A MASTER PLAN FOR
CHRISTIAN GROWTH ACADEMY
CHRISTIANSBURG, VIRGINIA

by

Reginald Allen Walker

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APPROVED:

D. J. Kilper, Chairman

J. C. Wang

D. O. Shanks

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Committee Chairman: Dennis J. Kilper
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(ABSTRACT)

The possible development of a private school/community recreation complex on a specific site in Christiansburg, Virginia was proposed. Thorough architectural programming (including interaction with the school's administration) and site analysis preceded the generation of design proposals for the project.

A phased structure built of concrete masonry with aluminum-framed atria was proposed, responding primarily to the administration's desire for a low cost, low maintenance structure which provided a maximum of natural illumination. Although the building would have a distinct presence within the existing neighborhood, care was taken not to cause the new complex to overpower the surrounding residential and commercial buildings.

A description of the complete design process is presented in addition to graphic representations of the proposed facility.

ACKNOWLEDGEMENTS

Thanks . . .

. . . to my parents, for whose unfailing support and confidence in me I will be eternally grateful . . .

. . . to my wife, whose assistance, encouragement (and patience) have refreshed and undergirded me time and time (and time) again . . .

. . . to my Advisory Committee members, whose frank comments, patient manner and accurate professional advise have helped me learn more about myself while learning about architecture . . .

. . . to the many friends and acquaintances that have prayed for me and wished me well along the way . . .

. . . BUT, most of all, "thanks" goes to my Lord and Savior Jesus Christ, without Whose vision, strength and encouragement this book would never have come to be.

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PREFACE

One thing I had desired to do while an architecture student was to be involved in a "real live" project and interact with a "real client" while still within the "safety" of an academic environment. Professors usually gave me a verbal or written program which supplied enough information to get started, but there was no "client" to talk with to ascertain their heart-felt goals and aspirations for a project. I would usually end up either having to make assumptions as to what these deeper goals and desires might be or fabricate them based on my own desires or a momentary whim. I longed for the opportunity to give form, shape and substance to someone else's dreams instead of "designing for me" all of the time since, as a practicing architect, I would be called upon to delineate the aspirations of others on a day to day basis. Therefore, when the idea for this project occurred to me, I could hardly wait to get started.

I had also desired to learn more about the process of architectural design in general, and about my own design process in particular. Therefore I decided to use this project as a case in which to study this subject and to observe my own design actions and decision-making.

This book documents the process I followed in developing a master plan for Christian Growth Academy (CGA), a small private school located in Christiansburg, Virginia, and presents the product of those design investigations. Initially I did not know each step I would need to take in order to devise such a plan, but I did have a basic idea of how I wanted to proceed. As the work progressed, I followed my "inward intuition" (and gave heed to timely suggestions from my Advisory Committee) in determining the next best course of action to take. The resulting design is one from which I have learned much about architectural design and my own process of designing - and one from which I am sure I will continue to learn.

INTRODUCTION

The administration of CGA desired to centralize the location of its student body and to provide more space to accommodate expected increases in student enrollment. The school, grades K through 7, was then conducting classes in two separate buildings situated approximately three hundred fifty feet (350'-0"±) apart on a street in a small but growing residential and commercial neighborhood. They desired to reuse one of these buildings, already located on the proposed site, in the new school complex, as well as to provide some recreational facilities for school and community use. Additionally, the school had a very limited budget to work with.

PROCESS

My original plan of action was as follows: (a) to acquire and analyze a statement of the school administration's program for the new complex, and to further develop and refine it as the project progressed in order to increase its comprehensiveness; (b) to thoroughly document and analyze the proposed site for the facility; (c) to generate three to five schematic design proposals in response to the aspirations and information uncovered during the programming and site analysis phases; and (d) to develop the design proposal selected in conjunction with the school's administration, establishing its final scope, size, form and appearance. As it turned out, the project followed this sequence with very few exceptions. What follows is a more detailed description of each of these steps.

PROGRAMMING

First, I established the basic elements of the program for the complex by talking briefly with the school's administrator and by reviewing plans of a proposed modification to a building for the school's use which the CGA Board of Directors had been considering. This information was then used to form the basis of a preliminary building program for my project. Next, I began to review the current methods of architectural programming in order to get a better idea of how to further clarify the needs and aspirations of the school. I then studied the way that the school was functioning in its existing facilities.

After having started to analyze the information I had already collected, I used procedures learned from my review of programming methods to acquire additional programming information in an in-depth interview with the school administrator. After this new information was analyzed, I developed a program of spaces to be included in the new complex (Figure 1). I also investigated the potential costs of the project and produced a preliminary cost estimate based upon the program of spaces previously developed (Figure 2). Finally, I composed a concise statement of design initiatives for the project based on the analysis of the programming information to serve as a guide for subsequent design efforts (Figure 3).

BUILDING:	REQUIRED SQUARE FEET WITHIN PHASES: I	II	III	SQUARE FOOT TOTALS
-Assignable Space-				
Classrooms	2,646	2,646	3,780	9,072
Class Storage	140	140	200	480
Toilets	110	80	120	310
Special Purpose	1,828	3,288	9,935	15,051
Support Spaces	480	218	204	900
*SUBTOTALS:	5,204	6,370	14,239	25,813
-Unassignable Space-				
Circulation	1,601	1,960	4,381	7,942
Mechanical	440	539	1,205	2,184
Public Toilets	120	147	329	596
Janitor Closets	40	49	109	198
General Storage	40	49	110	199
Bldg. Structure	561	686	1,533	2,780
*SUBTOTALS:	2,802	3,430	7,667	13,899
*BUILDING TOTALS:	8,006	9,800	21,906	39,712
SITE IMPROVEMENTS:				
-Parking-	5,828	5,828	13,640	25,296
-Recreation-				
Basketball/ Volleyball Court	0	3,108	0	3,108
Tennis Court	0	0	7,200	7,200
*SUBTOTALS:	0	3,108	7,200	10,308
-Vehicular Circulation-	4,410	1,488	0	5,898
*SITE IMPROVEMENT TOTALS:	10,238	10,424	20,840	41,502
**GRAND TOTALS:	18,244	20,224	42,746	81,214

SITE AREA SUMMARY:

BUILDING + SITE IMPROVEMENTS + OPEN AREA = TOTAL SITE AREA

28,875 + 41,502 + 77,509 = 147,886 SQ. FT.

NOTE: Building unassignable space square footages based on percentages by Pena.

FIGURE 1: CGA MASTER PLAN - Space Program & Area Requirements

BUDGET ITEMS		TOTALS
A. BUILDING COSTS:	(6,895 sq. ft. @ $20/sq. ft.)	$137,900
B. FIXED EQUIPMENT:	(10% of A)	13,790
C. SITE DEVELOPMENT:	(12% of A)	16,548
D. TOTAL CONSTRUCTION COSTS:	(A + B + C)	$168,238
E. SITE ACQUISITION &/OR DEMOLITION:		$10,000
F. MOVEABLE EQUIPMENT:	(10% of A)	13,790
G. PROFESSIONAL FEES:	(10% of D)	16,824
H. CONTINGENCIES:	(10% of D)	16,824
J. ADMINISTRATIVE COSTS:	(1.5% of D)	2,524
K. SUBTOTAL OF REQUIRED BUDGET:	(D + E through J)	$228,200
L. PERMANENT FINANCING COSTS:	(2% of K)	$4,564
M. **TOTAL BUDGET REQUIRED:**	(K + L)	$232,764

NOTES:
1) Six (6) classrooms will be constructed in Phase I.
2) 70/30% Building Efficiency Ratio (ratio of assignable/unassignable space).
3) Formulae after Pena.

FIGURE 2: CGA MASTER PLAN - Preliminary Cost Estimate (Phase I)

CONDITIONS	DESIGN PREMISES
FUNCTIONAL CONSIDERATIONS:	
Since the nature of the functional requirements and construction phasing would allow it, and a better, more advantageous facility could result through the consideration of both building options . . .	. . . the design may consist either of a single building OR a group of buildings arranged together on the selected site.
Since the administration has requested that the K through 4th or 5th grades and the 6th and 7th grades be located in separate areas of the new complex . . .	. . . the design should respond with an appropriate organizational form.
FORMAL CONSIDERATIONS:	
Since the administration has strongly requested that natural light (as opposed to artificial lighting) be employed as much as possible within the new structure . . .	. . . the design should respond with appropriate openings and apertures into all occupied spaces.
Since a given area of the site is the focal point of views toward the site and at the same time commands substantial views from the site . . .	. . . the design should take advantage of that focus/overlook by the appropriate location of the building(s) and other on-site functions.
Since the administration wishes to project an image of a quality learning environment for the children to passersby, and since no building in the immediate vicinity portrays the image of a quality environment . . .	. . . the design should provide this image of quality, being free to depart from the materials and building forms of the surrounding structures.
ECONOMIC CONSIDERATION:	
Since the project must be built within a relatively fixed budget, and the administration desires to employ "no maintenance" exterior materials and easy-to-clean interior finishes . . .	. . . the quality selection of the building systems, materials and finishes must be balanced within the budget without sacrificing durability or low maintenance and operating costs.
TIME CONSIDERATION:	
Since project funds are limited at this time, yet the administration wishes to incorporate more extensive amenities into the long-range plans for the school . . .	. . . the design should be able to be completed in stages, and should include all the facilities to ultimately be included in the total school complex.

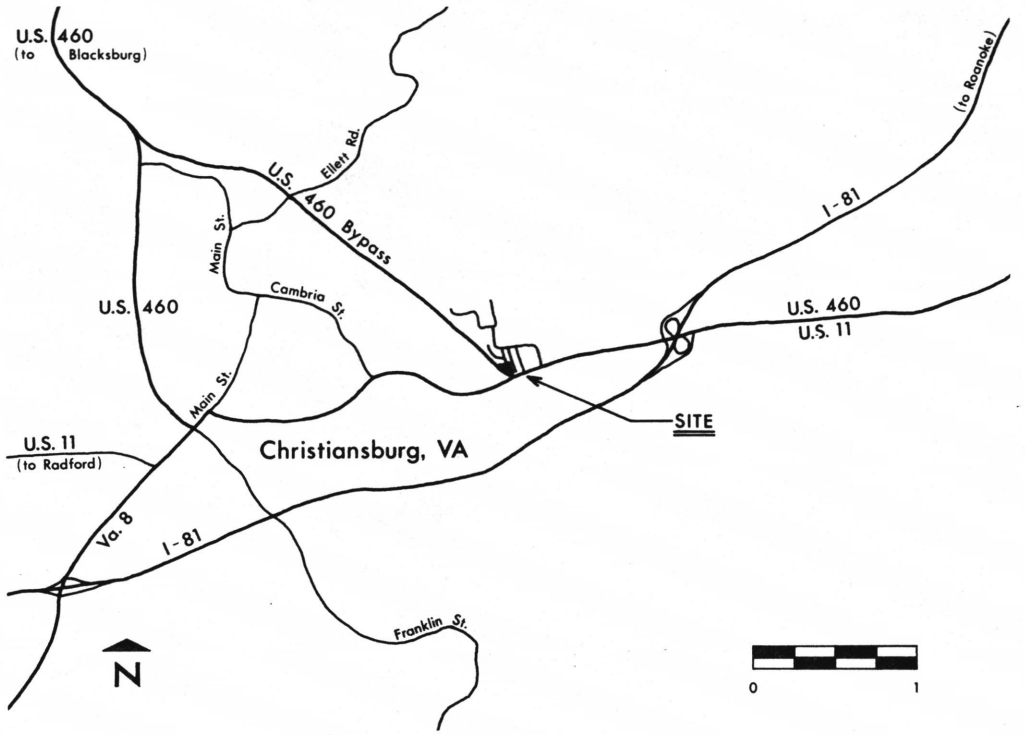
NOTE: Format after Pena.

FIGURE 3: CGA MASTER PLAN - Design Initiatives

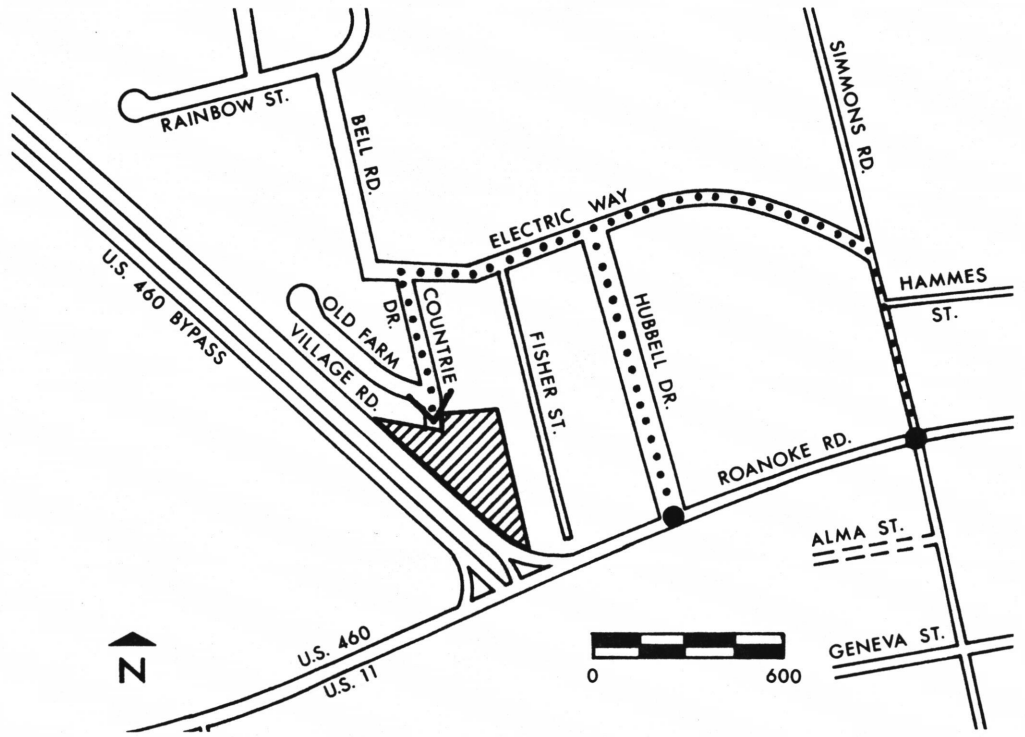
SITE ANALYSIS

For the most part, the site analysis was done concurrently with the programming activities. Once the site was documented photographically, extensive research was conducted to locate and document the following types of information about the site and its surrounding context: physical and social composition of the neighborhood; legal boundaries and zoning restrictions; natural and man-made physical features; existing utilities; site access and circulation patterns; sensory and perceptual characteristics; climatological data; and the size, landforms and configuration of the actual site area.

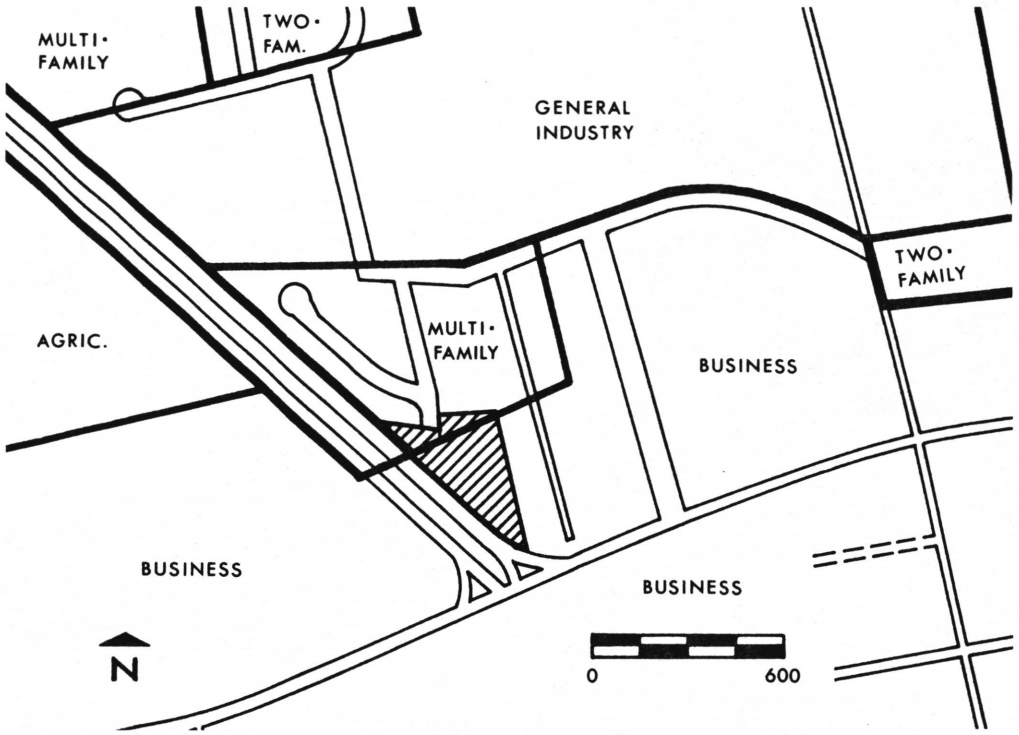
Once this data was recorded, the site was graphically analyzed in terms of these issues as they related to the development of a school complex on it. This analysis also included the execution of sectional drawings of the site topography and the construction of a scale model of a portion of the site.



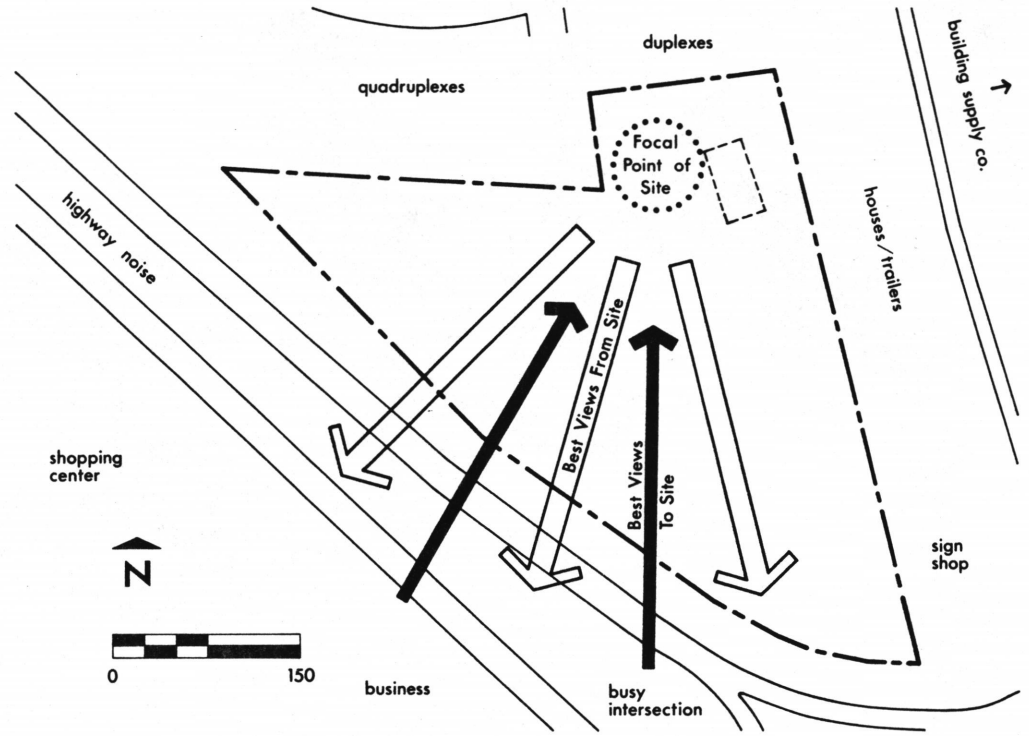
Location Map



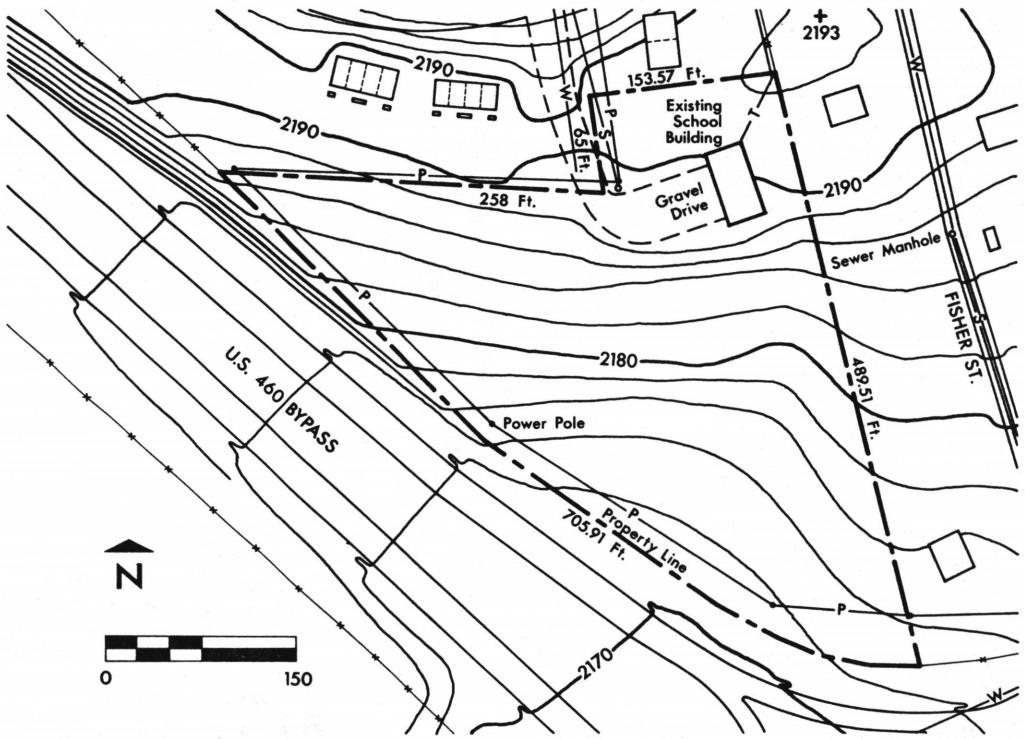
Site Accessibility



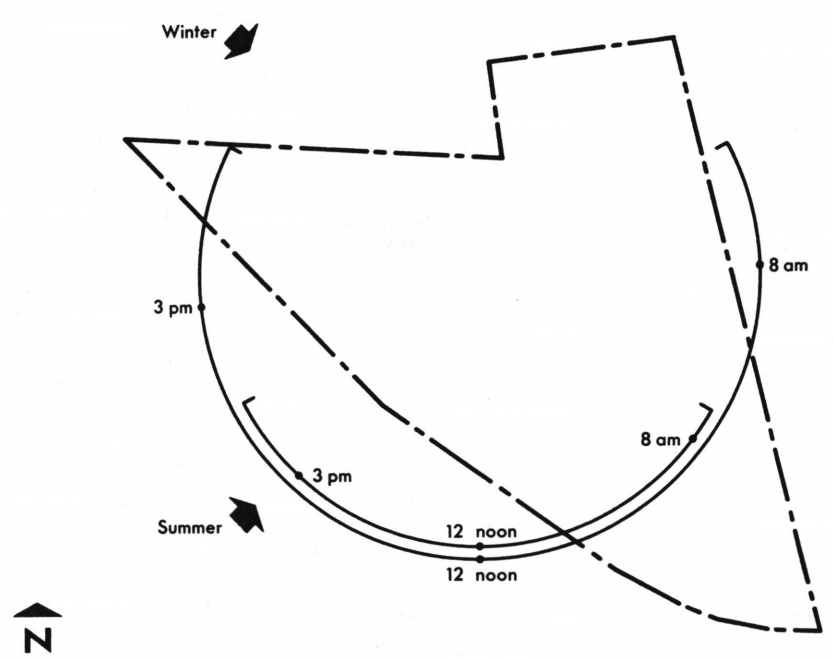
Zoning Map



Visual & Auditory Aspects



Physical Characteristics

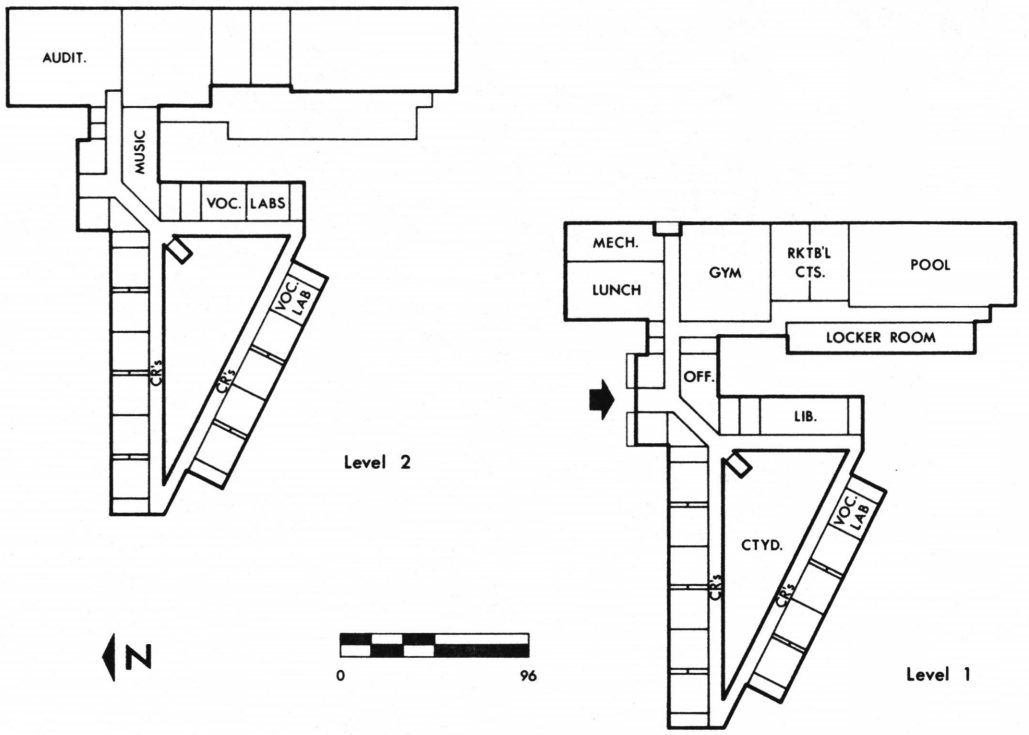


Solar Exposure & Prevailing Winds

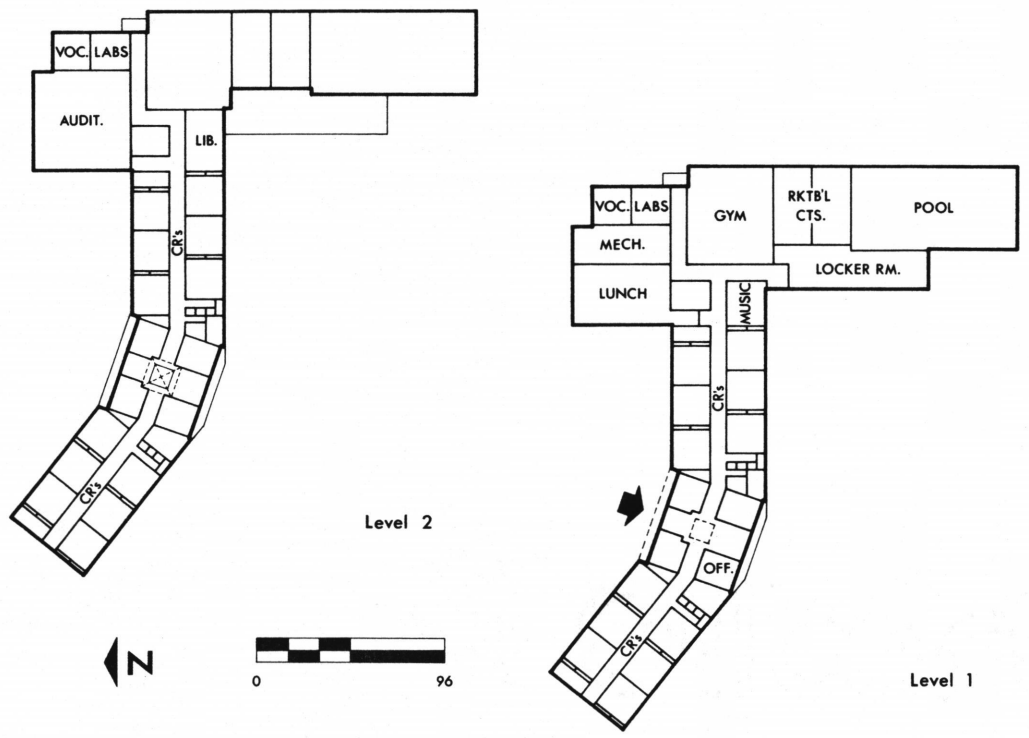
SCHEMATIC DESIGN

Preparation specifically for the schematic design phase was begun early in the overall process (during the programming and site analysis phases) in the form of planning and design data research for the proposed building type. Case study research on recently built private schools and on school design in general was initiated before the two earlier phases had been completed.

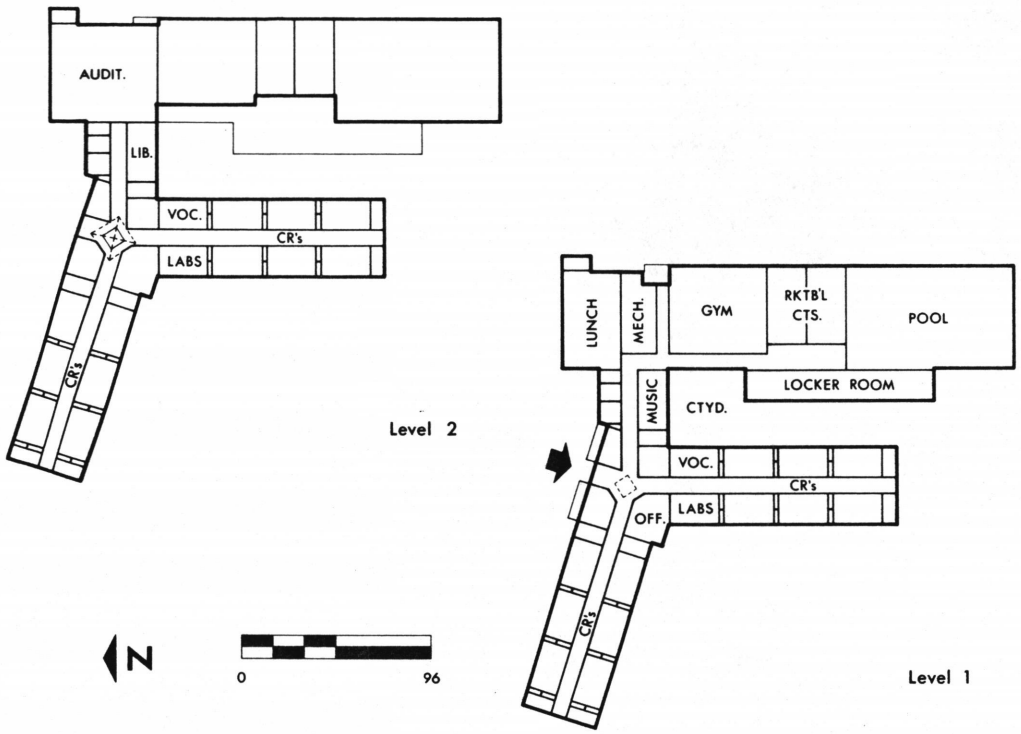
Once the bulk of the programming and site analysis had been accomplished, the project's critical design issues were identified. After this, studies of the arrangement of the existing buildings and landforms around the site were begun in order to identify specific ways of integrating the new complex into the context of the neighborhood. This lead to studies of ways to organize the various program functions on the site. After identifying the "optimum" location to build on the site, a number of informal sketches were developed representing some possible forms and massing for the new complex, as well as ways to situate them on the site. From these sketches emerged five schemes for the proposed school facility.



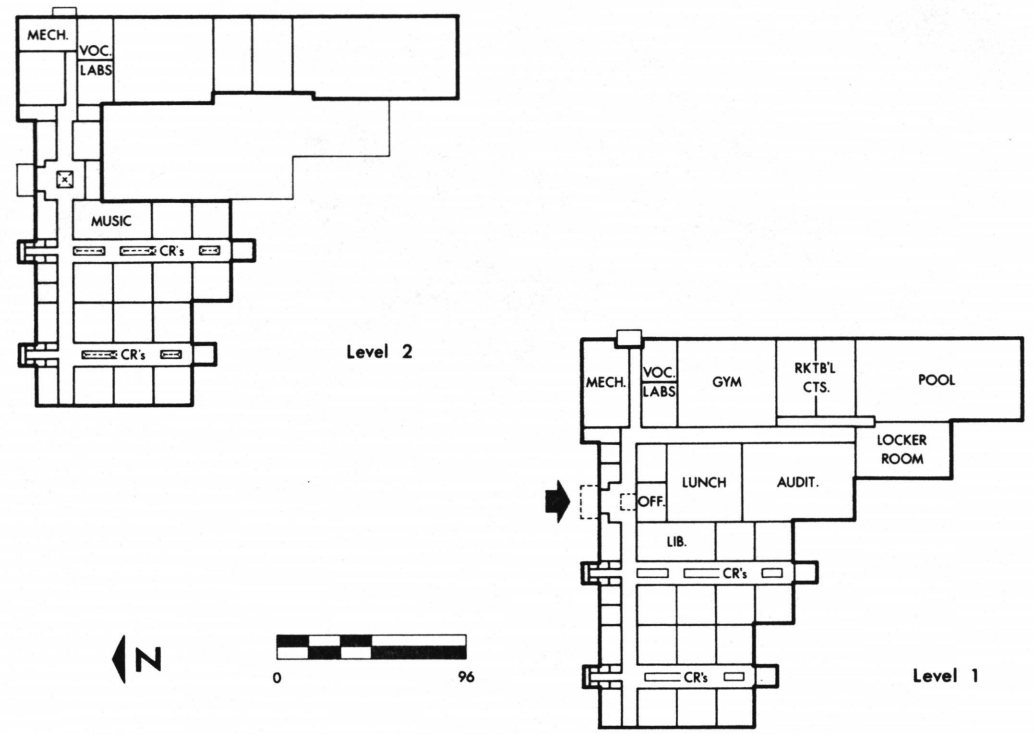
Scheme A



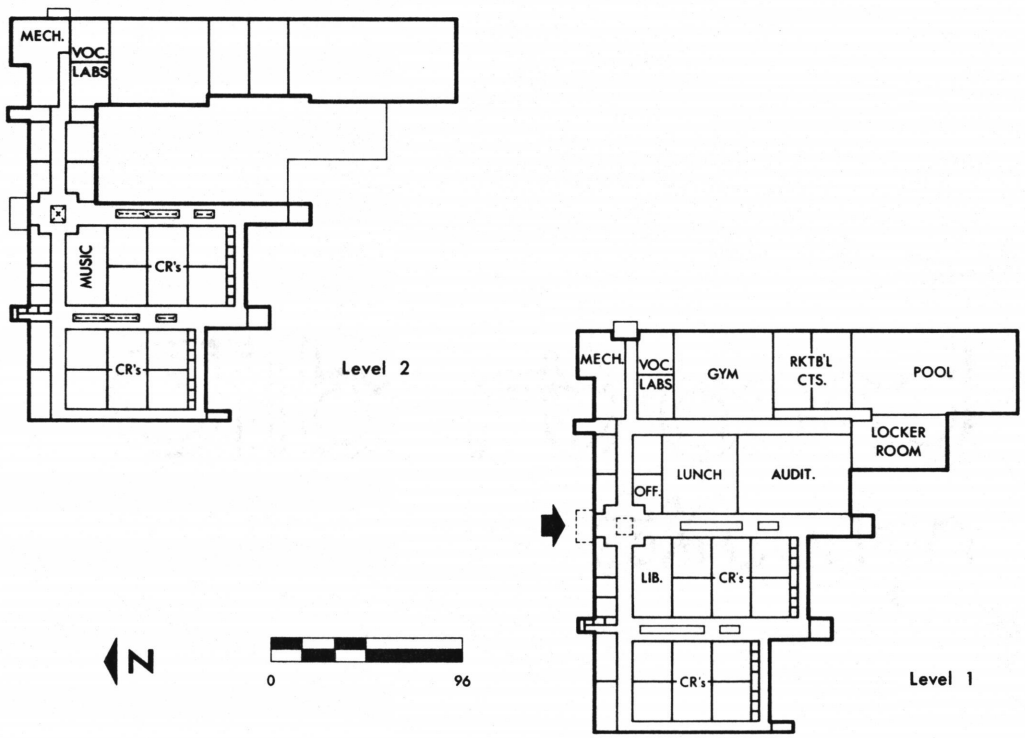
Scheme B



Scheme C



Scheme E



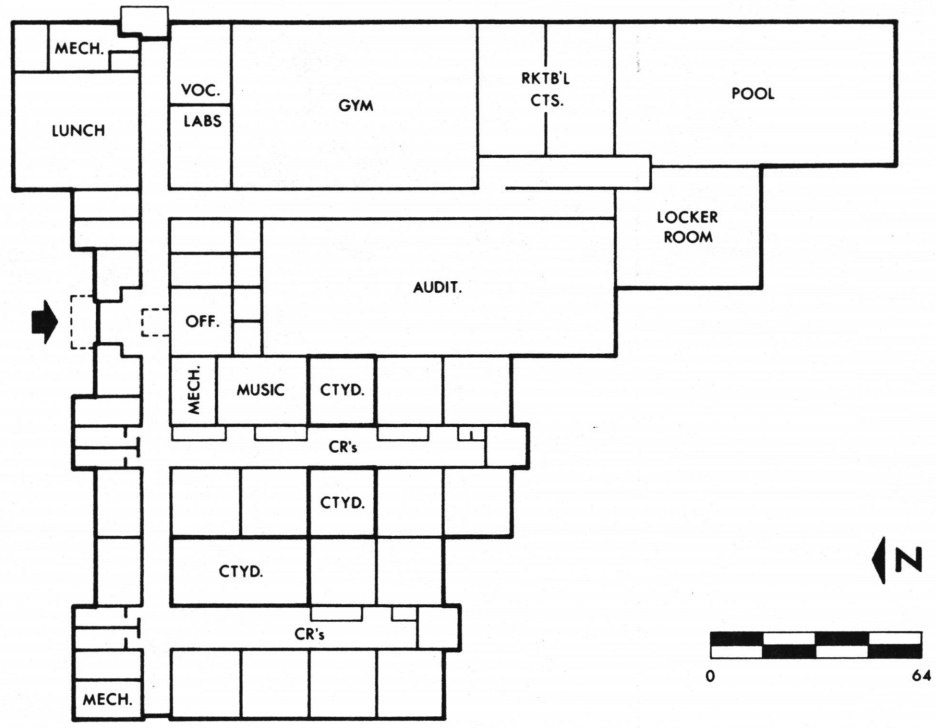
Scheme D

While all of the schematic design proposals addressed the critical design issues, Scheme E was selected for development, largely because it appeared to be the most economical scheme to build. This joint selection by the school administrator and myself was made in spite of the fact that we both preferred one (or more) of the other proposals over this one; we perceived that they had more architectural potential than the scheme we chose. When in the "real world," however, one must do what one has the means to do; therefore our choice stood, and I then took up the task of discovering, enhancing and amplifying the vitality of the selected scheme.

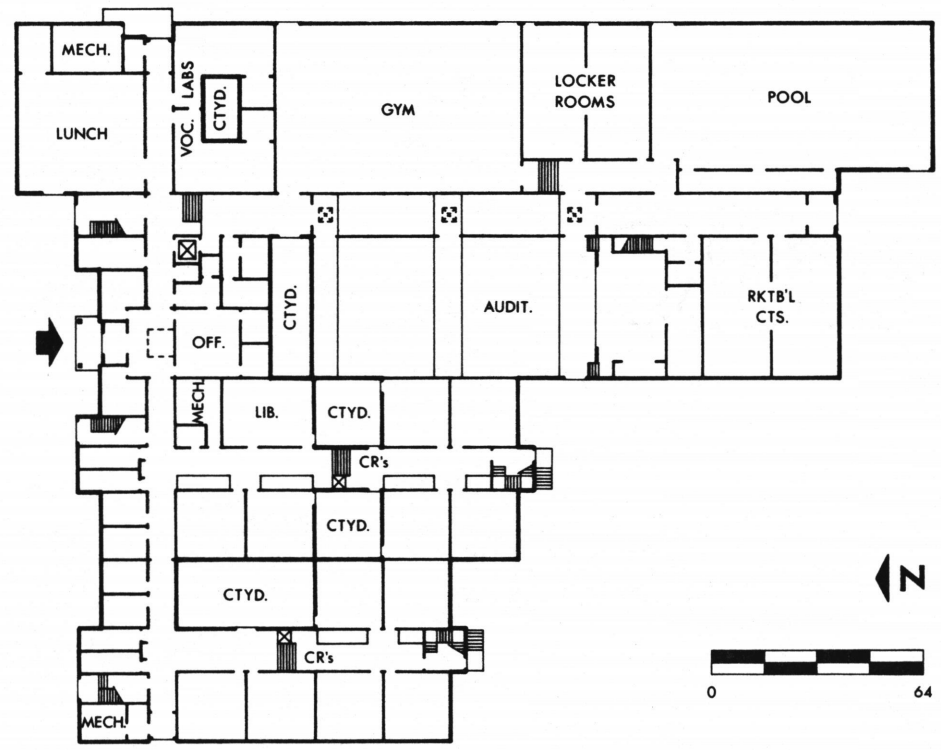
DESIGN DEVELOPMENT

During the design development phase, the organization and form of the selected proposal was seemingly in a state of constant revision. In retrospect, however, these revisions actually took place in discernible "stages" which corresponded primarily to significant changes in the organization of the building plan. Each of these stages and the design/revision work contained within them produced progressive "versions" or iterations of the building leading up to what was to become the "final product" of the investigations and design work.

Version 1 of the building differed little from the simple line drawings representing the original design scheme. A structural system of load-bearing concrete masonry walls and wood truss floor joists was selected because of their low cost and the ease with which other building systems could be integrated within them. The only organizational changes within this version consisted of the elimination of the tennis court, a relocation of the lunch/multi-purpose room, and minor revisions to the skylights and the addition of outdoor courtyards in the classroom wings. Version 2, on the other hand, contained a significant modification of the spatial organization and circulation within the recreation wing as well as a great deal of refinement of the design of the main lobby and other circulation spaces. (It was also decided during this stage that it would not be best to reuse the existing building on the site.) Version 3, which contained the most sweeping changes of all, actually became the final version of the building design. This version will be presented in detail in the next section.



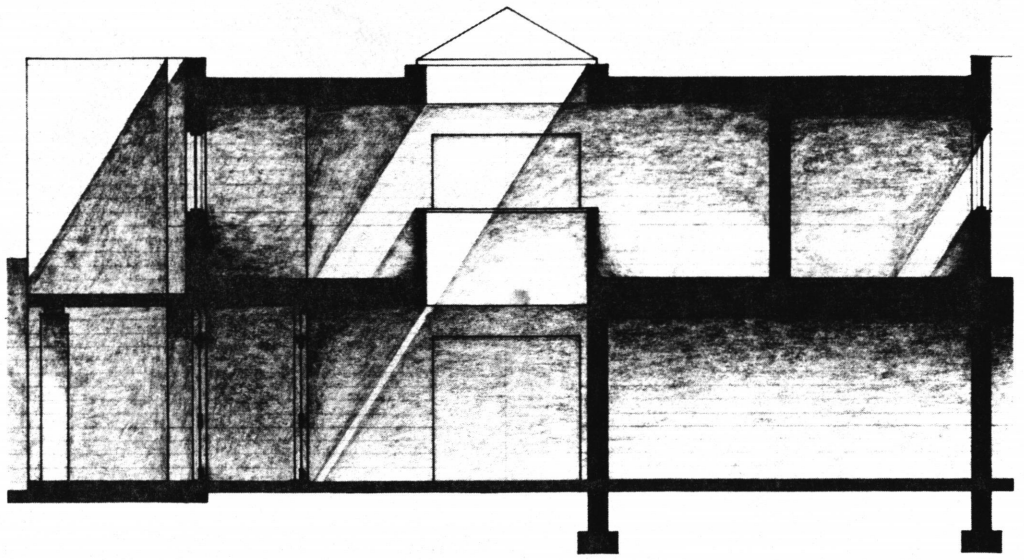
VERSION 1: First Floor Plan



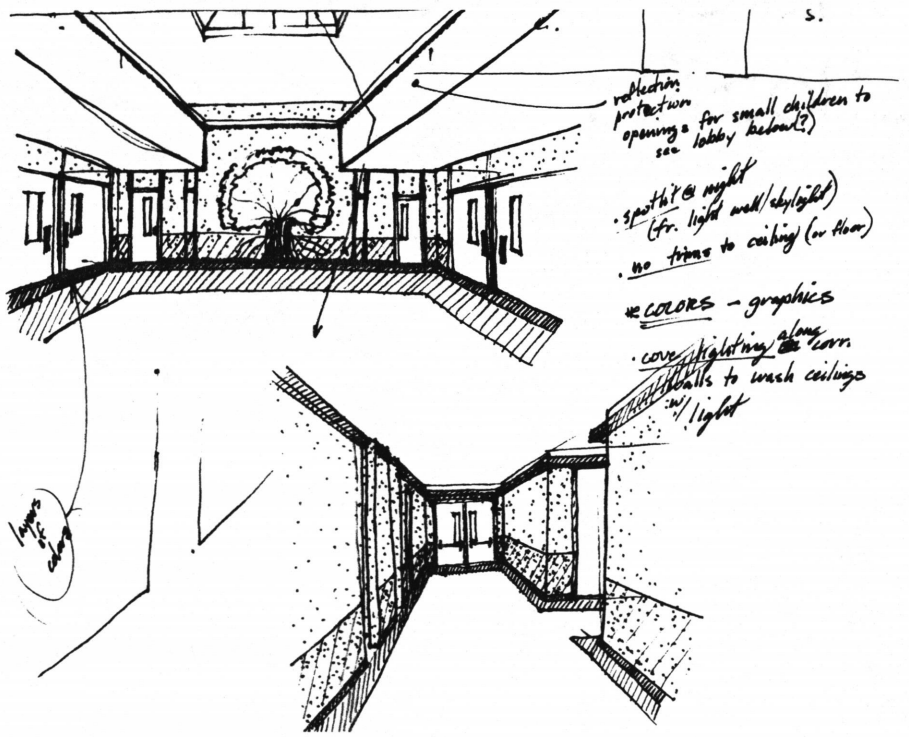
VERSION 2: First Floor Plan

DESIGN SKETCHES

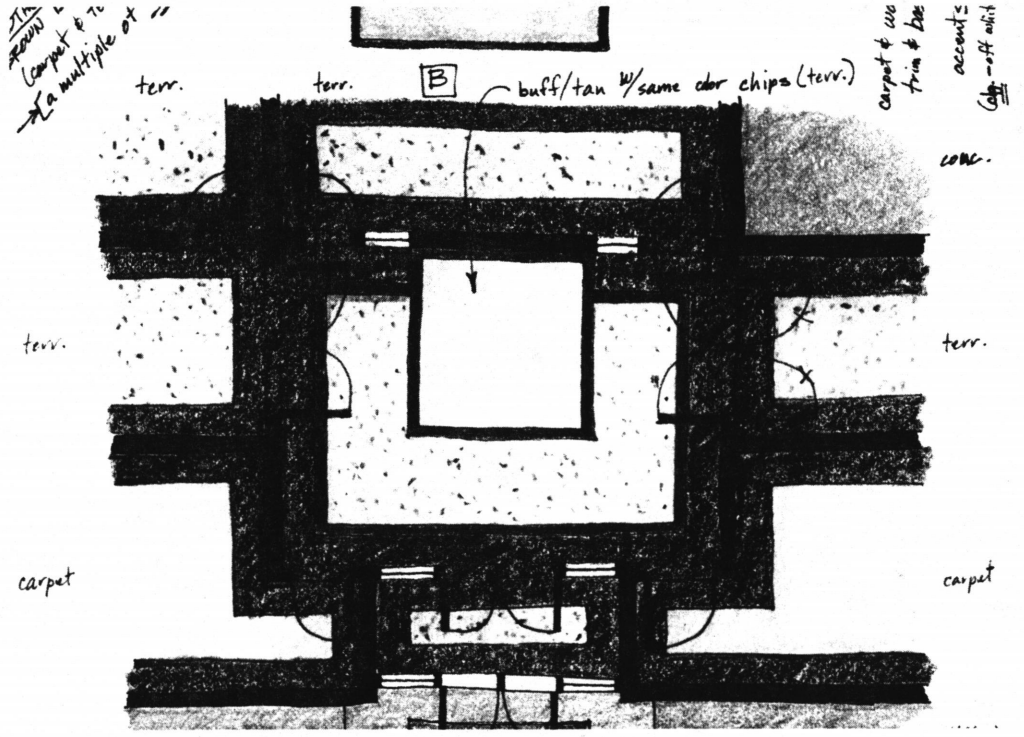
Throughout the design development process, sketches were employed first to record new ideas for the design, and then to "bring them to life" so that I could visualize how an idea might look or what a particular space might be like were it actually built. These sketches and studies (shown here and in the next section) were very important to the process of deciding which version or versions of a space or building element would be incorporated into the final design.



DESIGN SKETCH: Section through Main Lobby



DESIGN SKETCH: Main Lobby & Corridor Spaces

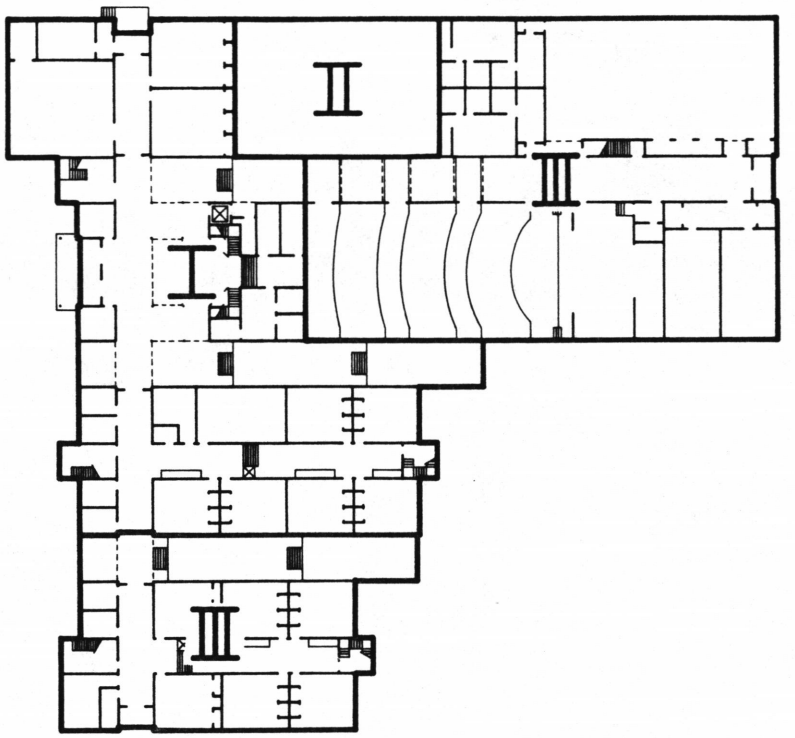


DESIGN SKETCH: Main Lobby Flooring Patterns

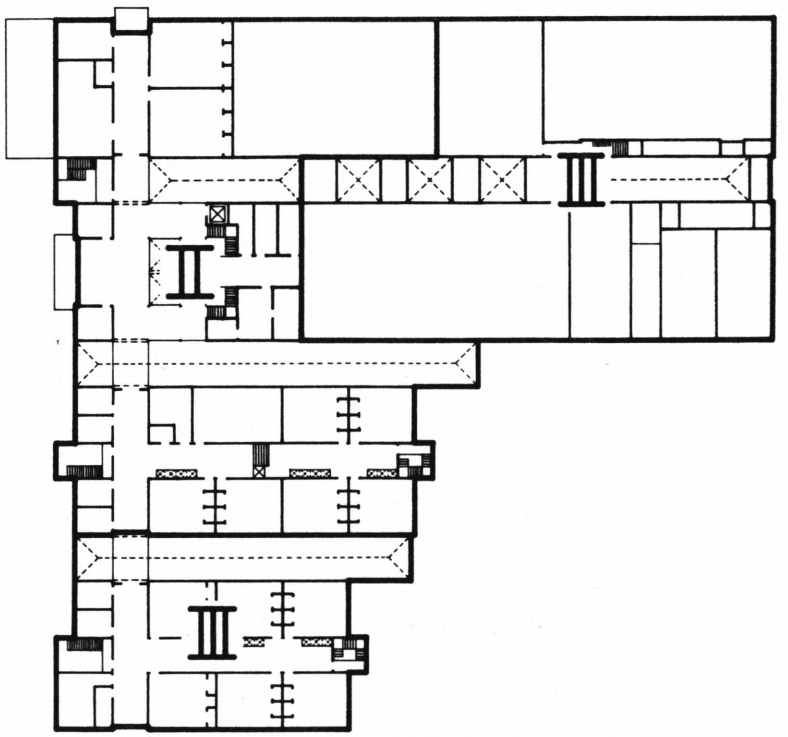
PRODUCT

The incorporation of glass-enclosed, aluminum-framed atria between the wings of the building was the most significant change in Version 3 of the building design, the "final product" of the architectural investigations and design work. These atria replaced the smaller outdoor courtyards which were intended to provide space for special small group functions. Although the atrium spaces would be more public in nature, they could still function as small group activity areas. Unlike the courtyards, however, the atria would be useable year-round. If the school administration so desired, one (or both) of the atria could be left partially or completely unenclosed to provide sheltered outdoor activity space for warm weather use and/or plant-growing projects. If so, the sections of the main corridor traversing the atrium spaces would be enclosed to provide sheltered passage between building wings. In addition to their functional use, the atria also add spatial variety and interest to the complex and allow the entrance of natural light into the spaces overlooking them.

Other major changes in Version 3 consisted of a reduced amount of area for on-site parking, an enlarged main lobby with a central stair and direct access to the auditorium, and an expanded auditorium space with a revised seating and circulation arrangement. Further refinements incorporated into this version included the development of the building fenestration and the design of the pool and locker room areas within the recreation wing.

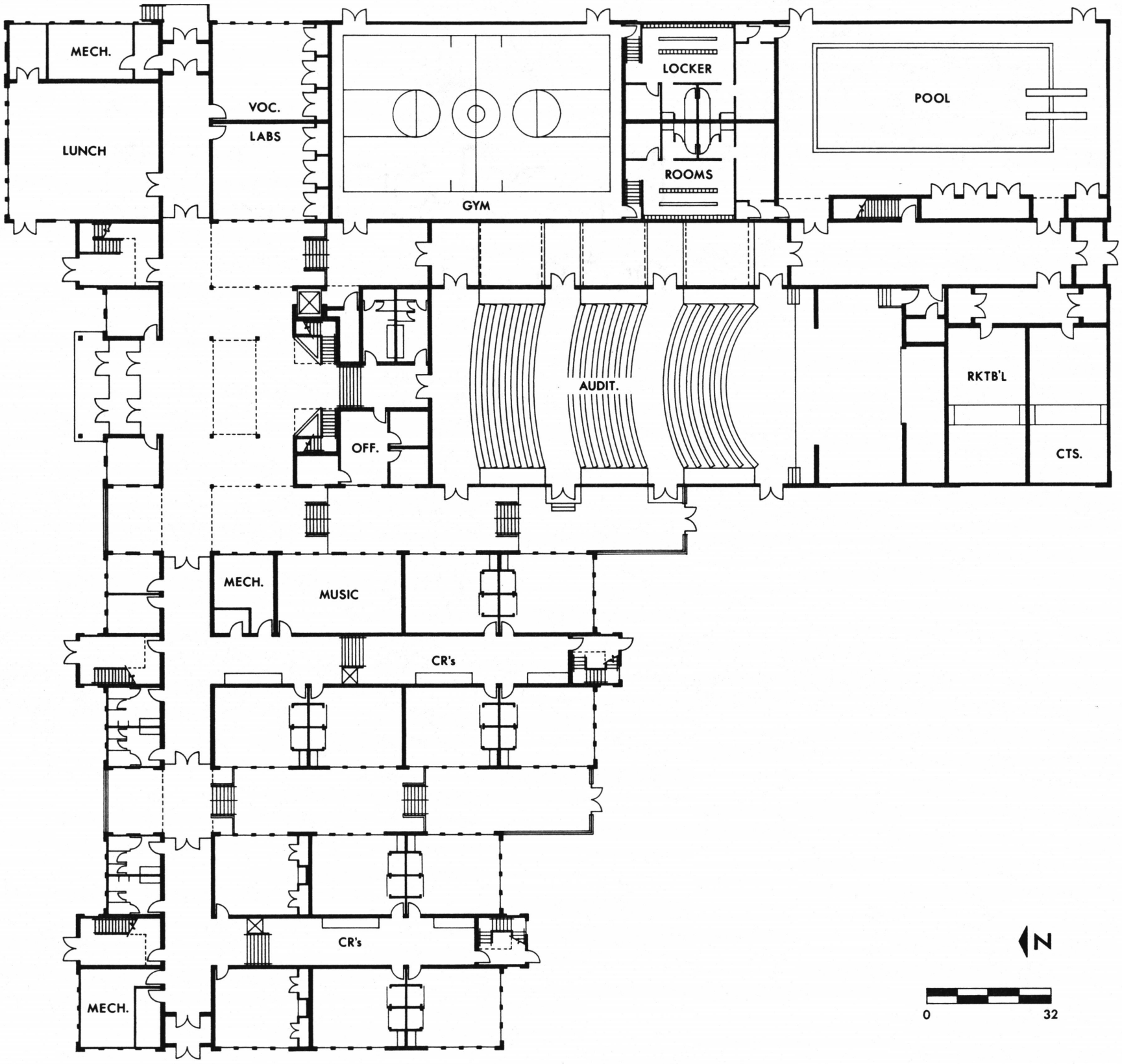


VERSION 3: First Floor Plan showing Construction Phasing

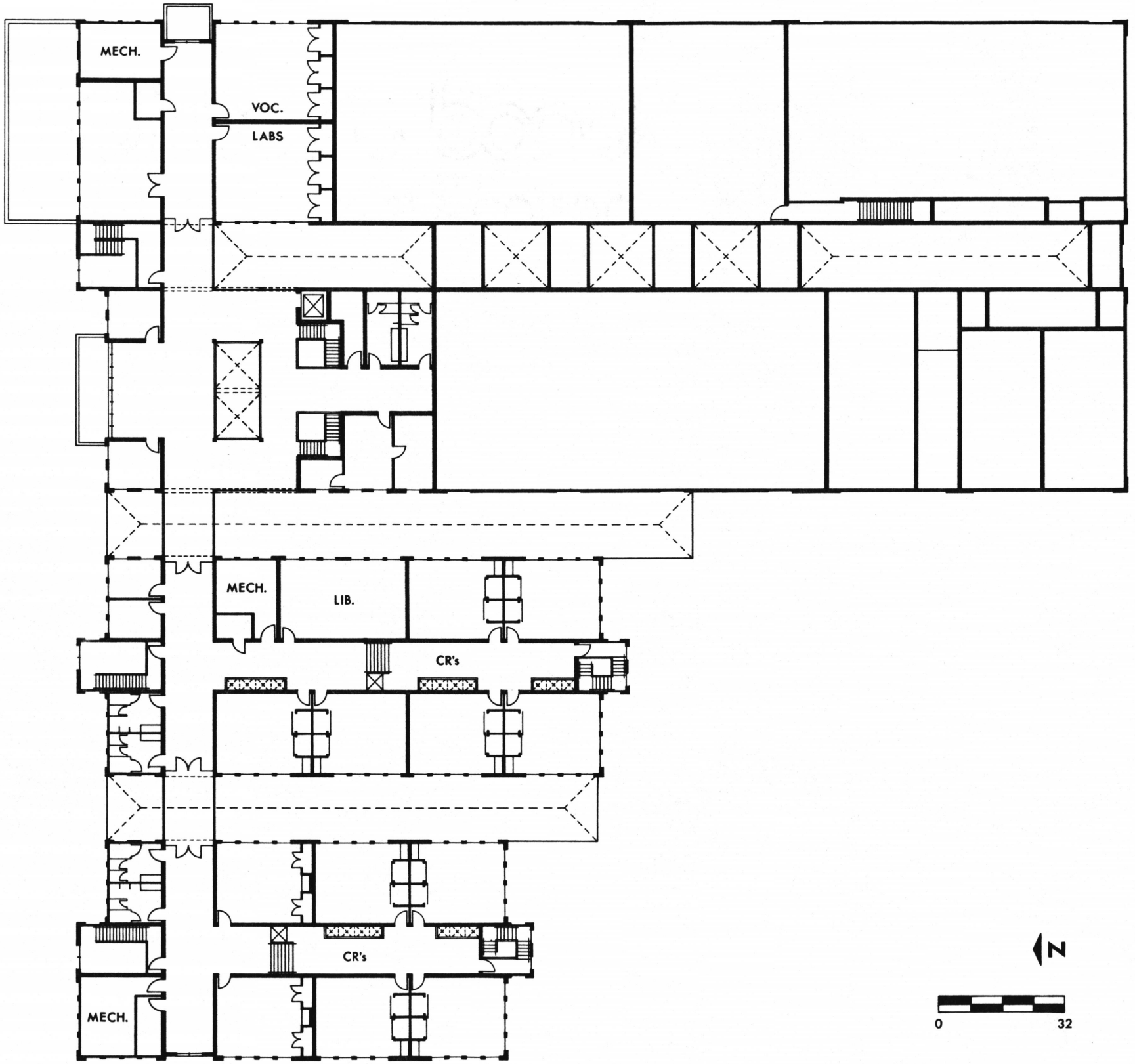


VERSION 3: Second Floor Plan showing Construction Phasing

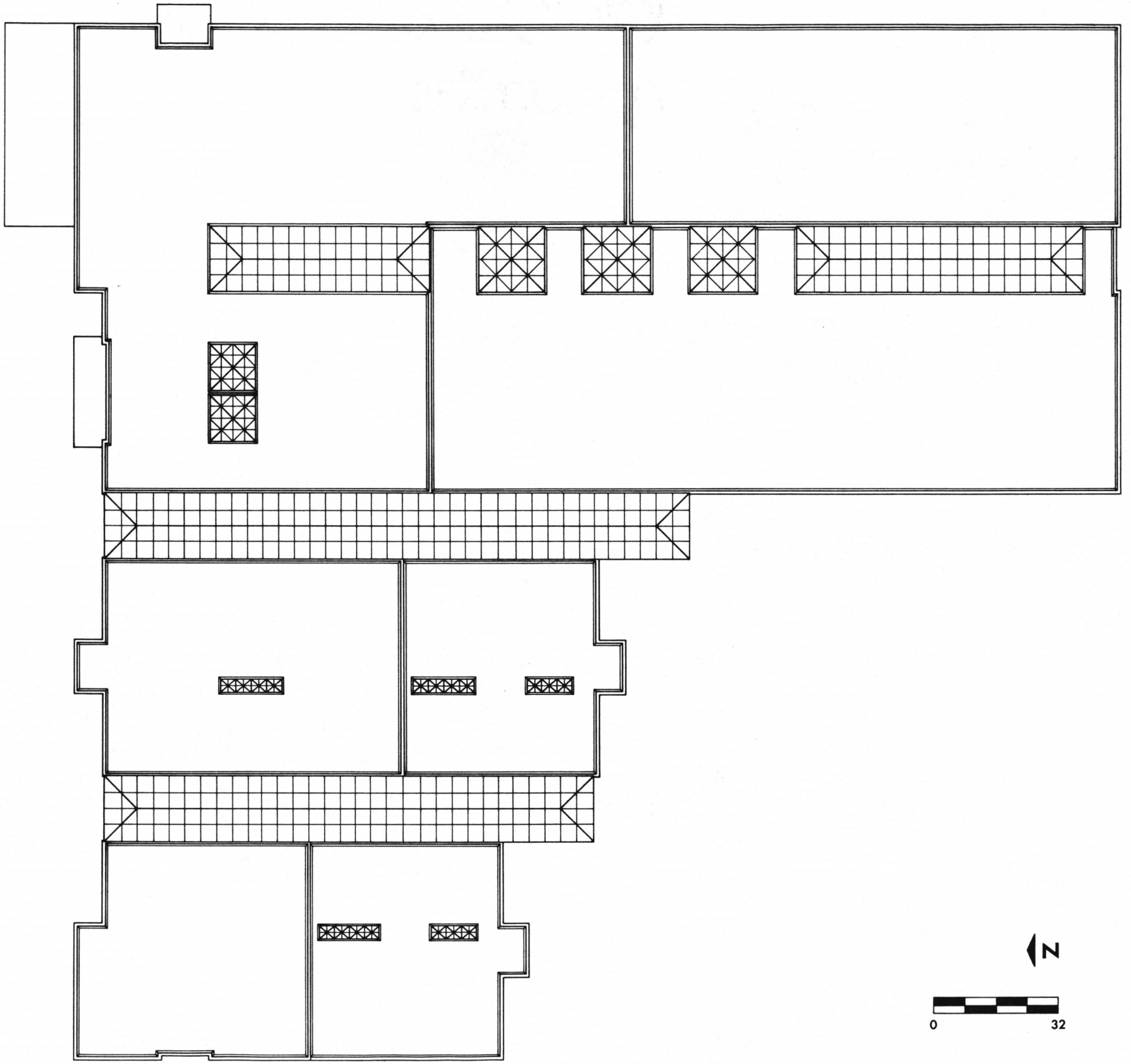
PHASE III: Site Plan



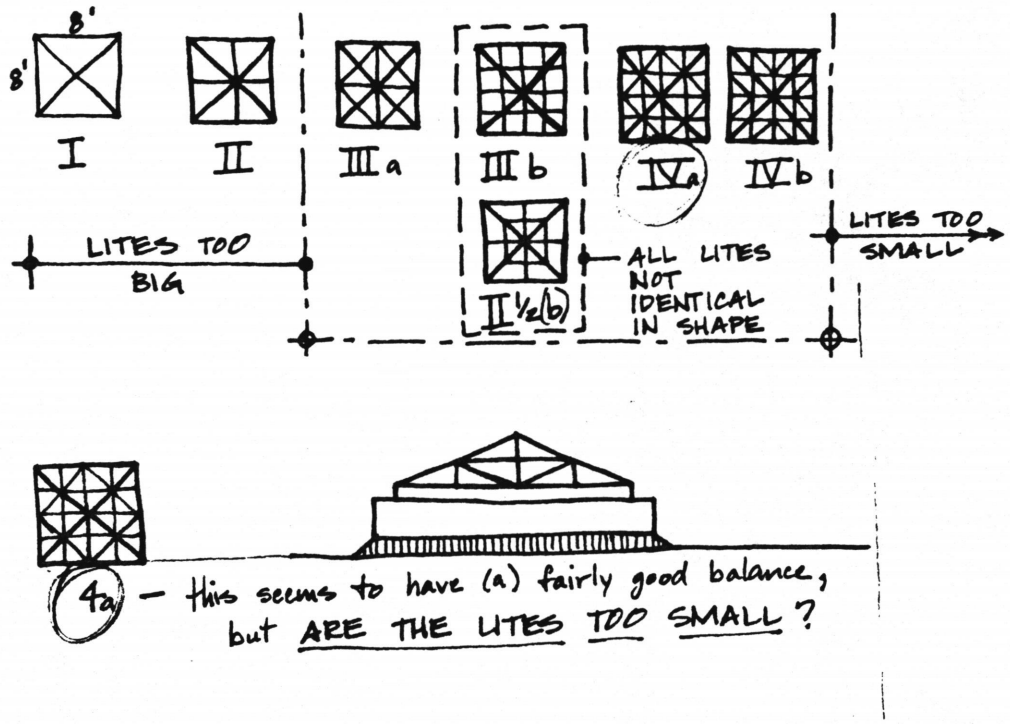
PHASE III: First Floor Plan



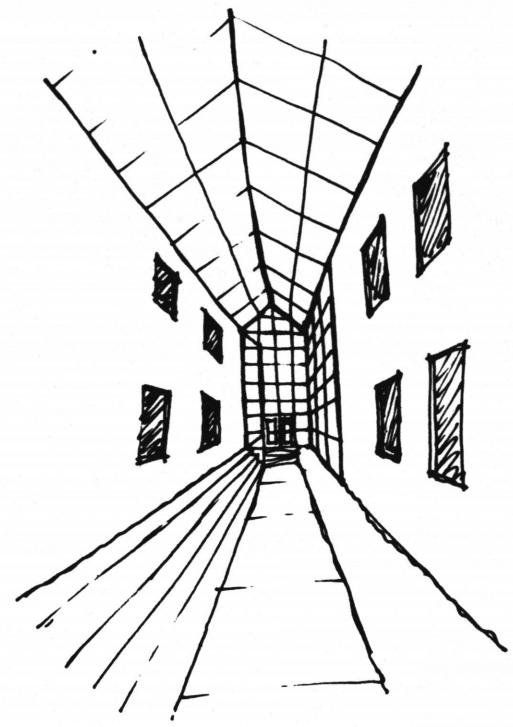
PHASE III: Second Floor Plan



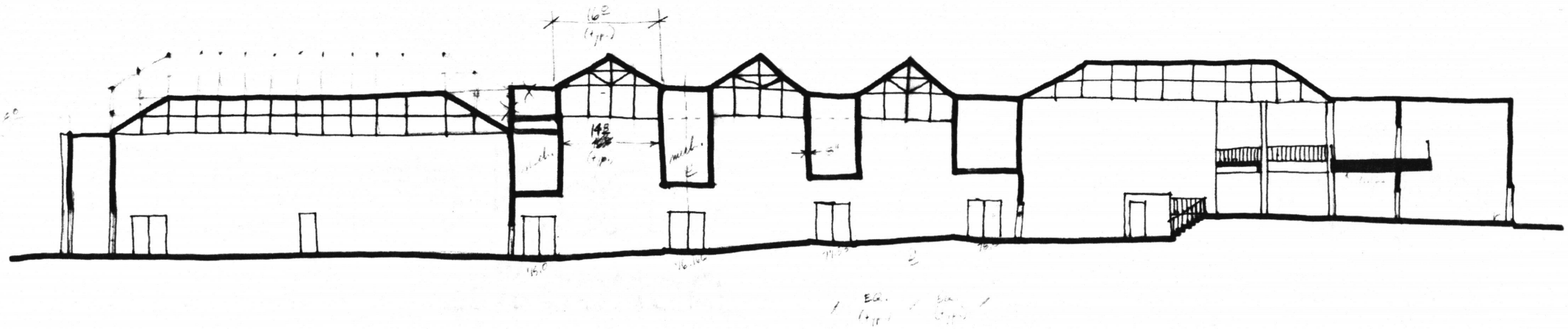
PHASE III: Roof Plan



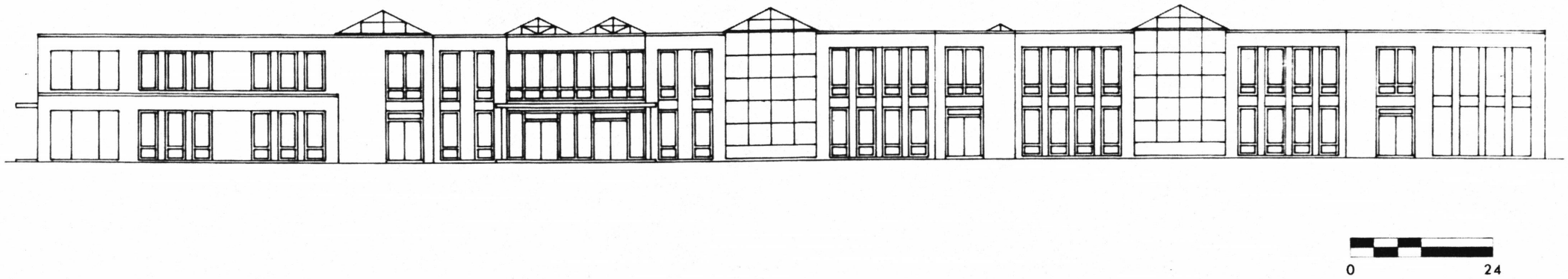
DESIGN SKETCH: Skylights



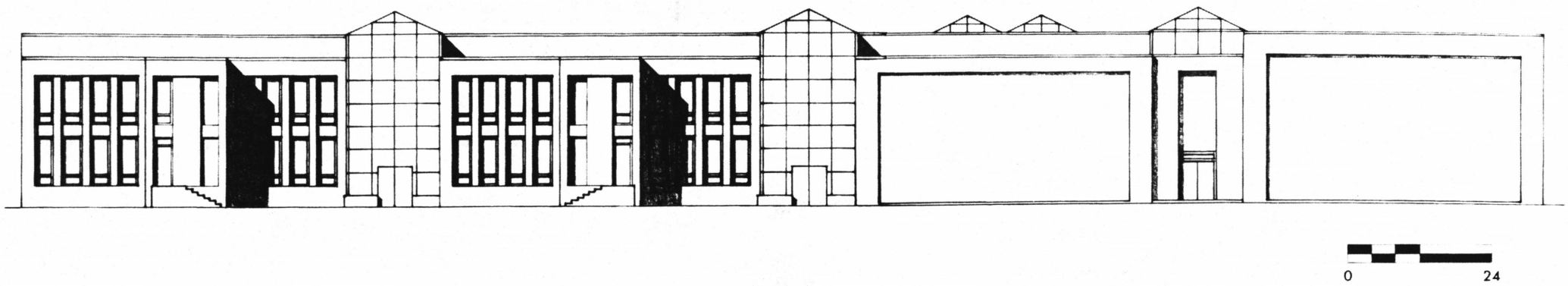
DESIGN SKETCH: Atrium



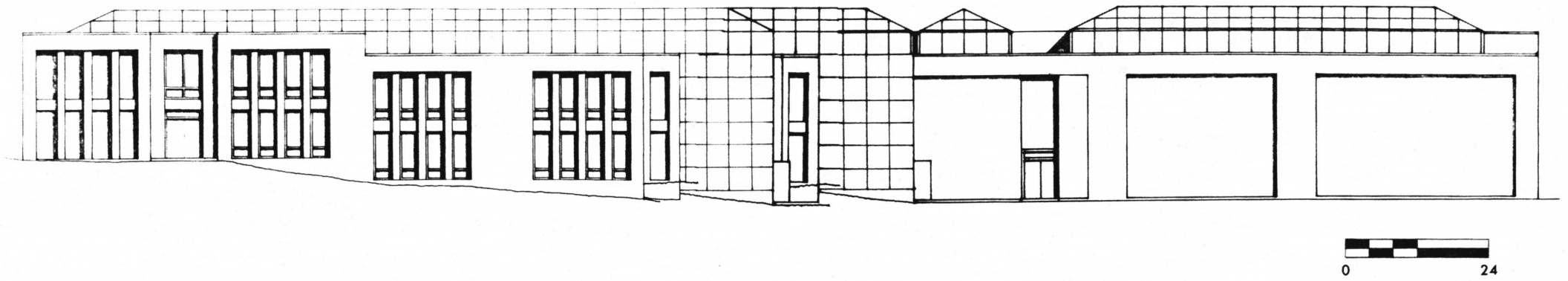
DESIGN SKETCH: Section through Recreation Wing Corridor



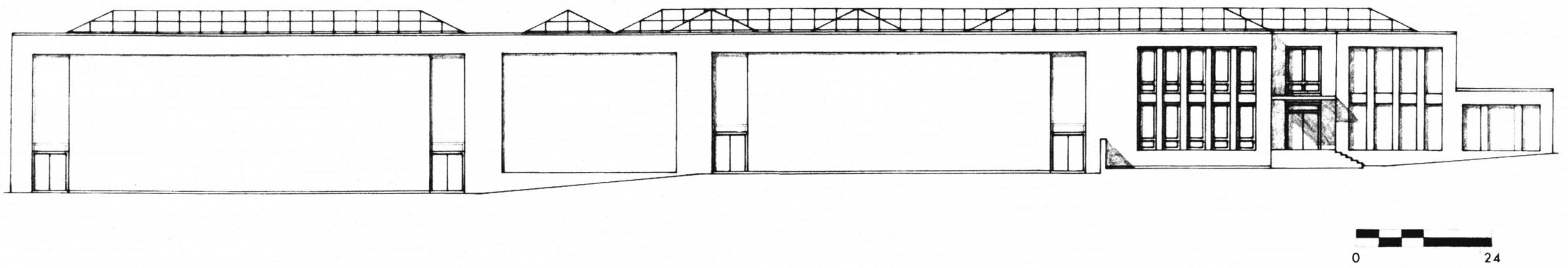
ELEVATION STUDY: North Elevation



ELEVATION STUDY: South Elevation



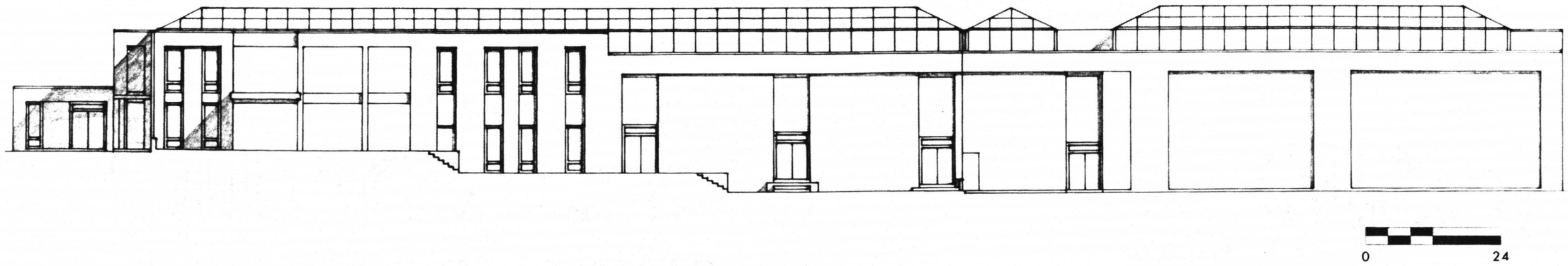
ELEVATION STUDY: West Elevation



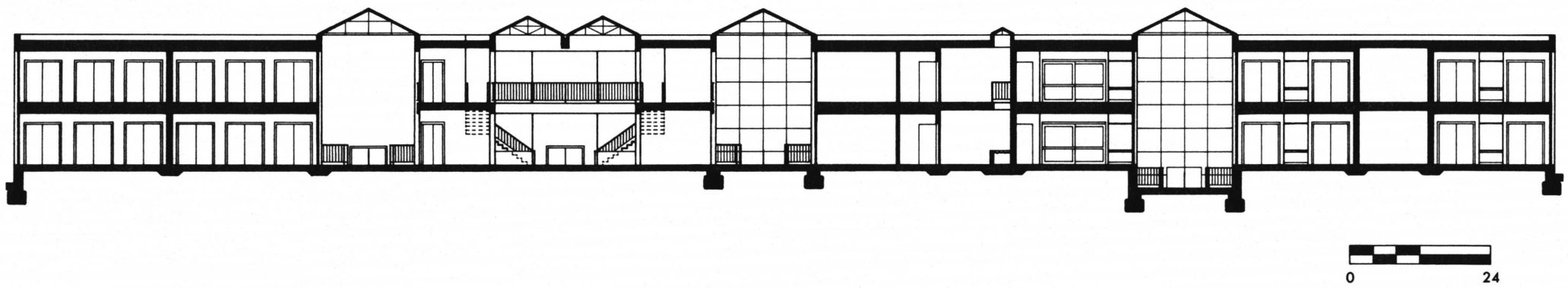
ELEVATION STUDY: East Elevation

ELEVATION STUDY: West Elevation/Section through Atrium B

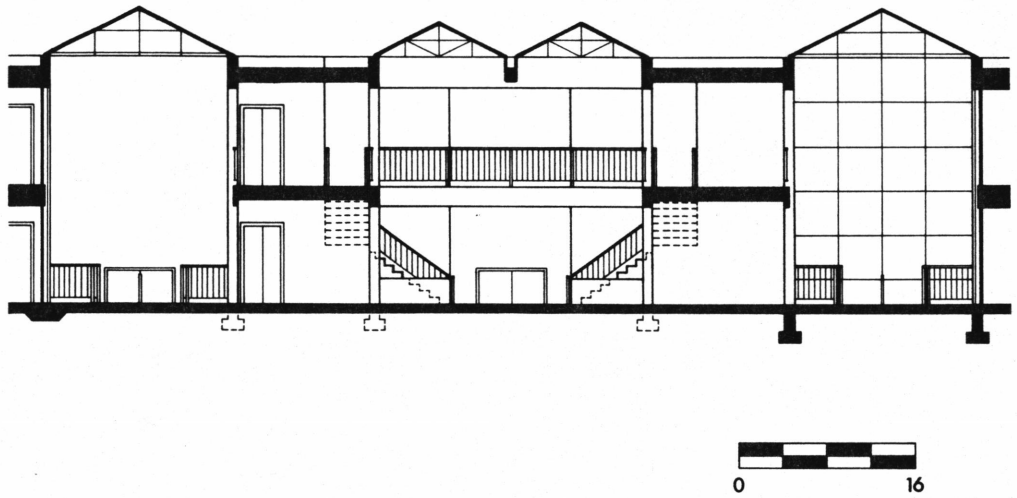
ELEVATION STUDY: East Elevation/Section through Atrium B



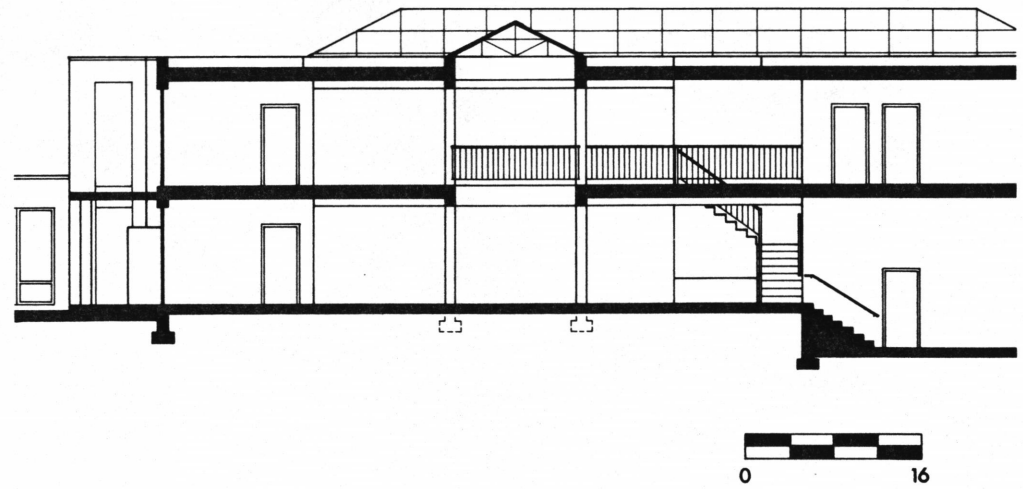
ELEVATION STUDY: West Elevation/Section through Atrium A



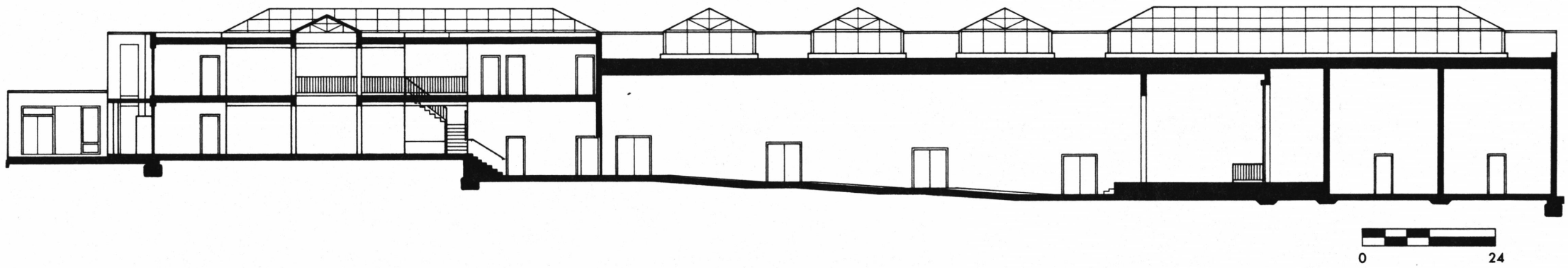
CROSS-SECTION: Main Lobby/Classrooms



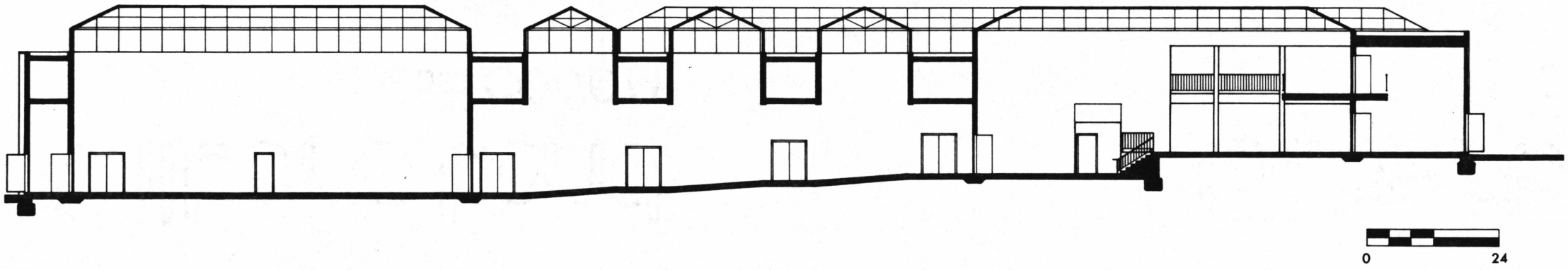
CROSS-SECTION: Main Lobby/Atrium A



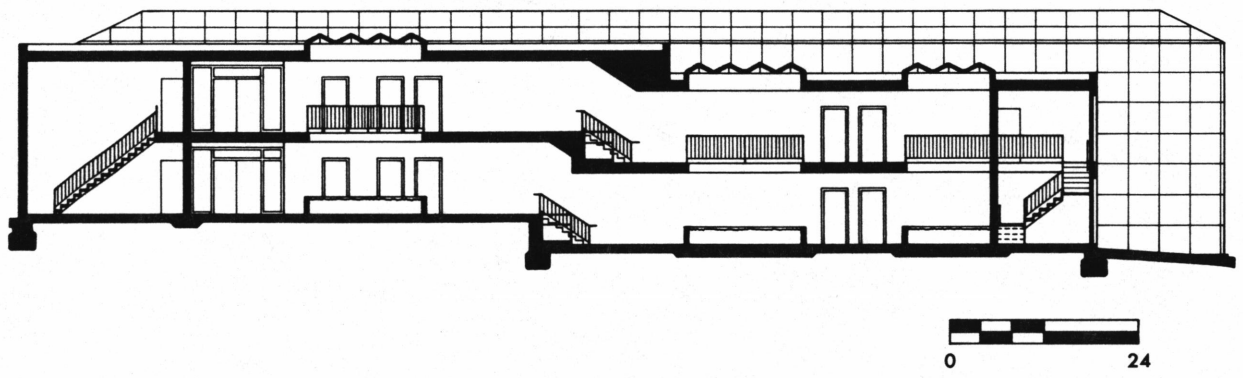
LONGITUDINAL SECTION: Main Lobby



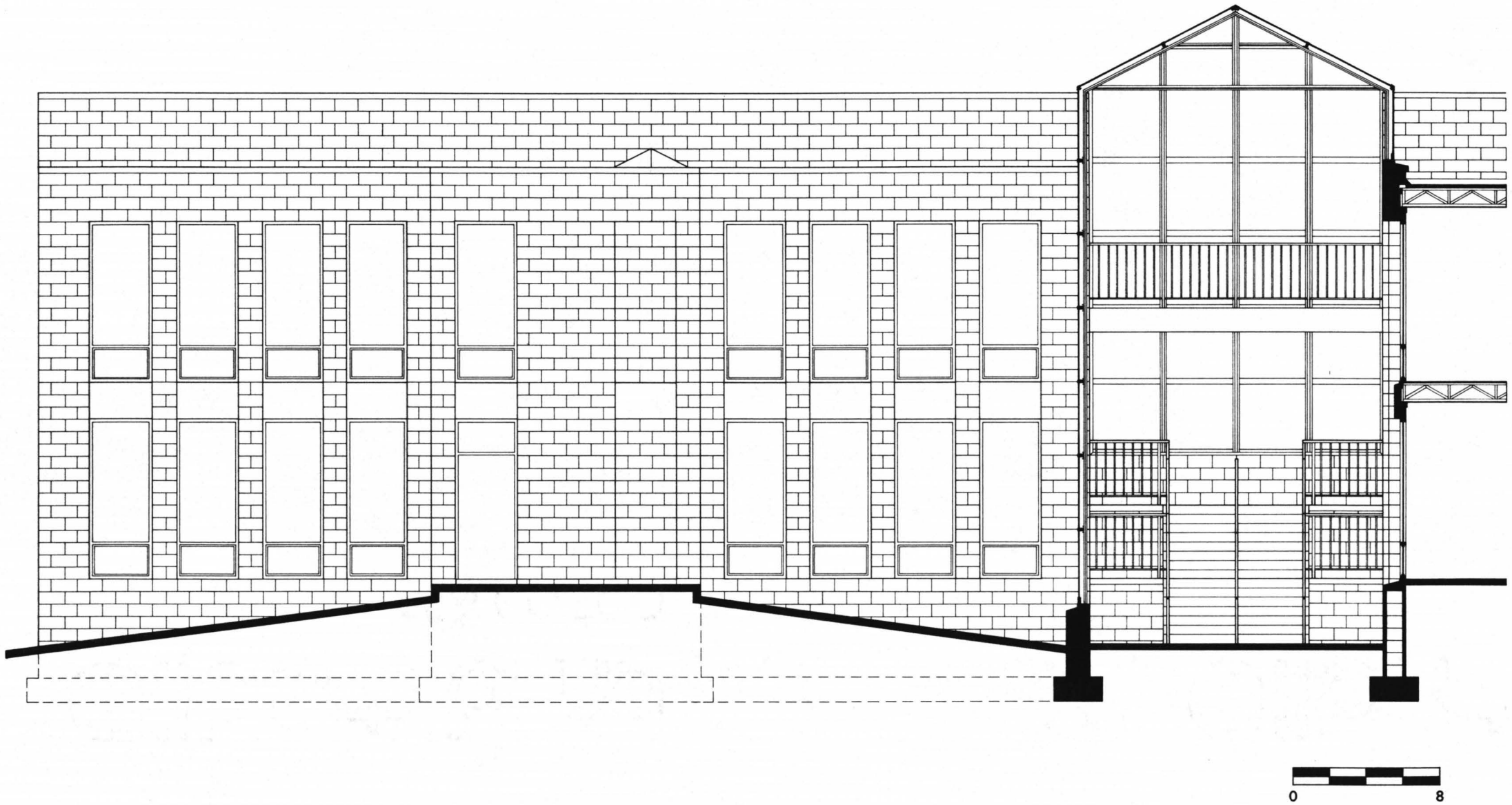
LONGITUDINAL SECTION: Main Lobby/Auditorium



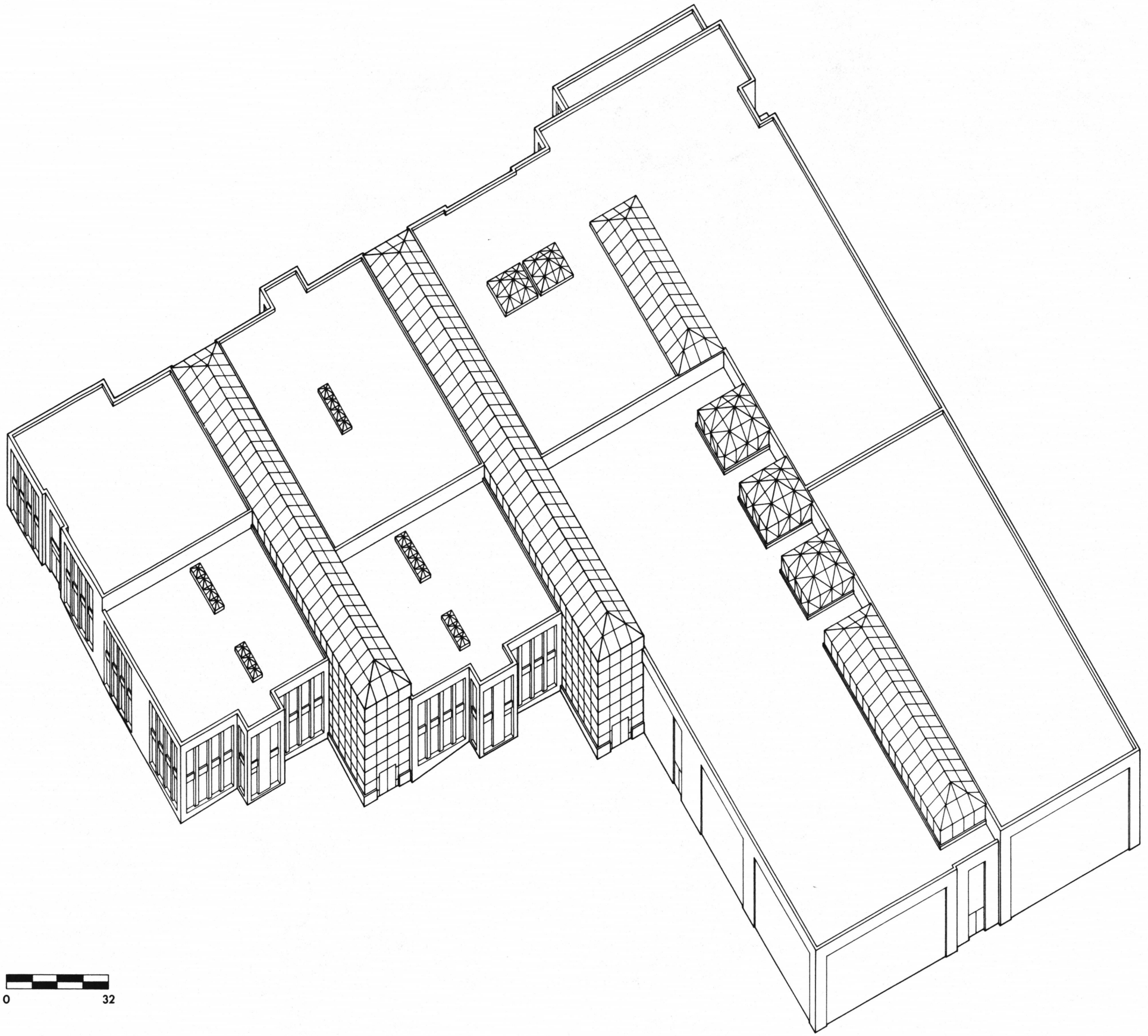
LONGITUDINAL SECTION: Recreation Wing Corridor



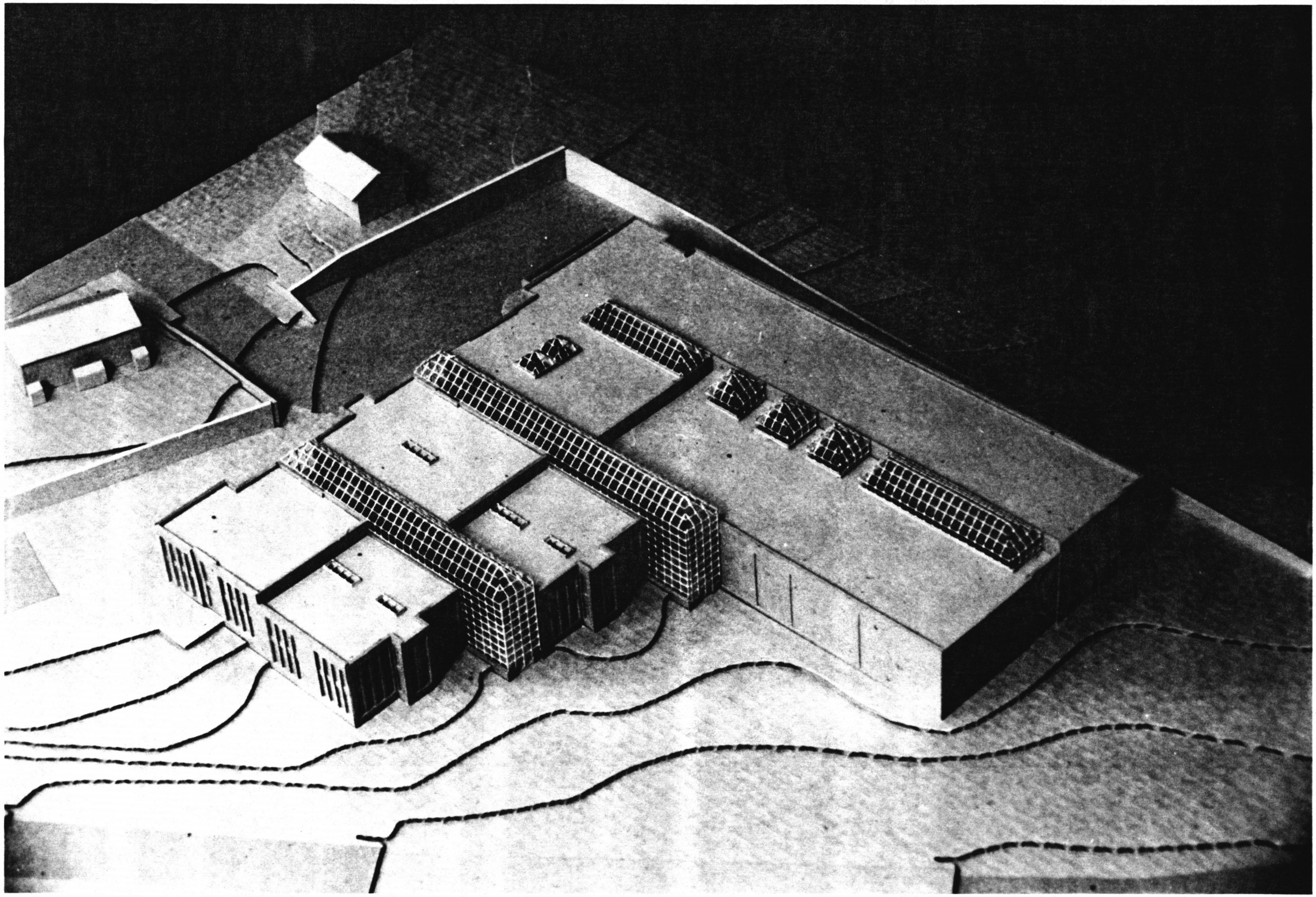
LONGITUDINAL SECTION: Classroom Wing Corridor/Light Wells



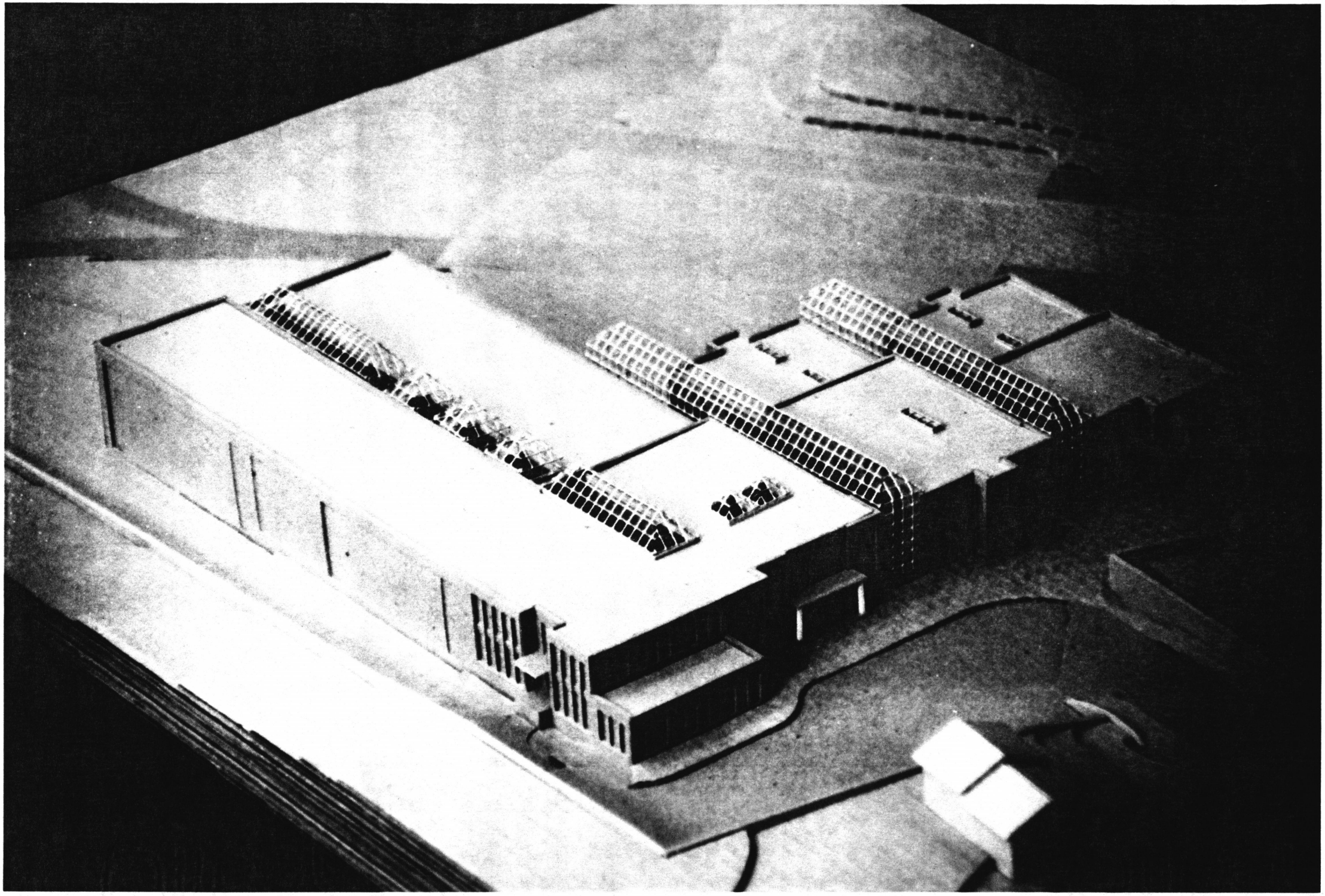
ELEVATION/SECTION: Classroom Wing & Atrium B



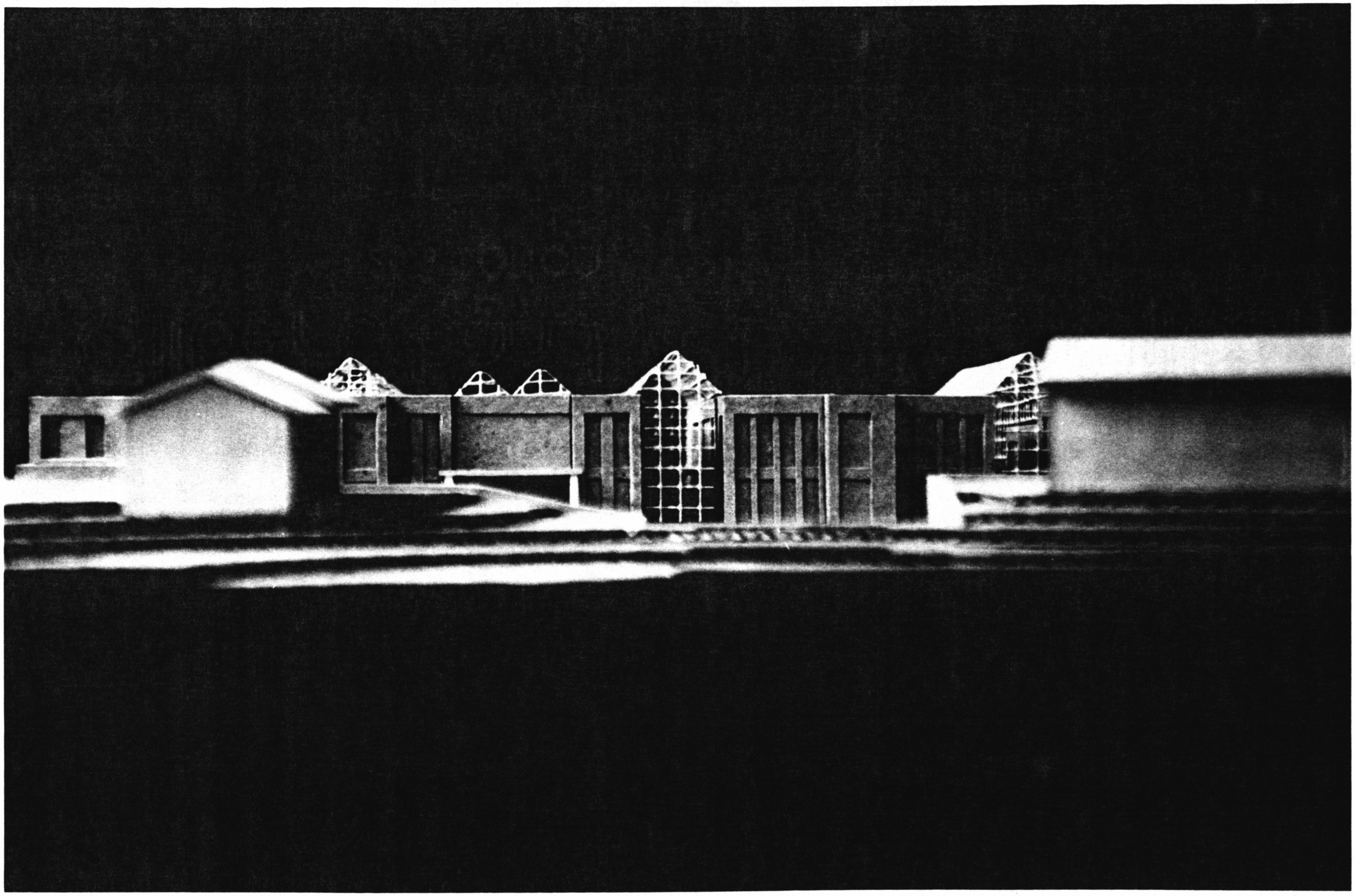
AXONOMETRIC: Phase III



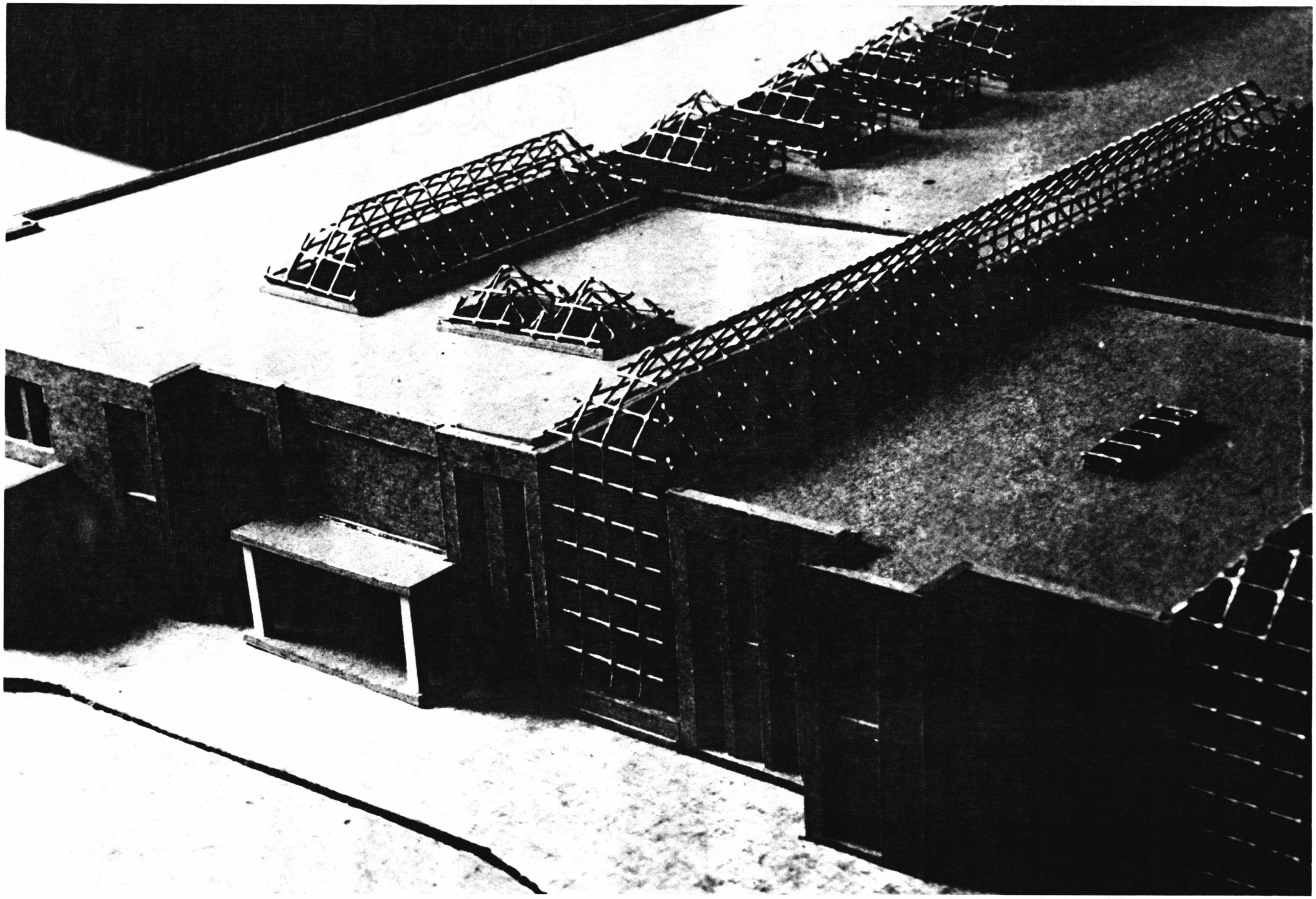
MODEL: Bird's-eye View from Southwest



MODEL: Bird's-eye View from Northeast

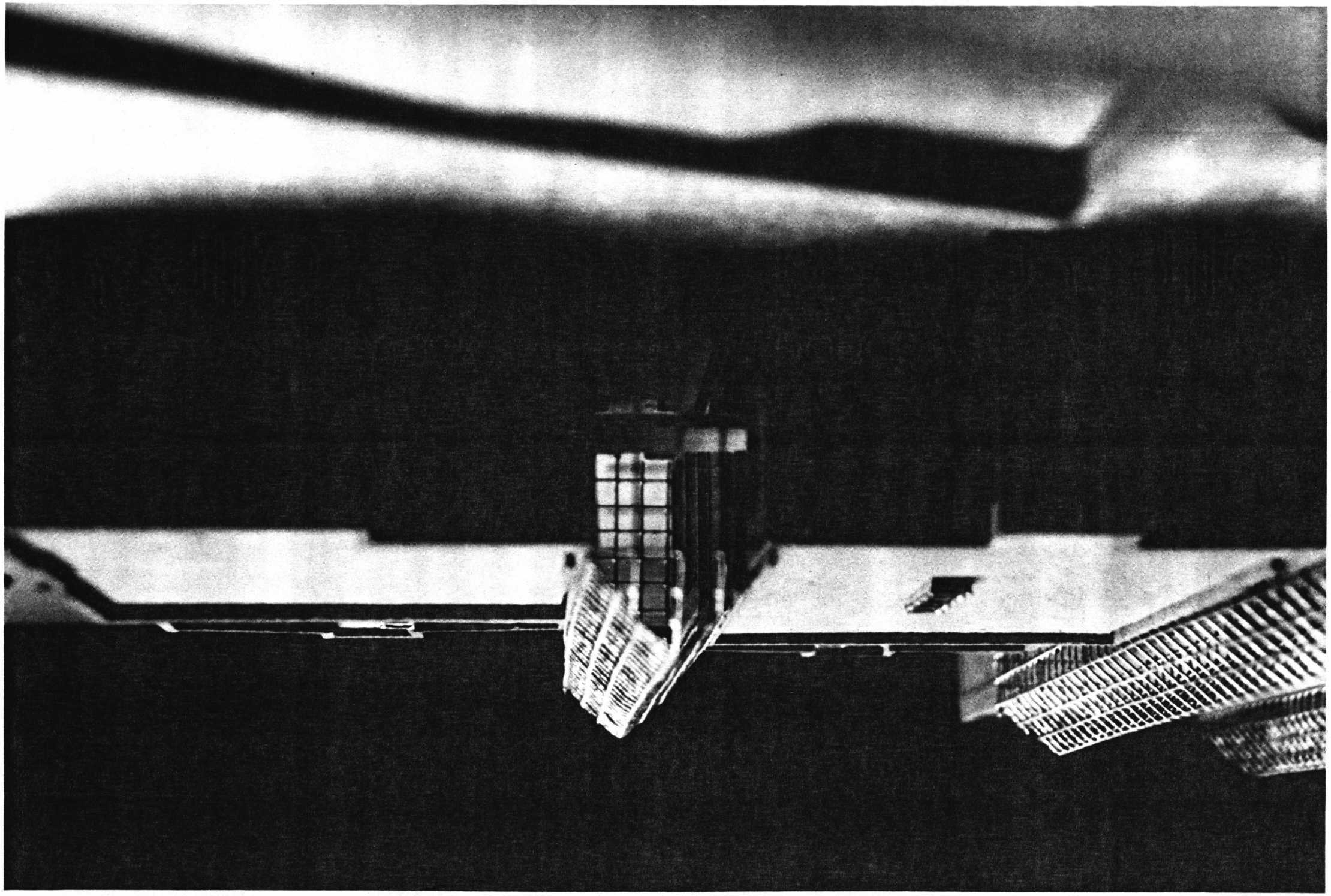


MODEL: Countrie Drive Approach



MODEL: Lobby/Atrium A

MODEL: Atrium A



CONCLUSION

I believe that the design of the facility could have been even better, but then again there is always room for improvement. Specifically, I wish I had allowed myself more freedom of thought in the conception of the schematic design proposals for the building and, similarly, in the development of the selected scheme instead of concentrating on issues largely related only to cost and/or function. Perhaps my early involvement with the economic and functional aspects of the project during the programming phase predisposed me toward decisions made primarily in terms of those aspects. In any case, having had this experience, I know to guard against such a limiting mind-set in the future. I have also learned that it takes a lot more than a well-defined program to design an exceptional building; I now realize that there are many, many things that a simple program of spaces cannot tell an architect about the design of a building.

I am confident that having engaged in this project has better prepared me to make a positive contribution to the profession and field of architecture. Although the scope of the project did not include the production of detailed construction documents (one of my next professional goals), I believe that the insights I have received concerning architect-client interaction and my own approach to design will serve me well in the years to come, and will form a good foundation for my continued growth and professional development.

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