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## Compressive uses and its role in the spatial expansion of the holy city of Kerbala

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### Abstract

The importance of the research was to know the role of compressive uses in the area expansion of the holy city of Karbala. Urban land uses have affected the city's spatial expansion from the city center, which is considered a starting point for this expansion as a result of the pressure generated on urban land uses of various services and infrastructure. As this pressure led to the areal expansion from the sides through which pressure can be relieved inside the city center. Where population change had a clear impact on urban land uses, however, these uses are still distributed randomly in the city of Kerbala, which clearly affected the uses of urban land. The commercial use had the main role in the center of Karbala city, as it occupies the forefront in relation to the rest of the other uses because of the religious status of the city of Karbala that made the movement of tourists and visitors continuous along days of the year. Where commercial and religious activity (tourism) is accompanied by another use, which is transportation, and it has a major role in the expansion of the city in different directions, which reduces the severity of the pressure resulting in the city center area. As the city witnessed economic, social, demographic and urban changes, this affected its urban expansion, which created burdens on the designs set for it, which was reflected in its various urban activities.

**Keywords:** Spatial expansion, Kerbala, Urban land

### Introduction

In this chapter, we have dealt with the phenomenon of spatial expansion, which occupied the thoughts of many geographers, planners, and economists, as the city of Karbala is one of the Iraqi cities that was subjected to this expansion in a large way, due to the nature of its geographical location, the flatness of its land, and the availability of population and functional requirements in it, but this Expansion collided with determinants that stood as an obstacle to its spatial extension, and the most important of these determinants are the human determinants. Urban developments have had a great impact on the development of the city of Karbala, in all economic, social and cultural fields. These developments put pressure on the city center as a starting point for the spatial expansion of the city, in directions that allow this expansion according to future plans developed by the Urban Planning Department and the municipality in Karbala, to alleviate the pressure generated in the center. The knowledge of the reasons according to which this expansion occurred can be known by studying the changes that occurred in the urban land uses and the urban stages that the city of Karbala went through, to highlight the images of the variation in the urban expansion and mapping processes that have been clarified, as well as a future prediction that will happen in the size of the population and estimate The area using statistical methods that rely on official data and identifying the urban expansion axes of the city.

### Analysis of the concept of compressive uses

The pressure uses are the uses of the land, originating and distributed within the urban framework or outside the built-up area of the city, and they are urban and rural uses and environmental aspects that are compressive because they represent undesirable uses by the urban dweller due to functional, social, psychological or morphological considerations. And the pressing uses can be urban or non-urban land uses, usually endemic at the outskirts of the urban space, and as the city grows, it expands, and this matter leads to the demolition of the old wall and swallowing it up in the process of growth, and its location is exploited as a ring

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road that usually surrounds the city, as happened in most cities old. (Salah Hamid Al-Janabi, 1977, p. 92) <sup>[1]</sup>. And we can summarize the concept of compressive uses as a functional pattern performed by the unit area and on this basis, compacted areas may be devoid of use such as high areas, sharp edges, deep valleys, gardens, open areas, etc., and some others, which are the most represented by human-induced compaction uses, such as cemeteries and quarries of construction materials garbage dumping areas, camps, industrial areas, non-urban use, etc. The most important pressure uses that cities suffered from since their inception and until the beginning of the twentieth century were the walls, which were compressive stone belts that limited the growth of the cities spatially, and in some cases the necessity required the construction of new walls around the city, and as the city grew and expanded, this matter led to the demolition of the old wall and swallowing it up. In the process of growth, its location is exploited as a ring road that usually surrounds the city, as happened in most of the ancient cities. As for today, cities have got rid of their pressing stone belts, and there are also pressing uses that appeared under legal legislation, and among these uses are high-pressure towers and their taboos, taboos for external

roads and highways, taboos for oil pipelines and environmental determinants for some polluting uses, in addition to archaeological sites and their taboos and military taboos, as well as Irrigation and drainage network taboos. Some uses and their legal taboos in non-crowded areas.. For example, cemeteries should be far away:

- A. 3 km from the residential areas
- B. (500 m) from the streets
- C. 250 m from the rivers.
- D. Cemeteries are established in dry and sandy sites
- E. These proposals have been amended for the cemetery system No. (18) of 1935 and archaeological sites. Article 8 of the amended Antiquities Law No. (164) of 1975 stipulates the following:

If it is proven to the Department of Antiquities that there are some antiquities in any place, the Minister may decide to consider that place along with the lands surrounding it, according to scientific need, as historical sites.

While the camps imposed some distances on the urban plan to move away from the military sites with different distances that may reach (7 km).



**Picture 1:** The role of roads in the spatial expansion of the city

In the picture above, it shows how transportation methods play a role in the urban expansion of cities, and this means that the city is in dire need of additional areas of land, so the increase in population and the development of urban activity necessarily means that the city needs wider areas, and this means additional traffic on the roads and an increase in different sectors, As well as providing various services such as schools, health centers and other public services. (Bassem Raouf, 1980, p. 57) <sup>[2]</sup>.

### **Kerbala city**

The study of the spatial characteristics of the city is part of the interest of the geography of cities. The expansion and development of the city is closely related to those characteristics, and it is divided into two types: the natural characteristics represented by the location, position, geological composition, surface, climate, soil and water sources, which delineate the geographical surroundings or

the geographical environment, and the population characteristics that are represented by knowing the growth of The population, its composition and its dense distribution, because of its great impact on the economic and social activities and the various services within the city. We will start with the natural characteristics as the determinant of the geographical basis of the environment.

### **Location**

The location and location and the associated natural manifestations are among the most important factors influencing urban centers, and this had a direct impact on human life and stability in specific places, as the location of the dwelling is close to it and its distance from all workplaces (Riyad Kazem Salman Al-Jumaili, 2007, p. 51) <sup>[3]</sup> Various service centers, transportation lines, and communications are all important factors in urban planning or when regulating the use of land within cities.



Source: Google Earth (2011).

Map 1: Showing the location of the study area in relation to the governorates of Iraq:

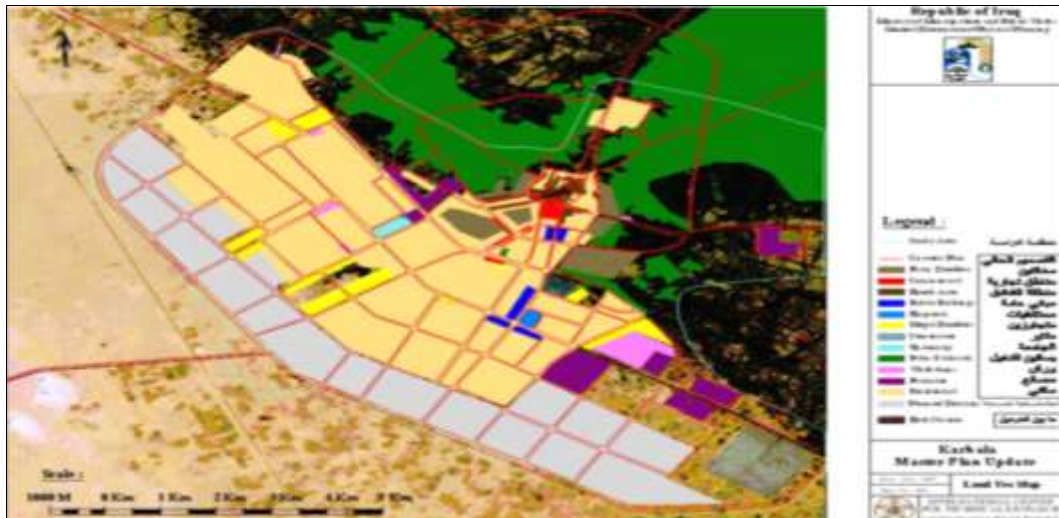
### The site is defined

As the study of the natural characteristics of the area or space occupied by the city, including (surface - topography - the degree of slope of the land on which the city is based - its geological composition - water sources - soil - natural vegetation - the local climate (which prevails in the city) The position in the relative scale is one of the components or items of the site. And the elements of the location affect to a large extent the shape of human settlements, their growth, their plan, and the methods of using the land in them. The city of Karbala enjoys a more suitable location than its location due to the great impact of the natural environment of the city, represented by the important agricultural and tourist areas that surround the city, which are characterized by their abundant production of fruits, vegetables, animal production, and its soil, which is part of the sedimentary floodplain, as well as the religious function that the city exercises in its dense territory. Wide. The city of Karbala is located at the eastern end of its province and is bordered to the north, northwest and east by the orchards and agricultural areas, while to the south and southwest it is bordered by the western plateau.

### As for the location

It means indicating the center of the city and its relationship with the surrounding areas or those located outside its urban borders with which it has economic, social and political

relations. The site has an important impact on the life of the city, its origins and development, as it is a crucible in which the natural characteristics of the place melt with the human characteristics in order to provide a kind of preference for this place that qualifies it to be a dynamic element that gives the city the characteristic of interaction and attraction for various human activities (Fouad Abdullah Muhammad, 2006, pp. 175-184) <sup>[4]</sup>. This is clear with regard to the location of the city of Karbala, which is not devoid of distinctive locational indications, as the city is located southwest of the capital (Baghdad) at a distance of (105 km), bordered on the north and northwest by Anbar province, from the south and southwest by Najaf province, and from the east and southeast by Babylon province, so it is thus The site is surrounded on four sides by ancient urban centers with a historical dimension, especially the cities of Baghdad, Babylon, Najaf and Anbar, the location of the city of Karbala in relation to the Iraqi cities is characterized as marginal, because it is located west of the Euphrates River on the edge of the western desert, and central as it is located in the center of the sedimentary plain. As for its astronomical location, it is located at latitude (32.39°N) and longitude (44.8°E). As for the location of the city of Karbala in its governorate, it represents the center of the governorate. Through what it owns in the main and secondary road network spread in the governorate, which connects the city with neighboring Iraqi cities.



Source: The researcher's work, Karbala Municipality Directorate, GIS Division, 25-2-2018.

Map 2: The basic design of Karbala 2017:

**The main factors affecting compaction in the city center of Karbala**

**First: The economic (commercial) factor**

The concept of the economy is a process of supply and demand for goods and services, so we find a strong concentration of services in it clearly, and the land uses in it are “tourist” hotel services closely related to religious places, as their number in the city of Karbala reached (245) tourist hotels in 2006 in addition to shops and stores of goods. In the center of the city of Karbala, there are main commercial streets and secondary commercial streets. The most important main streets in the old city are:

**Al-Jumhuriya Street**

It is considered one of the main streets that represent the highest commercial activity and continuous movement of

people at all times, especially on holidays and religious occasions. The markets have varied in the holy city of Karbala.

**Imam Ali Street**

This street witnesses a continuous movement of citizens to shop and shop all the time, as there are various shops selling clothes, sharaf, gold and all the household items that the citizen needs that he uses in his daily life.

**Maytham Al-Tamar Street**

This street is characterized by continuous commercial activity due to its advantages such as the availability of various goods in addition to the fact that shops are located on the main street, which makes it easier for the shopper to park his car near those markets.



Source: Karbala Municipality Directorate, gis department, 2018.

Map 3: Showing the center of Karbala (2017)

Among the markets that dominate most of the streets of the center, such as Qibla Al-Hussein Street, Al-Abbas Street, Imam Ali Street, and the area adjacent to the two pure shrines, and many branches and commercial alleys, and one

of the most important markets is Al-Dahan Market, which is considered one of the most important main markets in the city of Karbala because it provides everything that the citizen needs of foodstuffs Different in addition to the

appropriate prices compared to other markets. Commercial use occupied an area of the center's land estimated at (28.2%). With regard to religious use (7.7%) of the land of the center, the nature of the internal composition of land

uses in the city center comes according to the arrangement of competition formulas, land price and functional activities).



Source: The researcher's work / at nine o'clock in the morning on April 22, 2018.

Figure 1: of the main markets in the city center of Karbala

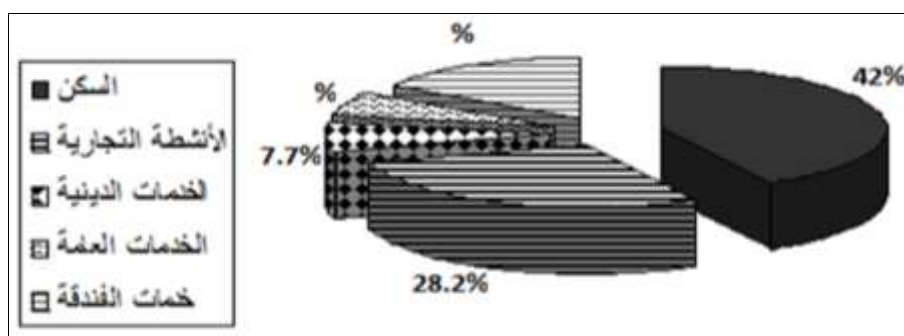
The process of control exercised by the religious factor over the rest of the uses in the land of the center stems from its being the main driver of these activities, and the process of total attraction of the uses of the land for religion is a clear indication of the difficulty of making any spatial change in the land of the center in which the price of the land and its economic value play a significant role.

**Second: the housing factor**

of the land uses within the city and in response to a number of variables, the most important of which is the population increase, the total expected increase of urban land uses in the city of Karbala will amount to (7763.1) hectares distributed among the various land uses, which will provide

a suitable area for the distribution of land uses that meet human needs and be able to perform its functionality. The housing percentage constituted (42%) of the center's land, which includes (67608) people, who constituted (14.8%) of the city's total population distributed over (9) residential neighborhoods: Al-Abbasiya Al-Sharqiya, Al-Gharbia, Bab Al-Taq, Bab Al-Najaf, Bab Baghdad, Bab Al-Salameh, and Bab Tuwairaj And the camp, we notice as a result of the areal pressure on the center of the city of Karbala, where this pressure is reflected in three areas:

1. Bab Al-Khan area
2. Akkad Iblebel area
3. The boubiat area



Source: Riyadh Kazem Al-Jumaili, published research, Karbala University Journal.

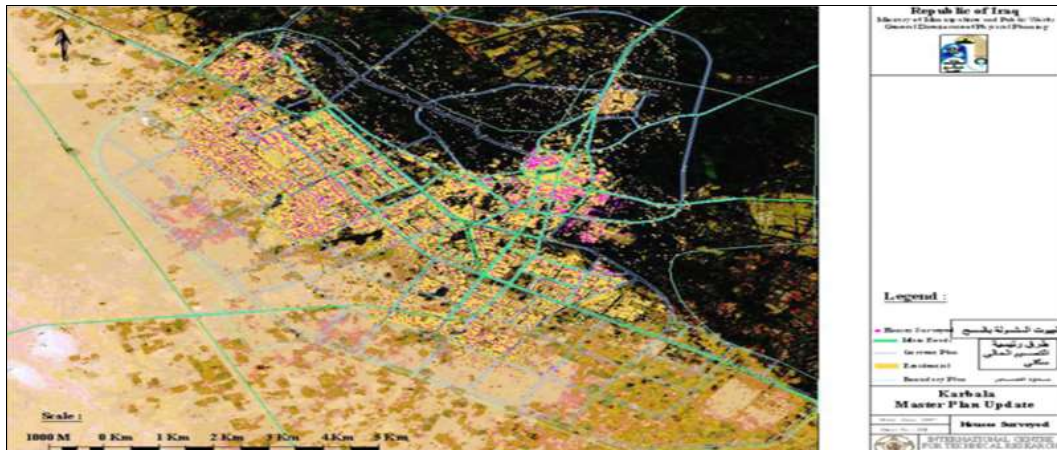
Fig 1: Percentages of urban land uses in the traditional center of Karbala for the year 2006:

Where the figure above shows the different percentages of urban land uses in the holy city of Karbala, and we note that the security of residential use is the highest percentage of other uses, then followed by commercial use, then religious and public services and hotels.

The urban land uses in the study area tend to accelerate and develop due to rapid population growth as a result of natural increase and incoming immigration to the city, which puts great pressure on the level of services in the city center of

Karbala, as this is reflected in a decline in the health, cultural and social level, and this also leaves pollution Great environmental, especially in times of religious events when millions of visitors flock to the city of Karbala.

We will also use a map showing the population density in the city of Karbala through an aerial image in which a GIS plan was used to clarify the focus of the city study to know the population density in the city of Karbala.

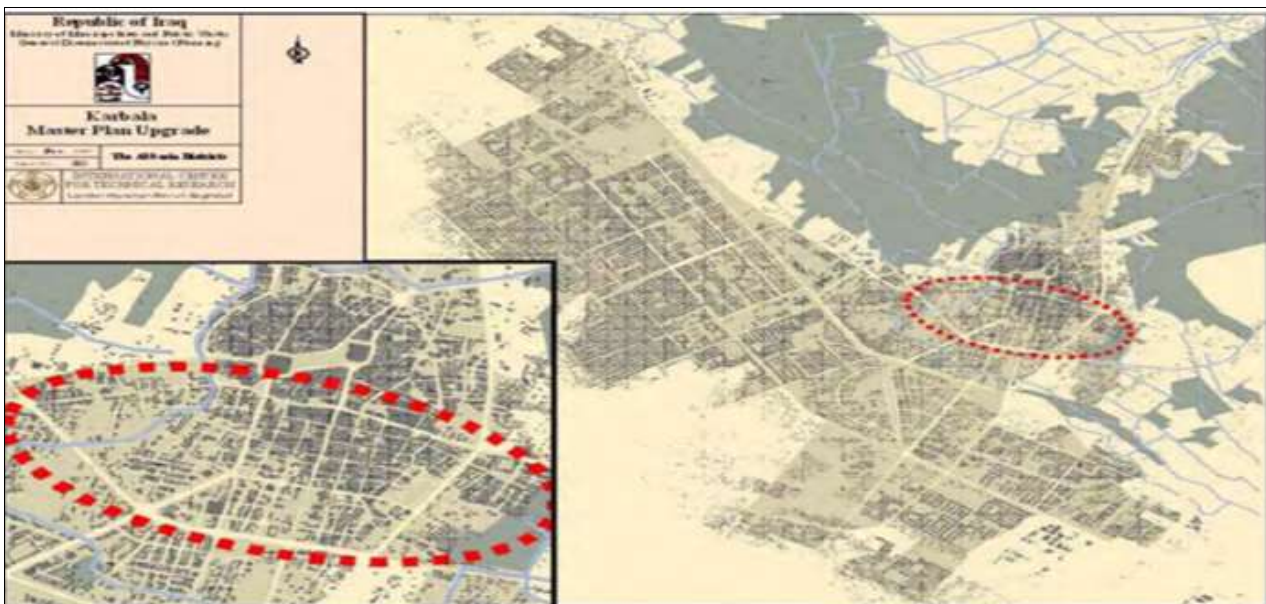


Source: Researcher's work, Karbala Municipality Directorate, 2018.

Map 4: Shows the population density in the city of Karbala:

From what we note, this continuous change in land uses came as a result of a change in residential use, as the area in the base year (2011 AD) amounted to (4077.6 hectares), while in the target year (2017 AD) it will reach (4797.5 hectares), except that This use has witnessed a tangible decline in the residential function due to the tendency of the

commercial function to obtain the best sites in order to invest and raise economic levels, and we notice that due to the increase in commercial activity in the city center, most of the population has concentrated their work in the city center, despite the competition of commercial use. We explain this through the following map:



Source: Department of Urban Planning, 2018

Map 5: of a satellite video that identifies the areas of population expansion in Karbala 2018:

Since the percentages are variable in the distribution of the population from one period to another, we conducted a study to find out the population change of the city of Karbala during the period (1997-2017) and we noticed that the numbers changed from one period to another, so the population for the year 1997 was (324147) people, i.e. an annual growth rate (13) The population in 2005 was

(464,726) people, i.e. an annual growth rate of (4.3%), while in 2011 the population was (553,234) people, i.e. an annual growth rate of (3.5%), and in 2014 it was The population is (599,274) people, at an annual rate of (4.3)%, and in 2016 the population was (781,994), at an annual rate of (4.3)%, as shown in the following table.

**Table 1:** The population of the city of Karbala and their annual growth rate for the years (1997-2017)

Year	Population (inhabitants)	Annual growth rate (%) (*)
1997	324147	1.3
2005	464726	4.3
2011	553234	3.5
2014	599274	4.1
2016	781994	4.3

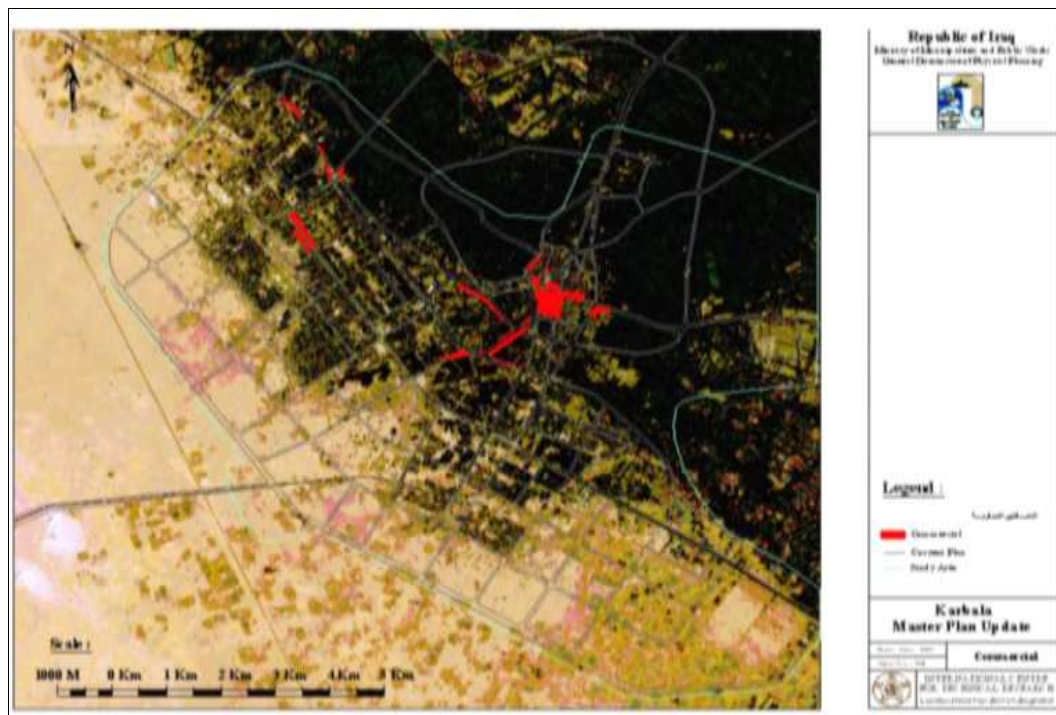
**Source:** The Directorate of Urban Planning in the Holy

Karbala Governorate, unpublished data, a field study  
 The residential job is the main objective of attracting the commercial job in obtaining the best sites in order to invest and raise economic levels, in addition to the deterioration of a number of housing units in the city center, which encouraged their migration and conversion into commercial establishments due to the high land prices, and this contributed to the increase in the number of housing units and the construction of Residential (inclusions) outside the city center and this encouraged vertical housing, in addition to several factors that contribute to the expansion and

development of the residential function, including the wide displacement of the population from the cities of the south, government support (the real estate bank) and the high standard of living, and these factors work together on the development of the residential function in Karbala city.

**Third: commercial use**

As for commercial use, it is of great importance in the city of Karbala, and this use takes place in the central areas (C.B.D), street facades, roads, and transportation nodes, as shown in the map below:



**Source:** Directorate of Urban Planning in Karbala, 2018.

**Map 6:** Shows the distribution of commercial land uses in the city of Karbala

We note that most of the buildings have multiple floors, in addition to the basements that are used as warehouses. It is not surprising to note the expansion of this use, as its area in 2011 AD reached (414.9 hectares) and is expected to reach (482.3 hectares) in the target year. 2017 AD), with an increase of (27.4 hectares) between the base year and the target year, and this is thanks to religious tourism and the high standard of living of the city's residents.

**Fourth: industrial use**

As for industrial use, its area in 2011 reached (348.5 hectares) and is expected to reach (404.1 hectares) in the target year. As for land use for transportation purposes, it is

the main factor in the urban expansion and future growth of the city through the development of a network Transportation, as the area of this use in 2011 reached (188.1 hectares) and is expected to reach (215.1 hectares) in the year (2017 AD) due to the increase in the number of cars in the city and the increase in the number of garages (garages), in addition to the bridges and tunnels that have been developed. As for the service uses, they also developed greatly between the base year and the target year, due to the population and urban growth witnessed by the study area and the emergence of modern residential neighborhoods and meeting their needs of various services, Table (2).



**Source:** The work of the researcher, Department of (Urban Planning in Karbala), 2018. Unpublished data.

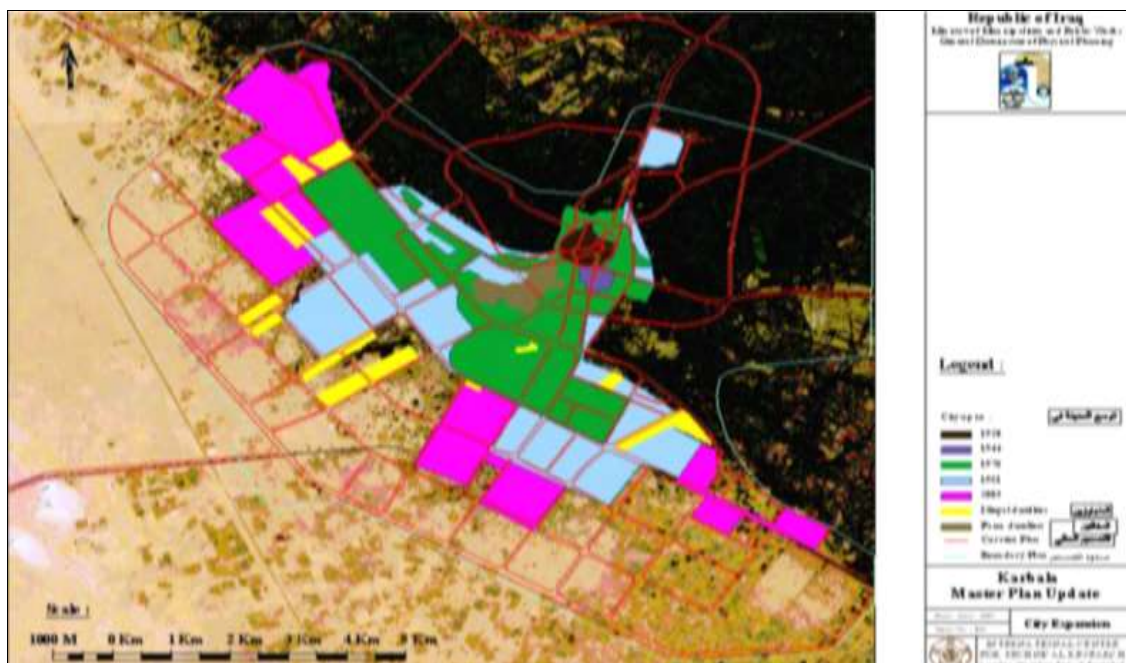
**Map 7:** Showing the industrial and workshop areas in Karbala

As for the axes of its urban expansion and its future directions, the city of Karbala followed in its growth since the time of the ring system (circular) around the two shrines according to the theory of concentric circles of (Ernest Burgess) (Ali Nuri Hassan, (1988, pg. 43):) [5]. The theory (Homer Hoyt) The theory of sectors (axial) from the center towards the outside and takes an important part of the transportation methods, where the growth began towards the following axes (Iyad Ashour Al-Taie & others, (p. 17) [6]. And as it is known that religious tourism leads to the growth of national income, if it is exploited rationally and reduces the deficit in the balance of payments through the entry of foreign currencies that contribute to the reconstruction of religious tourism as well as its contribution to the creation

of new job opportunities or raise the standard of living of the population and contribute to Improving income, and religious tourism is a tool for getting to know the customs of peoples and bringing closer bonds of love, and there is no fear of the influence of strange ideas and customs, as is the case in other types of tourism.

**Proposed alternatives for the expansion and development of the city in the future**

There are a number of proposals that aim to reduce pressure on the city center, where these treatments are according to a targeted, scientific plan that takes into account the content of future expansions without leaving obstacles or pressures on other uses.



**Source:** The researcher's work, the directorate of urban planning in Karbala, 2018, unpublished data as follows

**Map 8:** shows the directions of area expansion of the city of Karbala



**A. The first alternative is annular expansion**

It is represented by the axis of future expansion towards Najaf, Hilla, Baghdad, Al-Razzaza Lake, and towards the desert lands this alternative was proposed by the Directorate of Urban Planning for Karbala Governorate, and its advantages are ():

1. It provides a good area of land that can be exploited for the purposes of urban expansion and the development of land uses, and this alternative can accommodate a large future population increase.
2. The city expands significantly, even for years after the target year.
3. The value of land for industrial, residential and commercial projects is very cheap.
4. Giving the possibility for the development of empty areas between the centers and the city for growth and development.

**B. The second alternative is vertical expansion**

The areas proposed for this alternative extend through the actual use of the city as much as possible, and the increase is in the areas adjacent to the city, as well as the use of multi-story buildings in the existing neighborhoods of the city, and industrial uses can expand with the establishment of a belt of buffer green areas between residential uses.

And industrial use, and commercial uses are also expanding near the Hawally road that surrounds the city. The advantages of this alternative are:

1. Achieving a state of balanced growth at the city level in general.
2. Reducing private transportation and focusing on public transportation.
3. Reducing the city's population's need for additional lands for housing.

**C. The third variant is linear expansion**

The city expands according to this alternative along the longitudinal extension of the Karbala-Najaf road axis to the south and the Karbala-Razzaza road axis to the north. This alternative depends on finding a commercial and residential center on the Najaf axis and establishing a tourist and residential complex on Al-Razzaza Lake.

1. Creating commercial and residential centers adjacent to the city.
2. Ease of benefiting from public and private transportation along the city.
3. Lack of allocations required to provide infrastructure services.

**Remove the bottlenecks pressing on the city center**

We follow the following steps:

1. Banks: Withdrawing banks to areas that are gradually far from the city center. They are five government branches affiliated to Al-Rafidain and Al-Rashid Bank.
2. Establishing wholesale markets comparable to the markets in the city center.
3. Establishment of a complex for government departments, approximately (3) km<sup>2</sup> away from the city center (the court, the Land Registry Department, the municipality)
4. Most services are concentrated in the city center, which causes pressure on them (water and sewage).
5. Establishing an optical cable in the city center.

**Conclusion**

The compressive uses have become endemic as a result of several reasons, some of which are endemic in its location by virtue of urban planning, and others are endemic in the absence of municipal authority according to the principle of squatters. And the absence of a future vision in the perception of the size of the problem that may result from the endemic uses that compress the areal expansion within the borders of the urban space has led to an enlargement of the problem even more. Therefore, we note that some pressing uses have become a realistic matter that cannot be removed or mitigated, such as cemeteries, large industries, and others. We find that the nature of these uses varies in the degree of their impact based on the difference of each type of these pressing uses. While it is possible to implement a measure to reduce the impact of some of them without high material costs, others require very high material costs to remove them. However, there are some measures suggested by the study to reduce the impact of the compact uses on the areal expansion of the city of Karbala. There are no obstacles to implementing them, especially the physical ones, and then they can be implemented if they receive moral and material support from the state.

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