



URBAN HOUSING FOR SAN FRANCISCO

Submitted as partial fulfillment  
of requirements for the  
Master in Architecture degree  
Massachusetts Institute of Technology  
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ABSTRACT

Urban Housing for San Francisco

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Submitted to the Department of Architecture on August 14, 1961  
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The significance of residential mobility as a force in contemporary American society is discussed and the implications of that mobility for housing design are drawn. Inadequate and unadaptable housing space are found to be major causes of residential mobility. Basic principles for housing systems are established which will provide the required adaptability and expansion to eliminate some unnecessary moves.

An application of these principles is demonstrated in the design of a community for 4,000 people on Gold Mine Hill, part of the Diamond Heights Redevelopment Area, San Francisco, California.

190 Prospect Street

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Dean Pietro Belluschi  
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Dear Dean Belluschi,

In partial fulfillment of the requirements for the degree  
Master in Architecture, I submit the following thesis entitled,  
"Urban Housing for San Francisco".

Sincerely,

Carl Frank Steinitz

## ACKNOWLEDGEMENTS

I wish to express my gratitude to those members of the faculty and of my class who have given my work the benefit of their constructive criticism.

I would especially like to acknowledge the help of my wife, Vicky, my severest critic and most valuable assistant.

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## I. Residential Mobility as a Social Phenomenon

We have witnessed notable increases in real income accompanied by manifestations of the improved social status in the past generation. We have also watched the agonies of decaying cities - the cities from which people flee at the first opportunity, be it when forming a family or after work each day. At last, a massive effort is to be made to revive these cities. Unfortunately, this attack is being conceived in the terms of the past generation - of those who overcame scarcity. We cannot rebuild our cities and expect them to be vital when we are using the housing forms of static societies. Today's consumer can choose between urban life and suburbia and in ever-increasing numbers he is choosing the latter. If the city is not to be left to die - or to serve as a refuge only for the wealthy elderly, the struggling young and the perpetually poor - new forms of housing which depart from and improve upon present systems, but which are conceived as solutions to present day needs, are required.

The situation our cities face is intimately related to the rapid growth in residential mobility we are experiencing. While this phenomenon has been duly recognized and deplored by professional social critics, little of constructive use has been written or done about it. Our housing designers remain oblivious to the new needs created by an increasingly mobile society. In their use of space they employ carry-backs to the days of a more rigid,

stratified society. It is necessary that the designer become aware of the findings of the social scientist. Before we can begin to alter our housing designs to meet the new needs created by mobility, we must equip ourselves with some basic information about its extent, kinds and causes.

A. Extent and Effects

One out of every two persons moves once in five years. <sup>1</sup>  
One out of every five persons move during each year.

Eight years ago, the average period of residence in the same dwelling was four years. Today, it is 27 months. <sup>2</sup>

The cost to the individual and to the nation of 36,000,000 people changing their place of residence each year is staggering. The expenses of transportation and of speculative profits due to rapid turnover of real estate can be measured in monetary terms. The time spent in searching and negotiating for a new residence, the wastefulness of disrupted friendships and education sequences, cannot. Nor can be the enormous cost of the increasing time cycles of neighborhood deterioration. The best defense against neighborhood decline is stabilization. Builders of public and private housing should attempt to build the kind of physical plant which will minimize tenant turnover and maximize tenant stability.

1. Foote, N. N. et. al., Housing Choices and Housing Constraints. Action Series on Housing and Community Development. New York, McGraw-Hill Book Co., Inc., 1960, p.134.
2. Lynch, K., Personal Communication.

## B. Kinds and Causes

Of the 20% of the population who move in any year, 35% (7% of the population) are inter-community movers. They generally leave for a new area for job or health reasons. The remaining 65% (13% of the population) move within the same community. An analysis of the intra-community moves shows three-fifths of them to be housing-motivated and two-fifths to be a byproduct of another decision. Rossi, in his study of a cross-sectional sample of Philadelphia found the following distribution of housing -  
1  
motivated reasons:

- 1) 16% - to buy a home
- 2) 18% - to upgrade quarters and location
- 3) 13% - to increase living space
- 4) 12% - to reduce living space

Tableman, in a study of intra-community migration in Flint, Michigan  
2  
also found that a majority of the moves were housing-motivated.

Mobility is an area where there is a high correlation between attitudes and behavior. Dissatisfactions<sup>1</sup> with housing, when they arise, are so pressing that most people translate their desires to move into reality. Rossi found in a follow-up study eight months after his initial inquiry that 80% of those who had said they in-  
3  
tended to move actually had moved.

1. Rossi, P.H., Why Families Move: A Study in the Social Psychology of Urban Residential Mobility. Glencoe, Ill. The Free Press, 1955, p.125.
2. Tableman, Betty, Intra-Urban Migration in the Flint Metropolitan District. Ann Arbor, Mich. Univ. of Michigan Press, 1948.
3. Rossi, p.8.

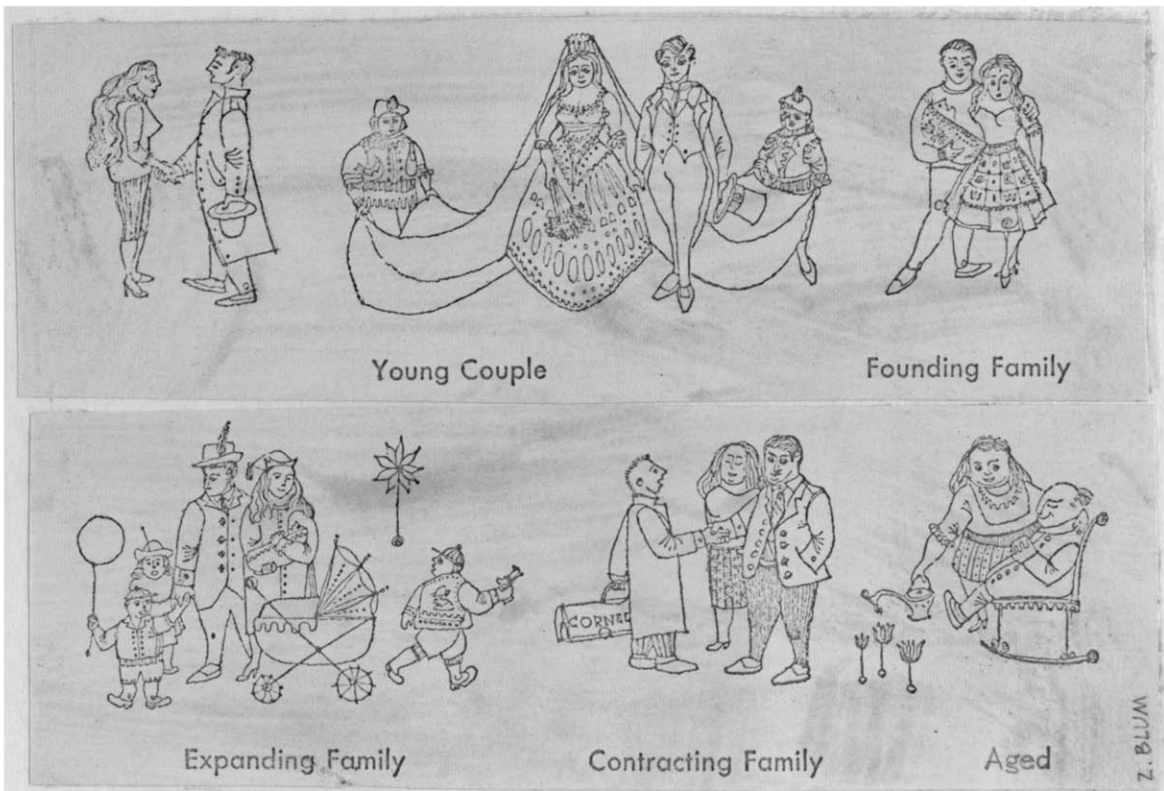


The single most important factor in intra-community moves is dwelling space. Rossi found that the actual amount of space available is not as important a determinant of dissatisfaction as is a shift in the relationship between family size and dwelling size. A family will generally adapt itself to a given amount of space over time, but when the family expands the space is experienced as inadequate.<sup>1</sup> The family life cycle is intimately related to its housing needs and to its residential mobility. The typical adult's life cycle is characterized by ten different modes of housing, each of which corresponds roughly to the individual's needs at the given time.<sup>2</sup>

1. Just married. Live for a brief period of time with parents or in a small furnished apartment.
2. Change of husband's job. Rent a large unfurnished apartment.
3. Building small equity. Purchase a small second-hand house.
4. Change in husband's job or income. Increase in equity. Purchase a larger new house.
5. Children in high school. Remodel and expand house. Complete payments.
6. Custom built house (obtained by a few upper and upper-middle class persons).
7. Children leave home. Neighborhood deteriorates.
8. Sale of house. Purchase of smaller house or rental of small apartment near center of the city.
9. Death of one mate. Retention of home by survivor.
10. Sale of house. Moving in with child or institution.

1. Rossi, op. cit., p.145.

2. Foote, op. cit., p.362.



The large number of housing changes is made necessary by the inflexibility of present living quarters. Every family goes through a phase of expansion and then a phase of contraction. Rossi found that families at the peak of the expansion phase, those with young heads of household (under 35 years of age) and of large size (five or more members) were most likely to want to move.<sup>1</sup> Yet, these are the very families which are least able to afford a move and which experience the most difficulty in finding a place to which to move. Moves by such families are unproductive. We urgently need a system which will make them unnecessary.

The dominance of space complaints as a primary motivating factor in "unnecessary" moves should indicate to the designer and

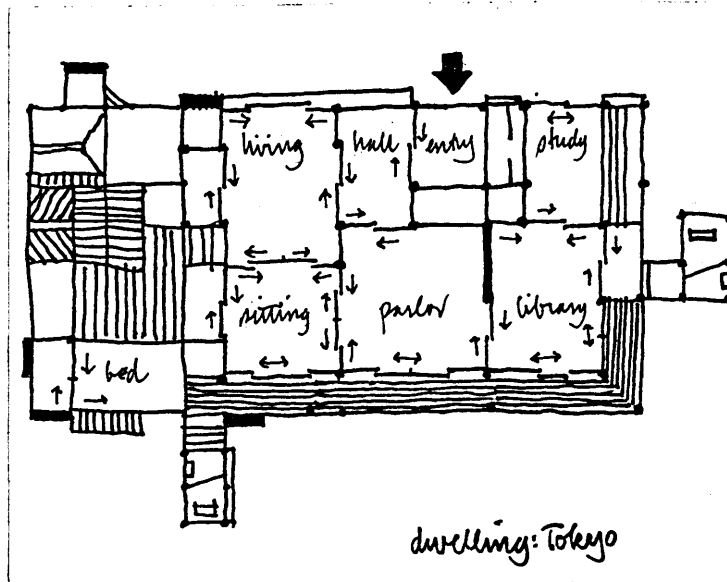
1. Rossi, op. cit., p.71.

builder of housing that residential stability might best be aided by the design of dwellings that can be adapted to meet changing household space needs. It should be possible to devise a dynamic housing system in which need prediction over time was combined with a natural expansion and contraction of unit size in space. Such a system applied to higher density urban housing would advance us a long way towards achievement of the stability that our cities so desperately need and which architects and planners too often attempt to obtain by restrictive measures.

## II. Housing Design and Residential Mobility

The concept of a house as an inflexible and unchanging design must be rejected. The concept of mass housing as an agglomeration of such houses, whatever their organization, must also be repudiated. As a household changes, it should be able to adapt its dwelling to meet its new needs. The lone house on open land, exemplified by the rambling multi-generation farm building, possesses this characteristic. In an urban situation where high density is a planning must, similar possibilities are very much more difficult to obtain. Nonetheless, they should be the architect's goal and methods and principles which might attain these advantages must be explored. It is not necessary to return to the primitive dwelling forms and to begin again. Extremely sophisticated housing systems do exist. The principles of these systems must be analyzed, adapted and developed technically in order to obtain high density solutions for urban dwellings. These solutions must simultaneously provide internal flexibility, possibilities for plan variation and methods for external expansion.

## A. Internal Flexibility



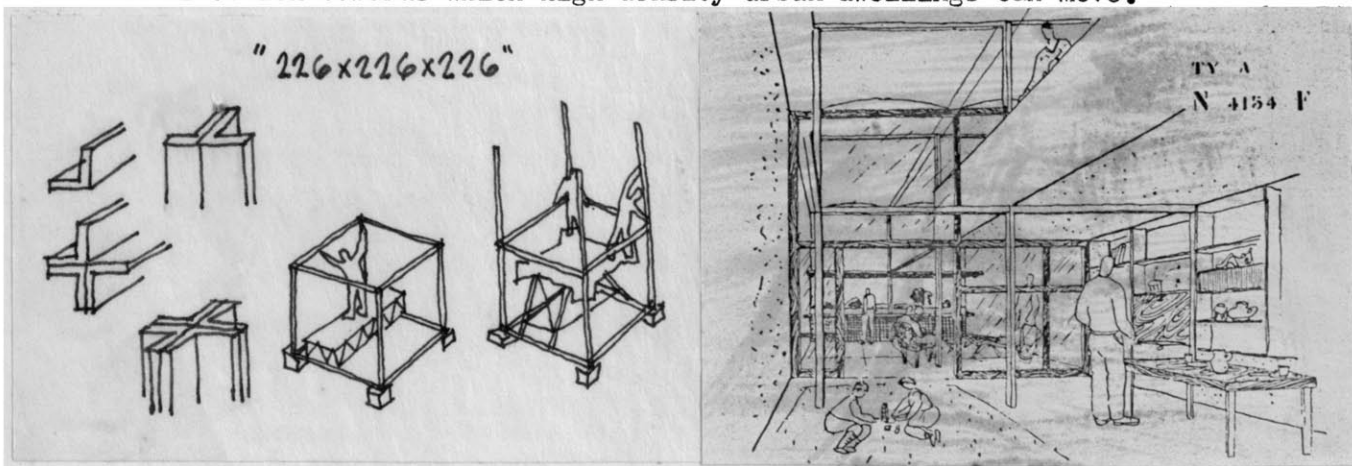
The Japanese house, essentially a single room, ever changing in arrangement and use, utilizes non-structural sliding wall sections to obtain a great variety of organizational patterns. Only a people unencumbered by objects can make full use of this intriguing possibility. The American home, repository of a wealth of family belongings, is more likely to be able to accommodate major changes on a seasonal rather than on a daily basis. Various systems of fixed, non-structural, easily removable panel construction can and have been explored. Sound transmission and appearance are major problems at the present time, but the possibilities provided by new composite materials, adhesives and sealants, have yet to be fully investigated. Studies of house layout use have been carried out in the "Space Use Laboratory" of the Small Houses Council, University of Illinois in a house which incorporates complete room

1. Speer, G., "Will Science Plan the Home of Tomorrow." Housing Research, Spring 1952, pp.39-45.

and utility variability. Many such laboratory systems could economically be made operational.

With moveable interiors we can free ourselves from artificial "room" standards and actually have neighboring units being utilized at minimum and maximum space standards. We can even live without rooms if we so choose. This may be a method of obtaining a non-segregated natural urban mixture, the missing factor in present day "project design". There is no single scientific answer to the question of how best to use space in a house. In ever changing social and economic conditions, a house must be adaptable if it is not to become rapidly outmoded.

Investigations should also be undertaken of systems which allow for two-story spaces, perhaps in combination with a means for variable internal circulation. This would involve a non-permanent floor panel and could, when used in conjunction with variable walls, make possible a great variety of internal organizations in three dimensions. The idea of a three-dimensional module explored by Le Corbusier in his "brevet 226 x 226 x 226cm." <sup>1</sup> (albeit for a fixed house design) is a direction towards which high density urban dwellings can move.

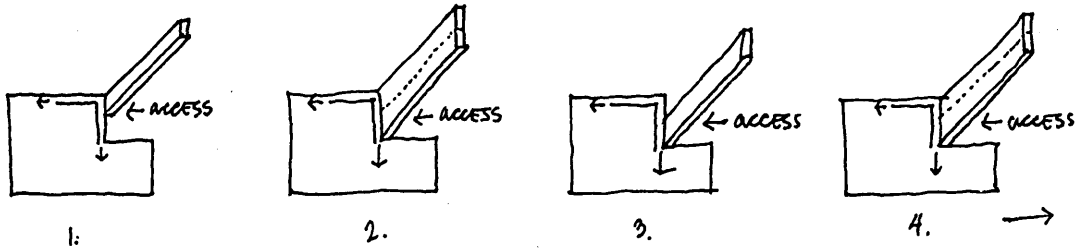


1. Le Corbusier, 1946-1952. Zurich, Editions Girsberger, 1953, p.58-65.

Flexibility must be concurrent with liveability. The module which has only one view, only one possibility for air and sun, is inadequate. A balance must be achieved between a useful economic module and liveability. A three-dimensional module including private open space could be a feasible structure. Possibilities for prefabrication of such units should be considered.

Another design aspect which merits consideration is the utility system. A complete utility system in single or multiple vertical cores with space for horizontal connector runs, perhaps to "plug in" kitchen and bath units, must be provided. Economical solutions for unitized services can be developed with the aim being to minimize vertical systems and to maximize the rate of modernization at the unit level. The application of techniques such as combined heating and cooling systems, mechanical garbage disposal and individual chemical toilets must be more carefully explored for high density housing.

It is also important that ways be found to give external expression to internal variations. One cannot expect rational individual use of an interior cloaked behind a uniform unchanging exterior. People are not insensitive to group pressures with reference to outward appearance, but controls can be set through the provision of a variety of awnings, deck structures, planting elements and a wall system which can give as much freedom to the window wall as to the interior wall. The last is not outside our means. The total variety of individualized unit combinations can still be subordinate to the form of the building group.



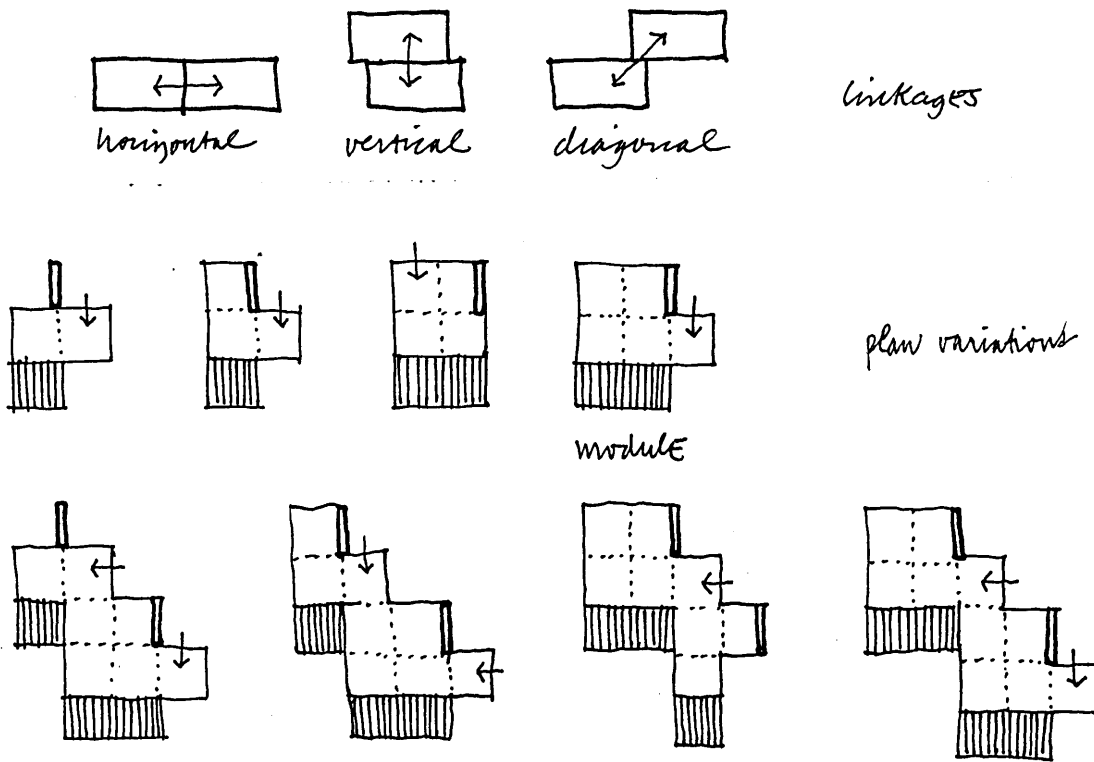
### *cycle of utility renewal*

The module itself should be adaptable to progress. Improvements in wall techniques can be introduced as wall sections wear out. Over the length of the life of a building, only the superstructure need remain. All the moveable parts may have been replaced. The utility service to the module will likely undergo major expansion or overhaul a few times during this period. Space and easy service access must be provided for this expansion. The ability to renew obsolete components is of major importance in maintaining residential stability.



## B. Plan Variation

In any housing system, it is necessary that accommodation be available for a complete range of family sizes. Since fixed plans are not provided, the module must be compatible with a variety of uses and linkages. A larger unit which is divisible may be more flexible than a smaller repeatable unit.



The Strasbourg Block of Le Corbusier has shown an almost infinite variety of plan sizes which are derived from a minimum amount of structural variation.<sup>1</sup> This is imperative for low cost economical construction. A system whose main result is an apparently random, though actually highly regulated, exterior and

1. Le Corbusier, op. cit. p.106-115.

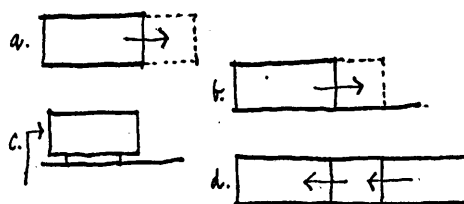
interior organization is insufficient for today's requirements. It is not enough for the architect to organize a building according to his whim, for this fixes upon the inhabitants the same rigid system as does the standard vertically stacked apartment house. Le Corbusier's complex facade does not change - it is static throughout the years.

The Techbuilt House system is another example of the use of a few structural elements to obtain a maximum variety of plan layouts. However, it is dependent upon open land for expansion and is therefore not adaptable to a vertical housing system. A more viable structural module must be devised which is specifically applicable to urban high density living.

### C. External Expansion

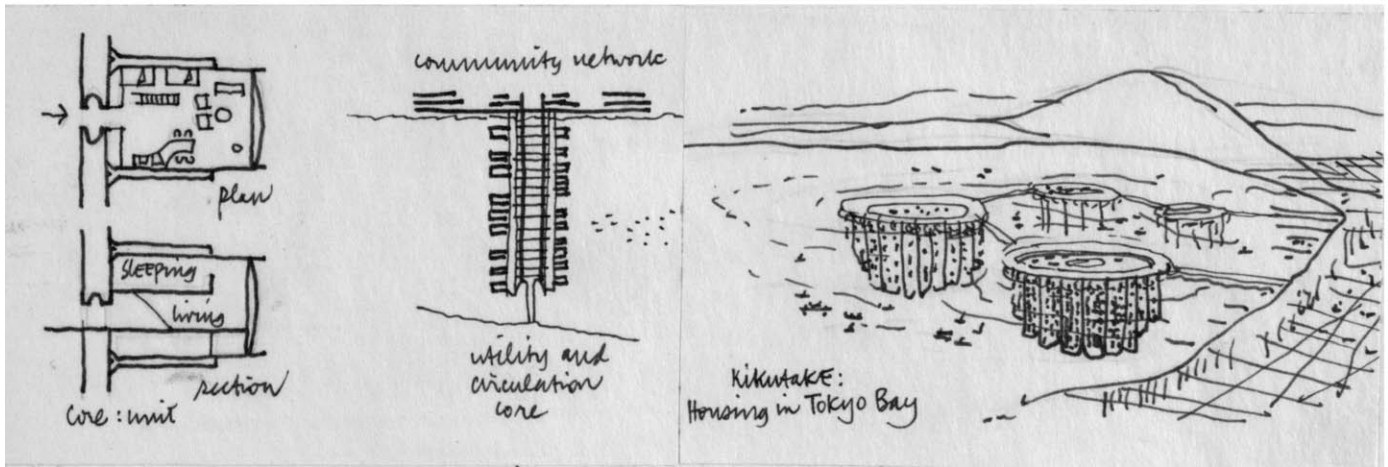
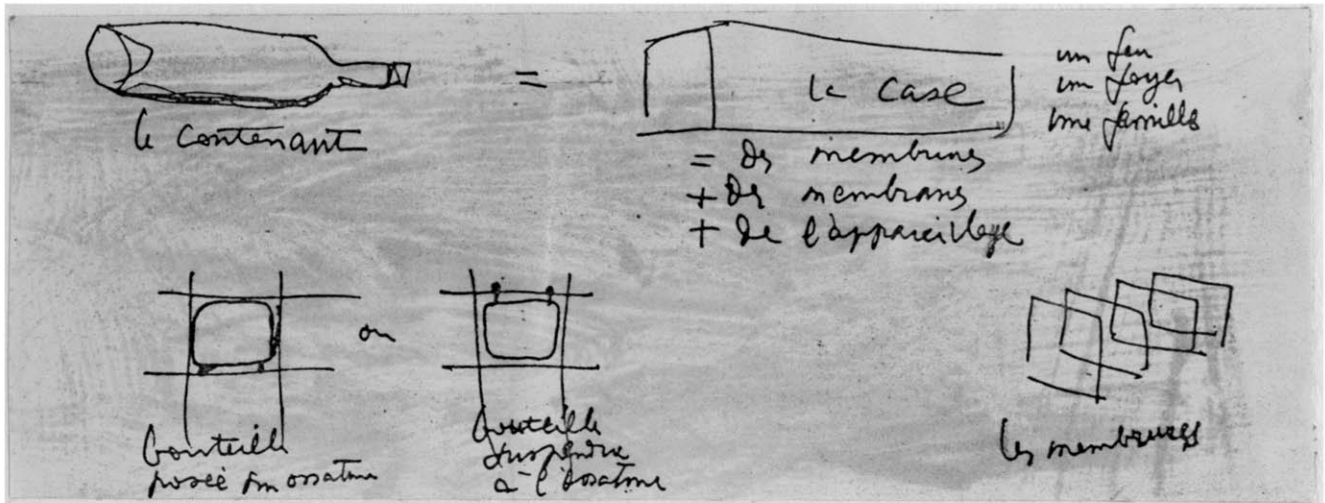
Ways of using space which are both efficient and which provide for expansion pressures must be found. There are several possibilities, none of which has been adequately explored in use:

1. Simple addition of cubage
2. Enclosure of open space
3. Transfer of mobile units
4. Transfer of existing cubage



1. The simple addition of cubage to an already fixed structure involves major problems of structural and utility expansion. The concepts of pre-planning and of spatial control on a large scale are extremely important in a high density urban environment. These would be violated as would the rights of "inner" modules to sunlight, privacy, etc. Only perimeter units would be able to meet their expansion needs and after meeting them initially, they too would become rigid.

2. The enclosure of open space in a completed structural framework to meet expansion pressures violates a basic order of progression - that open space should increase as unit size increases. Also, a household would have to retain expansion area until it was needed; that would involve very inefficient utilization of space. A saturation point denying further expansion would be reached rather rapidly if economics dictated the amount of open space to be maintained. A new cycle could begin only if the expansion module were demountable and the unit contractable.



3. The transfer of mobile units implied in Le Corbusier's "bouteille" analogy and Kikutake's scheme for underwater housing in Tokyo could be achieved in America with a vertical parking grid for trailer-like units. The trailer industry today accounts for over 10% of all new house starts; yet, 85% of the trailers are permanently parked. While we must appreciate the symbolic appeal of this mobility as well as the need for a high degree of real mobility for many, we cannot prescribe this way of life any more than is absolutely necessary. Doing so would involve condoning a mobile society in the nomadic sense with

its concomitant breakdown of community structure. Such an outcome is in direct opposition to those for which we are striving. The trailer cannot be easily expanded if it is to remain mobile. If it is no longer to mobile, there is little reason for its continued existence. There is an added danger in such a scheme - that of a mechanistic or technologically dated superstructure with a chrome-ugly facade and extreme susceptibility to obsolescence.

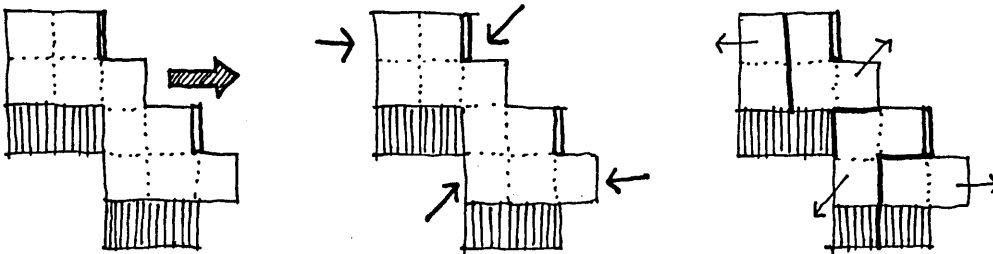
4. The transfer of existing cubage carries with it the assumption that man can behave rationally with regard to his space needs. We have noted that studies such as Rossi's show a high correlation between mobility plans and mobility behavior. It is within the means of the social psychologist and the statistician to predict occupancy changes and requirements with some degree of accuracy. If the number of expansion directions can be maximized, a relationship between probable need and availability of space can be established. If, in addition, internal plan flexibility maximizes the number of expansion choices which can be conveniently used, occupants will be able to expand or contract their units in a fairly routine manner.

Since the techniques of cubage addition, enclosure of open space and transfer of mobile units suffer from basic defects, it appears that the transfer of existing space has the greatest chance of success as an operational method.

#### D. Three Dimensional Transfer of Space

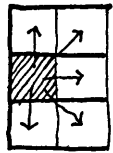
To be efficient, the transfer of existing space requires a large number of connected modules. There already exist a few limited instances of room transferability between two apartments. Single direction, linear expansion, however, forces a difficult situation upon the two neighbors when the decisions about space transfer must be made. The possible number of directions in which expansion can occur must be increased further. The necessary technical innovations can be experimentally tried, step-by-step, as basic improvements to our known housing types.

Every transfer involves two moves - the giving up and the taking of space. Vacated space arises from two major sources. First, those families which are in the contraction phase of the life-cycle frequently require less space than they had previously occupied. Second, households which are forced to make inter-community moves must vacate entire units. Apartments which are vacated in toto will often be multiple module units, for the average job-shifting family is near its peak size. Since the expansion needs of the average household will be in terms of a half, or at most a whole module, several households can expand into each vacancy.

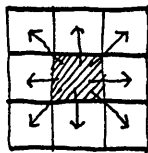


Space exchange could be either left to a free buyer-seller market of owners, controlled by a renting landlord or run by a tenant cooperative. Since the efficiency of the system increases with larger number of participants, a cooperative becomes the most attractive operational method. It would preserve the merits of individual control of housing, provide the ownership " halo effect" and be an important force in the fuller use of the system's potential. It would eliminate speculative profits and have the further advantage of promoting large scale savings in production and maintenance. Self interest, as a motivating force would lead to constant improvement of the physical plant. The governing body of the cooperative might also act as a purchasing agent for all vacated modules.

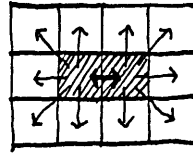
Regardless of the tenancy method, a central administration which used machine control methods must be formed to coordinate vacancies and expansion needs. It might be possible to forecast future space needs of tenants if the relevant data were assembled and tabulated. Newcomers could be introduced into the system by being given predictions about the probable future availability of expansion units. This would be more in the nature of a service than of a rigid system. Certainly, no one would be forced to vacate and no one would be introduced into the system before space was available. The same administration would coordinate the rental or purchase of moveable wall sections, stair units and other variable elements which would be centrally stocked.



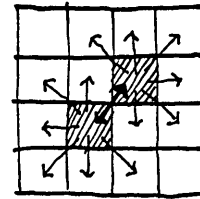
*perimeter*



*interior*



*Secondary*



Full utilization of two-dimensional expansion potential, vertical as well as horizontal, provides eight possible directions. Each module has the same eight chances of being absorbed that it has of being expanded. The number of direction choices increases as the number of modules in the unit increases. A perimeter module can only expand in five directions. It is therefore important in any grouping to maximize the number of interior modules in relation to the number of perimeter ones. By doing this, one will achieve the greatest possible over-all expandability.

It may be possible to generate new forms of housing by the grouping of modules according to the principles discussed. Structure, utility, vertical circulation systems, social and spatial organization are continuing design criteria. A great variety of densities could be achieved. Variations on access systems might be studied. If, for example, market analysis shows that very few small households will ever be accommodated, some flexibility in terms of individual module access can be sacrificed. This would enable the designer to obtain economies with skip-stop lifts and other section variations.

It must be reiterated however that a balance between flexibility and liveability must be struck. One which promotes traditional



values such as privacy, air and sun is desirable. Any vertical staggering of a basic module in order to create private open spaces or horizontal staggering to increase the potential exterior wall area may decrease expansion possibilities. The desirable balance, a function of local climate and other conditions, must be considered in any design application.

Although the consumer is becoming increasingly more sophisticated and competent in selecting his dwelling space, it remains for the architect to prove to him that he can live the way he chooses in an urban high density residence. People must be made to realize that it is they and not the designer or the space landlord who should decide the way in which their space is to be used. The role of the architect is to provide the framework, to guide the consumer and to make constant improvements upon the means of individual self-expression.

There is no optimum solution, no ideal type, no panacea for all design situations. It is necessary that architects design housing modules for different societies, different climates and different economic conditions. The modules must be combined rationally, yet imaginatively, at all levels of the urban organizational hierarchy. Varied building types can be used and hopefully, new forms will be developed. A successful system must have the ability to be varied at every level of use. We must provide this variability of expression for our cities.

## E. Research Proposal

A prototype structure consisting of about fifty modules might be built to serve as a permanent laboratory in which to test technical innovations. Concurrently, social scientists could study the mobility patterns of a typical cross-section of inhabitants over a long period of time. The design of the first prototype would be based upon architects' experiences with existing housing types, but the results of social research would indicate directions which design innovations should take. The following are some of the variables which could be investigated:

1. Arrangements and uses of internal unit space
2. Timing of internal changes
3. Utilization of flexibility features
4. Prediction and implementation of unit expansion
5. Consumer satisfaction
6. Technical innovations and obsolescence

Research of this nature provides the only means of rapidly obtaining a fund of information about the effects of a major innovation in housing design. We have had centuries of experience with static housing forms. It is time that we demonstrated the potential inherent in a dynamic system.

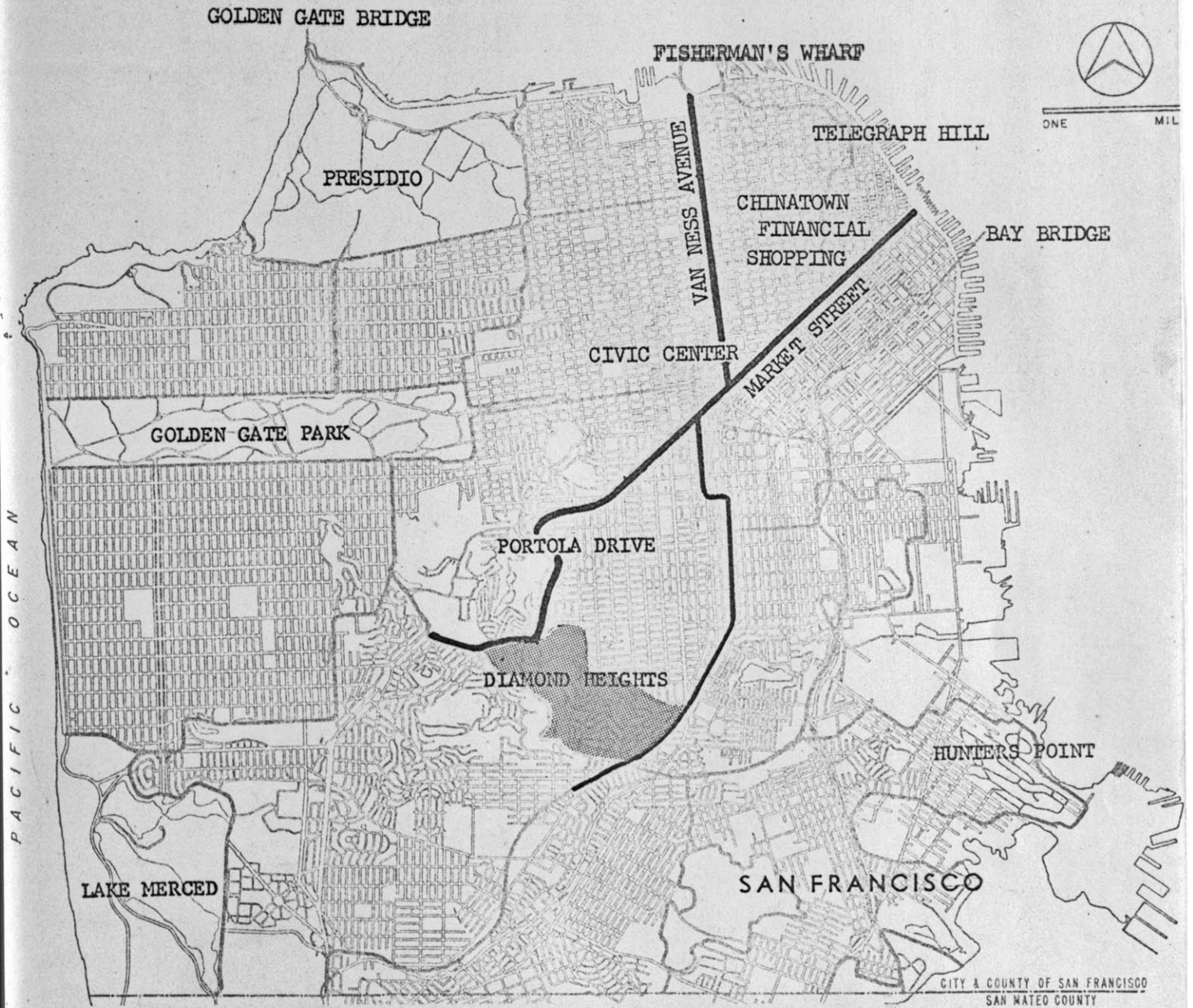
III. Urban Housing for San Francisco



A. Site: Gold Mine Hill, Diamond Heights Redevelopment Area

To study the architectural and planning implications of a flexible housing system, a site has been selected for development. The Diamond Heights Redevelopment Area is one of several areas in San Francisco which because of its steepness and small land holdings had been bypassed for residential use. The site has been the subject of several studies in the past decade which have concluded that it has high potential for residential development under a comprehensive plan.<sup>1</sup> It is, however, still virtually vacant. It comprises approximately 325 acres of land and consists of a chain of three hills and a canyon. The site is Gold Mine Hill (el. 680 ft.). The other defining features are Red Rock Hill (el. 690 ft.), Fairmont Heights (el. 540 ft.) and Glen Canyon (el. 220 ft. at its mouth). Views over the city are superb in all directions and from the higher points, on clear days, one can see the Pacific Ocean to the west, Marin County to the north, Mount Diablo to the east and the South Bay and Peninsula areas to the south. The climate is mild and there are many sunny days. These conditions are conducive to an active, outdoor life. There are occasional strong winds from the west which are accompanied by fog.

1. See San Francisco Redevelopment Agency, Redevelopment in Diamond Heights. San Francisco, 1950 and San Francisco Redevelopment Agency, Report on Tentative Redevelopment Plan. San Francisco, 1952 for a more detailed discussion of the site.



# LOCATION MAP



Gold Mine Hill  
Diamond Heights Redevelopment Area      Scale: 1 = 12,500      -30-



Diamond Heights Redevelopment Area Aerial View

The area is within a fifteen minute drive by private car from downtown San Francisco via Portola Drive and the freeways. Public transportation by bus will be available to the developed area. Because of its proximity to the downtown area and the excellent views and potential amenities, Gold Mine Hill is eminently suitable for development as a high density residential area.

#### B. Residential Program and Analysis

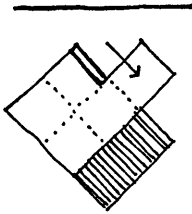
Residential accommodation will be provided for approximately 4000 persons on 80 acres (gross area) of Gold Mine Hill. This gross density (50 persons per acre) is consistent with the standards of the San Francisco Master Plan. A preliminary market analysis indicates the following probable initial unit breakdown.

<u>Type</u>	<u>Percentage</u>	<u>Average Module Count</u>
Efficiency	9%	.6
One Bedroom	18%	1.0
Two Bedroom	36%	1.4
Three Bedroom	36%	2.0

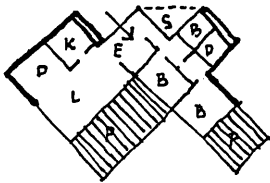
It is desirable that every unit have a useable private open space. The system allows for larger units and for a varying range of space use standards. The net residential density coverage of the solution is 35 acres, giving a net residential density of 33 average units or 114 persons per acre. The remaining 45 acres are devoted to the vehicular system, community facilities and public open space.



A hierarchical progression is developed as the basis for the formal and ecological organization of the site.

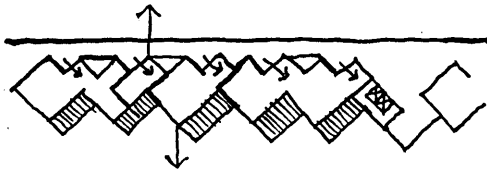


Space Module



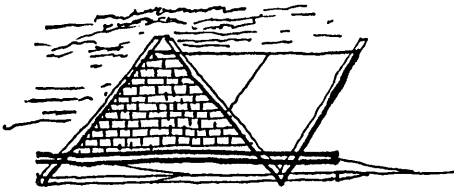
Unit

Private horizontal and vertical circulation.



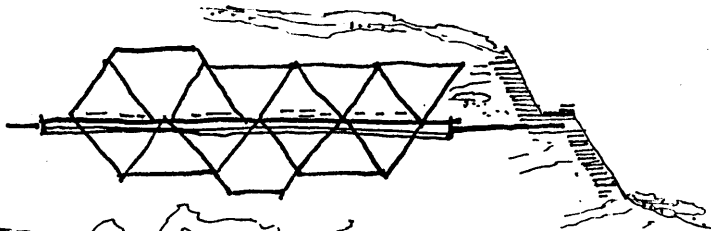
Cluster

Public horizontal circulation.



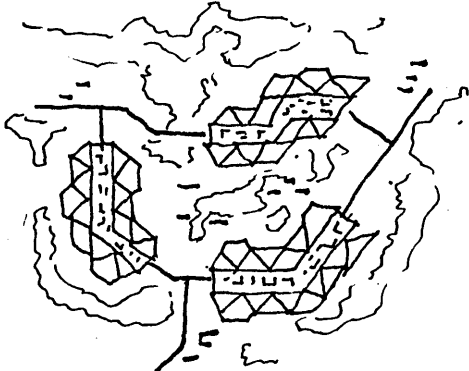
Group

100-150 persons. Public vertical circulation. Parking.



Linkage

1200-1500 persons. 50 pupil (average) nursery school. Service shops. Public facilities.



Community

4000 persons. 350 student elementary school. Library. Churches. Public facilities.

## C. Circulation System

1. Vehicular: The area street system fits into the officially adopted trafficways plan of the city as a whole. It connects two major arterial routes, Portola Drive and Guerrero Street. The road network is designed in such a way as to discourage through traffic.

The road system is intended to obtain maximum use from the minimum amount of horizontal road construction, since this aspect of the system requires the most regrading. Automobiles are kept in a vehicular belt and are centrally parked convenient to vertical circulation. The parking levels form sound barriers between the residences and the road. The parking ratio of one car space per module allows for multi-car households and is also ample for visitor parking. There is no parking permitted on the major roadway. Off-street, short term spaces are provided as are taxi stands and service drives. Public transport is provided by local bus on the major roads. There may be express buses to the downtown area from key points on the hill. Intersections are minimized and major existing local roads are connected to the system.

2. Pedestrian: It is intended that the design encourage pedestrian traffic. The public pedestrian system is separated from the vehicular network and consists of inter-connected park areas at the "top" and "bottom" of the system and of an urban shop-lined promenade atop the vehicular belt.

Both park belts connect with the Glen Canyon park, one of San Francisco's beauty spot which is still in an almost natural state. The canyon is part of a green belt extending over Twin Peaks and Mt. Sutro to Golden Gate Park. This park belt connects the three communities of Diamond Heights with the proposed Junior High School and High School sites at the head of the canyon and with the district center situated between Red Rock and Gold Mine Hills.

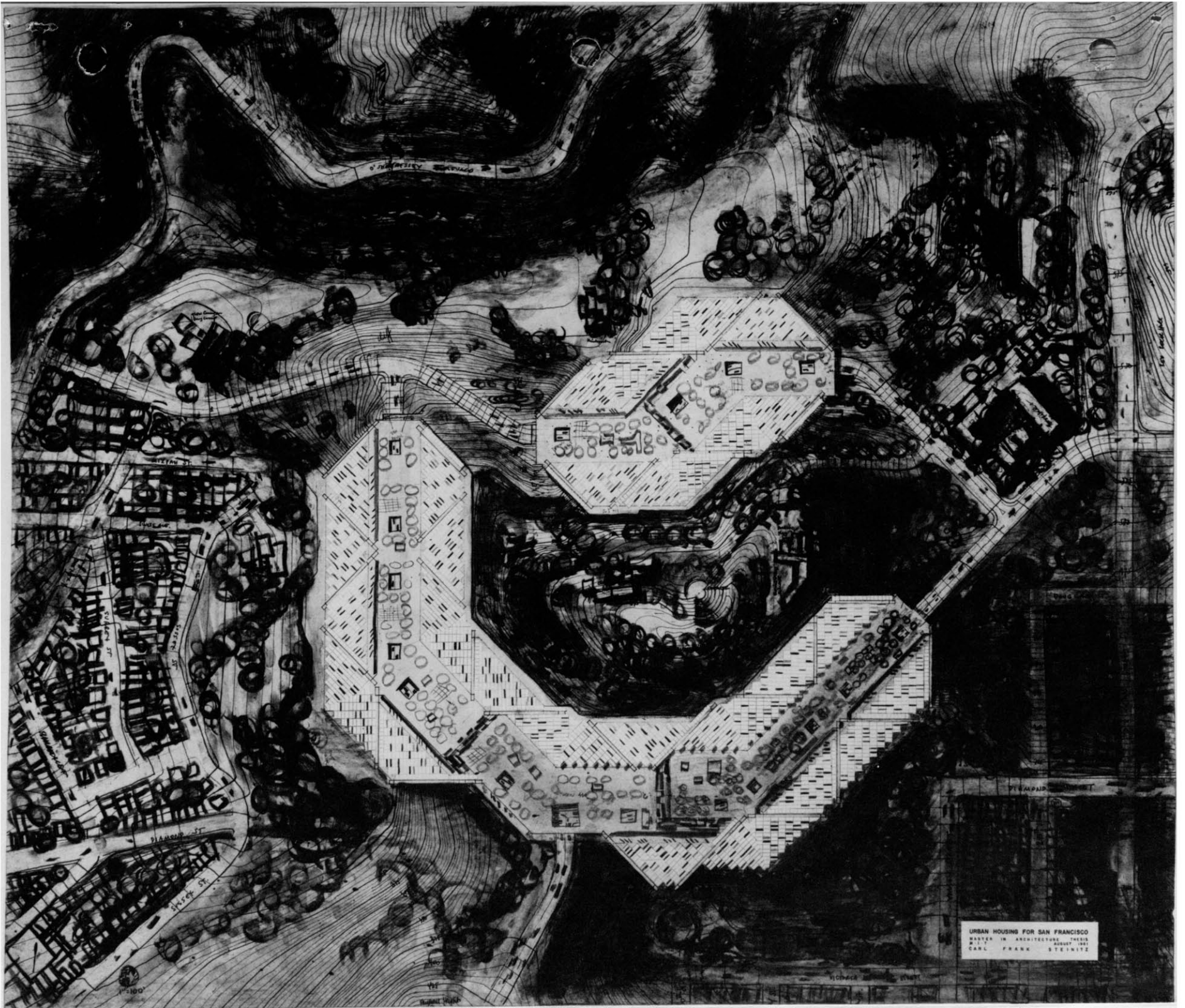
The promenade, more local and urban in character, would be an important center of activity, particularly at night. Its sections will have varied activities and public facilities and in some parts overlook the lights of the city. Locations for service shops, restaurants, entertainment facilities, churches, clubs, etc. would be provided with separate pedestrian and automobile service access. Vertical public pedestrian circulation is accomplished through the full utilization of the lifts, the promenade forming multiple crossing points over the auto belt. This is the major way to the elementary school, the library, the swimming pool and other community facilities situated towards the crown of the hill.

It is the intention of this program that a housing system be developed which, when combined with adequate public open space and facilities, will be attractive to suburbanites wishing to return to the city as well as to urbanites wishing to remain there.

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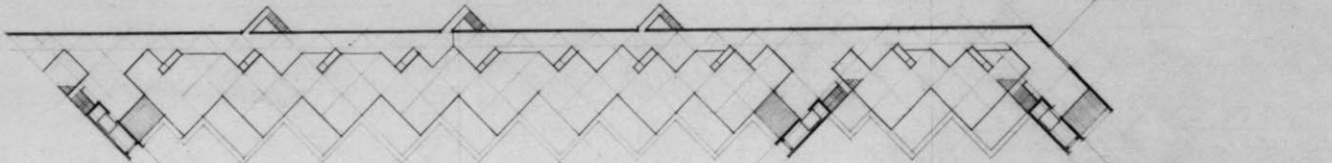
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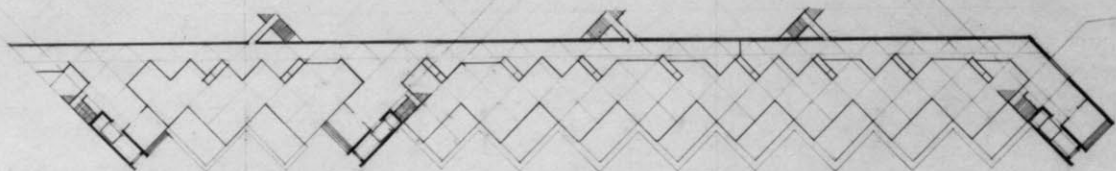


URBAN HOUSING FOR SAN FRANCISCO  
MASTER IN ARCHITECTURE: THEODORE W. H. HUBBARD  
ARCHITECT: CARL FRANK STEINITZ

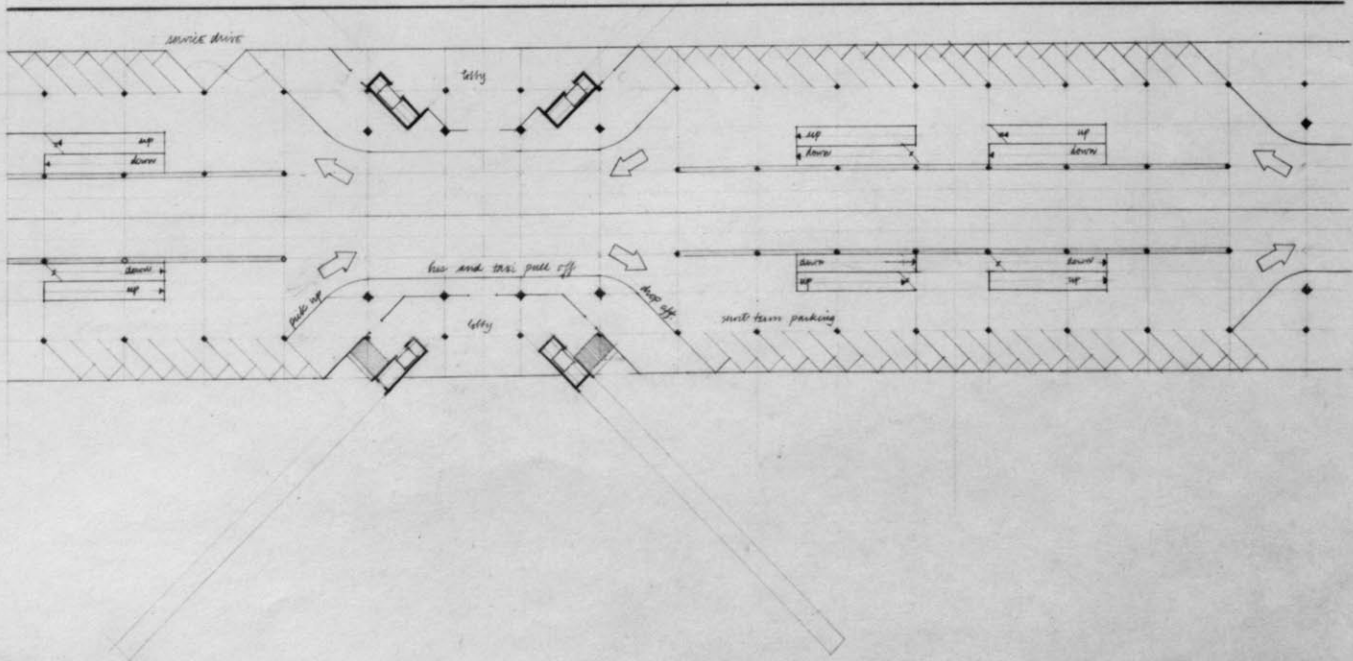
TWELFTH FLOOR PLAN

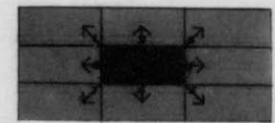
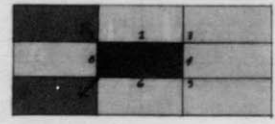
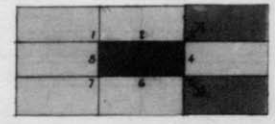
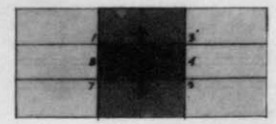
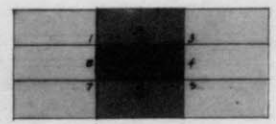
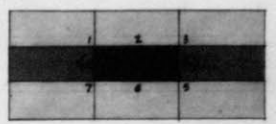
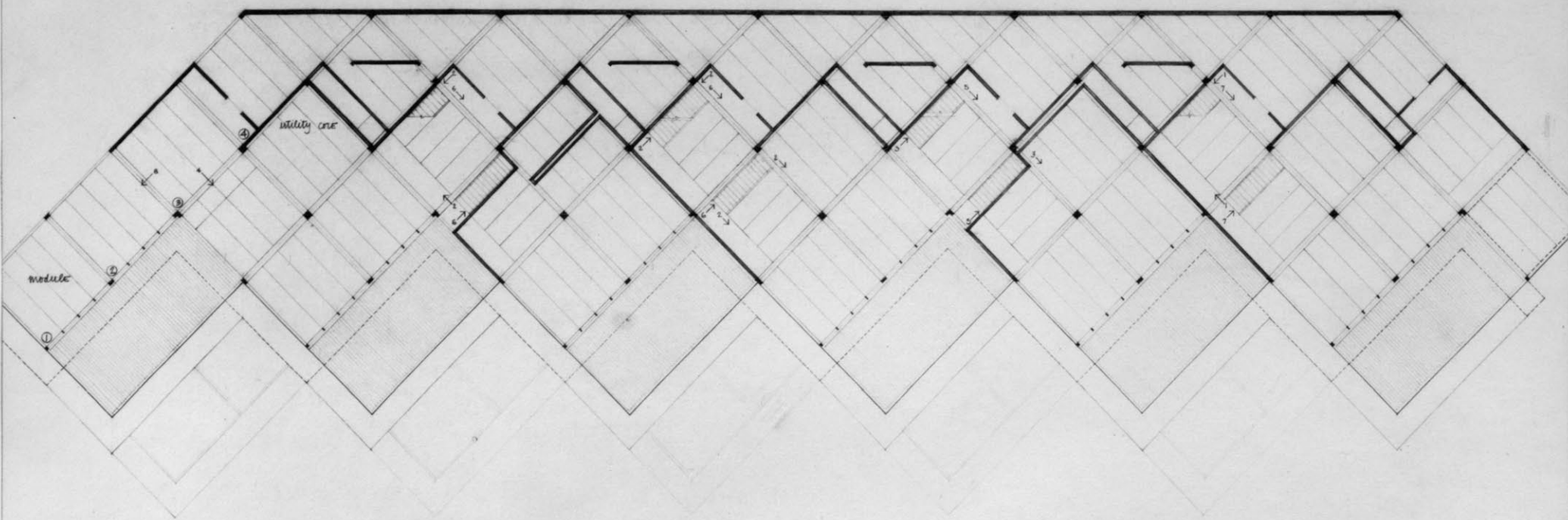


FIRST FLOOR PLAN



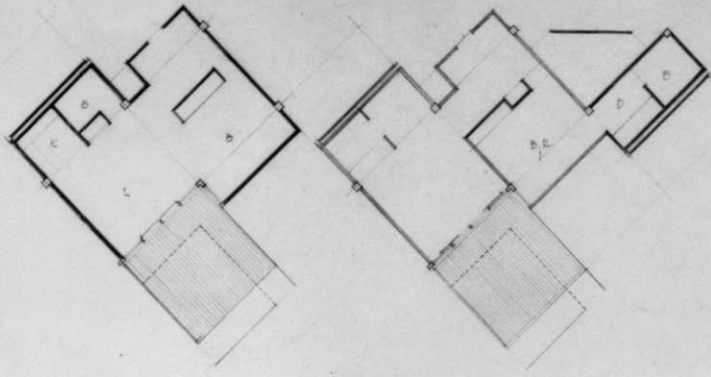
ROAD LEVEL PLAN





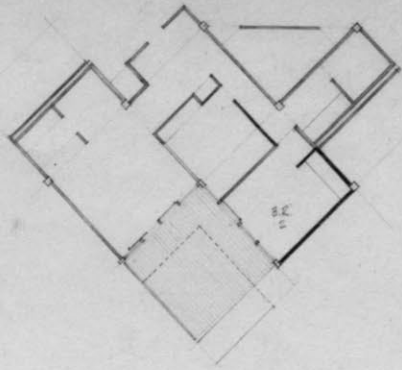
EXTERNAL EXPANSION SYSTEM



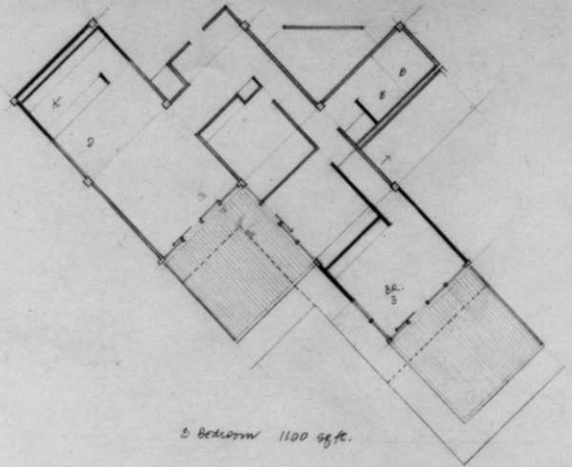


*Efficiency*

1 Bedroom

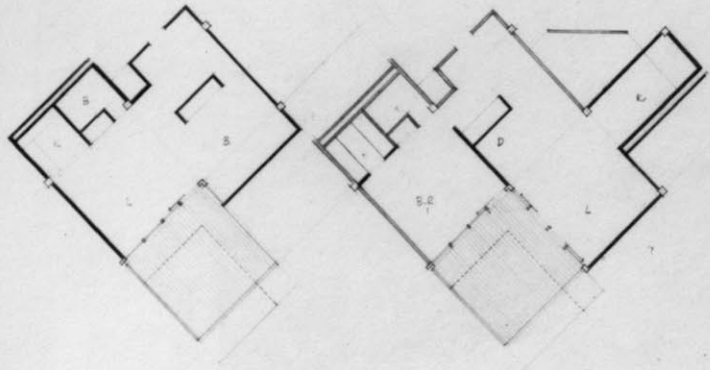


2 Bedrooms



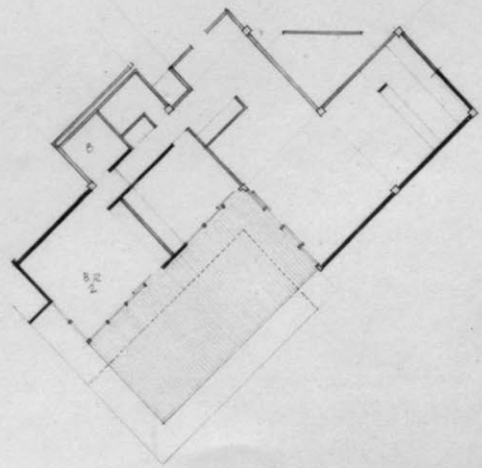
3 Bedrooms 1100 sq. ft.

LOW SPACE USE UNIT

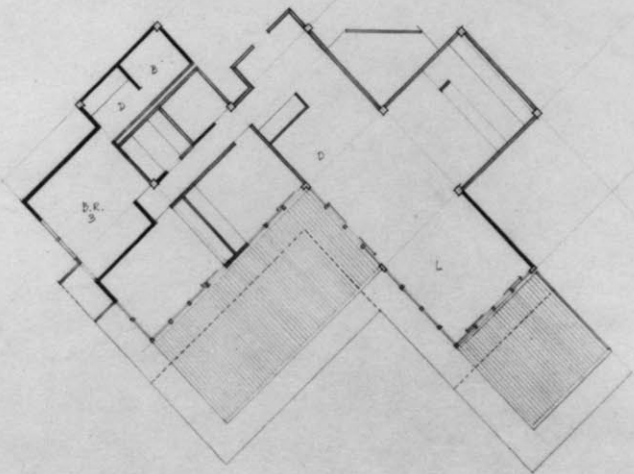


*Efficiency*

1 Bedroom



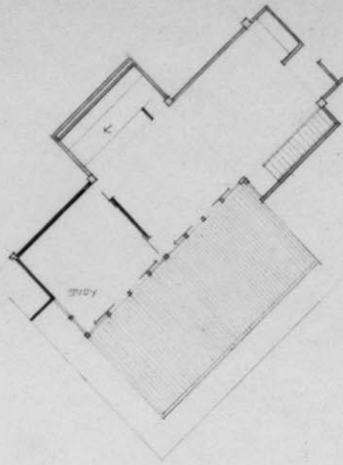
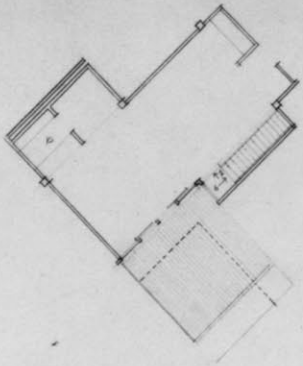
2 Bedrooms



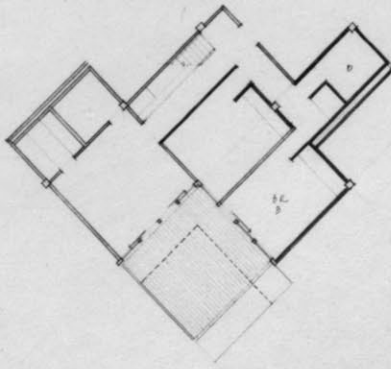
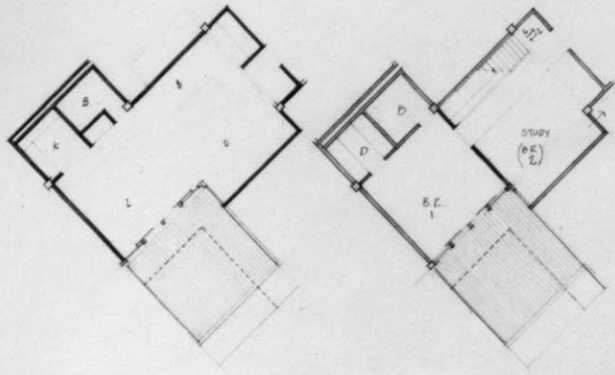
3 Bedrooms 1600 sq. ft.

HIGH SPACE USE UNIT





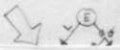
UPPER FLOOR



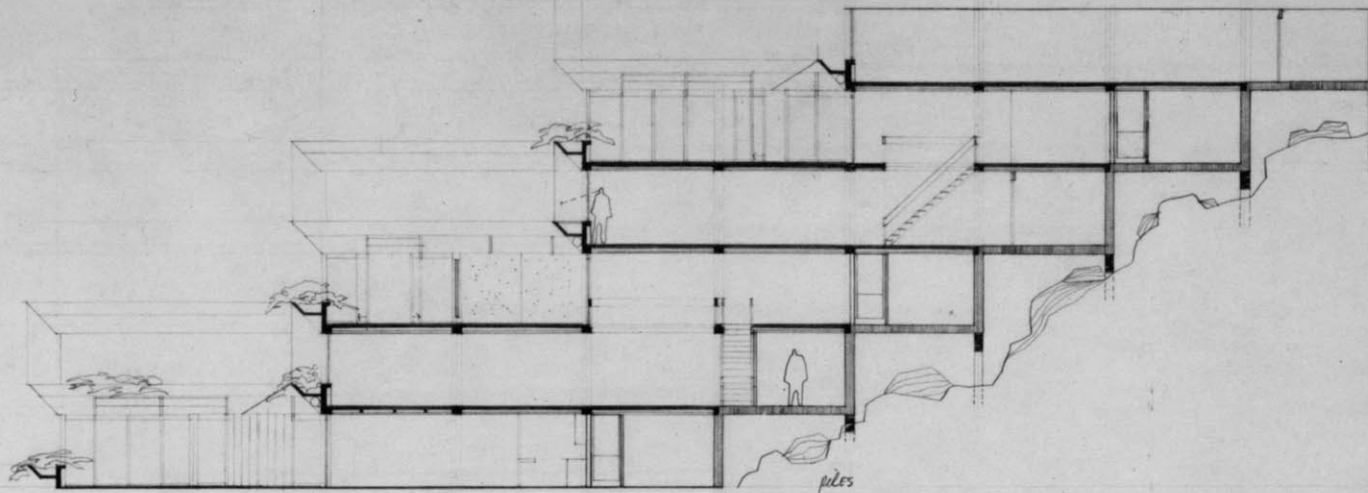
LOWER FLOOR

3 Bedrooms

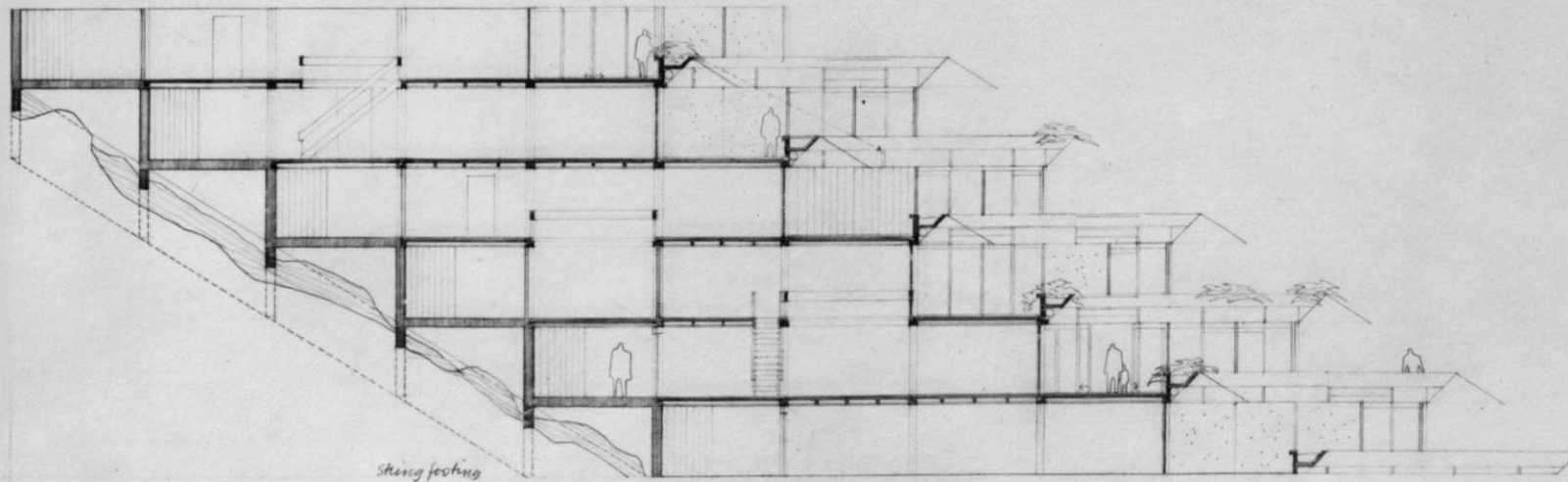
VERTICALLY EXPANDED UNIT



Options for space use  
w/ing rooms & high space use

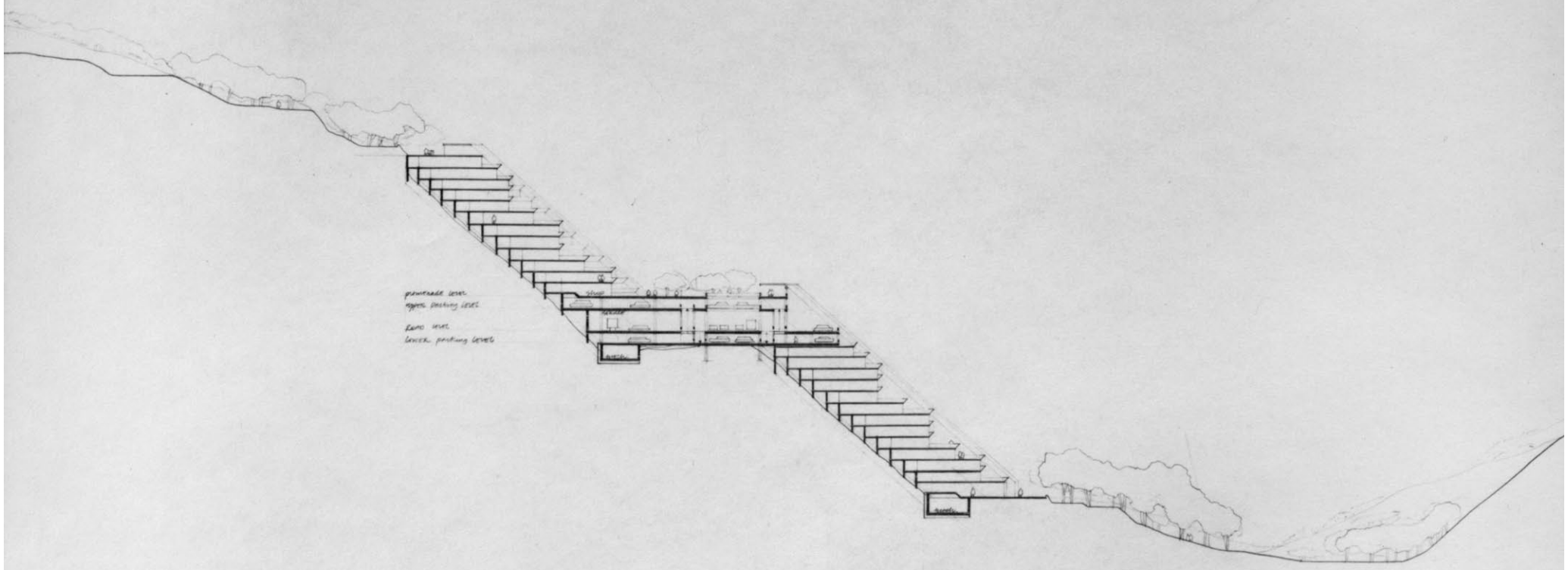


SECTION ACROSS SETBACK AXIS  
 1/8" = 1'-0"



*string footing*

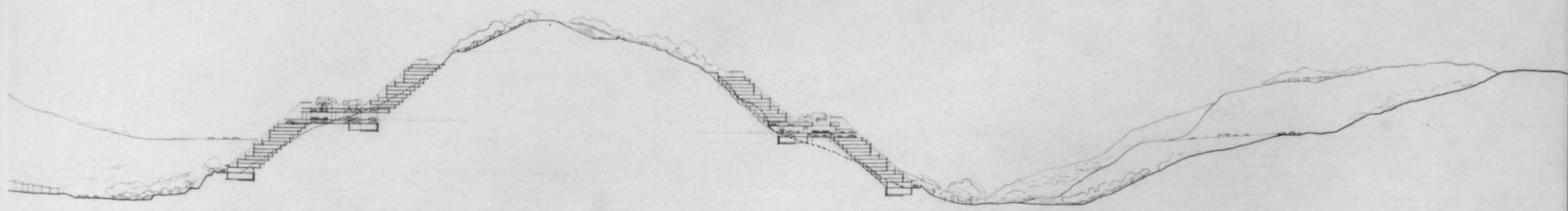
SECTION ALONG SETBACK AXIS  
 1/8" = 1'-0"



promenade level  
upper parking level  
2nd level  
lower parking level

SECTION  
1/32" = 1'-0"

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MASTER IN ARCHITECTURE THESIS  
M.I.T. AUGUST 1961  
CARL FRANK STEINITZ



GOLD MINE HILL  
SITE SECTION 1" = 100'

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