Landscape and urban planning transformation of space-planning structure

Elina Krasilnikova
Urban planning Department, Volgograd State Architectural and Civil Engineering, Akademicheskaya St.1, 400074, Volgograd, Russia

E-mail: lanurbanizm@gmail.com

Abstract
The 21st century in urban theory and practice is characterized as the century of "new urbanism". Current trend in the practice of city structure urban development is the landscape and urban planning transformation of the space-planning structures. Landscape and urban planning transformation of the city territories and agglomerations allows creating an open plan structure of the city, developing an efficient transport infrastructure, and creating a system of agricultural landscape neighboring the border of the city [1]. In global urbanization over the last 10-15 years the number of urban population has increased dramatically. On the one hand, the socio-economic role of cities as economic and cultural center of agglomeration increases, on the other the pressure on cities’ ecosystem is growing, which has serious negative environmental problems. In this situation, the relevance of transforming urban environment is becoming evident. Volgograd has a population of one million people. We are considering options for landscape and urban transformation, based on the principles of sustainable development.

The uniqueness of Volgograd linear structure and the specifics of local climatic conditions prevent use of conventional techniques and methods of urban design. The planning structure is an efficient vector of the city development and its metropolitan area.

Key words: landscape, urban planning transformation; sustainability, landscape urbanism

1. Introduction
Garrett Eckbo said that in any landscape we look for two features: one is an expression of landscape nature specifics, the other is development of maximum landscape opportunities for adjustment to the human being’s needs [2]. Landscape and urban planning transformation in the era of global urbanization is an efficient vector and a mechanism of development of a stable planning city structure. One of the main factors caused fast tempo of urbanization at the end of the 20th – beginning of the 21st centuries is active population migration from African countries, Middle East, Central Asia and China to European countries. The reason for that is the need of better economic and climatic conditions for migrants from these regions. This situation is a result of active globalization which is currently accelerators of fast urbanization, whereas fast urbanization causes negative influence on environment in cities and around.

In the past 20 years in Russia the urbanization growth has had some certain specifics connected to socio-economic factors of post-soviet state development. Active migration into big cities
caused population growth in bigger cities. The issue of this phenomenon is quite complicated, it is related to the absence of agricultural cluster in general around the country, to the absence of socio-economic links between town and country and bad transport connections. As a result quite a paradoxical situation appeared in the country: lots of agricultural land outside town is not occupied whereas it could provide towns with food products and could make up geographic range around towns and cities. 

The landscape of the 21st century is not just a territory and nature fundamental principal, which is taken into consideration while planning and renovating towns, it is a basic element of the planning structure which forms a safe bio positive environment of town at all levels. From the point of view of modern town planning conceptions (for example, Paris, Hamburg, London, Berlin, Amsterdam, Moscow) landscape plays one of the most important and sometimes even the most important role in the forming of urban planning structure development. Landscape is many-sided and double natured, if we look at the city as a united landscape-urban planned system, then in the 21st century – the century of the landscape urbanism [3]- we don’t talk about the system of recreational territories, we talk about the landscape infrastructure of town. Landscape infrastructure differs from the system of recreational territories because of its more complex and detailed integrated spatial structure. Thus, for instance, the system of recreational territories is a part of a town landscape infrastructure, but not the main functional element of the city gardening plan as it was 20 years ago. Landscape infrastructure nowadays is an efficient vector of the city development and its metropolitan area.

Duality of landscape infrastructure nowadays means that besides being a vector of the urban planning it possesses important socio-ecological and cultural factors of the city development. It is the formation of socio-oriented and comfortable city environment using modern approaches in the sphere of landscape planning and design as well as new technologies that allows create identity and unique character of public areas. This process begins with creation communication transport areas, public gardens, squares, pedestrian areas, embankments, and finishes with formation of inner areas of flat complexes and architectural objects designed based on the principles of “green architecture”.

One of the priorities of effective landscape infrastructure creation is shaping up a continual system of pedestrian links – comfortable green roads to walk along or cycle along which should go through the whole city, and what is more be effective links with suburban landscape. It allows not only improve sanitation role of the city landscape infrastructure, but also creates reliable links between the city and its suburbs helping provide with accessibility and openness of the city.

Each town, no matter how big or small it is, has its own peculiarities. That is why formation of landscape infrastructure in every town, metropolitan area, conurbation will have their own peculiarities in each region as well, their own specific approaches to the methodologies of research and design of effective infrastructure in the symbiosis with development and transformation of its urban planning structure. It is the landscape-planning city structure of already existing spatial-planning city structure which is considered to be one of the main mechanisms of forming a stable, viable, friendly and flexible and open-to-nature city.

It is appropriate to analyze specific peculiarities of a linear-disarticulate structure of Volgograd plan. Thus, for example, urban planning structure of the city has been developing in the symbiosis with its transport infrastructure, and three main roads (highways) divide the city like a pie into three pieces which are situated in unequal climatic and economic development
conditions. The most valuable from the point of view of urban planning development places are the territories near the rivers, and they are still occupied with plants and municipal warehouses. These riverside zones are one of the main elements of landscape infrastructure and they must be a vector and catalyst element of the whole city planning development. But modern town planning situation is rather difficult; the problem is without transport frame development it is impossible to have landscape infrastructure development. This is a peculiarity of a linear structure of Volgograd. The length influences natural elements in a negative way. There is a danger of partition of the nature landscape, because their natural components are a weak point of this linear planning structure, which is why it is necessary to define the most effective ways of the city development in the symbiosis with the environment.

Thus, currently landscape-urban planning transformation is considered to be the most balanced way in the reconstruction and reclamation from the principles of stable development and formation of safe and socio-oriented city environment.

2. The origin of linear planning structure conceptions
Observation of main stages of the theories of linear town planning structures development allows defining their positive and negative sides for further use of them in the town planning practice.
In the 20s functional zonation was a way to solve ecological problems, it was the main planning principle of the city formation. That was the reason why at that time there was a way back from ideas about centered city and a range of projects about pedestrian connectivity of the main city elements and the criterion of accessibly of natural environment appeared. If there is a desire to keep stable links with natural environment, having reached the width of about 4 km, there must be a way of growing into length.

Starting from the times of Soria and Mata Arturo who were designing the first linear city in 1882, the ideas about linear city did not develop. The impact of Soria and Mata into the development of the urban planning conceptions has a big significance for town planning theory and practice – his conclusions about dependence of the development of industrial and intended for building sectors on formation of transport links acted as a fillip of further and deeper research of linear conception and its possible realization. At the end of the 20s of the 20th century Soria and Mata’s ideas were being studied really seriously and found its continuation in Russia. These ideas were formulated by N.A. Milutin on the ground of Magnitogorsk design (1929) and Stalingrad (1930) and lab search of optimal linear structures. At the heart of this lay-out there was a clear differentiation of the city territories. An industrial zone was divided from the residential one with green space. In 1930 a linear structure was implemented by N.A. Milutin on the territory close to Stalingrad Tractor Plant. This area still exists in modern Volgograd being a monument in the open air. A linear city was presented by soviet architects as two narrow lines of residential and industrial value. They were divided by the green protective line where there were objects of public service comfortably connected with lengthway transitional highway. At the process of industry enlargement the enterprise could have grown bigger along transport through-passages. This way both functional zones were located in immediate surroundings of green space of recreational zones.

Basing on the theory of N.A. Milutin, N. Ladovsky suggests an idea about city development into one way – with linear dynamic center and axis of recreational, industrial and green zones expanding on parabolic curve.
In 1931 Le Corbusier worked out the conception of the city line the basis of which is extensive multikilometer building repeating the outline of the sea coast (reconstruction project of Algeria and Rio de Janeiro). In 1941 a team “Mars” (A.Korn, A. Linch, etc.) used the idea of a linear town while working on the project “Combining Paris”.

However, despite the obvious advantages of the linear structure planning, its weaknesses also should be noted. Basically it’s expressed in excessive length of utilities, that directly increases the cost, and in a large transportation arteries extent, that contributes to a wide range of problems at the city transport system, at the extended system of public and cultural service facilities. As the result, the urban environment is characterized with the physical and psychological burden on citizens.

Beginning from 1960 the question of the possibility of the practical implementation of the linear city, its operational profitability in the urban scale has been discussed actively. Gradually, starting with the linear city concept planners came to the concept of linear corridors, as a real variant of the linearity at the city structure. So, G.R.Collins (1968) describes a category of linear forms and cities (1 axis plan, industrial linear plans, linear-dissected plans) [5]. The result of his research was the conclusion that the linear concept of urban development is an aspect of regional planning development. According to Collins, the linear concept of urban development is a scheme first of all, a process, a script, and is not just the actual architectural implementation.

According to the architect C.A.Doxiadis (1967) [6] the project of Soria y Mata "Ciudad Linear" (1882) was designed to implement not at the whole city scale, but only as a part - as an urban corridor development and for further interaction between the cities. This finding is supported with the project of Madrid tram equipment by Soria y Mata based on radial-ring master plan.

Doxiadis concludes that because of 3-dimensional space perception the full realization of the linear city concept is impossible and will not work throughout the city scale.

Gradually, the linear city concept is modified into the model the urban development, the agglomerations based on it. For example, KenzoTange project - Planning Structure Tokio Bay (1960), where the "linear city" becomes a road-city of "linear metropolis".

In 1957-1958, Hans Scharoun reconstruction project of post-war Berlin to Capitol City Berlin also was based on the principles of linear settlements, seeking to connect the city and its picturesque outskirts.

Thus, the concept of a linear city was transformed into a scenario of urban development not only for cities, but also as the type of agglomeration corridors development. "Corridor" serves as the axis of the region infrastructural development. For example the "corridor" M-4 in the UK, which connects London and Bristol, acts as a priority aspect of region economic development. In Germany this process can be observed due to development of the Frankfurt Rhein-Main region where urban planning and economic development is held along the east-west infrastructure (rivers, roads and railways).

In the late 1990s the concept of urban corridors development became one of the leaders in the Netherlands. This concept is considered as the optimal form of the region spatial development as facilitating mobility, improvement of visual perception due to the enhanced use of natural elements, improvement of the environmental performance due to the city and its beautiful suburban areas merger.

A modern example of linear planning conception usage is reflected in a development project of Grand Paris which was shown by Jean Nouvel in 2009 at an international consulting
competition on planning and architectural decoration of Grand Paris. Jean Nouvel’s project is a democratic, socio-oriented and ecological project. In his conception he comes to use a linear structure to develop central territories of Paris. Jean Nouvel suggests creation of a potent linear university town along the Seine River which is the main nature artery of Paris. He does it to open the river for the city. According to his ideas the formation of a linear city along the river gives high power push for further development of Paris metropolis in its connection with environment.

Linear planning structure main advantages (maximum interaction with the natural elements, transport mobility, decentralization) may be implemented as a cluster method - in the form of corridor urban development.

If the linear city concept is considered apart from its specific production aspect, it’s focused on the preservation of a natural element in the city structure, designing powerful recreational system that runs through the whole city, the desire for decentralization and therefore the reducing the load on the city ecosystem – this allows linear urban structures to be characterize as the most stable. And its modification into the corridor development only confirms the viability of the urban planning theory and relevance of sustainable urban environment creating.

3. Analysis of the modern Volgograd planning structure evolution

Bertrand Russel once said that to understand an epoch and a nation we must understand its philosophy, and to understand its philosophy we have to be philosophers at some point (The History of Western Philosophy. St.Petersburg, 2001, p.23) [7].

Analysis of the planning structure evolution allows to determine not only the main stages of the planning changes dynamics in the city structure, but also to identify the causes of these changes in order to understand the opportunities and ways of its development.

Thus, the stages study of Tsaritsyn (1589-1925), Stalingrad (1925-1961), Volgograd historical development allows tracing the formation of the city’s planning structure and revealing the dynamics of its structural and planning framework changes (Fig.1). Volgograd’s historical and urban planning development is determined by five main formation periods of the planning structure and is characterized by special features of the city’s evolution, the main among them are the primordial nature and specific features of the previous socio-economic development.
1st period: the end of the XVI - beginning of XIX. The end of the XVI – XVII. The process of settlement along the banks of the Volga River established the basis for territorial development of Tsaritsyn - the type of coastal settlement. In 1589 the city and fort Tsaritsyn was founded. Exactly during this period the region’s natural dominant – the Volga River - played the main role in shaping Tsaritsyn’s planning structure. The river is a major transport hub and a powerful vital resource.

2nd period: beginning of XX century - 40th year of XX century. This period is characterized by rapid growth of industrial (construction of Stalingrad Tractor Factory and “Red October” Factory) and commercial development of the city, increasing the concentration of population along the water transport and road transport line. It’s defined as a dispersed type of settlement. According to the active designing on the Volga banks, the deforestation in the coastal part was conducted, ravines prevented production placement were gulling, rivers were led underground - in the channels. Such powerful human influence was not enough compensated by designing of the urban landscape objects. In 1927 the single plan for the reconstruction of Stalingrad was designed. It was made in the Institute GIPROGOR under the direction of Vesnin brothers [8]. The theory of linear city by N.A.Milyutina ("Sotsgorod", N.A.Milyutin, [4]) was reflected in the planning structure of Stalingrad.

RSRIAFM experience developed their planting techniques were used for the landscape design around Stalingrad. May 16 1935 forestation machine-tractor station was established, now it is Volgograd production and agroforestry experimental station (VPELS). It formed "Green ring": recreation area with a complex of water objects and greenery. A few years later semi-desert landscape of ancient neighbourhoods of the city turned into a forest park oasis.

3rd period: 40-s XX century – 1962. This period is a formation stage of the city’s linearly-segmented planning structure. The catalyst for the formation of linearly-segmented planning structure was military destructions - the city was completely destroyed and needed a new master plan. The basis of the new master plan - the project of the city’s rebuild – was a draft of the Academy of Architecture under the direction of K.Alabyan. Planning principles, developed under the leadership of K.Alabyan, defined the architectural image of Stalingrad for many
years: the continuity of architectural planning ideas was persisted. The master plan called for the establishment of such planning, where considerable extent of development wouldn’t be felt. Therefore the city was divided into four distinct complexes: the North (Traktorozavodsky and Krasnookiabrsky districts), Central (Central, Dzerzhinsky and Sovietsky districts), Kirovsky and Krasnoarmeysky districts.

One of the basic principles was the use of the city’s advantageous natural conditions, its terraces topography, expressive Volga views and opening views of its left, flood-plain coast (which is a recreational area of the city). All residential areas should have received access to the river using green embankments. This approach contributed the development of a linear planning structure in close coordination with the natural factors balanced the environmental situation in the city with a strong industrial sector.

The master plan by K. Alabyan provided Stalingrad to become an example of a new settlement system 70 km long, had no theoretical justification that time. Much later, this settlement system received theoretical basis and scientific recognition, which didn’t fit the general idea of the city formation.

4th period: the end of 70's – 2002. This period is characterized by the further development of the linear-group settlement system and the formation of the Volgograd Agglomeration by planning merger of Volgograd and its companion Volgsky, as the result of Volgograd North planning area expansion and the increment of the suburban areas in the direction of transport link Volgograd-Moscow. In 1982 a new city master plan was provided where urban development is proposed along the Volga River in the form of five planning zones, separated by green breaks. Changes in socio-economic conditions adversely affected the formation of the city’s planning structure, as there was a departure from the principles laid down in the master plans 1939, 1962, 1975's.

In the transitional post-socialist period in the early 90s the spontaneous building up of natural green gaps between planning districts of individual residential buildings was begun. Financial instability wasn’t able to provide industry movement from the waterfront territories and the construction of waterfront highway and also further formation of a connected well-maintained landscape areas along the Volga River, providing the output of residential areas to the water. This became the reason for the deformation of the city’s planning structure and formation in its structure environmentally conflict zones.

5th period: 2002 - to the present. This period is very important in the formation and development of the city’s planning structure. In 2002-2005 new concept of the master plan of the city was made [9], where the continuity of the urban planning concept 1945 is traced. The main advantage of the new Volgograd’s master plan concept is the formation of a united waterfront along the river, on the basis of the 0-longitudinal highway. But unfortunately, this concept doesn’t take into account the real relationship between depression and actively developing areas, in terms of optimizing the density and its environmental friendliness [10].

Nowadays Volgograd is a complex urban planning structure (Fig.2). Today Volgograd is a city-planning structure, elongated the banks of the Volga River more than 90 km and 9 km in width. We can notice its gradual transformation into a more complex linear-dispersion-type structure of agglomeration. That is connected with the urban land increase, with the development of new transport links and the formation of the new residential areas development.
4. **Peculiarities of linear city transformation due to its urban planning development specifics.**

The city’s urban planning developed and is still developing in a symbiosis and sometimes depending on its transport infrastructure. Three main lengthwise highways divide the city into three parts which are located in unequal in terms of its climatic and economic conditions of development.

The main reason for forming elongated city along the river should be found in local natural and economic factors that had a decisive influence on its structure. To the economically important waterway, the Volga River, all the businesses and industry had always tried to approach (Fig.3).
Housing, in its turn, was concentrated in the form of isolated settlements near the businesses located along the waterfront. Linear principle of settlement at the territory of modern Volgograd was the only rational throughout the evolutionary development from the feudal village to strategically important industrial centre. Due to the active city trade, the coastline was dotted with wharves, warehouses, markets. The most part of city's population lived in the slopes of ravines, which covered all the coastal territory. Period of rapid industrialization touched the town at the end of XIX century. The active involvement of the capital led to building up of waterfront areas by large industrial enterprises. Thus, the industry became the main factor in the process of Volgograd’s planning structure formation. Chaotically located along the waterfront enterprises became the centres of production areas, around which the primitive dwelling areas were formed, as a prototype of future industrial planning districts of modern city.
Volgograd has historically formed environmentally stable structure that nowadays came into conflict with the principles according to which it was founded because of the urbanization influence. (Fig.4). The project of well-known Russian urbanists, Vesnin brothers, developed in 1930, became the basis for the planning structure of the modern city. It provided the separation of residential areas by environmental breaks - landscaped areas, which are currently in crisis situation – they are built up chaotically, turned into municipal landfills. This leads to the disruption of functional planning structure, the degradation of the natural framework.

The increase of anthropogenic pressure on the city ecosystems affected crisis state of its current linear-segmented structure. And one of the causes of such crisis is the lack of waterfront transport infrastructure. There’re several reasons for this situation. The main one is industrial areas location along the waterfront territory of the Volga River. Historically, Volgograd’s industrial enterprises were located along the river at its upper terrace, and the resulting is a paradoxical situation when residential and public spaces aren’t in a favourable microclimatic zone of the river influence, but there’re plants, have been polluting Volga for over 100 years. This situation is typical of almost all the cities with linear structure and for major cities located along the major rivers and water areas, where the main compositional axis is the city or federal traffic artery. The growth of urban areas, in our opinion, can’t occur as a result of expansion of city limits - its boundaries, as in this case linear structure will be violated, that will lead to the destruction of the natural-planning framework and the imbalance of its ecosystems.
Just linear urban environment as so close as possible to the configuration of the dominant natural factors (topographic features, waterways, green space arrays, etc.) without deforming of the natural structure, the city adapts to it. As a result - citizens get urban environment softened by natural landscape. This is how the principle of "vegetation sponges in the asphalt desert" works [11]. Therefore, it’s possible to conclude that the "quality of life" (which is based on the movement "Cities for life") is maximal for cities with a linear planning structure, where it’s possible the optimal use of infrastructure benefit: with sufficient resources, clean air, affordable housing, with a wide employment market, with the available recreation spaces [12].

Forming every urban system is inextricably linked with the natural context, what frames it evolved. The influence of the characteristics of climate, topography, availability of water artery on the urban structure formation is evident. These natural factors simultaneously serve as a background basis, natural setting and also as natural potential of this territory (Fig.5).
During the urban structure development anthropogenic environment is gradually replacing the natural environment. This is inevitable due to the rapid pace of modern urbanization (urban population growth in particular). As the result, over the past decades the issue of balanced urban space creation became very important. Because finding answer, mankind is able to create a comfortable and safe living environment. The definition of urban balance in the context of this study is considered as a balance of natural and anthropogenic components, forming an integral city environment. The integrity is the primary measure of the urban environment quality, expressed in a balanced interaction of city-forming elements - built-up and open spaces, transport infrastructure and, of course, the landscape. Consequently, as successful these elements coexist in urban environment, so achievable balance between human and natural components, directly influencing on the formation of a sustainable integrated urban environment.

![Diagram: Landscape and urban planning transformation]

**Fig. 5** The factors affecting on formation of the landscape and urban planning transformation
5. Landscape-planning transformation of a linear city as a vector of stable development of its spatial-planning structure.

Landscape-planning transformation of a linear city is one of the most ecologically oriented directions of further development of the city spatial-planning structure. Symbiosis of architectural transformations and formation of stable landscape system will allow make up viable, flexible, and stable landscape town planning infrastructure of the city. Interrelation between the landscape and the city must be on every hierarchic level not only of the town planning structure but also of its space-planning structure.

In the global scale transformation of the city space aims at creation urbo-ecological balance of the city environment. Taking into consideration that a weak and at the same time a strong element of the linear planning structure is a linear landscape-natural component, it should be noted to use it as a base of the landscape-town planning, therefore enhancing its role in the creation of the stable and flexible spatial-planning city structure. The base of these transformations is a multifunctional use of ecological opportunities of already existing landscape-planning frame and its diffusion into the urban planning structure of the city on every hierarchic level. Thus, we can neutralize negative characteristics of the linear planning structure (isolation of its natural elements and their linear state in the structure of the linear city) on the base of the creation of dispersive multifunctional and socio-oriented infrastructure which will thread all the elements of the planning city structure and influence the development of the border territories.

Studying the symbiosis of socio-ecological effectiveness and esthetic perception and landscape we come to the conclusion that landscape, being the basis of the process of landscape town planning city environment transformation as anthropomorphic space, must originally correspond not only with the requirements of ecological quality improvement of the city space but also with the criteria of its esthetic perception by a human being as the main consumer of the city anthropomorphic space.

What are the possible ways of landscape transforming on example of Volgograd, as a major industrial city with highly expressed linear dispersed planning structure?

Certainly, the Volga River is the major natural dominant and the main city-forming aspect for Tsaritsyn-Stalingrad-Volgograd. The significance of this water artery can hardly be overstated – it’s still the lifeblood of Volgograd agglomeration. A lot of smaller rivers flow into Volga along its bank, making the alternation of urban landscape with natural landscape of floodplains and beams.

These green wedges are visual boundaries of the city planning districts, going through the entire city from Volga bank to the Volgograd’s green ring. External green ring of the city is a unique element of landscape infrastructure that is the main tool for favourable microclimate creation at the semi-desert zone, where Volgograd is located. Nowadays interconnection between all mentioned factors is violated, that doesn’t let us maximum effectively using the features of Volgograd’s landscape infrastructure.
As usual the citizens are not able to interact with the main city-forming element – the river. The result of active industrialization period of XX century can be still observed – the chain of industrial zones located along the river bank and does not give the citizens the opportunity to use waterfront territory. The post-industrial period, characterized with innovation field’s development, implementing contemporary technologies for “clean” production, the priority of ecological security question, hasn’t changed mostly the city map. Industrial giants are still located at most investment effective waterfront territories, making irreparable damage to the city ecology and taking away social-active spaces from the citizens. Thus, creation of single waterfront space, oriented to the people needs, is one of the foreground directions of sustainable landscape infrastructure creation.

6. Development models of landscape infrastructure of a linear city Volgograd as an example
The specific of the linear city can be described with the determinative significance of its transport infrastructure. Thus, in Volgograd exactly transport arteries form the specific framework, serving as basis for landscape infrastructure forming. Obviously, first of all the maximum efficiency of the linear city landscape infrastructure depends on the greening degree of the transport arteries, taking into account the creation of green pedestrian spaces system. In Volgograd this situation is complicated with huge length of three main longitudinal roads and shortage of cross transport links (Fig.6). Solving this question will also require the green pedestrian links design at the direction the river – external green ring. Exactly such global green framework should become the basis for the city sustainable landscape infrastructure development (Fig.8).

![The transport structure of Volgograd](image)

The grid of green communicative spaces is superimposed on the frame of longitudinal-transverse green corridors according to the diagram of administrative districts gardening degree. Unfortunately, the current state of such green urban network isn’t able to satisfy social and aesthetic needs of the citizens (Fig.7, 9). The limited variance of landscape infrastructure forms, limited of its functional diversity, terrible condition and sometimes even its absence negatively affect not only the ecological balance of the area, but also creates an unfavorable social situation.
Fig. 7 Volgograd’s contemporary landscape structure condition
It is important to note that the aesthetics of modern urban landscape is a subjective concept. Today, the diversity of the landscape within the urban planning structure depends on such categories as relevance, information, and multimedia. Traditional functional differentiation of landscape infrastructure objects doesn’t mostly satisfy citizens requires. The establishment of open air public libraries, modern exhibition in the structure of public open spaces, using the natural environment potential to enjoy multimedia processes, drafting agricultural landscapes to meet the aesthetic and economic needs – that’s just part of the current trends in the urban landscape.

Nevertheless, modern urbanite also needs personal landscape space. That’s why the formation of balanced, sustainable urban environment depends on the speed that landscape infrastructure transforms in accordance to the current citizens’ needs. [13]

Thus, the balanced urban environment design in the linear city (Volgograd as the example) can be reached by the following means of landscape transformation:

- Formation of the external "city green belt";

- Formation of unified landscape and urban planning transport system (communication with suburban and river landscape);

- Formation of spatial planning framework of social oriented landscaped public recreational spaces – internal "city green framework";

- Formation of the waterfront public recreational space based on creation of an efficient waterfront transport infrastructure of the city center part – as intercultural communication space, located in symbiosis with the environment of the river, the city’s historical center, carrying the cultural tradition of the previous historical development [14,15];
Fig. 8 E. Krasilnikova, (1999), Urban-ecological approach to the urban-planning structure of the city.
8. Conclusions

One of the main directions in the landscape-architectural transformation of spatial structure is elaboration of its landscape architecting scenario. The main object of the creation of “Conception of landscape architecting scenario of Volgograd” is regulations’ elaboration of architectural-planning organization of general object (parks, gardens, squares, embankments, etc.), regulations for main highways and regulations of architectural spatial organization of public places and local environmental zones. The goal of the conception elaboration lies in the integration of elements of the city landscape into the planning frame of the city.

The conception of urban landscape architecting scenario is based on scientifically-reasoned models of landscape infrastructure and ways of landscape transformation of the city structure planning development taking into consideration its particular features, which are described in the paragraph 4.6 of this article.
This conception is a research and practical work which is of vital importance for the future urban development of Volgograd. The main directions of landscape transformation of the city structure are reflected in 4 main schemes (Fig.10, 11, 12, 13). They show the social-ecological trend of this conception:

1. "Conceptual structural scheme of municipal forestry" which is based on formation of a continual green frame “yard-street-park-square-garden-embankment” on the ground of renovation of already existing green space and revelation of vacant and non-efficiently used territories (Fig.10).
Fig. 10. The landscape transformation of Volgograd - 1 Formulation of spatial planning framework of social oriented landscaped - public recreational spaces – internal “city green framework”. 2, 3 Conceptual structural scheme of municipal forestry.
2. “Landscape-architectural regulations of functional use of all the element types of public use landscape gardening” (based on “Conceptual structural scheme of municipal forestry”) depending on town-planning significance inside the city for the formation of effective system of the city landscape gardening taking into account their architectural-landscape peculiarities. (Fig.11)

Fig.11 Scheme. Landscape-architectural regulations of functional use of all the element types of public use.
3. “Architectural-artistic regulations of the main highways and public spaces”. (Fig.12) The goal of the development is implementation of town-planning documents regulating development of comfortable and safe environment at the main roads and city streets.

4. “Architectural-artistic regulations of improvement of Volgograd embankments”. It is an important step for creation of unified architectural-artistic decoration of berthing facilities, improvement of the embankments. The regulations include not only design principles but also address programs of their location, careful towards historical ensembles of the city embankments. (Fig.13,14)
The conclusion is that systematic realization of methods of landscape-town planning transformation of the existing plan structure will help to form safe, stable environment regardless of the context of existing urban planning structure [15];
Historically the city is formed in certain climatic conditions and spatial-planning time frames, develops gradually, changing the landscape and sometimes even suppressing it. It is necessary to create a stable, flexible, ecologically effective and safe city environment, an important method for which is landscape-town planning transformation of formed spatial-planning city structure.

Landscape-town planning transformation gives an impulse for the city development on the grounds of principle of stability, ecological safety and bio positiveness of the city environment. The main point is that during the process of landscape-urban planning transformation the problem of creation a stable spatial urban planning city structure where the elements of urban landscape play the role as significant as town planning ensembles, monuments, and other architectural-spatial dominants of the city is being solved.
Landscape and urban planning transformation of space-planning structure


Linear City Concepts, [online], doi: <http://www.imagine-city.info/imaginecity.info/Linear_City_Concepts.html>


http://www.enpc.fr/sites/default/files/12buftod_programme-v2.pdf
