Facility Condition Assessment & Space Study Project

KRS 164 / M-05468008

Final Report



Submitted by:

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Paulien & Associates

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Kentucky Postsecondary Education System
University of Kentucky
Facility Condition Assessment & Space Study

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TABLE OF CONTENTS

Note on Figure and Table Headings: Figures and Tables are numbered sequentially as if both illustrations were part of the same list. i.e. Figure 1.3 may be followed by Table 1.4, without there being a Table 1.3.

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Part II. G.

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Section 1. Introduction

The Kentucky Council on Postsecondary Education (CPE) contracted with Vanderweil Facility Advisors, Inc. (VFA) to assess the condition, space adequacy and space capacity of selected facilities at Kentucky's nine public higher education institutions during the summer and fall of 2006. The studies are intended to inform both the Council and the institutions as the basis for a 15-year capital plan that would help address the following important questions:

- What is the condition of each institution's facilities? What system renewals are due for those facilities, both deferred renewals due today and future renewals due within the next 15 years?
- Is the current space (in selected buildings) fit for continued use? If not, how much would it cost to upgrade those buildings?
- Does each institution have enough space, now and to meet enrollment projections for the year 2020? If not, how much will it cost to add the needed space?
- How do Kentucky facilities compare to other postsecondary educational portfolios?
- Is there evidence to indicate why the predicted capital reinvestment is needed?
- What recommendations does the project team have as KPES creates a 15 year capital plan for facilities?

Summary of Findings Figures:

Figure 1.1: UK 15-Year System Renewal Needs

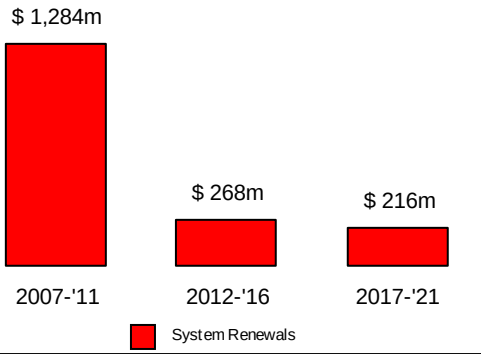


Figure 1.2: UK 15-Year Space Adequacy + Capacity Needs

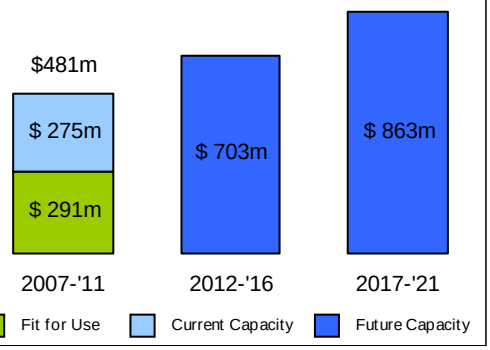
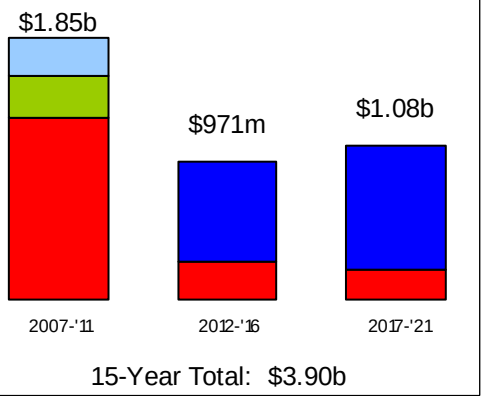


Figure 1.3: UK 15-Year Blended Needs



LEGEND: Colors in Figure 1.3 correspond to labels in Figures 1.1 & 1.2. Figure 1.3 summarizes the annual needs presented in Figure 6.4.

Attributions:
All sections of this report are by Peter Scanlon, Thomas Bart and Joseph Maggiore of VFA, Inc., unless otherwise noted under the Section heading.

Table 1.4: Percentage of Institutional Portfolios Included in Study

Institution	Institutions' Portfolios* Total # of Buildings	Gross Square Ft	Condition Assessment by VFA** Total # of Buildings		Gross Square Ft		Space Adequacy Study by Paulien Total # of Buildings		Gross Square Ft	
Eastern Kentucky University	190	4,626,458	55	(29%)	2,829,774	(61%)	10	(5%)	867,593	(19%)
KCTCS	284	6,138,142	198	(70%)	5,740,720	(94%)	8	(3%)	509,813	(8%)
Kentucky State University	54	1,223,473	37	(69%)	726,963	(59%)	7	(13%)	148,841	(12%)
Morehead State University	112	2,718,050	39	(35%)	1,556,012	(57%)	11	(10%)	813,450	(30%)
Murray State University	169	3,710,171	48	(28%)	2,453,372	(66%)	3	(2%)	203,667	(5%)
Northern Kentucky University	109	2,440,541	26	(24%)	1,558,254	(64%)	5	(5%)	649,987	(27%)
University of Kentucky	908	14,884,891	167	(18%)	8,700,858	(58%)	51	(6%)	3,564,946	(24%)
University of Louisville	136	7,889,007	107	(79%)	4,513,765	(57%)	36	(26%)	2,469,961	(31%)
Western Kentucky University **	54	4,266,565	40	(74%)	1,860,621	(44%)	10	(19%)	809,809	(19%)
Total	2,016	47,897,298	717	(36%)	29,940,339	(63%)	141	(7%)	10,038,067	(21%)

*Source: Fall 2005 Building Data Base submission.
**Space assessed by VFA is Education and General Space.
***Revised to include WKU housing facilities.

Summary of Findings:

- The present study examined only a portion of University of Kentucky's (UK) portfolio (167 of 908 buildings (18%) for condition study and 51 of 908 buildings (6%) for space study). The results of the present study most likely understate the amount of capital investment needed.
- UK facilities included in the study require $1.284 billion in system renewals during 2007-2011, and $484 million more between 2012 and 2022, totaling $1.768 billion in system renewals over 15 years. (Figure 1.1 and Section 4.)
- UK facilities included in the space fit-for-continued use study require $291 million between 2007 and 2011 to bring them up to current educational adequacy standards. (Figure 1.2 and Section 5.)
- UK facilities require $275 million between 2007 and 2011, to have enough space to meet current enrollment needs, and an additional $1.566 billion over the following 10 years to meet future enrollment projections. (Figure 1.2 and Section 5.)
- For facilities included in the study, the total 15-year capital investment required to address condition, adequacy and capacity is $3.9 billion. (Figure 1.3 and Section 6.)
- University of Kentucky compares unfavorably (49% 5-year Facility Condition Index) to the benchmark higher education institution's portfolio (18% 5-year FCI). (Section 4.)
- The condition of facilities UK is generally consistent with the age and construction methods of the facilities. There are many major system renewals due because 66% of UK buildings were built over 30 years ago (approximately 60% of instructional space is over 40 years old), and as would be expected, many systems are at the end (or beyond the end) of their expected useful life. (Section 4.)
- The project team recommends CPE and UK address all three needs (condition, adequacy and capacity) with blended investments to address them simultaneously, staged over 15 years. (Section 6.)
- Funding options for UK to consider vary according to the type of facility: The "cleanest" approach to funding the backlog of deferred renewals would be a state bond issue paid from general operating revenues, together with a requirement that each institution spend an amount equal to the GASB recommended depreciation amount. New construction of auxiliary facilities is most often funded with long term debt supported by student direct use charges. The predominant funders of general academic facilities—classrooms, labs, offices, and libraries—are state and local governments (direct appropriations or debt) and private donors (outright gifts). The primary funders of research facilities are state and federal governments and private donors (either individuals or philanthropic organizations). (Table 1.5 below, and Section 7.)

Table 1.5 below (a copy of Table 7.3 in Section 7) is presented as a worksheet for KPES.

Here, the subtotals of the "Strategic Funding" scenario suggested in Section 6.8 are shown in the "Amount Needed, from 2006 Study" column. (The total amount needed, $3,874m, is less than the $3,900m shown in Figure 1.3 because the recommended "strategic funding" leaves a small, usually acceptable (10%), portion of the deferred renewals undone.)

KPES and UK policy makers can use Table 1.5 as a framework to allocate the Amounts Needed across the most likely sources of funds to create KPES' 15 Year Funding Plan.

If KPES and UK choose to supplement this study with additional information, any additional capital investments identified would need to be included.

TABLE 1.5
UK Funding Patterns Worksheet for Higher Education Facilities

USES		SOURCES					
	Amount Needed, from 2006 Study	Students	State	Local Govt.	Federal Govt.	Donors	Institutional Funds
Renewal and Renovation							
• Condition/End of Life	$1,742m		Approp./debt				Approp./debt
• Space Adequacy	$291m		Approp./debt				Approp./debt
New Construction							
• Auxiliary	n/a						
2006 Capacity							
• Academic facilities	$144m	Fees	Approp./debt	Debt		Gifts	Lease/ purchase
• Research facilities	$130m		Approp./debt		Grants	Gifts	
2020 Capacity							
• Academic facilities	$891m	Fees	Approp./debt	Debt		Gifts	Lease/ purchase
• Research facilities	$675m		Approp./debt		Grants	Gifts	
TOTAL	$3,874m						

Figure 1.5 is a copy of Figure 7.3 in Section 7.

Section 2. Project Overview: Methodologies, Data, Outcome & Limitations

The nine institutions included in the study were:

- Eastern Kentucky University
- Kentucky Community & Technical College System
- Kentucky State University
- Morehead State University
- Murray State University
- Northern Kentucky University
- University of Kentucky
- University of Louisville
- Western Kentucky University

The study includes selected buildings identified by CPE as education and general space on each institution's campus. In total, VFA performed a Level 1 Lifecycle Condition Assessment (LCA) of 167 assets at UK comprising 8.7 million square feet (18% of 54 buildings; 58% of square footage in portfolio). Nearly 6.1 million square feet (42%) of institutional space was NOT included in the condition study. Also, VFA's project partner Paulien & Associates was asked to examine the space adequacy of 51 education and general buildings selected from various campuses (only 6% of 908 buildings in the portfolio), and evaluate the space capacity of each institution vs. current and future student populations.

The number of buildings and amount of space not included in the present study means the results of the study most likely understate the amount of capital investment needed at UK.

Methodologies

In the Level 1 Lifecycle Condition Assessments, VFA facility experts profiled each asset's major building systems to assess the capital renewals required now and in the future. A renewal of a building system is defined as an investment required at the end of the system's useful life, to prolong, or renew, its service in the facility — for example, re-roofing a worn out old roof. "Deferred Renewals" are renewals that, based on the age of the facility, were due in the past, but have not yet been completed.

Each building's system lifecycle assessment included establishing a replacement value of each system, comparing the system's expected (industry standard) useful lifespan to its observed remaining life, and estimating the cost to renew that system when replacement is due. Replacement values (adjusted to reflect local market conditions) of each asset's component systems were then added together to establish an asset's replacement value, and the cost of system renewals due within the coming five years was summed. The ratio of these 5-year renewal costs divided by the replacement value of their asset(s) establishes an index, called a Facility Condition Index, which can be used to compare the relative condition of assets. Lower FCIs indicate an asset requires little renewal investment; buildings with higher FCIs are in worse shape. Lower FCIs are better.

$$FCI = \frac{[\text{Sum of 5-year Renewals}]}{[\text{Replacement Value of Asset(s)}]}$$

The LCA process and methodology is supported by the expert opinions of facilities engineers and architects, along with VFA's web-based capital planning software application, VFA.facility. Condition data about each facility were collected during an on-site visual inspection and through a series of interviews and feedback cycles with facility managers at the institution. Detailed cost estimates for the replacement value and renewal cost of each system were developed using the VFA.facility software application, which has the widely accepted R.S. Means construction cost estimating database embedded within it. R.S. Means estimates, already localized by a city cost index by Means, were further adjusted (up) to match the historical project cost experiences represented by a cross section of Kentucky public postsecondary institutions. For consistency between campuses, the same adjustment factors were made across all institutions. Expected useful lifespans for individual building systems were based on Building Owners & Managers Association (BOMA) standards and verified though consultation with CPE and APPA (formerly the Association of Physical Plant Administrators). A detailed account of these sources and adjustment factors is presented in Appendix A2.

Selected buildings that were less than five years old were assumed in "good" condition (because of their young age). Their future system renewal needs were included in the condition study by modeling system types and renewals based on construction records and interviews with university feasibility managers. This produced data compatible with the Level 1 (and Level 2) assessments. No physical walk through or visual inspection was conducted on these buildings. (As expected, due to their young age, many 5-year-old-or-less buildings had no renewals due within the coming five years, and hence an FCI = 0.)

Each asset greater than five years old was assumed to have a backlog of systems that were at or beyond their expected useful life. In determining the backlog, all capital renewals due in 2006 or previous years were defined as "deferred capital renewals." Renewals due in 2007 or beyond were treated as future capital renewals.

It is worth noting that the Level 1 Lifecycle Condition Assessment process does not include identifying "deferred maintenance" deficiencies. These facility needs, while often rising to the level of requiring capital investment to address, would each require less than replacing each deficiency's entire system. (Replacements of entire systems are called renewals, and are included in Level 1 LCAs.) Identifying and estimating the cost of deferred maintenance requirements is a service available through VFA's Level 2 Detailed Facility Condition Assessments.

In the Space Adequacy or Fit-for-Continued-Use portion of the study, buildings selected by CPE and the institution were visually inspected for compliance with 9 metrics of the facility's educational adequacy. Where gaps were identified, recommended corrective actions were developed, including cost estimates for those actions. Cost estimates were based on historical averages for similar upgrades at higher education institutions nationwide, and adjusted to coincide with the replacement values for similar building types estimated in the VFA condition study.

The Space Capacity portion of the study addresses the need for additional educational and general (E&G) space to meet the needs of the student and staff population, both now and into the future, based on enrollment data and projections provided by CPE.

Detailed methodologies explaining both the condition assessment and the space study are presented in Appendices A2 (Condition) and A4 (Space).

Data

Detailed records of each building in the study are presented in the appendices:

Appendix A3. Facility Condition Data Reports
- Asset List Report
- Asset Detail Report(s)
- System Renewal Report, by Year
- System Renewal Crosstab Report

Appendix A5. Space Study Data Reports
- Building Space Fit-for-Continued-Use Profiles
- Space Capacity Detailed Report

Complete electronic records of each asset are available for licensed users of VFA.facility, VFA's capital planning and management software system. VFA.facility software offers the flexibility to investigate, analyze and model the capital needs for each institution, and for the Kentucky postsecondary education system as a whole.

Outcomes

KPES' and UK's goal is to gain a complete picture of Kentucky's public higher education facility capital needs over the coming 15 years.

To that end, this study presents some valuable pieces of that picture, though not yet a complete picture:

Condition:	Major system renewal needs for 167 assets, or 8.7 million square feet of space (58% of portfolio square footage)
Space Adequacy:	"Fit-for-continued-use" ratings, and cost estimates for upgrades, for 51 buildings (6% of portfolio buildings; 24% of square footage).
Space Capacity:	Capacity projections and cost estimates for UK's education

and general use space needs, now and to meet 2020 enrollment goals.

Funding Source Options: A summary of options for funding higher education capital needs, presented at a statewide level. Funding options are most efficiently approached across Kentucky's postsecondary education portfolio, and are not broken down by institution within this report.

Section 6 of this report presents the 15 year capital needs outlook for each portion of the study. The 15-year plan also presents models for how UK might want to invest in those needs, based on various spending patterns and strategic priorities. The spend alternatives are included to demonstrate how a truly complete picture of Kentucky's public higher education capital plan might be constructed.

However, as mentioned in the Limitations section below, the outcome of the present study does not present a 100% complete picture of the whole. Each portion of the study is valuable on its own, but the condition, space adequacy and space capacity needs portions each examined only a specific group of each institution's facilities. Further, the Space Capacity projections, while updated from the Paulien 1999 model (revised by Paulien in 2001), may not be aligned with other strategic initiatives underway or planned at individual institutions.

Section 6 includes the consultants' team suggestions for further work to align goals and construct a more complete picture of Kentucky's public higher education facility capital needs.

In the condition assessment portion of the study, VFA found the amount of system renewals required by the great majority of UK's facilities to be consistent with the age and use of each facility, and many buildings to be surviving (for the time being) past their expected useful lifespans. And while there are examples of major capital investment in new facilities, the amount of investment in the existing building stock has not met these buildings' aging needs.

Limitations

It is important to note a few limitations to the VFA | Paulien portions of the study:

- **Assessed only selected buildings** – 167 of UK's facilities (18% of the number of buildings), comprising 8.7 million gross square feet (58% of gross square footage), were included in the condition assessment. Further study or modeling of the remaining assets would be required to gain a 100% complete picture of the condition or capital needs of the institutions.
- **Assessed for budgeting purposes –** The survey outcomes are intended for planning and budgeting purposes; they are not intended to provide construction specification-grade information about an asset. Outcomes for condition needs, space adequacy needs and space capacity needs may be added together to ascertain a more rounded picture of an institution's needs (in fact, the project team encourages such a blended view of capital investments for each asset/campus), however because such a limited portion of most institutions' portfolio was studied, the "blended" picture is far from complete.
- **Assessed for system renewals only** – The Level 1 LCA services provided under this contract included profiling the type, condition and renewal needs of each building and its major systems. The condition assessment does NOT provide a detailed list of requirements for each building. (This service is available through VFA's Level 2 Detailed Facility Condition Assessment.) Thus, while projecting system renewals over 15 years, the forecast does not account for sub-component needs related to a system unless they collectively contribute to general system failure. These are sometimes called "deficiencies" or "requirements," are usually concentrated in the next 1-5 years, and again, are not included in this report.

  Also not included in the study is any assessment of the day-to-day facilities operations. The study specifically and intentionally focused on the level of investment needed for major system renewals only. The study collected no data and draws no conclusions about how institutions are

budgeting to address daily operations and maintenance of their facilities.

- **Space Study only for selected Education and General buildings –** The Space Study included 51 buildings across the nine institutions. This represents only 6% of the total number of buildings (and 24% of gross square footage). The space adequacy study is intended to summarize the adequacy of the study buildings only. Since the buildings surveyed were not chosen to serve as a statistical sample of the overall university's space adequacy, extrapolation of the space adequacy results to model all adequacy needs for each institution is not recommended.
- **Space capacity projections include Education & General Space only** – The Space Capacity Study accounted for the education and general space at each institution, the institution's current enrollment, and the 2020 enrollment projections. Needs for residential and related enterprise space such as agriculture were not included. As noted, further survey or advisory services are available from the VFA | Paulien team to help fill in any gaps in the information that are deemed of high importance.

Section 3: Study Overview: Project Organization & Implementation

Organization

In April, 2006, the Council on Postsecondary Education contracted with VFA, Inc. of Boston, MA, as prime contractor, to conduct the overall facility condition and space adequacy | needs study. VFA provided overall project management as well as facility condition assessment services and capital planning software for the project. VFA teamed with higher education space planning experts Paulien & Associates of Denver, CO, to provide the Space Adequacy / Fit-for-Continued-Use and Space Capacity portions of the study. And, as a subcontractor to Paulien, the National Center for Higher Education Management Systems, of Boulder, CO, provided an analysis of funding sources KPES may want to consider when deciding how to implement the 15 year capital plans.

A project organization chart is shown in Figure 3.1

Figure 3.1 Project Organizational Chart

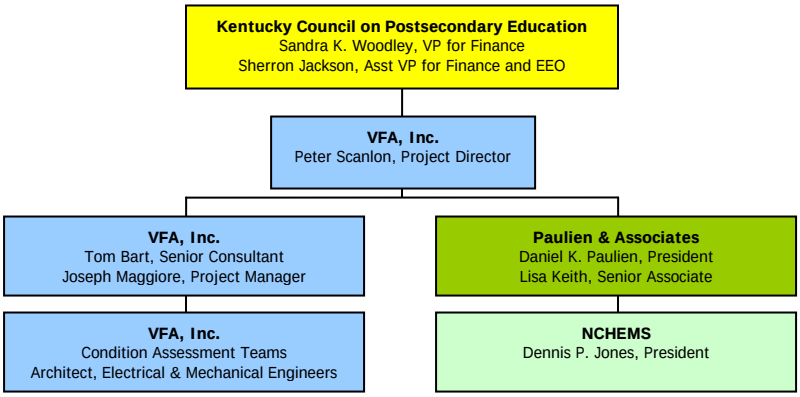
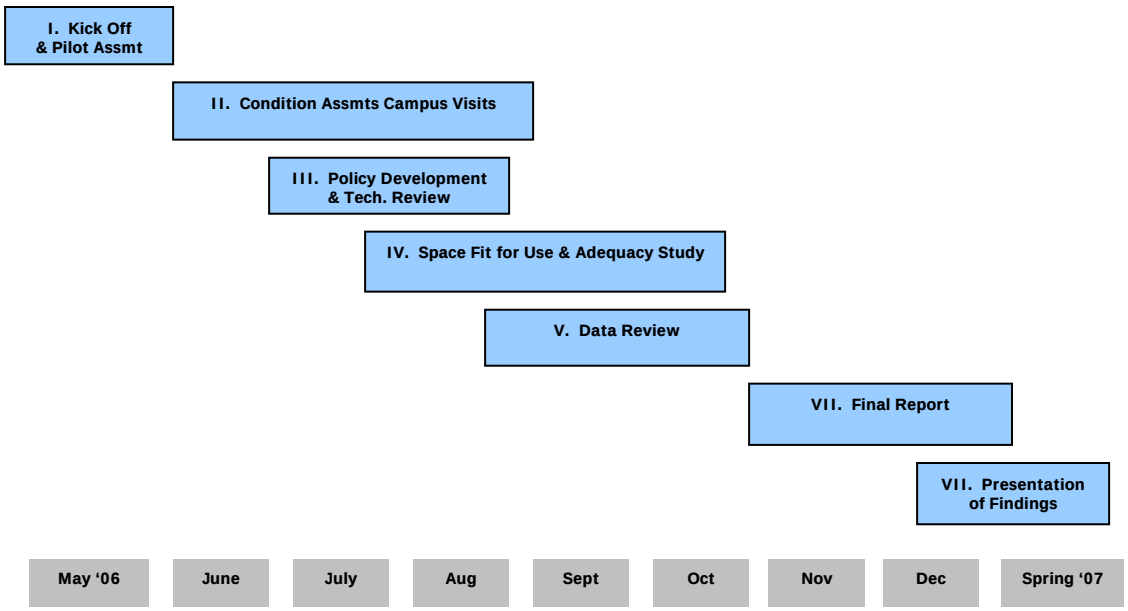


Figure 3.2: Project Schedule



Implementation

The study proceeded under a fast track schedule during which 27 million square feet, and 700+ assets, were assessed statewide during five months of 2006. Figure 3.2 illustrates the major portions of the project schedule.

Phase I: Kick Off & Pilot Assessment

The project kicked off in early May 2006 at a planning meeting hosted by Kentucky State University and attended by representatives of the Council, each of the public postsecondary education institutions, and the VFA | Paulien project team. The overall project schedule and methodology were presented, and a pilot assessment was conducted.

For the pilot assessment, a team of VFA assessors conducted a Level 1 Life Cycle Assessment of 2 facilities on the KSU campus. Representatives from each institution joined the VFA team to familiarize themselves with the Level 1 LCA process. During a debriefing session at the conclusion of the visual inspections, questions about the process, standards and schedule were answered.

In the weeks following the kick-off meeting, VFA developed sample data and reports based on the KSU pilot buildings. The reports were submitted to the Council and institutional representatives, who approved the data content and format that would be used for the subsequent Level 1 LCAs on their respective campuses.

Phase II: Campus Visits

During the summer and fall of 2006, assessment teams from VFA and Paulien visited selected buildings at each institution.

Data generated in the Facility Condition Assessment portion of the study was collected by teams of VFA assessors – typically architects, electrical and mechanical engineers and/or facility managers – during a visual inspection of each asset. The detailed project assessment schedule is included in Appendix A1.

During the visual inspection, VFA assessors interviewed key facility managers at the institution, profiled the type, age, condition and renewal actions due for each major system of each building/infrastructure asset. Assessors also took digital photos, which are included in the reports and stored in the project database.

Upon completion of the field visit, the assessment teams began the data and cost estimating portion of the work, when they developed detailed cost estimates of each building system, the time remaining in each system's useful life, and the likely cost of renewing the system at the end of its useful life.

The replacement values of each system were totaled for each asset to derive a current replacement value (CRV) for that asset. CRVs presented in the data are intended to represent the construction cost of replacing the building (or system), with a similarly functioning building/system, in 2007 dollars. The CRVs do not include any "upgrades" of particular systems unless current building methods make the upgrade equal or less expensive.

Phase III: Policy Development and Technical Review

The project team worked closely with the Council to develop policies that would guide the submission, review and possible adjustment of the data. Guiding principles that shaped these policies included goals of:

- Accuracy: data should reflect actual conditions for each facility, as closely as possible given methodologies used for each portion of the study, providing a reliable record of the portfolio today.
- Consistency: similar standards, reference information and adjustment factors should apply uniformly to all institutions statewide, ensuring fair and equitable treatment across the postsecondary system.
- Transparency: all data sources, cost estimating and adjustment processes should be easy to reference, understand and track, providing maximum transparency to the information underlying the study's conclusions.

The process of reviewing and refining the data (Phase V, below) followed these principles as closely as possible.

Phase IV: Evaluation of Space Adequacy & Capacity

The Space Adequacy and Capacity portion of the study was led by Paulien & Associates. A detailed explanation of Paulien's methodology is included as Appendix A4.

Space Adequacy | Fit-for-Continued-Use Study

CPE and the institutions identified a specific set of education and general facilities for evaluation in the space adequacy study. The facility selection process was developed by CPE and was the same for each campus. Selection criteria for inclusion in the space adequacy study included: (a) research facilities, (b) constructed before 1965, (c) identified by the institution as being unfit for continued use, or (d) identified as being in too deteriorated condition to support programs currently housed in the space.

The key areas evaluated include:

- *Does the building serve the program's current and future needs either by design or retrofit?*
- *How do the spaces in the building fit today's expectations and/or can the building be reasonably renovated to meet those expectations?*
- *Is the building's physical condition adequate to meet program needs and today's expectations (including life safety issues) and how major of a conversion or renovation is needed?*
- *Where applicable, are research laboratories of acceptable, flexible dimensions and up-to-date equipment to sustain on-going use as modern research facilities?*

Multiple rooms in each building were reviewed. The goal was to examine a sampling of the best, worst, and norm for the building. Classrooms, laboratories, offices, special use spaces, and bathrooms are examples of spaces reviewed. Mechanical and structural spaces were typically not included.

At the end of each day's assessments, the team discussed each building and collectively determined each building's criteria rating and recommended action.

Building Design

When evaluating the buildings in the space adequacy study, there were several conditions examined on a case-by-case basis. These conditions contributed to the recommended action

for each building. Where possible these types of issues are included in the comment section of each building's evaluation. In general, it is important for a facility to promote and serve the activities and programs it houses as well as support the mission and overall master plan of the institution. It is entirely possible that a building was designed for and adequately serves the programs it houses yet be physically located in the wrong precinct of a campus or be a smaller single story building in a prime location that would be better served by a larger, multi-story building.

Some of the buildings were specifically designed for the programs contained in them or for the functions they serve, yet the building may now be overcrowded due to the institution's/ program's growth or the physical design is antiquated for today's standards or the construction materials do not allow for an cost-effective or efficient renovation. Certain buildings are on the historical registry. Many of these older facilities are best suited for administrative offices and not instructional programs. If the building does not meet ADA requirements then the additional constraint is that the administrative function should not be one that is high profile which generates a lot of people traffic.

Space Adequacy Assessment

The consultants reviewed nine criteria and rated each building on a one to four scale as follows: 1 = Unsatisfactory; 2 = Somewhat Unsatisfactory; 3 = Somewhat Satisfactory; 4 = Very Satisfactory; 0 = Not Applicable. An average rating was calculated based upon the criteria that were applicable to the building. The nine criteria are:

1. *Room Capacities*
2. *Functionality*
3. *Suitability to Purpose*
4. *Flexibility of Space for Different Learning Styles*
5. *Gathering Space*
6. *Multi-Media Technology*
7. *Computers and Connectivity*
8. *Instructional Laboratories / Lab Equipment*
9. *Research Laboratories / Lab Equipment*

Physical Condition

Each building's physical condition was reviewed in general terms. Areas of observation included, but were not limited to: ADA accessibility, roof leakage, asbestos related materials, air quality/condition issues, electrical and lighting issues, window glazing, elevator presence and condition, type of construction, and general maintenance of the building.

Buildings were then categorized into four major groups to more easily quantify the estimated renovation costs for the adequacy study.

The four categories used ($25/sf, $50/sf, $75/sf, $150/sf) provide budgetary guidance which should fall within a plus or minus 20% range of actual costs. The dollar value selected (as part of the space study estimates) includes all costs, both soft and hard. Categories carrying $25/sf and $50/sf renovation costs were termed "minor" --- indicating they could likely be occupied during renovation (mostly finishes, slight reconfigurations). Categories carrying $75/sf and $150/sf were termed "major" renovations – indicating the need to move all occupants out during renovation. Also, when we refer to a renovation as "major" we are attaching a sense of urgency to the need.

How were the four cost ranges determined and what documentation from the construction industry was used? Until recently, all construction estimates and contracts were guided by the Construction Specifications Institute Format (CSI) and the 16 divisions therein:

Division 1 General Conditions
Division 2 Site Work
Division 3 Concrete
Division 4 Masonry
Division 5 Metals
Division 6 Wood & Plastics
Division 7 Thermal & Moisture Protection
Division 8 Doors & Windows
Division 9 Finishes
Division 10 Specialties
Division 11 Equipment
Division 12 Furnishings
Division 13 Special Construction
Division 14 Conveying Systems
Division 15 Mechanical
Division 16 Electrical

The CSI format has been in use for 75 years or so, and is well suited for use in estimating the renovation costs. CSI has revised the format recently, but this traditional version was used. Each of the Divisions above has several subheadings--- for example, Division 9 - Finishes

has 14 subheadings among which are Painting, Tile, Carpet, Acoustical Treatment, etc. Division 15 - Mechanical has 12 subheadings among which are Plumbing, Fire Protection, Air Distribution, etc. Therefore, ALL pieces of a building are given in the CSI format. In a simple but lengthy process, an experienced construction estimator could assign square foot values to all the nearly 200 subheadings and have the information necessary for a reasonably accurate renovation cost. Paulien's construction consultant, Wayne Elwell, used his experience to provide values for most of the subheadings necessary for budgetary purposes. These incremental pieces, for example, $15/sf for a new HVAC system, $12/sf for an updated electrical system, $4/sf for new paint, etc., all contribute to the number that fits one of the four categories.

Space Needs Study

The Finance Unit from CPE provided a Fall 2004 facilities inventory, staff full time equivalents, and research expenditure data for each of the institutions. The Council also provided enrollment, staffing and research expenditure projections for year 2020.

The Space Model used in the current study was based on the 1999 Space Needs Model developed for CPE by Paulien & Associates, updated by Paulien in 2001, and again updated during this study per the consultant's recommendations to reflect changing use standards and the physical limitations of certain Kentucky buildings.

The existing assignable square footage (ASF) used in the model reflects educational and general (E&G) state supported space only. It does not include hospital space, farms, and locations (remote locations and service centers) off the main campus. This is important as the student and staff full-time equivalents (FTE) include all students and staff for an institution. The Kentucky postsecondary education system provided a dataset of the spaces to be included in the model. It was the consultants' understanding that the non E&G spaces were removed. As the study progressed, the consultants found parking garages, leased space, farm space, and other spaces that typically should have been excluded in the model were actually included at individual institutions. Where possible, the consultants excluded these spaces. Council staff was informed of these anomalies, and agreed that these adjustments should be made. In future applications of the space model, the consultants encourage the Council and the institutions to review the spaces carefully so that each institution is being measured appropriately against the model.

Phase V: Institutional Review of Data

As campus visits were ending during the summer of 2006, ten representatives of the Council and institutions were trained on the capital planning software, VFA.facility. These facility managers and planners then reviewed draft condition data developed by VFA. Current Replacement Values for each asset and system definitions and scopes were reviewed by representatives of each institution. Where gaps in cost or scope were identified by the institutions, and supported by historical or industry standard data, VFA adjusted the data. A list of adjustments is included as Appendix A6.

Some cost adjustments were statewide and necessitated comparison of Kentucky data to national norms, as defined by APPA, or a compilation of historical data from Kentucky institutions. In these cases, VFA carefully compared the scope and costs, and where necessary, considered specific adjustments. The Council had final approval on which adjustment factors would be applied statewide, and which could be applied specifically to each institution's data.

Phase VI: Final Report

A draft of the Final Report was assembled and produced for the Council during December 2006. Each institution received a copy of Part I, the Council-level Executive Summary, plus the portions of Part II applicable to their institution.

Comments from the Council and the institutions on a draft of the report were incorporated in the Final Report.

Phase VII: Presentation of Findings

At the time of this writing, the consultants' team of VFA | Paulien | NCHEMS plans to present the findings of the study to the Council during the spring of 2007.

Section 4. Facility Condition Assessment

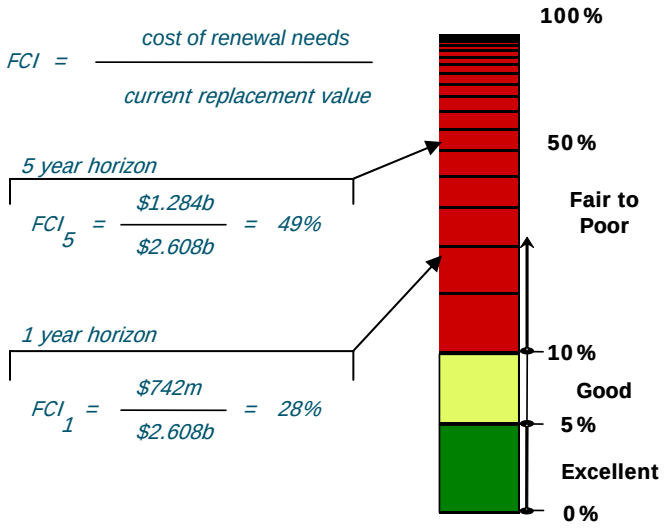
How do University of Kentucky's facilities compare?

At UK, for the 167 facilities assessed, the estimated cost of system renewals currently due (1-YR Renewal Cost) is $742 million, and the estimated cost of renewals due within the next 5 years (5-YR Renewal Cost) is $1.284 billion. (Note: present 2007 dollars are used in all reported numbers. Inflation factor considered = zero.)

The facilities assessed have a current replacement value of $2.608 billion, so the Facility Condition Index (cost of renewals, divided by current replacement cost) for the portfolio is 28% for a 1-year horizon, and 49% for a 5-year horizon. Based on International Facility Managers Association standards, both the 1-year and 5-year FCIs would be considered "fair" to "poor" rankings.

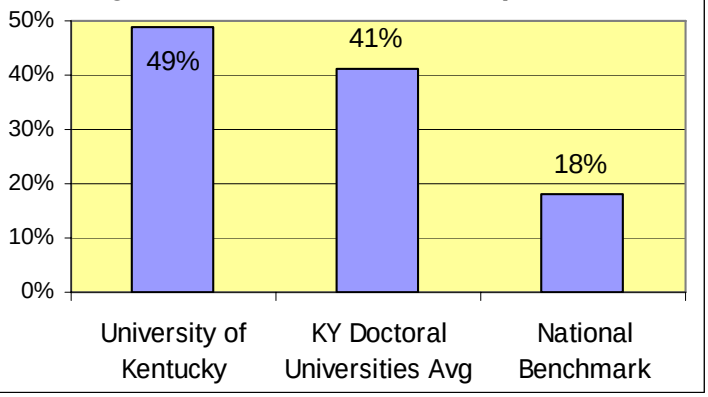
Compared to other higher education portfolios evaluated by the consultants' team over the past 5 years, UK's is in worse condition (49% UK 5-year FCI vs. 18% benchmark 5-year FCI).

Figure 4.1: University of Kentucky Facility Condition Index



Condition ratings based on International Facilities Managers Association standards.

Figure 4.2 UK 5-Year FCI Comparison



What are the most urgent facility condition needs?

This Executive Summary highlights the capital renewal needs of UK assets. More detailed information is available in Appendix A3 or in KPES' VFA.facility database (http://kcpe.vfafacility.com).

Of the assessed assets, UK as a whole has 11 facilities in "Satisfactory" condition, 32 requiring "Remodeling A" work, 71 requiring "Remodeling B" work, and 53 requiring "Remodeling C" work. Based on condition alone, none of the assessed assets required Demolition or Termination (see box below).

Figure 4.4 ranks the facilities assessed at UK by their 5-year Facility Condition Index.

To see which systems across the UK portfolio require the most renewal work, Table 4.5 lists the 5-year facility renewal needs by major system type. Distribution Systems, Communications and Security, Electrical Service & Distribution, (Fixed) Equipment & Furnishings, Sanitary Sewer and Exterior Windows are among the systems requiring the most immediate large scale investment.

A complete list of all facilities assessed, showing renewal needs by year, is included in Appendix A3 in the System Renewal Crosstab Report.

Figure 4.3: SUMMARY OF UK BUIDLINGS BY CONDITION CODE

APPA CONDITION CODE	MIN FCI	# Bldgs	5-YR RENEWAL COSTS
1 - Satisfactory	0%*	11	$ 877,000
2 - Remodeling A	0%	32	66,831,000
3 - Remodeling B	25%	71	413,488,000
4 - Remodeling C	50%	53	803,104,000
5 – Demolition		0	0
6 - Termination		0	0
		167	$ 1,284,300,000

*No single need > $40k

A list detailing specific system renewals (and in which asset they are located) for years 2007 through 2022, is provided in Appendix A3, as the System Renewal Report.

The tables and reports included in this document represent only a small fraction of the ways the facility condition data can be sorted, organized, subtotaled and analyzed. More detailed (or differently organized) data is available in the VFA.facility software for data export and further detailed exploration.

Condition Study vs. Space Study Recommendations:
VFA's condition assessment (Section 4) and Paulien's space study (Section 5) evaluated facilities based on different criteria, and in some cases different recommendations are shown for the same building. This is entirely appropriate, given the different questions posed to each team. For example: VFA was asked to evaluate the condition of facilities based on their current use only, not considering the appropriateness or cost of adapting a building to a new use, while Paulien's space study specifically addressed the possibility of adaptive re-use for buildings. Also, VFA did not categorize any asset in 'Demolition' despite a small number of buildings having very high FCIs. (Assets with FCIs over 75% are sometimes considered good candidates for replacement.) The space study in Section 5 incorporated different standards for evaluating buildings, and may have reached different conclusions.

Table 4.4: University of Kentucky Facilities, Ranked by 5-Year FCI

Institution: Campus	Asset Name	Asset Replacement Value	5YR FCI Cost	5YR FCI ↓	5-YR Building Condition Code
University of Kentucky					
UK: 00	Gluck Equine Research Center Addn.	1,450,000	1,220,000	84%	4. Remodeling C
UK: 00	Central Heating Plant #2	10,675,000	8,875,000	83%	4. Remodeling C
UK: 00	Medical Center Heating-Cooling Plant	22,719,000	17,597,000	77%	4. Remodeling C
UK: 00	Utility Services: Sidewalks	110,344,000	84,880,000	77%	4. Remodeling C
UK: 00	Utility Services: Parking Lots	158,922,000	122,248,000	77%	4. Remodeling C
UK: 00	Utility Services - Storm Sewer	71,379,000	54,907,000	77%	4. Remodeling C
UK: 00	Utility Services - Sanitary Sewer	51,694,000	39,764,000	77%	4. Remodeling C
UK: 00	Utility Services - Steam	42,615,000	32,781,000	77%	4. Remodeling C
UK: 00	Utility Services - Domestic Water	42,314,000	32,549,000	77%	4. Remodeling C
UK: 00	Utility Site: Natural Gas Distribution	33,235,000	25,565,000	77%	4. Remodeling C
UK: 00	Utility Services - Electrical	20,607,000	15,851,000	77%	4. Remodeling C
UK: 00	Greenhouse No.4	1,052,000	776,000	74%	4. Remodeling C
UK: 00	Greenhouse No.2	1,032,000	757,000	73%	4. Remodeling C
UK: 00	Greenhouse No.1	868,000	633,000	73%	4. Remodeling C
UK: 00	Greenhouse No.3	856,000	622,000	73%	4. Remodeling C
UK: 00	Agron Head House And Greenhouse	707,000	498,000	70%	4. Remodeling C
UK: 00	Greenhouse No.9	785,000	533,000	68%	4. Remodeling C
UK: 00	Greenhouse No.7	814,000	549,000	67%	4. Remodeling C
UK: 00	Greenhouse No.6	921,000	618,000	67%	4. Remodeling C
UK: 00	Dimmock Animal Pathology Building	9,486,000	6,287,000	66%	4. Remodeling C
UK: 76	Mycology Bldg.	448,000	297,000	66%	4. Remodeling C
UK: 00	Tobacco Research Laboratory And Greenhouses	2,176,000	1,431,000	66%	4. Remodeling C
UK: 00	Greenhouse No.11	787,000	517,000	66%	4. Remodeling C
UK: 00	Slone Research Building	7,545,000	4,924,000	65%	4. Remodeling C
UK: 00	Insectary Conservatory Laboratory	1,378,000	897,000	65%	4. Remodeling C
UK: 00	Greenhouse No.5	808,000	517,000	64%	4. Remodeling C
UK: 00	Isolation Barn	121,000	77,000	64%	4. Remodeling C
UK: 00	Breckinridge Hall	5,273,000	3,361,000	64%	4. Remodeling C
UK: 00	Ktrdc Building	16,152,000	10,034,000	62%	4. Remodeling C
UK: 00	Memorial Hall	5,751,000	3,514,000	61%	4. Remodeling C
UK: 00	Kinkead Hall	3,900,000	2,324,000	60%	4. Remodeling C
UK: 00	Reynolds Warehouse #1	24,744,000	14,633,000	59%	4. Remodeling C
UK: 00	Oldham Court Bldg.	1,140,000	672,000	59%	4. Remodeling C
UK: 00	Thomas Hunt Morgan Building	22,948,000	13,404,000	58%	4. Remodeling C
UK: 00	Agr Science North	40,974,000	23,889,000	58%	4. Remodeling C
UK: 00	Old Engineers Residence	704,000	407,000	58%	4. Remodeling C
UK: 00	Thomas Poe Cooper Building	8,430,000	4,873,000	58%	4. Remodeling C

Table 4.4: University of Kentucky Facilities, Ranked by 5-Year FCI

Institution: Campus	Asset Name	Asset Replacement Value	5YR FCI Cost	5YR FCI ↓	5-YR Building Condition Code
UK: 00	Bradley Hall	5,195,000	3,002,000	58%	4. Remodeling C
UK: 00	Taylor Education Bldg.	20,683,000	11,833,000	57%	4. Remodeling C
UK: 00	Civil Engineering Building	2,091,000	1,167,000	56%	4. Remodeling C
UK: 00	Ecological Research (Small Animal Lab)	693,000	386,000	56%	4. Remodeling C
UK: 00	Kelly Hall	6,441,000	3,533,000	55%	4. Remodeling C
UK: 00	Erikson Hall	9,080,000	4,968,000	55%	4. Remodeling C
UK: 00	S. J. Sam Whalen Bldg.	7,086,000	3,875,000	55%	4. Remodeling C
UK: 00	Singletary Center For The Arts	32,671,000	17,738,000	54%	4. Remodeling C
UK: 84	Agriculture Field Laboratory Bldg.	1,158,000	627,000	54%	3. Remodeling B
UK: 00	147 Washington Avenue	836,000	450,000	54%	4. Remodeling C
UK: 00	Scott Street Bldg.	1,534,000	820,000	53%	4. Remodeling C
UK: 00	643 Maxwelton Ct.	911,000	484,000	53%	4. Remodeling C
UK: 00	King Library	30,366,000	16,080,000	53%	4. Remodeling C
UK: 00	Lafferty Hall	4,422,000	2,334,000	53%	3. Remodeling B
UK: 00	Agriculture Motor Pool Bldg.	2,235,000	1,172,000	52%	3. Remodeling B
UK: 00	Medical Center Storage Facility	1,887,000	986,000	52%	3. Remodeling B
UK: 00	641 Maxwelton Ct.	620,000	322,000	52%	4. Remodeling C
UK: 00	White Hall Classroom Bldg.	37,360,000	19,098,000	51%	4. Remodeling C
UK: 00	Isolation Barn / Incinerator	97,000	50,000	51%	3. Remodeling B
UK: 00	Head House	1,926,000	971,000	50%	4. Remodeling C
UK: 00	Chemistry - Physics Bldg.	90,552,000	45,418,000	50%	4. Remodeling C
UK: 00	624 Maxwelton Ct.	870,000	432,000	50%	3. Remodeling B
UK: Bluegrass	John W. Oswald Bldg.	31,688,000	15,710,000	50%	3. Remodeling B
UK: 00	Garrigus Building	40,398,000	20,011,000	50%	3. Remodeling B
UK: 00	Ellen H. Richards House	444,000	216,000	49%	3. Remodeling B
UK: 00	Alumni Gym	8,876,000	4,328,000	49%	3. Remodeling B
UK: 00	Frazee Hall	4,495,000	2,188,000	49%	3. Remodeling B
UK: 00	Funkhouser Bldg.	28,353,000	13,790,000	49%	3. Remodeling B
UK: 00	Medical Science Bldg.	98,725,000	47,765,000	48%	3. Remodeling B
UK: 00	Student Center	41,451,000	19,853,000	48%	3. Remodeling B
UK: 00	F. D. Peterson Service Bldg.	26,424,000	12,636,000	48%	3. Remodeling B
UK: 00	K-Lair Grill & Food Storage Bldg.	5,278,000	2,519,000	48%	3. Remodeling B
UK: 00	Memorial Coliseum	53,870,000	25,687,000	48%	3. Remodeling B
UK: 00	Guignol Fine Arts Center	28,713,000	13,654,000	48%	3. Remodeling B
UK: 58	Kentucky Center For Applied Energy Research	20,368,000	9,604,000	47%	3. Remodeling B
UK: 00	Agriculture Distribution Center	1,109,000	517,000	47%	3. Remodeling B
UK: 00	Recreation Equipment Building	313,000	145,000	46%	3. Remodeling B
UK: 00	408 Linden Walk	567,000	262,000	46%	3. Remodeling B
UK: 00	641 South Limestone	692,000	317,000	46%	3. Remodeling B
UK: 00	Reynolds Warehouse #4	128,000	58,000	46%	3. Remodeling B
UK: 00	Mcvey Hall	13,610,000	6,216,000	46%	3. Remodeling B
UK: 00	Patterson Office Tower	70,205,000	31,977,000	46%	3. Remodeling B

Table 4.4: University of Kentucky Facilities, Ranked by 5-Year FCI

Institution: Campus	Asset Name	Asset Replacement Value	5YR FCI Cost	5YR FCI ↓	5-YR Building Condition Code
UK: 00	Medical Center Annex #5	1,608,000	731,000	45%	3. Remodeling B
UK: 00	Research Facility #1	5,473,000	2,476,000	45%	3. Remodeling B
UK: 00	Helen King Alumni House	4,842,000	2,186,000	45%	3. Remodeling B
UK: 00	Child Development Research Center	444,000	200,000	45%	3. Remodeling B
UK: 00	644 Maxwelton Ct.	627,000	279,000	45%	3. Remodeling B
UK: 00	Seaton Hper Building	18,840,000	8,340,000	44%	3. Remodeling B
UK: 00	Dickey Hall	13,162,000	5,809,000	44%	3. Remodeling B
UK: 00	Mineral Industrial Building	4,106,000	1,792,000	44%	3. Remodeling B
UK: 00	F. Paul Anderson Engineering Tower	39,201,000	16,947,000	43%	3. Remodeling B
UK: 00	Barker Hall / Buell Armory	8,480,000	3,663,000	43%	3. Remodeling B
UK: 00	658 South Limestone	758,000	327,000	43%	3. Remodeling B
UK: 00	149 Washington Avenue	1,160,000	495,000	43%	3. Remodeling B
UK: 00	Wenner-Gren Research Laboratory	3,015,000	1,284,000	43%	3. Remodeling B
UK: 00	660 South Limestone	632,000	268,000	42%	3. Remodeling B
UK: 00	Wenner-Gren Laboratory Addition	1,963,000	827,000	42%	3. Remodeling B
UK: 00	Dental Science Bldg.	45,136,000	18,747,000	42%	3. Remodeling B
UK: 00	Metal Arts Bldg.	695,000	288,000	42%	3. Remodeling B
UK: 00	Law Building	26,549,000	10,948,000	41%	3. Remodeling B
UK: 00	College Of Nursing Center	33,425,000	13,588,000	41%	3. Remodeling B
UK: 00	College Of Medicine Office Bldg.	1,409,000	566,000	40%	3. Remodeling B
UK: 58	Animal Diagnostics Storage Bldg.	93,000	36,000	39%	3. Remodeling B
UK: 00	Cooper House	999,000	379,000	38%	3. Remodeling B
UK: 00	Multi-Discipline Research Facility	15,204,000	5,745,000	38%	3. Remodeling B
UK: 00	Seed House	5,788,000	2,161,000	37%	3. Remodeling B
UK: 00	Flammable Storage Building	184,000	67,000	36%	3. Remodeling B
UK: 00	Garage - Engineering Transportation Research	387,000	137,000	36%	3. Remodeling B
UK: 00	Environmental Health	1,188,000	419,000	35%	3. Remodeling B
UK: 00	Bowman Hall	10,756,000	3,716,000	35%	3. Remodeling B
UK: 00	Sanders-Brown Gerontology Center	30,138,000	10,311,000	34%	3. Remodeling B
UK: 00	Thomas D Clark Building	1,507,000	505,000	34%	3. Remodeling B
UK: 00	Safety & Security Bldg.	2,312,000	771,000	33%	3. Remodeling B
UK: 00	Business & Economics Bldg.	39,182,000	12,956,000	33%	3. Remodeling B
UK: 00	Wright Medical Plaza	28,873,000	9,484,000	33%	3. Remodeling B
UK: 00	C. W. Mathews Bldg.	4,658,000	1,519,000	33%	3. Remodeling B
UK: 00	Student Center Addition	15,306,000	4,948,000	32%	3. Remodeling B
UK: 00	Little Fine Arts Library	16,690,000	5,351,000	32%	3. Remodeling B
UK: 00	Kastle Hall	15,810,000	5,044,000	32%	3. Remodeling B
UK: 00	417 Columbia Avenue	407,000	129,000	32%	3. Remodeling B
UK: 00	Centrifuge Bldg.	994,000	309,000	31%	3. Remodeling B
UK: 00	Univ Medical Plaza	31,689,000	9,484,000	30%	3. Remodeling B
UK: 00	Kentucky Humanities Council	2,216,000	614,000	28%	3. Remodeling B

Table 4.4: University of Kentucky Facilities, Ranked by 5-Year FCI

Institution: Campus	Asset Name	Asset Replacement Value	5YR FCI Cost	5YR FCI ↓	5-YR Building Condition Code
UK: 00	College Of Pharmacy Bldg.	27,756,000	7,558,000	27%	3. Remodeling B
UK: 58	Poultry Research Facility	2,891,000	767,000	27%	3. Remodeling B
UK: 00	Scovell Hall	13,518,000	3,494,000	26%	3. Remodeling B
UK: 00	Cooling Plant #2	18,730,000	4,764,000	25%	3. Remodeling B
UK: 00	Pence Hall	12,919,000	3,253,000	25%	2. Remodeling A
UK: 00	Cooling Plant #1	15,997,000	3,987,000	25%	2. Remodeling A
UK: 00	Grehan Journalism Bldg.	8,529,000	2,068,000	24%	2. Remodeling A
UK: 00	Gaines Center - Betts House	1,287,000	305,000	24%	2. Remodeling A
UK: 84	Small Animal Hospital	3,753,000	889,000	24%	2. Remodeling A
UK: 00	Engineering Annex Bldg.	3,062,000	708,000	23%	2. Remodeling A
UK: 00	Sturgill Development Bldg.	2,262,000	495,000	22%	2. Remodeling A
UK: 00	Koinonia House	2,263,000	490,000	22%	2. Remodeling A
UK: 00	663 South Limestone Street Garage	91,000	20,000	22%	1. Satisfactory
UK: 58	Livestock Disease Diagnostics Center	13,459,000	2,889,000	21%	2. Remodeling A
UK: 00	Gaines Center - Davis House	1,384,000	260,000	19%	2. Remodeling A
UK: 00	Agriculture Machine Research Lab	1,251,000	230,000	18%	1. Satisfactory
UK: Bluegrass	Moloney Bldg.	9,672,000	1,710,000	18%	2. Remodeling A
UK: 00	E.S. Good Barn	4,837,000	841,000	17%	2. Remodeling A
UK: 00	Mining / Minerals Bldg.	33,589,000	5,817,000	17%	2. Remodeling A
UK: 00	Gaines Center - Commonwealth House	1,745,000	295,000	17%	1. Satisfactory
UK: 00	Robotics Facility	21,925,000	3,600,000	16%	2. Remodeling A
UK: 00	Combs Cancer Research Center	28,949,000	4,708,000	16%	2. Remodeling A
UK: 00	Mersack / Leavell Bldg.	4,328,000	694,000	16%	2. Remodeling A
UK: 00	Poundstone Regulatory Services Building	9,642,000	1,495,000	16%	2. Remodeling A
UK: 00	Communication Building	1,074,000	162,000	15%	1. Satisfactory
UK: 00	Gluck Equine Research Center	19,744,000	2,681,000	14%	2. Remodeling A
UK: Bluegrass	Academic / Technical Bldg.	11,463,000	1,452,000	13%	2. Remodeling A
UK: 00	Ezra Gillis Bldg.	4,078,000	486,000	12%	2. Remodeling A
UK: 00	A.S.Te.C.C. Bldg.	27,066,000	3,067,000	11%	2. Remodeling A
UK: 00	Max Kade German House	2,151,000	239,000	11%	2. Remodeling A
UK: 00	Miller Hall	6,525,000	722,000	11%	2. Remodeling A
UK: 00	Kentucky Clinic	43,909,000	4,836,000	11%	2. Remodeling A
UK: 00	Oliver H. Raymond Civil Engineering Bldg.	20,159,000	2,203,000	11%	2. Remodeling A
UK: 00	Hardymon Communications Bldg	6,884,000	739,000	11%	2. Remodeling A
UK: 00	Lancaster Aquatic Center	11,113,000	1,089,000	10%	2. Remodeling A
UK: 00	Health Sciences Research Bldg.	43,882,000	3,988,000	9%	2. Remodeling A
UK: 00	P.P.D. Storage Bldg.	269,000	23,000	9%	1. Satisfactory
UK: 00	Davis Mills M.R.I.S.C. Bldg.	16,455,000	1,402,000	9%	2. Remodeling A
UK: 00	Stuckert Career Center	4,135,000	322,000	8%	2. Remodeling A
UK: 00	Barnhart Ag Engineering Building	34,131,000	2,635,000	8%	2. Remodeling A
UK: 00	W.T. Young Library	98,475,000	6,760,000	7%	2. Remodeling A

Table 4.4: University of Kentucky Facilities, Ranked by 5-Year FCI

Institution: Campus	Asset Name	Asset Replacement Value	5YR FCI Cost	5YR FCI ↓	5-YR Building Condition Code
UK: 58	Aluminum Research Center	2,137,000	77,000	4%	1. Satisfactory
UK: 00	Envirmntal Qual Mgmt	3,252,000	71,000	2%	1. Satisfactory
UK: 00	Greenhouse No.12	941,000	0	0%	1. Satisfactory
UK: 00	Utility Services - Chilled Water	90,314,000	0	0%	1. Satisfactory
UK: 00	Utility Services - Telecommunications	14,191,000	0	0%	1. Satisfactory
UK: 00	Utility Services: Roadways	6,441,000	0	0%	1. Satisfactory
	TOTAL	**2,608,706,000**	**1,144,621,000**	**44%**	

> $10 million
> $1 million

Table 4.5: UK Building Systems Ranked by 2007 Dollar Value Renewal Needs
(figures in millions of dollars)

SYSTEM NAME	2007 + backlog ↓	2008	2009	2010	2011	5-YR TOTAL	15-YR TOTAL
Distribution Systems	98.162	6.361	2.510	4.463	1.662	113.158	159.136
Communications and Security	78.426	1.596	2.631	3.611	6.892	93.157	199.843
Electrical Service and Distribution	58.913	2.202	4.423	0.112	6.417	72.068	84.423
Equipment and Furnishings	40.030	0.345	11.177	11.909	10.451	73.912	132.657
Sanitary Sewer	39.765	0.000	0.000	0.000	0.000	39.765	39.765
Exterior Windows	38.301	1.039	2.503	6.331	2.970	51.144	68.328
Heating Distribution	32.780	0.000	0.000	0.000	0.000	32.780	32.780
Water Supply	32.549	0.000	0.000	0.000	0.000	32.549	32.549
Floor Finishes	31.230	0.799	0.703	4.908	9.066	46.707	88.558
Ceiling Finishes	25.188	1.421	1.101	1.078	4.732	33.521	57.693
Lighting and Branch Wiring	24.615	0.332	1.270	0.982	1.071	28.271	35.043
Wall Finishes	21.843	0.749	1.914	2.561	4.730	31.797	68.260
Plumbing Fixtures	16.124	0.456	0.871	0.080	2.145	19.677	25.149
Electrical Distribution	15.851	0.000	0.000	0.000	0.000	15.851	15.851
Domestic Water Distribution	14.147	0.925	0.681	0.189	2.497	18.438	27.738
Controls and Instrumentation	13.940	0.510	1.387	2.780	0.413	19.031	28.520
Exterior Doors	12.349	0.110	1.405	1.330	1.241	16.435	22.919
Heat Generating Systems	12.051	5.160	0.035	0.016	0.000	17.261	17.365
Fittings	9.315	0.252	0.027	1.163	0.182	10.940	14.054
Other Plumbing Systems	8.937	0.039	0.067	0.000	0.225	9.267	11.030
Emergency Light and Power Systems	8.936	0.569	0.263	0.316	0.617	10.702	18.579
Cooling Generating Systems	8.380	7.360	0.260	0.183	0.393	16.576	26.509
Conveying	6.588	1.005	0.392	0.484	0.353	8.823	13.678
Plumbing	6.440	0.126	0.060	2.352	0.082	9.060	17.269
Roofing	5.823	1.552	0.614	2.826	1.388	12.203	25.712
Partitions	3.579	0.109	0.341	0.898	4.905	9.831	28.667
Terminal and Package Units	2.871	0.154	0.039	0.280	0.052	3.397	8.298
Interior Doors	2.681	0.027	0.000	0.089	1.828	4.625	16.363
Glazed Roof Openings	0.653	0.000	0.699	0.036	0.000	1.387	1.934
Stairs	0.377	0.000	0.064	0.082	0.686	1.209	2.171
Fire Protection	0.325	0.905	0.000	0.550	0.000	1.780	7.776
Exterior Walls	0.316	0.033	0.013	0.096	0.711	1.169	2.368
Substructure	0.261	0.000	0.002	0.000	0.081	0.345	0.537
Fixed Furnishings	0.254	0.000	0.143	0.000	0.000	0.397	0.492
Superstructure	0.175	0.000	0.009	0.000	0.794	0.978	1.948
Grounding Systems	0.158	0.000	0.000	0.000	0.000	0.158	0.158
Paving and Surfacing	0.025	0.000	0.000	0.000	0.000	0.025	0.025
Exterior Steps	0.000	0.000	0.000	0.000	0.025	0.025	0.027
Interior Balustrades and Screens	0.000	0.000	0.000	0.000	0.000	0.000	0.002
Storm Sewer	0.000	0.000	0.000	54.907	0.000	54.907	54.907
Pedestrian Bridges	0.000	0.000	0.593	0.000	0.000	0.593	0.902

Table 4.5: UK Building Systems Ranked by 2007 Dollar Value Renewal Needs
(figures in millions of dollars)

SYSTEM NAME	2007 + backlog ↓	2008	2009	2010	2011	5-YR TOTAL	15-YR TOTAL
Fuel Distribution	0.000	0.000	0.000	25.565	0.000	25.565	25.565
Chilled Water Distribution	0.000	0.000	0.000	0.000	0.000	0.000	0.594
Roadways	0.000	0.000	0.000	0.000	0.000	0.000	4.954
Chilled Water Systems	0.000	0.000	0.000	0.000	0.000	0.000	86.840
Kennels and Animal Shelters	0.000	0.000	0.000	0.000	0.000	0.000	0.199
Parking Lots	0.000	0.000	0.000	0.000	122.264	122.264	122.264
Site Communications and Security	0.000	0.000	0.000	0.000	0.000	0.000	10.916
Pedestrian Paving	0.000	0.000	0.000	0.000	84.889	84.889	84.889
Totals	672.357	34.137	36.196	130.179	273.763	1,146.634	1,726.203

Section 5. Space Study
Evaluation of Adequacy and Fit for Continued Use

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OVERVIEW

Paulien & Associates, Inc. as part of the VFA team, reviewed selected buildings for educational adequacy and fit for continued use as well as reviewed and applied the KCPE Space Needs Model. For the doctoral universities, the Paulien team included an additional team member to evaluate research space. Richard Heinz, a Principal with Research Facilities Design (RFD) of San Diego, California, who specializes in laboratory planning and design, evaluated the research space at the University. The details of this process and methodology are included in the overall KCPE study.

The buildings included in the educational adequacy and fit for continued use study were selected by Council staff and the institution representatives. The outcome of this portion of the overall analyses does not represent an institutional summary – only the outcome for the buildings assessed.

2020 Projections

	Fall 2004	2020	Percent Increase/
Student FTE	22,648	39,037	72%
Faculty/Staff FTE requiring Office Space	5,804	10,004	72%
Research Expenditures	$211,043,676	$600,000,000	184%

The student enrollment, faculty and staff, and research expenditure projections were provided by the Council for use in this study. The only space intended to be included in the Space Needs Model is Educational and General (E&G) space. Therefore all of the assignable square footage (asf) from a particular building may not be included. The Council provided a dataset of the spaces to be included in the model. It was the consultants' understanding that the non E&G spaces were removed. However at individual institutions parking garages, barns, and farm spaces were included. Where possible, the consultants excluded these spaces. Council staff was informed of these anomalies, and agreed that these adjustments should be made.

FIT FOR CONTINUED USE

There was a substantial difference in quality between the Health Sciences area of the campus and the rest of the campus. There clearly has been more capital investment on the Health Sciences side recently which would reflect the significant research activity of those units and the clinical services. On the rest of the campus the consultants saw a relatively significant number of smaller buildings which seem to have expended their useful life, that have not had appropriate renovation either for the needs of the users or to keep up with new code requirements. We believe there are about a dozen buildings out of the 51 we looked at that should be seriously considered for demolition. This would allow better land use in those areas. In one instance, a current site project has been routed around small buildings which are in very poor condition, because the University of Kentucky views itself as been very tight on space and is reluctant to remove any space from its inventory. At the other extreme, in the Health Sciences, there are some buildings that are approximately 20 years old that the consultants believe have significant additional useful life that are at least five stories in height that the Health Sciences Center may seriously consider demolishing to construct buildings with greater floor area ratios as the research program continues to grow as part of the Medical

Campus of the Future plan. The consultants believe that those buildings still have a significant useful life and could be renovated to serve a revised use but understand that more intensive land use may be deemed necessary. The contrast between the two parts of the campus was very striking.

The consultants were surprised at the large number of classrooms which are not ADA accessible. These are on upper floors of older buildings that do not have elevators and, in some cases, on below grade levels of buildings that do not have elevator access. There was a striking contrast with what the consultants observed at other campuses. This situation at the University of Kentucky was much more prevalent. UK seems not to be as far along toward ADA compliance as we observed at other campuses. UK has provided a graph which shows the vast majority of UK classrooms pre-date the ADA law and most were built in the 1970's or earlier.

The University of Kentucky did a very good job of defining issues they had with each building and why they wanted it assessed. This allowed the consultants to focus on issues such as possible future uses of a particular building. Each of the 51 buildings assessed has its own evaluation form with written comments, the numerical scores question-by-question, and a table showing the mix of existing space by space type. The facilities inventory data as currently gathered by KCPE does not include school and college or department information, so that could not be included. The UK representatives filled out information on major occupants and primary uses and those are on the individual forms.

Note Regarding Demolition:
The criteria that would cause a recommendation of demolition are different than the Lifecycle Conditions Assessment criteria set forth by VFA for this project. The criteria used for this portion of this assessment has to do with educational adequacy and fit for continued use and building design as it relates to these issues. While the building's physical condition was overviewed as part of this assessment it was done from the point of educational adequacy, land usage, etc., and what could/should be done to enhance the educational experience and the campus environment.

Issues that the consultants noted regarding fitness for continued use:

Many of the classrooms have not been refurnished to reflect the current desire for group activities in many classes. Group activities tend to be fostered most by a table and chair environment where the chairs are movable and the tables are also light and re-arrangeable. There remains a great deal of tablet armchair usage at UK. The consultants note that the current trends have resulted in the need for substantially more space per student station than traditional tablet armchairs. In jurisdictions where tablet armchairs were considered the norm, a usual square feet per student station average figure for classrooms is 15 square feet. The consultants now normally recommend 20 square feet per station and in specific applications with the full use of computers and with large work surface environments the figure can be as much as 25 square feet per student station.

Regarding science and engineering laboratories, there is now a desire also for more group activities in the laboratory setting and access to computer technology. The write-up by Research Facilities Design (RFD), which was part of the assessment team, will illustrate what they see as state-of-the-art teaching laboratories for the sciences. There were a number of buildings from the 50's, 60's, and early 70's that clearly need a major and complete overhaul to provide the quality of space that would be expected in those disciplines. This not only applied in certain science and engineering disciplines but in the arts as well.

For research, there has recently been a strong trend in the life sciences toward modular concepts with multiple lab benches in one large room. In most cases, several principal investigators are working within those spaces. A recent trend has been to put work stations against the windows for laboratory-based staff and students. There is usually a corridor and then support space serving the principal investigators housed on that floor. There is a strong trend to providing group spaces outside the laboratory to address the OSHA prohibitions against food or drink in the laboratories. These are often now clustered at the ends of hallways with vending machines and in some cases additional break amenities such as microwaves, refrigerators, etc. A key issue regarding research space is floor-to-floor height. Generally a minimum of 13' 6" is viewed as necessary. In a number of the older buildings this feature was not achieved suggesting that as those buildings need major renovation it may be desirable to convert them to non-wet lab uses. There is additionally a need for adequate depth so that a proper bench setup can be provided. In most instances this

would be a minimum of 28 feet. The University of Kentucky also had us look at some recent buildings such as the BBSRB, which has just been occupied and is clearly a state-of-the-art research building. It could well serve as a model for other University of Kentucky life sciences research buildings. The robotics facility, while it is now over 15 years old, has been well cared for and struck the consultants as a high-quality building that did not seem to have any significant needs for programmatic renovation.

The University of Kentucky had the consultants look at multiple animal quarters facilities. They hope over time to consolidate more of the animal facilities into newer facilities. This seems a very wise step. A number of the older facilities would not meet current AALAC accrediting requirements and it would be a difficult retrofit. One of the problems is the need to provide cage washing and rack washing facilities,

Summary of Evaluation of Adequacy and Fit for Continued Use Outcomes

Building Name / No.	ASF in Space Model	Building Age	Rating	Recommended Action	Gross Sq. Ft.
University of Kentucky					
Ag Science Center • 0091	99,275	42	2.0	Major Renovation	166,194
Agron H House-G Hous • 0066	6,048	56	1.0	Demolition	6,982
Barker Hall • 0028	32,956	104	1.5	Major Renovation	41,006
Barnhart Building • 0276	71,412	17	3.2	Minor Renovation	107,650
BBSRB • 0509	96,558	1	4.0	None	204,450
Bowman Hall • 0059	24,743	59	1.0	Major Renovation and Assign to a New Use	41,448
Breckinridge Hall • 0056	14,499	77	1.4	Major Renovation	23,825
Business Econ Bldg • 0034	77,479	41	3.0	Minor Renovation or Minor Renovation and Assign to a New Use	135,363
C. W. Mathews Bldg. • 0047	11,379	98	2.2	Major Renovation or Major Renovation and Assign to a New Use	18,040
Centrifuge Bldg • 0209	5,936	38	1.2	Demolition	7,550
Chemistry-Physics • 0055	154,981	43	1.9	Major Renovation and Assign to a New Use	245,347
Civil Engineering • 0052	6,690	65	1.2	Demolition	10,283
College Of Pharmacy • 0082	53,137	21	2.4	Major Renovation and Assign to a New Use	94,634
Combs Cancer Researc • 0096	28,366	19	3.5	Minor Renovation	75,826
Dental • 0297	40,532	44	1.9	Major Renovation and Assign to a New Use or Demolition	120,000
Dimmock Animal Path. • 0076	24,916	58	1.0	Demolition	39,888
Engineering Annex • 0038	6,985	99	1.3	Major Renovation or Demolition	11,172
Erikson Hall • 0050	25,374	66	1.9	Major Renovation	39,880
F. Paul Anderson Twr • 0046	61,139	40	1.8	Major Renovation	106,703
Fine Arts Guignol • 0022	67,663	57	1.8	Major Renovation	101,181
Funkhouser • 0054	72,851	66	2.1	Major Renovation	109,860
Garrigus Building • 0215	67,476	33	1.7	Major Renovation	109,794
Gluck Equine Bldg • 0099	43,375	20	3.4	Minor Renovation	80,151
Grehan Journalism • 0042	22,270	55	3.0	Minor Renovation	35,090
Insectary Consvatory • 0062	5,093	91	1.0	Demolition	7,692
Kastle Hall • 0044	41,230	96	1.9	Major Renovation	51,122
King Library • 0039	114,969	76	1.4	Major Renovation	155,447
KTRDC • 0236	26,548	29	2.8	Minor Renovation	53,609
Lafferty Hall • 0024	12,624	67	2.0	Major Renovation	17,719
Law Building • 0048	65,191	41	2.6	Major Renovation and Assign to a New Use	100,279
M.R.I.S.C. Bldg • 0098	25,317	15	2.7	Major Renovation	68,000
McVey Hall • 0045	36,408	78	2.4	Major Renovation and Assign to a New Use	51,866
Medical Science • 0298	176,296	44	1.6	Major Renovation and Assign to a New Use	310,000
Miller Hall • 0035	16,806	108	2.2	Minor Renovation	28,476
Multi-Disp Res Facil • 0216	36,107	34	1.5	Demolition	51,776
Pence Hall • 0041	30,021	97	2.8	Major Renovation	41,472
Research Facility #1 • 0003	19,080	37	2.5	Major Renovation or Demolition	25,678
Reynolds Whse #1 • 0101	108,593	44	2.6	Major Renovation or Major Renovation and Assign to a New Use or Demolition	144,081

Building Name / No.	ASF in Space Model	Building Age	Rating	Recommended Action	Gross Sq. Ft.
University of Kentucky					
Robotics Facility • 0108	37,929	17	3.5	None	72,423
S.J. Sam Whalen Bldg • 0043	15,875	38	2.5	Minor Renovation	25,748
Sanders-Brown • 0230	33,963	27	2.5	Major Renovation	68,237
Scovell Hall • 0064	44,403	99	2.8	Major Renovation	68,916
Seed House • 0092	10,506	42	2.8	Demolition	19,987
Slone Research Bldg • 0053	20,366	49	1.6	Major Renovation and Assign to a New Use or Demolition	30,536
Small Animal Lab • 0065	2,066	71	1.0	Demolition	3,600
T H Morgan Bio-Sci • 0225	52,428	31	2.1	Major Renovation	92,450
Taylor Education • 0001	41,067	77	1.9	Major Renovation	77,797
Thos Poe Cooper Bldg • 0073	22,566	76	1.6	Major Renovation and Assign to a New Use or Demolition	33,858
Tobacco Research Lab • 0061	9,660	70	1.2	Demolition	11,015
Wenner-Gren Res Add. • 0237	3,864	29	1.2	Demolition	7,168
Wenner-Gren Res Lab • 0070	8,666	65	1.2	Demolition	13,677
Total ASF	**2,133,682**	**Total ASF in Space Model:** 4,326,941			**3,564,946**
No. of Buildings Assessed: 51		***Total ASF as a Percent of Total ASF in Space Model:*** *49%*			
Average		**54**	**2.1**	***Most Recommended Action:*** *Major Renovation*	

Rating Scale: Unsatisfactory = 1; Somewhat Unsatisfactory = 2; Somewhat Satisfactory = 3; Very Satisfactory = 4

which can more effectively be handled on a bulk basis in a larger facility. The consultants saw the mix of perception and other similar psychology experiments that are conducted with animals without invasive procedures in the same facility with the life sciences research where invasive procedures are done. These appear to work effectively in one larger facility.

Estimated Renovation Costs

Building Name / No.	Gross Sq. Ft.	Renovation Type	Renovation Costs
Ag Science Center • 0091	166,194	Category 3, Major	$12,464,550
Agron H House-G Hous • 0066	6,982	Demolition @ $20	$139,640
Barker Hall • 0028	41,006	Category 4, Major	$6,150,900
Barnhart Building • 0276	107,650	Category 1, Minor	$2,691,250
BBSRB • 0509	204,450	None	$0
Bowman Hall • 0059	41,448	Category 4, Major	$6,217,200
Breckinridge Hall • 0056	23,825	Category 4, Major	$3,573,750
Business Econ Bldg • 0034	135,363	Category 1, Minor	$3,384,075
C. W. Mathews Bldg. • 0047	18,040	Category 4, Major	$2,706,000
Centrifuge Bldg • 0209	7,550	Demolition @ $30	$226,500
Chemistry-Physics • 0055	245,347	Category 3, Major	$18,401,025
Civil Engineering • 0052	10,283	Demolition @ $20	$205,660
College Of Pharmacy • 0082	94,634	Category 3, Major	$7,097,550
Combs Cancer Researc • 0096	75,826	Category 1, Minor	$1,895,650
Dental • 0297	120,000	Category 4, Major	$18,000,000
Dimmock Animal Path. • 0076	39,888	Demolition @ $20	$797,760
Engineering Annex • 0038	11,172	Category 1, Minor	$279,300
Erikson Hall • 0050	39,880	Category 4, Major	$5,982,000
F. Paul Anderson Twr • 0046	106,703	Category 3, Major	$8,002,725
Fine Arts Guignol • 0022	101,181	Category 3, Major	$7,588,575
Funkhouser • 0054	109,860	Category 4, Major	$16,479,000
Garrigus Building • 0215	109,794	Category 4, Major	$16,469,100
Gluck Equine Bldg • 0099	80,151	Category 1, Minor	$2,003,775
Grehan Journalism • 0042	35,090	Category 2, Minor	$1,754,500
Insectary Consvatory • 0062	7,692	Demolition @ $20	$153,840
Kastle Hall • 0044	51,122	Category 4, Major	$7,668,300
King Library • 0039	155,447	Category 4, Major	$23,317,050
KTRDC • 0236	53,609	Category 2, Minor	$2,680,450
Lafferty Hall • 0024	17,719	Category 3, Major	$1,328,925
Law Building • 0048	100,279	Category 3, Major	$7,520,925
M.R.I.S.C. Bldg • 0098	68,000	Category 1, Minor	$1,700,000
McVey Hall • 0045	51,866	Category 3, Major	$3,889,950
Medical Science • 0298	310,000	Category 4, Major	$46,500,000
Miller Hall • 0035	28,476	Category 1, Minor	$711,900
Multi-Disp Res Facil • 0216	51,776	Demolition @ $20	$1,035,520
Pence Hall • 0041	41,472	Category 4, Major	$6,220,800
Research Facility #1 • 0003	25,678	Demolition @ $20	$513,560
Reynolds Whse #1 • 0101	144,081	Demolition @ $20	$2,881,620
Robotics Facility • 0108	72,423	None	$0

Estimated Renovation Costs

Building Name / No.	Gross Sq. Ft.	Renovation Type	Renovation Costs
S.J. Sam Whalen Bldg • 0043	25,748	Category 1, Minor	$643,700
Sanders-Brown • 0230	68,237	Category 1, Minor	$1,705,925
Scovell Hall • 0064	68,916	Category 4, Major	$10,337,400
Seed House • 0092	19,987	Demolition @ $20	$399,740
Slone Research Bldg • 0053	30,536	Category 4, Major	$4,580,400
Small Animal Lab • 0065	3,600	Demolition @ $20	$72,000
T H Morgan Bio-Sci • 0225	92,450	Category 3, Major	$6,933,750
Taylor Education • 0001	77,797	Category 4, Major	$11,669,550
Thos Poe Cooper Bldg • 0073	33,858	Category 4, Major	$5,078,700
Tobacco Research Lab • 0061	11,015	Demolition @ $20	$220,300
Wenner-Gren Res Add. • 0237	7,168	Demolition @ $30	$215,040
Wenner-Gren Res Lab • 0070	13,677	Demolition @ $30	$410,310
Total GSF Assessed	**3,564,946**		**$290,900,140**
No. of Buildings Assessed:	*51*		

Renovation Costs per GSF: Category 1, Minor - $25; Category 2, Minor - $50; Category 3, Major - $75; Category 4, Major - $150; Demolition - $20 or $30

Research Laboratories

During the Paulien team's assessment review of the existing science facilities, several elements common to modern science facilities were considered as part of the evaluation criteria. These elements include:

- *Floor-to-Floor Height*
  Contemporary science buildings generally have a floor-to-floor height of 14' to 16' in order to provide adequate vertical clearance for the distribution of mechanical, plumbing and electrical systems with a deep enough structure to provide good vibration resistance while allowing for a reasonable finished ceiling height. Many newer science facilities are using pendant hung direct/indirect lighting fixtures for better light distribution which tend to require ceiling heights of 9'-6" or higher.

  It is worth noting that the newest science building on the University of Kentucky campus, the BBSRB Building, has a floor-to-floor height of 15'-4", while many of the older facilities have much tighter floor-to-floor dimensions.

- *Modular Planning*
  One of the fundamental planning methodologies to accommodate flexibility in science facilities is the concept of 'modular planning'. Laboratories should be organized around modular planning principles so that they are developed with standardized units or dimensions for adaptability and a variety of uses. Modular planning is used as an organizational tool to allocate space within a building. The module establishes a grid by which building structure, architectural partitions, laboratory casework, and primary utility routings are located. As modifications are required because of changes in laboratory use, instrumentation, or departmental

organization, partitions can be relocated, doors moved, and laboratories expanded into larger laboratory units or contracted into smaller laboratory units without requiring modification of building structural elements or major reconstruction of building electrical and mechanical elements.

The module is based on the bench space (width and length) required for work stations, instruments, and procedures. The space required between benches or tables is designed to allow people to work back-to-back at adjacent benches, to allow for accessibility for disabled and still allow for movement of people and laboratory carts in the aisle.

Common planning module dimensions in modern science facilities are 10'-6" to 11'-0" in width by 28'-0" to 32'-0" in depth. This module will generally provide adequate bench space plus space for floor standing equipment and fume hoods, and can be divided for smaller support spaces such as equipment and instrument rooms.

For purposes of our assessment review, it was important to keep in mind that research laboratories are much more adaptable to alternative room proportions and column locations than teaching laboratories, where optimal proportions are more critical for sightlines to instructional media such as chalk or white boards, projections screens and demonstration tables while maintaining a column-free space.

Many of the older science facilities at the University of Kentucky campus have module dimensions that are too narrow and/or too shallow to properly accommodate 21st century science in a safe, functional and efficient manner. (See the Laboratory Building Assessment Summaries tables listing the approximate key module dimensions or structural column spacing for the buildings included in this assessment review.)

UNIVERSITY OF KENTUCKY

Laboratory Building Assessment Summary

Building Number	Building Name	Floor to Floor Height	Floor to Floor Rating	Module Size/ Column Spacing	Module Size Rating
24	Lafferty Hall	12'-0"	Poor	Varies	Poor
38	Engineering Annex Building	9'-10"	Poor	8' x 17'-3"	Poor
43	SJ Sam Whalen Building	14'-0"	Good	27'-4" deep	Fair
44	Kastle Hall	Varies from 12'-0" to 14'-8"	Poor to Good	Varies/Shallow	Poor
45	McVey Hall	Varies from 12'-5" to 14'-0"	Poor to Good	Varies	Poor
46	F. Paul Anderson Engineering Tower	13'-4"	Fair	10' x Varies	Fair
50	Erikson Hall	12'-0"	Poor	Varies	Poor
52	Civil Engineering Building	N/A, but tight	Poor	Varies	Poor
53	Slone Research Building	12'-0"	Poor	8' x 29'	Poor
54	Funkhouser Building	12'-3"	Poor	Varies/Shallow	Poor
55	Chemistry-Physics Building	13'-4"	Fair	11' x 32'	Excellent
56	Breckinridge Hall	N/A	Poor	15' deep	Poor
59	Bowman Hall	10'	Poor	Varies/Shallow	Poor
61	Tobacco Research Lab	N/A	Poor	Varies	Poor
62	Insectrary Conservatory	N/A	Poor	Varies	Poor
64	Scovell Hall	11'-6"	Poor	Varies/Shallow	Poor
65	Small Animal Lab	N/A	Poor	Varies/Shallow	Poor
66	Agronomy Headhouse	N/A	Poor	N/A	Poor
70	Wenner-Gren Research Building	N/A	Poor	15' deep	Poor
73	Thomas Poe Cooper Building	N/A	Poor	Varies/Shallow	Poor
76	Dimmock Animal Pathology Building	N/A, but tight	Poor	14' x 17'	Poor
82	College of Pharmacy Building	14'-0"	Good	10' x 25'	Fair
91	Ag Science North	13'-6"	Fair	12' x 28'	Good
92	Seed House	N/A, but tight	Poor	15' x Varies	Poor
96	Combs Cancer Research Building	13'-0"	Fair	11' x 27'	Good
97	Dental Science Building	11'-5 1/2"	Poor	17' x 17'	Poor
98	Davis Mills MRISC Building	13'-0"	Fair	Varies x 30' deep	Good
99a	Gluck Equine Research Center	11'-8" 1st/2nd flrs	Poor	10' x 32'	Good
99b		17'-6" 3rd/4th flrs	Excellent	10' x 32'	Good
108	Robotics Facility	15'-4"	Excellent	12' x 30'	Excellent
209	Centrifuge Building	N/A	Poor	Varies	???
215	Garrigus Building	18' w/ interstitial	Excellent	10' x 30'	Fair
216	Multi-Disciplinary Research Building	12'-4"	Poor	10'-3" x 30'	Good
225	T.H. Morgan Builidng	13'-1 1/2"	Fair	10'-6" x 32'	Very Good
230	Sanders-Brown Building	12'-0"	Poor	11' x Varies	Poor
236	KTRDC Building	13'-5"	Fair	11' x 22'	Fair
237	Wenner-Gren Addition	11'-3"	Poor	Varies/Shallow	Poor
276	Ag Engineering Building	16'-8" (lab wing)	Good	11' x 29'	Excellent
298	Medical Science Building	11'-5 1/2"	Poor	18' x 24'	Poor
509	BBSRB	15'-4"	Excellent	Approx 10' x 40'	Good

Note: Floor to floor height and module dimensions are approximate, based on review of drawings and observation of field conditions. This data should not be relied upon for accuracy, but is provided for general indication of appropriateness of the facilities for continued use for laboratory functions in comparison with contemporary industry standards.

Prepared by: **Research Facilities Design**

Trends in Undergraduate Science Facilities

Over the past two decades, significant changes have evolved in undergraduate science programs throughout the country. One of the major catalysts for reform has been the organization known as Project Kaleidoscope (PKAL) in Washington, DC. In 1989, PKAL was founded with grant funding from the National Science Foundation (NSF) to study 'what works' in science education. PKAL discovered that 'what works' in science education is a hands on, laboratory rich environment in which students learn science by doing

science. Thus, a trend has evolved in which there has been an increased emphasis on laboratory experience and collaborative work where students are more active participants in the learning process.

Another trend has been the integration of technology to support and enhance the laboratory experience. Computers and other electronic instruments have proliferated in the laboratories and support spaces, requiring more bench space and access to IT systems. Multi-media audiovisual equipment is becoming commonplace not only in classrooms, but in the teaching laboratories as well. This is related to another trend of greater integration of laboratory and lecture activities within the same space. Although lecture sections comprised of multiple laboratory sections are still the norm, particularly at larger institutions, the integration of lecture/discussion activities within the teaching laboratory is becoming increasingly common. This requires proper room proportions and clear sightlines to allow visibility to the 'teaching wall' including chalk or marker boards, projection screens and other educational technology.

Scientific collaboration is another important trend observed in recent years. This can take many forms, including provision of adequate Faculty/Student Research Laboratories and spaces for interaction among faculty and students outside of the laboratories. There has been an increased recognition of the importance of these interaction spaces for student study and as places to 'hang out' waiting for a class or to meet a faculty member. They can also provide a safe haven for consumption of food and drink outside of the laboratory environment. Another form of collaboration is how the building 'engages' the occupants and visitors in the 'Celebration of Science' with places for display of student posters, incorporation of scientific art, displays of collections or scientific artifacts, and the use of interior windows to put 'science on display'. A key to the development of an effective undergraduate science facility is creating an environment where students and faculty want to be, resulting in an 'active' building.

These and other relevant evaluation criteria were used as a 'benchmark' against which the Paulien team assessed the suitability of the University of Kentucky science and engineering laboratory buildings for continued use in support of laboratory related functions.

SPACE NEEDS MODEL

The Fall 2004 application of the space needs model shows a nominal 2% surplus for the entire campus. Significant space deficits exist in the research laboratory category (about 327,000 ASF) and physical education and recreation space (121,000 ASF). While there is a 33% deficit of open laboratory space some of this may be offset by the surplus of teaching laboratory space for a net 16,500 ASF deficit in instructional laboratory space. While the model shows that there is a large surplus of support space (about 250,000 ASF), the consultants' feel that a deeper study of this space type should be conducted. The support space equates to about 13% of all other E&G space on campus which is about twice the amount that most master planning guidelines suggest.

At the 2020 projection target, there are deficits in every space category except for support space for an institutionwide 75% deficit of 3.23 million ASF. The largest needs are in the research space and office categories.

Space Needs Model Application

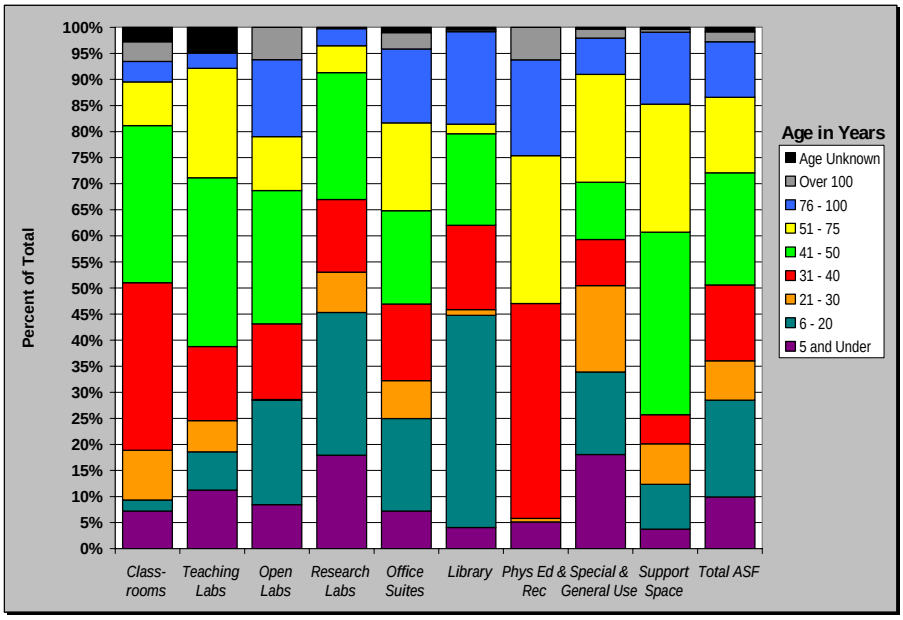
Space Category	Existing ASF	Fall 2004 Student FTE = 22,648 Staffing FTE = 5,804 Research Expenditures = $211,043,676 Guideline ASF	Surplus/ (Deficit)	Percent Surplus/ (Deficit)	2020 Student FTE = 39,037 Staffing FTE = 10,004 Research Expenditures = $600,000,000 Guideline ASF	Surplus/ (Deficit)	Percent Surplus/ (Deficit)
Classrooms & Service *10 ASF/Student FTE*	233,359	226,480	6,879	3%	390,370	(157,011)	(67%)
Teaching Laboratories *8 ASF/Student FTE*	209,532	181,184	28,348	14%	312,296	(102,764)	(49%)
Open Laboratories *8 ASF/Student FTE*	136,355	181,184	(44,829)	(33%)	312,296	(175,941)	(129%)
Research Laboratories *900 ASF/$100,000 for first $50M in R&D Expenditures; 600 ASF/$100,000 for $50M-$100M R&D Expenditures; 350 ASF/$100,000 over $100M in R&D Expenditures*	811,821	1,138,653	(326,832)	(40%)	2,500,000	(1,688,179)	(208%)
Office Suites *195 ASF/Staff FTE*	1,421,586	1,131,780	289,806	20%	1,950,780	(529,194)	(37%)
Library *No Standard*	396,710	396,710	0	0%	396,710	0	0%
Physical Education & Recreation *12.10 ASF for 100% Undergraduate Student FTE, 25% of Graduate FTE, and 15% of Staffing FTE (75,000 ASF minimum)*	114,129	235,379	(121,250)	(106%)	405,708	(291,579)	(255%)
Special Use & General Use Space *21 ASF/Student FTE*	481,434	475,608	5,826	1%	819,777	(338,343)	(70%)
Support Space *8 ASF/Student FTE plus 4 ASF/Student FTE if land grant mission*	522,015	271,776	250,239	48%	468,444	53,571	10%
TOTAL	**4,326,941**	**4,238,754**	**88,187**	**2%**	**7,556,381**	**(3,229,440)**	**(75%)**

ASF = Assignable Square Feet

EXISTING E&G SPACE

Age of Existing E&G Facilities

Approximately 30% of UK's space is over 50 years old. Another 36% of its space is between 31 and 50 years of age and 30% percent of its space is less than 30 years old. Between 50 and 60% of its instructional spaces (classrooms, teaching laboratories, and open laboratories) are in facilities over 40 years old. Slightly more than half of its physical education and recreation space are in facilities over 50 years old. Approximately 45% of UK's research facilities are less than 20 years of age.



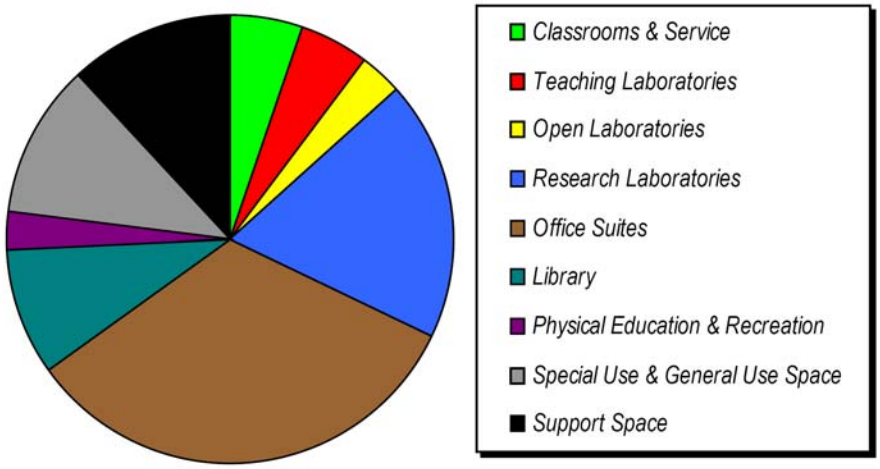
Comparison of E&G Space to KCPE Doctoral Universities Average

UK has 191 ASF per Student FTE which is approximately 13% greater than the KCPE Doctoral University average. In the different space categories, UK tends to have the larger amount of space except for the open laboratory, library, physical education and recreation, and special use and general use space categories.

	Existing E&G Facilities		KCPE Doctoral Universities	
Space Category	ASF per Student FTE	% of Total	Average ASF per Student FTE	Range of ASF
Classrooms & Service	10	5%	9	*8 - 10*
Teaching Laboratories	9	5%	7	*5 - 9*
Open Laboratories	6	3%	8	*6 - 10*
Research Laboratories	36	19%	29	*22 - 36*
Office Suites	63	33%	57	*52 - 63*
Library	18	9%	19	*18 - 20*
Physical Education & Recreation	5	3%	6	*5 - 6*
Special Use & General Use Space	21	11%	22	*21 - 22*
Support Space	23	12%	14	*4 - 23*
TOTAL	**191**	**100%**	**169**	**148 - 191**

Distribution of Existing E&G Space by Space Category

Over half of UK's space is in office space (33%) and research space (19%). Only 13% of its space is in instructional space (classrooms and all instructional laboratory categories). Twelve percent (12%) of its space is in support space.



NOTE: The percentages are found in the "Percent of Total" column in the table above.

Section 6: 15 Year Capital Plan

The 15-year Capital Plan presented in this section incorporates all three portions of the study – condition, space adequacy & space capacity. Condition and space funding needs are presented separately first, and then aggregated together to show the total funding needed for the university facilities included in the study. In addition, two views of the spending pattern are shown:

Table 6.1: UK 15-year Actual Capital Needs

Data supports Figures 6.2 through 6.4. Note: In 2007 dollars, Inflation factor set to 0%.

Funding Year	Condition Needs	Space - Adequacy	Space - Current Capacity	Space - Future Capacity	Total Funding
2007	$ 741,824,000	$ 290,900,000	$ 274,921,000	$ -	$ 1,307,645,000
2008	130,303,000	-	-	-	130,303,000
2009	273,887,000	-	-	-	273,887,000
2010	115,494,000	-	-	-	115,494,000
2011	22,792,000	-	-	-	22,792,000
2012	26,123,000	-	-	127,832,000	153,955,000
2013	41,855,000	-	-	134,223,000	176,078,000
2014	44,052,000	-	-	140,615,000	184,667,000
2015	30,682,000	-	-	147,007,000	177,689,000
2016	124,980,000	-	-	153,398,000	278,378,000
2017	28,850,000	-	-	159,790,000	188,640,000
2018	44,815,000	-	-	166,181,000	210,996,000
2019	44,563,000	-	-	172,573,000	217,136,000
2020	19,504,000	-	-	178,965,000	198,469,000
2021	78,013,000	-	-	185,356,000	263,369,000
Total	$ 1,767,737,000	$ 290,900,000	$ 274,921,000	$ 1,565,940,000	$ 3,899,498,000

ENDING FCI = 0%

- **Actual** – with spending assumed to vary to meet the annual dollar amount predicted by the forecasts each year;
- **Strategic** – with spending aligned to meet strategic goals recommended by the consultants for each five year period of the 15-year plan. The strategic goals and timeframes can be adjusted to match priorities set by the Council and the institutions.

Actual Needs

The "actual needs" summarized here depict the amount of capital investment estimated to be needed in each of the next fifteen years based on the consultant team's professional opinion of when each need would come due. The needs are broken out by three reasons that investment might be required: (a) to address system renewals that are driven by poor physical condition (orange for first year, red in later years), (b) to address space adequacy issues preventing a facility from being utilized in its highest and best use by current educational standards (green), and (c) to grow space capacity to meet current (light blue) and future (dark blue) enrollment projections.

Based on condition alone, University of Kentucky's Lifecycle Condition Assessments identified $741 million in deferred capital renewals due in or before 2007, and $1.284 billion by 2011, creating a starting 5-Year FCI of 49% (next 5-year renewal needs / current replacement value).

Spending that amount would reduce the FCI to zero and bring all assessed facilities into excellent condition. Maintaining an FCI level = 0% forecasts needing an additional $483 million in capital renewals over the following 10 years, for a 15-year total capital renewal need of $1.77 billion. (Note: All in 2007 dollars; Inflation factor = 0%.)

If the university funded the capital renewals in the exact years each renewal is forecast to be due, the investment pattern would look like Figure 6.2.

The Space Study identified $291 million needed to make selected buildings fit-for-continued-use, plus $275 million needed for E&G buildings to meet current enrollment capacity, and $1.566 billion needed for E&G buildings to meet the 2020 enrollment projections. Figure 6.3 shows capital investments based on space needs, including investment in future capacity starting in the second 5-year period, and growing modestly over the following 10 years until all space capacity needs are met by 2021.

When aggregated together, the condition + space needs of the University look like the spend pattern shown in Figure 6.4, totaling $3.9 billion (in 2007 dollars, inflation = 0%).

Figure 6.2: University of Kentucky
15 Year Facilities Capital Plan
Actual Renewal Costs for Assessed Facilities

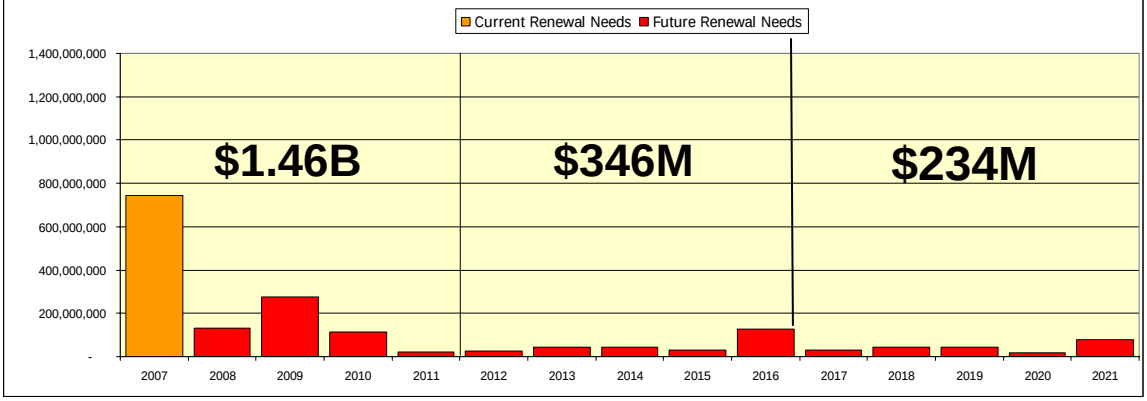


Figure 6.3: University of Kentucky
15 Year Facilities Capital Plan
Actual Space Needs

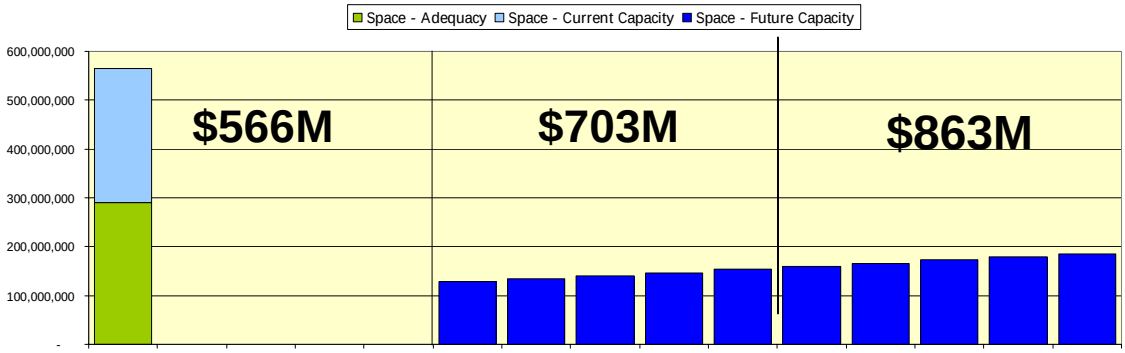
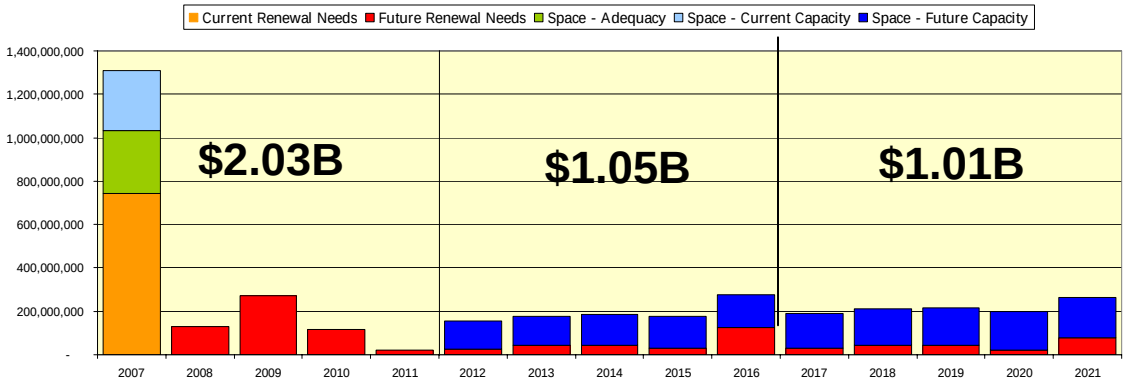


Figure 6.4: University of Kentucky
15 Year Facilities Capital Plan
Blended Space + Renewal Costs



Funding to Meet Strategic Goals

The consultants' team believes the spending pattern depicted in Figure 6.4 to be difficult to achieve – it is unlikely KPES and the institutions could mobilize the financial, facility planning and project management resources necessary to make such a high level of investment in year 1 of a 15 year plan.

Table 6.5: UK 15-year Strategic Capital Investments

Data supports Figures 6.6 through 6.8. Note: In 2007 dollars, Inflation factor set to 0%.

Funding Year	Condition Needs	Space - Adequacy	Space - Current Capacity	Space - Future Capacity	Total Funding
2007	$ 150,435,000	$ 58,180,000	$ -	$ -	$ 208,615,000
2008	91,351,000	58,180,000	63,935,000	-	213,466,000
2009	93,006,000	58,180,000	67,132,000	-	218,318,000
2010	94,660,000	58,180,000	70,329,000	-	223,169,000
2011	96,315,000	58,180,000	73,525,000	-	228,020,000
2012	105,040,000	-	-	127,832,000	232,872,000
2013	103,500,000	-	-	134,223,000	237,723,000
2014	101,960,000	-	-	140,615,000	242,575,000
2015	100,420,000	-	-	147,007,000	247,427,000
2016	98,880,000	-	-	153,398,000	252,278,000
2017	97,340,000	-	-	159,790,000	257,130,000
2018	95,800,000	-	-	166,181,000	261,981,000
2019	94,260,000	-	-	172,573,000	266,833,000
2020	92,720,000	-	-	178,965,000	271,685,000
2021	91,179,000	-	-	185,356,000	276,535,000
	$ 1,506,866,000	$ 290,900,000	$ 274,921,000	$ 1,565,940,000	$ 3,638,627,000

ENDING 1-Year FCI = 10%

Further, while the 2007 backlog of deferred capital renewals, space adequacy and space capacity needs are real today, the dates for future renewals and capacity investments are only forecasts – the exact year each is required can be adjusted if aligned with careful maintenance practices and space use assignments. Thus, spreading the investment out is a reasonable, and practical, goal.

To best manage the capital investment, UK should establish some high level programmatic goals for capital investments. The goals should represent a 'blended' approach to address all three causes for facilities investments: condition, adequacy and capacity. The consultants propose the following strategic capital funding goals:

1. **Fit-for-Use in 5 Years:**
   Bring all facilities up to Fit-for-Continued-Use standards within the first 5 years. (Table 6.5, green column, with spending averaged over 5 years.)

2. **All "Good" Condition within 10 Years:**
   Reduce the backlog of deferred capital renewals to 10% (all buildings in "good" condition) over the first 10 years, and maintain a 10% FCI thereafter. (Table 6.5 red column. Note this is less than "Actual Needs" shown in Table 6.1 because the investment is spread out over more years (rather than invest immediately when predicted the need with come due), and maintaining 10% FCI is a reasonable goal. (Maintaining 0% FCI is not reasonable.)

3. **Invest Regularly to Build Capacity:**
   Invest regularly to build space capacity, addressing current capacity needs over first 5 years (light blue) then, starting in year 6 (dark blue) growing with enrollment through year 15.

Table 6.8 summarizes the investment pattern required to meet the proposed strategic goals. (Note that the total spent for Condition is less than in Table 6.4, because Goal 2 allows for carrying forward 10% of the current replacement value in renewals.)

To meet the proposed strategic goals, the System's 15-year capital investment would be $3.64 billion (in 2007 dollars, inflation = 0%).

Establishing funding needs that align with priorities this way will enable UK to better access various funding sources, which are frequently targeted at specific initiatives or available at more favorable terms when pooled with similarly grouped needs from multiple Kentucky public postsecondary education institutions. Section 7 includes a more detailed discussion of funding sources potentially available to KPES and UK.

Figure 6.6: University of Kentucky
15 Year Facilities Capital Plan
Strategic Investment in Renewal Costs

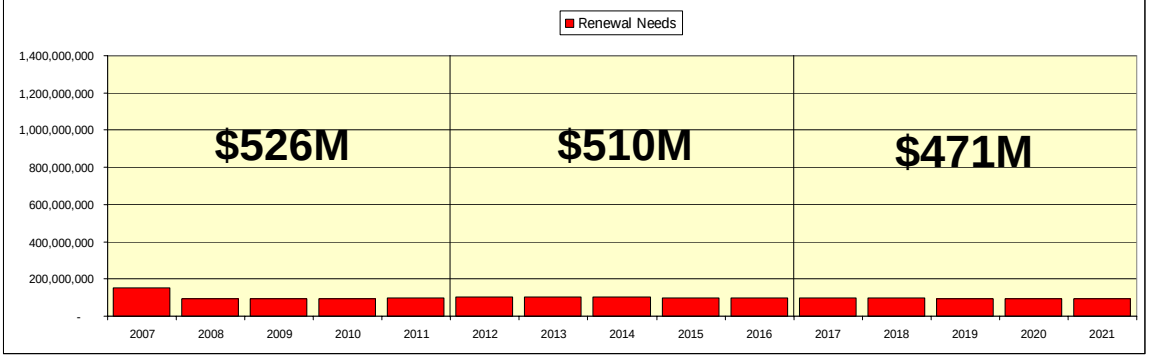


Figure 6.7: University of Kentucky
15 Year Facilities Capital Plan
Strategic Investment in Space Needs

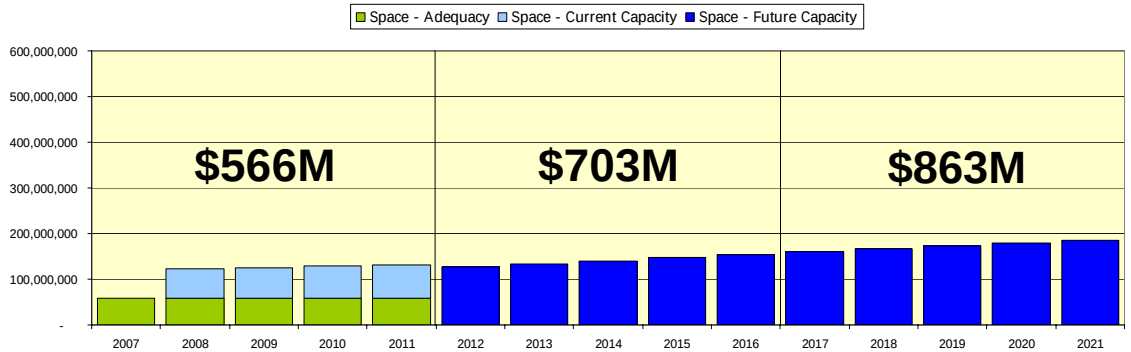
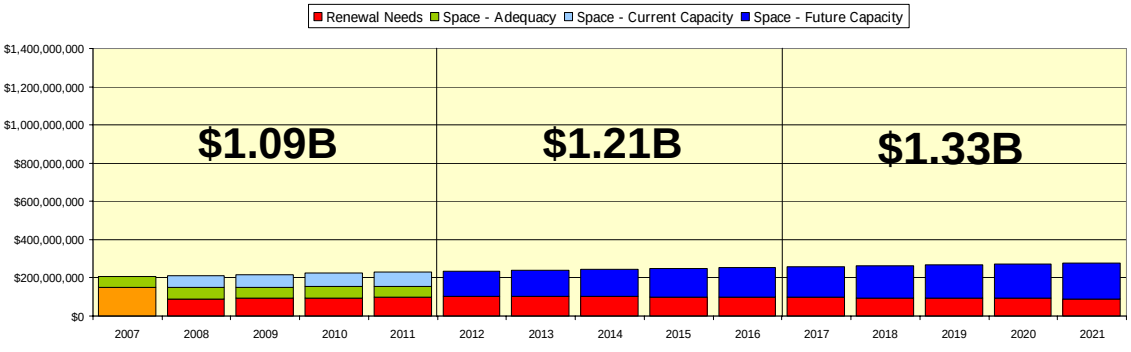


Figure 6.8: University of Kentucky
15 Year Facilities Capital Plan
Strategic Investment in Blended Space + Renewal Costs



Section 7:
Financing of Physical Facilities

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INTRODUCTION

Physical plant represents the primary asset of most institutions of higher education. Many facilities were built in response to the enrollment growth of the baby-boom generation. These buildings are now of an age where they need either replacement or considerable renovation if they are to meet current needs. In addition, programmatic additions and mission changes (such as increased emphasis on research) create needs for additional facilities even under conditions of enrollment stability. These factors, and likely others, create ongoing requirements for financial resources that can be devoted to replacement, renewal, or expansion of an institution's stock of physical assets.

This need for resources comes at a time when state governments, the primary source of capital funding for public institutions, are under considerable pressure to reduce tax burdens and/or to fund competing programs. This requires institutions to look further afield for sources of funds for capital projects. This brief white paper explores the array of alternatives and some of the financing mechanisms that are commonly employed. The paper employs a simple conceptual schema with three components:

- Potential Sources of Revenue
- Uses of Revenues
- Financing Mechanisms

The schema is shown diagrammatically in Table 7.1.

This schema reflects the realities that:

- Institutions have multiple sources that can be tapped for capital projects.
- Different sources are often aligned with different uses (the specifics in this regard will be explored later in the paper).
- There are different kinds of uses (renewal vs. new, auxiliary facilities versus general academics). Different finance mechanisms are often used with the financing of these different kinds of facilities.

Each of these dimensions will be explored in more detail in subsequent sections of this paper.

TABLE 7.1
The Dimensions of Financing Alternatives

USES	SOURCES					
	Students	State	Local Govt.	Federal Govt.	Donors	Institutional Funds
Renewal and Renovation New Construction • Auxiliaries • General Academic • Research	MECHANISMS					

THE ALTERNATIVE SOURCES OF FINANCING AND THE ASSOCIATED MECHANISMS

Colleges and universities obtain financing for facilities from a variety of sources. Chief among them are the following:

A. Students

Students have traditionally been a source of funding for certain college and university facilities, particularly those where there is a direct relationship between a funding stream and a provided service. The classic example is funding for dormitories and dining halls. In this case, room and board charges are almost always established in a way that allows the institution to repay bonds issued to pay for construction and/or to accumulate a reserve fund sufficient to pay the necessary costs of renewal and renovation.

Closely related are fees levied on all students for purposes of paying for construction of facilities. Typically such fees are used to pay for construction and renewal of facilities such as student unions and student recreation buildings. It is rare that such fees are collected for the purpose of constructing new academic buildings (and never research facilities). While the practice of using student fees to construct academic space is still not common, it is a practice that is gaining adherents. There are recent examples in which students have voted increases in fees in order to pay for badly needed campus instructional space. In the few instances to date in which students have paid for academic facilities at public institutions, the situations were unique, typically ones in which state funds were not available for a critically needed building. Student funding of a new Law School facility at the University of Colorado—needed to meet accreditation requirements at a time of state revenue declines—is a good illustration. This very nascent movement represents further recognition that students—not the state—are the dependable source of institutional revenues. This is explicitly the case regarding operating funds in the several states in which tuition revenues exceed state appropriations. With this precedent in place, there is no reason to believe that the practice will not evolve on the capital side as well.

It should be noted that funds obtained from students are acquired in ways (and at a rate) that make their use consistent with repayment of bonded indebtedness rather than up-front payment for construction or renovation.

B. State Governments

States have historically been—and continue to be—the primary provider of funds for the construction (and reconstruction) of academic buildings on college campuses. While institutions are always seeking to diversify sources of funds for capital projects, very few public institutions get to the point where states become the junior partner in such ventures. This situation is unlikely to change. Buildings are very tangible; legislators know quite precisely what they are getting when they appropriate funds for campus construction. Capital appropriations have at least two other attractive features:

1. They create (construction) jobs for blue-collar workers and thus spread the benefits across a wider swath of the citizenry.

2. They do not obligate the legislature to ongoing payments in the same way as do increases in appropriations for operating purposes. This feature explains why it is often easier to get funds for capital (one-time) expenditures than for increases in the operating budget.

The mechanisms used by states to provide funds for capital constructions vary over a relatively narrow range. On one side are states that adhere to a pay-as-you-go philosophy and appropriate funds in a lump sum to pay for construction (although the payment may be split with payment for planning being covered in one year's appropriation and actual construction in another). Other states are more prone to issue bonds to pay for campus capital projects. Some states (North Carolina, New Jersey) issue general obligation bonds that are backed by the full faith and credit of the state; the states, not the institutions, are responsible for repaying the debt. In other states, legislatures establish ground rules (and sometimes devices for pooling borrowing in the search for better rates) that let institutions borrow up to some predetermined limit. In such cases, institutions often must pledge tuition as collateral for the debt. While

the state is not directly responsible for the debt, there is recognition that, in case of institutional default, the obligation will likely end up on the legislative doorstep. With this in mind, the state's authorization to issue debt instruments is typically coupled with inclusion of repayment amounts in the operating budgets requested by, and appropriated to, the institutions.

C. Local Governments

In the main, only community colleges that have their own taxing authority have been in a position to acquire and use local tax revenues to pay for capital construction projects. The norm is a situation in which the state establishes an upper limit on the tax rate (almost always a real property mill levy) that can be imposed without a referendum approving an override. Given the nature of the revenue stream, these tax revenues are most frequently used to repay debt rather than being accumulated and utilized in a pay-as-you-go manner.

Recently, there has been a break in the tradition of local tax revenues being confined to use by community colleges having their own taxing authority. The City of Phoenix has successfully passed a tax referendum that will provide local tax support for the construction of a downtown campus for Arizona State University. As local governments increasingly recognize the value of institutions of higher education as "anchor tenants" in their downtown redevelopment efforts, there will likely be opportunities for such arrangements in other urban areas.

D. The Federal Government

In the 1960s, the federal government—through the Higher Education Facilities Act—was a major funder of academic facilities on college campuses. Those days are long since past. Now federal funds for capital projects are limited to facilities that are:

1. In direct support of a federal priority. This translates almost completely into support for the construction of special-purpose research facilities that will house activities of a very select nature (for example, research into different issues related to bio-terrorism).

2. Constructed as a result of Congressional earmarking. These appropriations can cover any type of facilities and are dependent solely on relationships with a Member in a position to "bring home the bacon" to an institution in his/her state or district. Since the level and nature of earmarking is causing considerable consternation in some quarters, this may be a funding mechanism that has reached its high-water mark.

E. Private Donors

For some public institutions—specifically those with large (and affluent) alumni bases and effective fund-raising offices—private donors have been, and will continue to be, important sources of financing for capital projects. Such support is typically found at major research universities; comprehensive universities and community colleges are much less likely to obtain major funding from such sources. Very few public institutions have an alumni base—and a history of success in tapping that alumni base for academic building support—to make this source a reliable one for most institutions. It takes a rare combination of a rich alum and common ground between donor and institutional need to bring such funding to fruition. Even when such funds are provided, they are much more likely to be focused on facilities normally not priorities of the state. Most donors would consider general academic buildings at public institutions to be a state responsibility.

Donors with the ability to provide substantial amounts of funds for capital projects will typically provide:

1. All the funding for a building, or

2. Funds that match those from another (type of) contributor—usually the state or federal government.

In almost all cases, they are interested in having naming rights for the building—they want either themselves or someone of their choosing to have their names inscribed in stone on the campus. This particular interest on the part of donors means that money from this source is rarely available for renewal and renovation projects; naming rights for existing buildings have long since been granted.

Accepting funds from private donors can create problems as well as benefits. It is not unheard of

for donors to provide funds for a building that is not a campus priority—or may not even be on the institution's radar screen. Institutions are hard-pressed to say "no" in such circumstances, but saying "yes" may cause friction within the institution and with the state over issues of funding the maintenance and operations of the building and the programs it is designed to house. Further, the gift may be for a priority project but come with complicating strings attached. A major gift for construction of a sports facility at the University of North Dakota came with the stipulation that the "Fighting Sioux" label on the sports teams be retained, a requirement that has put the University in a difficult position vis-à-vis the NCAA.

F. Institution's Own Funds

There are circumstances in which institutions can, and do, use undesignated general fund revenues to renovate or acquire academic buildings. This is particularly the case regarding renovation projects that are required but unfunded by other sources, specifically state governments. However, there are also instances in which campuses acquire new academic buildings using their own resources. Two instruments are favored under such circumstances:

1. Bonded indebtedness in which the "full faith and credit" of the institution lies behind the securities. This is little different from state bonds that must be repaid by institutions with the exception that there is less tacit understanding that state appropriations are made with repayment in mind. Another variation on this theme is the circumstance in which universities designate indirect cost reimbursement funds to pay off indebtedness on research facilities. Even in situations where this arrangement is utilized, special permissions may be requested from the state—or such arrangements may be included in the broader financing plan for major construction projects. This was the case for the financing of the new Health Science complex at the University of Colorado.

2. Lease-purchase arrangements in which the institution enters into a long-term lease arrangement with an owner with a provision that title transfers to the institution at some specified point in the future. This mechanism is easier to arrange for residential space since the owner can find an alternative use should the institution renege on its obligations. The more specialized the space, the more difficult it is to make a lease/purchase work—it is easier, for example, with general office space than with science laboratories.

Regardless of the instrument, these arrangements require a regulatory environment that allows institutions to engage in such practices. Such is not often the case; most states insist on prior approval that may or may not be granted under the premise that such actions are indirect means of obligating the state to future payments. The rules around this practice vary substantially from sate to state. They also require institutions to accept the responsibility of making the associated payments an annual budget priority—taking funds "off the top" of the annual budget—in the face of vagaries in funding streams for general institutional operations.

Perhaps the least constrained environment for use of institutional funds to repay borrowing for construction of academic buildings is in Arizona, where the state formulaically establishes a ceiling on borrowing and allows institutions to manage their own borrowing portfolios within the limits established.

MECHANISMS

In one way or another, all of the frequently used mechanisms were discussed in the prior section. This section serves to summarize the bits and pieces in a more orderly fashion. In reality there are only two generic mechanisms for supporting capital projects—outright purchase or acquisition through payments over time. The equivalent is paying cash or borrowing and repaying the loan.

The former is straightforward; the institution accumulates resources and pays for the capital project when the funds are accumulated. The funders who are in a position to support such an approach are state governments, the federal government, and private donors.

The case in which institutions essentially borrow funds and pay them off over time is only slightly more complicated. The basic instruments are either debt or lease/purchase arrangements.

There are numerous variations around the former:

- Whose obligation is it—the state or the institution?
- What is the nature of the collateral—full faith and credit or specific revenue streams (housing revenues, tuition, indirect cost recovery)?
- What is the recourse in case of default?
- What is the specific nature of the instrument—revenue bonds, tax anticipation notes, etc.?

While these are highly technical differences, the basics are fundamentally the same.

State practices vary enormously in this arena. Some states believe strongly in pay-as-you-go funding for capital construction and pay for most construction out of general fund appropriations for specific construction projects. Others rely heavily on state bond issues where the proceeds are utilized for campus construction projects and annual payments are made by the state. Massive bond issues in North Carolina and California are examples. Finally, there are states like Arizona that allow institutions to borrow (up to a limit) with repayment coming from the institutions' operating funds. Typically the state appropriations to institutions are structured with these repayment obligations in mind. The latter arrangement provides institutions with the most freedom; it also carries the most risk.

USES

As indicated in Table 1, there is but a limited number of different kinds of capital projects:

- Renewal and renovation projects
- New construction projects
  - Auxiliaries
  - General Academic
  - Research

The relationships between revenue sources and uses were noted in several instances in Section II but will be treated more systematically here.

A. Renewal and Renovation

In most states renewal and renovation projects take their place alongside new construction projects and get prioritized in competition with them. Projects dealing specifically with safety concerns frequently migrate to the top of the priority list while others slip to the bottom—a new building is much more attractive to funders than replacing steam lines or replacing the electrical system in Old Main.

The funders for such projects are predominantly the states, local taxing authorities (typically only for community colleges), and the institutions themselves, with the states being the primary source. They tend to use the same approaches—direct funding or debt—regardless of the type of project. One can make a very good case for shifting responsibility for renovation and renewal projects entirely to the institutions, leaving the state's capital projects appropriations to cover new construction projects. The rationale goes as follows:

1. The state (or some other funder) paid for the facility in the first instance; at that point it becomes the institution's responsibility. The state should not have to pay multiple times for the same facility.
2. Sound management practices would call for depreciation accounts (1½-2% of replacement value) that accumulate funds for renewal purposes. GASB accounting rules now require recognition of depreciation expense. Unfortunately such rules did not take effect until well into the useful lives of most buildings. The new rules help to avoid further accumulation of deferred maintenance liabilities. They do little to reduce the level of deferred maintenance that had occurred prior to the GASB reforms.
3. Use of set-aside funds puts establishment of priorities in the hands of the institutions where, many would argue, it rightfully belongs. Legislatures are not in a position to establish interinstitutional priorities for such projects.

4. Legislatures are much better equipped—and much more interested—in establishing priorities for new buildings.

The state of Missouri follows this policy (at least it did a few years ago). Under this policy the institution was obliged to spend the equivalent of the depreciation expense amount on renewal and renovation projects. The institutions selected the projects; their only obligation to the state was an accountability requirement indicating that the required funds had, indeed, been allocated to renewal projects.

In reality, institutions typically find ways to use their own funds only when needs become dire and funds are not forthcoming from the state (or any other source).

Sound practice with regard to funding renewal and renovation would have the following features:

- An explicit, system-wide determination of levels of deferred maintenance on each campus.

- A multi-year plan for the elimination (or significant reduction) of this backlog. This plan should be established as separate from financing for new facilities. The "cleanest" approach would be a state bond issue paid from general operating revenues and intended to remove R&R from the agenda as a state obligation.

- A requirement that an amount equal to GASB depreciation amounts be spent each year out of institutional operating funds on renewal and renovation projects. The institutions should make the selection of projects to be so funded. The accountability requirement should be that a) the institution has an annually updated list of R&R priorities, and b) funds in the amount of prior year's deprecation amount are expended on the highest priority items.

  Such a process, if implemented, would result in elimination of past accumulations of deferred maintenance and make the institutions, not the state, responsible for ensuring that deferrals do not accumulate in the future. Such a policy would also create disincentives for institutions to acquire additional facilities of marginal benefit or to hang onto facilities that might better be removed from the inventory. Finally, it would keep the focus of the capital process on new facilities—a focus consistent with legislators' interests and policy determinations and eliminate the confounding of policy decisions (new facilities) with ongoing operational decisions at the campus level. Kentucky would do well to consider such a policy.

B. New Construction Projects

1. Auxiliary Facilities

   Construction of auxiliary facilities—residential and dining facilities—is almost always funded by students through direct use charges (room and board fees). If such use charges are insufficient, institutional funds are tapped as a last resort to fill the gap.

   Construction of facilities such as student unions and recreation facilities are also typically paid for by students although the mechanism is almost always a broadly applied student fee rather than a use charge. For these types of facilities, private donors often contribute as part of a larger capital campaign. In some instances, states contribute directly to construction of such facilities.

   In virtually all projects supported by student charges or fees, the instrument used is some form of long-term debt.

2. General Academic Facilities

   The predominant funders of general academic facilities—classrooms, labs, offices, and libraries—are state and local governments and private donors. In rare instances students (through an imposed fee) and institutions themselves contribute. The federal government will participate only in the case of Congressional earmarks.

   The instruments most likely to be used by the state are direct appropriations for construction of the building or debt instruments that are repaid by the state either directly or indirectly through annual appropriations to the

institutions. Conceptually, the most satisfying approach is likely to be one similar to Arizona, where the state establishes a borrowing cap for each institution and empowers the institution to borrow in its own name. This avoids much of the competition for funds borrowed through a centralized state pool. A compromise is to establish borrowing limits for each institution but bundle the bond offerings each year as a way of securing better rates than can be negotiated by each institution acting independently.

Donor contributions most often come in the form of outright gifts.

3. Research Facilities

The primary funders of research facilities are state and federal governments and private donors (either individuals or philanthropic organizations). Funds from the latter two providers most frequently come in the form of lump-sum contributions. Funds from states follow the same pattern as funding for other academic facilities—in some states it is direct, pay-as-you-go appropriation. In other states, funds are provided through issuance and repayment of debt instruments. States fund research facilities in much the same way as they fund other academic facilities. Pay-as-you-go states maintain this practice for research facilities. States that borrow for general academic space also borrow for research facilities. To the extent that there are variations, they take the form of:

a. The state providing a challenge grant that leverages the capacity of the institution to generate funds from private sources.

b. Comprehensive financing plans for truly large undertakings such as the multi-billion dollar Health Services Campus at the University of Colorado.

SUMMARY

Reverting to Table 7.1 and filling in the blanks, primary funding patterns for higher education facilities are predominantly as indicated in Table 7.2.

While there are exceptions in almost all instances, the summary in Table 7.2 represents the weight of practice.

TABLE 7.2
Primary Funding Patterns for Higher Education Facilities

USES	SOURCES					
	Students	State	Local Govt.	Federal Govt.	Donors	Institutional Funds
Renewal and Renovation	—	Approp./debt	—	—	—	Approp./debt
New Construction						
• Auxiliary						
– Residential/dining	Use charges	—	—	—	—	—
– Recreation	Fees	Approp./debt	—	—	Gifts	—
• Academic facilities	Fees	Approp./debt	Debt	—	Gifts	Lease/purchase
• Research facilities	—	Approp./debt	—	Grants	Gifts	—

Table 7.3 below is presented as a worksheet for UK.

Here, the subtotals of the "Strategic Funding" scenario suggested in Section 6.8 are shown in the "Amount Needed, from 2006 Study" column.

KPES and UK policy makers can use Table 7.3 as a framework to allocate the Amounts Needed across the most likely sources of funds to create UK's 15 Year Funding Plan.

If UK chooses to supplement this study with additional information, any additional capital investments identified would need to be included.

TABLE 7.3
UK Funding Patterns Worksheet for Higher Education Facilities

USES		SOURCES					
	Amount Needed, from 2006 Study	Students	State	Local Govt.	Federal Govt.	Donors	Institutional Funds
Renewal and Renovation							
• Condition/End of Life	$1,742m		Approp./debt				Approp./debt
• Space Adequacy	$291m		Approp./debt				Approp./debt
New Construction							
• Auxiliary	n/a						
2006 Capacity							
• Academic facilities	$144m	Fees	Approp./debt	Debt		Gifts	Lease/ purchase
• Research facilities	$130m		Approp./debt		Grants	Gifts	
2020 Capacity							
• Academic facilities	$891m	Fees	Approp./debt	Debt		Gifts	Lease/ purchase
• Research facilities	$675m		Approp./debt		Grants	Gifts	
• TOTAL	$3,874m						

Section 8:
Recommended Next Steps

The VFA | Paulien | NCHEMS team recommends KPES and UK work closely together to align each institution's capital needs with its strategic priorities for the coming 15 years. The following steps should be considered to help complete the picture that this study has started to paint, and well position the Commonwealth's public postsecondary education system as a national leader in stewardship of its facilities:

1. **Establish strategic goals for the 15-year capital plan**, possibly broken down into three 5-year periods. The strategic goals may go beyond those considered or recommended in this study, such as a new emphasis on building research capacity, a residential campus or other programmatic goals specific to the institutions.

2. **Complete the data** so that the 15-year plan includes ALL assets. There are various ways to establish or estimate the investments needed to address condition and space needs for the facilities not yet studied, including more facility condition assessments, further sampling and extrapolating condition or space results of similar buildings, or pure modeling based on age and use profiles of buildings yet to be studied.

3. **Integrate all capital planning data into central records** for each asset, and maintain those records to reflect recent changes (improvements or degradations). Records should be stored in capital planning and management software that makes strategic planning, spend management, and progress tracking easy.

4. **Fund according to needs –** as established in this and subsequent studies. "Needs based funding" can serve as a defensible, transparent way to allocate funds while addressing any past capital investment inequalities among the institutions, or on any particular campus. Funding allocated by percent of student population or annual increases to historical distributions tend to perpetuate past inefficiencies.

5. **Pool institutional capital needs** with similar needs from other Kentucky postsecondary education institutions, to facilitate better sources and financial terms for those funds. For example, to consider one possible funding source, the Legislature might fund (from appropriations or another source) all roof projects statewide in one budget cycle, or issue a bond for building new research facilities across multiple institutions.

It is the consultants' strong belief that the Kentucky Postsecondary System and University of Kentucky have already made a wise investment in their facilities through this study, which should serve as the basis for well-informed capital decisions that will help UK and the Commonwealth achieve their 15 year goals.

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