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DIPLOMARBEIT

Kyiv residential upgrade: revitalisation of mass housing estate of 1960's

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Abstract DE

Ein wesentlicher Teil der theoretischen sowie praxisbezogener Stadtplanung befasst sich mit dem Wohnungsbau der Nachkriegszeit. Insbesondere in der ehemaligen Sowjetunion findet man diesen systematischen Wohnungsbau vor, im allgemeinen Sprachgebrauch als Plattenbau "Chruschtschowka"bekannt. Dieser Wohnungsbautyp der vor allem in der Sowjetunion vorkommt, ist in der Plattenbauweise errichtet, der geeignet für eine massenhafte Vervielfältigung ist. Zusätzliche Charakterisierungen sind die fünf Geschosse der Gebäude und die kompakten kleinen Wohnungsgrundrissen.
Teilweise herrscht in den postsowjetischen Städten wie Wolgograd, Krasnojarsk, Tscheljabinsk und Kasan diese Bebauung aus Wohngebäuden der Nachkriegsjahre mit mehr als 30 Prozent vor.
Häufig wirkt diese Bebauung monoton und ist strikt nach einem System aufgebaut. Die strikte Trennung zwischen Wohnbebauung von anderen Nutzungen führt zu einem Ungleichgewicht in der Stadtstruktur. Im weiteren Verlauf hat diese städtebauliche Struktur weitreichende Folgen auf das städtische Leben und ihre sozialen Zusammenhänge. Dies steht im Gegensatz zum heutigen Verständnis der individuellen und durchmischten Stadt.

Diese Diplomarbeit setzt sich mit Lösungsansätzen der obengenannten Problematik des Siedlungsbaus der Nachkriegszeit anhand einem konkretem Beispiels auseinander. Das Forschungsgebiet liegt in dem Bezirk Otradniy in Kiew, in welchem eine genaue Analyse des Areals hinsichtlich der Lage in Stadtstruktur, Bebauung, funktionalen Inhalt und sozialen Aufbau durchgeführt worden ist. Die Ergebnisse der Analyse werden in einem konkreten Revitalisierungsprojekt umgesetzt. Das Ziel der Diplomarbeit ist es durch gezielte städtebauliche Eingriffe wie einer zonale Trennung, einem modernes Mobilitätskonzept, einer Einführung von funktionalen Vielfalt, eine Entwicklung des Freiraumprogramms und Wohnbautransformation das Wohngebiet aufzuwerten und zu verbessern.

Abstract EN

An significant part of the theoretical and practical urban planning deals with housing of the post-war period. This mass housing construction can be found in the former Soviet Union in particular, known in common parlance as the «Khrushchevka» prefabricated building. This type of housing, which occurs mainly in the Soviet Union, was built using the panel construction method, which is suitable for mass reproduction. Additional characterizations are the five floors of the building and the compact, small apartment plans.
In some of the post-soviet cities such as Volgograd, Krasnoyarsk, Chelyabinsk and Kazan, this development of residential buildings from the post-war years constitute more than 30 percent of total housing area.
This development often appears monotonous and is strictly structured according to a system. The strict separation between residential development and other uses leads to an imbalance in the urban structure. As it progresses, this urban structure has far-reaching consequences for urban life and its social context. This is in contrast to today's understanding of the individual and mixed city.

This diploma thesis deals with possible solutions to the above-mentioned problems of post-war settlement construction using a concrete example. The research area is located in the Otradniy district in Kiev, in which a detailed analysis of the area has been conducted with regard to the location in urban structure, development, functional content and social structure. The results of the analysis are implemented in a specific revitalization project. The aim of the diploma thesis is to upgrade and improve the residential area through targeted urban planning interventions such as zonal separation, a modern mobility concept, the introduction of functional diversity, a development of the free space program and residential building transformation.

Contents

Chapter I

Introduction to a modernist settlements renewal

Urban renewal basics

In the process of development of any settlements, from villages to megalopolises, over time, there is a need to transform the elements of the urban planning system or the entire system. At the same time, the scale, methods, tools and objects vary significantly depending on the many factors and goals that urban transformation sets for itself. Starting from individual buildings, streets, neighborhoods and ending with districts, transport hubs and interchanges and even entire cities - all this is often amenable to changes due to the changed context, requirements, needs and challenges of the time. So, with the change in building technologies, dilapidated and outdated houses were mercilessly demolished and replaced with new ones. Wars and fires destroyed entire settlements, new, more modern buildings arose in their place. During classicism, the chaotic development of medieval cities was replaced by a more orderly one; later, with the development of transport, wide avenues and highways were built. (Cities grew, replacing) Thus, it is worth noting that the city has always changed at all times. This process is an integral part of urban development and the natural evolution of the urban structure.

In contrast to the non-stop natural renewal of the urban fabric for a couple of centuries, a system has developed aimed at preserving the urban environment, primarily the historical one, based on such concepts as the conformity of construction activities, the protection of the historical appearance and silhouette of the city, the preservation of historical and architectural monuments and the replacement of the original purpose of the building. new, suitable function. This has had an impact on the modern urban transformation, which is characterized by a more respectful and gentle approach to changes in the structure of the city, which was not observed until the 20th century, when many important architectural monuments survived only because of their constructive endurance.

Urban transformation is an action with a previously formed urban formations or education, aimed at its development, improvement or optimization. Such transformation becomes expedient taking into account the needs, requirements and opportunities that have changed over time, as well as the emergence of new approaches and previously unavailable technologies.

Reconstruction provides for a wide range of possible transformations, both qualitatively and quantitatively, from almost complete preservation of the existing structure to its complete replacement. In this regard, depending on the degree of influence on the existing urban environment, various types of interaction (impact) differ: conservation, restoration, renovation, modernization, reproduction, as well as the construction of a new environment.

The second half of the 20th century is a time of intensive construction and growth of most European cities. Historical circumstances have created a huge field of activity both for new construction and for the reconstruction of war-affected areas of cities. It was the reconstruction of historical centers and the construction of a large number of new housing that was the primary task of urban planning in the post-war decades. Over time, the setting of the tasks has changed:
Recently, extensive urban planning policy, with the development of free territories and expansion of cities, comes intensive - with the priority of transformation and development established urban areas. Proceeding from this, one of the challenges of modern urbanism, along with the solution of numerous transport, functional and operational problems in the very reconstructed historical parts of the city, is the development of an integrated approach to the reconstruction of significantly outdated residential areas of the 50-70s of the 20th century. Such districts represent a certain urban-planning formation, subordinated to a rather strict concept, which defines, first of all, the mode of living in them, programmed philosophy and behavioral scenarios. Such urban planning aspects as the appearance of buildings, layouts, functional zoning of the concept of free space are the physical manifestations of the ideas that new cities were supposed to serve.

The areas of panel high-rise buildings are a “face” of the former socialist countries, but the massive construction of micro-districts is, in principle, characteristic of Europe in the 1960s - 1970s: the entire continent was experiencing a post-war housing crisis. While the Marzahn residential area was being built from panel buildings in East Berlin, the same Merkisches Fiertel and Gropiusstadt were erected behind the wall.

Amsterdam, Bijlmer neighbourhood [1]

Berlin, Marzahn, Third residential area [2]

In various countries, such houses had their own local names, so in Germany such houses were called Plattenbau, in Hungary - Panelház, and in the Czech Republic and Slovakia - Panelák and Sídlisk

Houses with small in area, but very comfortable apartments for that time solved the post-war shortage of housing. But what seemed satisfactory 40 or 60 years ago now looks hopelessly outdated.
Today, such areas are a big headache for many European cities - the French “big ensembles” in Paris, Marseille and other large cities have turned into poor ethnic ghettos, including due to the lack of social infrastructure and remoteness from the center.

As soon as Berlin reunited, the panels in Marzahn, which became the largest residential area in European history, were recognized as low-quality and inadequate housing. About 20% of the apartments in the 180 thousandth district became empty, living in Marzana was considered not prestigious.

In the late 1960s, the Bijlmer district in Amsterdam was being built as an exemplary vertical garden city. This housing was more spacious than usual and was positioned as elite and ultramodern. However, very soon, from a privilege to live here, Baymer turned into a punishment: the standard of living was rapidly falling, the area was settled by immigrants, the crime rate increased, the level of vandalism went off scale, and as a result, the garden city acquired the label of the only «ghetto» in Amsterdam - from Bijlmer tried to move most of the Dutch families who received housing here in the 1960s, and their place was taken by immigrants.
Already in the early 1970s, such areas began to be gradually demolished - the authorities of European countries quickly realized that in the long term, ares of mass panel construction create huge problems.

Courtyard in mass housing district today. Paris [3]

But Probably the most acute is the situation in large Eastern European, primarily post-Soviet cities, where panel construction has acquired an unprecedented scale: according to various sources, up to 70 percent of citizens live in such areas.

Despite the fact that, for example, in Moscow and some other central cities, a program is being implemented to demolish the most obsolete panel structures of the 50s, this approach is extremely irrational. Due to the enormous scale of the planed demolition, complicated by the provision of alternative housing and the prohibitively large budget for Eastern European countries, it can be used pointwise, but cannot be seen as a solution to the problem in a global sense. Thus, it is the preservation and modernization of panel housing that will be successfully implemented in many cities of European countries, being an uncontested model for the development of residential areas based on economic and socio-political considerations.

The urgent need for the modernization of residential areas of panel development is characterized by many reasons, they can be classified according to the main areas:

1. Physical deterioration - a lot of local damage and shortcomings, due to the poor quality of construction work during construction and often the lack of maintenance. Due to the deteriorating condition with each subsequent year, the scale and funds for the reconstruction of such buildings only increase, up to the impossibility of performing construction work due to the dilapidation of the building.

2. Low energy efficiency is an extremely impermissible thing, heaving with modern energy efficiency standards and programs aimed at protecting the environment, which is one of the main tasks of our time. In accordance with European experience, in the process of modernization, it is possible to significantly reduce the energy consumption of such houses (up to 50 percent) and in this way not only reduce the load on the environment, but also further provide an opportunity to recoup the costs of reconstruction.

3. Inconsistency with modern requirements and needs - starting with individual space and ending at the urban planning level - the inability of the architectural environment to meet the needs of residents in comfort, mobility, household processes (services), public spaces, visual environment and outdoor activities. This discriminates the area, has a negative impact on the quality of the urban environment in general, and introduces a large imbalance in the fabric of the city, which contributes to the development of a whole series of negative social processes in the city.

As we see, successful reconstruction should provide solutions to many diverse problems, with the involvement of specialists from different disciplines, well-coordinated joint work of Engineers, Urban Planners and Sociologists. Equal importance is not only the modernization of the housing stock of the bausubstants, but also the improvement of the public space between houses.

Many research and preparatory stages are passed to the beginning of design and construction. Here are some of them from the study of prefabricated buildings in Berlin:

I. Assessment of the general condition of the building

2. Tests of building materials on the bearing building structure

3. Construction-physical comparison of deviations from the norm (heat, noise and fire protection).

4. Assessment of the technical equipment of the building (heating, ventilation, plumbing)

5. Power supply assessment

6. Investigation of a possible asbestos hazard

7. Development of renovation project and options for improving the quality of life

8. Cost estimation

[Kalleja& Flämig 1999: 6]

In parallel with these stages, social surveys and work with residents are carried out. Their involvement is a common practice for more specific formulation of design tasks and the study of local preferences. Thanks to such surveys, over all this time, a certain set of shortcomings has been formed, characterized by commonality for the absolute majority of panel development areas in Western and Eastern European cities. Here are this problems, as well as the most commonly used measures to help eliminate some of them.

Monotonous, dreary appearance of the buildings and the outdoor facilities

In some cases, too little living space per inhabitant

Often too small or poorly designed rooms.

Poorly designed entrance areas

Too few shopping and service facilities

Generally noticeable, poor Execution quality.

In the practice of renovation the most frequent and expedient are the following tools and techniques aimed at eliminating the above disadvantages and improving the quality of development:

The structural division of the facades using ETICS or curtain wall with appropriate color.

Relatively seldom, changes in the floor plan lead to redistribution and Addition of apartments.

Elevators installed at a later date are often used to improve accessibility for wheelchair users and the mobility impaired

Redesign of the entrance areas

Construction of new buildings in gaps between houses (residential and commercial buildings)

Extensions (shopping and service facilities)

Change in the shape of the roof by adding storeys to the building.

[Kalleja& Flämig 1999: 12]

Analyzing the experience of renovation of such residential areas, thanks to the use of modern technologies and appropriate solutions, with proper preparation and planning, it is possible to significantly improve the quality of development and the urban planning situation in general, and successful principals and premiums used in one area can be transported to others. Projects of houses for industrial housing construction, which are very similar to each other, allow using standardized techniques for modernizing such buildings. At the same time, with proper time planning, it will be possible to carry out construction work without the need to resettle the tenants, and the result of improvements in most cases is assessed positively even by the most skeptical occupiers and specialists.

At the moment, there is already a certain foundation of practical experience in renovation, primarily due to developments in this area of such European countries as Germany, Holland, Poland, Czech Republic, Slovakia, France. Considering the very impressive volume of panel development (for example, in Poland), the modernization process dragged on for decades. Theoretical and practical activities in this direction are in an active phase and many houses are still waiting for their turn. Most of the projects were aimed at improving energy efficiency and diversifying the appearance of buildings. Therefore, the replacement of windows, building services and facade insulation with the implementation of a new color concept is, so to speak, the standard minimum set of renovation. There are also more sophisticated, complex projects of transformation that make it possible to increase the area of apartments, add new qualities and futures of the house. Some of these projects are presented in the next chapter.

Six upgraded entrances and elevators provide access to the 90 apartments of modernized pannel house at Askanische Strasse 70-80 in Dessau. [4]

Before/after transformation. Lacaton & Vassal Architektes, Bordeaux, France. [5]

There are different approaches to solving the problems associated with the post-war mass housing development, which depend on the urban planning and social context, economics, legal aspects and development strategies of each individual city. Sometimes districts and houses are subject to complete or partial demolition, other approaches to the solution are rehabilitation and modernization.

Such projects are increasingly appearing among European countries. Modernization of existing prefabricated houses allows to increase usable living space and raise energy efficiency and living comfort to a new level. In addition, reconstruction and refurbishing is often more profitable than the demolition and construction of a new house.

An example of such a solution is the renovation project of old prefabricated houses in Leinefelde
and Halle, executed by the archbureau Stefan Forster Architekten, who received an award at an international exhibition as the best example of renovating cities in Saxony-Anhalt.

Of the 11 blocks that the panel house in Halle originally had, the half was demolished. On the last-5th floor, about half of the apartments were also “cut out”. In their place there were open terraces for apartments, which left. Layouts of apartments were varied, and apartments on the ground floor received private ground plots.

These methods of transformation of the building are also used in other 7 projects implemented in Leinefeld. The most impressive and radical example of transformation is the reconstruction of an old panel house 180 m long, which architects turned into separate urban multi-apartment villas, dismantling the intermediate sections of the multi-sectional house.

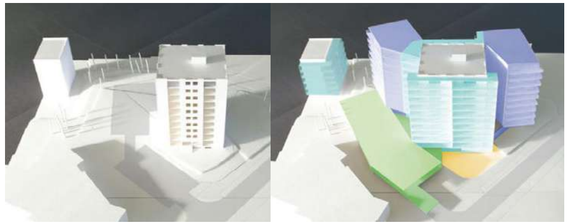
Facades of House 08 after renovation, Halle (Saale), Stefan Forster Architekten [6]

The architects made flats more spacious and light and developed their own technique, according to which the apartments in panel houses were enlarged by dismantling the external walls, replacing them with light-penetrating structures with sliding doors and adding additional space to them. The appeared square serves as a winter garden or a glazed loggia. It increases the area of the apartment and makes housing more comfortable.

Architects used this method during the reconstruction of the 17-story Tour Bois Le Pretre together with Frédéric Druot in the north of Paris.
This option allowed her to maintain the status of social housing: all current residents remained at their apartments. They did not even need to temporarily move out of the house: prefabricated parts were used during the reconstruction, which reduced the "destructive" side of the repair to a minimum.

Before/after transformation.
House 07, Leinefelde Stefan Forster Architekten [6]

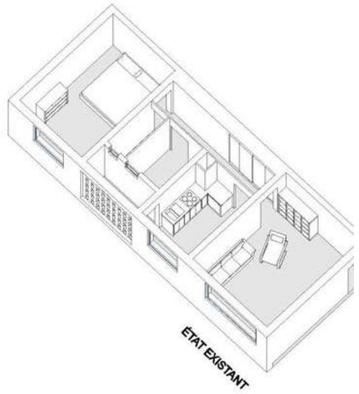
Different stages of transformation models of the house in Saint-Nazaire. Lacaton & Vassal Architektes. [5]

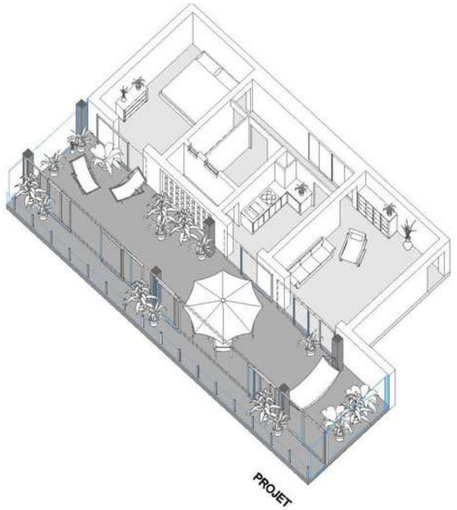


During the reconstruction of houses in Saint-Nazaire, in addition to expanding the facade due to glazed terraces, two significant in size volumes were completed on the sides of the building. Lacaton & Vassal Architektes, Saint-Nazaire, France. [5]

The same scheme, but on a larger scale, was implemented during the reconstruction of 3 houses in Bordeaux has been finished in year 2016.

Contemporary reconstruction projects show the high potential and effectiveness of the revitalization of residential panel buildings. With proper programming of the space and quality reconstruction, it was possible that mean areas could create an attractive urban environment again.





Loggia annex photo, schema and facade of house by Lacaton & Vassal Architektes in Bordeaux, France. [5]

I would like to start considering the topic not with the analysis of the site and not even with the character of city planning, but with an introduction to the soviet building development of 1960's and the "Khrushchevka" residential house in particular, as its fundamental element. In the hierarchy, this is an even more general and global intention than the area or city, because this phenomenon has left its gigantic mark on the territory of the whole of eastern Europe - in the form of districts, quarters and entire settlements. Distribution territory - all post-soviet countries, almost 1⁄6 of the inhabited land of the Earth.

Chapter II

Theoretics of soviet mass housing

Historical background

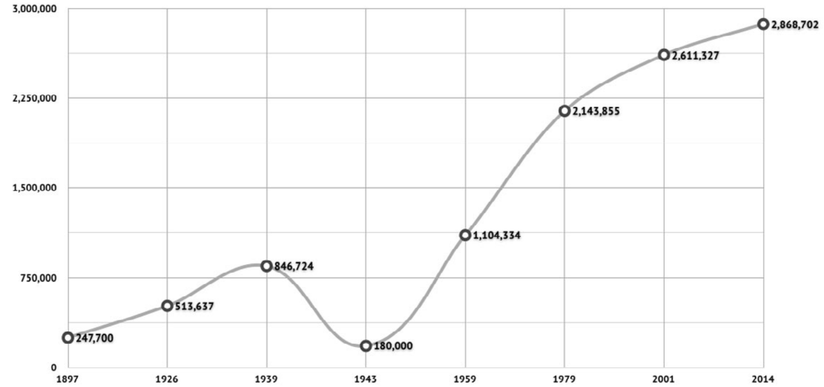
For a better understanding of the reasons for the appearance and features of mass typical development of the 50-60s, it is necessary to consider a number of historical and social premises. They had a huge impact on the design formation and urban development tasks, as well as building standards of that time.

The consequences of World War II left a huge imprint on the post-war face of European cities. It entailed far-reaching socio-economic and political consequences. The postwar period was marked by a very intensive population growth in Europe. As for the countries that participated in the war, by 1960 even the most affected of them not only offset the decline in population, but also significantly exceeded the pre-war numbers.

The main driving force behind urban growth in the post-war period was still industry. As the process of concentration of production continued, cities grew. However, the development of large cities and primarily metropolitan centers occurred not only due to an increase in the number of factory workers, but also due to an increase in the number of employees — mainly office and service workers, various representatives of intellectual work. A direct indicator of urban growth is the dynamics of the proportion of urban and rural population in each country. As a general rule, cities have developed faster in countries where the degree of urbanization has not yet reached a high level. Such country was USSR, where until the beginning of the 30s of the 20th century numbers of the urban and rural population of the USSR were almost equivalent. The industrialization of the country, which manifested itself with particular strength in the postwar years, changed the balance of the population in favor of cities.

In the Soviet period, the population of Kiev grew rapidly both due to the internal, and due to inter-republican migration. In this way post-war destruction and an unprecedented increase of the urban population caused an acute shortage of housing, which was a huge problem of post-war time.

Amount of Kiev's citizens graph [8]



Soviet soldiers march along central street in destroyed Kiev 1943. [7]

After the liberation of Kiev in 1943, the Soviet government first began the restoration of strategically important facilities: bridges and industrial enterprises.

But of course, reconstruction of the destroyed buildings had also be done. The architectural competition for the restoration of Khreshchatyk (the main street of Kyiv) - the desire not only to restore the destroyed cities and reconstruct them, but also at the same time reflect the pathos of the world-historical victory over fascism in large urban ensembles

The only acceptable architectural style of the mid-1930s, which deprived architects of the right to express individualism in their work, was “Stalin’s” architecture, in which representative projects were designed throughout the country.

Replacing rationalism and constructivism, during the reign of Joseph Stalin, architectural policy contributed to the formation of a classic monumental style, in many ways similar to empire, eclecticism and art deco. Often, stalinist architecture, with its monumentalism, ideology, and the cult of a heroic past, is considered in the context of totalitarian architecture of the 20th century and is seen in it as typologically similar to Italian and German architecture of the same time.

A characteristic feature of this architecture was the ensemble development of streets and squares, the synthesis of architecture, sculpture and painting, the use of architectural orders and bas-reliefs, overhanging cornices, which were believed to give buildings a monumental look. They were used both before the war and after, until the mid-1950s. By this time, the idea of exalting the Soviet era by means of architecture had taken on caricatured forms.

Thus, Stalinist architecture was to expensive and was not adapted for mass application. In the 1930s, the introduction of the stalinist “empire” meant a five to eightfold increase in the average cost of a square meter of the apartment’s living space in comparison with the average indicators of the mid-late 1920s. Behind this was the government’s attitude towards the fundamental rejection of the construction of comfortable housing. The microscopic number of apartment buildings (in the 30s, about 10% of the total housing area under construction) countervailed the huge amount of barracks, which did not even formally respond the concept of permanent housing.

Turret on Khreshchatyk, 13/2.
Architects; A. Vlasov, A. Dobrovolsky, B. Priymak. [9]

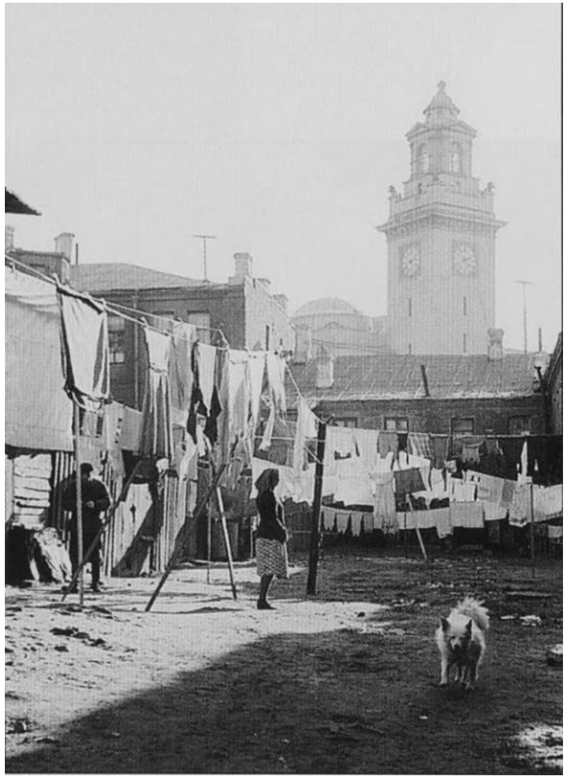
Khreshchatyk in 1943 and in the early 50’s [10],[11].

Acute housing crisis in USSR
Transition to racionalism in architecture

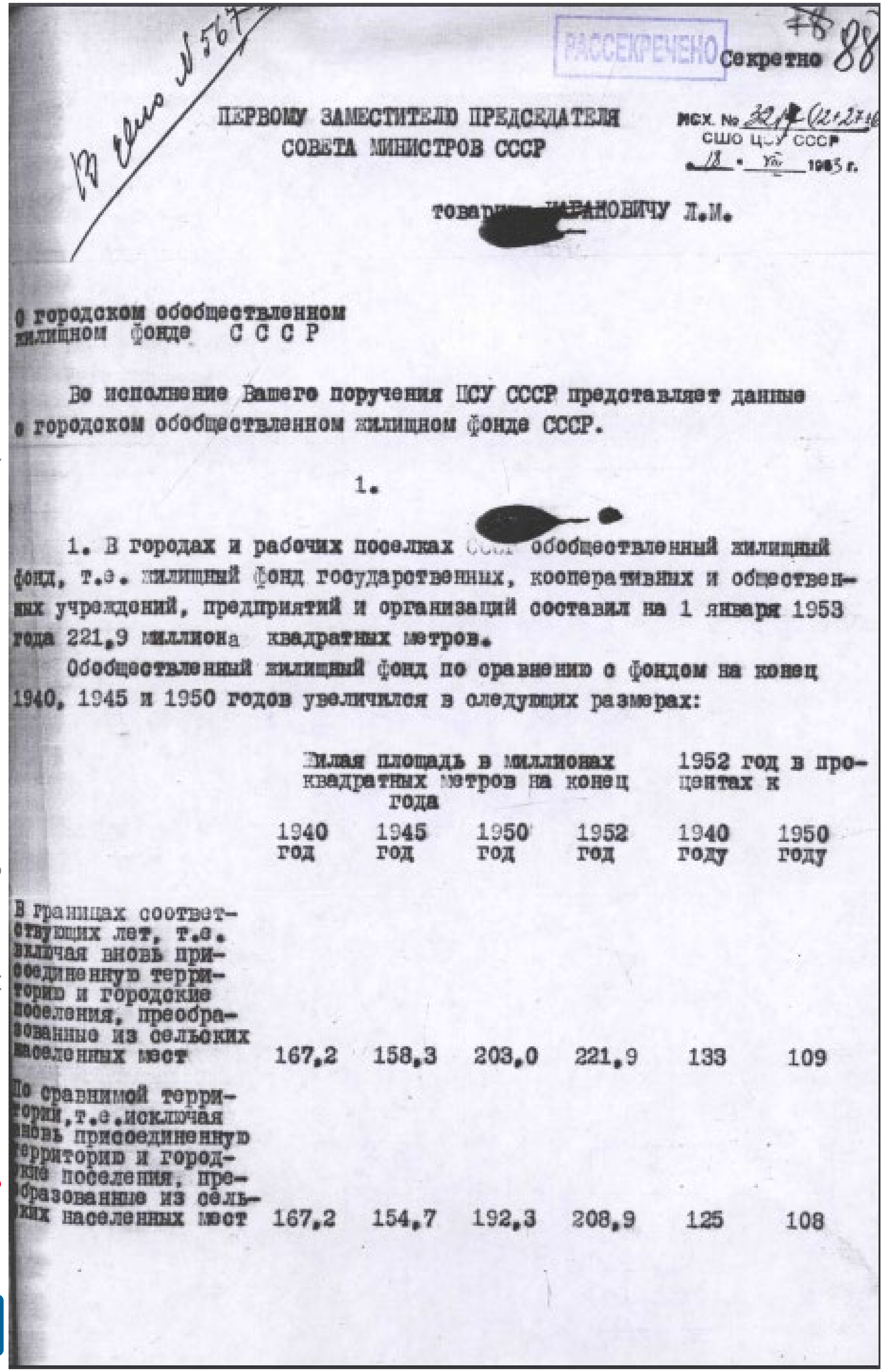
The unconditional adherence to the architectural style, the image projects of public and government buildings priority, ensembles and skyscrapers, glorifying socialist reality, finished with the death of the ideological inspirer I.V. Stalin in March 1953.

There was an acute housing crisis in the country. The post-war pace of housing construction could not satisfy the needs experienced by soviet people. Even before the war it had extremely limited numbers and was intended mainly for the soviet elite - employees of state committees and nomenclature. Ordinary citizens also settled in so-called “Stalinka”, but the main concept in the Stalin years was not apartment-by-apartment, but room-by-room settlement. That is, several families settled in a two or three-room apartemnt, one family in each of the rooms. In a three-room apartment of 80 meters, could live 12-15 people, used the same bathroom and cooked in the same kitchen.
The housing situation was so deplorable that such a crowded communal apartment was not the worst option, since many lived in wooden barrack without any amenities that were drowned with firewood or coal. Living conditions in such huts could not be called humiliating.

Barracks. [12]



Courtyard near the Kievsky railway station 1949 [13]



РАССЕКРЕЧЕНО Секретно

ПЕРВОМУ ЗАМЕСТИТЕЛЮ ПРЕДСЕДАТЕЛЯ
СОВЕТА МИНИСТРОВ СССР

исх. № 321
ЦСУ СССР
1953 г.

товар[redacted]АНОВИЧУ Л.М.

О городском обобществленном
жилищном фонде С С С Р

Во исполнение Вашего поручения ЦСУ СССР предоставляет данные о городском обобществленном жилищном фонде СССР.

1.

1. В городах и рабочих поселках [redacted] обобществленный жилищный фонд, т.е. жилищный фонд государственных, кооперативных и общественных учреждений, предприятий и организаций составил на 1 января 1953 года 221,9 миллиона квадратных метров.

Обобществленный жилищный фонд по сравнению с фондом на конец 1940, 1945 и 1950 годов увеличился в следующих размерах:

	Жилая площадь в миллионах квадратных метров на конец года				1952 год в процентах к	
	1940 год	1945 год	1950 год	1952 год	1940 году	1950 году
В границах соответствующих лет, т.е. включая вновь присоединенную территорию и городские поселения, преобразованные из сельских населенных мест	167,2	158,3	203,0	221,9	133	109
По сравнимой территории, т.е. исключая вновь присоединенную территорию и городские поселения, преобразованные из сельских населенных мест	167,2	154,7	192,3	208,9	125	108

The situation was evidenced by the secret report of the central statistical administration about the state of the urban housing stock in 1940-1952, presented 5 months after the death of Stalin:

"Despite the large growth in the urban housing stock, housing needs are still far from being met. This is due to a significant increase in the urban population, especially in ater-war period. In housing construction in cities and workers' villages have to be solved a number of urgent issues ...

1. The average size of living space per 1 resident in cities and workers' settlements as of January 1, 1953 was 5.6 square meters ... Considering temporarily residing and unregistered living space provision is much lower.

2. In cities and workers' settlements, there are 18 million square meters of living space in barracks, which is 9 percent of the total socialized housing stock as of January 1, 1953, 3 million 758 thousand people lived in this appartments ...... 144% from the number of square meters before the war.

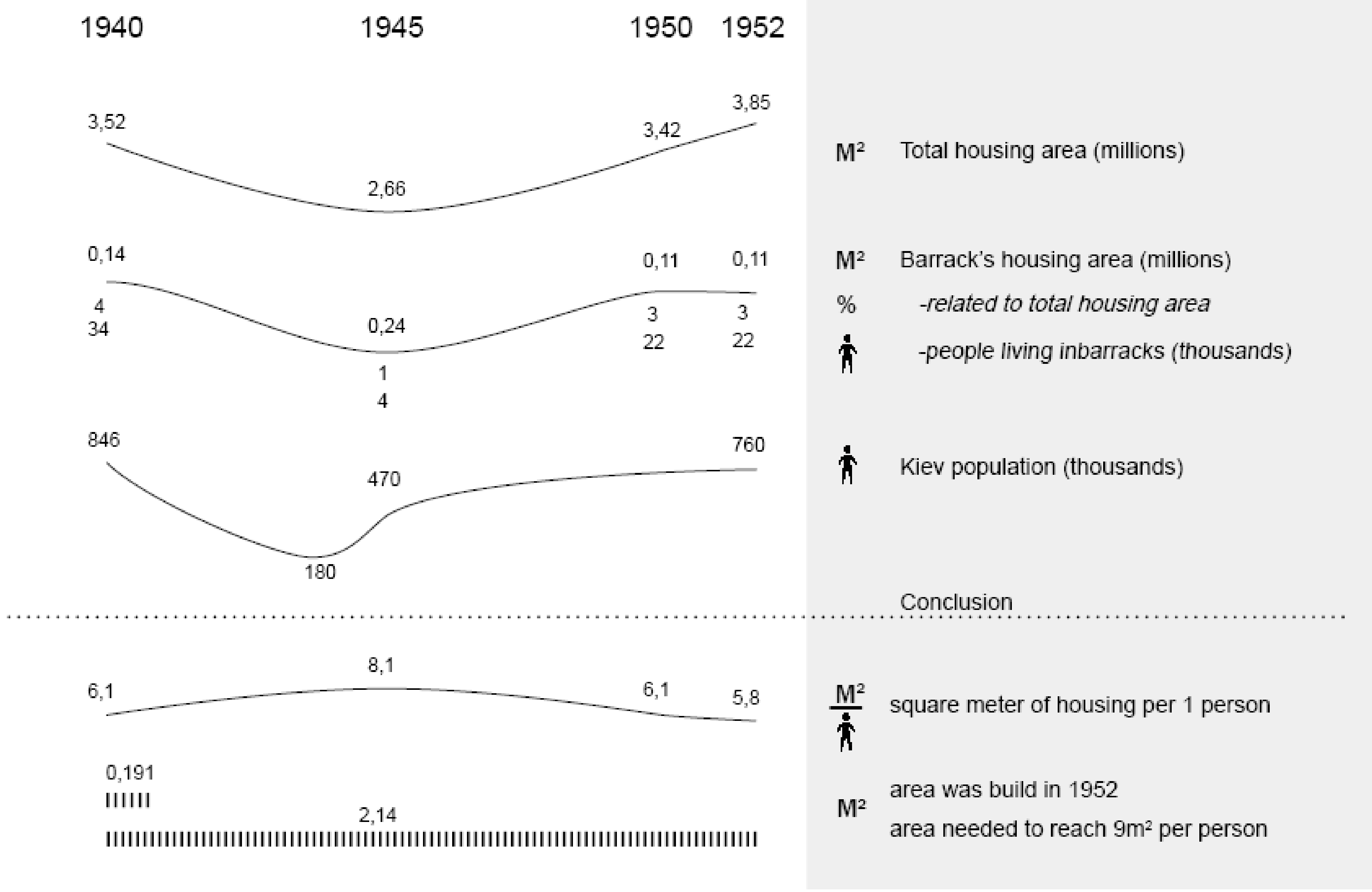
3. The improvement of the living space as of January 1, 1953 compared with the previous period is characterized by the following data: 100% of the housing is equipped with electric lighting
80% water supply, 73% sewage, 47% central heating (data for Kiev).

4. During 1951 and 1952, it was not erected, compared to the plan, the living space of 4.6 million square meters (11% of the planned area).

[Report of the Central Statistical Administration of the USSR to L.M. Kaganovich about the state of the urban housing stock in 1940-1952]

First page of the report. 1953 [14]

Brief statistical summary



To provide all citizens with comfortable housing, a real revolution in construction was required, and it followed: shortly after the start of the analysis of the housing situation, on September 7, 1953, Nikita Khrushchev became a leader of Soviet Union, who personally led the long-awaited construction reform. The new apartment building ‚main component of reform, also went by the name of new USSR chef.

Nikita Khrushchev (April 3, 1894, Kalinovka, Russian Empire - September 11, 1971, Moscow, USSR)
Soviet statesman. Political leader of USSR from 1953 to 1964. The reign of Khrushchev is often called the «thaw», including the deployment of active housing construction.

Khrushchev gives directions to architects. 1955 [15]

The first step of reform was the holding on November 30 - December 7, 1954 of the All-Union Meeting of Architects and Builders. It was an unprecedented event - both in form and in meaning. From this moment, the beginning of the architectural and construction reform in the USSR is officially counted. Khrushchev, obviously being acquainted with the experiments of European countries with mass construction technologies, delivered a speech that determined the development of the construction industry for decades:

"... they understand architecture too aesthetically, as artistic activity, and not as a means of satisfying the urgent needs of the Soviet people. It's they who spend national money on beauty that nobody needs, instead of building simpler, but more. "

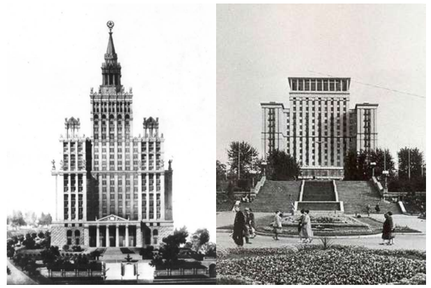
[Sarabyanov1979: 375]

By this time, a decree "On the development of the production of prefabricated reinforced concrete structures and construction elements" had already been issued, which provided the construction of 402 factories of prefabricated reinforced concrete structures and the organization of the manufacture at 200 sites of the landfill type. Wherever possible, it was required to replace metal with precast concrete.
The next important event was the key resolution, which determined the architectural reform in the USSR, "On eliminating excesses in design and construction"

"Consider the main task of design organizations ... the development of cost-effective standard projects and standard structures and their use in construction."

[Pravda 1955: 1]

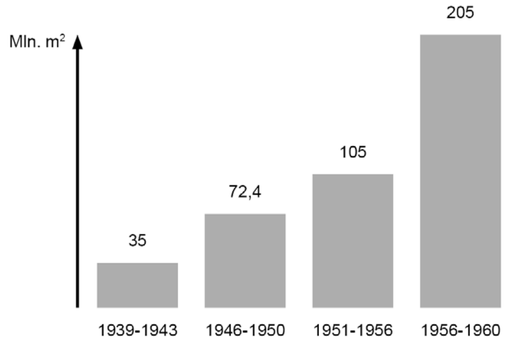
A vivid illustration of this turning point in Soviet architecture was the construction of the hotel "Moscow" (now "Ukraine"), which was just ending at that moment.



Facade of the hotel «Ukraine» according to the project and after the completion of construction. Kyiv [16], [17]

The first concrete plan that characterizes the scale of reforms was considered at the congress of the ruling political party, which approved the program for 1956-1960. It was the first time in Soviet history, when the government declared thesis, that it is necessary to solve the housing problem and provide the urban population with housing. Khrushchev announced the intention to provide each soviet family with an apartment for the next three five-year plans. *[Gorlov 2017: 75]* The barracks and other temporary housing wasn't among the area being built, as before.

And in January-February 1959, at the new congress, housing construction indicators were once again sharply increased. This required an insignificant increase in the volume of construction, compared with plans for the coming years.



The planned volume of construction

In connection with the large-scale reform, the new residential areas had to sharply contrast in structure, spatial solutions and infrastructural content with the areas of the stalinist buildings and with the buildings of 18-19th centuries.

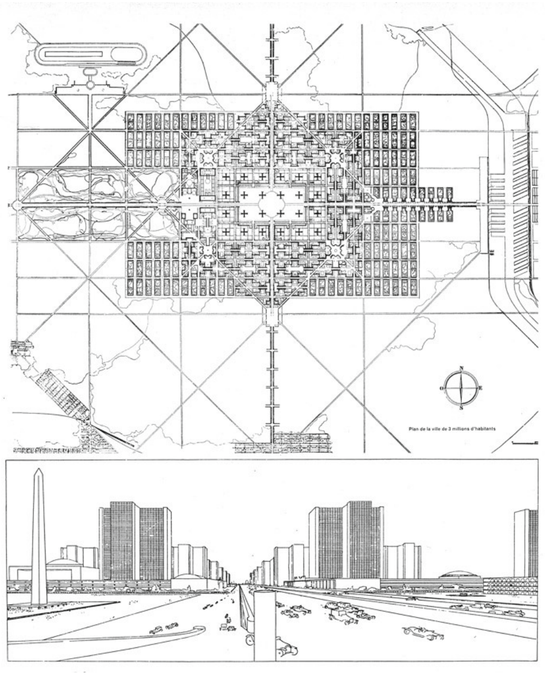
It was already a completely new Khrushchev city based on typical urban planning techniques, typical housing construction and standard apartments for the lower class. From the stalinist city, which consisted of a grand center with housing for the privileged segments of the population and barracks for workers, it differed fundamentally. The body of the city had to be massive apartment housing for everyone. This implied the development of the city as a system of large housing areas with appropriate infrastructure.

City -planning principles have completely changed - they were partially imported from the western Europe, where due to difficult socio-economic and transport crisis, new forms of settlement were searched. At that time it was developed a lot of innovative modernist concepts and urban utopian ideas.

The point of many of them was creating of a new consciousness and a new home, corresponding to the new era. Life processes had to be strictly programmed and optimized. In the spirit of functionalism, prevailing at that time, mathematical and statistical science was involved in urban planning: the life of society was carefully modeled in new microdistricts. People's needs and optimal routes to workplaces, schools and clinics were calculated. The social background changed, the new city was seen as a comfortable space for the life of the entire population, and not just its privileged part.

Many different approaches to the implementation of tasks were developed, however, the treatises of Le Corbusier became the most influential. He was distinguished by consideration of problems of the new architecture based on technocratic utopia. The interaction of the real and the utopian determined the integrity of the creative personality of the architect and his popularity as a forerunner of new ideas throughout the world.

The architect saw the city as a "living mashine". According to him, symmetry reigns in an ideal city, the necessary components are the sun, space and trees. That is why the houses - skyscrapers, the same in shape and height are among the parks, meet the modern requirements of insolation and sanitary standards.



«La ville radieuse» Le Corbusier, 1922 [18]

A "radiant city" based on four principles:

-Increase in population density
-New diverse modes of transportation
-A large number of parks and green spaces
-Attempt to "unload" the center of the city.
In other words, urban development of suburbs.

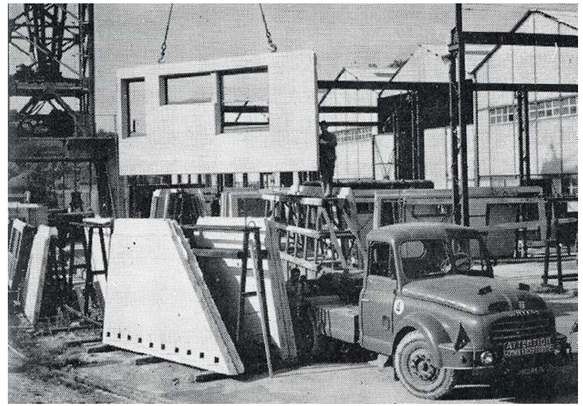
[Zakharychev 2016: 1]

Although his "five starting points" of modern architecture were obviously not applicable for the tasks due to economic and technological costs, at the urban level his ideas had a visible influence on the city-planners, although they were not fully implemented. Of course, Le Corbusier had no direct relation to the design of buildings and regions of the USSR. Nevertheless, being the pioneer of modernism and functionalism in architecture, which, by the way, were very close in spirit to the ideology and aesthetics established with the advent of Khrushchev, subsequently had a great influence on the appearance of Soviet cities. The construction of new free territories with identical separate houses, the use of reinforced concrete as the main material, the spreading of urban planning patterns on a large territory and clear zoning, which reflected the ideas of functionalism in urban planning, corresponded well with the tasks of the post-war period.

As for the houses themselves, at that time there was no sense in any high-rises, due to the lack of a technological base and the high cost of more durable structures. It was decided to achieve the required volume with low-rise buildings, but on a larger territory. Moreover, the experience of mass building already existed at that moment in some european countries, in particular France-pioneer of construction from prefabricated reinforced concrete elements.

Namely the work of the French engineer Raymond Camus in panel house-building turned out to be very applicable in soviet project institutes. Authorities acquired the right to use its technologies. It is known that the French developer and owner of "Camus", himself, came to the USSR three times in order to give the necessary advice to designers and builders.

Soviet architects and engineers, in addition to studying foreign innovations, also engaged in their own developments, thanks to which in five-seven years in the USSR there was a change in all professional guidelines in urban planning and architecture: the social prerequisites for the design, the standards for providing citizens with housing and social services, the scale and nature of financing civil engineering, the principles of organizing the urban environment, the typology of housing and residential infrastructure, the official architectural style and the structures used in the construction underwent radical changes.



Preparation for transporting in Camus prefabricated concrete factory. France [19]

Experimental panel construction of USSR

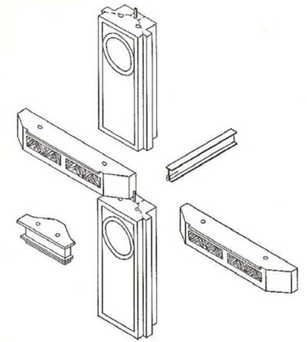
The massive use of prefabricated structures in USSR began with the coming to power of Nikita Khrushchev, but construction of buildings from standard elements by unified projects began before the war. Even at that time, the construction of houses lagged behind the development of industry and architects were looking for an opportunity to reduce the time and cost of building. However, this had an experimental format and no mass character.

One of the brightest representatives of the pre-war experience in designing of prefabricated houses is the “Openwork House”, built by architects Andrei Burov and Boris Blokhin in 1939-1940. The project was conceived as a variant of standard development, combining the economy of prefabricated housing construction and artistic expressiveness. Architects sought to present the elements of functional construction in aesthetical way, creating an expressive decor of the facades. Expressiveness enhances the strict alternation of monolithic parts, windows and concrete lattices of floral ornaments, cast according to the drawings of the artist Vladimir Favorsky. Thanks to them, the building got its name. The house had 2 elevators, the ceiling height almost 3 meters, public spaces in the common hallways and well developed infrastructure on the ground, non-residential floor.
At the same time, the house had features inherent in the post-war Soviet house-building — the complete absence of interior decor, a reduced-size apartments, and a combined bathrooms and tiny kitchens, which emphasizes the mass housing purpose of project.

The next step was the development of a single panel forming the entire external wall of the room. Since 1947, almost every year is marked by the implementation of a new pilot project, mainly in Moscow.

Panels combination of «Openwork house», architects: Andrei Burov, Boris Blokhin [21]

«Openwork house», architects: Andrei Burov, Boris Blokhin [20]



In 1948 began the development of the area of Peschanaya streets. There was a large-scale experiment launched on an area of about 300 hectares for the high-speed construction of prefabricated frame-panel houses of the pilot series under the guidance of Z. Rosenfeld and P. Pomazanov using the new in-line method. Multi-storey sections, a mezzanine, arches, concrete blocks imitating rust, concrete platbands and balustrades add variety to the building ensemble. In addition to the complete prefabrication of the elements, construction was accelerated thanks to the in-line method, in which all the houses of the quarter were assembled in parallel. A four-story house was built in 96, and a five-story house in 120 workdays. *[Archsovet 2014]*

Ensemble of houses on a Peschanaya street. Architect: Z. Rosenfeld and P. Pomazanov. *[22]*

In 1949, architects M. Posokhin, A. Mndoyants and engineer V. Lagutenko developed a project for a quarter of four-story frame-panel panel houses on Khoroshevskoye Shosse. V. Lagutenko, subsequently, became the main builder of "Khrushchevka". Here he developed his own system: the frame for the houses was made in metal forms right at the construction site. There was no factory base yet, and all construction and installation works were carried out in a semi-artisanal way. Nevertheless, after the first experimental house in the same area, the "flow-speed method" was used to erect two lines of 15 residential buildings of this constructive type in two stages. Behind the decor of the house on Khoroshevskoye Shosse it's not easy to recognize typical "Khrushchevka". The house is decorated with attached parts - garlands located under the windows and pilasters in the walls cover the seams between the plates. So M. Posokhin described the principles that guided the design:

"*Frame-panel residential buildings should have the same features that are inherent in the Soviet, socialist type of housing, that have harmonious proportions, solid and beautiful finishes and, depending on urban conditions, have balconies, bay windows, loggias. New construction methods should not impoverish architecture. On the contrary, they can and should enrich it. "'*

[Posokhin 1953:17]

A deviation from such an understanding of the tasks of large-panel construction both in soviet architecture and in Posokhin's work in particular, can be traced after Khrushchev's reforms in architecture, including the resolution "On eliminating excesses in design and construction" that was published in November 1955. Architectural critics, in context of the changes, spoke rather negatively about Posokhin's buildings and gave instructions to designers according to a new vision of aesthetics and the role of the architect:

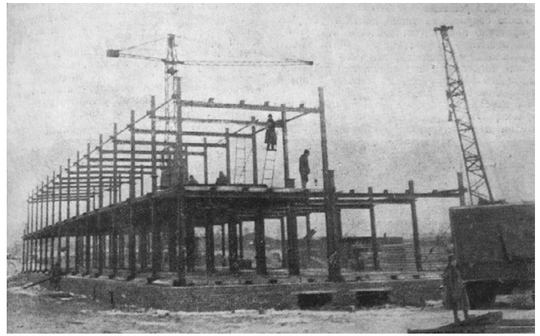
"A serious drawback of houses on Khoroshevskoye Shosse is the use of hinged architectural details - window frames, garlands under windows, etc. We perceive these details not only as architectural excesses - they are organically contraindicated to the very nature of factory house building."

Experts saw the development of the aesthetics of panel housing in the following:

"Of course, it would be wrong to reduce all the richness of the features of the compositional construction of the facade of a large-panel building only to the choice of how to cut walls on the panel. The architect must carefully think through the plastic of the panels themselves, their size, texture, color, wall topography, and the method of processing joints between panels. Repeatability of the main wall elements - panels, and therefore the joints between them, attaches particular importance to the kind of the architectural and artistic processing of the joints between the panels. This largely determines the expressiveness of the facade of the building and its style characteristics "

*[*Erofeev *2014]*

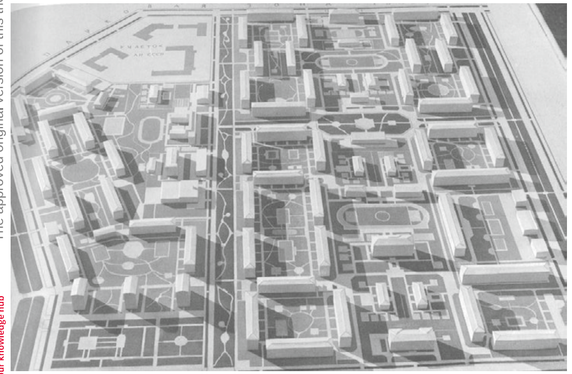
The aforementioned houses of Posokhin were built with the use of a frame-panel scheme. The frame was built of reinforced concrete, and the panels for these houses were made in metal molds right at the construction site. It's just that the construction of such a house was even more expensive than at the time of Stalin, which in no way could satisfy a higher management of industry. One of the reasons was the use of the full frame as the carrying structure of the building. For that reason this structural system was used very rarely in subsequent mass panel construction.



Frame and exterior of a finished residential building on Khoroshevskoe highway, Moscow. Architect: M. Posokhin. [21]

Since 1950, in addition to frame-panel houses, the construction of frameless panel houses began, which were more economically profitable. They turned out to be half the price of Posokhin's frame "masterpieces".

The plot for the construction of experimental houses, which can be called the first "Khrushchevka" and the last experimental houses, was allotted near the village of Cheryomushki near Moscow. The new district was called Novye Cheryomushki, and the pilot-demonstration microdistrict became its 9th quarter. Construction began in 1956 with the participation of engineer Lagutenko and architects Osterman, S. Lyashchenko, G. Pavlov. 16 4-storey houses were built using different technologies: they were both block and panel, with different roofs, from tiles to ordinary slate, they had mainly four entrances and were arranged in accordance with a carefully designed plan of landscape.



Model of housing area Novye Cheryomushki [23]

In these projects, architects still tried to introduce unique elements into the design. For example, on Grimau street, "Khrushchevka" are crowned with plates with floral patterns.

In 1957, the first tenants settled in the houses. Architects watched over one year how their life evolved. As a result of the experiment, several of the most successful and cheapest building projects were selected and further improved, but they themselves did not become mass: Grimau, 16, for example, can only be called the prototype of the II-07 and 1-510 series, and the neighboring 14th house is the prototype of the legendary K-7 series by engineer Vitaly Lagutenko.

In the work on the 9th quarter, architects returned to the ideas of integrated development, formed back in the 1920s, and designed the interior with care of the convenience of residents. Traffic through the microdistrict was excluded: car owners left their cars in parking lots and followed home along footpaths. Separate zones for relaxation and playgrounds for children and sports were provided in the courtyards. Children's institutions (nurseries, kindergartens and schools) were grouped in one part of the microdistrict. Behind the shops were provided utility areas where tenants could knock out carpets or dry clothes. There was also a large swimming pool on the territory of the microdistrict, and for children there were small pools in each yard. The landscape design of the quarter followed the latest world trends of that time: on the line, separating residential buildings from the carriageway, identical trees were planted at different distances and various green spaces in the courtyards were organized into picturesque groups surrounded by lawns. *[*Erofeev *2016]*

The experience of the construction of the Cheryomushkinskas recorded a new standard for the housing development. Soon it was distributed all over the country, but with huge reductions, especially in the yard space and infrostructure. From 1946 to 1956, 225 large-panel residential buildings of various projects and constructive solutions were built. The construction experience of these years tested technologies on the prototypes of large-panel housing construction, which allowed to move from experimental to mass construction in following years.

Residential building in the 9th quarter of the Novye Cheryomushki district. Moscow. 1964. [24]

Scale of construction in USSR. [21]

By the end of the 1950s, USSR was the first in the world in terms of volume of housing construction. From 1956 to 1963, the country's housing stock almost doubled - from 640 to 1,184 million square meters. In less than a decade, there was built more housing than in the previous 40 years. *[Grigorieva 2010]* It was possible to reach such rates due to industrialization of construction using prefabricated reinforced concrete structures. For the installation of a five-story "Khrushchevka", 15 days were needed and twice as much - for furnish.

The new building regulations adopted in 1957, which in many respects legally determined the features of residential buildings of the Khrushchev era, also played a decisive role. All "additional spaces": corridors, bathrooms, kitchens - were reduced to a physiological minimum. Ceilings were lowered, stairwells were narrowed, storage rooms, garbage chutes and elevators were eliminated. Economy were achieved also through rationalization of living space and typification of solutions.

The main idea was to build entire series of houses according to a single standard project, which provides for the modeling of three-four options for a particular house with a standard internal layout. New principles have been worked out for the development of housing districts, combining residential complexes with cultural institutions.

Construction in progress. [25]

Most significant paragraphs of building code:

The height of living rooms in apartments and dormitories and hotel rooms from floor to ceiling should be equal to 2.5 m in all climatic regions.

Passenger elevators should be arranged in residential buildings at the floor level of the upper floor above the sidewalk or blind area: a) in apartment buildings and in dormitory buildings of 15 m or more; b) in hotel buildings 9.5 m or more.

The common room should be directly connected to the front and can be a walk-through to the bedrooms and the kitchen.

The area of the kitchen should be at least 4.5 m^2. The width of the kitchen should be at least 1.6 m. Kitchens with an area of more than 6 m^2 should be designed as kitchens-dining rooms.

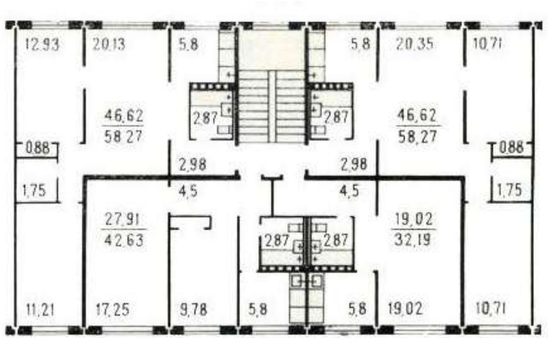
The area of the bedroom should be at least 8 m^2, and the width - at least 2.2 m; in three to four rooms apartments are allowed one and two bedrooms respectively each with an area of at least 6 m^2 and a width of at least 1.8 m.

The area of the common room in two-, three- and four-room apartments must be at least 14 m^2

[State publishing house of literature on construction, architecture and building materials 1957*]*

Number of rooms in apartament	min. area (m^2)
1	16
2	22
3	30
4	40

The smallest living area of apartments should be taken according to the table.

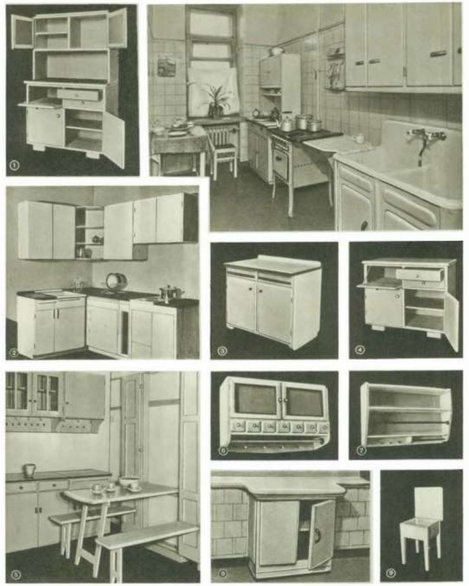


Typical block plan with 1, 2 and 3 rooms apartaments

Although paragraphs of the norms often indicate the minimum values of areas, they were often perceived as optimal for the sake of saving materials and space.
For example, they admitted the possibility of combined bathrooms and walk-in rooms, in fact, combined toilet and bathroom have become standart practice. From here also originate a normal height of “Khrushchevka” of 5 floors, since according to the norms in a residential building less than 15 meters in height (with a floor height of 2.5 meters) it was allowed to provide no elevator, which saved a significant 8% of the construction costs.

Since the rooms in small apartments had to combine several functions (for example, a living room during the day and bedrooms at night), compact and multifunctional furniture was created for them, because the models produced earlier simply did not fit: sliding dining tables, armchairs-beds and sofa-beds ,

Family in the kitchen of «Chrushchevka»[26]



Kitchen furniture catalog [27]

small kitchen sets and other home furniture. Both architects and furniture developers relied on soviet and european experience in ergonomics for the most efficient and rational use of the space of cramped apartments. At first, tenants could order new furniture from the catalog, and then it appeared on open sale. Examples of planning decisions, photographs and drawings

of furniture were published in illustrated guides after the exhibitions and in manuals on organizing everyday life. During the exhibitions themselves, the organizers conducted opinion polls and collected feedback on new items, which were included in numerous reports on the products of furniture enterprises and indirectly influenced the formation of the model range. The central design bureau and a special architectural design bureau worked on the development of small-sized furniture projects. The apartments were furnished with built-in furniture, which was designed to save the small space of the apartment.

Five-story, with low ceilings, combined bathrooms, tiny kitchens and corridors, thin walls, without elevators and utility rooms, these houses were uncomfortable, but cheap, and therefore were built quickly, in whole areas. Obtaining a separate two-room apartment for a family-inhabitants of barracks or overpopulated communal apartments became a real feast, especially considering the fact that they received such apartments from the state for free. The housing problem was somewhat mitigated, although, of course, it was not possible to finally solve it. Naturally, such government approaches to solving the housing problem have significantly improved the post-war demographic situation. Housing provision with 9.2 m^2 per person in 1967 increased to 16 m^2 by 1990.

New dwelling [28]

Mass settlement of tenants in new apartments. 1962 [28]

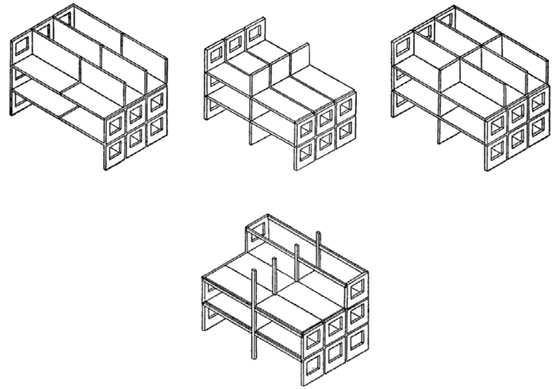
It should be noted, that “Khrushchevka” is a unofficial name for a bundle of Soviet residential buildings produced in 1950’s and 1960’s. This concept includes a huge number of types (series) of residential buildings, which differ slightly from each other in some respects.

Construction of «Khrushchevka» from concrete blocks [29]

Installation of reinforced concrete panels [30]

1. The choice of wall material

As a rule, prefabricated reinforced concrete technology was used in most houses, but there are series where the material was brick or large concrete blocks. These series were used in the early years of mass construction, when the process of manufacturing reinforced concrete products was not yet established everywhere.
In the future, they were rarely used, mainly in those areas of the USSR where the construction of the plant was impractical and the transportation of panels was difficult. In such cases, bricks or blocks were made from local materials. The wall thickness of the blocks and brick walls is usually 40 cm, and the panel is from 12 to 30 cm.



Constructive system types

2. Constructive system

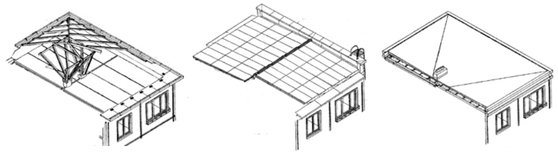
All series of “Khrushchka” can be divided into 2 types-frame and frameless, the last constructive scheme was preferred, and most of the series relate to it. Bearing elements in this case are the longitudinal or transverse walls. If both longitudinal and transverse walls were bearing, then such a system was called cross-wall system.

The frame structural system is most often represented by a structural scheme with an incomplete frame, where the crossbars rest one side on the front bearing panels, and the other on a row of columns located in the center along the building. *[Banykin 1963: 11]*

3. Roof type

The first types of “Khrushchka” often had a rafter four-pitched. The attic and coating with reflective materials (light slate, galvanized metal) do not allow the roof to overheat in the summer.

With the development of industrial construction flat ventilated roofs are finding more application. They were largely inferior to pitched roof, including their life time, but were more economically advantageous. They were made of prefabricated



reinforced concrete panels, which relied directly on the ceiling of the last floor. Top covered with layers of roofing material or metal sheets. There were different roofs with an internal drain (the slope of the panels in this case was directed inside the building) and free (rainfall was diverted due to the tilt of the panels outside the building).

[Shereshevsky 2005: 14,20]

It is worth mentioning, that houses of standard series were built throughout the USSR and neighboring countries, these are 14 climatic regions on an area of about 22.4 million km², which certainly influenced the characteristics of individual series. For the development of the series that meets the characteristics of climatic, geological and other local conditions, the design and construction zoning of the territory of the USSR was developed with subdivision into republics and regions. Zonal organizations developed a series of standard projects for each case. So, for example, the thickness of the panels of the external walls, the size of window openings, the presence of balconies, the material and thickness of the insulation, the area of the premises, the construction of foundations, etc. could vary.

At the same time, it is important to understand that all series were designed according to the same standards and corresponded to the same requirements of economy. Because of this they are very similar both in appearance and structure and have basically the same disadvantages.

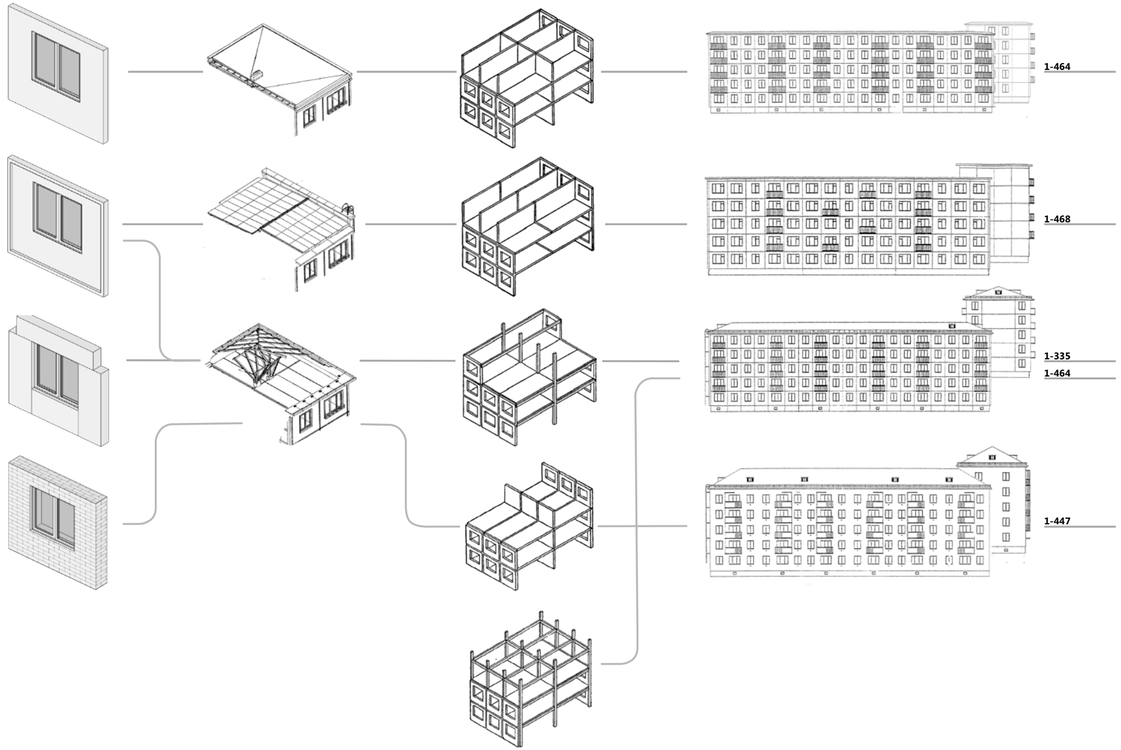
Professor of the International Academy of Architecture Yevgeny Lishansky, recalls:

"We prepared projects for detailed planning of Ukrainian cities, where the main buildings were "Khrushchevka". At the meetings of the Gosstroy, projects were approved not for a specific city, but for the whole country, with small nuances for each climatic zone...

...At that time, there was a tough and very scarce nomenclature of elements of residential buildings. As long we try, the houses constructed from this "econometric set" all turned out to be the same.

To the assertions that a different approach to design should be taken: abandon narrow and walk-through rooms, increase the area of kitchens, provide utility rooms, spacious hallways, otherwise these houses will become obsolete very quickly. There was an answered: You are not a politician and have forgotten that we have millions of citizens living in barracks. The government, in order to quickly resettle people from there, makes the most "modest" decisions. And after 10 years we'll think about how to resettle them: where four people live in two rooms now, will live only two. "

[Novosvitnyaya 2005]



The logic of elements' combination on the exampe of some "Khrushcheka" types.

Summary

Look on the new «Hrushchevka» quarter [31]

At the end of the 40s there was an acute housing crisis throughout the Europe, and in the USSR in particular. It was caused by historical and social processes common to many countries: the unprecedented resettlement of peasants to cities, which began at the beginning of the 20th century and accelerated in the 1930s (in 1917, the urban population was 17% of the country's population. In 1956- 48,4%),as a result, several families lived in one apartment; dilapidation and depreciation of city housing stock; a significant gap between residential construction and industrial extension (in the 1930s, the living space of soviet cities grew extremely slowly with a rapidly growing population); the war and its consequences (70 million m² of living space was destroyed).

The growth of urban living space began after the war. Nevertheless, these rates were not enough, and the statistics on residential construction in large numbers included barracks and other temporary housing. People continued to huddle in communal apartments.

Naturally, one of the main tasks of Khrushchev, that came to power in 1953 was the resettlement of the population according to the slogan: "Each family will have a separate apartment." The implementation of such a grandiose construction program required the reorganization of the entire design and construction business, the reduction of the construction time of buildings with the maximum saving of labor, materials and money was an important task. The inhibitory factors of construction have always been the diversity of building development and the complexity of the decoration of interiors and facades. The first entailed an individual, "piece-wise" execution of buildings, the second increased the cost and laboriousness, delaying highly skilled workers at the buildings.

And so, despite traditions, the most forward-thinking architects, engineers and statesmen began to call for standardization of houses, for a reasonable simplification of the appearance of buildings and, finally, for the mechanization of construction processes up to the organization of house-building plants.

The easiest was to get rid of the decor, as functionalism has sufficiently prepared the basis for this. But more difficult was the mastery of new construction equipment, which required the transfer of housing and construction activities from the sphere of manual labor at the construction site to the sphere of mass factory production and mechanized installation. To make this truly great step forward, it was necessary to prepare the industrial-building revolution, first of all, in the minds of many people and primarily architects.

The factory production of reinforced concrete opened up great opportunities for the mass development of cities.
Under the personal control of Khrushchev, architects prepared designs for typical four- and five-story buildings, the mass construction of them began in 1956. Performed in the style of functionalism, they were deprived of excesses like stucco molding on the facades, but their role was originally not to decorate the city: the so-called "Khrushchevka" were primarily designed to realize the dream of a separate flat.
As a result, over ten years, more than 50 million people have moved into their own apartments. Entire areas were erected on the place of old, half-empty villages, sparkling with purity and freshness.

Panel building was such a large-scale and epoch-making phenomenon that it became a fundamental figure in soviet and post-soviet culture. Authors often put panel modernism at the center of works. In painting, these were the socialist realist paintings of Yuri Pimenov and the works of Antonina Romodanovskaya. Shostakovich created the operetta Cheryomushki didicated to new housing. Film productions shot a huge number of movies in the scenery of new districts.

Overview

1945

End of World War II..

More than 1700 Cities in USSR were on 15-95% destroyed.

bis 1950er

In post-war years

were the buildings along main arteries of the cities in the so-called «Stalin Empire» built.

1953

Khrushchev becomes party leader of the Soviet Union.

70% citizens live in Multi-family old apartments and barracks.

1954-1955

Decree "On the development of the production of prefabricated reinforced concrete structures. "

Decree "On the elimination of excesses in design and construction"

1956

XX Congress of the Communist Party.

In 15 years: each family's own apartment. Establishment of the first "Khrushchevkas" in Moscow.

1960

A most productive year

82.8 million m^2 living space put into operation.

1980's

290 million m2 of living space built. 'Khrushchevkas' amount to 10% of all residential houses in USSR.

Panel construction was further developed and left a main building technology until the end of the 20th century.

About three quarters of the urban population of Ukraine lives in high-rise apartment buildings, which is about 80% of the total population.

This statistics dates back to the time of Khrushchev, who has set a course for the rapid mass construction of housing. The program was very successful, never before in the history of Soviet Union in such a short time (20-30 years) had such a massive relocation of people to individual housing occurred. But today, after 50 years, tiny rooms, the lack of elevators and combined bathrooms are not the only “Khrushchevka’s” shortcomings: thin exterior and interior walls, as a result -low noise and thermal insulation, freezing and penetration of joints between panels, leaking roofs, low energy efficiency significantly complicate the explutation of houses.

Low standards and the quality of construction work are associated with the projected life time of most series of 50 years (the first K-7 series was designed for 25, and brick series for 100 years of explutation). Nevertheless, many experts are inclined to believe that the limitations on the operating life are rather ideological in nature — a significant improvement in life should be found in the near future, and the population would no longer have to live in “Khrushchevka’s” apartments. In fact, the deterioration of certain series is only 35-40 percent, this relate primarily to the deterioration of communications, and less to the construction of the buildings. Thus, after major repairs, the service term can be increased by more than 2 times. Problem is, that such houses as the building itself are outdated morally. The urban environment formed by the panel areas does not meet modern requirements and standards of the present time and, in addition, creates hard social consequences.

Implementation of renovation programs in Moscow[31]

The construction of identical houses, the distribution of urban planning patterns on a large territory and clear zoning reflected the ideas of functionalism in urban planning, corresponded well enough with the tasks of the post-war period. Similar areas arose throughout the post-war world, but in the USSR that they achieved the greatest asceticism and economy and scale.

The practice of perimeter development of quarters with enclosed courtyards, which was usual for the previous period, was discontinued, and the practice of creating microdistricts spread.

In a modern city there should not be a mixture of different types of activities, it will become orderly, logical, planned. *[Rybchinsky 2015: 53]* This was one of the main principles of planning according to Le Corbusier. Indeed, in the early to mid-twentieth century, such a concept was very progressive: industrial zones were withdrawn from residential premises, squares and parks were located between houses, cars were goeing along wide avenues instead of narrow historical streets. But on the other hand, such a strict zoning complicates the development of the urban environment and limits its flexibility in being able to adapt to changing needs. The microdistrict development does not take into account the interests of an person and individual households, but immediately divides the urban space into distinctive zones with different functional purposes: a citizen comes here to spend the night and there - to work, here is a recreation area, and there is a motorway which serves for connection to the neighboring zone. Such a strict subordination of the urban environment to a specific scenario complicates its effective functioning and adaptation to the processes and way of life that have changed over time.

This is what is observed, because the city exists only in all its functional diversity, and such areas offer a very meager set of opportunities. Life in city is a huge number of other functions. And if all this is not the neighborhood, then the city dweller begins to experience serious discomfort.

To date, places for business and commerce have not been considered in the residential areas and in residential buildings, there was basically no premises for placement of infrastructure facilities either on the ground floors or in the outbuildings. As a result, there is no place for trade, services and small private business. If earlyer, when the districts were built, it didn't have any particular significance, nowadays it is in contradiction with the modern social structure, since the area is losing its attractiveness for both business and residents. In such areas there is almost no opportunity to either create jobs or get a service.
As a result, the necessary infrastructure elements, as a rule, open in temporary containers-stalls not suitable for this, randomly located along the main routes. They not only spoil the image of the city, but also cannot provide the costumers with the necessary quality and full functionality.
All this gives rise to inevitable «pendulum movements» around the city. In particular, the migration of urban population between home and work in the morning and evening creates a huge traffic flow, and as a result traffic jams, which increase the travel time to 1-2 hours. This is a huge loss of time and environmental costs.

And by the way, despite the long distances that have to be overcome, residents of such areas suffer from a lack of movement and lack of physical activity. Where the old quarter was crowded and compact, the microdistrict stretched for whole kilometers and it was difficult to walk on it.

It also turned out that the modernist idea of housing around gardens has failed. According to it, multi-storey houses of the same type were scattered across huge courtyards-parks - this was supposed to create a feeling of free space.
In fact, there was a huge amount of space, which instead of gardens eventually turned into giant wastelands, and with the increase in the number of private vehicles, it also became huge chaotic parking area. The land of the microdistrict is common and in the same time unowned. Panel houses are cheap, typical and monotonous. In large open spaces, a person does not feel comfortable and here it comes to another problem - huge territories that belong to no one contribute to the emergence of marginal layers of society.

Residents rarely walk in the surrounding area and prefer either to stay at home or, because of the lack of local alternatives, spend free time in the city center, coming home only for a night's rest. All this makes the territory not only unusable, but also uncontrollable. The circle closes when prosperous residents try to leave the place, and lower layers of society come to replace them. In this way the prerequisites for the formation of the "Ghetto" appear - an area with a unfortunate image and an appropriate society. Such places gravitate toward esolation from the surrounding areas. Now such areas are still not like ghettos, because the society is still mixed. But already in recent years, the processes of territorial demarcation between the rich and the poor have been noticeable. Such social segregation with the transformation of certain regions into real ghettos will only intensify in the future.

Another problem of the industrial standard development of residential microdistricts is the psychological impact on society. The "Khrushchka" is a crystallized form of a purely utilitarian consciousness, opposing the aesthetic understanding of architecture and the urban environment. Straight lines, right angles and monotony - this is an aggressive video environment. Such structures are also called "vampire houses". Maybe partly because of this, in the housing areas, where there are the most dull buildings of the same type,the crime is increasing year by year.They form a depressing habitat, which produces marginals and attracts strangers.

Of course, environment like this has a certain impact on behavioral attitudes of cityzens. It forms their total alienation and individualism in the worst sense. It doesn't facilitate communication between people - residents often do not even know their stairwell neighbors. The yards in such houses do not fulfill their main function of the space of socialization, but serve only as an intermediate zone between the apartment and the street.

The danger of a faceless, ascetic space was also understood by the creators. They tried to diversify the appearance of the houses. There were options with a different arrangement and design of balconies, entrances, windows. Widespread was the execution of staircase panels in the form of a pattern. Also, architects tried to use different panels, complicate the perception of the facade by defining volumes in different colors, and to decorate the side facades with mosaics. But all these actions, which could increase the diversity, were rarely implemented in practice due to the increase in labor costs and the excessive need to increase the production lines of precast various concrete elements. As a result-extremely monotonous, dull and visually depressing urban environment.

All in all, instead of planned "garden" cities, in practice we get extremely unlikely urban structures. Despite the relatively close location to the city center and the high price of land, real estate is depreciated and loses its investment attractiveness.
Of course, "Khrushchevka" solved the short-term task - millions of people moved from barracks and communal apartments to separate apartments, but after more than 50 years they need a complex revitalisation .The authorities of European countries quickly realized that in the long term, identical development creates huge problems and have already a big expirience in a field of mass housing transformation.

Attempts of "Khrushchevka" creators to diversify facades [34]

Typical courtyard in old pannel housing district

Chapter III

Analysis of Otradniy area

Kiev in **1945**

1961

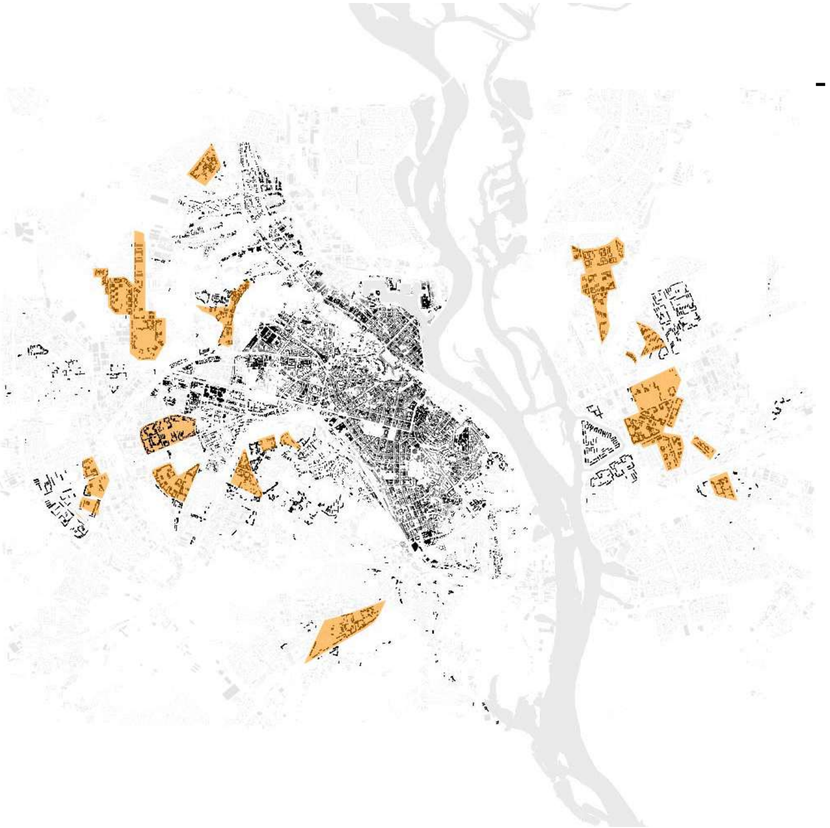
After the war, Kyiv was a city located in historical borders, formed in the 19th century.

Urban development ramped exclusively on the right bank and was surrounded by a large number of villages and hamlets on both sides of the Dnipro. They consisted mainly of individual low-rise buildings. Some of them were formed immediately after the war from temporary housing for workers, retired officers and disabled people of World War II.

With the coming to power of N. Khrushchev and the beginning of the construction reform, in 1949 a new master plan of Kiev was developed. The focus was on solving the housing problem by creation a new districts in vacant peripheral areas with identical five-story apartment buildings- "Khrushchovkas".

Thus, since 1957, from the fragmented construction of buildings in Kiev went to large-scale development of new districts. Construction in areas with existing buildings, including the city center, was small and local.

At this time the city started expanding on the both banks of the Dnipro river.



1970 ---------- **2000's** →

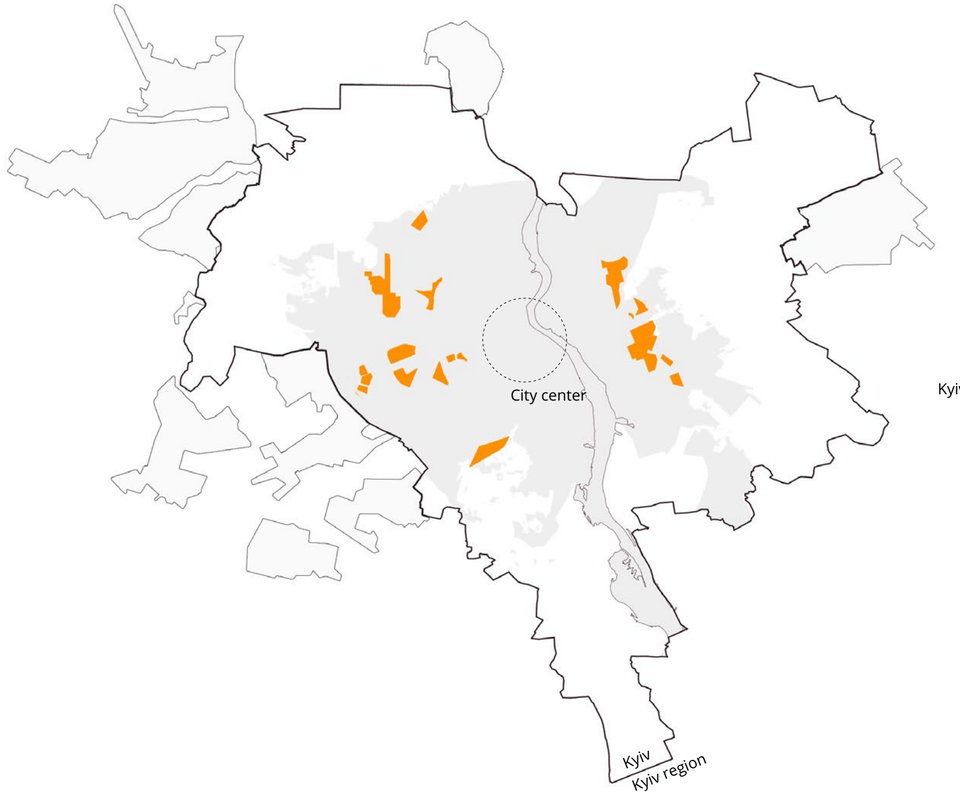
By the end of 60s, the formation of the first residential areas of Kiev, planned with the beginning of the construction reform, was almost finished. Rapid development was carried out due to the industrialization of construction and typification.

Increase in the number of city residents demanded further development of the program of mass housing construction in Kiev and elaboration of a new master plan of the city with determination new, free from development areas suitable for mass housing. The master plan of 1966 was a step towards the urban structure of modern Kiev. The formation of new housing arrays was envisaged, where new higher-rise buildings (9-16 floors) with improved planning were built. Such houses can be also found in five-story building areas of previous years.

By the beginning of the XXI century, Kiev had finally formed its structure and modern territory borders.

New urban areas appeared in the second half of the XX century, both during the USSR and independent Ukraine. The city expanded its territory in the southern, northern and western directions. Also, from the late 90's, small ground plots within the city that remained free were also intensely built up, as well as large areas previously not intended for housing.

Over time, the number of storeys and the type of houses changed: from 9 or 16 storey prefabricated panel houses of the 70's, to 20-30 storey reinforced concrete «skyscrapers» of the XXI century.



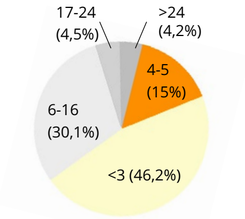
Kyiv's agglomeration

2020+

Today, the urban density in most areas has reached its boundary values. Since the number of residents is constantly growing, developers are forced to massively erect residential complexes on the periphery of the city and in satellite towns, which inevitably leads to pendulum movements of the population and the organization of the necessary infrastructure.

As a rule, such entities are located at a considerable distance from the business and social center of Kiev, but at the same time remain dependent on it. For this reason, high-quality, modern housing is losing its attractiveness, while earlier residential areas have a more territorially advantageous location, but cannot provide high standards of living due to moral and physical obsolescence. First of all, these are areas of the so-called Khrushchev's development. Such areas require reconstruction not only irrespectively, but also on a larger scale in the context of the rational use of land.

Storeys count of Kyiv's buildings*



Residential houses with a height of 5 floors, recognized as the most comfortable living, occupy only 15% of the total area of Kyiv. This are historical buildings and so called "Khrushchevkas" houses, because already in late 1960's started building of 9-storey residential houses and with the years the building's hight only increased. Architects never returned to the design of five-story houses. Low floor number distinguish Khrushchev 5-story building and gives good base for their further transformation into a qualitative housing space.

Built in 2019*

Amount of flats

Kyiv	17 353
Kyiv region	22 639

Total housing area (m^2)

Kyiv	1 113 986
Kyiv region	1 861 046

Avarage flat size (m^2)

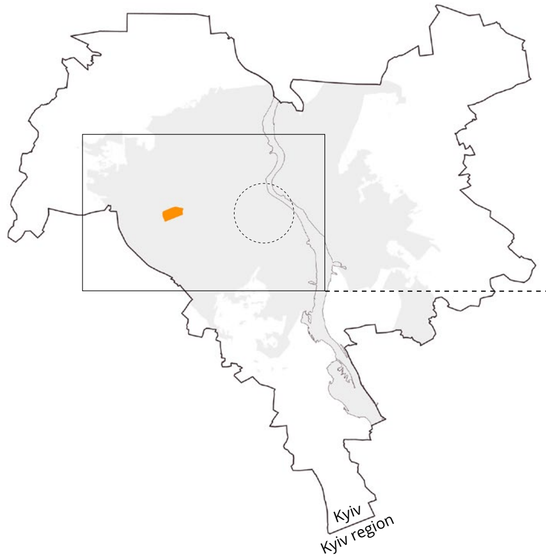
Kyiv	64,1
Kyiv region	82,1

**according to the data of misto LUN*

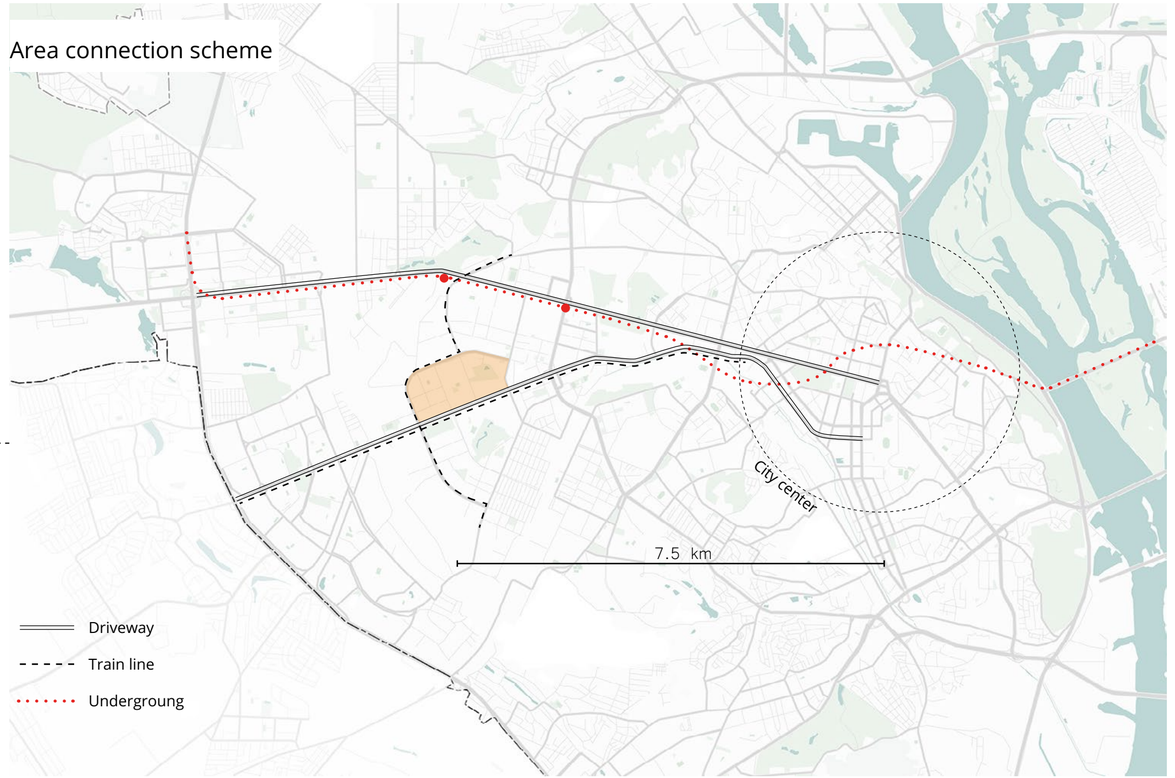
District analysis

Area location

Area Otradniy is the one among the big amount of Kiev's districts, which has been projected in late 50's. At that time it was situated on the border of city, but now located along the driveway, connecting intensely developing suburb, residential district Borshagivka and city center. Considering location of neighboring living zones the most important seems to be transport connection between them in east-west direction, which is dominating in this city part and is provided also by different kinds of public transport, such as speed-tram route and underground-line. Location of the Otradniy district on these ways is winning situation, enables not only access to center, but also engages people and creates opportunity for business, leisure and commercial service institutions between residential areas and city core.

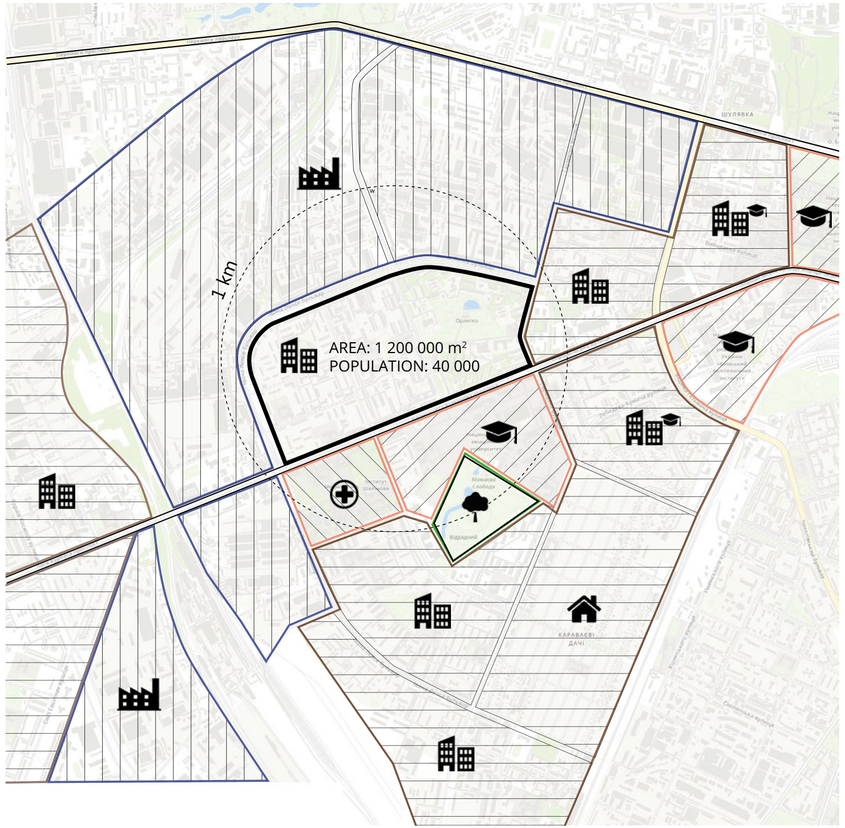


Area connection scheme



Neighborhood

- Residential area
- Residential area and student hostels
- University terrain
- Industrial zone
- Medical
- Park
- Privat housing



Basic functional scheme

- Residential area
- Education institutions area
- Social
- Park

- Religion
- Medical
- Educational
- Industrial
- Business

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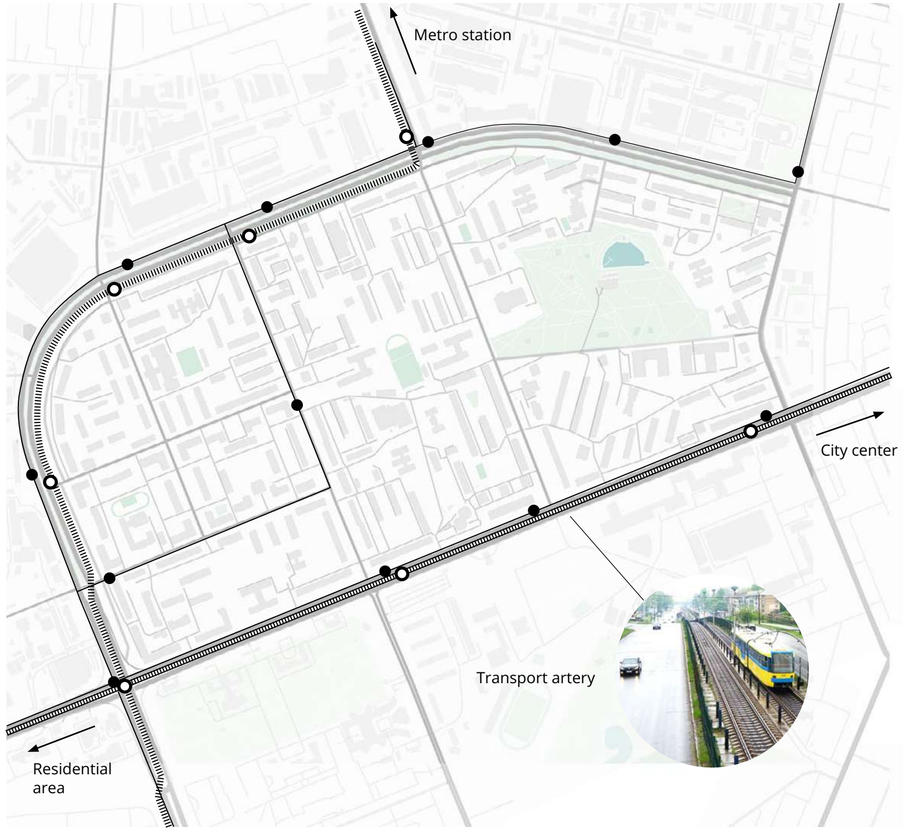
Road network scheme

Tram line / stop

Bus line / stop

Driveways

Minor roads



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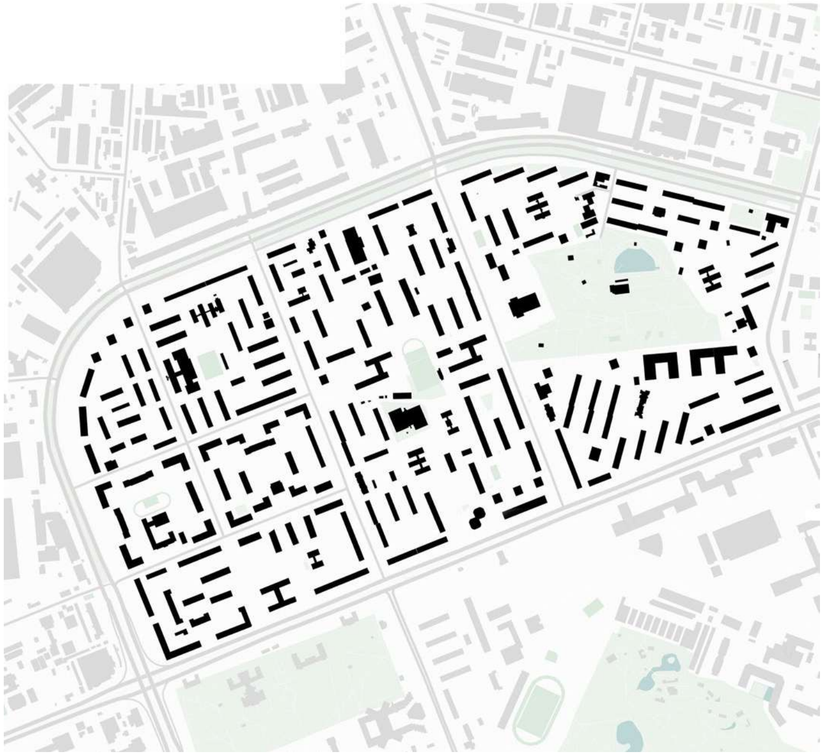
Area plan

The district is a fairly autonomous residential formation, surrounded on all sides by a road network. Other residential quarters adjoin it only from the east, while from the west and north there is a large industrial and warehouse zone, and from the south, the driveway and public functions areas- the national aviation university and hospital.



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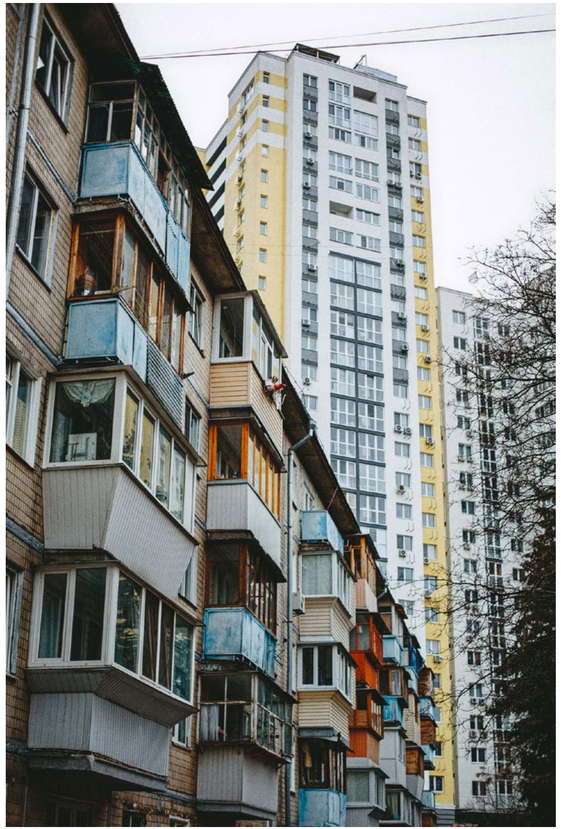

Contrast in building development of Otradniy [35]

Building development of the site

Since the district owes its appearance to the need for resettlement of workers of the neighboring industrial zone enterprises, a surge in construction fell on the foundation of the district in 1959-1965. This was a fundamental stage in the development of the region using precast concrete construction technology. Five-story “Khrushchevka” buildings began to be erected and with them kindergartens, schools and sports complexes. In subsequent years, the “Khrushcheka” buildings were supplemented by panel and brick 9 and 16-storey buildings of the 1970’s and 1980’s. And already in our time, in conditions of a lack of free territories for construction, the area was supplemented by several modern large residential complexes.

Thus, although it is an area of mass prefabricated construction of 60’s, its structure is complemented by the buildings of subsequent years and stages, which is in principle typical for large post-soviet developing cities.

Unresidential buildings

Small supermarkets located in separate standing buildings. They also serve for shops, administrative and commercial institutions.

2 floors

Kindergardens are situated in 2-storey brick buildings in every quarter of the area

2 floors

During the construction of the district, also a large number of infrastructure objects appeared, including educational-schools and kindergartens.

2-5 floors

Public buildings were usually built according to standard projects. They containe large-span spaces for sport or event-halls. In this case, they become a local dominants. Currently partly abandoned.

2-3 floors

Schema

The plan highlights unresidential buildings in a context of layers, relating to different purposes.

M 1:10 000

Housing types

1955	1960	1970	2000
			
“Stalinka”	“Khrushchevka”	“Brezhnevka”	Modern housing
By the beginning of district’s development, building reforms had been not fully implemented. Construction began with buildings of previus generation built of bricks, with spacious apartments and decorated facades, typical for stalinist architecture.	It is a district’s basic housing type. Their construction, as well as the formation of the district, was completed by 1966.	At the end of 60’s, construction switched to improved higher-rise residential housing. As “Khrushchevka” was basis for this project, building technology was the same.	These are modern multi-storey buildings constructed according to individual projects. For higher ground usage efficiency, they have maximal floor count. Often, a monolithic reinforced-concrete frame structure is used.
4-5 floors	5 floors	9-16 floors	16-24 floors

Schema

The plan shows residential buildings in a context of layers, relating to different periods of development of the area.

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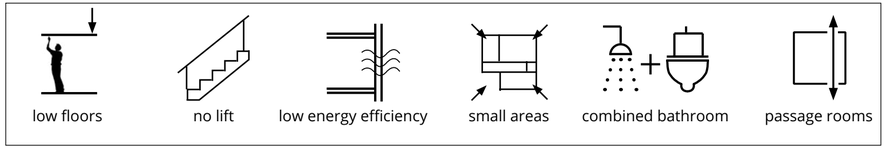
disadvantages



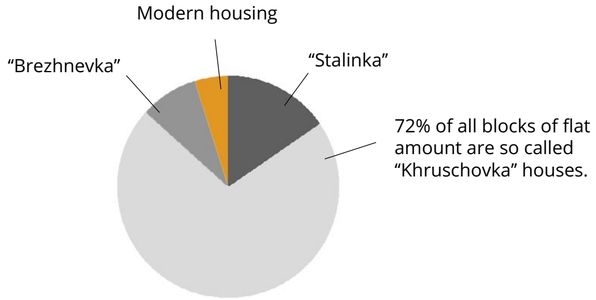
District's houses disadvantages comparison

"Khrushchka" forms the majority of houses in the district. They are characterized by a particularly low level of comfort for residents and the mismatch of living conditions with modern standards.

Tiny rooms, the lack of elevators and combined bathrooms are not the only ones. Thin external and internal walls, and as a result low noise and thermal isolation, freezing and penetration of joints between panels, roof leakage, low energy efficiency cause a problems during house exploitation.

That's why the rehabilitation of this residential building, as a part of the revitalisation of the Otradny district, will significantly improve living condirions in the most houses of the area.

Housing types fractions



Poor condition

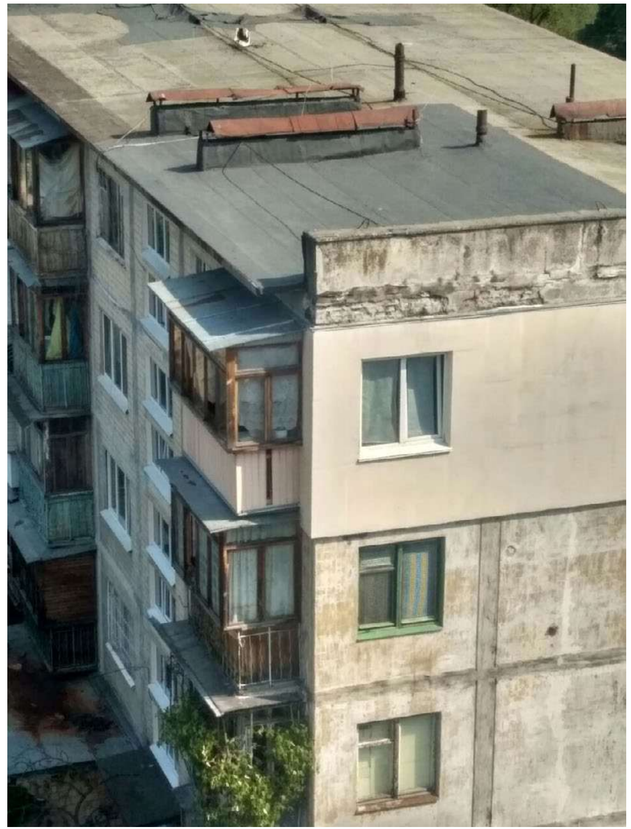
For a long time of operation - more than 50 years, work has never been carried out to support the state or condition of buildings. “Khrushchevkas” are in poor physical condition. With their neglected facades, they noticeably spoil the perception of the urban environment.

Extencions

Basically, mainly due to cramped apartments and insufficient area for local services, extensions were built to increase the area of apartments or to provide shops or other commercial services in them. These are often illegal. Design of them is not consistent with the appearance of the building- this adds the randomness and degrades the quality of the environment.

Accessability

During the construction of buildings in the middle of the last century, accessibility for people with special needs was not such an indispensable task for architects as it is today. For a number of reasons, “Khrushchevka” do not have elevators and is totaly not adapted for barrier-free access. Insecurity, lack of storage space are also characteristic of “Khrushchevka’s” entrances.



Physical performance

Although bearing structures still have a sufficient strength, the panels did not have sufficient physical indicators at the begin of operation, worsened over time. This applies primarily to thermal and noise isolation of walls, as well as the tightness of the roof. Thus, residents are forced to insulate walls and balconies, isolate panel seams on their own, which, moreover, creates chaos in the appearance of the house.

Life in district

Otradny is an old residential area on the western outskirts of Kiev, which was formed in the 1950s-1960s. First, a large industrial zone arose on the territory of the former farm, and a few years later, the first apartment buildings were built to the south of it. Mainly workers of the industrial zone received apartments here. This is how a small working class district with an orchard and a lake in the center, the remains of the Otradny village, was formed. Now, on the site of the garden, there is a green and beautiful park - a favorite vacation spot for local residents.
The National Aviation University and the Medical Center are nearby. Quiet green courtyards, parks and a direct tram to the city center are pleasant features of the area.




Seniors

Many retirees-former workers of the neighboring industrial zone got apartments from authorities in soviet times. Often apartments are inherited, hereby many neighbors known each other for years and have friendly relations.

Families

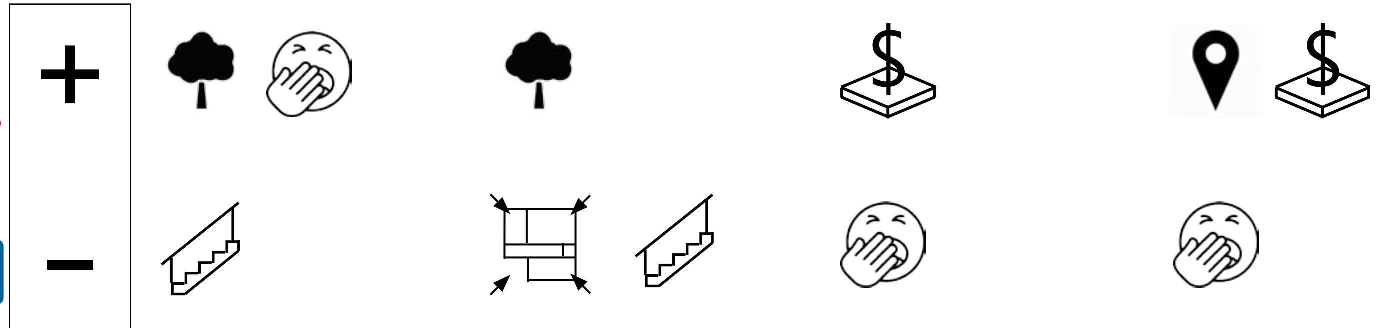
Families with children, as a rule, of low incomes living in the area have inherited apartments from the previous generation. They value living in the area because of the low pay, greenery and the abundance of kindergartens and schools within walking distance.

Couples

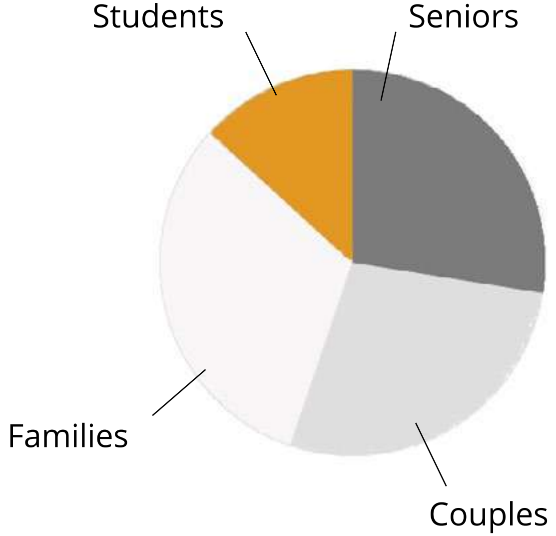
Small apartments for rent close to the city center are in demand in the Kyiv real estate market. Despite the known disadvantages, the above mentioned features attract young, working families due to the location and the cost of renting apartments.

Students

Due to the low cost of living and the nearby Kiev Aviation University and its hostels, a large area for residents of the area consists of students who rent apartments in "Khrushchevka" houses. These advantages greatly outweigh the known disadvantages.



Area's social groups fractions



Lively facade of «Khrushchevka» [36]

Courtyards

Courtyards are the fundamental part of social life in the area.

Having different spatial configurations, they are all one in one: many motorways and unused space. Originally conceived as gardens, now due to the disorganisation and lack of care - devastated and mostly non-functional rooms between the houses.

Such places are often used for car parking and dog walking, especially since there is no specific function for such places at all.

Gardening & handicraft

Decorating courtyard areas with plants and handiwork in garages is an integral part of courtyard life. The areas in front of the houses often turn into improvised gardens, in which the residents of the house, and especially those who live on the ground floors, are happy to plant flowers.

In practice, garages serve not only for storing cars, but also as workshops. For the older generation, this is one of the few activities that they can do in free time outside the flat. Such hobbies have a positive effect on establishing contacts and add new meanings to the everyday life of seniors.

Upgrade

Since the local authorities
are not involved in improving
the area, residents try to
solve the shortcomings
of the surrounding space
themselves. Particularly socially
active of them, on their own,
equip places for recreation,
playgrounds and gardens in the
yards. On the one hand, this
gives everyone the opportunity
to make their own contribution
to the arrangement of the
yards, and on the other, it
is of poor quality, since the
furnishings of the territory are
the business of professionals.

One day on the bench

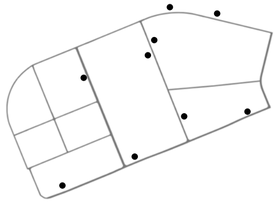
Small business & trading

There are no large supermarkets and specialty stores on Otradniy, so residents need to travel to other areas for substantial purchases.
Everyday grocery shopping can be done in several supermarkets.

Small shops are located in extensions, basements of houses or in separate temporary structures, located throughout the area, especially along pedestrian routes and next to public transport stops.

Homemade products can often be bought from visiting villagers or local residents right on the street. Unregulated spontaneous trade is an integral part of the district's life.

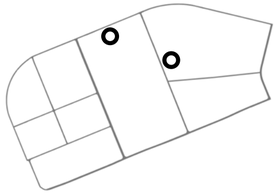
Gastronomy and service establishments are often located in basements and diverse chaotic extensions to houses. Manicurists and hairdressers often provide services right at home.



Ruined fountain on the central square next to the palace of culture

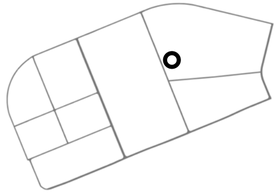
Abondement

Unfortunately, there is almost no cultural and social life in the area, and two of the three public buildings originally intended for performances, gatherings and events are in an abandoned state. These buildings have a central planning position and their neglected state leaves a negative impression on the perception of the entire area.



Palace of culture

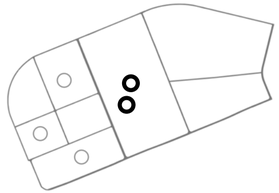
In fact, the only cultural institution in the area was the Korolov palace of culture, with an area of 5727.2 sq.m. In connection with its functional purpose, it occupies a territorially central position in the district and has a large square infront. In the past, it has hosted various performances - it is equipped with a hall for 1200 people and various auxiliary rooms, including the necessary engineering structures. Currently closed. His condition is characterized as neglected due to lack of maintenance and rare exploitation and, as it were, characterizes the general situation in the area.



Sport

The sports infrastructure is well developed in the district. There are gyms, public sports fields, indoor sports halls designed for various types of sports activities. There are a lot of sports and dance schools for children and adults.

In the heart of the area is the sport complex. A large number of sports activities and entertainment are concentrated here. It provides a ton of opportunities for those who love a healthy lifestyle, such as fitness club, spa, massage, solarium, etc. There are two large halls for sports and dance competitions and events.



Painting outdoors

Residents of the area on a picnic

Thematic meetings at the local library

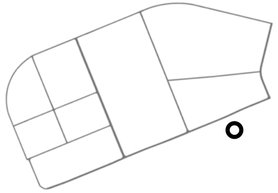
Event in the sports hall of the complex

Pensioner for their typical occupation - chatting on the bench

Boating on the pond in the park

Education

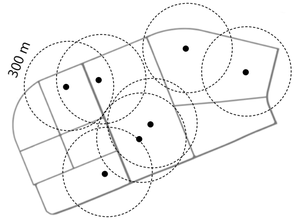
Otradny is a good choise for families with children. A large number of kindergartens and schools are located on its territory.
There are also many students on Otradnoye who come to study at the National Aviation University and live in student hostels in neighboring areas. The university has a sports complex and a park. Students spend time there after classes and during breaks.



Occupancy diagram of schools in Kyiv,grading from 20 to 40 pupils in class.

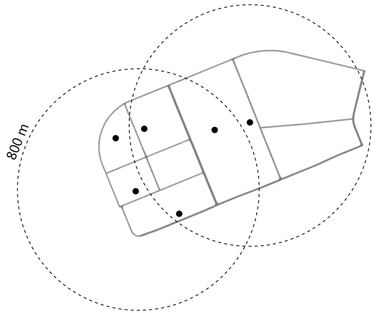
Children

There are 7 kindergartens on the territory of the district, and their radius of accessibility covers almost the entire territory. The buildings are in satisfactory condition, although they need more maintenance. The workload of these educational institutions is below the average for Kyiv.



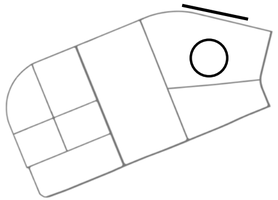
Pupils

The area is gratifying with a sufficient number of places in local schools, and the accessibility radius of 800 meters, according to the standards, covers the entire territory. In 5 schools in the district, the average number of pupils in the lower grades is 25-30, which is an acceptable average for the city. School buildings were built without the use of panel building technology and are generally in a good condition, but some of them require renovation of the external and internal finishing. School grounds need significant improvement.



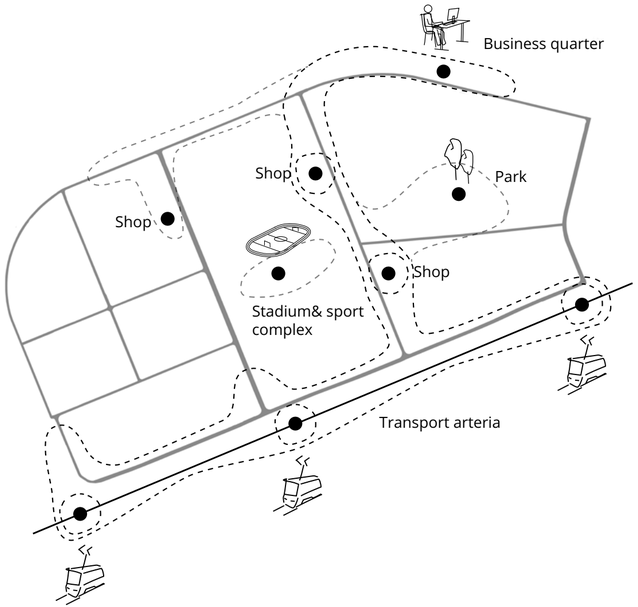
Large urban formations

«Orlyatko» Park has been recently reconstructed and is a large modern recreational area with a pond and restaurant complex. It is an important facility for local residents for an outdoor relaxation and open air activities.



Given the lack of business life in the region, the only place of such activity is a series of business centers along the Václav Havel boulevard, bordering the region from the north.

Main areas of district's activity



District from the bird's view

Resume. Strategy of urban transformation

Functional scheme

Residential area

Education institutions area

Social

Park

- Religion
- Medical
- University
- Industrial
- Business
- Sports center
- Supermarket
- Abandoned

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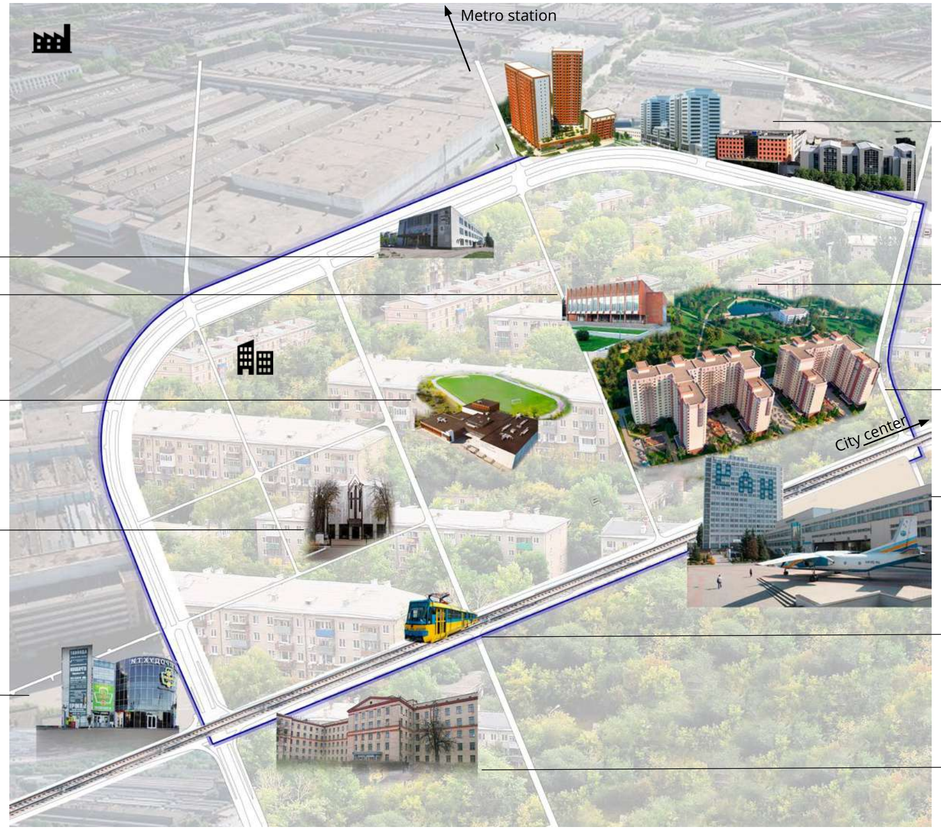


Public buildings, not in use at the moment

Sport center, sports events hall

Evangelical charch

Shopping center

The business core.

The park is the main recreational formation of the area.

Modern residential complex

National Aviation University

Speed train line

Multidisciplinary hospital complex

In the process of area's research, a certain image and a system of main objects and zones was formed, creating a portrait, a picture of the area. Their functional completeness characterizes the area and the types of activities that it offers to the residents. Several new residential complexes, primarily due to their height and appearance, contrast with the other buildings. From a global perspective, there are industrial area in the north and the university and hospital complexes in the south. The district itself is a residential formation, almost entirely consisting of «Khrushchevka» houses.

Advantages and weaknesses of Otradniy area

Conducting a complex analysis of the «Otradny» residential area, it is clear that it is a typical one of the post-sovietresidential areas. Designed for the living of the average soviet «working class» of the middle of the XX century, it does not meet modern requirements, although it certainly has its own strengths along with the typical shortcomings of the area of mass typical development.

+

The location of the area, although not central, is quite suitable for living area and provides a fairly good connection to the city center.

Right building's scale and they proportions to free space.

General greenness of the courtyards and the presence of public green areas within walking distance.

Well developed educational infrastructure.

Sport activity's diversity.

−

There are almost no cultural and entertainment establishments on Otradniy and its neighborhood.

The colossal lack of space for business and commerce.

General abandonment, lack of care and programs for organizing yard and street space.

Monotonous, physically and morally obsolete residential houses.

Goals

In connection with the outlined disadvantages and taking into account the positive lines, project tasks are formed, which are characterized by the following theses:

✓

Creation of conditions for development of business, cultural and entertaining establishments.

Concept development and programming of free space.

Development of a project for the reconstruction of Hrushchevka. residential buildings

Adherence to the principle of diversity with every task, adapting the urban environment to modern requirements and trends.

Potentials

Public buildings that are not in proper use can become a new attraction points.

Newly recunstructed park with lake and lot's of accompanying functions and activities.

Due to width and location of Mykola Vasylenko and Watswala Gavela streets, they have a potential that is currently not being used.

80 m.

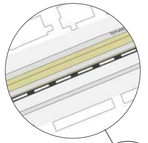
55 m.

Central places in almost in every quarter, now defined by stadiums, can be evolved into places for outdoor leisure and activity.

Location of the district on an important urban path between the center and residential areas creates the conditions and flow of customers for business and services development.

Big unused areas create opportunities.

Challenges



Irrational organization of traffic and park alley on the Wacwala Gavela street.

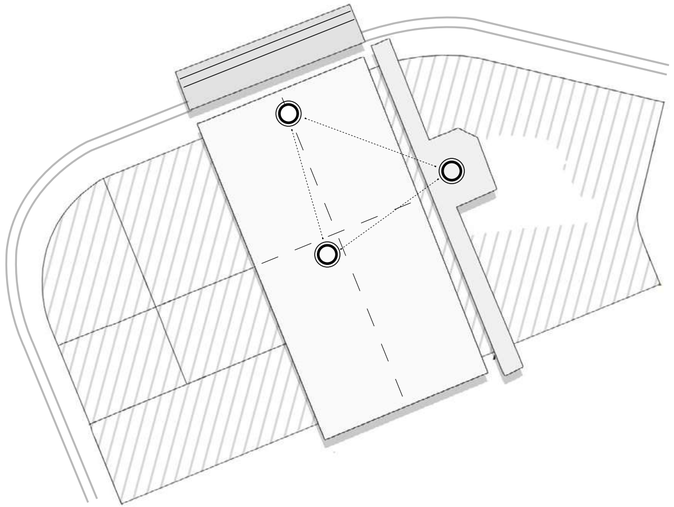
Dense network of minor roads and parkings in living areas.

Renovation of «khrushchevka» - 73% of the district's buildings.

Providing an alternative for trading stalls and place for services.

Unauthorized buildings and garages in the courtyards

Urban subdivision & revitalisation strategy



Residential area

Restriction of minor roads within urban subdivisions and quarters, using existing axes and streets as a framework for the development of space. Elaboration of yard spaces concept. Reconstruction of Khrushcheovka houses, arrangement of additional functions and services in ground floors.

Semi-residential

Division of a continuous residential microdistrict into smaller quarters. Restriction of driveways and their removal outside the yard.

Revitalisation of existing public buildings and their role as community centers. Spatial formation of the environment considering their space forming role and the connections between them.

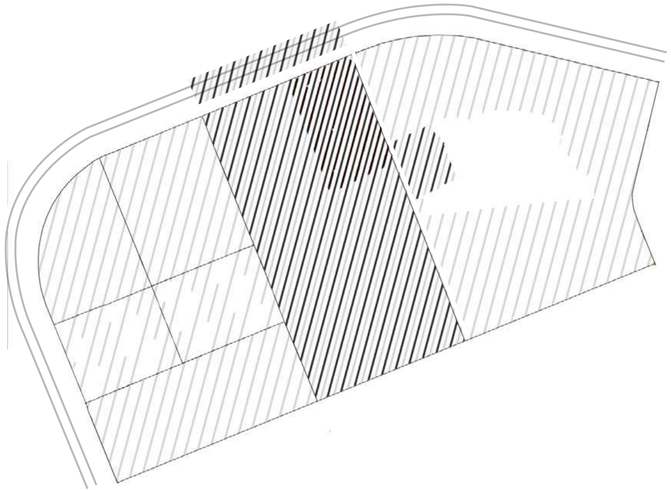
Boulevard

Transformation of Mykola Vasylenko Street into the central street of the district due to its location and configuration. Reconstruction of the square with a public building. Functional filling of free space and organization of premises for various purposes.

Transport magistral

Reorganization of transport lines on Watswala Gavela street, a shift in direction from residential buildings and the release of free space for further usage.

Preciseness definition setup



Project affection area

-Conceptual proposals for development and reconstruction. General layout of the territory.

Detalisation area

- Detailed development of proposals ,specific planning solutions for the renovation for concrete urban areas of various types.

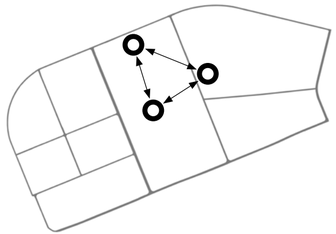
High detalistion area

-Revitalisation of residential house group in focus, rearrangement of yard space.

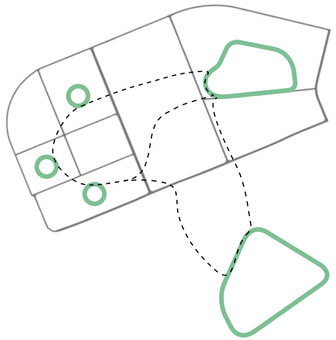
-Universal project of «Khrushchevka» reconstruction.

Chapter IV
Revitalisation project

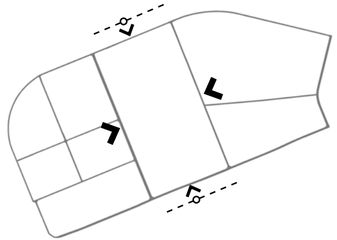
Concept development



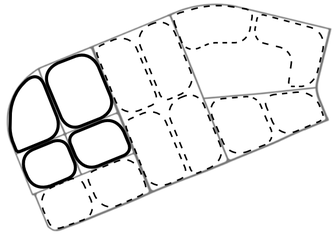
Visual and connectional correlation of three main community centers



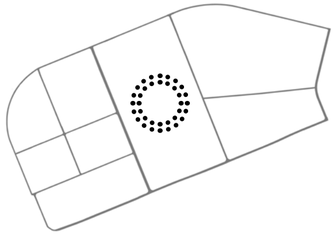
Activation of recreational points in western part of district and creation of green zone's network including neighboring park.



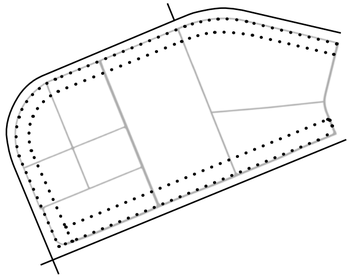
Middle block as communication center of the district.



Subdivision of continiuos monoton blocks in smaller quarters.



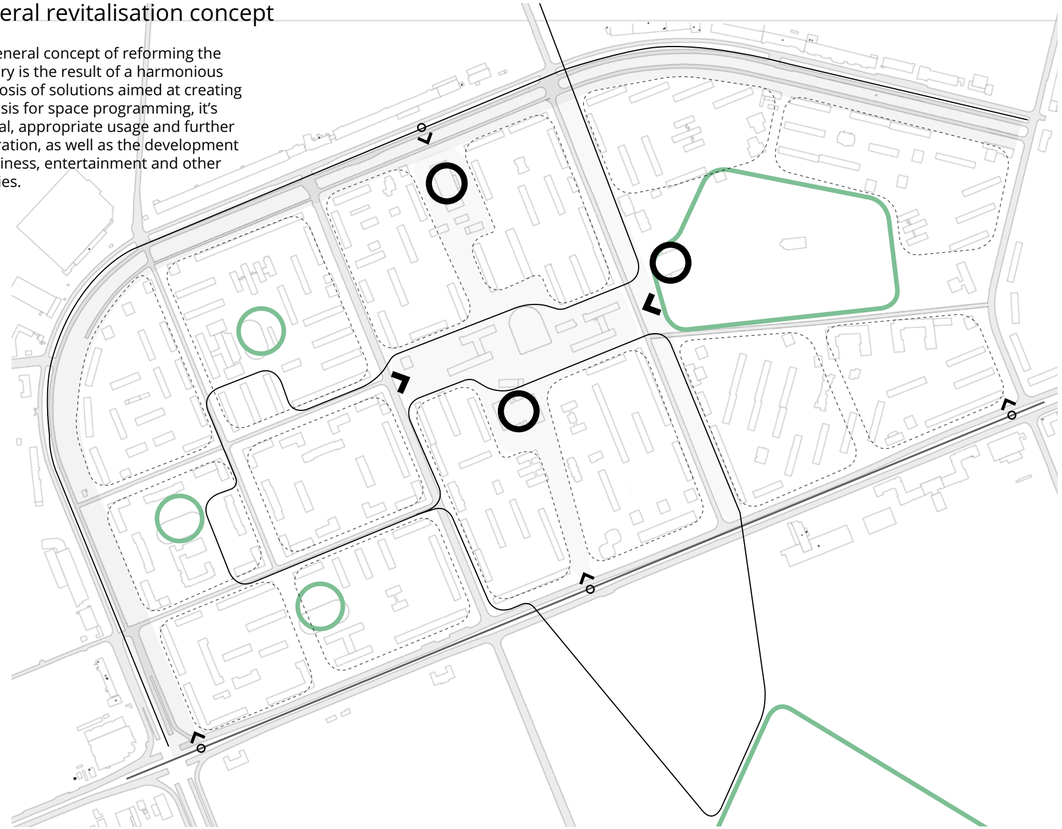
Potential of the central quarter to become a public center of the district.



A busy traffic on the roads along district's borders encourages commercial development on border areas.

General revitalisation concept

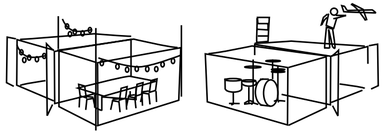
The general concept of reforming the territory is the result of a harmonious sembiosis of solutions aimed at creating the basis for space programming, it's rational, appropriate usage and further elaboration, as well as the development of business, entertainment and other activities.



Free space functional programming

In programming and developing the concept of free space, the principle of diversity, intensive use of the territory and communication outside of own apartment has a great influence.
The completeness of the function for people of different ages and interests is provided by a large amount of infrastructure for various types of activities, spread into different areas. The amount of such activities provide functional diversity and create a «palette» wich is the instrument of free space programming of the district. The elements are sorted in 4 main groups such as sport, communication, institution and different kinds of activities.

Taking into account the fact that gardening and handicraft in garages was already a certain hobby in this area and covered the need of free time spending mainly of the older generation, it was decided to preserve them and to continue promoting opportunities for such pastime. And although garages no longer serve for storing cars, their transformation and further use as workshops will preserve the special flavor of the area and will facilitate the communication of schoolchildren, middle-aged people and pensioners in pursuing their hobbies.



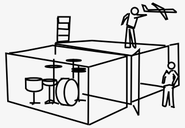
Former garages used as workshops and party rooms

Gardening zones preserved in yard spaces as a hobby of seniors

Activity

Playgrounds

Places for dog walking



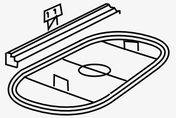
Leisure spaces/ workshops

Skate park

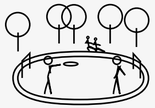
Street art area

Sport

Sports complex



Stadium



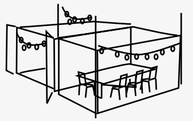
Outdoors activity

Climbing area

Sportsground

Communication

Garden



Community spaces

Relax zone

Gastronomy

Grill zone

Institution

Concert hall / theater

Educational center

Entertainment

Services / Trade

Office/Coworking

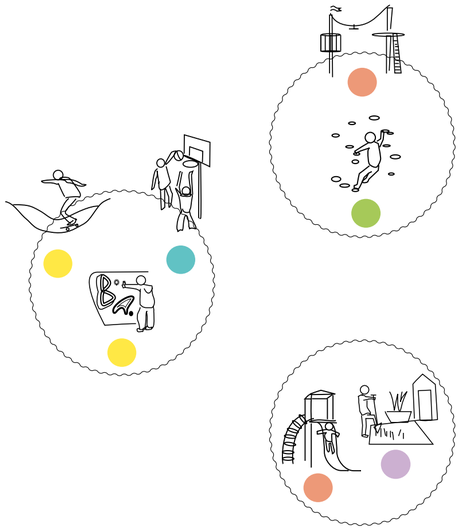
Basic functional content of public spaces and newly formed structures scheme

Combining several functions helps reaching a specific atmosphere of every single part of the area, helps communication between peers and people of different ages and unite like-minded people in common spending of their free time in everyday life.

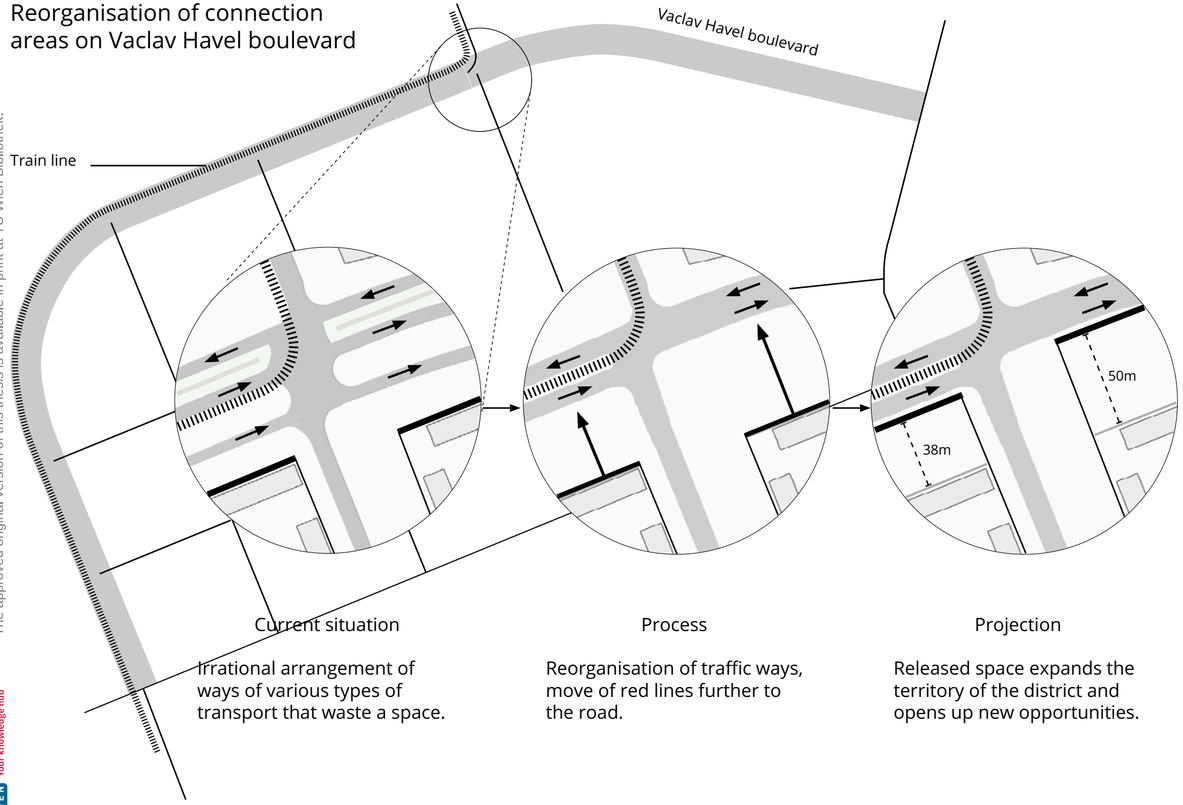
Thus, the combination of a playground and a garden creates a village atmosphere where it is convenient for the older generation to look after the grandchildren who play on the playground or in the garden. At the same time, each side does its own thing.

The combination of climbing with playgrounds for older children creates a children's area with different types of activities.

A basketball court near the skatepark and outdoor art space and garages create an atmosphere that high school and college students alike love. This interchangeability of images of the urban space helps to break the monotony of the area.



Reorganisation of connection areas on Vaclav Havel boulevard



Current situation

Irrational arrangement of ways of various types of transport that waste a space.

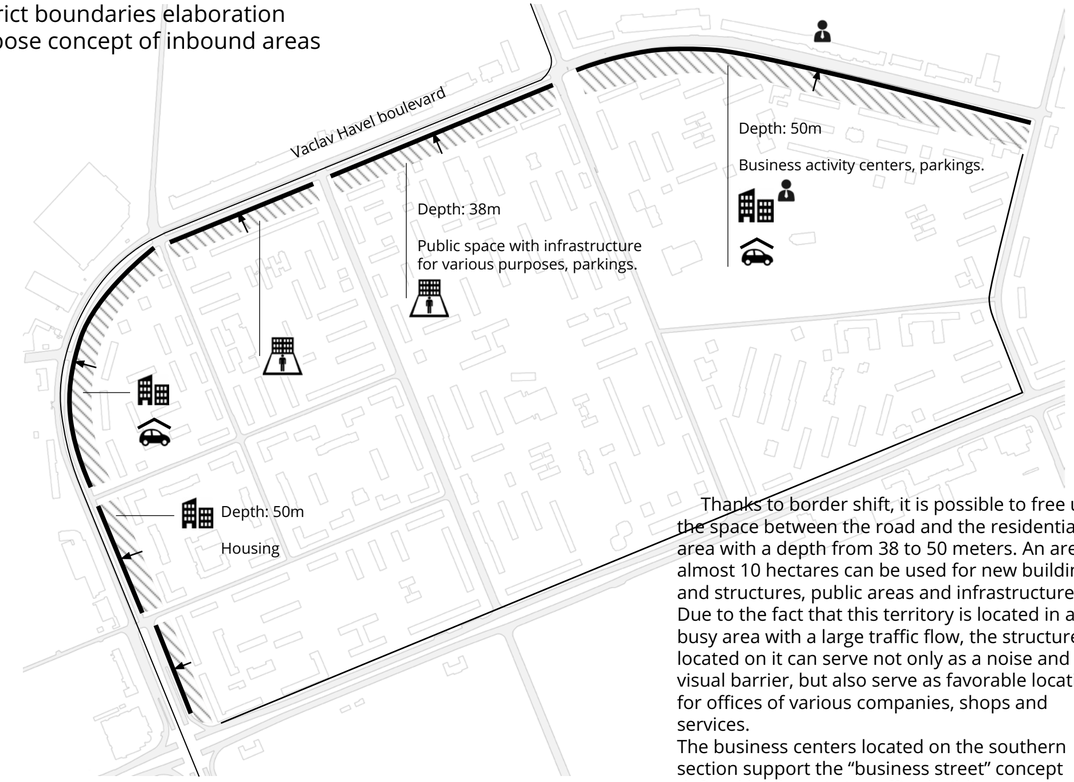
Process

Reorganisation of traffic ways, move of red lines further to the road.

Projection

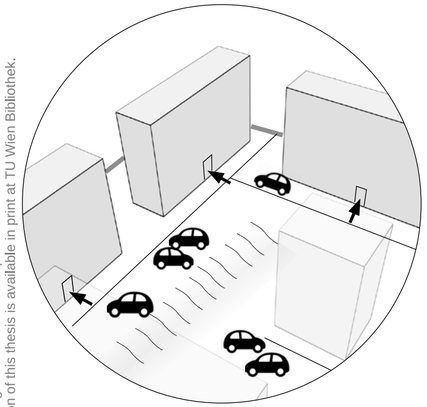
Released space expands the territory of the district and opens up new opportunities.

District boundaries elaboration
Purpose concept of inbound areas



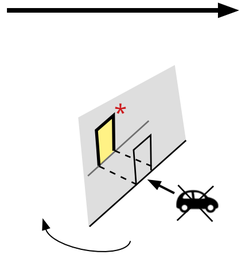
Thanks to border shift, it is possible to free up the space between the road and the residential area with a depth from 38 to 50 meters. An area of almost 10 hectares can be used for new buildings and structures, public areas and infrastructure.
Due to the fact that this territory is located in a busy area with a large traffic flow, the structures located on it can serve not only as a noise and visual barrier, but also serve as favorable locations for offices of various companies, shops and services.
The business centers located on the southern section support the “business street” concept defined by the existing office buildings across the Vaclav Havel boulevard.

Semi-privat space- courtyard

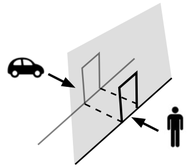


The current state

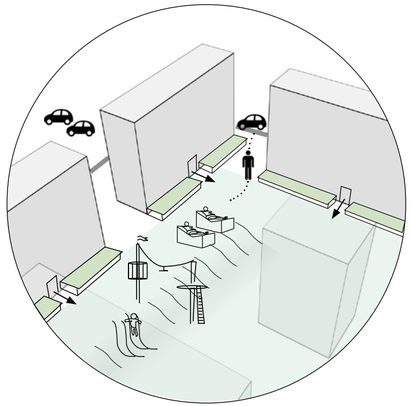
Yard space is primarly used for minor roads and car parkings. They are unsafe for children and generally highly-urbanised uncomfortable place.



Restriction of vehicle movement inside the cortyard.
Creation of a new entrance to the house from the road for car users.

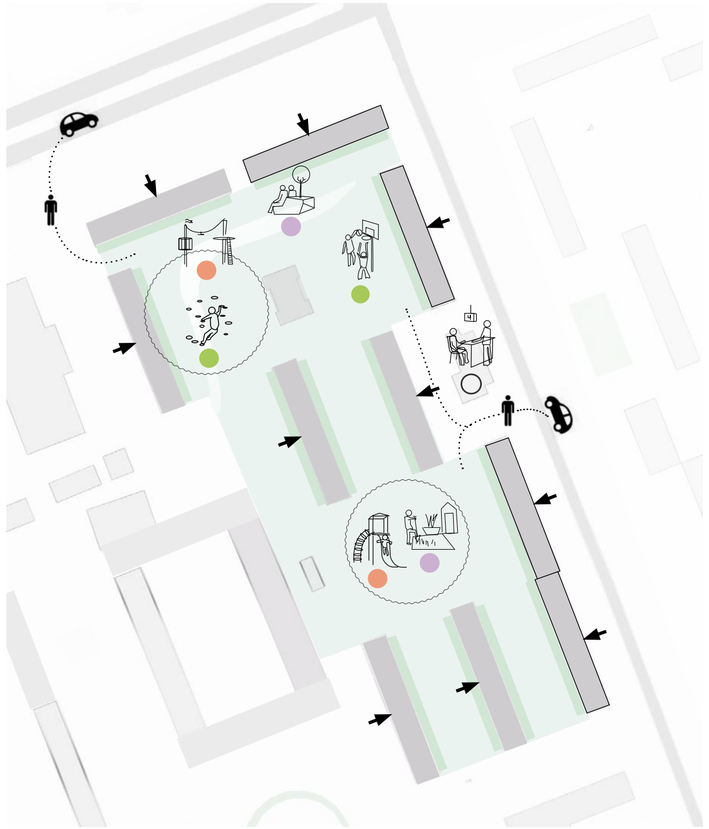


Use a existing cortyard entrance only for pedastrians and bicycles.

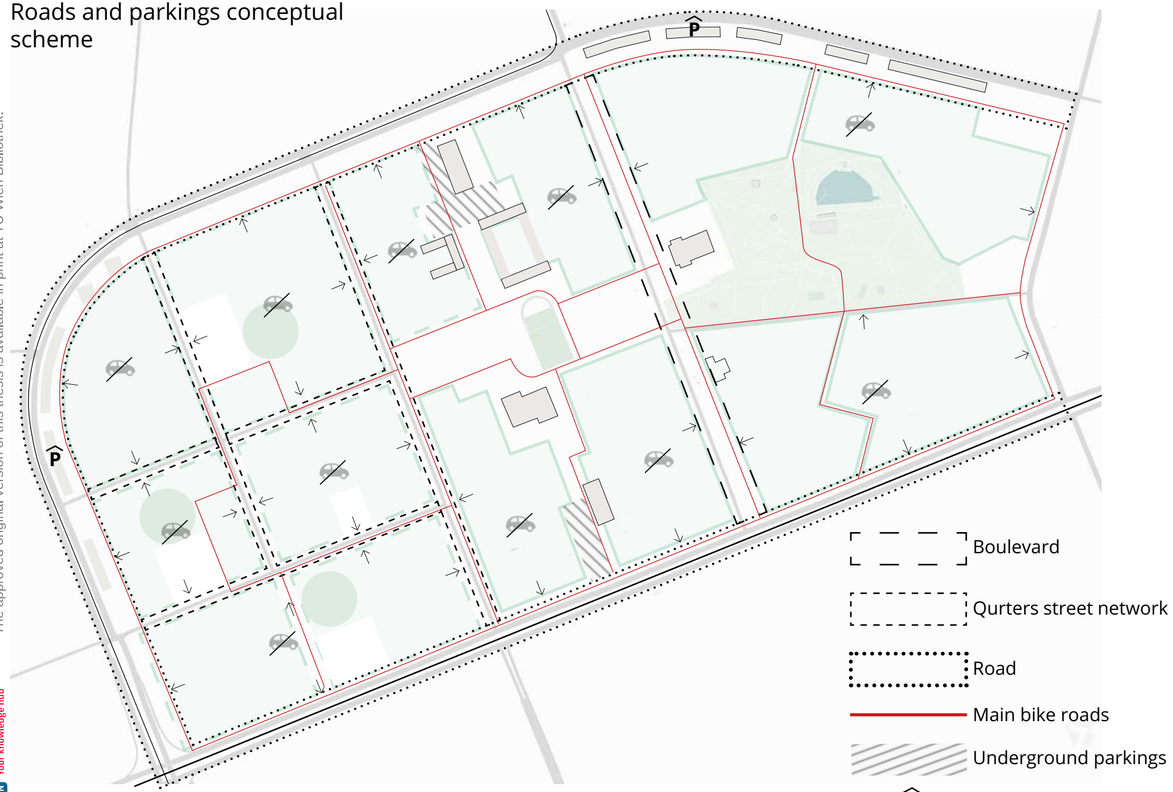


Projection

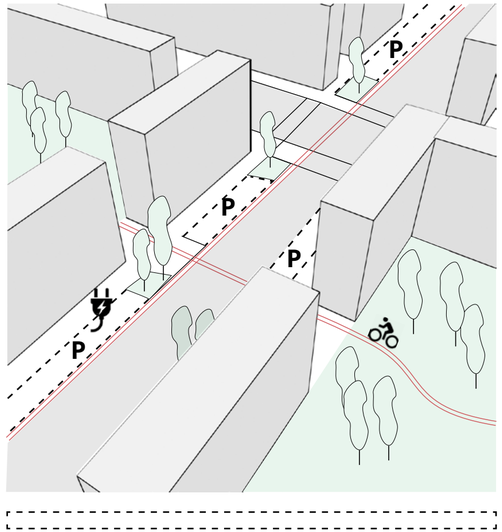
Green, vehicle-free, human-orinted courtyard zone for both activ and calm relaxation. Significant elevation differences found in the courtyards help in the arrangement of infrastructure and landscaping elements. The free place in front of the houses emerging due to the elimination of roads is used for private terraces.



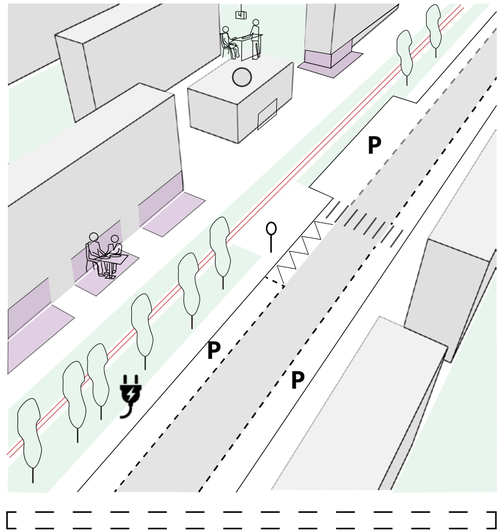
Roads and parkings conceptual scheme



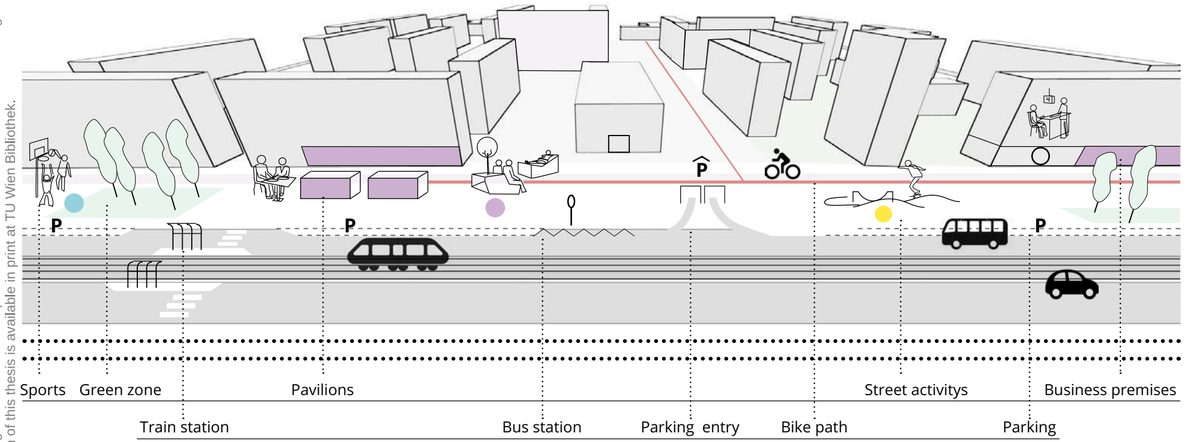
Connectional areas



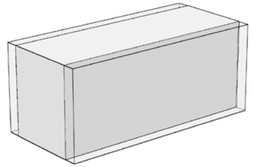
Qurters street network



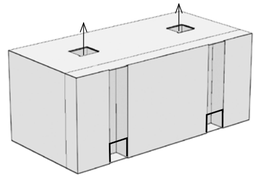
Boulevard



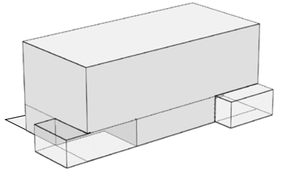
Road



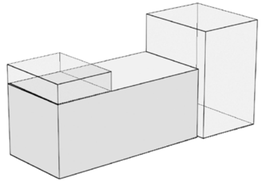
Increase in areas due to the facade expansion



Arrangement of an additional entrance and an elevator



Providing ground floor activities



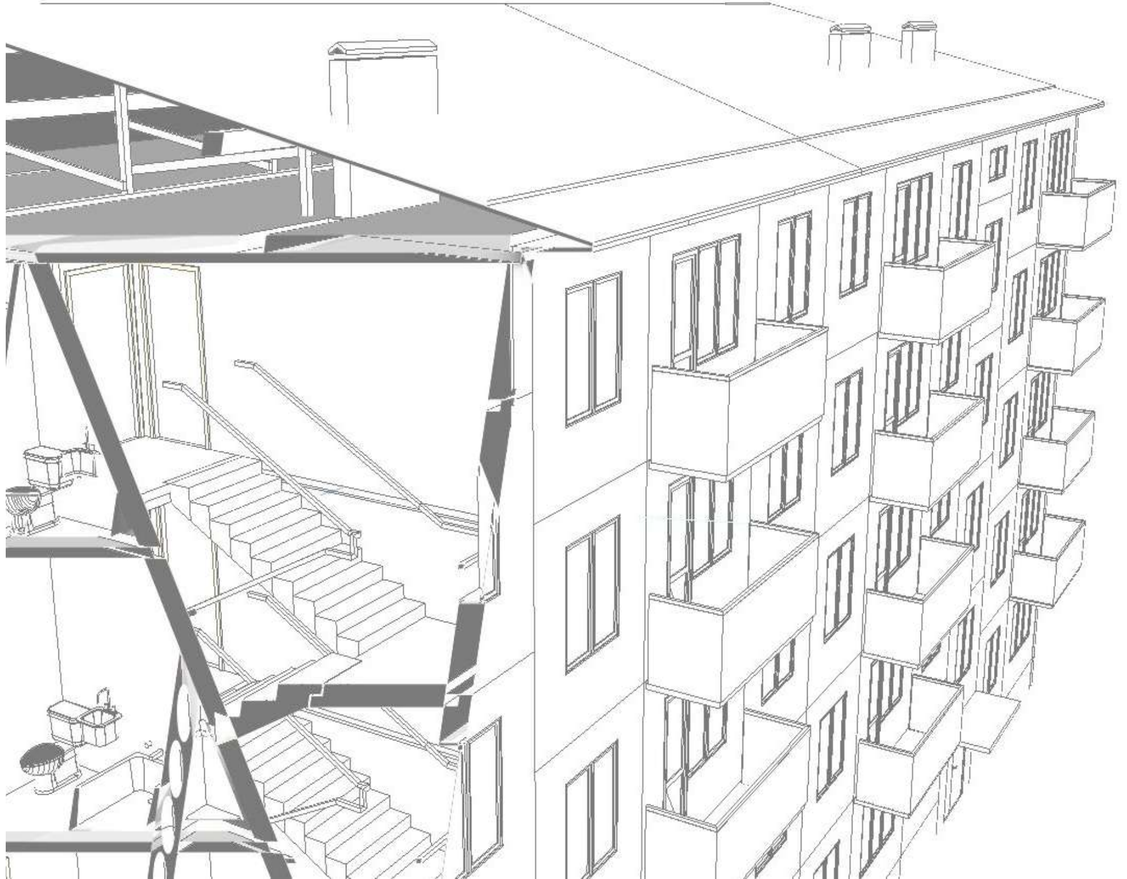
Extension of new volumes for housing and commerce

Housing

One of the key tasks of the reconstruction of the district is the renovation of the “Khrushchevka” - integration of old housing into the general concept of the development of the district, taking into account the principle of diversity both for the various purposes of the ground floors of buildings, and for the appearance and various extensions and superstructures. They are designed to enrich the typology and planning solutions of housing, volumetric plastic and increase the amount of commercial and residential space.

In addition, during the renovation, steps are taken to improve the comfort of living - equipping with an additional spacious entrance group, an elevator, storage spaces, privat terarces and communal spaces on the roof.

«Khrushchevka» reconstruction

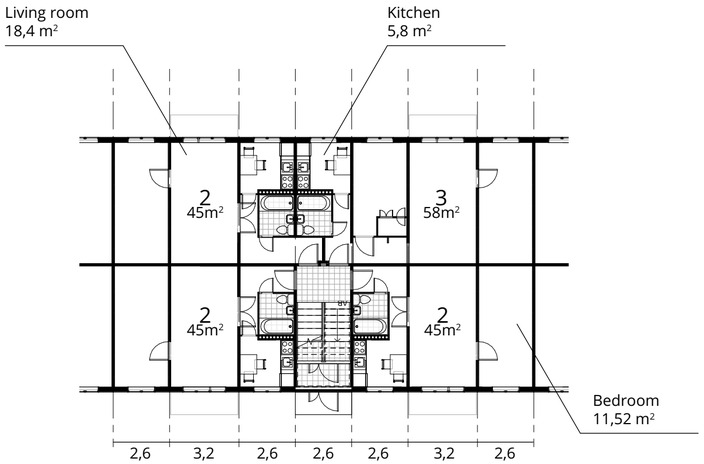


Serie 1-464

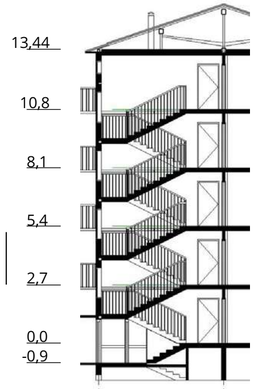
The all-Union series of panel «Khrushchevka», built throughout the USSR from the late 1950s to the 1970s, makes up the majority of the district's residential buildings.The structural basis of the 1-464 serie is a cross-wall carring system, which on one side increases the strength of the building and at the same time complicates the reconstruction since all walls except for small partitions are load-bearing.

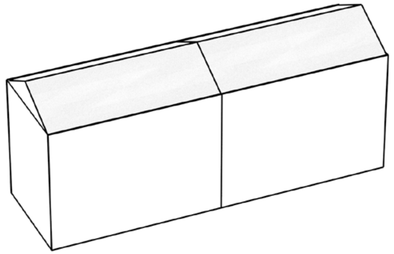
Fasade
1:250

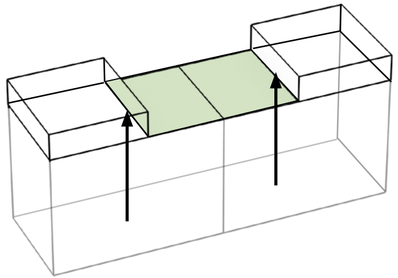
left-end block | middle block | right-end block



Typical floor plan
1:200







Demolishing of an old roofing allows to create a new housetop formations. Roof extensions and terraces bring a several absolutely new qualities into existing buildings:

-penthouse apartments and common premises in extensions

-terraces for house inhabitants

-multilevel and multiplicity of housetop silhouette.

Roof structures are located in such a way that the terrace is common to two adjacent blocks and can be accessed from both of them.

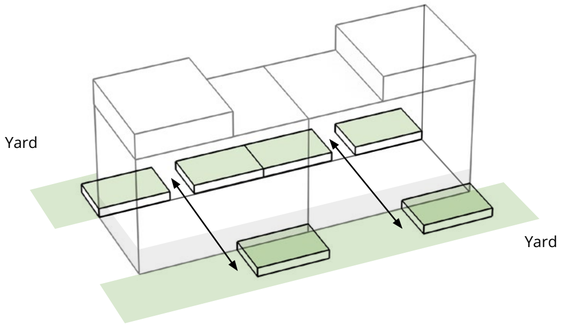
Logic of units merging

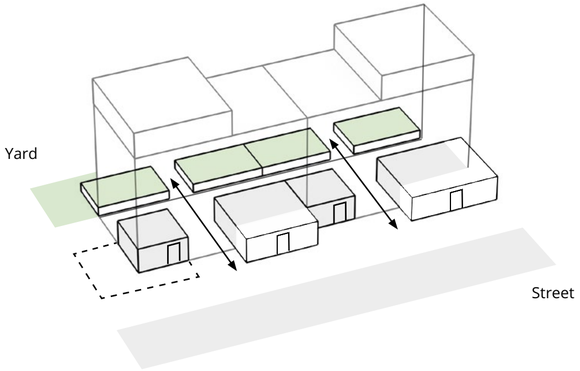
Initially series 1-464 consists of start and end blocks, as well as a different number of identical middle blocks.

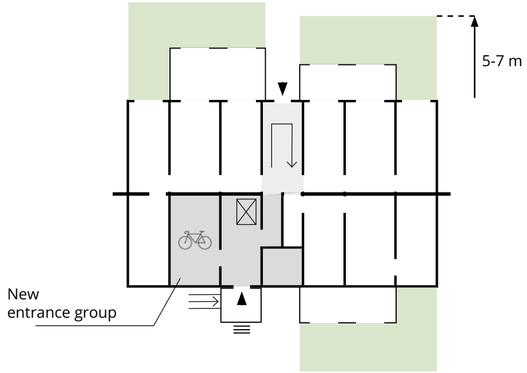
The reconstructed units are connected in such a way that the pair forms a common large terrace and premises, access to which is provided from both staircases. To enable such merging, there are 2 options for reconstructing the attic floor for the middle and rightmost section, which also brings a certain variety of reconstruction.

Depending on where the house to be reconstructed is located, new functions are envisaged on the ground floors. In houses located along the roads, instead of apartments on the street side, rental premises for various activities, such as trade, services, coworking, small gastronomy, etc. are being developed.

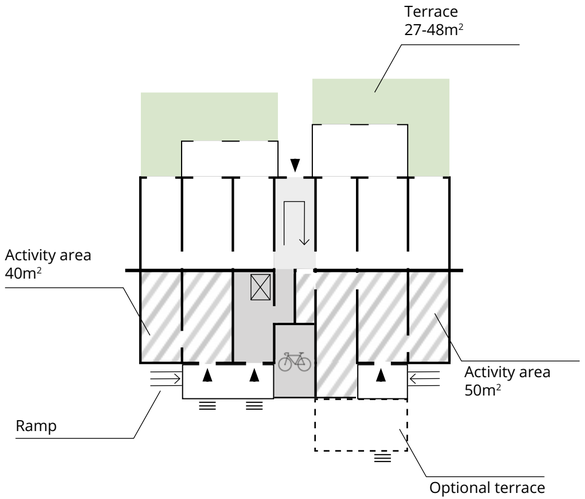
Apartments on the inner side of such a house, as well as houses located in the depths of the quarters, receive private terraces for ground floors inhabitants.

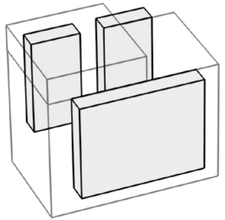


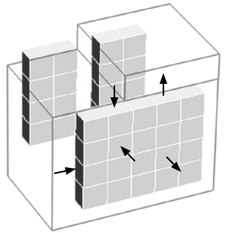


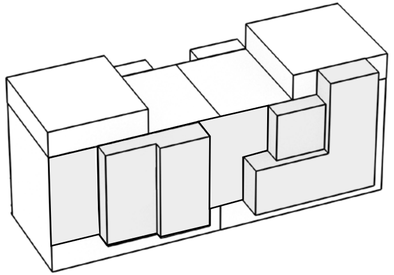


As part of the reconstruction of the first floor, a through passage with a new entrance group is being organized. Each entrance is equipped with an elevator and a ramp for wheelchair access and storage space for bicycles and carriages.





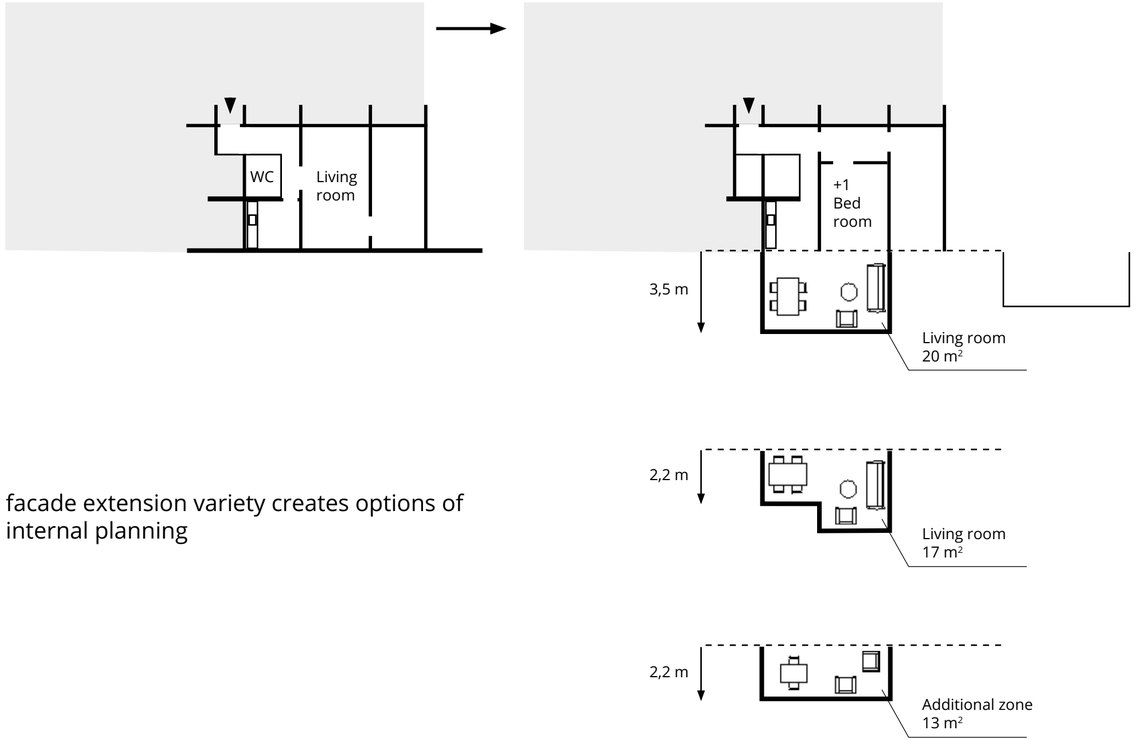




Facade transformation

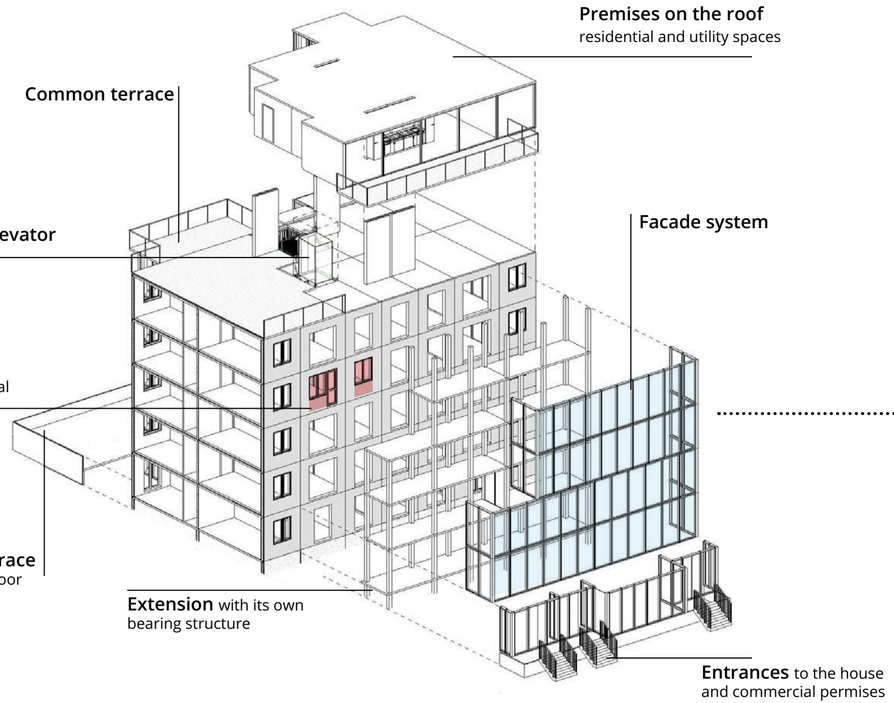
Additional extensions are added to the volume of the building. This allows to cope with one of the most significant disadvantages of the original project - the tightness of apartments and their lack of space.

Thanks to the different depths of these extensions, it is possible to vary the volume and configuration of the add-on area - from adding a dining zone to creating an entire living room in the annex. The complex division of the volume also increases the plastic expressiveness of the facade, and it's possible variations to improve the variety of facades appearance.



facade extension variety creates options of internal planning

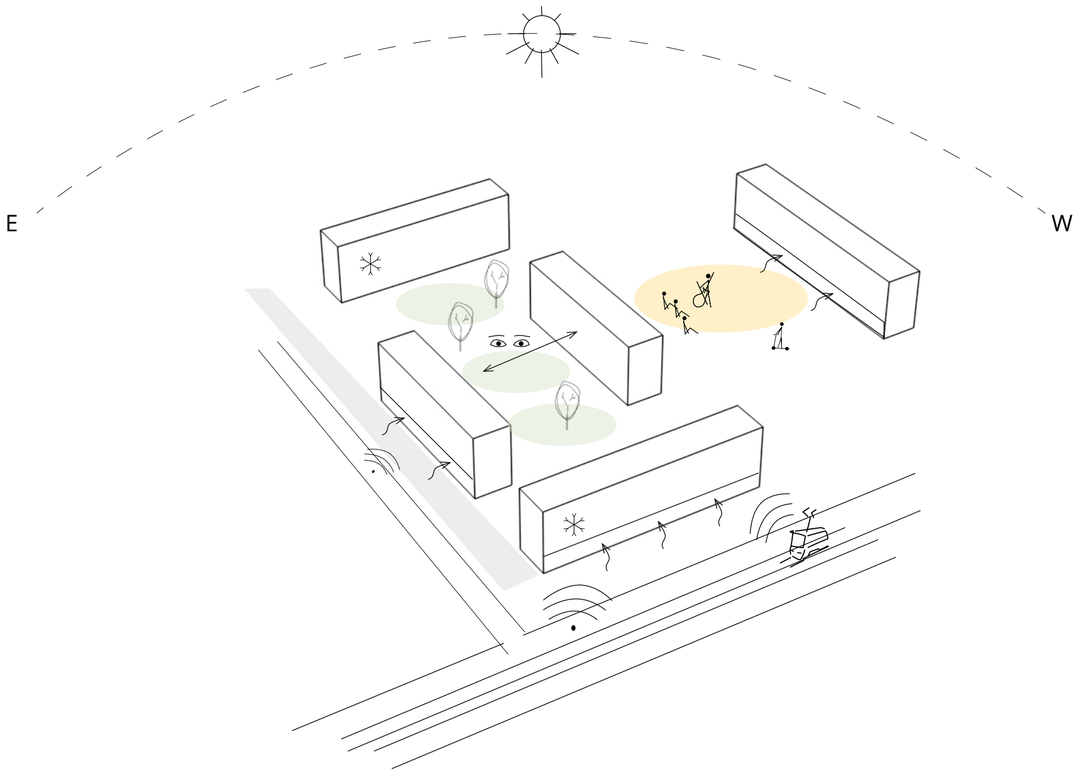
Unit's reconstruction method in overview



Addaptive element

One of the main mistakes of the urban planning practice of mass construction was the multiplication of one single prototype block throughout the entire territory, regardless of the nuances of its location. By architectural means, it is possible to make one single prototype flexible and let it realize those qualities that are required in each specific urbanistic situation.

To better adapt to each specific context, the variety in the design of the building helps - that is, the development of an adaptive facade. Thus, the prototypes remain typically close, but differ both externally and functionally and bring the necessary qualities corresponding to the location of the building.



Specific properties of urban locations

& influence on fasade design

Calm courtyard

Increased connection to the yard space
v

outdoor relaxing areas

enlarged terraces and balconies

transparent facades

\+ Visual contact

close contact between buildings facing each other

less privacy on terraces

restriction of visibility

Noise & dust

Uncomfortable conditions for relaxing on the open air structures

less balcony areas

more glazed loggias

Public space

Intense street life

representative fasades

particular material's selection

less terraces & balconies

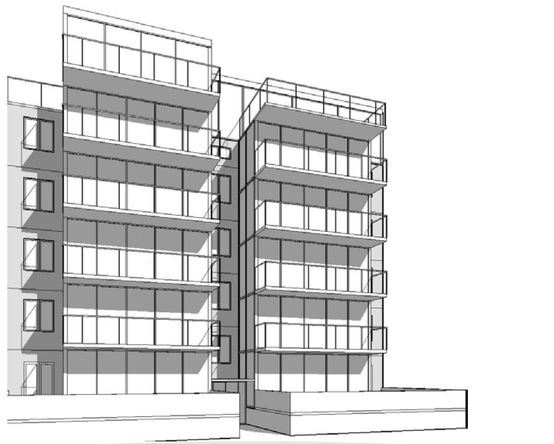
open loggias

North side

Unfavorable conditions for staying outside on the open structures.

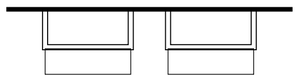
glazed loggias & balconies

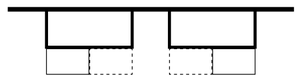
less glass fasade elements, more solid walls



Calm courtyard

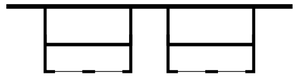
Types of facade intended to be used in green couryards. Maximal area of terraces and balconies to have a spacious relaxing place outside.
Big glass fasade provide visual connection to the yard's greenery.

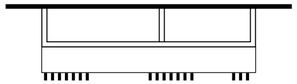


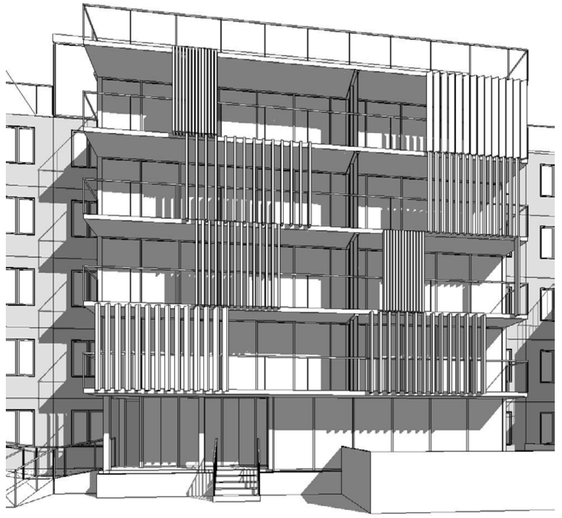


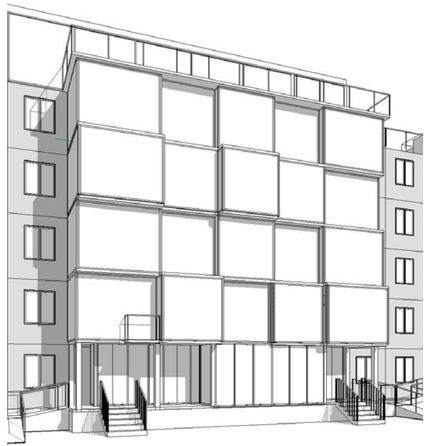
Visual contact

Excessive visibility may affect primarily «terrace-type» buildings located opposite each other.
To limit visibility on terraces, movable swing blades can be used. Loggias closed on the sides and partially on the front side thus help to avoid unwanted contact.



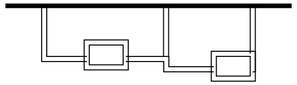




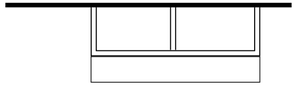


Noise & dust

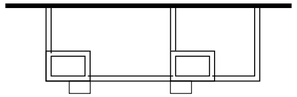
The facades of houses along the roads are mainly equipped with glazed balconies. By creating a buffer between street and interior space of the apartment , they protect against noise and dust. Making loggias in one level with facade also contributes to sound insulation. On less busy roads, the upper floors can already receive terraces and balconies.

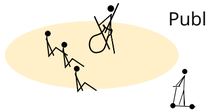


4th floor



1st floor

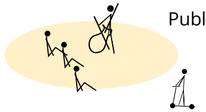




Public space

Taking into account the rather active social life that is programmed in the central pedestrian parts of the district, the facades of houses should, on the one hand, not be too transparent to ensure a sufficient level of privacy in crowded areas, and on the other hand, deliver a sufficient amount of light to the interior.

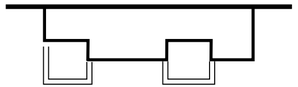
For this, a combination of solid walls and large panoramic windows is used. Loggias extending into the facade provide a comfortable stay on them, protected from prying eyes.



Public space

North side

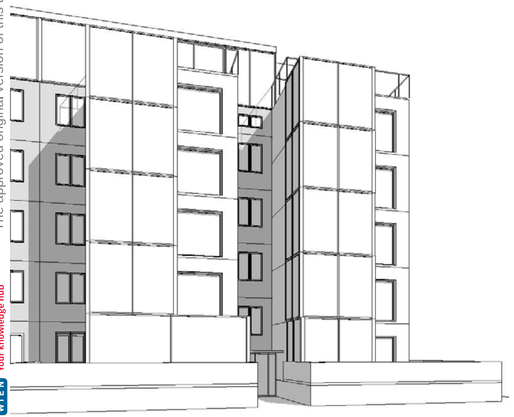
If the facade is located on the north side, the open loggias are glazed, which in addition gives variability to the appearance of the houses.

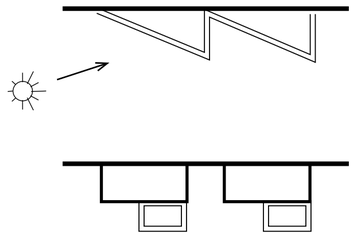


North side

Calm courtyard

The facades facing the courtyard in the north have glazed balconies and the terraces, in this case, in addition to glazing, are located in such a way that they can catch more sunlight from the west.

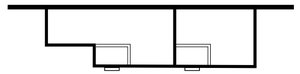




North side

Noise & dust

In addition to such negative influences as noise and dust from the road, a permanent shadow is added when located on the north side. In the design of such facades, the number of balconies is reduced to a minimum. Instead, internal loggias with French balconies are used. As well as an increased area of solid walls with thermal and sound insulation.



Bringing more variability

To achieve a greater variety of the building facades and bring it to a smaller scale, it is worth visually «dividing» long panel houses into smaller ones by using different finishings and color concepts for blocks of single house.

It is also possible to vary the height of the outbuildings, both visually due to the materials and the distance of the outer wall of the last floor from the lower ones, and due to the actual decrease / increase in the number of storeys.

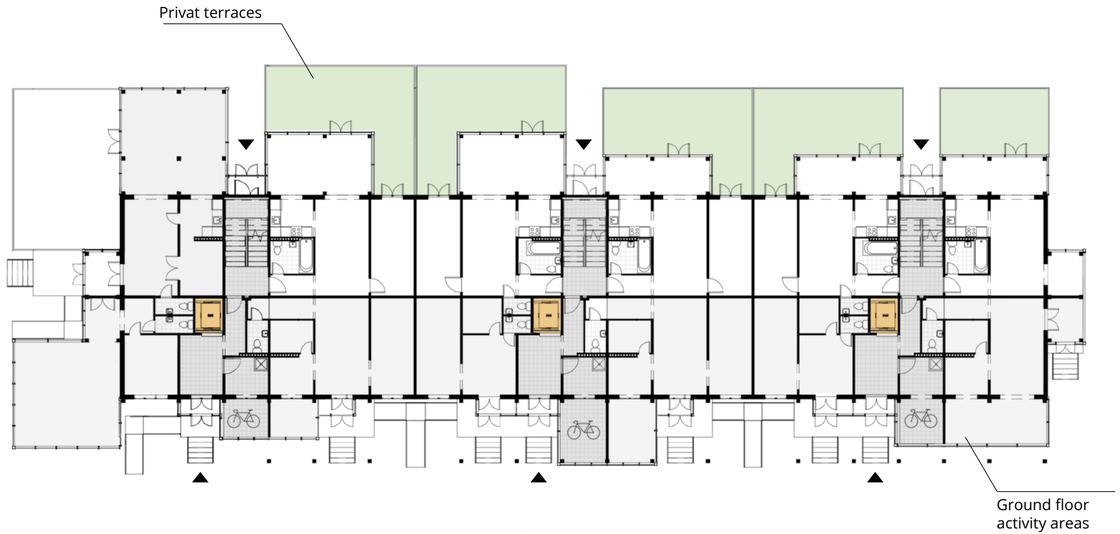
Visual division technique on the example of a 5-block renovated house.

Neighborhood interaction scheme

Not only the facades of the reconstructed buildings adapt to different urban planning situations, but also the arrangement of the first floors. Depending on the location, they can accommodate both gastronomy and services, bureaus or shops, and the flexible structure allows them to organize extensions, showcases, terraces and entrances of various configurations, which provide areas with the required properties each of ground floor activies.
Thus, the building perceives the peculiarities of its location and responds to them in the form of generating a structure on the ground floor that suits the existing urban planning context in the best way.

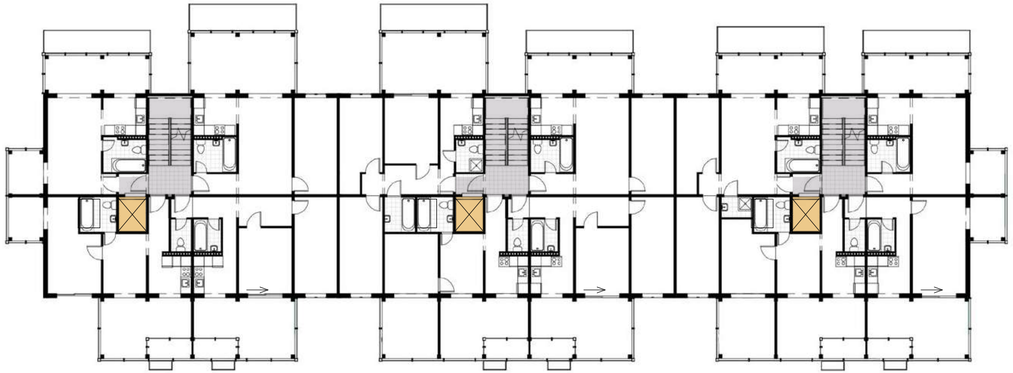
Facade

M 1:250



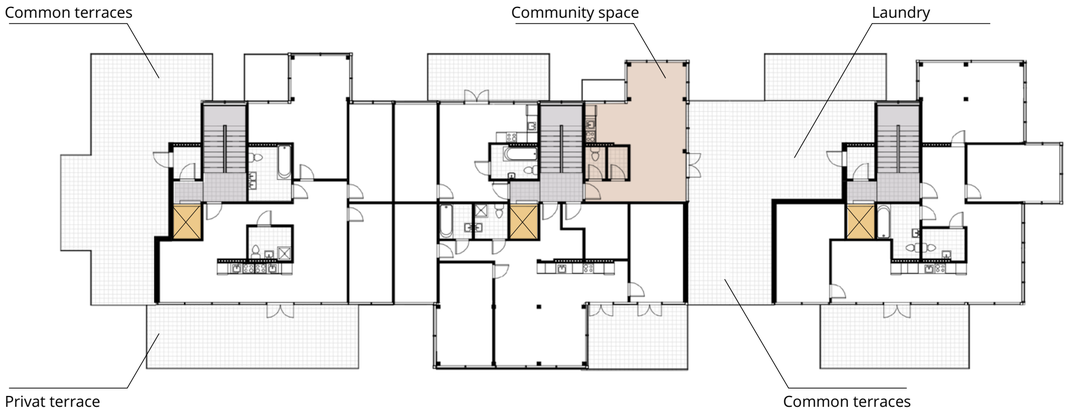
Ground floor

M 1:250



First floor

M 1:250

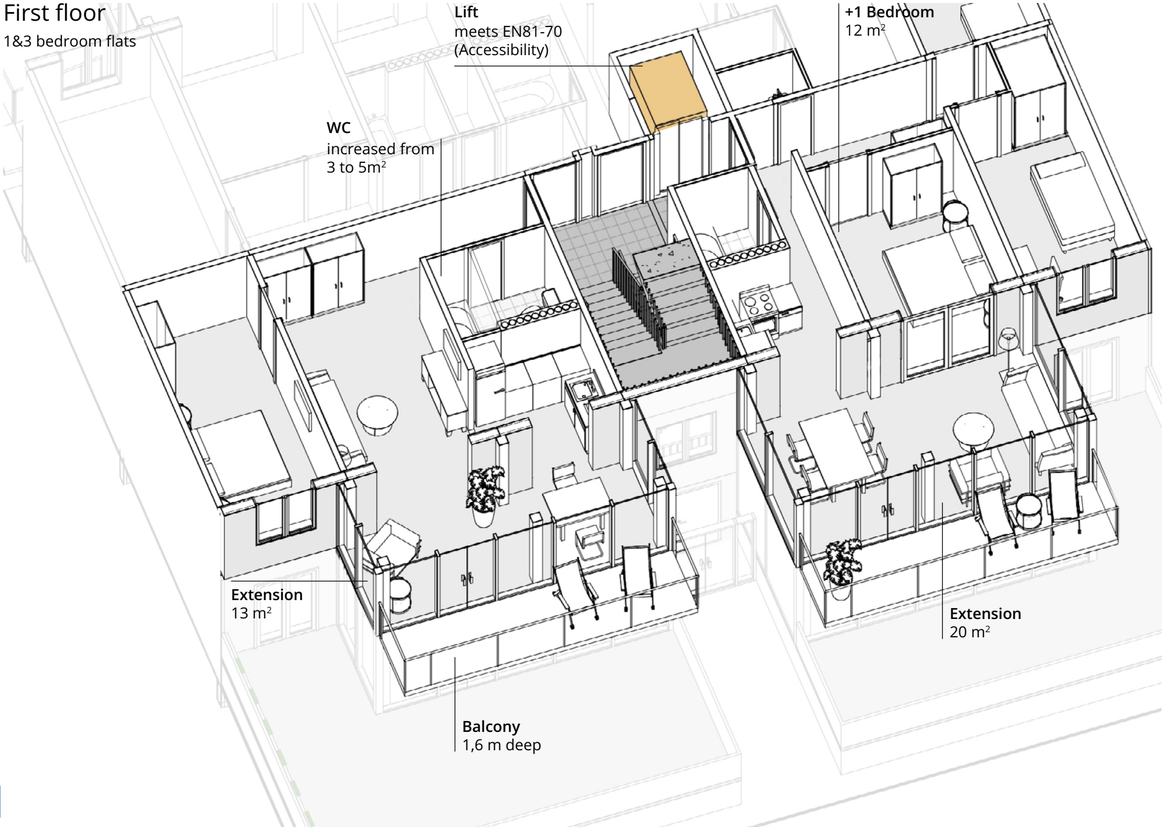


Mansard floor

M 1:250

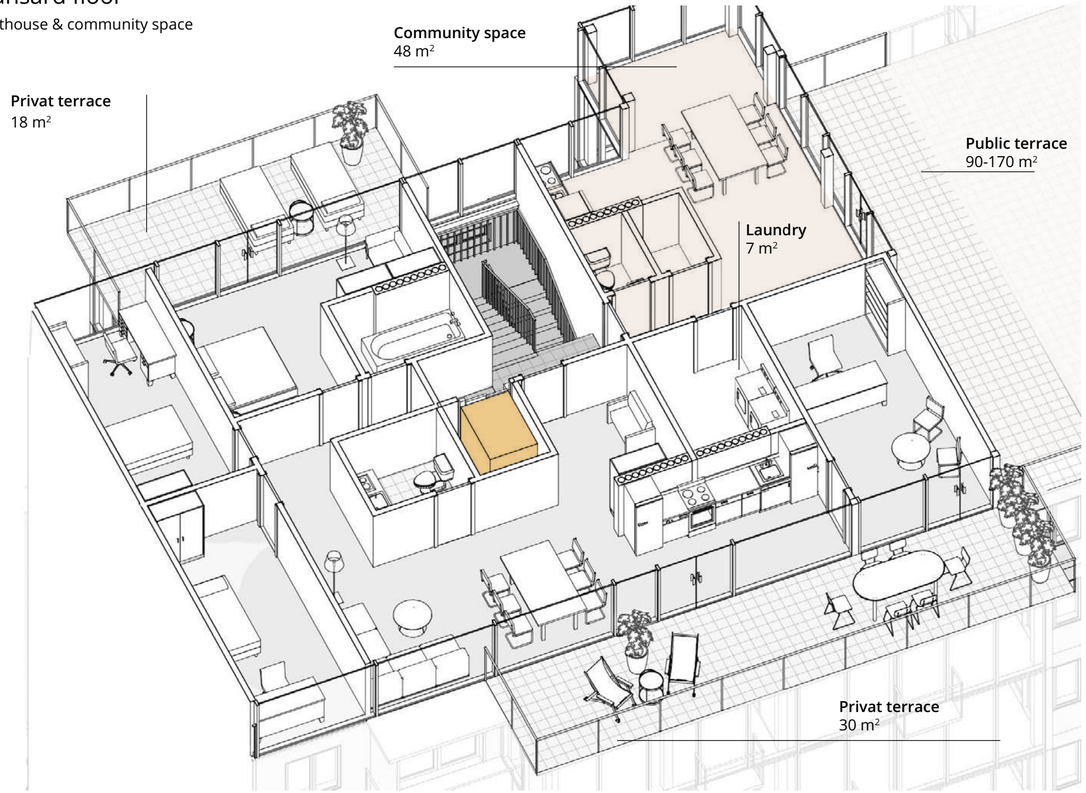
First floor

1&3 bedroom flats

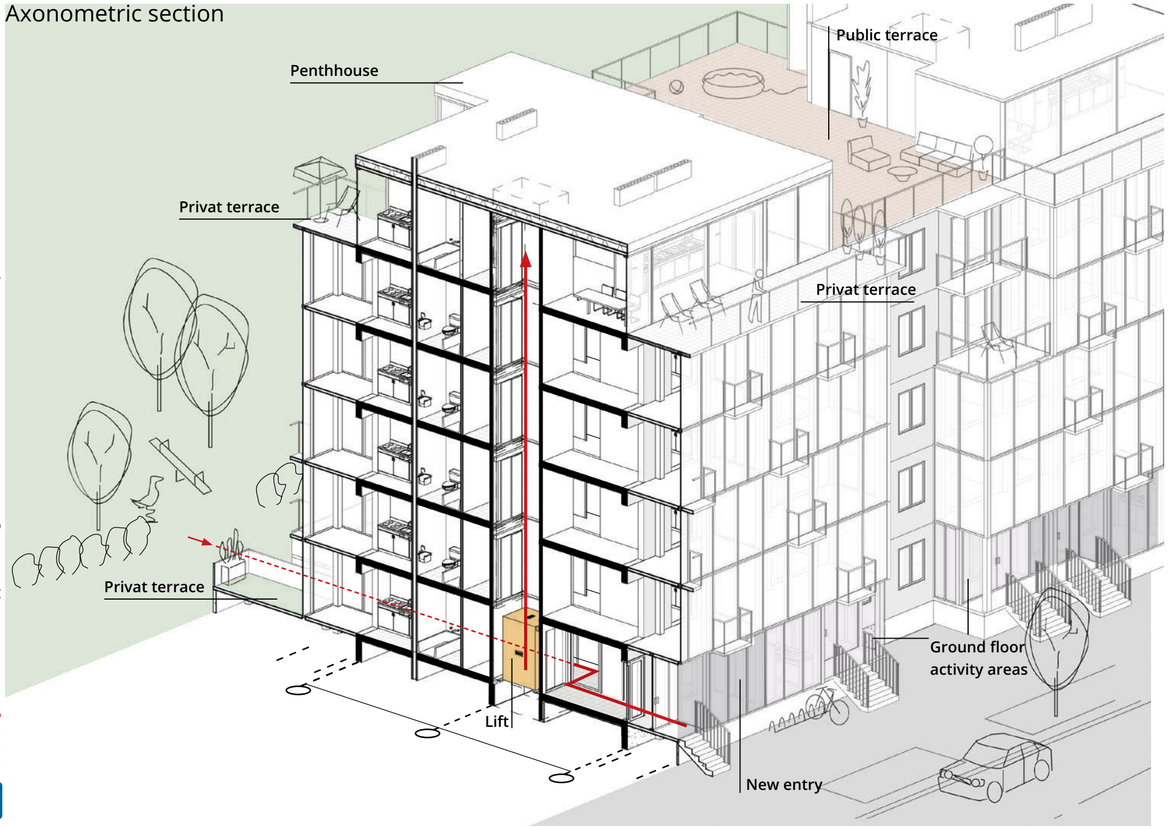


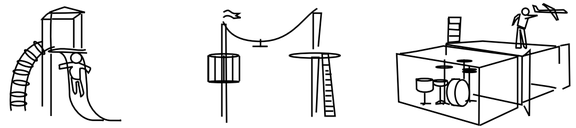
Mansard floor

Penthouse & community space



Axonometric section





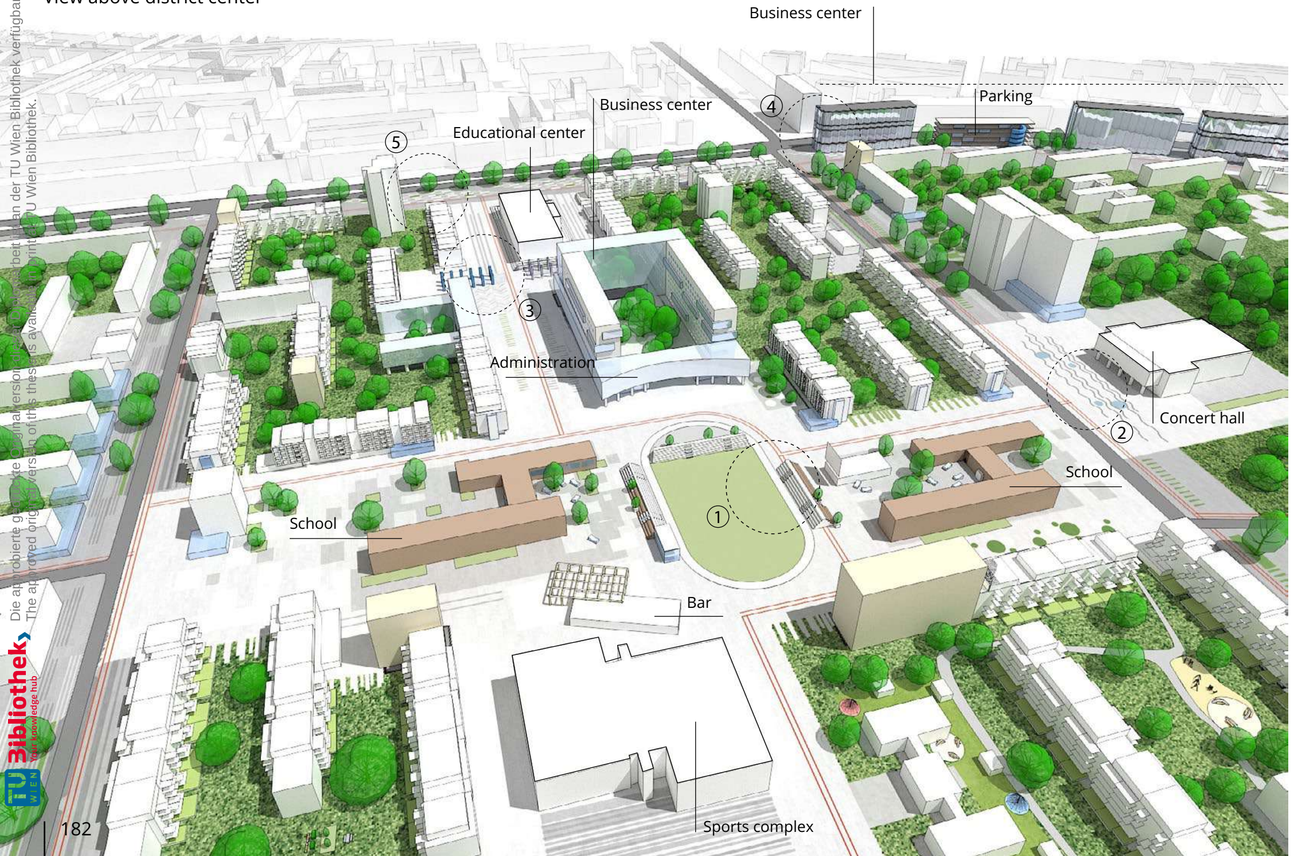
Spatial renovation

Residential quarter design
1:1000

1 Playground
2 Relax zone
3 Community spaces
4 Grill zone
5 Sportsground
6 Workshops
7 Climbing wall
8 ft mobility knot

Courtyard

View above district center



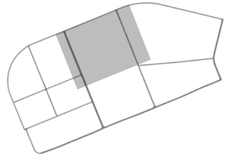
The central part of the district is formed by a series of flowing public spaces, combining three main public buildings - a concert hall, an educational center and a sports complex, as well as schools, administration, office complex and stadium.

Erected administrative building of the district will contain a police station, a prosecutor's office, a service center, housing office etc. - everything that was located in separate buildings in the courtyards all over the district.

The stadium has an important role. its location allows it to provide the neighboring two schools with a place for physical education lessons, and in the rest of the time - serves for competitions and various events.

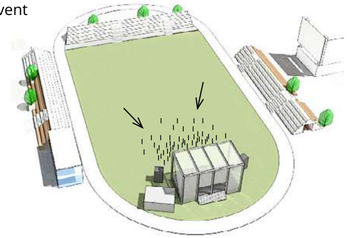
It is convenient to rest in its stands. Due to the double orientation, they are also oriented towards the schools and the central square, thanks to which they also become part of the landscape of the surrounding space.
In the evenings, the stadium becomes a place for watching movies in the open air.

All this makes the central square a place of day and evening activity, and the stadium, together with the adjacent bar, a meeting place, whether for a jogging or to spend time with friends.

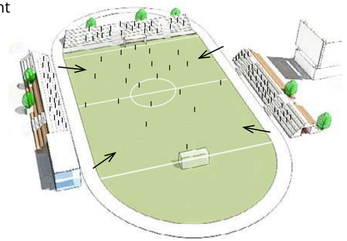


① Stadium

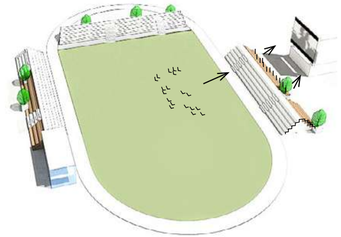
concert / event



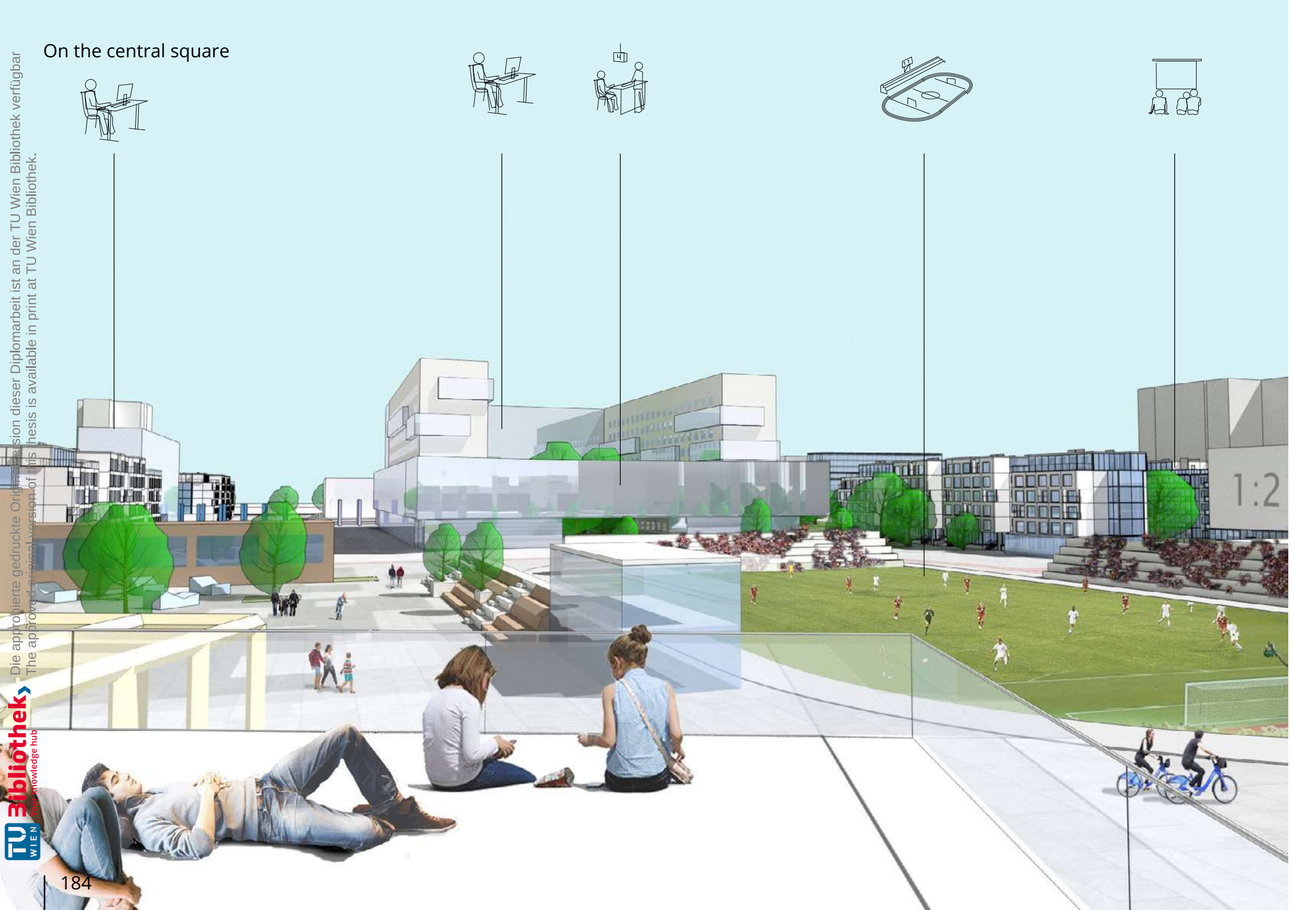
sport's event



film screening



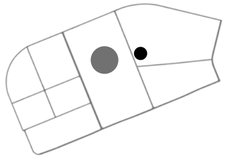
On the central square



② Fountain square

Concert hall

The place in front of the concert hall is designed as the fountains square. The old fountain was replaced by a composition of modern fountains of various heights, connected by water gutters. In hot weather, it will become a fun place for children to play with the jets of water. The possibility of arranging dancing fountains will complement the atmosphere of the cultural place of the area, set by neighboring concert hall.

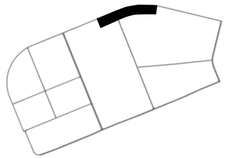


③ Art space - the gate

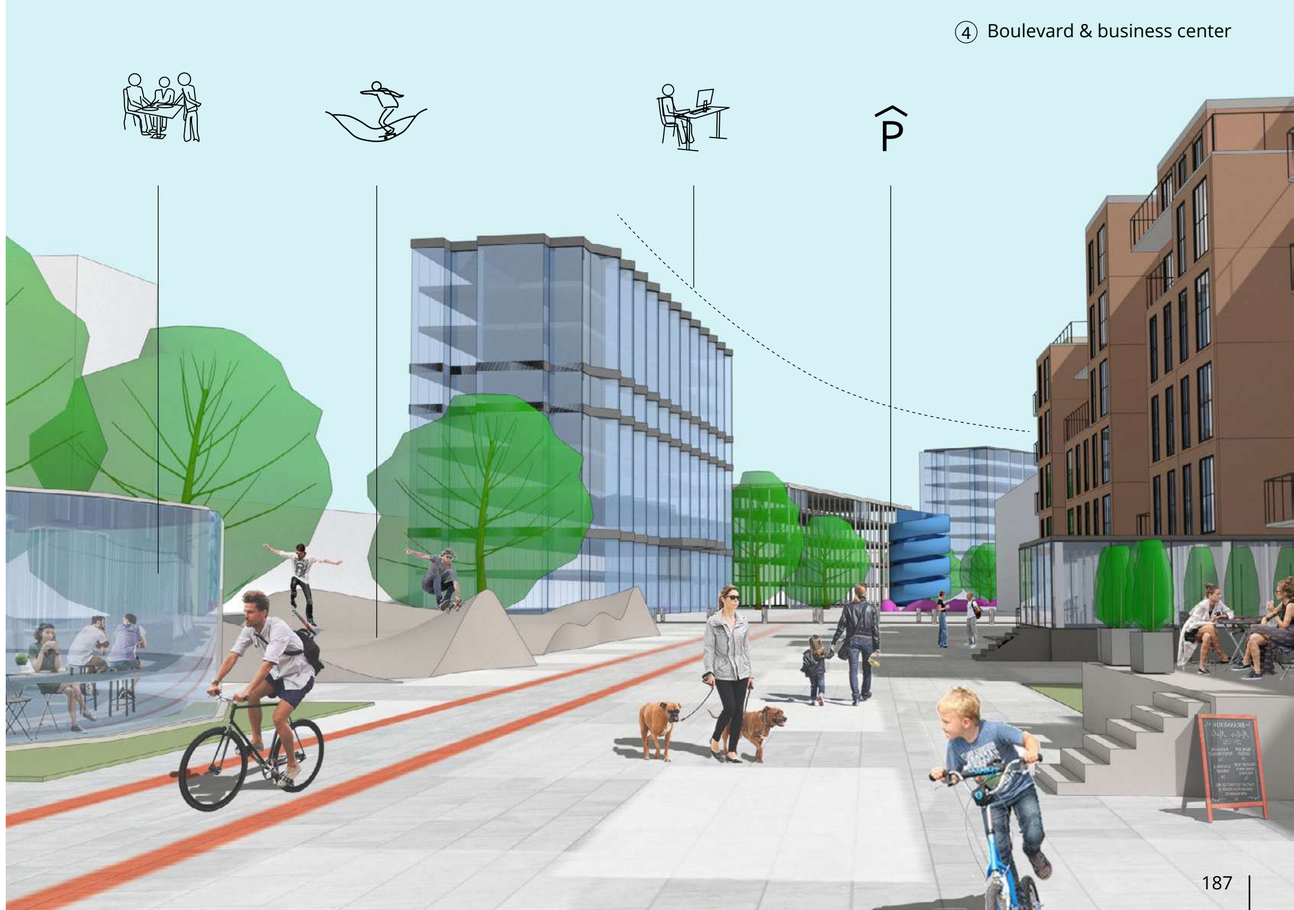
Educational center

Mediocre two storey buildings were converted into art objects. Parts of their structures were demolished, and the remaining elements are used by street artists. The second one serves as a basis for a mirror maze.

Flanking of the passage to the central square with these installations evokes an analogy with the gates on the squares of ancient cities, which organically fits into the surroundings, creates a visual separation of the boulevard from the core of the district and becomes a certain landmark of the area.



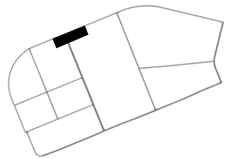
④ Boulevard & business center



⑤ Boulevard

Boulevard is the northern border of the region. The adjacence of a large road and tramway leads to a big amount of transport infrastructure - parkings, stops, as well as bicycle paths and soft mobility stations. In addition, a large flow of people stimulates the development of business and commerce along the entire boulevard. These are rental areas on the first floors of houses and separate roadside pavilions. In addition, there are various activities for local residents, such as skate parks, the noise of which can disturb in quiet places within the area.

It is also a good location for fairs as a large number of villagers come to town to sell homemade products on weekends. Vans can be parked along the alley, and the proximity of public transport will provide easy access and sufficient amount of shoppers.



Weekend fair on the boulevard

Otradniy: eco-friendly housing estate

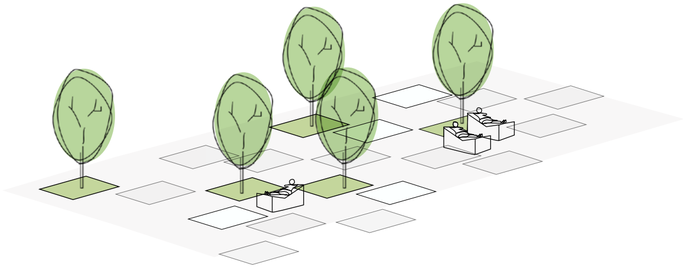
Renovation of the Otradny district is aimed at improving the quality of life in the district, which, of course, consists of various components. The project is innovative in many ways and shows by its example how urban areas of standard construction can change and develop in accordance with the goals of sustainable cities and communities of united nations. Some of them are the focus of this project:

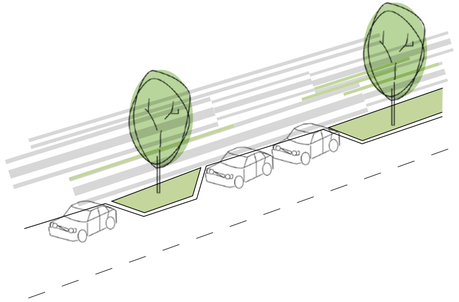
-ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums;
-reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality;
-provide universal access to safe, inclusive and accessible, green and public spaces.

[https://www.un.org]

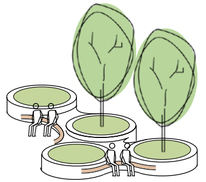
Old trees as a part of design

1&3 bedroom flats



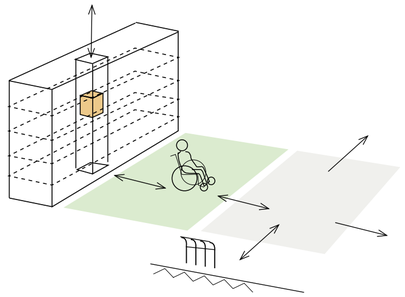


A huge amount of large old trees is one of the indisputable advantages of the area. That is why it is so important to preserve as many of them as possible during the renovation process. The design and coverage of squares and roads are designed with respect to old trees in such a way that they fit in with the existing vegetation, and the places of relaxation use the natural shade and comfort from the crowns of large trees, developing their composition around their trunks.

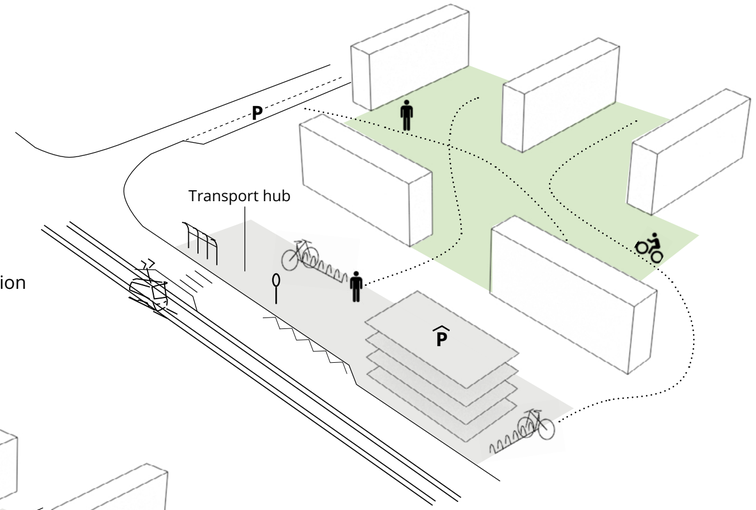


The project is also aimed at reducing harmful emissions into the environment. The concept contributes to a significant reduction in the use of cars and the development of public transport and soft mobility. In urban planning, this is the elimination of car traffic in courtyards, a developed network of bicycle paths and stands, the organization of parking lots between neighborhoods and the organization of transport hubs at border areas, where residents can leave their car and use a bicycle or scooter to move around or transfer to a public transport or use car sharing for longer trips.

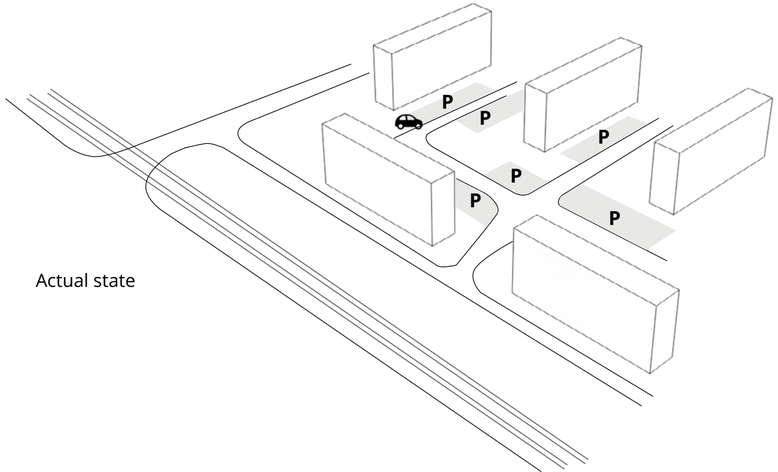
The entire area of the district is continious and barrier-free for people with disabilities, starting from the floor of reconstructed “Khrushchevka” to the stop of public transport or cafe, wich gives a complete accessibility throughout the area.



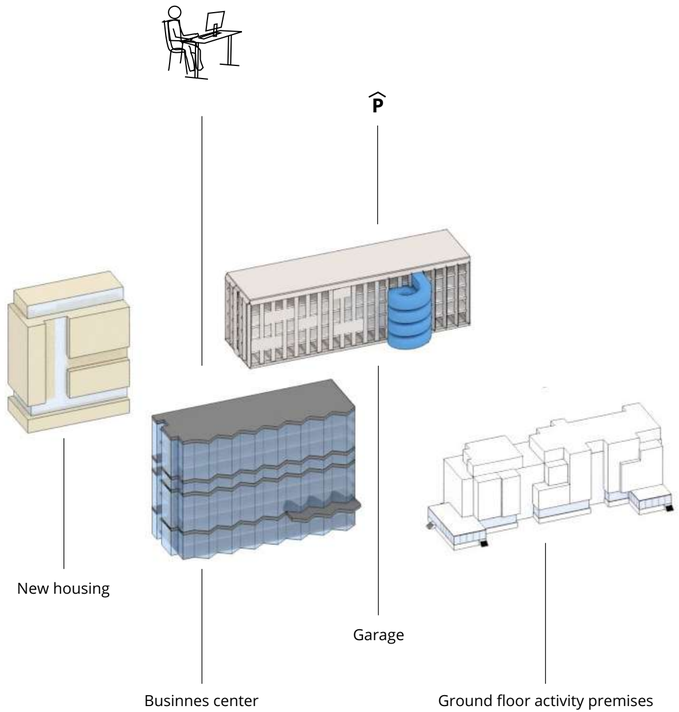
Mobility concept



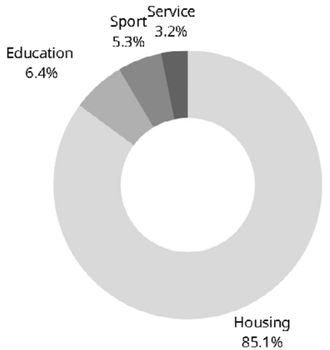
Projection



Actual state

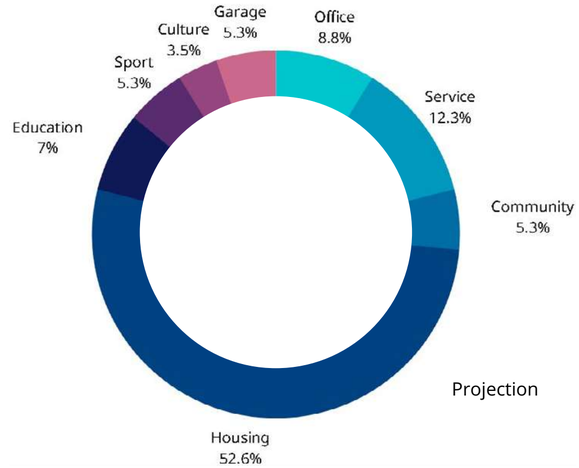


Afterword



Actual state

As a result of the renovation of the area, the diversity has increased significantly. The new buildings expanded the typological palette of the district's buildings and provided the district with new opportunities in terms of work and leisure. The active use of premises on the ground floors of residential buildings contributes to the development of small business, gastronomy and services for locals within walking distance, which is an important indicator of a balanced urban environment. Previously abandoned public buildings have added to the functionality of the area culturally, educationally and entertainingly. Thanks to its wide range of functions, the district has become a local community center for the surrounding neighborhoods and a desirable, comfortable and balanced place to live, where there is a place for everyone.



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