

# A Morphological Examination of Urban Renewal Processes: The Sample of Konya City

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**Abstract**—This research aims to investigate morphological changes in urban patterns in urban renewal areas by using geographic information systems and to reveal pattern differences that occur before and after urban renewal processes by applying a morphological analysis. The concept of urban morphology is not involved in urban renewal and urban planning practices in Turkey. This situation destroys the structural characteristic of urban space which appears as a consequence of changes at city, street or plot level. Different approaches and renewal interventions to urban settlements, which are formed as a reflection of cultural issues, may have positive and negative results. A morphological analysis has been applied to an urban renewal area that covers 325 ha. in Konya, in which city urban renewal projects have gained speed with the increasing of economic investments in this study. The study mentions urban renewal and urban morphology relationship, varied academic approach on the urban morphology issue, urban morphology components, changes in lots pattern and numerical differences that occur on road, construction and green space ratios that are before and after the renewal project, and the results of the morphological analysis. It is seen that the built-up area has significant differences when compared to the previous situation. The amount of green areas decreased significantly in quantitative terms; the transportation systems has been changed completely; and the property ownership has been reconstructed without taking the previous situation into account. Findings show that urban renewal projects in Turkey are put into practice with a rent-oriented approach without making an in-depth analysis. The paper discusses the morphological dimension of urban renewal projects in Turkey through a case study from Konya city.

**Keywords**—Konya, pattern, urban morphology, urban renewal.

## I. INTRODUCTION

THERE are a lot of reasons of structural changes in the cities. Some of them are apprehension of income, changes of social dynamics, changes occurred due to natural disasters, and physical aging or ramshackle. One of the reasons of these changes is urban renewal practices [1]. These alterations that were caused by the interventions in urban built environment can be in different formats. The most observable changes out of them are the ones in physical patterns. These changes may give positive or negative results for the characteristics of the city [2]. It is seen that these morphological changes, which generally occur in urban spaces, give negative results for the observations concluded in contrast to usual settlements and

physical patterns as well as for social structure of the environment where the interventions took place.

The alterations in urban space bring morphological changes with transformation. The changes based on lots, the transformation of structuring, the change of storey height, and the changing of density cause the morphological changes by the urban renewal interventions. This situation also shows the morphological changes in the urban fabric. In some applications, typological changes are seen with regard to the alterations of the original pattern character and the identities because of the change of the density and the order [3].

At the present time, there is a process which is developed by means of zoning plans and provides urban renewal through rebuilding methods apart from the areas which are structurally spoiled because of economic, physical, social and functional reasons. A new spatial and social relationship is expected on the urban fabric of the previous periods by means of urban renewal practices that are carried out to protect the old structural fabric. However, historic, cultural and natural spaces have ended up losing their original urban fabric as a result of these kinds of applications [4].

Some of the renewals [5] in the city centres, which mostly started in 1950s in Turkey and go on today without compromising the intensity, spread on a large area whereas some have been performed on single building plot or single lot scale. These alterations are performed partly as reconstruction of buildings destroyed in a single plot or lot, changing the shapes of building plots and building height, changing the sizes of the lots or the building layout [5]. In this context, the concept of urban morphology is not within the process of urban planning and urban renewal practices in Turkey and the changes occurring based on lots, the whole cities or parts of cities cause the disappearance of the structural characteristics of urban space, building plots, and street patterns. The fact that the settlements that occurred as a reflection of the cultural structure were exposed to renewal interventions as a result of the different approaches may give positive or negative results. In this regard, a morphological analysis has been applied to an urban renewal area that covers 325 ha. in Konya, in which city urban renewal projects have gained speed with the increasing of economic investments. The main aim of this study is to contribute to urban renewal applications depending on urban design, and urban planning process of urban morphology approach, and to discuss the morphological dimension of the renewal practices in Turkey with reference to the discussion in Konya.

The study is divided into six sections. The first section is introduction. The second section explains several academic

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approaches on the urban morphology issue. The third section is about urban morphology components. The fourth section mentions definition and development of working area. The fifth section explains changes in lots pattern and find out numerical differences that occur on road, construction and green space ratios before and after the renewal project. In the conclusion, the result of the morphological analysis shows that radical structural changes occurred in the identity of the renewal area examined in this research.

## II. THEORETICAL APPROACHES IN URBAN MORPHOLOGY

Urban morphology is a field of study which studies formation and transformation processes in a settlement fabric or in a structure scale in terms of historic periods and studies and reveals spatial characteristics in structure scale. Urban morphology has nearly one century-history as a science. Urban morphology constitutes a supplementary part of urban geography and it maintains its importance especially in Germany[6]. In England and U.S.A, it has a short history like urban geography and it started to develop during World War II. Especially in the U.S.A. and other countries where urban geography made progress, it remained as a sub-branch of urban geography and it is not so possible to come across the sources related to urban morphology in the mentioned countries. The study of Vance is one of the most exceptional studies that have been carried out about morphology so far [7].

Soon after the second half of the 19<sup>th</sup> century in England, the studies about urban morphology started to take place in research subjects. The underlying cause of this was that the numeric data gained importance, sociological researches became a primary issue and the structures with individual features declined in importance [8].

The studies related to urban morphology are concentrated on three regions in the world: Central Europe, England, North America, especially in the U.S.A. The studies apart from these countries do not seem too important to focus on [9].

Geisler was one of the most important names to influence urban morphology of Germany after World War I. He carried out a research on Danzig (Gdansk: A coastal town in the north of Poland on Baltic Sea) from a different point of view, which could not be performed by any other researchers until that day [10]. Then he dealt with the urban planning and classification of office types of German cities in his studies [11]. This study which was carried out by Geisler enabled the counter-works to be improved. As is the case with the study of Martiny [12] that analyzed the formation of the plans of urban and rural German settlements, the overall approaches of Geisler and Martiny [12] that dealt with whole Germany were criticized because they were found unnatural. These studies were criticized because the scientists who performed these studies kept the dimension of the morphographical grouping works bigger. Besides, they did not take into account the origins of the defined plans and they were satisfied with the description of the topographic maps of the settlements. They also did not approach the process of historical development of the settlements. The reason why such a situation arose was that

the geographers and architects of the time could not follow the works and researches related to urban planning closely [13].

By 1930s, the fact that the urban geographers knew the works of the urban historians such as Meier and Rorig [14] and of the architects of urban planning history like Klaiber [15] and Siedler [16] and they put emphasis on the powers that created the formations show that some important changes occurred in terms of urban morphology in those years. The studies of Bobek [17] and Christaller [18] partly caused such a progress as well [19]. As a result of their studies, the focus of the urban geography of Germany turned towards function after form.

In urban morphology, the description of the forms in terms of socio-economic and historic development was accepted widely. For instance, in the analysis of the origin of urban planning, Scharlau used cadastral plans that showed the streets and the building plots in 1941 [9].

German morphogenetic (the examination of morphology during the historic period) made an appearance in England through Conzen. Conzen was under the influence of Louis[18] and Bobek [17] when he was a student in England in 1920s and he generally contributed to urban morphogenetic rather than urban planning. His study about the forms of urban and rural settlements in the north-east of England in 1949 and his work on Whitby in 1958 were a follow-up of German morphogenetic. This study by Conzen show not only a sampling of building types and building uses but also how the physical structure of the city can be used to protect the city scape [11].

The greatest contribution of Conzen to urban morphology was his study named "Alnwick, Northumberland: a study in town-plan analysis" in 1960. In this study; the development of the principles of the urban morphology, revealing the current development, the determination of the building plots in terms of analysis units, a detailed map analysis and the progress in urban structure were presented. In the meantime, Conzen provided opportunity to study the city, urban plan, the usage of the building forms and analysis in three parts by dividing them into streets, street system, city blocks and building which are still valid today [20].

In the analysis of the urban forms according to Conzen's suggestions, it is necessary to deal with the whole historic process of the research to produce a rational analysis method and, by the way, to give importance to the lost elements as well as the available ones and to take into account the plans and historical records of the lost [21].

In 1970s, the studies of English Urban Morphology were under the influence of the studies in America. American Urban Morphology was divided into two groups: A cultural-geography group that was set up at Berkeley School and another group that studied socio-economic aspects of land use. Cultural geography constituted a poor branch of urban geography in America. The studies in this field started with Leighly [22] and continued with Spencer, Rickert, Bastian [23], [24] and Jakle [25], [26]. The primary objective of this research was to keep the interest with the research tradition of

Central Europe in low level that was into cultural styles and had a long historic past [13].

The historical development of the individual cities was studied in America by urban historians. The economic interests of different social classes were searched by social scientists in 1980 and as a result urban morphology, it was influenced by urban geography from various aspects directly or indirectly. It is necessary to compare both land use and the incomes obtained through various usages to better understand the economic effects on urban morphology. Some proprietaries consider the buildings as investment, the others show them as the covertness of their activities. It is expressed that the understanding of the difference between these two approaches will clarify urban morphology better [13].

According to Gurdes, different usages and different transportation systems have a significant effect on urban morphology. Especially, the variability effect of transportation structures or street systems on the city were emphasized and the fact that the morphological structure of the city could not depend on a single reason was mentioned [27].

Gurdes studied the development of the spatial systems of the cities and the reflections of the new developments on European city spaces. He stated that the cities depended on similar structural bases although they were in different periods and the street systems that were formed in the first periods did not lose their characteristics easily. His ideas about the fact that European urban fabric could not be adapted to innovations easily contributed the production of knowledge related to transportation system relations. He also expressed that urban characteristics could affect morphological structure [27].

Aldo Rossi was the first scientist to search the facts that lay behind the depths of the formation of the material form and fabric of the city by linking them with sociological, cultural and psychological reasons [28]. Bill Hillier studied architecture and urbanism by linking them with the dynamic structure of the city's global form and he described the cultural, historic, social and psychological structure of the city. Besides, he added a numeral dimension to these descriptions and he produced works on urban morphology. These studies manifested themselves as new and interesting approaches within the fields of urban morphology and urban design [29].

In the research performed by Whitehand and Larkham, the studies about the fields of urban morphology were analyzed in three different groups.

- The researchers in the first group describe the spatial variations of the cities from past to present in terms of map, city plans and photographs. These studies generally contain the cities with strong historical background.
- In the second group of the studies, the physical change of the cities is commented in terms of the actions of the actors in this period.
- In the third group of the studies, decision making procedure and process related to the change in urban space and the relations between instruments and actors directing this process are described [30].

### III. COMPONENTS OF URBAN MORPHOLOGY

In the process of shaping the urban space, functional, visual, morphological or contextual features show an alteration in the urban constructed environment. Some of these changes cover a large area and it may be impossible to observe them. However, it is likely to observe the changes that occur especially in single lot or in building plot scale. These types of changes in urban space are generally performed partly and they manifest themselves with the change of building plot forms, the heights of the buildings or the structuring formation and reconstruction of the buildings after pulling them down. In other words, the changes that can be watched directly in urban space seem as the changes in morphological features (the height of the building, structuring order, the sizes of the lots, building plots etc.). The point of interest of urban morphology is the physical forms that can be observed and occur basically in lots, building plots, buildings and street pattern [2, 31].

Conzen expresses the basic components of morphology with three elements which are tight-knit. The first of them is the urban plans that constitute the building plots or street patterns described as *town plan*. The second one is the land use that reveals property traces (*land use pattern*). The third is the three-dimensional traces that take forms in property patterns or reveals physical structure (building fabric) [20].

Density and reachability, which are important factors in habitability and integration of the housing areas, are important components in the formation of morphological feature of urban fabric [32]. It is understood from all these approaches that the basic components that form urban morphology are structure, property, open and green areas, street patterns, and density.

### IV. DEFINITION AND DEVELOPMENT OF WORKING AREA

In this study, the region called as "Sekiz Mahalle Renewal area" is located in the administrative boundaries of Selçuklu settlement in Konya and it is in the area that is surrounded by the railway in the east, Beyşehir Street in the south, Rauf Denkteş Street in the north and Beyşehir Ringroad in the west. In this region, there are districts called Mimar Sinan, Şeker Murat, Selçuk, Yeni Selçuk, Hacı Kaymak, Molla Gürani, Kılıçarslan and Özlem; and it covered 326-hectare area. Sekiz Mahalle Renewal Area mostly consisted of housing areas before renewal applications and there were 1-2 storey-houses most of which were in poor conditions. The houses in the region showed slum-structure typology. In spite of the fact that the urban renewal applications were not totally performed, it was observed that function profile of the region was continued but there were significant changes in building density. After the renewal interventions, 10-17 storey-buildings were constructed in the region. These new buildings appeared as modern blocks unlike the previous traditional buildings [33].

After Konya Sugar Factory was opened in 1959 the workers and their families who immigrated to Konya from the towns near the city, especially from Hocacıhan and Sarayköy, settled in this area. There were 25-30 unlicensed houses that were

built in that area next to the factory until 1965 and these houses created the core of these eight districts. Meanwhile, the construction plan in the working area was the first plan that contained the decisions about the working field. It was approved in 1965 and was made by Yavuz Taşçı and Haluk Berksan. It was achieved through a competition. Within the context of this plan, the developing directions of the city were determined as west and north-west and the target population for 1985 was estimated to be between 300.000 and 350.000. The primary target of this plan was to reduce urban pressures on cultivated areas in the South fringe of the city, to prevent unlicensed constructions by averting insufficiency of infrastructure in fringe areas and to meet the need for open and green fields [34].

Unlicensed construction in the region continued until 1993 in the form of one or two-storey buildings due to lack of inspection of the municipality and new parcel formations by means of allotment. The population of the region until that date was about 10.000 [35]

After Selçuklu municipality declared that reconstruction works would start in the region in 1993, unlicensed construction was stopped and a new development plan was started for the area, in 1998. The region consisted of the districts called Mimar Sinan, Şeker Murat, Selçuk, Yeni Selçuk, Hacı Kaymak, Molla Gürani, Kılıçarslan and Özlem and the decision was made to include them into urban renewal project [33]. This working plan was first performed in 1998 as a 1/5.000 scale master plan and the target population was determined to be 125.000. Within the context of the plan, housing, trade, open/green field, public enterprise and social reinforcement were proposed [33].

Urban Renewal was put into practice after the street called Şefik Can was opened.

#### V. ANALYTICAL STUDIES IN WORKING AREA

An analytical study was carried out in the working area about pre and post the interventions so as to reveal the morphological differences in urban renewal areas. Within this study, the change of density in structural fabric, open and green field fabric, street fabric and the area of these usages were compared numerically to reveal the morphological feature before the intervention.

##### A. Comparison of Building Spaces

The changes in the structural fabric of the working area emerged depending on the significant differentiation of structure formation and height. The formal characteristic change of the fabric will not be mentioned because the study is limited with the differentiation of the numerical value of fabric change. Numerical changes related to pre and post intervention in 326-hectare-working area are given in Table I. In Fig. 1, the patterns of structural fabric in two dimensions before and after the intervention are expressed.

In the analysis performed to reveal the numerical comparison of the changes in morphological building, it was determined that total building spaces before urban renewal intervention (a) was 901,620 m<sup>2</sup> and the proportion of this in

total area was 27,67%. It was determined after the intervention (b) that total building floor area was 529,659 m<sup>2</sup> and the proportion of this in total area was 16,26%.



Fig. 1 Building fabric differences that occurred before (a) and after (b) the urban renewal area where the transformation was performed in structural fabric-working area

TABLE I  
 PRE AND POST URBAN RENEWAL OF BUILDING SPACES

|   | Pre urban renewal | Post urban renewal |
|---|-------------------|--------------------|
| Building Floor Area (m <sup>2</sup> )     | 901,620           | 529,659            |
| Total Construction Area (m <sup>2</sup> ) | 1,618,381         | 3,162,336          |
| Total area (m <sup>2</sup> )              |                   | 3,258,237          |
| The Change in Floor Area (%)              |                   | 41,25              |
| The Change in Total Construction Area (%) |                   | 95,4               |

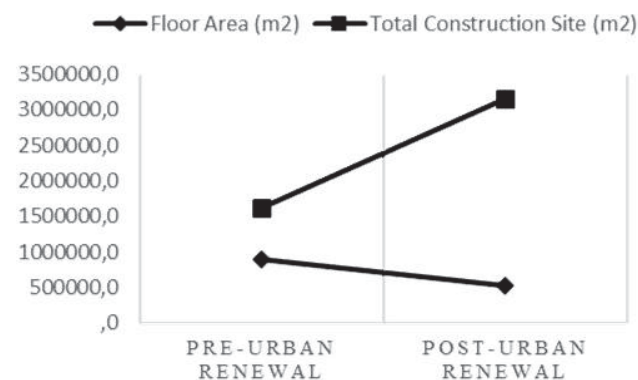


Fig. 2 The graphic of building density change: Total building floor area is decreasing and total construction area is increasing

As a result of the analysis, it was seen that total construction area before the intervention was 1,618,381 m<sup>2</sup> and this corresponded with 49,67% of the area in two dimensions. It

was determined that total construction area after the intervention was 3,162,336 m<sup>2</sup> and this corresponded with 97,05% of the area in two dimensions.

### B. Comparison of Road Areas

The comparison of road areas was made depending on the differences in street –plot fabric that occurred pre and post urban renewal as in the comparison of building density. In the study, the proportional comparison of the previous road fabric and of the road fabric most of which was transformed and redesigned was given. The differences that occurred in road areas were the ones that occurred in structural fabric. Road areas became different depending on the changing of building sizes.

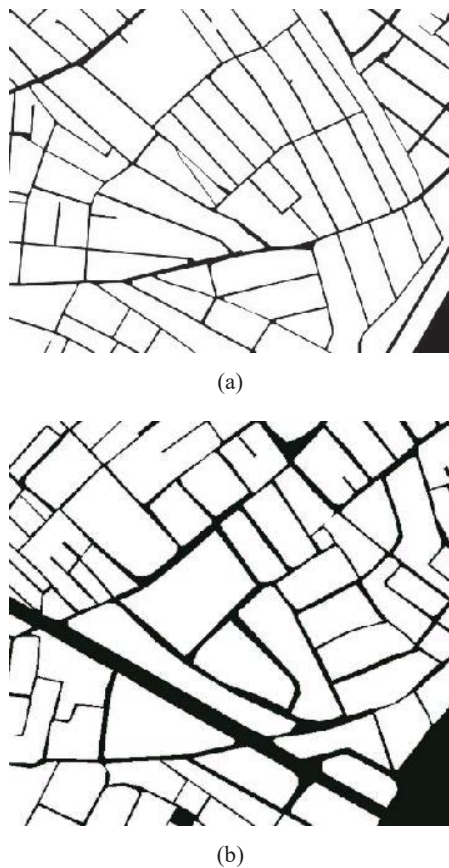


Fig. 3 Road fabric before (a) and after (b) urban renewal: The differences of transportation fabric of the area where the renewal was totally performed

TABLE II  
 PRE AND POST URBAN RENEWAL OF ROAD AREAS

|                               | Pre urban renewal | Post urban renewal |
|-------------------------------|-------------------|--------------------|
| Road Area (m <sup>2</sup> )   | 567,717           | 751,721            |
| Total Area (m <sup>2</sup> )  |                   | 3,258,237          |
| The Changes in Road Areas (%) |                   | 32,41              |

In the analysis carried out to reveal the numerical comparison of the changes in morphological building, it was observed that numerical changes occurred in road areas depending on the differentiation of street and plot fabric. It

was determined that before urban renewal intervention (a) total road areas were 567,717 m<sup>2</sup> and the proportion of this within total area was nearly 17,42%. Total road areas after the intervention (b), by the way, were determined to be 751,721 m<sup>2</sup> and the proportion of this within total area was 23,07%. It was seen that the changes in road areas as a result of renewal intervention was proportionately 5,65%.

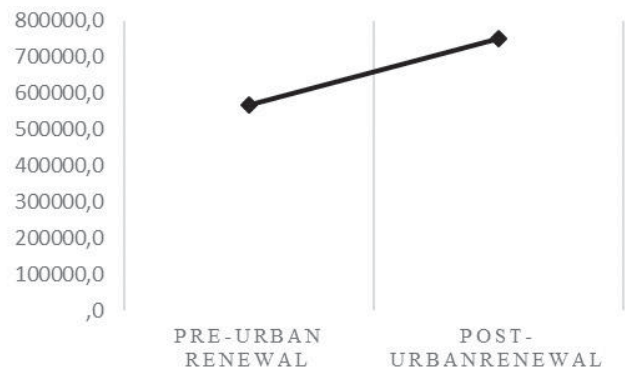


Fig. 4 The graphic for the changes of road areas: Road areas have increased as a result of the changes in street-plot fabric

### C. Comparison of Open and Green Fields

One of the researches in this study is the comparison of open and green fields before urban renewal intervention as part of analytical review that was performed depending upon numeric values. As a result of the change of building fabric, street and plot fabric, some differences emerged in open and green fabric. Due to the increase in storey height, the spaces between the buildings got bigger and this caused the increase of open and green fields.

In the numerical differences analysis of the morphological components in the working area, it was observed that numerical changes occurred in open and green field fabric depending upon the changes in building and street/plot components. It was determined that open and green fields in total were 1,788,900 m<sup>2</sup> before urban renewal intervention (a) and the proportion of this within total area was 54,91%. Total open and green fields after the intervention (b) were determined to be 1,976,857 m<sup>2</sup>, and the proportion of this in total area was 60,67%. It was seen that the change in open and green fields was 5,76% after renewal intervention.



(a)



(b)

Fig. 5 Open and green field fabric pre (a) and post (b) urban renewal: Differences of the region in open and green fabric where most of the transformation was carried out

TABLE III  
 THE CHANGE OF OPEN AND GREEN FIELDS

|  | Pre urban renewal | Post urban renewal |
|--|-------------------|--------------------|
| Open and Green Field (m <sup>2</sup> ) | 1,788,900         | 1,976,857          |
| Total Area (m <sup>2</sup> )           | 3,258,237         |                    |
| The change of Open and Green Field (%) | 10,50             |                    |

#### D. The Change of Lots Pattern

It is not possible to see the traces of the previous lots in the area where urban renewal project was carried out. By combining all lots in the area, a new lot fabric that never corresponded with the previous fabric came in sight. The reason why a new lot fabric was created combining with the previous lot fabric was the effort to produce lots in accordance with the building formations that were planned to be built. Lots typology of detached house (a) was evolved in lots typology of gated community (b).

The changes in the working area in the lot fabric occurred in the size and geometry of the lots depending upon the relationship between the building and the lot. Before urban renewal interventions (a), the lots with irregular forms became regular and the lots with square, rectangle and trapezium forms kept their similar geometry and became different in size after urban renewal (b). The lots with average 346 m<sup>2</sup> size turned into the lots with average 2519 m<sup>2</sup> size. The fact that building formations turned into large scale block buildings, when they had generally 1 or 2 storeys before the renewal, and that they could have 17 storeys affected the emergence of these changes.

## VI. CONCLUSION

Impressive values were found out in the analytical study which was performed depending upon the fact that the concept of urban morphology was not included in renewal application process in Turkey adequately because the changes in urban complex, parts of the city, street pattern, building plot or lot level destroys the structural characteristics in urban space. In the field survey, morphology components such as building,

density, open and green fields, numerical change of plot and street fabric and lot structure were studied.



(a)



(b)

Fig. 6 Lots changing loop – lot fabric before urban renewal (a) in the same area and lot fabric that occurred later (b)

As a result of the analysis, it was observed that building floor areas in the working field decreased by 41,25% whereas building density increased by 95,4%. The road areas increased by 32,41% and led to the change in road fabric. Open and green fields increased by 10,50%.

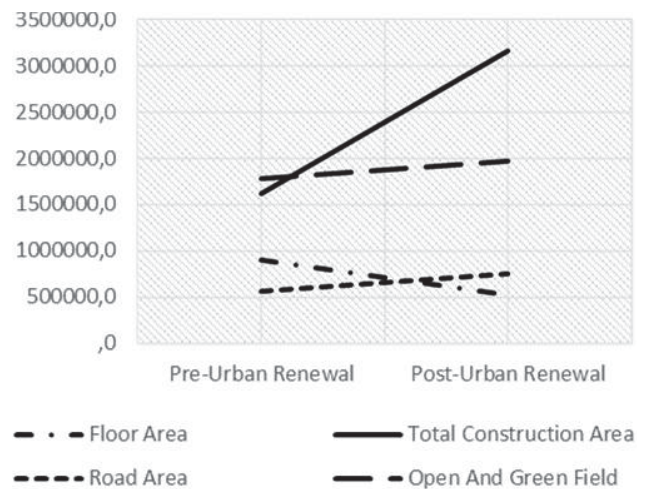


Fig. 7 Numerical changes of urban morphology components of working area about pre and post urban renewal

Lots size and lots geometry represent social living and cultural features depending on building formation/size and the existence of open and green field. The fact that the settlements, which were formed as the reflection of cultural structure and were exposed to renewal interventions as a result of different approaches, could give positive or negative results. It can be said that moving from a settlement with detached-lots layout to a bigger settlement with shared-lots layout causes the change of living habits. While the increase of open and green fields and road areas can be considered as a positive result in terms of covering up the deficiency of open and green fields, the increase of building density can be thought as a negative outcome because it occurs in accordance with income expectations and it differs by building fabric of the area.



Fig. 8 The scale of the old and new buildings in the study area

The settlement fabric that generally consisted of 1 or 2 storey buildings turned into an area with 10-17 storey buildings after urban renewal intervention. These big changes in morphological structure could produce negative results in sense of belonging of the people living in that region. It can be said that there may be a compliance problem when the people with different level of income start to live in the area.

According to the numerical analysis that was performed in the working area, morphological aspect was not dealt with adequately. As it is understood from the aim of the study, in the renewal area in Konya, it was observed that urban morphology in the applications of urban planning and urban renewal was ignored depending on the radical changes of the data obtained from the numerical analysis that was performed within the context of the morphology components in the form of plots/road pattern, building, open and green field, density and lots design.

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