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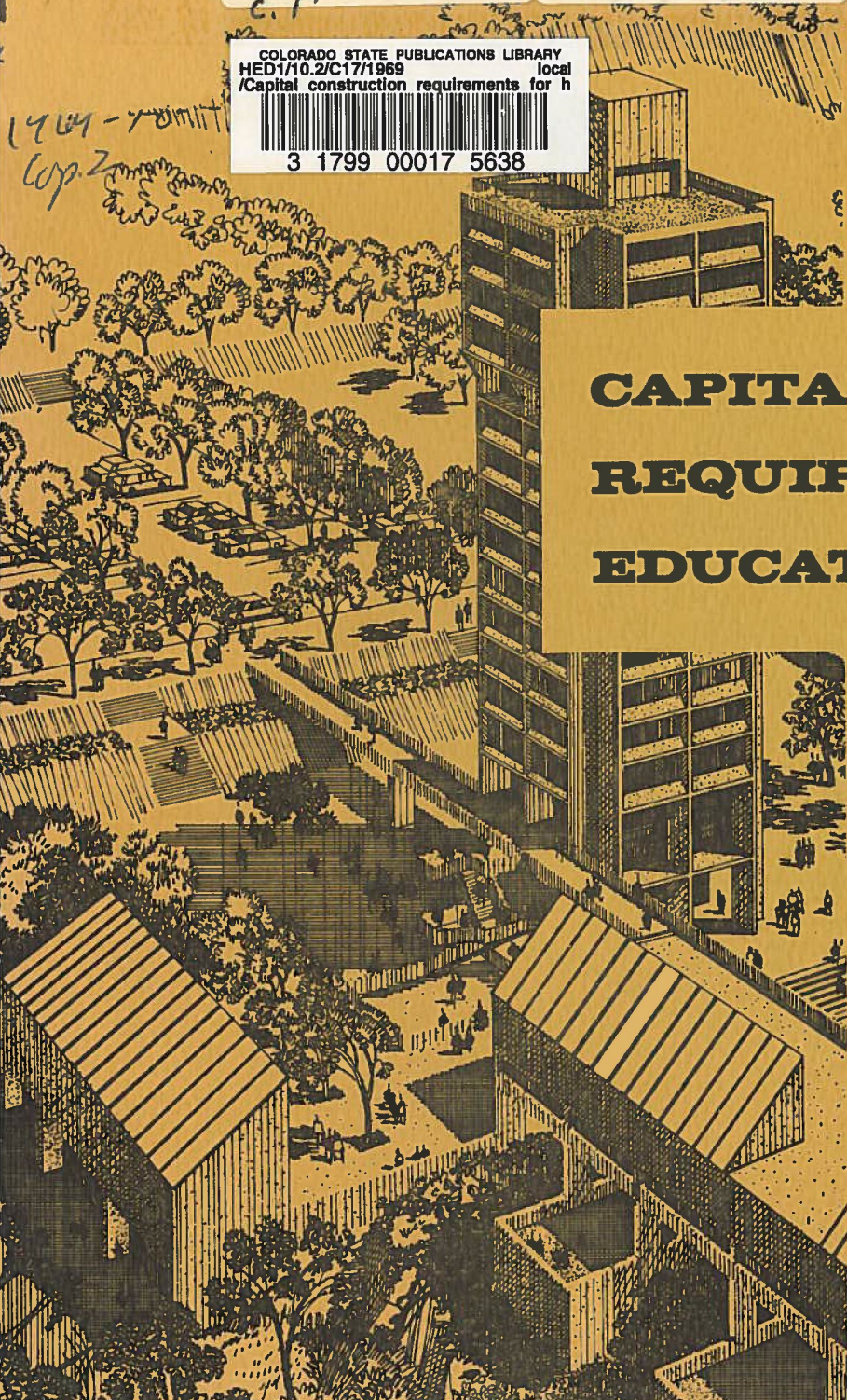
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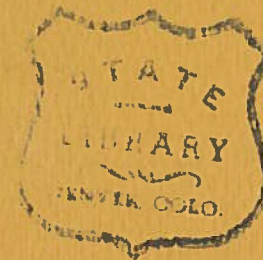


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CAPITAL CONSTRUCTION REQUIREMENTS FOR HIGHER EDUCATION IN COLORADO • 1969-79



COLORADO COMMISSION ON HIGHER EDUCATION

The Honorable Leslie R. Fowler, Chairman
Committee on Fiscal Policy
State Capitol
Denver, Colorado 80203

Dear Mr. Fowler:

The Colorado Commission on Higher Education reported, in February 1968, a need for nearly \$300 million of construction for higher education by 1975, based upon preliminary analysis of currently available space and a calculation of needs according to enrollment projections then available. We estimated that possibly \$45 million of this very large requirement might be met through federal funds. In light of the magnitude of the need the Commission proposed that a state building authority be created through which construction approved by the Legislature might be provided, using borrowed funds, such borrowings to be repaid through annual rental payments by the institutions utilizing the buildings. This kind of approach has been used in a good many states. While it involves interest costs, it permits careful scheduling and an acceleration of construction which in turn would offset some of the costs that are associated with a slower pace of construction.

As we stated at that time, further analysis was needed in order to pin down the rather gross estimates that were involved in light of limitations in information then available.

In the interim, the Commission has conducted the first truly comprehensive inventory and analysis of available (and funded) space in the history of the State. Every room on every campus has been inventoried and assessed as to its continuing usefulness. We have also developed enrollment projections for the public colleges and universities in which we can have considerable confidence. We also have been able to develop standards for space requirements which are valid in reference to national norms. We thus have developed the sources of information needed to produce estimates of capital construction requirements that we believe to be authoritative and a solid base for planning.

In the following pages our methods and findings are set forth. In summary, the analysis documents a need for nearly \$333 million in construction during the ten-year period through 1978-79. Assuming that \$50 million of this requirement may be provided from federal fund sources (an amount not likely to be achieved unless federal support is substantially increased over present levels), there will be a net requirement in state funds of \$283 million during the ten-year period.

Tables 1, 2 and 3, following, summarize the results of the comprehensive inventory of space recently completed by the Commission. Table 1 reports the current space that can be continued in use indefinitely, based upon a room-by-room inventory and a building-by-building analysis, on the spot, by a Commission planning team comprising an architect and engineer from the Division of Public Works in addition to the Commission planning officer. Table 2 includes space now in process of development, and Table 3 adds this to current space to provide the total now available or funded. Table 4, then, estimates the space that will be needed in 1978-79 based upon Commission enrollment projections for each institution and upon generally-accepted planning standards, and Table 5 summarizes, institution by institution and by space type, the additional needs by 1978-79. No projections of space needs are made for certain categories of space which are related to program development more than to numbers of students enrolled; these are categories generally related to research and to public service functions. Such space today represents 20 per cent of the total inventory of space available, and in making projections of total requirements in 1978-79 we assume that these same categories will require 20 per cent of total space at that time.

The enrollments used to project needs as of 1978-79 have been developed by the Commission using information provided by the institutions and by other state agencies. In calculating institutional space needs, we have excluded evening enrollments because evening classes obviously can be taught in buildings required for the daytime program (assuming, as is expected to be the case, that daytime enrollments exceed evening). Thus the enrollment figures we have used for space planning are lower than those that would be used in projecting operating fund requirements, inasmuch as additional faculty, staff, and supplies are needed for evening enrollments even though additional instructional space is

not. The enrollment figures used are set forth on page 7. These projections will, of course, be revised annually as actual experience provides a basis for updating.

Planning standards for the various types of space--classrooms, teaching laboratories, physical education facilities, faculty offices, library space, and the like--are described in detail on pages 7-10. The faculty-student ratios indicated in the discussion of the standard for teaching faculty offices and related service space are not necessarily Commission-approved standards for 1978-79 but are believed to be at least as appropriate for planning purposes as the 1968 actual ratios which are generally the same as or somewhat lower than those indicated on page 7.

The findings from this extensive analysis are summarized on page 10. A total additional space requirement estimated at 5,642,650 assignable square feet is converted to gross square feet at a ratio of ASF/GSF = 70 per cent. (Planning for space needs is in "assignable square feet," i.e., the inside dimensions of spaces used for academic and administrative functions; but costs must be computed in "gross square feet," which includes spaces for halls, stairways, toilets, the thickness of walls and columns, and the like.)

Expected building costs are computed by taking the approximate average construction cost of nearly a million square feet of all types of space that has actually been built in the past two years (\$20.75) and projecting this cost at a 5 per cent per year increase in construction cost. Rationale for using a 5 per cent figure is also presented on page 10; it is obvious from this information that construction costs are subject to enormous variations from year-to-year, and a relatively long-run base appears to be appropriate. For costing purposes, an assumption is arbitrarily made that equal amounts of space will be built annually throughout the ten-year period and a mid-point cost (\$27.40) is used. If relatively more space were built in the early years of the period, the total ten-year cost would presumably be reduced somewhat.

These projections confirm a magnitude of need comparable to that postulated last winter and seem to the Commission to demonstrate the necessity of a long-term funding device that will permit a markedly increased level of construction for higher education. The Commission has had assistance from eminently qualified advisers in reviewing the Building Authority concept, and a proposal for a nonprofit "Colorado State Agencies Plant Expansion Corporation" has been received and is now being evaluated. Such a corporation may be established under the Colorado Nonprofit Corporation Act (C.R.S. 31-24). It is stated that with certain enabling legislation such a corporation could issue obligations which could be tantamount to state general obligations, thus enjoying capital market acceptance and a cost of borrowing well below that of a building authority as otherwise conceived.

We shall keep you informed as our evaluation of the corporation device is completed, and of course will be happy to supply any additional information available concerning the matters discussed herein.

Sincerely yours,



Frank C. Abbott
Executive Director

November 25, 1968

TABLE 1 ●

ASSIGNABLE SQUARE FEET OF EDUCATIONAL AND GENERAL SPACE WHICH IS PRESENTLY AVAILABLE AND CAN BE CONTINUED IN USE INDEFINITELY, SPRING, 1968

Institution	Classroom and Service	Teaching Laboratories and Service	Physical Education Facilities and Service	Other Teaching Facilities and Service	Teaching Faculty Offices and Service	Other Instructional Space	Organized Activities	Research Faculty Offices and Service	Other Research Space	Extension Administrative Office Space	Public Service Space	Library Space	Administrative and General Office and Service Space	Other Administrative and General Space	Physical Plant Service Space	Total
CU-Boulder	132,106	190,296	57,027	29,650	207,763	57,588	7,370	55,752	261,304	12,007	60,792	200,757	55,301	31,816	107,963	1,467,492
CU-Denver	33,950	17,867	--	3,402	18,728	1,442	--	--	1,092	379	--	5,206	6,212	2,877	7,882	99,037
CU-Colo. Sprgs.	986	--	--	--	9,384	914	--	--	--	--	--	--	371	--	42	11,697
CSU	115,649	138,983	64,204	12,949	182,830	47,289	31,220	31,988	313,686	15,946	604	91,250	52,773	19,380	58,766	1,177,517
CSM	33,403	75,351	69,245	20,044	29,814	50,083	--	--	--	--	--	28,632	12,767	7,439	25,004	351,782
Fort Lewis	21,383	13,929	13,238	3,356	8,886	6,781	--	--	--	--	4,112	29,893	5,081	2,750	15,250	124,659
ASC	25,803	35,468	67,220	2,584	17,468	9,365	--	2,251	496	--	2,095	14,179	1,139	--	10,869	188,937
CSC	38,675	41,757	47,609	10,428	20,832	17,306	89,257	96	2,100	--	430	45,626	18,628	11,536	33,954	378,234
MSC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCSC	33,814	67,337	18,927	2,220	19,426	6,633	--	--	--	--	--	33,264	12,470	3,010	9,798	206,899
WSC	38,553	37,373	46,073	4,451	20,406	22,919	--	--	1,004	--	--	47,636	12,661	1,697	36,784	269,557
CC of Denver	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
El Paso CC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lamar	10,698	2,469	--	1,256	1,188	--	--	--	--	--	--	3,497	2,977	209	1,844	24,138
Otero	9,050	22,958	--	997	2,694	536	--	--	--	--	8,044	6,356	3,839	295	--	54,769
Trinidad	13,734	32,863	--	5,939	2,188	9,246	--	--	--	118	2,528	11,150	3,552	918	--	82,236
Aims	--	--	--	--	--	--	--	--	--	--	--	--	2,280	--	--	2,280
Arapahoe	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colo. Mtn.-Glenwood	4,111	5,813	885	--	1,858	--	--	--	--	--	--	4,596	563	--	--	17,826
Colo. Mtn.-Leadville	3,201	6,723	885	--	1,858	--	--	--	--	--	--	4,596	563	--	--	17,826
Mesa	25,585	15,934	10,204	2,215	14,462	7,226	--	--	129	--	--	20,886	11,812	1,373	8,576	118,402
Northeastern	40,689	17,523	14,024	1,849	8,749	15,711	--	--	--	--	--	--	8,790	8,417	3,522	119,274
Rangely	7,769	8,815	14,667	635	1,774	--	8,504	--	--	--	--	3,548	2,611	392	5,486	54,201
Total	589,159	731,459	424,208	101,975	570,308	253,039	136,351	90,087	579,811	28,450	78,605	551,072	214,390	92,109	325,740	4,766,763

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TABLE 2 ●

ASSIGNABLE SQUARE FEET OF EDUCATIONAL AND GENERAL SPACE WHICH IS FUNDED AND IS BEING PLANNED, IS UNDER CONSTRUCTION, OR IS UNDERGOING RENOVATION, SPRING, 1968

Institution	Classroom and Service	Teaching Laboratories and Service	Physical Education Facilities and Service	Other Teaching Facilities and Service	Teaching Faculty Offices and Service	Other Instructional Space	Organized Activities	Research Faculty Offices and Service	Other Research Space	Extension Administrative Offices Space	Public Service Space	Library Space	Administrative and General Office and Service Space	Other Administrative and General Space	Physical Plant Service Space	Total
CU-Boulder	43,051	40,707	--	2,345	18,844	1,600	--	41,968	140,390	--	--	19,323	--	--	--	308,228
CU-Denver	--	--	--	--	--	--	--	--	--	--	--	27,288	--	--	--	27,288
CU-Colo. Sprgs.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CSU	12,772	49,483	--	813	63,055	17,897	--	11,489	58,694	2,400	--	--	--	--	13,494	230,097
CSM	27,743	--	--	4,279	6,822	21,925	--	--	--	--	--	--	--	--	--	60,769
Fort Lewis	--	8,805	--	600	3,200	--	--	--	--	--	--	--	--	--	--	12,605
ASC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12,256	12,256
CSC	49,417	5,845	--	--	37,026	15,896	--	--	3,694	--	--	122,263	--	--	--	234,141
MSC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCSC	15,560	46,987	--	1,080	15,826	22,859	--	--	--	--	--	--	--	--	126	102,438
WSC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CC of Denver	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
El Paso CC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lamar	2,998	19,456	--	144	1,563	306	--	--	--	--	--	--	--	--	--	24,467
Otero	2,604	5,106	--	--	416	--	--	--	--	--	--	--	--	--	--	8,126
Trinidad	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,800	5,800
Aims	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arapahoe	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colo. Mtn.-Glenwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colo. Mtn.-Leadville	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mesa	1,702	6,212	--	2,475	1,270	10,818	--	--	--	--	--	--	--	--	--	22,477
Northeastern	1,104	--	--	--	--	--	--	--	--	--	--	--	6,327	520	--	7,951
Rangely	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	156,951	182,601	--	11,736	148,022	91,301	--	53,457	202,778	2,400	--	168,874	6,327	520	31,676	1,056,643

TABLE 3 •

TOTAL ASSIGNABLE SQUARE FEET OF EDUCATIONAL AND GENERAL SPACE WHICH IS AVAILABLE AND THAT WHICH IS FUNDED, SPRING, 1968^a

Institution	Classroom and Service	Teaching Laboratories and Service	Physical Education Facilities and Service	Other Teaching Facilities and Service	Teaching Faculty Offices and Service	Other Instructional Space	Organized Activities	Research Faculty Offices and Service	Other Research Space	Extension Administrative Office Space	Public Service Space	Library Space	Administrative and General Office and Service Space	Other Administrative and General Space	Physical Plant Service Space	Total
CU-Boulder	175,157	231,003	57,027	31,995	226,607	59,188	7,370	97,720	401,694	12,007	60,792	220,080	55,301	31,816	107,963	1,775,720
CU-Denver	33,950	17,867	--	3,402	18,728	1,442	--	--	1,092	379	--	32,494	6,212	2,877	7,882	126,325
CU-Colo. Sprgs.	986	--	--	--	9,384	914	--	--	--	--	--	--	371	--	42	11,697
CSU	128,421	188,466	64,204	13,762	245,885	65,186	31,220	43,477	372,380	18,346	604	91,250	52,773	19,380	72,260	1,407,614
CSM	61,146	75,351	69,245	24,323	36,636	72,008	--	--	--	--	--	28,632	12,767	7,439	25,004	412,551
Fort Lewis	21,383	22,734	13,238	3,956	12,086	6,781	--	--	--	--	4,112	29,893	5,081	2,750	15,250	137,264
ASC	25,803	35,468	67,220	2,584	17,468	9,365	--	2,251	496	--	2,095	14,179	1,139	--	23,125	201,193
CSC	88,092	47,602	47,609	10,428	57,858	33,202	89,257	96	5,794	--	430	167,889	18,628	11,536	33,954	612,375
MSC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCSC	49,374	114,324	18,927	3,300	35,252	29,492	--	--	--	--	--	33,264	12,470	3,010	9,924	309,337
WSC	38,553	37,373	46,073	4,451	20,406	22,919	--	--	1,004	--	--	47,636	12,661	1,697	36,784	269,557
CC of Denver	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
El Paso CC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lamar	13,696	21,925	--	1,400	2,751	306	--	--	--	--	--	3,497	2,977	209	1,844	48,605
Otero	11,654	28,064	--	997	3,110	536	--	--	--	--	8,044	6,356	3,839	295	--	62,895
Trinidad	13,734	32,863	--	5,939	2,188	9,246	--	--	--	118	2,528	11,150	3,552	918	5,800	88,036
Aims	--	--	--	--	--	--	--	--	--	--	--	--	2,280	--	--	2,280
Arapahoe	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colo. Mtn.-Glenwood	4,111	5,813	885	--	1,858	--	--	--	--	--	--	4,596	563	--	--	17,826
Colo. Mtn.-Leadville	3,201	6,723	885	--	1,858	--	--	--	--	--	--	4,596	563	--	--	17,826
Mesa	27,287	22,146	10,204	4,690	15,732	18,044	--	--	129	--	--	20,886	11,812	1,373	8,576	140,879
Northeastern	41,793	17,523	14,024	1,849	8,749	15,711	--	--	--	--	--	--	15,117	8,937	3,522	127,225
Rangely	7,769	8,815	14,667	635	1,774	--	8,504	--	--	--	--	3,548	2,611	392	5,486	54,201
Total	746,110	914,060	424,208	113,711	718,330	344,340	136,351	143,544	782,589	30,850	78,605	719,946	220,717	92,629	357,416	5,823,406

^aIncludes all educational and general space which is presently available and which can be continued in use indefinitely as well as that space which is funded and is being planned, is under construction, or is undergoing renovation.



TABLE 4 ●

TOTAL ASSIGNABLE SQUARE FEET OF EDUCATIONAL AND GENERAL SPACE ESTIMATED TO BE NEEDED BY 1978-79^a

Institution	Classroom and Service	Teaching Laboratories and Service	Physical Education Facilities and Service	Other Teaching Facilities and Service	Teaching Faculty Offices and Service	Other Instructional Space	Organized Activities	Research Faculty Offices and Service	Other Research Space	Extension Administrative Offices Space	Public Service Space	Library Space	Administrative and General Office and Service Space	Other Administrative and General Space	Physical Plant Service Space	Total
CU-Boulder	249,373	358,849	55,515	33,309	231,000	111,030						380,295	68,250		157,426	1,645,047
CU-Denver	28,625	26,229	25,490	3,824	41,832	12,745						45,545	16,744		15,404	216,438
CU-Colo. Sprgs.	20,135	18,450	17,930	2,690	18,648	8,965						22,350	9,435		8,895	127,498
CSU	239,985	345,339	53,425	32,055	209,832	106,850						332,943	66,490		140,424	1,527,343
CSM	33,533	95,910	29,860	4,479	35,784	14,930						46,141	12,958		21,071	294,666
Ft. Lewis	36,857	33,772	32,820	4,923	26,208	16,410						31,784	13,846		15,261	211,881
ASC	42,045	38,526	37,440	5,616	31,416	18,720						44,216	15,823		17,898	251,700
CSC	137,511	126,001	122,450	18,368	113,904	61,225	No Projection Made	No Projection Made	No Projection Made	No Projection Made	No Projection Made	169,283	37,278	No Projection Made	66,985	853,005
MSC	135,030	221,869	120,240	18,036	132,888	60,120						127,175	41,545		64,268	921,171
SCSC	100,261	162,311	89,280	13,392	91,392	44,640						90,201	32,190		47,001	670,668
WSC	40,428	37,044	36,000	5,400	28,728	18,000						37,794	14,800		16,567	234,761
CC of Denver	60,878	98,554	54,210	8,132	71,400	27,105						61,014	27,350		30,643	439,286
El Paso CC	28,884	46,759	25,720	3,858	29,232	12,860						26,412	14,287		14,101	202,113
Lamar	10,118	16,380	9,010	1,352	9,912	4,505						8,773	4,670		4,870	69,590
Otero	9,748	15,780	8,680	1,302	11,424	4,340	No Projection Made	No Projection Made	No Projection Made	No Projection Made	No Projection Made	9,105	5,045	No Projection Made	5,532	70,956
Trinidad	18,114	29,324	16,130	2,420	12,936	8,065						14,126	8,490		8,488	118,093
Aims	22,370	36,215	19,920	2,988	22,512	9,960						20,758	2,073		10,260	147,056
Arapahoe	30,635	49,595	27,280	4,092	35,784	13,640						31,916	16,786		15,730	225,458
Colo. Mtn.	12,510	20,253	11,140	1,671	15,456	5,570						12,038	6,965		6,420	92,023
Mesa	38,744	62,721	34,500	5,175	30,912	17,250						28,268	15,070		17,561	250,201
Northeastern	24,841	40,214	22,120	3,318	20,328	11,060						19,100	11,293		12,091	164,365
Rangely	13,296	21,525	11,840	1,776	13,608	5,920						10,616	6,085		7,017	91,683
Total	1,333,921	1,901,620	861,000	178,176	1,235,136	593,910	--	--	--	--	--	1,569,853	447,473	--	703,913	8,825,002

^aRepresents a projection of total space requirements to 1978-79 (except for those indicated areas where projections have not been made), without consideration of space which is already available. For those areas where no precise projections have been made, a technique has been used to account for such needs on our overall state-wide basis.

TABLE 5 ●

ADDITIONAL ASSIGNABLE SQUARE FEET OF EDUCATIONAL AND GENERAL SPACE ESTIMATED TO BE NEEDED BY 1978-79^a

Institution	Classroom and Service	Teaching Laboratories and Service	Physical Education Facilities and Service	Other Teaching Facilities and Service	Teaching Faculty Offices and Service	Other Instructional Space	Organized Activities	Research Faculty Offices and Service	Other Research Space	Extension Administrative Office Space	Public Service Space	Library Space	Administrative and General Office and Service Space	Other Administrative and General Space	Physical Plant Service Space	Total
CU-Boulder	74,216	127,846	--	1,314	4,393	51,842						160,215	12,949		49,463	482,238
CU-Denver	--	8,362	25,490	422	23,104	11,303						13,051	10,532		7,522	99,786
CU-Colo. Sprgs.	19,149	18,450	17,930	2,690	9,264	8,051						22,350	9,064		8,853	115,801
CSU	111,564	156,873	--	18,293	--	41,664						241,693	13,717		68,164	651,968
CSM	--	20,559	--	--	--	--						17,509	191		--	38,259
Fr. Lewis	15,474	11,038	19,582	967	14,122	9,629						1,891	8,765		11	81,479
ASC	16,242	3,058	--	3,032	13,948	9,355						30,037	14,684		--	90,356
CSC	49,419	78,399	74,841	7,940	56,046	28,023						1,394	18,650		33,031	347,743
MSC	135,030	221,869	120,240	18,036	132,888	60,120	No Projection Made	No Projection Made	No Projection Made	No Projection Made	No Projection Made	127,175	41,545		64,268	921,171
SCSC	50,887	47,987	70,353	10,092	56,140	15,148						56,937	19,720		37,077	364,341
WSC	1,875	--	--	949	8,322	--						--	2,139		--	13,285
CC of Denver	60,878	98,554	54,210	8,132	71,400	27,105						61,014	27,350		30,643	439,286
El Paso CC	28,884	46,759	25,720	3,858	29,232	12,860						26,412	14,287		14,101	202,113
Lamar	--	--	9,010	--	7,161	4,199	No Projection Made	No Projection Made	No Projection Made	No Projection Made	No Projection Made	5,276	1,693		3,026	30,365
Otero	--	--	8,680	305	8,314	3,804	No Projection Made	No Projection Made	No Projection Made	No Projection Made	No Projection Made	2,749	1,206		5,532	30,590
Trinidad	4,380	--	16,130	--	10,748	--						2,976	4,938		2,688	41,860
Aims	22,370	36,215	19,920	2,988	22,512	9,960						20,758	2,073		10,260	147,056
Arapahoe	30,635	49,595	27,280	4,092	35,784	13,640						31,916	16,786		15,730	225,458
Colo. Mtn.	5,198	7,717	9,370	1,671	11,740	5,570						2,846	5,839		6,420	56,371
Mesa	11,457	40,575	24,296	485	15,180	--						7,382	3,258		8,985	111,618
Northeastern	--	22,691	8,096	1,469	11,579	--						19,100	--		8,569	71,504
Rangely	5,527	12,710	--	1,141	11,834	5,920						7,068	3,474		1,531	49,205
Total	643,185	1,009,257	531,148	87,876	553,711	318,193	--	--	--	--	--	859,749	232,860	--	375,874	4,611,853

^aSpace reflected in this table represents the difference between total requirements to 1978-79 and space which is presently available or funded.

PROCEDURES FOLLOWED IN PROJECTING SPACE REQUIREMENTS

The general approach of the Commission in projecting space needs has been to (a) establish space standards for various types of space, (b) project space needs ten years hence (to 1978-79) based on the established standards and projected enrollments, (c) determine the space currently available which can be continued in use, and (d) determine additional needs by subtracting presently available space from total need.

The enrollment projections to 1978-79 which have been accepted by the Commission are as follows:

Institution	Fall Day FTE	Fall Day and Evening FTE
CU-Boulder	22,206	23,375
CU-Denver Center	2,549	4,248
CU-Colorado Springs	1,793	1,887
CSU	21,370	22,495
CSM	2,986	2,986
Fort Lewis	3,282	3,282
ASC	3,744	3,941
CSC	12,245	12,889
MSC	12,024	15,030
SCSC	8,928	10,345
WSC	3,600	3,600
CC of Denver	5,421	8,340
El Paso CC	2,572	3,429
Lamar	901	934
Otero	868	1,009
Trinidad	1,613	1,698
Alms	1,992	2,691
Arapahoe	2,728	4,262
Colo. Mtn.--Glenwood)	1,114	1,393
Colo. Mtn.--Leadville)		
Mesa	3,450	3,690
Northeastern	2,212	2,431
Rangely	1,184	1,217

The standards which have been used are as follows:

1. Classrooms and Classroom Service Space.--Included in this category of space are general classrooms, seminar rooms, and teaching auditoriums equipped with chairs which render the rooms capable of accommodating lecture or discussion type classes, seminars, or meetings. Also included is accompanying service space such as storage rooms, projection booths, and the like. The standard which has been used is based on an acceptable level of utilization of rooms and of the seating capacity (student stations) of rooms, and on an appropriate amount of space per student station.

THE STANDARD: 0.802 assignable square feet (ASF) per student-station-period occupied (SSPO)

A student-station-period occupied is one student seated in a classroom chair for one hour. The standard assumes that classrooms will be utilized an average of 30 hours per week and will be filled to 67 per cent of capacity during the hours they are used. Also, the standard assumes an average of 15 assignable square feet per student station. Since classroom service space is generally directly related to classroom space, the standard assumes an average of 1.125 ASF of classroom service space per student station (7.5 per cent). Thus, the standard includes 0.746 ASF per SSPO for classroom space and 0.056 ASF per SSPO for classroom service space.

To illustrate, assume that an institution has available only one classroom with 1,500 square feet and 100 student stations. If the institution uses the room 30 hours per week and fills it to 67 per cent of capacity during those hours, there would be 2,010 student-station-periods of occupancy. The 1,500 square feet divided by the 2,010 would produce 0.746 square feet per SSPO.

The number of student-station-periods of occupancy was projected on the basis of the number of FTE day students (through 5:00 P. M.) expected at each institution for the fall term of 1973. It has been assumed that students at each institution will spend 14 hours each week in a classroom facility. It is known that institutions differ somewhat in the degree of utilization of classroom space by their students because of curricular differences among the institutions. At some institutions virtually all credit-hours are earned in classroom facilities while at other institutions considerable credit-hours are earned in laboratories, physical education facilities, or other types of facilities. Some institutions have a considerable number of students earning credit through independent study, thesis or dissertation, student teaching, field work, and the like, which does not involve classrooms, laboratories, and other instructional facilities at all. A study is being initiated by the Commission which will produce statistics on utilization of classrooms, teaching laboratories, and physical education facilities in order that a more precise projection of student-station occupancy might be made in future years.

For comparison purposes, the following statistics show how the standard which has been used relates to similar standards used in several other states for which information is available:

State	Hrs. per Week of Classroom Use	Per Cent Of Capacity During Hrs. Used	ASF per Student Station	ASF per SSPO
California	34	66	15	.67
Oklahoma	30	67	15	.75
Florida	30	60	15	.833
Illinois	30	60	15	.833
Virginia	30	60	15	.833
Colorado (recommended)	30	67	15	.746*

*The 0.746 ASF per SSPO for classroom space plus 0.056 ASF per SSPO for classroom service space results in the 0.802 ASF per SSPO referred to in the standard.

2. Teaching Laboratories and Service Space.--Included in this category of space are laboratories which are organized and equipped for special types of instruction and which are not readily adaptable to general use. Also included is accompanying service space such as storage rooms, make-up rooms, and the like.

THE STANDARDS: Schools with engineering--3.59 ASF per student-station-period occupied

Schools with substantial technical education--4.04 ASF per student-station-period occupied

Colorado School of Mines--5.84 ASF per student-station-period occupied

Other Institutions--2.94 ASF per student-station-period occupied

The above standards are based on the following assumptions: (a) Schools with engineering (CU-Boulder and CSU)—45 square feet per student station, service space 27.5 per cent of laboratory space, 20 hours per week room use, 80 per cent of station use when rooms in use, and 4.5 student-station-periods of occupancy per FTE student; (b) schools with substantial technical education (MSC, SCSC, and the community colleges)—55 square feet per student station, service space 17.5 per cent of laboratory space, 20 hours per week room use, 80 per cent of station use when rooms in use, and 4.5 student-station-periods of occupancy per FTE student; (c) Colorado School of Mines—55 square feet per student station, service space 27.5 per cent of laboratory space, 15 hours per week room use, 80 per cent of station use when rooms in use, and 5.5 student-station-periods of occupancy per FTE student; and (d) other institutions (CU-Denver, CU-Colorado Springs, Ft. Lewis, ASC, CSC, and WSC)—40 square feet per student station, service space 17.5 per cent of laboratory space, 20 hours per week room use, 80 per cent of station use when rooms in use, and 3.5 student-station-periods of occupancy per FTE student.

Since sufficient information is not now available to be able to make student enrollment projections by course, and thus project laboratory utilization by specific type of laboratory, it has been necessary to use an average for each institution based upon what is known about the institutions' programs and student composition. These estimates have been arrived at through a consideration of a number of factors, the primary one being that of how the institutions compare with institutions in other states for which data are available. It is the intent of the Commission staff to obtain sufficient data about space utilization to be able to project laboratory requirements by specific type of laboratory in future years.

Projections of laboratory space needs were made on the basis of day students for all institutions. Comparative standards used in several other states for purposes of planning teaching laboratory space are as follows:

State	Hrs. per Week of Laboratory Use	Per Cent Of Capacity During Hrs. Used	ASF per Student Station	ASF per SSPO
Florida	19	75	25-125	1.75-8.77
Illinois	20	80	68	4.25
Oklahoma	24	80	40	2.08
Virginia	20	80	40	2.50
Colorado (recommended)				
Schools with Engineering	20	80	45	2.81*
Schools with Technical Education	20	80	55	3.44*
CSM	15	80	55	4.58*
Other	20	80	40	2.50*

*Includes space for laboratory space only--service space is added to this figure.

3. Physical Education Facilities and Accompanying Service Space.--Included in this category are gym playing floors, swimming pools, handball courts, and other similar indoor physical education facilities. Also included is related service space such as equipment rooms, shower rooms, locker rooms, and the like.

THE STANDARD: 10 ASF per student-station-period occupied

For purposes of applying this standard it has been assumed that FTE students at the universities will occupy physical education facilities an average of 0.25 hours per week and that students at other institutions will occupy physical education facilities one hour per week. Here, too, additional data need to be available in order to project physical education facilities needs with more accuracy.

4. Other Teaching Facilities and Accompanying Service Space.--This category includes such facilities as music studios, music practice rooms, and rooms which are designed and equipped for use by students of special audio-visual or other programmed instructional equipment on an individual basis for self-instruction purposes. Also included would be related service space such as instructional equipment storage rooms, control rooms, etc.

THE STANDARD: 1.5 ASF per FTE student

5. Teaching Faculty Offices and Related Secretarial, Clerical, and Office Service Space.--Included here are offices for resident teaching faculty, academic deans, instructional department or division heads, secretarial and clerical personnel of instructional departments, and related office service space such as reception rooms, conference rooms, file rooms, and the like.

THE STANDARD: 168 ASF per FTE instructional faculty and academic administrative staff member

The standard includes a factor of 120 ASF per FTE instructional faculty and academic administrative staff member plus 48 ASF (40 per cent of office space) for related secretarial, clerical, and office service space. The number of instructional faculty was projected on the basis of an assumed student-faculty ratio as follows:

CU--Boulder	17:1	CC of Denver	19:6
CU--Denver Center	17:1	El Paso CC	19:7
CU--Colo. Springs	17:1	Lamar	15:7
CSU	18:1	Otero	14:8
CSM	14:1	Trinidad	21:9
Fort Lewis	21:1	Aims	20:0
ASC	21:1	Arapahoe	20:0
CSC	19:1	Colo. Mtn.--Glenwood)	15:0
MSC	19:1	Colo. Mtn.--Leadville)	15:0
SCSC	19:1	Mesa	20:0
WSC	21:1	Northeastern	20:0
		Rangely	15:0

Projections of space needs for faculty offices were made on the basis of total enrollments (day and evening) for all institutions.

6. Other Instructional Space.--Included in this category is instructional space other than that itemized in "1" through "5" above. Examples of such space would be museums and galleries related to the instructional program, auditoriums and theatres related to instruction, and the like.

THE STANDARD: 5 ASF per FTE student

7. Research Faculty Offices and Related Secretarial, Clerical, and Office Service Space.--No projections have been made of this type of space due to the lack of information about research faculty at the various institutions. Future studies of faculty and staff must be made which will enable the development of guidelines for projecting research personnel.

8. Other Research Space.--No projections have been made of this type of space due to the lack of information about graduate students and research faculty at the various institutions.

9. Extension Administrative Office Space.--No projections have been made of this type of space.

10. Public Service Space.--No projections have been made of this type of space.

11. Library Space.--Projections of library space needs have been made for (a) stacks, (b) readers, and (c) service.

THE STANDARDS: Stacks--0.0833 ASF per volume to be housed

Readers--6.25 ASF per FTE student (total) for universities; 5 ASF per FTE student (total) at other institutions

Service--25 per cent of stack and reader space

The number of volumes for four-year colleges and universities were calculated as follows:

(a) 50,750 volumes for a basic undergraduate library, (b) 100 volumes for each faculty member, (c) 12 volumes for each FTE student, (d) 335 volumes for each undergraduate major, (e) 3,050 volumes for each master's level program, and (f) 24,500 volumes for each doctoral program.

Projections of volumes for the community colleges were made as follows: (a) 16,875 volumes for a basic general education offering, (b) 51 volumes for each FTE faculty member, (c) 5 volumes for each FTE student, and (d) 165 volumes for each subject field of study.

The criteria for determining the number of library book needs are those recommended by Verner W. Clapp and Robert T. Jordan of the Council on Library Resources.^a

12. Administrative and General Office Space.--Included in this category is space for general executive and administrative offices, general administrative secretarial and clerical personnel, student services, admissions and registration, placement, public relations, institutional publications, business offices, and the like.

THE STANDARD: Assignable square feet per FTE student as follows:

	<u>Universities</u>	<u>Other</u>
First 2,000 students	6.0	5.0
Next 3,000 students	4.0	3.0
Next 5,000 students	3.0	2.5
Next 5,000 students	2.5	2.0
All over 15,000 students	2.0	1.5

The above criteria are those recommended by Richard P. Dober in his book Campus Planning.

13. Other Administrative and General Space.--No projection was made of this type of space.

14. Physical Plant Service Space.--This category includes maintenance shops, machine shops, motor pools, garages, heating plants, boiler rooms, police and fire protection facilities, and the like.

THE STANDARD: 7.5 per cent of all other educational and general space

^aVerner W. Clapp and Robert T. Jordan, "Quantitative Criteria for Adequacy of Academic Library Collection," College and Research Libraries, September, 1965.

SUMMARY OF PROJECTED SPACE AND COSTS

1. Additional Assignable Square Feet of Educational and General Space Which Will Be Required to 1978-79 (Exclusive of the Medical Center and certain space identified below for which institution-by-institution projections have been made)	4,611,853
2. Estimated Assignable Square Feet of Space Required for Organized Activities, Research, Extension and Public Service, and General Space for Which No Institution-By-Institution Projections Have Been Made (Estimated at 20 per cent of the total--its ratio in 1968)	<u>1,030,797</u>
Total Additional Assignable Square Feet of Educational and General Space Required (Exclusive of Medical Center)	5,642,650
Converted to Outside Gross (at a ratio of 70 per cent)	8,060,929
Estimated Cost (at \$27.40 per gross square foot)	\$220,869,455
Estimated Cost of Additional Movable Equipment (at 15 per cent of construction cost)	33,130,418
Estimated Cost of Additional Land	10,000,000
Estimated Cost of Site Work, Utilities, and Landscaping	10,000,000
Estimated Cost of Renovations and Alterations	10,000,000
Estimated Cost of Additional Medical Center Facilities (set forth in institutional master plan)	<u>48,875,000</u>
Total	\$332,874,873
Less Amount Estimated to be Available from Federal Government	<u>50,000,000</u>
	<u>\$282,874,873</u>

CRITERIA USED IN ARRIVING AT ESTIMATED SQUARE FOOT COSTS

1. Historical Building Cost Indexes, Denver, Colorado*

Year	Index (1941=100.0)	% Increase	
1960	211.8		
1961	270.9	27.90	
1962	274.9	1.47	
1963	282.5	2.76	
1964	287.3	1.69	
1965	294.0	2.33	
1966	297.5	1.19	
1967	305.1	2.55	
1968	310.4	1.73	

5.2 per cent average increase past eight years

*Dodge Building Cost Services

2. Cost of Academic Facilities Constructed at Colorado Colleges and Universities Past Five Years

Year	Gross Sq. Ft.	Cost	Cost per Gross Sq. Ft.
1964	713,017	\$12,991,000	\$18.22
1965	355,008	6,706,000	18.89
1966	1,169,642	21,972,000	18.79
1967	555,130	11,728,000	21.13
1968	348,828	7,167,000	20.55

Cost Used for Projection Purposes \$20.75

Projected at 5 per cent per year:

1969	\$21.79
1970	22.88
1971	24.02
1972	25.22
1973	26.48
1974	27.80
1975	29.19
1976	30.65
1977	32.18
1978	33.79

Average = \$27.40
(This figure used for costing new space on the assumption that additional space requirements will be provided at an equal amount each eight years.)



