

UNIVERSITY OF LOUISVILLE

1993 LONG RANGE

DEVELOPMENT PLAN

SETTING

The 1993 master plan update evaluates the planning issues and opportunities on three University of Louisville campuses which vary significantly in size and character. The **Belknap Campus**, established in the 1920's, is home to the University's major non-medical academic programs. This 165-acre campus, located 3 miles from the downtown area, offers a traditional campus setting with open space quadrangles framed by mature trees and low- to mid-rise buildings (3 to 4 stories in height). The **Health Sciences Center** is located approximately two miles north of the Belknap Campus in the heart of Louisville's Medical Center on the eastern edge of the downtown area. This campus, established in 1962, encompasses approximately 38 acres in an intensively developed urban setting where the street grid serves as a primary organizing element. The Shelby Campus of the University of Louisville is located 10 miles to the east of downtown at the intersection of Shelbyville Road and Hurstbourne Lane. This 243-acre campus was initially developed in the early 1960's as a Baptist Liberal Arts College and was acquired by the University in 1969.

PLANNING PROCESS

Following are the steps that were taken in the planning process:

- Step 1 - Data Gathering
The external consultants identified planning data needs for all three campuses. The administrative staff of the University then gathered the appropriate data, including University-Wide Strategic Directions Document 1990, 1995, Six-Year Capital Plan 1990-1996, and the Ten Year Major Maintenance Plan.
- Step 2 - Data Review and Summary Preparation
The external consultants took the data and prepared a summary document for use by the planning group.
- Step 3 - Planning Charrettes
A planning group including external consultants and representatives of the University faculty and staff met in two, 2-day planning sessions. In these working sessions the campus plans were essentially developed.
- Step 4 - Document Preparation
Following the charrettes, the external consultants produced narrative, sketches, and maps to describe the new campus master plans.
- Step 5 - Presentation to University
The master plans for each of the three campuses were presented to the planning team, Board of Trustees and others for reaction.

- Step 6 - Integration with Strategic Unit Plans
While the campus master plans were being developed, specific unit plans to implement the University-wide Strategic Directions Six Year Capital Plan and Major Maintenance were also being prepared and updated. The campus master plans were reviewed to be sure they were in agreement with these concurrent processes.
- Step 7 - Final Document Preparation.
The 1993 Master Plan, identifying the needs of the three campuses for the next five years and beyond, was thus developed for distribution.

Critical to the planning process was the participation of the planning team representatives of the University, City and State. Teams Members were:

University Faculty and Staff Team Members were:

Bernard “Sonny” Altman	Larry Mehlbauer
Louis Dickey	Ronald Moore
Kenneth Dietz	Rafael Nystrand
Edward Dusch	William Olsen
Dennis Golden	Larry Owsley
Clarke Johnson	Linda Shapiro
Wallace Mann	

External Planning Teams Members were:

Brian Bobo — City of Louisville Public Works
 Jim Pasakowski — City of Louisville Traffic Engineer
 Bill Seymore — State of Kentucky Highway Department
 Noel Thompson — City of Louisville Public Works

In addition to **Arrasmith, Judd, Rapp & Associates, Inc., Architects** three other external consultants assisted with the planning effort:

- **Johnson Johnson & Roy/Inc.**
Landscape Planning and Campus Planning
- **Walker Parking Consultants/Engineers, Inc.**
Transportation and Parking
- **E. R. Ronald and Associates**
Campus Engineering and Utilities

The product of the planning effort is best viewed as a joint effort of the planning group including the external consultants and the University participants.

EXECUTIVE SUMMARY

OVERALL CAMPUS PLANNING PRINCIPLES

Despite the differing characteristics of the University of Louisville campuses, a number of general master planning principles apply to all three. These basic principles are briefly stated below. They have served as the foundation of previous master plans and are reconfirmed in this update.

The specific implications of these principles on the Belknap, Health Sciences Center and Shelby campuses are described and illustrated in the following section, Planning Issues and Recommendations.

Open Space

Use open spaces to clarify and reinforce campus organization, to define campus edges and to create a positive campus identity.

Locate and design open spaces to create a more people-oriented environment and to provide opportunities for social interaction.

Use pedestrian corridors to link existing and new open spaces into a continuous system to create a visible pattern of organization.

Pedestrian Circulation

Give priority to the quality of the campus pedestrian experience.

Establish a hierarchy of walks that enhances campus orientation. Coordinate the location of primary walkways and major activity generators.

Extend campus walkway corridors into newly developed (or redeveloped) campus areas to create an integrated network.

Clearly define pedestrian street crossings to maximize the visibility and safety of these potential conflict points.

Development Patterns

Establish a compact, concentrated pattern of development to use land efficiently, enhance security and maximize convenience for pedestrians.

Encourage similar uses to locate within defined functional areas.

Coordinate the height and density of new construction with the character of existing campus development.

Vehicular Circulation

Encourage vehicular through traffic to move around the edges of each campus to maintain a clear pedestrian orientation within the campus interior.

Capitalize on the visibility afforded by major arterial streets to establish a positive, recognizable campus image.

Major Maintenance and Renovation Program

Although new buildings and expanded campus grounds make up the majority of this report, the University recognizes that effective care of existing campus facilities is absolutely essential. As the planning aspects were undertaken to develop the 1993 Master Plan, a comprehensive inspection of existing building conditions was performed. The information gathered in this process was used to develop a detailed report of major repairs that will be required over the next ten years. Summary information from this document is included in the Major Maintenance and Renovation section, pages C-1 through C-26.

Parking

Maintain a balance between parking supply and demand as new development occurs.

Plan for a transition from surface lots to parking decks to maximize convenience, while minimizing land utilization and visual impacts.

Locate parking decks on or near arterial streets on the campus perimeter for easy access and to minimize campus through traffic.

Distribute parking to ensure convenience for the greatest number of users; provide for visitor, patient and special needs parking in close proximity to campus destinations

Service and Utilities

Utility Systems

The utilities systems serving the campus will need to be upgraded and expanded but only as new facilities are brought into operation on the campus.

Landscaping

First priority must be the maintenance of the central campus. A second priority should be the planting of canopy trees since these will take many years to mature. Other landscaping should be included as parking lots and building projects occur and as funds permit.

SUMMARY OF PLANNING ISSUES AND NEW INITIATIVES

The 1993 Long Range Development Plan re-affirms many of the basic concepts recommended in the 1975 Master Plan and restated in the 1985 Master Plan Update, while identifying significant new planning directions.

BELKNAP CAMPUS

Re-affirms:

- Consolidation and expansion of campus athletic and recreational programs is underway on newly acquired land along the eastern edge of the campus (University Park).
- Student Parking is being relocated to the campus perimeter to maximize the pedestrian orientation of the campus core.
- A clearly defined northern entrance to the campus from Cardinal Boulevard has been developed.
- The creation of an engineering/research development zone south of Eastern Parkway by relocating the baseball stadium and track.
- Acquisition of Stansbury Park.
- The closure of Brook Street and the redevelopment of this right-of-way as a major north-south pedestrian corridor.
- The closure of Brandeis between Third and Fourth Streets to create a pedestrian corridor linking a major student parking area to the campus core.

Significant New Initiatives:

- Relocation of service functions from the southeast quadrant of the campus to newly acquired land located to the north of Cardinal Boulevard and east of the CSX Railroad right-of-way.
- Long-term relocation of student housing from the northeast quadrant of campus to its western edge (Fourth Street) to make room for academic expansion, while continuing to provide special need housing within the core area.
- Renewed emphasis on the traditional quadrangle pattern of development as new academic buildings are constructed.
- The closure of Eastern Parkway as a through traffic street and the conversion of this right-of-way to a campus entry drive (on the east) and pedestrian mall (on the west).
- The possible relocation of the baseball stadium, the development of a University Football

Stadium to the south of the Southern Rail line.

- The closure of Warnock Street from 1-65 to Floyd and the closure of the remaining segment of Intramural Way (west of Brook).
- Consolidation of Student Services (including admissions, registrar, student records, financial aid and mail service) in the Houchens Building.
- Acquisition of the remaining commercial properties on the block bounded by Cardinal, Third, Fourth and Brandeis.

HEATH SCIENCE CENTER

Re-affirms:

- Strengthen the functional organization of the campus by concentrating academic and research functions on the western end of the complex and clinical/patient care functions to the east.
- Plan for the expansion of patient care functions to the east of Hancock Street.
- Locate parking on the perimeter of the campus with easy access from major arterial streets; accomplish a transition from surface parking to decks.
- Work within the Medical Center's grid of streets; improve the quality of the streetscape to enhance the campus image and soften the hard surfaces of the urban environment.

Significant New Initiatives:

- Create at-grade pedestrian/open space connections linking the interior of academic/ research and patient care blocks; create a second, north-south pedestrian/open space connector which ties parking decks to the primary east-west walkway.
- Establish open space focal points on the interior of new development blocks.
- Improve security in perceived and real terms by concentrating pedestrian traffic on well-lit, high-volume corridors and by reducing reliance on distant surface parking lots.
- Plan for the eventual expansion of patient care facilities south of Chestnut (between Hancock and Clay); acquire land south of Chestnut (between Floyd and Clay) as it becomes available.

SHELBY CAMPUS

Re-affirms:

- A loop road will provide access to parking on the edges of a pedestrian core.
- A new, main entrance to campus will be established from Hurstbourne Lane.
- The campus zone adjacent to Shelbyville Road should be sold for private and/or joint venture development.

Significant New Initiatives:

- More detailed investigation of a new program orientation for the Shelby Campus is recommended. This program places increasing emphasis on continuing education with the addition of video conferencing and computer training facilities to serve the needs of the business community. Additional conference space and a nearby, off-campus hotel might also be part of this evolving program concept.
- A new entrance drive from Hurstbourne Lane will open up additional acreage (to north of campus core) for potential sale or lease to private or joint venture developers. In the interim, the University may continue to authorize community use of these areas for recreation.
- Sale of the university-owned parcel located to the east of Hurstbourne Lane to a private developer is recommended.

PLANNING ISSUES AND RECOMMENDATIONS

BELKNAP CAMPUS

Introduction

The Belknap Campus accommodates an enrollment of 22,900 full-time equivalent (FTE) students and provides approximately 3.5 million gross square feet (GSF) of building space. The older portions of the campus have been developed in a traditional pattern with 3- to 4-story buildings framing open space quadrangles graced by mature shade trees. As development has occurred in the northern and eastern portions of the campus core, this open space pattern has not been extended. As a result, the clarity of the campus structure and image has been weakened. Nevertheless, these new buildings (Student Activities Center, School of Music, University Club and Alumni Center) have established new campus design themes (in their scale, choice of materials and architectural style) which should serve as a reference for the design of future buildings in this campus sub-area.

The campus is bounded on the north by Cardinal Boulevard, the Old Louisville Preservation District and du Pont Manual High School. Rail corridors bound the campus to the south and west. A third rail line runs north-south through the eastern third of the campus, separating the academic core area from University Park, the new athletic complex. Interstate 65 forms the eastern campus edge.

Summary of Planning Issues

Many of the planning concepts for the Belknap Campus recommended in the 1975 Master Plan and restated in the 1985 Master Plan update have been implemented wholly or in part by the University.

- Consolidation and expansion of campus athletic and recreational programs is underway on newly acquired land along the eastern edge of the campus (University Park).
- Student parking is being relocated to the campus perimeter to maximize the pedestrian orientation of the campus core.
- A clearly defined northern entrance to the campus from Cardinal Boulevard has been developed.

Other master plan concepts have not yet been implemented, but are reconfirmed in the 1993 master plan update. These include:

- The creation of an engineering/research development zone south of Eastern Parkway by relocating the baseball stadium and track;
- Acquisition of Stansbury Park;
- The closure of Brook Street and the redevelopment of this right-of-way as a major north-south pedestrian corridor;
- The closure of Brandeis between Third and Fourth Streets to create a pedestrian corridor

linking a major student parking area to the campus core.

The 1993 master plan update also identifies significant new initiatives:

- Relocation of service functions from the southeast quadrant of the campus to newly acquired land located to the north of Cardinal Boulevard and east of the CSX Railroad right-of-way;
- Long-term relocation of student housing from the northeast quadrant of campus to its western edge (Fourth Street) to make room for academic expansion, while continuing to provide special need housing within the core area;
- Renewed emphasis on the traditional quadrangle pattern of development as new academic buildings are constructed;
- The closure of Eastern Parkway as a through traffic street and the conversion of this right-of-way to a campus entry drive (on the east) and pedestrian mall (on the west);
- The possible relocation of the baseball stadium, and development of a university football stadium to the south of the Southern rail line;
- The closure of Warnock Street from I-65 to Floyd and the closure of the remaining segment of Intramural Way (west of Brook);
- Consolidation of student services (including admissions, registrar, student records, financial aid and mail service) in the Houchens Building;
- Acquisition of the remaining commercial properties on the block bounded by Cardinal, Third, Fourth and Brandeis.

Development Patterns

The master plan identifies opportunities for accommodating growth over the long term and for providing a degree of flexibility in meeting these future needs. The Long Range Framework Plan illustrates areas which warrant acquisition and delineates development sites both within existing campus boundaries and selected acquisition areas. The location and configuration of these sites demonstrate how future development can help to strengthen the organizational structure of the campus by framing open space “quadrangles.”

Land Use: The recommended organization of land uses on the Belknap Campus includes two notable modifications to the existing land use pattern.

- Historically, academic uses and special functions (the Grawemeyer Hall, J. B. Speed Art Museum) have occupied the academic core area bounded by Cardinal Boulevard, Brook Street, Eastern Parkway and Third Street. To reinforce this pattern in planning for future growth, the 1993 Long Range Framework Plan recommends that housing be relocated from the northwestern quadrant of the campus to the area between Third and Fourth Streets. This will make three major development opportunity sites available for future academic

expansion. It will also place the majority of student housing in close proximity to the primary student parking area (located west of Fourth Street) and immediately adjacent to the concentration of commercial services at Cardinal and Fourth. Low-density student service functions now located in the northeast quadrant (Ecumenical Center, Minority Services Building) will be considered for consolidation with other student services in the Student Activities Center (SAC) and the Houchens Building.

- Support and athletic/recreational functions now located in the academic core area, as well as several support functions located between Brook Street and the parallel rail line, will be relocated to allow for future academic growth. Athletic and recreational facilities will be consolidated in the University Park area, located east of Floyd Street from Cardinal Boulevard to Eastern Parkway. Support service functions will be consolidated in the service complex located east of the CSX right-of-way and north of Cardinal Boulevard.

As suggested in previous master plans, development sites for research functions will be made available to the east of the engineering complex in the area south of Eastern Parkway, now occupied by Parkway Field, the track and recreational fields. With the exception of the baseball field, these athletic functions will be relocated to the University Park area where new and existing athletic and recreational facilities will be consolidated. Like support and recreational/athletic facilities, new parking will also be concentrated on the periphery of the campus.

Growth Capacity: A significant amount of expansion capacity exists *within existing campus boundaries*. To realize that capacity, however, the University must remove obsolete structures and relocate low intensity uses out of academic core area. Existing athletic facilities on southern edge of campus and existing surface parking areas also present opportunities for future building development.

The Long Range Framework Plan recommends:

- The future replacement of housing and low density student service functions in the northeastern portion of the campus with academic buildings (sites 18A, 19A, 20A). This future development should frame two new open space quadrangles which extend the open space pattern established in the older, southwestern portion of the campus.
- The relocation of student housing to the western edge of the campus along Third and Fourth Streets (sites 1A, 2A, 3A, and 14A), while continuing to provide for special needs student housing in the core area.
- The re-use of certain surface parking lots for new building development (sites 4A, 9A, and 10A).
- The relocation of existing athletic/recreational facilities in the area south of Eastern Parkway to accommodate new development needed to support research and engineering expansion (sites 22R - 25R).
- Demolition of obsolete buildings (Fine Arts Building; Belknap Gym) in the southeastern portion of campus (sites 6A and 21A) and relocation of support functions (sites 7A, 8A) to

land acquired to north of Cardinal on periphery of campus.

- Redevelopment of land acquired by University, but still accommodating older apartment housing (a portion of site IA).

In order to relocate existing facilities to make room for new academic and research functions, additional *land acquisition* will be needed.

- Acquisition of additional parcels in the University Park area will be needed to complete the development of a consolidated athletic/recreational complex.
- Acquisition of additional land on the northeast edge of campus will be needed to complete the creation of a service complex (specifically north to Lee Street and possibly west to Brook Street). Land north of Cardinal and west of the CSX rail line should also be considered for future parking.
- Acquisition of the balance of the block bounded by Cardinal, Third, Fourth and Brandeis, including the Cardinal Shopping Center, for future housing development and limited student-related commercial uses. Additionally should the Masterson Restaurant be offered for sale, the site could be used for future student housing and limited student-related commercial functions.
- Since 1975, the master plan has recommended that the University acquire Stansbury Park on the southwest corner of the campus. This site could be used for future student housing, research or academic functions.
- The University is also considering the acquisition of land to provide for a football stadium and, possibly, the relocation of the baseball field. A site evaluation study for the football stadium is now underway.

Estimates of growth capacity (in gross square feet of building space) have been developed for the 25 opportunity sites illustrated in the Long Range Framework Plan. These capacity estimates are based on (1) building heights consistent with surrounding development and (2) an efficiency factor derived from existing campus development patterns. Based on these estimates, the Long Range Framework Plan illustrates approximately 3.1 million gross square feet (GSF) of growth capacity. This would allow the University to nearly double the building square footage which exists on campus today (3.4 million GSF).

SEE DEVELOPMENT CAPACITY BY SITE CHARTS ON PAGES 17& 18.

Open Space

New Open Spaces: The original core of the Belknap Campus -- its southwestern corner -- exhibits a strongly defined open space pattern which helps to establish a positive image and appealing pedestrian character. Here, open spaces framed by buildings serve as focal points, rather than “leftover” spaces. As a result, these open spaces play a significant role in creating a sense of campus structure.

As the area to the north and east of this original campus core was developed, the open spaces needed to extend this strong organizing pattern were not provided. Nevertheless, opportunities for redevelopment in the northeastern portion of the academic core, and opportunities for new development to the south (parkway Field area) and west (Stansbury park area), offer the potential to create open spaces which give a clear organizational structure and pedestrian orientation to the campus.

- The Long Range Framework Plan illustrates the opportunity to create two additional open space quadrangles in the northeastern portion of the academic core. These quadrangles will be framed by new and existing buildings (SAC, 18A and 19A; Humanities, 6A, 19A, 20A, and 21A). Pedestrian walkways should link these open space focal points to each other, and other campus open spaces, to form a continuous open space network.
- Another major open space opportunity is presented by the proposed closure of Eastern Parkway and the relocation of the existing baseball and track facilities. This area to the east of the engineering complex can be redeveloped to accommodate new research and engineering uses. The redevelopment approach illustrated in the Long Range Framework Plan reserves a central open space with buildings (22R - 25R) located to frame its eastern, southern and western edges. The Long Range Framework Plan also illustrates the reconstruction of the southern portion of Eastern Parkway right-of-way as a major pedestrian mall.
- The Long Range Framework Plan proposes the same "quadrangle" development approach in the Stansbury Park area, if this park can be acquired by the University. This new open space would extend the visual impact of the Oval to tie the areas to east and west of Third Street together.

Open Space Treatments: Two major open space types, or treatments, are recommended in the Long Range Framework Plan: softscape and hardscape. The great majority of campus open spaces will follow the "softscape" model established by the Oval, the open spaces to the east and west of the Library and those between the Natural Science Building and Gardiner Hall. The landscape treatment of these spaces emphasizes open lawn areas, with informally spaced shade tree plantings creating an overhead canopy. Shrub plantings are used only along building edges. For the most part, primary pedestrian corridors are also routed along the perimeter of these spaces.

In contrast, campus "hardscapes" emphasize special paving, richer plantings along building edges (including groundcover, shrubs, and smaller scale ornamental trees), and seating areas to accommodate intensive pedestrian use and create informal social spaces. For the most part, these “hardscape” open spaces are located at major building entries. However, a special student gathering

space is also proposed adjacent to the Student Activities Center and the Red Barn.

The Long Range Framework Plan also identifies several important open spaces located at campus entries to establish a positive identity and aid in orienting visitors. Existing entry open spaces include the Oval at Third Street and the Cardinal Boulevard entry located between the School of Education and the School of Music. Additional entry spaces are proposed on Cardinal Boulevard and Eastern Parkway east of Floyd Street. Special landscape treatments are appropriate to distinguish these entries, along with appropriate directional signs and lighting.

Pedestrian System

The 1993 master plan update recommends the continuation of efforts to move surface parking out of the academic core area to create a high quality pedestrian environment in the heart of the campus. The utilization of development opportunity sites 4A, 6A, 7A, 8A, 9A, 10A, and 21A — now occupied in part by surface parking — will help to accomplish these objectives.

As illustrated in the Long Range Framework Plan, the pedestrian system on the Belknap Campus should form a grid of walkways, each passing through or connecting to a major core area open space. Existing walkways must be extended and new walkways created to complete this network. The most critical east-west and north-south pedestrian corridors are briefly described below:

East-West Corridors: The Long Range Framework Plan illustrates four new or extended pedestrian corridors which are critical in creating east-west linkages.

- A more clearly defined pedestrian connection should be created between Third and Fourth Streets to tie the parking area west of Fourth Street to the existing walkway linking the Law School, Library and Humanities buildings. This walkway should also be extended east to University Park. This extension can be facilitated by development of the proposed quadrangle formed by sites 6A, 19A, 20A and 21A. As this walkway moves further east, it will tie into the existing rail line overpass and connect to the upper level of the proposed parking deck on site PD-1.
- Brandeis Street should be closed between Third and Fourth Streets to extend the existing east-west walkway which connects Third Street to the new University Club and Alumni Center. This western walkway extension will create a new pedestrian entrance to the campus from the major student parking area located to the west of Fourth Street. Improvements should also be considered along the portion of this walkway which parallels the service drive between the Business School and the University Club.
- The proposed closure of Eastern Parkway and the conversion of this major street into a pedestrian mall will eliminate some of the most severe pedestrian/vehicular crossing conflicts on campus. This proposed street closure will make it possible to link the science/engineering/research area more effectively to the core of the campus.
- Redevelopment on sites 6A and 21A will make it possible to create an improved east-west walkway between the Brook Street right-of-way and the Grawemeyer Administration Building and an improved pedestrian connection along the southern portion of the former

Shipp Street right-of-way.

North-South Corridors: The Long Range Framework Plan also illustrates one new north-south pedestrian corridor which can be created by closing Brook Street. This walkway will link the Student Activity Center to the proposed research concentration south of Eastern Parkway.

Pedestrian/Vehicular Conflicts: As noted above, some of the most severe pedestrian/vehicular conflicts on campus will be eliminated with the recommended closure of Eastern Parkway. However, continued efforts must be concentrated on improving the visibility and safety of pedestrian crossings on Third (at the Confederate Monument and just north of the Law School) and Fourth (at Brandeis and just north of Stansbury Park).

Vehicular Circulation

Recent City plans for improving access to Churchill Downs and the State Fairgrounds, including the extension of Central Avenue, make possible the closure of Eastern Parkway within the Belknap Campus. The Long Range Framework Plan illustrates the benefits of this closure. The portion of the right-of-way west of Brook Street will be converted into a pedestrian mall. The portion of the right-of-way east of Brook will be used as a campus entry drive terminating at the proposed research development area. This campus drive will follow Eastern Parkway's existing vertical alignment -- ramping up to cross over Floyd Street and the rail line. As a result, the drop-off area in the proposed research zone will serve a second level building entrance (site 22R).

Other important street closures recommended in the 1993 master plan update include:

- The closure of Brook Street (from Cardinal to the existing Southern Railroad track) to create a new north-south pedestrian corridor linking the proposed research area to the Student Activities Center (SAC).
- The closure of Brandeis between Third and Fourth Streets to create a pedestrian entrance to the campus from the major student parking area located to the west.
- The closure of Confederate Place to create a more attractive foreground and provide a usable open space for campus fraternities and sororities.
- The closure of Warnock between I-65 and Floyd Street; Cardinal Boulevard and the entry drive developed in the Eastern Parkway right-of-way will serve as connections between the campus and I-65.

The Long Range Framework Plan also proposes the development of an internal campus service drive paralleling the rail line which runs north-south through the campus and the rail line which now marks the southern campus boundary. Major walks within the core of the campus will also continue to provide service vehicle access.

Appendix A — Traffic Analysis — Belknap Campus, Pages A-21 through A-28; Prepared by Walker Parking Consultants/Engineers, Inc.

Parking

The 1993 master plan update continues to emphasize the implementation of two fundamental parking-related objectives.

- To create a quality pedestrian environment in the campus core, the majority of student parking will be relocated to the perimeter of campus.
- To maintain convenient walking distances from parking to destination, and to use land efficiently, the majority of additional campus parking must be provided in decks, rather than surface lots.

The Long Range Framework Plan illustrates five proposed parking deck locations on or near the perimeter of campus and easily accessible from major surface streets. The parking deck locations proposed on the perimeter of the campus allow all academic core destinations to be reached within an 8-minute walk.

In the short term, two parking decks will be needed (on sites PD1 and 2). Opportunities for expanding the supply of structured parking are also illustrated (sites PD3, 4 and 5).

The deck proposed for site PD1 is now under construction. This deck will replace surface parking spaces lost in the development of University Park. This deck will serve the area of campus with the highest parking demand, accommodating student and staff parking during the day and special events parking (for University Park) during the evening hours. The proposed deck on site PD2 will serve the Speed School, the proposed research area and the southeastern portion of the campus core.

A certain amount of surface parking will be maintained in the academic core area to serve the needs of faculty, staff and students who are disabled. Landscape improvements are recommended for these surface parking areas (including screening and shade tree planting) to reduce their visual impact.

*Appendix A — Parking Supply and Demand — Belknap Campus, Pages A-1 through A-12;
Prepared by Walker Parking Consultants/Engineers, Inc.*

Service and Utilities

Utility expansions that will be required to support new facilities at the Belknap Campus can be summarized as follows:

- Expansion of steam and chilled water tunnel system.
- Expansion of electrical distribution and communication systems along with new tunnels.
- Additional refrigeration capacity at the Central Steam and Chilled Water Plant.
- Storm water flooding should also be corrected by MSD.
- Sanitary and storm sewers need to be separated in the older sections of campus as development occurs in these areas.

- The majority of the gas distribution system is maintained by the Louisville Gas and Electric; as new areas are developed, easements for expansion and upgrading of gas service will be needed.
- Telephone, data, security, fire safety, and automation systems are included in the underground conduit that parallels the electrical distribution system and utility tunnels. As other utilities are extended, these will need extension as well.

Appendix B - Belknap Campus, Pages B-1 through B-14; Prepared by E.R. Ronald and Associates

Landscaping

The Landscape Development Plan for Belknap Campus (developed in the 1985 Master Plan update) illustrates a conceptual landscape plan. It is best to view the landscaping of the campus in terms of five zones.

- North Entrance - This newest area of the campus needs landscape enrichment-canopy trees, evergreens and shrub masses to screen parking - so as to eventually compare to the mature central areas immediately to the south.
- University Park - As these properties are acquired (east of Floyd) perimeter canopy trees should be planted to define the campus and relieve the size of facilities such as the field house and parking deck.
- Speed School/Research Complex - The area south of Eastern Parkway, similar to the north zone, needs landscape development to tie it to the older areas of the campus across the Parkway.
- New Parking Area - The new surface parking areas west of Fourth Street will require perimeter canopy trees to define pedestrian access ways as well as plants to screen the large parking areas.
- Campus Core - The campus core is mature and an invaluable landscape zone. Continuing maintenance is essential to preserve the integrity of this zone.

DEVELOPMENT CAPACITY
BELKNAP SIX YEAR PLAN

Development Zone	Footprint SF	Height (in stories)	GSF	Efficiency Factor (%)	Adjusted Capacity (GSF)
1A	52,700	3	158,100	50%	79,100
2A	40,250	6	241,500	50%	120,800
3A	21,600	1	21,600	100%	21,600
4A	42,000	4	168,000	85%	142,800
5A**	36,000	3	108,000**	85%	91,800**
6A	28,800	6	172,800	85%	146,900
7A	28,500	4	114,000	85%	96,900
8A	21,000**	4	84,000	85%	71,400
9A	54,000**	4	216,000	85%	183,600
10A	26,600	4	106,400	85%	90,500
11A	58,000	1	58,000	100%	58,000
12A	76,000	1	76,000	100%	76,000
13A	38,000	1	38,000	100%	38,000
22R	58,800	4	235,200	85%	199,900
23R	25,200	4	100,800	85%	85,700
24R	54,600	6	327,600	85%	278,500
TOTAL GROSS SQUARE FEET					1,781,500

DEMOLITION GSF **214,610**
NET INCREASE IN GSF **1,566,890**

** - Sites Available Now

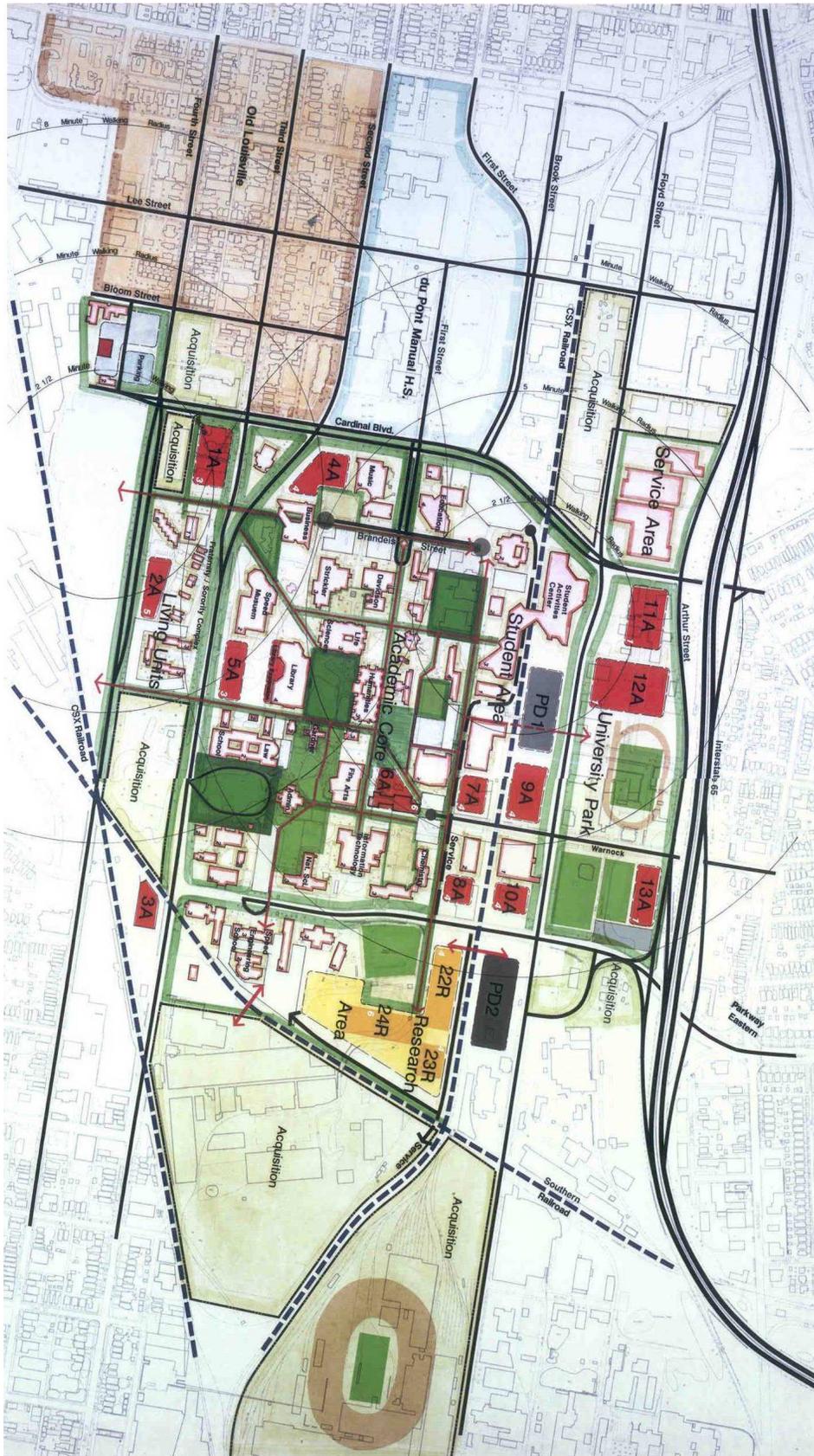
DEVELOPMENT CAPACITY

BELKNAP LONG TERM PLAN

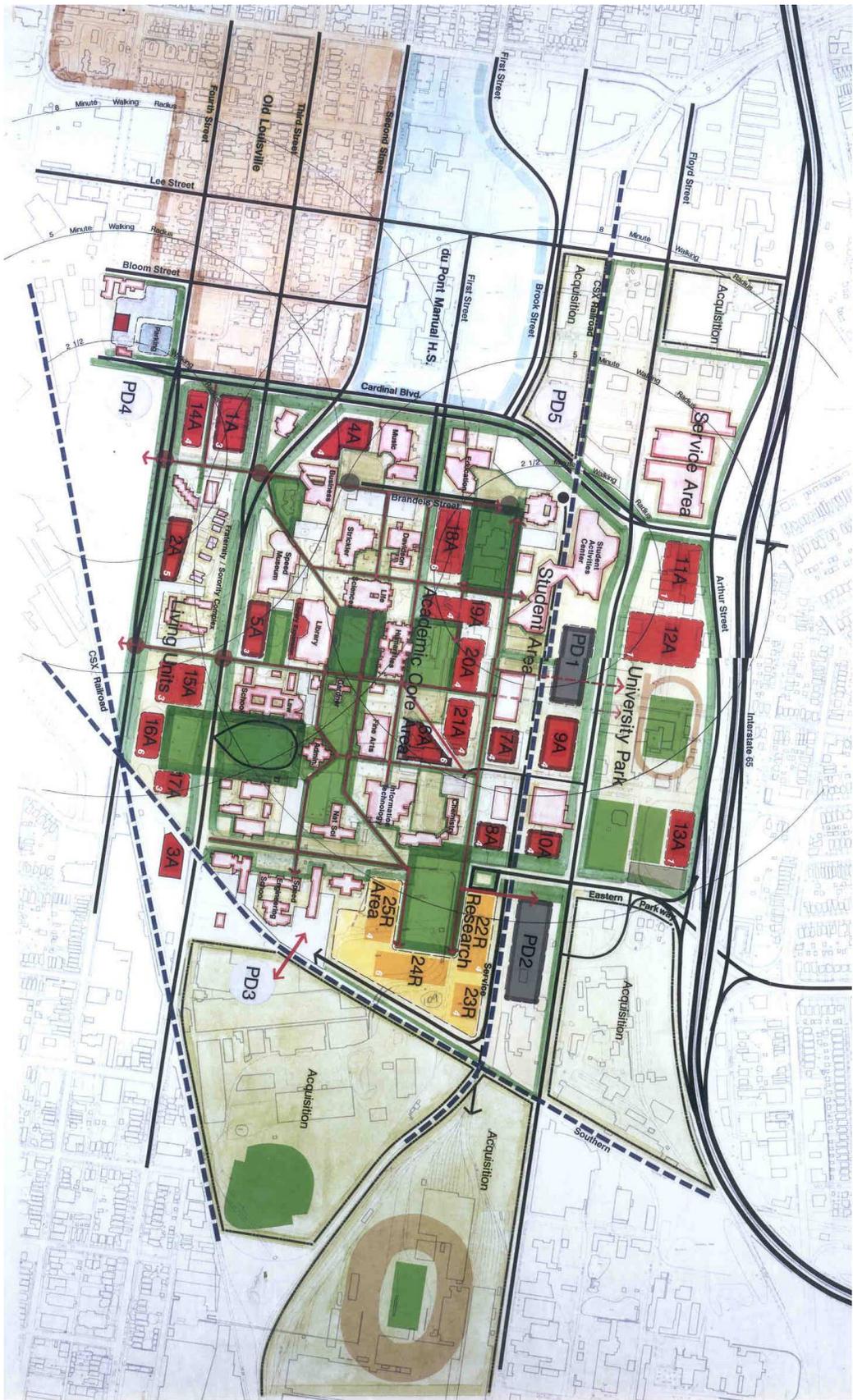
Development Zone	Footprint SF	Height (in stories)	GSF	Efficiency Factor (%)	Adjusted Capacity (GSF)
14A	31,000	4	124,000	50%	62,000
15A	56,250	3	168,750	85%	143,400
16A	32,500	6	195,000	85%	165,800
17A	21,600	3	64,800	85%	55,100
18A	61,200	6	367,200	85%	312,100
19A	46,800	4	187,200	85%	159,100
20A	40,600	4	162,400	85%	138,000
21A	39,200	4	156,800	85%	133,300
25R	46,200	4	184,800	85%	157,100
TOTAL GROSS SQUARE FEET					1,325,900

DEMOLITION GSF **216,775**
NET INCREASE IN GSF **1,109,125**

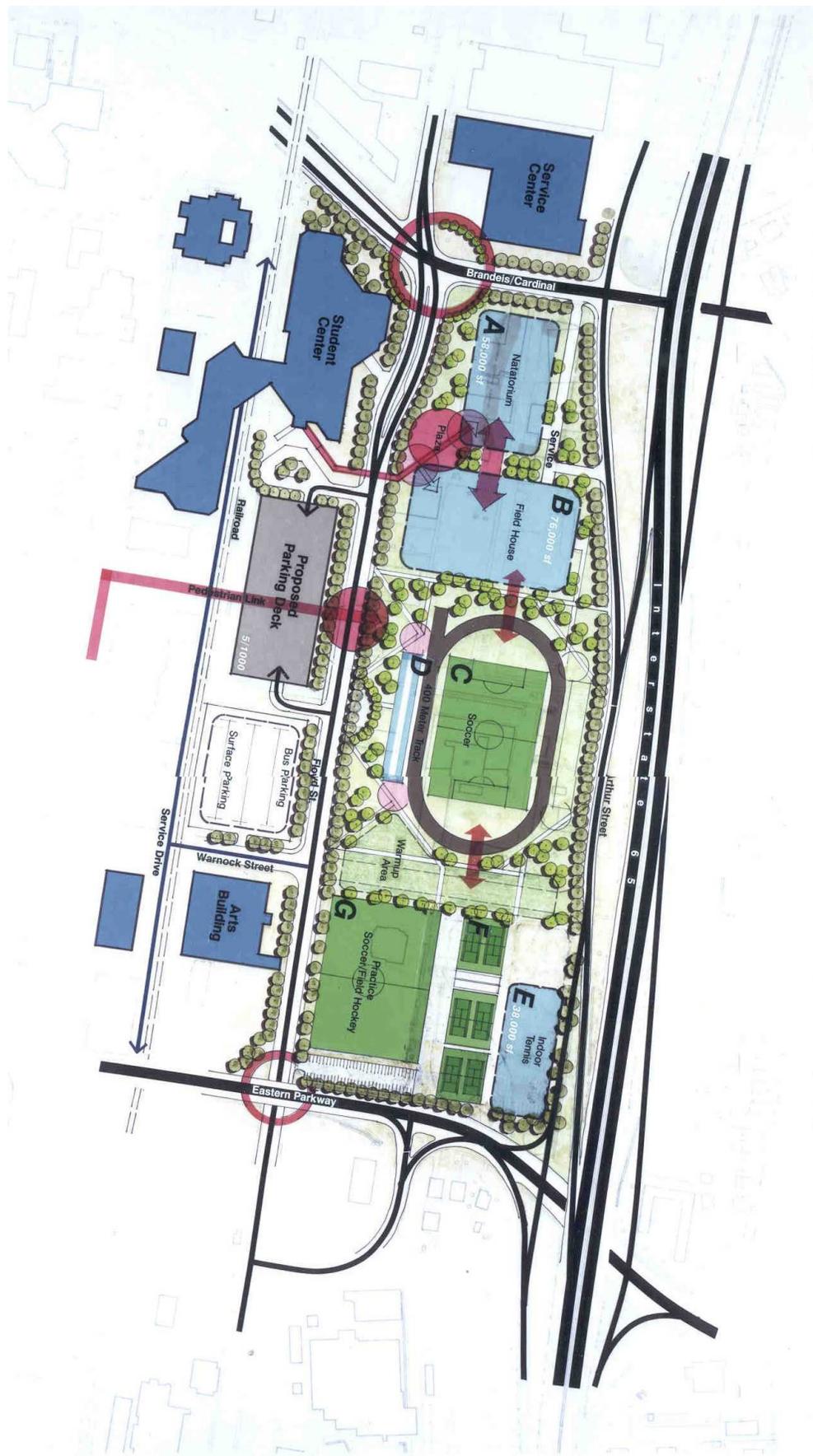
BELKNAP SIX YEAR NET INCREASE IN GSF **1,588,690 GSF**
BELKNAP LONG-TERM NET INCREASE IN GSF **1,109,125 GSF**
BELKNAP TOTAL INCREASE IN GSF **2,697,815 GSF**



Belknap Campus - SIX YEAR FRAMEWORK



Belknap Campus - LONG RANGE FRAMEWORK



Belknap Campus - SUBCAMPUS PLAN
HEALTH SCIENCES CENTER

Introduction

The Health Sciences Center accommodates an enrollment of 1,850 full time equivalent students. The campus currently supports approximately 1.3 million gross square feet of building space. While the majority of campus buildings are concentrated on the two blocks bounded by Muhammed Ali Boulevard, Chestnut Street, Floyd and Jackson, some campus buildings are located on adjacent blocks. Other major institutions with facilities in the Medical Center area include Jewish Hospital and Alliant Health Care System. Inter-institutional staff assignments, the hospitals' proximity, and the unifying grid of streets blur the definition of each institution's identity. All of the Medical Center institutions share common interests and concerns and are impacted by each other's planning and development decisions. As a result, it is appropriate to consider the benefits of establishing a forum for sharing information and coordinating initiatives within the Medical Center

Summary Planning Issues

The 1993 master plan update for the Health Sciences Center re-affirms many of the basic concepts established in the 1975 plan.

- Strengthen the functional organization of the campus by concentrating academic and research functions on the western end of the complex and clinical/patient care functions to the east.
- Plan for the future expansion of patient care functions to the east of Hancock Street.
- Locate parking on the perimeter of the campus with easy access from major arterial streets; accomplish a transition from surface parking to decks.
- Work within the Medical Center's grid of streets, improve the quality of the streetscape to enhance the campus image and soften the hard surfaces of the urban environment.

The 1993 master plan update also identifies significant new planning directions:

- Create at-grade pedestrian/open space connections linking the interior of academic/research and patient care blocks; create a second, north-south pedestrian/open space connector which ties parking decks to the primary east-west walkway.
- Establish open space focal points on the interior of new development blocks.
- Improve security in perceived and real terms by concentrating pedestrian traffic on well-lit, high-volume corridors and by reducing reliance on distant surface parking lots.
- Plan for the eventual expansion of patient care facilities south of Chestnut (between Hancock and Clay); acquire land south of Chestnut (between Floyd and Clay) as it becomes available.

Development Patterns

The Framework Plan for the Health Sciences Center illustrates development sites located within

existing campus boundaries and in adjacent expansion zones. These future development sites are configured to demonstrate how growth can strengthen campus organization, provide improved pedestrian connections, and enhance the overall campus image. To accomplish these goals, future building sites are located to create open space courtyards on the interior of new development blocks and clearly defined pedestrian/open space corridors are established.

Land Use: The Framework Plan reinforces the existing land use pattern in the Health Sciences Center by recommending that academic and research functions continue to be located at the western end of the campus with clinical/patient care functions expanding to the east. Because the greatest growth can be anticipated in patient care activities, it is appropriate that these functions be located where the greatest expansion potential exists.

Acquisition: Existing Health Sciences Center facilities are concentrated on the three blocks bounded by Muhammed Ali, Hancock Street, Chestnut and Floyd. While significant expansion capacity is available within these boundaries for academic functions, patient care expansion potential is limited. As a result, the Framework Plan illustrates acquisition of the block bounded by Hancock, Muhammed Ali, Clay and Chestnut for patient care expansion. The majority of this block is now used for surface parking, much of it leased by the University. In the longer term, additional expansion could be accommodated on the block bounded by Hancock and Clay, south of Chestnut. Approximately one third of this block is already in university ownership. The 1993 master plan update also recommends that the University acquire properties which become available on the blocks south of Chestnut between Preston and Hancock.

Development Capacity: Three major development sites are identified in the Framework Plan in the academic/research portion of the Health Sciences Center. These sites, which occupy existing surface parking lots, are located to preserve an open space focal point shared with the Library and the School of Dentistry. The estimated development capacity of these sites totals approximately 338,000 GSF. The buildings are assumed to be 4-5 stories in height with the exception of site A, where a taller building (9 stories) can create a visual terminus to the east-west pedestrian/open space corridor.

The two development opportunity sites located within existing campus boundaries in the patient care portion of the Health Sciences Center will provide approximately 187,000 GSF of growth capacity. Expansion of the campus to the east of Hancock Street will provide approximately 612,000 GSF of development capacity on three sites. As in the academic/research area, these development sites are configured to preserve a central open space which serves as the eastern terminus to the east-west pedestrian corridor linking all major Health Science Center facilities. An additional 383,000 GSF of growth capacity can be provided on the block located to the south of Chestnut (between Hancock and Clay).

In total, the Framework Plan illustrates 1.5 million GSF of growth capacity. Existing Health Sciences Center facilities total approximately 1.3 million GSF.

SEE DEVELOPMENT CAPACITY BY SITE CHARTS ON PAGE 27.

Open Space

The Health Sciences Center is located in an intensively developed urban context where the grid formed by the street network is the strongest organizing element. Previous campus master plans

have emphasized the use of varied building setbacks to create an open space setting along these streets and to soften the hard surfaces of the urban environment. The 1993 master plan update proposes a new approach, however, by recommending the creation of major open spaces on the interior of development blocks in two areas spanning Preston Street and in the expansion block to the east of Hancock, these internal open space areas will serve as the focal points for new building development, while creating an improved campus pedestrian setting.

The relationship of new development to adjacent streets will continue to have an important influence on the image of the Health Sciences Center. The Framework Plan recommends that a standard setback be established to allow buildings to create a more consistent “edge” to the street. These open space setbacks should be landscaped to create an attractive urban foreground. In addition, renewed emphasis should be placed on implementing streetscape improvements (lighting, street tree planting) within the public rights-of-way.

The corner of Floyd and Chestnut streets (currently a surface parking lot) presents a special opportunity to create an open space statement that (1) marks the entrance to the Health Sciences portion of the Medical Center and (2) creates an appropriate foreground to one of the campus’ most important and historic buildings (the Abell Building).

Pedestrian Circulation

In the past, master plan recommendations for the pedestrian system at the Health Sciences Center have emphasized the development of an elevated “pedway” system linking groups of buildings within the academic and patient care portions of the campus and, ultimately, linking these concentrations to one another. The elevated and enclosed links which have already been developed will remain an important part of the overall pedestrian movement system. However, clearly defined, high quality pedestrian connections are also needed to link facilities which are not architecturally connected. Such a pedestrian system can be created in concert with new development on sites A, B, and C by establishing an at-grade pedestrian connection along the Abraham Flexner service drive. Ultimately, this major east-west walkway will terminate in the new open space quadrangle developed in the expansion block to the east of Hancock.

To create a quality pedestrian “street,” it will be necessary to make a significant investment in improving the Flexner service drive. Special paving, lighting, and street tree planting will be needed to “humanize” this corridor and create a strong pedestrian emphasis. Special definition of the points at which this east-west pedestrian corridor crosses Preston, Jackson, and (in the future) Hancock Streets will be needed to ensure pedestrian safety.

The location of existing buildings will also make it possible to establish a major north-south pedestrian corridor extending from the existing parking deck at the corner of Muhammed Ali Boulevard and Jackson Street to the deck now under construction south of Chestnut (between Preston and Jackson). This link to the campus’ proposed east-west pedestrian “spine” is essential because of the volume of pedestrian activity which the parking decks will generate.

Vehicular Circulation

The 1993 master plan update recommends no changes to the existing street network. Although Abraham Flexner east of Floyd is to be improved as a major east-west pedestrian connection, its service access role will be maintained (with access from Floyd to serve the academic/research area and from Hancock to serve the patient care area).

Muhammed Ali Boulevard and Chestnut Street carry the heaviest traffic volumes through the area and provide maximum visibility and exposure for the Health Sciences Center. As a result, these streets should receive priority for streetscape investment.

The primary entrance to the Health Sciences Center is located at the intersection of Chestnut and Floyd. The Framework Plan recommends that the surface parking area on this corner be redeveloped as an open space to mark this gateway and provide a foreground to the university's historic Abell Building.

Parking

The Framework Plan illustrates two future parking decks sites. The deck (PD-1) proposed to the south of Chestnut between Preston and Jackson is now under construction. The second deck (PD-2) will be located between Hancock and Clay on Chestnut Street and will serve the patient care expansion area. An alternate site for the Second Deck (PD-2) could be the current Carmichael Building site provided current program needs for this building can be met within other renovated facilities on the H.S.C. Campus.

Appendix A — Parking Supply and Demand — Health Science Center, Pages A-13 through A-20; Prepared by Walker Parking Consultants/Engineers, Inc.

Service and Utilities

Utility Expansions that will be required to support new facilities at the Health Sciences Center can be summarized as follows:

- Extend underground tunnels with steam and chilled water distribution.
- Extend underground electrical distribution and communications systems along with new tunnels.
- Additional chilled water flow capacity will also be required in existing tunnels.

Appendix B — Health Science Center, Pages B-15 through B-21; Prepared by E.R. Ronald and Associates

Landscaping

The landscape scheme proposed is a continuation of the patterns suggested in the 1975 and 1985 plans. The current task is to strengthen and develop specific areas in an overall comprehensive scheme that relates to both vehicular and pedestrian movements within the Medical Center Setback zones allowing landscaping along the traffic lanes also provide opportunities for visual penetration into the interiors of building groupings within each block. The planting of street trees (6" diameter and larger) should be continued as a means of softening the edges of major traffic arteries and will be used to direct people to building entrances. Other plant materials can be used to screen service areas and surface parking lots. Both active and passive landscaped zones are available and need to be enhanced for relaxation and extemporaneous sport activities

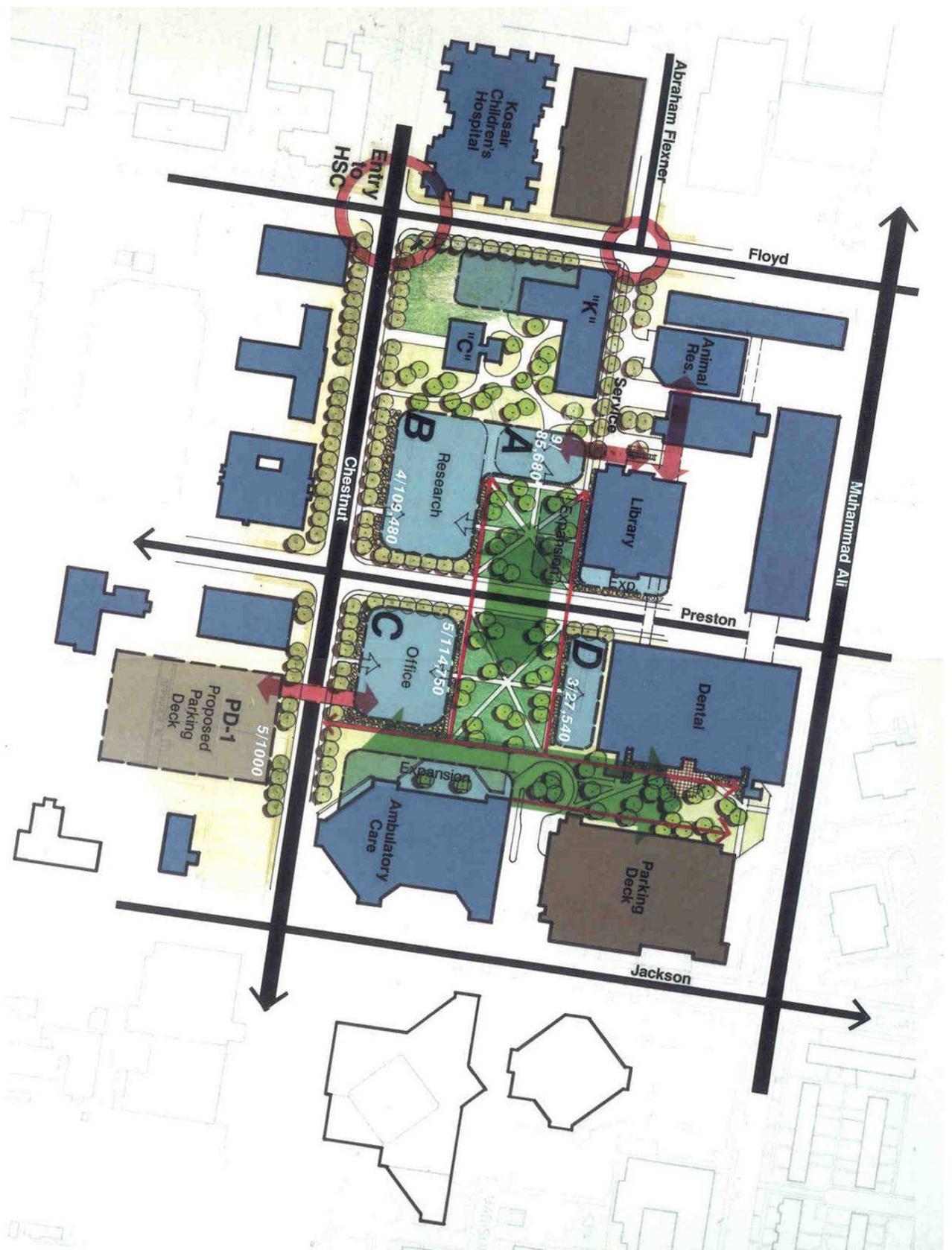
DEVELOPMENT CAPACITY
HEALTH SCIENCES CAMPUS

Development Zone	Footprint SF	Height (in stories)	GSF	Efficiency Factor (%)	Adjusted Capacity (GSF)
A	27,000	5	135,000	85%	114,800
B	32,200	4	128,800	85%	109,500
C	10,800	3	32,400	85%	27,500
D	22,750	4	91,000	85%	77,400
E	30,000	4	120,000	85%	102,000
F	75,000	6	450,000	85%	382,500
G	25,500	4	102,000	85%	86,700
H	30,000	5	150,000	85%	127,500
I	43,500	4	174,000	85%	147,900
J	32,300	4	129,200	85%	109,800
K	43,500	4	174,000	85%	147,900
L	33,000	4	132,000	85%	112,200
M	11,200	9	100,800	85%	85,700
TOTAL GROSS SQUARE FEET					1,631,400

DEMOLITION GSF **8435**
NET INCREASE IN GSF **1,622,695**

UNIVERSITY OF LOUISVILLE
 HEALTH SCIENCES CAMPUS
 FRAMEWORK PLAN 1994





Health Sciences Campus - SUBCAMPUS PLAN

SHELBY CAMPUS

Introduction

The Shelby Campus was established in the early 1960's as a Baptist Liberal Arts College. It was acquired by the University in 1969 and now accommodates an enrollment of 3,732 students. Its buildings provide a total of approximately 170,000 gross square feet on a total land area of 243 acres. Land adjacent to the Shelby Campus has been developed with higher intensity commercial and residential uses on Shelbyville Road and Hurstbourne Lane to the south and east and lower density single-family residential development to the north and west.

Summary of Planning Issues

Several basic concepts recommended in 1975 master plan are confirmed by 1993 update:

- A loop road will provide access to parking on the edges of a pedestrian core.
- A new, main entrance to campus will be established from Hurstbourne Lane.
- The campus zone adjacent to Shelbyville Road should be sold for private and/or joint venture development.

Several new planning directions have also been established in the 1993 master plan update:

- More detailed investigation of a new program orientation for the Shelby Campus is recommended. This program places increasing emphasis on continuing education with the addition of video conferencing and computer training facilities to serve the needs of the business community. Additional conference space and a nearby, off-campus hotel might also be part of this evolving program concept.
- A new entrance drive from Hurstbourne Lane will open up additional acreage (to north of campus core) for potential sale or lease to private or joint venture developers. In the interim, the University may continue to authorize community use of these areas for recreation.
- Sale of the university-owned parcel located to the east of Hurstbourne Lane to a private developer is recommended.

Development Patterns

The Framework Plan illustrates opportunities for locating new University development to complete the enclosure of an open space quadrangle located within the campus loop drive. Five parcels for future, private sector and/or joint venture development are also identified outside of the loop, along the existing and proposed entry drives. In the interim, before these parcels are leased or sold for development, the parcels to the north of the campus core can continue to be used for community recreation.

Development Capacity: The Framework Plan illustrates six university development parcels

yielding approximately 146,000 GSF of capacity if developed to a two-story height. The five private and/or joint venture parcels range in size from 10 - 25 acres, in total, they provide over 80 acres for future university-related development. The Framework Plan also identifies a university-owned parcel located to the east of Hurstbourne Lane as a candidate for immediate disposition. Because this parcel has been separated from the balance of the campus by the construction of Hurstbourne Lane, the two areas no longer have a strong functional relationship. Nevertheless, the character of development on this parcel could influence the visual character of the proposed Hurstbourne Lane entrance to the campus.

SEE DEVELOPMENT CAPACITY BY SITE CHART ON PAGE 33.

Open Space

The Framework Plan demonstrates how new development can help to define a central open space quadrangle which serves as the image and activity focus of the Shelby Campus. Broad open space setbacks are also illustrated between this new development and the existing loop drive to maintain the open, spacious image which has traditionally characterized the campus. Before parcels outside the loop drive are sold for private and/or joint venture development, it will be important to establish guidelines -- including open space setbacks -- to ensure that the character and quality of this new construction complements the campus image.

Pedestrian System

Priority should be given to the development of pedestrian connections between buildings and parking areas located within, and immediately adjacent to, the area bounded by the loop drive. As illustrated in the Framework Plan, these walkways extend from the basic grid established by new buildings and the central quadrangle. Special care must also be taken in defining the points at which pedestrian walkways cross the loop drive.

Vehicular System

The Framework Plan suggests the location and alignment for a new campus entrance drive from Hurstbourne Lane. This new entry will significantly improve egress from campus for those turning east on to Shelbyville Road. In the short-term, however, and at a substantially lower cost, the University could relocate the southern portion of the existing campus entry drive to the east to take advantage of the existing traffic signal Whittington Parkway.

Services and Utilities

The amount of land at the Shelby Campus offers the University opportunities that are not available at the other campuses. Utility expansion should be carefully coordinated with facility growth in order to maintain the flexibility and options that now exist for the University.

Utility expansions that will be required to support new facilities at the Shelby Campus can be summarized as follows:

- Water, Gas, Storm and Sanitary Sewers services are adequate for present and short-term expanded facilities.

- Heating and Cooling for long-term expanded facilities should continue with individual building systems.
- Electrical Power for long-term expanded facilities should be extended via underground electrical distribution systems running along the Circle Road to complete an electrical distribution loop.
- Communications for long-term expanded facilities should also be extended via underground communication duct system running along the Circle Road parallel with the electrical distribution loop.

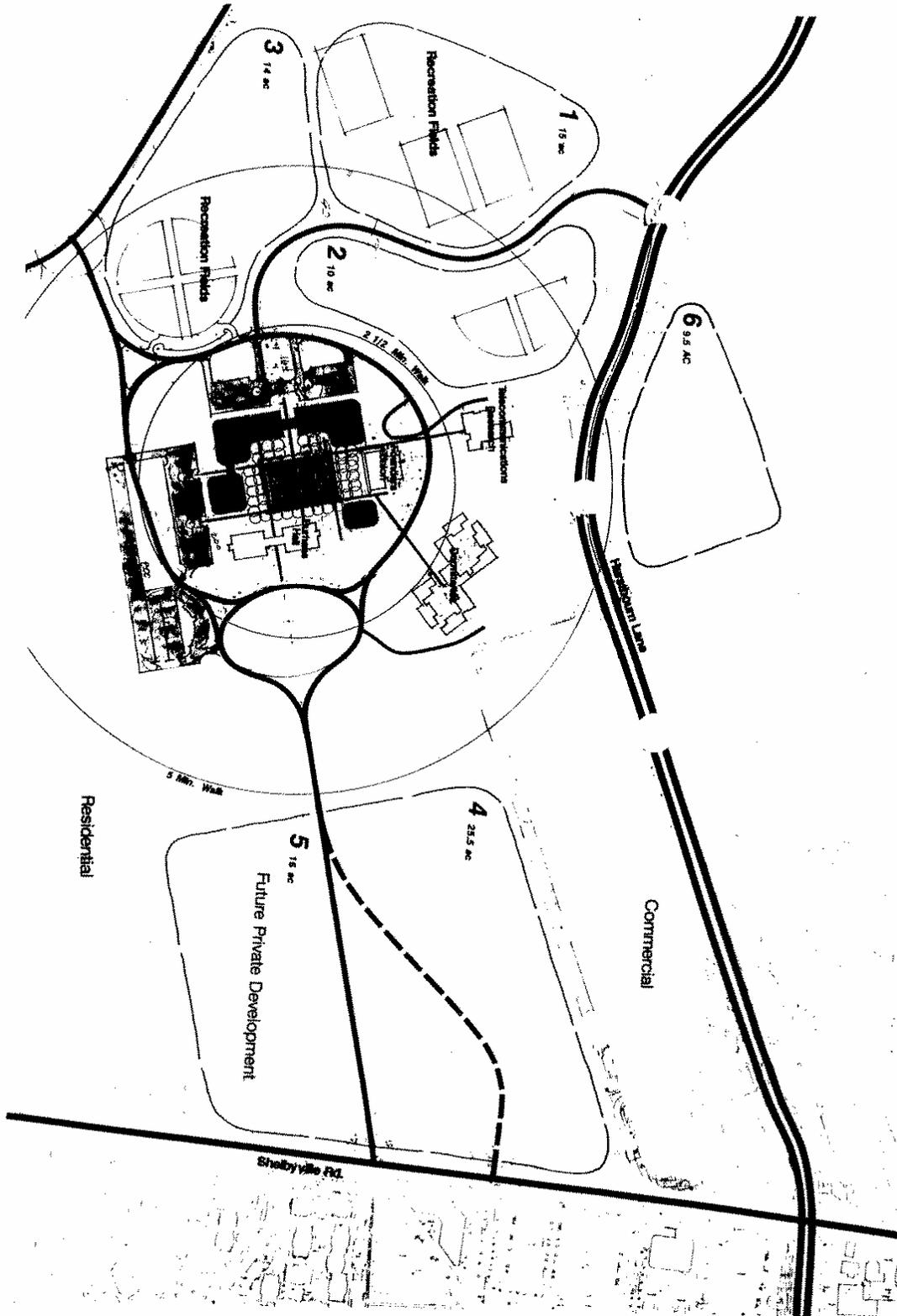
Appendix B — Campus Utilities — Shelby Campus, Pages B-22 through B-27; Prepared by E.R. Ronald and Associates

DEVELOPMENT CAPACITY
SHELBY CAMPUS

Development Zone	Footprint SF	Height (in stories)	GSF	Efficiency Factor (%)	Adjusted Capacity (GSF)
A	14,000	2	28,000	85%	23,800
B	26,000	2	52,000	85%	44,200
C	28,000	2	56,000	85%	47,600
D	18,250	2	36,400	85%	30,940
TOTAL GROSS SQUARE FEET					146,540

DEVELOPMENT AREAS

AREA	AREA SIZE
1	15 ACRES
2	10 ACRES
3	14 ACRES
4	25.5 ACRES
5	16 ACRES
6	9.5 ACRES
TOTAL	90 ACRES



Shelby Campus - FRAMEWORK PLAN

PARKING SUPPLY AND DEMAND

BELKNAP CAMPUS

Existing Parking Conditions, 1992

Study Methodology

The study methodology used to determine the parking supply and demand consisted of (1) reviewing information regarding faculty/staff and student populations on the University campus, (2) reviewing information regarding parking habits on the University campus, (3) utilizing WALKER's data bank of parking demand ratios that have been developed from similar urban universities. This data was used to determine the existing parking supply, demand, and adequacy of parking on the University of Louisville (U of L) campus. The campus has also been divided into four zones to better stratify the parking needs on the campus. The accompanying drawings show how the campus was divided.

Parking Supply

An inventory of parking spaces on the U of L campus was provided by Parking & Traffic Services. The total parking supply was established at 7,339 spaces within the study area, plus an additional 580 on-street spaces for a total parking supply of 7,919 spaces, as shown in Table I-1. About 19% of the supply is provided for faculty/staff use, about 57% is provided for commuter students, 10% for students living in University residence halls, 5 % for visitors, 1% for disabled persons and the remaining 7% are on-street spaces. For the purpose of this report the disabled and on-street spaces have been allocated to the visitors. A detailed breakdown of the parking by lot can be found in Appendix Table A-1 while a summary of the parking is provided by zone in Table I-1.

It is a generally accepted principle in parking supply/demand analysis that a supply of parking operates at optimum efficiency when occupancy is 85 % to 95 %. The excess spaces provide a "cushion" to allow for the dynamics of vehicles moving in and out of parking stalls and to reduce the time required to search for the last few available spaces. This cushion also allows for daily, weekly, and seasonal variations as well as vacancies created by restricting facilities to certain users, misparked vehicles, and minor construction. When occupancy exceeds the optimum level, there may be delays and frustration in finding a space. The parking supply may be perceived as inadequate even though there are spaces available in the system. As a result, the "effective" parking supply is used for analysis of the adequacy of the parking system rather than the total supply or inventory of spaces. The point of optimum efficiency for a particular facility depends on a variety of factors, including:

Capacity:	Small scattered facilities operate less efficiently than one large facility. Conversely, it is more difficult to find the available space in a structure than in a surface lot.
Type of Users:	Regular parkers such as students or staff can find the available space more efficiently than infrequent visitors.

Assignment of Spaces: A facility or area of a facility that is reserved for a specific group of users will have vacancies that can't be used by other parkers.

For the U of L campus, a factor of 95% was used for green permit spaces, all metered spaces, all visitor spaces and the on-street spaces. A factor of 85% was applied to the red permit spaces and the spaces reserved for the physically disabled. A factor of 90% was used for the blue permit spaces and the yellow permit spaces. Therefore, the current "effective" parking supply at U of L is 7,362 spaces or 93 % of the total supply as shown in Table I-1.

Parking Characteristics

The University provided detailed lot by lot occupancy counts of all areas on the campus. Vehicle counts were conducted on October 16, 1991 in all campus parking areas, to determine current usage of existing spaces. The field counts were taken once in the morning and once in the afternoon. Table I-2 summarizes the occupancy levels observed within the campus study area by zone.

The peak daytime occupancy occurred at 9:15 a.m. with 83.3% of the spaces occupied (6,600 vehicles). A detailed lot by lot breakdown of the occupancy information can be found in Appendix Table A-2.

Parking Demand

Parking demand is the peak accumulation of vehicles generated by the faculty/staff, students, and visitors of the University of Louisville. The demand is projected for a design day, which is defined to be a busy day which occurs frequently enough that a lack of parking would be a constraint on the University's delivery of its services and the quality of life on the campus. It should be above the average but below the absolute peak level of activity. For example, city street systems are frequently designed using the 85th percentile in the range from lowest to highest traffic volume. While it is impossible to precisely identify the 85th percentile day at a university, the design day is usually selected to be the busiest day of the week, about midway through the first semester. This allows for the departure from the campus of those who drop out early, and for the campus activity to settle into a routine. The 1990 fall census of students and faculty/staff was used to model peak parking demand at U of L. This was the most recent data available.

Parking demand ratios were developed to stratify demand by user group. This technique facilitates two objectives:

- More accurate projections of future needs if the population of different groups increases or decreases at different rates, and
- Understanding of the specific parking needs of different groups now and in the future.

Demand ratios are expressed as spaces required per unit statistic, which for a university is per student or faculty/staff. The ratios consist of two components. The first is the percentage of the population group present at the peak hour on the design day. The second factor is the percentage of the population group that arrives at the campus as the driver of the vehicle; this is called the driving ratio. It is often calculated by dividing the "modal split" for cars--which planners define to be the

percentage of the group that arrive by private vehicles--by the persons per car.

The demand ratios were developed from WALKER's data bank of university parking demand ratios that has been developed over the years through our work with universities throughout the country.

Student enrollments in day classes were analyzed to determine student presence on campus. The demand ratios were then calibrated by comparing the resulting total demand to the peak parking occupancy data collected on October 16, at 9:00 a.m.

Faculty/Staff Demand

Faculty and staff have been distributed throughout the campus on the basis of assignable square footage as provided by the Office of Planning, Design and Construction. Based on a total of 293,169 assignable square feet and 2,487 faculty and staff the total campus parking demand is estimated to be 1,869 spaces. Approximately 52% of this demand is located in Zone 3 with 42% of the demand located in Zone 2.

Resident Student Demand

On the Belknap Campus the bed capacity for dormitory residents is 1,936 plus 70 beds available for Greek students. Based on full occupancy the resident student parking demand is estimated to be 1,205 spaces. All resident student demand is assumed to be at the resident housing units since it is desirable that residents not move vehicles around the campus during the day.

Commuter Student Demand

Student enrollment listings were used to determine that 5,443 students (25.3% of the total enrollment of 21,460) are currently enrolled in classes at 9:00 a.m. on Wednesdays. Based on WALKER's data bank it was estimated that 79% (4,321) were commuter students who are assumed to be in class at 9:00 a.m. Additionally there are a number of students present in academic buildings for appointments, group study sessions, etc. There will also be a substantial number of students present in non-classroom buildings such as the Student Center, Library, and other areas on the campus. This is assumed to cause an addition of approximately 10% to the classroom presence factor for commuter students enrolled in classes. Therefore, total commuter student presence on the Campus is 4,801 students, increasing the presence factor to 25%. The parking demand for commuter students is estimated to be 3,604 spaces at 9:00 a.m. Approximately 69% of this demand is in Zone 2, with the remaining 31% of the demand located in Zone 3.

Visitor Parking Demand

It is very difficult to determine the number of visitors on a university campus at any one time. However, a "rule of thumb" frequently used is that the average number of visitors present for typical University activities is equal to 5% of the total faculty/staff presence. While this presence factor is an estimate, the total demand of visitors is relatively small and any error in this calculation will be negligible compared to the total parking demand of the campus ($112/6,718 = 1.6\%$). Therefore, the estimated visitor parking demand is 112 spaces at 9:00 a.m. Visitor demand has been distributed throughout the campus in proportion to faculty/staff presence.

Parking Demand Summary

The parking demand for each category of users (faculty/staff, resident, commuter students, and visitors) was calculated by multiplying the demand ratios by their individual populations. The parking demand ratios for faculty/staff, resident students, commuter students, and visitors are shown in Table I-4.

The total 1992 parking demand on the U of L campus is estimated to be 6,790 spaces, allocated as follows: 1,869 faculty/staff spaces, 1,205 resident student spaces, 3,604 commuter student spaces, and 112 visitor spaces. This includes the demand of those who currently park off-campus. For comparison purposes, the peak accumulation of vehicles observed on the survey day was 6,600 spaces.

In order to evaluate the need for parking by location on campus, the parking demand was distributed to each campus building for individual user groups as follows:

- Commuter Students: classroom attendance at 11:00 a.m. and presence in non-classroom buildings.
- Resident Students: dorm or Greek house location.
- Faculty/Staff: employees per building based on assignable square footage.
- Visitors: employees per building.

Parking demand for faculty/staff, students, and visitors distributed by building is shown in the Appendix, Tables A-3 through A-5, respectively. The distribution of demand by zone is summarized in Table I-5.

It should be noted that the demand for visitor spaces represents only demand by visitors at 9:00 a.m. and does not necessarily indicate the total need for short term spaces for inter- and intra-campus trips.

Parking Adequacy

Parking adequacy is the ability of the parking supply to accommodate the parking demand. This is measured by comparing the parking demand to the “effective” parking supply. Table I-6 shows the existing parking adequacy by zone and user group.

The total campus area is estimated to have a surplus of 572 spaces. If the on-street spaces were not available for University parkers, the surplus would be reduced to 21 spaces. Without the use of on-street spaces it appears that the University of Louisville can currently satisfy its users’ needs.

Future Parking Conditions

Future parking conditions on the Belknap Campus will be impacted by both reductions in supply (i.e. loss of surface parking due to construction of new facilities) and increases in demand (due to occupancy of those new facilities).

The future supply and demand relationships have been estimated based on the six year plan and the long-term plan as described in this Master Plan. Parking demand has been estimated on the basis of the current overall demand of 2.43 spaces per 1,000 square feet (6,790/2,800,000) applied to the potential new square footage on the campus.

Parking in the six year plan is summarized as follows:

Current Parking Supply	7,919
Spaces Displaced In 6 Year Plan	<u>-1,601</u>
6 year Parking Supply	6,318
Current Parking Demand	6,790
Potential 6 Year Parking Demand Added	<u>+ 4,382</u>
Potential 6 Year Demand	11,172
Spaces needed to satisfy 6 Year Parking Demand {11,172 ÷ .93} =	12,013
New Spaces needed within 6 Year Plan {12,013 - 6,318} =	5,695

Thus if the six year plan as described herein is fully implemented, approximately 5,695 spaces should be constructed to account for reduced supply (due to new buildings) and increased demand. These calculations take into account retention of an effective supply cushion.

Parking relationships after the six year plan to the end of the long-term plan are summarized as follows:

Current Parking Supply	7,919
Spaces Displaced in Long-Term Plan	<u>- 2,540</u>
Long-Term Parking Supply	5,379
Current Parking Demand	6,790
Potential 6 Year Plus Long-Term Demand Added	<u>+ 7,604</u>
Potential Long-Term Demand	14,394
Spaces Needed To Satisfy Long-Term Parking Demand {14,394 - 93} =	15,477
New Spaces Needed After 6 Year Plan through Long-Term Plan {15,477 - 5,379 - 5,695} =	4,403

Thus, another 4,403 spaces should be added after the six year plan is implemented, to accommodate long-term growth.

Parking through the long-term plan is therefore summarized as follows:

Current Spaces on Campus	7,919
Total Spaces Displaced	<u>-2,540</u>
Current Spaces Remaining	5,379
Spaced Added for 6 Year Plan	+ 5,695
Additional Spaces Added after 6 Years	

$$\{9,694 - 5,219\} = +4,403$$

Total Spaces on Campus at End of Long-Term Plan 15,477

Potential sites on the campus for adding the required spaces are discussed elsewhere in this Master Plan.

TABLE I-1
EXISTING PARKING SUPPLY, 1992
University of Louisville
Belknap Campus
Louisville, Kentucky

Location	Red Permit 0.85	Blue Permit 0.90	Green Permit 0.95	Yellow Permit 0.90	Meters 0.95	Visitor 0.95	Disabled 0.85	On-Street 0.95	TOTAL	Effective Supply
Zone 1	76	235	1,868	129	4	93	21	184	2,610	2,452
Zone 2	263	111	0	330	0	211	42	218	1,175	1,064
Zone 3	381	347	566	0	55	49	32	30	1,460	1,328
Zone 4	2	78	2,096	341	2	0	7	148	2,674	2,518
TOTAL	722	771	4,530	800	61	353	102	580	7,919	7,362
% of Total	9.1%	9.7%	57.2%	10.1%	0.8%	4.5%	1.3%	7.3%		93.0%

Source: Appendix Table A-1.

TABLE I-2
 PARKING OCCUPANCY, 1992
 University of Louisville
 Belknap Campus
 Louisville, Kentucky

Location	Number of Spaces	9:15	2:15	Peak Occupancy
Zone 1	2,610	2,227	2,097	85.3%
Zone 2	1,175	996	1,040	88.5%
Zone 3	1,460	1,374	1,370	94.1%
Zone 4	2,674	2,003	2,003	74.9%
TOTAL	7,919	6,600	6,510	83.3%
% of Total		83.3%	82.2%	

Source: Appendix Table A-2.

TABLE I-3
CAMPUS POPULATION
University of Louisville
Belknap Campus
Louisville, Kentucky

User Group	1992	2002
Faculty/Staff	2,487	2,487
Commuter Students	19,454	19,454
Resident Students	1,936	1,936
Greek Students	70	70
Visitors	1,197	1,197

Source: University of Louisville, Fact Book, 1990-1991.

TABLE I-4
 PARKING DEMAND RATIOS
 University of Louisville
 Belknap Campus
 Louisville, Kentucky

User Group	Presence Factor	Driving Ratio	OVERALL RATIO	
Faculty/Staff	0.85	0.90	0.77	spaces per Staff Member
Commuter Students	0.25	0.75	0.19	spaces per Commuter Student
Resident Students	1.00	0.60	0.60	spaces per Resident Student
Greek Students	1.00	0.60	0.60	spaces per Greek Student
Visitors *	0.05	0.90	0.05	spaces per Staff Member

* Presence is estimated to be 5% of Faculty/Staff.

TABLE I-5
 PARKING DEMAND SUMMARY, 1992
 University of Louisville
 Belknap Campus
 Louisville, Kentucky

Zone	Faculty/ Staff	Resident Student	Commuter Student	Visitor *	TOTAL DEMAND
Zone 1	90	144	0	5	239
Zone 2	782	573	2,489	38	3,882
Zone 3	979	0	1,115	51	2,145
Zone 4	18	488	0	18	524
TOTAL	1,869	1,205	3,604	112	6,790

* Visitors allocated in proportion to faculty/staff present.

TABLE I-6
 PARKING ADEQUACY SUMMARY, 1992
 University of Louisville
 Belknap Campus
 Louisville, Kentucky

User Groups	Effective Supply	Parking Demand	Surplus/Deficit
Faculty/Staff	276	90	186
Commuter Students	1,775	0	1,775
Resident Students	116	144	(28)
Visitors	285	5	280
Zone1 – Subtotal	2,452	239	2,213
Faculty/Staff	323	782	(459)
Commuter Students	0	2,489	(2,489)
Resident Students	297	573	(276)
Visitors	444	38	406
Zone 2 – Subtotal	1,064	3,882	(2,818)
Faculty/Staff	636	979	(343)
Commuter Students	538	1,115	(577)
Resident Students	0	0	0
Visitors	154	51	103
Zone 3 – Subtotal	1,328	2,145	(817)
Faculty/Staff	72	18	54
Commuter Students	1,991	0	1,991
Resident Students	307	488	(181)
Visitors	148	18	130
Zone 4 – Subtotal	2,518	524	1,994
Faculty/Staff	1,307	1,869	(562)
Commuter Students	4,304	3,604	700
Resident Students	720	1,205	(485)
Visitors	1,031	112	919
CAMPUS TOTAL	7,362	6,790	572

HEALTH SCIENCE CAMPUS

Existing Parking Conditions, 1992

Study Methodology

The study methodology used is very similar to that used for the Belknap Campus.

Parking Supply

An inventory of parking spaces on the Health Science Campus (HSC) was provided by Parking & Traffic Services. The total parking supply was established as 2,071 spaces with an “effective” supply of 1,896 spaces. Since the HSC is located in downtown Louisville there are a number of on-street spaces in close proximity. These spaces, however, have not been included in the HSC parking supply. Because of the competition for on-street spaces it is WALKER’s opinion that the University should not rely on the availability of on-street spaces. About 38% of the supply is provided for faculty/staff use, about 52% is provided for commuter students, 4% for students living in the Medical Apartments, 4% for visitors, and 1% for disabled persons. For the purpose of this report the disabled spaces have been allocated by permit user. A detailed breakdown of the parking by lot can be found in Table II-1.

Parking Characteristics

The University provided detailed lot by lot occupancy counts of all areas on the campus. Vehicle counts were conducted on October 23, 1991 in all campus parking areas, to determine current usage of existing spaces. The field counts were taken once in the morning and once in the afternoon. Table II-2 summarizes the occupancy levels observed within the campus study area.

The peak daytime occupancy occurred at 9:15 a.m. with 79.1% of the spaces (1,639 vehicles) occupied.

Parking Demand

Since the HSC is much more compact than the Belknap Campus, zoning of the campus was not used. Also the parking demand for each user group was not distributed on a building by building basis. Instead the parking demand has been estimated for each user group on a campus wide basis. Many of the same principles have been used to determine the parking demand for the HSC.

The parking demand for each category of users (faculty/staff, resident, commuter students, and visitors) was calculated by multiplying the demand ratios by their individual populations. The parking demand ratios for faculty/staff, resident students, commuter students, and visitors are shown in Table II-4.

The total 1992 parking demand on the HSC is estimated to be 1,658 spaces, allocated as follows: 753 faculty/staff spaces, 81 resident student spaces, 810 commuter student spaces, and 14 visitor spaces. For comparison purposes, the peak accumulation of vehicles observed on the survey day was 1,639 spaces.

When compared to the “effective” supply the HSC has a parking surplus of 238 spaces, as shown in Table II-6.

Future Parking Conditions

Future parking conditions on the Health Sciences Campus will be impacted by reduction in supply due to new facilities and increased demand due to occupancy of those new facilities.

As was done for the Belknap Campus, the future parking supply/demand relationships were estimated on the basis of the current overall HSC parking demand ratio of 1.28 spaces per 1,000 square feet (1,658/1,300,000).

Future HSC parking conditions are estimated as follows:

Current Parking Supply	2,071
Spaces Displaced in Plan	- <u>508</u>
Potential Parking Supply (Current Spaces Remaining)	1,563
Current Parking Demand	1,658
Potential Demand Added	+ <u>2,004</u>
Potential Future Demand	3,662
Spaces Needed to Satisfy Future Demand {3,662 ÷ .92}	3,980
New Spaces Needed to Satisfy Future Demand {3,980 - 1,563}	2,417

Thus, approximately 2,417 additional parking spaces should be constructed on the HSC campus to satisfy future parking demand, including the desired effective supply cushion.

TABLE II-1
 EXISTING PARKING SUPPLY, 1992
 University of Louisville
 Health Sciences Campus
 Louisville, Kentucky

Location	Red Permit 0.85	Blue Permit 0.90	Green Permit 0.95	Yellow Permit 0.90	Visitor 0.95	Disabled 0.85	TOTAL	Effective Supply
HR-1	71					7	78	66
HR-2	29					1	30	26
HR-3	68						68	58
HR-4	21						21	18
HR-6	220						220	187
HR-7	48						48	41
HR-9	1						1	1
HR-10	1						1	1
HR-11	2						2	2
HR-12	83						83	71
HB-1		53				1	54	49
HB-2		26				1	27	24
HB-7		169					169	152
HG-1			95				95	90
HG-2			70			1	71	67
HG-3			98			8	106	100
HG-4			391				391	371
HG-6			191			2	193	183
HG-7			235				235	223
HY-1				89			89	80
HV-1					7		7	7
HV-2					50		50	48
HV-3					24	2	26	25
HV-4					4		4	4
HV-5					2		2	2
TOTAL	544	248	1,080	89	87	23	2,071	1,896
% of Total	26.3%	12.0%	52.1%	4.3%	4.2%	1.1%		91.5%

Source: U of L Parking Administration, January, 1992.

TABLE II-2

PARKING OCCUPANCY, 1992
 University of Louisville
 Health Sciences Campus
 Louisville, Kentucky

Location	Number of Spaces	9:15	2:15	Peak Occupancy
HR-1	78	56	60	76.9%
HR-2	30	18	21	70.0%
HR-3	68	53	57	83.8%
HR-4	21	21	18	100.0%
HR-6	220	162	176	80.0%
HR-7	48	40	34	83.3%
HR-9	1	1	1	100.0%
HR-10	1	0	0	0.0%
HR-11	2	1	2	100.0%
HR-12	83	42	42	50.6%
HB-1	54	54	52	100.0%
HB-2	27	27	27	100.0%
HB-7	169	169	167	100.0%
HG-1	95	99	91	104.2%
HG-2	71	71	71	100.0%
HG-3	106	103	104	98.1%
HG-4	391	395	366	101.0%
HG-6	193	182	175	94.3%
HG-7	235	12	12	5.1%
HY-1	89	74	77	86.5%
HV-1	7	7	4	100.0%
HV-2	50	25	42	84.0%
HV-3	26	23	25	96.2%
HV-4	4	4	4	100.0%
HV-5	2	0	1	50.0%
TOTAL	2,071	1,639	1,629	79.1%
Percent Occupied		79.1%	78.7%	

Source: U of L Parking Administration, January, 1992.

TABLE II-3
CAMPUS POPULATION
University of Louisville
Health Sciences Campus
Louisville, Kentucky

User Group	1992	2002
Faculty/Staff	1,195	1,195
Commuter Students	2,025	2,025
Resident Students	125	125
Visitors	60	60

Source: University of Louisville, Fact Book, 1990-1991.

TABLE II-4
 PARKING DEMAND RATIOS
 University of Louisville
 Health Sciences Campus
 Louisville, Kentucky

User Group	Presence Factor	Driving Ratio	Overall Ratio	Overall Ratio Description
Faculty/Staff	0.70	0.90	0.63	spaces per Staff Member
Commuter Students	0.50	0.80	0.40	spaces per Commuter Student
Resident Students	1.00	0.65	0.65	spaces per Resident Student
Visitors/Patients	0.30	0.80	0.24	spaces per Faculty/Staff

TABLE II-5
PARKING DEMAND SUMMARY, 1992
University of Louisville
Health Sciences Campus
Louisville, Kentucky

User Group	PARKING DEMAND
Faculty/Staff	753
Commuter Students	810
Resident Students	81
Visitor/Patients	14
TOTAL	1,658

TABLE II-6
 PARKING ADEQUACY SUMMARY, 1992
 University of Louisville
 Health Sciences Campus
 Louisville, Kentucky

User Groups	Effective Supply	Parking Demand	Surplus/ Deficit(-)
Faculty/Staff	696	753	(57)
Commuter Students	1,034	810	224
Resident Students	80	81	(1)
Visitors	86	14	72
HSC TOTAL	1,896	1,658	238

TRAFFIC ANALYSIS

BELKNAP CAMPUS

Introduction

Objectives

This section of the report addresses the existing and future traffic conditions, and recommended improvements to the traffic/pedestrian circulation system which has been incorporated into the University Master Plan. The University and other members of the consultant planning team provided their insight, traffic/pedestrian concerns, and a framework plan which has guided WALKER in our traffic analysis. The University, City of Louisville, and the Kentucky Department of Transportation (KDOT) also provided WALKER with background information regarding traffic volumes along with their traffic concerns. WALKER also observed the existing traffic conditions during the spring of 1992.

Study Methodology

To assess existing conditions and to provide input into the future Master Plan, the following steps were taken:

- Inventory of physical and operational characteristics of the street system in the vicinity of the University of Louisville.
- Identification of existing traffic patterns.
- Collection of existing traffic data.
- Meetings with University officials, consultant planning team, and local/state public agencies to determine their existing and future traffic/pedestrian concerns and proposed roadway improvements in the vicinity of the University.
- Present alternative roadway solutions to University officials and the consultant planning team for their input and recommendations.
- Recommend roadway improvements to be incorporated into the future Master Plan.

Existing Traffic Conditions

Streets on the campus provide access to buildings and parking areas as well as allow for through traffic movements for both University-related and public use. The through traffic movements are generally on South Third and Fourth Streets and Eastern Parkway. The number of through traffic movements is considerable and is a major concern of the University. Most campus roadways are two-way city streets with a variety of roadway cross-sections. As the University has grown, the campus has consumed many of the surrounding properties along with a street system designed to serve a variety of land uses and through traffic. Good north-south access is provided to the

University via I-65 and Second and Third Streets. Access from the east is provided by Eastern Parkway and Cardinal Boulevard. Access from the west is limited.

Stop signs, yield signs and traffic signals provide traffic control at campus intersections. Traffic signals also provide traffic control at major pedestrian crossing locations. Figure III-1 locates the existing traffic control devices.

The Belknap Campus is located approximately 2.5 miles south of Louisville's central business district. Both Churchill Downs and the Kentucky Fair Exposition Center are located within 1.5 miles south of the Belknap Campus.

Daily Traffic Volumes

Traffic volumes are useful in a traffic analysis to establish growth trends, daily and seasonal variations, and overall traffic flow patterns for a region. In order to accurately assess roadway capacity and levels of traffic congestion, and to assess the need for roadway improvements, daily and hourly traffic volumes must be studied.

Existing daily traffic volumes were provided or were estimated from peak hour traffic turning movement counts provided by the City of Louisville's Public Works Department, and are shown graphically in Figure III-2. Traffic volumes on Eastern Parkway (30,400 vehicles per day (vpd) and South Third Street (23,800 vpd) are extremely high and create potential conflicts for the pedestrians that must cross these two streets.

In addition to the daily traffic volumes, the estimated directional distribution of entering and exiting University traffic is also shown. Interesting to note is that more traffic (47% vs. 30%) is accessing the University from the north and south via Second and Third Streets than from I-65.

Peak Hour Traffic Volumes

Turning movement studies at the major campus intersections, during peak traffic conditions, were provided by the City of Louisville's Public Works Department.

Table III-1 summarizes the traffic data collected at these intersections during the morning, noon and evening peak hour periods. The directional turning movements for the entire peak hour periods at each intersection are available from the City of Louisville's Public Works Department.

Traffic and Pedestrian Concerns

Conflicts between pedestrian traffic and vehicular traffic are a concern on any university campus. This concern is magnified at the University of Louisville due to the number of through vehicles that must pass through the campus. The ideal situation is to have students and faculty/staff park on the perimeter of the campus, and then walk into a campus closed to vehicles. Usually the ideal situations are not totally practical solutions but should be a goal for implementation whenever practical. Utilizing the traffic and pedestrian data collected plus the concerns expressed by the University community, the consultant team, and the city, the major traffic/pedestrian concerns have been identified and are shown on Figure III-3. These concerns can be classified as potential

vehicular/pedestrian conflicts or strictly traffic concerns:

Vehicle/Pedestrian Conflicts

South Third Street - Students residing in dormitories/fraternity/sorority houses, and commuter students parking lot G-19 (1,631 spaces) must cross South Third Street to reach the core of the campus. Pedestrian actuated traffic signals have been installed by the city at two locations (See Figure III-1) to aid students in crossing this roadway. Unfortunately, not all of the students cross at these two signalized locations, but rather randomly cross the street at other locations.

South Fourth Street - Similar concern as above. Again two traffic signals have been installed to provide safer crossing locations, however, the commuter students parking in Lot G-19 cross South Fourth Street at other locations.

Eastern Parkway - The Speed Building and other campus facilities, including commuter student parking lots south of Eastern Parkway, are separated from the campus core by a major arterial roadway (30,400 vpd) A traffic signal and pedestrian underpass (See Figure III-1) now provide safer crossing locations, however, pedestrians also cross at other locations. This vehicle/pedestrian conflict will be resolved with the construction of the Central Avenue extension project which will relocate the existing through traffic and will allow this facility to be closed to non-university traffic.

Traffic Concerns

I-65 Access - Present access to I-65 is poor which may partially explain why more motorists access the University via Third and Fourth Streets than I-65. The present configuration represents 1950's design standards in which existing local streets were utilized for ramping, which resulted in poor access to the University. Northbound I-65 traffic exiting at the Eastern Parkway exit is directed initially away from the University as shown on Figure III-3 which results in a confusing and congested intersection at Crittenden Drive and East Warnock Street.

Emergency Vehicle Access - A portion of the core campus (See Figure III-3) is only accessible via East Warnock Street. Between South Floyd and South Brook Streets there is an at-grade railroad crossing East Warnock Street. A train, therefore, could prevent emergency vehicle access to a portion of the campus.

Crittenden Drive Railroad Crossing - An at-grade railroad crossing now exists on Crittenden Drive just north of I-65 (See Figure III-3). Concern has been expressed by KDOT of a potential safety hazard due to the increase of vehicular traffic with the completion of the Central Avenue extension project on this portion of Crittenden Drive.

Cardinal Boulevard Access - A number of parking facilities now utilize South First Street for access to Cardinal Boulevard. University exiting traffic now experiences difficulty in accessing Cardinal Boulevard during peak traffic periods without the benefit of traffic signals.

Left Turns From Cardinal Boulevard - There presently is a traffic delay for westbound left turning traffic at South Third Street and Cardinal Boulevard because a left turn arrow is not provided.

Master Plan Recommendations

The consultant team has met with University officials periodically to discuss the Belknap campus Master Plan. WALKER has provided expertise on traffic and pedestrian circulation issues. The master plan has evolved through this process as individual issues and concerns have been addressed and evaluated. Undoubtedly the two main issues, from a traffic prospective, are I-65 access and Eastern Parkway traffic. The Eastern Parkway traffic issue is being resolved with the Central Avenue extension project which will divert through traffic away from the University and allow a portion of this roadway to be closed. The City of Louisville has begun the design of this project. Yet to be resolved however, is access to and from I-65.

I-65 Access

The following two possible alternatives were presented to the consultant team and University officials by WALKER:

- One interchange with Warnock Street as the major east access to the University.
- Two interchanges with Cardinal Boulevard and Eastern Parkway as east access points to the University.

An important consideration of both alternatives, with the construction of the Central Avenue extension is the shifting of the major through east/west traffic volumes from Eastern Parkway to Crittenden Drive/Central Avenue. With that shift, the demand to enter/exit I-65 at Crittenden Drive will increase considerably. Consideration should be given to further developing the I-65 and Crittenden Drive interchange as the major access point to I-65 for the non-university traffic rather than having some of that traffic penetrate the campus. Existing I-65 ramps at this location would not accommodate the northbound I-65 exiting traffic to southbound Crittenden Drive.

- *Warnock Street Alternative* - This alternative focuses the main access to the east side of the campus via Warnock Street. It has the advantage of simplifying I-65 access with a diamond interchange at Warnock Street. Warnock Street provides access to South Floyd Street; therefore, there is not a need for a roadway from South Floyd Street to Eastern Parkway.

The termination of Eastern Parkway, as shown on the Master Plan, would be adequate assuming daily parkers could enter the Speed School parking lots via the rear from South Floyd Street or through the Research Area. Visitors could park in the lot south of the Grawemeyer Hall.

The Warnock Street and Crittenden Drive intersection should be reconfigured to reflect the magnitude of the traffic volumes. In that reconfiguration, the north leg of Crittenden Drive would “T” into the south leg of Crittenden Drive/west leg of Warnock Street. This alternative is shown conceptually in Figure III-4.

The disadvantage of this alternative is the amount of traffic that will be directed to South Floyd Street through the Warnock Street intersection and an at-grade railroad crossing in Warnock Street west of Floyd Street. Warnock Street would also bisect the University Park.

- *Cardinal Boulevard/Eastern Parkway Alternative* - This alternative provides I-65 northbound and southbound entrances and exits at Eastern Parkway and Cardinal Boulevard. This alternative is shown conceptually in Figure III-5. The extension of Eastern Parkway to the

circle in front of the Speed School is recommended under this alternative so as to better serve parking near the Speed School.

The one concern of both alternatives, is a lack of a peripheral circulation roadway along the eastern edge of the campus; South Floyd Street will have to provide this function. Pedestrians crossing South Floyd Street will be a future concern. Separation of pedestrian and vehicular traffic between the University Park and the remainder of the campus should be considered. One location could be the continuation of the pedestrian walkway serving Parking Deck One over Floyd Street into the University Park development.

Selected I-65 Access Alternative

Both I-65 access alternatives were discussed with the consultants, University, City and KDOT officials. The Cardinal Boulevard/Eastern Parkway alternative was selected as the best alternative for the following reasons:

- Provides two I-65 access points rather than one.
- De-emphasizes traffic on Floyd Street.
- Minimizes railroad conflicts on East Warnock Street.

A scaled schematic drawing was prepared by WALKER so as to further refine and show proposed construction phasing for the Cardinal Boulevard/Eastern Parkway alternative. That drawing is shown on Figure III-6. The closing of East Warnock Street between Arthur Street and South Floyd Street is optional depending upon the needs of the University Park. A traffic signal would be required at the Hahn Street and South Floyd Street intersection if East Warnock Street is closed.

It is proposed that the I-65 access construction be done in two phases as shown in the figure. The intersections that would require signalization are also shown on Figure III-6. It is advisable that the I-65 access construction occur after the Central Avenue extension project is completed to reduce the traffic impact upon Eastern Parkway traffic.

Additional Traffic Issues

- *Eastern Parkway Cross-Section* - Eastern Parkway, west of Hahn, should be narrowed to a two lane roadway with the remainder of the bridge as pedestrian walkways. The only traffic on this section of the roadway would be motorists with parking permits for the area near the Speed School and Grawemeyer Hall.
- *Internal Roadways* - An emergency access roadway should be provided to facilities west of the railroad tracks that are serviced by Warnock Street. The service roadway shown in the Master Plan could serve this function.
- *Pedestrian Crossing Third and Fourth Streets* - To direct more pedestrians to the two signalized crossings the utilization of landscaping materials is recommended.
- *Cardinal Boulevard and First Street* - Present traffic volumes do warrant a traffic signal at

this location. The city has so far declined to locate another traffic signal at this location because of coordination problems at Third and Fourth Street intersections that would impact light sequencing beyond the capability of installed signaling control mechanism.

TABLE III-1: EXISTING PEAK HOUR TURNING MOVEMENTS, 1984 - 1990

University of Louisville
 Louisville, KY
 4/27/92

Intersection/ Date of Count	Time	from NORTH				from SOUTH				from EAST				from WEST			
		L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total
S. 3rd St. & Eastern Parkway 4/10/92	AM	111	303	0	414	0	967	785	1,752	781	0	265	1,046	0	0	0	0
	Noon	399	575	0	974	0	508	728	1,236	1,004	0	209	1,213	0	0	0	0
	PM	355	758	0	1,113	0	502	840	1,342	1,005	0	282	1,287	0	0	0	0
Crittenden Dr. & Eastern Parkway 3/11/91	AM	204	104	277	585	219	162	165	546	201	486	144	831	297	467	131	895
	Noon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	PM	320	154	200	674	244	178	151	573	318	648	259	1,225	377	777	126	1,280
S. Floyd St. & Warnock St. 8/14/84	AM	33	119	38	190	27	180	63	270	57	170	26	253	19	51	16	86
	Noon	229	256	78	563	21	191	41	253	53	225	33	311	57	240	47	344
	PM	127	257	32	416	16	140	38	194	32	101	70	203	34	202	21	257
Crittenden Dr. & Warnock St. 10/6/86	AM	1	46	96	143	704	84	1	789	0	226	10	236	159	8	584	751
	Noon	5	79	70	154	662	88	2	752	0	40	2	42	123	10	575	708
	PM	3	54	59	116	646	109	4	759	0	4	77	3	131	15	527	673
S. Floyd St. & Atwood St. 9/5/90	AM	57	290	66	413	169	440	87	696	8	18	22	48	16	53	38	107
	Noon	55	478	50	583	75	493	66	634	21	12	66	99	34	49	63	146
	PM	41	476	52	569	95	438	33	566	21	10	58	89	38	15	64	117
S. 4th St. & W. Brandeis Ave. 11/25/85	AM	15	361	0	376	1	960	29	990	22	1	7	30	0	0	0	0
	Noon	27	684	0	711	0	452	43	495	21	0	27	48	0	0	0	0
	PM	30	985	0	1,015	0	395	50	445	27	1	17	45	0	0	0	0
S. 4th St. & Cardinal Blvd. 9/13/89	AM	0	46	188	29	11	714	182	907	292	260	124	676	0	14	1	15
	Noon	125	340	11	476	14	343	311	668	305	91	189	585	23	167	22	212
	PM	116	740	15	871	6	339	255	600	417	100	157	674	7	87	9	103

Key: L-Left Turning Traffic
 T-Through Traffic
 R-Right Turning Traffic

Source: City of Louisville, Department of Public Works &
 Kentuckiana Regional Planning & Development Agency

TABLE III-1 cont.: EXISTING PEAK HOUR TURNING MOVEMENTS, 1984 - 1990

University of Louisville

Louisville, KY

4/27/92

Intersection	Time	from NORTH				from SOUTH				from EAST				from WEST			
		L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total
S. 3rd St. & Cardinal Blvd. 1/24/90	AM	112	255	37	404	0	0	0	0	151	1,006	0	1,157	1	302	22	325
	Noon	134	680	66	880	0	0	0	0	219	728	0	947	0	867	50	917
	PM	146	1,291	116	1,553	0	0	0	0	246	553	0	799	0	467	51	518
S. 2nd St. & Cardinal Blvd. 1/14/87	AM	0	0	0	0	84	1,051	151	1,286	0	562	115	677	34	336	0	370
	Noon	0	0	0	0	88	837	100	1,025	0	899	133	1,032	95	813	2	910
	PM	0	0	0	0	79	541	188	808	0	804	155	959	40	570	0	610
S. 1st St. & Cardinal Blvd. 9/10/90	AM	0	0	0	0	51	0	55	106	230	1,016	2	1,248	3	307	68	378
	Noon	0	0	0	0	96	0	145	241	127	666	7	800	1	988	101	1,090
	PM	0	0	0	0	95	2	226	323	199	772	38	1,009	7	617	148	772
S. Brook St. & Cardinal Blvd. 2/1/88	AM	163	0	168	331	0	0	0	0	0	0	154	154	104	240	0	344
	Noon	264	0	192	456	0	0	0	0	0	0	104	104	109	726	0	835
	PM	370	0	286	656	0	0	0	0	0	0	107	107	102	655	0	757
S. Floyd St. & E. Brandeis Av. 2/12/89	AM	18	114	17	149	340	208	29	577	134	798	57	989	27	161	274	462
	Noon	32	121	18	171	512	246	78	836	64	471	28	563	20	667	478	1,165
	PM	34	223	20	277	533	209	52	794	94	716	19	829	21	665	420	1,106
Arthur St. & E. Brandeis Av. 1/8/90	AM	235	64	197	496	0	0	0	0	11	341	0	352	0	112	32	144
	Noon	311	90	172	573	0	0	0	0	10	233	0	243	1	432	131	564
	PM	670	109	190	969	0	0	0	0	8	195	0	203	0	614	92	706

Key: L-Left Turning Traffic
T-Through Traffic
R-Right Turning Traffic

Source: City of Louisville, Department of Public Works &
Kentuckiana Regional Planning & Development Agency

CAMPUS UTILITIES/MECHANICAL, ELECTRICAL, & COMMUNICATIONS

BELKNAP CAMPUS

Utility Systems

The University of Louisville Belknap Campus is served by the following utility systems:

- Water
- Sewer (Sanitary & Storm)
- Natural Gas
- Steam
- Chilled Water
- Electric Power
- Communications

Water, sewer, and gas services are distributed throughout the campus by primarily utility owned mains. Steam and chilled water are provided from a University owned and operated Central Energy Plant located at the corner of Brook Street and Warnock Avenue. The steam and chilled water is distributed through University owned and maintained underground lines. Most campus facilities are connected to the Central Energy Plant, but numerous buildings have their own independent heating and/or air conditioning systems. The majority of the campus electric power is obtained from the utility company through medium voltage (13.8 KV) service at the Central Energy Plant.

Electrical power is distributed by University owned and maintained underground distribution lines. Most campus facilities are served by this distribution system, but several buildings have independent services directly from the utility company. The University has contracted with South Central Bell for Telecommunications Service (ESSX). Telephone equipment and cabling within University buildings are University owned and maintained. Telephone cables between buildings are owned and maintained by South Central Bell. Some of these, along with cables of other communication companies, are in University owned communication duct banks.

Water

The Louisville Water Company serves the University. Water pressure at the street level varies from 70 to 85 pounds per square inch. Cast iron water mains from 4 to 48 inches are arranged in a loop system. The pressure is usually adequate for both domestic and fire protection requirements, however, high rise buildings may require booster pumps for sufficient fire protection.

In some cases, water will be extended to new buildings by the utility company, which may require the University to grant utility easements. Commonwealth of Kentucky Fire Protection Codes require water flow and pressure tests before new sprinkler systems can be installed, to assure adequate supply capacity is available.

Sewers

The Metropolitan Sewer District (MSD) owns and operates the sewer system serving the University. Their network of sewers carries the sanitary waste to a sewage treatment plant with the effluent being discharged into the Ohio river. The MSD sewer network is made up of storm, sanitary, and combination storm/sanitary lines. Combination storm/sanitary systems are no longer permitted and existing ones are rapidly being phased out.

The University owned and operated sewer lines are also a mix of systems. Older sewers are usually combination storm and sanitary type. However, in the past 25 years all buildings have been constructed with separate storm and sanitary sewer system in accordance with current standards.

The Metropolitan Sewer District along with the Urban Renewal Agency have an active program to upgrade the sewer system. Under normal conditions, MSD's sewer system should be adequate to provide for the present and the expanded campus. However, during periods of heavy rainfall, the capacity of storm and combination sewers is not sufficient. This is particularly evident in Brook Street between Eastern Parkway and Cardinal Boulevard.

Gas

The Louisville Gas and Electric Company provides natural gas to the University. Adequate gas mains are located on and adjoining the Campus, with sizes ranging from 4 to 20 inches. The underground gas distribution mains have pressures that vary from 4 ounces to 100 pounds.

There should be an adequate supply of gas for present as well as future needs of the University.

Steam

The University owned and operated Central Energy Plant generates high pressure steam, the majority of which is distributed in mains through underground tunnels with some direct buried lines.

The steam plant has three steam boilers with the following steam capacities:

	75,000	Thousand BTU per hour (MBH)
	75,000	MBH
	56,000	MBH
Total	<hr/>	206,000 MBH

To insure adequate heating is always available for the campus, steam loads should not exceed the amount available from two boilers, including the smallest unit. This allows either one of the largest boilers to be out of service and the steam plant still be capable of heating the campus. Based upon operational data obtained from the University the steam plant has the following spare capacity for future growth:

Minimum Two Boilers:

	75,000	MBH
	56,000	MBH
	<hr/>	
Maximum Permitted Load	131,000	MBH
Less Previous Peak Heating Demand	- 70,000	MBH
	<hr/>	
Spare Capacity	61,000	MBH

This spare capacity should support approximately 1,220,000 square feet of additional new facilities before additional boiler capacity will be required.

Chilled Water

The Central Steam and Chilled Water Plant has five refrigeration machines with the following capacities:

<u>MACHINE</u>	<u>RATING</u>
A	570 Tons
B	1125 Tons
C	1250 Tons
D	1250 Tons
E	750 Tons
	<hr/>
Total	4945 Tons

Campus air conditioning loads on this plant have reached its maximum capacity. However, two of the existing machines are getting old and should be considered for replacement (Chiller A - 40 years and Chiller E - 18 years). Replacing each of these with 2,000 ton machines will provide a "NET" increase of 2,680 tons to total plant capacity.

To insure adequate cooling is always available for the campus, air conditioning loads should not exceed the amount available from the chilled water plant with either one of the largest refrigeration machines out of service. If the two oldest machines are replaced as described above, the chilled water plant would have the following spare capacity for future growth.

<u>MACHINE</u>	<u>RATING</u>
A	2000 Tons
B	1125 Tons
C	1250 Tons
D	1250 Tons
E	2000 Tons
Total	<u>7625 Tons</u>
Less Previous Peak Cooling Demand	<u>-4945</u> 2680 Tons
Largest chiller off-line Spare Capacity	<u>-2000</u> 680 Tons

This spare capacity should support approximately 221,000 square feet of new facilities.

Replacement of refrigeration machines should include consideration of environmentally acceptable refrigerants and availability of continued service for existing machines. The University may also want to consider going to medium voltage refrigeration machines in lieu of 480 volt equipment in order to install larger machines more economically.

Tunnels

The new steam and chilled water piping systems will eventually form complete loops around the campus. These piping systems should be installed in new underground tunnels or extensions of present tunnels. Some existing tunnels have reached their maximum capacity. A new south tunnel should be interconnected to the proposed Speed complex. A new west tunnel should be extended to the new apartments and sorority/fraternity houses. A new north tunnel will complete the loop and serve new buildings in that general area. A new east tunnel will serve the University Park, the Service Complex, and other future buildings on the campus eastside.

Because some of the existing tunnels tie directly into building basements, water detection systems and heat sensors should be installed for added safety.

Electric Power

The Louisville Gas and Electric Company (L.G. & E.) provides electrical power to the University over two primary circuits. Both circuits originate at L.G. & E.'s Floyd substation and terminate at the University's Central Energy Plant. Manual switching is provided in the Plant to change from a preferred mode to a stand-by emergency mode whenever service is lost on any one of the two L.G. & E. primary circuits. Because both circuits are shared with other customers, L.G. & E. must be notified before the campus load is transferred from one circuit to another.

The present Belknap Campus 13.8 KV distribution system was originally designed in the mid

-70's by E. R. Ronald and Associates, installed in the late 70's and early 80's. All 13.8 KV circuits originate in the Steam and Chilled Water Plant.

The purpose of loop circuits configuration is to provide the capability so that any cable within the system, which may have failed, can be isolated. Thus only the affected section of the system is without electricity while repairs are made.

- Loop Circuit No. 1, (now comprised of two circuits), serves the north campus and is approximately two-thirds complete.
- Loop Circuit No. 2 is extended to south campus including the Speed buildings and is approximately one-third complete.
- Loop Circuit No. 3 will serve the new University Park, Student Activity Center plus other existing buildings for load balance and expansion to the north-east.
- Loop Circuit No. 4 is reserved for the development of the Steam and Chilled Water Plant and is equipped with four (4) 3,000 ampere, 480 volt electric services for a total capacity of over 8,000 KVA.
- Loop Circuit No. 5 is for future development west of Fourth Street.

As campus electrical loads grow, an additional Louisville Gas and Electric Company dedicated primary circuit should be provided to the campus.

Campus 13.8 KV distribution growth will include expansion of the north loop feeder circuit 1, the south loop feeder circuit 2, and the development of loop feeder circuit 3 for the University Park. Feeder Circuit 4 should be reserved for the Steam and Chilled Water Plant. Future plans should include electric services to the proposed buildings as well as redistribution of electric services to some present buildings to balance electrical loads on the four feeder circuits.

Communications

The University Center has become the communications center for the Belknap Campus. Future campus growth will require additional underground communication raceways both to the University Center and throughout campus. It is recommended that the present practice of installing communication and electrical ducts along side of steam and chilled water piping tunnels be continued. Major communication trunk routes should consist of minimum eight (8) four inch ducts with (4) four inch ducts into individual buildings.

Summary

Utility expansions that will be required to support new facilities at the Belknap Campus can be summarized as follows:

- Expansion of steam and chilled water tunnel system.

- Expansion of electrical distribution and communication systems along with new tunnels.
- Additional refrigeration capacity at the Central Energy Plant.
- Storm water flooding should also be corrected by MSD.

UNIVERSITY OF LOUISVILLE

BELKNAP CAMPUS

EXISTING BUILDINGS

REVISED: SEPTEMBER 27, 1993

ESTIMATED ELECTRICAL LOADS

BLDG. NO.	BUILDING NAME	NET S.F.	GROSS S.F.	KW LOAD ON UNIVERSITY POWER SYSTEM	INDEPENDENT ELECTRICAL SERVICE	KW LOAD ON UTILITY POWER SYSTEM	REMARKS
0001	CRAWMEYER HALL	19640	32133	169	NO	0	
0002	BRIGMAN HALL	10708	17798	93	NO	0	
0003	PATTERSON HALL	5079	7048	37	NO	0	
0005	OPPENHEIMER HALL	5319	9078	48	NO	0	
0006	JOUETT HALL	5380	7404	39	NO	0	
0007	FORD HALL	4401	6504	34	NO	0	
0008	GARDINER HALL	13948	19766	104	NO	0	
0009	ERSTROM LIBRARY	180297	206733	1085	NO	0	
001A	INFORMATION CNTR SOUTH	403	477	3	NO	0	
001B	INFORMATION CENTER	800	1090	6	NO	0	
0010	GOTTSCHALK HALL	7083	9165	48	NO	0	
0011	THE PLAYHOUSE	14743	19115	0	YES	100	
0013	MCCANDLESS HALL	4603	6277	33	NO	0	
0015	CUPA	3645	5368	28	NO	0	
0016	SAC/HPER	189516	291915	1533	NO	0	
0017	BINGHAM HUMANITIES BLDG.	50108	83436	438	NO	0	
0018	LIFE SCIENCES BLDG.	66810	97977	514	NO	0	
0019	SCHOOL OF LAW	87887	115894	608	NO	0	
0020	SCHNEIDER HALL	51047	59806	314	NO	0	
0021	STUDENT CENTER	79063	97304	511	NO	0	
0022	UNIVERSITY CLUB BLDG.	22988	29728	156	NO	0	
0024	THRELKELD HALL	39042	51477	270	NO	0	
0026	CRAWFORD GYM	42085	56153	295	NO	0	
0027	STEVENSON HALL	23608	34045	179	NO	0	
0028	KERSEY LIBRARY	25545	28926	152	NO	0	
0029	DOUGHERTY HALL	17086	24204	127	NO	0	
0030	J.B. SPEED HALL	23565	33990	178	NO	0	
0031	SACKETT HALL	16109	21250	112	NO	0	
0032	W.S. SPEED HALL	27375	33633	177	NO	0	
0033	ERNST HALL	25616	36279	190	NO	0	
0034	NATURAL SCIENCE BLDG.	54250	72867	383	NO	0	
0035	PARKWAY FIELDHOUSE	5921	6569	34	NO	0	
0036	CHEMISTRY BLDG.	68024	89169	468	NO	0	
0037	ENGINEERING GRAPHICS	2005	2658	0	YES	14	

UNIVERSITY OF LOUISVILLE

BELKNAP CAMPUS

EXISTING BUILDINGS

REVISED: SEPTEMBER 27, 1993

ESTIMATED ELECTRICAL LOADS

BLDG. NO.	BUILDING NAME	NET S.F.	GROSS S.F.	RW LOAD ON UNIVERSITY POWER SYSTEM	INDEPENDENT ELECTRICAL SERVICE	RW LOAD ON UTILITY POWER SYSTEM	REMARKS
0038	MILLER HALL	38676	56651	297	NO	0	
0040	RAUCH PLANETARIUM	1673	2123	11	NO	0	
0041	BRODSCHI HALL	3366	4269	22	NO	0	
0042	REYNOLDS BLDG.	83935	91557	0	YES	481	
0043	URBAN RESEARCH INST.	20068	28967	0	YES	152	
0044	ROBBINS HALL	6850	11077	58	NO	0	
0045	LOUISVILLE HALL	39996	52198	274	NO	0	
0047	JOHNNY UNITAS TOWER	33124	57180	300	NO	0	
0048	UNIVERSITY TOWER APTS.	61615	75452	396	NO	0	
0069	HUMANA GYMNASIUM	14756	22297	117	NO	0	
0070	STEAM/C.W. WATER PLANT	30503	30503	160	NO	0	
0071	STUDIO ARTS/HPER	23477	29692	156	NO	0	
0072	ENVIRONMENTAL HEALTH	2053	2600	14	NO	0	
0073	SHERMAN APTS.	39195	46720	0	YES	245	
0074	PUBLIC SAFETY BLDG.	3839	5206	0	YES	27	
0076	CARDINAL HALL	0	57500	0	YES	302	
0077	JOHNSTON BUILDING	23303	47066	0	YES	247	
0079	ALUMNI/DEV./PUB. INF	13006	16344	0	YES	86	
0081	HOUCHENS BUILDING	45078	62423	328	NO	0	
0082	HEALTH AND COUNSELING	6780	8624	0	YES	45	
0083	MUSIC SCHOOL	78039	120042	630	NO	0	
0084	EDUCATION	55395	84464	443	NO	0	
0085	BAPTIST STUDENT CENTER	5242	6782	36	NO	0	
0086	ECUMENICAL CENTER	3833	5128	27	NO	0	
0087	DAVIDSON HALL	48214	82571	433	NO	0	
0088	STRICKLER HALL	51328	82806	435	NO	0	
0089	FACILITIES MANAGEMENT	4405	8397	44	NO	0	
0090	SCHOOL OF BUSINESS	62499	91347	480	NO	0	
0098	ARCHIVES/SURPLUS PRO.	25760	26100	137	NO	0	
0099	VOGT BUILDING	18044	29806	156	NO	0	
0100	ARCH SURVEY/TRANS.	6745	7061	37	NO	0	
0102	HUGHES OFFICE BLDG.	5217	7729	41	NO	0	
0104	CAUFIELD		40500	213	NO	0	
0105	C&T ANNEX	5200	5200	27	NO	0	

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UNIVERSITY OF LOUISVILLE

BELKNAP CAMPUS

EXISTING BUILDINGS

REVISED: SEPTEMBER 27, 1993

ESTIMATED ELECTRICAL LOADS

BLDG. NO.	BUILDING NAME	NET S.F.	GROSS S.F.	KW LOAD ON UNIVERSITY POWER SYSTEM	INDEPENDENT ELECTRICAL SERVICE	KW LOAD ON UTILITY POWER SYSTEM	REMARKS
0106	CENTRAL RECEIVING	35935	35935	189	NO	0	
025A	HONORS PROGRAM BLDG.	2148	3491	18	NO	0	
034A	GREENHOUSE	1074	1074	6	NO	0	
036A	SOLVENT STORAGE	900	900	5	NO	0	
039C	MINORITY AFFAIRS	2984	3966	21	NO	0	
039I	RED BARN	6544	7315	38	NO	0	
039N	CHI OMEGA SORORITY	3381	3381	0	YES	18	
039O	TRIANGLE FRATERNITY	2904	2904	0	YES	15	
039Q	PI BETA PHI	2366	2366	0	YES	12	
039R	SIGMA PHI EPSILON	3600	3600	0	YES	19	
039S	KAPPA DELTA SORORITY	3600	3600	0	YES	19	
039T	DELTA ZETA SORORITY	3228	3228	0	YES	17	
039U	KAPPA ALPHA PSI SORORITY	3381	3381	0	YES	18	
049A	FRATERNITY A	14788	20772	109	NO	0	
049B	FRATERNITY B	16622	22227	117	NO	0	
049C	FRATERNITY BLDG. C	15062	20667	109	NO	0	
072A	ENVIRONMENTAL HEALTH	7207	7207	38	NO	0	
072B	CREDIT UNION	3274	3357	0	YES	18	
076A	MR. C'S		1060	0	YES	6	
076B	CATERING SERVICES BLDG.		3600	0	YES	19	
080A	SERVICE COMPLEX	29903	33541	176	NO	0	
098A	BELKNAP OPERATIONS CTR.	19600	19600	0	YES	103	
TOTALS:		2233414	3128790	14464		1963	

UNIVERSITY OF LOUISVILLE

BELKNAP CAMPUS

REVISED: SEPTEMBER 27, 1993

EXISTING BUILDINGS

ESTIMATED HEATING AND COOLING LOADS

BLDG. NO.	BUILDING NAME	NET S.F.	GROSS S.F.	CENTRAL PLANT		INDEPENDENT HEATING/COOLING SYSTEM	INDEPENDENT SYSTEM LOADS		REMARKS
				HEATING MBH	COOLING TONS		HEATING MBH	COOLING TONS	
0001	CRAWMEYER HALL	19640	32133	1607	99	NO	0	0	
0002	BRIGMAN HALL	10708	17798	0	0	YES	890	55	
0003	PATTERSON HALL	5079	7048	352	22	NO	0	0	
0005	OPPENHEIMER HALL	5319	9078	454	28	NO	0	0	
0006	JOUETT HALL	5380	7404	370	23	NO	0	0	
0007	FORD HALL	4401	6504	325	20	NO	0	0	
0008	GARDINER HALL	13948	19766	988	61	NO	0	0	
0009	EKSTROM LIBRARY	180297	206733	10337	636	NO	0	0	
001A	INFORMATION CNTR SOUTH	403	477	24	1	NO	0	0	
001B	INFORMATION CENTER	800	1090	55	3	NO	0	0	
0010	GOTTSCHALK HALL	7083	9165	458	28	NO	0	0	
0011	THE PLAYHOUSE	14743	19115	0	0	YES	956	59	
0013	MCCANDLESS HALL	4603	6277	0	0	YES	314	19	
0015	CUPA	3645	5368	268	17	NO	0	0	
0016	SAC/HPER	189516	291915	14596	898	NO	0	0	
0017	BINGHAM HUMANITIES BLDG	50108	83436	4172	257	NO	0	0	
0018	LIFE SCIENCES BLDG.	66810	97977	4899	301	NO	0	0	
0019	SCHOOL OF LAW	87887	115894	5795	357	NO	0	0	
0020	SCHNEIDER HALL	51047	59806	2990	184	NO	0	0	
0021	STUDENT CENTER	79063	97304	4865	299	NO	0	0	
0022	UNIVERSITY CLUB BLDG.	22988	29728	1486	91	NO	0	0	
0024	THRELKELD HALL	39042	51477	2574	158	NO	0	0	
0026	CRAWFORD GYM	42085	56153	2808	173	NO	0	0	
0027	STEVENSON HALL	23608	34045	1702	105	NO	0	0	
0028	KERSEY LIBRARY	25545	28926	1446	89	NO	0	0	
0029	DOUGHERTY HALL	17086	24204	1210	74	NO	0	0	
0030	J.B. SPEED HALL	23565	33990	1700	105	NO	0	0	
0031	SACKETT HALL	16109	21250	1063	65	NO	0	0	
0032	W.S. SPEED HALL	27375	33633	1682	103	NO	0	0	
0033	ERNST HALL	25616	36279	1814	112	NO	0	0	
0034	NATURAL SCIENCE BLDG.	54250	72867	3643	224	NO	0	0	
0035	PARKWAY FIELDHOUSE	5921	6369	0	0	YES	328	20	
0036	CHEMISTRY BLDG.	68024	89169	4458	274	NO	0	0	
0037	ENGINEERING GRAPHICS	2005	2658	0	0	YES	133	8	

UNIVERSITY OF LOUISVILLE

BELKNAP CAMPUS

REVISED: SEPTEMBER 27, 1993

EXISTING BUILDINGS

ESTIMATED HEATING AND COOLING LOADS

BLDG. NO.	BUILDING NAME	NET S.F.	GROSS S.F.	CENTRAL PLANT		INDEPENDENT HEATING/COOLING SYSTEM	INDEPENDENT SYSTEM LOADS		REMARKS
				HEATING MBH	COOLING TONS		HEATING MBH	COOLING TONS	
0038	MILLER HALL	38676	56651	2833	174	NO	0	0	
0040	RAUCH PLANETARIUM	1673	2123	0	0	YES	106	7	
0041	BRODSCHI HALL	3366	4269	213	13	NO	0	0	
0042	REYNOLDS BLDG.	83935	91557	4578	282	NO	0	0	
0043	URBAN RESEARCH INST.	20068	28967	1448	89	NO	0	0	
0044	ROBBINS HALL	6850	11077	0	0	YES	554	34	
0045	LOUISVILLE HALL	39996	52198	0	0	YES	2610	161	
0047	JOHNNY UNITAS TOWER	33124	57180	2859	176	NO	0	0	
0048	UNIVERSITY TOWER APTS.	61615	75452	0	0	YES	3773	232	
0069	HUMANA GYMNASIUM	14756	22297	1115	69	NO	0	0	
0070	STEAM/C.W. WATER PLANT	30503	30503	1525	94	NO	0	0	
0071	STUDIO ARTS/HPER	23477	29692	0	0	YES	1485	91	
0072	ENVIRONMENTAL HEALTH	2053	2600	0	0	YES	130	8	
0073	SHERMAN APTS.	39195	46720	0	0	YES	2336	144	
0074	PUBLIC SAFETY BLDG.	3835	5206	0	0	YES	260	16	
0076	CARDINAL HALL	0	57500	0	0	YES	2875	177	
0077	JOHNSTON BUILDING	23303	47066	0	0	YES	2353	145	
0079	ALUMNI/DEV./PUB. INF	13006	16344	0	0	YES	817	50	
0081	HOUCHENS BUILDING	45078	62423	3121	192	NO	0	0	
0082	HEALTH AND COUNSELING	6780	8624	0	0	YES	431	27	
0083	MUSIC SCHOOL	78039	120042	6002	369	NO	0	0	
0084	EDUCATION	55395	84464	4223	260	NO	0	0	
0085	BAPTIST STUDENT CENTER	5242	6782	0	0	YES	339	21	
0086	ECUMENICAL CENTER	3833	5128	0	0	YES	256	16	
0087	DAVIDSON HALL	48214	82571	4129	254	NO	0	0	
0088	STRICKLER HALL	51328	82806	4140	255	NO	0	0	
0089	FACILITIES MANAGEMENT	4405	8397	0	0	YES	420	26	
0090	SCHOOL OF BUSINESS	62499	91347	4567	281	NO	0	0	
0098	ARCHIVES/SURPLUS PRO.	25760	26100	0	0	YES	1305	80	
0099	VOGT BUILDING	18044	29806	1490	92	NO	0	0	
0100	ARCH SURVEY/TRANS.	6745	7061	0	0	YES	353	22	
0102	HUGHES OFFICE BLDG.	5217	7725	0	0	YES	386	24	
0104	CAUFIELD		40500	0	0	YES	2025	125	
0105	C&T ANNEX	5200	5200	0	0	YES	260	16	

UNIVERSITY OF LOUISVILLE

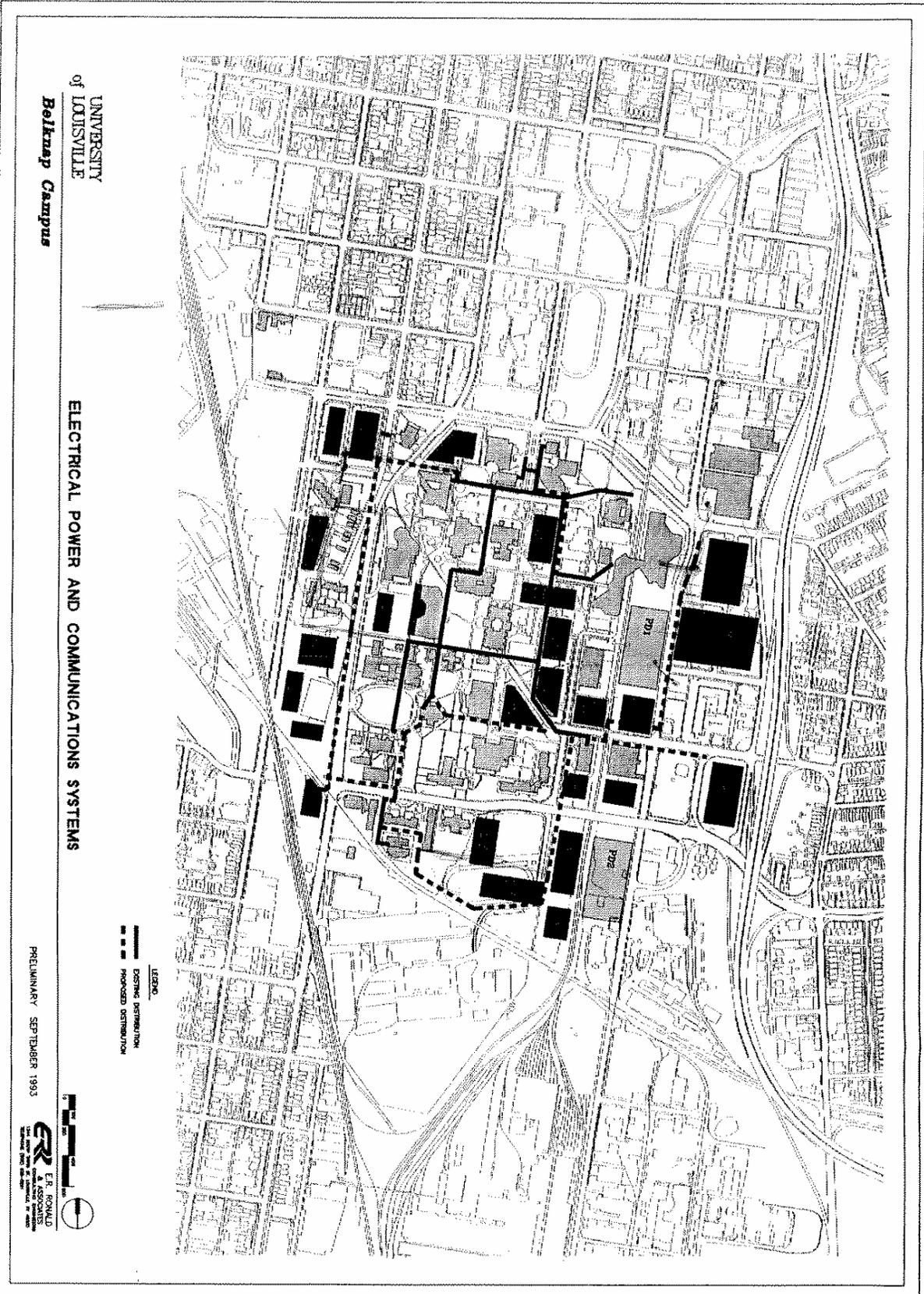
BELKNAP CAMPUS

REVISED: SEPTEMBER 27, 1993

EXISTING BUILDINGS

ESTIMATED HEATING AND COOLING LOADS

BLDG. NO.	BUILDING NAME	NET S.F.	GROSS S.F.	CENTRAL PLANT		INDEPENDENT HEATING/COOLING SYSTEM	INDEPENDENT SYSTEM LOADS		REMARKS
				HEATING MBH	COOLING TONS		HEATING MBH	COOLING TONS	
0106	CENTRAL RECEIVING	35935	35935	0	0	YES	1797	111	
025A	HONORS PROGRAM BLDG.	2148	3491	0	0	YES	175	11	
034A	GREENHOUSE	1074	1074	54	3	NO	0	0	
036A	SOLVENT STORAGE	900	900	45	3	NO	0	0	
039G	MINORITY AFFAIRS	2984	3966	198	12	NO	0	0	
039I	RED BARN	6544	7315	366	23	NO	0	0	
039N	CHI OMEGA SORORITY	3381	3381	0	0	YES	169	10	
039O	TRIANGLE FRATERNITY	2904	2904	0	0	YES	145	9	
039Q	PI BETA PHI	2366	2366	0	0	YES	118	7	
039R	SIGMA PHI EPSILON	3600	3600	0	0	YES	180	11	
039S	KAPPA DELTA SORORITY	3600	3600	0	0	YES	180	11	
039T	DELTA ZETA SORORITY	3228	3228	0	0	YES	161	10	
039U	KAPPA ALPHA PSI SORORITY	3381	3381	0	0	YES	169	10	
049A	FRATERNITY A	14788	20772	0	0	YES	1039	64	
049B	FRATERNITY B	16622	22227	0	0	YES	1111	68	
049C	FRATERNITY BLDG. C	15062	20667	0	0	YES	1033	64	
072A	ENVIRONMENTAL HEALTH	7207	7207	0	0	YES	360	22	
072B	CREDIT UNION	3274	3357	0	0	YES	168	10	
076A	MR. C'S		1060	0	0	YES	53	3	
076B	CATERING SERVICES BLDG.		3600	0	0	YES	180	11	
080A	SERVICE COMPLEX	29903	33541	0	0	YES	1677	103	
098A	BELKNAP OPERATIONS CTR.	19600	19600	0	0	YES	980	60	
TOTALS:		2233414	3128790	121048	7449		35392	2178	



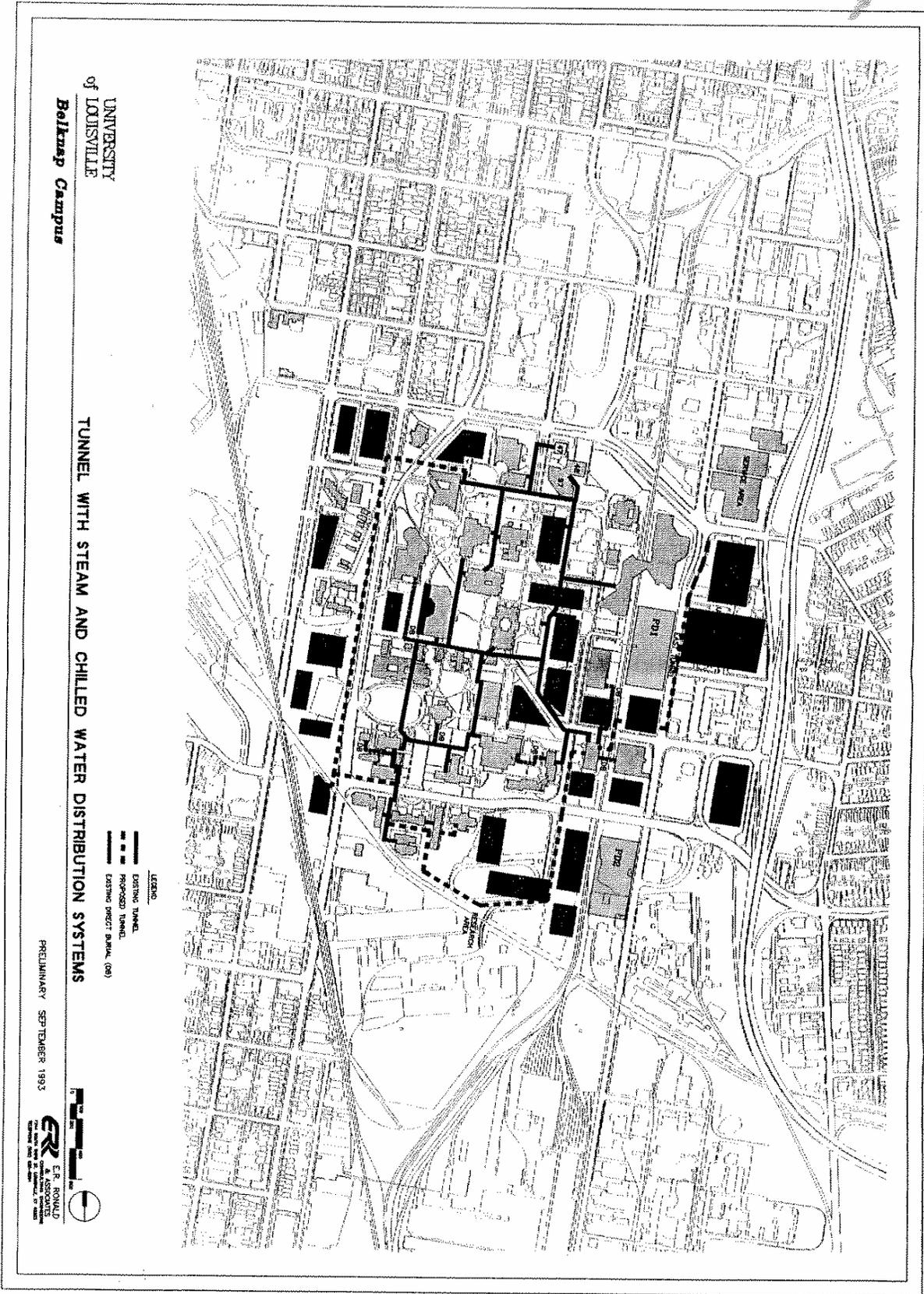
UNIVERSITY
of LOUISVILLE
Belknap Campus

ELECTRICAL POWER AND COMMUNICATIONS SYSTEMS

LEGEND
 ———— EXISTING DISTRIBUTION
 - - - - - PROPOSED DISTRIBUTION

PRELIMINARY SEPTEMBER 1993

E.R. RONALD
& ASSOCIATES, INC.
ELECTRICAL ENGINEERS
PLANNERS



UNIVERSITY
of LOUISVILLE
Belknap Campus

TUNNEL WITH STEAM AND CHILLED WATER DISTRIBUTION SYSTEMS

- LEGEND
- EXISTING TUNNEL
 - - - PROPOSED TUNNEL
 - EXISTING DUCT BANK (DB)

PRELIMINARY SEP/TEMBER 1983

ERK E. R. RONALD & ASSOCIATES
 CONSULTING ENGINEERS
 1000 W. MARKET ST., SUITE 1000
 LOUISVILLE, KY 40202

HEALTH SCIENCE CENTER

Utility Systems

The University of Louisville Health Sciences Center is served by the following utility systems:

- Water
- Sewer (sanitary & storm)
- Natural Gas
- Steam
- Chilled Water
- Electric Power
- Communications

Water, sewer, and gas services are, in most cases, distributed throughout the campus by utility owned mains. Steam and chilled water are provided from the Medical Center Steam and Chilled Water Plant located on Floyd Street and Abraham Flexner Way. The Plant is not owned by the University and serves other non-University facilities in this area in addition to the University's Health Science Center. Electric power is provided through the campus, both on utility distribution lines and University owned and maintained 13.8 KV distribution lines. Communication services are provided both by the University and private communication companies.

Water

The Louisville Water Company serves the Health Sciences Center with loop piping systems consisting of cast iron water mains from ranging from 6 to 20 inches. Water pressure at street level varies from 70 to 85 pounds per square inch. This pressure is usually adequate for both domestic and fire protection requirements, except for high rise facilities.

Present distribution systems have ample capacity for both domestic and fire protection systems for the present facilities as well as any short term additional buildings.

Sewers

The Metropolitan Sewer District owns and operates the sewer systems serving the Health Sciences Center. All buildings in this area are required to be connected to separate storm and sanitary sewer systems. Sewer systems in this area should be adequate for present and the long term expansion.

Gas

The Louisville Gas and Electric Company provides natural gas to the Health Sciences Center. Sufficient gas mains are located in the near vicinity. Underground gas distribution mains have pressures that vary from 4 ounces to 100 pounds, with lines ranging from 4 to 16 inches. There should be adequate natural gas distribution to meet the demands of present and future facilities.

Steam and Chilled Water

The Health Science Center purchases steam and chilled water from the Medical Center Steam and Chilled Water Plant.

The present distribution tunnel has two high pressure steam lines with capacity to satisfy the present heating loads and long term expanded facilities. However, chilled water mains located in the existing distribution tunnel east of Preston Street are approaching their capacity according to the managers of the Medical Center Steam and Chilled Water Plant. The present distribution tunnel has spaces for future chilled water mains. The capacity of these lines should be thoroughly investigated before any major facility expansion takes place.

Electric Power

The Louisville Gas and Electric Company (L.G. & E.) provides electric power to the University's 13.8 KV distribution system at the Health Sciences Center. In addition, several buildings that are not connected to this system are served directly by L.G. & E.

The present University owned and maintained Health Sciences Center 13.8 KV underground distribution system originates from 13.8 KV switchgear in the Medical School (B-Building). It is served from two Louisville Gas and Electric Company's substations and has an automatic transfer switch capable of switching over should one incoming service fail.

All buildings, with the exception of the Cancer Center, are served by double-ended substations with a primary selector switch and two common 13.8 KV incoming circuits from the main switchgear. Normally each end of the substation is connected to opposite incoming cables; however, should one cable fail, both ends can be served by the other cable. Should one transformer fail, both ends may be served by the other transformer through a "tie" switch in each substation. This arrangement maintains the "double-feed" option required for hospital type facilities throughout the campus system.

Each circuit is designed for a continuous demand of 7,500 KW. The double circuit has a capacity of 15,000 KW, however, should the one circuit fail, the system capacity is reduced to 7,500 KW. The main service equipment has a capacity of 12,000 KW.

The University's underground electrical services should be extended to existing buildings not served by the campus system including The Medical-Dental Research Building, Lion's Eye Research Building, and "C" and "K" Buildings of the original Louisville General Hospital complex. Space will need to be provided in the Medical-Dental Research Building and in "K" Building for 13.8 KV switchgear or space for pad mounted equipment outside the buildings.

The University's underground electric service should be extended to planned new construction sites as they are developed.

Communications Raceways

Empty communications raceways are to be provided with new underground electric distribution raceways. A minimum of eight (8) four inch raceways will be provided between manholes and four (4) four inch raceways from the manholes into the buildings.

Summary

Utility Expansions that will be required to support new facilities at the Health Sciences Center can be summarized as follows:

- Extend underground tunnels with steam and chilled water distribution.
- Extend underground electrical distribution and communications systems along with new tunnels.
- Additional chilled water mains may also be required in existing tunnels.

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UNIVERSITY OF LOUISVILLE

HEALTH SCIENCES CAMPUS

REVISED: SEPTEMBER 27, 1993

EXISTING BUILDINGS

ESTIMATED ELECTRICAL LOADS

BLDG. NO.	BUILDING NAME	NET S.F.	GROSS S.F.	KW LOAD ON UNIVERSITY POWER SYSTEM	INDEPENDENT ELECTRICAL SERVICE	KW LOAD ON UTILITY POWER SYSTEM	REMARKS
0051	MDR BLDG.	68114	96690	508	NO	0	
0052	MEDICAL DENTAL APTS.	58951	73468	0	YES	386	
0053	RENAL DIALYSIS CTR.	7042	13670	0	YES	72	
0054	CHILD PSYCHIATRY CNT.	5979	8435	0	YES	44	
0056	LIONS EYE BANK	21383	35900	0	YES	188	
0057	RESEARCH RESOURCE CT.	10339	25754	0	YES	135	
0058	MYERS HALL	15726	22860	0	YES	120	
0059	CARMICHAEL BLDG.	38376	54388	0	YES	286	
050A	AMBULATORY CARE BLDG.	104437	154042	809	NO	0	
050C	CONCENTRATED CARE			0	NO	0	
050I	INSTITUTIONAL SERVICES	280749	281056	1476	NO	0	
050R	BROWN CANCER CENTER	45198	76365	401	NO	0	
055A	SCHOOL OF MEDICINE	73868	150791	792	NO	0	
055B	HEALTH SCIENCES BLDG.	71995	94531	496	NO	0	
055C	SCHOOL OF DENTISTRY	120609	186983	982	NO	0	
055D	LIBRARY & COMMONS	41466	61873	325	NO	0	
059A	HSC ANNEX	7908	10360	0	YES	54	
059B	KCG BLDG.	54839	60898	0	YES	320	
059C	ABELL ADMIN. CENTER	14714	26467	0	YES	139	
059R	KIDNEY DISEASE PROG.	15584	21872	0	YES	115	
TOTALS:		1057277	1456403	5787		1859	

UNIVERSITY OF LOUISVILLE

HEALTH SCIENCES CAMPUS

REVISED: SEPTEMBER 27, 1993

EXISTING BUILDINGS

ESTIMATED HEATING AND COOLING LOADS

BLDG. NO.	BUILDING NAME	NET S.F.	GROSS S.F.	CENTRAL -PLANT		INDEPENDENT HEATING/COOLING SYSTEM	INDEPENDENT SYSTEM LOADS		REMARKS
				HEATING MBH	COOLING TONS		HEATING MBH	COOLING TONS	
0051	MDR BLDG.	68114	96690	4835	298	NO	0	0	
0052	MEDICAL DENTAL APTS.	58951	73468	3673	226	NO	0	0	
0053	RENAL DIALYSIS CTR.	7042	13670	684	42	NO	0	0	
0054	CHILD PSYCHIATRY CNT.	5979	8435	422	26	NO	0	0	
0056	LIONS EYE BANK	21383	35900	1795	110	NO	0	0	
0057	RESEARCH RESOURCE CT.	10339	25754	1288	79	NO	0	0	
0058	MYERS HALL	15726	22860	0	0	YES	1143	70	
0059	CARMICHAEL BLDG.	38376	54388	0	0	YES	2719	167	
050A	AMBULATORY CARE BLDG.	104437	154042	7702	474	NO	0	0	
050C	CONCENTRATED CARE			0	0	NO	0	0	
050I	INSTITUTIONAL SERVICES	280749	281056	14053	865	NO	0	0	
050R	BROWN CANCER CENTER	45198	76365	0	0	YES	3818	235	
055A	SCHOOL OF MEDICINE	73868	150791	7540	464	NO	0	0	
055B	HEALTH SCIENCES BLDG.	71995	94531	4727	291	NO	0	0	
055C	SCHOOL OF DENTISTRY	120609	186983	9349	575	NO	0	0	
055D	LIBRARY & COMMONS	41466	61873	3094	190	NO	0	0	
059A	HSC ANNEX	7908	10360	518	32	NO	0	0	
059B	KCC BLDG.	54839	60898	3045	187	NO	0	0	
059C	ABELL ADMIN. CENTER	14714	26467	1323	81	NO	0	0	
059R	KIDNEY DISEASE PROG.	15584	21872	1094	67	NO	0	0	
TOTALS:		1057277	1456403	65140	4009		7681	473	

UNIVERSITY
of LOUISVILLE

Health Sciences Campus

ELECTRICAL POWER AND COMMUNICATIONS SYSTEMS

PRELIMINARY SEPTEMBER 1993



UNIVERSITY
of LOUISVILLE
Health Sciences Campus

TUNNEL WITH STEAM AND CHILLED WATER DISTRIBUTION SYSTEMS

PRELIMINARY SEPTEMBER 1993



LEGEND
— EXISTING TUNNEL
- - - PROPOSED TUNNEL

SHELBY CAMPUS

Utility Systems

The University of Louisville Shelby Campus is served by the following utility systems:

- Water
- Sanitary Sewer
- Natural Gas
- Electric Power
- Communications

All buildings on this campus have independent heating and air conditioning systems, except for the Dormitory Complex (9 Buildings), which has one boiler and chiller with heating and cooling distributed to each building via interconnecting piping.

Water

The Louisville Water Company serves the Shelby Campus with both domestic and fire protection water services. Water mains are 4 to 10 inches in size. Water pressure at street level is in the neighborhood of 60 pounds per square inch. This pressure is usually adequate for both domestic and fire protection, except for high rise facilities.

Existing domestic water system and fire protection water system are adequate for present facilities and short term expansion, but a thorough study of the two systems should be made before initiating any facility expansions.

Storm Sewers

Storm water from both building and grounds is collected and extended to natural drainage ditches. This system is adequate for present conditions but proposed buildings and parking areas will require development of storm sewer systems.

Sanitary Sewers

The Metropolitan Sewer District owns and operates the sewer system serving the Shelby Campus. Present 12 inch sanitary sewer is of sufficient size to serve the present facilities and any short term expanded facilities.

Gas

The Louisville Gas and Electric Company provides natural gas to the Campus. Underground gas distribution mains having medium pressure are connected to building clusters and buildings. Gas services is adequate for present and short term expanded facilities.

Heating and Cooling

Presently, the campus facilities are heated by *gas/oil* fired boilers. Water cooled chillers are used to cool individual buildings. These systems are adequate to meet the present loads.

Long term expanded facilities should continue with individual heating and cooling systems.

Electric Power

The Louisville Gas and Electric Company (L.G. & E.) provides electric power to the Shelby Campus by a single circuit overhead primary line from Shelbyville Road. The University has several underground electrical ducts in the central core area of the Campus.

As future campus plans become more definite, the University's underground electrical distribution system should be extended along the circle road to provide a complete electrical distribution loop.

Communications

Communication service is provided to the south side of the central core area by an underground duct bank from residential area on the west side of the campus.

As the campus grows the underground communication ducts should also be extended along the circle road parallel with the electrical duct bank expansion.

Summary

Utility expansions that will be required to support new facilities at the Shelby Campus can be summarized as follows:

The amount of land at the Shelby Campus offers the University opportunities that are not available at the other campuses. Utility expansion should be carefully coordinated with facility growth in order to maintain the flexibility and options that now exist for the University.

UNIVERSITY OF LOUISVILLE

SHELBY CAMPUS

REVISED: SEPTEMBER 27, 1993

EXISTING BUILDINGS

ESTIMATED ELECTRICAL LOADS

BLDG. NO.	BUILDING NAME	NET S.F.	GROSS S.F.	KW LOAD ON UNIVERSITY POWER SYSTEM	INDEPENDENT ELECTRICAL SERVICE	KW LOAD ON UTILITY POWER SYSTEM	REMARKS
0060	BURHANS HALL	42250	64701	340	NO	0	
0063	FOUNDERS UNION BLDG.	20402	31669	166	NO	0	
0064	JR. ACHIEVEMENT (LEASED OUT)	5384	5384	28	NO	0	
0066	GROUNDS SHOP	1800	1800	9	NO	0	
0067	TELE RESEARCH CENTER	10846	13798	72	NO	0	
061E	DORMITORY E	4057	4913	26	NO	0	
061F	DORMITORY F	4057	4913	26	NO	0	
061G	DORMITORY G	4057	4913	26	NO	0	
061H	SEMINAR CENTER	4244	5225	27	NO	0	
061X	CENTRAL HOUSE	5621	8285	43	NO	0	
062A	DORMITORY A	4057	4913	26	NO	0	
062B	DORMITORY B	4057	4913	26	NO	0	
062C	DORMITORY C	2365	3221	17	NO	0	
062D	DORMITORY D	4487	5319	28	NO	0	
TOTALS:		117684	163967	861		0	

UNIVERSITY OF LOUISVILLE

SHELBY CAMPUS

REVISED: SEPTEMBER 27, 1993

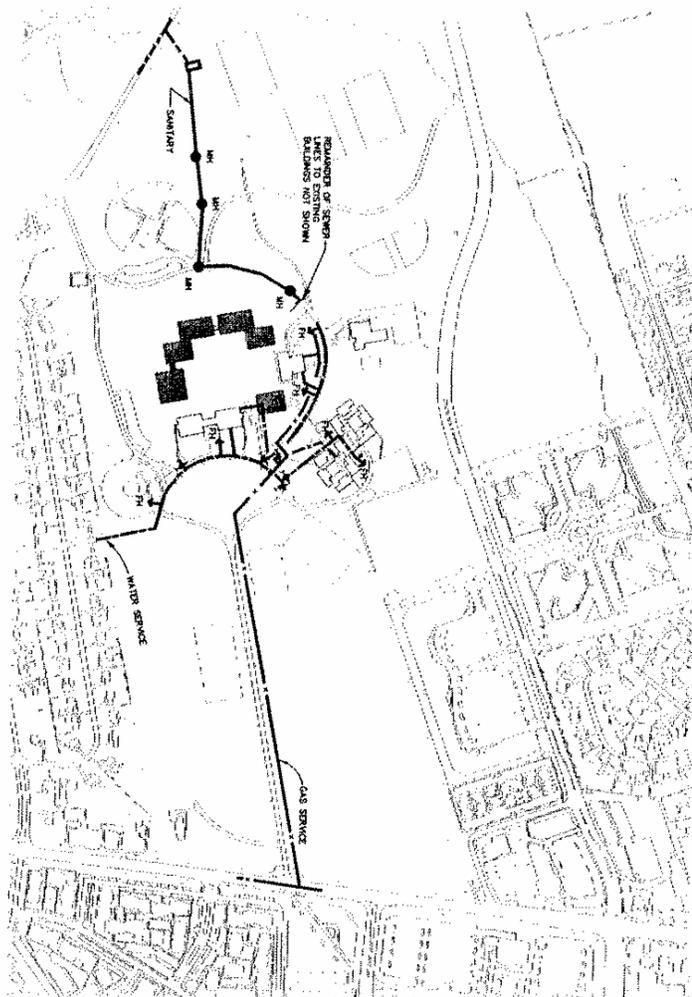
EXISTING BUILDINGS

ESTIMATED HEATING AND COOLING LOADS

BLDG. NO.	BUILDING NAME	NET S.F.	GROSS S.F.	CENTRAL-PLANT		INDEPENDENT HEATING/COOLING SYSTEM	INDEPENDENT SYSTEM LOADS		REMARKS
				HEATING MBH	COOLING TONS		HEATING MBH	COOLING TONS	
0060	BURHANS HALL	42250	64701	0	0	YES	3235	199	
0063	FOUNDERS UNION BLDG.	20402	31669	0	0	YES	1583	97	
0064	JR. ACHIEVEMENT (LEASED OUT)	5384	5384	0	0	YES	269	17	
0066	GROUNDS SHOP	1800	1800	0	0	YES	90	6	
0067	TELE RESEARCH CENTER	10846	13798	0	0	YES	690	42	
061E	DORMITORY E	4057	4913	0	0	YES	246	15	
061F	DORMITORY F	4057	4913	0	0	YES	246	15	
061G	DORMITORY G	4057	4913	0	0	YES	246	15	
061H	SEMINAR CENTER	4244	5225	0	0	YES	261	16	
061X	CENTRAL HOUSE	5621	8285	0	0	YES	414	25	
062A	DORMITORY A	4057	4913	0	0	YES	246	15	
062B	DORMITORY B	4057	4913	0	0	YES	246	15	
062C	DORMITORY C	2365	3221	0	0	YES	161	10	
062D	DORMITORY D	4487	5319	0	0	YES	266	16	
TOTALS:		117684	163967	0	0		8198	505	

NOTE: THERE IS NO CENTRAL HEATING/COOLING PLANT AT SHELBY CAMPUS.

EXISTING GAS, WATER AND SANITARY SYSTEMS



- LEGEND
- GAS
 - WATER
 - SANITARY (48")
 - PRE-HOSPITAL (18")

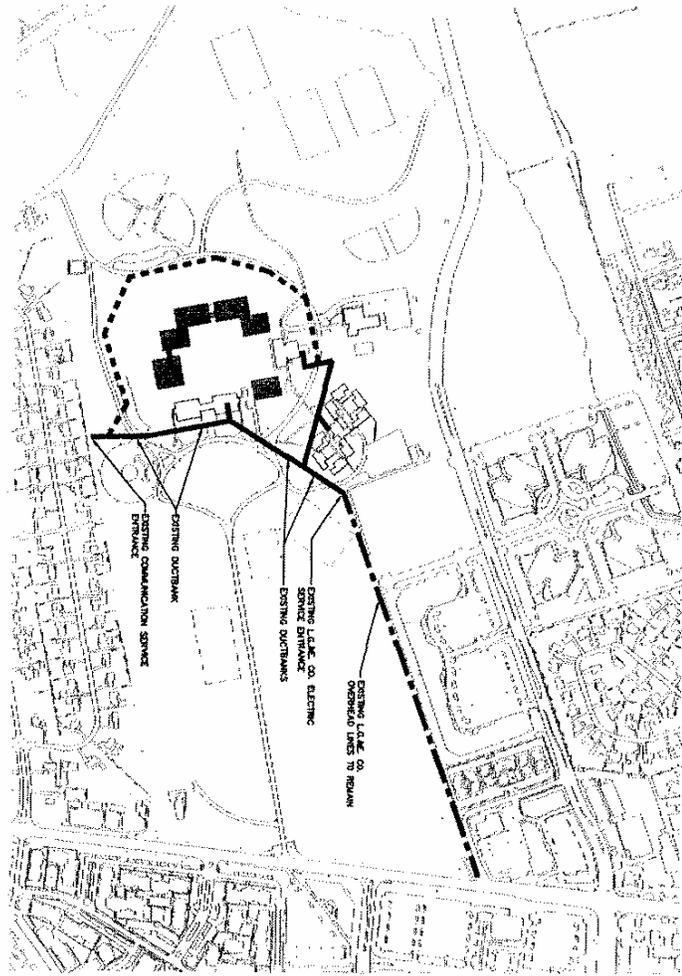
PRELIMINARY SEPTEMBER 1993



UNIVERSITY
of LOUISVILLE
Shelby Campus

ELECTRICAL POWER AND COMMUNICATIONS SYSTEMS

PRELIMINARY SEPTEMBER 1983



LEGEND
 ——— EXISTING DISTRIBUTION
 - - - - - PROPOSED UNDERGROUND DISTRIBUTION

MAJOR MAINTENANCE AND RENOVATION PROGRAM

Effective Care of Existing Campus Facilities

New facilities and expanded campus grounds are vitally important to the future of the University.

The University is currently involved in a considerable facilities expansion program on Belknap and Health Science Center campuses. Two parking decks, the Academic Building, the Tennis Center, and several major renovations are in various stages of completion.

This 1993 Master Plan defines a continuing program of constructing buildings and recreational facilities.

Another extremely important dimension of campus facilities management is maintenance and upkeep of existing buildings and systems. Adequate funding and staffing must be provided so that a well executed plan of scheduled maintenance, repair, and replace can be carried out.

Major Maintenance

Major maintenance, sometimes called “deferred maintenance’ includes the labor and materials expended in the periodic restoration of facilities that are deteriorating on time cycles of greater than one year. Regular or routine maintenance expenses are allocated on an annual basis. But, in addition, cash reserves must be established for facilities and facility components and systems with maintenance life cycles of greater than one budget cycle.

For example, a roof which has a useful life of twenty-five years and now in the fifteenth year may be considered to have accumulated a partial deferred expense of 15/25ths of its restoration cost. When the roof reaches twenty five years old (and at the expiration of its useful life) the funding plan must provide the entire replacement cost of the roof.

The purpose of the Ten Year Major Maintenance Plan is to identify the current and projected needs in buildings and campus utility systems.

The ten-year schedule of work activities is based on physical inspections of the following components and systems:

- Roofs
- Exteriors (windows, masonry, etc.)
- Interiors (ceilings, floor covering, painting)
- Plumbing Systems
- Heating & Air Conditioning Systems
- Electrical Systems (power and lighting)
- Utility Distribution (steam, chilled water, electrical, etc.)
- Roads, Walks, and Parking Lots

Generally, the work called for in the first two to three years of the Ten Year Major Maintenance

Plan includes renewal of components and systems that have or soon will reach the end of their useful life. The identification of these work elements comes from actual conditions known to exist and not from projected “useful life” expectancies. Years four and five include work that is beginning to need attention, and years six through ten of the plan identify renewal items that are based on “useful life” projections.

The total amount of funding required to fully implement the full plan on all three campuses is as follows:

<u>Year</u>	<u>Cost</u>
1	\$ 3,026,644.00
2	1,622,746.00
3	2,373,856.00
4	1,969,545.00
5	2,151,718.00
6	1,692,014.00
7	1,891,788.00
8	1,906,537.00
9	1,994,507.00
10	2,089,019.00
TOTAL	\$20,718,374.00

Building Renovations

When buildings undergo complete renovations, most components and systems are renewed all at once. The Ten Year Major Maintenance plans is a useful planning tool for determining the building elements that are in need of total renewal or replacement at the time the building is renovated.

In nearly every case, renovations occur when the building occupancy or function is changing, or when a facility is acquired and requires alterations before occupancy can occur. The exception to this is the renovation of dormitories, which must be accomplished in June, July, and August to take advantage of the lower student resident population that exists in the summer.

Buildings that have undergone extensive renovation in recent years are the following:

- Belknap Theatre “Playhouse” 1980
- School of Law 1982
- CUPA Administration Building 1985
- Schneider Hall 1985
- Sackett Hall 1986
- W.S. Speed Museum 1986
- Paterson Hall 1989
- Telecommunications Research Center 1989
- Brigman Hall 1990

- Kersey Library 1990
- Miller Hall 1990
- Threlkeld Hall 1991
- Abell Building 1992
- Cardinal Hall 1992
- Football Dormitory 1992
- Honors Building 1992
- Jouett Hall 1992
- Shelby Campus Dorms “F” and “G” 1992
- Uritas Tower 1992
- Ford Hall 1993
- Kidney Disease Program (Long Run Baptist) 1993
- University Center (Old Student Center) 1993

Buildings that are planned for renovation in the near future are as follows:

- “K” Building (Old Lou. General Hospital) 1994
- Medical/Dental Apartments 1994
- Stevenson Hall 1994
- University Tower Apartments 1995

**TEN YEAR MAJOR MAINTENANCE PLAN
TOTAL COST PER YEAR**

AS OF 10/11/93

<u>Year</u>	<u>Sum of Estimated Cost</u>
01	\$ 4,104,768.00
02	2,068,465.00
03	2,956,995.00
04	2,660,867.00
05	2,575,777.00
06	1,971,617.00
07	2,131,458.00
08	1,992,892.00
09	2,128,913.00
10	2,383,751.00
TOTAL:	\$24,975,503.00

**TEN YEAR MAJOR MAINTENANCE PLAN
TOTAL YEARLY COST PER CAMPUS**

AS OF 10/11/93

	<u>Year</u>	<u>Sum of Estimated Cost</u>
CAMPUS: BELKNAP		
	01	\$ 3,077,645.00
	02	1,361,668.00
	03	1,958,537.00
	04	1,732,260.00
	05	1,925,963.00
	06	1,632,133.00
	07	1,749,425.00
	08	1,212,709.00
	09	1,544,683.00
	10	1,513,335.00
	TOTAL:	\$17,708,358.00
CAMPUS: HSC		
	01	\$ 706,160.00
	02	597,411.00
	03	863,258.00
	04	712,959.00
	05	489,308.00
	06	260,516.00
	07	316,962.00
	08	620,280.00
	09	544,190.00
	10	727,188.00
	TOTAL:	\$5,838,232.00
CAMPUS: SHELBY		
	01	\$ 320,963.00
	02	109,386.00
	03	135,200.00
	04	215,648.00
	05	160,506.00
	06	78,968.00
	07	65,071.00
	08	159,903.00
	09	40,040.00
	10	143,228.00
	TOTAL:	\$1,428,913.00

UNIVERSITY OF LOUISVILLE

15-Oct-93

1992-98 SIX-YEAR CAPITAL PLAN

FINAL

1992-94		1994-96		1996-98	
1992-93	1993-94	1994-95	1995-96	1996-97	1997-98

PRI. ITEMS AUTHORIZED IN THE 1992-94 BIENNIAL AND FUNDED (REQUIRE STATUS REPORT ONLY)

6YR C.P.	SRR#						
1	MR/LB	1	"K" Building - Life/Safety Renovation (Phase I)	State Bonds	2,552,000		STATE FUNDED
2	MR/PI	6	"K" Building - Renovation (Phase II)	Plant Funds	4,825,000		U OF L FUNDED
3	AG/ES	7	Land and Building Purchase/Renovation (NSC)	Private	3,973,000		U OF L FUNDED
4	MR/PI	21	Ford Hall Renovation	Plant Funds		845,000	U OF L FUNDED
5	MR/EG	OUT	Student Health/Counseling Building Renovation	F/for \$200,000	354,000		U OF L FUNDED
6	RA/MM/PI	10	University Dorms - Medical/Dental Apartments	Agency Bonds/Fd	1,940,000		UofL to Issue Bonds
7	RA/MM/PI	11	University Dorms - University Tower Apartments	Agency Bonds/Fd	2,346,000		UofL to Issue Bonds
8	DE	13	Sharaan Apartments Demolition and Parking	Plant Funds	363,000		Plant Funds
9	RA/MM/PI	17	University Dorms - Stevenson Hall	Agency Bonds/Fd		676,000	UofL to Issue Bonds
10	NC/ES	20	University Park - Tennis Facility (has Indoor Tennis)	Private		3,650,000	U OF L FUNDED
10	NC/ES		University Park - Outdoor Tennis (Added to Tennis Facility)			879,000	above

UNIVERSITY OF LOUISVILLE

1992-98 SIX-YEAR CAPITAL PLAN

FINAL

ITEM No.	PRI. No.	ITEMS FOR THE 1992-98 SIX YEAR CAPITAL PLAN		1992-94		1994-96		1996-98	
				1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
1	NC/ES	1	Research Building (HSC)	State Bonds		17,662,000			
2	HM/LS	2	American Disabilities Act (ADA) Project Pool	State Bonds		8,339,000			
3	HM/LS	3	Life and Fire Safety Pool	State Bonds		2,886,000			
4	HM/ER	4	Chlorofluorocarbon Project Pool	State Bonds		2,865,000			
5	RA/MA/LS	5	Chemistry Building Ventilation System	State Funds		270,000			
6	NC/ES	7	Multi-Cultural Center Building	State Bonds		1,307,000			
7	HM/LS	26	Sprinklers Systems - Buildings 48, 51, 52 and 55A	State Bonds		1,233,000			
8	RA/HA/PI	25	Natural Sciences (Rebuild Parapet Walls)	State Funds		476,000			
9	RA/HA/PI	26	Replace Roof - 55A (Medicine)	State Funds		217,000			
10	RA/HA/PI	27	Replace Roof - 55C (Dentistry)	State Funds		271,000			
11	RA/AQ/ES	28	Property for Support Services	State Funds		830,000			
12	EA/NC/ES	29	Univ. Park - Track & Field, Soccer, and Field Hockey Fac.	Private		4,118,000			
13	RA/HA/ES	30	Steam and Chilled Water Plant	State Bonds		4,162,000			
14	RA/CR	31	Cardinal Hall Demolition	State Funds		250,000			
15	NC/ES	64	Print Shop Facility	State Bonds		2,785,000			
16	NC/IS	65	Hurstbourne Lane Access Road for Shelby Campus	Road Fund		727,000			
17	HA/ES	66	University Center Renovation (Phase III)	State Bonds		4,314,000			
18	NC/ES	67	Football Stadium (30,000 Seats)	Agency		60,000,000			
19	NC/EC	68	Pediatric Office Facility	Private		11,075,000			
20	RA/HA/ES	69	University Club Courtyard Enclosure and Expansion	Private		885,000			
22	MR/PI	70	Medical/Dental Research Bldg. Renov. - Phase II	State Funds		460,000			
23	MA/ES	71	Education Learning Resource Center	State Bonds		1,343,000			
24	MR/ES	72	Founder's Union Renovation	State Funds		609,000			
25	MR/ES	73	Standard Oil Building Renovation	State Bonds		3,488,000			
	MR/PI	74	Oppenheimer Hall Renovation	State Bonds		1,110,000			
26	NC/ES	75	Research Building (Belknap)	State Bonds			24,411,000		
27	NC/ES	76	New Residence Hall	Agency			14,061,000		
28	RA/NC/ES	77	University Park - Field House	Private			12,200,000		
29	RA/NC/HS	78	University Park - Natatorium	Private			12,848,000		
30	MA/UT	79	Utilities for University Park and Service Complex	State Bonds			6,212,000		
31	RA/AQ/ES	89	Support Services Land Acquisition (Northeast)	Private			3,786,000		
32	RA/HA/PI	90	Carmichael Building Renovation	State Bonds			2,587,000		
33	MA/UT	91	Utility Distribution Improvements	State Bonds			7,629,000		
34	RA/NC/ES	92	Information Center (East)	State Funds			297,000		
35	NC/IS	93	Arthur Street Extension - Connector	Road Fund			238,000		
36	NC/IS	94	New Ramps and Ramp Closings for I-65	Road Fund			4,949,000		
37	MR/PI	116	J.B. Speed Renovation	State Bonds			2,683,000		
38	MR/PI	117	Natural Sciences Renovation	State Bonds			2,847,000		
39	MA/HA	118	Devideon Hall Renovation	State Bonds			1,386,000		
40	MR/ES	119	Houshens Building Renovation	State Bonds			1,829,000		
Total						131,602,000	97,963,000		

UNIVERSITY OF LOUISVILLE

1992-98 SIX-YEAR CAPITAL PLAN

FINAL

				1992-94		1994-96		1996-98	
				1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
41	NC/ES	120	Support Services Building	-----	-----	-----	-----	12,015,000	-----
42	NC/ES	121	Conference Center (Shelby Campus)	-----	-----	-----	-----	9,808,000	-----
43	NC/ES	122	University Park - Baseball Stadium	-----	-----	-----	-----	2,069,000	-----
44	NM/PI	123	Replace Roof (Music School)	-----	-----	-----	-----	271,000	-----
45	NC/ES	134	Information Center (HSC)	-----	-----	-----	-----	297,000	-----
46	NM/PI	134	Replace Roof (Law School)	-----	-----	-----	-----	250,000	-----
47	NR/UT	135	Electrical and Telephone Utility Relocation	-----	-----	-----	-----	2,897,000	-----
48	NC/ES	136	Kornhauser Library Addition - 55B	-----	-----	-----	-----	11,780,000	-----
49	AQ/ES	137	Purchase and Renovate Bldg. - 485 E. Gray St.	-----	-----	-----	-----	6,672,000	-----
50	NR/PI	138	Ernst Hall Renovation	-----	-----	-----	-----	5,174,000	-----
51	NR/PI	146	Gardiner Hall Renovation	-----	-----	-----	-----	2,392,000	-----
52	NR/ES	147	HSC Auditorium Renovation - 55B	-----	-----	-----	-----	572,000	-----
53	NR/ES	148	Instructional Building Renovation - 55B	-----	-----	-----	-----	2,456,000	-----
54	NC/ES	149	New Classroom Building (Belknap)	-----	-----	-----	-----	-----	12,139,000
55	NC/ES	150	Multipurpose Building (HSC)	-----	-----	-----	-----	-----	18,719,000
56	AQ/ES	151	Land Acquisition-South	-----	-----	-----	-----	-----	974,000
57	ME/ES	152	Ambulatory Care Building Academic Addition	-----	-----	-----	-----	-----	9,138,000
58	NM/PI	153	Shelby Campus Lodging Facilities	-----	-----	-----	-----	-----	762,000
59	NM/PI	167	University Dorms - Dormitory Complex Dorm 49C and 49A West	-----	-----	-----	-----	-----	364,000
60	NE/ES	168	Sackett Hall Extension	-----	-----	-----	-----	-----	244,000
61	NE/ES	169	James Graham Brown Cancer Center Addition	-----	-----	-----	-----	-----	19,534,000
62	NM/PI	170	Replace Roof (Education Building)	-----	-----	-----	-----	-----	287,000
63	NM/PI	171	Replace Roof (Houchens Building)	-----	-----	-----	-----	-----	308,000
64	NC/ES	172	Ctr. for Environ. and Conservation Stud. Bldg	-----	-----	-----	-----	-----	10,302,000
65	DE	173	Service Complex Demolition	-----	-----	-----	-----	-----	221,000
66	NE/ES	174	Choral/Opera Rehearsal and Practice Rooms	-----	-----	-----	-----	-----	3,187,000
67	NR/RR	175	Myers Hall Renovation	-----	-----	-----	-----	-----	4,307,000
68	NC/ES	182	Vogt Building Addition	-----	-----	-----	-----	-----	4,095,000
Total								56,653,000	84,581,000

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