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REVITALIZATION OF THE URBAN WATERFRONT AREAS

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structural-planning reorganization, waterfront areas, water diameter, recreational framework, revitalization, rehabilitation of riparian territories.

ABSTRACT

The article presents a strategy for renovation in the riverside area: improvement of water protection functions; rehabilitation of disturbed territories; the use of recreational and urban planning potential of such territories for creating a recreational framework on the waterfront; integration of eco-clusters into the structure of riverside territories and the development of an integrated management system for waterfront zones. As a result of the research, the necessity of rethink the attitude to urban planning within the riverside areas is formulated. Possibilities of sustainable development of riparian territories are determined. Stages of rehabilitation of communal warehousing and industrial territories for sustainable development and rehabilitation of urban areas are proposed. A formalized model of structural renovation of the exploring areas are being built, on the basis of which the identified principles of rehabilitation are being tested. The significance of the obtained results for urban science lies in the development of new approaches to the identification and formation of the structure of territories in the area of interaction with the water area. In the formulation of the basic principles underlying the structural and planning transformations of riparian areas.

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Introduction. Features of recreational use of urban areas, in particular the formation of landscape structure and integrated landscaping system of the coastal area in relation to the water area, the creation of water-green diameters, revitalization of river valleys, the formation of individual water-green objects, clustering - notable modern urban trends many cities around the world are still not sufficiently implemented in the cities of Ukraine. World experience shows that a systematic approach to the urban organization of riparian areas includes complex environmental and recreational tasks: management of surface runoff within the catchment; protection of territories from flooding and flooding, which can be implemented in particular in a landscape way. These processes are confirmed by the relevant planning documents, but have not yet become widespread.

Solving the functional and planning needs of the city and the architectural and landscape organization of recreational spaces in its structure is complicated by the peculiarities of the river landscape and its interaction with the urban environment [4].

The issues of rehabilitation of the existing urban structure are becoming key in urban planning. The balance of urbanized and recreational elements is also important for the sustainable development of the city. Riverside areas, being part of urban areas with varying degrees of urbanization, have great urban, natural and recreational potential. Urban "smart-development" of riparian areas is associated with environmental safety, structural and functional transformations of the territories, with the identification of their condition and rehabilitation opportunities. In order to transform urban areas and their further sustainable development, to create a comfortable, accessible, aesthetically pleasing environment. In order to form a recreational framework in the structure of the river zone of the city.

The processes of rehabilitation of urban structures, and riparian areas in particular, are based on closely integrated market conditions, state planning and local interests of communities [1]. The key importance is attached to the stage development of the territories in accordance with the planned master plan of the city. At the same time, one of the main principles of sustainable development of the river zone is the creation of a single water-green, ecological-urban framework of the city. This principle provides for the analysis of the ecological state of functional zones in the structure of riparian areas, their restoration, removal of environmentally hazardous enterprises with subsequent rehabilitation of territories. The aim is also to create significant green areas within the coastlines that perform recreational and conservation functions. Rehabilitation of riparian urban spaces contributes to the improvement of the ecological condition and restoration of the urban environment. The composition of permissible functional zones in the structure of riparian areas, building density parameters, is considered as a tool and an opportunity to create a comfortable environment, achieved through close integration of landscape infrastructure, structural and planning reorganization of urban fabric on the border with the water area. Equally important are changes in the structure of urban mobility, the formation of a continuous pedestrian framework of the city, which aims to create a system of pedestrian mobility that integrates the linear and nodal components of the spatial planning infrastructure of the river zone of the city.

Materials and methods. Activation of water protection functions of river areas. Great importance in the greening of the city is given to the formation of its ecological infrastructure, an integral part of which is the system of greenery and the water area of the city, which comprehensively form a natural recreational framework. This is a system of natural type, which provides the creation of appropriate, from an ecological point of view, living conditions in the city, allows the continuity of the natural framework in the city and forms a connection with suburban recreational areas (Fig. 1).



Fig.1 Identity of recreational frame of the city

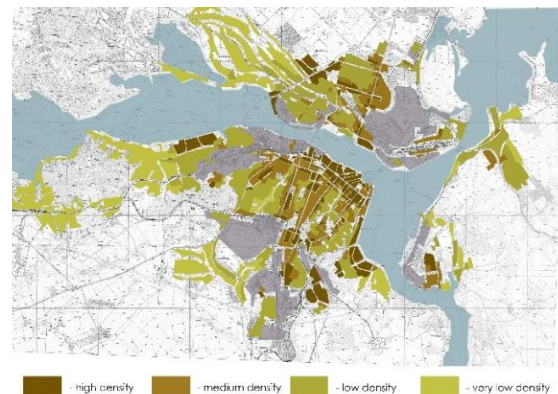


Fig.2. Industrial areas in the riverside territory

The methodology of spatial-functional formation of the urban environment in the water area takes into account the transformation of the coastal zone into a spatial-thematic scenario together with the need to integrate the entire number of local urban planning tasks. Analysis of possible vectors of river space development within the city with the formation of a contact zone in its structure, as a tool for project modeling, makes it possible to regulate the structural components of buildings and landscaping within the water area, creating a contact area with meaningful levels of interaction of river basins [3].

Rehabilitation of riparian areas, which means a set of measures within the riparian space, contributes to the territorial restoration and implementation of the principles of ecological sustainability, humanization and social orientation of the environment, maintaining the balance of natural and anthropogenic components of urban landscape and recreational needs of urban population. In this period of development, riparian areas are functionally rich and urbanized space. The study of the development of the territorial-spatial structure of cities in relation to the water systems allowed to determine that the riparian areas are prone to varying degrees of urbanization, some of them need renovation and replacement. One of the main goals of the reconstruction projects is to determine approaches to the transformation of the landscape system of the city of Dnipro into an efficient and stably functioning urban framework. However, many aspects concerning the forms of urban landscape transformation and natural forms in terms of their spatial characteristics and role in shaping the composition of the city, as well as the process of forming the ecological and urban framework and the organization of open spaces remain

unclear. Thus, the master plan, as a regulatory document, should determine the path of transformation of the urban environment in the direction of the vector of sustainable innovative development of the territory on the basis of the introduction of a new structural element of the natural complex.

Acquisition of qualitatively new content in the interaction of man and nature can be realized under the conditions of providing territorial-spatial and urban processes of culturological content. Thus, the issue of functional orientation on landscape reconstruction of territories along the waters of large rivers is actualized in a number of scientific works that were included in this study. According to them, the analysis of the existing functional use of the coastal zone of the city of Dnipro showed that residential buildings, as well as public and industrial zones occupy up to 80% of the area of all developed river areas. According to the sum of factors, the location of residential buildings near the central zone of the city gives a greater economic effect from the use of the territory than the formation of recreational complexes, but contradicts the need for green spaces. Industrial territories located in the middle zones of the city and in the structure of riverine territories (Fig. 2). They are polluted, decayed and even dangerous for the development of the territory. Numerous foreign studies have concluded that Brownfields, using the capabilities of existing infrastructure, have great potential for sustainable development. These areas are part of planning strategies to combat urban sprawl. These areas are used to achieve a balance in the strategies of spatial planning and regeneration of urban areas [2]. The article considers the possibility of creating a recreational cluster, which will ensure certain continuity of natural framework, regarding its multi-vector formation in the urban space. This connection of the recreational cluster with the suburban green belt and water area, will allow establishing a pedestrian and recreational framework inside and outside the city. In the context of the functional organization and location of industrial zones in the structure of the riparian areas of the great river, three different approaches to their extension have been identified.

- *Restoration of industrial facilities with a possible change in the function of the facility.* Bringing the object to the status of a memorial, a monument of industrial architecture. Analysis and development of strategy and stages of work depending on the complete, detailed restoration, the need for reproduction. Identification of working technology, the urgency of modernization, the need for improvement. The industrial function is preserved, however, the position of the functional zone in the waters of the water is contradictory. The size of the occupied territory, the percentage of operating and functioning enterprises requires a detailed analysis.

- *Partial functionalization of industrial territories.* Uncompetitive industry, further complete change of technology, and the need for functional transformation of the structure. Reconstruction and preservation of the main planning structures of the building. Conservation or museification of the object depending on further strategies. Inclusion of objects of a new type, characteristic of the era of refunctionalization, in the structure of a historic industrial facility.

- *Full functionalization of industrial areas.* Functionalization of the existing monument of industrial architecture, Relatively relevant socio-cultural criteria, and structural transformations of the functionalization of the territory, identification of stages of rehabilitation from industrial pollution. Assessment of the historical value of objects. Changing the industrial function in accordance with urban development strategies. Ecological rehabilitation of the territory. Strategy formed after a detailed analysis. Reclamation of the territories which have got to a pollution zone, increase in percent of a recreational component.

The research methodology included the use of the method of complex factor-by-factor analysis to identify the urban potential of the territory, using a systematic approach and study of graphic, cartographic, normative materials, with data on structural and planning and landscape organization of the urban environment. The study conducted a multifaceted, comprehensive assessment of the factors influencing the development and organization of the riparian areas of the Dnieper River within the city of Dnipro. A number of conflicts have been recorded. To a large extent, the cause of pollution of the surface waters of the Dnieper is the lack of adequate systemic actions and efforts to combat the consequences, rather than to eliminate the factors that cause the negative impact. Thus, the main reasons that led to the threatening state of the environment can be considered: outdated production technology and equipment; high energy and material consumption, which exceeds two or three times the corresponding indicators of countries; high level of concentration of industrial facilities; unfavorable structure of industrial production with a high concentration of environmentally hazardous industries.

Results. Programs for the conservation and restoration of river ecosystems should be aimed at minimizing damage to the sustainable functioning of the basin and preserving the integrity of river

systems. The purpose of this analysis was to obtain a systematic view of the formation of infrastructure within the water area in the process of urban planning and urban development. In order to improve the environmental situation in the Dnieper region, the main activities have been identified. The recreational framework of the city of Dnipro was revealed (Fig. 3). The comprehensive program should be formed in order to improve the ecological condition of the Dnieper basin, solve the problems of waste management, especially toxic and unsuitable ones, and improve the system of ecological monitoring in the region. Environmental protection, rational use of natural resources, ensuring the environmental safety of human life are essential conditions for economic and social development of the region. In areas of long-term development, the question arises about the relationship between the current urban situation and new forms, methods of rehabilitation that meet modern priorities of landscape originality, accessibility, spatial diversity, inclusion of riparian areas and water space in city life.

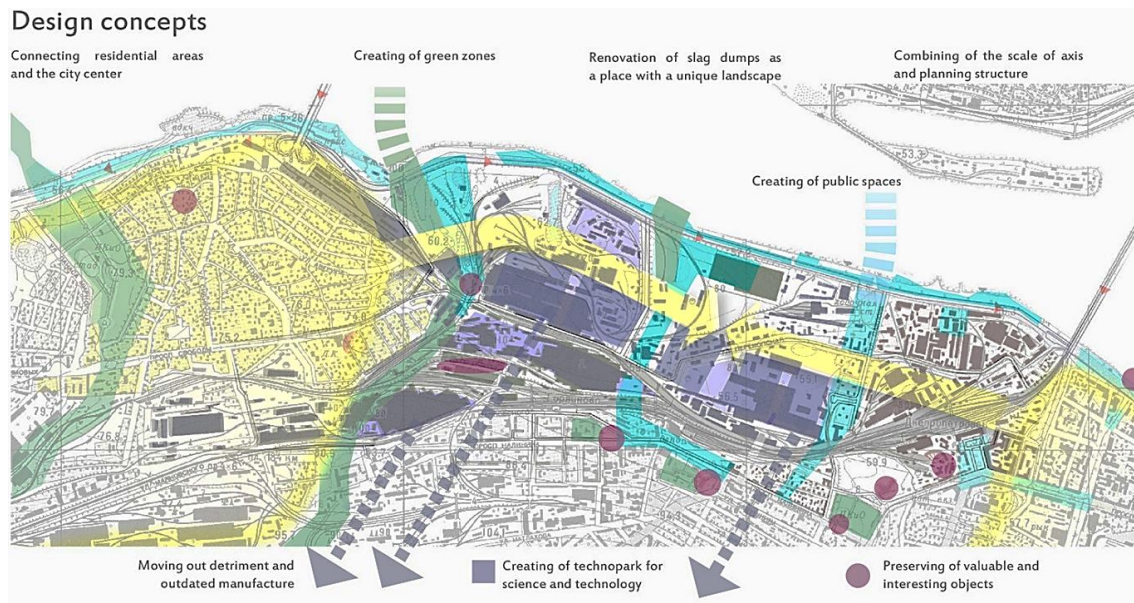


Fig. 3. Analysis of the riverside areas in the city structure. Coastal transformation strategies.

The main principles of renovation of industrial areas of the city on the example of the city of Dnipro. Conditionally riparian areas are divided by the type of their use of the territory. They include: areas of production and storage facilities, areas of individual housing, areas of multi-storey housing, recreation areas, green areas and sports areas. In the scheme of planned activities, they are presented in different colors, according to the symbols. The main measures of environmental, communication and social areas take into account the nature of land use, as well as involve the functional content of a particular area. As a result of the carried out work, taking into account the revealed problems within territorial limits of research, three basic directions of the organization of coastal space are offered: ecological, communication and social.

Ecological direction of landscape organization. The ecological direction of the territory development is the formation of a single structure of green spaces, which can be described as a recreational corridor, due to the preservation of existing green areas and the formation of new in the structure of areas to be renovated and alluvial areas. The main principles of this direction, which underlie the development of methodological approaches are: the principle of preservation, restoration and development of the natural potential of the territory; the principle of forming a barrier-free ecological environment; principle of parity; the principle of adaptation, humanization and social orientation.

Communication direction of landscape organization. The communication direction of the territory development is the formation of the main connections of the river area with the city in general, with the adjacent residential areas in particular, and provides the connection of the planned points of gravity along the river. The principle of communication direction and general accessibility implies the availability of different age groups and different degrees of mobility. The main principles of this area are: urban planning principles; the principle of general accessibility; the principle of connectivity of the territory and adaptation; the principle of inventory and significance, priority; the principle of the cultural matrix.

Social direction of landscape organization. The social direction of the territory development consists in the formation of contact zones and communicative recreational objects, within the water area of the city, which function evenly and are structural objects of the system of recreational pedestrian corridor along the water area. The main principles of this direction: the principle of forming a comfortable environment; the principle of multifunctionality; the principle of comprehensive renovation; the principle of compliance with socio-economic requirements; the principle of aesthetic harmonization of the environment; the principle of sustainable development and environmental safety.

Integration of eco-clusters into the structure of riparian areas. Changing the quality of the urban environment in the direction of the vector of sustainable development of the territory is possible on the basis of the formation of principles and methods of rehabilitation of riparian urban areas. Significantly increase the level of innovation activity will allow the use of cluster approach in the formation of recreational corridors along the water area, introducing technopark structures replacing industrial areas, creating tourist and recreational areas as poles of economic growth, forming communication spaces, sustainable recreational ecoclusters. One of the approaches to the restoration of industrial areas is their ecological rehabilitation: reclamation of areas covered by the pollution zone; transformations within the transport infrastructure: bicycle connections, development of high-speed rail transport, organization of communication complexes within the embankment.

Development of a system of integrated process control in the riparian zone. On the one hand, uncontrolled self-filling of urban areas with natural elements affects the overall balance of green areas in cities, on the other hand, provokes social and urban conflicts. This property of "uncontrolled landscaping" of urban areas allows urban policy to assess the reserves of environmentally friendly development. For example, the Open Space Strategy, launched in the United Kingdom, officially regulates the use of river water protection zones as corridors of an ecological urban framework. This strategy also considers the small but important "green islands" between buildings and along roads as "informal natural areas", which also play a role in shaping the system of open urban spaces [5].

Conclusions. As a result of the research in order to identify the techniques and principles of structural and spatial transformations of river areas, their current state is analyzed, with a comprehensive urban analysis and identification of their urban potential. The principles and methods of structural-density and morphological transformations that can be used in projects of sustainable development and rehabilitation of the formed urban river areas have been developed.

These principles have the opportunity to be implemented through a number of methods of urban organization. The main directions of the organization of the coastal space are aimed at forming a clear comprehensive strategy for the transformation of the structure of the recreational facility in accordance with current trends. Within the city, the river space is formed in a complex way, as a strategic object in the context of ecological planning programs, as the main element of the framework of water-green diameter, ecological corridor. All principles function in synergetic dependence, are complexly connected with each other, in this connection, a complex of measures on landscape organization, rehabilitation, renovation is applied in the developed territories.

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