



OHIO BOARD
OF REGENTS

The Capacity of Ohio's State Funded Colleges and Universities

A Study of the Ability of Campus Facilities to Meet
Ohio's Higher Education Needs

September 9, 2004

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Forward

To the best of our knowledge, this is the first assessment of public campus capacity ever conducted for Ohio. Capacity has become a major concern recently, given delays and declines in state capital funding for higher education, the rapid aging of campus facilities, the pressing needs of technology, and the recommendation of the Governor's Commission on Higher Education and the Economy that Ohio should increase higher education enrollments by 30% in the next 10 years.

In Ohio and across the nation generally, states have been challenged to serve more students, conduct more research, and train more workers with less state support. This report does not pretend to solve or even address this major issue of public finance. Rather, it simply attempts to document the status of Ohio's public campus capacity to serve students in FY 2003 and discuss the implications that this has for state capital decisions in the future.

This report could not have been completed without the frequent, competent, and critical contributions of the facility directors and managers, fiscal officers, and student housing managers at Ohio public colleges and universities. We deeply appreciate the work they did for this study, as well as the work they do every day to make their campuses safe, efficient, attractive, and effective places to live and learn. They are listed in the final appendix to the report.

Finally, I want to acknowledge the outstanding contributions of Stephanie McCann, Assistant Director of HEI, who led this effort from its beginning and saw it to completion in producing this fine report. Our capacity to understand capacity has been greatly enhanced by her wonderful effort.

Roderick G. W. Chu
Chancellor, The Ohio Board of Regents
July 2004

Introduction

State policy makers and members of the media often question whether Ohio is over-invested in its higher education facilities. Regents staff have heard or read complaints that Ohio has too many buildings with too much space, or even that Ohio has too many campuses.

In response to these concerns, and to better understand Ohio's ability to meet the pressing educational needs of the state, Regents staff have worked with representatives of Ohio's public colleges and universities over the past year to prepare this first-ever study of the capacity of state-funded colleges and universities to serve Ohio's students. The goal of the study is to evaluate the capacity of Ohio's higher education facilities to meet current and future needs. By providing state decision makers and Ohio citizens with this information, we hope that this report will clear up any misunderstandings that may exist and contribute to the decision making process that governs the allocation of state capital resources.

At the outset, it is important to note three qualifications regarding the scope of this study.

First, the study reports on only four categories of space:

- Classrooms
- Classroom Labs
- Offices
- Residence Halls

Many other types of space -- such as research space, libraries, food service facilities, gymnasiums, and libraries -- are also needed for educating students and contributing to the economic growth of the state. The four categories of space considered in this study, however, represent the core needs of students and faculty and provide an important starting point for understanding Ohio's higher education space needs, the amount and condition of existing space, and its capacity.

Second, only credit activity is measured in the classroom and classroom lab capacity calculations. References to the number of students enrolled include only those students involved in courses taken for degree credit. Workforce development initiatives as well as noncredit continuing education classes were not considered in this study because detailed data on these activities do not currently exist.¹ Since all campuses provide some level of workforce development and noncredit continuing education courses, the inclusion of data about the space needs of these programs would probably result in higher estimates of capacity utilization than are reported here.

Third, this study includes only those facilities that are owned by the institution. Leased space is not included in the analysis. Leased space obviously

¹ The Board of Regents is working with campuses to define data elements for noncredit activity for future data collections.

adds to the capacity of colleges and universities, often in important ways, and many space-cramped campuses will rent space to serve their students at off-campus locations.

To the greatest extent possible, the benchmarks used in this study relied heavily upon national benchmarks or those used in other states' analyses.² All such studies require the use of various and sometimes complicated assumptions that enable us to compare occupancy to capacity. The table below describes how "capacity" was measured for two space categories using these benchmarks.

Table 1: Capacity Assumptions Used for Classrooms and Labs

	Classrooms	Classroom Labs
Hours open	12 hours per day, 5 days per week = 60 hours per week	10 hours per day, 5 days per week = 50 hours per week
% of time room is in use	70%	50%
% of seats filled	67%	67%
Space needed per student	20 sq. ft.	50 sq. ft.

In addition, office capacity was assessed by using 140 square feet of office space needed for each full-time equivalent (FTE) faculty member or staff at four-year campuses, and 100 square feet of space for each FTE employee at two-year campuses. Residence hall capacity was measured by reports from campuses that compare actual occupancy to bed capacity.

² Appendix B identifies studies reviewed for this report.

Executive Summary

Ohio has 38 public colleges and universities.³ During the 2002-2003 fiscal year, Ohio's state funded higher education facilities accommodated 358,943 FTE students and 59,214 FTE faculty and staff to educate and serve them.⁴

The first major conclusion of this study is that, at the state level, Ohio's public higher education system was operating almost at capacity in FY 2003. In particular, the study shows that each category of space was in use at the following levels:

Table 2: Percentage of Space in Use, Statewide Totals

Space Category	% Space In Use
Classrooms	96%
Classroom Labs	90%
Offices	98%
Residence Halls	98%

Given these utilization levels, Ohio's public colleges and universities could have accommodated an additional 17,656 FTE students and an additional 1,333 FTE faculty and/or staff in FY 2003. However, recent estimates indicate that 9,385 additional FTE students enrolled in public campuses in FY 2004, and another 13,186 students will enroll during the 2005 and 2006 fiscal years. This enrollment growth would virtually fill Ohio's 2003 classrooms, classroom labs, and residence halls by FY 2006 if no additional space becomes available.

The table and analysis above consider all space reported in each category in FY 2003, regardless of the condition of the space. Given the data reported in Table 1, Ohio seems to be at least adequately provided with higher education facilities during FY 2003 – although Ohio is by no means over-endowed. This initial conclusion, however, is wrong because it overlooks the fact that 31% of Ohio's classrooms, classroom labs, and offices were physically obsolete or required rehabilitation at costs exceeding 25% of replacement value, as shown in Figure 1.⁵

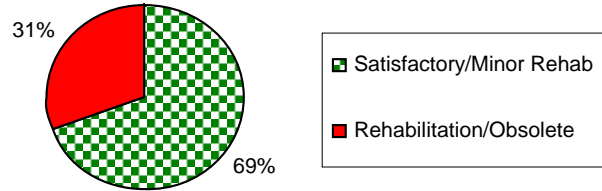
The first major conclusion of this study is that, at the state level, Ohio's public higher education system was operating almost at capacity in FY 2003.

³ This study considers only state funded higher education facilities. Private colleges and universities are not included in this report. In July 2003, Regents staff published a study that analyzed the number of public and private campuses in Ohio relative to its population. That study (located at <http://www.regents.state.oh.us/mainpages/Issue-Too%20Many%20Campuses-July03.pdf>) found that Ohio is slightly below the national average in terms of the number of institutions per capita.

⁴ These numbers are estimated as of December 2003.

⁵ Definitions are provided in more detail in the actual report and in the appendix. Space that is in satisfactory/minor rehabilitation condition is that space which requires little to no rehabilitation (the cost of which is less than 25% of the replacement value of the building).

Figure 1: Classroom, Classroom Lab, and Office Space Conditions



When we exclude from this analysis space that is obsolete or in need of major rehabilitation, we find that Ohio has significant shortfalls of classroom, lab and office space, as shown below:

Table 3: Estimate of Space Capacity, Excluding Obsolete and Related Space

Space Category ⁶	% Space Shortfall
Classrooms	-37%
Classroom Laboratories	-19%
Office Space	-34%

The second conclusion of the study is that there is a serious shortage of classroom, lab, and office space that is in good condition. This shortage translates into 92,202 FTE students who meet in older outmoded classrooms and labs. Although the amount of classroom space needed could be reduced if more students enroll in distance-learning classes, this would require additional investments in faculty training and high-cost distance learning technology. In autumn 2003, 3.3% of Ohio’s undergraduates enrolled in distance learning classes. This suggests most students still prefer conventional classes where students and instructors can interact face-to-face and work in groups.

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The conclusion that so much classroom, lab, and office space is in need of rehabilitation or replacement is supported by a recent analysis of college and university capital requests. About 78% of the requests for capital funds in the FY 2005 - 2006 biennium were for rehabilitation or replacement of existing campus facilities, or to enable campuses to better collaborate. Ohio, like many other states, has a large bloc of aging facilities that present campuses with a number of issues –

⁶ Residence hall data was calculated differently and therefore is not available for this table.

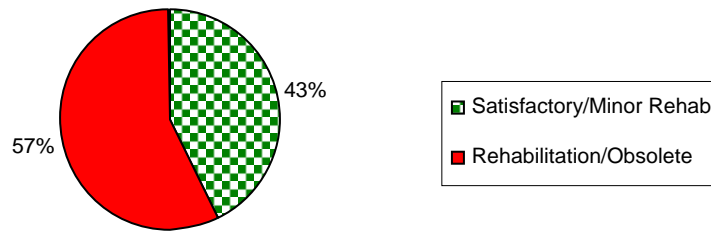
including challenging health and safety issues – that need to be addressed in the near future.

The condition of Ohio’s residence halls is no better: of the 8,133,789 square feet of residence hall space, 4,645,350 -- or 57% -- is in need of repair or replacement.

This is a natural part of a building’s life cycle since most of the residence halls were constructed in the 1950s and 1960s and have reached that point in time when renovation or replacement should occur. Campus administrators are well aware of the condition of these facilities, and to the greatest extent possible are investing more local funds to upgrade residence halls as quickly as possible. In doing so, they prioritize health and safety issues, but do not ignore the educational and consumer needs of today’s students.

Ohio, like many other states, has a large bloc of aging facilities that present campuses with a number of issues – including challenging health and safety issues – that need to be addressed in the near future.

Figure 2: Residence Hall Space Conditions



In addition to the quantitative data analysis provided in this report, college and university presidents were asked in a survey to evaluate how well their institutions can meet student needs. Many presidents indicated that space on their campuses needs to be updated, renovated, or improved with new technology. Some noted that outdated classrooms and classroom laboratories are less flexible and not conducive to current teaching and learning styles.

The photos on the next two pages are provided to illustrate “before” and “after” conditions in two buildings built in the 1930s that were rehabilitated with state funds to create modern electronic classrooms, classroom labs, and offices.

Braunstein Hall Rehabilitation, University of Cincinnati

Large classroom – Before



Large classroom – After



Renovated electronic classroom



Renovated flexible classroom (with furnishing)



Teachers College Phase I Rehabilitation, University of Cincinnati

Typical classroom - Before



Typical computer lab - After



Typical electronic classroom - After

Typical corridor - Before



Typical corridor- After



Implications for State Capital Funding

The Regents' capital funding policy encourages campuses to rehabilitate, renovate, or replace aging facilities to reduce space needs, energy use, and future construction and maintenance costs. These policies are needed to help campuses address the following FY 2003 facility needs:

1. Ohio had more than 4.7 million assignable square feet of classroom, classroom lab, and office space in need of rehabilitation at costs exceeding 25% of replacement value.
2. The gross square footage (GSF) of this space – that is, space including walls, corridors, stairs and elevators, mechanical and electrical equipment rooms, and restrooms - was about 7.5 million GSF. It would cost between \$0.9 and \$1.7 billion in 2003 dollars to rehabilitate this 7.5 million GSF of classroom, classroom lab, and office space. It would cost about \$2.1 billion to replace it.⁷
3. Significant additional funds are also required to rehabilitate or replace Ohio's research space. Unit costs for research space are about 30% higher than costs for other types of higher-education academic space.⁸

In addition to these issues caused by aging facilities, campuses now appear to be running out of room to educate additional students, and it is unclear how a significant increase in new students could be accommodated without additional facilities or new alternatives to the construction of new buildings. Leased space, distance education, and off-peak scheduling will help to increase capacity, but it appears that some experimentation will be needed to determine if any of these options are the ones that students will require or prefer to serve their educational needs.

Much of the capital funds requested by campuses are used to help address needs related to aging facilities. The relatively small percentage of projects that result in a net gain in instructional and research space are a response to strong growth in enrollment or increased research activity at some campuses.

Most Ohio campuses now receive significantly less capital funding per biennium than a decade ago, despite a cumulative 30% inflation in construction

⁷ This estimate is based on $\frac{3}{4}$ -median construction costs for comparable academic space published in the nationally-recognized R. S. Means Building Construction Cost Data (2004 Edition). The estimate includes allowances for site work, abatement of hazardous materials, furnishings and equipment, design and construction management, and other "soft" costs.

⁸ See Means 2004 Cost Data, Section 17 (page 493). The $\frac{3}{4}$ -median cost per square foot reported in Means is 36% higher, but the cost difference is about 30% when the costs mentioned in note 7 are considered.

costs during this time period and the pressing need to replace or renovate the large bloc of rapidly aging facilities which were built before 1980.

To address these concerns, campuses and universities should continue to be encouraged to reinvest in aging facilities or replace aging facilities with new facilities. But they cannot do so on their own, and they will need major state capital investments to address these problems.

Details of the Report

Scope of Study

This report groups Ohio's state-funded campuses into one of five sectors: residential university main campuses, open access urban university main campuses, university branch campuses, community and technical colleges, and co-located campuses.⁹ Data in this report were analyzed by sector and at the statewide level.

Although many types of space are required to educate students, this report examines four categories of space:

- Classrooms
- Classroom Labs
- Offices
- Residence Halls

The physical condition of Ohio's higher education space is reported to the Ohio Board of Regents for each building annually, using the following definitions:

Satisfactory (SA): Suitable for continued use with normal maintenance.

Minor Rehabilitation (MI): Needs minor physical or functional rehabilitation or repair. The approximate cost of physical rehabilitation is less than 25 percent of the replacement value of the structure.

Rehabilitation (RE): Needs physical rehabilitation or repair. The approximate cost of physical rehabilitation is at least 25 percent, but less than 50 percent of the replacement value of the structure.

Major Rehabilitation (MA): Needs a major physical rehabilitation. The approximate cost of rehabilitation is 50 percent or more of the replacement value of the structure.

Physically Obsolete (PO): Physically inadequate and not feasible to renovate. The structure should be evaluated for demolition.

In order to simplify the analyses for this report, these five condition categories were combined into two more general groups:

Satisfactory/Minor Rehabilitation Space: Space that is in good condition or needs only minor rehabilitation at a cost less than 25 percent of replacement value.

Rehabilitation/Obsolete Space: Space that needs rehabilitation at a cost exceeding 25% of replacement value, or is physically inadequate and not feasible to renovate.

⁹ The term co-located campus refers to two separate institutions which are adjacent or very close together. All co-located campuses in this report involve a university branch campus and a technical college. In many cases, co-located campuses share some resources such as space or staff. In this report, the students, faculty/staff and square footage are combined as if the two co-located campuses were a single institution. Data for Ohio's two stand-alone medical schools are excluded from this study.

Data Used in This Report

Much of the data for this report is reported regularly to the Ohio Board of Regents via the Higher Education Information (HEI) system. Classroom, Classroom Lab, and Office data were all drawn from the HEI system. Residence Hall data was collected through an annual Regents survey. In a separate survey, the presidents of Ohio's state-funded colleges and universities were also asked about the capacity of their institutions to meet current and future student needs.

To fully understand the tables and conclusions of this report, it is important to read the Appendix: Calculations, Assumptions, and Definitions.

Classroom Space

Space reported as classrooms include lecture rooms, seminar rooms, and general purpose classrooms.

Capacity Estimate Using All Space Regardless of Condition

According to data from the 2002-2003 fiscal year, Ohio's state-funded higher education campuses could have absorbed an additional 13,633 students in their classroom space. At a state level, Ohio had 3,581,395 square feet of classroom space used by 358,943 FTE students who were in class for 4,832,626 contact hours that take place in classrooms.¹⁰

A total of 3,435,997 square feet of classroom space would be needed to educate students in FY 2003. This estimate allows 20 square feet per student for student seating and for the instructor area. It assumes that rooms are available an average 60 hours a week, that they are in use 70% of the time (42 hours a week), and that two-thirds of the seats are full.

The table below shows that, when all classroom space is considered, university residential main campuses lacked space for 11,291 FTE students. This suggests that Ohio's residential main campus classrooms have less space per student, were used more than 42 hours a week, or had more than 67% of the seats filled per course.

¹⁰ A full-time equivalent (FTE) student is a measure of the equivalent of a student taking a standard full-time course load, which is 30 semester credit hours per year, or 45 quarter credit hours per year. To calculate student FTE for a year, total credit hours are divided by 30 for schools on a semester calendar and 45 for schools on a quarter calendar. For resource planning and subsidy distribution, higher education analysts often speak in terms of FTE rather than student headcount.

Table 1: Classroom Capacity (All Space)

Sector	# FTE Students (FY 2003)	Contact Hours in Classrooms	Classroom Space Available (NASF)	Classroom Space Needed (NASF)	Square Footage Surplus (+) or Shortfall (-)	% Surplus (+) or Shortfall (-)	FTE Surplus (+) or Shortfall (-)
Open Access Urban Universities	62,556	853,889	610,472	607,115	3,357	1%	315
Residential Universities	162,984	2,224,732	1,461,365	1,581,784	-120,419	-8%	-11,291
University Branch Campuses	21,826	297,925	315,577	211,825	103,752	33%	9,728
Community and Technical Colleges	87,845	1,146,377	913,937	815,074	98,863	11%	9,270
Co-located Campuses	23,732	309,703	280,044	220,199	59,845	21%	5,611
Statewide Totals	358,943	4,832,626	3,581,395	3,435,997	145,398	4%	13,633

Other sectors could have accommodated additional FTE students in FY 2003 as follows:

- ❑ Open access urban universities -- 315 FTE students
- ❑ University branch campuses -- 9,728 FTE students
- ❑ Community and technical colleges -- 9,270 FTE students
- ❑ Co-located campuses -- 5,611 FTE students

Capacity Estimate Using Space in Satisfactory Condition or in Need of Minor Rehabilitation

However, when only space that is in satisfactory/minor rehabilitation condition is considered, available classroom space is in much shorter supply statewide:

Table 2: Classroom Capacity (Satisfactory/Minor Rehabilitation Space Only)

Sector	# FTE Students (FY 2003)	Contact Hours in Classrooms	Classroom Space Available (NASF)	Classroom Space Needed (NASF)	Square Footage Surplus (+) or Shortfall (-)	% Surplus (+) or Shortfall (-)	FTE Surplus (+) or Shortfall (-)
Open Access Urban Universities	62,556	853,889	371,661	607,115	-235,454	-63%	-22,077
Residential Universities	162,984	2,224,732	887,764	1,581,784	-694,020	-78%	-65,074
University Branch Campuses	21,826	297,925	206,480	211,825	-5,345	-3%	-501
Community and Technical Colleges	87,845	1,146,377	799,575	815,074	-15,499	-2%	-1,453
Co-located Campuses	23,732	309,703	248,551	220,199	28,352	11%	2,659
Statewide Totals	358,943	4,832,626	2,514,031	3,435,997	-921,966	-37%	-86,448

The amount of classroom space available at the state level decreases from 3,581,395 square feet to 2,514,031 square feet. At the state level, Ohio lacks suitable classroom space for 86,448 FTE students according to the 2003 data -- a 37% shortfall in satisfactory/minor rehabilitation space (or, a shortage of -921,966 square feet). Residential university main campuses have the largest shortage of space (-78%), lacking "good" satisfactory/minor rehabilitation space for 65,074 FTE students (or 694,020 square feet). Open access urban universities also have a large shortage of space in satisfactory/minor rehab condition (-63%), lacking space for 22,077 FTE students. University branch campuses and community and technical colleges suffer a smaller loss of space, in large part because facilities at these institutions are newer than those at the university main campuses. University branch campuses lack satisfactory/minor rehabilitation space for 501 FTE, and community and technical colleges lack space for 1,453 FTE. Only co-located campuses are able to accommodate additional students (2,659 FTE).

Classroom Lab Space

The space reported in the Classroom Lab category includes rooms used for scheduled classes in a wide range of disciplines: computer classroom labs where each student workstation has a computer, art and design studios, music performance labs, language labs, science wet labs and instrument labs, and other types of classroom labs with special equipment.

Space needs for the many different types of lab space vary widely, but they all require more space per student than general purpose classrooms to accommodate computers or other types of lab equipment. Our estimates allow an average of 50 square feet per student lab work station and the instructor area, and assume rooms are available an average 50 hours a week, are in use 50% of the time, and that two thirds of the work stations are full. Some types of classroom labs require more time to set up lab equipment or cannot be used by multiple sections, making them available fewer hours per week.

Ohio's state-funded campuses show a surplus in space for classroom labs when classroom labs in all conditions (whether in satisfactory condition or in need of major rehabilitation) are considered. However, that surplus becomes a slight shortfall when only classroom lab space that is in satisfactory/minor rehabilitation condition is considered.

Capacity Estimate Using All Space Regardless of Condition

With regard to all classroom lab space regardless of condition, Ohio's state-funded higher education institutions could accommodate only an additional 4,023 FTE students in FY 2003. Statewide, Ohio has 3,658,554 square feet of classroom laboratory space. A total student FTE of 358,943 translates into about 1,104,959 student contact hours in classroom laboratories. The classroom laboratory space needed at the state level is 3,298,303 square feet, which results in a surplus of 360,250 square feet of classroom labs – or about 10%.

Table 3: Classroom Lab Capacity (All Space)

Sector	# FTE Students (FY 2003)	Contact Hours in Classroom Labs	Classroom Lab Space Available (NASF)	Classroom Lab Space Needed (NASF)	Square Footage Surplus (+) or Shortfall (-)	% Surplus (+) or Shortfall (-)	FTE Surplus (+) or Shortfall (-)
Open Access Urban Universities	62,556	168,901	530,543	504,170	26,373	5%	295
Residential Universities	162,984	440,057	1,152,259	1,313,570	-161,311	-14%	-1,801
University Branch Campuses	21,826	58,930	350,570	175,907	174,663	50%	1,950
Community and Technical Colleges	87,845	342,596	1,286,153	1,022,648	263,505	21%	2,943
Co-located Campuses	23,732	94,476	339,029	282,009	57,020	17%	637
Statewide Totals	358,943	1,104,959	3,658,554	3,298,303	360,250	10%	4,023

As with the classroom calculations, residential university main campuses have a deficit of classroom laboratory space, -14% (lacking space for 1,801 FTE students), even when space in all conditions is considered. The other sectors have surpluses of space ranging from 5% to 50%.

Capacity Estimate Using Space in Satisfactory Condition or in Need of Minor Rehabilitation

The estimated surplus of classroom lab space at the state level disappears when only that space in satisfactory/minor rehabilitation condition is included in the analysis.

Table 4: Classroom Lab Capacity Satisfactory/Minor Rehabilitate Space

Sector	# FTE Students (FY 2003)	Contact Hours in Classroom Labs	Classroom Lab Space Available (NASF)	Classroom Lab Space Needed (NASF)	Square Footage Surplus (+) or Shortfall (-)	% Surplus (+) or Shortfall (-)	FTE Surplus (+) or Shortfall (-)
Open Access Urban Universities	62,556	168,901	371,720	504,170	-132,450	-36%	-1,479
Residential Universities	162,984	440,057	706,198	1,313,570	-607,372	-86%	-6,782
University Branch Campuses	21,826	58,930	280,424	175,907	104,517	37%	1,167
Community and Technical Colleges	87,845	342,596	1,105,747	1,022,648	83,099	8%	928
Co-located Campuses	23,732	94,476	328,185	282,009	36,910	12%	412
Statewide Totals	358,943	1,104,959	2,792,274	3,298,303	-515,296	-19%	-5,754

A total of 3,298,303 square feet of classroom labs would still be needed to educate the 358,943 FTE students enrolled in lab courses in FY 2003. However, the classroom laboratory space available statewide decreases to 2,792,274 square feet resulting in a state level shortfall of -515,296 square feet (or 5,754 FTE). Residential university main campuses lack satisfactory/minor rehabilitation space for 6,782 FTE students (an 86% space shortfall), and open access urban universities suffer a 36% space shortfall (lacking space for 1,479 FTE students). The space surpluses at the other sectors decrease significantly, with co-located campuses only able to accommodate 412 more FTE students, community and technical colleges able to accommodate 928 more FTE students, and university branch campuses able to accommodate 1,167 more FTE students. In all cases, the student FTE percentages listed in Table 4 represent estimates of the percentage of students currently enrolled in a course that requires a classroom laboratory, not of all students enrolled in all courses.

Office Space

The offices included in this study are offices used by full-time and part-time faculty and staff directly engaged in instruction and research or its support. Offices used by personnel funded by auxiliary operations, such as bookstore, dining hall, parking, and the like, and hospital employees were excluded.

The study used FY 2003 employees to generate space estimates. Part-time employees (including Graduate Assistants) and Service/Maintenance workers were counted as $\frac{1}{2}$ FTE; full-time faculty and other full-time staff were counted as one FTE. The office space needed for university main campuses was estimated at an average 140 net assignable square feet (NASF) per FTE faculty/staff member. For all other sectors, 100 NASF per faculty/staff was used. This estimate yields a statewide average of about 130 NASF needed per FTE staff person.

The office space capacity data exhibits findings similar to the findings for classroom and classroom labs. When all office space is considered, regardless of condition, Ohio seems to have a small surplus of space. On the other hand, when only space that is in satisfactory/minor rehabilitation condition is considered, a deficit in space becomes apparent.

Capacity Estimate Using All Space Regardless of Condition

When all office space is included, there is a small surplus of office space statewide (2%); community and technical colleges, however, have a 3% office space shortfall.

Table 5: Office Space Capacity (All Space)

Sector	Total FTE Faculty/Staff (FY 2003)	Office Space Available (NASF)	Office Space Needed (NASF)	Square Footage Surplus (+) or Shortfall (-)	% Surplus (+) or Shortfall (-)	FTE Surplus (+) or Shortfall (-)
Open Access Urban Universities	9,583	1,473,674	1,341,620	132,054	9%	943
Residential Universities	35,483	5,020,061	4,967,550	52,511	1%	375
University Branch Campuses	2,383	242,495	238,325	4,170	2%	42
Community and Technical Colleges	9,225	898,065	922,500	-24,435	-3%	-244
Co-located Campuses	2,540	275,676	253,975	21,701	8%	217
Statewide Totals	59,214	7,909,971	7,723,970	186,001	2%	1,333

At the state level there is a total of 7,909,971 square feet in office space of all condition types (satisfactory to obsolete). There are a total of 59,214 faculty and staff FTEs. When 140 square feet is allowed per faculty/staff FTE for university main campuses and 100 square feet per faculty/staff FTE for all other sectors, the result is a 2% surplus of office space. Expressed in terms of the number of faculty and staff that could be accommodated, this means that Ohio can accommodate an additional 1,333 FTE. The amount of space surplus or shortfall varies by sector. Open access urban universities (9%), co-located campuses (8%), university branch campuses (2%) and residential university main campuses (1%) have small surpluses of office space while community and technical colleges have a small shortfall (-3%).

Capacity Estimate Using Space in Satisfactory Condition or in Need of Minor Rehabilitation

A significant deficit of office space becomes apparent when only data for office space that is in the category of satisfactory/minor rehabilitation space is included in the analysis.

Table 6: Office Capacity (Satisfactory/Minor Rehabilitate Space)

Sector	Total FTE Faculty/ Staff	Office Space Available (NASF)	Office Space Needed (NASF)	Square Footage Surplus (+) or Shortfall (-)	% Surplus (+) or Shortfall (-)	FTE Surplus (+) or Shortfall (-)
Open Access Urban Universities	9,583	906,971	1,341,620	-434,649	-48%	-3,105
Residential Universities	35,483	2,987,956	4,967,550	-1,979,594	-66%	-14,140
University Branch Campuses	2,383	180,107	238,325	-58,218	-32%	-582
Community and Technical Colleges	9,225	790,236	922,500	-132,264	-17%	-1,323
Co-located Campuses	56,674	247,017	253,975	-6,958	-3%	-70
Statewide Totals	59,214	5,112,287	7,723,970	-2,611,683	-51%	-19,219

When only satisfactory/minor rehabilitation space is included in the analysis, the amount of office space available decreases from 7,909,971 square feet to 5,112,287. Overall, Ohio's state-funded higher education facilities show a deficit of 2,611,683 square feet, or -51%, in office space. The result of this deficit is that 19,219 FTE of faculty and staff are housed in less than satisfactory circumstances. All sectors have notable shortfalls for office space. The older university main campuses have the highest shortfall, with residential universities suffering a 66% space shortfall and open access urban universities suffering a 48% space shortfall. University branches have the next highest shortfall, -32%; community and technical colleges have a shortfall of -17%, and co-located campuses have a shortfall of -3%.

Residence Hall Space

Residence hall space was analyzed differently in this report than classroom, classroom laboratory, and office space. The need for residence hall space varies widely by the size, type, and location of campuses and institution goals. Not all students need residence hall space, so no FTE capacity calculation was conducted on the residence hall data.

Instead, institutions were surveyed to determine residence hall capacity and occupancy rates. Campuses with residence halls have verified that all residence halls are at or near 100% occupancy, indicating there is high demand for students to live on-campus when this is possible.

The residence hall space considered includes housing for students, faculty, staff, and visitors to the institution. Unfortunately, the condition of Ohio's residence hall space is worse than the condition of its academic space – about 57% of residence hall space needs replacement or rehabilitation at costs exceeding 25% of replacement value:

Table 7: Residence Hall Space Conditions

Campus Name	All Residence Hall Space (NASF)	Satisfactory/ Minor Rehabilitate Residence Hall Space (NASF)	Square Footage to be renovated or replaced	% Space to be renovated or replaced
Open Access Urban Universities	1,119,707	813,140	306,567	27%
Residential Universities	6,626,985	2,423,518	4,203,467	63%
University Branch Campuses	257,607	191,772	65,835	26%
Community and Technical Colleges	129,490	60,009	69,481	54%
Statewide Totals	8,133,789	3,488,439	4,645,350	57%

Statewide, institutions report that there are 8,133,789 square feet of residence hall space. Most of this space is at the residential university main campuses (6,626,985 square feet) and the remaining space is at open access urban universities (1,119,707 square feet) university branch campuses (257,607 square feet) and community and technical colleges (129,490 square feet). When considering only the satisfactory/minor rehabilitation space data, the result is startling: it seems that more space is in need of major rehabilitation than is not.

A Note on Square Footage Per Student FTE Assumptions

The capacity calculations for academic space in this study were based on the following estimates of average net assignable square feet of space (NASF) per FTE student:

- 20 NASF per FTE Student (Classrooms)
- 50 NASF per FTE Student (Classroom Labs)

These estimates are averages based on current practice. However, there is a significant difference between current practice and what the desirable square footage allowance per student should be in the future:

- ❑ Older pedagogies based on students sitting in large lecture halls who took notes in seats with small tablet-arms require less space than current practices.

- ❑ Current trends toward group study and the use of computers to perform calculations, investigate options, or take notes during class requires moveable furniture and larger station sizes.
- ❑ Learning rooms must also be designed to accommodate instructors and students who use wheelchairs.

It is important to recognize that new pedagogies, technology, or changes in furniture design may require an increase in the amount of space used to estimate academic space capacity to about:

25 NASF per FTE Student (Classrooms)
 55 or 60 NASF per FTE Student (Classroom Labs)

The use of these revised space benchmarks would greatly reduce the capacity estimates provided in this report.

Survey of Presidents

In addition to this quantitative and general analysis, Regents staff conducted a brief survey of all state college and university presidents in the winter of 2004 to seek a more customized, qualitative assessment of the capacity of their institutions to serve their communities and the state. The purpose of the survey was to provide a quick understanding of the capacity of Ohio's campuses from the president's perspective. This open-ended survey was intended to provide presidents with the broadest possible range of discretion in responding.

The survey asked the question:

Generally speaking, how many more students can your campus accommodate without having to add additional faculty, staff, buildings, or other resources?

While response to the survey differed from institution to institution, a number of points were repeated:

- ❑ Most institutions are seeing growth in student enrollment¹¹
- ❑ Most say they can accommodate no more or very few additional students (depending on program)
- ❑ Most mention the expense of technology and the need to update technology regularly
- ❑ Many mention the need to update current facilities

Most of the presidents also discussed how they were dealing with their current capacity issues.¹² The methods that were being employed included:

¹¹ This point is strongly supported by the enrollment data that campuses regularly report to the Regents.

¹² Institutions regularly review courses and programs to eliminate those that have a low priority or are not cost-effective because of low enrollments. Because this course and program review is a standard process, it is not listed here as a special action related to capacity.

- ❑ Establishing caps and waiting lists on popular programs
- ❑ Offering classes outside of preferred/popular hours
- ❑ Expanding distance education
- ❑ Partnering with other institutions or campuses
- ❑ Expanding class size

Some of these methods have been less than favorably received by the students.

- ❑ Caps and waiting lists are most often found in programs such as nursing and allied health which are in high demand.
- ❑ Some students simply will not attend courses that are offered at times that do not fit with their work and family schedules.
- ❑ Distance education is expensive and often involves the need for additional space and costs for technology and faculty training.
- ❑ Expanding class size can adversely impact learning.

Conclusions

This study concludes that, while Ohio's state-funded colleges and universities may *appear* to have just enough space to meet *current* enrollment demand, a significant amount of that space is in need of some form of replacement or major rehabilitation.

- ❑ When only space that is satisfactory or only requires minor rehabilitation is considered, there are major space shortfalls in every space category.
- ❑ These space shortfalls will become more pronounced as student enrollment increases over the next few years and as space standards change to meet the pedagogical and technological needs of a strong higher education system.
- ❑ Most requests (78%) for capital funds in the 2006 biennium were sought to improve or replace existing space.

To meet Ohio's education needs, the state-funded higher education community and state decision makers must continue to address the problem of aging facilities and consider the space changes needed to accommodate modern teaching pedagogy, technology, and future growth in enrollment and research.

Appendix A: Table Calculations and Assumptions

Most data in this report are reported to the Higher Education Information (HEI) system. File layouts and more detailed definitions listed in the parameters below can all be found on the Web at www.regents.state.oh.us/hej under the submitting data heading. Calculations for each of the tables provided in the study are provided below.

Classroom Capacity Calculations: Tables 1 and 2

Table 1: Classroom Capacity (All Space)

FTE Students (FY 2003): Reported by institutions as of October 2003 (<http://www.regents.state.oh.us/hej/subsidyreport.htm>).

Contact Hours in Classrooms: # FTE Students is first multiplied by 15 to produce the total number of student contact hours. The total student contact hours is then multiplied by the percentage of hours that are reported as classroom instruction for each sector. Classes are considered Classroom Instruction if they are reported as Lecture, Discussion, Recitation, or Seminar in the Course Sections Taught (ST) files.

Classroom Space Available (NASF): All net assignable square footage reported in the Area Inventory (AI) files with an area type of Classroom (110) and with Instruction and General Function Codes (10, 21, 22, 40, 51, 52, or 53).

Classroom Space Needed (NASF): To determine the net assignable square footage, the number of Contact Hours Meeting in Classrooms is multiplied by a space factor of .711.

The .711 space factor for classrooms is reached by applying the following assumptions:

Space Factor	A. Number of assigned square feet per station	B. Maximum number of hours room available per week	C. Room Use Rate	D. Station Occupancy Rate
0.711	20	60	0.70	0.67

Calculation for the .711 classroom space factor:

$$20 / (60 \times .70 \times .67)$$

or

$$\text{A. Number of assigned square feet per station} / (\text{B. Maximum number of hours room available per week} \times \text{C. Room Use Rate} \times \text{D. Station Occupancy Rate})$$

Square Footage Surplus (+) or Shortfall (-):

Classroom Space Available (NASF) – Classroom Space Needed

% Surplus (+) or Shortfall (-):

Surplus (+) or Shortfall (-) NASF/Classroom Space Available¹³

FTE Surplus or (+) or Shortfall (-):

Square Footage Surplus (+) or Shortfall (-)/Space Factor = Student Contact Hours

Student Contact Hours/15= FTE Surplus or Shortfall

Table 2: Classroom Capacity (Satisfactory/Minor Rehab Space)

Calculations in Table 2 are identical to those in Table 1 except for the Classroom Space Available column. While Table 1 included all space without regard to the condition status, Table 2 data include only that classroom space (area type Classroom, 110 and Function Codes 10, 21, 22, 40, 51, 52, or 53) that was reported in the Physical Structure (PS) Inventory file with Physical and Functional Condition Status codes of Satisfactory or Minor Rehabilitation. Definitions for all condition status codes are as follows:

Physical Condition Status: This field must be reported for all owned and non-institutional structures. If the structure is leased, enter NA. The following codes reflect a qualitative judgment of the physical (or structural) condition of the structure. This evaluation includes considerations based on the age of the structure and its systems (HVAC, electrical, plumbing, etc.) as well as safety issues and federal regulations (ADA, OSHA, etc.).

Satisfactory (SA): Suitable for continued use with normal maintenance.

Minor Rehabilitation (MI): Needs minor physical rehabilitation or repair. The approximate cost of physical rehabilitation is less than 25 percent of the replacement value of the structure.

Rehabilitation (RE): Needs physical rehabilitation or repair. The approximate cost of physical rehabilitation is at least 25 percent, but less than 50 percent of the replacement value of the structure.

Major Rehabilitation (MA): Needs a major physical rehabilitation. The approximate cost of rehabilitation is 50 percent or more of the replacement value of the structure.

¹³ % Surplus (+) or Shortfall (-) was calculated by comparing the Surplus or Shortage NASF to existing space (see Appendix A). Another way of calculating shortfall/surplus percentage would be to compare Surplus or Shortage NASF to the calculated need.

Physically Obsolete (PO): Physically inadequate and not feasible to renovate. The structure should be evaluated for demolition.

Functional Condition Status: This field must be reported for all owned and non-institutional structures. If the structure is leased, enter NA. The following codes reflect a qualitative judgment of the functional capabilities of the structure. Evaluation of a structure for functional condition should reflect how well the structure is able to serve the program(s) to which the structure is assigned. Note that a building may be in good physical condition but not suited for its function. For example, a house may be donated to an institution with the intention that the house be a library. Such a structure might be coded as physically adequate but functionally obsolete.

Satisfactory (SA): Suitable for continued use with normal maintenance.

Minor Rehabilitation (MI): Needs minor functional rehabilitation or repair. The approximate cost of functional rehabilitation is less than 25 percent of the replacement value of the structure.

Rehabilitation (RE): Needs functional rehabilitation or repair. The approximate cost of functional rehabilitation is at least 25 percent, but less than 50 percent of the replacement value of the structure.

Major Rehabilitation (MA): The structure needs a major functional rehabilitation. The approximate cost of rehabilitation is 50 percent or more of the replacement value of the structure.

Functionally Obsolete (FO): The structure is functionally inadequate in its present use and requires physical modifications. It may be used for another function.

Classroom Lab Capacity Calculations: Tables 3 and 4

Table 3: Classroom Lab Capacity (All Space)

FTE Students: Reported by institutions as of October 2003 (<http://www.regents.state.oh.us/hei/subsidyreport.htm>).

Contact Hours in Classroom Labs: Total # FTE Students is first multiplied by 30 to produce the total number of student contact hours. The total student contact hours number is then multiplied by the percentage of hours that are considered laboratory instruction for each sector. Classes are considered Classroom Laboratory Instruction if they are reported as Lab, Clinical or Studio in the Course Sections Taught (ST) files.

Classroom Lab Space Available (NASF): All net assignable square footage reported in the Area Inventory (AI) files with an area type of Classroom Laboratory (210) and with Instruction and General Function Codes (10, 21, 22, 40, 51, 52, or 53).

Classroom Lab Space Needed (NASF): To determine the net assignable square footage, the number of Contact Hours Meeting in Laboratories is multiplied by a space factor of 2.985.

The 2.985 space factor for classroom laboratories is reached by applying the following assumptions:

Space Factor	A. Number of assigned square feet per station	B. Maximum number of hours room available per week	C. Room Use Rate	D. Station Occupancy Rate
2.985	50	50	0.50	0.67

Calculation for the 2.985 space factor:

$$50 / (50 \times .50 \times .67)$$

or

$$\text{A. Number of assigned square feet per station} / (\text{B. Maximum number of hours room available per week} \times \text{C. Room Use Rate} \times \text{D. Station Occupancy Rate})$$

It should be noted that the number of assigned square feet per station for laboratories is higher than classroom space. The higher number reflects the extra space needed for special equipment needed in laboratories. Also, because of the special equipment often needed for labs, the maximum number of hours that the room is available and the room use rate drop to account for set up and take down time as well as the special maintenance required by labs.

Square Footage Surplus (+) or Shortfall (-):

Classroom Lab Space Available (NASF) – Classroom Lab Space Needed

% Surplus (+) or Shortfall (-):

Square Footage Surplus (+) or Shortfall (-) / Classroom Lab Space Available

FTE Surplus or (+) or Shortfall (-):

Square Footage Surplus (+) or Shortfall (-) / Space Factor = Student Contact Hours

Student Contact Hours / 30 = FTE Surplus or Shortfall

Table 4: Classroom Lab Capacity (Satisfactory/Minor Rehab Space)

Calculations in Table 4 are identical to those in Table 3 except for the Classroom Lab Space Available column. While Table 3 included all space without regard to the condition status, Table 4 data include only that classroom space (area type Classroom, 210 and Function Codes 10, 21, 22, 40, 51, 52, or 53) that was reported with Physical and Functional Condition Status codes of Satisfactory or Minor Rehabilitation. See definitions for these codes at the Table 2 description.

Office Capacity Calculations: Tables 5 and 6

Table 5: Office Capacity (All Space)

Total FTE Faculty and Staff: Includes all Faculty and Staff reported in All Employee (AM) file for 2002 for all fund groups except Auxiliary and Hospital. Each full-time employee for all work categories except Service/Maintenance is counted as 1 FTE. Each full-time employee reported as Service/Maintenance is counted as ½ FTE. Each part-time employee and all graduate assistants are counted as ½ FTE.

Office Space Available (NASF) All net assignable square footage reported in the Area Inventory (AI) files with an area type of Office (310) and with Instruction and General Function Codes (10, 21, 22, 40, 51, 52, or 53).

Office Space Needed (NASF): Total FTE Faculty and Staff is multiplied by 140 square feet for university main campuses. For all other sectors, Total FTE Faculty and Staff is multiplied by 100 square feet. Data from institutions indicate that practices for assigning office space to faculty and staff tend to result in averages that reflect 140 ft² for the four-year universities and 100 ft² for the two-year campuses. Some representatives from two-year campuses noted that they believe that they should provide more office space for their faculty and staff, but have been constrained by resources from doing so. Ideally, these representatives believed that they should be providing 130 or 135 ft². The use of the higher office space figures in this report would have greatly reduced the estimate of office capacity for faculty and staff.

Square Footage Surplus (+) or Shortfall (-):

Office Space Available (NASF) – Office Space Needed (NASF)

% Surplus (+) or Shortfall (-):

Square Feet Surplus (+) or Shortfall (-)/Office Space Available

FTE Surplus (+) or Shortfall (-):

Square Feet Surplus (+) or Shortfall (-)/140 or 100

Table 6: Office Capacity (Satisfactory/Minor Rehab Space)

Calculations in Table 6 are identical to those in Table 5 except for the Office Space Available column. While Table 5 included all space without regard to the condition status, Table 6 data include only that classroom space (area type Classroom, 210 and Function Codes 10, 21, 22, 40, 51, 52, or 53) that was reported with Physical and Functional Condition Status codes of Satisfactory or Minor Rehabilitation. See definitions for these codes at the Table 2 description.

Table 7: Residence Hall Space Conditions

All Residence Space (NASF) : All square footage reported in the Area Inventory (AI) file with the Residence Hall (900 series) codes.

Please note the definition for 900 series codes:

Residential facilities include housing for students, faculty, staff, and visitors to the institution. Hotel or motel and other guest facilities are included in this series if they are owned or controlled by the institution and used for purposes associated with defined institutional missions (i.e., excluding commercial investment). It is important to note that not all space located in residential halls is coded using the 900 series. Because that space is coded in the same way as non residential facility space, it cannot be included in the residence hall calculations. Some of the space that is located in residence halls but is not in the residence hall calculations include: lounges, study rooms, dining areas, and recreational rooms.

The 900 Series Includes:

- 910 Sleep/Study Without Toilet Or Bath
- 914 Guest Room
- 919 Toilet Or Bath
- 920 Sleep/Study With Toilet Or Bath
- 935 Sleep/Study Service
- 950 Apartment
- 955 Apartment Service
- 970 House

Satisfactory or Minor Rehab Residence Space (NASF): Data in this column reflect all residence hall space (900 series) that was reported with Physical and Functional Condition Status codes of Satisfactory or Minor Rehabilitation. See definitions for these codes at the Table 2 description.

Square Footage to be renovated or replaced:

All Residence Space (NASF) – Satisfactory or Minor Rehab Residence Space (NASF)

Appendix B: Other Studies

Studies from other states and MGT were used to inform the calculations in this report. These studies are listed below. Where possible, hyperlinks are provided to Web documents.

Financing Higher Education: The Appropriate Balance among Appropriations, Tuition and Fees, and Financial Aid to Achieve the Goals of Closing the Gaps, Texas Higher Education Coordinating Board, March 2003.

Future Student Demand and the Capacity of Illinois Higher Education, Committee on Access and Diversity, State of Illinois Board of Higher Education, August 1999.

Higher Education Capital Planning for New Jersey's Future, New Jersey Commission on Higher Education, December 2001
<http://www.state.nj.us/highereducation/capplanning.htm#_edn1>.

Pennsylvania State System of Higher Education Instructional Facilities Capacity Analysis, State of Pennsylvania, January 2002.

A Regional Study of Undergraduate Enrollment Demand and Capacity for the University of California, California Postsecondary Education Commission, April 2003
<<http://www.cpec.ca.gov/Publications/ReportSummary.ASP?1066>>.

A Review of Community College and State University Facilities Space Planning Models: Final Report and Recommendations by the Florida Postsecondary Education Planning Commission, MGT of America, January 2000.

Space Standards for Selected States' Higher Education Systems, MGT of America, Inc., September 1999.

Systemwide Needs Assessment for Virginia Higher Education: 2001, State Council of Higher Education for Virginia, March 28, 2002
<<http://www.schev.edu/Reportstats/SystemwideNeedsAssessment032802.pdf>>.

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