

CITY PLANNING, PLANNING OF VILLAGE SETTLEMENTS

UDC 711.4

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SPACE TOPOLOGY OF THE BELGOROD CITY

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Statement of the problem. The challenge is to develop a method to identify the relationship of the urban topological aspects of the physical space layout and its social logic. The problem is solved by the example of the city of Belgorod.

Results. An approach to how to interpret qualitative social values of the urban community using the language of the urban space topological modeling is developed. The regularities of the urban network, central places and residential areas of Belgorod are revealed. The street network pedestrian movement intensity and its distribution are identified for the Belgorod city center conditions.

Conclusions. The division of the city in the places with their internal layout; multiplication of places tending to a closed cycle of life; establishing or breaking the link between the different urban networks elements and the formation of the network paths as enhancing traffic and control access are the topological transformations which create conditions for social efficiency increasing of the city. These transformations are the tool for addressing urban development conflicts.

Keywords: urban space, types of places, urban construction development, space topology, social efficiency, topological modelling, pedestrian traffic intensity.

Introduction

An urban space is home to residents as well as a business hub. Its capacity is a primary physical characteristics that describes this space as a place of residence. The capacity depends on the physical qualities of a landscape where a city is sprawling particularly on the shape of a relief and construction sites and business venues as well as water resources. Besides its capacity, an urban space has certain living standards, i.e. pertaining to urban lifestyles. Urban social values comprise the quality of a city's environment, financial conditions, social activities, urban landscapes, privacy levels, information provision, historic heritage objects integrated into a modern city.

The methods of analyzing urban networks and theory of spatial syntax were set forth by Professor B. Hillier [12, 13] and his successors Sevchuk and Mekonnen [14]. An urban construction as such that complies with the above standards of sustainable development was proposed in [1]. What remains to be answered is how to make an urban space comply with the urban lifestyle values by means of a topological arrangement. The answer is as follows: 1) by comprehensive expansion of construction cells (quarters, districts) into more accessible spaces considering current restrictions, 2) by arranging built-in areas according to a city's internal texture and aesthetic structure, 3) by physical growth and development of places according to emerging social needs, 4) building connections between places as parts of a network.

1. Types of urban networks

The overall urban network space is transformed in such a way that there are sets of specialized small areas that are rendered their own geometry and thus meet social needs. There are two moments arising through the course of this transformation: that of the original place of residence into a network cell as well as the development of a network of central areas. The second one is the spread of the urban texture, its expansion into the underlying surface of the landscape. In the second process the major role is played by expansion and branching of the main and local streets beyond the original construction site and inside it. Branching of these streets just as growth of blood vessels stimulates the growth of cells, i.e. quarters and small districts.

The original cell of a city's growth (kremlin, burg, prison, fortress) is constantly transformed. Following the loss of its fortification purposes the cell more or less retains its administrative and trading value. *A trading centre* is a market and is essential in any historic centre. Examples are trading centres in Red Square, Moscow, trading centre "Mercury" in Speransky Avenue, Irkutsk, market quarter in the historic centre of Belgorod. Preservation of the Moscow Kremlin promotes the historic heritage of government. Even managing to preserve some parts of religious buildings might contribute to cultural functions of the historic centre (Irkutsk).

In Belgorod following the war *the main administrative square* (Sobornaya Avenue) is located in the geometric centre of the historic centre on site of a female monastery. The building of the region's government is in conjunction with that of the Drama Theatre on the opposite side of the square. In Belgorod's central network this square takes a vacuum space restrained with two streets going uphill (Popova Street and Teatralniy Drive) and two streets along the hill (Slava Avenue and Svyatotroitskiy Boulevard).

Public spaces spreading in all directions from the administrative centre within the network as well as the configuration and development of connections of these spaces are positively eval-

uated. Down the hill from Sobornaya Avenue there is a range of parks towards Victory Park and *Museum Square* that are located along *the Vezelka River embankment*. Along the hill to the west of the administrative square there is the immense Svyato-Troitskiy Boulevard. It leads to the spiritual centre of the city. This is the site of the former Troitskiy Cathedral and Iosafovskiy Park where there are three operating churches (*church quarter*). Up the hill there are two parallel Popova and 50-letiya Belgorodskaya oblast streets lead to *the market square*. From the administrative square along the hill to the east along Grazhdanskiy Avenue we get to *the railway station square*.

Therefore the topological system of central spots is made up of: 1) the administrative square, 2) Museum Square, 3) Iosafovskiy Park with acting cathedrals and designated former Troitskiy Cathedral; 4) the market square and 5) Vokzalnaya Square with the railway station. They comprise *the cross location with the centre in the administrative square*.

A.V. Krashenninikov suggested an approach to structuring the spots according to their accessibility and connection with the division into such types of spaces as enclaves, districts and regions. An enclave is a place of restricted accessibility and a small population proportion to that of the surrounding area connected with event relations (quarter, park). A district is a location created by the influence zone of some central object along the traffic lanes. A region is a network structure joining groups of central spots or locuses of social activity [8].

Using the above definition, the connection “administrative square — market square — Museum square — railway station — cathedral square” as a network structure can be called a region. Apart from this location, there is the River Vezelka embankment and riverside park as well as Narodniy Boulevard — the main shopping street of the historic network that is parallel to the embankment. There is also the main acting cathedral of the Belgorod denomination — the Preobrazhenskiy Cathedral — along the main axis of the cross that goes up the hill in the quarter between the administrative square and the market.

Note that this constellation of the central places expands into wide streets that run parallel to the hill and the river onto the city’s main road — B. Khmelnitskiy Avenue that spreads up the mountain and the North. In 1650 on the hill up the street on the Belaya Gora in the area of the modern shopping centre “Slavyanskiy” and the apartment complex of the same name in B. Khmelnitskiy Avenue where there used to be Vezelitskiye Gates, a wooden prison was built. The southern wall of the prison was bordered with the Belgorod region. The northern wall of 350 metres in length had four towers. Through the main one, the Moskovskaya Tower [5], a road ran that led to Moscow. Nowadays this is B. Khmelnitskiy Avenue.

Surface of the landscape subbase. The city of Belgorod is booming on the right bank of the valley of the Severskiy Donets River where it flows into the River Vezelka (Vezelitsa). The relief of the Belgorod area is prone to erosion and scarcely cut with a network of ravines with the average values reaching 1.5 km per square kilometer [6]. The city proper is made up of two hills divided by the valley of the River Vezelka: the northern hill (it was populated first) is called Belaya Gora, the southern one is Kharkovskaya Gora (it was mainly developed in the 1970s). The altitudes of both hills are no more than 200 m. The lower cut of the waters of the Vezelka and Severskiy Donets is 113 m. I.e. the relative height of the hills over the erosion foundation is significant. The width of the hills is about 3 km, the meridian width of each hill is about 6—7 km. The hills are restricted and cut by ravines, beams and river valleys from all the sides.

If one imagines the structure of an urban texture as a stretching of a network of streets onto a relief, some of its features can be accounted for in the following way. As a network is stretched onto the surface of a relief, it is as if it is partially torn. It is largely along the valley of the River Vezelka that is the major barrier that keeps the network from being integral. The major streets cut through the valley.

If the transformation of the city's geometry and its street network is compared with manufacturing a fabric, the longitudinal streets, i.e. those with a meridian, are called the threads of the foundation. These are B. Khmel'nitskiy — Schors and Vatutin — Nikolay Chumichov streets. The threads are longitudinal streets as well as six wide ones in the historic centre as well as those crossing both hills along their width. The fabric is not torn but the city's network rather consists of two layers of fabric. One lies in Belaya Gora and the other one in Kharkovskaya Gora. The edge of these layers is Levoberezhnaya and Poedby streets along the left bank and Suprunovskaya street along the right one. The right bank edge in Belgorod is not developed. There is currently a problem of designing high-rise residential buildings in the riverside area. Along the valley of the River Vezelka there are railways. It was already mentioned that the valley along with the railroad bed is crossed with two major threads. As these major connecting streets go up the right and the left bank of the valley, they are parts of the corresponding districts and make up portals, i.e. special nodes that are *internal passageways* from one district (the central, historic one) to the other (the southern one with more recent construction).

The city's texture is mainly composed of *residential urban units*, i.e. quarters and microdistricts. They lie to the North and South of the central historic core. The residential urban unit as a place is characterized with the composition of populated cells. There are four

types of them: labyrinths, lines, quarters and mansions. Labyrinths have houses as brackets that are all composed so that an open space of one bracket becomes an internal one of the other bracket. The axis of the brackets can change their directions. Lines have houses as parallel plates with their longitudinal axis coinciding some directional axis. They are a group of parallel lines. They typically contain communicating doors. There are no isolated cells but a continuous space between the parallel plates running through the houses. Quarters have houses along the perimeter of isolated polygons that are mainly rectangular quadrangles.

Detached houses along small spots (parcels) with the area of 6 or 8 square meters have the quarters filled with parcels of individual houses. They are located in two major streets of the quarter. The remaining two sides of the quarter are restricted with lanes.

Labyrinth planning structure is typical of the southern microdistricts in Kharkovskaya Gora. Closer to the centre there is a microdistrict with the line planning structure in this district. The first microdistrict to the North from the centre in Belaya Gora is arranged as a quarter. At the northern end of the city there is a mansion planning structure. It is also found in the valley of the River Vezelka on its right bank.

The above types of a planning structure for the residential cores, i.e. yards and streets, are classified as follows.

A mansion planning structure, i.e. detached housing, a house with a small land plot, is mostly typical of a Russian city. A house overlooks a street with the main façade and the yard is entered through the street into the plot. They are blocked with the front borders further into the quarter. Two rows of the plots are between the main streets. The lanes divide the long row into smaller parts. A public (or rather a transit) space is a street. Plots are private spaces. The mansion interacts with the rest of the world through the façade.

The quarter along the perimeter followed the mansion as the population became more dense and the properties within the quarter were joined. I.e. the forms of property impact the structure of the land property within the quarter [15]. The land plots within the mansions were now owned by neighbours as properties adjoining the house. The perimeter of the quarter is isolated. In this case the proportion and division of the forms of property as well as of the behavior in the urban space is best achieved. The public space of the street commonly belongs to the municipal authorities. The yard space belongs to the community of the property owners. The private space is protected from trespassers with the wall. There are public forms of urban activities sprawling in the street. In the yard there are semi-private (collective) forms of activities.

Line planning structure has the cores of the yards open along the half of the parameter. They are free to pass through, which is not good for the residents' privacy. This morphological type is associated with W. Gropius (Dammerstock, Germany), Ernst May and the history of the industrialization and rationalization of the USSR construction in the 1930s [7]. There are typically not densely populated networks of streets in the microdistrict. Line planning can run perpendicular as well as parallel to the street. In the first case the yard space opens onto the street and in the second one onto the lane adjoining the street. There is no boundary between public and private.

Labyrinth planning of an urban unit in this country started with the 1975 project of an experimental residential complex in Gorkiy (Nizhniy Novgorod). The space of the complex had public and external objects (open public spaces) joined in one place which is not crossed with the streets [10]. Employing the labyrinth planning of a city as a way to achieve more intimacy is discussed by Ye. G. Lapshina [9].

2. Values and conflicts of the urban construction development

The motivation behind the urban construction activities that direct the city's geometry to the values of the sustainable development was discussed by the author in 2003 [1]. In this paper we rely on different types of the connectivity of the city's objects that are used to implement these values.

A. Quality of the city's environment. In terms of the topological structure, the city's environment should be associated as much as possible with the positive environmental factors, i.e. natural landscapes, and have as few negative factors in it as possible (transportational and industrial wastes). The natural foundations in Belgorod are valleys, beams and ravines where forests are growing, or used to grow, or might grow. In this region they are beam forests. Cuts in the dense urban construction system filled with parks, squares and boulevards are positive. The connecting configuration of the natural foundation is a ring around the stone core that is in the cut between the core and the suburban belt. Firstly, it is not continuous and secondly, it runs deeply into the city's texture. The ring is mainly made up of the valley of the River Severskiy Donets in the east, River Gostyanka and Chicherin Yar in the west, Krasnyanskiy Yar and Igumnov Yar in the south, the beam Kondrov Yar in the north. The green diameter is the valley of the River Vezelka crossing the city with an extensive belt dividing Kharkovskaya Gora from Belaya Gora.

The problem of urban construction planning is to retain the recreational and conservational use of these landscapes. Industrial pollution comes from the north-west as well as chalkpits to

the west and east of the stone core. The Belgorod airport, which has a distinctive architectural planning, is an important transportation hub that is also the growth restriction in the north of Belaya Gora and is a noise area that cuts the city's growth into the north. The growth direction in the south in Kharkovskaya Gora remains on the list of the city's priorities.

B. Financial prosperity. Financial prosperity of a city involves accessible housing. In the context of urban construction and planning it is essential that labour, costs for the transportation of people, loads and energy are preserved and entropy is avoided. This means the development of easy navigation, consolidation with the centre and promotion of the central areas in the south as well as in the east. In addition, working places must be located in the industrial areas as well as the city centre. This is actually taking place at the moment.

C. Social activity conditions. Social activity takes place in cities and district capitals. These are the main forces of promoting social activity. Social centres and public open spaces can be made more appealing by identifying the configuration of central and popular streets and prescribing them commercial and cultural functions. Commercial functions need to be placed on urban construction units, aesthetically attractive spots need to be designed in urban environments, streets where public services are provided should be made more dense by means of free planning of microdistricts. Besides, well-arranged boulevards such as Pervogo Salyuta in the microdistrict in Kharkovskaya Gora where the Shukhov Lyceum was recently opened enhance the city's appeal.

D. Quality of the city's composition depends on the combination of the arrangement of the streets, axis, cells of the city's texture and diversity of its streets and quarters. Unique new buildings of the so-called "flash" archetype should be implemented into the city's environment at the intersections of the main streets.

One of such intersections is Vladimirskiy Passageway onto Kharkovskaya Gora in Belgorod. This passageway was formed in Vatutin Street where it crosses the valley of the River Vezelka, i.e. where the street goes up the right edge of the valley. In this node there is a stunning ensemble. The foundation of the open space is a wide alley of streets. The border of the street is complex. There are open spaces such as a myriad of plots with the statue of the Tsar Vladimir who introduced the Christianity in the old Russia at the top adjoining the traffic lanes. Downhill is an entertainment building that offers panoramic views of the opposite bank of the River Vezelka. Across the traffic lanes from the plot with the monument to the Tsar Vladimir there is a pedestrian bridge with a fluorescent support on top. Below the bridge is a square with a hotel building in front of it, which is a square with a

large atrium. Below the hotel there are three buildings that go downhill to the axis line of the composition down the slope. A complex-shaped building of the residential complex Vladimirskiy is the upper boundary of the ensemble. All of the buildings are in harmony with the architectural style of the above pedestrian bridge and resemble an arrow. The same impression is retained throughout the entire ensemble and has a developed spatial shape. At all of the major intersections of Belgorod's main streets and the valley of the River Vezelka there are public centres, each with its distinct spatial solution.

E. Privacy conditions. One of the major indications of privacy in Belgorod is its suburban belt with over 100 thousand residents in 16 areas. They all have mansion planning with land plots of around 15 square meters. They match the configuration of the water boundaries between the beams, ravines and streams. The curved lines of the networks, stub-end streets with clusters around them, large contact areas with corresponding natural landscapes all contribute to creating more privacy.

F. Information provision of the urban environment. The more consistently and comprehensively buildings are arranged in space, the easier it is to get hold of the information on the structure of the urban environment. This involves distinct dominance of the centre, hierarchical order of the elements of the first and second order, the use of regular cells, clear rules for more complex structures. High-rise buildings are also good for navigation, i.e. towers at the nodes of the cell, relative homogeneity of residential areas, high-rises and interesting architecture of the main streets of Bogdan Khmel'nitskiy, Vatutin, Schors all contribute to the efficient information provision. The city's streets and cells have a linear and node structure.

G. Inclusion of historical objects into the city's modern structure. The historical heritage of Belgorod is not well preserved due to destructions following the WWII. However, over 30 objects have survived.

The main topological task for the reconstruction and control of building construction is to open architectural objects of older envelope buildings with no disruption to their connection with new ones. These objects should be open and visible as much as possible surrounded by an array of other buildings.

3. Networks of the centres, places, landscapes and passageways

The central spots serve their surroundings, i.e. "hinterland": exchange (trade), industry, administration, medicine, culture, education. The surrounding area exports agricultural produce, raw materials, etc. and, more importantly, provides the human resources. Between the area and the centre there is a market relation. However, it is the case only if the

centre is defined as the city and the area as a region or a district controlled by it. If the city is referred to (as in this case), the central places are markets and entertainment and shopping centres, cultural and museum complexes, universities, administrative centres, the railway station, airport. Between the central places and the city's districts they cater there are certain dynamic proportions. The size of the centre and the radius of the area it caters vary depending on the population's buying capacities and the amount of consumers in the shopping centres. For the university the same depends on the capacity, productivity and the status, the country's or the region's demand for highly qualified employees, instruction levels of future students at secondary schools (their education level), the amount of students finishing secondary schools in the region (district, city). The city's schools make up a network with the university on top.

If places are referred to as residential urban units, i.e. microdistricts, they are also part of the network. In this country this is mainly an area between the centres, i.e. a cell between the district's main streets. Residential areas with transport-oriented development (TOD) are common around the world. E.g., Vällingby in Stockholm where the transport and a stop cross the middle of a microdistrict. In Belgorod we found 38 residential urban construction units as well as 37 schools were surveyed on the average score on the Unified State Exam (USE). The rating of a secondary school and the urban construction quality of a corresponding district were found to correlate on average of more than 65 % [3].

The network typically has a range of points that are connected in more than one way. The network can form a cell, wood, curve, polygon, non-isolated line, radial and ring scheme (wheel). The connections have a double nature, i.e. the spatial and social one. Whether there are such connections or not is essential to the development of the network.

Landscapes can be viewed as distinct networks. E.g., an area of a hydraulic network that is part of the mouth of the main river between the tributaries of the first or the n -th order depending on a task. Landscapes of the network of the ravines and beams form a tree-like picture. The big tree spreads all over the entire water pool. The small trees can "grow" from the erosion foundation of the tributary of the n -th order. The trees that are formed by water flows join the network of residential cells. These connections are arranged in order to improve the environment of the populated area.

Passageways, or the street network, is the most common object of the network analysis [12–14]. In the network of Belgorod's streets and passageways there are three types of cells. The first one is a regular orthogonal cell of the centre and is the most dense one. In

this matrix of six streets that run parallel to the slope and the river embankment up the slope of Belaya Gora. Six streets are involved in the dominance of the slope. In relation to the front near the River Vezelka embankment these streets are called belt roaded and are oriented towards all the sides like a meridian. Their step is 300 meters. There are streets parallel to the slope are called frontal and those expanding widely with a varying step from 140 to 240 m. The length of the belt is about 1 km. The length of frontal streets is 1.6 km. I.e. in the centre per the area of 160 hectares we have 36 crossroads and roughly 1 crossroad per 4 hectares. These networks are dense. There are a lot of ways to get from one point to another, i.e. a cell with its transport capacity and the amount of transportation options is fairly powerful if it is evaluated in terms of the density of its crossroads, i.e. the points where one can change their direction. The density of the crossroads in the centre is $36/160$, about $1/4$ (25 %).

The second area of the network is the southern one. This network first has a big step of the streets that is 600m and more. This means there are long stretches of the road where the direction of the traffic cannot be changed. Secondly, what is most important for topology is that this network is non-isolated. A lot of streets do not cross the entire spot of the southern district. A lot of streets of the district, i.e. between the quarters, end here at the crossroads and do not continue any further. That means that reverse direction or direction to the side from one point to another is more necessary than in the first cell. Thirdly, the choice of the direction of the traffic when travelling routes from one place to another are selected is limited. There is the total of 21 crossroads in the construction site of about 16 square kilometers, or 1600 hectares. I.e. the density of the crossroads is about $1/10$ (10 %). That means that the transportation capacity and traffic variation of the southern network is 2.5 times lower than that of the central one.

The third sport of the network, which is a cross, is an intersection of two main streets – B. Khmelnitskiy and Studencheskaya. Two eastern quarters can be identified as well as two distinct microdistricts made up by the cross that dominate the planning network and are belted roads that we will call the northern-eastern and southern-eastern. Two western quarters are not made up as belted roads. The southern-eastern microdistrict (including the regional hospital) is restricted by B. Khmelnitskiy Avenue, Studencheskaya, Popov-Sadovaya and Belgorodskiy Pol streets. The microdistrict has an orthogonal cell with two internal cuts in the network (a park of 30 hectares and the regional hospital area of 15 hectares). There are 20 crossroads of relatively wide streets, i.e. those running through the populated part of the

microdistrict. The density of the crossroads is 20/120, or 1/6. This is a good indicator that approaches that of the historic centre but is lower and is more considerable than that of the southern district. The proportions of the densities of the crossroads of the network (the central district — the regional hospital microdistrict — the southern district) are 1/4: 1/10: 1/6 respectively. The highest density of the streets and crossroads indicates the maturity of the urban construction form. The only exception is a small array of garden and plantation cooperatives as well as private residential areas dating back to the Soviet era where street spaces are not well-shaped even though they have a dense network.

4. Traffic along the places and networks

In order to evaluate the traffic along the street network, let us consider the historic centre of Belgorod (Fig.). There are departure points and destinations. The major departure points are public transport stops from where people get to the city centre; quarters of the centre dominated by residential buildings. Destinations are shops, restaurants, market, public-service enterprises, cultural institutions (museums, cathedrals, theatres, studios, amusement parks). There is the following principle to identifying traffic patterns: from a departure point routes are designed along the streets to all the destinations, then the same is done for another location till all the departure options are covered. All the routes within a part of a street are summed by their width. I.e. traffic flows from a departure point to a destination are accumulated in certain parts of the network and thus parts of the streets where the sum of the flows is maximum, medium and minimum are found.

The crossroads were nodes from where the identified flows are distributed in certain top directions. The primary traffic source is a public transport stop and quarters dominated by residential buildings. There are three categories of the crossroads: high, medium and low-intensity.

The high-intensity crossroads are: 1) a corner of Popov Street and Narodniy Boulevard; 2) a corner of 50-letiya Belgorodskoy oblasti Street and Narodniy Boulevard; 3) a corner of Belgorodskiy Avenue and 50-letiya Belgorodskoy oblasti Street; 4) a corner of B. Khmel'nitskiy Avenue and Narodniy Boulevard; 5) a corner of B. Khmel'nitskiy Avenue and Svyato-Troitskiy Boulevard; 6) a corner of Podeby Street and Teatralniy Passageway; 7) a corner of Nikolay Chumichov Street and Slavy Avenue.

The second group are the crossroads of: 1) Vokzalnaya Street and Slavy Avenue, 2) Vokzalnaya Street and Grazhdanskiy Avenue; 3) Tsar Trubetskoy and Preobrazhenskaya streets; 4) Belgorodskiy Polk Street and Narodniy Boulevard; 5) Nikolay Chumichov Street and Narodniy Boulevard; 6) Tsar Trubetskoy Street and Narodniy Boulevard; 7) Grashdanskiy Avenue and Belgorodskiy Polk Street.

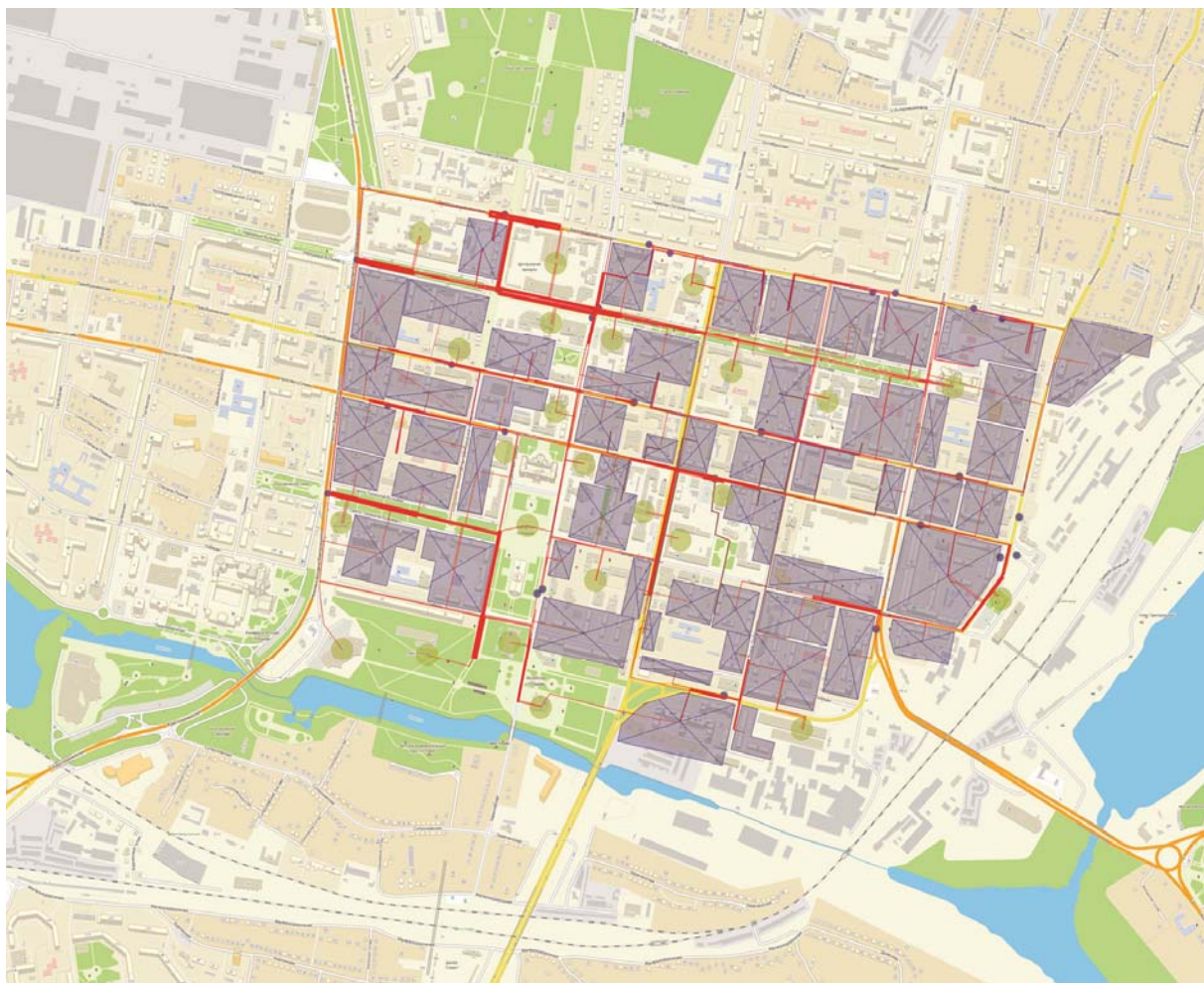


Fig. Identifying the traffic intensity of pedestrians in parts of the street network [4]:

in violet there are the quarters or their parts dominated by residential buildings;

khaki circles are destinations; the thickness of the red lines shows the intensity of flows along parts of the streets

The remaining crossroads are in the third category and there are 22 of them. The numbers are approximate.

This model and distribution of crossroads according to the traffic intensity allows us to recommend first of all to place stock sales in streets adjoining the above crossroads of the first category and improve the corresponding parts of the streets. This would have a great commercial and social benefit.

Conclusions

Location of parts, types of places; division and connectivity of urban spots; isolation and openness, combination of landscape surfaces with different environmental modes and varying urban places; preservation of visibility pools of architectural monuments; growth of the density of quarters and the street network; preservation of natural foundations; identification

of the configurations with the largest traffic potential are all the issues that have to be dealt with in urban construction planning and are all topological.

As a result of the study we have concluded the following:

1. The conflict of economics and ecology in the city is solved by means of the following topological transformations: the natural, functional and planning foundations of the city are polarized and they cannot be combined in space. There are too many garages in ravines and beams in Belgorod;
2. The conflict of public values and privacy in Belgorod is solved by further expansion of public spaces — streets — and increase in the density of public objects in the “stone core” accompanied by the growth of the privacy potential of suburban areas with mansion planning in land plots of about 15 square meters;
3. The conflict of values of information arrangement of the networks and aesthetic diversity is addressed by designing unique buildings that are high-rise and plasticity of volumetric and spatial solutions. The growing complexity of the city’s texture and the central network is due to the use of places that we referred to as portals — passageway streets when at the intersection of the city’s main cell with the valley of the River Vezelka public nodes emerged and are sprawling to combine open spaces and unique buildings. These are Vladimirskiy Passageway onto Vatunin Street, a complex of the Belgorod State University buildings in the passageway from the Vezelka embankment to Belaya Gora;
4. The analysis of the development of the urban construction forms of residential units — microdistricts — shows the advantages of streets with the step of no more than 300 m before as opposed to microdistricts with exaggerated, rough open spaces where streets with public transport are in a large step and are hardly accessible by walking. In the microdistricts there should be extra pedestrianized streets with public transport access;
5. The topological method of identifying the traffic intensity in parts and crossroads of the street network is set forth. This allows us to recommend certain parts of the streets and crossroads to be utilized for enhancing their commercial and social potential, which would result in the overall growth of social efficiency of the city’s construction planning.

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