DOCUMENT RESUME

ED 034 390 EF 003 858

TITLE	Facilities Planning Guide for the Community College System.
INSTITUTION	Massachusetts Advisory Council on Education, Boston.
PUB DATE	Oct 69
NOTE	80p.
EDRS PRICE	EDRS Price MF-$0.50 HC-$4.10
DESCRIPTORS	Building Design, *Campus Planning, *College Buildings, *Community Colleges, *Evaluation Criteria, Facility Expansion, *Facility Guidelines, Facility Requirements, School Planning, Space Utilization

ABSTRACT

These guidelines include definitions pertaining to educational criteria and planning criteria, and guidelines regarding--(1) administrative ratios, (2) space allocation in assignable square feet, (3) area conversion factors, (4) gross building area distribution, (5) curriculum balance development, (6) project performance schedule, and (7) project budget cost. Evaluation of special program requirements is considered with regard to instructional space development and program analysis. (FS)

FACILITIES PLANNING GUIDE

FACILITIES PLANNING GUIDE

FOR THE

COMMUNITY COLLEGE SYSTEM

Prepared for

THE COMMONWEALTH OF MASSACHUSETTS

by

THE MASSACHUSETTS ADVISORY COUNCIL ON EDUCATION

October 1969

PREFACE

The law creating the Advisory Council instructs it to "analyze, plan and evaluate the programs and systems used by all agencies for public education in the Commonwealth."

In the fall of 1968, the President of the Board of Regional Community Colleges informed the Staff of the Advisory Council that the Board did not have a scientifically prepared set of guidelines for the planning of individual campuses, buildings, and facilities. Although the new campuses have been developed along general guidelines, Dr. Dwyer urgently requested assistance to identify sound criteria which would provide flexibility within certain limitations. Obviously, sound economies could be effected and accommodation could be made for variations in space to reflect the specific curriculum needs of the region to be served.

In consequence, upon recommendation of the President and Board of Regional Community Colleges, the Advisory Council commissioned the firm of Daniel, Mann, Johnson, & Mendenhall to prepare a set of guidelines to assist the Board in planning extensions of its present ones. On behalf of the Advisory Council on Education and the Legislature which created it, I submit these Guidelines to the Board of Regional Community Colleges with the intent that they will assist in assuring greater efficiency and economy in community college planning and development for the Commonwealth of Massachusetts.

William C. Gaige
Director of Research
The Advisory Council on Education

TABLE OF CONTENTS

I. INTRODUCTION

The Board of Regional Community Colleges now has twelve operating colleges and according to the Master Plan, developed in 1965 by Donald E. Deyo, a total of seventeen such institutions is projected to provide this kind of education for over ninety-five percent of the students residing in the Commonwealth of Massachusetts.

Aside from one community college housed in an extensive plant which permits renovation and remodeling, the other eleven, or sixteen in the 1965 Master Plan, necessitate the complete planning of a new campus for each of these institutions. The magnitude of the total project requires extensive and careful planning to assure the most effective expenditure of the tax dollar. The Commonwealth is already confronted with construction demands by higher education to the point of straining state resources. To provide for increased enrollments requires careful attention to both new planning and the efficient use of existing structures.

The spectacular rise of community colleges across the nation since World War II has projected these two-year institutions into the public eye. However, in several states in the South, Midwest, and far West, years of experience are available prior to World War II to provide a history useful for purposes of evaluating current and future plans. The growth of the community colleges in the East can be dated to their introduction by New York in 1950. Just ten years later, Massachusetts initiated its state-supported community college system with one 156-student college in an old high school building. Since that time, eleven more community colleges have come into being, adapting facilities which range from condemned school buildings through factories, former supermarkets, to an office building. Only one existing college has room which may be renovated to accommodate expanding enrollments. At this writing eleven of the twelve colleges are unable to meet increased enrollments unless additional temporary facilities can be acquired.

National surveys reveal the creation of at least one new community college every week. The popularity of this institution should not have been unexpected in Massachusetts. The gap which has been left between high schools and the four-year colleges and universities was made wider through the demand for increased education and training by business, industry, the health field and service areas. The community college provides the unique opportunity for students to achieve, close to home, the first two years of a four-year program or to enter into curriculums which require an additional two years of education and training.

INTRODUCTION

The uniqueness of the total program is that the student who has overestimated his abilities and his motivation and finds the transfer program beyond his present reach may change to one of the occupational programs designed to prepare him for employment after two years. At the same time, the student whose performance in high school and whose socioeconomic background has not stimulated his desire for four years of education may find his capabilities exceed the demands of an occupational program, and this student has the opportunity for lateral movement into a transfer program. Given the necessary resources, a community college can achieve these goals and such students need not become frustrated automatic drop-outs or put-outs. In addition to these two commonly accepted purposes of the two-year college, these institutions across the nation have accepted their responsibility for service to the community. Such service provides a transitional stage for students who may be disadvantaged, whether for social or economic reasons. Service to the community also involves the adult in continuing education and other forms of cooperation with business, industry, health agencies, and various civic groups. As further indication of this, 45,000 students who are taking advantage of the Commonwealth's twelve community colleges, only a little over 16,000 are full-time day students.

The role of the community college is mentioned in this introduction for the simple reason that the function of the institution must determine the design of the facilities which are intended to implement these various educational purposes. The accepted statement of the philosophy of the community college recognizes its relation to the community it serves. Since Massachusetts has a fully state funded system of community colleges, master planning is possible which accepts the premise that an enrollment of 2,000 full-time students is necessary if the college is to provide diversity of opportunities and curriculums necessary to achieve its goals and, at the same time, to provide these opportunities on an economical basis. In this state, a "community" is not a specific city or county, but rather a region of the state whose population density will generate an enrollment of at least 2,000 students.

The nature of this task leads directly to the purpose of this Guide. First, the task of the Guide is to identify the various activities and functions to be conducted on campus and to establish a format by which the president and planning committees at a college will have a basis for establishing the educational specifications for new facilities. Criteria, as well as program procedure, are provided to estimate the kinds of space needed for all of these activities and functions. Formulas translate basic decisions into

INTRODUCTION

numbers and spaces and present a process from which phasing of the campus may be planned. The Guide allows for individual evaluation for special program requirements that may arise to answer the particular needs of the regional community or service areas.

The Guide allows for individual evaluation for special program requirements that may arise to answer the particular needs of a community. Community colleges continue to develop in creative and innovative ways. This is reflected in the development of philosophies and objectives pertaining to each individual college campus.

It is not the intent of this document to develop criteria or procedures required for the complete preparation of a Master Plan Program. These would include special site characteristics, existing utility provisions, traffic analysis, climatic data, physical education field requirements, and depending upon the availability and experience of staff and faculty, the Schematic Program. These technical aspects of Program development should occur concurrently with the purposes of this document.

From time to time the Guide should be reviewed and a determination made for the necessity of any modifications. Meanwhile, users of the Guide should always hold in mind the unique needs of a given region and modify statements found in this document in the light of any local differences. One further word to the user about the planning Guide: only a careful reading and use of the materials in this Guide will yield useful results.

IN SUMMARY:

The Guide will serve as a common instrument by which the office of the Board of Regional Community Colleges may evaluate the philosophical and physical specifications developed by the individual college. These specifics will be invaluable to the architect and to the Massachusetts Bureau of Building Construction in fulfilling their respective responsibilities.

Carefully considered data , rather than subjective judgment, should be the basis for requesting new facilities. With this Guide both the colleges and the Board will be constantly in a position to evaluate the efficiency for the use of existing buildings and this, in turn, will provide a firm rationale on which to judge when new construction should be requested and how much will be necessary to accommodate enrollments in the future.

II. PROCEDURES

As a guide for the total development of a project, a program must be prepared that reflects the unique character of the individual campus so that it can relate meaningfully to the community it serves.

The following provides, in outline, the information necessary for the preparation of a comprehensive planning program for community college development.

A. A Statement of the Educational Philosophy and Objectives:

This will include not only the instructional aims of a college program, but will offer any innovative planning goals to answer special needs of the community.

B. Campus Organization:

A statement of the Educational and Administrative Divisional Structure of the college. Refer to Exhibit A.

C. Curriculum Development:

A statement of the subject offering and the relative emphasis of each within the program framework. Included will be a statement of the recommended policy for class size. Refer to Exhibit B.

D. Administrative Organization:

An administrative chart that states the name and position of each of the key and support personnel in the administration of the college. Refer to Exhibit C.

(Items A thru D form what is frequently called the Educational Criteria or Educational Specifications.)

PROCEDURES (Cont.)

E. Enrollment Projections:

The anticipated enrollment growth of a community. This, translated into Full-Time Equivalent Student (FTE) allows lead-time in phased planning development. Refer to Form MCC-I.

F. Planning Development:

The following define the key phases for project development which are necessary in arriving at an ultimate planning solution. Upon completion of each phase there should be a review for conformance with the initial intent of the Educational Criteria.

Master Plan Program:

A written presentation of educational objectives, campus organization and architectural character, site description and ultimate planning requirements, approximate area allocations for the space requirements, (derived from the curriculum development), project performance schedule and project budget estimate. Also a part of this may be the Schematic Program. This is a written outline of each room programmed giving the purpose, desirable size and shape, any special functional requirement, and significant interelationship to other spaces. Details of furnishings, equipment and building utilities are not included at this phase of planning.

Long-Range Development Plan:

A graphic presentation showing the solution of the Master Plan Program. This is a drawing that depicts the intended ultimate development of the site showing approximate size, shape and relation of building groups, as well as athletic and parking facilities, landscaping pattern, and related traffic and utility planning. Importantly, this plan will also state the direction by which incremental development may be implemented.

PROCEDURES (Cont.)

Schematic Plan:

This is the solution of the Schematic Program translated into drawings. The scale is larger than that of the Long-Range Development Plan to permit the inclusion of rooms and spaces within the building outlines. With the more complete information from the Schematic Program the specific shape, size and relationship of each room can be shown with accuracy. A certain portion of this planning should be developed concurrently with the Long-Range Development Planning in order to be assured that the buildings thus depicted realistically portray the required space on the site.

Preliminary Plan:

This is the last presentation prior to the preparation of architectural working drawings. It is a larger scale drawing consisting of the floor plan and elevations showing location of furniture and equipment, utility systems, material designations, and the specific development of the architectural character and structure. Included at this phase are the Preliminary Specifications which outline type and extent of materials, fixtures, and equipment that will be incorporated in the building program. The completion of this phase includes an Area Summary and Preliminary Cost Estimate.

Working Drawings:

Detailed and technical drawings and specifications upon which bids are taken for construction. The completion of this phase includes a Final Area Summary and Cost Estimate.

It is the purpose of this Guide to provide assistance in the development of these procedures.

III. DEFINITIONS

A. EDUCATIONAL CRITERIA

Student Station (S.S.):

An instructional space furnished with a chair, a desk, or a laboratory work surface which will accommodate one student.

Teaching Station (T.S.):

An instructional space, lecture, laboratory or activity necessary to accommodate one class.

Instructional Space:

There are three basic types of space necessary to accommodate the instructional needs of a community college program.

1. Individual Study: (Carrel)

   Unequipped (dry): A single space furnished for study by one student.

   Equipped (wet): A single space equipped for audio-visual learning experience.

2. Classroom -Lecture:

   Seminar Room: To accommodate 10-15 students. Along with instructional uses, this space may also be used for conferences.

   General Classroom: To accommodate 25-45 students. A room used by classes which do not require special-purpose equipment.

   Lecture Classroom: To accommodate 65 students and over. A room which may or may not be specially equipped, but which will require fixed seating and a sloping or stepped floor.

DEFINITIONS (Cont.)

3. Laboratory - Shop:

A specialized instructional space designed and specifically equipped for student participation, experimentation, research and observation. Included are spaces for science, art, music, drama, technical and occupational programs.

Support Service Space:

An area directly serving an instructional space as an extension of its activities. Included are spaces such as workrooms, preparation rooms, special storages, balance rooms, darkrooms, equipment and tool issue rooms, museums, greenhouses, herbariums, student project spaces, practice and listening rooms, kiln rooms, recording and production rooms.

Enrollment:

1. Full-Time-Equivalent Student (FTE):

Any student who carries 12 or more credit hours, or combination of part-time students whose total programs equal 12 or more credit hours.

2. Part-Time Student:

Any student taking less than 12 credit hours.

3. Weekly Student Contact Hour (WSCH):

The total student-hours spent in instructional space, within campus buildings, for one full week between the hours of 8:00 a.m. and 5:00 p.m. Omitted are the student-hours generated in physical education classes such as gymnasium and field activities; included are such physical education curricula as health and theory of individual sports.

DEFINITIONS (Cont.)

4. Credit Enrollment:

The total number of credit students requiring instructional space during a given college day. This does not include extended day, adult, or audit students.

Classroom-Lecture requires 1 hour per credit - 12 hours for 12 credits. Laboratory-Shop requires 2-3 hours per credit - 24-36 hours for 12 credits.

Curriculum Balance:

The percentage enrollment emphasis desired in the various subject or instructional program offerings.

1. Subject Discipline:

English, mathematics, chemistry, music, typing, etc.

2. Instructional Programs:

University Parallel (Transfer Program)
General Education
Developmental Education
Occupational (Career Program)
Community Service

3. Instructional Spaces:

Classroom-Lecture; Laboratory-Shop.

Class Size:

The recommended policy for each institution for student loading of the various instructional spaces. (This directly relates to the desired faculty-student ratio and room utilization standards.)

DEFINITIONS (Cont.)

Instructional Space Utilization Standards:

(Based on a 45-hour week and representing accepted national norm.)

1. Classroom-Lecture (includes individual study spaces):

   Hours per week space is to be used - 34

   % of student station occupancy - 66

   Factor for student-station use: 34 x .66 = 22.4

2. Laboratory-Shop:

   Hours per week space is to be used - 25

   % of student station occupancy - 85

   Factor for student-station use: 25 x .85 = 21.3

Administration:

1. Staff:

   Key and support administrative personnel such as president, deans, business manager, directors, registrar, librarian, bookstore and kitchen managers.

2. Faculty:

   Division chairmen and faculty.

3. Stenographic Services:

   Any personnel necessary for the support of staff and faculty.

B. PLANNING CRITERIA

Space Category:

Each type of building space necessary for the operational needs of the community college. For convenience in preparing Federal forms, the Code Classification used conforms to the "Higher Education Facilities Manual" (United States Department of Health, Education, and Welfare - HEW).

Assignable Square Feet (ASF):

The net area of a building assigned to students, faculty, or staff for instruction, operation, or administration purposes. This area is computed by inside measurement from finished surface to finished surface. Included are space subdivisions for classrooms, laboratories, offices, seminar and conference rooms, libraries, and specifically related support service spaces. Also included are special purpose spaces such as auditoriums, student activity areas, and physical education areas.

General Service and Circulation:

All building space not included in the above.

1. General Service:

   Structures: This includes walls, furred space, partitions, columns, unusable areas for attics or basements. This is the residual area remaining after deduction of the ASF, circulation, custodial, toilet and mechanical areas.

   Custodial: This includes areas used for building protection, maintenance, and operation. Included are areas such as janitor closets and locker rooms, maintenance and storage rooms.

DEFINITIONS (Cont.)

Mechanical: This includes all areas necessary for mechanical equipment, and utility services. Included are such areas as air-duct shafts, boiler rooms, mechanical and electrical equipment rooms, fuel rooms, mechanical service shafts and tunnels, meter and communications rooms, telephone booths, temperature control, mechanical and fan rooms.

2. Circulation:

Interior: This includes corridors, lobby and foyer spaces, display areas, stairwells and stairways, elevator shafts, including dumbwaiters, pedestrian tunnels and bridges. This space is measured as full area.

Exterior: This includes roof overhang over unenclosed paved space, open connecting corridor area, receiving and loading platforms. This space is measured as one-half full area.

Outside Gross Square Feet (OGSF):

The sum of the Assignable Square Feet and the General Service and Circulation areas.

Project Performance:

A relationship between the construction development costs and the instructional capacity of the facilities necessary for a given educational program.

1. Project Cost:

Includes the total construction cost including site development, utilities and new buildings, and related costs, but excluding conversion, rehabilitation and demolition work.

2. Capacity:

The total number of student stations that can be available at any one time.

DEFINITIONS (Cont.)

Project Budget Cost:

The total cost, estimated and actual, for the complete planning and construction of a project. This will include:

1. On-Site Development:

Service-Site Improvement: Development within the property boundaries which is required to prepare an area of land serviceable for the construction of facilities such as clearing, rough grading, fill and compaction. Also included are surface and subsurface drainage structures required for erosion protection or for control of normal run-off from or onto surrounding properties.

General Development: Finish development on the property such as fine grading, parking and physical education areas, pavements, walks, courts, steps, fencing, turfing, sprinkling, landscaping, including landscape lighting.

Utilities: Distribution systems for sewer, gas, water, power and telephone, necessary to bring service from the property boundaries to the buildings and site functions. Utilities within the building are included in the building cost.

2. Building:

This includes demolition, conversion, rehabilitation, new structures and fixed equipment. The cost is determined by isolating the building from all other cost categories as measured at the actual perimeter of building construction.

3. Contingencies:

Planning: An allowance for adjustments in scope during the planning development.

Construction: An allowance for unforeseen construction development such as site conditions, subsurface conditions, requested changes in building scope, extended construction time due to extreme weather or unavailability of materials.

DEFINITIONS (Cont.)

Market Escalation: An allowance for variance of labor and materials costs over the planning development period of the project.

4. Related Costs:

Fees: This includes educational consultants, architectural and engineering planning preparation, topographic and boundary surveys, construction tests, soils tests, salary for the resident construction engineers and legal costs.

Furniture and Equipment: This includes movable manufactured items such as desks, chairs, tables, laboratory equipment, file cabinets, etc., which are not fixed to the structure of the building. (These items are not a part of the construction contract and although purchased by separate contracts are still a part of the total operable project cost.)

IV. GUIDELINES

A. ADMINISTRATIVE RATIOS

The following gives a range of staff loading ratios for the various campus administrative functions. These are for check purposes only, as variances may occur in personnel allocation, curriculum balance, teaching station occupancy and utilization policies.

1.	Credit Enrollment to Faculty	15-20:1
2.	Credit Enrollment to Faculty and Staff	12-16:1
3.	Stenographic Services to Faculty and Staff	6.5-8:1

B. SPACE ALLOCATION IN ASSIGNABLE SQUARE FEET

The following pages give the Assignable Square Feet which are necessary for the proper function of the administrative, educational, and activity services which generally occur within a comprehensive program. The range in space allocations provides flexibility in planning which will allow for special equipment requirements, spatial arrangements, or building structure design to accommodate a modular framing system. Code Classifications are in accordance with "Higher Education Facilities Manual" - HEW.

GUIDELINES (Cont.)

CODE CLASSIFICATION	SPACE CATEGORY	ASF/STATION
1110	CLASSROOM	
	10-15	20*
	20	18
	30	16
	40	16
	60	15
	75	15
	90	15
	120	12
	240	12
	480 (& Over)	10

NOTE: Above do not include staging, storage or preparation facilities.

*Includes Seminar & Conference Rooms

GUIDELINES (Cont.)

CODE CLASSIFICATION	SPACE CATEGORY	ASF/STATION
	LABORATORY	
1210	Life Sciences	50-55
1310	Mathematical Sciences	25-30
1320	Computer Sciences	30-35
1330	Physical Sciences	50-60
	Storage & Preparation	17-20
1410	Psychology	35-40
	Storage & Preparation	12-15
1420	Social Sciences (Refer to 1110)	
1510	Fine Arts	
	Art	45-50
	Sculpture & Ceramics	55-65
	Student Lockers	2-2.5
	Storage & Preparation (Includes kiln rooms)	10-16

GUIDELINES (Cont.)

CODE CLASSIFICATION	SPACE CATEGORY	ASF/STATION
	Music	
	Instrumental Room	30-35
	Choral Room	25-30
	Ensemble Room	25-35
	Practice Room	90-100
	Storage & Preparation (Includes robe, uniform, piano & repair areas)	5-7
	Drama (Performing Arts Theatre)	35-40
1520	Humanities (Refer to 1110)	
1640	Home Economics	60-65
1705	Agricultural Technologies	150-175
1710	Apparel Design & Fabrication Technologies (Refer to 1640)	
1715	Business Technologies	
	Business Administration & Secretarial Sciences	30-35
	Journalism (total department)	60-65
	Data Processing	30-35
	Merchandising	35-40
	Cosmetology	130-140

GUIDELINES (Cont.)

CODE CLASSIFICATION	SPACE CATEGORY	ASF/STATION
1720	Construction Technologies	
	Air Conditioning & Refrigeration	150-160
	Building Trades	250-300
	Metal Trades	130-145
	Wood Products	250-300
	Welding	150-175
1725	Engineering Technologies	
	Chemical	70-80
	Drafting	40-45
	Electrical	65-70
	Electronic	50-60
	Engineering	75-80
	Industrial	75-85
	Mechanical - Metallurgical	200-225
1730	Graphic Arts Technologies	145-155

GUIDELINES (Cont.)

CODE CLASSIFICATION	SPACE CATEGORY	ASF/STATION
1735	Health Technologies	
	Nursing	100-115
	X-Ray Technician	60-65
	Dental Hygiene	60-65
	Medical Lab Technician	60-65
	Child Care & Training	200-250
1750	Public Service Technologies (Community Services)	
	This may include Law Enforcement, Fire Protection, Conservation, Library Services, Public Administration, Recreation Services.	
	Due to the wide variance in programs, the allocated ASF will be derived upon establishment of actual curricula needs.	
1760	Transportation Technologies	
	Auto Mechanics	225-275*
	Aeronautics	300-350
	Machine	180-200

NOTE: The above ASF allocations, Classifications 1640 - 1760, include related storages, workrooms and preparation areas, and clean-up.

*Variance will occur depending on number of car stalls.

CODE CLASSIFICATION	SPACE CATEGORY	ASF/STATION
	AUXILIARY SERVICES	
7000	Student Activities Center	
	Seating: 25%-35% of enrollment Dining - per occupant	12-15
	Kitchen, Preparation & Service Clean-Up & Storage	
	Ultimate Development per dining occupant	4.5-7*
	First Phase Development per dining occupant	7.5-10**

*Range relates to type of service arrangement; menu served, teaching station accommodation.

**Assumes total space developed at first phase to accommodate ultimate requirements. Range relates to type of service arrangement; menu accommodation.

	Coffee Shop Dining - per occupant	12-16
	Kitchen, Preparation & Service Clean-Up & Storage	
	Per dining occupant	6-10*
	Lounge Space	18-20

*Range relates to menu.

GUIDELINES (Cont.)

CODE CLASSIFICATION	SPACE CATEGORY	ASF/STATION
1810	Gymnasium Services	
	Main Gymnasium (3 Stations at 40)	100-110
	Combatives (1 Station at 30)	40-50
	Body Development (1 Station at 40)	40-50
	Women's Gymnasium (2 Stations at 40-60 - Includes Dance)	60*
	Gymnasium Seating	4-4.5
	Showers	3-3.5**
	Lockers & Dressing	12-14

*Will increase if used for practice court.

**Will increase if individual shower units are planned.

GUIDELINES (Cont.)

CODE CLASSIFICATION	SPACE CATEGORY	ASF/STATION
5000	Learning Resources Center (Includes library services, audio-visual services, study-skills center)	
	Stack Space: 20,000 vols. - basic collection	
	Per volume	.10
	Seating: 25% of enrollment	
	General	20-25*
	Carrel	10-12
	Library Support Areas: Workroom, processing & storages - 10% of the stack & seating area.	

*Includes general, reference, & periodical areas.

Audio-Visual Services (Includes support areas)	50-55
Study Skills Center (Includes support areas)	75-80
Common Services	
Microfilm Reading	10-12
Typing and Copy Room	14-16

GUIDELINES (Cont.)

CODE CLASSIFICATION	SPACE CATEGORY	ASF/STATION
6000	General Administration & Institutional Services	
	Office of the President	350-400
	Office of the Administrative Assistant	200
	Office of Dean, Director, or Manager	150
	Office of Assistants	125
	Office - Counseling	100
	Reception & Secretary:	
	Secretary	80
	Waiting - Each	20
	Secretarial Pool - Each	75
	Faculty:	
	Division Chairman	150
	Office	90
	Health Services (Includes Office of the Nurse)	525-550

NOTE: Support functions such as vault, machine & data processing, mail room, duplicating services, testing & records storages, student areas, require individual determination for the needs of each campus operation.

GUIDELINES (Cont.)

CODE CLASSIFICATION	SPACE CATEGORY	SF/STUDENT ENROLLMENT
7000	Campus Service Center (Includes maintenance operations, warehousing, and vehicle storage)	5-7

GUIDELINES (Cont.)

C. AREA CONVERSION FACTORS

The following gives the factors required to convert Assignable Square Feet (ASF) to Outside Gross Square Feet (OGSF). This allocates 65 percent of the total building area to Assignable Square Feet.

CODE CLASSIFICATION (HEW)	ASF	OGSF
1110, 1310, 1420, 1520	1 :	1.59
1210, 1320, 1330, 1410	1 :	1.58
1510	1 :	1.55
1640, 1710, 1730, 1735, 1750	1 :	1.55
1725	1 :	1.54
1705, 1720, 1760	1 :	1.47
1715, 6000	1 :	1.56
5000	1 :	1.51
7000	1 :	1.55
1810	1 :	1.48
AVERAGE	1 :	1.538

GUIDELINES (Cont.)

D. GROSS BUILDING AREA DISTRIBUTION

The following page gives a percentage range for the various functions that normally occur in a comprehensive program. Deviations may be found depending upon the curriculum emphasis desired for a particular campus development. This will be most significantly noted in the Occupational Programs developed to answer the special needs of a community.

Listed by general subject category, this will provide a check as to the balance of each type of activity as it relates to the Outside Gross Square Feet of area (OGSF). This should be done at completion of the Master Planning Program in order to determine that the intent of the program needs are being met by appropriate area allocation.

Outside Gross Square Feet (OGSF) per Credit Enrollment:

This will vary in accordance with class loading policy and the space utilization factors used and will also vary upon whether the campus is an initial or an on-going program.

Ratio:

First Phase Development: 135-145 OGSF per Credit Enrollment

Ultimate Development: 115-130 OGSF per Credit Enrollment

GUIDELINES (Cont.)

CATEGORY	PERCENT OF TOTAL CAMPUS
1. Administration Services	4.7 - 6.5
(This will allocate 4-7 OGSF per each credit student at ultimate campus development)	
2. Learning Resources Center	9.4 - 12.4*
(This will allocate 8-12 OGSF per each credit student at ultimate campus development)	
3. Student Activities Services	8.3 - 11.3
(This will allocate 10-13 OGSF per each credit student at ultimate campus development)	
4. Programs	
Business Education	3.1 - 4.8
Science & Mathematics	8.6 - 10.3
Language Arts	4.5 - 5.7
Social Sciences	2.1 - 3.4
Fine Arts	10.6 - 14.3
Occupational	17.5 - 27.4
Physical Education	13.8 - 21.3

*This percentage may be greater depending upon the extent of Audio-Visual & Developmental Programs planned within this facility.

GUIDELINES (Cont.)

E. CURRICULUM BALANCE DEVELOPMENT

The following page gives an example which provides a point of departure in establishing the curriculum emphasis, and thus the student station allocation, desired to meet the needs of a particular community in which a college is to be developed. It represents a comprehensive program with greater emphasis in the University Parallel Program.

It will be noted that the Instructional Programs are divided, for the convenience of analysis, between the University Parallel or Transfer Programs and the Occupational or Career Programs. Such programs as Developmental Education and Community Services are not made separate because they generally "scatter" across the full spectrum of the subject disciplines. Consideration for these programs is included in the following Curriculum Balance.

GUIDELINES (Cont.)

	% ENROLLED
1. UNIVERSITY PARALLEL PROGRAM	
Science-Mathematics	
Life	6.1
Physical (Includes Earth Sciences)	9.2
Mathematics	6.5
Language Arts	
English (Includes Reading Laboratory)	11.2
Foreign Language	4.0
Journalism	.5
Drama-Speech	2.4
Social Sciences	16.1
Creative Arts	
Arts and Crafts	3.6
Music	2.9
	62.5
2. OCCUPATIONAL PROGRAM	
Business Education (Includes Distributive Education & Data Processing)	12.2
Engineering-Technology	18.6
Occupational (Includes Health and Home Economics)	6.7
	37.5
3. PHYSICAL EDUCATION (Includes Health Education)	4.8
4. UNASSIGNED	2.2

This Program Balance generates the following percentages for the major areas of instructional space.

Classroom-Lecture Space:	67-70
Laboratory-Shop Space:	30-33

F. PROJECT PERFORMANCE SCHEDULE

The following presents a reasonable schedule for the development of a community college project. The "Long" recognizes a new program; the "Short" recognizes an on-going campus development, and considers client continuity in the development of program data. Refer to Exhibit D.

	Months	
	Long	Short
Master Plan Program	6	4
Long-Range Development Plan	6	2
Schematic Planning	4	2
Preliminary Planning	5	4
Working Drawings	12	10
Bidding Period	3	2
Construction	27	20
Occupancy	2	1
	65	45

The above Schedule allows for a reasonable period of time at key phases of the work for required Agency review and approval.

GUIDELINES (Cont.)

G. PROJECT BUDGET COST

The following gives a normative percentage for the costs necessary for the complete development of a community college.

This can be checked against the definitive Project Budget Cost, as developed by Form MCC-V, for each phase of a project. In addition, Form MCC-V provides space for analysis of square foot and cost relationships. It should be noted that the space allocated for the ratio of Project Cost to Capacity (as defined on Page 12) only provides a nominal check against other similar community college projects occurring in the same time period of development. It is impossible to predict a reliable range for development cost per student in today's escalating labor and materials market. Each project must rely on all the known cost factors occurring at the particular time of development.

GUIDELINES (Cont.)

1. Construction (Refer to Form MCC-V)

On-Site Development (% of Building Cost)	
Service-Site Improvement	5.0 - 7.5
General Development	16.0 - 21.0
Utilities	5.5 - 8.5

Building - Outside Gross Square Feet (% of Building Cost)	
Architectural-Structural	62.2 - 73.3
Mechanical	10.8 - 14.2
Plumbing	5.5 - 9.5
Electrical	10.4 - 14.1
% of Total Construction Cost	74.0 - 83.0

2. Contingency (% of Construction Cost)

Planning and Construction	12.0
Market Escalation	Varies
Location	Varies

3. Related Costs

Surveys, Plans, Tests and Inspection (% of Construction Cost)	10.0 - 15.5
Furniture and Equipment (% of Building Cost)	(AV.) 21.0
Administration, Business Education, Faculty Offices	17.0
Learning Resources Center	20.0
Student Activities Center	22.0
Classrooms and Lecture	14.0
Sciences	27.0
Fine Arts	22.0
Engineering-Technology	24.0
Occupational	25.0
Industrial	27.0
Physical Education	12.0

V. PROGRAM DEVELOPMENT AND ANALYSIS

A. INSTRUCTIONAL SPACE DEVELOPMENT

The following demonstrates the procedure for deriving the space requirements of an instructional program. Two examples are given to illustrate each of the two major categories of instructional space.

It is important to note that this assumes a new program that has no precedent of an on-going, established enrollment. When a college has begun operation, the conversion factor and curriculum percentages can be developed from the records of enrollment data and will more accurately reflect actual instructional patterns.

Step 1. Determine desired FTE Enrollment

(This is generally done by demographic projections for an area or community. This will also assist in establishing patterns for formulating curriculum emphasis.)

Example: FTE = 1500

Step 1. is prepared on Form MCC-I

Step 2. Establish Curriculum Emphasis by subject discipline

Example:		
	English (Classroom-Lecture)	11.19%
	Life Sciences (Laboratory-Shop)	6.13%

Step 3. Establish Class Size

Example:		
	English	30 Student Stations
	Life Science	24 Student Stations

PROGRAM DEVELOPMENT AND ANALYSIS (Cont.)

Step 4. Convert Total FTE to Weekly Student Contact Hours (WSCH)

Example: $\frac{\text{FTE}}{.0625} = \frac{1500}{.0625} = 24,000$ WSCH

Step 5. Convert Curriculum Emphasis into WSCH

Example:

English	11.19% x 24,000 = 2686 WSCH
Life Sciences	6.13% x 24,000 = 1471 WSCH

Step 6. Apply formula to determine required Teaching Stations (T.S.) by subject discipline (Refer to Page 10)

Formula:

$$\frac{\text{WSCH}}{\text{Space Utilization Factor x Class Size}} = \text{Teaching Stations}$$

Example:

English $\quad \frac{2686}{22.4 \times 30} = 3.9$ T.S.

Life Sciences $\quad \frac{1471}{21.3 \times 24} = 2.8$ T.S.

Adjust by Conference

English	4 T.S.
Life Sciences	3 T.S.

Steps 2. - 6. are prepared on Form MCC-II

PROGRAM DEVELOPMENT AND ANALYSIS (Cont.)

Step 7. Prepare Program of Instructional Space Requirements in Assignable Square Feet (ASF)

(Certain of the ancillary service spaces, such as related special project areas and material and equipment storages, will be developed on an individual basis in accordance with instructional needs.)

Formula:

No. of T.S. x Class Size x ASF = Total ASF per subject discipline

Example:

English	4 x 30 x 16 = 1920 ASF
Life Sciences	3 x 24 x 55 = 3960 ASF

Step 7 is prepared on Form MCC-III

Step 8. Prepare Summary of Space Requirements

This converts Assignable Square Feet (ASF) to Outside Gross Square Feet (OGSF).

Formula:

ASF x Conversion Factor = OGSF

Example:

English	1920 x 1.59 = 3053 OGSF
Life Sciences	3960 x 1.58 = 6257 OGSF

Step 8. is prepared on Form MCC-IV

PROGRAM DEVELOPMENT AND ANALYSIS (Cont.)

B. PROGRAM ANALYSIS

Upon completion of the Instructional Space Requirements a Program Analysis should be prepared for review in order to determine that the program falls within the critera-range indicated by the Guide. Any excessive variance or deviation will be evaluated for substantive needs to answer special instructional requirements.

Step 1. Prepare Project Budget Cost

This provides the total costs required for the development of a community college project.

From this can be developed the ratio of Project Budget Cost to Capacity. (Refer to Page 12.) This is a significant figure in determining a realistic educational program and the funding required to develop the planned facilities.

Step 1. is prepared on Form MCC-V

Step 2. Prepare Program Summary for the following:

Student Stations: Classroom-Lecture; Laboratory-Shop
Teaching Stations: Classroom-Lecture; Laboratory-Shop

Refer to Exhibit E

PROGRAM DEVELOPMENT AND ANALYSIS (Cont.)

Step 3. Determine Credit Enrollment

From this can be developed the ratio of total Outside Gross Square Feet (OGSF), as prepared on Form MCC-IV, to total Credit Enrollment. (Refer to Pages 9 and 27.)

Step 4. Review Instructional Space and Personnel ratios

Credit Enrollment to Faculty
Credit Enrollment to Faculty and Staff
Stenographic Services to Faculty and Staff
Program Balance

Steps 3. and 4. are prepared on Form MCC-VI

Step 5. Prepare Summary of Gross Building Area Distribution

This provides a review of the percentage-range of area allocated to each facility function as it relates to the total gross building area of the campus. This summary may be prepared from data developed by Form MCC-IV. (Refer to Page 28.)

SUMMARY

The foregoing data, when completed for review and approval, become the basis for the development of a Master Plan Program. The information should be established prior to beginning design of the Long-Range Development Plan by the architect. The Guide allows for individual evaluation for special program requirements that may arise to answer the particular needs of a community. It is also intended to provide a set of uniform standards, as well as a programmed procedure, for planning development - its intent is to allow flexibility to meet the diverse needs throughout the community college system. A procedure for periodic review of the Guide should be established in order to adjust for such factors as new methods and techniques in teaching and technological advances that may call for changes in space requirements. In essence the Guide sets the parameters by which a logical master planning development can take place.

The following pages provide, in sequential order, examples and forms necessary for the educational criteria and space development for a community college program. It should be noted that included in the procedures of this document is Form MCC-VII. This material is prepared upon completion of the working drawings. It is a graphic summary of the final space provisions for a given program and provides a check for the ratio-analysis between ASF and OGSF prior to approval of the construction documents.

VI. EXHIBITS AND FORMS

FORM MCC-I	FTE Projection
EXHIBIT A	Campus Organization
EXHIBIT B	Curriculum Emphasis and Class Size
EXHIBIT C	Administrative Organization
FORM MCC-II & Example	Instructional Space Development
FORM MCC-III & Example	Instructional Space Requirements
FORM MCC-IV & Example	Summary of Space Requirements
EXHIBIT D	Project Performance Schedule
FORM MCC-V	Project Budget Cost
EXHIBIT E	Instructional Program Summary
FORM MCC-VI	Program Analysis
FORM MCC-VII & Example	Graphic Summary of Final Planning Development

FORM MCC-I

Project:_____No._____

Location:_____

Date:_____

TEN YEAR ENROLLMENT PROJECTION

	Year	Full-Time Equivalent Enrollment (FTE)		Part-Time Equvalent Enrollment (FTE)		Total WSCH
		Transfer	Career	Transfer	Career	
Recorded Enrollment						
Projected Enrollment						

EXHIBIT A
(Example)

CAMPUS ORGANIZATION

Administration	Administration Services Business Services Student Services Instructional Student Personnel Counseling Placement Health
Learning Resources Center	Library Services Audio-Visual Services Curriculum Laboratory Study Skills Center
Student Activities Center	Student Services Store Government Food Services Publications
Division I	Science & Mathematics
Division II	Language Arts
Division III	Social Sciences
Division IV	Humanities
Division V	Occupational Business Administration & Secretarial Sciences Engineering Related Health Related Service Related
Division VI	Physical Education
Campus Service Center	

EXHIBIT B
(Example)

CURRICULUM EMPHASIS & CLASS SIZE

DIVISION I

Subject Discipline	Percent Curriculum Lecture	Laboratory	Class Size	Remarks
Science & Math.				For purposes of Master Planning an initial campus it is assumed that the ultimate development will be a straight-line projection of first phase curriculum balance. This allows space on the site for future building development even though future programs and curriculum emphasis may change.
Life Sciences				
Zoology	2.52	2.32	24	
Botany	.23	.53	24	
Anatomy	.20	.33	20	
Physical Sciences				
Chemistry	2.48	3.11	24	
Physics	1.38	1.05	24	
Geology	1.02	.20	30	
Mathematics	6.50	-	35	

ADMINISTRATIVE ORGANIZATION

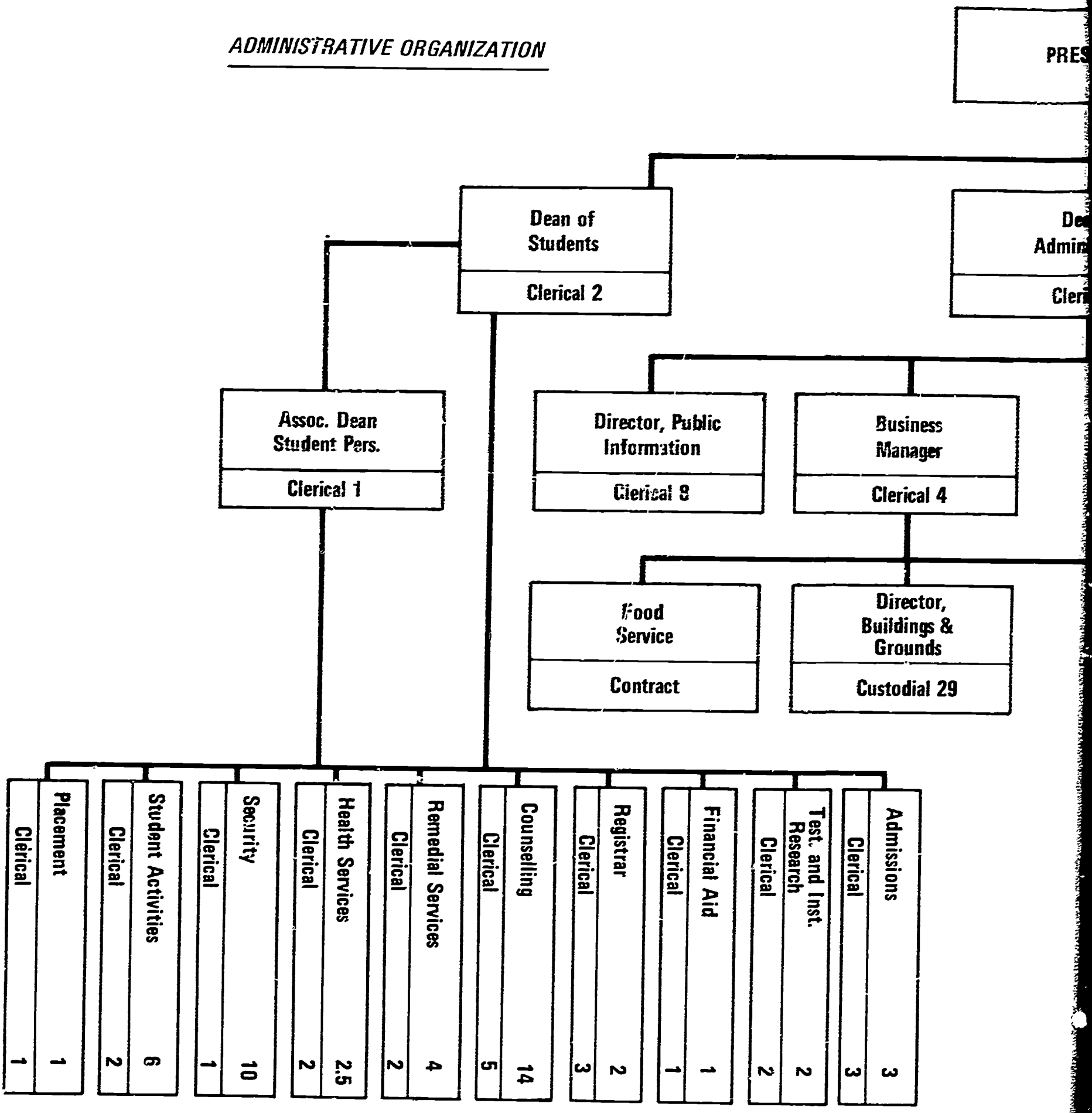
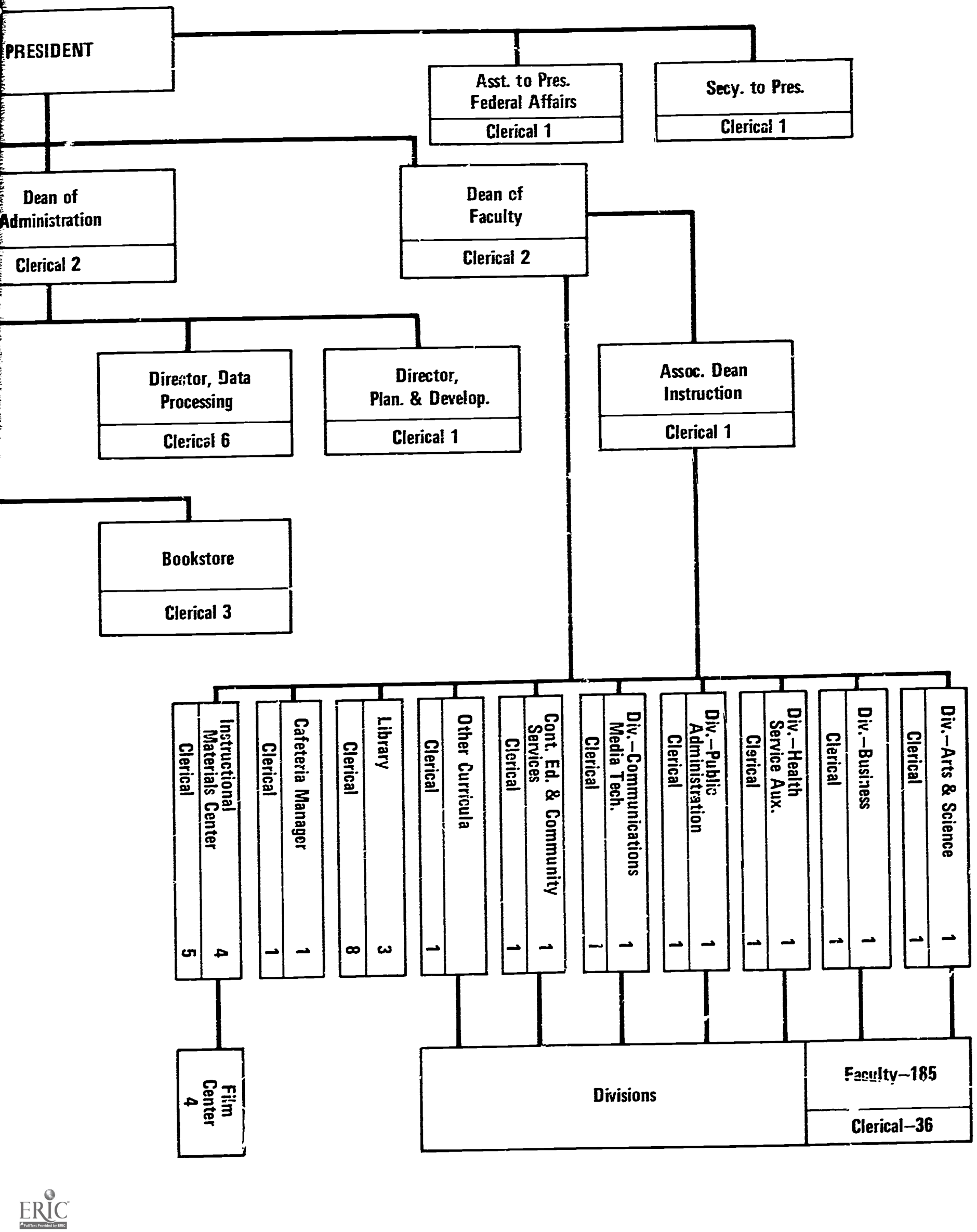


EXHIBIT C

(Example)



FORM MCC-II

Project:_____ No._____ Location:_____ Phase:_____ Date:_____

Projected Enrollment (FORM MCC-I) _____ FTE

1. Total WSCH:_____ 2. Space Utilization Factor: Classroom-Lecture:_____ Laboratory-Shop:_____

INSTRUCTIONAL SPACE DEVELOPMENT

A	B	C	D	E	F	G	H	I
Subject	Curriculum Emphasis (Re: Ex. B)	WSCH per Subj. Item 1 x Col. B	Class Size (Re: Ex. B)	Computed T.S. Reqm'ts. Col. C ÷ Item 2 x Col. D	Adjust By Confer-ence	Ade-quate T.S. Avail.	T.S. Req'd. This Prog.	Remarks

Project:_____ No._____ Location:_____ Phase:_____ Date:_____

FORM MCC-II
(Example)

Projected Enrollment (FORM MCC-I) 1500 FTE

1. Total WSCH: 24,000 2. Space Utilization Factor: Classroom-Lecture: 22.4 Laboratory-Shop: 21.3

INSTRUCTIONAL SPACE DEVELOPMENT

A	B	C	D	E	F	G	H	I
Subject	Curriculum Emphasis (Re: Ex. B)	WSCH per Subj. Item 1 x Col. B	Class Size (Re: Ex. B)	Computed T.S. Reqm'ts. Col. C ÷ Item 2 x Col. D	Adjust By Conference	Adequate T.S. Avail.	T.S. Req'd This Prog.	Remarks
English	11.19	2686	30	3.9	4	-	4	
Life Science	6.13	1471	24	2.8	3	-	3	

FORM MCC-III

Project:_____ No._____ Location:_____

Phase:_____ FTE:_____ /Ultimate:_____ Date:_____

INSTRUCTIONAL SPACE REQUIREMENTS DIVISION I

Group Function

Space No.	Space	No. of Spaces	Capacity Ea. Space	ASF Distribution First Phase Program	ASF Distribution Ultimate Program

FORM MCC-III
(Example)

Project: _____ No. _____ Location: _____

Phase: 1 FTE: 2,600 / Ultimate: 5,000

INSTRUCTIONAL SPACE REQUIREMENTS — DIVISION I

Group: G — Function: Science-Mathematics

Space No.	Space	No. of Spaces	Capacity Ea. Space	ASF Distribution: First Phase Program	ASF Distribution: Ultimate Program
	1. Division Services				
G1.1	Office of Division Chairman	1	3	150	
G1.2	Faculty Offices - Mathematics	11/11*	2	1100	1100
G1.3	Faculty Offices - Physical Sciences	11/11	2	1100	1100
G1.4	Faculty Offices - Biological Sciences	18/18	2	1800	1800
G1.5	Reception & Secretary	1	4	200	
G1.6	Conference Room	1	15	300	
G1.7	Workroom & Storage	1	-	150	150
	2. Mathematics				
G2.1	General Classroom	6/6	30	3240	3240
G2.2	Storage & Preparation	1/1	-	150	150
G2.3	Computer Laboratory	1	30	900	
	3. Physical Sciences				
G3.1	Chemistry Laboratory	3/3	24	3600	3600
G3.2	Balance Room	3/3	6	360	360
G3.3	Instrument Room	1	6	450	
G3.4	Radio Active Vault	1	-	60	
G3.5	Preparation & Storage	1	-	1080	1080
G3.6	Physics Laboratory	2/2	24	2400	2400

* Required for 1st Phase/Additional for Ultimate Development

Group G — Function: Science-Mathematics

Space No.	Space	No. of Spaces	Capacity Ea. Space	ASF Distribution: First Phase Program	ASF Distribution: Ultimate Program
G3.7	Optics-Instr. Laboratory	1	-	450	
G3.8	Radio-Isotope Laboratory	1	-	450	
G3.9	Preparation & Storage	1	-	1020	1020
G3.10	Physical Sciences Laboratory	2/2	24	2400	2400
G3.11	Museum	1	-		600
G3.12	Preparation & Storage	1	-	840	840
G3.13	Student Project Area	1/2	15	350	700
G3.14	Lecture Classroom	2/2	80	3200	33200
	4. Biological Sciences				
G4.1	Laboratory	6/6	24	7200	7200
G4.2	Museum	1	-		600
G4.3	Herbarium	1	-	350	
G4.4	Animal Room	1	-	600	
G4.5	Preparation & Storage	1	-	2520	2520
G4.6	Student Project Area	1/2	15	350	700
G4.7	Lecture Classroom	2/3	80	3200	4800
	5. Related Services				
G5.1	Planetarium	1	80		2000
G5.2	Project & Repair Shop	1	-	200	
G5.3	Receiving Area	1	-	GSC	
		Total ASF		40,170	11,560

FORM MCC-IV

Project:_____ No._____ Location:_____

Phase:_____ FTE:_____ Ultimate:_____ Date:_____

SUMMARY SPACE REQUIREMENTS

Group / Division	Function	ASF Distribution 1st Phase	ASF Distribution Ultimate	Factor	OGSF Distribution 1st Phase	OGSF Distribution Ultimate	Total

FORM MCC-IV
(Example)

Project:_____ No._____ Location:_____

Phase: 1 FTE: 2600 Ultimate: 5000 Date:_____

SUMMARY SPACE REQUIREMENTS

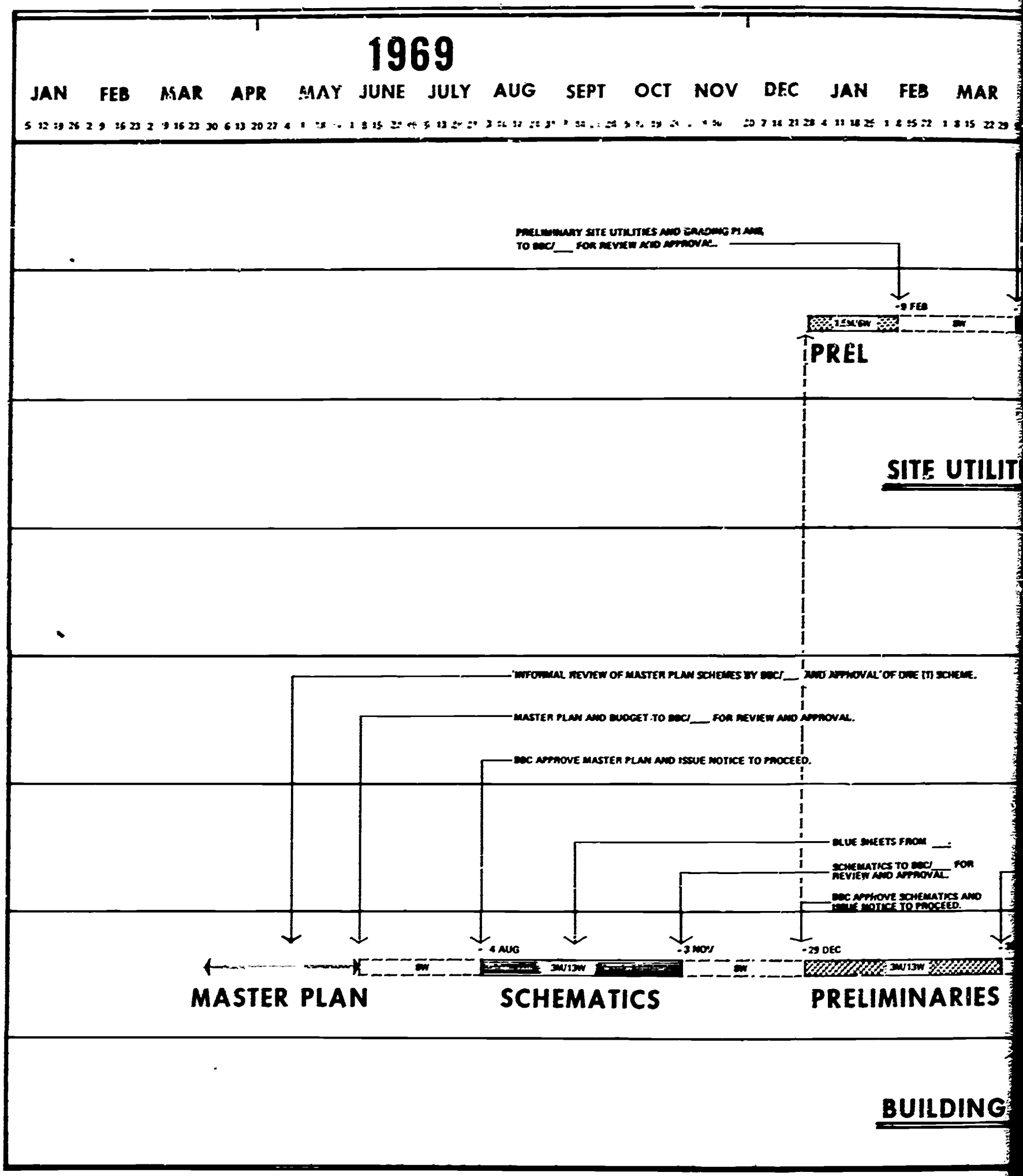
Group / Division	Function	ASF Distribution 1st Phase	ASF Distribution Ultimate	Factor	OGSF Distribution 1st Phase	OGSF Distribution Ultimate	Total
A	Administration	17,725	-	1.56	25,700		25,700
B	Instructional Resources Center	30,490	23,435	1.51	42,690	32,800	75,490
C	Student Center	33,910	18,535	1.55	48,830	26,690	75,520
D/I	Humanities & Fine Arts						
	1. Division Services	4,500	3,850	1.56	6,530	5,580	12,110
	2. English	5,820	5,820	1.59	8,620	8,620	17,240
	3. Foreign Languages	1,860	1,910	1.59	2,750	2,830	5,580
	4. Art-Craft	3,925	3,350	1.55	5,650	4,820	10,470
	5. Music	5,205	1,925	1.55	7,500	2,770	10,270
	6. Drama-Speech	-	21,000	1.55	-	30.250	30,250
	7. Forum/General Classroom	9,930	1,080	1.59	14,700	1,600	16,300
E/II	Social Sciences						
	1. Division Services	2,600	1,550	1.56	3,770	2,250	6,020
	2. Classroom/Lecture	7,870	7,270	1.59	11,650	10,760	22,410

FORM MCC-IV (Cont.)
(Example)

Group / Division	Function	ASF Distribution 1st Phase	ASF Distribution Ultimate	Factor	OGSF Distribution 1st Phase	OGSF Distribution Ultimate	Total
F / III	Business Administration & Secretarial Sciences	13,880	5,130	1.56	20,130	7,440	27,570
G / IV	Science-Mathematics						
1.	Division Services	4,800	4,150	1.56	6,960	6,020	12,980
2.	Classroom/Lecture	10,690	11,390	1.59	15,820	16,860	32,680
3-5.	Laboratory	24,680	23,220	1.58	36,280	24,130	70,410
H / V	Engineering-Technology						
1.	Division Services	1,400	600	1.56	2,030	870	2,900
2.	Engineering	8,280	5,700	1.54	11,840	8,150	19,990
3.	Industrial	6,000	-	1.47	8,160	-	8,160
4.	Classroom/Lecture	1,080	1,080	1.59	1,600	1,600	3,200
J / VI	Occupational						
1.	Division Services	3,250	-	1.56	4,710	-	4,710
2.	Health	6,550	-	1.55	9,430	-	9,430
3.	Chiid Care	2,000	-	1.55	2,880	-	2,880
4.	Police Sciences	3,100	-	1.55	4,470	-	4,470
5.	Classroom/Lecture	2,520	-	1.59	3,730	-	3,730

FORM MCC-IV (Cont.)
(Example)

Group Division	Function	ASF Distribution 1st Phase	ASF Distribution Ultimate	Factor	OGSF Distribution 1st Phase	OGSF Distribution Ultimate	Total
K VII	Physical Education	37,175	26,100	1.48	50,930	35,760	86,690
	1. Division Services	2,300	1,300	1.56	3,340	1,890	5,230
	2. Classroom/Lecture	630	630	1.59	930	930	1,860
	TOTALS	252,170	169,025		361,630	242,620	604,250
L	Campus Services	11,000	13,000	1.47	14,960	17,680	32,640
	1. Division Services	1,115	-	1.56	1,620	-	1,620
	GRAND TOTALS	264,285	182,025		378,210	260,300	638,510



LEGEND

1. START PROGRAM
2. COMPLETE PROGRAM, START MASTER PLAN.
3. COMPLETE MASTER PLAN.
4. START SCHEMATIC DRAWINGS
5. COMPLETE SCHEMATIC DRAWINGS.
6. BBC/___ REVIEW.
7. START PRELIMINARY DRAWINGS AFTER NOTICE TO PROCEED.
8. COMPLETE PRELIMINARY DRAWINGS AND OUTLINE SPECIFICATIONS.
9. PREWORK CONFERENCE. START WORKING DRAWINGS AFTER NOTICE TO PROCEED
10. START SPECIFICATIONS.
11. ONE HUNDRED PERCENT (100%) COMPLETION OF WORKING DRA SECTION CHECK; SUBMITTAL OF ENGINEERING SPECIFICATIONS
12. COMPLETE SPECIFICATIONS, INCLUDING TYPING, RUNNING AND SUBMITTAL OF DRAWINGS AND SPECS TO BBC/___, OMJM START CHECKING. ENGINEERING ESTIMATES DUE TO ESTIMATING SECT
13. FINAL ESTIMATE TO BBC/___

COMMUNITY COLLEGE

1970 1971

PR MAY JUNE JULY AUG SEPT OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY A

19 26 3 10 17 24 31 7 14 21 28 5 12 19 26 2 9 16 23 30 6 13 20 27 4 11 18 25 1 8 15 22 29 6 13 20 27 3 10 17 24 31 7 14 21 28 7 14 21 28 4 11 18 25 2 9 16 23 30 6 13 20 27 4 11 18 25 1

BBC/___ APPROVE SITE UTILITIES AND GRADING PLANS AND ISSUE NOTICE TO PROCEED.

WORKING DRAWINGS, SPECIFICATIONS AND COST ESTIMATE TO BBC/___ FOR REVIEW AND APPROVAL

BBC/___ RETURN WORKING DRAWINGS AND SPECIFICATIONS FOR MAKING REQUIRED REVISIONS.

REVISED WORKING DRAWINGS AND SPECIFICATIONS TO BBC/___ FOR FINAL APPROVAL AND BIDDING.

PR - 15 JUNE 26 AUG 7 SEPT 5 OCT - 2 NOV - 23 NOV - 15 MAR START CONST 6 M

2.5M/10W 2W 8W 2W 4W 4W 3W NO SITE WORK DUE TO WEATHER

- 29 JUNE

W.D. & S. REV. BID CONSTRUCTION

SITE UTILITIES

S & GRADING SCHEDULE

REVISED WORKING AND SPECIFICATIONS TO BBC/___ FOR FINAL APPROVAL AND BIDDING.

BBC/___ RETURN WORKING DRAWING AND SPECIFICATIONS FOR MAKING REQUIRED REVISIONS.

COST ESTIMATE TO BBC/___ FOR REVIEW AND APPROVAL.

WORKING DRAWINGS AND SPECIFICATIONS TO BBC/___ FOR REVIEW AND APPROVAL.

PRELIMINARIES TO BBC/___ FOR REVIEW AND APPROVAL.

BBC APPROVE PRELIMINARIES AND ISSUE NOTICE TO PROCEED.

R - 25 MAY - 18 JAN - 15 FEB - 15 MAR - 10 MAY - 21 JUN - 19 JUL

SW 7.5M/34W 4W 8W 6W 4W 5W

WORKING DRAWINGS SPECIFICATIONS ESTIMATING REVISE BID

CHEDULE

(11) (12) (13) (14) (15) (16) (17) (18)

SPECS. CHECKING REVISIONS BIDDING CONSTRUCTION OCCUPANCY BY ___

ABBREVIATIONS

M – MONTHS

W–WEEKS

,INCLUDING EC. WRITER,

NG, DINATION

14. ANTICIPATE RETURN FROM BBC/___, START OF BBC/___ REVISIONS, AND COMPLETION OF DMJM COORDINATION CHECK AND START OF REVISIONS.

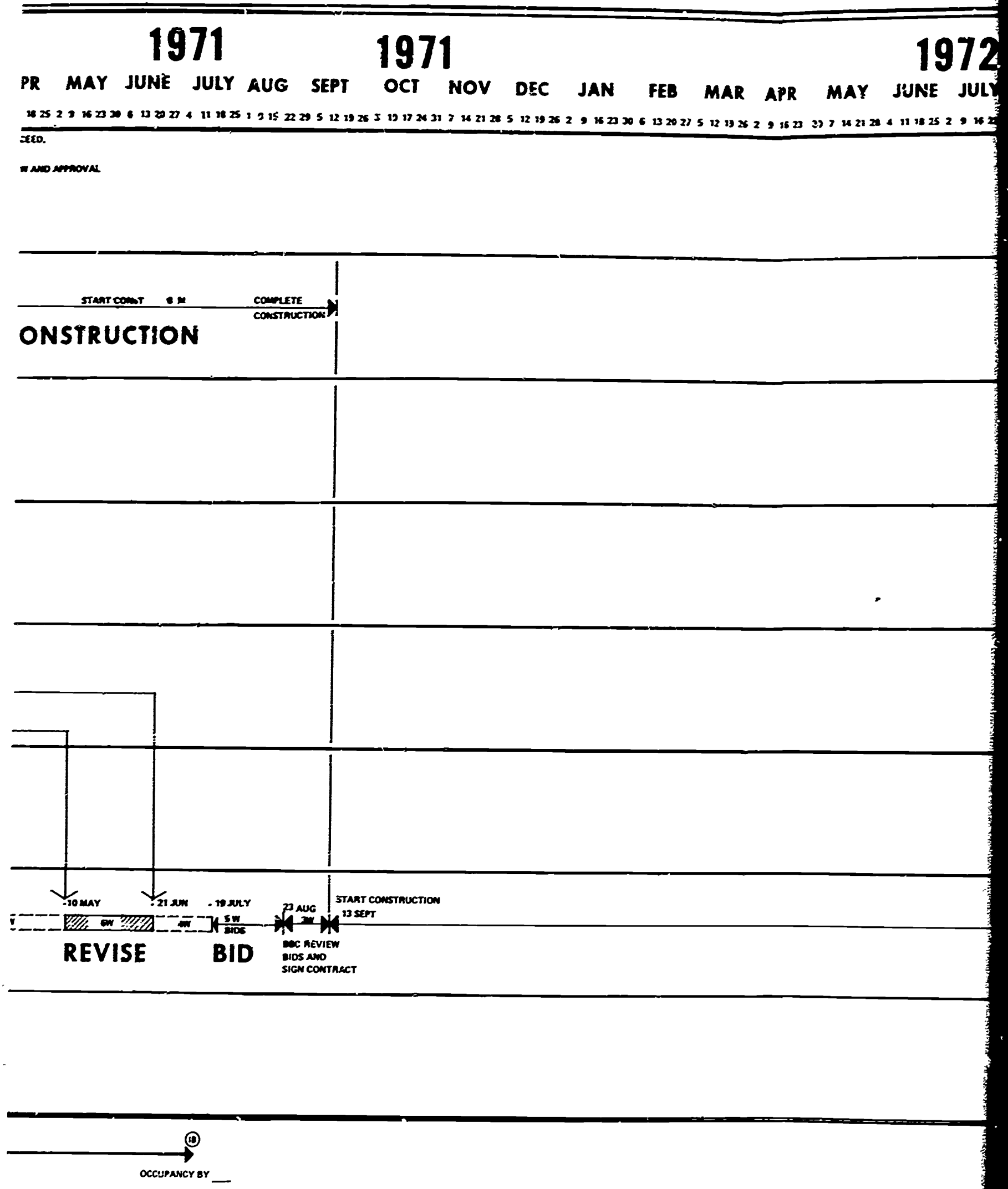
15. COMPLETION OF BBC/ AND DMJM'S REVISIONS. SUBMITTAL TO BBC/___ FOR APPROVAL.

16. DATE BIDS DUE.

17. START CONSTRUCTION.

18. COMPLETE CONSTRUCTION AND OCCUPANCY BY OWNER

PROJECT PERFORM



:T PERFORMANCE SCHEDULE

1972

EC JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC JAN FEB MAR A

2 19 26 2 9 16 23 30 6 13 20 27 5 12 19 26 2 9 16 23 30 7 14 21 28 4 11 18 25 2 9 16 23 30 6 13 20 27 3 10 17 24 1 8 15 22 29 5 12 19 26 3 10 17 24 31 7 14 21 28 4 11 18 25 4 11 18 25 1 8

23/M COMPLETE 27 AUGUST 1973

CONSTRUCTION

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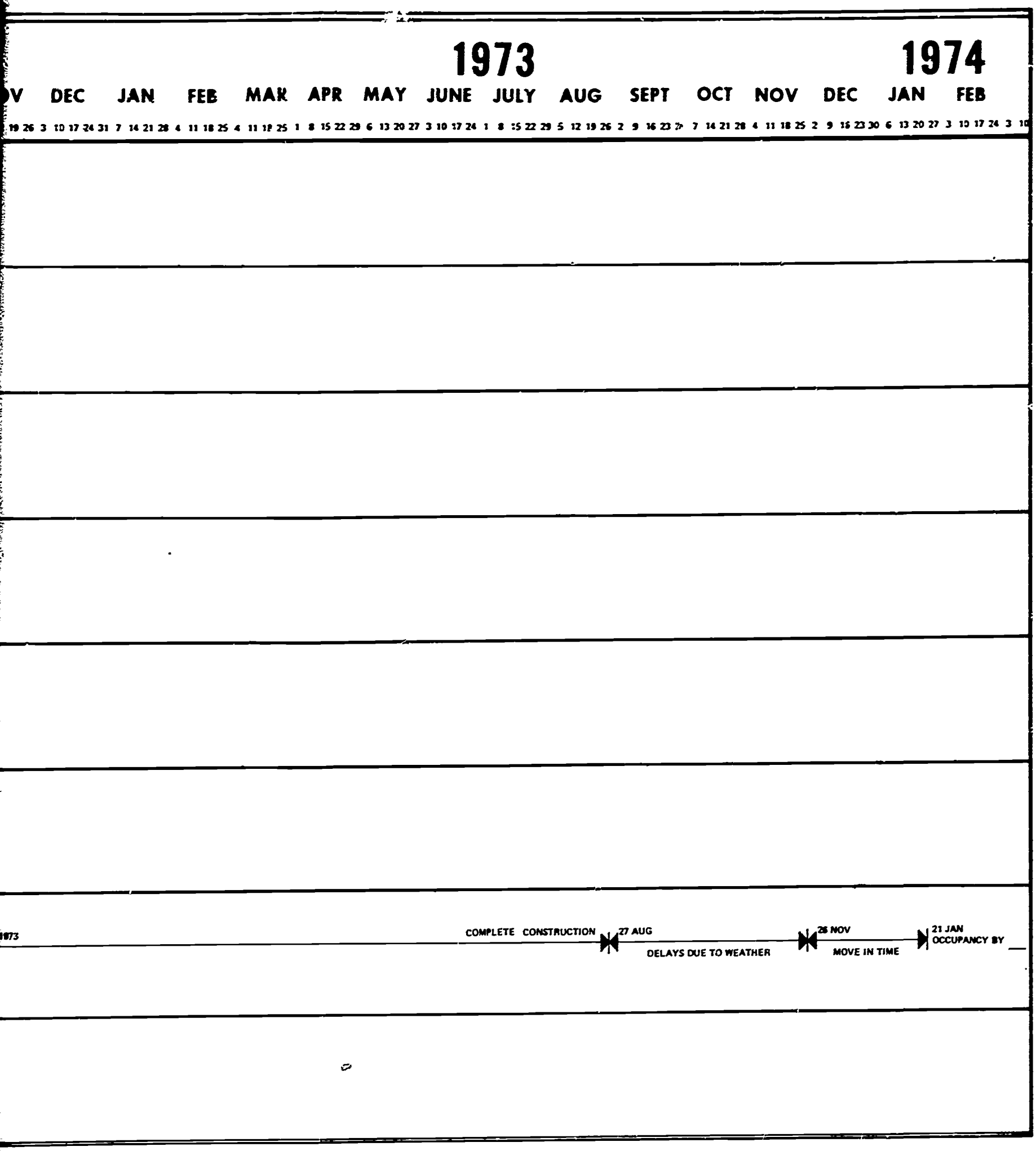


Exhibit D
(Example)

Date: _____

MASSACHUSETTS STATE PROJECT EJ68-2

DANIEL, MANN, JOHNSON, & MENDENHALL
1925 WILSHIRE BLVD • LOS ANGELES CALIF 90025 • AREA CODE 213 381 3663
PLANNING $ ARCHITECTURE $ ENGINEERING $ SYSTEMS $ ECONOMICS

FORM MCC-V

Project: _____ No. _____

Location: _____ Phase: _____

Date: _____

I. PROJECT BUDGET COST

A. Construction (Define with Detailed Breakdown)

1. On-Site Development

Service-Site Improvement	_____	
General Development	_____	
Utilities	_____	
Sub-Total On-Site Development		_____

2. Building (OGSF)

Demolition	_____	
Rehabilitation	_____	
New Construction:		
Architectural, Structural	_____	
Mechanical	_____	
Plumbing	_____	
Electrical	_____	
Sub-Total Building Cost		_____

B. Contingency

1. Planning & Construction	_____	
2. Escalation Factor	_____	
3. Location Factor	_____	
Sub-Total Contingency		_____

C. Related Costs

1. Topographic Survey	_____	
2. Soils Testing	_____	
3. Resident Inspector	_____	
4. Architect-Engineering Fee	_____	
5. Furniture & Equipment	_____	
6. Other (Define)	_____	
Sub-Total Related Costs		_____
Total PROJECT BUDGET COST		_____

II. PROJECT ANALYSIS DATA

ASF	OGSF	%ASF: OGSF	Cost per Sq. Ft. Bldg. Cost (Item 2.)	Cost per Sq. Ft. Project Budget Cost	Project Cost to Capacity

INSTRUCTIONAL PROGRAM SUMMARY

Exhibit E continued on p. 62

University Parallel (Transfer)		*Classroom*			*Lecture*		
Div.	*Facility*	Teaching Stations	Student Sta./Rm.	Total Student Sta.	Teaching Stations	Student Sta./Rm.	Total Student Sta.
	Administration						
	Instr. Resource Center	1/	40/	40/			
II	Science–Mathematics	2/3	30/30	60/90	1/2	75/75	75/150
III	Language Arts	5/5	30/30	150/150	/1	/75	/75
		2/	20/	40/			
IV	Social Sciences	3/3	40/40	120/120	/1	/75	/75
V	Creative Arts	1/1	30/30	30/30	1/1	180/75	180/75
					1/	300/	300/
	Sub-Total	14/12		440/390	3/5		555/375
Occupational (Career)							
	Student Center	1/	30/	30/			
I	Business Education	2/1	30/30	60/30			
VI	Occupational	2/2	30/30	60/60	/1	/75	/75
VII	Industrial	4/5	24/24	96/120			
	Sub-Total	9/8		246/210	/1		/75
VIII	Physical Education	1/1	30/30	30/30			
	GRAND TOTAL	24/21*		716/630	3/6		555/450

*Required for First Phase/Additional for Ultimate Development

EXHIBIT E
(Example)

continued from p. 61

Laboratory			*Shop*			*GRAND TOTAL*	
Teaching Stations	Student Sta./Rm.	Total Student Sta.	Teaching Stations	Student Sta./Rm.	Total Student Sta.		
1/	-	-					
1/	30/	30/					
4/4	24/24	96/96					
1/	30/	30/					
/1	/40	/40					
2/	10/	20/					
1/	20/	20/					
/1	/30	/30					
2/2	24/24	48/48					
1/1	100/120	100/120					
13/9		344/334				30/26	1339/1099
2/	15/	30/					
1/	24/	24/					
2/	30/	60/					
1/2	40/40	40/80					
1/2	24/24	24/48					
/1	/30	/30					
/2	/40	/40					
2/6	24/24	48/144	1/2	24/24	24/48		
1/1	40/40	40/40	/1	/15	/15		
1/2	16/16	16/32	2/	12/	24/		
			1/1	20/20	20/20		
11/16		282/414	4/4		68/83	24/29	596/782
						1/1	30/30
24/25		626/748	4/4		68/83	55/56	1965/1911

FORM MCC-VI

Project: _____ No. _____

Location: _____ Phase: _____

Date: _____

PROGRAM ANALYSIS

I. Capacity

Student Stations x $\frac{22.4}{12}$ = Credit Enrollment for Classroom-Lecture

_____ x $\frac{22.4}{12}$ = _____

Student Stations x $\frac{21.3}{24}$ = Credit Enrollment for 2 Hours Laboratory-Shop

_____ x $\frac{21.3}{24}$ = _____

Student Stations x $\frac{21.3}{36}$ = Credit Enrollment for 3 Hours Laboratory-Shop

_____ x $\frac{21.3}{36}$ = _____

Total Credit Enrollment _____

II. Building Area

Outside Gross Square Feet (OGSF) per Credit Enrollment

_____ / _____ = _____ OGSF/Student

III. Instructional Space & Personnel

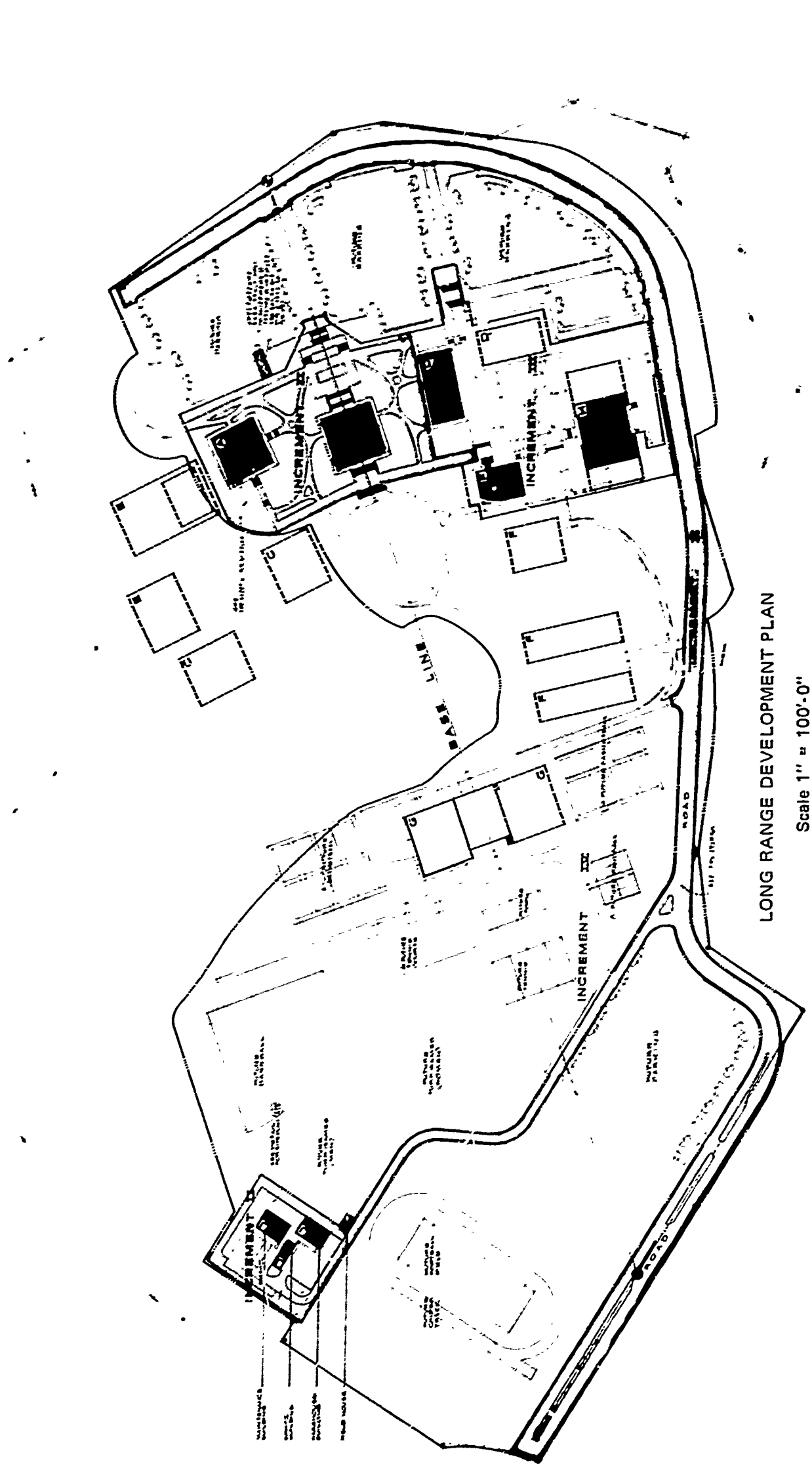
Credit Enrollment:Faculty ____:1
Credit Enrollment:Faculty & Staff ____:1
Stenographic Services:Faculty & Staff ____:1

Program Balance (by Teaching Station Space)

Classroom-Lecture ____%
Laboratory-Shop ____%

EXAMPLE

Form MCC-VII



LONG RANGE DEVELOPMENT PLAN

Scale 1" = 100'-0"

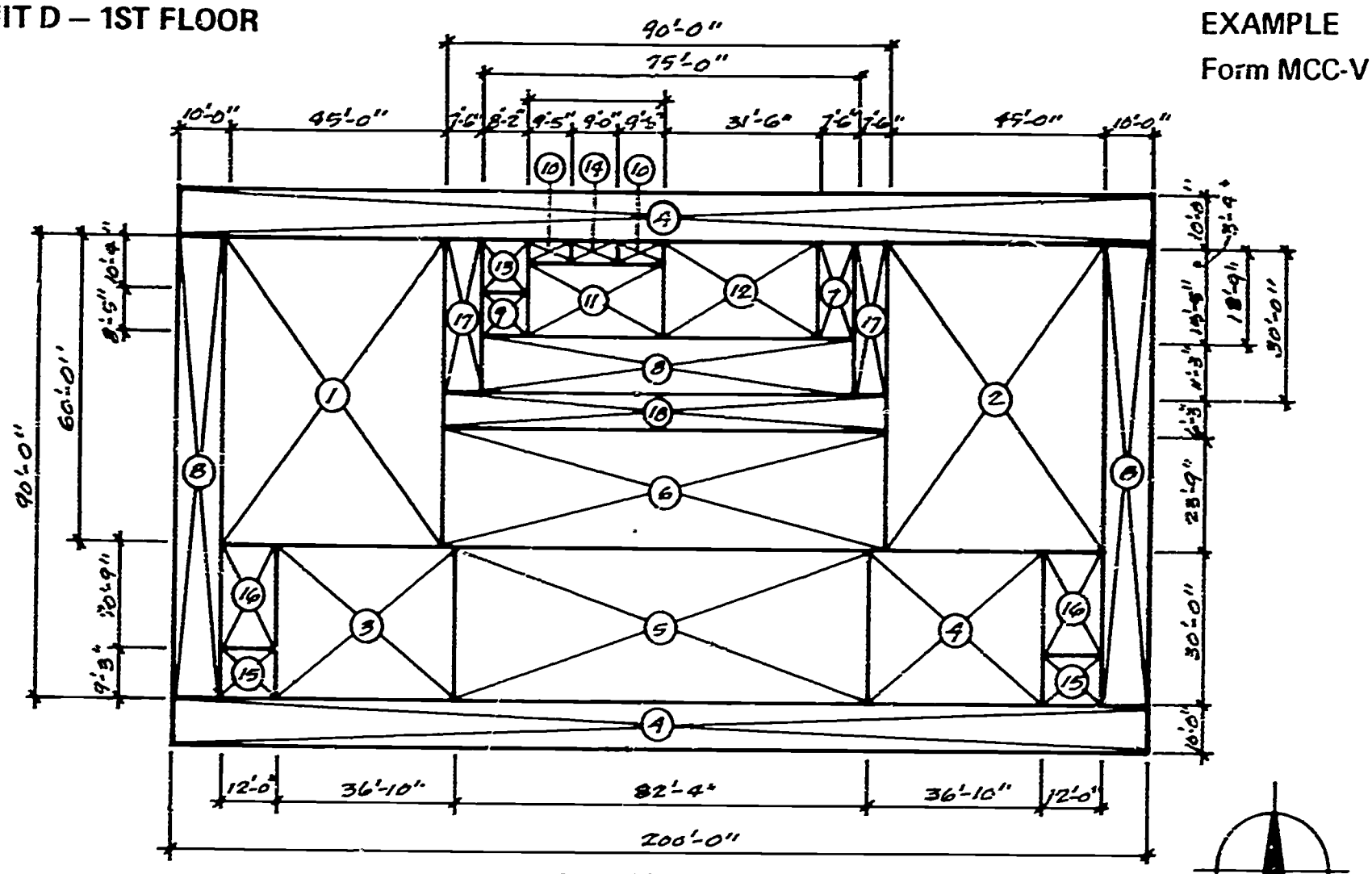
SUMMARY

EXAMPLE
Form MCC-VII

SPACE	UNITS D	F	H	SQUARE FEET
CLASSROOMS & LECTURE RMS	10,433	4,800		15,233
SCIENCE LABS	12,876			12,876
GEOLOGY & GEOGRAPHY LAB	1,289			1,289
ELECTRONICS LAB		1,330		1,330
BUSINESS MACHINES LAB		900		900
TYPING CLASSROOM		1,200		1,200
DRAFTING CLASSROOMS		2,830		2,830
ARTS & CRAFTS STUDIOS		3,000		3,000
DARKROOM	141			141
PRINTING ROOM		160		160
SALES			2,355	2,355
OFFICES & WORKROOMS	1,826	2,608		4,434
LOBBY, LOUNGE & TICKETS			2,704	2,704
COATS & COT ROOM			647	647
STUDENT DINING & COFFEE SP.			10,230	10,230
KITCHEN, SNACK BAR & SERVING			6,249	6,249
TOILETS	984	940	723	2,647
MECH. STOR. & CUSTODIAN	1,834	3,095	4,963	9,894
CLOSED CORRIDOR	8,822	5,698	871	15,391
OPEN CORRIDOR	2,900	2,523	2,581	8,004
TOTALS	41,105	29,084	31,325	101,514

UNIT D — 1ST FLOOR

EXAMPLE
Form MCC-VII

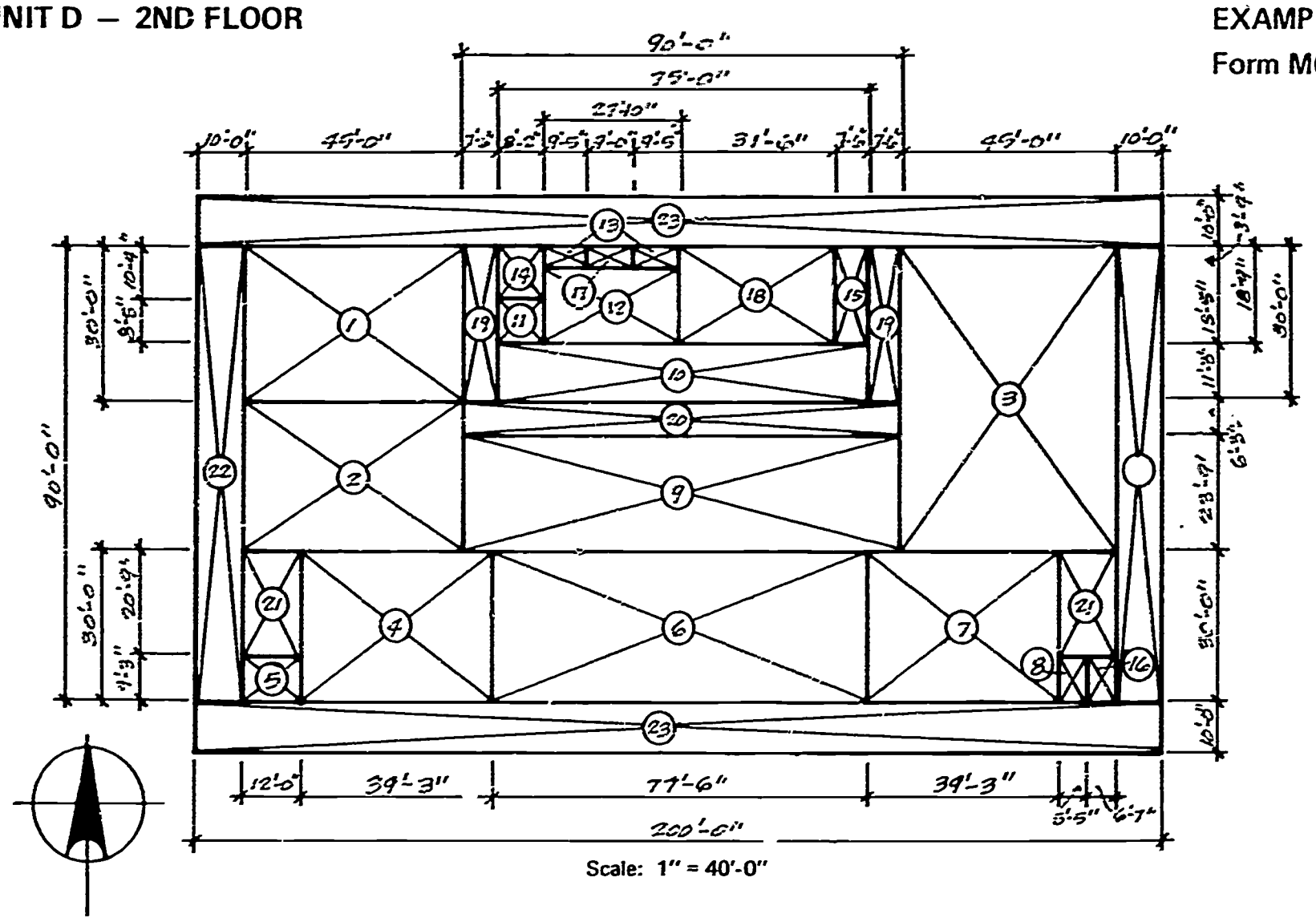


Scale: 1" = 40'-0"

AREA	SPACE	DIMENSIONS	SQUARE FEET
1	LECTURE ROOMS	60.0 x 45.0	2,700
2	BIOLOGY LABS	60.0 x 45.0	2,700
3	MATH ROOMS	36.83 x 30.0	1,105
4	BOTANY ROOM	36.83 x 30.0	1,105
5	CHEMISTRY LABS	82.33 x 30.0	2,470
6	SCIENCE PREP & STOR. LABS	90.0 x 23.75	2,138
7	DARKROOMS	18.75 x 7.50	141
8	OFFICES	75.0 x 11.25	844
9	OFFICES	8.42 x 8.17	69
10	TOILET	9.42 x 3.33 x 2	63
11	TOILET	27.83 x 15.42	429
12	MECH. & ELECT. ROOMS	31.50 x 18.75	591
13	STORAGE	10.33 x 8.17	84
14	CUSTODIAN	9.0 x 3.33	30
15	STORAGE	12.0 x 9.25 x 2	222
16	CLOSED CORRIDOR	20.75 x 12.0 x 2	498
17	CLOSED CORRIDOR	30.0 x 7.50 x 2	450
18	CLOSED CORRIDOR	90.0 x 6.25	563
A	OPEN CORRIDOR	200.0 x 10.0 x ½ x 2	2,000
B	OPEN CORRIDOR	90.0 x 10.0 x ½ x 2	900
	TOTAL		19,102

UNIT D — 2ND FLOOR

EXAMPLE
Form MCC VII

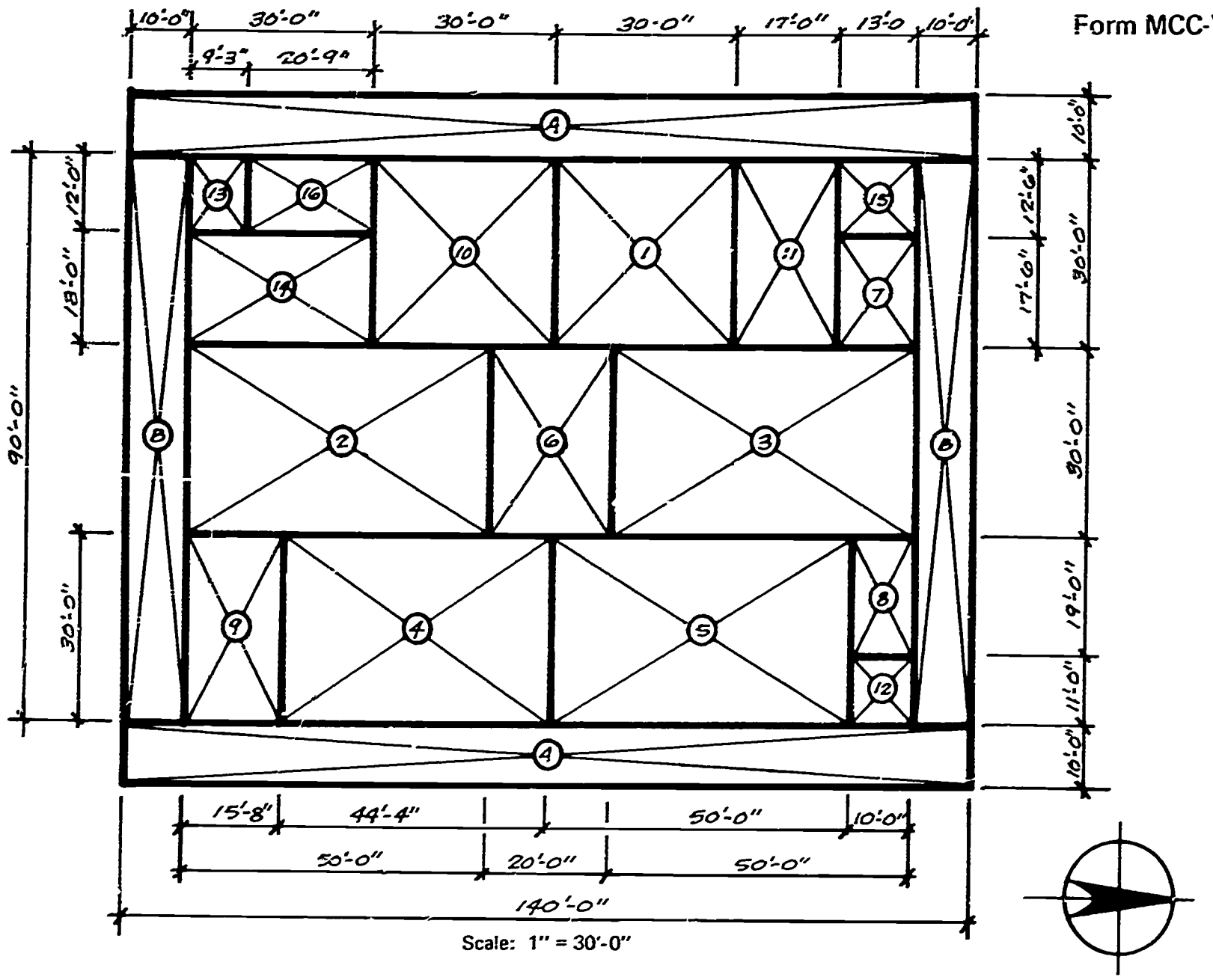


Scale: 1" = 40'-0"

AREA	SPACE	DIMENSIONS	SQUARE FEET
1	MATH CLASSROOMS	45.0 x 30.0	1,350
2	GEOLOGY & GEOGRAPHY RMS.	45.0 x 30.0	1,350
3	SOCIAL SCIENCE	60.0 x 45.0	2,700
4	GEOLOGY & GEOGRAPHY LAB	39.25 x 30.0	1,178
5	MAP ROOM	12.0 x 9.25	111
6	PHYSICS LABS	77.50 x 30.0	2,325
7	PHYSICS LECTURE RM.	39.25 x 30.0	1,178
8	PHYSICS LECTURE RM.	9.25 x 5.42	50
9	SCIENCE PREP & STORAGE	90.0 x 23.75	2,138
10	OFFICES	75.0 x 11.25	844
11	OFFICES	8.42 x 8.17	69
12	TOILETS	27.83 x 15.42	429
13	TOILETS	9.42 x 3.33 x 2	63
14	STORAGE	10.33 x 8.17	84
15	STORAGE	18.75 x 7.50	141
16	STORAGE	9.25 x 6.58	61
17	CUSTODIAN	9.0 x 3.33	30
18	MECHANICAL	31.50 x 18.75	591
19	CLOSED CORRIDOR	30.0 x 7.50 x 2	450
20	CLOSED CORRIDOR	90.0 x 6.25	563
21	CLOSED CORRIDOR	20.75 x 12.0 x 2	498
22	CLOSED CORRIDOR	90.0 x 10.0 x 2	1,800
23	CLOSED CORRIDOR	200.0 x 10.0 x 2	4,000
	TOTAL		22,003

UNIT F — 1ST FLOOR

EXAMPLE
Form MCC-VII

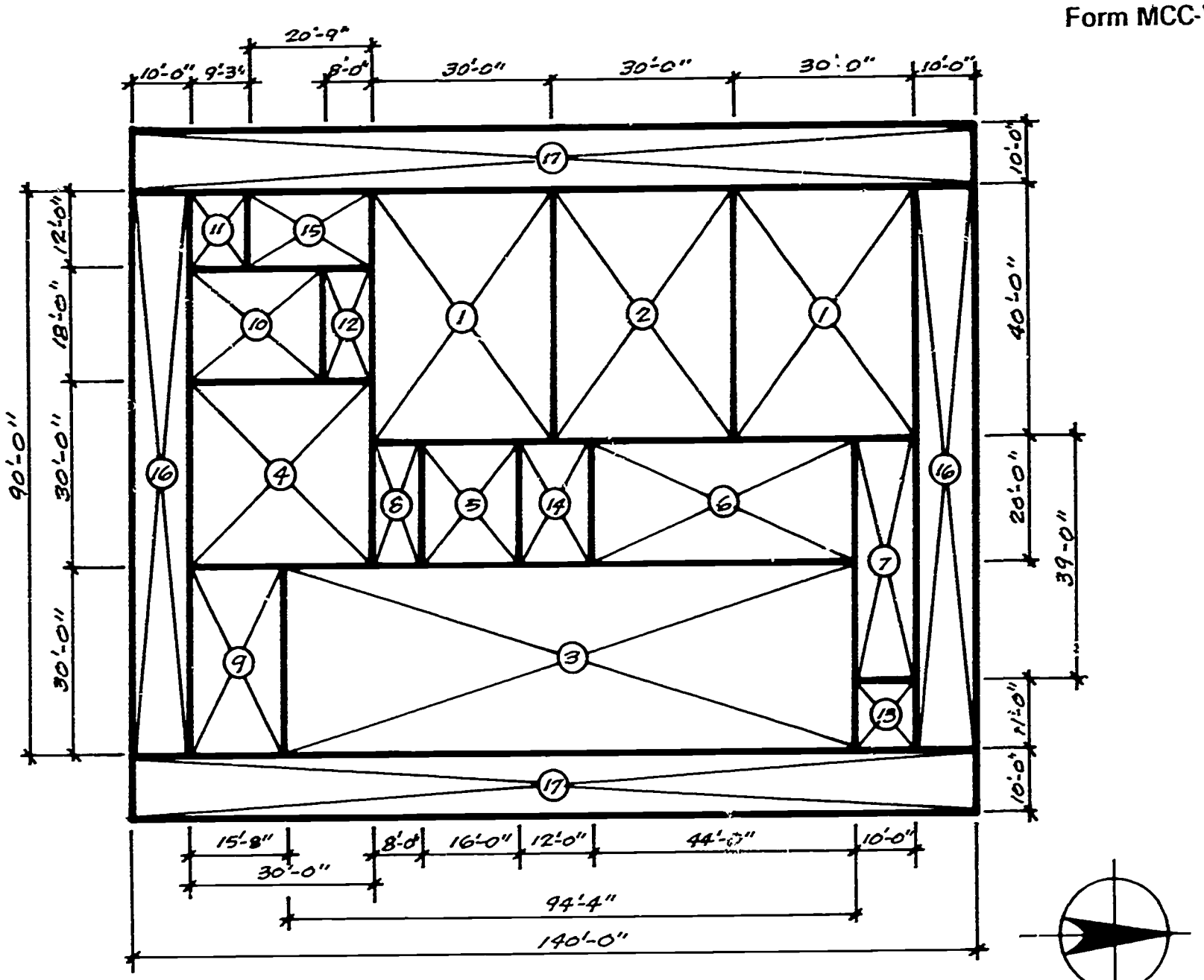


Scale: 1" = 30'-0"

AREA	SPACE	DIMENSIONS	SQUARE FEET
1	BUSINESS CLASSROOM	30.0 x 30.0	900
2	DESIGN STUDIO	50.0 x 30.0	1,500
3	PAINTING STUDIO	50.0 x 30.0	1,500
4	ELECTRONIC LAB	44.33 x 30.0	1,330
5	SOCIAL CLASSROOMS	50.0 x 30.0	1,500
6	WORKROOM	30.0 x 20.0	600
7	OFFICES	17.50 x 13.0	228
8	OFFICES	19.0 x 10.0	190
9	TOILETS	30.0 x 15.67	470
10	STORAGE	30.0 x 30.0	900
11	STORAGE	30.0 x 17.0	510
12	STORAGE	11.0 x 10.0	110
13	CUSTODIAN	12.0 x 9.25	111
14	MECHANICAL ROOM	30.0 x 18.0	540
15	ELECTRICAL ROOM	13.0 x 12.50	163
16	CLOSED CORRIDOR	20.75 x 12.0	244
A	OPEN CORRIDOR	140.0 x 10.0 x ½ x 2	1,400
B	OPEN CORRIDOR	90.0 x 10.0 x ½ x 2	900
	TOTAL		**13,101**

UNIT F — 2ND FLOOR

EXAMPLE
Form MCC-VII

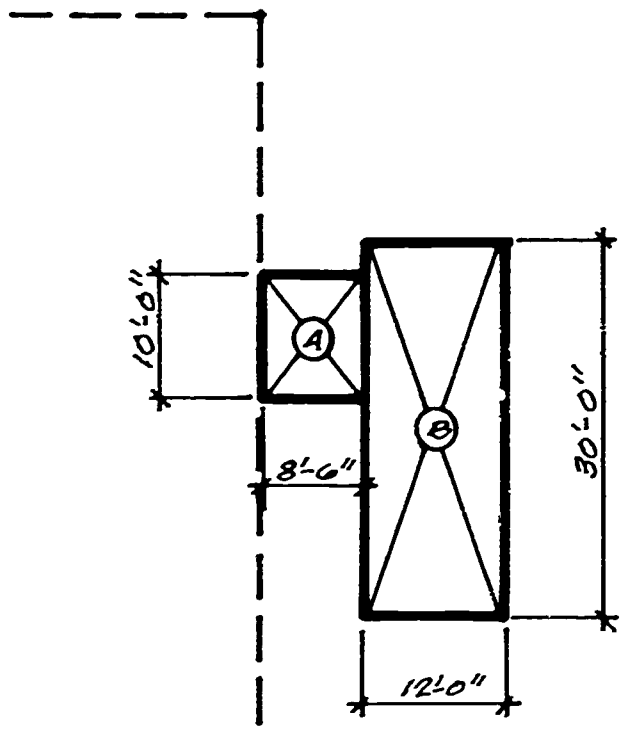


Scale: 1" = 30'-0"

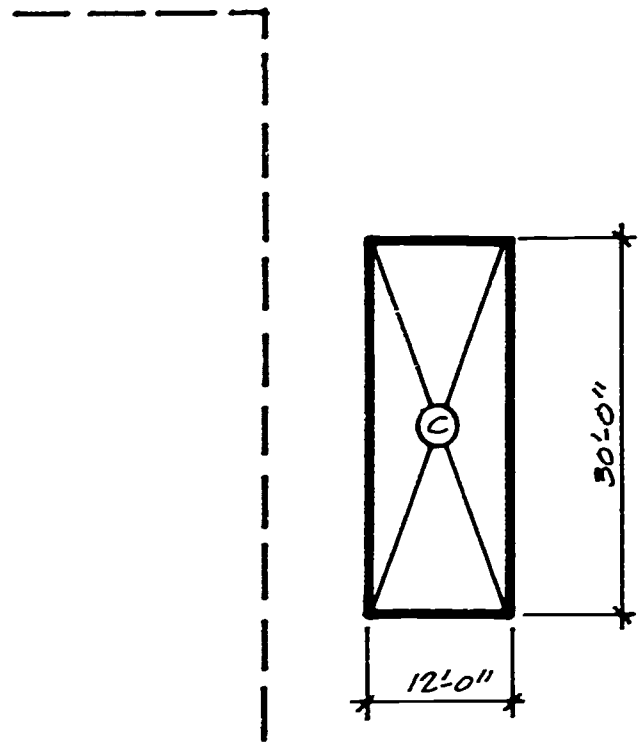
AREA	SPACE	DIMENSIONS	SQUARE FEET
1	BUSINESS CLASSROOMS	30.0 x 40.0 x 2	2,400
2	TYPING CLASSROOM	30.0 x 40.0	1,200
3	DRAFTING CLASSROOMS	30.0 x 94.33	2,830
4	BUSINESS MECH. LAB	30.0 x 30.0	900
5	OFFICES	16.0 x 20.0	320
6	OFFICES	44.0 x 20.0	880
7	OFFICES	39.0 x 10.0	390
8	PRINTING ROOM	20.0 x 8.0	160
9	TOILETS	30.0 x 15.67	470
10	MECH. ROOM	22.0 x 18.0	396
11	CUSTODIAN	12.0 x 9.3	111
12	STORAGE	18.0 x 8.0	144
13	STORAGE	11.0 x 10.0	110
14	CLOSED CORRIDOR	12.0 x 20.0	240
15	CLOSED CORRIDOR	12.0 x 20.75	249
16	CLOSED CORRIDOR	10.0 x 90.0 x 2	1,800
17	CLOSED CORRIDOR	10.0 x 140.0 x 2	2,800
	TOTAL		15,400

STAIRCASE – UNIT – F

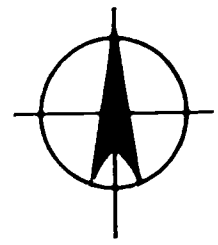
EXAMPLE
Form MCC-VII



1ST FLOOR



2ND FLOOR

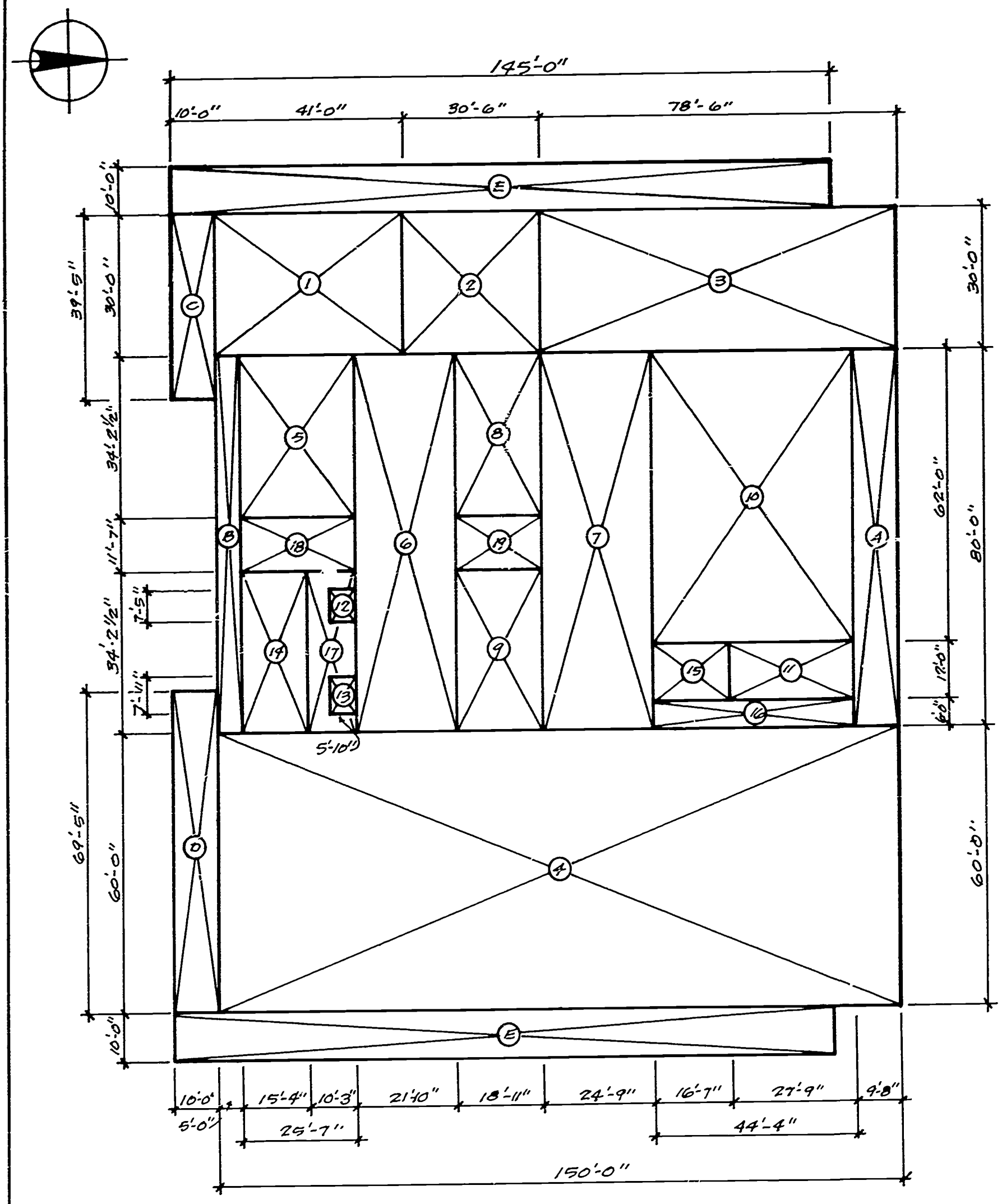


Scale: 1" = 20'-0"

AREA	SPACE	DIMENSIONS	SQUARE FEET
A	OPEN CORRIDOR	10.0 x 8.50 x ½	43
B	OPEN CORRIDOR	12.0 x 30.0 x ½	180
C	CLOSED CORRIDOR	12.0 x 30.0	360
	TOTAL		**583**

UNIT H

EXAMPLE
Form MCC-VII



Scale: 1" = 30'-0"

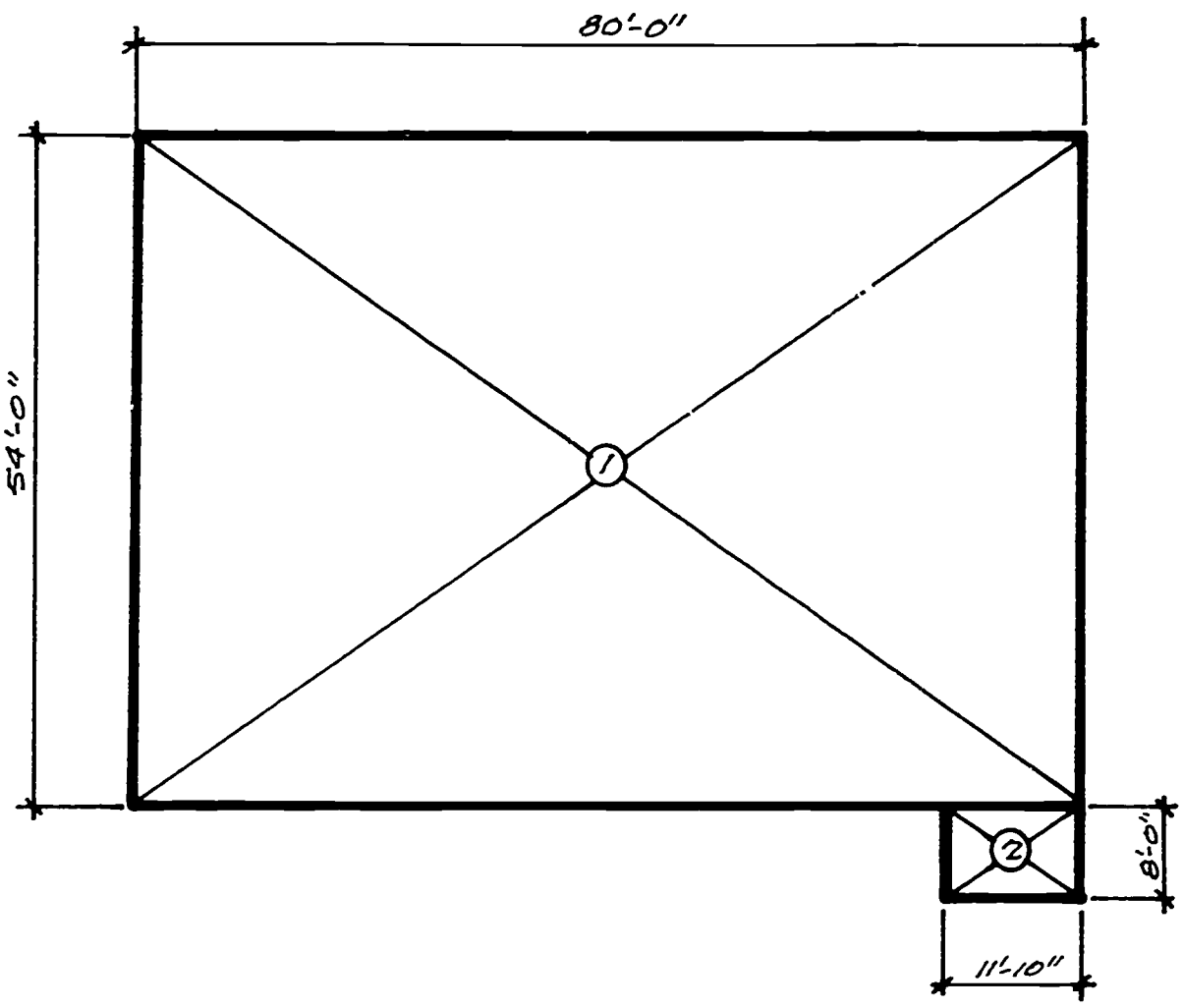
UNIT H

EXAMPLE
Form MCC-VII

AREA	SPACE	DIMENSIONS	SQUARE FEET
1	COFFEE SHOP	41.0 x 30.0	1,230
2	LOUNGE	30.50 x 30.0	915
3	SALES	78.50 x 30.0	2,355
4	STUDENT DINING	150.0 x 60.0	9,000
5	SNACK BAR	34.27 x 25.58	874
6	LOBBY	80.0 x 21.83	1,746
7	SERVING ROOM	80.0 x 24.75	1,980
8	COATS & COT ROOM	34.17 x 18.92	647
9	KITCHEN	34.27 x 18.92	647
10	KITCHEN	62.0 x 44.33	2,748
11	STORAGE	27.75 x 12.0	333
12	TICKET	7.42 x 5.83	43
13	CUSTODIAN	7.92 x 5.83	46
14	TOILETS	34.17 x 15.33	524
15	TOILETS	16.58 x 12.0	199
16	MECH. SPACE	44.33 x 6.0	266
17	CLOSED CORRIDOR	34.17 x 10.25 – 89	261
18	CLOSED CORRIDOR	25.58 x 11.58	296
19	CLOSED CORRIDOR	18.92 x 11.58	219
A	OPEN CORRIDOR	80.0 x 9.67 x ½	387
B	OPEN CORRIDOR	80.0 x 5.0 x ½	200
C	OPEN CORRIDOR	39.42 x 10.0 x ½	197
D	OPEN CORRIDOR	69.42 x 10.0 x ½	347
E	OPEN CORRIDOR	145.0 x 10.0 x ½ x 2	1,450
	TOTAL		**26,910**

UNIT H — BASEMENT

EXAMPLE
Form MCC-VII



Scale: 1" = 20'-0"

AREA	SPACE	DIMENSIONS	SQUARE FEET
1	BASEMENT (MECH.)	80.0 x 54.0	4,320
2	CLOSED CORRIDOR	8.0 x 11.83	95
	TOTAL		**4,415**

ACKNOWLEDGEMENTS

The assistance of the following persons in preparing the Guide is greatly appreciated:

BOARD OF REGIONAL COMMUNITY COLLEGES

William G. Dwyer, President of the Board
Basil Castaldi, Dean of Faculty
Jack Hudnall, President, Bristol Community College
John L. Spiby, Associate Engineer

THE JUNIOR COLLEGE DISTRICT, ST. LOUIS, MISSOURI

Joseph P. Cosand, President

EDUCATIONAL FACILITIES LABORATORIES

Alan C. Green, Secretary

BUREAU OF BUILDING CONSTRUCTION

D. H. Chapman, Senior Civil Engineer
James J. Cusick, Building Construction Plans and Specifications Engineer
Walter J. Flaherty, Associate Civil Engineer
Philip C. Geoffrion, Senior Civil Engineer
Joseph Glynn, Principal Civil Engineer
Frank B. Johnson, Principal Sanitary Engineer
Bernard D. Lucey, Senior Civil Engineer

THE MASSACHUSETTS ADVISORY COUNCIL ON EDUCATION

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The Massachusetts System of Higher Education in Transition,
by Samuel K. Gove, jointly sponsored by the Council and the American Council on Education – July 1967.

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The Measurement of Alternative Costs of Educating Catholic School Children in Public Schools,
by Andre Daniere and George Madaus – March 1969.

A Cost-Benefit Analysis of General Purpose State School-Aid Formulas in Massachusetts: Full Report,
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