OUTLINING THE CHARACTERISTICS OF TRACTABLE HOUSING—A DESIGN OF ROWHOUSES

by

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Associate Professor of Architecture

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Maurice Smith, Chairman
Departmental Committee for Graduate Students

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Submitted to the Department of Architecture, June 16, 1980, in partial fulfillment of the requirements for the degree of Master of Architecture

ABSTRACT

Architecture is not just flashy design, nor is its sole aim to determine what dispositions of form are appropriate for all people for all time. Sometimes the architect must take a more humble, less visible role. Participation of the people who inhabit a place is key to maintaining the environment. For such participation to occur, an architect must enable inhabitants to exercise a wide play of choice in the use of a built environment and of change in the adaptation of its physical structure. Such characteristics of a place contribute to its tractability. The objective of this thesis is to outline design characteristics which contribute to the tractability of housing, using the rowhouse type as a spring point.

This study is grounded in a behavioral perspective. Dimensional criteria are generated using behavior patterns, in an attempt to avoid stereotypes inherent in defining household activities by rooms. Activity settings and use scenarios are vehicles for examining two instructive examples of housing. Relevant characteristics are summarized and employed in the design of rowhouses for a Cambridge site, to simulate future conditions as scarcity of natural resources brings about concern for intensification of urban land use.

Thesis Supervisor: Chester Sprague
Title: Associate Professor of Architecture

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This work is dedicated to the house of my heart, the garden of my thoughts, in all their seasons, and is devoted to the people who transformed them into my home.

This is for Miriam Balliett Craig and the memory of John Earl Craig.

There are many who contributed to this work both directly or in more obscure, but no less important, ways; to each I extend my gratitude.

I thank my advisor, Chester Sprague, for his encouragement from my first day at MIT and for his criticisms and help and my readers, Sandra Howell, Anne Vernez-Moudon and Antonio di Mambro, for their help, their insights and confidence in my efforts.

The others are those who have given me things to think about, or set examples for me or buoyed my spirits, most important of all. Fellow thesis-sufferers, instructors and friends, I am in your debt - Kim, Mark, Suzanne, Walter, Zaurie, Jon, Kate, Paula, Muriel, Giancarlo, Ed, Jan, Fred, Ellen, Julie, Gayle, Michael, Rich, Joan, Gini, Bruce, Louise, Charlie, Diane, David, Dee, Mr. and Mrs. Davis, Anna, Steven, Pat, Linda, Marina, Jo, George, Lois, Debbie, Liz, Henry, Issac, Janet, Susan, Ron, Jack and Lucia.

1 WHY

We are on the verge of crisis.

There was a time when an architect designed for friends, acquaintances or clients drawn to the office. The bulk of current professional work is now done for the "unknown" client, the user, not necessarily the person who pays for the architect's work. But this idea is fixed in the present. Future developments are likely to change the unknown quantity, so that it envelopes unforeseen functions and constraints in addition to unknown clientele. Western society now faces crises of resources which are bound to change the nature of our use of the environment, both built and natural. Limited energy resources will change our current living patterns. Society cannot afford to wait for technology alone to solve the problems. Resources must be managed carefully, in all sectors. This is the case with the housing stock.

As the post World War II boom of babies matures, the housing stock in the United States is due to fall into short supply. There is presently a lessening vacancy rate in housing, a statistic which is likely to worsen as young people in-

creasingly seek to establish independent households. This, coupled with a presently decreasing number of construction starts caused by increasing loan costs, means that a critical need for housing can be anticipated. The crucial question for architects and planners is how to produce housing which will make prudent use of limited resources.

TRACTABILITY ?

Quite a bit can be predicted with a little information and careful reasoning. As transportation costs rise people will be less and less willing to live far from their work. The population will concentrate; whether in old city centers or the ring of immediate suburbs, housing densities will rise. Land use will intensify. Barring a technological miracle, Broadacre City is dead. The single family detached house on its own lot is, even now, becoming an unaffordable luxury for most households. It already is for newly established households, given ever-increasing financing rates for construction and purchase.

To these issues must also be added the problem of energy consumption of each household. Non-mechanical ways (i.e., architectural solutions) have to be employed in conserving energy resources as well, in terms of the patterns of land use as well as in the configuration of the built materials of individual units. Given the shortage of energy and money, buildings can no longer be conceived as throw-aways, particularly housing. In order to make optimal use of resources, housing has to be designed to be changed easily, and effectively as successive waves of users come to inhabit structures designed originally for someone else.

The premise of this thesis is that ahead of a response to the impending housing shortage, our profession ought to look carefully at what the characteristics of the resultant production should have. The view here is that the idea of "house" should be reconsidered as "housing stock," a

commodity that changes and adapts to the needs of differing, changing inhabitants. Such a housing stock then, logically, needs to be tractable or easily manageable, readily changed.

Continued readaptation of housing implies that much of the work involved may be accomplished by the inhabitants themselves. Such a "hands-on" approach to housing is one aspect of what is broadly referred to as participation. User or inhabitant participation in the shaping of living environments is a positive thing. It means they can be involved in and can care for, and about, the environment around them. The underlying line of thinking entails the urban environment being broken down into small units which are easily managed and owned by the people within them, which in turn increases the likelihood of involvement in maintaining the environment. Where a person has an impact upon a place, where effort can be realized, alienation will be lessened. A person who has an active part in a place cannot be alien to it, nor the place alien in turn. Architects bear a responsibility to enhance the full play of this phenomena or what has come to be termed the powers of inhabitation [cf. Report of the Second Residential Course]. Tractable environments promote the powers of inhabitation. A myriad of urban problems lie within this topic, but only the aspect of the physical environment at the household level can be discussed here in any depth.

This thesis rests upon work presented at the International Laboratory of Architecture and Urban Design conference in Urbino in 1979, by MIT, entitled "Outline Extended" in which the theoretical model for the concept of tractable environments was set out. Two kinds of adaptation within the built environment were postulated: choice and change [p. 16]. Choice is the circumstance where an inhabitant varies activity within the structure of the building environment. Change is the case where built environment is altered to accommodate changing activity [cf. Oxman, "Variability" and "Adaptability"]. Moving furniture about a room or changing functions of rooms within a house exemplifies choice as does choosing a different sitting place in a room, at a more temporal level, i.e., acts of inhabiting.

Change, characteristically, takes events further, as it entails the restructuring of existing space or the creation of new, i.e., the act of building. The actions of choice and change are then tied into investments, or the energies and resources involved in the execution of either. The assumption is that the lower an investment in real or psychological terms can be to execute a desired choice or change, the more tractable the environment.

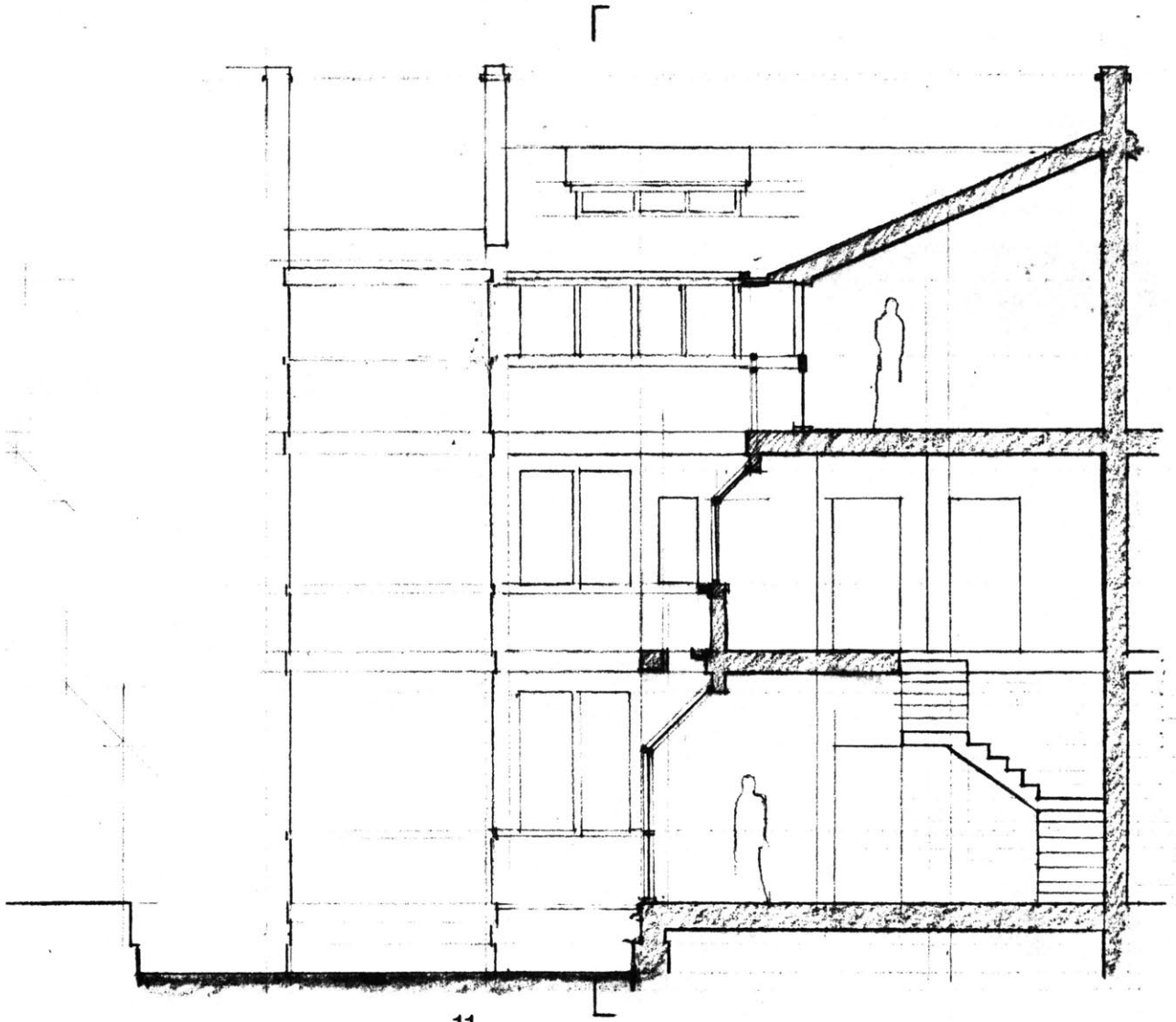
What this thesis then is aimed at is to outline the characteristics of the design of housing which contribute to its tractability. Reasonably, a more tractable house is one which allows alteration of conditions through the exercise of choice, first, and thereafter by the exercise of change with the most reasonably minimal investments [negotiation effort, shut-down time, technical demand, and cost, p. 17, "Outline Extended"].

Another issue touched upon in the discussion of tractability is that of slack [p. 36] or an excess of dimension. It is this seeming waste of space, this excessiveness of structural capacity or dimension which is a key premise in the achieving greater tractability for lesser investments. In the assessment of tractability, both in analysis and design, attention is first focused on increasing potential for choice and then change.

In addressing the topic of tractability, one must also work through preconceptions of what a tractable house is. A type that has historically been freely used in a variety of ways is the rowhouse. Rowhousing, of sorts, can be traced to the construction of the Illahun pyramid, c. 2670 B.C. Rowhouses in the form commonly used nowadays were developed in London after the Great Fire--notably the form, parallel bearing walls, results as the increment of surveyors' planned neighborhoods. In this country they are also a logical consequence of the gridiron plans of colonial Philadelphia and Boston, dating from the late 1700's. These houses as a type have survived the changing needs of the intervening 200 years. Their resilience, coupled with the projected trend toward higher density living makes rowhouses the choice of study here. Their typical dimen-

ommend their application in such a short study over other housing types; factors of dimension and light are quickly discernable as issues to work with in the reasonably small physical limits of the type. Rowhousing conjures up imagery of well delineated spaces, which is another preconception of tractable structures to be discussed.

Both SAR method and the work of Andrew Rabeneck, precedents for this study, deal with rooms or rather well-defined household spaces. At the outset this seems counter to the modern architectural conception of "flexible" space, that is the Mies, the Wright, the Corbusier, free plans. Granted, this concept of flowing spaces was in part responsible for the successful adaptations carried out at Corbusier's Pessac project, as outlined by Boudon. It is the contention here, however, that more "complete" spaces will prove more tractable. Similar thinking is laid out by Engel in reference to the Japanese house, the American architect's icon of free plan. Engel sees this as a misinterpretation; indeed, activities can occur at almost any place within the Japanese house, but do so in a highly demarcated space. Planimetrically the organization can be read as "free," but in reality the screens between rooms, the shojii, can only be removed at the lower level where a plan is usually cut. The floor surfaces may seem continous from space to space but ceilings are not. Furthermore, it is the case that such rooms are usually perceived from a static, seated perspective, not the common Western-style of inhabitation-in-locomotion. Further, such seemingly open spaces are the result of commonly held use patterns governed by strict etiquettes, something that can in no way be assumed in a changing American culture. What this all points to is the use of rooms or closeable spaces for optimal tractable usage, with apologies to Frank Lloyd Wright. At least these are the biases with which this study has begun.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CONCEPTS

2

After culling literature on the topics of housing and flexibility, it is reasonable to clarify why this study is different from other approaches to housing. Primarily, the attitude that housing is not to be built solely for occupation by standard families is the major difference. This short work is clearly not as extensive as a study as its well known precedents, particularly the works of Habraken and Rabeneck. The attempt here is to supplement previous work by taking a step back and re-addressing the problem from a slightly different angle. For all the laudable advances of other bodies of work, the criticism held here is that they address the problem of housing from the nuclear family perspective, albeit implicitly. The reader will, in fact, find quite a bit in this study which parallels the SAR method, for example, but this initial difference of perspective is a key, though subtle, difference. Certainly, the family situation offers a logical set of circumstances from which to evolve ideas about other

& FRAMEWORK

situations. It is a situation most everyone knows, after all, but currently comprises only about seven percent of the household situations in the United States, as cited in the article "Housing and Community Design for Changing Family Needs." Here an attempt has been made to identify in the scenarios what some optional living situations are and are becoming, based in the reality of present day trends. This work then is somewhat more situation based, less theoretical than the preceding ones, but such a claim could not be made without the groundwork having been laid [cf. Habraken, Rabeneck, Brady, Oxman, Vernez-Moudon]. A discussion published in the Architectural Record, October 1979, "Housing and Community Design for Changing Family Needs," closely addresses the concerns taken up here (even though the inherent bias of "family" is maintained in its title). What one seeks as a designer, though, is a structure for operationalizing all such ideas for design; that is the search undertaken here.

The progression of thought through this exercise is built upon the premise that design decisions ought to be based upon objective, recorded ob-

servation. For this reason Howell and Epp's study Private Space is used as a starting point for the analysis. The hazard in this logic is in assuming its findings are transferable. The study was done, after all, for a special segment of the population. The settings described are very traditional as well; herein applied in the proposition of non-traditional settings which respond to greatly differing patterns of use. There are two rationalizations to counter this. Such changes in use patterns can be looked upon as being evolutionary; they are, in fact, based in a tradition, a typifyable set of uses. The second is that this material is available; no other group (to my knowledge) has been studied in terms of use of space focused around the equipment or furnishings that support use patterns. By focusing on such use-evolved configurations, no dictum is issued. Such furniture arrangements are not seen as desirable, but simply as a recorded pattern is reflective of the tendencies people express in living in their homes. The context, of course, is North American. These patterns represent one set of options for use, nothing more. Therefore, the dimensions evolved from them are not to be considered as fast rules; there is leeway implied. Some bits of dimension are dispensible. What those "bits" are, as yet, needs to be outlined.

The dimensioning of the activity settings represents a minimal area for typical uses. Of course, people and settings can be crammed into smaller spaces, but that is not the point here. The dimensions outlined may appear to be commodious, excessive and uneconomic, but attempt to indicate the area needed for furnishings of maximal dimensions. It cannot be stressed enough that these ideas are NOT meant to be standards. The idea of creating standards is based upon a well-intentioned reasoning, to keep sizes of spaces at a habitable level, but this can all-too-easily be perverted. Standards become design directives, but not everyone operates within standards; it is not the way people live. The optimal condition is not to shoehorn people into Frankfurt

kitchens and force upon them "Frankfurt" lifestyles, but to allow them to carve out new lifestyles from extant living patterns which are familiar to them. They will need room to do this. Here it becomes necessary to develop the idea of activity settings as a way to understand the environmental implications of behavior.

The concept of an activity setting can be traced to Roger Barker's concept of behavior setting. It seeks to bring clear description to an intangibility, the agglomeration of behaviors over a range of space and time. Similarly, activity settings are concepts set in a broad space and time; however, they seek to establish a direct relationship with the built environment and behavior patterns. Simply put—activities are described in terms of their spatial implications [cf. Howell and Epp, pp. 1.3 - 1.4].

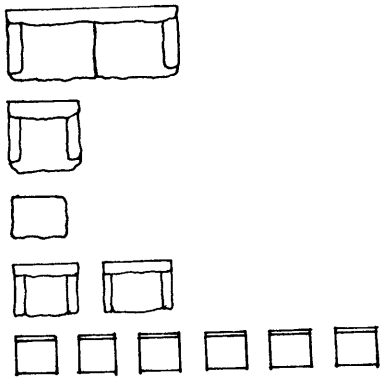
ACTIVITY SETTINGS

The reason for describing function areas within a living unit as activity settings [Howell and Epp, Private Space] is to avoid making built-in, room-specific bias into the study. It is presumable that by describing the activities people carry on and the equipment and furnishings typically associated with those activities, one can arrive at an approximation of spatial need which will be non-stereotypic. Not all households, after all, are "typical" four-person family units. Even if that be the case, present day lifestyles often preclude a "typical" and unified use over time. To have everyone in the house sit down to an evening meal becomes increasingly rare, as do most commonly regarded family rituals when extra-familial activities change individual schedules. If activities which are generic can be described spatially and if a unit allows sufficient room and a convenient (and if need be, private) enough ordering for those described activities to be accommodated in varying arrangements, then one can assume tractability can be achieved. After showing the basic dimensions of an activity setting, that area can be traced on floor plans to determine where it will logically fit in. What also might be a good idea is to throw in some

excess dimension on the premise that not everyone will want to cook, eat, sleep, dress or entertain in a "common" way. Eccentricities might require more space than outlined here. One does not have to dream up slack, since simply by assuming two orientations for some "dumb-linear-out-of-the-catalog" arrangement, one can dimension an excess of space which will probably suffice. The more rationalist-minded may object, however; things might seem padded by allowing more than one orientation of activity in a room. Then too, one single-minded occupant is not assumed here.

By laying an area of hatching which represents the overall dimensions needed for an activity setting onto a floor plan, one can also begin to identify what areas are "slack" ["Outline Extended," p. 76]. One might reasonably assume that slack might take on the dimension needed for a secondary activity. Even enough room to make a circulation path from the space in excess of a new activity setting is enough to make slack useful when change occurs. Hence, the definition of spatial slack is definable in terms of human behavior.

It is slack or overly generous dimensioning which will allow activity settings with varying dimensional requirements to be relocated from one space to another. Slack which is found beyond the minimal dimensions of an activity setting will enable new uses to come into being as change is exercised as well. For example, circulation to newly created spaces or reordered ones can affordably be carved out of "excess" floor areas (or "circulation by-pass" as Chester Sprague has termed it in conversation) without adversely affecting existing activity settings. By anticipating the purposefulness of slack it can then be "located" intelligently, or hopefully so. Projecting the location and necessary dimensions of slack can avert problems of privacy intrusions, disordered access sequencing, blockage of light and ventilation. In short, environmental quality can be maintained in the event of adaptation, in the face of changes in use.



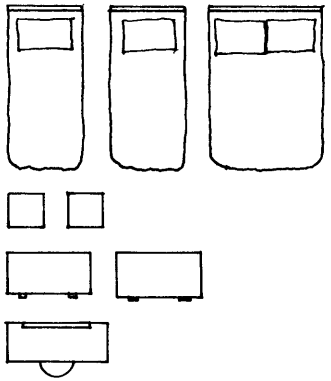
couch 36" x 82"

easy chair 34" x 36"

footstool 18" x 22"

armchair 24" x 29"

side chair 18" x 18"



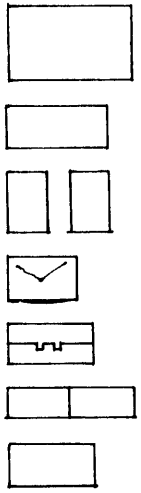
vanity 18" x 48"

bureau 20" x 42"

single bed 39" x 82"

double bed 54" x 82"

TYPICAL FURNISHINGS



dining table 30" x 40"

coffee table 18" x 48"

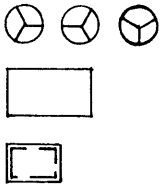
end table 18" x 30"

TV 20" x 32"

cabinet 18" x 42"

shelves 14" x 30"

desk 20" x 42"



lamp 20" diameter

plant stand, etc. 24" x 42"

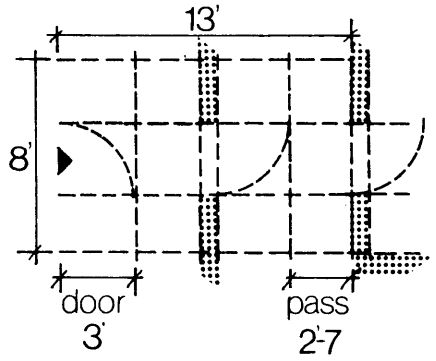
TV tray 18" x 24"

The dimensioning of activity settings which follow is derived of furniture dimensions from Private Space. Supplementary use dimensions are found in the British Design Bulletin, Housing the Family, itself derivative of Danish and Dutch research. These dimensions seem reasonable to rely upon here as they are so often plagarized in other works in this country.

[Source: Private Space]

Activity settings developed here fall into three categories: primary, secondary and integral. These are ordered by size and somewhat by their importance in a living place. Primary activity settings include: lounging/entertaining spaces [L], sleeping/dressing spaces [s/d], dining space [D], and food preparation [fp]. These activity settings are often focal in a home and

INTEGRAL

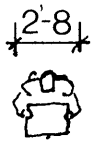


e

ENTRY

may occur in combinations within spaces. Secondary settings include: utility spaces such as laundry [u], bathing spaces [b], toilet spaces [lv], informal dining [iD], sleeping for overnight guests or small sleeping areas [g] or [1s/d], or places for individual tasks or hobbies such as reading or building models, etc. [t]. Smaller common spaces fall into this category too, such as small lounging or TV watching places [sL]. Integral activity settings are those which are at once more permanent and more temporal spaces which imply critical dimensions. Often these are sub-sets of other settings, passage through spaces, ambulatory or handicapped [p], storage [st], and entering the house or passing between spaces or realms of the household [e].

SETTINGS



p
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TRAY

p
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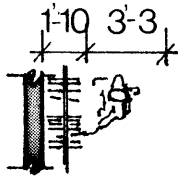
WHEELCHAIR



st
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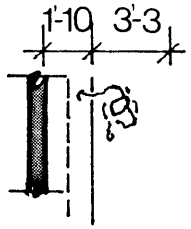

st
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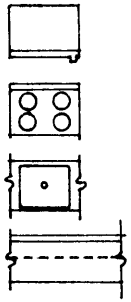
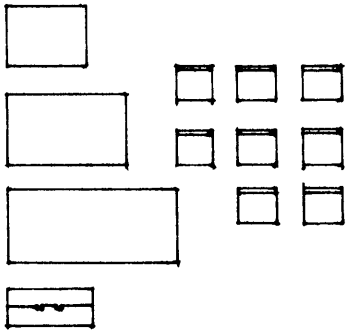
SHELVES

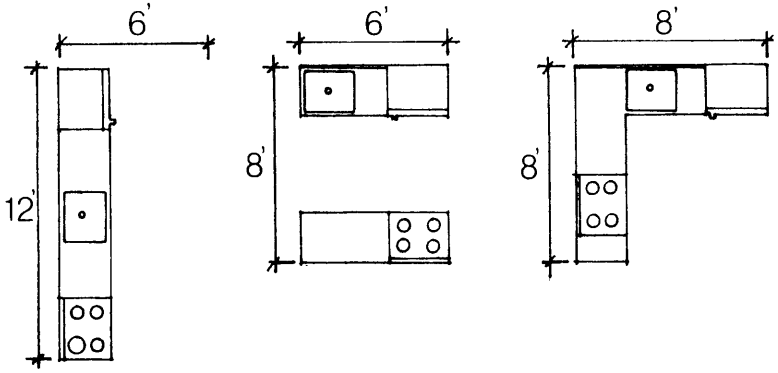
PASSAGE

STORAGE



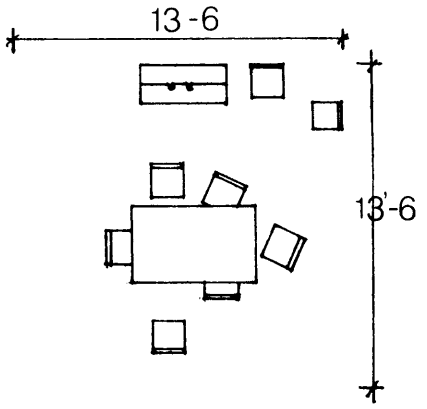


PRIMARY



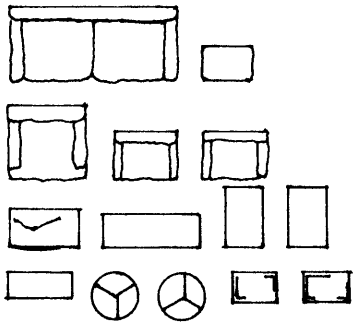
fp

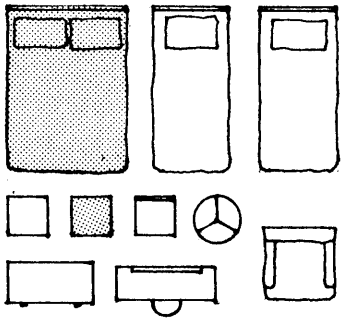
D



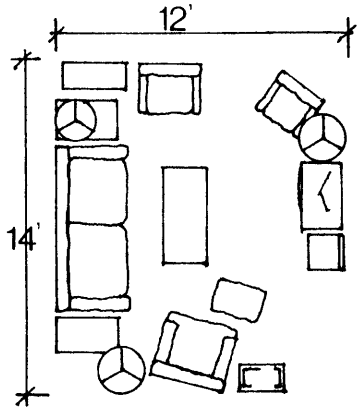
FOOD PREPARATION

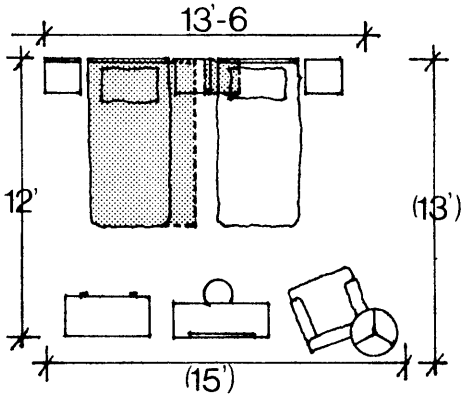
FORMAL DINING





SETTINGS





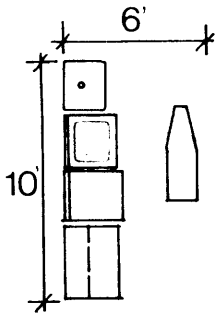
L

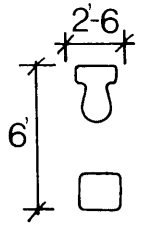
sd(+t)

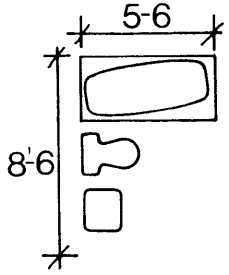
LOUNGE/ENTERTAIN

SLEEP/DRESS

SECONDARY



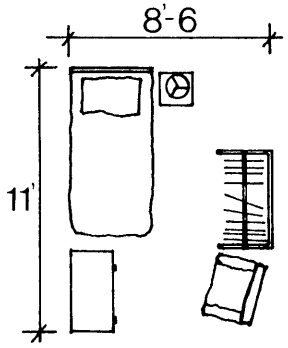




u lv b

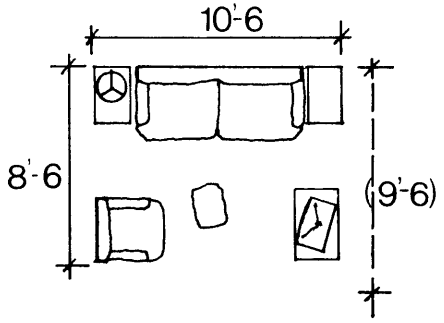
UTILITY TOILET BATH

SETTINGS



1sd

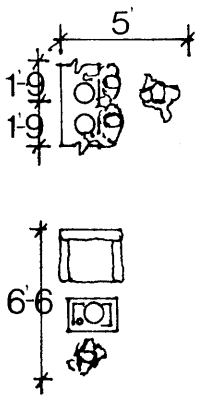
SINGLE SLEEP/DRESS



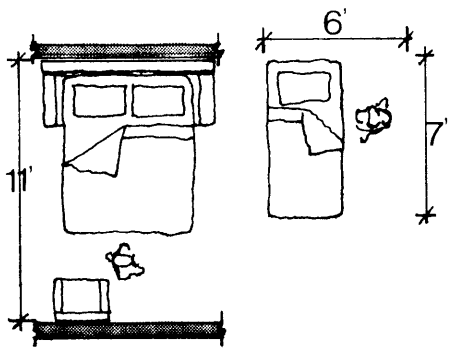
sL

SMALL LOUNGE

SECONDARY &



iD



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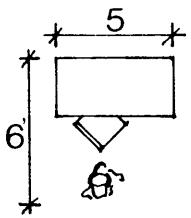

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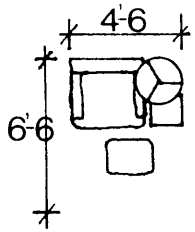
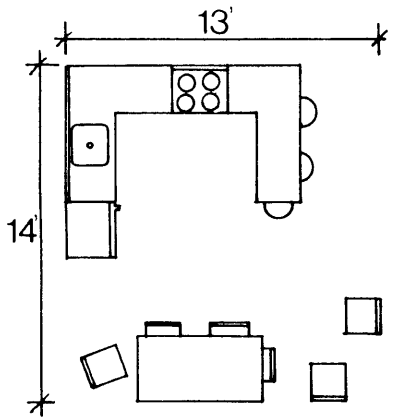


t

INFORMAL DINING GUEST OPTIONS TASK OPTIONS

COMBINED SETTINGS



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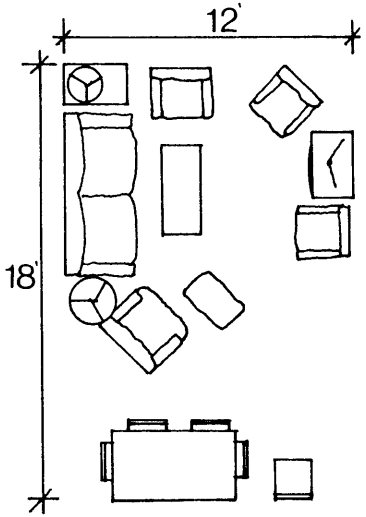
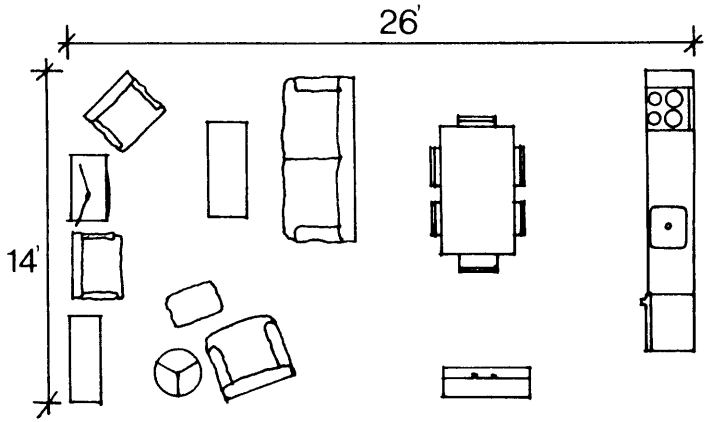


L-D



fp-D-L

FOOD PREPARATION - DINING - LOUNGE OPTIONS

A critical part of the problem posed by this project is defining what the behavioral needs are for which a built environment must be tractable. Whose need? How are they to be assessed? Are they real? The point, in fact, is that "needs" is a nebulous term. What, as Sandra Howell has pointed out in discussion, can be more objectively recognized and therefore designed for are the users': (1) preferences; (2) lifestyle variations; and (3) use changes.

Preference rises out of individual habit, idiosyncratic use. One commonly ignored, but not so incredible fact, is that often the user will prefer to have some amenity or arrangement within the immediate environment which no architect (or few, anyway) would conceive. Witness, for instance, the work of the brothers Arsene-Henri as cited by Rabenek, Sheppard and Town [Architectural Design, November, 1973], where 10 model suites were drawn up as samples for occupant-designed units in a flexible layout apartment house—Montereau. Not only did the future occupants of the building not choose any of the 10 promotional options, but each unit of the 37 built was different. A similar misunderstanding of use preference has been conveyed in conversation by Gayle Epp who asked a group of architects and planners to "furnish" on paper typical, low income, elderly housing units. Results to the exercise, in most cases, showed "polar-opposite" furniture arrangements to those recorded by the MIT Design Evaluation Project [cf. Howell and Epp, Private Space]. Two potential solutions to this type of misunderstanding are evident. One would be to train all designers of housing to respond via design to users' preferences, a task most architects, it would seem, do not have the sensitivity to accomplish. Second, the argument for tractable environments is to get the design professions be aware of designing to give the user latitude within the built environment to exercise preferences, to make choices (and ultimately changes) easily.

Lifestyle variation is tied to preference, another area of "need" which the architectural profession does not sufficiently understand. Most housing does not recognize in its design any other group of occupants than the nuclear family. The problem now is that increasingly households are non-familial units. No longer are units guaranteed to

be occupied by Mom, Dad and 2.3 children. Even if the units might fit current demographic needs, use patterns certainly are not typical. For one thing, the whole family may seldom be home at one time to use group areas or may have conflicting needs for quiet or privacy due to variations in personal schedules.

According to projections for the 1980's, an increase in the number of households can be expected beyond the rate of expansion of population, particularly single-person households [cf. Schmertz, also Spink]. More people will be moving away from family to establish independent households for varieties of reasons. One increasingly common phenomenon—attestable by a quick scan of apartment-to-share ads in any metropolitan newspaper—is the rise in the number of units shared by independent persons. Young working persons or students, for reasons of economy or convenience, find it desirable to share housing with others in similar situations. Special privacy needs are not the same as those of the "typical-all-sharing" family. Elderly, single persons, and extended families are typically given short shrift in the housing market when it comes time to consider the particular conditions affecting their daily lives.

The "single family unit" must adapt to other lifestyles; it must become tractable. Further "need" is expressed by changes of use a unit must be able to undergo. A home may be needed as a place of work as well under mounting economic pressures. An office to conduct business is one scenario whereby a housing unit may "need" to be altered. Preferably, such a change should maintain internal privacy for the household. The question being, more directly, can the business space be accessed directly from the unit entry without going through, or even seeing, other spaces? Few places are designed with such an idea in mind.

The introduction of a completely new activity challenges design-by-preconception. In the end, it is, simply put, unwise (and uneconomic) to design for strict conventionality. People may live differently from the ways designers think they do. Preference, lifestyle variation and change of use are uncertain quantities in the design function.

SCENARIOS

The purpose of sketching user scenarios in detail is to have a notion a little closer to reality of how a house may be used. The four scenarios presented are neither complete nor definitive; they are meant to represent how spaces may typically be used, after examining a number of possible living situations. A logical "loose-fit" is intended, in that each of these four is meant to be characteristic of other scenarios which could not be presented here that also share needs for similar conditions. Design proposals may be tested against these, either by setting up household units to accommodate each of the four sample scenarios, or (more realistically) setting up a place for one scenario and projecting the changes undergone over time by both place and scenario.

Of the changes taking place over time which are likely to impact the use of a housing unit, most are related to changes in lifestyle and in uses of spaces as life cycles progress. These are consequences of the passage of time. As people age, there is a greater or lesser need for space--as children are born, as children leave home. Teenagers share fewer and fewer activities with parents as they develop and ultimately leave home. People also change the needs for uses, for example, to add space for an at-home workplace or for a set of electric trains. Such longitudinal changes are reflected by the differences between Scenarios 3 and 4 where it is conceivable a widowed parent moves in with a couple whose children are approaching the age of leaving home.

Similar courses of change can modify each scenario. It is conceivable that any given scenario may evolve to another.

The diagrams set out with each scenario are drawn from Roderic Lawrence's study, and then elaborated where appropriate. Here they are meant to explain the sequencing and characteristics of the domestic spaces. Dotted lines indicate permeability, an implied physical--often visual--connection. Solid lines indicate differentiated spaces. Lawrence's terms for these respective conditions are "associated" and "demarcated"; analogous terminology to describe such places are: public/private; collective/individual, etc. The implications of these ideas will determine the order in which the spaces are experienced, as well as their relative locations and physical natures. It is from Lawrence's study too that concern for the significance of the entry setting is underscored. Its symbolic and functional virtues are discussed as well by Howell and Epp. But the import of the entry in both discussions lies in the filtering of public and private realms and the buffering of group and individual areas within the household which occur there. What follows are four outline scenarios with listings of the activity settings they incorporate. Speculation is made on other situations which may be comprised of similar activity settings.

The scenarios are adapted from the MIT Department of Architecture, User Needs Workbook.

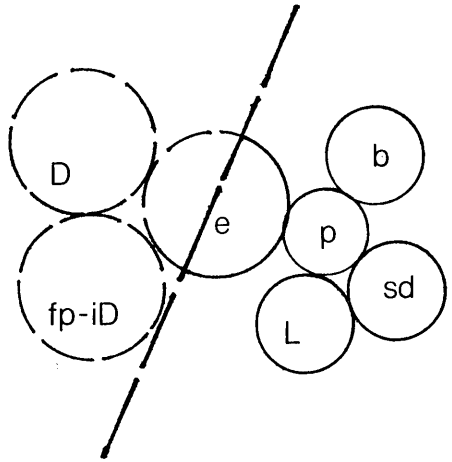
SCENARIO 1:
INDEPENDENT ADULTS SHARING A HOUSEHOLD

1 adults

One can assume that in the course of any given day independent adults sharing a house or apartment share activity settings relatively seldom, at the same time. Separate sleeping/dressing settings are a given commodity. Bathing facilities may be shared—given the temporal nature of their use; but separate facilities may be considered. Being that it is more economic, a shared food preparation setting is needed; it should probably be of a size to allow two people to work in parallel preparation of meals at once. Formal and informal dining settings should be adjacent to food preparation to permit entertaining of guests. The lounging/entertaining setting is more problematic; its standard configuration being a shared "living room" where two sets of activities for two individuals and their guests may conflict. An option to this is to provide the potential for smaller individual lounge settings adjacent to or contiguous with the individual sleeping/dressing areas. In this way entertaining does not have to be a collective undertaking. Circulation and entry sequence should be set up to buffer private, individual spaces from each other as well as from the communal space. A population of two is used for discussion here; there could be more people in a household.

Diagrams are adapted from Roderick Lawrence's "Comparative Experiences of Domestic Space."

associated



demarcated

Settings proposed:

1 large area to accommodate food preparation with provision for informal and formal dining
1 bathroom (possibly 2)
1 utility room
1 entry area
2 sleeping/dressing areas
2 small lounge areas (which may double as individual task or study areas) adjacent to each sleeping area

OTHER SCENARIOS WITH APPROXIMATELY THE SAME ACTIVITY SETTINGS:

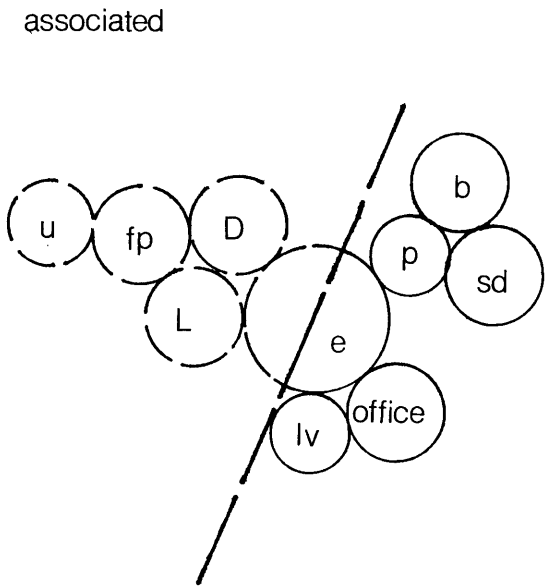
elderly people (not married) living together
students sharing a place
a couple with lodgers

SCENARIO 2:
WORKING MARRIED COUPLE, ONE OF THEM WORKING AT HOME

2

couple

The amount of space is not so crucial in this context as is layout. The clustering of activities around entry, food preparation, dining and lounging areas with a "public" work area are the central problem. As Roderic Lawrence's study "Comparative Experiences of Domestic Space" suggests, public and private separation at the entry can be a focal issue for the inhabitants. The successful resolution of the separation depends often on a seemingly redundant provision for circulation and services, "public" and "private" passages and, perhaps, a "public" toilet near the entry.



Settings proposed:

1 entry area with access but not intrusion upon food preparation, lounging and perhaps dining areas
1 food preparation area with informal dining for 2
1 formal dining area (optional, may combine with lounge)
1 lounging/entertaining area
1 bath
1 utility area
2 sleeping/dressing areas (1 large, 1 small for guests which may be incorporated by another setting)
1 office/work area near the entry
1 toilet near the entry in the "public" part of it

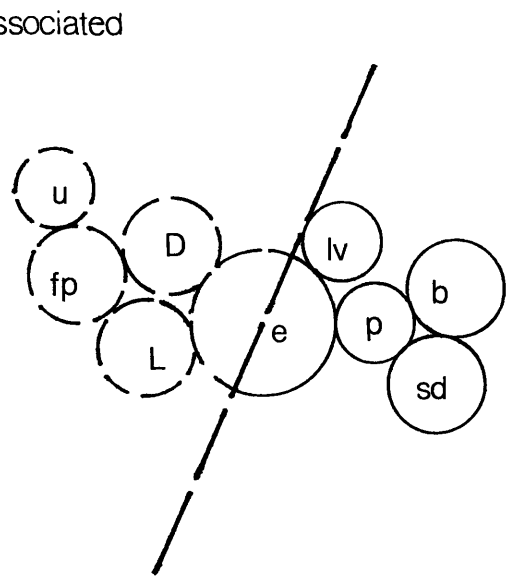
OTHER SCENARIOS WITH APPROXIMATELY THE SAME ACTIVITY SETTINGS:

cohabitating couple
elderly couple
single person

SCENARIO 3:
FAMILY WITH THREE CHILDREN (7, 4 and 1)

3 family

Characteristically, the family is comprised of a married couple, one or both of whom work outside the home. The children in various stages of development attend school for all or part of the day. This set of activity settings is a fairly commonly accepted image--in fact, the one for which nearly every designer usually (however implicitly) designs. Many settings are shared, but individual privacy is at times a critical developmental or social need for each inhabitant. Provision for individual activities away from shared spaces probably should be provided, most likely related to sleeping/dressing settings. Play settings for small children nearby adult work areas place additional demand on the organization of household spaces. Here again, entry and circulation perform mitigating functions, between "public" and private areas and between private realms for adults and children [cf. Community and Privacy, Chapter 13].



Settings proposed:

1 entry area
2 large area for food preparation and informal dining
1 lounging area (or several for varying activity)
1 laundry area/utility area
1 or 2 bathing areas
3 (at least) sleeping/dressing areas, each to accommodate 2 people (2 children may share a room, but provision for separate rooms in the future should be anticipated)
OR
1 double and 3 single sleeping/dressing areas (all sleeping/dressing areas have provision for private, unrelated activity for each person; if not, such places are elsewhere in the unit)

OTHER SCENARIOS WITH APPROXIMATELY THE SAME ACTIVITY SETTINGS:

one-parent household

SCENARIO 4:
EXTENDED FAMILY, COUPLE WITH THREE TEENAGERS (17, 14 and 11), ELDERLY WOMAN

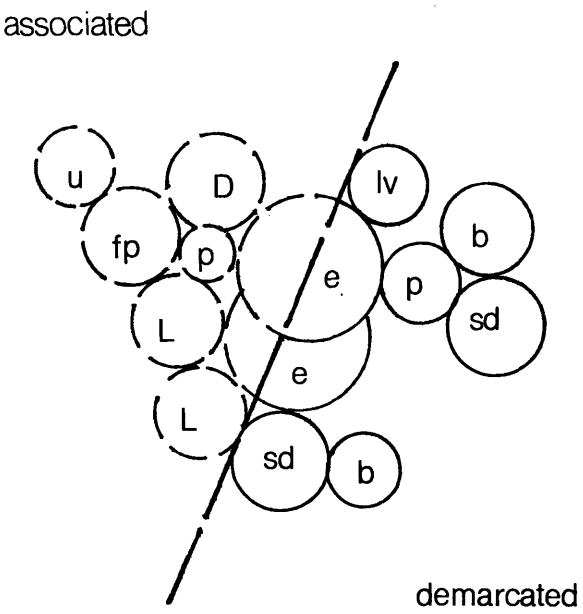
4 extended family

The term "extended family" evokes an image of a rich and interactive mix of people. The extinction of three-generation households is often the result of lack of room for the older folks to live with the younger. Then too, changing lifestyles make the managing of such households difficult, given the layout of most housing in the United States. Even if a place is big enough to accommodate an older relative, the house may not be organized so that all parties can come together, but maintain discretional privacy. Privacies are generally not respected where places are designed for families, as has been pointed out before, given the "all-together-or-nothing" attitude toward family-style activities. Private realms can be sifted out most expediently in layers of sequenced options, a vestibule, stair hall, passages between rooms. One should never have to pass through one realm to get to another.

Settings proposed:

1 entry area
2 large area for food preparation and informal dining
1 lounging area (or several for varying activity)
1 laundry area/utility area
1 or 2 bathing areas
1 double and 3 single sleeping/dressing areas (all sleeping/dressing areas have provision for private, unrelated activity for each person; if not, such places are elsewhere in the unit)

1 separate entry or entry from the household vestibule
1 sleeping/dressing area (possibly with adjunct lounge)
1 bath
interior connection to the rest of the household so that shared activities and services can be easily accessed
allow adequate space for a small food preparation area to be added to the sub-unit



OTHER SCENARIOS WITH APPROXIMATELY THE SAME ACTIVITY SETTINGS:

couple with son, daughter-in-law and baby living in temporarily
family with lodger(s)
couple with teenager(s) or older offspring living in

3

ANALYSIS

This segment of analysis identifies the parameters concerning the disposition of materials and forms of built environment which have been postulated to influence tractability in the paper, "Outline Extended." Structure, non-bearing internal partition and weather skin are located as they affect the ease of re-structuring or change of spaces. Service walls, i.e. plumbing chases, are located for the same reason, particularly that chase location will constrain the possibility of adding bathing or food preparation settings at will, or of relocating them[1]. Formal aspects such as overhangs and adjacent exterior use space are located as well for their potential as places for

[1] Limitations of a similar nature are inherent in the distribution of heat, electric power, gas and communications services. For the sake of simplicity, these additional matters are not dealt with here, realizing, of course, that they too in reality need to be located just as do water and waste.

expansion of household space. It is clearly easier to add new spaces or to extend old ones where part of the construction has already been done. Level changes are also located as they limit the possibilities for the exchanging of settings from one space to another. The tendency is that more private settings—sleeping/dressing, etc.—will always be located up a flight of stairs from the entry, if that condition is originally present. Settings in such a case cannot be freely re-ordered without violating such logic inherent in the disposition of forms. This is not a very tractable condition, even though there are situations where such a device is appropriate. The aim here is not to determine what dispositions of form are appropriate for all, or any people, but what characteristics of form allow wide range of choice and change.

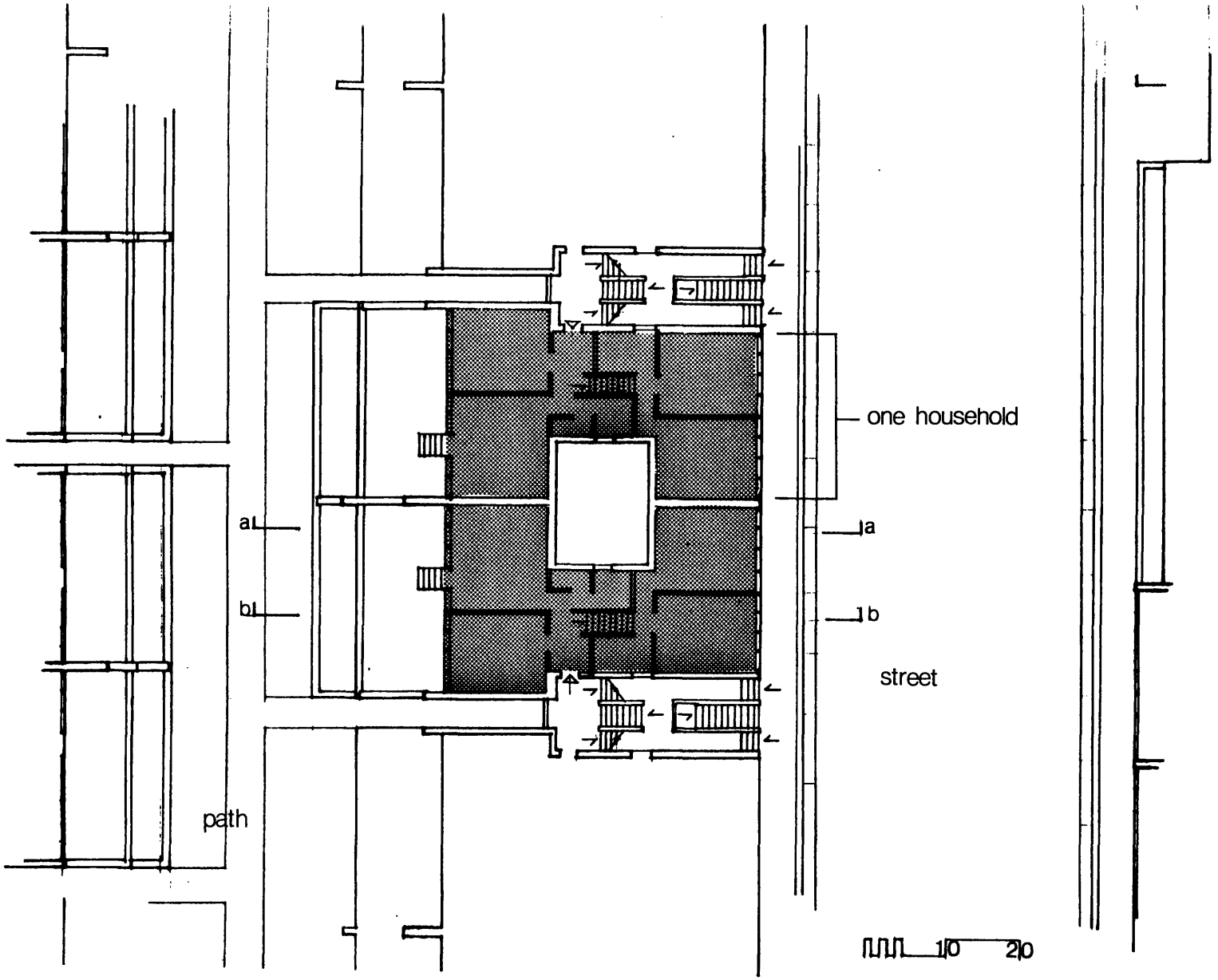
The second phase of physical analysis ties the spaces with the activity settings. Each space has been dimensioned then labelled as to which settings will fit into them based solely on floor area required. No attention is given at this point to ordering access, nor to adequacy of light and ventilation and so on.

- T E R N I -

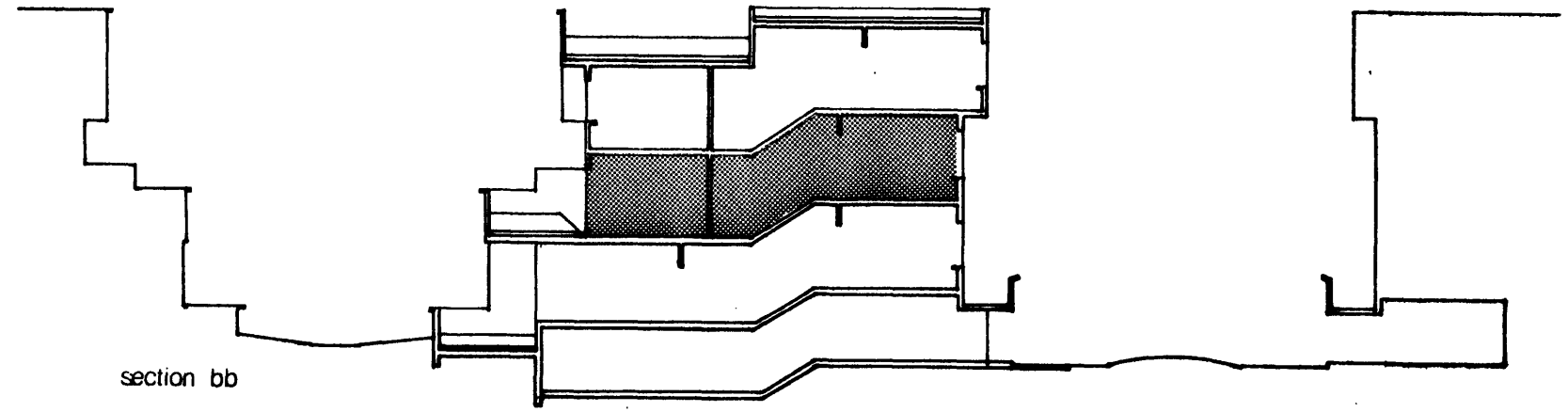
The housing unit looked at here is from the Matteotti Village, workers' housing at Terni, Italy, designed by Giancarlo De Carlo. It is analyzed here to find its virtues and deficiencies relative to tractability. It was chosen not for being hypercritical of its faults, but because of its strengths as a carefully designed project. It has been well maintained by its inhabitants since its completion in 1976, judging from such things as the well-cared-for appearance of the private terraces. It also offers a particular building typology which may be revealing of characteristics important to tractability—light courts and split level units. Cultural variation is assumed to be negligible from the North American situation; room sizes approximate common American dimensions. The project could as easily have been built in New Jersey as in Umbria. The Village is formed by four rows of four-story "rowhouses" of varying configurations. It is impossible to examine all the house-types here, not even all the units within one type. The houses are separated on one side by landscaped pedestrian path and on the other by auto access. The project is built of exposed ferro-concrete with steel window frames; its uniformity is broken by varying the arrangements of house types in each of the rows.

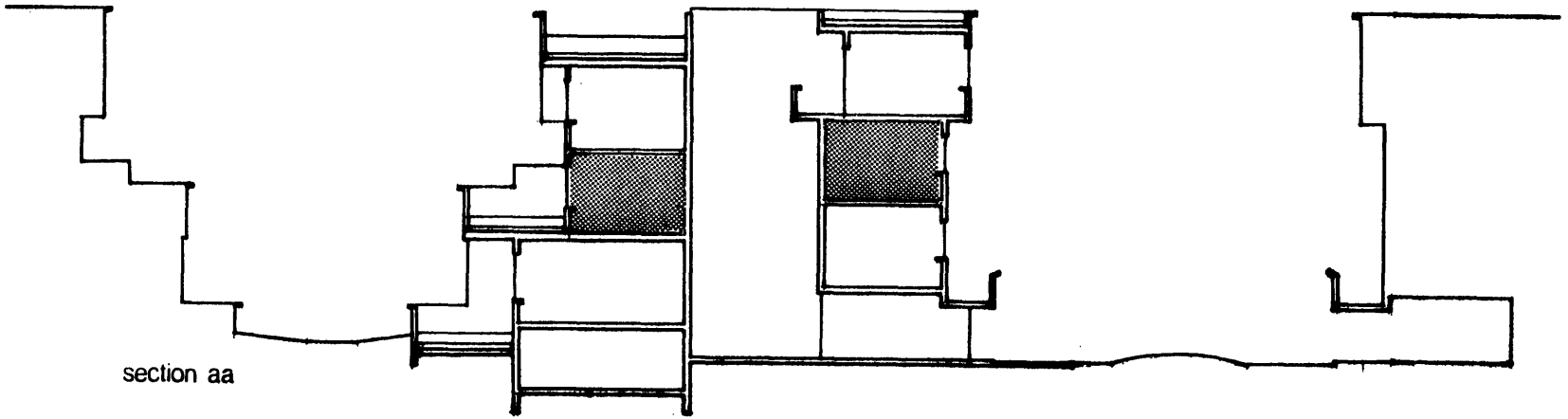
- B O S T O N -

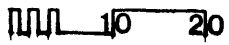
The housing unit shown here is a stereotypic one. It is drawn up along the lines of the common description of the neighborhood and rowhouses of Boston's South End. It was picked for its touted tractability. This type has proven adaptable to a succession of inhabitants and uses. Since construction in the early 19th century as single family housing, rowhouses have been used as boarding houses for independent persons, and more recently have been converted to flats and multi-level apartments. This particular district is comprised of many streets of rowhouses much the same as the sample drawn here. Further, it is a type common to many cities of the Eastern United States. Oddly (or not so, perhaps), the spacing of the rows of buildings is not too dissimilar from the Terni model. Construction is typically brick bearing wall with wood and plaster infill. The building type is surprisingly uniform. Variation is achieved in the differences in detailing of similar facades and in the choice of materials and finishes.



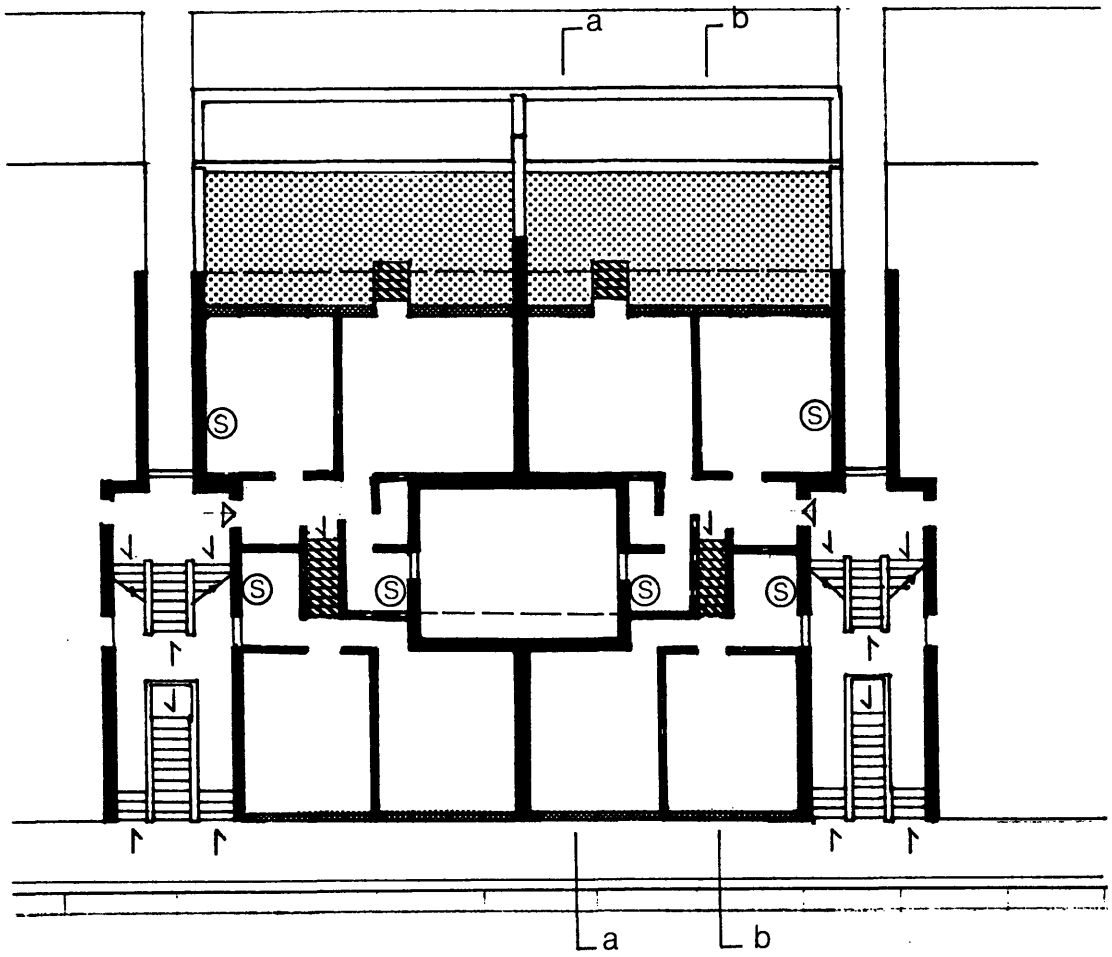
TERNI base plan FIRST LEVEL







sections

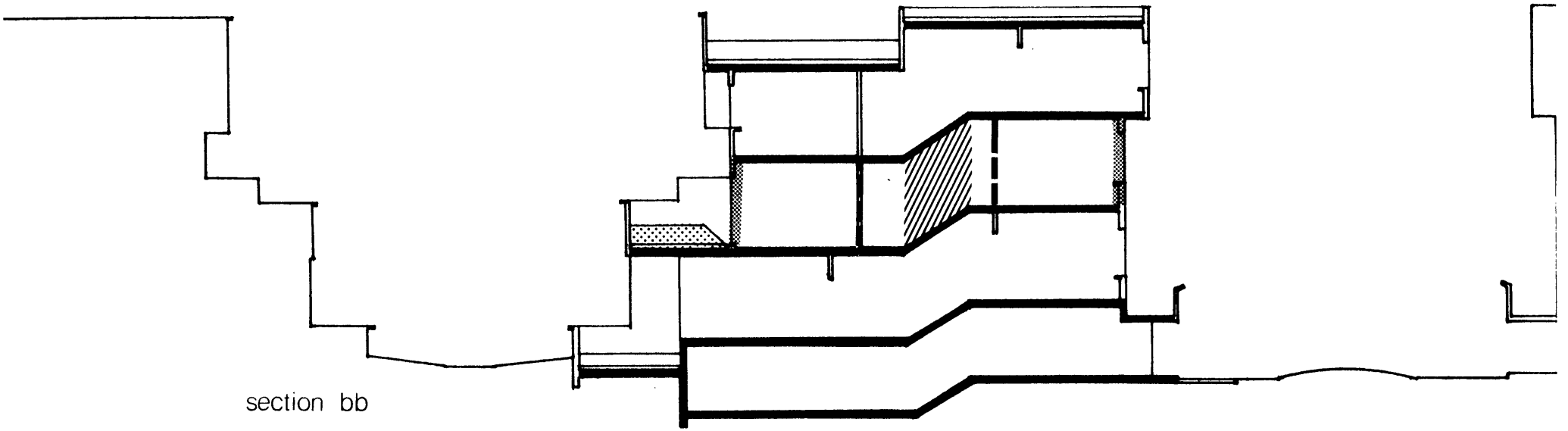


built elements identified

first level plan

ft.

structure
partition
weather skin
overhang
Ⓢ service wall
level change
exterior use



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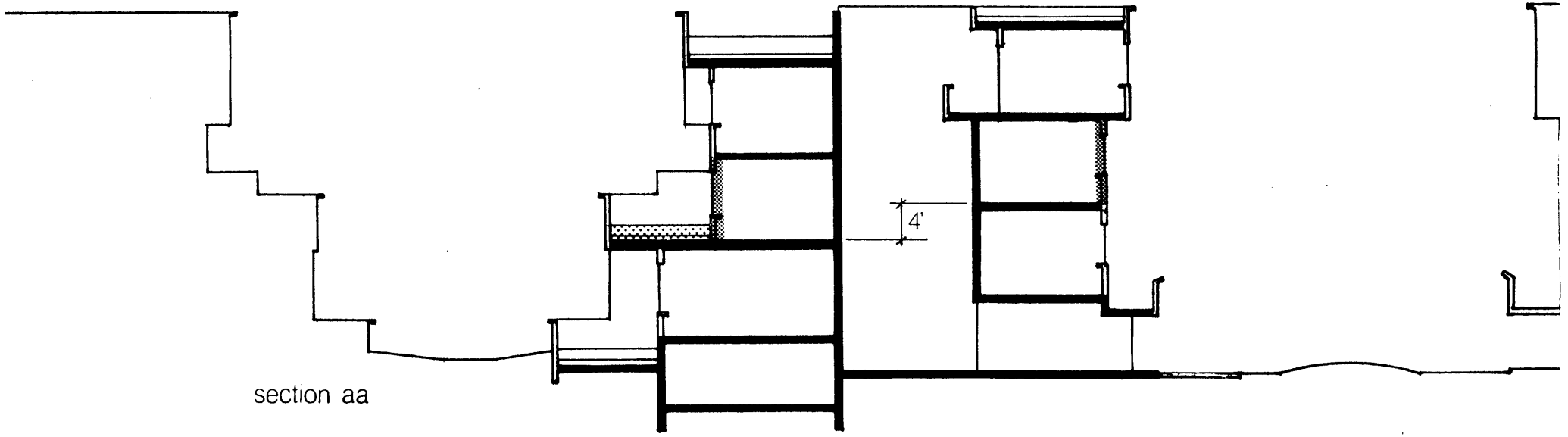

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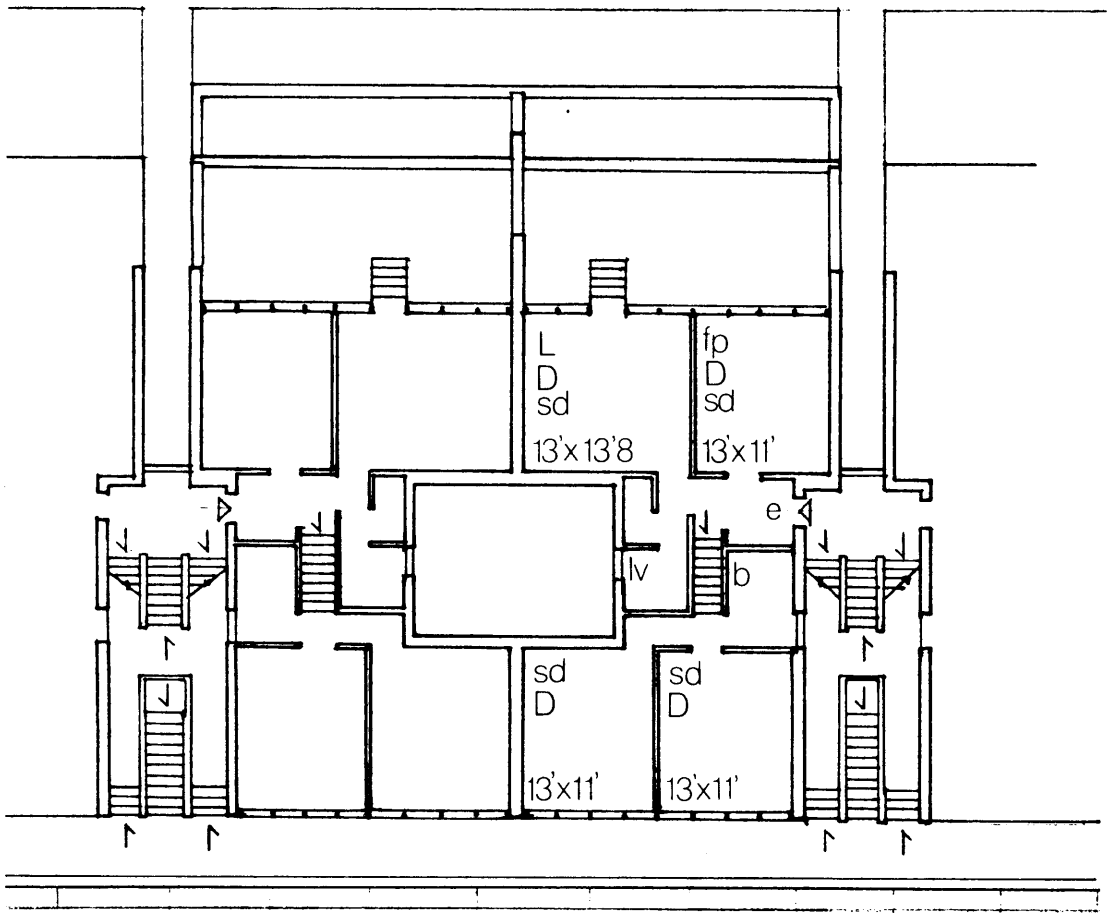


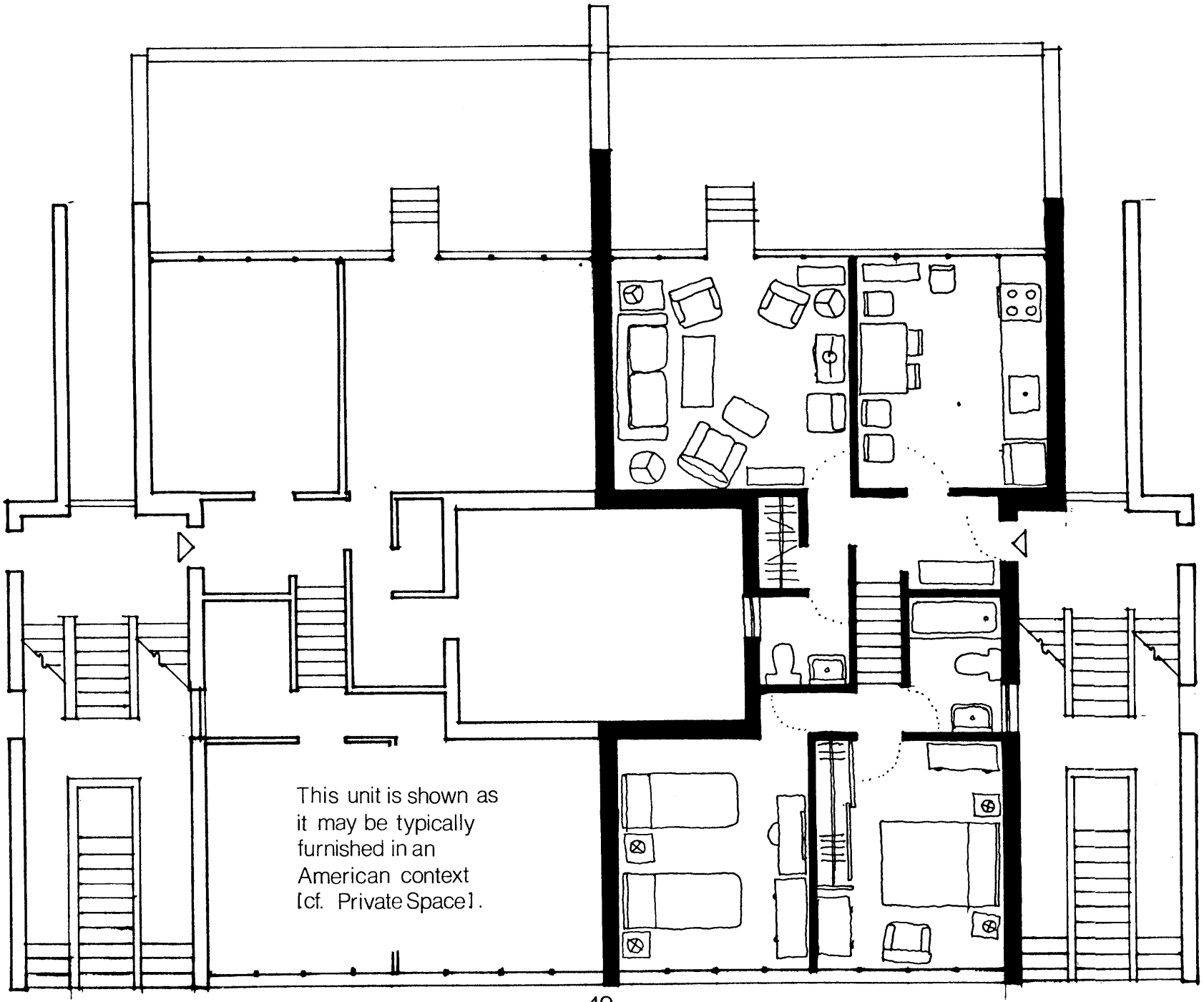
activity settings located

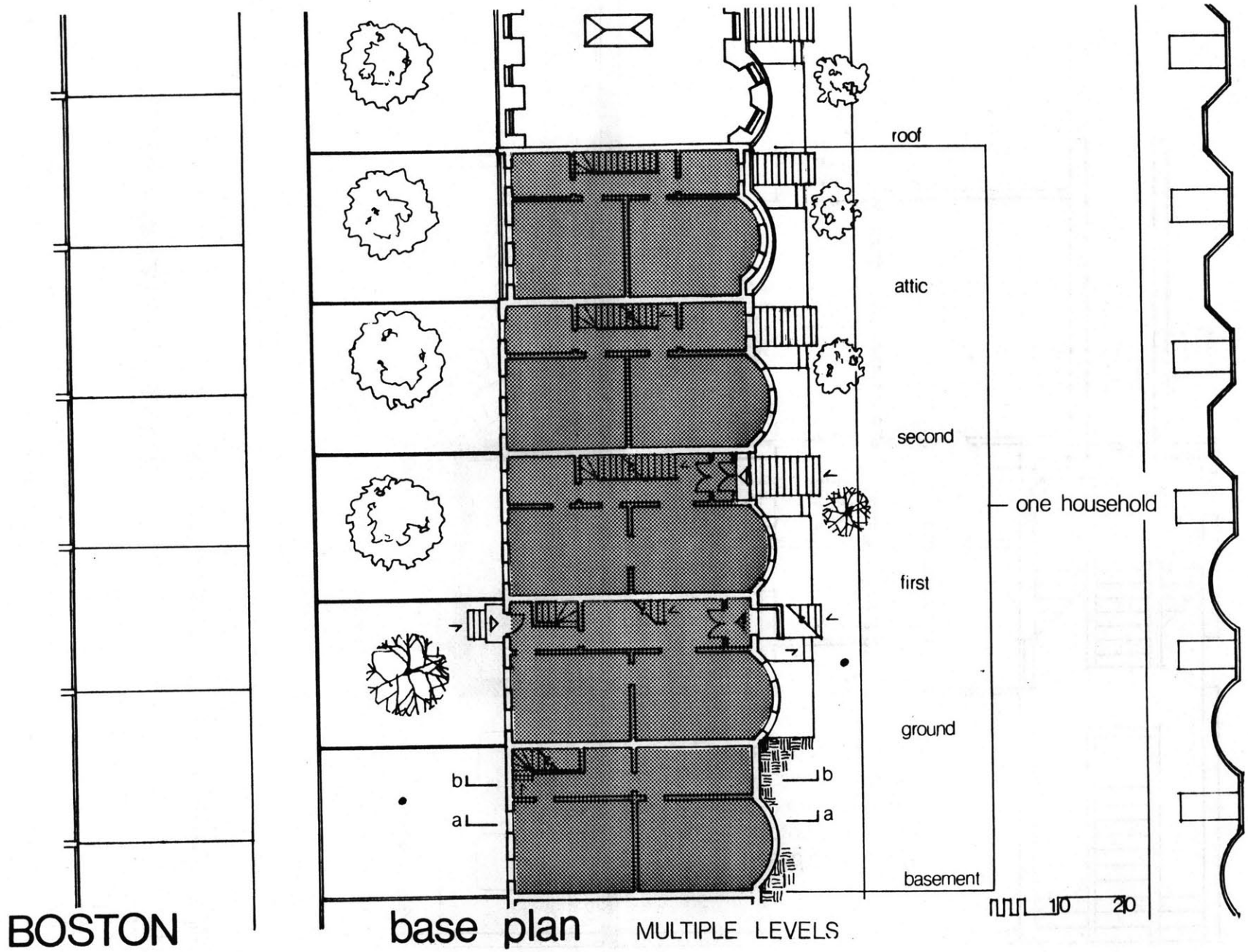
first level plan

ft.

fp	food preparation	(6x12, 6x8)
L	lounge/entertain	(12x13 or 14)
D	formal dining	(13x13-6)
sd	sleep/dress	(11x12)

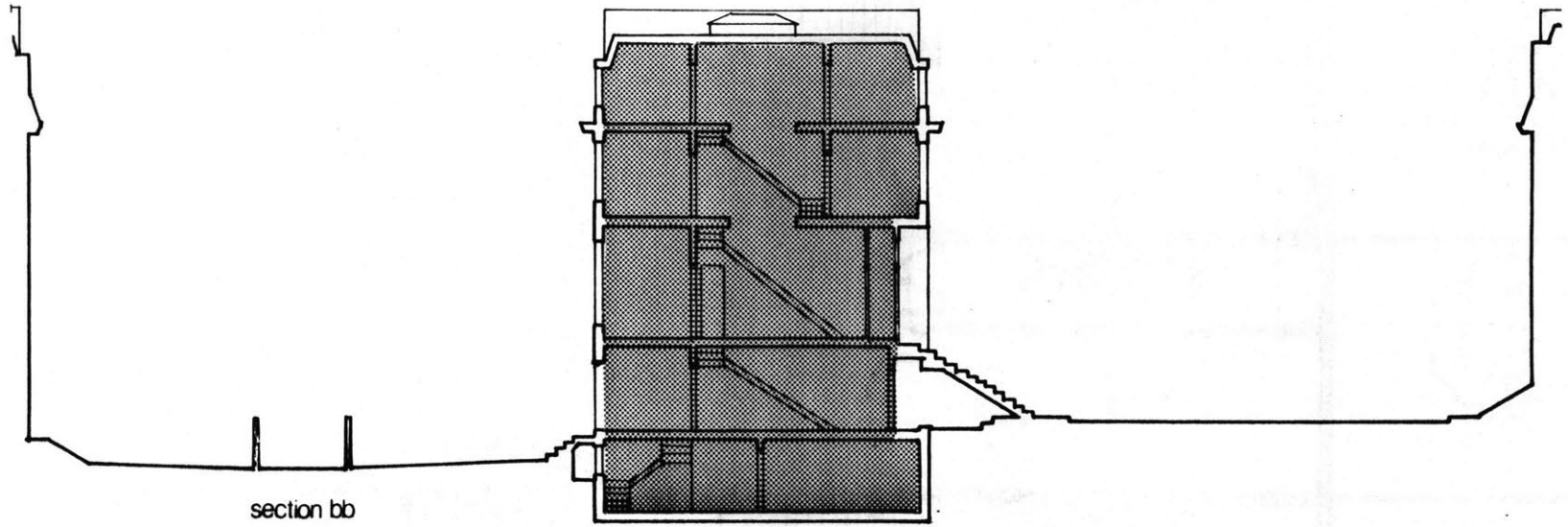
ACTIVITY SETTINGS


This unit is shown as
it may be typically
furnished in an
American context
[cf. Private Space].



BOSTON

base plan MULTIPLE LEVELS



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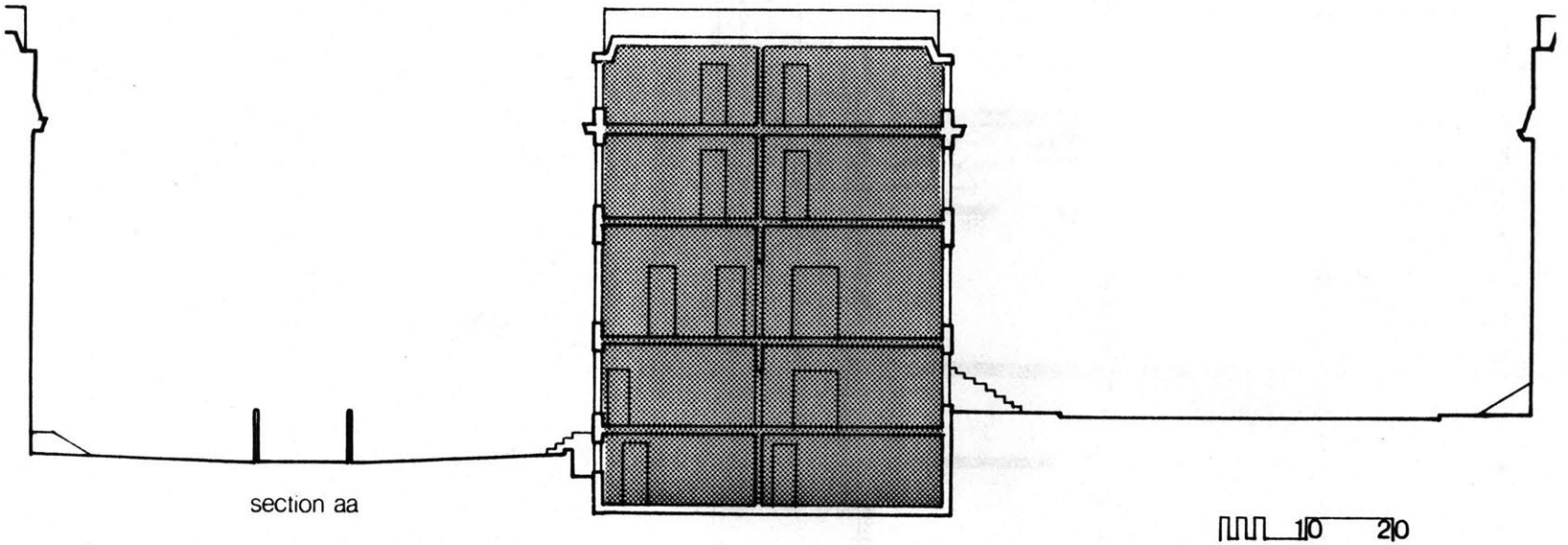
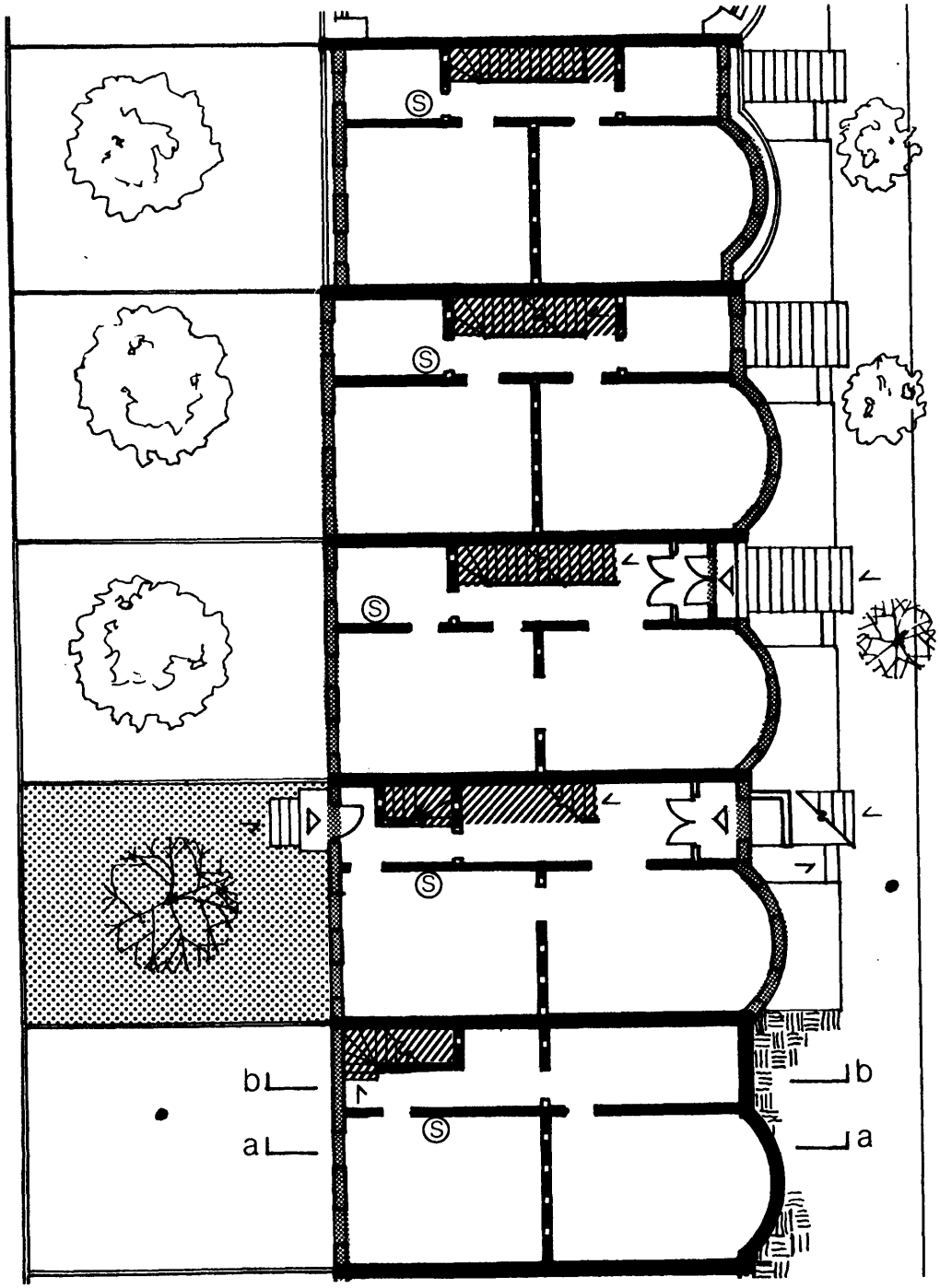


section aa

1|0 2|0

sections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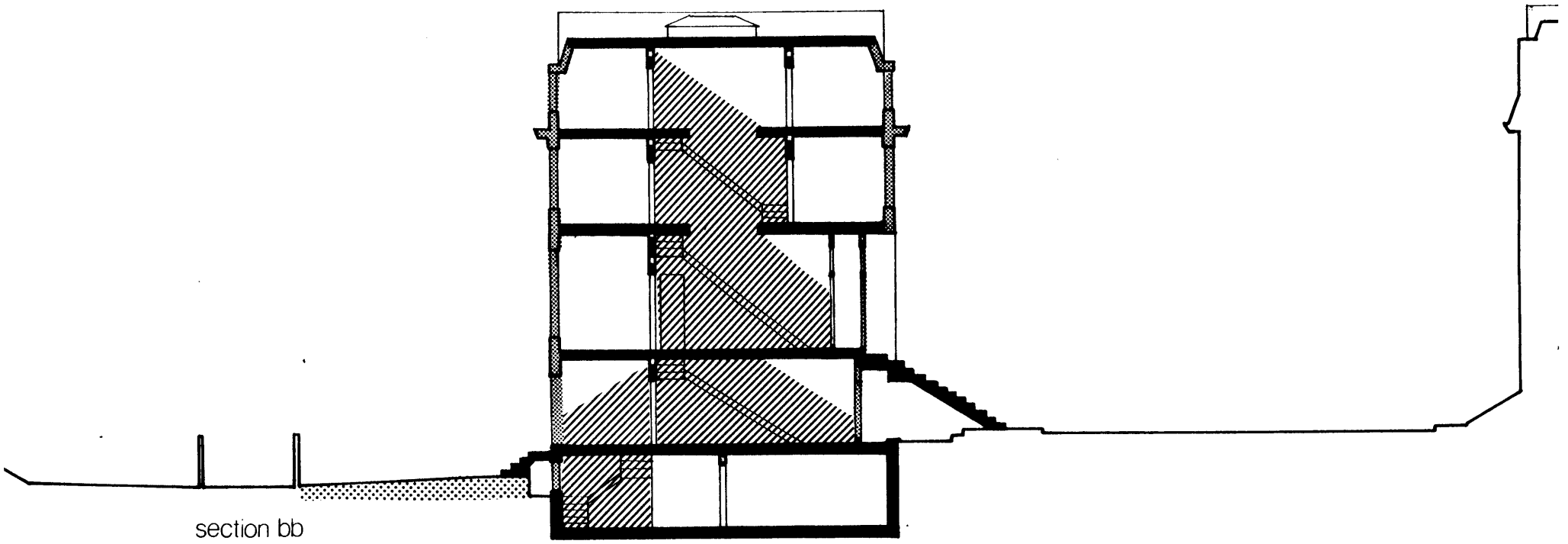

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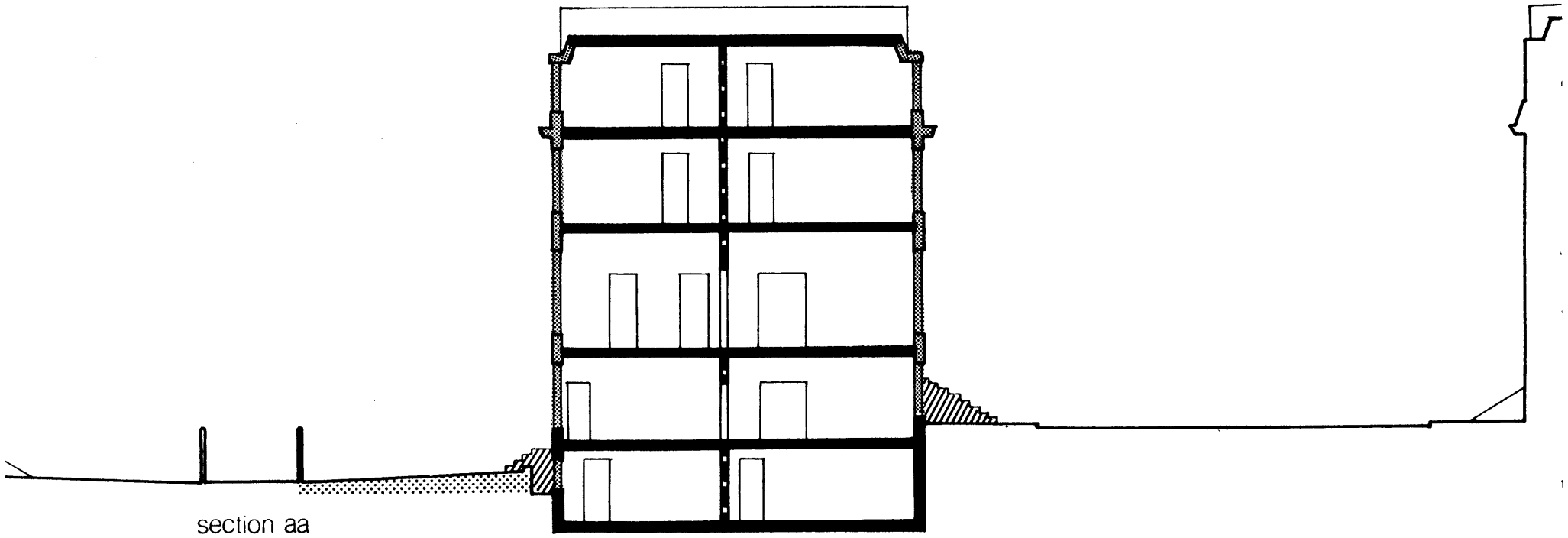

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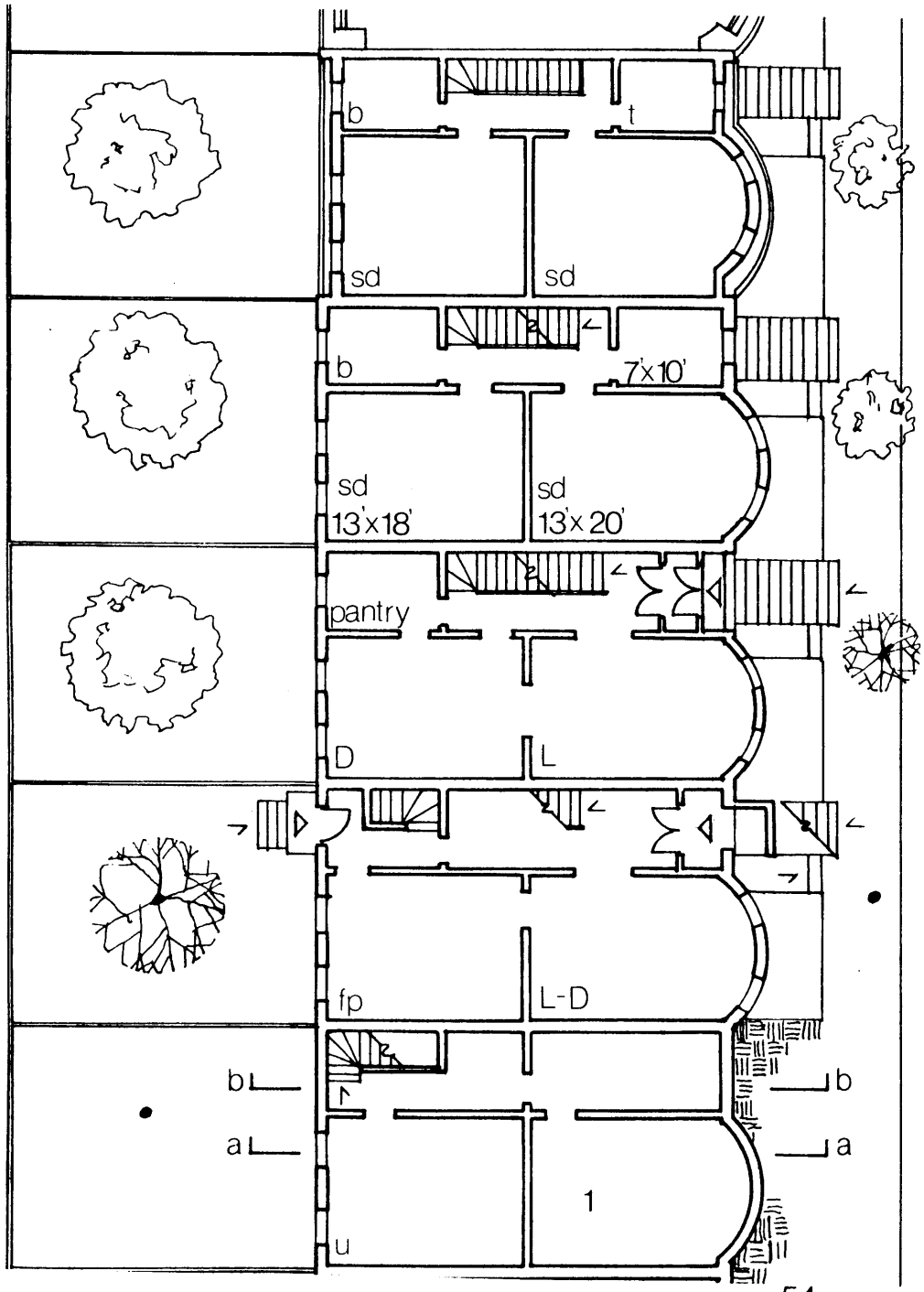


activity settings located

ACTIVITY SETTINGS

fp	food preparation (6' x 12')
L	lounge/entertain (12 x14)
D	formal dining (13' x13'-6)
sd	sleep/dress (11' x12')
b	bathe (5'-6 x 8'-6)
u	utility (6' x10')
t	task (5' x6')

Given the room sizes, settings are easily interchanged.

1|0 2|0

something entirely desirable from the tractability standpoint. The saving grace of South Boston rowhouses is precisely a dimension overage which permits a second circulation path to be made parallel to the original one. Such excess has allowed original stair halls to become shared access as each floor is converted to individual apartment use. However, the relegation of services to one

of missed opportunities . . .

What rises out of this phase of the investigation are a set of general questions concerning the disposition of spaces and materials for tractability. These are ordered and presented in the next chapter. The important thing to mention here is some few missed opportunities, specifically at the Terni site where the spaces surrounding light courts could have been connected as a household expanded laterally had there been sufficient dimension for circulation to be taken from existing spaces. Had the entire household unit been set on one plane it would have been easy to connect all circulation with the entry, position at the rear of the rowhouses constricts the re-interpretation of spatial ordering--bathing, food preparation and such water-dependent settings can only be moved toward the front of a house with considerable investment of negotiation, time, skill and money. On the whole, though, both examples serve as sources to draw upon for design for tractable houses.

The disturbing thing about a well practiced art, or architecture, is that whatever one accomplishes quite often opens up to questions.

4 EXTRAPOLATION

So too the exercises described in the preceding chapters require order.

Insatiably, one seeks to know more, to order what one thinks one knows.

Curiously enough the device for this task is a set of questions, developed in an effort to enlighten the design vis á vis criticism.

& SYNTHESIS

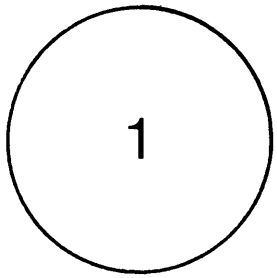
The analysis of a household unit most reasonably is approached keeping a particular use scenario in mind, even though the questions were intended to be as neutral as possible to cover the major portion of possible scenarios.

Tractability can be "tallied" as questions concerning a household unit are answered.

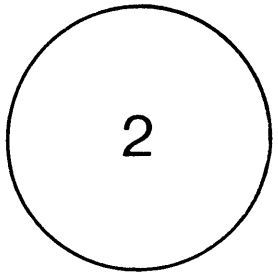
It is important to note that the following questions are ordered such that the investments (negotiation effort, shutdown time, technical demand and cost) are implicit; as one progresses through the list the magnitude of investment for a given change increases, i.e., questions begin with matters of choice and range through matters of change. Extensive construction is not an issue until one gets to the eighth question.

Q U E S T I O N S

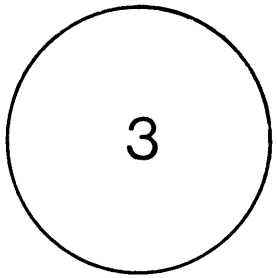
The questions are phrased so that they can be answered either "yes" or "no." A tally of predominantly "yes" answers indicates greater tractability; the measure is relative, not absolute. An attempt is made to maintain quality of living environment through any projected changes by making each question four-phased, to cover the concerns of accessibility and security, visual and aural privacy, sufficiency of natural light and ventilation and the dimensional adequacy of both newly created and existing activity settings. The questions are also ordered to attend first to the immediate concerns of a single unit, then to expand toward changes which affect the aggregate of housing.



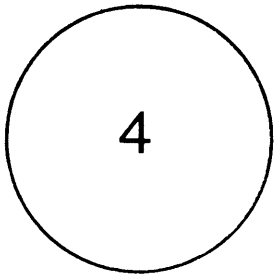
Given the dimensions of primary, interior household, activity settings, can primary-sized spaces be used interchangeably? In each case for each assumed scenario? For a change in scenario?



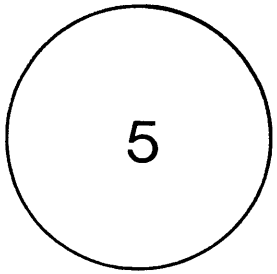
Does the location and quality or type of connection of circulation (both vertical and horizontal) allow the interchange of activity spaces so that ones requiring visual or aural privacy can be private; so that access is logically ordered and security can be attained; so that light and ventilation are each sufficient; so that activity settings are all dimensionally adequate?



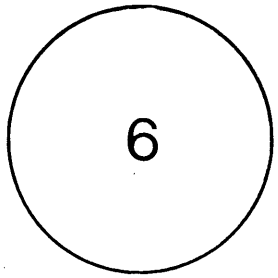
Does the location of exterior household (private) space allow the interchange of interior activity settings? [For Rabeneck this issue was conveyed by not making balconies accessible only through bedrooms.] Maintaining visual/aural privacy; access and security; light and ventilation; dimensional adequacy?



Are services (water and waste) located so that food preparation or other activity requiring services can be located in each space?

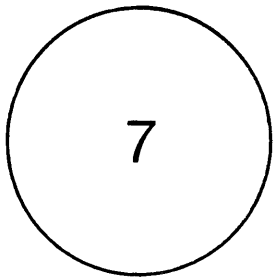


Can any given interior activity space be expanded slightly (i.e., allow an activity to overflow) either permanently or temporarily (without physical change to the unit) so there are no adverse effects to visual/aural privacy; access and security; light and ventilation; dimensional adequacy?



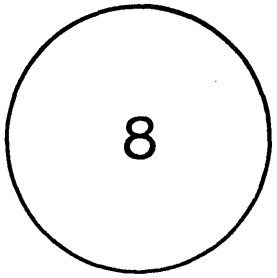
Can changes of use, that is the introduction of new activities which cause existing ones to shift within household space, be effected without adversely affecting visual/aural privacy; access/security; light/ventilation; dimensional adequacy?

For example: if a small office or business is introduced; if a small, independent subunit (studio apartment) is created for an elder relative or lodger?

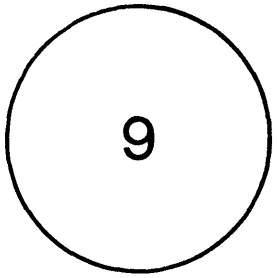


Can household spaces be reapportioned to

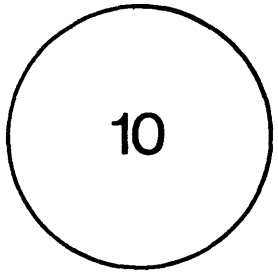
accommodate a variety of living unit types, i.e., a change of use scenario maintaining visual/aural privacy; access/security; light/ventilation; dimensional adequacy? Will the location of exterior, household space permit these conditions?



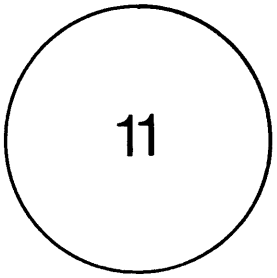
Are structure and partitions located so that spaces can be made larger or smaller (e.g., making a primary use space into two smaller use spaces), maintaining visual/aural privacy; access/security; light/ventilation; dimensional adequacy?



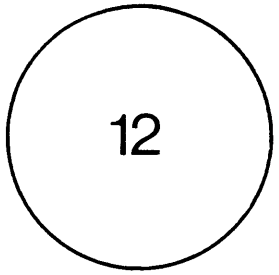
Can partially defined exterior, household spaces (e.g., space under overhangs, areas between structures, ledges, etc.) be enclosed to expand interior space without building new structural elements, maintaining visual/aural privacy; access/security; light/ventilation; dimensional adequacy?



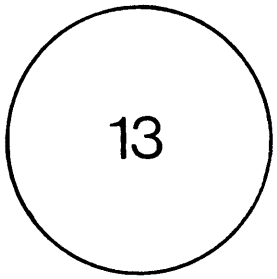
Is adjacent, useable exterior, household space located so that new primary spaces can be added without adversely affecting visual/aural privacy; access/security; light/ventilation; dimensional adequacy?



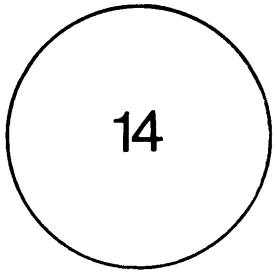
Is adjacent, exterior, public space located so that new primary spaces can be added without adversely affecting visual/aural privacy; access/security; light/ventilation; dimensional adequacy?



Is exterior, household space dimensioned and located so that it can be used for exterior household activities (e.g., for play, work, parking, entertaining, eating, cooking, etc.) maintaining visual/aural privacy (where appropriate); access/security; light/ventilation; dimensional adequacy?



Can the unit be expanded "laterally" into another unit without adversely affecting visual/aural privacy; access/security; light/ventilation; dimensional adequacy?



Can the aggregation of units be reorganized into a wide variety of unit types--or if already a wide range exists--into a narrow range, still maintaining visual/aural privacy; access/security; light/ventilation; dimensional adequacy?

In light of preceding chapters, the intent of the questions should be clear. Working through the list requires a mental re-design of the household unit being examined. What has been arrived at, somewhat obliquely, is a listing of characteristics of tractable housing, in hypothesis form. What remains is to test the ideas in design.

design

Ideas juxtapose and play off one another. Out of the analysis comes design, or more accurately, they emerge together. It is important to note that the process of design is one that involves identifying problems. At least that is the tack taken here. It is the case that the system of analysis set out in the previous chater has been revised by the design, as the design has been "revised" by employing the techniques of the analysis. The whole task, it seems, is a slow whittling toward resolution. Indeed the foremost idea is that the "piece" will never be finished as an art object is; even so, it can (and must, as a personal view) maintain a well-crafted integrity, indicative of a well-designed intent, of careful consideration.

The value of the exercise to the more hardened veterans of the practice of architecture may seem small, a restatement of "platitudes-we-already-knew." However, it is an orderly approach to design with one issue central to all other considerations--change. It also sets out a structure not only for identifying issues for which design responses are to be made, but also a means of self-critiquing a design, hopefully clarifying con-

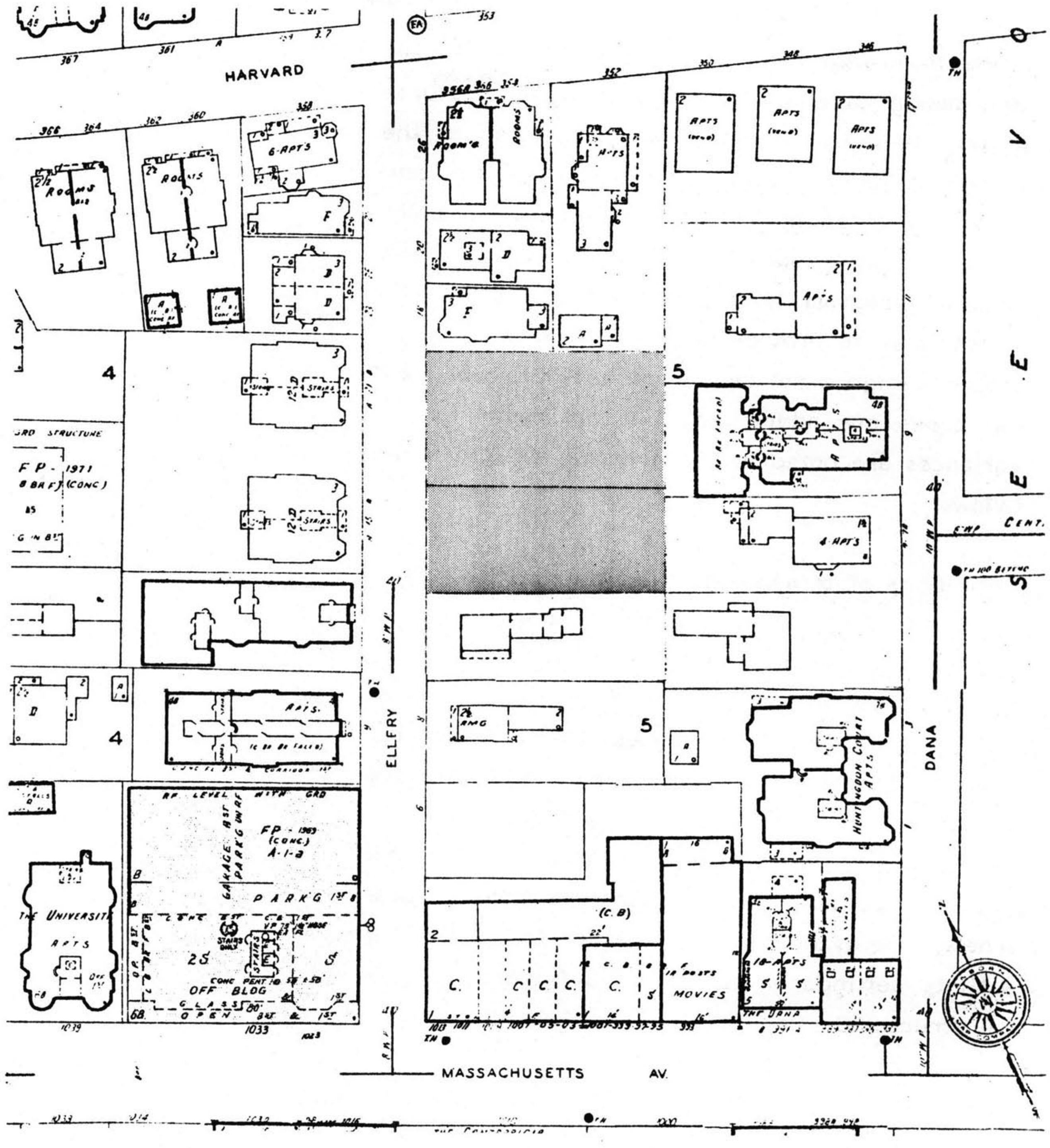
cepts and honing the product as design proceeds. Its value as a thesis is a synopsis of sorts, culminating the working through a design curriculum. Clearly the design presented is but a schematic, first pass. What is presented is somewhat prototypic, though definitely not meant for endless replication.

This segment will cover the intent of the design and a brief on the site. The design will be linked to the initial premises of the thesis by presentation of a series of sketches of aspects considered in a somewhat Pattern Language manner. Brief statements on alternatives as they developed will be listed before the presentation of the design scheme in its most recent state. What remains as a task for the reader is the testing of the scheme by means of the analysis, after amending the analysis itself where necessary. Testing of this project has to be given over to someone other than the designer to insure its validity. Whatever "testing" or re-analysis this designer does is recognized as notes-to-self to outline what may have been more thoroughly considered. This reappraisal is set out in the next chapter.

For the design exercise a site was chose in Cambridge, Massachusetts, which would be representative of older inlying communities in metropolitan areas. This choice typifies future conditions; densities in such communities will very likely rise as mobility decreases with fossil fuels coming into short supply. The other structures

- C A M B R I D G E -

in this site area are a mix of two and one-half story single family dwellings and three-story walk-ups, known locally as triple-deckers. Predominant construction is wood framing. Interspersed in the area are brick apartment houses of generally no more than four stories. Lot frontage along the street varies from 40 feet to 75 feet. The street is a residential connector lying between a major commercial street and a through residential street. The site is a double lot, lying at the low crest of a hill; for all intents, the site can be considered to be flat.


HARVARD
ELLERY
DANA
MASSACHUSETTS
AV.
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5
6-APTS
APTS
4-APTS
HUNTINGDON COURT APTS
THE UNIVERSITY
APTS
GARAGE
PARK'G
OFF BLDG
MOVIES
THE DANA
FP - 1963
(CONC.)
A-1-a
(C.B)

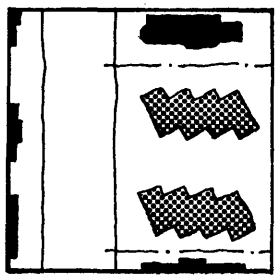
scale: 100':1"

NOTES ON DESIGN

Aside from addressing the issues of tractability, the design strategy was to provide structures which would be characteristically similar to the surroundings. Scale, massing, materials and forms are intended to work together to complement the neighborhood and streetscape. No specific program is addressed here, since the objective is to provide housing stock rather than custom-design a set or rowhouses. Current zoning codes are addressed, but not restrictively; variances are noted in the notes on design, which follow.

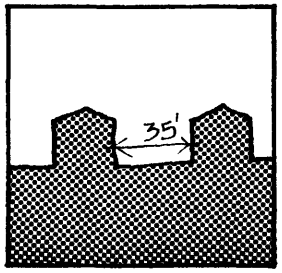
Definitions of terminology must be clarified. The word "building" is used to describe a contiguous aggregate of housing units. "House" here means the slot between two parallel party walls, regardless of occupancy. "Household unit" is generic, used to denote a singular, private realm related to occupancy, be it a flat or apartment on one floor, duplex or two-floor apartment or whole house. "Building" and "house" are morphological labels; "household unit" refers to realms of activity settings or territories defined by physical structure.

SITING

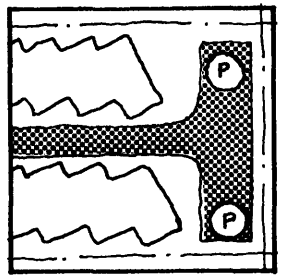


As a contextual consideration, building mass is aggregated parallel to existing neighborhood morphology. Units are angled toward the southern sun, a deviation from the existing pattern, to take advantage of solar gain. F.A.R. is also assumed to be greater than current codes allow, for reasons of energy conservation [cf. Chapter 1].

OPEN SPACE



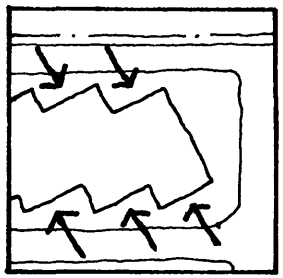
Distancing between buildings is made to provide exterior space of useful dimensions for primary activity setting, at least 15 feet by 20 feet, oriented to the south, which will also accommodate parking, gardening or children's play. To maintain environmental quality, sun angles limit the height of the buildings and indicate the location of a 35-foot space between buildings on this site so that sun may reach the northerly building; auto access logically fits in here.



Parking is shown in this scheme at the rear of the site. One space per two units is provided, less than the current code dictate of one to one, based on the assumption that the energy situation will curtail individual car ownership. (This notably is a point for contention.) However, the yards provided on either end of the houses can be turned over to parking if residents so desire. Should the buildings be organized as flats—the increased demand for parking would be compensated by lessened need for ground activities—i.e., children's play space would likely not be necessary for a population of working adults

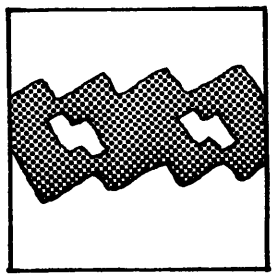
which would choose to live in flats. For tractability open space is considered as a commodity to be reapportioned for outside activities. If the site were wider so that two driveways could be provided with parking or garages to the north sides of the buildings, the range of options to organize open space would be greatly broadened. Even so, the lot would need to measure 200 by 200 feet (presently designed as 165 by 165 feet) and the building spacing would exceed the existing neighborhood conditions. The potential on a larger site for allotment of space for community gardens or cooperative play spaces removed from parking is apparent. The key issue though is that it is not the bigness alone which makes the site tractable, but alternatives for organizing the site.

PEDESTRIAN ACCESS



The site plan allows several means of access—so that front and back household orientations may be determined by the occupants.

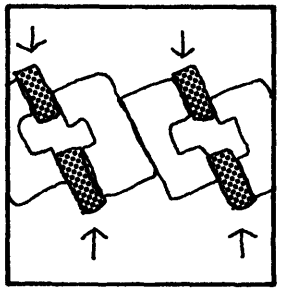
BUILDING CONFIGURATION



The typology chosen was that of a rowhouse with party walls at 22-foot centers. The type has been altered by the "insertion" of a small courtyard between houses. This was meant to allow light to penetrate to mid-structure spaces—typically dark in old rowhouses. It was done not for the sake of mere amenity, but for increased freedom to extend each rowhouse so that

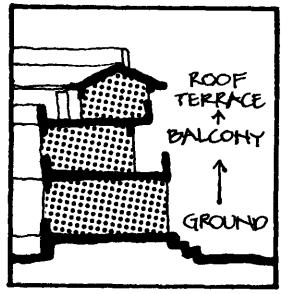
the units have the potential for becoming quite deep. Expansion can occur without incurring loss of light or ventilation for "interior" spaces. The bottom level of the courts also offer places in which to expand a household, provided a skylit central space is acceptable to the ground floor inhabitants.

CONNECTIONS



Two external stairwells are provided adjacent to the light courts. These apparent redundancies allow the houses to be organized as small flats at all levels. They echo the similarly resilient circumstances of old houses with main and servant stairs. Access could have been provided with a single stair by splitting levels of the floors; however, this would restrict the possibilities for the division of the houses vertically, aside from the communal/individual structure implicit in the splitting of longitudinal units (i.e., group settings would normally be found on the entry level and more private ones relegated to the level removed either up or down. (The Terni units exhibit such a condition.)

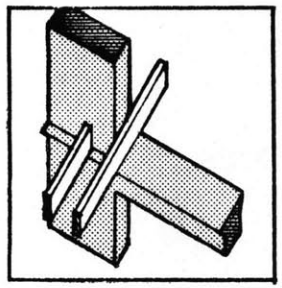
EDGES



The tendency in initial construction is to complete the building to its outermost edges allowed by law. The decision here has been not to do so, particularly on the second and third levels, which obviously have no adjacent ground surface. These levels benefit from having at least some small segment of outside space as a part of them. Should the houses be used as flats, no additional exterior construction would be necessary to provide outside space for such mundanely useful activities as drying clothes or shaking out a rug. In this way, unbuilt edges contribute to liveabi-

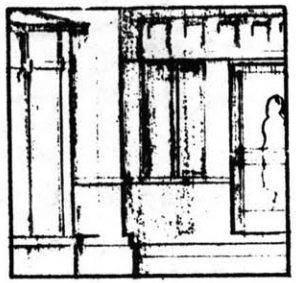
lity of the household units at each level. With regard to tractability, such unbuilt areas are possible to annex to interior space with less investment than it would take to make an addition via new construction.

UNDERLYING STRUCTURE



The structure is conceived as a reinforced concrete skeleton upon which wood-framed floors and weather enclosures are built. The skeleton extends for the full three floors at party walls, but only up to the third floor level to support a fully wood-framed unit at the top in order to limit upward expansion to small moves within the framing. Firewalls between units are completed by filling in the structural skeleton with unit masonry. The unit masonry infill was devised to permit lateral reapportionment of spaces as needs change. (Fire zone situations would have to be handled locally in such cases.) Concrete structure is minimized to allow openness of the internal plan. Heavy structure can be used to mark the limits of additions to the basic structure or to reserve areas for outside activities by outlining their dimensions. The reality of economy, however, makes concrete an unlikely choice of structure. The system could as easily be carried out with concrete block bearing walls having appropriately placed lintels built-in and then the same wood infill as before.

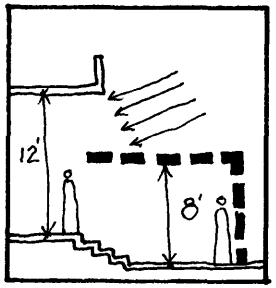
CONSTRUCTION DETAILS



The building is finished with wood shingles, since they are a small-unit covering. Shingles can be refitted in small areas as changes are made in the building shell. Optional finishes could be devised: stucco could be detailed in small panels or wood siding could be composed in short lengths. The character of the building is intended so that choice of outward finish is discretionary.

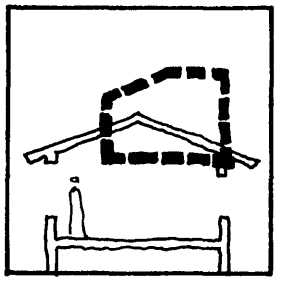
What is perhaps more important to tractability is the application of sheathing beneath finishes. Attention needs to be given to the rhythm of assembly of the exterior skin—the layering of materials, the placement of openings. Areas where changes can be projected should be separately sheathed so that large sheets of material do not overlap with an area which does not need to be altered. Construction economy is a factor to consider as well, order of the facade should not involve intricate fitting and waste of material.

GROUND EXPANSION



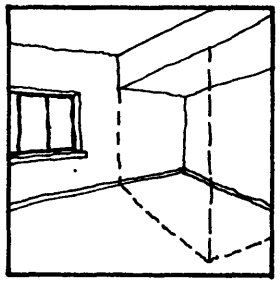
Ceilings are made high on the first level to permit expansion at ground level, maintaining a clerestory for the more interior space.

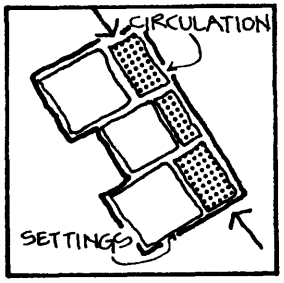
ROOF EXPANSION



A reasonable construction condition would be to provide maximal enclosure at the top of the buildings at the outset, to provide attic space to be converted to intensive use as needed. Building height is constrained on this site, though.

Hence the roof form is stipulated, a "closed set"—given as a cap under which all adaptive activity takes place. This serves as well to maintain a building height and mass in keeping with the domestic scale of the neighborhood.

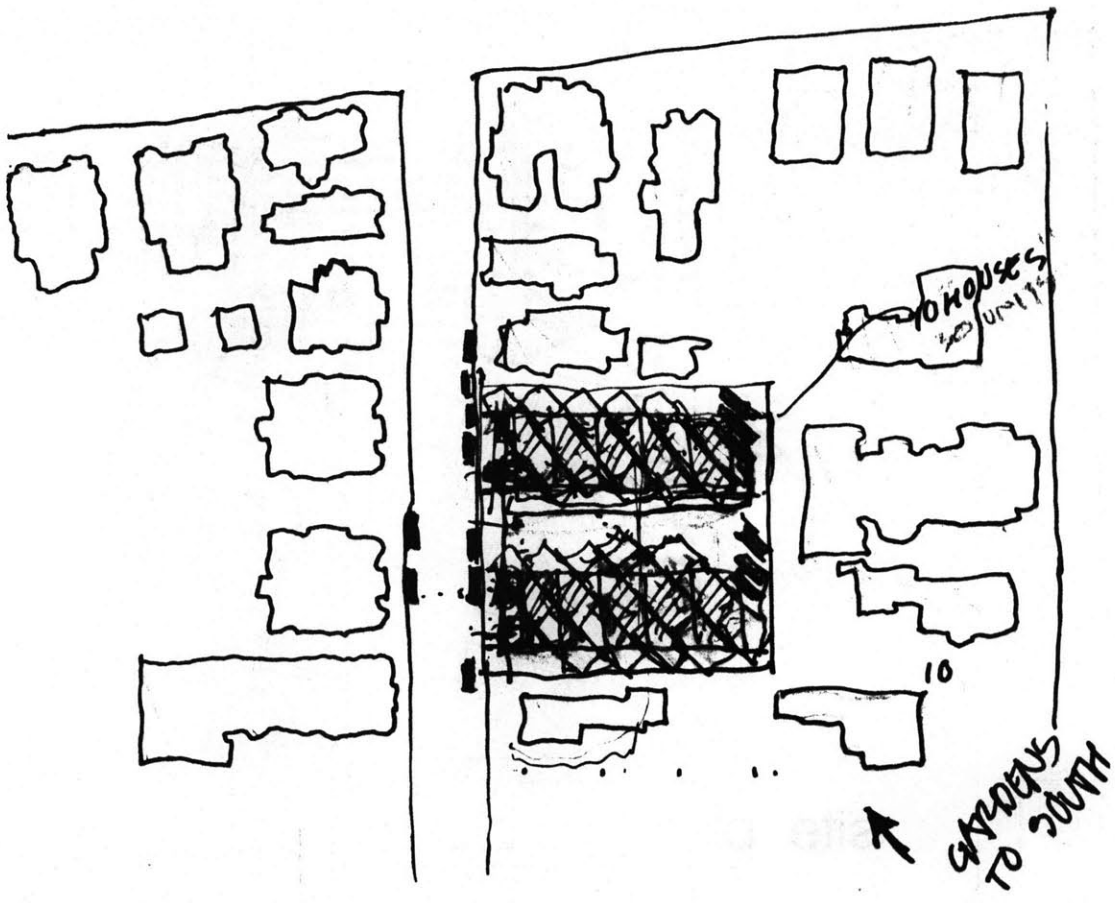




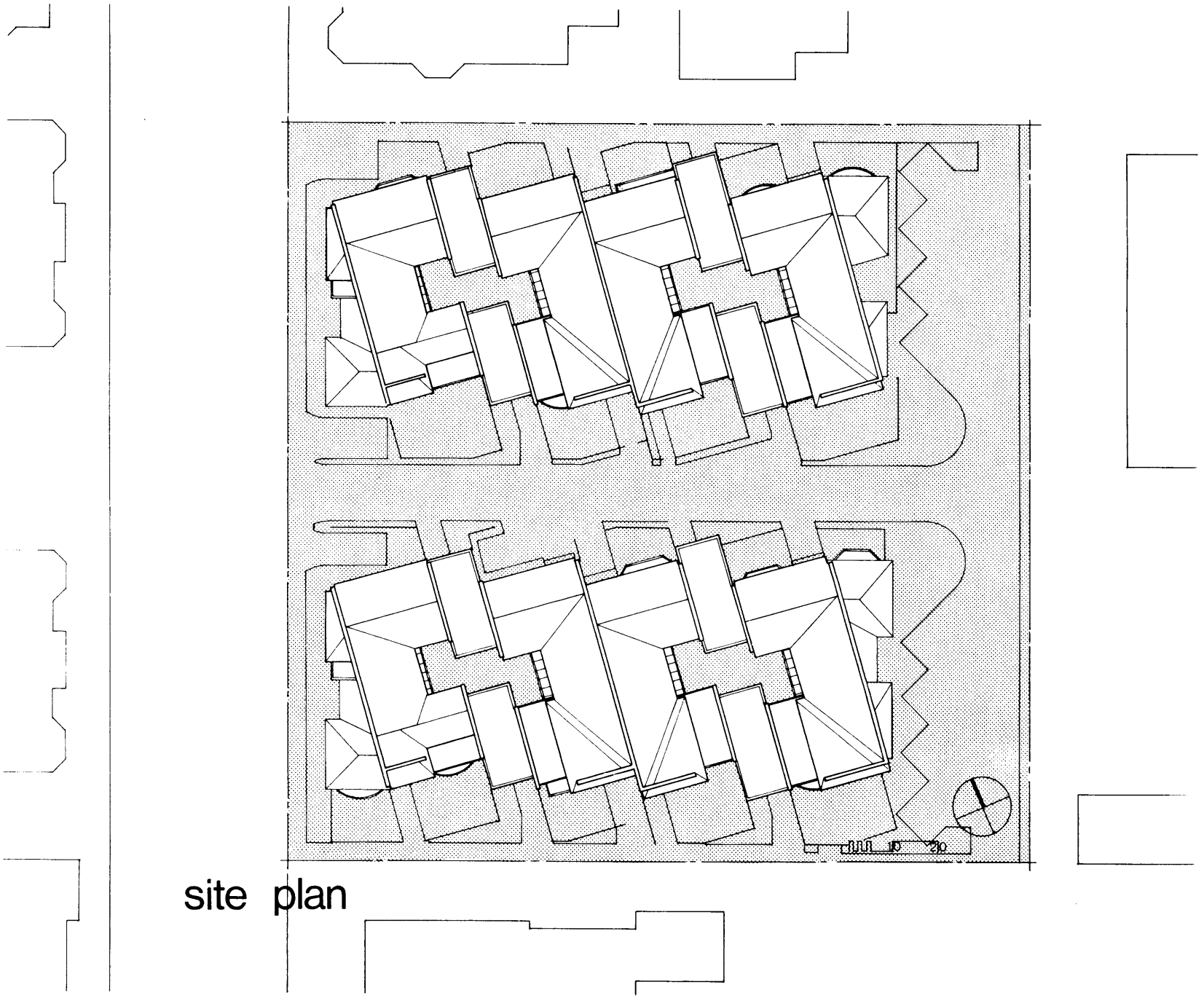
As Rabeneck pointed out, and Lawrence after him, the type of utility a space will have is largely determined by the location of closets. Rooms with closets become bedrooms. For expediency, storage here is assumed to be either furniture or fitted into designed-in alcoves in each space as needed with the addition of doors.

Really, closets are in-built equipment, just as are plumbing fixtures which determine where food preparation and bathing take place. For the sake of tractability, it is not assumed that built-ins are eliminated, just made to be relatively easy to re-locate.

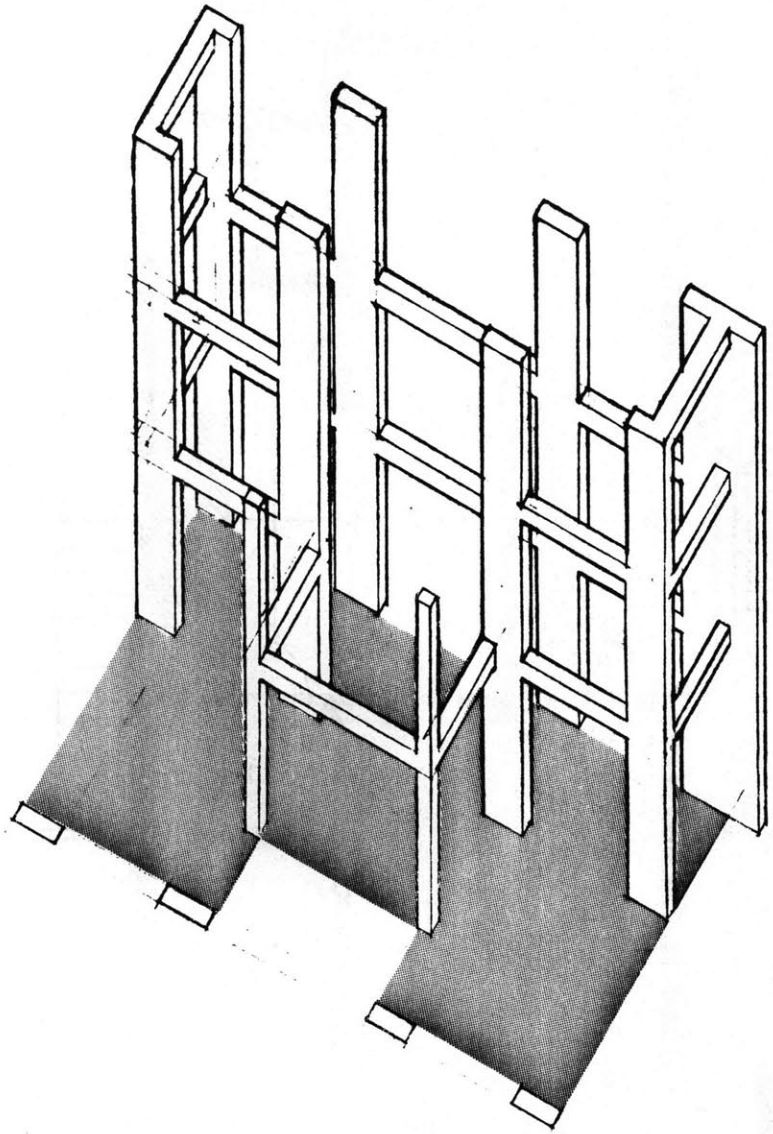
The ordering of the spaces anticipates the answering of the analytic questions set out previously. However, primary spaces are roughly "symmetric" (i.e., similarly dimensioned, similarly related to circulation) in their intent so that the activity settings may be located differently from household to household. Spaces are dimensioned and located so that circulation may be created to pass settings, not pass through them.

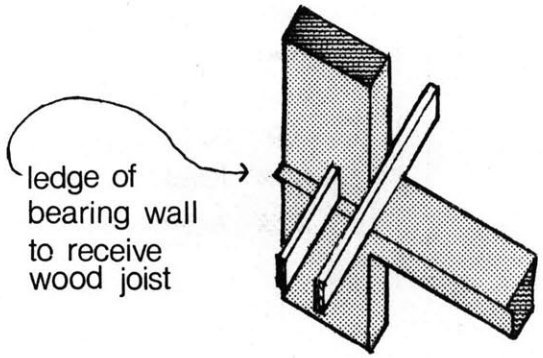


an early site sketch



site plan





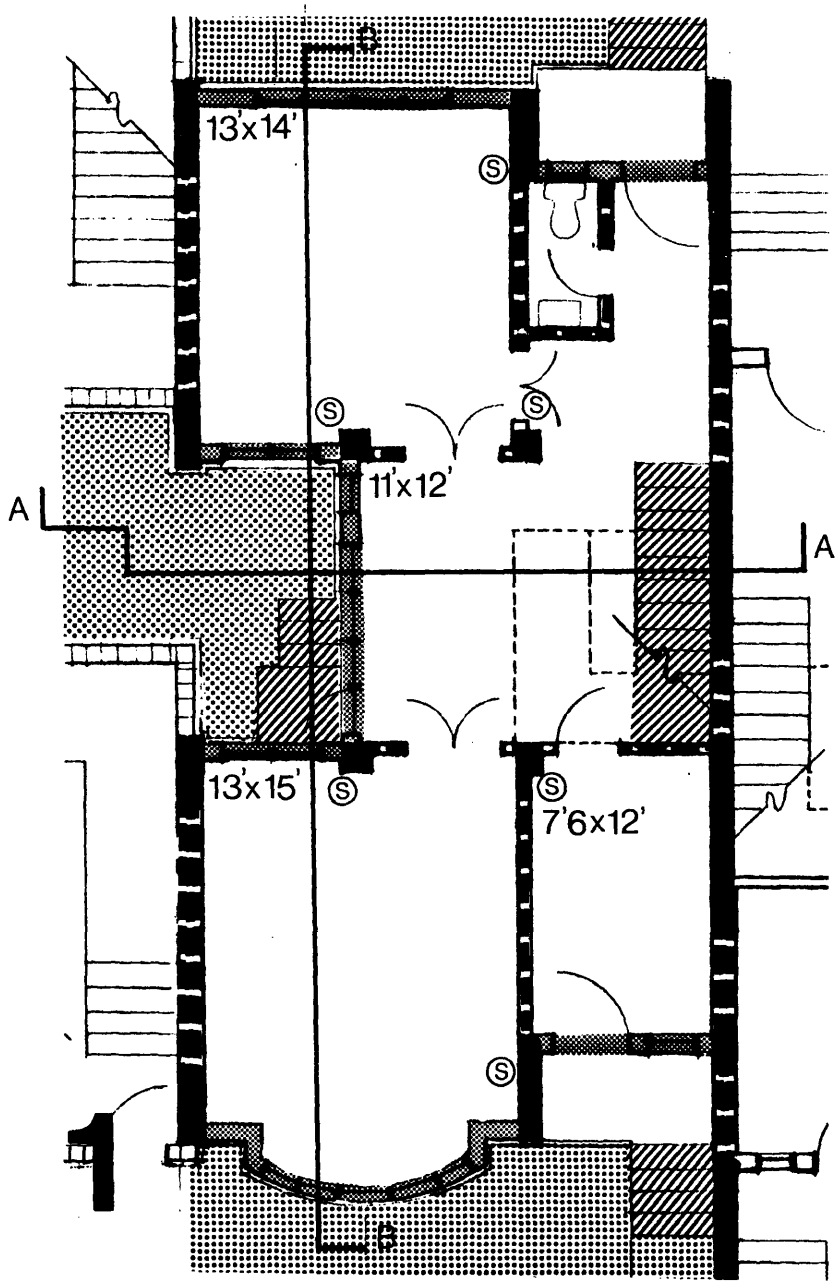
CONCEPTUAL STRUCTURING

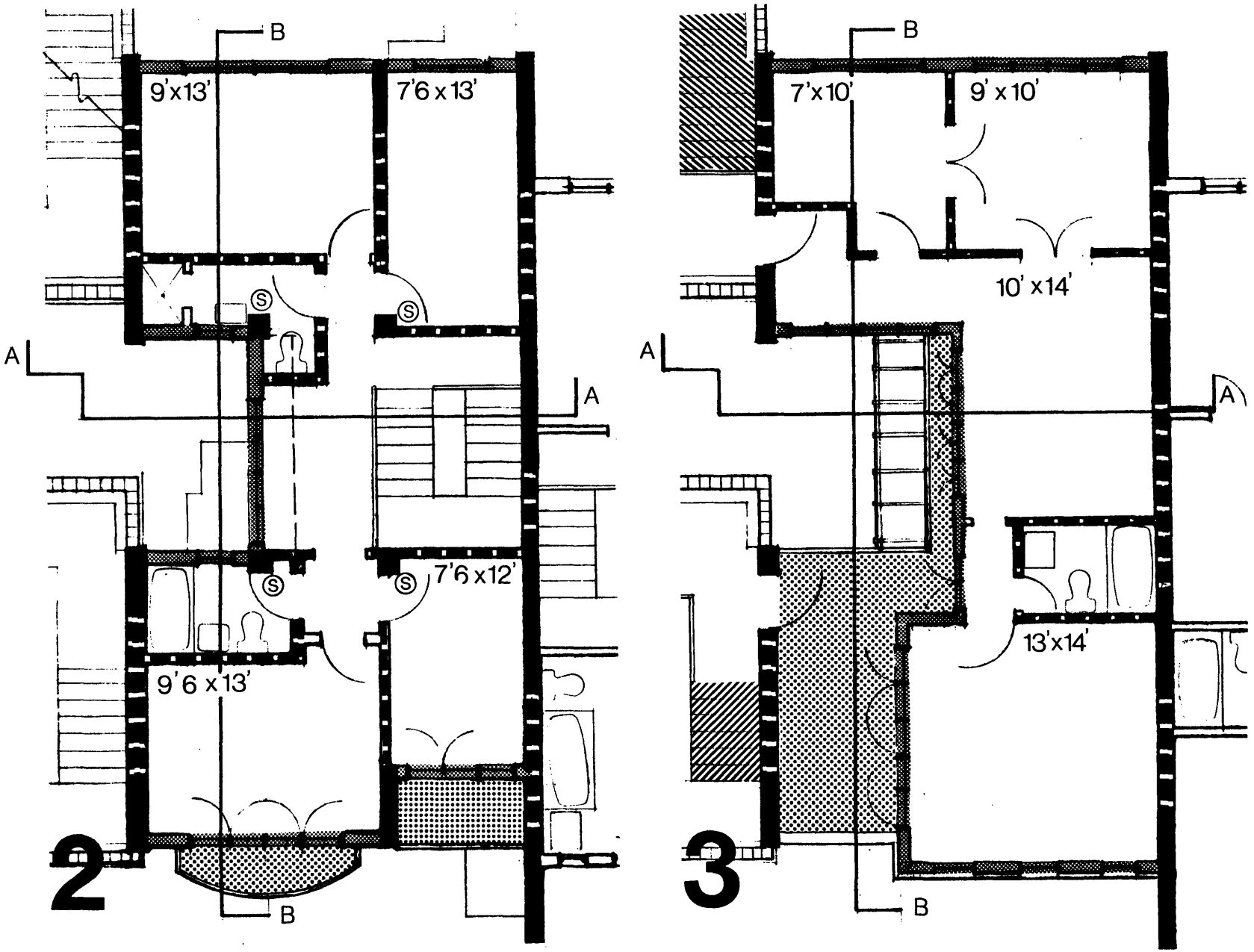
The structure for the rowhouses has been developed only so far as the conceptual level. As mentioned in the notes on design, the system may as well be built by any of several methods. Here is shown an axonometric of what was conceived originally as the primary supporting system of reinforced concrete. It is important to note where the openings in the "bearing" walls occur. For no matter what structural system is employed, the openings are necessary to permit spaces to have large openings between them and to connect adjacent household units as "need" for lateral expansion arises.

structure
partition
weather skin
Ⓢ service wall
level change
exterior use

basic plans

The base plan is a house designed as a duplex with a flat above. Conceivably, these could be homes for a family with three children below and a couple or single person above. The duplex unit could also be adapted to three independent adults, with some changes on the first level (provision of a bathroom, a discrete lounge and a sleeping/dressing setting). The extended family scenario would be satisfied by occupation of the original duplex--again by changing the first level either internally or by adding sleeping/dressing and bathing settings and perhaps a separate lounge for the elder relative.




B
9'x13'
7'6 x 13'
A
A
7'6 x12'
9'6 x 13'
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10' x14'
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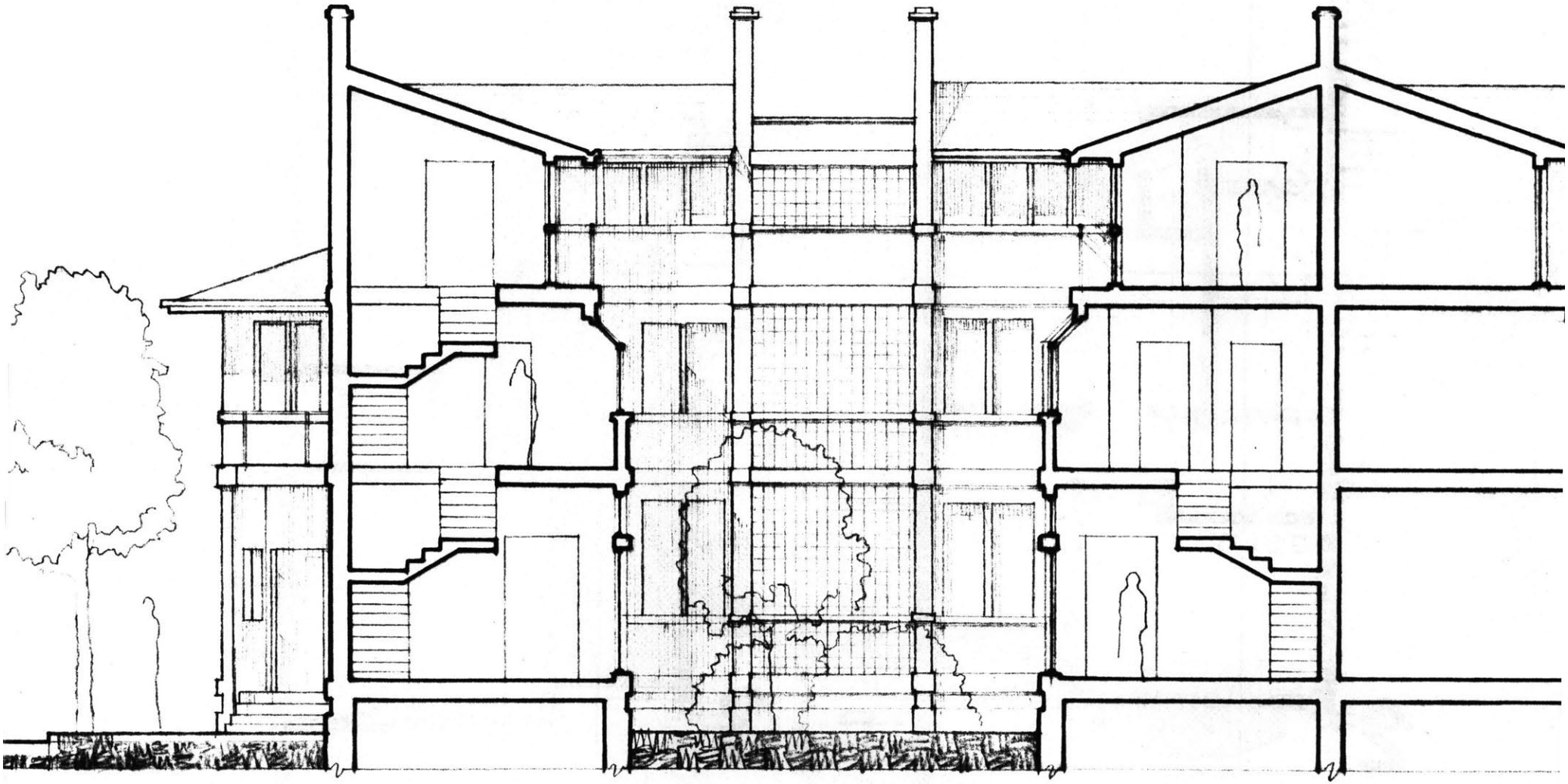

SECTION AA

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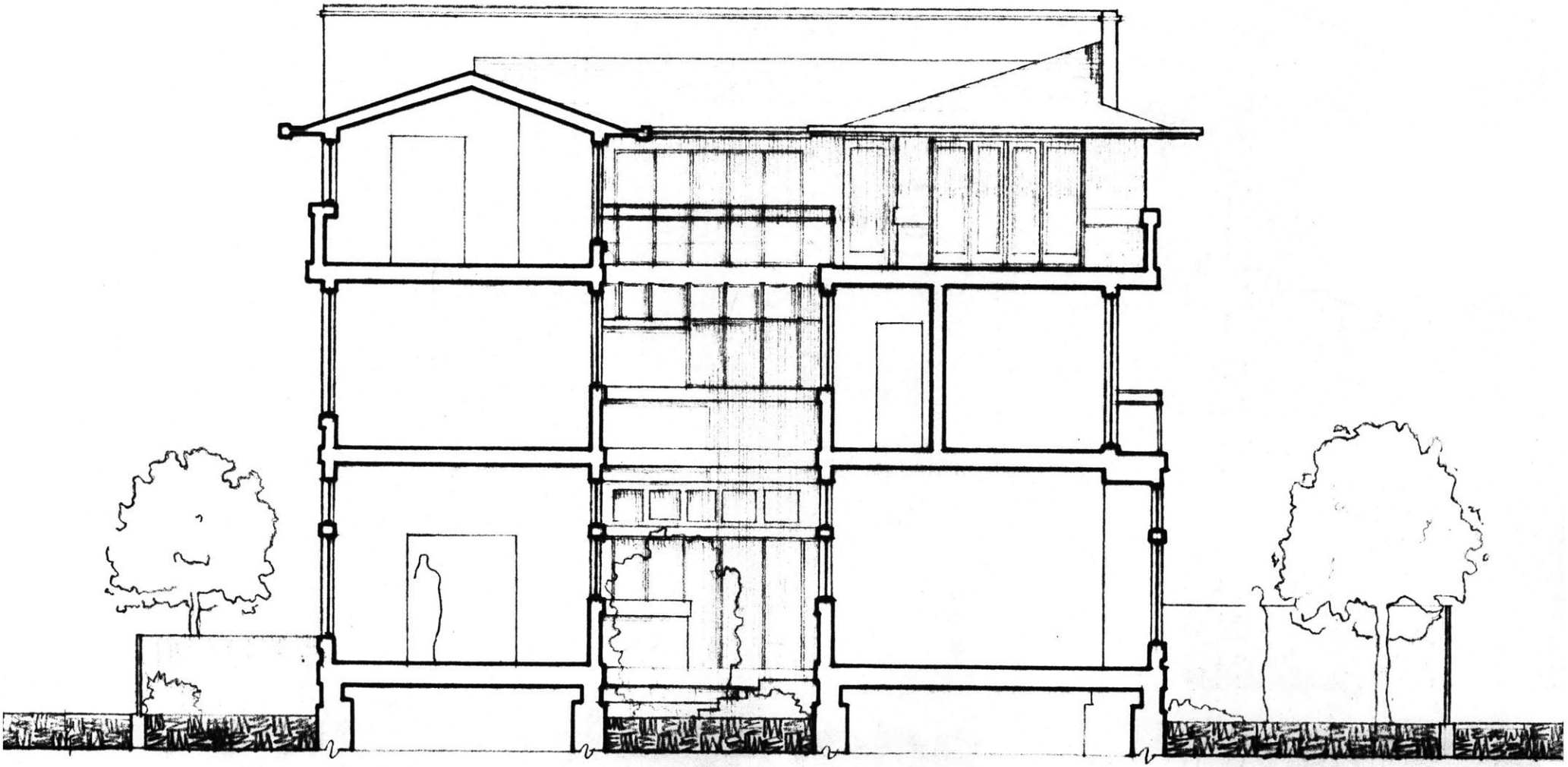

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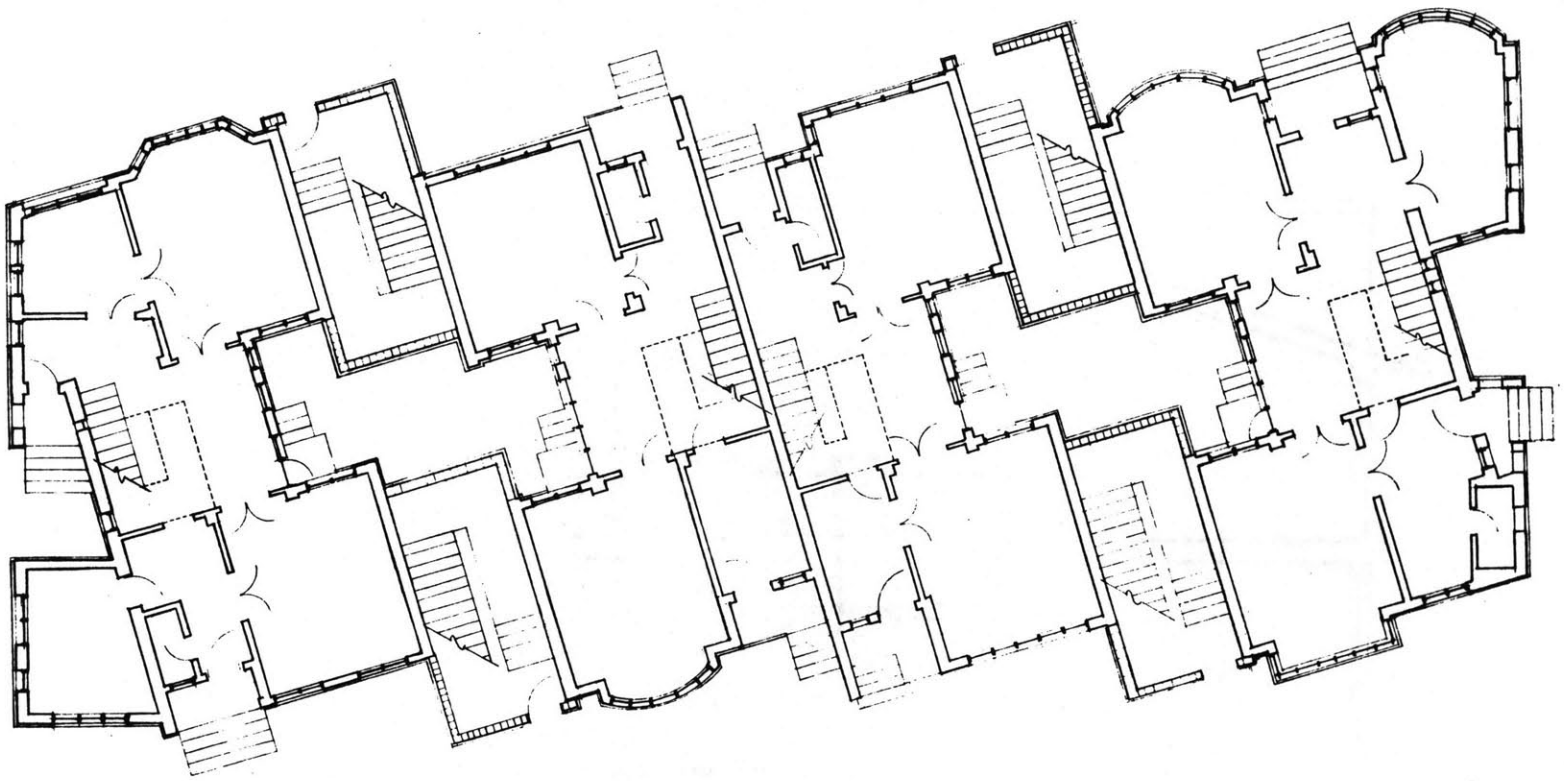
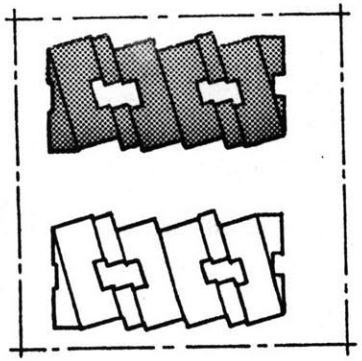
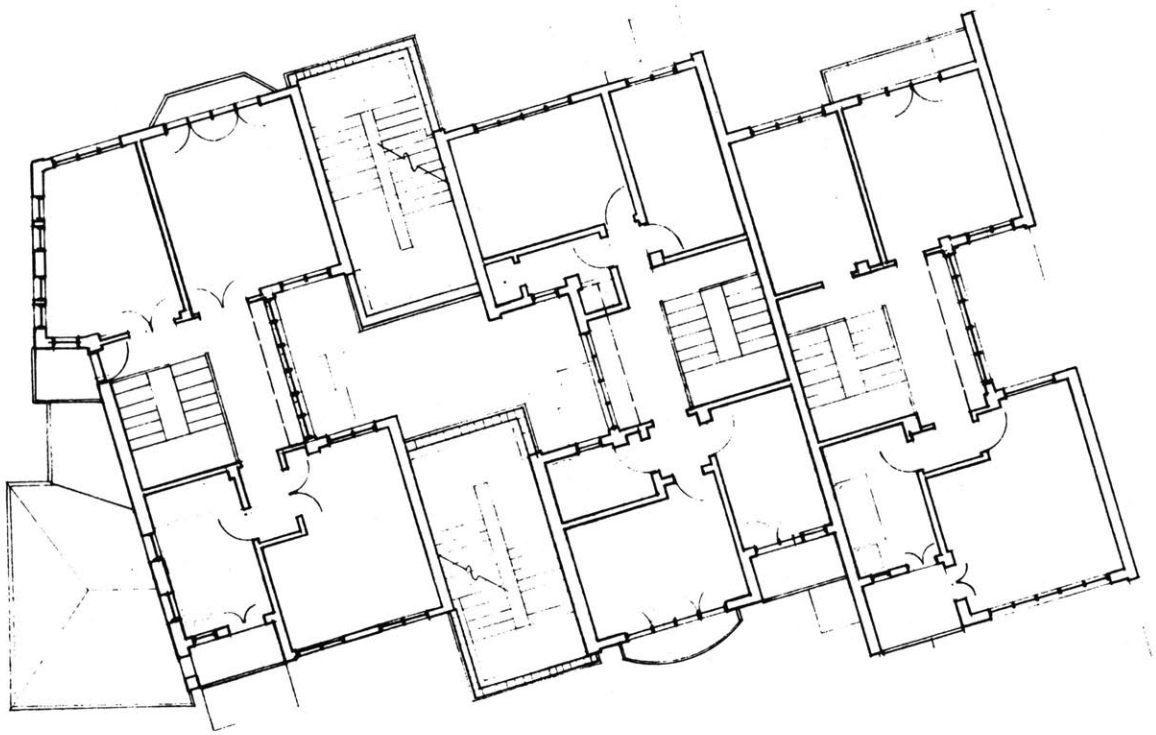
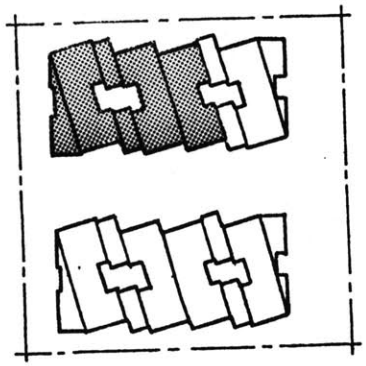




1
aggregate plans





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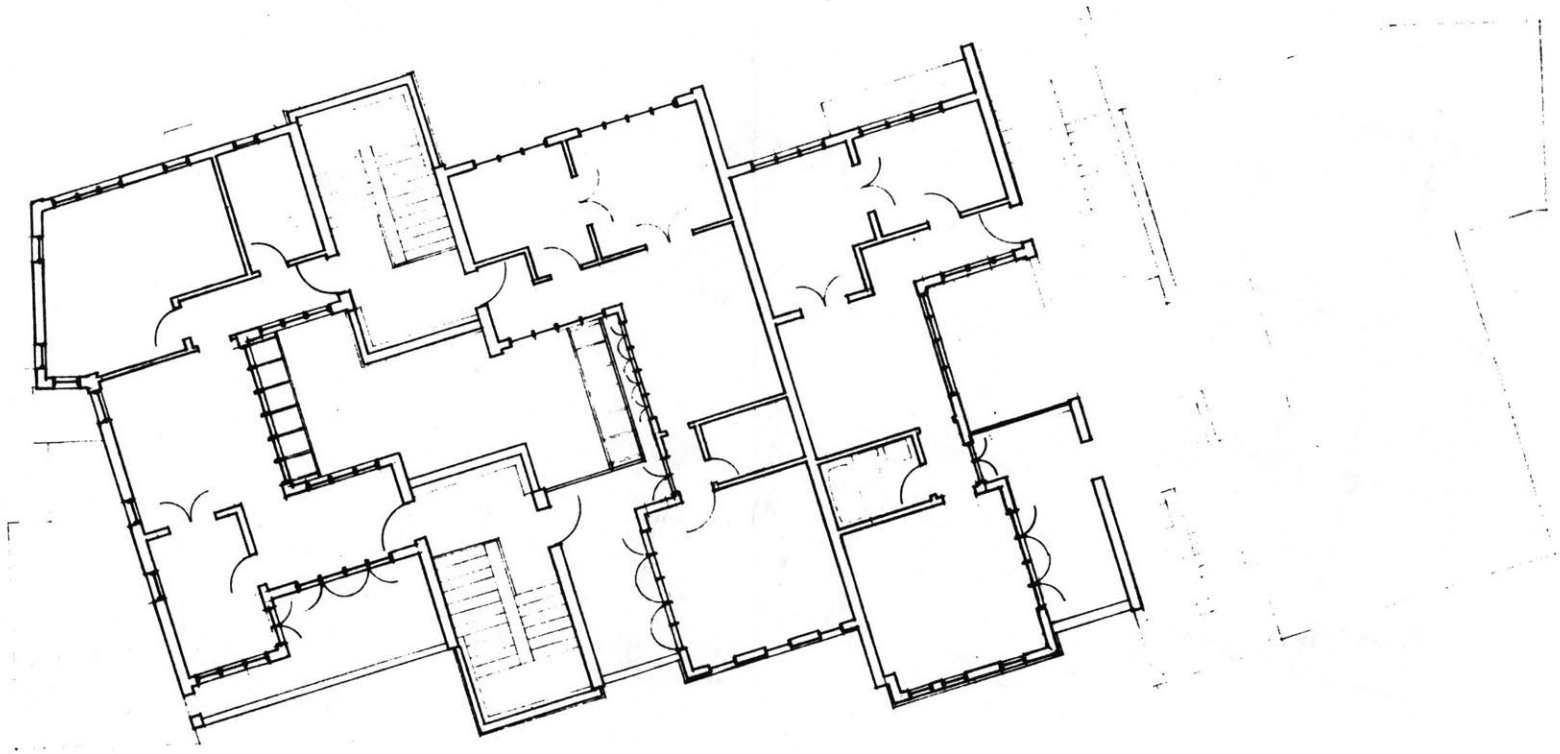
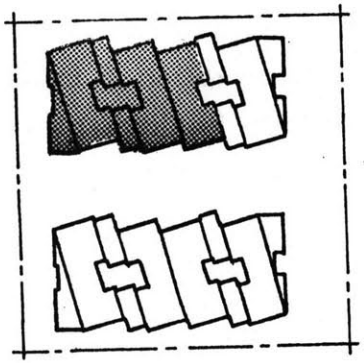
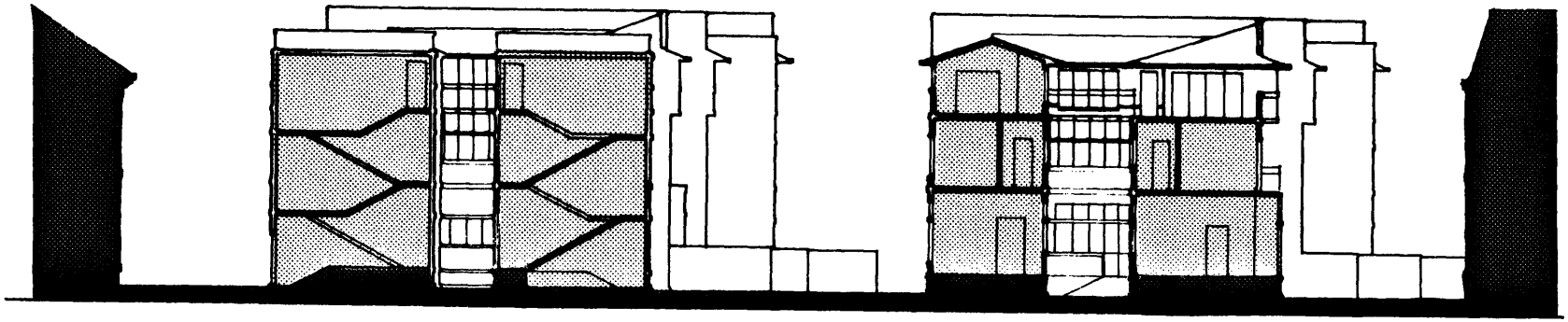
Basic unit plans are rather straightforward. They are comprised of two primary-sized spaces per floor, with a secondary-sized linking space between. Circulation is relegated to the side of

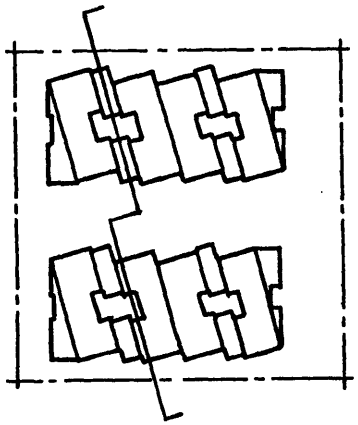




3

the unit away from the light court. Where through circulation is not required, as on the second floor of a duplex, the area allotted in this zone is ample enough to accommodate secondary activity settings.



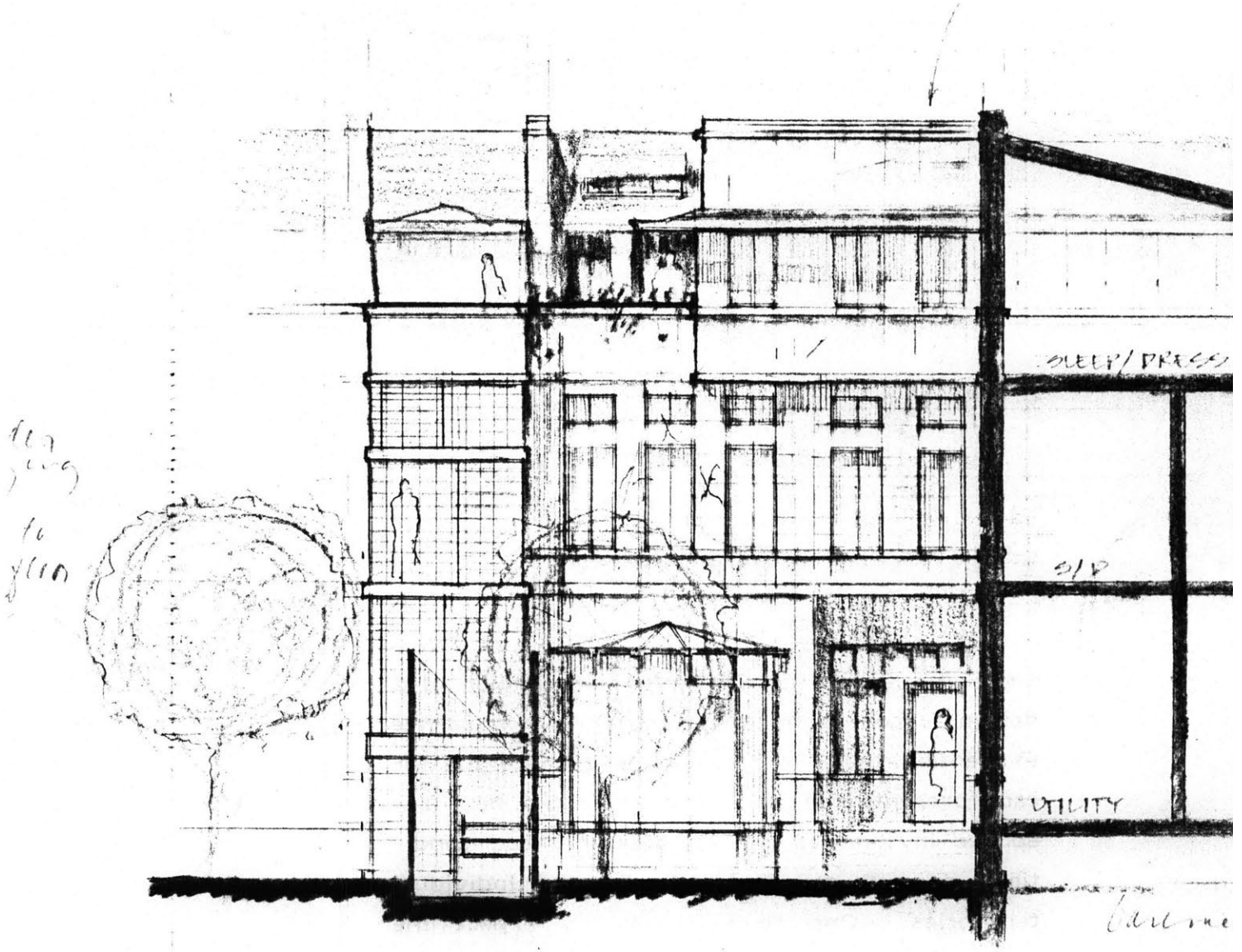


site section

The unit facade here was sketched with stucco finish in mind. This is not a widely used material in Cambridge, but not a foreign one either. Fenestration, moldings, and roof detailing are intended to be reminiscent of late 19th century construction, but not as a parody.

façade

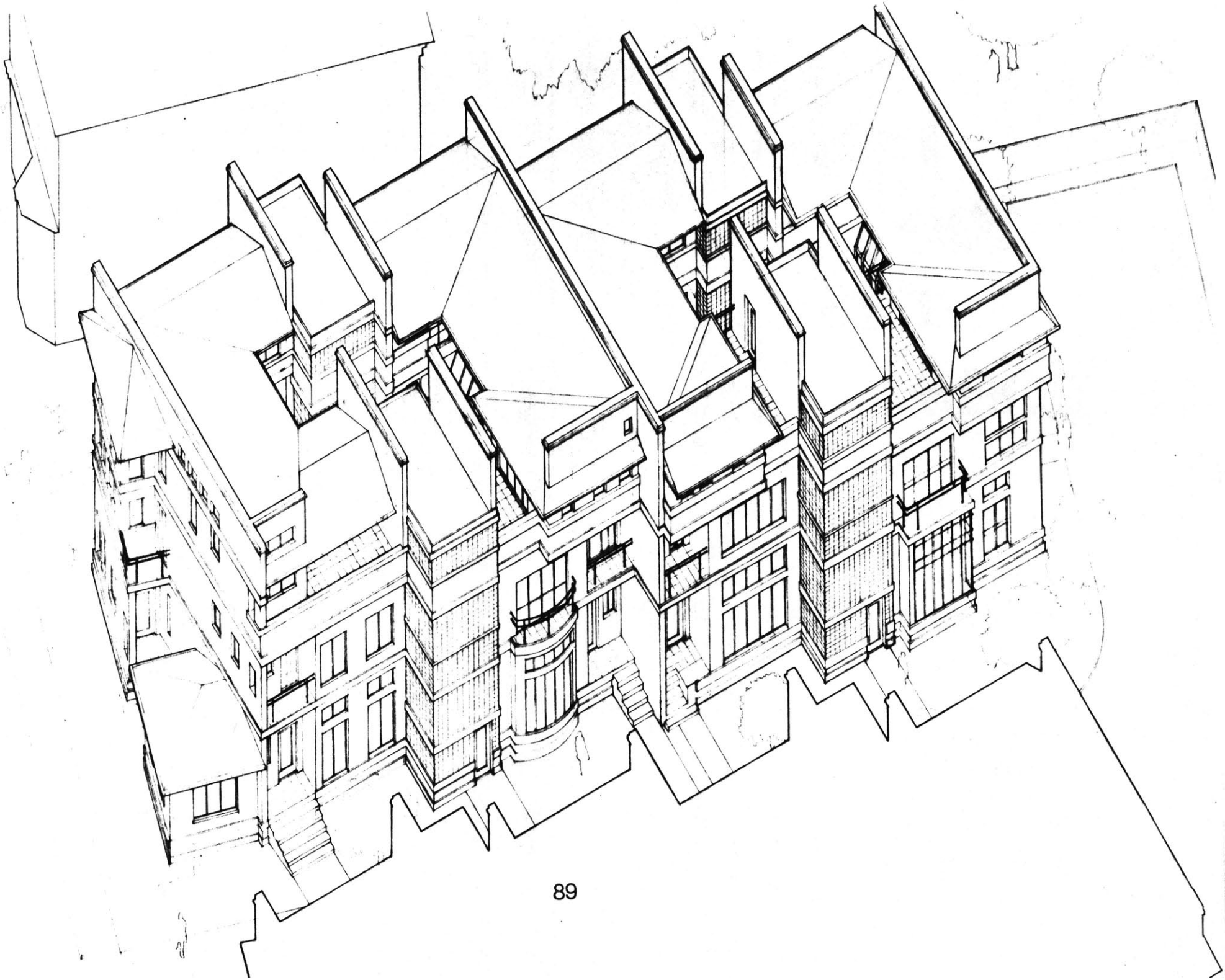
Facade study in detail is not achieved in this thesis. Preliminary thoughts along these lines lead in the direction of completing a facade with a range of lighter, "operable" elements such as awnings, shutters, planters, trellises, etc., which inhabitants may use to enhance both the comfort of their dwellings as well as to mark individual homes or to use as a base to expand interior space. Even the facade can support true tractability if such care is given to detail. Merely letting inhabitants choose the color to paint their homes is superficial participation. After all, intractable places can be painted pretty colors too.



ELEVATION

$\frac{1}{8}$ = 1'0

Since this is not an in-depth investigation of a design for one particular site only, let it suffice to mention that the nature of the image the facade presents the neighborhood should be a response in kind of existing neighborhood conditions as well as of the inhabitants' individual territories. One could reasonably expect the houses in one built mass to share common elements but this is not requisite.



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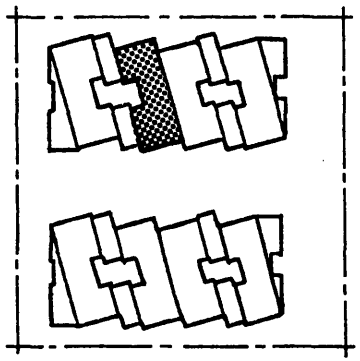
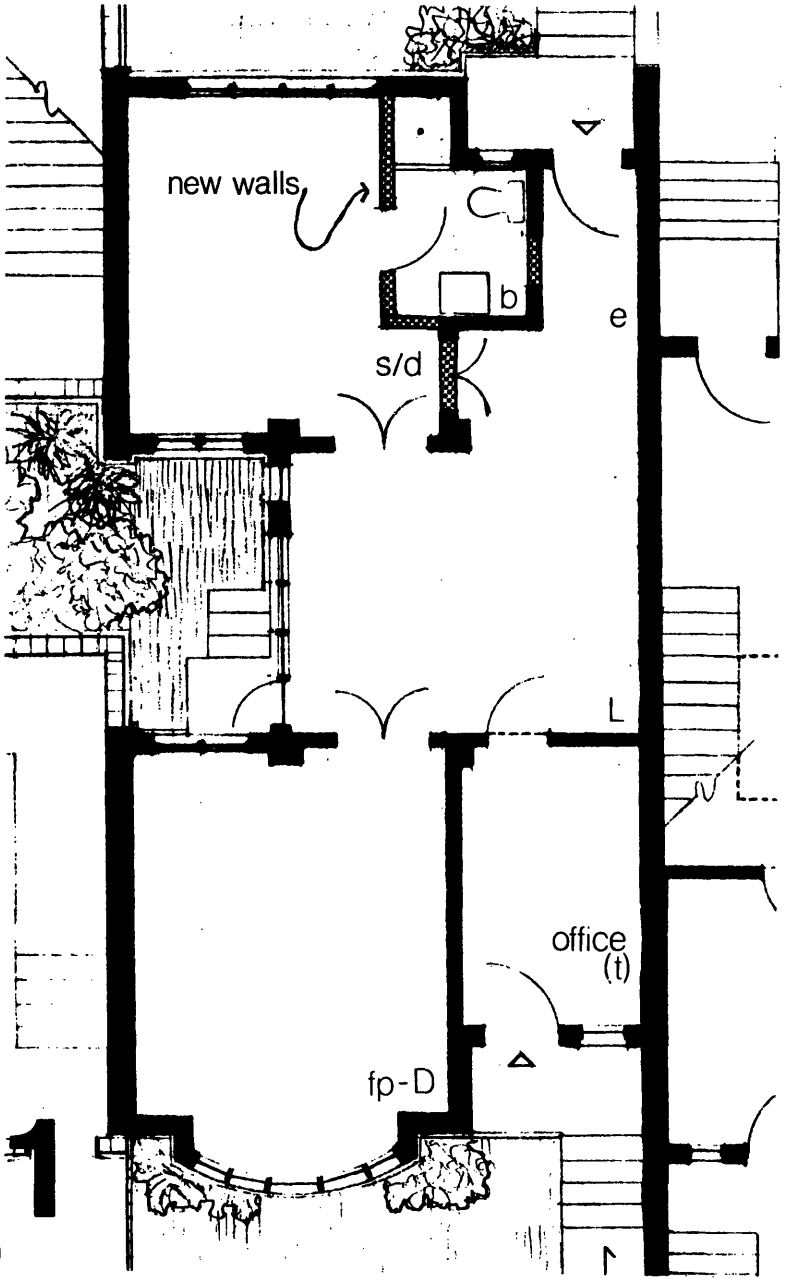
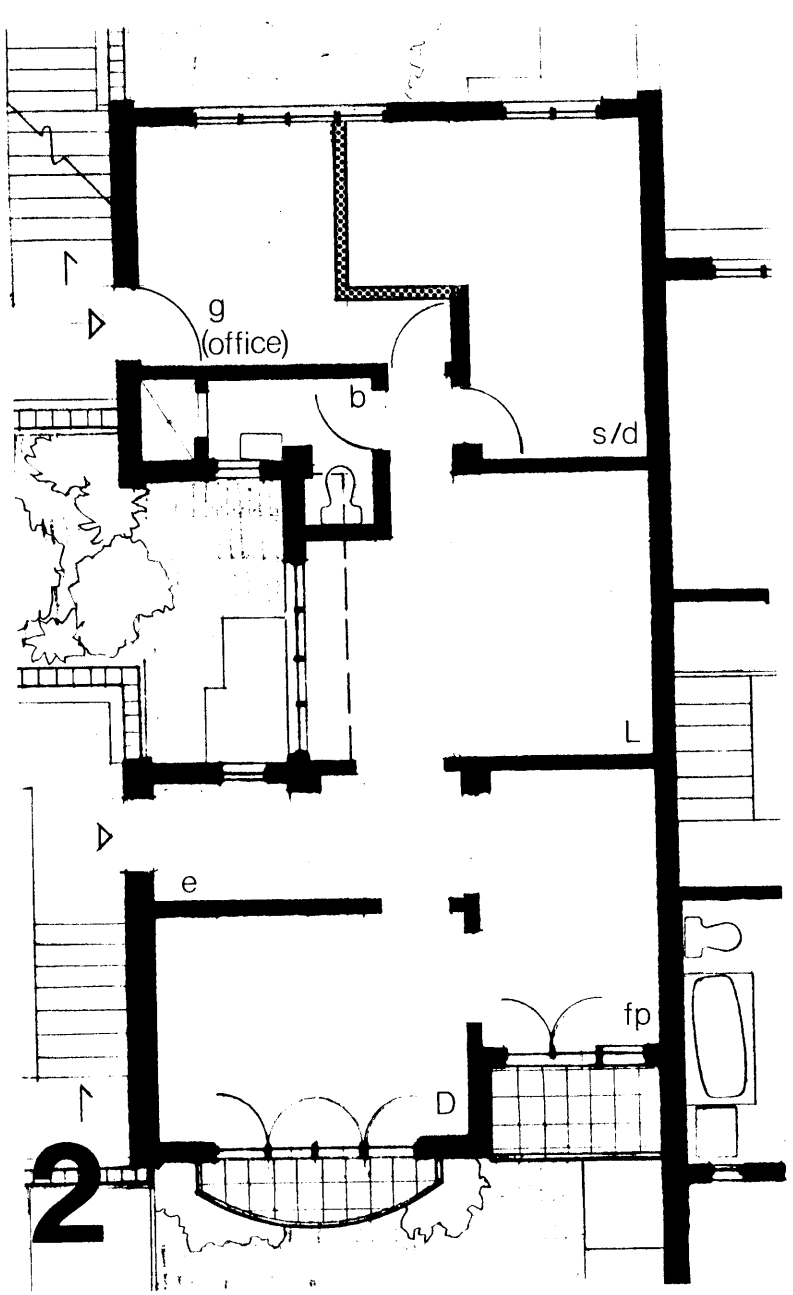
TO FLATS

The house can also be organized as three flats to accommodate working adults—either independent persons or married couples without children. This is achieved by full activation of the external stairwells.



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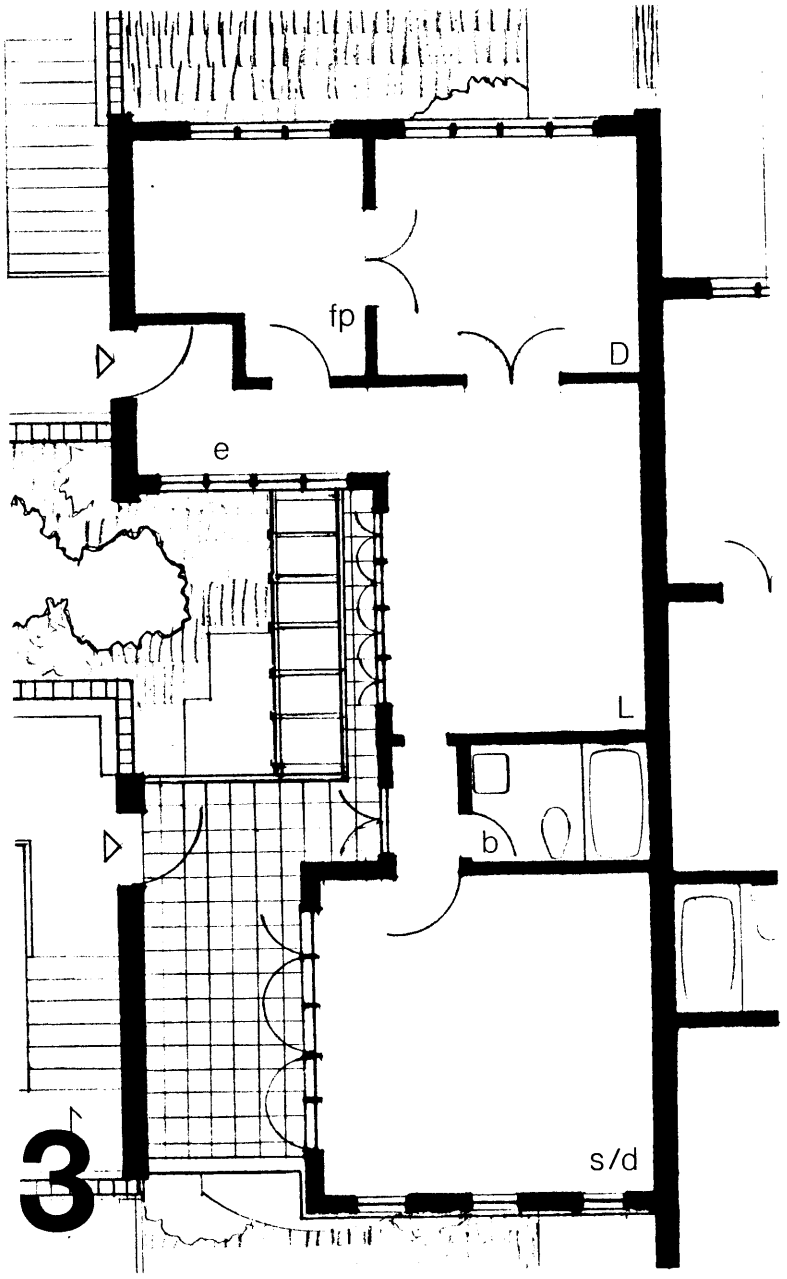
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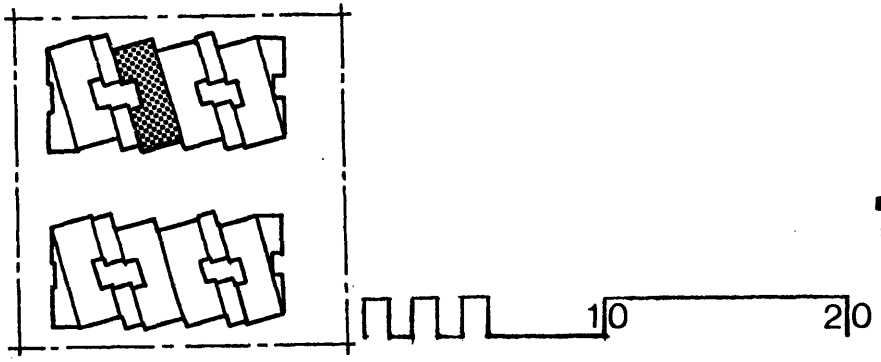
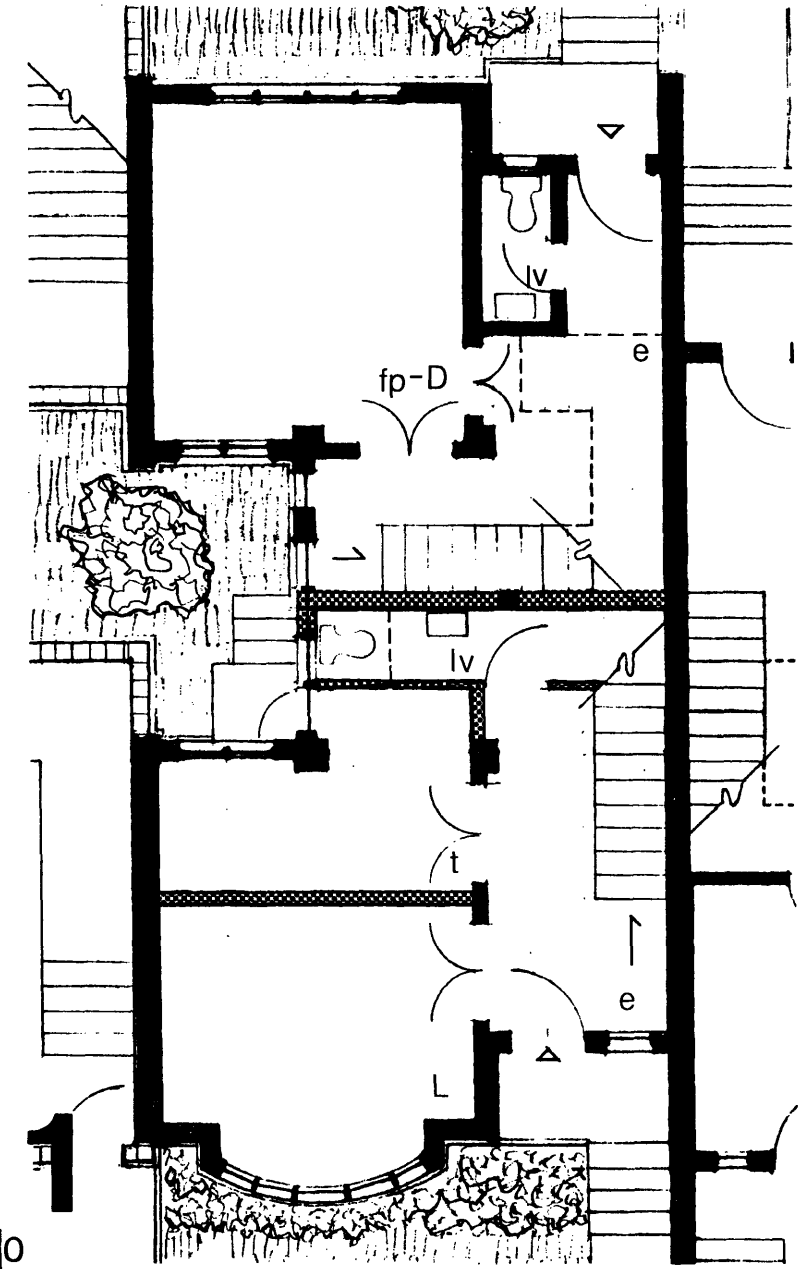
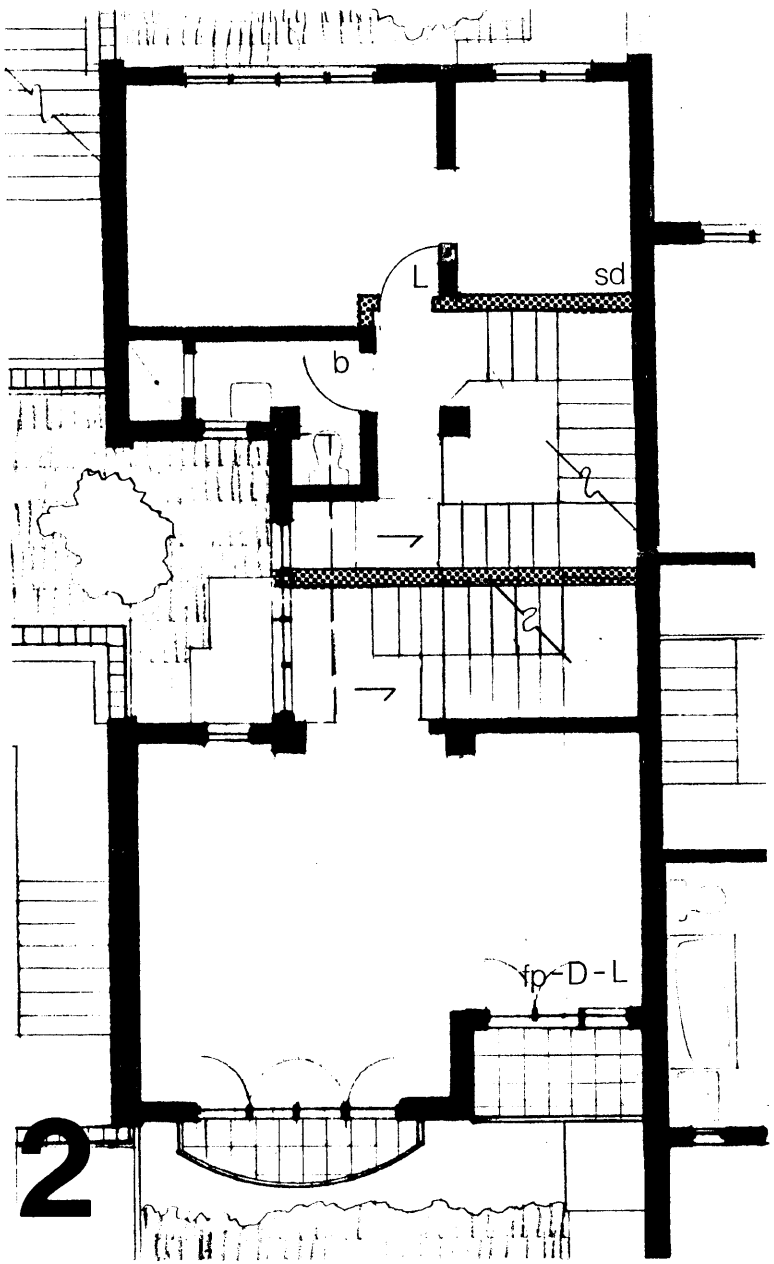
IN HALVES

Further, it is possible to "halve" the houses, converting them to vertically ordered households. Quite likely this pair of units would be appropriate where one family member needs an office or workplace on the first level.

Half-floor efficiency apartments can also be made, given access from the two stairwells.



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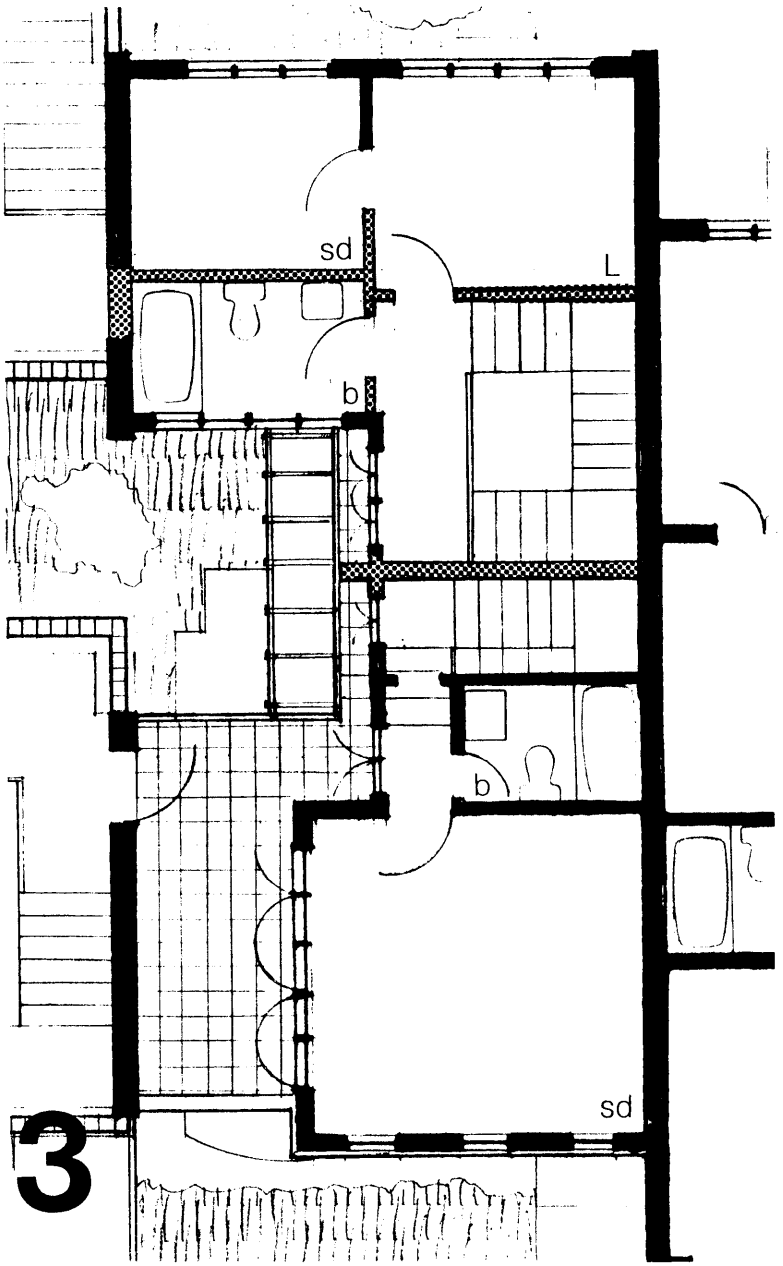
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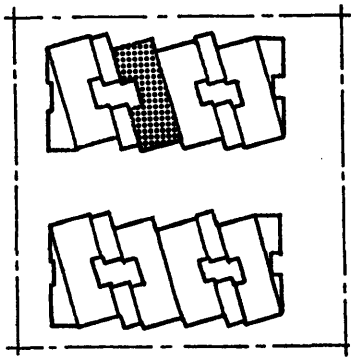
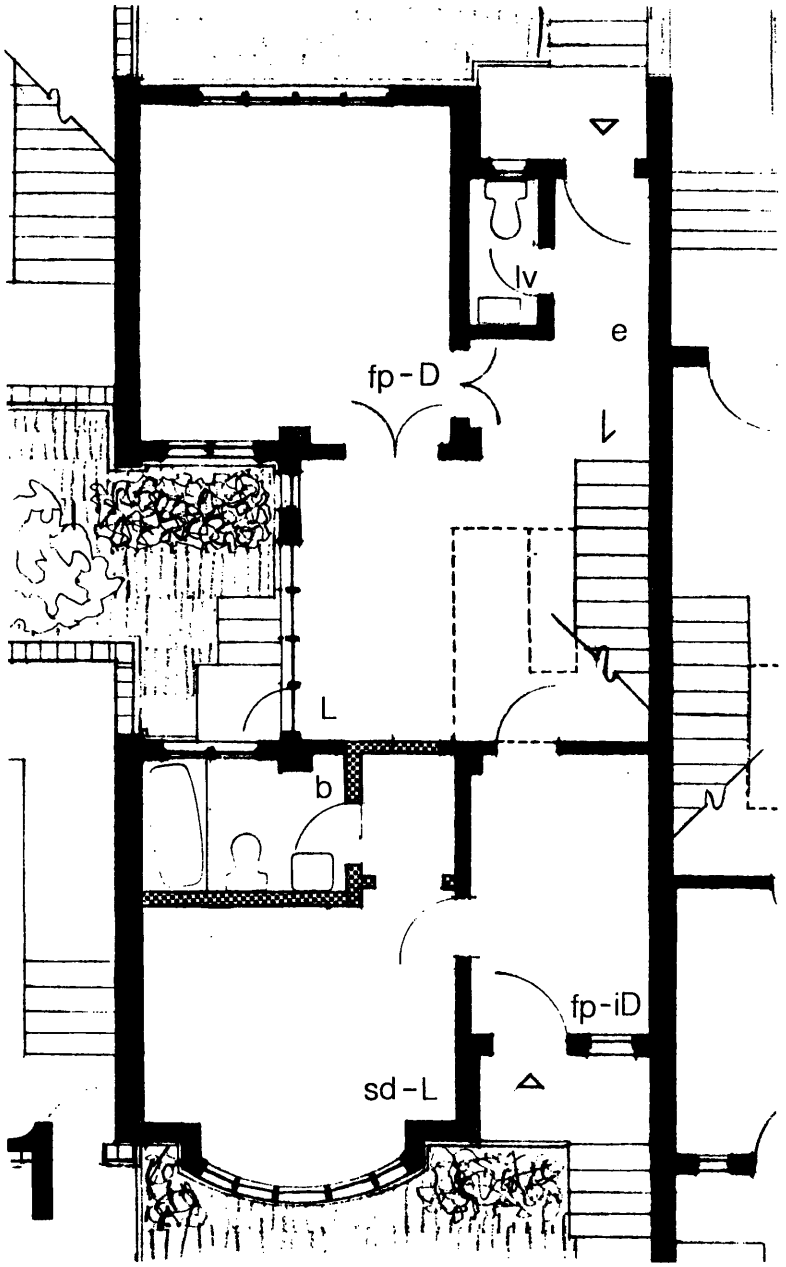
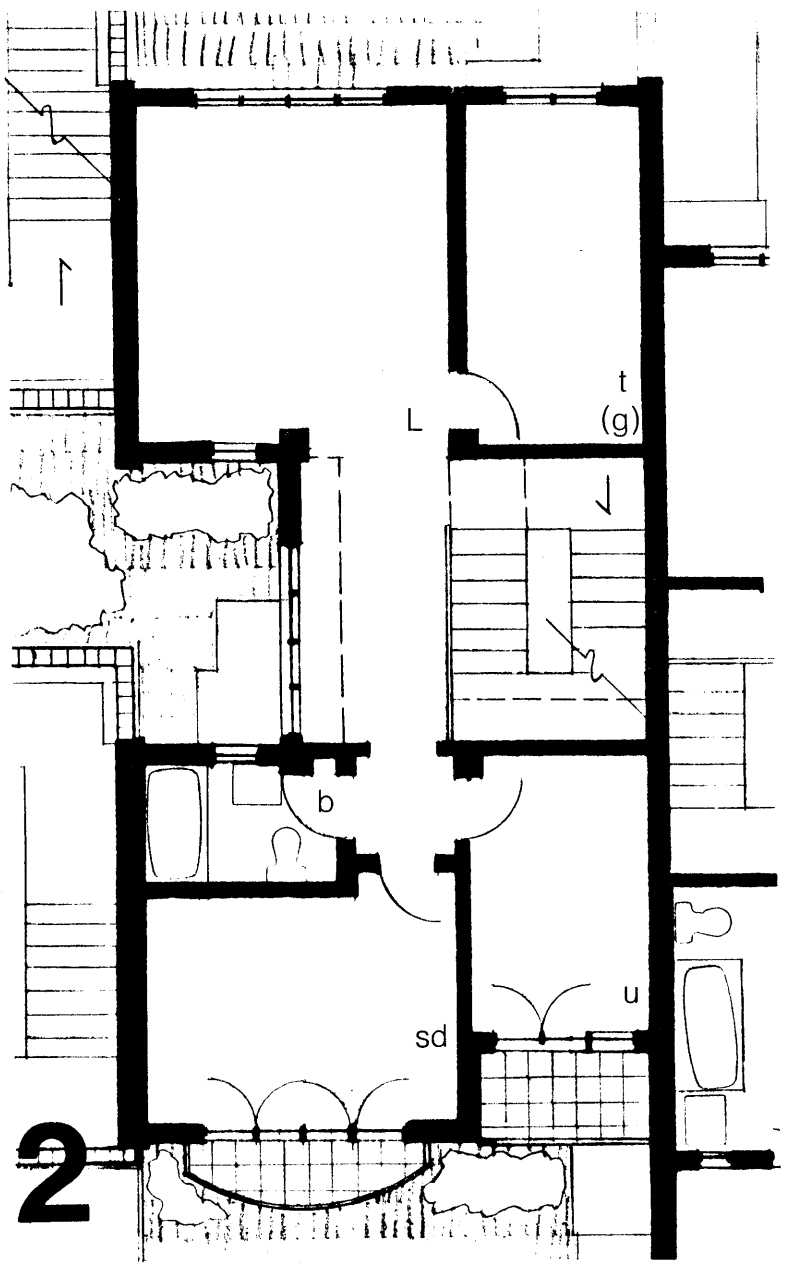
AS A WHOLE

The house may as well be made "whole" too, perhaps to accommodate a communal living group or the scenario for the extended family. The household stair may be extended upward to the third level or one of the external stairwells could be appropriate (with the neighbors' agreement) as the vertical circulation to free more internal area for additional activity settings.







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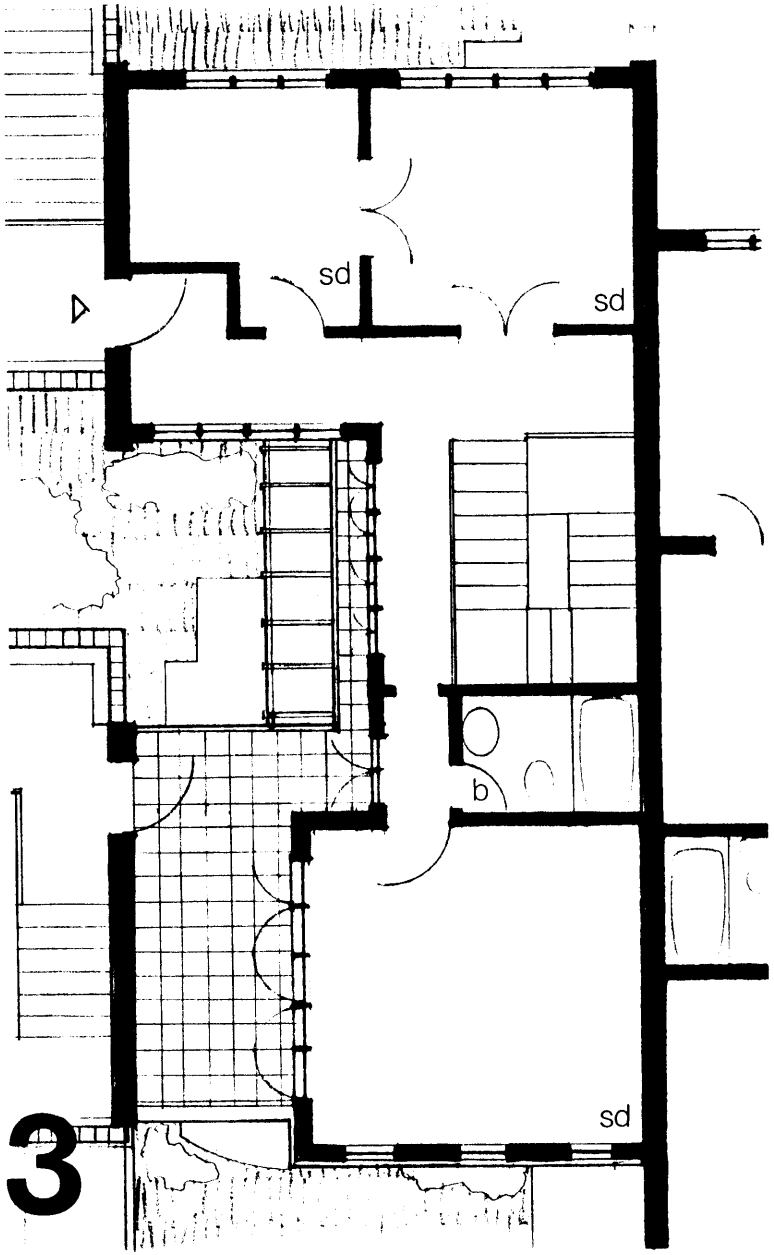

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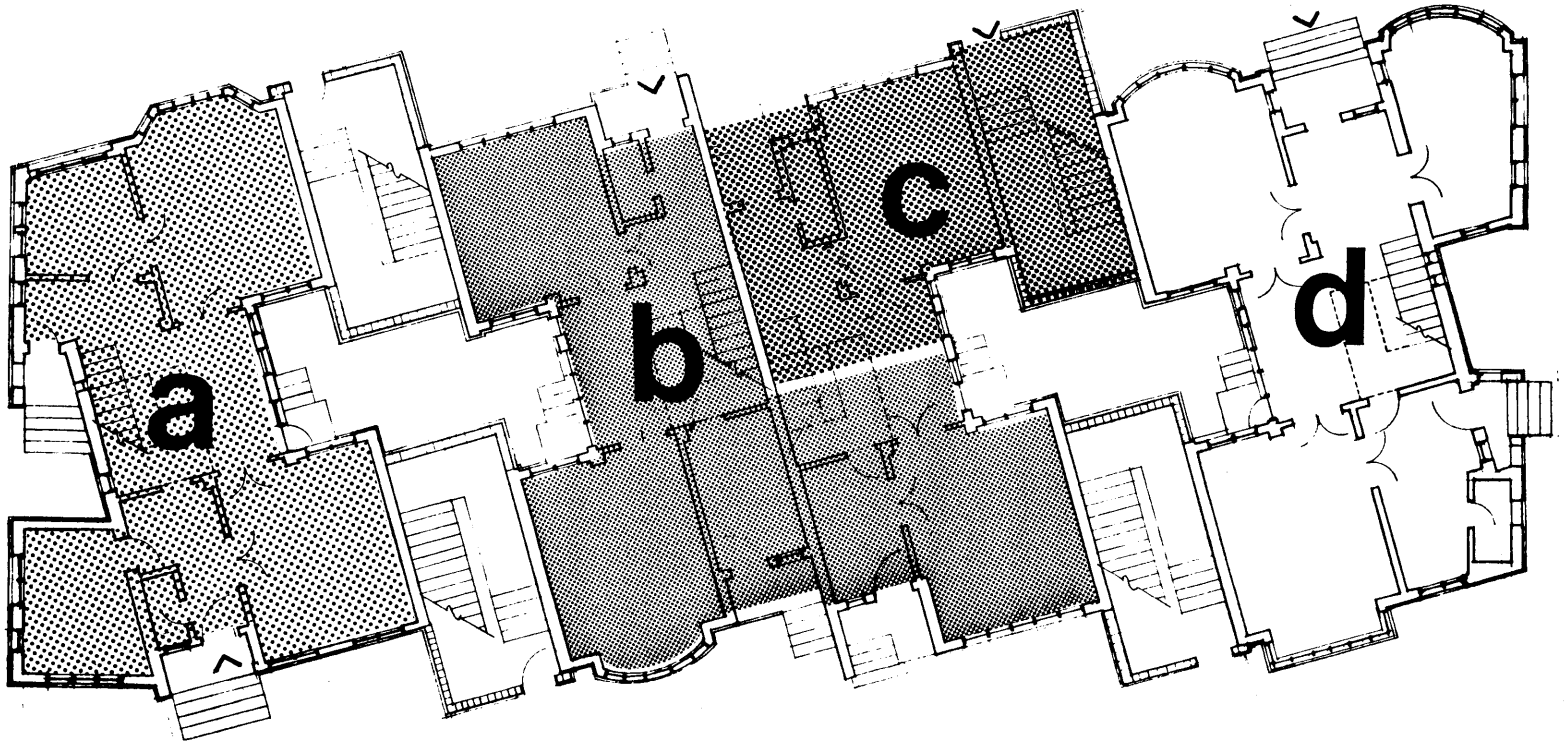
Bigger household units, too, are possible when potential for lateral expansion is exploited.



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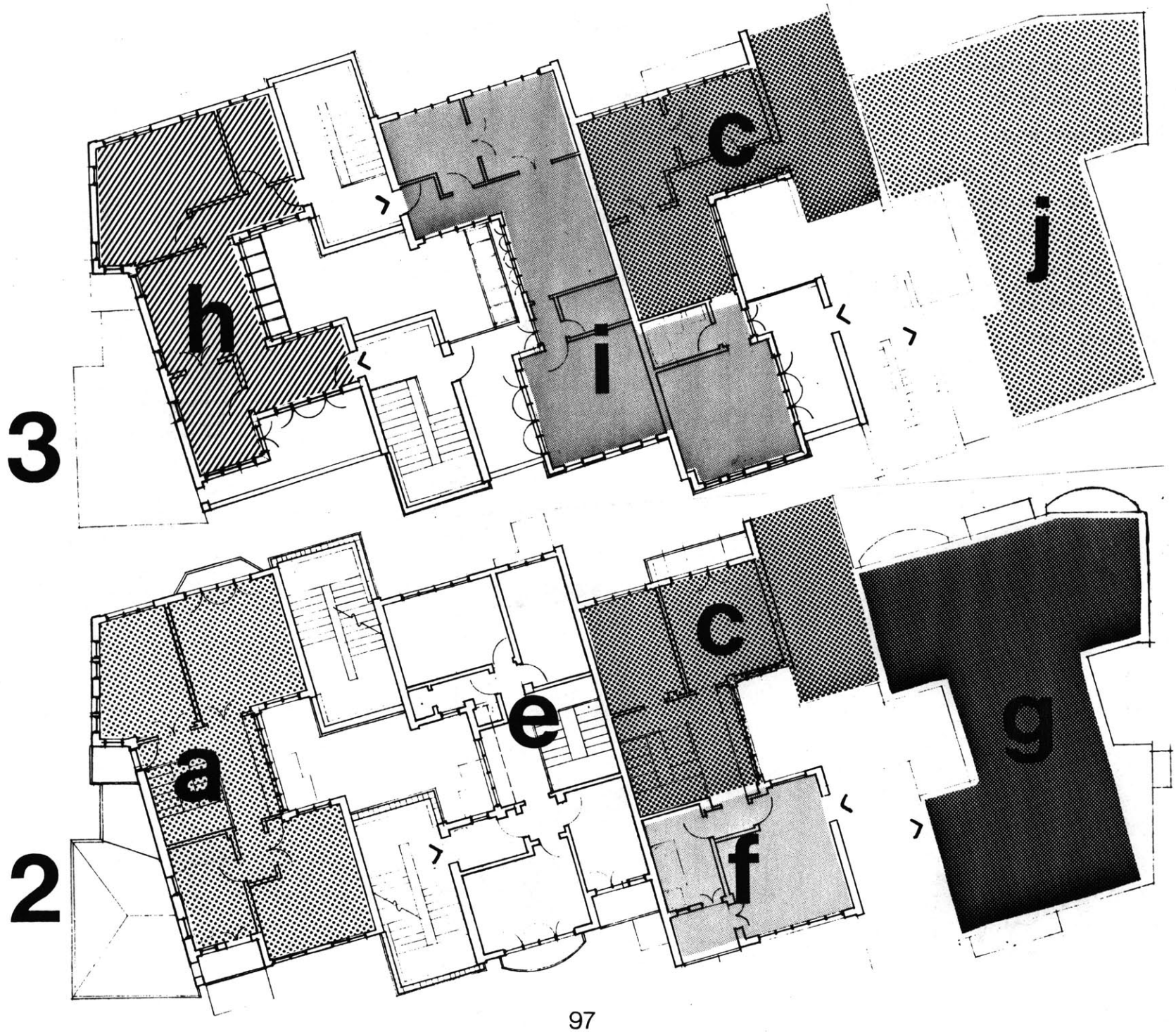
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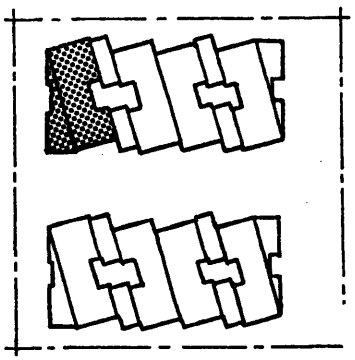
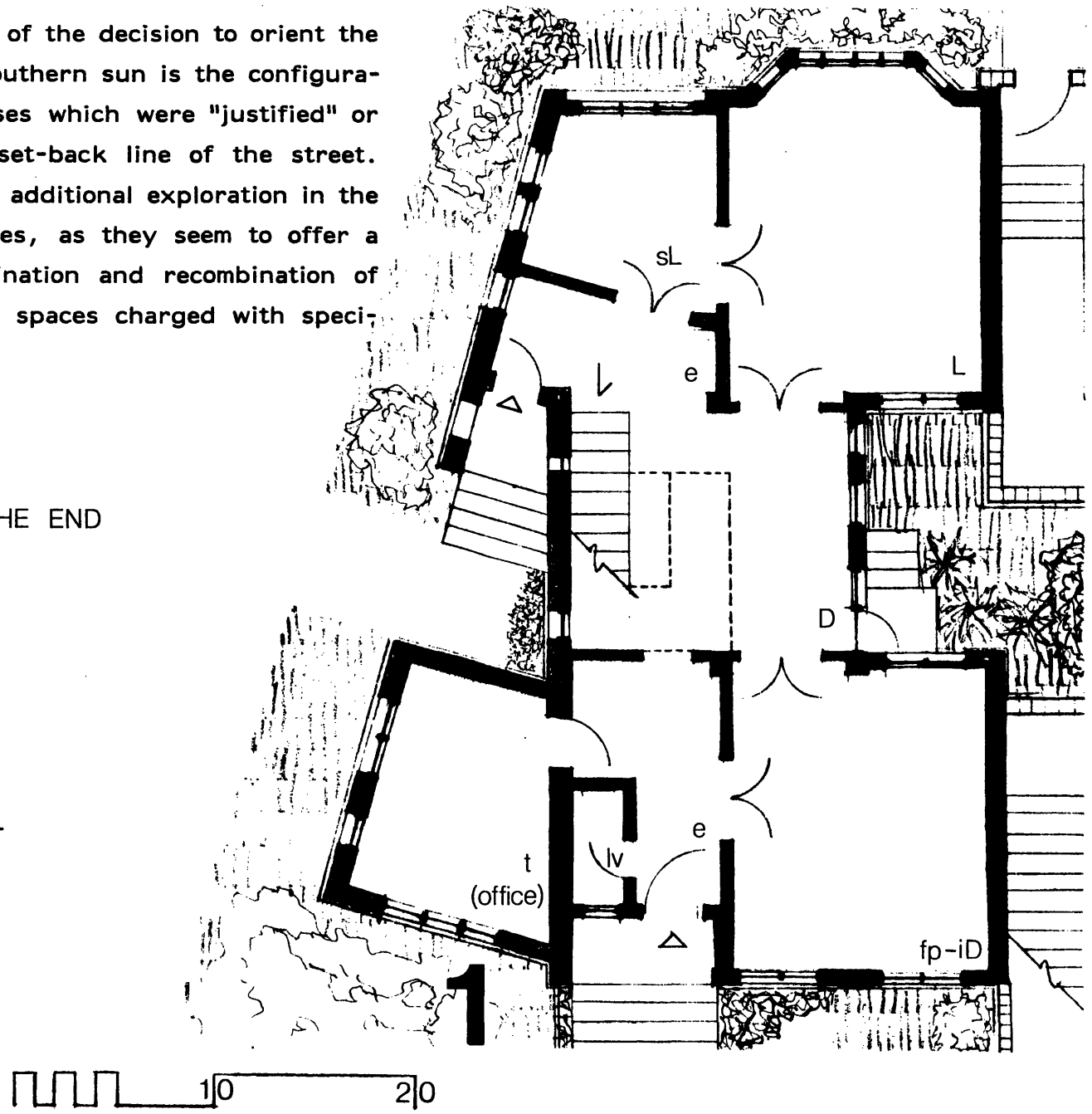
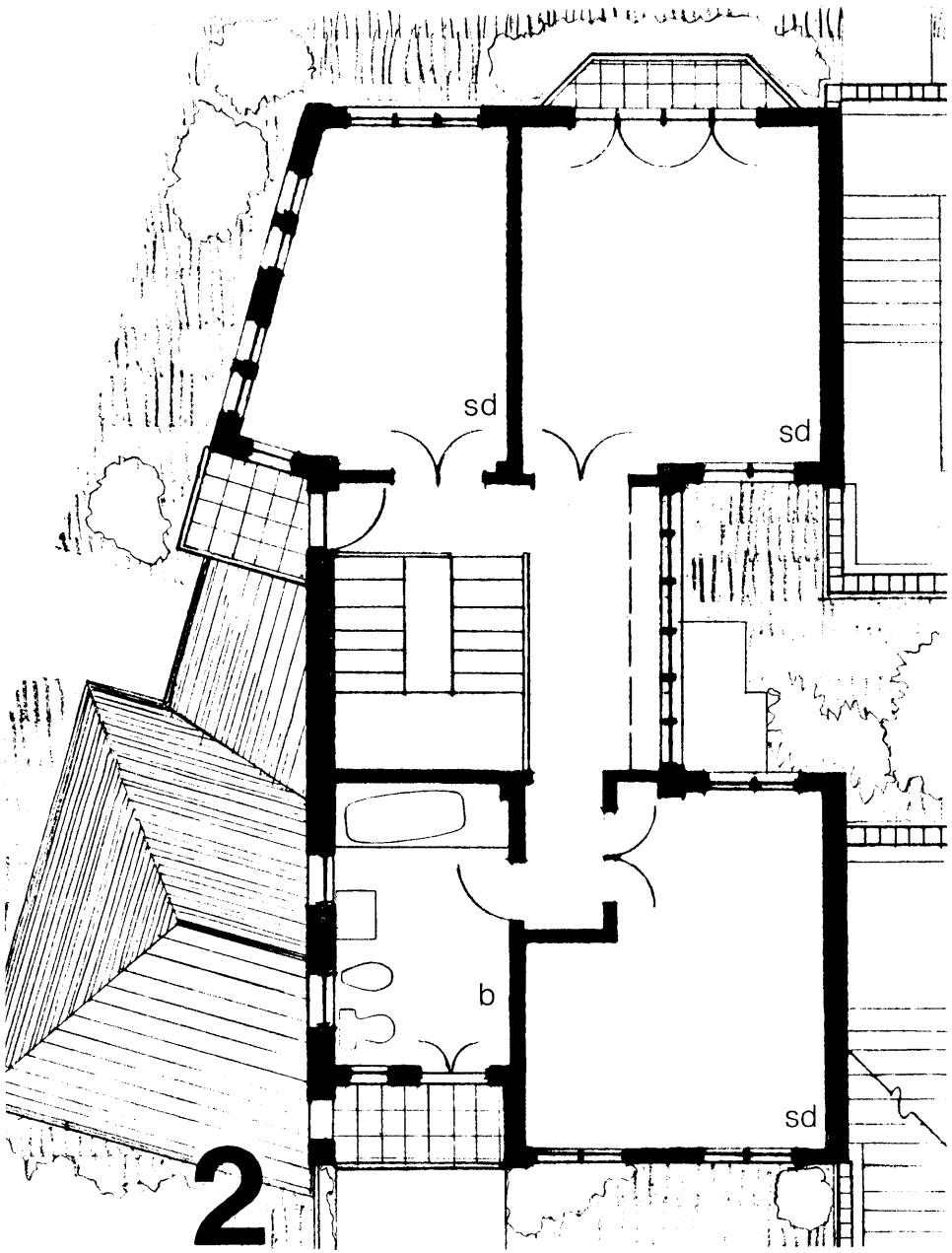
An intriguing fallout of the decision to orient the houses toward the southern sun is the configuration of the end houses which were "justified" or lined up with the set-back line of the street. These plans suggest additional exploration in the direction of dual axes, as they seem to offer a rich range of combination and recombination of activity settings and spaces charged with specific character.

AT THE END







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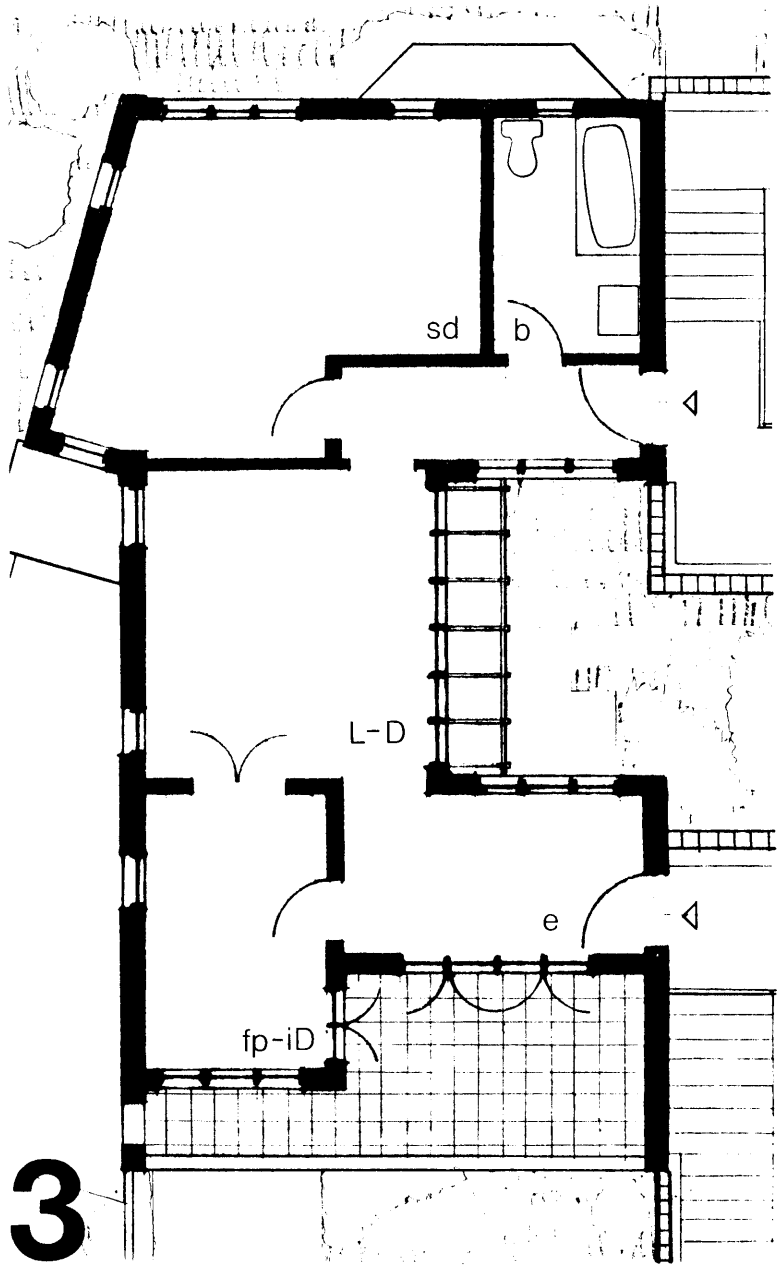

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5

The conclusions will not be conclusive. Who, after all, can be so damned sure? As never suspected at the outset, the delving into this topic has been the opening of the proverbial can of worms. It is a temptation to let the questions from Chapter 4 stand as the conclusions, which seems unfair to the reader, after some thought. What will become the end of this opus are pieces: a brief critique of the design, a listing of what admittedly are informed hunches of what particulars will make a tractable house, and some musings on the practice of architecture and design, besides the usual suggestions for further study.

CRITIQUE

The design has been criticized for the light courts which are inspired by both Matteotti housing and Wright's Roloson houses in Chicago. The apprehension the courts evoke is that of noise. Their room-sized dimensions and depth are problematic too in that they do not suggest use as an exterior household space. Attention has been given to forms suggesting the limits of territories in the shared courts, but final definition has been assumed to be made by the occupants with fence, shrubs, trellises, which is a gamble on the reliability of occupant resourcefulness. As mentioned earlier, the end-house condition which can be more fully developed as a Boston triple-decker type merits design exploration which has not been played out in this study. Among aspects for further detailed consideration are "cornering" conditions where the direction of the rowhouses would change. Further exploration of collective spaces which may bind the aggregate of individual units as a neighborhood-based social unit would supplement work begun here, as well as study of alternative open space uses. Car parking, too, requires more thorough study, as garages may be more desirable to some inhabitants than open parking. Orienting the

houses on a north-south axis has pinched space which could have been given over to cars, but then, perhaps this is the way priorities ought to be anyway. The "if-I-had-it-to-do-over" wish would be to examine construction detailing and outward expression (facades) more thoroughly. Ideally, every part of a tractable house should have a meaningful intent. An intriguing challenge would be to design a room, with a distinctive architectural character and tractability. Intuition shys from Rabeneck's "neutral" rooms, as not being suggestive of improvisational use, or worse, of neutral emotional response to spaces which should imbue "home."

The forms tractability might take on are still open to discussion. This writer's reasonings end up as follows, with a tractable house having:

1. rooms sized approximately 12 feet by 14 feet and 7 feet by 9 feet to accommodate any of the respective primary or secondary activity settings set down here;

2. circulation spaces of sufficient dimension and of a range of characters so they may contain activity other than movement and mitigate amongst group and individual realms as well as serving to orient persons who enter the house from without;

3. exterior use spaces adjacent to several interior spaces, so that access to the outside is never forced to be through an individual's space;

4. access to service chases from all spaces, implying reasonably central and multiple locations for chases;

5. "nebulous" edges to some spaces so that activities can spill over as needed, open spaces or wide openings with double or sliding doors between spaces;

6. a building system such as frame construction with integral lintels or archways between spaces which permit easy reordering of spaces;

7. suggestion of varying uses, such as alcoves or soffits may give, in some part of each room so closets can be created with the adding of doors, or other functions may be located apart from the main space;

8. initially built partial definition of adjacent exterior space, so that only minor construction will serve to expand interior space (courts, balconies, overhangs, etc.);

9. sufficient width of household unit (about 22 feet) to permit a space to be added at the end of the house with room left for access and light to enter the original space;

10. exterior space large enough (at least 14 feet in depth and 12 feet or more in breadth, exclusive of access, which is about 4 feet) to accommodate a primary activity setting and be able to be screened for privacy;

11. "redundant" vertical circulation to permit reordering and reinterpretation of household spaces and aggregate uses;

12. materials of small unit dimension and detailed in an order so that repairs or alterations can be made in small increments.

This list may need to be added to, but represents the general bent of what details need attention in tractable design. For the most part, these are not contradictory notions to the premises laid out by Rabeneck, but are intended to be more open-ended.

Another work which this one has paralleled is SAR theory. It is not so surprising, perhaps, but similar dimensions and orderings of activities rose out of investigation independent of SAR writings. One small hope, though, is that by presentation in this less rigorous methodology some of the rigidity of SAR-based interpretations can be avoided. The knee-jerk impulse to place "service spaces," i.e., kitchens, in windowless locations in a house is not written as dictum by Habraken, et al., yet almost invariably, those who reinterpret SAR method commit such an oppression. On the whole, though, the paralleling seems acceptable, even if blundering redundancy

is risked. It is reassuring in a way to find oneself not too far from an already beaten path, yet hopefully taking in a new perspective of that same ground.

Reappraisal includes a look to a greater context. What this study has attempted is to outline more direct relationships between behavior and design. The hazard is shortsightedness, not looking to the context of human events (as Barker's behavior settings do, for example) in which isolated acts occur. The changing social environment is often overlooked. New roles and variant behavior patterns are ignored; norms are assumed. Little effort is focused in architectural education on developing designers' objective, analytic powers to deal with changing contexts. The bravado of intuitive design still has an overpowering allure. Even more sensitive designers hide from inquiries about their methods behind cloaks of divine intuitive mystique. Their observers and their students rarely detect subterfuge.

Presently, we find design-behavior study playing a minor role in the practice of architecture [cf. Robert Sommer in AIA Journal, April 1980]. Bruno Zevi has posited that behavior and human use or experience be the basis for criticism of architecture. This viewpoint presents a reasoned foundation for the assessment of the success of an architectural work, to which the caveat is

added that there are no absolutes since the judgmental criteria are based in behavior in such a schema. Accounting for social change is in-built in this critical perspective, as criteria will change with behavior. Thus, tractability is a critical concern as well. One suspects it is the difficulty of mastering the complexities of understanding behavior in relation to architecture which makes it an unpopular effort.

It is useful to draw upon Zevi's thinking in order to pin down the greater context in which this thesis fits. Social and historical contexts influence present day situations. Understanding history of which Zevi speaks (here this is differentiated from stereotyped notions from past conventions of how people operate in an environment) is as much part of a clear-thinking approach to design as is the concomitant understanding of the base of future trends. Issues of form and behavior are akin in these senses. The understanding of the social as well as the physical context within which a new building is placed needs to be regarded. The point of view here is that present day and future building is meaningful as transformation of the past.

Architecture is evolutionary. Hence, the recherché aspect of the design presented here. There is a recognized return to early 20th century formal vocabulary which is aimed at inhabitants' associational appeal, to conditioned images of home and at being a response to local conventions of form. Reference is consciously made to Wrightian and Shingle Style elements and images, as a recollection of innovation within American circumstance. This represents a period which marked the beginning of an architectural reassessment, as does our own time. Symbolism in the design presented here combines with purposiveness. It is not meant as an historic pastiche, nor as "bold form-making," but is an intentionally quiet variant of local conditions, not at all exactly the same as it surrounds, but within the same vocabulary. A singularly self-conscious building style would be out of place here. It is this writer's opinion that the practice of architecture need not call attention to its own novelty with sparse nor frenetic form. Architecture becomes an art well-practiced when conventional systems of construction are used to achieve the creation of space which responds appropriately to the users' true situations. Here forms and building finish are understated; attention need not be called to the buildings if the detailing has inherent quality, bespeaking the care taken in design. Clearly, and regrettably, this project is not carried to fine detail, given its theoretical nature.

The position taken is that the practice of architecture is the practice of a serving profession, the idea of it all being that an architect—man or woman—serves those who occupy buildings he designs, not his ego, not the people who write about architecture, not momentary style. Perhaps this all sounds a bit moralistic; indeed it may be. Broader objectives destine responsible professional practice than do profit and publicity.

What is sought in such musings besides a personal philosophy for practice is a direction for architecture to take in the near future. Professionally, we are at a crossroads, so the architectural journals would have us believe. No one seems to know what direction practice should take, at least no one can pin a label on it as

yet. What will characterize architecture in the United States? Current interests in architecture as art work offers little beyond intellectual games as it retraces civilization's steps. Serious criticism of such stuff regurgitates questions about the Nature of Beauty. One wonders about the Nature of Progress.

Bear in mind, this thesis does not exclude aesthetic concern from people's lives but intends to relegate it to its appropriate position in a hierarchy of needs. The brutish appearance of a living place can wash aside the pains taken in more basic details relating to behavior. A building to receive favorable, reasoned critique must have had the full range of details attended to—from mechanics of structure through satisfaction of use requirements to aesthetics. Firmness, commodity and delight are all to be dealt with, in that order. Seemingly contradictory concerns must be brought into alignment. One's hope at the prospect of attaining the end of institutional education is to be able to distinguish amongst the three concerns. To be able to capably bring order to some small part of the universe is situational, based in reality transcending jargon and dogma, and above all intuitive whim. Inevitably, one returns to basic ideas at the start or finish of a project. Finesse lies in doing so without starting from zero each time.

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