

# MANAGEMENT OF BIOSPHERE-ORIENTED URBAN AREAS: NEW APPROACHES



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*The city planning of the future should take into consideration biosphere-oriented approaches, concepts of which are being established.*

As the world's population becomes more urbanised, it comes under greater stress, which is manifested both environmentally and psychologically. But can mankind be urbanised and yet maintain its cultural heritage and biodiversity in an environment complete with ecological balance? Some potential solutions for these problems have begun to be worked out as alternatives to existing megacities.

## THE PROBLEM: BIOSPHERE AND MODERN CITY PLANNING

By the beginning of the 21st century, more than half of Earth's population was living in cities, many of which have grown to become megacities in the last 30 to 40 years. Assuming the current rate of growth and approaches to social-economic development remain constant,

the number of people living in cities will almost double by 2050 to 6 billion people. Total worldwide expense for development and maintenance of city infrastructure alone is expected to average more than 350 trillion US dollars for the three decades leading up to 2050.

This type of urbanisation is associated with rapid economic development (especially industrial production), leading to increased pressure on surrounding ecosystems at the local and regional levels, and, eventually, on the planet's biosphere at the global level. This trend has been occurring often with little guidance.

At the same time, scientific research has proved that living in megacities exposes people to pollution that leads to problems in healthy reproduction. Overcrowding and a lack of diversity in geometrical forms – straight lines dominate in cities – contribute to psychological and emotional abnormalities which can manifest themselves in aggressive behaviour and conflict. As a whole this may lead to gradual genetic degeneration and increased mortality rates; the destruction of not only society through individualism and demise of the family; but also of nature.

Megacities usually lack ecological balance, which in city planning is defined as the condition of the natural-anthropogenic environment providing long-term sustainability with regards to the reproduction of the main abiotic (air, water) and biotic (soil, flora and fauna) elements of the biosphere.

City planning theory identifies three relative levels of ecological balance in view of population density:

1. Complete ecological balance – supports a balanced coexistence of nature, urbanised environment and industry. Population density in various parts of the world depends on climatic and hydrological situations, mainly the availability of drinking water, and biodiversity richness. In temperate areas, the population density does not exceed 60 people in a square kilometre, with forests occupying not less than 30% of the area.
2. Conditional ecological balance – natural resources do not reproduce completely naturally—it is characteristic of urban areas. The population density in temperate locations in this case does not exceed 100 people in a square kilometre, and forests cover 20-30% of the area.
3. Relative ecological balance – urbanised territory is used within acceptable limits, but natural balance is partially broken since the ecosystem may not fully neutralise environmental pollution, at the same time providing sustainable interaction of ecosystem elements. Population density ranges from 100 to 210 people in a square kilometre.

At the same time, modern city planning practice is geared towards the development of the megacity and does not resolve the biosphere-social crisis, and as a result the population density in modern cities exceeds any reasonable limits. This development can be attributed to the domination of the capitalist model of economic development, where profit is the main motive and effectiveness criterion of any activity.



**NEW NAME,  
NEW STATUS,  
SAME VALUES!**



## THE SOLUTION: BIOSPHERE-ORIENTED URBANISATION AND SMALLER SETTLEMENTS

An alternative to megacities is biosphere-oriented (in some Russian-language sources also called “landscape-manor”) urbanisation, which means providing conditions for the development of the intellectual-creative potential of every person. This helps to achieve the reproduction of successive generations of biologically healthy populations that are capable of cultural development, and who conserve and develop habitats with infrastructure built for sustainable living and economic activity.

Both megapolis and landscape-manor urbanisation are characterised by a common list of composition parts that form one system of interconnected and interleaved layers as a whole. These parts are divided into the following set of scales:

1. A house for family living (its form, sizes, floors number, material, etc.);
2. A land area where the house is located (its form, sizes, etc.);
3. A region – land areas gathered in one common module;
4. The character of the settlement, its plan;
5. A group of settlements;
6. A network of the settlements which constitute a country or all settlements of the planet as a whole.

An ideal life would be in a settlement of a village type which would combine the comfort provided by the services offered in the city on one hand, and accessibility to nature on the other. City comforts include: access to education; developed economical infrastructure and a wide spectrum of social services; various opportunities for spending free time; access to various art types; and a diversity of communication with various people. At the same time there is a natural environment, which supports the physical and mental health of the people. Access to nature can positively influence people’s health, providing them with clean air, water and food.

In such a situation, a person would constantly interact with nature and live in a natural landscape, and be able to observe natural phenomena, i.e. live and develop in his natural environment (habitat suitable to the human species). Children would grow to base their perception of the world on the images of nature and understand and link causal relations between natural phenomena, leading to a comprehensive and holistic view of the world around them. This scenario also provides an opportunity for every person to experience natural scenery (forest, field, park) for a short time to disconnect from the community and think about problems or future plans.

The main condition for conservation and development of biocenoses<sup>1</sup> is the presence of nature reserves i.e. national nature parks, strict nature reserves, etc. in which economic activity is completely prohibited, and tourism activity is set in accordance to the reproduction regimes of the biological species present. The purpose of such biological reserves is for them to be a source of expansion for biological species’ to the zones where economic activity and human life prevent normal reproduction in biocenoses.

## BIOSPHERE-ORIENTED CITY PLANNING

Settlement planning must be carried out in landscape-manor fashion. The main requirements to the design as follows:

1. The land plots should not border each other and are divided by strips of untouched nature or artificial plantations of 10 to 20 metres in width; the size of the land plot varies from 0.25 to 0.4 hectares depending on the number of family members (the calculation is about 0.03 to 0.04 hectares per person);

2. The perimeter of the land plots should be curvilinear because nature does not know straight lines and angles, and curvilinear borders eliminate psychological barriers between a person and nature;
3. All major parts of the settlement should be within walking distance of one another; the main transport inside the settlement would be bicycles, scooters, or pedal cars to address the lack of physical activity.

Houses should be designed to accommodate multi-generational families under one roof while allowing for the possibility to modernise and expand in view of future family growth. Multi-generational families are more likely to have positive social effects as they could provide a holistic image of the world for children and solve the social problem of lonely old people.

The settlement should hold 2500 to 3000 people, and the land area should be configured so that everyone would be personally acquainted with about a third of the population. Other social connections would be provided by cross-acquaintance. This population size translates to about 250 to 300 land plots with an average of eight to nine people on each land plot. As a result, the total population density is about 115 people per square kilometre, which is almost twice the optimum density recommended by ecologists (60 people in a square kilometre). One of the important conditions of the settlement design is that the route from the settlement's edge to its center does not take more than 25 to 30 minutes on foot. If the average walking speed is three to five kilometres per hour, the optimal settlement diameter works out to between three and three and a half kilometres, which works out to a circle of about 1,000 to 1,500 hectares.

The settlement plan and its structure must contain an algorithm that prevents unsustainable enlargement of its size and preserves the balance between sites of human activity and nature. Places for work and leisure should not be totally separated (work inside the settlement, leisure sites only outside), and nature must be a full and integral component of the settlement.

Conserving the cultural and natural heritage of humanity, and the sharing these values with future generations can be preserved. But it will require new approaches such as biosphere-oriented city planning rather than a laissez-faire approach.

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[1] A biocenosis (biological community or ecological community), coined by Karl Möbius in 1877, describes the interacting organisms living together in a habitat (biotope). [\[back to text\]](#)