

Morphology of Residential Housing of Al Fallujah City

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The residential Houses are one of the main important jobs in the City of Fallujah, as housing represents a basic need from its instinctive and life needs. that represents the circle of necessities even in the narrowest extent of it. since a person spends most of his time in home and next times their will be a strong relationship between families and their housing. Therefore, the family strives to make the housing unit suitable for its frequently needs, so Fallujah city is one of Al Anbar province and later on it developed with The changes of morphological stages that the city went through.as there are a huge of variety of maps and designs and building materials and also rooms number and height of houses in addition to their front. And opening inside and outside the house according to technical and civilized development for society. therefore, we had characterized three main morphological stages and every stage represent the city in a period and differ from followed period, but it will be completed.

Key words: *Morphology, Building Style, Internal Design, Housing Unit.*

Introduction

Many of studies dealt with the phenomenon of traditional Arabic house during present figure and content without dealing with changes that happens as land or engineering design or building materials and spaces distribution among period of time to another.so the idea for go back and stay away for connection with modern changes that happens a complexity figures to traditional Arabic houses .so this leads to make changes in final figure for this house like general framework and engineering design and also distribution spaces. so, the final figure for house in al Fallujah city depends on the changing that happens in this society.

Does traditional Arabic house is unable to achieve the family requirements in al Fallujah City. Whenever they replaced it with new forms after the appearance of new service just like

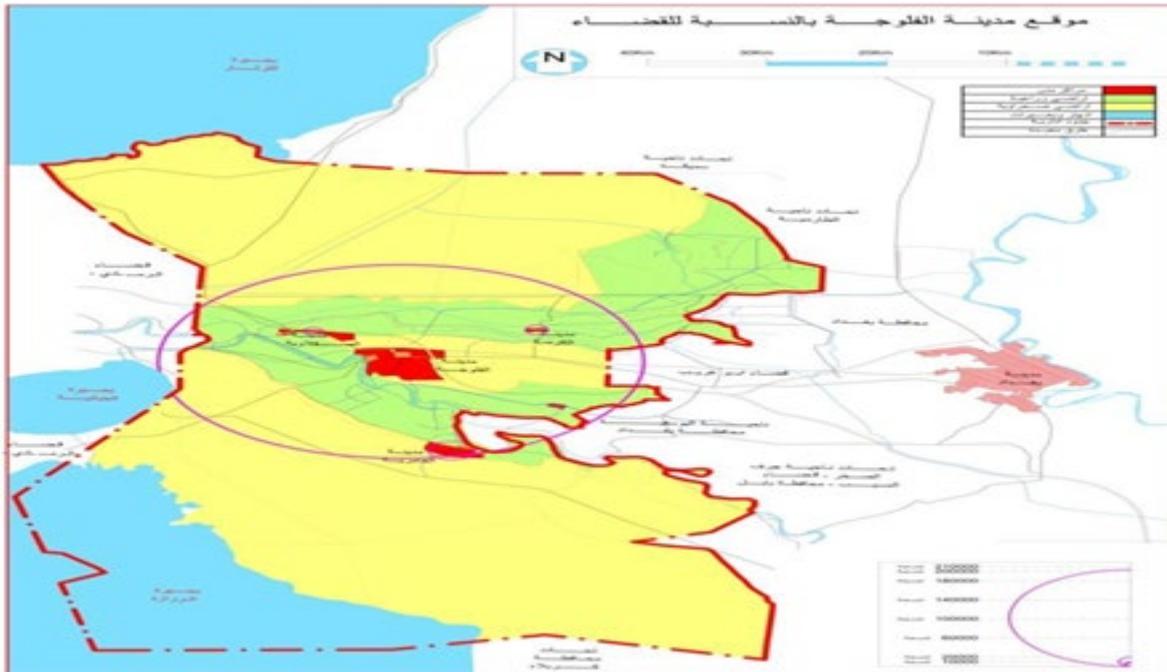
electricity and warm & cool tools and modern building materials. Traditional Arabic house has achieved life efficiency and sufficiency for their resident under the absence of electricity and building materials otherwise the western houses designs can obsess over the Arabic traditional houses after repair their negative side and does we can get benefit from modern traditional Arabic house design in drawing maps and designs for modern houses after of the imported western modern prevailed including pros and cons.

The search aim to follow up changes that developed in figure and job of houses spaces over period and in appointment to morphological style on City land. And how can we get benefit from style and designs of Arabic houses in treating houses cons with imported templates.

Location of the City of Fallujah

Fallujah City is located within municipal boundaries as it shown in map No. (1) on the left bank of Euphrates on the point that cross width point (33,21) north and line (43,46) western bounded on the north and east and south the center of Fallujah. And western Euphrates it about (57km) from Baghdad in the point when Euphrates and Tigris cross .while it about (45 km) from al Anbar Province western and about (110 km) from Samraa northern ,and it was an administrative center for the City and it consist of four administrative areas :Fallujah is the city center and karma area from north and north East, and saqlawyah Area from west and north west ,and al Amryah area from south and southern west .the Area of the city (42,5) km² it represent ratio (% 3,04) from area of province and population of City for year 2019 about (266752) peoples ,that represent ratio (% 39 ,66) from Fallujah peoples .and (%35) from population of province in about (1561312) peoples (central statistical system / 2011) . that make her national and international importance .while their figure had been appear in map No.(2) leveling the surface of Fallujah City it about(50-43 meter) above the sea level as it means the city of Fallujah is leveling surface and empty of any kind of landforms this reason make it suitable for building and trading .

Map No. 1. location of Fallujah City



Reference: Abdullah Farhan, (the contemporary City between planning thought's and Civilized City (Fallujah City studying matter) University of Baghdad -Urban and Regional Planning Institute–ph.Thesis – Unpublished (2011-page 88).

And landing phenomena has been wide spread from northern parts and western and eastern ,so it lack to most of services and commercial and industrial foundations , so that all these areas has been depending mainly of Fallujah City as (City center)as these area are focuses on it .in addition their trading position play a strong role on it

Maps No. 2. Lines of equal heights in al Fallujah City.



Reference: depending on Digital height model (DEM) with accuracy (30 *30) m and outlets (Arc map 10.4.1)

Establishment of Fallujah City

Many of History books had mention the location of Fallujah and al Rahala books also one of the writers is Yaqoot al Hamawi in his lexicon as he said about Fallujah as (falaleej al sawad) their villages and biggest Fallujah or smallest Fallujah, as two villages from Baghdad and (Kufaa sawad) and also said highest Fallujah and lowest Fallujah (Al Hamawi,1979:275) .

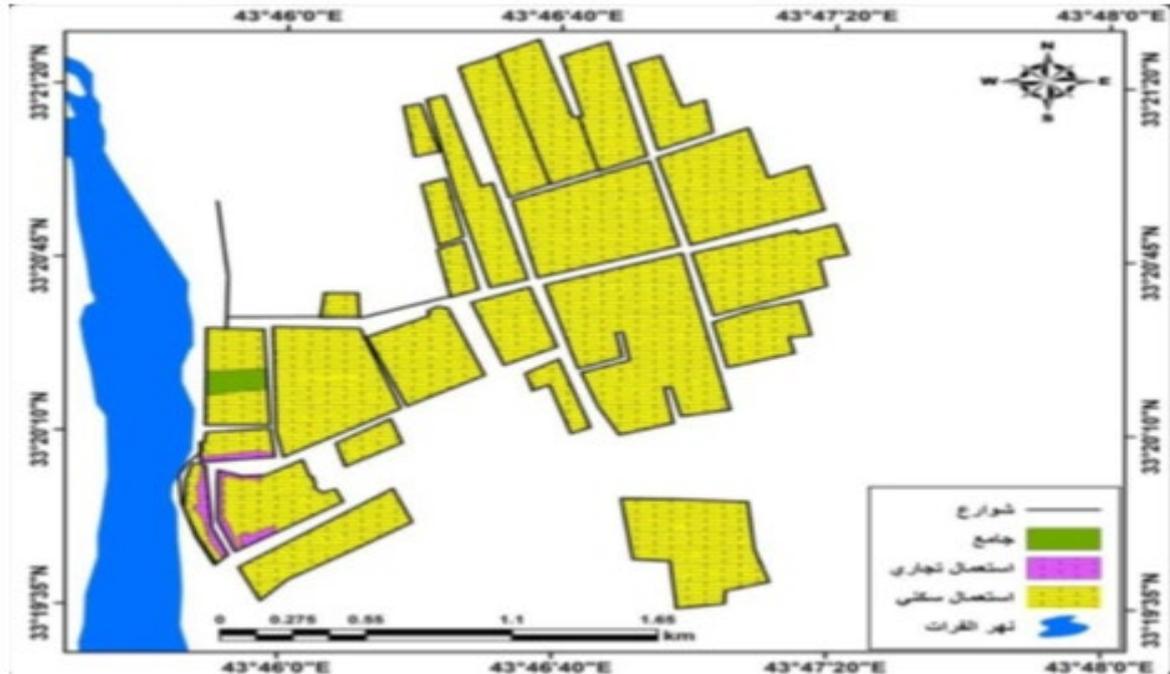
Also they mentioned Fallujah name in plural as(Falaleej) in more than one reference as in(Al Tabari History)(Al Ali,1989:48) · and also couple as (Faloujtaeen) as in countries fatooh .so it mentioned in singular also in al (Tabari History) in addition to this it fall on very important location for lands and rivers communications that make the city take a very important role for trading, also the merchant select it as a place for trading because of policy situation in Mesopotamia, and commercial activity and way of communications play an important role in flourishing and ,therefore, the main point for making it an important place as it fallen in very important trading place that connect Iraq with Arabic Golf states and the Levant and Mediterranean costs .their location encourage peoples to live or resident in it in addition it surrounded with rivers .Fallujah location make it as a very important place for trading as it connect with Arabic Golf States and Levant and Mediterranean coasts .Fallujah place play an important role for people resident and merchants as it about small Village some of the farmers are live in .Till the Viceroy Medhat Basha established al Ramadi City (1869 AD)during this time this period the Ottomans building a bridge of wood on Euphrates rivers in (1885 AD) (Al Muhammadi,2007:21)and also they established break houses (khanat)on the road named as (khan awaeed hamw) that was the first kernel for its establishment and expanded as it was breaking station for merchants and it represent trading center to bring people from many area and (Al Saqlawiyah District) after this it miss their importunity after shifting of way of communications for it (Jaata,1976:274).

After this the Viceroy (Kadhim Basha) build a mosque named as his name and then changed to (Al Fallujah Big mosque) then the construction a castle as an army store.

The growth of Fallujah City wasn't arbitrary ,but it a result to interface factors (Abo Ayash,1980:53),as it represent a very important an Economical and (trading) factor for establishing the City ,so the City is surrounding with wide Agricultural areas in addition to Animal wealth that had been founded before.

At the End of 19 period ,when Fallujah city becomes a Housing Residential in about (150)(Jaata,1976:229) house, map No.(3) this situation becomes justified from Ottomans decision makers and Responsible persons .as the Head quarter has been shifting from Saqlawiyah District to Fallujah City with government decision on year (1900AD).

Map No. 3. Fallujah City on year (1919).



Reference: Archive of the Fallujah municipality

The City began to grow up faster than before as population increase during this period as a result of new woody bridge had construction from England on year 1918AD, till year 1903AD as the City becomes as a river port that passing the peoples through towards west toward al sham, and East toward Baghdad. Then the Construction of the road on year 1923AD till it becomes the first civilized center within its regional area and Acquired managerial quality on year 1926 AD as City Center (Archie of Fallujah City).

Definition of Residential House

It is an important location and place for House in family's life, as it places for stability and relief and safe. As its special stable house not a transitional one, otherwise, houses is homelands and its stable type, as it said in Holy books " And if we pit Ibrahim the place of the house "(Al haj Ayah 26) and the location of home was known before. And we can say Holy House named in this name because its permanent and lasting for ever.as it houses or home. And if we make a test for it so it will be stable house for ever as it mentioned in Holy bible, do not inhabit them from where you lived from your grandfather" (divorced Ayah 6)and after this time when the women stay long time in it become house for her, as it said in Holy Book "Do not take them out of their homes and do not leave them unless they come with the outrageous obscene" (Divorced ayah1). firstly, entrance to the home by women it will be her house, and if she resident in it for long time it become home for her. This means that long resident from building it will be house, and short residence will be resident .so we

can define House as it small distance from land consist of spaces that contain sleeping rooms and guests and other service spaces.

The Concept of Morphology

Morphology means the final figure that had been reflected by Earth uses, one of them is houses using in its functional and urban composition, in form and content. This will give the city its morphological figure in new stage after the formation of new styles and figures in new land for long time, to fall a social and service needs of the community that will be activate and sharing among them as its Land uses and urban fabric and City plane or street net and an Urban unit that will organized on tow side the City parts(Al Ashaab,1982:18-19)

Morphology of the City

Every city is characterized with special morphology style according their urban and functional composition, as it represents real production for reaction of many factors (humans, cultural, planning, technical, articles.)

And during of study any city from morphological state so we can distinguish Its urban fabric and narrow roads that make the houses nearest to each other's. But this special Morphological style for an old city will be changed during the time, so the wide street and urban unites among the Residential and related in two sides and also building materials and new designs, and how to distribute their spaces(Al-Fatean,2005:59)

Stages of Change, Shape, Residential Building Patterns in Fallujah

We mean figure is photo that had been reflected by house in its compositions and will give its figure through styles and materials figures in many stages according to many theories behind it. the residential existence to every stage and amount of activity and complete between its Physical ingredients, so the classification of Residential houses from figurative type and Architecture in Fallujah City depends on:

- The architectural style of the house that includes land space, and building style, and building materials, and internal composition of House.
- street style.

The First Morphological Residential Stage (Building Stage)1870- 1950

We can divided the city age into stages that differ in number and extended and Properties according to circumstances of established and developed that reflected the reality of Fallujah

architecture, economics, and social one in general we can classify the historical stage for the area from its beginning and end and how old it is.

- It aims to understand the characteristics of this stage, it was necessary to know the conditions and factors of city formation:

The City Genesis Factors

The city of Fallujah grew spontaneously because of accumulated many factors that participate in grew it up and among these factors:

The Administrational and Economical Factor

Fallujah City consider as administrational and service and Economical center, as it was city center and the district belong to it. this importunity as the population living in it from peoples in province as general. this city will give the services and activities to the region that belong to it, as it lacks all types industrials and services and commercials institutions, as it represents the main market for the city. Fallujah City have a wide commercial activity that participate, and the close of the City to the Capital that make it commercial Wholesale and retail market, in addition to that, accumulated the most important industry in City.id addition the efficiency of roads for communications that connect most of Urban cities and countryside with the City, within daily mutual relation.

Fallujah City role is permeant during the gradual administrational services, as we consider it as an administrational center and the City consider as the main location and all the offices and district are belonging to it.in this way as it considers the connection point between the districts and the province, in addition to government planning factors presented by building new houses to the employees and market also. Within new design that specified according to housing and industrial areas and picnics.

Development of transport and Communications

The Geographical location of Fallujah City take an important role during the way of transport pass through as it considers as passing point to high Euphrates areas .in spite of it was attacked by nomadic peoples through the Caravans of Commerce .so, Precautions were taken to preserve the safety of convoys through the police stations set up by the governor (Medhat Pasha) .

And after entrance of vehicles to Iraq and open the land way between Iraq and Damascus as this period consider as the beginning of new development in year 1950 they established

reconstruction council as it planning for new wide Economical and servant projects one of them is transport ways ,after it gets Oil revenue (50%).that achieved an Economical developments in whole country (Administrative guide ,1990:483)

One of the most important ways that established during this period is that Baghdad- Fallujah way its length about (60 km) on year 1954 it considers an important way (Abood,2012:89).

City Planning

The City Grew firstly without pre-planning along the international Road. That connect Baghdad and Levant that pass on this city and Earth surface, so new designers know the City weather The face charts are consistent with the desert climate, so it make closed cities that filled with population, and urbane, this reasons make the street narrow, and houses close to each other's till the passages (Azeqa) sometimes curving or closed in order to bring shadow and keep Air cold inside the ways and passages(Al-Baqi,1982:89). As for the desert texture of the city at this stage, with an area dominated by the residential job, at a rate of (41.68%)(Al-Mahamadi,1990:58) of the total land use occupying an area (31.40 hectares), it stemmed from the needs of different residents. There was no clear identification of urban land uses, as the markets are connected to housing and social services from schools. Mosques and baths spread over the entire populated area, which gained the city integration and harmony between its functions, which enabled its residents to move easily. And nesting in the presence of urban tissue, several factors can be summarized as follows:

Social factor

Population statistics characterized that hold previously on year 1947 as it was not accurate, so two researchers depending on population statistics that had separated by formal counting as Fallujah population on year 1947 (10947 people) (Al-Mahamadi,1990:80)

And that city is included it , through coherent and interlinked organic pattern ,so this style reflect the City social traditions for brotherhood and closing to each other's ,and refused the idea for distance between peoples.so knowing yours neighbors before housing is prominent at that time. And some people prefer to stay close of market in this case will be crowded among peoples. some brothers stay at same house or divided it into parts to stay in isolation.

Economic Factors

Market occupy city center and that prefers by many people to resident near the market in small houses, as a wish to worked in market. So to be easy for arriving as most of them People with limited income, and this make people get benefit for rent their houses and with

the shop that belong to it.in order to increase their income or the houses be store for foodstuffs.

House Represent the Stage (Traditional Eastern House)

There is no different in Houses in its design and general frame inside Fallujah and other Cities .in most of Arabic and Islamic state houses are characterized with eastern Traditional style with open spaces and this style is go back to The second century BC.(Al-Gazali,2007:46) as it developed in Abbasi century and new designed happen in Ottoman period, and this style knowing in Orr and Ninawa and Babylon Civilization (Al-Ashaab,1980:25) and that Houses stay fir long time as Abbasi period style and this style is characterized by:

Designable considerations

That characteristics of this House Its architectural style or called traditional Arabic style. That was coherence with Climatic, religious and social conditions, and building material at that time was fire brick (Al ajar) and gypsum, mood ,wood, Palm fronds one thing, so these houses consist of two floors ,earthly height (3,5 m) and upper (3 m) so this houses is different to each other according to the Economic situation to their winners .so riche houses is very beautiful from its new design and build with a good bricks and second floors with wood and its accessories and also furniture.

wall from its thickness its size about (30-55-cm) to be good house and suitable for heat and resisting. during the period of 20 centuries the Houses are close to each other without separated, and the reason is to protect them from sun at summer avoid wind in winter, also the connection between houses make social relationship and neighborhood. The features of traditional eastern House as its more than Housing designs flexibility in designing small distance of house. And irregular from its high quality in Fulfilling the needs and uses of family person .as it distinguishes to be simple and avoid proud. (figure No.1) (Al-Janabi,1984:49).

Climate Consideration

This style of House represents permanent natural circumstances as it effected with society principles, and climate circumstances .and the person build it suitable for this circumstance (Mosa,1997:98).

The connection between houses and the nearest to Each other's make a very narrow passages, as it was just suitable for weather changes, as traditional Arabic House reflects the person

Photo No. 1. One of the narrow alleys in the Sarai



Reference: Field study 20 /12/2019

The Baha(yard) system is one of the most important characteristics of the Arab house which came in harmony with the hot and dry climatic conditions (Al-Ashaab,1998:14) and the values and customs of the Arab person in addition to the traditions of society the courtyard of the house is surrounded by other spaces while the walls of the house that overlook to the alleys are open and sometimes decorated and the Chenille ((shanashilles)) it was affordable just for the rich people this is a type of decoration entrance which provides complete privacy for the family by not allowing passerby to see who lives inside the house.

Social Factors

As for the social factors prevailing in the Arab societies in the past they played a big role in the size of the housing unit in terms of the actual building area of the housing and the number of floors for largest number of people. The number of housing members at that time ranged between (10-25) and the rate was 15 for a single residence this indicates to the social cohesion and boasting about the large size of the family resulting from the strength of the blood bond that links the family members to each other as grandchildren, children and parents live with grandparents (meaning that there is more than one generation raised in the life cycle of a single house).

The housing of this stage meets the needs of the population from a social point of view and is based on strengthening neighbourly relations and cooperation between the locals in the locality despite the existence of independence and privacy of the family as the religious beliefs represented by the prevailing norms were reflected on the planning and architectural aspects through their direct connection to the sky in the yard of the house.

Building Materials Technologies

The building materials were local as they were represented by clay and stucco which were available from the local locations at the site of the city the construction techniques were affected by the type of building materials which was often eroded by dry desert climate factors which in turn didn't help in the formation of specific architectural style and thus was the reason for the simplicity of designs at that time.

The Attributes of the Representative Stage of the House (The Traditional Eastern House)

The house in the city of Fallujah is distinguished at this stage by the traditional eastern style, in line with the needs and capabilities of people in its early stages of developments and is characterized by the following:

- It consists of one floor with a high ranging from (3,5-3m) while its area is mostly different and in cases it does not match on (150-200m).
- Local materials were used in the construction such as: milk, clay and palm trunks which are corrosive materials that were reflected in the construction technology as well as the brick brought from the ancient city of Anbar.
- Wall thickness up to (75cm) while the thickness of the ceilings up to (35-40cm).
Most of the houses of this stage are free of gardens. -
- Contained water wells and some of houses have been contained refuge. The number of these refuges were (27) refuge used by the rich to spend a siestyle to reduce the effect of high heat (Field study,2019)
- Achieve the highest functional efficiency through multiple rooms , each room has a special function where the rooms close to the house entrance will be dedicated to guests while some specialize for conservation and food and another section devoted to cooking only with a small space not exceeding (2X3m), (Picture No. 2) is characterized by architectural and functional design features represented by the following:

The Ground Piece Shape

Picture no, 2. Traditional Arabic House.



Reference: Fallujah city municipality Archief .

The traditional houses of the city of Falluja are distinguished by the irregular shape of the ground pieces and the irregular size of their areas due to the irregularity of their sites which produced organic twisted alleys in addition to the unopened alleys.

The Outer Wall

Most of traditional houses are free of external windows and if there are they are mostly in the upper parts near the ceilings to ensure that passers-by are not watching what is in the house.

The Entrance of the Broken House

The entrance broken in its appearance in the house is the link between the outside and the inside and it came to achieve a social goal mainly to preserve the sanctity of the home and the family from eyes of those crossing the streets and if there is no broken entrance the residents of the house put a curtain that comes with the same purpose. It prevents penetration from public to private directly as it provides protection for the individual and helps for psychological and social stability of the family.

The entrance to the door is the main and important part of the house and its size is the proportional to the size of the house and sometimes one appreciates the luxury of the house from the inside through the main door especially in terms of size and decoration .and the most important features of the entrance door of the traditional Arabic house are the hammers

.The mental hammer placed on the right side of the door which still performs its function in many heritage residences in the study area or another popular cities . The inner corridor comes immediately after the entrance through which the process of access to the reception, dining, and intermediate space. The architectural corridor consists of a turn because the dimensions of the home yard which is the focus of the family's activity in the residence and far from noisy. Also, the turns provide a kind of freedom and calm. The shape of the corridor is rectangular or square through which communication with those in the center of the house is through a door away from the opening opposite the entrance door (Ali,2004:34).

The Iwan

It is a schematic element in the traditional eastern house. The iwan is a unit of the ground floor, it is an open space from the side overlooking the courtyard. The iwan is used for rest time during the day and has communication points with other units. Outlets are useful for moving to and from the iwan easily and quickly in the event of sudden rain or unexpected storms. The facade of the iwan is adorned with some columns made of wood and decorated with crowns. Those columns work as walls for carrying bridges and incoming ceiling. The column is either a square or a rectangle that opens towards the house and is used in the living room, dining and to eat food and drink tea in summer.

The Family/Lounge Room

It is a very important non-roofed space surrounded by the different courtyards of the house devoted to the practice of various family activities, In addition to its contribution to reduce the intensity of heat in summer. It is the only exposed part of the residence toward the sky, as sunlight and light enter it. The leading axis to the surrounding units is lower, and the courtyard floor is somewhat lower than the sections sewn into it to prevent rainwater falling on the roof to the other rooms. Through the inner courtyard, air and lighting are carried out through the doors, windows, and raids, to the parts of the residence surrounding the courtyard, and from the architectural aspect, the courtyard floor is mostly paved with square-shaped tiles and various forms that give an aesthetic shape to the square(Salman,1996:267).

Rooms

It is the most characteristic of the traditional house, and the survey showed that 5% of the houses contain one room and 32% are two-room while 49.2% contains three rooms and 13.8% consists of four rooms and more and represent the guest room The largest rooms on the ground floor, which face the entrance directly, and due to the fall of the basement under it, the floor usually rises from (30 - 70) above the level of the floor of the family room. This

rise is due to the opportunity to create small holes towards the alley to light and ventilate the basement.

The Basement

The basement is an important element that distinguishes traditional dwellings from other dwellings and complements the ground floor. It was originally designed for a purely climatic purpose, which is to deal with the high temperatures that characterize the hot western regions, especially in Summer (Abo raheel, Madfook,1995:74). In Winter, it is used as a storehouse for excess household supplies. In general, the basements are of two types: the mid-basement, which ranges between (4-9 square meters) (Ali,2004:36) .

The total basement, which is like a building floor in the ground, and the depth of the basement ranges between (4-5 square meters). As for the height of its ceiling above the ground level, it ranges between (1-2 square meters) to provide light through holes placed close to the surface that overlook the alley and the courtyard.

The Bathroom

The bathroom is used to be with the kitchen due to no place for it around the house, and often used the public bathroom for men. As for the process of drainage of water and waste from these facilities, it is carried out by the drain, due to the lack of a sewage network at the time. It should be noted that the water drainage tanks were a contributing factor to the erosion of many traditional houses.

The Stairs

They are located in the corner that contains the kitchen, bathroom, and toilet, to facilitate the process of accessing from the ground floor to the basement or from the ground floor to the upper floor and then the roof.

The Oven (Tanoor)

It is one of the necessities of the Arabic house. and 91.3% of the houses of this stage had it, due to the inefficiency of the bakeries at that time and the small number of them. The oven is in one of the corners of the courtyard in the big houses, while the small ones was placed in one of the corners of the roof.

The Roof

The roof is usually the only part of the house after the yard exposed to direct sunlight. It is composed of wooden bridges, such as tree and palm trunks. To reduce the effect of thermal radiation, Iraqi architecture has emanated a certain roofing method by placing wood cutters roughly over its bridges and covering it with mats made of reeds and papyrus in contrast to the extension of the columns, then placing palm leaves over the layers of the mats to reduce the pressure on them and maintain their flatness when a layer of peeled clay is placed with a thickness of 10-20 cm.

The ceiling was used for sleeping in summer, as well as drying clothes, in addition to drying vegetables and making some home products, The opening of the roof on the inner side of the house is surrounded by an iron fence, or it may be from bricks, in order to maintain the safety of the residents(Al-Janabi,1984:55).

The Street Settings

Street settings in urban areas is among the most important foundations according to which the types of urban plans are classified according to ancient and modern, as these settings reflect the level of civilization that prevailed the stages of change in the shape of the region.

Animals are the approved means of transportation, so there was no necessity of adopting wide streets, if the streets perform their duties completely in the conditions of the city situation at this stage. The streets and alleys of the old city were in harmony with the means of transportation used at that stage, represented by carriages, camels, and horses, it is hoped that the strength of these streets is mainly formed by dirt.

The street occupied an area of 27.4% of the area of the city and came second after residential use (Al Mohamadi,1990:58). The alleys were taking a hierarchical system that starts with the closed road, which is 1-1.5 meters wide to serve a number of residential houses, the main road, which is two meters or more wide, represents the residential block, and the alleys end, and such type of alleys usually serves the largest number of housing according to the length of the residential block, to end with the secondary alley, which is three meters in width and above to serve a number of residential blocks, which ends and usually goes towards the main streets that connect the area with other regions, these alleys were characterized by their gradual zigzagging and narrowing due to climatic and social considerations.

The Third Topic

The Second Stage (Improved Eastern Houses) 1950-1960

Photo 3. New Arabian House in Fallujah



Reference: (Field Study)

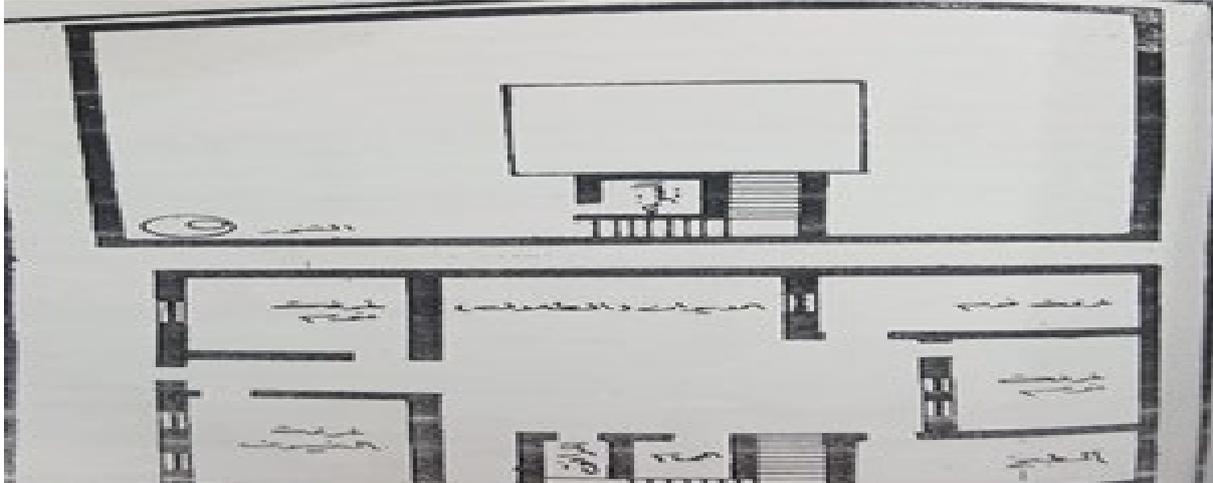
This style dominates the Arab-style dwellings with its well-known architectural details, which have created some architectural details for the traditional Arabic house, such as opening the house outward through the windows of the front façade which does not exceed much from the level of looking, and the front door of the house is centered on the front of the dwelling (Photo No. 3)

The most of its places take from one of the angles of the façade a location for the door, however, these houses have preserved the basic elements of the traditional Arabic house and are devoid of gardens, but the area of the house is larger and there are two types:

- Low quality house, the old Al-Haswa neighborhood, the Sarai neighborhood, and Albu-Lahm housing. Small houses are sized 275-280m and were built with clay, plaster, and wood. There were no health conditions, which led to their original owners leaving them to move to modern neighborhoods, and these houses attracted poor families due to a low rent. Also, most of them consist of one floor, and characterized by the fact that its streets are unpaved, which causes trouble for their owners in summer, as it raises dust when the winds blow, and in winter becomes muddy when it rains.

- Medium quality houses: They are distinguished as the bigger houses of 280-530m and are characterized by the presence of infrastructure services and tiled streets, as well as water and electricity services, especially in the new Haswa neighborhood. Bricks, plaster, metal bars and clay were also the main materials of the construction.

Figure (2) New Arabian house map in Fallujah



Reference: Hasan K. Hasan al- Janabi: The Residential Function of Al-Ramadi city, Unpublished MA thesis, College of Arts, University of Baghdad. 1984:90.

This style of houses inhabited middle and good income families, especially business owners, to take advantage of the proximity to the market, and some houses replaced multi-store buildings, especially the houses located on the old and new main street.

The Representing Stage House (The Improved Arabic House)

The Arabic house continued at this stage by being traditional in most of its details in terms of its design, its functional efficiency and its compatibility with the conditions of the city's environment, as some of the changes that gave it a distinct shape from the houses of the traditional region, and this type of house is considered an extension of the traditional houses, as this developed pattern is not for the city of Fallujah only, but it appeared in most Iraqi cities.

The new Arabian house is characterized by using new building materials such as bricks and iron rods. These materials are characterized by their resistance to environment, easy in building, as well as they give houses their esthetic designs, Figure (2) represents the map of the new Arabian house in Fallujah.

The house is composed out of the following architectural elements:

A. Plot Form

The streets system in this stage had sorted out various engineering shapes of plots where the area of the house is ranged between (200m-400m) and no interference may appear as it is the case of traditional houses.

B. Exterior Wall

Houses are opened to streets through exterior windows which are mostly made of wood and supported with iron rods. Those windows changed the houses fronts and make them more opened.

C. Corridor

The corridor that joins the front door of the house with the interior, has various shapes and designs. Two rooms are located at the front of the house separated by the corridor. The unbroken shape corridors represent (65%) of the houses, while (35%) of the houses have broken shape corridors. The unbroken shape corridors are open to the inside of the house and the inside are seen, thus, they put curtains to be unseen by other passers-by.

D. Hall (Living Room):

The location of hall varies from house to another, but it is often isolated far from the house entrance to prevent the vision of passers-by. After the development of modern heating and cooling systems, the importance of the hall began to recede and modified into a room by separating it by a wall. Thus, the Arabian house lost one its important part.

E. Courtyard

The courtyard continues to be an essential part for the new Arabian house as it was in the traditional house where it was an architectural characteristic friendly to weather patterns, and it is the join between the house and other yards.

F. Rooms

Rooms are mostly close to the entrance of the house and some are specified for guests. The one-room houses represent (6.6%) of the total number of houses, while the two-room houses represent (34%). Besides, three rooms represent (38.5%), while four-room houses represent (21.1%). In this stage, people increase the number of rooms as well as their area which ranges between (3x3m) or (4x5m), and their windows overlook on the middle courtyard (al-Hosh).

G. Bathroom

85% of the surveyed houses contain this room, while the rest represent 14.1% where the bathroom is built-in within the kitchen where the area of the bathroom ranging between 2.5-3m.

H. Stairs

It is often near the living room and ends with an upper room called (Baituna) which is used a small store for superfluous stuff out of daily needs such as food supplies and beddings.

I. Kiln

Its location is either at the roof of the house or in one of the house's angles. Kiln reserves its importance in providing bread for the family where 80% of the houses have it.

J. Roof

The roofs are projected forward towards the street with a platform area ranging between 80-100cm. This projection is used as a balcony surrounded by an iron fence giving the house some aesthetic touches. In addition, these balconies protect passers-by from sunlight and rain.

K. Lawn (Garden)

Houses that have a lawn/garden represent 62% of the total number of homes in Fallujah, and they are often small, and there are no gardens around houses except for some houses where they represent 13%. The front gardens form 28% of the total houses that contain gardens.

L. Water Closet

A small room found in all houses. It is often under the stairs and isolated away from the rooms and living room.

M. Kitchen

A room used for cooking as well as for eating for some families. 90% of the surveyed houses have it. Its area ranging from 2x3m in small houses, while it is 4x3m in large houses.

N. Street system

The quadruple system is prevailed in this stage, as a logical response to the requirements of vehicles (cars), where no new transportation system was used such as Metro or Tram and even internal railways.

The transportation area reaches 76.7 Hectare with a rate 27.33%, which includes the first stage's streets as well as the streets after expansion in the second stage that are designed to serve cars. These streets are characterized as being wide, systematic, and straight. Those streets are branched to secondary streets which are characterized as being not straight and including blocked ways as it is the case of the expansion of Al-Ba'ath the first and Al-julan districts at this stage where they represent the trespassed areas which appeared to be remote from the observation of administration and municipality authority.

Third Stage from 1969- Until Now (Western House)

This stage is very important to the city's life because it witnessed a wide urban expansion where the city area reached (347,6) Hectares. The economic and technical developments are among the most important factors behind the change of the face of Arabian city during this stage due to the increased openness to the world. Such changes can be observed in both patterns of urban growth, the shape of housing, street systems, and lifestyle.

In 1961 was consider the beginning of contemporary morphology stage in which the city of Fallujah passes and depending on a set of variables:

- interacted and gave the city its general form and completion of the stage that preceded it.
- the architectural models of the residential units have become strange and hybrid of many details.
- the street system was in line with the technological development and the fascination with the mechanical means of transportation that were in line with it
- land use has evolved in preparation to the socio-economic development of the population and technological development.
- models of housing construction represented at the level of the stage to reflect historical interruption specifically for the first and second stages due to dependence on imported and alien models for Iraqi society.
- the emergence of engineering system for cooling and heating which led to neglect the role of buildings toward climate and nature.
- the concrete bridge was built in 1963, which is great period for expansion westward across the river.

The study area has become filled with three types of housing, the traditional Arab housing which is found in the saray street and the other type represented at the modified Arab house which found in the new Haswa street, and al Baath street the first and apart from al- bolaham plus the old streets, represented in Al saray and old Haswa street represented in this level to two types of building like:

Photo no. 4. Housing style with Arabic roofing type.



The Style of Roofed Arab Housing (Semi- Western)

Represented in the housing which is in the east of the central area that take the main and secondary street places of it .plus apart from Hay Al Jamhourya and it represented as one floor housing with knowledge details which represented the end of the opening family room .substitute the roofing family room which made the same old role and a lot of big window which look down to the front garden home and the side lanes for some homes, and the vast majority of them are free of the front garden and it marked with a law external fence plus a big size of the building between 300-600 m (Photo no.4) an example of house building .

The Second Style Include Western Style Houses

Include Residences located in the remaining places represented in the noab Al –Thubat street ,Al-shourtaa,Al-thubat ,Al-askree the first and the second ,al-moalemeen ,the second Baath ,the northern section of al Bulaham ,and section of hay Al-Jamhouryaa,and developed in this period housing plans to the western style with all its architectural details (Photo No. 5) (Figure 3):

The Represented Stage House Is Characterized

- The size of dwelling was generally large, ranging between 300-600 m.
- The Residence opened out wards through its wide window with front glass.
- the house was completely isolated from the outers space, where the role of opening countyard was completely removed.
- Most of dwelling contained a parking garage, unlike the building of the previous stages, as it was missing them.

Photo No. 5.



Reference: field study

Figure 3.

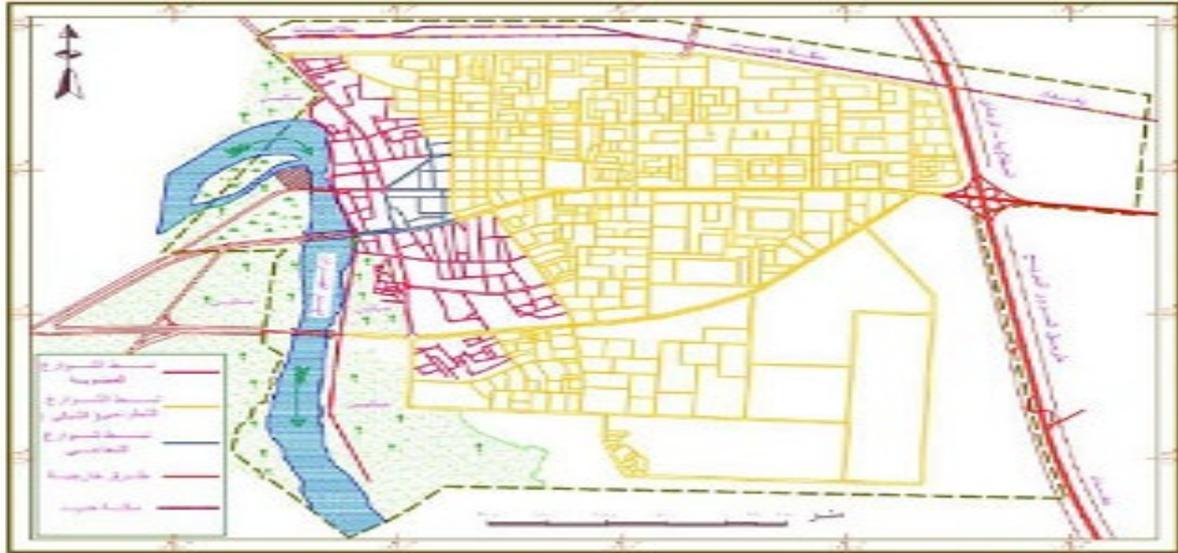


Reference: field study

3-2-3-Street systems:

The streets of this stage witnessed its expansion to keep pace with the development taking place in the transportation media ,where it was subject to pre- planning according to the basic design of the city ,so it was of quadrilateral style represented by modern neighborhood that were previously subject to the planning process, ,Jamhoria and old, new haswaa and saraai.lastly al Thirthar street that passing through al malmeen area, and nowab dhubat and shorta ,al bolaham(map No.4).

Map No. 4. mainly and secondary streets in Fallujah, 1988.



Reference: Ahmed Fayadh al mohamdi, previous reference, page no.226.

Many basic plans were developed for the development of Fallujah city, in agreement with foreign institution and offices as for the stage of comprehensive plan, was in 1971, when it was the beginning of the establishment of the directorate of planning, general engineering, in the ministry of municipalities. This year was the real start of city planning, in Iraq with Iraqi teamwork. as the last quarter of this year witnessed the issuance of the structural planning for the city of Fallujah which carries the no. (186/610) (Abid,2011:111) from specialized work team (map No,5)

The Basic Design of Fallujah, Map No. 5. 1971.



Reference: Directorate of Urban Planning, Central District Planning Department, the basic design of Al Fallujah city 186- 610.

Conclusions

- 1- Even though Fallujah city has an important location so, it does not be as civilized center till the paved the international road.
- 2- The social factors took an important role in Housing crowds close the traditional market in new stages for grew of the city.
- 3- The level the surface of the city's placement in any way and empty of natural objections that participate in heading peoples toward north.
- 4- The Residential house has occupied the biggest part for its three stages.
- 5-Development projects have participated at first centuries from third stage of city grow in expending the housing as result of people's movement out of the traditional city.
6. The-Climatic characteristics of the city's contributed to specify the urbanism characteristics and planning for the city as its response for the first stage in street style and building style also.
7. It was stated from studying the urban development of the city it has passing in three urbanism stages, the first characterized as slowly, and the third represent as urban revolution that the city has expanded three duplications.
8. During the study of urbanism city compositions as City style its Hybrid mixture from different building style beside of traditional Arabic house there is a hub Arabic house, and western house that make it new in design.

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