



MOVEMENT AND THE NEIGHBORHOOD
FABRIC AS THE GENERATORS FOR
AN URBAN ELEMENTARY SCHOOL

by

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Movement and the Neighborhood Fabric as the Generators for an Urban Elementary School

by
David Louis Liberatore

Submitted to the Department of Architecture on May 11, 1988 in partial fulfillment of the requirements for the Degree of Master of Architecture.

Abstract

"Perhaps the mind-body dichotomy of our philosophical heritage had prevented us from appreciating the fundamental role movement plays in all our intellectual capacities."(Olds,1980)

This thesis is based on educational ideas which stem from this statement.

The thesis is a proposal for the design of an elementary school in the North End of Boston, Massachusetts. The school primarily services children from preschool through fourth grade; however, it is meant to be a facility for a more widespread community population.

The goal is to present a design for an educational facility that could be used twenty-four hours a day all year long. The driving force for the design is the belief that the development of a circulation system that provides a heightened level of sensory stimulation can both organize a viable piece of urban architecture and guide the development of a better learning environment.

Thesis Supervisor: Bill Hubbard Jr.
Title: Assistant Professor of Architecture

Dedication

To all the children ...
because they make it worthwhile.

Acknowledgements:

To Carla, my family, and friends ...
for the support;

To Jamie, Chris, Jose, and Greg ...
for the inspiration;

To Maria, Janina, Damon, Julie, and Len ...
for the help;

To Bill ...
for all of these.

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To the Reader

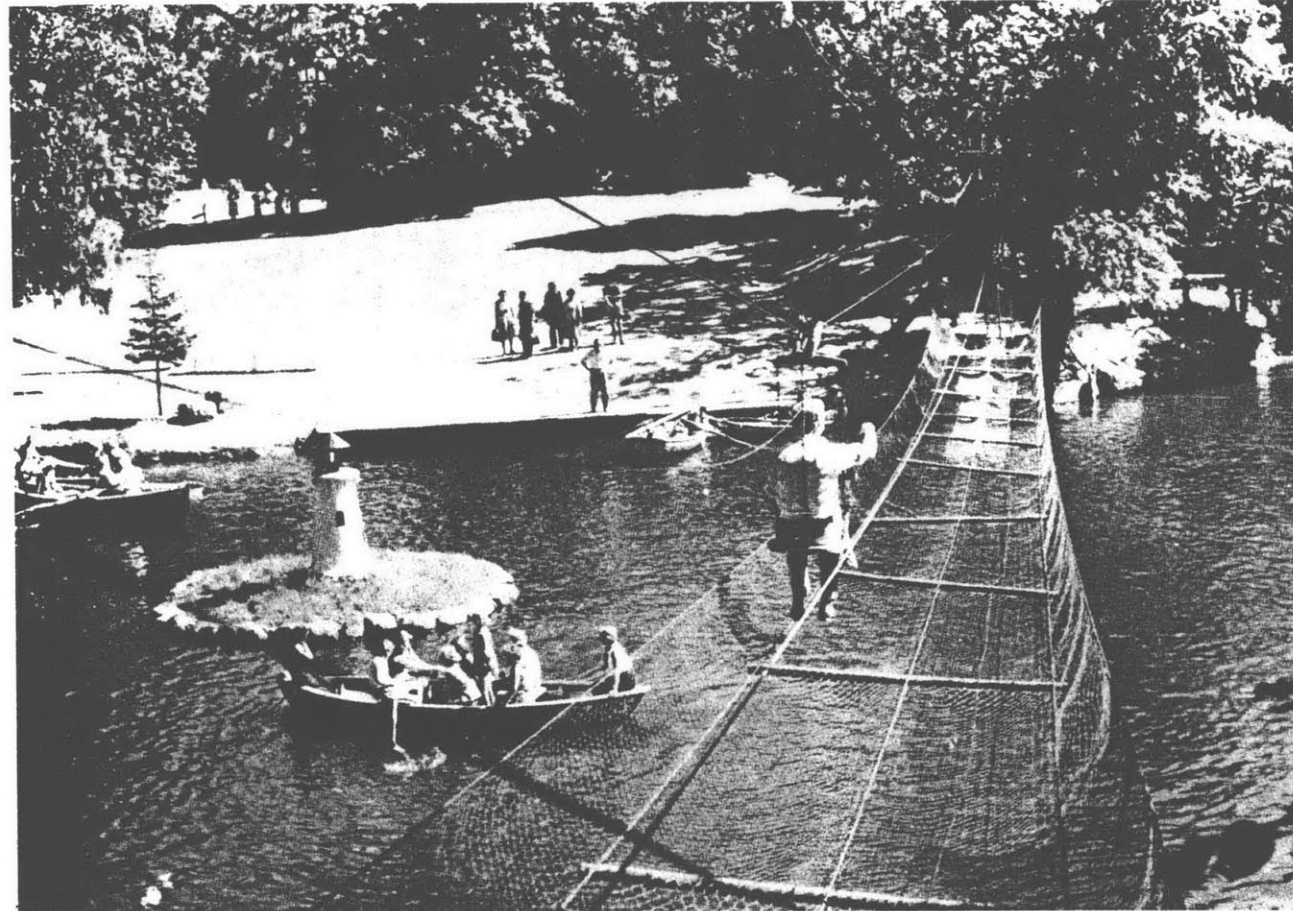
"The fact has to be faced that modern civilization interferes with a hard and heavy hand in the spontaneous play of children."¹

This thesis proposes a design that encourages, rather than inhibits play.

Because of a belief that the most essential ingredient in play is the ability to move and actively engage with the environment, this thesis is about the importance of movement in the architecture of educational settings. The ideas for the school are based in educational theory that links the ability to move with learning.

The results of this thesis are in the form of a design -- a design for an urban elementary school in the North End of Boston, Massachusetts. The method of presentation will be as follows:

1. A brief description of the educational goals and architectural goals and assumptions.
2. A visual and verbal description of the proposed design.
3. A discussion of the educational foundation upon which the design is based.



The Framework

As in any project, an understanding of initial goals and assumptions is vital to the evaluation of the piece of work. This thesis is no exception to this idea. Therefore, the following educational goals are presented as the basis for this thesis.

First and foremost is the development of a design that meets the educational needs of children from preschool through the fourth grade. These needs can be specified as follows.

--Play and movement are key aspects for learning in children of all age groups. In fact, play is the work of children. It is the way in which they make sense of the world. Children must be active participants in their environment if learning is to occur. Movement and heightened sensory stimulation can therefore enhance the students' learning ability.

--Learning involves risk-taking. Children are very good at what adults define as taking risks because kids know their own limits. The design should encourage safe experimentation with risk.

--The school is independent of the publicly administered system, but it should foster a strong sense of community.

--Unlike many schools which are used on a very limited basis after 3 pm and during the summer months, the proposal is for a facility that could be open twenty-four hours a day throughout the year. Likewise, the school should be used by a wide constituency especially during the 'off hours'.

--Young children learn best when provided with a consistent learning environment. They are generalists and function well with the aid of a single instructor. Within this framework, however, it is essential to provide the



child with a rich and varied set of experiences. Children can themselves be very good teachers and role models for each other. Grouping children of different ages together in appropriate situations can foster learning. The school should prepare the children to function in the complex environment in which they live.

In an attempt to translate these educational goals into architectural ones, the following set of assumptions has been developed:

--Circulation is the most important aspect of the architectural design. To support the importance of movement and sensory stimulation to the learning process, individuals should be made aware of their own presence in space as they move throughout the school.

--The school should be a creature of its neighborhood. Contextually, the facility should relate to the brick bearing-wall buildings of the North End. The materials used and the method of construction need to be in keeping with the buildings in the neighborhood. Also, there should be a diversity of use represented by the spaces in the facility. Thus, a cafe, a bakery, and residential units have been added to the traditional components of an elementary school program.

--Streetlife is key to the definition of the North End. To enhance the previous two ideas and to foster the twenty-four hour functioning of the school, the vitality of street activity should become a part of the design. Toward this end, it is recommended that the plan be decentralized in organization, but referenced to a common circulation system. There should be a variety of spaces, both indoor and outdoor, for differing types and groups of people. It is particularly important that the school provide opportunities for outdoor play. These areas should be either created by the building or directly linked to the school.

With these goals and assumptions in mind, the following program is proposed for the Copps Hill School:

Programatic Requirements: Copps Hill School

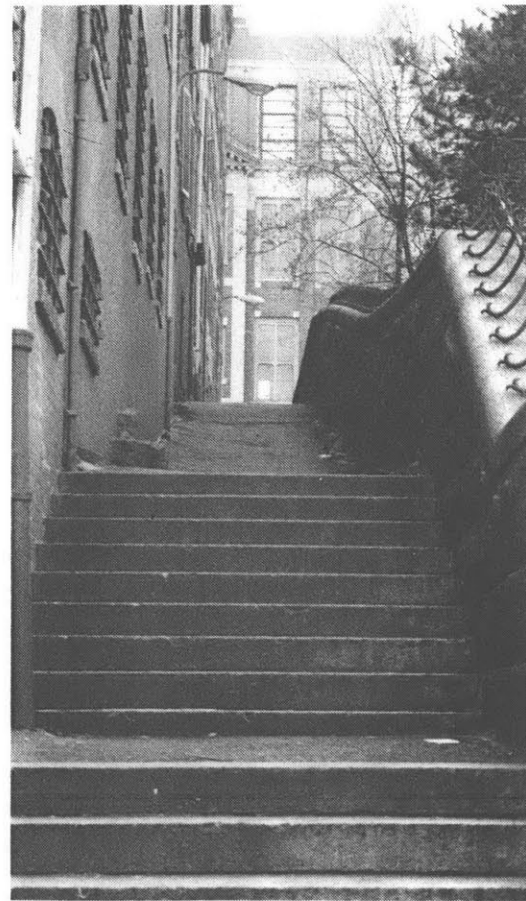
Classrooms (12-15 students/room)

Kindergarten (2 @ 475).....	950 S.F.
1st Grade (2 @ 450).....	900 S.F.
2nd Grade (2 @ 450).....	900 S.F.
3rd Grade (2 @ 450).....	900 S.F.
4th Grade (2 @ 450).....	900 S.F.
Day Care Center	1720 S.F.
Outdoor Play Area	1680 S.F.
Resource Centers	
Wood Shop	650 S.F.
Indoor Greenhouse	220 S.F.
Technology Center	375 S.F.
Arts Center	380 S.F.
Cultural Center	300 S.F.
Outdoor Experimentation Deck	600 S.F.
Library	1750 S.F.
Offices (2 @ 240, 1 @ 300, 1 @ 375).....	1155 S.F.
Rest Rooms (6 @ 190, 6 @ 120)	1860 S.F.
Gymnasium	6950S.F.
Gymnasium Lobby.....	6950 S.F.
Locker Rooms (2 @ 360)	720 S.F.
Auditorium	7904 S.F.
Auditorium Lobby.....	1553 S.F.
Dressing Rooms (2 @ 210).....	420 S.F.
Cafeteria.....	1900 S.F.
Receiving.....	850 S.F.
Storage & Maintenance.....	4533 S.F.
Apartments (2 @ 1330).....	2660 S.F.
Cafe.....	820 S.F.
Bakery.....	2570 S.F.
Total.....	55,458 S.F.





A view of the site looking across Commercial Street to the south.



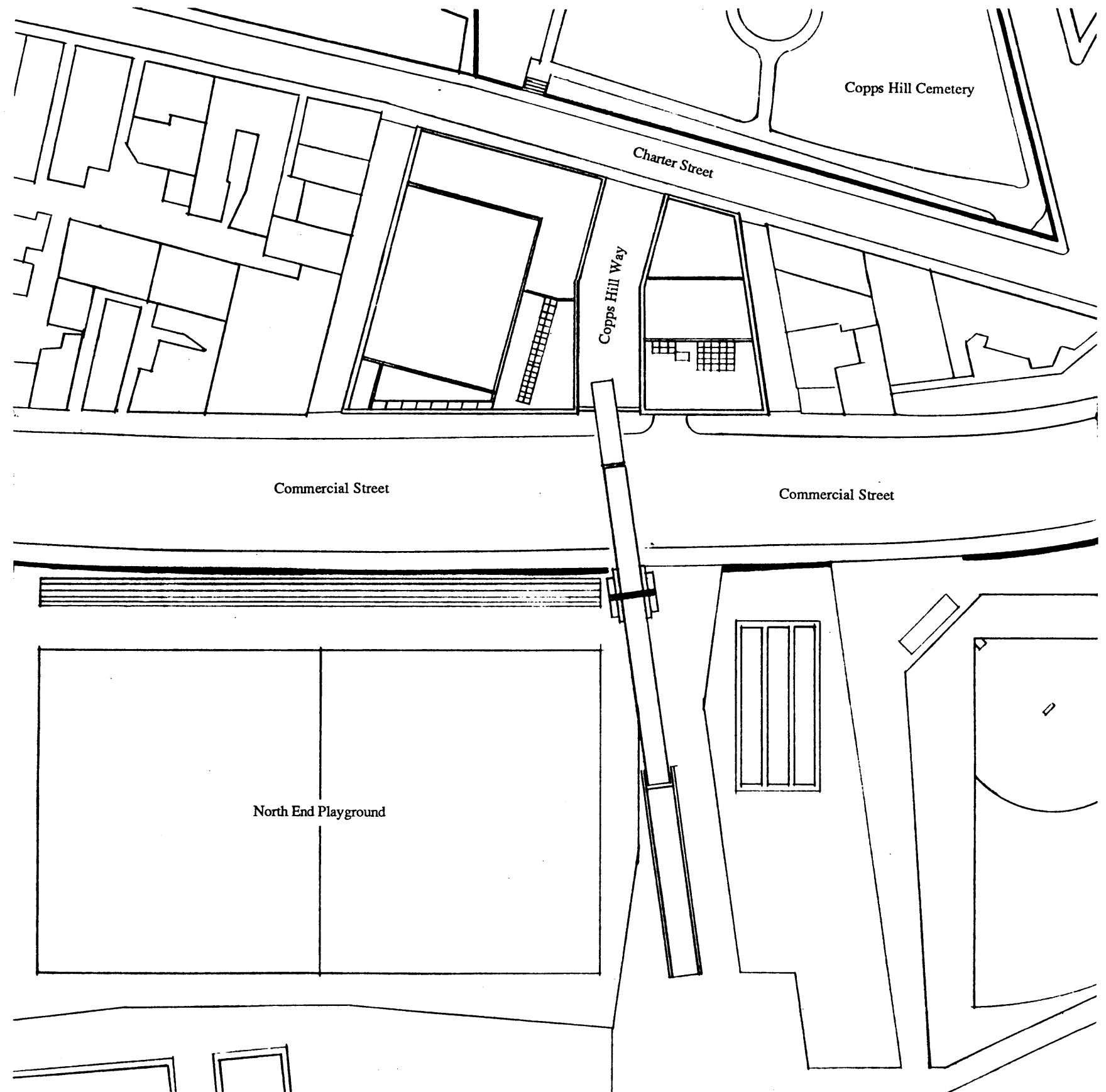
The eastern alleyway leading up to Charter Street.



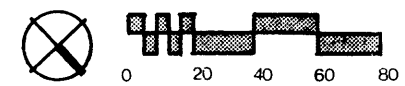
A view of the site looking north to the Boston Harbor.

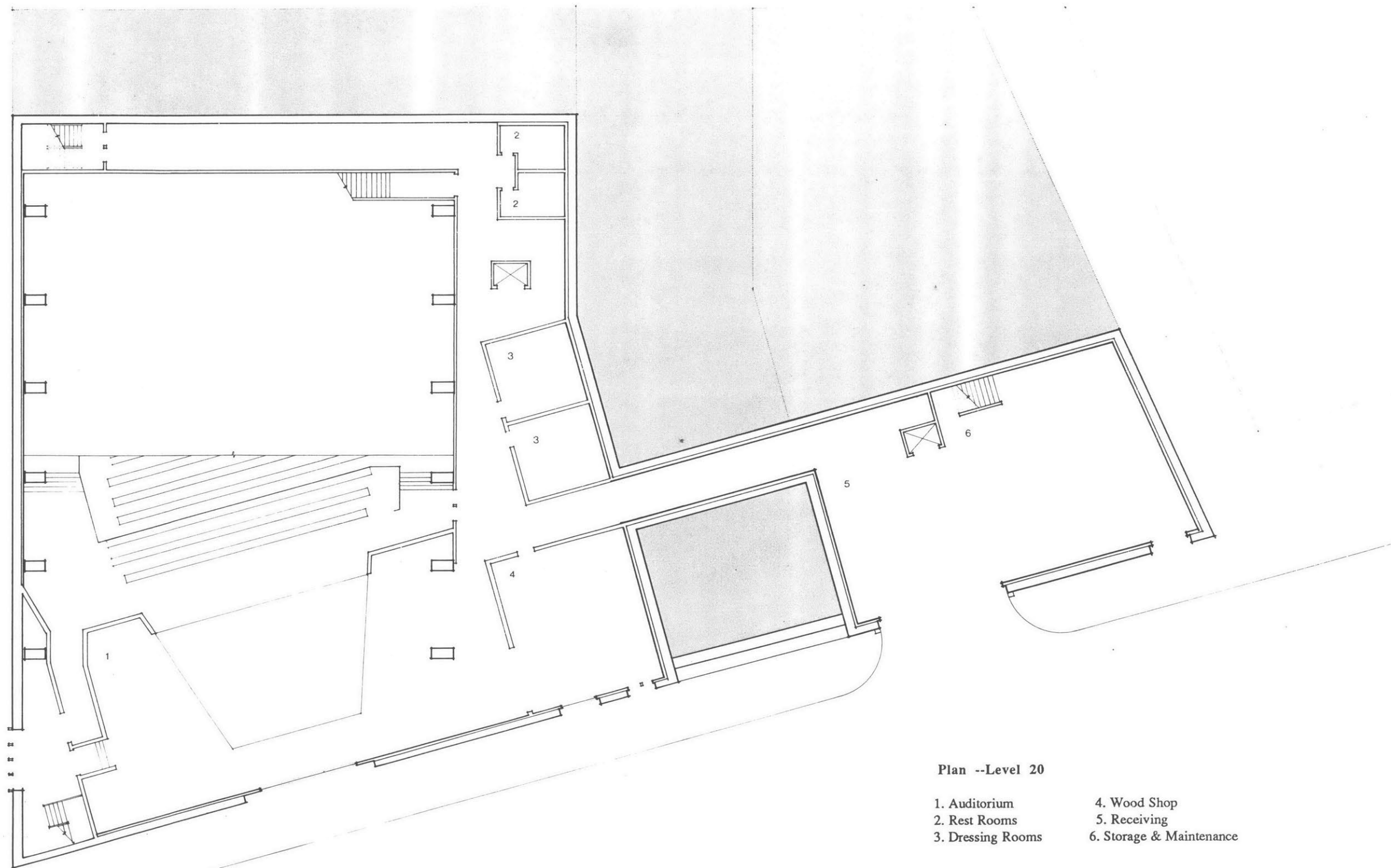


The western alleyway leading down to Commercial Street.



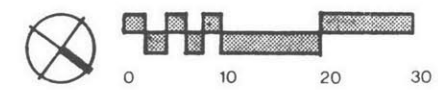
Site Plan

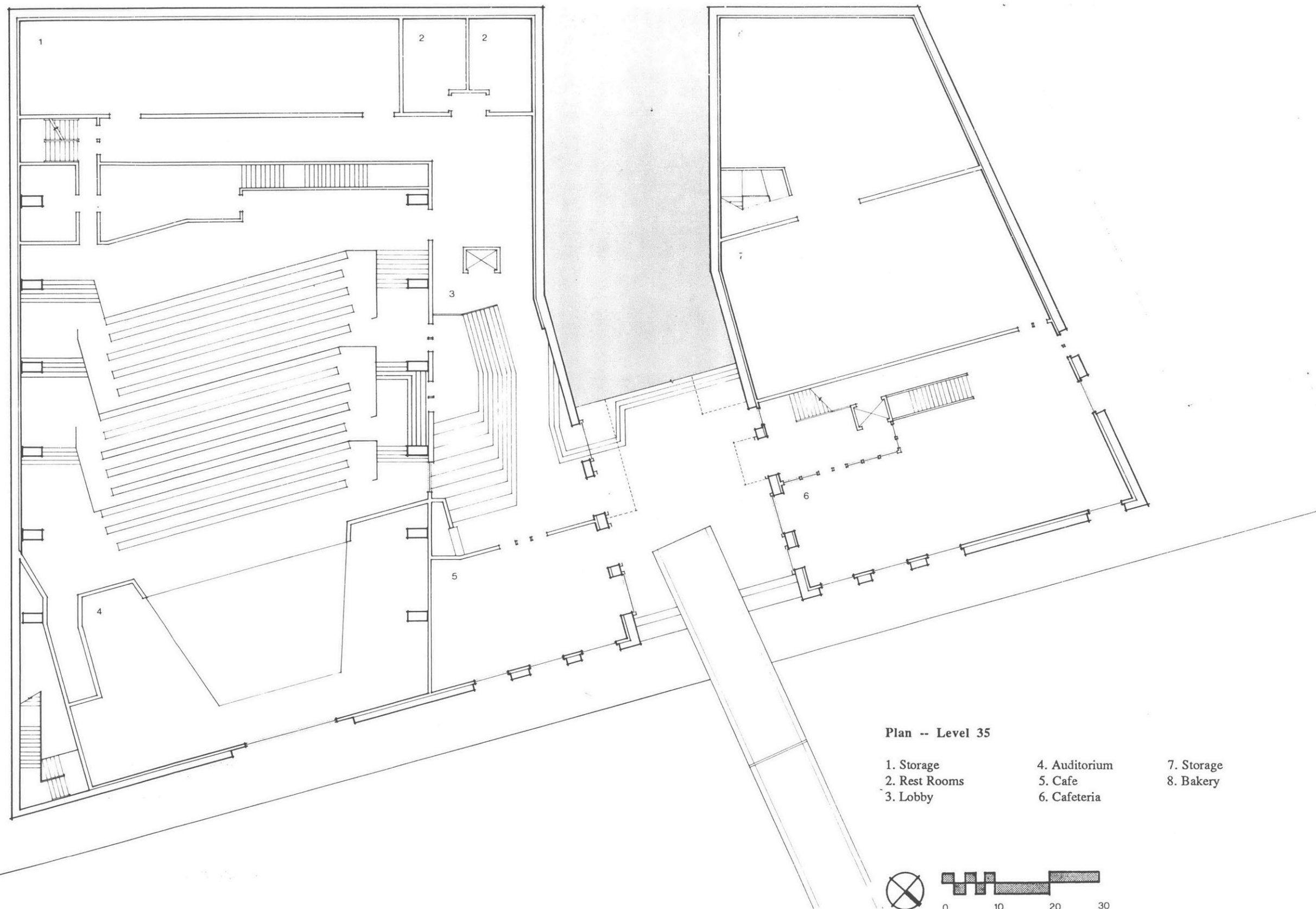




Plan --Level 20

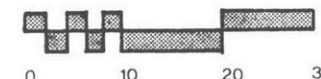
- | | |
|-------------------|--------------------------|
| 1. Auditorium | 4. Wood Shop |
| 2. Rest Rooms | 5. Receiving |
| 3. Dressing Rooms | 6. Storage & Maintenance |

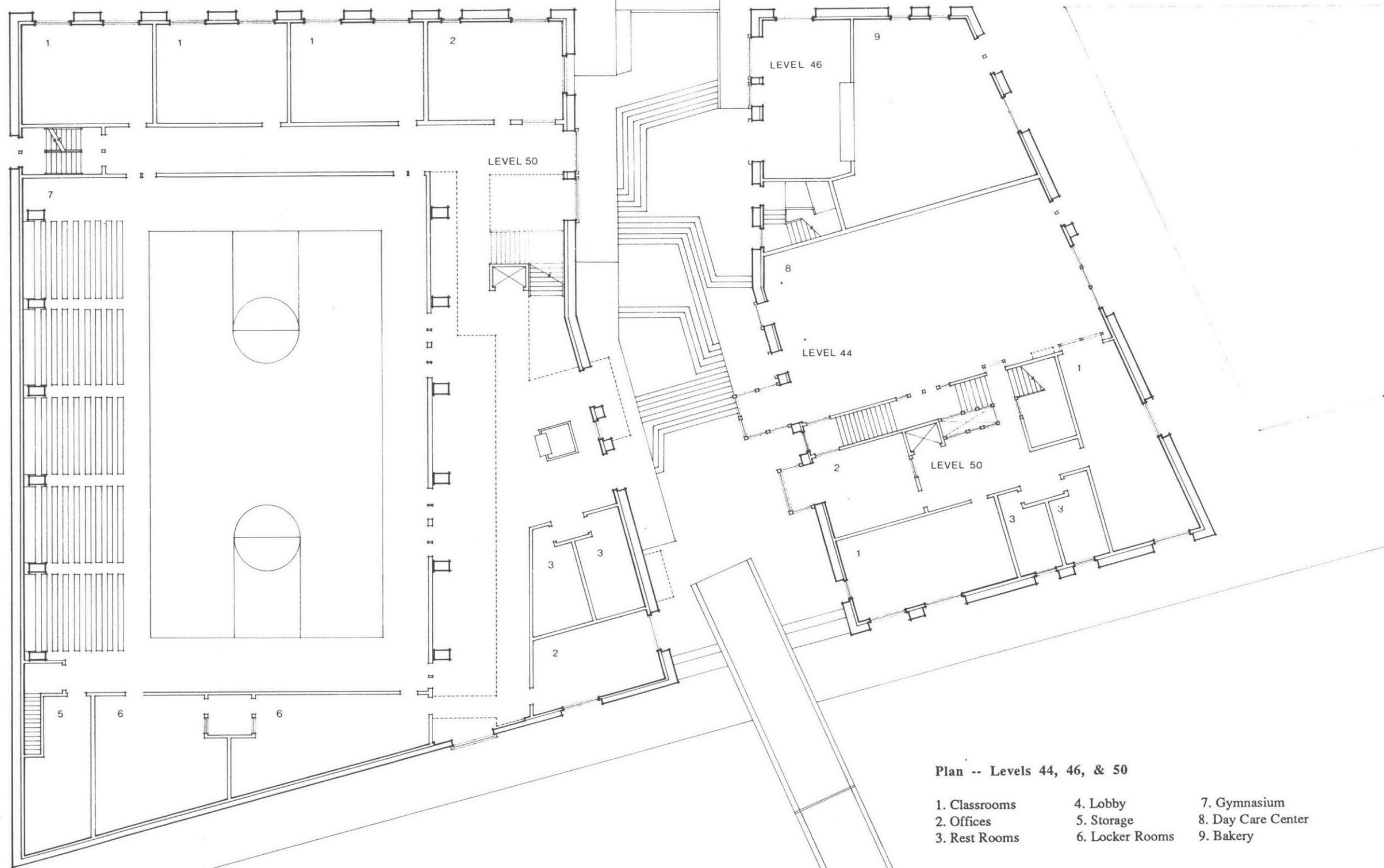




Plan -- Level 35

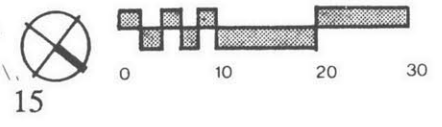
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|---------------|---------------|------------|
| 1. Storage | 4. Auditorium | 7. Storage |
| 2. Rest Rooms | 5. Cafe | 8. Bakery |
| 3. Lobby | 6. Cafeteria | |

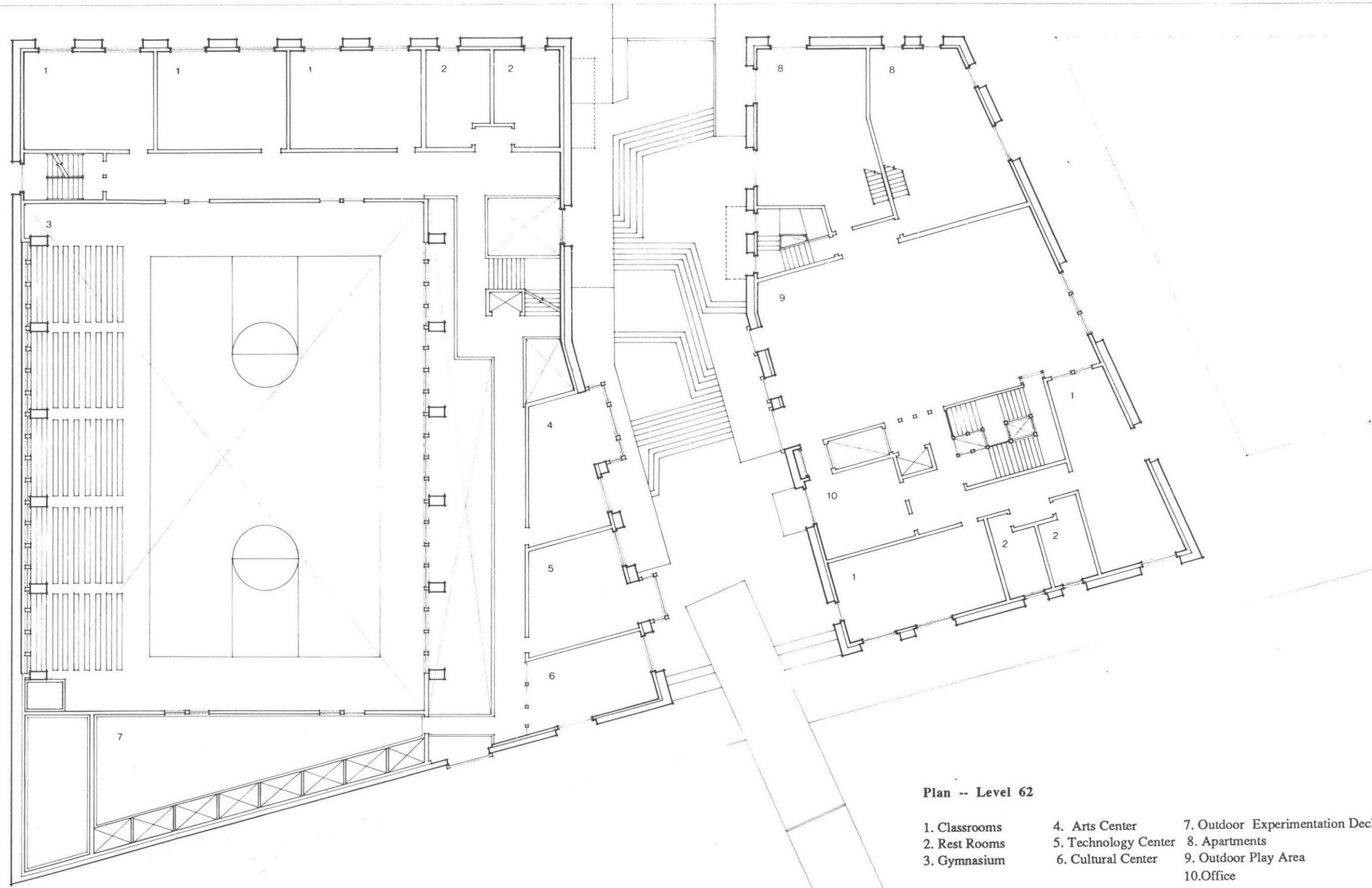




Plan -- Levels 44, 46, & 50

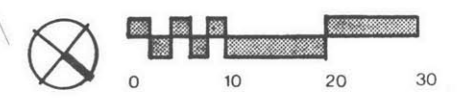
- | | | |
|---------------|-----------------|--------------------|
| 1. Classrooms | 4. Lobby | 7. Gymnasium |
| 2. Offices | 5. Storage | 8. Day Care Center |
| 3. Rest Rooms | 6. Locker Rooms | 9. Bakery |

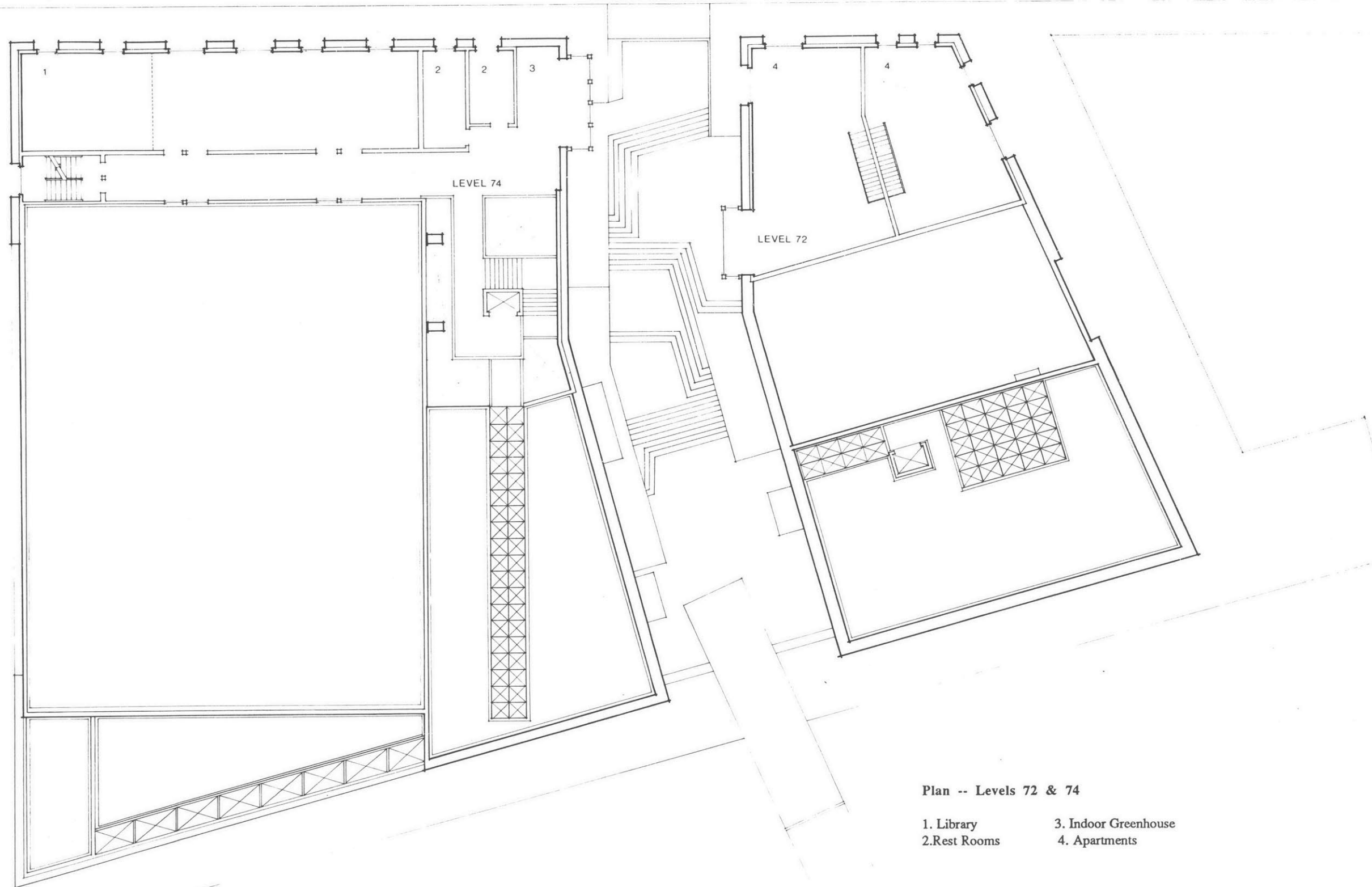




Plan -- Level 62

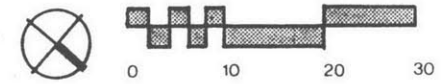
- | | | |
|---------------|----------------------|---------------------------------|
| 1. Classrooms | 4. Arts Center | 7. Outdoor Experimentation Deck |
| 2. Rest Rooms | 5. Technology Center | 8. Apartments |
| 3. Gymnasium | 6. Cultural Center | 9. Outdoor Play Area |
| | 10. Office | |

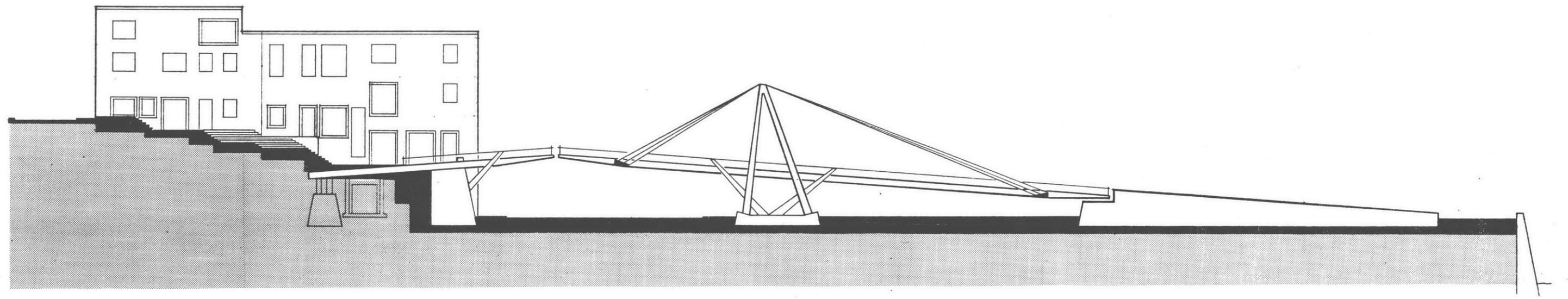




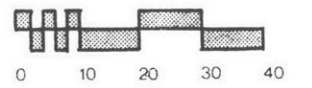
Plan -- Levels 72 & 74

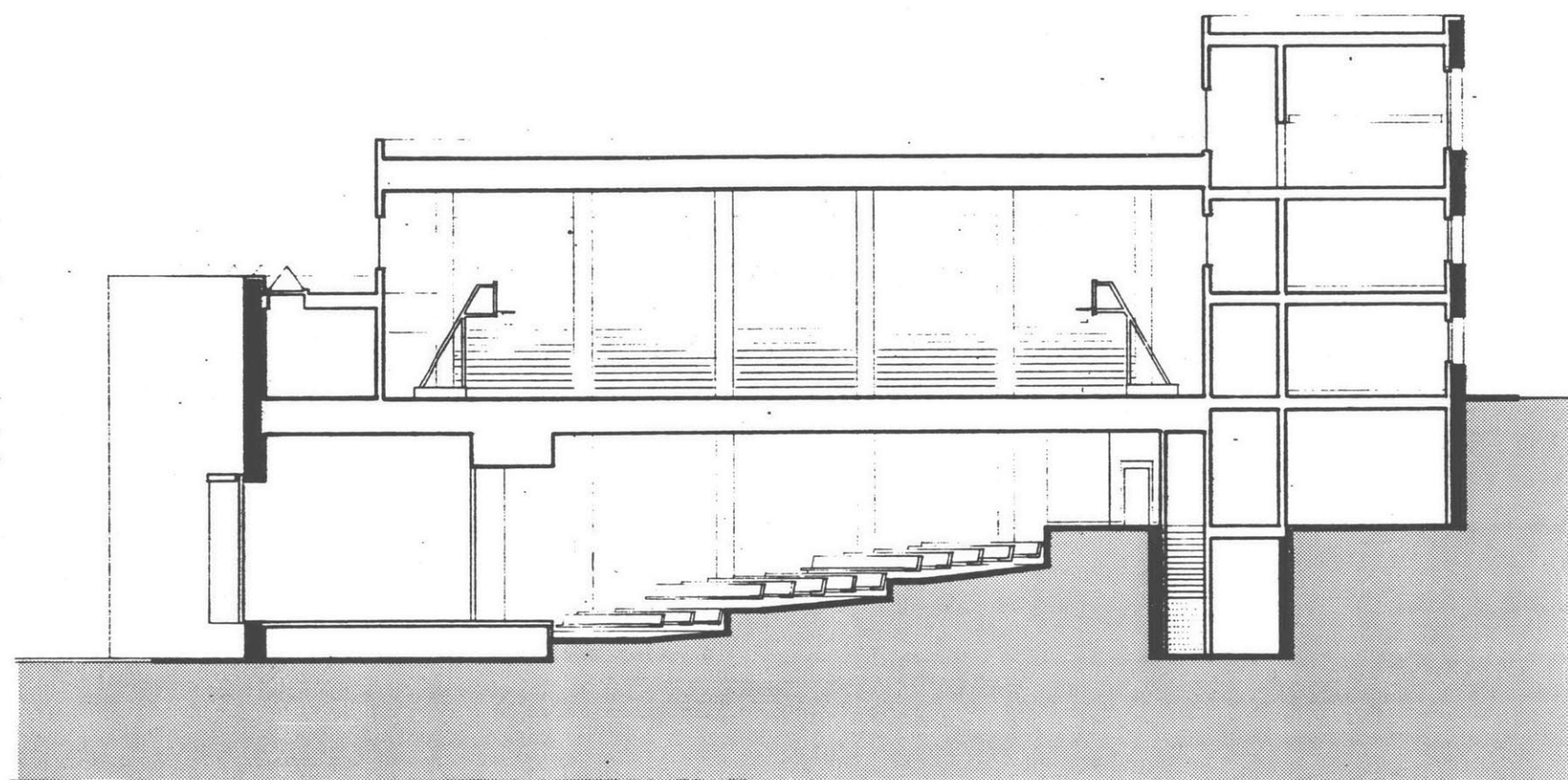
- 1. Library
- 2. Rest Rooms
- 3. Indoor Greenhouse
- 4. Apartments



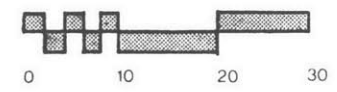


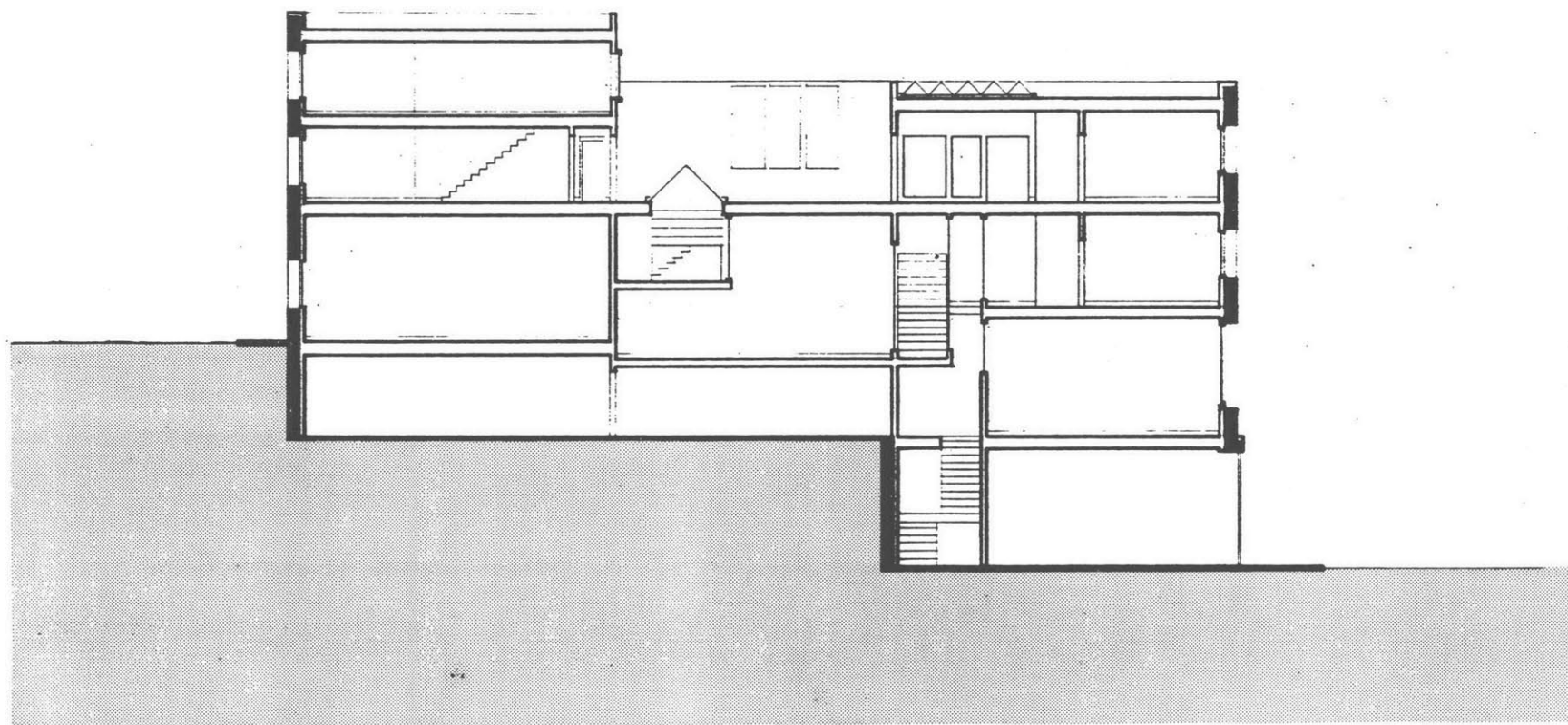
Site Section -- West



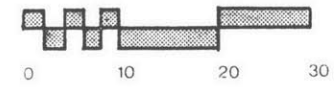


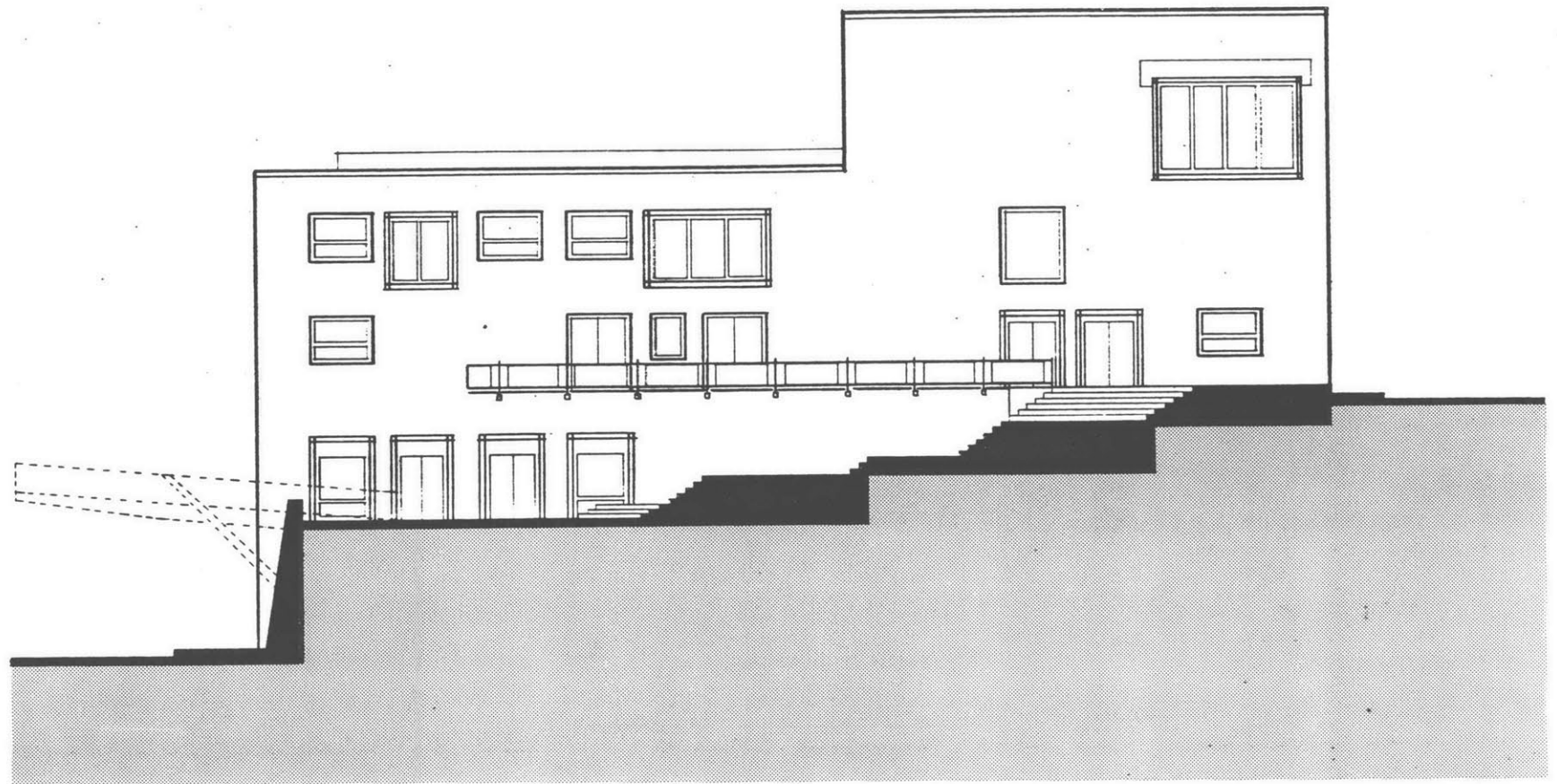
Section -- Gymnasium & Auditorium



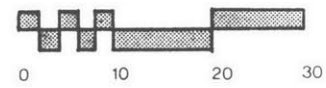


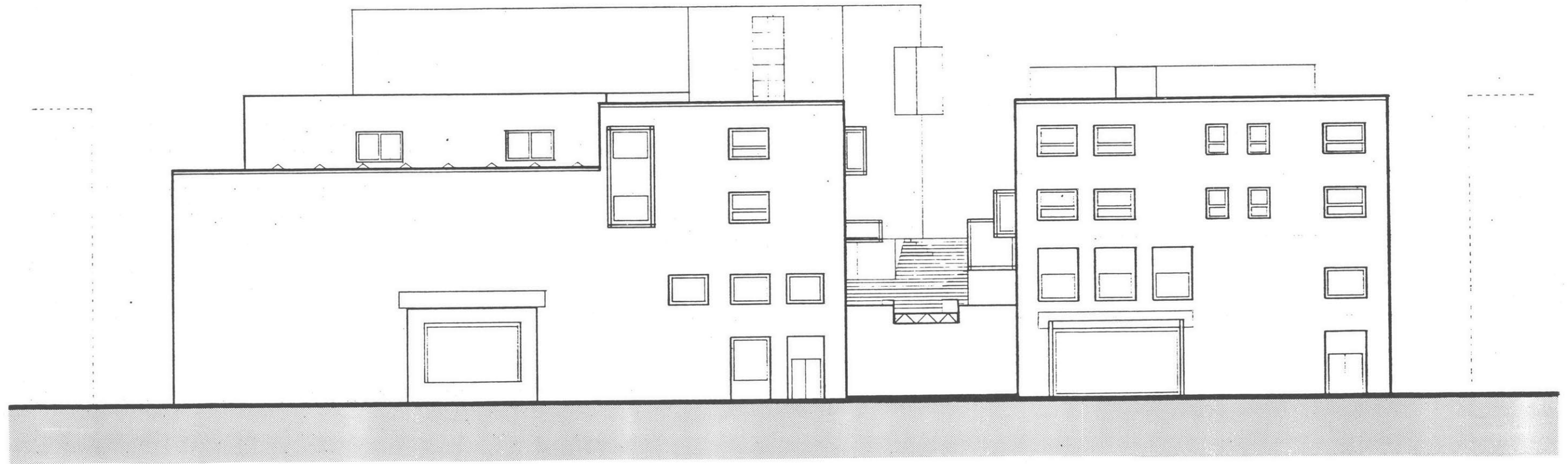
Section -- Day Care



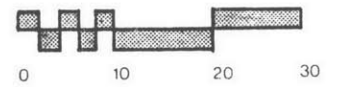


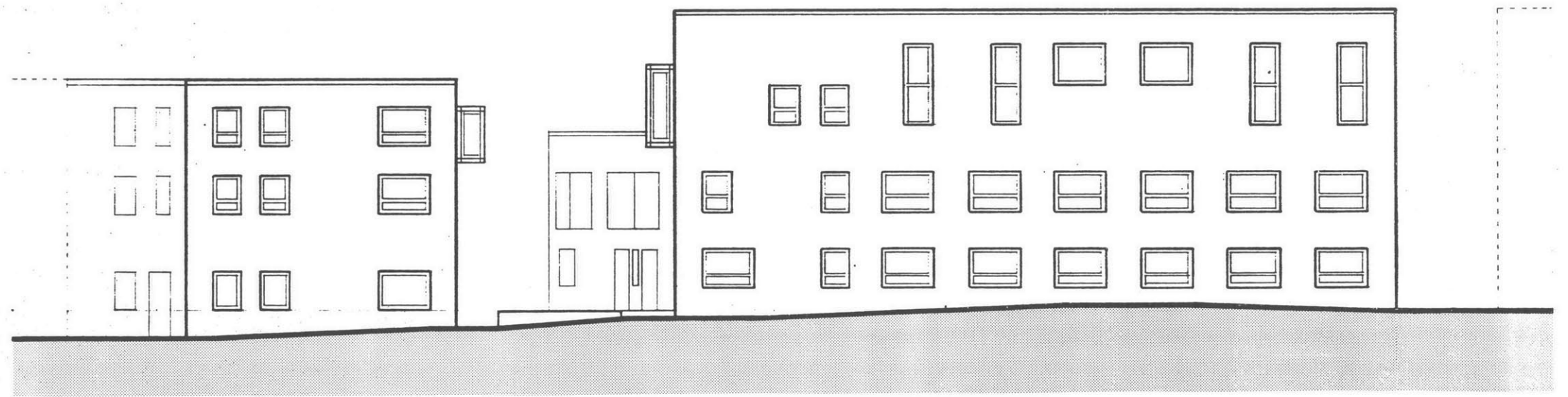
East Elevation -- Copps Hill Way



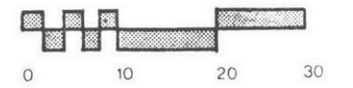


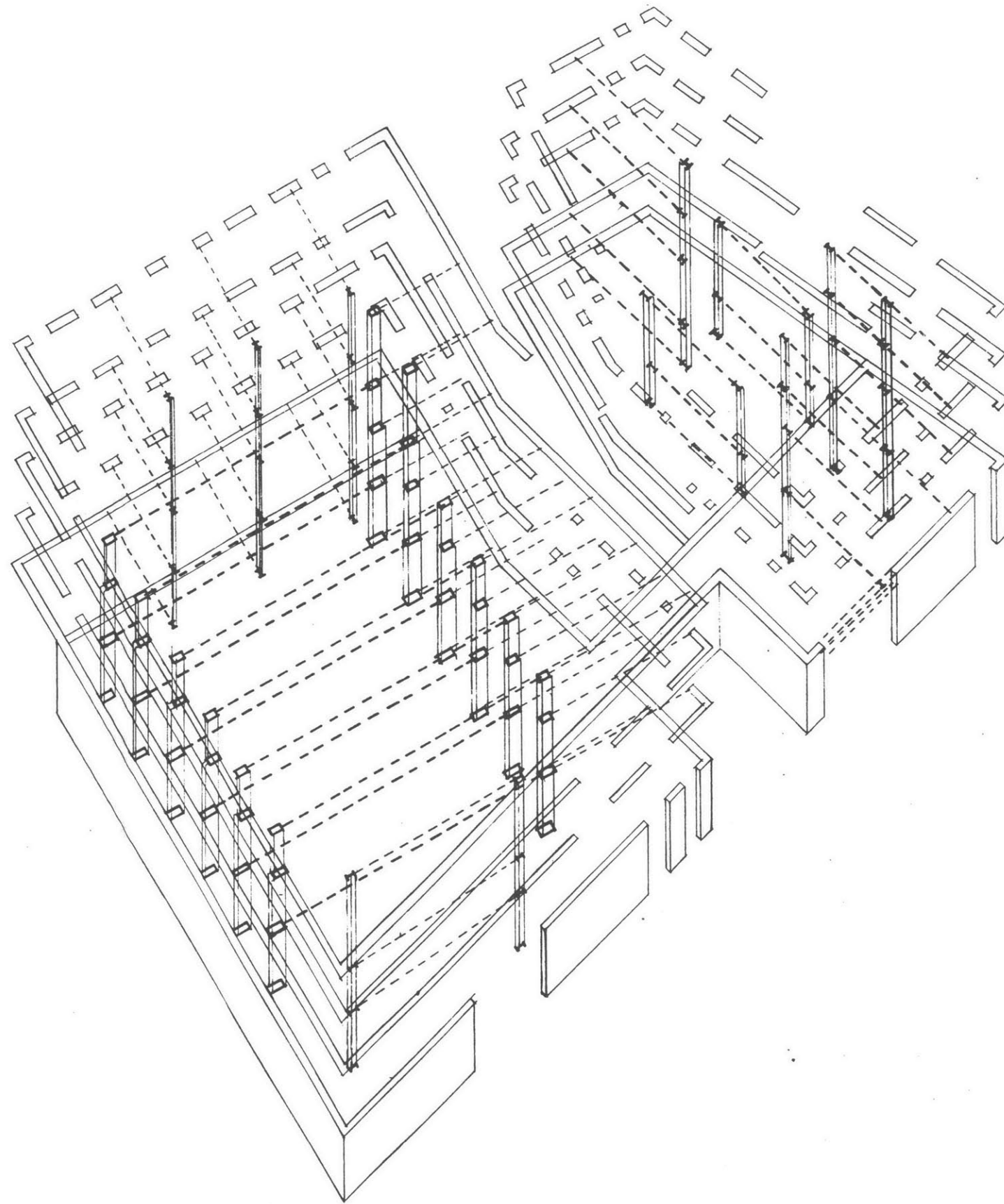
Commercial Street Elevation



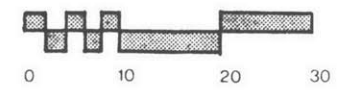


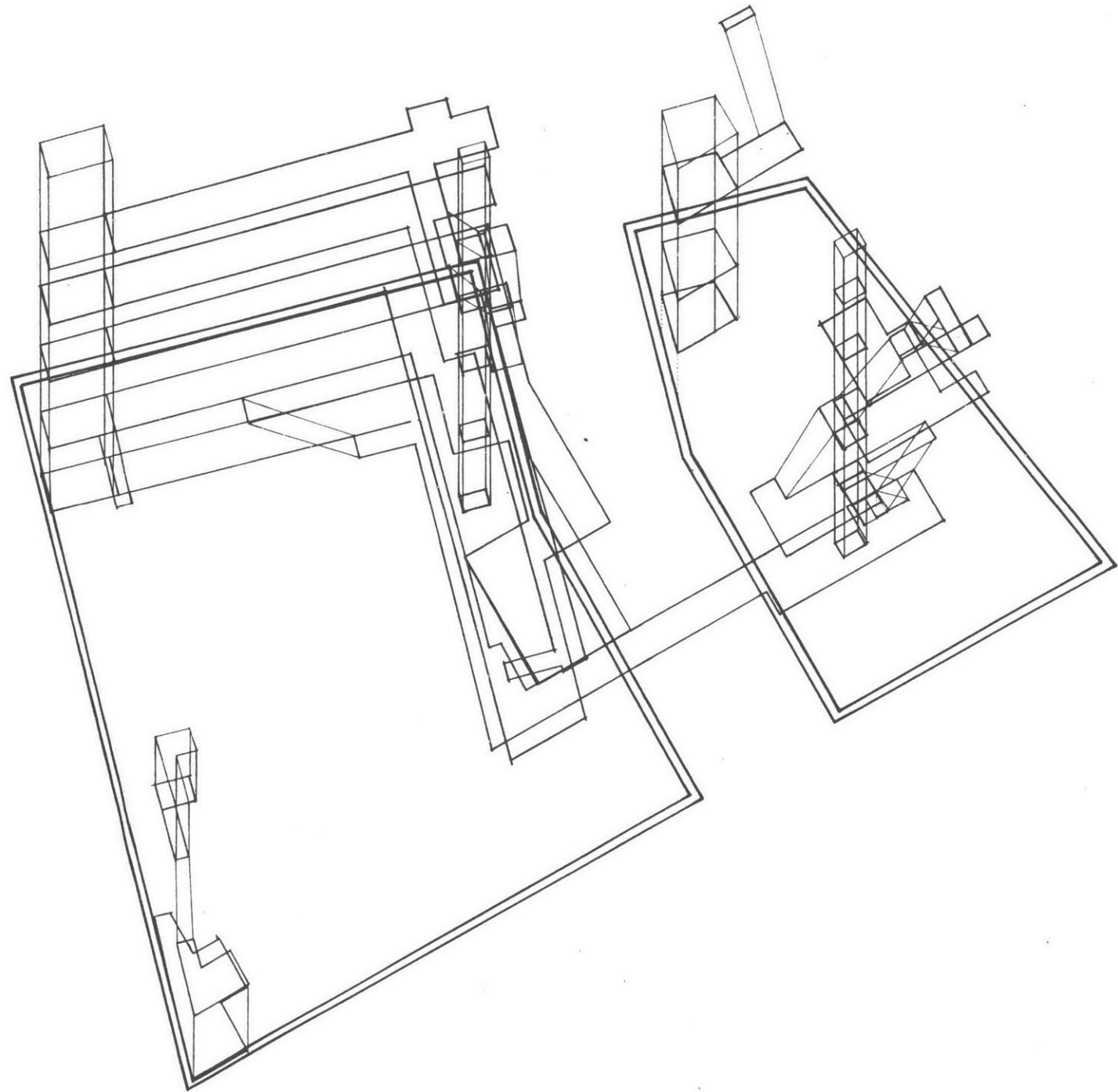
Charter Street Elevation



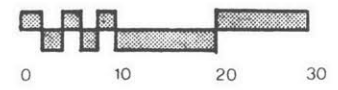


Structural Axonometric





Circulation Axonometric





The Design

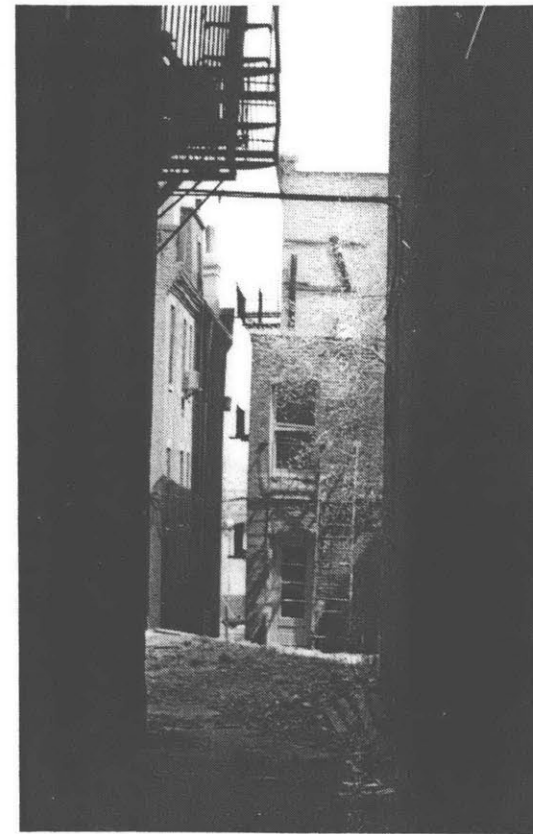
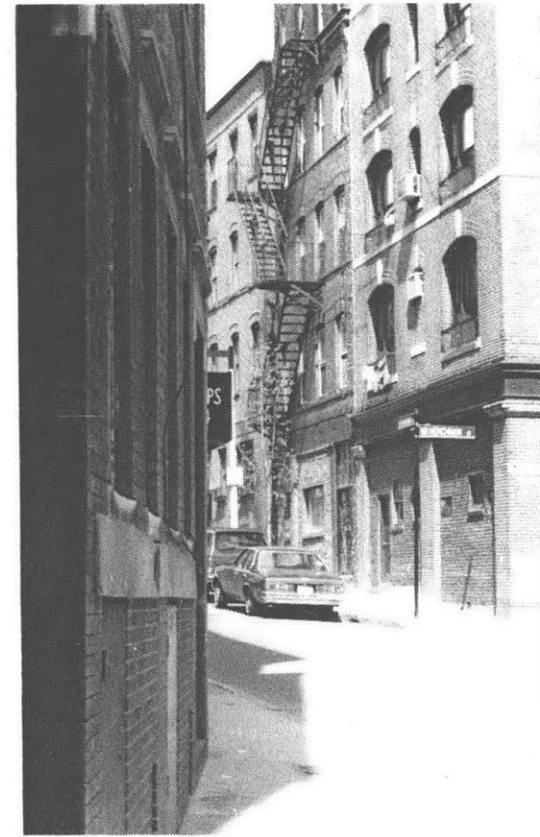
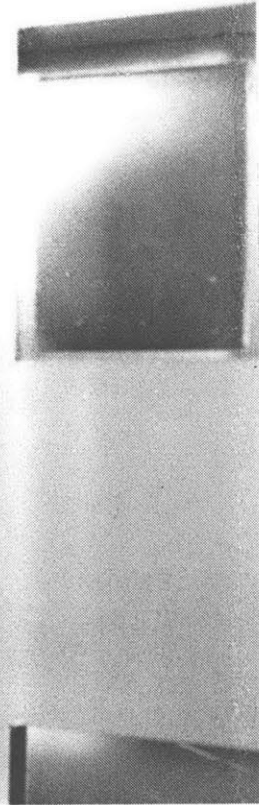
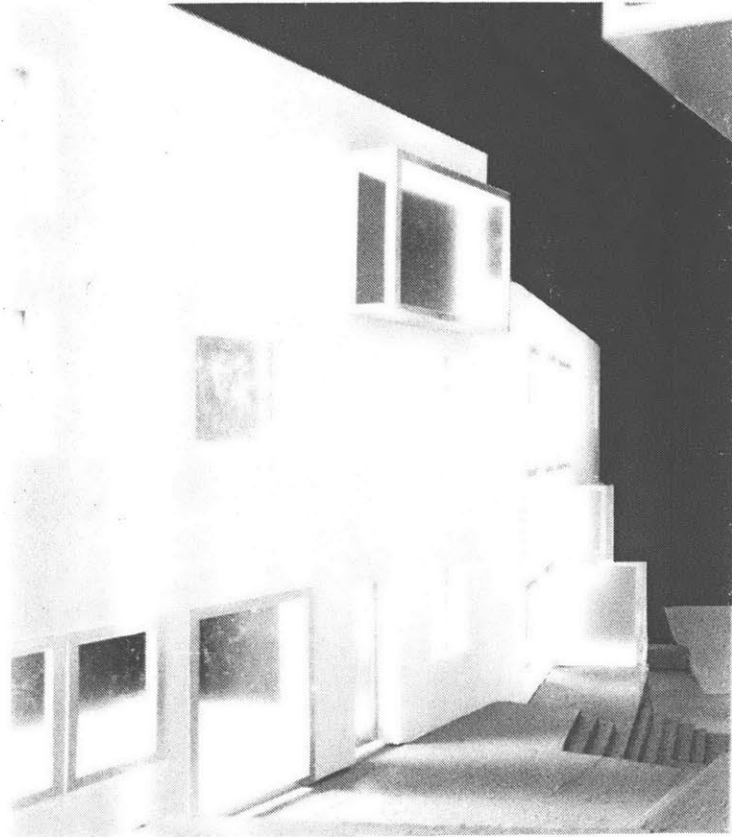
In this chapter of the thesis, the sections presented represent levels of thinking that were brought to the project. While the order of presentation is roughly analogous to the design process followed, it is also true that there was a constant shifting of thought between these areas of concern. Therefore, each level of thought is valuable-- as both an isolated fragment and an integral part of the concatenation represented by the final design.

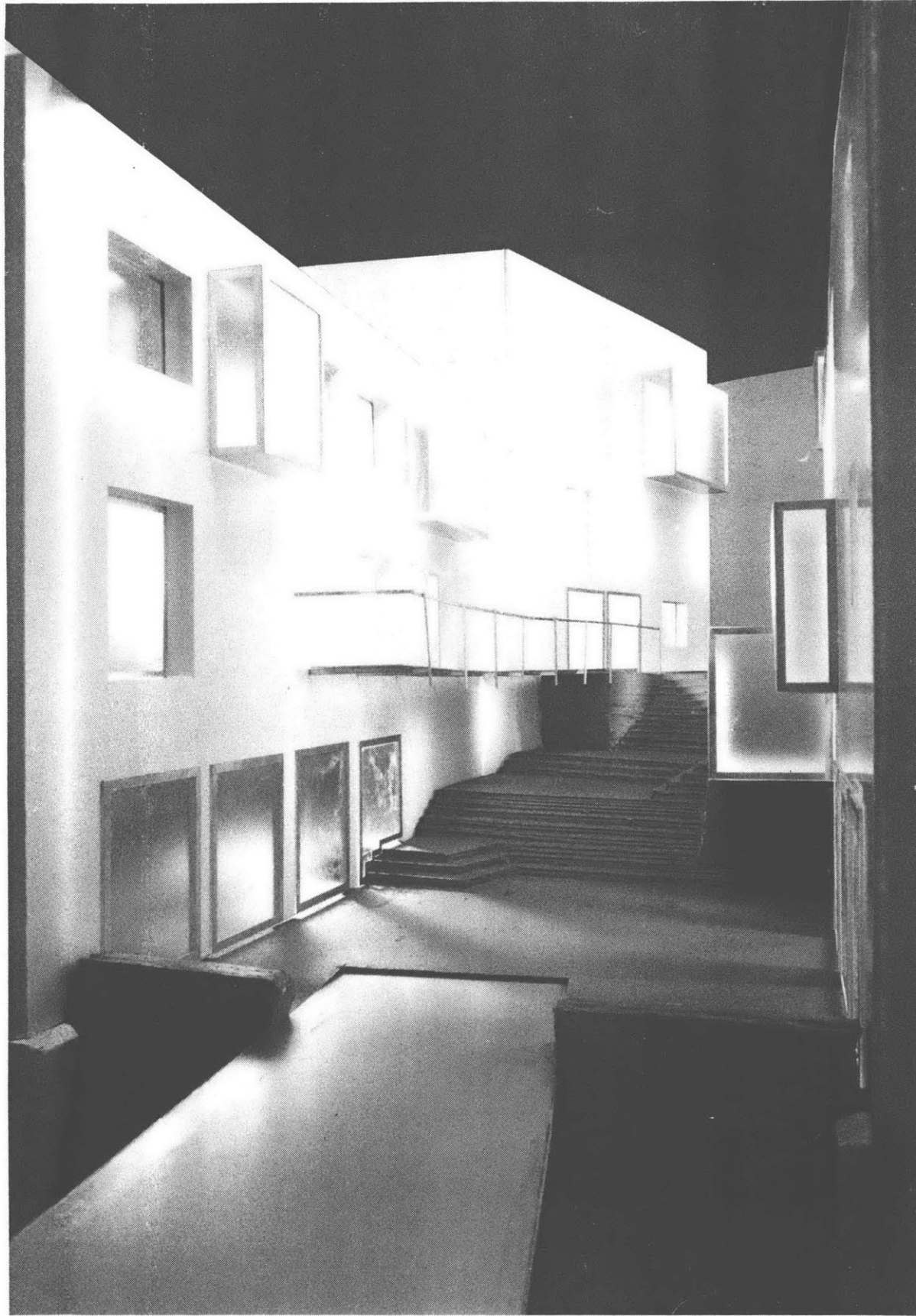
Establishing the Street

Circulation emerged as the most important element during the goals clarification process, so a street was created through the site and named Copps Hill Way.

This is a pedestrian way that links the northern and southern boundaries of the site to the surrounding neighborhood. Specifically, a pedestrian bridge across Commercial Street connects to the North End Playground. This provides a safer, more pleasant way of crossing the highway-like Commercial Street to get to all of the North End Playground facilities (skating rink, swimming pool, playing fields, bocce courts, and playground structures).

In addition, the southern end of Copps Hill Way is at the same level as the Copps Hill Cemetery entrance across Charter Street. This links the Copps Hill Way and the bridge, suggesting an appealing rerouting of the Freedom Trail. Instead of doubling back out of the Copps Hill Cemetery to go down Hull Street, walkers could proceed out to the waterfront walk.





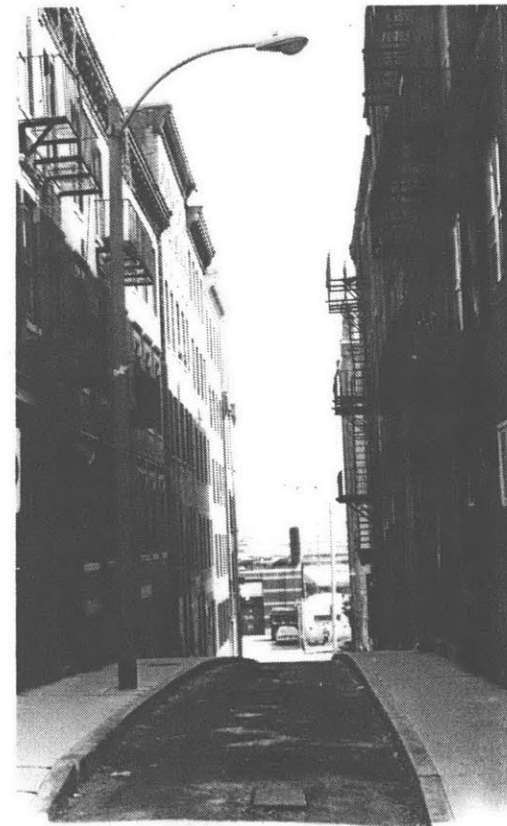


This journey provides impressive views of the U.S.S Constitution and a more celebratory trip to the Charlestown Navy Yard.

All of this should not underplay the connection provided to the playground facilities. The North End Playground is the main recreational area for the residents of the North End. The new link to the residential areas of the North End would enhance the use of this popular spot.

In the process, the interests of the school would also be served. By increasing the flow of traffic across the site along the main pedestrian way, a situation analogous to the busier Salem and Hanover Streets is proposed.

Similarly, the Paul Revere Mall is a good example of a pedestrian thoroughfare. This generous way provides a link between Hanover Street and the Old North Church on Salem Street. In addition, it is a gathering point for the street-active North End residents and a play area for the children of the Eliot Junior High School.



Though the activity level of the Paul Revere Mall is a reference for the creation of Copps Hill Way, the Way was proposed and developed as a street, not a plaza. It is a pedestrian thoroughfare in keeping with the existing street pattern that gets from the 'main' streets of the North End, out to the wharves in a fashion that is perpendicular to Commercial Street. The angle in the street was derived from the differing geometries of Charter and Commercial Streets. Combined with the stepped quality of the Way, the intent is to create a thoroughfare in keeping with the most charming streets of the North End.

The Brick Tubes and the Steel Lining

With the site organization being established by the development of the pedestrian street, the next move was to organize the two block-size pieces created by the street.

Again the North End offered a powerful analog. At the scale of the block, the brick buildings can easily be perceived as large brick tubes that together rim the edge of the site as each rams into the earth. The many stores and residences which occur along any block are then created by a secondary carving up of this inner tube.

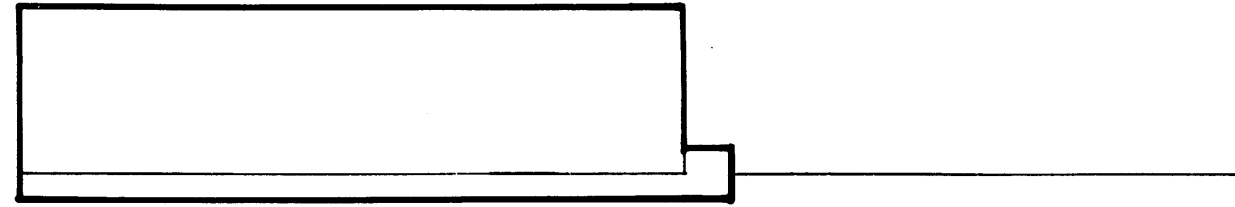
Because of the goal to create a decentralized school which presents a model of the surrounding environment, the brick tube analog was adopted. The next step was to determine how the interior of the tubes would be divided up.

In order to accomodate the wide variety of spaces in the program, a flexible steel structure was chosen. How this system would work with the brick tubes now needed to be determined.

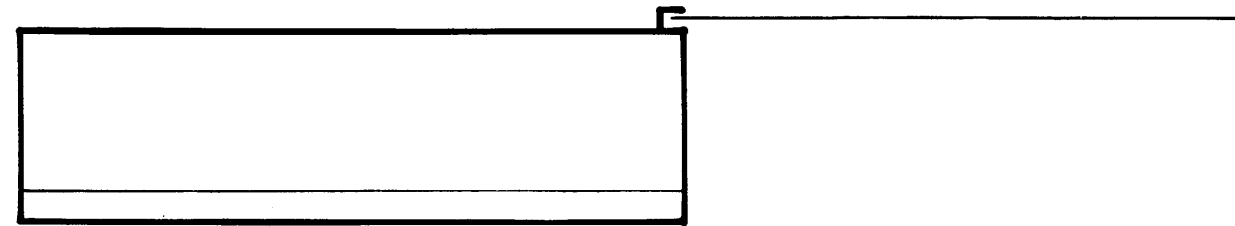
Again, the solution was initiated by an analog. In this case, the steel system was perceived of as a lining to the brick tubes. Unlike the brick tubes, however, the steel system is free to move off the block-size boundaries established by the tubes. This move happens throughout the building-- either for the purpose of creating an opening in the tube or for the steel to become the structural members supporting and defining a particular space.

When the steel is a lining to the brick tubes, it takes the form of metal furring channels that carry dry wall (or some other appropriate finish material). When the steel gets 'loose' from the brick, it becomes full-depth steel stud walls or I-beam members that serve to support walls, bays, or floors as needed.

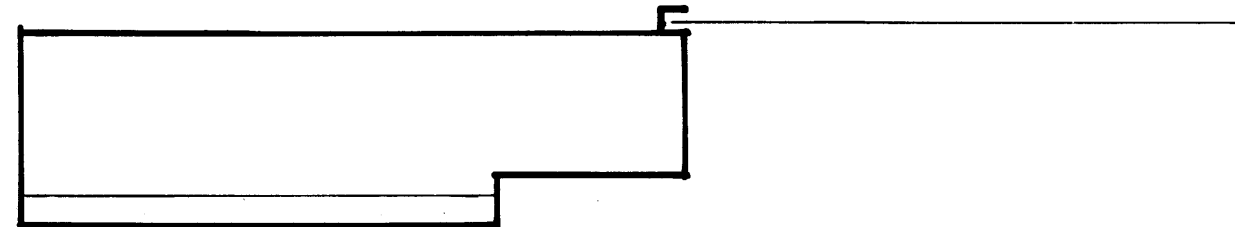
The diagram represents the various conditions of the wall system. The conditions are as follows:



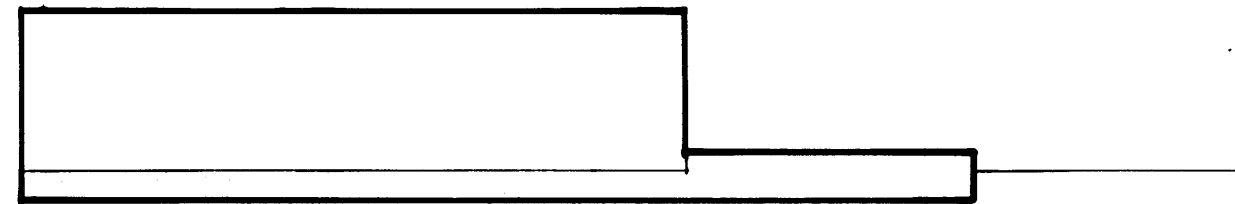
1. The steel lines the brick tube as a furring channel and becomes a glass frame;



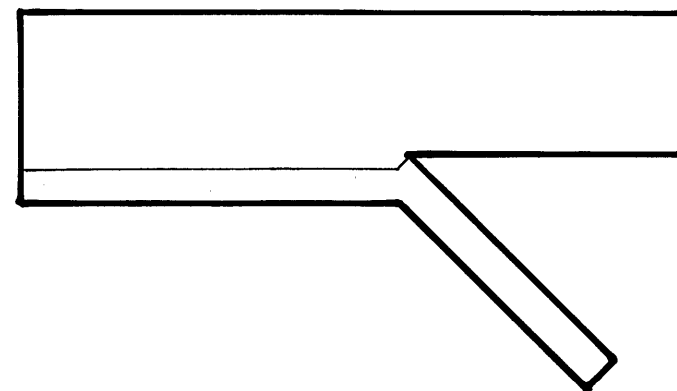
2. The steel and brick end simultaneously and the glass is clamped to the exterior face of the brick with steel channels;



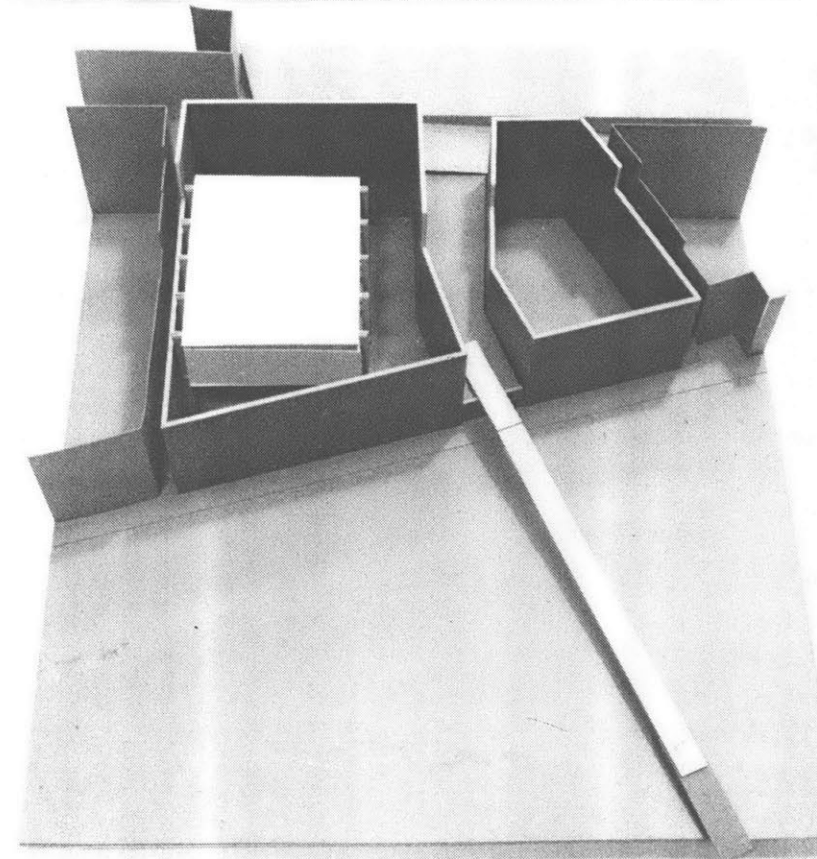
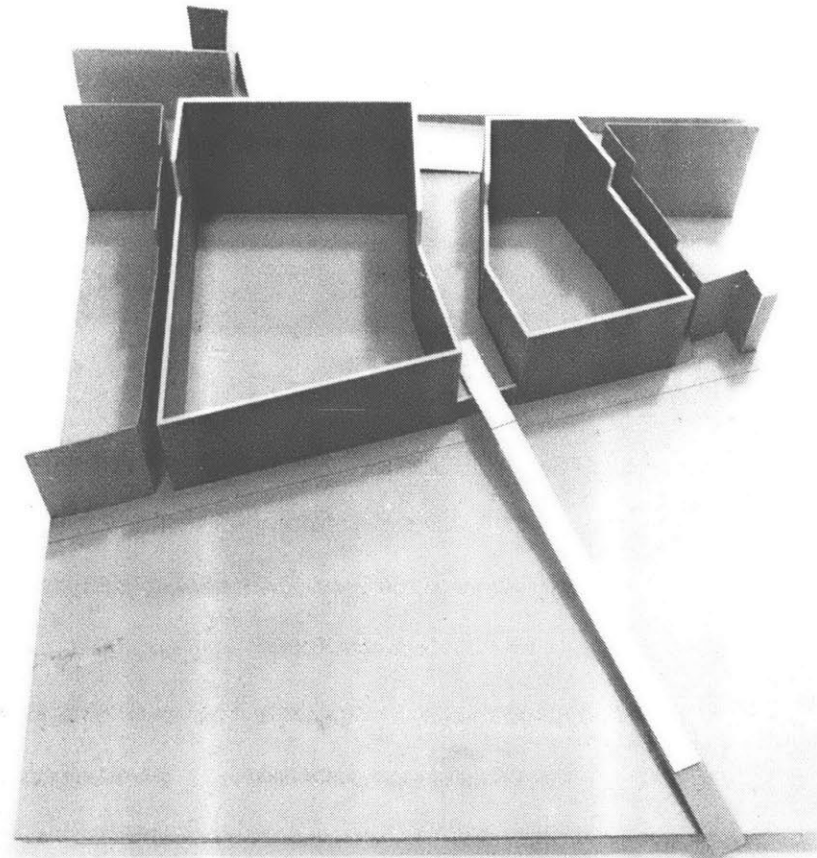
3. The steel stops short to expose the brick on the interior of the building. The glass is clamped to the exterior face with steel channels;



4. The steel moves past the brick and becomes a stud wall supporting the glass;



5. The steel 'gets free' from the brick to become metal studs or I-beam



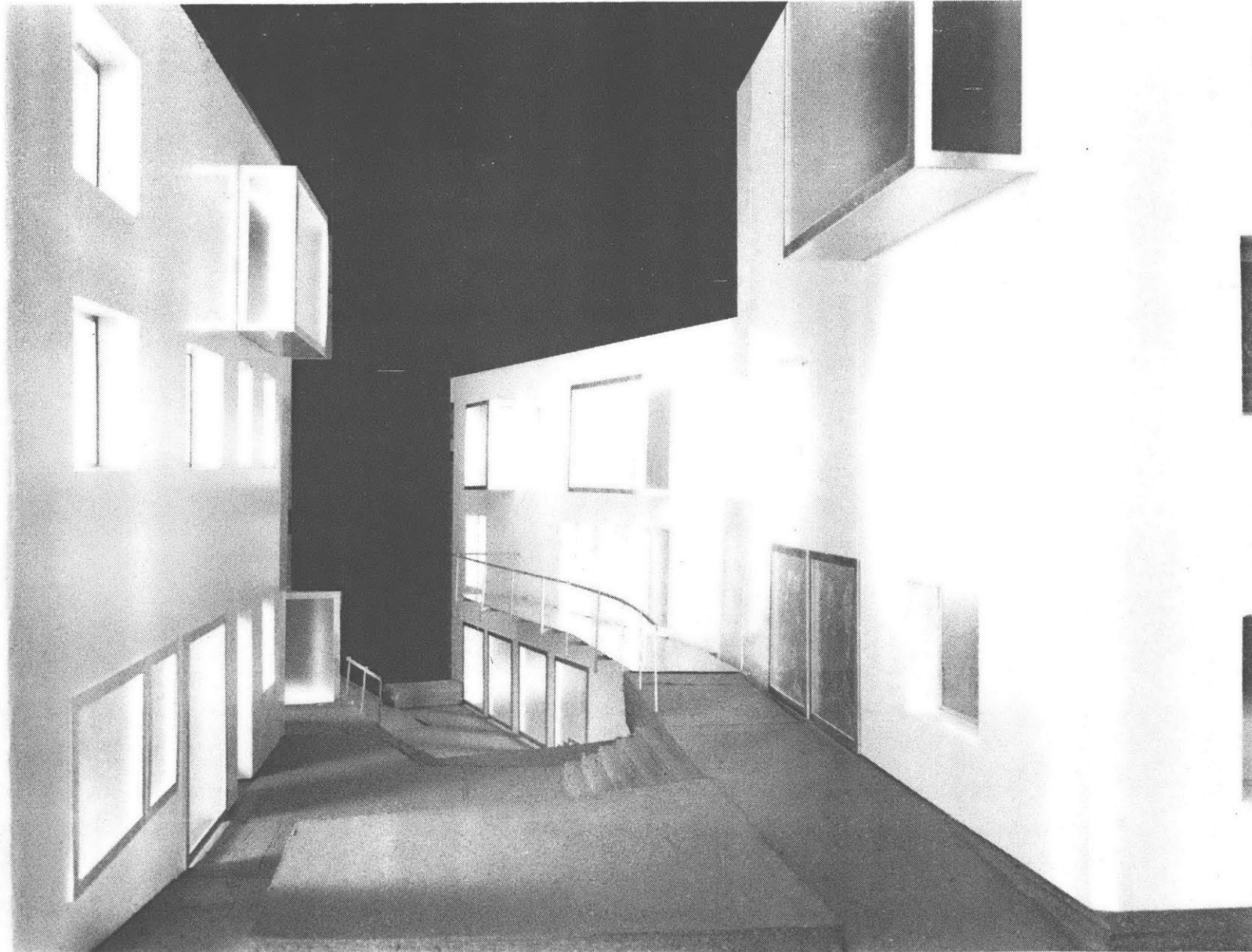
The Floating Box

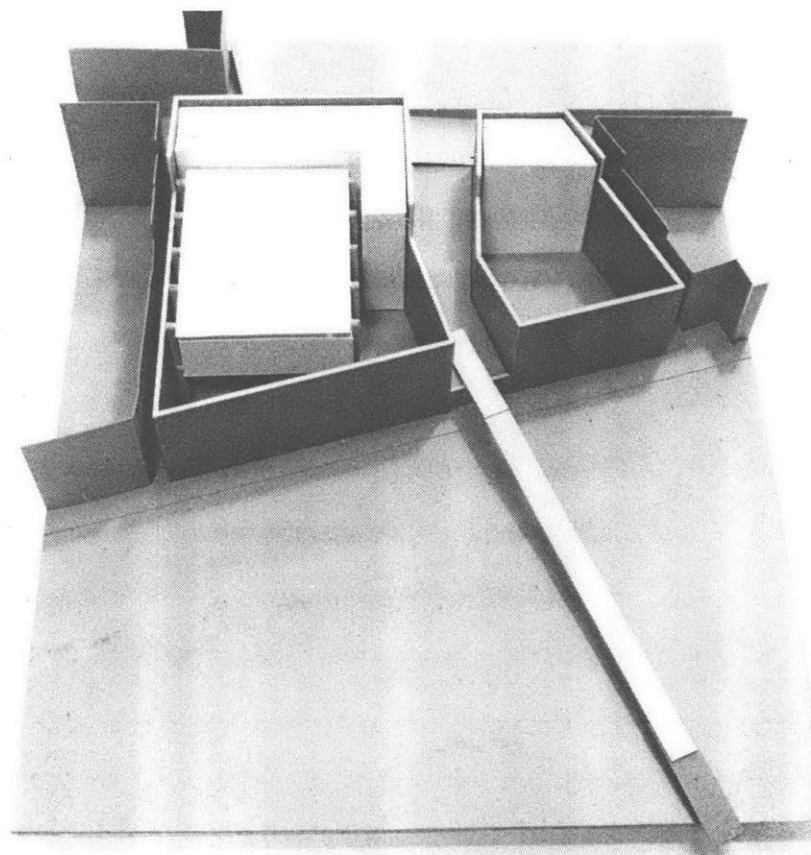
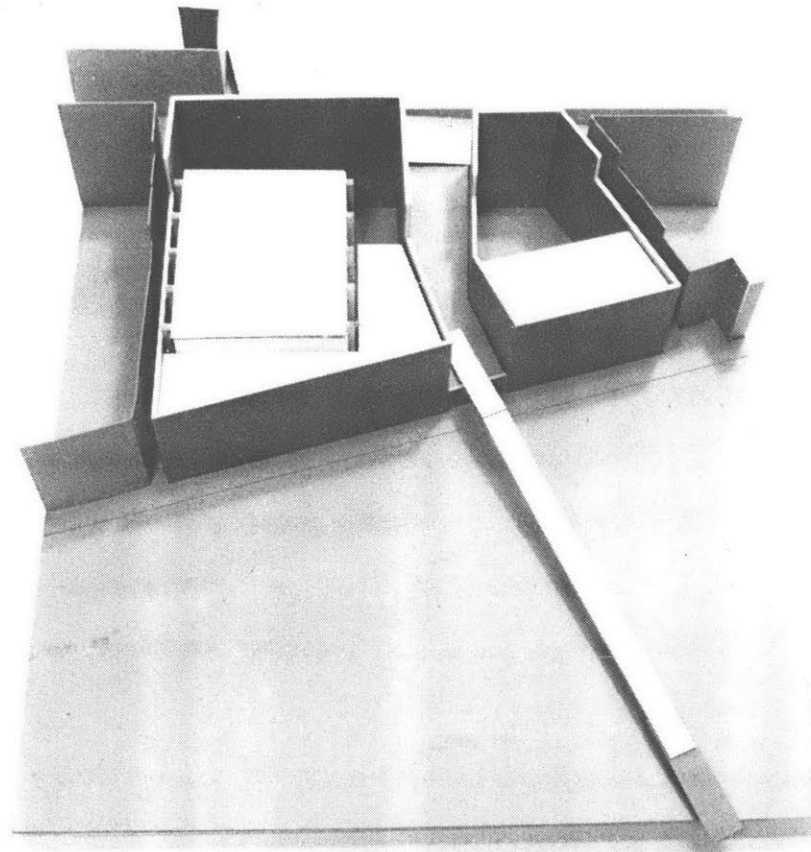
With a building system that could meet all the architectural needs of the program, it was important to determine the best location for the gymnasium and the auditorium. Because of their size, the placement would have a strong effect on the organization of all the other spaces in the school. Therefore, it was vital that a location be chosen that was in keeping with the architectural goals of the project.

Because the site dropped thirty feet from the Charter Street side to Commercial Street, it seemed right to set the auditorium into the hill. By making use of the slope of the land, the programmatic requirements could be fulfilled quite naturally.

Once such a large volume was defined, it also seemed right to place the gymnasium over this space. The use of the steel system was essential to this move. By allowing the steel to take the form of large two by four foot columns, the gymnasium was 'floated' over the auditorium.

One of the most important benefits of this decision was that these two large volumes could now respond to different geometries. The auditorium responds to the geometry of Commercial Street -- the same geometry which organizes the lowest portion of the newly created Copps Hill Way. And, in the other instance, the gymnasium responds to the geometry of Charter Street. Therefore, both of these spaces are creatures of the level upon which they are entered. An orientation reference is created for the user.





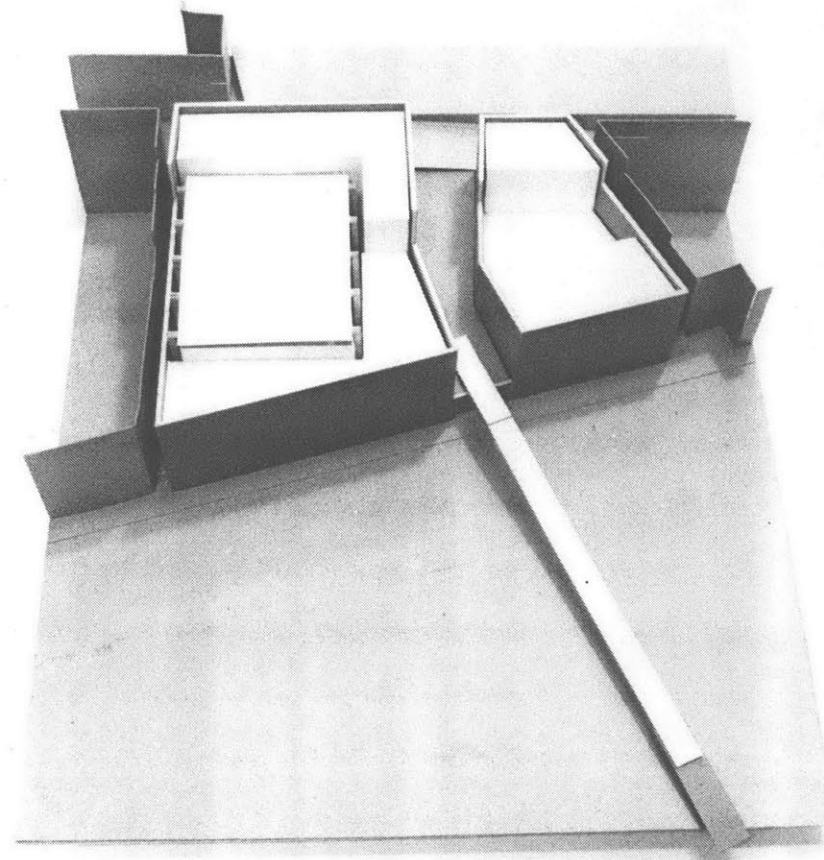
Packing the Tubes

With the gymnasium and auditorium in place, determining appropriate locations for the remaining spaces was the next task. The priorities for this step were first, to place the spaces which would most enhance the vitality of the street at the ground floor level; second, to foster the idea of a decentralized plan; and third, to balance the site functionally and spatially.

In relation to this first goal there were the cafe, the cafeteria, and the bakery, all of which offered the greatest opportunity for exchange with the street. These places would attract use not only by a large number of people, but at a wide range of times throughout the day. In fact, one could easily imagine someone occupying one or more of these places at any hour of the day.

Like their counterparts on Hanover or Salem Streets, then, these shops could serve as both generators and watchplaces of street activity. Placing them at the corners of the site increases the potential for both of these activities. Because the cafe would function well in conjunction with gymnasium and auditorium activity, and because the two previously-stated goals would also be fulfilled, the cafeteria and bakery were placed at each end of the western tube. The cafe was then located at the northern end of the eastern tube adjacent to the auditorium lobby.

The other two spaces which required a strong connection with the street level were the day care and one of the school administrative offices. Site balance suggested that the volume created by the placement of the bakery and cafeteria be filled with the day care. This was also appropriate because



the day care could thus be very easily accessed, though it could be vertically separated from the descending street. This created important design opportunities related to the security and stimulation of the children.

This move also left the southern corner of the eastern tube for placement of one of the school offices. In fact, this is the main control point for the school. Though its location suggests this function, the storefront-like quality of the entrance at this point is in keeping with the desire for a decentralized plan.

Placing the day care in its present location created a negative volume that was analogous to the positive 'box' created by the gymnasium and auditorium. This negative volume had the potential to organize the distribution of the other spaces above the ground level on this side of the site.

This opportunity was utilized by designating the area above the day care for an outdoor playground. This move provided the chance to create a direct link into the day care and suggested the adjacency of the lower-grade classrooms to this outdoor space. Thus, the kindergarten and the first-grade classrooms were placed above the cafeteria.

A second opportunity was utilized when the apartments were placed above the bakery. This afforded these units a desirable level of privacy, provided exciting views both back to Boston and out to the harbor, and placed them on the more residential, southern side of the site.

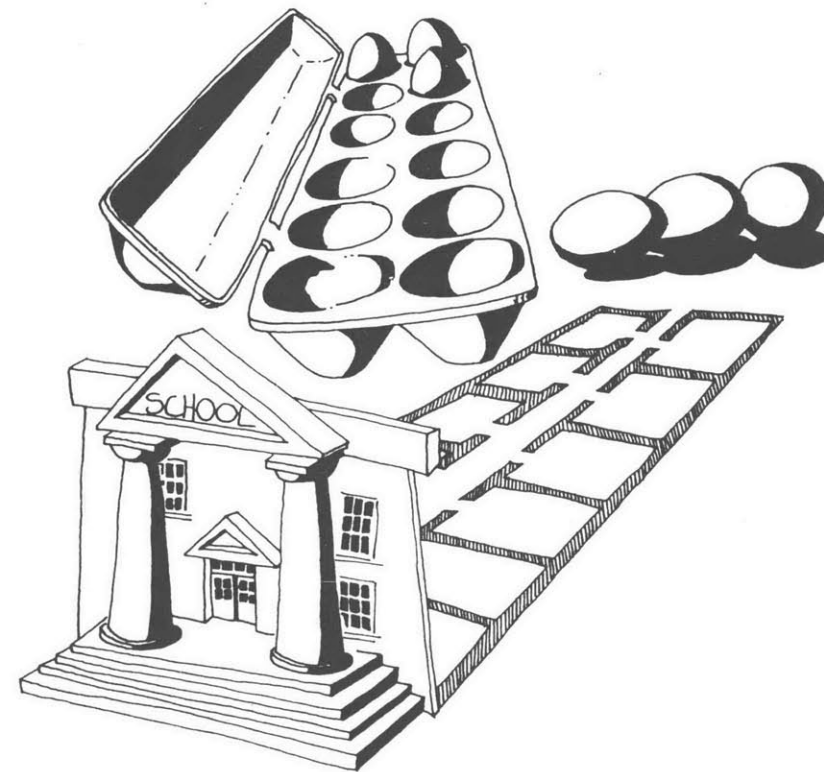
With all of these moves made, the library, the second through fourth grade classes, and the learning resource centers, as well as, all of the support spaces for the gymnasium and auditorium, needed to be located. The initial placement of the gymnasium and auditorium suggested strong adjacencies for the support spaces, and these are reflected in the final plans.





One important part of locating the support services was placing the receiving space for the building on the Commercial Street side below the cafeteria. This move reinforced the early choice to bridge pedestrians across this busy roadway, and it is contextually in keeping with the warehouses located along Commercial Street.

The area on the south and west sides of the gym now remained as the location of the library, classrooms, and resource centers. Given the earlier choice of locating the main administrative office in the southwest corner of this tube, this was both a reasonable and desirable location for these spaces.



Circulation

At this point, the functional diagram for the site was strong and intact. However, another level of organization was needed to bring the scheme together. Just as the initial move of developing a pedestrian street organized the school on the site level, the development of a clear internal circulation system brought an added strength to the scheme at the building level.

An earlier reference mentioned the 'storefront-like' quality of the entrances. By storefront-like, a New England vernacular of signage and canopies is not meant, but rather the number of entrances, what they connected to, and the rhythm of their placement. The intention was to create two facades along Copps Hill Way that, like Hanover and Salem Streets, offer the user a variety of choices. Unlike the traditional school, which might have one grand central entry, the notion again is for a decentralized system.

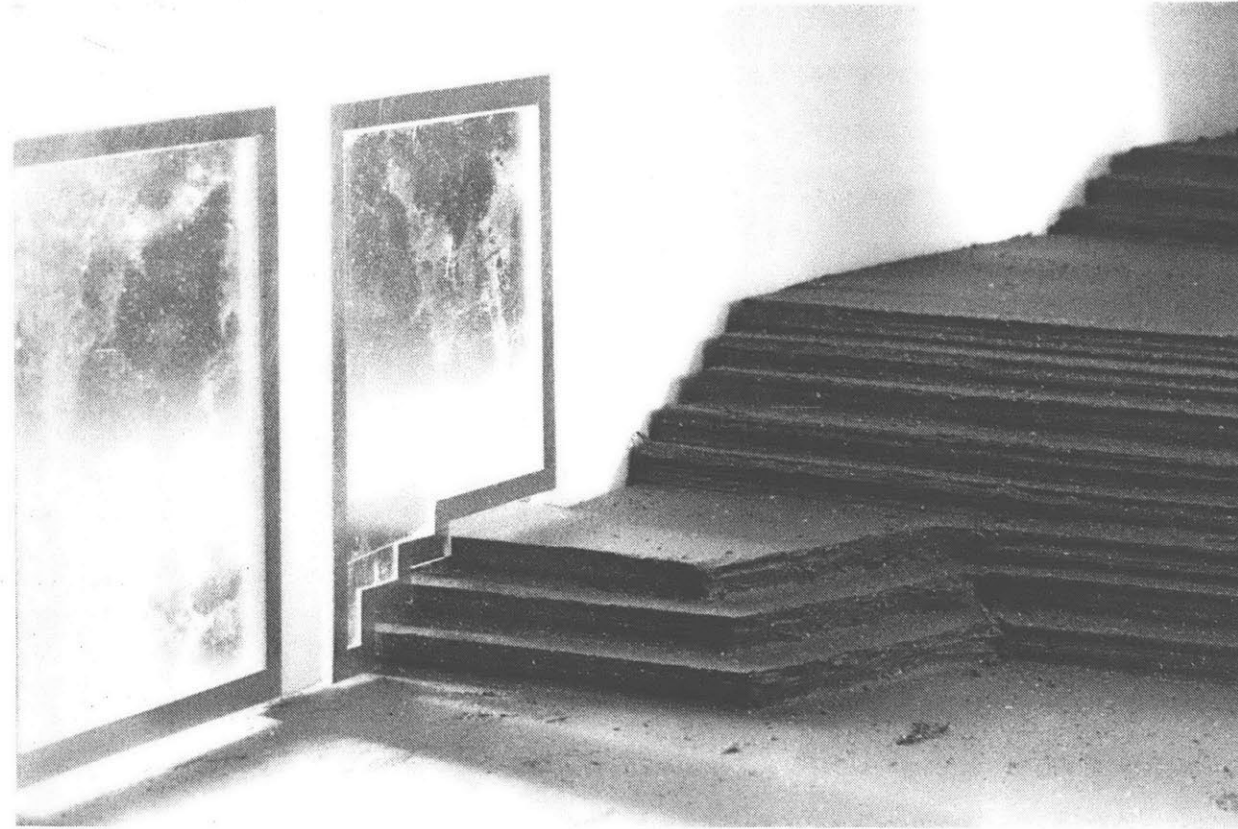


To develop the streetscape entrances of Copps Hill Way in a manner that resulted in more than stage set facades meant that the openings had to be connected to a clearly ordered internal circulation system. The clarity of this internal system needed to be as powerful as the movement patterns on the external street.

This clarity was achieved with a system that established consistent movement patterns throughout the building. Whether one is moving through the building in a manner parallel with or perpendicular to the external street, the patterns are consistent from floor to floor. To prevent each floor from becoming merely a stacked copy of the one below or above it, the vertical circulation pieces and multi-level spaces were used to provide reference links. In this way, the individuals are made more aware of their location in the building and in space.

Places designed to heighten awareness can be found both on the interior and the exterior of the tubes. In the gymnasium lobby, for example, one can move parallel to the street at two different levels; all the while, the gymnasium to the east provides a consistent reference about one's location in the building. Similarly, as one moves along the exterior of the tube, on the eastern side of Copps Hill Way, the street falls off in a cascade of stairs, but the steel deck maintains the constant level of the gymnasium within the building.

Another way in which the circulation system provides a heightened sensory experience is through the many connections it offers back to the pedestrian street. Some of these connections are visual, providing a reference as one moves within the building. In the auditorium lobby, for



example, one is reminded of the street outside by the exterior rough-cut granite steps that turn into the building and slide under the glass opening. At this point, the steps then change to a cascade of highly polished stairs that descend into the auditorium itself.

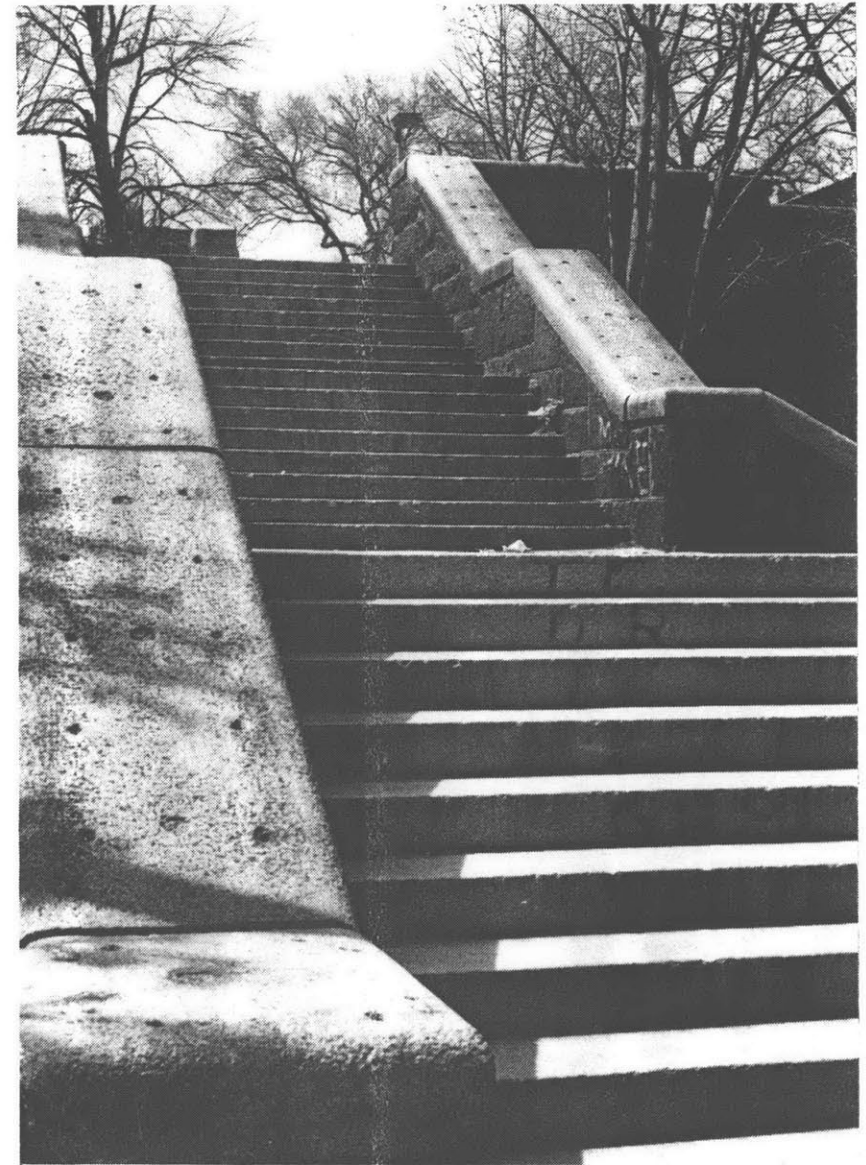
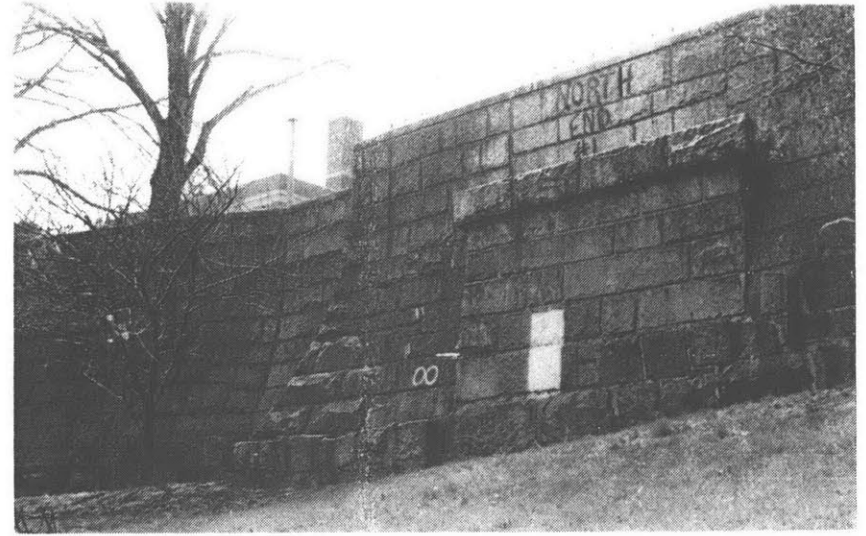
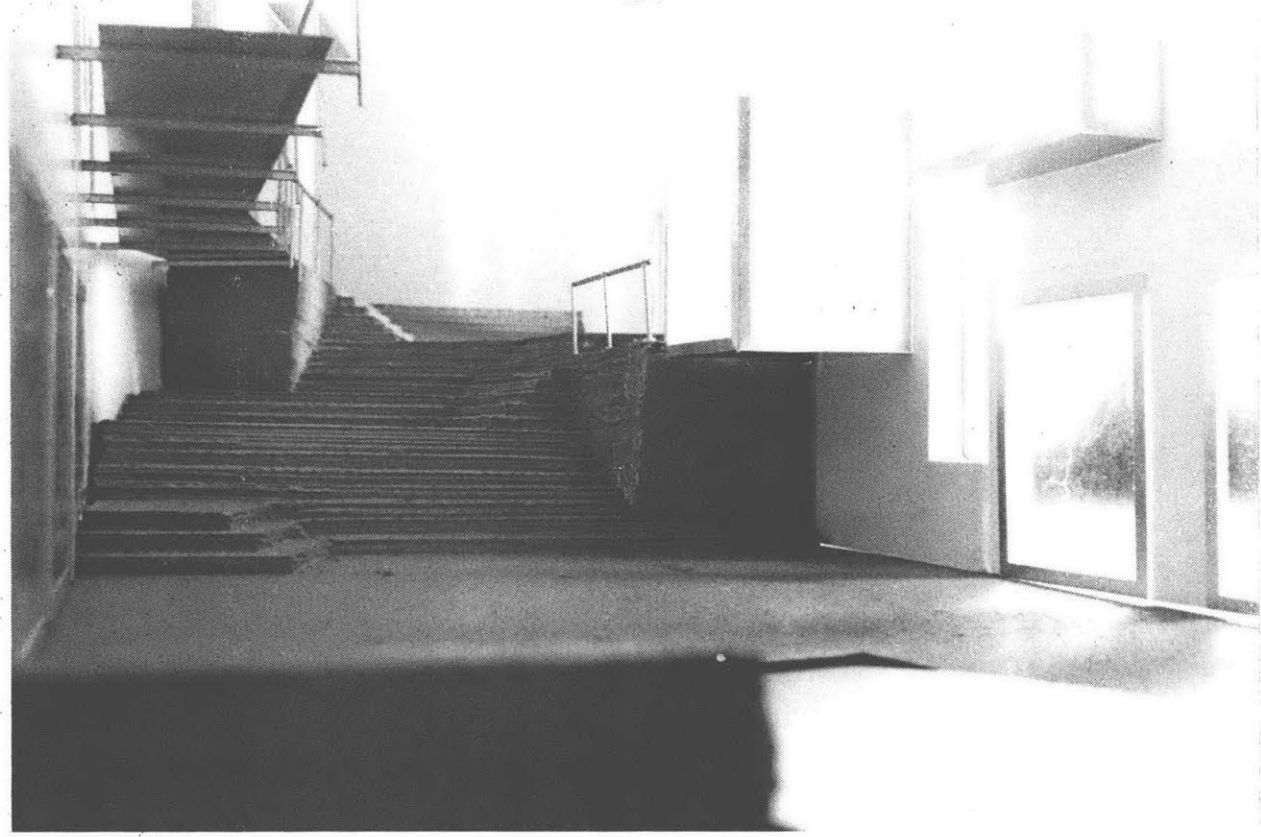
Other connections are more direct and afford opportunities for individuals actually to move back to the street in a manner and location different from the point where they may have left the street. This factor increases the inter-connectedness of the building, thereby promoting a sense of community and enhancing the activity level of the street.

Likewise, the use of granite for the paving of the Way and the lobby of the auditorium was not just an aesthetic decision. The proposal, in fact, is to re-use all of the granite stones that presently form the Copps Hill Terraces. In this way, economy is served and the school is linked with the history of the site. And, since granite is used in the waterfront playground across Commercial Street, another vital connection to the neighborhood community is achieved.

The Quality of the Spaces

At the start of this chapter, it was mentioned that a constant shifting of thought occurred between the levels of decision-making. What often caused these shifts or actually drove the design was the search for a way of synthesizing fragmented ideas about the qualities desired for particular spaces within the design.

An active streetlife is a concept that drove the design from the start. Some aspects of this idea have already been discussed. One which has not,





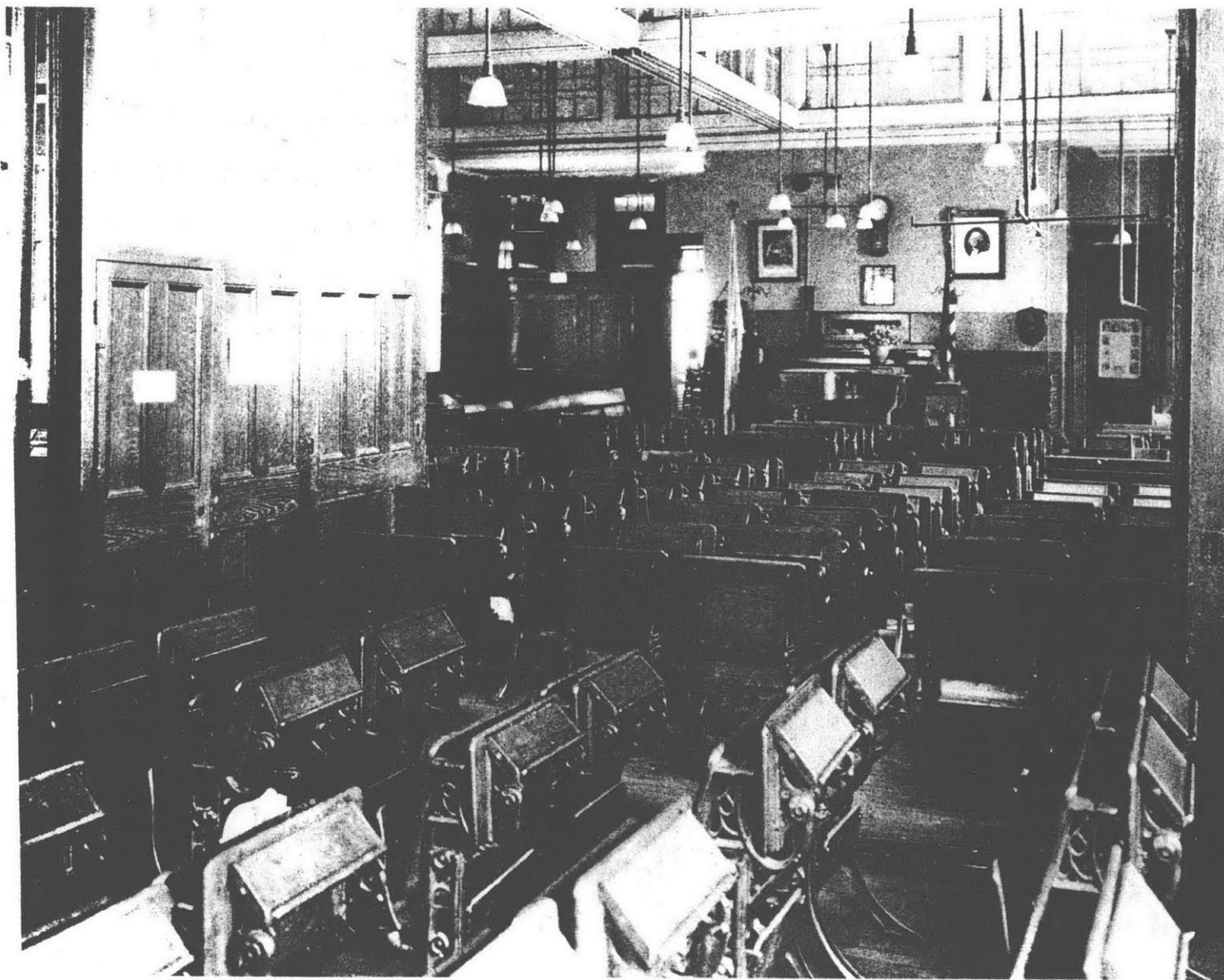
however, is the way in which the people of the North End engage in activity through their upper story windows or from the fire escapes that hang below them. The wrought iron fire escapes of the North End are used in many fashions. These balconies are outdoor flower stands or holders for various religious shrines. They are places for hanging the laundry and talking to the neighbors. Or, they become viewing perches during festivals and street celebrations.

How, then, could this example of active participation in and with the built environment be incorporated into the school design? This question resulted in the development of steel-framed bays that were designed to be hung on the Cops Hill Way elevations of the brick tubes. Though these all provide direct connections to the pedestrian way, they function in a variety of ways, from greenhouse space to a small group play area in the day care center.

Connection is a theme that was vital to the development of the day care space. It influenced the final design in at least three ways. First is the link with the pedestrian way. The play area that safely overlooks the descending street was already mentioned and it should be noted that the main day care entrance occurs directly off of the street.

The second and third levels of connection are strongly vertical in nature. From within the volume of the day care center, the children are made aware of the presence of other school members by the balcony windows that protrude into the northern side of this space. Similarly, the children are reminded of the presence and actually directly linked to the playground above by a climbing structure that moves up through the roof of the day care center. This multi-level structure would be reminiscent of the climbing





sculpture currently in the Boston Children's Museum. It would be an important element in fostering the child's active participation with his environment.

It is important to note that the school is handicapped accessible despite its hillside location. All of the spaces and facilities of the building can and should be used by a wide range of people. And, although passage across the Way is encouraged, it is possible to remain indoors and cross the site when necessary.

Young children are generalists in their learning patterns and do best with one classroom teacher. For this reason, and to encourage the use of the classrooms during the off times, the kindergarten through fourth grade rooms were grouped in two areas and given very basic layouts. The design has been based on the assumption that users (instructors, students, social groups, etc.) should have the ability to arrange the room in a way that best suits their needs, rather than adhering to a preconceived, rigid desk arrangement.

Complementing these generalist -type rooms would be the indoor and outdoor learning resource centers. The design calls for six of these centers. They are designated as the wood shop, the outdoor experimentation deck, the indoor greenhouse area, the technology center, the arts center, and the cultural center. All would be places to be utilized by each of the classes in the school for appropriate projects or they could be used by community members during off times.

Four of the six centers also provide another link to the community. These centers offer a direct architectural link to the pedestrian way through the bays that help to form their space. On a more symbolic level, this



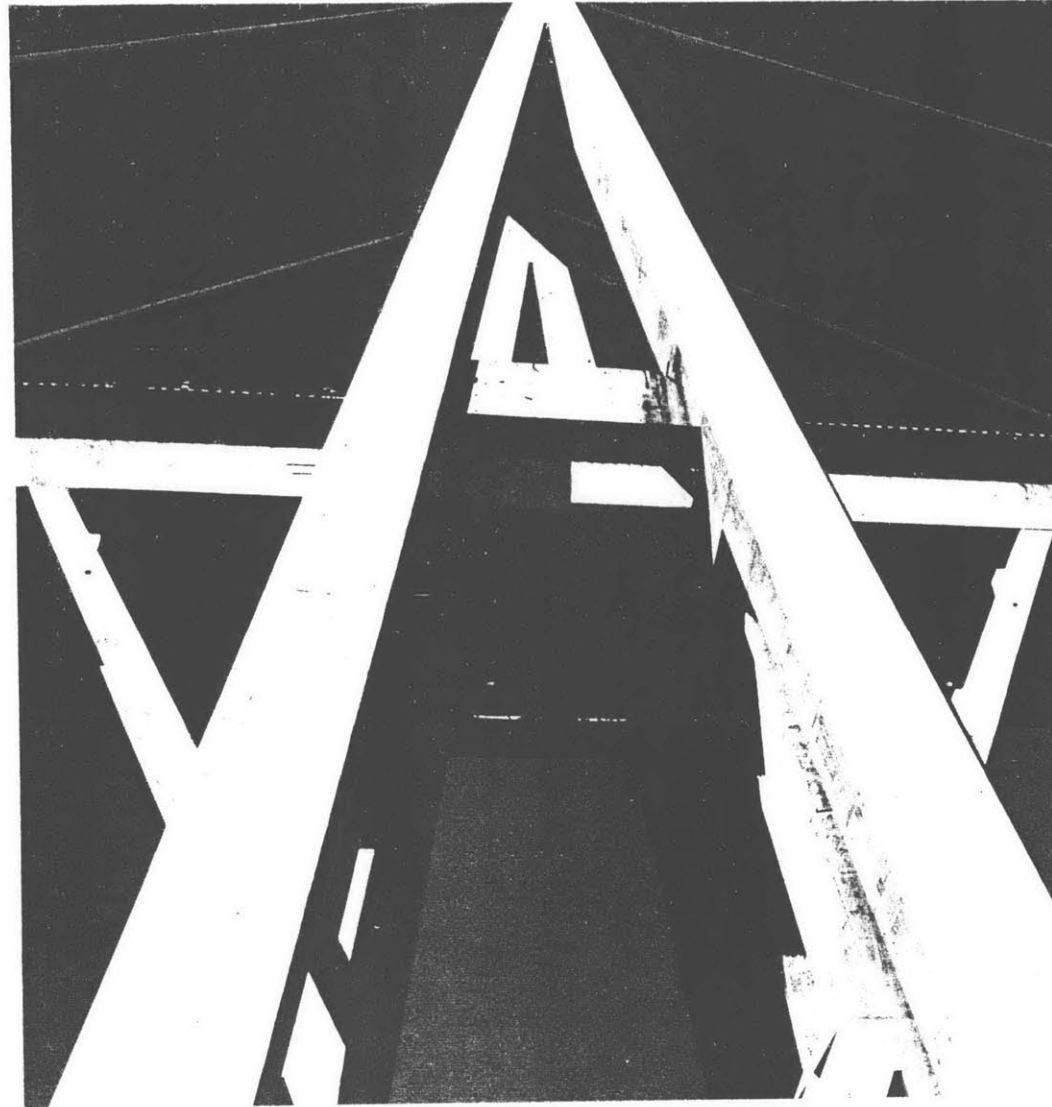
connection is indicative of a relationship that could be developed between the school and the community by bringing knowledgeable individuals from the neighborhood into the centers to assist with instruction.

The bakery, cafeteria, and cafe could also be thought of as specialized resources for the school. Each of these facilities could be utilized to teach and engage the children in special aspects of the world they are so much a part of!

Likewise, these eateries would serve to engage the community with the school. It is easy to imagine the following scene:

Several small groups of people spill out of the bakery to sit at umbrella-covered tables at the southern end of the Way. As they enjoy their pastry and an espresso, a cluster of tourists slide by them and move down to the footbridge on their way to the waterfront. At this bridge end of the site on this sunny day, the sliding doors of the cafe and cafeteria are up inviting patrons to sit outdoors.

From here the harbor, the activity in the playground across Commercial Street, and the play of children returning to classrooms after lunch can all be enjoyed. Here, too, the uplifting quality of the footbridge may best be felt. This is not just a structure for getting to and from the waterfront. It's gleaming aluminum deck celebrates both the act of crossing and the activities that surround the bridge at either end. It is a gateway and landmark that affirms the importance of its surroundings.



I like a bridge--
It cries, "Come on
"I'll take you there from here an
 here from there
"And save you time and toil."

I like a bridge--
It breathes romance;
"There's new adventure on the
 further side
"And I will help you cross."

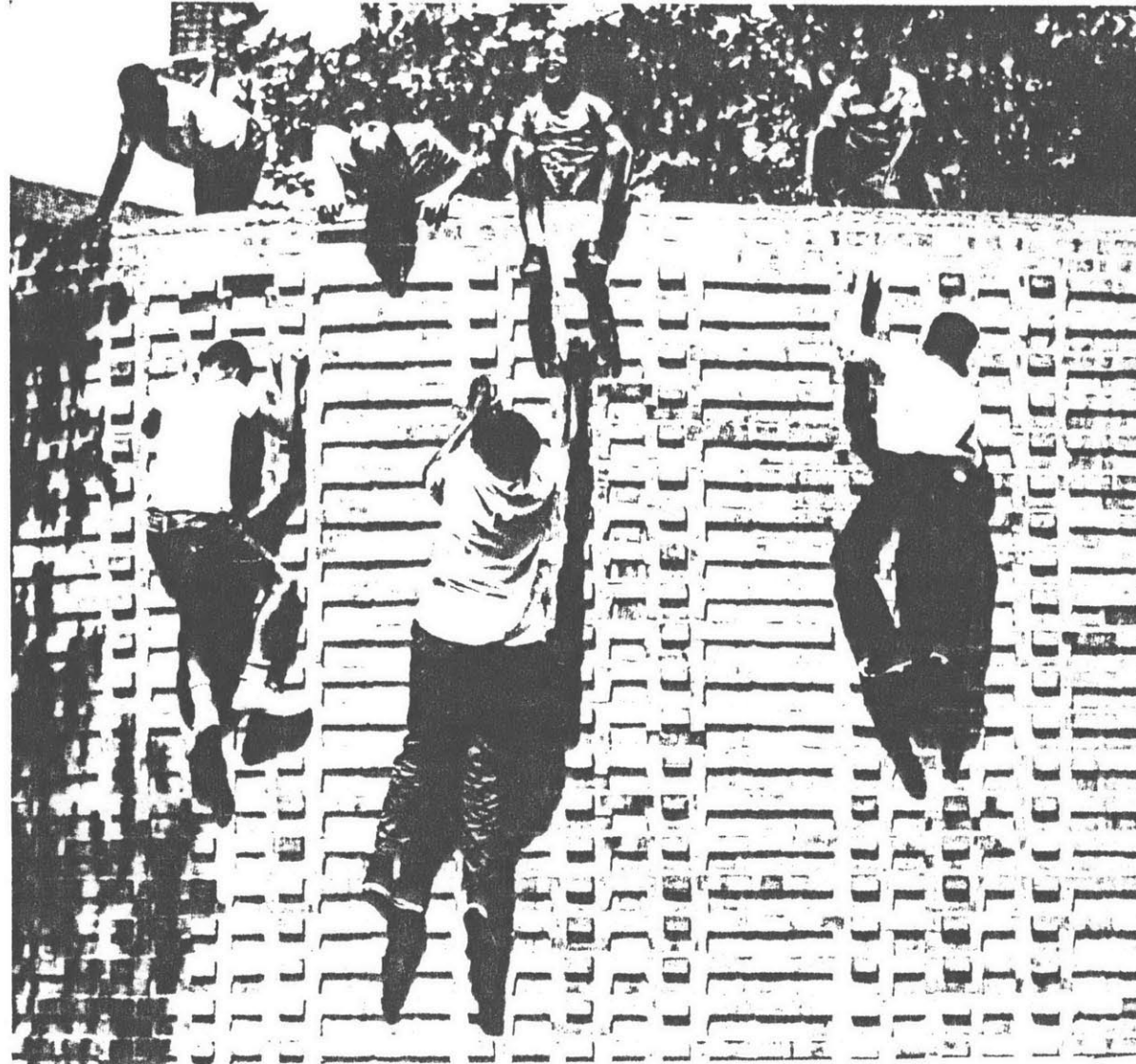
I like a bridge--
It makes me think
That when worry comes, my
 mind will find
Somewhere a friendly bridge.

--W.G.R.



"In the history of Architecture, those
bridges are the most attractive which
are something more than mere passages
for carriages and pedestrians."

--Russel Sturgis



The Theoretical Base

Movement and the Active Child

Connections, links, exchanges ... each of these terms and others have been used a great deal in the description of this thesis. The fact that these ideas are indicative of the way in which the street life of the North End operates is an important reason for their widespread use. However, had this school been proposed for a site outside of the North End, these descriptors would still have been an essential part of this thesis.

The reason for this is that these concepts are rooted in the educational philosophy that forms the basis for this thesis. Key to this philosophy is the necessity for the child to be able to move.

Children, especially through their elementary school years, need to be active. They need to be able to engage with their environment. They need to examine the world around them by touching, feeling, and smelling. This is how they make sense of the environment they have been placed in.

Piaget's theory of development is based on the observation that the formation of intellect is directly related to the existence for movement capability. The first stage of learning is called the sensorimotor stage, during which the child experiences the world primarily through his senses and motoric apparatus.

Although an individual passes through this stage, it is not completely outgrown by adults. In fact, when presented with novel situations, the adult will resort to sensorimotor behavior. Specifically, adults will touch, feel, and test with their bodies before analyzing with their minds.



Evidence from other researchers also reinforces the link between movement and learning. Janet Zeller, for example, has found that the difficulty of dealing with symbols experienced by learning-disabled children may be caused by an improperly developed sensorimotor system.²

Likewise, the theory and methodology of Jean Ayers illustrate that "children will respond more readily to symbolic tutelage after having been trained in the use of fundamental motor patterns that promote sensory integration."³

All of these approaches begin to form the basis for the importance of movement in a learning environment. This is not just an issue of curriculum development. It can and should be translated directly to the architecture of the facility. As suggested earlier, this can be accomplished with a well-organized circulation system that heightens the sensory stimulation of its users.

The analog for this gesture is one of a playground brought into the building and transformed into a movement system. The reasoning behind this idea is that on the playground children are often at their best. Here they are not afraid to take risks. Children run, jump, and play in a free and active way that is completely engaging. They are learning how to use their bodies in space.

The idea of fostering sensory-heightened movement patterns for educational purposes can be made even stronger by returning to the theory of Jean Piaget. In his work, he speaks about the necessity for the child to be active in the learning process. In addition to the overt possibilities of running, jumping, climbing, etc., which are commonly associated with being active, it should be understood that activity also relates to behavior on the fine motor and kinesthetic level. Children need to play in the sand,



manipulate puzzles, experiment with water, and build with blocks. When involved in concept learning children need to do, not just watch a demonstration.

On yet another level, children must be given the opportunity to feel the wind in their face or smell the scent of freshly baked bread. The power of the senses to engage the individual and activate learning processes must not be under-estimated.

All of these ideas suggest utilizing opportunity. Thus, the design of the Cops Hill School affords both children and adults a wealth of opportunity. There are the learning resource centers which utilize hands-on instruction in six different educational areas. Then there are the gymnasium and auditorium spaces for the larger school-related and public events. In a similar manner, the service facilities engage people with their surrounding environment and present chances for experiential learning. In addition, there are the pedestrian street, the bridge, and the rooftop playground which offer a great many opportunities for play or connection to play areas.



Play as a Method of Learning

Play is the last piece in the argument for the necessity of movement as a basis for establishing an educational environment. With the ability to move comes the ability to play. A heightened movement experience can thus result in a heightened play experience.

This idea was utilized and vividly portrayed in the creation of the recreational play area at Ontario Place in Toronto, Canada. Here, as in the



similar parks which took their inspiration from this stimulating environment, the child and the adult user are given many opportunities to participate in novel movement experiences. By engaging individuals with a wide range of play facilities, they are made more aware of their own existence in space and can therefore better understand the environment that surrounds them. This notion about play provided a great deal of inspiration for the development of the Copps Hill School.

Also of inspiration was the previously discussed idea that play is the work of children. Play is the manner in which they make sense of the world. Play is also many other things. Play is fun and active. Play is spontaneous and purposeless. It is also purposeful and serious. Play is self-initiated. It relieves stress. Play is learning. It prepares children for the future. Play is development.

And, according to Friedrich Froebel, the founder of kindergarten, "Play is the highest expression of human development in childhood for it alone is the free expression of what is in a child's soul."⁴

It is also important to understand that play should not just be an activity associated with children. In fact, "A human is most human ... when at play."⁵ And it is easy to imagine how each of the above descriptors of play could enrich the lives of adults and children alike.

The value of play and therefore movement to the learning process should be clear. In the past, however, many school designs have been based on ideas contrary to this belief. "Perhaps the mind-body dichotomy of our philosophical heritage had prevented us from appreciating the fundamental role movement plays in all our intellectual capacities."⁶

This thesis does appreciate the importance of movement to learning, and it is an attempt to translate educational ideas about movement into architecture.



In Summary

"When a child cannot play, we should be as troubled as when he refuses to eat or sleep."⁷ Because of a strong belief in the value of play to children's (and adults') learning and the equally strong belief that movement is the most essential component in the ability to play, this thesis is an architectural attempt to develop an environment that fosters movement and active involvement with the environment.

From a base of knowledge and theory about learning and movement, a set of educational goals was derived. Then these goals were translated into architectural goals and assumptions. Finally, with all of this as a guide, a design was developed given a particular location in Boston's North End.

The design, then, represents a building that fulfills the initial educational goals and aspirations of the project and at the same time is a fitting piece of urban architecture.

Footnotes

1. Lady Allen of Hurtwood, Planning for Play, Cambridge, MA: The MIT Press, 1968, p.II.
2. Janet Zeller, in "From Cartwheels to Caterpillars: The Child's Need for Motion Outdoors", by Anita R. Olds, Human Ecology Forum, Winter 1980, Vol. 10 No. 3, p. 23.
3. A.J. Ayres, Sensory Integration and Learning Disorders, Los Angeles: Western Psychological Services, 1973.
4. Freidrich Froebel, in Children's Play and Playgrounds, by Joe L. Frost & Barry L. Klein, Allyn & Bacon, Inc., 1979.
5. M.J. Ellis, Why People Play, Englewood Cliffs, NJ: Prentice Hall, 1973, p.1.
6. Anita R. Olds, "From Cartwheels to Caterpillars: The Child's Need for Motion Outdoors", Human Ecology Forum, Winter 1980, Vol. 10 No. 3, p. 23.
7. Ruth F. Hartley, Lawrence K. Frank, and Robert M. Goldenson, Understanding Children's Play, New York: Columbia University Press, 1952.

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