

# BUILDING A LANDSCAPE FOR DWELLING

by Michael B. Raphael

B.S.A.D., Massachusetts Institute of Technology, 1979

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Submitted to the Department of Architecture on May 8, 1981 in partial fulfillment of the requirements for the degree of Master of Architecture.

## ABSTRACT

This thesis is an examination of future growth outside of the towns and suburban developments in Upper Bucks County, Pennsylvania. Its aim is to offer projections for inhabitable physical form. These projections will be responsive to the many specific issues of a given site.

Any project contains issues associated with four distinct sizes; namely, Overall Size, Collective Size, Containment Size, and Personal Size. From these issues and their ramifications, this thesis will develop continuities (i.e., of access, sizes, di-

rections, and forms) at each size. The different continuities will reinforce one another in the design of a cohesive place for dwelling.

The design projections will be applied to a 30-unit housing development to be built on 12 acres of wooded land, which is located along the western perimeter of Sellersville, Pennsylvania.

Thesis Supervisor: Maurice Smith  
Title: Professor of Architecture

## ACKNOWLEDGEMENTS

I gratefully acknowledge and sincerely thank the following persons for their support and contributions:

Maurice Smith, for the lifetime's worth of architectural thoughts that he has offered me in only a few terms of exchange...

Richard Tremaglio, for his insight and open-minded attitudes that have helped me to better understand architecture...

Barry Zevin, for his thoughtful criticism from term #1 through term #8...

Bob Slattery, for reminding me what the real task at hand is...

Albert P. Hinckley, Jr., for enabling me to travel throughout Italy, kindling this love of walls...

and my understanding wife Joanne, for offering encouragement and consolation throughout this entire experience.

## FOREWORD

There are only two attitudes towards nature. One confronts it and one accepts it. The former finds but the rawest of materials in nature, to do with, as one will: a form is imposed on chaos. The latter discovers in chaos, a new kind of naturalness—and to naturalize nature is to accept it.<sup>1</sup>

<sup>1</sup>Teiji Itoh, The Japanese Garden: An Approach to Nature (New Haven: Yale University Press, 1972), p. 138

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## SECTION I

# INTRODUCTION

This thesis represents an initial endeavor to integrate several similar, but divergent, interests that I have developed over the past several years. Being in a transient state of existence, as many other students may also find themselves, I have grown to appreciate the solidity and permanence of "home."

An interest in maintaining and improving the positive architectural qualities of "home" is the first component of the tripartite objective of this thesis. The second component is a desire to explore and exploit the construction processes employed in assembling the physical components that support and enclose

a building as a primary means of form and space definition. The third component addresses the explicit understanding of working methods, appropriate images, and concepts that are involved in the generation of physical form.

## FORMING A THESIS

# Home

In order to maintain and improve the positive qualities of the term "home," it is necessary to make observations about specific ingredients of "home," as portrayed in the past and the present. Learning from the positive qualities, and projecting physical changes to alter the negative developments of the recent past, one is able to offer suggestions that will reinforce many of the positive characteristics of home in the future.

There are a plethora of interpretations of the word "home," but I am particularly interested in the connotations of geographic location, community, and built precedent. To me, "home" (Bucks County, Pennsylvania) connotes a place where, in the past, there was an integral relationship exhibited between the natural landscape and the buildings that inhabit the landscape.

the wooded rolling hills offered natural paths for people to follow in their journey from one major city (e.g., Philadelphia) to another (e.g., Bethlehem). In general, the paths that people followed were the ways that offered the least resistance. Paths were established that reinforced the natural directions. It is easier to walk along a river or the ridge of a hill than to move counter to the major landscape directions. Therefore, the major landscape components served as associational cues to people moving through the landscape on their journey from city to city.

Clearings along these paths offered places to stop and rest. At the edge of these clearings, a hotel or store would have been built to service the people who stopped to rest. In some cases, this would become a nucleus around which a town would expand in incremental units.

As I interpret the relationship,

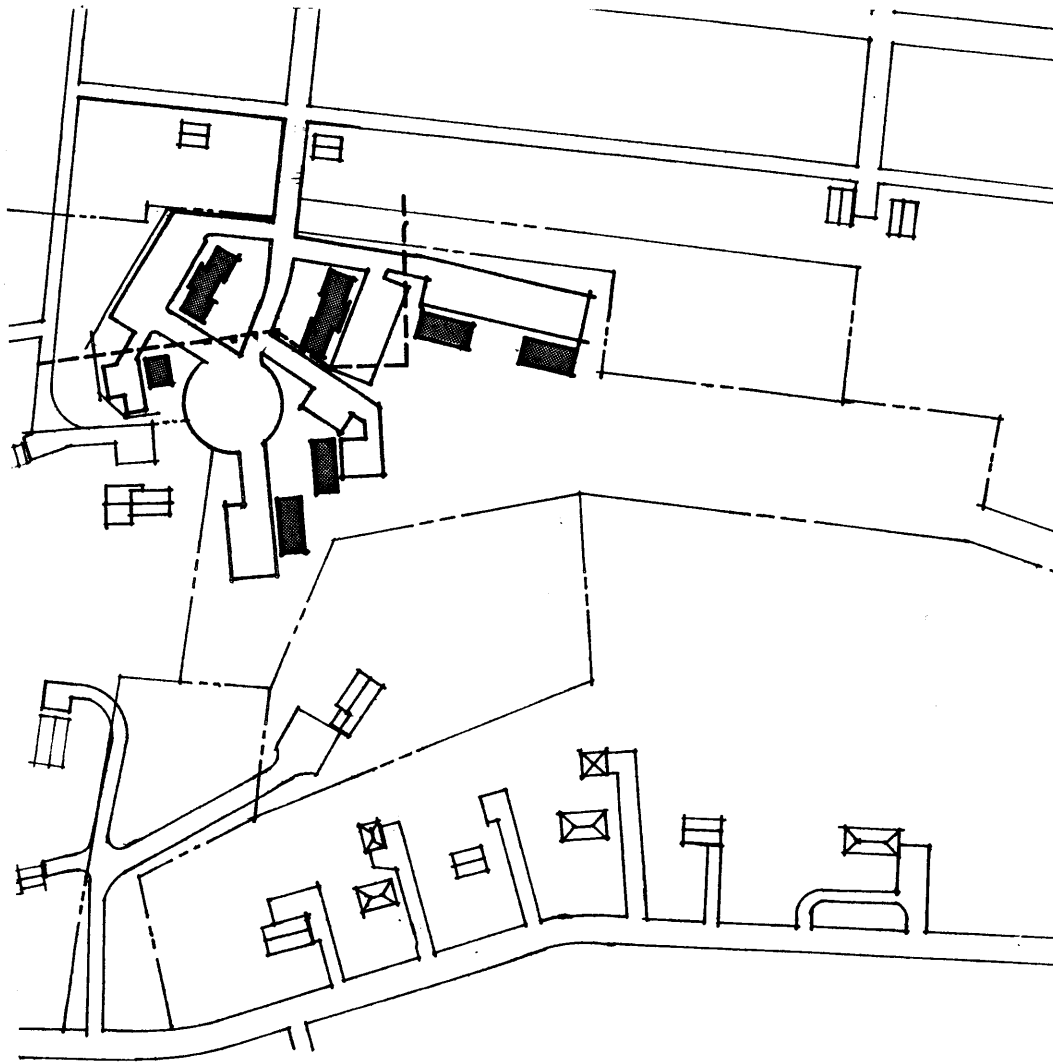
The growth of the town would follow the same associational rules that generated the paths through the landscape. Towns could be understood to take form through a process of acknowledging, reinforcing, and intensifying the natural landscape's edges, directions, and landmarks.

More recently, this geographic understanding of place has been replaced by an understanding of place defined in terms of marketability. Developers of new housing developments no longer show concern for the relationship between the new buildings and the natural landscape. The primary generator of physical form involves the ability for the buildings to offer maximum profits to the developer. The craft of building houses has been reduced to a process of intensifying minimum vehicular access and parking surfaces.

I have been presented with a



plan for a development of this sort, to be built on the outer perimeter of Sellersville, Pennsylvania -- a small town in upper Bucks County. Part of



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the aim of this thesis is to offer physical form projections for this housing development. The focus will acknowledge, reinforce, and intensi-

fy the existing natural landscape, as a positive alternative to the current proposition.

The twelve acre site on which the proposed housing development is to be built is bounded on the north-east by the edge of the town: Sellersville. There are several blocks of houses directly adjacent to the site to the east. These homes were built in the 1920s and 1930s and the structures create a coherent neighborhood fabric.

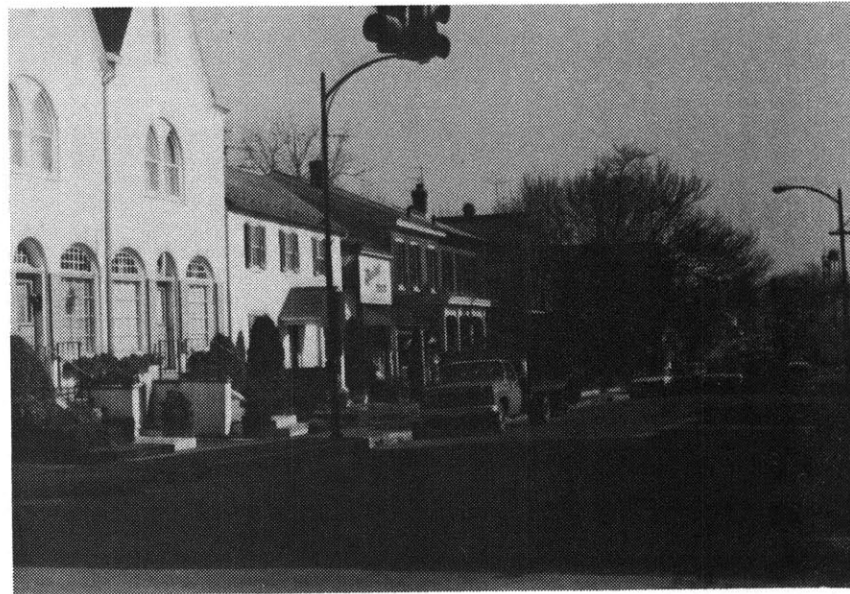
Families live in close proximity to one another, and often interact in collective functions ranging from sharing adjacent gardens to shovelling snow off neighbors' sidewalks to attending an annual Fourth of July neighborhood picnic.

A small commuter train station on the commuter rail lines that connect Philadelphia and Bethlehem is

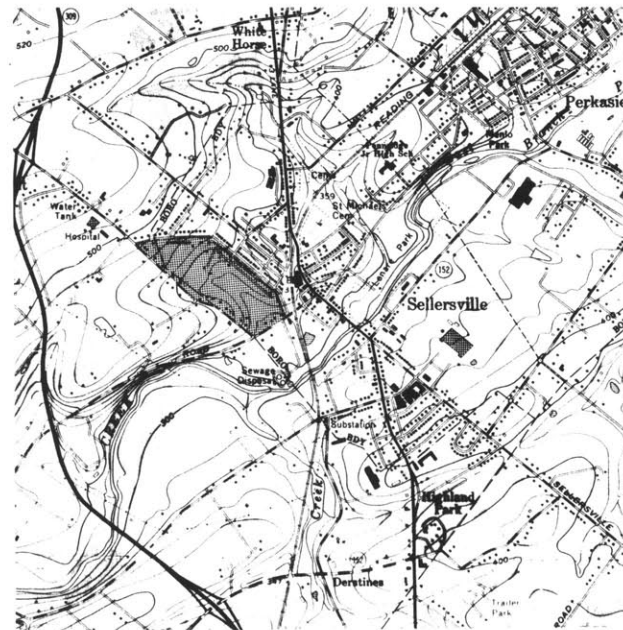
within a five minute walking distance. On the other side of the tracks, one finds an antique shop, a small movie theater, a bar, a deli, a bank, and other various shops which form the nucleus for a commercial concentration in the center of town.

The southeast edge of the site is defined by a public park system consisting of a children's playground, baseball fields, tennis courts, and open land that follows the east branch of the Perkiomen creek continuously to the next adjoining town of Perkasio.

The southwest edge of the site is bounded by suburban single-family residences built in the 1950s. To the northwest and north, a medical complex growing around the area's 200 bed hospital is developing rapidly. A 15-acre public recreation area of swimming pools and tennis and hand-



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ball courts is also in this locality.

It is the objective of this thesis to reinforce the communal components of the existing surroundings through establishing a built landscape. This will consist of a pedestrian walkway that links the commercial, recreational, and medical territories with one another. The pedestrian walkway will then be intensified, creating a village for dwelling, which is integrally related to the community of Sellersville.

The final aspect of "home" that I am interested in preserving and exploiting concerns the quality and sincerity of construction exhibited in the vernacular architecture of the area. One must admire "how sincerely these houses and farm buildings manifest their function; how perfectly they are expressed in the best materials at hand..."<sup>2</sup>

<sup>2</sup>Eleanor Raymond, Early Domestic Architecture of Pennsylvania (Exton, PA: Schiffer, Ltd., 1977), p. 12

Through a sensible attitude for understanding the intrinsic qualities of the available materials, the local builders developed a logical use of materials to achieve various qualities of spatial definition. Whether the builders were constructing massive walls for containment or a lacy post and beam framework for spanning and openness, the buildings of the past exhibit a sincerity in expressing the process of construction. The old homes and barns are products of a straight-forward objective: using the available materials to build a habitable, climate-controlled enclosure that is responsive to the land on which it sits.

The multi-faceted concerns of the present-day builder have overshadowed the true objectives of building. No longer are people building only for themselves or their friends. Many of the present local builders are

speculation developers. An additional objective is adopted to maximize profits.

Often this new objective overshadows the concerns exhibited in the buildings of the past. As the speculation builder attempts to maximize profits, he tries to minimize construction time. This involves reduction of the number of different trades and materials to be used in the structural part of the house. Different materials are used only at the end of the construction process as a veneer or applique to alter the image, consequently raising or lowering the selling price from a known base.

The materials' intrinsic qualities are no longer used in sensible ways to achieve different spatial conditions that are responsive to the natural landscape. Instead, prototypical designs are used that are gener-

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ated by marketable images. The specifics of the site, orientation, materials, and construction processes are ignored.

This thesis will provide projections for designs on this specific site that will serve as a reminder to speculation developers. It will demonstrate that buildings should once again be responsive to the concerns for logical use of ma-

# Construction Process

materials in terms of expressing construction processes and defining the desired spatial condition. This thesis will stress the importance of correlation to the logical vernacular buildings of the past.

The second interest that I will explore in this thesis is directly related to the last aspect of "home" --expressing the process of constructing a house. I will use the components necessary for structural support and weather closure as primary space-defining elements. This differs considerably from the building processes exhibited in the current construction projects. In these, the structural support system is used only as a framework on which to hang a completely different set of materials which "define space." Part of the task of this thesis will entail developing a fuller range of possible interior and exterior enclosure conditions.

Using the most appropriate available materials for desired spatial conditions, I will establish polarities of associational qualities. I will consequently develop a more extensive vocabulary of enclosure definition, ranging from: open to enclosed, sparse to dense, permanent to temporary, dark to light, opaque to transparent, stationary to movable, planar to lineal, heavy to light, and large to small.

The final objective of this thesis involves explicitly documenting working methods and appropriate images that are implicitly understood as essential ingredients in the generation of form. This task poses some major problems. The process of design is inherently a non-linear operation, while the task of writing a thesis is of course lineal, if one expects the pages to be read and viewed in numerical order.



The process of design that I will be explaining in the following pages involves integrating several reciprocating working methods. Information learned in exploring a particular issue will influence results gained in exploration of another issue.

Paul Feyerabend clearly states in his Against Method (as cited in Frank Miller's M. Arch Thesis, 1979) why it is necessary to have several working methods on which one may draw. "The generic advantage of using any particular method is that it gets you out of the bind of having to make idiosyncratic and arbitrary decisions in order to get on with what you want to do. A good working method is like a hatrack; without one you have to carry your hat around in your hand. You need to have a convenient place to hang ideas, tools, and various odds and ends necessary in order to get on with the work at hand."

The working methods that I will employ to design physical form can be roughly defined in five categories: exploration, concept definition, analysis and projection, problem-solving, and integration of analogues.

Exploration involves placing specific boundaries on a subject of inquiry and then allowing the action being explored to offer insight into intrinsic qualities of the materials or processes entailed in the action. Concept definition deals with intensifying and reinforcing initial intentions concerning a particular architectural project, which provides a means of integrally relating each component of the building to all others.

Analysis and projection provides a way of using existing facts as a pool of information to apply to the particular situation, subject to the designer's unique understanding and

interpretation. Any architectural project will also contain a certain amount of problem-solving, where there is a most correct solution which one must seek out.

The final working method that I intend to use involves selecting appropriate images of other places. These images will be chosen as "analogues" according to observable parallel issues to those under study in the given project.

These five different processes of design input will have overlapping concepts as well as some different and possibly even negating ideas. Therefore, the final process of integration entails selecting appropriate proportions of information gained from each of the five facets of the working method.

## ORGANIZING THIS THESIS

In order to address the many issues involved in building a landscape for dwelling, this thesis will undertake four different investigations. These investigations will correspond roughly with a full range of sizes that are associated with a project.

An investigation of the Overall Size will explore reinforcing continuities of direction, size, and form between the natural and the built landscapes. Issues dealing with the site and the community as a whole will be of primary concern in this phase.

A related but different set of issues is associated with a Collective Size. This intermediate organizational device will address issues of access and collective or communal activities. Defining shared use territories for the inhabitants of neighboring dwellings will be the key objective of this phase. This involves establishing a virtual continuity between the poles of private and public territories.

Exploring a continuum of spatial conditions relating to a group of people or to a family defines an investigation of the Containment Size. Exploiting differences between rooms according to orientation will be the thrust of exercises conducted at this size. Some of the orientation differences to be explored are the following: inside and outside, private and public, up and down, and protected and exposed.

The final group of issues to be investigated involves built decisions visible at close proximity or Personal Size. The task of detailing demands understanding the intrinsic qualities of the materials and construction methods available to the local builders. Logical use of the materials is a direct outcome of understanding the intrinsic qualities of the materials. This logical use then provides the means of achieving the different desired spatial conditions projected in the previous investigation.



SECTION II

# OVERALL SIZE

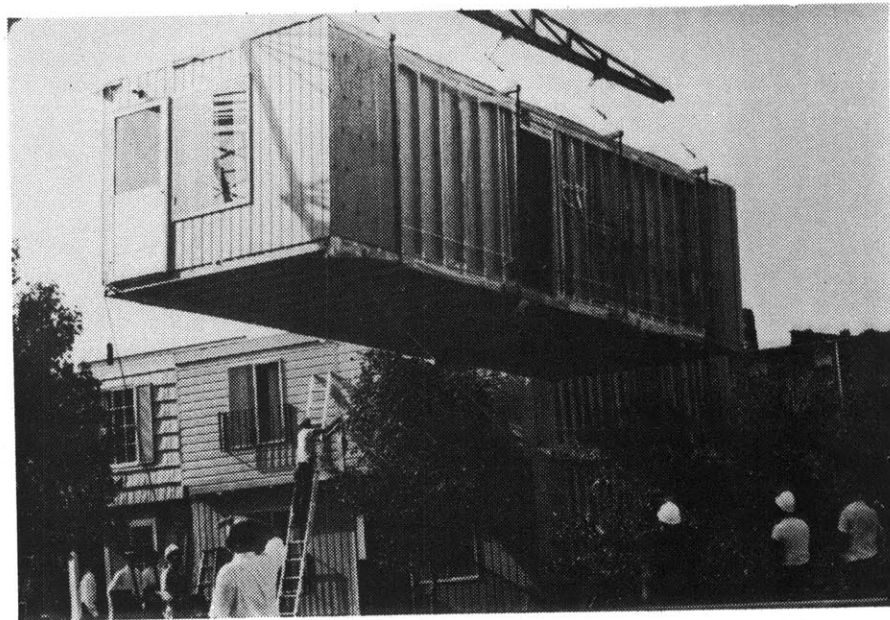
It is the objective of investigations undertaken at this size to recognize the continuities of directions, size, and forms that exist in the natural landscape. These continuities will be reinforced through the process of building. Building is then understood to be an extension or intensification of an already inhabitable landscape.

Of course building is not always thought of in this way. Some view the act of building as a process of making autonomous objects that will be placed on an environmentally hostile landscape.

Explaining building as a process of inhabiting the landscape, this type of building can be described as a VISITOR. The building is temporarily

## INHABITING THE LANDSCAPE

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resting on the natural landscape. There is no reciprocity of form between the building and the land. Sooner or later the "visitor" will be moved away...either by natural forces (i.e. hurricane, tornado, flood) or by truck.

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Sometimes the "visitors" are not moved. They remain for an extended period of time. The natural landscape around the building is intensified to extend the territorial influence of the building.

This type of building can be described as a PERMANENT GUEST. No longer is the building an autonomous object, relating only to itself.

Foundations are extended to create garden walls. Trees and bushes are planted to define exterior zones relating to the building. Different surface materials are used on the ground as another means of extending the territory associated with the house farther into the landscape.

Sometimes the natural landscape is so powerful that minimal provisions are necessary in order to survive in it. An example of this type of place can be seen in Mesa Verde

National Park in Colorado. The natural landscape provides both partial enclosure and horizontal use surfaces. Inhabiting this territory involves building a few walls to provide environmental control - protection from the sun and rain.

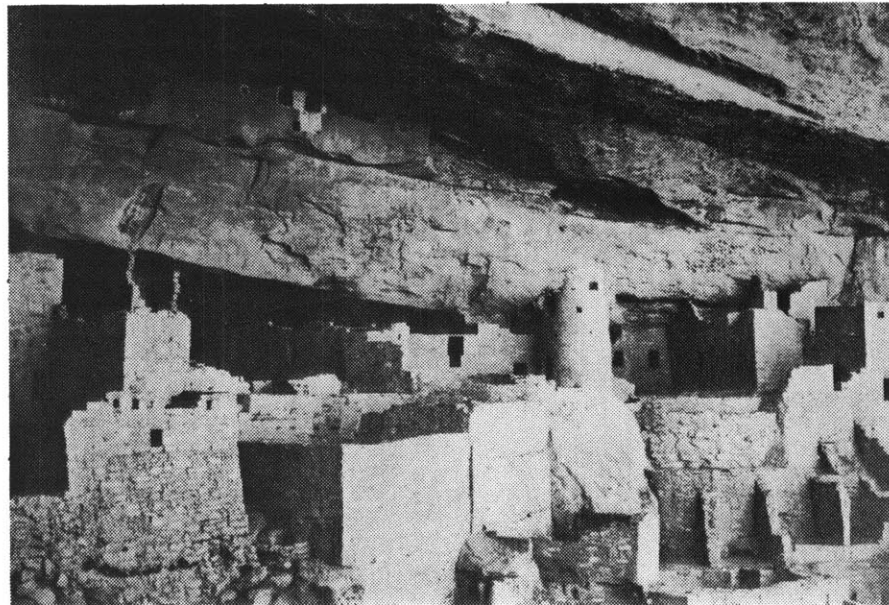
When there is reciprocity of form and of territorial definition between the natural and the built landscapes, the buildings can then be thought of as OCCUPANTS.

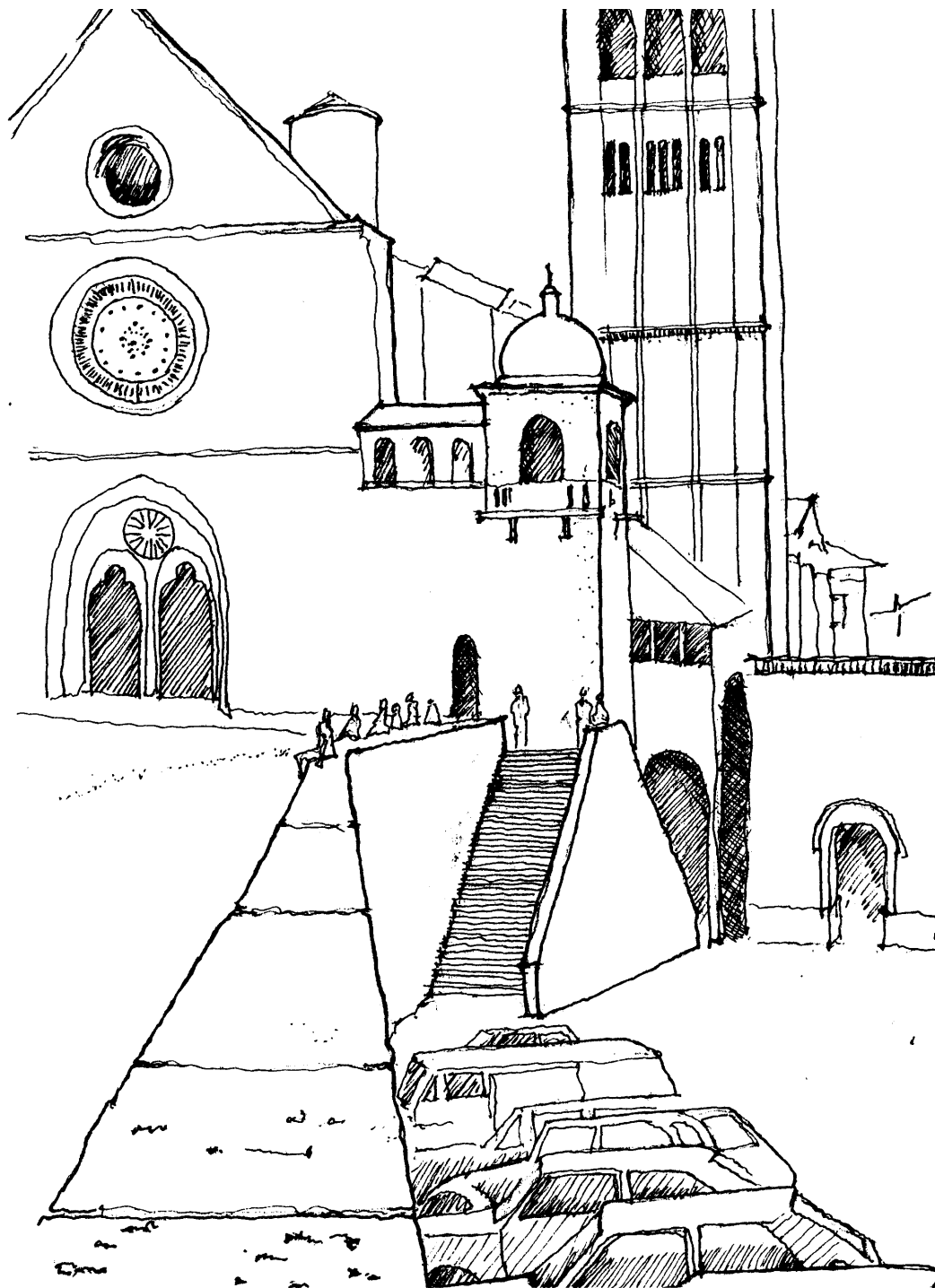
It is rare that we will find a natural landscape that provides such a readily inhabitable territory. Usually we must modify the landscape slightly to obtain partial enclosure and horizontal use surfaces.

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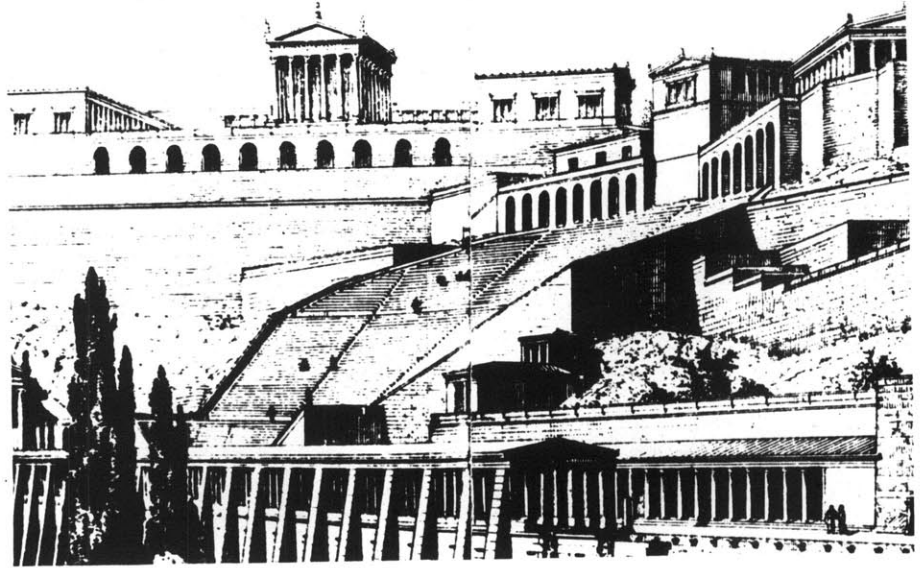


TERRACING - a directional field of retaining walls running parallel to the sloping hillside - can be observed throughout the world. This provides containment and horizontal surfaces for a multitude of uses. In Assisi, an Italian hilltown, the terracing provides a territory for access. Terracing walls also establish places for public gathering in the ancient cities of Pergammon and Athens. In Nepal and Yemen, terracing offers the possibility to farm.

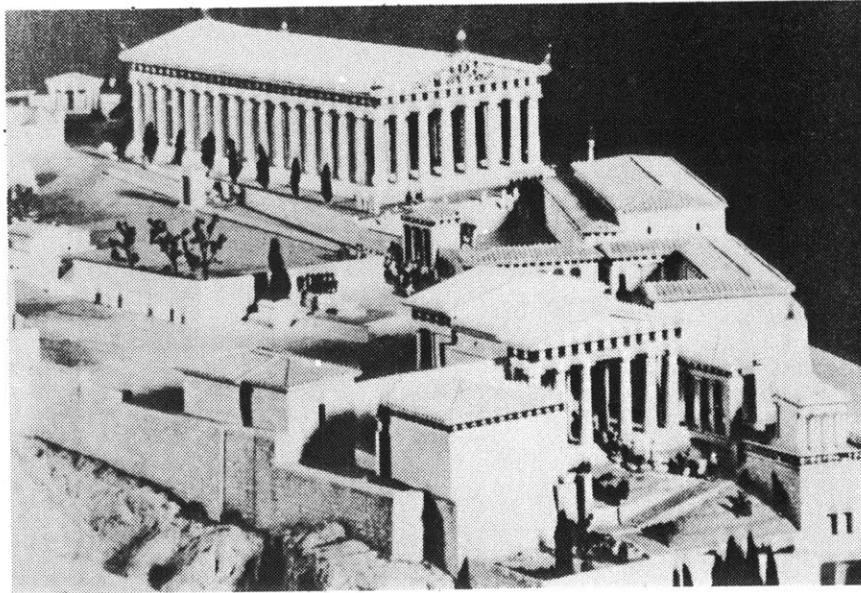
Both the height of the wall and the width of the horizontal surface will vary according to the slope of the land. As the grade approaches a relatively flat slope, the width of the horizontal surface gets very large. Inhabiting the territory defined by the retaining walls may entail more than the addition of a few walls for environmental control.



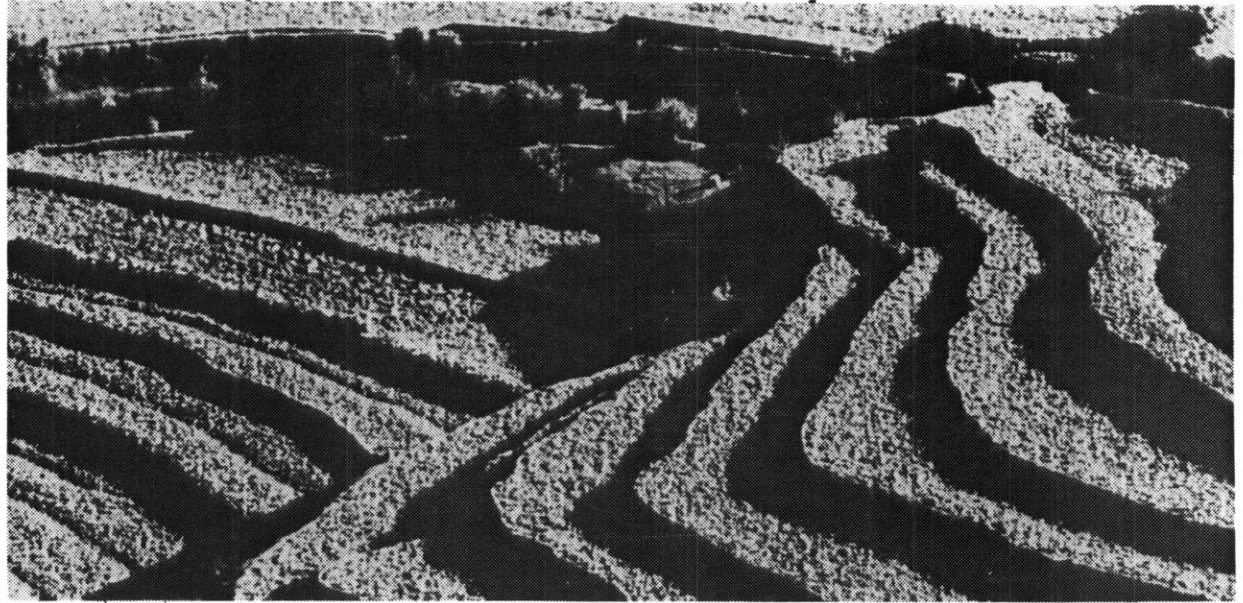
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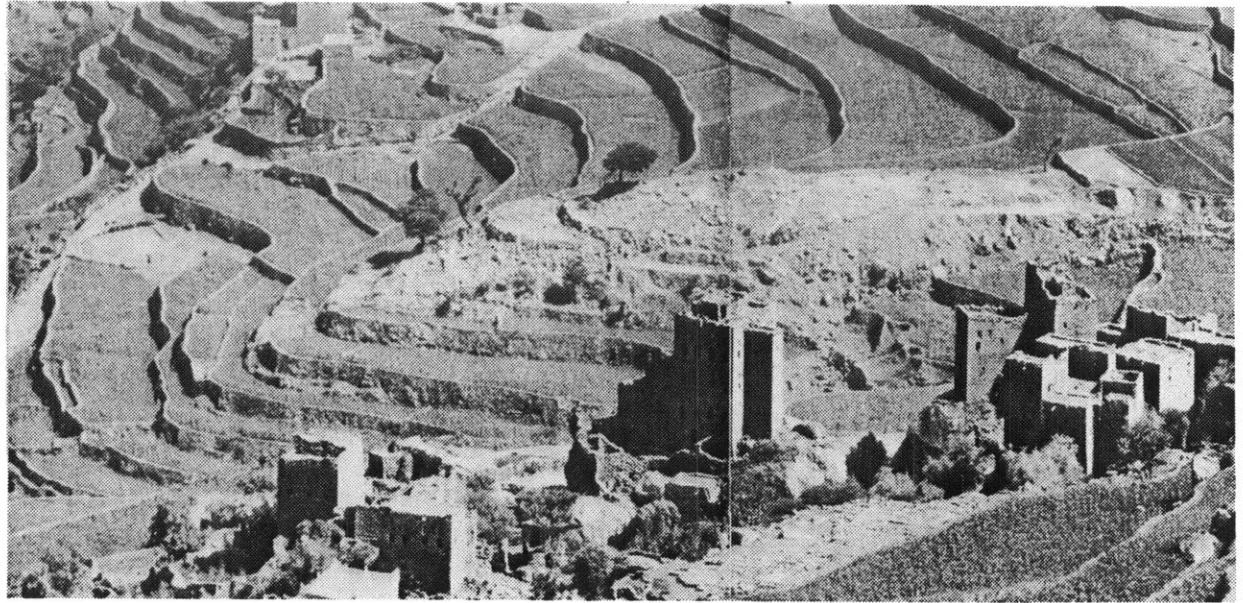
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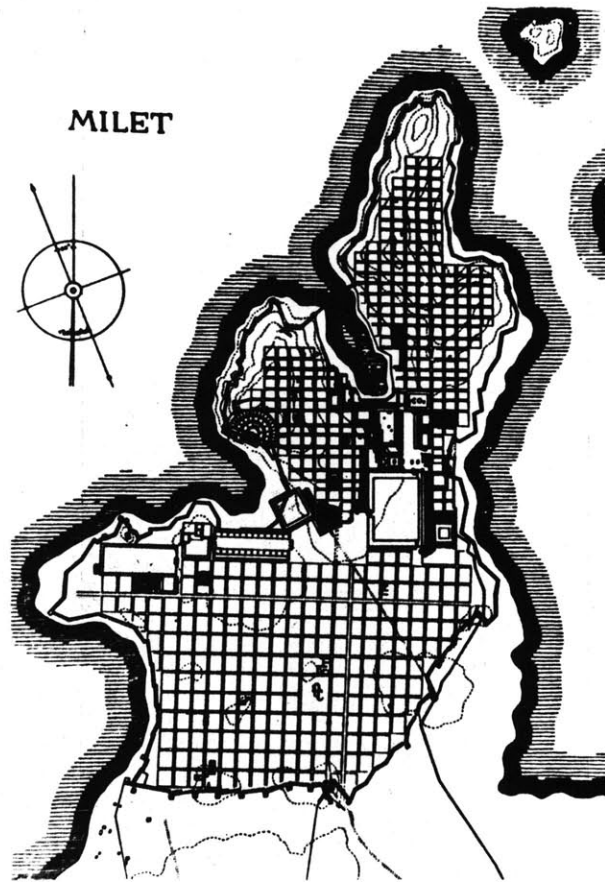


To be able to inhabit the horizontal surfaces, there must be some means of access associated with the bearing walls. There is a limit to the width of horizontal surface that can be serviced by a single access pathway. If the width is wider than the dimensions needed for access and one or two privacies, it becomes necessary to establish a NETWORK for access.

A network can be described as a two-or three-dimensional system for the movement of people, services, and goods.

In the ancient Greek city of Miletus, a network of streets was built along a two-dimensional grid. The major direction of the streets reinforced the direction of the peninsula that the city was inhabiting. The grid of streets was built continuously over the relatively flat terrain up to the edges of the natural

landscape. The exception was a large open area, between two distinct zones created by the natural forms of the peninsula. This area was inhabited by the collective, public agora, as a center of the city.



## INTENSIFYING THE HORIZONTAL SURFACES

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Much can be learned from Miletus as a prototype for city planning. Certain changes must occur to account for the complexities of movement systems in a present day city. A full network consists of the following:

- 1) Regional Vehicular Access
  - a) Arterial Highways
  - b) Urban Collector Avenues
- 2) Local Vehicular Access
  - a) Feeder Street
  - b) Service roads
- 3) Pedestrian Access
- 4) Public Transportation
- 5) Telecommunication lines
- 6) Water and Sewer lines

I explored some of the above issues in an urban design project. This exploration dealt with the land presently occupied by Bethlehem, Pennsylvania. In this project, the networks were built as a framework. A framework is the most permanent element of the physical organization (usually roads and sewers).

Buildings would then be added to this

framework as infill.

Infill can be organized in three different categories:

- 1) Compositional form - complete discreet volumes with free-standing edges,
- 2) Megaform - large skeleton or masterform into which smaller forms are placed. Smaller forms derive their support through the master support, and
- 3) Aggregate form - a system of generative elements; a growth form, created through incremental additions.



In the relatively flat parts of this site (0-5% slope), the network is developed to its fullest. Urban collector avenues reinforce the natural edges of the mountain slope and the river. Feeder streets, service roads, and pedestrian walkways further intensify the territory defined by the natural landscape.

In an attempt to emphasize the natural edges, the space directly ad-

jacent to the river edge and a zone (5-15% slope) between the flat land (0-5% slope) and the steep part (15% slope and higher) of the mountain side, have been left open.

Infilling these areas would be accomplished with primarily compositional forms and the necessary vehicular access roads for each discreet building. In this way the space reads as the continuity and the infilling as discontinuities.

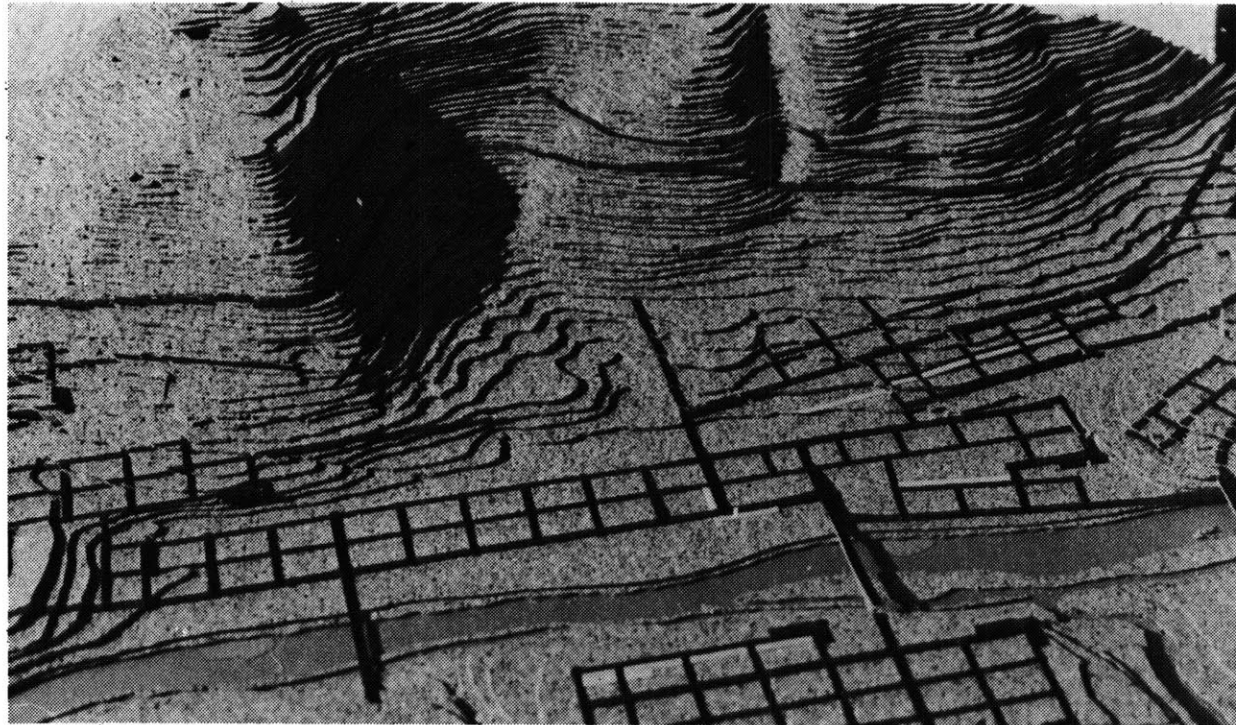
In the flat territories, the building should read as the continuity with open spaces as discrete territories. This is best achieved through the use of aggregate form infil.

In the very steep territories the two-dimensional network is reduced to single access roads (which

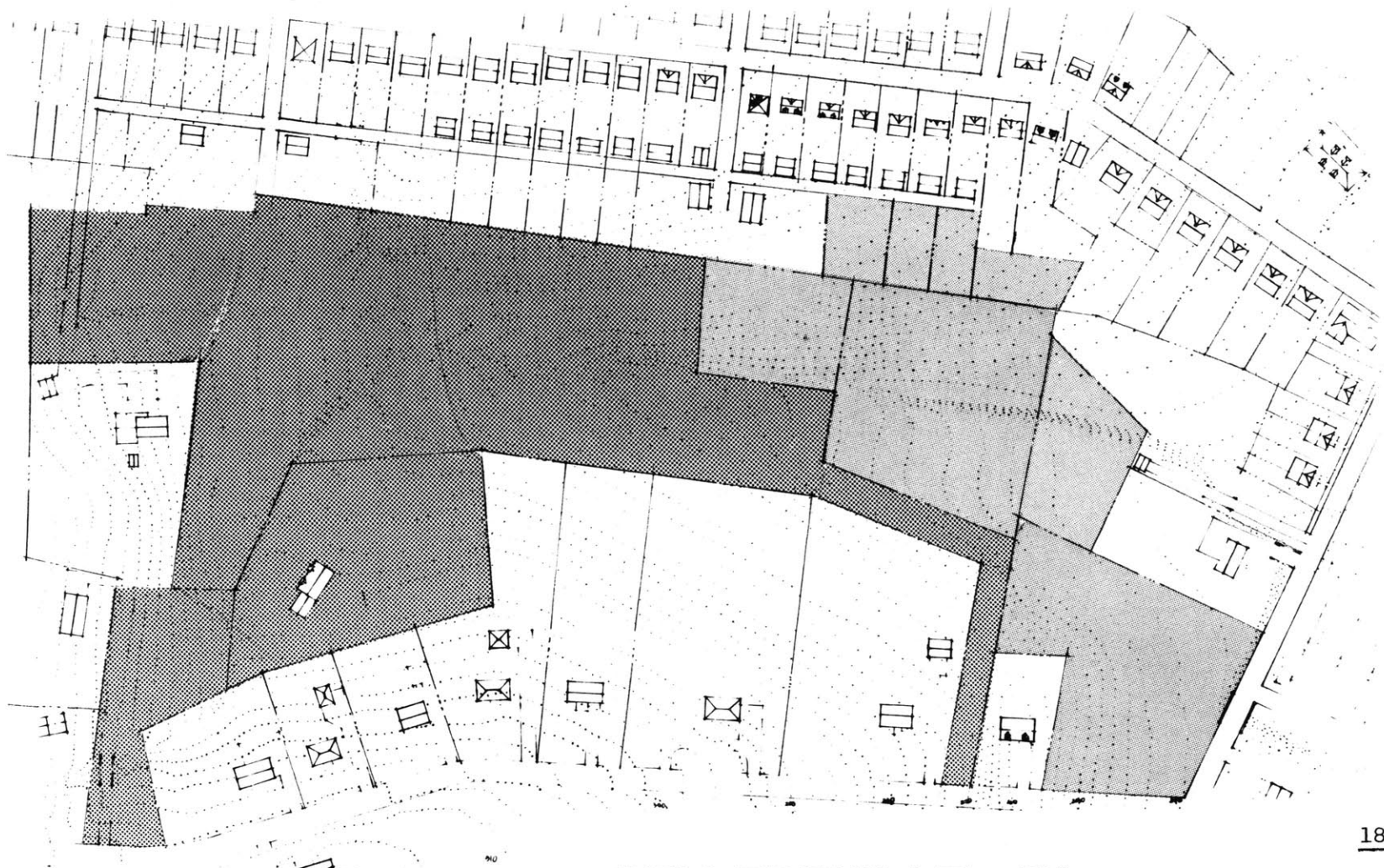
must follow the contours quite closely). The roads can be intensified with any of the three forms of infill:

- 1) retaining walls and wall extensions as Megaform,
- 2) Aggregate form to extend the built territory associated with the retaining walls, and
- 3) compositional form to emphasize the continuity of the hill side.

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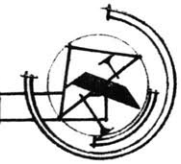
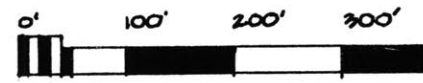


**LIVING WITHIN THE TERRITORY OF EXCHANGE**



# SITE PLAN SELLERSVILLE, PA

- PROPERTY RETAINED BY PREVIOUS OWNER OF FARM
- OTHER "LEFT-OVER" LAND





In this section I will apply the information gained from the previous written discussion to a specific site. Approximately twelve acres of land that once was part of a farm on the western perimeter of Sellersville, Pennsylvania constitute this site.

Throughout the past few decades, individual building lots along the roads surrounding the farm have been sold. Recently, even the farmhouse itself (along with a couple of acres) was sold. Now, all that remains of the farm is a left-over piece of wooded land. The land is bounded by a multitude of rear building lot lines. Several right of ways provide access to the "outside" vehicular network system.

The objective of these design projections is to recognize and exploit the positive attributes of this left-over land. This will enable me to generate a place for dwelling that is

a positive contribution to the landscape and community of Sellersville.

There are several building lots to the east of the site, which, by ownership, should not be part of the site. Nevertheless, these eight lots also share some of the qualities of "left-over land". Therefore, in this thesis, I will assume that all areas shaded in dark and light gray form the territory known as the site.

The strongest physical cues in this site are features of the natural landscape, not components, of a man made framework. The first step in the design of places for dwelling is to recognize the natural edges and their associated zones. A small creek, woods, pastures, and hillsides all give form to specific natural territories.

It is my intention to establish a virtually continuous built landscape, generated within the territory of



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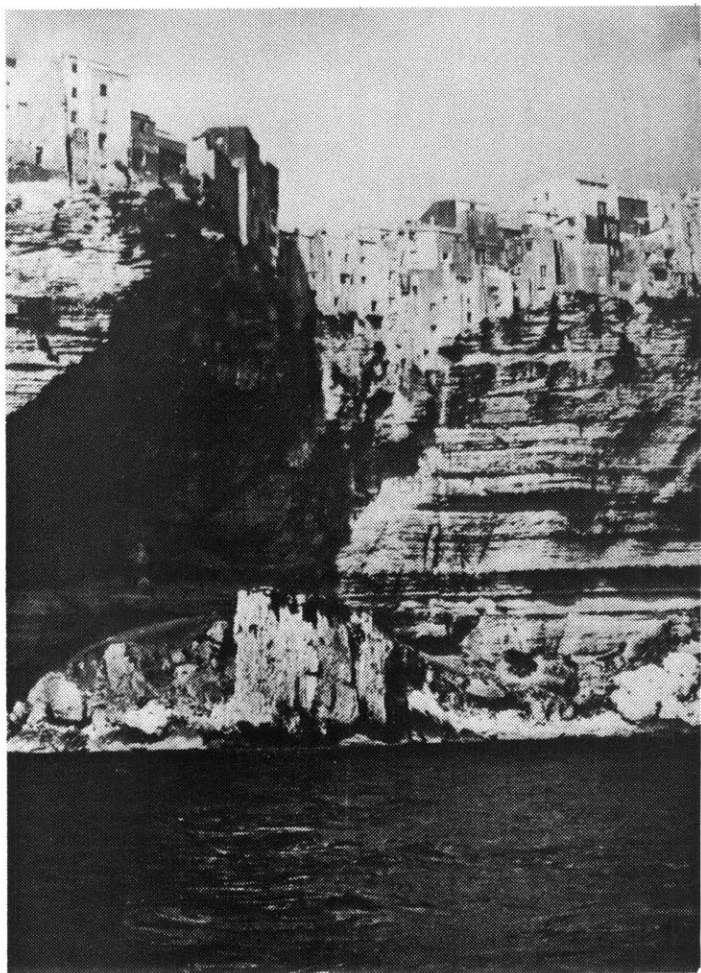


exchange between different natural zones. Through this process, I intend not to reinforce boundaries, but to thicken existing edges of natural zones.

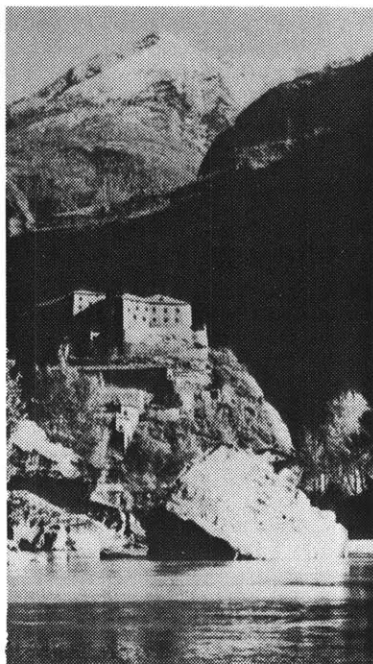
If the dwellings inhabit this built landscape, the occupants will be able to experience a much fuller range of differences. Each zone has particular spatial conditions and physical attributes. Living in the "territory of exchange" enables a person to experience the spatial conditions and physical attributes associated with several zones.

This multitude of experiences offered to people inhabiting the territory of exchange is clearly shown in the Italian hilltowns and buildings of Bonifacio, Aosta, and Vitorciano.

Building portions of the site to achieve a habitable landscape starts

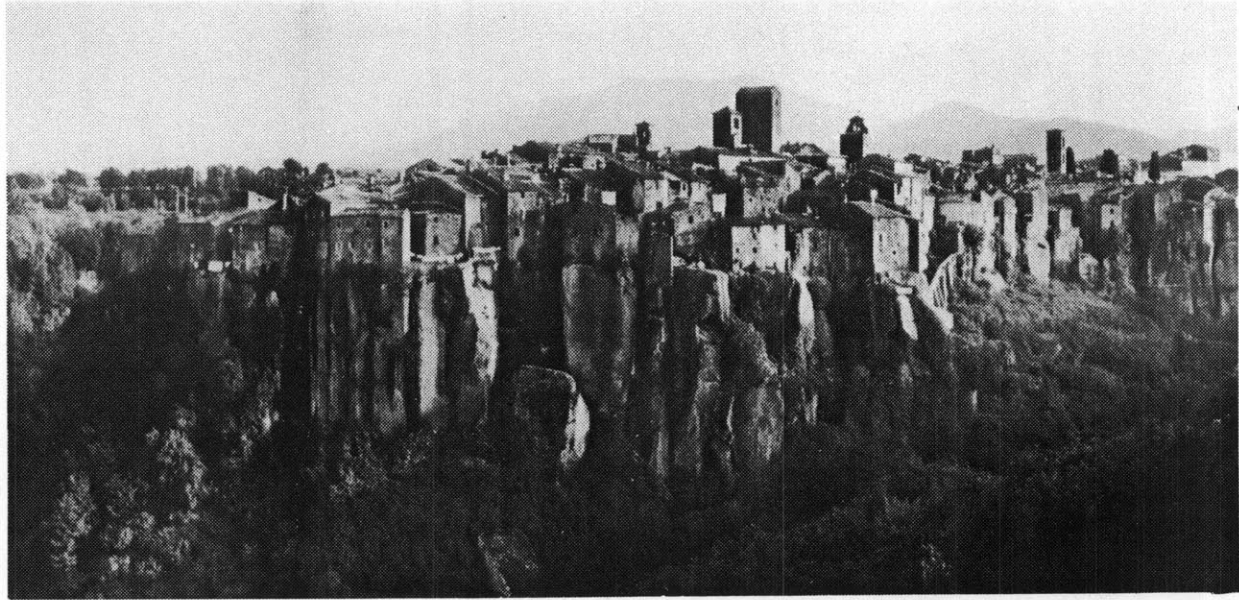


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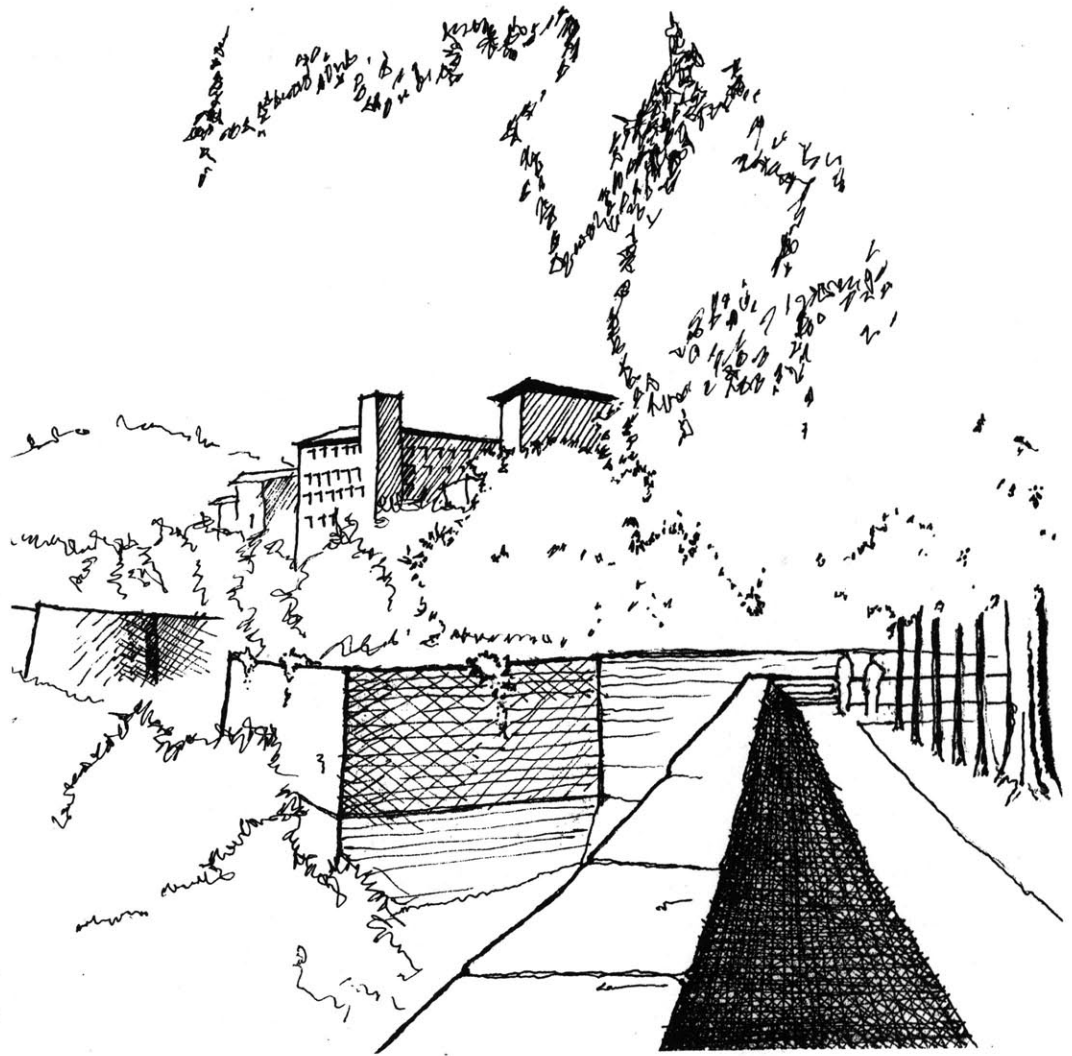
with a process of edge intensification. Within a territory associated with the edge of a natural zone, the physical form should be built more forcefully.

At the size of the site, edge intensification of a natural territory could mean building a directional field of several retaining walls at the edge of the steeper sloped hills. The size of these walls should be on the same order of magnitude as that of the natural territory which they are intensifying. This size may be achieved with long continuous walls, like those that provide horizontal use surface at the edge of the steeper part of Bergamo,

Italy. The same intention may be achieved with a series of parallel walls that collectively add up to a larger dimension. This latter case allows the possibility for more frequent access from one terrace to the next.

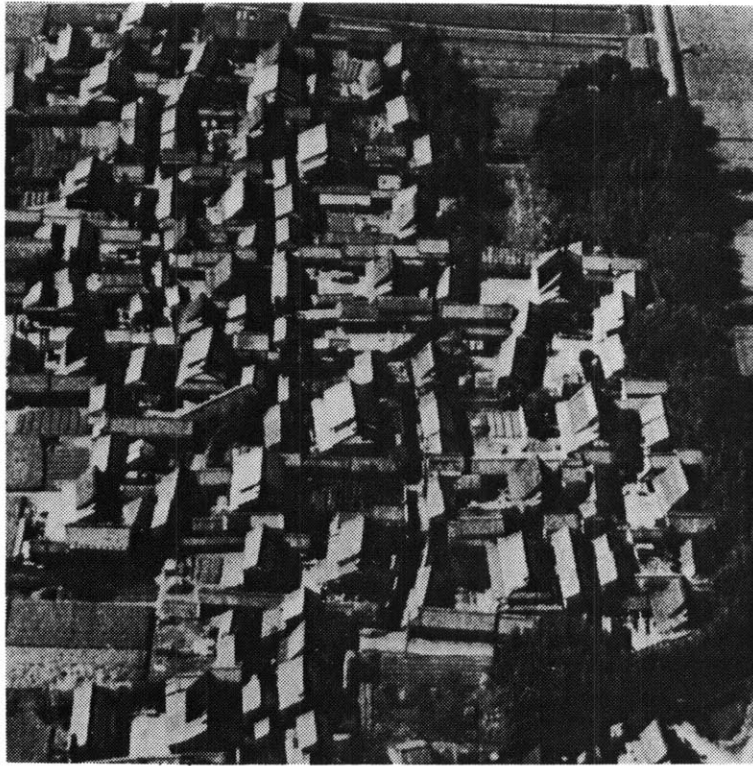
As mentioned earlier, these retaining walls provide partial enclosure and horizontal surfaces making the landscape inhabitable. Certain territories associated with these retaining walls will be inhabited with dwellings. This entails adding aggregate form building pieces to the territory influenced by the large retaining walls.

The aggregate form components will be built in a directional field. This reinforces the major site directions, as well as the long site-sized retaining walls. A directional field of aggregate form dwellings may be seen in both a rural community in



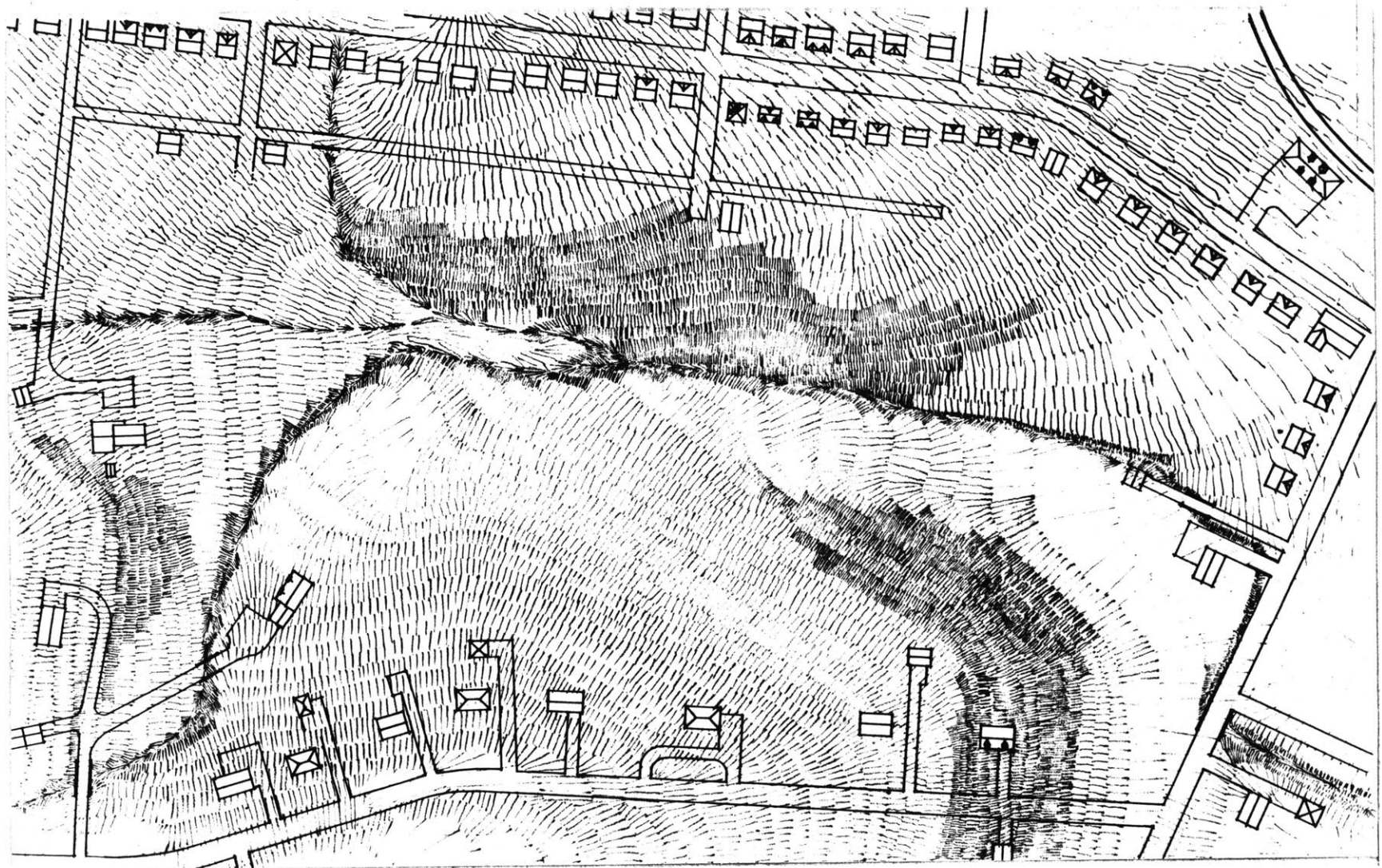


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central Japan, and the Italian hilltown of Casares.

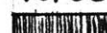


It is not necessary that the aggregate form pieces of physical form are built parallel to either the site directions, or the retaining wall directions. The aggregate form may generate the site in a direction perpendicular to the site directions, or even in an askew direction. This enables the dwellings to be responsive to other directions (such as microclimate, or existing neighborhood buildings) and simultaneously add up to the major direction.

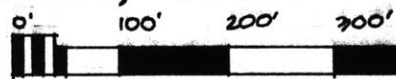


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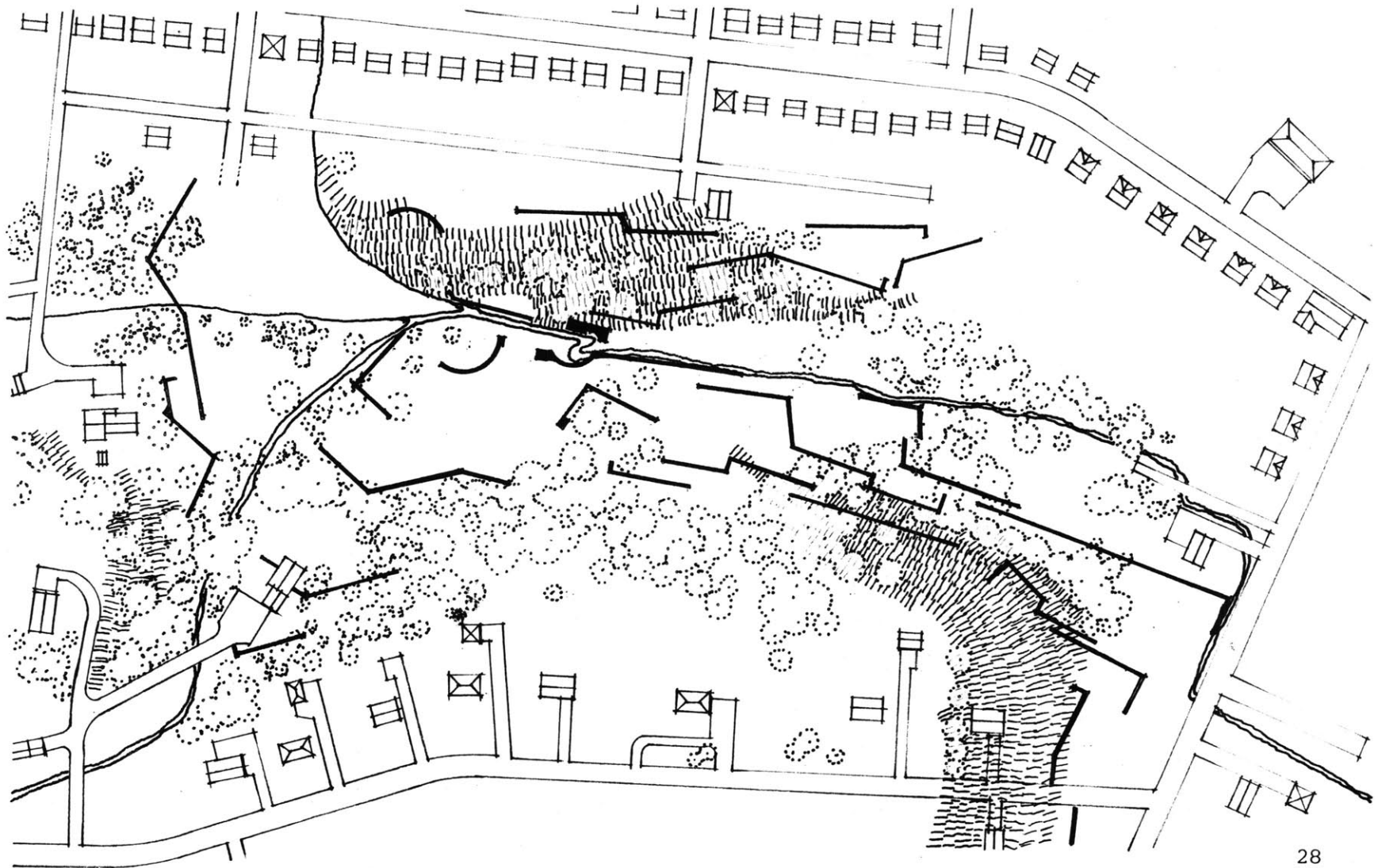
# SITE PLAN SELLERSVILLE, PA

TOPOGRAPHIC TERRITORIES

	12° →	SLOPE
	4° - 12°	SLOPE
	0 - 4°	SLOPE



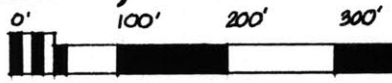
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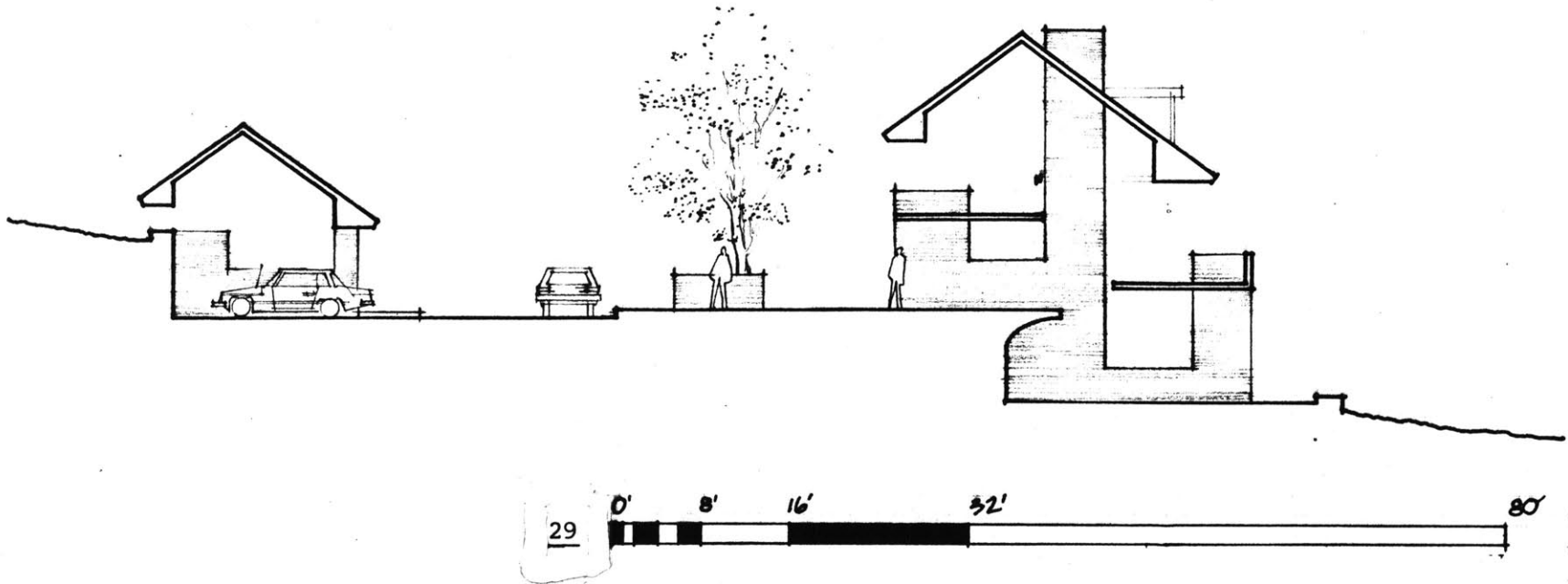
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# SITE PLAN SELLERSVILLE, PA

EDGES OF NATURAL TERRITORIES  
INTENSIFIED WITH RETAINING WALLS







An initial site cross-section shows the dimensions required for inhabiting the retaining walls with aggregate form, access and the external spaces associated with dwellings. Due to the slope of the hillside, and the dimension between the site boundaries and the stream in the center, it will not be necessary to establish a full network system as previously described.



SECTION III

# COLLECTIVE SIZE

"... Man firmly becomes part of nature itself. There is no assumption that there is something better than nature... to insist upon harmony other than the underlying one naturally revealed is precisely unnatural..."<sup>3</sup>

The objective of exercises conducted at this size will be to integrate relationships between man, nature and built form. If building can be understood as a process of intensifying the landscape, reciprocity of form and territorial definition follows. Man becomes part of this integral relationship between nature and built form through inhabitation.

ACCESS through the site, along the built form, and into the privacies is the aspect of inhabitation that is crucial to integrating reciprocal relationships between the three components. By incrementally experiencing the built and natural

landscape through processional access, the occupant is reminded every day of his or her relationship to the two.

The idea of understanding one's relationship to the natural and built surroundings by walking along a processional path is exemplified in the tour garden of Katsura Palace, in Kyoto, Japan. "One may experience the garden only by walking through it... One new view emerges after another... One is a spectator of an experience that opens and closes...Sights are deliberately arranged so that they may not be seen in their entirety from any angle. It is only by moving

## ACCESS

<sup>3</sup>Teiji Itoh, The Japanese Garden: An Approach to Nature p. 138

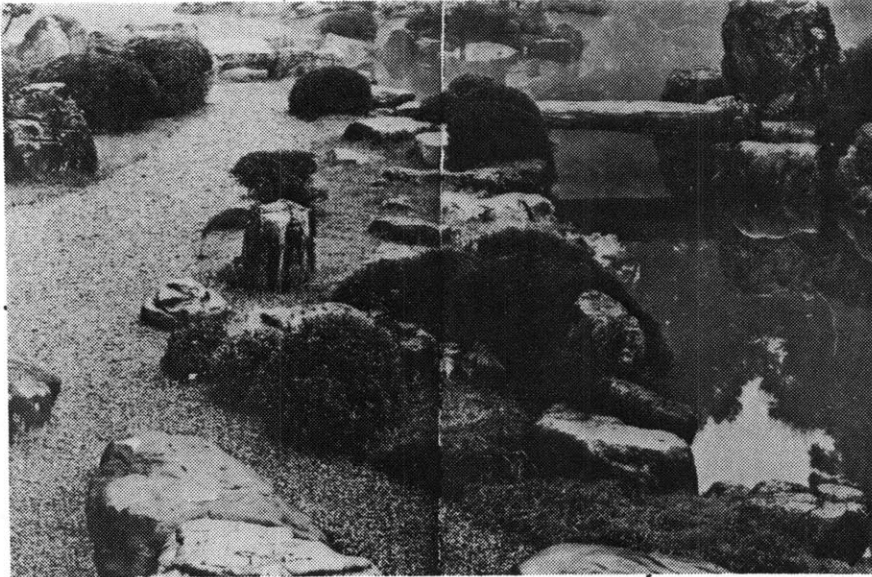
among them that they may be understood and appreciated...one creates the garden by walking through it."<sup>4</sup>

The Japanese tour garden, no matter how many buildings it contained, was always arranged around its path. The path was always generated by moving along and through the natural and built landscape.

<sup>4</sup>Itoh The Japanese Garden: An Approach to Nature, p. 191

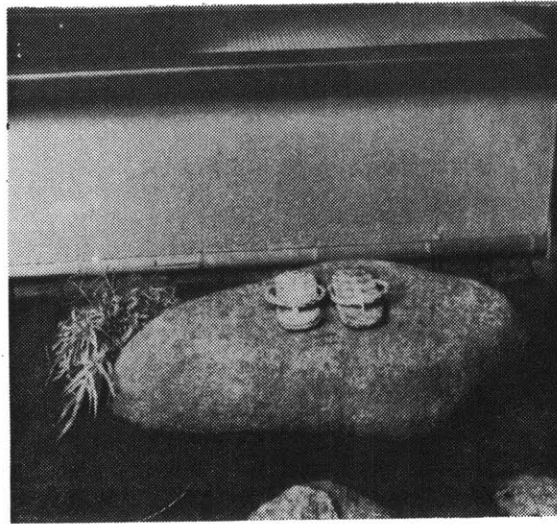
Of course, the public path should be more than just a system for movement. Public plazas in which to sit, observe, congregate, and play must be associated with the pedestrian access system. Once again referring to the design of Japanese gardens can be helpful in designing the location and form of these plazas.

In order to use the Japanese garden as an "analogue", it is necessary to perform a simple mental size transformation. One must consider the "keystones" in the following quote to refer not to foot-sized stones, but to "collective"-sized plazas. "Japanese garden designers devised the rule that the path could not be completed until the locality of certain keystones was determined: the first stone, the last stone, the shoe removing stone, stones for pausing to view, stones in front of lanterns or water basins. Once the



places for these stones were determined, the other stones were placed in a way which was natural not only to the walker, but also to the stones themselves..."<sup>5</sup>

From this lesson, one can extract that the location of the plazas is paramount to the design of the public access system. The locality and forms of the plazas must be responsive to use implications (i.e., access, view, relative privateness...), natural implications (i.e., site components, solar orientation...), and built implications (i.e., site-size retaining walls, enclosure formed by aggregate form infill, surface materials...).



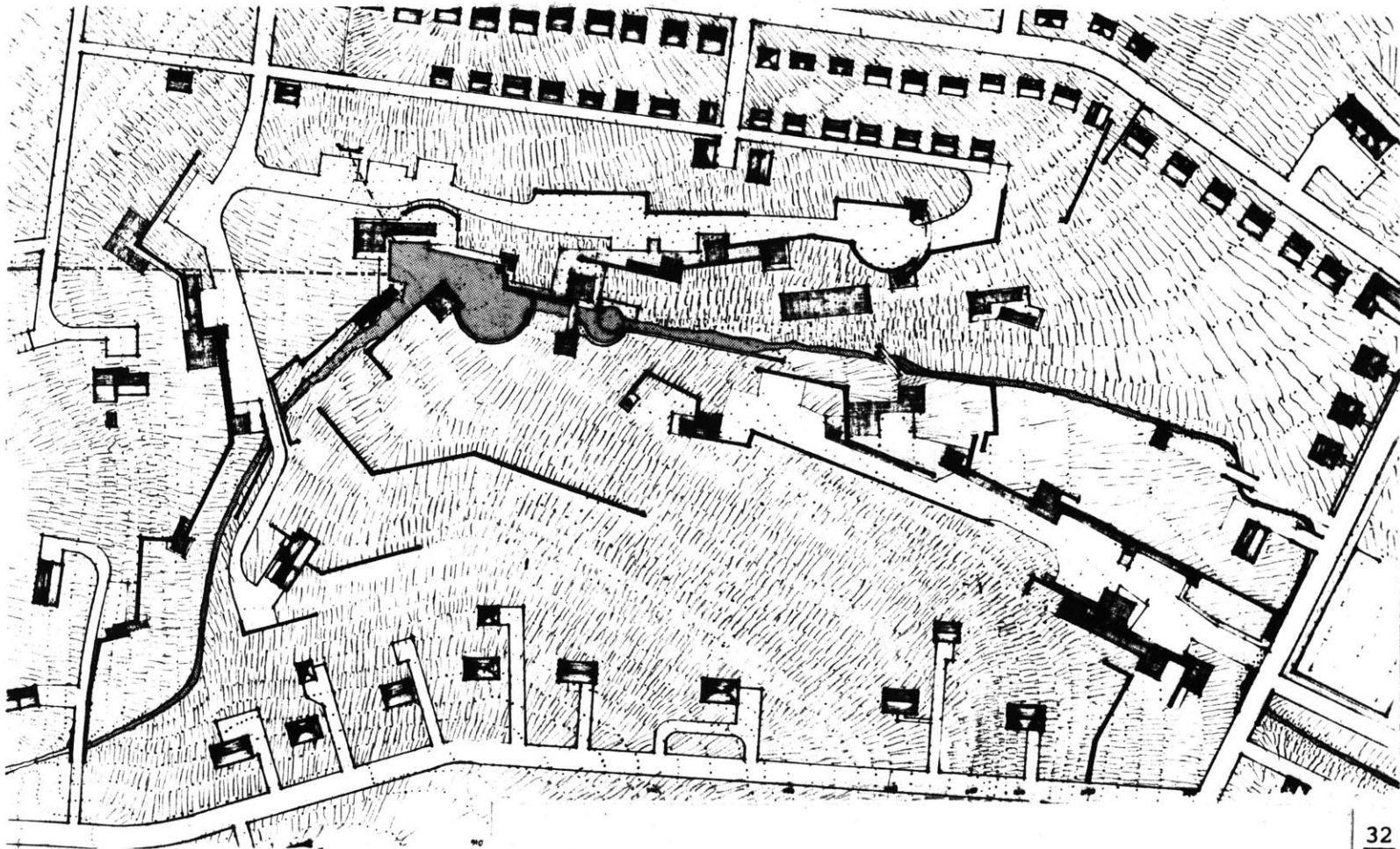
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<sup>5</sup> Itoh The Japanese Garden: An Approach to Nature, p. 187

An early site plan shows some initial thoughts on the design of these public plazas that serve as the "keystones" in the design of a public pedestrian path. The plan shows a concern to reinforce the edges of natural components - the creek, hillsides, and wooded areas. This is realized by building these territories more intensely. The plazas are usually associated with the large retaining walls, although a few do "break away" into the unbuilt landscape.

The plan also shows the intention to establish a relatively continuous "string" of plazas. The pedestrian pathway then becomes the most continuous built element in the landscape. Vehicular distribution contrasts with this continuity. Several extensions of the existing vehicular distribution network service dwellings associated with a group of two or three plazas. There is no attempt to make a con-

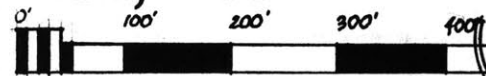
tinuous framework for vehicular distribution. The site will be understood by walking along it, not driving through it.



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**SITE PLAN**  
PUBLIC PLAZAS

**SELLERSVILLE, PA**



# Virtual Continuity Between PRIVATE and PUBLIC Territory

The second aspect of collective size involves establishing a virtual continuity between the polarities of private and public territory. The diagram on the next page shows a cross-section of territories associated with typical dwellings in

- 1) the older part of the town, to the north of the site, and
- 2) the 1950s suburban development.

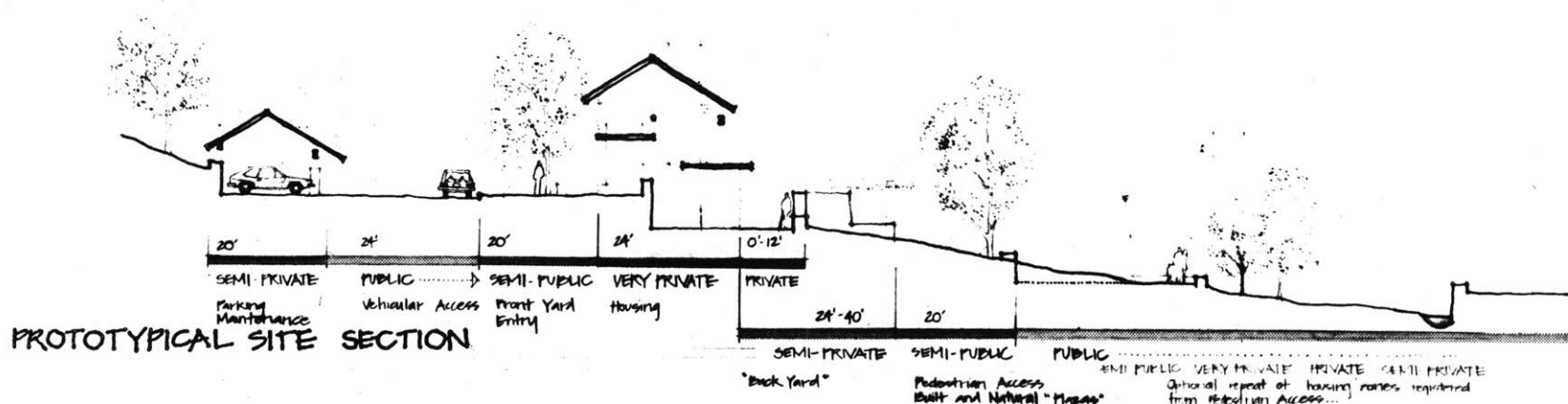
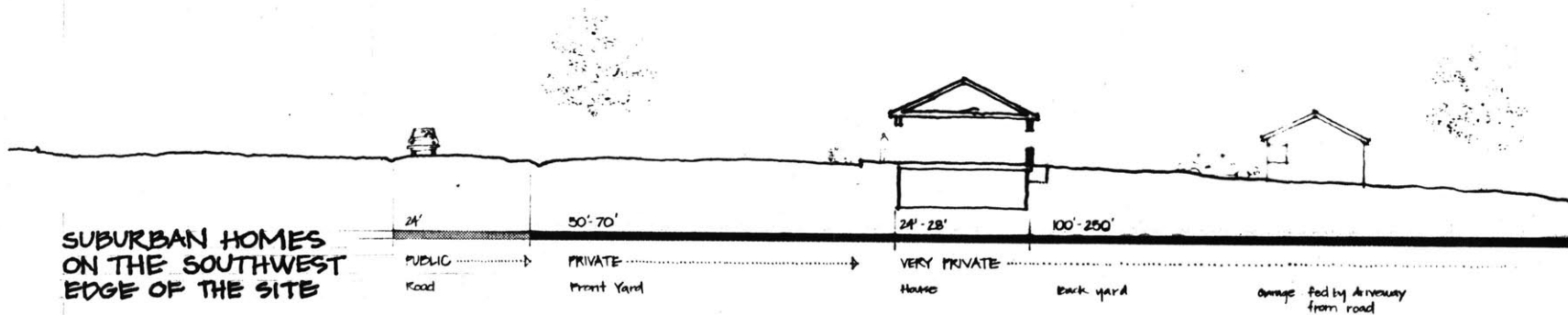
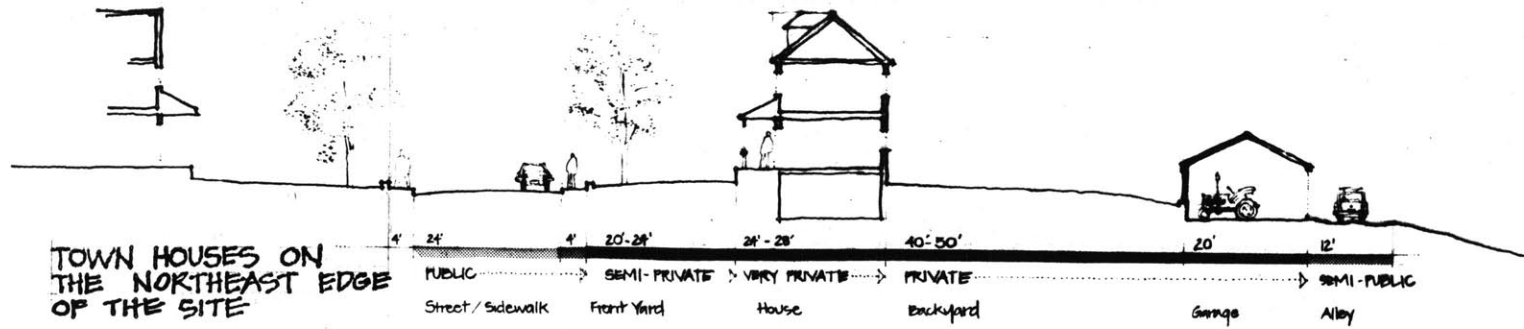
The 1920s house shows a minimal provision for collective activities. The street is public; used by all members of the community. The sidewalk and back alley are semi-public, comfortably used by the local residents. If one were to walk on the front lawn, he would not be considered an intruder, although it is certainly understood that the land belongs to the residents of the house. The house and backyard are private territories, where uninvited people outside of the family would not be welcome. The

The 1950s suburban house provides a sub-minimum allowance for collective use. Besides the road, which is used by cars, not people, all territory associated with the house is private.

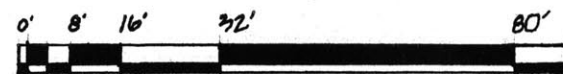
The third diagram is an initial attempt to provide for more than the minimal collective use. There must still be a private territory defined by built form. There also should be allowances for territories to be used by neighboring families, as well as territories to be used comfortably by any member of the community.

People need the option of controlling their contact with other activities and people. There is a great difference between optional privacy and isolation. In the older town fabric, people achieve the desired amount of privacy by at least two means. In some cases, people built more physical definition - low walls, screens, and level changes -





## TERRITORIES NECESSARY FOR DWELLING



## Territorial NORM Defined By BUILT LANDSCAPE

to achieve privacy. In other instances they merely retreat to more protected interior spaces. Either method offers the option to interact with one's surrounding neighbors.

Without physical definition that establishes territory, people have difficulty regulating when and with whom they will interact. Often to ensure privacy in an underdefined landscape, people attempt to maximize their personal space. This of course provides for privacy, but offers no opportunities for occasional public interaction. This can be illustrated in the suburban homes built in the 1950s.

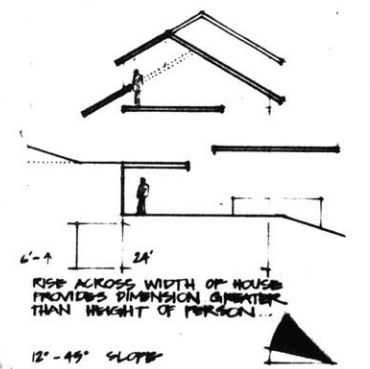
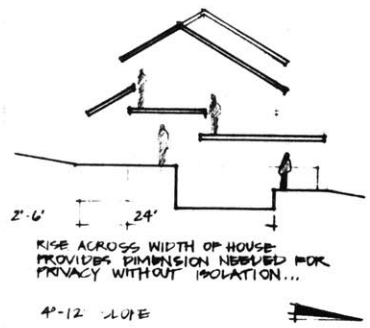
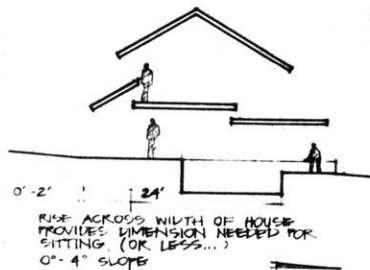
It is the intent of this exercise to define a continuum between polarities within this new community for dwelling. Very private, private, semi-private, semi-public, and public places should exist within the fabric of the community. Built definition

will provide clear boundaries to each different territory.

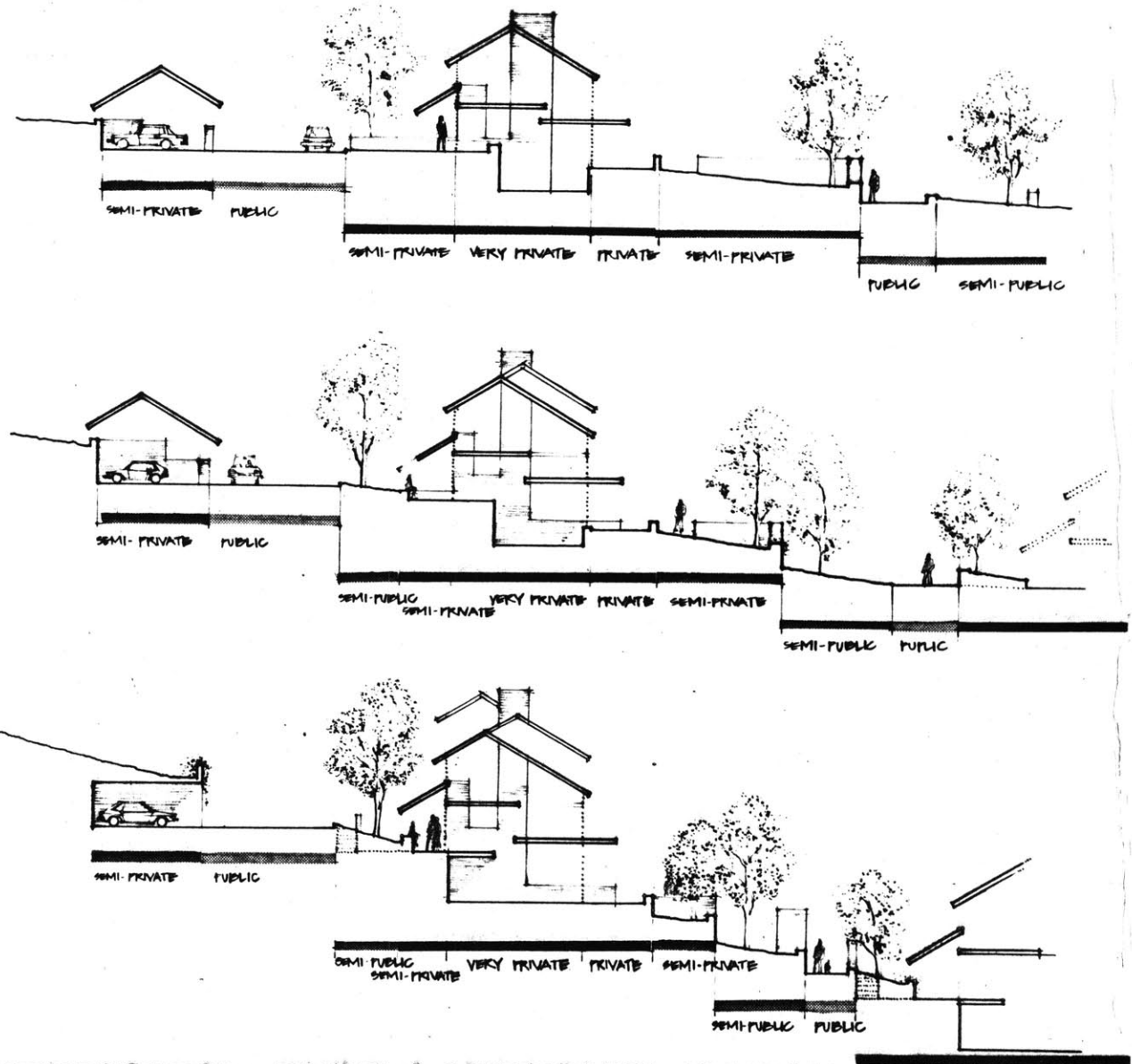
People will then have the choice of withdrawing into protected privacies or engaging in collective interaction with neighbors. Individuals will not be forced to lead lives that are always dictated by total privacy.

I will develop a prototypical built landscape that establishes an understandable continuum of territories, ranging from private to public. The norm will then be altered to accommodate for specifics of the exact place in the landscape that it will inhabit. The following are specific issues that will result in altering the norm:

- 1) topography changes
- 2) solar orientation
- 3) relative privateness desired
- 4) amount of built definition desired



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**PROTOTYPICAL BUILT LANDSCAPE**  
respect to topography differences

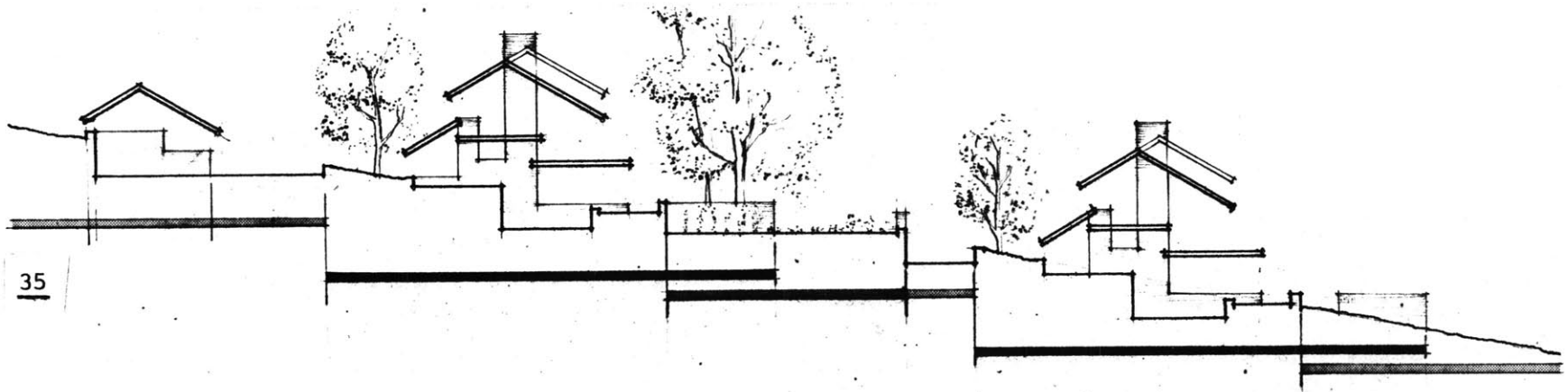
changing with  
51

- 5) relationship to the access pathways
- 6) relationship to site-size retaining walls

Some possible uses of the land labelled as semi-private or semi-public are the following: places to sit and watch, children's play areas, gardens and farmland. If people would grow flower or vegetable gardens, the land could be thought of as "rentable" land.

This land could be rented by the community as park or open space. It could also be rented by an individual who either wishes to expand his private territory or to grow a large garden -- perhaps to grow food which could then be sold to other people within the community.

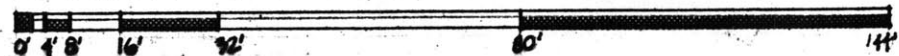
Transferring this information as portrayed in section, to information portrayed in plan, involves several



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### PROTOTYPICAL BUILT LANDSCAPE

PRIVATELY OWNED  
RENTABLE  
COLLECTIVELY OWNED

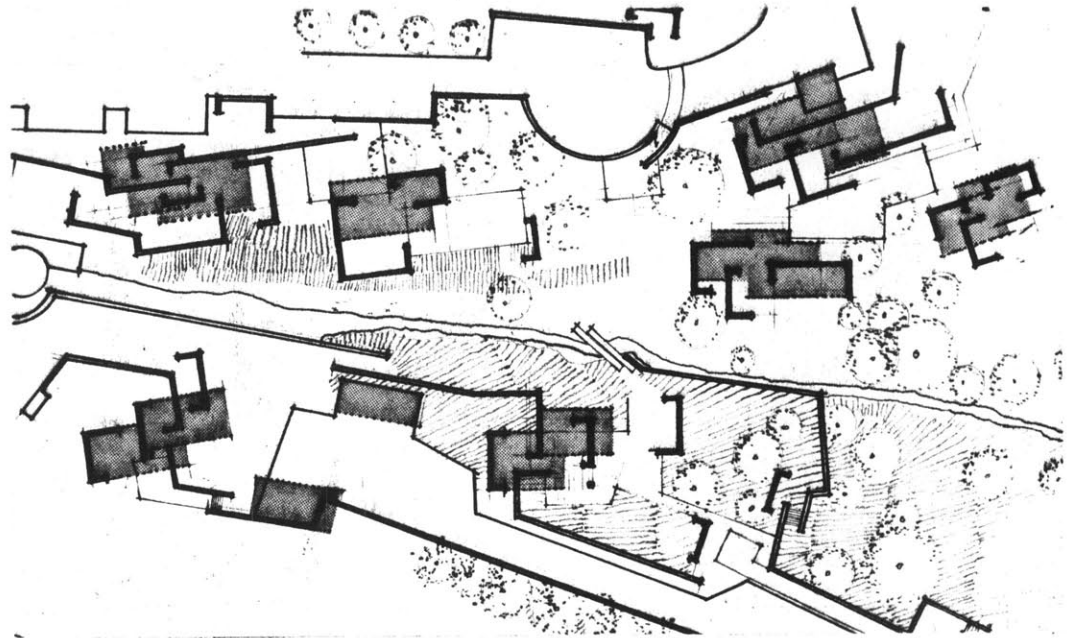


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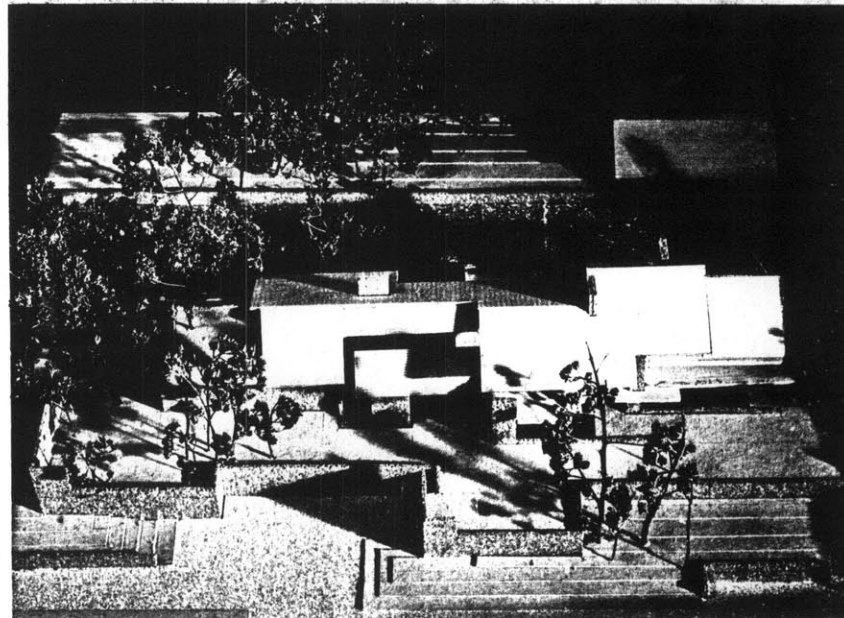
steps. First, aggregate form infill is added to the site-size retaining walls and to the edges of the public plazas. This establishes the approximate locations of dwelling units.

Several dwellings can be massed together to collectively form a building. A building which contains one middle and two end units can take advantage of shared semi-public territory without undue loss of privacy for each unit.

Collective activities associated with vehicular distribution occur to the north of a building. Pedestrian access from parking spaces and an entrance territory for the three units establishes a semi-public zone associated with each building. Semi-private porches provide a controllable entrance into the privacies of each home.

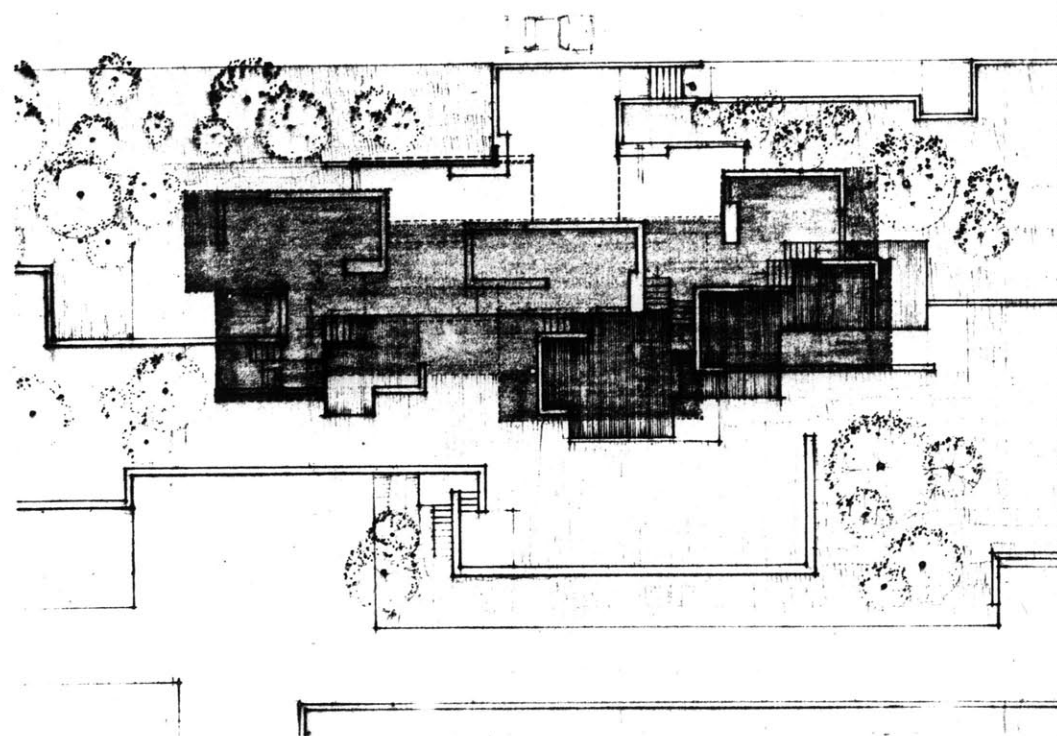
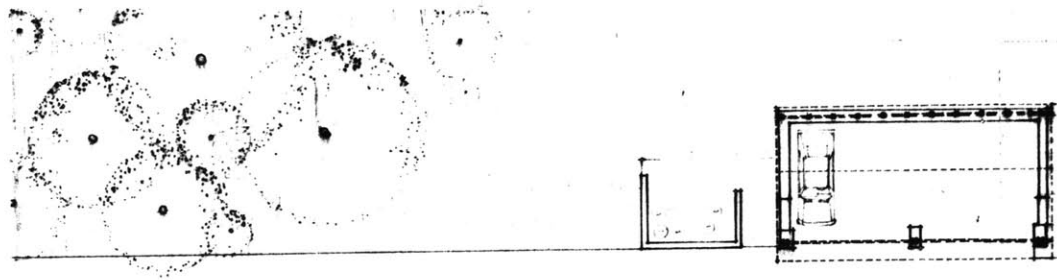


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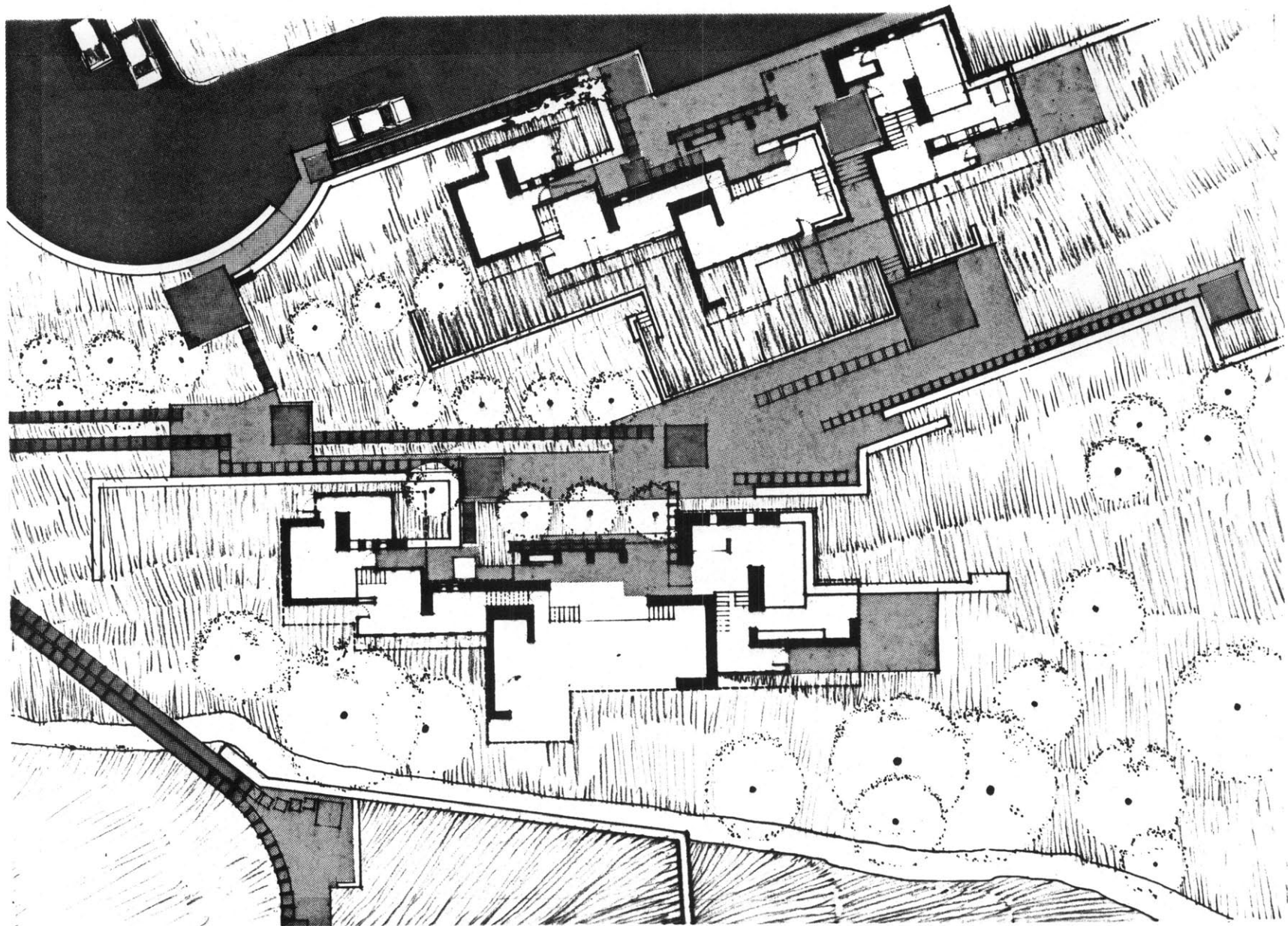
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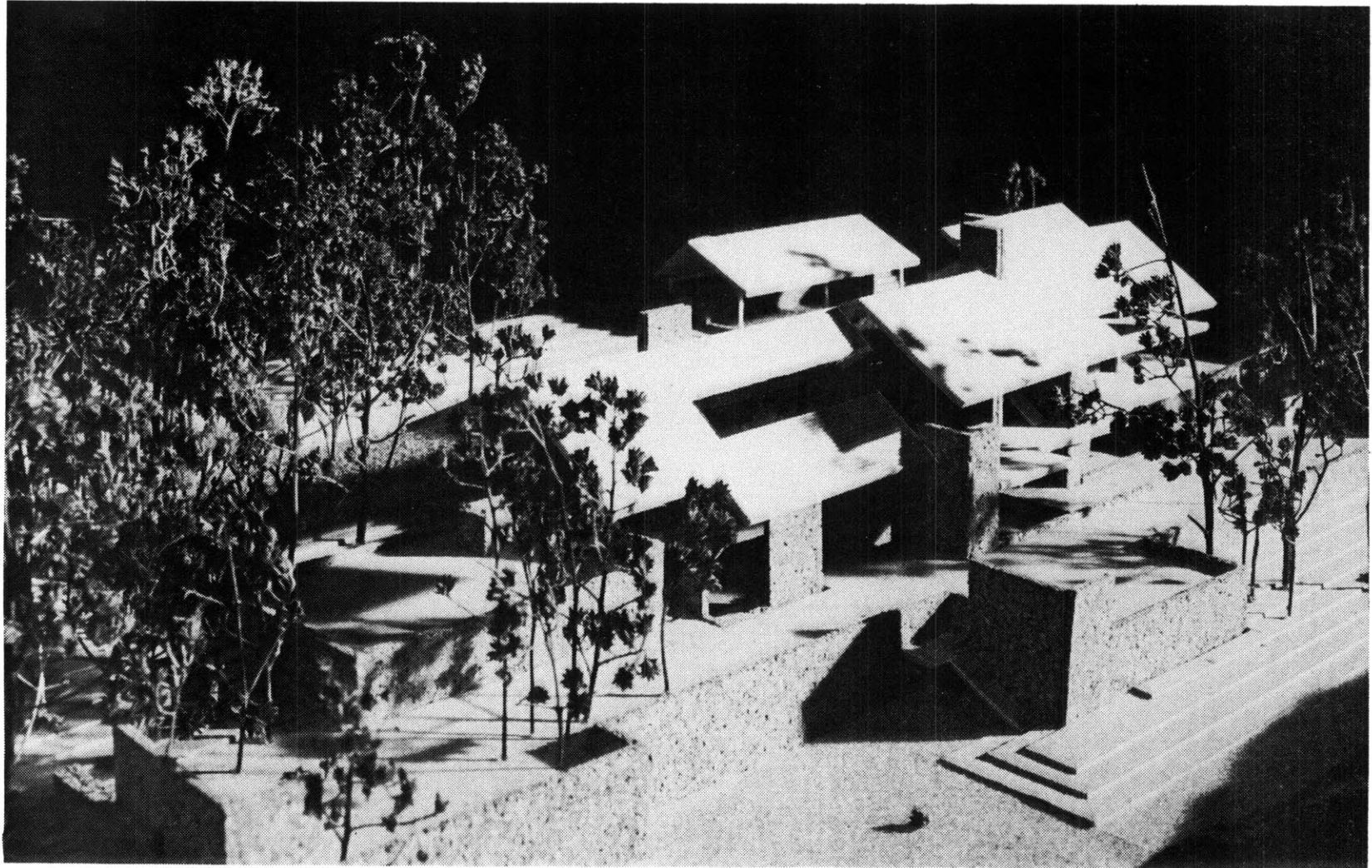
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In fair weather, the privacies expand outward to take advantage of the southern exposure. Semi-private outdoor terraces overlook the public path and its accompanying semi-private places to sit.

Another building could repeat this pattern to the south of the pathway. This would give a plaza more enclosure or containment. Because the lower building would be located along a pedestrian path, not a vehicular one, parking would be located in a remote position. The pedestrian path could be used for limited vehicular access for drop off and emergencies.







SECTION IV

# CONTAINMENT SIZE

Using architectural fragments from local vernacular buildings, I will develop aggregate form infill components. The components will serve as an architectural vocabulary to be used in the design of dwellings. Different forms of the vocabulary will be extracted from the large extended family farmhouse of the past, as well as the old Pennsylvania Dutch barns.

Forms which are understood to be part of the local architectural heritage can be reapplied to meet new housing demands. There is a difference inherent in this reapplication, however. I will generate buildings for higher density dwellings than the

buildings owned by single families, from which the forms have been extracted.



Physical Form  
to Offer  
**PARTIAL**  
CONTAINMENT

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I will adopt no complete forms from the past. To do this would require packing new demands into a building constructed to satisfy different concerns. I am interested in developing a building vocabulary that offers partial containment. Containment is defined as the act of holding. The elements being "held", in the architectural use of this word, are people. Perhaps "protecting" or "sheltering" could be substituted for "holding" to arrive at a more apropos definition.

If the vocabulary element offers containment that is too complete, like a box or cell, then people are being stored. While offering protection, a building component that is too complete results in defining spaces that are totally isolated from one another. On the other end of the spectrum, if the building component offers insufficient containment, like a plane, not enough "protection" or "shelter" will

be defined by any one element of the vocabulary. A plane is two-dimensional by definition, and is therefore hardpressed to define space, which is three-dimensional.

I am interested in developing three-dimensional, incomplete forms. The roots of these forms should be deeply imbedded in vernacular buildings of Pennsylvania's rich architectural past. The massive stone end walls (and the associated returns of the walls that offer lateral stability) of the old Pennsylvania barns are an example of vernacular building fragments that can serve as aggregate form building components.

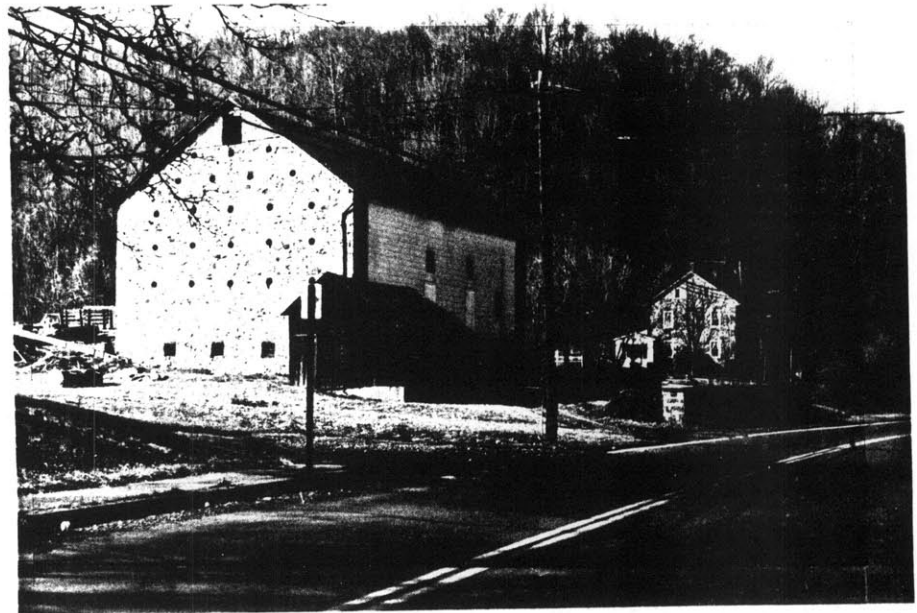
One can think of the site-size walls as a framework on which to add these aggregate form infill components. This will intensify the territory associated with the walls, thus providing for additional partial containment. In this way, the landscape becomes

suitable for dwelling.

The partial containment offered by these aggregate forms allows the possibility to expand and contract the defined space. According to a person's mood, the desired amount of privacy, or even the outside weather conditions, boundaries of the defined territory may change.

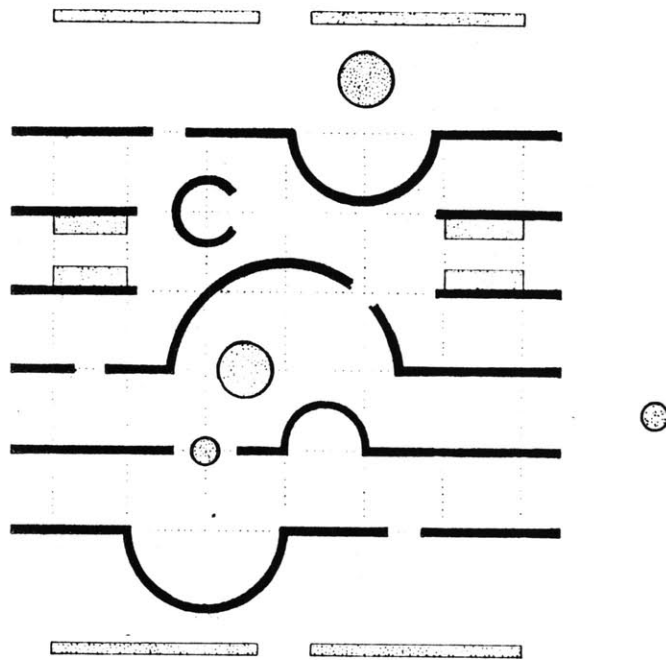
There is always a minimum territory associated with a containing form, offering "shelter" or "protection", into which a person can retreat. In very cold weather, the occupants of a building may retreat deeply into the center of this territory. Movable screens can provide environmental control so that only a very small, contained area must be heated to a "cozy" temperature. In warmer weather, the screens defined by the containing form could expand out into the open air. Partial containment forms provide the opportunity to expand

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and contract the space to the appropriate degree for the situation at hand.

These containment forms will be constructed in such a way as to create a directional field of building components. In the architectural sense of the word, a field can be described as a territory in which the location of the different components inhabiting it can be determined, as a result of



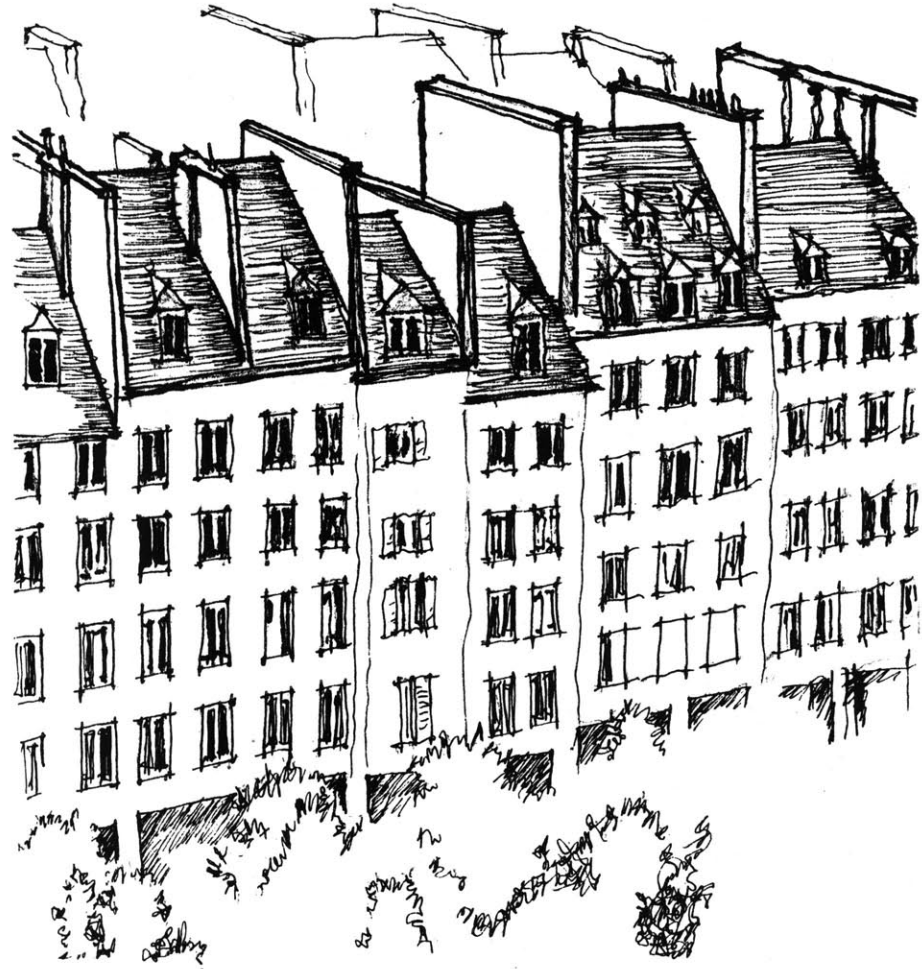
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their reaction to certain discernable forces. Most "forces" that are applicable to architectural definition behave in a directional fashion. The sun's rays, the sloped hills, the flowing creek, and the paths of moving inhabitants are all reacting to directional forces. The containment forms will be built in response to these same forces. Therefore, it is reasonable to expect that these components will set up a directional

field.

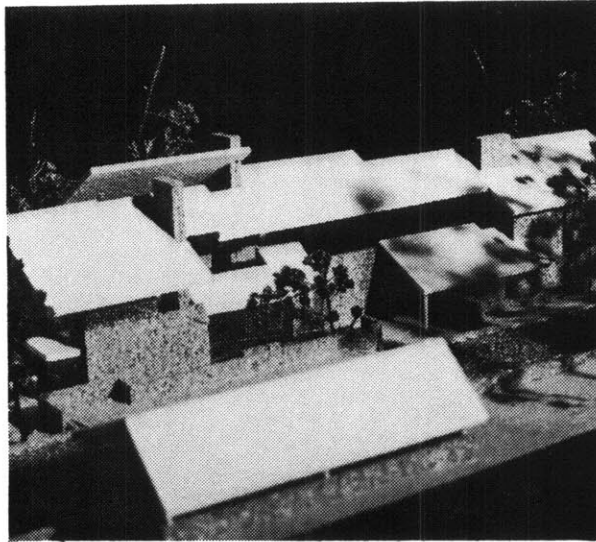
A directional field of containing walls sets up a continuity of spaces in which objects may exist. In Aldo Van Eyck's sculpture pavilion, the walls form places to contain art objects. In the design of dwellings, the directional field of walls would set up continuities in which objects like furniture or special rooms could exist.

In order for these containing forms to be inhabitable as dwellings, there must be some means of achieving environmental control. As seen from looking across the Boubourg Plaza, the row homes in Paris illustrate infilling a directional field of bearing walls. This can be applied to the Sellersville project. Opaque and transparent screens can be built in roof or bay forms. These could then be added to the containing walls to provide environmental control.



Recapitulating the previous information as it is applied to the Sellersville project will help to better understand the implications of this information. From the previous chapters, it should be clear that the large site-size walls should reinforce the landscape directions. Access into the dwellings should be associated with these walls. In order to leave the southern territories open for pedestrians and use spaces, vehicular access and the act of entering the dwellings will usually occur from the north.

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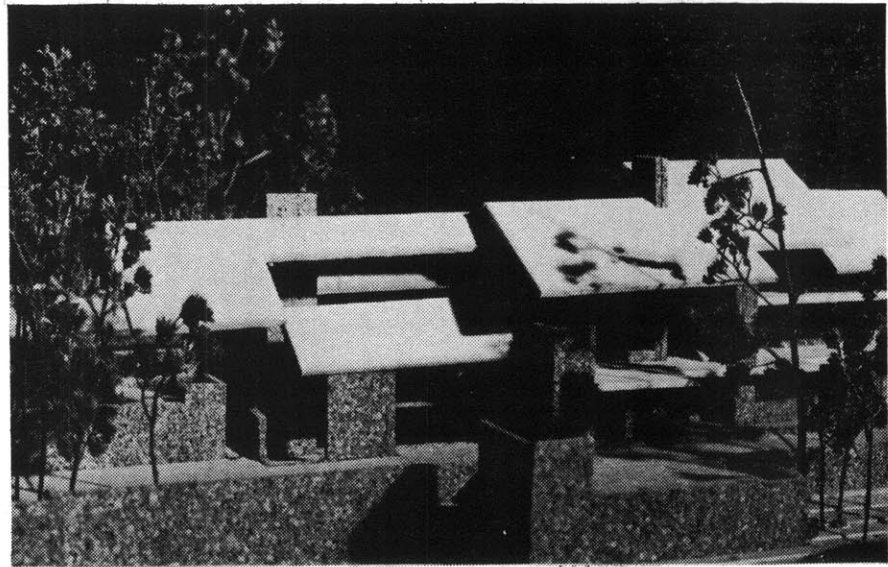
Portions of the retaining walls associated with access will define hard, massive northern edges for the dwellings. This will be useful in providing thermal insulation as well as defining an initial zone of containment on the north side of the building.

The aggregate form containing-walls will be added to the territory associated with the large retaining walls. These will be built in a directional field that collectively reinforces the direction of the larger walls.

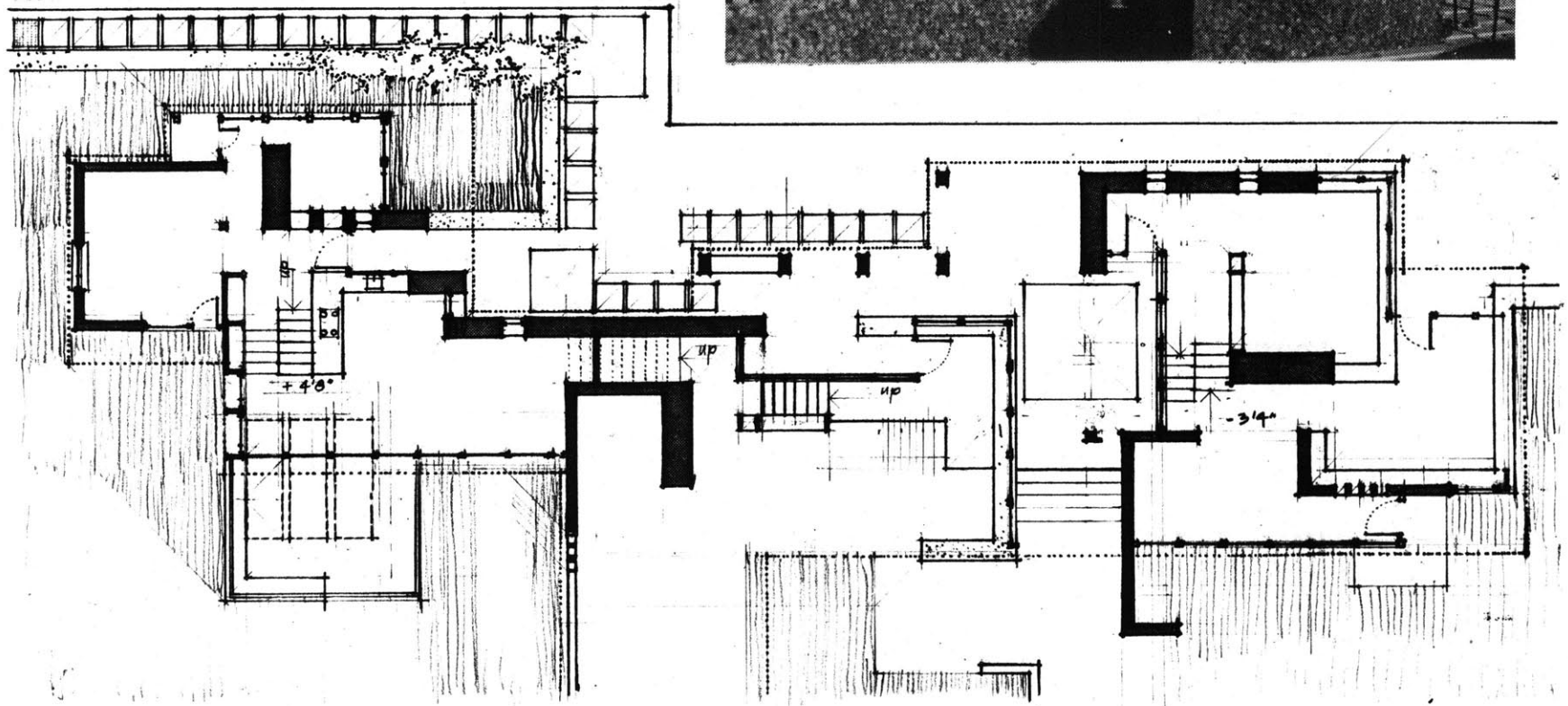
Individually each aggregate form wall will probably run north to south so that the southern light is not blocked from getting into the spaces. It may be useful to build some of the containing-walls on the southern edge, running east to west. These would trap some of the sun's heat in the mass of the building. Providing environmental control for the inter-

ior spaces demands the addition of transparent and opaque screens to the existing containing forms.

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# PRIVACY

Transforming the habitable landscape into a place for dwelling involves more than reinforcing the continuities that exist in the landscape. Merely building physical definition that offers partial containment is also insufficient to achieve the transformation. In order for the habitable landscape to be useful as dwelling, the sense of privacy must be incorporated into the physical definition. Privacy is defined as the condition of being secluded from the sight, presence, or intrusion of others. Total privacy will not always be desirable, but partial privacy should be associated with most territories of a dwelling.

Building privacies in close proximity to public territories demands explicitly understanding the relationship between different physical definition and the privateness or publicness of associated spaces. The objective of this section involves esta-

blishing a set of principles to use in the design of privacies.

Some of the ways to affect the privacy of a space involve changing (1) the horizontal dimension between adjacent spaces, (2) the height difference between two levels, (3) the direction of access, volumes, or building components, (4) the amount of enclosure, and/or (5) the form, color, and materials of the physical definition.

The last four methods create privacies by building a degree of discontinuity into the landscape, where continuity is understood to imply publicness. In contrast, the first method achieves privacy by demanding isolation. Unnecessary isolation is a quality that I will try to avoid in the task of designing privacies. This section of the thesis deals with the remaining four methods of offering privacy within the built landscape. They

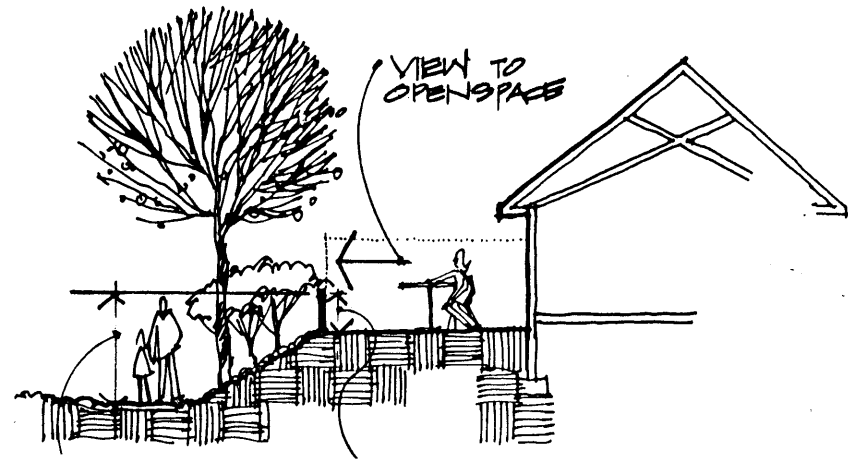


can be used separately or in combination with one another to attain the desired conditions.

A range of privacy definition can be offered by varying the vertical difference between adjacent ground and floor surfaces. People on higher levels will have unobstructed views of people below them. Conversely, people on the lower level will have limited views of the individuals above them. This is illustrated in the accompanying diagram. It is easier for a person on the higher level to control visual or physical intrusion; therefore, this person is in a private position.

The vertical height difference need not be this large for the quality of privacy to remain. A range of different use heights can provide spatial definition, where the higher territory will usually be considered a more private place (unless one of the other methods of achieving pri-

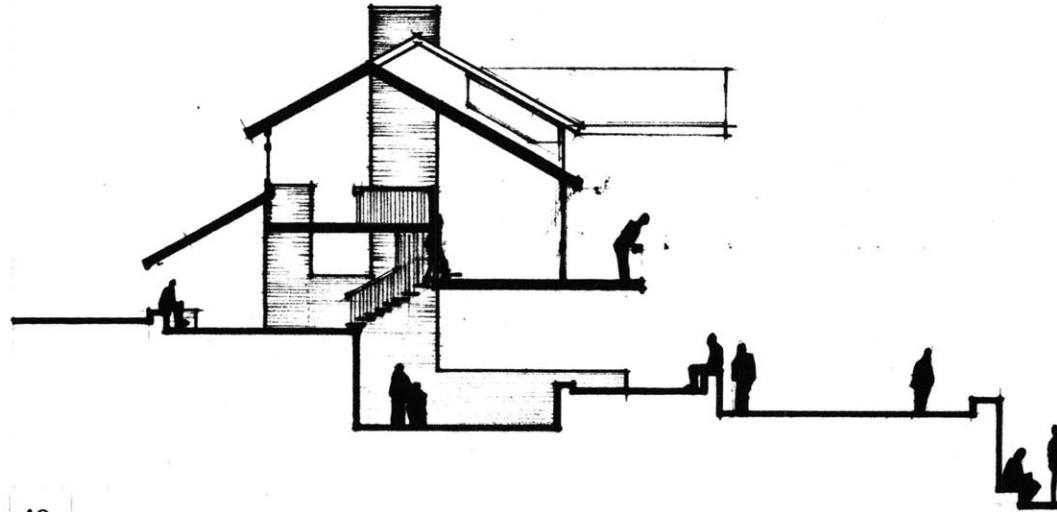
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vacy is used in a more forceful manner).

Applying this information to the design of dwellings, one would expect to find the following vertical arrangement: the dwelling itself would be raised slightly above the level of the public territory. Inside the dwelling, the more public portions of the house (i.e., living room, kitchen, dining room...) would be raised slightly above the entrance. Above these spaces one would find the more private rooms (i.e., bedrooms, bathrooms, den...).

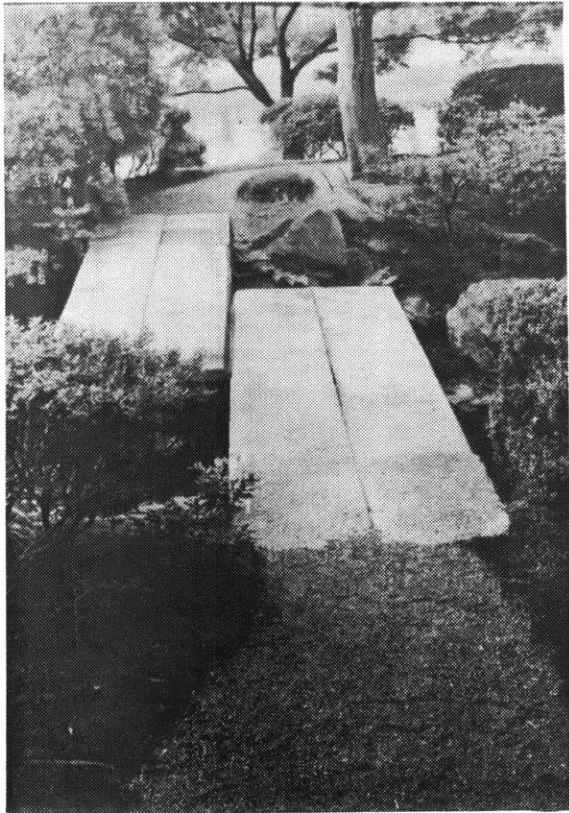
The arrangement may change to satisfy other issues in a specific situation. In this case, privacy would be defined by one of the other three methods.



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A change in direction can also be used to set up a privacy. A path with few discontinuities is generally understood to be more public than one which has many. Imagine walking along a path and coming upon a split, where one side of the path continues in more or less the same direction and the

other moves off in a different direction. The continuous part will be understood to be the public path, while the change in direction will offer a journey into a more private territory.



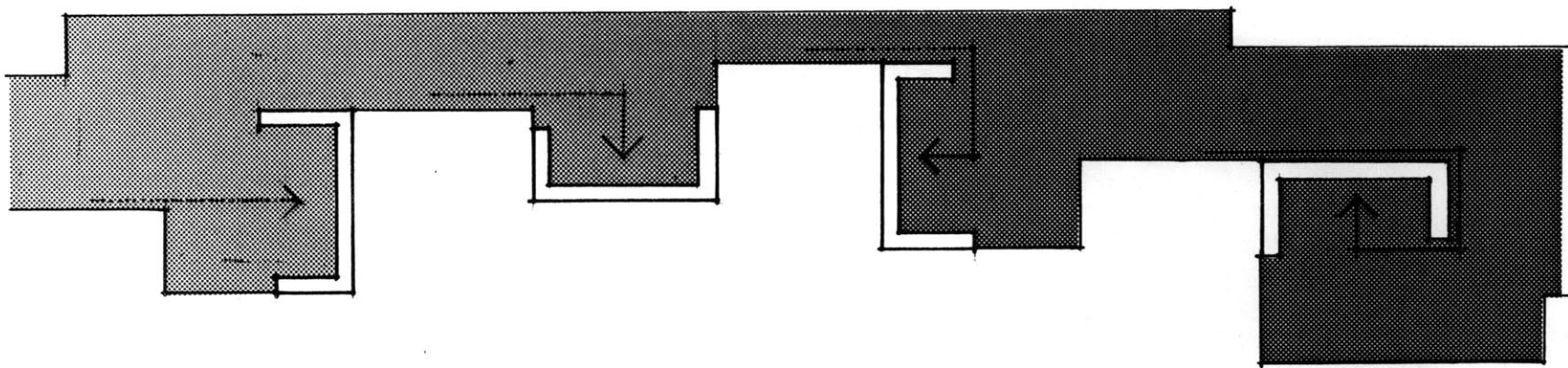
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Associating privacy with a change in direction can easily be applied to the orientation of a physical form along a movement path. As illustrated in the following diagram, one may build a range of conditions from very public to very private. A containing-form building component defines a space. The relative privacy of this space changes as one approaches it from different directions. If the approach direction is held constant, then al-

tering the orientation of the defining physical form can be employed as a design tool in designing a range of privacy conditions. The orientation that affords the easiest, most direct entrance will define the most public territories. The orientation that offers the most circuitous entrance will house the most private activities.

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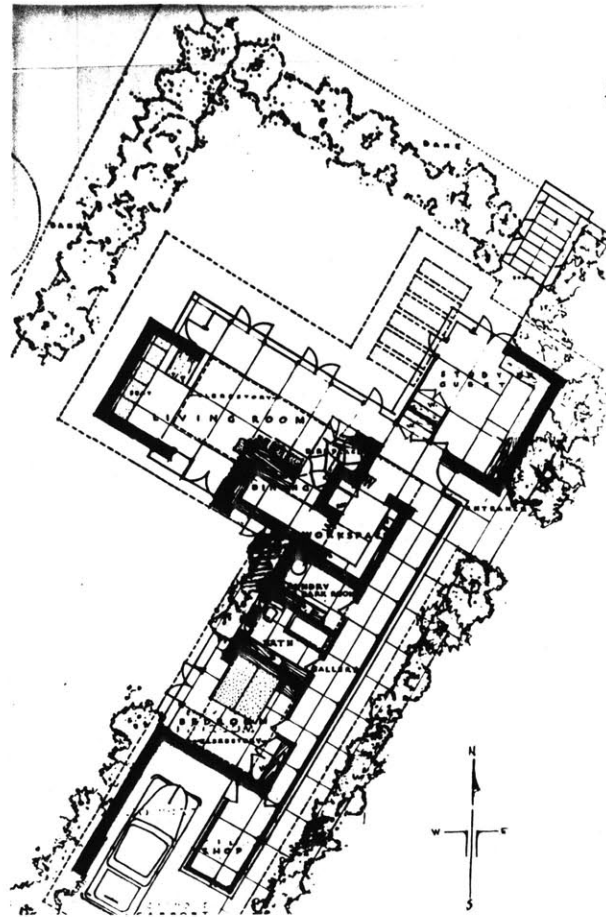
## PRIVACY IMPLICATIONS FROM VARYING THE ORIENTATION OF A GIVEN ENCLOSURE COMPONENT ALONG A PATH



68 VERY PUBLIC

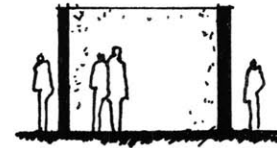
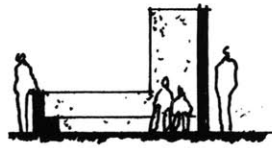
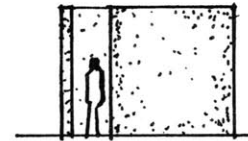
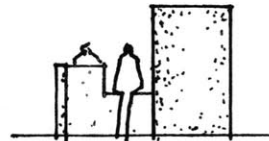
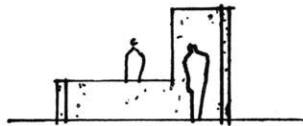
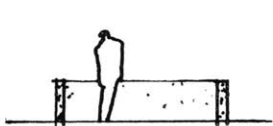
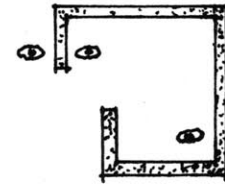
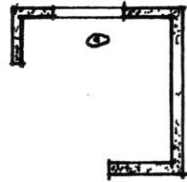
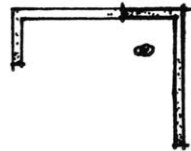
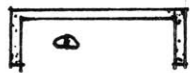
.....VERY PRIVATE

In Frank Lloyd Wright's Miller residence, built in 1952, this method of defining privacies is clearly evident. One approaches the house by following a long continuous wall. A ninety degree turn at the end of the path precedes entering into the house. Straight ahead, one finds the most public part of the house, the living room. Other privacies are defined within this wing by altering the orientation of specific containing-forms with respect to the direction in which one enters. The more private parts of the house are located along another wing of the house. This private wing is ninety degrees off the direction one enters, or one hundred eighty degrees off of the direction that one approaches the dwelling.



The next method used to achieve privacy involves varying the amount of enclosure. The more enclosed an area is, the more protected the space within will be. This applies in plan as well as in section.

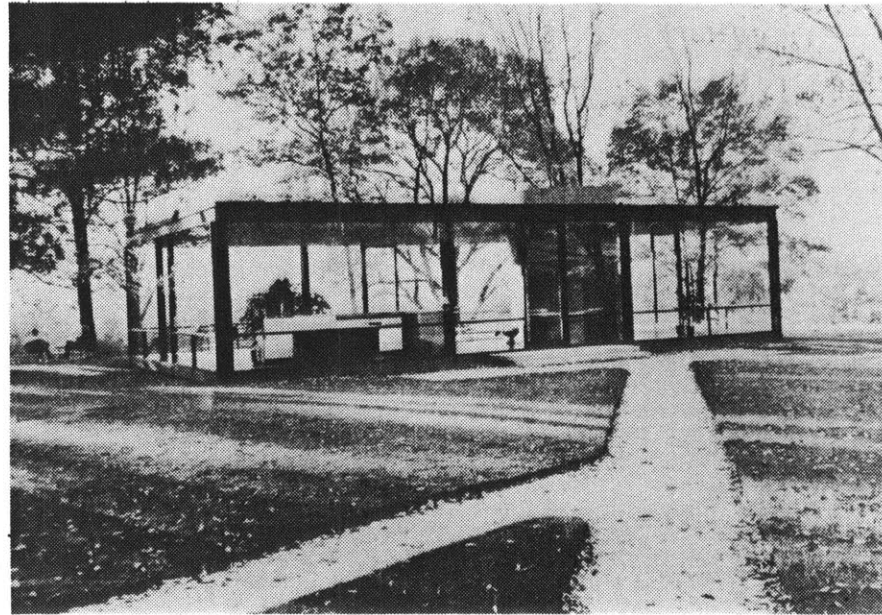
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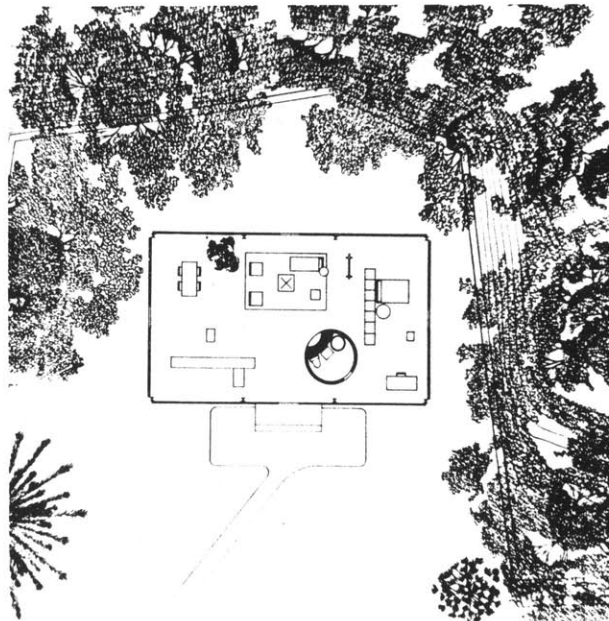
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The final method to be used in defining privacies involves changing the form, materials, and color of the physical definition of a space to create an object or discontinuity. A discontinuity is understood to be different from the physical definition surrounding it. The difference in physical qualities implies a difference in the use of the space defined by the physical form.

For example, the built object could be surrounded by physical definition that reinforces existing directions and continuities. Continuity implies publicness. Therefore, the built object which is perceived as a discontinuity will be understood as a privacy. If, on the other hand, the built object is surrounded by a field of physical definition that defines privacies, then perhaps the discontinuity will be interpreted as a public place.



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## SECTION V

# PERSONAL SIZE

This chapter deals with the construction processes and materials that will be most responsive to the multitude of use, microclimate, and landscape issues that exist in the design of a habitable landscape for dwelling. It is necessary to explore a full range of possible building components. This provides a designer with a palette from which to select the built form that makes spatial definition most appropriate for the desired environmental control.

An implicit assumption in this investigation is that the components which carry the structural loads with-

in the dwelling will also serve as the primary means of achieving spatial definition. Thus the walls, screens, and lineal assemblages that exist in a house will not only define a space, but will also offer physical information to astute observers. The building components can teach the inhabitants about the construction process as well as the relationship between form and the influence of the landscape, the environment, and use.

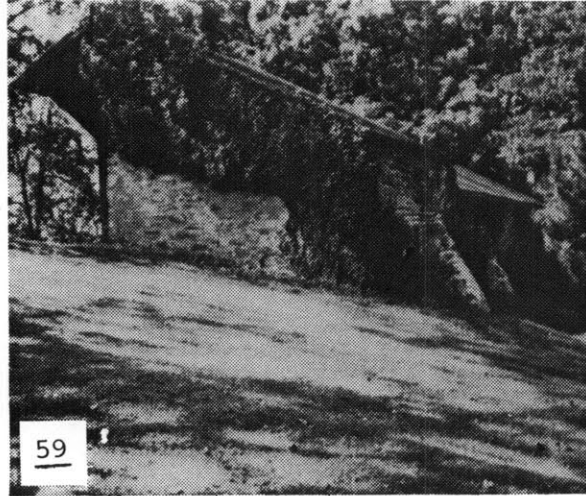
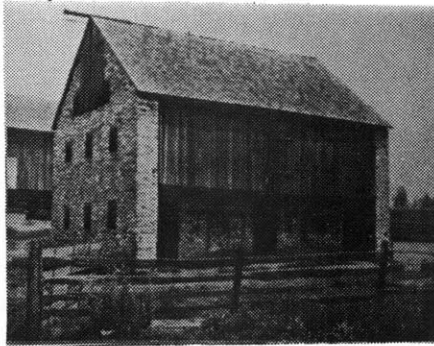
In the construction process, the first order of physical definition can be thought of as a built extension of the ground. "Ground form", as this

## GROUNDFORM

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type of physical definition is called, most minimally entails building foundations and retaining walls. However, ground form can also define parts of a zone of the dwelling associated with living close to the earth. The continuous surfaces of the earth provide containment and stability. A built landscape of ground form should possess these same qualities.

Building a truly continuous surface is possible with relatively few construction techniques. It is probably more sensible to build via a

process of incrementally adding small structural units, which collectively will form a virtually continuous surface. This building technique can be observed in the heavy stone walls of the vernacular architecture in Pennsylvania. The walls are constructed by the incremental addition of stones. One stone is laid at a time, and yet the final result of the building process is a continuous surface.

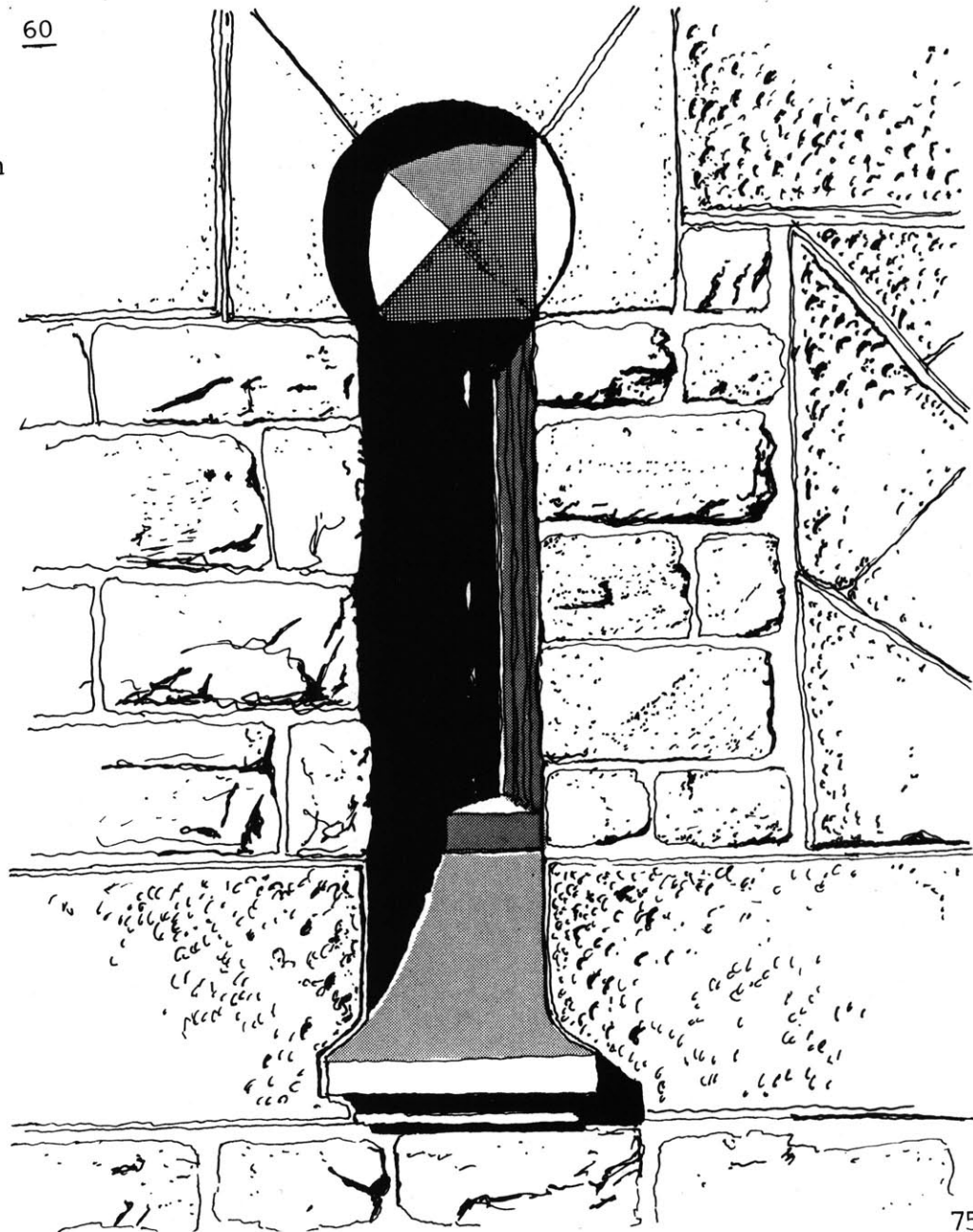
Openings in the surface of ground form are generally small. This is a consequence of the construction method, although it also serves to reinforce the contained "cave-like" qualities of built earth. In this type of wall, building loads are carried directly through each structural unit (i.e., stone, brick, block). Openings wider than the length of one of these units require a different spanning material to serve as a lintel. The lintel transfers the loads from above the

openings into the surface materials on either side. In this type of wall it is more reasonable to make tall, slender openings with short lintels, than wide openings which require large spanning members.

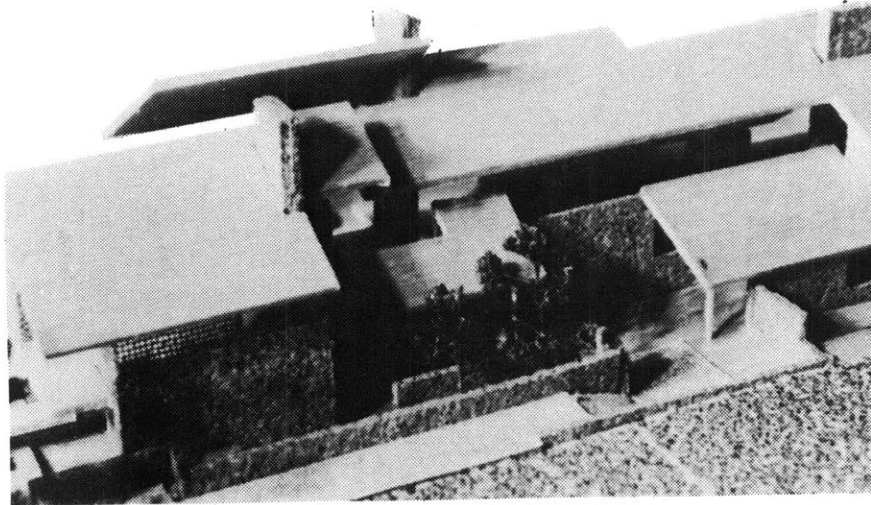
If one were to build ground form walls for all of the physical definition of a dwelling, spaces would be relatively dark and isolated from one another. Usually, ground form should only partially define a space. The intrinsic qualities of ground form should be used to define areas within a room where these qualities are desired. Other materials will be used to build physical definition more appropriate for different environmental conditions.

The qualities of ground form are useful in responding to some environmental issues. The continuity of the surface is helpful in insulating the interior spaces from excessive exter-

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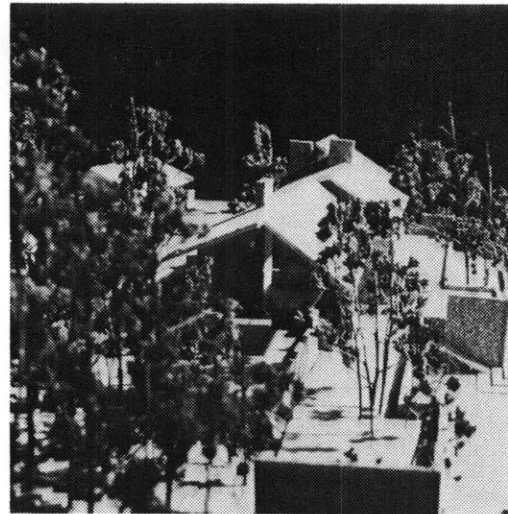


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ior heat and cold. However, this characteristic will also block much of the natural daylight.

Therefore, much of the northern edge of the dwelling will be defined by ground form walls. This will insulate the interior from the cold, shaded northern edge. The southern edge will usually be left open so that the direct light can reach the depths of the dwelling.

The mass of ground form walls can be used to passively store the warmth of the daytime sunlight or the coolness of the nighttime air. To store the heat of sunlight, some ground form definition must be located on the southern edge. This is, of course, in direct opposition to the objective of keeping the southern edge open for direct sunlight.

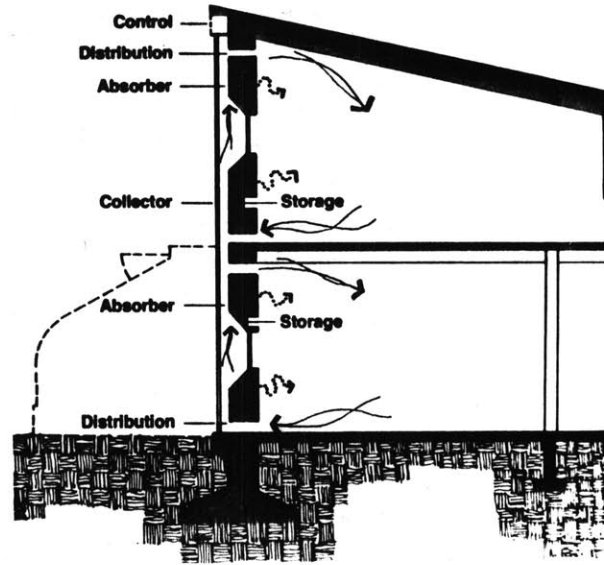
Consequently, in the spaces open to the south, it may be necessary to store the solar heat in the horizontal surfaces. Other spaces along the southern edge may not benefit from direct sunlight. These spaces will

be partially defined by ground form, providing vertical surfaces in which to store solar heat.

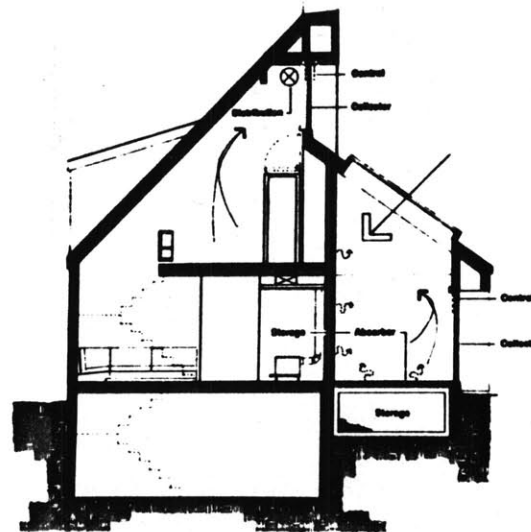
Having stored the heat, there must be some means of controlling the desired temperature of a space. This can be facilitated by using transparent and opaque screens. The following diagram of a Trombe wall illustrates this point.

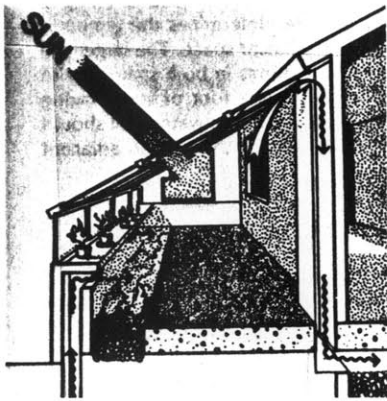
There is a thin membrane of glass on the outside edge of the storage wall. This provides a satisfactory solution for the storage of heat, but is not very useful as habitable space. It makes more sense to design the space between the control screen and the heat storage wall as a territory which the inhabitants can use.

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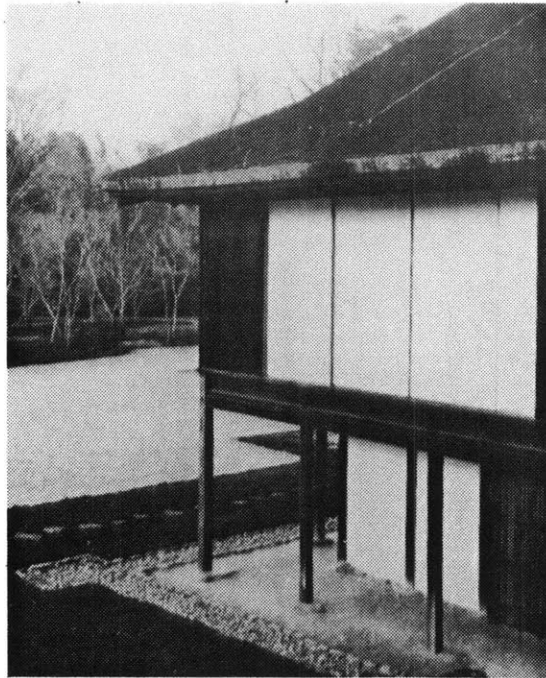


## SCREENS

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Other environmental issues will be better accommodated for by using types of built definition other than ground form. The ability to control the natural light, air flow, and room temperature throughout the day, or from season to season, demands built definition that functions as a screen. A screen allows the desired qualities of the environment to pass into a space while keeping out the undesira-

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ble ones. Ground form, on the other hand, functions more as a barrier than as a screen.

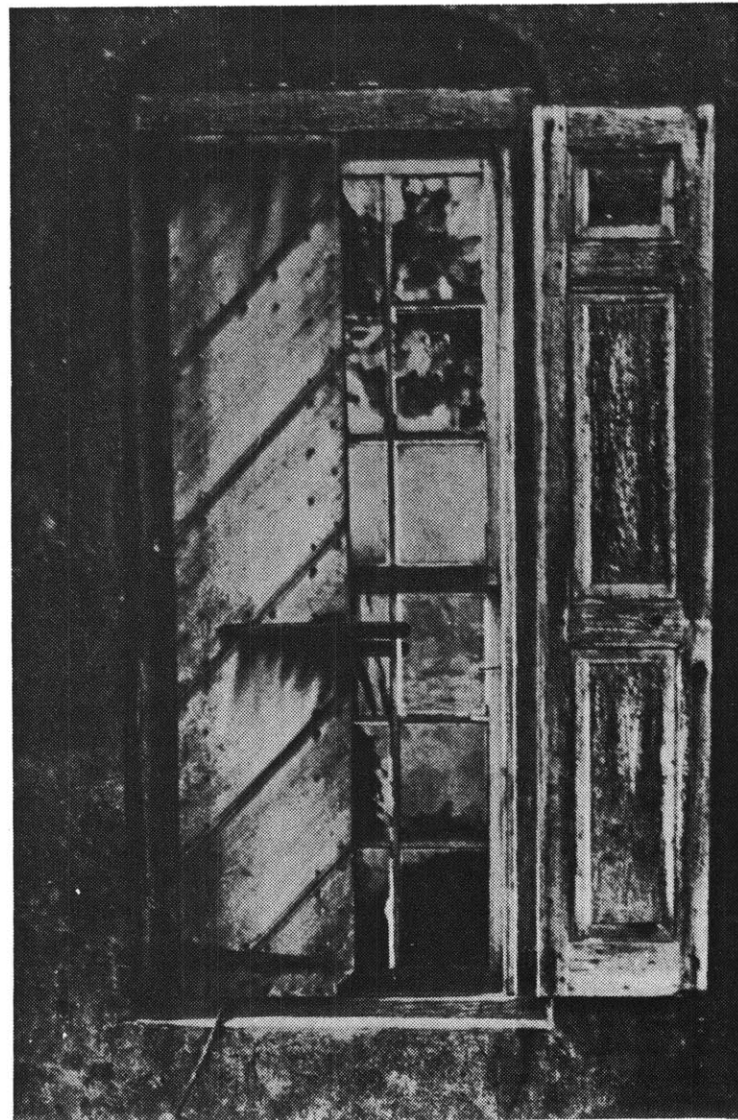
Both the functions and the physical qualities of a screen differ from those of ground form. Screens are constructed of lineal components, like wooden or metal sticks. Assembled together, the lineal components span across space to make a three-dimensional framework. Opaque, translucent, and transparent panels are then attached to the lineal assemblages to achieve the desired environmental control.

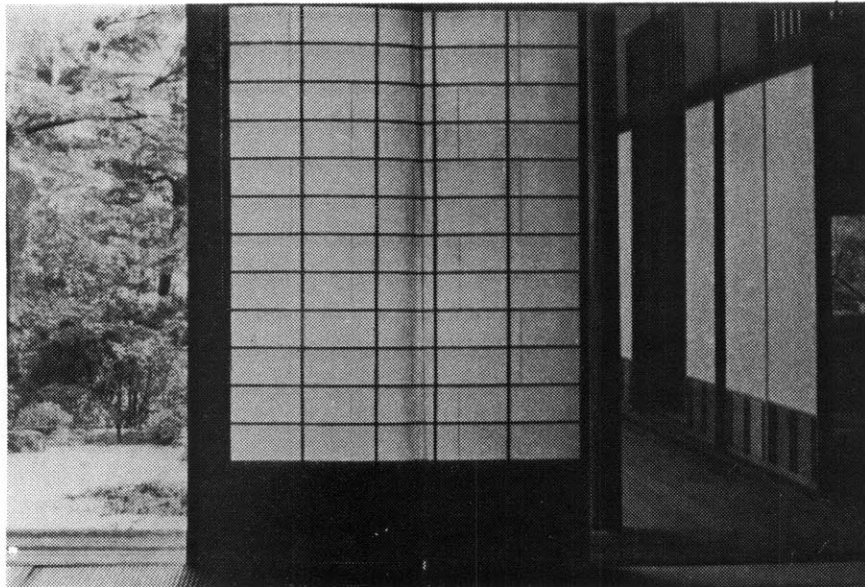
While the built definition offered by ground form is relatively permanent, screens can be made to be permanent, operable, or even movable. Permanent screens are built for much the same reasons as ground form. They provide shelter and protection from the elements, as well as from other people. Screens, however, are much easier to alter than

ground form, should space requirements change throughout the years.

Operable screens provide even greater adaptability for physical definition, to respond to environmental and use demands. The swinging shutters offer the inhabitants of an old Pennsylvania farmhouse the ability to control the amount of light, wind, and rain that would otherwise enter through the window opening. The sliding shoji screens in Katsura Palace and the tilt-up wooden doors on a building in central Japan offer ways of opening up the inside to take advantage of the fair weather outdoors. These same principles can be built into the physical definition of the dwelling in this present project.

In some instances, it may be desirable to build self-stable screens that are actually movable. These will accommodate easy expansion and contraction of spaces responding to





environmental and use demands.

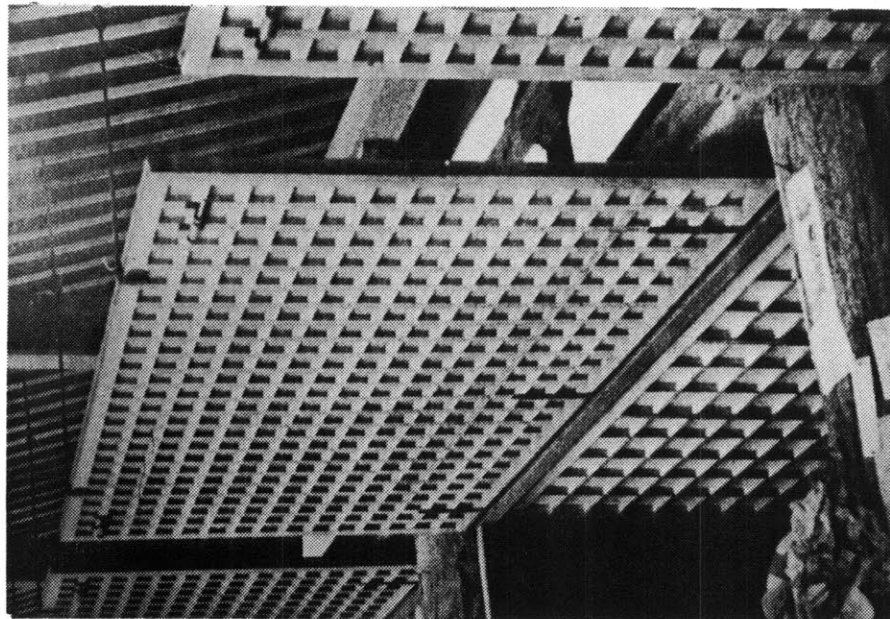
If very many panels are added to the screen, where the panels are relatively small compared with the size of the screen, the physical definition may once again approach a continuous surface. This leads to a third type of built definition.

A continuous surface that is added onto a screen will provide enclosure and shelter much like ground form. However, this type of definition would not be associated with the ground. It will be able to span across large distances since it is constructed of light, lineal assemblages. Because it is actually a screen, this type of continuous surface could be constructed of permanent and operable components.

This is illustrated in the wooden screens that span across the long side of the old Pennsylvania barns.

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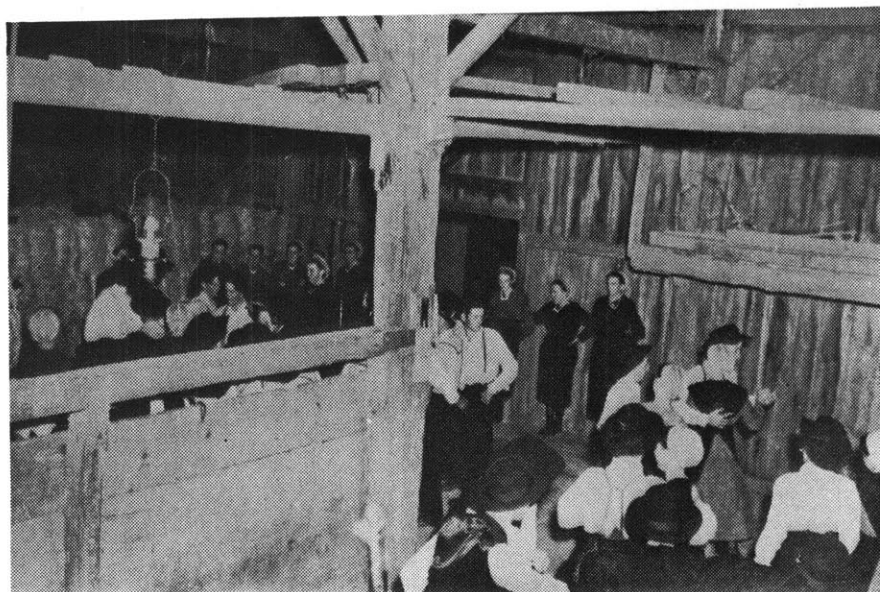


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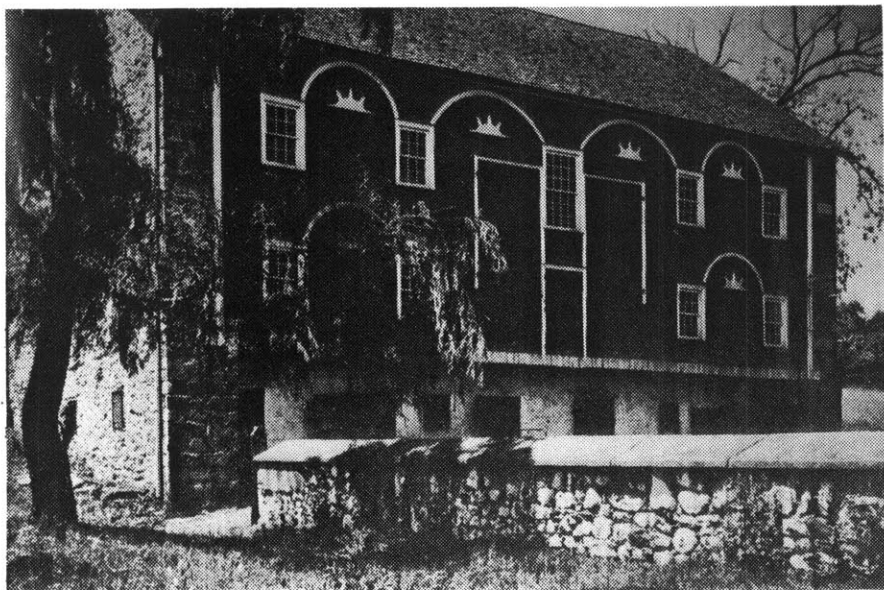


Wooden boards were attached to an interior post and beam framework to achieve enclosure, protecting the hay and the animals. It was necessary to open large portions of the surface when filling up the barn with hay bales. Therefore, portions of the screen are actually sliding doors.

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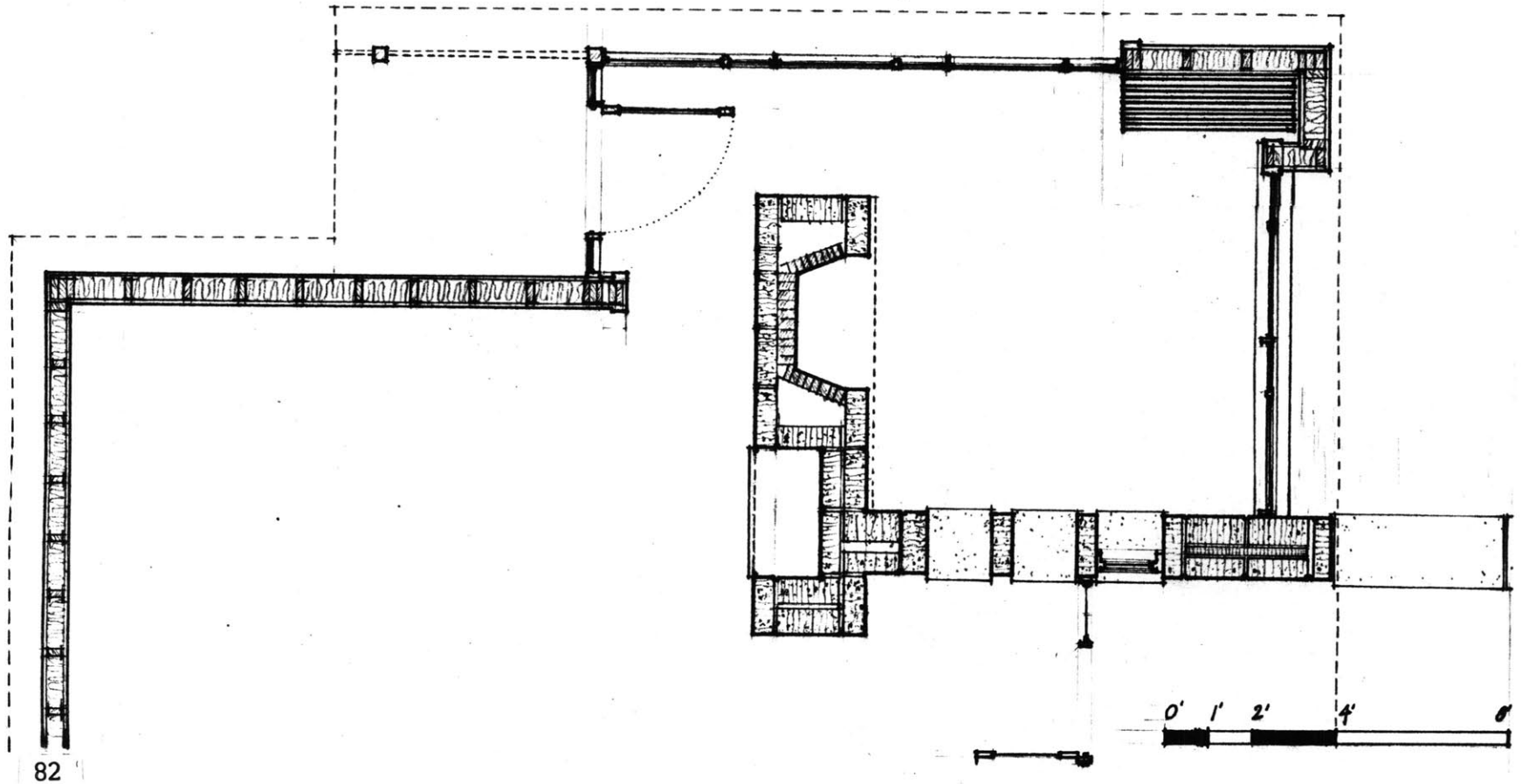
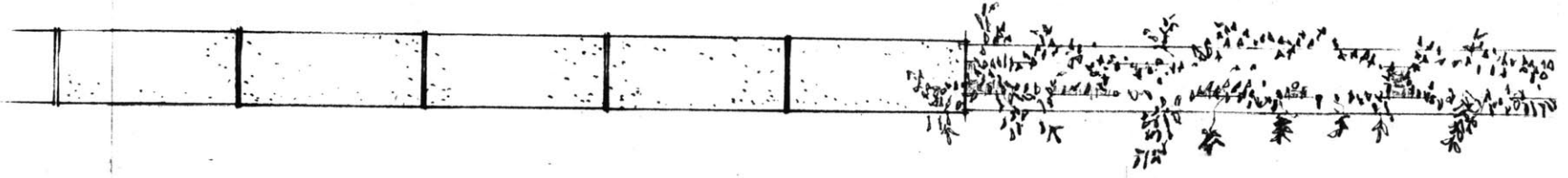


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Thus, it is apparent that these three types of form can be used to generate physical definition for a dwelling. As previously stated, the ground form will usually be associated with the bottom zone of the building. The continuous surface screen will usually be associated with the top portion, providing shelter and protection from the elements; and in order to exploit the differences between the top and bottom zones, exposed screens will occupy the middle-territory.



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- 57-58) Ground form providing partial enclosure in vernacular Pennsylvania buildings. Raymond, Early Domestic Architecture of Pennsylvania, p.23, 35.
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