

Jeffrey J Morin

AN EXPANDABLE HEALTH
FACILITY FOR COLSTRIP,
MONTANA

P378
.M8255

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an
expandable
health
facility
for
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Under-Graduate Thesis in Architecture

Submitted to the School of Architecture as
partial fulfillment of the requirements for
a Bachelor of Architecture Degree

Montana State University--June 7, 1974

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~~TOP SECRET~~
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Prepared by Jeffrey J. Morin

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The Thesis

- A. Aesthetic of change as opposed to fixed
- B. Planning functional flexibility
- C. The growth factor

The Project

- A. Project description and correlation
- B. Determination of services

Community profile

Regional facilities

Access

Available personnel

Service area

- C. Phasing of services
- D. The facility

The elements

Functional adjacencies

Circulation

Segregation of entrances

- E. The site

Site selection

Site potential

Site limitations

The Design

- A. Schematic plans
- B. Development of desirable plans
- C. Final solution

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In light of today's rapidly changing technology and social idioms, the modern architect can no longer allow himself to create forms which are finite conclusions to a fixed program. We are surrounded by examples of this approach to aesthetics in which the finished product stands alone, as a sculpture barring the admittance of any foreign element. Visually, the creation is an unalterable finished answer which has been rounded off and polished at all edges to guard from the outside. The designer has achieved an unpenetratable shell of unity or oneness, in which all elements have been carefully aligned in their proper relation to one another until ultimately, a sphere of perfection is reached. Though this perfection has grown out of abstract feelings and hence can never assume ultimate levels, it has never the less served as a nebulous goal for much of present day design. Such an approach might be viewed as functionalistic. The designer concentrates entirely on manipulating a determined set of elements into the most functional arrangement without thought towards later adaptations to changing patterns of society or technology. The

aesthetic of change

desired result is an unmistakable three dimensional counterpart of the working relations between the established functions. Unable to respond to future needs and changing attitudes, such creations stand as monuments to a past way of life. Unless it is the intention of the designer to design a museum of past relics, such design procedures can not be tolerated. "As an expression of the closed form, contemporary architecture cannot be adapted to change. It becomes often outdated even before being completed. Putting increased emphasis on physical communications involves throwing over traditional aesthetic values which were mostly concerned with fixed relationships; and on the other hand rejection of Cartesian aesthetics because they are incapable of carrying the cultural loading of our time, inevitably leads to an aesthetic of change, the plastic resolution of the problems of mobility" (Kenzo Tange).

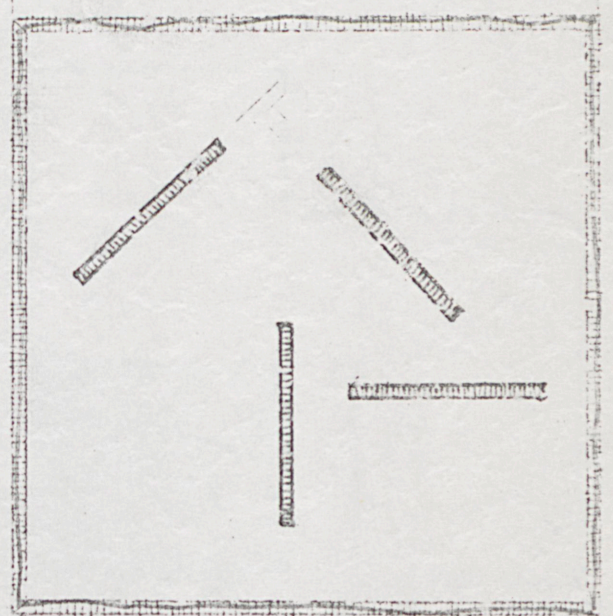
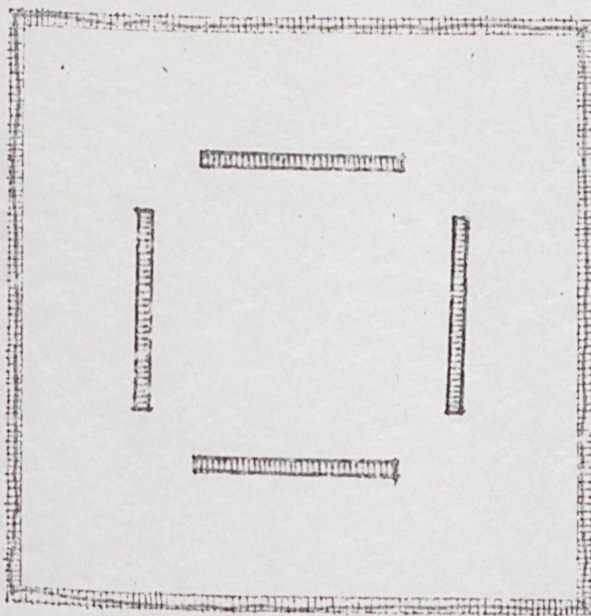
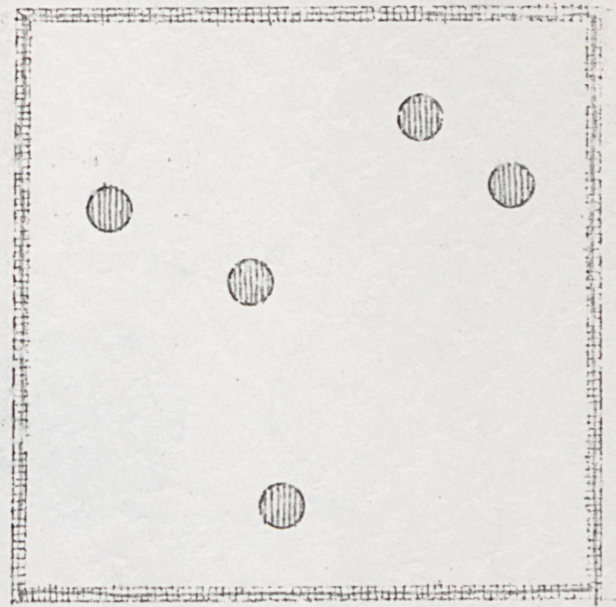
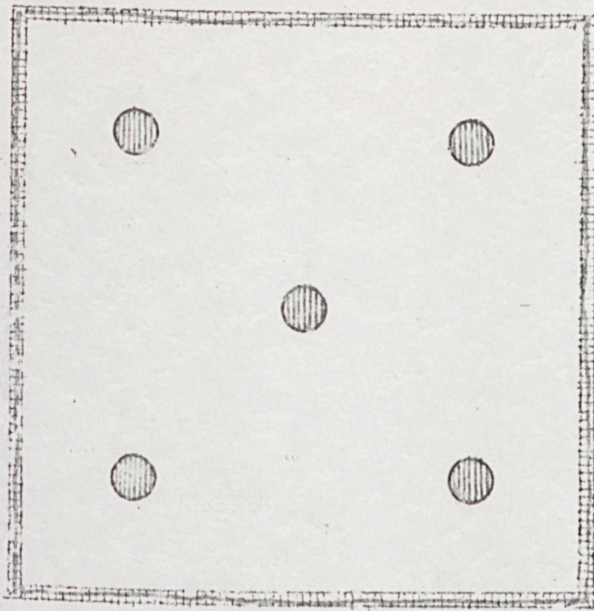
I am proposing an approach which is diametrically opposed to the above sphere of perfection method and which I shall refer to as the 'perpetual additive element' method in which

the finished product is never visually finished, or stalemated. Elements should be arranged so as to form a balanced composition yet never be so reliant on each other as to close the circle to addition. According to Norbert Wiener, an organization is not connected so tightly that it is impossible to change one aspect without destroying the specific features of all other aspects, nor so loose that anything can happen without any relation to other things.

This sort of planning involves a concept of architecture which is of something not fixed, but as something not finally decided and subject to constant evolution. It should be appropriate in form to a society which is also evolutionary. The building has not been conceived in the traditional sense, as a fixed, unalterable shape, from which nothing can be removed or to which nothing can be added, but as a structure that is amenable to change and modification. The shape of the building is not definitively established, it can be freely modified in response to emergent requirements. The building could very well be conceived to be in dynamic continuation.

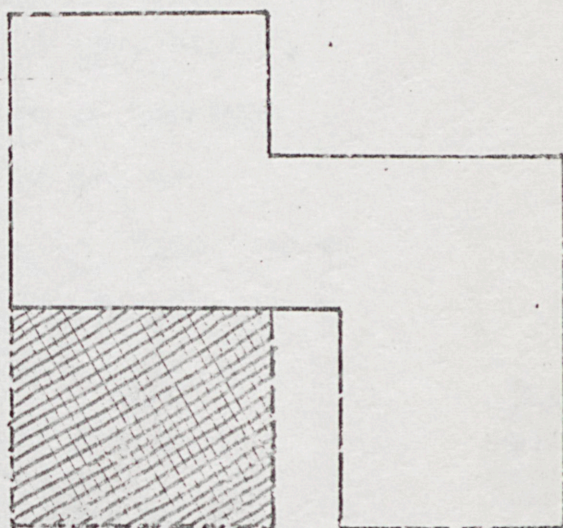
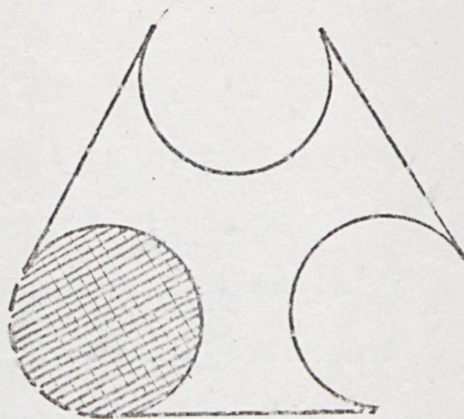
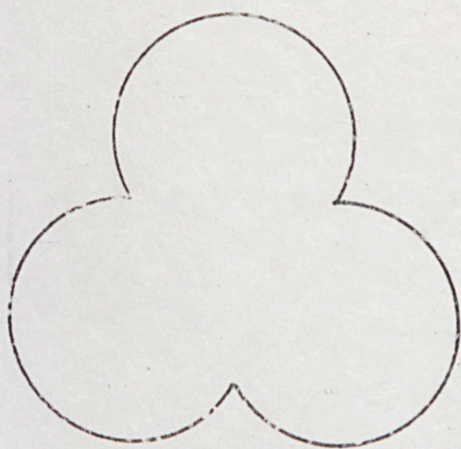
An aesthetic of change can be represented with the aid of two dimensional diagrams demonstrating a basic principle of open and closed systems. The first two diagrams of closed systems illustrate an orientation of elements into an organization which restricts the addition or subtraction of like elements. It could be important to note in passing that both closed systems tend to emphasize the center of the composition, whereas the organization of the open systems is more random in nature, forming a balanced unit, yet not so reliant on the presence of other elements as to restrict addition or subtraction.

The closed form, in contrast to the open form, also illustrates a manner of enclosing an area which restricts logical alterations. The open form, on the other hand, presents the possibility of varied alterations to the original area without upsetting the logic of the form.



CLOSED
SYSTEMS

OPEN
SYSTEMS



CLOSED
FORMS

OPEN
FORMS

The aesthetics of the buildings in an urban environment should reflect the appropriate cycle of change. In order for this to occur, consideration of pending change must be a decisive factor in preliminary planning. One criticism of those projects which have attempted to create architecture which is adaptable to change, through the outward appearance, is that in fact the building is not receptive to functional changes. This, of course, is nothing more than a manipulation of visual impressions to give an illusion of flexibility. If the aesthetics of a building are to truly reflect a functional flexibility, the potential for growth, must be an inherent input into the earliest stages of design.

We find that in addition to 'functioning' we also need a process which Kenzo Tange calls 'structuring,' a process of coupling the functional units. Just as the huge and ever increasing power of modern civilized society is changing the physical shape of society, from our immediate circumstances to the whole environment, so are the couplings of functional units becoming less monistic and more pluralistic, less static

flexibility

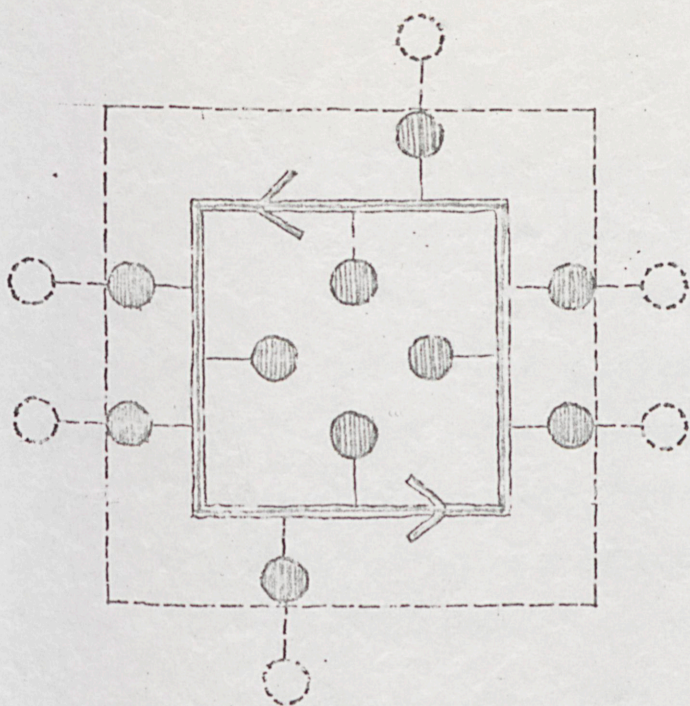
and more elastic, less decisive and more selective, less compulsory and more spontaneous. The resulting spatial organization is dictated by the structuring of functional unit couplings, whether fixed or transient. This spacial organization in itself contains the system of growth and change.

Flexibility can be broken down into three basic categories and represented by diagrams showing how change occurs and how circulation is affected. Metamorphic flexibility indicates a system in which the elements are categorized as to their transient nature, and then located accordingly, with those elements of a more transient nature being placed further to the outside, around the fixed elements, thus allowing expansion to occur in relocation of transient elements caused by displacement by growth of fixed elements. Circulation must also be displaced outward.

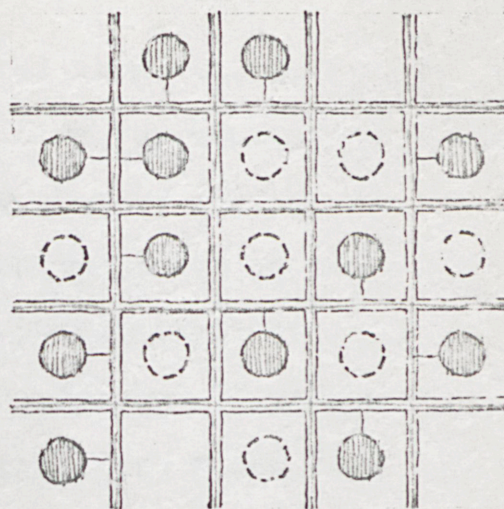
Oversized flexibility is represented by a diagram indicating an intentional allotment for future projected needs. Such allotments are generally in the form of overly generous space requirements or unfinished segments of a system

which are represented by voids in the diagram. Circulation is not greatly affected by the filling of these voids to accommodate expansion.

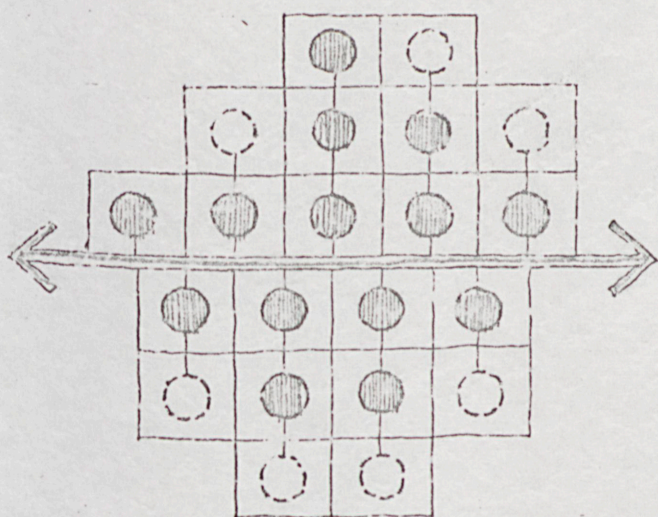
A third method of flexibility can be termed as open ended, where the elements of a system are located along a central circulation spine and allowed to expand perpendicular to the spine. New elements are added to either end of the system and the only alteration to circulation is extension of the previous system. Here, the importance of circulation is especially prominent since the system of flexibility is essentially one of circulation.



METAMORPHIC



OVERSIZED



OPEN-ENDED

FLEXIBILITY DIAGRAMS

Certainly a good deal of flexibility is determined by the built in ability for growth which must be planned into a system at the outset. There are various methods by which growth occurs, each having individual assets and limitations.

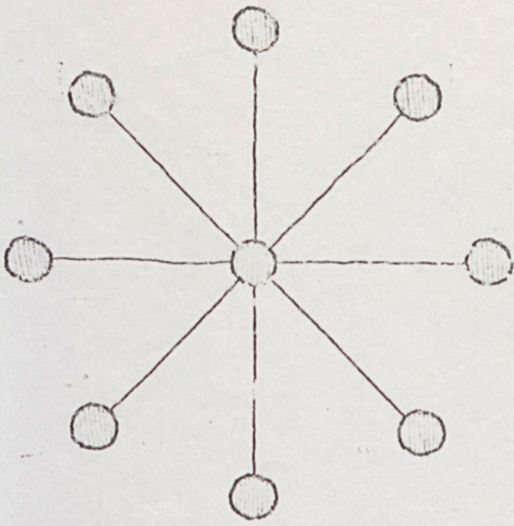
Kenzo Tange describes a concept of growth which centers on a central circulation spine from which extend spines to separate functions "The evolution and growth of living organisms indicate the necessity of the development from radial to linear forms. The amoeba and the asteroid have radial centripetal forms, but vertebrates have linear bone structures with parallel radiations. When the living functions of organisms differentiate and perform the composite function of life, the centripetal pattern evolves into a system of parallel lines grouped around an axis formed by a spine and arteries. The process whereby a vertebrate body hatches from an egg illustrates the possibility of gradual development on the part of a linear system." Methods of growth such as Kenzo Tange describes can be represented in diagrammatic form and analyzed as to the counter relationship of elements.

growth

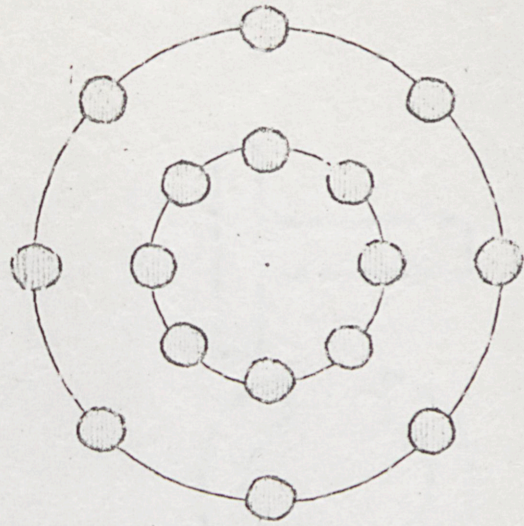
Centripetal, or radial growth begins with a single element from which new elements radiate, placing increased restrictions and congestion on the growth of the inner elements. Concentric growth which develops in a system of rings of new elements, identifies closely with the characteristics of centripetal growth in that pressure is placed on development of the inner elements. Hierarchical growth, too, indicates a form of growth in which, new elements develop from a single primary unit and expand in one direction in ever increasing stages much as the branches of a tree develop from a stump. Linear growth, which Tange relates to vertebrate structure, allows for unrestricted addition of new elements at each end with the possible expansion of elements in directions perpendicular to the main spine. This system reaches limitations when distances between elements along the spine become excessive because of the necessity to add new elements at the outer ends. The linear pattern when formed into a closed system and allowed to expand in all four directions is termed loop growth. Here, addition of new elements has been somewhat restricted by

establishing a predetermined form from which expansion occurs in each element out away from the loop, much in the same manner as the linear system. Another method of growth, that of expansion along a grid, completely removes the importance of any one single element and sets no restriction on the direction of growth which must occur. Each element becomes an unexpandable part of the system, which can only be enlarged by addition of a new element.

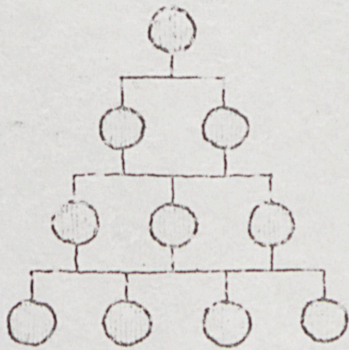
Each of the diagrams of methods of growth represents a hypothetical model of the various forms of growth which are known to exist. Certainly they do not serve to cover all shades of growth which may share certain traits. It can not be ascertained which form of growth is necessarily the ideal method, since differing expansion needs would call for various combinations of growth characteristics.



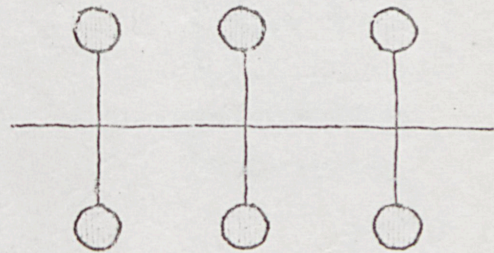
RADIAL



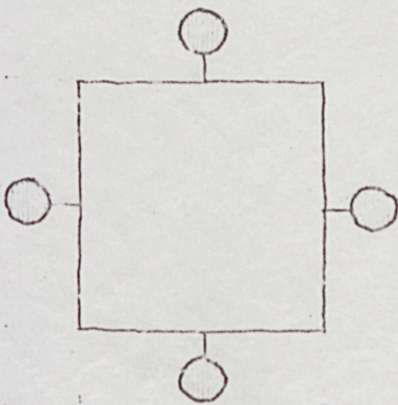
CONCENTRIC



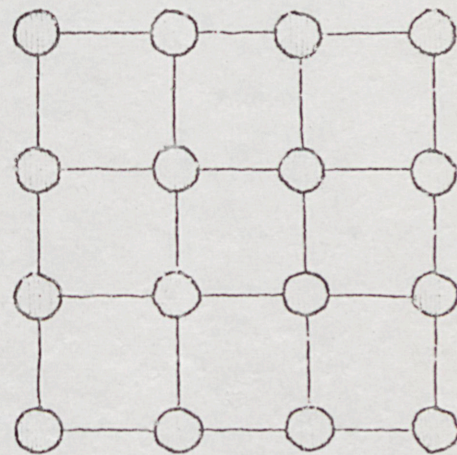
HIERARCHICAL



LINEAR



LOOP



GRID

GROWTH DIAGRAMS

A vertical sequence of seven geometric shapes, each a variation of a simple letterform. From top to bottom: a 'T' shape, a 'C' shape, a 'W' shape, a 'U' shape, an 'O' shape, a 'Z' shape, and a 'D' shape. Each shape is drawn with a single continuous line, forming a hollow outline.

As a community which has been projected to have a rapidly changing population force, and hence expanding community needs, Colstrip provides an excellent base upon which to set about conceptualizing a scheme for an additive element structure, namely a health facility. Historically, health care facilities have been shown to be victims of a lack of responsible planning for changing future needs. Rural health units are a special problem due to the lack of a sufficient number of qualified personnel and are typically obsolete before their time, over equipped, and overcostly.

In order to responsibly plan a health care program for a community, a comprehensive study must be made of the drawing area for a facility, taking into account potential for growth and the new facility's relation to existing health units. From this data then, a core unit can be designed to meet the present needs for the community, from which planned extensions will generate with added need.

The Colstrip area presents an added feature of potential for change which is not often

correlation

considered in planning projects of any nature. As a mining town of the typical nature, the community will most likely grow to a peak, drop off, and at some point stabilize. This stabilization point is hard for statisticians to predict, but at any rate the problem presents an emphasized version of a mobile society, highly incompatible with a fixed, closed form of architecture.

One of the most critical problems facing rural residents is a lack of sufficient health care due to a scarcity of qualified medical personnel. Newly graduated physicians simply do not want to practice in an area with limited resources, both salary and socially wise, if they have a choice. The typical rural doctor is an elderly man who himself may not be in outstanding physical health, but has been in the community for a good many years. There are occasions of younger physicians being induced into rural areas for various reasons, but this is not the general practice. Organizations such as WAMMI are striving to alleviate the problem by programs which would encourage, if not require, that rural medical students return to their states to do

medical on the job training. HDSC, an organization from Salt Lake City, has proposed a contractual agreement with rural communities to supply the needed personnel and equipment plus the enticement of communication with a medical school to increase diagnostic up-to-dateness. It is not the architects concern to attempt to solve the problem of supplying adequate staff, but he must be aware of the problem in order to intelligently design feasibly functional spaces for an anticipated work force.

Colstrip is characterized by rolling hills and occasional ridges and bluffs. The topography generally is conducive to building and road construction, although some areas will require grading.

The east fork of Armells Creek flows seasonally through the vicinity in a meandering path. The creek floods periodically in some areas, primarily east of the townsite.

The semi-arid climate limits the vegetation that will survive without irrigation. Viable plant life consists primarily of short grasses, scrub brush and evergreens.

Precipitation has ranged from an annual maximum of 19.34 inches in 1953 to a minimum of 10.10 inches in 1952. The annual mean temperature is 46 degrees. Maximum recorded high is 110 degrees and minimum recorded low is -50 degrees. Predominant winds are from the northwest in winter and from the southeast in summer. Maximum wind velocity recorded in the area is 73 miles an hour, with short gusts up to 95 miles an hour. The construction season normally extends from March through November.

service determination...profile

One of the largest surface coal mines in the nation is at Colstrip. The mine was opened in 1923 by the Northern Pacific Railway. Opening of the mine coincided with construction of the town of Colstrip.

The town was owned and operated by the railroad company until 1958, when mining ceased. Until that time, the coal was used to power rail locomotives. The switch to diesel locomotives ended the demand for coal and mining.

The Montana Power Company purchased coal interests and Colstrip in 1959. Mining was resumed in 1968 under the supervision of Western Energy Company, a coal-mining subsidiary of Montana Power Company.

Coal mined at Colstrip initially supplied the J.E. Corette steam electric generating plant in Billings, Montana. Since then coal has been sold as fuel for other utility companies. The present fuel supply area extends east to Chicago.

The town has maintained its original size except for the 1958-1968 period when only a custodial crew and a few ranch families lived there.

Western Energy Company provides those community facilities that usually are the responsibility of local government. Housing is owned by the Company and rented to community residents. The only exceptions to company-owned facilities are two churches and the school.

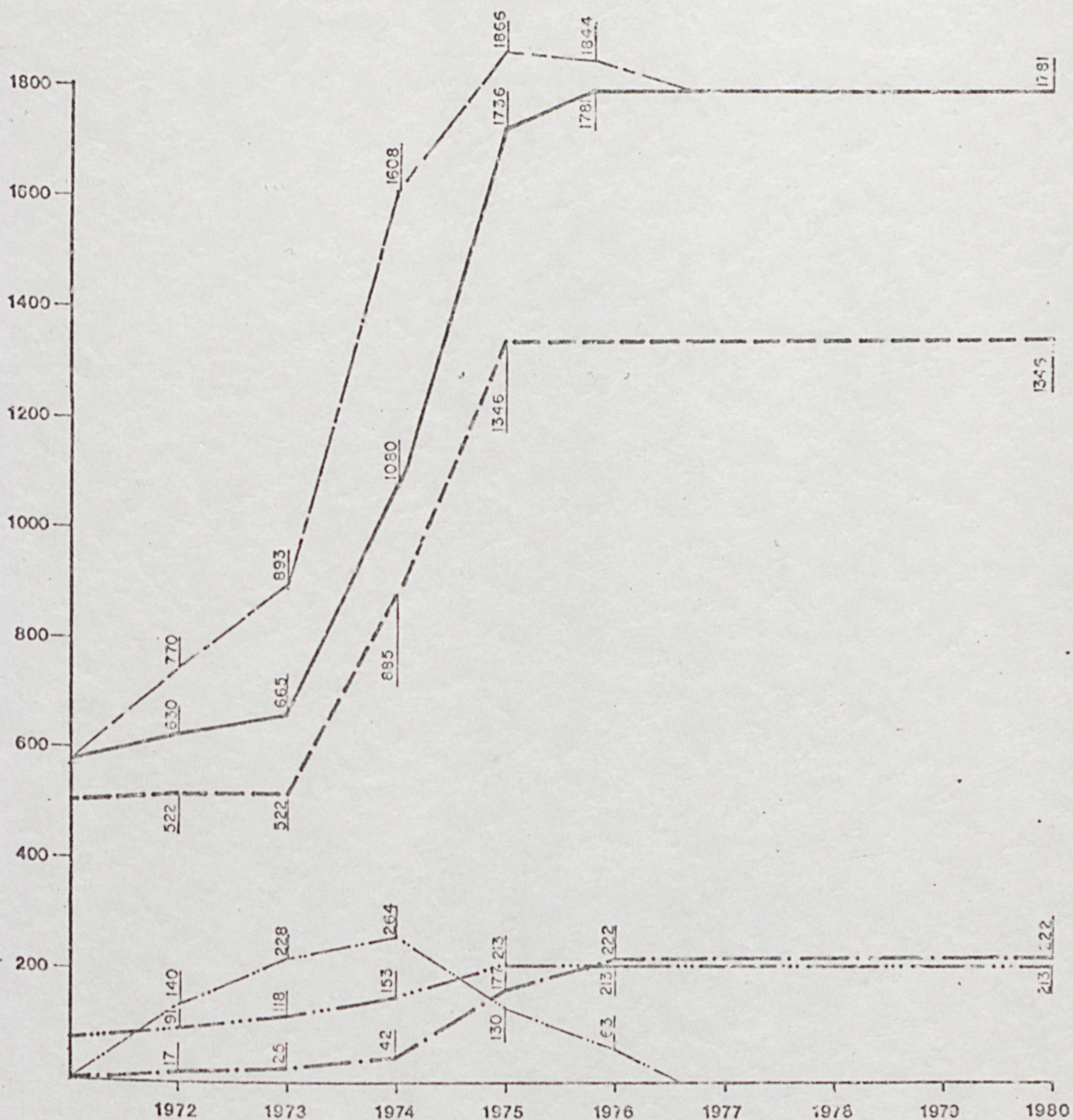
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Rosebud County, of which the Colstrip community is a member, occupies approximately 5,036 square miles covered sparcely by a projected 1975 population of around 6,000, not including growth projections resulting from stepped up mining operations in the Colstrip area.

A population projection done by the Westinghouse Corporation for Western Energy lists the projected population of Colstrip by year till 1986 as follows.

Year	Population
1974	3750
1975	4626
1976	4400
1977	5496
1978	6025
1979	4168
1980	3465
1981	3521
1982	3577
1983	3634
1984	3691
1985	3747
1986	3804

Population Growth - Colstrip, Montana



- TOTAL PERMANENT POPULATION
- - - WESTERN ENERGY COMPANY
- . - MONTANA POWER COMPANY
- . . SERVICE POPULATION
- . . BECHTEL CORP
- - - TOTAL POPULATION (including temporary population)

The year 1979 taken as a median in the development stage can be broken down into representational age groups weights in the following fashion.

Age	Number	Percent
0-4	408	9.8%
5-11	588	14.1%
12-13	168	4.0%
14-19	529	12.7%
20-44	1665	40.0%
45-64	696	16.7%
65-	114	2.7%
	4168	100 %

Though these projections are already somewhat doubtful, they can never the less be used together with various other surveys as a worthwhile means of predicting expansions and contractions which must be allotted for as well as giving an indication of the dispersion of age groups, a primary interest of planning comprehensive health care.

It is therefore predicted that 40% of the future mining population will be 20-44 years of age as might be expected of such a work force.

Tables listing important causes of death by age group indicate that the major cause of death for this age group is vehicular accidents followed by other types of accidents and heart diseases in the older portion. Another 40% of the future projected population will be less than 20. Here again the tables indicate the major sources of death to be accidental followed by birth injuries in the lower age groups. Though such tables may only indicate the areas of emphasis in emergency care, certainly such projected age group dispersions can be correlated to a need for obstetric, pediatric, and certain health education services to also be included in the facility at a future date.

The current population of Rosebud County is served by two doctors, one dentist, a public health nurse, and one Indian health doctor and an assistant to serve over 2,000 Northern Cheyenne Indians of which 75-80% are registered tribal members and hence eligible for Indian Public Health Service. With the exception of the Indian health personnel located in Lane Deer, all the professionals are located in Forsyth, the

county seat. Adding to the problem is the fact that both doctors are elderly men and one is in ill health himself. Both doctors in Forsyth refuse to work on weekends or after hours and the Indian health service may be without medical staff when the term of service of the current physicians is over, possibly without replacements.

Obviously with one of the lowest physician to population ratios in the state, Rosebud County is in dire need of medical care without the added burden of Colstrip's expansion potential. In a survey conducted by M.S.U. graduate students of community service needs for a planning study, Colstrip residents already list inadequate health care as a top priority which needs immediate consideration and implementation. Current plans for Colstrip call for a clinic to be located within a new commercial shopping center which is nearing the construction stage. However, should the need for health care reach the stages possible with added populations generated by stepped up mining pooled with the loss of public health professionals on the Northern Cheyenne Reservation, Colstrip would not only need a minimal clinic as

MONTANA



PHYSICIAN : POPULATION RATIO

COUNTRIES WITHOUT PHYSICIANS

No. 1052 — County Outline Map
STATE PUBLISHING COMPANY
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called for in the current plans, but a potential for expansion to respond to advancing health needs, which could not easily be met within a shopping center.

I am proposing to prove that the health needs of the Colstrip community can be best met by a planned scheme of phasing which reflects the corresponding community population trends. At this point in the process I am visualizing a care clinical unit which can be expanded to meet an increased volume to the point that auxiliary services begin to develop at the necessary time and place. In order to realistically plan the order of phasing, it is necessary to make a complete study of the loading of each individual department, their relation to each other, existing services and their coverage, and the community's individual health needs. The result will be partially theoretical, based on estimated population growth and logistics of needed service, and partially practical as a planning basis for health care facilities.

Through this process, I will endeavor to create a building which not only has the advantage

of being functionally adaptable to change, but also imparts an architectural aesthetic of dynamic continuation, a visual statement of the intended solution.

IMPORTANT CAUSES OF DEATH BY AGE GROUP
Montana, 1971
(By place of residence)

CAUSE OF DEATH	No.	Percent	Rank Order
UNDER 1 YEAR			
Total, All Causes	267	100.0	
Birth injury, difficult labor and other hypoxic & anoxic conditions	83	31.1	1
Congenital malformations	42	15.7	2
Immaturity unqualified	40	15.0	3
Other diseases of early infancy (exclusive of infections)	22	8.2	4
VIOLENT & ACCIDENTAL DEATHS	17	6.4	5
Pneumonia, all forms	16	6.0	6
All other causes	47	17.6	
1-4 YEARS			
Total, All Causes	50	100.0	
ACCIDENTS, EXCLUSIVE OF MOTOR VEHICLE	18	36.0	1
MOTOR VEHICLE ACCIDENTS	7	14.0	2
Congenital malformations	5	10.0	3
Pneumonia, all forms	4	8.0	4
HOMICIDE	4	8.0	4
All other causes	12	24.0	
5-14 YEARS			
Total, All Causes	74	100.0	
ACCIDENTS, EXCLUSIVE OF MOTOR VEHICLE	26	35.1	1
MOTOR VEHICLE ACCIDENTS	24	32.4	2
Malignant neoplasms	10	13.5	3
All other causes	14	18.9	

SOURCE
MONTANA STATE DEPARTMENT OF HEALTH & ENVIRONMENTAL SCIENCES
BUREAU OF RECORDS & STATISTICS

IMPORTANT CAUSES OF DEATH BY AGE GROUP
 Montana, 1971
 (By place of residence)

CAUSE OF DEATH	No.	Percent	Rank Order
15-24 YEARS			
Total, All Causes	213	100.0	
MOTOR VEHICLE ACCIDENTS	99	46.5	1
ACCIDENTS, EXCLUSIVE OF MOTOR VEHICLE	38	17.8	2
SUICIDES	22	10.3	3
Malignant neoplasms	10	4.7	4
Injury undetermined whether accidents or purposely inflicted	10	4.7	4
HOMICIDES	8	3.8	5
All other causes	26	12.2	
25-34 YEARS			
Total, All Causes	162	100.0	
MOTOR VEHICLE ACCIDENTS	42	25.9	1
ACCIDENTS, EXCLUSIVE OF MOTOR VEHICLE	26	16.0	2
Malignant neoplasms	16	9.9	3
SUICIDES	16	9.9	3
HOMICIDES	11	6.8	4
INJURY UNDETERMINED WHETHER ACCIDENTS OR PURPOSELY INFLECTED	9	5.6	5
All other causes	42	25.9	
35-44 YEARS			
Total, All Causes			
HEART DISEASES	51	19.8	1
Malignant neoplasms	44	17.1	2
MOTOR VEHICLE ACCIDENTS	33	12.8	3
ACCIDENTS, EXCLUSIVE OF MOTOR VEHICLE	30	11.7	4
SUICIDES	17	6.6	5
Cerebrovascular disease	14	5.4	6
All other causes	68	26.5	

SOURCE

MONTANA STATE DEPARTMENT OF HEALTH & ENVIRONMENTAL SCIENCES
 BUREAU OF RECORDS & STATISTICS

IMPORTANT CAUSES OF DEATH BY AGE GROUP
Montana, 1971
(By place of residence)

CAUSE OF DEATH	No.	Percent	Rank Order
45-54 YEARS			
Total, All Causes	540	100.0	
HEART DISEASES	145	26.9	1
Malignant neoplasms	126	23.3	2
ACCIDENTS, EXCLUSIVE OF MOTOR VEHICLE	38	7.0	3
MOTOR VEHICLE ACCIDENTS	31	5.7	4
SUICIDES	27	5.0	5
Cerebrovascular disease	23	4.3	6
Cirrhosis of liver	20	3.7	7
All other causes	130	24.1	
55-64 YEARS			
Total, All Causes	990	100.0	
HEART DISEASES	394	39.8	1
Malignant neoplasms	215	21.7	2
Cerebrovascular disease	57	5.8	3
Cirrhosis of liver	32	3.2	4
ACCIDENTS, EXCLUSIVE OF MOTOR VEHICLE	29	2.9	5
Bronchitis, emphysema & asthma	28	2.8	6
MOTOR VEHICLE ACCIDENTS	27	2.7	7
SUICIDES	22	2.2	8
All other causes	186	18.8	
65 AND OVER			
Total, All Causes	4,304	100.0	
HEART DISEASES	1,734	40.3	1
Cerebrovascular disease	692	16.1	2
Malignant neoplasms	627	14.6	3
Pneumonia, all forms	153	3.6	4
Arteriosclerosis	150	3.5	5
Bronchitis, emphysema & asthma	106	2.4	6
Diabetes mellitus	93	2.2	7
ACCIDENTS, EXCLUSIVE OF MOTOR VEHICLE	91	2.1	8
All other causes	658	15.3	

SOURCE
MONTANA STATE DEPARTMENT OF HEALTH & ENVIRONMENTAL SCIENCES
BUREAU OF RECORDS & STATISTICS

Of primary importance to the development of a health care program is an extensive survey of supporting facilities, access, medical personnel, and the anticipated service area with considerations towards peculiar demographic characteristics. Since the extent of health service is to be represented in a series of phases demonstrating growth potential, it is necessary to examine the existing health care coverage to justify additional services in Colstrip. Although it will be the intent of this project to propose a phased health care program to meet the future needs of the Colstrip community in relation to a logical regional centralization of medical specialties, it will also be demonstrated how certain medical specialities can be adapted to a core unit, hence broadening the conceptual application.

Supporting facilities are those medical facilities which residents of the Colstrip community and surrounding areas necessarily rely on for health care and are categorized into three types depending on extent of service. Major hospitals, two in Billings and one in Miles City are located in centers of population which can

... regional facilities

support specialized personnel and diagnostic and therapeutic equipment. The major hospital fulfills the health needs of those requiring special care and treatment and should be operated on a referral basis from smaller facilities.

The Montana Licensing Law and Standards for Hospitals and related institutions defines the major hospital thusly:

General Hospital - In order to receive this classification every generalized hospital of 100 beds or more must provide the facilities and services enumerated below. Other generalized hospitals having less than 100 beds, but providing these facilities and services, may also receive this classification, upon request. To be licensed, such an institution must provide complete medical and surgical care to the sick and injured and complete obstetrical care through:

a. An organized staff of qualified professional, technical and administrative personnel with a chief, or chairman, of the attending staff and appropriate hospital department heads.

b. An approved laboratory with standardized equipment necessary for performance of bio-chemical bacteriological, serological, hematological and parasitological tests, and the services of a consulting clinical pathologist. Necessary equipment shall be available for the preparation of pathological specimens. Surgical tissues, if not examined in this laboratory shall be submitted to an approved laboratory with a clinical pathologist for examination.

c. X-ray facilities with the services of a consulting radiologist. These facilities shall include, as a minimum, a complete radiographic unit consisting of a transformer, tube stand, table with fluoroscopic equipment adjustable to horizontal and vertical positions, a viewing box, and a dark room equipped for the developing of films. Stereoscopic equipment is recommended.

d. A separate surgical unit with the following as minimum facilities: an operating room, sterilizing room, scrub room, work room, and dressing room.

e. An isolation unit consisting of a sufficient number of rooms according to the size and needs of the hospital that may be isolated as a separate section with separate lavatory and toilet facilities.

f. Separate maternity facilities including a segregated maternity department with wards or rooms for patients and with a delivery suite including labor rooms, delivery rooms, scrub facilities, sterilizing facilities, and work room all completely separated from the surgical department and all exclusively designated and used for maternity patients only, except as provided for in Part VII. A nursery or nurseries with examination and work room shall be provided for newborn infants.

g. A mental unit shall be provided in a section which can be separated from other patients. For existing facilities, if this cannot be provided, there shall at least be facilities for the temporary handling of mental patients in the community either through this hospital or a second hospital in the community. The isolation facility and mental unit facility may be used interchangeably. Alcoholics and temporarily disturbed patients are included in this category.

Small hospitals, located in Forsyth and Hardin, are generally overly costly to operate and inefficiently staffed, but a necessary function of delivering health care to remote areas. The small hospital typically offers from ten to thirty beds of general to specific patient care depending on the special treatments which may be available at each individual facility. Statistically, nursing care units of less than fifty beds create problems with efficient personnel and reasonable cost. However, the small hospital fulfills the needs of persons needing general patient care for short periods of time who would otherwise have to traverse long distances away from friends and relatives who would desire ease of communication. The small general hospital is defined thusly:

Small General Hospital - In order to receive this classification every generalized hospital of 10-39 beds must provide the facilities and services enumerated below. Other generalized hospitals having less than 10 beds but providing these facilities and services, may also receive this classification, upon request. To be licensed as such, the institution must provide medical and surgical care to the sick and injured and obstetrical service through:

a. A staff of qualified personnel organized with a chief, or chairman of the attending staff.

b. The services of an approved laboratory shall be readily available. Hospitals in this classification shall have as minimum facilities within the institution suitable space, laboratory equipment and supplies for the performance of urinalyses, blood counts, and blood cross matching.

c. An operating room with standard equipment, including adequate facilities for sterilization of surgical supplies and instruments, scrub room, dressing room and work room.

d. Isolation facilities, preferably as an isolation unit, but at least consisting of patient rooms, which may be used for cases requiring isolation, each room being provided with a lavatory and preferably a toilet.

e. Maternity facilities consisting of wards, or rooms, for patients; a delivery room with standard equipment, facilities for scrub-up and a labor room all exclusively designated and used for maternity patients, except as provided for in Part VIII. There shall be a nursery for newborn infants.

f. A mental unit shall be provided in a section which can be separated from other patients. For existing facilities, if this cannot be provided there shall at least be facilities for the temporary handling of mental patients in the community either through this hospital or a second hospital in the community. The isolation facility and mental unit facility may be used interchangeably. Alcoholics and temporarily disturbed patients are included in this category.

It is recommended that consulting radiologist and pathologist services be arranged for, for the purpose of general supervision and for receiving surgical tissue specimens and X-ray films for interpretation and diagnosis.

X-ray facilities may consist of a portable X-ray unit provided a full sized X-ray unit is available within one hour's time from the hospital.

Where there are two or more physicians, one shall be appointed as chairman of the attending staff.

Clinical facilities, the basic health unit in a regional plan, are normally operated in conjunction with a general practitioner and can be conceptualized as the preliminary phase of health care delivery. Metropolitan areas often offer specific clinical treatments such as drug treatment or tuberculosis clinics to meet a high volume for need generated by a dense population. However the rural clinic must respond to a limited base of general common illnesses with the ability to meet certain specialized health needs which may be peculiar to a community. A clinical facility when combined with a minimum nursing care unit is termed a community health facility. It is defined in the licensing standards thusly:

Community Health Facility - To be licensed as such the institution must provide medical care, with normal maternity service, emergency medical care, minor and emergency surgical care, have at least one resident physician in the community and on the institution staff, and have less than 10 beds. The facility shall have:

a. The services of an approved laboratory, and must have as a minimum, facilities for urinalyses, blood counts and blood cross matching.

b. X-ray facilities to include a portable X-ray unit, as a minimum.

c. A well equipped emergency room in order that it may also be used for minor surgery and emergency surgery, including adequate sterilization and blood transfusion facilities.

d. Maternity facilities consisting of at least two beds in the same or separate rooms designated exclusively for maternity patients, a delivery room and a nursery for newborn infants.

e. Isolation - There shall be at least one room equipped with a lavatory that may be used for isolation as needed.

Accessibility plays a major role in determining the placement of a new health facility in relation to supporting facilities. The elements of the new facility can be determined in part by the ease of accessibility to existing health care centers. One immediate factor which must be considered is the condition of connecting

Accessibility

highways and the urgency of year round passability, in order to gain an idea of the time factor involved in seeking various forms of health care. Coupled with the condition of the highways and the distances involved is the availability of ambulance service to take patients elsewhere to an established facility. To a certain degree the placement of air fields plays a role in the planning of health facilities in the case of critical emergencies, where accessibility to specialized major hospitals is important.

In conjunction with planning the new facility with regards to existing supporting facilities must be a consideration of relative accessibility of various medical professionals in order to determine a probable staff load. The basic core staff could consist of a general health care team which would develop specialists to respond to a rapidly growing population.

In addition to accessibility of medical personnel is the consideration of health care competency, i.e. age, experience, and extent of service.

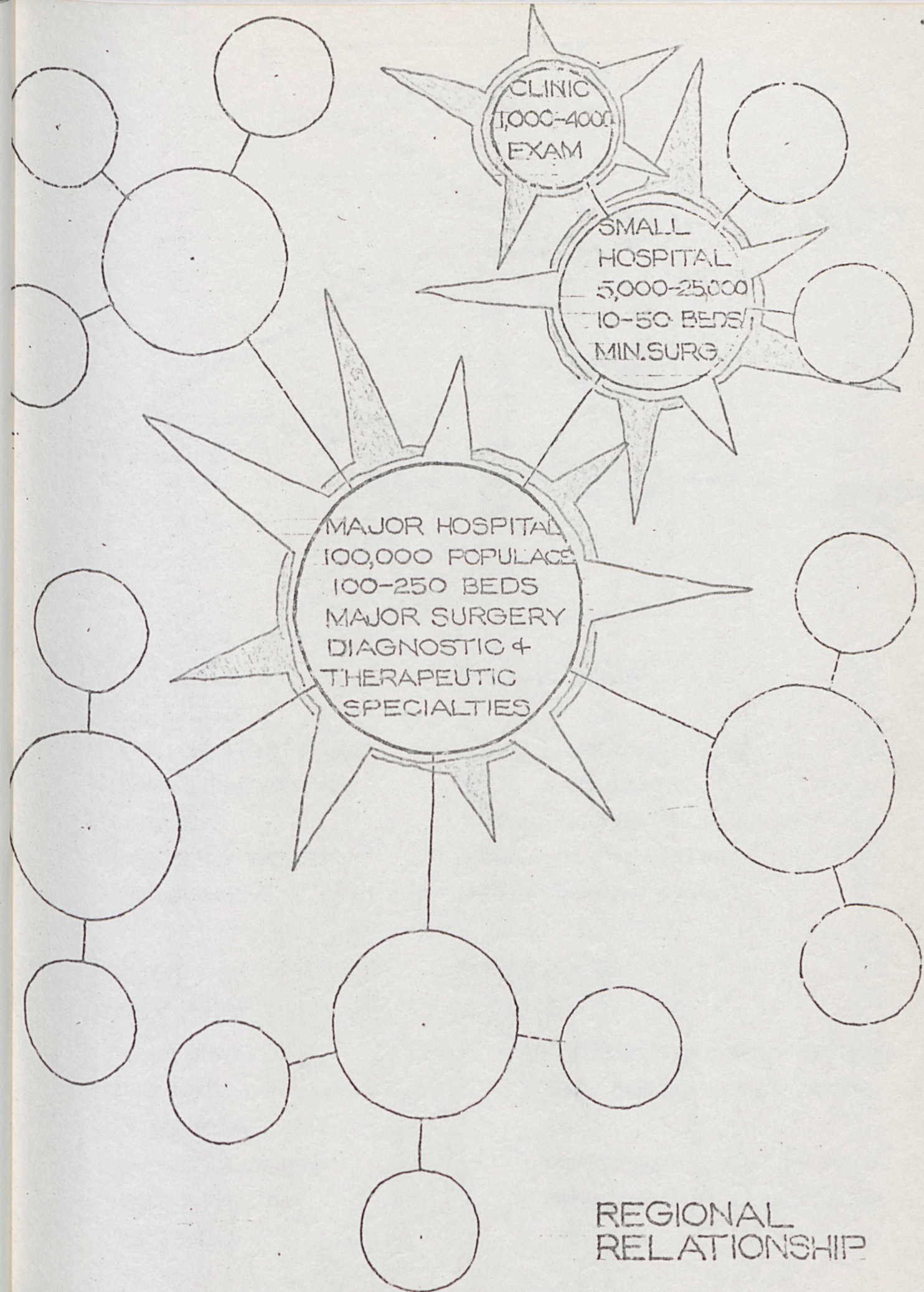
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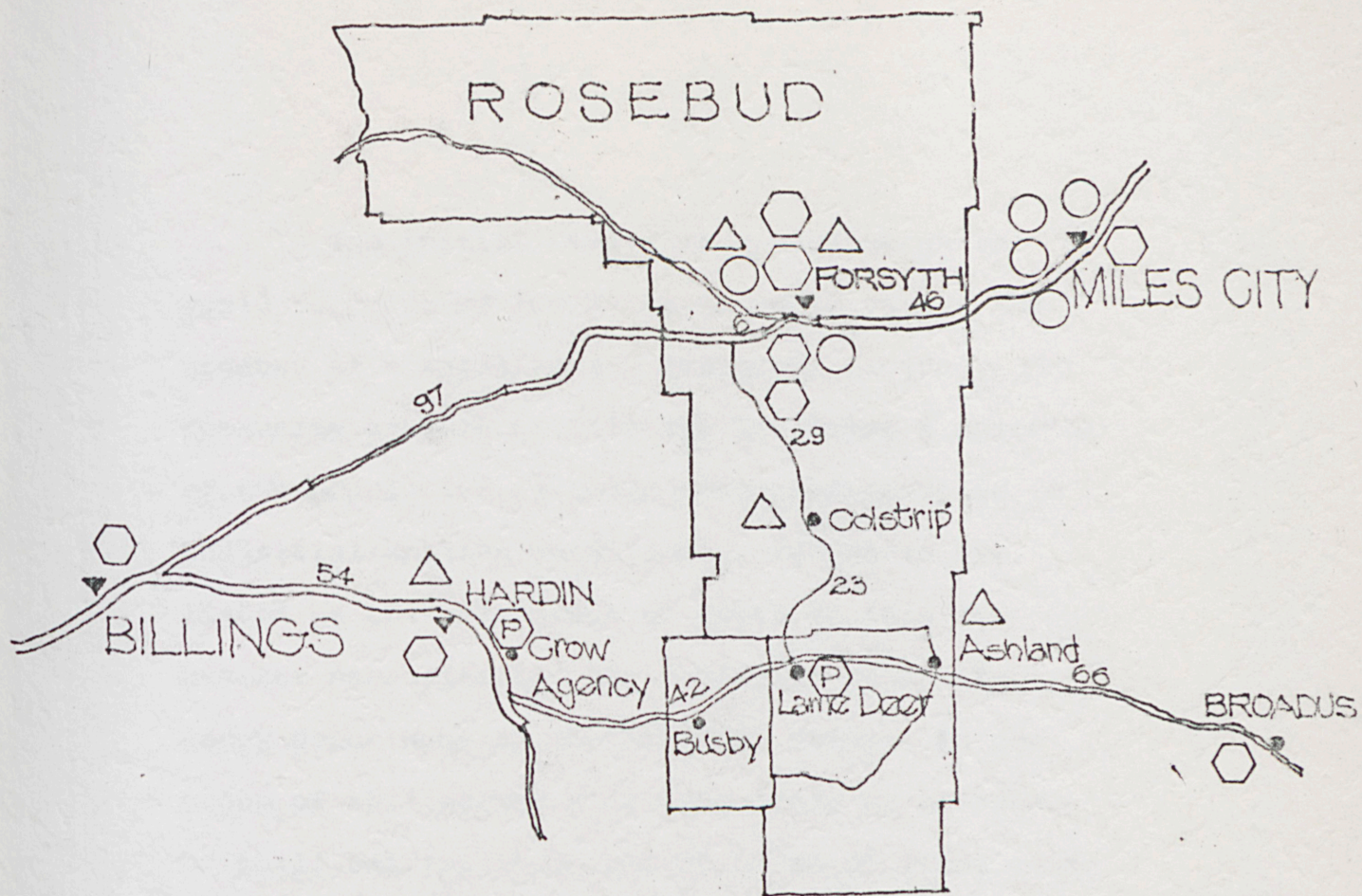
Forsyth currently has two physicians, both of which are elderly and not willing to meet health needs after hours.

Other personnel have been categorized as dentists, pediatricians, gynecologists, and internal medicine specialists. The location of these personnel with respect to Colstrip will indicate whether sufficient need exists for including specialized facilities within the Colstrip unit.

The service area could be described as that immediate area of population within which people could be expected to seek the forms of health care which would be offered at the proposed facility. Obviously, the anticipated service area depends to a great extent on the accessibility of supporting facilities and medical personnel at those facilities. For instance, the loss of public health personnel at the Lame Deer clinic could necessitate the expansion of the service area to include part of the Northern Cheyenne reservation.

...service area





REGIONAL FACILITIES

- MAJOR HOSPITAL
- SMALL HOSPITAL
- CLINIC
- NURSING HOME
- PHARMACY

ACCESSIBILITY

- △ LANDING FIELD
- △ AMBULANCE
- == DIVIDED FOUR LANE
- == MAJOR HIGHWAY
- NARROW PAVED

MEDICAL PERSONNEL

- GEN. PRAC.
- DENTIST
- SURGEON
- GYNECOLOGIST
- PEDIATRICIAN
- INT. MED.

SERVICE AREA

- FUTURE COLSTRIP GROWTH AND SURROUNDING AREA
- POSSIBLE LOSS OF P.H.S. PHYSICIAN IN LAME DEER

The initial health care package which would be proposed for Colstrip would stress the urgency of a satisfactory emergency program. The community profile of Colstrip indicates a majority of the population is under forty and occupied in industrial working conditions. Accidents are listed as the main cause of death in this age bracket necessitating the inclusion of an emergency department in the earliest stage. An age group of this nature will also imply an abundance of child bearing women and children of young ages. Facilities for routine inspection of such should be provided with provision for emergency delivery if necessary. The nearest gynecologist or pediatrician is located in Miles City requiring any cases needing specialized service to be referred either there or to the hospital in Forsyth.

An office for a public health nurse will be allotted in the initial stage to compensate for social health matters not requiring the expertise of a physician. Based at the clinic, she would operate throughout the community especially working through the school system.

A physician's examination services are

phasing services

also demanded by the residents of Colstrip, requiring an office and a typical group of examination rooms. Since a full time doctor may not be easily acquired in the first stage of operation, a treatment room for patients needing shots, or physical examinations or the like should be included.

Both the emergency and examination procedures will require the services of a lab and radiology equipment. Such services may be forced to operate on a scheduled periodic basis, when the proper personnel can be present. A small pharmacy can also be operated on this basis as a branch of a commercial business or as a scheduled stop for a traveling pharmacist.

As the community grows to the anticipated levels, increased inconvenience of traversing the distance to either Forsyth or other medical facilities will call for the addition of further examination service with the possibility of space for a dental practice. Although there is currently a dentist practicing in Forsyth; a population of 1800, which Colstrip is projected to reach, this

is thought to be a profitable field for a practice.

As Colstrip begins to lose its migrant residents employed in construction activities, the community is expected to stabilize in a permanent pattern of residents. Such a population will have generated a larger share of elderly residents who have developed ties to the community, calling for a small nursing care unit which will be operated on a short term basis such as for recovery from minor surgery or maternity cases. The average stay would not be expected to last longer than a week except in special cases.

Such an expansion of services would correspond to a similar expansion of administrative services caused by the need for larger book-keeping space and administrative functions.

The nursing care unit would also necessitate the addition of food preparation space with the possibility of dining space for employees.

Minor surgery and delivery are accomplished in additional emergency rooms to be transported to the nursing unit.

1975

COMMUNITY CLINIC PHASE 1

EMERGENCY MED. AND SURG.
X-RAY
LAB
PHARMACY
GENERAL EXAM.



1980

PHASE 2

DENTISTRY
HEALTH OFFICE



1990

RURAL HOSPITAL

OBSTETRICS
MINOR SURGERY
NURSING UNIT
KITCHEN
ADMINISTRATION



EXPANDING
ROLE

Department Name: EMERGENCY

Description: Probably the most urgent if not the most important branch of health care. The emergency department of a clinical operation deals with sustaining injuries until the patient can be transported to a more advanced facility if necessary. The basic department would consist of an emergency treatment room (168 ft²), a recovery room (120 ft²) and storage for wheelchair and stretchers (45 ft²). The demand for medical care has experienced a large increase in Montana as throughout the nation. Studies have shown the patterns and pressures of emergency services in American hospitals. Problems have been identified such as: the over-utilization of the emergency department for non-urgent medical problems; and the tendency to substitute the emergency room care for care by a private physician. Other influencing factors have been noted such as the inability of patients to find a physician in time of emergency, especially at night, on weekends, and on holidays; the economic advantage of using hospital emergency facilities because of insurance

the facility...elements

coverage; the recognition by the public of the hospital as a center of community medical care where the best facilities and staff should be available; the increasing use of these facilities by doctors themselves, a large number of whom refer patients directly to the emergency department or arrange to meet patients there, especially on weekends and at night, when their offices are closed, or when the physician recognizes that the facilities in his office are inadequate for diagnosing and treating the condition at hand. In addition, increased longevity, accompanied by increased frequency of emergency illnesses in the older age group and the increase in automotive and industrial injuries result in greater utilization of emergency rooms.

The emergency department is increasingly used by low-income groups. These groups tend to seek health care not on a preventive basis, but rather on a crisis basis. It also has been shown that low-income families tend to use the emergency department as a source of ongoing care, while high-income families use it for true emergencies.

On a national level, non-emergency cases in emergency departments run from a low of about 15 percent of all visits to a high of approximately 90%. In 1966, the Division of Medical Sciences of the National Academy of Sciences reported that more than two-thirds of the 40 million emergency room visits in 1966 could not be classified as emergent.¹

White and O'Connor in determining the degree of urgency from emergency room records, and physicians found that emergent cases resulted in 3.3% of the visits to the emergency department; urgent cases were 57.1% and 35.9% were non-urgent cases. Scheduled procedures such as cast changes or minor surgery attributed to 3.3% of the visits.

The utilization of emergency departments in Montana parallels the national situation. From hospital records, it has been established that the hospital outpatient load in Montana (1972)

¹Emergent: threatening to life or limb without immediate medical attention; acute and usually severe. Urgent: requiring medical attention within a few hours; acute but not necessarily severe. Non-urgent: not requiring the resources of an emergency room, non-acute, minor severity.

was almost 432,000 visits. Only about 26% of these visits were listed as actual emergency cases. Thus, 74% of all hospital outpatient visits in Montana, which is almost all cases means emergency department visits, were for non-emergencies.

A suggested method of solving the overloaded emergency department would be to eliminate the major causal factors of the overloading, a significant cause being the scarcity of alternate sources of medical care. For many, especially the low-income group, the emergency department is, of necessity, the initial point of entry into the health care system.

The development of alternate care facilities for the non-urgent patient should be considered. Concurrently, educational programs for the general public on the proper function of the emergency department would have to be implemented. The use of other types of outpatient facilities should be emphasized for non-urgent patients.

These alternate sources of primary care could take the form of ambulatory care centers, primary care centers, neighborhood health clinics, and outpatient departments that stay open evenings

and weekends. Efforts would be made to separate the persons wanting primary care from those who are acutely ill or severely injured.

Perhaps a more practical solution to the over crowding of emergency departments in Montana would be to accept all patients in the emergency department, regardless of the nature of their complaints, and to expand the emergency departments' outpatient capabilities to accommodate them. This approach would not only allow the hospitals to continue to serve the health care needs of the non-emergent patients, but would contribute to the actual improvement of such services. In view of the recent trends in outpatient care being provided in the emergency department, this latter proposal would probably be easier to implement by the hospitals themselves and would be more readily acceptable to the patients.

Activities: Although the emergency department is often misused as a place of checking minor illnesses, the major functions are:

- a. Control of major external hemorrhage,
- b. Primary care and closure of wounds,

- c. Administration of intravenous drugs, fluids and blood,
- d. Immobilization of fractures,
- e. Cardio pulmonary resuscitation emergency steps,
- f. Cardio pulmonary resuscitation definitive therapy,
- g. Management of life-threatening cardiac dysrhythmias,
- h. Endotracheal intubation and ventilation,
- i. Tracheostomy,
- j. Aspiration - joint,
- k. Aspiration - abdomen,
- l. Aspiration - chest,
- m. Decompression of pleural space,
- n. Decompression of pericardial space,
- o. Treatment of poisonings, including gastric lavage.

Blood shall be readily available from an established blood bank or from local donors on roster.

In certain cases the emergency treatment room can be utilized for minor surgery or deliveries.

The observation room is used for recovery or possibly for sobering up.

Furniture and Equipment: Essential to any emergency treatment room is an examination table (2'x 6') and a portable emergency light. A scrub sink within the room would become necessary to most operations with a counter cabinet combination for storage of instruments. For resuscitating patients, a portable oxygen system and anesthesia unit would be required. A defibrillator would be a handy item in critical cases. The emergency department shall be equipped with surgical equipment, airway control and ventilation equipment, suction devices, gastric lavage equipment, intravenous fluids, and drugs and supplies. Electrocardiograph-defibrillator shall be readily available for use in the emergency department.

Participants: Nursing staff capable of handling the average load with provision for peaks. A physician should be available to a patient within 15 minutes of arrival. Nursing staff should not be relied on for administrative tasks. Registered nurse, surgical training, L.P.N. or male orderly. Any public accompanying injured may also be allowed in the area.

A designated physician shall be on-call from in-house or outside the hospital 24 hours a day. The department shall be staffed by a registered nurse or a licensed practical nurse (under the immediate supervision of a registered nurse), who shall be on-call in-house 24 hours a day, and other allied health personnel. All must be trained in emergency lifesaving procedures.

The quality of staffing is the determinant of emergency departments' functional excellence. The "on-call" system of coverage of most of Montana's hospitals is, in many instances, outmoded and unproductive. To function in conformity of today's high medical standards and provide the community with their crucial services, emergency departments should, whenever possible, have full-time coverage by physicians who limit their practice to emergency medicine. The full-time practice of emergency medicine is emerging as a new medical specialty. There is a welcome trend for community hospitals to initiate efforts to establish this type of coverage.

There are various acceptable methods for staffing emergency departments which (not

necessarily in order of preference) include:

1. Voluntary service of staff members and assignment of them on a rotational, on-call basis as indicated in a roster. The roster is periodically prepared by the emergency department director and should be posted in the department, at the hospital switchboard, and other suitable places.

2. Compulsory service by all active or attending staff members, regardless of specialty, on a rotational on-call basis. The rationale for compulsory emergency department service is that such service is an obligation imposed by the acceptance of admitting privileges and staff membership.

3. Compulsory or voluntary assumption by staff physicians of responsibility for medical coverage in the emergency department for rotated periods. Each doctor has advance notice of his assignment and is spared from frequent and irregular calls at inconvenient times.

Codes and special considerations: Doors to emergency treatment rooms should be at least

3' 8" wide. Oxygen cylinders must be stored separate from anesthesia cylinders. If plaster casts are to be applied a plaster trap should be provided. Ceiling should be not less than 9'.

Privacy: Critical

Orientation: Not a factor other than accessibility to emergency entrance.

Transient nature: Relatively inflexible

Growth nature:

Floor area: 333 ft²

Department Name: NURSING STATION

Description: The nursing station of the basic medical core first evolves in response to the needs of the emergency patient. The nursing staff should be so located as to be immediately receptive to incoming cases. The station would consist of a seating and charting area (120 ft^2) toilet facilities (80 ft^2) and staff storage area (10 ft^2) and medication room (36 ft^2). The preliminary nursing station will also handle reception.

Activities: Although the nursing station serves as the immediate reactor to emergency cases, the bulk of the workload will come from outpatient service. The nursing station as the home base for the nursing staff, becomes the intermediary between doctors orders and patients. Nurses must keep charts, prepare medications, and confer with doctors. Reception of patients will occur here in the basic unit.

Furniture and Equipment: Cabinet storage and a counter for medication preparation are necessary for treatment of outpatients as well as

a sink. Desk space for several nursing staff is required for keeping charts, along with chart racks. X-ray reading illuminator might be located here. Cabinet files for current patients would have to be nearby. A refrigerator is needed in the medication room.

Communications equipment shall be available and operating for in-hospital coordination. In addition, direct two-way radio service available between hospital, ambulances, and other appropriate emergency service personnel is required. This should be integrated with the state-wide Emergency Medical Service Communications Plan.

Participants: One head nurse to supervise would be in charge of two less experienced staff members, probably an assistant nurse and an orderly. A physician will chart patient records in the nursing station.

A secretary would carry out receiving and accounting.

1. In Community Health Facilities at least one registered nurse shall be on duty for not less than eight hours each day, and at all

other times at least one readily available registered nurse shall be on call, with a minimum of one practical nurse or qualified nurse's aide on duty.

2. Practical nurses shall practice only under supervision of a registered nurse. They shall not be assigned to acute or critically ill patients except as an assistant to, or under the supervision of, a registered nurse. All treatments for the acute or critically ill patients shall be the responsibility of a registered nurse.

Codes and special considerations: Supply area for the nursing station will be covered in a later department description. For a basic medical core, the same nursing station would serve both emergency and outpatients.

Privacy: Desirable to eliminate distractions.

Orientation: Towards pleasant view if possible.

Transient nature: Quite flexible

Growth nature:

Floor area: 240 ft²

Department Name: X-RAY

Description: The use of X-ray equipment is often helpful in diagnosing emergency treatment procedure, and is therefore a worthwhile addition to the emergency department. A basic X-ray department will contain a combination radiography and fluoroscopy room (216 ft^2), dark room (64 ft^2), and changing area (20 ft^2). Any X-ray procedures in a smaller facility would be strictly diagnostic.

Activities: Radiography activities would include chest, spine, extremity, and head X-rays. Fluoroscopy activities which might be offered are gastrointestinal scans, kidney and ureter scans, and intestinal tract scans. In all cases the patient is positioned with the machine and then "photographed" by the technician from the shielded control. The film is passed through to the dark room, where it is processed, and illuminated for reading.

Furniture and Equipment: The radiography room would of course contain an X-ray table ($6' 6" \times 2'$) with a combination radiography and

fluorography unit running on a 12' ceiling track. The X-ray generator (1' 6" x 2' x 4' high) is located behind the lead lined viewing control booth. The dark room must contain a pass through box, film loading counter and cabinets, film storage bin, film dryer, developing tank, and sink. The X-ray transformer must be located above or below the room.

Participants: The X-ray patient and the operator. The X-ray department should be under the supervision of a physician, preferably a trained radiologist or one who has had special training in X-ray diagnosis. One of the nursing staff, if properly trained, could assist with procedures. Personnel operating X-ray equipment shall be qualified by education, training and experience to perform capably the assigned tasks.

Codes and special considerations: The surrounding walls, ceiling, and doors of any X-ray machine must be shielded by a lead lining. The added weight of the lead lining and X-ray equipment could cause special structural considerations.

Privacy: Critical

Orientation: Not a factor

Transient nature: Relatively inflexible

Growth nature:

Foor area: 300 ft²

Department Name: WAITING

Description: Waiting space should accompany the emergency department to compensate for those people who have brought emergency cases to the facility and must not be allowed to interfere with staff procedures. Emergency waiting could be efficiently combined with outpatient waiting in a beginning area of 216 ft^2 with toilet facilities (160 ft^2) and telephone booth. Clothing storage is also needed (12 ft^2).

Activities: The waiting area serves as a supporting space for other medical activities. The person is either waiting to gain entry to the outpatient department or waiting for another who is involved in some form of health care.

Furniture and Equipment: Seating for 15 people with various tables and magazine rack. A children's seating area could be provided to occupy interest while parents are seeking health care. Clothes hanging equipment must be supplied close to the point of entry.

Participants: The waiting area is a non staff area used by waiting patients and accompanying public. The nurse must enter the area periodically to collect patients.

Codes and special considerations: Special consideration should be placed on the orientation of the waiting room to the outside as this area can be opened by windows and serves the role of the public front.

Privacy: Not a factor

Orientation: Towards a pleasant view, away from the direct sun.

Transient nature: Quite flexible

Growth nature:

Floor area: 388 ft²

Department Name: EXAMINATION ROOM

Description: The examination room (120 ft²) serves as a private consultation space between physician and patient for scheduled and non-urgent health problems. The patient should be provided with a private changing area (2 ft²) safe from personnel interruptions.

Activities: The various forms of medical examination range from gynecologic such as pap smears to allergies and common cold examinations. A small community health center would also conduct routine physical examinations, including common vision and audiology tests on a referral basis. The patient is examined, possibly escorted to a diagnostic facility, and then often treated within the room.

Furniture and Equipment: An examination room would require an examination table 2' x 6' and a writing desk for the examining physician. A sink in each examination room is required. Space for changing, sitting, and hanging clothes must be screened from view from the room. Storage

space for minimal examination instruments must be provided for.

Participants: A physician, or physician's assistant must give most medical examinations. Nursing personnel can be utilized for such activities, as taking temperatures, blood pressure, inoculations, and specimen collection. The procedure normally consists of the patient and examiner only.

Codes and special considerations:

Privacy: critical

Orientation: North light if possible, otherwise no factor.

Transient nature: Quite flexible

Growth nature:

Floor area: $3 @ 120 \text{ ft}^2 = 360 \text{ ft}^2$

Department Name: PHYSICIANS OFFICE

Description: The examining physician requires a private office space close to the examination rooms and adjacent to the nursing station (120 ft²).

Activities: The physicians office provides a private space for recording medical histories and consultation with patients or visitors.

Furniture and Equipment: An executive type desk will be required for the doctor with several comfortable seats for consulting visitors. File cabinets for the physicians personal records and space for clothing storage should be included. An X-ray viewing screen is often provided.

Participants: One doctor to a room. The doctor may be visited at times for consultation with patients or meetings with staff or salesmen.

Codes and special considerations:

Privacy: Desirable

Orientation: Towards pleasant view

Transient nature: Quite flexible

Growth nature:

Floor area: 120 ft²

Department Name: LABORATORY

Description: The laboratory is essentially an adjunct diagnostic department in the basic medical core. The laboratory facilities serve urgent emergency needs such as blood types as well as routine urinalysis and blood tests for examinations.

Activities: Activities in a basic minimal lab unit would be mainly of an analysis nature. Categorically these functions are termed bacteriology (bacteria cultivation), serology (antigen-antibody reactions), histology (tissue tests), hematology (blood tests), cytology (cancer cells), chemistry (body fluids and materials), and urinalysis (urine tests).

Furniture and Equipment: (1) 8 cu. ft. refrigerator, (2) centrifuge, (3) lab autoclave, (4) counterwork space with sink, cabinets mostly above, (5) writing table space, (6) incubator, (7) filing cabinets, (8) bookshelves, (9) shaking machine on stand.

Participants: The laboratory should be under the supervision of a physician, preferably

a trained clinical pathologist or one who has had special training in clinical and pathological lab procedures. The personnel of the laboratory shall be qualified by education, training, and experience to perform capably the assigned technical tasks. No one except personnel are needed in the lab.

Codes and special considerations: All piping would need to be acid resistant. Maximum window exposure is desirable to north side.

Privacy: Desirable for control of odors

Orientation: No factor

Transient nature: Relatively inflexible

Growth nature:

Floor area: 150 ft^2

Department Name: PHARMACY

Description: The pharmacy serves as a supporting department to the examination procedure and ranges in scope from a drug storage room to a compounding facility for prescriptions. A compounding room will be necessary where a commercial pharmacist is not convenient. All pharmacies should include locked storage.

Activities: Activities include compounding and dispensing medications. Records must be kept of all issuances and turned over to the business office.

Furniture and Equipment: A refrigerator for the storage of thermolabile products. Counter space for compounding prescription orders. Drug storage cabinets, writing table space, narcotics safe, file cabinets for record storage, sink and graduate rack above, book shelves, 5 gal. water tank.

Participants: The pharmacy shall be in charge of a pharmacist registered in Montana. Medications cannot be prescribed by other than

a physician. The dispensing and administration of medication shall be the responsibility of a registered nurse.

Codes and special considerations: Drug storage facilities must be well guarded against entry by unauthorized personnel.

Privacy: Not necessary

Orientation: No factor

Transient nature: Less flexible

Growth nature:

Floor area: 80 ft²

Department Name: CENTRAL SUPPLY

Description: Central supply acts as a centralized source of clean goods and items for the various departments. A small central supply would consist of a laundry (120 ft²), soiled linen storage (60 ft²), clean linen storage and house-keeping (30 ft²), and instrument sterilization. Anesthesia storage, (70 ft²).

Activities: Laundering of soiled articles mainly from emergency. Sterilization of instruments mostly from emergency.

Furniture and Equipment: Washer and dryer, shelving space for linen storage, ironing board, sterilizing machine, laundry cleanup sink floor receptor.

Participants: Nursing staff would transport the linen to and from the supply area in out of business hours and conduct any cleaning or sterilizing needs during hours.

Codes and special considerations:

Privacy: Not necessary

Orientation: No factor

Transient nature: Less flexible

Growth nature:

Floor area: 280 ft^2

Department Name: STORAGE

Description: A centralized distribution point for incoming delivered goods and temporary storage of items which are not constantly in use (144 ft²). Serves as overflow storage for the lab, business office, X-ray, and the emergency room, and pharmacy.

Activities: Central storage should be readily accessible to the service entrance in close proximity to areas utilizing storage space. Activities which occur within the space are loading from the outside and distribution from within.

Furniture and Equipment: Shelves and closets, locking storage for pharmaceuticals.

Participants: All staff utilize the storage area but none are required to maintain it. The storage area will also be stocked by visiting delivery personnel.

Codes and special considerations: Oxygen must be stored separate from anesthesia gases, must be ventilated to outdoors.

Privacy: No factor

Orientation: No factor

Transient nature: Quite flexible

Growth nature:

Floor area: 144 ft^2

Department Name: MECHANICAL ROOM

Description: The mechanical space consists of a boiler and pump room (500 ft²) and maintenance shop.

Activities: Activities include checking the mechanical equipment.

Furniture and Equipment: Space for two boilers, and emergency generator.

Participants: A maintenance man capable of repairing a boiler is necessary. His duties might overlap into housekeeping and perhaps he could be a part time employee.

Codes and special considerations:

Privacy: No factor

Orientation: Towards service entrance

Transient nature: Relatively inflexible

Growth nature:

Floor area: 500 ft²

Department Name: DENTISTRY

Description: A sufficient rise in the Colstrip population could generate suitable business for a dentist's practice. It is generally agreed that a two chair unit is the minimum for any dental operation, (200 ft²) with a small lab (30 ft²) for processing X-rays. The dentist would require his own private office (120 ft²) in addition. The dentistry department should be convenient to common reception and waiting.

Activities: Activities in the dental unit would consist of the general nature of examining, X-raying, cleaning, and filling teeth. Work of more specific nature would require referral to a specialized facility.

Furniture and Equipment: Each operatory includes the examination chair, dental unit, instrument cabinet, foot action lavatory. One operatory is supplied with an X-ray unit. The lab contains a sink developing tank, and counter space and storage cabinets.

Participants: The dentist could maintain the department until added volume required the addition of an assistant. Regular nursing staff could not be utilized for lack of specialized training. Reception staff would be shared.

Codes and special considerations:

Privacy: Desirable

Orientation: No factor in exam and work rooms, towards pleasant view in office

Transient nature: Relatively inflexible

Growth nature:

Floor area: 350 ft^2 (230 ft^2 exam + 120 ft^2 office)

Department Name: RECEPTION AND ADMINISTRATION

Description: The reception area must have a direct relation to the waiting area. The main components whether separate or combined are the business office (300 ft²), medical record storage, admissions, and personnel closets.

Activities: The reception area is responsible for the transaction of all business records. Admitting, accounting, record keeping, and purchasing must all be combined in this space until sufficient volume necessitates separation into a separate room.

Furniture and Equipment: Filing cabinets for storage of medical records (6' x 2'). Receptionists combination desk and typewriter table. Safe for confidential records, Closet space for staff clothing. Counter space between reception and waiting with drawers and cabinets below.

Participants: A single receptionist secretary with accounting background could handle all reception and record keeping. With the addition of bed units a secretary to the administrator

could be required. The general public will generally not go beyond the reception counter.

Codes and special considerations:

Privacy: Not necessary

Orientation: Towards a pleasant view

Transient nature: Quite flexible

Growth nature:

Floor area: 300 ft²

Department Name: HEALTH OFFICE

Description: The health office responds to a community health problem rather than a strictly medical impetus. Minimal requirements would be an office (120 ft²) for consultation and administration and a conference room (240 ft²) for health education and meetings.

Activities: The activities of any given health department will depend on such factors as the special problems of the area. The basic functions would include control of communicable disease, public health nursing service, health education, and maternal and infant welfare.

Furniture and Equipment: The health office would require an office desk with adequate storage space for files and information sources. The conference room would need a conference table with blackboard with the possible use of kitchenette equipment.

Participants: The health office could be staffed by a public health nurse who would carry out administration and counseling in the office

and education in the conference room as well as traveling to the schools and community. A possible later addition of a secretary.

Codes and special considerations:

Privacy: Desirable

Orientation: Towards a pleasant view

Transient nature: Quite flexible

Growth nature:

Floor area: 360 ft²

Department Name: OBSTETRICS

Description: A minimum of one delivery room (324 ft²) adjacent to a labor room which can act as a (255 ft²) second delivery room. A scrub room located between the two is desirable (30 ft²) sterilizing and cleanup is efficiently enough handled in central facilities. A small nursery (120 ft²) would need to be controlled from the nursing station.

Activities: Activities would include controlling labor and bringing about birth. Nursery facilities would require space for examination and treatment of infants.

Furniture and Equipment: Delivery table, cabinet and cupboard space, single basin stand; heated bassinet, portable emergency light, anesthetist's table, anesthesia unit, instrument table, scrub sink between delivery and labor, obstetrical bed.

Participants: An anesthetist, a physician, and a nurse for assistance to handle the typical maternity case.

Codes and special considerations: The obstetric department should be located on a circulatory deadend to insure privacy from the rest of the facility.

Privacy: Critical

Orientation: No factor

Transient nature: Relatively inflexible

Growth nature:

Floor area: 730 ft²

Department Name: MINOR SURGERY

Description: Minor surgery facilities would consist of an operating room (400 ft²), a scrub up alcove (30 ft²), storage, for clean supply, 30 ft² (2) change rooms and cleanup (220 ft²) sub sterilizing station (30 ft²).

Activities: Scrub down and gowning for surgery, scrub down of operation site, administration of anesthetic, positioning of patient.

Furniture and Equipment: Operation table operating light, anesthesia equipment, monitoring equipment, (ECK, EKG), dictating facilities, air, oxygen, and suction outlets from inverted pedestal cabinets for prepackaged supplies.

Participants: A physician in charge of the operation, one or two nurses to assist, one person to administer anesthetics, one nurse is a circulating nurse while the other is a scrub nurse.

Codes and special considerations: Special provision is necessary to guard against explosion

hazards in all areas where anesthetic gases are used or stored and in adjacent corridors, conductive flooring, ceiling height between 12' and 13', 10-12 air changes/hr.

Privacy: Critical

Orientation: No factor

Transient nature: Relatively inflexible

Growth nature:

Floor area: 910 ft²

Department Name: NURSING UNIT

Description: A general holding area for recovery of minor surgical patients, medical treatment cases, minimum facilities for pediatric care, and separate obstetric care beds, common bathroom for staff and patients, a dayroom for diversion from bed routine and waiting, conference room, for teaching.

Activities: Exchanging of linen, catering of meals, bathing of patients, replacement of bed pans, patients rest, exchange of information, dispensing drugs.

Furniture and Equipment: Patient room-- bed side table, overbed table, chairs, bath, closet, desk.

Participants: One head nurse, and an assistant minimum staff per shift. During day hours the total nursing staff would be boosted to four serving both examination and nursing units. Visitors would also be allowed within nursing units.

Codes and special considerations:

Privacy: Critical

Orientation: Towards pleasant view, away
from direct sun

Transient nature: Quite flexible

Growth nature:

Floor area: 1620 ft^2 for 3 with two beds
and 3 with 1 bed.

Department Name: KITCHEN

Description: The area providing food service to patients confined to beds and an area for staff members to gather for meals. The kitchen would consist of a food preparation area (150 ft²), washing area (60 ft²), dining area (150 ft²), food storage (104 ft²).

Activities: Cooking, preparing meals on trays, washing dishes and cookware, recording of dietary requirements for patients, feeding of personnel.

Furniture and Equipment: Commercial oven with grill and range top, fryer.

Participants: One cook is sufficient for preparation of meals and washing chores. Delivery of meals to patients in such a small nursing unit could be accomplished by nurse's aides.

Codes and special considerations: Fire detection and prevention is of primary concern. Walls and flooring should be easily cleanable materials.

Privacy: Desirable for sound and odor transmission.

Orientation: Accessible to service entrance.

Transient nature: Relatively inflexible

Growth nature:

Floor area: 460 ft²

Department Name: ADMINISTRATION

Description: When the facility has expanded to the point of nursing care units, there will likely evolve the need for an individual to carry out administrative duties solely. Such an individual would require a private office (120 ft²) and space for a secretary-receptionist (60 ft²).

Activities: The administrator would be responsible for the hiring and dismissing of employees. Other duties would include the purchasing of necessary supplies and meeting with firms doing business with the health center. The administrator must also meet with those concerned with the welfare of patients.

Furniture and Equipment: In his office, the administrator will need an executive size desk, book shelves for a small library, filing cabinets, and several chairs for consultation. The secretary-receptionist requires a combination typing desk and file cabinets.

Participants: Participants are the administrator, the secretary-receptionist,

employees, those doing business, and those seeking patient oriented consultation.

Codes and special considerations:

Privacy: Desirable

Orientation: Towards pleasant view

Transient nature: Quite flexible

Growth nature:

Floor area: 180 ft²

The growth of a system depends to a great extent on the nature of the bonds between the individual elements. Categorically, the functional bonds can be differentiated as fixed or transient with variations between. A fixed bond would indicate a relationship which was not likely to alter with change whereas a transient bond would indicate a relationship which is important to one set of elements with the possibility of lessening with the addition of new elements to the system. In the base health unit, receptive and administrative duties could be carried out within the nursing unit, thereby creating a frontal entry and orientation to this point. With increased service volume, the facility will need accompanying expansion of the administrative department into a separate space. It must be possible for this to occur without disrupting the point of entry which has been established. The functional bond between waiting and the nursing station in the base unit therefore must be planned as a transient relationship.

Functions will be placed adjacent to one another in accordance with trip frequency between

...adjacencies

functions and with respect to the urgency of the proximity. Trip frequency can be measured empirically and compared by means of a bar graph.* The urgency of the proximity is not so easily quantified and must be left to personal evaluation.

Obvious groupings of elements will arise as a consequence of several spaces combining to form a function. For example, the registration and waiting process are interdependent elements, unable to operate apart from each other. Examination rooms also form an efficient functional group when combined with the lab and X-ray room. It is also possible for certain elements of functional groups to overlap into other functions. For instance, the emergency operation must be separate from the examination routine but certainly each must share the lab and X-ray facilities.

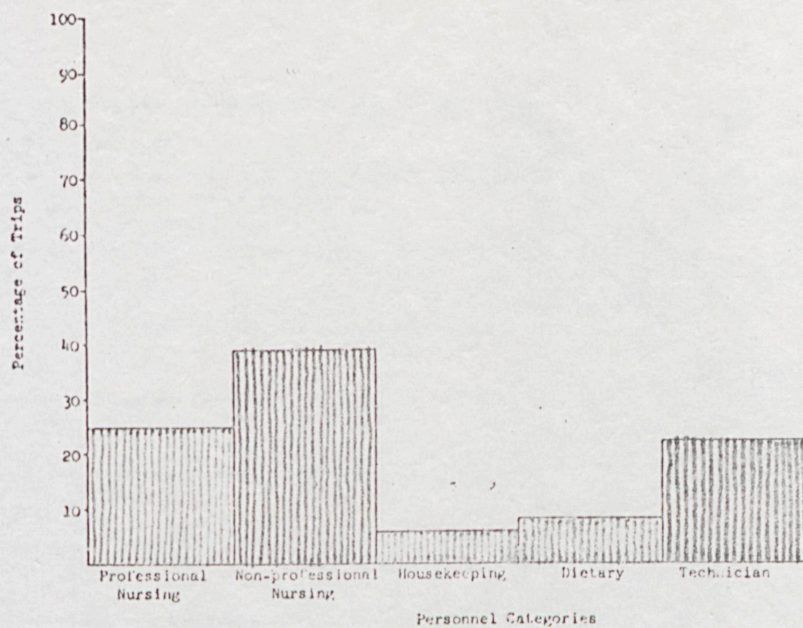


Figure A-19. Department-Personnel Interaction: Emergency

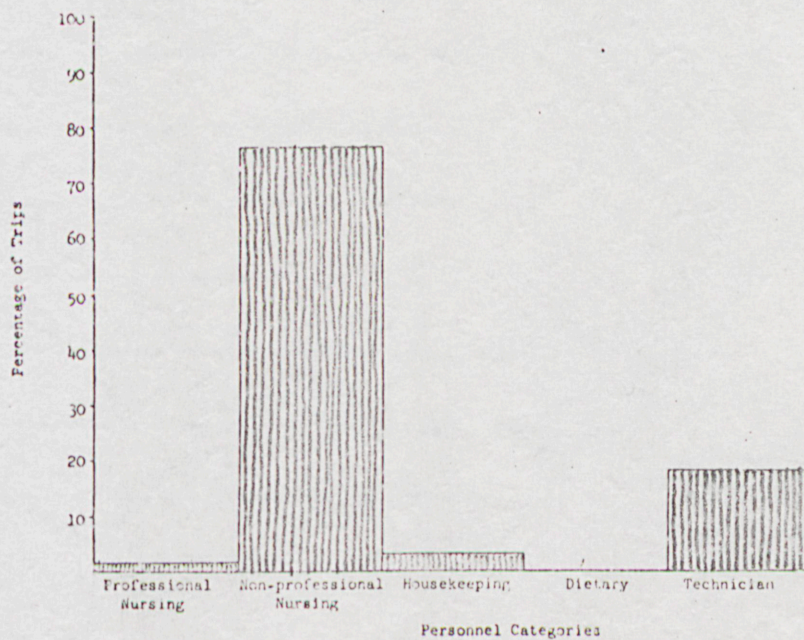
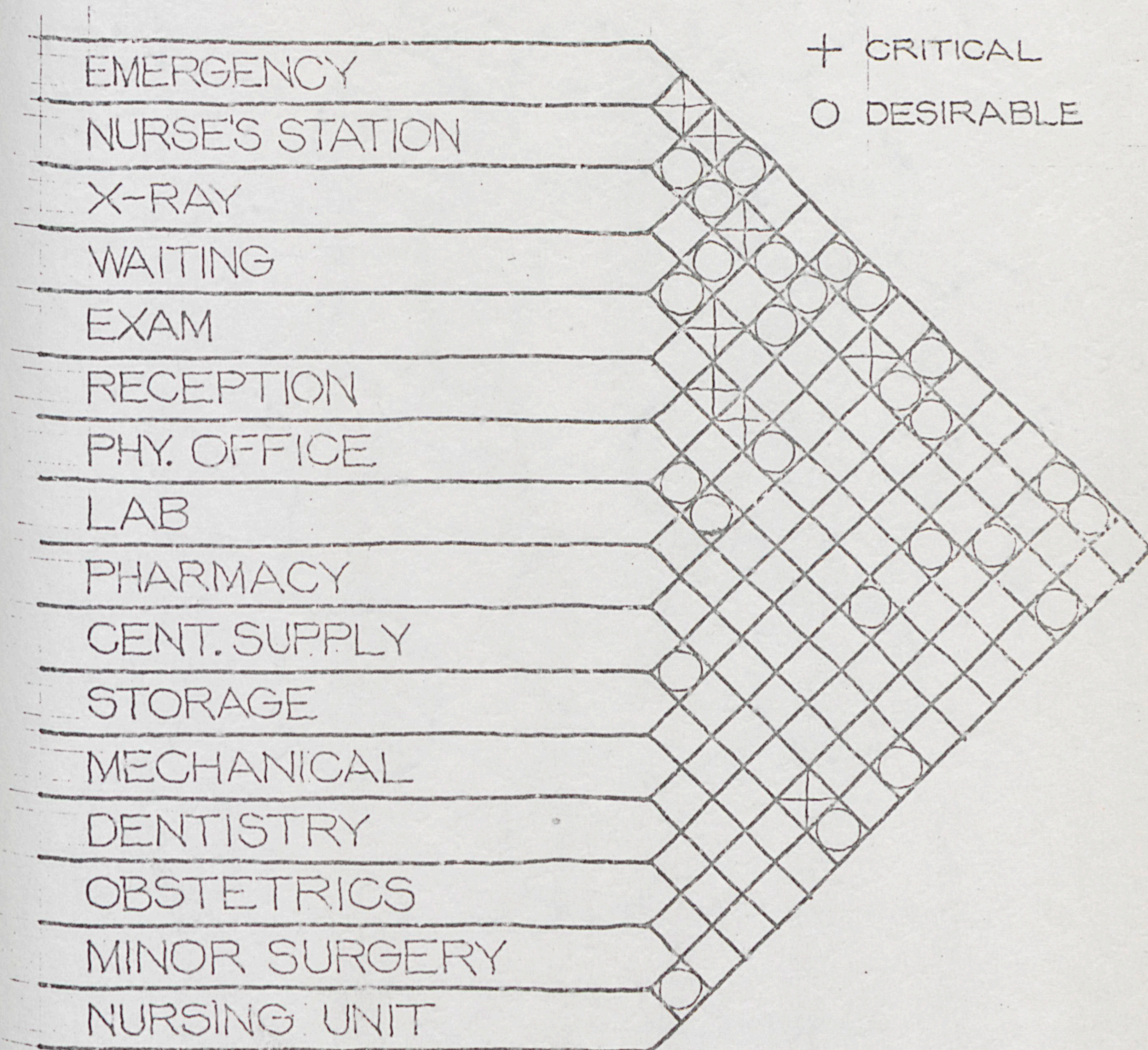
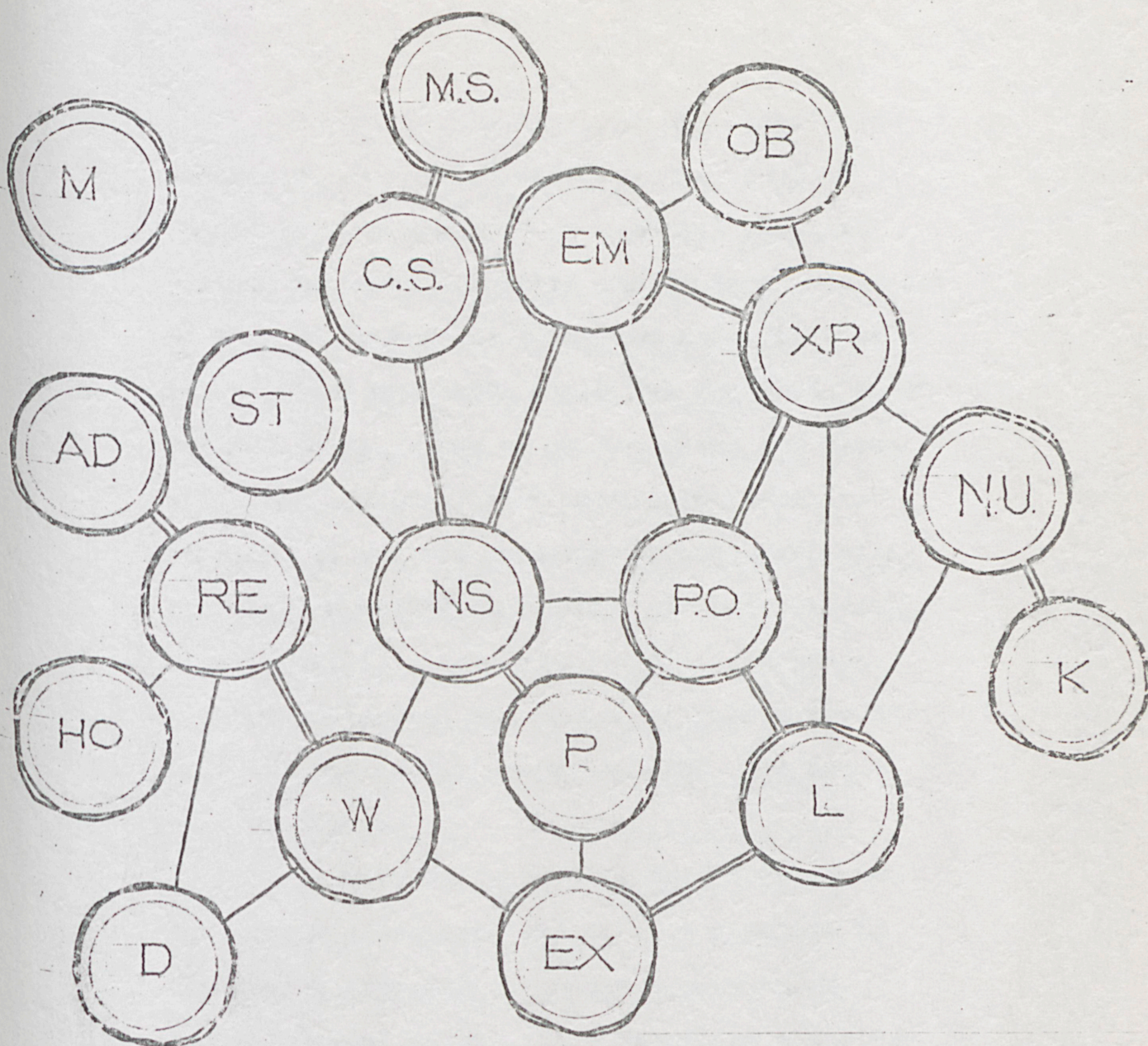


Figure A-20. Department-Personnel Interaction: Pharmacy



PROXIMITY MATRIX



_____ CRITICAL

===== DESIRABLE

FUNCTIONAL BONDS

In order to understand the circulation of materials, an outline defining the scope of considerations involved in material handling systems is helpful. First the types of materials to be handled must be separated into those which are supplied and those which are returned, or in general terms, those which are clean and those which are soiled. Clean materials which are supplied to various departments include dietary articles, supplies consisting of pharmaceutical, other medical, linen, non medical, and house-keeping varieties, and equipment consisting of medical, non-medical, housekeeping, and engineering types.

Dietary articles will originate in the food preparation area and will be supplied to the dining area and the patient care units. Pharmaceutical supplies are stored in a dispensary for distribution to nursing care patients, examination patients, and emergency patients. Other medical supplies will be stored in central supply or the nursing station for distribution to nursing care units, examination rooms, and the emergency room. Linen is stored in clean supply

...circulation

and delivered to examination rooms, patient care units, and the emergency department. Non-medical items consist mainly of business and accounting materials and are kept in common storage for distribution to recording activities which are located in the majority of departments. House-keeping articles are also held in common storage and distributed to custodial stations. All supplies are received by the facility at the service entrance and distributed to the appropriate storage point.

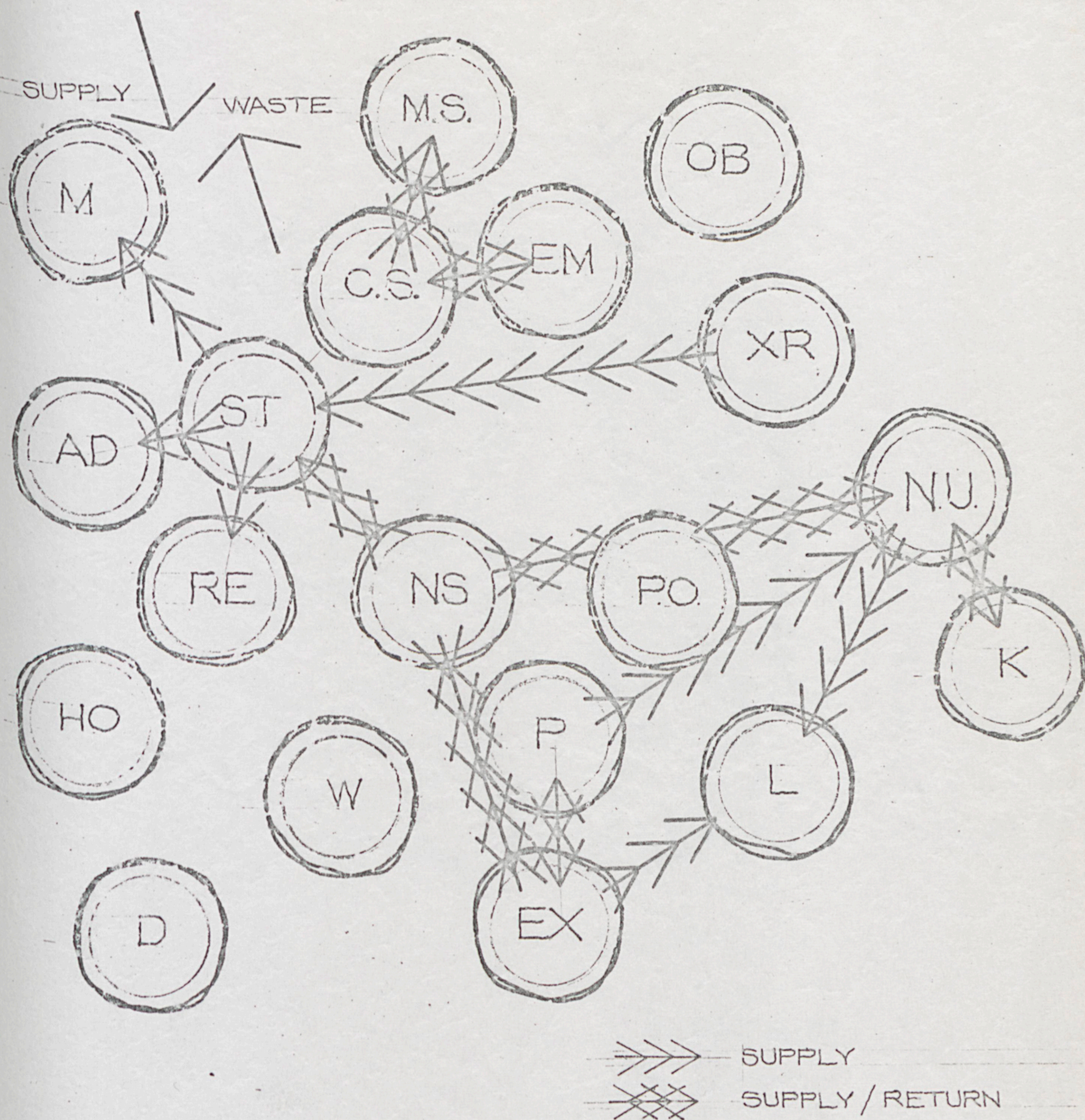
Medical equipment would consist of portable X-ray machines, EKG monitors, wheel chairs, stretchers, etc., which must be kept in storage which is accessible to examination patients, emergency patients, and nursing care units. Housekeeping equipment is stored at custodial stations and used throughout the building.

Soiled materials which return from the various departments and must be decontaminated or disposed of include soiled dietary items, trash, soiled linen, pathological waste, and equipment. Soiled dietary items will return

from the dining area and patient rooms to be cleaned for reuse in the kitchen. Trash is deposited at all departments to be collected and delivered to a collection point near the service entrance (in this case, outdoors). Soiled linen is collected in examination rooms, emergency rooms, and patient care units for delivery to a soiled holding area where it is laundered and transferred to clean supply for reuse. When pathological waste does occur, it must be either incinerated in an acceptable manner or placed in sanitary bags to be picked up with the trash. Contaminated equipment will return from examination rooms, emergency rooms, lab, and patient care units for sterilization in central supply, to then be returned to their individual storage points.

The circulation of materials is further differentiated by determining the nature of the delivery requirement. These are represented by routine scheduled, non-scheduled, and emergency. Routine deliveries consist of dietary, linen, normal supplies, and normal equipment. Non-scheduled deliveries are composed of special dietary pharmacy not of an emergency nature,

supplies including accounting materials and medical items, and equipment not available on the unit but which is non emergency. Emergency deliveries include pharmacy items which are needed immediately but which are not kept in reserve on unit or the supply of which has been depleted, supplies such as emergency blood or glucose, and equipment not available on the unit and needed immediately, such as stretchers or portable defibrillators.



MATERIAL MOVEMENT

If orderly circulation is to occur, it is necessary to differentiate between entrances to a degree increasing with the size of the facility. As the facility becomes larger, increasing in the scope of service provided, each department becomes more independent and separate from the other. The incompatibility of certain types of traffic along with the simple fact of increased distances begins to dictate a segregation of entrances.

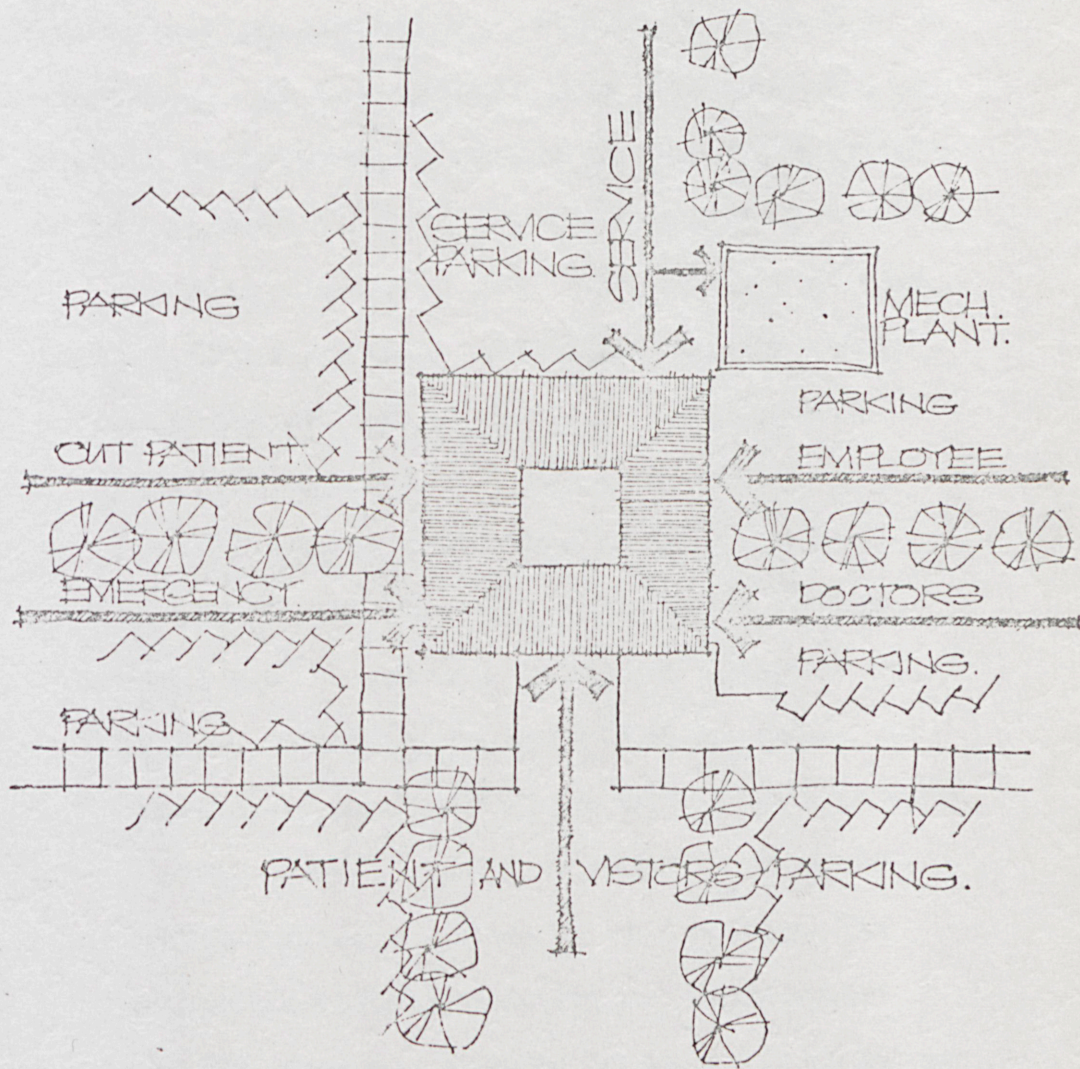
Along with increased service must go an increased differentiation between staff members who will be required to operate the facility. In the smallest operation, the physician will typically request a separate entrance from other employees. The employee will often begin to identify with the entrance which he is accustomed to using, and therefore in large facilities, an entrance will be provided for each department.

The Colstrip health center will require as a minimum, a separate patient and visitor entrance, a service entrance, an emergency entrance and employee entrance. The patient and visitor entrance will serve as the main public access to the facility and therefore should

...entrances

address itself to the problem of providing a welcome focal point to the composition of elements. Orientation to existing walkways and proposed parking should be efficiently correlated. The emergency case requires a minimum of circulation conflict and prompt uninterrupted care from the ambulance to the emergency room, and therefore a separate entrance. The emergency entrance will serve privately delivered emergencies as well as ambulances, and therefore should compensate for the presence of families and friends. For similar reasons, the emergency entrance must be readily accessible to the unfamiliar emergency driver who will be arriving from the main access to town. Some facilities have combined the emergency entrance with the service entrance but an increased volume of service will result in conflicts, necessitating a separate entrance. Service calls will amount to intermittent deliveries of goods and maintenance of equipment. Bulk waste will also be collected and stored by means of the service access. The employee entrance primarily allows the physician to enter and leave the facility without passing by the public patient

waiting areas. Other nursing personnel will
utilize the entrance for much the same reasons.



SEGREGATION OF ENTRANCES

After an analysis of the clinical facility and the range of services based on community needs, the planner is able to knowledgeably begin to narrow the possibilities for location within the community. An understanding of the facility and what it will offer becomes a primary determinant in the selection of an appropriate location.

With the needs and requirements of the facility thus in mind, the site will be selected on the basis of: 1. access, 2. town growth, 3. availability, and 4. compatibility.

1. Access - Because of the inherent nature of stressed emergency care in the rural health center, location adjacent to primary roadways is essential to quick and convenient delivery of the critically injured.

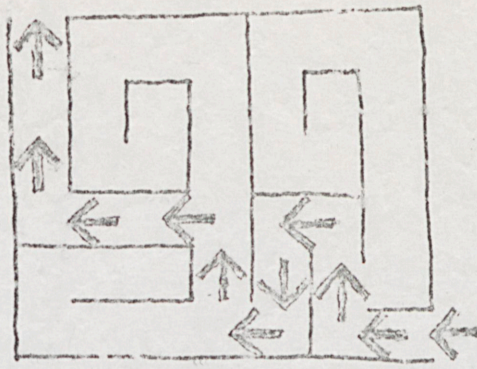
2. Town growth - A study of proposed growth patterns will aid in locating the health facility centrally in the community for the present population as well as future shifts.

3. Availability - Obviously site selection must depend to a great extent on a limitation of those spaces which are available

the site...selection

for purchase. Location within a community center will necessitate an appreciably reduced choice of sites.

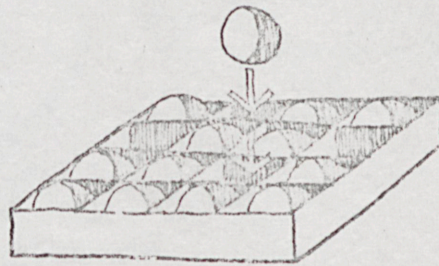
4. Compatibility - The range of choices is further narrowed by a consideration of the health facility's compatibility with neighboring functions. Such functions as railroads and taverns would not provide a suitable atmosphere for the health environment whereas a neighboring park could be an asset.



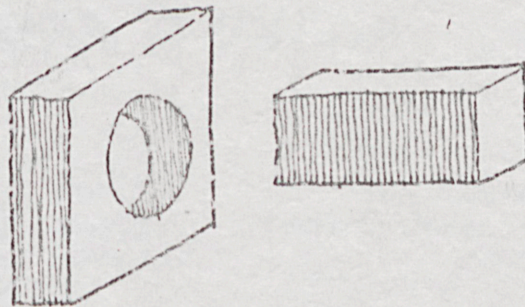
ACCESSIBILITY



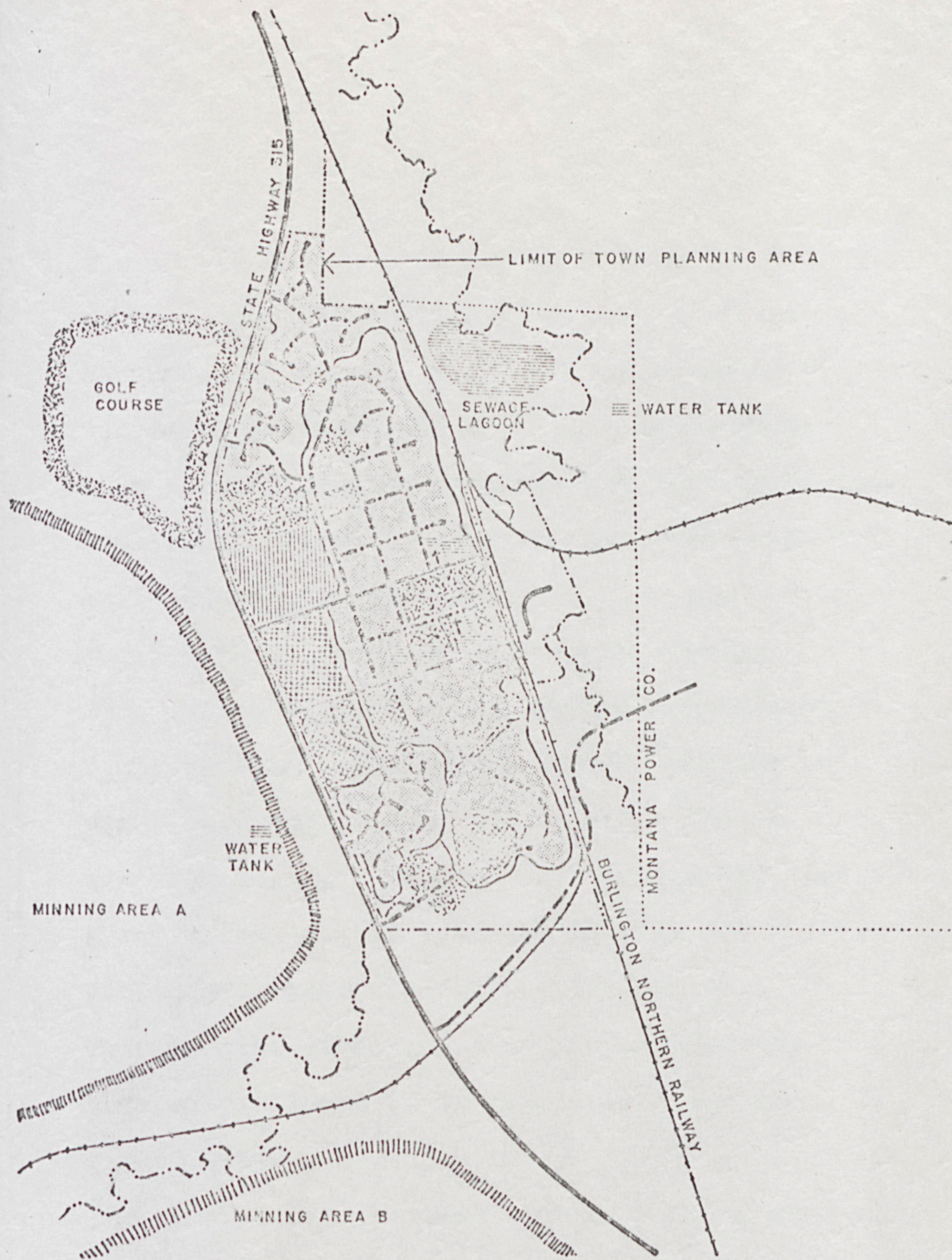
TOWN GROWTH



AVAILABILITY



COMPATABILITY



THE PLAN FOR COLSTRIP, MONTANA

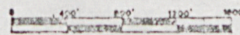


Figure 2

 SINGLE FAMILY
 MULTI-FAMILY
 MOBILE HOME PARK
 COMMERCIAL
 SCHOOLS
 CHURCHES
 PARKS

 BICYCLE-PEDESTRIAN PATH
 UTILITIES, SHOPS & WAREHOUSING
 VACANT & OPEN SPACE
 MAJOR THOROUGHFARES
 COLLECTOR STREETS
 LOCAL STREETS

After the site has been selected from the range of possibilities and settled upon, it must be evaluated for areas which deserve consideration for development in the initial design scheme. Such characteristics as views, natural landscape, topography, location of utilities, and neighboring building developments should be analyzed as to their ability to contribute to the design.

The site selected for the Colstrip health facility stands across the street from the town park, allowing a direct view across the park and into the adjacent foothills. Waiting and viewing areas would be well oriented in this direction. Vehicular traffic should be diverted away from this viewing area, all parking requirements carefully planned so as not to encroach at a future date.

The site is also located along a community walkway, which has been designated for development in the community master plan. Access off this artery could play a major role in tying the facility into the community.

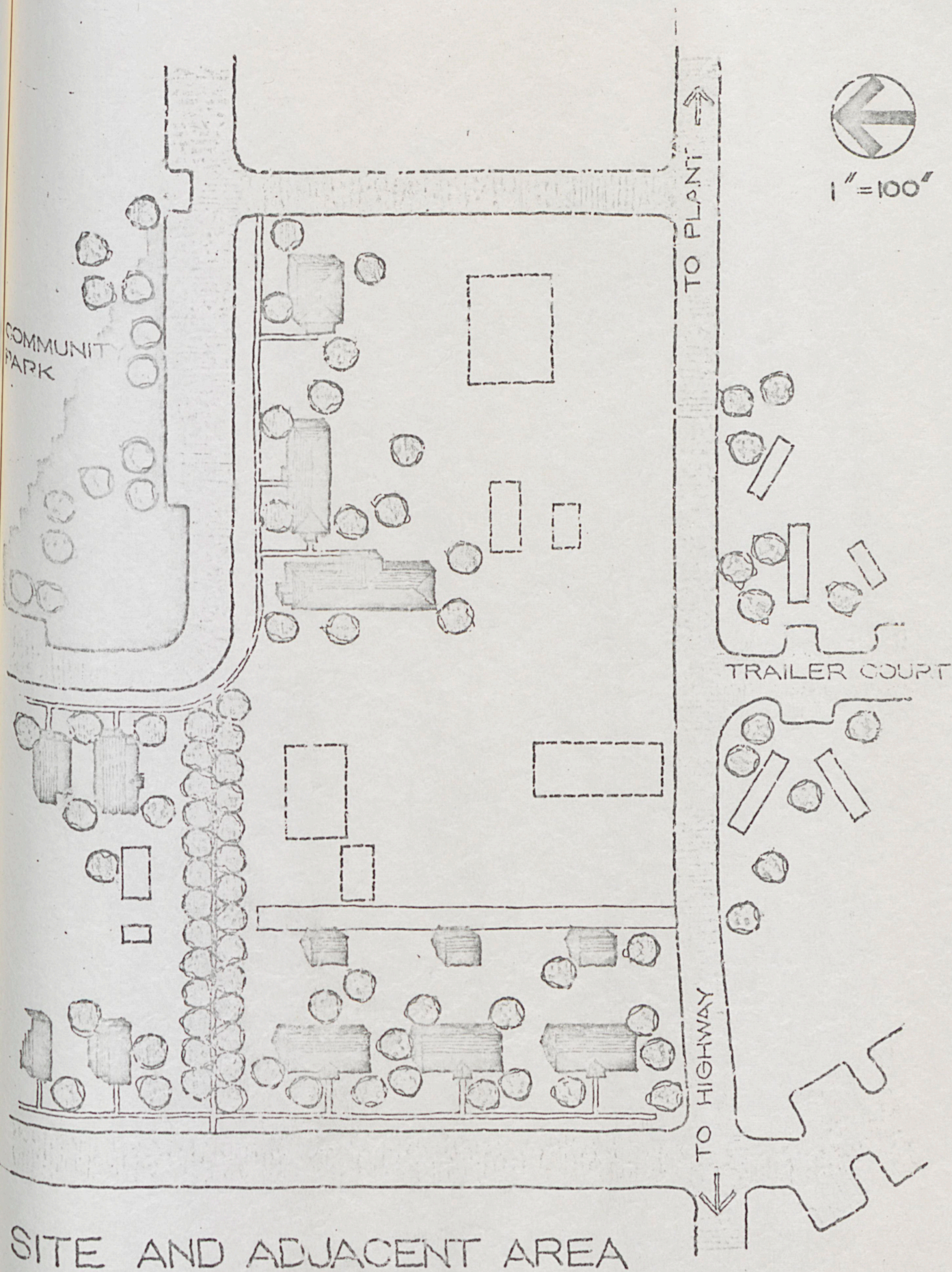
An analysis of site deficits is also of utmost importance in the early stages of concept

...potential & limitations

formulization. Such areas must deserve adequate attention in the form of screening and orientation such that they will not detract from the overall function and feeling of the building.

The site for the health facility is to be located along the major entrance access to Colstrip. Although this location insures prompt and efficient delivery of emergency patients to the health care center, it also brings about problems with sound and visual distractions. Waiting and viewing areas should be located farthest from this distraction, with the whole facility tending to shift to the opposite side of the lot, towards the park.

Adding to the need for tending away from this access road, is a trailer court on the opposite side, certainly not an attractive highlight. The rear yards to the west should be deemphasized, if only with landscape screening.



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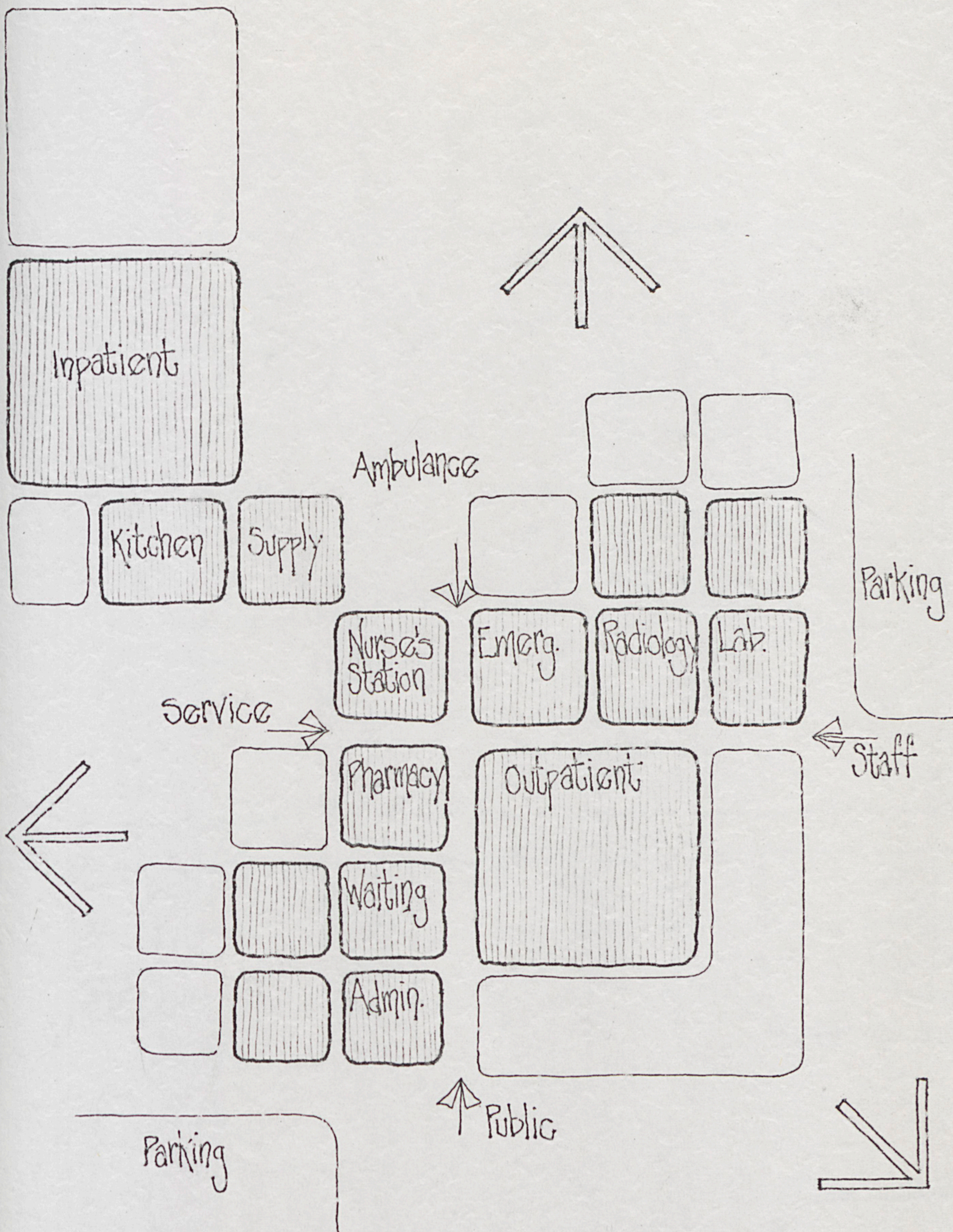
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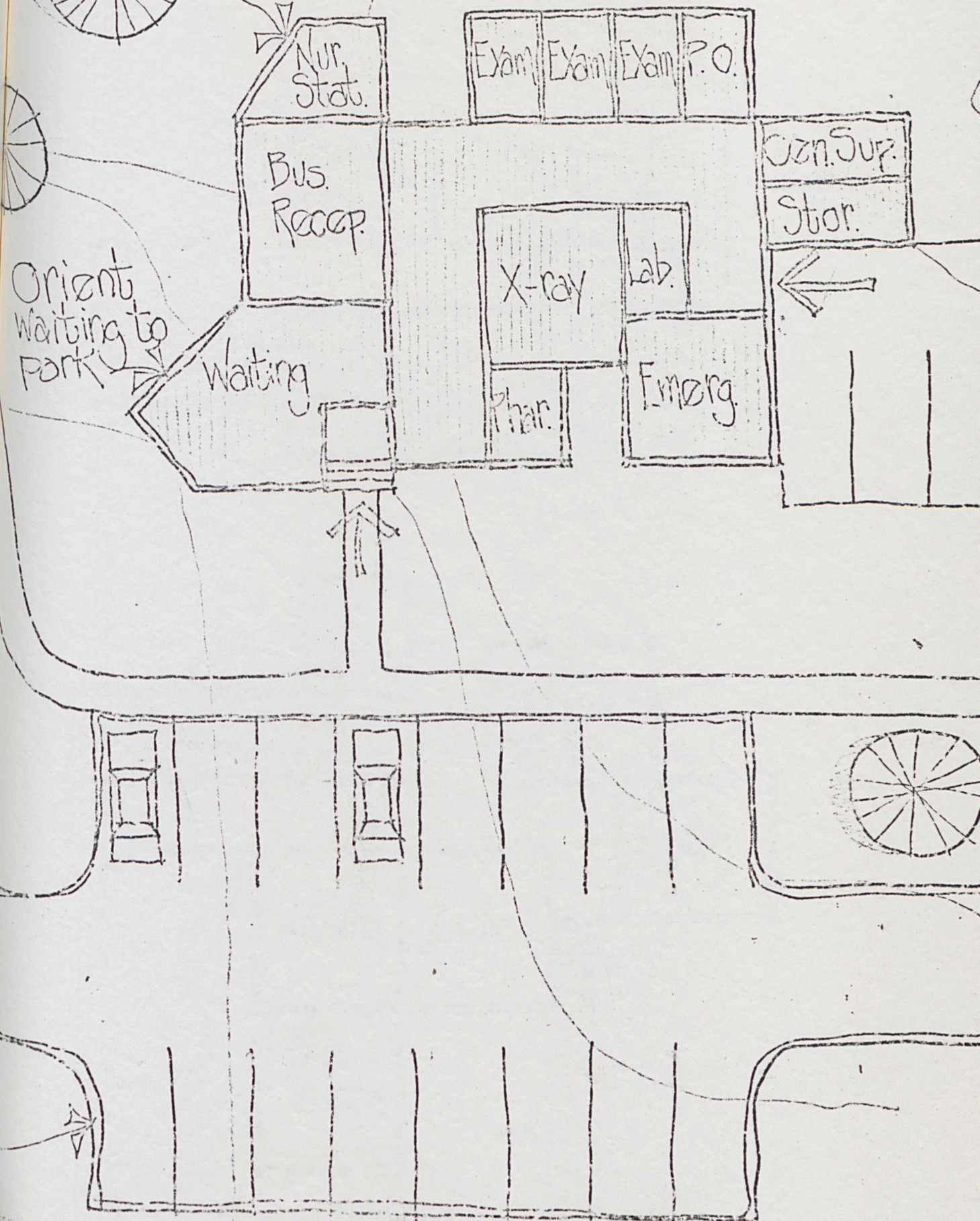
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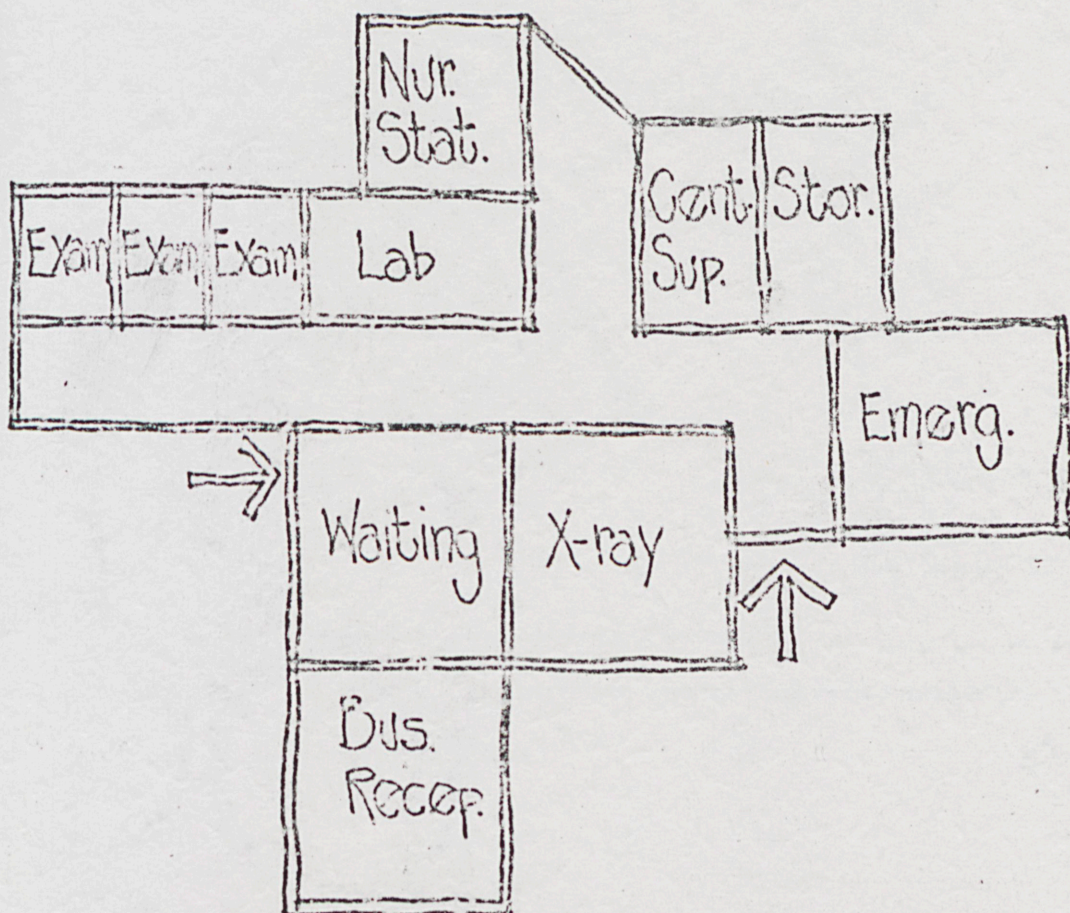
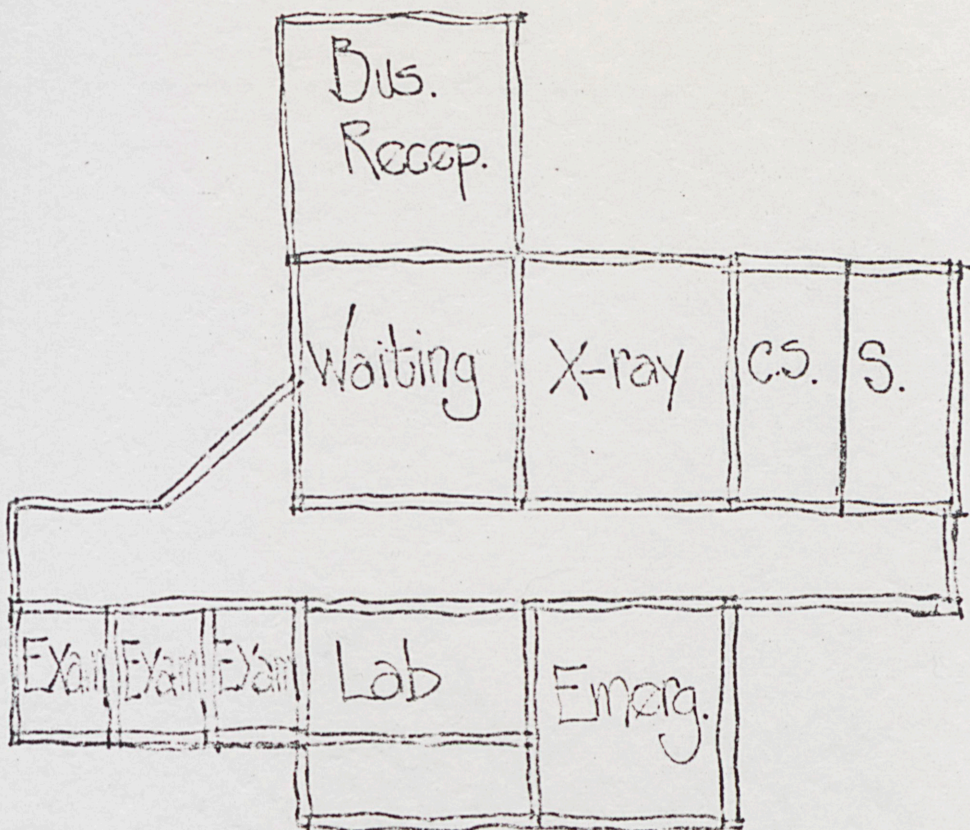
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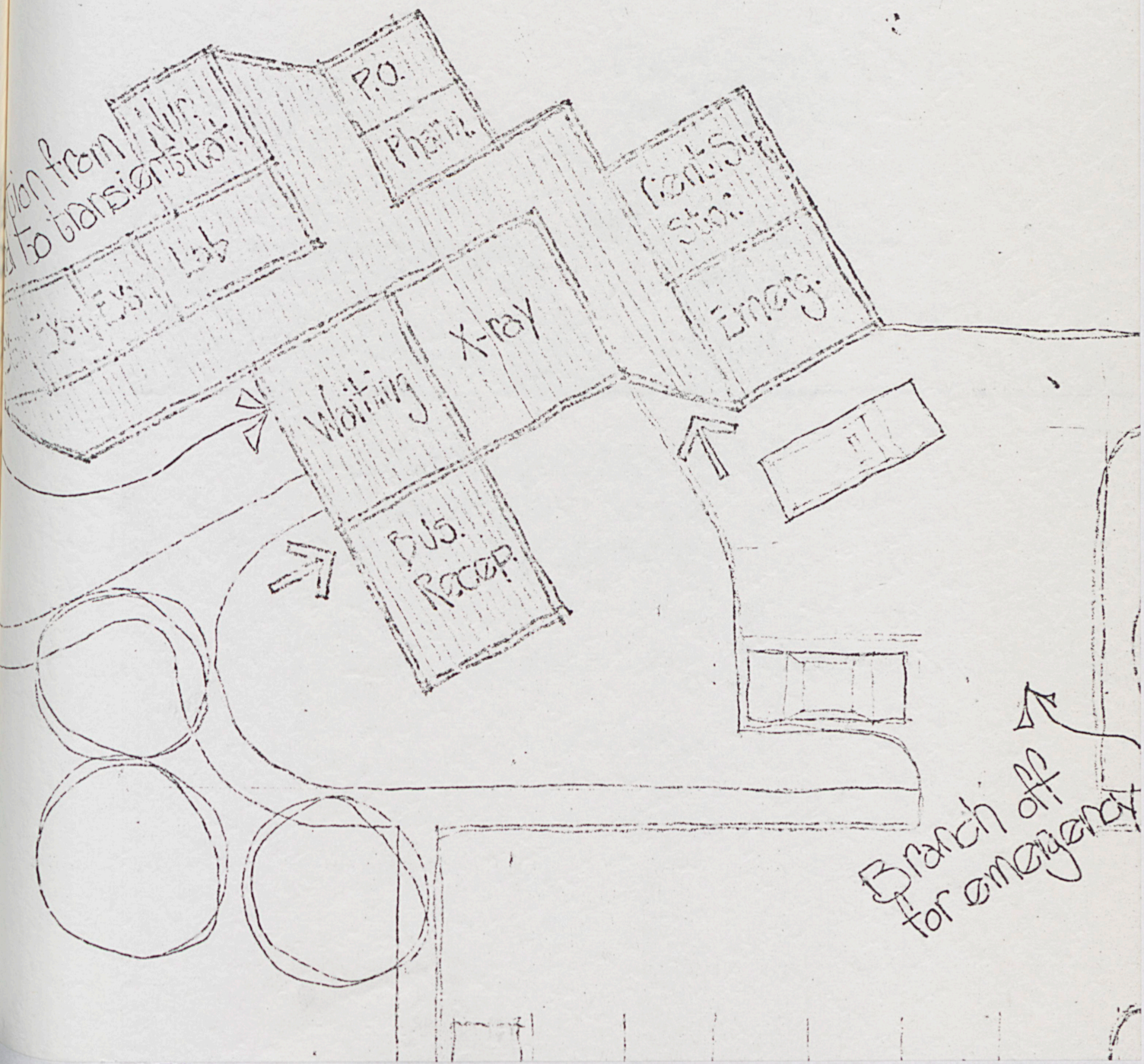


CONCEPTUAL GROWTH

Nursing station as link to bed units



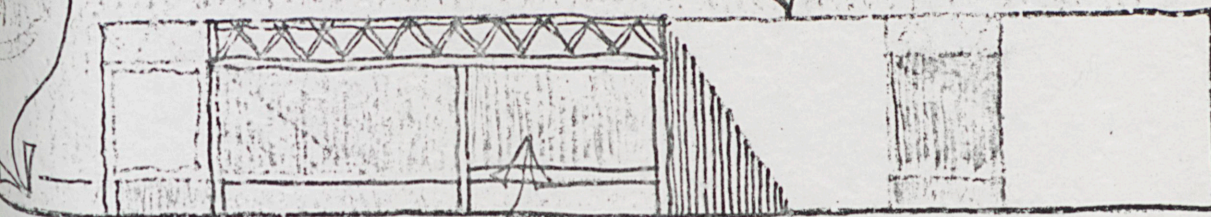


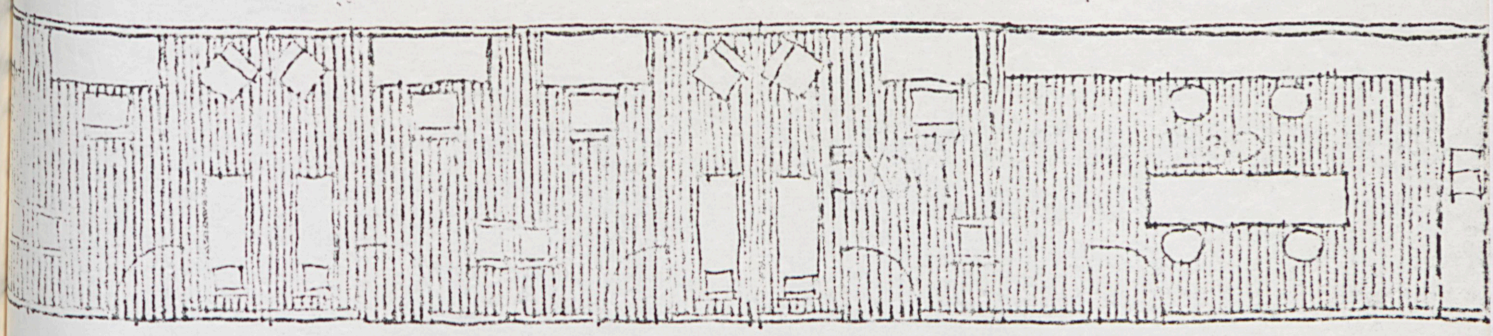


Problem with
floor level

Fixed elements as
solid volumes

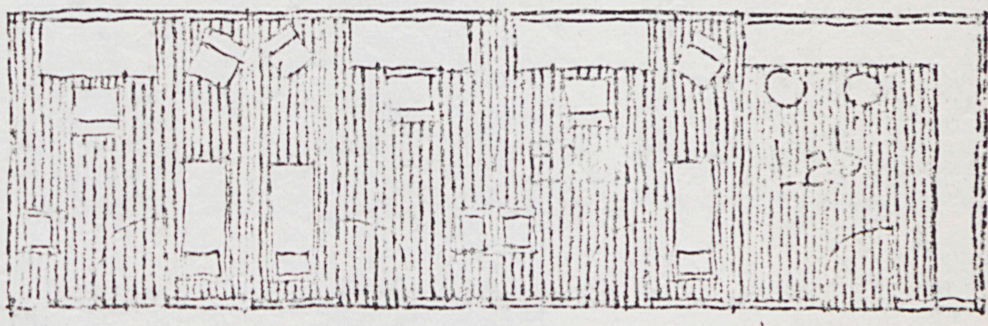
Transient elements
as suspended to be
filled in with expansion





Corridor

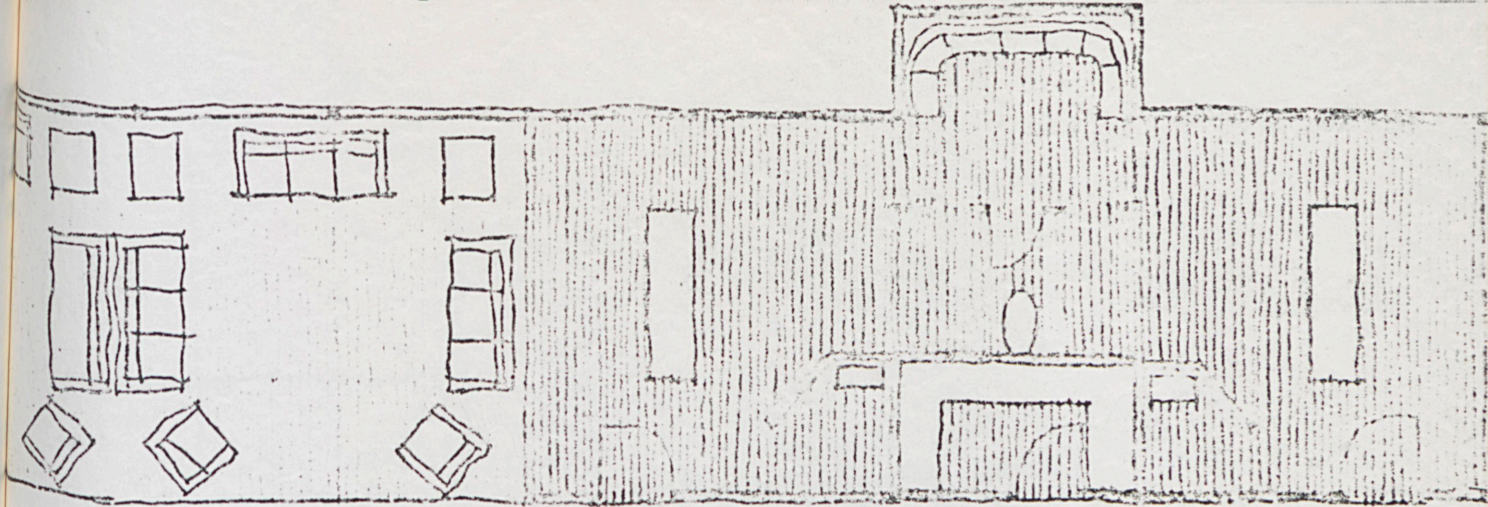
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Corridor

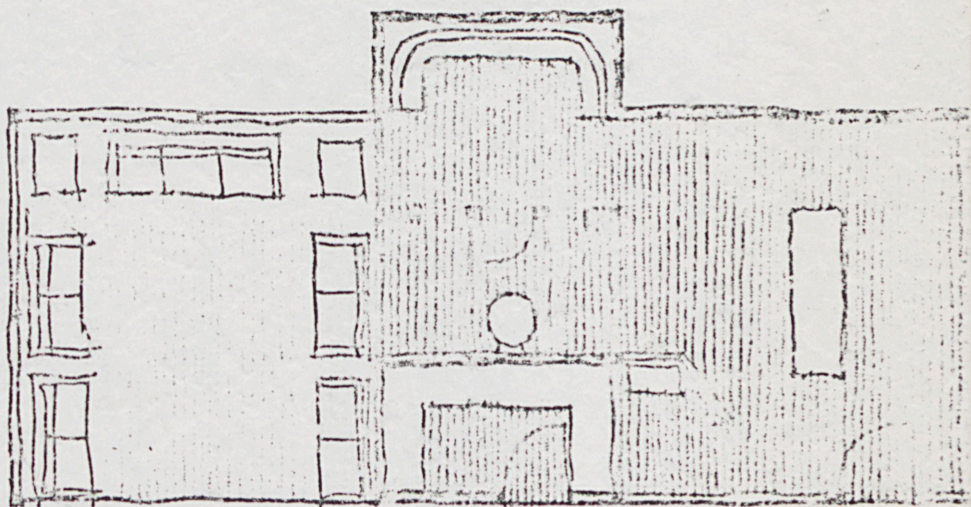
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LAB



Corridor

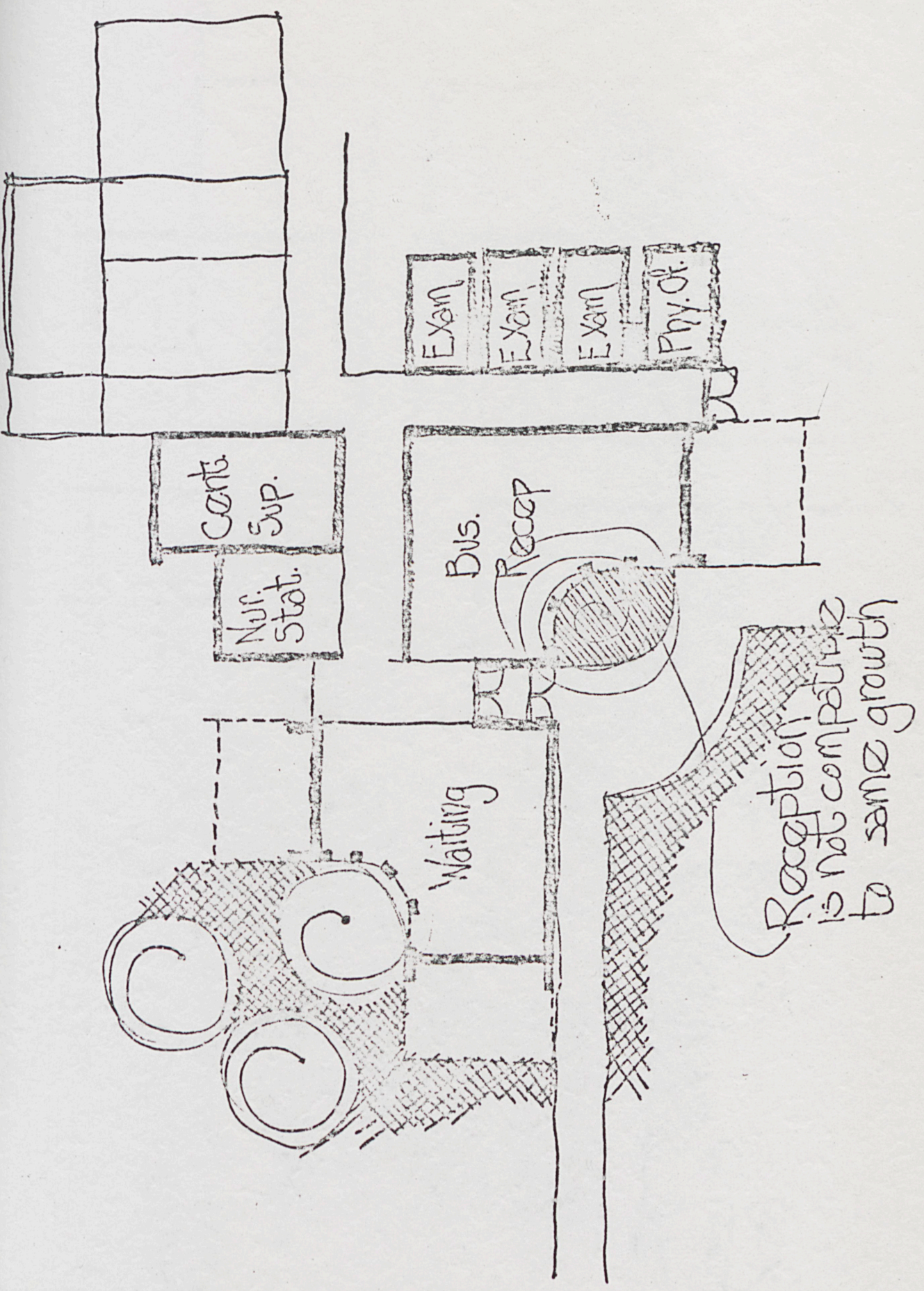
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Corridor

1

X-RAY



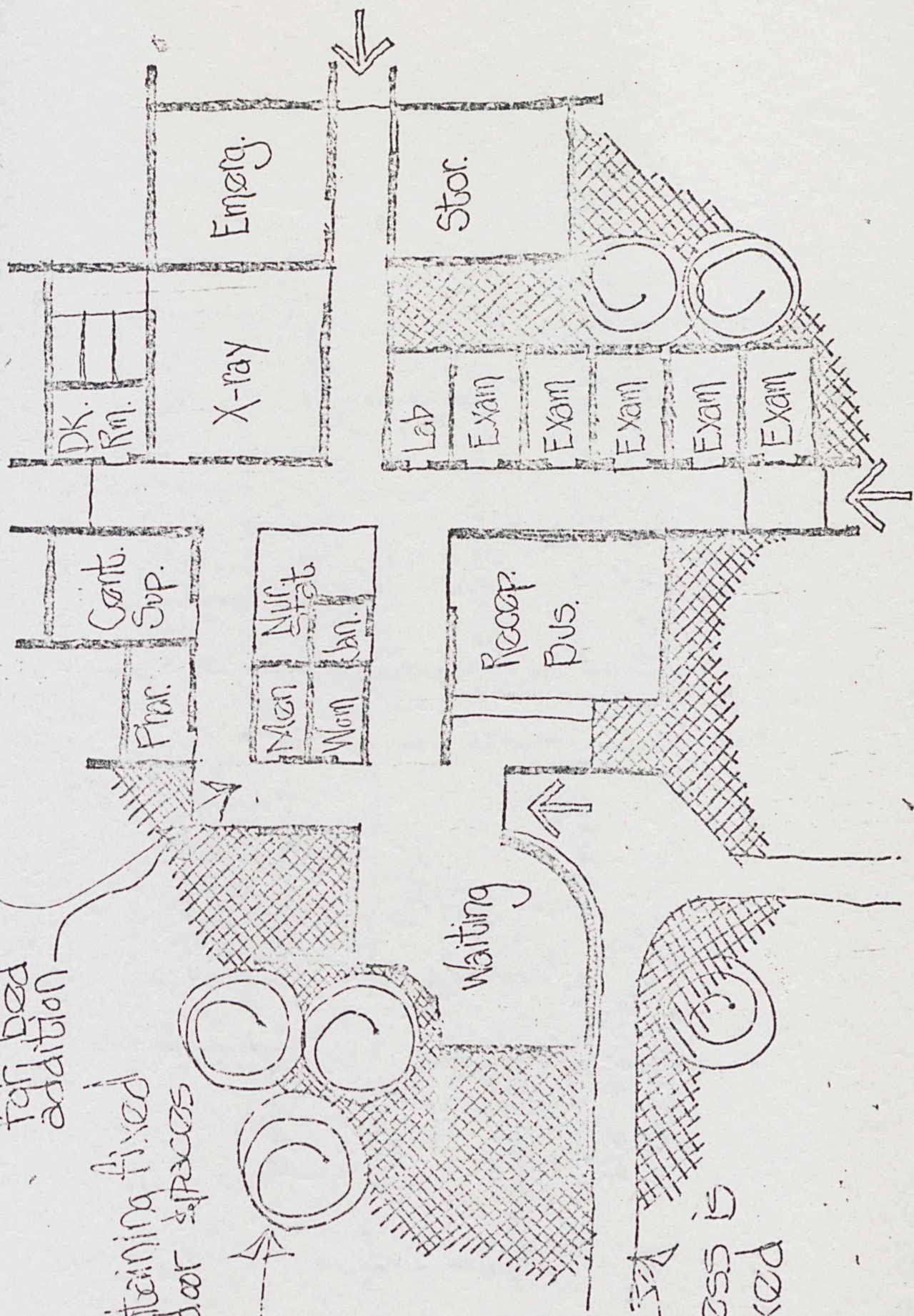
open end
for bed
addition

Core concept

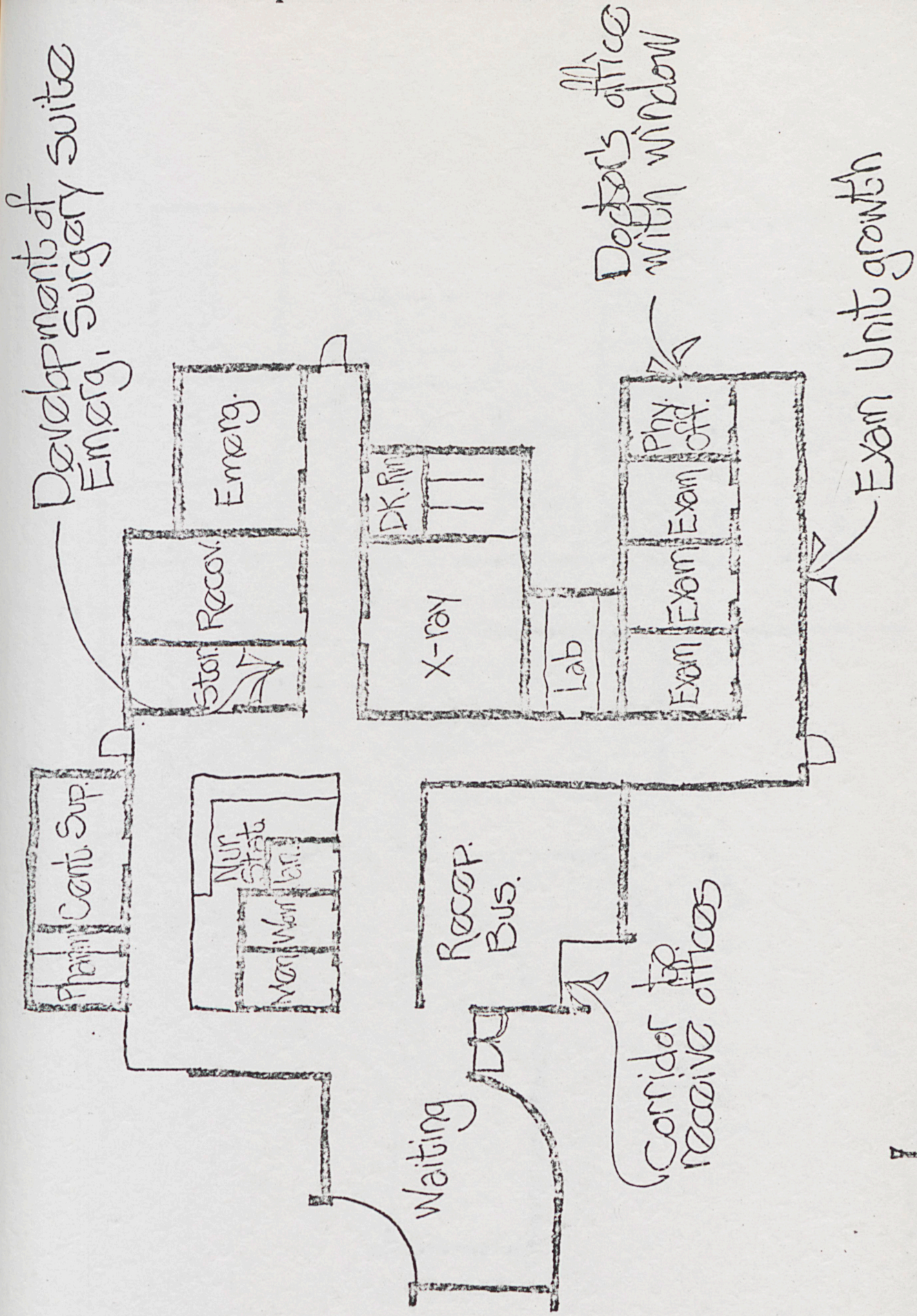
Maintaining fixed
outdoor spaces

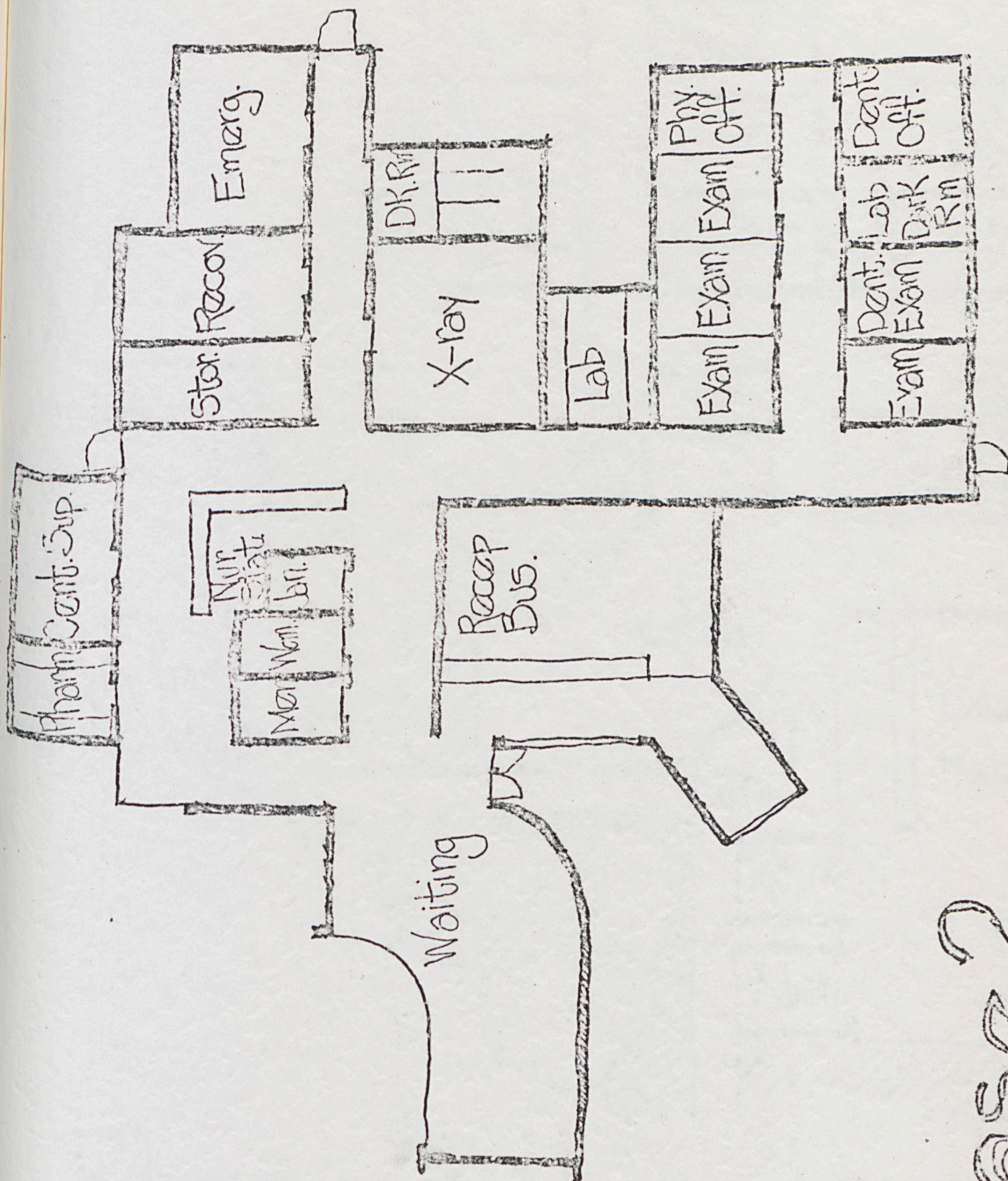
Waiting

Access is
fixed

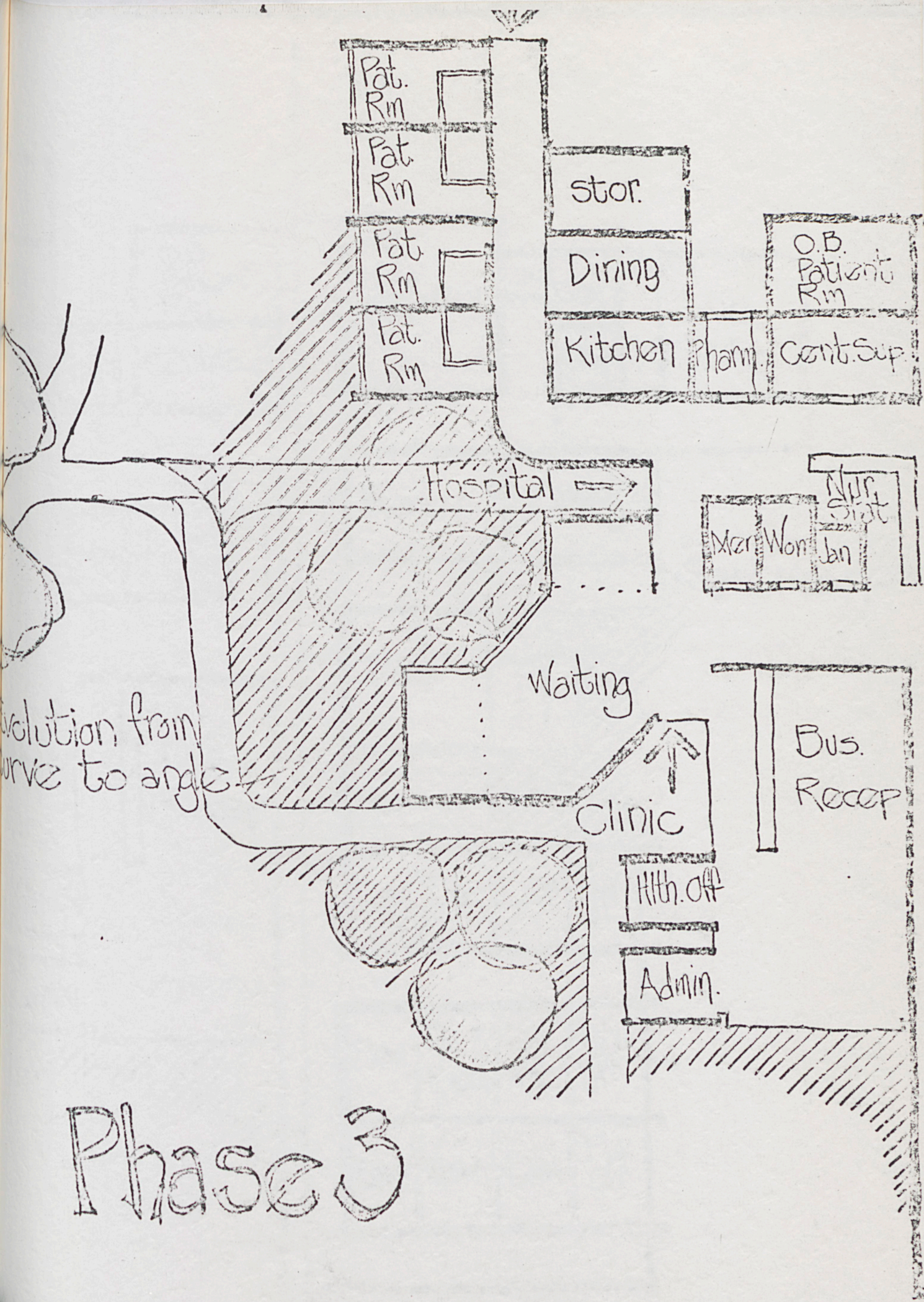


Phase I

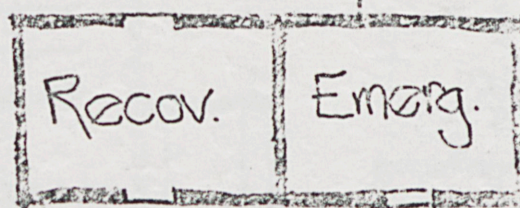
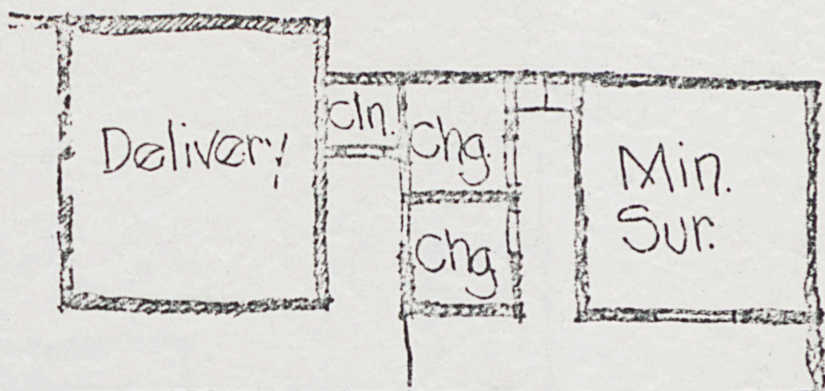
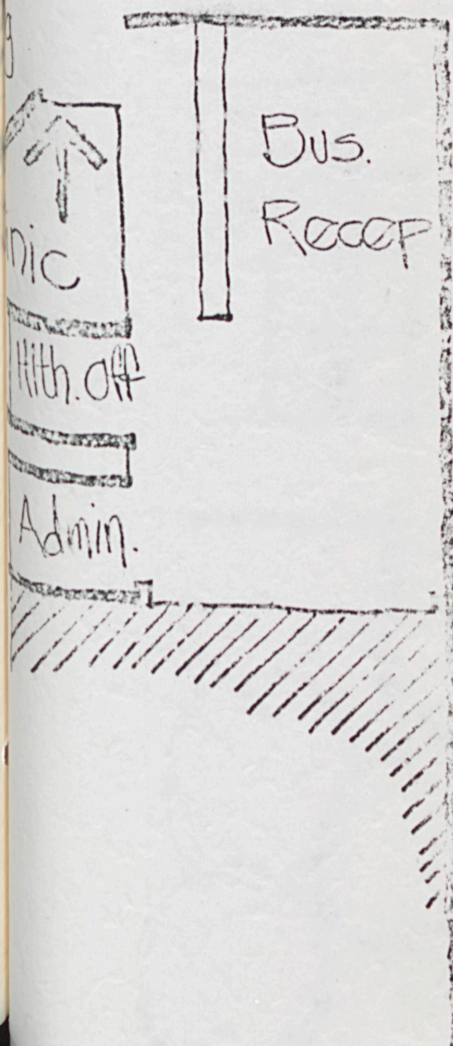
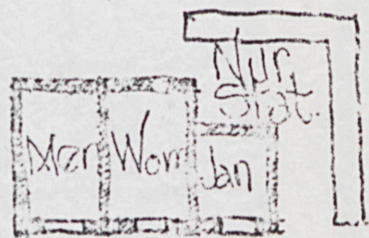
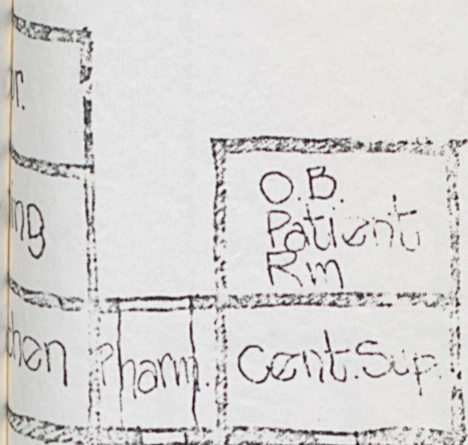




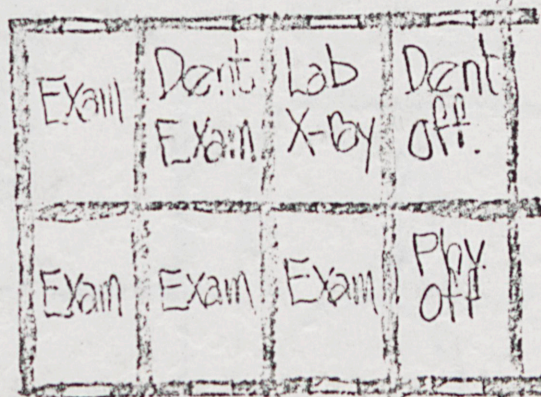
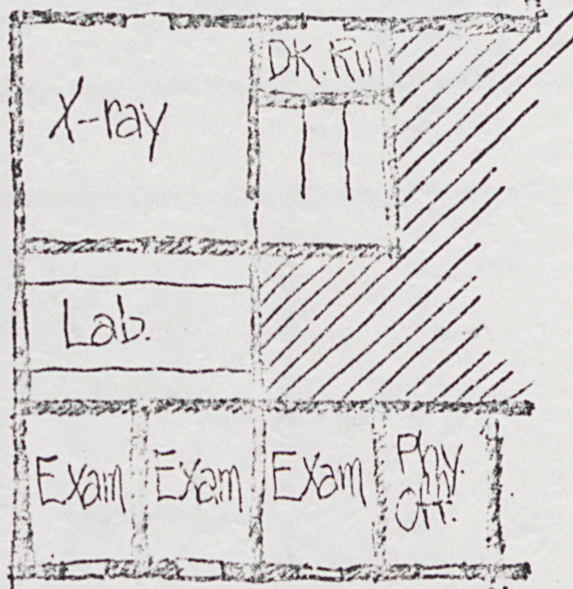
Phase 2

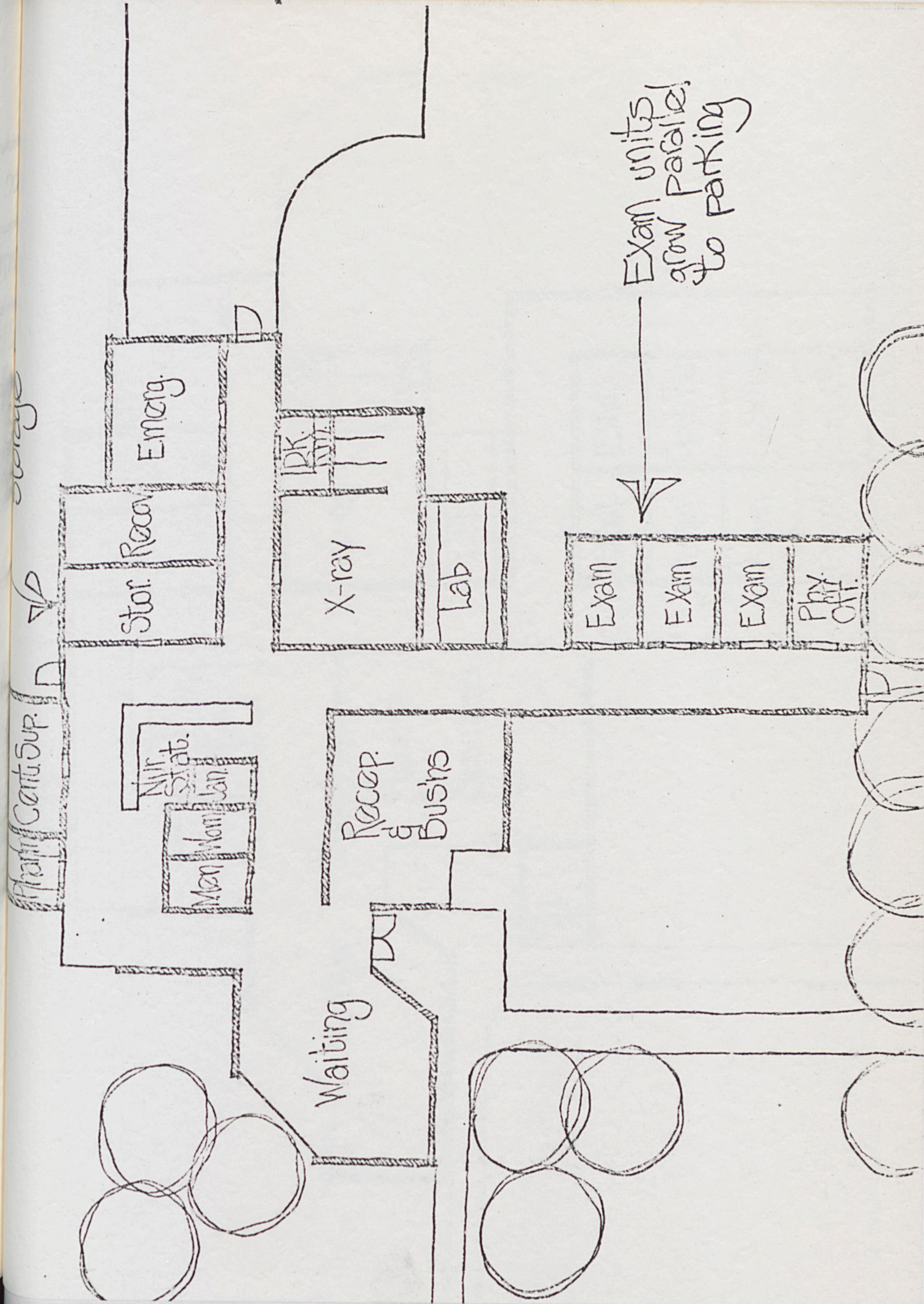


Phase 3



← Emergenc





Pharm Cont. Sup.

Men
Non-Sm
Nurse
Sto

Waiting

Recep.
Business

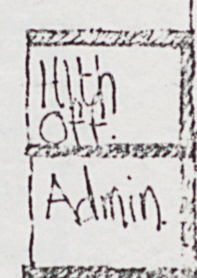
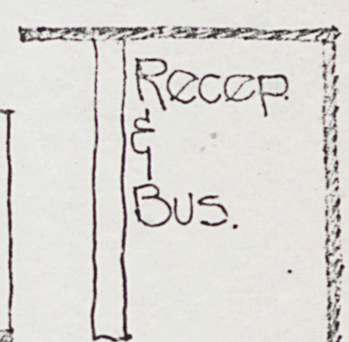
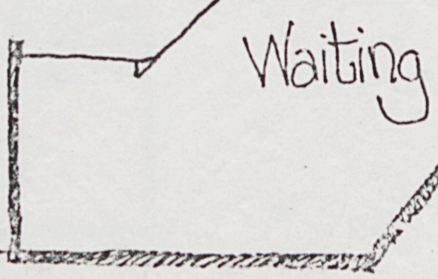
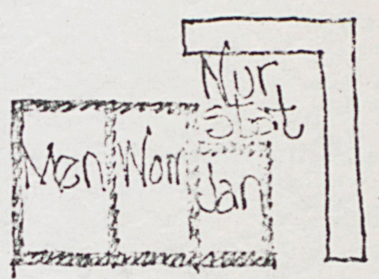
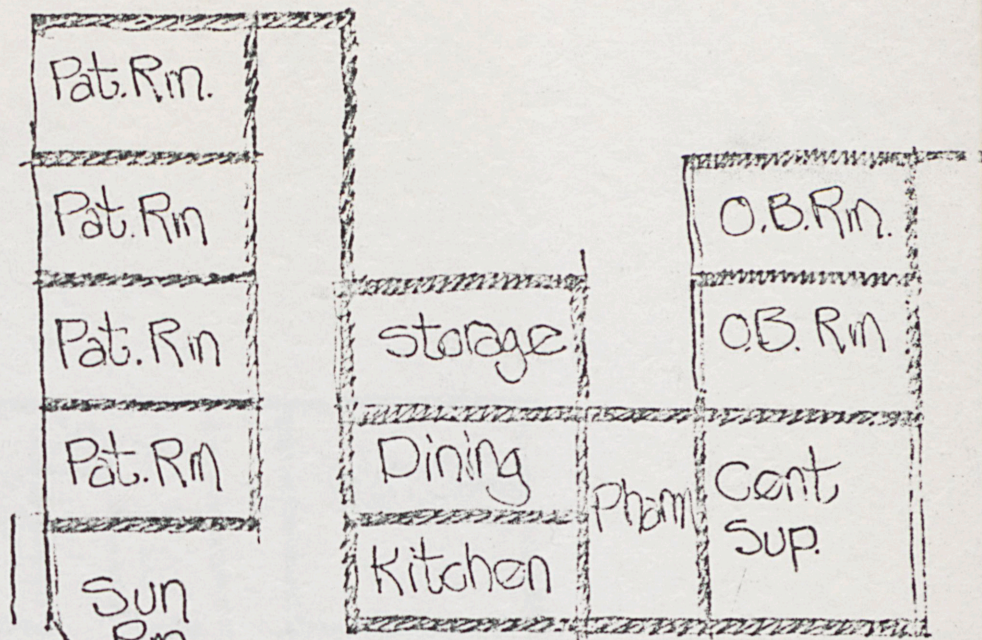
Pharm
Off.

Star
Recep
Emerg.

X-ray
D.K.R.
Chnge

Lab

Exam	Exam	Exam	Phy. off.
Exam	Dent. Exam	Lab. X-ray	Dent. off.



O.B. Rm.

O.B. Rm

Cont
Sup.

Nur
Stat
Jan.

Recep
&
Bus.

Delivery

clin M

F

Min. Surg

Recov

Emerg.

X-ray

Dx Rm

Lab

Exam

Gen
Exam

Exam

Exam

Dent
Exam

Exam

Exam

Lab &
X-ray

Exam

Phy.
off.

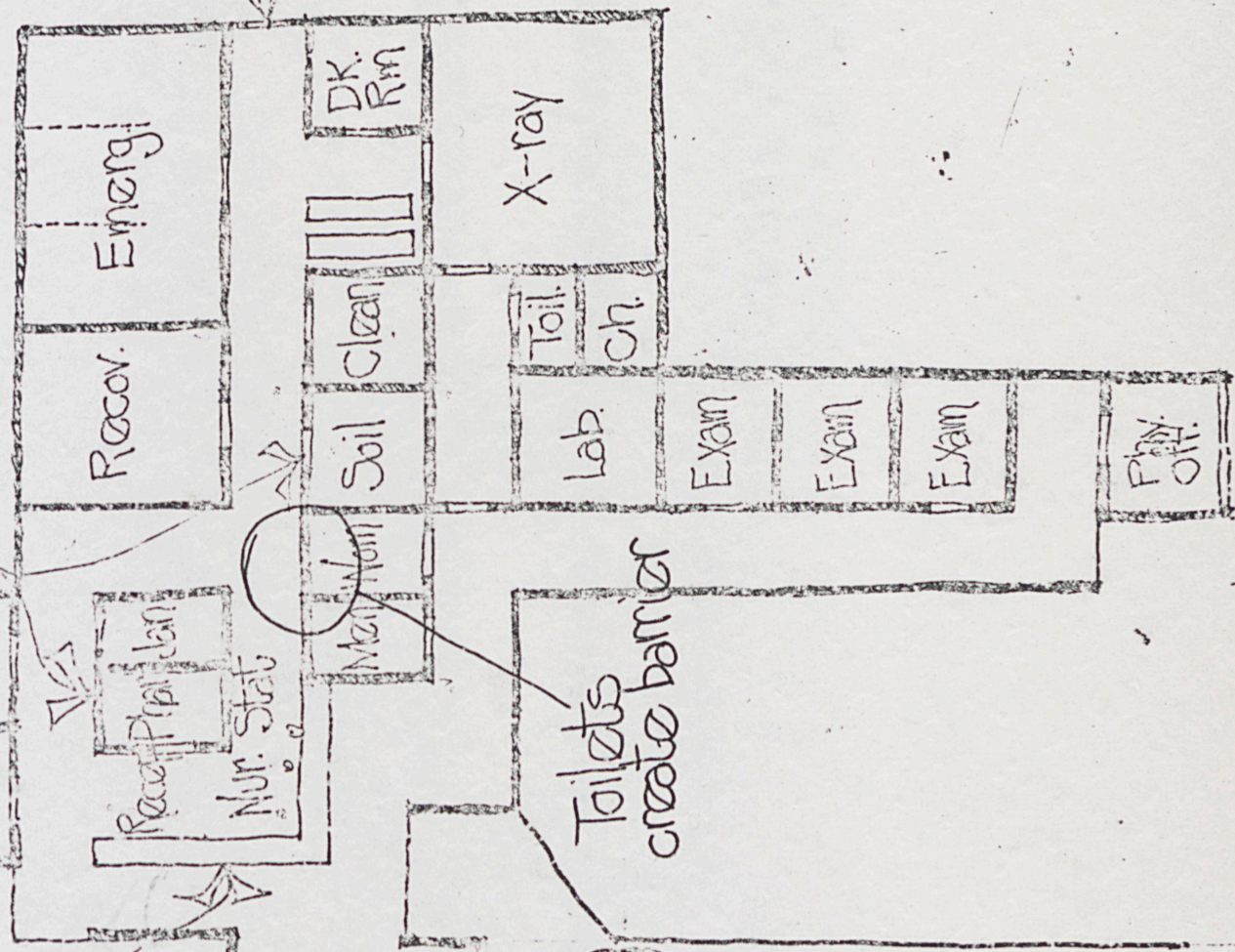
Dent.
office

Phy
off.

Nursing Station
Services as
Preliminary
Center

Station
Concept

Separation of
emergency
and exam



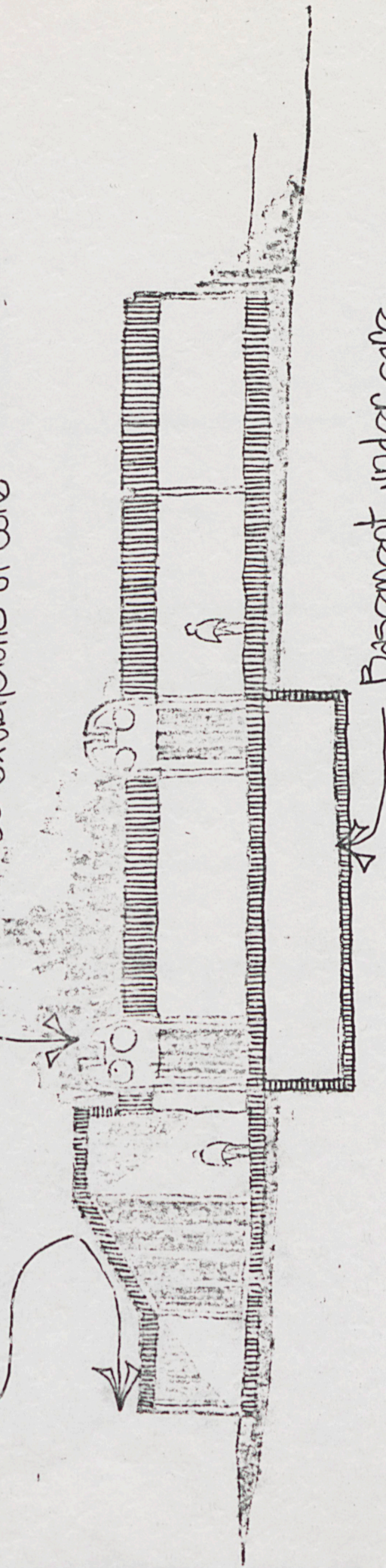
Waiting

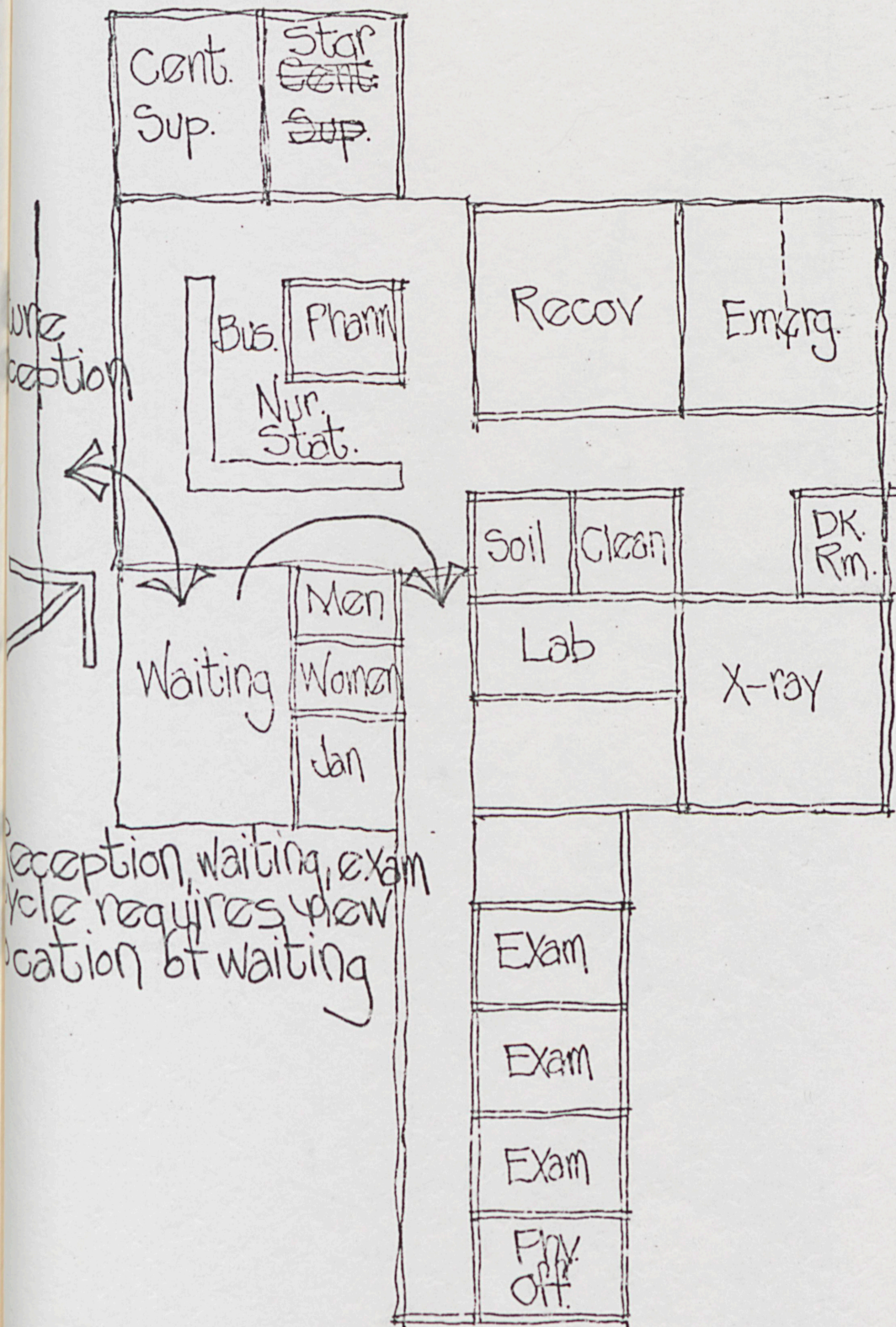
Toilets
create barrier

Form goes down
and out for
expansion

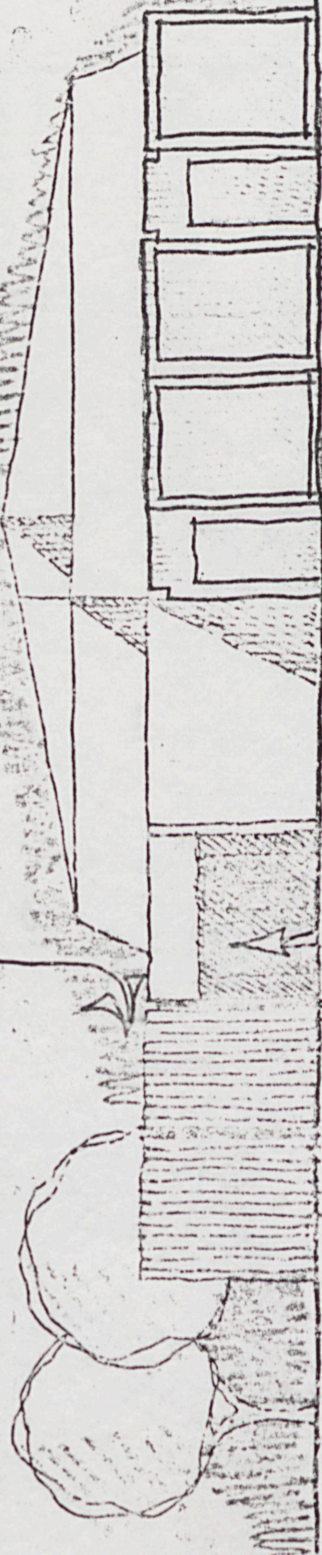
Corridors are expressed
structurally and mechanically
as extensions of core

Basement under core
houses mechanical

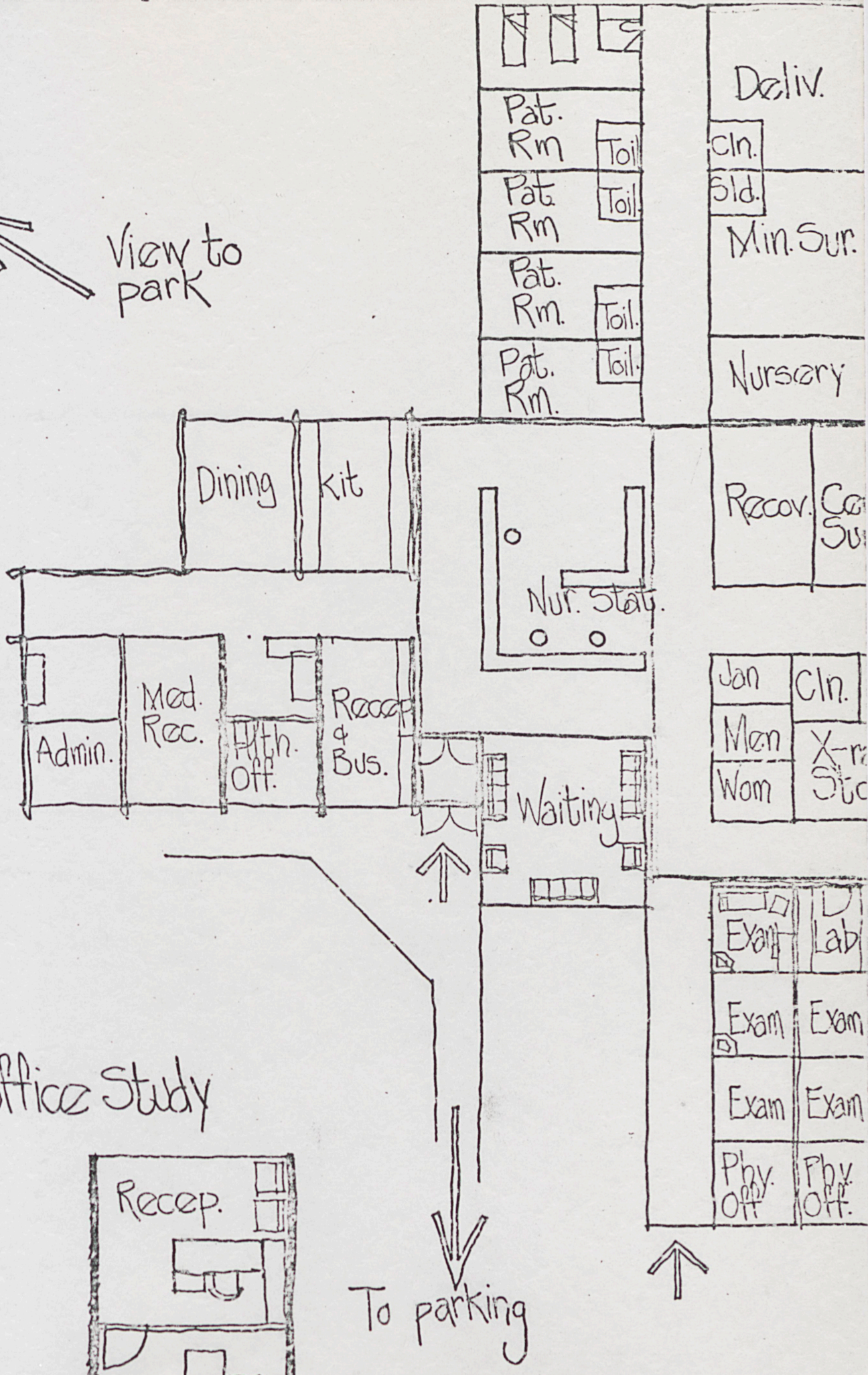




How does core form
transcend to additive
units?



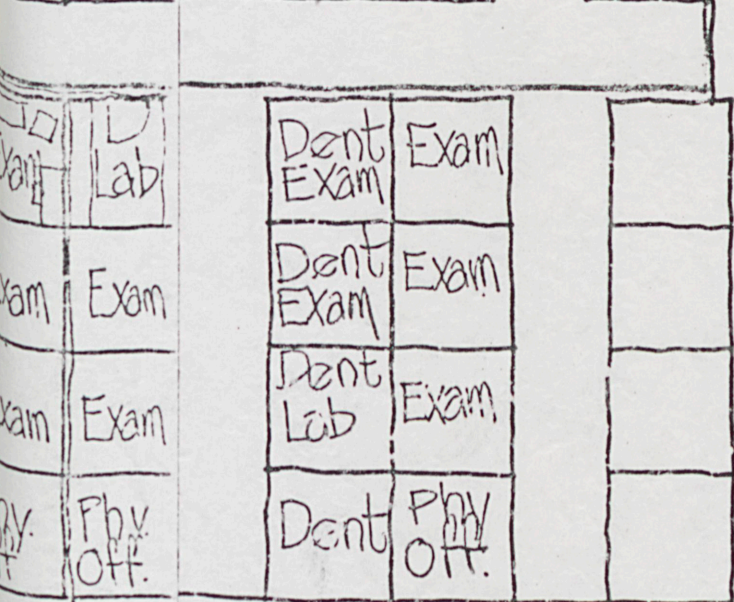
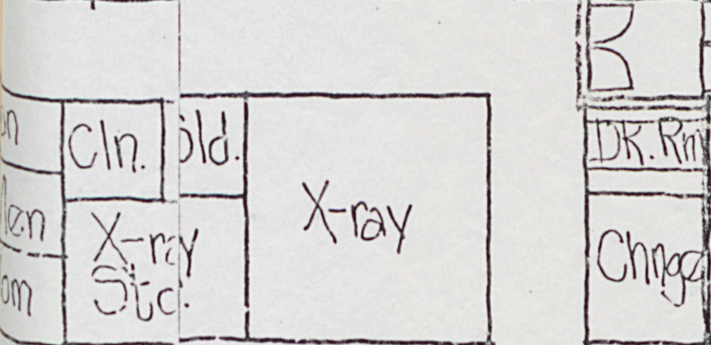
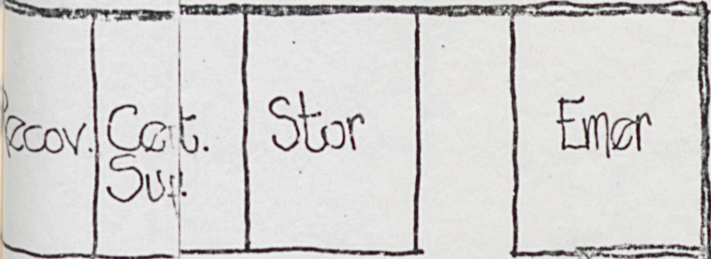
View to park



To parking

Building Plan

Deliv.
 Kin. Sur.
 Nursery



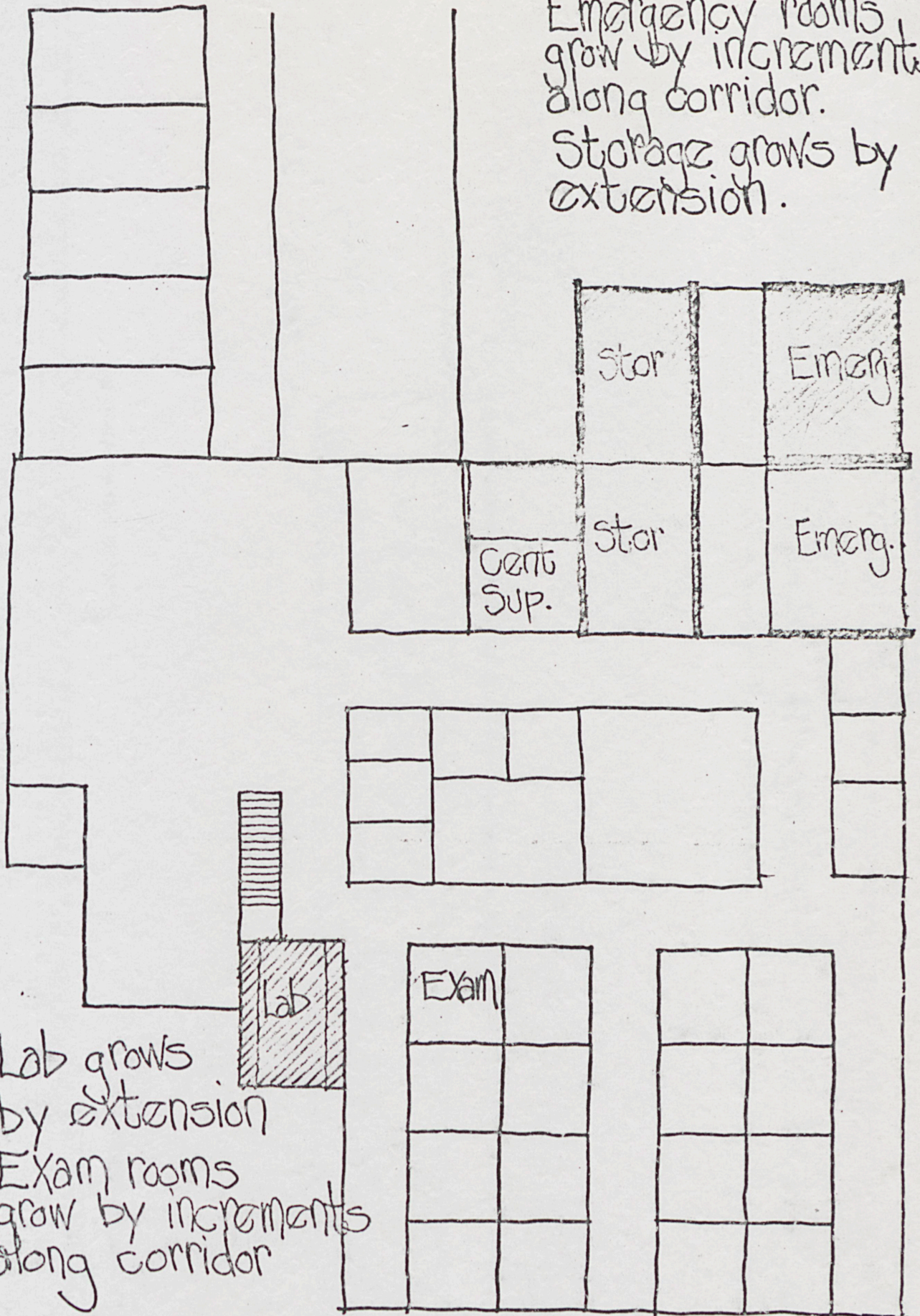
Future
exam
rooms



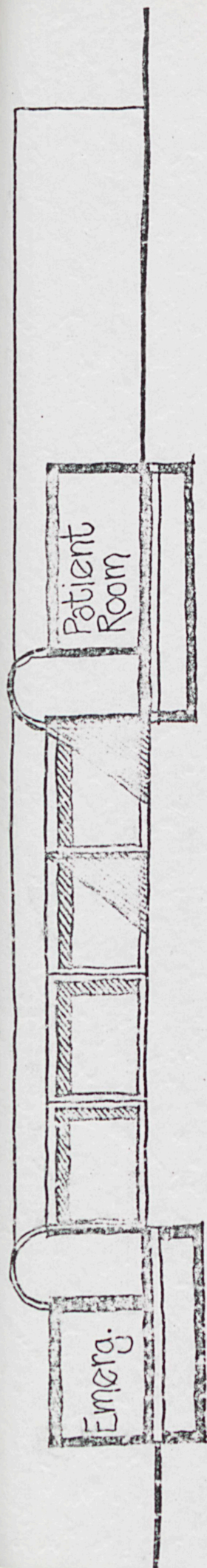
To access road

Plan 1/16" = 1'-0"

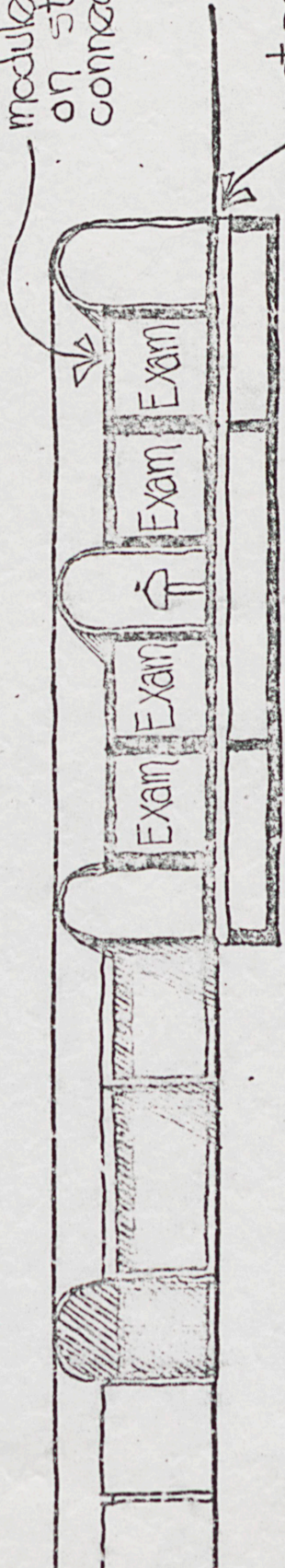
Emergency rooms
grow by increments
along corridor.
Storage grows by
extension.



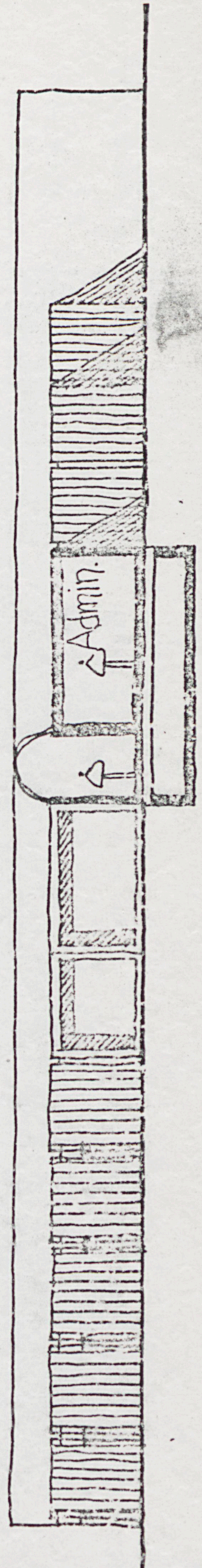
Lab grows
by extension
Exam rooms
grow by increments
along corridor



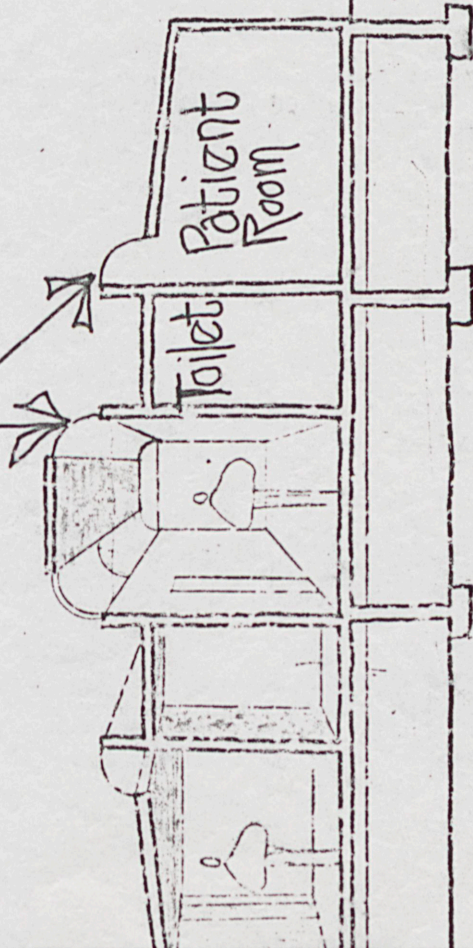
modules are placed
on steel beams and
connected together



steel beam
supported on
concrete walls



Bringing light into corridors
and individual rooms



Toilet
Patient
Room

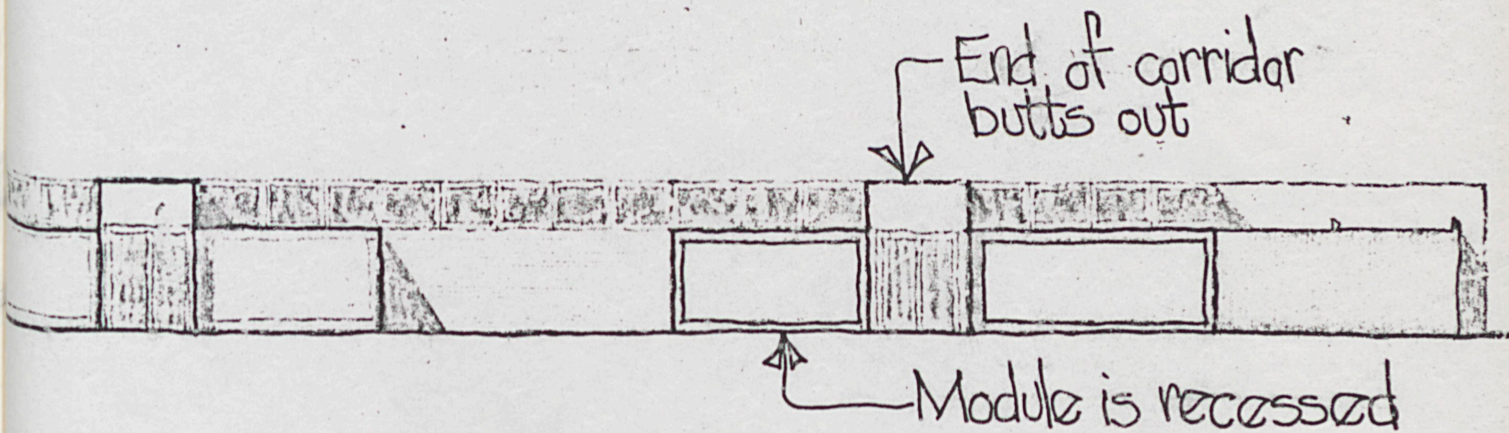
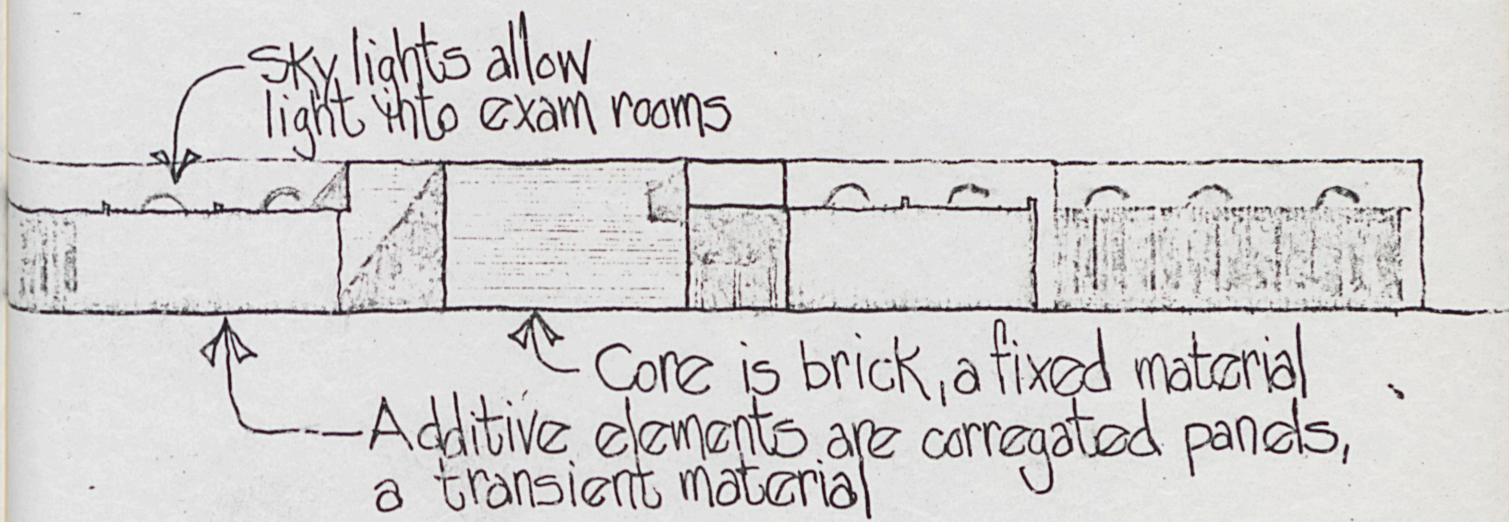
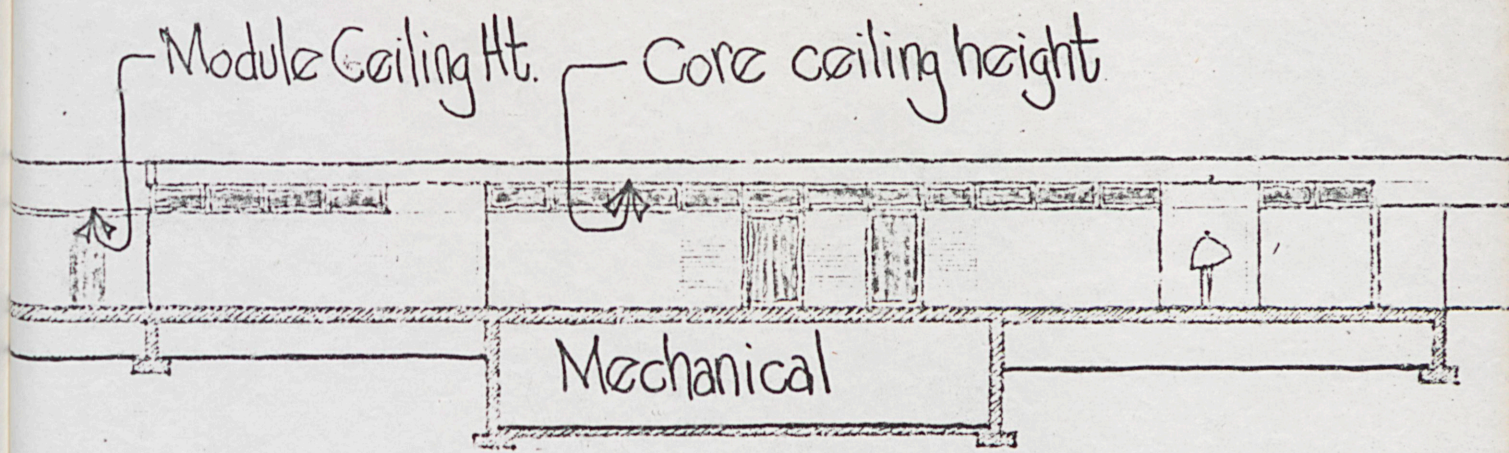
Exam

4' crawl space

Mechanical runs through crawl space

Clarestory windows carry out
to corridors helping continuity

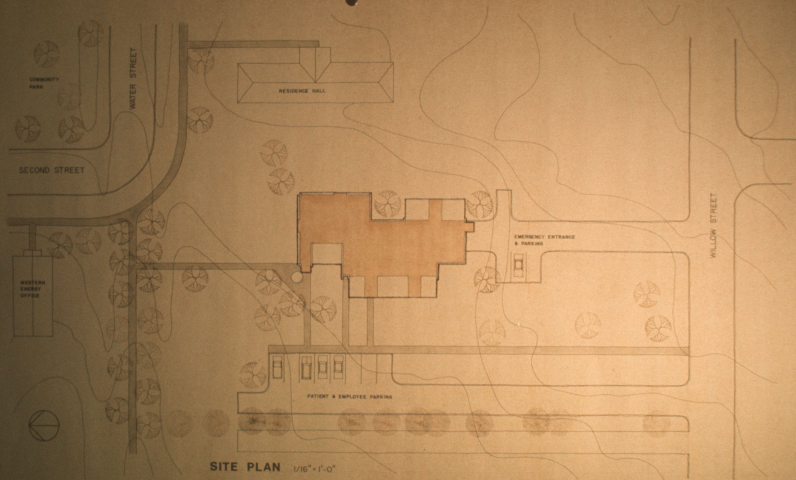




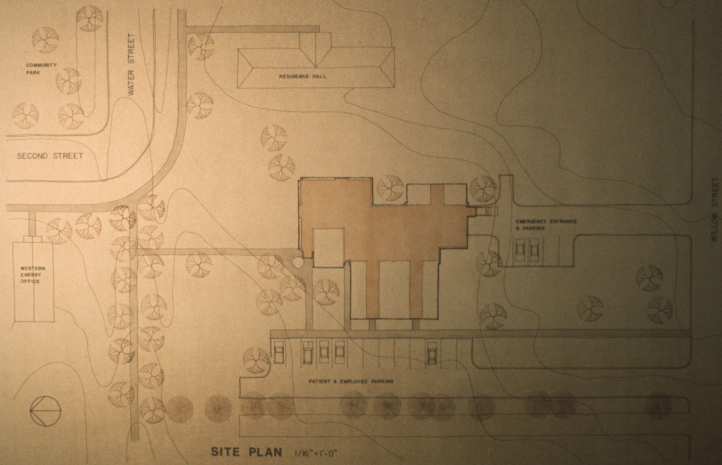
**AN
EXPANDABLE
HEALTH
FACILITY
FOR
COLSTRIP
MONTANA
TO PROVE
ARCHITECTURAL
CREATIONS CAN
BE RECEPTIVE
TO CHANGE**

MORIN

PHASE I



PHASE II

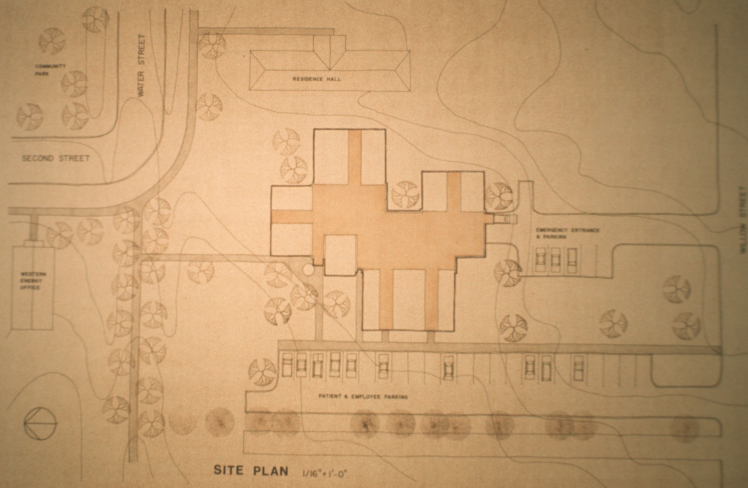


SITE PLAN 1/16" = 1'-0"

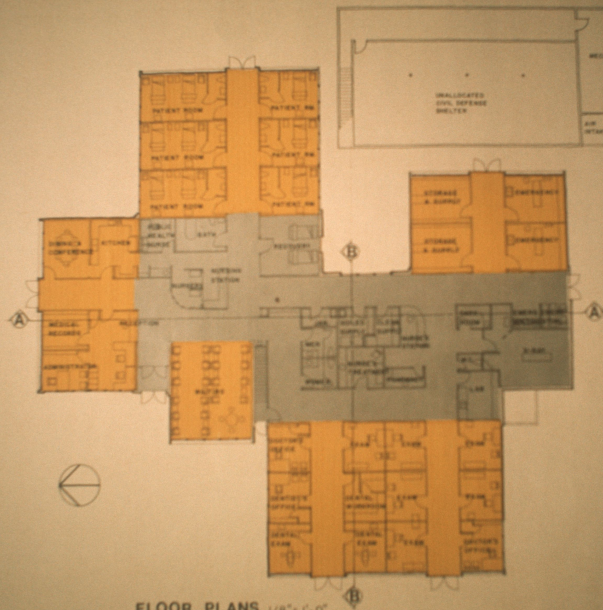
SITE PLAN 1/16" = 1'-0"

PHASE III

SITE PLAN 1/16" = 1'-0"







FLOOR PLANS 1/8" = 1'-0"

WEST ELEVATION

NORTH ELEVATION

EAST ELEVATION

SOUTH ELEVATION



A perspective sketch of a modern building facade. The building features large, dark-framed windows and a central entrance with a light-colored door. A person is standing in front of the entrance for scale. The sketch is rendered in a simple, line-art style with some color washes.

SOUTH ELEVATION

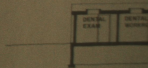
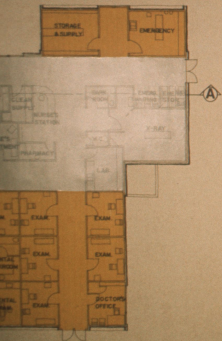


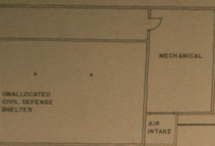
An architectural elevation drawing of a building facade. The drawing is rendered in a minimalist style with black outlines and some color accents. From left to right, it features a large window with a dark frame, a solid orange-colored door or panel, another large window with a dark frame, a dark rectangular entrance, and a series of three smaller windows on the right. The building has a flat roof with some overhanging sections. The drawing is set against a plain, light-colored background.

Architectural elevation drawing of a building facade. The drawing is minimalist, using black lines on a light background. It features a central entrance with a yellow door and a large window. The entrance is flanked by dark rectangular sections, possibly representing windows or structural elements. The overall style is modern and architectural.

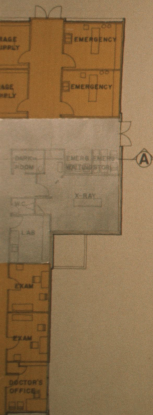
A detailed architectural section drawing of a building. The drawing shows a large, dark, overhanging roof structure. A person is standing under the overhang on the right side. The drawing is rendered in a minimalist style with black lines on a light background.

SOUTH ELEVATION





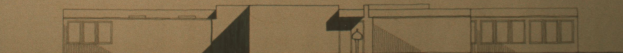
WEST ELEVATION



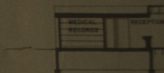
NORTH ELEVATION

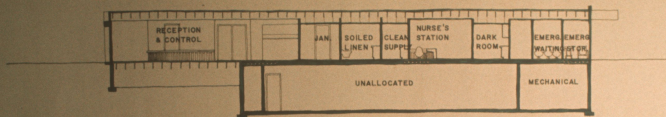


EAST ELEVATION

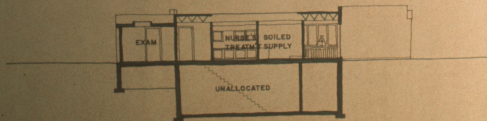


SOUTH ELEVATION





SECTION AA

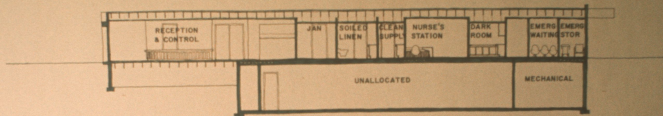


SECTION BB

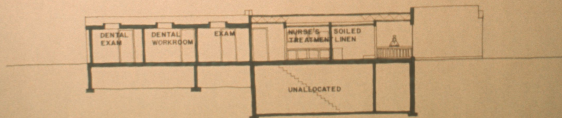
1627 GWSA
at 2' s.s.

FIN TUBE RADIATO

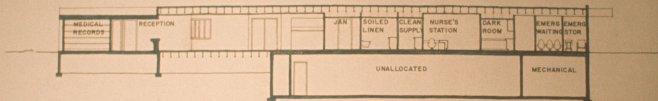
8 3/8" FLOOR &
ROOF PANELS, 4" W



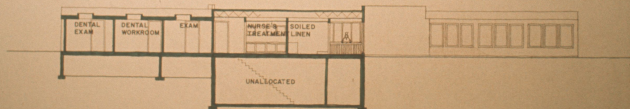
SECTION AA



SECTION BB



SECTION AA



SECTION BB

8 3/8" FLOOR &
ROOF PANELS, 4' W.

UNIT VENTILATOR

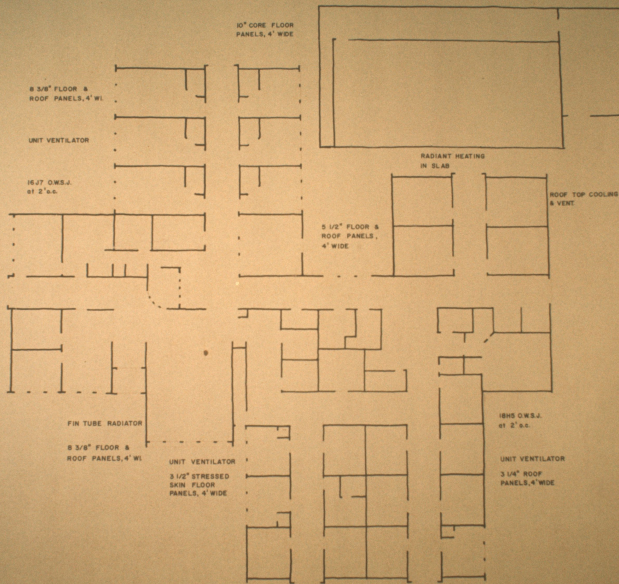
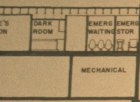
16/27 OWS. &
at 2' x 4'

FIN TUBE RADIATOR

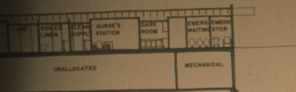
8 3/8" FLOOR &
ROOF PANELS, 4' W.

UNIT VENTILATOR

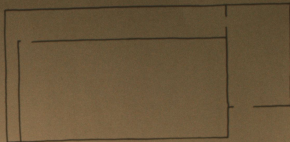
8 1/2" STRESSED
SKIN FLOOR
PANELS, 4' WIDE



MECH. & STRUCT. PLAN



10" CORE FLOOR
PANELS, 4" WIDE



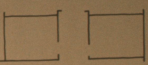
RADIANT HEATING
IN SLAB

16/17 O.M.S.J.
at 2' o.c.



3 1/2" FLOOR &
ROOF PANELS,
4" WIDE

ROOF TOP COOLING
& VENT.



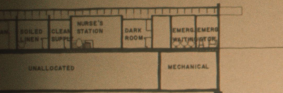
FIN TUBE RADIATOR
3 3/8" FLOOR &
ROOF PANELS, 4" W.

UNIT VENTILATOR
3 1/2" STRESSED
SKIN FLOOR
PANELS, 4" WIDE

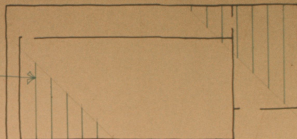
18/19 O.M.S.J.
at 2' o.c.

UNIT VENTILATOR
3 1/4" ROOF
PANELS, 4" WIDE

MECH. & STRUCT. PLAN



10" CORE FLOOR
PANELS, 4' WIDE



RADIANT HEATING
IN SLAB

16/7 GWS.J.
at 2" s.s.



5 1/2" FLOOR &
ROOF PANELS,
4' WIDE

ROOF TOP COOLING
& VENT.

FIN TUBE RADIATOR

8 3/8" FLOOR &
ROOF PANELS, 4' WIDE

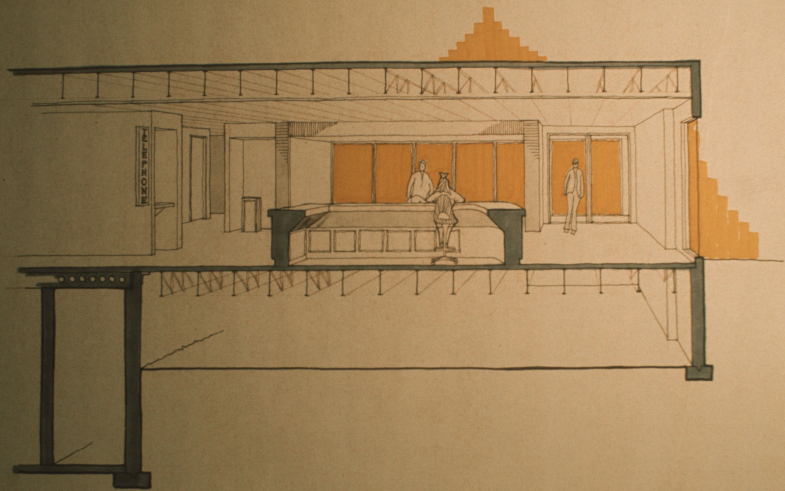
UNIT VENTILATOR

3 1/2" STRESSED
SKIN FLOOR
PANELS, 4' WIDE

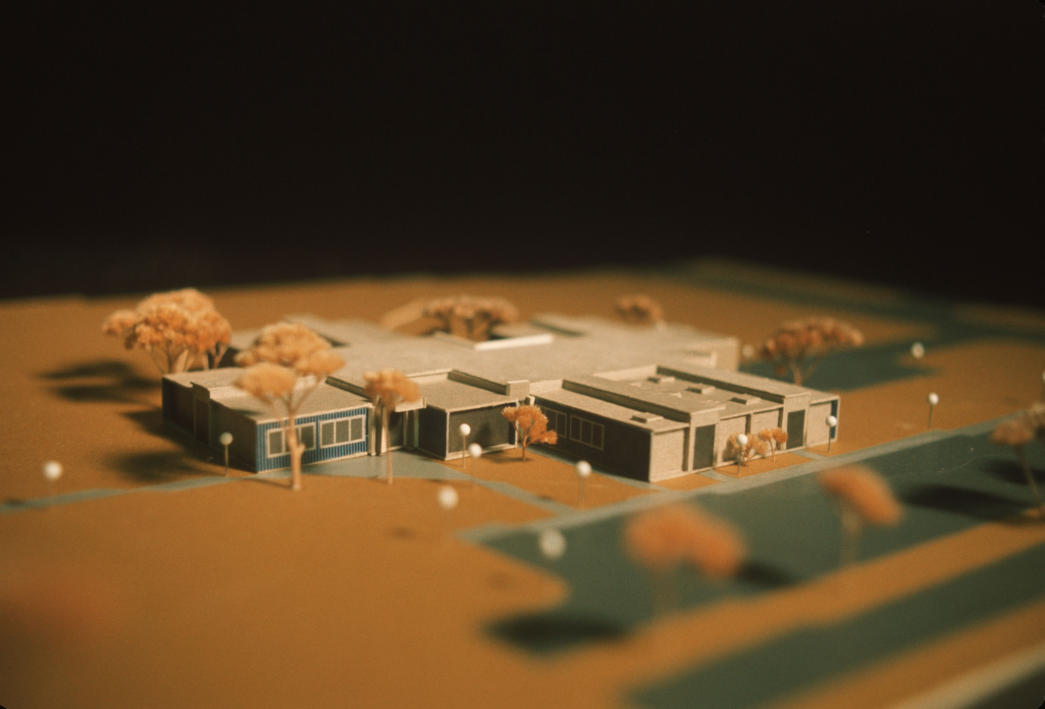
18/8 GWS.J.
at 2" s.s.

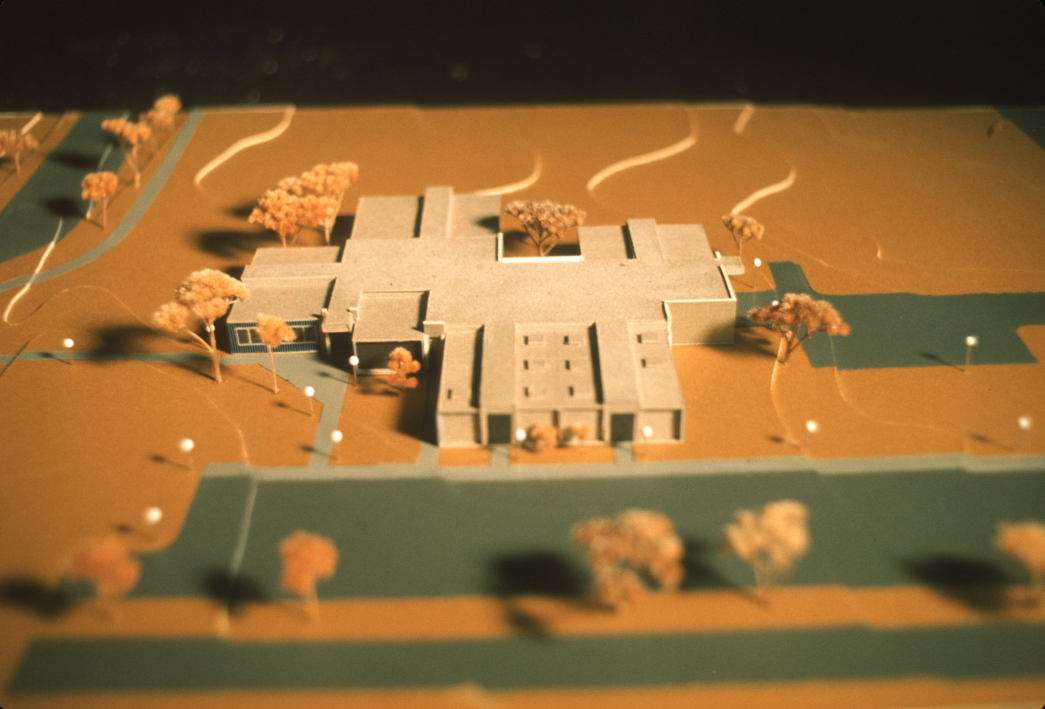
3 1/4" ROOF
PANELS, 4' WIDE

MECH. & STRUCT. PLAN



RECEPTION AREA





MONTANA STATE UNIVERSITY LIBRARIES
stks 720.6.M76M825 CA
An expandable health facility for Colstr

3 1762 00158113 9

MAR 4 '78

APR 24 '78

MAY 28 '78

7
~~720.6~~
~~M76~~
M825
~~LID. USE ONLY~~

