



# THE URBAN TRANSFORMATION IN A PRECARIOUS HOUSING AREA: COMPARATIVE ANALYSIS BETWEEN BAKU (AZERBAIJAN) AND TEHRAN (IRAN)

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## ABSTRACT

Urban transformation has become an increasingly important tool in cities for achieving a range of goals. Among many other cities, Baku and Tehran have been subject to urban transformation practices. Despite the differences (scale, size of population, geographic particularities etc.), these cities have experienced a similar urban development model: initially being part of the Eastern world, they subsequently integrated, in different ways, the approaches applied to Western cities. Urban transformation is generally focused on facilitating the city network(s), the need for housing for the population and providing circulation. These aspects are guiding the city's development at first. The presented article is also focused on a transformation of the precarious area of the city in relation to the housing and transportation. Based on two urban transformation projects – “Winter Park” (*Qış Parkı*) in Baku and the “Navvab Highway” in Tehran – the aim of the study is to analyze the logic of urban development, explore the reasons behind the transformation and see what defines the logic of such transformation in Baku and Tehran, which will lead to better understanding of such possible urban transformations in the future.

*Keywords: urban transformation, precarious housing, logic of intervention, comparative project analysis, Baku and Tehran.*

## 1. INTRODUCTION

Nowadays, urban transformation has become an important practice regarding city development. Baku – the capital of Azerbaijan – and Tehran – the capital of Iran – have had a long and rich urban development history, with their recently experiencing major renewal in their city centres. Moreover, both these cities in neighbouring countries, initially being part of the Eastern world, have been party to the influence of Western cities in terms of their city development model and urban transformation. Obviously, their scale regarding the size of the population, magnitude of the administrative boundaries, geographical topography as well as their historical importance as the capital are all different. Accordingly, we are interested in analysing the particularities of city development in terms of what defines the logic of transformation nowadays, which is anticipated will lead to understanding the possible further urban transformations in the future in these two cities. In sum, the study is aimed at eliciting the reasons behind earlier transformation of the two focal cities and also explaining how they have implemented the practices used in Western cities.

First, we consider briefly the history of urban development on a large scale (city scale) to understand its urban transition. Next, we select a small scale (neighbourhood scale) urban transformation project to identify the logic of transformation. The need for housing for the population and the importance of providing the circulation – primarily defines the city's development. That is, urban transformation involves focusing on precarious areas of the city in relation to these two aspects. Accordingly, this article analyses the urban transformation in a precarious housing area of the city. In Baku, the focus is on the “Winter Park” (*Qış Parkı*) project, involving the transformation of an historically inhabited locality in Baku's Yasamal district into the largest public space in the urban area (after the Baku Boulevard on the

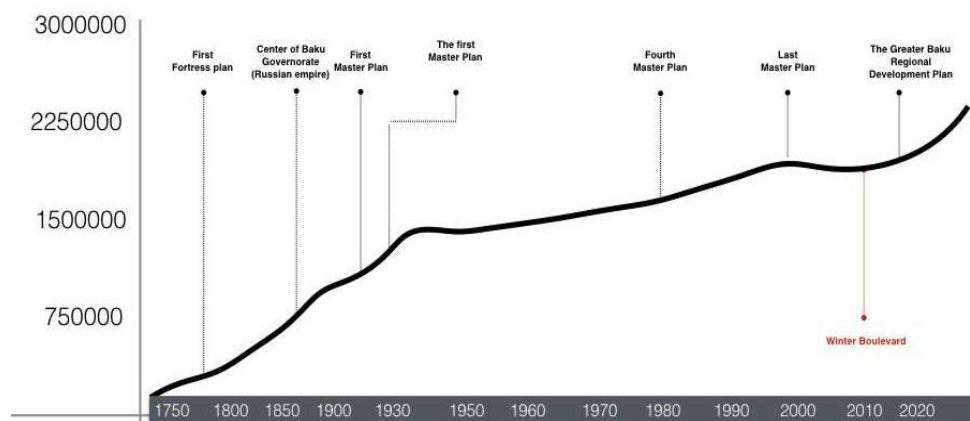
Seafront). In Tehran, we have chosen the “Navvab Highway” (Shahid Navab Safavi Expressway) project, which pertains to the transformation of old houses into medium and high-rise buildings, followed by the construction of a new highway, in Tehran’s 10th district. The presented projects are appropriate large scale relevant case studies for analysing the logic of urban transformation in the two focal cities.

## 2. DEFINITION OF URBAN TRANSFORMATION

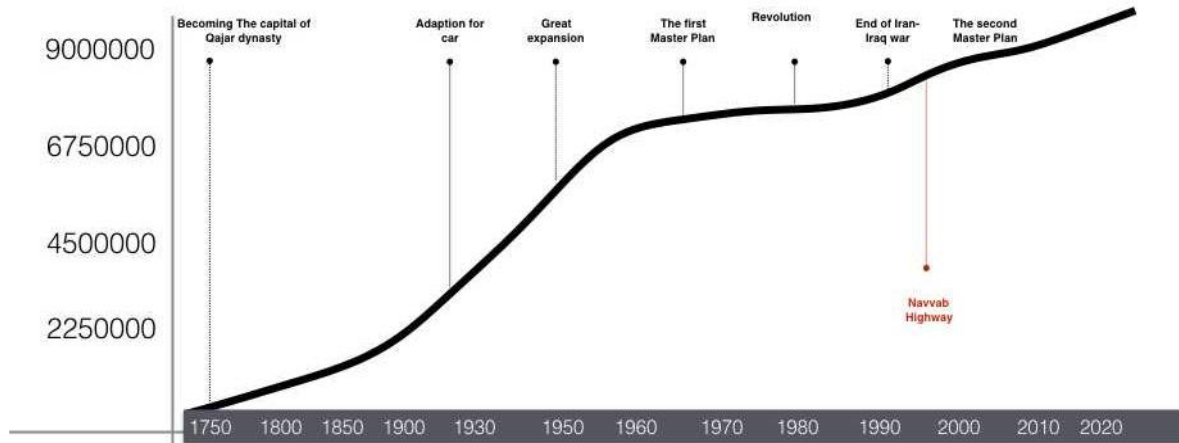
Urban transformation is commonly used by the cities as a tool for the renovation of decaying areas within their boundaries. Regarding which, Dalia Lichfield [8] defines it as the reconciliation of the need for better understanding of the processes of urban decay and the results obtained in this reconciliation process. Urban transformation can also be seen as a method of resolving problems found in urban blight, in a coordinated manner [4]. That is, it refers to a comprehensive integrated vision and action, aimed at ensuring the continuous improvement of an area’s economic, physical, social and environmental conditions [10]. From these definitions, we can understand that the urban transformation is used by the city authorities within the context of tackling the urban decay process, the improvement of poor living conditions in terms of public health, addressing the physical and social infrastructure as well as resolving problems in a continuous coordinated manner. The parts of a city urban transformation are primarily focused upon, are generally unaffordable (high housing costs relative to income), unsuitable (overcrowded poor dwelling conditions, unsafe and/or poorly located) and insecure (insecure tenure type and subject to forced moves) districts. These three elements (unaffordability, unsuitability and insecurity) illustrate how we should identify “precarious housing” [6].

## 3. COMPARATIVE HISTORIES OF URBAN DEVELOPMENT

At the beginning of the 18th century, from the structural point of view, in the old European cities, the transformation of the means of production and transport, as well as the emergence of new urban functions, contributed to the destruction of the old frames of the medieval city, with these being replaced by new modern forms [3]. The City of London (1,873,676 inhabitants, 1841) and Paris (1,696,141 inhabitants, 1861) were the first on with rationalized communication routes and other types of infrastructure, including railway stations, department stores, hotels, cafes and apartment buildings (idem). Subsequently, industries were set up in the suburbs, to which the middle and working classes flocked. At that time, the cities of Baku and Tehran were small urban areas. The former was a small port city (13,000 inhabitants, 1860) on the Caspian Sea, connected to the Silk Road, whilst the city of Tehran (174,256 inhabitants, 1867) was situated to the north of the historical city of Rey, also near to the Silk Road. The common history of both cities in terms of their urban development came to an end after the Russo–Persian wars (1813; 1828), when Baku was incorporated into the Russian Empire. Later on in the 19th century, Baku became one of the first oil cities in the world, creating its city image with residential and industrial areas, through the exploitation of its natural resources.



**Fig. 1.** Baku : key dates in urban history and demographic evolution, Source: Aliyev T., & Hashemi A., 2018



**Fig. 2.** Tehran : key dates in urban history and demographic evolution, Source: Aliyev T., & Hashemi A., 2018

Figure 1 and 2 shows the historical urban dynamics and the demographic growth in both cities. As can be seen, Baku and Tehran experienced significant population growth between 1750 and 1930. Whilst Baku had stable evolution from 1930 to 2000, Tehran's continued to increase rapidly until 1960 and since then, it has been quite uniform. Regarding Baku, in recent times, after a short dip in population at the end of the last millennium, there was exponential growth, which has continued until this day. Notably, the population of Baku (2.3 million) today is three times less than that of Tehran (8.8 million), whereas the administrative area of the former (2,130 km<sup>2</sup>) is three times bigger than Tehran's (686 km<sup>2</sup>). Simple division of these figures reveals that the city of Tehran's (12,896 hab./km<sup>2</sup>) population density is more than 10 times that of Baku (960 hab./km<sup>2</sup>).

Baku, having been an oriental medieval city, started to integrate European approaches into its urban planning. The city was developed around the old city with new French Baroque architecture and Haussmann's 19th century architectural style buildings. With the creation of large French-style buildings, Baku became known as "the Paris of the Caucasus" [5]. The new French-style districts were incorporated in the first official master plan of the city, developed by German civil engineer Nikolaus Von der None in 1898. During this period, the city grew into one of the major industrial centers of the Russian Empire, becoming for the first time in its history the capital of an independent state, the Democratic Republic of Azerbaijan, after the collapse of the Russian Empire (1918–1920). During the period of the Soviet Union (1920–1991), the city's architecture was dominated by the Soviet-style, before it became the capital of the Independent Republic of Azerbaijan (from 1991), which signaled a departure from this genre.

Nowadays, the city of Baku officially has 2.3 million inhabitants<sup>1</sup>. It has enlarged its urban landscape with new postmodern buildings, new city districts, large scale renovations and retrofitting projects. The modern urban development of the city can be divided into two historical and different modes of urban development [1]:

1. From 1991 to 2005: The development of the city can be defined as chaotic, with public and green spaces disappearing, and a pressing need for housing resulted in rapid construction of buildings;
2. From 2005 to 2018: The development of the city can be defined as being more controlled, with the restoration of public and green spaces, the renovation of the city center, retrofitting of the industrial "Black City" area as well as the appearance of skyscrapers, all of which having contributed to a positive (modern) image of the city.

In the case of Tehran, the city came to prominence in 1786, when it became the capital of the Empire of Iran. Initially, it had been developed in accordance with the traditional Iranian architectural model. However, during the dynasty of Qajar (1786–1925), the architects of Tehran, given their good ties with European countries, decided to adopt the urban development model of France. That is, the first urban development and master plan of Tehran was influenced by Haussmann's renovation of Paris [7].

<sup>1</sup> Unofficially, it is estimated that up to 3.5–4 million people live, or commute, to the city every day (Valiyev A., 2012).



Source: Aliyev T., & Hashemi A., 2018

Fig. 3 & 4. Illustration of the city plan and localization of the urban projects in Baku (above) and Tehran (below)

However, the vision of urban development in Tehran changed after the coming to power of the Pahlavi dynasty (1925–1979), when the American model exerted a profound influence. In 1968, for the

first time ever, the municipality started the development of a Master Plan involving coordination between the Iranian and American societies<sup>2</sup> [9]. This was primarily focused on a highway transportation system and on zone planning similar to the arrangements in Los Angeles (idem). However, the plan was abandoned after the Islamic Revolution and the introduction of revolutionary thought in society, which rejected anything seen as a product of American cities. Nevertheless, the basis of the master plan was implemented in terms of the structure of the highway transportation system and nowadays, Tehran is continuing its development according to the same principles.

#### 4. ANALYSIS OF THE “WINTER PARK” URBAN TRANSFORMATION PROJECT IN BAKU

In the context of political and economic system change (from 1991), the city of Baku was not able to implement its Master Plan successfully, which resulted in chaotic development of the city. This happened because of internal demographic growth accompanied by the arrival of refugees and IDPs to the Baku region fleeing the Nagorno-Karabakh territorial conflict. The rising need for housing and the rapid development were accompanied by the disappearance of the public and green spaces in the city center. From 2005 onwards, the authorities started to think about how to avoid this negative trend and decided to introduce more controlled development, which would involve the restoration and creation of new public and green spaces, renovation of the city center etc. The developments at “Winter Park” became part of this strategy. The project area of 10.5 ha (105,000 m<sup>2</sup>), including seven hectares of public space with an approximate width of 160 meters in the city center, was not chosen randomly. The transformation of the precarious housing area was already integrated into the last Master Plan of the city in 1986, which indicates that “Winter Park” was planned to be built at that time.



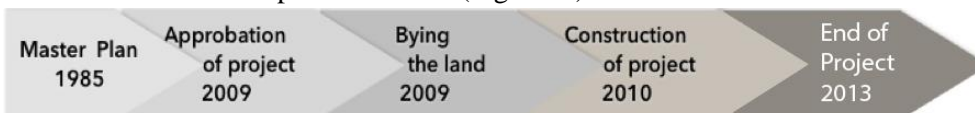
Source: APA



Source : <http://detrip.ru>

**Fig. 5.** Example of precarious housing in Baku

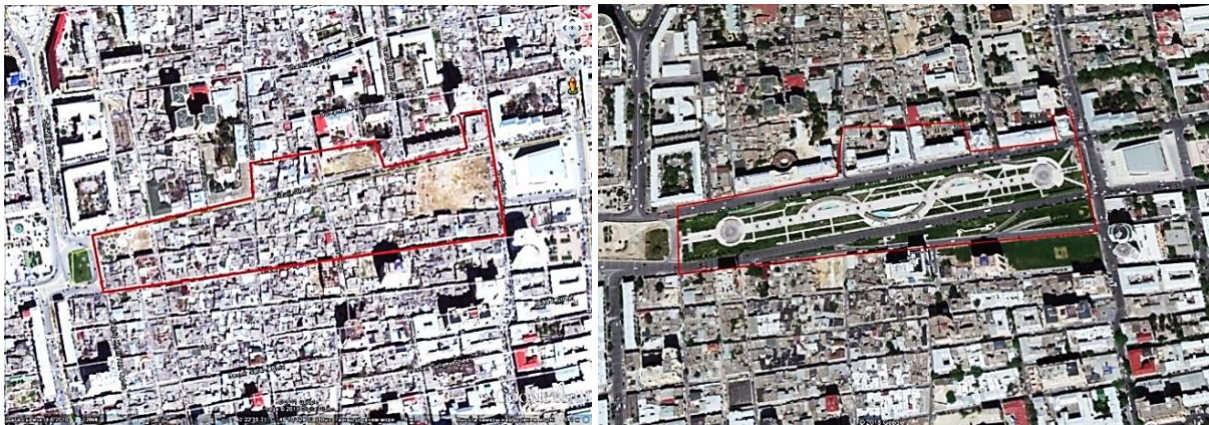
However, in the context of political and economic system change, the Master Plan was not implemented carefully. Approximately two decades after of chaotic development, the authorities are started to develop the city in accordance with the last Master Plan Approval for the project was granted in 2009 and it was completed in 2013. (Figure. 6)



**Fig. 6.** “Winter Park” Project Evolution, Source: Aliyev T., & Hashemi A., 2018

The “Winter Park”, being the largest park in the city center, represents a strategic hub, which is at the heart of the city network, connecting the public spaces. Specifically, the main idea behind this development was the connection of public spaces and the facilitation of the flow from the East to the West part of the city, in parallel with the Baku’s Seaside Boulevard.

<sup>2</sup> A. Farmanfarmian (from Iran) and V. Gruen (from USA)



**Fig. 7.** “Winter Park” – before and after the transformation, Source: Google Earth /Modified by Aliyev T., & Hashemi A., 2018

The project was inspired by traditional European style planning, where pedestrian flow was given priority over the promotion of a network for cars (Figure 8). The next step of the project is the transformation of another precarious part of the city, “Sovietsky”, on the Western part of the “Winter Park”, thus illustrating continuity in the planning procedure.



Baku: Winter Park, Start : 2013 /  
Source: Winter Park Baku Hotel

Barcelona: La Rambla, Start: 1850 /  
Source : <http://detrip.ru>

Moscow: Tsaritsyno Park/ Project of  
Sergey Skuratov / Start: 2017, Source:  
Komitet Po Arkhitekture I  
Gradostroitel'stvu Goroda Moskv

**Fig. 8.** European model of public space

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## 5. ANALYSIS OF THE “NAVVAB HIGHWAY” URBAN TRANSFORMATION PROJECT IN TEHRAN

After the Islamic revolution, followed by the Iran-Iraq War, the city of Tehran was confronted by huge urban sprawl. Because of the war and loss of jobs in the regions, migrants moved to Tehran from other cities, which vastly expanded the urban settlement. The municipality did not pay attention to managing the evolution of the city, largely because of the absence of financial resources, which was a basic responsibility of the city authority. In 1987, the new mayor of Tehran (G. Karbaschi), who came from “Construction Government”<sup>3</sup>, launched a new and ambitious project in the city. As the last Master Plan, focused on the highway transportation system and on zone planning, municipality developed now project that was promoting the “Highway of Chamran” in the direction of South Tehran. The objective of the highway was to create a new North-South axis of transit, which would also in the future link the

<sup>3</sup> “Construction Government” – type of government that invests primarily in construction, rather than other spheres.

city to the new International Airport of Tehran<sup>4</sup>. As the portal to the city from the planned airport, the “Navvab Highway” would portray a positive image of a modern capital. As shown in Figure 9 and mentioned above, the project was inspired by the American model of urban development, which focuses on highway transportation and can be seen in other cities, such as Los Angeles and Dubai etc.



Tehran: Navab, Start : 1968  
<http://kusarevelayat.parsiblog.com>

Dubai: Zayed, Start: 1971  
 Source : <http://www.buro247.me>

Los Angeles: La Sienea, Start: 1937  
 Source : Al\_ka

**Fig. 9.** American Highway model in different countries, Source: Aliyev T., & Hashemi A., 2018

However, after being initiated in 1968, the ambitious project remained uncompleted owing to the budget deficit brought about through the extensive war period. The major problem before this transformation was to buy the land and apartments of the population already living along the highway (Karbashi, interview by Hashemi, 2017).



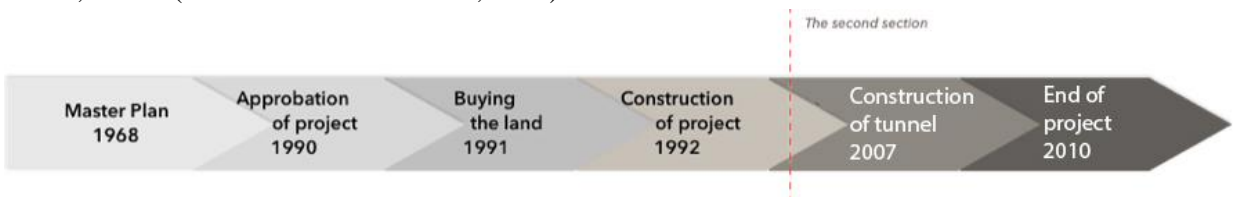
Source: Aminzadeh, Bahraini, 2007



Source: Isna.ir (97032812917)

**Fig. 10.** “Navvab Highway” – before and after the transformation

When seeking an appropriate solution, the municipality decided to construct the project at the core - in close proximity to the city center (Figure. 10). To avoid financial problems, it called for the construction of the new apartment buildings along the highway, which could be sold to cover the construction cost of the project. In 1990, after a long period (Figure. 11) and following the first Master Plan of the city, the municipality adopted it and launched the complex project. It was anticipated that it would improve the circulation and provide high-density residential, commercial and office buildings. The total area of demolished residential units was set at 47.96 ha (479,600 m<sup>2</sup>) and the length of the strip was 5,529 m. (Aminzadeh and Bahraini, 2007).



<sup>4</sup> Imam Khomeini Airport (IKA)

**Fig. 11.** “Navvab Highway” Project Evolution, Source: Aliyev T., & Hashemi A., 2018

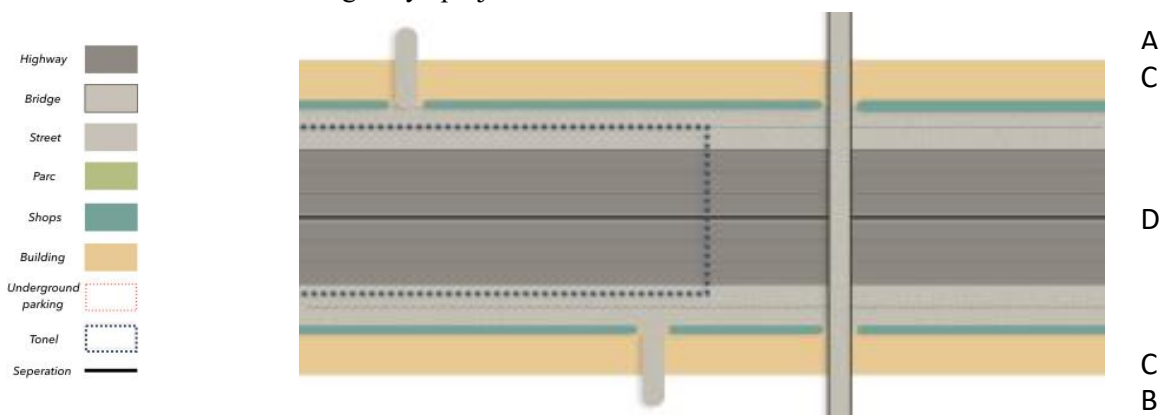
A large-scale project is invariably faced by strong opposition. Different groups were against the project before its launch and subsequent to this, other groups emerged against it. Also, the city of Tehran by developing this complex urban project on such a large scale involved a multitude actors and different groups as well as individuals. The organizational structure and management mechanisms of the project show the conflict between the actors during the different periods of the construction. (Table 1).

**Table 1.** Challenges of the project before start-up and after inauguration

Start up		Inauguration	
Group	Reason against	Group	Reason against
People living in the project area	The price of land proposed by the municipality was not enough.	Metro company	Instead of investment in the highway, the project should have involved investing in public transportation, like the metro.
City planners	Municipalities should develop the project in line with it being a memorial to the population.	City planners	The project didn't sit well and connect in the urban context.
		Private investors	The noise and air pollution coming from the highway. The shopping areas were not sufficiently attractive to entice customers.

## 6. COMPARATIVE ANALYSES

In general, the “Winter Park” and “Navvab Highway” projects had the same objectives. Their main aims were to improve the transportation network of their respective cities (promote car traffic) by transforming precarious (unaffordable, unsuitable, insecure...) housing parts of the city. The urban projects should also have contributed to the development of several functions (habitation, commerce, office etc.) along the highway. Moreover, the decision in both cases came from the top-down, with little or no participation of the population in the decision-making process. In fact, in both countries, decision-making and implementation of projects are made at a high-level and imposed upon society as goodwill gestures geared towards improving the quality of the citizens' lives (Aminzadeh and Bahraini, 2007). However, in the end, the outcomes have been quite different to what was proposed. The form and functionality of the projects show clearly that the urbanist's role was minimized to only putting the project in its location, without there being any planning towards integrating what was proposed into the surrounding urban context. As a consequence, instead of making the place more permeable and integrated, the projects have split the neighborhood into two parts and rather than making the place more walkable as well as facilitating the use of soft transport, they have promoted car circulation. Moreover, the new buildings' role with the modern facades is to cover the distressed urban area located at the rear: the projects are primarily focused on esthetic issues rather making the place more functional by promoting the sustainability and social mixity. As figure 13 shows, four different zones can be identified in the “Navvab Highway” project.

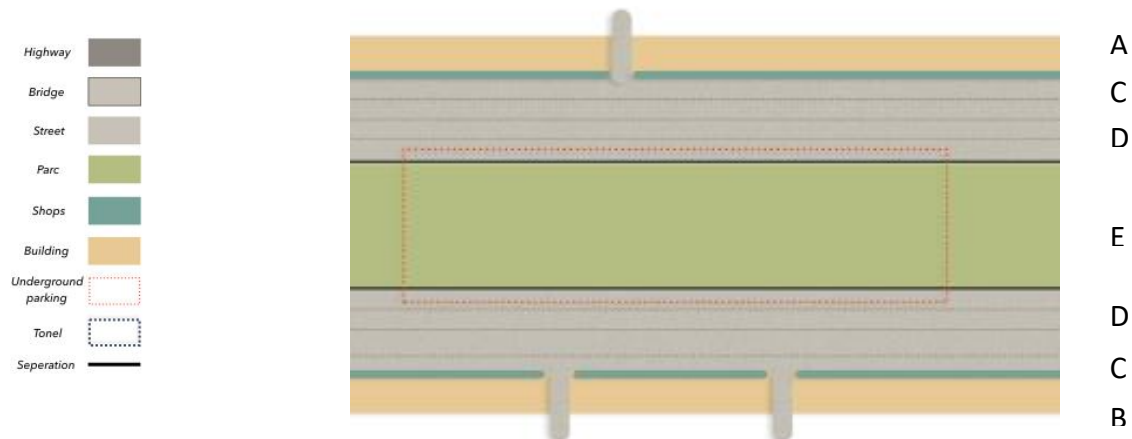
**Fig. 13.** Schematization of the Navvab Highway's Zones, Source: Aliyev T., & Hashemi A., 2018



1. The First Zone (A): Located at the rear of the project, this area has more residences than offices. The population of the zone has attachment to the neighborhood, thus preserving its identity.
2. The Second Zone (B): This other rear zone is located near to the city center and for this reason, it has more offices within it.
3. The Third Zone (C): New buildings, which have been welcomed by a new population, which stimulated gentrification of the neighborhood. The population doesn't have the same socioeconomic conditions as those living in Zones A and B.
4. The Fourth Zone (D): People use the highway with cars passing through the neighborhood, which creates ecological problems in the form of air pollution and excessive noise for the population living there.

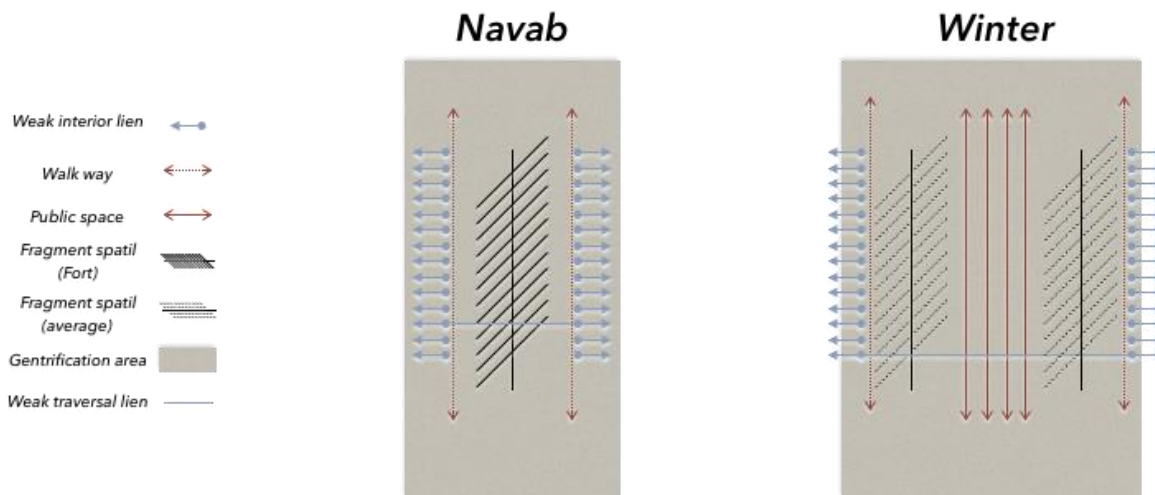
In Baku's "Winter Park" case, as shown in figure 14, the car circulation is mixed with the public space that is located in the middle of the developed area. The public space makes the integration of the project into its urban context easier, which is not the case with the "Navvab Highway" project. For this reason, one additional zone can be identified in "Winter Park" when compared to the latter project.

5. The Fifth Zone (E):
  - Despite the attractive design, the project presents a weak relationship with the neighborhood and has not promoted "social mixity". The usage of the area by the population of the neighborhood has not met the expectation of public space, for instead of this being an easily accessible integrated place, it is partially divided by car traffic. The population from the different neighborhoods is connected to the area for leisure primarily through the use of private cars. Hence, the place represents a network for cars with underground parking places, rather than being for pedestrians.
  - "Winter Park" is covered almost completely by granite slabs and the buildings on each side of the street are tiled, which gives the impression of an artificial place.
  - During the winter period, it is almost impossible to walk through the area because of the cold wind.



**Fig. 14.** Schematization of "Winter Park" project, Source: Aliyev T., & Hashemi A., 2018

The presented analysis of the different zones shows the critical points of "Winter Park" and the "Navvab Highway". In addition, both projects have encouraged a gentrification process in the neighborhoods, with integration being generally ignored and accordingly, they can be defined as "not deeply assimilated" to their urban context. Moreover, "Winter Park" can be defined as a "public space", rather than a "park", for despite the 5,000 m<sup>2</sup> of green space and five fountains, the main elements of the park concept "natural and integrated place for leisure, more walkable, promoting the biodiversity, the accessibility by soft transport and easy-accessible", have, for the most part, not been achieved. The different forms of car circulation divide the neighborhood into three parts, which is an obstacle to the fluidity of the walking population (Figure 15). Hence, the public space has become an isolated place, which needs more walkable access to the inhabited area around it. In the case of the "Navvab Highway", this has divided the neighborhood into two (Figure 15), with the circulation of the cars only pertaining to passing through it. Also, as abovementioned, it has led to ecological problems, such as air pollution and excessive noise for the population that lives there.



**Fig. 15.** Schematization of the functionality and usability of the Navvab Highway and Winter Park, Source: Aliyev T., & Hashemi A., 2018

From the analysis, it would appear that both cities have tried to integrate the best practices from European and American cities in order to modernize the urban areas. Their logic and intention can be considered as being “positive”, whereas the actions taken were not appropriate and outdated, for these have not been consistent with the “sustainable urban transformation” concept, which refers to avoiding spatial, social and environmental fragmentation. It is also about promoting biodiversity, social cohesion and mixity, thus avoiding gentrification. Moreover, it pertains to balancing in terms of maintaining the identity (architectural, traditional, cultural...), thereby protecting the collective memory of the place, whilst at the same time modernizing the area in question. The authorities of Baku and Tehran should address the negative experiences of other cities, as well as their own, in order to deliver successful and sustainable urban projects in the future.

## 7. CONCLUSION

Urban transformation became an important practice of city development in Baku and Tehran. Despite their differences, both cities initially being part of the Eastern world, were subsequently influenced by Western cities in terms of the urban transformation models, but in different ways. Through analyzing the transformation of precarious housing areas in the city centers of Baku (Winter Park) and Tehran (Navvab Highway), the aim of this article has been to underline the particularity of each transformation. Baku and Tehran both tried to integrate the best practices from European and American cities to modernize the focal urban areas. However, the authorities in each did not properly understand the concept of sustainable urban transformation and do not learn from negative experiences elsewhere, thus failing to deliver effective project outcomes. As explained above, the logic and intention of those in charge of the development can be defined as being positive, whereas what was implemented was inappropriate and outdated. In contrast, many European and American cities today have broken with the past and are pursuing sustainable ways of urban transformation.

The presented wide scale and relevant projects in each city has involved revealing the logic of urban transformation. Baku’s “Winter Park” example shows that, the city authorities tried to integrate the sustainable urban transformation elements (making a public space - a place for leisure in the city center) with some aspects of improvement (integrating the project into the neighborhood, avoiding artificial materials, thinking not just about esthetic aspects, but also about functionality, social and environmental conditions, easy-accessibility as well as promoting soft transport and biodiversity). In Tehran’s “Navvab Highway” case, we have identified the strategy of “complete destruction of the neighborhood” and “complete modernizing of the area”, rather than there having been a more mixed and sustainable urban project. Moreover, sustainable urban transformation is also about public participation in urban projects in cities. However, in both projects, strategic decision-making was made at a high level, whilst citizens’ access to information and the decision-making process were extremely limited. Among the

abovementioned elements, the citizen's support and participation presented a key element for the successful and sustainable urban projects. In sum, the authorities in Baku and Tehran should take heed of the negative experiences of other cities as well as their own so as to be able to deliver successful and sustainable urban projects in the future.

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# WHAT REMAINS OF OLD HARRAN AND REDEFINING IN VERNACULAR URBANISM

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## ABSTRACT

Old Harran house, or what remains of it, is a beehive houses existing on the Harran/Shanlurfa. Its old vernacular houses were designed and constructed in order to be sustainable and to subsist through hundreds of years. Each family constructed mud house to its name and call it "beehive house". The beehive houses are an evidence of vernacular architecture and rural urbanization.

But in the near time, the indigenous inhabitants of Old Harran were relocated to Halfeti region. In the new Harran settlements, the houses did not meet the expectations of indigenous people about the sustainable architecture and social sustainability.

This paper aims to demonstrate the particularity of Old Harran, especially when it comes to vernacular architectural sustainability. The hypothesis of this paper is that a vernacularly conceived urban space, like Old Harran, it can take lessons from in a way the principles of sustainable architecture/urbanism. It also conducts a comprehensive survey concerning the architectural /urban advantages of each one of houses.

*Keywords: Old Harran, vernacular architecture, beehive-houses, sustainability, urban settlement*

## 1. INTRODUCTION

### 1.1 Historical Preview

The urban settlement of Old Harran is located on the south about 50 kilometers of Urfa. First mentions about Harran have been found in ancient tablets from the 9th century BC. It is also the most probable date founding the first settlement in this location. One of the earliest inhabitants were Carthaginian merchants who settled down at a source of fresh water, today known as Emerald Pond. The oldest building that survived to modern times is the stronghold at the lake, now housing the City Museum. The stronghold is estimated to have been built in the 4th century BC by the Romans [1]. The Walls survived intact for many centuries, but were partially destroyed in the 11th century. AD. The region had been struck by a series of severe droughts that lasted for at least twenty years. The droughts had led to famine. Rebellions had broken out destroying large parts of Harran in their wake. The City Walls were then rebuilt in 1530, many years after the rebellions had ended [2].

For the next 200 years Harran experienced a relatively calm period of steady development under the Turkish rule. The symbol of this prosperous period is the Academy of Harran, founded in 1720, which turned the city into an unofficial intellectual capital of the region [3]. After World War I the city became partially independent due to the collapse of the Ottoman Empire and birth of the Republic of Turkey. The independence reinforced turning Harran into a self-governed city-state it is today.

The region's autonomy was reflected to architecture. Each family constructed mud house to its name and call it Beehive house. Harran's beehive-shaped mud brick houses are called as kumbet. According to archaeological findings, the custom of building such houses dates back to thousands of years in Northern Mesopotamia. Today there are around 960 kumbets in Harran [4]. Every kumbet has an open hole on top of the roof for the purpose of day lighting. This open hole serves the dual purpose of a chimney. The conical shape and clay material have excellent thermodynamic and air circulation properties. Kumbets are perfect for Harran's climate: they are cool in the summer and warm in the

winter. It is said that when hens kept in kumbets, hens give more eggs than usual, domestic animals like horses become healthy, and onions sprout faster [5].

The beehive houses are an evidence of vernacular architecture and rural urbanization. The Ministry of Culture bought and restored 4 kumbets, which now collectively function as a museum. This museum displays traditional costumes, jewelry, and other artifacts specific to the region.

## **1.2 Paper's Interest and Objectives**

Old Harran has a strong architectural/urban vernacular character of great interest with remains. Architectural sustainability principles are simply integrated morphologically and structurally in different housing types. It's true that pure architectural concepts and aesthetic intentions are relatively absent in the urban space. However, it represents a holistic urbanization approach that considers the role of environment, climate and available resources as major factors in the production of its space.

The hypothesis of this paper is that a vernacularly conceived urban space, like Old Harran, it can take lessons from in a way the principles of sustainable architecture/urbanism. The sustainability here is achieved more efficiently via the process of living and building using local materials. Furthermore, it demonstrates that sustainability is not necessarily entwined with a certain urban form or a Professional concept [6]. It is simply the answer to the need of living in harmony with the environment. By comparing architecture, building materials and urban spaces in the beehive houses remained of Harran, our objectives will be clarified. The collected data concerning the beehive houses from literature is the outcome of field work.

## **2. LITERATURE REVIEW**

In order to be able to redefine sustainability in vernacular architecture/urbanism, in this article, we will shed light on what we believe was most essential in achieving sustainability principles in Old Harran. For this reason, firstly, we will define sustainability in architecture and urbanism in general. Then, we will mention through the concept of sustainability in the vernacular architecture.

### **2.1 Sustainability in Urbanism and Architecture: a redefinition**

Sustainable urbanism means an urbanism that endures indefinitely. It may be a trend of urbanism that will be subsist through the years. Basically, sustainable urbanism is defined as "walkable and transit-served urbanism integrated with high performance buildings and high-performance infrastructure" [7]. A broader definition is: "the application of sustainability and resilient principles to the design, planning, and administration/operation of cities" [8]. Compactness (density) and biophilia (human access to nature) are considered as the core values of sustainable urbanism [6]. From another point of view, sustainability in urbanism also means that any urban community can reach a degree of social sustainability. In practice, the ten leaders in urban sustainability each have their own thematic focus area: transport in Bogota, energy in Melbourne, air quality in Mexico City and so on. Hence the main focus of sustainable urbanism lies on the design of urban environments and aims to implement sustainable solutions through these designs. The leading cities however show strong preference for certain themes.

In architecture, the term sustainable means to design buildings that minimize the negative impact on the environment by using natural resources as well as efficient materials, energy and space design. Ecological understanding of the water system, the soil and nature becomes important as the directing force of designs. This means literally that everything that the town or city needs is right there making it truly self-sufficient and sustainable. Energy and resources consumption depends in a big part on the characteristics of the building. Basically, if a building supports the low-energy, low-resources-waste lifestyles concepts, it will efficiently contribute to achieving sustainability; it is also a strong piece of evidence that its inhabitants adopt this kind of lifestyle. Accessibility is another influence.

If the inhabitants of this urban can work at a walking distance, the urban is sustainable. Furthermore, in urban design, the designer should keep in mind that conserving cultural values is a must in order to achieve sustainability. This is what makes the difference between urban social spaces produced by their inhabitants and professionally designed ones. (vernacularly vs. professionally designed). Because, the

social spaces spontaneously formed and produced by the residents are social areas that respond to local needs.

## **2.2. Sustainability in Vernacular Architecture/Urbanism**

Sustainability is attained in vernacular architecture/urbanism in its simplest form. It is a first primitive step towards what we are longing to realize today. Unfortunately, vernacular architecture, the simplest form of addressing human needs, is forgotten in modern architecture. Whereas, there is still much to be learned from the traditional knowledge of vernacular construction. These buildings were designed for urging needs before long ago architectural existence.

These buildings are comfortable shelter simply and responsive to the climate. Vernacular architecture represents the humanistic desire to regionally/culturally connect to the environment that these architecture has proven to be energy efficient and altogether sustainable. Basic native knowledge concerning energy efficient concepts gives advantage especially in usage of local resources and materials.

Old Harran houses (beehive house/mud house) a striking example for Sustainable architecture and urbanism. Old Harran houses were able to satisfy the needs of the inhabitants including climate conditions and topography, because of the simplicity of the building process, structure techniques and the usage of local materials.

## **2.3 Sustainability and Theories of Relocation**

Resettlement is a highly sensitive subject. Even when households are confronted with obvious risks in their present locations, involuntary displacement may be resisted as highly hazardous sites usually [9].

Halfeti region is the new settlement area of the old Harran community. Physical space inadequacies have often been a factor in the relocation.

In order to understand why the Old Harran society relocates, we must relate to relocation theories, because of, there is relationship between sustainability and relocation theories. We believe that Old Harran community was able to achieve sustainability principles because basically. This factor was missing in the other new Harran settlements, and this is why architectural/urban sustainability couldn't be achieved the same way.

Relocation often represents socialization; Even a move from one section of a city to another requires learning neighborhood norms [10].

Today two main theories of relocation exist. The first is Scudder's theory concerning the stages of adjustment and adaptation after relocation [11]. The second is Carnea's regarding impoverishment risks and reconstruction due to resettlement. We are more interested in Carnea's theory as it clarifies why relocated communities can't really attain sustainability principles in their mode of urbanization. In his theory Carnea identifies the reasons for which impoverishment happens as a result for displacement, loss of human land, livelihoods and occupation and social support system. He also suggests that after their displacement the resettles will surely have difficulty in rebuilding their livelihoods [12]. As a result, the displace will not be able to adopt a sustainable lifestyle and they will lack the means to restructure their economy. Therefore, eight fundamental risks are identified in Carnea's theory concerning relocation [13], landlessness, joblessness, marginalization, increased morbidity and mortality, food insecurity loss of access to common property and social disarticulation. This theory clarifies the reason of unsuccessful achievements of architectural/urban sustainability in the two New Harran settlements.

# **3. RESEARCH OUTLINES AND APPROACH**

## **3.1. Field Study**

The process of surveying aims at tracing the sustainability principles in the settlement of Harran. It is a survey of a range of buildings, with emphasis placed on buildings connected with sustainability related to the period of the first settlement date. An extensive survey was inventoried in addition to archival and field work. Representative types of buildings, are illustrated by field sketches. Photographs and estate plans are also included throughout The influence of the physical geography and geology of

the area is considered with relevance to land use and settlement, and also to the distribution and utilization of building materials. The social and economic aspects of settlement are also discussed. The layouts of settlements are described together with the character of the houses. It is seen from building samples that Settlement and other regional architecture create common language when it contributes to the character of local buildings.

Past and present effects of various factors, which helped to create the vernacular architecture of this county are assessed, noting the changes of attitudes towards style and function in certain building types, which illustrate social and economic changes in regional life.

Thus, the study attempts to bring together into ecologic synthesis sustainable and this is an architectural evidence. At the same time, a regional architecture is being described.

Finally, it is arrived at the research outcomes which are represented by a sort of comparison between the Harran beehive houses.

### **3.2 Comparing the beehive houses**

In order to elucidate the vernacular sustainability in Old Harran, and based on the available data, we attempted to compare the beehive houses through three main axes:

- Urbanism and Urban concepts
- Architectural Particularity
- Climatic adaptation

Urbanism and urban concept axis will undertake the studies of locations, urban fabrics and forms of the houses. It will also elucidate urban concepts. Vegetation and activities will also be taken into consideration in the urban studies; as they will give us an idea of how residents act and interact with green elements and how activities affect the evolution of a space.

The rapid development of cities emerged in Upper Mesopotamia in the third millennium B.C.E. As a result of newly formed, densely populated cities concentrated multitiered settlement system emerged to maximize agricultural production. The cities of Kazane and Harran shared the Harran Plain of southeastern Turkey, a large inland area with optimal dry-farming conditions. These cities arose as peer polities that shared the resources of the plain even as they likely competed for political and economic influence [14].

This historic survey is analysis of settlement patterns in the Harran Plain from the Neolithic to the Islamic period.

Multitiered settlement system necessitates agricultural sustainability. Agricultural sustainability of Harran settlement extends and positions urban in the context of urban settlement systems to Upper Mesopotamia. For the Early Bronze Age, the results are consistent with models of urban-center food supply in dry-farming environment. Moreover, as-yet undocumented irrigation altered the size of sustaining areas [15].

What really stands out in the modern village of Harran are the clusters of primitive “beehive houses.” This is an architectural tradition of settlement at least 3,000 years old. Made entirely of mud or clay bricks, these buildings are designed to fence off searing heat and retain cool air. The dome-like structure located at the top of the building is also functional, as hot air collects in the upper part of these houses and escapes through the aperture.

The houses open on to short roads and squares of various sizes on the settlement. These squares are spaces where the people’s social communications are experienced intensely, where their conversations, meetings and games play out.

The clear design of the house plan isn’t much seen in the village settlement. The development of the Harran houses creates a beautiful settlement organization and a naturally appearing neighborhood.

The smallest house is made up of three units. It is entered through a single-leaf entrance door and three rooms used together. According to the needs of the family, the number of rooms increases. Wealthy families with many children and more than one spouse reside in large houses with courtyards generally with one or two sides ringed with lines of cells and the other sides with high walls. The courtyard serves the purpose of salon, dining, sleeping, game playing, etc. In the courtyards in which daily life is led and home life is hidden behind high walls, and, there one finds the hearths that benefit the making of bread.

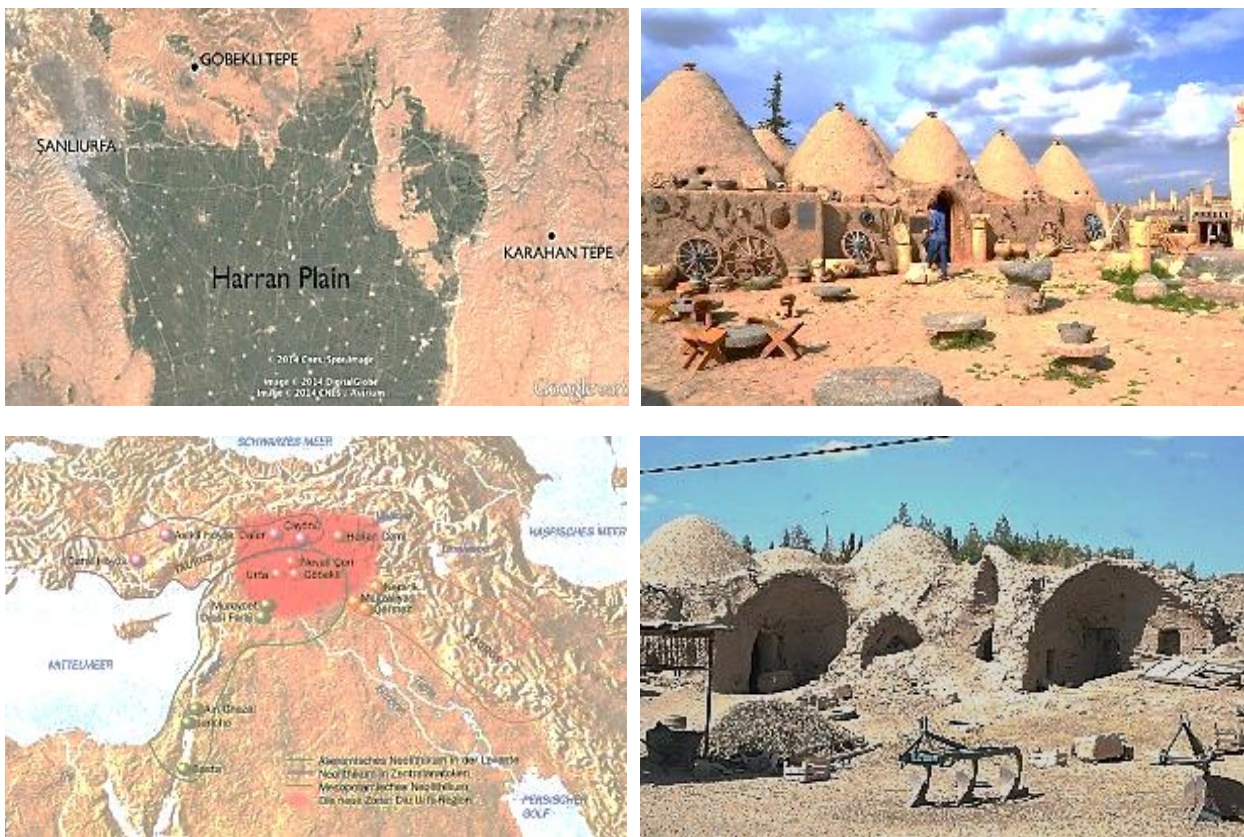


Fig.1. Urban fabric, limits and spaces (A larger area of the Plain, shown with draped topographic map)



Fig. 2. Urban space and Vegetation in the Old Harran

During the winter months the bread is cooked in the kitchen-pantry called the “tandırılık”. This room at the same time serves as the bath [16]. In the neighborhood for a long time while the closed social building that religious and customary elements have influenced continues to exist, these social buildings it has function depending on the user.

**Vegetation in the settlement** is very contradictory. Because of the lack of water over the Harran contains rarely plants. Irrigation is crucial for much of the agriculture in the region. Water is not the sole source for farming. In general, precipitation in the Middle East is concentrated within a relatively short period of the year between late October and early April. Consequently, the major rain-fed crops of the region, such as wheat and barley, are grown during the winter months and are ready for harvest in late spring and early summer [17].



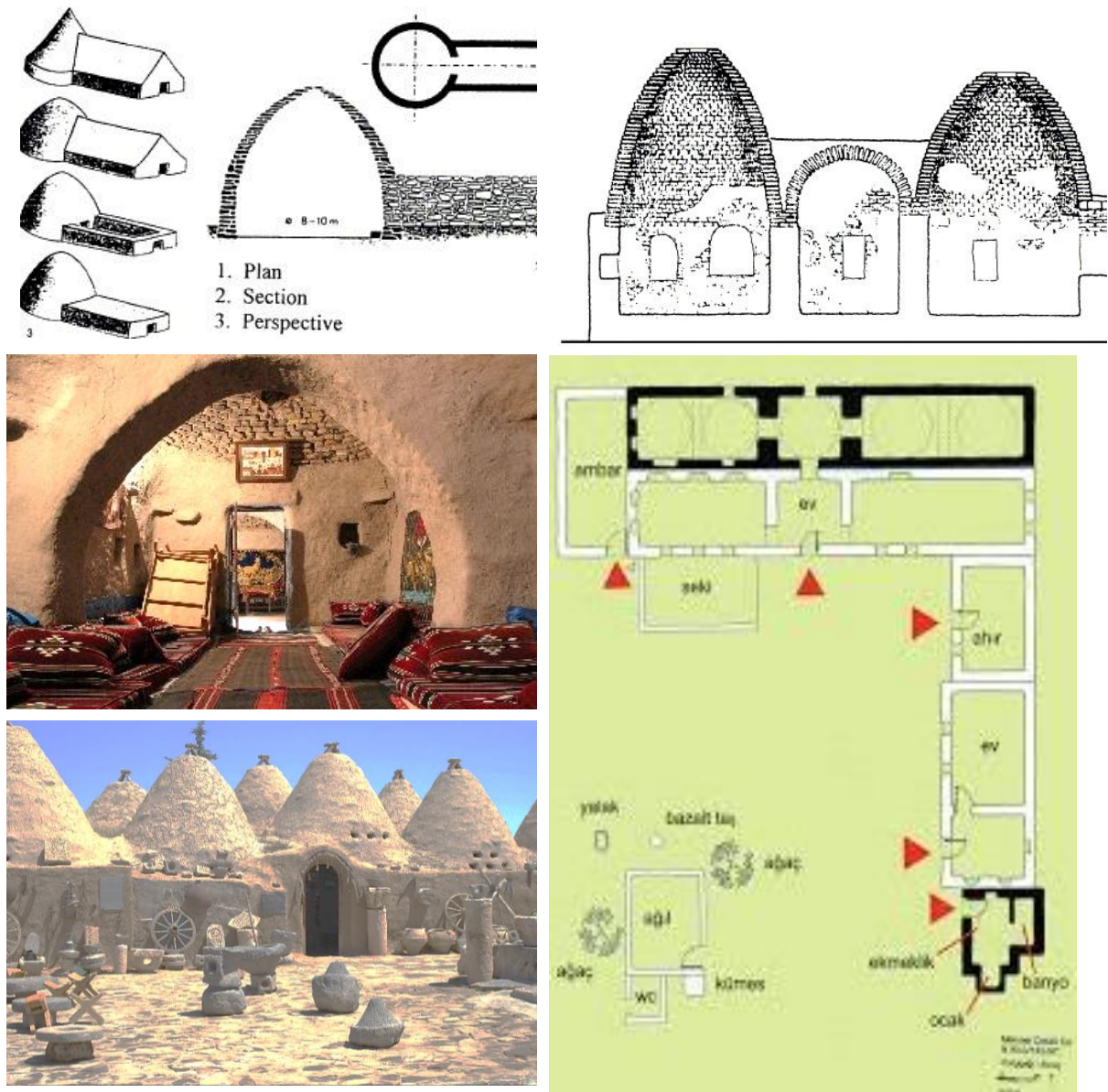


Fig. 4. Activities' distribution, exterior architecture, street layout

**Activities in Old Harran** were residential function. People in transition from permanent to temporary nomadic life who make their living by agriculture and stock-breeding had to live close to the production activities. Thus, at their shelters, they made spaces not just for themselves but also for their animals and products. At present, houses with conical domes covering square rooms are in majority. Each room covered with a single dome is a building unit and serves as living room, kitchen, store or barn. Festivals and traditional ceremonies are also integral parts of physical space, too.

For these festivities women prefer the houses and men the courtyard or the broad areas where the squares are found. "In weddings the bride brought to the man's house on a horse while passing through the double-leaved door is brought to the courtyard. While the bride after the wedding for 40 days wears different clothes with the specially prepared crown on her head, she sits in the guest room. This room is being prepared for guests, painstakingly. In this time, the guests visit the room to see the bride. This space that is given the name of head room belongs to the head of the family except for special days. Generally, the stove and tandır hearth are in this room.

**Architectural particularity axis** will cover house typology, architectural distribution, forms and interior particularity.

Houses in Old Harran were built each with a different planned to answer user's needs. The income level of the building owners, family population and their necessities determine the number of rooms [2]. If the family enlarges, the new rooms are added. Thus, typical examples of flexible or the extendible

house concept is seen in Harran vernacular houses. Usually beehive-shaped houses have a main entrance. Houses contain an inner courtyard.

In the spatial organization of Harran houses, the rooms are arranged on one side of the courtyard in one, two or three rows. The room rows are positioned on east-west axes, thus the solar radiation from the west is shaded by the domes and cool spaces are obtained. Houses show a lot of creativity and elasticity and, are connected to each other with internal doors or arches. Some of the rooms are opened to the courtyard with a small door. A bathing place is included in the room which serves as a kitchen. In winter, the kitchen is also used as a living room and is locally called a “tandırlik”. The toilets are not placed within the building because water is scarce. They are placed at a corner of the courtyard away from the rooms. In some courtyards there is also a well close to the center.

In Old Harran community, mud material was used for building construction. Harran houses with rosewood, straw, soil and egg whites used in wall material. The masters plastered their houses with the mud they prepared with red soil, salt and straw before the winter season. The conical dome is built by sliding the flat bricks inward at each brick row. Mud bricks are sun dried or burned bricks collected from older ruins.

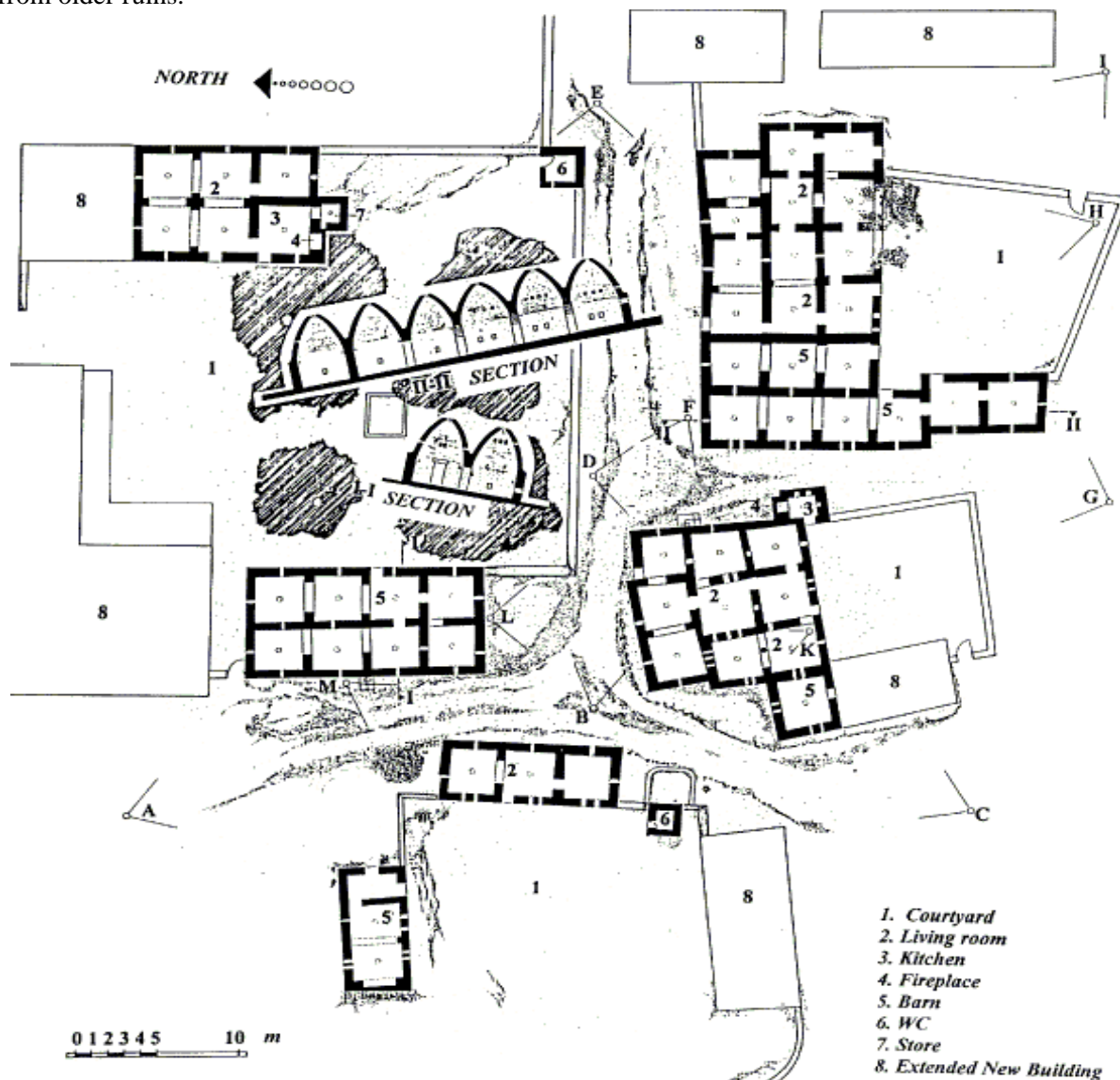


Fig. 5. Activities' distribution, exterior architecture, street layout

The thickness of the dome wall is about 25 -35 cm. At the square planned base walls, sun-dried adobe, brick and a small amount of stone are used. Generally, stone is used between the top corners of the base walls and the dome. A limited amount of stone is used at Harran houses. Some of the bricks have been obtained from the ruins of ancient buildings. This kind of building materials are locally called

“devshirme” meaning “the collected” [18]. Even stone carvings of the ancient civilizations can be seen on some Harran houses. Only mud mortar is used in joining stones and bricks. Sand and lime is never used. straw is mixed with mud rendering.

Street layouts are important elements in Old Harran houses’. The street layout of Harran has organic form like the forms of the houses. People belonging to the same tribe wish to live together. Thus Harran houses are adjacent layout or very close to each other. As a result of this, the street layout is casual and in natural layout. In Old Harran, house partitions serve to different usage. For example, a bathing place is included in the room which serves as a kitchen. In winter, the kitchen is also used as a living room and is locally called a “tandırlik”. The toilets are not placed within the building due to water shortage. They are placed at a corner of the courtyard away from the rooms. In some courtyards there is also a well close to the center.

In Old Harran, houses may seem poor and lack aesthetic norms; however, these buildings and their lines present an instructive lesson of architecture. Each of these houses was built simply to fulfill its user’s needs; they were built without architectural concept. A straightforward adaptation of the existing materials represents sustainability concepts in its simplest forms.

**Climatic adaptation axis** concerns building technique using the local materials in order to adapt the building to the surrounding climate with energy efficiency.

People constructed their houses by themselves. Because, the construction technique engages the whole family in the process, because of on-site production of construction. This is why Harran houses resistant to standing they are for 300 to 200 years.

The construction materials and the used concepts in building make their indoor temperature convenient all day long. Using during day, inside the houses the temperature is lower by 8-9 degrees compared to the outside; air currents refresh also the weather inside thanks to wind towers. The heat is absorbed by houses’ walls is effective to radiate this heat during the night when the outside temperature drops. In terms of heat comfort, the houses are self-sufficient; there is no need for electricity or heater to adapt the house’s climate.

One of Old Harran main inconveniences was the lack of water. In fact, perhaps, it may have been provided the advantage of water shortage. One of the reasons because of which Old Harran could subsist for such long time, the mud brick construction technique does not provide a good combination with the existence of underground water as material composition.

### 3.3 Outcomes and Remarks

The research about Old Harran beehive-domed construction showed that despite the lack of water in houses, vernacular architectural techniques and local materials used in housing construction are pertinent to architectural sustainability concepts. Old Harran is considered as national treasures that deserve to be preserved. The technique used in Old Harran can provide us with a lot of knowledge, in its simplest form, in domain of sustainability.

## 4. CONCLUSION

Achieving sustainability isn’t limited to a certain urban form or to a certain architectural typology. vernacular architecture and urbanism represent a holistic urbanization process that takes into consideration the surrounding environment, climate and available resources. Vernacular architecture is a clean process for sustainable buildings and urban spaces. This paper tried to demonstrate that one of the efficient ways that leads to sustainability is achieving it via the process of living and usage of local materials. In vernacular architecture-urbanism, sustainability is simply an answer to the need of living in harmony with the environment.

The example of Old Harran helped us to understand the complexity and the particularity of sustainability concepts in vernacular architecture/urbanism. It helped us to understand also information can be achieved by trial and error. The indigenous knowledge that led to sustainability in architecture and urbanism of Old Harran evolved via methods of trial and error.

Vernacular architecture /urbanism in Old Harran may seem poor and lack aesthetic standards. However, it is considered most sustainable compared to other professionally designed urban spaces. Old Harran was able to satisfy socially, urbanely and architecturally its inhabitants.

It's true that Old Harran was built without architectural concept. Nevertheless, it represents sustainability concepts in its purest and simplest forms.

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# WHAT TRIGGERED THE CREATION OF COWORKING SPACES?

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## ABSTRACT

Beginning from the time when people began to execute certain basic tasks and up until today, professional production and working places have undergone massive changes. From total discomfort to ergonomics, from lack of windows to right placement of each part of the lighting system, from problems with isolation and concentration to shared spaces and integration of workflows, from ordinary same offices in the mid-50s to contemporary and sustainable spaces of coworking centers.

The process that was built on experience, new inventions and creations broadened our view on how we work and interact. By giving the best options and getting closer to the perfect working atmosphere people gained maximum return in the scope of productivity.

*Keywords: coworking, history of workplaces, history of coworking spaces, evolution of the offices*

## 1. INTRODUCTION

### 1.1 Historical Preview

Coworking is not a new concept, but the exact term itself is truly contemporary. The first writings which admired the power of this concept were already published in the 17th century. Yet they only praised the coworking power, which also has shown multiple publications in 1645, 1651, 1653 or 1657. The concept changed over time into what it is today: a representation of working independently, but together. Most coworkers work as their own Bosses. They are freelancers who share common values and work structures. However, it took many centuries to shape what we have and call coworking today, which will be revealed and explained in this article.

## 2. BIRTH OF WORKPLACES

### 2.1 Scriptoriums

If we want to know more about the times of creation of coworking centers we should look deeper into the history of work fields and offices in general. The birth and evolution of office work is dating back to the Middle Ages. It is during this exact period that form of work surfaced, the type of work we all still familiar with today: wage. Offices, workplaces, or to be exact, scriptoriums [1], located in monasteries. Scriptoriums were the locations of real intellectual creation, where the monks were supervising and recording the knowledge of Middle Ages. For certain centuries sitting workplaces were an exemption and privilege for them [2]. Bureaucratic work system of that time required monks to write standing up and in total solitude. Fig. 1.



**Fig. 1.** Monk working standing up in a scriptorium



**Fig. 2.** Uffizi Palazzo in Florence

## 2.2. Renaissance and first multi-functional spaces

At the beginning of the fourteenth century, during the rise of renaissance, creative and intellectual work started the movement towards the science, trade, and commerce. Since income was no longer certain, and business was more advanced, more techniques, skills, and styles of work were emerging, new demands for working places occurred. Engineers, artist, architects, writers began to use the worktable.

Around the seventeenth and eighteenth centuries, administrative structures greatly expanded in their functions. This was caused by centralized states of that time. Due to that in 1581 Uffizi Palazzo Fig. 2 was constructed in Florence by the Medici [3]. This allowed to create some revolutionary spaces for that time, that combined administrative part, court and archives under the same roof.

## 2.3 Enlightenment era

The transformation and archiving information was still a big part of trade and business of that time. However, offices gained popularity among creative workers, artist, and other creative minds. The main idea of those individuals was to isolate themselves in their own creative space [4]. Thanks to Enlightenment era, with the introduction of concentration, practices and discipline, the workflow of people massively changed. The reason for that shift was the high level of education. This was a small step for an immense future leap of compulsory education. Nonetheless, what all this has to do with the job industry and coworking areas in particular? Schools and classrooms – these are the places we began to work in for the first time.

# 3. TRANSITION TO CONTEMPORARY OFFICE APPROACH

## 3.1. Shaping of the commercial offices

Moving forward to the 19th century we can observe the birth of the primitive commercial offices in important areas of US. The most interesting and groundbreaking inventions of that time lead to another shift of workplaces. These were the creation of the telegraph, telephone, developed transport lines, and railways. The invention of previously mentioned tech allowed the managing offices and administrative parts of the enterprises to be positioned outside the manufacturing zone [5]. Despite this fact, office workers still were outnumbered by the physical workforce and were treated as ineffective.

Inspired by the brave thoughts of Taylorism or scientific management, commercial structures as governmental bodies and incurrence corporations formed the skeleton of bureaucratic work system [6]. This created a strict system and order of workers and they were aligned in a line. The distribution and division of the workplaces were with typewriter and lights. Hierarchy of the workers played a high role

in the way workplaces were designed. Employees with a lower status were working in poorly ventilated and lit areas. The light source or windows were placed above the employees to give them an atmosphere of complete concentration.

### 3.2 Influence of the rebuilding process in Chicago

During the 19th century during the reconstruction of Chicago, the government was looking for ways of commercializing the empty spaces. Thanks to well-known Chicago school first buildings were created. The first Elisha Otis lifts let them big taller building than ever before and created the possibility to optimize workspaces, as well as reduce the bureaucratic approach in the office spaces. First ever office skyscraper was built in 1885, in Chicago and well known as the home insurance building Fig.3. [7]. Larkin Administration Building followed its success and was designed in 1904 by Frank Lloyd Wright. The capacity of this building was 1800 workers, which was an immense number for the time. Since it was the first building created for a specific company, it included numerous innovations. Noise absorbing walls, air conditioning can be few of many innovative solutions presented by Frank Lloyd Wright in 1904.



Fig. 3. Home Insurance Building in Chicago



Fig. 4. Panel offices in 60s

### 3.3 Introduction of contemporary concepts

With a desire to express their difference and personal identity, companies tried to have diverse design solutions with the arrival of the 1930s. Johnson Wax building designed by Frank Lloyd Wright was following popular trend of that time which resulted in employee satisfaction and proudness of their workplaces [8]. The amount of boost in productivity is also shouldn't be underestimated. However, offices were still reflecting strong patterns of hierarchy. With managers and bosses working on upper-levels, ordinary workers would be placed below. Usually, there was no outside view and space was illuminated by artificial light. In the United States, bureaucratic and hierarchical practices continued until the 1970s.

During the chaotic rebuild period after World War II, many modern architects were inspired by the Chicago's system of the rebuilding process. Famous architect Le Corbusier came up with an idea of "functional city" in a scope of the utopian and pure structure. Le Corbusier was always creating with a conviction that "where the order is born, well-being is born" [9]. However, after 1950, all these Modernist ideas and concept of the functional city started to be topic of a dispute. That was the first-time interior designers and architects looked inside the building to understand the layout of workspaces and workflows to boost the factor of productivity.

## 4. THE MODERN HISTORY OF WORKPLACES

### 4.1 Introduction of contemporary concepts

In the mid-60s, the image of services and offices were completely changed with the introduction of the computer business. The early hierarchical spaces with clear visual differentiation were transformed into places that were more motivational for employees. "Action Office Series 1" was set up by Herman Miller company Fig 4. and was the first office entirely from panels [10]. It was the first few steps towards the flexible and interactive design of workspaces. In 1968, Robert Probst designed the "cubical", still widespread in the United States, which was followed by the now famous open space. The latter has its origin in the "office landscape", imagined 20 years ago by brothers Eberhard and Wolfgang Schnelle. They had a very different view of the current open space, which is now more human, artistic and often includes plants.

The open space that increases the size of the area with a very small investment then emerged to foster collaboration and project work. The only downside: its uniformity, and its lack of personality. Finally, management "egalitarian" turned out to be an incredible source of stress for employees [11].

### 4.2 Understanding ergonomics during the 70s

Ergonomics were not the main topic of designing workplaces places yet. Until that period, comfort in sitting was synonymous with laziness. Especially in the bureaucratic system type and size of the chair represented the status in the company, executives and employees, as well as female and male workers used to work on different chairs. During the 70s designers slowly started to release the importance of comfort and ergonomics. Books called "Human Scale" and "Measure of a Man" by Henry Dreyfuss and Neil Diffrient were ground-breaking pieces of writing. "Human Scale" includes the newest researches on the human body, medicine, and psychology [12]. Designers and architects were inspired by this work as were many others, including popular anthropologists as Levi-Strauss. Now the creation of any workspace began to focus on the comfort of the workers.

In 1974, created the Centraal Beheer insurance company Fig 5, a space conceived as a "village worker" designed so that the occupants 'would have the feeling of being part of a working community without being lost in the crowd' [13]. space was deliberately flexible and consisted of small workspaces, like the islands forming virtually to connect to one another. These structured platforms were built repeatedly throughout the space and can accommodate groups of ten people, who were encouraged to decorate their workspace themselves, including adding their own furniture.

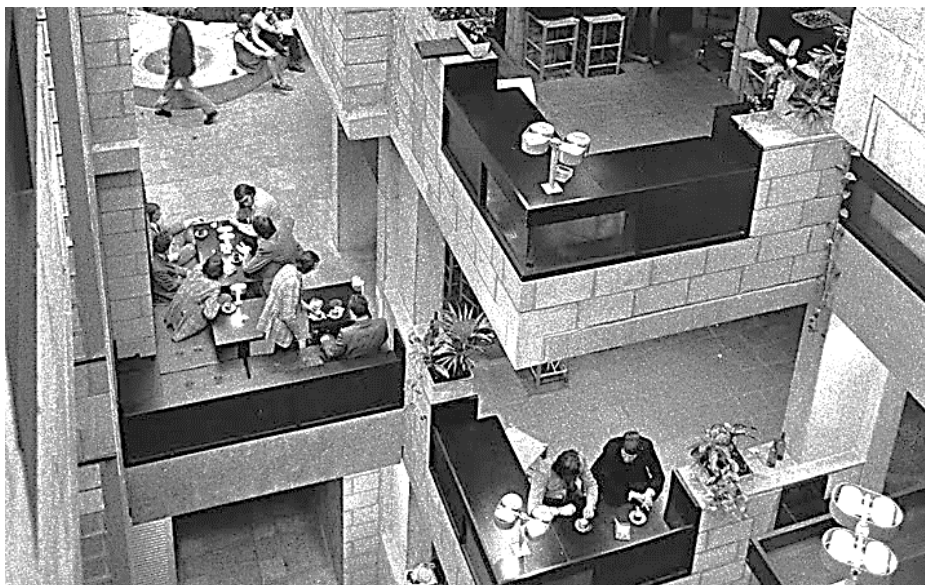


Fig. 5. Centraal Baheer insurance company

### 4.3 Influence of Silicon Valley

The explosion of ICT and the amount of information that has emerged from the creative industry in Silicon Valley has resulted in a new generation of workers changing the world, due to such inspiring



workspaces [14]. Since the year 2000, the push to create, innovate, and find the "next big thing" became the obsession of IT companies.

To foster creativity and collaboration, office design trends are typically pleasant and informal, such as a simple "desk", where you can simply put your laptop. It's an unthinkable concept for the older generations, that there are now sofas, ottomans, trees and even baskets of sneakers integrated into some workspaces. When we enter coworking spaces, we can now understand that our work environment has become much more "human" [15]. Areas prioritized in the open-plan space, moved towards favouring more informal spaces like meeting rooms. Designers want, above all, to promote interaction, and to see serendipity Fig. 6. While Taylor rationalized, Google now measures the tail of the coffee machine to maximize interactions between their employees.

While we still have little adaptive buildings representing the prestige of corporations, communities of entrepreneurs now banish the wage hierarchy and appropriate their own coworking spaces. Subsequently, you follow it, or you do it because the coworking is already on its way to building it.



Fig. 6. Typical modern Silicon Valley office

#### 4.4 Global village

The global village once predicted by Marshall McLuhan in the 1960s is here [16]. Thirty years of information and communication technology fundamentally changed the way we live, work, and innovate—and it continues to change at an exponential rate. To meet this global challenge, companies need the right talent at the right time in the required quantity, quality, and composition—a task that can paralyze today's "lean" companies due to the constraints of traditional office systems. With their infrastructure, supportive information technology, and established culture, traditional office systems—while perhaps effective at supporting business outcomes such as continuous improvement—can stifle creativity and innovation. Additionally, many knowledge workers have left adrift from outsourcing and offshoring IT service trends in the 1990s [17].

These conditions created a wide range of freelancers and corresponding work uncertainties:

- No formal or stable boundaries in terms of employment contracts, working hours, or workplaces
- Declining importance of traditions to justify social practices
- Greater subjectivity in the work; at the same time, the work requires greater subjectivity from individuals [18].

Thus, project-oriented, time-limited contracts for work and services surpassed working within a traditional office system. The workplace, for some, as a furnished, thoroughly organized place of work had been replaced by home offices and Wi-Fi cafés. However, working remotely limited crucial networking opportunities for knowledge exchange. It was time for something new.

#### 4.5 Pioneers of coworking spaces

That “something new” happened in 1995 when C-Base opened in Berlin as one of the first hackerspaces worldwide [19]. Although the term “coworking” did not exist at that time, C-Base was considered a “pre-stage” for coworking spaces Fig. 7. It embodied three key coworking features:

- A collection of like-minded people with similar interests and values
- Emphasis on community
- Space available for coworking and events

“Coworking,” coined by Bernard DeKoven in 1999 [20], was fundamentally different from traditional corporations where work was cordoned off in hierarchical structures and under constant observation and assessment—conditions that led to competition rather than collaboration. The core concept of “coworking” was working together as equals, and in the following years, a variety of coworking spaces opened their doors. What is more relevant than which space was the first “true” coworking space is the fact that these such spaces emerged at different locations worldwide, independent of one another. All of which focused primarily on the collaboration of like-minded, independent people working in mutually beneficial ways—the foundation of a successful coworking model.



Fig. 7. C-Base Berlin

## 5. CONCLUSION

### 5.1 Modern coworking in numbers

Thus, coworking spaces doubled every year since 2006 as reported by Deskmag [21]. Every workday, the number of coworking spaces grew, on average, by 4.5 spaces. In 2012, there were 200,000

coworkers worldwide and every workday the figure increases, on average, by 245—which corresponds to a conservative estimate of an annual growth of 50,000 people Fig.8.

Despite this growth, The Hub in Brussels, Citizen Space in San Francisco, and Betahaus Cologne in Germany—just to mention a few—had to close their doors. Potential reasons for failed coworking spaces include the mismatch of lease periods, thin capital base [22], unfavorable location in terms of balancing cost-effectiveness and convenience, incompatible personalities and needs between space operators and coworkers, and misaligned space with business models. Coworking spaces that claim to establish and develop a “community” need to be of a certain minimum size; according to one of the Fraunhofer IAO interviewees, coworking spaces are usually only profitable from 1,000 sq. m (approx. 10,800 sq. ft.) [22]. According to Deskmag [23], there are five reasons coworking is here to stay:

- Coworking spaces usually invest their own money.
- The labour market constantly changes the demand for certain office types.
- Coworking spaces don’t thrive on market crises.
- Coworking spaces adjust to the needs of its members
- The coworking market is far from saturated.

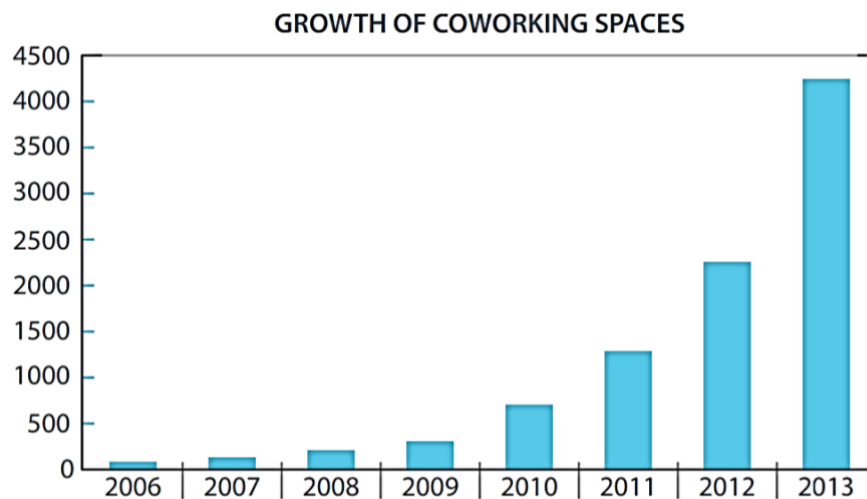


Fig. 7. Growth of coworking spaces in numbers

## 5.2 Evolution and the future

While the growth rate in excess of 80 percent will most likely decline in the coming years, a significant increase in the number of coworkers and coworking spaces will likely continue. What is the next shift in the workflow? Time will show.

Humanity in search of the better working environment and improved productivity took us throughout hundreds of years of evolution. Creation of coworking spaces is just another step forward. Nonetheless, working environments and coworking spaces are not perfect and we are only in the middle of an evolution. History shows that in a constantly evolving world, working spaces were catching up with recent inventions. Considering the fact that speed of progress is accelerating in geometric progression, it will be extremely hard to keep up and will require massive effort to be always close to perfect.

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# TRANSPORT ENVIRONMENT IN A MODERN CITY

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## ABSTRACT

The article considers problems of formation of design of transport environment of the city of Baku. It is revealed that the organization of design of transport environment is a priority task of environment design. Among the elements of the design of the transport environment visual communications have a special place, and its organization is one of the important tasks of design. The principle of development of the compositional lighting system of the city environment, taking into account the existing planning structure of the city is considered. In the decision of a light environment participate the following components, depending on its hierarchical structural and artistic characteristics: Transport and pedestrian system, city community center, historical part of the city, objects of landscape system. Taking into account the conditions of hot climate and pollution of the urban environment, it would be considered expedient to organize spaces with artificial microclimate. Modern public centers and communications were "under the roof", and developing the concept of shopping malls with artificial microclimate, provided visitors with a variety of services. To improve the quality of the population's stay in the urban environment, the use of "shielding of transport spaces" is considered appropriate, which would significantly reduce the noise effect of urban transport, while the artistic form, color and texture of the screen material can bring additional decoration elements into the space. It is noted that the development of landscape urbanism transforms transport communications into landscape communicative spaces. It is possible to conclude that formation of modern organized communicative public spaces of urban environment, define qualitatively new urban traditions, influence on increase of a rating of city that in turn raises attractive aspects of tourism. Search of new scientific concepts of improvement of quality of transit spaces, can be considered as modern style in the life of society, and to influence to the harmonization of daily life of the society.

*Keywords: transport environment, visual communications, landscape urbanism, pedestrian system, communicative public space.*

## 1 INTRODUCTION

The development of urbanization processes in the urban system reveals the primary role of transport infrastructure in the distribution of human resources in the settlement system. Today it is impossible to imagine a modern Baku metropolis without a transport system: Road and railway bridges, multilevel car overpasses, tunnels, underground and elevated crossings for pedestrians, parking lots. Fig. 1.

There are three stages in the development of the transport system on the territory of the Metropolis. The first stage began in 1883 with the construction of the railway in Transcaucasia, the second stage covers the Soviet time of construction of an extensive network of electrified railway in 1926 and the creation of a number of railway stations on the Absheron peninsula, as well as the bridges of Baghirovo, Javanshir, on Tbilisi Avenue and others, and finally, the third stage is the period of Azerbaijan's independence, since 2000 a large number of (about 20) transport interchanges, consisting of bridges with the use of new technologies, for example, metal suspension structures of the bridge have been built in the area of metro "Koroghlu", tunnels and transitions. For example, at the intersection of the avenues of H. Aliyev and Z. Bunyadov built an overpass length of 3145 meters, at the intersection of Tbilisi Avenue with the street of H. Zardabi - a bridge length of 278 meters, etc. [19].

The Baku transport system is divided into internal, providing transport interconnection of functional zones within the city's own boundaries, and external, providing the interrelation with the

region and the pendulum migration of the population, which promotes interrelated development of functional zones of urban agglomeration.

TRANSPORT SCHEME OF URBAN PASSENGER

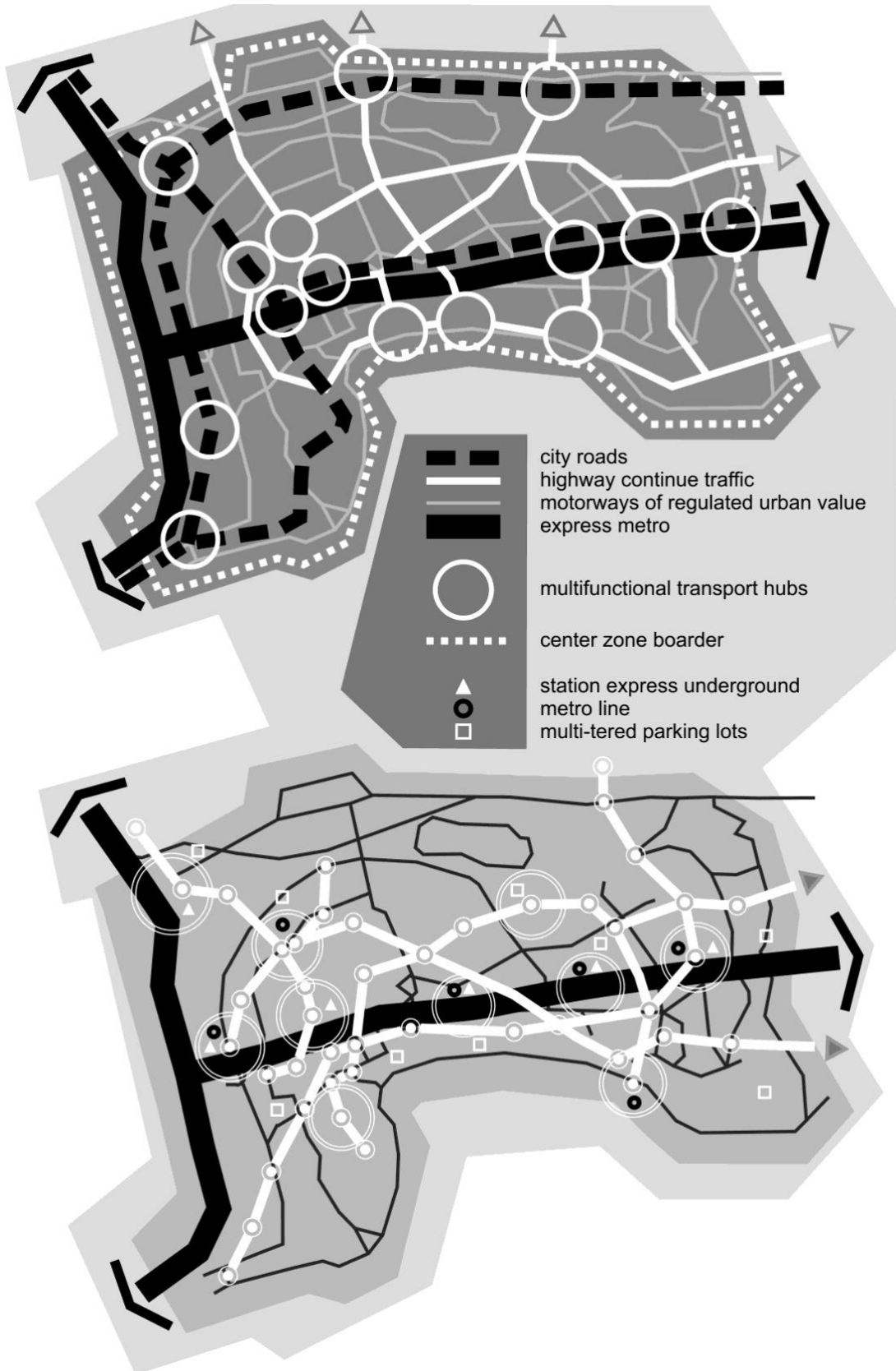


Fig. 1. The scheme of urban passenger transport in Baku (author's scheme, based on research of Prof. F.M. Huseynov)

The transport infrastructure of the Baku agglomeration was formed as a multifunctional system in the city environment, it is presented as a new typological object on the basis of modern innovative technologies, is in cooperation with other forms of the environment system. And because the transport system is deeply integrated into the urban environment, its structures are complicated by different functions of a secondary nature. Fig. 2,3,4,5.



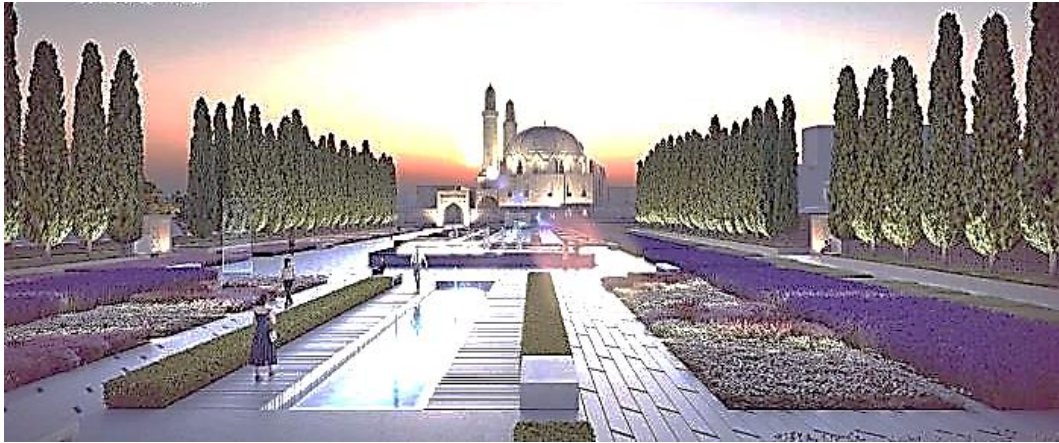
**Fig. 2.** Three-dimensional model of a land foot bridge in Baku



**Fig. 3.** A bridge in the area of the metro station "Koroglu" above the railway



**Fig. 4.** New interchange near the metro station "Meshadi Azizbekov"



**Fig. 5.** Reconstruction of the road infrastructure, landscaping around the complex of the mosque "Tezehir"

Transport infrastructure, which is of a town-planning character, is the interconnection of transport networks and a set of enterprises, creating conditions for the performance of transport, and their immediate implementation. In the zone of transport infrastructure there are communications of railway and road transport, as well as sea, air and pipeline routes, and in the engineering zone are placed the facilities and equipment serving them. The following facilities are included in the Baku Transport system engineering facilities:

- metro stations, suburban public transport, and transfer hubs;
- construction of parking space, parking lots, and garages;
- logistics facilities, terminals, warehouse and wholesale bases;
- objects of maintenance of transport, service stations, operating enterprises of city and suburban transport.

As a result, the design of the transport environment as a design part of the environment design of the urban environment synthesizes all kinds of design, as well as engineering, architectural, landscape design, also the simultaneous availability of vehicles and devices, and its design. Fig. 6.



**Fig. 6.** Design of the Azerbaijani car



**Fig. 7.** Night illumination of transport infrastructure in Baku.

The design of the transport environment has always been interesting for outstanding masters of Architecture and Design: V. Gropius was engaged in the design of the passenger train compartment, the futuristic ideas of space equipment were developed by R. Lowy, the aerodynamic forms of aviation by U. Teague, the unique bridges and stations by S. Calatrava, road transport by J. Giugiaro etc. Achievements of modern design on formation of transport environment, as synthesis of technical and aesthetic creativity, are the corporate or collective symbols created by architects and designers, for example, in new-York bridge Verracano, "Boeing" , NASA, the liner "Queen Mary", "Kamaz", etc.).



## 2. STUDY AREA

Modern perception of the urban environment is not possible without expressive and effective design character of the transport system, altering the image of the city and influencing other forms of the environment. Functional transformation of transport infrastructure, the process connected with increasing of mobility of the society and occurrence of various motivations of their movement in modern city. [13] The transport environment is considered as a universal component of the modern way of life, changing the appearance of urban spaces, by its "personal presence". A special problem of the modern city is the environmental quality of the highway, the perception of the city from the car. The principles of "modern movement" are most clearly and consistently traced in the construction of new cities and districts. [14]

The formation of the transport environment has developed a whole system of tools and techniques inherent in this particular area of project activity, which has been collectively referred to as the "design of the transport environment". Design elements of the transport environment can be conditionally divided depending on the purpose of the components of the environment design:

- transport network: Highways of all categories, streets, roads:
- transport mobile objects
- engineering constructions: Underground stations, parking lots, terminals, enterprises of maintenance of transport, service stations, etc.;
- equipment and engineering installations: Contact network of transport, illumination of highways and streets;
- elements of visual communications: Graphic design, supergraphics, pictograms, visual navigation systems, font sets;
- substantive filling intended to provide requests for engineering facilities;
- elements of landscape architecture and design.

Among the elements of the design of the transport environment visual communications have a special place, and its organization is one of the important tasks of design. Navigation systems as part of visual communications are the subject of environmental design. The orientation of the transport system in the city space is quite a complex process in the design of the visual navigation graphics system. One of the most "problematic" places for the orientation of people in the modern city is the space of transport facilities: underground, airports, railway stations. [18]

## 3 PROBLEMS

The metro system, where the elements of guidance graphics were used for the first time, was a space where there were no visual landmarks for people. An example of this can be the visual organization of the London Transport system's corporate identity (Transport for London). The main innovation of the London Transport was the unified "Umbrella" visual system. All modes of transport are combined in it a single plastic solution, which changes the color and inscriptions depending on the destination: Metro-red, light Metro-orange, tram-green, river transport-blue, etc. The new corporate style is very correctly integrated into the city communications, it does not break the existing images but will complement them. The navigation charts in 1960s were developed by the German Civil Airports Working Group (ADV) system of symbols for airport navigation. This graphic complex was subsequently used in the basis of visual communications not only in airports, but also in other transport structures, and served as a model for the development of guidance graphics, both in the street space and in local objects. On the basis of the developed principles, over time, two systems of standards appeared independently: "AIGA", developed by the American Institute of Graphic Arts in cooperation with the U.S. Department of Transport, and "ISO 7001", designed by specialists of International Organization for Standards.[18].

Visual communications carry the information of branded transport modes and play a crucial role in the formation of the symbol of one or another city. [4] Directions of design of transport objects are one of the priority developing and competitive, determining the formation of modern style in the life of society. For example, the development of concept arts visualization technologies as a source of ideas

that play a leading role in the creation of new plastic forms of vehicles rely on innovative technologies while creating new models of the future.

Modern man also needs an environment that carries the traits of civilized, an environment containing the features of the future, for the sense of belonging to progress, to tomorrow, the environment stimulating creativity, and renewal. The person is contraindicated monotonous, poky, monotone, faceless, soulless, and purely technogenic environment. So, the atmosphere of the city is kept on three bases: sophistication, peculiar to the historical part of the cities, entertainment, which gradually with the development of visual communication systems and scenario design principles, new lighting systems, small forms gradually comes to our city and the civilized, as an environment that meets the models of the present and the future. [18]

One of the aspects of the design of the transport environment is its illumination. The principle of development of the compositional light system of urban environment takes into account the existing planning structure of the city. The following components are involved, depending on its hierarchically structural and artistic characteristics in the solution of the light environment:

- transport and pedestrian system:
- city Community Center
- landscape system Objects
- historical part of the city

The main means of creation of the city's lighting system is evening and night illumination, identification of main and secondary axes – highways and streets, highlighting the center with unique historical objects, the system of visual communication, and also Objects of landscape system, boulevards, parks and squares. Fig.7.

Another aspect of the design of the transport environment is the use in the organization of this space of techniques of landscape architecture and design, with the presence of elements of natural nature. In the conditions of progressive urbanization one of the new directions of town-planning theory and practice is the development of landscape urbanism, considering the possibilities of functioning of urban life through the "prism" of ecological approach. [14] The new strategy of preservation and regeneration of the natural environment of the city is a necessary component of its spatial structure and allows to use innovative landscape technologies at construction of landscape-town-planning objects that in turn provides environmental sustainability. Fig.8.



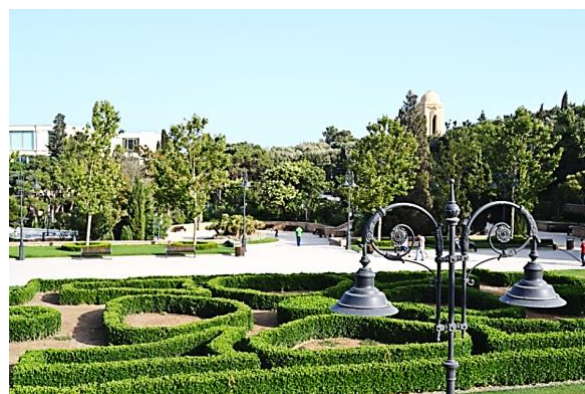
**Fig. 8.** New Baku. Regeneration of industrial coastal marine zone of Baku city under public spaces. Osipov V. In the Project Proposal

Modern tendencies of use of landscape design in transport environment are connected with new technical means, and modern materials (in fountains and cascades, automated control of water devices), increase the unusualness, brightness of design proposals. [2]

The transformation of urban functions at this stage of development presupposes the inclusion of new elements of the landscape in its environment, primarily active means of enhancing aesthetic expression: new design forms and installations, small architectural forms, water devices, altered relief, ornamental flower gardens, fortified multi-level lawns etc. [8]



**Fig. 9.** The Garden of the Philharmonic (formerly the Governor's Garden)



**Fig. 10.** Nagorniy Park. Alley of Shahids

In recent years, the creation of "mini-parks" or small sections of short-term activity, near the highways with a busy schedule of transport activity has spread. In organization of transport environment, underground passages, places and squares, ground pedestrian zones use of architectural-design and landscape techniques, for example, decorative paving, modern technical equipment, object filling, multilevel system of landscaping, visual communication and lighting system qualitatively improved the comfort level and aesthetic qualities.[9]

One of the techniques used to improve the quality of the population's stay in the urban environment is "shielding of transport spaces", which significantly reduces the noise effect of urban transport, while the artistic form, color and texture of the screen material bring additional decoration elements into the space. [5]

In the transport environment, the organization of pedestrian areas, the main function of which is the separation of a pedestrian from moving transport, is a serious multilateral challenge. The configuration, information content and layout of the elements of pedestrian zones, which attract huge transit flows of the population, involves structuring the system of pedestrian zones depending on the transport traffic. [6]

Creation of a unified system of transport navigation provides: underground and elevated transitions for pedestrians and parking lots. The system of pedestrian zones of the city includes "open spaces" of places, squares, and recreation areas. Individual elements of the object filling: kiosks, fencing, bollards, garbage cans, etc., supplement the space and reinforce the originality. [7] The decent pedestrian streets emerged in many European cities in the 1960s, with a developed system of visual communications, equipment and substantive content, according to a pre-developed theme in a single stylistic and coloristic solution, brought a new idea to the comfort of the urban environment. The emergence of a kind of comfortable buffer, a massive and an aesthetically-compositional solution of space would slightly level down the conflict between the new high-rise buildings in the city and the manifestation of the mental and physiological state of the human organism.

Especially it is necessary to note the pedestrian zone of seaside Boulevard, which stretched from the monument of the State Flag of Azerbaijan to the port, the national park, sometimes called the "diamond necklace of Baku", stretches along the Baku Bay for 16 km.

Its history began in 1865-1868, the architect Gasymbey Hajibeyov settled the coastline and created the embankment, which became a transport highway linking the sea shore with the central part of the city. The role of the main road seaside Park was performed until 1909, when the embankment officially became a seaside boulevard. The founder of a small park near the sea was the head of the construction Department of the city Council, engineer and talented organizer M.G. Ganjiskiy. The

first significant object in the territory of the seaside park in the Soviet period is a parachute tower, which appeared in the capital in 1936. The tower with the height 75 meter was considered to be the highest in the entire Soviet Union. In the 60s of the last century Boulevard was thoroughly updated and expanded to 2.7 km, and there were such attractions as sea port, restaurants "Pearl", "Sadko", "Sahil" and "Small Venice". [19]

Today, the territory of seaside Boulevard is a three-tiered open walking space, the first tier is paved with round river stones, is located right by the water and it was chosen by young people. The second with presence of green islands and open cafes and a lot of benches of lanterns and urns, is a favorite place of rest and the older generation. The second with presence of green islands and open cafes and a lot of benches of lanterns and urns, is a favorite place of rest of the older generation. The third tier is designed so that the green spaces and flower beds with fountains and entertainment facilities, shopping center and restaurants, cafes etc. Boulevard has a wonderful evening and night lighting. Seaside Boulevard is a national park and the pride of the population of Baku.

An important component of the transport environment of the modern city is the construction of a cycling network. The methods used in the European countries such as France, Switzerland and others can greatly contribute to the formation of a safe environment; safe sidewalks are wide enough with kerbs tapering to the same level with the road. Pedestrian crossings with traffic lights with switching cycle, optimal for road crossing, and countdown; ramps, lifts and elevator in the streets and buildings. Of course, to make the bike a full-fledged means of transportation, it is necessary to take measures to adapt the road infrastructure and it is required to integrate into the public space which is already lacking. This means that it is necessary to combine the contradictory requirements of different classes of citizens, and at the same time to provide an adequate level of urban environment which is not an easy task for designers. The peculiarity of formation of functional-spatial system of pedestrian zone of the central part of the city of Baku, it is possible to consider principles of selectivity and continuity which are connected with subsystems of the city. Within the pedestrian zones of public centers are located:

- information technology equipment (route diagrams, information boards, scoreboards, stands, pointers);
- equipment for rest (benches, tables, shade structures, urns);
- children's playground equipment at specialized sites;
- auxiliary equipment (kiosks, cabinets, inter-connections).

The right choice of material, shape and style gives the space of pedestrian zones an individual appearance.

One of the functions of the transport infrastructure is to address the problems of disabled persons. The Convention on the Rights of Persons with Disabilities which has already been signed by 147 countries, including Azerbaijan, provides ways to integrate persons with disabilities into social life. In order to secure equal conditions for all citizens of the Republic on the possibility of using social, engineering and transport infrastructure facilities, the Ministry of Labour and Social Protection of the population of Azerbaijan has developed a draft of a new law on Protection of the Rights of Persons with Disabilities. Improvement of legislation in order to bring the labor market in line with the needs of disabled people and integrate them into the social life of society. Currently, there are 14 regional centers of the Ministry for the Rehabilitation of Disabled People, cash benefits are being raised, wheelchairs and transport are provided as well.

However, the problems of persons with disabilities which are associated with the lack of well-managed system of transport services for disabled persons are not sufficiently addressed. A serious sociological survey, audits and analysis of the impact of accessibility to the transport infrastructure affecting social and economic development of society are needed to identify disability issues. One of the problems is the lack of methods of formation of accessible transport infrastructure and estimation of its efficiency which is connected with town-planning problems. The urban environment, transport and social infrastructure are not adapted for movement by citizens with limited mobility. Accessibility measures are not always laid at the design stage of the infrastructure, which increases costs, and causes significant economic damage. Transport problems are associated with the lack of forms of transport services: individual transport, pedestrian traffic, social taxis, urban and suburban passenger transport and the operation of specialized routes.

The use of innovative technologies in the process of passenger transportation will enable the development of a database on the accessibility of transport infrastructure facilities, as well as relevant design and technical documentation that identify a system of criteria and methods for auditing the accessibility of buildings and structures, vehicles, communications and information for the disabled persons.

The application of foreign experience on the problem of project management at the modern scientific level will identify the tasks for creating equal conditions for all citizens of the Republic on the possibility of using objects of social, engineering and transport infrastructure.

The social and transport infrastructure of the regions of our Republic is not sufficiently adapted to the habitation, movement and service of persons with disabilities, which include: people with musculoskeletal disorders and their attendants, people with auditory and visual disabilities and senior citizens.

On implementation of measures on introduction of principles of universal design it is necessary to test urban public modes of transport on objects of social and transport infrastructure: automobile and underground. These types of urban routes are most actively used by citizens with limited mobility. In order to adapt the social infrastructure for unimpeded movement, it is necessary to adapt buildings and premises for the use by persons with disabilities. In modern buildings these devices are laid in the projects themselves, problems arise in old buildings, where, unfortunately, such devices were not laid and additional devices are not always effective. Urban transport infrastructure should be provided, first of all, by buses and taxis with low-lying floor devices, which, undoubtedly, will contribute to the socio-psychological rehabilitation of disabled people and increase labor activity, integrating them into social life.

#### 4. NEW CONCEPT

In conditions of hot climate and pollution of the urban environment, it would be considered expedient to organize spaces with artificial microclimate. Modern public centers and communications were "under the roof", and developing the concept of shopping malls with artificial microclimate, provided visitors with a variety of services. An example is the system of seven passages, created in the historical center of Hamburg, interconnected with the total length of 1 km. The largest of them "Ganzafirtel" bears functions not only of a shopping center, but also communication public space, with convenient pedestrian ways under glazed vaults, providing visitors with climatic comfort. [15]

The formation of modern organized communicative public spaces of the urban environment, define qualitatively new urban traditions, influence the rise of the rating of the city, which in turn enhances the attractive aspects of tourism. The public center of the historical part of Baku is a unique variety of style and pare buildings, somewhere in a large scale to a person, and somewhere, is saturated with modern architectural dominants. The peculiarity of that part of the city is well attended by a large number of citizens and tourists. [16] In free time, weekends and holidays, on weekdays, in the morning and in the evening the pleasure movement is diverse and motivated by the desire to relax and get new impressions and interesting information. [17] Local centers in most areas of the city of Baku are also able to present to the population and to its guests comfortable and qualitative public spaces of the urban environment, designed for walking. [19] Fig.11.

Creation of comfortable conditions of people's stay in the territory of public centers is provided by convenient transport and pedestrian communication. Pedestrian accessibility ensures mass attendance of the community center. The separation of pedestrian and transport communications horizontally and vertically is a prerequisite, as the supply of commercial facilities and catering facilities take place on a permanent basis and become a source of pollution of community center. Organization of pedestrian and transport communications in the underground space vertically, creates opportunities to use open green spaces on the surface. [11]



**Fig. 11.** Zaha Hadid Heydar Aliyev Cultural Center

## 5. CONCLUSION

Rapidly developing transport system of Baku city, integrates into the urban environment and is complicated by various functions. The modern urban environment is saturated with new highways, traffic junctions, bridges, underground and ground crossings, which makes its appearance more expressive and effective. Transforming urban environment activates the means of aesthetic expressiveness of new architectural and design symbols with the inclusion of landscape elements, small architectural forms, unusual fountains, decorative lawns and flower beds. The transport environment changes the appearance of urban spaces. Increased mobility of society is based on a variety of motivations for their movement in the city with the use of vehicles, which changes the environmental quality of the highway, the perception of the city from the car. [13]

In recent years, in transport environment organization, innovative technologies of ground and underground pedestrian areas have been spread, and techniques of landscape design have also been used: modern technical equipment, subject saturation, lighting system and visual communications, decorative paving that improved aesthetic qualities and comfortable levels. Formation of functional-spatial system of pedestrian zone in the central part of Baku city is based on the principles of continuity. Pedestrian areas of public center should be provided with vehicles facilitating the movement of people with a violation of the musculoskeletal system, hearing and vision. [12]

Considering the climatic conditions of Baku city, to improve the comfort of visiting public areas. Creation of spaces with an artificial microclimate is required. A strong social infrastructure of the city was created, providing visitors with a variety of services, social and shopping centers, parks, cafes and restaurants, qualitatively improving the comfortable level of service and aesthetic qualities of the city space. The design of the elements of visual communication of transport system ensured the orientation to the cities. Formation of transport environment design, being an important task of forming the urban environment, provides new scientific concepts for improving the quality of transit communications, taking into account their transformation into landscape communicative spaces, which are defined as modern style in the life of society, balances and harmonizes the everyday life of population. [10]

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# COMPATIBILITY OF THE PASSIVE URBAN DESIGN IN CONTEXT OF THE MICRO SCALE FOR COLD CLIMATE (CASE STUDY: ARDABIL CITY)

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## ABSTRACT

In this paper, in order to ensure the comfort of the building, the solar passive urban form design (model) is presented using the energy consumption analyses method for the cold climate of Ardabil city. The importance of applying structural models and related costs has made it more sensitive to the use of software methods and models. The main reason for this sensitivity is the ability to understand the emotional and conceptual differences and concepts of comfort components from the perspective of experts from different fields and individuals with different geographic and cultural characteristics.

Most of the previous design methods, relative to the climatic characteristics of the city, the general approach, the comfort components, did not actually play a very role in the design and structure. In other words, due to the comfort (thermal, refrigeration, ventilation and others) was considered a post-construction category, so it was not necessary to consider the pre-construction, evaluation of the quality of the operation and the manner in which comfort was experienced (operating period) and energy consumption.

However, the proposed strategy of non-active solar micro urban form, with support of HEED software and the use of "the Climate Consultant" plugin as a complementary micro-climatic features, discover several factors: of defining the future comfortable conditions, for the building structure; the smart planning of architectural components as a size or position of openings, materials specification: predictable operation for designers.

The proposed model makes use of energy standards with real time comparing of energy consumption in the residential area and in fact in certain city zoning. The amount of consumption load as well as the cost-effectiveness of the energy indicate opportunity to saving energy in proposed project, before the construction begin.

The achievement of the present report, based on descriptive analytic is "The Solar Passive House Design (with 2 Energy Saving Patterns)", which is introduced as a final result.

*Key words: energy, cold climate, passive urban forms, energy efficiency, climatic design, sustainable design*

## 1. INTRODUCTION

The criterion for the arbitration of architecture is its degree of adherence to the requirements of environmental preservation, not imposed on the environment [1].

Since cost savings and energy-efficiency issues in the architecture of buildings and in the field of architectural knowledge are highly sensitive, the use of computer-aided simulation of energy consumption in building design can be one of the most effective methods,[2]. Over the past 50 years, more than hundreds of simulation programs related to energy in the building have been designed and used by various organizations involved in this area. The most basic software is the ones that completely simulate the system and such things as consumption over different periods, energy costs, temperature and humidity calculations, which are the results of the main indicators of energy performance in the building, are in the form of different output results, HEED software is of this type, [3], [7].

HEED is a simple and easy-to-use design tool that can simulate the saving of home-grown design energy; it's a fast software, especially for calculating the thermal level for 8760 hours of the year, It adjusts to the actual amount of heat needed for comfort.



According to ASHRAE and ANSI standards, HEED software is a software application (written in Java programming language) that can be used to calculate and modulate energy savings in the home design. HEED, along with the Climate Consultant, is being used as a complementary software that delivers smart cluster information and convenience features to the HEED software. After calculating and estimating the energy based on the California Energy Efficiency Standard 2008, and comparing it, structural specifications of the design are put into the design.

The process is to introduce and analyze micro-city climatic data, and provide convenient data-proportional components. Based on this, the energy used is calculated by the software to provide optimum comfort, while the structural characteristics of the proposed design are determined (in accordance with the defined energy coordinates). Also, the existing buildings of Ardabil city, from the point of view of the Urban and various methods of making energy efficient, are divided into groups of under 10 years old, between 10 years to 15 years, 15 years to 20 years old and more than 20 years old, and are analyzed in terms of energy, so that the findings of this study with their energy conditions, comparing and saving costs in the proposed options is analyzed. The proposed options are A and B, which are the same in terms of the physical structure and design of the project, but in terms of their composition and composition in the outer walls, ceilings and floors, and the new elements of energy, including the solar cell.

In a general summary, the process can be described as follows:

Information processing, preparation of proposed options and final results of this article, including the use of HEED and Climate Consultant software, include:

- Analysis of micro-urban climatic data
- Determine the components and scope of comfort
- Estimation of the relative energy of climate and comfort
- Comparison of energy consumption in the proposed project with energy consumption in existing houses in the city
- Economic analysis and cost estimation, in terms of energy saving, and finally, the specification of the structural features and the presentation of the proposed option.

However, from the final analysis and conclusion, the following results are obtained:

By comparing and analyzing the energy consumption of existing buildings in the city with the energy consumption of 2008 in California, it is observed that in these houses (130-150%) of that code, energy is consumed, in other words, energy consumption in existing homes in the city of Ardabil 30-50 percentage higher than standard intake.

Energy consumption in the proposed option A with consumption (85%) of California's 2008 energy consumption is 15% lower than standard consumption. Energy Saving The proposed option B with consumption (70%) of California's 2008 energy consumption is 30% lower than standard consumption. A Passive Solar building Design [4] is suggested as a suitable way for a desirable housing pattern in Ardabil city. It is suggested that the structural conditions determined include basic guidelines for the design of the climate architecture and can be responsive to energy demands.

## 2. COMFORT CONDITIONS IN EXISTING RESIDENTIAL BUILDINGS

The comfort of the existing buildings of the city studied are as follows: Mostly, any air flow cooling system (removal of ventilators and ceiling ventilation) is neglected. Because there is no fan for cooling and comfort, if there is a need to cool the air and if the outside temperature is comfortable.

The design of the building must be adapted to climatic conditions, in order to suit the natural conditions. Also, the performance of the building should be minimized in adverse climatic conditions so that the amount of energy consumed for heating and cooling can be minimized, [5]. The walls are blocked with blocks of 22.5 centimeters (9 inches), which are plastered in the inner parts. Today, thermal insulation is the easiest and most effective technology available for energy efficiency, and insulation technology with exterior coatings and foundations, with external insulation, a solid wood foundation, effectively compensates for the thermal insulation, [6], [10] and the best insulation is the double insulation option according to the current energy code (2008) of California, without thick walls,  $R = 21$  ( $R$ = thermal resistance) for the wall,  $R = 38$  for the roof and  $R = 19$  for the floor. Compared to this code, buildings in the city of Ardabil have poor insulation and the strength of the insulation in homes

more than 20 years age is not suitable and efficient. There is no radiation protection in the roof. This category of buildings has ducts for the HVAC system, but Duct does not have any special seals. The gaps are also weak, at certain levels, based on the building code of 1978-1987. The level of openings is equal to 31.2% of the outer surfaces of the north and south directions of buildings. Doors and windows are mostly shaded. The windows in the openings of the windows are simple and single-walled.

### 3. DESIGNING SOLUTIONS

File format used in softwares Climate Consultant and HEED in these study is EPW which climate informations are adjusted and analysed hourly. The first step in this design is to configure the meteorological data sheet of the city of Ardabil (Table1) (from the results and outputs of the Climate Consultant software). After obtaining the climatic characteristics and its processing, it is provided by the HEED software or the comfort criteria in the residential building of the study area.

After defining the comfort range and determining the criteria for the map, the specifications of the plan are as follows: Setting up the heating thermostat, for a lower temperature. (Fig. 1). Getting heat from appliances, lamps and interior materials will reduce the need for heat. Therefore, it is necessary that the living area is kept clear, insulated (used in the summer of ventilation) Fig. 2. Using an efficient system (energy consumption), Fig. 3, while controlling the cost of building, the heat is taken back to the building again. [9]. Use of external insulation (requires efficient insulation) For the process of inspection, air flow under the ceiling is necessary, therefore, while using the ceiling insulation, consider the minimum space of 2 inches for the air flow between the insulator and the final cover of the ceiling. Is taken. Also, approximately 10% of the shear walls with a 16-inch (center-to-center) gap in the mirror (connection) of the insulated thermal bridge, increasing the distance from 16 inches to 24 inches, the thermal bridge decreases from 10% to 6%. Fig. 5

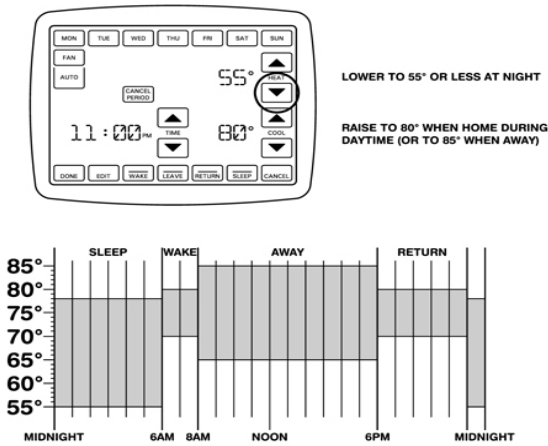


Fig. 1. Setting up the heating thermostat, for a lower temperature.

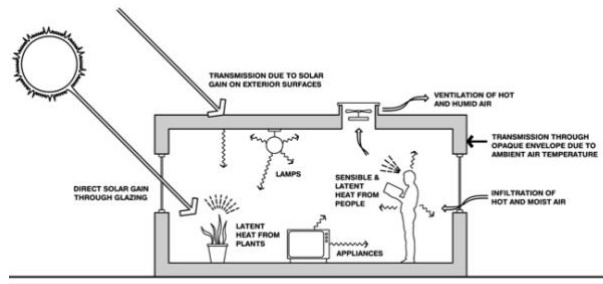


Fig. 2. Feeling the heat through people and appliances and domestic

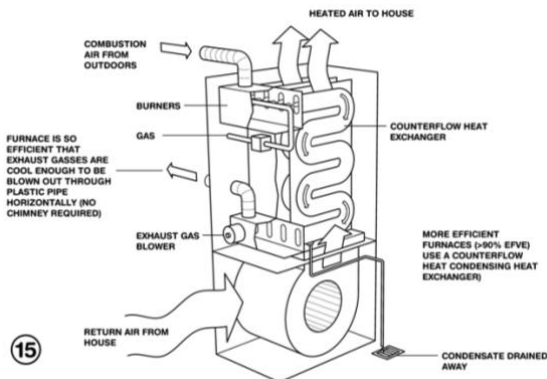


Fig. 3. Using efficient appliances (with low energy consumption)

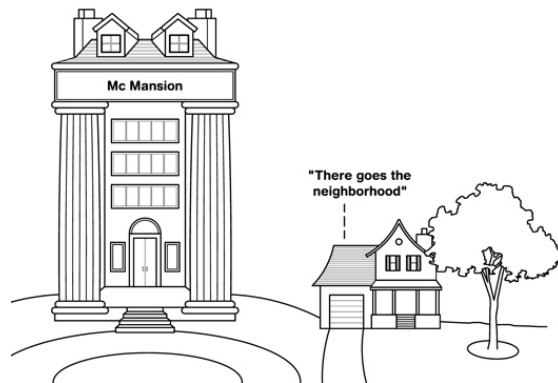


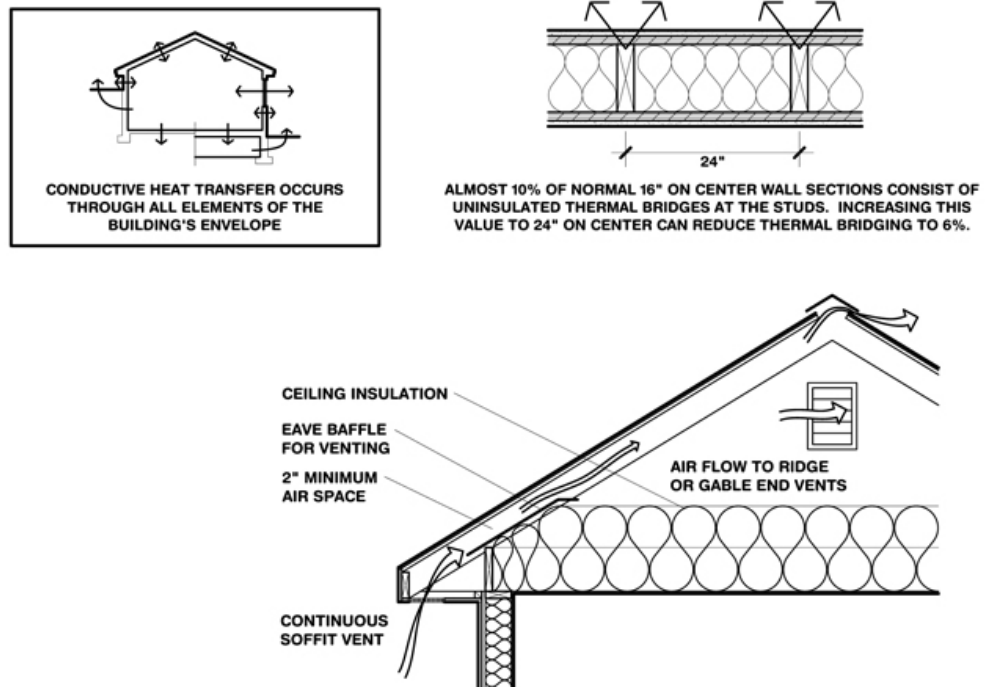
Fig. 4. Small and compact building (offcourse with correct size and scale).

**Table 1.** Design Guidelines for Analyzing Climate Information in the Climate Consultant Software

<b>DESIGN GUIDELINES (for the Full Year)</b> California Energy Code User Modified Design Strategies, User Modified Criteria	<b>LOCATION:</b> Baku (Observatory), -, - <b>Latitude/Longitude:</b> 40.383° North, 49.85° East, <b>Time Zone from Greenwich</b> 4 <b>Data Source:</b> MN7 378500 WMO Station Number, <b>Elevation</b> 5 m
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Assuming only the Design Strategies that were selected on the Psychrometric Chart, 100.0% of the hours will be Comfortable. This list of Residential Design guidelines applies specifically to this particular climate, starting with the most important first. Click on a Guideline to see a sketch of how this Design Guideline shapes building design (see Help).

19	For passive solar heating face most of the glass area south to maximize winter sun exposure, but design overhangs to fully shade in summer
20	Provide double pane high performance glazing (Low-E) on west, north, and east, but clear on south for maximum passive solar gain
35	Good natural ventilation can reduce or eliminate air conditioning in warm weather, if windows are well shaded and oriented to prevailing breezes
11	Heat gain from lights, people, and equipment greatly reduces heating needs so keep home tight, well insulated (to lower Balance Point temperature)
3	Lower the indoor comfort temperature at night to reduce heating energy consumption (lower thermostat heating setback) (see comfort low criteria)
33	Long narrow building floorplan can help maximize cross ventilation in temperate and hot humid climates
18	Keep the building small (right-sized) because excessive floor area wastes heating and cooling energy
8	Sunny wind-protected outdoor spaces can extend living areas in cool weather (seasonal sun rooms, enclosed patios, courtyards, or verandahs)
37	Window overhangs (designed for this latitude) or operable sunshades (awnings that extend in summer) can reduce or eliminate air conditioning
4	Extra insulation (super insulation) might prove cost effective, and will increase occupant comfort by keeping indoor temperatures more uniform
24	Use high mass interior surfaces like slab floors, high mass walls, and a stone fireplace to store winter passive heat and summer night 'coolth'
16	Trees (neither conifer or deciduous) should not be planted in front of passive solar windows, but are OK beyond 45 degrees from each corner
15	High Efficiency furnace (at least Energy Star) should prove cost effective
62	Traditional passive homes in temperate climates used light weight construction with slab on grade and operable walls and shaded outdoor spaces
31	Organize floorplan so winter sun penetrates into daytime use spaces with specific functions that coincide with solar orientation
42	On hot days ceiling fans or indoor air motion can make it seem cooler by 5 degrees F (2.8C) or more, thus less air conditioning is needed
34	To capture natural ventilation, wind direction can be changed up to 45 degrees toward the building by exterior wingwalls and planting
65	Traditional passive homes in warm humid climates used high ceilings and tall operable (French) windows protected by deep overhangs and verandahs
39	A whole-house fan or natural ventilation can store nighttime 'coolth' in high mass interior surfaces (night flushing), to reduce or eliminate air conditioning
14	Locate garages or storage areas on the side of the building facing the coldest wind to help insulate



**Fig. 5.** Prevent thermal bridges in insulation areas.

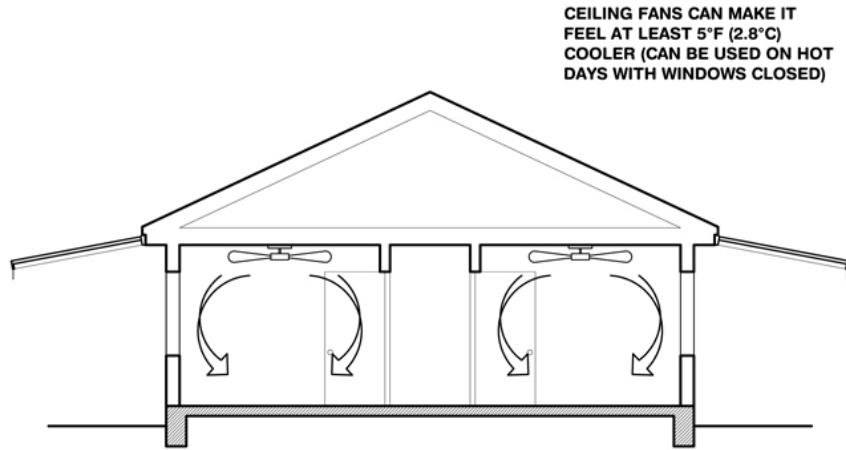


Fig. 6. The use of a ceiling fan on hot days.

- Use of a ceiling fan during hot days with a boom closure, or by blowing up the interior air can lower the interior temperature without mechanical ventilation of 2.8 degrees Celsius. Fig.6
- Excellent outdoor sunblock space (seasonal sunbeds, enclosed patios, backyards or porches) to enhance the room's living space in cold weather. Fig.7

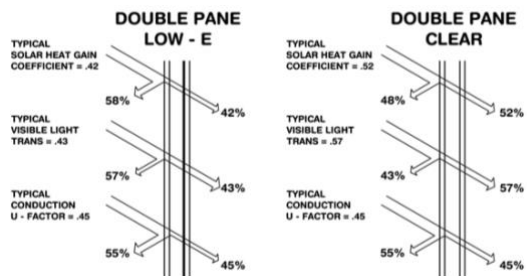
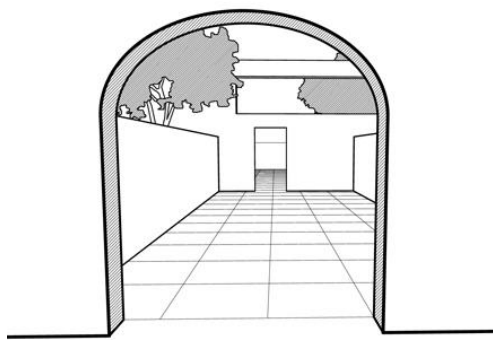


Fig.7. Use of an exterior sunscreen environment that disturbs the wind.

Fig.8. Use of Maximum Glass Levels in Contact with the Sun.

- Establishment of double-glazed glass surfaces with clear and clear insulated frames in all geographical directions for maximum absorption of sun heating and sunlight. Fig.8

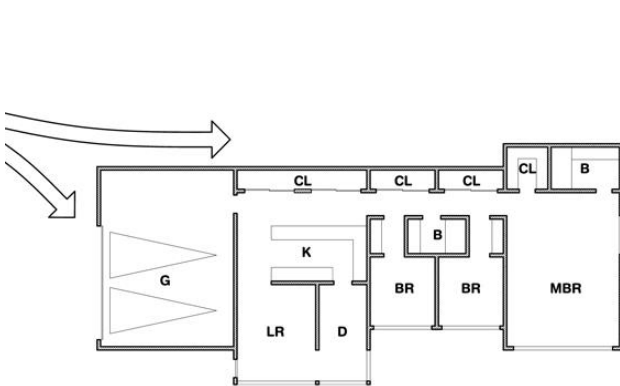


Fig. 9. The garage is located on the side facing the cold wind direction, that is to the west, which is against the wind and these spaces are a kind of obstacle.

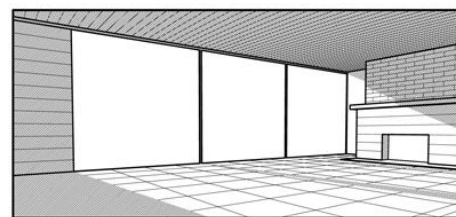
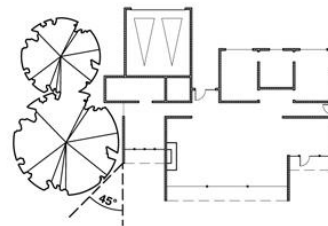
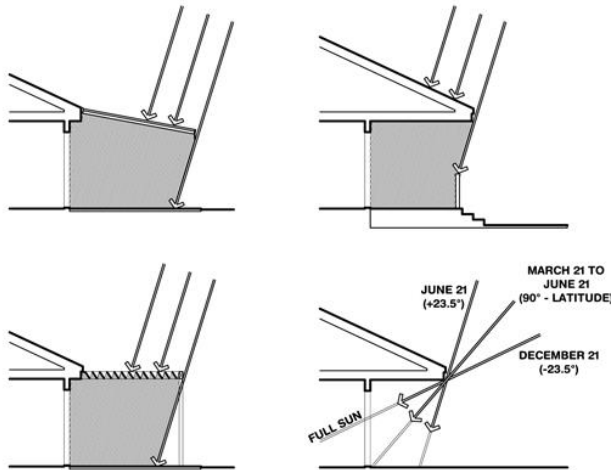


Fig. 10. Consider the maximum absorption of the heat of the sun in winter by shifting the direction for spaces that need to absorb heating energy throughout the day.

In this climate, ventilation of the air will always be necessary; however, if the design of the building, upfront heating (fireplaces, etc.) is minimized, the need for air ventilation can be reduced to a large extent. Window fronts (designed for these geographic coordinates) or operator shadows - which extend out in the summer and close in the winter - can reduce or limit the need for air ventilation. Fig.11

**Insulating parts of the covered building**

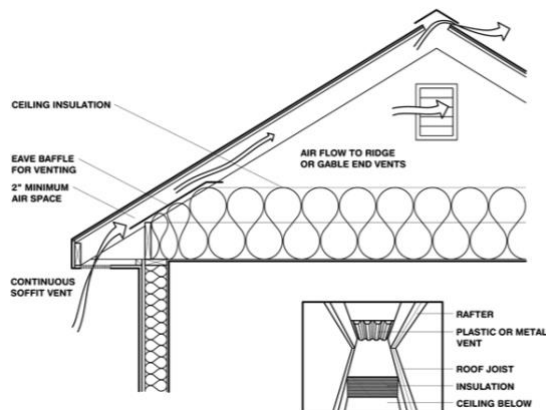
Insulating the covered parts of the building helps to reduce the heat dissipation during the night of the winter. The building's insulation ensures a 50% reduction in the heating load in cold and temperate regions and 45% in tropical regions, as well as a 35% reduction in the cooling load in warm, temperate and even cold areas, Fig.13, 14, 15.



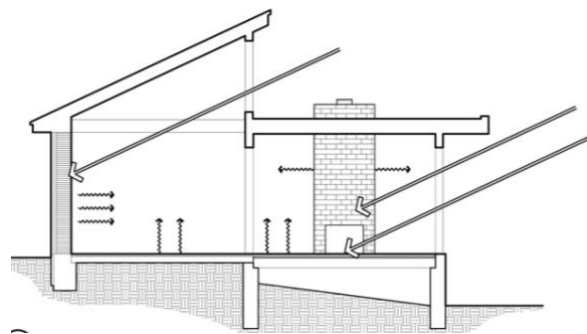
**Fig. 11.** The use of a leap forward that is widespread in the summer and closes in the winter.



**Fig. 12.** Avoid planting any tree (whether or not a broad leaf) in front of the sun's inactive windows. Of course, it can be planted on the side of the building and in a 45 degree position relative to its corners.



**Fig. 13.** Insulation of the external shell of the building,



**Fig. 14.** Use of more materials or heat capacity, such as thick walls and thicker sheets inside the building, will be used to store inactive winter and cool temperatures during the summer.

It is recommended that no insulation with a thickness of more than 15 cm be used, especially in temperate regions. In cities where humidity is high, the use of insulators even with a low thickness prevents condensation, [7]

Properly seals the building, especially the winder's sides, carefully to seam the seams and pores to the minimum (sealing the urban forms, straightening and sealing the air openings and installing double-glazed windows). Sealing including pipe and cable conduits, door and window frames And round the frame) that is done by taping and so on, Fig. 16.

In average, 23.8% of the total heat loss of the total cooling and heating energy consumed by the household (as reported in 2004) is due to the influence of intrusive air, and an annual cost of 536.2 billion rials (approximately 66,250,000 US \$) resulting from optimization of fuel consumption and prevention of energy waste in residential branch of the country (based on the cost of the year 2004 in Iran), [8]. With sealing, at least 38% of the air intake can be reduced to the residential unit.

Through the plants, light radiation through the exterior surfaces of the building, the use of hot and humid air, hot and humid air control, and light distribution by exterior levels proportional to the temperature can also produce sunlight.

#### 4. PROPOSED OPTION A AND B COMPARISON (HEED RESULTS)

Site conditions: These conditions are calculated with hour by hour information for each ASHRAE formula in HEED programe, [11].

##### Wall and project openings specification in option A

The wall thickness is 22.5 centimeters and includes solid units with inner endodontics. The ability to transfer the absorption coefficient of the building walls is 50%, and the average U\*-factor of each of them is 0.023, Table 3. [U\*-Factor is the thermal conductivity measured in BTU/hr °F ft<sup>2</sup>], [12].The duration of the building wall can be absorbed by 11 hours and their thermal loss coefficient 14 Percent.

##### Roofing in option A

The structure is such that it creates natural ventilation and has a weight of 0.21 kg / m<sup>2</sup> for roofing, foil and no other radiation protection is not recommended (Sloped roof).

**Table 1.** General criteria in option A

<b>SITELOCATION:</b>	
EPW	EnergyPlus Weather file (see City Location above) as defined on Initial Design Screen
38.05	Latitude (provided by Climate Data File but user may modify, negative in southern hemisphere)
16	Similar California Zone (used to establish Energy Code Requirements for Scheme 1)
<b>SITECONDITIONS: Computed from Hourly Climate Data per ASHRAE formulas</b>	
5.00	Winter Outdoor DESIGN LOW Temperature F (Winter Extreme)
92.84	Summer Outdoor DESIGN HIGH Temperature F (1.0% Cooling Dry Bulb)
5,397.19	Heating Degree Days (Computed from hourly data for Base 65 degrees)
<b>DESIGNCONDITIONS: User Supplied Constraints for this Scheme</b>	
70.00	Lowest Indoor COMFORT Temperature Degrees F (i.e. 70° Dry Bulb)
75.00	Highest Indoor COMFORT Temperature Degrees F (i.e. 75° Dry Bulb)
75.00	Highest Indoor EFFECTIVE Temperature at Indoor Air Velocity set on Ventilation Cooling screen (i.e. no change because 0 FPM)
0.20	Ground Reflectance ( vegetation = .20, new snow = .74)
0	12 Day Analysis Start Month ( 1 to 12, or 0 for all 365 days)
0	12 Day Analysis Start Day ( 1 to 31, or 0 for all 365 days)

If 0 is entered for "12 Day Analysis ...", then the calculation will be for a full 365 days, or 8760 hours/year. Hourly climate data in .EPW format for all 8760 hours/year can be downloaded for hundreds stations from the web (see READ-EPW.TXT file).

**Table 2.** Physical characteristics of dimensions and size, area, height of floors and other elements of option A.

36.00	Overall Width Dimension Ft
40.00	Overall Depth Dimension Ft
1,452.00	Area of the Largest Floor of Flat Roof (Footprint) Sq Ft
100.83	Percent of Maximum Footprint (divide by Length x Width)
2.00	Number of Floors
2,904.00	Total Floor Area Sq Ft
9.00	Floor to Floor Height Ft Average (Effects Exterior Surface Areas)
8.00	Floor to Ceiling Height Ft Average (Effects Interior Volume)
23,232.00	Total Volume of Occupied Space Cu Ft (Interior)
0.00	Bearing Off True South (Clockwise is Positive)
33.05	Roof Slope in Degrees from Horizontal (Equivalent to Pitch of 8:12)
0.10	Roof Reflectance (Cool Roofs at least .55 flat, .20 sloped shingles, .15 sloped tiles)
0.75	Roof Thermal Emittance (Cool Roofs at least .75)

**Table 3.** Wall and openings specification in option A, computations based on data in HEED software.

	Area sq ft	% of Max Surface	Transmissivity or Absorptivity	Average U factor	Time Lag	Decrement Factor
<b>Windows + Doors</b>						
South	142.00	21.914	0.55	0.381		
West	0.00	0.000	0.00	0.000		
North	171.00	26.389	0.56	0.377		
East	0.00	0.000	0.00	0.000		
Skylight	0.00	0.000	0.00	0.000		
<b>WALL</b>						
South	506.00	78.086	0.50	0.023	11	0.14
West	0.00	0.000	0.50	0.023	11	0.14
North	477.00	73.611	0.50	0.023	11	0.14
East	0.00	0.000	0.50	0.023	11	0.14
ROOF Opaque	1,452.00	100.833	0.90	0.016	4	0.86
FLOOR Raised	1,452.00	100.000		0.000	9	0.10
SLAB Edge in feet	0.00	0.000	F factor=	0.560	24	0.00

**Table 4.** Proposed roof type in option A.

**Roof Construction :**

- No Heat Loss through ceiling because upstairs is another heated unit
- Cool Roof Flat or Low Sloped (less than 9.5 degrees)
- Cool Roof Sloped, Naturally Ventilated Attic, Light Weight Shingles (less than 5 lb/sq ft)
- Cool Roof Sloped, Fan Vented Attic, Light Weight Shingles (less than 5 lb/sq ft)
- Cool Roof Sloped, Naturally Vented Attic, Heavy Weight Tiles (5 lb/sq ft or more)
- Cool Roof Sloped, Fan Vented Attic, Heavy Weight Tiles (5 lb/sq ft or more)
- Default Flat or Low Sloped Roof, (less than 9.5 degrees)
- Default Sloped Roof, Naturally Ventilated Attic, Light Weight Shingles (less than 5 lb/sq ft)
- Default Sloped Roof, Fan Vented Attic, Light Weight Shingles (less than 5 lb/sq ft)
- Default Sloped Roof, Naturally Vented Attic, Heavy Weight Tiles (5 lb/sq ft or more)
- Default Sloped Roof, Fan Vented Attic, Heavy Weight Tiles (5 lb/sq ft or more)

Cool Roofs have higher reflectance which means they absorb less solar radiation, and slightly higher thermal emittance which means they re-radiate heat to the sky during both day and night.

In this climate zone, attics do not need to have a Reflective Foil Radiant Barrier on the underside of the roof exposed to attic air, to meet the Energy Code's Prescriptive Package C and D (see Basic Insulation screen).

All Roofs have Plaster Board Ceilings and Wood Joists with Insulation between.

Attic Fans have a thermostat so only run when needed.

Other Assemblies calculated by hand can be loaded on the Surface Area screen (use Time Lag and Decrement from similar roofs here)

**Table 5.** HVAC System specification in proposed option A

<b>HEATING/VENTILATION/AND AIR CONDITIONING including FANS</b>	
3.80	INFILTRATION SLA (Specific Leakage Area) use 4.3 with ducts, 3.8 if ducts are sealed, 3.2 if not ducts, deduct .5 for house wrap (see Help)
0.52	INFILTRATION Air Changes per Hour at Winter Design Low Temp (used for HVAC System Sizing) if revised here it is fixed annually
64.29	CFM FRESH AIR REQUIRED with continuous fan (7.5 cfm/person+FloorArea/100. per ASHREA 62.2) to delete fan enter 0.0 for Watts/CFM.
0.00	AIR CHANGES PER HOUR MAXIMUM when cooling with outdoor air (i.e. Whole House Fan or Natural Ventilation) Max about 20 ach
60.00	THERMOSTAT SetBACK Temperature during Heated Occupied Nighttime Hours 11pm to 7am (i.e. 60 °F)
55.00	THERMOSTAT SetBACK during Heated Unoccupied Hours (i.e. 55°F)
85.00	THERMOSTAT SetUP during Cooled Unoccupied Hours (i.e. 88°F) (Note: Indoor Comfort Temperature High and Low set on Climate screen)
	Temperature Outdoors Monthly Average when Furnace is SHUT OFF for the SUMMER SEASON (i.e. for no seasonal shut off set to 85 = blank)
30.00	% Latent Load added when Air Conditioning to remove Humidity (i.e. 30%, mostly from internal loads: people, washing, cooking, etc)
	% EVAPORATIVE COOLER Efficiency (i.e. 80-90%, 0=none=blank)assumes a Whole-House Fan and 100% outdoor air (see Help)
14.50	SEER Cooling System Seasonal Energy Efficiency Ratio (Code Minimum air conditioner 13.0, Energy Star 14.0, Best Available 19.5)
0.90	AFUE Heating System Annual Fuel Utilization Efficiency (Code minimum=.78, EnergyStar=.90, Best Available=.97, Electric Furnace or Baseboard=3.41, Radiant Heat = 3.55, Heat Pump=7.7)
0.80	Watts/CFM FURNACE or AIR CONDITIONER BLOWER maximum (.80 default, .58 per Code in zones 10 to 15, 0 if no blowers)
0.00	Watts/CFM WHOLE-HOUSE COOLING FAN for Night Flushing (small=.07,large=.04,if natural ventilation=0.0)
0.25	Watts/CFM CONTINUOUSLY RUNNING FRESH AIR VENTILATION FAN required in new California homes (.25, or 0.0 to eliminate fan)
	% Efficiency of HEAT RECOVERY VENTILATOR (HRV) if added to the above fan (65% to 85%, or 0% if no HRV) uses 2 of above fans
0.00	Watts/CFM CEILING FAN (EnergyStar=.0133) assume 5000 cfm gives 300 fpm; 3000 cfm gives 160 fpm
4.0	% DUCT LEAKAGE LOSS (6% new homes sealed, 4% sealed and tested, 0% if inside conditioned space, 16% default, older homes higher)
8.0	DUCT INSULATION R-FACTOR (R=4,2, 6,or 8,in different climate zones, or 25 if covered by 3.5" fiberglass, or 31 if cellulose)

Opaque and non-slip roofs have created conditions for absorption and transfer of 90% over a period of 4 hours, with an average U-factor of 0.066 BTU/(hr °F ft<sup>2</sup>). The floor of the building also has a reduction of 10% and can absorb heat for 9 hours. 2 layers of insulations, based on the current energy code (2008), Table 4. *Floor and ceiling*: length 12 meters, width 10 meters. *Wall*: Length 12 W 2.4 m. *Floor materials (concrete)*: Useful thickness 10 cm, density 140 lb / cu Specific heat 0/22 btu / lb / Deg F Length compression 12 btu \* Inch / hr \* f<sup>2</sup> \*°F Maximum thickness 99/4 Inch.

**Table 6.** Specifications of the water heater chosen in the design.option A and B are the same.

<b>AUXILIARYPOWEREDNON-SOLARWATERHEATERTANK:</b>	
<b>Water Heater Default Data can be manually entered below, or can be loaded from the AHRI web site into the following screen.</b>	
1	Water Heater Type: Storage Tank: Gas=1,Electric=2,Propane=3,Oil=4; Instantaneous In-Line: Gas=5,Electric=6; Heat Pump Electric=7; (None=0) (Default=1)
0.59	Energy Factor (EF): California and Federal Code minimums: Storage Tank Gas=.60,Electric=.94,Oil=.59; Instantaneous Gas=.73, and although there is no code minimum assume Storage Tank Propane=.59; Instantaneous Electric=.94; Heat Pump Electric=2.00 Energy Star minimums: Storage Tank Gas=.67, Storage Tank Gas Condensing=.80; Instantaneous Gas=.82; Heat Pump Electric=2.00 (note that many AHRI listed water heaters are much better than these minimums)(R-12 External Insulation Wrap is sometimes required)
50.00	Volume of Water Heater Tank, Auxiliary Powered: gallons (default=50,instantaneous=1) (see AHRI screen)
40.00	Input Power: kBTU if Gas Tank or kWh if Electric Tank (Default = 40. kBTU)
76.00	Percent Recovery Efficiency (Default=76%)
1.00	Distribution Loss: Pipes with full insulation=.90, Standard Insulation=1.00, no Insulation=1.19; Recirculation Systems: Demand Control=1.31, Timer Control=3.03, Temperature Control=3.37,no Control=4.52
135.00	Tank Minimum Temperature Set Point (i.e. 140° F)
203.00	Tank Maximum Safe Temperature Set Point (i.e.203° F)
41.10	Gallons Per Day Water Consumption (i.e. CEC says 21.4+ (.014xFloorArea up to 2500 sq ft)
67.50	Temperature of Tank Location ° F (60=Default temperature of tank environment) Note: This can be a stand alone Water Heater, or Water Heater that is a Backup for a Solar Hot Water Tank (as defined on the SDHW screen)



**Table 7.** Thermal mass of option A.

<b>THERMAL MASS Interior Storage Scheme 7 : Ardabil House A- Offer 1</b>		<b>Project : Ardabil House A(+ 20 il) Building Type SINGLEFAMILYRESIDENCE City Location: Tabriz,-,IRN,ITMY,40706</b>			
Name of Storage Element (revise to suit)		floor	walls	ceiling	
Length of Storage Element in Feet		36.15	40.17	36.15	0.00
Width or Height of Element in Feet		40.17	8.00	40.17	0.00
Number of Wall Surface or other Elements		2.	24.	2.	0.
Material (drywall,brick,concrete,stone,adobe, plaster,tile,wood,lt.wt.concrete,water,other)		concrete	drywall	drywall	
Inches Thick Useful Storage (or Gallons if Water)		3.50	0.62	0.62	0.00
*Density of Thermal Mass (lb/cu ft)		140.00	50.00	50.00	0.00
*Specific Heat of Mass (BTU/lb/DegF)		0.22	0.26	0.26	0.00
*Conductivity per Inch of Mass (BTU*in/hr*sq ft*DegF)		12.00	1.10	1.10	0.00
*Maximum Thickness for Useful Storage (inches)		4.99	2.32	2.32	0.00

\* These values are computed automatically; to override them enter any other word for Material.  
 In order to store heat inside the Building, all these Thermal Mass Storage elements must be on the interior side of the INSULATION LAYER in the building's outside walls. Include things like interior partitions and fireplaces. However note that the Total Thermal Mass (both inside and outside the insulated layer) will determine the U-FACTOR, as well as the TIME LAG that delays when the heat conducts from the outside to the interior of the Building, and the DECREMENT or damping of this temperature wave. These three values are input on the SURFACE AREA screen and can be calculated in our design tool called OPAQUE: (see Energy-Design-Tools web site).

*Wall and ceiling:* Useful thickness 0.62 inch Density 50 lb / cu Special heat 0/26 btu / lb / Deg F Length compression 10/1 btu \* Inch / hr \* f<sup>2</sup> \*°F Maximum thickness 32/2.

**Water Heater in proposed option A and B**

**Table 8.** Applied Energy Building Standards in proposed option A.

<b>WATER HEATER (Storage Tank or Instantaneous) Ardabil House A- Offer 1</b>		<b>Project : Ardabil House A(+ 20 il) Building Type SINGLEFAMILYRESIDENCE City Location:Ardabil,-,IRN,ITMY,40706</b>	
<b>AUXILIARYPOWEREDNON-SOLARWATERHEATERTANK: Water Heater Default Data can be manually entered below, or can be loaded from the AHRI web site into the following screen.</b>			
<input type="text" value="1"/>	Water Heater Type: Storage Tank: Gas=1,Electric=2,Propane=3,Oil=4; Instantaneous In-Line: Gas=5,Electric=6; Heat Pump Electric=7; (None=0) (Default=1)		
<input type="text" value="0.59"/>	Energy Factor (EF): California and Federal Code minimums: Storage Tank Gas=.60,Electric=.94,Oil=.59; Instantaneous Gas=.73, and although there is no code minimum assume Storage Tank Propane=.59; Instantaneous Electric=.94; Heat Pump Electric=2.00 Energy Star minimums: Storage Tank Gas=.67, Storage Tank Gas Condensing=.80; Instantaneous Gas=.82; Heat Pump Electric=2.00 (note that many AHRI listed water heaters are much better than these minimums)(R-12 External Insulation Wrap is sometimes required)		
<input type="text" value="50.00"/>	Volume of Water Heater Tank, Auxiliary Powered: gallons (default=50,instantaneous=1) (see AHRI screen)		
<input type="text" value="40.00"/>	Input Power: kBTU if Gas Tank or kWh if Electric Tank (Default = 40. kBTU)		
<input type="text" value="76.00"/>	Percent Recovery Efficiency (Default=76%)		
<input type="text" value="1.00"/>	Distribution Loss: Pipes with full insulation=.90, Standard Insulation=1.00, no Insulation=1.19; Recirculation Systems: Demand Control=1.31, Timer Control=3.03, Temperature Control=3.37,no Control=4.52		
<input type="text" value="135.00"/>	Tank Minimum Temperature Set Point (i.e. 140° F)		
<input type="text" value="203.00"/>	Tank Maximum Safe Temperature Set Point (i.e.203° F)		
<input type="text" value="41.10"/>	Gallons Per Day Water Consumption (i.e. CEC says 21.4+(.014xFloorArea up to 2500 sq ft)		
<input type="text" value="67.50"/>	Temperature of Tank Location ° F (60=Default temperature of tank environment) Note: This can be a stand alone Water Heater, or Water Heater that is a Backup for a Solar Hot Water Tank (as defined on the SDHW screen)		

**Thermal mass of proposed option A**

In building design, thermal mass is a property of the mass of a building which enables it to store heat, providing "inertia" against temperature fluctuations. Scientifically, thermal mass is equivalent to thermal capacitance or heat capacity, the ability of a body to store thermal energy. It is typically referred to by the symbol C<sub>th</sub> and measured in units of J/°C or J/K (which are equivalent). Thermal mass may also be

used for bodies of water, machines or machine parts, living things, or any other structure or body in engineering or biology. In those contexts, the term "heat capacity" is typically used instead. ([https://en.wikipedia.org/wiki/Thermal\\_mass](https://en.wikipedia.org/wiki/Thermal_mass)). At our studied climate in Ardabil city thermal mass interior storage is shown in Table 7.

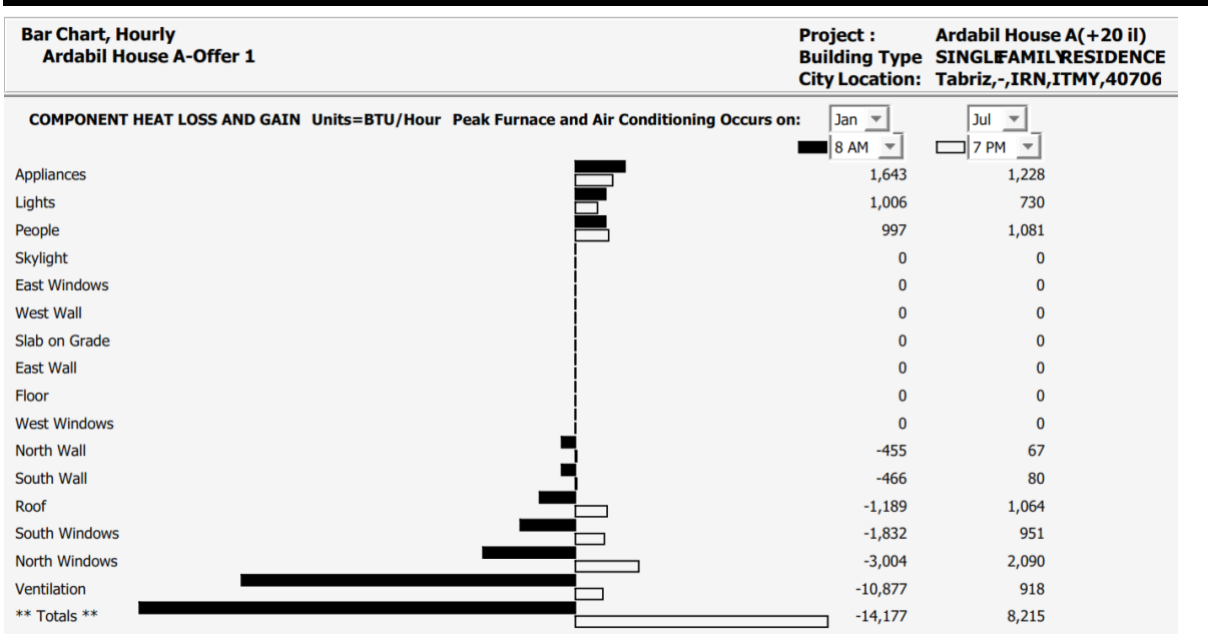
**Buildings energy performance standards comparison in proposed option A and B**

As showed and discussed above in option A and B with selected different construction elements in roofing, external wall, penetrations, size, materials, water heating systems and other specifications energy performance between these two options are compared as in tables 9 and 10.

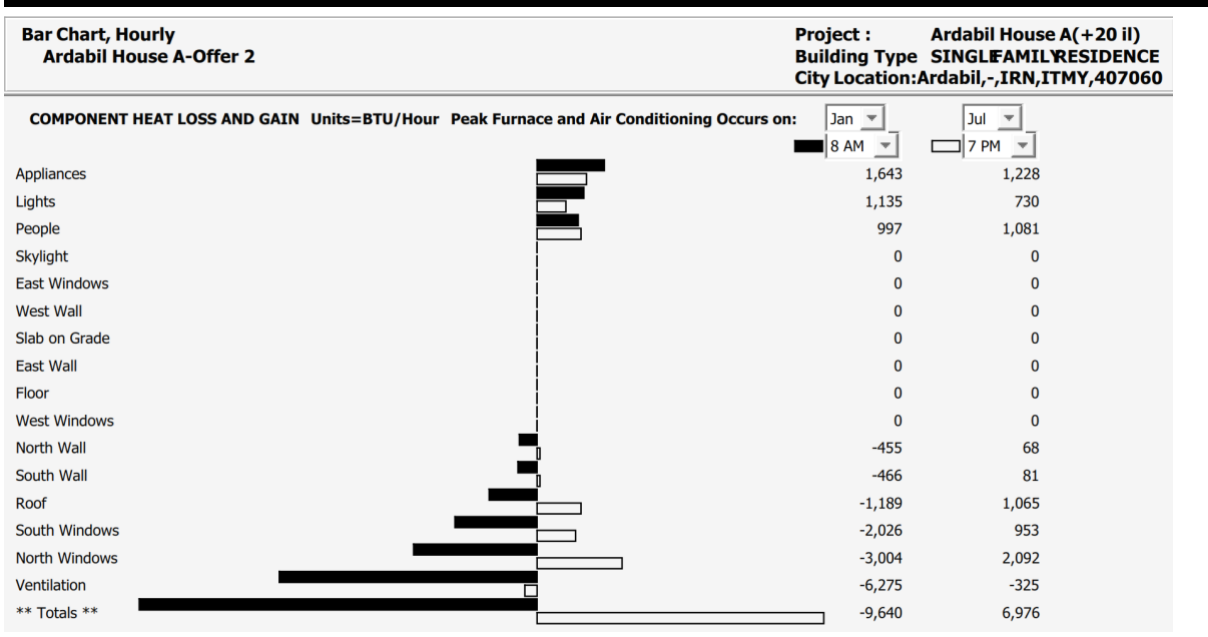
**Specification of Proposal option B**

Climatic, structural, architectural and applied heating-cooling equipment (HVAC) in this option is the same as option A of the proposal, and only one window of 1 \* 1 square feet has been removed from the unnecessary openings - to the south. Table 10.

**Table 9.** Applied Energy Building Standards in proposed option A.



**Table 10.** Applied Energy Building Standards in proposed option B.



## 5. ANALYSIS AND CONCLUSION

Meanwhile, comparing and analyzing the energy consumption of existing urban form in context of micro scale is observed in these houses 130%-150% of that code, energy is consumed, in other words, energy consumption in existing homes in the city of Ardabil is 30%-50% more than standard consumption.

Also, from the analysis of the obtained data, it is observed that the energy consumption in the proposed scheme option A with consumption 85% of California energy standard in 2008 is 15% lower than the standard consumption and the proposed option B with consumption 70% of energy consumption in 2008 California, 30 percent less than standard consumption.

**Table 11.** Comparison of Energy Consumption Based on 2008 Energy Quality Standard, California.

Subject	Consumption Percent to baseline	Percentage differences in consumption compared to baseline	Consumption Percent to baseline
1 According to energy consumption	100	+0	100
2 High energy efficiency	90	-10	90
3 Ardabil houses (over 20 years old)	130-150		
4 Ardabil houses (15-20 years old)		30-50	130-150
5 Ardabil Houses (10-15 Years)			
6 Ardabil Houses (1-10 Years)			
7 Proposed house option A for Ardabil	85	-15	85
8 Proposed house option B for Ardabil	70	-30	70

**Table 12.** Summary Energy Cost Based on 2008 Energy Quality Standard

Subject	Annual energy cost			Amount of savings compared to baseline
	Electricity	Gas	Total (US \$)	
1 According to energy consumption	879.15	860.85	1,740.01	
2 High energy efficiency	473.72	873.16	1,346.87	23%
3 Ardabil houses (over 20 years old)	2,187.84	3,191.16	5,379.00	-209%
4 Ardabil Houses (over 20 - 15 years old)	1,486.70	1,821.15	3,307.85	-90%
5 Ardabil houses (over 15 to 10 years old)	1,158.39	1,520.44	2,678.84	-54%
6 Ardabil Houses (1-10 Years)	775.81	1,480.95	2,256.76	-30%
7 Proposed House No. 1	569.22	795.91	1,365.13	22%
8 Proposed option B	517.31	565.75	1,083.07	

From the analysis of electricity and gas data, it is concluded that the proposed option A, 22%, and the proposed option B, 38% savings compared to 2008's California energy consumption.

Comparing the annual energy cost of existing houses in the city, it is noticeable that the proposed option A offers significant savings compared to the existing residential buildings in the city.

As it is shown in the table 11 and 12, the proposed option B is more efficient in comparing with option A. It is noted that despite the similarity of the other conditions, both proposed option A and B reduce by 0.155% to 141 square feet by reducing the window - unnecessary - to 1 \* 1 square feet, on the south side of the proposed option B, 21% of the total body of that side. Consequently, with the control of the air permeation from 54% to 31%, the thermal load of option B in June and July in comparing to option A has been significantly reduced.

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# THE RELATIONSHIP BETWEEN GLOBAL BRANDS AND IDENTITY OF LOCAL ARCHITECTURE IN ISTANBUL, ISTIKLAL STREET

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## ABSTRACT

Istiklal Street that can be considered as the heart of Istanbul is chosen as a case for this article. The street takes place on the European part of Istanbul that the transformations and changes can apparently be seen in that place during the years. Although the street can be seen branded with its local identities, we can also observe so many global brand space uses on, to realize the type of different brands the street includes. During last years, lots of well-known branded spaces such as chain of fast foods, coffee shops, boutiques and entertainment centers (like Starbucks, Mc Donald's, Mac, Diesel, Mango, Zara, ...etc.) have been located on the street. They try to bring their existent space concepts to the street just like on the other parts of the World they take place. But this street has a special spatial reflection to branded spaces with its local identities that forces them to change for adaptation. So this interrelation enables new space formations on the intersection of globalization and locality. City adopts this branding space with revolution. The revolution of "branded spaces" concept is trying to argue with Istiklal's locality issue. Istiklal Street can be seen as an efficient example for this situation to reveal metamorphosis such as space design, material usage, consumer profile...etc. of "branded spaces", that will be related with the street attraction. Experiencing and determining the metamorphosis of different local and global branded spaces both take place on the street can supply various discussion. So this paper aims to determine this revolution by examined different brands on the street.

*Keywords: Istiklal Street, Branding Spaces, Globally, Locality, brand development, historical urban fabric*

## 1. INTRODUCTION

### 1.1 Location and History of City

Istanbul, which has a fundamental background, has been an attraction centre during the history. The city which has 300.000 years history has sometimes come forward for different reasons but the main important reason was on its geographic situation [1].

The city that has been a bridge between Asia and Europe, had been based in BC 7. In BC 660 the name "Bizantion" was given and its free city status continued till AC324 [1]. The Rome empire encompassed the city and made it the governance centre of eastern Rome. With the Rome Empire's disintegration, eastern Rome had been established and Istanbul became the capital city of Eastern Rome. Later on, Western Rome was demolished and Byzantium Empire was established in AC 5 again. In 1453 Ottoman Empire conquered Istanbul and made it its capital [2]. After the foundation of Turkish Republic in 1923, the capital city status was changed but its importance has never been decreased. Nowadays, most of the cultural inheritance belongs to Byzantium and Ottoman period.

With the acceptance of The Republic, the city drew into completely different process. After a big war, Upon Ottoman Empire's being collapsed, foundation of a new state changed the way of living in this city. Istanbul lost its attraction after the establishment of republic because of the capital city changed.<sup>1</sup> The aim of newly established modern country, the city lived a static period administratively

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<sup>1</sup> Ankara was a new capital of Turkish Republic.

at the beginnings of the Republic [3]. But later, the existed energy of the city rose to the occasion and Istanbul was born from its ashes again in 1980's. The economic improvement being lived in 1980s made the city indisputable leader [4]. As government took place in Ankara, it became an advantage for Istanbul, so that it used its potential for economy, culture, changes, modernization and globalization [5]. Figure 1.



**Fig. 1.** General Photography of Istanbul [5].

With its 15 millions' population, Istanbul is one of the known metropolitans in the world [6]. It is an exceptional international city with its locality. With its accessibility, culture, economy, the city connects people each other, changes rapidly with the help of non-stop movement and gets involved among other well-known cities. The image of Istanbul arouses a picture in many people's mind in the world. And this picture sometimes appears with its history, magnificent naturalness or fast life and creates a brand. The economic and social background of the city accelerates creating this brand.

## **1.2. Importance of Istiklal Street-Beyoglu**

Beyoglu district in Istanbul has been an important area during the history. It was founded as a Latin and Catholic colony in Byzantium period. In different periods Venetian and Genoese got the management of Istanbul but it stayed Latin and Catholic. The situation did not change after the Istanbul's conquest either. The Latin part of population left their place to Greek and Jewish, so Beyoglu preserved being the special centre where Non-Muslims lived. In Ottoman period, this district, where the most Non-Muslims lived, was both trade and living centre. Galata had lived its gorgeous days since the second half of 19th century. In additional to capitulation, the foreigners and minorities who got exceptions with Tanzimat edicted in 1939, became stronger, so Galata became rich rapidly and the embassy houses of foreign countries, churches, big estates, luxury apartment houses, shopping, entertainment and art centers were built [7].

Ottoman accepted European life style as a policy but the Balkan war caused political turbulence in Istanbul while Galata was living its gorgeous days. During the Independence War, while Istanbul was under occupation, Galata hosted and enjoyed occupation forces [10]. Istanbul, Beyoglu which was founded on consumption and also Istiklal Street were negatively affected by the republic's declaration, capital's movement to Ankara, the things brought by new government, the bad economy after war and the negative improvement that the Second World War brought [3]. In 1950's Istanbul was started planning, according to that planning stud, Beyoglu also Istiklal street's architectural features did not change. All special characterization was conserved from architectural details to street parcelization. But immigration between 1940-1980 (living minority's leaving and people's taking place from rural areas) disaffected the social structure of the district [11].



Fig. 2. Old Photos of Istiklal Street [8], [9].

The economic improvement in Istanbul generally reflected to Istiklal Street after 1980. Making street for pedestrians refreshed the trade axle so that the density for residential areas lessened [12]. The district made its own brand in the city addressing different users. It is possible to understand that one part of the city that becomes a brand, by explaining criteria of branding values in urban scale. Nowadays, the street called Istiklal Street-Beyoglu is the most important determiner that expresses the life style of the city.

## 2. Branding

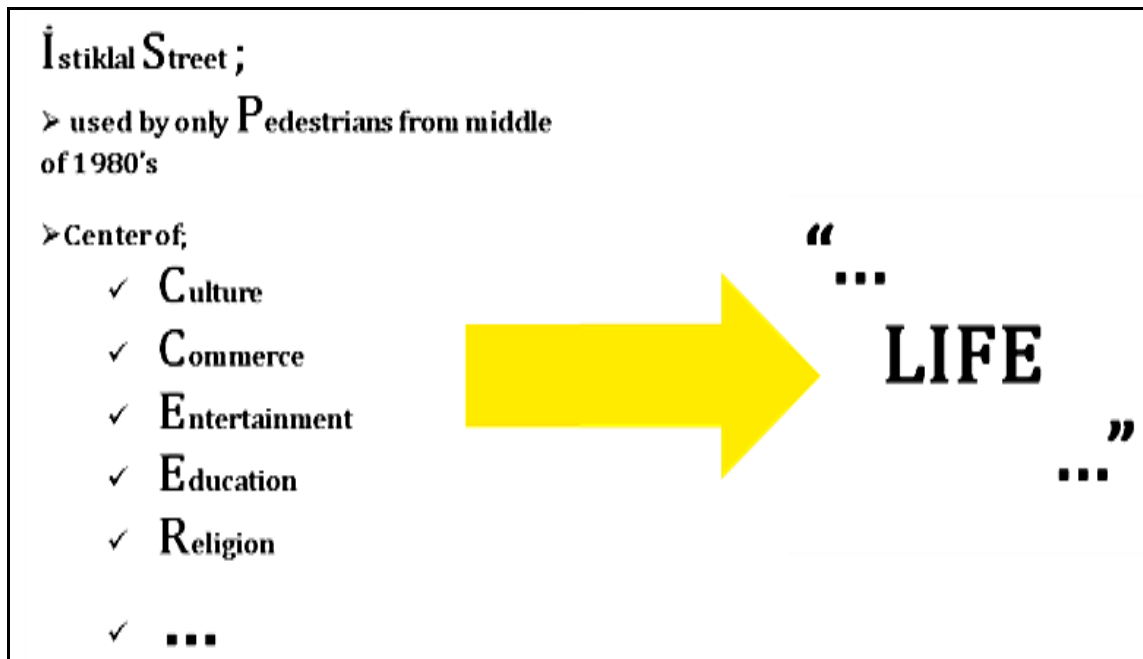
*“The process involved in creating a unique name and image for a product in the consumers' mind, mainly through advertising campaigns with a consistent theme. Branding aims to establish a significant and differentiated presence in the market that attracts and retains loyal customers” [13].*

According to that definition, it is possible to be a brand by keeping different basic criteria together such as making strategic studies to put the importance of the brand forward, preparing management project, keeping the differences of the object ahead and being able to be chosen by users. For a city branding is directly related with previous economic structure and increasing the level of income and level of city life quality is also one of the factors that affected brand value [14]. The city whose life quality is high and knows that it is a rival to all other cities being a brand means it has been a BRAND.

The international investor that comes to the brand value of the city invests in the city which can carry its name to the forward more [15]. Otherwise they have to carry city name with its own brand value. In most of the cities that became brand in the world, the famous firms appear on their own. They don't have to come into prominence in rivalry so the city directly brings the consumers to the stores (like Paris Fashion stores). However, investors, who live in non-branded cities, coexist with other investors and have similar policies implemented. They must work together with competitors to come forward, they have been raced with their differences, slogans, market shares, policies of sales, and try to reveal branding values over the others but this struggle have existed in local scale in the non-branded cities like shopping-centers [16].

Istanbul is a worldwide branding city. Especially it stands out by its geographical location, historical values so it can rise to the other competitor cities with those values. Istiklal Street is the most important factor of the branding of Istanbul. It is the one of the centers where public and the tourists (foreign / local) firstly arrive because of its historical development, physical change without damaging the historical structures, location, investors (local / foreign), and entertainment places like restaurants, bars, theaters. The street usage average is fairly high [17]. It is used as a center of life besides being a connection axis from Taksim to Galata. Trade function is carried out in the main axes but residential usage is also relatively high in the back of the streets. The coexistence of many functions make Istiklal Street a living center.

The main aim of the study, is analyzing the Street's usage potential, discussing differences and approaches of foreign and local investors related to commerce that plays an active role to make Istiklal Street a brand. Local investors are generally small-scale businesses and trying the continuation of the traditional lifestyle. (Figure 4) Global investors are starting to invest in the street because of the potential to access more by right marketing methods. (Figure 8)



**Fig. 3.** Life description of Istiklal Street

These investors are the national investors who are from “Branding Cities”. For this study, any special trade branch is not determined. The international investors’ effects are tried to analyze on the street. Previously local investors are located but now street have changed and had a new face with global investors. But the most important factor in changing of the street is retaining with its locality. Brands have invested to the street as becoming "Istiklal" in historical urban fabric. This change will try to be described by conservation of locality.

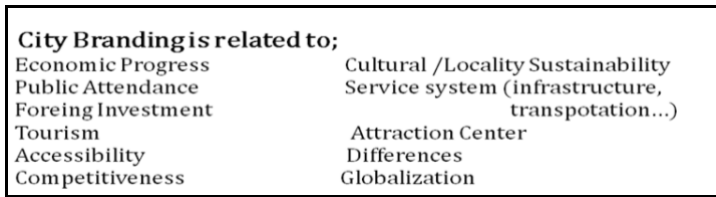


**Fig. 4.** Local Shop Examples of Istiklal Street<sup>2</sup>

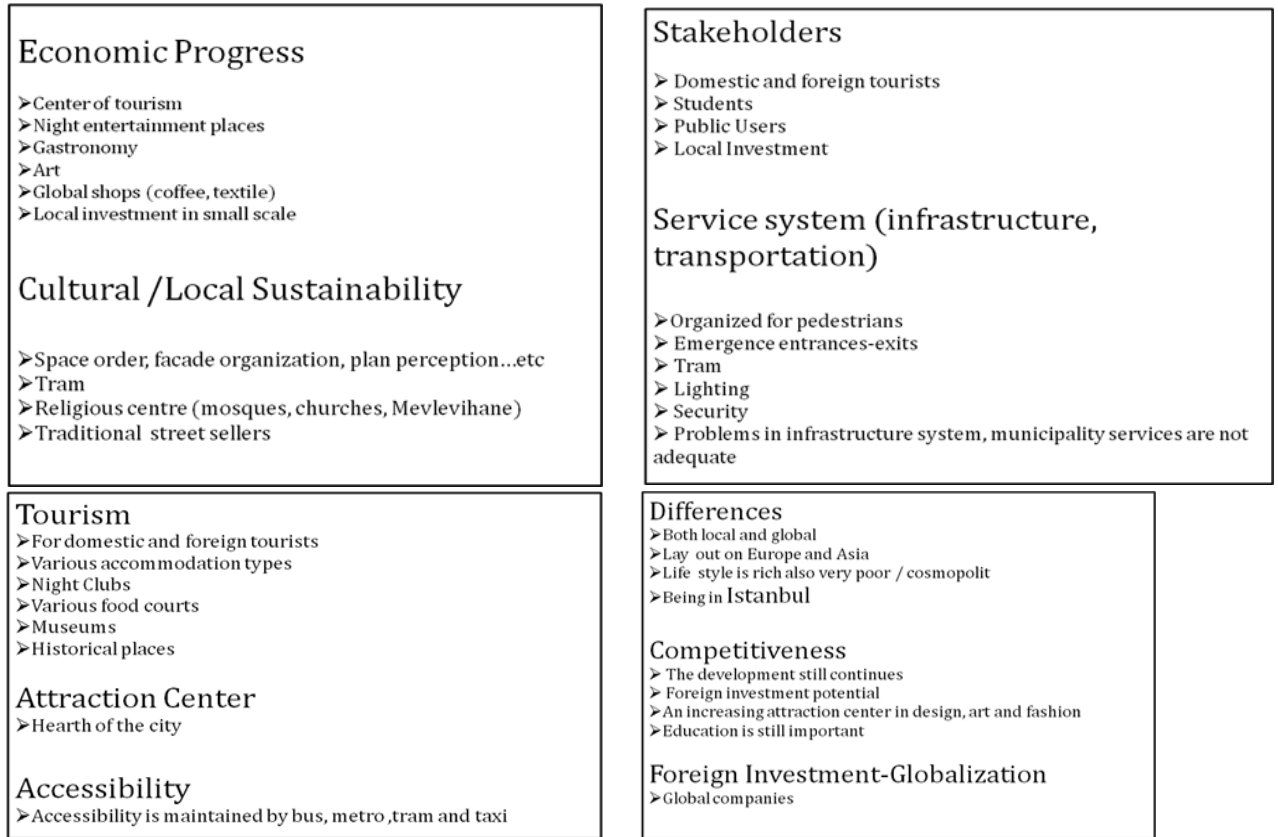
Firstly, cities must have certain contexts for branding. Analysis for determination of these contexts, are tried to make for Istiklal Street. These analysis are; economic development, cultural and local sustainability, participants (local residents, tourists), service systems (infrastructures, transportation, etc), tourism, being a center, accessibility, differences, competition and foreign investment (globalization). This practice has been revealed as weak and strong aspects with this identifies, also potentials that will be developed are defined. With this study, investors' profiles, changes on Istiklal Street and alternations of branding categories are determined.

<sup>2</sup> Photos belong to writers





**Fig. 5.** Factors Related To City Branding



**Fig. 6.** Details of Factors Related To City Branding

**Branding evaluation of İstiklal Street ;**

Economic Progress	✓
Cultural /Locality Sustainability	✓
Public Attendance	✓
Service system (infrastructure,transportation...)	✓
Tourism	✓
Attraction Center	✓
Accessibility	✓
Differences	✓
Competitiveness	✓
Foreing Investment	✓
Globalization	✓

**Fig. 7.** Branding Evaluation of Istiklal Street

These criteria are evaluated to demonstrate Istiklal Street’s branding values. In this evaluation the strong and weak aspects are considered in all functions hosted by the street. By increasing these properties and strengthening life quality makes branded cities or 'part' of these cities to be attraction centers. When Istiklal Street is considered, Istanbul which is a brand city that does not need any

strategic branding efforts, international investments spontaneously settle into the city. Investors try to move their brand values even further in other branded cities but in Istiklal case, being on this street gives different results. International brands' stylistic and spatial characteristics have tried to access into Istiklal's strong traditional properties. This situation is determined by examples which are located on street. For observation of most distinctive and recognizable spatially changes, the investments, which are associated with the global trade, have been selected. International firms have been determined to work according to these defined criteria. Basically gastronomy and fashion functions are selected and studied on these examples. The spatial configurations and formations of the international brands are compared in other cities with Istiklal. As first brand "Starbucks Coffee", a world chain, is selected. The chain of coffee shops, which is part of their own design approaches, can change their image according to the urban concepts but they don't lose basic brand's elements. It can be adapted to the city without compromising their brand colors and font style. This approach is similar about Istiklal Street. Coffee shop, is located by expressing itself fully without damaging the existing structure and also without losing locality. Different from other cities, coffee shop is not coming forward in the urban fabric, it is just located with the representative name of the brand image.



Fig. 8. Starbucks Coffee, Gloria-Jeans Coffee and Mc Donalds on Istiklal Street<sup>3</sup>

Other example is the "Gloria Jeans Coffee" that is a part of worldwide coffee shops chain. Similar to the "Starbucks" café, this shop has branding values and these values can be supported by common colors and spatial design. "Gloria Jeans Coffee" is settled into the traditional part of Istiklal Street with its own interpretation to the street. This store is not expressing any piece of Istanbul, so it is far from the spirit of the locality with its globalized style. One of the significant examples of gastronomy is "Mc Donalds" which is known as an expression of a known brand in each region. No doubt, it is more than one in every city. This hamburger stores, are located all over the world with their own branding values, are usually independent from the urban fabric. It has focused directly on their own brand-oriented values without considering the local characteristics. This situation is same in the store in Istiklal Street. It is located in a historical building's ground floor, and imposed its own design concept to the building so historical part of ground floor cannot perceived because of this implementation. The advertisement posters are also hindered the perception of historical building's facade. However fast food chain doesn't use its latest brand's spelling style here, preferred a more compatible spelling style to the traditional urban fabric. This approach shows that exception of locality will never be fully possible.

<sup>3</sup> Photos belong to writers



**Fig. 9.** Mango and Diesel on Istiklal Street<sup>4</sup>

Fashion shops are other examples of this study. "Mango" is selected as a first example. This fashion shop takes place in many cities in the world. Generally shops are located in modern part of cities with their own modern design but in Istiklal Street, they are in historical part of city. "Mango" is also different from other examples described above; it is opened instead of a major department store in fashion that had a branding value for Turkey. In other word, it is a continuation of a local brand. This situation shows the spirit of the place can be continued by same function but by different brands. Although the pattern of street is historical, building is fairly new constructed. So designers of the store could easily design a new facade for here. "Mango" is constructed as a continuation of the existing clothing store; but only local users perceive this. It means, this continuous is expressionless for the new users or tourists, so new brand is located on the street without carrying the spirit of history. It isn't different from other examples in the world.

The last example is a fashion brand in this study. "Diesel" is a famous sportswear shop which is used by many people. Modern design approach also reflects to its own store design. It stands out with differences in facade and spatial organization in Istiklal Street. With the colour usage, the material chosen, the transparent facade organization and different designing, it shows its brand value.



**Fig. 10.** Other Fashion Shops on Istiklal Street<sup>5</sup>

### 3. CONCLUSION

The brands settle into patterns with their designing expressing values. But as in some examples, without extinguishing the locality, ensuring the continuity of spirit of the traditionary while there are naturalized brands, as in some examples, free from the essence of the locality, show themselves with their independent designing power. It is difficult to conclude from this kind of study. Changing and conservation are not terms which means opposite, computing or destroying oneself but terms that have to supply each other. The international brands must be provided to settle into locality without losing its essence. Istanbul "Starbucks Coffee" and Paris "Starbucks Coffee" has to be thought different from each other. The main important thing must be the city not the brand. Istiklal Street is a part of a city that tries to be a brand without losing locality adapting brands to itself. The brand value will be possible to be global without separating the street from locality.

<sup>4</sup> Photos belong to writers

<sup>5</sup> Photos belong to writers

As mentioned in the paper the factors related to city branding can be evaluated to demonstrate the city's branding values. The city is also a brand with its heritage identity and the role of urban planning, urbanization, masterplanning has a significant role to keep its value. The main issue is to preserve the identity of the local architectural heritage while the city is contacting with the global brands. So the global strategies of the countries become more important today to present the city on worldwide scene with its locality under the effects of branding.

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# SUSTAINABLE STRATEGIES OF REGIONAL PLANNING FOR LIVABLE CITIES

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## ABSTRACT

The rapid re-planning of cities in developing countries has mostly manifested as taking European success of urban approach into society and economy. Many issues in the Eastern areas show that the cities are growing globally under common strategy. This is a case where there is no consideration of the local factors of people mentality, climate, local architectural originality, heritage etc.

Human civilization in general is progressively driven by product industry and social behaviors dominate in the world ecosystem, which is specifically circulates in all biological systems and other existing substance. Nonetheless, natural life surviving and high value of utilization by peoples lead to the approach of actual changes among issues.

Regionalism begins to rise in the political agenda mostly in European countries (for instance the UK, France, Spain, Germany etc.) leading to growing experiments with both philosophy devolution and environmental degradation. Meantime this process has been getting more academic interest in the way in which regionalism has been inserted into state reconstruction. Nevertheless, all main regional institutions in the civil world actually are changed with pursuing sustainable development as part of their strategic approach to economy, regions planning and urban management.

Regionics intends to reveal the significance of these factors of the formation of distinctive and identical architecture, for the creation of the expressive urban space and give a way to the planning of a sustainable city. This paper explores the overall view of the conception of regionics as a new discipline of region and urban planning. Linked to such concept of equal coexisting of human beings and planetary environment has emphasis on planning of livable cities as an integrated concept and indeed integrated device, with its insistence on the needs to see economic, social and environmental issues as always inter-related. Ideas regarding regionalism and sustainable urban planning are applicable in many societies around the world, both in economically developed countries and in regions that have either a chronology of the colonial intervention or the status of developing countries. The monography 'Regionics' is the first generalizing, conceptual work on the region and the sustainable development of cities, which has the opportunity for the first time to be presented to a wide audience. This paper also addresses establishing the important requirement of the way of the sustainable strategy for livable cities.

*Keywords: regional features, urban planning, regionalism, trends, local factors, regionics, sustainable development.*

## 1. INTRODUCTION

Since the 1960s the field of architecture and architects have been repeatedly criticized for ignoring the importance of understanding and working with historic buildings. Recently, with the rise of sustainability and "green" buildings, the argument has been expanded to ignoring the rehabilitation and reuse of existing buildings regardless of their official "historic" qualifications [1]. Historical and spiritual values of the people culture, natural and geographical features of the place where architectural works and town-planning complexes were established have always been the most active factors that provided the architecture of cities and regions with diversity and expressiveness.

Regional features of architecture and urban planning are manifested in all their elements, mainly in the typology of housing, the features of spatial solutions, the methods of forming residential development, the materials used and the structural and technological solutions, architectural images

and aesthetic features of settlements. Historically formed images are the basis of social, family and personal stereotypes, which are mainly expressed in mass development, especially in the architecture of housing. In this regard, the progressive traditions of vernacular architecture should not be left outside the educational and practical design despite some inconsistency in the problem of isolating the specifics of regional architecture and urban planning [2].

Taking into account the above-mentioned significance of the “*regional*” in architecture and urban planning, as well as the core role of the *foundations of the regionics* in the design process, let us take a look at the history of this issue.

Progressive trends in science began to take shape in many countries of the world in the 60s of the XX century. In the 70-80s, this trend in the form of a so called regionalism began to cover not only the architecture and urban planning, but also the related subjects: geography, history, ecology, and politics. However, a theoretical basis which would summarize separate studies into a single scientific theory did not yet exist. Only in the early 90s of the last century did the foundations of a new science — regionics — were laid in Azerbaijan. The term “*regionics*” (from Latin. "Regiono" and English. "Region") was proposed as the one to reflect the essence and goals of the new theory in the best way [3]. Some of its principles are borrowed for developing by the International Academy of Architecture of Eastern Countries and are becoming the impetus for a discoverer of new scientific researches in the field of architecture and urban planning.

Regionics is a new trend in science which studies the evolutionary development of settlements and their architecture. This scientific discipline was discovered by the famous urban planner, prof. F.M. Huseynov, who got his ScD at age 39. In his lifetime he has launched many region and urban planning programs, wrote numerous books and had been the head of architecture and urban planning faculty of Azerbaijan University of Architecture and Construction (AUAC) for 30 years. Leading the architecture faculty he certainly created a new vision and level of architecture school that he left behind.

From a methodological point of view, the study about regionics allows to reveal the essence of the processes of structural planning and functional development of cities in specific regions that helps determine the basic laws of the architectural and spatial planning of the new and historical cities of the East, Arabic, Turkic and other worlds. Because of regionics we can enhance the knowledge about the ideology of Islamic architecture and its difference from Western models, and clearly formulate our understanding of the original "national" architecture of Eastern countries and other regions.

Regionics as a modern practice of architectural design and urban planning has not yet been fully formed. With the complete absence of regional norms, rules and legislation, an empirical, intuitive search for new forms of architecture is being conducted. Many research centres created under initiative of prof. F.M. Huseynov, including: KANON - educational, research and design centre, ELM 2000 creative production company, “Region XXI” (Society of Urbanists of Azerbaijan) were focused to find architecture that would be in line with the spirit of the place and time. The practical scope of the regionics is particularly evident in proposals which focused on founding the standardization of low-rise residential buildings, in the projects of stepwise-cascaded and blocked housing, providing the planning of courtyards, shaded terrace, naturally ventilated and insulated rooms, providing human comfort and microclimate during high summer temperatures with increased solar radiation and complex topography.

## 2. REGIONICS AS AN INTERDISCIPLINARY FIELD

Regionics is able to unite scientific and practical researches in various fields of knowledge: from engineering, geography, sociology, biology and politics to art history, culture, music, painting and other humanitarian areas of human activity. It leaves the doors open to planners, demographers, ethnographers, archaeologists, economists, and psychologists. It has a big interest in areas of microclimate and energy, landscape architecture and ecology. Thus, the concept of regionics includes everything that expands our knowledge about the space of human life activity, cultural traditions, the evolutionary growth of settlements, urban studies and the national architecture of specific countries and people mentality.

At the Department of Architectural Design and Urban Planning of the architecture faculty of the AUAC, the basic knowledge of the Regionics as a discipline is studied in the bachelor degree and is enhanced further in the master degree according to students' specialization in two main subjects: "Architectural Regionology" and "Urban Planning Regionics". This takes into account the characteristic features of various regions of the world, of our country, as well as radical changes in society itself.

The subject and essence of the region is directly related to the world architectural trend of regionalism. Therefore, it is important to establish the significance of regionalism in architecture and urban planning of various countries of the world from the very beginning [4].

Regionalism (from Latin. "regionalis", English. "regional"), which in some sense is a branch of organic architecture gave rise to a number of original structures in the middle and in the second half of the XX century. Addition of regionalism falls on the 30s of the XX century is associated with the aesthetic rejection of the impersonal geometrical avant-garde. This rejection became even more irreconcilable in the 50s in response to an even more aggressive spread of a new wave of modernism, surging on the world architecture from the United States under the name of "international style".

First of all, regionalism began to take shape in Europe, then in Latin America, Japan and other countries. The development of regionalism was defined not only by the shortcomings of modernism, but also by the peculiarities of social processes in the post-war years [5]. This period is characterized by a sharp increase in the mobility of the population, even a low-income part of the population due to the development of the mass tourism. Travelers and tourists are the first (but rather superficial) seekers of originality of the places and their architecture. Another process was going on in parallel during this period - an in-depth and extensive activity focused on the restoration and reconstruction of historic cities, which turned in the second half of the XX century into an independent branch of research and design in Italy, Austria, Germany, France, Great Britain and other countries [6]. The search for the artistic identity of nations and countries, especially those that have lately gained independence play an important role in the formation of regionalism.

### 3. EVOLUTION OF THE ARCHITECTURAL CONCEPT IN DIFFERENT COUNTRIES

The experience of designing national pavilions for numerous international and worldwide exhibitions contributed to the identification of (sometimes exaggerated) regional architectural features. In the XX century the architects of the Scandinavian countries were the first to take the path of consistent regionalism, they were one of the first to learn the lessons of modernism, and started to move away from them in the 30s. The use of urban planning and layout techniques of modernism (small buildings, rectangular volumes, flat roofs, open underground, etc.) led to the deterioration of microclimatic parameters of the buildings and being in the climatic conditions of Scandinavia.

According to the regional conditions, the transitions quickly took place here to blocked and semi-blocked buildings. These have been planned predominantly as a long or often by curvilinear layouts in terms of housing, repeating the pattern of horizontals where these buildings have reshaped the mountain slopes, characteristic of Scandinavian relief. The need for a natural snow dumping process has resulted in moving away from the flat roofs and returning to the traditional sloped, mostly steep sloped roofs [7]. Finally, the danger of excessive heat loss and downgrade of the microclimate of the ground floor required to stop constructing buildings on separate pillars and arranging warm underground shelters or basements. Excess heat losses through the ribbon windows have led to a reduction of the openness of the outer walls and transformation to the closed shape of the windows, and sometimes to the planning of the skylight.

A return to the traditional architectural forms has forced to give preference to traditional materials such as stone, brick and wood. Finding aesthetic features of modern constructions in traditional materials (for example, bent wood gluing etc.) in the volumes and interiors of public buildings became a characteristic feature of Scandinavian regionalism. It was very clearly expressed in the projects of the outstanding Finnish architect Alvar Aalto.

Simultaneous establishment of the same types of structures and constructive methods is observed at the early stages of human development in hot regions and countries, sometimes separated by vast distances and without any connections between them (which excludes the fact of borrowing).

Peoples of different continents experiencing similar unfavorable natural-climatic factors for a long time had been gradually developing, and then continued to improve general principles of the regional interpretation of forms of architecture and environmental improvement. Later, as a result of improving relationship between states, reaching similar levels in the technical upgrades, the colonization of large territories of undeveloped countries situated in intertropical latitudes by Europeans and due to a number of other reasons, the climate was usually neglected and soon completely forgotten [8]. Adoption of architectural and compositional techniques from other areas (mainly European) was ongoing, which resulted in the fact that all recent European achievements in the construction realm found a reflection in the architecture and planning of buildings in hot countries. At the turn of the XIX and XX centuries, during the period of eclecticism in architecture, the construction practice of hot countries observes a tendency of a free combination of artistic forms of various styles borrowed from both the architecture of various countries existed in the past and from local architecture. It created chaos in architecture and led to the climate control and local conditions and traditions to be completely ignored. For example, a good evidence of this is the reconstruction of Delhi, the capital of India which was carried out in architect Ren's style, as well as types of Georgian and Victorian architecture on the territories of English colonies. Even the creative trends of functionalism and constructivism that appeared in the 20s of the XX century as a protest against eclecticism and stylisation, which played a certain role in the development of the new architecture, were distinguished by the narrowness of the rationalistic approach to architecture and, in many cases, a negligent attitude to the specifics of local conditions. Later this purely utilitarian functionalism, which was gradually losing the features of the creative method and putting some of its examples into the dogma, was transformed into a kind of "international style" that operated only with the external attributes of an expedient form. It was instilled in the undeveloped and dependent countries as a symbol of political and cultural domination of the West and did not consider either the environmental conditions, or the climate, or the traditions of the architecture of each country [9]. Returning to the wider canvas, Healey and Shaw (1994) have argued that the development of discursive, communicative approaches to exploring the form and content of development plans is more likely to reflect the breadth of contemporary understanding than the calculative approaches used by the Government. [10] The evolutionary changes in panning approach is given in (Table. 1)

**Table. 1.** Environmental planning: the historical context (updated and modified version of the framework provided in Healey and Shaw (1994))

<b>Methods</b>	<b>Function story</b>
Welfare utilitarianism (1940 - 1950)	Separation of town and countryside was central to planning activities in the pre and immediate post-war period, emphasizing the restriction of urban sprawl through devices such as green belt and the protection of agricultural land
Growth management (1960)	During a period when planning was preoccupied with growth, the environment was treated largely in functional terms as a resource for recreation, an amenity and a provider of an aesthetic setting
Active environmental care (1970)	During the 1970, the attitude towards countryside nature changed from being a back-cloth to one where natural systems needed to be managed. Local authority intervention in the countryside increased with a new emphasis on recreation
Market utilitarianism (1980)	In a period of deregulation with a presumption in favour of development, moves to relax green belt policy fell foul of Conservative Party supporters in the shire counties and were withdrawn. Elsewhere, the environment was viewed as a tradable asset with private developers promoting the idea of planning-gain
Environmental sustainability (1990)	Following the return to a 'plan-led' system and the 1992 Rio Earth Summit, sustainable development became the buzz word in planning. Early attempts to operationalize sustainable development focused on techniques designed to protect environmental assets such as carrying capacity, environmental capital, and environmental appraisal
Quality of life (later 1990 - 2000)	In part arising from professional concerns about the lack of attention to the socioeconomic aspects of sustainable development, and following the election of the Labour Government, sustainable development was re-defined as a holistic concept about 'quality of life'. The environment was one of four objectives of sustainable development, to be met at the same time in pursuit of win solutions
Not quantitative evaluation of standards for urban planning	Characterization of city by social support, healthy life expectancy freedom to make life choices, generosity, trust. Although, happiness has been evaluated by many researchers, there are very limited studies on happy environment, specifically happy cities. In addition, different methods that



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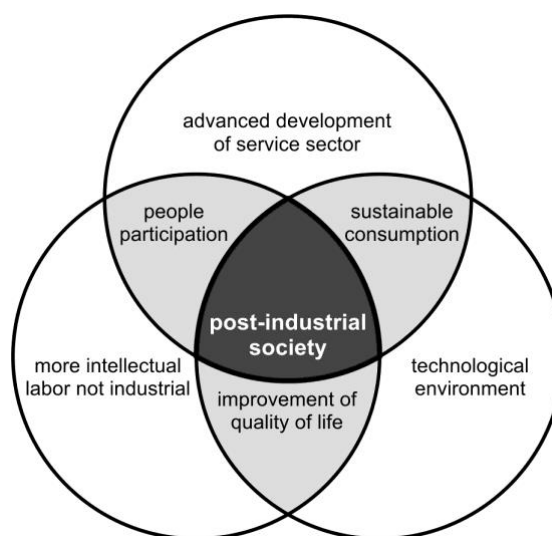
(2012-2018) have been introduced for measuring happiness by previous studies have several major shortcomings. Firstly, happiness is considered equivalent to satisfaction or the quality of life. Secondly, the majority of these methods are not easy to follow and it is difficult to connect them to design process. Furthermore, these methods support only a limited number of indicators and majority of them are not related to the happy environment

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This led to contradictions with the principle of a sustainable approach to architecture and urban planning. In the mid-30s of the XX century, organic architecture became one of the most common trends. The leader of this movement, architect F.L. Wright, insisted on closer links between architectural forms and nature, and on diluting of urban development in the landscape. Regional architectural schools were established under the influence of organic architecture in Finland and Sweden. Interest in local traditions and national architecture revived in Japan, Brazil, Venezuela, Greece and a number of North African countries.

#### 4. THE TRENDS AND DIRECTION OF THE REGIONALISM

The objectives of improving the efficiency of economy, creating sustainable social relations and management of urban planning in Azerbaijan are closely related to the improvement of city structures and settlement system. Regional urban planning appears in a state of a young independent country as one of the most important elements of the long-term development of the material and spatial environment. It intends to provide the necessary prerequisites for sustainable territorial development, as well as the creation of qualitatively new architectural works, worthy of the era of post-industrial and informational society (Fig. 1).



**Fig. 1.** Concept of competitiveness in the context of post-industrial society (developed by author)

Based on the expanding practices of contemporary architecture in capital cities, long-term planning, and systematic approach, the improvement of regional urban planning could be achieved by several basic goals.

*The first main (social) goal* of urban planning of Azerbaijan lays in the creation of urban planning prerequisites for the formation of a population management system that provides the best living conditions and comprehensive development of a person.

*The second main (economic) goal* of the development of modern urban planning in Azerbaijan should aim at creating conditions for resettlement, actively contributing to the further rational development of the country's economy.

*The third main (environmental) goal* of the development of urban planning in Azerbaijan is to identify the trends for the development of settlements in the country, contributing to the improvement and protection of the environment.

*The fourth main (aesthetic) goal* of urban planning is to create a harmonious system of settlements, convenient and rationally planned cities of Azerbaijan, distinguished by their expressive and unique architectural and artistic image.

Each of the above-mentioned goals of the regional urban planning of Azerbaijan is broken down to smaller goals and objectives, which interact with each other and define general trends in the development of settlements network during the post-industrial society phase.

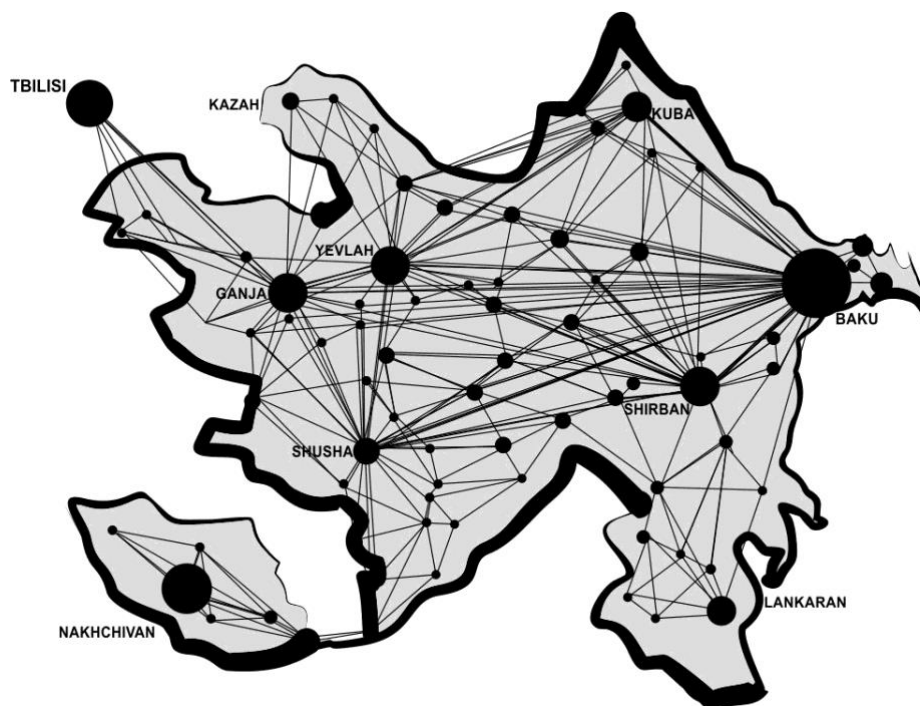
**Social goals of sustainable development of cities.** The main social goal of perspective urban development of Azerbaijan is predetermined by big changes in the conditions of our society, which, under the influence of the scientific and technological revolution, lead to a change in the social content of a free time, expansion of people interests, changes in people activities, enhancing spatial and social mobility. In such conditions there is a need for upgrading a settlement system of Azerbaijan to provide every person with a lot of opportunities for choosing a profession, education, trades and advancing skills and qualifications.

Social trends in growing needs of Azerbaijan people in material goods and services significantly affect the development of the network of settlements in the country. The process of industrial specialization in Azerbaijan economy inevitably decreases functional content of autonomic settlements, creates prerequisites for more easily accessible and wider selection of activities and development of socio-cultural centres mainly located in big cities like Baku, Ganja, Sumgayit and others. As a result, at the beginning of the XXI century one can notice a transition from isolated to interconnected resettlement on the territory of the whole country. To achieve the social goal of a perspective urban development in Azerbaijan of the XXI century, the following main objectives of the sustainable urban development must be considered:

- providing an accessible selection of places for labour, service centres, leisure, education and recreational areas for the population of cities and rural settlements;
- overcoming significant differences in living conditions in urban and rural settlements of different sizes, economic profile and location;
- rational use of the existing capital housing and communal fund of settlements and the restoration of historical cultural and architectural monuments.

**Economic goals of sustainable urban development.**

The main economic goal of urban development in Azerbaijan in the XXI century is predetermined by further intensification and concentration of social production, changes in sectoral and territorial proportions of development of the economy of the country, changes in the employment of the population, upgrades in vehicles, increased agricultural productivity, etc. The modern period is mainly characterized by the intensive growth of oil production and refining, mining, metallurgical, electrical and technical, food industry, as well as production of construction materials. Continuous introduction of science into production is going on under the influence of scientific and technological progress [11]. The decrease of employment and at the same time the growth of mechanization and automation in the labour-intensive sectors of the exploration industry of the country significantly reduces their role in city formation. Accordingly, the city-forming functions of the final branches of the manufacturing industry, science, education, culture, and the service sector are growing. Their faster development leads to qualitative structural changes in the market economy of Azerbaijan, which in turn has a big impact on the transition from historically established and relatively autonomous forms of development of populated areas to interconnected and integrated resettlement [2]. The traditional paradigm of working mood has changed. Figure 2 show the principle change in transportation after the new way of networking and outstanding coworking methodology of communication and business. The system of links between the urban centers is going to be more complex. The cities are not more a single area having potential for synergetic commune activity. The initiatives have grown in agglomerations. From this moment its independence and self-organization give an opportunity for subarea which was before under stringent control of regional centers. This process globally makes the changes into the pattern of peoples moving.



**Fig. 2** The development of the spatial links between regions and cities in of Azerbaijan (resource of author)

To achieve the economic goal of urban planning in Azerbaijan, the solution of the following main objectives must be considered in the XXI century:

- the creation of settlement systems, contributing to the formation of a regional economic complex and more local production areas based on the market model of the economy;
- the development of conditions for sustainable settlement, including the development of small and medium-sized cities, taking into account the full use of labour resources, the resettlement of refugees and a streamlined migration of the population;
- the formation of settlement system, which allows to overcome an excessive concentration of production in the regional center - the megalopolis of Baku and the creation of new jobs, small and medium businesses in the farther regions of the country;
- the selection of trends of sustainable urban development, contributing to efficient use of agricultural land;
- providing conditions for the reorganization of rural settlements, contributing to the restructuring, specialization and intensification of agricultural production, the development of agro-industrial zones and farms.

**Environmental goals of planning of sustainable cities.** The main ecological goal of the urban development of Azerbaijan in the XXI century is defined by the need to maintain the ecological balance and a favourable natural environment in various regions of the country, to meet the needs for a healthy natural environment, to create an ideal microclimate in attractive landscapes that are generated not only by natural-biological and hygienic needs of a modern man but also his growing cultural demands.

Due to its geographical location, complex terrain (from -28 to 4480 m), and variety of climate factors (9 types) Azerbaijan has an extremely rich nature.

Such a variety of natural conditions, indeed, stimulated the development of industry, diversified agriculture and, as a result, increased the impact of human economic activity on the natural environment. The development of Azerbaijan settlements and, above all, its cities leads to a significant change in the environment and brings issues of ecological nature to the attention of city planners. In this regard, consideration of environmental factors, assessment of links in the natural complex and of consequences taking place under the influence of the urbanization process and the development of a network of settlements in the region [12,13,14] becomes one of the most significant issues in Azerbaijan.

This goal involves the following main objectives:

- defining the scale of development of cities and other settlements, taking into account the prevention of pollution of the air and water basins, as well as the soil and vegetation cover of the region;
- providing conditions for the restoration and maintenance of ecological balance based on the stable development of zones of active urban planning and agricultural development, protected natural landscapes in the region.

#### **Architectural and urban planning goals of sustainable cities development.**

Development of a comfortable and beautiful city, which meets the needs of the post-industrial, informational society has been and continues to be the main aesthetic goal, expressed in achieving the expressiveness and originality of the architectural and artistic appearance of the cities of Azerbaijan. It unites Azerbaijan architecture with the architecture of other countries of the world, multiplying its characteristic features coming from regional peculiarities. The architecture of Azerbaijan should continue to develop on the basis of organic combination of global modern tendencies with traditions of national culture and vernacular architecture.

The main trends at increasing aesthetic expressiveness and obtaining originality of architectural and artistic appearance of Azerbaijan settlements are:

- Integral structural and planning construction of the city and spatial interconnection of architectural ensembles of residential areas, industrial zones, public centers, transport systems and green spaces;
- Formation of a silhouette of the city, its panoramic prospects with inclusion of the vertical accents and development of variable storeys into the overall composition of the urban environment;
- An organic combination of new and historically developed buildings in the renovation of cities, preservation of the monuments of architecture and of valuable historical and cultural heritage;
- Active use of works of monumental art in synthesis with urban architecture of cities, their districts and separate buildings;
- Interaction of new socio-functional and technical-economic requirements with architectural and artistic traditions of Azerbaijan national architecture;
- Comprehensive consideration of natural factors in the spatial organization of populated areas and effective use of local construction materials.

These trends should be consistent with the typological peculiarities of the cities of Azerbaijan, their economic profile, size and condition in the settlements system of the country. Construction of an expressive and clear composition of urban environment in Azerbaijan should be carried out taking into account the requirements of efficient use of material resources on the basis of industrial methods of construction, increase of technical level and maneuverability of the construction base, considering local natural-climatic and territorial peculiarities of the development of settlements. In the process of transformation of the architectural and spatial appearance of the historically established and new cities of the country, the complexity and consistency of solving social, functional, technical, economic, artistic and aesthetic objectives arising from the general goals of regional urban planning should be ensured.

In Azerbaijan, being an area of ancient settlement and having preserved a significant number of architectural monuments of different epochs thank to its historical peculiarities, the scope of renovation of the existing Old City areas should steadily increase. The use of historical and architectural heritage and improving the efficiency of renovation of historically developed areas will require implementation of three important trends:

- Development of scientific research, experimental design and material and technical basis of capital repair, and reconstruction of buildings and structures of historical building;
- Development of the methods to manage renovation of historical buildings, ensuring coordination of design works, concentration of resources, mutual linkage of construction works to repair preserved buildings and construction of new and structures;
- Development of the scale of actual renovation of historical buildings, as well as new construction in accordance with the requirements of protection of the historical environment and town-planning peculiarities of the regions of the country.

Planning of sustainable urban development on a systemic regional basis will achieve a significant social, economic and urban-planning effect.

*Social* efficiency of the complex renovation will be expressed in the substantial improvement of living conditions.

*Economic* efficiency will be determined based on the efficient use of material, technical and labour resources, as a result of their concentration at certain town-planning facilities.

*Urban* efficiency will consist of the possibility of achieving a high architectural-artistic and functional result in the specific conditions of the region.

## 5. CONCLUSION AND RECOMMENDATION

“*Regionalism*” deserves a special attention amongst significant and ever-growing diversity of new trends in the modern foreign architecture of the XX century, since it recognizes the importance of local climate conditions being considered not as part of one state or a nation but within a larger belt or zone with almost identical climate conditions.

A famous Japanese architect Kenzo Tange is worth mentioning here. He always warned about misunderstanding of traditional forms of regional architecture. Tange used to say: “I don’t think that regionalism is the best way to express local tradition. Many regionalists wrongly believe that the use of special forms specific to one region can lead to the creation of something original. I believe that tradition does not guarantee anything, does not create anything. Nowadays, creativity is expressed by both the technology and humanism. Tradition is only a catalyst that activates a chemical reaction, and dissolves itself in it. Tradition itself can participate in creativity, but is not a creative force by itself” [15].

Regionalism can lead to a positive result only if each region with its actual conditions, contradictions and its own complexities sets the standard in order to overcome a “local tradition”. For Kenzo Tange it was not about imitating historical forms of architecture and adapting them to modern times, he was guided only by modern requirements. Tange believed that the tradition continued only thanks to the new [16].

One can recreate a lifestyle and structure of a corresponding society based on the architecture of a certain historical period viewed in its broadest sense as the art of arranging spatial structures that shape the environment required for people's livelihoods.

In modern conditions the intensive development of all types of production, especially industrial production as well as rapid population growth, its concentration in cities and the increase of a vehicular transport adversely affecting the urban environment over the years.

Searching ways to improve the ecological situation and the organic interaction of society with nature is one of the main goals of modern urban planning and architecture.

The environment is shaped by both nature and society. Society cultivates nature, transforms it, establishes control over the forces of nature, uses and subordinates it. The linkage between climate and architecture is based on the principle of the inseparable unity of the human body and the environment. Hence, human and his/her physiological perception of the environment created to meet his/her biological needs serves as the criterion for evaluating any architectural work.

In the early stages of human development urban planning was closely linked to the climate and the environment. A human had to solve construction problems put forward both by the climate and natural-geographical conditions of the construction area and by local materials. Even in ancient times regional adaptation was recognized to be an essential principle of architecture. Vitruvius noted this in his book “Architecture”, Al-Farabi also noted this in his philosophical work “A True Happy Life” expressing thoughts about a “beneficial city”.

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# HIGH-PERFORMANCE SUSTAINABLE FACADES AND THEIR IMPACTS ON URBAN SPACE

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## ABSTRACT

The objectives of this paper determine methods and ways to create high-performance sustainable facades and also identify their impacts on urban environment. In the cities the temperature is often higher than in suburbs, and it can lead to high expenditures to energy for cooling and heating the buildings. The main purpose of facades is to separate the external environmental effects building's from and provide comfortable conditions inside of the buildings by the principles of the passive and active design.

Facades of buildings contribute not only attractiveness of the external appearance of urban space, but also primarily responsible for energy consumption. Therefore, they should be designed so as to ensure a pleasant appearance of the city in parallel with the application of sustainable principles. The first part of the paper was devoted to adaptive climatic methods for sustainable facades. For such types of climate as hot, cold and moderate, their respective methods have been defined. In the second part of the paper was discussed about the influence of facades on the urban environment, examples of basic façade systems, as well as were shown the table of geometry of shading devices.

*Keywords: facades, energy efficiency, energy saving, solar, sustainable, urban space.*

## 1. INTRODUCTION

Today, one of the actual challenges can be considered like are the exhaustion of natural resources, environmental pollution, global warming and so on. Many countries in the world are taking certain steps to introduce sustainable strategies in different areas of activity. Sectors such as transport, business, and manufacturing have become leaders in terms of applying sustainable strategies for protecting the environment and the future generation.

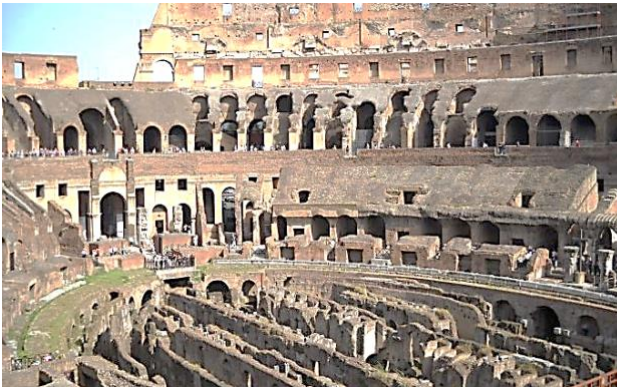
The lack of extraction of natural energy resources in the 70s of the last century led to an energy crisis in many countries. As a result, prices for fuel and other energy resources increased several times. In some countries, the government had to introduce limits on their use. Thus, the global crisis has led people to gradually introduce energy-efficient systems. Recently, a green movement in the construction sector, creating a balance between environmental, social and economic indicators comes to the fore. It includes a wide range of sustainable actions to reduce energy consumption in buildings, negative impact on the environment and on human health.

The balance between buildings and urban environment is a major factor, which necessary to take into an account at the design stage. Each building has its own effect on the urban space. According to the United Nations Environment Program, buildings are the largest source of greenhouse gas emissions in the world, this uses 40% of global energy and generates about 30% of carbon dioxide emissions [1]. In order to reduce these indicators to a minimum, it is necessary to take following measures:

- apply energy efficient equipment;
- introduce renewable energy sources (solar energy, wind energy, biomass energy and so on);
- use of vertical and horizontal landscaping on buildings;
- apply a high degree of thermal insulation on the envelope of buildings;
- maximum use of solar heat and light gain in buildings (atrium, skylight, roof monitors);
- choose the best orientation of buildings.

## 2. THE EVOLUTION OF FACADE CONSTRUCTION

In the aesthetic concept and in the role of external enclosing facade of the buildings are their main elements. Even in ancient times, stone, wood and clay were used such as the facade materials. Slightly later, window panes appeared that became widely used in Europe since the 16th century. In order to understand the evolution of facade construction, it is necessary to consider the history of the development of facade systems and using materials. For comparison, we can take two completely different buildings, differing between the time of construction, style, building materials and so forth: Colosseum in Rome (fig. 1) and the stadium World Games in Taiwan. (fig. 2)



**Fig. 1.** Colosseum in Rome, Italy



**Fig. 2.** Stadium World Games in Kaohsiung, Taiwan

The building of the Colosseum is the largest amphitheater in the whole ancient world. In this age those facade materials were applied which were able to achieve. Treated and shaved stone, as well as marble were the main building materials for the construction of the coliseum [2]. Stadium World Games in Taiwan, which in addition to the function of a sports stadium, also produces electricity by solar panels integrated on the facades of the building. The main construction materials are reinforced concrete, reinforced glass, which used such as roof in some parts of stadium and steel beams, that support big amount of solar panels.

In these examples you can see how the building materials used on the facades change over time, and how they fit into the surrounding urban environment as a part of it. If in the ancient period people paid attention to the aesthetic appearance of the building, decorating it with different architectural elements, then in the modern world much attention is paid to:

- functionality;
- sustainability;
- efficiency;
- security.

With the advent of new technologies in the construction industry, facade systems of buildings are changing. Already at the turn of the 20th century, with the appearance of completely different types of facades, such as namely translucent enclosing structures, composite heat-insulating and hinged ventilated (IAF) the image of modern cities were changed [3].

Later appeared green building facade materials that able to be recyclable, have a high level of sound and heat insulation, that can minimize energy consumption, have enough a light weight, and easy to install using. In 21th century in design of modern building facade great attention was paid to energy-efficiency and requirement of high comfort interior environment. High-performance sustainable facades must control the penetration of fresh air, daylight, solar insulation and hold back good indoor microclimate, which promote the health and productivity of the building's inhabitants. Summing up the above we can distinguish the following properties for high-performance sustainable facades in urban environment [4]:



- allow maximum use of natural daylight where it is needed;
- provide the natural ventilation, while cooling the building in the summer and purification an air in the winter season of the year;
- prevent the entry of undesirable amounts of sunlight and heat;
- keep the heat received during the day due to the thermal mass of the envelope of the building;
- prevent heat loss through envelope of the building;
- prevents moisture or cold air from entering the rooms;

It is also worth adding that a significant number of high-performance sustainable facades have such properties as the generation of energy by mean of special equipment (solar panels and wind turbines), which architects and engineers are using on the facades of buildings such as an element of architectural decoration. And another type of modern facade which, thanks to vertical vegetation, located on balconies or on facade walls, cleans the polluted urban air that enters the building, reduces the level of noise pollution and dust.

### 3. CLIMATE-ADAPTIVE METHODS FOR SUSTAINABLE FACADES.

The climate of the area means temperature, humidity, rainfall, atmospheric pressure, wind direction and force. Climate depends on and geographical location and relief of the terrain. Energy performance modeling of building's facade depends on climate. For this purpose, climate data such as temperature, humidity, wind speed and direction, solar radiation intensity is collected. At the same predictive climate model is being developed, which determines the amount of CO<sub>2</sub> emissions in the atmosphere and the temperature change.

The facade of each building has two functions: one of them is separating the inner environment from the outside and the another is being the general silhouette of the building. High-performance sustainable facades systems except for the listed functions can generate energy, be energy-efficient and create the best habitat for people. In contrast to traditional facades, high-performance sustainable facade systems actively revive the external environment, whether it is urban or rural space, reducing the allocation in buildings of greenhouse gases. High-performance sustainable facades play a significant role in having low environmental impact and creating of favorable conditions inside buildings.

For creating climate-adaptive sustainable buildings facades, it is first necessary to take into account the climatic indices of the territory where the buildings are located. Climatic parameters have a great influence on the choice of the type of facade, facing material, the presence of shading elements or gardening, thermal insulation and many other factors. Different design methods should be used for different types of climate in order to create high-performance sustainable facades (Table 1,2,3).

The hot type of climate is distributed almost by more than 50% of the earth's surface area. The hot climate is divided into two types: hot and dry, hot and humid. A characteristics feature of this climates are the high average annual temperature and depending on the territory, high humidity. In a hot dry climate, the preferred layout of the urban space is compact. Narrow streets and buildings of different number of storeys contribute to the creation of shading, which is the main factor for gain comfort. The correct configuration of the streets will allow airing inside the streets [5].

But despite this difference, there are general principles of designing buildings that are typical for both hot dry and hot humid climate. In the traditional architecture of hot climate buildings, it was appropriate to use massive walls reaching almost one meter in width and small window openings. But over the time, with the improvement of building materials, it was possible to escape from these principles. Based on ASHRAE Standard 62.1-2013 (ASHRAE, 2013) natural ventilation should be provided in each building [6]. High-efficiency building materials began to be used in hot climate buildings. The correct choice of facade systems is the main indicator for reducing energy consumption for heating and cooling in buildings.


A cold climate is a very complex type of climate, since extreme low temperatures and strong winds create great discomfort for people's livelihoods. Cold climate has two types: cold climate with dry summers and a cold climate with dry winter. In this climate winter is long and cold and the temperature can reach up to -20 °C, in summer 20-30 °C. Preferred character of the urban layout is compact or mixed. The main factor in the construction of buildings in a cold climate is the elimination of heat leakage through the external enclosing structures of the building. A high degree of insulation should be provided to keep heat inside the building, thereby saving energy consumption for heating. It is necessary to choose such facade materials, which have a low value of heat transfer. Using of a fully glazed facade is

inappropriate in this climate, since the value of U is the highest performing glazing. The placement of windows on the facades of the building should be such that there is more daylight, but at the same time minimizing amount of glazing.


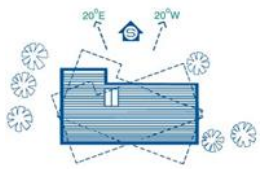
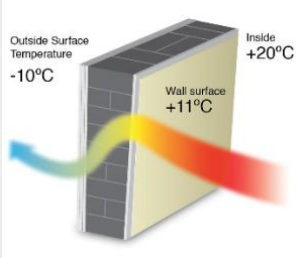
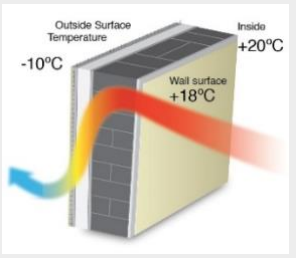
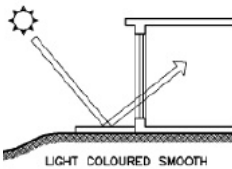

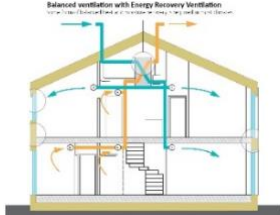
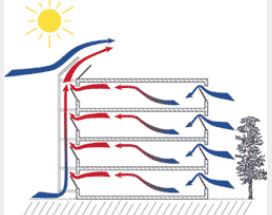



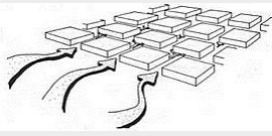
For a template climate are characterized by differences in atmospheric pressure, a large temperature difference in winter and summer, intense winds and a change in their direction depending on the location, as well as precipitation and humidity. In winter, the air temperature drops below 0 °C, and in summer can rise above 25 °C. The preferred layout of the urban space is open or closed forms.

**Table 1.** Facade design methods for hot climate types.

Design methods	Hot Climate
<p>Choosing of the correct orientation of the premises in the building</p>	<p>In order to avoid a strong overheating of the main facade of the building in the summer, it is necessary to orient it to the south, south-east or south-west. Western direction is not desirable.</p>  
<p>Insulation of building envelope</p>	<p>Application of continuous layer of highly insulated airtight materials. This means that any increase in outside temperature will not be emitted through the external enclosing structures inside the building and cooling the premises will take less time. 1- absence of thermal insulation, 2- application of thermal insulation.</p>  
<p>Solar control</p>	<p>Eliminate the direct sun rays on the main facade of the building by means of shading device, greening or shape of the building. This method helps minimize a big proportion of energy consumption.</p>  
<p>Natural ventilation and cooling</p>	<p>Natural ventilation and cooling are provided by the holes on the facades, by means of the wind catcher as in the traditional dwellings of hot countries and water pools.</p>  
<p>Daylight</p>	<p>Daylight reduces energy demand in buildings. It is necessary to use high-performance with reflective characteristic glasses. In order to obtain a greater benefit of daylight, roof monitors are used, which it would be appropriate to place against the direction of the falling rays of the sun. Skylight is not recommended, because of direct sunlight and heat.</p>  
<p>Integration of photovoltaic systems and wind turbines</p>	<p>In addition for the introduction of these systems the appropriate orientation of the building, it is necessary to find a balance between achieving efficient energy and aesthetic appearance of the building.</p>  

<p>Urban planning of streets</p>	<p>In a hot and dry climate, the preferred layout of the urban space is compact. In a hot and humid climate, city planning must be open and free, which favors the movement of air.</p>		
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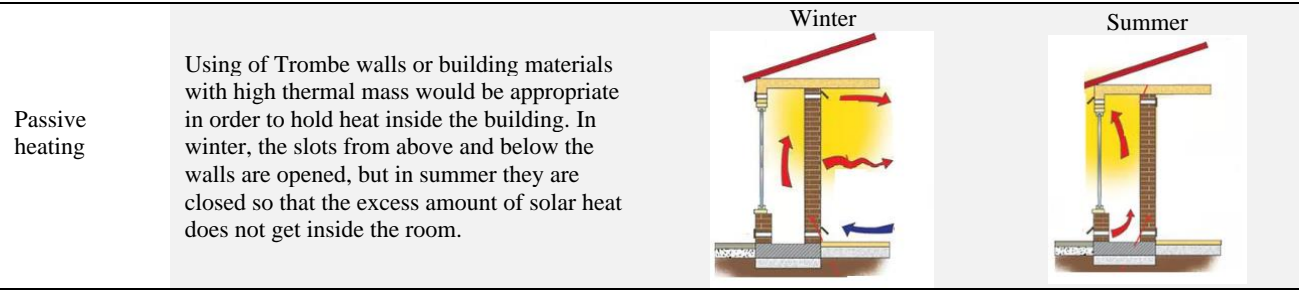
**Table 2.** Facade design methods for cold climate types.

Design methods	Cold Climate		
<p>Choosing of the correct orientation of the premises in the building</p>	<p>The building should be oriented the main facade to the south, south-east or south-west. And if this is a residential building, then all living rooms should be located on the southern part of the building</p>		
<p>Insulation of building envelope</p>	<p>It is the fact that heat always moves to low temperatures areas, and the using of thermal insulation is an important aspect. Not only the facades of the building are responsible for the heat leakage, but also the foundation and the roof. This means that the thermal insulation of the envelope and install very high-performance windows of the building are appropriate for a cold climate. 1- absence of thermal insulation, 2- application of thermal insulation.</p>		
<p>Solar control and daylight</p>	<p>Instead of a lawn around the building as a covering, reflective tiles can be used, which helps to reflect the sun's rays through the windows inside the building. Windows should not be obscured by any shading device. The introduction of light shelves helps to give even greater light profits.</p>		
<p>Natural ventilation</p>	<p>In the summer season, natural ventilation has the property not only to promote the intake of clean air inside the building, but also to cool it. In the winter season, using of natural ventilation is not very effective.</p>		
<p>Integration of photovoltaic systems and wind turbines</p>	<p>In some cases, it is acceptable to use wind turbines for more energy efficiency and solar panels for solar hot water system.</p>		
<p>Urban planning of streets</p>	<p>It is acceptable to orient the streets from west to east so that sufficient sunlight and heat get into the buildings. The distance between buildings should be such that the main facade is not be shade.</p>		

Passive heating	Using of Trombe walls or building materials with high thermal mass would be appropriate in order to hold heat inside the building. But for the complete heating of the building in a cold climate, all the same, there must be interventions of the active systems.		
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**Table 3.** Facade design methods for cold climate types

Design methods	Template Climate		
Choosing of the correct orientation of the premises in the building	The building should be oriented the main facade to the south, south-east or south-west. Homes in template climates are more efficient when the building located on the axis east/west.		
Insulation of building's envelope	Thermal insulation of buildings' envelope gives more efficiency not only on winter, but also in summer.		
Solar control	As in the hot climate, in the template climate to eliminate the direct sun rays on the main facade of the building by mean of shading device, greening or shape of the building. This method helps minimize a big proportion of energy consumption		
Natural ventilation and cooling	Natural ventilation has the property in the summer and winter season.		
Daylight	The use of daylight inside buildings is one of the required factors in all types of climates. Also using of skylights, light shelves, roof monitors would be suitable for achieving financial benefits.		
Integration of photovoltaic systems and wind turbines	For the introduction of these systems, in addition to the appropriate orientation of the building, it is necessary to find a balance between achieving efficient energy and aesthetic appearance of the building.		
Urban planning of streets	In the process of planning the streets, it is necessary to provide protection from the wind through the arrangement of buildings, orientation, gardening or other means		



#### 4. URBAN ENVIRONMENT

Climate change is the global problem throughout the world that leads to long-term and negative consequences for the sustainable development of all countries. Buildings cause a significant amount of greenhouse gas emissions, mainly CO<sub>2</sub>, altering our planet's climate. The building sector is one of the key consumers of energy and is responsible for 40% of energy consumption and 36% of CO<sub>2</sub> emissions in the Europe [7]. The cities play a major role in environmental pollution. But the right urban design can improve air quality and provide a healthy environment for people.

Facade systems of buildings are the main elements that responsible for the energy budget for the entire life cycle of the building and their impact on the surrounding urban environment. In addition to hindering the adverse external influences of environment, highly effective facade systems can minimize energy consumption, also contribute the right urban microclimate. The amount of heat allocated by buildings, greenhouse gases and other harmful substances affects to the urban environment.

In order to create comfortable conditions, it is necessary to consider the city immediately from two positions - its general form of buildings envelope and the layout of individual building sites. Turning to the history of urban development and the experience of foreign countries, we can say that to each type of building corresponds to its planning decision and the choice of building materials for the envelope of the building.

The negative impact on the urban environment through the means facades are the follows:

- shading effect. Excessive shading of the urban territory to direct and diffuse solar radiation by structural elements or green plantations on facades;
- solar reflective effect. The facades' ability to reflect solar radiation through the choice of finishing;
- heat island effect. Thermal conductivity and heat capacity of building materials;

The shading effect can be positive or negative depending on the particular site, circumstances and purpose. Sunny access is a necessary issue for urban planning. High-rise buildings affect the urban environment with a high percentage of shadows that may have negative impact, such as:

- loss of natural light;
- loss of heat (for a cold climate);
- inactive influence on human health.

Some buildings in which have been applied external glass panels, have the ability to reflect. It is contributing to the appearance of negative results, such as:

- creation of an intensive solar flare on the surrounding urban environment;
- increase in temperature around the building.

In order to avoid these consequences, architects can use certain software. For example, Computational Fluid Dynamics (CFD) will not only be able to identify the location of reflected light, but also to reveal its intensity and the degree of temperature increase in a given locality [10].

A characteristic feature of almost all densely populated cities is the urban heat island. The urban heat island has many causes. This phenomenon arises through the activities of people, cars and buildings. In general, it occurs in the zone of increased density of development. When there is not enough space for new building builders erect buildings skyward. Skyscrapers are the main sources for the allocation of heat to the urban environment. When high-rise structures are closely located to each other, the heat that stands out from the buildings is delayed between them. Asphalt roads and facades of buildings during the daytime absorb some heat, and at night, when the air temperature drops, give it to the surrounding urban environment.

Due to the above-mentioned, the average temperature in cities differs significantly from suburban areas. The effect of the urban heat island not only leads to environmental changes in the urban area, worsening its quality, but also affects the health of people, affects their ability to withstand temperature changes, and also the state of the body as a whole. In the winter season, additional heat may be sufficient to prevent the snow from covering the entire city, even when the air temperature is low enough [8]. But in summer, the effect can increase energy consumption costs of cooling the premises and may even force cities to create their own microclimate. And this in turn even more affects the temperature of the effected of urban heat island.

To reduce the effect of urban heat island, the following solutions must be taken into account:

- the application of even larger green spaces (parks, alleys, squares);
- the use of reflective roofing materials;
- the use of gardens on the roof of buildings;
- the use of light colors on the envelope of the building;
- choosing the right façade systems and building facade materials with a low degree of heat capacity.

## 5. FACADE SYSTEMS

The ability of buildings' envelope to reflect the sun's rays moderately is an important indicator of the energy characteristics of a building for cooling or reducing the effect of urban heat island effect. Such facades along with the radiating ability, are also able to reduce the superheating of the surface, exposed to direct sunlight. One of the main types of facade systems are:

- double skin facades;
- kinetic facades;
- curtain wall facade;
- solar facade systems.

Double skin facades systems consist of two layers of glass shell, which are separated from each other by air space, which plays the role of isolation from wind, sound and dust. The distance between the shells can reach up to one meter. Also very often there are double skin facades systems between the layers set the shading devices, thereby reducing the expense for cooling the interior (Fig.3).



**Fig. 3. (b)** Double skin facades

Depending on the time of the year, whether there is a need for heating or cooling, the heated air between the two layers of the façade can be retracted into the interior rooms or simply ventilated from the building by means

of fans installed in the inner layer of the facade glazing. Recently, this system has become very widely used due to energy efficiency and improved sunlight and heat supply, the possibility of natural ventilation, protection from external pollution, reducing artificial lighting, increasing the service life of the building, increasing the comfort of passengers and acoustic protection.

Kinetic facade systems are such systems that include adjustable and mobile technologies that adapt to climate change and the position of the sun in the sky. Kinetic facades are mainly installed on high-altitude buildings. In a hot dry climate, the integration of these systems is very appropriate.

The use of kinetic facades has not only an aesthetic function, but also to improve the energy efficiency of buildings and control of daylight. Integration of these strategies for kinetic facades will increase the durability and suitability of facades with existing requirements for construction, energy efficiency and thermal comfort level (Fig.4).



**Fig. 4. (a)** Kinetic facades systems



**Fig. 4. (b)** Kinetic facades systems

The curtain wall system is an external covering of the building. In this system, the outer walls are non-structural and are used as enclosing structures for the external environment from the internal. Due to the fact that the curtain walls are non-structural, it can be made of lightweight materials. The use of glass has its advantage, since it facilitates the arrival of natural light into the interior of the room. The curtain walls systems, as a rule, are made by means of aluminum frame elements and does not bear any load on the building. The use curtain wall system without solar shading would be inappropriate from the point of view of energy efficiency (Fig.5).



**Fig. 5.** Curtain wall facade

Solar facade systems are systems of shading facades of buildings, as well as the use of solar panels on them. Solar facades play an important role in making a decisive contribution to heat and sound absorption and, at the same time, realize conceptual energy concepts using sophisticated user architectural solutions [9].

**Table 4.** The Geometry of Shading Devices.

	<p>Horizontal overhang. - Most effective when they have southern orientation.</p>		<p>Blinds – glass. - Blinds and drapes can provide up to 50% reduction in radiation depending on reflectivity.</p>
	<p>Horizontal louvers. - Horizontal louvers parallel to wall permit air circulation near the wall and reduces conduction heat gain.</p>		<p>Hung louvers. - Louvers hung from a solid overhang provide protection for low sun angles. - May interfere with view.</p>
	<p>Horizontal louvers. - Slanted louvers provide more protect than those parallel to wall. - Angle varies according to sun's attitude range.</p>		<p>Egg crates. - Egg crates combine the characteristics of horizontal and vertical louvers and have a high shading ratio. - Efficient in hot climates.</p>
	<p>Vertical louvers. - Most effective for eastern or western exposures. - May be operable to adapt to sun's angle. - Separation from wall reduces conduction heat gain.</p>		<p>Vertical sliding shutters. - Can be static or fixed. - Respond to climatic or other environmental factors. - Improve performance and efficiency.</p>

## 6. CONCLUSION

The growth of cities in recent years has raised concerns about future planning. In this regard, environmental degradation, as well as urbanization, degradation of natural systems, increased consumption of fossil fuels leads to a more confusing state when healthy life becomes the main problem. However, recent studies on the use of energy-efficient solutions in the architecture of buildings have shown that cities are a solution to these problems.

The facade of buildings is the dominant figure of the city and gives a city identity. For this reason, all the facades have a direct impact on the urban space. Since the facade of the building is exposed to the external environment, it is necessary to choose the right types of facades and building materials to make it more stable. High-performance sustainable facades have better performance than traditional ones. Thanks to the right choice of



building materials and glazing, shading devices, provision with natural ventilation, daylight and much more. They also improve overall building envelope operation, microclimate, visual comfort and energy efficiency.

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# NATURE AND OPEN AREAS AS A PUBLIC SPACE

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## ABSTRACT

We found ourselves in a time when ecology and energy efficiency have become key factors for the architects in their designs. For many years, each of us tried to give at least some environmental benefits. Gardens are great places, human spaces - the idea of the place, which will people have, which will enter inside, increase the ability of fantasize. Everything - species of trees, bushes, pavement, rocks, and type of the soil - creates the Genius Loci of the place.

Last, more than three decades more spaces have been given for closed shopping malls, festival places, corporate plazas etc. However, nowadays people started getting tired of marketing and commerce and they try to spend much more time with the nature.

In most cities, citizens are not able to own private gardens and they do not have direct access to parks. Moreover, streets become social meeting, communication points with other people. Streets are directions orientating people, where they can pass and familiarize faces, forms, figures, postures and dresses (Jacobs, 1993).

In addition, this article is about creation of new network between leisure areas, plan new active social life of the city more outside, create clear infrastructure in an example city – Sines where the nature will be involved in industry. Especially in the cities where working class is the majority (industrial cities), the attention to rest areas is necessary. The streets, nature, infrastructure all together create one idea – idea of boulevards.

*Keywords: nature, public spaces, boulevard, infrastructure, urban design, ecology, psychology, industry.*

## 1. INTRODUCTION

In many cities peripheral areas in term of architecture and function are poor, boring, sleeping areas differ by scarcity and monotony, there are no comfortable places for communication, for active and quiet rest. These force citizens to seek places outside the residential areas. And usually the most visited area becoming the historical center of the city and there pops up the problem with roads.

Nowadays increases relevance to sport life and in a small city cycling roads become irreplaceable.

Leisure phenomenon represents a kind of cultural and aesthetic development of modern interest and acts qualitatively by new stage of connection of culture, sports, comfort. The location of the seaside countries made people plan cities along the shores.

Agglomerations formation is one of the natural stages of the process of urbanization. This is a worldwide trend that showed itself in the second half of the twentieth century. Today, more than half of the urban population of the Earth lives in agglomerations with a population size of more than 500 thousand people. According to the UN, the percentage of urban population has been on the rise for a long period [1].

In urban planning this urbanization process comes with merging of the territories of settlements creating interconnected settlement systems, and formation of large agglomerations. In the course of study of agglomeration processes there are the issues most of which do not yet have a decisive answer, in particular the issue of agglomeration territories delimitation.

This work is based on research of the relationship between the public spaces and sea costs area and finding solutions by citing to local and global references for Sines, making the city

alive for citizens and accessible for guests. Chosen place is close to habitation and central part which makes it easy to access. It is the end of the city where people can feel outside from the city and therefore they can move away from the noise and retire with family and friends. Project of wide green boulevard-connection will save the natural spirit of the city. The different variations of pavement will clearly show the transformation "city-nature".

State of landscape architecture allows to judge it as an independent and bright phenomenon created by the Earth itself and needs to be always the main part of the urban environment. We have number of sources which show the significant role of the nature, trees in Sines. So, how can be returned that essential thing to the city?

There is such a thing that for more productive work people need to be well rested. In Sines its natural gifts are not used as it should because of access. Nature gives us a soul, air, breeze and more incredible things. And what shall we give a nature? Does it need new Genius Loci? How it can grow inside and be a part of the city?

## 2. STUDY AREA

It is already a long time that public spaces are considered to be the main components of urban life. Last centuries more spaces have been given for closed shopping malls, festival places, corporate plazas and etc. According to Boyer [3], Madanipour [14] they have become the main core of attention of architects for already more than three decades. But nowadays people started getting tired of marketing and commerce and they try to spend much more time with the nature. No matter how much higher points the civilization achieve in the technology of commercialized public places, people still prefer natural spaces their origins came from.

What can give us public spaces? It literally forms psychology, society, economics, aesthetics, ecology, politics. For sure geometry of each city is created by both, private and public areas. But the main role in forming city centralities, city structure are the second ones.

In the last quarter of the XX century increased the number of renovated public spaces. [9] Streets, boulevards, avenues are the main communication channels of the city. [7] They are one kind of the movement between people, buildings from one zone to the other and serve the daily routine. Public spaces can contain different street needs as street signs, lights and different hardscape elements. [18] Practical use of signs and symbols can be very useful with the aim of transforming city to an intellectually open system. For example, Francesca Arici in her work for Joint PhD Seminar indicates by giving as an example the Central Park in NYC, piazza del Campo in Siena, Duisburg Park in the Ruhr Valley, of the just finished High Line park in NYC with high amount of skateboard spaces, social centers, new experimental forms of public design (figure) or, arguably, of the internet (the alleged killer of public space) which supposed to be a useful tool to intensive communication, to facilitate civic debate and effective citizenship. Fig 1. According this title Madnanipour says that that one of the reasons for the interest in one or another place is increased despatialisation of activities which means that new technologies of communication allowed it possible for the information, as well as news, money, goods, to be exchanged without close contact.



**Fig. 1.** Experimental road signs. Source: "Understanding the Post-Industrial City", 2016. Concept of competitiveness in

context of post-industrial society

Equally, important role (physical role) of public spaces is ecology. Nowadays ecology, sustainability, energy efficiency are the center of attention for everyone related with this sector. Greenings can bring favorable microclimate, filter dust particles, provide cooling, and prevent strong winds (figures below - good examples to show ecological and aesthetic contributions of public spaces). Fig. 2., Fig. 3.



**Fig. 2.** Parque Eduardo VII, Lisbon. Photo created by author, 2016.



**Fig. 3.** Dolina Roz, Kislovodsk. Photo created by author, 2015.

The role of the public spaces in the psychology of the population has also mentioned. They can be both, a treatment for the society and the core of spark of the negative emotions. What can cause psychological irritation? Car parking and car traffic gradually assign spaces in squares, streets. [9] Depleting of city life is the reason of dirt, noise, visual pollution which can irritate community. It is becoming a reason of a reduction of interest in people to get around on foot, spend time in public places. Let's agree that it is not so pleasant to move between maneuvering and parked cars.

**Sines – an industrial port-city of Portugal.** The twentieth century begins almost with the municipal restoration in 1914. The cork industry, fishing and some agriculture and tourism are the basis of Sines life until the end of the 60s, when, in addition to the proximity of the sea, Sines is hardly distinguished from the rest of the Alentejo. The large industrial complex is being created by government of Marcello Caetano in Sines in 1970. The population expands and diversifies, the landscape gets new configurations and the community struggles to keep their integrity and the quality of life, mitigating the negative impacts of installation of new units and taking advantage of the positive. [17] Walking conditioned sight, and sight Conditioned walking, till it seemed only the feet could see. [5]

In a conception of Public Space that refuses a merely morphological approach, the direct contact with territory is a fundamental way for its analysis. The act of walking makes possible a better involvement with territory, although as a more comprehensive perception of its multiple dimensions. The physical walk allows the mental walk, stimulating the thought and making possible the contact of the body, as element of measure, with the space.

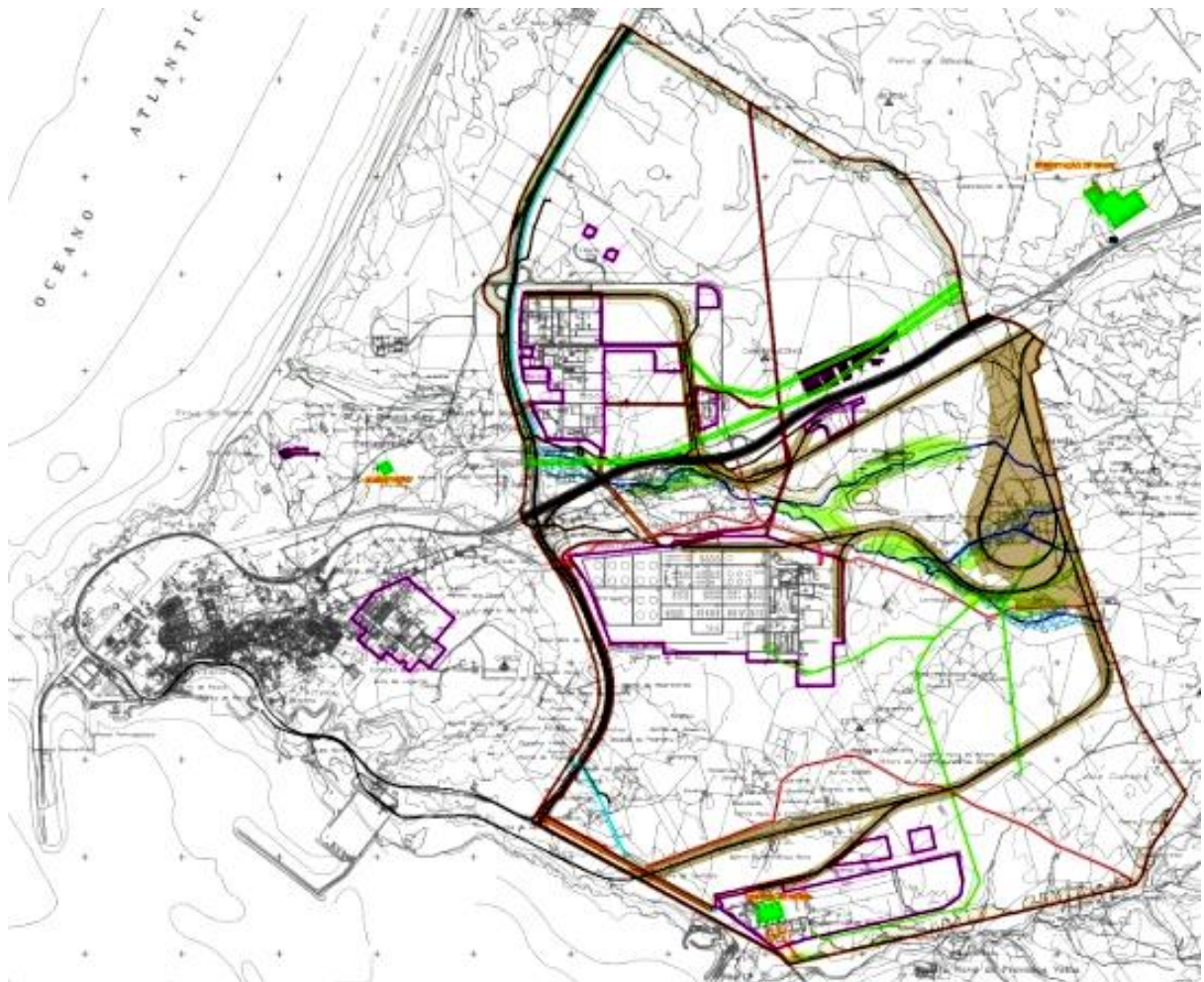
PhD research of Rita Ochoa in analyzing the articulation between city and waterfront as though as the role of public art in this articulation (considering public art in relation with urban space), it was early detects that the contact with territory must be the fundamental primary source to use. But a simple question was done: How to walk? [15]

Such as the architectural experience, urban experience involves not only the physical presence but also the movement of all body – the individual body and the social body. Walking emerge as a critical tool, as a way to look at urban landscape (the "eyes in the feats", that mention Smithson).

The route, as a simplified journey, is essential to the comprehension of the urban space. Without the introduction of the movement, the space perception stays limited to a steady and firm vision. It is fundamental to tread on the floor, to go through in the space, finding its multiple dimensions. It is also fundamental to understand how a city can be molded by different eventualities: the different lights during the day, the weather, the memories that a singular space projects. The proper spirit conditions that the observer carry. In the limit, the space never totally perceives because its perception is dependent of the moment that it is experienced.

Sines is an expanding municipality and a strategic place for Portugal. It has an ideal location for developing and creating global impact on industries. As the primary national port its able to handle any type of cargo and is entire port for strong materials. Its role stands in the energy sector and in the world of shipping containers with several direct services linking Sines with the main production and consumption regions of the globe. With an articulated and complementary train shipment and the use of road and rail transport strategies Sines port is currently responsible for the largest number of container trains per year in the Iberian Peninsula. In addition to the energy and petrochemical industry it also beds on renewable energy sites which is a significant factor in transforming the municipality into one of the main drivers of the national economy. In addition, Sines is located on the wild landscape environment: fishing and tourism as well as unique living species make it an attractive spot for international audience. Extensive coasts of fine beaches, make them perfect for the practicing water sports it is a tourist destination of excellence where you can find one of the only recreational ports of the entire Alentejo coast.

The sea is a source of development. Sines is the main fishing port of the region and one of the most important of the country. Sines - the gateway of Portugal and the world Fig. 4. [19]



**Fig. 4.** Map. Condition Plan of Sines, Portugal. Source: Cartography of the Municipality of Sines, 2015.

There are three medians which create the boulevard: the sidewalk, the access roadway and the planted median. And besides the pedestrians it encourages drivers inside the whole movement and makes them to go very slowly and respect the pedestrians using the street. [11]

The conclusions about the necessary conditions for emergence of pedestrian realm: continuously medians between through lanes and the access lanes; a line of planted trees along those medians till the intersection; more or less narrow roadways which let only one lane of traffic (which are controlling by signs at every intersection); the location of such small points as kiosks, benches, bus or tram stops (because people need to cross the sidewalk to achieve them); access ways the differ from the main thruway realm by a change of height (level) and paving.

These all conditions provide the safeness of pedestrians. But their observation shows that their walk there is seldom despite a slow movement of cars.

The main aim is to create new network between leisure areas, plan new active social life of the city, create clear infrastructure; rehabilitate the "memory"; to contact North beach with the South beach by a green line.

For the most port cities one of hallmarks for the whole history had been a connection between city and harbor. And the main obstacle in case of Sines is the steep topography. Unfavorable environmental conditions, visual discomfort, the poor quality of the urban architectural environment, unsettled pedestrian spaces, the lack of comfortable public spaces, and degradation of green areas led the city to lose its past vital existence which we can read from memoirs with interest.

### 3. PROBLEMS

As the object of my research was Sines, I should find out problems there. Observing the city, we can come to conclusion that it has preserved by government a lighthouse which is far from view but not so far by its location as Sines is not so big city. Its area is 199 km<sup>2</sup> with population of 13613 people. In Baku, or example seashore boulevard grows day by day. The parts of the Caspian shore where ones were nothing despite black fuel oil and oil rigs become clean big areas where factories transformed to cultural centers and a soil – to bike roads. Architects have created new center in each end of the boulevard. The same solution can be applied for Sines. But in that case the center will not be created. But conversely, the path which once was one of the main, leading to the Lighthouse and Northern beach will return its relevance.

Very difficult for practical solution is the question of re-planning of already built-up parts. Often they determine not only the closure of unnecessary deadlocks or the expansion of squares and streets at the expense of wastelands or front gardens, but also a realignment of parts of quarters, affected by redevelopment. This need, of course, arises more often than the haphazard and chaotic old plan of the city and its development. In general, breaks and restructuring play a secondary role in planning work and they are used in cases of extreme necessity, distributing work for a number of years. It is often resorted to establishing red lines of a new layout, to restricting the right of building, to prohibiting capital repairs, renewing or expanding existing buildings beyond the red line. Time finishes this work, and at 10-15 or 20 years, redevelopment is realized through a series of gradual steps that require, however, unremitting attention and perseverance. Only in those cases when the urgency of redevelopment is unconditional, resort to breakage. But it must be said that, often, these surgical measures - of course, provided they are correctly applied - are not only necessary, but also beneficial for the city. Examples of this can be found in Tbilisi, where a very serious surgical measure is now underway to expand one of the main streets of the Old Town, with undoubtedly positive results for the overall improvement of the city and its economy. Similar work of a smaller scale, but also with a positive result, was carried out in Baku with the expansion of Torgovaya Street, which had local restrictions due to the unregulated construction of previous years. With the correct formulation of the case and with sufficient tension in the economic life of the city, redevelopment, even associated with restructuring, economically justifies itself in the coming years. [20]

Research objectives:

1. Analyze historical experience of formation, development and modern condition of green areas in industrial city.
2. Create a classification of the types of connection, define features of their placement, internal structure.
3. Identify urban planning regularities and methods of formation of the road systems and establish principles of functional and spatial organization of the road system in chosen roads, analyze local and global references.
4. Develop mechanism on solution of the problem by topography analysis with connection fishing port Camping Park of Sines - North beach.
6. Define old, available to demolishing buildings (necessary ones).
7. Renovate old soulless streets transforming them into a part of nature; work on proposal.

Present work is about making this coastal attraction accessible for everybody and merging the inhabited part of the North beach with the city.

Lately the rehabilitation of an urban area, converting empty streets without shadows to the green boulevards became necessary. Day by day technologies about planting of greenery improve, enabling engineers to provide more efficiency in the limited time period. The proposal is about rehabilitation of the streets which will establish a pedestrian and cycling connection between the city and the North beach revealing the lighthouse of the Cabo de Sines as well as its' reconstruction given its architectural and esthetic significance to the other side of the city.

Methodology. Project of wide green boulevard-connection will save the natural spirit of the city. The different variations of pavement will clearly show the transformation "city-nature".

As a general methodology to research I have chosen the inductive method. It helped to take several examples, ways to solve the problem, to come to the final conclusion. And that final conclusion will be the main arteria of final project.

The study of public places cannot be called a new topic. And these problems appeared in early XX century when people started little by little integrate to a social life and the need of communion has become required. Also, after a line of scientific discoveries industrial boom has started. People started to gather in industrial cities and need of public places, recreational zones there decreased.

In a recent book chapter George Farhat [8] approaches landscape as a two-fold concept, both as potent element of territorial structure based on open space, and as the territorial and cultural expression of the relationship between society and its environment. Whereas the latter may be seen as competitive resource in terms of innovation, pro-active local governance and integration into global networks - in line with the concepts of milieu - the former offers the complementary and interdependent view on the specific spatial and biophysical articulations needed to build an operative and coherent territorial project.

The choice of having landscape as the starting point for this paper comes from its acknowledged operative strength as a conceptual bundler for the interpretation and design of contemporary urban and territorial development. It operates on significant conceptual combinations: of natural flows and features with the artificial transformation and appropriation by human activities, of subjective personal perception with the production of territorially defined cultural references, of persistent traces of transformation with the cinetical frames of apprehension through movement. Most of such recent reflections emphasise the need to overcome disciplinary and conceptual dichotomies between city and landscape, proposing a new synthesis where landscape can be understood as a field where ecological, infrastructural and conventional urban elements (buildings, streets, parks, plazas) play as a tactical work of choreography in a constant state of flux.

Following parallel lines of thought, Farhat and Corner come to understand Paysage infrastructure or landscape-infrastructure as the form by which an infrastructural-based landscape (supported by matrix networks such as hydraulics, sewage and roads) becomes also a metropolitan scale network of open spaces producing a new kind of urban infrastructure. [8] For Corner, such an approach offers the "ability to shift scales, to locate urban fabrics in their regional and biotic contexts, and to design relationships between dynamic environmental processes and urban form". [6]

Of course, such an interpretation is particularly important within the context of complex metropolitan territories where large open spaces are often the result of artificial transformations, either by making part of an environmental structure (i.e. natural parks and reserves, natural linkages) or by integrating them into an industrial scale production system of forest areas or hydraulics based agriculture.

Urban rehabilitation:

- Rehabilitation of the area of the Camping Park and creating pedestrian connection between South and North coasts.
- Creating the main public green area of the city.
- Keeping the history:
- Transformation of old and unattractive but significant buildings to points of interest.
- Keep conditionally idea of camping.
- Developing sustainable project [in terms of economy, ecology, culture]:
- Transformation of an old and nude but nonetheless one of the main recreation areas of the city to one of the centers.

- Restoration of existing master plans/ spaces/paths/roads/buildings for purpose to create conceptual unity.
- Creating of the transition city/habitation-public spaces/green area.
- Implementation of life elements (green area) and active rest elements.
- Positive effect can be reached by providing the rhythm of relaxation and tension. It is single-mindedly desirable for psychological and mental health. [13] People go out to rest and keep distance with stresses of daily life. It can be referred to its role in formation of society.



**Fig. 5.** Plaza Sul, Madrid. Photo created by author, 2014.



**Fig. 6.** Estoril, Portugal. Photo created by: Mario Novais's Studio.

We can call public spaces also "arenas of social interaction". They may serve as meeting points and locations where different groups of people regardless of their ethnic origin, class, gender and age to be in touch with each other. Fig 5., Fig. 6. Open spaces are all these localities in the environment which people can freely choose and act spontaneously: "public meadows and parks, but also unfenced vacant lots and abandoned waterfronts opened for grassy slope; or kind of movement, as a prairie or unobstructed wood; roving eye, as a vista or the open sky"[10]. People choose the place individually according to what allows them to realize things they are interested in and gives them the degree of economic status too. Concerning the designer, he provides open space - its devices plastic forms "which adapt themselves easily to a great variety of behaviors, and which provide neutral but suggestive material for spontaneous action". [13] Open spaces can satisfy all branches of generation tree. As well as grandfathers and grandmothers spend their time in small places of relaxation and recreation, adolescents try out different activities, bring out from themselves various skills. With all its diversity, open spaces can be good places for such trial runs.

The idea of "openness" in open-space plan should work for a person to also be "open to choice, open to active use and manipulation, open to view and understand, open of access, to new perceptions and experiences". [13] Burgers [4] notes that sport and cultural events, such as football tournaments, festivals, carnivals, flea markets, circuses and fairs, which have been organized for city promotion and city marketing have made public spaces popular once more.

Another role of public spaces is economic role. Since a long time commercial activities started to take part in the universal public arenas. [9]

It would be wrong not to mention political role of public places. Squares and streets are places where people can share their political view and it causes the democracy. They can either agree or disagree by making their voices heard and by discussions.

And what about public spaces in industrial cities? Changed view of the industrial city caused also changes of public spaces, one of which is "decentralized, self-referential and inward- oriented retail units". For example, shopping malls first appeared in 1950's by "retailing functions" outside the central city (Carr, Francis, Rivlin, Stone, 1992). And those places first times in the main were accessible by car. They were connected to each other through streets and few of them mixed commerce with leisure. [2, 16]

In the post-industrial cities flyovers, underground tunnels were counting as spaces for social interaction. For example, let's see some references from Middle Asia. Baku (Azerbaijan) for many decades was an industrial center of Soviet Union and one of its main port-cities. Funicular was considering a public space there. Fig. 7, Fig. 8.



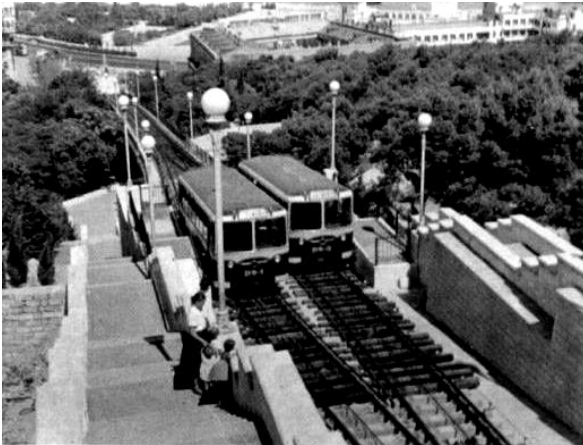


Fig. 7. Funicular, Baku, Azerbaijan. Source, 1990's.



Fig. 8. Funicular, Baku, Azerbaijan, 2013

One example of completely changed industrial part of the city: "Black City, as a legacy of the first oil boom and the result of urban events of the distant past, was formed in the late 19th century in the eastern part of Baku. Subsequently, he played an important role in the oil industry for more than 100 years, carrying out activities for the processing, storage and transportation of "black gold".

Currently the industrial space of the Black City located in the center of Baku bay offers an unprecedented perspective on the revival. The space in the east of the city center on the territory of 221 hectares, surrounded by a dynamically developing urban infrastructure gets a chance to be reborn to his new mission and become one of the most attractive investment opportunities." And "Black City" transforms to a "White City".

#### 4. NEW CONCEPT

State of the Art:

"In town and in country there must be landscapes where we can walk in safety, pick fruit, cycle, work, sleep, swim, listen to the birds, bask in the sun, run through the trees and laze beside cool waters." Tom Turner, *Landscape Planning and Environmental Design*. This quote describes all beauty of Portugal almost in each city of which everyone can find his paradise.

In 1924, the same Dadaists propose the walk as an oniric and surreal component, directing the deambulation through obscure places in the city, called unconsciousness zones in space. These are not walks previously elected to a certain place in the city, like in actions before, but irregular and erratic walks in certain territories.

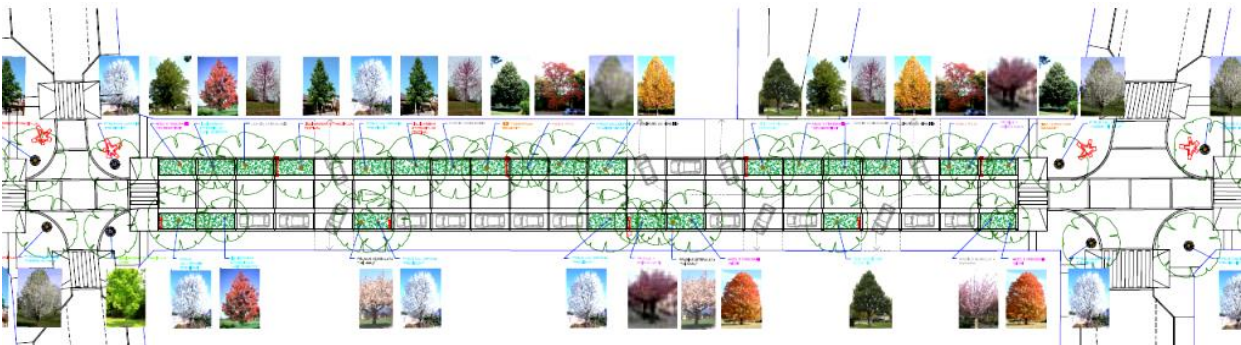
For the surrealists, the promenade consist in achieve, by the walking, a hypnos stadium, a disorder loss of control. It is a medium through which to enter into contact with the unconscious part of the territory (Careri, 2002: 84). The city can be crossed, as the mind, to reveal a non-visible reality. The surrealism uses the walk as a way to inquire the parts that escapes to the traditional representations of the city.

Rehabilitation Proposal. The project consists of two steps one of which is a regeneration of an urban area and the second - rehabilitation of public sight. More precisely. Rua Floresta is one of the old roads in Sines which in past already had a connection role. From both sides it is surrounded by private houses with low fences. Fig. 9. The road has 20 meters and more of width and in both sides it has parking lots and grass. The axis of Rua Floresta crosses nearby the lighthouse and create a good opportunity to be one of the important roads of the city as a boulevard.



**Fig. 9.** Rua Floresta, Sines, Portugal. Photo created by author, 2016.

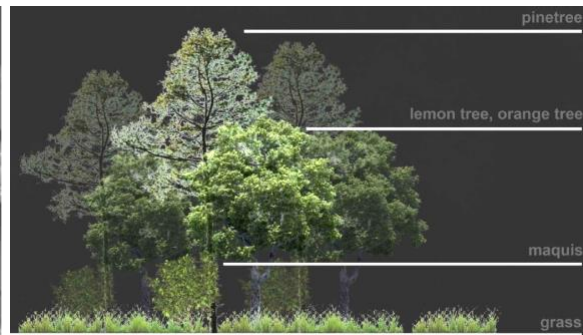
The distance across the road lets us plan such meridians as pedestrian line, tree line with benches, cycling line, running path, parking, one-way road and again parking, tree and pedestrian line. Green line had been planted with trees referring to the project of the group of Spanish architects. Fig 11.



**Fig 11.** Planted Road Plan, Milladoiro, Spain. Author: Luis Ponte Lavandeira, 2007 - 2010.



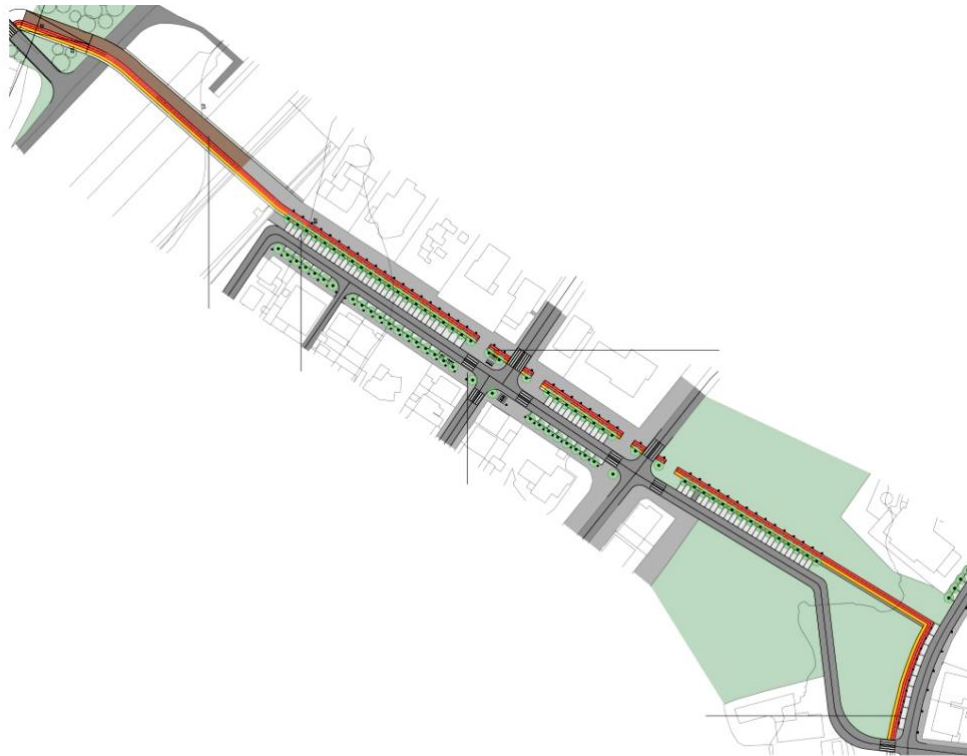
**Fig. 12.** Planted Road, Spain. Author: Luis Ponte Lavandeira, 2007-2010.



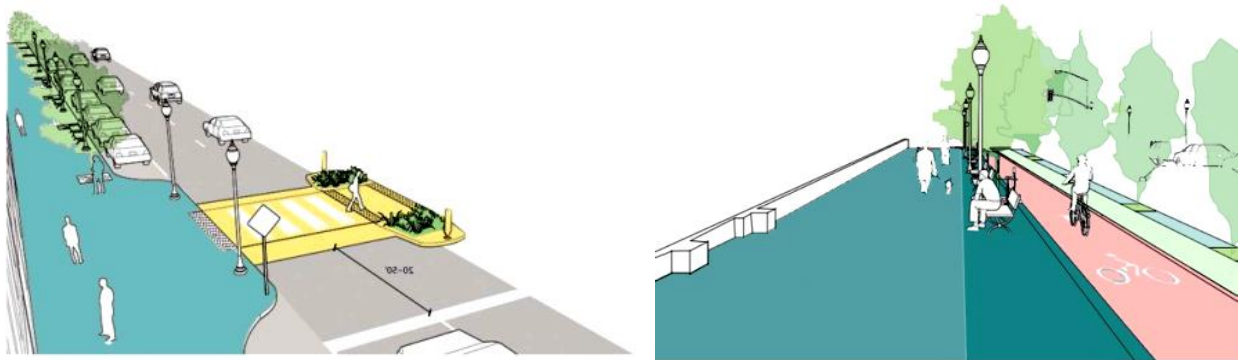
**Fig. 13.** Combination of Trees. From project of author, 2015.

The trees and other plants had been chosen as pine tree, lemon tree, orange tree, maquis, grass.

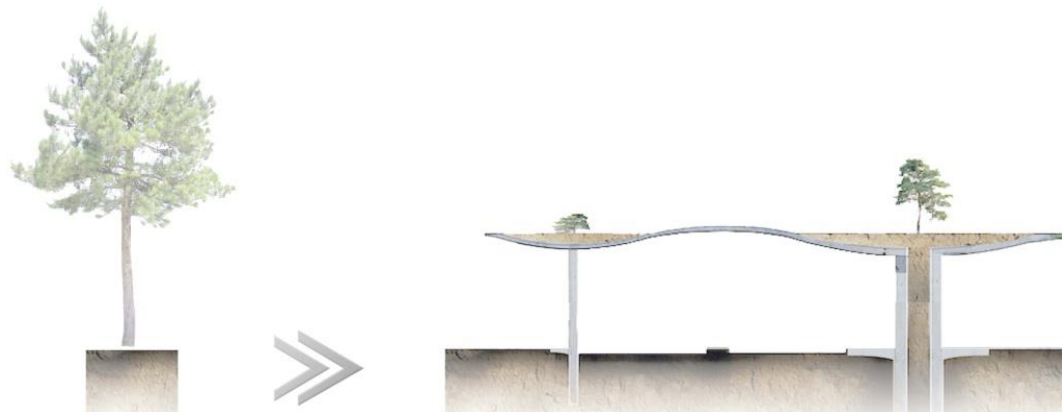
The line switches to the bridge which will cross the wide industrial pipeline. Being only pedestrian (also with cycling road) it brings people to the lighthouse surrounded by green yards on the north and industrial zone on the South. Fig. 12, Fig. 13.



**Fig. 14.** Plan of Rua Floresta, Sines, Portugal. Author of project: Afat Mammadzada, 2015.



**Fig. 15.** View of Rua Floresta, Sines, Portugal. From project of author, 2015.



**Fig. 16.** Bionical Transition. Author's proposition, 2015.

## 5. CONCLUSION

With this theme proposal we seek to establish the emergence of solidarity practices in urban contexts. It is considered that in its diversity, the cities include consensus and conflict, as well as emerge individualistic logics along with ways of building collective action.

Thanks to its multiculturalism and its multi-spatiality, the city reveals as a stage of complex social relationship that form the basis of their creative ability and innovation. At the social level, it is in the cities that we see the flowering of a multiplicity of experimenting that seeks to promote social cohesion but also to recreate the social ties. Fig. 14, Fig. 15, Fig. 16.

Sines as a city makes it a great port location as well as an industry center. People living here are basically industry workers and, because of the small size of the city their angle of view is not so much. Walking in the streets you can always see (from open high points) even a small part of local industry. And the city needs more places to go by foot. Finding green line solution is good for its treatment. For providing a better comfort for citizens the whole attention should be in solving of the problem basing in convenience of the areas for rest, education, training, demonstration (in case of Sines it is topical because this city is the host city for the World Music Festival); allocation of the important buildings, spaces, objects in terms of architecture; implementation of the development defining target group and suitable density; " target 65% of transport public expenditure on projects that benefit pedestrians, cyclists and public transport users". [12].

Keeping the history or even bringing it back to people and to the city is one of the main task for an architect in urban rehabilitation. Above were mentioned an example of rehabilitated street and in the case with Sines lighthouse is also a good solution to give bag the meaningful object to citizens.

And proposed project by increasing limits of green public spaces eases the access from one point to another and implements new natural spirit to industrial city.

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# DELIMITATION OF THE TERRITORIES BEING UNDER THE INFLUENCE OF AGGLOMERATION

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## ABSTRACT

Presently, the significance of major cities is increasing. This is confirmed by the trends in the spatial development of territories. Major cities are the centres of gravitation of closely located settlements, and together they form an integrated system – an agglomeration.

Over the past few years, such spatial formations as agglomeration become more and more popular. In the course of study of agglomeration processes there are the issues most of which do not yet have a decisive answer, in particular the issue of agglomeration territories delimitation.

With this in view, the paper considers existing domestic and foreign methods for delimiting agglomerations. The spatial structure of an agglomeration was determined. Key criteria used for distinguishing a territory as an agglomeration are suggested.

There has been developed the method of delimitation of the territories being under the influence of agglomeration, including the development of a unified structural model. The structure of the model is made up of five stages, namely: recognition of the territory as agglomeration; characterization of the city centre (core) of the agglomeration; delimitation of the territories being under the influence of agglomeration in two directions (considering and ignoring the administrative and territorial division); characterization of the territories being under the influence of agglomeration; checking the development of the territories being under the influence of agglomeration.

Indicators were developed to evaluate the degree of appurtenance of a region to zone of agglomeration influence. They help identifying better the most investment attractive administrative regions and determine those of them that are perspective and can be included in the future in the zone of influence of an agglomeration.

*Keywords: delimitation, agglomeration, the territories being under the influence, administrative and territorial structure, region.*

## 1. INTRODUCTION

The process of agglomerations formation and development is one of the burning issues for modern urban planning and space planning. Over a number of years, this has been promoted by a swell in urban population and its concentration in big economically developed cities.

As a result of its development, lack of possibilities for further development, and the need for a larger spatial organization, cities "go beyond the boundaries" losing their lines that were clear before. Thus, the city is not the only and main form anymore, since there are new group forms called agglomerations.

Agglomerations formation is one of the natural stages of the process of urbanization. This is a worldwide trend that showed itself in the second half of the twentieth century. Today, more than half of the urban population of the Earth lives in agglomerations with a population size of more than 500 thousand people. According to the UN, the percentage of urban population has been on the rise for a long period [1].

In urban planning this urbanization process comes with merging of the territories of settlements creating interconnected settlement systems, and formation of large agglomerations. In the course of

study of agglomeration processes there are the issues most of which do not yet have a decisive answer, in particular the issue of agglomeration territories delimitation.

## 2. STUDY AREA

The approaches of experts from different countries to the allocation of agglomerations vary. In many European countries, the external boundary of agglomeration is determined by the end of the continuous built-up area. In the US and Canada, agglomerations are given a formalized status – the metropolitan governments are being formed, however no administrative unit is being created. Sometimes the boundaries of these formations do not coincide with the administrative boundaries of the units making them up. In France and Italy, the special status of urban agglomerations is prescribed by the law [2].

In many countries, agglomerations delimitation is based on a statistical data comparison. In Ukraine, like in many post-Soviet countries, there is no official statistical recording of agglomerations. All expert opinions of the spatial structure, area, population of the agglomeration have authorial nature and may vary thus complicating the process of delimitation.

In this paper, agglomeration is considered as a form of settlement emerging on the basis of a big city (or several cities), creating a significant urbanization area that tends to unite neighboring settlements, as well as a system of modern settlement.

The presence of a big city-center (core) or city-centers (cores) of agglomeration is the basis for recognition the territory as agglomeration. The territorial proximity of settlements that tend to unite is considered to be the main feature.

Having analyzed the agglomerations formation trends, the agglomeration has a complex spatial structure, made up of the following elements:

- core (central city);
- satellites:
  - the nearest satellites (the outer districts are located beyond the administrative boundary of the central city, connected with the core by transport lines);
  - locking satellites (cities that are located on the boundary of the territory, where the flows of the circular migration disappear and serve as counterbalances in communications with the core).
- suburban area;
- the first satellite belt (the area of active agglomeration processes);
- the second satellite belt (the area of weak agglomeration processes);
- the second-order agglomerations.

Having analyzed foreign and domestic literature there has been determined the criteria for the allocation of agglomerations. The author believes that according to these criteria it is possible to recognize the territory as agglomeration:

- presence of a large city-center (core) or city-centers (cores) of agglomeration;
- city-center (core) should have high-level administrative functions and can in its size and economic potential form agglomerations;
- settlements territories uniting;
- city-center population (core) of agglomeration (from 100 thousand people);
- the urban population of agglomeration (from 110 thousand people);
- population density;
- continuity of construction (up to 2 km);
- the presence of satellite cities;
- the number of satellite cities (at least two);
- developed transport network;
- the level of development of the transport network (km/km<sup>2</sup>);
- the availability of labor, cultural and social and recreational connections;
- the availability of regular suburban buses, electric trains, motor vessels;
- the level of transport infrastructure (up to 80 km by railways, highways, river and sea routes).

The connections between the city and the district are in the difference of forms, depending on the specialization of the city and district, population density, and settlement nature. Being based on

different forms of relations, the connections are combined and superimposed on one another, creating the city influence area.

Most of the methods for delimitation of the territories being under the influence of agglomeration are based on the level of transport infrastructure from the city center (core) to the satellite area.

The indicator of the level of transport infrastructure is determined by assessing the distance from the agglomeration core to the external settlement or time taken by residents to get to the city center (core). It is quite difficult to determine this indicator first of all due to the lack of statistical data, and when determining the boundaries, due to the lack of binding to the administrative boundaries of the influence area – the agglomeration area satellite.

According to V.G. Davidovich, the range of the settlements – satellites of the "second circle" (the second satellite belt) exceed 70 km, and sometimes even reach (in some directions) 80 km [3].

Despite the fact that the researchers determined agglomeration as a form of settlement, N. M. Demin places the emphasis on that "agglomeration, as a form of settlement, is not a systemic integrity, meaning that agglomeration, as a whole or in part, is always only a component of the systems of regional settlement of higher ranks that is why it cannot be considered to be the object of management"... "according to simplified representations of urban planning, as the science of connections – spatial connections between integral objects in terms of functional and territorial regard, together forming, complex planning and social and production systems of different levels, agglomerations territories as management objects, may be and should be considered exclusively in the context of regional settlement systems" [4].

Regional settlement systems are being formed around centers – big cities with a developed economic base, social infrastructure, a system of inter-settlement social and economic (social and cultural and labor) connections, and developed transport infrastructure. Their influence area has a hierarchical functional and spatial structure, made up of four integrity levels: "primary", "municipal", "local", "regional". The ranges of influence areas of centers are being formed according to: "primary" systems 5-7 km; "municipal" – 12-20 km; "local" (inter-district) – 40-80 km; "regional" (interregional) – 180-250 km. [5].

### 3. PROBLEMS

It is important to note that today there are a lot of methods for agglomeration delimitation. They vary from country to country, showing the polemical character of this issue. The existing methods may be compared, but none of them enables complex delimitation.

In general terms, the process of agglomeration delimitation offered by G.M. Lappo, is made up of five basic stages: 1) delimitation purpose and principles determination; 2) territorial centers selection; 3) delimitation criteria determination; 4) setting quantitative values for criteria selected; 5) agglomeration outline detection [6].

Today the methods of agglomeration delimitation developed by the Institute of Geography of the Russian Academy of Sciences and the Central Scientific Research Center of Urban Development are the most commonly used [6].

The methods of the Institute of Geography of the Russian Academy of Sciences provides allocation of already formed agglomerations and includes of a number of successive and interrelated stages: 1) determination of the potential city-centers (cores) with a population of at least 250 thousand people; 2) determination of the potential agglomerations boundaries; 3) checking the development level of the latter based on the calculation of values of the special development coefficient.

To determine the agglomeration development level, the development coefficient ( $C_{dev.}$ ) is calculated:

$$C_{dev.} = P * (M * m + N * n), \quad (1)$$

where  $P$  is the urban population of agglomeration, million people;

$M$  and  $N$  is the number of cities and urban-type settlements in the agglomeration, pcs.;

$m$  and  $n$  is the parts in the urban population of agglomeration.

According to the method, the agglomeration development coefficient is divided into classes:

–  $C_{dev.}$  more than 50 – the most developed;



- $C_{dev.}$  from 10 to 50 – strongly developed;
- $C_{dev.}$  from 5 to 10 – developed;
- $C_{dev.}$  from 2,5 to 5 – poorly developed;
- $C_{dev.}$  less than 2,5 – the least developed or potential.

The boundaries of agglomeration according to these methods are determined in the form of a two hour isochron of the level of transport infrastructure of the city-center (core) combined with a 0.5 hour isochrones from big cities and medium-sized towns located on the agglomeration periphery. To assess the agglomeration development level, there have been offered the coefficient and index of agglomeration.

Agglomeration coefficient ( $K_a$ ) is the density of the network of urban settlements agglomeration to the average shortest distance between them ratio. This coefficient is calculated according to the formula:

$$K_a = \frac{N}{SL}, \quad (2)$$

where  $K_a$  is the agglomeration coefficient;

$N$  is the number of urban settlements in agglomeration, pcs.;

$S$  is the area of agglomeration territory, thousand km<sup>2</sup>;

$L$  is the average shortest distance between urban agglomeration settlements, km.

This coefficient should be at least 0.1.

The agglomeration index ( $L_a$ ) shows the population of the settlements of the external area (satellite areas) to the urban population of the entire agglomeration ratio. The agglomeration index is calculated according to the formula:

$$L_a = \frac{P}{P_a}, \quad (3)$$

where  $L_a$  is the agglomeration index;

$P$  is the number of urban population of the external area (satellites area), persons;

$P_a$  is the urban population of agglomeration, persons.

The higher this part, the more distributed the population and the more developed the agglomeration.

In practical determination of agglomeration the method of isochrones is being used. It is based on the allocation of so-called rings around the city-center (core) of agglomeration.

According to the method, the population of the city center (core) of agglomeration is 250 thousand people and more. According to the method of isochrones, the boundaries of agglomeration are determined by the time taken to get to the city center (core). Time spending includes both the time spent in the vehicle and the time spent for waiting at stops (gross expenses). The family of isochrones is built in relation to the city center (core) of agglomeration for time spending 0.5; 1.0; 1.5 and 2.0 time isochrones, making it possible to find the appropriate areas. In most of the cases the 2-hour isochron is set as the agglomeration boundary.

As a result, there is being outlined the territory where the accessibility to the center-based agglomeration formation is possible. Further, within this territory, there is being determined the presence of urban settlements, towns, and urban-type settlements. If there are more than three cities - satellites, the presence of agglomeration is recorded.

P.M. Polian, N.I. Naymark and I.N. Zaslavskiy, based on the methods of the Institute of Geography of the Russian Academy of Sciences and the Central Scientific Research Institute of Urban Planning, offer a unified method for agglomeration delimitation, combining some features of each of the approaches [7].

At the first stage it is necessary to determine the potential centers of agglomerations, in particular cities with a population of 100 thousand people and more. At the second stage, there is being found the area of potential action of agglomeration connections: a 2-hour (gross) isochron of the level of transport infrastructure of the center is combined with a 0.5-hour isochron from big cities and medium-sized towns located on the periphery. If the external area will have at least two urban settlements and the system will successfully pass the test for development level ( $C_{dev.}$ ), the allocated system of settlements should be recognized as the formed agglomerations. A group of potential urban agglomerations are being put a special focus. This group includes associations that fail to satisfy one

of the conditions provided. It may take a while before the potential agglomeration satisfies all the requirements and is put in the list of formed agglomerations.

The United States may be an example of a pragmatic and very fruitful approach to the issue of agglomeration allocation. In the United States, the metropolitan areas are the main units of statistical accounting of the population of the country, according to which the statistics – being used for social and economic planning and forecasting - is collected. Without a special legal status and legal registration, standard metropolitan statistical areas are used both in scientific works and various documents [8, 9].

In the United States the issue of agglomeration allocation occurred back in the 1940's. During this period, scientists and officials noted that the traditional administrative boundaries of cities are no longer reflecting the new features of urbanization. Thus, by the 1950's, there has been developed a methodology of allocation of so-called metropolitan areas, in particular clusters of population around big cities.

In 2013 the United States adopted updated standards for the allocation of statistical areas of different levels. They were developed by the Office of Management and Budget (OMB).

There are five types of statistical areas:

1. Metropolitan (Metropolitan Statistical Area).
2. Micropolitan Statistical Area.
3. Combined Statistical Area.
4. New England City and Town Areas (NECTAs).
5. Combined New England City and Town Areas [9].

All except for the combined areas were given the general name CBSA – Core Based Statistical Areas. Core areas mean territorial objects containing a core with a population of at least 10 thousand people, as well as an adjoining territory with a high degree of social and economic integration with the core.

Core areas are allocated on the grid of the counties and equal administrative units. The exceptions are the areas of the cities of New England – in six states of New England, for a number of historical reasons in terms of administrative aspect, the most important ‘town’ and ‘towns’ are the subdivisions of the counties for which there is more information collected and where exactly they but not the county, are the main ‘bricks’ of statistical areas. Core statistical areas are divided into two types – metropolitan and micropolitan. The difference between them is based on the population of the core: the metropolitan areas have the minimum threshold set of 50 thousand people, the micropolitan areas have from 10 thousand to 49.999 thousand people [9, 10].

In Canada, there are census metropolitan area (CMA) and a census agglomeration (CA).

Delimitation of the CMA and the CA, their inclusion to the neighboring municipalities (census subdivisions – CSD) are governed by certain rules (the CSDs are included in the CMA or the CA if they satisfy at least one of the rules):

1. The core rule means when the CSD is wholly or partially inside the core of the agglomeration.
2. Forward commuting flow rule means that 50% of migrants (as a minimum) residing in CSD, work in the core of the agglomeration according to the data on the place of work specified in the previous census.
3. Reverse commuting flow rule means that 25% of migrants (as a minimum) work in the CSD, reside in the core of the agglomeration according to the data on the place of work specified in the previous census.
4. The spatial contiguity rule – the CSDs that fail to satisfy the criteria for reverse commuting flow may become part of the CMA or the CA, and the CSDs that satisfy the criteria for reverse commuting flow may be excluded from the CMA or the CA based on spatial contiguity.
5. Historical comparability rule – in order to compare the previous and current CMAs and big CAs (based on the census data of past years) the CSDs are included in the CMA or the CA, even if they fail to satisfy the criteria for reverse commuting flow (rules 2 and 3) An exception to this rule applies where the CSD limits have been changed (for example, due to annexation).

6. Manual adjustment rule – sometimes there are situations when application of the abovementioned rules can cause undesirable effect or it is quite difficult to apply them. In such a case, it is possible to apply manual override to keep spatial integrity.

7. Merging adjacent CMAs and CAs rule – when the CA is a ‘neighbor’ of the CMA, the the CA and the CMA may merger, provided that the total percentage of circular migration igration between the CA and the CMA is not less than 35% according to the data on the place of work specified in the previous census [11].

In France, (multicommunale) the urban unit consisting of several communes (with a population of at least 2 thousand people in the commune), each of which concentrating more than half of its population in the continuous build-up area is recognized as agglomeration. The build-up area is considered continuous if there is a gap less than 200 meters between two buildings [12].

The provision of workplaces within the agglomeration – the central city should have more than 5 thousand of workplaces and more than 40% of the suburbs population should work in the central city – is the criteria. It also takes into account the population of the central city, with a population of more than 15 thousand people [11].

Thus, it may be concluded that using the existing methods it is quite difficult to recognize the territory as agglomeration and delimit the territories of the area of its influence.

Based on the above, agglomeration goes considerably beyond the boundaries of the city center (core) spreading in a star-like form and covering an area that hardly coincide with the existing administrative and territorial division. Thus, the agglomeration boundaries can cover only a part of administrative units. As a result, there is a need to develop a method for delimitation of the territories being under the influence of agglomeration considering the administrative structure of the region, providing an opportunity to make a more complete assessment of the interaction of all administrative units. In addition, such agglomeration development planning will provide the complexity and balance of its social and economic and urban planning.

#### 4. NEW CONCEPT

There has been developed the method of delimitation of the territories being under the influence of agglomeration. The method includes the development of a unified structural model based on the work of many domestic and foreign specialists. The proposed model is structurally made up of five stages and connections between them (fig. 1).

The first stage is the recognition of the territory as agglomeration.

There has been made a comparative analysis of the city center (core) of agglomeration and the region in terms of statics and dynamics according to the main indicators of social and economic development and analysis of the territory being considered according to the main criteria and indicators making it possible to identify the territory as agglomeration.

The main indicators of social and economic development of the territory include:

- administrative status of the city center (capital, city of regional subordination, city of district subordination);
- economic potential, meaning the development of the city center (industrial, service, labor, financial, or scientific potential);
- demographic capacity that includes high population density of the region, migration growth, resource base (land, water, food resources);
- logistics potential meaning favorable geographical location, international transport corridors, availability of transport hub and infrastructure.

*The second stage* is the characterization of the city center (core) of agglomeration in terms of its formation and development.

To determine the characteristics of the city center (core) of agglomeration, the following indicators are used:

- agglomeration type is determined by the number of cores of agglomeration and characterizes its structural feature (monocentric or polycentric);
- population density of the city center (core) is characterized by the number of population residing per1 km<sup>2</sup>;
- city center population (core), thousand people;
- classification according to the population in the city center (core), thousand persons: the largest (more than 1000); large (500-1000); big (250-500); medium (100-250).

*The third stage* is delimitation of the territories being under the influence of agglomerations.

To determine the boundaries of influence of agglomeration upon the territory it is necessary to find out the following key components, in particular: city center (city centers), settlements, transport network (railways, highways, etc.), recreation areas serving as a framework of the agglomeration territory.

There have been offered two ways of delimitation of the territories being under the influence of agglomeration:

- ignoring the administrative and territorial division of the region;
- considering the administrative and territorial division of the region.

The external boundary of the territory being under the influence of agglomeration from the city center (core) of agglomeration is determined on the range of the impact areas of the center, making 80 km.

Agglomeration has a complex spatial structure. That is why, when delimiting the territories being under the influence of agglomeration without considering the administrative and territorial division, it should be determined according to the following principles: the level of transport infrastructure (the intensity of connections in the main directions of communication of all means of transport, the intensity of connections with the city center); concentration (the presence of urban satellite – settlements); compactness (direct adjoining of densely populated territories to the main city without major breaks between buildings).

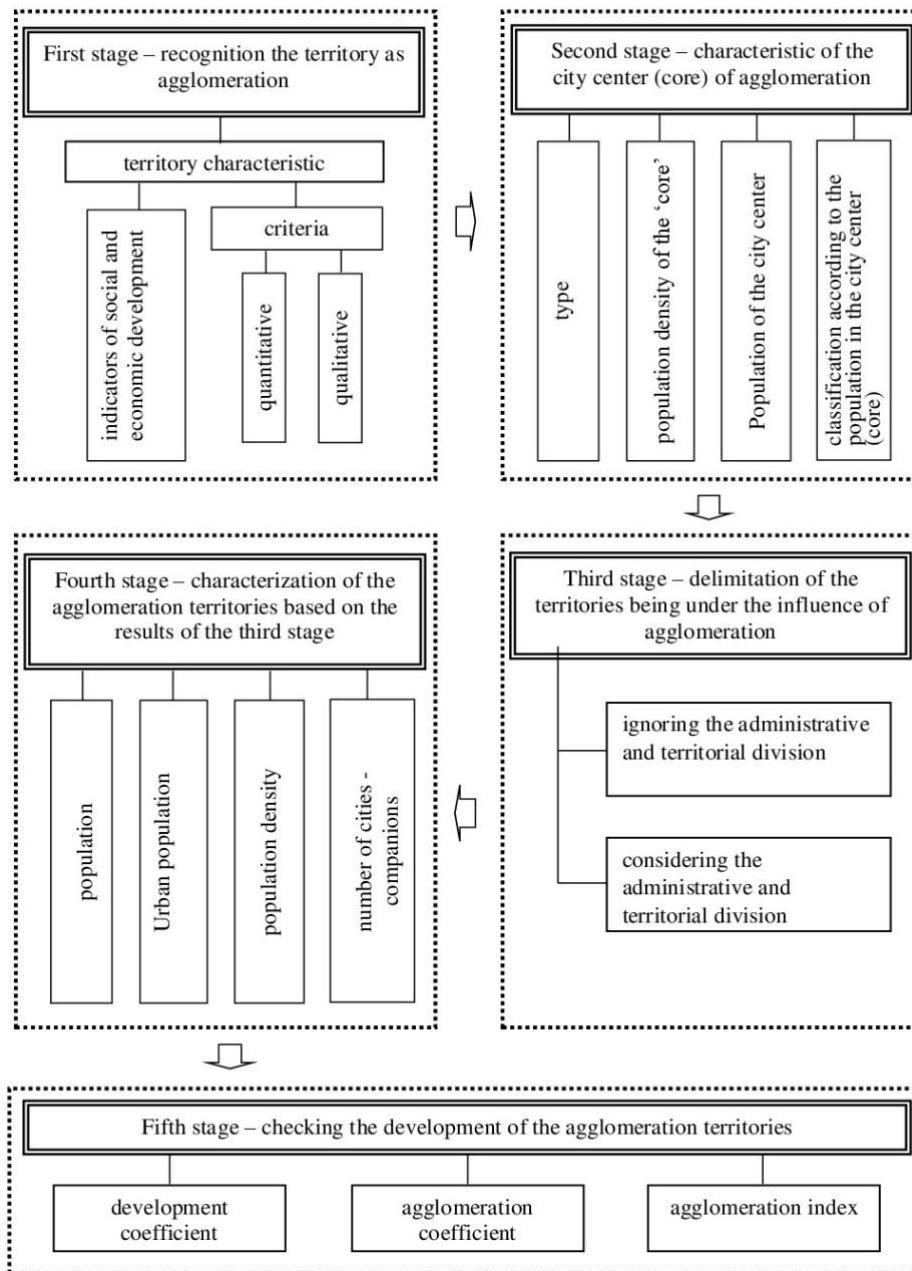


Fig 1. The unified structural model of delimitation of the territories being under the influence of agglomeration

Since agglomeration is not an element of the administrative and territorial division of the region, statistics treats it controversially and it is quite difficult to analyze the territory.

To delimit the territories being under the influence of agglomeration, considering the administrative and territorial division of the region, there have been offered the indicators assessing the degree of belonging of the administrative district territory to agglomeration. These indicators influence the formation of a perspective direction of the development of territories under the influence of agglomeration.

Table 1 shows the indicators helping to determine the degree of belonging of the administrative district territory being under the influence of agglomeration.

Table 1. Indicators of assessment of the degree of belonging of the district territory being under the influence of agglomeration

Indicators status	No,	Indicators of assessment	Indicator index	Indicator characteristic	Relative weight $\alpha, \beta$
External indicators	1	Population migratory movement, including			0,08
	1.1	Urban settlements	$a_1$	increase	0,06

		a <sub>2</sub>	decrease	
1.2	Rural area	b <sub>1</sub>	increase	0,02
		b <sub>2</sub>	decrease	
2	Number of arrived persons, including			0,06
2.1	Urban settlements	c <sub>1</sub>	increase	0,04
		c <sub>2</sub>	decrease	
2.2	Rural area	d <sub>1</sub>	increase	0,02
		d <sub>2</sub>	decrease	
3	Number of departed persons, including			0,05
3.1	Urban settlements	e <sub>1</sub>	increase	0,02
		e <sub>2</sub>	decrease	
3.2	Rural area	f <sub>1</sub>	increase	0,03
		f <sub>2</sub>	decrease	
4	Natural population movement	g <sub>1</sub>	increase	0,06
		g <sub>2</sub>	decrease	
5	Population, including			0,08
5.1	Urban settlements	h <sub>1</sub>	increase	0,06
		h <sub>2</sub>	decrease	
5.2	Rural area	i <sub>1</sub>	increase	0,02
		i <sub>2</sub>	decrease	
6	Population density	j <sub>1</sub>	high (more than 55 %)	0,1
		j <sub>2</sub>	medium (50-55 %)	
		j <sub>3</sub>	low (less than 50 %)	
4	The level of transport infrastructure	k <sub>1</sub>	high density of highways and railways (km per thousand km <sup>2</sup> )	0,15
		k <sub>2</sub>	medium density of highways and railways (km per thousand km <sup>2</sup> )	
		k <sub>3</sub>	low density of highways and railways (km per thousand km <sup>2</sup> )	
8	Recreational area	l <sub>1</sub>	high (more than 55 %)	0,07
		l <sub>2</sub>	medium (50-55 %)	
		l <sub>3</sub>	low (less than 50 %)	
9	Built-up area to the total area of the district ratio	m <sub>1</sub>	high (more than 55 %)	0,15
		m <sub>2</sub>	medium (50-55 %)	
		m <sub>3</sub>	low (less than 50 %)	
10	Urbanization level (% urban population)	n <sub>1</sub>	high (more than 55 %)	0,2
		n <sub>2</sub>	medium (50-55 %)	
		n <sub>3</sub>	low (less than 50 %)	

Internal indicators

It has been understood that the external indicators (*EX*) have a more serious influence upon the degree of perspective development of the territory of the district. But the totality of internal indicators (*IN*) can play a crucial role, either.

In order to determine the integral indicator of assessment of the district territory belonging to agglomeration, the relative weights of external and internal characteristics ( $\alpha, \beta$ ) are used.

$$P_{mep} = f\{EX, IN\}, \tag{4}$$

where *EX* is total value of external indicators;

*IN* is the total value of internal (local) indicators of the district territory.

The amount of external indicators:

$$EX = \sum(a_i + b_i + c_i + d_i + e_i + f_i) \tag{5}$$

The amount of internal indicators:

$$IN = \sum(g_i + h_i + i_i + j_i + k_i + l_i + m_i + n_i) \tag{6}$$

$$P_{mep.} = (\sum(\alpha iEX) + (\sum(\beta iIN))) / \sum i_{max}, \quad (7)$$

where  $\alpha, \beta$  are the weight values of the *EX* and *IN* assessment;

$\sum i_{max}$  is the maximum value of the degree of belonging of the territory; benchmarkable metric, determined by the maximum urban development indicators.

Based on the calculations, the belonging of the district territory being under the influence of agglomeration is being determined (Table 2).

**Table 2.** The degree of belonging of the district territory being under the influence of agglomeration

0,7-1	The district territory belonging being under the influence of agglomeration and having high urban planning potential
0,4-0,7	The district territory belonging being under the influence of agglomeration and having an opportunity for development
< 0,4	The district territory that does not belong being under the influence of agglomeration

To study demographic indicators (external indicators, p. 1-3 and internal indicators p. 4-5, given in Table 1), there have been used the methods of time series analysis. To assess the parameters of time series models and calculate the predicted values there is being used the method of the integrated variable mean value autoregression [13].

This method makes it possible to delimit the territories being under the influence of agglomeration that are close to reality – considering both cities and rural areas in its composition.

*The fourth stage* is the characterization of agglomeration territories based on the results of the third stage.

Having determined the agglomeration influence boundaries in two directions: considering the administrative and territorial division and ignoring the administrative and territorial division, it is necessary to analyze the area being under the influence of agglomeration of both variants according to the following indicators:

- agglomeration population, thousand people;
- the number of urban population in the agglomeration, thousand persons: small (50); medium (50-120); big (120-500); large (500-1000); the largest (1000-5000); extralarge (more than 5000);
- population density of agglomeration, persons / km<sup>2</sup>;
- number of cities-satellites, pcs.

*The fifth stage* is checking the development of the agglomeration territories. Once delimited the territory being under the influence of agglomeration is checked for development. For this purpose, the following indicators are used: agglomeration development coefficient ( $C_{dev.}$ ), agglomeration coefficient ( $C_a$ ), and agglomeration index ( $L_a$ ).

## 5. CONCLUSION

The proposed method of delimitation of the territories is under the influence of agglomeration makes possible to determine the existing boundaries and boundaries for the calculated period, characteristics of its development, assess the interaction between all administrative units which are its part.

The key elements of delimiting the territory of the zone of agglomeration influence are as follows: segregating territories as agglomerations by the key indicators of social and economic development, and the basic criteria of their segregation; identifying its city-centre or cities-centres; determining the type, the population size and its density; identifying townships of the agglomeration; calculating the size of the urban population of a township zone; identifying the links within an agglomeration; identifying the spatial structure of an agglomeration; checking the agglomeration territory for development.

The indicators developed for evaluating the degree of appurtenance of a region's territory to the zone of agglomeration influence enable assessing the degree of appurtenance of the territory of an administrative region to the zone of agglomeration influence. These indicators also affect the formation of a perspective line of development of the territory influenced by the agglomeration zone.

The developed unified structural model of delimitation of the territories being under the influence of agglomeration makes it possible to determine the agglomeration area influence boundaries considering the administrative structure of the region.

In the author's opinion, it is practical to determine the agglomeration influence zones with account of the administrative and territorial organisation of the region. In doing so, it should be taken into account that agglomeration in both Ukraine and post-Soviet countries, without being an element of the administrative and territorial organisation, is perceived controversially by statistics agencies, and this poses a huge problem for analysing a territory. In addition, according to the legislation, the development of territories in both Ukraine and other countries is the exclusive right of the state and local administrations. Hence, the coincidence of the limits of influence of agglomerations with administrative boundaries will have an effective impact on the processes occurring in this territory.

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# IMPACT OF THE GREEN AND TRANSPORT FRAMEWORK ON PLANNING OF RECREATIONAL ZONES IN URBAN AREA: CASE OF BAKU CITY

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## ABSTRACT

The organization in the large city of vacation spots, their scale and placement often depends on natural structural opportunities of the area. However, the urban processes of the city, their architectural-planning and transport structure representing a framework of its borders are of great importance.

The natural components of the city which form and substantiate chosen as options of the organization of small recreation areas are described in this article. In this regard, the role of not only the transport frame, ensuring the availability and safety of such places of recreation, but also pedestrian zones, which cover all parts of the Central part of the city, is highlighted.

As it could be seen, in that case, multifunctional elements of the urban landscape at the same time can be used, and actually, among the types of small recreational areas in the Central part of the city of Baku, the most common are urban squares. Although these green gardens are small, but they perform a variety of (recreational landscape, transport and communication) functions. In addition, these zones able to include artificially created microenvironment complexes located within the areas in front of showcases and technologically equipped winter gardens on the roofs of high-rise buildings are providing short-term services.

Thus, we have opened several approaches to the organization of recreational areas in the current conditions of the historical city of Baku.

*Key words: city, structure, recreational zones, three-dimensional, urban framework, territory, transport traffic.*

## 1. INTRODUCTION

The introductory part of the article reveals the importance of the raised issue for the city of Baku, where there is a very strong relationship of its territorial and planning divisions of the city. The research area is the analysis of the spatial and natural fundamental principles of small planning zones arising simultaneously as functional and compositional fragments in the city plan. In the conditions of the center of Baku today it is a zone of liberation from traffic flows, parking along the sides of the city avenues, recreation areas in front of public buildings, surrounded by areas of open spaces of greenery, acting together as a small pedestrian and recreational areas. At present, the problematic issues of these zones are the large limitation of these sites in the historical part of the city in the presence of heavy traffic flows, the employment of large land plots for parking of individual cars and the density of the traditionally developed residential areas.

On the other hand, it also deepens the needs of small and medium-rise formed and in recent years, changes in the spatial structure of this part of the city associated with the functioning of a dense grouping of large volumes of multi-story buildings located at the shortest distance from each other. This has a bad effect not only on them and on the natural illumination of the premises of houses facing the transverse facades, but also to ensure insolation and aeration of the first floors occupied by cultural and public facilities. In order to solve these problems, it is necessary to take into account the increasing needs in places of recreation not only for the population of Baku requiring an increase in the horizontal

dimensions of open spaces with the possibility of switching them if necessary for small pedestrian and recreational areas.[1]

## 2. AREA OF STUDY

The variety of functional and recreational requests of the city's population in its historical environment determines the diversity of their spatial forms use with the possibility of increasing their emotionally artistic impressions due to the formation of small recreation zones represented as well as urban interiors.

All these three series of needs for the use of valuable historical sites in the historical part of the city of Baku are very important both visually and functionally for the life of citizens and guests of the city, because stepping into a dynamic interweaving with residential areas, they allow us to consider them today ready pedestrian and recreational spaces of the city. It is thought to solve these problems will help and the division of such spaces into 3 varieties:

Primarily, this is a specially designated area for the erection of flat structures that perform specific functional tasks. These are exposition areas, with a technologically equipped network of fountains, although here most of all prevails on the surface of these areas, and their visual perception. Fig. 1.

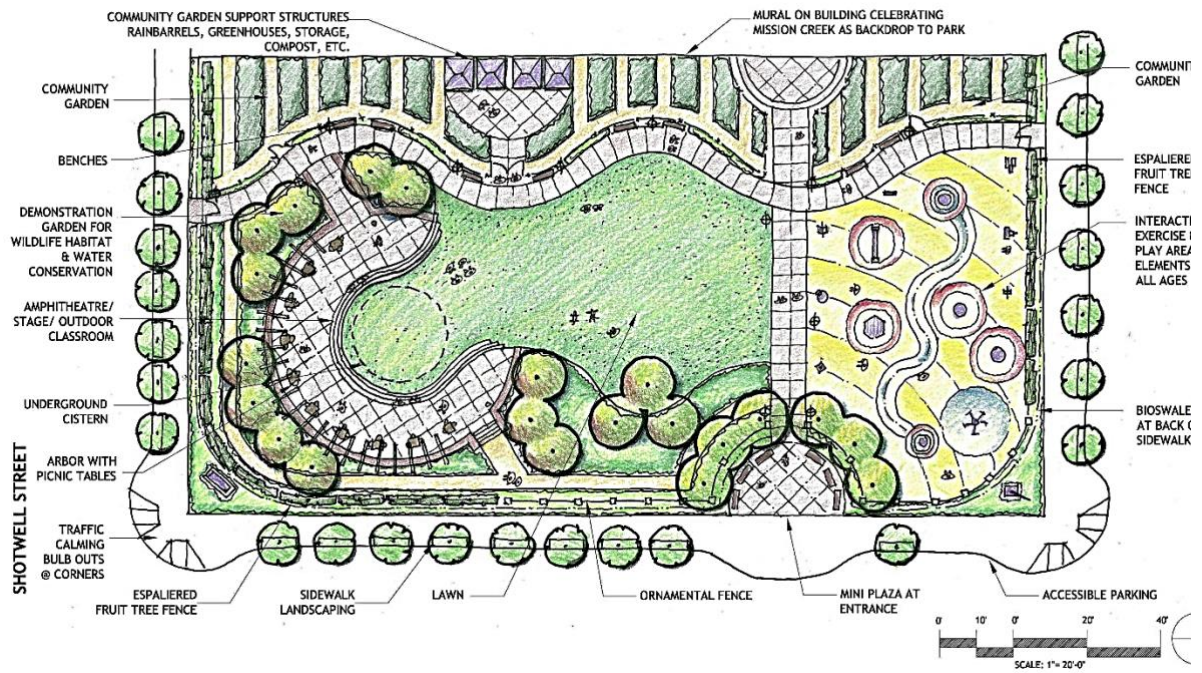


Fig. 1. Initial layout for in the historical core of Baku, (case of Icheri Sheher)

The second type of space is the existing independent areas around those architectural structures that are located in the courtyard areas of residential development of historical neighborhoods. In the gaps of these blocks can be arranged coronary, esplanade for a short rest and leisure.



**Fig. 2.** Rearrangement of landscape in framework of Ancient Inner City in the historical core of Baku, (case of Icheri Sheher

So that they would be purely recreational purposes are not subject to the surrounding buildings, in this case, it will be rational to partially free the first floors of the fundamental to use them as pedestrian passages and transit passes. Fig. 2.

The third type is multi-purpose spatial formations, where it is possible to accurately determine the originality of the compilers that organize them in the form of pedestrian transit zones that extend to the boundaries of city's historical part. Here, the functions of both are closely intertwined. Usually the reason for the appearance of such zones is the presence of enlarged urban planning (planning and transport) factors: the need for citywide communications, pedestrian and recreational places for short-term use. They are inconceivable without the cultural and entertainment establishments addressed to them, brand shops and public institutions, formed on the first floors in monumental buildings and in the monument zone. This category of places includes the city's interiors, which are dissimilar in structure: pedestrian streets, squares, small cafes, etc. In contrast, our seaside boulevard, harmoniously integrated into the general structure of the central planning area street space, is divided into several parts. But sometimes it is possible to add to them and the yard living spaces of the quarters adjoining to them possessing a position of recreational genesis.[10]. Fig. 3.



**Fig. 3.** Typical variation for renovation of “Sovetskiy’s area”

### 3. PROBLEM

Today the most from capital cities live into intensive traffic zones. These blocking aren't develop the reduce of touristic flows and take away the opportunity of city center. The increase of street width isn't effecting well in many urban situations. The unregulated location of buildings (constructed in post-soviet period 1995-2015) are holding back the optimization of urban roads structure. The most central zones of Baku city are ready to be for the pedestrian. In any ways, the cars entered in center between 5 to 8 o'clock sometime are disabled one hour to catch the necessary destination. [7]

In these conditions, through the pedestrian zone vacationers could, if necessary, stopping for a short time to relax and have fun. It would be correct to organize evacuation from roadsides of the cars occupying unloading strips the highway passing along the sea coast.

In the Central zone of the historical part of Baku there are sites that are solved together with squares, where hundreds of people flock for rest. For this reason, the architecture of the buildings surrounding

these areas is more monumental than the architecture of buildings in other parts of the city, also suitable for use for pedestrian and recreational purposes. [3] Fig. 4.

In this regard, the natural framework of the city today can be acceptable for the formation of new small recreational areas only with the use and introduction of high-tech means of improvement. Because the planning structure of the coastal zones of Baku in the Central part has all the possibilities for the organization of daily rest even within the Central main axis working on both sides for Parking. At the same time, the Boulevard recreation area consisting of a whole group of environmental components and means can be connected to the transport and planning framework of the city by fundamentally new attitudes and methods of formation.

Everyone knows that the natural framework of a major city is given the role of the basic life support system that maintains the ecological balance in the form of the "city-nature" system, although even at the modern level of urbanization it has not yet become a full part of the city planning. Because there are only its separate parts in the form of more or less developed systems of gardening and watering elements. Along with this natural system the study of another system of TFC (transport frame of city) is still on the stage of theoretical and technical developments in the conditions of this seaside landscape. One of the main functions of this system is the traffic flows one direction transmission or transportation. These flows are reproduced both in the territory of its historical part and beyond, providing movement to all suburban formations, providing suburban settlements and villages. [5]

In order to meet the recreational needs of the people of this region near its cities, territories are required several times more than they are today. To solve this problem it is necessary to use the opportunities of existing highways, or rather, the roadsides of those that transit through the historic district of the city, where most of all there is an opportunity to organize places of daily short-term rest.

#### 4. CONCLUSION

On the functional characteristics of the historical part of the city is to ensure the unrestricted movement of pedestrians in both directions ( in the form of linear parallel and transversely perpendicular to the bands) with maximum access to the open areas in front of buildings of cultural-entertainment destination to sites of the organization of small recreational areas, as well as in the ways of pedestrian traffic.

The conclusion of the article can be considered the acquisition of several ways to improve the transport problems of Baku.

First is the need to ensure the continuity of both systems (PKG and THC) in the territory of the historical part of the city which sometimes cause contradictions between the network structures of agglomeration. This is due to the fact that the natural framework has a positive impact on the planning structure of this part of the city meets with the restriction of transport and pedestrian lanes, which are occupied by the parking lot left by the owners for the whole day.

In addition to transporting functions (the transport framework of the city) part of this system should ensure the delivery of passenger traffic to the eastern massif of the city. In this regard, more flexible options for the preservation of transport systems should be created to ensure recreation areas in the city center.

In connection with the fact that the morphological relation of such zones can be attributed to certain territorial nodes and axes of the landscape of the city, they should be based on those laws that would justify the equivalent placement of recreational areas in the structure of the city, additionally performing architectural and artistic functions that enhance their visual perception. [6]

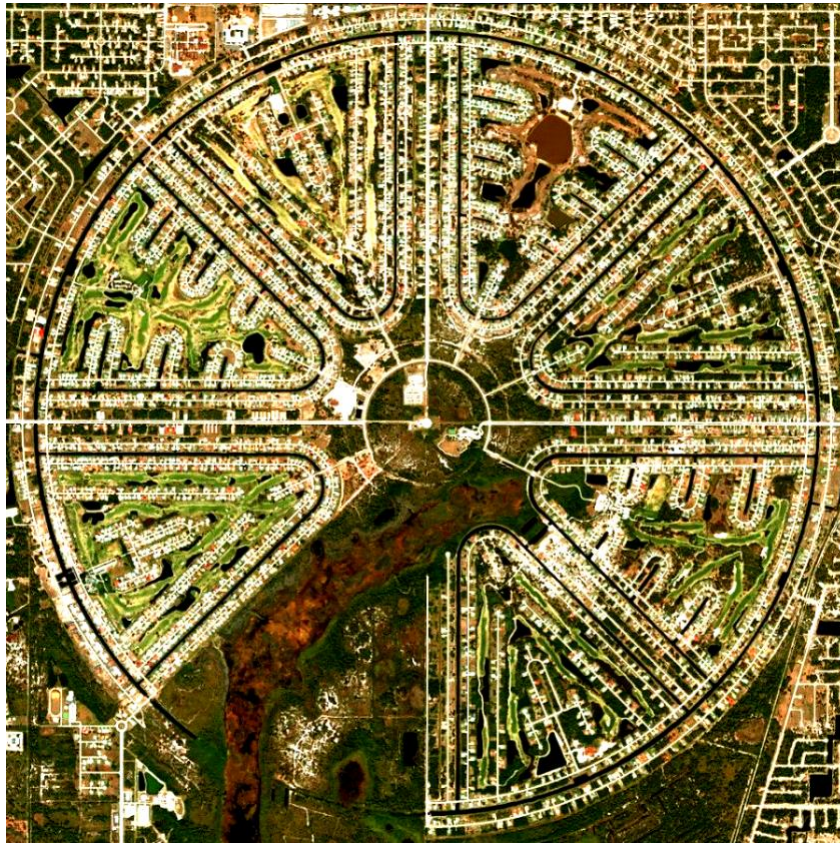
As you can see, in this case, multifunctional elements of the urban landscape can also be used, and for now, among the types of small recreational areas in the Central part of the city of Baku, the most common are urban squares. Although these green gardens are small in size, but they perform a variety of (recreational landscape, transport and communication) functions. In addition, these zones can also include artificially created microenvironment complexes located within the areas in front of showcases and technologically equipped winter gardens on the roofs of high-rise buildings providing short-term services. Also, these include the territory of the first floors of densely built-up buildings, partially exempt from housing and maintenance. In this position, within this part of the city transit traffic on highways

will be possible to move to underground tunnels freeing the ground areas of these spaces for pedestrian traffic. [9]



**Fig. 4.** General part of structural solution for renovation of “Sovetskiy’s area”

Thus, we have opened several approaches to the organization of recreational areas in the existing conditions of the historical city of Baku.

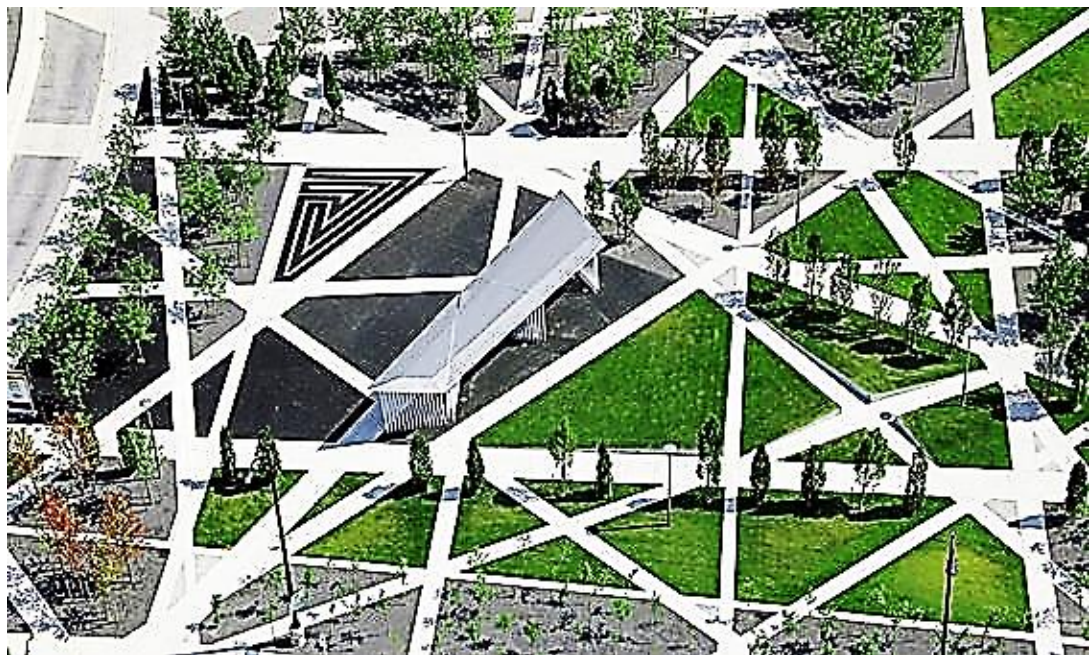


**Fig. 5.** Rotonda West is an unincorporated, deed-restricted community situated in west Charlotte County, Florida (from source of wikipedia), (solution by circular wedge-shaped layout)

One of them is the method proposed by the Russian scientist Vergunov to identify the main zones of gardening. For them, he offers several forms of organization in the form of (wedge-shaped ring, nuclear (concentrated) water-green diameters, which, with a strip, mesh, dispersed individual inserts, are introduced urbanized environment. [4]



**Fig. 6.** Conceptual proposition of renovayion in park “Dede Qorqud” (water-green area, pointwise solution)



**Fig. 7.** Conceptual proposition of one extentional part of central bulvar. (strip and meshble solution)

In the practice of urban planning in Sweden in the improvement for elements of large cities another method is proposed. It is proposed to distinguish three types of substructure (green belt, green wedges, green capillaries) inside the city building. But they are not always solved in unison with the local landscape. In the conditions of Baku, the most justified are the green corridors that play the role of guides in the solution of these recreational zones, taking an intermediate position within residential areas, they connect the green belt of the city with the green capillaries of streets and squares. [4]

These issues were considered by another Russian scientist urban planner Vladimirov V.V. considering the functional and architectural-spatial characteristics of zones in the role of leisure, but

only at the level of recreation of the city and its districts. Thus, in conclusion, we can say that relatively large Baku can be divided into three main types of garden elements within a specific agglomeration system. These are areal elements, linear elements, point elements functioning in the planning structure of the agglomeration. So:

Within these exist conditions of Baku city, area elements of this ecological system are the areas which basically carrying out the functions as natural components and at the same time defining ecological potential of the territory.

Linear elements of NFC and TFC (natural framework of city and transport framework of city) can be the axis of urban activity within the agglomerations. For them, the main task is to maintain the integrity of the natural framework of the entire peninsula, which ensures the movement of mobile components of recreational zones in the coastal zone in the north and in the south of Absheron.

Point elements can be considered nodes of environmental activity within the city, that is, the territory of the squares whose main task is the organization of individual recreation in the face of a financially organized environment. The last system under consideration is a supplier of micro recreational resources, which makes it necessary to provide them with the most intensive material and material equipment and parquet landscaping, where an exchange between its elements and an urbanized environment with monumental buildings is required. [8]

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