Analysis of the spatial structure of the housing estates transformations’ possibilities on a selected example

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Abstract. The article is a summary of scientific and research work aimed at determining the possibility of transforming one of the selected so-called large-scale housing estates in Bielsko-Biała in Poland. One of the final work’s effects was the concept of the spatial development of a new housing estate in the area and in the neighborhood of the existing one. The research work was ordered by Cavatina & Partners Company, which in its offer has a rare combination of leading experience in the design and construction of a wide range of real estate. The company's goal is to create modern facilities and places of daily use for the dynamic needs of people, communities and companies. In its activities, it focuses on the innovative thinking, the latest technology and the sustainable development. The aim of the scientific and research work was to prepare scenarios and explore spatial possibilities in the event of the need to demolish a large complex of multi-family buildings, so-called blocks of flats. The research was based on the assumption that the lifecycle of buildings was completed due to their technical condition. The scenarios presented variant possibilities of shaping the concept of development of the selected area and should serve as a basis for starting social consultations regarding the future development of the above-mentioned area. Scenarios and concepts are to take into account the improvement of housing conditions of the housing estate residents. The development options are to show different possibilities of changes in the area taking into account: 1 – the results of social research on existing housing conditions, 2 – the records of strategic city documents such as the city development strategy, study of conditions and directions of spatial development and local spatial development plan, 3 – the stage options investment. The formation’s history of blocks of flats in Poland dates back to the 1950s. Currently, about 12 million people live in them, which is about 30% of the population of Poland. Hence, all problems related to this type of building are in fact becoming national problems. That is why discussions and questions arise: if the first of them were created more than 60 years ago, should they be demolished due to the technical condition and based on similar decisions? And maybe renewed and revitalized? If they constitute such a significant percentage of urban development and despite negative aesthetic impressions, should they be removed from the spatial structure of cities? The answers to this question often depend on the individual characteristics of the blocks with which their residents and users have to deal with. Even the most accurate answers do not often match individual cases.

1. Introduction - why blocks of flats?
The spatial structure of the contemporary majority of Polish and European cities is significantly affected by the nature of housing developments from earlier periods. The industrialization’s impact and urbanization processes that have occurred over the last 60-70 years is evident both in the
physiognomy of cities, in their socio-spatial structure, as well as in the functional and spatial structure. In Poland, in the years from 1945 to 1989, it was the period of real socialism and then the communist system, which significantly influenced the nature and distribution of residential areas.

Housing construction in the post-war forty years was implemented almost exclusively in the form of housing estates. It can be safely said that every city had its socialist district consisting of a housing estate or a group of housing estates. Analyzing the structure of residential housing from 1945-1982, it can be seen that its basic disadvantage was significant unification [1]. This caused typing projects and industrializing construction. For the economic reasons, the authorities preferred the construction of multi-family houses as high as possible, but not so high that passenger lifts had to be installed. As a result, a type of master initially became a four-storey (then five-storey) building with no elevator. Along with the striving to increase the intensity of buildings, elevated buildings (eleven-storey buildings) were commonly opened. The effect of the housing policy conducted during the forty years of real socialism was the creation of a significant number of apartments characterized by a relatively low standard and low quality (figure 1).

Large settlements with block building were located on extensive, demanding utilities, often in a considerable distance from the downtown area. It had a clear relationship with the adopted technology of a large slab, which was easier to implement on large undeveloped areas. In the absence of a realistic economic calculation, the costs incurred to extend the length of technical and communication infrastructure were not limited in such a choice of location for new districts [2].

![image](image.png)

**Figure 1.** Block of flats in Jastrzębie Zdrój, existing status, 2017. An example of implementation from the so-called big plate

2. **Block of flats in retrospect**

Currently, in retrospect, it is attributed to the block building, the desire to implement numerous models and housing concepts emerging at the turn of the 19th and 20th centuries and in the interwar period, which offered an alternative to the nineteenth-century rapid and chaotic urbanization. In the sphere of design and planning of urban space belonged, for example, to the concepts of the industrial city of T. Garnier, the garden city of E. Howard and neighboring unit C. Perry, and in the sphere of architectural design works of the environment around the German school Bauhaus and the Dutch group De Stijl. A special role in the development of urban planning, which laid the foundations for modernist multi-family housing in the form known from post-war cities, played the concepts of urbanist and architect Le Corbusier, one of the most important theoreticians of the modern movement in architecture.
The creators were entitled to a noble idea. The "Plattenbau" was supposed to be a response to the rapid development of cities and population growth. The first of them began to be built after the First World War in the Netherlands, then in Germany, France and Finland. This type of construction became more widespread after the Second World War. A huge number of workers arrived in the destroyed cities, and many residents lost their homes. People had no place to live, so they started to build the first multi-family residential houses in prefabricated technologies. In Poland, the first such buildings arose in the 1950s (Figure 2), but as many as 75% of the blocks in Poland were built between 1971 and 1988.

![Figure 2. An example of a Polish block of flats from the 1970s [3]](image)

Spatial and social phenomena are currently known and studied. The word "block" alone is badly associated. Usually, we think about a colossus that overwhelms a person. It is gray, ugly and dirty, reminiscent of blocks with a flat elevation, without any diversification [4]. The buildings have five, eight or eleven stories and many staircases. This scale significantly hinders perception. They are distinguished not only by the scale, but also by a very poor architectural form. However, the biggest disadvantage of large plate estates is their quality. The technology used 70-30 years ago is unfortunately outdated and does not meet today's standards.

Socially, the residents of the blocks of flats are divided into three basic groups. One of them is the unemployed. Their social status is low, and therefore often leads to the birth of pathological behaviors. Another group is a group of older people who live in these settlements from the beginning and the third - young families starting out in life, usually with children, who choose these apartments because of the price.

Blocks simply grow old in technical and social terms. Poor quality of flats means that people with a higher economic and social status move out to a better standard. The result is that in countries such as Germany, France and the Netherlands, decisions about the demolition of blocks, and even entire settlements from the "plattenbau" are made more and more often.

If we believe the “plattenbau’s” creators estimates, in our lifetime some of them will have to disappear from the cities or be thoroughly renovated. Simply, their shelf life will expire. The Ministry of Infrastructure and Construction announced the need to "x-ray" the large slab from the outside. The
aim is to diagnose the condition of buildings which durability has been determined for 100 years. What should be done? Whether to renovate or demolish [5]. This dilemma is already being struggled in France, Belgium, the Netherlands, so the problem will also come to Poland. Currently, many of them function as lower-category flats there - they are inhabited by migrants and poorer social classes. Some cities decide to revitalize such buildings, but this is an expensive process. An example is the Sachsendorf-Maslow estate in Cottbus or the French Aubervillers near Paris. Attempts are made to use prefabricated elements from demolished buildings to construct new single-family houses. However, demolition of entire settlements is also popular [6]. That is why only in Saxony, Germany, about 100,000 apartments have been demolished, and another 150,000 are waiting in line.

The aim of the article is not to study the characteristics of the chosen housing estate, but a pragmatic answer to the question: what action scenario should be adopted in the perspective of the POSSIBLE necessity of demolishing this housing complex for one or several reasons.

The problem seems to be significant, because despite the known stereotypes and despite a number of shortcomings, they still enjoy interest among customers, their standard deviates significantly from modern construction, however, most importantly, in this type of blocks of flats currently live in Poland about 10-12 million inhabitants.

3. Bielsko-Biała and the Karpackie housing estate - basic data
Bielsko-Biała is a city located in the southern part of the Silesian Voivodship, on the Biała River, between the mountain ranges of the Beskid Mały and Beskid Śląski, being part of the Western Beskids. It serves as the main administrative, industrial, commercial and service, academic, cultural and tourist center of the Silesian-Lesser Poland borderland area, often referred to as Podbeskidzie. It is one of the better developed economies in the region and Poland (table 1).

| Table 1. Statistical data of Bielsko-Biała against the background of the region and the country [3] |
|-------------------------------------------------|---------------------------------|-----------------|-----------------|-----------------|
| birthrate (%)* | density of population (people/km²)* | unemployment rate (%) | inhabitants (H) |
| Polska | -0,002 | 123 | 9,8 | 38 413 139 |
| region śląski | -0,143 | 370 | 8,2 | 4 548 180 |
| Bielsko-Biała | -0,065 | 1 377 | 4,4 | 171 505 |
| Karpackie A | - - | 36 280 | - - | 2 540 |

*birthrate per 1000 inhabitants in the period 2002-2017; *no data for the area.

Bielsko-Biała is officially divided into 30 settlements, operating on the basis of statutes adopted in 2002, and which constitute auxiliary units of the commune. There is also an unofficial division into "districts". This division is a common division used by the residents of the city, as well as the district's name. The border between the "districts" mostly resembles the boundaries of the historical parts of Bielsko and Biała and the villages gradually incorporated into the city border.

4. Karpackie Estate - a short description
Karpackie Estate, belonging to one of the housing estates where the project's area of activity is located, is the third largest housing estate in this city, inhabited by approx. 10,427 inhabitants. It was created in the years 1980-1985 according to the design of S. Smolarski and J. Glaca and consists of 54 blocks from the large plate (figure 3), belonging to the Carpathian Housing Cooperative and is a typical example of a housing estate from the 1980s. It is composed of several morphologically separate parts, one of which has been covered by the study (figure 4).
The important buildings on the estate also include: a Catholic church (one of the largest in the city), a Kaufland hypermarket, an indoor swimming pool, a sports hall and a school complex consisting of: two elementary schools and a secondary school. The areas around the school complex are recreational facilities. In addition, there are 28 service premises on the ground floor of the building, representative offices of banks, post office, kindergarten, library, medical clinic, pharmacy, etc.

The estate has a stagnant age structure, which means that there are as many young people there as the older ones. It has not been mentioned in the list of settlements whose inhabitants are perpetrators of criminal offenses and is considered a safe place.
5. Possibilities of transformations in the light of planning documents

Only fragments of the selected area are covered by the records from planning documents. They concern neighborhood, single-family housing buildings, greenery areas and parks adjacent to the block of flats. From the requirements assigned to these zones and good urban practices [7], such as: neighborhood space, proportions or urban interiors and insulation on the estate, the newly created estate should refer to typology and intensity to the surrounding buildings, and create a coherent communication system and green areas [8]. The maximum height of the storey and the building density are the records that significantly affect the new solutions. It causes these transformations of the settlements taking into account modern requirements, force enlarging its area by neighboring areas.

6. Established scenario

Initial reflections on the possibilities of transformations and the new housing structure entered into were based on the analysis of possible scenarios. They are edited on the basis of interviews with property developers, their real estate market analysis as well as on the tendencies related to contemporary concepts of shaping sustainable housing complexes. The social acceptance of spatial solutions along with respecting the tastes and possibilities of the housing estate residents was accepted as the basis for success [9]. One of the most frequently repeated opinions was the negative assessment of the inclusion of the housing estate in the surrounding landscape of the foothills and the surrounding structure of the outskirts of the city of Bielsko-Biała (figure 5).

It was adopted as the main element of shaping the planned, new structure of the housing estate.

Preliminary analyzes of distinctions from the existing structure of divisions, which were derivatives of the stage formation of the housing estate and the perceived division into micro-socialization, identifying with individual areas (figure 6, 7). It was assumed, therefore, that the planned new stages will correspond to the existing division, but most of all they will implement the paradigms of contemporary urban planning, respond to the demands of creating neighborhood space, a sense of security and sustainable development [10]. These activities led to the conclusions: 1 - "repairing" by referring to the existing spatial structure of this part of the city, 2 - introducing an additional approx. 10% of residents to change the settling character of the housing estate, 3 - reducing the intensity of population settlements.

Figure 5. Karpackie Estate, Bielsko-Biała, synthetic visualization of the existing state
Implementation of the assumptions would be carried out in stages, taking into account neighboring areas, which would reduce the density of population and operate with lower objects, with a less monumental scale.
The first stage, (figure 8), is intended for people who will first decide to move to a new complex, located outside the existing housing estate. At this stage, 370 apartments will be completed, with an area from 45 to 110 m², for approx. 1220 inhabitants, in 31 buildings.

The second stage of implementation, (figure 9), assumes the "exchange" of a part of the spatial structure of the existing housing estates for lower objects and with the assumption of implementing modern residence concepts. Additionally, in the western part, a fragment of the building will be complemented, which will be primarily a compositional combination of the existing, newly created housing estate, with a dominant expressive layout with other fragments of the housing estate. At this stage, 320 apartments will be completed, with an area of 40 to 100 m², for approx. 1420 inhabitants, in 30 buildings. What is very important, at this moment, according to the assumptions, flats for approx. 2,640 inhabitants were completed, which causes about 2% more than the current population of the housing estate, which allows for the implementation of further stages improving the quality of the housing estate's surroundings.

The next, third stage of implementation, (figure 10), assumes a further exchange of a part of the spatial structure of existing housing estates for lower objects and with the assumption of implementing modern residence concepts. The north-south, previously not created, pedestrian communication axis was completed, connecting the areas of trade services with sports and recreation areas, following the example of French settlements in Nanterre or Trapeze. At this stage, 110 apartments will be completed, with an area of 40 to 120 m², for approx. 430 inhabitants, in 12 facilities.
In the last stage, (figure 11), parts of the spatial structure of existing settlements with the highest objects have been replaced, and the new ones have been adapted to the existing largely new structure. The sequences of greenery have been completed and all urban interiors have been closed. At this stage, 130 apartments will be completed, with an area of 65 to 120 m², for approx. 550 residents (Figure 12).
The results of the project are:

1. linking the newly designed housing estate with the neighboring buildings;
2. matching the scale of buildings to the surrounding landscape of the Beskid foothills;
3. "refreshed" and rejuvenated social structure of the estate, thanks to the sale of some apartments dedicated to young marriages;
4. new apartments: 930 - increase by approx. 25%, for approx. 360 inhabitants - increase by 24% in a liked location in the city;
5. enlarging the average size of apartments - corresponding to contemporary needs and tendencies of residence;
6. freeing the space of above-ground car parks for decorative greenery and meeting places;
7. a clear and spatially readable hierarchy and inter-block space with a division into the public space (main pedestrian-to-pedestrian routes), semi-public (quarter-place squares) and semi-private space (figure 11);
8. improving the quality of public spaces within quarters and raising living standards - they are an element of encouragement to live "in a housing estate" with negative historical connotations.

However, the most important effect of the scientific and research work was the beginning of the discussion on the assessment and preferences of forms of residence in the estate. In addition, the prepared project has become the beginning of a social discussion, preparing the society for change and serving to listen to grassroots opinions.

8. Conclusions

In 20 to 50 years, the Polish society will face the fact that the lifetime of buildings constructed in the technology of "plattenbau" has come to an end. Guarantees and technology - have run out. May there be no construction catastrophes at this time, which can suddenly and drastically put government institutions and housing cooperatives before an urgent necessity to find a solution to the problem that may affect about 10,000,000 inhabitants.

Until then, researchers and designers, or participants in the construction processes should look for and can start to "experiment" with new solutions that will make decisions easier in the future. One of such solutions is the alternative, gradual exchange of the residential tissue, which in addition to preventing construction disasters, can implement modern models of shaping housing complexes.
In the chosen example, not only the most interesting spatial solutions were obtained, but also, thanks to the stepwise solution, the social structure of the housing estate was refreshed and the quality of the surroundings and standards of living improved.

References
[1] J. M. Chmielewski and M. Mirecka, „Modernization of housing estates”, Warsaw, p. 27, 2001.
[2] Data Base of GUS, (National Statistical Office), Warsaw, 2018.
[3] S.J. Jansen, H.C. Coolen and R.W. Goetgeluk, “The Measurement and Analysis of Housing Preference and Choice”, Springer Science & Business Media, 2011.
[4] J. Muliuolytė, “Rediscovering large scale housing estates in post socialist cities”, Journal of Architecture and Urbanism, pp. 51-58, 2013.
[5] S. Opania, “A study of the spatial structure of a small town”, [in:] Trends in economical and spatial development of small towns in Poland, [ed.] B. Bartosiewicz, Space-Society-Economy, no.17, pp. 49-66, 2016.
[6] S. Opania, A. Iwanek, M.Opania and M. Śnieżek, „A variant concept for the development of the Carpathian estate in Bielsko-Biała”, Gliwice, 2018.
[7] K. Scanlon, Ch. Whitehead and F. Blanc, „The future social housing provider”, Jack Weaver, Public Affairs Advisor at Flagship Group, 2017.
[8] J. Słodczyk, „History of planning and construction of cities”, Uniwersytet Opolski, pp. 422–427, 2012
[9] J. Uitermark and M. Loopmans, “Urban renewal without displacement? Belgium’s “housing contract experiment” and the risks, of gentrification”, Journal of Housing and the Built Environment, Volume 28, pp. 157–166, 2013.
[10] F. Wassenberg, „Large social housing estates: From stigma to demolition?”, Journal of Housing and the Built Environment, Volume 19, pp. 223–232. 2004.