 5 to 6 standard-size buses operating around the clock on weekdays from about one hour before the starting of the first major class to about one hour after the close of the last major class and on Saturday mornings. Effective service would require consistently on-time operating schedules with a maximum headway time between trips of 5 to 6 minutes, with extra units added during regularly scheduled peak day class hour periods.

Evaluation of the campus design and population concentrations and dispersals proposed under the Long Range Development Plan and the recommended traffic and parking program indicates that a shuttle bus type operation is not especially warranted at this time and or likely in the future. Western Kentucky University is restricted to some degree

in the extent of ultimate campus development possible on the present campus site because of the nature of existing urban development surrounding the campus and the natural barrier imposed by the railroad. However, this also works to the advantage of the University in the maximum distances between the most extreme parts of the campus (even under ultimate development) will represent distances reasonable for pedestrian travel. This in turn minimizes the need for a supplemental form of intra-campus mass transportation.

Enforcement Considerations

Terrain and other considerations which influenced the earlier land and roadway development in the vicinity of the campus continue to exert a strong influence on the future shape of the campus and roadway system development. The Long Range Development Plan and the recommended traffic and parking program have both attempted to extract every possible advantage for the ultimate optimum campus design from the existing topographic and developmental characteristics.

However, the nature of these physical characteristics is such that the effective control of undesirable intra-campus vehicular traffic can not be accomplished through the physical establishment of campus entry stations on entrance roadways into the campus. If physical characteristics permitted, the establishment of entry stations would serve a most valuable purpose in helping directly control the proper driver observance of regulations relating to unauthorized intra-campus vehicular travel. In addition, the basic concept of entry stations is valuable in providing a beneficial public relations service through furnishing visitors with easy directions to their desired campus destination and conveniently located visitor parking areas.

Since entry stations do not appear practical for Western Kentucky University, the enforcement of the established traffic and parking regulations must be performed on a continuing basis by members of the campus security force. As the size of the developed campus area and population increase in coming years, the strength and resources of the security force will need to be increased proportionately to permit keeping abreast of the changing traffic and parking problem. In view of the nature of physical development of the campus and dispersal of the parking areas, the use of three-wheel cycle units for convenient and continuing campus roadway and parking facility enforcement appears deserving of consideration.

WILBUR SMITH