

**EFFECTIVE MANAGEMENT OF THE BUILT ENVIRONMENT IN CHIȘINĂU IN  
THE CONTEXT OF ITS DENSIFICATION, THROUGH COMPLIANCE WITH  
LIGHTING STANDARDS**

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**Abstract:** *The article examines the problems of managing urban space and of the existing urban development and, in this connection, the need for a preliminary urban planning analysis at the planning stage, the initial design - in the context of densification of the existing area. Particular attention is paid to the understanding of the possibility of densification, provided the norms of insolation and natural light, as a factor in the development of the city.*

**Keywords:** *densification, natural light and insolation, sustainable development, urbanization, urban planning.*

The general trend of settlement development in all countries, regardless of their level of economic development, is the increasing rate of urbanization and its urbanization increasingly rapid and inclusive.

The UN Habitat estimates that by 2050, 70% of the world's population will be urban dwellers. Today's economy, a well designed city with the necessary infrastructure serves as a centre of gravity for the highly skilled, most talented citizens, generating a process of urbanization. Chisinau, being one of the largest agglomerations in the Republic of Moldova, influences in the same context the general economic development indicators of the country, accumulating in its budget over 65% % of the country's total gross domestic capital and human resources growth.

However, the processes of urbanisation have positive as well as negative consequences. First and foremost, they change the human habitat -one of the most important dominants of a comfortable and healthy way of living. The comfort of people living in a given area depends on many factors, one of them is infill development. The term "infill construction" is not defined in urban planning and regulatory documents of Moldova's urban planning documents. This definition is interpreted in the professional sphere as densifying, pitting, selective, piecemeal, one-off, etc.

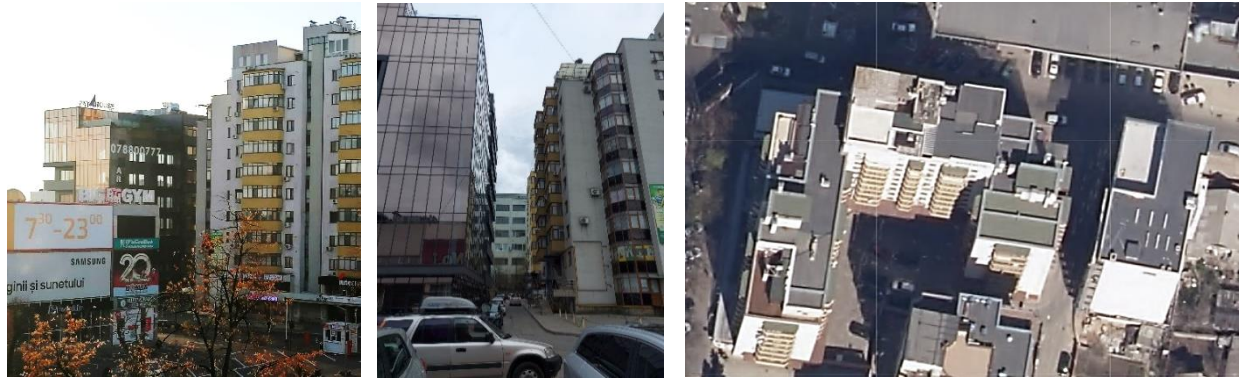
The density of the building is a density exceeding the normative values, which reduces the comfort level of the living environment. (In the Republic of Moldova the norm is 550 persons/hectare).

The purpose of this study is to rethink the significance of densification as part of a spatial development strategy at municipal and regional level, and the possibility of building on unused rational territories, under conditions of strict adherence to architectural and structural norms.

In most developed countries, the practice of densification of the urban environment is one of the areas of urban spatial development. With proper regulatory and subsequent design and construction that takes into account long term development, this type of development allows for an efficient use of financial and human resources. In most developed countries the practice of densification of urban environment is one of the spatial development trends. land resources while preserving the environment and the comfort of its inhabitants.

In our country, one of the building problems is chaotic, disoriented urban planning policy of municipal and local administration on the one hand and a policy of making quick

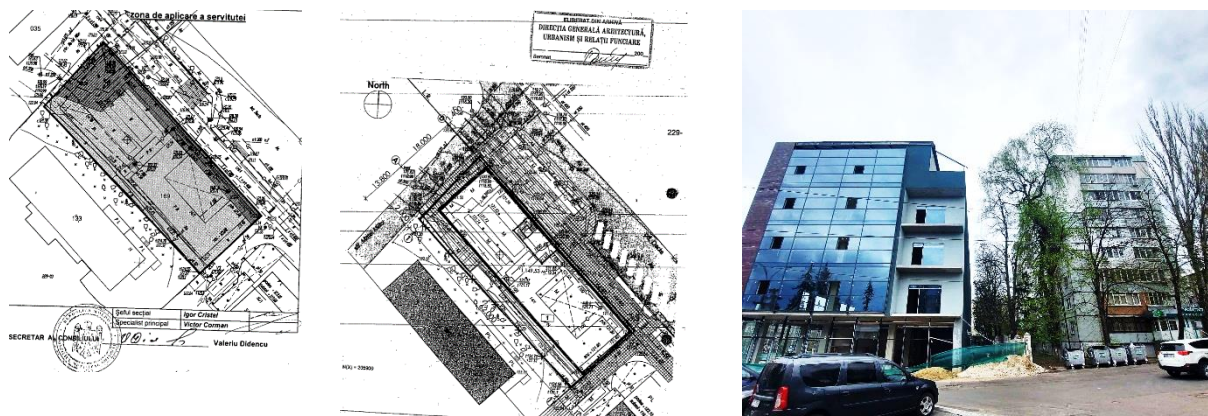
profits. on the other developers and designers on the other. The problem of building compaction is multifactorial inconsistency with an integrated approach to the development of the city. One of the most important factors is the non-compliance with the urban development plan, which takes into account the potential of the surrounding area as part of the city's development. Developers also often ignore the height restriction affecting the urban ensemble (shaping the cityscape) is often ignored (the formation of the urban landscape) and the external appearance of the building, often out of the overall context of the city. Examples of densified development in Chisinau (Figure 1).



**Figure 1. Building density in Chisinau**

As a result, in terms of urbanisation, we have at this stage quantitative growth of Chisinau, but if we look at the situation in terms of efficiency and quality, the area's potential is used against the man. Consequently, the urban environment is becoming less comfortable because of unreasonably high volume of constructions, lack of improvement of surrounding and diversity of functions. In light of the new challenges special importance is attached to sustainable development strategy, which has become a fundamental development concept for the global community.

One of the main problems of dense building applications is the shading of the areas and spaces of adjoining buildings. The standards for natural lighting meet people's need to comply with sanitary regulations, and are also the only calculation standard for spacing between buildings. Natural light is provided both by insolation and diffused light from the sky, reflected from the facades of buildings, the ground, etc. The positive effect of insolation and natural light are bactericidal, biological psychological, aesthetic and economic-energetic aspects.



**Figure 2. Dacia Avenue. Master Plan.  
Construction of a commercial centre [Source: made by authors]**

In regulatory documents on natural lighting the value of the coefficient of natural light is regulated. The daylight coefficient (DC) is standardized for spaces of various purposes and serves as a determining value of light comfort.

The general formula for calculating the DC is as follows, formula 1:

$$e_c^l = \frac{(\sum_{i=1}^L \varepsilon_{li} \times q_i + \sum_{j=1}^M \varepsilon_{clj} \times b_{fj} \times K_{clj}) \times r_0 \times \tau_0}{K_r} \quad (1)$$

To assess the impact of densification on natural lighting, the following assumptions and calculations were made:

- the existing building (Figure 2), consisting of a nine-storey building residential units and an opposing (screening) building for the proposed commercial centre. The main problem causing citizen dissatisfaction is the projected distance between the buildings and the resulting shading of the flats.

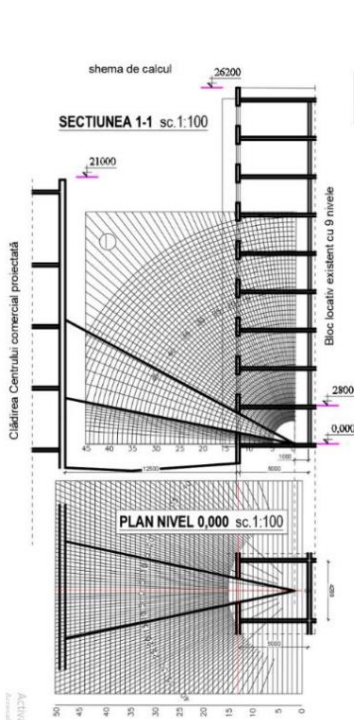
For the analysis of the natural lighting parameters (DC value), the following were selected: residential room on the ground floor. In this case, the geometric DC will be constant and is:

- 0,425% for living spaces according to NCM C.04.02:2017 Iluminatul natural și artificial. The results of the calculation are shown in Table 1.

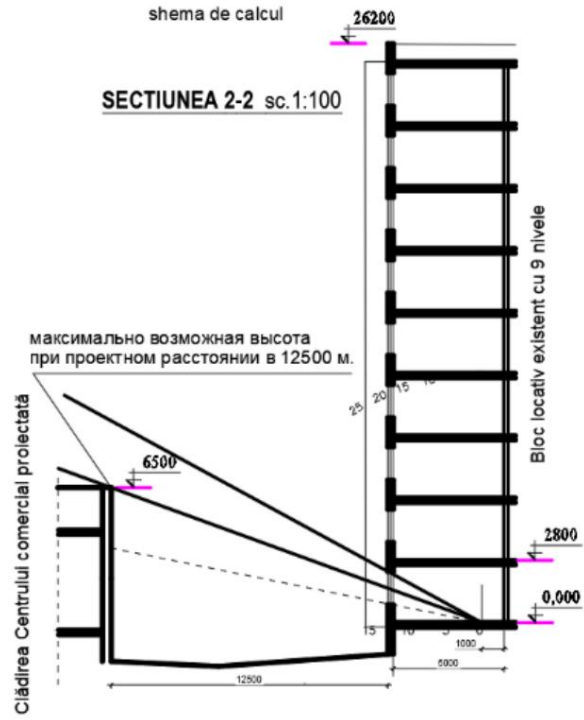
*Table 1. Analysis of natural lighting parameters*

Room Name	En,% before construction	En,% after construction	Normative Estimated Indicator En,%	Conclusion
Living room	0,85	0,28	0,425	The standard is not respected
Living with balcony	0,6	0,23	0,425	The standard is not respected
Kitchen	1,2	0,5	0,425	Norm is met but there is a decrease in EO of 60%

The calculation diagram is shown in *Figures 3,4.*



**Figure 3: Scheme for calculating the DC according to project**



**Figure 4: The result obtained maximum dimensions of the projected**

### **Conclusion**

The following conclusions can be drawn from this study:

With an opposing building at a distance of 12.5 m, and a height of 21.00 m, the normative level of natural light in the dwellings of the opposing building will not be met. The calculation method determines the feasibility of erecting this object at a height of 6.5 m., flattening the area, subject to regulatory compliance, providing natural lighting adjacent areas and premises.

### **Findings**

1. The analysis reveals that densification has some potential in terms of integrated urban development, but in the context of pre-project surveys.
2. At the municipal level, many development decisions are made behind closed doors, without taking into account the views of independent experts and the public. In the opinion of the author, this is the basis for the conflicts between developers, planners and residents. In addition to developers and the city administration, the interested public, the interested non-profit organisations, local communities of the inhabitants who will be influenced by the planned densification, and urban experts who can provide an objective and professional assessment have to take part in the discussion of the projects to change the urban environment. But this requires full transparency and openness of the authorities and investors, as well as information about the project.
3. The quality of the legal and regulatory framework in the field of construction needs to be improved taking into account current development trends. Improve the quality of design solutions through professional supervision in strict compliance with the legal and regulatory framework. legal framework.

### **References**

1. Legea RM nr. 835/1996 privind principiile urbanismului și amenajării teritoriului;
2. NCM C.04.02:2017 Iluminatul natural și artificial.
3. FRIPTULEAC G., ALEXA L., BĂBĂLĂU V. „Igiena mediului”. Chișinău. Știința, 1998.
4. Regulamentul local de Urbanism al or. Chisinau.SC „Linia Nova „ SRL 2007
5. Основы устойчивого развития: Учеб. пособие / Под общ. ред. д. е. н., проф. Л. Г. Мельника. — Сумы: ИТД «Университетская книга», 2005. — 654 с.
6. ТЕТИОР А. Н. Устойчивое развитие города. — М., 1999. — 323 с.