

# Conditions of the transformation of the landscape of the residential quarter developed in the 1950s-1960s in the mass renovation

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**Abstract.** The relevance of the problem under investigation is due to the mass renovation of the existing landscape of residential quarters in Moscow. The purpose of the article is to disclose the influence of the urban-planning and investment potential on the development of pre-project proposals corresponding to the conditions for the renovation of the quarter without demolition and resettlement of residents, without demolition with resettlement of residents, with the full demolition and resettlement of residents with an assessment of the spatial properties of the newly formed landscape of the residential quarter. To solve this problem, a multivariate analysis of the results of design solutions for the renovation of existing buildings of quarters was made. It allowed to disclose the characteristic features of the transformation of landscape components caused by major repair, the installation of lift shafts, the construction of superstructures, attics, extensions and insertions, the reconstruction of existing and construction of new facilities of the pre-school and general education institution, an updated system of landscaping and greenery system, a street-road network and parking garages. The main results of the article show that the implementation of a multivariate analysis of pre-project solutions for renovation of the existing residential five-storey buildings of quarters having their own specifics and peculiarities will allow to obtain results that meet the interests of the administration, residents and investors, and also differentially approach to the accounting of social, financial, legal and other aspects of urban planning. The materials of the article can be useful for, urban planners, architects, builders, investors and administrative organs.

## 1. Introduction

In accordance with the Decree of the Government of Moscow [15] in the city began the program of mass renovation of the five-storey building was established in the 1950s-1960s.

The main direction of the renovation is associated with a massive demolition of the existing residential buildings in order to prevent growth of the emergency housing funds in the city and update the living environment with creation of the favorable living conditions for Muscovites.

Along with the demolition of the residential buildings is possible the renovation without demolition and without resettlement or resettlement of the residents, as well as with partial demolition and resettlement of the residents [1, 2, 4]. In this regard, it seems advisable to consider the influence of the



main conditions of the renovation program on the results of architectural and planning decisions of the residential quarters in conjunction with investment feasibility.

## 2. Materials and Methods

To illustrate the development of possible urban planning and investment variants for transforming the landscape of a residential quarter during renovation, the territory in the South-Western of Moscow along the Architect Vlasov street with an area of 11.15 hectares was chosen, where is placement of 16 five-storey residential buildings. Features of the existing planning structure of this quarter 'figure 1'; territorial-construction resource (TSR) for renovation without demolition of the buildings and major repairs the contingent of the residents (3540 people) and the conditions of their resettlement, to the starting house; the existing capacity of schools (294 places) and kindergartens (72 places); provision of places for personal vehicles (948 cars/places), social and cultural facilities and gardening (7 m<sup>2</sup> / person) are responsible for the prospective opportunities and results of transformation of the components of the developed landscape of the quarter. The transformation of the landscape of residential quarters, depending on the renovation conditions, is associated with taking into account the characteristic features and specificity of their possible architectural and planning organization, which affect the changes in territorially-spatial characteristics. These features, specifics and characteristics allow assessing the investment potential of the buildings of the quarters and choosing the most appropriate solution ensures the performance of the functional- technological, physico-technical, composition-artistic, technical and economic requirements. With this approach, is carried out an objective prediction of the future state of the buildings of the quarters in the median prestigious zone of Moscow, which especially requiring highly professional analysis and expertise.



**Figure 1.** The existing state of the five-story residential development: a - scheme of the master plan (existing state).

The choice of the most expedient solution for the development of a quarter planning project is necessary at the pre-project stage, when the technical-economic efficiency and investment appeal of the renovation is justified depending on the urban development potential of the territory. Potential possibilities of the territory of the quarter has a rigid system of constraints formed due to the type of development (closed and semi-closed, mixed, line, free types) and its characteristics, as well as planning factors, such as places of employment, educational institutions, public and commercial centers, facilities for leisure and recreation of residents, street-road network. Such a system of restrictions allows to predict with a high degree of reliability the volume of investments in the renovation and the revenues received [1, 2].

### 3. Discussions

The variant 1 – the renovation without demolition of residential buildings and without resettlement of residents, see ‘figure 2’, is caused by the desire of the residents to stay in the existing houses.

Such conditions are characterized by the development of the architectural and planning solution of the quarter, the transformation of the landscape in which is associated with the creation of comfortable conditions for the residents after major repairs of the residential buildings, partial or complete replacement of the system of the external engineering equipment and networks, as well as the reorganization of improvement, gardening, the reconstruction of the school and preschool children's institutions.

At the same time, implementation these activities carrying out at the expense of the revenues derived from the sale of the superstructures, attics, outbuildings, inserts, car spaces and public premises in the first floors of the buildings.



**Figure 2.** The renovation of the quarter without demolition of the residential buildings, without resettlement of the residents: a - the pre-project proposal; b - the fragment of the transformation of the landscape components of the development with the construction of the two-storey superstructures.

Adopted in the project the construction of the two-storeys superstructure, the attic (it can be done even higher), the annexes (9 storeys) leads to an increase in the number of inhabitants from 3540 people up to 5604 people, which, requires an increase in the existing number of parking spaces for permanent and temporary storage of the cars from 948 to 1500 cars; the existing capacity of the school from 294 to 843 places, kindergarten from 72 to 376 places.

Only for implementation of the major repairs in this case of 16 residential houses without the installation of elevators, with the modernization of facades, the upgrading of the system of landscaping and gardening around the house, and the repair of the external engineering communications, require 1 billion 276 million 316 thousand rubles.

The cost of the renovation, which includes all the components of the landscape, is 2 billion 666 million 169 thousand rubles. (Calculation of all variants was carried out according to the procedure [1] and the data of MNIITEP for construction works for 2013). The income from the sale of new housing in the superstructures, attics, outbuildings, inserts, parking spaces, public premises in the ground floors at a market price of 150 thousand rubles per square meter is 5 billion 717 million 376 thousand rubles, which allows to recoup all construction activities and earn a profit of 3 billion 051 million 207 thousand rubles.

Realization in this way of measures for the renovation of the quarter at the expense of private investors affects its territorial-spatial characteristics, which fully depend on the existing development and to some extent repeat its planning structure.

A new space-planning solutions for the residential buildings due to the completion of their superstructures and attics, the installation of lift shafts, the increase in the area of balconies, the use of modern finishing and roofing materials for facades and roofs will allow to obtain new composite qualities in the transformed landscape, to take into account the scale of the perceived buildings height from 7 to 9 storeys 'figure 2'.

Modified architectural appearance of the residential buildings will correspond to modern landscaping with the required width of the driveways and convenient organization of automobile traffic; availability of temporary and permanent storage facilities in open planar parking areas and in underground parking garages under an exploited roof between the buildings; landscaping, rid of random shrubby trees; modernized after the reconstruction by the extensions the new volumes of the schools and kindergartens.

Variant 2 – the renovation without demolition of the residential buildings with the resettlement of the residents 'figure 3' is due to the development of the architectural and planning solution of the quarter, the transformation of the landscape components in which is associated with the creation of a new non-repetitive planning system of the existing buildings. The residents are offered comfortable accommodation in the inserts and annexes, and the existing residential buildings are being reconstructed with the redevelopment of the apartments and the construction of the superstructures, attics and lift shafts. In accordance with the increase in the number of the inhabitants, the system of the external engineering equipment and networks, improvement and landscaping, the school and kindergartens are being reconstructed. Implementation of these activities carried out at the expense of revenues derived from the sale of the superstructures, attics, extensions, inserts, parking spaces, and public premises. Adopted in the second project proposal the construction of the two-storeys superstructures, seven-storeys extensions and inserts leads to an increase in the number of inhabitants from 3540 people up to 6636 people, which, accordingly, requires an increase in the number of parking spaces for permanent storage of cars and guest parking lots in comparison with the existing from 948 to 1776 places; the existing capacity of the school from 294 to 952 places, kindergarten from 72 to 436 places.

In this variant, besides the overhaul of the existing residential buildings, carried out their complex reconstruction, in which the layout of the apartments and the appearance of the residential buildings completely changes. The cost of the renovation in this case is 3 billion 573 million 928 thousand rubles. Financial income from the sale of the new apartments in superstructures, attics, outbuildings, inserts, parking spaces in underground parking garages, premises of the first public floors at a market



price of 150 thousand rubles per square meter is 10 billion 347 thousand rubles, which makes it possible to recoup all construction activities and get financial profit of 6 billion 426 million 419 thousand rubles.



**Figure 3.** The renovation of the quarter without demolition of the residential buildings with resettlement of the residents: a - the pre-project proposal; b - the fragment of the transformation of the landscape components of the development with the construction of the two-storey superstructures, and the extensions, inserts.

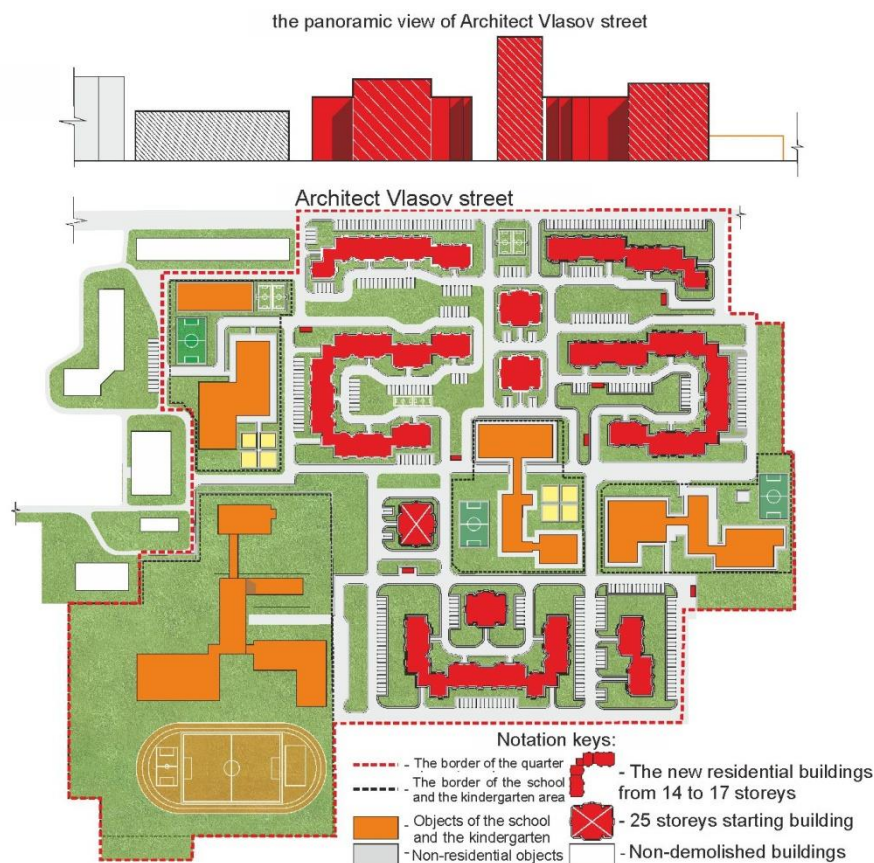
Implementation of architectural-construction measures for the renovation of the quarter without the demolition of the residential buildings, and with the resettlement of the residents, which to some extent depend on the existing buildings, as they preserve its planning base, allows obtaining diversity in spatial characteristics. The new space-planning solutions of the existing residential buildings due to the completion of their the superstructures and attics, installation of the lift shafts, additions to the apartments of new premises increasing their area, combined with the modern space-planning solutions for the new buildings of inserts, extensions using beautiful finishing and roofing materials for facades and roofs, it is possible to obtain new composite qualities in the transformed landscape, to take into account the scale of the perceived development in the considered variant with a height of up to 7 storeys (the number of storeys can vary).

A new architectural appearance of the dwelling houses will correspond to normative improvement and landscaping with a convenient organization of the traffic, availability of temporary and permanent storage facilities in the open planar parking spaces and underground parking garages; modernized buildings of the school and kindergartens with a larger capacity after the reconstruction by adding new volumes.

Variant 3 – the renovation with the demolition of the residential buildings and relocation of the residents to the new houses in the same territory of the quarter, see ‘figure 4’ is caused by the

transformation in the existing building of only the schools and kindergartens and development in it of the new landscape components not tied up to the existing structure.

The residents offering comfortable accommodation with a coefficient of 1.39. With increase of number of the residents, due to the purchase of the commercial housing, the system of the external engineering equipment and networks, improvement and gardening completely replacing, reconstructing the objects of the school and kindergartens. The implementation of these measures, as well as the demolition of the existing residential buildings, carrying out through the income derived from the sale of the commercial housing, parking spaces in the underground parking garages, public premises in the first floors of the houses. Accepted in the project the number of the storeys from 14 to 25 is due to the profitability of the carrying out of the construction activities, since the average storeys, in which the financial income is zero, is 12 storeys. This condition leads to an increase the number of the residents from 3540 people up to 8664 people, and an increase the number of the parking spaces for permanent storage of the cars and guest parking lots compared with the existing from 948 to 2320 places; the existing capacity of the school from 294 to 1172 places, kindergarten from 72 to 581 places.



**Figure 4.** The renovation of the quarter with the demolition of the existing residential buildings: a - the project proposal; b - the fragment of the transformation of the components of the development landscape with the placement of the new residential buildings

This variant of the landscape transformation, completely changes the architectural and planning decision of the quarter, requiring the costs for the renovation of 7 billion 681 million 795 thousand rubles. The income from the sale of the new commercial housing, parking spaces in underground parking garages, public facilities at a market price of 150 thousand rubles per square meter is 26

billion 43 million 900 thousand rubles allows to fully pay back all construction activities and get financial profit 18 billion 362 million 104 thousand rubles.

Implementation of the architectural and construction measures for the renovation of the quarter with the resettlement of the residents, depending on the conditions of resettlement in the starting residential houses on the territory of the existing buildings, the heights of a new, cost-effective development [1, 2, 4, 5], allows obtaining for a diversity in territorial-spatial characteristics. The fundamentally new space-planning solutions for the residential buildings with a modern layout of the apartments, using of the beautiful finishing and roofing materials for the facades and roofs, the normative improvement and landscaping with a convenient organization of a traffic, the availability of the parking lots for temporary and permanent storage, the modernized schools and kindergartens with a larger capacity after reconstruction through the addition of the new volumes, will allow in the transformed landscape to receive new composition-art and functional-technological qualities, take into account the scale of the perceived development in the considered variant with a height of 14 to 25 storeys (the number of storeys can vary). The offered variants of the pre-project proposals aim to improving the architectural and planning organization of the residential quarters, taking into account the formation of the courtyard territories, public spaces, development of the improvement and gardening system, the street-road network, the ground and underground parking garages.

#### 4. Conclusions

Comparison of the three variants of the pre-project proposals for the renovation of the quarter of the five-storey residential buildings shows the most expensive variant is (3) with the demolition of the residential buildings. The payback in the variants (1) and (2) can be higher, firstly, by increasing the number of the extensions and inserts and their number of the storeys; secondly the sale of the multifunctional facilities, made on the basis of the existing five-storey residential buildings.

The functions of these public facilities can correspond to the interests of the residents in one quarter or several. In the third variant, the height of the houses is higher than houses in variants (1) and (2), at 7-16 and 18 storeys, and the total number of the residents is more by 2 and 3 thousand. In the third variant, requiring more places than in the (1) and (2) variants, in the school for 330 seats and 220 seats and in kindergartens for 205 and 145 seats. The necessary number of the parking spaces in the variants (1) and (2) is less by 820 and 544. Accounting for the increase the number of the personal vehicles in the population poses the task of rational use of the intra quarter territories and development of the underground space for the construction of the parking garages in the underground and basement floors of the projected houses, under the sports grounds and intra-quarter roads. The intra quarterly location of these landscape components in proximity to places of the residence will ensure their increased demand and the profitability.

The implementation of a multivariate analysis of the renovation results of the existing development of the quarters in the prestigious zone of Moscow at the pre-project stage, with an appropriate assessment of their specifics and peculiarities meeting the interests of the administration, residents and investors, will allow to differentially approach to the accounting of the social, financial, legal, functional and other aspects of the urban planning and coherently realize the urban-planning policy. With this approach, professional activities of the urban planners, architects, builders, administrators should be carrying out on the fundamental knowledge in the field of the building reconstruction and renovation of the residential development accumulated over the past decades [1-15] that will avoid mistakes and shortcomings made during the mass five-story construction in the 1950s-1960s, and not get new ones during the mass renovation of its results.

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