# Site and Services Project Case Study: Ahmedabad, India

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February, 1984

"A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Architecture".

Abstract.

A review of low income urban shelter theory is presented, and the low income urban shelter situation in Ahmedabad, India is described.

A case study of a site and services project in Ahmedabad is presented, with information on project implementation, physical constraints, construction process, and house form variations. Data from interviews with the projects' residents is also presented, and the performance of the project is evaluated.

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Résumé.

La présente étude examine différentes théories sûr les abris urbains à coût minimum et décrit la situation de cette forme d'habitation à Ahmedabad, en Inde.

L'étude porte plus particulièrement sur un projet "d'emplacement et de services" à Ahmedabad et fournit des données sur la mise en oeuvre du projet, les contraintes physiques, les techniques de construction et les variations dan les formes des habitations; de plus, on y présente les resultats d'entrevues menées auprès des residents du projet. Enfin, L'étude évalue l'efficacité du projet.

Acknowledgements:

I wish to express my sincere appreciation to Clifford C.F. Wong, Architect, for making it possible for me to study at McGill University as the first recipient of the Clifford C.F. Wong Fellowship; to Professor W. Rybczynski who suggested the idea of doing a case study on the Bhadreshwar site and services project; to my advisor, Professor V. Bhatt who offered many valuable insights on cultural and other aspects of housing in India; to Professor B.V. Doshi, Architect, who gave me the opportunity to pursue fieldwork on the Bhadreshwar project as a research fellow at the Vastu-Shilpa Foundation in Ahmedabad, India; to Maureen Anderson, who helped so often with the administrative arrangements for both my studies and research; to Himanshu Parikh, P. Eng., member of the Vastu-Shilpa Foundation, who put up with my endless inquiries; to those who helped me in setting up my research in Ahmedabad, especially Milan Desai, Mayur Purani, Bimal Patel, and Muktiraj Chauhan; to my energetic and able assistant and interpreter, Bharat Lakhtariya; to Hetti Mellin for proofreading the manuscript; and to the residents of the Bhadreshwar Site and Services Project, who gave so generously of their time.

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The purpose of this study is to document and evaluate a site and services project presently under development in Ahmedabad, India: the Bhadreshwar Housing Colony.

Part one surveys recent theory pertaining to low income urban shelter in the Indian context, examining contemporary urban shelter alternatives (settlement upgrading and site and services). A review of urban shelter issues is also presented, such as user control of the construction process, self-help, community development problems and policy, urban land problems, and government and agency involvement in the housing delivery process.

Part two examines low income housing in Ahmedabad, describing the situation of pavement dwellers, tenement dwellers, and informal settlement dwellers. Background information on cultural aspects of low income urban residents and rural-urban migrants is also presented.

Part three is a case study of the only site and services project developed and occupied at present in the state of Gujarat, the Bhadreshwar Housing Colony, located on the periphery of the Ahmedabad urban area near the airport. This project is one of several site and services schemes planned by the Gujarat Housing Board, with financial assistance from H.U.D.C.O. These projects use a prototype which provides identical plinth areas, toilet enclosures, wash places, street widths, services, and standards for open space. However, of these projects only the Ahmedabad and Baroda schemes have been developed (the author visited the site and services scheme in Baroda near Gotri village in September, 1983, and found that with all plinths and infrastructure in place since 1978,

not one family had started house construction).

Field work for information gathering on the Bhadreshwar project was conducted from mid-September to December, 1983, while the author was a research fellow with the Vastu-Shilpa Foundation, Ahmedabad, (B.V. Doshi, Director). The author measured and photographed houses which would demonstrate variations in form and completeness of construction in October and early November, 1983. A six page interview form was developed (in Gujarati), and with the assistance of Mr. Bharat Lakhtaria, a press reporter who is a Bhadreshwar Housing Colony resident, interviews were conducted with the families whose houses were previously measured and photographed. The interviewing was done in late October and all of November, 1983. Also, the author met with many officials of the Gujarat Housing Board in Ahmedabad and the State Housing Ministry in Ghandinagar, to obtain as much background information as possible on the Bhadreshwar project and on low income housing problems and policies. All drawings and photographs presented in the case study are by the author, as is the project analysis and interpretation of results. In addition to the physical documentation of selected houses, information is presented on income levels, employment, and family structure, as well as construction methods, building codes and Gujarat Housing Board regulations, and construction costs.

In part four, the project is evaluated with regard to project location and development, site planning and infrastructure, construction process and house form variations, project administration, and residents' income level.

A. The Economically Weaker Sector.

In describing low income urban shelter, various terms like squatter settlements, slums, informal settlements, spontaneous settlements, and hutments are used. None of these terms seem appropriate, and as some writers have observed, often the "slum" label is not deserved in settlements where there are distinctive patterns of life and association. In the discussion which follows, however, terms are used as found in the source material.

Many well intentioned writers on the subject of housing problems in India describe the shortage of housing and also present statistics on the number of new houses which must be constructed in order to solve this problem. Taneja states that "One of the urgent problems facing the country is the acute shortage of housing. In planning for achieving self-sufficiency in housing a correct estimation of the housing requirements should form the very first step.". (1)

Similarly, Mehta writes of the housing shortage in India with reference to the often quoted turn-of-the-century time frame.

> "According to the survey in 1974 the total shortage of houses in urban areas was as much as 3.8 million and according to one study by 2001 A.D. the shortage is expected to be about 12,000,000 units. The country has an overall rate of construction of mere 2 houses per 1000 persons annually, 3.5 in urban areas and 0.44 in rural areas. Against this an expert body of the United Nations has recommended construction of minimum of 10 houses per 1000 persons. The rate of construction of houses in the developed countries is between 6.5 to 7.5 and we will have to gear up housing activity considerably if we are to meet with even the bare minimum target.
>
> Our cities are undergoing a process which major cities of North America underwent during the late nineteenth century and early days of the industrial revolution," (2)

Writing on the futility of achieving even moderate housing success in the near future, Yeh presents a more realistic projection of the time frame involved.

> "It is unrealistic for most countries to attempt to solve their housing problems within 10 years. Given the rapid rate of urban population implosion, the growth of slum and squatter areas, and the substantial backlog in housing and infrastructure (measured by whatever standards), compounded by the required changes in political thinking, legislation, administration, and resource allocation, a comprehensive solution for most countries will require decades rather than years." (3)

Payne presents a different view of the housing problem, one which is gradually gaining acceptance by both practitioners and government agencies concerned with low income housing.

> "As many observers now agree, the third world does not in fact have a housing problem at all, since the mass of the people have always housed themselves and are perfectly capable of still doing so, even in the changed environment of large cities. What does exist is a problem of urban land use and resource planning- in short a settlement problem." (4)

In this context, housing can be defined as "....a complex product, providing a combination of services: space, environmental services, (water supply, waste disposal, energy use), and locational services (access to jobs and social infrastructure such as education and health facilities).". (5)

Writing on the economic and political reasons for the unavailability of housing for the lowest income groups in India, Ramachandran describes current housing market mechanisms.

> "....the housing market is guided predominantly by economic consideration, e.g. SUPPLY SIDE: the sources and quantum of funds, rate of interest and rate of return, and DEMAND SIDE: the supply side considerations prompt investment in private sector to

cater for the needs of middle and higher income groups." (6)

Also, the same writer assesses the status of government and institutional attempts to provide low cost housing, and he claims "....the available data indicate that the services rendered by these institutions have only marginally met the needs of the target group." (7)

De Souza writes on the contribution the lowest income groups (the informal sector) make to the urban economy. He also comments that "....slums and squatter settlements are a permanent, not a transitory, feature of modern urban life in the less developed countries of Asia." (8) He also observes that urban poverty is not a "....problem of people but of structures maintained through a technocratic value system and ideological beliefs that keep large numbers of men and women poor and powerless." (9)

Even though the informal sector does contribute to the urban economy and provides cheap sources of labour for industry and services for the higher income groups, the attitude of government and planning agencies has been to regard this sector's habitation as "....an undesirable element and treat it as a nuisance which has to be controlled in the context of orderly urban growth. This is often reflected in the efforts of law enforcement authorities to prevent various types of informal activities, eject them from certain locations and generally to subject them to close supervision on the ground that many of the areas of informal activity provide fertile ground for illicit operations of various types.". (10)

The monthly income of the Economically Weaker Sector (E.W.S.)

in India as presently defined by the Housing and Urban Development Corporation (H.U.D.C.O.) and compared with higher income categories is shown on the table below.

| INCOME CATEGORY | MONTHLY INCOME (RS.) | MONTHLY INCOME ($-CAN.) |
|---|---|---|
| E.W.S. | up to 350 | up to 43.75 |
| Low Income Group | 351-600 | 43.75-75.00 |
| Middle Income Group | 601-1500 | 75.00-187.50 |
| High Income Group | 1501 + | 187.50 + |

As discussed above, the monthly income of the E.W.S. is so low that this sector cannot afford "conventional" low cost dwellings. As will be shown in this study, even low income shelter alternatives like site and services sometimes fail to reach this sector.

Jain and Bhargava describe the situation of the E.W.S. in India and this sector's inability to spend money on housing, and they also describe a sub-category of E.W.S. income.

> "Over 80% of the people in our cities belong to households with a monthly income less than Rs. 600, over 60% of the households are below Rs. 350 which puts them in economically backward groups. At least half of the latter group live in monthly household income below Rs. 200. It is estimated that in our country only 12% of the urban families have earnings enough to spend on a house. Again, in India we call it a reasonable rent if it is within 10% of one's earning. However, due to the high cost of construction, whether under private or public sector, the rent takes away substantially higher portion of one's wages. The result is that the poor have to make a choice between food and a roof." (11)

Bhargava also describes the inability of an economically weak household to repay a housing loan from an institution, in this case

the Maharashtra Cooperative Housing Finance Society. "Based on the monthly installments and the rate of service charge, it is worked out that an economically weak household (E.W.S. category) who would occupy 20 square meters of built-up area will have to pay at least Rs. 900 as an initial payment and if the loan is obtained from M.C.H.F.S. then the amount to be paid is Rs. 1980 and monthly installment is Rs. 51 which is as against the paying capacity of between Rs. 20 to 40 per month for this group." (12)

Lakshmanan claims that "....poor housing is a reflection of the per capita income of the populace....", and he is critical of government policy for the E.W.S..

> A major offender in this regard is the widely prevalent policy in many developing countries of not tailoring housing programs to the country's income level or the household's ability to pay. Instead, the approach has been to divert scarce resources into the provision of a few dwellings with inappropriately high standards (of space, materials, and service levels) and, in the face of rapid urbanization, to issue calls for a shift of real resources from other economic sectors into housing. This approach has been inefficient because it has tended to inhibit the large scale production of dwellings with lower standards and sometimes even to reduce the stock of existing housing by clearing squatter settlements. It has also been inequitable because it has provided superior housing services for the few and inferior services for a larger segment of the urbanites." (13)

Payne has written that "....public authorities should desist from providing any form of house units for the lowest income groups. Instead, every facility should be available to assist small builders to design and construct decent and imaginative units, of whatever cost standard or layout is required by the residents." (14)

Payne advocates urban shelter alternatives which allow for

gradual improvement, and also the provision of loans to small builders and further research on appropriate technology and low cost materials. He observes that it is "....relevant to look to the environmental solutions adopted by squatters as providing a more realistic basis for new housing settlements." (15) Payne calls particular attention to the importance of accessibility to places of work in the location of such housing settlements. Also, when considering urban shelter alternatives, it is well to consider Payne's observation that "Whilst the very nature of housing problems can offer an optional basis for future policies in the varying contexts of Third World cities, a certain direction does appear to be indicated by the evidence. Even then, of course, it is difficult to conceive of a 'solution' or 'solutions', since housing is an expression of dynamic processes and it is inevitable that the problem to be tackled will change continuously, especially as a result of rising expectations." (16)

In the material which follows, the lack of concern of government and planners for the E.W.S. and their shelter problems is discussed. However, unless public concern heightens, it seems likely that no effective housing approach for this sector is possible. Jagmohan aptly summarizes the situation as follows:

> "....the seeds of the problem lie buried in the womb of an indifferent and superficial society- a society which has substituted empty rhetoric for significant content and from which real humanism is absent. Those who are in a better position are not alive to their responsibilities towards the weaker sections. They would like to have their clothes washed by the dhobis, get their shoes polished and repaired by the cobblers, and have their houses cleaned by the sweepers, but they would not like to contribute anything in the shape of land or

structures for these essential service personnel. A few words of sympathy is all they offer. On the other hand, even the servants' quarters and garages are rented out for commercial purposes, thus forcing the dhobis, the cobblers, the gardeners, the sweepers and the like to squat upon public lands and set up shanty colonies." (17)

B. Housing Statistics.'

Although housing statistics are often used to indicate the scope of the housing problem, there are dangers in relying on these statistics without understanding the context in which they are developed. As Payne points out, "....they represent arbitrary definitions as to what does and does not constitute a house." (18)

Lakshmanan writes that self-help construction or makeshift dwellings in the squatter settlements are rarely taken into account in statistical data on housing. (19) Payne states that rather than providing a true picture of the housing situation, "....deficit estimates reflect more accurately the way in which adequate or minimum housing is defined than they do the nature of housing shelter as it actually exists.". (20) Payne elaborates on other flaws of deficit statistics as follows:

> "Deficit estimates as indicators of such problems have the further limitation of being static estimates and as such are unable to assess the rate at which new housing is entering the market, how much is being improved to a state at which it is considered (officially) to qualify as acceptable, or conversely, at what rate existing sound housing is deteriorating into a state which is considered unsuitable for habitation. In short, they are unable to express, let alone explain, the dynamic nature of shelter provision within a situation of socio-economic change and rapid urban growth.". (21)

In addition to the possibility of misrepresenting the housing situation, Jain and Bhargava write of the basic unreliability of housing statistics (22), and they view statistical data as tending to "....make housing for the urban poor a question of the raising of resources rather than a problem of structural change. Neither state nor the central government can raise the necessary finance to

provide housing that conforms to the conventional building code for all the urban poor." (23)

C. Housing Standards.

Writing on the subject of housing standards for the E.W.S., Varghese perpetuates the attitude of government agencies and planners who insist on minimum housing standards. He presents the history of development of minimum standards in India, beginning with the Textile Labour Inquiry Committee of 1931 which recommended a minimum area of 3.71 sq. meters per person (24), and he presents the recommendations of the Health and Survey Committee of 1948 which called for the following standards for workers:

> a. Single man: room 10 x 12 feet (3.0 x 3.6 meters) and a verandah of 8 x 10 feet (2.4 x 3.0 meters). For a group of such quarters community kitchens, latrines, and bathing places should be provided.
>
> b. Family: two rooms, 10 x 12 feet (3.0 x 3.6 meters), with verandah, kitchen, bath room and latrine. For a family including grown up children, the accommodation should be increased by at least one extra room of similar size. (25)

Varghese claims that Indian town planners insist on minimum housing standards "....established by various committees and technical missions...recommending the two roomed houses with adequate sanitary facilities as the barest minimum if the normal aspiration of healthy living is to be achieved." (26) He believes that standards cannot be lowered even with the knowledge that government cannot meet these standards in the provision of housing, claiming that "....sub-standard housing will lead towards the creation of future slums." (27) Varghese also presents Mahatma Ghandi's opinion on building standards and codes, who he claims believed that the "....economy of housing must not be achieved at the cost of quality. In his view, planned slums, slum improvement

schemes, slum services schemes are all terms for disguised substandard housing. He concludes that the solution of the housing problem lies in building more and more houses.". (28)

Varghese concludes that 40 to 50 square feet (3.7 to 4.6 square meters) per person is a reasonable standard for housing in India. "A housing unit must have two rooms of 100 square feet (9.29 square meters) each to accommodate 4 to five members and, a bathroom plus W.C. and a Kitchen. These basic standards should be adhered to at all costs." (29)

Similarly, Rao maintains the opinion that substandard housing is not acceptable, stating that "Since the growth rate of households, or the demand for housing, outstrips the number of completions, people will be forced to inhabit houses otherwise fit only for demolition.". (30)

Lakshmanan presents a more realistic approach to housing standards when considering available national resources, and he describes how developing countries have been influenced by the developed countries.

> "As incomes increased over time in the developed economies, this latter component of housing need has led to the acceptance of socially desirable minimum housing standards.
>
> In response to their social welfare ideologies, many developing countries have adopted some version of these minimum standards, which are not being sustained by the current low incomes of their people. This approach has led to gloomy assessments of current housing and high estimates of future needs to serve as fairly staggering targets for housing progress in these countries. A more realistic approach would be to identify and use standards that are more consistent with the country's income." (31)

Taneja supports this view, stating that "....at present, no

serious attempt has been made to fit the envelope of the house with the size, structure, and socio-economic needs of the family.". (32)

In Lakshmanan's view, reduction of dwelling standards results in reduced construction and materials costs, and savings could be realized through the acceptance of modest space standards, including reduced land area. (33) He states that "What we are suggesting here is that a formal recognition of lower standards can greatly help in incorporating safety and health considerations into these market-induced standards.". (34)

Jagmohan has gone so far as to suggest that standards can be used to regulate construction funds, land area, and materials costs to the advantage of the economically weaker sector, and he also would like housing standards to make provision for E.W.S. housing areas.

> We must ban by legislation any further construction of houses costing, say, a lakh of rupees or more, and concentrate on building simple and inexpensive units of shelter. A ceiling of say, 300 square yards (258.7 square meters), should be fixed on the size of plots, and it should be stipulated that no new residential colony would be sanctioned, unless five to ten percent of land is allocated, free of cost, for 'service personnel', i.e., the class to which most squatters belong." (35)

Writing on the government's failure to provide for the economically weaker sector, Mehta writes that "....the government on its part has never given any incentive to encourage the private building industry to go in for the construction of smaller tenements. A compact 22-24 square meter kitchen, with 2-3 square meter verandah and a 4-5 square meter toilet space would be within the easy reach of our masses.". (36)

De Souza, writing on the negative effect of housing standards on such approaches as self-help housing, writes that "....the tendency of slum clearance boards and other building agencies has been to construct houses at a cost of Rs. 8000-15,000 and to charge rents that are beyond the capacity of the urban poor- for whom this housing is meant- to pay. Thus, we have what Turner has called 'mis-matches between personal priorities' of the poor and 'housing conditions' imposed by urban planners and government legislation.". (37)

D. Rural-Urban Migration

The problem of rural-urban migration of population in India has not been solved, and as long as the present rate of migration continues, there will be informal settlements in India's urban areas. One of the reasons for rural-urban migration is the desperate living conditions found in many rural areas. "In the villages standards generally are low. Water sources are often contaminated, sanitation is non-existent, communications are poor, organized planning is almost unknown, and the ravages of insects and rats are a constant threat to health." (38)

De Souza views the primary reason for rural-urban migration as economic, stating "....the rural poor migrate to the cities in search of employment rather than better employment opportunities.". (39) Varghese describes the push factor of rural India as causing rural-urban migration, both for economic and educational progress. (40) Much has been written about the difficult conditions in which these migrants live in India's urban areas, however, De Souza found that despite these conditions, most migrants believed "....their standard of living had improved when compared to their situation in the rural areas.". (41)

De Souza also found that for those migrants who became successfully established in urban areas, they tended to shift from wage employment to self-employment, thus continuing their caste-specific occupations. (42) De Souza writes extensively on the subject of rural-urban migration, and he quotes Majumdar's observations that rural migrants form the same settlement organization they had in the villages, (43) and that "....the

spontaneous settlements of the urban poor are not merely aggregations of shacks and huts but communities of fellow migrants. Each is based on a network of primary affinities of language, region, village, caste, or kin. It enables the rural migrants coming from small village communities to become socialised and acculturated in the complex and diversified environment of a metropolitan city.". (44)

Regarding planning policies of population control which could alleviate rural-urban migration, Payne writes "If it is really considered necessary to disperse population, it must be acknowledged that an equal dispersal of economic activity would also be required and this may well necessitate a re-appraisal of the relationship between public and private sectors. Failing that, it is obviously unreasonable to expect the rural and urban poor to remain in areas of low productivity and low per capita incomes.". (45)

De Souza writes of the possibility of establishing rural development incentives as a way of preventing migration to urban areas. (46) However, he cautions that industrial dispersion is difficult because of the non-availability of skilled labour in rural areas. (47)

Gandi's solution for India's urban problems was to develop the villages. As Chatterjee writes of his views, village organization should be so transformed "....that people would no longer want to flock to the towns. Only then would the village cease to be a mere appendage to the city.". (48)

Bhargava subscribes to the view that the "....creation of focal centres of attraction in the form of towns or villages....would

serve to counteract the push from the countryside into existing urban centres.", (49) and that this should be made part of national development policies. However, Jagmohan advocates a system of population migration control similar to the one presently in use in mainland China.

> "It is therefore necessary to regulate the flow of population to the metropolitan cities by law. Under this law, a system of registration for different categories of people visiting the cities could be devised. At the same time through a judicious policy of regional planning, a sizable number of rural migrants could be deflected to satellite towns or other urban centres in the region." (50)

However, for anyone familiar with the problems of government in India and also the contemporary cultural context, the suggestion to regulate population migration by law must seem absurd. Considering national housing policy, Yeh advocates the improvement of basic rural living conditions, rather than than attempting to eliminate the housing deficit. He writes that this "....would help reduce urban migration and would be within the financial reach of government and local residents.". (51)

E. Planning and Housing Policy

As discussed in the section above on rural-urban migration, there is a need for planning policy which considers a regional perspective. In addition, it is necessary to understand the cultural origins of planning policy, and to find effective and equitable methods for decision making in planning practise.

Payne writes of contemporary planning policy in India which more often "....reflects inequality rather than compensates for it.", (52) and he makes the point that planning policy has often made the situation of the poor worse, especially considering the resources which have gone into expensive public housing. Payne presents the bias of planning policy in India as follows:

> "Plans and programmes reflect the values and aspirations of the middle and upper class elites regarding problems of environmental quality, pollution, and the fear of social disorganization, which are naturally of less concern to the urban poor. The fact that many planners and architects are trained in the universities of Europe and North America, or are susceptible to their influence, has not helped to change this situation.". (53)

The point has often been made that Indian planning practise has been too influenced by western cultural concepts and standards. De Souza sees this as a result of using planning concepts inherited from the colonial period, and he characterizes colonial planning policy as being based on racial and economic segregation (as evidenced in the spatial layout of residential areas). (54)

Payne sees western concepts of planning such as zoning, density standards, and transportation proposals being implemented which do not respond to the Indian context. He is especially critical of the adoption of the grid, which he claims is not suitable for efficient

public transportation in India's cities, and he suggests that more appropriate urban form can be found in an area like old Delhi, which had "....a dense and compact city centre with very little suburban development, permitting short journeys to work and mixture of land uses and social groups.". (55)

The tendency of planners to put forward master plans must also be questioned, as according to Payne, they are not effective in regulating urban growth. He believes master plans allow planners to avoid reassessments of the changing urban condition, and he advocates more flexible and pragmatic methods of planning. (56)

This is not to suggest that government and planning institutions should not have long term goals. Jain presents the history of recent national housing plans in India, and in the Sixth Five Year Plan there are policy changes specifically involving the Economically Weaker Sector and self-help approaches to housing.

> "In the Sixth Five Year Plan (1978-83), the housing programmes are visualized with the following objectives:
>
> 1. Promotion and encouragement of self-help housing.
>
> 2. Formulation of public sector social housing schemes in such a manner as to cater to and also be within the paying capacity of economically weaker sections of the community.
>
> 3. Augmentation of resources of institutional agencies like Housing and Urban Development Corporation (H.U.D.C.O.) and State Housing Boards to enable them to provide infrastructural facilities as a means of giving impetus for housing by private agencies.
>
> 4. Promotion of research in building technology by development of cheap and local building material."
>
> (57)

Hall describes the tendency of local level planners to indulge in purely spatial planning as "....at best, palliatives; short term means to be justified by long term ends of coherent urban, regional or national policies of structural change which can encompass and put into perspective the root cause of spatially expressed problems and suggest possible solutions.". (58)

Similarly, Payne indicates that excessive concern with physical planning aspects "....rather than their socio-economic context has led to widespread attempts to impose inappropriate forms of balanced and ordered growth.". (59)

Much has been written about the concept of participation in planning process, and there have been recent projects in India (for example, the flood victims relocated by A.S.A.G. in Ahmedabad) which have put theory into practice. Various suggestions have been put forward which seek to define the degree of responsibility which should be vested in planning and housing agencies in housing project administration. Payne suggests that the planners' and agencies' responsibilities should stop at the community or settlement planning level, however, it is not clear to what degree the authorities would be involved in such decisions as infrastructure locations, etc.. (60) He presents the optimistic view that:

> "....resolving detailed problems of plot layout and house construction would all appear to be within the competence of such a community organisation (residents' organization). Thus, not only would authorities be relieved of many detailed problems, leaving them free to concentrate of those aspects which are within their wider terms of reference, but the increased responsibility of community leaders should assist in creating wider public support. Within this framework, applications for plots in the new settlements could then be invited from residents

> for their relations and friends living in existing settlements. This would also serve to discourage the formation of new areas of unauthorized housing and stabilise the situation until new programmes can get underway. Recruitment methods, therefore, offer an opportunity to maintain and increase the degree of self-sufficiency developed by the poor regarding their shelter needs as well as their rate of integration with the wider urban community. At the same time, the administrative problems of local government in implementing programmes can be reduced." (61)

Hall describes the situation Indian authorities sometimes find in the administration of housing projects, where shortage of finance and personnel means certain responsibilities must be delegated to the voluntary housing associations. (62) However, as will be shown in the site and services project case study in Part Three, this is not always a helpful practice. Hall is very critical of vague notions of community participation in decision making, and he states that "As both a nebulous and overused term, 'participation' can rank alongside 'neighborhood' and 'community' as terms to avoid were it not for the lack of suitable alternatives.". (63)

Hall makes the point that there are many different ways in which participation can occur, that it is necessary to be specific on the type and amount of participation, and that "....total or near total participation by itself....could result in greater inequalities, producing....virtual anarchy. The economically and physically strong and active tend to participate most effectively, leaving the weak and poor inarticulate and resourceless.". (64)

De Souza views citizen participation in planning as a logical process considering spontaneous settlement organisation in urban areas, and he quotes Majumdar who developed typologies of resident's

associations in these settlements. Majumdar "....distinguishes five types of associations based on caste, kinship, regional or religious identities as well as common interests. In his view these associations 'provide an institutional framework for the articulation of demands and rights of the inhabitants and thus link the basti community to the rest of urban society and through it to national institutions.' ". (65)

However, Hall cautions that participation may not represent the economically impoverished sectors of the community, claiming that attitude groups are generally composed of the higher income, and more articulate groups.

> "It may be the case, however, that these articulate status groups do not represent the majority view of an area when that area also includes elements of low status housing or squatter's huts. It is the residents of the latter type of area, the groups found at the lower end of the socio-economic spectrum who most need a voice to be raised in their favour, but who, ironically and almost implicitly often lack the necessary economic power, degree of articulateness and political acumen for such undertakings." (66)

A prerequisite of effective and well considered planning is to obtain accurate and detailed background information on local conditions. Payne describes one of the earliest examples of painstaking information gathering in India, conducted by Patrick Geddes in his work between 1915 and 1919 on informal settlement upgrading in Calcutta. Payne writes that "....Geddes was a strong advocate of undertaking detailed social and environmental surveys before preparing plans for an area and he believed in learning from the achievements of local people rather than imposing arbitrary solutions.". (67)

The importance of doing proper social surveys on which to base planning decisions in the Indian context is made obvious by complex family structure. In his study on Indian villages, Unni presents various factors which can determine family structure and the extent of the joint family, such as "....property ownership, depth of generation, number of married couples, Kin composition, common residence and common worship of family deities. There are, however, other facts which manifestly mean certain degrees of jointness of different types which have a bearing on the problem of housing." (68)

As discussed in the section on the Economically Weaker Sector, sub-groups of E.W.S. income exist. The importance of obtaining detailed information on the economic conditions of this sector is obvious, and awareness of these conditions allow an understanding of the nature and magnitude of the problem. For example, in addition to the existence of sub-E.W.S. income levels, Singh and De Souza found that the average monthly income of employed women was only Rs. 76 compared with Rs. 192 for men (monthly income). (69)

There have been many social and economic surveys of spontaneous settlements in India, and these have provided much valuable information. However, there is a need for surveys of some of the more recent developments, such as site and services and slum improvement. Unfortunately, the government and housing agencies who implement these projects rarely do follow-up studies evaluating project performance.

Payne observes that even if detailed information on housing needs and local conditions was available for the use of planning

agencies, most likely this information could not be used with their present organisation, which is to implement only large projects with planning decisions made by higher level administrators.

> "The more traditional systems controlled from the bottom up, employed by the mass of the people in the world's exploding cities, are based on lateral information and decision networks that are totally different from the vertical and hierarchic organizations of large scale works and services. When these centralized systems are used to house the poor, their scale and the limitations of management rule out the essential variety and flexibility of housing options." (70)

Writing about the responsibilities of agencies in the housing delivery process, Payne indicates that the only proper role for these agencies is in "....providing those elements which people cannot provide for themselves.". (71)

Other problems with government agency involvement with housing in India are: conflicting mandates of agencies, the large number of agencies, the separation of policy and implementation agencies, departmental isolation, and rigid professional hierarchies within the agencies. (72) Varghese describes housing projects which "....suffer from several administrative defects. They are administered and executed by a plethora of agencies resulting in duplication, uncoordinated efforts and dissipation of resources.". (73)

Major Urban Housing Agencies in India:

| | |
|---|---|
| National Level: | Ministry of Works and Housing |
| | H.U.D.C.O. |
| | State Department of Housing and Urban Development |
| State Level: | Housing Boards |
| | Housing Repairs Boards |
| | Slum Improvement Boards |

Industrial Development Corporations
Industrial Finance Corporations

Local Level: Municipal Bodies
Private Sector
Other Local Institutes (74)

A factor which undermines housing agency administration is local politics. Payne observed that exceptions to master plans were granted to jurisdictions under the control of the ruling political party (75), and Hall observed that long-term holistic attempts to solve urban problems can be resisted by local government representatives who fear the erosion of their power base (76). Hall also indicates that valid public welfare schemes often fail as the local political influences are not taken into account in project implementation (77). On the other hand, Payne questions the ultimate contribution of political intervention for resource distribution to the urban poor, characterizing such attempts as palliative measures only (78).

In considering contemporary planning policy, it is helpful to review recent experience with user-control approaches to community development and housing.

An early advocate of user control for the informal housing sector, Turner has written of participation processes in housing, and he presents a comparison of housing delivery systems which he terms OPEN (local, individual control), and CLOSED (centralized, agency control). He presents scenarios which describe how decisions are made on projects, such as "sponsors decide and users provide" (typical of self-help projects), "users decide and users provide"

(as evidenced in dwelling rehabilitation), and "users decide and sponsors provide" (private developers and higher income groups involved with new housing). Turner is careful, however, to distinguish between user-control and the concept of self-help in construction, meaning user control can still occur in a situation where the residents have not done the actual construction. (79)

Payne, however, cautions that Turner's experiences with user control as documented in his writings on the squatter settlement of Pampa de Cuevas Barriada on the outskirts of Lima, Peru, involved "....a specific section of low-income groups who were able to offset the additional transportation costs against the obvious advantage of a well-built house and the security and investment potential it affords. For them, squatting provided an opportunity to circumvent a housing market that inadequately met their needs.". (80)

Payne's study of low income settlements in Delhi reveals that "....even when the poor were excluded from official housing programmes, they evolved a positive, imaginative, and coherent form of urban settlement, which was only constrained from further improvement by the lack of communal services and facilities.". (81)

The appropriateness of user-control concepts and self-help construction has been questioned in cultures where people have lost their building traditions. But, as was discussed in the section above on rural-urban migrants, in India people bring their village traditions to the urban areas and, given partial security of land tenure and a few building materials, they are usually able to provide their own rudimentary shelter.

Related to user control and citizen participation in housing is

the practice of community development. Hall presents an extensive analysis of contemporary community development in India in relation to the concepts of territoriality and neighborhood. He distinguishes between neighborhood, which may be perceived as a specific cluster of dwellings, and territory, which is a dynamic quantity that changes according to circumstances.

> "....territoriality will be expressed in terms of the home if threatened by demolition; in terms of a district if buttressed by caste homogeneity; and in terms of a region in respect of an area inhabited by people sharing the same language or dialect." (82)

According to Hall, neighborhood and territory "....need not necessarily be co-extensive and, indeed, the spatial expression of social networks can produce a series of non-contiguous spatial 'islands'.". (83)

The importance of this distinction is that planners have had a tendency to mould planning concepts to pre-conceived and perhaps invalid spatial constraints, either to further their own ends or for the sake of expediency. Hall writes that such an approach was used by the American planner Clarence Perry, who "....saw the desirability of setting primary social contacts within a prescribed spatial context." (84), and which ultimately ignored human factors and equated residential status with the physical aspects of the dwelling. In contrast, Hall describes Indian slums where "....the roles of such factors as length of residence; upkeep of dwelling; the way children are disciplined; the number of children a family has; male occupation and income, may all, superficially at least, bear some relationship to status symbolism in the west (if at times inversely).". (85)

Defining neighborhood in India is equally difficult as Hall writes "Such a referential definition was seen to be dependent upon the contextual circumstances and the breadth of the resident's social contacts.". (86)

Hall is especially critical of the misuse of the term "community", which he asserts has no common meaning among writers and practitioners. The point is that in the Indian context, the term may present the planner's preferred vision of community when in fact "The Indian context calls for the recognition of an often marked absence of urban traditions and urban ways of life among city dwellers. Rural immigrants' attitudes, values, and behaviour patterns may significantly differ from the 'norm' of conventional wisdom.". (87)

F. Urban Land Issues and Housing Subsidy.

In India, perhaps the main obstacle to the successful implementation of projects for the urban Economically Weaker Sector is the provision of land, either in the form of granting tenure to existing illegal squatter settlements or in finding new sites for settlements in the urban area. Laquian writes that "...there is still a shortage of ways and means to make serviced land available to the urban poor. Governmental intervention, ranging from taxes on idle land to use of eminent domain to justify expropriation, has been slow, dragged down by complex legal maneuvers and conflicts. Ideological and moral considerations still heavily influence the process of policy making related to providing access to land and urban services.". (88)

On the subject of land control, Payne has suggested that removing the land market mechanism may be the only realistic way to make urban land available to the poor. He writes that in urban areas, "....the greatest numbers of people are living at the lowest income levels and in areas with some of the highest land values, so that only by comprehensive changes of priority will it be possible to effect the scale and extent of changes required. ....The scale of change can, however, only occur at the structural level and not at the local or individual level, since it is the structures themselves which are the impediments to progress.". (89)

De Souza indicates that at present in India, urban land prices are artificially controlled by speculators, and "....as a result the urban poor have to travel considerable distances to the place of work.". (90)

Bhatt describes the urban land problem in Ahmedabad, and he accounts for variations in land values with the following factors:

1. The nearness to the centre of the city.

2. The development of roads and transport facilities.

3. The availability of the public services such as electricity, drainage, and educational and medical facilities. In the case of Ahmedabad, one may find that the sewage system and the growing menace of mosquitoes, and smoke had also some influence on the land value in certain localities."

(81)

Bhatt further describes the urban growth process of Ahmedabad, which has been to expand and gradually incorporate existing small villages. He sees an opportunity, because of high land prices, for the demolition of existing old residential areas in the centre of the city, to be replaced by new, multi-storey buildings. This is happening to some extent in Ahmedabad, and many of the existing central high-density residential areas are deteriorating.

Unfortunately, suggestions are still put forward to solve urban land problems using questionable and ill-informed western practice.

> "The regularization of ill-planned hutment colonies being undertaken in our urban areas on a vast scale also requires second thoughts. The huge sum of money being spent to provide improved services to these colonies may go to waste, because there is practically no coordinated planning for drainage, roads, etc., required to make them viable permanently. These hutments are absolute haphazard horizontal growth. Would it not be worthwhile to accommodate these dwellers in well planned 4-5 storeyed buildings and utilise the remaining land for housing more people on the same land? Land in a city always has an inherent value, whether nationalized or not." (92)

Rao advocates a well defined national land use policy, and he

indicates that "Sporadic laws on land use enacted by various local development authorities have hardly met the needs of the situation.". (93) However, previous government attempts to regulate urban land in India have not been successful. One has only to look at the chaotic Urban Land Ceiling Act of 1976 to predict what future success the government may have in this area. Hajra lists the objectives of the act as follows:

> "The objectives aimed at by this enactment include (a) prevention of concentration of urban land in the hands of a few persons and consequent speculation and profiteering, (b) bringing about socialization of urban land to subserve the common good by ensuring its equitable distribution, (c) discouraging luxury housing leading to conspicuous consumption of scarce building materials and ensuring their equitable distribution, and (d) securing orderly urbanisation. State governments are the competent authorities to implement the Act and Rules and guidelines clarifying various points, issued under its provisions by the Union government." (94)

As Hajra has written, the ultimate effect of this act was to bring construction activity to a standstill, creating uncertainty among developers because of "A number of checks under the Act on sale, mortgage, lease and transfer of land, sanctioning of building plans, and ambiguity of certain provisions." (95) This tended to aggravate the housing shortage in the formal housing sector and also to create unemployment in construction labour and the construction materials industry. Mehta observed that the act permitted "....bureaucratic bungling and red-tapism where corruption is bound to reach fantastic proportions in the course of time.". (96) Mehta recommends instead that an annual tax be imposed "....on excess vacant urban land instead of a ceiling limit.". (97)

An earlier proposal, the Land Aquisition and Development Scheme

(1959) which established urban land bank practices for state government provision of housing for low income groups also met with failure. Varghese writes that "....up to 1969, about 8700 houses only could be constructed under this scheme." (98), and he points to abuse of the system as follows:

> "Experience in many centres shows that those who have foreign income and black money, take part actively in auctions and are benefited while really needy people for whom this scheme has been formulated are relegated to the background." (99)

Two approaches to urban shelter, site and services and slum improvement, involve not only government intervention in land tenure rights and land aquisition but also some degree of financial subsidy. Varghese categorizes housing in India's urban areas according to financial subsidy as follows:

> "Housing schemes for urban centres are of two types: (a) Subsidized Schemes and (b) Non-subsidized Schemes. Industrial Housing Scheme and Slum Clearance Scheme are Subsidized Housing Schemes, while Low Income Group Housing Schemes, Middle Income Group Housing Schemes, Rental Housing Scheme for State Government Employees, and Land Aquisition and Development Schemes fall under Non-subsidized type of Scheme. Two more schemes which are recently introduced to meet urban housing needs are Central Scheme for Environmental Improvement in Slum Area and Hire-Purchase Scheme." (100)

Jain and Bhargava are critical of government performance in providing housing subsidy:

> "The housing policy of the government of India until now has been based on the concept that only marginal assistance could be given by the government in the social housing sector and that the private sector had to play a greater role in accelerating house construction. The bulk of housing investment has always been expected to come from the private sector. For instance in the Fifth Five Year Plan, government investment in housing was stipulated at Rs. 5801.6 million in addition to Rs. 4500 million

> for staff accommodation while the investment for the private sector was likely to be Rs. 36,000 million." (101)

Bhattacharya recommends a scheme of cross subsidy which would see higher income groups and commercial land users subsidizing the development of E.W.S. and L.I.G. category housing. (102) This principle will be used in a new site and services project presently being planned for Indore, India (Vastu-Shilpa Foundation, Planners), and would seem to offer some hope for similar projects where various income levels are represented. (103)

G. Housing Location and Housing Density

The most important factor of housing location for the Economically Weaker Sector is proximity to the place of employment. This sector cannot afford to pay the cost of public transportation to housing sites located on the periphery of the city, and even where public transportation subsidies are contemplated, it is likely that the subsidy will not reach the intended income sector either because of bureaucratic inefficiency or abuse of the system. As Payne indicates, "....it is difficult to see how (transportation subsidy) could compensate for a suitably located site.". (184) He suggests that it may be possible to disperse employment, however, this seems unlikely in the Indian urban context where much of the employment of the E.W.S. is through servicing of existing higher income residential areas, or in small business activity such as hawking goods in high density areas.

Resettlement programs, such as those associated with slum clearance, tend to make life harder for the E.W.S., not only because of the difficulty of access to employment but because of the loss of investment in existing housing and the disruption of community social structure. As Hall writes:

> "Increasingly, relocation programmes are being looked on unfavourably. ....slum settlements are being regarded as inescapable, relatively permanent, and present the only pragmatic approach to housing the urban poor in such societies as India. Many would now stress their important function for ultimate integration into city life. Yet until very recently, the hidden costs of slum clearance and redevelopment were overlooked: the destruction of investment residents had made in their slums, the greatly increased transportation costs and the loss of employment opportunities all disappeared under a tide of conventional wisdom." (185)

Another problem of resettlement schemes is the provision of infrastructure. De Souza writes of the higher cost the city has to bear for extending basic services like water and sewer to the urban periphery. (106) Jagmohan writes of the need to consider services in resettlement schemes, and he also cautions about the effect these schemes have on rural-urban migration:

> There is the problem of fresh squatters and the misuse of allotted sites; there is the problem of distance between the place of work and the place of resettlement; and there is the problem of inadequate services. Delhi's experience shows that it is not possible to solve the problem in isolation. The wider the gap between the facilities available in the hinterland and in the city proper, the stronger and more massive becomes the flood of migration. When the scheme was started, there were about 45,000 squatter families. Now there are 200,000. Our dilemma throughout has been: if no facility is provided at the resettlement site, it raises human problems; and if facilities are provided, it attracts more squatters. Such, unfortunately, is the vicious circle of poverty and under-development." (107)

Another factor to consider in urban shelter proposals is density. More recent planning practice in India has seen the adoption of lower densities in housing, again closer to western planning practice. There are indications, however, that planners in India are beginning to consider the merits of traditional, higher density housing and also housing layouts which respond more to the local context (climate and culture). Payne presents the following summary of the positive features of traditional settlements which planners should incorporate in their projects:

> 1. High density: To ensure that no land is wasted and that extensive and costly transportation systems are minimized. This also increases the accessibility to resources and services for all residents and reduces the infrastructure necessary to

provide them.

2. Mixed land use: This permits the interaction of activities required and also reduces transportation requirements. The symbiotic use of space....can be encouraged and secondary economic activities developed.

3. Variety of plot size: This permits the integration of socio-economic groups and enables buildings to meet diverse needs.

4. Local control over housing provision: As seen in terms of location, type, and cost. (108)

In his study of the Rouse Avenue settlement in Delhi, Payne found that it was possible to "....achieve a stable domestic life at densities of over 1000 per acre (2470/ha.). What is more remarkable is that in most of these examples, the control which individuals or groups could have exercised over the location, type and cost of dwellings was often significantly greater than is possible in most commercial settlements built to higher standards and lower densities.". (109)

Writing on the subject of density standards for village improvement schemes, Mouli indicates that the concepts of "high density" and "low density" are only relative terms. Rather, "....the context in which density can be said to be high or low is all important. ....Density figures, rather being seen as a determinant in policy, should perhaps more usefully be seen as a result of wise and appropriate policy. The actual density figures themselves vary in accordance with needs, circumstances, and 'what is possible'.". (110)

H. Slums, Slum Clearance, and Slum Improvement.

In order to understand the problems of the Economically Weaker Sector, a knowledge of the causes of slums and their characteristics is essential.

Taneja lists the major causes of slums as rural-urban migration (primarily after 1930), rapid industrialization, shortage of housing, and sub-standard housing. (111) De Souza views the cause of slums to be "....neither industrialization nor the size of the city but urban poverty and the socio-cultural marginalization of the urban poor.". (112)

Accounting for the increase in slum areas and the lack of success with slum relocation schemes, Hall quotes Singh and De Souza's opinion that need for access to employment is the cause, and that four major categories of slums can be distinguished on this basis: "....industrial slums, which house the lower level industrial workers; residential slums, containing housing domestics and service workers; construction slums, the usually temporary housing for construction workers; and refugee slums, particularly numerous in Delhi and Calcutta following independence and partition.". (113)

In addition to the above causes of slums, Hall presents the following causes: "....high living costs, low living standards and expectations, inefficiency and corruption in the planning system, and urban land use problems.". (114) Hall presents the following list of potential slum situations as devised by Khatu:

> "....Khatu (1978) has recognised some thirteen potential situations whereby slum development can take place:
>
> 1. In configured areas of the city, such as in or

near quarries and ravines.

2. Such linear spaces as railway lines and yards, open spaces along roads, along old city walls, parapet walls, and footpaths.

3. Around construction sites.

4. Adjacent to industrial estates and complexes.

5. In and around neglected/disputed properties or where the owner of a property is absent.

6. Open, vacant land owned by public bodies or government agencies.

7. Agricultural plots within the city limits, especially around village sites.

8. Around places of charities, where plots are owned by trustees.

9. On the immediate outskirts of the city.

10. Abandoned buildings used once for non-residential purposes.

11. Old buildings with multiple ownership.

12. Old villages encompassed by extended city-boundaries.

13. Terraces of multi-storeyed buildings in high density or central business areas. (115)

INDIAN SLUM NAMES:

1. KATRAS: small, single room tenements, generally rows within large courtyards or enclosures with a single entrance; often Muslim in origin.

2. CHAWLS: multi-storeyed single-room cubicle tenements particularly associated with Bombay.

3. BUSTEES: (also Bastis): a name often liberally given to any Indian spontaneous settlement (especially by non-Indians), while deriving from a specific land use relationship in Calcutta whereby the land belongs to one person, and the huts to another while the actual slum dweller is only a

tenant paying a monthly rent without any claim to the land or the hut. Otherwise used to denote thick clusters of small mud huts with roofs and walls of scraps, wood, etc.

4. JOMPRIES: stone and wood huts, traditionally associated with Delhi.

5. JUGGIES: another term essentially used in Delhi for wood and straw huts.

6. AHATAS: huts built within compounds or walls, and particularly characteristic of Kanpur.

7. CHERIS: mud and thatch huts, closely resembling their rural counterparts, and typically southern Indian.

8. JHOPOOPATTI: term for hutments in Gujarati.

(116) (adapted from Hall)

Hall writes that no reliable figures exist on the number of people living in India's slums, but he gives Singh and De Souza's estimate of 1977 which suggests that "....more than 20% of India's total urban population live in slum conditions.". however, he points out that despite this percentage, only 6-10% of the urban land area is occupied by slums. (117) Bhargava states that if the United Nations definition of a slum was applied to India, "....we would have to classify three quarters of our metropolitan cities as slums.". (118)

The physical problems in India's slum areas have been well documented in many case studies, and perhaps the main problems are water supply and sanitation. Other problems include lack of security of tenure (with incidents of protection racketeering), lack of drainage facilities, flooding in monsoon, lack of electricity, lack of privacy (bathing), lack of medical care and poor sanitary

practices, and lack of amenities.

De Souza observes that "....there is a tendency of the upper income groups and urban planners to consider residents of slums and squatter settlements as 'cancerous growths' that are a hindrance to the development of a healthy environment in the city.". (119)

However, Bhargava does not subscribe to this view, and he recognizes some positive aspects of these settlements.

> "To say that life in slums is nothing but evil is not true. The slums sometimes exhibit a vigorous and vibrant culture of their own life pattern that bubbles with warmth and intimate contact. Love and scandals, factions and fights, festivals and functions are all there, touched with colour and imagination. Even in the worst slums of India....the human spirit abides." (120)

The terms slum clearance and slum improvement are sometimes used interchangeably now in India, owing to the delegation of slum improvement activity to the same agencies previously responsible for slum clearance (now a less common practice). The negative effects of slum clearance and forced relocation have already been described above. Slum improvement is now considered to be the most promising way of reaching the Economically Weaker Sector residing in informal settlements, and in recent years, several large Indian cities have initiated such programs. Hall describes the Federal Ministry of Works and Housing Scheme of Environmental Improvement of Slums of 1972, however, the impetus of the project declined when transferred to the state government level in 1974. (121) In this program, there was also a failure to take into consideration the opinions and concerns of the residents. The 1972 scheme was to apply to slum areas not designated for clearance before 10 years, and a 100% grant

for improvements would be provided by the government.

Yeh suggests that granting of land tenure to slum dwellers would make a considerable difference not only for improving the individual houses but for the general environment. However, he indicates that "....some payment for the land should be required in exchange for ownership rights so that excessive subsidies don't go to only a small number of people. Issuing land rights to squatters may still be a complex and explosive political and legal issue, requiring a strong commitment by the decision makers and careful planning by the practitioners.". (122)

Most slum improvement work completed thus far in India involves the provision of basic water and sanitary services. It should be realized, however, that installing services in existing settlements with intricate village-type layouts is difficult and costly, and that compensation or relocation for at least some residents is probably inevitable.

I. Site and Services.

The site and services approach to low income urban shelter has been in use since the early 1970's, and has been promoted largely by the efforts of the World Bank and the United Nations. Site and services projects in India provide plots of land for the use of the Economically Weaker Sector, with varying levels of services and amenities. The residents are usually offered a low interest, long term loan to purchase their plots, the cost of which is subsidized by an agency such as H.U.D.C.O.. The plots may or may not include construction of a plinth or facilities like a toilet and wash place. The residents are expected to build their own shelter in an incremental building process as their funds allow, the consequence of which should be to improve the family's equity as well. Government responsibilities for site and services projects are usually limited to general project layout, plot allocation, loan administration, services provision (standpipes for water supply, street lighting, sanitary services, and drainage), road paving, and maintenance of services.

Jain and Bhargava list the provisions made in the Sixth Plan of the federal government, in which the main emphasis was to provide for the Economically Weaker Sector largely through site and services projects. Under the provisions in the plan for site and services, the beneficiaries were to receive a "....loan not to exceed Rs. 3000, with a 20-25 year payback period at nominal interest rates.". (123) Concerning loans for such projects, Yeh indicates that the shortage of mortgage funds inhibits the development of low income housing, and that "....lending in small amounts to low income

borrowers, sometimes a component for self-help housing improvement, calls for special institutional approaches in housing policy.". (124)

Payne observes that while many governments have instituted site and services projects, in many cases they have not continued the practice. He writes that "....perhaps such solutions appeared as a compromise with the aspirations of the planners, though it would be hard to believe that they clashed with those of the poor. Any project experimenting with self-help does, of course, involve a great deal of administrative coordination and possibly requires a higher degree of supervision than conventional projects and this admittedly puts great stress upon governmental resources. It would seem to be unreasonable to discontinue them for this reason, however, and more worthwhile to recruit and train staff with the necessary competence; certainly manpower represents one of the Third World's greatest resources.". (125)

Payne describes site and services projects as rationalized versions of the processes at work in spontaneous settlements in the urban areas. He is critical, however, of the rigidity of site organisation found in many settlements, and he suggests that although infrastructure layout must be efficient, project planners could benefit from a consideration of traditional urban settlements in which a "....more symbiotic use of space has been shown to permit varied and informal use of space even at the highest densities.". (126) Payne cites the example of Old Delhi, as follows:

> "....house units were frequently grouped in clusters of between 10-25 units, each of which related to a communal space similar to those found in

> rural areas. Allowing for the range of household sizes observed, it would appear that such clusters approximately accommodate 100 people at densities of about 2400 per ha (1000 per acre). If this material is used as the basis of planning new settlements in the Delhi context, it should be possible to facilitate the formation of similar aggregation modes by organizing an appropriate distribution of services infrastructure. In transferring existing data into future projects it should, however, be noted that household sizes may well vary from their present levels and that they will require somewhat larger plots than at present. In the Rouse Avenue settlement there was a preponderance of large, extended families in linear clusters adjacent to paths and thoroughfares, whilst smaller households were grouped around courts or chowks. If the layout of infrastructure provided the possibility of clusters in which each household had direct access to both a thoroughfare and a courtyard, high densities could be achieved which could improve still further upon existing layouts. If similar principles of settlement planning, based upon an understanding of existing local priorities were followed in other areas where new low income settlements were required, the possibility of residents controlling the full extent of their housing needs would be greatly increased and the demands upon central authorities reduced to those areas which are appropriate.". (127)

Rybczynski, Bhatt, and Mellin propose an alternative to the grid plan for site and services, the grid being primarily an economic device but one which may contribute to environmental failure. A three step methodology for planning site and services projects is proposed as follows:

> STEP ONE: economic optimization of the project, establishing total site area and also area of open space, community facilities, circulation, building plots, and also fixing street widths.
>
> STEP TWO: identification and modification of patterns to suit the project's context (see A PATTERN LANGUAGE by C. Alexander.).

> STEP THREE: synthesis of patterns with standards developed in step one. (128)

Rybczynski, Bhatt, and Mellin present a site and services concept for Indore, India, in which the organizing components are the patterns "Identifiable Neighborhood" (about 150 meter diameter maximum containing about 800 persons), and "Household Mix" (a constraint which allows the combination of various income levels in the neighborhood and which relates well to the possibility of the higher income groups subsidizing land and services for the Economically Weaker Sector). (129)

Writing about installation of services for site and services projects, Payne suggests these should be installed initially to the maximum extent permitted by the project budget.

> "This has two advantages; if initial settlement densities are as high as the economic use of land suggests they should be, then high capacities will be needed immediately; if, however, densities eventually drop as other areas are settled, then the existing services will automatically result in an increased standard being available to residents remaining, without any cost increase being involved." (130)

However, considering the Indian context and the fact that in some site and services projects the projected population density has not materialized, it would seem that a phasing process for the provision of services can be justified. The method and sequence of plot allocation would also have an influence on the required phasing of services, as services for the entire site need not be installed if only a portion of the residents intend to begin construction immediately (this is the situation which the author found in the

Bhadreshwar site and services project described in Part Three).

Laquian describes site and services project planning process, and he writes that "....at present, planners and administrators charged with site and services projects rarely rely on community resources and skills in the early stages of construction in a project. They have found that standards of performance and time constraints make such inputs difficult.". (131) Laquian cautions that community participation and self-help in such things as the provision of water and sanitary services is difficult and that these systems "....require a certain scale for effectiveness and efficiency. Efforts to find alternative water and sewerage systems using low or intermediate technology have not yielded satisfactory results.". (132)

Some of the original enthusiasm for the site and services approach to low income urban shelter has now faded, and some of the reasons for this are presented below.

Laquian views project location as the biggest problem, considering that most of the early site and services projects were located on vacant land on the periphery of urban areas, and accommodated persons who were relocated from the inner city slum areas, "....resulting in economic, social, and personal dislocations.". (133) He ascribes this problem to a lack of metropolitan planning awareness, with too much attention given to the individual site and services project. Another problem cited by Laquian is that many of the site and services project sites were on land unsuitable for permanent dwellings, thus leading to high rates of project failure. Also, the failure to upgrade municipal

services, particularly transportation, and the failure of jobs to materialize in the viscinity of the project contributed to the lack of success. (134) Procuring suitable land for site and services projects in India is a major problem, and as was discussed in the section on urban land problems (above), this situation is unlikely to change in the near future.

Laquian is critical of the role of the self-help component in site and services, and he comments as follows:

> "....the unlocking of popular energies and resources among lower income people involved in site and services projects has not materialized to the extent that supporters of this approach have expected. Where such energies and resources have come out, it has not been easy to fit them into large scale, planned, and institutionalized activities required by work programs. Despite high costs, initial outlays in massive infrastructure have been found necessary to maintain performance standards, stick to predetermined time tables, and meet high expectations of authorities and the site and services clients themselves.". (135)

A further difficulty with site and services posed by Laquian is the question of the applicability of the concept for the Economically Weaker Sector. He suggests that based on the recent experience of many developing countries, the site and services concept may be inapplicable for those in the highest and lowest income categories. (136)

Laquian cites Peattie and Doebele's reservations about site and services, who felt that distinctions between the poor and the poorest income levels are encouraged by this approach, resulting in "....a spatial and social segregation among the working classes.". (137) As a result of site and services projects being located on the urban periphery, Payne indicates that only "....the upper-low or

middle income groups can afford to live there.". (138) De Souza observes that site and services projects located on the urban periphery make employment especially difficult for women, who need to be close to their place of work. (139)

Bhattacharya notes three main problems with site and services projects in India:

> 1. The non-availability of land at suitable site since the households in the lower income groups have distinct propensity to stay close to the existing settlement areas or job centres which offer them ready secondary jobs for members of the family and also reduce the transportation cost.
>
> 2. Non-availability of funds to provide even the modest facilities for the population since servicing of capital and maintenance costs very often pose serious recovery problems.
>
> 3. Temptation to offer land to higher income groups and commercial users which assure revenue to the authority- both capital and maintenance.
>
> (140)

Further, Bhattacharya suggests that housing programs for low income groups must be linked with job promotion plans if these programs are to achieve success. (141)

Yeh discusses the general economic aspects of site and services projects in relation to other low income urban shelter alternatives, as follows:

> "An effective policy is one that clearly recognizes the limits and sets of priorities accordingly. Most governments will be doing well if they can generate the supply to keep up with demand resulting from population growth let alone the correction of existing deficits.
>
> Although site and services, slum upgrading, and self-help or mutual-help housing improvement schemes

> do, at least in principle, maximize equity and cost less than alternatives, they are by no means inexpensive compared to what governments normally allocate to low cost and low income housing. Unless there is a very sizable increase in funding and a very rapid development of government land banks, it is unlikely that most countries can commence more than a limited number of projects at any given time.". (142)

One of the more interesting site and services projects currently under development in India is the Composite Housing Scheme #78 planned by the Vastu-Shilpa Foundation (B.V. Doshi, Director) for the Indore Development Authority. In this project, a large scale, comprehensive effort has been made to incorporate all aspects of the 1976 HABITAT BILL OF RIGHTS. If successful, this project should serve as a model for future site and services projects in India. (143)

Concerning the future of site and services projects, Laquian predicts that:

> 1. The involvement of the World Bank in such projects will most likely continue or even increase.
>
> 2. Methods for gathering "soft" data (other than purely economical) will improve in the planning of new projects.
>
> 3. Future projects will have more program variety (finished and semi-finished housing, rental to owner tenure systems, public and private housing).
>
> 4. Various income levels will be represented in specific projects, allowing for cross-subsidy.
>
> 5. Projects will become smaller and less visible, thus avoiding the image of ghettoes for the poor.
>
> 6. Greater integration of site and services projects with metropolitan or regional planning will occur.
>
> 7. Site and services projects will be developed in small and intermediate size cities,

in an attempt to slow rural-urban migration.

(144)

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Ahmedabad is a major industrial city in Gujarat State, located 52 meters above mean sea level, and is situated 447 Kilometers north of Bombay and 760 Kilometers southwest of Delhi. Its climate is hot and dry from mid-March until the start of monsoon in June; hot, humid, and rainy until the end of monsoon in mid-October, and dry with moderate temperatures from mid-October to mid-March. Summer temperatures range from 26-40 degrees centigrade (average), and very high day temperatures are common. Winter temperatures range from 12-29 degrees centigrade (average), and the annual rainfall is 82.5 centimeters. The major languages spoken are Gujarati, Hindi, and English.

Founded in the year 1411 by sultan Ahmed Shah, the city alternately prospered and declined until the British presence was established in the early 1800's, and since then it has been growing steadily. The original walled city located on the east bank of the river Sabarmati retained its medieval character until the 1850's. In the latter part of the 19'th century, many new textile mills were built, primarily on the east side of the river beyond the city walls. In the early 20'th century, residential areas started to develop on the West bank of the river, and were linked to the old city by Ellis Bridge. Today, the main commercial area is located in and around the old city area, while residential areas of more suburban character and also various universities and institutions are located in the western and southwestern areas.

The city topography is flat and featureless, except for the Sabarmati River which varies from 100-500 meters in width depending on the season. The soil is sandy in the entire city area, and

riverbed sand is used for construction purposes.

The effect of climate on the morphology of the old residential areas (pols) is described by Jain as follows:

> "Climate has ifluenced the design fabric of the city from earliest times. In fact, the urban morphology of Ahmedabad has evolved partly in response to the dry climate conditions. The buildings, particularly of pols, were closely built with wooden fittings in a labyrinth of street network to provide shade and security. Walls were made to share between the buildings in order to avoid their exposure to the scorching sun. Wooden floors and planks placed below the ordinary roofs made of tiles or concrete kept the internal surroundings of houses cooler in summer. The overall texture of the pols gave a honeycomb structure. The east bank location of the town gave relief in summers, as hot winds passed through the river course and cooled before reaching the city." (1)

Schoenauer describes the origin and layout of the pols area as follows:

> "The Mogul practice of settling the generals and troops with their respective families near the gateways of the city brought about a cellular urban structure of quasi-autonomous subcities, each forming an entity in itself. These subcities were further divided into puras inhabited by a specific guild, caste, or religious group. Each pura had in turn a spinal street, or pol, with small blind alleys or lanes branching from it; gates at both ends of the pol barred entry into the pura to strangers at night. Each pura usually had a small chowk or square (often not more than a widening of the street), where public activities of these close-knit communities took place; moreover, puras often had their own water wells and vadies, or community open spaces for communal feasts, caste meetings, or religious hearings. Public notices and news bulletins were placed on notice boards next to the gateways.
>
> The city was divided into homogeneous community cells, but these cells or residential precincts were not based on income levels of their inhabitants; rich and poor lived side by side with their guild or caste fellows." (2)

Bhatt and Shah describe a typical house in the pols area of the

old walled city, which has a lot 6 meters wide and 13.7 meters deep, is attached on three sides, has masonry walls of 14-18 centimeters thickness, and similar construction to that described by Jain (above). A main feature of the house is the interior courtyard or chowk which has very narrow and deep proportions, thus providing much needed shade and also creating a microclimate for the house. (3)

The author visited a house in the pols which, although lacking an interior courtyard, made up for it with a remarkable variety of shaded roof terraces. The house was connected with the adjacent houses by various bridges and intricate passageways, and as most of the families in the pol were related, the chowk (street space) functioned as a semi-private open space.

The pols area thrived when the city was contained by the area within the fort walls, but when the city expanded to the west bank of the river, many of the more affluent pols residents started to move out. Many of the larger pol houses have been subdivided, and often several families occupy one house. Many of the houses are deteriorating for lack of maintenance, some of which would have been difficult if not impossible due to termites. The author observed a family living precariously in a house in which the entire front wall had collapsed in the monsoon, leaving the interior completely exposed to public view. However, in some pols new residences have been built of concrete, and the new construction must conform by law to the constraints of the building previously occupying the site.

De Souza has even gone so far as to call the pols area a slum, although his opinion related to perhaps unjustified reservations

about high density settlements: "In Ahmedabad 25% of the population is concentrated in 400 pols in the walled city where densities can be as high as 1000 persons per acre (2469 persons/ha.).". (4)

Other problems with the pols area are heavy air pollution (from industry, cooking fires, and from thousands of substandard vehicles), lack of parking and traffic congestion (parking is a problem for the affluent who aspire to automobile ownership), and services maintenance (deteriorating water and sewer lines).

As indicated above, traditional urban form is not to be found in the new residential areas. Solanki describes traditional urban form in India according to the following hierarchy of streets:

> FIRST ORDER: Bazaar or main commercial street with linear space, pedestrians, and slow-moving traffic.
>
> SECOND ORDER: Commercial street involving specialized trade usually next to the main bazaar; slightly narrower than the first order.
>
> THIRD ORDER: Neighborhood or shopping area street serving local people; commercial and residential mixed, but pedestrian dominated.
>
> FOURTH ORDER: Narrower street, first floors for residential use; primarily residential area (pols).
>
> FIFTH ORDER: Narrow, dead end streets serving about 10-12 houses, sometimes marked by a gate, which are used as community space or children's play areas; no automobiles because street is too narrow.
>
> (5)

In this hierarchy, the fourth and fifth order streets formed neighborhoods which were usually dominated by caste or a community group. The smallest urban spatial component is the private house courtyard. In addition to the order of streets, certain activities

take place at intersections or nodal points, as follows: first and second order street intersections form the primary public space of the city, and third and fourth order streets form small scale neighborhood community space. (6)

Solanki describes the order of streets in contemporary urban planning in India as follows:

> FIRST ORDER: wide road dominated by motorized vehicles.
>
> SECOND ORDER: non-existent.
>
> THIRD ORDER: (forms the second order) vehicular traffic and low density.
>
> FOURTH ORDER: residential street- low intensity of activity.
>
> FIFTH ORDER: non-existent.
>
> (7)

In Ahmedabad, little or no provision has been made by government or industry for assisting the Economically Weaker Sector with their settlement problems. The location of informal E.W.S. settlements in the Ahmedabad urban area is as shown on the diagram on page 64.

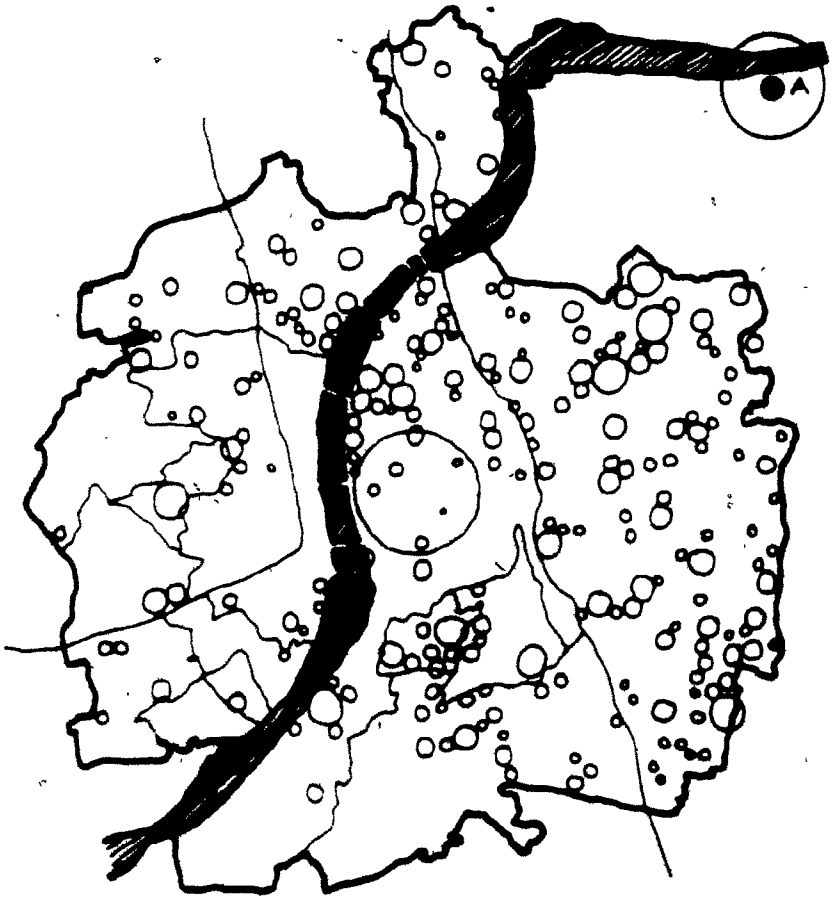
FIGURE ONE.

---

Informal settlements of the Economically Weaker Sector in Ahmedabad-1977 [after Shah: (8)]

Settlement size shown on the diagram varies from 100 persons (small circles) to 400 persons (large circles). The largest circle in the center of the city indicates the pols area, which is inhabited by various income groups, including the E.W.S.

SCALE: 20 Kilometers




Bhadreshwar Housing Colony (A)

NORTH

For any existing housing which might be available to the Economically Weaker Sector and low income groups in Ahmedabad, the following table gives housing costs:

Cost of cheapest existing housing unit and the percentage of households unable to afford it in selected cities:

| CITY | COST/UNIT (U.S.$:1970) | % UNABLE TO AFFORD UNIT AT: PRESENT COST | 50% REDUCTION |
|---|---|---|---|
| Mexico City | 3005 | 55 | 37 |
| Hong Kong | 1670 | 35 | 14 |
| Nairobi | 2076 | 68 | 53 |
| Bogota | 1474 | 47 | 26 |
| Ahmedabad | 616 | 64 | 51 |
| Madras | 570 | 63 | 31 |

(9)

Hall describes the settlement problem in Ahmedabad as follows:

> "In Ahmedabad, India's sixth largest city, and inadequate performance by the Municipal Corporation in the sphere of housing provision saw half of the city's 1.8 million population living in slum areas and squatter settlements, many subject to protection rackets and manipulation by small-time politicians.
>
> On the other hand the rent of many new slum replacement tenements had been beyond the capacity of the people they were meant for, so that subletting was undertaken on a large scale, with many of the previous slum residents returning to other slum areas." (10)

Hall views the situation as ironical, considering the

aspirations of the consultants who had much influence on the planning of the city, LeCorbusier and Khan. He believes that part of the reason for rural-urban migration to Ahmedabad was the improved physical environment: "Thus, a vicious circle was set up of an initially well planned city, perceived as a superior environment and attracting large scale in-migration sprouting slums and spontaneous settlements, thereby destroying much that was attractive to those in-migrants in the first instance." (11)

S. Shah estimates that 83% of the hutment population in Ahmedabad is composed of migrants, 54% of whom have a monthly income of between Rs. 200-400, and that 40% of the hutment residents work in the textile industry. (12)

Patel estimated that 30% of Ahmedabad's population lived in hutments, 20% lived in chawls, and 14% in sub-standard accommodation. He observes that although some environmental improvement schemes for the E.W.S. have been implemented, the efforts have been sporadic at best. (13)

---

POPULATION DENSITY IN DIFFERENT RESIDENTIAL AREAS OF AHMEDABAD (14)

| Settlement | # of each | Population (% of total) | Area (% of total) | Density (ha). |
|---|---|---|---|---|
| Pols | 400 | 25 | 20 | 834.52 |
| Housing Society & Colonies & Tenements | 350 | 25 | 40 | 44.44 |
| Urban Village | 18 | 3 | 3 | 987.60 |
| Hutments | 300 | 26 | 16 | 987.60 |
| Chawls | 1400 | 21 | 27 | 987.60 |

Yagnik found that most of the squatter settlements were on private land because tenure on government land was less secure (eviction easier than on private land), and also private landowners sometimes encouraged squatter settlement formation as illegal rent collection can be more profitable than revenue gained from conventional land use. (15)

Similar to the models proposed by Turner (bridgeheader and consolidated) and Benninger (reception, prolonged reception, intermediate, and consolidated), Yagnik defines three income categories for urban migrants as follows:

> 1. NEWCOMER: income of Rs. 0-100 per month. These persons must strive to make contacts and gain employment. The status of their housing and land tenure is of secondary importance to the search for employment.
>
> 2. DEVELOPING: income of Rs. 100-400 per month. Investment in dwelling occurs as they become familiar with the city, as their employment becomes more secure, and as they are accepted by members of the community.
>
> 3. STATUS SEEKER: income of Rs. 400+ per month. The desire for a better quality dwelling is apparent but the resident cannot afford to move because of housing market costs. (16)

A sub-E.W.S. category in Ahmedabad partially composed of rural-urban migrants is the street sleepers or pavement dwellers. Gajar defines three categories of street sleepers, as follows:

1. TEMPORARY: one day to six month stay.
2. SEMI-PERMANENT: six months to one year stay.
3. PERMANENT: stay of one year or longer. (17)

Gajar found that many of these people returned to the rural areas during the monsoon period for agricultural employment, and many men who are pavement dwellers sent funds to relatives or families still living in their native place. Pavement dwellers are usually looking for better shelter located closer to their place of employment, although some establish hereditary claim to a particular pavement location (Gajar describes a pavement dweller who lived in the same location for 20 years, and whose father and grandfather also lived there). Gajar found that in a month a pavement dweller spends Rs. 44 for food, Rs. 10 for clothes, Rs. 28 for vehicle rent, Rs. 2 for entertainment, Rs. 4 for vices, and Rs. 2 for miscellaneous expenses. The average total earning was Rs. 100-125 per month (gross), but less if renting a rickshaw or cart for employment. Gajar found that most pavement dwellers were debtors in the Rs.200-1000 range. A more elaborate pavement dweller's shelter would have a canvas roof cover fixed to a wall, which can be rolled up and stored in place during the day. On pavement where the authorities do not allow the canvas cover, the pavement dwellers sleep in the open. They have few possessions, and these are often owned communally as many live in a joint family situation. (18)

Yagnik found no evidence of upward mobility among hutment

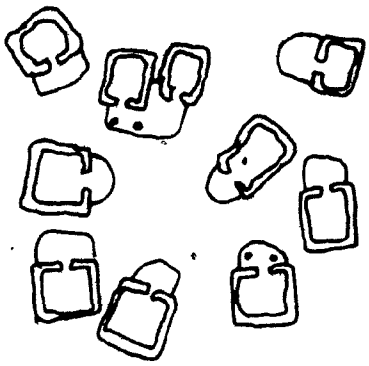
dwellers in Ahmedabad beyond the status seeker category, and he indicates that government housing efforts have been insufficient for the E.W.S.. What government or industrial housing does exist is deficient in many aspects. The following chart compares squatter settlements with government housing:

| SQUATTER SETTLEMENTS | GOVERNMENT HOUSING |
|---|---|
| Sporadic and random open area | : Uniform distribution of open area |
| 30-50% semi-open area | : negligible semi-open area |
| Three cluster types- | |
| scattered, streets/lanes, courts | : formal layout |
| non-uniform high density | : uniform low density |

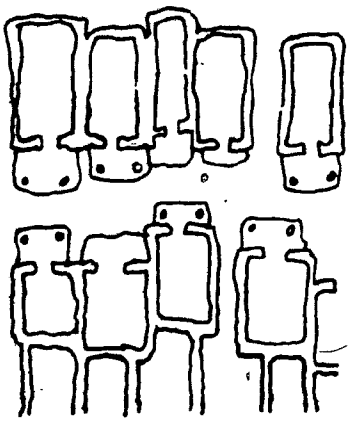
(19)

In his analysis of squatter settlements in Ahmedabad, Yagnik found three basic layouts of dwellings as shown below:

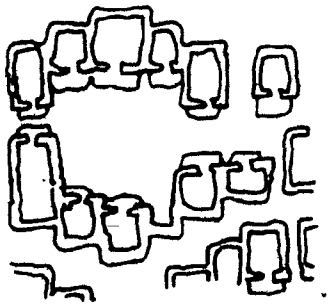
FIGURE TWO.



SCATTERED CLUSTERS: randomly placed, with unrelated open spaces, and not oriented to a single common space. This arrangement is usually found on the periphery of squatter settlements, where boundaries are not well defined. The large open spaces are used for infill, and the small open spaces are left over and accumulate debris. The layout is determined by the occupational needs of the residents or by the topography (unlevelled ground or riverbank conditions). The built area to open area ratio is from 1:2 to 1:5.



STREETS/LANES: form influenced by settlement location, common wall construction economy, and area restrictions. The streets and lanes function as semi-private open area, and vary from 0.75 to 2.0 meters in width, with 50% encroachment during the day and 90% encroachment at night (sleeping, sitting, etc.). Generally poor hygenic conditions are present, with no sewer, drainage, or garbage collection. The walls or backs of large buildings sometimes act as form generators along the periphery of these settlements. The ratio of built area to open area is from 1:1 to 1:2.



CLUSTER COURTS: Open space is in the form of controlled courtyards which are the immediate responsibility of the dwellings oriented towards them, either as extensions of the street or as closed pockets. The open space is often used for cattle sheds or as meeting or worship space.

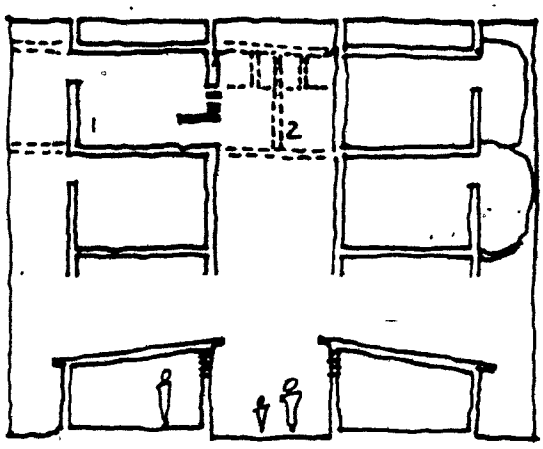
(20).

Yagnik also describes the housing agency scheme Dani Limda, which demonstrates the characteristics shown on the table comparing squatter settlements with government housing projects (above). In this scheme, a directional grid is used which results in under used, "uncontrolled" open space (not oriented to particular dwellings). Open space is concentrated at single points, and there is no possibility of growth in terms of additional dwelling units. In the 1.5 meter dwelling expansion area, the housing agency has wrongly outlawed temporary construction (including shading devices), as an awning or porch roof is required in order to make this area habitable. (21)

FIGURE THREE.

1. Existing unit

2. Extension




Plan and section of Dani-Limda housing project (after Yagnik).

Built area.....14.85 sq. m.

Built area including extension area.....20.13 sq. m.

| | | |
|---|---|---|
| Plinth cost | (% of total)..... | 18% |
| Wall cost | (% of total)..... | 48% |
| Roof cost | (% of total)..... | 34% |
| | | 100% |

Yagnik makes the point that squatter settlements permit random additions of new dwellings, and dense pockets cannot be considered overcrowded as lifestyle and communication patterns have achieved a level of social and physical adaptability. Besides manifest

function (sleeping, cooking, bathing), latent functions are accommodated quite well in squatter settlements, involving communication patterns, community identity, and spontaneity (freedom of choice and ability to cope with changing circumstances and growth). Also, as indicated previously, squatters can form ethnic and occupational groups, and the use of open space is such that the entire community becomes a home. (22)

The cluster patterns shown above for squatter settlements are determined by the needs of the residents as they derive from particular caste or occupational group needs. In part one it was indicated that urban migrants tend to return to or retain occupations pursued in their place of origin, and evidence of this can be found throughout Ahmedabad in its informal settlements. Yagnik presents a comparison of occupational groups with their dwelling layouts, and he found that in these settlements there was "....evidence of optimal space-functional relationship within the marginal land resources and of the accommodation to their mutual interests at—individual and group levels.". (23)

However, government agency and industrial housing developed to date for the E.W.S. prohibits the proper functioning of these mutual assistance occupational groups because of finite composition, prototypical size and inflexible design of the dwellings, channelized physical communication between dwellings because of the grid, and lack of identity. (24)

Other features of squatter settlements given by Yagnik are as follows:

1. Incremental process of self-help in construction, and use of vernacular technology.

2. Flexibility in construction scheduling and finance.

3. Dwelling personalization and sense of belonging in the community.

4. Evolution of an optimal dwelling size, and a natural balance between need, economic capacity, and physical constraints.

(25)

In summary, there are few alternatives available for urban shelter that will reach the Economically Weaker Sector in Ahmedabad. The most promising approach is presently in-situ improvement of informal settlements if the land tenure problem can be solved. However, new site and services projects in Ahmedabad will not be developed until the urban land problem is solved. As indicated in the introduction, there has been only one site and services project developed in Ahmedabad, and a case study of this project is presented in Part Three to determine its suitability for E.W.S. urban shelter.

FIGURE FOUR.

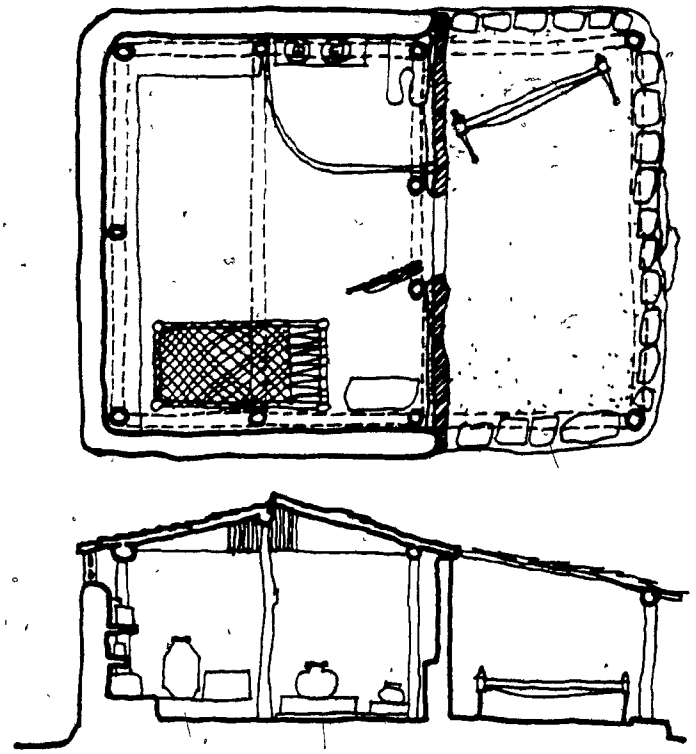
---

TYPICAL DWELLING IN SUKHIPURA HUTMENTS

[after Yagnik: (26)].

Construction materials are mud, stone, timber, thatch, metal sheets, tar drums, industrial scrap, and plastic. The cost percentages are as follows: plinth, 11%; walls, 33%; and roof, 56%.

SCALE: [redacted] 6 meters [redacted].



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2. Schoenauer, Norbert. 6000 YEARS OF HOUSING: VOL. 2- THE ORIENTAL URBAN HOUSE. New York: Garland STPM Press, 1981, pages 99-100.

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5. Solanki, B.N. URBAN SPACES IN INDIAN CITIES. Thesis, School of Architecture, Ahmedabad, 1970, page 6.

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8. Shah, Parul. "A STUDY OF CHANGE: ITS COMPREHENSION AND THE EVIDENCE OF CHANGE IN THE DWELLING FORM. Thesis, School of Architecture, Ahmedabad, 1977, page 15.

9. Lakshmanan, page 946.

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13. Patel, Parul. RESTRUCTURING OF SQUATTER SETTLEMENTS IN AHMEDABAD. Thesis, School of Architecture, Ahmedabad, 1978.

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17. Gajar, Kanti. A STUDY OF PAVEMENT DWELLERS WITH REFERENCE TO THE CITY OF AHMEDABAD. Thesis, School of Architecture, Ahmedabad, 1972.

18. Ibid.

19. Yagnik, Thesis.

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23. Ibid., page 52.

24. Ibid., page 53.

25. Ibid., page 58.

26. Ibid., page 54.

A. Project Description, Implementation, and Finance.

The Gujarat Housing Board announced the availability of site and services plots in its Bhadreshwar project in 1976. In the original plans for this project, 726 plots were to be allocated to the Economically Weaker Sector.

The Gujarat Housing Board (G.H.B.) was formed in 1961 by the Gujarat State Government, and up to the date of announcement of the Bhadreshwar project it had constructed 36,467 houses in various schemes, however, not exclusively for E.W.S. residents. The G.H.B. planned several other site and services projects in the state in the mid-1970's using the same toilet-washplace-plinth prototype, however, as indicated in the introduction, only the projects in Ahmedabad and Baroda were implemented, and only the Ahmedabad project was occupied.

The original estimated cost of the project was Rs. 21.78 Lakhs ($272,000.00 Canadian) in which Rs. 15.74 Lakhs ($196,750.00 Canadian) was to be subsidized by the Housing and Urban Development Corporation (H.U.D.C.O.), and the remainder to be recovered from the residents. The G.H.B.'s intention was to initiate other site and services projects provided the Bhadreshwar project was a success. The purpose of the project was to "....provide residential facilities for poor and economically backward people living in the city, at low cost." (as stated in the project announcement bulletin issued by the Gujarat Housing Board, 1976.). In order to be eligible to participate in the project, prospective residents had to be able to prove their monthly income was below the Rs. 350 per month upper limit of the E.W.S. income category (proof of income by

affidavit).

The Bhadreshwar Housing Colony is located near the Sabarmati River at the end of the airport runway, approximately 8.0 kilometers from the center of the old city of Ahmedabad (see site location plan on page 64). Adjacent to the site is the village of Hansol, the army cantonement, agricultural land, and the estate of one of India's former top government officials. The project site was originally agricultural land when purchased by the G.H.B. There is a severe problem of flooding on the site due to improper and incomplete surface drainage, and this problem is unlikely to be resolved until construction of a major highway on the southern site boundary is completed. The drainage problem is worst in the southwestern corner of the site where there is a natural, undrained depression. Another site problem is infestation with mosquitoes due to the drainage problem and also due to pools of stagnant water created by irrigation of adjacent agricultural land.

Across the highway on the southern boundary is a recent squatter settlement on government land. The residents of the Bhadreshwar Housing Colony claim that people are seeking land tenure there through the construction of religious temples with the expectation that the government will not be able to evict them if the ground is consecrated. The Bhadreshwar Housing Colony residents also claim that not all the people living in the squatter settlement are from the E.W.S., and that some are from the Low Income Group and Middle Income Group, have houses elsewhere, and are just trying to establish a presence on the land in the hope that the government will have to buy them out if another use is eventually required for

the land. It was not possible for the author to verify the truth of these claims, but they are presented here as the residents of the site and services project are very concerned about the presence of the squatter settlement, especially since some permanent house construction has begun in the squatter settlement.

Photo of Squatter settlement adjacent to the Bhadreshwar Housing Colony, showing the start of permanent construction.

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Adjacent to the Bhadreshwar Housing Colony are several housing projects under construction, both government and private, for E.W.S., L.I.G., and M.I.G. residents. These projects provide completed houses using identical one storey units, and most of these projects have dwelling unit layouts which are monotonous in the extreme.

Low income housing project adjacent to the Bhadreshwar Housing Colony.

---

From the date of announcement of the site and services project in 1976 to November, 1983, only 248 out of 726 plots had been occupied or have evidence of construction. The site plan on page 82 gives the status of the project in October, 1983. Of the 248 plots, 167 have complete or nearly completed houses; 66 are in an intermediate construction phase and are partially occupied, and 15 are unoccupied and are in basic construction. Most of the completed houses are located in the West portion of the site near the main square, but this cannot be explained by the method of plot allocation which was supposedly conducted at random (by lottery) by the Gujarat Housing Board officials.

FIGURE FIVE.

---

Site plan: status as of October, 1983.

○ = standpipe location. A = 14.0 meter road.

● = streetlight location. B = 7.5 meter road.

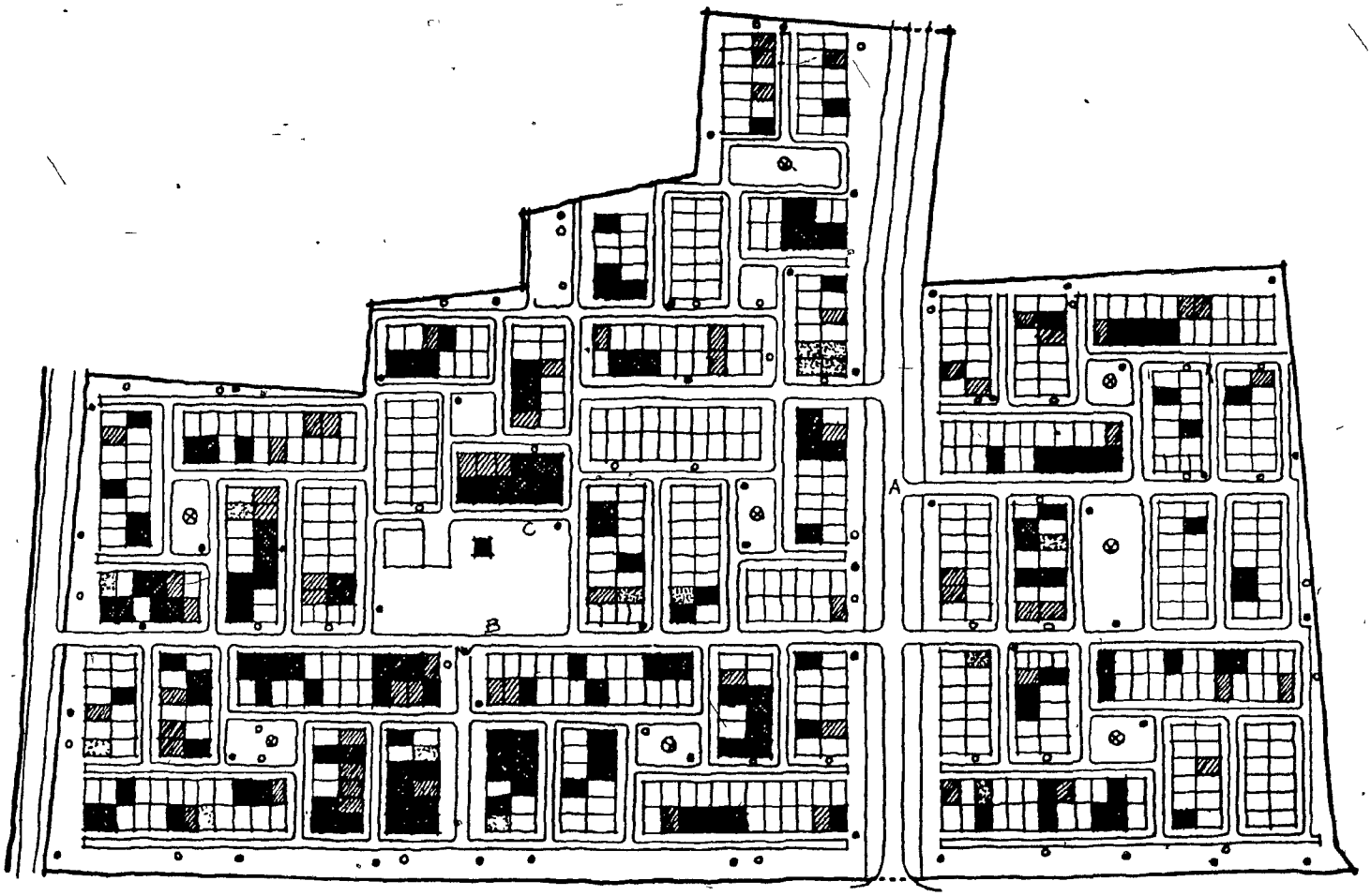
⊗ = septic tank location. C = 6.0 meter road.

= completed construction.

= partially completed construction.

= beginning construction.

SCALE: 120 meters NORTH



According to the G.H.B., at present there are 18 plots available in the project through delinquency (failure of residents to begin construction), and these plots may be re-allocated. However, this does not account for the remainder of vacant plots in the project. Extensions have been granted to plot owners who required more time before starting construction, and the G.H.B. officials have taken a fairly lenient approach to the administration of plot agreements as they have had difficulty attracting suitable applicants from the E.W.S. For those residents who desire a plot in a particular location or who wish to exchange plots with someone else, an application is made to the G.H.B.

The loan for the project was completely financed by H.U.D.C.O., at an annual interest rate of 5% and a repayment period of 20 years. Repayment of the loan was to start two years after the date of project sanctioning, which was in May of 1977. However, due to delays in project implementation, the first payment was not made to H.U.D.C.O. until September, 1983. Under the agreement with H.U.D.C.O., the ceiling price on unit cost was Rs. 5000 ($625.00 Canadian). In the project announcement, the development cost of each unit is given as between Rs. 3000-3500 ($375.00-437.50 Canadian), including water supply (standpipes), drainage, roads, street lighting, and sanitary system (septic tanks). A Rs. 250 downpayment ($31.25 Canadian) was required for resident registration in 1976 when the project was announced, and 350 families registered at that time. However, it was not until January of 1981 that all services and facilities, including plinths, toilet enclosures, and wash places were completed by the G.H.B., and the project was not

occupied until this date. Plot allocation took place in August, 1980, and at that time the G.H.B. required the plot owners to form a housing association (this was accomplished by December, 1980). The total cost of each plot under the hire purchase scheme was Rs. 4800.00 including miscellaneous charges of the G.H.B. After plot allocation in August 1980, the plot owners were required to make a payment for plot possession of Rs. 992, calculated as follows:

Rs. 1200: Deposit (25% of 4800).
-Rs. 250: Previous deposit.
+Rs. 42: G.H.B. misc. expenses.

---

= Rs. 992 ($124.00 Canadian).

Following this, a further payment was required of Rs. 130 by the last week of December, 1980 for the housing association, of which Rs. 20 was for housing association furniture and Rs. 10 was for the regular monthly payment to sustain the housing association. Loans for plot purchase are arranged through the G.H.B., and the monthly payment per plot is Rs. 31 ($3.87 Canadian) with a repayment period of 18 years (225 installments). Therefore, the total monthly payment per plot is Rs. 41 ($5.12 Canadian), including the regular monthly payment to the housing association. Penalties on late monthly payments are calculated according to table one (below) on a cumulative basis (3 month delay = penalty of Rs. 6.0).

TABLE ONE. (late installment penalty).

| | | |
|---|---|---|
| 1 | month delay = Rs. | 1.0 |
| 2 | month delay = Rs. | 2.0 |
| 3 | month delay = Rs. | 3.0 |
| 4 | month delay = Rs. | 7.0 |
| 5 | month delay = Rs. | 9.0 |
| 6 | month delay = Rs. | 12.0 |
| 13 | month delay = Rs. | 175.0 |

The housing association representatives are elected by the residents once a year, and consist of a chairman, secretary, president, vice-president, and other representatives-at-large for a total of between 9-12 persons (meetings once a month).

B. Site Organization, Amenities, Services, Plot Details, and Building Constraints.

The site has a total area of 37,802 square meters and a density of 198.60 dwelling units per hectare. Adjacent to the site, the following land use is found:

---

1. South boundary: 61.0 meter wide state highway (under construction).

2. West boundary: unpaved road leading to the Bhadreshwar temple and the Sabarmati River, and agricultural land.

3. North boundary: large, private estate and agricultural land.

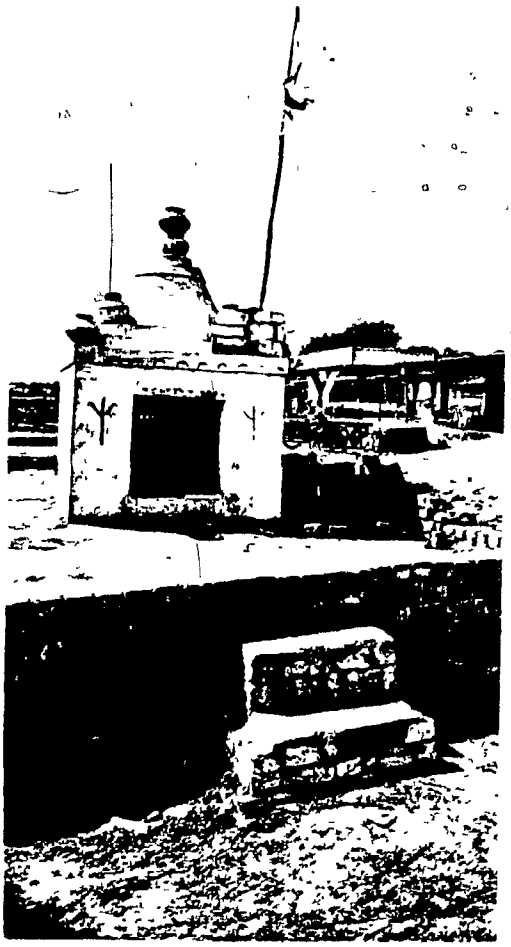
4. East boundary: village houses and hutments.

---

A main 14.0 meter wide access road running north-south connects with the state highway. 7.5 meter wide approach roads running east-west lead from the access road, and 6.0 meter wide approach roads lead from the 7.5 meter wide roads to service the majority of the dwellings. A 45 by 25 meter open space is provided in the center of the West portion of the site, and a pump house for water supply is located there. Land for a future school is reserved in the open space, the school not to be built by the G.H.B. but by the school board when the project is completely occupied or when funds allow. Also, any community facilities, such as a temple, are expected to be located in the main open space, but thus far the only sign of activity in this space is the temporary erection of the Navrati festival canopy (once a year in October). A temple has been built without G.H.B. approval on the shoulder of the state highway, but the Bhadreshwar Housing Colony residents have been notified that

it will be torn down. It is expected that the temple will be rebuilt in the main square.

View of the main square showing the water pump building, reservoir, and toilet and washplace enclosures.



Views of Navrati festival shelter in the main square (left) and the temple next to the state highway (right).

Water buffalo in the pool created by excavation for the state highway.

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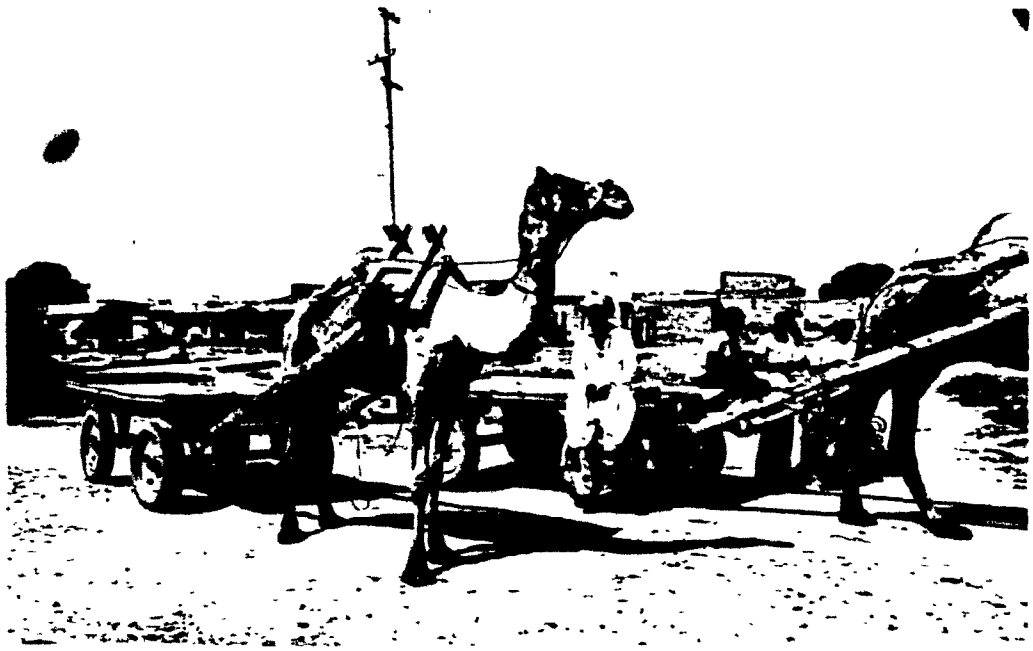

Camels on the state highway (under construction).

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Shopping stalls- located on plots intended for duellings.

---

Fruit vendor with pushcart.

---

There are eleven other open areas or small squares distributed throughout the site, and these range in area from 80 to 448 square meters (does not include pavement area around open areas shown on site plan). Provision is made for four groups of shopping stalls, and these occur at the ends of rows of building plots.

Building plots are arranged in back-to-back row house layout, with block lengths varying from 5 to 12 units, or from 20 to 48 meters. Each plot has a frontage of 4.0 meters and a depth of 6.0 meters, for a total area of 24 square meters. However, under the original project regulations, house construction was to be limited to 18.0 square meters of the total plot area.

If the circulation area is calculated according to the 14.0, 7.5, and 6.0 meter wide road widths shown on the site plan, the areas shown on table two are obtained:

TABLE TWO.

| FULL ROAD WIDTH: | TOTAL LENGTH: | TOTAL AREA: |
|---|---|---|
| 14.0 meters | 200 meters | 2800 square meters |
| 7.5.meters | 503 meters | 3607 square meters |
| 6.0 meters | 2315 meters | 13404 square meters |
| TOTAL: | 3018 meters | 19811 square meters |

If the circulation area is calculated according to the pavement widths shown on the site plan, the areas shown on table three are obtained:

TABLE THREE.

| PAVEMENT WIDTH: | TOTAL LENGTH: | TOTAL AREA: |
|---|---|---|
| 4.5 meters | 200 meters | 900 square meters |
| 3.0 meters | 503 meters | 1509 square meters |
| 2.0 meters | 2315 meters | 5026 square meters |
| TOTAL: | 3018 meters | 7435 square meters |

It is not possible to be specific about what constitutes circulation area because the G.H.B. has not provided a paved road surface, many residents have extended construction beyond the front plot boundary, and the area in front of most houses is used as open space. However, if the pavement widths listed above were installed, and if provision was made for surface drainage (trenching along the pavement), the available usable open area in front of the houses would be severely reduced. There is no regular vehicular traffic at present on any 6.0 meter wide road, and it is rare to see a vehicle larger than a motorcycle on these roads.

6.0 meter wide road with the start of tree planting.

---

The following tables show the project areas, using the different circulation areas derived above:

TABLE FOUR.

| FUNCTION: | AREA: | % OF TOTAL AREA: |
|---|---|---|
| Circulation (full road width) | 19811 sq. m. | 52.40% |
| Open space & community facilities | 375 sq. m. | 0.99% |
| Shopping stalls | 192 sq. m. | 0.50% |
| Building plots (726) | 17424 sq. m. | 46.08% |
| TOTAL AREA: | 37802 sq. m. | 100.00% |

TABLE FIVE.

| FUNCTION: | AREA: | % OF TOTAL AREA: |
|---|---|---|
| Circulation (pavement width only) | 7435 sq. m. | 19.66% |
| Open space & community facilities | 12751 sq. m. | 33.73% |
| Shopping stalls | 192 sq. m. | 0.50% |
| Building Plots (726) | 17424 sq. m. | 46.09% |
| TOTAL AREA: | 37802 sq. m. | 100.00% |

The circulation percentage shown in table four is much higher than average for site and services projects, and does not express the true situation with regard to open space, particularly in the small open squares. From the way the site plan was drawn by the G.H.B., part of the circulation width around the open squares should be included in the open space area. Increasing the area of the open squares in this manner results in the figures shown in table six below.

TABLE SIX.

| FUNCTION: | AREA: | % OF TOTAL AREA: |
|---|---|---|
| Circulation (Full road width except at small open squares) | 18555 sq. m. | 49.08% |
| Open space & community facilities | 1631 sq. m. | 4.31% |
| Shopping stalls | 192 sq. m. | 0.50% |
| Building plots (726) | 17424 sq. m. | 46.09% |
| TOTAL AREA: | 37802 sq. m. | 100.00% |

Auto-rickshaw.

The services provided thus far by the G.H.B. are street lighting, septic sanitation system, and water supply (standpipes). As indicated above, installation of surface drainage and road paving are also the responsibility of the G.H.B., but have not been completed to date. The septic tanks are located in the small public squares, and have obtrusive looking concrete covers and cleanout hatches. Because the tanks take up so much area in the small squares, the planting of trees is difficult and also tree roots could interfere with system maintenance. The residents' only complaint about the septic system is the occasional emanation of bad smells from the tanks. Standpipe locations are shown on the site plan on page 82, and many residents have been able to afford the connection cost of water supply to their houses. Many residents who have water taps in their houses continue to use the standpipes for some washing functions which occur outside, such as washing large pots and pans, clothes, and motorcycles.

General view of vacant plots with toilet enclosures and wash places.

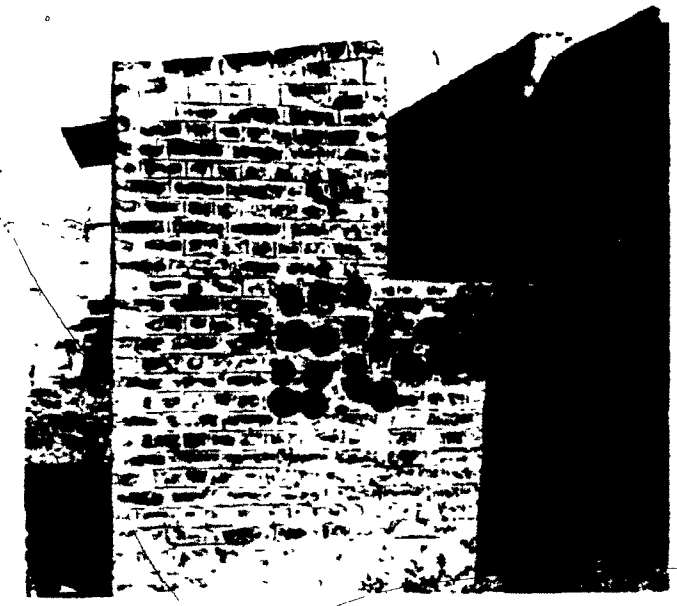
---

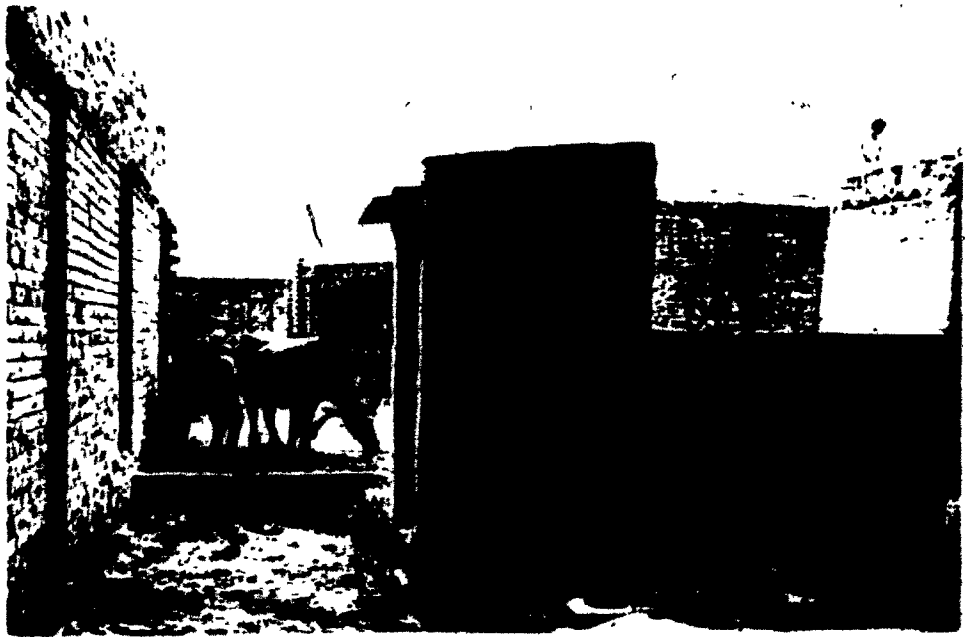
Provision of residential electricity was not part of the original scheme, but there has been some confusion on this point and many residents feel they were misled by the project's promotional literature as issued by the G.H.B. The residents have been petitioning for electricity for two years without success. The G.H.B. has estimated the connection cost of electricity to be approximately Rs. 1200 per unit, but the actual estimate from the Ahmedabad Electricity Corporation ranges from Rs. 835-1700 per unit, depending on dwelling location. An article describing the situation from the November 11, 1983 INDIAN EXPRESS is presented in Appendix Three.

Table seven summarizes project costs based on 1976 cost estimates:

TABLE SEVEN.

| | | |
|---|---|---|
| 1. | Estimated cost (all inclusive)..... | Rs. 3000 (per tenement). |
| 2. | Building cost..... | Rs. 1366 ( " " ). |
| 3. | Land cost (Rs. 15.76/sq. m.)..... | Rs. 850 ( " " ). |
| 4. | Water supply..... | Rs. 700 ( " " ). |
| 5. | Exterior drainage..... | Rs. 760 ( " " ). |
| 6. | Street light..... | Rs. 120 ( " " ). |
| 7. | Spreading charu (road base material)... | Rs. 30 ( " " ). |
| 8. | Hire/purchase scheme cost (+ interest). | Rs. 4700 ( " " ). |
| 9. | Development cost/square meter (land)... | Rs. 28.50. |
| 10. | Construction cost including land..... | Rs. 254/square meter. |
| 11. | Construction cost excluding land..... | Rs. 194/square meter. |
| 12. | Cost of cement per tenement..... | Rs. 336. |
| 13. | Cost of steel per tenement..... | Rs. 27. |
| 14. | Estimated electrical connection cost... | Rs. 1200 (per tenement). |





Views of toilet enclosure on vacant plot being used to dry cow dung cakes (top) and of buffalo grazing on vacant plot (bottom).

As described above, the total plot area is 24 square meters, and under the original form of agreement the actual built area was not to exceed 18.0 square meters. The areas listed on table eight below show how the project designers envisioned the use of space for each house.

TABLE EIGHT.

| FUNCTION: | DIMENSIONS (m): | AREA: (sq.m.) | NOTES: |
|---|---|---|---|
| Toilet | 0.9 X 0.9 | 0.81 | enclosure provided. |
| Wash place | 1.02 X 0.75 | 0.765 | partial enclosure. |
| Kitchen | 1.77 X 1.68 | 2.991 | plinth & foundation. |
| Living area | 3.77 X 2.71 | 10.216 | plinth & foundation. |
| Open area | 1.88 X 2.94 | 5.541 | not for construction. |

FIGURE SIX:

---

Elevation of and section through G.H.B. provided toilet enclosure and wash place.

SCALE: 4m

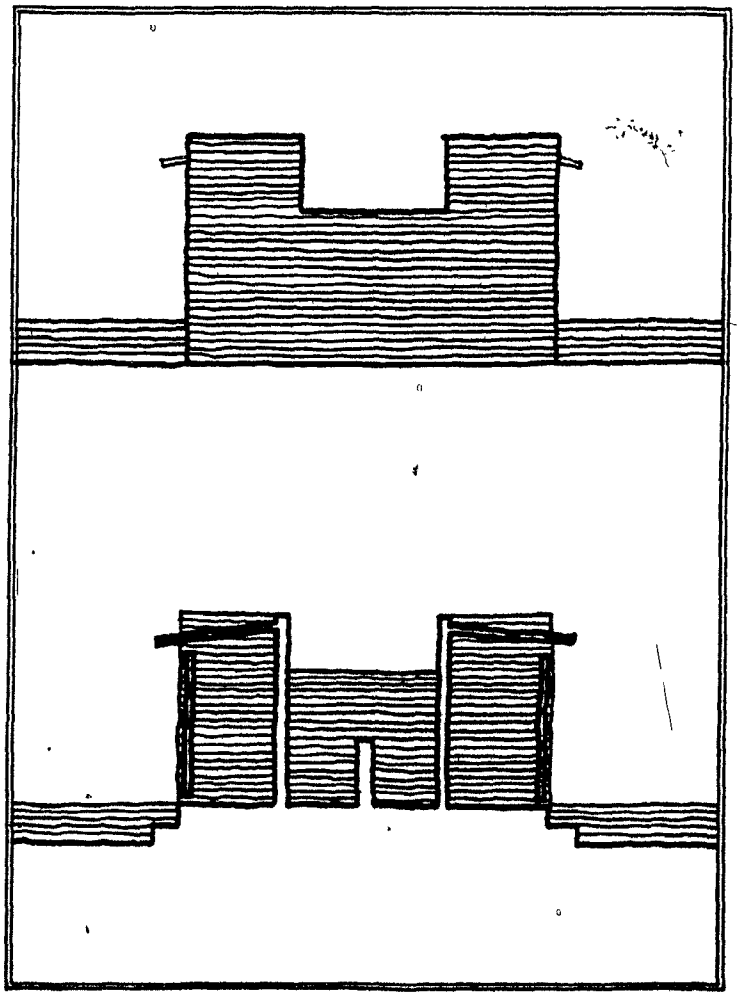


FIGURE SEVEN:-

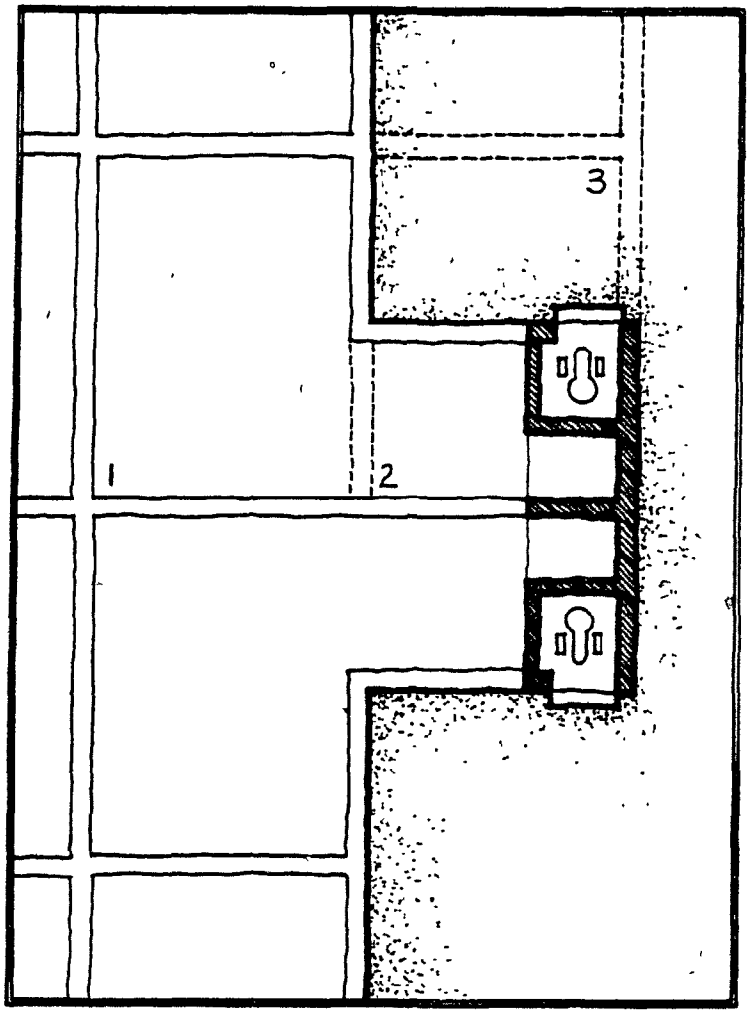
Plan of plot layout as provided by the Gujarat Housing Board.

SCALE: [redacted] 4m [redacted]

1 = Living area.

2 = Kitchen area.

3 = Open area.



The following constraints applied to house construction under the agreement between the residents and the Gujarat Housing Board:

1. Open plot in hire purchase plan is for open use to hirepurchaser and not for construction.

2. Common properties such as walls, G.T. drainage lines, man holes, etc. shall be maintained jointly by the adjacent hirers.

3. Construction of living area and kitchen area is only up to plinth level, wash place up to sill level, and toilet enclosure up to roof level.

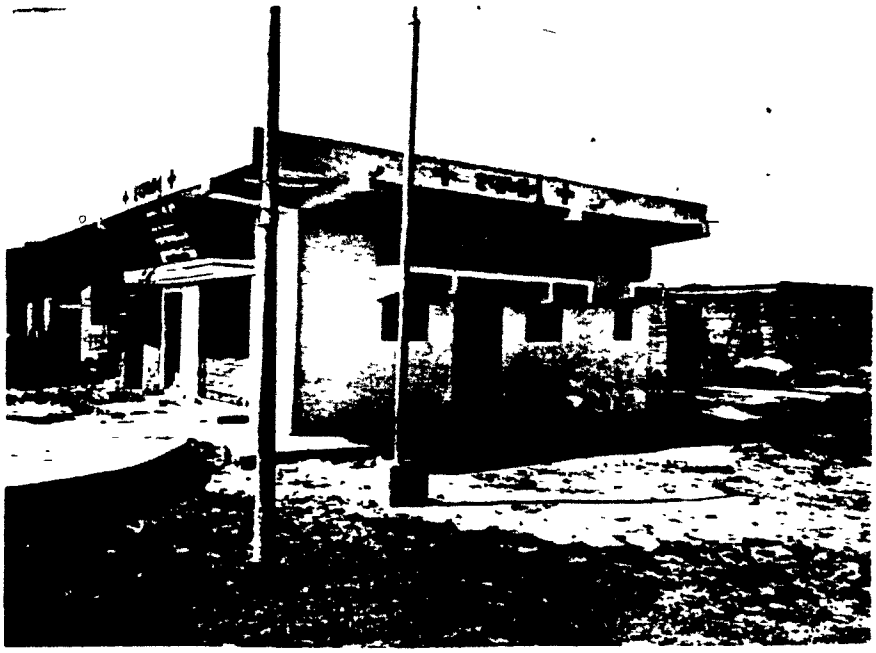
4. The hire purchaser can extend the construction vertically only up to 4.57 meters from plinth level or up to 56.99 meters above mean sea level, whichever is less. Electrical accessories like aerial, lighting accessories, and civil work like stairs, water tanks, or any other civil work shall be constructed as limited by the height regulations (above).

5. Before any construction is undertaken the permission for construction from the concerned local authority shall be taken and the Gujarat Housing Board informed accordingly.

(adapted from form of agreement between the G.H.B. and the plot owner).

However, the Gujarat Housing Board later permitted a relaxation of some of the above constraints, as will be seen in the houses presented in this case study. Many residents have extended their houses 0.9 meters into the street, however, permission to do so is supposedly no longer granted by the G.H.B. The most typical extensions are composed of clever stair and roof cantilever combinations. Most of the owners have ignored the regulation prohibiting construction in the open area within the plot boundary,

and quite a few houses have two storey construction thus ignoring the height limit set by the airport authorities. The residents claim the height limit on construction is unfair because of existing two storey construction immediately adjacent to the site. Also, many residents have "claimed" territory beyond the 0.9 meter front extension by application of lipan (surface treatment of cow dung and mud on low plinth), by planting trees and shrubs, and in some cases by installing permanent paving and clothes wash places. In the 6.0 meter wide roads the furthest surface extension is limited to the centerline of the road, but for those houses which front on wider roads, open squares, or left over open spaces, these extensions can be quite large.



One of two private health clinics set up on dwelling plots.

Houses on the main square showing recently planted trees and the extent of semi-private open space in front.

C. House Form Variations.

The houses documented in this study were selected by the author to demonstrate variations of house form, layout, and construction completeness (see appendix one). Fifty-six houses were measured and photographed, and interviews were then held with the residents of these houses. The houses are presented according to the following categories:

---

A. INTERMEDIATE CONSTRUCTION (houses 1-6):

Houses are occupied but construction has stopped with one or two rooms, leaving an open area within the plot boundary. This variation depicts the Gujarat Housing Board's vision of a completed house according to the hirepurchaser/G.H.B. agreement.

---

B. BACK TO BACK ROW HOUSES (houses 7-40):

These are arranged according to the following sub-categories:

1. Houses with no stair (houses 7-13).
2. Houses with an inside stair (houses 14-17).
3. Houses with miscellaneous minor variations (houses 18-22).
4. Houses with enclosed kitchen area, adjacent wash place, and stair/toilet combination in the front of the house (houses 23-25).
5. Houses with kitchen open to front room, and with stair/toilet/wash place combination in the front of the house (houses 26-30).
6. Houses with enclosed kitchen, and with stair/toilet/wash place combination in the front of the house (31-34).

7. Houses with kitchen open to front room, adjacent wash place, and with stair/toilet combination in the front of the house (houses 35-40).

---

C. CORNER HOUSES (houses 41-50):

These are arranged according to the following sub-categories:

1. Houses with no open-wall corner room (houses 41-42).
2. Houses with open-wall corner room and with toilet/wash place combination (houses 43-48).
3. Houses with minor toilet/wash place location variations (houses 49-50).

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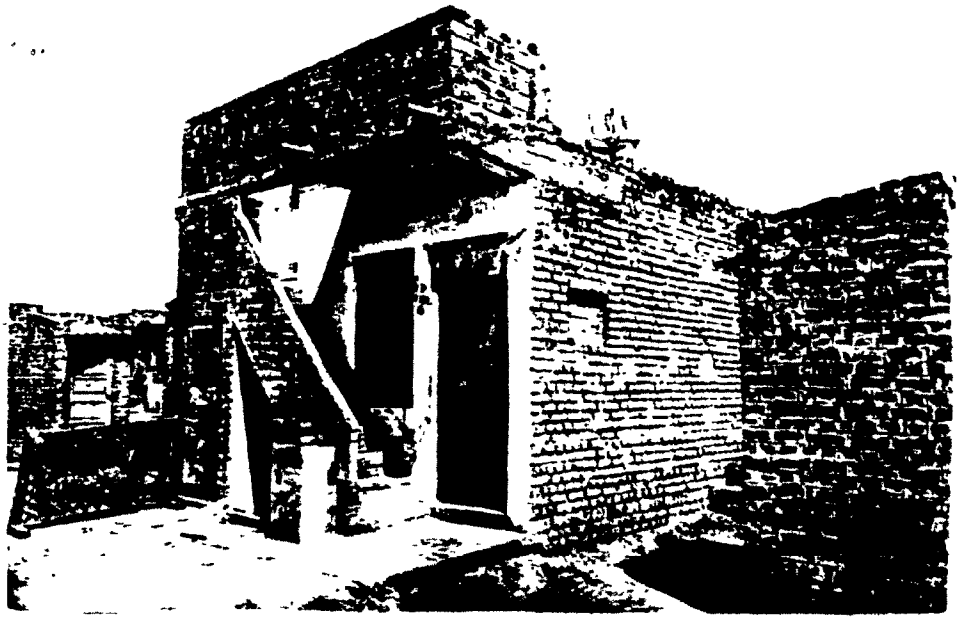
D. DOUBLE HOUSES (houses 51-56):

Single or joint family housed on 2 plots.



Row House.

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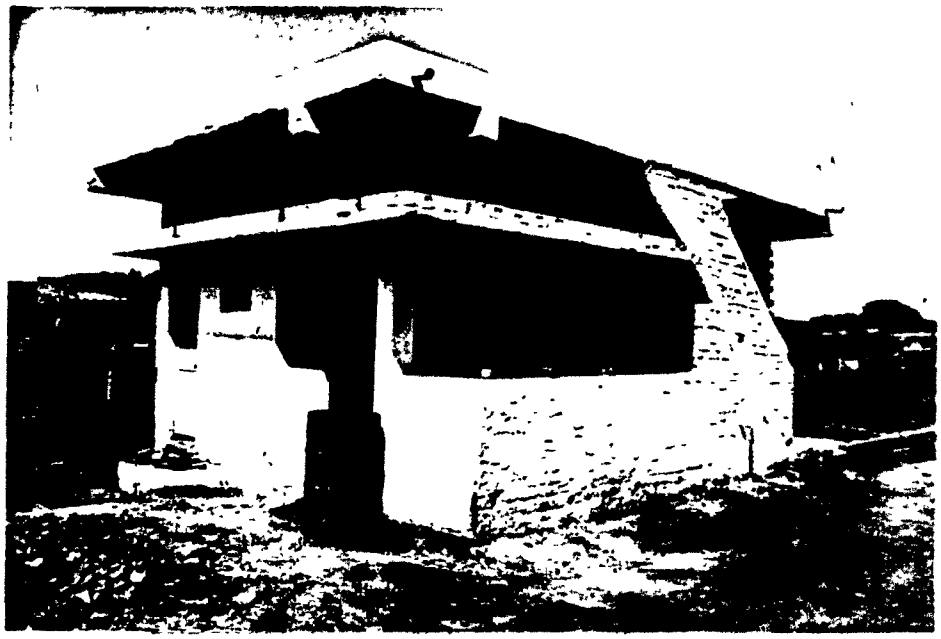
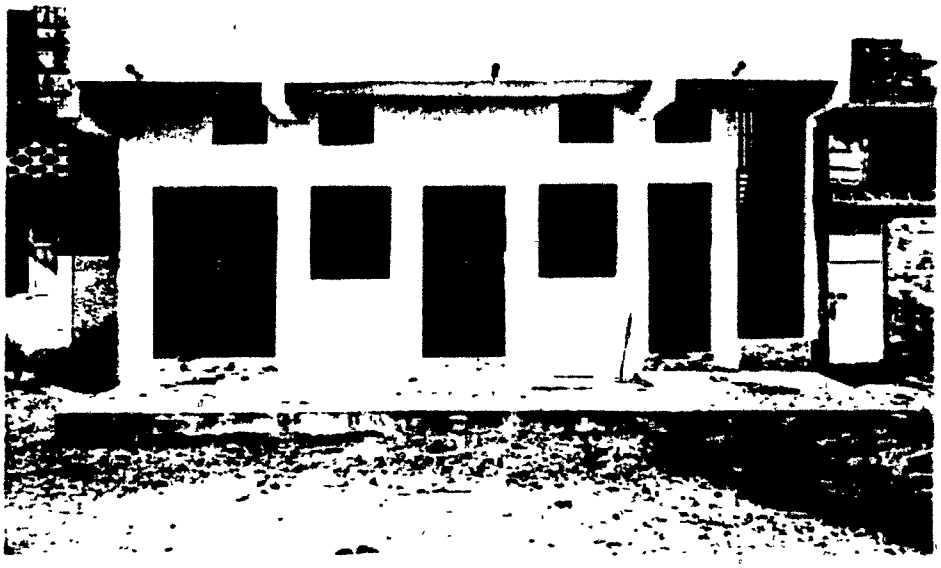


Corner House.



Double House.

FIGURE EIGHT:

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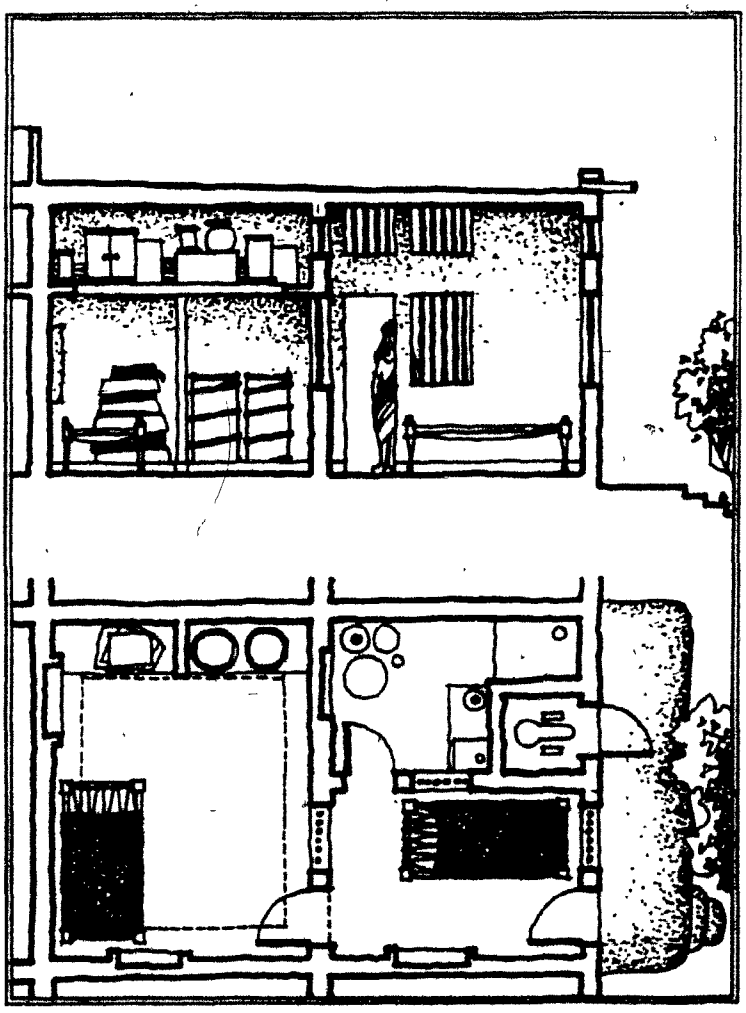
Plan (bottom) and section (top) through typical row house: note storage shelves and upper-wall ventilation openings shown on section.

SCALE: 4m



D. Use of House Space and Furnishings.

1. LIVING AREA: In almost all the houses measured, the living area (or room at the back of the plot according to the Gujarat Housing Board's plot plan) is used for sleeping and storage of possessions. Either beds or Khatalas (traditional cot or couch made of wooden frame with rope netting) are used, and Khatalas are found in sizes ranging from 1.0 X 0.5 meters to 1.0 X 2.0 meters. In some houses, cooking is also done in a corner of the living area. Many houses have a storage system which runs the full length of of a wall in the living area. The storage system consists of a 0.9 meter wide raised concrete platform over which a 0.9 meter wide concrete shelf is located at a height varying from 1.8 to 2.2 meters above finished floor level. Occasionally a solid masonry wall bisects the space between the raised platform and the shelf acting as a shelf support and divider. Grain is stored in large metal drums on the raised platform as a hedge against food shortages, and often there is a pile of mattresses and blankets next to the drums. The shelf above contains less frequently needed items. It is not unusual to see a 3-400 mm. concrete shelf around the entire room at the same height as the shelf described above. Other storage shelves occur in built-in wall alcoves, and temples are often located in these alcoves. Alcove storage shelves may be either open to the room or made into cupboards with solid or glazed doors. In monsoon, the living area is used by as many family members as possible for sleeping. When the weather is more favorable, the living area is used for sleeping mainly by women and children. Ceiling fans are often found in the living area, wrapped in plastic and waiting for

electricity.

2. KITCHEN AREA: In most houses, the kitchen area roughly coincides with the originally intended location, and may be either open to the adjacent rooms or completely partitioned off. The residents are particularly skilled at arranging efficient storage space for dishes, utensils, and foodstuffs. These items are stored on built-in concrete shelves, in alcoves, and on Kota stone shelves attached to the walls. A display of brightly polished stainless steel or brass dishes is often found in the more affluent households, and is often located where it can be seen by visitors. Some of the more elaborate kitchens have built-in Kota stone counters with small sinks made of the same material. Water storage is in permeable, low-fire clay vessels which keep the water cool and fresh tasting. The floor is used as a food preparation surface, as the cook finds it most convenient to squat on a low wooden platform while surrounded by stoves and vessels. Indoors, a primus-type kerosene stove is used most often, although some wood-burning stoves were also found indoors (none with chimneys but usually located next to a vent). As very few enclosed kitchens have proper ventilation, kerosene and wood stove fumes are a problem. Also, some of the enclosed kitchens seemed to lack sufficient daylight. In house number 52, a superb example of kitchen design can be found. The combination of different shelves, ceiling heights, and natural light sources (including a skylight) with an efficient layout make the space most pleasant to use (see photo of kitchen in house # 52 in appendix one).

Kitchen in "intermediate construction phase" house.

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3. OPEN AREA: As indicated previously, this area has been enclosed in most houses. The area is most often used as an entrance, transition zone, although sleeping also occurs in this area in monsoon and winter. Often, a cradle is placed here, either of the trestle type or hung from the ceiling. In some houses, a ceiling fan can also be found in this area. Clothes are dried here, and occasionally food preparation extends to this area, especially if there is an open kitchen. In some houses, the area is used for home industry (for example, a tailor shop) or as a small store (grain shop).

4. WASH PLACE and TOILET: Many of the residents have relocated their toilets and wash places, usually in order to gain more space with the 0.9 meter front extension. The wash place can be either open or enclosed. Where it is open, it often gets used in food preparation as well as for clothes washing and bathing. The residents do not seem to be particularly concerned with private access to or screening of the toilet entrance, and in most houses the toilet is located in the front of the house with a door directly accessible from the street, even in house layouts where it would have been possible to build a screened or side toilet entrance. However, some of the toilets are located in the front because an interior location is not possible, either because of space or circulation problems, privacy considerations (toilet proximity to indoor functions) or the desire to locate the toilet entrance as far as possible from the food preparation area. In most of the double houses, there is sufficient space to allow for an interior location for the toilet. Another reason for the exterior toilet location in some houses is that easy access is possible for tenants renting either a room on the roof or a separate ground floor room.

5. EXTERIOR AREA: As indicated above, many residents have managed to personalize the exterior area adjacent to their dwellings. Much of the activity of the household takes place in this area, in a generally congenial and sociable manner. Women prepare food outside in favorable weather, though usually behind a partial enclosure of lipan-made wall or on a raised platform. Two kinds of stoves are used outdoors, a "chula" (semi-circular stove

made from mud and cow dung) and a "sagadi" (stove made from an old metal bucket and lined with mud and cow dung). Clothes washing is usually done in a concrete wash place located next to the water tank. The tank is often located under the lowest portion of the stair to the roof terrace in order to save space. Khatalas are often used outside, either for sleeping or sitting or turned on their sides and used as a fence. Where exterior stairs are found, these add to the number of different surfaces which can be used for sitting. A round, tapering brick planter (no mortar) is often found in front of the houses, which offers good protection for young trees.

6. ROOF TERRACES: These are used for sleeping in summer, storage of building materials, work space, and drying clothes. Parapets are sometimes constructed for privacy and some have vent holes for air circulation. In houses where a second floor room is for rent, the remaining roof terrace area is used as open space for the tenants, and sometimes a wash place is located there as well. Occasionally a lockable gate is located at the top of the stairs leading to the roof terrace.

Regular morning activity: cleaning pots with ashes in front of the house.

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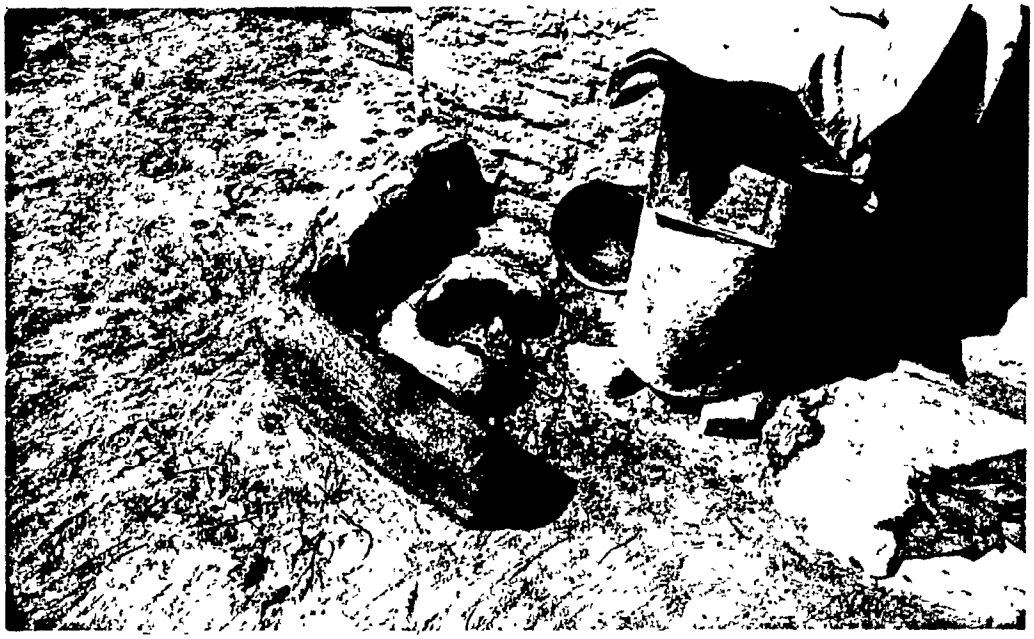

Stove made of lipan material (chula).

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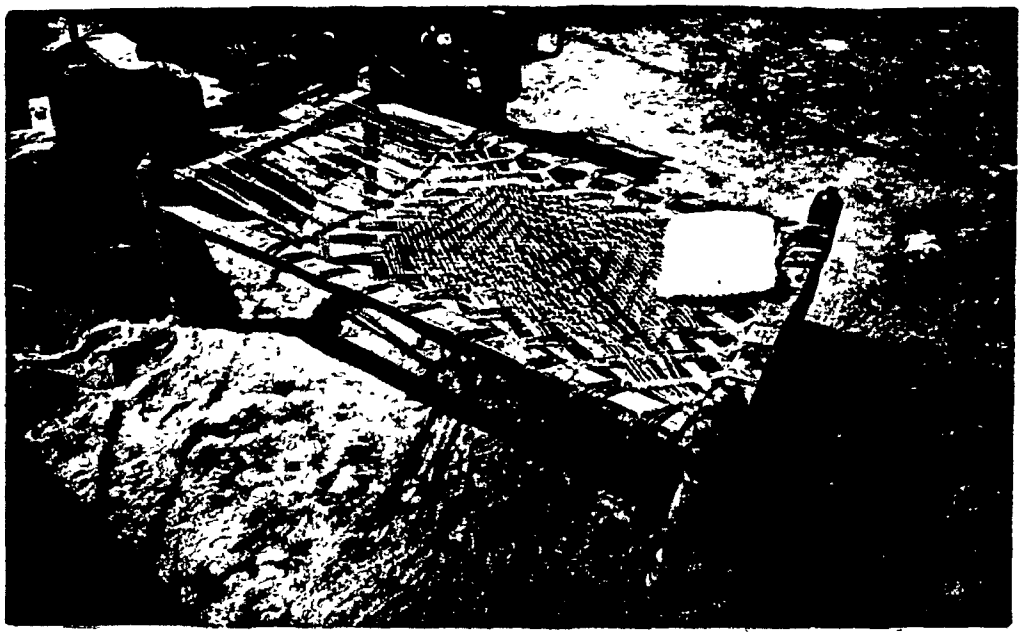

Khatala.

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Khatalas used for fencing.

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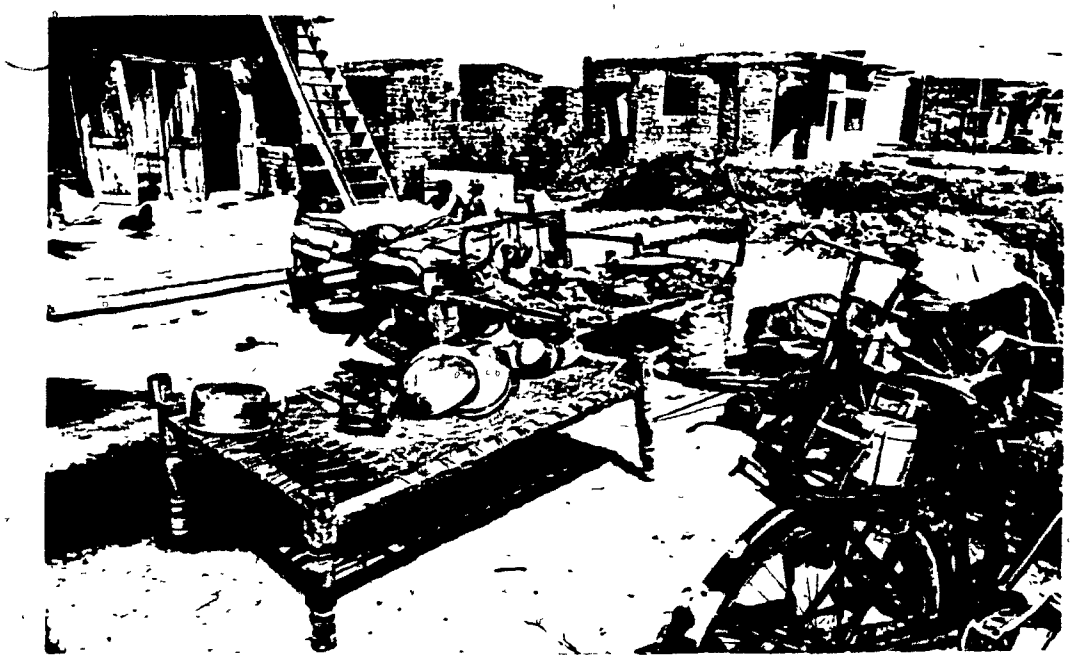

House painting day before Diwali (new year) festival.

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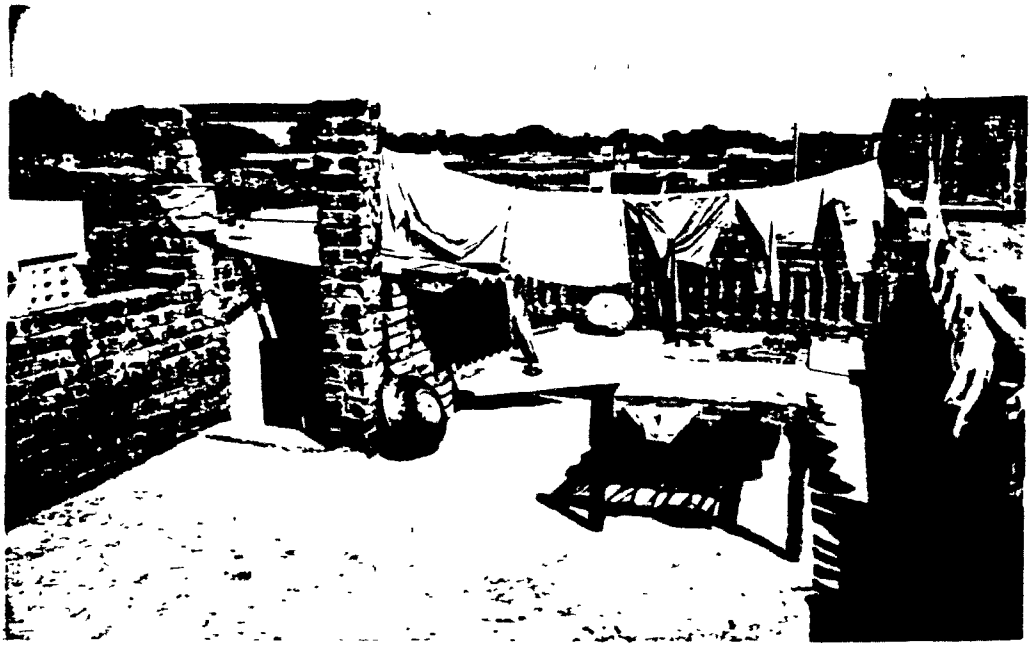

Roof terrace.

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Parapet brick detail on roof terrace.

E. House Construction Details and Costs.

Figures nine and ten (below) illustrate typical house construction details. Figure nine shows construction from the foundation to the height of the storage system shelf. Exterior wall foundations extend 600 mm below grade, and are placed on a 300 mm bed of crushed stone. The plinth provided by the Gujarat Housing Board is 450 mm above grade, and is filled with earth. Load bearing brick walls are 225 mm wide and are constructed of two widths of 100 X 225 X 75 mm brick using 12 mm mortar joints. If a resident is constructing a house next to a vacant plot, a record of expenses for common wall construction is kept, the cost to be eventually shared by the neighbor. As a considerate gesture, the builder of the common wall usually installs built-in alcoves for the use of the neighbor, even if the identity of the neighbor is unknown at the time. In this way, conflicts which sometimes arise over common wall construction in site and services projects are easily resolved. The usual method is to construct the wall to the height of the storage shelf. The height of the built-in alcoves is fixed at this level, allowing the concrete storage shelf to act as a lintel above the alcove. Where no concrete shelf is located above the alcove, either a separate concrete lintel is installed or an informal brick lintel is made, which usually sags in the middle. The alcove partition is constructed of one width of brick with the 100 mm dimension placed vertically.

FIGURE NINE:

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Axonometric of construction to top of storage system shelf.

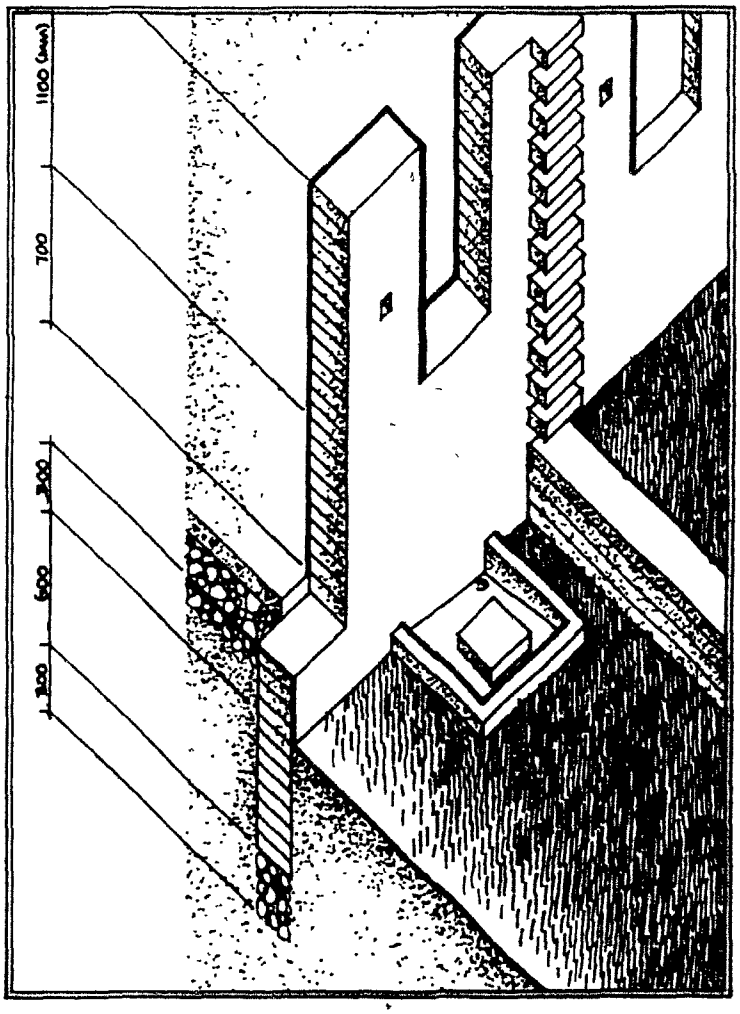

FIGURE TEN:

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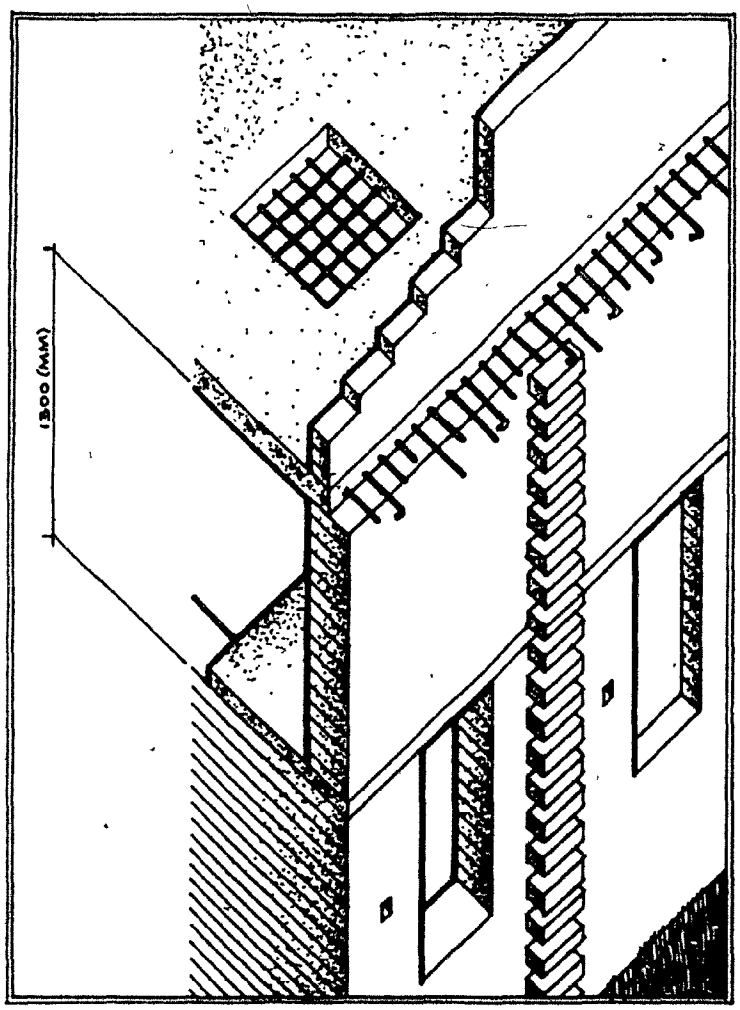
Axonometric of construction to roof level.



A 75-100 mm concrete slab-on-grade is placed on a 125 mm bed of crushed stone, and the slab may be installed either during wall construction or after roof construction. The latter time is sometimes preferred because of easier clean-up, and also it gives the option for installing a lipan floor if funds for concrete are not available. Figures nine and ten show small holes left in the brickwork which are used to support scaffolding during construction.

Figure ten shows construction from the storage shelf level to the roof terrace level. The concrete shelf for the storage system extends to the outside of the brick wall, and is usually 75 mm thick. The 225 mm double-width brick wall is constructed on top of the shelf to the roof slab level. The slab usually rests on half of the solid masonry wall with reinforcing bar left protruding in order to accommodate the neighbor's roof slab. A difficulty with this construction system is that expansion joints should occur at least every 30 meters, and many of the block lengths exceed this dimension. This could pose serious problems in the future, especially for the houses at the ends of the blocks, if no expansion joint is introduced. For construction economy, roof slabs generally have one dimension limited to a three meter span and are typically constructed of 115 mm thick concrete with 10 mm diameter reinforcing bar placed both ways at a 75 mm spacing. Concrete beams where required are most economical in a 4 meter maximum span, which coincides with the plot width. Concrete beams are typically 300 mm deep and 225 mm wide, and have 12 mm diameter reinforcing bar.

Skylights are sometimes constructed by allowing the reinforcing bar to continue across the opening, thus maintaining sufficient

strength as well as providing a protective barrier. Roof parapets are generally constructed with single thickness brick walls (100 mm). It is not unusual to see bricks protruding from exterior walls in order to facilitate the neighbor's wall anchorage, as shown in figures nine and ten.

Floor surfaces on concrete slabs are either of Kota stone (38 mm stone on 38 mm mortar bed) or a material called gray tile (19 mm tile on 19 mm mortar bed). Brick walls are covered with 19 mm cement plaster (interior and exterior) but sometimes the plaster is left off the exterior wall. As demonstrated in the houses shown in this study, the exterior plaster work is often highly decorated and is often painted with bright colours, and coloured tile is sometimes embedded in the exterior plaster work.

Windows and doors are often constructed of metal grilles, some of them highly decorative, which provide ventilation and security. Wooden shutters are used both on interior and exterior windows. When a metal grille or door is located in a single-width brick wall, the 38 X 38 mm metal angle at the top of the grille or door is used as a somewhat precarious lintel.

The wooden doors of the original toilet enclosures are reused when the toilet is relocated, and wood is sometimes used for other interior and exterior doors.

Also commonly used for windows are concrete "jali". These are ready-made grilles which come in a variety of sizes and patterns. The jali can be painted different colours or left plain, and are very effective in reducing glare, providing ventilation, and providing security.

Ceiling heights are kept high if possible (2.75 to 3.0 meters is typical) to encourage air movement, for the installation of ceiling fans, and also to give more storage space. Jali and metal grilles are often placed above normal height window and door openings to aid in air circulation.

Those families who can afford to, construct concrete roof slabs. Otherwise, corrugated asbestos cement roof panels supported on horizontal metal tubing are used. Holes are often left where the corrugated roof panels meet the exterior brick walls to provide ventilation.

Lipan is often used for interior floors and exterior surfaces. Although various kinds are made, typical ingredients are as follows:

MIX:

2 parts sandy soil.

1 part cow dung (1/2 dry & 1/2 wet).

1 part clay.

ADD: water to suit.

APPLY: on dampened soil.

This mixture forms a base coat which is allowed to dry. The final finish coat is applied on a dampened base coat, and usually contains more cow dung and fiber (rice husk). Lipan takes two days to dry, and is restored once a year or as needed during monsoon. Although difficult to keep clean at times, it forms an agreeable, light brown surface which is pleasant to smell and to touch. It looks especially inviting when used to form continuous floor and

wall surfaces (no sharp corners) and, as described above, is also used to construct stoves.

The average cost of the houses measured was Rs. 23,393 ($2924.12 Canadian). For a typical 27.9 square meter house, the costs based on a percentage of the total for each component are as follows:

| COMPONENT: | COST: | PERCENT OF TOTAL COST: |
|---|---|---|
| Floors | Rs. 1800 ($ 225.00) | 7.69% |
| Walls | Rs. 4699 ($ 587.37) | 20.08% |
| Roof slab | Rs. 5014 ($ 626.75) | 21.43% |
| Fixtures, finishes, etc. | Rs. 11880 ($1485.00) | 50.78% |

Gujarat brick.

Scaffolding system.

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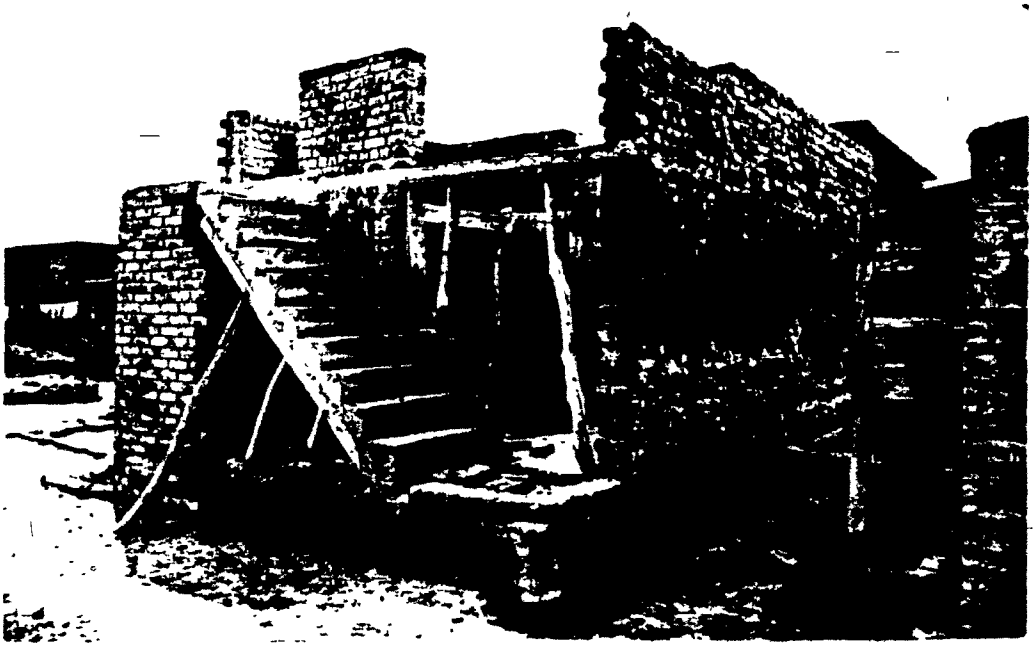

House under construction.

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Unsuccessful roof slab construction by owner. A brick pier was added to support the slab after this photo was taken.

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Owner living on site in temporary brick shelter (right) during construction.

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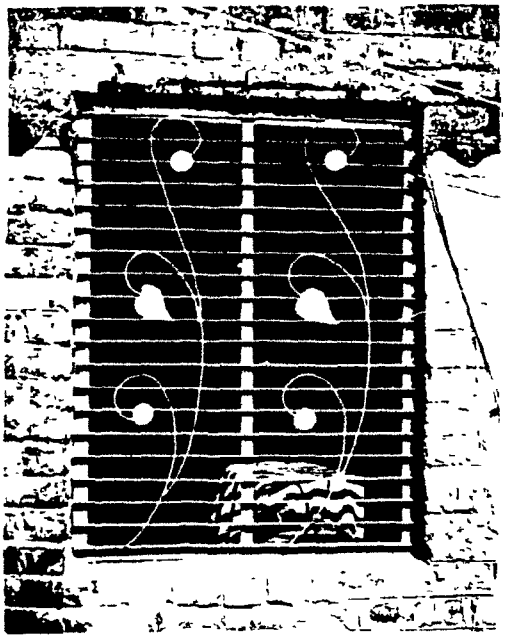
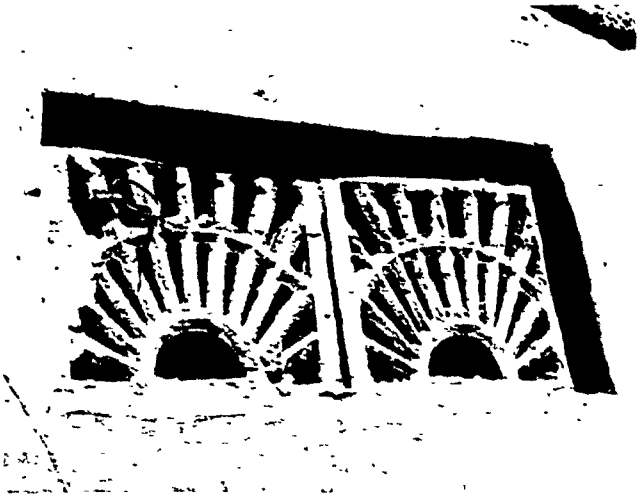
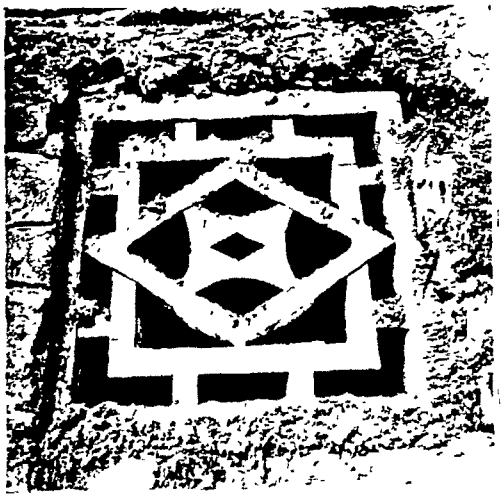
Metal grilles for doors and windows.

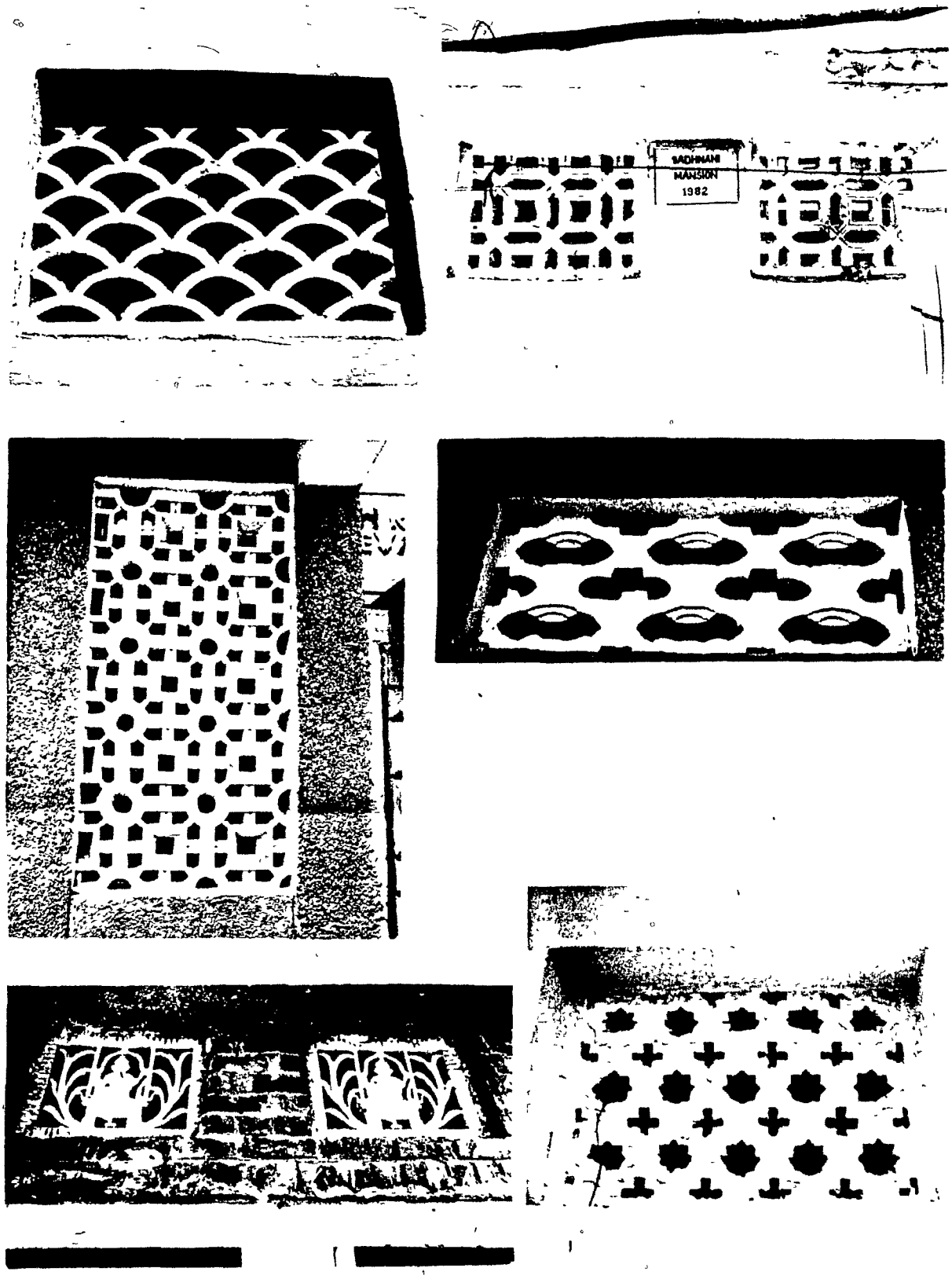






Concrete "jali".

Concrete "jali".



F. Incremental Construction Process.

Most of the houses presented in this study were constructed without any evidence of the long term, incremental construction process which one may reasonably expect would occur in a site and services project for the Economically Weaker Sector. However, some houses do give evidence of this process, which is summarized in the illustrations below.

Figure eleven shows the extent of construction provided by the Gujarat Housing Board, including plinth, toilet enclosure, and wash place (enclosure to sill level only). The G.H.B. also provided foundations for perimeter walls.

Figure twelve shows a one room house with the room located at the back of the plot, with asbestos cement roof. The area between the house and the toilet enclosure/wash place is a semi-private open area, often used for cooking and sleeping in favorable weather.

Figure thirteen shows an extension of the plinth area, and enclosure of the area between the back room and the toilet/wash place. The semi-private open area functions described in figure twelve are now transferred to the extended plinth area. The back room is sometimes provided with a concrete roof slab at this stage.

Figure fourteen shows the relocation of the toilet within the 0.9 meter wide extension space, and also a further 0.9 meter wide surface beyond this which often contains a wash place for clothes and dishes. At this stage the space within the plot boundary originally intended for use as semi-private open area is enclosed, and a concrete roof slab is provided over the entire house, sometimes allowing for the installation of a stair to the roof

terrace.

Figure fifteen shows the completion of the stair to the roof terrace and the completion of the roof parapet.

Figure sixteen shows the beginning of second floor construction, the use of which has been described previously (usually for rental purposes). Roofs for rooms constructed on the second floor are usually of asbestos cement.

FIGURE ELEVEN:

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Vacant plots provided by the Gujarat Housing Board.

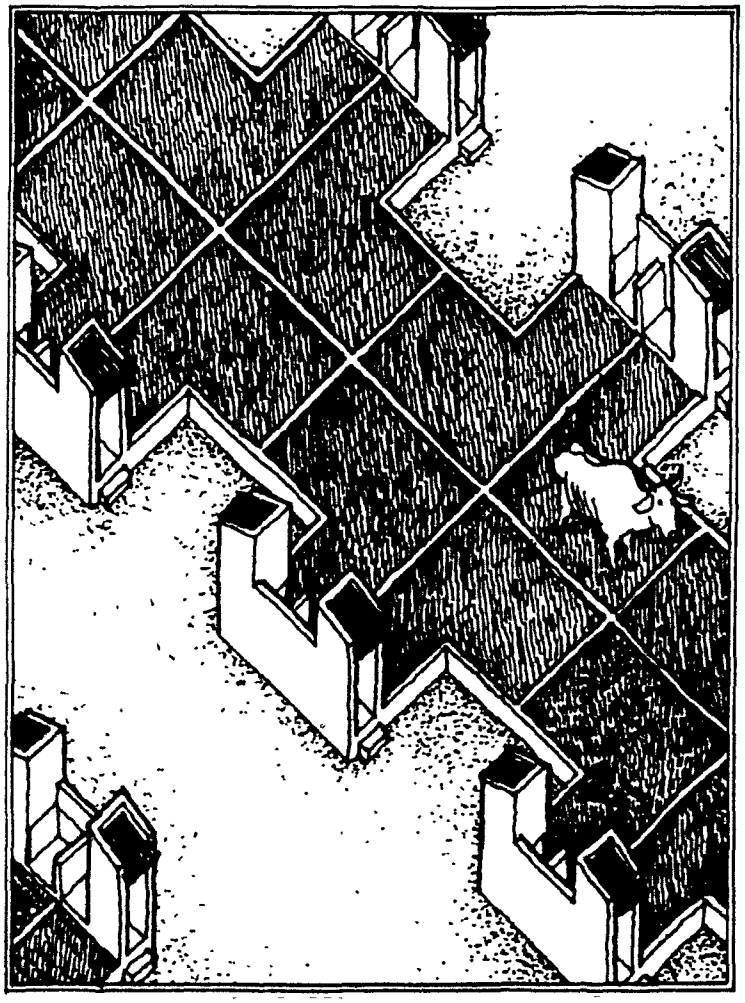

FIGURE TWELVE:

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One room house.

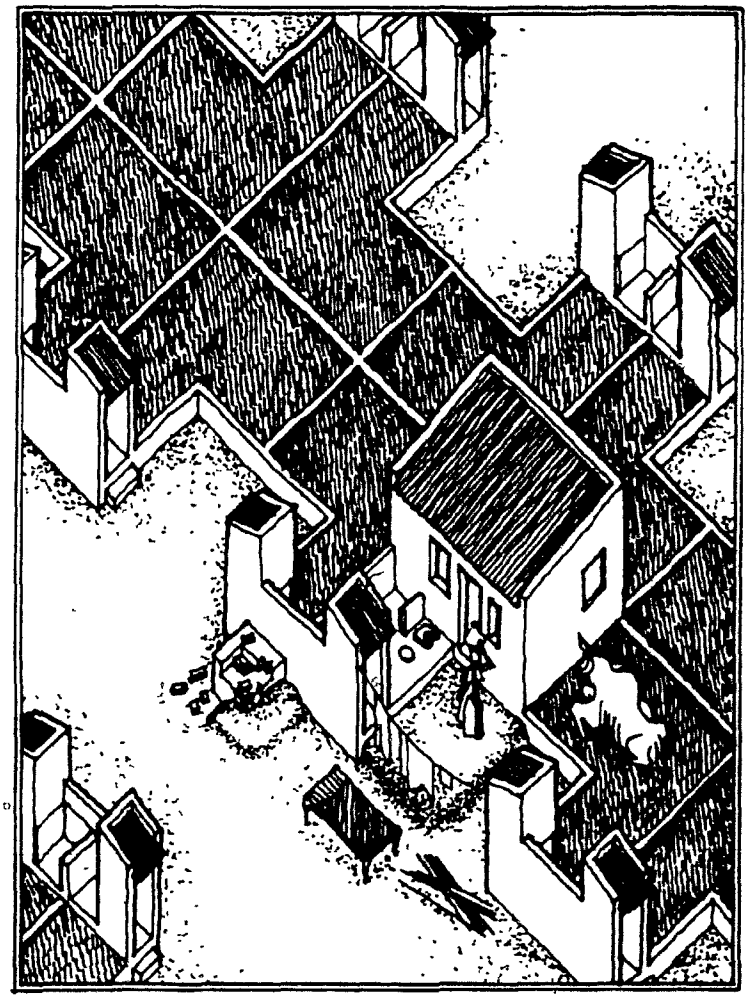

FIGURE THIRTEEN:

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Two room house.

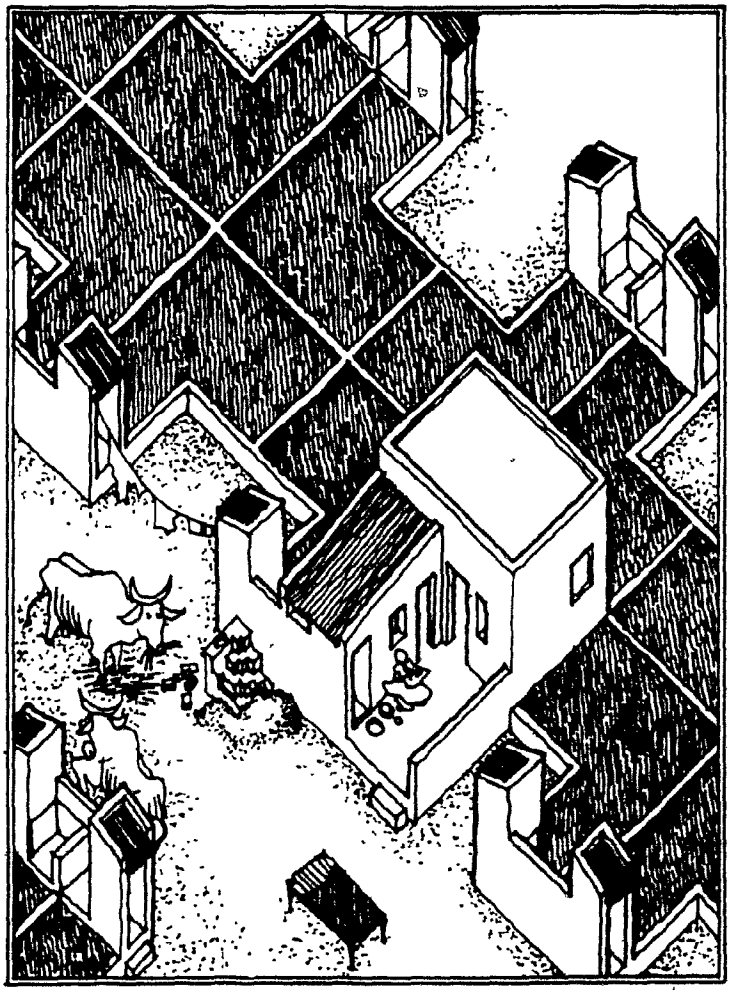

FIGURE FOURTEEN:

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Level one complete.

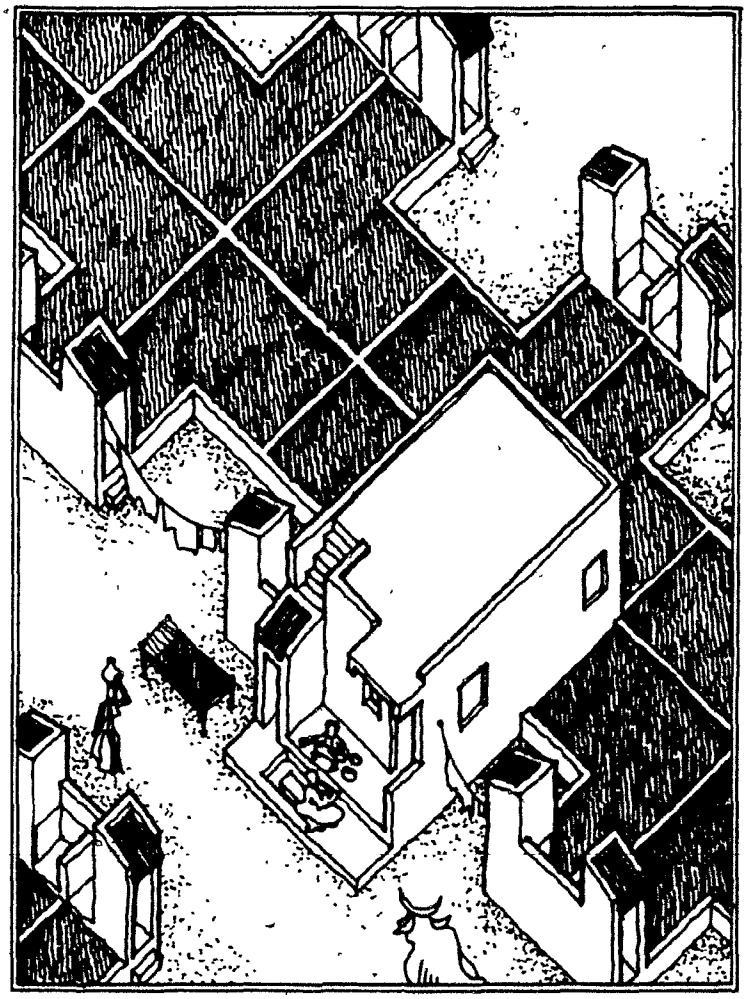

FIGURE FIFTEEN:

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Stair to roof complete.

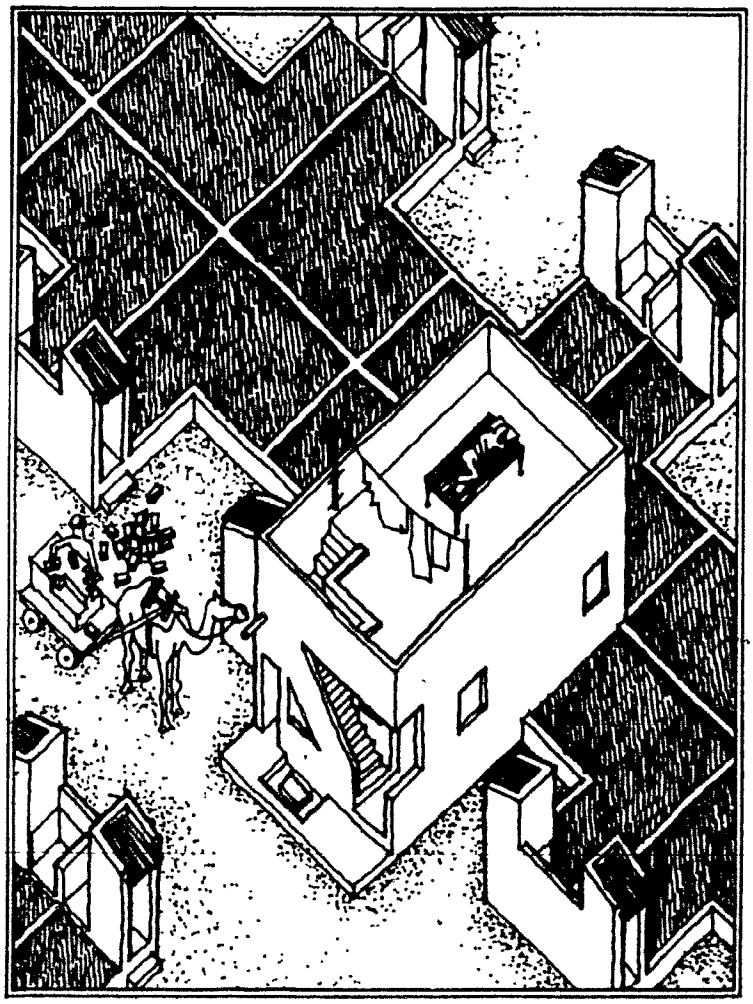

FIGURE SIXTEEN:

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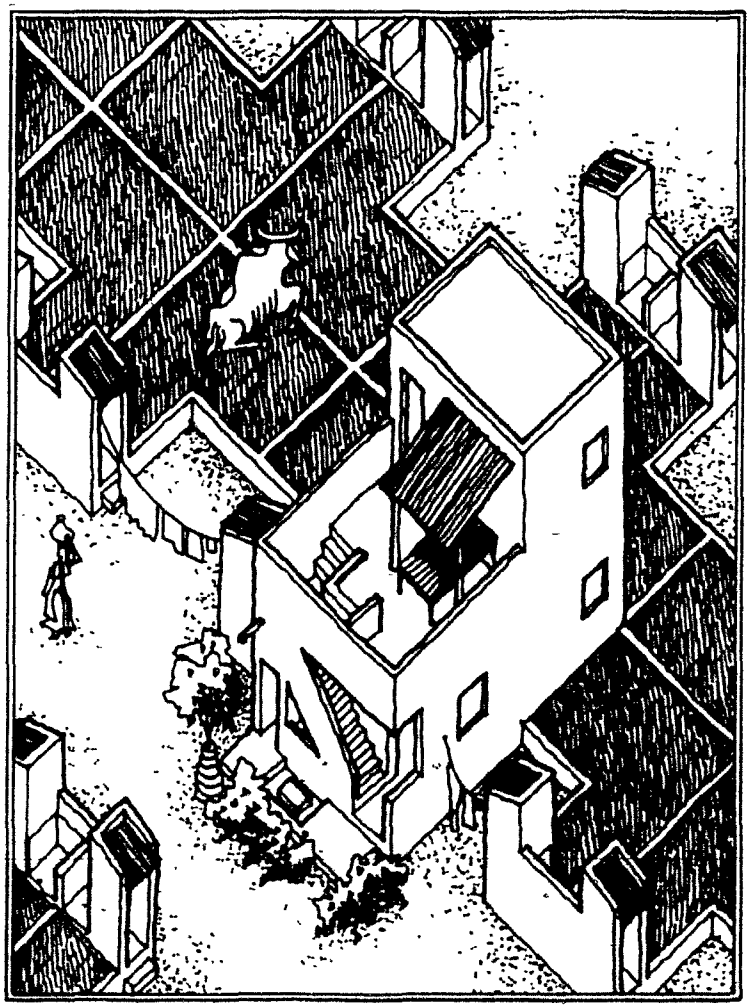
Second floor construction begins.



G. Interview Information Summary.

As written in the introduction, a six page interview form was developed in Gujarati, and the interviewing was done by Mr. Bharat Lakhtaria. The author transferred the information from the interview forms to a summary sheet, and in so doing found that several questions were redundant or inapplicable. These questions have been deleted in the translation of the questionnaire given below. Also, the order of the questions has been slightly revised for the sake of continuity. In order to maintain confidentiality, private information is presented in summary form only (income levels, debt burdens, construction costs, etc.). Data comparisons between house form variations were not possible as the sample size for each variation was too small, and the number of interviews for each variation was not consistent. The reader should beware that despite the generally cooperative attitude of the residents interviewed, financial information is only approximate and may not have been fully disclosed. The same caution applies to information which may have been withheld due to conflict with Gujarat Housing Board Regulations.

QUESTIONNAIRE:

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1. QUESTION: What is the distance from the Bhadreshwar Housing Colony to your last place of residence?

   RESPONSE: 91% of residents lived within a 5.0 kilometer radius of the Bhadreshwar Housing Colony.

2. QUESTION: When did you move to the Bhadreshwar Housing Colony?

   RESPONSE: 05.3% moved to Bhadreshwar in 1981.

   51.7% " " " " 1982.

   42.9% " " " " 1983.

3. QUESTION: What is your religion?

   RESPONSE: 98.2% of residents are Hindu.

4. QUESTION: What is your caste situation?

   RESPONSE: 37.0%- Prajapati caste.

   19.0%- Sindhi caste.

   07.1%- Harijan caste.

   07.0%- Brahmin caste.

   05.3%- Rajput caste.

   24.6%- Other

5. QUESTION: How many children and adults are there in your household?

RESPONSE: Adults per household.....2.17% (average).
Children per household...2.10% ( " ).
Persons per household....4.10% ( " ).

6. QUESTION: What is the employment of the members of your household?

RESPONSE: 31.2%.....Construction.
15.0%.....Textile industry.
12.0%.....Auto-rickshaw drivers.
07.8%.....Industry.
07.8%.....Tailors.
07.8%.....Office workers.
03.1%.....Government.
03.1%.....Vendors.
03.1%.....Teachers.
02.4%.....Other.

7. QUESTION: What is the distance between your house and your place of employment?

RESPONSE: 21.5%.....less than 5.0 Kilometers.
30.3%.....more than 5.0 Kilometers.
48.2%.....distance varies.

8. QUESTION: Is the Bhadreshwar Housing Colony conveniently located with regard to your place of employment?

RESPONSE: No.....64.3%

Yes.....35.7%

9. QUESTION: Are amenities located too far away from the Bhadreshwar Housing Colony?

RESPONSE: Yes.....100.0%

10. QUESTION: How much do you spend per month for food, clothing, and transportation?

RESPONSE: Food.....Rs. 792.0 (average).

Clothing.....Rs. 90.0 (average).

Transportation.....Rs. 88.0 (average).

The percent of monthly income spent for food, clothing, and transportation is 86.3% (average).

11. QUESTION: What transportation do you use regularly?

RESPONSE: Bus.....89.2%

Bicycle.....64.0%

Motorcycle or scooter...10.7%

Auto-rickshaw.....14.0%

12. QUESTION: What is your monthly income (per household)?

RESPONSE: Rs. 1135 per month (average).

13. QUESTION: What was your monthly income when you registered for your building plot (per household)?

RESPONSE: Rs. 329 per month (average).

14. QUESTION: How much money do you presently owe for any loans, other than for your plot purchase (per household)?

RESPONSE: Rs. 9600 per household (average).

15. QUESTION: From what sources did you obtain your loans?

RESPONSE: Relatives.....76.0%

Company or department...24.0%

(89.2% of the households have loans).

16. QUESTION: What is the total cost of construction of your house?

RESPONSE: Rs. 23,393.0 (average).

17. QUESTION: Do you have any relatives living in the Bhadreshwar Housing Colony?

RESPONSE: Yes.....57.1%

No.....42.9%

18. QUESTION: If given the choice, and if provided with identical accommodation, would you rather live elsewhere?

RESPONSE: Only 17.8% of the residents questioned would rather live eslewhere.

19. QUESTION: Do you keep any animals in the Bhadreshwar Housing Colony?

RESPONSE: Only 3.5% of the households keep animals.

20. QUESTION: Are you able to make regular monthly payments to the Gujarat Housing Board for your plot purchase loan?

RESPONSE: 69.0 percent of the residents questioned were able to make regular monthly payments.

21. QUESTION: Can you afford to pay the estimated Rs. 1200 charge for electrical connection to your house?

RESPONSE: Only 19.00 percent of the residents questioned are able to afford this charge.

22. QUESTION: At your present monthly income, can you afford to make improvements to your house?

RESPONSE: Only 14.0 percent of the residents questioned are able to afford improvements to their houses at present.

23. QUESTION: Did you occupy your house before the completion of major construction?

RESPONSE: Yes.....7.3%

No.....92.7%

24. QUESTION: Where did your family live during construction?

RESPONSE: On site.....1.7%

(remainder lived off site, usually in rental accommodation).

25. QUESTION: How long did it take to construct your house (major construction)?

RESPONSE: Average time.....6.7 months.

26. QUESTION: Who did the construction work on your house?

RESPONSE: Only 28.0% of the owners constructed their own houses- the rest used contractors.

27. QUESTION: Do you have any construction ability?

RESPONSE: 32.0% of the residents questioned had construction ability.

28. QUESTION: Did you make any major construction additions or modifications after occupancy?

RESPONSE: Yes.....12.0%

No.....88.0%

29. QUESTION: Do you plan any future additions to your house?

RESPONSE: Yes.....37.0%

No.....63.9%

30. QUESTION: Is the plot area sufficient?

RESPONSE: Yes.....53.0%

No.....47.0%

31. QUESTION: Are you able to sublet part of your house?

RESPONSE: Yes.....17.0%

No.....83.0%

32. QUESTION: Have you had any difficulty with common wall construction?

RESPONSE: No.....100.0%

33. QUESTION: Have you had any difficulty in obtaining construction materials?

RESPONSE: Difficulty obtaining cement.....100.0%

Difficulty obtaining steel.....10.7%

Difficulty obtaining brick.....1.7%

34. QUESTION: Would you have preferred to construct your own toilet/wash place?

RESPONSE: Yes.....26.7%

No.....73.3%

35. QUESTION: Should the Gujarat Housing Board have constructed at least one room on the plot?

RESPONSE: Yes.....100.0%

36. QUESTION: Would you have been willing to pay a higher monthly installment to cover the cost of construction of one room?

RESPONSE: Yes.....100.0%

37. QUESTION: Do you have any difficulty with road or site flooding during the monsoon?

RESPONSE: Yes.....83.8%

38. QUESTION: Do you have any difficulty with water supply?

RESPONSE: No.....100.0%

39. QUESTION: Do you have your own water connection?

RESPONSE: Yes.....78.5%

No.....21.5%

40. QUESTION: How much did your water connection cost?

RESPONSE: Average connection cost was Rs. 480.

41. QUESTION: When was your water connection made?

RESPONSE: Original construction.....57.14%

After original construction.....42.85%

42. QUESTION: Are the road widths sufficient?

RESPONSE: Yes.....55.36%

No.....44.64%

(average minimum width desired was 7.6 meters).

43. QUESTION: Have you experienced any difficulty with the septic sanitary system?

RESPONSE: Yes.....14.28%

No.....85.72%

(only difficulty reported was occasional smell from septic tanks).

44. QUESTION: How many houses do you consider form your immediate neighborhood?

RESPONSE: Average.....5.64

45. QUESTION: Do you believe the Gujarat Housing Board will make any improvements in the future in the Bhadreshwar Housing Colony?

RESPONSE: No.....100.0%

46. QUESTION: Do you have any general comments or concerns relating to the Bhadreshwar Housing Colony?

RESPONSE:

A. Late installment penalty should be reduced, and the installment period and frequency revised (46.0% of residents).

B. The Bhadreshwar Housing Association's activities must be monitored by the Gujarat Housing Board (69.6% of the residents).

C. The Gujarat Housing Board must expedite the installation of residential electricity (58.9% of residents).

D. The Gujarat Housing Board and government should provide amenities, such as shopping facilities, health clinic, and a school (75.0% of residents).

E. Loans should be provided for construction of the house superstructure (5.3% of residents).

F. The Gujarat Housing Board should have constructed a room or preferably the whole house (76.7% of residents).

G. The Gujarat Housing Board must pave the roads (46.4% of residents).

H. Building constraints should be relaxed (92.8% of residents).

I. Prevent the construction of illegal shops in the housing colony (12.5% of residents).

J. Solve the site drainage problem (83.9% of residents).

K. Allocate the plots sooner after project announcement (7.14% of residents).

L. The appearance of the houses must have more uniformity (1.78% of residents).

1. Project Location and Development.

Most of the residents of the project are from nearby villages (91% from within a 5.0 kilometer radius). In this regard, the project demonstrates the failure of site and services projects which are located in the urban periphery reach their intended population (E.W.S. families from the city or recent rural-urban migrants). True E.W.S. families could not afford the transportation costs if their place of employment was in the city, and suitable employment is not available near the project for these families. From the survey results, only 21.5% of the residents think the project location is inconvenient with regard to employment. The remainder have employment near the project or else the place of employment varies. All the residents complained of the lack of amenities in the area, and this situation would be worse for true E.W.S. income residents because of transportation costs.

Project location undoubtedly contributed to the failure of the project to attract enough applicants and thus resulted in a lengthy development period. Many of the original applicants sold their plots (at profit) to others when they found they were unable to commit themselves to construction. Meanwhile, the Gujarat Housing Board's maintenance burden (physical and financial) in the project implementation period was greatly increased. Toilet enclosures, wash places, and infrastructure began to deteriorate, and loan installments were not collected from vacant plots. This is what happened in a similar site and services project of the Gujarat Housing Board in Baroda. However, G.H.B. technicians claimed the

vacancies in Baroda were caused by common wall construction conflicts, and lack of desire on the part of the residents for user-controlled construction and user-built construction (there was no difficulty with either common wall construction or the construction process in the Bhadreshwar project). Another difficulty with the lengthy development period was that abuse of the plot allocation system occurred. Many plots were sold to residents who already started construction, enabling them to erect one house on two or more plots.

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2. Site Planning and Infrastructure.

With regard to site planning, the grid layout resulted in extremely high circulation area, and there are left over spaces around the perimeter of the project which cannot be utilized as common open space. Unfortunately, in housing developments in India, small left over spaces tend to get used as garbage dumps when they are not large enough or intended for a specific use. Many roads on the perimeter have houses on only one side, resulting in circulation and infrastructure inefficiencies. Water standpipes have not been located to best advantage. If these had been located in the small public squares, the social activity involved with getting water would have brought more life to these areas. Also, standpipes located next to some of the houses tend to be "claimed" by those houses as part of the semi-private open space, a situation which results in some degree of inequality and awkwardness. In some small public squares, the septic tank location is obtrusive and prevents

the planting of trees, without which these areas are unusable in hot weather. Shopping stalls have been located arbitrarily, and these could have been used to reinforce activity in the small public squares.

As indicated in part three, site drainage has not been provided by the Gujarat Housing Board, and this results in hardship for at least 83.% of the families surveyed. At present, part of the land on the site could be considered as unsuitable for permanent construction due to flooding in monsoon, and as road surfacing has not been provided by the G.H.B., the situation is made even worse.

If house construction had been constrained to the original G.H.B. regulations, the lack of semi-private open space would not be so critical. As most residents have extended their semi-private open space into the circulation area, it would now be difficult and in many cases destructive to provide road surfacing and drainage trenching. On one of the 6.0 meter wide roads, the extensions of semi-private open space have reached the centerline of the road and the residents are starting to plant trees in the center of the road as well. When the trees mature and the semi-private extension surfacing is complete, this area will be very pleasant (only the drainage problem remains unsolved).

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## 3. Construction Process and House Form Variations.

With true E.W.S. residents, most houses should have shown evidence of a long term, incremental growth process. However, 93% of the houses surveyed were built in six or seven months at high

cost (Rs. 23,393 average). An aspect supposedly characteristic of site and services projects which was missing was on-site family accommodation during construction. E.W.S. families would have found it difficult to rent alternative accommodation during construction, and the site and services approach allows the resident to set up temporary shelter on-site before beginning or completing major construction work. Of the families surveyed, 93% moved to the project after the entire house was built, and the remainder moved to the project after at least one permanent room was built.

Another aspect sometimes missing in the Bhadreshwar site and services project is owner-built construction. Only 28% of the residents did construction work on their own houses, even though 31.2% of the residents had construction skills. However, a positive aspect of the project is that the construction was user-controlled, with the result that the houses have great variety of design and a high degree of economy and personal utility.

Although most of the residents appreciated the G.H.B.'s construction of the toilet enclosures and washplaces (73.3%), most of the families surveyed have changed either some aspect of this construction (door relocation) or have relocated these facilities elsewhere. All of the residents surveyed thought the Gujarat Housing Board should have built one room on the plot, or preferably the entire house. The reasons given for this by the residents were that they thought the houses would have been cheaper if the government had built them, and also the appearance would have been better (many residents complained, not of individuality of house design but of unfinished or abandoned construction). All the

families surveyed indicated they would have been willing to pay a higher monthly installment for a completed house, but without knowing the exact amount of the increased installment this is only speculation.

The back-to-back row houses which seemed to work best had an open stair in front and a roof terrace, which increased the semi-private open area of the house. The dark interiors of the back-to-back row houses are actually a relief in the hot season, but the ventilation in these houses is often insufficient. The most pleasant corner houses had a corner room with open metal grillwork, which allows security with plenty of ventilation. The most pleasant double houses had an open courtyard at the front entrance. An exception to this is house number 52 which had a skylight and cross ventilation. In the houses surveyed, there were few instances where a house on two plots was occupied by more than one family or a large joint family, which would point to the possibility of including larger size plots for higher income levels in site and services projects.

Many of the houses displayed traditional or religious ornament, and plastered surfaces were often articulated to receive bright paint colours. Other houses displayed a distinct owner preference for modern design, and some of the corner houses are particularly of interest in this regard. The houses at Bhadreshwar exude vitality and personality, qualities which are sorely missing in contemporary public housing in India.

4. Project Administration.

With regard to the Gujarat Housing Board and its involvement with the project, the concerns of the residents adequately summarize their disappointment. The Gujarat Housing Board has advised the residents' association that they have fulfilled all their obligations as sponsors of the project, and that it is now up to the residents and their association to organize and complete the remaining work. If nothing else, the G.H.B. should at least be monitoring and guiding the housing association to try to curb corruption and mismanagement. As it is, the association does not have the political or financial power to get things done (as evidenced in the electricity supply problem and the site drainage problem).

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5. Residents' Income Level.

The Bhadreshwar site and services project was planned for the assistance of the Economically Weaker Sector. Analysis of the survey data, however, indicates the project did not reach this income group.

It is doubtful if the information on residents' income levels at the time of project announcement in 1976 has been accurately reported. Although affidavits were required by the Gujarat Housing Board stating that the maximum income per month was less than Rs. 350 (E.W.S. upper limit) in order to be eligible for the scheme, 13

interview respondents had the courage to indicate their income was higher than Rs. 350 in 1976.

Although the site and services approach allows the residents to build equity over a period of time through house ownership, it is doubtful if this process can account for the difference in family income levels between 1976 and 1983. The average monthly income per family was Rs. 1135 in 1983, which is in the middle income group range according to H.U.D.C.O. (Rs. 601-1500 per month). None of the families surveyed had income in the low income group range (Rs. 351-600 per month) or the E.W.S. range.

In summary, the Bhadreshwar site and services project did not reach the Economically Weaker Sector, and in the author's opinion it is doubtful that site and services projects in India will ever be able to do so. Part of the difficulty in defining project success on this basis is that even in hutment areas, Low Income Group and Middle Income Group families are sometimes found. Perhaps the true Economically Weaker Sector based on the H.U.D.C.O. scale is to be found in the pavement dweller category described in part two. It is unlikely that these persons will be reached either by site and services schemes or by slum improvement schemes.

However, the Bhadreshwar site and services project is a success in the sense that it demonstrates a viable way for Low Income Group and Middle Income Group families to obtain shelter which is appropriate for the Indian context.

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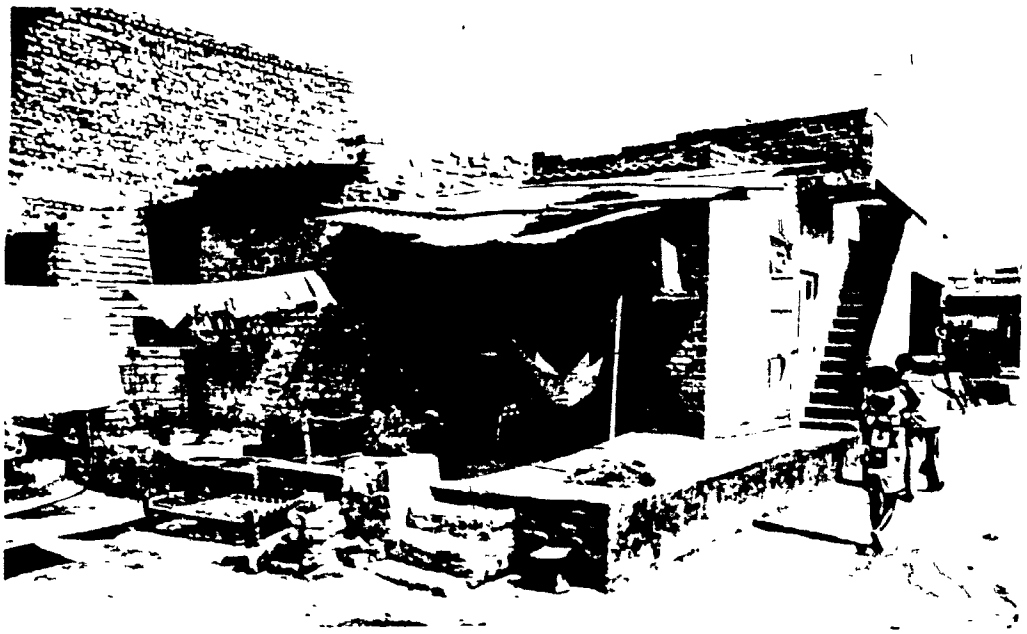
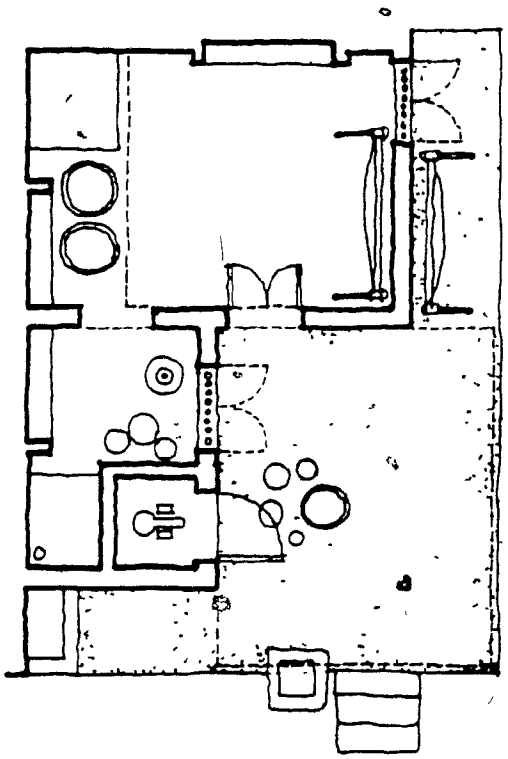
Appendix One: House Form Variations.

INTERMEDIATE CONSTRUCTION

HOUSE # 1





SCALE: 4 METERS

Number of adults.....2

Number of children.....4

Religion.....Hindu

Caste.....Prajapati

Employment.....in service

Initial house size.....one room

House construction by.....self

Construction time.....6 months

Owner has construction ability...yes

Future additions planned.....yes

Flooding problem in monsoon.....yes

Own water connection.....yes

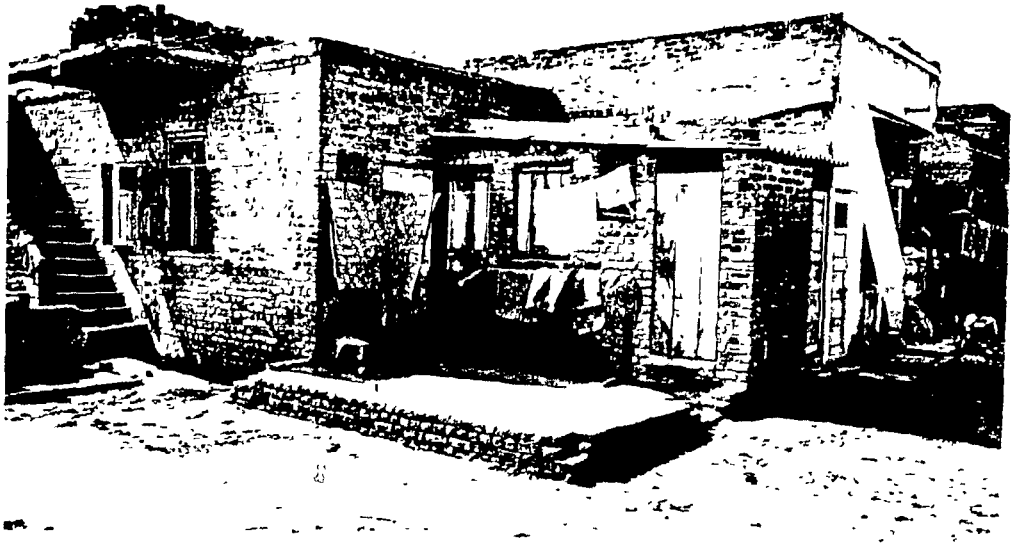
Plot size sufficient.....no

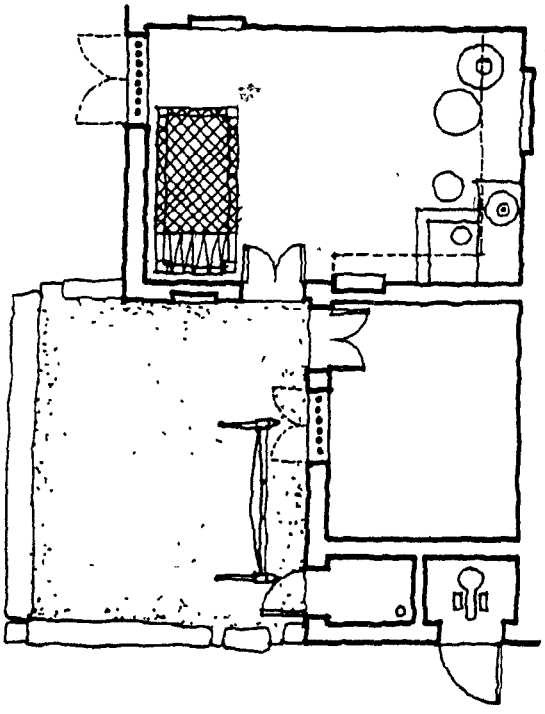
Date of occupancy.....May, 1982

Appendix One: House Form Variations.

INTERMEDIATE CONSTRUCTION

HOUSE # 2





SCALE: [redacted]4 METERS[redacted]

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Prajapati

Employment.....mason

Initial house size.....as shown

House construction by.....owner

Construction time.....4 months

Owner has construction ability...yes

Future additions planned.....yes

Flooding problem in monsoon.....no

Own water connection.....no

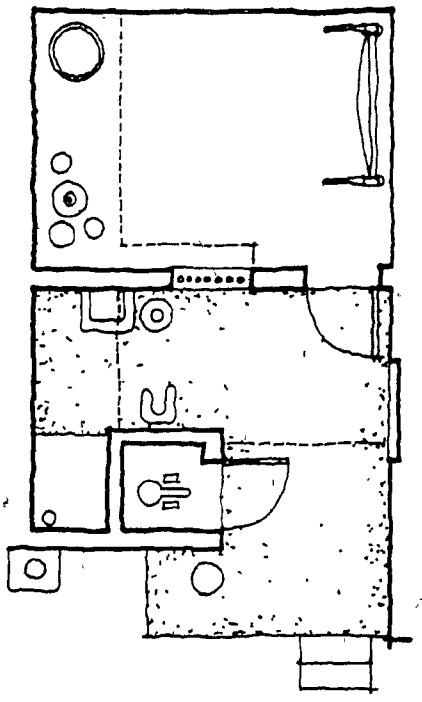
Plot size sufficient.....no

Date of occupancy.....July, 1983

Appendix One: House Form Variations.

INTERMEDIATE CONSTRUCTION

HOUSE # 3



SCALE: 4 METERS

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Prajapati

Employment.....mason

Initial house size.....as shown

House construction by.....contract

Construction time.....5 months

Owner has construction ability...yes

Future additions planned.....yes

Flooding problem in monsoon.....yes

Own water connection.....no

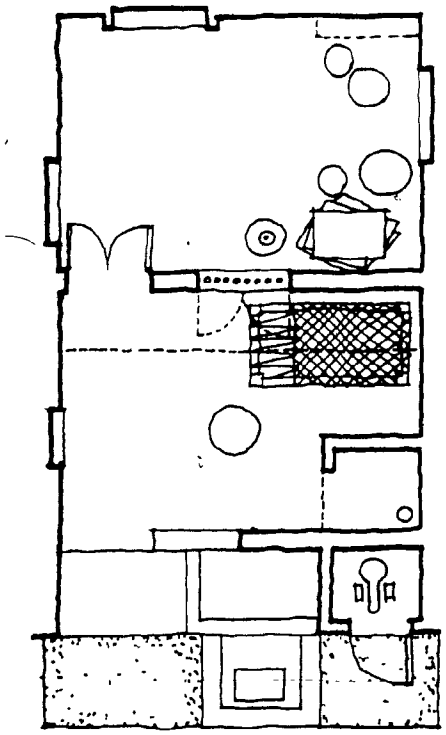
Plot size sufficient.....yes

Date of occupancy.....August, 1983

Appendix One: House Form Variations.

INTERMEDIATE CONSTRUCTION

## HOUSE # 4



SCALE: [redacted]4 METERS[redacted]

Number of adults.....2

Number of children.....2

Religion.....Hindu

Caste.....Prajapati

Employment.....mason

Initial house size.....as shown

House construction by.....owner

Construction time.....6 months

Owner has construction ability...yes

Future additions planned.....yes

Flooding problem in monsoon.....yes

Own water connection.....yes

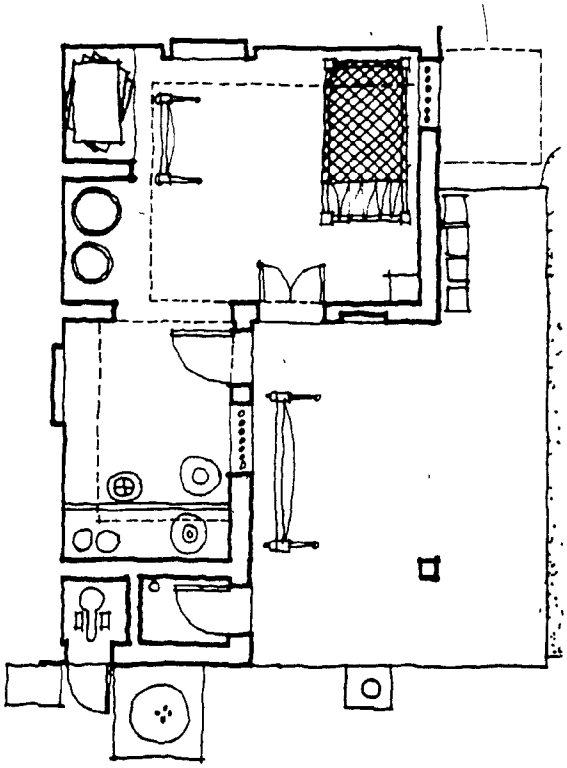
Plot size sufficient.....yes

Date of occupancy.....January, 1983

Appendix One: House Form Variations.

INTERMEDIATE CONSTRUCTION

## HOUSE # 5



SCALE: 4 METERS

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Prajapati

Employment.....mason

Initial house size.....as shown

House construction by.....owner

Construction time.....9 months

Owner has construction ability...yes

Future additions planned.....yes

Flooding problem in monsoon.....yes

Own water connection.....yes

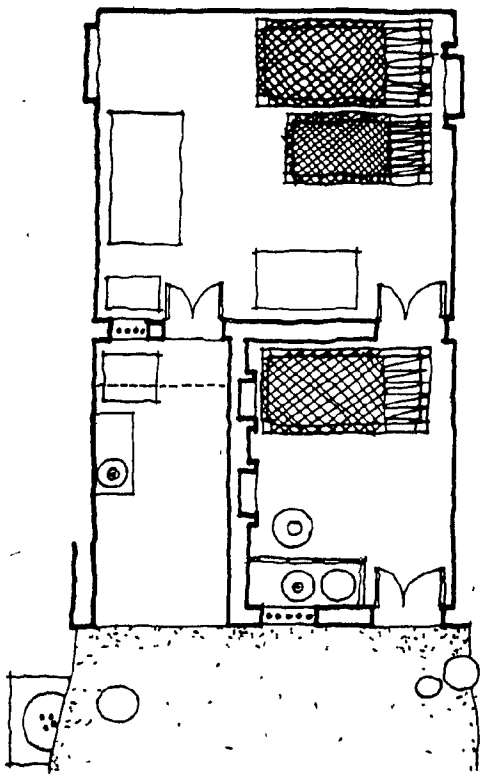
Plot size sufficient.....no

Date of occupancy.....March, 1983

Appendix One: House Form Variations.

INTERMEDIATE CONSTRUCTION

## HOUSE # 6



SCALE: 4 METERS

Number of adults.....2

Number of children.....3

Religion.....Hindu

Caste.....Sindhi

Employment.....rickshaw driver

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....yes

Flooding problem in monsoon.....no

Own water connection.....no

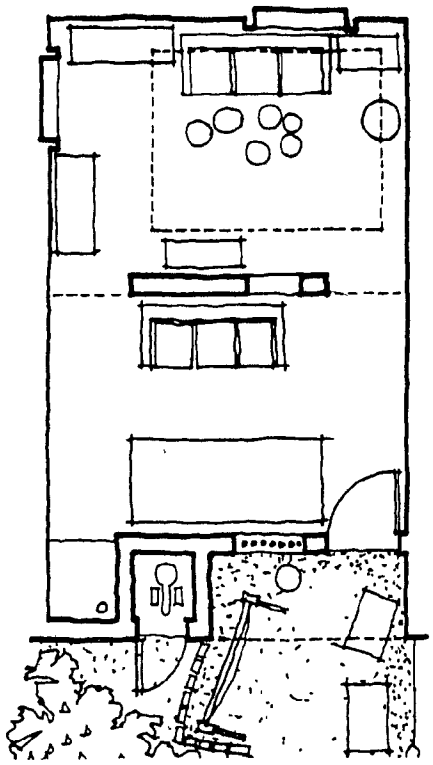
Plot size sufficient.....no

Date of occupancy.....January, 1983

Appendix One: House Form Variations.

HOUSES WITH NO STAIR

HOUSE # 7



SCALE: [redacted]4 METERS[redacted]

Number of adults.....2

Number of children.....0

Religion.....Hindu

Caste.....Thakor

Employment.....Textiles

Initial house size.....as shown

House construction by.....others

Construction time..... months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

Own water connection.....yes

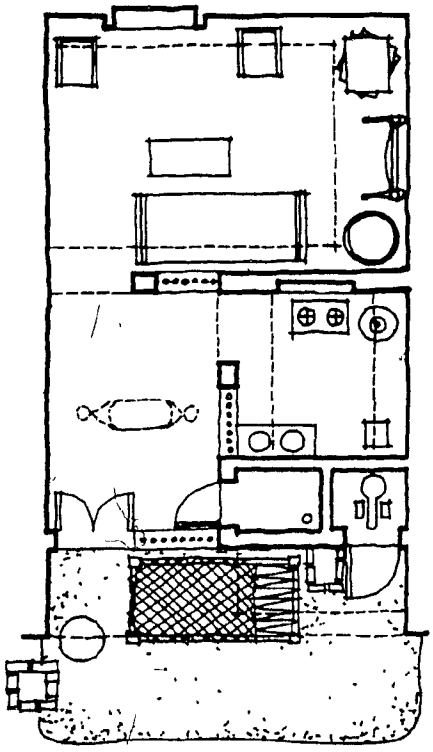
Plot size sufficient.....no

Date of occupancy.....March, 1983

Appendix One: House Form Variations.

HOUSES WITH NO STAIR

## HOUSE # 8



SCALE: 4 METERS

Number of adults.....2

Number of children.....2

Religion.....Hindu

Caste.....Brahmin

Employment.....Textiles

Initial house size.....one room

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....yes

Flooding problem in monsoon.....yes

Own water connection.....no

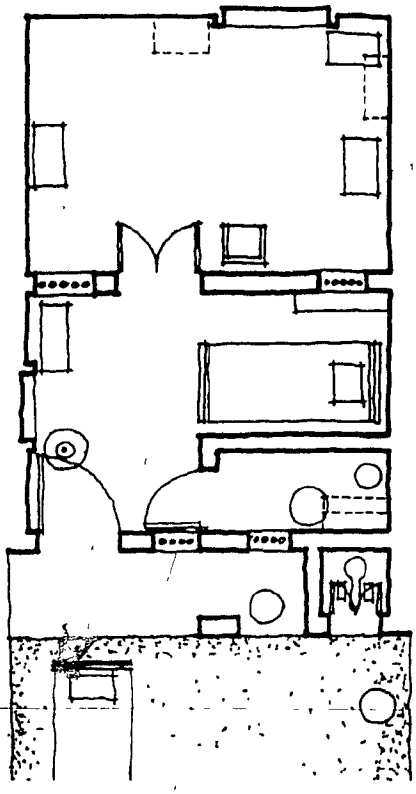
Plot size sufficient.....no

Date of occupancy.....January, 1982

Appendix One: House Form Variations.

HOUSES WITH NO STAIR

## HOUSE # 9



SCALE: 4 METERS

Number of adults.....2

Number of children.....2

Religion.....Hindu

Caste.....Sindhi

Employment.....rickshaw driver

Initial house size.....as shown

House construction by.....others

Construction time.....10 months

Owner has construction ability....no

Future additions planned.....yes

Flooding problem in monsoon.....no

Own water connection.....no

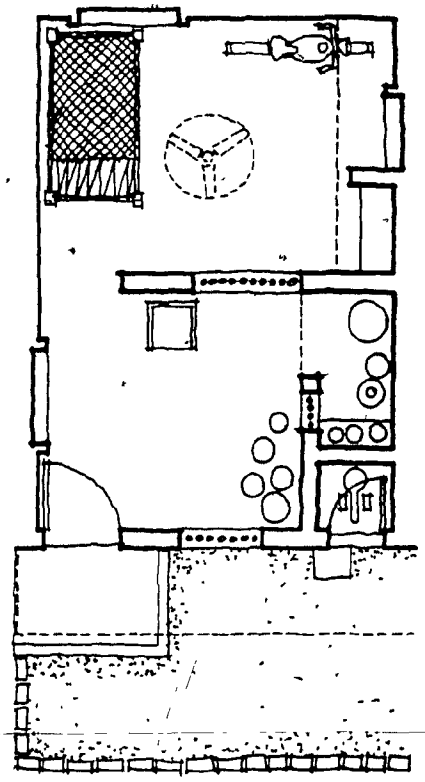
Plot size sufficient.....no

Date of occupancy.....July, 1883

Appendix One: House Form Variations.

HOUSES WITH NO STAIR

## HOUSE # 10



SCALE: 4 METERS

Number of adults.....3

Number of children.....1

Religion.....Hindu

Caste.....Marwadi

Employment.....Textiles

Initial house size.....as shown

House construction by.....others

Construction time.....7 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....no

Own water connection.....yes

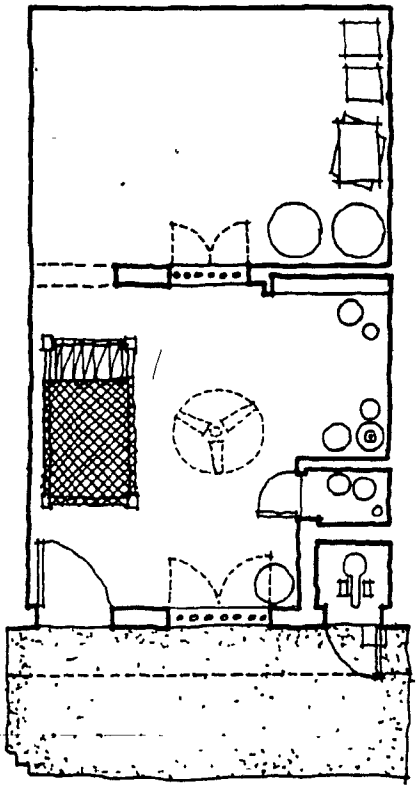
Plot size sufficient.....no

Date of occupancy.....January, 1983

Appendix One: House Form Variations.

HOUSES WITH NO STAIR

## HOUSE # 11



SCALE: 4 METERS

Number of adults.....2

Number of children.....2

Religion.....Hindu

Caste.....Thakor

Employment.....Textiles

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

Own water connection.....yes

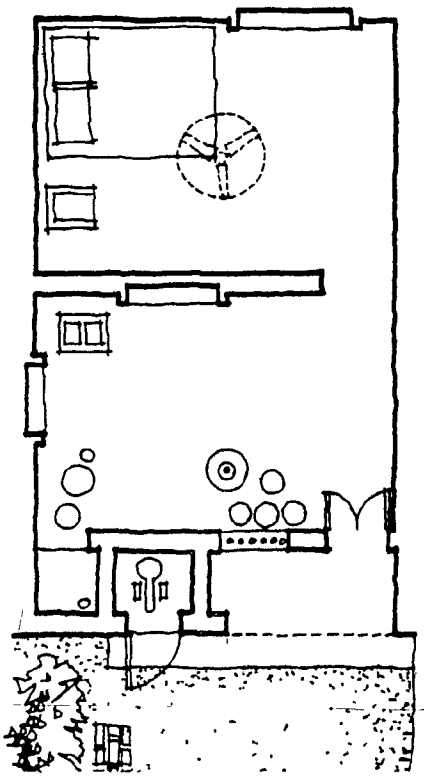
Plot size sufficient.....no

Date of occupancy.....December, 1982

Appendix One: House Form Variations.

HOUSES WITH NO STAIR

## HOUSE # 12



SCALE: 4 METERS

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Harijan

Employment.....Textiles

Initial house size.....as shown

House construction by.....others

Construction time.....8 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

Own water connection.....yes

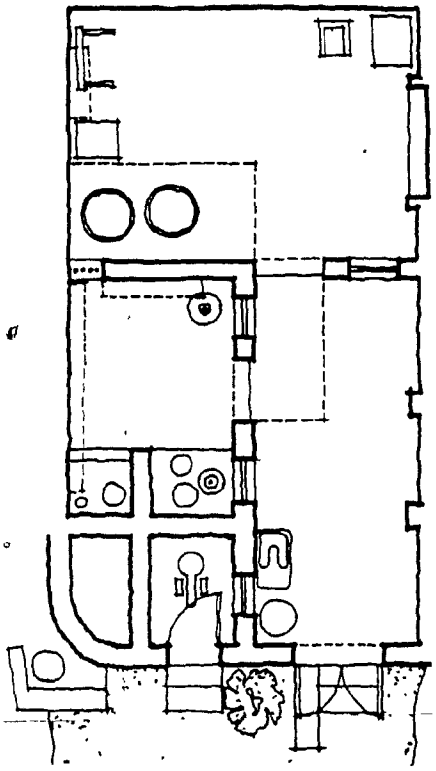
Plot size sufficient.....yes

Date of occupancy.....February, 1982

Appendix One: House Form Variations.

HOUSES WITH NO STAIR

HOUSE # 13



SCALE: [redacted]4 METERS[redacted]

Number of adults.....2

Number of children.....3

Religion.....Christian

Caste.....

Employment.....Industry

Initial house size.....as shown

House construction by.....others

Construction time.....10 months

Owner has construction ability....no

Future additions planned.....yes

Flooding problem in monsoon.....yes

Own water connection.....no

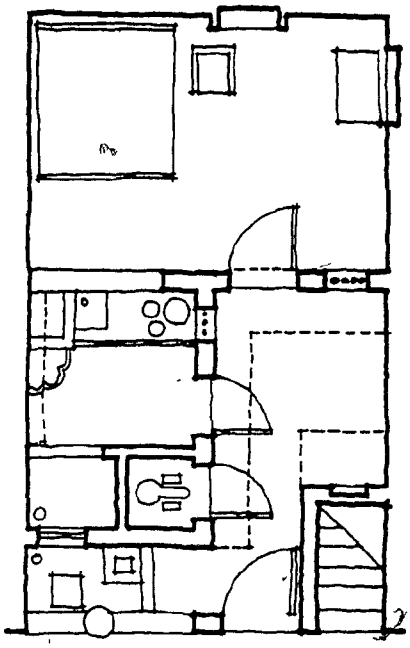
Plot size sufficient.....no

Date of occupancy.....May, 1982

Appendix One: House Form Variations.

HOUSES WITH AN INSIDE STAIR

## HOUSE # 14



SCALE: 4 METERS

Number of adults.....2

Number of children.....2

Religion.....Hindu

Caste.....Patel

Employment.....Textiles

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

Own water connection.....yes

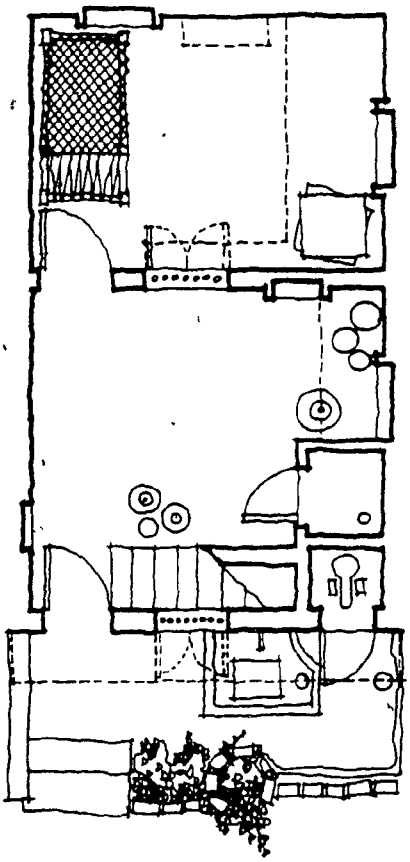
Plot size sufficient.....no

Date of occupancy.....August, 1982

Appendix One: House Form Variations.

HOUSES WITH AN INSIDE STAIR

## HOUSE # 15



SCALE: 4 METERS

| | |
|---|---|
| Number of adults.....2 | Construction time.....7 months |
| Number of children.....3 | Owner has construction ability....no |
| Religion.....Hindu | Future additions planned.....no |
| Caste.....Sindhi | Flooding problem in monsoon.....yes |
| Employment....rickshaw driver | Own water connection.....yes |
| Initial house size...as shown | Plot size sufficient.....no |
| House construction by..others | Date of occupancy.....February, 1983 |

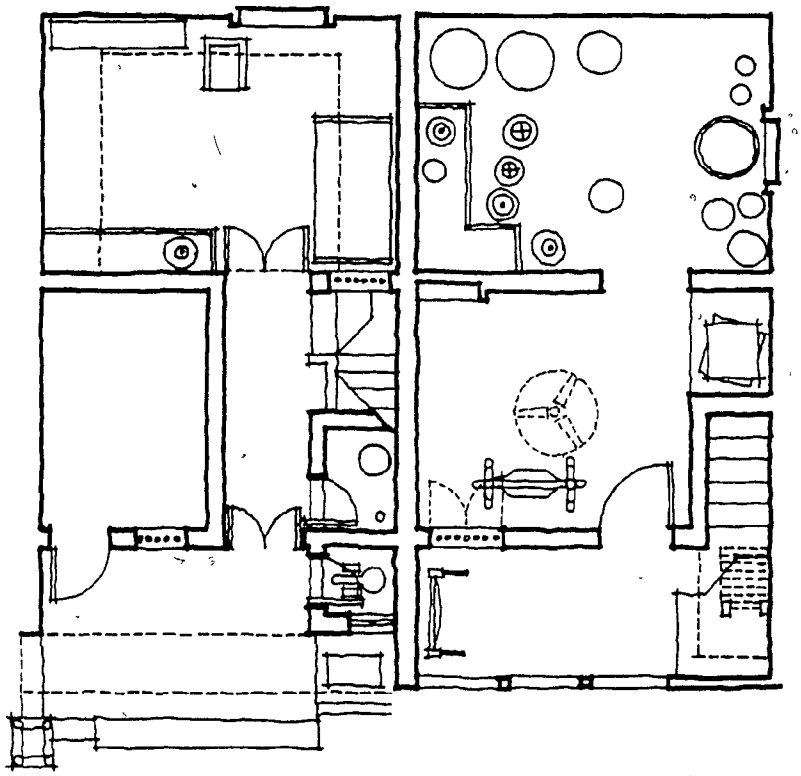
Appendix One: House Form Variations.

HOUSES WITH AN INSIDE STAIR

HOUSE # 16

Level One

Level Two



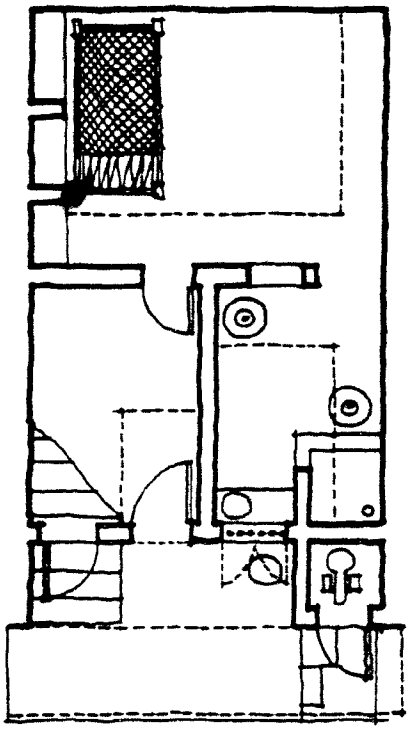
SCALE: 4 METERS

| | |
|---|---|
| Number of adults.....2 | Construction time.....9 months |
| Number of children.....3 | Owner has construction ability...yes |
| Religion.....Hindu | Future additions planned.....no |
| Caste.....Marwadi | Flooding problem in monsoon.....no |
| Employment.....construction | Own water connection.....yes |
| Initial house size...as shown | Plot size sufficient.....yes |
| House construction by..others | Date of occupancy.....December, 1982 |

Appendix One: House Form Variations.

HOUSES WITH AN INSIDE STAIR

HOUSE # 17



SCALE: 4 METERS

Number of adults.....2

Number of children.....2

Religion.....Hindu

Caste.....Sindhi

Employment..tailor & rickshaw driver

Initial house size.....as shown

House construction by.....others

Construction time.....8 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

Own water connection.....yes

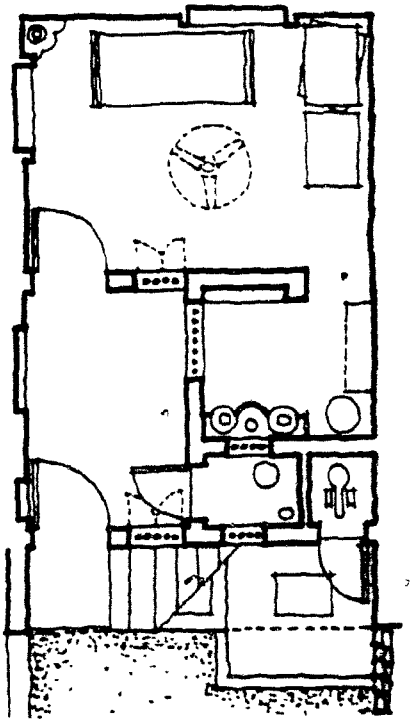
Plot size sufficient.....no

Date of occupancy.....March, 1983

Appendix One: House Form Variations.

MINOR VARIATIONS

## HOUSE # 18



SCALE: 4 METERS

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Tamil

Employment.....Textiles

Initial house size.....as shown

House construction by.....others

Construction time.....7 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

Own water connection.....yes

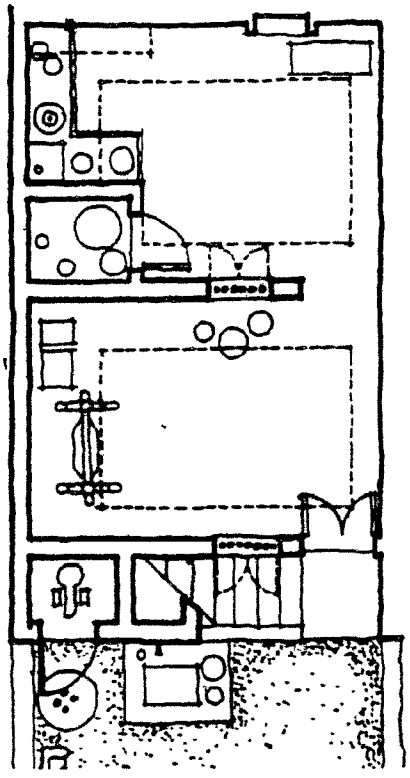
Plot size sufficient.....yes

Date of occupancy.....July, 1982

Appendix One: House Form Variations.

MINOR VARIATIONS

HOUSE # 19



SCALE: 4 METERS

Number of adults.....2

Number of children.....2

Religion.....Hindu

Caste.....Harijan

Employment.....government

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

Own water connection.....yes

Plot size sufficient.....no

Date of occupancy.....August, 1982

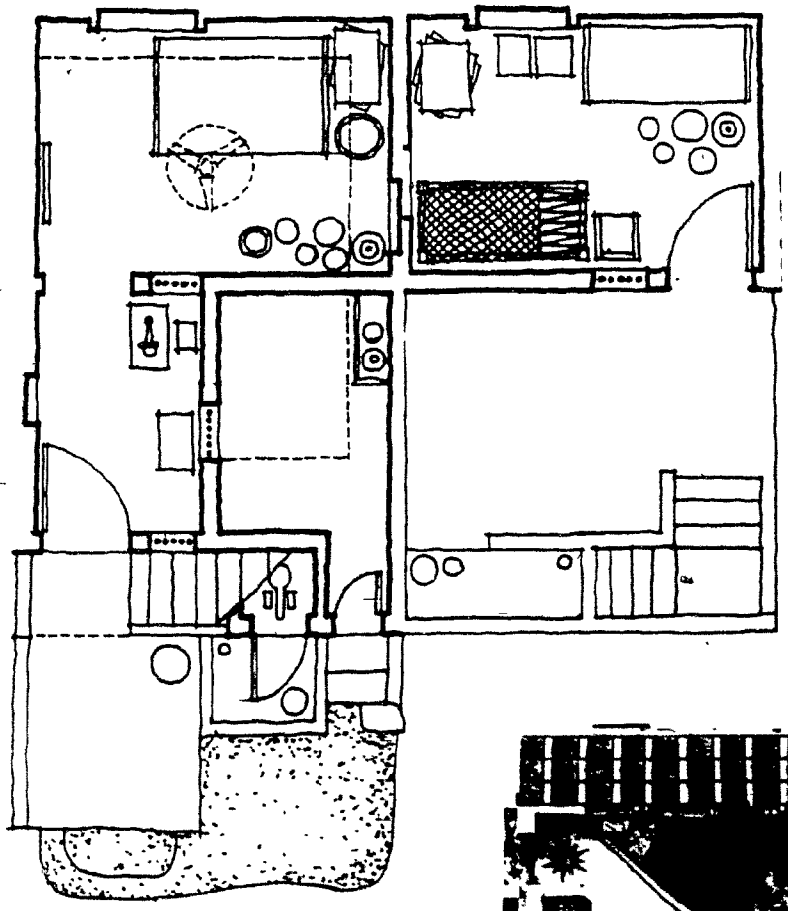
Appendix One: House Form Variations.

MINOR VARIATIONS

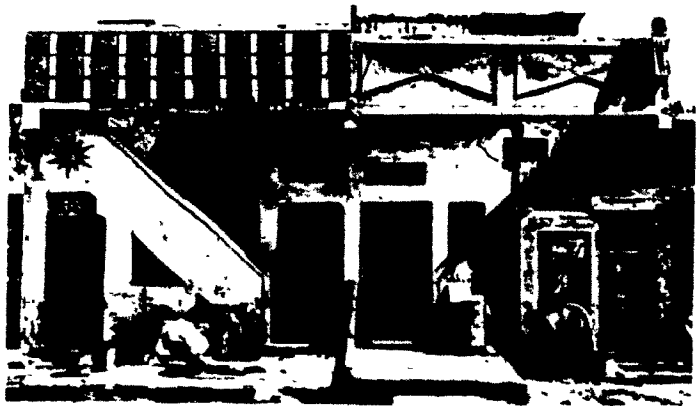
HOUSE # 20

Level one

Level two



20 (right)



SCALE:

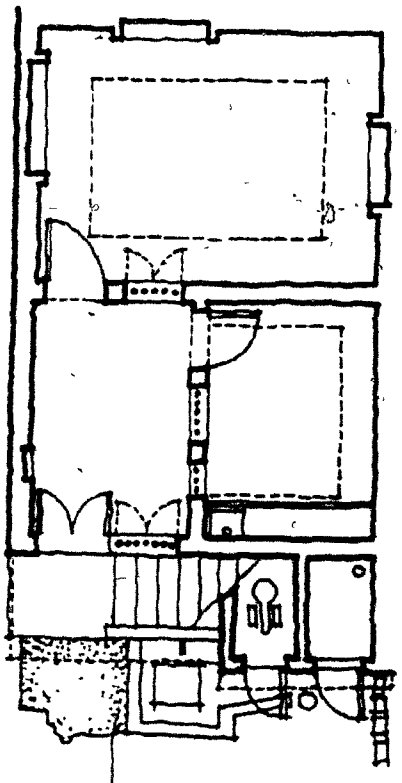
4 METERS

| | |
|---|---|
| Number of adults.....2 | Construction time.....7 months |
| Number of children.....2 | Owner has construction ability....no |
| Religion.....Hindu | Future additions planned.....no |
| Caste.....Marwadi | Flooding problem in monsoon.....yes |
| Employment..... | Own water connection.....no |
| Initial house size...as shown | Plot size sufficient.....no |
| House construction by..others | Date of occupancy.....March, 1983 |

Appendix One: House Form Variations.

MINOR VARIATIONS

## HOUSE # 21



SCALE: [redacted]4 METERS[redacted]

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Prajapati

Employment.....mason

Initial house size.....as shown

House construction by.....owner

Construction time.....6 months

Owner has construction ability...yes

Future additions planned.....no

Flooding problem in monsoon.....yes

Own water connection.....yes

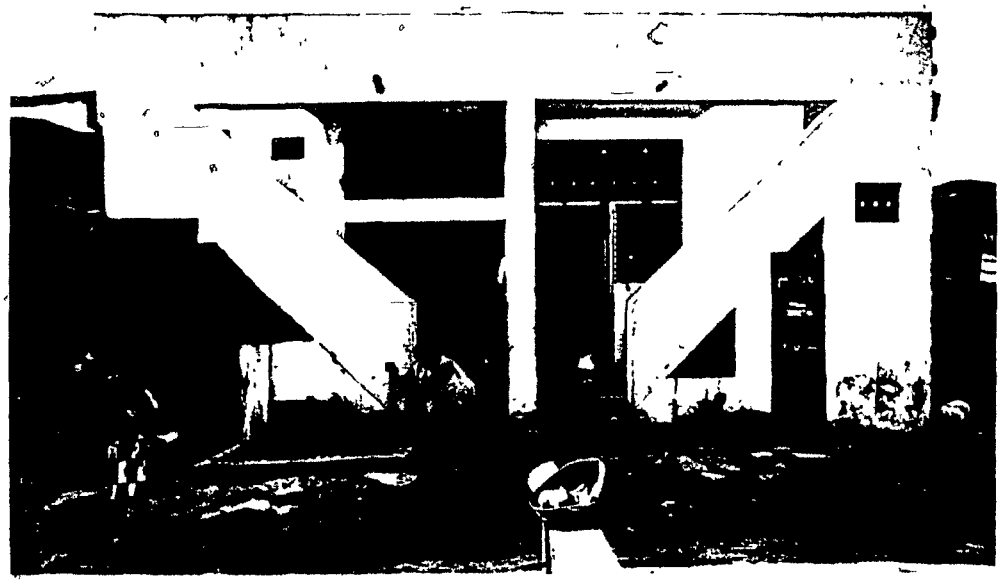
Plot size sufficient.....yes

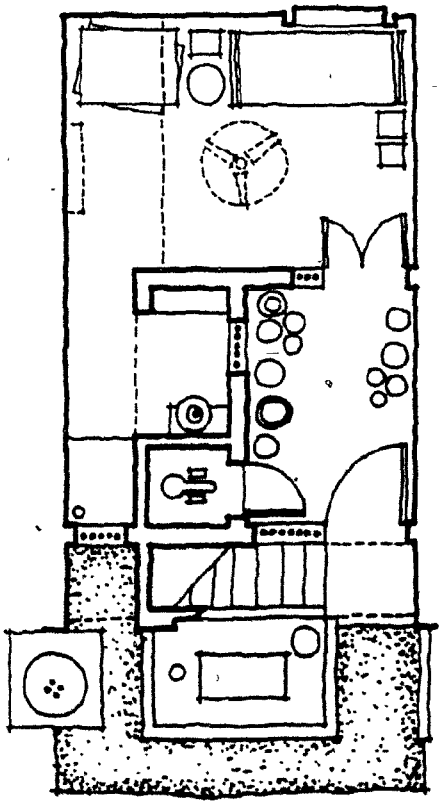
Date of occupancy.....August, 1982

Appendix One: House Form Variations.

MINOR VARIATIONS

## HOUSE # 22





SCALE: 4 METERS

Number of adults.....2

Number of children.....2

Religion.....Hindu

Caste.....Shah

Employment.....industry

Initial house size.....as shown

House construction by.....others

Construction time.....8 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

Own water connection.....yes

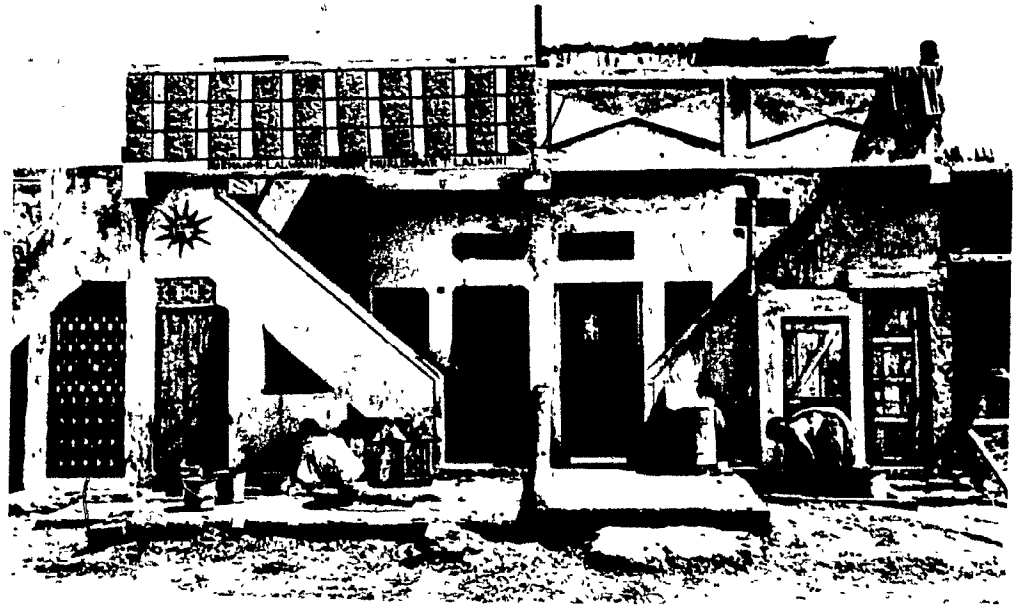
Plot size sufficient.....no

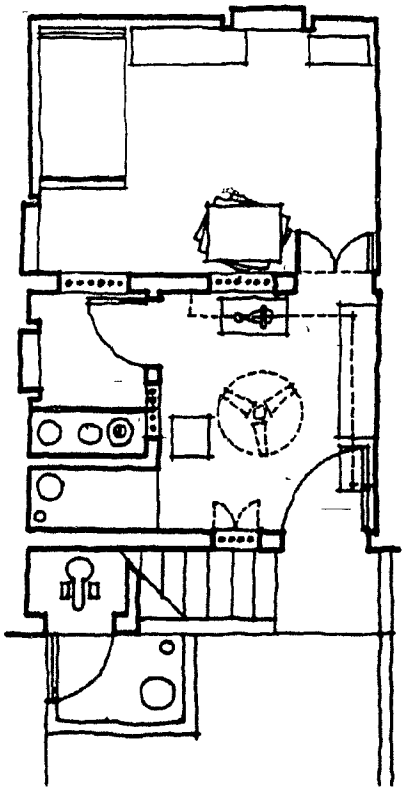
Date of occupancy.....December, 1881

Appendix One: House Form Variations.

ENCLOSED KITCHEN: STAIR/TOILET AT FRONT

HOUSE # 23





SCALE: 4 METERS

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Sindhi

Employment.....rickshaw/government

Initial house size.....as shown

House construction by.....others

Construction time.....7 months

Owner has construction ability....no

Future additions planned.....yes

Flooding problem in monsoon.....yes

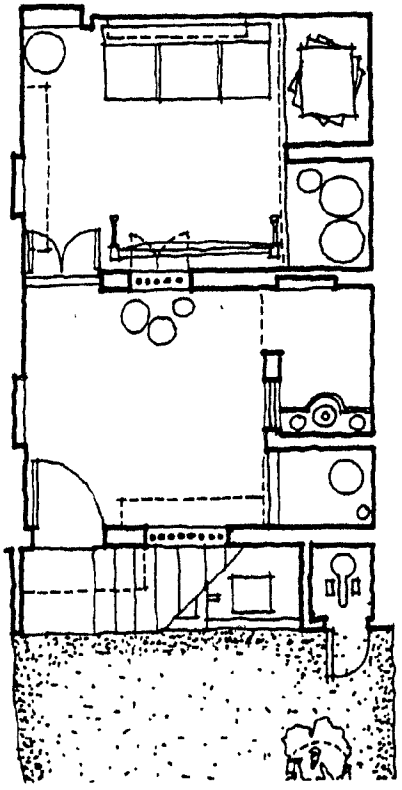
Own water connection.....no

Plot size sufficient.....no

Date of occupancy.....January, 1983

Appendix One: House Form Variations.

ENCLOSED KITCHEN: STAIR/TOILET AT FRONT HOUSE # 24



SCALE: 4 METERS

Number of adults.....2

Number of children.....0

Religion.....Hindu

Caste.....Prajapati

Employment.....mason

Initial house size.....as shown

House construction by.....owner

Construction time.....5 months

Owner has construction ability...yes

Future additions planned.....yes

Flooding problem in monsoon.....yes

Own water connection.....no

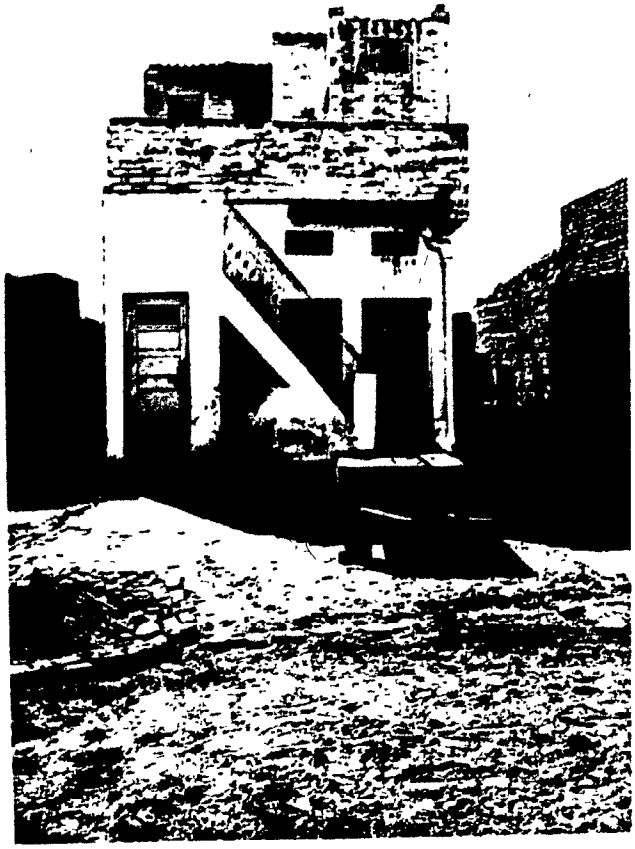
Plot size sufficient.....yes

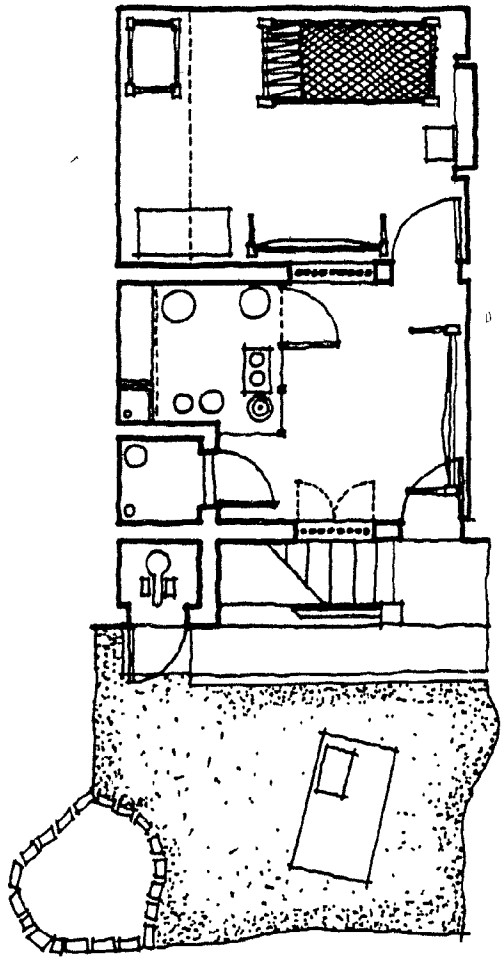
Date of occupancy.....December, 1982

Appendix One: House Form Variations.

ENCLOSED KITCHEN: STAIR/TOILET AT FRONT

HOUSE # 25



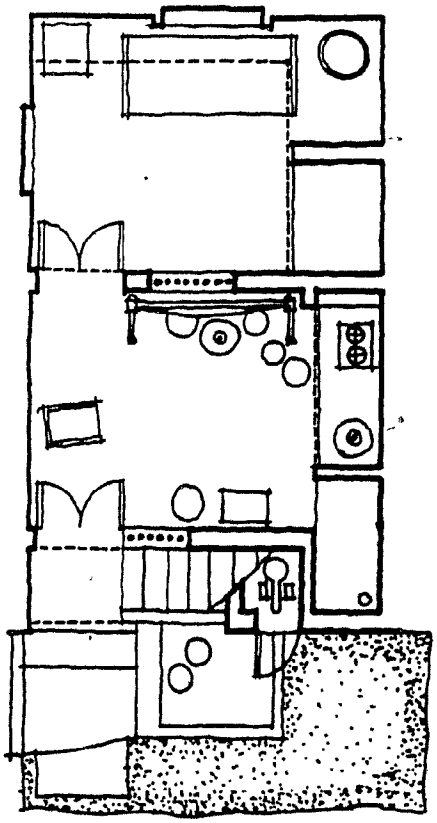


SCALE: 4 METERS

| | |
|---|---|
| Number of adults.....2 | Construction time.....9 months |
| Number of children.....4 | Owner has construction ability....no |
| Religion.....Hindu | Future additions planned.....yes |
| Caste.....Sindhi | Flooding problem in monsoon.....yes |
| Employment.....government | Own water connection.....yes |
| Initial house size...as shown | Plot size sufficient.....yes |
| House construction by..others | Date of occupancy.....March, 1983 |

Appendix One: House Form Variations.

OPEN KITCHEN: STAIR/TOILET/WASH PLACE AT FRONT HOUSE # 26.



SCALE: 4 METERS

Number of adults.....1

Number of children.....3

Religion.....Hindu

Caste.....Harijan

Employment.....office

Initial house size.....as shown

House construction by.....others

Construction time.....7 months

Owner has construction ability....no

Future additions planned.....yes

Flooding problem in monsoon.....yes

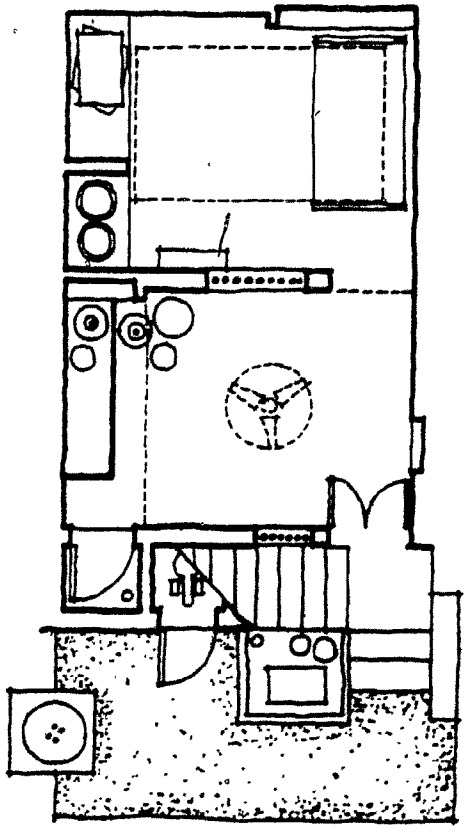
Own water connection.....yes

Plot size sufficient.....no

Date of occupancy.....January, 1982

Appendix One: House Form Variations.

OPEN KITCHEN: STAIR/TOILET/WASH PLACE AT FRONT **HOUSE # 27**



SCALE: [redacted] METERS

Number of adults.....2

Number of children.....3

Religion.....Hindu

Caste.....Prajapati

Employment.....industry

Initial house size.....as shown

House construction by.....others

Construction time.....7 months

Owner has construction ability....no

Future additions planned.....yes

Flooding problem in monsoon.....yes

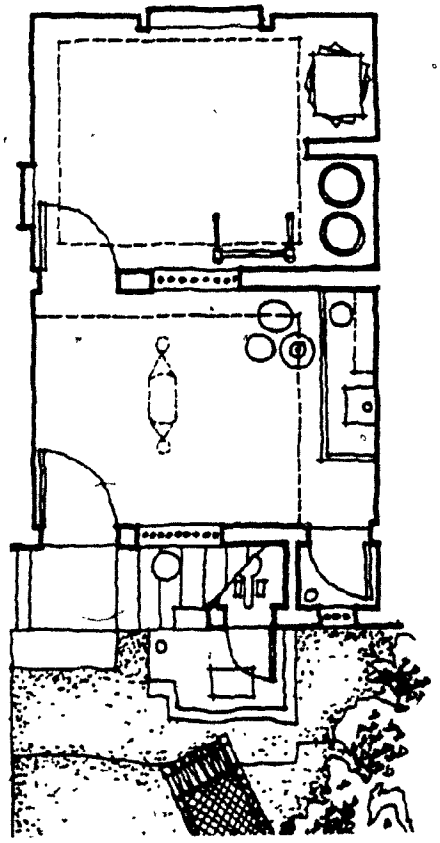
Own water connection.....yes

Plot size sufficient.....yes

Date of occupancy.....November, 1982

Appendix One: House Form Variations.

OPEN KITCHEN: STAIR/TOILET/WASH PLACE AT FRONT HOUSE # 28



SCALE: [redacted] METERS[redacted]

Number of adults.....2

Number of children.....2

Religion.....Hindu

Caste.....Prajapati

Employment.....mason

Initial house size.....as shown

House construction by.....owner

Construction time.....8 months

Owner has construction ability...yes

Future additions planned.....no

Flooding problem in monsoon.....yes

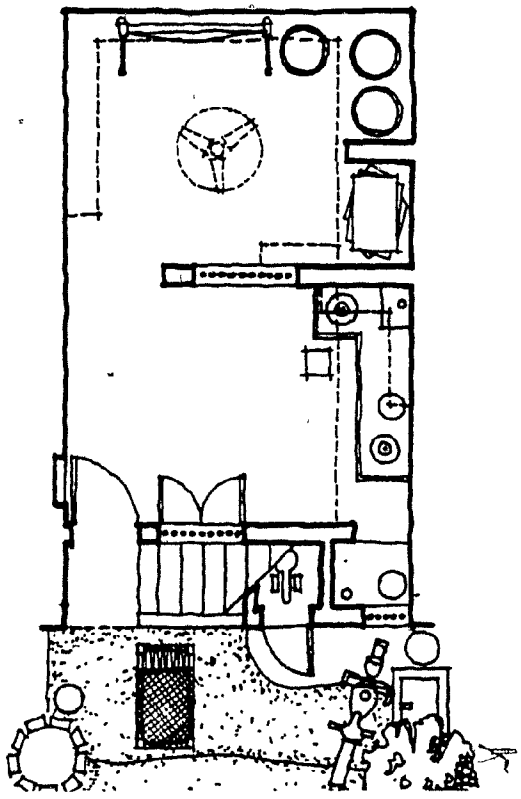
Own water connection.....yes

Plot size sufficient.....yes

Date of occupancy.....July, 1982

Appendix One: House Form Variations.

OPEN KITCHEN: STAIR/TOILET/WASH PLACE AT FRONT HOUSE # 29



SCALE: 4 METERS

Number of adults.....2

Number of children.....2

Religion.....Hindu

Caste.....Prajapati

Employment.....construction

Initial house size.....as shown

House construction by.....owner

Construction time.....6 months

Owner has construction ability...yes

Future additions planned.....no

Flooding problem in monsoon.....yes

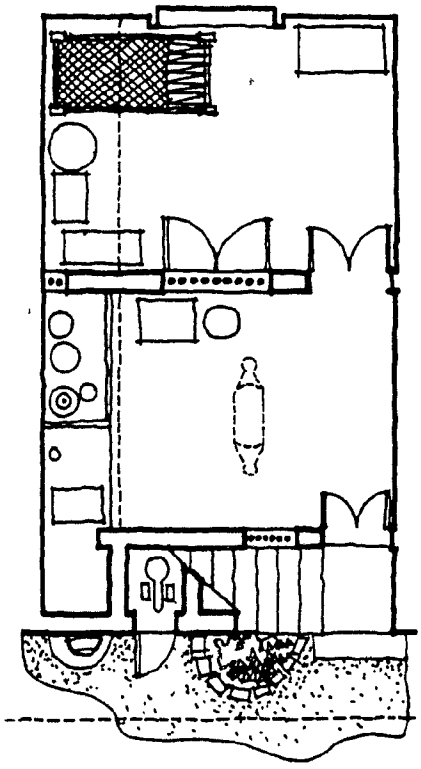
Own water connection.....yes

Plot size sufficient.....yes

Date of occupancy.....October, 1981

Appendix One: House Form Variations.

OPEN KITCHEN: STAIR/TOILET/WASH PLACE AT FRONT **HOUSE # 30**



SCALE: 4 METERS

Number of adults.....2

Number of children.....2

Religion.....Hindu

Caste.....Sindhi

Employment.....vendor

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

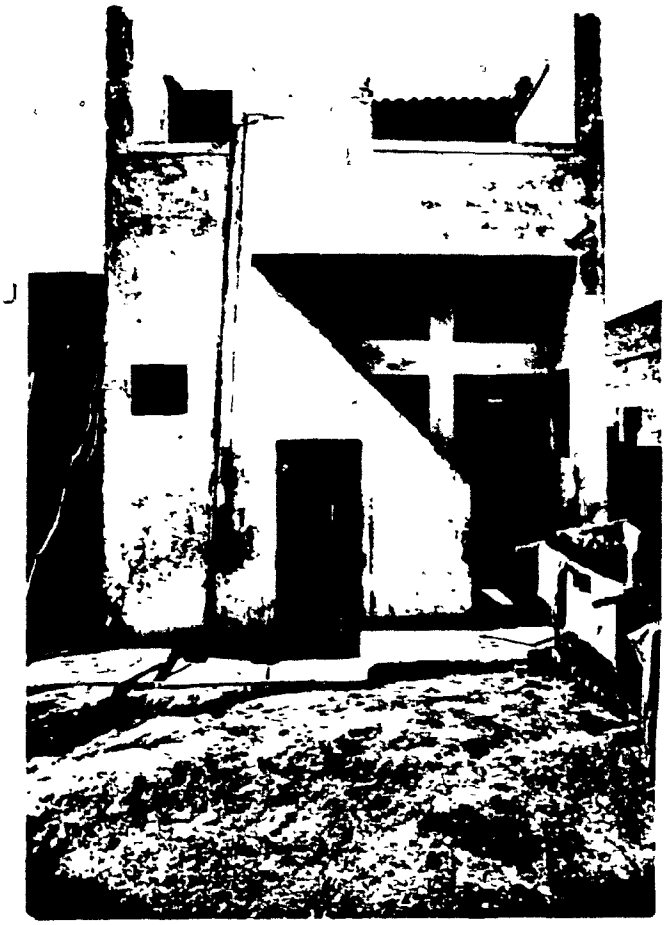
Own water connection.....yes

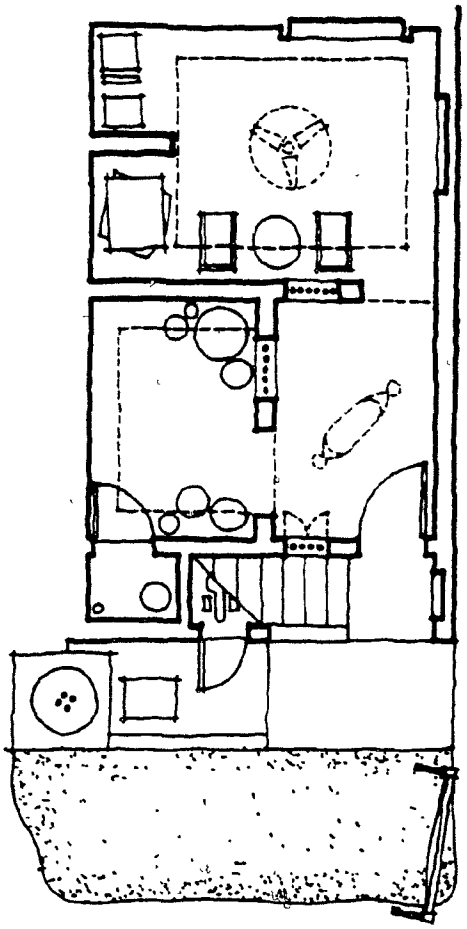
Plot size sufficient.....no

Date of occupancy.....March, 1983

Appendix One: House Form Variations.

ENCLOSED KITCHEN: STAIR/WC/WASHPLACE AT FRONT **HOUSE # 31**





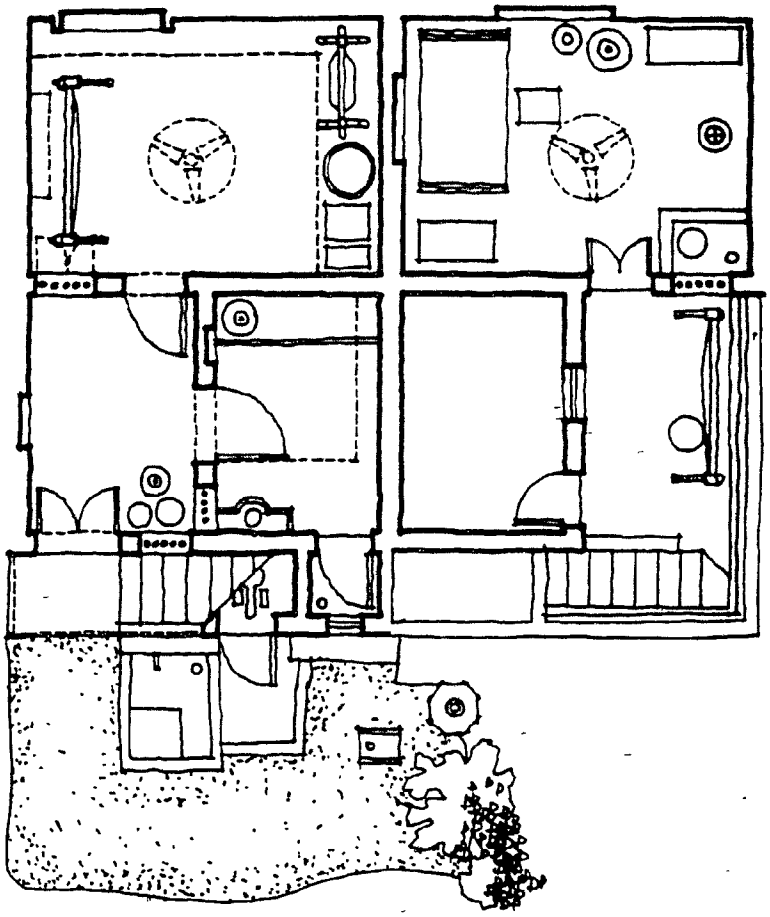
SCALE: 4 METERS

| | |
|---|---|
| Number of adults.....2 | Construction time.....5 months |
| Number of children.....2 | Owner has construction ability....no |
| Religion.....Hindu | Future additions planned.....no |
| Caste.....Goldsmith | Flooding problem in monsoon.....yes |
| Employment.....teacher | Own water connection.....yes |
| Initial house size...as shown | Plot size sufficient.....yes |
| House construction by..others | Date of occupancy.....January, 1982 |

Appendix One: House Form Variations.

ENCLOSED KITCHEN: STAIR/WC/WASHPLACE AT FRONT **HOUSE # 32**

Level One Level Two

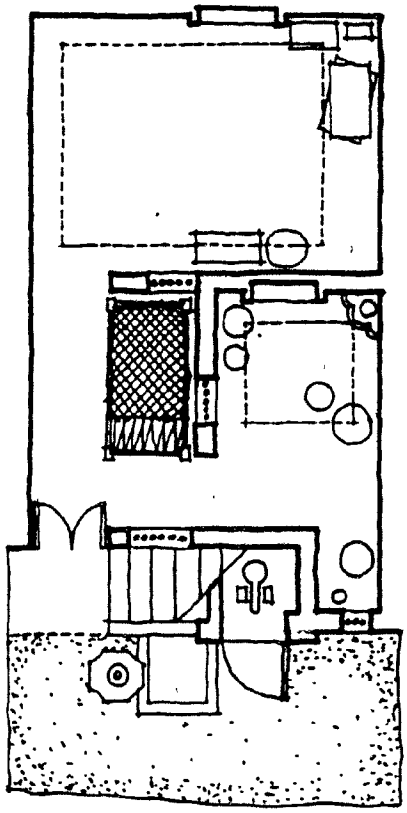


SCALE: 4 METERS

| | |
|---|---|
| Number of adults.....2 | Construction time.....6 months |
| Number of children.....2 | Owner has construction ability....no |
| Religion.....Hindu | Future additions planned.....no |
| Caste.....Rajput | Flooding problem in monsoon.....yes |
| Employment.....industry | Own water connection.....yes |
| Initial house size...as shown | Plot size sufficient.....yes |
| House construction by..others | Date of occupancy.....June, 1983 |

Appendix One: House Form Variations.

ENCLOSED KITCHEN: STAIR/WC/WASHPLACE AT FRONT **HOUSE # 33**



SCALE: 4 METERS

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Prajapati

Employment.....office

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....no

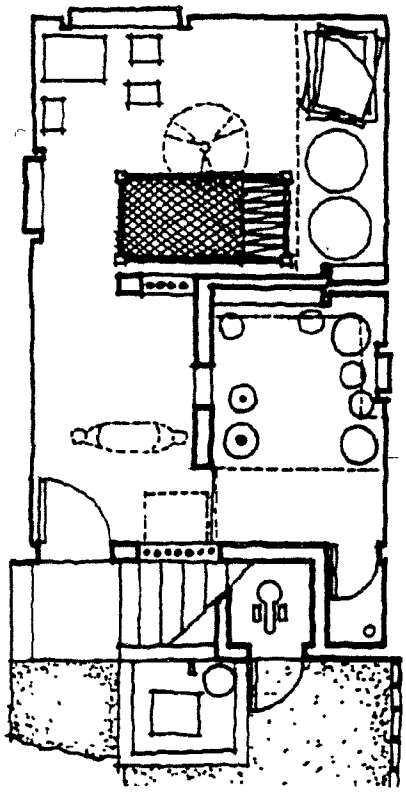
Own water connection.....yes

Plot size sufficient.....yes

Date of occupancy....December, 1982

Appendix One: House Form Variations.

ENCLOSED KITCHEN: STAIR/WC/WASHPLACE AT FRONT HOUSE # 34



SCALE: [redacted]4 METERS[redacted]

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Rajput

Employment.....textiles

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....no

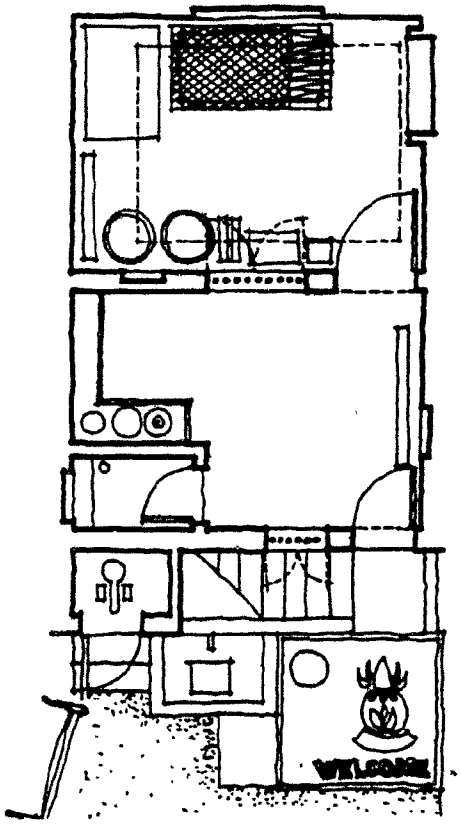
Own water connection.....yes

Plot size sufficient.....yes

Date of occupancy.....July, 1983

Appendix One: House Form Variations.

HOUSES WITH OPEN KITCHEN: STAIR/WC AT FRONT HOUSE # 35




SCALE: 4 METERS

Number of adults.....2

Number of children.....4

Religion.....Hindu

Caste.....Prajapati

Employment.....construction

Initial house size.....as shown

House construction by.....others

Construction time.....8 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

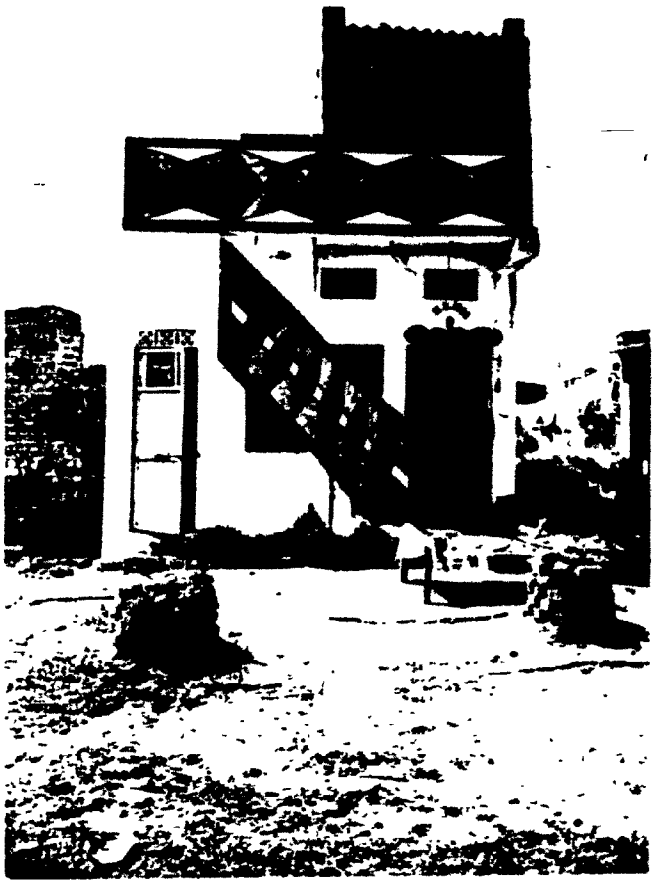
Own water connection.....yes

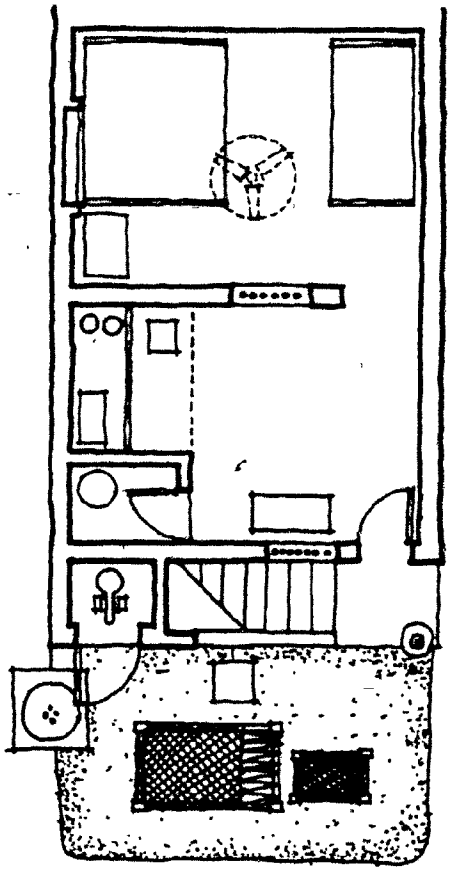
Plot size sufficient.....yes

Date of occupancy.....July, 1982

Appendix One: House Form Variations.

HOUSES WITH OPEN KITCHEN: STAIR/WC AT FRPNT **HOUSE # 36**



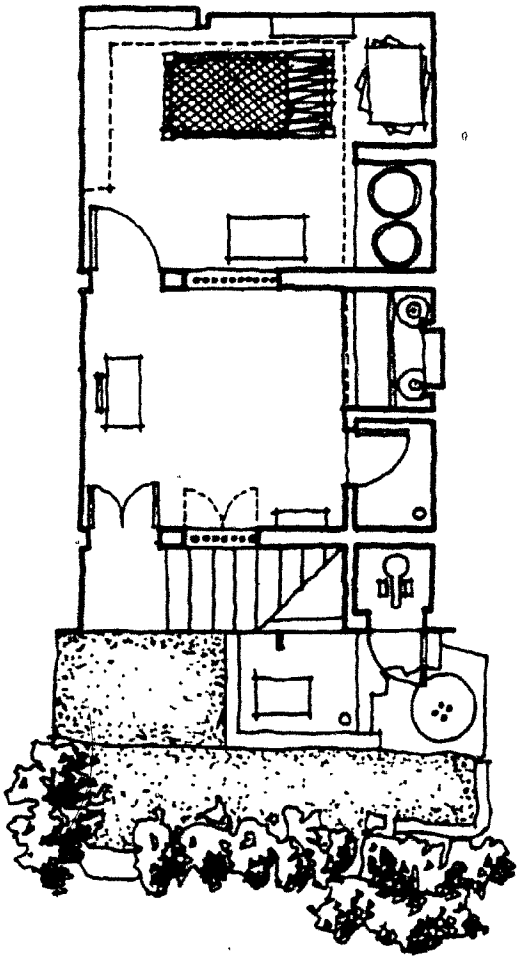


SCALE: 4 METERS

| | |
|---|---|
| Number of adults.....4 | Construction time.....6 months |
| Number of children.....2 | Owner has construction ability....no |
| Religion.....Hindu | Future additions planned.....no |
| Caste.....Sindhi | Flooding problem in monsoon.....no |
| Employment....rickshaw driver | Own water connection.....yes |
| Initial house size...as shown | Plot size sufficient.....yes |
| House construction by..others | Date of occupancy.....July, 1982 |

Appendix One: House Form Variations.

HOUSES WITH OPEN KITCHEN: STAIR/WC AT FRONT HOUSE # 37

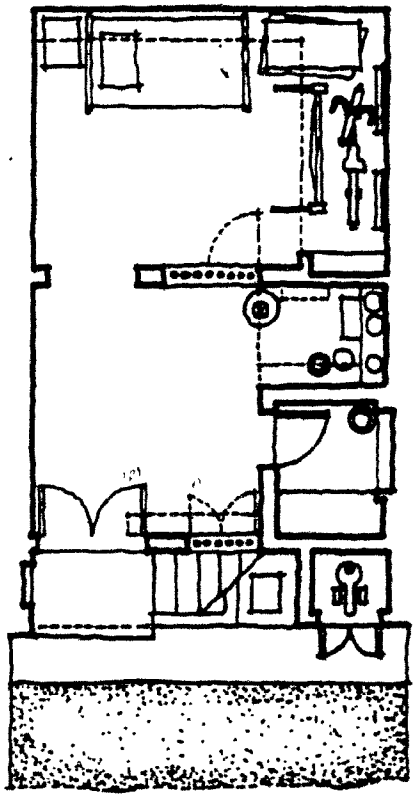


SCALE: [redacted]4 METERS[redacted]

| | |
|---|---|
| Number of adults.....2 | Construction time.....6 months |
| Number of children.....4 | Owner has construction ability...yes |
| Religion.....Hindu | Future additions planned.....yes |
| Caste.....Prajapati | Flooding problem in monsoon.....yes |
| Employment.....construction | Own water connection.....yes |
| Initial house size...as shown | Plot size sufficient.....no |
| House construction by...owner | Date of occupancy.....December, 1981 |

Appendix One: House Form Variations.

HOUSES WITH OPEN KITCHEN/ STAIR/WC AT FRONT HOUSE # 38



SCALE: 4 METERS

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Harijan

Employment.....service

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

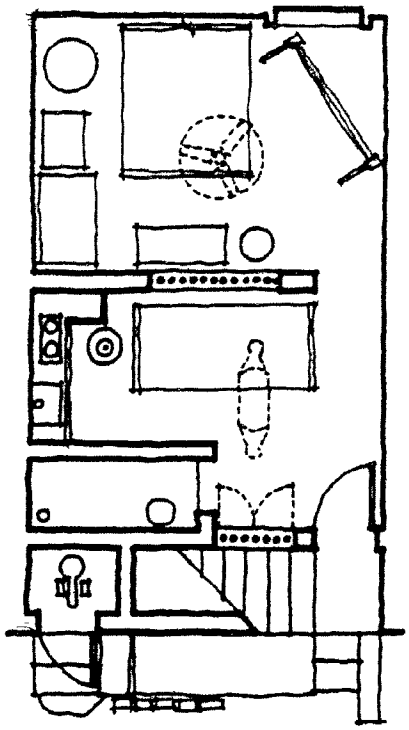
Own water connection.....no

Plot size sufficient.....yes

Date of occupancy.....August, 1982

Appendix One: House Form Variations.

HOUSES WITH OPEN KITCHEN: STAIR/WC AT FRONT HOUSE # 39

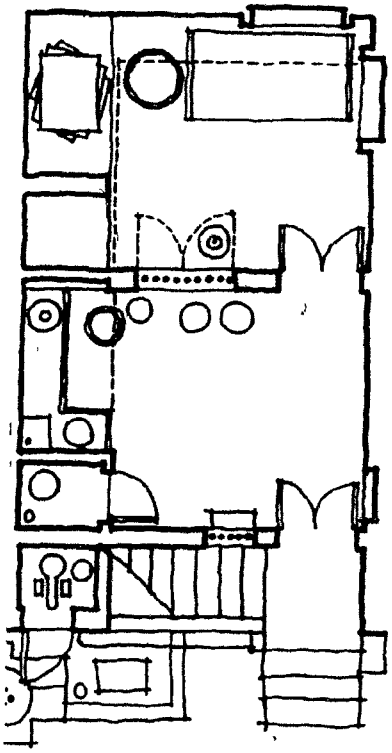


SCALE: 4 METERS

| | |
|---|---|
| Number of adults.....2 | Construction time.....6 months |
| Number of children.....2 | Owner has construction ability....no |
| Religion.....Hindu | Future additions planned.....no |
| Caste.....Sindhi | Flooding problem in monsoon.....yes |
| Employment.....industry | Own water connection.....yes |
| Initial house size...as shown | Plot size sufficient.....yes |
| House construction by..others | Date of occupancy.....February, 1983 |

Appendix One: House Form Variations.

HOUSES WITH OPEN KITCHEN: STAIR/WC AT FRONT HOUSE # 40



SCALE: 4 METERS

Number of adults.....2

Number of children.....3

Religion.....Hindu

Caste.....Patel

Employment.....Textiles

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

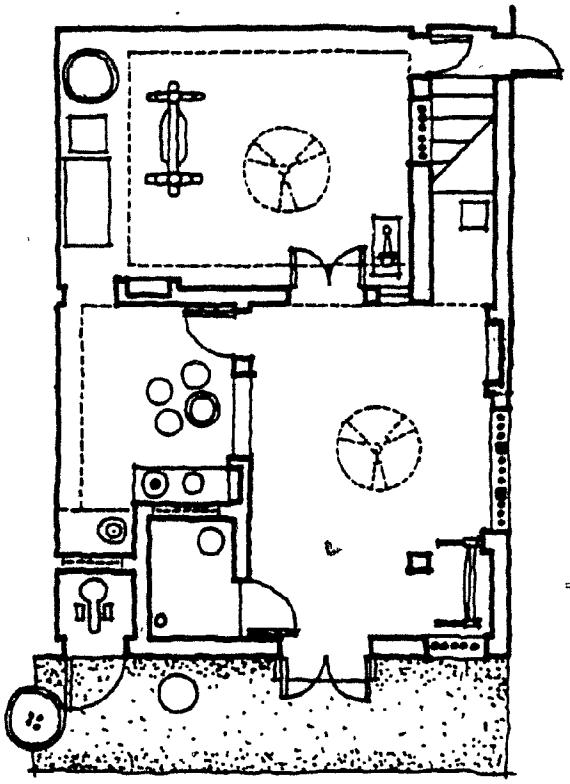
Own water connection.....yes

Plot size sufficient.....yes

Date of occupancy....September, 1983

Appendix One: House Form Variations.

CORNER HOUSES WITH ENCLOSED ENTRANCE ROOM HOUSE # 41



SCALE: 4 METERS

Number of adults.....4

Number of children.....2

Religion.....Hindu

Caste.....carpeneter

Employment.....construction

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

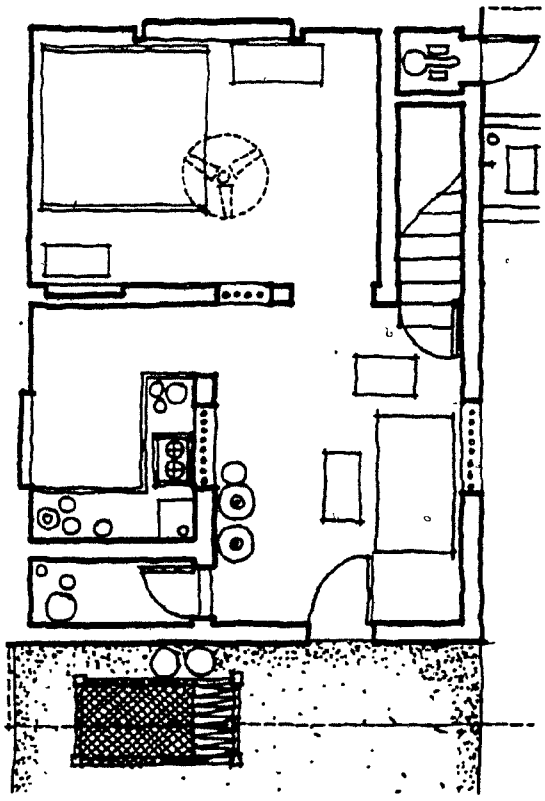
Own water connection.....yes

Plot size sufficient.....yes

Date of occupancy.....February, 1983

Appendix One: House Form Variations.

CORNER HOUSES WITH ENCLOSED ENTRANCE ROOM **HOUSE # 42**



SCALE: 4 METERS

Number of adults.....2

Number of children.....4

Religion.....Hindu

Caste.....Sindhi

Employment.....government/vendor

Initial house size.....as shown

House construction by.....others

Construction time.....8 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

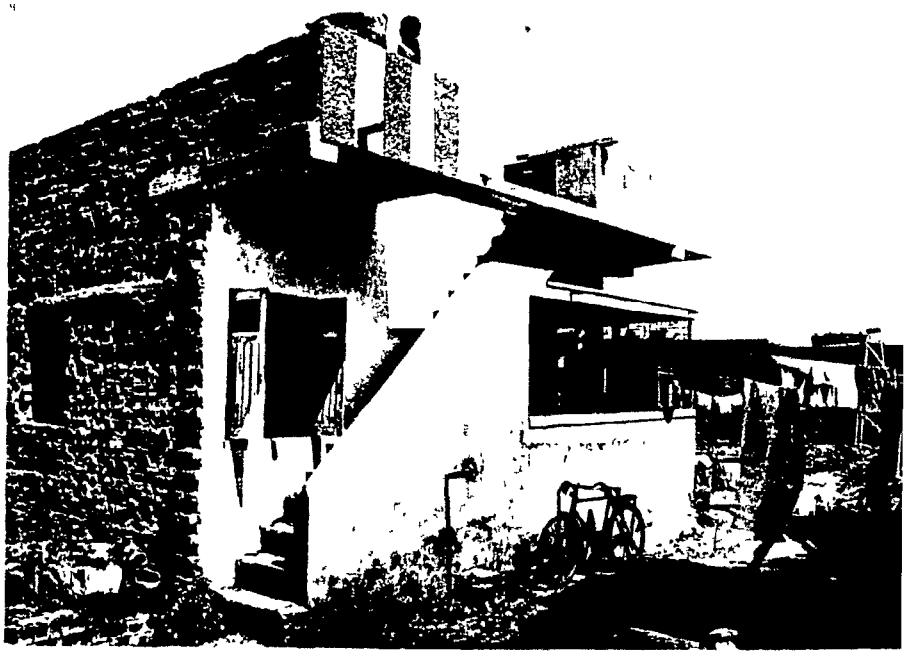
Own water connection.....yes

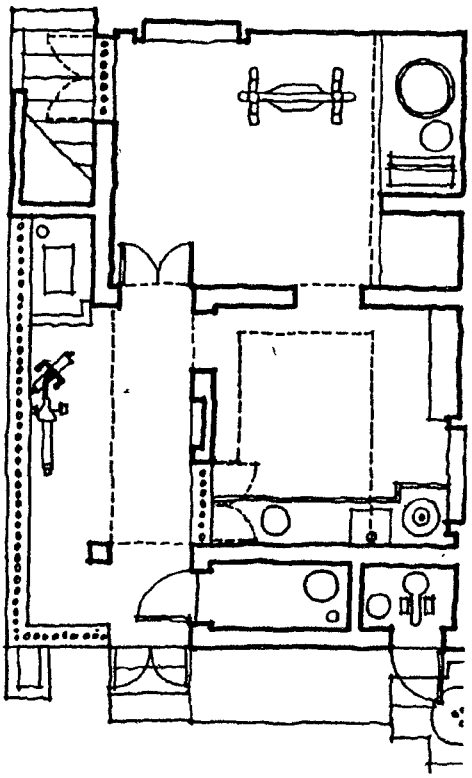
Plot size sufficient.....no

Date of occupancy.....January, 1983

Appendix One: House Form Variations.

CORNER HOUSES: OPEN CORNER ROOM & WC/WP PAIRED **HOUSE # 43**





SCALE: [redacted]4 METERS[redacted]

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Prajapati

Employment.....mason

Initial house size.....as shown

House construction by.....owner

Construction time.....6 months

Owner has construction ability...yes

Future additions planned.....no

Flooding problem in monsoon.....yes

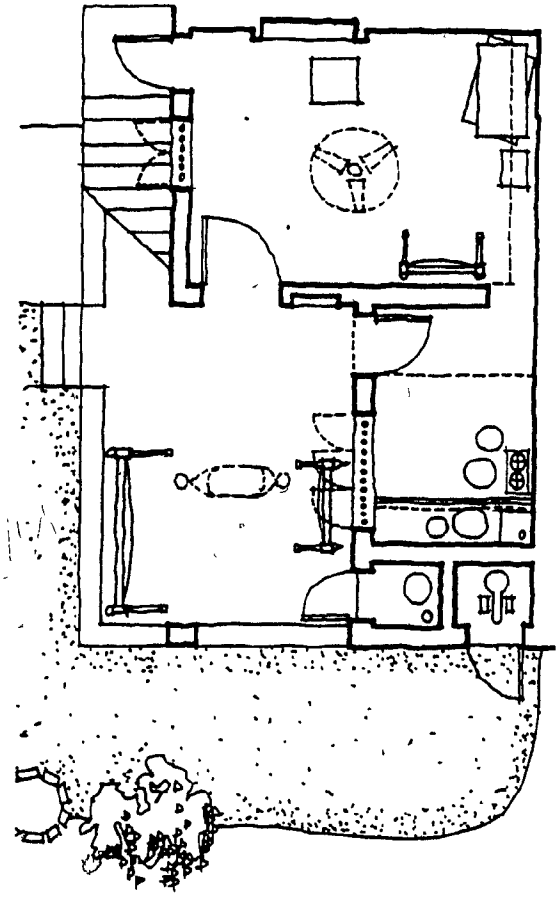
Own water connection.....yes

Plot size sufficient.....yes

Date of occupancy.....August, 1983

Appendix One: House Form Variations.

CORNER HOUSES: OPEN CORNER ROOM & WC/WP PAIRED **HOUSE # 44**



SCALE: 4 METERS

Number of adults.....2

Number of children.....2

Religion.....Hindu

Caste.....Prajapati

Employment.....carpenter

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

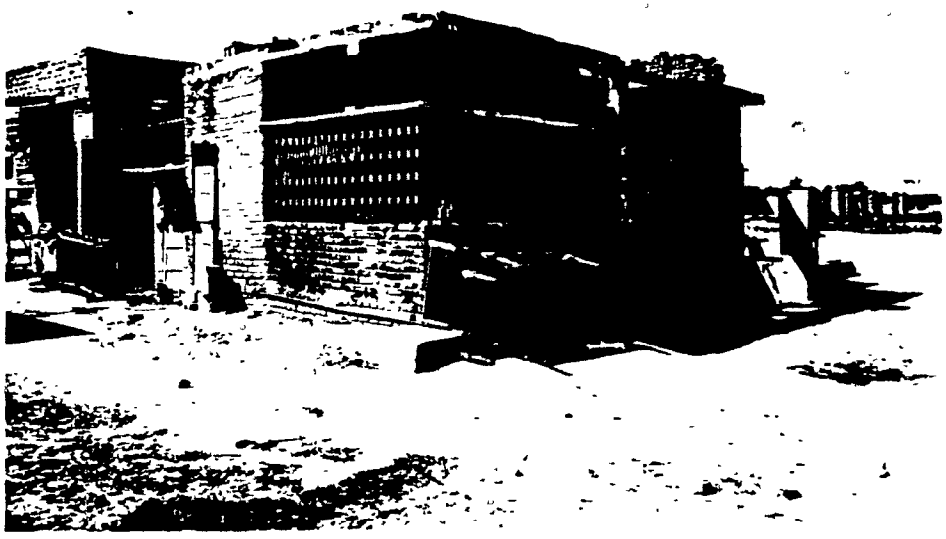
Own water connection.....yes

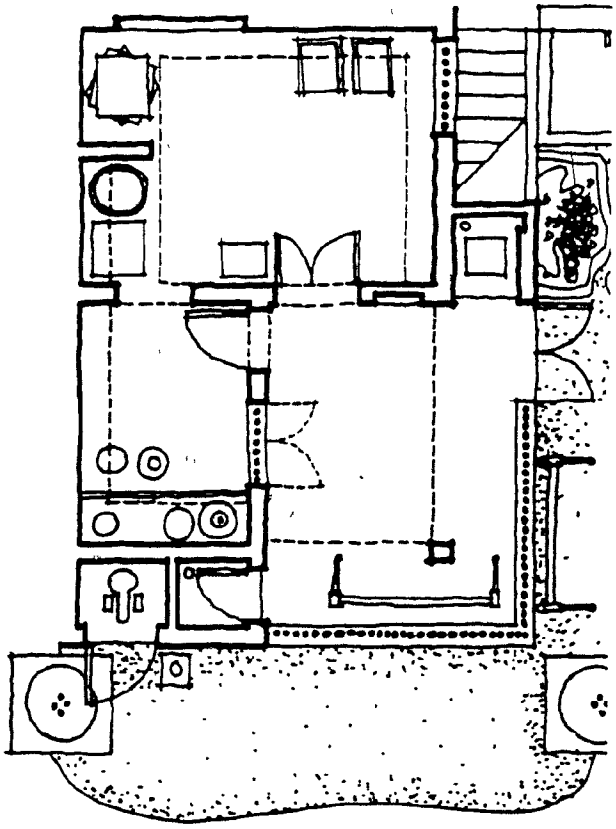
Plot size sufficient.....no

Date of occupancy.....March, 1983

Appendix One: House Form Variations.

CORNER HOUSES: OPEN CORNER ROOM & WC/WP PAIRED HOUSE # 45





SCALE: 4 METERS

Number of adults.....2

Number of children.....3

Religion.....Hindu

Caste.....Prajapati

Employment.....mason

Initial house size.....as shown

House construction by.....owner

Construction time.....8 months

Owner has construction ability...yes

Future additions planned.....no

Flooding problem in monsoon.....no

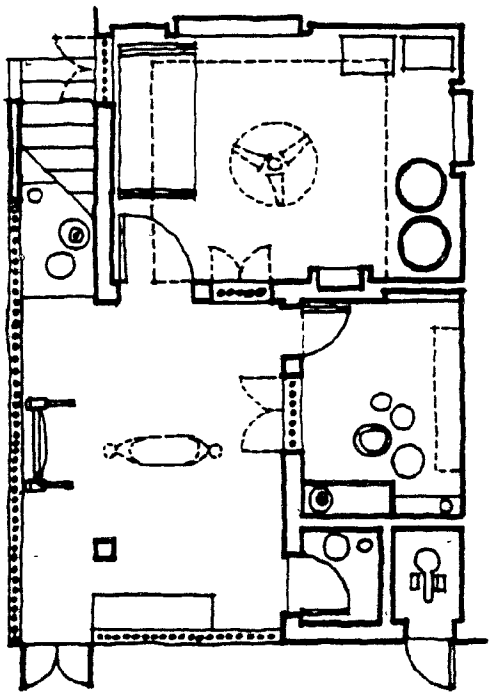
Own water connection.....yes

Plot size sufficient.....no

Date of occupancy.....October, 1982

Appendix One: House Form Variations.

CORNER HOUSES: OPEN CORNER ROOM & WC/WP PAIRED **HOUSE # 46**



SCALE: [redacted]4 METERS[redacted]

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Prajapati

Employment.....mason

Initial house size.....as shown

House construction by.....owner

Construction time.....6 months

Owner has construction ability...yes

Future additions planned.....yes

Flooding problem in monsoon.....yes

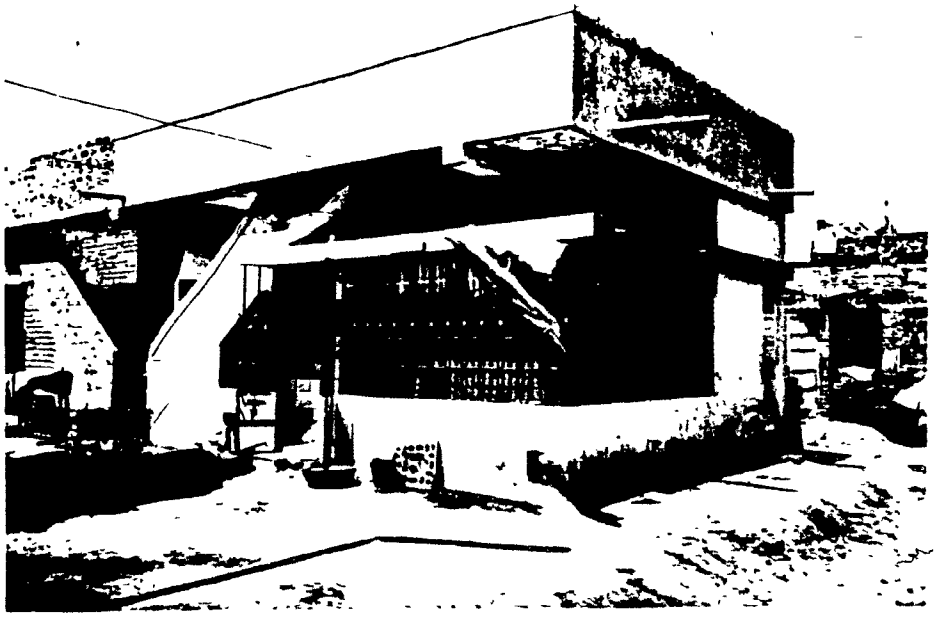
Own water connection.....yes

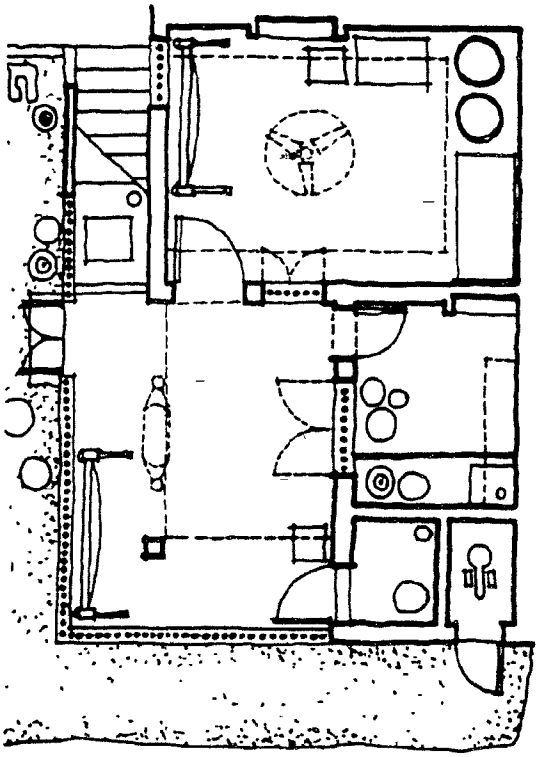
Plot size sufficient.....yes

Date of occupancy.....March, 1982

Appendix One: House Form Variations.

CORNER HOUSES: OPEN CORNER ROOM & WC/WP PAIRED **HOUSE # 47**





SCALE: [redacted]4 METERS[redacted]

Number of adults.....3

Number of children.....3

Religion.....Hindu

Caste.....Prajapati

Employment.....construction

Initial house size.....as shown

House construction by.....owner

Construction time.....3 months

Owner has construction ability...yes

Future additions planned.....yes

Flooding problem in monsoon.....yes

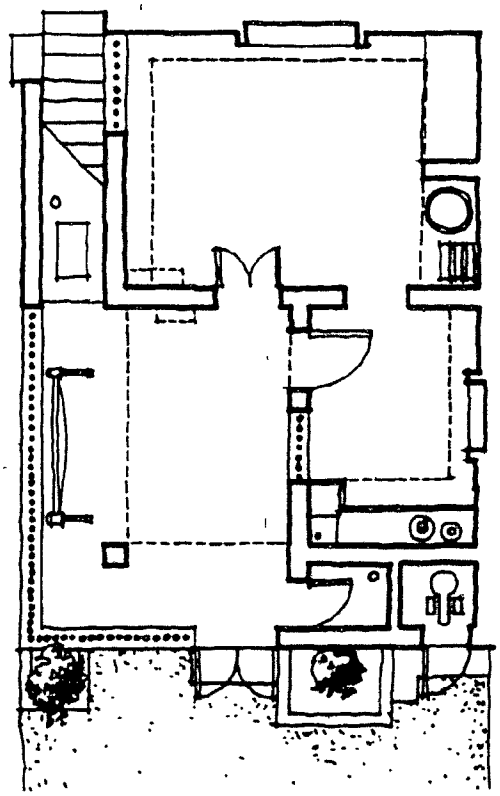
Own water connection.....yes

Plot size sufficient.....yes

Date of occupancy.....February, 1982

Appendix One: House Form Variations.

CORNER HOUSES: OPEN CORNER ROOM & WC/WP PAIRED **HOUSE # 48**



SCALE: 4 METERS

Number of adults.....2

Number of children.....3

Religion.....Hindu

Caste.....Prajapati

Employment.....mason

Initial house size.....as shown

House construction by.....others

Construction time.....7 months

Owner has construction ability...yes

Future additions planned.....no

Flooding problem in monsoon.....yes

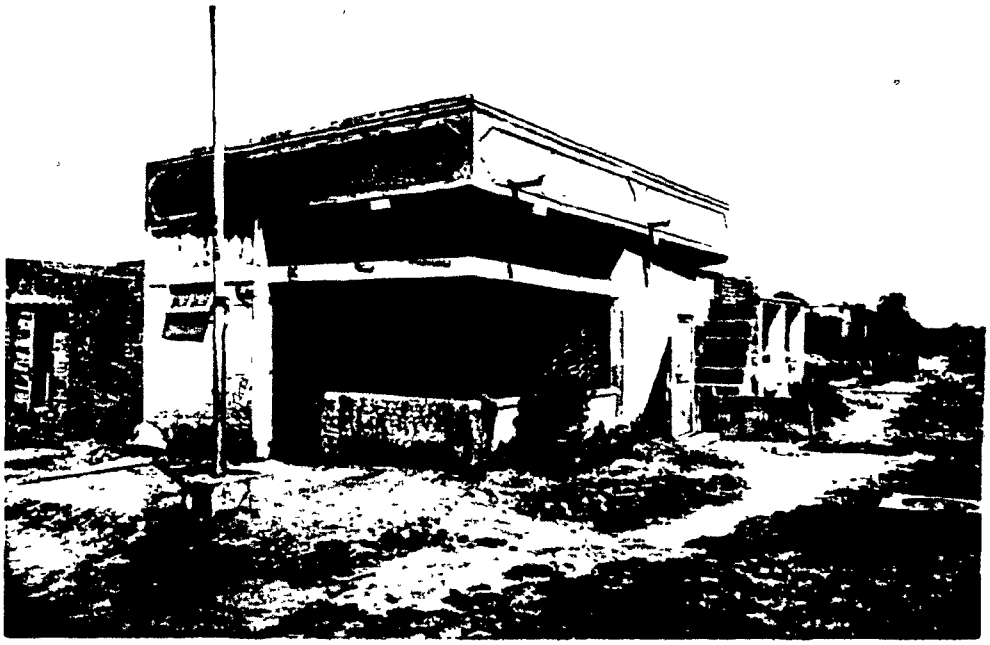
Own water connection.....yes

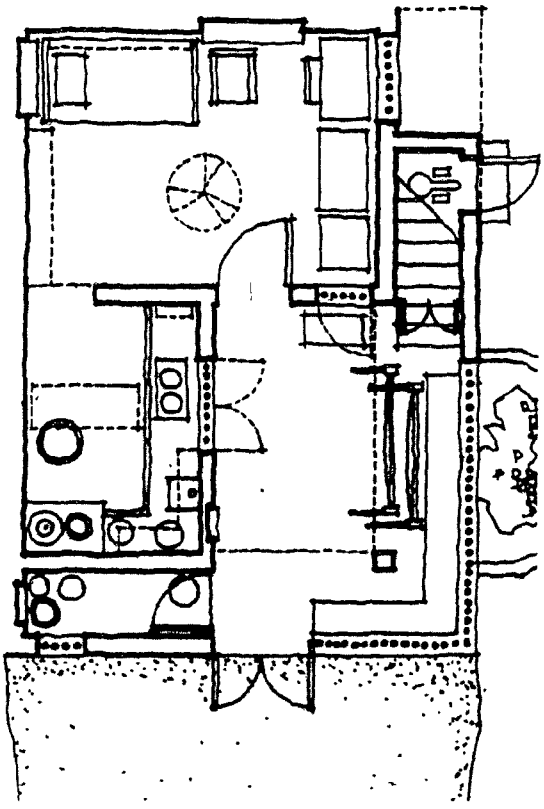
Plot size sufficient.....yes

Date of occupancy.....July, 1982

Appendix One: House Form Variations.

CORNER HOUSES: OPEN CORNER ROOM VARIATIONS HOUSE # 49





SCALE: 4 METERS

Number of adults.....2

Number of children.....2

Religion.....Hindu

Caste.....Brahmin

Employment.....government

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

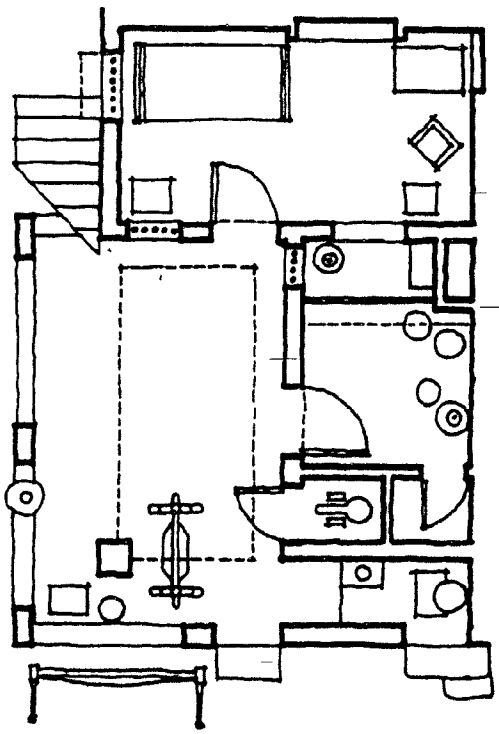
Own water connection.....yes

Plot size sufficient.....yes

Date of occupancy.....March, 1982

Appendix One: House Form Variations.

CORNER HOUSES: OPEN CORNER ROOM VARIATIONS HOUSE # 50



SCALE: [redacted]4 METERS[redacted]

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Brahmin

Employment.....office

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....yes

Flooding problem in monsoon.....yes

Own water connection.....yes

Plot size sufficient.....yes

Date of occupancy.....March, 1982

Appendix One: House Form Variations.

DOUBLE HOUSES (TWO PLOTS).

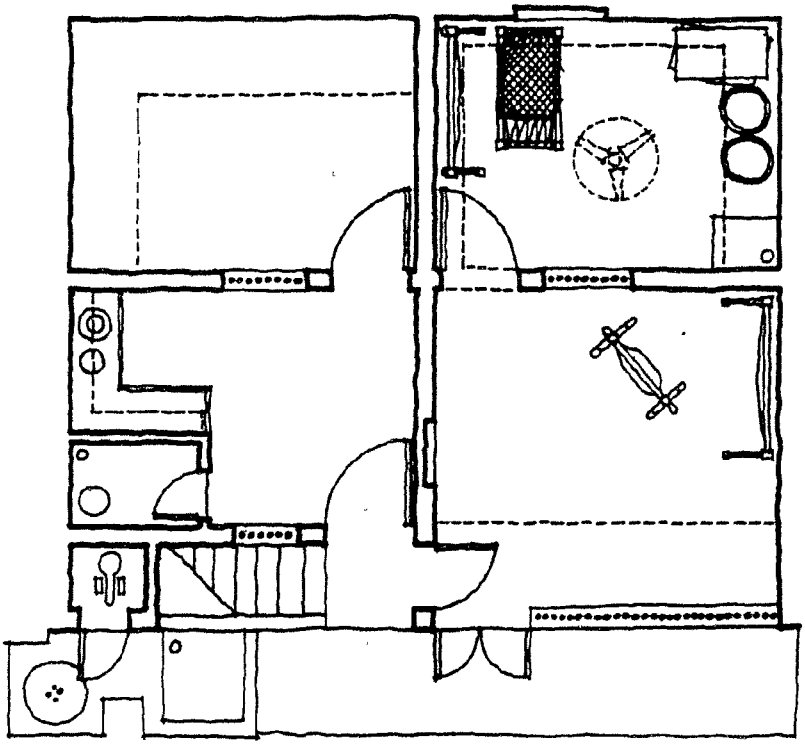
## HOUSE # 51

| | |
|---|---|
| Number of adults.....2 | Construction time.....10 months |
| Number of children.....3 | Owner has construction ability...yes |
| Religion.....Hindu | Future additions planned.....no |
| Caste.....Prajapati | Flooding problem in monsoon.....yes |
| Employment.....construction | Own water connection.....yes |
| Initial house size....partial | Plot size sufficient.....no |
| House construction by...owner | Date of occupancy.....March, 1982 |

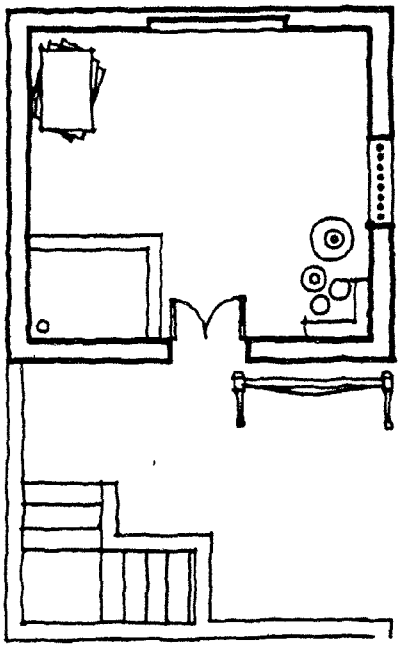
Appendix One: House Form Variations.

DOUBLE HOUSES (TWO PLOTS).

HOUSE # 51



Level One



Level Two

SCALE: [redacted]4 METERS[redacted]

Appendix One: House Form Variations.

DOUBLE HOUSES (TWO PLOTS).

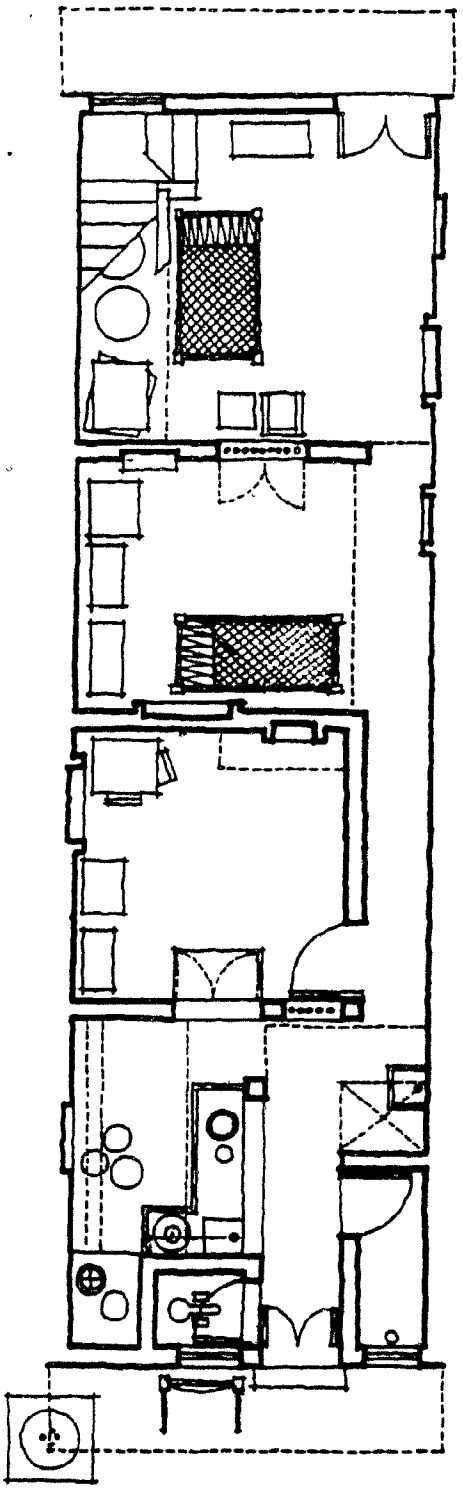
HOUSE # 52

| | |
|---|---|
| Number of adults.....5 | Construction time.....8 months |
| Number of children.....1 | Owner has construction ability...yes |
| Religion.....Hindu | Future additions planned.....yes |
| Caste.....Prajapati | Flooding problem in monsoon.....yes |
| Employment.....office/mason | Own water connection.....yes |
| Initial house size...as shown | Plot size sufficient.....no |
| House construction by...owner | Date of occupancy.....October, 1982 |

Appendix One: House Form Variations.

DOUBLE HOUSES (TWO PLOTS).

HOUSE # 52



SCALE: 4 METERS

Appendix One: House Form Variations.

DOUBLE HOUSES (TWO PLOTS).

HOUSE # 52

Views of Kitchen

Appendix One: House Form Variations.

DOUBLE HOUSES (TWO PLOTS).

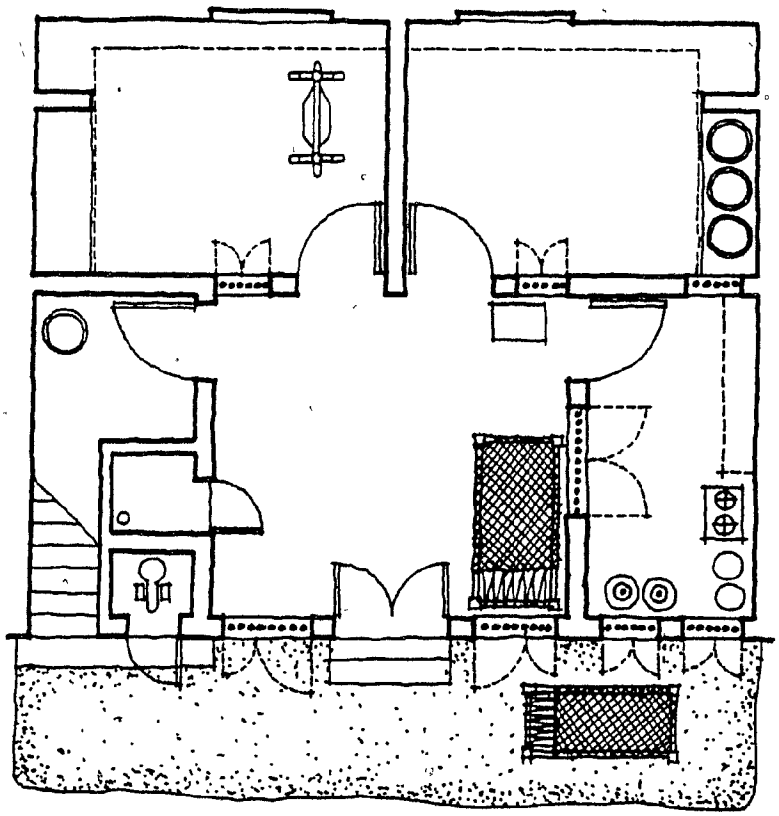
HOUSE # 53

| | |
|---|---|
| Number of adults.....2 | Construction time.....8 months |
| Number of children.....3 | Owner has construction ability....no |
| Religion.....Hindu | Future additions planned.....yes |
| Caste.....Rajput | Flooding problem in monsoon.....yes |
| Employment.....Industry | Own water connection.....yes |
| Initial house size...as shown | Plot size sufficient.....no |
| House construction by..others | Date of occupancy.....March, 1983 |

Appendix One: House Form Variations.

DOUBLE HOUSES (TWO PLOTS).

HOUSE # 53



SCALE: [redacted]4 METERS[redacted]

Appendix One: House Form Variations.

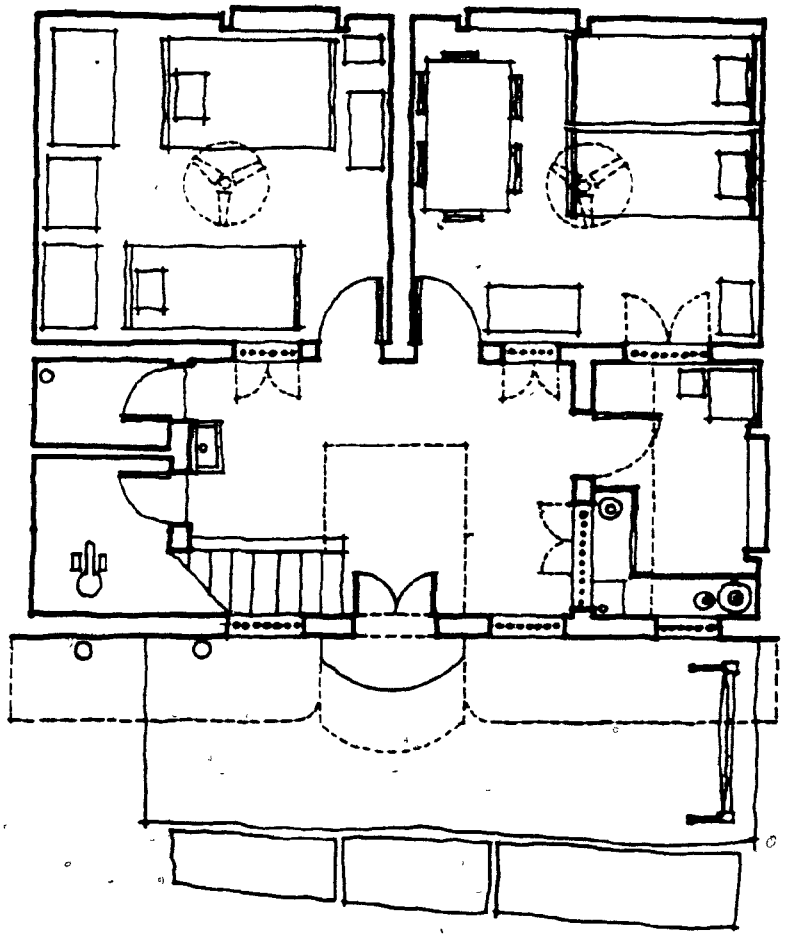
DOUBLE HOUSES (TWO PLOTS). HOUSE # 54

| | |
|---|---|
| Number of adults.....2 | Construction time.....8 months |
| Number of children.....3 | Owner has construction ability....no |
| Religion.....Hindu | Future additions planned.....no |
| Caste.....Sindhi | Flooding problem in monsoon.....yes |
| Employment...rickshaw/service | Own water connection.....yes |
| Initial house size...as shown | Plot size sufficient.....no |
| House construction by..others | Date of occupancy....September, 1982 |

Appendix One: House Form Variations.

DOUBLE HOUSES (TWO PLOTS).

HOUSE # 54

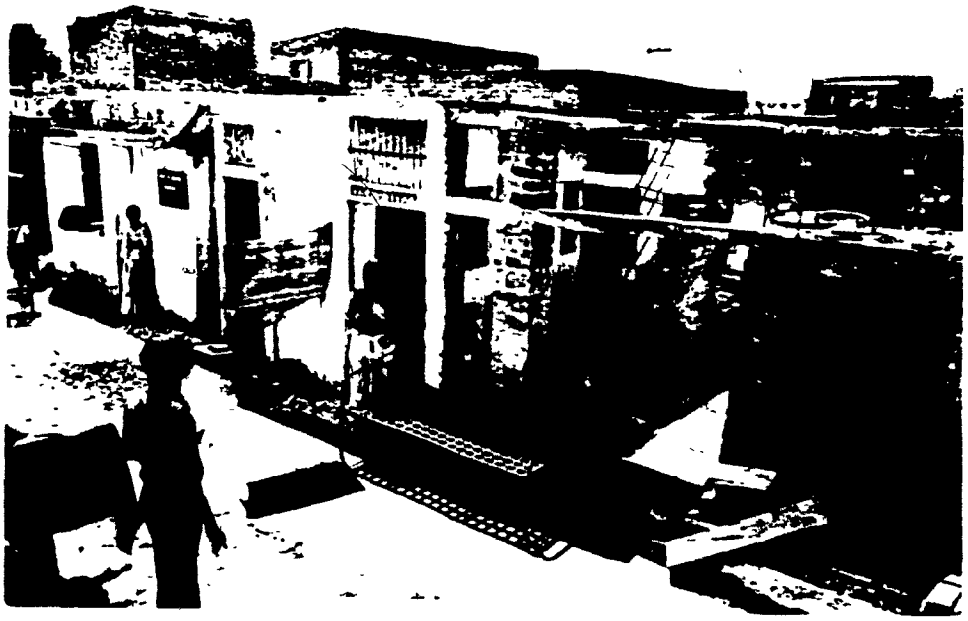


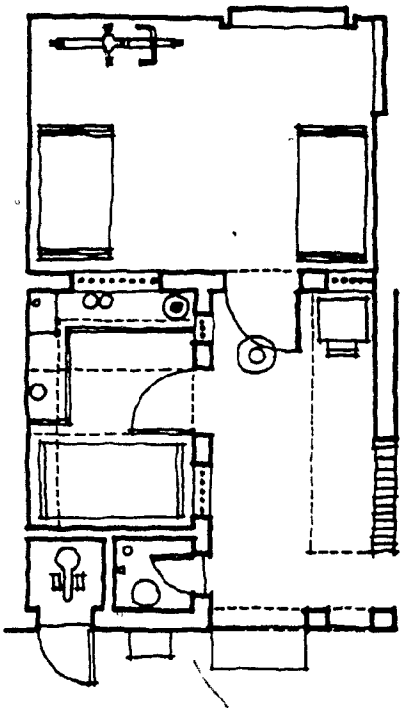
SCALE: [redacted]4 METERS[redacted]

Appendix One: House Form Variations.

DOUBLE HOUSES (TWO PLOTS).

## HOUSE # 55





SCALE: 4 METERS

Number of adults.....2

Number of children.....1

Religion.....Hindu

Caste.....Brahmin

Employment.....office

Initial house size.....as shown

House construction by.....others

Construction time.....6 months

Owner has construction ability....no

Future additions planned.....no

Flooding problem in monsoon.....yes

Own water connection.....yes

Plot size sufficient.....yes

Date of occupancy.....March, 1982

Appendix One: House Form Variations.

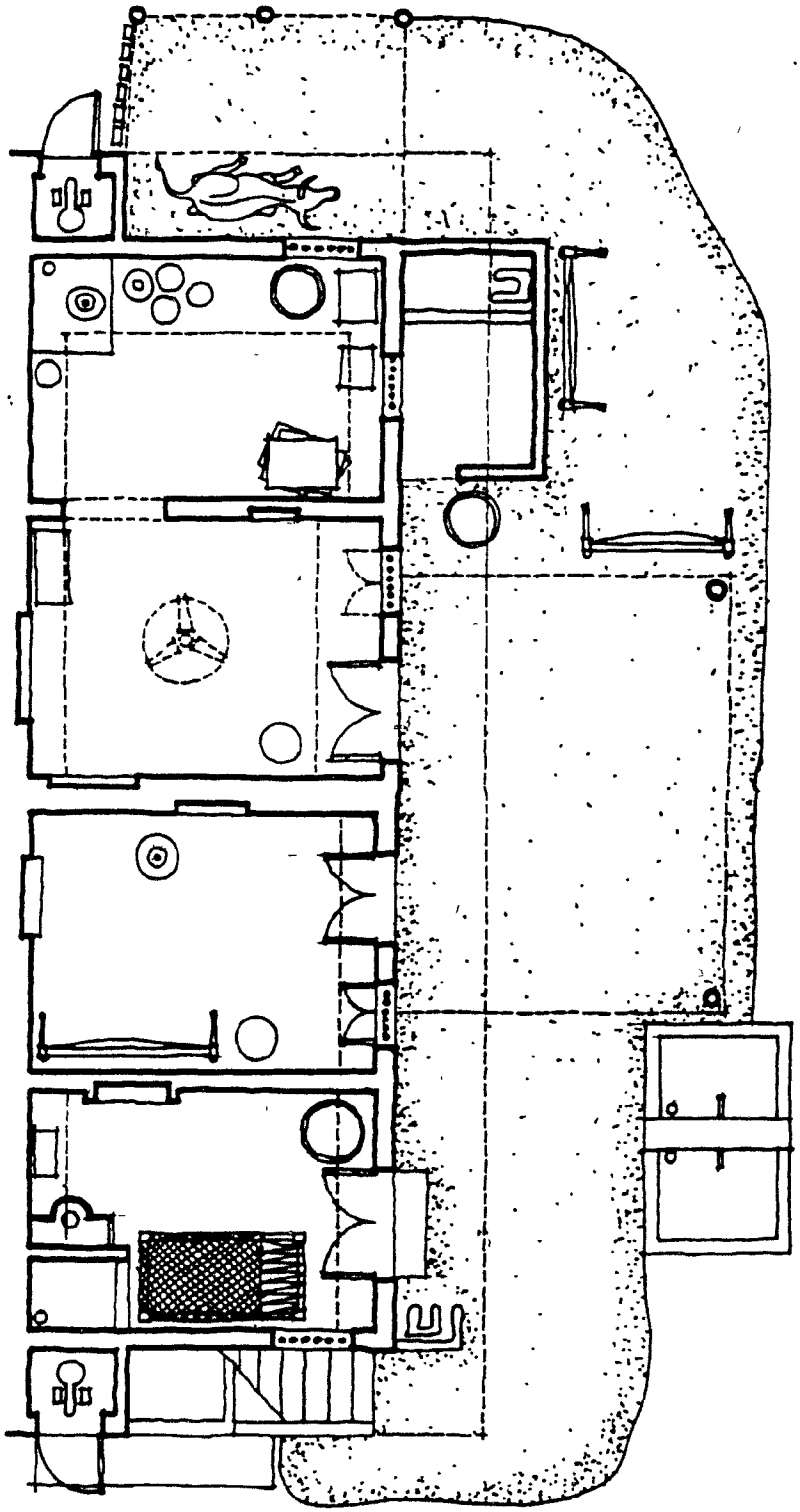
DOUBLE HOUSES (TWO PLOTS). **HOUSE # 56**

| | |
|---|---|
| Number of adults.....4 | Construction time.....6 months |
| Number of children.....4 | Owner has construction ability....no |
| Religion.....Hindu | Future additions planned.....yes |
| Caste.....Rabhari | Flooding problem in monsoon.....yes |
| Employment.....cattle owner | Own water connection.....no |
| Initial house size...as shown | Plot size sufficient.....yes |
| House construction by..others | Date of occupancy.....August, 1982 |

Appendix One: House Form Variations.

DOUBLE HOUSES (TWO PLOTS).

HOUSE # 56



SCALE: [redacted] METERS[redacted]

Appendix Two.

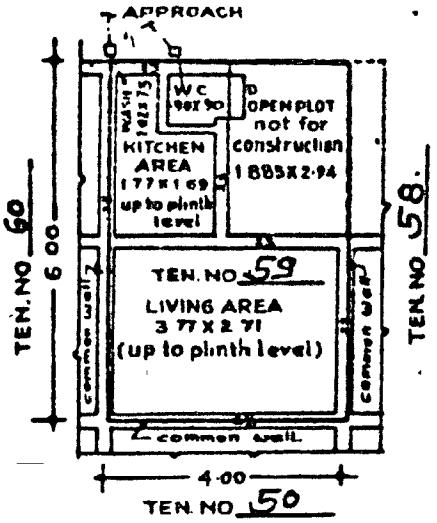
Form of agreement between plot owners and the Gujarat Housing Board.

# Gujarat Housing Board
# Ahmedabad.

GF-9

## HIRE PURCHASE PLAN

## HIRE PURCHASE SCHEME OF 726 SITE AND SERVICE TENEMENTS AT SARDARNAGAR AHMEDABAD.




### GROUND FLOOR PLAN

SCALE : 1=50

PROPERTY LINE SHOWN IN RED

TEN. NO.

FLOOR : GROUND FLOOR

BLOCK NO.

OLD SUR. NO.

NEW SUR NO.

VILLAGE . SARDARNAGAR

| |
|---|
| G.F. 59 |
| G.F. |
| 4 |
| 17 |
| 77 |

Drainage Arrangements.

| | |
|---|---|
| ● Nahni trap | —.— 100 mm ϕ O S W pipe. |
| □ Gully trap | _____ 100 mm ϕ C. I. Pipe. |
| O Vent | . —75 mm ϕ C. I pipe. |

Note :—

(1) Open plot shown in H P plan is for open use to hirepurchaser & not for construction.

(2) Common properties such as walls, O.T. drainage lines M.H etc. shall be maintained jointly by the adjacent hirers.

(3) Construction of livingarea kitchen area is only upto plinth level, wash up to sill level & w.c. up to G P. roof level.

(4) The hire purchaser, can — extend the construction vertically only up to 15'-0" from P L or up to 187'-0" above ASML which ever is less. Elect. accessories Like arrial, lighting accessories & civil work like stairs, water tank or any other civil work shall be constructed, within the Limit of 15'-0" from P.L. or within the limit of 187'-0" AMSL whichever is less.

(5) Before any contruction is, under taken the permission for construction from concerned local authority shall be taken and G H.B to be informed accordingly.

HIRER

Hirer's Witnesses

Deputy Engineer
Housing Sub. Division IV
Ahmedabad.

1st Witness

2nd Witness

Executive Engineer
Housing Division No. II
Ahmedabad.

Owner's Witnesses

(Owner)
Housing Commissioner
Gujarat Housing Board
Ahmedabad.

1st Witness

2nd Witness

Appendix Three.

Situation regarding provision of residential electricity.

INDIAN EXPRESS.

# Lead, kindly light

By Our Staff Reporter

AHMEDABAD, Nov 11

Dinner by candle light is not a matter of fancy for about a thousand residents of the Gujarat Housing Board colony in Sardarnagar on the outskirts of Ahmedabad. They have been living without electricity in their houses for the past three years.

The colony was the first attempt made by the Board to realise the early dreams of the 20-point programme way back in 1976. The ambitious site-and-service project aimed at developing housing colonies in eight cities of Gujarat to accommodate over a lakh poor families has fallen by the way-side.

Only two colonies one in Sardarnagar and another in Baroda, have come up. The idea was that the board would build up to the plinth level and allocate the plots to the registered members. It was for the new owners of the plots to build houses on them and pay back the cost of the plots in easy instalments.

Only 200 owners of the 726 developed plots allocated by the board in Sardarnagar have been able to build their houses. Meanwhile, the board has hiked the cost of the tiny plots to Rs 4,800. The literature distributed to the members in 1976 has quoted the price of the plots at ranging between Rs 3,000 and Rs 3,600.

The residents have been literally running from pillar to post to get power connection. At one stage, they arranged connections from the street light system illegally. The Ahmedabad Electricity Company was quick to recover the cost of the electricity units consumed and disconnect the connections.

But when it comes to providing the houses with connections the AEC officials demand clearance from the Gujarat Housing Board. When the residents who have been living without power for three years applied for power connections recently, the AEC wrote back giving them just one month to pay up the deposits and warned that if all the requisite conditions were not fulfilled in a month's time, the application would become null and void.

The Housing Board refuses to bear the expenses of electrification of the houses on the plea that it had promised street lightings when the scheme was floated. This apart, the Housing Board has not fulfilled its promise for roads in the housing colony. The residents have been using a kutcha road.

Even the intervention from the chairman of the Government's 20-point programme implementation committee Mr Jinabhai Darji did not help improve the situation. Mr Darji had called a meeting of officials of the board and the AEC, but the AEC officials abstained from the meeting. It is the lack of co-ordination between the concerned agencies that is delaying the electrification of the houses it is alleged.

The AEC has at last worked out the estimates of the electrification. It had divided the colony into four groups and estimated the cost of electrification ranging from Rs 835 and Rs 1700 per tenant.