A DAY-CARE COMPLEX FOR 1000 CHILDREN

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PREFACE

If campaigns now being undertaken to educate the United States public about the need for institutionalized child-care are successful, then day-care as an organized service may well develop on a scale approximating that of the elementary school system. When that occurs, the architectural profession will be very much involved in adapting form and space to the unique needs of child-care.

Although the concept of day-care encompasses all children in need of care, between birth and 18 years of age, this study is concerned only with the preschool child between 2½ and 5 years old. This stage, at which a child begins to interact with and interpret the world around him, happens to coincide with an area of nearly total neglect regarding spaces planned specifically to accommodate his learning processes. In spite of the fact that a great deal of research has been conducted toward understanding the needs of small children, most applications of this information have not often required architectural interpretation. However, it is my feeling that an architectural study at this time may shed some light on possibilities regarding the ultimate size of day-care centers and, thus, perhaps contribute to an earlier understanding of problems

which may develop in such a far-reaching institutional program.

The study is intended to accomplish three things:

1. Define the present-day philosophical basis and statistical background of day-care for preschool children.
2. Characterize preschool children in terms of universal characteristics which are fundamental to normal development.
3. To interpret the general philosophy and specific characteristics in terms of an architectural design study capable of accommodating as many as 1000 children.

ACKNOWLEDGMENTS

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FOREWORD

When an architect is confronted with the design of any project, the thing that he is actually being asked to do is to interpret the actions of man and the beliefs of man as usable space. In making such an interpretation, he will try to lend functional clarity to the actions and expressive character to the beliefs. Therefore, in interpreting the needs of a day-care center, the architect must understand both the philosophical base on which day-care builds and the specific characteristics of the children for which it is intended.

The study proceeds from the general to the specific in the following manner:

Chapter I concerns itself with statements of philosophy and statistics which develop into a justification of the major theme of study.

Chapter II icnludes an architectural interpretation of the characteristics of preschool children which are critical for successful physical, emotional, and social development.

Chapter III is a detailed discussion of architectural design concepts based on Chapters I and II.

Chapter IV cites specific information pertaining

to a design-study for Stillwater, Oklahoma
The Summary and Conclusion relates the major. findings and considers them in terms of the original intent of justifying and designing a day-care center for 1000 children.

CHAPTER I

PHILOSOPHY AND STATISTICS

Chapter I is concerned with accomplishing two things:

1. Defining day-care by stating its philosophical basis and statistical background.
2. Justifying the reason for an architectural design study of a large day-care complex.

Child Care as a Basic Concern

Among those things about which man is generally concerned, there exist some which are more closely skin to his basic nature than are others. The care and socialization of children is one of those concerns which is so fundamental that it can be considered a universal defining element of man (7).

In the western world and in the United States in particular, the traditional pattern of socialization begins in the home and proceeds from there becoming increasingly independent through outside influences such as the school system and friends (9). Throughout this process, there is always a great deal of concern on the part of adults about the success of a child's development.

Even in the light of this strong basic concern for

their children's welfare, many women have unknowingly, in recent years, put their children's development in jeopardy by acting on a feeling of necessity to leave the home and go to work. In many cases, these women have been the mothers of preschool children. Out of concern for their children's welfare, most of these women have made arrangements with either neighbors or relatives for child care. Being unable, in most cases, to afford private nursery schools, this path has had both the advantage of being convenient and the traditional prerogative of being acceptable. However, in more recent years students interested in child development have found that in more cases than not these young children of working mothers do not receive the necessary attention and concern to effectively lead them toward healthy physical, mental, and social adjustment (6).

Findings in the Study of Child Development

In recent years the area of child development has been very extensively studied. From many related inquiries and reliable amounts of accumulated information, researchers have been led to set down those findings which appear to be universally essential to the development of a normal individual. The format used to structure this statement of universal elements has been the establishment of a hierarchy of developmental stages which encompass the entire life span of an individual. The total hierarchy of

all stages is called the "life-cycle." The life-cycle is generally thought to consist of eight sub-division, or stages, each of which indicates that the subject has arrived at a new plateau in life. The preschool stage is the second of these eight basic stages. As each particular stage is taken into consideration, it is broken down into more specific units called developmental tasks. The developmental task is a universally essential task (within a given culture) which must be successfully completed before an individual can cope with the problems of the next stage in his life-cycle. Deficiency at one stage of developmental tasks will set a pattern of deficiency at all remaining stages. From this viewpoint, it can be seen that the preschool stage of development is a highly important one and will predispose the character of an individual's social behavior during the remaining majority of his life span (3). This sort of information coming from respected authorities presents a strong argument in favor of institutionalized care of potentially neglected children.

The Response of Day-Care

In response to this possibility of children being neglected, when mothers must work, day-care is a program aimed at providing an extension of the same basic concern for welfare generally provided by the family home. The programs are administered by professionally trained people,

and soon all day-care centers, which are currently in the process of falling under state level codes and licensing, will be staffed by licensed personnel who have the time and the training to provide the crucial guidance needed by children who are not yet old enough to attend public schools.

Day-care, as outlined here, is an institutionalized expression of the basic human concern for the effective care and socialization of children. Further, day-care is, within our society, an attempt to further the expression of a social ideal that guarantees equal opportunity for physical health, emotional health and social adjustment to all children (2).

This briefly summarizes the philosophical basis for day-care. From this material, it may be suggested that an architectural response to this subject should exhibit a character closely allied to that ideal socialization unit, the family home. This character might be more clearly interpreted as one of intimacy, warmth, and concern on three fronts: the physical, the emotional, and the social. These characterizations will become more evident when the unique nature of preschool children is more closely observed in Chapter II.

Statistics

As a result of the opportunity being provided, the working woman has become an indispensable unit of United

States economy. The working woman now accounts for one-third (32,000,000) of the total national work force. Of that one-third, about 4,000,000 are the mothers of children between the ages of 3 and 5. There are presently licensed day-care centers providing supervision for approximately 2 per cent of the children of these 4,000,000 women. All others according to a Census Bureau survey are cared for by fathers, relatives, brothers or sisters under 16, or neighbors (10).

Looking ahead the Department of Labor Statistics forsees a 17 per cent increase in working women, compared to an expected 9 per cent for men, in the period from 1964 to 1970. This indicates that women will account for about one-half of all additions to the labor force in that six-year period. Because of this increasing essentiality of the working woman to the national economy, the problem of pre-school child neglect is going to increase also. There remains no hope of reversing this trend short of reversing the values of society (10).

By comparison with other countries who have recognized day-care as a need inherent in technological societies, the U.S. is lagging considerably behind. England has established day-care as a mainstay in a system of national defense. Russia, in approximately one-half the time spent by the U.S., has developed day-care provisions for 20 per cent of the children of their working mothers. And public support of day-care has become a reality

throughout most of Europe. In contrast to these, the United States has made only a slim beginning (5).

Public support in the United States has been virtually zero due to the mass ignorance that any problem exists. As pointed out previously, the care of small children by friends and relatives is generally considered quite acceptable. The primary problem facing day-care in this society - prerequisite to government appropriations as well as public donations - is mass education about the problem (6).

Encouragingly, there has been some recent concern at the Federal Government level which indicates a beginning awareness of the problem. Under the 1962 amendments to the public welfare provisions of the Social Security Act, the first specific authorization of funds for day-care was made since World War II. These amendments authorized a five million dollar a year increase in the existing twenty-five million dollar maximum appropriation for child care, up to a maximum of fifty million. The increased amount, over twenty-five million, is designated for the establishment of day-care centers. This amount, if used to build new centers, would increase the per cent served from the approximate 2 per cent mentioned above to about 2.5 per cent. However, state directors will probably find the more productive use for these funds to be in expanding and refining the licensing and supervision of existing centers. Because of the lack of public understanding and,

thus, lack of major government or individual support, the majority of this nation's day-care centers are currently small and on a very tight budget (10).

The typical day-care center in the United States today will range in size from around twenty to a maximum of about one hundred. Funds are always short and, therefore, the facilities and the staff are usually the minimum required by law - law which in general is primarily concerned with the elemental standards for physical health and safety. The size of these centers may restrict their being able to offer many badly needed services such as professional physical and mental health services, adult education classes, and a variety of learning and playing situations.

Conclusion

If the proper public support could be obtained to finance large complexes into which several centers could be grouped, it may then become reasonable to maintain a resident staff including such professionals as child-care specialists, doctors, dentists, family guidance counselors, psychologists, and dietitians. This is the type of response which results when the essential elements of successful development are weighed against the probability of what may be happening to the 98 per cent of those 2½-5 year old children who are outside of their mothers' care each working day. Few people ever perceive any connection

between a pre-school child who is shuttled about and subsequent emotional and social difficulties. Yet, the probabilities are astoundingly real ones. The neglected pre-school child is a probable channel for insuring the promotion of weaknesses which may lead to divorce, delinquency, emotional illness, and the uncomitted man. If the public becomes successfully educated about the needs of day-care, and adequate support becomes a reality, then centers of twenty to one hundred children will be highly inadequate and much larger complexes will be necessary.

It is toward this possible future realization of day-care in near-full response to society's needs, that the remainder of this inquiry is based on a study figure of 1000 children. The major problem of this project is that which develops out the citation of a figure as large as 1000; that is, how to maintain an architectural character of intimate concern and still accommodate this large number of preschoolers. After a closer look, in Chapter II, at developmental tasks, the activities they encompass and the type of spaces required for them, Chapter III will return to this question of character and size in a discussion of architectural design concepts.

Summary

The concept of day-care as an institution has arisen out of a basic human concern for the proper guidance of children, being confronted by the reality that many

mothers are becoming indispensable working units of United States economy. This situation is aptly stated by Helen B. Shaffer (10).

> It has become a sociological fact of life: That women in large number are in the labor force, that they are there to stay, that many of them have children, and that if the children receive poor care there is bound to be trouble.

There are two-fifths of tomorrow's citizens in potential need of day-care and 2 per cent of them are receiving it.

Public support to date has been negligible, as evidenced by today's small bare-minimum centers, many of which must neglect important needs such as health services, treatment of emotional problems and adult education. These are the very types of services which could be provided in centers large enough to maintain a resident staff.

As a beginning, a few Federal Government officials are becoming sincerely concerned and federal funds are being earmarked specifically for day-care. When public concern on a universal scale does become a reality, and money is available to provide day-care facilities for the remaining 98 per cent, then centers accommodating 100 or so children will be far too small.

It is on premises that the remainder of this study is structured in terms of a complex for 1000 children, with its accompanying problems of providing this large number of children with an atmosphere which still expresses something close to a home situation.

CHAPTER II

ARCHITECTURAL INTERPRETATION OF DEVELOPMENTAL TASKS

This chapter is concerned with listing the type and character of architectural spaces which correspond to the basic pattern of development tasks for preschool children. A brief introduction to the concept of developmental tasks as representatives of successful development was made under the heading "Findings in the Study of Child Development," in Chapter I.

The Developmental Tasks

The preschool stage of development takes in children between 2½ and 5 years of age. At this age level, the child is coming out of the indulgence and preoccupation of babyhood and emerging as an individual capable of sharing with others, participating as a family member, and finally moving on to the next developmental stage of being ready for school. The child's physical growth is slowing down and many of his bodily activities are becoming more routine and better coordinated. His growing ability to express his ideas in speech and his increasing awareness of the world around him attest to his intellectual and

emotional progress. Both the physical and mental development of the child have, by this time, made their rudimentary establishments. The preschool stage is that at which these two basic systems, physical and mental, begin to refine themselves in response to many various circumstances. This refinement in the light of various challenges compose the developmental tasks of a preschool child (3).

Architectural Interpretation

The developmental tasks discussed above, when considered from an architectural viewpoint, become indicative of specialized activities which require specialized spaces. On subsequent pages (13-19), Table I lists the developmental tasks of the 2½ to 5 year old child and then categorizes their architectural implications under several pertinent headings. The categories under which information is presented are: activity, space, and character. Information is divided into three categories in the following manner:

1. Activity - This category lists the activities inherent in the completion of the corresponding developmental task.
2. Space - This category consists of translations in terminology from that denoting a type of activity to that denoting a type of architectural space. (Included here is a rough

estimate of square footage requirements.)

3. Character - This category contains comments explaining each space more specifically regarding function and environment.

In keeping with the proposed theme of developing a day-care complex for a hypothetical 1000 children, the categories of activity, space, and character are further classified as to limits of application:

L. Application to large complexes only.

S. Application to small centers only.

E. Application to either.

Also, an additional secondary listing is included under some developmental tasks indicating those professional resident personnel which would have special concern for that particular area of child development.

A second table (Table II, pp. 20 and 21) lists the services which a day-care center should provide in order to satisfy the outline of developmental tasks. These services are grouped under the three headings: Child-Care Services, Clinical Services, and Administrative Services.

The listings found in Tables I and II will be used in Chapter III as a basis for developing a workable architectural design concept.

Several additional points regarding the characteristic behavior of preschool children should be made since they have definite design implications in addition to the developmental task outline.

TABLE I

DEVELOPMENTAL TASKS AND CORRESPONDING
ARCHITECTURAL IMPLICATIONS

Developmental Tasks and Their Inherent Activity Types		Translation of Activity Types to Architectural Space Types			Character Interpretation From Activity Type for Space Type		
Tasks	Activity		Space	Sq. ft.		Character	Size
1. Settling into healthful daily routines of rest and activity	a. resting b. naps c. relaxing when tired d. active play in a variety of situations run jump climb throw balance push pull e. ability to accept change	abc	isolated or set apart from play area	20/child	abc	quite, peaceful	E
		de	variety of different types of play spaces outdoor indoor (see 4a and 4b)	 70/child 40/child	de	encourage group participation. light, air nonhazardous	E
2. Mastering good eating habits	a. Use of utensil b. learning the social pleasures of eating	ab	dining space isolated from play spaces	10/child	ab	quiet, peaceful; accessible to main traffic pattern from kitchen which should be located so as to easily service all meeting	E
		ab	kitchen	2500			*L

TABLE I (CONTINUED)

Tasks	Activity	Space	Sq. ft.	Character	Size
		storage		rooms by cart adjacent to	
*(a concern factor for proper diet)	*dietitian	*office living qt.	100 460	kitchen	
3. Mastering basic toilet training	a. cooperation b. beginning sex discrimination c. learning how to use facilities	abc Separate toilets boys girls	 20/doz 20/doz	abc Easily found	E
4. Developing physical skills appropriate to stage of motor development	a. large muscle skills run jump climb throw catch balance push pull skip	a outdoor large flat and open mounded dugout a indoor large and small	70/child 40/child	a natural and artificial elements to provide a wide variety of opportunities for activity type should encourage exploration and activity. variety in scale of space	E
	b. small muscle skills: buttoning zipping cutting drawing	b outdoor small space set aside from 4-a type activity	10/child	b may not be an architectural space as much as a furnished or sub-space, however should be part of	E

TABLE I (CONTINUED)

Tasks	Activity	Space	Sq. ft.	Character	Size
	modeling manipulating small objects			activity and yet protected	
* (A concern factor for good physical health)	* resident doctor and dentist	* offices exam labs files living qt.	150/ea 100 100/ea 80/ea 800/ea	* need not be immediately central in location, but always accessible within combines of the complex	* L
5. Becoming a participating family member	a. assuming responsibility b. giving and receiving attention c. identity with parent of same sex d. sharing with others e. recognizing individual differences			abd e These are all factors which come within the program of any center. All are the beginnings of autonomous action and as such at their early beginning occur more easily within an atmosphere structured to encourage and accept them	E
* (A concern factor of family adjustment)	* A resident family guidance counsellor	* office files	150 80		L

TABLE I (CONTINUED)

Tasks	Activity	Space	Sq. ft.	Character	Size
		adult educ. classrooms conference auditorium	2 at 600 120 1600		
6. Beginning to master impulses and to conform to others expectations * (A concern factor for emotional adjustment)	a. overcoming infant outbursts b. enjoying companionship c. playing alone d. developing a co-operating way with others e. appropriate behavior for situations and places: noise, quiet, messing, etc. * see (7*)	bd cooperative game space same as 4a c separate small enclosed open (see 4b)		bd These actions would occur as part of the general play space c intimate, small	E
7. Developing healthy emotional expressions for a wide variety of experiences.	a. playing out frustrations, needs and experiences b. developing patience, waiting c. discriminating expressions, pleasure, eagerness, tenderness,	ac acting arena nodule indoor outdoor	20/child	ac a place for dramatic play in groups. This space would be used as part of a general program to encourage individual expression and the discrimination of feelings	E

TABLE I (CONTINUED)

Tasks	Activity	Space	Sq. ft.	Character	Size
	affection, fear, sympathy, anxiety remorse sorrow				
* (A concern factor for emotional development)	* Resident psychologist	* office conference files	150 120 80	*	* L
8. Learning to communicate effectively with an increasing number of other people	a. talking about: feeling experiences impressions curiosities b. listening and responding c. acquiring social skills of getting along with people	abc arena and nodule indoor and outdoor	20/child	abc This activity is similar in nature to 7abc and would in a similar manner use the same spaces for specific concentration on developing these skills	E
9. Developing ability to handle potentially dangerous situations	a. respect for fire, traffic, high places, etc. b. acting effectively in situations calling for caution	abc simulated traffic training		a This space could provide training devices simulated street, traffic lights, etc.	L
	c. accepting help when needed	bc natural outdoor space (see 11b)		bc This space could provide cautionary training regarding	E

TABLE I (CONTINUED)

Tasks	Activity	Space	Sq. ft.	Character	Size
				the natural world. (see 11c)	
10. Learning to be an autonomous person with initiative and a conscience of his own	a. making responsible decisions b. taking initiative for: inovation experiment trials	b. same as 4a, 4b, and 7ac		abc These actions depend heavily on the day-care program for their encouragement and reception. With respect to space they would occur as part of other activities in general spaces such as 4a, 4b, and 7ac	E
11. Laying foundations for understanding the meanings of life[2]	a. beginning to understand the origins of life b. beginning to understand the nature of the physical world	ab display a and auditorium space		ab a small space on child's scale relating basic and interesting phenomena	E

[2] ibid.

TABLE I (CONTINUED)

Tasks	Activity	Space	Sq. ft.	Character	Size
	c. learning about nature and the spiritual nature of life	c. natural state water trees grass		c. small natural setting well stocked with wild life, for natural state observation of basic life forces	L

Those tasks which would be supplemented by the advantages of a large center:

2. Diet
4. Physical development
5. Family guidance (Social Development)
7. Emotional development
11. Understanding natural world

Those tasks supplemented by a small center: None

TABLE II

SPACE AND ACTIVITY TYPES BY SERVICE CATEGORIES

I. Child Care Services

A. Play

1. Indoor

Large Space (multi-group)	Action type	Small Space (one group)
arena	drama	nodule
arena	expression	nodule
-	skip	open
-	jump	spec. equip.
-	climb	spec. equip.
-	slide	spec. equip.
aside	swing	spec. equip.
-	drawing	-
-	modeling	-
-	small objects	-
-	talk	-

2. Outdoor

Large Space (multi-group)	Action type	Small Space (one group)
open	run	-
mound	climb	mound
open	throw	open
open	catch	open
aside	swing	aside
open	jump	mound
natural	hide	-
-	slide	-
-	dig	-
pool	water play	-
-	talk	-

B. Rest - Napping
C. Food
D. Crafts
E. Nature Observation
F. Library

TABLE II (CONTINUED)

II. Clinical Services

A. Adult education
   1. Health education
   2. Family counseling
   3. Active participation with children

B. Medical
   1. Health examination
   2. Emergency
   3. Immunization
   4. Isolation of infectious admissions

C. Psychiatric

D. Dental

E. Records

F. Pharmacy

III. Administrative Service

A. Admission and Family Records

B. Staff Offices

C. Case-workers

The developmental tasks provide a guide to understanding the behavioral growth pattern of an individual child. However, if that child should become submerged in a group which is too large to allow individual attention or expression, the development of successful behavior could become thwarted in an otherwise receptive atmosphere. From this viewpoint, it must be considered mandatory to follow a scale for maximum group sizes corresponding to age. The following standard has been set under law by the Oklahoma Public Welfare Commission (4):

2-4 years old -- 1 staff member to 10 children
4-5 years old -- 1 staff member to 20 children
5 years old -- 1 staff member to 25 children.

In addition to grouping by staff members, it is also recommended that groups of not over 20 children, age 2-4 years old, and not over 30 children, age 4-5 years old, be placed in a single group space.

A second consideration concerns the arrival of children at the center. Because a day-care center is an institution directed at functioning as an extension of the family home, it does not schedule the arrival and departure times of the children which it serves. Centers may begin the day as early as 6:00 a.m. and continue until 6 p.m., depending upon the needs of the families involved. The arrivals may be by center-provided transportation service or by personal transportation. In either case, they are not regular in time or size (1).

The final point requiring consideration results from the day-care program which in all cases must function spontaneously to adapt to the multiplicity of needs presented by the families it serves. The spontaneous nature of the program amplifies the need for generalized spaces beyond the individual care-group area. These multi-group or multi-purpose spaces fit the program pattern of flexibility and change (1).

This concludes the discussion of those factors in preschool child behavior, which have definite relevance to the design of a day-care center. The following chapter will make direct use of this data in prototype design study.

CHAPTER III

DESIGN METHODS AND PROCEDURES

The purpose of this chapter is to discuss a method by which information outlined in Chapters I and II may be applied to the design of a day-care complex for 1000 children. The following list collects those factors which are of major concern in accomplishing this goal:

1. A general character of intimacy and concern for physical, emotional, and social development.
2. Provision of specific professional services in the areas of physical, emotional, and social growth.
3. Specific space types provided to accommodate the universal development tasks of preschool children.
4. Provision of care-group areas on the basis of recommended group sizing.

The Design Concept

From the information listed in Tables I and II, a basic pattern of organization started to reveal itslef. This pattern begins as one of indoor-outdoor play space

built around individual group sizes of 20 to 30 children. Beyond each group being represented by a distinct indoor-outdoor area of its own, it became apparent that several groups need to be related directly to general multi-group indoor and outdoor educational and play areas. Finally, all care-group areas have a secondary link to clinical, administrative, and food preparation services.

This organization pattern is further supplemented by citing its inherent demands for accessibility and flow. These demands are as follow:

1. The quick and simple movement of children from point of arrival to individual group areas.
2. The immediate access of each care-group area to:
    a. private outdoor play area
    b. multi-group indoor and outdoor educational-play areas.
3. The direct but not immediate access of food service and clinical service to individual group areas.

Further, these function and flow demands might be considered as denoting zones between which actions pass.

Thus:

Zone A. Individual group areas.

Zone B. Indoor multi-group education and play areas.

Zone C. Administration, clinic, food service and living quarters.

Zone Comparisons

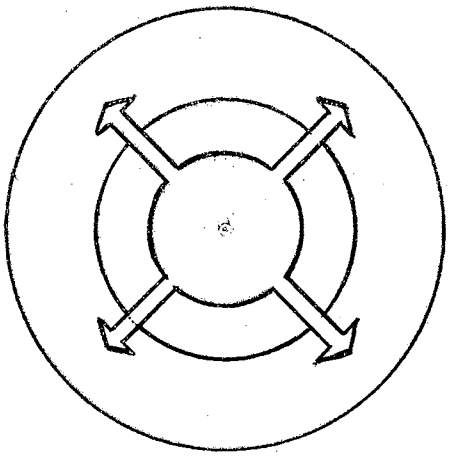
Considering these two outlines, accessibility and zone types, as fundamental design tools several preliminary sketches were made (see Appendix A). These sketches were directed at exploring some possible schemes or combinations of elements. Three schemes came under consideration:

1. Concentric Zone
2. Linear Zones
3. Vertical Zones

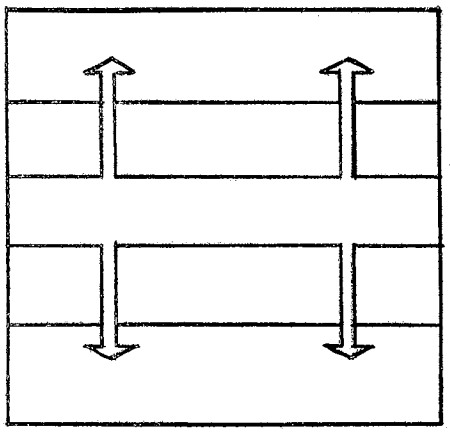
These zoning schemes are diagramatically illustrated in Figure 1, p. 27.

The vertical zone scheme was considered only briefly and ruled out on the basis of it being difficult to provide adequate outdoor space for specific group and multi-group requirements. This scheme could probably prove workable in a high density urban district where space is an absolute minimum. However, even in this case, it would be advisable to provide the greatest possible amount of individual group and multi-group outdoor space having a natural setting (see developmental tasks 4 and 11).

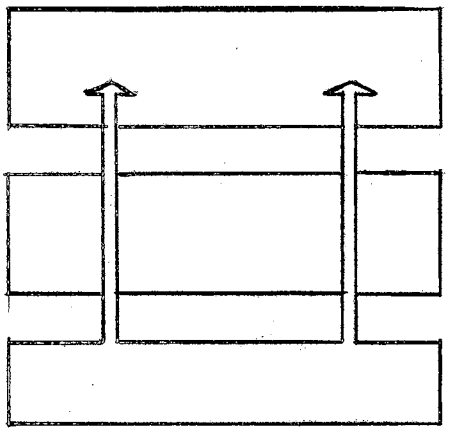
In comparing the concentric zone and linear zone schemes, both were found to have definite advantages. The linear scheme adapts itself particularly well to



a. Concentric Zones



b. Linear Zones



c. Vertical Zones

Figure 1. Preliminary Design Schemes

rectangular grid arrangements such as the block pattern of many cities. In addition, it allows delivery and pickup to occur continuously along a central axis or along either of two side axes. This again is a feature highly adaptable to most community street patterns.

The concentric zone scheme has as its major advantage a logical ordering of zones by function and by relative size. Zone "C", being equal to approximately 20 per cent of the total space and being the point from which service and control stem, falls easily into place as the core of a concentric system. Zone "B", consisting of several multi-group elements likewise arranges itself logically by size and function as an inner ring mediating between the central core and the peripheral individual group spaces of Zone "A". Both the linear scheme and the concentric zone scheme would place at the periphery a series of private and multi-group outdoor play spaces.

As the preliminary sketch studies proceeded, it was found that a combination of advantages from these two schemes offered a final statement which was stronger than either of the two original components. The primary reason for this choice concerns Zone "C", and the nature of its service to surrounding areas.

In the concentric zone scheme, Zone "C", functions as a core from which service might emanate in any direction. While, in the linear scheme Zone "C", is more in the nature of a ribbon from which services periodically stem to

either of two sides. This latter case presents a problem in providing food service. For example, food service originating at a central kitchen, would be much farther from some group areas than others. In addition, there would be the probability that any outside supply traffic following Zone "C", would sever the food service pattern at some point. In the concentric zone scheme, food service and other services are approximately equidistant from all points which they serve and this zone need not be severed by supply coming to it.

The solution which grew out of an attempt to solve this service problem, while maintaining the advantages of a rectangular grid setting, resulted in the concentric zone scheme being superimposed on the linear zone scheme. In this overlapping of schemes, the linear Zone "C", was removed and the concentric Zone "C", remained to function as a central core supplied by a loop drive. Figure 2, p. 30, illustrates this result of overlapping schemes.

The Complex as a Collection of Centers

During the preliminary sketch, phase one characteristic of organization became particularly evident as a result of graphic study. It became obvious that by the relationship of several individual group areas to a multi-group area and then to a single special services element a hierarchy based on size was being established. This indicated that the design was growing out of many small

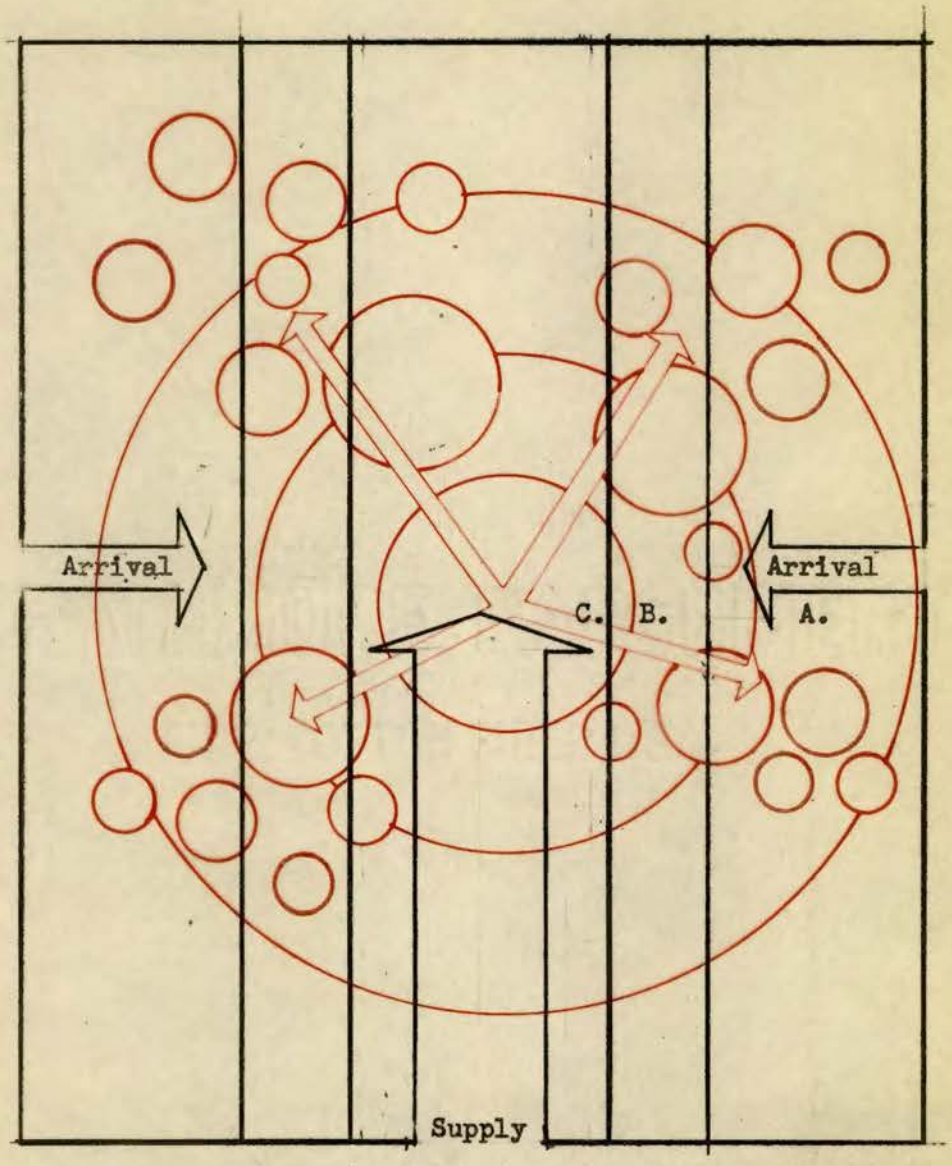


Figure 2. Overlapping of Linear and Concentric Schemes

centers, each self-sufficient for the most part, being related to common multi-group elements for additional developmental advantages, which in turn were related to a common service and control core. With the exception of clinical and food services, it was easy to imagine each multi-group area and its related individual group areas as forming a distinct center. This pattern can be clearly seen in Figure 2, p. 30.

This observation has the possible advantage of allowing the complex to be constructed in phases as opposed to erecting, at one time, the total structure to accommodate 1000 children. Considering the financial outlook of day-care, cited in Chapter I, it seems probable that an expandable scheme would be desirable. This theme was adopted as the next step in the design study.

The 250 Capacity Unit

Having established the organizational pattern in a graphic scheme, a search for a basic form which would both fit the scheme and lend itself to phase construction was begun. The first step was to develop the entire plan on a rectangular grid. This does not necessarily imply a post and beam bay system, but does recognize that regardless of structural system or materials, the probabilities are very high that both economy and flexability will favor this approach. When the scheme depicted in Figure 2, p. 30, was rationalized on a two way 90° grid system, the result

was a cruciform plan containing a square Zone "C" core. This adaptation is illustrated by Figure 3, p. 33.

The cross plan naturally divides itself into four symmetrical units of capacity 250, each of which repeat about the central specialized services area. The inclusion of this symmetrical grouping of four repetitive units about a nucleus completes the establishment of a preliminary design concept. The approach to final design development was made by detailed study in plan and section, of one basic 250 capacity unit which could then be arranged according to the concepts discussed above.

Since each sub-unit of 250 children can be considered as a distinct center in itself, having its own arrival area and special services connection, consideration of detailed design for only one unit of the total complex does not lessen the validity of the proposed 1000 capacity. The successful arrangement of one sub-unit predisposes success at the final capacity of 1000 children.

Specific Elements of Design

The specific study of design elements begins with a question concerning the topic of arrival at and movement into the center. The successful solution of this problem is critical to the accommodation of the large number of children involved. The question to be answered is as follows. Assuming that an individual group area is appropriate in function and character, can the method of

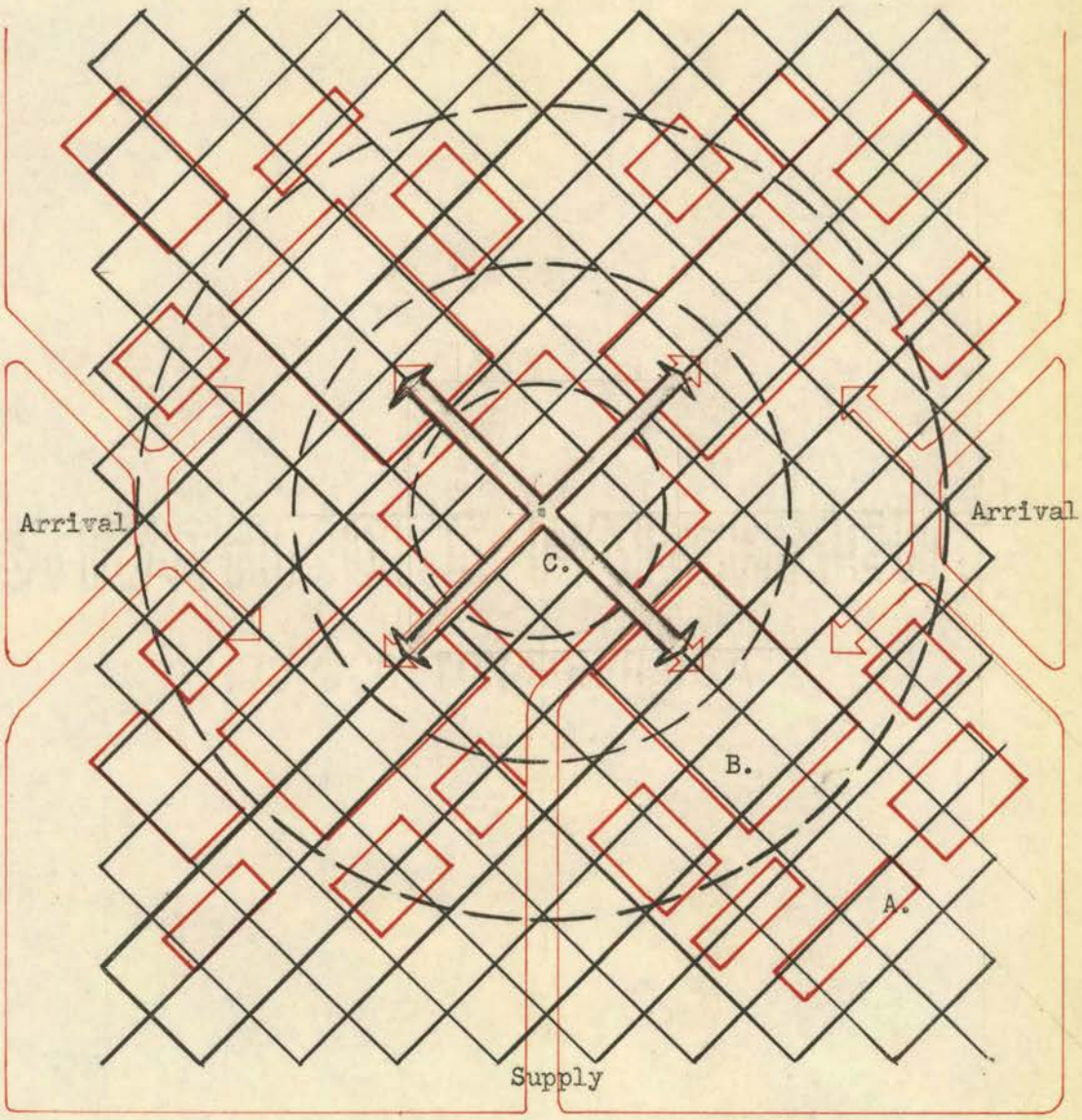


Figure 3. Adaption of Scheme to Grid

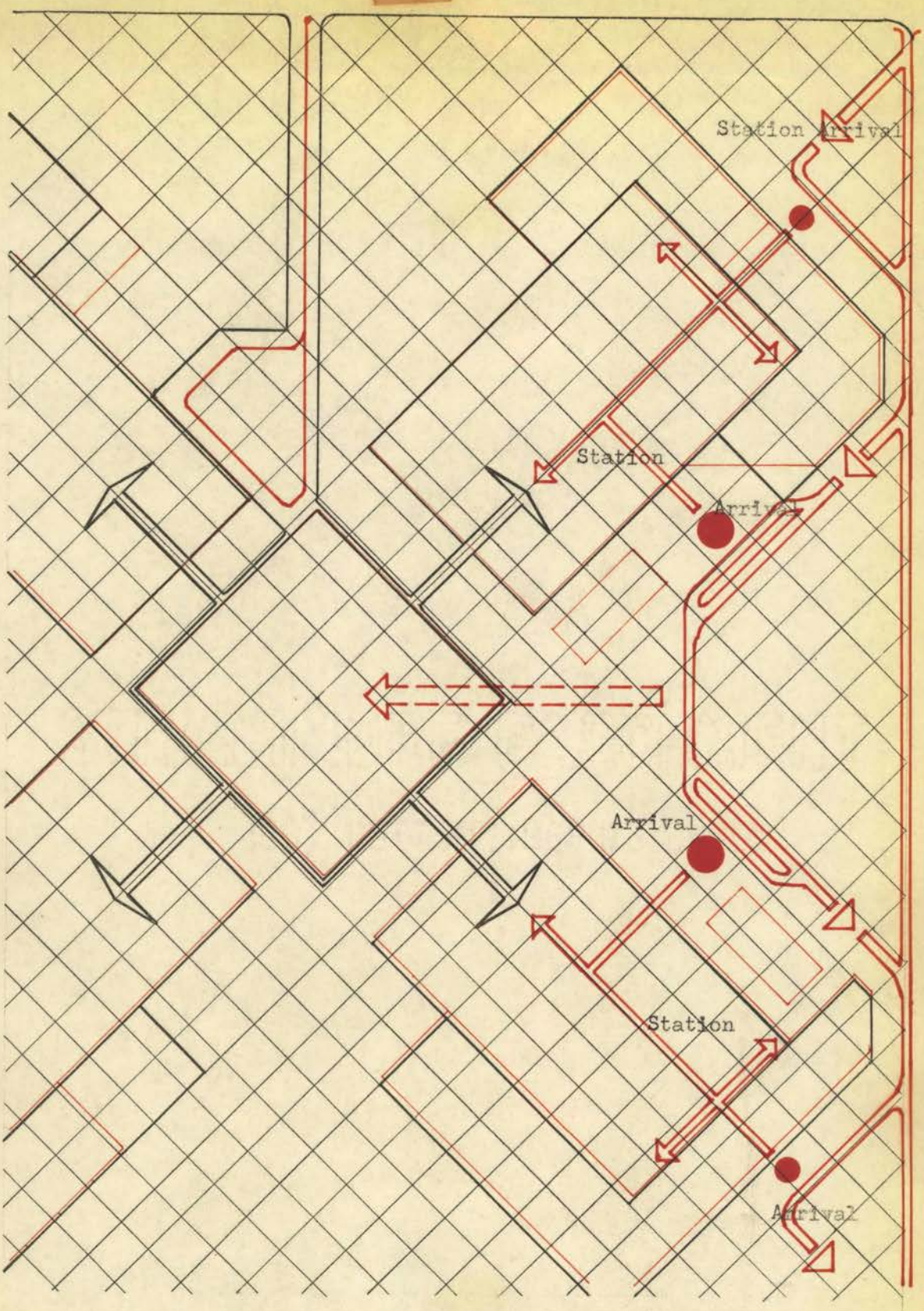


Figure 4. Scale Layout of Plan on Grid

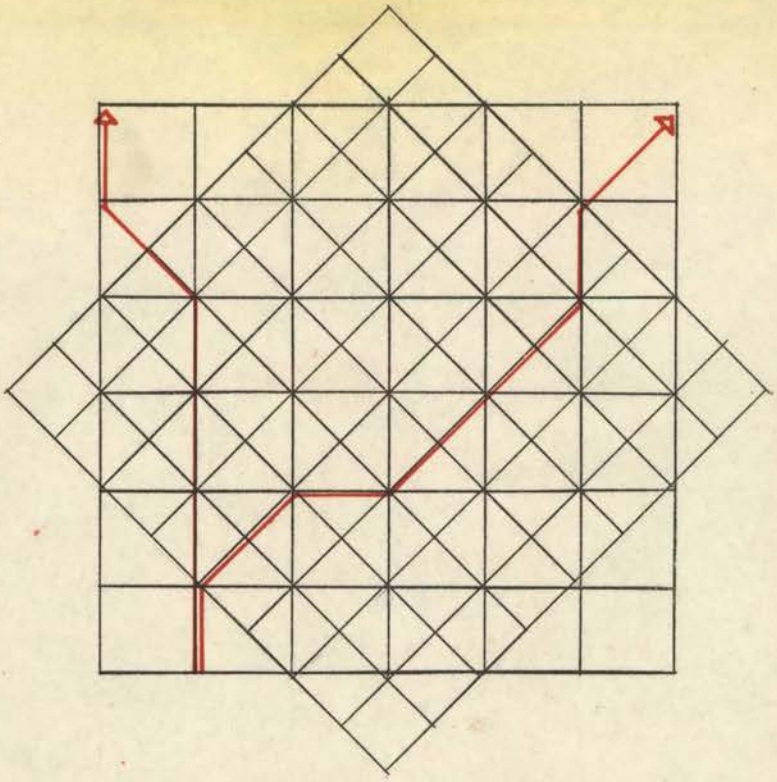
arrival within that area avoid lessening its effectiveness by exhibiting some of the same qualities? The following discussion is aimed at resolving this question.

Arrival and Movement

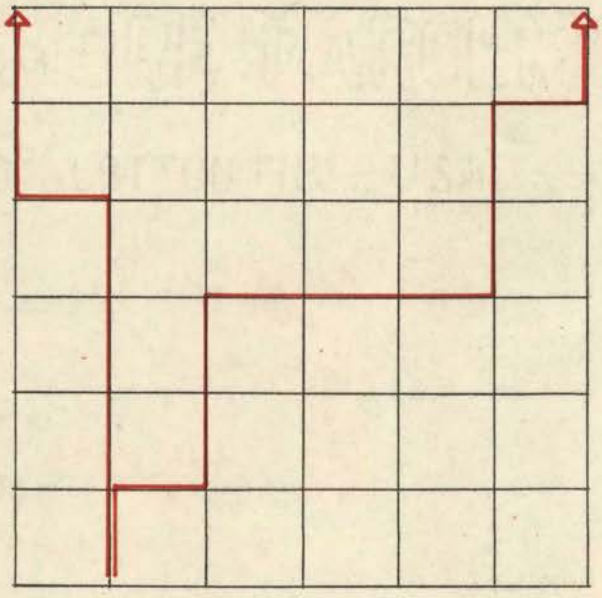
When the first scaled layout of elements was made, the size and number of individual group elements arranged about multi-group elements became awkward from the standpoint of circulation when considered as a one level scheme. In subsequent studies considering the possibility of a two level scheme, it was found that circulation to and from points of arrival and special service were reduced and simplified. By introducing the arriving child at a mezzanine level from which he proceeds either up or down 5', it was possible to maintain all group areas within a maximum distance of 130' from the point of arrival. The average distance was 80' from the point of the arrival vehicle to the care-group area. An example of the cruciform plan, showing arrival flow patterns, may be seen in Figure 4, p. 34. It can be noted in Figure 4 that a secondary arrival point has been intoduced. This was done as a means of placing $2\frac{1}{2}$-3 year old arrivals in a situation of immediate access to their respective group areas, and reducing the number of children entering a single arrival point. In this secondary instance, the average circulation distance is approximately 40'. As noted previously in Chapter II, arrival times at these points will follow

no regular pattern; therefore, a child arriving at the center could not be assured of being met by his individual group area staff member. To handle this situation, an arrival station has been included at each arrival point. These stations would always be attended and arriving and departing children could be either watched after or guided to their respective group area. The stations are noted in Figure 4, p. 34.

The movement of children to and from individual group areas, an important consideration in a large complex -- consequently effected the form of the over-all plan. One possible way of solving this problem is to base the plan on an overlapping system of two 90° grid systems superimposed at 45° to each other. Although the majority of the structure is laid out on a single 90° grid, the flow within that structure occurs along lines of both sets of superimposed grids. The advantage of this type of system is that it permits movement which nearly approximates a true flowing motion than does a single 90° system. This idea, graphically illustrated in Figure 5, p. 37, is evident in the typical floor plans of a basic 250 child unit. Figures 6 and 7, pp. 38 and 39. The arrangement of elements in plan, as seen in Figures 6 and 7, bend and flow on this dual grid to draw the arriving subject smoothly into and through a changing space which terminates in a surrounding of individual group areas. In this manner, the basic floor plans were designed to offer direct and



a. 90° grids opposed at 45°



b. 90° grid

Figure 5. Movement on Double and Single Grids

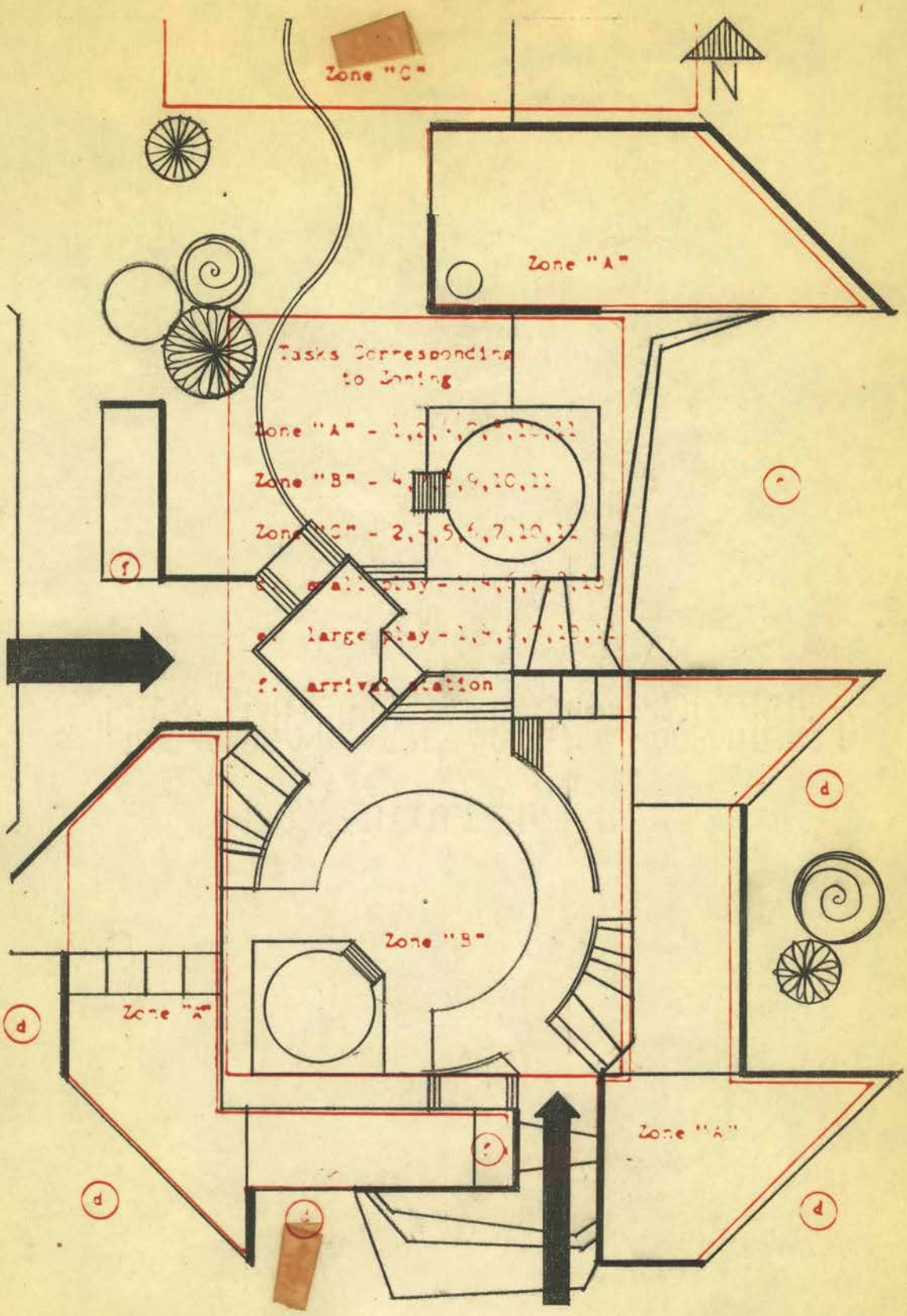


Figure 6. Lower Floor Plan

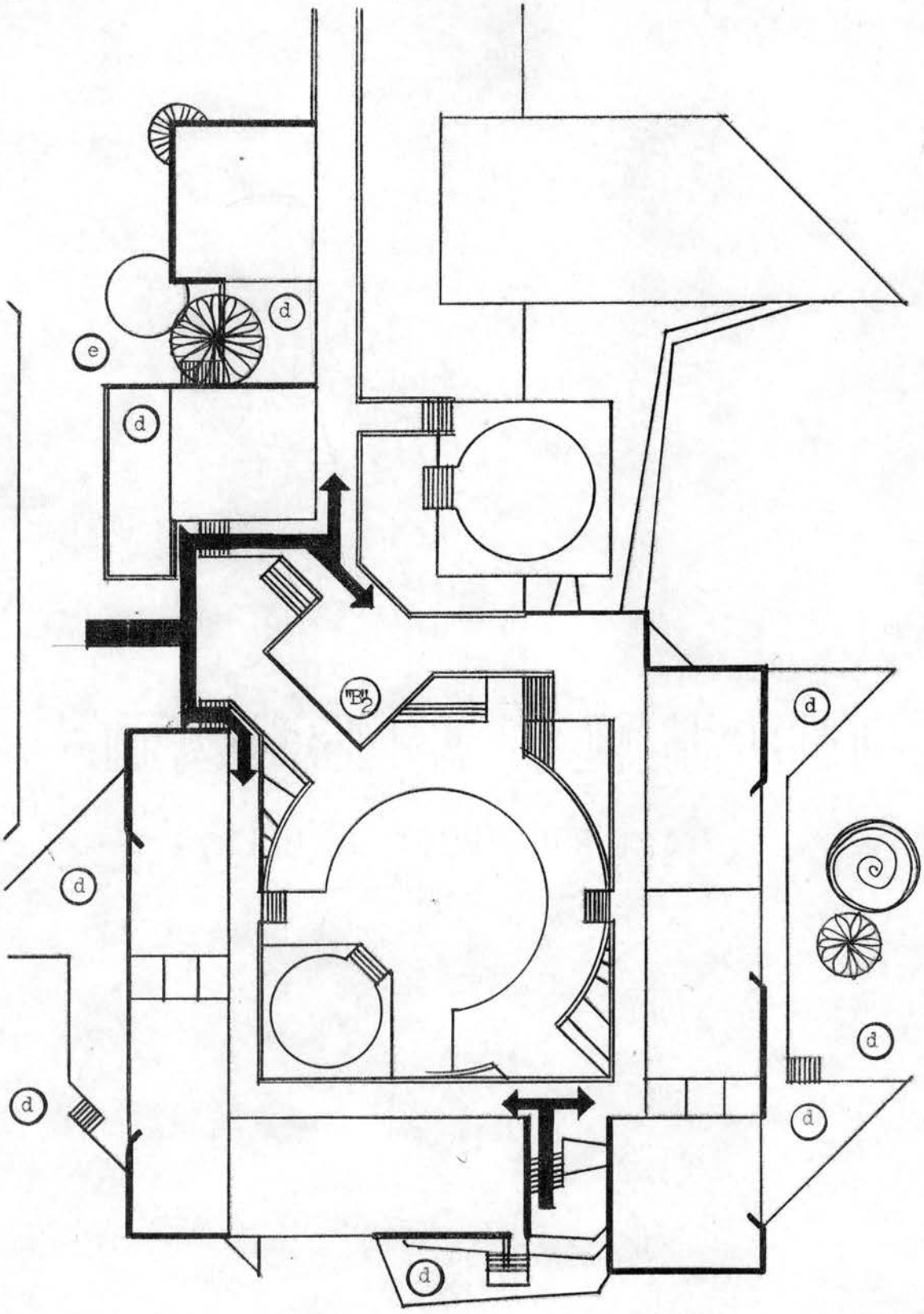


Figure 7. Upper Floor Plan

interesting means of getting an arrival to a care-group area.

The opposed grid flow system along with dual arrival points and arrival stations make up the resolution to the question of the effectiveness of moving children into their respective group. By a combination of these three means, any one of 1000 children can arrive at a point within a maximum of 130' from his destination and then proceed under staff guidance through a space which flows gently and directly to that destination. Having established this system as a justifiable basic plan layout, the topic of discussion can move on to the consideration of individual elements and the specific relationship of elements.

As a beginning orientation, reference is again made to Figures 6 and 7, pp. 38 and 39, where specific space types are noted and referenced to the developmental tasks with which each is associated, and to the zone in which each element falls. The relationship of zones was discussed previously as part of the development of the preliminary design concept. These zone relationships, now considered as fundamental, will be used to structure this more specific investigation.

Zone "A"

Zone "A", composed of individual group elements, must function as the mainstay of the daily care activities.

Toward achieving this end, each care-group area is characterized by the following design features. See also Figures 8 and 9, pp. 42 and 43.

1. Indoor individual group general use space: The indoor group space is a multi-purpose area offering unobstructed play space for the exploration of a variety of toys, games, and creative supplies. These group areas, as often as possible, express a three dimensional character of loftiness, light, and warmth. All developmental tasks relate in some manner to this basic individual group space. It is from this point that divergence for the child into multi-group and special service areas begins. Included within this general use space are several specific use areas. They are:
    a. resting and napping
    b. eating
    c. crafts
    d. general use tables
    e. storage bins
    f. acoustical quiet cube.
2. Outdoor play nodule: The outdoor nodule is a space approximately equal in size to the indoor individual group area and functions in a similar manner. Equipment unique to

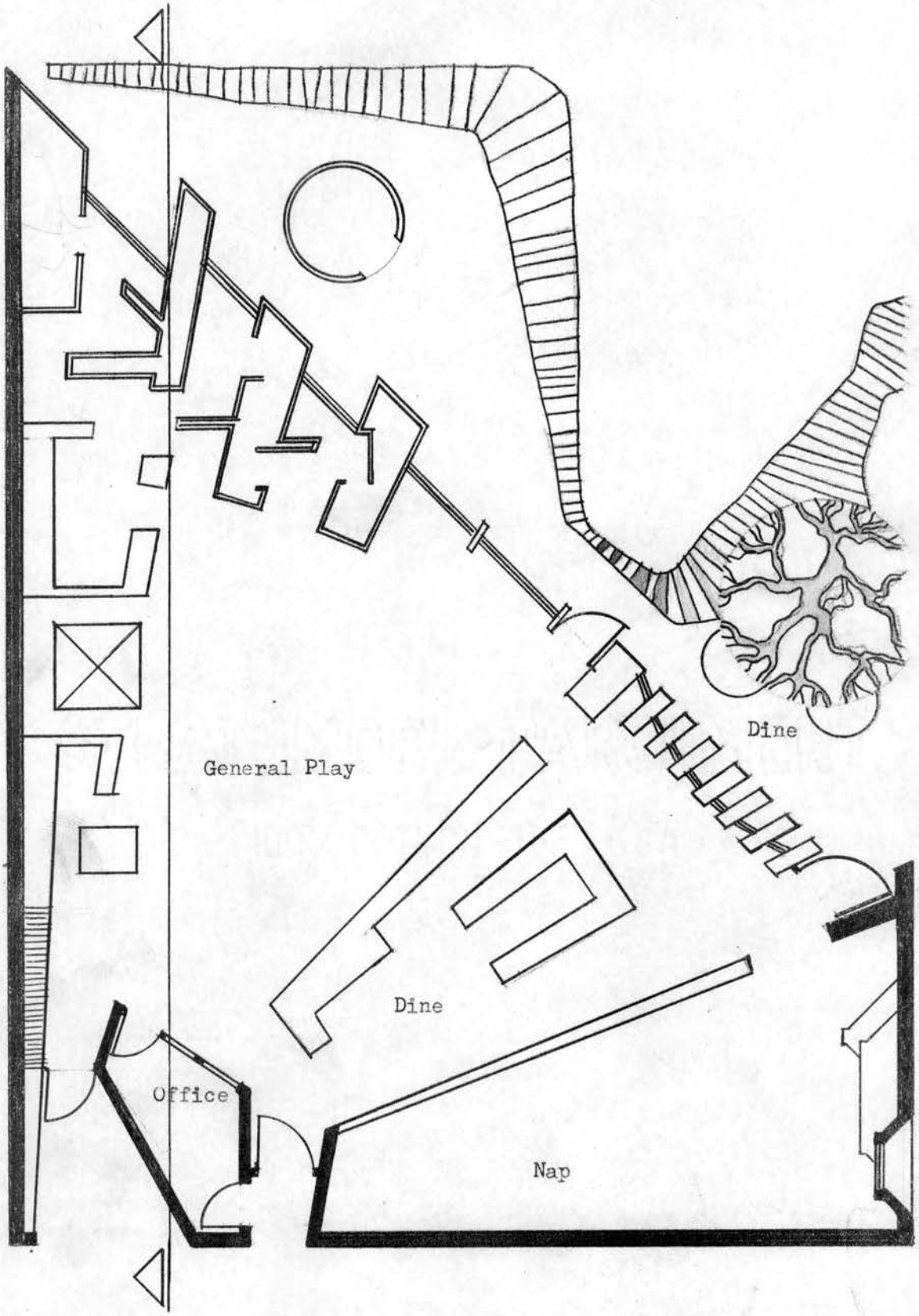


Figure 8. Plan of Typical Group Area - Scale 1/8"/1'-0"

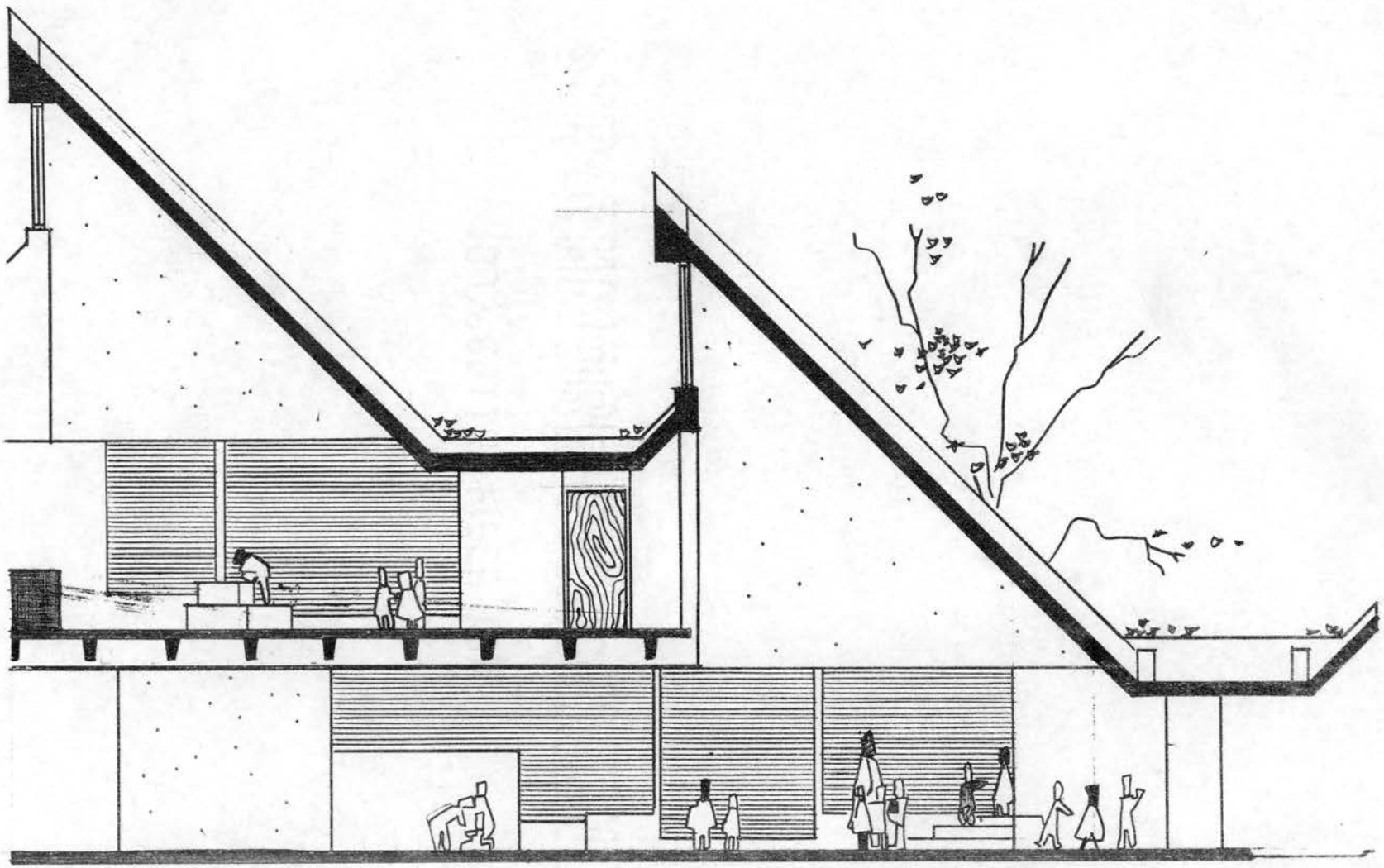


Figure 2. Section of Typical Group Area - Scale 1/8"/1'-0"

this area would include sandboxes, small climbing devices, wagons, push-pull toys, a crafts bench and a shallow running water trough. These nodules, arising from tasks 1, 4, 6, 7, and 8, are for general physical, emotional, and social development through catering to activities of a less vigorous nature than the larger adjacent multi-group spaces.

The combined features of specific and general indoor space and an outdoor play nodule, make the individual group areas of Zone "A" the back-bone of the day-care operation. Beginning in Zone "A", flexibility, safety, and convenient observation of the children are considerations which will encourage the healthy activity and development of children participating in the program.

Zone "B"

Zone "B", consisting of multi-group spaces, acts as circulation space to and from Zone "A", as well as containing some specialized elements of its own. The attempt has been made to keep the character of these spaces simple, light, and yet dramatic in a childlike way. This effort is consistent with the goals of developmental tasks 7 and 8 by encouraging imagination and expression in a variety of circumstances. The multi-group area is similar in nature to the individual group area with certain exceptions:

It offers space at a ratio of approximately 100 sq. ft./ child compared with 50 sq. ft./child in the single group area; it includes an arena setting for single or multiple group drama play; and it houses several specialized learning and experience devices. The more specific characteristics of each are as follows (see also Figures 10 and 11, pp. 48 and 49):

1. General Use Space: This area maintains an unobstructed volume approximately 3 times the size of the average single group space (12,000 cu. ft. versus 40,000 cu. ft.). Activities of a more vigorous type, such as large muscle development (tasks 1 and 4), can in Zone "B" take advantage of a greater freedom of movement and large equipment like game courts and climbers. Although most large muscle motor development activities would occur outside during nice weather, this indoor space provides both an alternative area during bad weather and a change of play atmosphere for all cases.
2. Drama Arena: The arena area is a mezzanine level element, square in plan, but having as its dominant feature a circular depression either 22' - 0" or 28' - 0" in diameter. There are two of these drama arenas per 250 child unit accessible to both upper and

lower level Zone "B" general use spaces. Preschool children are almost continually involved, if given the opportunity, in imaginative dramatic play. The arena area, not being intended for organized drama activity alone, would provide an atmosphere of focused attention even during more routine play patterns. Both the circular depression in plan and the pyramid roof (see Figures 10 and 11, pp. 48 and 49) are forms which tend to focus attention on their geometric center.

3. Special Learning Devices: As part of the advantages of a large day-care complex, some special educational devices have been included to help acquaint the child with the world in which he is beginning to take an active part. These special learning elements being in Zone "B" are directly accessible to the several surrounding individual group spaces. The specific devices are:

    a. Celestial sphere: This device is a complete sphere, 16' - 0" in diameter, at the center of which is suspended seating box for 12-15 children. The sphere may be rotated about the observers box in

any direction or one hemi-sphere may be rotated back inside of the other for observation of the sky. This device can be used to teach children the rudiments of solar orbital structure or simply function as an experimental projection both (task 11).

b. Traffic training: This is an area provided with a simulated street and traffic light. Traffic is artificially introduced by projected images. This is a specific response to developmental task 9.

c. Display area: Also in response to task 11, this space provides a specific area for the display of educational exhibits.

In general, Zone B can be considered an area unique to a large day-care complex. The space-types and special equipment of which it is composed are of the sort which become practical only where large numbers of children are involved and, even then, are only secondary to the fundamental developmental concerns of the individual group. However, in this hypothetical case of 1000 children, Zone B plays a vital role by providing four central areas about which several single group areas can collect. The dual functions of circulation and general-specific use make the

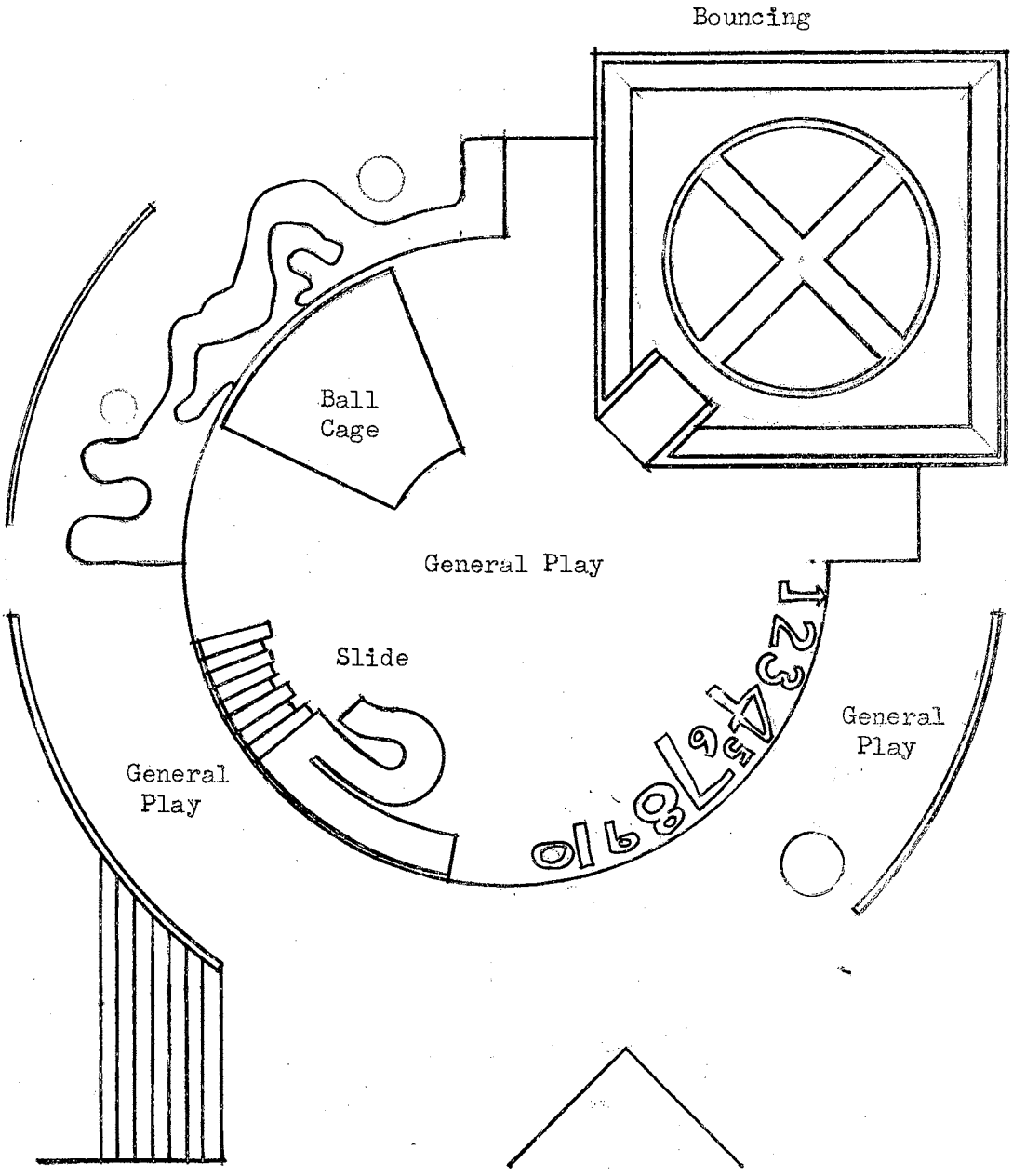


Figure 10. Plan of Typical Multi-Group Area - Scale 1/8"/1'-0"

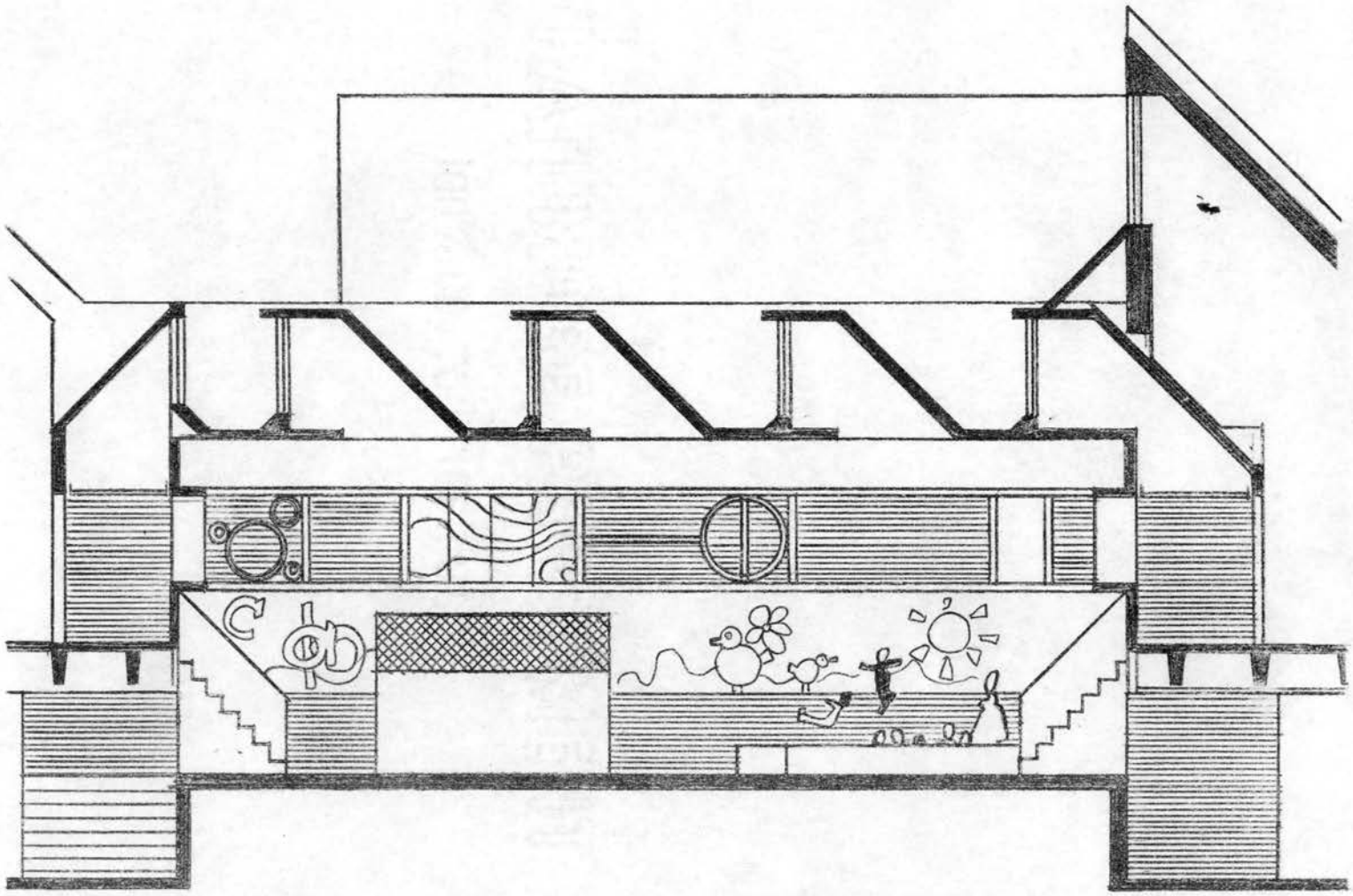


Figure 11. Section of Typical Multi-Group Area - Scale 1/8"/1'-0"

Zone B element the major organizational factor of each 250 capacity sub-unit.

Zone "C"

Zone C is that area which, assuming the total number of children can be successfully handled in Zones A and B, becomes the final fulfilling element of an ideal child-care organization. The spaces contained in this zone are types which have already been thoroughly explored architecturally and do not present basic changes resulting from their being included in a day-care center. The structuring of this area is on four levels. These four include: a basement level containing the kitchen, storage, and mechanical equipment; corresponding to the two levels of Zones "A" and "B" are two intermediate floors on which are found all clinical and adult education services; and a fourth level for administration and residential quarters.

For complete listing of the space types in Zones A, B, and C, see Table III (pp. 51-53).

Summary and Conclusions

Before designing specific elements for a day-care complex of 1000 children, a preliminary design concept was developed from information in Chapters I and II. The basis of this design concept grew out of a recognition of three distinct groupings of space types:

1. Those elements of concern immediately within

TABLE III

ARCHITECTURAL SPACES AND CORRESPONDING DEVELOPMENTAL TASK CHARACTER IMPLICATIONS

Zone	Space	Task	Character
Zone "A"	1. Indoor General Use Space	1,3,4,5,6, 7,8,9,10, 11	1. group play area unobstructed light airy non hazardous toilets included variety of actions and scale accessible to larger play space and equipment encourage imaginative play
	a. resting and napping	1	a. screened area
	b. eating	2	b. set aside from activity
	c. crafts	4	c. specifically designated and supplied
	d. general use tables	4	d. easily accessible
	e. storage bins		e. accessible to children
	f. acoustical quiet cube	6	f. easily accessible quiet place
	2. Outdoor Play Nodule	1,4,6,7,8	2. unobstructed light airy non hazardous accessible to larger space and equipment encourage imaginative play

TABLE III (CONTINUED)

Zone	Space	Task	Character
Zone "B"	1. General Use Space	1,4,6	1. unobstructed large open space light airy variety of action opportunities directly accessible to Zone "C" elements
	2. Drama Arena	7 and 8	2. focal space to encourage expression
	3. Special Learning Devices	9,10,11	3.
	a. celestial sphere	11	a. a model device demonstrating celestial bodies and movements a projection booth for variety of visual experiences
	b. traffic training	9	b. simulated traffic and street crossing conditions
	c. display area	10,11	c. specific area for displaying educational materials
Zone "C"	1. Basement		
	a. kitchen b. storage c. mech. equipment		

TABLE III (CONTINUED)

Zone	Space	Task	Character
	2. Clinic a. professional offices b. examinations rooms c. isolation quarters d. laboratories e. records storage 3. Adult Education a. classrooms - 2 b. conference rooms - 2 c. auditorium 4. Administration a. staff offices b. records storage 5. Housing a. quarters for 12 resident professionals		

an individual care-group.

2. Those elements used by several individual groups.
3. Those elements which serve or are concerned with all children in the center.

These three groupings were assigned the respective space denotations, Zone A, Zone B, and Zone C. Using these zone designations, preliminary sketches studied various ways of combining them into a functioning whole. Due to the convenience of peripheral arrival points on parallel lines in the linear zone scheme and the inherent equidistance to all service points in the concentric zone scheme, it was a combination of the two which proved most acceptable. As a result of placing the conceptual scheme on a grid a natural evolution of four distinct centers, as the arms of a cruciform plan, occurred. Considering as typical, one of the four sub-units of the complex, it was seen that by using two arrival points and an attended arrival station at each, any child may arrive within an absolute maximum distance of 130' from his group area and receive staff guidance to that area if need be. Both Zones "A" and "B", contain general use and specific use components which arose in response to combinations of developmental tasks. Zone "C", completing the organizational pattern as the core element fulfills the purpose of making readily available physical, emotional, and social guidance by resident professionals.

The conclusion can be drawn from this design study that it is architecturally possible to accommodate as many as 1000 children in a manner which assures each child receives - as part of a group no larger than recommended maximum for his age - the advantages of a physical surrounding specifically designed to encourage his proper physical, emotional, and social development. This conclusion is drawn on the basis of the following findings:

1. By using a concept based on combined linear and concentric zoning schemes, a plan evolved which could successfully place as many as 60 individual care-group spaces within immediate and direct access to both multi-group play space and special clinical and administrative services.
2. The layout of elements on an opposed grid system, of two 90° grids rotated 45° with respect to one another, provides the circulation pattern with a simplicity of flow which guides the subject into direct arrival at Zone A group areas. The maximum distance was 130'.
3. For the sake of children 2½-3 years old, a secondary arrival point was found to insure still simpler circulation. From this point, an average distance of 40' from vehicle to group area was achieved.

4. Due to the unpredictable arrival schedule of the children, it was realized that the center's program would probably include some sort of staff assistance at arrival and departure. The arrival station, included to serve this purpose, can insure supervised arrival and departure as well as possible accompaniment to individual group areas.

The combined effect of these four factors has been to illustrate an example leading to positive conclusions regarding the potential to deposit and collect into proper sized groups as many as 1000 preschool children in one day-care complex.

Beyond this stage, the design work, with its concern for interpreting developmental tasks as architectural space, is indicative of an intimacy and scale which regard the individual and the individual's care-group as the center of attention. The potential achievement of this atmosphere of concern is an additional conclusion pointing to the possible organization of a large complex.

Finally, the inclusion of the clinical and special services core, although not of specific concern in design, does conclude the total design picture by bringing the entire complex under professional observation. The inclusion of this element as the nucleus satisfies the original intent of designing a center which could offer an all

encompassing program of physical, emotional, and social developmental guidance and care.

CHAPTER IV

STILLWATER AS AN EXAMPLE STUDY

This chapter will illustrate, hypothetically, the establishment of a 250 capacity sub-unit as the first step in a program to provide a 1000 capacity day-care complex for Oklahoma State University and Stillwater, Oklahoma. The purpose of this example is to bring the total study into focus as a project responding to existing needs and solving specific site and community problems.

Statistics in Stillwater

At the present time in Stillwater - a town of 26,000 plus an additional 2500 student families - there are approximately 4800 working mothers in the University and civic communities combined. From this group of 4800 working mothers result approximately 1200 preschool children, age 2½-5, who could potentially use day-care services. Student family mothers contribute about 500 to this figure and the remaining 700 are from the community at large. Of the potential 1200 preschool children, about 300 now receive some sort of daily organized care. This data, resulting in a figure of 25% under programmed care, is phenomenally high compared to the national figure of

2%. This is probably due to the university atmosphere.

Based on city and university projections, the number of preschool children potentially in need of day-care will reach the 2200 mark by 1980. One thousand of these children will be from student families. It is toward serving this latter group that this example is directed.

The Site

The selection of a site should, in this case, satisfy two major conditions. It must be within reasonable proximity of the student family community and it must be of adequate size to allow the proposed expansion.

It is estimated that by 1980 there will be 5250 student families, of which about 2000 will be living in the married student housing district on the northwest side of the Oklahoma State University campus. These families will account for approximately one-half of the potential 1000 day-care preschoolers. In addition, the residential area lying just north of campus between the married student housing and Bennett Hall dormitory is a high-density student family housing zone. On this basis, a site in the area north of the campus and related to the married student housing community has been chosen.

The site lies immediately north of McElroy Avenue on a line projected west along Tyler Avenue from Washington Street to the existing married student housing apartments (Figure 12, p. 61). An additional advantage to the site

is provided by a small pond and its surrounding growth of trees, which are appealing from the standpoint of natural world experiences (task 11).

Special Considerations

Due to the configuration of streets around the site, some additional paving would be needed to make direct access to the center possible. In this example study, it is proposed that Tyler be extended west to the southwest corner of the building site and then turn north to connect with an extension at the existing adjacent married student housing drive. This proposal is illustrated in Figures 12 and 13, pp. 61 and 62. This arrangement allows access north off McElroy at Monroe Street, and the first student housing drive west of Monroe, and access west off Washington on Tyler. These two streets, McElroy and Washington, both being main thoroughfares, would carry the large majority of the traffic proceeding to the center.

Considering the sometimes sharp slope of the site to the east and south (maximum 1:8), the upper level could be expected to fall at ground level on the west while the lower level could occur at ground level on the east. However, the arrival points, though requiring grade adjustments, would remain at mezzanine level. Several other revisions also occur in the upper lower floor plans at the west side due to adaption to the site. These may be noted by comparing Figures 6 and 7, pp. 38 and 39, with Figures

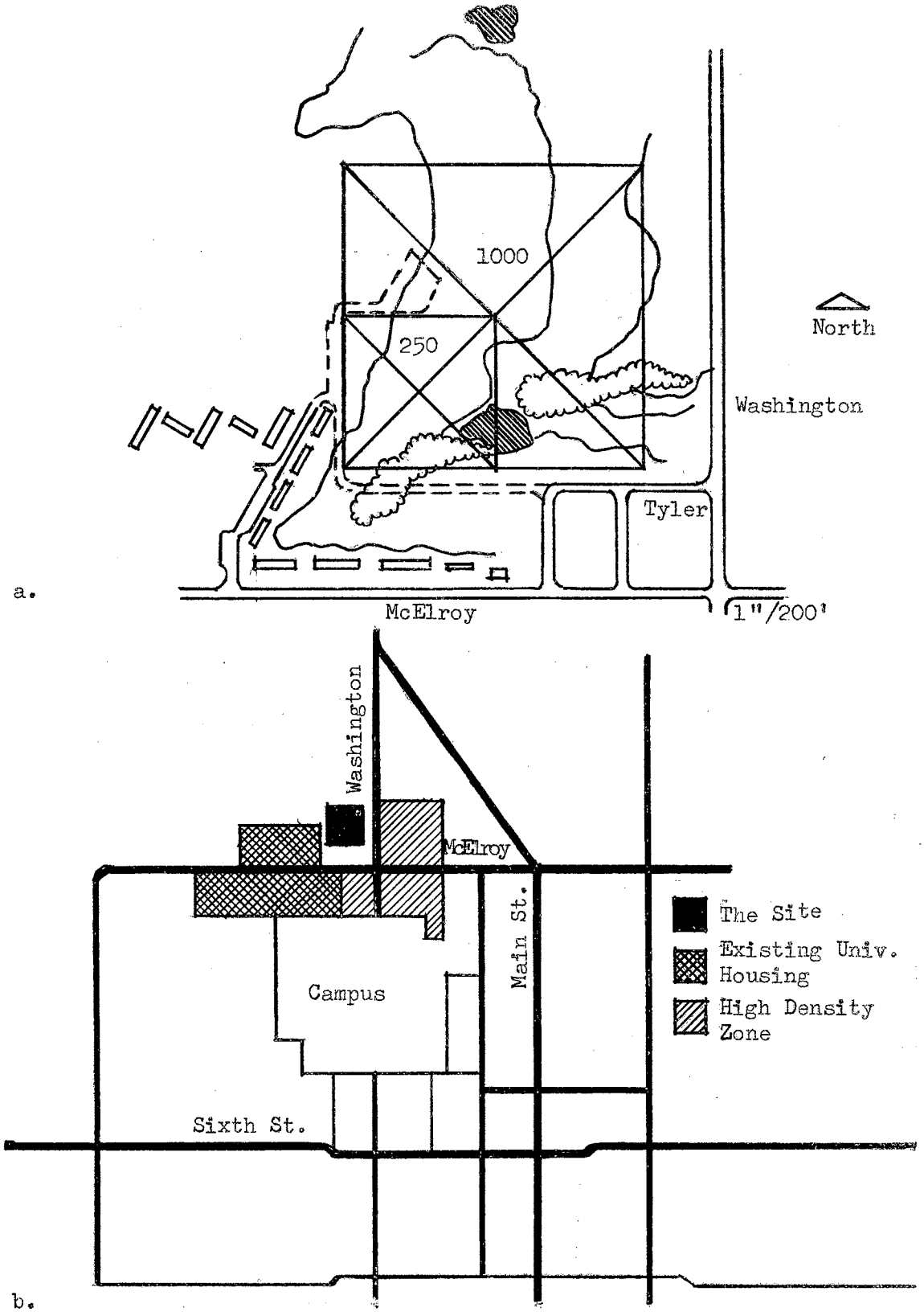


Figure 12. Stillwater Site Location

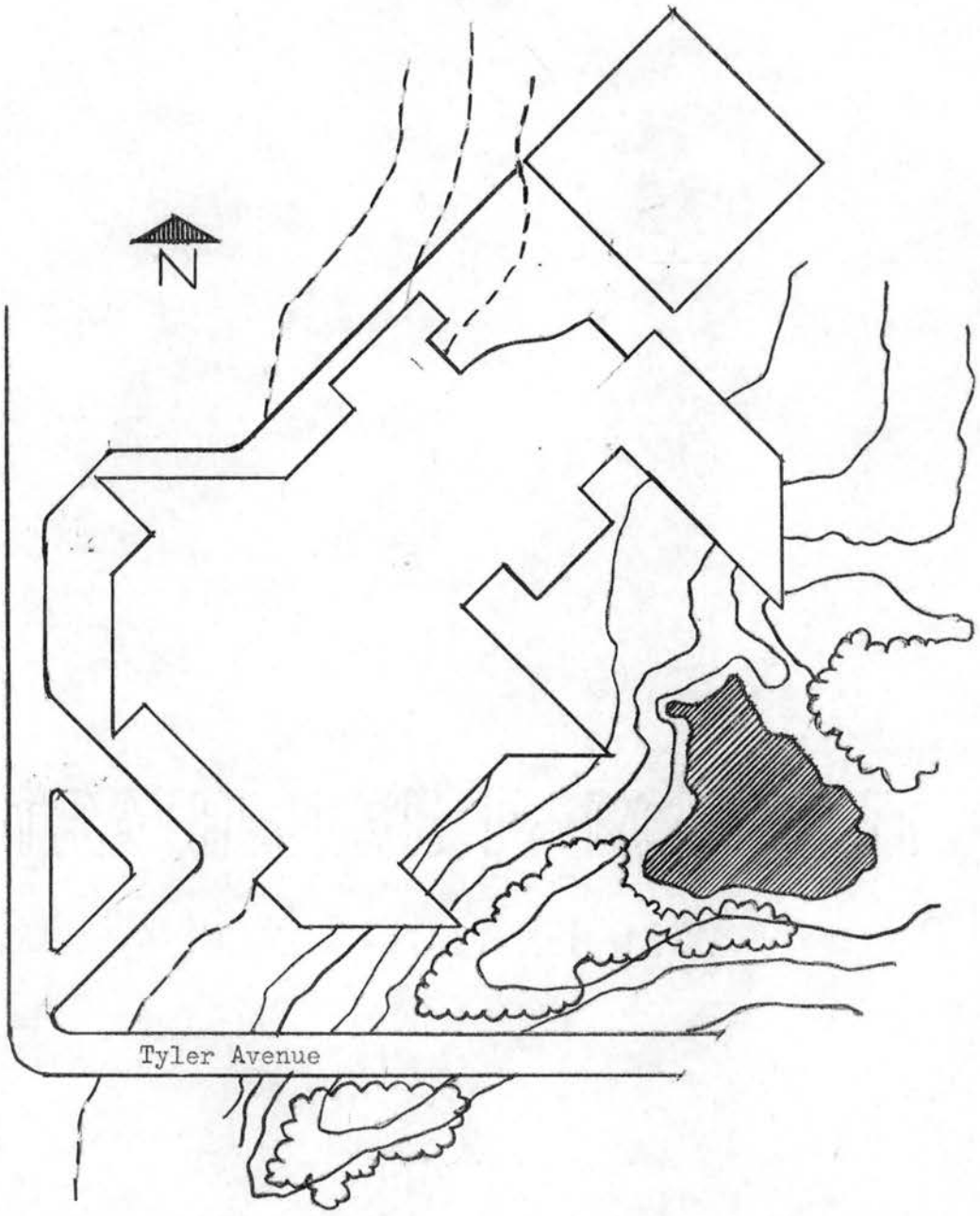


Figure 13. Site Plan - Scale 1/64"/1'-0"

14 and 15, pp. 64 and 65.

The special service core would, at this point, consist only of a kitchen, mechanical equipment space, administrative offices, a small health check-up center (to which a local doctor could pay regular visits) and one adult education classroom. Service to this area would occur as an extension of the west side drive.

Conclusion

In concluding this chapter, it can be noted that Stillwater and Oklahoma State University serve as a worthwhile example of a community in which both the eventual capacity 1000 and the phase construction scheme are justifiable. It can be said that land is available in the immediate proximity of the highest density of potential subjects and that only minor revisions to the basic plan need be made to adjust it to the site.

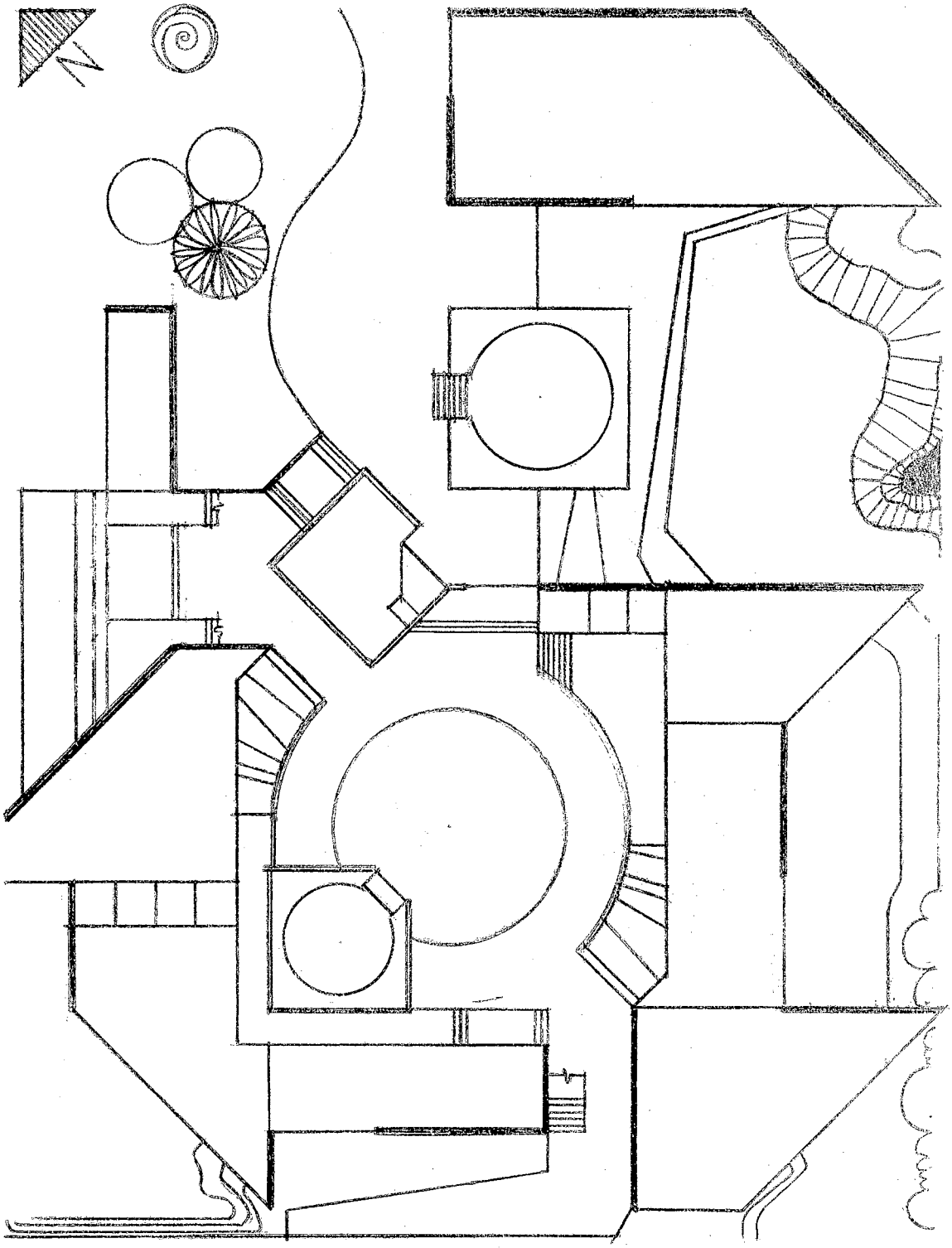


Figure 14. Adaption of Lower Floor Plan to Site

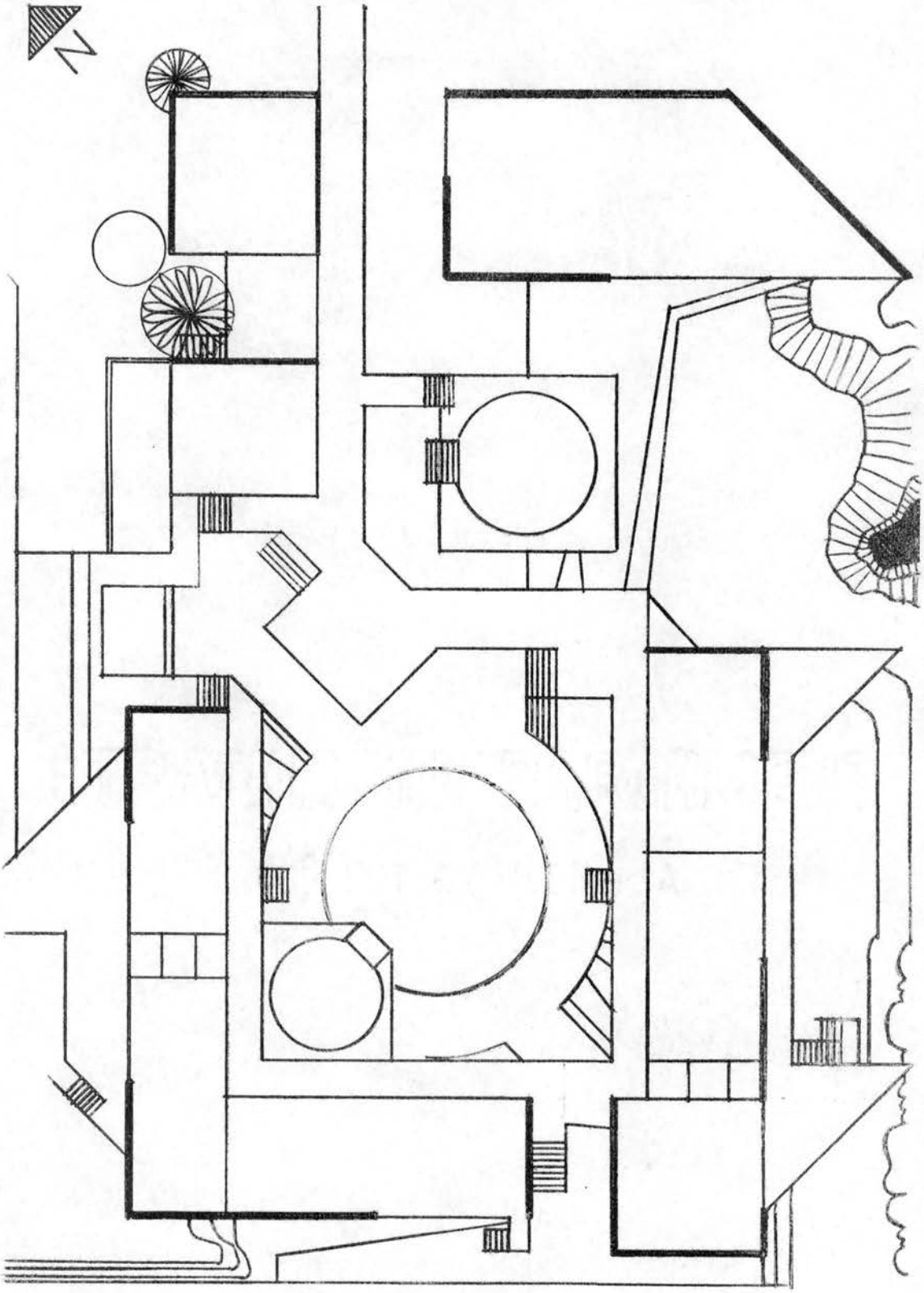


Figure 15. Adaption of Upper Floor Plan to Site

CHAPTER V

SUMMARY AND CONCLUSION

The problem undertaken in this project has been the justification and design of a day-care complex capable of accommodating 1000 children in an atmosphere of intimate concern. That theme of study is built on the philosophical concept of equality of opportunity for the healthy physical, emotional, and social development of all children and the statistical facts that working mothers increase yearly while only 2 per cent of their potentially neglected children receive professional care. On this basis, it is not hard to say that day-care centers accommodating as many as 1000 children are desirable, providing they can handle the individual child with a finesse appropriate to his age and needs.

The needs of children, and in this particular case of preschool children, have been a subject of thorough study resulting in abstractions which have set down a systematic group of tasks, the successful completion of which, predisposes normal development. By studying these tasks, it has been possible to infer a series of architectural space types and characters, which in turn form the basis from which a preliminary design concept evolves.

The continued development of this concept, through progressively more specific design study, is the method which utlimately results in the conclusion that it is feasible to design a day-care complex for 1000 children and still maintain intimacy on the individual level. This conclusion rests on a graphic development which demonstrates in terms of form and space one possible organization pattern for a large care center for preschool children.

As an example of how the final design scheme can be adapted to a specific site condition and how it can, by phase construction, adapt to a community's growing needs, Stillwater and Oklahoma State University proved, theoretically, to be both in immediate and future need as well as offering an excellent site location.

Even though at the present, public understanding and support of day-care are for practical purposes nonexistent, the realization that very large centers are capable of the type of individual child care which is consistent with the philosophical structure of the day-care movement, links philosophy, statistics and the physical plant, at the exclusion only of public concent, to make large scale day-care a truly potential institution in American society.

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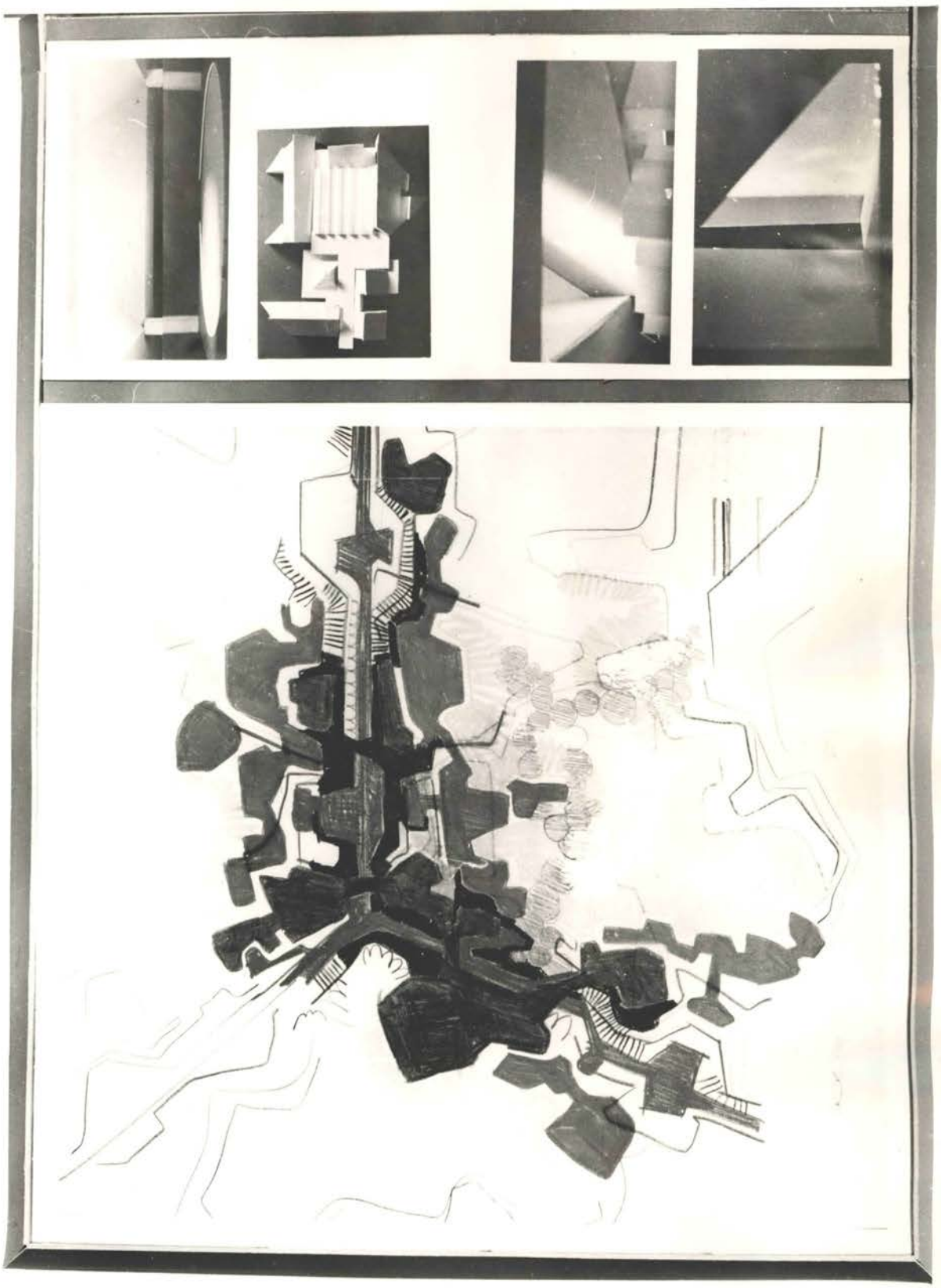
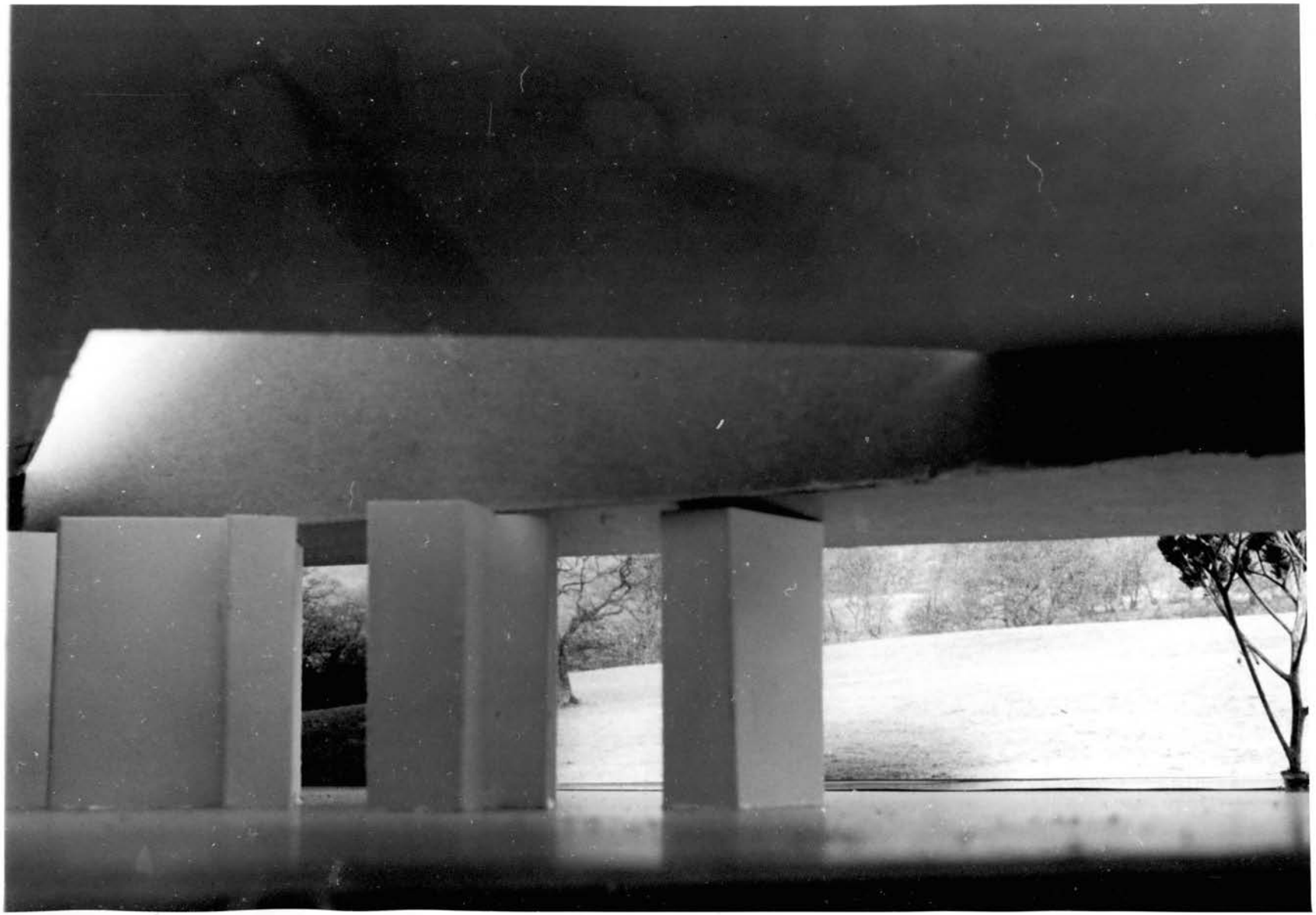
APPENDIX





VITA

George Rush Beggs

Candidate for the Degree of

Master of Architecture

Thesis: A DAY-CARE COMPLEX FOR 1000 CHILDREN

Major Field: Architecture

Biographical:

Personal Data: Born at Enid, Oklahoma, November 1, 1940, the son of George E. and Mary Eleanor Beggs.

Education: Attended elementary, junior high, and high school in Enid, Oklahoma, graduating there in 1958; received a Bachelor of Architecture degree from Oklahoma State University in May, 1965, and completed requirements for a Master of Architecture degree in January, 1967.

Professional Experience: Have completed the equivalent of two years architectural office experience, working part and full time during schooling. This included one six-month period spent in Santa Fe, New Mexico; also have taught one semester of freshman architectural design at Oklahoma State University as a graduate assistant.