THE INFLUENCE OF NATURAL AND CULTURAL ENVIRONMENT ON THE FABRIC OF THE CITY, WITH SPECIAL REFERENCE TO IRAQ

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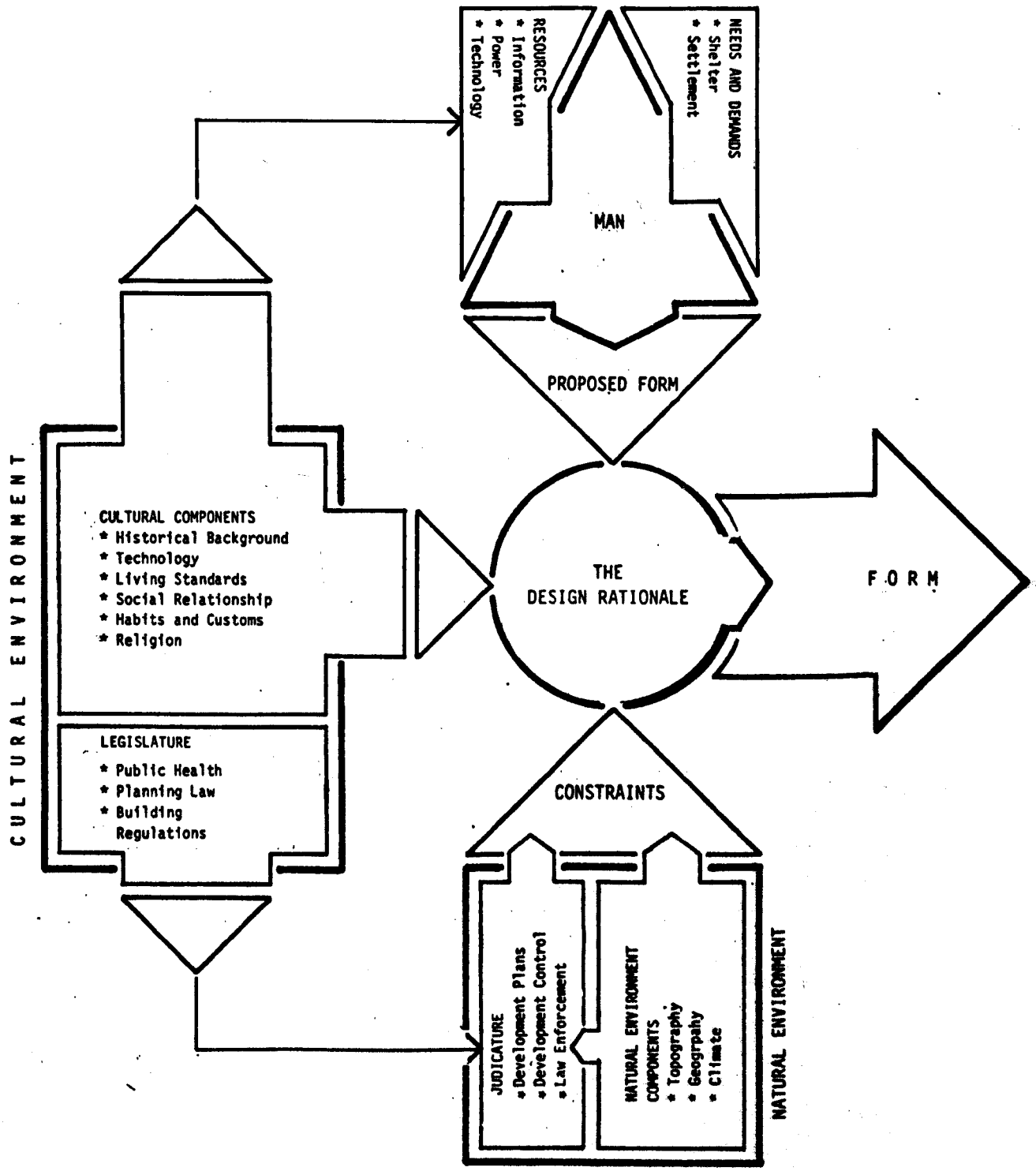


EVALUATION AND CONCLUSION

[I] EVALUATION AND CONCLUSION

[I.1] ON THE ESTATE LEVEL

I.1.1 THE POPULATION AGE-SEX GROUPS AND THEIR OCCUPATION AND EDUCATION STATUS

The population age-sex distribution in the traditional areas is closer to the overall population structure than in the modern areas. This is as a result of the greater number of extended families living in the traditional areas compared to nuclear families on the modern estates. In addition, younger workers are more likely to leave households in the modern estates in search of jobs.

Generally, the population in both types of area is characterised by a young age profile with a high percentage of young people aged less than 20 years old.

The population pyramids also indicate a comparative attenuation in the proportion of population aged between 30-49 years especially in the modern areas. This is because each of the modern estates represents principally one generation without integration with an earlier one. In contrast, the traditional areas show a homogeneous mixture of various generations with different age-sex groups.

These results affect the social life on the estate, as seen clearly from Figure I.1 which indicates that the mixture of age-sex groups of the inhabitants within the estate is linked to the level of inhabitants' social relationships and the degree of loneliness.

Moreover, the population pyramids of the modern estate shows that the dwellings are occupied mainly by people between 10-29 years and 50 years and over, whilst in the middle age ranges there are relatively few people. It can be expected that these estates will lose more population as time goes by and more people get married. (Figure I.2).

FIGURE: I.1

Social Relationship Activities Comparison Between Traditional and Contemporary Estate

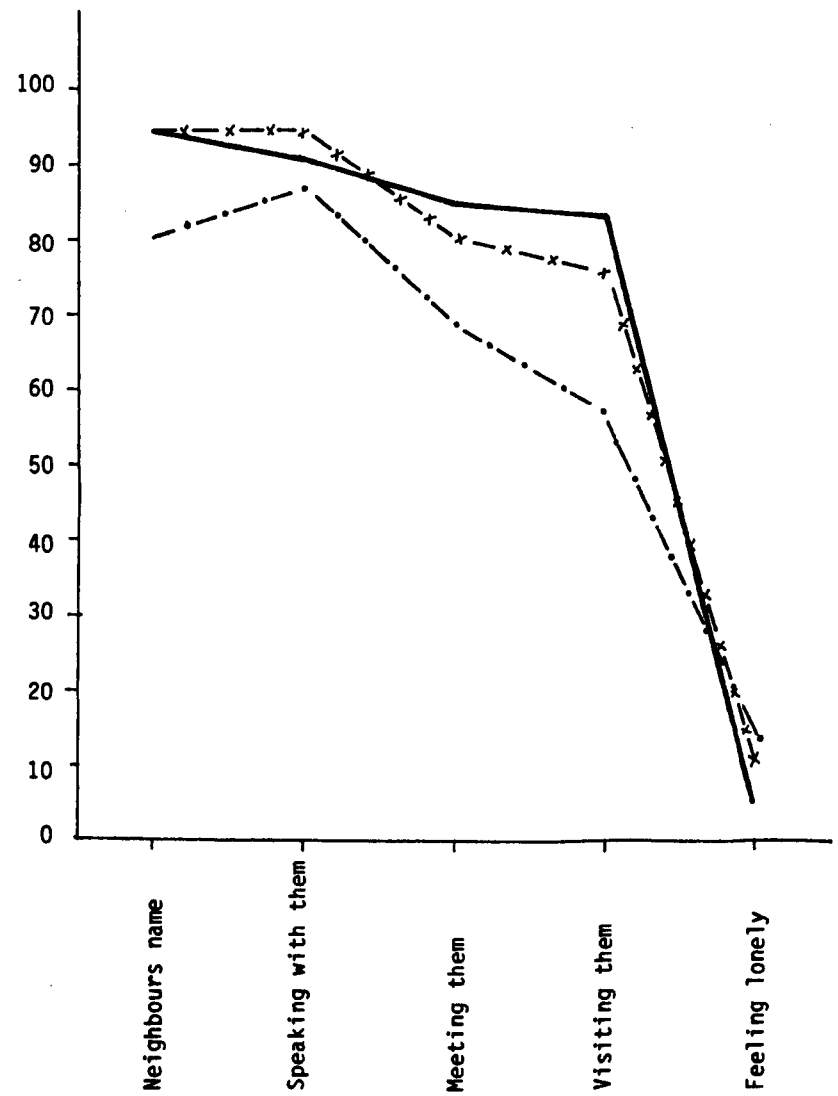
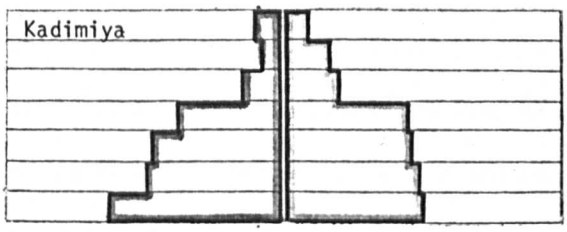
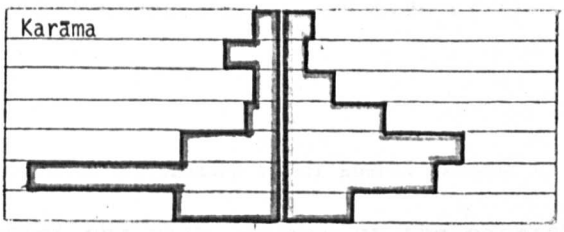


FIGURE: I.2.

Case Study Estate Age/Sex Pyramid.

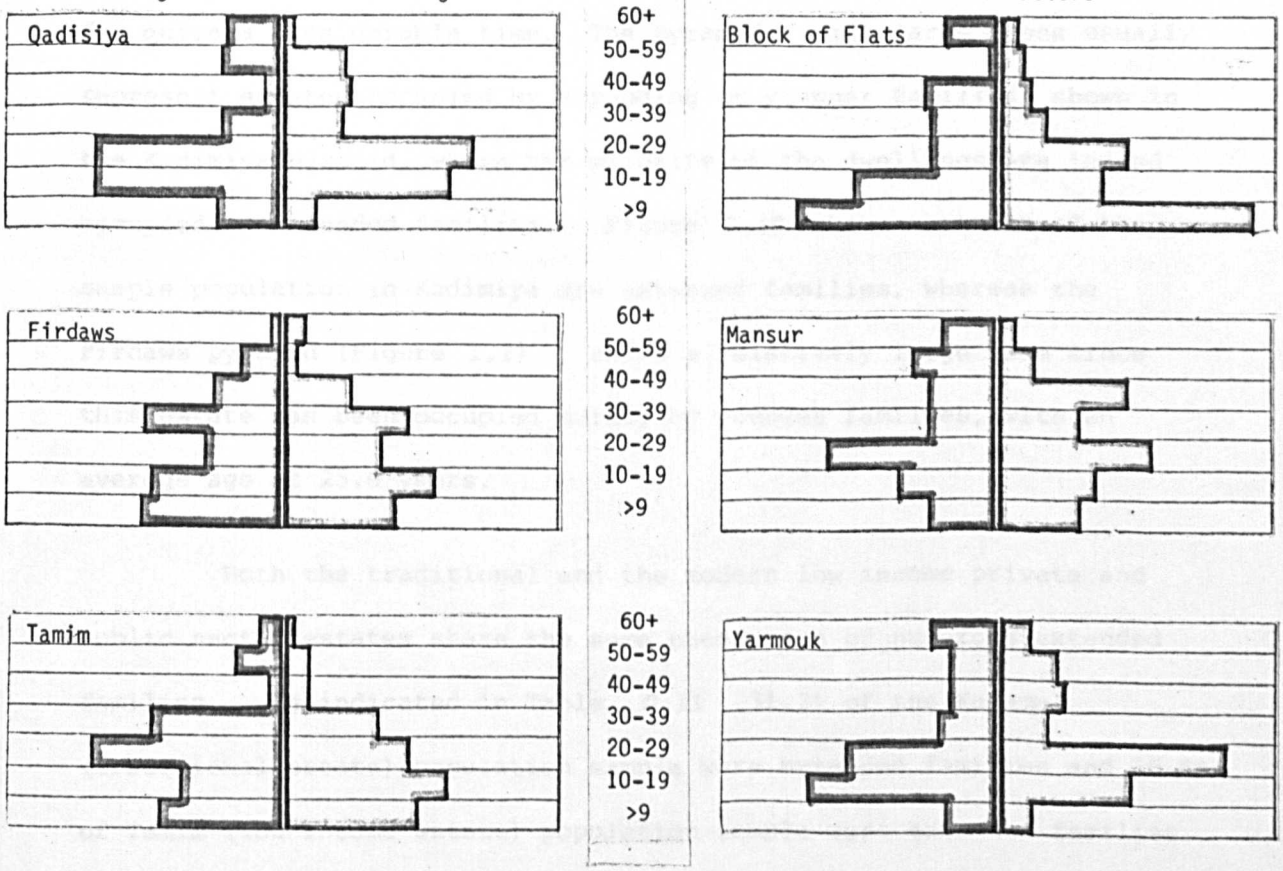
TRADITIONAL ESTATES DESIGNED IN RELATION TO NATURAL AND CULTURAL FACTORS





Estates Designed in Relation to Legislation

Estates Designed in Relation to Cultural Factors



Thus the elderly people may begin to form the majority of the residents on the estates and the average number in each family will decrease. This will result in an increase in the vacant living space within dwellings and reduce the propensity for social interaction. This phenomenon should be taken into consideration in the design of new estates, since it touches the social life of the inhabitants and the occupied space.

Population pyramids with small bases (i.e. low proportion of children) represent the main feature of the estates with the majority of the houses occupied by nuclear families and who have been resident for quite a considerable time. The pyramids with large bases usually represent estates occupied by expanding or younger families, shown in the Kadimiya pyramid, where the majority of the dwellings are indeed occupied by extended families. Figure G.10 shows that 20% of the sample population in Kadimiya are extended families, whereas the Firdaws pyramid (Figure I.2) shows a relatively large base since this estate has been occupied mainly by younger families, with an average age of 25.6 years.

Both the traditional and the modern low income private and public sector estates share the same phenomenon of numerous extended families. As indicated in Table G.11 31.2% of the Karama (traditional estate) population sample were extended families and 18.8% of Tamim (low income estate) population sample were extended families.

The pyramids in the modern estates show wide bases of young persons aged between 10-29 with relatively low representation of those aged 30-60 years. This is because work and marriage in this latter age group tends to separate them from their original families

and they establish new independent homes.

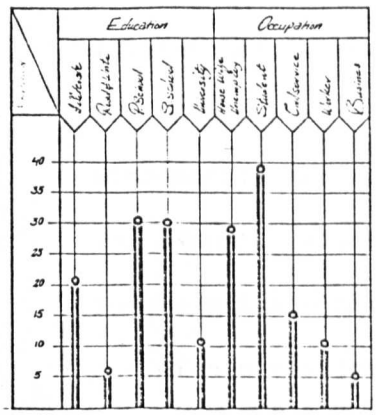
Family structure reflects directly on the house size and the family's housing needs and demands. Families with children or young persons aged between 1-29 years usually extend their homes in order to offer sufficient living space for the members of their families. This expanded house will become more than adequate for the family when most of the members marry or have to leave the family house due to work circumstances. Traditional estates do not seem to show a migratory depletion of people in the middle age ranges. This is usually as a result of the extended families and the death of the older generation.

Despite the variation in the occupation and education status in the public sector estates, there are similarities on the general level in their age structure, as can be seen clearly in the pyramids of both Yarmouk and Andulus (i.e. uniform and balanced population pyramids).

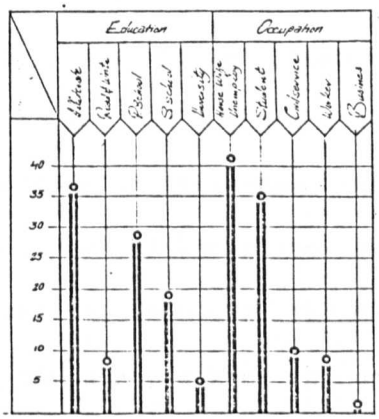
Despite the variations in the occupational and educational status in the private sector estates, in general there are similarities in the population structure which can also clearly be seen in the pyramid profile, with a broken and unbalanced age group population, as a result of variety of age and sex groups within the population.

Education and occupation (Figure I.3) shows that generally a large proportion of the population in each of the sample estates are students, followed by housewives and unemployed people. There is a strong relationship between educational and occupational status. This is shown clearly in Figure I.3 where the estates with low income inhabitants usually have a relatively large proportion of

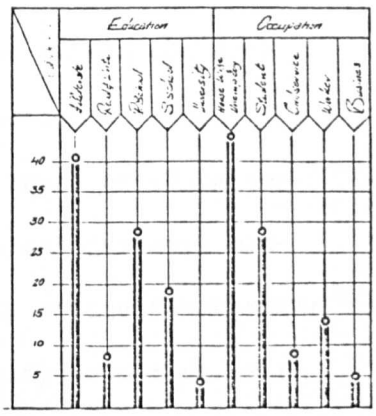
FIGURE: I.3



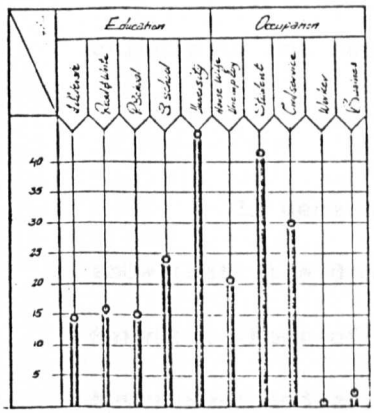
Kadimiya



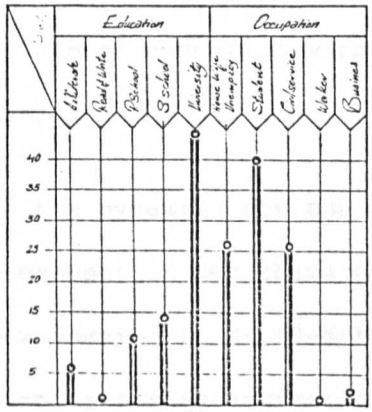
Karāma



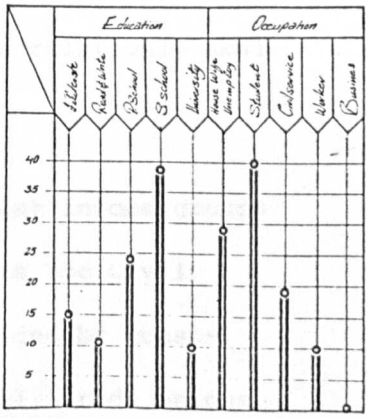
Block of Flats



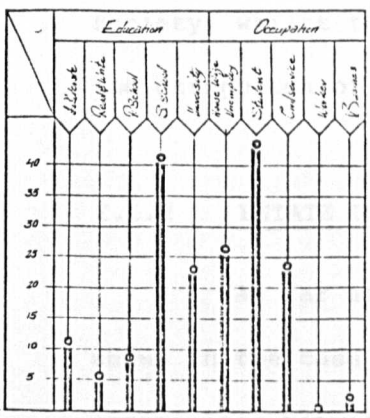
Mansur



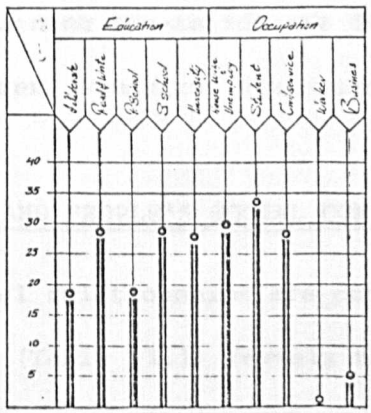
Yarmouk



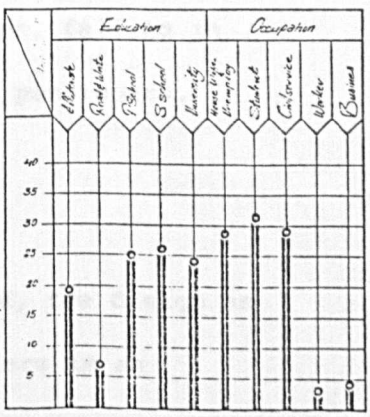
Andulus



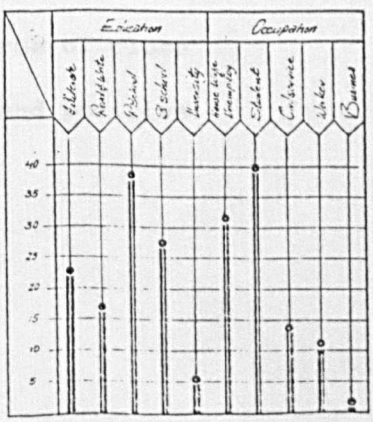
Qadisiyia



Firdaws



Tamim



Umal

The Education and Occupation Status in the Case Study Estates

illiterates. This also appears in the proportion of people who only attended primary school on low income estates whereas the estates with middle and high income occupiers show a higher level of education, for example Yarmouk mid-income public sector estates and Qadisiya mid-income private sector estates, show that the majority of the inhabitants are within the level of secondary school and university education, with a small proportion of illiterates. On Mansur (high income private sector estate) most of the inhabitants are within the level of the university and secondary school education with only a relatively small proportion of illiterates.

In general, all the pyramids for the different income groups show that the dominant occupation for these groups is the Civil Service. Most of the new housing in Baghdad is provided by quasi-government bodies which cater for government personnel, trade unions and the like. The productive manpower represents 20-30% of the society, whilst the remaining two-thirds are dependent, falling in the categories of children, students, housewives and pensioners.

I.1.2 ESTATE DESIGN AND PEOPLE'S SOCIAL CONTACT

As far as social relationships are concerned, the design as shown in the case study (Table I.1) reveals that there is an association between the average family size and the degree of social relationship, in that the highest average family (i.e. in the traditional area) is associated with the highest degree of close social relationship. This analysis reveals a high and positive correlation coefficient of 0.98. (Table I.2).

In the modern estates designed in relation to cultural factors, average family size is associated with a modest degree of social interaction which also gives a high and positive correlation coefficient of 0.98. (Table I.2).

The estates classified have been designed in relation mainly to the legislation and building regulations, and yield a correlation coefficient of 0.98 between average family size and social relationships. The significant conclusion to be drawn is that social relationships are positively related to family size. (In the survey we decided to measure social relationships by (a) asking whether respondents knew their neighbours' names (b) asking whether respondents regularly spoke with their neighbour (c) asking whether respondents arranged meetings/visits with their neighbours and (d) whether respondents felt lonely living on the estate). (Appendix 1).

Despite the different types of population in the various localities there is a high degree of social integration but on a detailed level there are many differences between the case areas. The traditional areas show the highest degree of close social relations whereas modern housing, employing social and cultural considerations into the design, shows a higher degree of social integration than the housing types designed only according to the legislation.

In contrast, considering the proportion of people who feel lonely (Figure I.1) shows that the traditional estates are lowest on this measure, the estates designed in relation to cultural factors a slightly higher degree, whilst the estates designed to meet merely legislative requirements exhibit the highest degree of loneliness.

TABLE I.1

RELATIONSHIP BETWEEN SOCIAL RELATIONSHIP AND AVERAGE FAMILY SIZE

Factors / Status	Estate	Social relation-ship * %	Average family size	Suffer from traffic %
Traditional	Kadimiya	85	8.25	17.5
	Karama	100	8.86	4.3
Estates designed in relation to cultural factors	Mansur	96	5.2	20
	Yarmouk	77.8	6.2	22.2
	Andlus	96.7	8.4	46.7
	Block of Flats	81.5	7.5	33.3
Estates designed in relation to legislation factors	Firdaws	86.7	5.8	46.7
	Qadisiya	90	8.5	43.3
	Tamim	64	7.0	44
	Umal	71.4	8.8	75

* The measure of social relationship has been explained earlier

TABLE I.2

Factor / Design Principles	r Plot x Distance of Services	r Soc.R. x Average Family Size	r Soc.R. x Suffering from Traffic
Traditional: Culture factor plays a role in design	.9945	.9989	.8108
Modern: Culture factor plays a role in design	.9576	.9802	.9383
Modern: Culture factor does not play a role in design	.8429	.9764	.9493

Correlation coefficient between Plot Size and Services Distance.
" " " Social Relationship and Family Size.
" " " Social Relationship and Suffering from Traffic

The location of the services and utilities in the modern estate in general is concentrated in one place (i.e. centralization). Social relationships appear to be affected by the design of the estate and by plot sizes for we have begun to show that where estates have been designed with a coherent hierarchy of facilities and where plot sizes are small, the level of social contact tends to be greater.

I.1.3 ESTATE DESIGN AND ITS RELATION TO SERVICES AND UTILITIES

From the case study findings illustrated in Table I.3 there is a negative relationship between the average plot size and the accessibility to services and utilities. In the traditional areas, where cultural factors have played a major role in the evolved design, the average plot size is 118m² and the majority of the people do not use cars in reaching the public services and utilities. In contrast, in the modern estates, which were designed in relation to cultural considerations, such as at Mansur, Yarmouk and Andulus, or the estates designed in relation to legislation and building regulations, such as Firdaws, Qadisiya and Tamim, the estates with larger than average sized plots (i.e. Mansur 732m²) are associated with higher percentages of people using cars to reach the services and utilities. In the estate with smaller than average sized plots (i.e. Tamim 250m²) the lowest percentage of people are found to use cars to reach the services and utilities. The associations grouped in Table I.3 give correlation coefficients between the average plot size and the services and utilities catchment areas with a computed correlation coefficient of 0.99, 0.95 and 0.84 for traditional areas, modern estates designed with consideration of cultural factors and modern estates designed without consideration of cultural factors, respectively. (The number of cases

used in these computations of correlation are very small so the results should be treated with care. However, we include scatter diagrams to give the overall picture of the relationships).

TABLE I.3

SERVICES AND UTILITIES - ESTATE INHABITANTS

Status	Factor	Estate	Average Plot	Near	By Foot	By Car
TRADITIONAL	Cultural factor plays a role in design	Kadimiya	105	81.4	16	2.1
		Karama	132.6	83.2	16.7	-
	Average			82	76.3	1
MODERN ESTATES	Cultural factor plays a role in design	Mansur	732	23.8	21.7	33.2
		Yarmouk	600	28	33.3	38
		Andlus	200	47.6	27.1	24.7
		Block of Flats*	100	79.9	9.5	10.5
	Average			33.1		31.9
	Cultural factor does not play a role in design	Firdaws	588.8	20.4	46.2	18.1
		Qadisiya	578.3	26.5	33.3	25.7
		Tamim	250	57.7	22.2	6.2
		Umal	250	23.2	25	34.7
	Average			31.9	31.6	21.1

* Excluded as the block of flats were erected recently within the traditional area of Karama and it is mainly occupied by the people whose houses were demolished.

Linear Regression Analysis for Services and Utilities

$y = a + bx$ linear equation

$$b = \frac{N\Sigma xy-(\Sigma x)(\Sigma y)}{N\Sigma x^2-(\Sigma x)^2}$$

$a = \bar{y} - b\bar{x}$

Assume that y_1 denotes the average plots

x_1 = responses that the services and utilities are near

x_2 = responses that the services and utilities are reached by foot

x_3 = responses that the services and utilities are reached by car

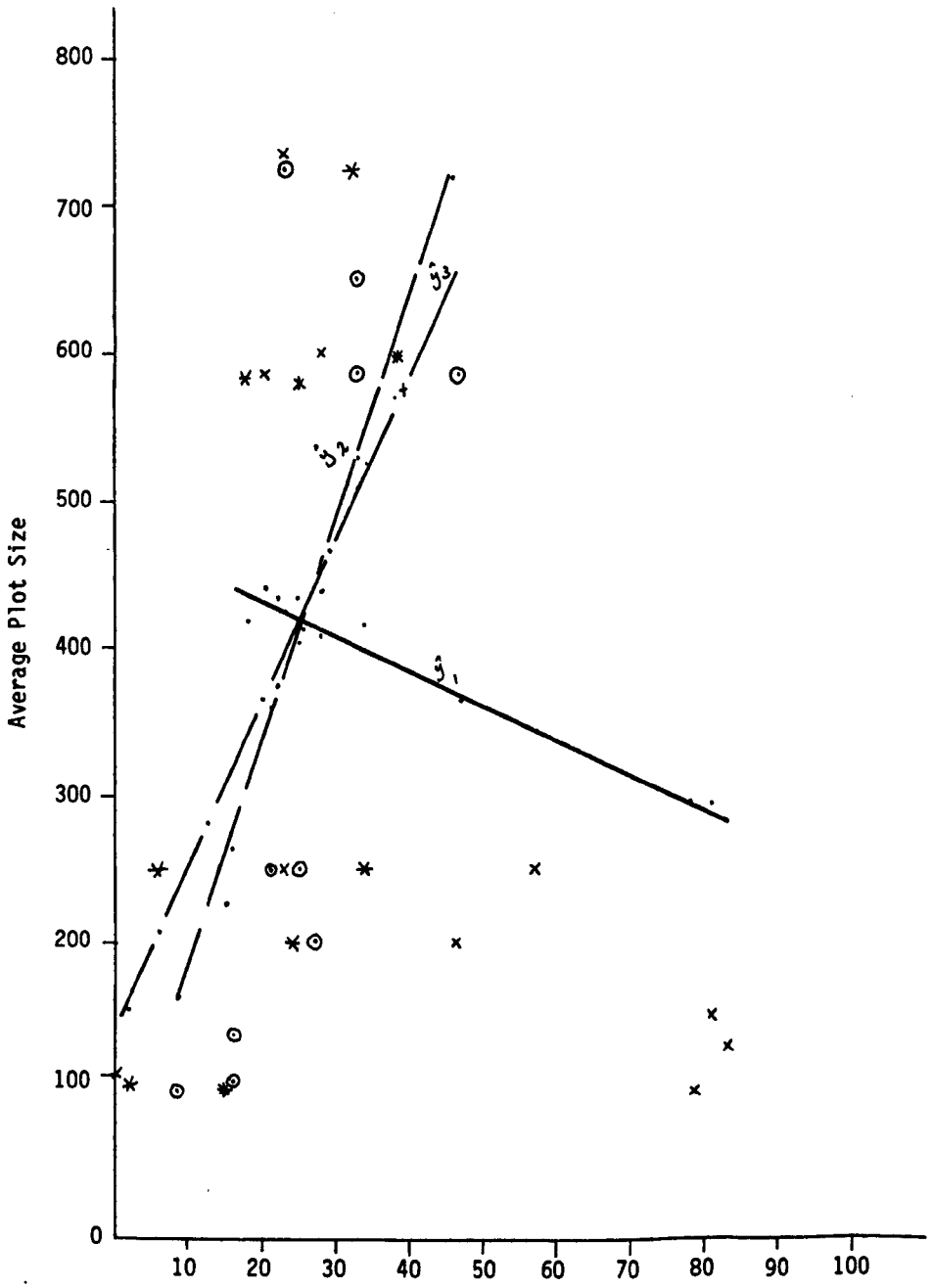
Then,

$\hat{y}_1 = 462.9079 - 2.1036\ x_1$

$\hat{y}_2 = 24.2637 + 15.1312\ x_2$

$\hat{y}_3 = 127.2859 + 11.7176\ x_3$

Estimated Average Plot if $x = x_1$		Estimated Average Plot if $x = x_2$		Estimated Average Plot if $x = x_3$	
y_1	x_1	y_2	x_2	y_3	x_3
291.67	81.4	266.36	16	151.89	2.1
287.89	83.2	276.95	16.7	127.29	0
412.84	23.8	352.61	21.7	516.31	33.2
404.007	28	528.13	33.3	572.55	38
362.78	47.6	434.32	27.1	416.71	24.7
294.83	79.9	168.01	9.5	250.32	10.5
419.99	20.4	723.33	46.2	339.37	18.1
407.16	26.5	528.13	33.3	428.43	25.7
341.53	57.7	357.15	22.2	199.94	6.2
414.10	23.2	402.54	25.0	533.89	34.7



$\hat{y}_1 = 462.9079 - 2.1036\, x_1$

$\hat{y}_2 = 24.2637 + 15.1312\, x_2$

$\hat{y}_3 = 127.2859 + 11.7176\, x_3$

× x_1

⊙ x_2

* x_3

I.1.4 THE ESTATE DESIGN AND THE DEGREE OF PRIVACY

The privacy and security of the inhabitants on both the individual and communal level has been achieved in varying degrees within each type of housing. In the traditonal areas, privacy and security has been achieved on the communal level by the hierarchy of the road network system. The major artery usually forms the main market place where shops and public buildings can be found. The secondary arteries act as linkages between the different parts of the area and are mainly used by the local people. The third element in the hierarchy is the web of narrow meandering alleyways and cul-de-sacs. These elements form a greater focus for inhabitants on the 'communal' level, whilst the fourth element of the road system network in the traditional area are the crossroads, which usually form junctions, resulting from crosses between two or more main arteries, usually within the core of each part of the estate. These form sub-centres where services and utilities can be found on the local level. This system achieves a high degree of privacy and security for the inhabitants and increases the social interaction between them.

In the modern estate this phenomenon of a hierarchical road network system can be seen on two levels: in the estates in which the social/cultural factors have been taken into consideration, a degree of hierarchy has been achieved by different scale and function of roads, i.e. main, secondary, loops and cul-de-sacs, as in Yarmouk, and Mansur. Segregation has also been achieved between pedestrians and vehicles in the Andlus estate on a Radbun-like system as in Andlus. This system creates some degree of privacy and security for the inhabitants.

In the estates in which their layout design is based on legislation and building regulation classification, the hierarchy of the road network system is not clear. The roads within these estates are mainly main and secondary roads in a grid-iron pattern, arranged with junctions and roundabouts, as can be seen in Qadisiya, Firdaws and Tamim.

However, where there is a hierarchy of the road network system this not only achieves safety and privacy for the inhabitants (i.e. reduces interference/nuisance from traffic) but can also be linked to levels of social interaction between the inhabitants, as can be seen in Table I.3. This shows a reverse relationship between the number of people who suffer from the effects of traffic movement and the level of their social relationships. This means that where the interference/nuisance from traffic increases, the level of social relationships in the area decrease and vice versa.

We need to be careful in attributing causality when considering these relationships. Correlation is not explanation and the reason for associating between the strength of social relationships and estate road layout and design may be found in influential factors not considered in our case study. However, the relationships are suggestive of criteria which should be incorporated in future housing design and planning in Iraq.

Linear Regression Analysis of the Relationship Between Social Relationship and Suffering from Traffic Noise

$y = a + bx$ linear equation

$$b = \frac{N\Sigma xy - (\Sigma x)(\Sigma y)}{N\Sigma x^2 - (\Sigma x)}$$

$$a = \bar{y} - b\bar{x}$$

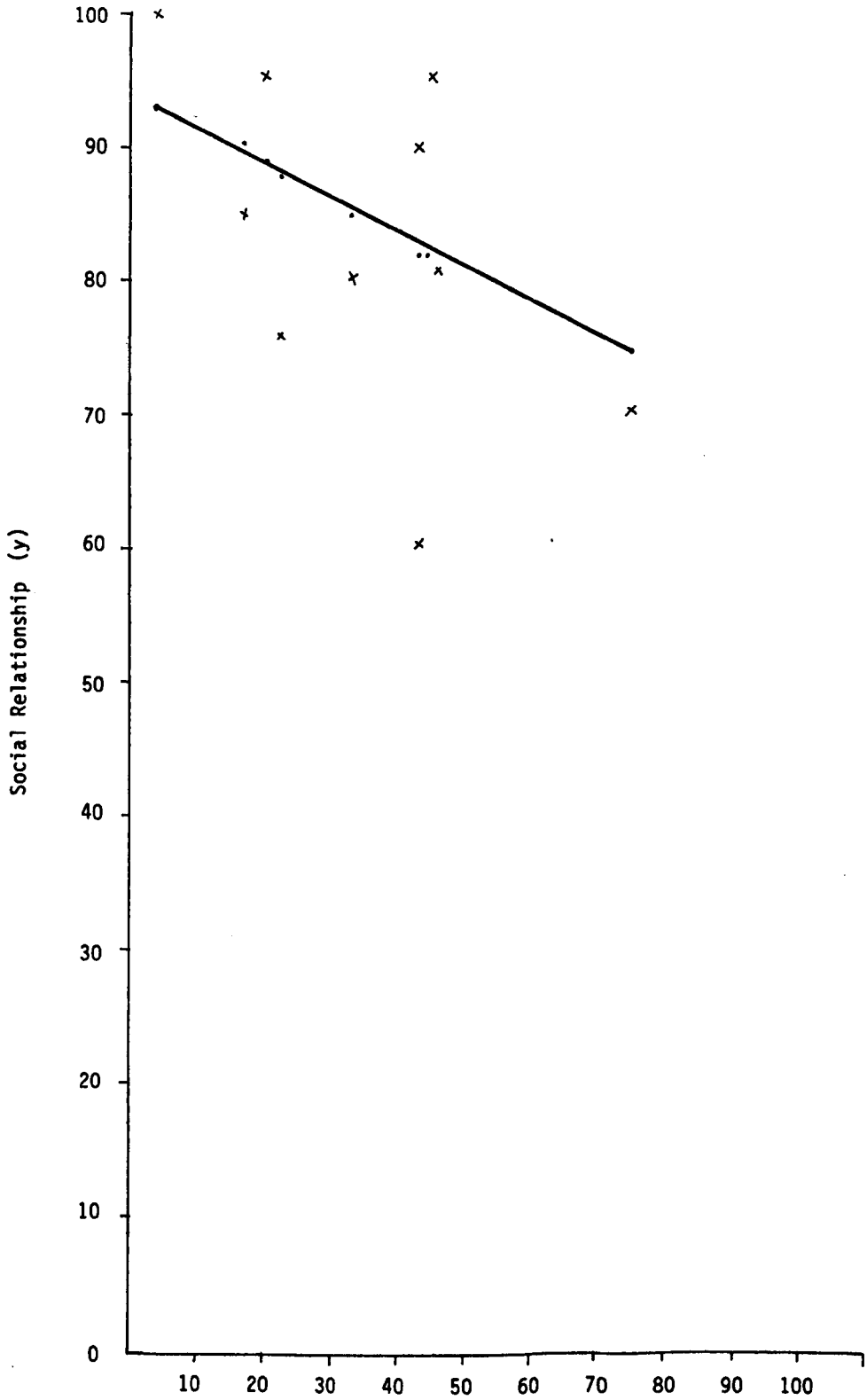
Assume that y_1 denotes that average responses for social relationship

x_1 = responses of suffering from traffic noise

Then,

$$\bar{y} = 95.1435 - .2899\,x$$

$\bar{y}$	x
90.07	17.5
93.89	4.3
89.35	20
88.71	22.2
81.61	46.7
85.49	33.3
81.61	46.7
82.59	43.3
82.39	44
73.40	75



$\hat{y}$ = 95.1435 - .2899

y = Social relationship

x = People suffering from traffic

I.1.5 EVALUATION OF DEGREE OF OVERCROWDING

To measure the degree of overcrowding in the sample estates, the density of each area was obtained. The average plot area has been calculated before in Sections G and H, but the outside space (i.e. street and different inhabitants' open spaces) should be added to this average as shown in column (3) in Table I.4. Hence the numbers of plots in each hectare may be obtained and multiplied by the average family size in order to obtain the density in column (6) from the same table. The resultant density is the highest between (600-700 p.p.h.) in the traditional area (i.e. Kadimiya, Karama) followed by the blocks of flats (488 p.p.h.). Next in order come the estates which have been designed in relation to legislation (75-200 p.p.h.) and finally, the estates designed in relation to cultural factors (50-100 p.p.h.).

However, the estates which complain of noise, particularly outside noise, are given in Table I.5. . This table shows that in the blocks of flats 85% of the residents were suffering from noise, caused mainly by children, followed in order of severity of the problem by the estates, which were designed in response to legislation, then the traditional areas and finally, the estates which were designed in relation to cultural factors (except Andlus, which is aberrant, due to its high average family size and small size of dwellings).

Accordingly, the degree of complaint from noise in relation to density can be arranged in ranks as given in Table I.6.
To compare the ranking of the density of the area and the complaints about the noise caused by children playing, the differences of ranks (Di) and squaring the differences can be calculated in Table I.6 and then Spearman's formula applied: $rs = 1 + \frac{6\Sigma^{10}Di^2}{N(N^2-1)}$

(Blalock, 1972, p. 416)

		Measurements / Estate	Average family size (1)	Average plot area (2) m²	Outside open space (3) m²	Gross plot area (4)=(2)+(3)	No. of plots in 1 hectare (5)	Density person/hectare (6)=(1)x(5)
		KADIMIYA	8.25	105	10	115	86.96	717.39
		KARAMA	8.87	132	10	142	70.42	624.63
THE DESIGN CRITERIA IS RELATED MAINLY:	TO CULTURAL FACTORS	MANSUR	5.20	732	250	982	10.18	52.94
		YARMOUK	6.29	600	210	810	12.35	77.68
		ANDLUS	8.43	160	200	360	27.78	234 19
		BLOCK OF FLATS	8.59	76	100	176	56.82	488.08
	TO LEGISLATION AND BUILDING REGULATIONS	QADISIYA	8.52	578	200	778	12.85	109.48
		FIRDAWS	5.87	588	200	788	12.85	75.43
		TAMIM	7.04	250	150	400	25	176
		UMAL	8.60	250	150	400	25	215

TABLE I.4

Measurement of Plot, Open space and Density

TABLE I.5

Noise / Estate	% of people complaining about noise	Sources of Noise		% Causes of Noise		
		Inside	Outside	Crowds	Children	Traffic and Services
Kadimiya	65.0	20	50	24.5	42.5	2
Karama	56.5	17.4	39.1	-	56.5	
Mansur	16.0		16	-	8	12
Yarmouk	51.9	3.7	44.4	3.7	11.1	44.4
Andlus	90.0	13.3	83.3	-	73.3	60
Block of Flats	85.2	7.4	66.7	-	77.8	25.9
Qadisiya	70.0	3.3	66.7	-	26.0	63.3
Firdaws	10.0	3.3	10	-	10	3.3
Tamim	72.0	-	68	-	68	16.0
Umal	67.9	3.6	57.1	3.6	67.9	35.7

TABLE I.6

Calculation of (r) by using Spearman's ranking formula

(see Blalock, 1972, p.416)

Estate / Rank	Rank of Density	Rank of Children	Difference D^2i
Kadimiya	1	6	25
Karama	2	5	9
Mansur	10	10	0
Yarmouk	8	8	0
Andlus	4	2	4
Block of Flats	3	1	4
Qadisiya	7	7	0
Firdaws	9	9	0
Tamim	6	3	9
Umal	5	4	1
ΣD^2			52
rs			0.685
Z			2.055

There is a significant relationship between the density (or the degree of overcrowding) in the area with the noise source. Noise from the children playing outside, due to the lack of open space for the children to play is a problem due to large family size found on some estates. Testing the significance of (r_s) the distribution can be applied as:

$$Z = \frac{r_s}{1/\sqrt{N-1}} = 2.055$$

This result suggests that there is a significant relationship at 0.01 level of significance.

I.1.6 THE ESTATE DESIGN AND AESTHETIC STATUS

The aesthetic status of the urban fabric and its elements can be measured by the articulations, transition and balance of both the mass of the buildings and the spaces between them in relation to both human and time scales.

These aesthetic factors are exhibited throughout the traditional urban fabric accompanied by exciting features which generates a dynamic and continuous aesthetic. This excitement is achieved by utilizing hidden elements and surprise due to meandering alleyways and closed vistas. Dramatic surprise is achieved by sudden change in the treatment of both the space and form of buildings. A dramatic change may occur during the movement from the outdoor narrow shaded meandering alleyways surrounded by a free composition of building facades, to indoor, regular, sunny open spaces surrounded by symmetrically treated facades.

All the dimensions and scales within the traditional urban fabric (the heights of the buildings, the width of the alleyways and their arrangement) are related to the scales and rhythms of the human beings and traditional transportational modes and arrangement of the space. The adorned and highly carved building facades provide visual variety appropriate to this scale.

In the modern urban fabric, especially the residential areas, the aesthetic rationale and form is not clear, since the open spaces within the residential area are large due to the penetration of the car and by the use of gardens which surround individual dwellings. These elements have been introduced into the general layout without any

aesthetic consideration of the urban fabric. This situation creates an imbalance in the articulation and the transition between the mass of the buildings and the space surrounding them. Although the open spaces have contributed to the aesthetic qualities of these modern areas, their design has failed to successfully articulate the essential relationship between the mass of the buildings and the created open space. The excitement of traditional aesthetic experience disappeared within the urban areas as a result of rational design criteria of the grid-iron plan with the open vision of the layout, and the monotony of mass production and repetition in design.

The dimensions and scales of the modern areas are based on human and vehicular scale with their different speeds of travel, need for visual variety or clarity etc. This creates the aesthetic conflicts within these areas which occurs in the treatment of the open space and facades of the buildings.

[I.2] THE EVALUATION AND CONCLUSION ON THE MICRO LEVEL (DWELLING)

I.2.1 THE FAMILY: PRIVACY AND SECURITY

The privacy, security and social interaction for the individual families and for the individuals themselves has been achieved in the traditional areas within the individual courtyard house, by creating different degrees of privacy throughout the inward looking dwelling. The main entrance acts as a public-private family circulation zone, the reception room as a public-private family zone, the courtyard as a private family main circulation area and activity zone, secondary entrances as family circulation zones between the different parts of the dwelling; the living rooms, services and utility quarters (bath, toilets, kitchen and stores) as a private family zone, and the bedrooms as individual private zones. This system creates within the house independence of each part, thus achieving both privacy and security for the family and its individual members.

It is possible to analyse both traditional and modern housing in terms of privacy and security. In both cases different zones of privacy/security can be identified in the house (semi-private, public zones etc.). However, the dispersion and relationships of these zones are dramatically different in the two cases due to the overall organisation and design of traditional and modern housing. Accordingly, in the modern compact house the open space (i.e. the garden) between the body of the house and the high wall around the plot acts as a semi-family public-private zone. The main entrance of the dwelling acts as a public-private circulation zone, reception room and dining area as public-private zones, the secondary entrance as a family private circulation zone, living rooms, services and utility quarters (kitchen,

bath, toilet, stores) as family private zones and bedrooms as individual private zones.

This adaptation results in the creation of some other new zones such as a conflict zone between the reception room, living room and the main entrance and also between the kitchen and the secondary entrance. Accordingly, the independence of these zones is affected and reduces the net area of the functional zone, as well as affecting the internal climatic conditions.

Both the traditional and modern housing types have the ability for flexibility by adaptability of the internal space. This flexibility within the modern types of housing usually creates conflict zones and waste in the net areas as a result of cross-circulation and use overlapping, whereas the flexibility within the traditional types of housing achieves adapted use of the internal space without creating conflict zones or affecting the net size of the functional areas.

Moreover, the traditional type of house has also flexibility for the conversion of the dwelling into smaller, independent units without affecting the general arrangement of the internal spaces or the form of the house. This can be achieved by adding light partitions between the different quarters. This ability is a result of the use of different family public and private zones, their relation to the main public-private and private circulation zones and distribution of access points. This possibility of adaptation is impossible within the modern type of house without affecting the form of the house or without creating more internal conflict areas and overlapping functions.

I.2.2 THE DESIGN OF THE DWELLINGS AND THE NATURAL ENVIRONMENT

The traditional urban quarters and their elements are carefully designed to adapt to severe climatic variations. This adaptation is achieved by using building forms and building materials to create different air pressure within the building and its surroundings in order to create air circulation and draft throughout the day in different seasons. Accordingly, the different house elements (rooms) are located throughout the dwelling according to their normal time of use and likely comfort requirements. For example, in summer the basement is used as a family living room during mid-day and afternoon and in order to increase the air circulation the air scoop system has been used. The courtyard is used as a family multi-activity space usually in the early morning and at night whereas the roof is used for the family to sleep on in the evening. In winter when the warmth of the direct sun is needed, the family living spaces are transferred to the first floor to face the sun, with their very wide windows, in order to collect solar radiation as much as possible to heat up the internal space and the upper level bedrooms which are linked to the living rooms.

In this respect, the modern dwellings and their different elements do not show any consideration for natural environmental constraints in their design. Thus artificial resources (fans, air coolers and air-conditioning) are usually used to overcome this problem. Therefore modern housing is designed mainly to meet cultural factors only.

I.2.3 TRADITIONAL/MODERN HOUSING FORM: A COMPARISON OF INTERNAL CLIMATIC RESPONSES TO THE NATURAL ENVIRONMENT

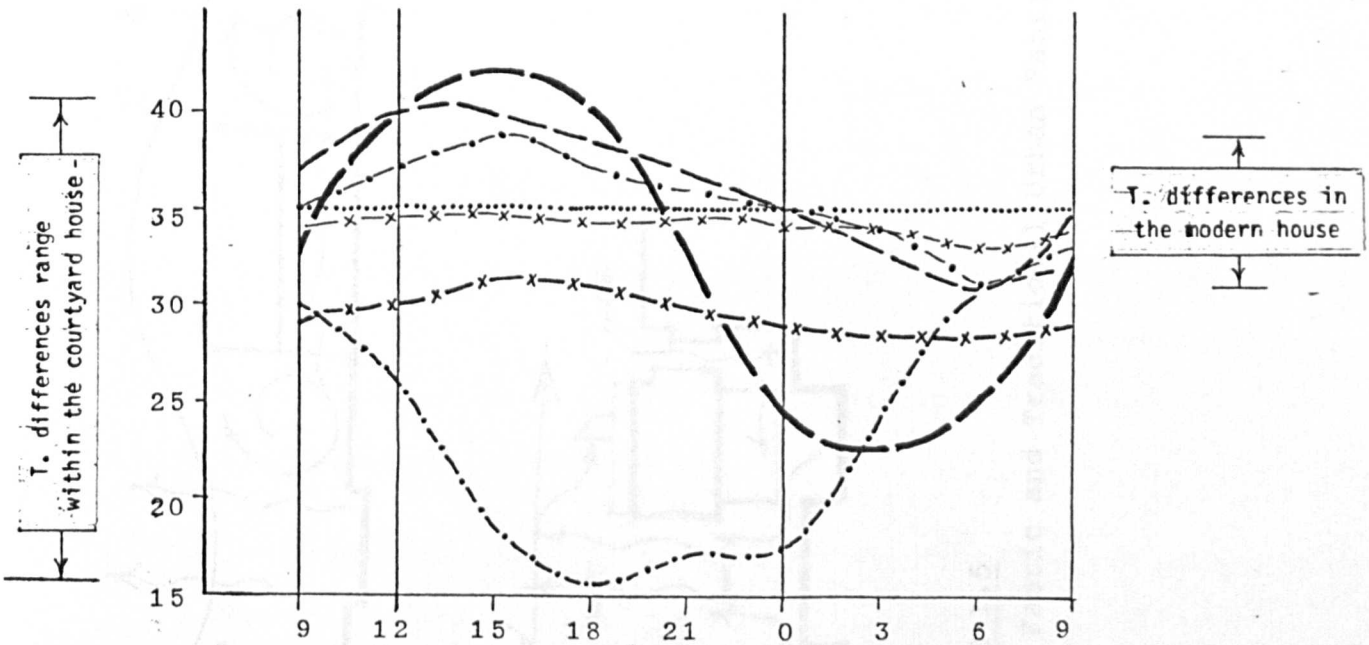
Despite differences in temperatures throughout the 24 hours within the compact house (i.e. modern), the range of these differences are very small if compared with the range of differences within the courtyard house (i.e. traditional) (Figure I.4). This physical capability of the courtyard house offers a wide range of spaces with different climatic conditions and thus a range of opportunities for family use at different times of day and different seasons. The range of temperature between 41°C and 15°C recorded in the traditional house enables the inhabitants to select appropriate spaces in relation to specific daily activities, whilst in the compact house temperature range is between 40°C and 31°C. This range is above the human body limit of comfort (see Section E.3.1.1). Accordingly, artificial resources are used (i.e. fan, air cooler, air conditioning) involving the use of energy, in order to lower the internal temperature conditions to acceptable levels particularly at midday and during the afternoon.

The courtyard house, with its own micro climate, successfully modifies the ambient atmospheric conditions to produce acceptable internal climatic temperatures and humidities whereas the compact house fails in this respect.

There is similarity in the range of temperature oscillation between the living room in the courtyard house and the internal condition of the compact house with open windows, despite the different relationship to the site and to other houses (i.e. the compact house

Fig. I.4.

Temperature and Humidity Records for the traditional house and the modern house.



Modern compact house:
Ground floor —x—x— Closed Window
First floor —•—•—•— Open Window
First floor ••••••••• Closed Window

Traditional Courtyard house:
Basement —•—•—•—
Living room —x—x—x—
Semi enclosed space – – – – –

Ambient temperature — — — —

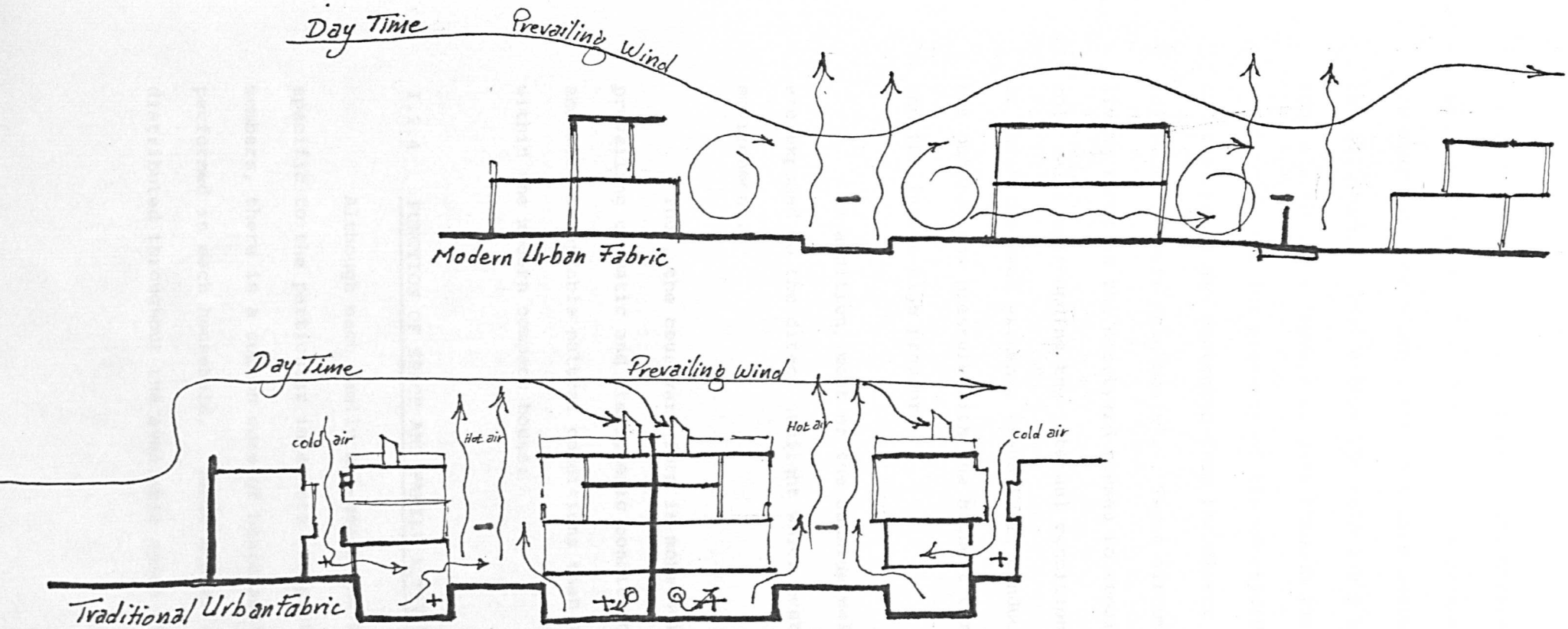


FIGURE I.5

A Cross-Section of the Modern Urban Fabric and Traditional Urban Fabric

oscillates between 39-33°C whereas the courtyard house living room oscillates between 31-28°C). This is because the living rooms in the courtyard house are either situated between the courtyard and the alleyways. This allows the relatively high pressure of the cool air in the alleyways to pass through the living rooms on its way towards the low pressure of the courtyard or the living room's external walls are protected from the direct sunlight as they are adjacent to their neighbours'. These circumstances enable the living rooms in the courtyard houses to remain cooler due to the cold walls surrounding the internal conditions of the compact house in which the heat exchange transfer is conducted directly between the outside low pressure with the highest temperature (i.e. ambient) and the inside high pressure.

In addition, most of the outside walls of the compact house are exposed to the direct sunlight which heats up the internal environment.

Thus, the courtyard form is more suitable within the prevailing climatic and atmospheric conditions, providing cheaper and more acceptable natural conditions than are readily available within the modern compact house.

I.2.4 FUNCTION OF SPACE AND FAMILY ACTIVITIES

Although each family has needs and behaviours which are specific to the particular interests and preferences of family members, there is a common core of basic activities which are performed in each household. These activities are usually distributed throughout the available space within the dwelling,

depending upon the area of the space and its location, the internal climatic conditions of each space during the different seasons and the privacy of the space. The influence of these factors on the distribution of the family activities can be seen in the spatial concentration of basic activities within the different spaces of the traditional and the modern types of housing of the case study (representing the common types of housing in Baghdad).

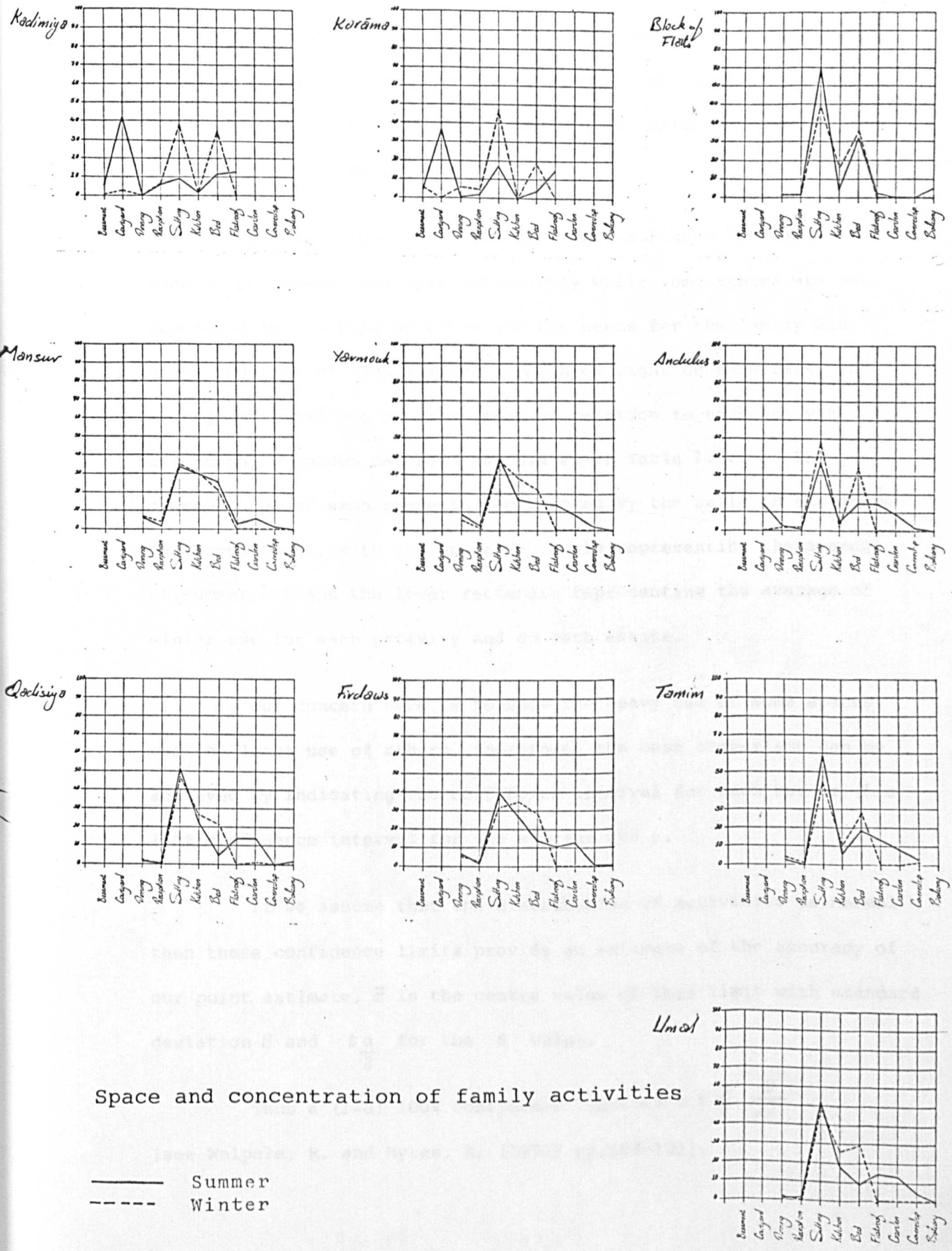
In order to measure the degree concentration of the family daily activities within the available spaces in each type of housing, the spaces within the house have been divided into two kinds of space - indoor and outdoor space. Indoor spaces include the rooms such as sitting, dining, bed, kitchen and basement, and outdoor spaces include the courtyard and the covered spaces linked with it, the garden, covered space (terrace, balcony) and the flat roof.

Figure I.6 shows the concentration of the family daily activities in both types of spaces within the case study samples.

The daily activities in the traditional type of house show a concentration of use according to the function of space and the seasonal thermal conditions. Accordingly, two alternative dispositions of daily activities have developed during the year. In the summer, most activities usually take place in the outdoor spaces, dominated by the use of the courtyard, including the adjacent covered spaces, whilst in winter the dominantly used spaces are the indoor spaces, the living room and bedroom.

In the modern compact type of housing the picture of the use of space is different; in this type the indoor spaces are used

FIGURE: I.6



Space and concentration of family activities

——— Summer
----- Winter

during the whole year, whereas the outdoor spaces are used only in summer. The above phenomenon can be seen clearly in the following diagrams which represent the use of space in relation to family activities in different types of housing, as illustrated in this case study in Baghdad.

It can be seen from the diagrams in Figure I.6 that some of the spaces are used intensively while some others are not, depending on the type of house and the needs for the family and hence the size of each family. To throw light on this fact, the average of total use of each space in relation to each activity according to season has been calculated in Table I.7. The seasonal use of each space is represented by the cells in the above mentioned table, with the upper rectangle representing the average of summer use and the lower rectangle representing the average of winter use for each activity and on each estate.

Our concern here is to show the heavy use of some spaces and the light use of others, therefore, the best comparison can be achieved by indicating the confidence interval for each use or $(1-\alpha$ 100% confidence interval for the average use μ.

If we assume that the distribution of activities is normal then these confidence limits provide an estimate of the accuracy of our point estimate, $\bar{x}$ is the centre value of this limit with standard deviation S and $t_{\frac{\alpha}{2}}$ for the t value.

Thus a $(1-\alpha)$ 100% confidence limit $= \bar{x} \pm t \frac{\alpha}{2} \frac{S}{\sqrt{n}}$

[see Walpole, R. and Myres, R. (1972) pp.187-192].

Seasons	Kadiniyo	Kavama	Block of Flats	Mansur	Yamauk	Anchillus	Qadisyo	Firdus	Tamim	Umal	Total	Average
	summer / winter	summer / winter	summer / winter	summer / winter	summer / winter	summer / winter	summer / winter	summer / winter	summer / winter	summer / winter	summer / winter	summer / winter
Basement	5.7 / .7	4.6 / 6.9									10.3 / 7.6	5.2 / 3.8
Courtyard	41.4 / 2.8	36.6 / 0				11.4 / 0					89.4 / 2.8	29.8 / 0.9
Dinning room		.6 / 5.7	1.6 / 1.6	6.8 / 6.8	8.5 / 5.3	2.8 / 1.4	1.4 / 1.7	6.2 / 5.2	2.9 / 4	.5 / 1.5	30.8 / 33.4	3.4
Reception "	5.3 / 5.7	1.7 / 4.6	1.6 / 1.6	1.1 / 4	2.6 / 1.6	.9 / 1.9	.9	1.4 / 1.9	/ 1.1	1.5	17 / 22.4	1.7 / 2.2
Living "	8.9 / 38.3	16.6 / 44.6	69.3 / 48.6	33.7 / 34.8	38.6 / 37.6	36.1 / 48.1	50.9 / 46.6	39.5 / 31.4	58.3 / 44.9	51.0 / 49.5	402.9 / 424.4	40.3 / 42.4
Kitchen	1.4 / 1.4		4.8 / 16.4	29.1 / 29.7	16.4 / 28.0	5.2 / 2.4	21.9 / 26.1	26.6 / 34.8	6.8 / 10.9	18.4 / 26.0	130.1 / 175.7	13 / 17.6
Bed room	11.1 / 35.7	3.4 / 18.9	31.7 / 34.3	5.1 / 21.1	14.3 / 22.8	14.7 / 33.3	4.8 / 21.9	13.8 / 28.6	18.3 / 22.6	9.2 / 26.6	126.9 / 211.8	12.7 / 21.2
Flat roof	12.5	14.3	2.1	2.8	13.2	14.2	13.3	10.5	13.1	14.3	110.3	11.0
Garden				2.7	8.9	9.0	13.8 / .5	12.8	8.6	13.8	69.6 / .5	2.7 / .1
Covered space				1.7	1.1	1.9		.9	3.4 / 1.1	4.6	13.6 / 1.1	1.7 / .1
Balcony			.5				1.4	.5			2.4	.3

* This space includes the covered spaces surrounding it

TABLE I.7

Seasonal Daily Activities

TABLE I.8

The 95% Confidence Limits of the Daily Family Use of Space During the Year

Used Space	Average Use $\bar{x}$	Standard Deviation S	Tabulated t value *	No. of Cases n	95% Confidence Limit $\bar{x} \pm \frac{t\alpha}{2} \frac{s}{\sqrt{n}}$
Basement	5.2	.778	12.706	2	$\bar{x}$ ± 6.9899
	3.8	4.384	12.706	2	$\bar{x}$ ±39.388
Courtyard	29.8	16.115	4.303	3	$\bar{x}$ ± 2.8191
Dining Room	3.4	2.880	2.306	9	$\bar{x}$ ± 2.2138
	3.7	2.129	2.306	9	$\bar{x}$ ± 1.6211
Reception	1.9	1.379	2.262	10	$\bar{x}$ ± .9864
	2.8	1.710	2.262	10	$\bar{x}$ ± 1.2232
Living Room	40.29	18.270	2.262	10	$\bar{x}$ ±13.0687
	42.44	6.400	2.262	10	$\bar{x}$ ± 4.5779
Kitchen	14.46	10.323	2.306	9	$\bar{x}$ ± 7.9349
	19.52	12.246	2.306	9	$\bar{x}$ ± 9.4131
Bedroom	12.69	8.324	2.262	0	$\bar{x}$ ± 5.9542
	27.17	5.951	2.262	10	$\bar{x}$ ± 4.2568
Flat Roof	11.03	4.661	2.262	10	$\bar{x}$ ± 3.3405
Garden	9.44	3.96	2.447	7	$\bar{x}$ ± 3.6625
Covered Space	6	1.44	2.571	6	$\bar{x}$ ± 1.5114
Balcony	.8	.5196	4.303	3	$\bar{x}$ ± 1.2909

* See Walpole, R. and Myres, R. (1972) pp.187-192

The calculated values of these limits are given in Table I.8.

We can assess the extent to which the use of spaces in housing on specific estates in our sample are used proportionately more frequently or less frequently than the average for use of spaces on all estates in the sample by means of this table. Using a range derived from the overall average use of a particular space plus or minus the standard deviation to represent "normal" use of any particular space in our sample we can then identify where that space is more heavily or less heavily used than the 'normal'. In the figure, 'normal' use within the ranges specified above is identified by the colour green. Heavy use of a space in relation to this room is identified by a red shading - light use by a blue shading. The seasonal differences are identified by dividing the cell diagonally with the upper segment representing summer use and the lower segment representing winter use.

Accordingly, Table I.7 can be read vertically to show the distribution of use of activities within the house throughout the day and according to season, whilst reading the table horizontally allows comparisons between the use of the space in the different types of housing.

In traditional houses the courtyard seems to be used well above the average in summer. This is because the courtyard represents the best natural climatic zone within this type of house for most of the day, i.e. morning, midday and evening. In contrast, the living rooms in the traditional house during summer offer an uncomfortable climate so they are found to be lightly used in relation to the sample

as a whole. In addition, the size of available space can affect the extent of use of space. For example, in the traditional house the small kitchen inhibits the family use of this area. Thus most of the daily activities take place in the courtyard during summer. Another example of the interplay of these factors, in Andlus estate, which is designed in relation to the environment, shows that the daily activities in winter are concentrated in the living room and the bedroom. This is because the living room represents the warmest space within the house by the use of artificial heating. Economy dictates heating mainly one room. Again the small size of the kitchen inhibits its use whilst in summer space in houses on Andlus estate are used uniformly.

In Firdaws estate, which is designed in relation to legislation by the private sector, daily activities are concentrated in the kitchen during both seasons. This is because the area of the kitchen is fairly large and the room is air conditioned.

Looking at differences between estates the obvious heavy and light average use of space according to different types of houses shows high concentration of use in the dining room for a number of estates. On Mansur estate the dining room is heavily used during both seasons due to the size of the space and the artificial climate conditions, whilst in Umal the use of the dining room is below the average. This is because this room is not always heated or cooled due to low economic status of the residents.

As for the reception room in the traditional type of housing this is seen to have high concentration of use due to its location and privacy, whereas the use of the reception room in Qadisya and Tamim

estates indicate a light degree of use. This is because the activities which would normally take place in this space are transferred to the other spaces as can be clearly seen from the concentration and heavy use of the living rooms.

Generally, only one heating and cooling unit is provided in modern housing and it is this factor, together with the location and size of the rooms in the dwelling that leads to a concentration of family activity in one or two places. In conditions of economic limitations on the family, necessity requires this concentrated use for reasons of comfort and cost.

The size of the space also plays a role in determining the use of the kitchen space in the traditional and Andlus housing. The kitchen is shown to be in light use, i.e. mainly cooking, because of its small size, whereas in Mansur and Firdaws the kitchen shows concentration of activities due to its larger size and air conditioning during the different seasons. Accordingly the families usually use it for having their main meals.

The use of the bedroom shows a concentration in the block of flats during the different seasons. This is because in summer most of the families do not use the flat roof for sleeping at night as there is very limited privacy from the neighbours. In winter it is one of the parts of the dwelling which is heated artificially and for the same reason of comfort in winter the activities are also concentrated in the bedrooms in Kadimiya and Andlus.

As for the outdoor spaces which are normally used in summer, the flat roof is frequently used in most of the surveyed estates,

with the exception of the block of flats (due to lack of privacy) and Mansur estate (because high income families can use air conditioning).

The other outdoor space, the garden, is normally used in most of the dwellings which have gardens (except in Qadisya and Umal estates) for eating and reception at night times.

Other covered spaces and balconies show average and light concentration of use; this is due mainly to questions of privacy or the location of the balconies in relation to neighbours and street. Use of the balcony can be observed by neighbours as can balcony users overlook families in adjoining dwellings.

This section shows the importance of the organisation of the space in relation to the daily and seasonal activities of the family and shows also the important role that the architect can play in this field, which is often disregarded.

[I.3] MAN AND THE CREATED URBAN FABRIC ENVIRONMENT

I.3.1 THE ESTATE LEVEL

What has been presented earlier are the relationships between the Man and his environment through an analysis of the different types of created urban fabric.

These types of urban forms were created to accommodate the Man and to offer him suitable life conditions. Thus the Man can be considered as a tool for measurement, to measure the failure and success of the urban form and the individual elements of the city. Before using the Man for this purpose, let us throw some light on his status from the anthropological and sociological points of view.

The prevailing cultural environment and its elements, i.e. religious beliefs, habits and customs, social contacts, education and the position of both the man and woman within the society, play a major role in drawing cultural boundaries. The degree of privacy is a principal concern within Islamic society and plays a significant part in defining several relationships and influencing building form. The homogeneity of traditional culture and behaviour can be seen most clearly in the small agglomerations or settlements in which the society is more settled and less influenced by outside circumstances. Thus differences in traditional cultures within Iraq can be distinguished in the varied cultures and cultural behaviour found in the different agglomerations in the regions of the country.

Practically, throughout the country it is in the small settlements where we find still retained most of their original cultural characteristic values, in spite of the fact that some of the cultural factors have been changed as a result of the contact, diffusion and the

influence of new cultural ideas, especially coming from the big cities. These changes include technology, education and so on.

Qala Diza, one of these agglomerations, a small town in the north of Iraq, whose economy is based on agriculture has a distinctive character. The traditional residential areas in this town are based on one storey courtyard houses with narrow meandering alleyways. These alleyways are usually framed by a continuous blank and thick wall which is formed by the joining together of the facades of the dwellings. Each dwelling usually has one door onto the alleyway, through which the transition between the external public circulation and the family internal private zone can only be achieved. However, in contrast to this obvious separation, the flat roofs of these houses are linked together without any kind of fences. This makes it hard to distinguish which part of the roof belongs to each house. By this means a continuous public platform has been formed, through which the courtyards of the dwellings act as holes. Families can walk across the roofs and see into their neighbour's courtyard. Visibility of the internal courtyard to passers-by means that daily activities in the courtyard are semi-public and the courtyard becomes a semi-public/ private zone. From the ground level of these courtyards access to the roof platform can be gained by means of moveable wooden ladders to each house, which allows some of the daily activities of the family to take place on the roof, i.e. drying of washing and wood for fires, and also for sleeping at night in summer. The moveable ladder from the courtyard to the roof allows the individual family the opportunity to limit or prevent neighbours' access to the courtyard. This allows some flexibility in social contacts and activities. Consequently, the inhabitants in this kind or urban form turn their back to the

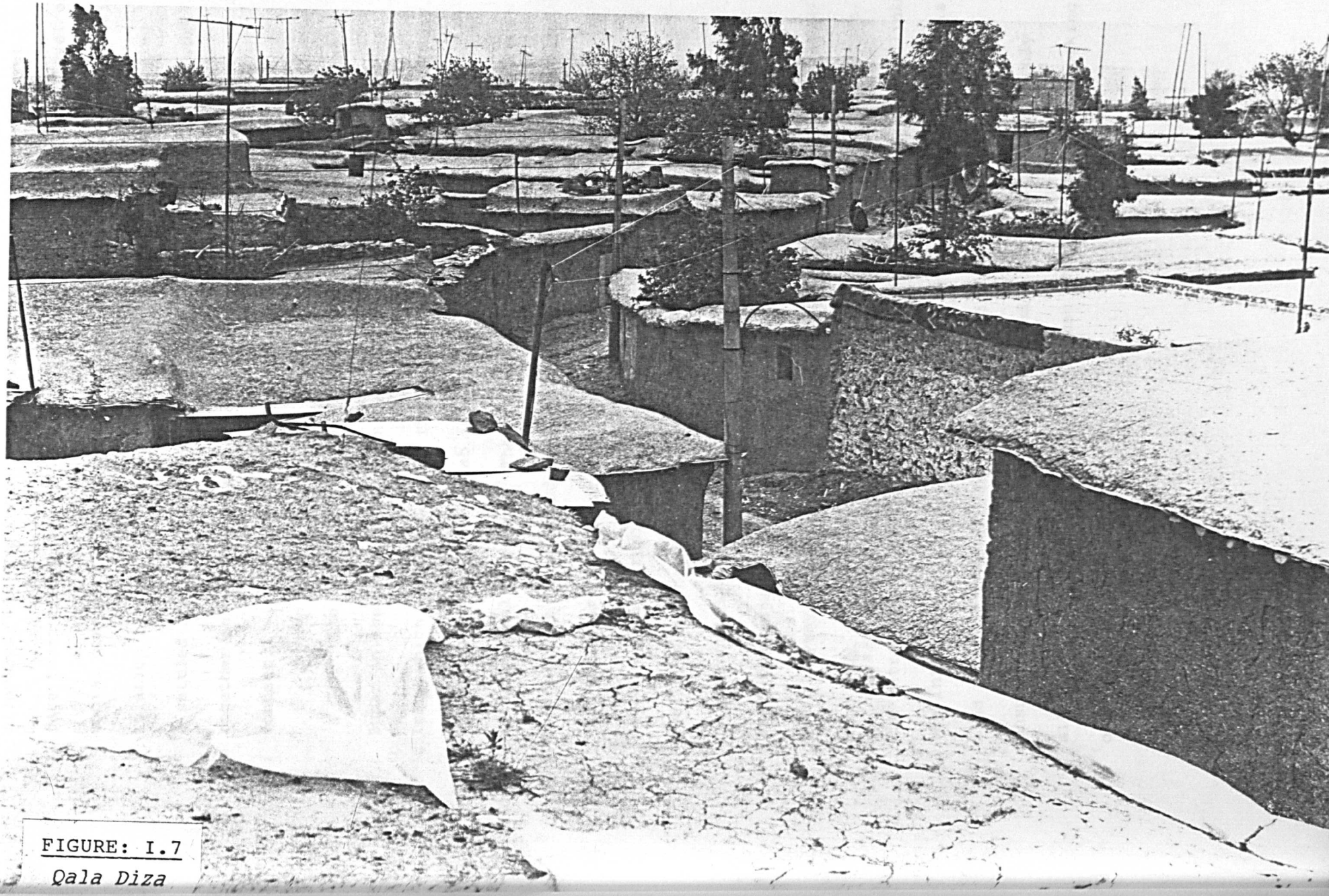


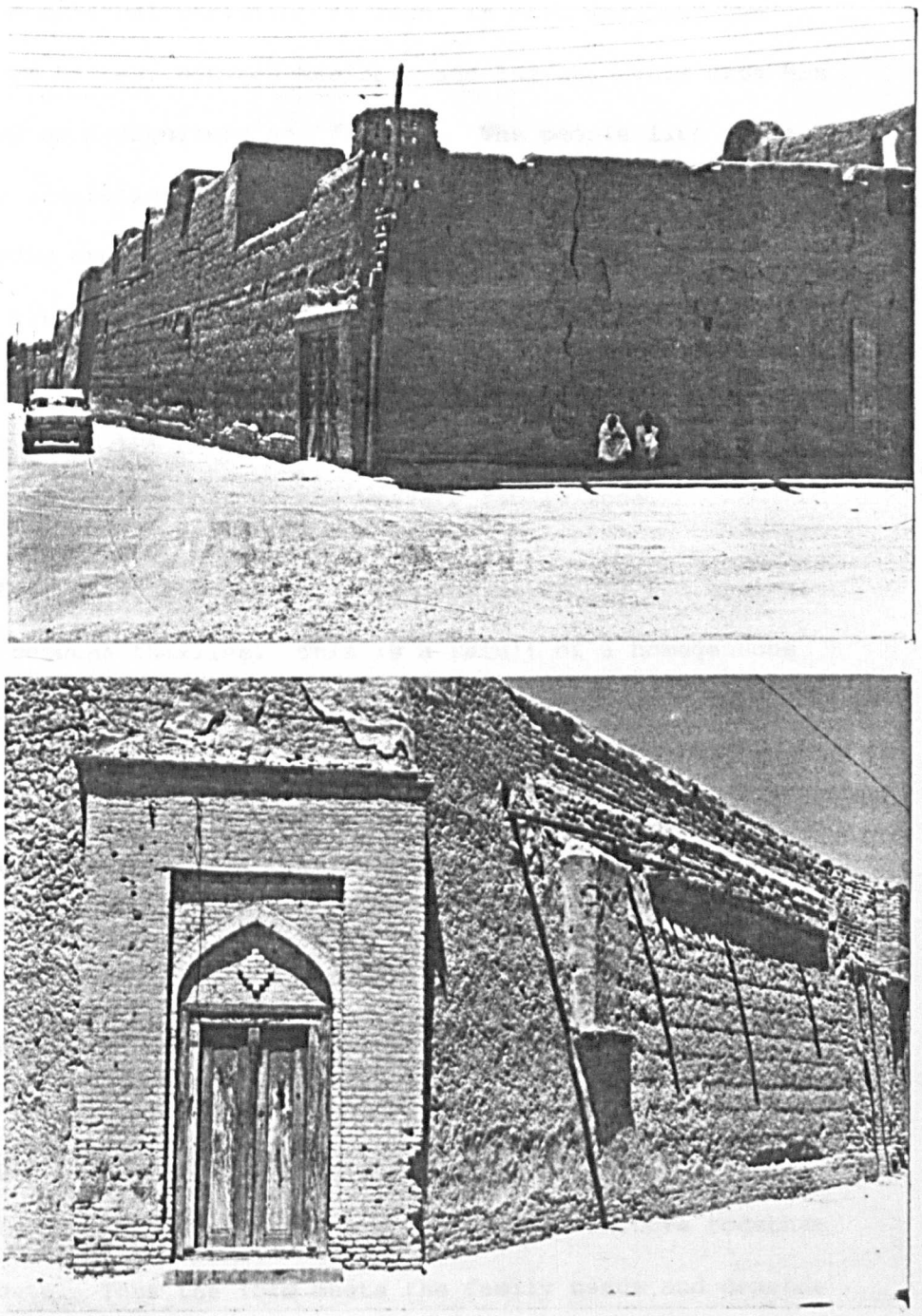
FIGURE: I.7

Qala Diza

alleyways, where a low degree of social contact takes place, yet face their neighbours on the flat roof platform where a high level of social contact can be achieved. This internal easy access and social relation between neighbours is the result of the inhabitants being a settled agricultural society, in which the males and females work together in the fields and neighbours have a long experience of social contact.

The opposite of this form of culture can be found in the Zubar in the south of Iraq in Basrah Muhafada, the only harbour of Iraq, which links Iraq with the outside world by water. Accordingly, the economic base of Basrah is mainly dependent upon national and international commerce. This brings in people from other countries and cultures to work and live in the city which makes Basrah a city with a mixture of culture; a cosmopolitan city. Zubar is a part of Basrah and is a residential area for businessmen and merchants. The dwellings are based on the internal courtyard form. Each dwelling is surrounded on each side by blank very high walls. These houses are built adjacent to each other leaving only one free facade facing the alleyway. These facades are joined together to form a continuous huge wall when seen from the street with only one door to each house. The entrance acts as the only possible access into the house and links the internal public circulation with the internal family zones. This kind of urban form represents a restriction on social contact and ensures strict separation between men and women. The men are only allowed to work outside, whilst the women are kept in secret, working only within the house.

FIGURE: I.8



Zubar

Another example of a different dwelling and urban form which is a response to cultural variation is found in Arab marshes, two hours by car from Basrah, between Nasiriah and Basrah. This area has an economy based on agriculture and fishing. The people live on small islands so some separation is achieved. Each family has a reed hut and outside shaded areas for their animals and where most of the family's daily activities usually take place, i.e. cooking, washing, eating, etc. As there are no real visual boundaries between these huts the area outside the huts can be considered as public zones whilst the internal space of the huts is the private family zone.

This form of subculture shows minimal divisions and maximal social contact between families. This is a result of a homogeneous and settled society, where the man and woman work together outside the house.

The aforementioned examples represent subcultures and their associated urban forms within the country. However, the urban form of these agglomerations is usually created by the people themselves with the help of friends and experienced people, i.e. a master builder, who has the knowledge of the local natural and cultural environment, because he is part of the local society with long local experience. This enables him to help the family to mould the two factors together to build the house. Thus the form meets the family needs and demands and fits harmoniously and organically into its setting within the surrounding area and urban fabric.

These examples of the vernacular form and agglomeration shows how Man has moulded his dwelling and the urban fabric in order to meet the specific cultural context found in a homogeneous and settled society.

FIGURE I.9

The Arab Marshes

But in the big cities the situation is different. As these cities have grown and represent centres of attraction for people who have migrated from different parts of the country mainly seeking jobs. Thus these cities represent a conflict of cross cultures populated from other regions, especially the city of Baghdad, which acts as a major target for migration (see Figure G.13). The traditional urban fabric of these cities is mainly based on a courtyard housing. This type of housing has a great ability for adaptation, due to its form and flexibility (see Section G.8.4.5), which enables it to accommodate people from different subcultures and backgrounds.

In the process of urban migration in recent history, Man passes from the traditional atmosphere in which the society is inwardly oriented and characterised by the dominance of the male and the segregation of the women, supported by strong beliefs in religion and traditional habits and customs to the modern materialistic way of life where women enjoy a form of emancipation and in which the society is more outwardly oriented. This change in the social habits and behaviour is coupled with a dramatic change in the urban form, i.e. from the courtyard houses within a compact urban environment to a compact house within a loose urban form. This change in the urban fabric and its elements brings to the surface the problems and tensions of a society which is in transition. However, the people start to prefer the compact house as it becomes a symbol for the new and modern life, and their beliefs about the compact house have remained fresh despite some of the disadvantages of their form as shown clearly in Table I.9.

TABLE I.9

THE DEMAND FOR FUTURE HOUSE TYPE BY ESTATE

Present Estate of Residence	Type of House / Estate	COURTYARD HOUSE		COMPACT HOUSE		TOTAL	
		No.	%	No.	%	No.	%
Courtyard	Kadimiya	14	35	26	65	40	100
	Karama	10	43.5	13	56.5	23	100
Sub-Total		24	38.1	39	61.9	63	100
Compact	Yarmouk	-	-	30	100	30	100
	Andlus	8	26.7	22	73.3	30	100
	High Rise Building	4	14.8	23	85.2	27	100
	Mansur	2	8.0	23	92.0	25	100
	Qadisiya	1	3.3	29	96.7	30	100
	Firdaws	3	10.0	27	90.0	30	100
	Tamim	1	4.0	24	96.0	25	100
	Umal	2	8.0	23	92.0	25	100
Sub-Total		21	9.5	200	90.5	221	100
Total		45	15.8	239	84.2	284	100

The introduction of legislation on plot sizes and layout introduced in 1935 brings only a partial order to modern urban development by stipulating basic standards in housing areas but gives no direction to house design.

Thus one way to measure the degree of success or failure of the created modern urban fabric or its elements can be to take the preference shown by people for a certain type of dwelling. But these preferences for modern housing represent a complex of factors; status and prestige, memories of the disadvantages of older run-down courtyard housing, the desire to present a 'modern' image and so on. The interpretation of our survey results is made more complex still because of the restricted number of dwelling types from which the urban resident can choose. To spend energy in devising new forms of housing may prove expensive and unproductive. Consequently, the family seeking new urban accommodation falls back on tried formulae. Prospective house dwellers seek the help of builders and architects who are themselves confused about the most appropriate form for modern housing in Iraq. Consequently, there is a tendency for borrowing and repetition of existing plans and very limited choice for the modern family.

Most of these modern dwelling types have been discussed and analysed in the case study and discussed in Section H.
Despite the different sources of these types of dwelling, they represent a conflict in design, since they are not based on any study of the natural and cultural environment. This ambiguity can be seen clearly in the plan of each house type where we see zones of conflict in use, overlapping functions and wasted areas.

However, the studies show that the private sector type of house is becoming the common choice. This is because of a set of factors. First of all, the main rooms and the kitchen of the house are facing the front garden and the road. Secondly, it has a degree of internal flexibility and thirdly, its plan composition allows a degree of separation between the internal public-private zones and private zones. This type, brought into Baghdad during the 1950's by an engineer, has gone through several stages of development and adaptation but the main principles of design and the relationship between its various elements in the house remain the same. The major changes and development of this house type which has included the form and disposition of the plan have usually been carried out by the architect, whereas the individuals when they are involved in the design of their own houses with the help of the builder, usually only create minor adaptations and alterations, including the size of the rooms, the location of the house within the plot and the appearance of facades depending on the inhabitants' requirements and social status.

Whatever the size and the scale of the change in the form of this type of modern house, whether adapted by the architect, the owner of the house or the builder, these developmetns are unable to accommodate the various requirements of Iraqi inhabitants, since the flexibility, extendability and repetitiveness is limited. This is due to attempts to modify a house type which is derived from Western culture. Conflict between this eclectic house type and tradition can be seen in the way that traditional architectural features are incorporated in the facades or the interiors of the modern compact house. Traditional values are being reintroduced and sought after but these adaptations are superficial. In addition, many of the

architects and designers working in Iraq have been trained in the West and fail to question the validity of Western house types to the Iraqi context. Thus they also contribute to the confusion about development of urban housing and urban form appropriate to Iraqi culture and climate. What is needed is urban design which can develop the physical fabric of the Iraqi city with sensitivity to modern needs and yet maintain an awareness of cultural context and traditional values.

As our findings from the survey showed the people in both areas (traditional and modern) prefer the outward-looking compact house. Table I.10 shows that 62% of the inhabitants in traditional areas prefer the compact house whilst only 38% of these people wanted the courtyard house. Similar results were obtained for the residents of the modern houses where 90.5% of them wanted their future house to be a compact house and only 9.5% wanted the courtyard house. Subsequently an overall percentage of 84.2% of the total sample surveyed demanded compact houses.

The preferred visual orientation of their future imagined house is given in Table I.10 and indicates that 63.2% of the people would prefer a street-facing orientation and 6% of them would prefer a rear-facing orientation, whilst 14% wanted outlooks at both the front and rear. Only 9% of the expressed preferences were for an orientation towards the courtyard, whilst 7% wanted to combine a front-facing orientation and outward-looking direction with the inward-looking courtyard style. In summary, these results give first priority to the views towards the front, second to the front and rear, third to the courtyard and fourth to the front plus courtyard.

TABLE I.10

	ESTATE / DIRECTION	Design with Cultural Measures					Design with Legislation Measures.					TOTAL	%	RANK
		KADIMIYA	KARAMA	YARMOUK	ANDLUS	HIGH RISE BUILDING	MANSUR	QADISIYA	FIRDAWS	TAMIM	UMAL			
VISUAL ORIENTATION	FRONT	19	13	21	17	17	20	19	19	20	21	180	63.2	1
	BACK	2	-	3	-	2	1	-	8	2	-	17	6.0	5
	SIDE	-	-	-	-	1	-	-	-	-	1	2	0.70	6
	COURTYARD	6	5	-	2	4	-	1	1	-	1	26	9.1	3
GARDEN LOCATION	FRONT AND BACK	6	-	3	11	3	2	10	-	3	5	40	14.0	2
	FRONT AND SIDE	-	-	-	-	-	-	-	-	-	-	-	-	-
	FRONT AND COURT	7	5	-	-	-	2	-	2	-	-	20	7.0	4
	T O T A L	40	23	27	30	27	25	30	30	25	28	285	100	

HOUSE VISUAL ORIENTATION AND GARDEN LOCATION

(Preference for outlook from main rooms of house and garden location by Estate

We can illustrate the confusion and conflicting demands which have emerged over the past 30 years in Iraq with respect to urban housing by following the development of the suburban compact house in Baghdad. In the 1950's the compact house was usually located towards the front of the plot. The demand for a large private open space was met by a large back garden area. This can be seen as a respect for the tradition of courtyard living.

The main rooms, i.e reception and living, were facing the front garden whilst the kitchen and the bedrooms faced the back garden. As the inhabitants of these houses were the people who moved from the traditional houses, their ties and beliefs in the traditional forms of housing were still strong; accordingly, a continuous boundary wall was built around the plot being very high and blank to draw a clear barrier between the public and the family zone. The family zones are distributed in relation to the degrees of privacy. As the rear garden offers more privacy from the road the family usually use the back garden for activities. This arrangement allows the rear garden to act as a private area.

Over the course of time, coupled with the change in the people's beliefs and attitudes, this type of house witnessed some change. Firstly, the kitchen was expanded in size to meet the plot boundary. This offered for the housewife a visual control on the main gate where the car space is located and allows observation of passers by. Moreover, the body of the house as a whole is shifted backwards to create a big garden in front of the house as it was assumed that the front garden could offer as much privacy for the family as the rear garden, due to the wide streets between the houses. The rear

garden failed to provide privacy as it can be directly overlooked by the neighbours. Such overlooking is not necessarily a problem as we have seen in the description of traditional housing in Northern Iraq. However, in a socially heterogeneous and migrant population where neighbours are not known in a deep and communal way, overlooking becomes a problem. In creating a small rear garden it does allow it to become private, whereas the front garden acts as a public-private area. Often the rear garden became a residual space, perhaps only 1 metre in depth, unusable for anything but refuse. The rooms facing this space became unpleasant. Additionally, the use of the rear space for rubbish adds to health hazards.

The conflicts raised by use of the front garden as private space are seen by attempts to screen the area with walls and fences. Continuous screening is usually provided by house owners who can choose to provide low walls or high walls. Over time see through grilles have been introduced which makes the space more visible from the road and reduces the value of the front garden for family activity.

We might conclude that these examples indicate an uncertainty and conflict between old and new cultural ideas with no clear pattern and preference emerging.

The same kind of conflict and ambiguity can be noticed in the internal planning of the modern compact house. The clarity of the traditional vernacular house is lost. Courtyard housing achieved a careful articulation and segregation of family functions by using the courtyard as a transition space , whereas the modern compact house plan is notable for cross circulation and overlapping of functions

which creates interpenetration and ambiguity in use, and a reduction in the usable space, lack of flexibility in furnishing and so on. We have considered these issues in a previous section.

This lack of attention to cultural values is mirrored in the inability of the modern compact house to provide adequate natural adaptation to the natural environment. Efforts to improve the environmental performance of the compact house by window shading is unlikely to radically change the internal environment. These are complementary elements of environmental adaptation which cannot alter the unsuitability of the compact house for creating comfortable living conditions in hot dry regions. Environmental adaptation in these conditions requires consideration of the environmental performance of the house as a whole and of the urban fabric in order to create a workable system of thermal exchange and control as seen in traditional housing areas.

Less ambiguous are the results of the survey on neighbourhood conditions in modern compact estates. For most people it seems that the level of social activity, satisfaction with facilities and accessibility to facilities are all lower in modern compared to traditional housing areas. We might conclude that these modern areas fail to provide a continuity with traditional Iraqi urban culture by making a fundamental break with the gregarious activity found elsewhere in the city. Density and provision of amenities are not factors which residents can affect directly because there are no opportunities for participation.

(a) Evaluation of the Case Study Estates in Terms of the Model

Ideally a strong relationship might be realized between the natural and cultural environmental factors which are involved in housing design and in the production of the urban fabric with respect to both the individual unit and the whole neighbourhood. The realisation of this relationship might be a principal goal for the modern urban designer in Iraq.

According to the housing types surveyed here, the traditional urban fabric can be considered as the product of Man's needs and demands evolved over a considerable period of time and within certain local cultural and natural parameters.

Although the individual might participate in modelling the traditional house and the space surrounding it, the final arrangement has usually been decided by the master builder, who has the knowledge and experience of local technology and of the natural and cultural context. On this basis the craftsman has the ability to combine human and environmental requirements; he understands the principal techniques for creating the appropriate micro-climate conditions by the correct orientation and disposition of elements both within the traditional house and between the broader environment of the building in relation to its surroundings.

By building in a vernacular or established manner he also has the capability to solve different design problems within the encompassing framework of the legislation or neighbourly agreements between individuals.

Consequently, the resultant dwelling and urban form (Figure I.10(a)) is satisfactory in meeting Man's environmental requirements in mediating the natural environment, in observing cultural parameters and in providing a 'communal' or accepted architecture and urban form.

Nevertheless, traditional housing built as the result of historical experience is no longer responsive to modern human requirements, since Iraqi culture is undergoing change (i.e. in technology, socially, in living standards and cultural habits and customs).

Since the 1920's in Iraq foreign and Iraqi consultants who have mainly received their education and experience in Western countries, have played a major role in changing the form of the city and its elements by introducing compact buildings within a loose layout in line with the precepts of the Modern Movement.

This modern urban fabric and its elements have been introduced into Iraq as an example of a rational architecture and planning technique, without giving any attention to the local natural and cultural environments. In general this kind of urban fabric can be seen in two phases:

The first phase in the modern development of residential areas offered a degree of freedom to prospective house builders by provision of sites within a simple road layout in undeveloped land. Certain contraints linked to legislation and building regulations had to be observed by the design of the individual housing and was left to the individual owner.

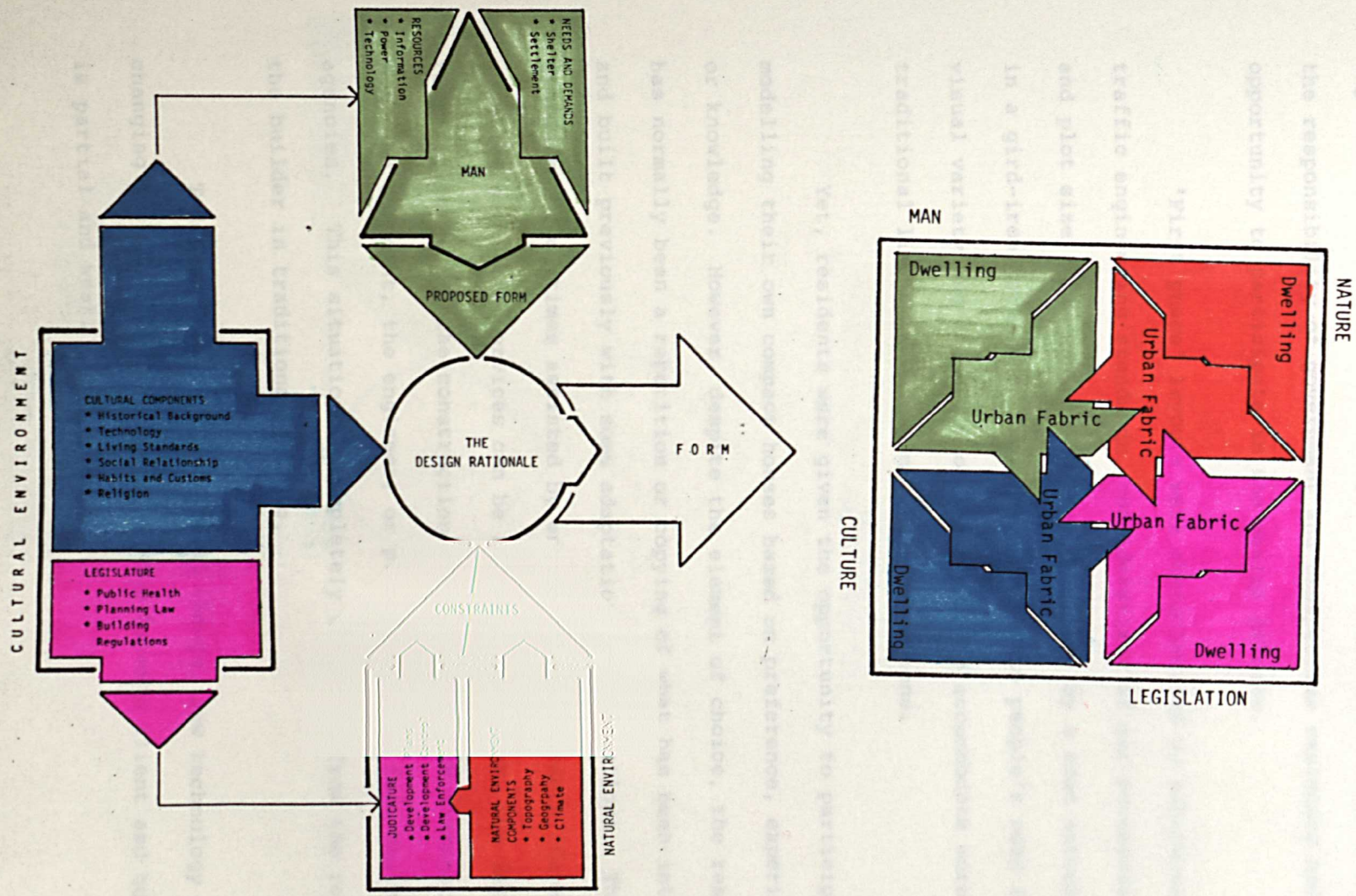


FIGURE: I.10(a)

The Pattern of Influence on Traditional Dwelling and Estate Design

Under the second phase of modern housing development in Iraq neighbourhoods were designed and built under the auspices of the government. Attention was given to wider human needs and some awareness of the cultural life and tradition of Iraqi people was incorporated into these schemes. The responsibility for design and implementation of the estate layout and house units themselves was the responsibility of government and prospective residents had no opportunity to participate in the design process.

'First phase' layouts were characterised by adherence to traffic engineering standards, considerations of car movements and plot size. These estates were dominated by a road network in a gird-iron form which was unsympathetic to people's need for visual variety and incapable of adaptation to accommodate more traditional living patterns and social relations.

Yet, residents were given the opportunity to participate in modelling their own compact houses based on preference, experience or knowledge. However, despite the element of choice, the result has normally been a repetition or copying of what has been introduced and built previously with some adaptations or alterations. The resident is sometimes assisted by engineers and builders, depending upon whether their services can be afforded. However, the latter's role is limited to the construction of the house with instructions from the resident, the engineer, or plans purchased from building agencies. This situation is completely different from the role of the builder in traditional housing.

Today, in a state of cultural change, new technology and changing social habits, the relationship between client and builder is partial and weak.

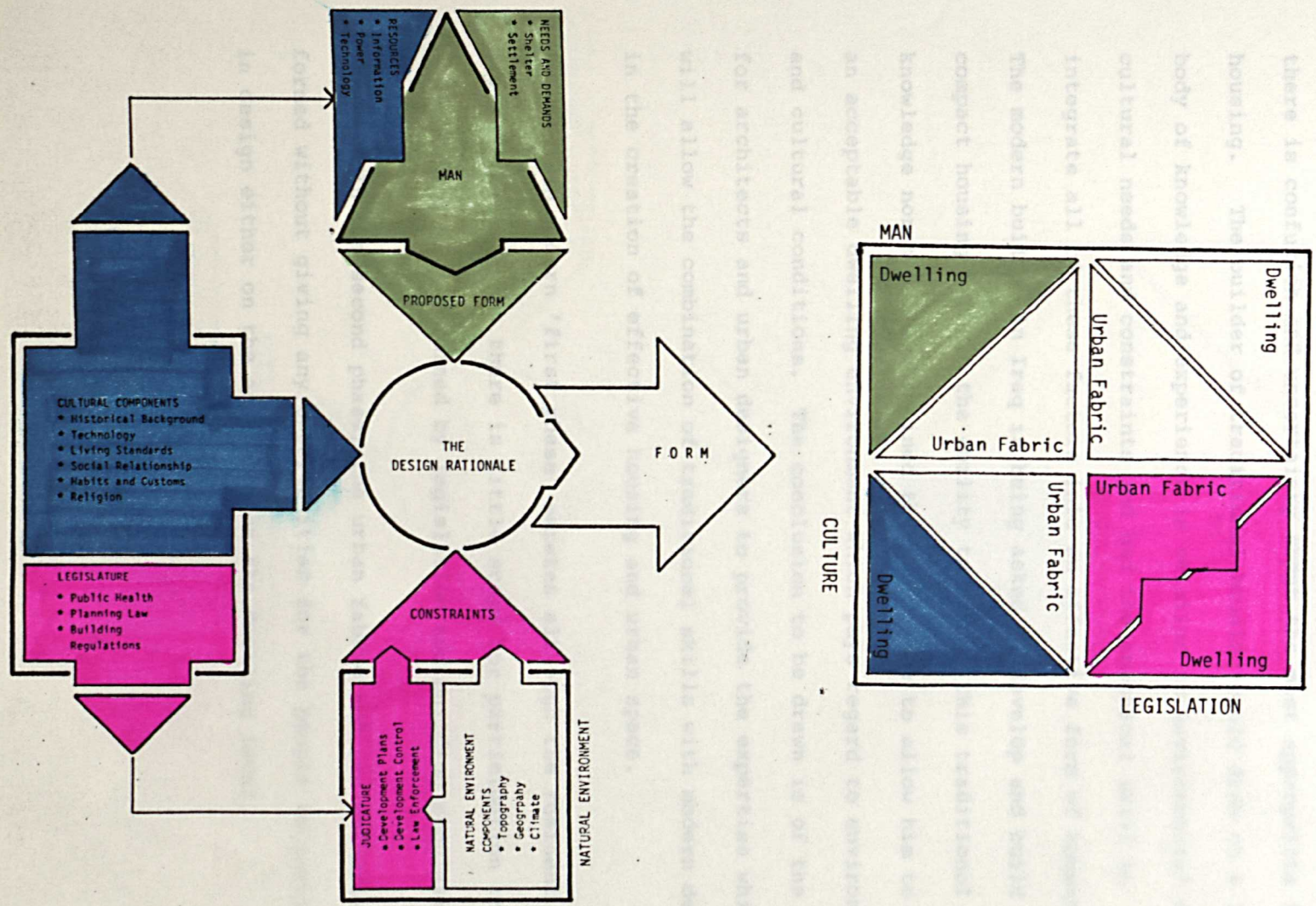


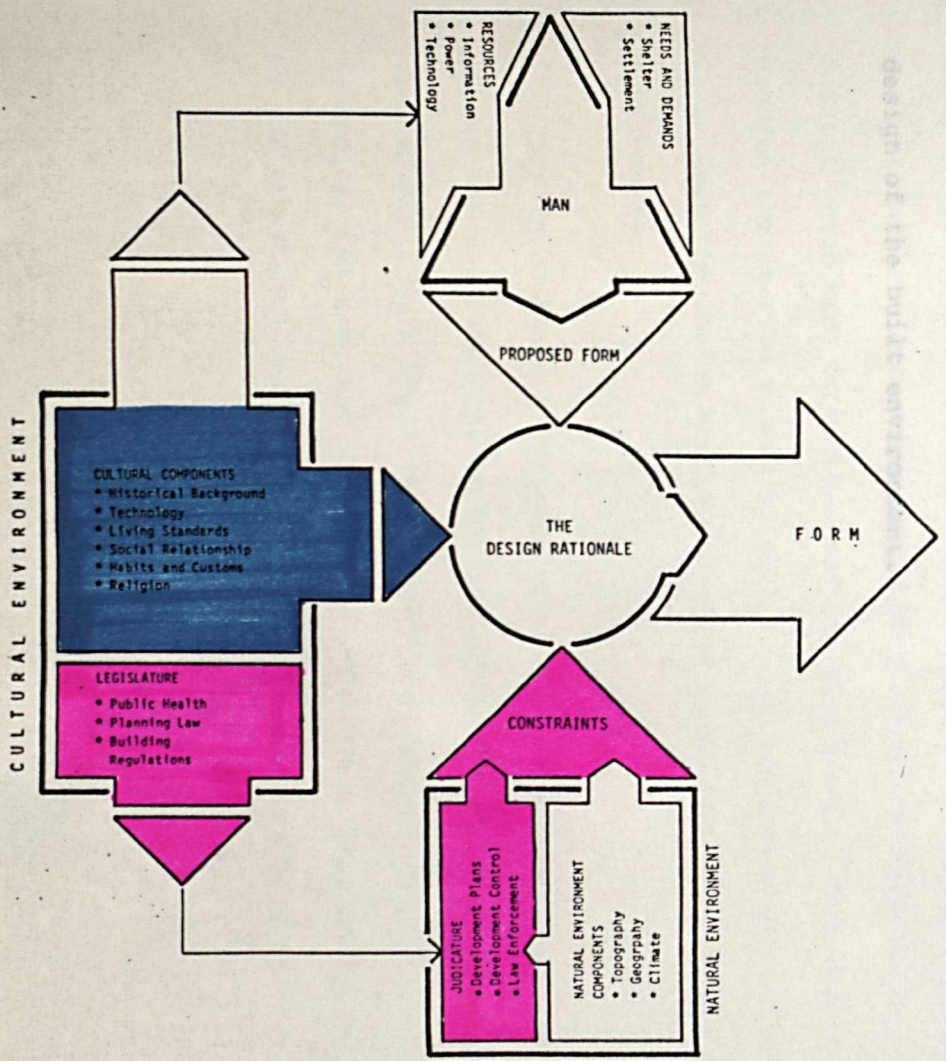
FIGURE: I.10(b)

The Pattern of Influence on the Modern Dwelling and Estates of the First Phase (Compact House)

Thus, with modern housing a different relationship is found between the client and the builder in comparison to the traditional relationship. The traditional house which evolved over a long period of time was adapted and developed to create cognisance and harmony between the construction, layout and space and the needs of the inhabitants. With modern technology, imported forms of housing and new, if confused, ideas about how modern Iraqi families might live there is confusion and uncertainty about the most appropriate form of housing. The builder of traditional housing could draw on a large body of knowledge and experience in relation to environmental and cultural needs and constraints and had the technical skill to integrate all of these factors into an effective form of housing. The modern builder in Iraq in being asked to develop and build compact housing has not the ability to employ this traditional knowledge nor has he yet gained the experience to allow him to create an acceptable dwelling environment which pays regard to environmental and cultural conditions. The conclusion to be drawn is of the need for architects and urban designers to provide the expertise which will allow the combination of traditional skills with modern demands in the creation of effective housing and urban space.

In modern 'first phase' estates although the resident has some say in house design, there is little scope for participation in estate design which is determined by legislation and building regulations.

In the second phase, the urban fabric and its elements are formed without giving any opportunities for the people to participate in design either on the estate or on the dwelling level.



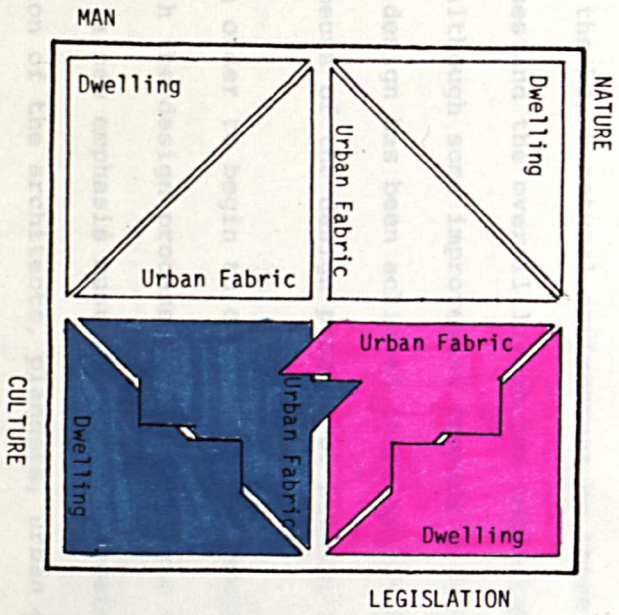


FIGURE: I.10(c)

The Pattern of Influence on the Modern Dwelling and Estate for the Second Phase (Compact House)

In this phase attention is given in a broad sense to the social and cultural factors in design of both the dwelling and estate achieving some integration between them. Also within this phase another relationship has been achieved between the dwellings and the estate through the existing legislation and building regulations. However, there is a failure to resolve the dwelling and the problems created by the harsh natural environment on these estates. The design of the houses and the overall layout has neglected climatic considerations so although some improvement towards a fully integrated and functional design has been achieved there is still a lack of attention to some aspects of the design problem of housing for Iraq.

In order to begin to overcome these problems and thus improve both the design process and local estate environmental conditions, a new emphasis must be placed on restructuring the training and education of the architects, planners, urban designers and builders, so as to achieve a better understanding of local influences on the design of the built environment.

(b) Man's Reaction to the Existing Situation of the Urban Form

In addition to the aforementioned positive factors within traditional areas and individual houses culturally and environmentally, these elements are suffering now from major defects in design, related to the use of technology and the change in people's attitudes and behaviour.

New modes of technology have been introduced within the ambit of the domestic level (i.e. refrigerators, gas and electric cookers, cars) and also on the public level (i.e. public service vehicles, infrastructure, electricity and service modes). The traditional areas and the elements of the courtyard house cannot always be adapted to allow these new services to be utilized by the inhabitants. This is due to the scale of the narrow meandering alleyways on the one hand and the scale of some parts of the house, especially the kitchen.

Moreover, the courtyard house in winter had proved inconvenient in that some parts of the house (i.e. kitchen, bath and toilet) which must be reached via the courtyard. This situation exposes the user to sudden changes in the environmental conditions (i.e. from the inside heated condition to outside natural cool conditions).

In addition people are now not fully satisfied by the use of the natural resources in cooling or heating since they are unable to adequately meet their requirements for comfort and because the technology has remained undeveloped. For these reasons they prefer to use artificial resourcees as they are more efficient.

Despite the traditional urban fabric containing open space (i.e courtyard) within each dwelling where the children can play and the family can gather and public buildings where people can meet socially, these areas show a lack of public open space where all the children can meet and play together accompanied by their families.

The existing physical condition of the traditional urban fabric, i.e. building construction dampness and poor sanitation, make its environment unacceptable to the inhabitants.

In contrast, the modern urban fabric shows some respect for the physical environment and Man's modern requirements; the use of different resources of technology on both the domestic and public level, i.e. the car, central heating and air-conditioning, public open spaces for the children, a garden within each dwelling.

Consequently both types of urban fabric, the traditional and the modern, show positive and negative aspects from the design point of view in response to Man and his environment.

Accordingly a new approach is needed to combine together all the positive factors of the existing types in one design formula in order to achieve an efficient urban fabric and better environmental quality for Man.

J

RECOMMENDATIONS AND PROPOSALS

[J] RECOMMENDATIONS AND PROPOSALS

What has been presented in the different parts of this thesis is an analysis of the influence of cultural and natural factors upon the urban fabric and measures of human comfort within the traditional and modern urban forms of Iraq. This presentation leads us to an essential question - whether it is possible to recommend design principles which can give designers guidance and direction towards creating better urban form in response to the natural and cultural environments.

Certainly we feel that it is possible to offer such guidance if the lessons from both the traditional and modern urban fabric are considered and the recommendations put into practice.

Although the people surveyed did not prefer the traditional urban fabric from a functional point of view, it seems that a careful study of the traditional achievements can offer possible suggestions for present and future urban design. The traditional system of house building in combination with modern technology can introduce satisfactory solutions for housing and settlement design in arid zones. This potential is important in a period of fuel crisis and rapid population growth.

Although the recommendations for the urban fabric design due to natural and cultural factors will be presented separately, yet they should be considered together in order to create acceptable urban form. The synthesis can be seen clearly in the forms of the traditional courtyard house and its urban fabric.

As we have identified earlier Iraq presents various types of climatic zone and environments. The following recommendations will focus on the dry climate arid zones and will be set out as follows:

[J.1] DESIGN CRITERIA

J.1.1 RESPONSE TO NATURAL ENVIRONMENT

J.1.1.1 Thermal System

Physical strain on the human body in an arid zone due to heat and exposure is a result of the sum of the metabolic adaptation due to the extreme daily and seasonal differences of the external ambient temperature. These conditions create very specific design parameters that must be respected if human thermal comfort or efficiency is to be achieved.

If the definition of design includes two key factors, first it is produced for people, second, that resources are always limited, then an optimal design is that which divides these resources so as to give the maximum satisfaction to those affected by the design. So people and economy are at the centre of good decisions about the thermal environment.

In general terms, the main design considerations on the town and building forms levels should include the following.

It should be possible to devise pleasant and comfortable conditions in most climates by a proper graduation of spaces between the inside and outside, with regard to the varied experiences and activities of household members.

Control, both human and automatic, over conditions is a vital part of economy, so that quick response to change is possible.

As energy to achieve comfort is becoming a major item of public and personal expenditure, careful thought has to be given to providing the cheapest combinations of the natural and artificial forms of adaptation to create acceptable living conditions.

In summer the heat load found in this region can be alleviated by reducing the radiant heat flux and improving the provisions for evaporative cooling. To do this, design must call for large shady areas and continuous air movement. Such natural methods of cooling are sometimes preferable to man-made cooling systems because air-conditioned spaces suppress sweating and leave the cooling to convection and radiation only, whereas in winter heat gain, heat retention and windbreaks are desirable during the cold months. Thus devices controlling solar gain and sunlight admittance must be carefully orientated and detailed for the right season and sun angle.

But in considering the aforementioned factors, the designers should take into account Man's two main activities in order to design for human comfort; these are work and leisure. Discomfort in one may result in interference with the other, as the type of work (indoor and outdoor) has a substantial impact on the extent of Man's interaction with his environment.

According to what has been aforementioned, a thermal system is recommended to adapt the urban fabric to respond to natural environment, in order to create acceptable climatic living conditions by the use of natural resources. The best example for such a system can be drawn from the adaptation of the human body and the courtyard building, as both systems depend upon evaporation as a cooling operation in summer where air pressure differences and the air movement accompanied by the presence of moisture are used to achieve this operation. In the human body the heart pumps heated blood from the internal tissues

of the body to the skin surface where evaporation takes place by the presence of the air movement and perspiration (see Section E.3.2.2). In the case of the courtyard building, local differences in air pressure are used to create air movement circulating throughout the building structure to achieve cooling of the internal atmosphere of the building and the human body (see Section G.8.4.6). In addition the air movement created increases the levels of ventilation since the wind speed in arid zones is very low.

In winter both the human body and the courtyard building are adapted to retain the heat and to circulate it internally.

Moreover, both systems achieve their success in adaptation of the micro climate through a succession of modifications to hot air in order to filter out the extra heat before the air is used for cooling the human body. These operations create micro climate or atmosphere surrounding the body and micro climate for it acts as shell and kernel. With regard to the human body clothes play a role of a macro climate shell preparing a micro climate beneath them (see Section E.3.4.1), whereas in the case of the courtyard building this integration is achieved by the tight compact urban fabric which plays the role of supporting a macro climate which enhances the micro climate of the individual building.

These natural systems in fact do not offer the same degree of coolness and comfort that the mechanical systems offer, but natural methods of adaptation can act as the first stage of cooling at the micro climate level. This will achieve seasonal and daily energy and economy savings. At the macro level, i.e.

urban fabric, the natural system of climatic adaptation forms the only efficient and economic thermal system which can create macro climate comfort.

J.1.1.2 Complementary Elements

It should be borne in mind that the overall thermal system requires complementary elements on the detailed level in order to control and ensure its effect and increase its efficiency. These elements are: lighting and ventilation, building envelope and building materials.

(a) Elements of Ventilation and Lighting

The elements which are involved in the natural ventilation of the buildings are mainly windows, openings and the airscoops. Natural lighting of the internal space is normally dependent upon the use of windows.

The heat in the internal space of the building increases rapidly in summer in the arid zone. Thus a good ventilation system is required to release the generated excessive heat usually created from both the occupiers and their different activities and the use of domestic appliances.

Accordingly, the natural method which can be used for this purpose is the prevailing wind and the created air movement which can be generated through channelling the breeze and by allowing different air pressure between indoors and outdoors.

However, windows also play a major role in natural lighting of the internal spaces. In some cases the natural light entering the space is accompanied by glare which is usually not acceptable by the occupiers. Thus in order to achieve good ventilation and an acceptable level of natural lighting, the

window size, pattern and location within the building should be carefully considered and designed to act not only as a functional element but as a control device by use of shutters etc. (see Section G.8.4.2).

(b) Elements of Building Envelope

As the arid zone includes both the extreme types of weather, hot dry in summer and cold in winter, and in order to create a comfortable human atmosphere within the home, the building envelope should act as both insulation and humidifier. The envelope acts to achieve separation between the internal and external atmosphere. Control of the interface between external and internal environment can be made by graduation of the integration between them in the required places. This can be achieved not only by appropriate use of building materials but by the use of shade and control of air movement.

(c) Building Materials

The other important elements in the complementary integration needed to achieve thermal adaptation are building materials, as they form the structure of the building, in particular the external insulation shell. Thus, these materials should be permanent, dimensional, interchangeable, provide a high degree of resistance to the wind and occasional torrential rain and be fire-proof, vermin-proof and adaptable to urban conditions. On top of all these requirements building materials for use in hot arid zones must have properties of insulation (see Section E.4.1.1).

However, not merely the quality of materials provides the protection for the internal space but their colour also plays an important role in climatic adaptation by means of reflectivity (see Section E.4.1.1).

It is then the responsibility of the designer to use available resources to optimum advantage and to try to guide his client in choosing the best available alternatives. Change is inevitable, and if the quality of life is to be improved, such change is desirable. As structures become more modern, roofing and other manufactured materials may be demanded at a cost which represents real economic sacrifice to the owners.

TABLE J.1

THERMAL PRINCIPLES OF HOUSING FOR HOT DRY CONDITIONS

OBJECTIVE	PRINCIPLES	APPLICATION
Reduce heat production	Minimize heat and vapour addition from cooking and other procedures	High operating efficiency in cooking and other heat-liberating devices
	Functional convenience	Isolation of "wild heat" by insulation or conductive-convective removal
Reduce radiation gain and promote loss	Minimize solar projection	Labor saving layout and facilities
	Shade	General design cubical
	High reflection of shorter but emission of longer wavelengths	Trees, bushes suitably placed
	Convection over surfaces heated by radiation	Eaves, shades on sun-exposed walls
	Insulation	White paint on sun-exposed surfaces
		Heat storage insulation in roof and sun-exposed walls
Promote evaporation	Wetting	Permit air flow over sun-exposed surfaces, vents in hot-air traps
	Maintain sufficient convection over evaporating surface	Wall openings closable on hot days, openable on cool nights
		Evaporative cooling devices

TABLE J.2

APPLICABILITY OF DESIGN PRINCIPLES FOR HOT DRY CONDITIONS UNDER ALTERNATIVE CONDITIONS

ITEM	APPLICABILITY TO COOL TEMPERATE	APPLICABILITY TO WARM HUMID
Reduced heat by production by man	Not important	Still important
External shade	Not desirable	Still important
Reduced ground radiation	Not desirable	Still important
Attached shade	Minimal effect desired	Still important
Water cooling	Not desirable	Operative on roof
Minimal solar projection	Greater projection required	Still important
High reflectivity	Not desirable	Still important
High -emissivity	Not desirable	Immaterial
External convection	Not desirable	Still important
Insulation	Desirable against reverse heat flow	Still important in roof, immaterial in walls
Internal convection	Not desirable	Still desirable
Low internal emissivity	Desirable	Immaterial
Controlled ventilation	Closed	Wide open
Roof space ventilation	Closed	Open
Ground cooling	Now operates for heating	Non-operative
Evaporative cooling	Not required	Relatively ineffective
Refrigerant cooling	Not required	For dehumidification
Reduction of heat liberation	Heat may be required	Still important

J.1.2 RESPONSE TO CULTURAL ENVIRONMENT

The other main factors which play a major role in moulding the urban form are cultural. These factors are almost always in a state of change due to social circumstances, diffusion of ideas, increase of wealth and the like.

As Iraq experiences change from Islamic traditional culture to a more westernised way of life, the cultural values are changing accordingly, resulting in losing and gaining values. Thus the following items will indicate some of these facts, their impact on the people and the urban fabric, including suggested recommendations for improvement on both the urban fabric and domestic levels.

J.1.2.1 Cultural Values and the Urban Fabric

(a) Social Relationships

The analysis of the age-sex distributions in our survey areas, the traditional and the modern estates, reveals that there is a degree of association between the people whose age groups are <9 years and 25-40 years on one hand and the social relationship on the other hand; in the traditional areas in general the sex-age groups pyramids are of a 'normal' type with children younger than 9 years of age forming a wide base with a representation of all older age groups. We find on these estates that social relationships are well developed and strong. On the other hand, in the modern estates, the population pyramids are notable for the under-representation of some age groups, particularly young people, and this is associated with a low degree of social relationship.

In order to ensure a communal basis for social life and in order to strengthen and generate a social relationship in the future, it may be necessary to undertake some form of social planning to give a balanced age structure in new estates. This can be achieved partly by the dwelling design. By good design it may be possible to divide the dwelling into more than one unit with independent entrances. This will give opportunity for the occupiers to divide and offer for sale or rent part of their premises if it becomes too large for them (for example, as children grow up and move away). This may also help to maintain the estate density and remedy some of the housing problems on both the national and regional level.

A characteristic of modern Iraqi housing estates is the social homogeneity of the residents who are often involved in the same kind of occupation and have similar levels of income. This characteristic is due to the method of land allocations in the country but we feel that there may be some value in a greater mix of social groupings in housing areas. Greater mixing of social groups is less socially divisive and may enhance broader social relationships. However, we are aware that mixing across wide social differentials does not occur easily so in looking for greater social mixing we would recommend the possibility of housing for groups of broadly similar social and occupational status.

(i) Social Relationship and Occupation Status

Not only the hierarchy of age-sex groups can improve the social relationships of an area but also the hierarchy of the roads network system and the separation between the pedestrian and the vehicles have the same effect on the social interaction, as shown

in the comparison between the traditional and modern estates in the case study (see Section I.1.1). In addition this suggestion will achieve a degree of privacy which is required by the inhabitants, and increases the road safety.

(b) Services and Utilities

It has been shown from the case study that there is a strong relationship between the modes of transportation to reach the services and utilities within the estate level and the size of the dwelling plots. The larger the plots the greater the distance to reach them, resulting in increase in the use of cars. Therefore, in order to bring the services and utilities near to the people, the size of the plots for the dwellings should be taken into consideration in accordance with the income and the status of the inhabitants; this will also help in saving energy and economy for the country on the national level.

(c) Aesthetic Status

To avoid monotony, repetition, imbalance between the mass of the building and the external spaces, which characterises the modern estates, the aesthetic values of the traditional urban form can be brought to bear to improve the aesthetic quality of the future urban fabric. These aesthetic factors are the articulation, the transition and the balance between the mass and the space in relation to both the human and time scale.

These aesthetic factors have been successfully used in the traditional estates accompanied by means of excitement, hidden

elements and dramatic surprise in the urban environment (see Section G.8.4.7).

J.1.2.2 Cultural Values on the Domestic Level

(a) Design Principles

The individual privacy, flexibility in the use of space and the ability of extending the space played a major role in forming the main design principles in the traditional buildings. These factors still play a role in the design process in the modern houses but without achieving the balance between design and contemporary needs that was achieved in the past between the courtyard house and the traditional way of life. In the traditional dwellings the use of space was due to its function having been clearly identified on the basis of the aforementioned design principles without side effects such as conflict, cross circulation and their effects on the use of space in the house. The experience of the modern dwellings shows that conflicts over function and cross circulation problems are frequently found (see Section H.

Accordingly, the designers should consider these principles in their designs with avoidance of these side effects as far as possible, as they affect the use of space, privacy and the internal climatic conditions of the modern houses, which causes waste in energy and economy.

(b) Function of Space and Family Activities

The use of space in relation to the family activities in the different types of dwelling of the case study, the traditional and the modern, shows that despite the availability of the different spaces within the house, the family activities usually are

concentrated in some of these spaces, creating heavy use of the space, leaving the others at a more normal or low level of use. This creates imbalance in the use of the available space, creating waste in energy and represents an uneconomic form of housing resulting from the mismatch between the function of cultural and natural factors in the design.

Therefore, it is the responsibility of the designers to readjust these factors in their designs to create a better use for the created space. This suggests as a matter of some importance that the designer should follow and watch and analyse the way the people use the spaces in their homes in order to learn and develop the ideas and experiences of the designer. This should also be followed when designing for a larger scale within the urban design level.

[J.2] REGIONAL ENVIRONMENTAL PLANNING

What has been presented in the first part of the recommendations is a guide to some of the design principles which may be followed in certain natural and cultural environments in order to create a suitable and comfortable human urban fabric.

The creation of the urban form usually depends upon two major factors - the layman with his understanding of his requirements and the professional, with his specialised knowledge of the technological factors involved.

In most cases, at this stage the urban form produced would not be the satisfactory answer either for the layman who cannot clearly determine his requirements in relation to his environment or for the designer who cannot go beyond his theoretical background for lack of environmental knowledge on both levels. This creates a gap in understanding between layman and professional which has resulted in the problems found in the existing urban fabric and the difficulties in achieving useful participation.

It is the role of the environmental educator then, to bring together these two major groups of people to create understanding and help lead towards a mutually satisfying environment.

Thus, in order to improve the layman's environment and to create better urban form, environmental education should be carried out from regional to local level, the level of which the details can be determined.

To achieve this, a team of specialists (i.e. sociologists, anthropologists, scientists, engineers, architects and planners), should be formed in order to divide the country into environmental regions based upon natural and cultural environmental aspects. Within each of these regions will be located a complementary team whose role will be to divide their particular region into smaller and more compact subdivisions, and to producing two separate and associated reports, each one incorporating the main features and characteristics of the region from the natural and cultural point of view, one for use by the educational institutions and the other for use by physical planning boards.

From these two reports will develop materials which will then be presented to the public on the one hand, by means of the popular media, via schools and at a higher level to the universities and colleges and the professional bodies on the other, by means of urban designers, architects and planners. (Figure J.1).

J.2.1 ENVIRONMENT EDUCATION ON THE PUBLIC LEVEL

The environmental education given on the public level through the media and schools with the cooperation of other ministerial and administrative bodies should consist of information about the natural and cultural environment, the nature of the cities and the settlements within the region and their inhabitants underlining their main features and characteristics. This kind of education will help the layman to understand the environment surrounding him which will then enable him to make the right decision and choice in the various domestic aspects and increases

his interest and involvement in his immediate surroundings; this will encourage him to participate in improving and retaining the environmental quality.

This form of education could help to increase people's awareness of their position in a contribution to the wider society and therefore have educational benefits beyond the improved understanding of the environment. People's perspective will extend beyond their house and their street to take account of undercommunity.

On the higher educational level, where the professionals are to be trained (universities and technical colleges) more advanced environmental education should be given. In addition to the basic fieldwork and surveys already incorporated into the different courses and specialisations, for example a student of architecture should be given information about his environment, not only on a national level, but also with particular emphasis on a regional level. Using this information he can then more closely study by field survey and exercises in relation to the environment such as the historical buildings to be used as studios, libraries and exhibitions. This gives the idea about the varied types of the urban fabric existing within the region and their response to the environment. This will enable the student to relate the basic theory to the reality linked to the existing situation and how it is possible to put theory into practice. The same technique can be used in other courses in order to achieve a degree of understanding for the people, their environment and the problems encountered, and the best approaches to solving them. This will

enable them to qualify for taking future responsibility and encourage them to practise within the region as specialists. We see this also as helping to solve one of the problems of professional manpower in Iraq which is centralisation and concentration of skilled workers in Baghdad.

J.2.2 BOARD OF PHYSICAL PLANNING AND ENVIRONMENT

The report which will be presented to the professionals concerned with creation of the physical environment should be more detailed and precise, incorporating the results of different up to date research projects relating to natural and cultural environment of the region. This data will play a major role in forming and shaping the city, the settlements and their elements. Accordingly, the environmental data should be collected together and used in a hierarchical manner, starting with the city and town planning level where the land use and the growth of the city can be analysed. Work at this level will be followed by studies of the design of each part of the city at the urban design level, where the main basic systems for the thermal control and cultural context can be determined. Finally, these areas of research will lead to work related to the design of the individual dwelling unit and buildings. This programme of research will help the designer and give him guidance and an orientation necessary to fit his design within the broader context.

At each of the three aforementioned design levels, the layman has a role to play in forming the research by means of participation. In fact each level of analysis should have its

own form of participation and should involve different types of participant. For example at city and town planning levels, all the people should be called for participation, but city wide organisations could be involved as participants, whereas at the urban design level the participation will be more specific, involving people and local groups whose usage is similar to the project in hand. In the design of the dwelling units or individual building the involvement must be at a personal level.

This approach to design and participation will create guidance and regulation on each of the three levels of analysis and spatial scale that we have identified instead of general regulations. We feel that this will allow for more flexibility in design and creation within the broader constraints of society's evolution and technological development. In this way, the planner, urban designer and architect will each have information to help develop effective proposals at the respective spatial scales bearing in mind the parameters used at other scales. Moreover, it allows for addition or amendment to the existing regulations without affecting other parts of the urban fabric of the city.

The completion of this research is not, in itself, the ultimate conclusion, but rather a prelude for further approaches to urban design in the future, which seek as their objective a better environment, within a human scale, by allowing the designer the utmost freedom of imagination whilst bestowing on society as a whole the maximum opportunity for educated participation in the design process.

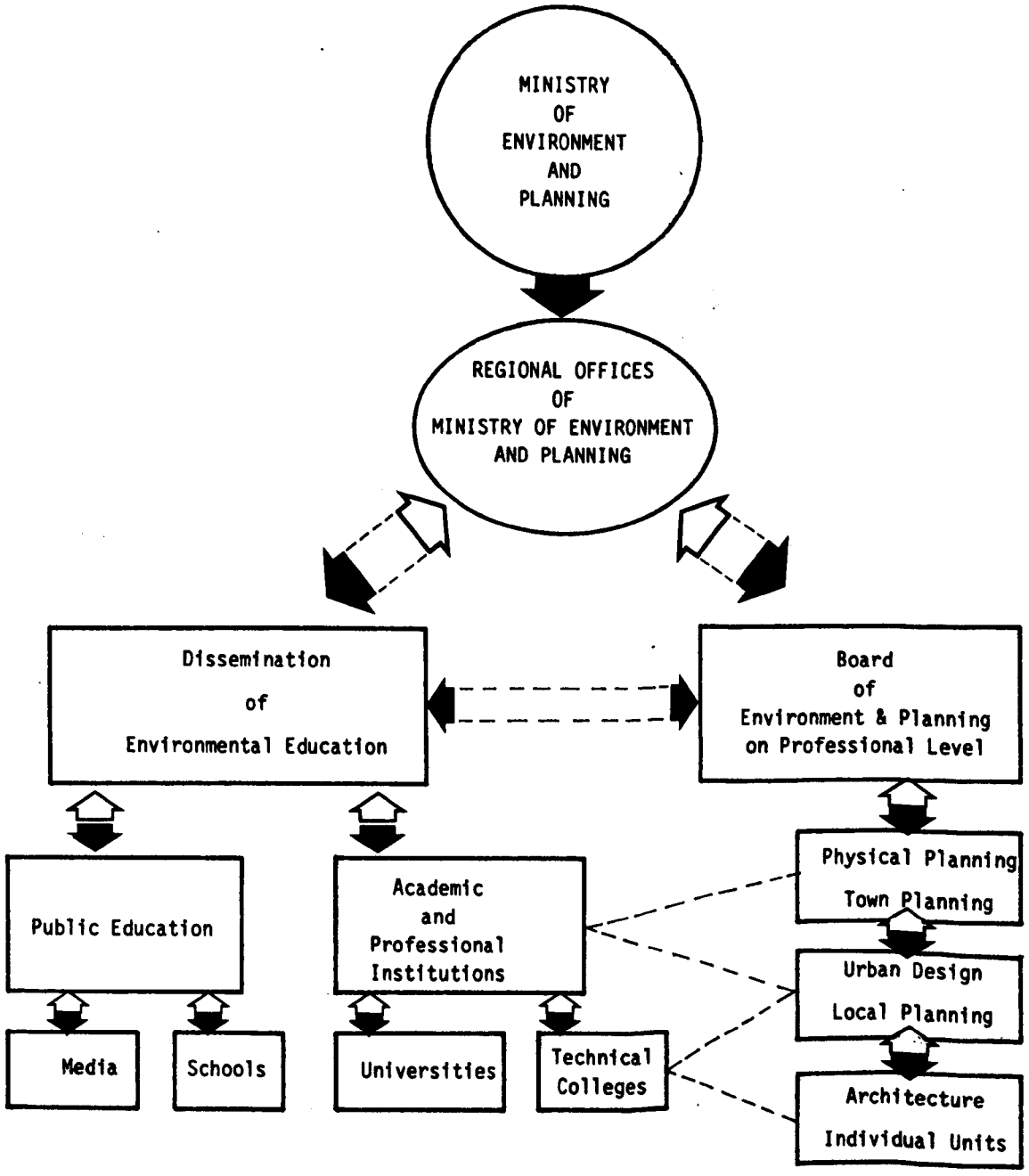


FIGURE: J.

Structure of Regional Environmental Planning.

[J.3] PROPOSALS

J.3.1 THE FIRST PROPOSAL

Compact Layout/Compact House

J.3.1.1 The Design Criteria and Concept

Man's natural and cultural rquirements were taken as the basic guiding principles for the design proposals in order to create a pleasant acceptable and comfortable housing environment for Iraq.

(a) The Natural Environment and the Design Concept

Naturally, on the macro level, the thermal system of the proposed scheme was based on a compact layout with compact units, since the people in the survey showed a preference for this type of house. Modern housing in Iraq must take account of the growth in car ownership and modern transportation. These dwellings are grouped around large courtyards like cells which provide vehicular access. Each of these cells are surrounded on the pedestrian side by narrow meandering walkways, (at least from three sides) designed to create maximum shade and to form the main pedestrian routeways for the area. This arrangement of large courts and narrow alleys on different sides of the house is applied in order to create differences in the air pressure during the day and night, i.e. negative pressure within the courtyard and positive pressure within the walkways during the day and vice versa at night.

These differences in air pressure will generate air movement throughout the house units as they are located in between the air pressure zones.

On the micro level within each house protection from the direct sunlight has been achieved by the adjacent setting of the

dwellings in a terrace form and the outward indented construction of the facades, whereas for efficient ventilation the flow of space within the house has been arranged in both the horizontal and the vertical cross section to enable flexibility in air circulation both in summer for cooling and winter for heating. A cooled basement also can be provided in the house for use in summer as space for siesta. These spaces can be serviced by air scoops as in traditional housing.

Complementary elements can be added wherever needed in order to control the direct sunlight or the air movements. These elements will create individual characteristics in each dwelling and add variety to the urban fabric.

(b) The Cultural Environment and the Design Concept

The proposed scheme takes into consideration the cultural factors on both the macro level 'the layout' and the micro level 'the individual house'.

On the macro level, the main aim for the housing layout and its grouping is to achieve for the inhabitants unity, privacy, quietness and safety from traffic within a reasonable distance from the services and utilities. There has been a general avoidance of long straight streets and chains of unbroken terraces of houses which create an atmosphere of dreariness and monotony.

The proposed housing scheme's aim is to bring light and life into the whole urban development and is designed at a human scale, with the maximum height of any housing unit being not more than four storeys.

Furthermore, each house unit includes open and semi-open space within the front and rear facades as gardens, balconies and garages.

Residential units are facing both inward towards the courtyard where access for the car has been provided and outward onto the walkways where another main pedestrian access for the dwellers is provided.

Variety will be the characteristic of the residential area orientated in many forms. Since the people are given the opportunity to participate in moulding the layout of the residential area and for the individual owners, the opportunity to choose their own house

type and the building materials. This allows each group and home to develop its own identity.

(ii) Privacy

This factor has been achieved in the design on two levels. On the estate level 'the macro' context is designed by the hierarchy of the walkways network system. This will help to build identity for each part of the estate, whilst the grouping of the dwellings around courtyards which act as public private zones and the existence of the gardens, which are located adjacent to the walkways, will create natural barriers and act as semi public private zones between the public zones and 'the streets' and the private zones 'the house'.

On the domestic level, 'the micro' context is designed to ensure the privacy of the inhabitants within the house from the passers-by. A deep bent entrance has been envisaged on the street level whilst the living space for the family has been elevated above the public level of the street and the semi public private zone of the courtyard. This not only creates privacy for the individuals but also improves the outward view of the inhabitants.

On the same level, the expendability of the internal spaces and the flexibility of used space within the house has achieved independent uses within the internal space of the house, avoiding conflict, cross circulation and overlapping in use.

The flexibility is also used by the possibility of dividing the house into two parts if needed. The upper storey can be separated from the rest of the house after blocking the internal

windows and providing a further light staircase for the lower parts. Flexibility is achieved by the use of an independent staircase passing throughout the floors of the building. This type of staircase will also play a major role as fire escape access. The compartmentalised staircase also allows the various levels of the house to act as independent climate 'zones' by cutting off the vertical air movement between floors which could result from an open staircase.

(ii) Social Life

This factor is achieved on the macro level of the estate by the location of the mosque in the middle of the area as society's spiritual focal point and the market as a social meeting place for the whole neighbourhood, where different activities can take place, i.e. shops, banks, clinic, public bus terminals, hotels, cinemas, clubs and cafes. These different daily activities will ensure this area being used day and night.

Social relationships and activities can be created between the inhabitants on the micro level by grouping the houses around courtyards and by the hierarchy of the walkways network system. According to the expected differences in micro climate between the narrow shaded walkways and the courtyard exposed directly to sunlight during the day, particularly in summer, the walkways will be in cool conditions whereas the courtyards will be in hot conditions. Thus the inhabitants will be expected to use the living spaces of the house which are adjacent to the walkways. This allows for the neighbours across the street to meet and contact, whereas in the

afternoon and at night, the climate condition of the walkways will be hot due to the heat reflected from the buildings. At the same time the courtyard presents cool conditions as it acts as an accumulator for the cooler air during this part of the day. Accordingly, the people in the houses will move from the spaces adjacent to the walkways to the spaces adjacent to the courtyards. This interchange of rooms in use will allow the inhabitants to contact and meet the people within the courtyard. By this arrangement a wider social relationship can be expected to develop on both the macro and the micro levels within the proposed estate.

(c) Transportation Network System

Two separate types of transportation network system have been introduced in the proposed design; one of them mainly for pedestrians which is the dominant network and the other for vehicles, merely to ensure function specialization, safety and comfort.

(i) Pedestrian Walkways

This system forms the main transportation network which tends to limit all the elements of the proposed estate together. The network is created mainly in order to achieve a human scale, giving the individual a sense of dominance over space, personal safety, quiet and increasing social relationships within a freedom of pedestrian movement, designed in such a way as to enable these activities to take place in reasonable comfort and safety. In addition this system takes into consideration that there is no doubt that provision of continuous, or nearly continuous, pedestrian and cycle ways running through most of the site and through or alongside open spaces of various kinds will offer the opportunity and encouragement for the dwellers to make journeys within the site.

In general terms the pedestrian routes follow design principles: firstly, they must form logical routes, the significance of which will be realised by the public. Secondly, they must offer facilities for strolling, 'socializing' and appreciating at leisure the total environment.

The size of the walkways within the pedestrian network system is usually determined by the volume of traffic that is likely

to use them and the functions which they will serve. Moreover, these walkways should provide for emergency circumstances such as use of fire or medical vehicles. They will be wide enough to allow this occasional use.

In order to avoid cross circulation and conflict between cars and pedestrians, bridges for the latter have been located across the collector roads, which link the car parking courtyards with distributor roads. The speed of the vehicles is expected to be fairly high on the collector roads so pedestrian-vehicle segregation is important.

(i) Vehicles Road Network System

Vehicular penetration and circulation into residential areas either by public or private vehicles has been minimised.

A system of collector roads is proposed to achieve easy access to all parts of the settlement and to the parking areas which are provided for each house throughout the courtyards and for the public within the various spots round the central area. These collectors are connected to the main distributor roads at the perimeter of the site. This access has been designed to be direct to the houses and with a minimum of pedestrian and vehicular cross-over conflict. According to the arrangement of this system screen and shelter can be provided to each private car within the house.

This system will also minimize the load of daily through traffic and discourage unauthorised vehicular penetration into residential courtyards which can be achieved by means of proper and adequate directional markings.

However, other modes of vehicular circulation around the site should be encouraged by the provision of public transportation facilities and also by providing adequate facilities for motor cycles, bicycles and taxis.

In order to achieve vehicular movements throughout the residential area for safety's sake the roads have been designed to give a meandering circulation and to slow traffic further 'sleeping policemen' can be proposed in the entrances of each residential courtyard. Furthermore, the surface of the courtyards can be deliberately uneven.

These precautions not only ensure the safety of the inhabitants but also decrease noise - a factor which was also considered in the design. Thus the main roads and the collector arteries are sunk below ground level with embankments on either side.

(d) Aesthetic

In the proposed scheme the height of the buildings and the hierarchy and size of the transportation network has been designed in relation to the human scale in order to create a human environment. Greenery is also introduced to the area to add a natural beauty to the built environment and to avoid aridness.

The articulation and the transition of the space has been achieved in the proposed scheme by creating a sense of balance between the open space and the mass of buildings.

The cantilevered and recessed elevations of the dwellings, extending beyond the natural border lines of the street and the resulting deep shade and shadow create the articulation between the mass of the building and the space. In addition the use of varied surfaces on chosen building materials also offers variety in texture and colour and increases this factor of the articulation.

The narrow meandering walkways with enclosed vistas will create the phenomenon of sudden surprise and discovery of hidden elements in the urban environment. This will encourage the inhabitants to walk around to discover the mystery, add visual variety and shorten the sense of the long walkways.

(e) Direction and Signs

This factor was considered on two levels of circulation and movement; the pedestrian and the vehicle.

For the pedestrians within the walkways, the corner of the buildings at road junctions should be bevelled to offer a smooth and easy circulation. In order to give visual attention and guide for movement, the walls of the buildings on either side of the walkways can be used by gradually widening or narrowing them towards the object or the main route of circulation.

The public buildings within the estate such as religious and social centres, schools and market places, can be designed and built in a distinguished manner to form focal points distributed throughout the site to give the pedestrian guidance, surprise and enrich the beauty of the space.

Pools of water and fountains can also be displayed within the walkways and the open spaces of the estate to form a striking and welcome feature acting as a mirror reflecting the surrounding environment and giving a refreshing feeling of coolness in contrast to the normal arid atmosphere. In addition, these features will also play a major role in shaping the macro and micro climate condition of the estate.

The aesthetic dimension is not to be confined simply to pedestrians and we have designed the new urban environment with a view to providing visual experiences and symbols for the car driver. Dramatic changes in view and perspective can be achieved along the collector roads and monotony avoided. As a guiding symbol a definite and distinguishable guiding feature will be built in order to identify the limit of car penetration. It can also act as a guide for pedestrians to indicate where the collector roads merge into the residential environment and warning of the presence of cars. In the market area the use of an architectural feature to signal the end of the collector and service roads can also signal the bus terminals.

The intention of providing an urban environment built up from the use of compact house units built around a network of pedestrian streets and vehicular routes is to create an urban environment which is similar to that found in traditional urban areas of Iraq. The value of this new form is that integration can be achieved with older parts of the city and even allowing retained older buildings to be incorporated into the new fabric.

(f) Legislation

Within this form of new urban environment it will be possible for builders, owners or architects to provide housing appropriate to the needs of their clients. However, certain principles of building and design will need to be identified to ensure that builders achieve maximum benefit from the proposed system of environmental control within the constraint of seeking a unified and homogeneous urban fabric.

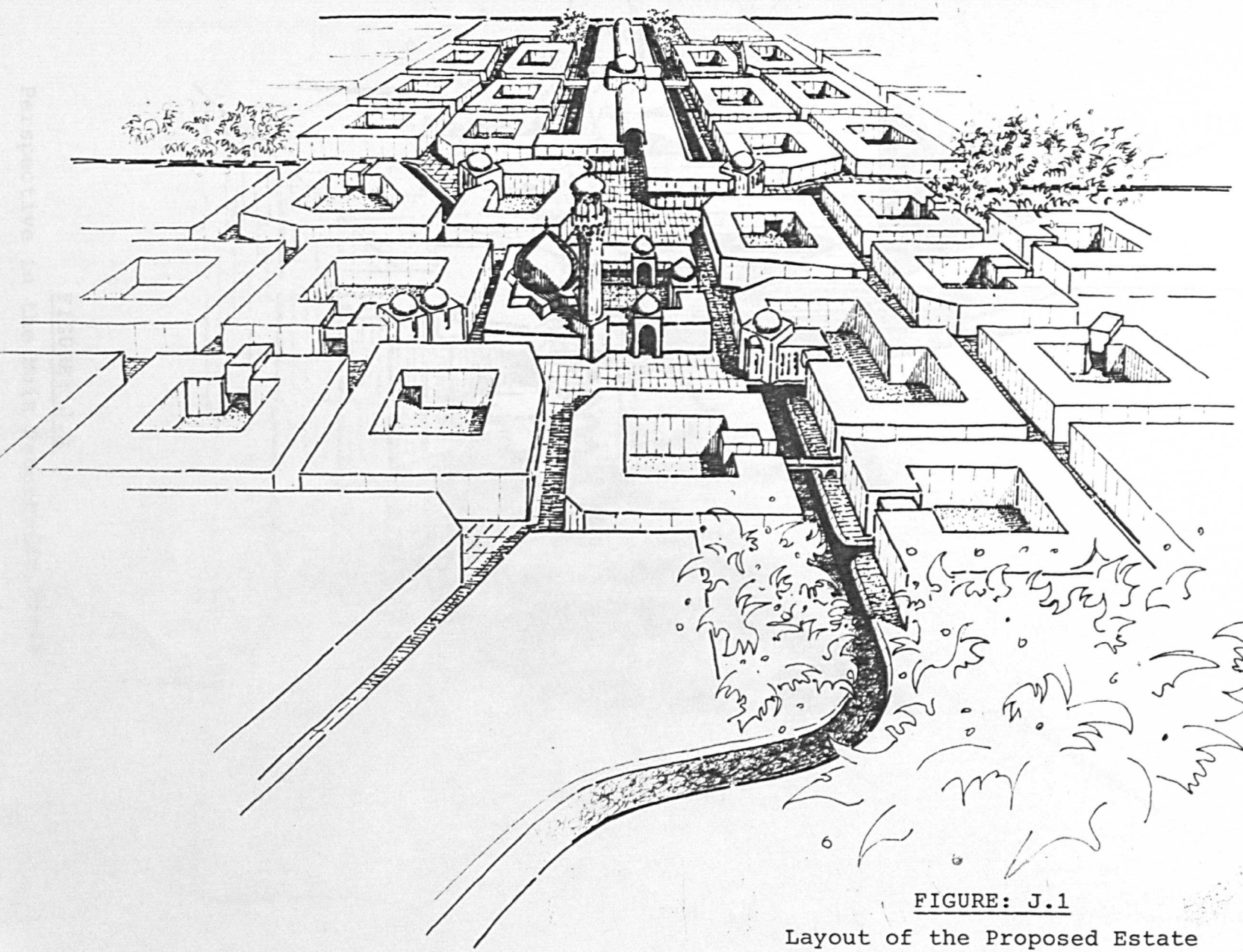


FIGURE: J.1

Layout of the Proposed Estate

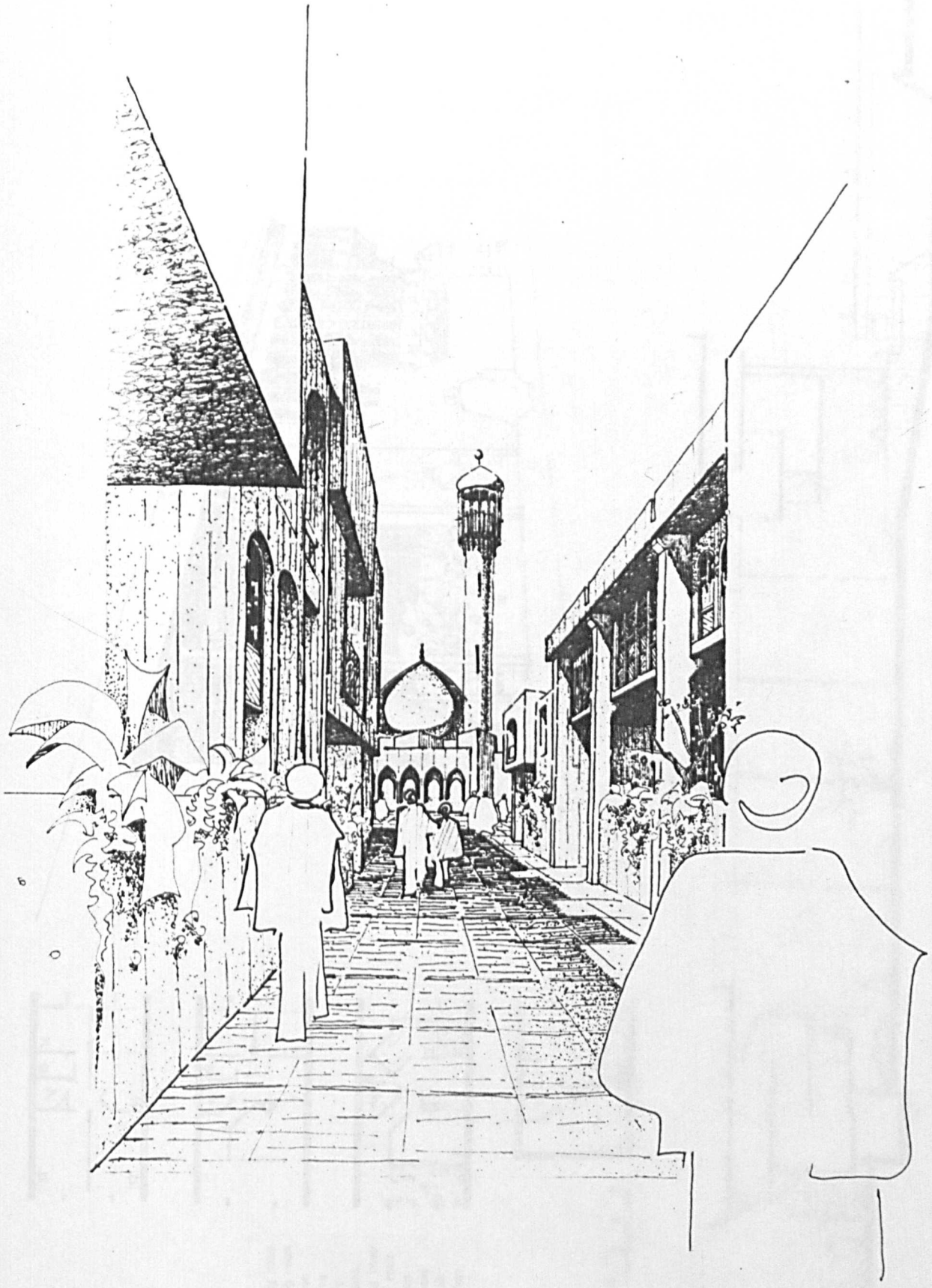
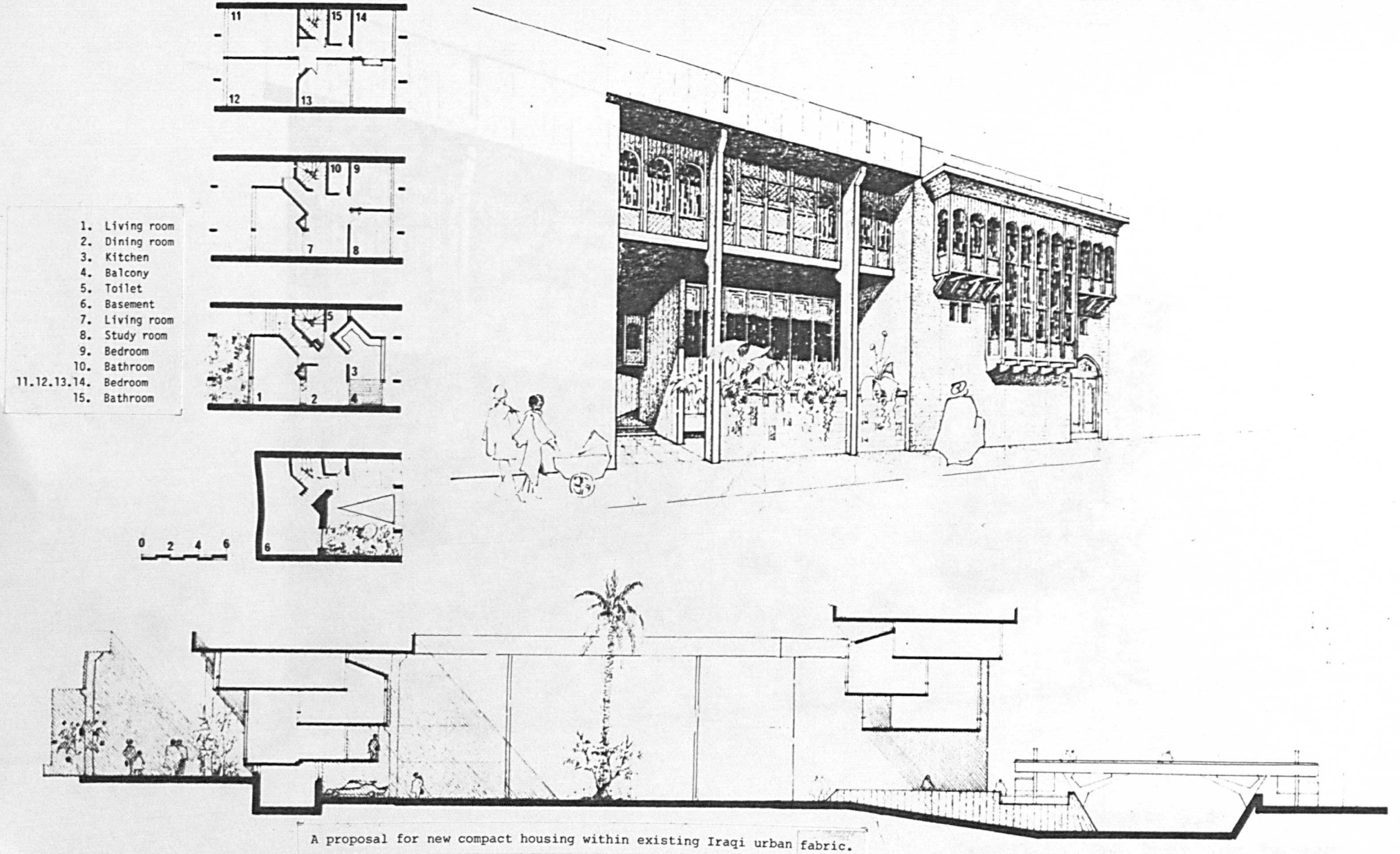


FIGURE: J.2

Perspective in the Main Pedestrian Route

FIGURE: J.3

Detail for a Residential Courtyard



A proposal for new compact housing within existing Iraqi urban fabric.

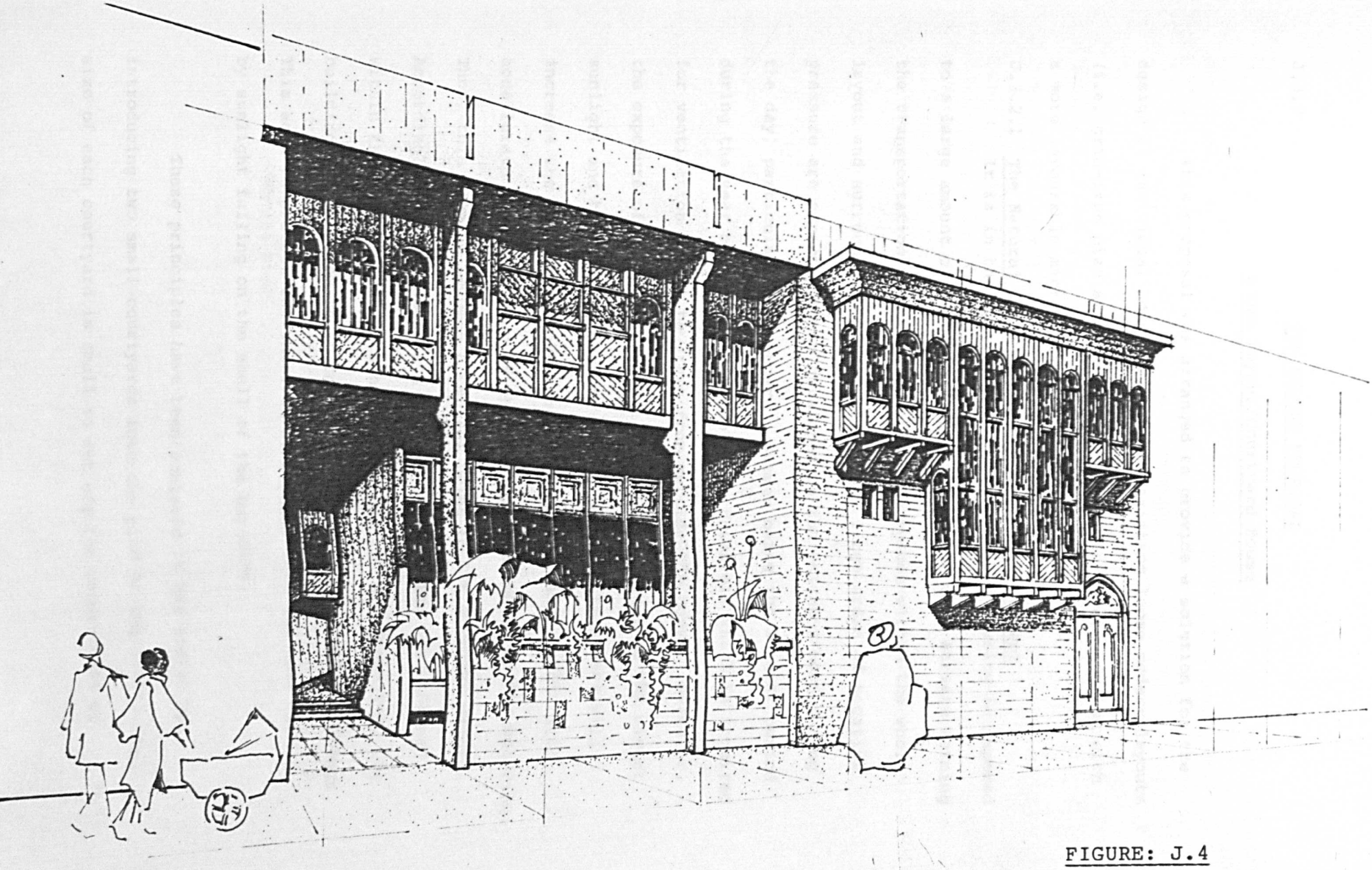


FIGURE: J.4

Detail of the Dwelling Facade

J.3.2 THE SECOND PROPOSAL

Loose Layout/Courtyard House

This proposal was arranged to provide a solution for the design of individual houses within the existing loose modern layouts (i.e. grid-iron plan and the like) in order to create housing with a more favourable micro climate.

J.3.2.1 The Natural Environment and the Design concept

It is in the nature of such layouts that housing is exposed to a large amount of direct sunlight due to the wide streets forming the transportation network and large open spaces within the whole layout and surrounding each house. Thus large areas of negative pressure are expected to be developed in the neighbourhood during the day, particularly in summer. Summer being the longest period during the year means that the cooler or fresh air which is required for ventilation cannot be drawn from outside the house. Moreover, the exposure of the building, i.e. the outside shell, to the direct sunlight and hot-dry temperature of the ambient atmosphere will increase the heat gain to the shell of the building. This will accellerate the heating up of the internal atmosphere of the building. Thus, this problem becomes a central point in the proposed design. Accordingly in our proposals a micro climate system was designed within the house to act as a humidifier for the air drawn into the building before allowing it to penetrate to the internal atmosphere. This acts to protect the internal atmosphere from the heat caused by sunlight falling on the shell of the building.

These principles have been achieved in the design by introducing two small courtyards into the plan of the house. The size of each courtyard is small to cut off the penetration of

direct sunlight to the inside of the house. This will help to create deep shaded areas within the building which enables these two courtyards to trap the cool air and forms a pool of positive air pressure. The arrangement is expected to create air movement which circulates from the positive zones in the courtyards towards the negative zones in the open spaces surrounding the house. In order to increase the cooling operation of the fresh air before entering the internal atmosphere of the house a pool of water and a fountain has been located in one of the courtyards. To protect the internal climate of the house, the external surfaces have been reduced by placing houses adjacent to each other and sharing a party wall, thus creating a mass structure which can act as a heat store.

Shading of external walls can be maximised by sheltering the facades by means of a series of projecting elements and cantilevers and creating double height spaces internally and externally.

As a complementary element the roof will be in the form of a ventilated double ceiling for the whole house and also ventilated double glazed windows have been suggested for the living space and surrounding courtyards.

A basement has also been proposed to use as a cool space in the hottest periods of the day; the basement is supplied by cool air from the courtyards after passing over the pool of water and the fountain. An air scoop effect has been created by design of the courtyard to bring any breezes or air movements into the house. This arrangement can never achieve the climatic performance and levels of comfort achieved in traditional courtyard houses but it represents a 'partial' improvement within the loose layout which

may mean less reliance on methods of artificial cooling and humidification.

J.3.2.2 The Cultural Environment and the Design concept

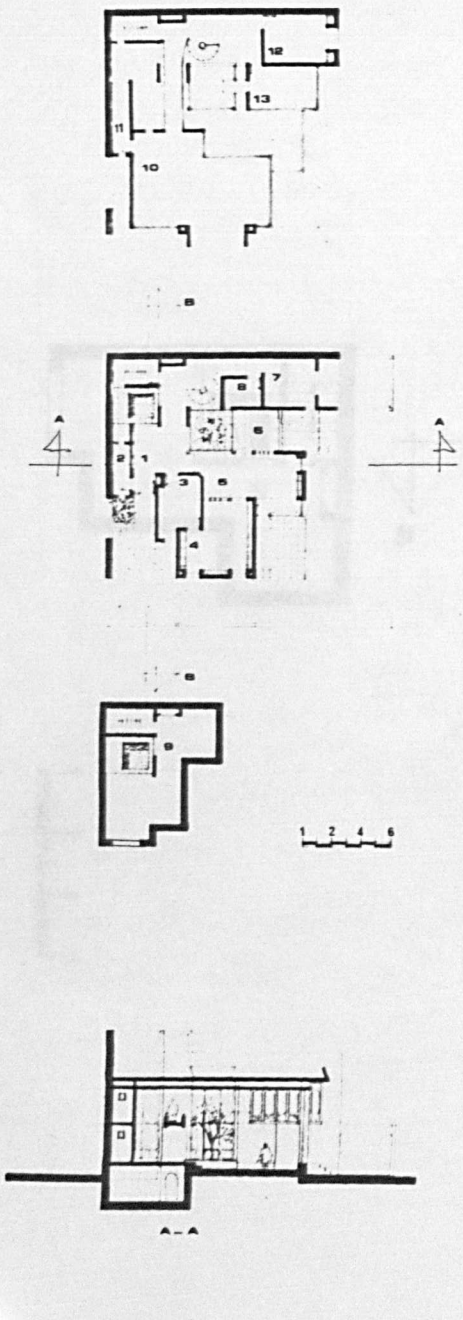
Culturally, various measures have been taken into account in the course of design in order to meet the requirements of this factor. They are as follows:

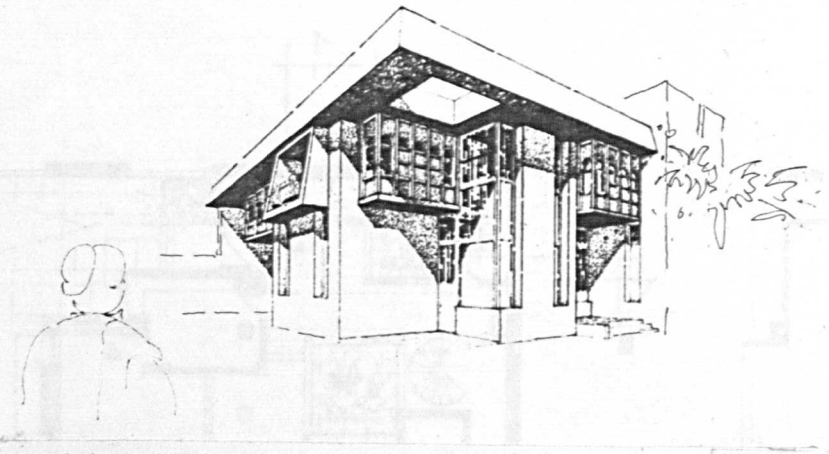
The privacy and the determination of the function of the space has been achieved by a separation of communal daily activities (i.e. activities which include all members of the family and visitors) and private activities related to the individuals. This separation has been achieved by locating the main entrance of the house in such a way to act as a "hinge" linking together the different zones of the house and forming the focal point of the main circulation activities (see Figure J.6). This arrangement not only provides privacy and separates the different functions of the house but minimizes conflicts of use and cross circulation within the different parts of the house. This arrangement will allow for best use for the space and will allow greater control over the internal climate. Flexibility in the use of the space has also been achieved within the various parts of the house (in particular the living space) by arranging its design on the basis of a multi-cellular principle which can allow the combination of spaces for single use yet with each cell having the potential for independent use, rather than on the more traditional separation of rectangular unitary spaces found in older houses. The internal courtyards act not only as elements of micro-climatic design but also act to articulate the internal space adding to the aesthetic and physical separation.

The surrounding garden acts as a semi-private zone separating the house from the road system.

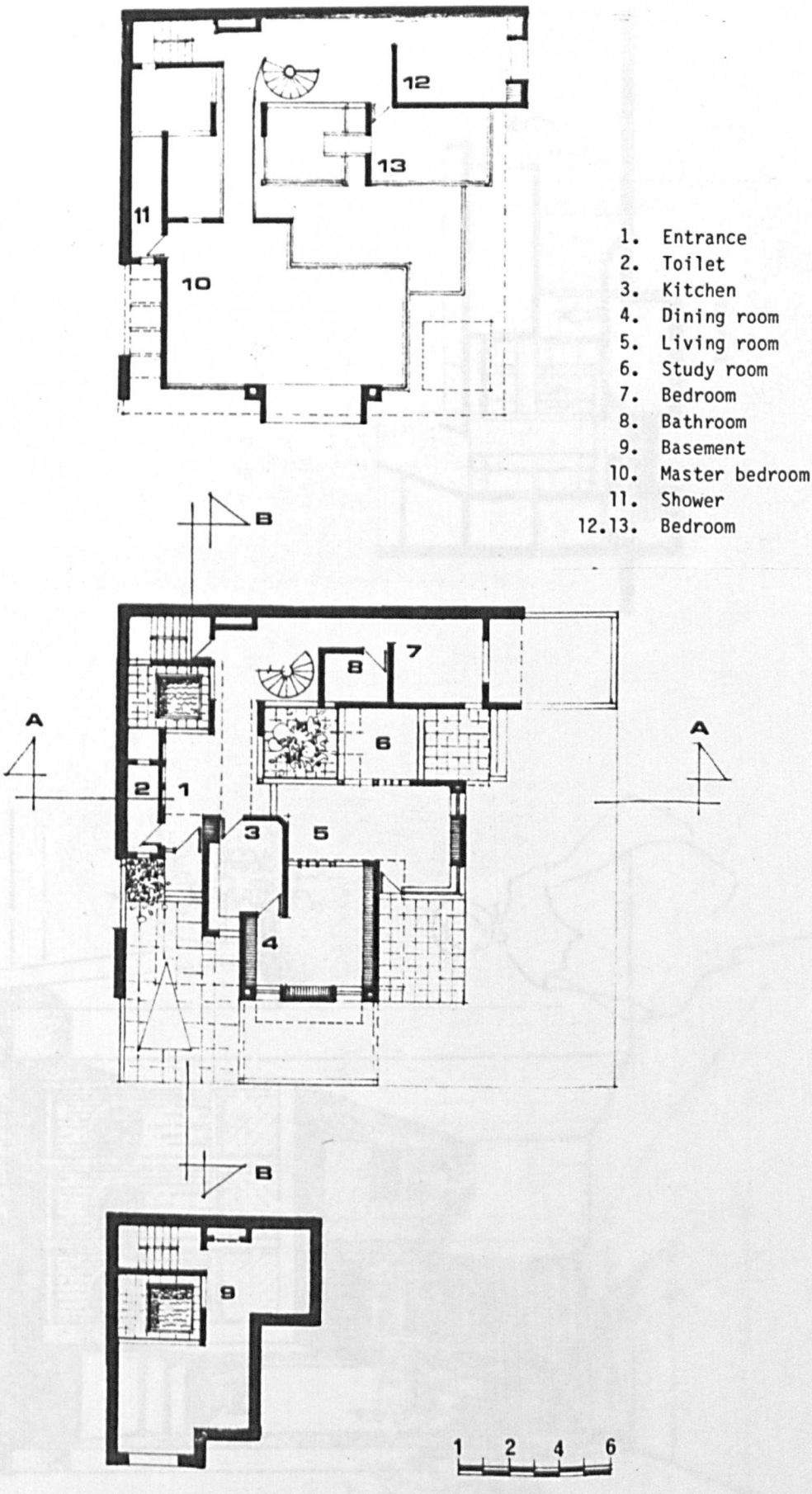
FIGURE: J.5

Proposal of Loose Layout/Courtyard House





A proposal for a new form of courtyard house in a plot development context.



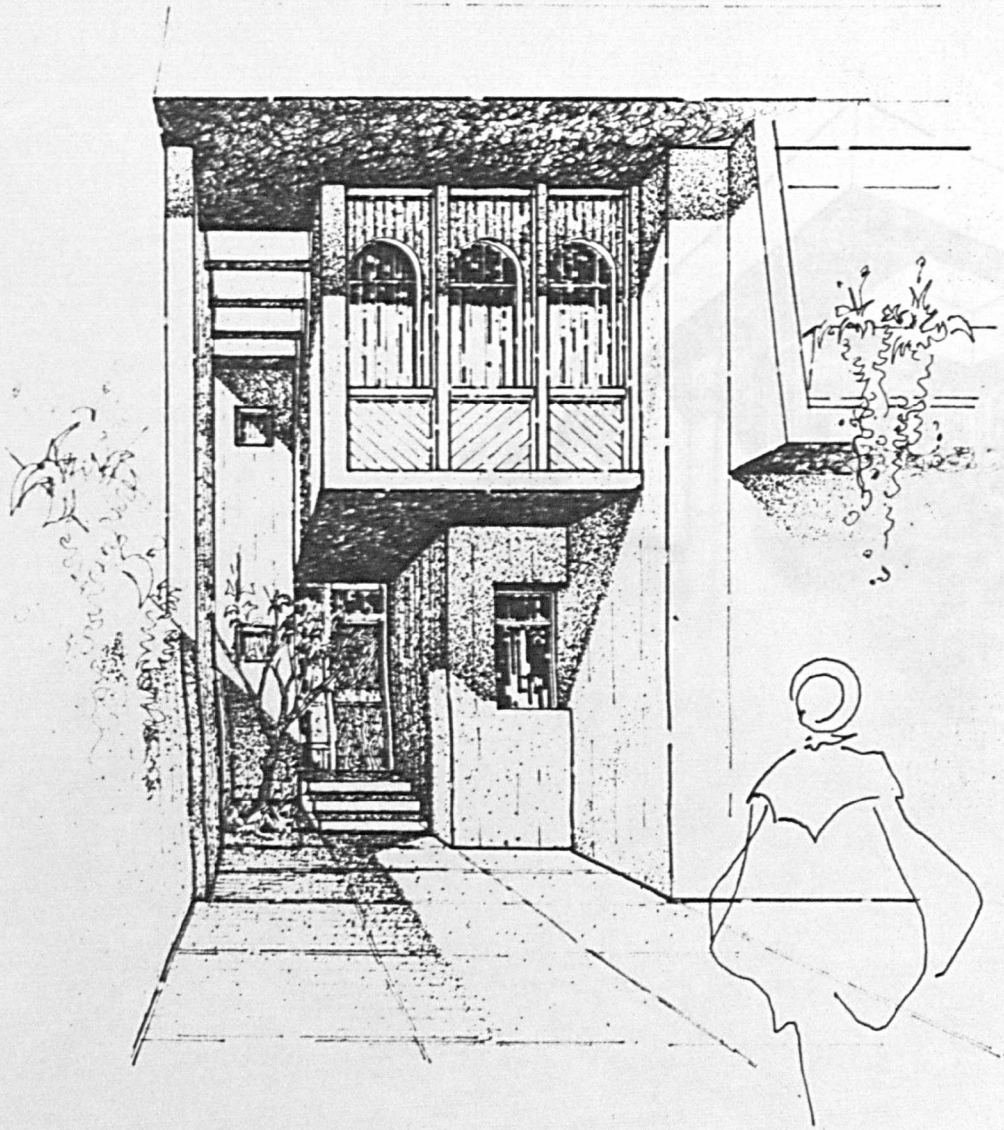
1. Entrance
2. Toilet
3. Kitchen
4. Dining room
5. Living room
6. Study room
7. Bedroom
8. Bathroom
9. Basement
10. Master bedroom
11. Shower
12.13. Bedroom

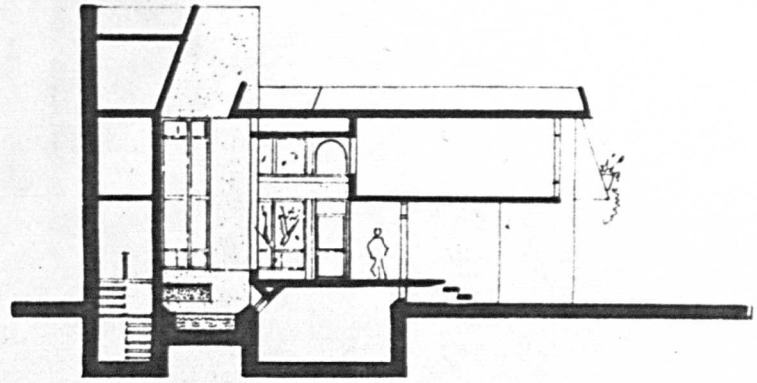
FIGURE: J.6

Detailed Plan

FIGURE: J.7

Section and Facade Detail





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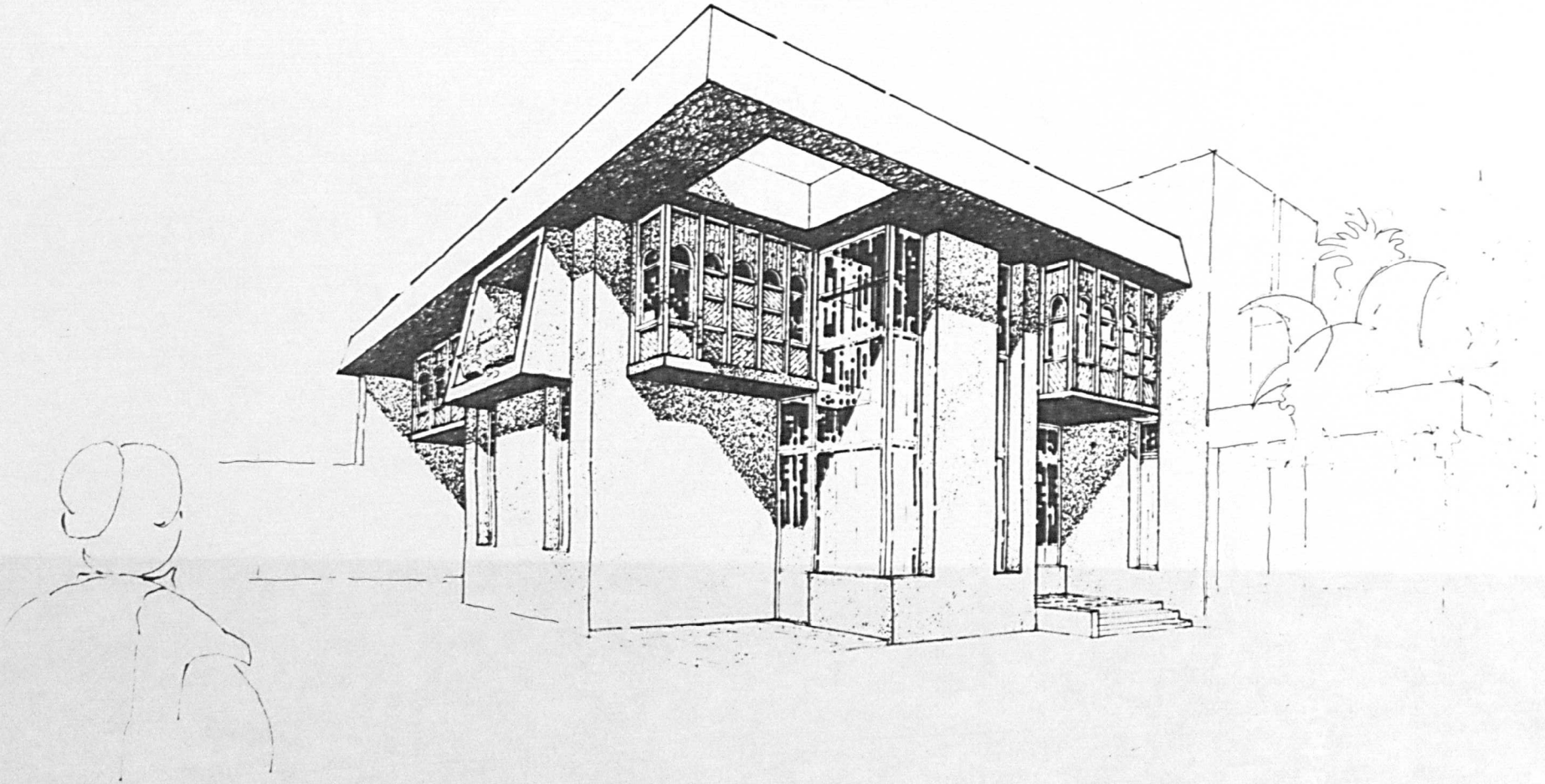


FIGURE: J.8

Perspective for the House

APPENDIX

The completion of this research is not, in itself, the ultimate conclusion, but rather a prelude for further approaches to urban design in the future, which seek as their objective a better environment, within a human scale, by allowing the designer the utmost freedom of imagination whilst bestowing on society as a whole the maximum opportunity for educated participation in the design process.

THE SURVEY QUESTIONNAIRE

GENERAL INFORMATION

1. Household Composition
(Please write down the appropriate answers)

	1	2	3	4	5
	Details of Every Person in the House	Sex	Age	Education	Employment/Occupation
	Head of Household	M	1	0	0
	Housewife	F	2	1	1
1	Children		3	2	2
2			4	3	3
3			5	4	4
4			6		
5			7		
6					
7					
8					
9					
10					
11					
12					
13					

4. Summing up your feelings about your previous home:

4.1 Would you think as a whole you were:

- Very satisfied ☐
- Fairly satisfied ☐
- ☐
- ☐

4.2 Why is that? (Write down any related comments made)

Satisfied		Not satisfied	
New House	☐	Small and uncomfortable	☐
Near workplace	☐	Old and in bad condition	☐
Near city centre	☐	Does not fit present needs	☐
Climatic condition	☐	Unhealthy	☐
Comfortable	☐	No garden	☐
Well organised	☐	Not enough light	☐
Contains basement	☐	Level of social life	☐

5. Present Estate and Home:

5.1 Did you, yourself, particularly want to come and live on ..... Estate?

- Yes ☐
- No ☐
- Don't know ☐

5.2 If YES, why was this?

- House design ☐
- House size ☐
- House location and workplace ☐
- House quality ☐
- Economic factors ☐
- Independence and privacy ☐
- Services and utilities ☐
- Relation to city centre ☐
- Place of birth ☐
- Ownership ☐
- Social factor ☐

2. Previous Home:

2.1 Where did you live before?

In Baghdad
- Inside ☐
- Outside ☐

Other Cities
- Inside ☐
- Outside ☐

2.2 How long did you live in your previous home?

- 1-5 years ☐
- 5-10 years ☐
- 10-15 years ☐
- 15+ years ☐

2.3 What type of home was it?

- Courtyard ☐
- Compact ☐
- Sarifa ☐
- Flat ☐

3. Components of previous home:

3.1 In your previous home did you have:

(Read out)	Of your Own	Shared	None
Kitchen			
Bathroom			
W.C. (Inside/outside)			
Garden			
Sufficient space			

3.2 Why did you move from your previous address?

- Near working place ☐
- Independency ☐
- Economic factor(s) ☐
- Social factor(s) ☐
- Ownership ☐
- House density ☐
- Design factor(s) ☐
- Small house size ☐
- Quality of the house ☐

5.3 If NO, why not?

- House design ☐
- House size ☐
- House location and workplace ☐
- House quality ☐
- Economic factors ☐
- Independence and privacy ☐
- Services and utilities ☐
- Relation to city centre ☐
- Place of birth ☐
- Ownership ☐
- Social factor ☐

5.4 How did you come to be living here?

- Social factor ☐
- Economic factor ☐
- Better environment ☐
- Near workplace ☐
- Ownership ☐

6. Area of house

6.1 Do you think the area of the house is:

- Adequate ☐
- Fairly adequate ☐
- Inadequate ☐

6.2 If inadequate, is it the whole house?

YES ☐ NO ☐

6.2.1 If not the whole house, which part?

- Reception room ☐
- Living room ☐
- Bedroom ☐
- Kitchen ☐
- Bathroom ☐

7. Arrangement of rooms

7.1 Do you think the arrangement of your room is:

- Good ☐
- Bad ☐
- Alright ☐
- Don't know ☐

7.2 Why do you think this is so?

- House design ☐
- House size ☐
- House facilities ☐
- Physically ☐
- Quality of house ☐
- Family needs ☐

7.3 I would like to have an idea about the use made of facilities in the house during Summer and Winter:

Facilities / Activities	1 S.R. S	1 S.R. W	2 D.R. S	2 D.R. W	3 R.R. S	3 R.R. W	4 B.R. S	4 B.R. W	5 K. S	5 K. W	6 C.Y. S	6 C.Y. W	7 B.M. S	7 B.M. W	8 C.S. S	8 C.S. W	9 Bal. S	9 Bal. W	10 Gar. S	10 Gar. W	11 Roof S	11 Roof W	12 Oth. S	12 Oth. W
Breakfast																								
Lunch																								
Siesta																								
Teatime																								
Dinner																								
After Dinner																								
Sleeping/Night																								
Other Activit.																								

Do you think the reasons are?

- Climatic conditions ☐ 1
- Social behaviour ☐ 2
- Easy to use ☐ 3
- Entertainments ☐ 4
- Size of the house ☐ 5

KEY:

S.R: Sitting Room
D.R: Dining Room
R.R: Reception Room
B.R: Bedroom
K: Kitchen
C.Y: Courtyard
B.M: Basement
C.S: Covered spaces
Bal: Balcony
Gar: Garden
Roof
Others

7.4 Does the use of the space change during weekends and holidays?

YES ☐ NO ☐

8. Other facilities

8.1 Does your house contain the following facilities?

	LOCATION	YES	NO	INSIDE	OUTSIDE
1	Kitchen				
2	Bath				
3	Toilet				
4	Store				
5	Garden				Front/Back
6	Garage				

8.2 If you have a garden, what do you mainly use it for?

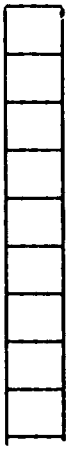
Planting ☐
Relaxation ☐
Drying washing ☐
Studying ☐
Children playing ☐
Not used ☐

8.3 Do you feel that you have enough privacy in your garden?

YES ☐ NO ☐

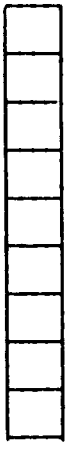
8.4. What is the approximate area of the garden?

- 0 to 49m²
- 50 to 99m²
- 100 to 149m²
- 150 to 199m²
- 200 to 249m²
- 250 to 299m²
- 300 to 349m²
- 350 to 399m²
- 400m² +



8.4.1 Any other space within the house area?

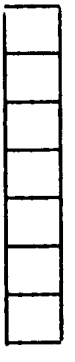
- 0 to 49m²
- 50 to 99m²
- 100 to 149m²
- 150 to 199m²
- 200 to 249m²
- 250 to 299m²
- 300 to 349m²
- 350 to 399m²
- 400m² +



8.4.2 What is the approximate area of the built-up area?

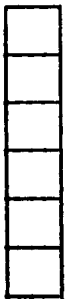
First Floor

- 0 to 49m²
- 50 to 99m²
- 100 to 149m²
- 150 to 199m²
- 200 to 249m²
- 250 to 299m²
- 300m² +



8.4.3 Second Floor

- 0 to 49m²
- 50 to 99m²
- 100 to 149m²
- 150 to 199m²
- 200 to 249m²
- 250 to 299m²



8.4.4 What is the approximate area of the whole plot?

0 to 99m²	☐
100 to 199m²	☐
200 to 299m²	☐
300 to 399m²	☐
400 to 499m²	☐
500 to 599m²	☐
600m² +	☐

9.1 From the climatic point of view, how do you rate your home?

	winter	summer
Very comfortable		
Comfortable		
Uncomfortable		
Don't know		

9.2 What kind of ventilation do you use in your home?

Natural	☐	(i.e. depends on the design of the house)
Artificial	☐	(i.e. air cooler, air conditioning, central air scoop)
Both	☐	

9.3 If it is artificial, do you prefer natural ventilation if it is supplied in good condition?

YES ☐ NO ☐

9.3.1 Why do you prefer natural ventilation?

Healthier	☐
More economical	☐
Less maintenance	☐

Do you think the reasons are?

- Climatic conditions ☐
- Social behaviour ☐
- Easy to use ☐
- Entertainments ☐
- Size of the house

7.4 Does the use of the space change during weekends and holidays?

YES ☐ NO ☐

8. Other facilities

8.1 Does your house contain the following facilities?

	Location	YES	NO	Inside	Outside
1	Kitchen				
2	Bath				
3	Toilet				
4	Store				
5	Garden				Front / Back
6	Garage				

8.2 If you have a garden, what do you mainly use it for?

- Planting ☐
- Relaxation ☐
- Drying Washing ☐
- Studying ☐
- Children playing ☐
- Not used ☐

8.3 Do you feel that you have enough privacy in your garden? YES ☐ NO ☐

8.4.4 What is the approximate area of the whole plot?

0 to 99m²	☐
100 to 199m²	☐
200 to 299m²	☐
300 to 399m²	☐
400 to 499m²	☐
500 to 599m²	☐
600m² +	☐

9.1 From the climatic point of view, how do you rate your home?

	Winter	Summer
Very comfortable		
Comfortable		
Uncomfortable		
Don't know		

9.2 What kind of ventilation do you use in your home?

Natural	☐	(i.e. depends on the design of the house)
Artificial	☐	(i.e. air cooler, air conditioning, central air .....)
Both	☐	

9.3 If it is artificial, do you prefer natural ventilation if it is supplied in good condition?

YES ☐ NO ☐

9.3.1 Why do you prefer natural ventilation?

Healthier	☐
More economical	☐
Less maintenance	☐

9.4 Please indicate which parts of your house are climatically suitable during the day and the seasons:

	SUMMER	WINTER
Sitting Room		
Reception Room		
Dining Room		
Bedroom		
Kitchen		
Courtyard		
Entrance		
Basement		
Roof at night		
Rooms in the second floor		

10.1 Do you think that sunlight in your house is:

	SUMMER	WINTER
More than enough		
Just enough		
Not enough		

10.2 What do you think is the cause of this?

Location	
Direction	
Window size	
Number of windows	
Existing courtyard	
Depth of courtyard or covered	
Existing trees, obstacles	

11. Dust

11.1 Do you have any problems in cleaning your home of dust?

YES ☐ NO ☐

11.2 What do you think causes these problems?

Too many openings	☐
The existence of the courtyard	☐
The location of the house	☐
Window details, location	☐
Unpaved roads under construction	☐

12. Noise

12.1 Are you or anyone in the family at all disturbed by noise when you are inside the house?

YES ☐ NO ☐

12.2 If YES, what is the cause of the noise?

Overcrowding	☐
Children, neighbours	☐
Services, traffic	☐

12.3 If YES, where does the noise come from?

Inside	☐
Outside	☐
Both	☐

12.4 If it is from outside, is it from:

Next door	☐
Above	☐
Below	☐
Street	☐

12.5 Do you hear noise from traffic at all?

Yes ☐
No ☐
Don't know ☐

12.6 Where does it come from?

Front ☐
Back ☐
Side(s) ☐

13.1 Do you hear any noise from children playing outside? YES ☐ NO ☐

13.2 If YES, where does it come from

Front ☐
Back ☐
Side(s) ☐

13.3 Does it bother you?

Yes ☐
No ☐
Don't know ☐

14. Privacy

14.1 Do you feel that the privacy of your family is interfered with by visitors?

YES ☐ NO ☐

14.2 Are you disturbed at all by neighbours or passers-by overlooking you?

YES ☐ NO ☐

14.3 If YES, why is that?

- Adjacency of houses ☐
- Houses, High Rise nearby ☐
- Outside fence ☐
- Roof fence ☐
- Different levels between houses ☐
- Looking inward ☐

15. Views

15.1 What do you think of the view from:

	GOOD	NOT GOOD
Kitchen		
Sitting Room		
Bedroom		

15.2 Why do you say that?

	Kitchen		Sitting Room		Bedroom	
	GOOD	NOT GOOD	GOOD	NOT GOOD	GOOD	NOT GOOD
Existing garden	☐	☐	☐	☐	☐	☐
Main street	☐	☐	☐	☐	☐	☐
Existing courtyard	☐	☐	☐	☐	☐	☐
Open space	☐	☐	☐	☐	☐	☐
Location	☐	☐	☐	☐	☐	☐
Obstacles	☐	☐	☐	☐	☐	☐

16. Relationships

16.1 Are there any social relationships/activities between your family and the other families on the estate?

YES ☐ NO ☐

16.2 Do you know the name(s) of your neighbour(s)?

YES ☐ NO ☐

16.3 Do you speak with them in the street?

YES ☐ NO ☐

16.4 Do you meet them?

YES ☐ NO ☐

16.5 Do you visit them?

YES ☐ NO ☐

16.6 Do you ever feel lonely?

YES ☐ NO ☐

17. What would you like to see provided on the estate?

Garden, open spaces for children	☐
Youth/Social/Sports Centre	☐
Youth/Cultural Centre	☐
Cafe(s)	☐
Cinema(s)	☐
Women's Social Centre	☐
Family Social Centre	☐

18. Services and Utilities

18.1 How far are the following services and utilities from your house?

Services and Utilities	Nearby	Walking Distance	Far: transportation required
Primary School			
Secondary School			
Clinic			
Public Baths			
Shops, Craftsmen			
Cafe(s)			
Mosque(s) /Church(es)			

18.2 In your opinion, what other services/utilities would the estate benefit from?

- Educational ☐
- Social ☐
- Environmental ☐
- Health ☐
- Public ☐

19.1 Of the people living on the estate, would you say there are:

- Too few people ☐
- Too many people ☐
- The right number of people ☐
- Don't know ☐

19.2 Why do you say that?

- Near services/utilities ☐
- Size of family & house ☐
- Multifamilies ☐
- No. of children playing in the streets ☐

20.1 Would you say that the upkeep and maintenance of the estate is:

- Satisfactory ☐
- Alright ☐
- Unsatisfactory ☐
- Don't know ☐

20.2 If UNSATISFACTORY, which area(s) merit criticism?

- Refuse collection ☐
- Paving ☐
- Water supply ☐
- Electricity supply ☐
- Telephone services ☐
- Sanitation ☐

20.3 In what way(s) could improvement(s) be made?

21. Do you think there are any differences between your previous and present estates from the following points of view?

Climatic conditions	☐
Walking in the streets	☐
Services and utilities	☐
Transportation	☐
Any other comments?	☐

22. Does any member of your family suffer inconvenience when walking in the streets?

YES ☐ NO ☐

If YES, please tick appropriate reason(s):

Long distance (paved/unpaved)	☐
Unpaved	☐
Climatic factors (hot/cold)	☐
Children playing	☐
Traffic	☐
Odour	☐
Other factors	☐

23. <u>Car and Transportation</u>

23.1 Do you have a car YES ☐ NO ☐

23.2 If YES, does parking your car on the estate cause you any problems?

YES ☐ NO ☐

23.3 Where do you usually park your car overnight?

Outside the curtilage of your property	☐
Inside the curtilage of your property	☐

23.4 If outside the house:

	YES	NO
23.4.1 Would you prefer a private garage	☐	☐
23.4.2 Would you prefer a public garage	☐	☐

24. If answer is NO to question 23.1, please answer the following:

24.1 Do you think the bus services on your estate are adequate?

YES ☐ NO ☐

24.2 How far is the bus stop from your home?

0 to 4 minutes	☐
5 to 9 minutes	☐
10 to 14 minutes	☐
15+ minutes	☐

25. In which ways would you like to arrange your house if the opportunity and the money were given to you?

25.1 Change the whole house ☐ YES ☐ NO **Change some parts** ☐ YES ☐ NO

25.2 **In which way would you like to change the house arrangements?**

Enlarge	☐
Add	☐
Transfer	☐
Remove	☐

25.2.1 Which parts would you like to enlarge?

Bedroom	☐
Reception Room	☐
Sitting Room	☐
Dining Room	☐
Kitchen	☐
Bathroom	☐
Toilet	☐
Store	☐
Basement	☐
Garage	☐

25.2.2 What would you like to add?

- Bedroom(s) ☐
- Reception room ☐
- Sitting Room ☐
- Dining Room ☐
- Kitchen ☐
- Bathroom ☐
- Toilet ☐
- Store ☐
- Garage ☐
- Flat in the garden ☐

25.2.3 Which parts would you like to transfer?

- Bedroom ☐
- Reception room ☐
- Sitting room ☐
- Dining room ☐
- Kitchen ☐
- Bathroom ☐
- Toilet ☐
- Store ☐
- Basement ☐
- Courtyard ☐

25.2.4 Which parts would you like to remove?

- Bedroom(s) ☐
- Reception room ☐
- Sitting room ☐
- Dining room ☐
- Kitchen ☐
- Bathroom ☐
- Toilet ☐
- Store ☐
- Garage ☐
- Courtyard ☐

25.2.5 Windows

- Enlarged ☐
- Reduced ☐

25.4 How many storeys would you like your house to have?

1 storey ☐
2 storeys ☐
More ☐

25.5 What type of house do you prefer

Compact house ☐
Courtyard house ☐
Flat ☐

25.6 Do you prefer the view from your house to be directed towards:

Inside the courtyard ☐
Outside ☐
Front facade ☐
Rear facade ☐

25.7 What window specification do you prefer?

Large ☐
Medium ☐
Small ☐

Preferred direction

North ☐
East ☐
South ☐
West ☐

Wood ☐
Steel ☐
Aluminium ☐

25.8 Would you like to have a private garden?

YES ☐ NO ☐ DON'T KNOW ☐

25.9 Where would you like the location of your garden to be?

Front of the house ☐
Back of the house ☐
Beside the house ☐
Around the house ☐
Inside the house (courtyard?) ☐

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