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## **LAND-MANAGEMENT EVOLUTIONARY PROCESSES OF SOCIAL SPATIAL STRUCTURE OF MEDIUM-SIZED CITIES**

## **PROCESY ROZWOJU LOKALNEGO SPOŁECZNEJ STRUKTURY PRZESTRZENNEJ ŚREDNICH MIAST**

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### **ABSTRACT**

The article is devoted the land-management evolution of social spatial structure of the medium-sized cities (on the example of Uzhgorod city, Ukraine) as a basis for decision making on the urban facilities reconstruction, for principles designing of urban development and spatial planning for the safe and efficient development of built-up areas and their rational planning in modern social -economic conditions.

Key words: evolutionary approach, social-spatial structure, optimization, development and reconstruction, medium-sized cities.

## 1. INTRODUCTION

Social-spatial structure has a special significance among urban systems and its role overemphasized. It forms the cultural and everyday correspondence in the city, providing public service, and is an important factor in the quality of residential areas. Given the importance and complexity of the social-spatial structure of the city, it serves one of the key categories of a variety subjects researches.

The high significance of issues and problems of improvement of social-spatial structure of cities also confirmed as state policy documents of several countries, and accepted laws of Ukraine "On the Fundamentals of Urban Development", "On Architectural Activity", and "On the Priorities in the Field of Urban Planning".

However, analysis of the scientific researches on this subject is characterized, on the one hand, a significant amount of literature with a sufficiently large number of recorded examples for the design of urban systems, on the other hand, lack of development of specialized issues lag urban planning decisions on requests of the modern practice of living environment formation of the medium sized city, incomplete descriptions of features, options, and other characteristics of residential areas, that is needed for sufficient validity and effectiveness of the design decisions.

Given the evolutionary nature of the urban development process and the impact of historical and planning features of Uzhgorod city, the evolutionary aspects of social-spatial structure require detailed research that is the basis for the concept of further optimization and reconstruction of the city.

## 2. STATE OF KNOWLEDGE

Over the past decade significantly increased interest in studying the nature of evolutionary processes of urban development. The high value of the historical features of the city plan, the organic continuity of old and new can be traced in many works. The main idea of the concept of global evolutionism is that the laws of evolution are the same for any form of moving. Global evolutionism in modern science becomes ideological and methodological status is used as a scientific research methodology problems [4]. The perspective is the application of this approach in terms of the reconstruction of historically formed city. After all, the character of the city is due, respectively, not only external to the planning factors are at any given moment (climatic, social, economic, technical and other), but the innate qualities of the planning, a kind of genetic code of the city as a spatial system [11].

### Objectives setting

Defining the concept of improving the social-spatial structure of the city considering the average established habits and traditions of the local population associated with the following tasks:

- 1 – Analysis of social-spatial structure of medium-sized cities (on the example of the Uzhgorod city);
- 2 – Making the information model of social-spatial structure of Uzhgorod city with defined principles, development models and classification, with the discovery of typological features of social-spatial structure of the city;
- 3 – Analysis and evaluation methods for optimizing existing social-spatial structure of the city, taking into account domestic and foreign experience in the design and reconstruction of the built-up areas;
- 4 – Developing the concept of reconstruction, including guidelines and proposals for improving the social-spatial structure of Uzhgorod city.

Regarding the use of an evolutionary approach to the study of social-spatial structure

of the medium sized city, improving methods of research sufficiently been conducted. It is solving optimization problems and concepts further reconstruction of social-spatial structure of the medium-sized city.

### Historical review

Uzhhorod is a city located in western Ukraine, at the border with Slovakia and near the border with Hungary. It is administrative center of Zakarpattia Region, as well as the administrative center of the surrounding Uzhhorod District within the Region. The city itself is also designated as city of region significance. Population is 115,163 (2016 est.). 1804-1867 – Austrian Empire, 1867-1918 – Austro-Hungarian Empire, 1919–1938 – Czechoslovakia, 1938–1944 — Kingdom of Hungary, 1944–1991 – Soviet Union, 1991–present – Ukraine.

On 10 September 1919 Subcarpathia was officially allocated to the Republic of Czechoslovakia. Uzhhorod became the administrative center of the territory. During these years Uzhhorod developed into an architecturally modern city. After the Treaty of Trianon 1920, Uzhhorod became part of the Slovak half of the new Czecho-Slovak state. After the First Vienna Award in 1938, Uzhhorod was retransferred to Hungary. On 27 October 1944 the city was captured by the troops of the 4th Ukrainian Front of the Red Army. This period brought significant changes. At the outskirts of Uzhhorod new enterprises were constructed and the old enterprises were renewed. On 29 June 1945 Subcarpathian Ukraine was annexed by the Soviet Union and became a westernmost part of the Ukrainian SSR. That year the Uzhhorod State University (now Uzhhorod National University) was also opened. Since January 1946 Uzhhorod was the center of newly formed Zakarpattia Region. Since 1991 Uzhhorod has become one of 24 regional capitals within Ukraine. Of these, Uzhhorod is the smallest and westernmost (Fig.1).

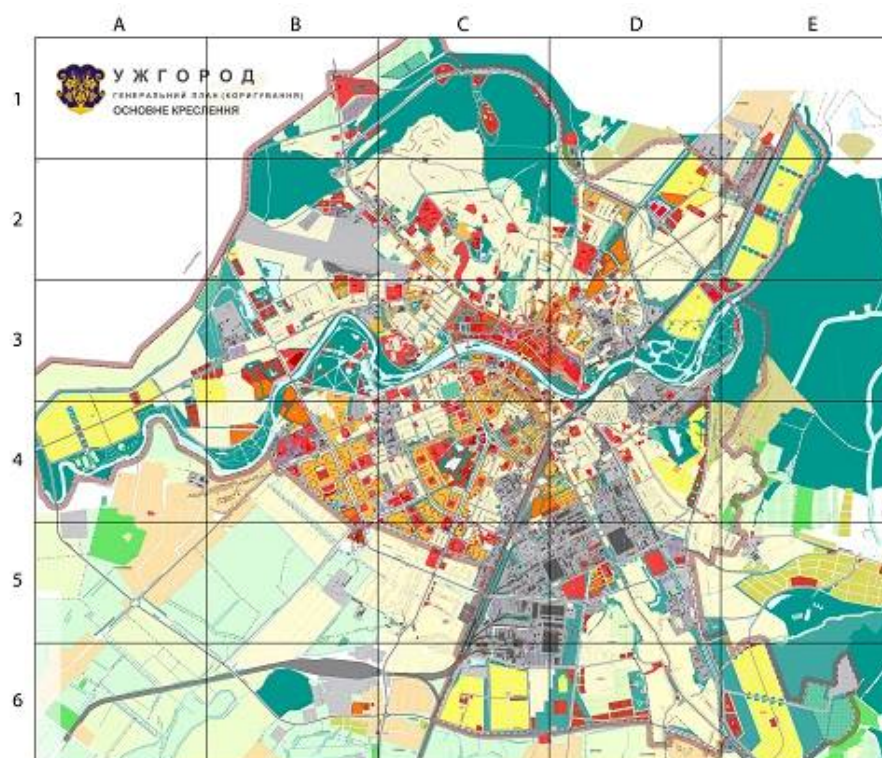


Fig.1. The a master plan for the Uzhgorod city as an example the medium-sized city. Source [9, 12]

### **Land-management evolutionary processes of social-spatial structure of Uzhgorod city**

Uzhgorod city is classified as medium-sized cities, and is, simultaneously, most sparsely populated and westernmost of the 24 regional centers of Ukraine. The city is diversified administrative, educational, scientific and cultural center of the Subcarpathian region. The population of Uzhgorod city is about 115 thousand residents, and has nearly 70 nationalities, including Ukrainian, Hungarians, Slovaks, Czechs, Jews and others.

The city is classified as historic, with valuable architectural and planning heritage. The city preserved the main features and characteristics of the old plan, ensembles and individual buildings, unique historical, urban and architectural value and standard residential construction quality. Some streets fixed buildings from different periods, keep the areas of roads and trade routes of ancient and medieval period. The city is located 5 objects which have the status of national importance monuments. In addition, the city is a monument of architecture and urban planning of local importance, a significant amount of history and archeology [5].

In recent years, urban development Uzhgorod city observed undesirable negative effects, contrary to the development of high-quality, healthy living environment. Gaps in the system of cultural and community services, which forms the social and city planning, organization, indicates the need for complex optimization measures. The evolution of the public service is divided into four periods (Fig.2).

1. The first period (until 1946) covers a considerable period of time, characterized by the gradual change in different historical periods, which, in turn, dictate the social and economic development of the city. At this stage the city center public service structure is characterized by concentration of almost all institutions as urban and regional importance in the downtown. In the city center, are the main administrative, social and economic organizations of the city, cultural institutions and community services. That public service is characterized by a complete mono-centrality.

2. The second period (1946–1970) is characterized partial shifting the focus of labor activity. The population of Uzhgorod city has counted about 47400 residents. Formed new tricks labor activity, stationed outside the city center. Built new factories, which mostly worked for the military-industrial complex of the USSR. Grew up new dock buildings, a shoe and garment factories, the furniture, meat, dairy plants, motor company, were reconstructed Uzhgorod Airport and more, have been constructed several regional hospitals; construct new musical drama theater, the new building of Uzhgorod State University and buildings of its dormitories on the waterfront, the new stadium and sports complexes; department stores, house of consumer services, hotels, regional radio and television center; was founded new park; grow new buildings of the city schools, artistic and cultural-educational school, vocational opened technical school. There are new streets and entire neighborhoods in large areas of old fields. Since the late 50's begins construction of the mass residential buildings. The territory of modern the city center in relation to the total area of the town at the end of the period already occupied about 15%.

3. The third period (1970–1990) is devoted the intensive development of the industrial complex of required expansion of the city boundaries. According to the Land Code of Ukraine in the 1970 edition of the limit of Uzhgorod city was set and changed Presidium of the Supreme Soviet of the Ukrainian Republic were added to Uzhgorod city surrounding villages. On the outskirts of Uzhgorod continued to build new facilities and renewed old ones. New residential areas have changed the face of the city and its boundaries close to the then current. With the help of Hungarian and later Slovak builders involved in the project "Urengoy-Pomary-Uzhgorod", there was "New Region", was erected only in a 16-storey building on the current Liberty Avenue, the new building Ukrainian school, kindergartens and other building. Community centers for new residential areas are sorted out on some service functions, forming, thus, developed in the area of social and spatial system of the city.

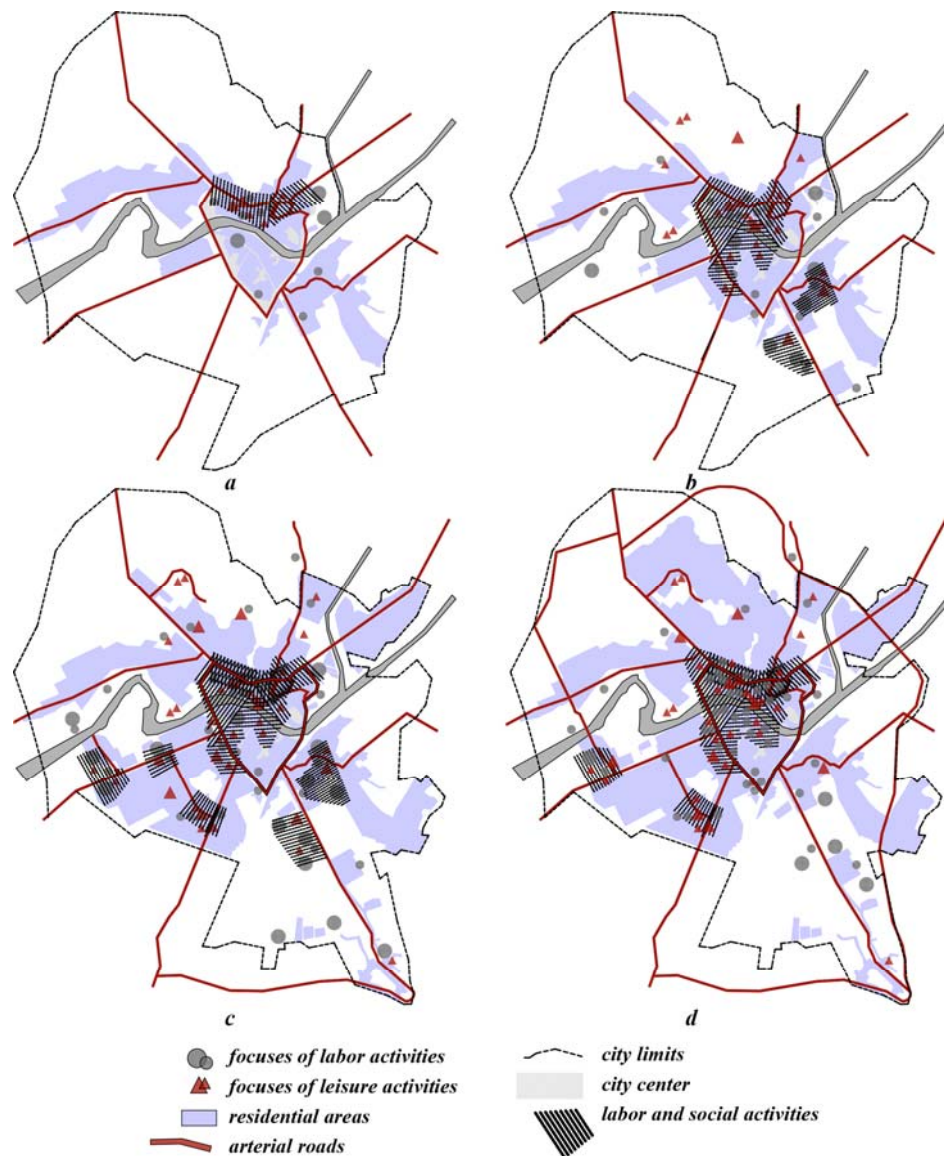


Fig. 2. The evolution of the public service of Uzhgorod city: a) until 1946; b) 1946-1970; c) 1970-1990; d) 1990-2012. Source: the author's scheme

4. The fourth period (1991–2013) is characterized by a sharp decrease in economic complex, transition state economy to new economic relations, change directions of the service sector. The possibility of privatization of trade led to chaotic conversion of certain facilities and the disappearance of the areas of residential areas of the institutions that are necessary for residents, but disadvantageous to new owners. Public services are characterized by certain mono-centrality headed the city center.

Today, new types of intersettlement functions changes the structure of the service centers communications occur at all levels of the service sector establishments. The system creates institutions as higher service levels and lower. However, the transition to market conditions, privatized outlets have begun to change their profile. From residential areas disappear institutions that are necessary for residents, but disadvantageous to new owners. This applies to institutions that satisfy casual and steady demand for goods and services essentials, ie primary care. In their place there are institutions not typical for resi-

dential building [1].

The evolution of social-spatial structure of Uzhgorod city found "innate" properties planning, particularly the role of sustainability in the historic core of cultural and social activities. This fact, especially given the value of architectural planning heritage, is required to take into account in the further optimization of social-spatial structure [2].

### 3. RESEARCH METHODOLOGY – URBAN BACKGROUND AND MAIN TRENDS OF SOCIAL-SPATIAL STRUCTURE OF UZHGOROD CITY

It concerns the features defining of social-spatial structure of Uzhgorod city, its operation and development, and the development of typology and identification of the characteristic features of the public service.

Based on the tasks considered most important factors influencing the formation and functioning of social-spatial structure of the medium sized city.

Uzhgorod city is diversified economic, administrative and cultural center of the Transcarpathian region. According to the State Building Codes of Ukraine (Urban Engineering - Planning and Development of Urban and Rural Settlements, 2002), this town belongs to medium-sized cities with a population of 115,95 thousand people. The city area is about 40 sq.km. The city belongs to the category of cities with a valuable historical architectural planning heritage. General plan, the territory of the city is divided into two planning areas - Right Bank and Left Bank. The planning areas are linked to the central core of the existing system and project transport links, combined transport circle. At the local level created 5 areas (Fig.3)

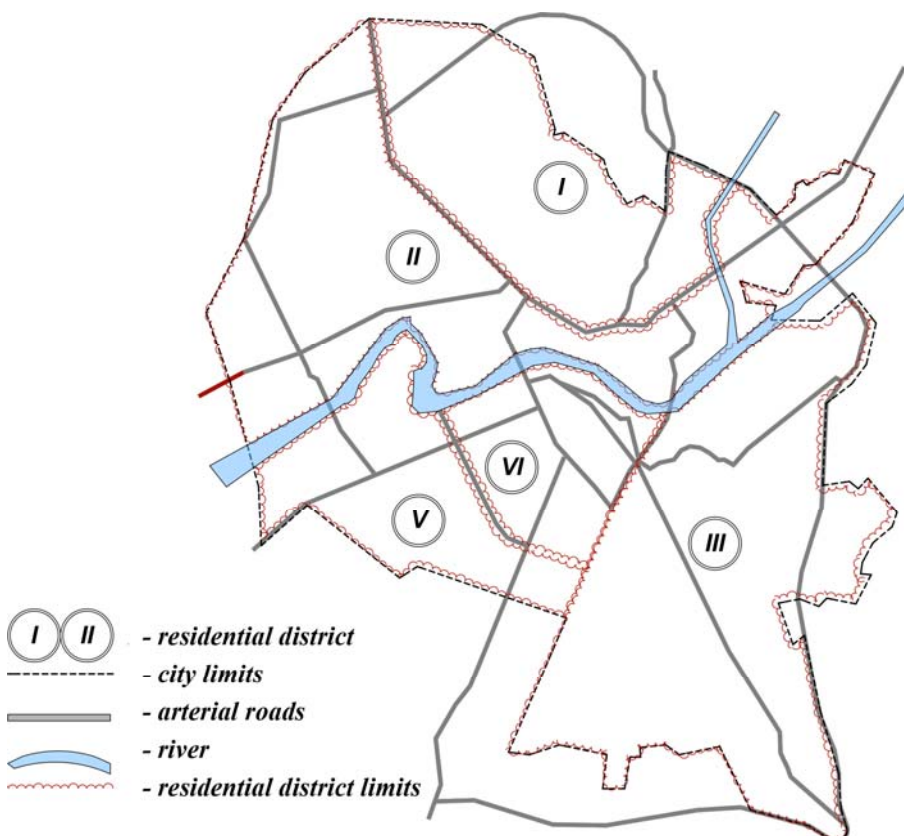


Fig.3. The Scheme of Uzhgorod City Zoning. Source: the author's scheme

As a research result of the Uzhgorod city public service have been found that the structural development of the city took place against the backdrop of changes in various historical epochs, as reflected in the planning structure, and therefore had a significant impact on the social structure. It has been determined that a significant impact on the formation and functioning of social and spatial of the city is the fact that Uzhgorod city, at the same time, is the administrative and cultural center of the Transcarpathian region. This includes increasing migration flows, administrative and cultural tricks.

The main causes of the problem of the city public services are following:

- improper structuring of the territory, which resulted in an absolute discrepancy public service network hierarchy structural units of the city, and therefore unjustified in migration flows;
- concentrating of the most city institutions mentioned in the downtown area, resulting in an additional burden on the road network of the city and its main areas of overload;
- uncontrolled urban development in the 90's years of XX century, which led to the uneven labor tricks location and facilities maintenance;
- increase the overall level of motorization.

The most institutions of urban values in the city center (that has 6.5% of the general city area) are concentrated: 19% the seats kindergartens, 49% the seats in schools, 35% retail, 48% schools catering, 98% theaters, 90% museums, there are industrial zones. Today functioning of public services city network is against the background of low population density with a significant number of residential areas, the uneven distribution of population in the city. In some cases observed partial or complete absence of consumer services establishments.

The evaluation of public services on the city showed that only 34.5% city area is provided by appropriately service. Although the level of security institutions and service agencies in the city generally satisfactory situation in the regions not responsible the standards. It demonstrates the significant deficiencies in the functioning of public service areas of the city, and therefore lowering the quality of urban planning area. It has been established that under these conditions the functioning of city public services there is a need to review the existing structured area to define priority criteria for structuring and distribution spend in the city self-sufficient building blocks for social background of established traditions.

One of the main features of the city service network is its attachment to the transport system of the city. This creates discomfort in the development and operation of both structures – transport and social planning. Specifically excludes the possibility of expanding streets, in proportion to the increase in transport load. At the same time, uneven spatial distribution areas of public services to the population is the cause and spread of sometimes not justified inter- settlement relationships.

#### **4. THE COURSE OF THE RESEARCH PROCESS – urban engineering reasoning for improving the social spatial structure of medium sized city**

Based on the state building standards [10], scientific and methodological literature analysis it has been determined that the minimum social-spatial residential unit of the medium sized city is the micro-district. It includes a full range of primary cultural and community services that satisfied within walking distance and is positioned within the next largest social-spatial unit of the city – residential district. It is established that due to different relief conditions, and of different types during development there is the problem of fixing the district boundaries and functional model.

A detailed study of the question of fixing the boundaries of micro-district suggests that different population density and character development in the low-rise building and

in multi-building is not a criterion for their identification, micro-districts borders could be conventional, but required strict adherence to zoning principles. And the presence of service facilities should be adjusted depending on the residents needs, given optimum power and adhering to regulatory affordability.

A detailed analysis of natural, demographic, historical and other features of the built-up areas has been completed, on the basis of that has been proposed two options for zoning of Uzhgorod city. The analysis of the spatial organization of the community centers network in the system of the city residential areas showed that formed over the years a network of cultural and community services of Uzhgorod city in currently, is no more responded to the progressive functional zoning of urban and contemporary task organization of the city. It has been determined that the spatial organization of Uzhgorod city public service closer to a functional system of accommodation facilities maintenance.

The obvious its disadvantage is attachment the service network to the planning structure of the city that often cause disproportionate the development of services network.

The effective model for structure optimization have been proposed on the example of public service network. The basis of the model is calculation of minimum population in the service area, that allows to have institutions of i-type by social potential method, and also graphical-analytical method in determining the optimal location of service facilities on the territory of Uzhgorod city. Block diagram of the calculation is shown at Figure 4.

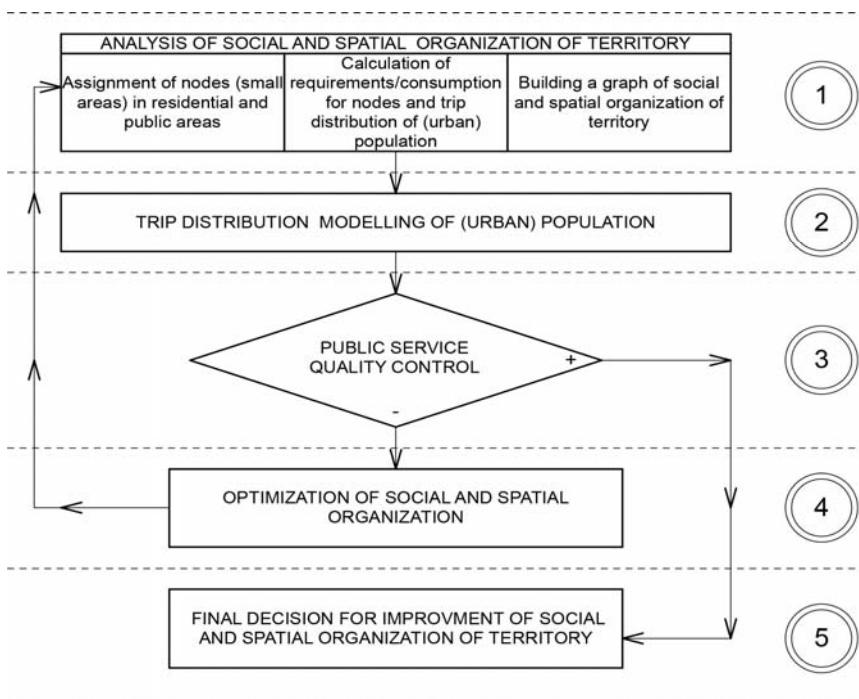


Fig.4. Block diagram for decision making to improve the social-spatial organization of the medium-sized city. Source: the author's scheme

On the first phase it is analyzed the existing network of public services, it is estimated compliance residential areas of each district, the regulatory requirements of the standards, it is performed breakdown of territory on residential areas – items that need to



provide services. The boundaries of settlement areas are set depending on the required accuracy of calculations, character development, and social-level spatial unit. Each item is assigned a network number. The collection of the following data is provided for calculations: cultural and social areas in the city, area of residential zones, and population density of these areas. On the second stage it is performed the modelling of flow distribution of the population. The third stage involves the assessment of each center column. All the necessary data for the evaluation of the first stage and the second stage of the algorithm. In the fourth stage it is made suggestions to improve this category of service based on estimates.

After making proposals to improve public service network of the city there is a transition to the first stage of the flowchart. Then running change of network using the proposed measures to improve and transfer the modified network elements.

As a result of optimizing the proposed layout of service network on the territory of Uzhgorod city and distribution service areas of these establishments. Optimization provide even residential service territory, optimal power performance and minimum maintenance facilities mean radius service areas.

The ability of the method applies to all categories of service network, as criteria for determining the quality of a priori defined, and can vary for different networks.

Among the general recommendations for improving the social-spatial structure includes the following: normative provision of social facilities, strengthening of planning, cultural-social and functional relationships between service centers at various levels, and creating conditions for planning the expansion of influence zones existing and new service centers.

In general, optimization of social and spatial structures will provide the quality cultural population consumer services.

### **The concept of urban territory reconstruction with a historically formed buildings**

Reconstruction of urban areas is to update, radical transformation of the historical sites of the city (the planning, building and landscaping), which is caused by social-economic, construction, sanitary, architectural and art objectives and requirements of scientific and technological progress. Modern reconstruction of urban areas involves usually new construction in existing areas, measures to restructure and preserve buildings and facilities, reconstruction of streets and squares according to the conditions of modern urban traffic. The most effective method of reconstruction of urban areas in recent years is a new building in a dense housing.

The basis of the reconstruction has always been identifying patterns of evolution of the urban environment, the principle of traditions continuity, which must be taken into account during the reconstruction of area with buildings of different periods development. The current environment with the relationships, advantages and disadvantages, and this underestimation may lead to loss of identity or repetition, monotony and the uniqueness of the "new level" of urban transformation, disruption the formation mechanisms of a complete and distinct architectural and spatial composition.

One of the most important problems in modern urban development is the task of rebuild an effective housing. Due to the acute shortage of free areas in historical cities, low intensity land use in the growing deficit areas for new construction, of particular relevance acquire the use of built-up areas. According to the current trends of urban development, the main reserves of residential fund increase are areas that released through the restructuring of urban territory and districts complex reconstruction [6].

In this connection there is need for a comprehensive reconstruction of neighborhoods districts, which includes the implementation of urban development on the basis of science-based relationships between elements of urban structures (residential buildings,

schools, cultural, community, and municipal public service, facilities engineering equipment and urban transport, engineering preparation measures, landscaping and gardening territory) to ensure maximum social and economic benefit. All elements of social and engineering infrastructure of the city should be developed as one of the normal housing environment.

The quality of the housing environment is considered at various levels for both individual buildings and for territory building as a whole. Complexity as a method of reconstruction is the simultaneous implementation of measures for the territory planning, the demolition and construction of new low-value residential and public buildings, repair of buildings and protected area in a relatively short time. In addition, the renovation of housing central areas very acute question of building conservation and transformation, that have value due to historical, cultural, architectural and art terms. Complexity reconstruction in densely built-up downtown areas due to the fact that the new construction influence zones is concentrated the objects of cultural heritage and the old housing stock. This highlights the problem of preserving not just facades, but its structural systems [7].

This is especially actual for today, when there is a massive overhaul of the historic building. Disregard for the built heritage, the lack of a clear policy in this area often negates all efforts to preserve historical urban environment, as a result of a complex urban central areas of the city to have an emergency condition.

Reconstruction of urban residential development is an important part of solving the housing problems of social character which derives from the role that it plays in human life. Integrated development of cities, despite the obvious benefits not received mass distribution. Most cities are characterized unfinished residential areas and districts, disproportionately urban development sectors of the economy, lagging construction of engineering structures, roads and facilities maintenance of public housing. Despite the urgency, so far not developed the scientific foundations and practical recommendations linked in a single system the full range of theoretical, organizational, technical, social, economic, financial and other issues that contribute to the solution of the formulated problem.

An important direction of modernization of housing stock is to solve the housing problem, creating a full range of cultural and service needs of the population to ensure its high standard of living. The modern part of the city should be a rational organization of complex residential buildings, industries, municipal enterprises, the network of public and cultural institutions, transport, engineering equipment and energy, providing the best conditions for work, life and recreation of people. This requires a radical transformation of old urban districts, and the implementation of comprehensive measures for its reconstruction.

The process of reconstruction proceeds differently in cities that differ in size, planning structure and development. Its basis is a master plan [3], which is developed for 20-25 years and the nearest 5-7 years, including scientific prediction of the future city and progressive solution planning, development and improvement, which must be satisfied the necessary requirements for a long time. For the successful implementation of master plans for the city reconstruction in its sequence must take into account all the surrounding buildings and material values inherent in the urban economy, rational use of the territory allotted for development, without exceeding standard norms, the length of the street network and related engineering services.

Streamlining the deployment of new buildings in a dense conditions is the most radical way to improve the planning and building reconstruction areas, which is also associated with problems of territory engineering preparation (ground strengthening array to prevent landslides, soil subsidence, etc.). The territory engineering preparation is an important stage in the building and improvement of any part of the urban area [8].

Most historical cities are highly inability streets and squares for modern public transport, excessive traffic (especially cars) in the central parts. To address these shortcomings should not only rational distribution of residential houses and institutions, but also the

reconstruction of existing traffic arteries of its intersections at different levels and traffic ways separation by placing overpasses, tunnels, platforms.

The urban areas reconstruction is accompanied by new construction in dense district buildings, and in this regard a gradual improvement planning structure of the city. New construction practice in cities shows that the economically most effective is combination of gradual reconstruction of the city built areas by building on free intra districts territories. The current planning structure of cities that has separated by a small-sized blocks, in the present social conditions do not satisfied the growing social needs. Therefore, one of the main tasks of the urban reconstruction is the city planning structure consolidation and reconstruction of urban areas with accommodation in existing micro-districts new buildings required amount.

It is assumed association complex of new and existing houses into the micro-districts, and groups – into the residential districts connected to planning areas to the centers, allowing for the totality of the terrain and natural conditions, and common functional zoning of urban areas in the allocation planning areas. During the reconstruction of residential development focuses on the preservation of existing buildings and structures, respect for economic, sanitary and fire-prevention requirements relating to housing density, building density, gaps between buildings. In addition to these factors provides for the necessary expansion of utilities, transport infrastructure, system maintenance, and increase the area of green zones and expansion of the complex a rest in the surrounding area.

An indispensable condition for the urban reconstruction is the measures to protect the urban landscape features which should be taken into consideration in the districts reconstruction and organizing bands of the most sophisticated architecturally sections of urban areas should be based on the area features. For example, in cities with over rugged terrain (that Uzhgorod city is) using high-altitude terrain point from which offers beautiful views and where the most important and interesting architecturally societies, building, visible from everywhere. The city relief features should be taken into account when building the existing areas with complex relief conditions to achieve an architectural expression that brings together the diversity of existing and new buildings together.

## 5. RESULTS AND CONCLUSIONS

Thus, the concept of reconstruction is taking into account the full set of interrelated and interdependent factors, and while addressing architectural and urban engineering, scientific and technical problems. Giving priority to one of the branches will inevitably lead to violations of steady balance within another, and this in turn will affect the state and prospects of development.

Successful development of medium-sized cities depends on advanced and flexible social infrastructure is, as it is adapted to possible changes in the evolution of the city. In modern urban conditions, special interest processes is the territorial scope of public services to the population, the ability to control and manage its development. As a pledge of providing comfortable urban living conditions at all levels, the issue of rational social-spatial structure has always been one of the priority issues and priorities for reconstruction, renovation and infrastructure optimization cities.

Based on the experience of theoretical and practical developments in the field of urban development and spatial planning, the model of social-spatial structure of the city, which was the basis for new scientific results. Defined urban methods for solving optimization problems of social-spatial structure of the medium sized city. The basis is taken social-planning organization as material and spatial system.

The study of the current state of social-spatial structure of the medium sized city and methods of improvement could be the basis for decision making for optimizing engineering designs of populated areas, taking into account technical and technological factors

influencing the urban environment, with a view to long-term and safe operation objects of municipal economy.

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