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Transport Methods and Their Impact on the Growth of Residential Use in the City of Kufa

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Abstract: The city is unique among human communities and has special significance. The town is a partial system represented by how each resident exercises their role, and this interdependence and the unpredictability it generates are hallmarks of the city's objective complexity. From a functional standpoint, which guarantees the state of attraction with other services through its operating performance, it enables the development process that is only possible with knowledge and understanding of the nature of use as a location and distribution. Career despite the continuous change according to the constantly updated requirements of the individual according to the process of constant mobility, and from that, we deal with the interconnected process between the movement artery within the city and between residential use or urban expansion, as the policies of countries today are concerned with infrastructure, the most important of which is transport methods to defuse the momentum from densely populated areas. Simultaneously, we establish. The lack of effective streets and their inception without previous planning are problems in many Iraqi cities.

Introduction

The city is of particular importance that differs from the rest of the human settlements. It is characterized by objective complexity, a state of a complex fabric of interconnected systems, and any imbalance will generate a form of randomness and interdependence within the city, which is a partial system represented in the uses that each exercises its function. In turn, it achieves the process of functional attraction to lead to the development of the place, which cannot carry out the development process without awareness and understanding of the nature of use as a location and distribution, and from a functional point of view, which guarantees the state of attraction with other services through its operating performance. Career despite the continuous change according to the constantly updated requirements of the individual according to the process of constant mobility, and from that, we deal with the interconnected process between the movement artery within the city and between residential use or urban expansion, as the policies of countries today are concerned with infrastructure, the most important of which are transportation methods to defuse the momentum from densely populated areas. At the same time, we find. Many cities in Iraq suffer from a lack of efficient streets and their origin without prior planning.

Theoretical framework

1- Problem of the Study

How do transportation methods impact the nature of residential use expansion in Kufa?

2- Hypothesis of the Study

Transportation routes significantly affect the nature of urban expansion and residential use, as each particular type of street generates a state of composition and balance in the heart of urban development and residential growth in the city.

3- Objective of the Study

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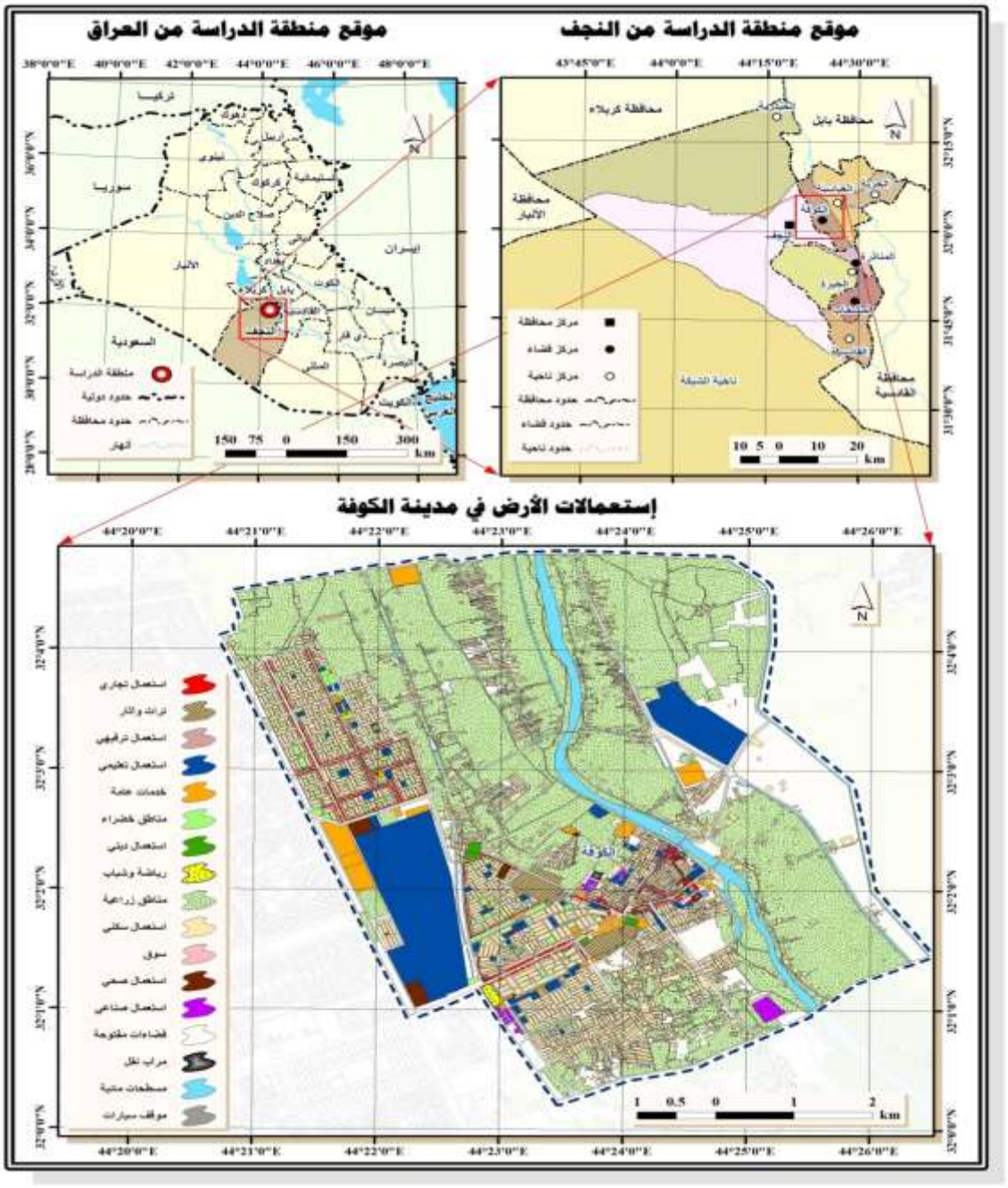
The research aims to explain the reality of the expansion of residential use, how to mutually influence transportation methods and residential use in Kufa, and the problems facing each of them.

4- The boundaries of the study area: The study area is represented by the city of Kufa, located astronomically between latitudes (1′ 32 º - 4′ 32 º) to the north and longitudes (20 ′ 44 – 26′ 44 º) to the east. Map (1), i.e., in the northern part of the Al-Sharqi district of Al-Najaf Governorate, it is 10 km away from the center of the governorate. It is bordered to the north by Babil Governorate, to the east by the Al-Abbasiya district, to the south by the Al-Manathira district, and to the west by the city of Al-Najaf. As for its location in Iraq is at the southernmost end of the northern section of the sedimentary plain on the edge of the western plateau and is located within the Middle Euphrates region.

Map (1) the location of the study area in Iraq and the governorate.



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-1. Republic of Iraq, Ministry of Water Resources, General Authority for Survey, Iraq administrative map, scale 1/1000000, 2012.

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2. Republic of Iraq, Ministry of Water Resources, General Authority for Survey, Iraq administrative map, scale 1/500000, 2012.
3. Directorate of Urban Planning, Najaf Governorate, Planning Department, updated basic plan for Kufa, 2020.

Second: Characteristics of transportation in the city of Kufa

The nature of the streets in the city of Kufa, some of which are narrow and crooked, especially the side streets, while others are wide and straight, like the public streets. Also, the main roads are predominantly commercial, and trade dominates them, as well as the secondary commercial areas, as factors related to the public interest affect the internal structure. Among these factors are associated with the safety of the individual and the public interest. This is done through organizing the uses of land within the city according to laws that prevent investments that cause traffic congestion, including those related to the external appearance of the town, and this, in turn, leads to the organization of a civilized space that leads to a clear final image. For land uses within the city.

From this, the importance of use for transportation and traffic purposes in the city of Kufa is determined by determining the city's activity and population, as it takes many patterns, as the width of the street ranges between (4-10) meters. There are also some streets with closed ends (1). The streets in the city are classified into the following: As shown in (Map 2):

1- Public (fast) streets: These main streets connect the ancient city of Kufa and its surrounding regions in several directions, as they connect the city to the city of Najaf through (Kufa-Najaf) Street, while the Manathira district is connected through Al-Ma'mal Street, which starts from Al-Jisr Street towards a cement factory. Kufa, as well as towards the Abbasiya district, a street towards the northern Najaf neighborhoods, the southern neighborhoods, Airport Street, and the street leading to Babil Governorate. Its total length reached (39,600 m).

Map (2) Streets of the city of Kufa

Source: The researcher worked using G.I.S, based on the master plan for the city of Kufa for the year 2020.

1 - Main streets: They are considered less traffic and passable than the main streets, and they are numerous in the city of Kufa, with a total length of (56330 m), including:

1- Al-Sekka Street: It has two directions, passing through the Serail and Al-Rashadiyah, and is linked to Muslim Bin Aqeel Street, passing both the Al-Jumhuriya and Al-Waqf neighborhoods.

2- Muslim Bin Aqeel Street (PBUH): It has high traffic density. This line crosses the old city of Kufa from the northeast of the Kufa Mosque.

3- Corniche Street: This street starts from the city's southern sections along the river's side, passing through Rashadiyah and Saray until the northern part of the city of Kufa.

4- Al-Sahla Street: This street consists of four lines, from Al-Kufa Mosque to Al-Sahla Al-Muazzam Mosque.

5- Al-Jumhuriya Street: It has a low traffic density compared to the streets above

There are also main streets within the city that extend between the city's neighborhoods.

2- Secondary streets vary in traffic volume and width ranges between (4-10 m). These streets serve the residential neighborhoods within the city. They also represent the link within the area

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and are mainly perpendicular to the main roads. Their total lengths in the town reached (46555 m).

3- Sub-streets: The total lengths reached (191,870 m) inside the city, and they are in the form of narrow alleys whose width is (4 m), sometimes less, and they may be closed while they are in the corridors of the residential neighborhood to serve the citizens of the same area.

Third: The reality of residential use in the city of Kufa

The city of Kufa is the second largest urban center in the province of Najaf, as it is considered the center of Al-Hurriya and Al-Abbasiyah sub-districts, and this helps to exploit the lands surrounding the city in an unplanned manner to satisfy the residential and service requirements of the population. With the apparent randomness, despite being subject to the planning process that it went through in its growth cycles, due to the increase in population growth of the city, which requires rapid urban expansion to accommodate the population, as the city of Kufa witnessed a sizeable urban development on the planned area, as well as randomly and the accompanying adverse urban problems and worsening of pressure On services (2), we will discuss the basic plans that the city went through, which regulate the spatial distribution of uses on the city's land.

The first basic plan for the year 1974:

The first modern basic plan for Kufa was prepared in 1974. Before this date, there was no basic plan leading to the town's development towards the future despite some organizational decisions and goals of a partial and immediate nature for the city.

At this stage, the time limit was set at (25 years), and one of the most essential features of the plan was defining spaces for various activities. In it, the most important uses of the land and its future stages were laid out, and they were developed in three time periods:

The first stage was from 1974 to 1985.

The second stage: 1986 until 1990.

The third stage was from 1991 to 1995.

The various uses in the city have been identified within this basic plan, including residential use, as well as around the population programs by installing a sectoral center serving the new residential areas, all of which were expected to be completed in 1995 AD and within stages (3). At the same time, the residential use exceeded some uses, as in the industrial use, as the industrial area was identified. Two sites were identified, one for industrial services west and north of the city and the other for east and southeast. It has now turned into residential areas due to the urgent need for housing due to the increase in the number of the population. As for recreational areas, they were not. It is clearly defined in the city, as it left an empty room (currently part of the housing of the Qureishat locality) (4).

As for housing, the plan tried to meet the need to provide a plot of land for residential purposes at the time and in the future, and on this basis, it allocated a group of spaces (the plan neglected the eastern side of the city). As for the transportation network, the basic plan concerned planning wide streets (40-60 meters) trying to connect sections. The city is outside the boundaries of the residential areas, as well as reducing the momentum on the main street leading to Najaf by proposing to build a second bridge. The plan created a middle road connecting the city center and its eastern and western sides with a width of (40 meters). There are sectoral streets 30 meters wide, local 20 meters wide, and service streets with a width of (12 meters) 3) It was also an attempt to connect the residential shops using sectoral roads to be finally linked to the main street leading to the city of Najaf, which is 60 meters wide, meaning that the plan was concerned with classifying streets and defining their functions.

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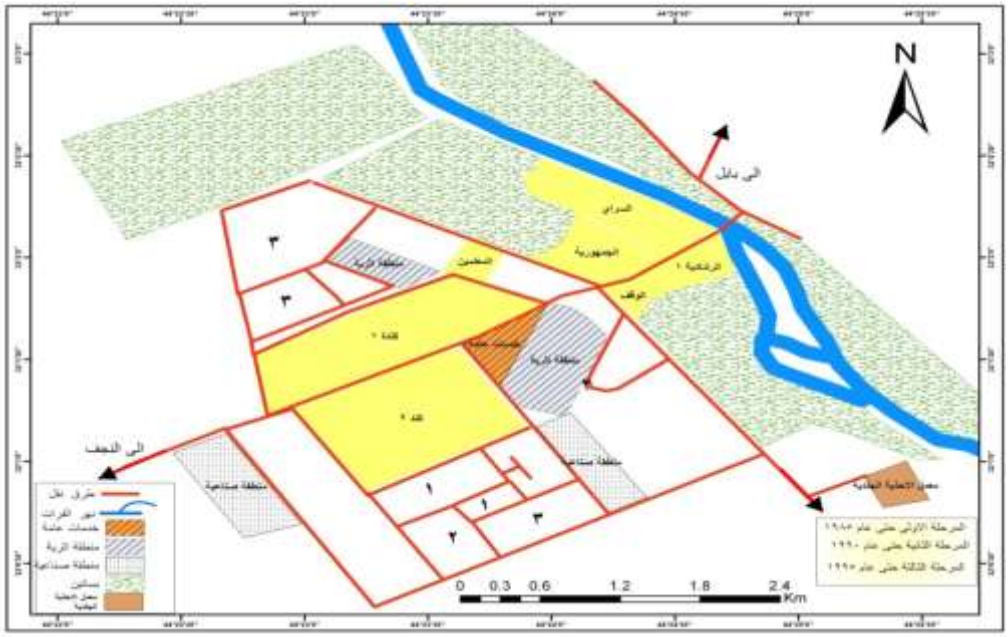


As for the main street from Najaf across the bridge towards Hilla, he did not change it but kept it wide.

The area of the master plan for the city of Kufa for the year (1974) amounted to (999.2) hectares (5), as residential areas occupied an area of (280.2 hectares) of the planned area. The size of public buildings reached (57.1 hectares), and the transportation network reached (382 hectares). hectares) and so on for the rest of the uses, each according to its area.

Since the highest area occupied by the city of Kufa is the area of the transportation network, and after it comes to the residential use, as the city's location on the central movement axis (Najaf-Kufa) and its local and regional connection was behind this high percentage and cadastral allocations for transportation purposes. In contrast, the city's population growth was the reason that achieving the residential transition ranked second.

The second master plan of 1982:

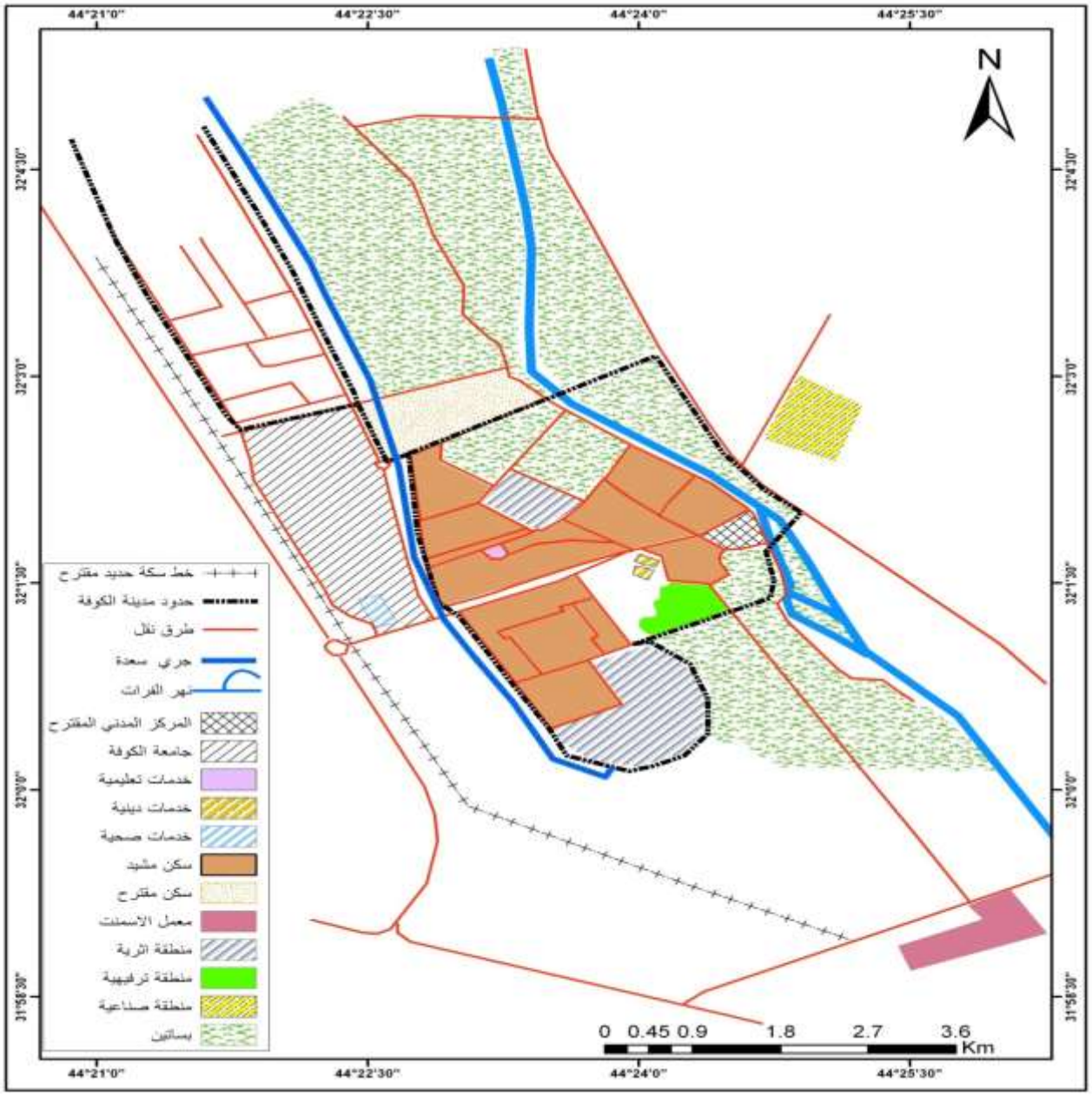
This plan complemented and corrected several proposals presented by the first plan in 1974. The city began to expand, and the Directorate of Planning and Engineering developed this plan in the Ministry of Municipalities. Therefore, the basic strategy 1974 was reconsidered for several reasons, including addressing the environmental and health aspects. And preserving archaeological areas, securing future housing needs until the year 2000, which the first plan was unable to implement, increasing the structure of spaces and services in the new areas that it identified, solving the problem of the civil center in the availability of land for government buildings, preserving agricultural lands and leaving them without expanding at their expense and securing lands For industrial and service purposes. Addressing the city's imbalances within the new master plan means more land should be available for expansion while remaining on the exact basic requirements and approving the expected future population increase. Thus, the amendment suggested expanding the city across the right bank of the river for several reasons, including the decline in land on the left side of the river. And the possibility of land exposure to floods, noting the rise in the groundwater level. It is also possible by isolating the left side and making it an area for industrial services and government projects (rice silo, technical institutes, gas stations, and other government buildings) (6).

The area of the city within this plan was (1533 hectares), and great attention was paid to housing. He focused on horizontal housing and selected a room with an area of (167 hectares), including an extent that exceeds the borders of the city of Kufa with the Najaf district,

represented by (Gari Saada), and another location within the western city limits of the Shuhada neighborhood. The implementation of the housing need came according to the following stages:
The first stage starts from 1982 AD until 1990 AD.
The second phase starts from 1990 AD until 1995 AD.
The third stage starts from 1995 AD until 2005 AD.

The plans included these sectors and were divided into residential neighborhoods with an area of (122 hectares) and each community includes four residential shops. The design of the sectors was linked to streets leading to Najaf and Kufa, as well as secondary roads that exit towards the residential neighborhoods. As for the existing areas, they were kept unchanged except for linking them. With circular streets that were proposed to surround it and end to the road leading to the city of Najaf (Map 4)

Map (4) the basic design of the city of Kufa in 1982



Source: Kufa Municipality Directorate, the basic design map for the year 1982

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While within the basic plan of 1982 was a clear interest in the transportation network, it was concerned with the regional road network, such as the roads that connect to the Kufa-Hilla road by the two proposed bridges, as well as the road leading to the cement plant from the side of the small (left) side, which facilitated the entry of large cement tankers into the city and what It causes noise and obstruction to traffic, and this road meets Diwaniyah Road. The planner tried to avoid the traffic of cars inside the city by suggesting other roads and bridges passing through the town. This was due to traffic jams and increased congestion, especially during religious seasons, visits, holidays, and events. As for the internal streets that connect the residential areas, the plan preserved the random organic streets in the old residential areas of the city. As for the streets of the new neighborhoods, the chess system was adopted, and the arc line of the proposed railway was introduced to the south of the city.

The area of Kufa increased in this plan to reach (1533 hectares), as the residential use ranked first with an area of (763 hectares) of the total planned area, followed by the rest of the other services. This indicates that the city is witnessing an apparent population growth that led to its urban development.

The third basic plan for the year 2008:

Each stage represents a response to the population growth the city is witnessing and the growth in land uses within it. This plan came in response to the rapid growth the city has seen in economic and social transformations, which led to the updating of the basic techniques, as the modern plan addresses the defect points in those previous plans. Modernization from the first stage in 1974 and the second stage of the basic strategy for 1982 with the schedule for 2008 Map (5).

The city of Kufa witnessed significant shifts in the amount of cadastral allocations for land uses, and this was due to the state of population growth, which explains the city's urban development condition.

The area of this plan for 2008 amounted to (1783.96 hectares) distributed over sizes and different proportions of urban uses, as the share of residential use was the largest among the rest of the other services by (565.28 hectares) of the planned area. The area of public buildings reached (316 6 hectares), while the total size of public roads amounted to (281 hectares) (7).

Fourth: The population growth of the city of Kufa

The high population increase and the urban centers corresponding to it in the cities came as a result of two practical elements, namely the natural growth resulting from the difference between births and deaths, as well as the migration of the population towards the city, as the population society is characterized as a living organism that is changing and evolving and is characterized by dynamism as it does not remain in one state. We notice the population increase. The rapid increase in the size of cities due to rapid urbanization requires continuous planning to keep pace with this increase, as the growth of residential use involves the extension of transport road networks to facilitate the movement of citizens and human activity and accommodate cars (8).

We will deal with the population growth in the city of Kufa, as the population and the city are in continuous interaction through exchange, and the population increase represents the starting point for urban and residential growth, specifically at all levels.

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It must increase residential expansion and the essential services it requires, such as transportation and paved roads. The development of population numbers in the city of Kufa and its growth rates can be explained in Table (1), as it witnessed a significant and continuous increase from 1965 until 2017, a time when the population reached 1965 (30,531) increased in the 1977 census to earn (47,062), an absolute increase of (16,531) people, with a change rate of (30.16%), while the annual growth rate reached (3.6%).

As for the 1987 census, the population reached (77,279) people, an increase of (30,217) people, with a percentage change of (20.28%), while the annual growth rate reached (5.1%). This was the result of the natural increase resulting from improved economic conditions. Social and health. And also because of the attractive factor that the city enjoys in terms of the availability of job opportunities and services, as well as the availability of the transportation network as an essential focal point for the population within the city (9). As for the 1997 census, the city's population reached (97,626) people, with an absolute numerical increase of (20,347). Population, with a change rate of (44.44%) and an annual growth rate of (2.4%). As for the results of the inventory and numbering that was conducted in 2009, the city's population reached (142,095) people, an absolute difference of (44,469) people over the year 1997, with a rate of change that is the largest ever, at (103.37%), while the annual growth rate reached (3). .2%, with a positive difference of (+0.8%).

As for the estimates for the year 2020, their number was (294,794) people, with an absolute increase of (152,699) people and an annual growth rate of (5.2), which had increased by a massive percentage as a result of the deterioration of the political and security conditions in a number of the country's governorates (central and northern). The migration and exodus of significant numbers of its population towards the central and southern governorates, including the city of Kufa, which enjoys a safe situation and provides services, making it a city capable of attracting residents, resulted in a relatively significant increase in population numbers, which caused pressure on services, especially health ones.

The distribution of the population in the city of Kufa according to residential neighborhoods for the year 2020 also shows that the population is not spread equally according to several factors and according to the availability of services there, as we find that the Maysan neighborhood obtained the highest rank in terms of population number, as it reached (118,291) people out of a total population of (294,794). Population, while the Teachers' Quarter occupied last place with a population rate of (2,908) inhabitants out of the city's total. These two ranks interspersed with the rest of the neighborhoods among themselves so that the population distribution varies between the city's neighborhoods, as some of them are capable of expansion and urban expansion within the area allocated to each community, and some of them encroach on the green spaces outside the area. The plan required this to extend networks of roads and streets to facilitate movement to and from within the city, as there was a size disparity in the population and the manner of population jump, and this indicates a state of imbalance in the size distribution of the people, which requires creating a state of harmony through re-planning or delivering services and extending networks. Transportation methods between neighborhoods to avoid causing an imbalance between urban communities and pass through a form of urban expansion with a similar level of development and an appropriately varying size hierarchy. This is what transportation methods primarily cause, as they facilitate the process of transportation and delivery to and from other communities and ports within the city.

Also, the city of Kufa, due to its distinguished location on the Euphrates River and the availability of services, began to attract large numbers of residents migrating from the countryside to the city, as well as from the city of Najaf, which, due to its population increase and the high prices of land there compared to the town of Kufa, some of its residents moved to the

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city of Kufa, as well as the residents of neighboring towns. The work search put pressure on services and, thus, residential expansion towards the outskirts.

This expansion requires urban expansion and the availability of services in the outskirts and the neighboring countryside to reduce neighborhood crowding. This is done by encouraging a new city policy to relieve pressure on major cities, limit their expansion at the expense of their agricultural field, and redistribute population and economic activities within the spaces adjacent to the urban area. To reduce rural exodus towards cities, control population growth, put an end to random migration towards cities, address the housing crisis, fight all forms of chaotic construction, and implement laws related to building and reconstruction, as well as through activating the role of municipalities while providing them with specialized competencies in the urban field and practical reconstruction tools, taking into account the specificities of the city and its function—functional and application of laws and legislation to protect agricultural lands (10).

Table (1) Population evolution, annual growth rate, and change rate in the city of Kufa for the period (1965-2020)

Percentage Change	The difference between the two enumerations	Annual Growth Rate	Population	Year
ـــ	ـــ	ـــ	30531	1965
30,16	16531	3,6	47062	1977
20,28	30217	5,1	77279	1987
44,44	20347	2,4	97626	1997
103,37	44469	3,2	142095	2009
-	152699	5,2	294794	***2020

1- Source: From the researcher's work, based on:
2- 1- Republic of Iraq, Ministry of Interior, General Civil Status Directorate, 1965 Population Census.
3- 2- Republic of Iraq, Ministry of Planning, Central Bureau of Statistics, General Population Census 1977.
4- 3- Republic of Iraq, Ministry of Planning, Central Bureau of Statistics, results of the general census of the population of Najaf Governorate for 1987.
5- 4- Republic of Iraq, Central Bureau of Statistics, results of the general census of the population of Najaf Governorate for 1997.
6- 5- Republic of Iraq, Ministry of Planning and Development Cooperation, Central Bureau of Statistics, Najaf Governorate Statistics Directorate, results of enumeration and numbering of housing in the city of Kufa for the year 2009.
7- 6- Republic of Iraq, Ministry of Planning and Development Cooperation, Central Bureau of Statistics, Najaf Governorate Statistics Directorate, population estimates for the city f Kufa for 2020.

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الجدول (2) عدد سكان مدينة الكوفة لعام 2020

An individual	%	Space	Percent	Population	Town
67.9	5,3	76.84	1.8	5217	Albu is Past
201	1,2	17.53	1.2	3522	University
208	4,1	59.42	4.2	12353	Republic
418	3	44.08	6.3	18434	Al-Rashadiya
224	4	57.42	4.4	12840	Serail
163	6	83.18	4.5	13550	Ambassador
99.8	2,4	35.16	1.2	3510	Suhailia
249	3,4	49.66	4.2	12359	military
423	3	44.23	6.3	18691	Euphrates
258.2	2,8	40.78	3.6	10528	Al-Mutanabi
213	1,8	25.48	1.9	5418	Teachers
394	0,9	13	1.7	5119	Endowment
84	3	42	1.2	3529	Easy transgressions
167	1,2	17.37	1	2908	The role of teachers
45.4	6,6	95.88	1.5	4356	Kinda1
127	4,6	65.75	2.8	8360	Kinda2
320	1,2	17.84	1.9	5705	The role of workers
214	7,2	104.45	7.6	22384	Maytham Al-Tamar
233.3	2,3	33.08	2.6	7720	The police
227	36	521.04	40.1	118291	Maysan
204,122	100	1444,20	100	294794	The total

Source: From the student's work, based on the Republic of Iraq, Ministry of Planning and Development Cooperation, Central Statistical Organization, Najaf Governorate Statistics Directorate, Kufa population estimates for the year 2020

Fourth: the impact of transportation on the growth of residential use.

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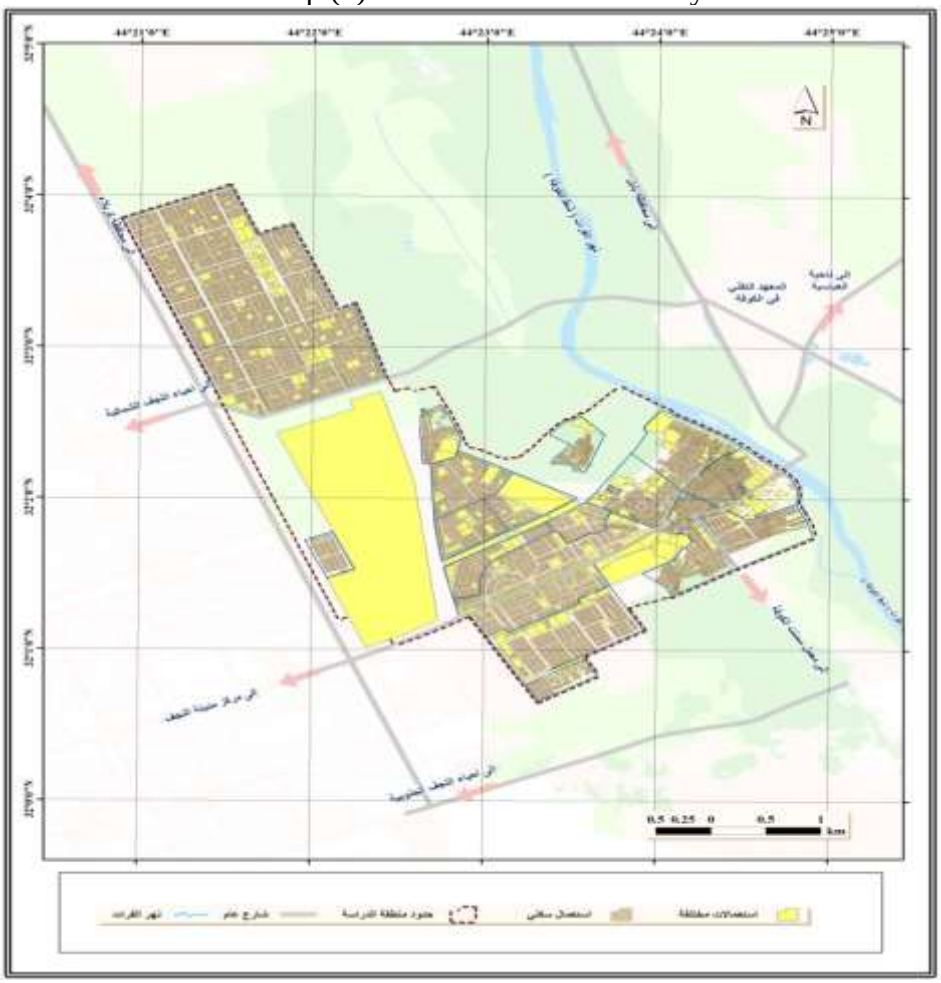
It can be said that the human settlements in the city are the ones that imposed themselves on the construction and paving of roads because the majority of these settlements have a historical dimension, especially the urban ones, as the transportation and communication methods are of great importance in the process of population distribution and stability, as it has an extension that allows the interaction of the population with the surrounding environments and regions. This vital facility is an influential factor for the various population groups, as it helps attract the people directly and serves those urban centers and their economic growth. The growth process increases in these settlements through which the roads pass, as the city cannot grow, develop, and interact among its internal parts. Or with other cities without transportation, as performing functions for different land uses in the town is challenging. Transportation and road networks are of great importance in the economic, demographic, and urban development of cities, as it is an essential component in the town's urban development and a basis for this expansion. Its population is a significant factor in increasing the pressure on the uses of the land, the most important of which are the transportation methods, because the increase in the number of the population will lead to the urgent need to extend the streets, which are outlets for the arrival and delivery of the population to their homes and work areas, as in my maps (2 and 6) and that this expansion towards the outskirts It came as a result of the inability to compete with commercial use in the heart of the city and the rise in land prices. This helped extend road networks to and from the heart of the town, specifically in the northern direction near the Al-Sahla excesses neighborhood, and thus, the emergence of streets that imposed themselves towards the Imam Ali Bridge (pbuh).

Map (6) Residential use in the city of Kufa.



Source: The researcher worked using G.I.S) based on the master plan for the city of Kufa.

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The narrow and local streets between the dwellings and the dwellings scattered near the Al-Suhailiya neighborhood, including streets towards the Euphrates River Street, as well as the residential expansion of the Maysan neighborhood towards the farms adjacent to it. The city and this necessitated the extension of streets to meet the region's residents.

The population momentum that the city suffers from requires an expansion of the road network to meet the requirements of the population on the city's land and accommodate the traffic, as tunnels and bridges were constructed in them, as in the Tunnel of Muslim bin Aqil, the Mukhtar Tunnel, as well as the Al-Sadr Hospital Bridge. Despite this, the city continued to suffer from momentum due to the increase in population, and most of the businesses and commerce are in the center.

The main streets, such as Al-Jumhuriya Street, Al-Sahla Street, and the streets leading to the Maysan neighborhood, tried to withdraw dominance from the public roads in the center, as they began to occupy large commercial and residential sites, in order to meet the requirements of the residents and the new housing located on them, as the residential use when it occurred required a need for other services and by virtue of The existence of the road attracts similar and identical benefits, such as commercial use, and thus causes a continuous growth process as long as the road exists and the residential movement is available, and thus provides an opportunity for a bud of interactions that causes urban growth and a natural interaction process by virtue of the presence of the road that residents require in their daily trips, and thus the effect of transportation extends from Transferring the population within the residential neighborhood to linking other regions and communities as well as to commercial and economic investment return, as well as to determining land prices, capacity and competitiveness, and this in turn causes a crawl towards agricultural lands in addition to the significant population growth and thus a continuous process as long as the city has rapid population growth.

Conclusions

1- Transportation in Kufa is essential, as it came second after residential use. It is a linking factor between the cities and provinces adjacent to the town and is vital to continuing urban and commercial expansion.

2- There are several modes of transportation in the city, as some of them are distinguished by their capacity between (4-10 meters) such as public streets, while others have closed ends, such as secondary streets.

3 - The population of Kufa is spread unevenly among the neighborhoods, some of which are characterized by high concentration and others with low density.

4- The population momentum that the city suffers from requires an expansion of the road network to meet the requirements of the population on the city's land and absorb the movement and traffic momentum that occurs in Najaf-Kufa Street) and the Sadr City Bridge.

5- The main streets, such as Al-Jumhuriya Street, Al-Sahla Street, and the streets leading to the Maysan neighborhood, tried to withdraw hegemony from the public roads in the center as they began to occupy large commercial and residential sites to meet the requirements of the residents and the new housing located on them, especially in the old city.

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