The Living Bridges of Vienna

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The Living Bridges of Vienna

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AFFIDAVIT

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THE LIVING BRIDGES OF VIENNA

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“The fate of the bridges is to be lonely; because bridges are to cross not to stay.”

Mehmet Murat Ildan

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Abstract

The present master's thesis deals with the possible occurrence and actual design process of an urban cluster in the form of multiple inhabitable bridges on a very delicate and exquisite location, namely over the Danube Island and across the river Danube itself in Vienna.

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Vienna, the capital of Austria, is a city constantly growing and striving for supreme living conditions in its urban areas, in order to remain one of the most liveable cities on the planet. In line with that, the presence of the Danube river plays a huge role in the Viennese living environment. The Danube river with its Island is seen as a prestigious and unique urban phenomenon and home to many leisure and recreational activities. However, this wide natural obstacle often still represents a physical as well as a symbolical gap between the two sides of the city. After many centuries of city as well as river transformations, the Danube is still showing tremendous potential for development.

The aim of this project is to design a viable and reasonable subtle megastructure, which would integrate social and cultural aspects of the river and the city. The proposed design must respond positively to the fragile environment and integrate well into the existing urban fabric, as well overcome all the constrains and take advantage of all at once. High living quality based on a human scale should prevail over the excessive aesthetic and seductive monumental effect. At the same time, an inhabitable bridge, a typology invented a long way back, is once again put to the test in order to create a contemporary and distinctive urban cluster, known as the *Living Bridges of Vienna*.

Abstrakt

(GERMAN VERSION)

Die vorliegende Masterarbeit beschäftigt sich mit dem möglichen Entstehen und tatsächlichen Gestaltungsprozess eines städtischen Clusters in Form von mehreren bewohnbaren Brücken an einem sehr empfindlichen und erlesenen Ort, und zwar in Wien, über der Donauinsel und der Donau selbst.

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Wien, die Hauptstadt Österreichs, ist eine Stadt die ständig wächst und optimale Lebensbedingungen in ihren Gemeindebezirken anstrebt, um einen der lebenswertesten Orte der Welt zu bleiben. Demnach spielt die Existenz der Donau weiterhin eine große Rolle im Wiener Lebensumfeld. Die Donau und ihre Insel gelten als prestigeträchtige und einzigartige urbane Phänomene welche viele Freizeit- und Erholungsmöglichkeiten beherbergen. Dieses breite natürliche Hindernis stellt jedoch oft noch eine physische und symbolische Spalte zwischen beiden Seiten der Stadt dar. Nach vielen Jahrhunderten Stadt- und Flussumgestaltungen weist die Donau jedoch immer noch ein enormes Entwicklungspotenzial auf.

Ziel dieses Projekts ist es eine tragfähige und angemessen subtile Megastruktur zu entwerfen, welche soziale und kulturelle Aspekte des Flusses und der Stadt integrieren würde. Der vorgeschlagene Entwurf muss sich positiv auf die empfindliche Umwelt auswirken und sich gut in das bestehende Stadtgefüge integrieren sowie alle Einschränkungen beider Lebensbereiche überwinden und auch dessen Vorteile ausnutzen. Eine hohe Lebensqualität nach menschlichem Maßstab sollte sich gegen eine übertriebene Ästhetik und verführerische Monumentalität durchsetzen. Gleichzeitig wird eine bewohnbare Brücke, eine schon vor langer Zeit erfundene Typologie, erneut auf die Probe gestellt, um ein zeitgemäßes und unverwechselbares Stadtcluster zu schaffen, die so genannten *Living Bridges of Vienna*.

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PART I.

VIENNA

THE MOST LIVEABLE CITY

For the tenth consecutive year, Vienna ranked first in Mercer‘s Quality of Living survey ranking in 2019. What exactly is it that makes Vienna the most liveable city on the planet? Whilst both the political as well as the social environment are key aspects of the survey, the study also analyses factors such as safety level, efficiency of public transportation and infrastructure, as well as the environmental and sustainable aspects of the city’s organization.[1]

Vienna as a Model City

Austria’s capital is considered as a model city for housing policies and for residential architecture. It all started in the early 1920s with the decision that organization of housing should not be entirely up to the private sector. In that time the city was governed by social democrats and their politics were based on Marxist theories. Soon, the neighbouring Bavaria and Hungary proceeded to follow these socialists’ perspectives and ideas of a democratic society as well. After the 1926 Vienna International Urban Planning Conference the idea sparked worldwide interest among architects and city planners. Similar housing concepts were thereafter established in various European cities, all from northern Italy to Scandinavia.[2] However, the Viennese housing concept is not the only positive example of Vienna’s successful urban strategy.

The political situation in Europe has pushed Vienna into an outstanding position and with the entire metropolitan region growing, today it is known as a prime Central European Capital. It is one of the fastest growing cities in Europe in addition to being one of the cities where people like to live. The decisions taken today will be essential in defining the urban spaces we will be residing in tomorrow.[3]

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1 MERCER: QUALITY OF LIVING RANKING, 2019, *https://mobilityexchange.mercer.com/Insights/quality-of-living-rankings*, 1.6.2019.

2 SEE FÖRSTER/MENKING (EDS.) 2016, P. 7.

3 SEE VIENNA CITY ADMINISTRATION: STEP 2025. URBAN DEVELOPMENT PLAN VIENNA (PDF), 2014, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008379b.pdf*, 10.4.2019, P. 9.

Vienna from above

Continuity and Innovation

After the Second World War the City of Vienna proceeded with its social housing program. Today, around 62 percent of Vienna's population lives in subsidized housing units. An important ground-breaking instrument to the policy of creating functional and social housing in all residential areas is called the *Four Pillar Model*. This model consists of four sets of criteria: planning, costs, ecology and social sustainability. It is developed in developer competitions, where each project is evaluated by an interdisciplinary group of independent experts. Juries would typically include experts from all *four pillars*, such as urban planners, architects, ecologists, economists, sociologists etc. The main aim is to encourage the development of upgrading as well as creating new communities while focusing on bringing a mix of the functional and social aspects. Besides architecture, ecology and costs, social sustainability is becoming a prominent criterion in this area. It includes goals such as public indoor and outdoor spaces for communication and community-building actions, in addition to the flexibility to cope with multigenerational living and diverse society. However, over the years Vienna has also resisted the desire to privatize its public housing capital, seeing as numerous European cities had done this to improve their economic status, yet it has often led to housing shortages and social segregation instead.[4]

Despite all of this, the model has been challenged by many factors in the recent years, for instance the fast-paced growth of the city, the financial crisis, the aging population, the increasing immigration processes and the requirements of the climate protection plan. Nevertheless, Vienna has been able to respond to all these challenges and has again, after almost a century, become a model city. Vienna's Model follows main characteristics, divided into ten chapters, which of course are essential for all planning sectors, not just for housing. These chapters are: continuity, innovation, social mixing, developing of new urban areas, diversity and integration, citizen participation, environmental and climate protection, use and design of public spaces, development of existing housing stock, building on the outskirts, the role of art and design.[5]

To enable high-quality urban development and to integrate Vienna's position in regional and international contexts, planning goals and strategies of the past urban planning in Vienna should be clear. The reason for this being that Vienna is what it is today, due to constant changes and upgrades of past decisions in the field of urbanism.

The biggest changes in urbanism began after the Second World War and were closely linked to the changes in the political system.[6] Not only did it affect the social housing program, as mentioned, but it also changed the structure of the entire city. The following represents a brief summary of the period from the Second World War to the present.

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4 SEE FÖRSTER/MENKING (EDS.) 2016, P. 7,10-11.

5 IBID., P. 8-9.

6 SEE GOTTFRIED PIRHOFER / KURT STIMMER (EDS.): PLÄNE FÜR WIEN. THEORIE UND PRAXIS DER WIENER STADTPLANUNG VON 1945 BIS 2005 (PDF), 2007, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008280a.pdf*, 20.3.2019, P. 26.

Construction of the U-Bahn

URBAN PLANNING IN VIENNA

Urban planning strives to coordinate and consolidate the position of every city in a regional as well as an international context. To achieve this, specific planning goals are to be developed and the guidelines and strategies of the city regularly evaluated. Moreover, urban development is to work hand in hand with governmental, societal and economic actors.[7] Next, a brief history of the urban planning in Vienna and some decisive projects that defined the city in the last decades will be introduced.

Reconstruction Following World War II

In 1945, the new city planning began as a joint act of the new city administration, which showed an encouraging signal of democracy in the world of urban planning. Initially, the predominant aspect of the new urban development plan was understandably the reconstruction of the city because of the devastating consequences of the Second World War. At the same time, the aim was to produce a vision of a new city, suited to the demands of the modern world. The idea to create a more relaxed and functional city however, was constantly in conflict with existing historic structures and the reality of urban spaces.

In July 1946, the municipality organised the first architectural competition, primarily intended for the most devastated areas. The construction of the first new buildings started in 1947, however there was a significant lack in building materials and machinery. Until 1951, more than 2.000 small apartments as well as community facilities such as schools, kindergartens and shops were built. In the first few years after the war, most of the building material was reserved for facilities of general importance, specifically health and welfare institutions, schools, kindergartens and workplaces.[8]

In 1958, Roland Rainer was appointed as a Viennese urban planner, marking the starting point of professional urban planning. After the era of Brunner, which was shaped by the model of a *relaxed* and *car-friendly city* and involved a relatively low implementation of new ideas, city planning finally took on a more realistic and advanced shape. The aim was a modern urban city, yet the quality of historical elements was recognized and included into development process as well. In addition to the selection of new centres and large residential complexes, bigger infrastructural projects become relevant for urban planning too. In comparison with the previous focus on private transport and mobility, public transport had also started becoming increasingly important.[9]

The Time of Big Projects

Two major projects, the realization of which began in the 1960s continue to be defining factors in the urban life to this day, namely; The Construction of the U-Bahn underground railway and the Flood Protection project. Both projects were part of intense political games, mostly due to high costs and long construction time.

There had been numerous other projects which required big efforts and intensive work of urban planners, for instance; the development of the road network together with new bridges over the Danube river; a new energy supply plan and environmental policy (construction of a new power plant, district heating, sewer and waste systems); construction of new and renewal of existing hospitals; construction of retirement homes; further development of the old town; extension of green areas; and expansions to the existing park network. This was the reason behind the city's growing necessity to implement new economic structures, especially in the area of services and to provide both suitable land as well as the necessary infrastructure. Certain projects, such as the rail rapid transit network S-Bahn, were thus planned in cooperation with the federal government for a national level. Another example of such a project was the construction of the UNO City (United Nations Office) together with the Vienna International Centre (VIC).[10]

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7 SEE VIENNA CITY ADMINISTRATION: STEP 2025. URBAN DEVELOPMENT PLAN VIENNA (PDF), 2014, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008379b.pdf*, 10.4.2019, P. 5.

8 SEE GOTTFRIED PIRHOFER / KURT STIMMER (EDS.): PLÄNE FÜR WIEN. THEORIE UND PRAXIS DER WIENER STADTPLANUNG VON 1945 BIS 2005 (PDF), 2007, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008280a.pdf*, 20.3.2019, P. 26-32.

9 IBID., P. 40-49.

10 IBID., P. 52-66.

UNO City

Urban Planning Becomes a Public Issue

The Underground Railway Project and the Danube Island Regulation Project, both highly criticised and part of many debates, changed the political atmosphere in the city. Urban planning, formerly an issue reserved only for professionals and politicians, had started being widely used in the media and in general discussions among the population. The optimism and innovative commitment that emerged from the city administration and from planners was quickly transmitted to considerable parts of the population. Together with full-fledged housing and modest urban renewal, environmental protection was considered the main challenge.

In 1972, new guidelines for urban development were introduced for discussion. These guidelines not only covered the defensive measures of the environmental protection, but also the constructive method of environmental planning. The rampant *materialistic* development should be limited; there should be more focus on living quality, health and other moral values.[11]

Urban development was closely linked to the qualities of historically transmitted urbanity. The goal was to create comprehensive urban planning for Vienna, known as STEP (Stadtentwicklungsplan) 84. This comprehensive urban development plan that should ensure the overall quality of spatial development, which can be achieved by encompassing social, urban and environmental factors, not only functionality. In 1981, the first draft of STEP 84 was presented to the public. Around 3.000 comments were raised in several discussion phases, with 25.000 contributors. Intense discussions and great participation of citizens, interest groups and experts showcased the interest of the Viennese public in urban development.

The priority of urban renewal over urban expansion presented a big challenge for STEP 84. Additionally, STEP 84 defined *axes of settlement*, based on main centres. These were to be connected with green corridors and efficient in means of public transportation. The protection of nature and open space was another sensitive point in the value and target system of STEP 84. Urban planning had had a clear need for a more complex approach since the beginning of the seventies. This new planning method is known today as *The Vienna Model*, and is a representation of the beginning of a new planning culture, which eventually became essential to the implementation of complex urban goals. The first competition based on this model was the Danube Region competition (1974- 1978).[12]

Urban Renewal to Replace Urban Sprawl

As early as 1970, there was a change of strategy in Vienna's housing policy – there being no lack of housing at that time. However; statistics showed that more than a third of Viennese apartments did not have their own toilet, and almost two thirds of them were not equipped with a bath or shower either. The conclusion drawn from this was that the quantitative housing problem in Vienna had at that point been replaced by a qualitative one - Too many bad apartments as opposed to too few previously. *Urban renewal instead of urban sprawl* hence quickly became the new slogan of the housing strategy in Vienna. In the beginning, the city subsidized up to 16.000 apartments per year for improvements, which consisted of the installation of water pipes, toilets, baths or shower enclosures, central heating systems and new windows, the merging of small apartments and the replacement of installation pipes. In these years, the city constructed only 2.000 new apartments per year on average. By 1985 there were already 8 urban renewal areas with a total area of 470 hectares and a population of more than 110.000 people.

In the beginning of 1980, the construction of new apartments gained importance yet again. But as already mentioned, the importance of housing construction in those years is not in the quantity of housing production, but in the search of a new quality of housing. Many discussions and controversies regarding new urban housing forms and expectations were taking place. At that time, two big projects were built. Both projects, residential towers Alt-Erlaa and residential complex Am

11 SEE GOTTFRIED PIRHOFER / KURT STIMMER (EDS.): PLÄNE FÜR WIEN. THEORIE UND PRAXIS DER WIENER STADTPLANUNG VON 1945 BIS 2005 (PDF), 2007, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008280a.pdf*, 20.3.2019, P. 68-69.

12 IBID., P. 73-85.

Residential Complex Alt Erlaa

Schöpfwerk, were regarded as housing experiments, however both were positively accepted.[13]

The biggest infrastructural projects at that time were the massive engineering project of flood protection together with Danube Island and New Danube as well as the expansion of the underground railway (U-Bahn). The underground railway project resulted not only in contributing to the strengthening of the public transportation and sustainably ensuring a good modal split, but also in changes to the hierarchy and value of urban areas. Moreover, it facilitated a massive development of non-central districts.[14]

The Period Following the Year 1989 - Vienna in the New Europe

At the end of the eighties Vienna started growing again, which spurred debates in favour of large-scale projects at various levels and of various dimensions, like the Vienna - Budapest EXPO 1995 or the establishment of *Vienna on the Danube*. Vienna's geopolitical position was affected by the fall of the Iron Curtain in 1989, representing a significant turning point for urban planning in Vienna. After a period of stagnation, characterized by a decline in population and by an aging population, a new era of Vienna had finally arrived.

The STEP 84 urban plan became fragile - it was mostly based on *soft location factors*, like quality of life, urban culture, environment, traditional and renewed urbanity. In the late 1980s the development of the city was moving towards big projects, in favour of skyscrapers, megaprojects, monumental urban planning ideas and setting an urban design as a *stage*. Nevertheless, controversies were needed, and they served as a self-reflection of the desired urban planning.

In 1989 a new scenario called *Growing City* was presented. The aim was to take the advantages of all offers regarding the location of Vienna to become the main centre of central Europe. That meant that Vienna would need more jobs, big investments in the public transportation system to connect the city with the international network, more quality in urban design and a reinforcement of the inner urban development areas (Nordbahnhof etc.). The possibility of hosting the EXPO 1995 represented an impulse for urban development in the Danube region. It was all about an active policy, a target system that would exceed the competences of spatial planning and the whole field of urban identity, preservation, modernization and innovation.[15]

Also, the topic of building high-rises in Vienna was discussed continuously. They were neither necessary nor appropriate in for the city. In 1991, an architect called Anton Brenner even stated, that it has been medically proven that living on top floors of high-rise buildings leads to high-rise syndrome. Such arguments affected the core of Vienna's identity. Later, they faced challenges around the conditions under which skyscrapers could fill a meaningful urban function. However as early as the year 1972, Hugo Potyka developed a skyscraper concept for Vienna together with Ernst W. Heiss. In 1991, an architectural office Coop Himmelblau created a *Viennese skyscraper study*, which proposed various urban zones with high-rise potential.[16]

13 SEE GOTTFRIED PIRHOFER / KURT STIMMER (EDS.): PLÄNE FÜR WIEN. THEORIE UND PRAXIS DER WIENER STADTPLANUNG VON 1945 BIS 2005 (PDF), 2007, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008280a.pdf*, 20.3.2019, P. 86-92.

14 IBID., P. 93-97.

15 IBID., P. 103-106.

16 IBID., P. 111.

Seestadt Aspern

Visions of a Second City Centre

In order to preserve the historic inner city in its urban structure and quality, Vienna had been increasingly discussing the creation of a second city centre for several years. The main idea was a creation of modern business, office and residential functions at high-quality locations with high-quality public transportation possibilities. Danube still represented an unfinished figure of Vienna; therefore, the vision of *Vienna on the Danube* was growing ever more. However, Vienna did not have the dimension and the growth potential for a new *city centre*; the main example being *La Defense* in Paris.

The idea also contradicted the existing urban plan, which was based on a ring of major and minor centres and strong axes. The most promising development axe being Lassallestrasse - Wagramer Strasse.

Parallel to the later cancelled EXPO 1995 project, a program for the development areas close to the Danube had also been created. Focus was put on 10 areas, among them: the Donaukanal, the Prater area, the Handelskai, the Danube Island, the Kagran, the Nordbahnhof area etc.[17]

STEP 94

In addition to a new increase in population, the economic and social factors were showing a need for modernization and development. Also, the existing urban STEP 84 plan was due for a renewal. However, the discourse showed that further urban development should be as far-reaching as possible, yet at the same time consistent with the traditional aspects of Vienna.
The new urban STEP 94 plan consists of 15 main theses, among them:
- Dealing with an open society and socially endangered people, especially in the context of migration and immigration;
- A strong focus on social housing together with economic, social and cultural infrastructure;
- Again, a strong focus on the development of the Danube area and nearby districts;
- Preserving Vienna's identity: preserving the old and promoting the new. Additionally, also promoting the creative potential in the architectural development;
- Developing a new environmentally friendly traffic concept and new environmental policies;
- Vienna and the surrounding areas: the basis of an intense regional cooperation;
- Strengthening Vienna's position in Europe, which required an upgrade of the transport infrastructure in and around Vienna and promoting creative potential in business, science, research, education, art and culture.[18]

Some of the actual projects that were created on the basis of STEP 94, are:
- Seestadt Aspern: with its 200 hectares is one of the largest urban development projects in Austria
- Kagran Development Area;
- Donau City;
- Nordbahnhof area.[19]

In line with the goals of STEP 84 and STEP 94, efforts in large-scale green and open space planning continued. In November 1995, the city council made a decision to establish something called Vienna's green belt, which introduced a concept for protecting recreationally relevant areas as well as areas with a landscaping priority. That also meant a significant step towards the preservation and further development of the living quality and the environment in Vienna.[20]

STEP 05

In its basic understanding and basic orientation, the new STEP 05 was more dynamic and, in terms of implementation, more strategic than STEP 94. It dealt not only with the strategic orientation of Vienna, but also with the development of the European Union. It opened new potential to enable its accelerated development policy and to continue in a future-oriented direction -

17 SEE GOTTFRIED PIRHOFER / KURT STIMMER (EDS.): PLÄNE FÜR WIEN. THEORIE UND PRAXIS DER WIENER STADTPLANUNG VON 1945 BIS 2005 (PDF), 2007, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008280a.pdf*, 20.3.2019, P. 114-116.

18 IBID., P. 131-134.

19 IBID., P. 145-153.

20 IBID., P. 144.

Main Train Station

such as the adoption of the skyscrapers, which was still a highly controversial topic during the development of STEP 95. Periphery was no longer periphery, but new intermediate city, and new potential areas opened up as well. As a result, the links between Vienna and the region (including Bratislava) became even more important.

Additionally, STEP 05 focused on various potential areas, which include different types, for instance office concentrations outside city centres or living with high recreational value. It also corresponds to unfavourably located spaces in the Vienna area. The urban plan designated 13 target areas (some overlapping with STEP 94), namely: the Donaukanal, the Westgürtel, the Seestadt Aspern, the Waterfront (Donau City, central Danube region, Nordbahnhof area), the Donaufeld and Bahnhof Wien (renovation of the main train station area).[21]

Due to the selected location of the project, the ongoing project of Donau City is described in more detail in the continuation of the present work.

The Plan and the City

Vienna's urban strength in international comparison is not so much defined with the development of eye-catching and spectacular major projects, as it is with the interpretation and transformation of existing urban spaces, often with high architectural quality.

The densely built-up urban structure has been changed extensively since 1945. It had been affected by urban renewal and decisive housing construction projects, but also through diverse economic and social development processes. The large outskirts of the city have experienced dynamic transformations and new developments were increasingly taking place in recent decades. The severe panned edge between urban renewal and urban sprawl has disappeared. Today, new urban growth in Vienna is represented by the attractive spaces and development potential.

Overall, the history of urban development in Vienna, especially in last decades, cannot simply be defined with processes such as urbanization, suburbanization, reurbanization etc., but in a simultaneity of developments, which depended on a constant networking with economy and society.[22]

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21 SEE GOTTFRIED PIRHOFER / KURT STIMMER (EDS.): PLÄNE FÜR WIEN. THEORIE UND PRAXIS DER WIENER STADTPLANUNG VON 1945 BIS 2005 (PDF), 2007, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008280a.pdf*, 20.3.2019, P. 162-174.

22 IBID., P. 185.

Donau City

DONAU CITY

The idea of building the area between New Danube, Wagramer Straße and UNO City dates to the year 1985, when the municipality of Vienna started discussing hosting a world exhibition together with Budapest. However, the idea of an EXPO 1995 was cancelled in 1991, after being voted down in a referendum.

The 1995 EXPO Vienna - Budapest project is described in more detail in the next part of this paper.

The area between the New and the Old Danube has always been highly attractive for notable construction projects. Over the years, the UNO City (United Nations Office) and Vienna International Centre (VIC) were established on the northern side. In the first years after World War II, this site was used as a landfill. The first formation of Donau City had its origins in hosting the Vienna International Horticultural Exhibition in 1964. In the immediate vicinity there was the A22 motorway and U1 underground line, which offered good transportation possibilities. On the other hand, the A22 motorway had its own disadvantages, such as noise and air-pollution. It also divided the area and obstructed the access to the high potential embankment of the New Danube.[23]

Masterplan

In 1991, the same year the EXPO was cancelled, the masterplan for the Donau City was designed. Land owner and general developer, WED AG commissioned the architects Krischanitz and Neumann to develop a masterplan. Adolf Krischanitz and Heinz Neumann created a clever masterplan for a city on two levels. The plan envisaged the construction of a large cover slab, under which the entire motorized transport would be located, together with the A22 motorway. The underground level would also serve as a service and delivery link. The upper outer plateau would be reserved for pedestrians and cyclists only. On this level many attractive spaces for commerce, public services and gastronomy would appear- bringing everything necessary for the modern urban life. The responsible architects also designed a complex modular network with a specific raster, which would enable high flexibility for urban elements. An important urban element is a promenade. This diagonally positioned street starts next to the U1 Station (Kaisermühlen VIC) and cuts through the area in the direction of the embankment.[24]

The construction of the slab over the A22 motorway was finished in 1996. Two years later, the first office high-rise rise, the Andromeda Tower, was topped out. In the same year, the housing complex Wohnpark Neue Donau and the residential high-rises of Wohnpark Alte Donau were finished. Since then, the urban development on this site has been continuous.

In 2002, around ten years after the first master plan was created, WED AG organised another international urbanistic procedure for a master plan update that would better respond to present day urbanistic challenges. The winning entry project, which was to serve as the basis for the development of a new zoning and land use, was submitted by the renowned architect Dominique Perrault. Perrault's concept focuses predominantly on the transition zone towards the New Danube. The embankment is to be given a more attractive appearance for urban design activities with a strong focus on leisure, culture and contemporary architecture.[25]

The new master plan also covered the design of three new skyscrapers. In addition to a 140 metres tall high-rise near Wagramer Strasse, two office skyscrapers with a height of approximately 160 and 220 metres were proposed. These two tall structures would act as iconic landmarks of the modern Vienna.

The construction of the first and tallest skyscraper started in 2010 and is known as the DC Tower 1. It is a 60 storey and 220 metres high building (250 metres if you count the antenna). It surpassed the Millennium Tower on the other side of the Danube, and is the tallest building in Austria at the moment. A slightly lower, 160 metres tall DC Tower 2 is due to be finished in a

23 SEE REINHARD 2013, P. 17-18.

24 IBID., P. 19.

25 SEE VIENNA CITY ADMINISTRATION: DONAU CITY (PDF), 2007, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008127.pdf*, 5.4.2019, P. 6-7.

Visualization of the three new proposed skyscrapers

few years. Both towers were designed and developed by the French architect Dominique Perrault in cooperation with architects Hoffmann and Janz. Both folded facades facing each other emphasise the relationship between each other. In addition to the two DC Towers, a third high-rise with a height of approximately 140 metres and different design language, the DC Tower 3, is being planned.[26]

Vienna on the Danube

Donau City had finally moved Vienna back to the Danube. The Urban Development Plan from 2005 (STEP 05) dealt with the central area on the right and left banks of the Danube for the first-time and defined them as the Waterfront area among 13 target zones in Vienna. No other urban project in Vienna has ever faced as many expectations as the Donau City development. As the second city centre it should absorb financial growth and act as a modern business area. It should also deal with an urban growth on the left bank of the Danube, serving as a contemporary multifunctional hub.[27]

Various functions and building types are located in the area. Donau City is also home to a construction holding company called the Strabag. Tech Gate Vienna serves as a platform for the networking of scientific and technology-oriented enterprises and thus promotes the cooperation between business and science. The main promenade goes through its building volume. The 90 metres tall Saturn Tower is in the north-western part of Donau City and is one of Vienna's premier office buildings. Part of this building is used by the IBM Corporation at present. Further, near the U1 Station (Kaisermühlen VIC) a contemporary shaped catholic church is located, designed by the architect Heinz Tesar. Among numerous residential projects, many are still under construction or being planned. There is also an underground parking garage with a capacity to hold 6.500 cars. Most of the development areas consist of office and commercial properties, the rest are residential use combined with cultural and recreational functions.[28]

At the moment, around 8.000 persons already live and work in the area. After completion, this number is expected to rise to 15.000 people. Donau City will be used by thousands of other business persons, hotel guests, shoppers and spectators at various cultural events. Vienna's second city centre with an urban atmosphere next to the Danube will contribute vastly to the skyline and overall outlook of the modern metropolis.[29]

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26 SEE VIENNA CITY ADMINISTRATION: DONAU CITY (PDF), 2007, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008127.pdf*, 5.4.2019, P. 7-9.

27 IBID., P. 2-4.

28 IBID., P. 5, 12-19.

29 IBID., P. 7.

Visualization of the future Nordbahnviertel

CURRENT URBAN PLAN - STEP 2025

Vienna is constantly changing. It continues to face new development challenges and has to be open for innovative solutions at all times. The city needs to respond, not only to an increasing number of inhabitants, but also to the need for greater creativity, more ideas, and improved development potentials. That is why a new Urban Development Plan STEP 2025 was created. It strives to show the strategies of the vision for a brighter future of Vienna. This urban development also involves and manages well known governmental, social and economic actors.[30]

STEP 2025 predicted eight key topics for the future planning in Vienna, namely:
- Vienna renews already built areas: existing areas of the city are available to constant transformation. The aim is to upgrade and modernize individual urban cases and outdated buildings.
- Vienna mobilises land and space for urban growth: without new districts and available spaces, Vienna cannot grow. This strategy focuses on empty undeveloped spaces and their potentials. Intelligent urban planning should prevent wasted spaces and inefficient use of resources.
- Vienna transforms centres and underused areas: the main aim is to ensure that the already established spaces remain competitive. The plan also anticipates continuing with the development potential on the ongoing projects, such as Vienna Central Station, Aspern Vienna's Urban Lakeside, Nordbahnhof area etc. The development must be environmentally friendly and should take advantage of the maximal potential and functions of specific areas.
- Vienna generates prosperity for business, science and research: the city has to support the modernization of the existing enterprises and create opportunities for the new ones. There should be investment in research, development and high-tech production. Additionally, new spaces for cooperative business locations, commercial zones and industrial production should be foreseen.
- Vienna as a strong metropolitan region: continuing the strong connection to its surrounding regions. This represents an opportunity to gain recognition in the international rivalry between regions. Existing practices can be used, but they have to follow overall trend and be updated.
- Developing networks of green and open spaces: preserving numerous spacious areas, which can be used for recreation and leisure activities. Design of open spaces has to fulfil the diverse needs of the residents and positively influence the quality and atmosphere of urban coexistence. Public spaces should also be adapted for a mixed-use development.
- Achieving diversified mobility in 2025: new trends demand changes in the transport system. Public transportation must respond to the expected increases in the population, the environment and should be accessible to everyone. By 2025, Vienna's mobility policy wants to ensure that around 80% of all journeys are made by public transportation.
- Vienna makes provisions for the future: focus on high-quality social infrastructure, such as schools, libraries, kindergartens and hospitals. Those facilities should be easy to reach, accessible to all and have an attractive design.[31]

These targets represent criteria, essential to the city as a whole. The entire urban STEP 2025 plan does not work as a critical review of the past processes, rather it is oriented and motivated towards future scenarios.[32]

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30 SEE VIENNA CITY ADMINISTRATION: STEP 2025. URBAN DEVELOPMENT PLAN VIENNA (PDF), 2014, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008379b.pdf*, 10.4.2019, P. 2-5.

31 IBID., P. 14-133.

32 SEE VIENNA CITY ADMINISTRATION: STEP 2025. URBAN DEVELOPMENT PLAN VIENNA. SHORT REPORT (PDF), 2014, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008379d.pdf*, 14.4.2019, P. 23.

PART II.

DANUBE

THE HISTORY OF THE GREEN HEART

The Danube area of Vienna is undoubtedly one of the most attractive leisure and recreational areas that a big city has to offer. Hardly anyone can imagine that until less than a hundred years ago, this area was part of a wilderness that stretched miles along the Danube basin. Probably there is no other region of Vienna that has changed as drastically in the past. After moving away from the river for centuries, Vienna is now finally moving back to the Danube. For a long time, it was like an urban obstacle with districts on each side of the Danube, but today that is no longer an issue, thanks to its excellent public transportation network. Vienna stands out among European cities, there is hardly any other city that would boast a centrally situated recreational landscape of this size and quality, also known as the green heart. For thousands of Viennese it is a unique leisure potential and space for bathing, cycling, skateboarding or surfing.[33]

The Struggle with the River

After the retreat of the oceans two million years ago from the Vienna basin, many water resources of the Alpine region transformed to form the Danube. Over many centuries and interglacial periods river cuts into the terrain and creates numerous arms. This is the place where the river descended and unloaded its sediment to form the distinctive Viennese sloped landscape. This is also the location where easy crossing was possible at shallow fords. The earliest sign of human life in this region dates 20.000 years back. However, an actual settlement, called *Vindobona*, was established by Romans in around 15 BC with a function to guard the northern frontier of the Empire during the reign of Emperor Augustus. Around 400 years earlier, Celts had already created a settlement, but they settled on the hillsides of Leopoldsberg, away from the unpredictable Danube.[34]

33 SEE PROKSCH/STADLER (EDS.) 2001, P. 6-7.

34 IBID., P. 11.

Medieval Vienna during Ottoman attacks with the Danubian plain in the back

Roman Vindobona grew fast. Its site was protected on three sides with watercourses, north it was simply limited with the Danube. The area, enclosed with Rotenturmstrasse, Griechengasse and Laurenzerberg today, was probably the site, where the Roman's Danube fleet was located. All urban development was focused on the right side of the river until the area lost its importance at the beginning of the 5th century. In the next five centuries urban development activities significantly drooped and yet again moved away from the Danube.[35]

The Danube Region in the Middle Ages

In 881, Vienna was first mentioned as *ad Weniam*. During the early Middle Ages, the inhabitants were limited to parts of the former Roman base and they used the river as a navigation and transport route. Because of the constant floods and due to the changes of the main river arm flow as well as the river course itself, the moorings had to be moved to the north. Soon, under Leopold VI, mayor urban interventions took place. During this period, a new city wall was built, more than four kilometres long. Also, a massive weir was erected close to the Rotenturm gate, to regulate the flow and prevent floods. This city wall defined the boundaries of the city for the next 700 years.

The first settlements outside the city wall appear in the beginning of the 12th century. In the 13th century, the settlements of the numerous Danube islands began. One of them, the Spital-Au was also used as a quarantine in the time of the plague epidemics. During the 14th century, the Danube played a key role, its port and transhipment of goods being main contributors to the urban economy. Although the Danube and its main arm (today's Danube Canal) were shifting to the north and because of the progressive aggradation of the main arm, the ship's navigation was threatened. From this point on, a lot of effort and engineering knowledge was invested to keep the navigation channel free.[36]

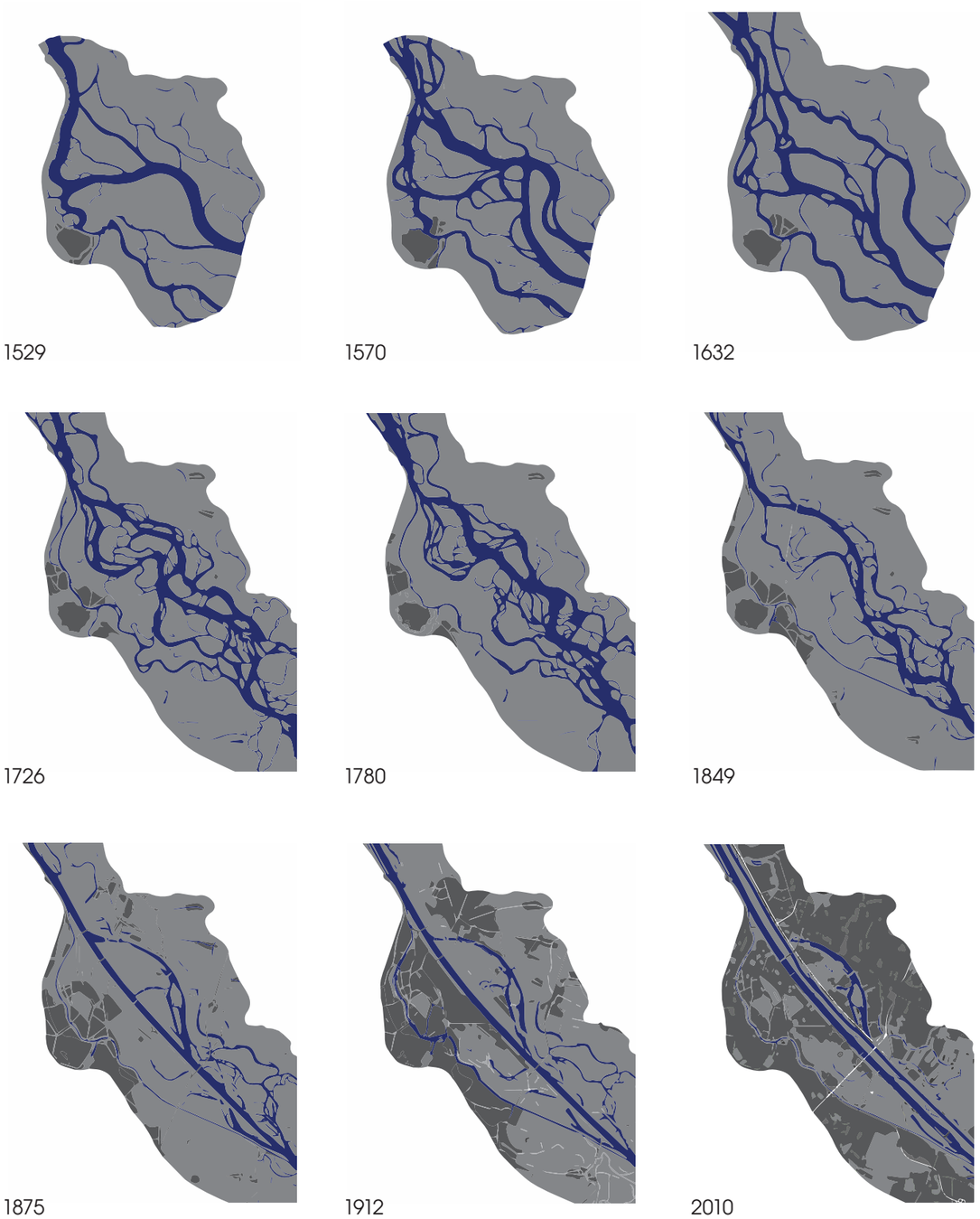
The constant movements and relocations of the Danube over the years resulted in a scattered river landscape with many main and side arms next to the city gates. The area of the river was transformed after every major flood and that was the main reason, why Vienna started building bridges relatively late. In 1439, King Albrecht II finally started building wooden bridges, which opened new trade routes. Those bridges were repeatedly damaged or destroyed by flooding, drifting ice and heavy storms. Despite significant maintenance costs, the additional bridges contributed to urban development in the Danube area. Crossing the river was possible with ferry boats as well, which constantly switched landings due to the changes in the river divisions. In 1533, Vienna became a royal capital again, which led to the construction of a new city wall to satisfy the needs of the rapid development and increased population.[37]

Floods and First River Regulations

The city was often flooded in the past, but the most catastrophic flooding of the millennium was probably in 1501, which was the reason behind considerable efforts to prevent future sedimentation of the river. The most devastating floods would typically happen after thaw in the mountains in a combination with heavy rainfall. However, the floods were not the main threat to the city. Due to the many incursions of Turks, there was a necessity to expand and invest into the existing system of defence. Since it made attacks to the city from the north-east side impossible, the Danube served as an obstacle.[38]

The biggest changes regarding river regulations started after the 1500. In 1529, the situation had already significantly differed from that of the previous centuries. The main arm of the Danube was located around 3,5 km out of the city in comparison to where it was in the year 1455. Additionally, the main arm, called *Wiener arm*, had already been defined and it is the predecessor of today's Donaukanal. By 1570, the river redirected its flow more to the north and moved the main branch (called the Wolf arm) away from the city. There were nevertheless constant movements of the floodplain

35 SEE PROKSCH/STADLER (EDS.) 2001, P. 11.
36 IBID., P. 12-13.
37 IBID., P. 13-14.
38 IBID., P. 14-15.



Transformation of Vienna and the Danube from 1500 to the present

and bridges needed to be continuously reconstructed. The Wiener arm being important for constant shipping, it was also regularly maintained. The Ottoman threats to the city had prevented all major interventions to the riverbed itself.[39] After the second Ottoman siege in 1683, the navigability of the Wiener arm and expansions of the fortifications became the main issue. With many smaller artificial cut-offs and first sizeable regulation measures, the riverbed was brought closer to the present position.[40]

Around the year 1760, river experts started to consider extensive solutions against floods and navigation problems. 36 floods had been documented between 1768 and 1789, out of those, 7 had been severe. Because of higher fluvial processes, the river bed had also widened itself by 600 meters between 1760 and 1780.[41] Moreover, in the 18th century, Vienna had increased its economic strength and experienced a wave of immigration, which was another source of motivation for hydraulic engineers to ensure new safe areas against floods on the flat terrain east of the Danube. Unfortunately, the expansion to the north and west was limited by the hillsides of the Vienna Woods. Numerous dams, spurs and river groins were built between 1780 and 1785 to protect the left bank of the Danube. The work was commissioned by Maria Theresa. Nevertheless, *All Saints Flood* in 1787 destroyed these protective dams and other artificial structures and caused devastation, mostly in the north region of the Danube. The next disastrous flood took place in the winter of 1830. Again, a long pause followed to allow for discussions on what to do next, to finally eliminate the threat of flooding in Vienna.[42]

Discussing the Great Danube Regulation

In the following decades, there had been a lot of deliberation regarding the technical and financial feasibility of various regulation projects. In 1825, a competition for the regulation of the Danube and for a new cable stayed bridge was held. However, at first no suitable solutions for a realization had been introduced. Meanwhile, the construction of embankments along the main river arms simply continued without an actual master plan. Flood protections dikes and other hydraulic structures were constantly being repaired and improved several times after floods.

In the 1850, there was another competition organized by the Danube Regulation Commission. Together with efficient flood protection, there was also a clear need for a development space for possible urban expansion and better transport connections across the Danube. After the dismantling of the city walls in the mid-19th century it was time for the construction of the famous Ringstraße boulevard. In the meantime, side arms of the Danube were dammed, flood levees were heightened and embankments of the main arm, yet still, no general plan had been in place. Several years later (1869/1870), an ambitious project for the regulation of the Danube, the so-called *Great Regulation of the Danube*, finally took place.[43]

The Great Regulation of the Danube

The Great Danube regulation started in 1870 and was finished in only 5 years' time. The Danube was regulated for the first time according to the proper master plan. A more than 13 kilometres long straight cut-off was built in order to prevent ice-jams between Nussdorf and Albern. Parallel to this new straight bed, a low-lying inundation area with a breadth of 470 meters was excavated to enhance the discharge capacity of the bed in case of floods. Flood protection levees at both sides of the new Danube were constructed to protect the entire city from devastating floods. During the works, about 163.000 square meters of previous hydraulic structures, thousands of wooden piles and 18.400 running meters of sills and other ties were

39 SEE SEVERIN HOHENSINNER A. O.: CHANGES IN WATER AND LAND. THE RECONSTRUCTED VIENNESE RIVERSCAPE FROM 1500 TO THE PRESENT (PDF) ,2013, *https://www.researchgate.net/publication/260497727*, 5.4.2019, P. 148-158.

40 SEE PROKSCH/STADLER (EDS.) 2001, P. 15.

41 SEE SEVERIN HOHENSINNER A. O.: CHANGES IN WATER AND LAND. THE RECONSTRUCTED VIENNESE RIVERSCAPE FROM 1500 TO THE PRESENT (PDF) ,2013, *https://www.researchgate.net/publication/260497727*, 5.4.2019, P. 159.

42 SEE PROKSCH/STADLER (EDS.) 2001, P. 16.

43 IBID., P. 17.

Danube around 1960

removed. Viennese officials hoped the main issue with flooding had finally been solved. The Donaukanal was reconstructed and widened as well. Around 550.000 square meters of sediments were removed and used to secure the river banks and to consolidate the terrain for new settlements.[44]

However, this led to the loss of importance of the Donaukanal as a waterway, as most of the Danube traffic was moved outside the city centre. The reconstruction of Freudenau port was finished in 1876 with a direct link to the main channel of the Danube.[45]

Together with the main regulation process, several new bridges were built. Ostbahn and Nordwestbahn bridges were constructed across flowing water, while Nordbahn, Floridsdorf and Reichsbrücke were built over the dry river bed. Many areas were upgraded and had lost its former rural characterr.

Between the years 1850 and 1890 the population of Vienna had grown rapidly from 520.000 to around 1.350.000. In 1873, the world exhibition was held in the Prater area of Vienna, likely representing the most important event in this period of Vienna. Other important infrastructural interventions came about, like for instance the mountain spring water pipeline, the Stadtbahn urban railway and the works on certain other canals on the Danube. At the end of the 19th century, Vienna was already known as the *Danube metropolis*.

From 1905 onwards, Vienna grew explosively, mostly because of industry and commerce. In 1914, it already had two million inhabitants. The first world war as well as the collapse of the Austrian- Hungarian Empire led to a loss of Vienna's political and economic power. Unfortunately, the great regulation of the Danube, which had been finished in 1875, did not manage to solve all the flooding problems either.[46]

New Threats

Soon after the completion of the Great Danube regulation, experts noticed that all problems had not been solved. A 30-year flood in 1897 and 100-year flood in 1899 showed, that the regulation was not nearly efficient enough yet. In the following year, the flood levees had been repaired and heightened yet again with the aim to protect the city from being inundated.[47]

A new plan was drawn up in 1908 to perform new excavations in the floodplain and to increase the height of the dams. In 1918, the idea of erecting a channel in the inundation area emerged for the first time. In 1927 it was announced that three new hydro-power stations were to be constructed on the Danube. After World War II, the criticism of the regulation done in 1875 was officially expressed. In 1969, a need for new flood protection project was confirmed.[48]

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44 SEE SEVERIN HOHENSINNER A. O.: CHANGES IN WATER AND LAND. THE RECONSTRUCTED VIENNESE RIVERSCAPE FROM 1500 TO THE PRESENT (PDF) ,2013, *https://www.researchgate.net/publication/260497727*, 5.4.2019, P. 162-163.

45 SEE PROKSCH/STADLER (EDS.) 2001, P. 25.

46 IBID P. 18-22.

47 SEE SEVERIN HOHENSINNER A. O.: CHANGES IN WATER AND LAND. THE RECONSTRUCTED VIENNESE RIVERSCAPE FROM 1500 TO THE PRESENT (PDF) ,2013, *https://www.researchgate.net/publication/260497727*, 5.4.2019, P. 163.

48 SEE PROKSCH/STADLER (EDS.) 2001, P. 23-24.

Danube Island

Danube Island

In 1969, a new flood control project was finally developed. Increasing the discharge capacity in the event of flooding was an essential part of the project's aim. On the other hand, it was necessary to retain as much water as possible during longer low-water periods in order to prevent the water level to fall too low. Also, the navigability and shipping had to remain undisturbed. The plans included the creation of an additional channel to replace the former inundation area. This second river bed, known as the New Danube, around 160 meters in width, would serve as a reservoir to take up the floodwater. Two proposed dams on both ends would separate the New Danube from the river's main channel. Along with the idea of a New Danube, the Danube Island appears as well.

The Danube Island was imagined as a 21 kilometres long and, on average, 200 meters wide island and was intended to serve as a fixed barrier between the New Danube and the existing Danube river. The excavated material from the New Danube channel would have been moved to the remaining strip of land between both river beds created in 1875 and the New Danube.[49]

Some of the main requirements of a planned solution are:
- A long-term complete flood protection for Vienna;
- Minimal upgrade of the existing flood regulation structures;
- The New Danube, with a total surface of 330 hectares, to accommodate water, suitable for bathing;
- The Danube Island to act as a filter;
- The Danube Island to cover an area of 400 hectares of easily accessible recreational land in the middle of the urban area;
- The navigation channel was not to be affected;
- The existing river morphology conditions in the existing Danube to remain the same.

It was in the city's interest to ensure that the planned flood protection measures would be integrated in the overall urban development. It was based on this that, in 1972, the government decided to organize an urban planning competition for the Danube zone consisting of two stages. The entire area covered around 60 square kilometres. The second stage of the competition with five selected planning teams started in 1974. By 1978 the so-called *Vienna Danube Zone Master Project* was developed, based on the Vienna Model.[50]

The works started as early as 1972, even though there was no final master plan in existence. They were finished in 1987. Certain additional measures were finished by 2010. Together with the construction of The Danube Island, some of the flood levees were heightened and flood protection gates for harbours and the outflow of the Donaukanal were constructed. However, whether all these interventions would be enough, remained unknown.[51]

Land Use Plan

As a result of the planning process and the competition projects, many recommendations had been made for the actual land use of the Danube Island and river embankments. The biggest focus was on the recreational and leisure functions without the building development on the Danube Island. Only developments promoting water and landscape activities were allowed. Motorized traffic was to be completely avoided as were any parking facilities on the island.[52]

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49 SEE PROKSCH/STADLER (EDS.) 2001, P. 27.

50 IBID., P. 28-31.

51 SEE SEVERIN HOHENSINNER A. O.: CHANGES IN WATER AND LAND. THE RECONSTRUCTED VIENNESE RIVERSCAPE FROM 1500 TO THE PRESENT (PDF) ,2013, *https://www.researchgate.net/publication/260497727*, 5.4.2019, P. 164-165.

52 SEE PROKSCH/STADLER (EDS.) 2001, P. 33-35.

Old Danube during summer

VIENNA AND THE DANUBE TODAY

The solution which included the construction of the Danube Island paved the way for Vienna to develop into an amazing city. Not only did it solve the problem of flooding, it also turned the area into the favourite recreational region of the Viennese and other visitors. Easily accessible due to its central position, it offers numerous multifunctional recreational and leisure areas on four river banks along with water, suitable for bathing in some spots.

Some centuries ago the Danube presented the biggest threat to the city of Vienna, and the creation of the city started away from the Danube. Today it seems impossible to imagine Vienna without the Danube. Almost 30 years of planning led to the implementation of a flood control scheme which at the same time turned into the unique solution of a recreational island.[53]

Last trends demonstrate that the long planning vision of bringing the Danube closer to Vienna is already becoming a reality. The urban development and housing projects on both sides have experienced an explosive growth. Several spectacular projects have surfaced, such as the iconic Millennium Tower on the right bank. Between the Old and New Danube, a new multifunctional area is growing, known as Donau City.

The Danube Island is known as a place where you can relax and serves as an important recreational resource for the residents of Vienna and as well as visitors. It is appreciated for its natural landscape and water. According to the findings of the 1997 visitor survey, many also recognize the peace and quiet of the environment with the possibility for relaxation. The main activities include cycling, swimming and sunbathing, skating, walking, visiting catering facilities and the use of picnic areas on the island. Younger visitors prefer sports facilities. The biggest event held on the island is the Danube Island Festival. Outside of that a favourite area for the visitors is the section between Brigittenau and Reichsbrücke in front of the Donau City.[54]

Accessibility

The Danube Island can be directly accessed on foot or by bicycle from both sides of the Danube. Seven bridges cross the island and connect it with both sides, while some smaller footbridges offer connection only with the left side of the New Danube, like Ponte Cagrana, Kaisermühlen, Steinspor and others. However, more than one-third of all visitors arrive to the island by public transportation.[55] The most popular station is the Donauinsel (U1 line) underground station, which is a part of Reichsbrücke, located in the middle of the island. There are 2 additional *Stadtbahn* lines that cross the island - U6 to the north-west and U2 to the south-east. In addition, there is also a rail service of the Vienna *S-Bahn*. Access is possible through many bus connections too. Direct public access to the island by car is only possible via the Floridsdorf bridge, where a small parking lot is established near the location of the Danube Island Festival. Best parking facilities are in the Donau City, which offers direct access to the Copa Cagrana area near Reichsbrücke.[56]

53 SEE PROKSCH/STADLER (EDS.) 2001, P. 55.
54 IBID., P. 59-61.
55 IBID., P. 62.
56 WIENER LINIEN: GESAMTNETZPLAN WIEN (PDF), 2019: *https://www.wienerlinien.at/media/files/2019/gesamtnetzplan%20tag_314694.pdf*, 18.7.2019.

New Danube during winter

The 2000 Vision

In the year 2000, the Municipality of Vienna prepared something called the Structure Plan for the Vienna Danube Zone - 2000 Vision, which focused on the future of the area. However, after almost two decades this vision is still relevant and not yet completely implemented - it is constantly being upgraded. The basis for it was the 1979 land use plan.

The main reason for constructing the Danube Island and the New Danube Channel was of course to ensure flood protection for Vienna. This should remain the priority under any circumstances. No other functions to the island, such as recreational or leisure, can jeopardise or detract the safety aspect.

As early as during the planning and the construction of the Danube Island it was obvious, that the 21 kilometres long island will become Viennese' most important recreational area. To keep this in mind, together with the quiet and pristine places this has to stay one of the most important goals of any future development of the Danube area in Vienna. Furthermore, public access to all areas must be kept. Public transportation, meaning existing underground lines, trains, bus links and even proposed ferry connections, are to remain a high priority for the future.[57]

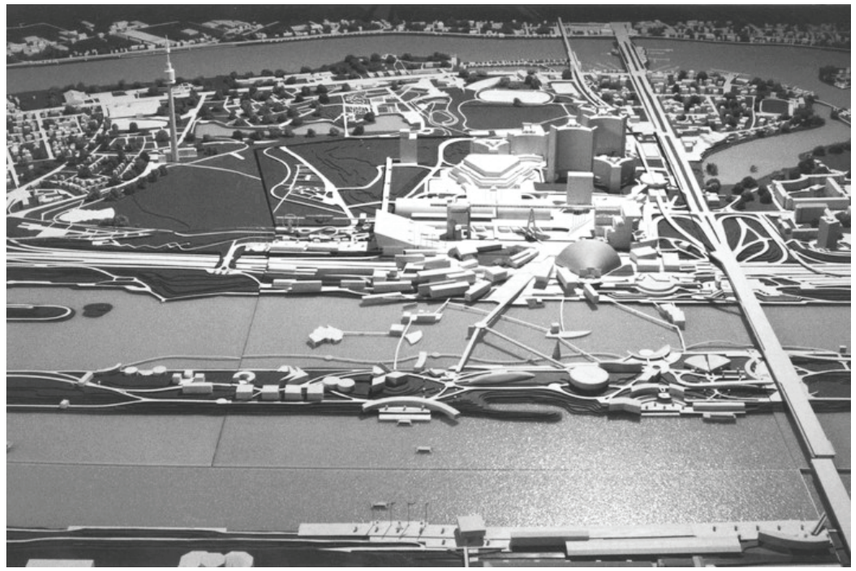
The program should be equally distributed across the entire area rather than limited only to the centre of the Danube island. The right bank of the Danube has a character of a strong urban edge, which is quite populated. The aim must be to create more overpasses and footbridges over the Handelskai embankment as well as the railway, as both make accessing the Danube more difficult.

The north and south sections have a more natural landscape character with many ecologically valuable landscapes, which should be retained. The drinking water chambers in the north section should be protected so this area has to stay reserved only for natural based recreational functions. Some of the most valuable natural landscapes are: Phönixteic, Endelteich, the Kuchelau port peninsula, Nussdorf lock (protected groundwater area), Toter Grund and area around the Tritonwasser.

The central section shows the trends of specific functions - mainly bars, restaurants and other leisure facilities which have been accepted well by the visitors even though they were not planned according to the original land use plan. That infrastructure should meet the leisure trends of the present day as well as the future.[58] Currently, there are some ongoing projects covering areas with catering and other leisure activities, one of them being the renovation of the entire embankment (Copa Cagrana) in front of the DC Tower I with vast public areas and with more orderly designed gastronomic properties.

Recreational and leisure-based landscape areas together with service points, sanitary and information facilities should appeal to all generations and groups (families with small children, senior citizens, amateur sportsmen and women etc.). Temporary culture events and features are also desirable. Public access and use should stay top priority together with the preservation of green areas as an urban structure. Also, the suggestions of the majority should be taken into account - like more festivals and events, more sports grounds, improved access to the water and more spots suitable for bathers, more seating and picnic areas etc. Developing and upgrading this area is a constant topic of the urban planners in Vienna, new visions and ideas appear on a regular basis.[59]

57 SEE PROKSCH/STADLER (EDS.) 2001, P. 63-64.
58 IBID., P. 65-67.
59 IBID., P. 68-81.



EXPO 1995 Competition Project

1995 VIENNA - BUDAPEST EXPO

Early in the mid-eighties, the efforts to put Vienna on the map as a strong international capital of central Europe continued. At that time, a new vision was born: the world trade exhibition project known under the motto Bridges to the Future: the Vienna - Budapest EXPO 1995. This would probably be the most daring vision that would significantly transform the Danube area in Vienna. The main aim was to give a new development boost to the economic and cultural scene.

Bridges to the Future

The concept of *bridges* as a motto has an interesting message. The planned EXPO 1995 was going to be a cooperation between two cities: the capital of Austria and the capital of Hungary. The Danube river in this case acts as a *geographical bridge* and symbolizes the connection between both cities and nations. Both cities were already in contact in Roman times, which formed a *historical bridge*. A *cultural bridge* would enhance the level of art and science of Vienna and Budapest. Both capital cities are centres of industries, commerce and transportation, which makes them an *economic* and *political bridge*. Nevertheless, for the first time in history this had the potential of being a cooperation of two nations to host a world exhibition.[60]

At that time, Vienna recorded a considerable population growth for Viennese conditions, mainly due to the war in former Yugoslavia and the Immigration. This EXPO would, however, mean the further opening borders as the positive metaphor or transcending bridge to the Eastern Bloc.

In 1985, the first considerations regarding holding a world exhibition were made - initially limited only to Vienna. In 1987 the declaration of intend to hold a world exhibition together with Budapest was signed. A year later, in 1988, the Vienna City Council unanimously agreed to hold the EXPO 1995 in the Danube area, close to the UNO City, directly in front of the conference centre.

In many ways this project exceeded the competence and logic of spatial planning, it was never not just a project of urban expansion. The idea of an EXPO emerged from the perception of the local political expectations of major international events for long-term urban development, modernization and innovation. It was a strategic idea to strengthen Vienna's potential and position in the heart of Europe which could not be sufficiently effective due to the Iron Curtain. That is also one of the main reasons for the EXPO 1995 to be planned together with Budapest and being addressed the *Bridges to the Future*.[61]

An Impulse for Urban Development

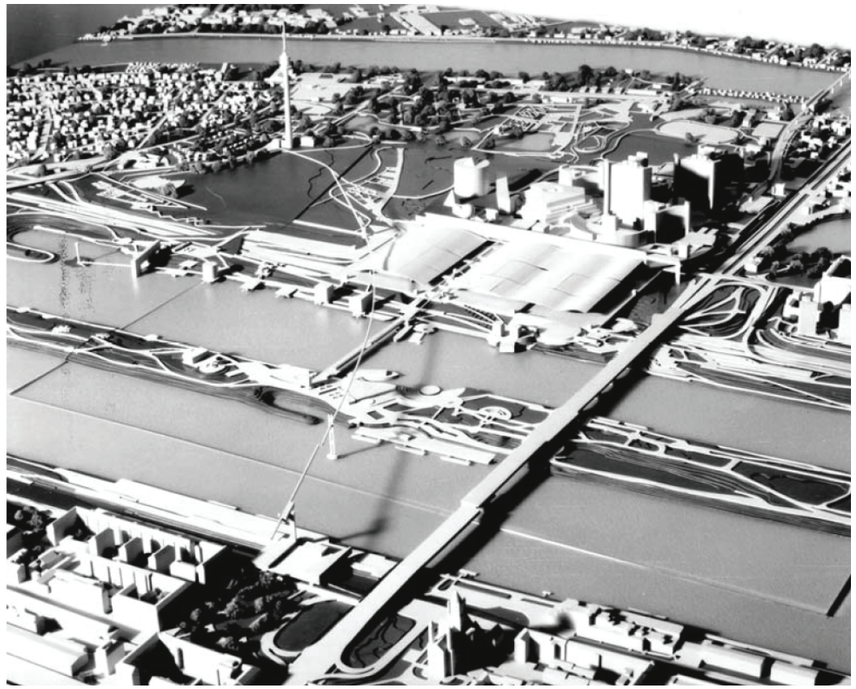
The EXPO should not be a singular event project but together with infrastructure and "re-use" of the site a long-term effective impulse for urban development of Vienna.

The EXPO should not be a singular event project but together with infrastructure and *re-use* of the site rather a long-term effective impulse for the urban development of Vienna.
The most important urban development goals were:
- Vienna on the Danube; connecting Vienna with the Danube river closely;
- Establishing a better connection between the east districts of the Danube with the central city districts. The EXPO to act as a bridgehead for urban development in the east of Vienna;
- Modernizing the city and making it more dynamic. Stimulation for an international and European metropolis for settlements of commercial companies, international organizations, students, tourists;
- Modernizing the field of urban planning and architecture.[62]

60 BUILDING RESEARCH AND INFORMATION: PROPOSED WORLD EXPOSITION - 1995, 1991, *https://www.tandfonline.com/doi/abs/10.1080/09613219108727137,* 5.4.2019.

61 SEE GOTTFRIED PIRHOFER / KURT STIMMER (EDS.): PLÄNE FÜR WIEN. THEORIE UND PRAXIS DER WIENER STADTPLANUNG VON 1945 BIS 2005 (PDF), 2007, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008280a.pdf,* 20.3.2019, P. 107-108.

62 IBID., P. 107.



EXPO 1995 Competition Project

The vision of the EXPO 1995 did not focus solely on the actual area of the planned world exhibition between UNO City and right bank of the Danube. The topic of intensive studies to provide an implementation of the real urban development that would be effective long-term extended to areas such as the development axis City - Praterstern - UNO City - Kagran (axis U1 North), for the WED - terrain (known today as Donau City in front of the UNO City) and the Nordbahnhof.[63]

Planning was therefore forced to try out the *learning by doing method*. Many inquiries from administration, science, culture, economics and marketing tried to initiate strategic planning, which resembled an experiment in some directions. A lot of courage and energy was invested into spatial scenarios, anticipated economic and social effects, cultural perspectives and public relations. Planning groups examined all relevant areas and the possible effects any plan could have on urban development.

Cancellation of the Project

However, not only large parts of the population, but also the media and a part of the elite groups were sceptical about the project from the beginning. Basically, the entire EXPO 1995 was not a project for conventional planning procedures known at that time. It took place only fifteen years after the UNO City, which had been massively controversial among the general public. EXPO 1995 was proposed on an even bigger scale and its long-term effects were incalculable. Also, several factors further constrained the project, among them being: the fear of the eastern bloc; housing speculations and memories of a previous Vienna EXPO from the year 1873 which had not been very successful.

Ultimately, the planned EXPO failed and was rejected in a referendum held in 1991. At the time, the global context had already massively differed from ten years before. With the fall of the Iron curtain, the proposed *bridge* between east and west had also lost its power. At the same time, fear of immigration and massive changes, which were spread among the population by the media, had increased.[64]

The Continuation of a Vision

After the cancellation of the EXPO 1995 in Vienna, big efforts to re-establish this area were still ongoing. The intended World-Exposition and already existing UN-buildings there was a competition for a masterplan with a diagonal axis with some high-rise buildings. There was even an idea to build the world-renowned Vienna's Guggenheim Museum.[65] Today, the vision known under the name Donau City is realizing at this site.

63 SEE GOTTFRIED PIRHOFER / KURT STIMMER (EDS.): PLÄNE FÜR WIEN. THEORIE UND PRAXIS DER WIENER STADTPLANUNG VON 1945 BIS 2005 (PDF), 2007, *https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008280a.pdf*, 20.3.2019, P. 110.

64 IBID., P. 108-110.

65 ATELIER HANS HOLLEIN: MASTERPLAN DIAGONALE, 1994, *https://www.hollein.com/eng/Architecture/Chronology/1990-1999/Masterplan-Diagonale*, 25.3.2019.

PART III.

LIVING ON WATER

THE BRIDGE AS A STARTING POINT

Bridges have followed humans from the first moment of their permanent settlement, despite it only being a short footbridge or a simple hanging bridge. Even though bridges are more prominent today, they span longer distances and they keep breaking new records; their basic function is unchanged, bridges still connect, and they are still conquering even today, only this is now done with trade. Bridges became the destination for tourists. Who does not know Golden Gate Bridge, Tower Bridge in London or perhaps the Old bridge in Mostar?

Not only do bridges connect the right and left side of an obstacle, they also connect nations, cultures and continents. They allow the passage of people and goods over natural barriers, such as rivers and seas, which, due to economic interests, need to be overcome. Therefore, the design of new bridges has always been a major challenge for builders who need to build longer, higher, more beautiful bridges every day. Bridges have always marked exceptional construction progress, from their early beginnings, ranging among the oldest civilizations, to the development of railways and industrial revolutions, all to the present day. Bridges are exposed to natural elements, are often placed in otherwise inaccessible places, yet are nevertheless the most visible and unforgettable architectural masterpieces of brave people and have the tendency to persist in the memories of future observers.

Precisely because of the occurrence and rich history of bridges these simple but splendid constructions probably represent the best starting point for any analysis of architecture related to the water. It is most probably also true that people did not initially settle down by rivers and water bodies in order to build and compete with bridges, but because of the vital importance of water.[66]

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66 SEE ZOREC/POCIVALSEK 2009, P. 6-7.

Golden Gate Bridge in San Francisco, USA

Bridge as a Structure

Bridges are structures that span over different kinds of obstacles, such as rivers, seas, valleys, roads etc. Their primary function is to keep the way underneath free and even more importantly, to provide passage for people and goods over obstacles. Viaducts, on the other hand, normally represent longer bridges with multiple spans. The actual design of a bridge depends on the function of the bridge, the situation, construction material and funds available. Every bridge should be functional, safe and economical, but also aesthetically acceptable. The exact definition of an elegant bridge cannot be explained, its presence always holds a high symbolic or visual aspect and has always been controversial.[67]

Technically speaking, we can divide bridges into four main categories: beam and cantilever bridges (including truss bridges), arch bridges, cable-stayed bridges and suspension bridges.

Beam and cantilever bridges are considered the simplest and most widespread bridges. Beam bridges are most often composed of a long beam, that is supported on both sides and carries traffic loads by bending. Normally we choose them for a small simple bridge or for a longer simple viaduct. In case of a cantilever bridge the beams are supported only on one side and on the other side they are attached to the shore or other extended part of the bridge. The simple cantilever bridge consisted out of two consoles, which are connected in the centre of the bridge structure. Cantilever bridges allow the construction of longer spans as beam bridges. Truss bridge consists out of numerous tension and compression elements. Trusses are also popular, because they require less material, which consequently means the structure being lighter and resisting wind better. The most famous cantilever truss bridge remains Forth Rail Bridge in Scotland, which was built in 1890. It has two main spans, each 521 metres long. To this day, the bridge is still considered an engineering marvel.[68]

The arch bridges are most often recognized by a simple geometric form - arc. Arch component carries loads by compression to each side of the bridge. The Mycenaean Arkadiko Bridge in Greece is probably the oldest existing arch bridge and dates back to 1300 BC. Back then, old builders already used stone as an excellent material for arch bridges. The Romans took the knowledge of arch construction principle from Etruscans and developed it to the maximum. They built powerful structures like, for example, aqueduct Pont du Gard near Avignon. The Romans distributed their typical bridge construction throughout Europe. The list of Roman bridges comprises about 330 arch stone bridges, 34 wooden bridges and 54 aqueducts. With the industrial revolution and the use of the new material – iron, the first steel arch bridges appear, and later with the steel and reinforced concrete, the number of this group of arch bridges increases greatly. At that time, a new group of arch bridges appeared as well. In the case of tied arch bridges, the arch-shaped structure is located above the deck which is suspended. An example of such a bridge is the Lupu Bridge in Shanghai with the main span of 550 metres. Sydney Harbour Bridge is probably considered the world's most famous arch bridge.[69]

Cable-stayed bridges are held up by numerous diagonal tension cables. The cables are attached to the pylons, which can then take over the weight from the hanging deck. After the evolution of the reinforced concrete and steel, the cable-stayed bridges become more prominent and popular. Nowadays, the need to replace older robust bridges with elegant cable-stayed bridges is quite common as well. Probably they allow for the most design diversity, which affects the shape of the pylons and the distribution of cables (harp, fan and other principles). Normandy Bridge in Northern France is considered the modernist and architectural pride of Normandy and has the longest cable-stayed bridge span in Europe. The Rio–Antirrio Bridge in Greece is one of the longest multi-span cable-stayed bridges in the world. It is an exceptional bridge, where movements of tectonic plates and strong winds have to be taken into account, while not forgetting aesthetics. In

67 SEE P. BILLINGTON/N. BILLINGTON/SHIRLEY-SMITH: BRIDGE. ENGINEERING, 2019, *https://www.britannica.com/technology/bridge-engineering*, 20.2.2019.

68 SEE ZOREC/POCIVALSEK 2009, P. 8-13.

69 IBID., P. 16-21.

Øresund Bridge between Denmark and Sweden

case of an earthquake, the foundations can slide and thus retain the bridge in one piece.[70] Another remarkable example is the Øresund Bridge, which is a combination of a railway and motorway cable-stayed bridge, which turned Copenhagen in Denmark and Malmö in Sweden into one big metropolitan area.[71]

A suspension bridge carries the deck with the help of vertical suspenders, which are hung from the main suspension cable. A suspension bridge can be routed over two high points with the help of pylons across deep and wide rivers, seas and bays. They allow the construction of bridges with the longest spans and are considered one of the oldest forms of bridges. In a simple rope design, they are still used in less developed areas of Asia, Africa and South America. The history of suspension bridges, known also as rope or swing bridges, goes back a long way. The first suspension bridges (without vertical suspenders) were built from ropes, made out of braids and climbing plants, then they were simply driven over the gaps and tied with some boards and just like that they were ready for the crossing. The first examples of these bridges existed as early as the 3rd century BC. The first modern examples of suspension bridges appeared at the beginning of the 18th century.[72] Probably the world's most famous suspension bridge is the Golden Gate Bridge in San Francisco, which was at the time of the opening in 1937 considered to be the largest bridge of its kind and with the largest span at that time (1.280 metres), with the highest steel columns ever installed, the longest suspension cables and the strongest concrete anchorages that were ever moulded. Golden Gate Bridge marked the new era of building bridges, which was characterized by slenderness and elegance.[73]

Thirty years after it was built, the mighty Japanese Akashi Kaikyo bridge remains the tallest, largest and longest suspension bridge on the planet. It was built in a place where no bridge should stand, in a place where typhoons are raging, and winds blow with a speed of up to 290 km/h. It crosses one of the busiest water ways in the world and stands in the middle of the earthquake zone. Its foundations are the size of a 20-storey block, 298 meters high pillars are almost as high as the Eiffel Tower in Paris, and with its cables we could circle the Earth seven times. Akashi Kaikyo Bridge, the suspension bridge with the longest span (1.991 metres) in the world already has numerous competitors.[74] Currently, there is a suspension bridge under construction in Turkey, known as The Canakkale 1915 Bridge, which is expected to be finished in 2022. With a span of 2.023 metres it is set to become the next longest suspension bridge in the world.[75] It is just a matter of time, when these giant *monsters* will connect the Strait of Gibraltar, Bering Strait or perhaps the two sides of the Red Sea. Thanks to bridges the borders between cities, countries, and continents are vanishing every day.

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70 SEE ZOREC/POCIVALSEK 2009, P. 26-33.

71 ØRESUNDSBRO: THE ØRESUND BRIDGE, *https://www.oresundsbron.com/en/node/6738*, 20.2.2019.

72 SEE ZOREC/POCIVALSEK 2009, P. 36-37.

73 IBID., P. 42-43.

74 IBID., P. 39, 44-45.

75 WIKIPEDIA: ÇANAKKALE 1915 BRIDGE, 2019, *https://en.wikipedia.org/wiki/%C3%87anakkale_1915_Bridge*, 20.2.2019.

Old Bridge in Mostar, Bosnia and Herzegovina

Bridge as a Symbol

Bridges have always been buildings with cultural aspects, as opposed to only being practical. They have the power, mostly because of their monumentality, to affect our consciousness. A bridge can be sealed in our memory by special event, literature, film, photography or our direct encounter with it.

An example of this is the world-famous Golden Gate Bridge in San Francisco. In 2007, the American Institute of Architects conducted a survey and produced a list of 150 favourite structures in the USA. Golden Gate Bridge was named fifth. The bridge which was built in 1937 and connects a part of San Francisco built on a peninsula along the coast, was the longest suspension bridge in the world at the time of construction. It became the world's most recognizable symbol of San Francisco and California. There are many photographs of the bridge, and right through pictures, the bridge has been written into the consciousness of the masses from all over the world.[76] Golden Gate Bridge is an exceptional tourist attraction, but unfortunately also one of the most frequently chosen locations to attempt suicide in the world.[77]

Old Bridge over the Neretva river in the Bosnian-Herzegovinian town of Mostar connects two parts of the city and two cultures. During the war between the republics of the former Yugoslavia, the bridge represented the demarcation line between the Muslims and the Croats, and it did not happen for the first time in the history that the bridge had to be destroyed in order to prevent the enemy from accessing his own territory. Bridges are one of the most frequent targets and victims in all wars, and the same was the fate of the Mostar bridge, which the Croatian army demolished in November 1993. In the following years, the city of Mostar almost lost its identity because of the absence of this bridge. The Old bridge, which was the symbol of Mostar, is a symbol of the possible coexistence of people of different faith and culture and has become the victim of the hatred of people on either side of the bridge. After the war, they began planning to rebuild the bridge, which would become a symbol of peace and reconciliation between conflicting nations. A lot of original material was used to rebuild the bridge. Missing blocks and unusable elements were carved again according to the traditional procedure used to produce the originals. In July 2004, the bridge was ceremoniously opened, and in 2005 the bridge was inscribed on the UNESCO World Heritage List.[78]

Bridges, which are undoubtedly one of the most famous tourist attractions, are not always famous because of their dimensions, but their popularity and visibility has often been guaranteed by their location. These links between the river banks act as threads and represent concentrations in certain parts of the city and serve as a visual corridor for the experience of a space. These bridges are normally part of historic city centres that belong to the world's cultural heritage. For example, Italy is a land of a number of cultural monuments including bridges, such as the Ponte Vecchio in Florence or Ponte di Rialto in Venice. Besides, tourist cannot leave Venice without at least taking a quick look at the second most popular bridge in the city. The bridge of modest dimensions connects the Doge's palace with prisons and has a symbolic name: *Ponte dei Sospiri*, which translates to the Bridge of Sighs. The route through this bridge for convicts was often only one-way, or best-case scenario, it meant the last look out to the sea and Venice for a long time.[79]

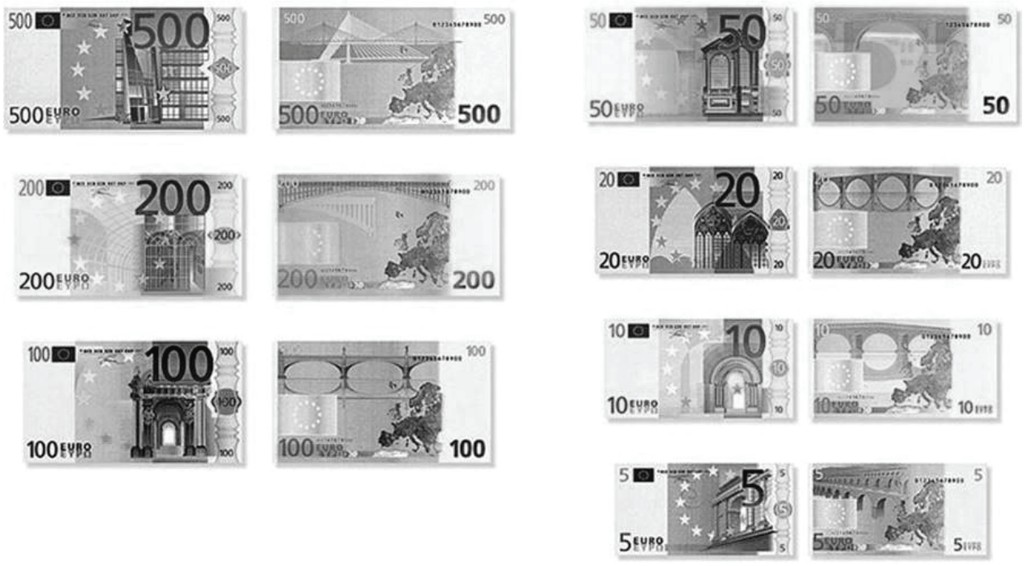
The beginning of the pontificate, also known as the papacy, during the Roman empire in Rome could be considered as one of the early beginnings of notable recognition of a symbol in connection to bridges. The people holding the top position at that time were known under the nickname *Pontifex Maximus*. The Latin term Pontifex Maximus means *largest pontiff*, which literally means the largest bridge builder. Later, the term was also transferred to the Catholic popes, but this title was not part of the official addresses of the Pope, rather it

76 SEE ZOREC/POCIVALSEK 2009, P. 60.

77 BATESON: THE GOLDEN GATE BRIDGE'S FATAL FLAW, 2012, *https://www.latimes.com/opinion/la-xpm-2012-may-25-la-oe-adv-bateson-golden-gate-20120525-story.html,* 15.6.2019.

78 SEE ZOREC/POCIVALSEK 2009, P. 59-60.

79 IBID., P. 61.



European Banknotes

appeared mostly on various papal coins, monuments and buildings, especially popular during the Renaissance and later modern times. For people named *Pontifex Maximus*, the word bridge-builder is worthy of understanding with a symbolic interpretation which says that they have built symbolic bridges between God and the people.[80]

Nobel laureate for literature from 1961 Ivo Andrić brought to the world the glory of the bridge built by the Turks, which represents the continuation of the excellent construction of the Romans - this is the bridge on the Drina river in Bosnia. The powerful stone arch bridge was also the main character of the book The Bridge on the Drina. The book has been translated into numerous languages, and the bridge has been remembered by many.[81]

The Yugoslavian writer, Ivo Andrić, wrote these sympathetic sentences about bridges in the book:

> "*In everything that man pushes by his vital instinct, builds and raises, nothing is more beautiful or more precious than bridges. Bridges are more important than houses, more sacred because they are more useful than temples. They belong to everybody and they are the same for everybody, always built in the right place in which the major part of human necessity crosses, more durable than all other constructions and they do not serve for anything secret or bad.*[82]

In modern times, bridges further confirmed the fact that they connect nations and continents. Over the years, the bridge has become a symbol of strength, exchange of ideas and goods. It is probably also due to these facts that it is depicted on European banknotes. The windows and doors on the front of the banknotes symbolize the spirit of openness and cooperation, and on the back of each banknote there is a bridge that is typical for each individual period in the cultural development of Europe. Bridges from multiple periods of the European history are used as a metaphor for cooperation between European nations and between Europe and the rest of the world.[83]

Bridges are surrealistic constructions, megalomaniac projects that have become the emblem of cities and regions where they are located. Bridge planners act as lawyers among remote nations which are trying to make new connections. Bridges are symbols of people and freedom, brotherhood among nations, connection, transition, peace and reconciliation, political decisions, financial power, urban growth, the bustling destination for tourists, unfortunately also a place where many end their life. Bridges are all the above.

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80 WIKIPEDIA: PONTIFEX MAXIMUS, 2019, *https://en.wikipedia.org/wiki/Pontifex_maximus*, 10.6.2019.

81 SEE ZOREC/POCIVALSEK 2009, P. 58.

82 STORIES FOR SPEAKERS AND WRITERS: IVO ANDRIC. THE SIGNIFICANCE OF BRIDGES, 2008, *https://storiesforspeakers.blogspot.com/2008/08/ivo-andri-significance-of-bridges.html*, 10.6.2019.

83 EUROPEAN CENTRAL BANK: BANKNOTES, 2019, h*ttps://www.ecb.europa.eu/euro/banknotes/html/index.en.html*, 5.6.2019.

The Pont au Change in Paris, around 1780

INHABITABLE BRIDGES

Bridges have gained several roles in our environment over the course of the history. They can be architectural achievements, symbols of nations and cultural icons, tourist attractions, but their primary function is of infrastructural importance - they serve for the transport of people and goods. However, the bridges of the past, especially in Europe during the Middle Ages, were multifunctional and quite popular in urban areas. This building type has always fascinated architects and urban planners.

An inhabitable bridge is a structure that normally consists of two main components: the lower structure acts as a bridge supportive structure and the upper architectural superstructure, that allows other functions than just crossing. As already suggested by the word *inhabitable* itself, such bridges are suitable to accommodate people or fit to live in. In contrast with a typical bridge it simply extends the urban structure and directly adds cultural and symbolic, sometimes even emotional value. These serve as a destination on its own, not just as a tool to cross obstacles. First inhabitable bridges appeared in the eleventh century, however their number had declined after the seventeenth century, and most of them were demolished in the eighteenth century.[84]

Multifunctional Bridges in the Past

The most dominating function of medieval inhabitable bridges in Europe was commerce. An example of that is Ponte Vecchio in Florence, which had been occupied with jewellers. Another example, Pont au Change in Paris was *reserved* for money-changers. The city of Paris invested in many similar structures and turned them into prestigious objects, strengthening their status. We can perceive them as the predecessor of the commercial centres or modern shopping malls. Pont Notre-Dame in Paris was rebuilt in 1515 and offered a row of shops with eye-catching display windows. Most sellers lived in higher floors on the bridge structures in order to secure their stock. Normally, such bridges had to support additional five storeys of housing. Most of these bridges were so congested with built structures that people were not able to see the river.

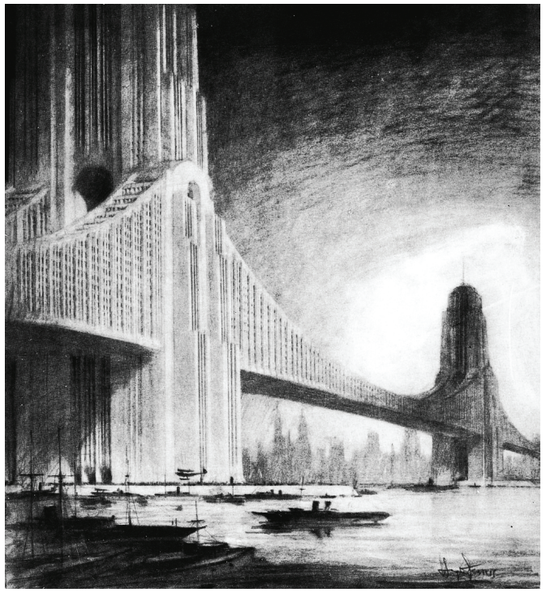
Inhabitable bridges in Europe spread across Italy and France, but also United Kingdom, Germany and Switzerland. Some bridges were even constructed or converted for industrial or strategic use, for instance the defensive bridge system in Strasbourg. The chapel-bridge *Ponte alle Grazie* in Florence also provided structures for religious purposes. In Nuremberg, Germany they even established a hospital on *Heiliggeistspitalbrücke* bridge, which can still be admired today. These structures hosted a wide range of functions and often acted as a micro city, like Old London Bridge, probably biggest inhabitable bridge ever built in Europe.

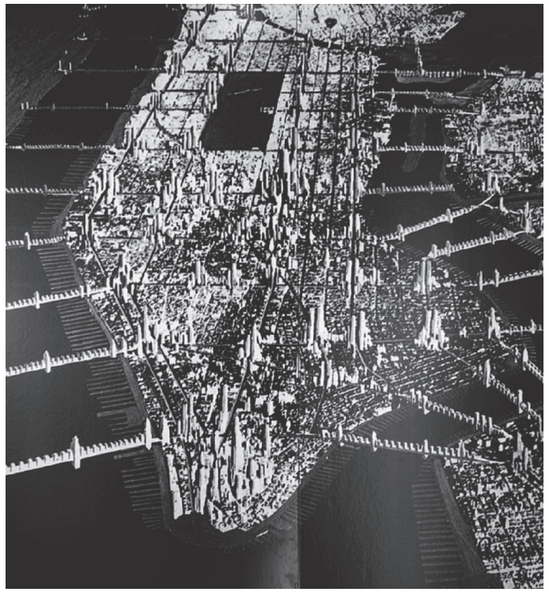
The medieval inhabitable bridges lost their importance in the eighteenth century, when most of them were demolished. A new military strategy, rapid economic and commercial growth as well as unlimited urban growth, also outside the city walls, contributed to their disappearance.[85]

Unrealised Visions until 1950

After the fall of the majority of inhabitable bridges in Europe at the end of the eighteenth century, the idea of such bridges was still quite popular among academic circles and visionaries. Many daring visions and proposals appeared, however, none of these megastructures were ever build. Grand bridge designs with a lot of arches and colonnades fascinated other architects across Europe and inspired many projects. Some examples worth mentioning are the design for a Bridge of Magnificence in London, designed by Thomas Sandby and a John Soane's design for a Triumphal bridge from 1799. Both examples act as a dramatic and powerful impression of ancient architecture.[86] A more rational, but still spectacular design was proposed for a new Avon Gorge Bridge in Bristol, designed in 1793 by William Bridges. Five storeys in the substructure supporting the bridge's deck foreseen variety of functions, like a public granary, corn exchange, museum, library,

84 SEE MURRAY/STEVENS (EDS.) 1996, P. 14-20.
85 IBID., P. 24-29.
86 IBID., P. 76-82.





Raymond Hood's vision for inhabitable bridges in New York, USA

marine school, chapel, offices and even some dwellings. Nevertheless, it was never realised.[87]

In the nineteenth century many new design proposals had appeared. L. P. Baltard proposed a new inhabitable bridge in Lyon in 1828. The bridge envisaged a theatre and numerous shops. On the other hand, Thomas Mosley designed a new proposal for the Waterloo Bridge in London, which, if built, would contain a European art Gallery. Probably the most desirable function of inhabitable bridges in that time was commerce – more specifically the function of a market. Such proposals appeared in Zürich, Amsterdam, London etc. Gustave Eiffel proposed a massive glass and iron assembly hall for exhibitions and shops on a bridge in Paris. The proposed project, which would be a part of the third Paris World's Fair in 1878, was rejected by the authorities. For the next world's fair in Paris Gustave Eiffel returned with another proposal. Instead of the inhabitable bridge this time he and his team proposed another superstructure - Eiffel Tower, which was built in 1889. Holden's proposal for the new Tower Bridge in London is another one worth mentioning. Rather than repairing it, after it had been damaged in the Second World War, W. F. C. Holden presented an idea of the Crystal Tower Bridge, which would offer around 24.000 square metres of office spaces.[88]

Inhabitable Bridges Beyond Europe

The United States of America discovered the idea of an inhabitable bridge as a new building typology quite late. In 1924 architect Louis Christian Mullgardt designed a radical skyscraper bridge, which would link San Francisco and Oakland. Residential and commerce programs were placed into the pylons, under the transportation deck. Mullgardt stated that such structures would be logical and economical, its program easily accessible etc. Several years later, Charles Morgan and the architectural office D. H. Burnham& Co. presented a similar visionary project for Chicago. Bridge piers would act as office skyscrapers with twenty-five storeys. However, the most dazzling project was proposed by Raymond Hood in the 1920s. He probably envisioned the most ambitious and massive inhabitable bridge ever designed. His extensive urban project introduced numerous inhabitable bridges linking Manhattan with other districts of New York. Around 50.000 people would live in massive structures, having direct access to shops, theatres, bridge promenades and roof gardens. The economic crisis of 1929 eliminated the visionary ideas of such structures on that scale.[89]

In the following, the most relevant inhabitable bridges from the past are presented. Additionally, some modern examples of these multifunctional structures in use today, are included as well.

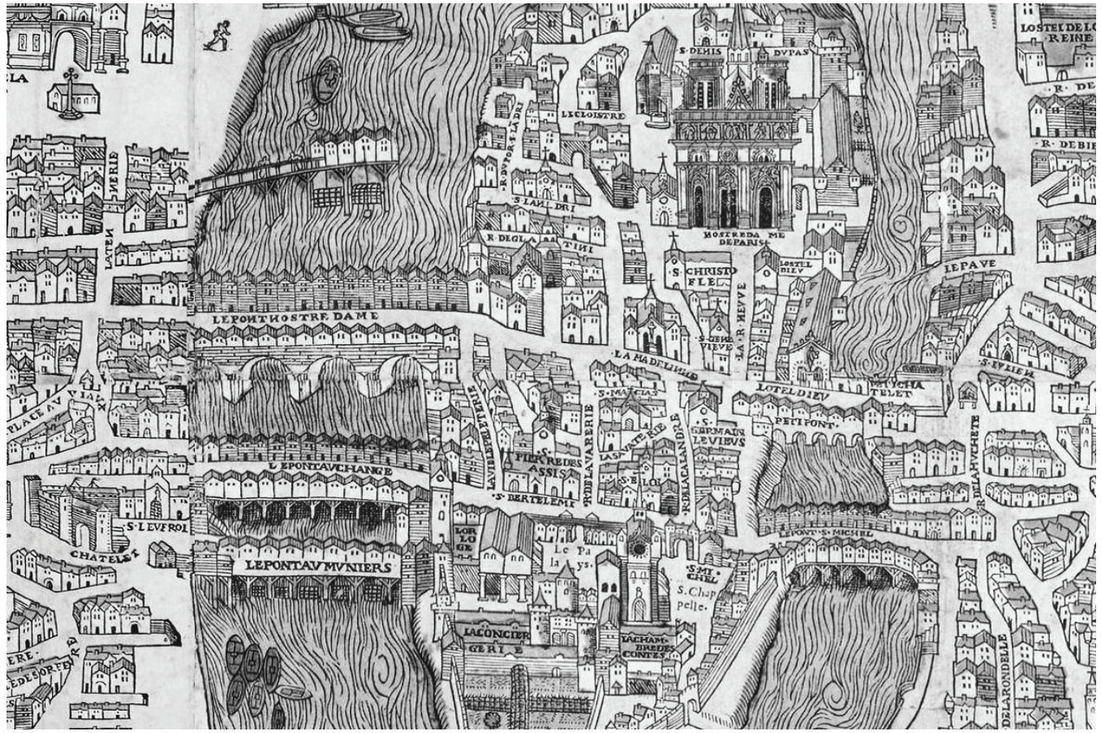
87 SEE MURRAY/STEVENS (EDS.) 1996, P. 82.
88 IBID., P. 84-90, 98-99.
89 IBID., P. 94-96.

Old London Bridge, London

Several bridges were built at this site – the first one in Roman times, the current one was opened to traffic in 1973. But the most remarkable structure crossed the river between the 13th and 19th centuries. Immediately after the completion the bridge became an important commercial crossing - by 1358 there were already 138 shops located in it. Even though the bridge structure had been repeatedly damaged, mostly because of disastrous fires, it had always been swiftly rebuilt. In the 16th century there were around 200 buildings on the bridge, that formed a kind of a tunnel through which all traffic had to pass. The available roadway was only 4 metres wide and at the most crowded time, it could take you up to an hour to cross it.

Because of repeated congestions, in 1722 Lord Mayor proclaimed a special order for the direction of the traffic movement, which was probably the first reference for the practice of traffic in Britain - driving on the left side of the road. However, in 1756, the city municipality decided to demolish all the buildings and improve the bridge. The last tenant left the bridge in 1762, when all the buildings were removed.[90]

90 WIKIPEDIA: LONDON BRIDGE, 2019, *https://en.wikipedia.org/wiki/London_Bridge*, 15.6.2019.



Medieval bridges to Ile de la Cite, Paris

The island in the middle of Paris, *Ile de la Cite*, represents the centre of the location where the medieval Paris was established. At that time, the island had been connected to the left and right banks of the river with four main bridges - Pont au Change, Pont Notre-Dame, Pont Saint-Michel and Petit Pont. The central position of the island and the appropriate width of the river were ideal for the construction of inhabited bridges, which were filled with commercial functions and housing. All these bridges were introverted, they acted like extensions of a normal street, they simply ignored the presence of the river Seine.

Most of these bridges have been collapsed and damaged over the years, but they were always rebuilt and often redesigned as well. However, by the end of the 18th century all building structures were removed from the bridges. With the demolition of the houses from the bridge deck, the river channel was finally exposed and offered some of the most wonderful views of the Seine river and the city.[91]

91 SEE MURRAY/STEVENS (EDS.) 1996, P. 52-61.

Ponte Vecchio, Florence

The Ponte Vecchio bridge, as we know it today, was rebuilt after a flood in 1345. It was the only bridge across the Arno that had not been demolished during the second world war.

However, the bridge was built as a defence system, many windows and other artistic elements that we can admire today were added later when shops occupied the bridge. First shops appeared back in 14th century, consisting of all types of shops, including butchers and fishmongers, which were a source of filth and stench. To give the bridge a more prestigious character, an order was made in 1593 to prohibit butchers from selling there. Only goldsmiths and jewellers could have their shops on the bridge from that point on. In order to connect the Palazzo Vecchio with the Palazzo Pitti, the Vasari's Corridor was built in 1565, which served as a major connection route for the Medici.

Today, Ponte Vecchio is a very charming place in Florence and offers great views of the Arno river and the bridge itself.[92]

92 FLORES: PONTE VECCHIO. AN EVERLASTING SYMBOL OF FLORENCE, 2011, *https://www.visitflorence.com/florence-monuments/ponte-vecchio.html*, 15.6.2019.

Rialto Bridge, Venice

The Rialto Bridge is one of the most famous tourist attractions in Venice. The current bridge was built in just three years, between 1588 and 1591, as a replacement of an older timber bridge structure. It remained the only way to cross the Grand Canal on foot till 1854, until the Accademia Bridge was built. The bridge has three passages: two on the outer side of the balustrades, and a main central walkway leading between two rows of small shops that mostly sell items for the tourist trade.

Over the centuries, the Rialto bridge has been both praised and criticised. However, most of the Venetians have always perceived it as the eighth wonder of the world. Over time, the Rialto bridge has earned a symbolic status, similar to the Eiffel Tower in Paris, beyond the reach of an aesthetic perception.[93]

93 IMBODEN: RIALTO BRIDGE. PONTE DI RIALTO, *https://europeforvisitors.com/venice/articles/rialto_bridge.html*, 15.6.2019.

Galata Bridge, Istanbul

The Galata Bridge spans the major waterway called Golden Horn in Istanbul, Turkey. Without a doubt, it is a true symbol of Istanbul and it appears on many postcards, t-shirts, posters, magazines and paintings. Walking over the bridge from one part of the city to another serves as a frequent sightseeing route and it is one of the most photographed spots in Istanbul. The bridge additionally acts as an important public space for pedestrians, fishermen, tourists, street vendors, shop owners and photographers alike.

The top deck has a standard traffic arrangement including a tram crossing and is also a popular fishing spot. The most recognizable highlight of the bridge is the lower deck, that features cafés, restaurants, shops and even a wet market. This was added for the first time in 1878 in the third version of the bridge. Today's is already the fifth version of the bridge, which was completed in 1994. It serves thousands of people each day.[94]

94 ROMANOWSKA: BRIDGE THROUGH HISTORY. THE STORY OF GALATA BRIDGE, 2017, *https://www.theguideistanbul.com/bridge-through-history-galata-bridge/*, 15.6.2019.

Entrepot Bridge, Amsterdam

The Entrepot Bridge is a part of a bigger urban project in Amsterdam's Eastern Docklands. The transformation of the former industrial area into a residential area began at the end of 1980s and was finished in the year 1997. It covers around 30.000 square metres of housing surface and was designed by a Dutch architecture firm called Atelier PRO.

The most recognizable structure of this residential complex is the Entrepot Bridge, which encloses the newly built area to the west side. It is not an ordinary bridge, namely, it is an inhabitable bridge. This six-storey residential block, which has a wavy dynamic shape, is the length of the intercity train and the height of a large passenger ship. This corresponds to its location between railway tracks and the harbour. At the water level, numerous additional walkways and some gastronomic facilities are located.[95]

95 ATELIER PRO: ENTREPOT-WEST, AMSTERDAM 1994,, *https://www.atelierpro.nl/en/projects/112/entrepot-west*, 15.6.2019.

Bosch Parkhaus, Stuttgart

The Bosch Parkhaus garage is a unique parking facility that lies near the Stuttgart airport in. This multi-storey truss structure stands over the A8 highway and offers parking spaces for the airport, as well as the new Stuttgart Trade Fair Centre. Across five levels, there is space for 4.200 cars. The entire parking complex consists of two separate 440 metres long structures with a main span of 100 metres.

For the drivers on the A8 highway coming from the east, the structure acts like as a welcoming gesture and at the same time it is also home to the second biggest logo in the world after the Hollywood sign. The German company Bosch owns this exclusive advertising space.

However, it was clear shortly after the completion, that the parking facility cannot operate economically. Its parking capacity is greatly over-dimensioned.[96]

96 WIKIPEDIA: MESSE STUTTGART, 2019, *https://de.wikipedia.org/wiki/Messe_Stuttgart*, 15.6.2019.

Køge Nord Station

A more than 200 metres long structure, located in the Danish city of Køge, was finished and opened to the public in 2019. This unique solution for pedestrians spans above a dense traffic profile, which consists of highway and railway tracks, including a high-speed train rail line. It acts as a distinctive landmark of the region and as an important transit hub. The winning proposal was selected in 2014 and was designed by two renowned Danish architecture firms - DISSING+ WEITLING and COBE. It serves around 8.000 people every day.

The unique tubular structure design is not solely intended for the people to pass from one side to another and for access to the train platforms, but also lends its space to the essential secondary function. Its structure creates a nice wood covered atmosphere, that welcomes the passengers and offers a warm covered resting space and stunning views over the area.[97]

97 KOGE NORD STATION: ABOUT KOGE NORD STATION, 2019, *https://koegenordstation.dk/english/about-koege-north-station/*, 20.6.2019.

Proposed Living Bridge in Hamburg, Germany

Contemporary Inhabitable Bridges

The idea of an inhabitable bridge, that would act as a multifunctional structure where people can work and live is still popular in the twenty-first century. It attracts architects, visionaries and urban planners. New ideas and inspirations are born on a daily basis, not only in Europe, which is known as the birthplace of the inhabitable bridges, but all over the world.

In 2007, German architect and designer Hadi Teherani presented the concept for the Living Bridge in Hamburg. It would be 700 metres long urban gesture, that would connect both sides of the Elbe river and would be one of the main symbols of the entire urban development area, known as HafenCity. At the base level, the bridge would serve as a standard bridge with 4 lanes for motorized traffic and lanes for cyclists and pedestrians. Above that, a massive green public area would be located, together with shops, bars, restaurants, office spaces and around 1000 apartments, all on more than 100.000 square metres. Seeing as the proposal has been widely discussed and criticized in the last years, it is probable that this project will remain a vision.[98] The architect, Hadi Teherani, has prepared two similar inhabitable bridge projects on a much bigger scale, in Abu Dhabi in the United Arab Emirates – one called Golden Gates City and the other Zayed Waterpalace.[99]

The City of London and its river Thames always attracted ideas of inhabitable bridges. As already mentioned, after the demolition of the famous Old London bridge, the city was constantly reviewing ideas for another inhabitable bridge project.

Some of the most remarkable examples:
- The multifunctional superstructure called *Crystal Span* on the site of the existing Vauxhall Bridge - designed by Jellicoe and Coleridge Architects with Ove Arup;
- The proposal for the Hungerford Bridge in 1986 - designed by Richard Rogers Partnership. In 1995 it was completely redesigned, however never built;
- The proposal for the new residential bridge, the *George Peabody Bridge*, on the site of the today's Millennium Bridge. Environmentally friendly inhabitable bridge was designed in 1995 by Richard Horden Associates;
- The competition for a new Thames Water Habitable Bridge organised in 1996. One of two selected designs was a proposal designed by Zaha Hadid Architects, which featured row of cantilevered volumes, filled with flexible and multifunctional spaces.[100]

The last ambitious inhabitable bridge project in London was the proposal for the Garden Bridge, designed by British designer Thomas Heatherwick back in 2013. The bridge would host trees and other plants and would act as a public park, not a mere connection between Temple and South bank. The project was cancelled in 2017, due to a lack of support from the city administration. It was estimated that the construction and maintenance costs would exceed the financial payoff.[101]

Similar proposals appeared in other cities around the world as well. For example, Cezary Bednarski with Studio E Architects proposed the *Millennium Bridge* in Rome over the Tiber river in 1996 to mark the entry into the new century. It should have provided offices, restaurants, bars and exhibition facilities. Further, in 1966 architect Mario Bellini presented a massive 480 metres long and 90 metres high structure for Dubai with spaces for a hotel, stock exchange, offices, luxury apartments, shops etc.[102]

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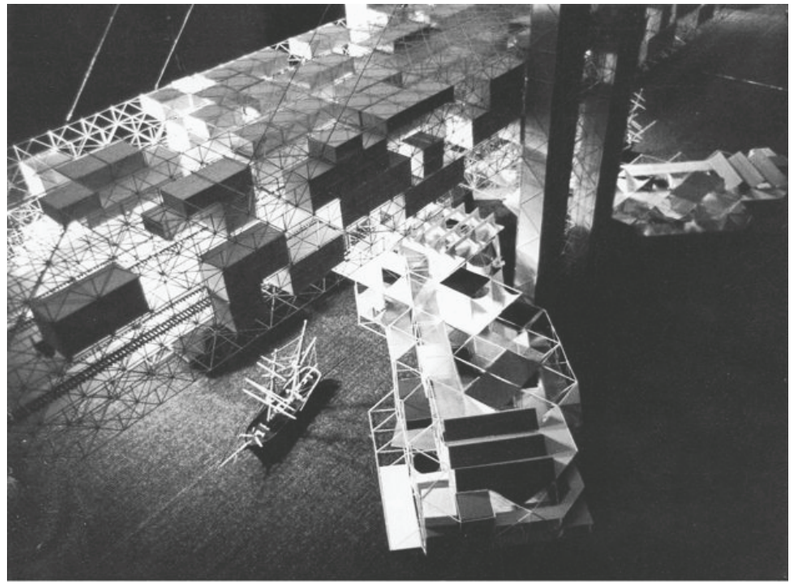
98 WELT: DIE LIVING BRIDGE GERÄT INS WANKEN, 2007, *https://www.welt.de/regionales/hamburg/article1184621/Die-Living-Bridge-geraet-ins-Wanken.html*, 3.6.2019.

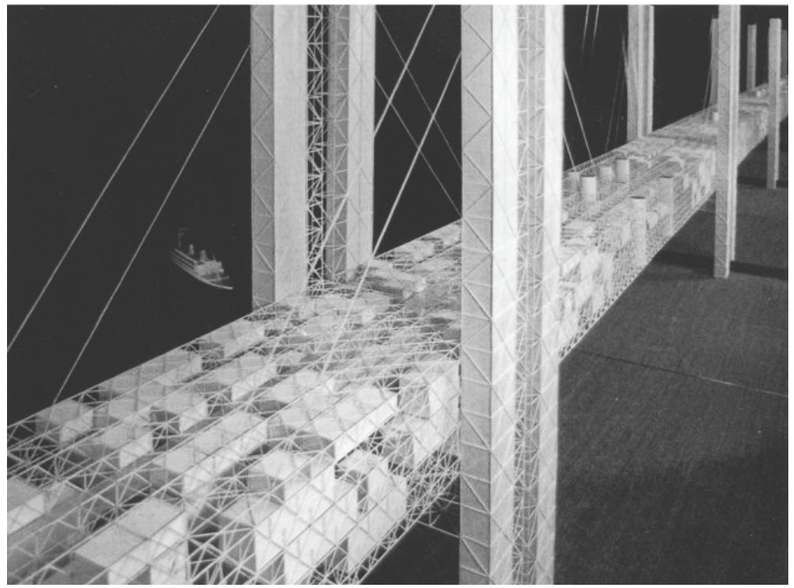
99 HADI TEHERANI ARCHITECTS: PROJECTS - LIVING BRIDGE, *https://www.haditeherani.com/en/project//living%20bridge//*, 5.6.2019

100 MURRAY/STEVENS (EDS.) 1996, P. 100-101, 111-113, 120-121, 135-139.

101 MAIRS: THOMAS HEATHERWICK'S GARDEN BRIDGE OFFICIALLY SCRAPPED, 2017, *https://www.dezeen.com/2017/08/14/thomas-heatherwick-garden-bridge-officially-scrapped-architecture-news-london-uk/*, 5.6.2019.

102 MURRAY/STEVENS (EDS.) 1996, P. 122-123.





Bridge City across the English Channel, proposed by Yona Friedman in 1963

Other Designs and Visions

In 1960, the time of many radical and experimental neofuturistic ideas, architect Yona Friedman presented the Paris Spatial project - a utopian megastructure over the Seine river in Paris. In his vision, numerous floating volumes would form neighbourhoods with housing, offices and other activities. Paris Spatial is just one among many other neofuturistic concepts, designed by Yona Friedman, one of the 1960s megastructuralists. Friedman proposed his concept of *La Ville spatiale* all around Europe (France, Italy, Germany...). He also proposed such floating megastructures in Africa, one of them being the Parliament House in Dares Salaam in Tanzania. Another significant proposal from Friedman from 1963 is the Bridge City across the English Channel between United Kingdom and France.[103] A similar concept was designed by Gunther Feuerstein in 1966. Another utopian megastructure, that resembles a space station would be placed over the Salzach river in Salzburg. Both projects are defined by distinctive links between main elements, which was a common characteristic of the works of Archigram and Japanese Metabolism. Proposals from that time are still fascinating to this day.[104]

In 2014, Stuttgart's Association of architects and engineers Stuttgart (AIV Stuttgart) organised a competition for students of architecture and civil engineering. The task was to design an inhabitable bridge over the Neckar river in Stuttgart. The so-called *Living bridge* should act as a connection for pedestrians and cyclists, together with integrated green recreational areas and a hotel. The jury received 19 interesting and quite rational projects, all of them showed great potential of such structures in the contemporary time.[105]

An idea with especially high potential was one for a special bridge structure, known simply as *The Bridge*, filled with housing and infrastructural functions, proposed by Bjarke Ingels Group (BIG) back in 2005. It was one of the first projects designed by BIG architecture office. Its massive structure resembles an image of a multi-span arch bridge, which vertically expands in the middle to allow bigger ships to pass under the it. At the top, the bridge structure would offer space for its primary traffic function. Under this profile, space for parking and commerce would be located. The bridge piers would offer space for apartments and offices with floating terraces around the piers. This additional program in piers would become an investment and at the same time offer new spaces for attractive housing or office units. Thus, *The Bridge* would finance itself, bringing inhabitable bridges a step closer to being reasonable.[106]

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103 VAN DER LEY/RICHTER (EDS.) 2008, P. 118-128.

104 MURRAY/STEVENS (EDS.) 1996, P. 102-103.

105 AIV STUTTGART: IDEENWETTBEWERB FÜR STUDIERENDE 2014. LIVING BRIDGE - INNOVATIVER BRÜCKENSCHLAG ZWISCHEN ROSENSTEINPARK UND CANNSTATTER WASEN, 2014, *https://www.aiv-stuttgart.org/archiv/wettbewerbe/2014/*, 5.6.2019.

106 BJARKE INGELS GROUP: BRO. THE BRIDGE, 2005, *https://big.dk/#projects-bro*, 5.6.2019.

Living with water in the past and present

BUILDING ON WATER

Water is one of the most essential components of the planet and is of vital importance for our existence, not to mention its many positive effects. Nowadays, a city by the river or the sea is a privilege for its inhabitants. The beginning of the construction of urban villages on water or near the water dates back a long way.

Prehistoric Dwellings around the Alps

Traces of the prehistoric pile dwellings can be found in six countries around the Alps - in Austria, France, Germany, Italy, Slovenia and Switzerland. The remains of prehistoric settlements date back from 5.000 to 500 BC and are situated under water, on lake shores or along rivers. This special method of construction in our vicinity, which can also be found in other parts of the world, gives us the chance to get acquainted with the early agrarian societies of Europe, that lasted more than four millennia.[107]

However, these structures were not exactly built on water, rather near water bodies on the shores of lakes and rivers. Since the objects were lifted from the ground, the predators could not easily climb to the homes. Most importantly, inhabitants had direct access to the fish in rich waters. At the same time, water offered a strategical trading route.[108] The unique construction technique that allowed constructing homes on wooden piles, protected buildings from periodic flooding as well. At the time of a flood, smaller bridges allowed the connection between the individual wooden huts. Later, the lakes had grown, which is why many piles are located underwater today.[109]

Expansions of Buildable Land

The creation of man-made islands, which is closely related to life near the water started quite early on, despite the popular modern impression of artificial islands. Ancient Egyptian civilizations were already familiar with land reclamation projects. Also, the Aztec city of Tenochtitlan, the predecessor of modern Mexico City, was formed on a dried lake Texcoco and was surrounded by numerous artificial islands. Another example is the man-made Ellis Island near New York, that served as an isolated immigration centre.

Today's projects are much more ambitious. Kansai International Airport in Japan was the first airport built on an artificial island in 1994. Four years later, Hong Kong International Airport was built on an artificial island as well to provide more buildable land. Artificially built islands are also extremely popular in the Persian Gulf in countries like Bahrain, Qatar and United Arab Emirates. Dubai, one of the emirates, is home to several artificial island projects, including world-known Palm Jumeirah, Palm Jebel Ali, The World etc. Dubai is a place with the most popular and innovative projects aimed at reclaiming land from the sea and thus extending its coast. However, only one of these projects (Palm Jumeirah) has been finished and inhabited, all others are at present on hold or have been cancelled.[110]

Similar but more rational projects, and projects on a much smaller scale than those in Dubai, can be found Europe too. In the need for additional space, the Netherlands have reclaimed over 17% of the current land area from sea and lakes since 1300.[111] The Flevopolder constructed in 1968 is a region of reclaimed land and is, with its 970 square kilometres, the largest artificial island on the planet. It has a population of more than 300.000 people, nonetheless, it is mostly used for agriculture.[112] Another interesting ongoing project in

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107 SEE UNESCO: PREHISTORIC PILE DWELLINGS AROUND THE ALPS, 2011, *https://whc.unesco.org/en/list/1363*, 10.7.2019.

108 SEE TURTLE: PREHISTORIC PILE DWELLINGS AROUND THE ALPS, UNTERUHLDINGEN, GERMANY, 2014, *https://www.timetravelturtle.com/prehistoric-pile-dwellings-alps-germany/*, 10.7.2019.

109 SEE UNESCO: PREHISTORIC PILE DWELLINGS AROUND THE ALPS, 2011, *https://whc.unesco.org/en/list/1363*, 10.7.2019.

110 SEE WIKIPEDIA: ARTIFICIAL ISLAND, 2019, *https://en.wikipedia.org/wiki/Artificial_island*, 10.7,2019,

111 BRILLIANT MAPS: LAND RECLAMATION IN THE NETHERLANDS 1300 VS 2000, 2017, *https://brilliantmaps.com/netherlands-land-reclamation/*, 10.7.2019.

112 WIKIPEDIA: FLEVOPOLDER, 2019, *https://en.wikipedia.org/wiki/Flevopolder*, 10.7,2019,

Floating student housing, designed by Bjarke Ingels Group

the Netherlands is the manmade archipelago on Markermeer lake, with a single goal - to preserve the wildlife and protect the biodiversity of the area.[113]

Something similar is happening in Denmark, another country with a rich history of land reclamation projects. More recently, in 2005, a two kilometres long artificial island was added to the *Amager Strandpark*, which offers additional space for the beach as well as leisure and recreational activities.[114] Denmark is also constructing a new urban district among many others, an ambitious urban project in Copenhagen, called Nordhavnen. A new unique sustainable district will provide living space for around 40.000 people and will provide high-quality recreational and leisure urban spaces and other public facilities. Water will be an important element of the design process.[115] With all these projects, the Netherlands and Denmark are not only protecting existing green areas and expanding buildable land, but also creating additional attractive spaces near the water.

Waterfronts as Exclusive Locations for Living

Coastal regions and other water related areas are considered prestigious and exclusive locations, especially for residential architecture. They attract new generations of inhabitants and at the same time, try to respond to the climate change, environmental problems and a lack of buildable land. This is a popular topic, especially in highly populated cities all over the world. The new urban landscaping trends are returning cities and their industrialized waterfronts all over the world after many decades back to the people. Homes near the water or in some cases even floating homes are to represent the improved way of living.[116]

HafenCity in Hamburg is probably the most relevant and one of the largest urban regeneration waterfront projects in Europe. The former port is being transformed into a new modern urban quarter, that will have space for around 12.000 new inhabitants together with workplaces for up to 40.000 people. Construction works started in 2001 and should be finished by 2030. Not only exceptional architecture, sustainable transportation system and high urban standards, but also the possibility of living directly by the waterfront are what impresses and attracts the users the most.[117]

Similar urban redevelopment projects near water bodies are also happening in other European cities, like Copenhagen Harbours Sydhavnen and Nordhavnen or urban district Düsseldorf-Hafen near the Rhine river. All these cities do not consider water as a and barrier, but rather a fascinating urban element, that should be integrated in every urban district and available to everyone. The Netherlands even went a step further with their implementation of floating homes. Contemporary floating communities are located all over the country and this unique style of housing culture could be a solution for the rising sea levels around the world. Living on water is nothing new to the Netherlands, as people had lived on houseboats and barges before, therefore new floating homes (for example in IJburg) are considered normal houses. Floating communities are not just more flexible, safer, cheaper and more sustainable, but their atmosphere is also improving the quality of living.[118]

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113 BOFFEY: MARKER WADDEN. THE MANMADE DUTCH ARCHIPELAGO WHERE WILD BIRDS REIGN SUPREME, 2019, *https://www.theguardian.com/world/2019/apr/27/marker-wadden-islands-netherlands-manmade-archipelago-wild-birds-eco-haven*, 10.7.2019.

114 WIKIPEDIA: AMAGER STRANDPARK, 2019, *https://en.wikipedia.org/wiki/Amager_Strandpark*, 10.7.2019.

115 COBE: NORDHAVN, 2008, *http://www.cobe.dk/project/nordhavn*, 10.7.2019.

116 URBAN HUB: WATER AND DESIGN MERGE TO BRING NEW ARCHITECTURE TO URBAN WATERFRONTS, 2018, *http://www.urban-hub.com/urban_lifestyle/water-inspires-new-designs-in-architecture/*, 12.7.2019.

117 HAFENCITY: HAFENCITY HAMBURG. STATE OF DEVELOPMENT, 2018, *https://www.hafencity.com/en/overview/hafencity-hamburg-state-of-development.html*, 12.7.2019.

118 MECKING: ARE THE FLOATING HOUSES OF THE NETHERLANDS A SOLUTION AGAINST THE RISING SEAS?, 2017, *https://psmag.com/environment/are-the-floating-houses-of-the-netherlands-a-solution-against-the-rising-seas*, 12.7.2019

Kenzo Tange's Tokyo Bay Project in Japan

Japanese Metabolism - Plan for Tokyo 1960

Metabolism was an architectural movement in post-war Japan, that amazed the world first in 1959. A group of architects proposed radical architectural projects all over Japan and focused on a design of organic inspired megastructures and urban clusters. The biggest and probably the last public engagement and biggest concentration of their work was presented at the 1970 World Exposition in Osaka.[119]

In 1960, a Japanese architect Kenzo Tange, who was also one of the main names of the Metabolist movement, developed a new radical expansion and redevelopment plan for the capital of Japan. Tange's plan for Tokyo 1960, to establish an entire cluster of floating megastructures and infrastructural objects at sea in Tokyo Bay, is probably one of the biggest, most futuristic and controversial projects not just of Metabolism, but of the entire modern era.[120]

After the end of the war, the already massive population of Tokyo started growing drastically - from 3.5 million in 1945 to 9.5 million in 1960. The Tokyo Bay expansion project had foreseen new space for more than 10 million inhabitants. The radical solution on the water was supposed to be an answer to the incompatible expansion in the old city structure. Instead of a typical centripetal city, the project team designed an around 20 kilometres long linear city. Basic housing units are 138 metres high A-frames floating megastructures. 30 years after Tange's first proposal and another property boom in Tokyo, Kenzo Tange upgraded and won a competition with a new plan- Tokyo Plan 1986. At the same time, Kisho Kurokawa presented his own Tokyo Plan 2025. Despite the fact that none of the plans were ever realized, more than 20 percent of Tokyo Bay was reclaimed anyway without an actual urban plan.[121]

Japanese metabolism generally marked the architectural scene and influenced many other movements (similarities with an avant-garde architectural group Archigram). An enormous number of futuristic megastructures have been not limited only to the land (Tange's Tsukiji Plan etc.), but many also found its place on the sea (Kikutake's projects of Marine City, Ocean City, Marine City etc.) and even in the air (City in the Air in Shinjuku etc.). After the EXPO 1970 and the 1973 oil crisis in Japan, the Metabolists proceeded to expand their vision across the Middle East and Africa.[122]

The spirit of past neofuturistic architectural movements is still alive. Controversial ideas are still dazzling architects and designers. One similar idea being the sustainable floating city concept, designed by the Bjarke Ingels Group. A cluster formed by hexagonal islands would be self-sufficient and would act as a contemporary example of a metropolis established on the water.[123]

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119 SEE KOOLHAAS/ULRICH OBRIST 2011, P. 18-20.

120 SEE KOOLHAAS/ULRICH OBRIST 2011, P. 266-267.

121 KOOLHAAS/ULRICH OBRIST 2011, P. 284-293.

122 KOOLHAAS/ULRICH OBRIST 2011, P. 334-335, 340-369, 590-637.

123 MARCHESE: BJARKE INGELS GROUP UNVEILS FLOATING CITY CONCEPT MADE UP OF HEXAGONAL ISLANDS,2019, *https://www.designboom.com/architecture/bjarke-ingels-big-floating-city-oceanix-04-04-2019/*, 15.7.2019.

Superblock Sewoon Sangga in Seoul, South Korea

LARGE-SCALE URBAN GENERATORS

Massive multifunctional buildings have many powerful synonyms, like megastructures, superblocks, hybrids, vertical cities etc. Because of their dimensions they lie in the grey area between architecture and urbanism. The possibilities and appearance of such structures do not stop at its borders, but rather blend into an urban fabric. The relationship to the existing urban structure is crucial. Megastructures are also known as a city in a city; however, they cannot survive on its own. An island effect can lead to isolation. Urban structures should be the generator of urban life and synergy between different substances- rather extroverted, than introverted. One of the main catalysts that motivates and connects people is trade, which is the reason behind the essential role of commercialization in such contemporary studies.[124]

A Pioneer Among Megastructures

Some designs of megastructures have already been mentioned in previous parts of this work - for instance the proposals from Yona Friedman or the Tokyo Bay Project, designed by Kenzo Tange. Megastructuralists from avant-garde architectural groups like Archigram and Japanese Metabolism were constantly drawing visions for futuristic urban megastructures. However, the city of Seoul in South Korea just went ahead and built one of such megastructures. Sewoon Sangga, designed by the architect Kim Swoo Geun, is a multifunctional complex which was built in the late 1960s. A more than one kilometre long urban mass was conceived as a city on different levels, also with a disconnection from pedestrians and motorised traffic. It is one of the first examples of megastructures that still work and had even survived many decades of change. This brutalist megastructure is not exactly *photogenic*, but it is dramatic and chaotic at the same time, a megastructure in its truest sense. It features a housing program on the top floors, retail and most interestingly, repair services as well as an industrial program on other floors. Among people it is known as an industrial centre and popular hub for electronics and markets. There was even a time when municipality wanted to simply demolish the entire structure. However, the current administration decided to renovate it instead. In the renovation process they added many new pedestrian walkways on different levels. In the last time, new young architectural firms, start-ups and even urban garden on the rooftops have appeared there. The motivations and expectations are the same as in the late 1960s - to establish an ultra-modern, high-tech, noisy and chaotic environment of urban culture and industries. A true megastructure that serves as evidence of a successful story for the upcoming megastructure visions.[125]

Hybrid Architecture

Urban megastructure works as a machine that has a particular function. However, its process cannot be foreseen entirely, especially to predict the upcoming changes in the future. It should be planned as an open-source creation without predestined ideology from the past. Vast physical resources and possibilities should allow modifications and should be oriented towards the changes in the environment. A hybrid structure is not an end product, rather it should always stay flexible. Hybrids in architecture are much more than just mixed-use buildings, they combine economical, physical and social aspects into one big living structure.

A phenomenon of a skyscraper is often challenged with a multifunctional program, as a synonym for a stacked city. However, it is hard to find synergies in verticality. For Steven Holl particularly the dynamic of a section in all dimensions is extremely important.[126]

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124 SEE RIEWE A.O. (EDS.) 2018, P. 71-95.

125 SEE HATHERLEY: "WHAT IS HAPPENING AT SEWOON SANGGA IS, QUIETLY, QUITE EXTRAORDINARY", 2018, *https://www.dezeen.com/2018/01/04/owen-hatherley-sewoon-sangga-seoul-extraordinary-revamp-brutalist-megastructure/*, 12.7.2019.

126 SEE RIEWE A.O. (EDS.) 2018, P. 119-143.

Steven Holl's Horizontal Skyscraper in Shenzhen, China

Viability of the Upcoming Inhabitable Mega-Bridges

To realise an inhabitable bridge or any kind of a large-scale building in the twenty-first century, these multi-functional superstructures will have to satisfy numerous demands and requirements of the contemporary urban environment. Nowadays, bridges mostly serve only one purpose - to convey traffic over obstacles, not just rivers, but also motorways, streets, railway tracks etc. They are strongly rationalized, as they should be feasible in terms of costs and income. The result is the most appropriate compromise between function, structure and material. Functionalism with high measure of bureaucracy and political decisions is in prevalence and leads the way. It follows the needs of the investor rather than those of the public or the wishes of the individual user.

In the future, the concept of inhabitable bridges will have to respond to many challenges in order to be implemented in the real world. We are all familiar with the advantages of such structures; however, we often forget to take the disadvantages into consideration. From utopian and imaginary designs, we will have to focus more on reasonable design and rational construction, to create a more reliable building type. The inhabitable bridge as a destination could concentrate mixed functions in the same spot, viable in terms of construction and maintenance costs. It should be highly flexible and adaptive to the possible changes in the future.

Feasibility studies, like in the case of The Thames Water Habitable Bridge Competition (1996), will be necessary, specifically to achieve commercial viability and at first, to satisfy the economic ability of investors. Inhabitable bridges will have to be redesigned as self-funding urban masses, to be practical in the management of the structure itself. Integration into the urban fabric will be crucial, such structures cannot survive on its own. A major factor in comparison with other possible building types is the cost of land.[127]

An inhabitable bridge or any similar structure could become a new building typology designed for the future. Therefore, dynamic and multifunctional structures should be promoted as competitors to other conventional building typologies, such as skyscrapers.

127 SEE MURRAY/STEVENS (EDS.) 1996, P. 33-34, 133-134.

PART IV.

SITE

GREAT URBAN POTENTIAL

The location between Donau City on the left side (Donaustadt district) and Handelskai on the right side (Leopoldstadt district) of the Danube river has a lot of potential for establishing a new urban megastructure. The selected site, next to the main bridge, called Reichsbrücke connecting central Vienna with the other side of the Danube, covers embankments of both channels of the Danube (the main Danube and New Danube channel) together with the Danube Island. Despite all the past interventions, the Danube river is still perceived as a physical obstacle dividing the city. A natural gap, almost 1 kilometre wide, cannot be easily transformed into something that bring people together neither physically nor mentally. However, recreational and leisure possibilities on the Danube Island contribute greatly to the overall image of the Danube river in Vienna.

The following site description is a result of previous research parts and a site visit.

The chosen site lies within the areas with different functions and characters. Donau City on the left side of the Danube is a modern business area. It has a strong character with many contemporary and high buildings. It is home to the United Nations Office and the Vienna International Centre. Donau City also features housing programmes with commerce and service functions, such as schools, shops, churches, kindergartens etc. The embankment near the New Danube has recently been renovated.

The right side of the Danube channel has a strong residential character with a typical urban rectangular pattern, that can also be found on the left side of the New Danube southeast from the Donau City. Those residential zones (Zwischenbrücken, Kaisermühlen, Handelskai, Stuwerviertel etc.) host several important headquarters, one being the Austria Campus. The newly build Austria Campus is just one of the projects within the massive Nordbahnhof development area in Vienna, that is still under construction.

Except for the area of Donau City and Kaisermühlen, the island between New Danube and Old Danube is mostly settled with individual housing. This is also typical for the entire nearby left side of the Old Danube. Not only Danube Island, but also the old channel of the Danube river together with the Donaupark represent a

Map of Vienna with the marked location of the project site

high level of recreational and leisure possibilities, like rowing clubs, public swimming pools and other sport facilities, as well gastronomic facilities etc.

Access

The area under consideration lies at the junction of the two most important traffic links in Vienna. The south-west- northeast link means connections between the inner city of Vienna with the Donaustadt on the other side of the Danube river. The northwest- southeast motorway represent the main connection with the air-port and nearby Bratislava, the capital of Slovakia. This motorway also partly runs underground in the area of Donau City and Kaisermühlen. Under the Donau City there are plenty of parking spaces, which can be accessed directly from the underground motorway.

However, the public transportation network is one of the main strengths of the site.[128] The most optimal public transportation station in the middle of the selected area is located on the Danube Island – it is the underground station Donauinsel located on the Reichsbrücke. The U1subway line directly connects the city centre with the southwest and northeast. Also, the main train station is part of the U1 line. The nearest train station with a rail rapid transit network (S-Bahn and regional trains) is Praterstern, which is two subway stations away from Donauinsel (1.8 kilometres). Nordbahnhofstraße, that starts at the Praterstern, also offers the possibility to enter the light rail tram (line 5). On both sides of the Danube river, there are also plenty of bus connections running through Donau City and Handelskai. On the right side of the main Danube channel there are railway tracks and the quite busy Handelskai street is located there as well. Both act as a barrier between the river embankment and the residential area.

The main bridge, Reichsbrücke, is equipped with wide lanes for pedestrians and cyclists. A small pontoon footbridge called Ponte Cagrana connecting Donau City with the Danube Island directly can be found here as well. Various bars and restaurants are located on both sides of that footbridge.

At the moment, no public transportation system is established on the Danube river, but the river definitely has potential for that to be realized in the future.

Main Restrictions

The selected location has some limitations, most of them relating to the natural environment. As already mentioned, new interventions to this site are not to jeopardise or threaten the safety aspect of the flood protection project. According to the 2000 Vision, the natural, especially ecologically valuable landscape areas, should be preserved. The project should not foresee massive construction interventions to the Danube channels and its embankments or to the Danube Island. Building volumes, especially larger ones, are undesirable on the area of the Danube Island. Existing high-quality green areas should be preserved and not reduced or degraded.[129]

An important limiting factor is the navigation channel on the main Danube channel, which is to remain unobstructed. For navigation, half of the main Danube river profile (left half), that lies next to the Danube Island is used.[130]

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128 WIENER LINIEN: GESAMTNETZPLAN WIEN (PDF), 2019: *https://www.wienerlinien.at/media/files/2019/gesamtnetzplan%20tag_314694.pdf*, 18.7.2019.

129 SEE PROKSCH/STADLER (EDS.) 2001, P. 63-67.

130 NAVIONICS: NAVIGATION CHANNEL IN VIENNA, 2018, *https://webapp.navionics.com*, 10.6.2019.

The following pictures of the site were taken during the visit of Vienna in April 2019.

SITE VISIT

Leaving the Kaisermühlen VIC subway station and entering the Isidro-Fabela Promenade

Spacious undeveloped area above the Kaisermühlen highway tunnel

Donau-City Street

Views of the Danube Island and the New Danube from the main bridge

View from the main bridge to the recently renovated waterfront in front of the Donau City

The Donauinsel subway station in the middle of the bridge, directly above the Danube Island

View from the walking path on the bridge towards the waterfront in front of the DC Tower

Views of the Handelskai District from the embankment of the Danube Island

Numerous gastronomic and other facilities on the Danube Island

One of many walking and cycling lanes along the Danube Island

View from the right river bank towards Danube City

Views of the road and railway tracks of the Handelskai District on Danube's right bank

View from the right bank of the Danube to the Reichsbrücke

PART V.

DESIGN

THE LIVING BRIDGES OF VIENNA

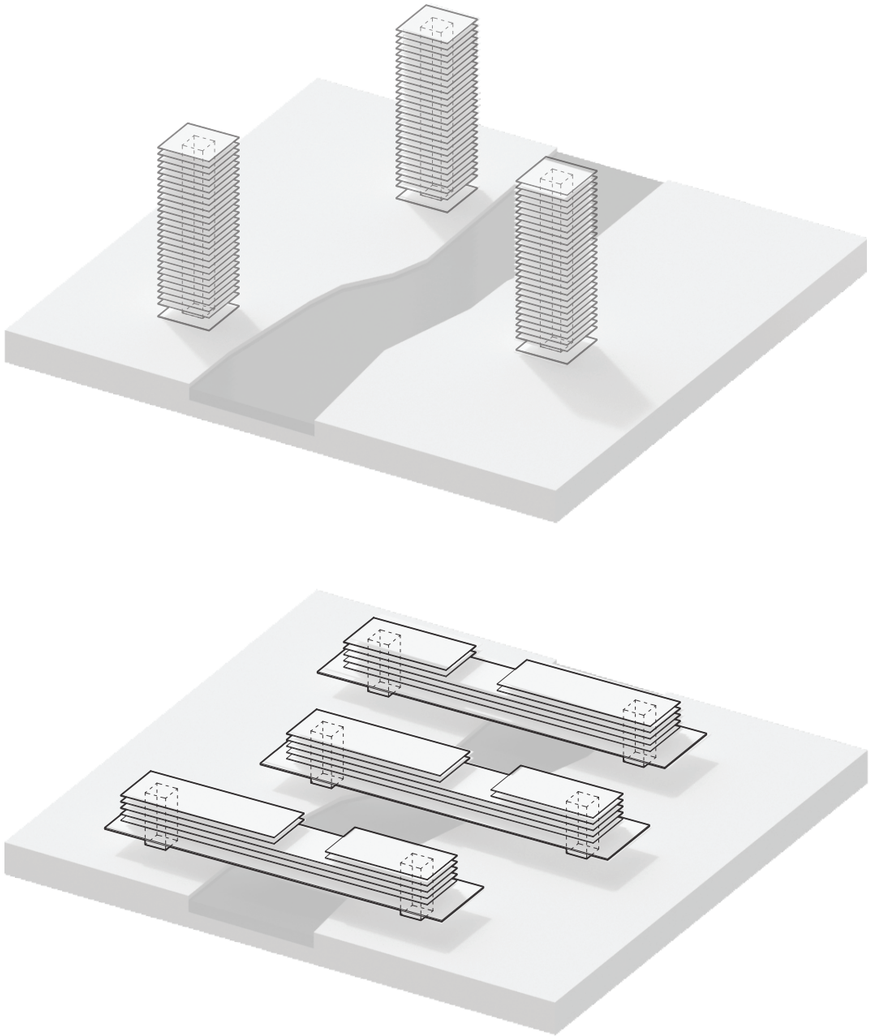
As it can be inferred from the theoretical part of this work, Vienna is one of the fastest growing cities in Europe at the moment, constantly striving for supreme housing, working and mobility solutions, as well as fulfilling any other architectural or urban criteria. Based on all findings, quality over quantity is in the Viennese DNA. Based on common sense, Vienna has managed to combine all the deciding factors in order to create a friendly and exceptional human experience in every direction. This mentality should therefore remain in the core of Vienna's future development.

Vienna had been established away from the river in its past, as Danube was considered a threat. Because of the devastating floods and related consequences in the riverbed, it was considered unpredictable. After many centuries, Danube is now perceived as a prestigious element of the city and is home to many leisure and recreational activities. The city and the river finally go hand in hand. Nevertheless, the existing natural landscape should not be degraded at any cost, nor should any kind of design disregard the safety aspect of the past river regulations. Conventional architectural solutions are inappropriate and unacceptable in this case.

The question that arises here is; what kind of an architectural mass can respond positively to all physical and non-physical demands and strict, yet challenging constrains of the chosen location? Could the answer to this be inhabitable bridges?

According to lessons learned from proposed and carried out projects, spanning from medieval times to the present, inhabitable bridges and similar structures have a tremendous potential nowadays. An idea awakening from the past, the rebirth of the inhabitable bridge in its purest form, however, focusing on a human scale. Social, cultural and even economic aspect should prevail over the excessive aesthetic and monumental effect in a time of enormous opportunities.

The aim of the following project is to overcome all these limitations and further, take advantage of them in order to create attractive and extraordinary living spaces.



Living bridges as a competitor to skyscrapers

MAIN CHALLENGES

Living Bridges as an Advanced Physical Link

Inhabitable bridges can act as multifunctional linkage between both sides of the Danube – a newly established emblem of the city. At the same time, the existing Donau City would be better connected with the historical city centre via numerous new links.

Living Bridges as an Ultimate Link with the Danube

After many centuries, the city has finally moved closer to the Danube. In the future, with the possibly emerging inhabitable bridges, the city could make an additional step closer and literally exist on the Danube. In that case, the Danube would be brought even closer to the people.

Living Bridges as a Multifunctional Urban Generator

The establishment of a new modern large-scale centre over the Danube would bring many benefits to the entire city. A multifunctional generator on another level that would serve everyone. A new hub would host numerous high-quality spaces which would open new vistas over the Danube.

Living Bridges as a Symbolic Gesture

After many centuries of seeing the Danube as a barrier and all the past inconveniences with flooding, the Danube is finally overcome and accessible to everyone. Living bridges would further consolidate the symbolic connection between both sides of the Danube. A symbol of connectivity, strength, patience, cooperation, a social and cultural symbol of modern living and contemporary architecture. A symbol of the new Vienna.

Living Bridges as an Example for Other Cities

Vienna had always been open to experimental and ambitious architectural solutions and advanced living concepts. The realization of such a project would give Vienna another possibility to be put on the map of modern architectural marvels and would serve as a model for other cities. Simultaneously, better living quality in Vienna would be promoted.

Living Bridges as a New Inhabitable Typology

The aim is to showcase the bridges of future generations as destinations rather than mere crossing as they are perceived nowadays. The purpose of inhabitable bridges should surpass the infrastructural aspects, as they have the potential to offer high-quality services at the same time, not simply on rivers, but also over any other obstacle. Various locations which had been considered unattractive or incapable of construction until now, are suddenly high potential. Such structures can be implemented in many delicate locations, where no other conventional building structure would fit.

Living Bridges as a Competitor to Skyscrapers

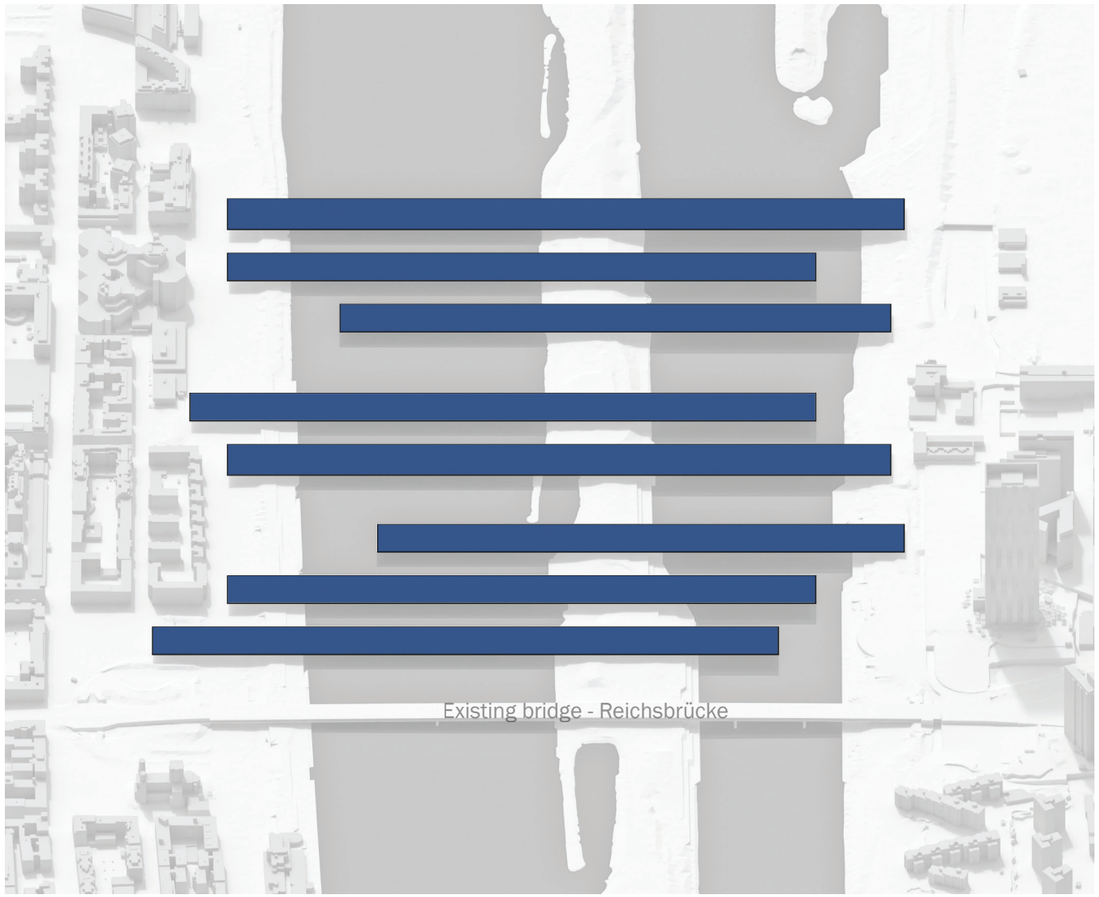
Inhabitable bridges are also known as horizontal skyscrapers or even *landscrapers*. Long and low structures offer multiple access points. They can easily be adjusted to the human scale and any existing urban environment. However; the high building footprint of inhabitable bridges in comparison to conventional skyscrapers and the additional space they require cannot be overlooked. The reasonableness of implementing long horizontal structures most often depends on actual site specifications.

Living Bridges as a Sustainable Form of Architecture

In comparison to other building typologies, inhabitable bridges have many advantages in terms of sustainability. Seeing as these structures can be lifted from the terrain, their impact on the environment can potentially be much smaller, provided that they are placed logically on challenging locations.

Living Bridges as a Viable and Reasonable Structure

To realise an efficient inhabitable bridge or any feasible megastructure, adaptivity and future optimisations must be taken into consideration. The construction of such a structure requires an unconventional approach, and the consideration of the actual economic abilities. However, inhabitable bridges can turn out to be an attractive junction of different urban needs and can additionally be more oriented towards the public, making them more practical than tall buildings.



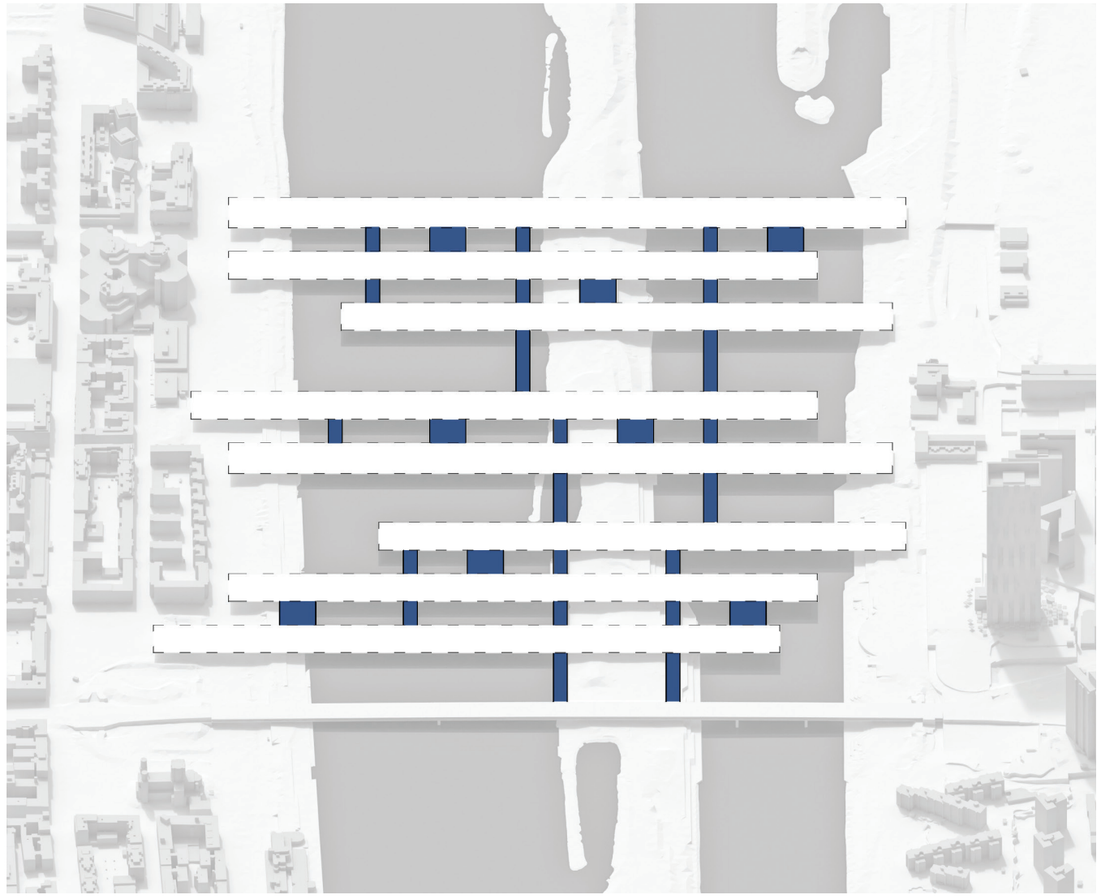
Basic Bridge Layout

The design process started with the placement of the individual bridge axis. They are defined by their variable length and the spacings between them. The rigid arrangement adapts well to the existing urban fabric. In addition, a simple straight structure pattern also has a positive impact on the economical aspect and allows for maximum flexibility.

The entire structural network is lifted over both river channels as well as the terrain. With this, the existing areas remain undisturbed. On the north side, the bridge layout also crosses a busy road and railway tracks.

The distances between individual bridges are the result of a compromise between the newly created lifted structures and the existing landscape below it. On the one hand, the gaps are small enough to ensure several smaller structures still function as one megastructure; on the other hand, the distance is vast enough to preserve the important presence of the Danube and the natural landscape in general.

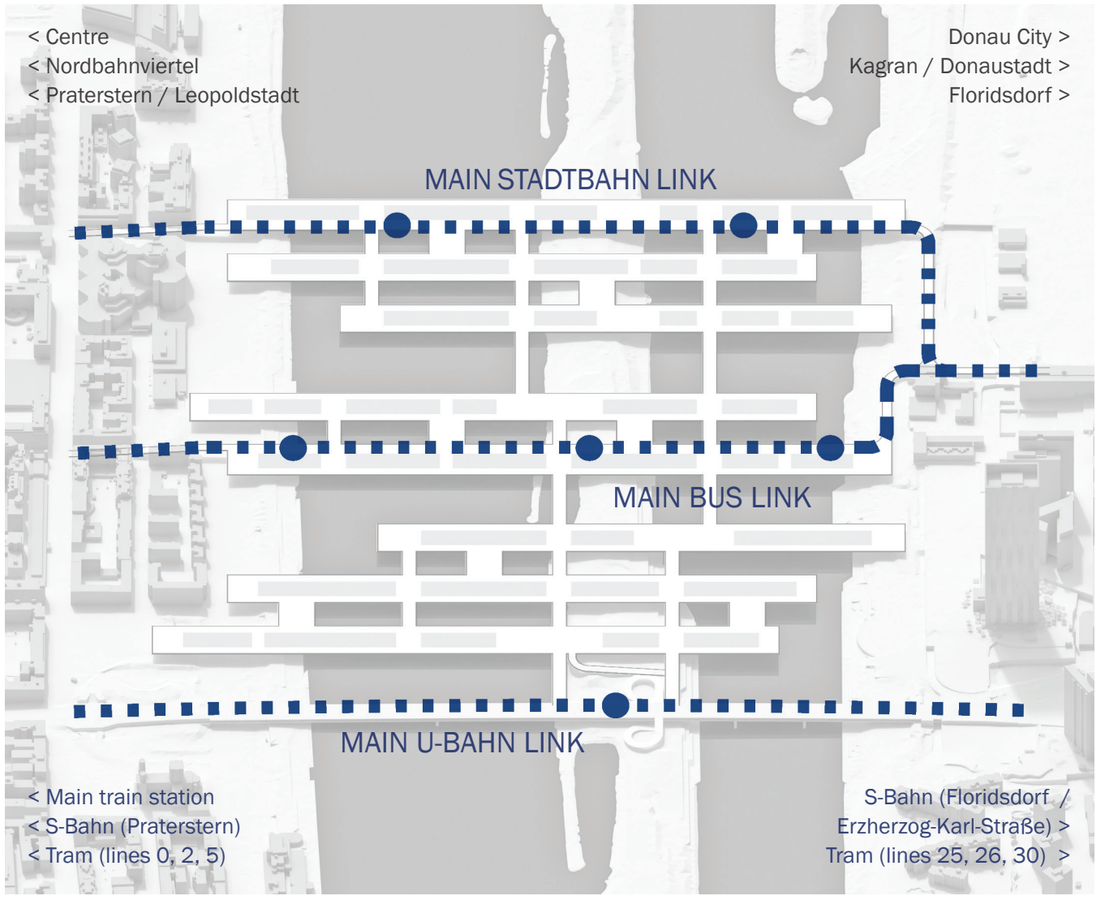
CONCEPT



Additional Connections

Independent bridge structures are connected via numerous short links. This is how the rectangular grid is established to ensure sufficient mobility within the living bridges. Consequently, linear bridges are transformed into an urban superficial cluster. Interestingly, only two bridges are full-length, since there is no need for a direct connection between embankments. The river banks remain open as a result of the secondary connections going in the opposite directions.

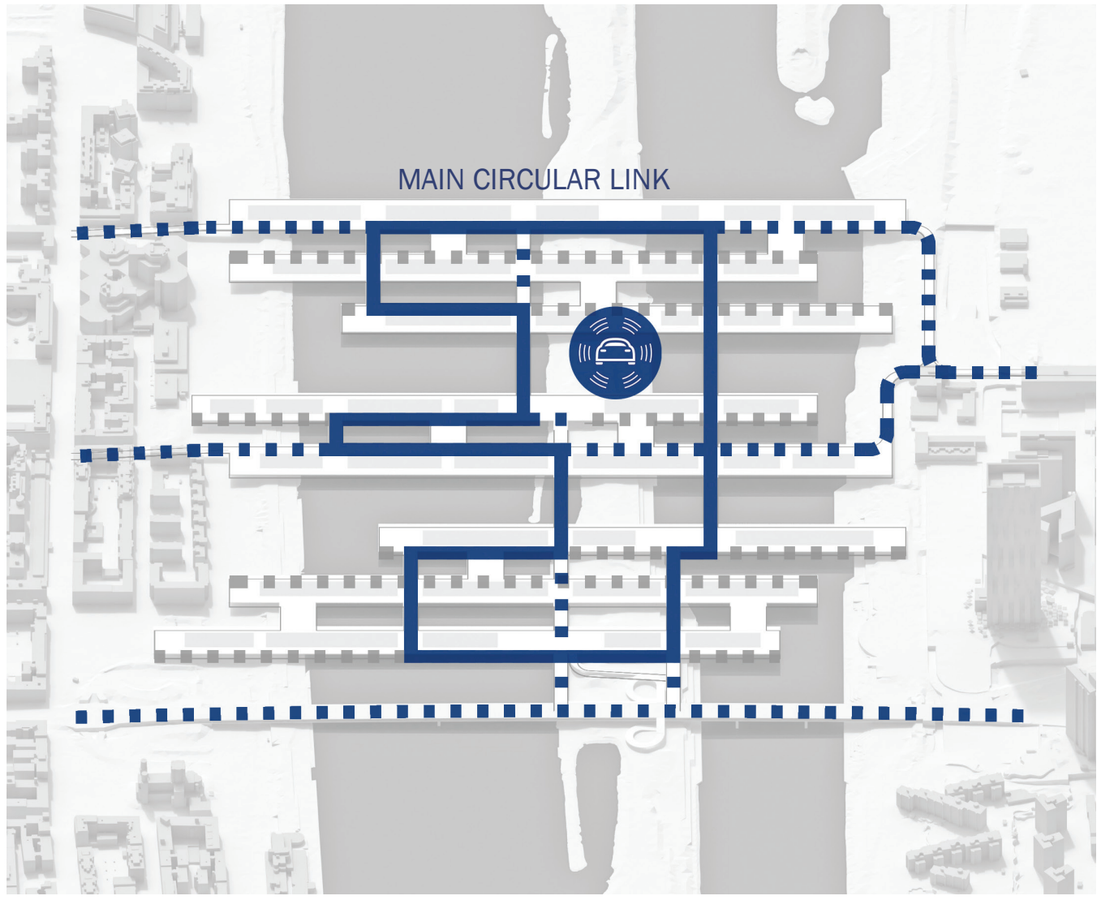
To organise the structural network, two types of connections, varying in width are defined. The primary purpose of the narrow connections is infrastructural, as they serve as main transportation links within the cluster. The wide connections also have a secondary function; hence they are more spacious. They can host small gastronomic facilities, leisure activities or simply serve as a junction of functions between two independent bridge structures.



Main Transportation Links

With an equal distribution of the various modes of public transportation, the first step towards sustainable urban planning is made. The relationship with other nearby city districts and beyond is vital. The most important connection, the *U-Bahn 1* underground line, already exists – it is part of the present *Reichsbrücke* bridge.

As proposed, the newly built bridge structures would host another two frequent types of public transportation. A new *Stadtbahn* line would take place roughly between the districts of Kagran and Nordbahnviertel. On the other hand, bus connections are made more flexible. There is even potential of establishing an efficient public transportation system on water between the north-western and south-eastern parts of Vienna. All these new links simultaneously contribute even to the nearby districts. Popular interchange points (including S-Bahn train connections) are located on both sides of the Danube (for example Praterstern station).

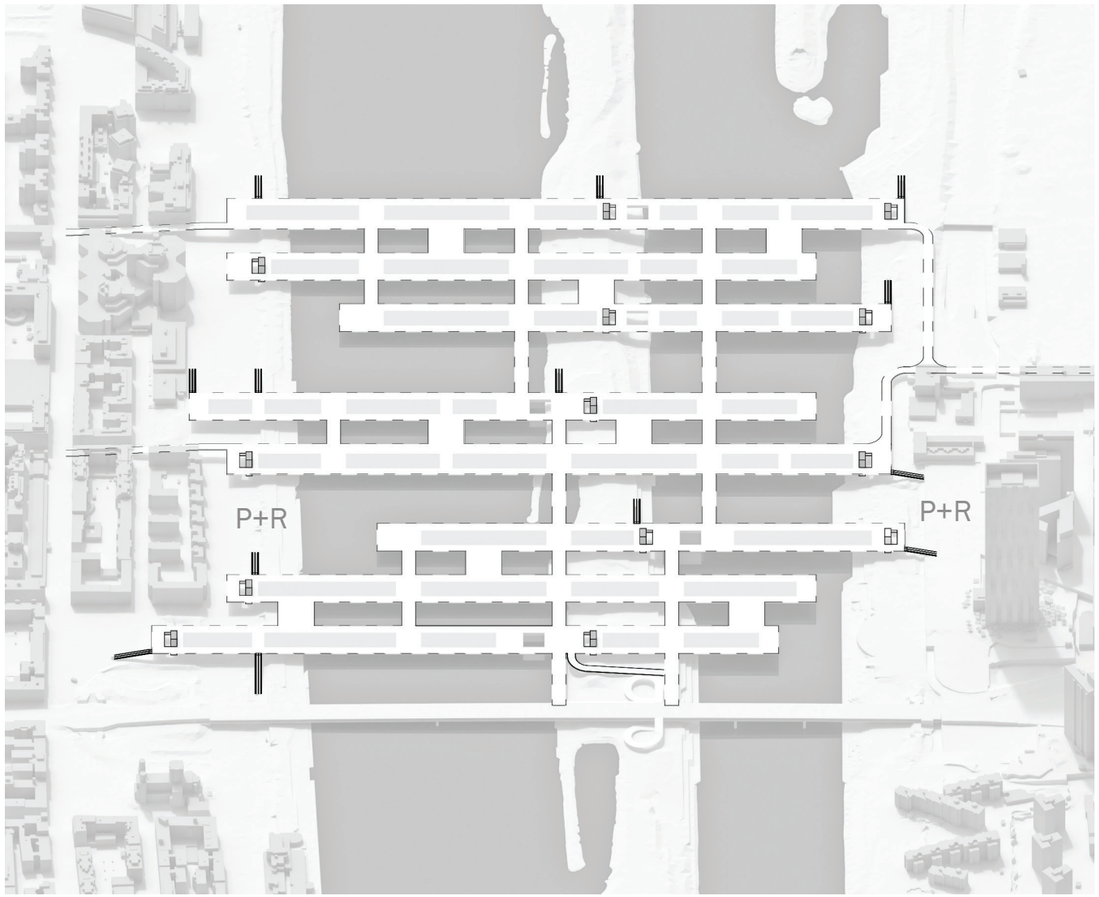


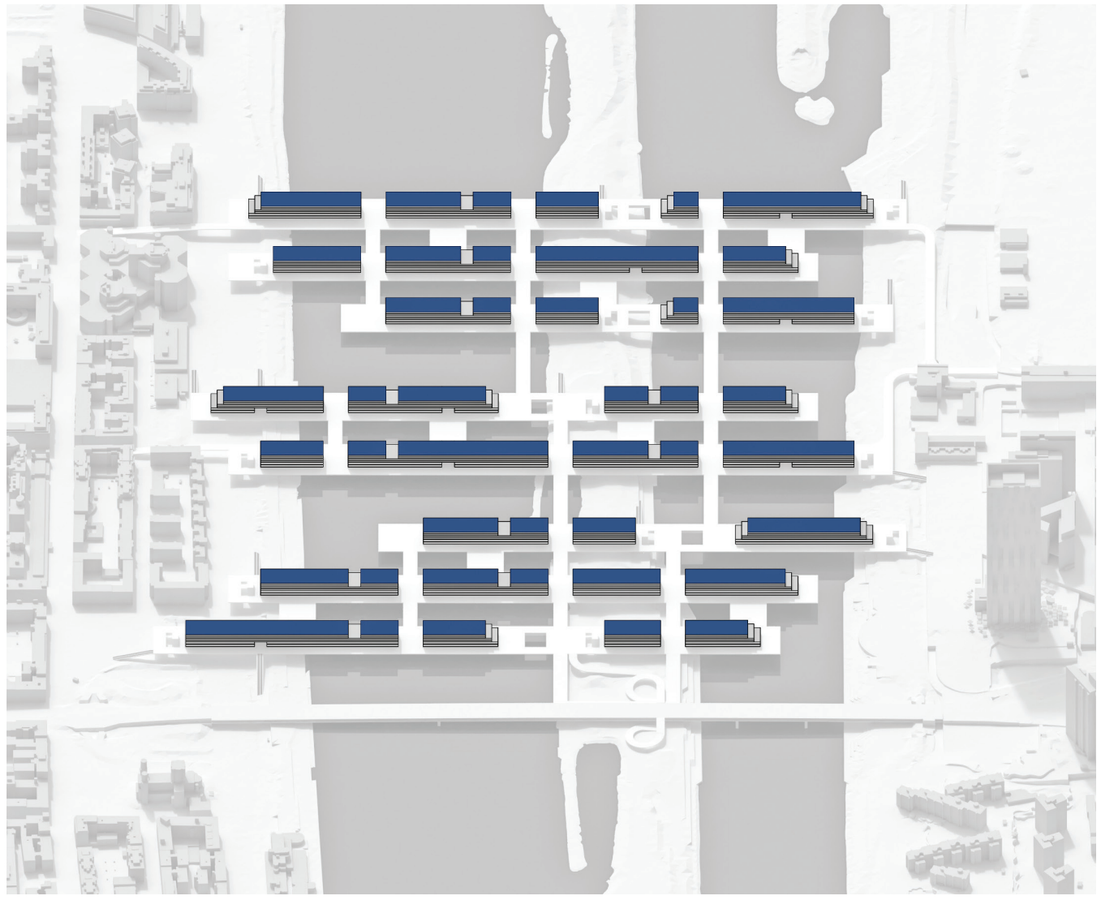
Internal Mobility

Accessible ramps primarily intended for public transportation serve as access points for other types of transportation as well. These include cyclists, electric cars, taxis, buses, delivery vehicles etc. Considering that this is a large-scale contemporary urban form, sustainable public transportation and shared mobility solutions must be prioritized.

Due to the size and longer distances between individual building blocks and functions of such a bridge, it also makes sense to set up its own transportation route, known as the main circular link. In this case, the use of autonomous buses or other similar means of transportation would be recommended. This link serves mostly for internal mobility; however, it can be extended to nearby districts (for example Donau City).

Every building block even adapts its orientation according to the transportation system, namely, every block has two different sides. One side serves as a mobility route, while the other side is reserved for the block's external functions, such as semi-public terraces, playgrounds or resting places.





Access

In addition to the main transportation links, there are plenty of other options for entering the bridge structures. Across the cluster, there are numerous additional communication cores and escalator ramps, known as *moving walkways*. These two types of access possibilities allow for the closest direct contact with the terrain below. Each individual communication core consists of stairs and two elevators.

Since car traffic is not encouraged on the proposed inhabitable bridges, sufficient and efficient parking spaces on both sides of the Danube river should be foreseen as well. This could be achieved by providing new *park and ride* facilities or simply by upgrading the existing parking network if necessary.

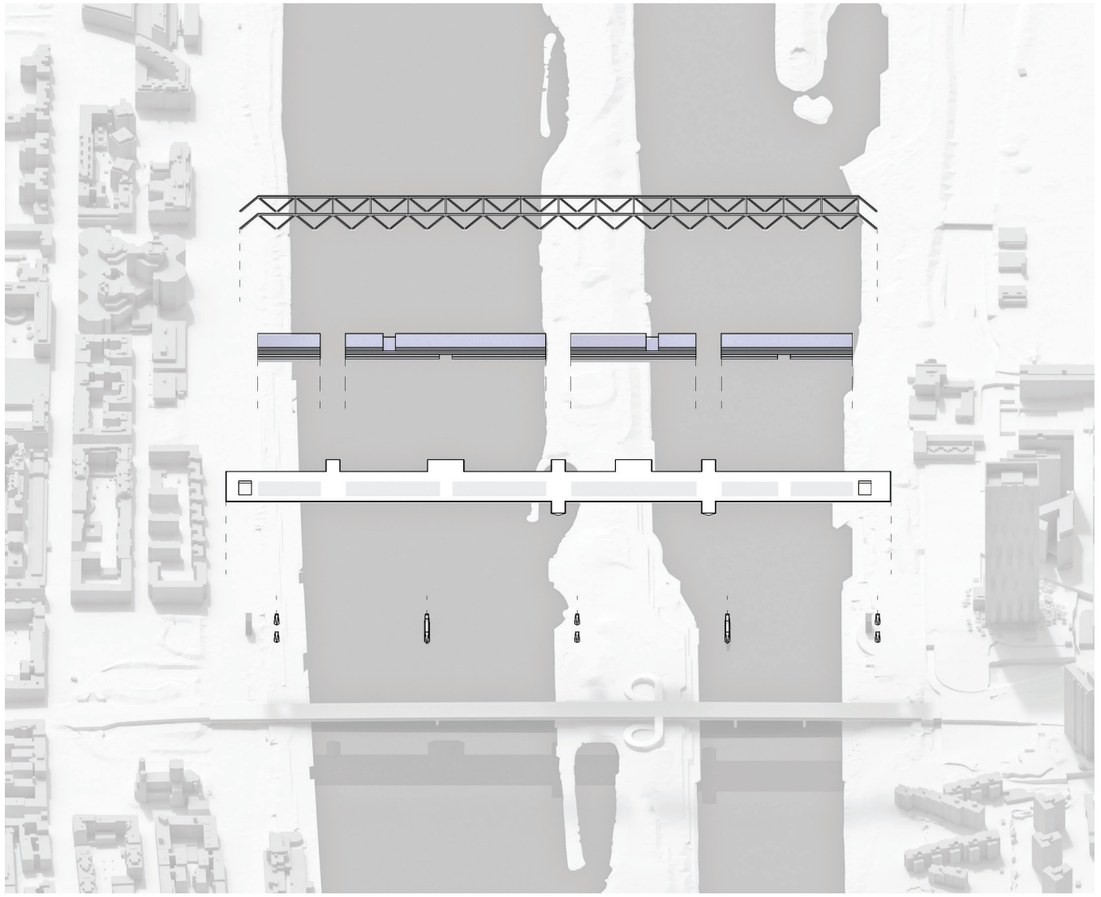
There is also an additional ramp on the Danube Island offering an indirect connection between inhabitable bridges and the existing bridge. Moreover, the entire structure can be upgraded with even more access points.

Program

Inhabitable volumes are distributed equally throughout the entire bridge structure. The height of the buildings corresponds to the nearest existing buildings. Six storey volumes are split between the crossing points of the main transportation links. Additional gaps are integrated into long building blocks to provide a short-cut through passage or to use as a terrace on the upper floors. All those sliced volumes with gaps at the same time do not block the view through the cluster entirely.

Laying the bridge structures and inhabitable volumes perpendicular to the Danube also has favourable wind effect, since it blocks the strong wind common in the area. However, good ventilation through openings between individual building volumes is still adequate.

The design of the inhabitable volumes must be flexible and feasible at any time in the future. Adaptive integration into the existing urban fabric is crucial. Nevertheless, the program of functions should not be defined exactly, but rather offer sufficient space and the possibility of future modifications.



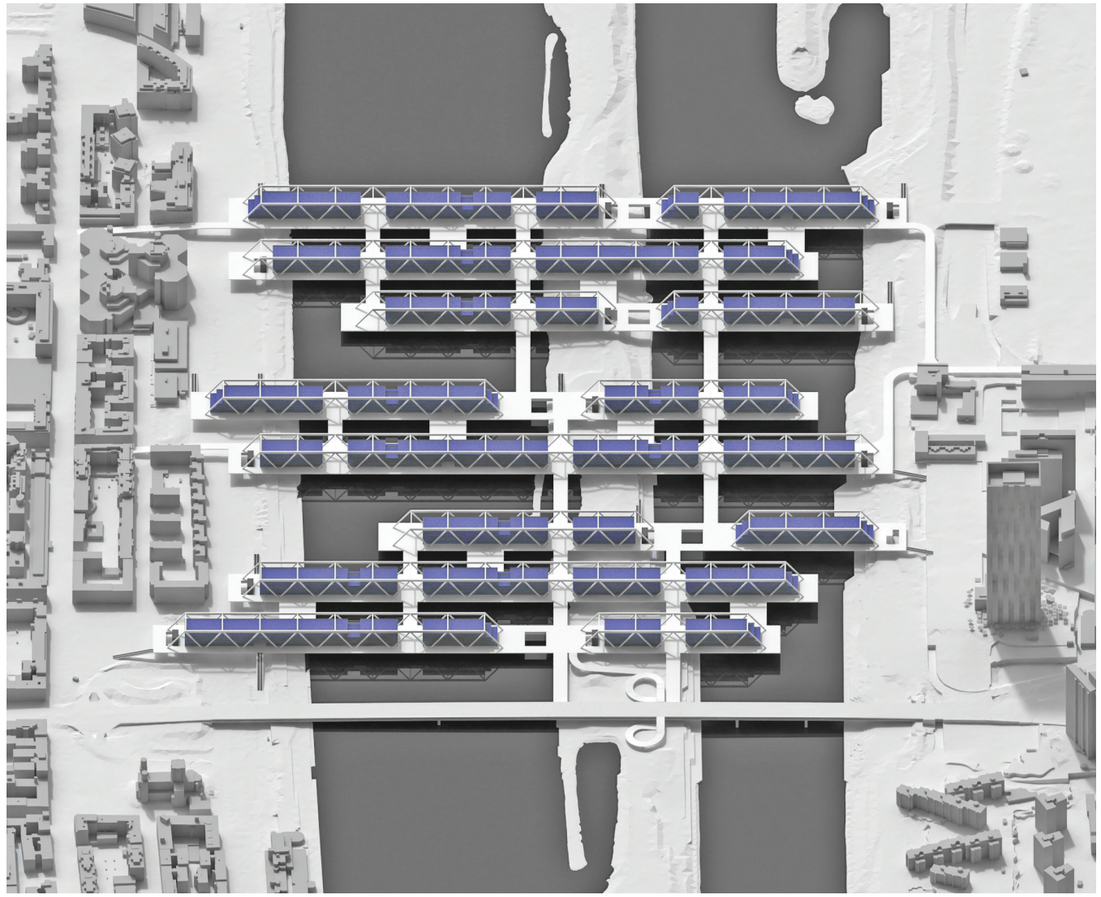
Structure

To avoid using the solution with a conventional beam structure, which would result in a significantly thick deck structure, another structure type is to be explored. Use of the truss structure, positioned above the thin deck structure, despite its dimensions acts open and permeable. It adapts perfectly to the specific spans (168 m) and does not affect inhabitable volumes due to its appearance.

The use of the steel truss structure has many other advantages, such as lower construction and maintenance costs. On the other hand, the thickness of the deck structure (4,5 m) still provides enough space for secondary functions, such as installation pipes, optional automated delivery and waste management.

The truss structure does not affect the secondary building structure that is completely independent and consequently more flexible in the terms of future adaptivity, choice of structural material, easy construction and maintenance. However, both structure typologies use the same basic raster (8 m).

At the same time, the chosen truss structure type seemingly unites inhabitable volumes as a perimeter and express structural elegance.

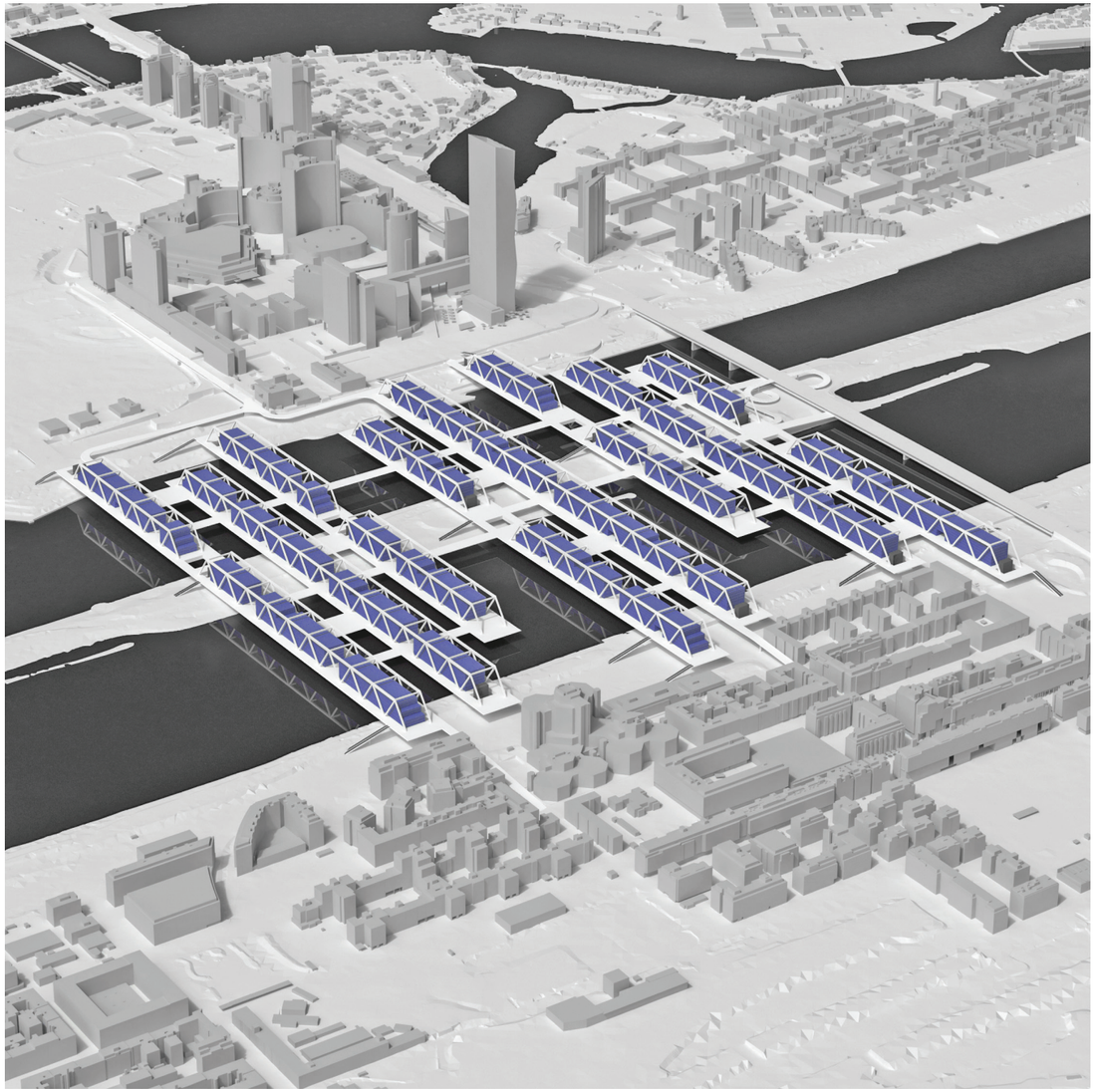


Result

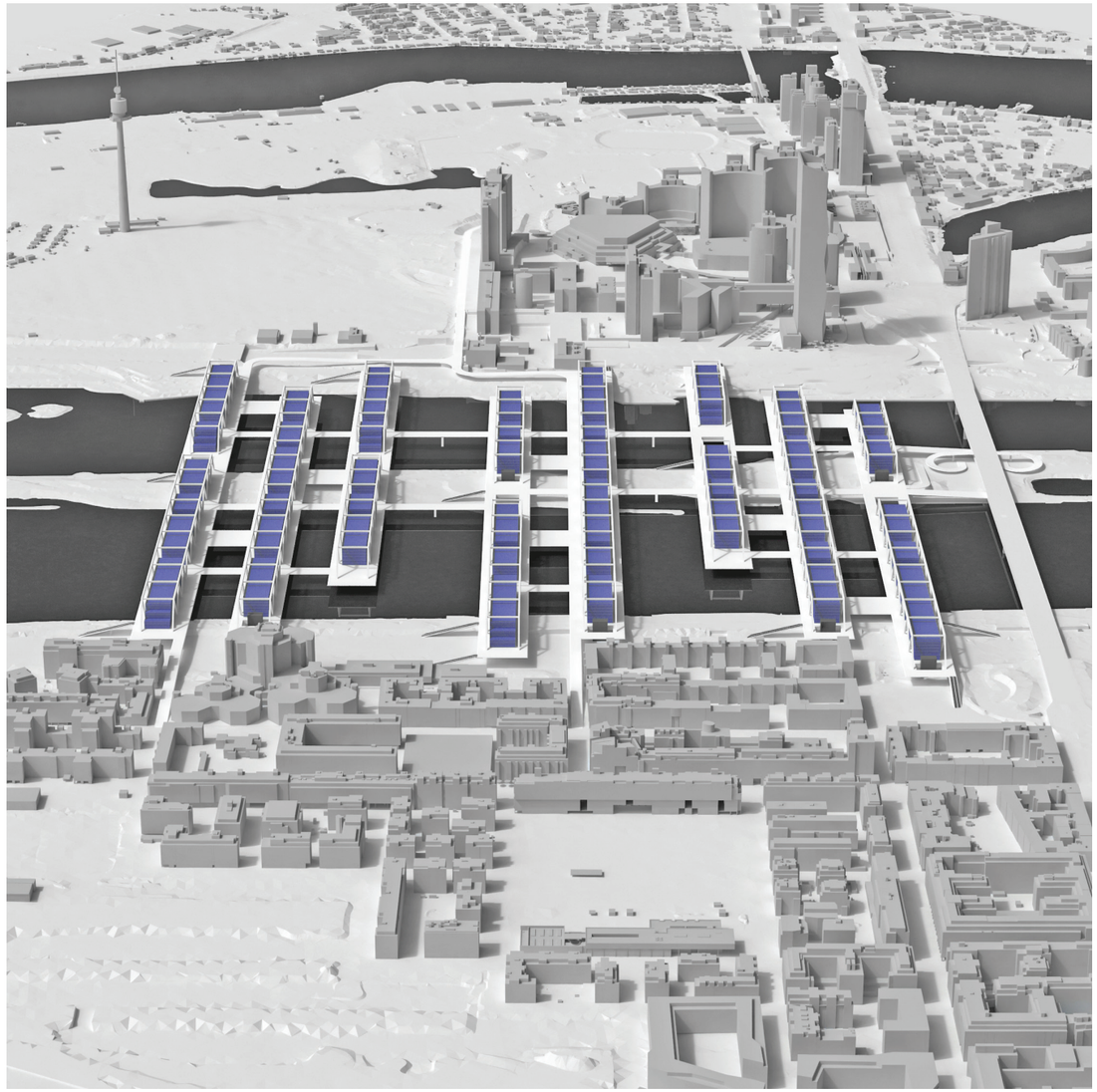
A set of basic conceptual development stages leads to a well-defined urban product, that completely adapts to the sensitive environment with many constrains. However, the design process does not end here. In the continuation, the design focuses largely on planning the inhabitable blocks themselves.

The cores of the inhabitable volumes in the following plans reveal the same design language as the external structural layout. In other words, the inner atriums also have numerous intermediate connections between the two sides of the building, which imitate the links between the individual bridges. Furthermore, extensive roof surfaces have great potential for photovoltaic and urban gardens, as well as convenience for rainwater collection.

With its highly transparent facade and numerous terraces, the overall impression of the building structure stays extroverted and symbolically connected with the Danube. A minor upgrade of the Danube Island area is proposed, focusing predominantly on developing more integrated gastronomic facilities.



3D view



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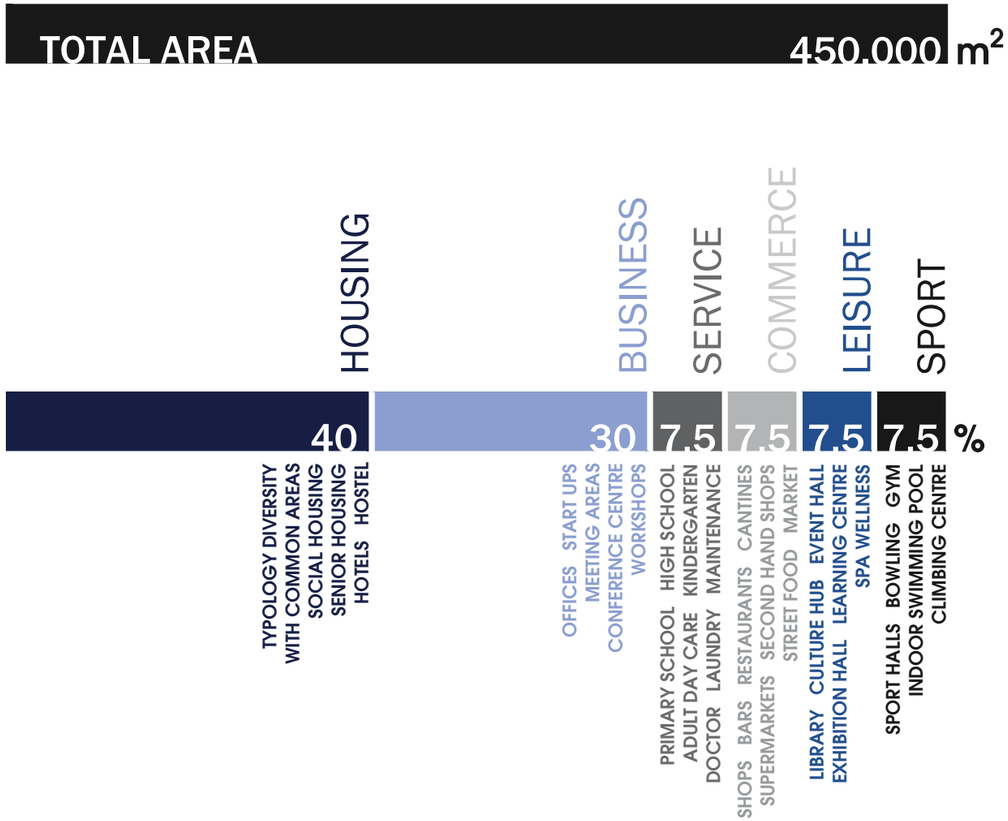


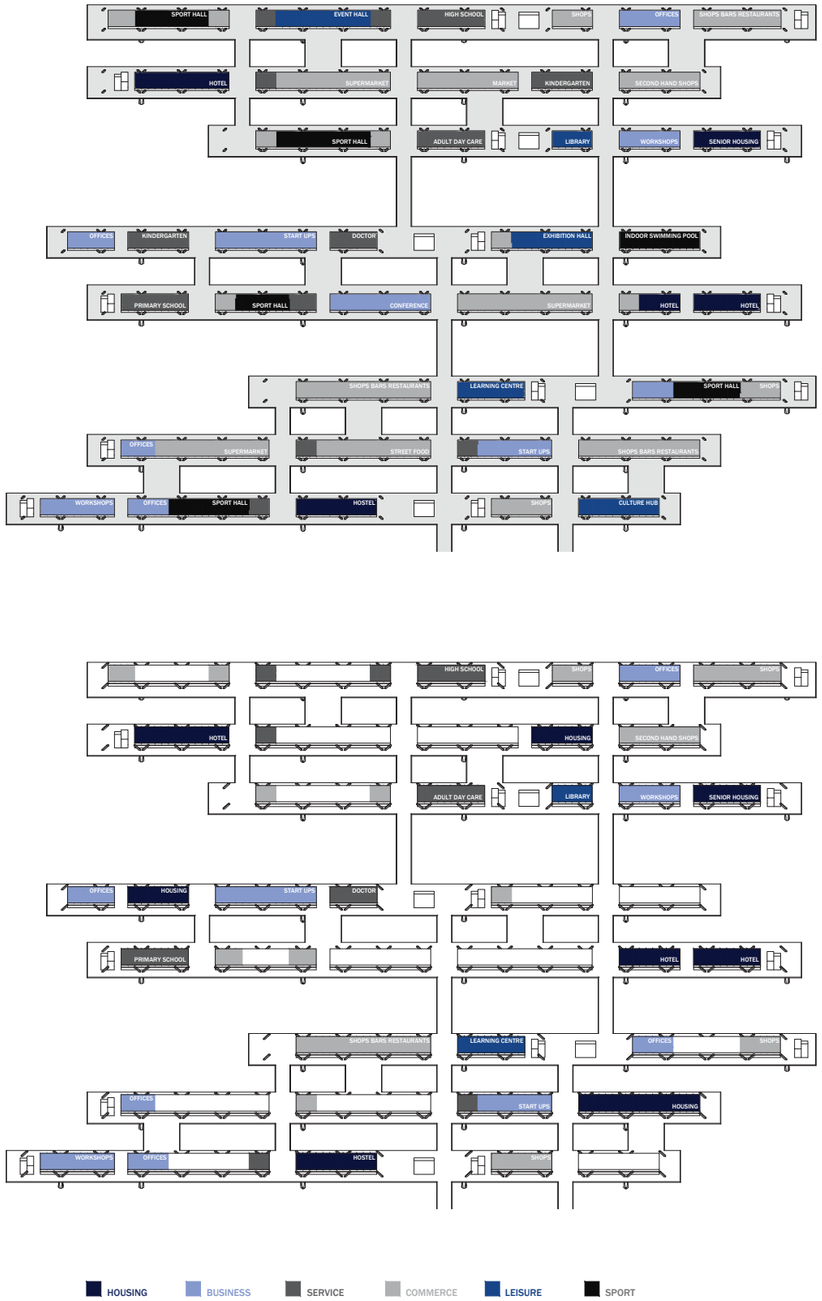
A Multifunctional Urban Cluster

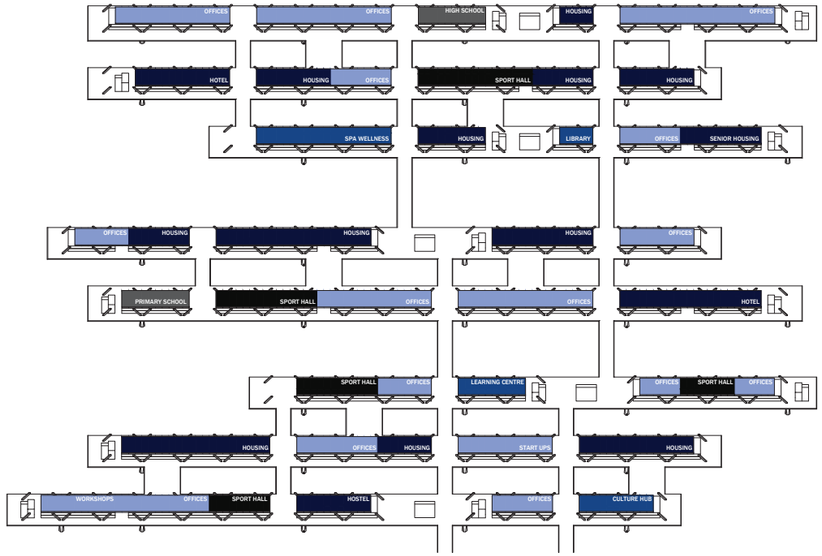
Any extensive structural network like this requires unconventional approaches, especially in functional interventions. The modular grid pattern and the chosen structural form allow for a lot of flexibility whilst also supporting opportunities for dynamic changes in the future. The symbiosis of both internal as well as external spaces is affiliated, while keeping the distinction between individual functions more fluid.

The main part of the program consists of mixed typologies of housing and residential content. Such a massive cluster requires other basic functions such as schools, shops and kindergartens to operate at all. There are also plenty of other multivalued functions that contribute and attract even other nearby districts. The proposed living bridges are created and intended for everyone, not only its inhabitants.

A great distinction from the classic *hybrids* is found in the absence of extensive green areas within the structure itself. Inhabitable bridges are located above the Danube and the Danube Island, both already full of easily accessible quality green spaces. Those leisure and recreational areas are crucial to the existence of the contemporary urban village that is lifted and thus does not take away from the existing natural landscape.

PROGRAM





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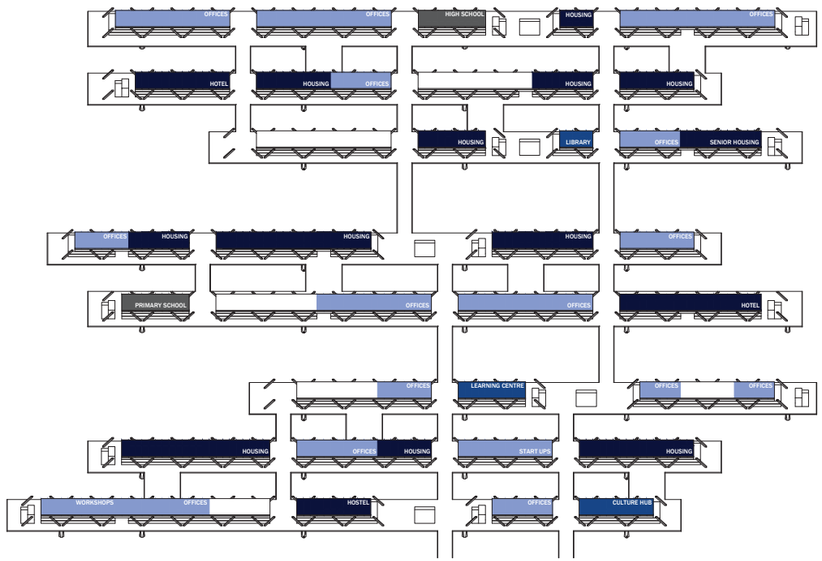

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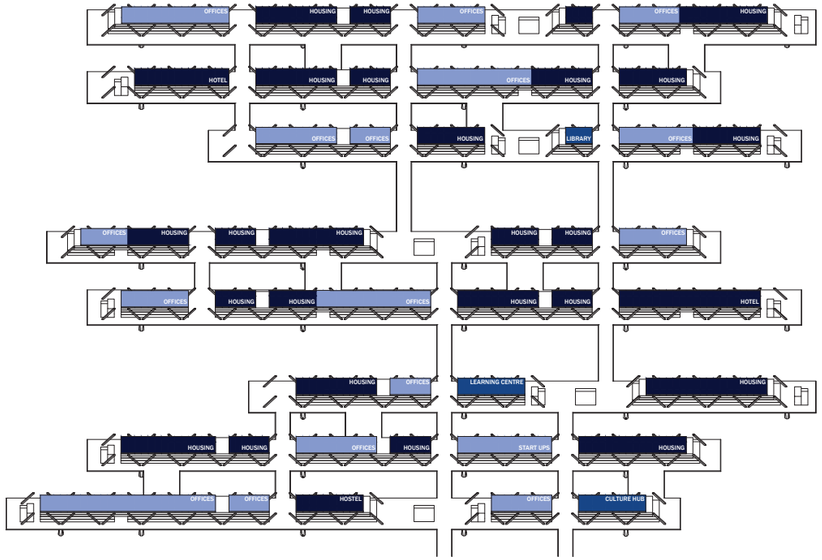
HOUSING BUSINESS SERVICE COMMERCE LEISURE SPORT



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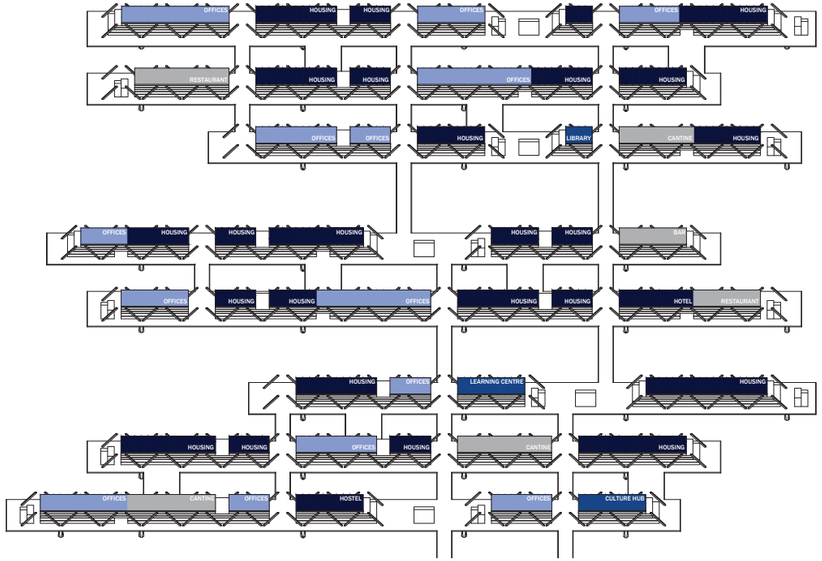

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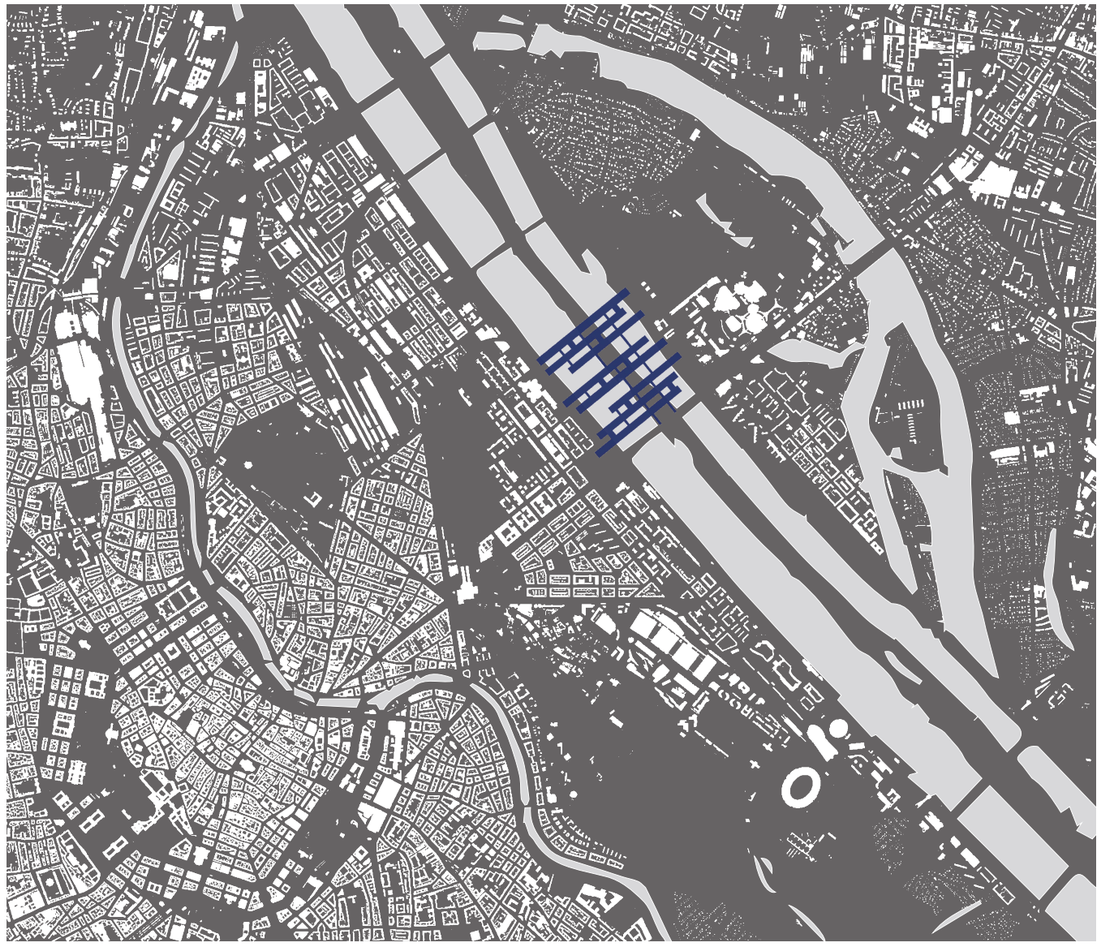
PLANS



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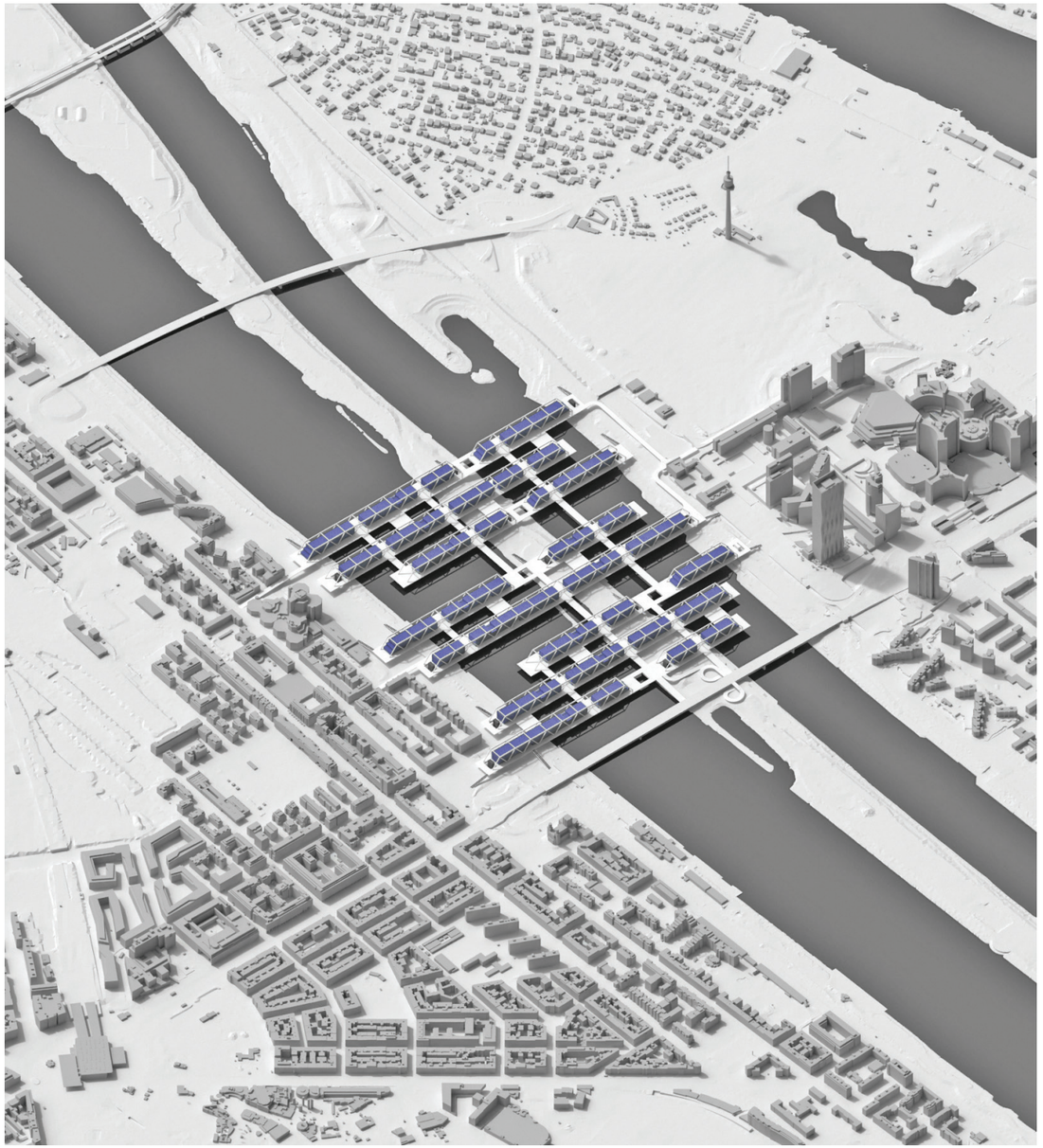
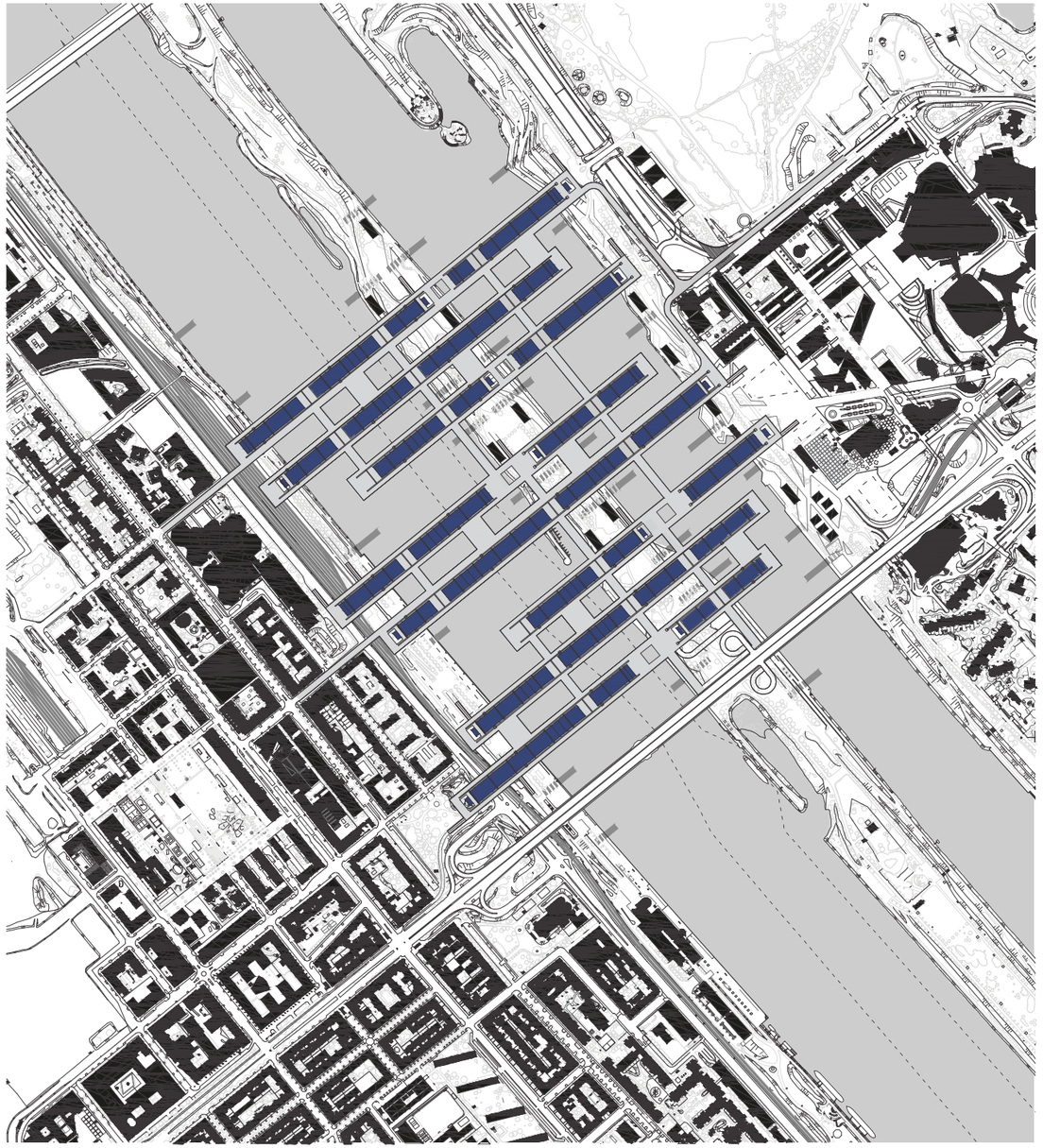


3D view



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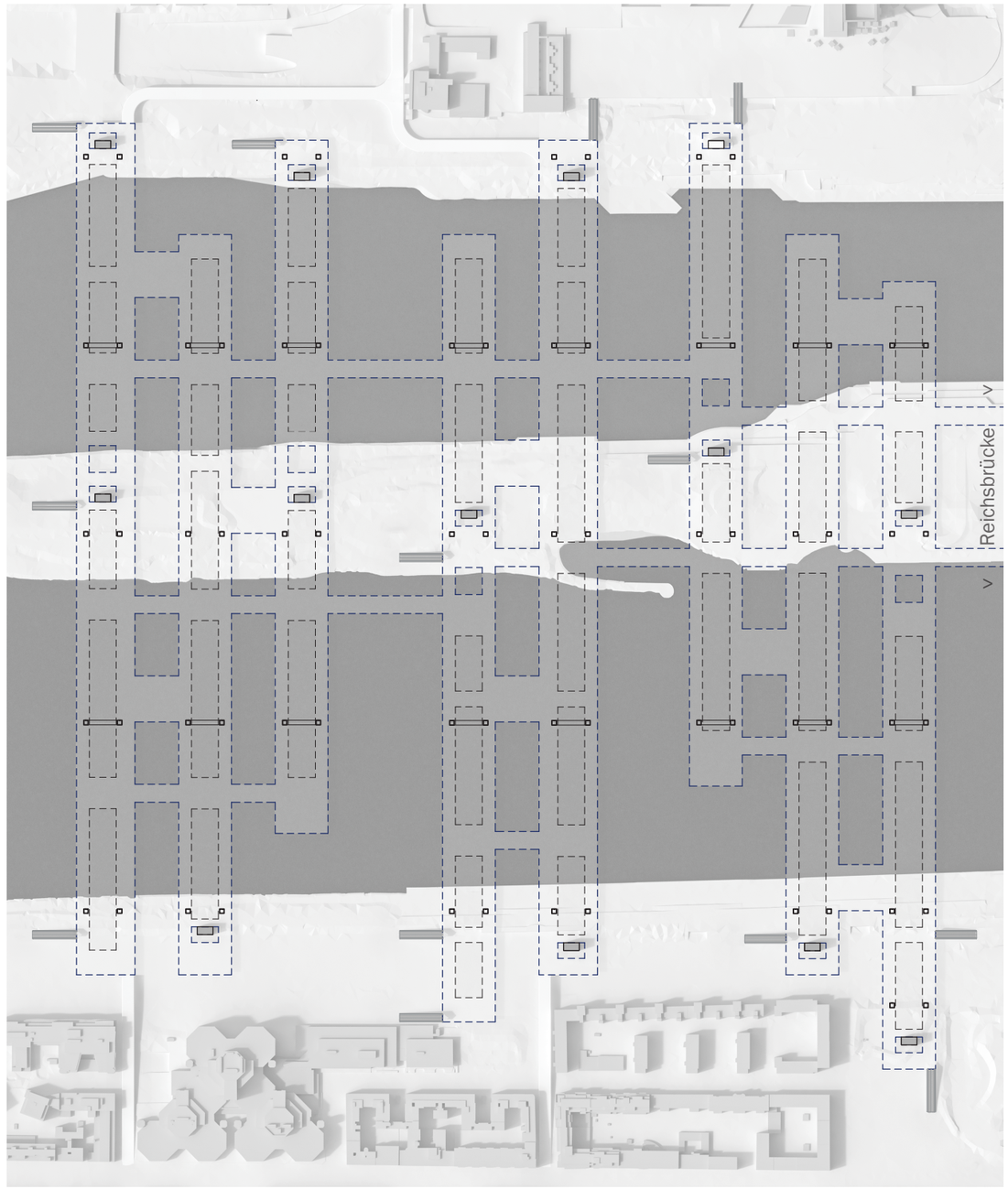

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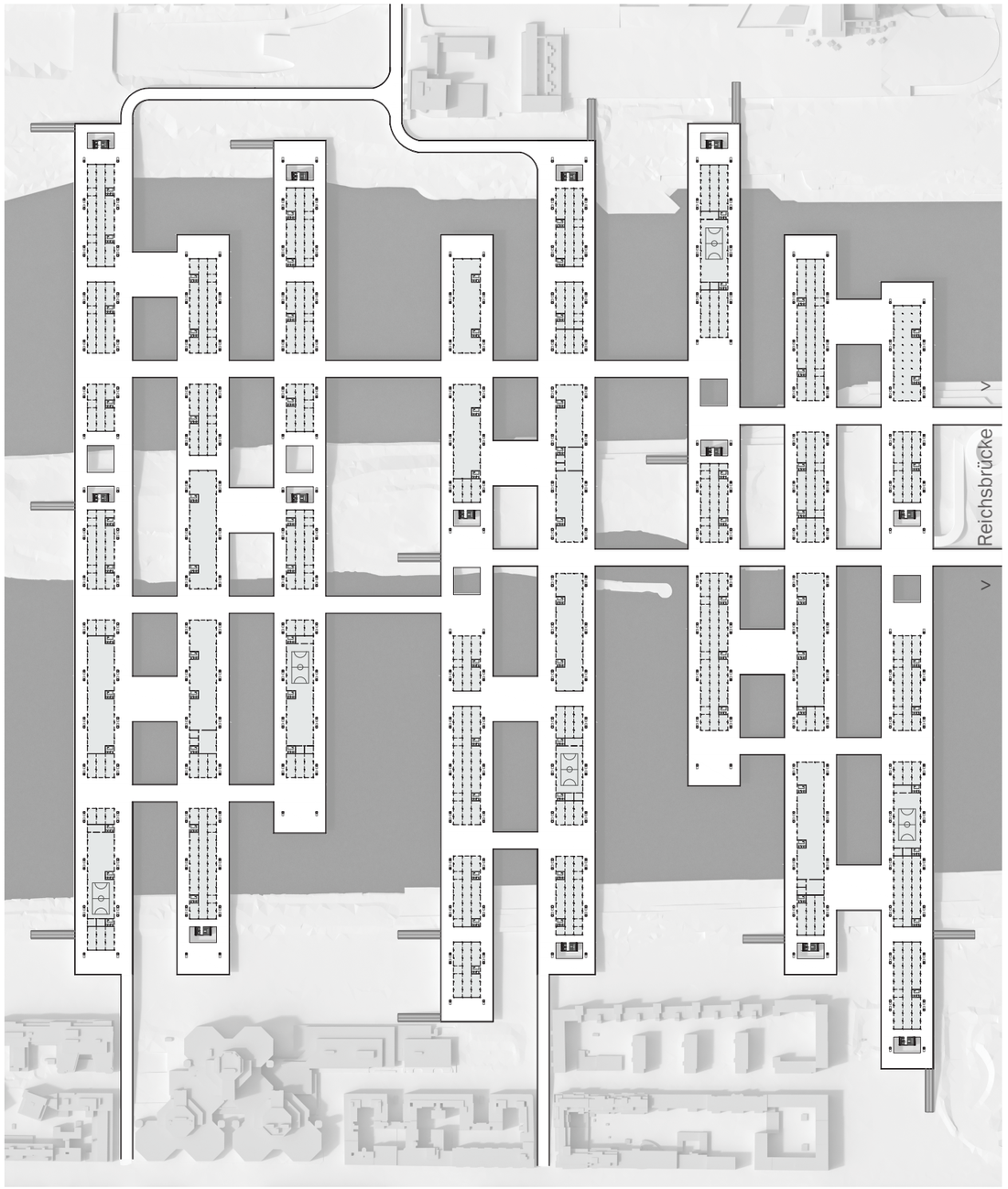

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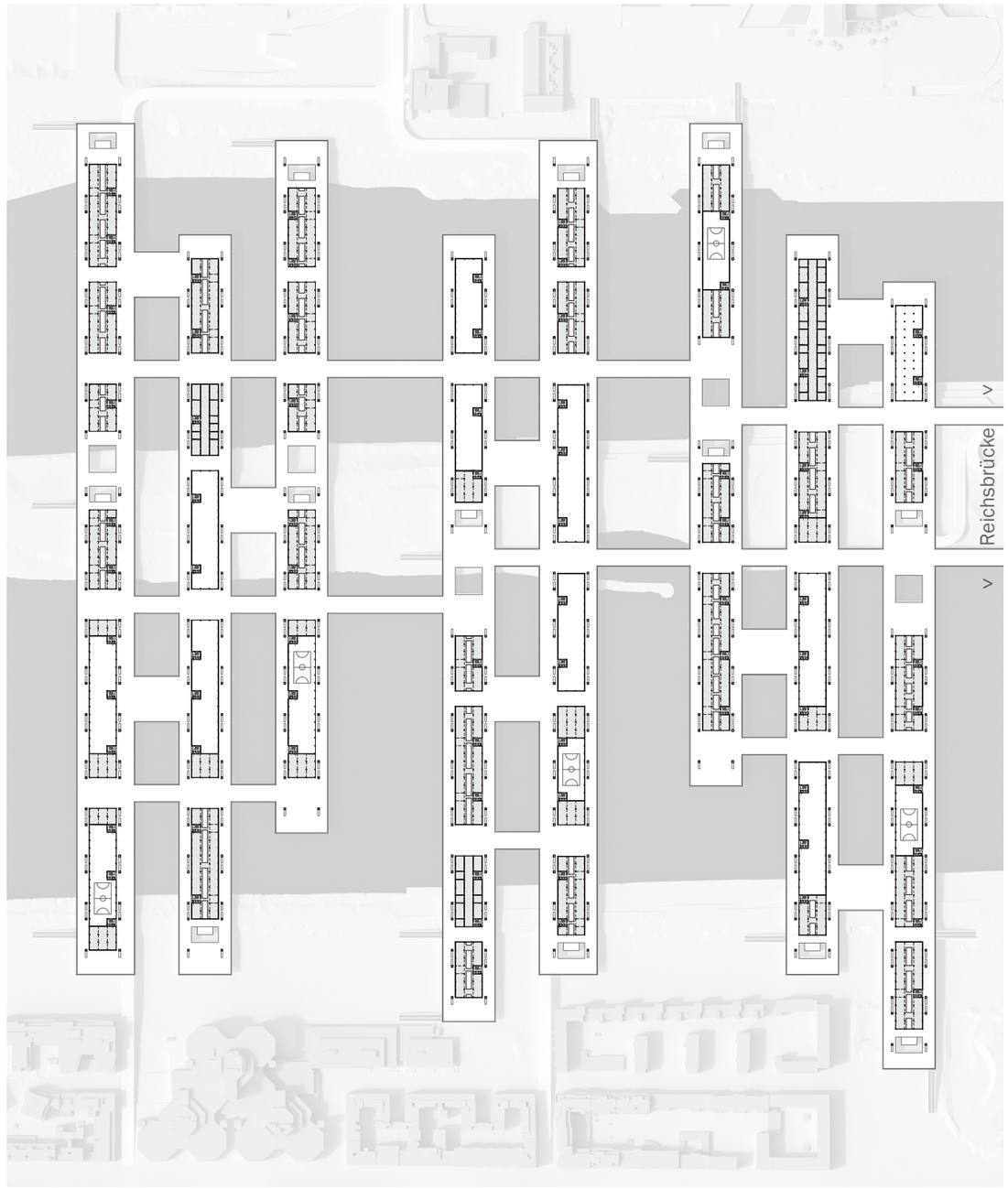

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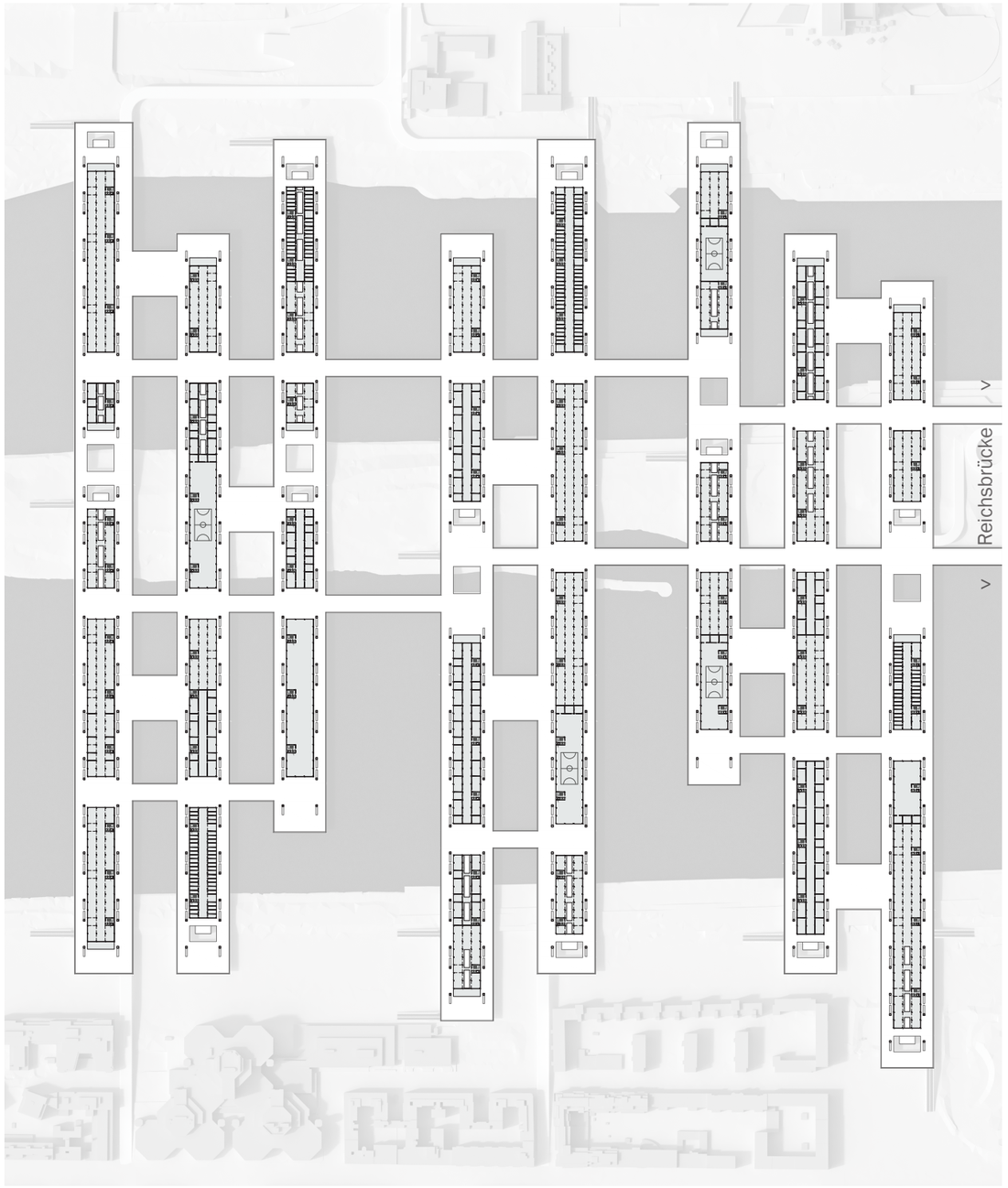

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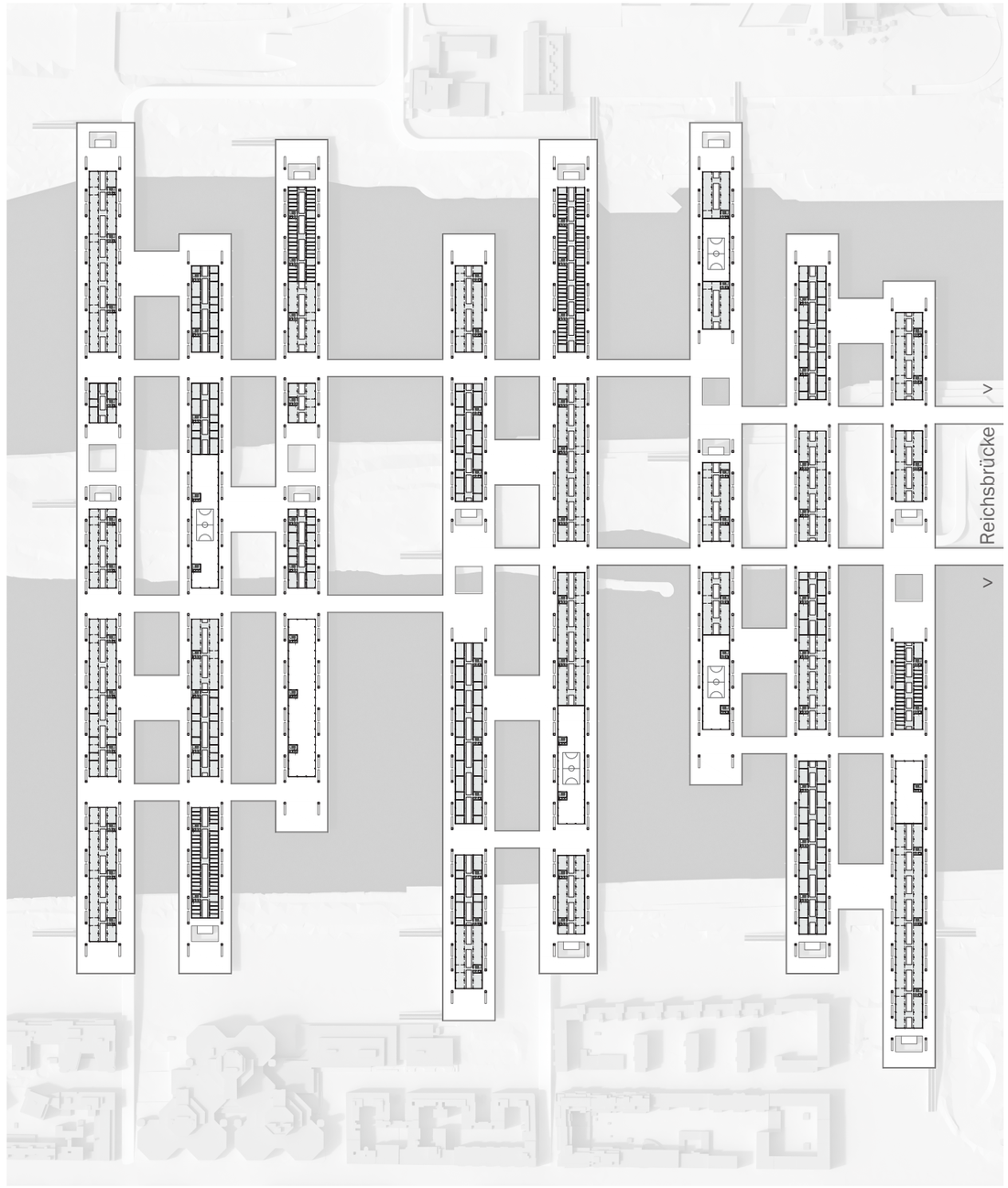

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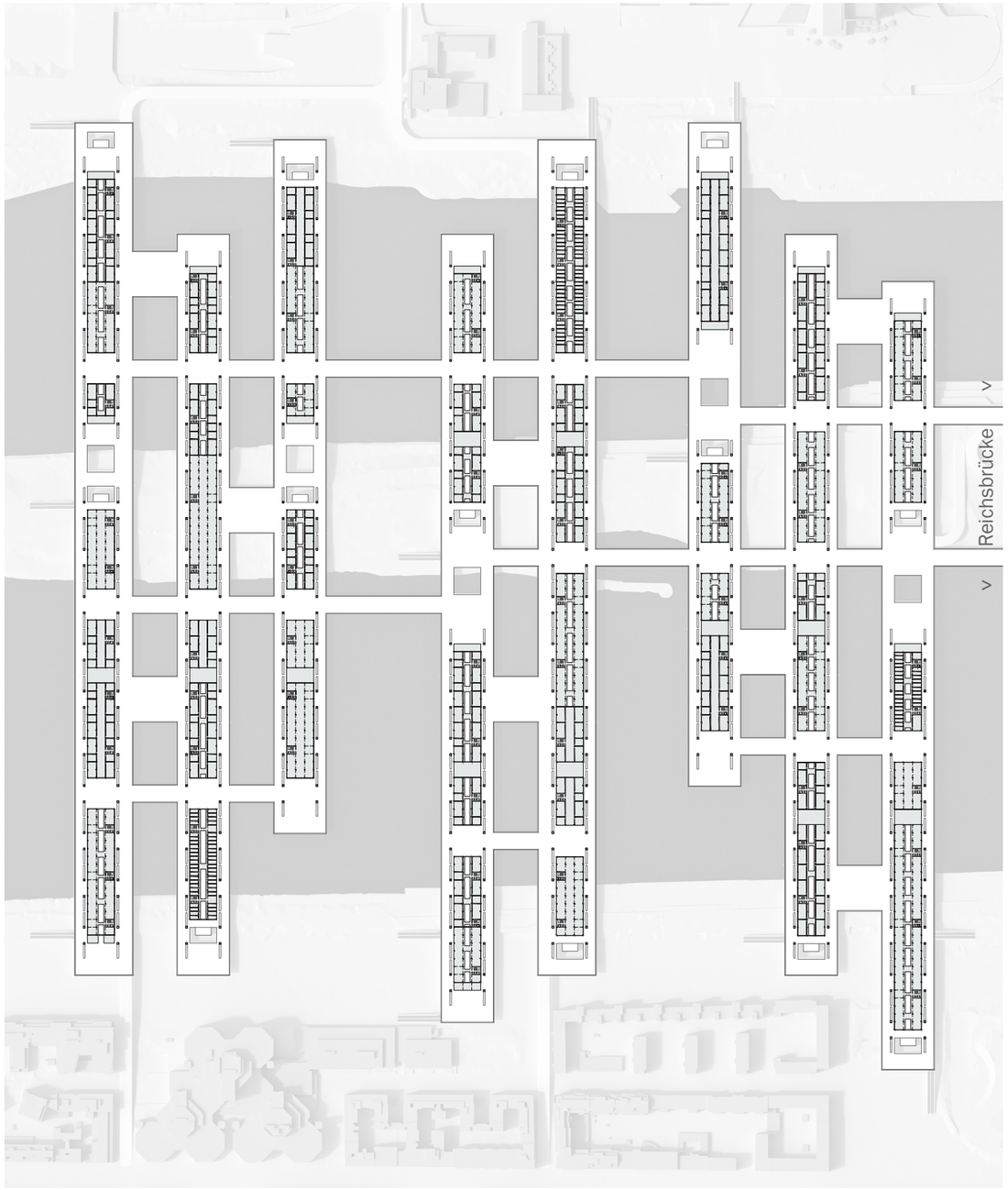

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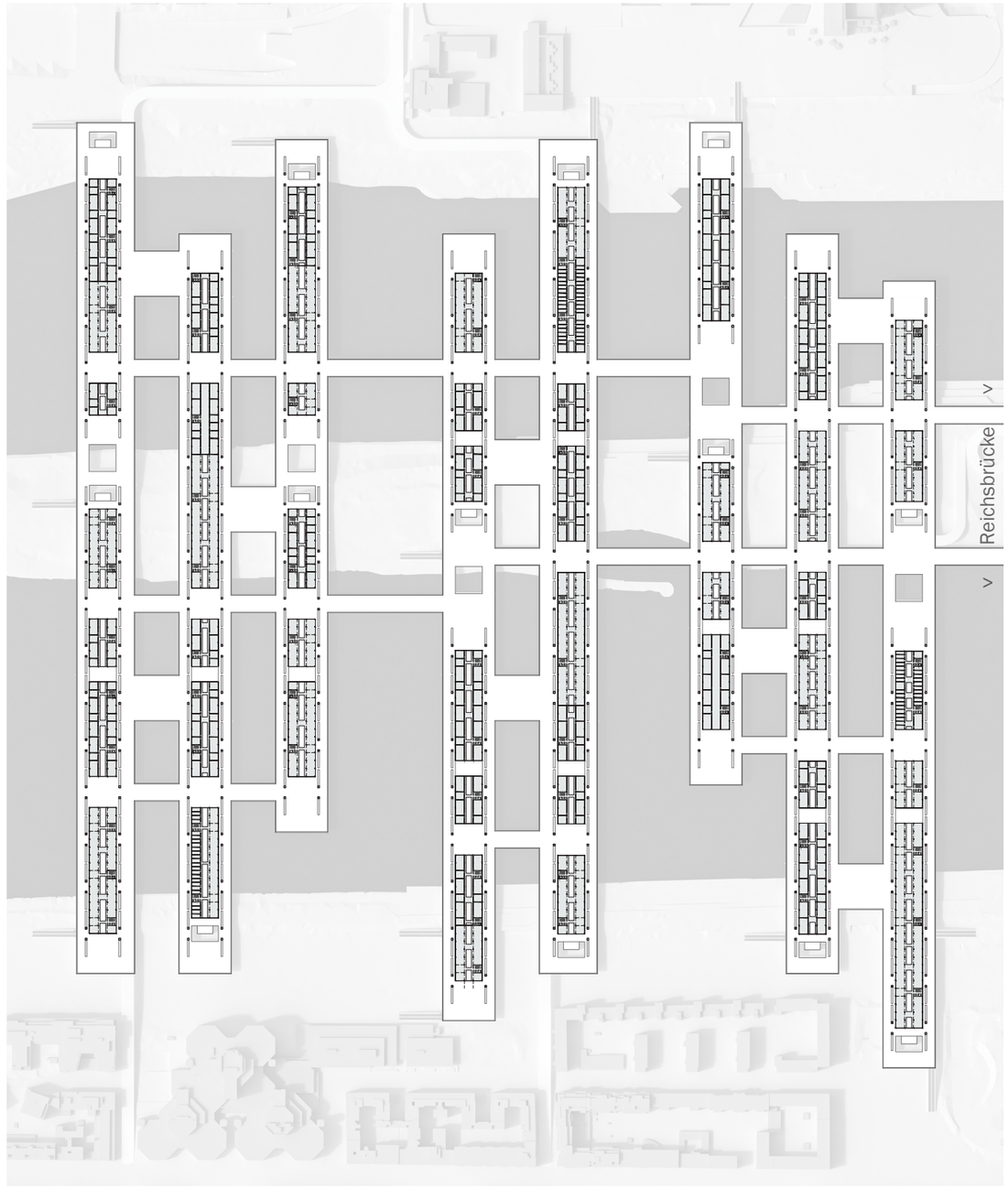

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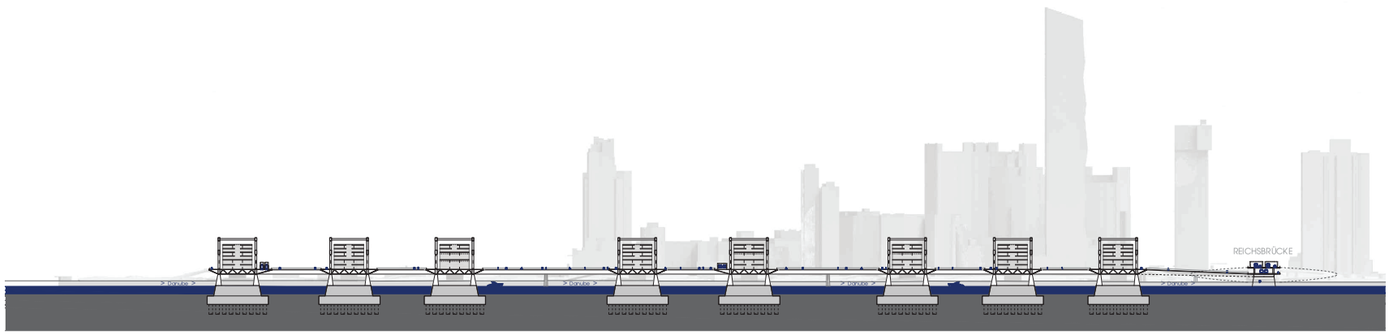

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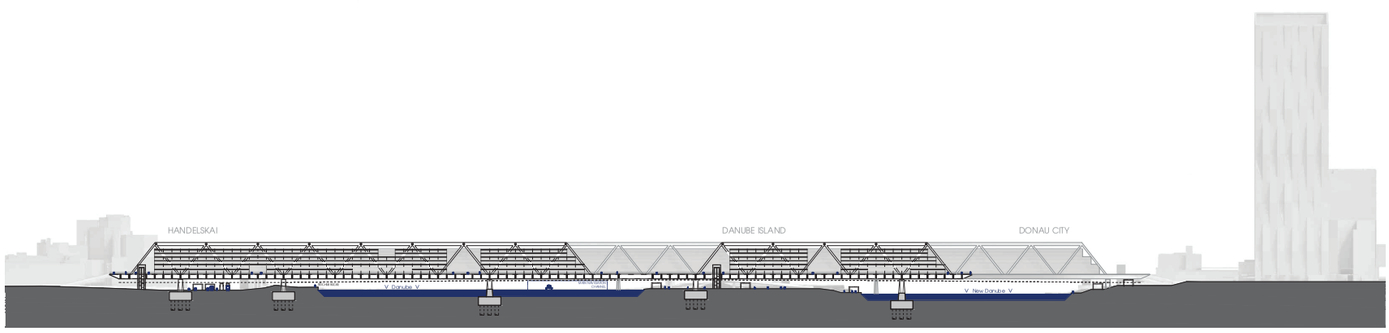

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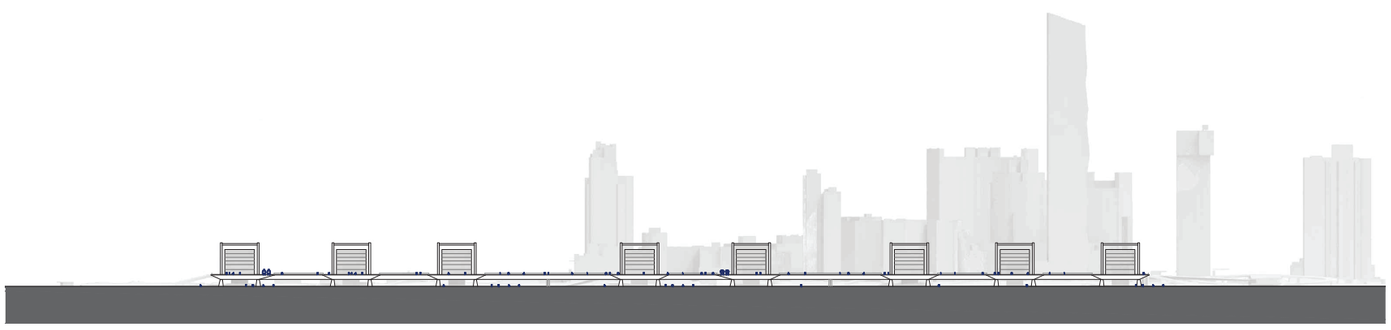

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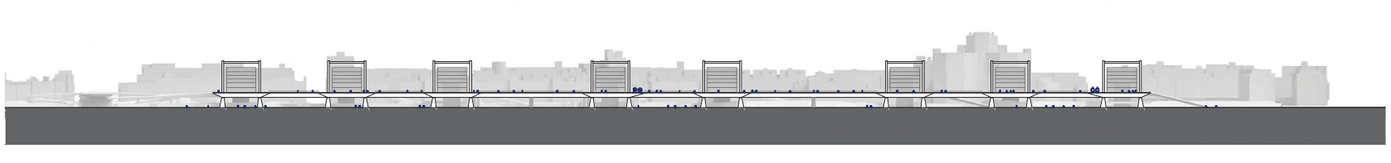

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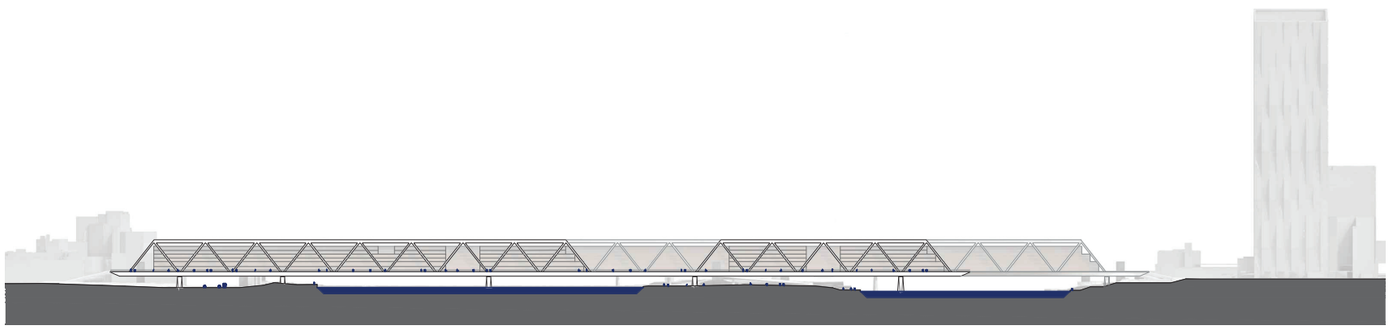

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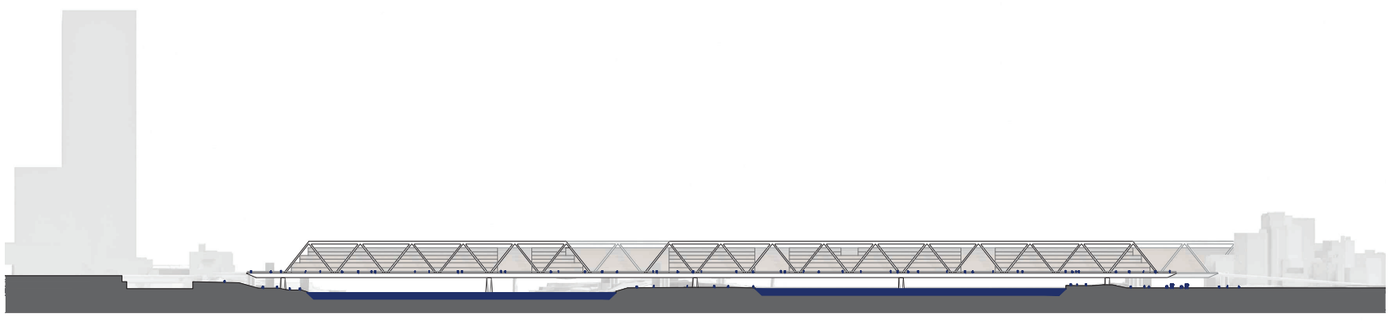

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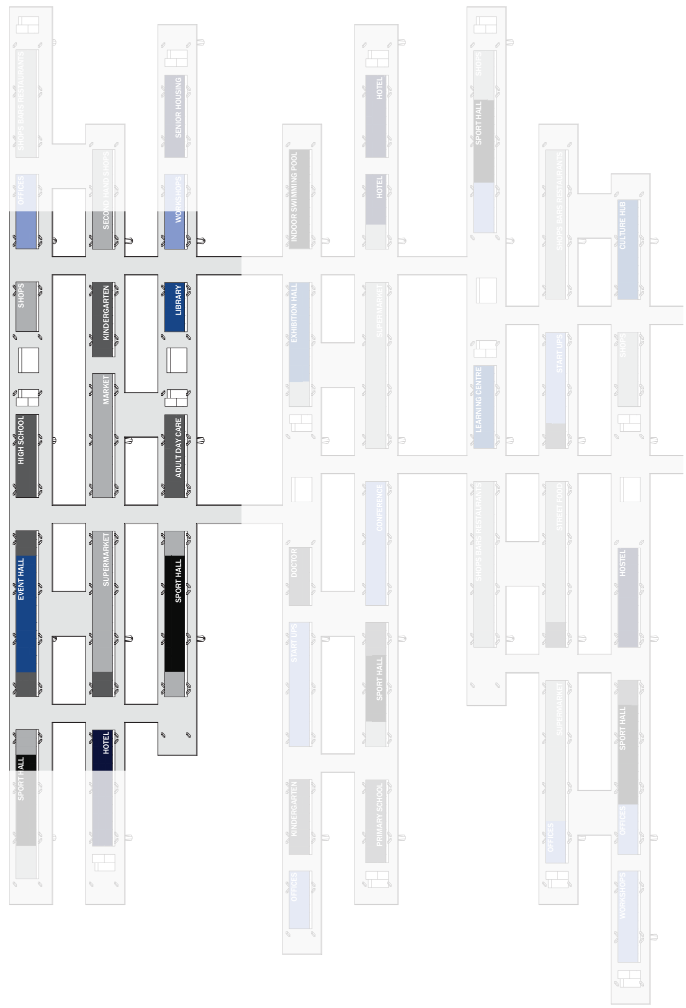

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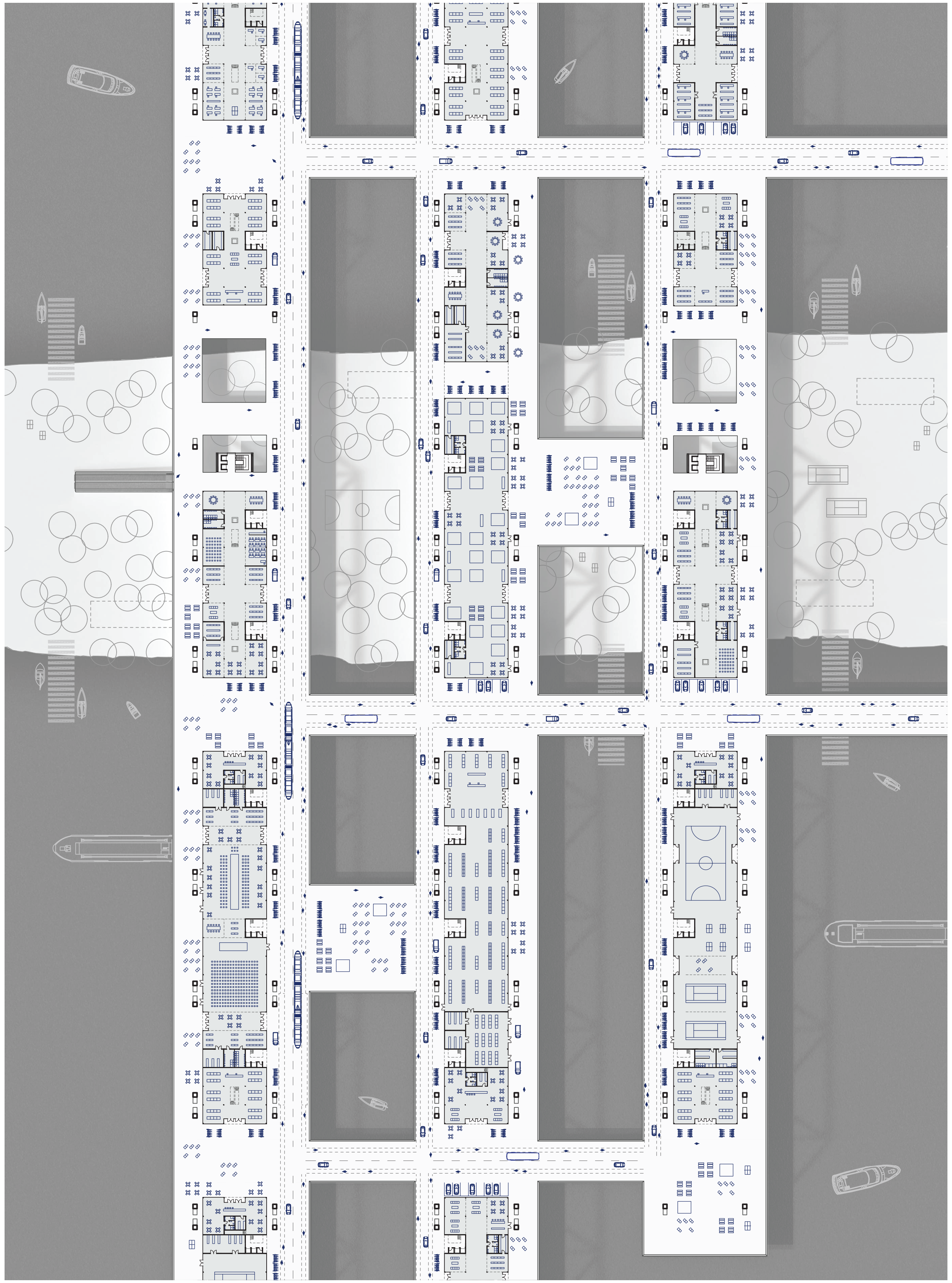
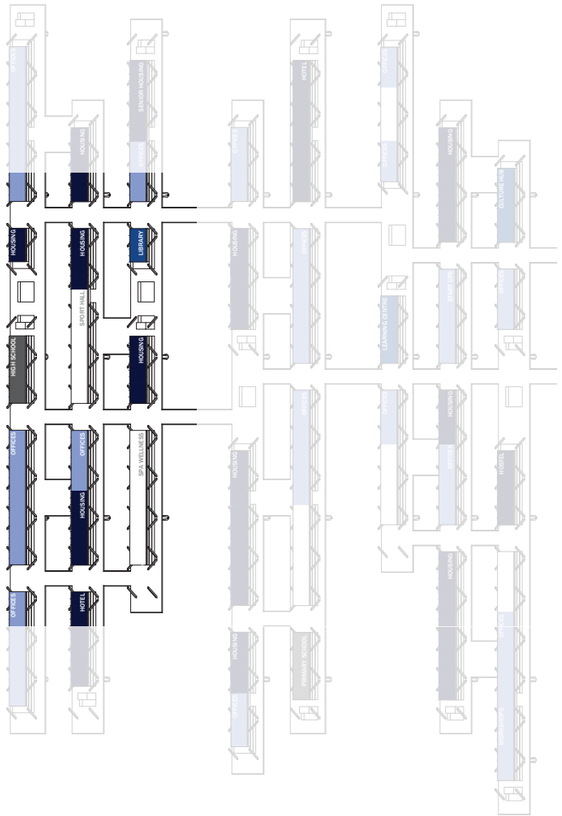


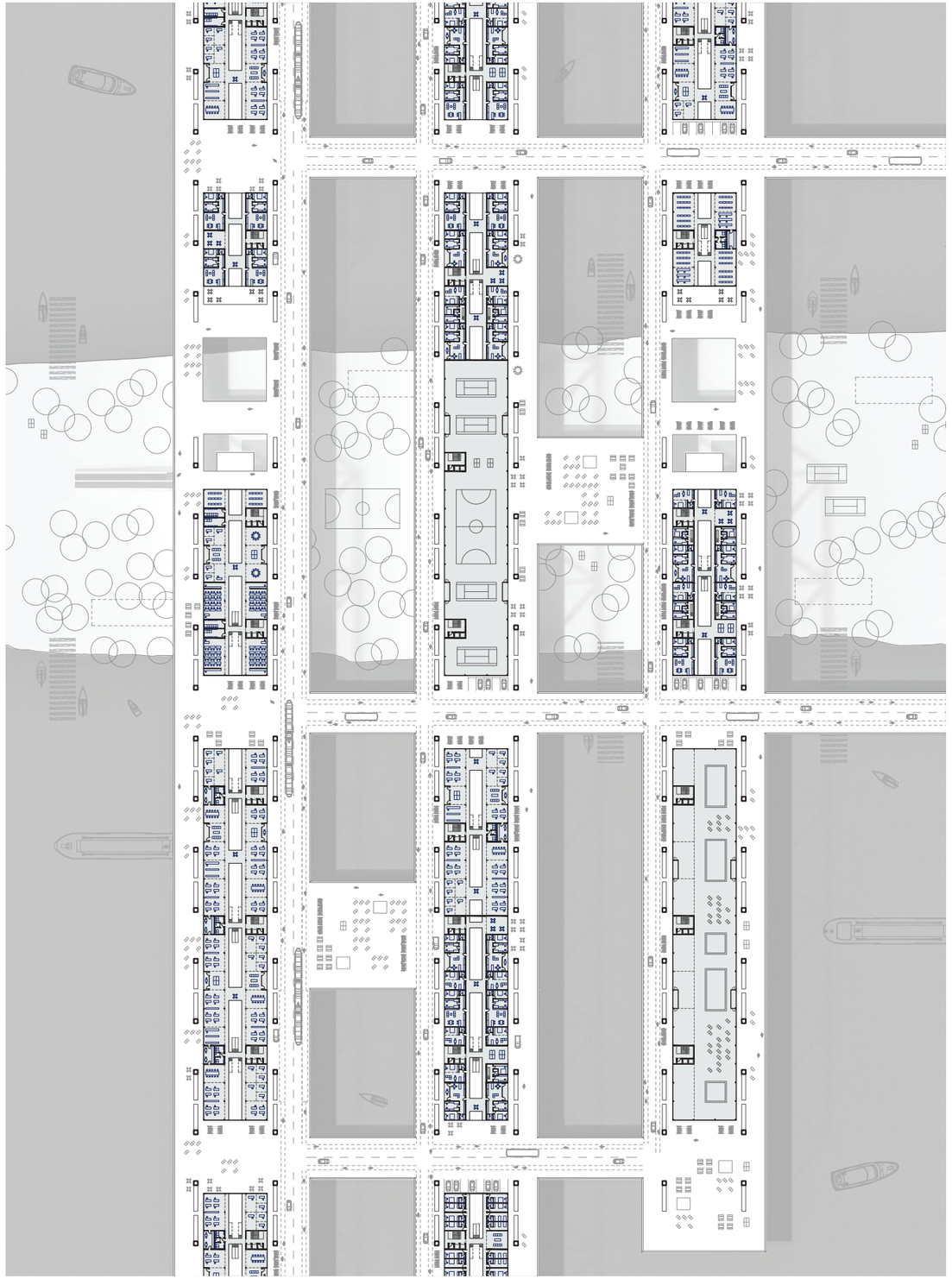
Level 0 **1 : 2.000**

0 20 40 60 80 100 m

V.

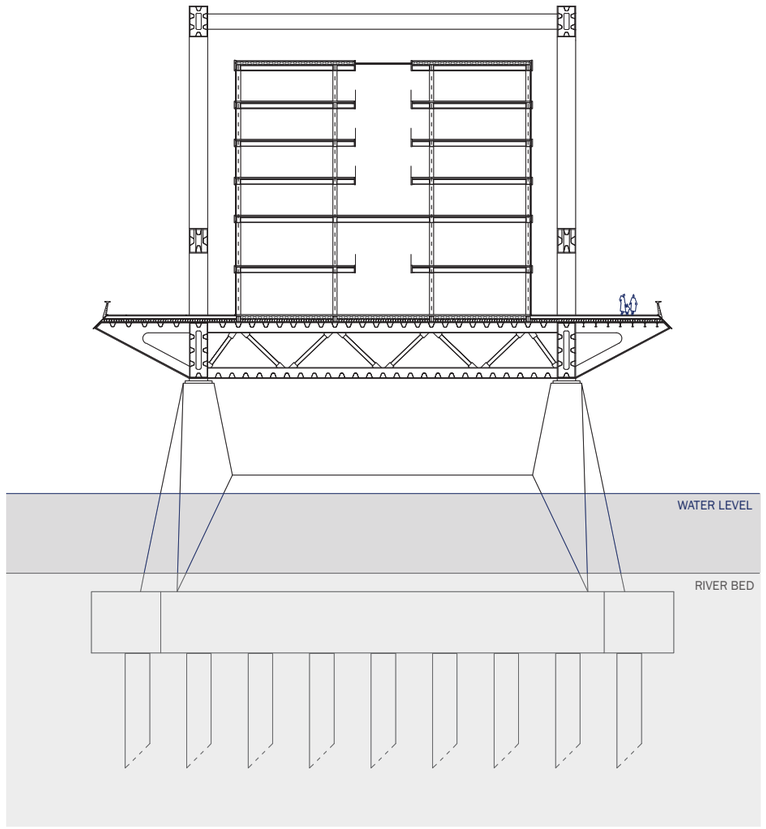


3



Level 3 **1 : 2.0000**

0 20 40 60 80 100 m

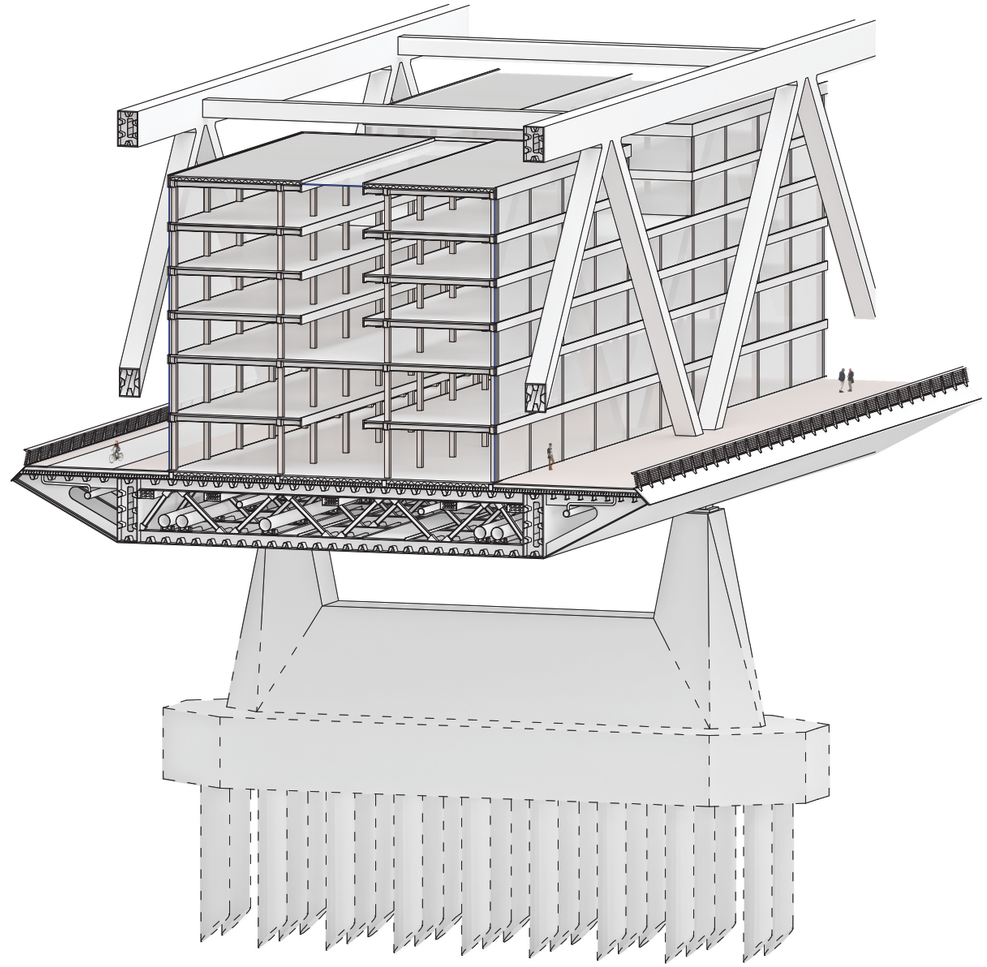


UPPER CHORD = 1.50 m x 2.50 m
LOWER CHORD = 1.50 m x 4.50 m
STRUT = 1.25 m x 1.25 m
DIAGONAL = 1.50 m x 1.25 m

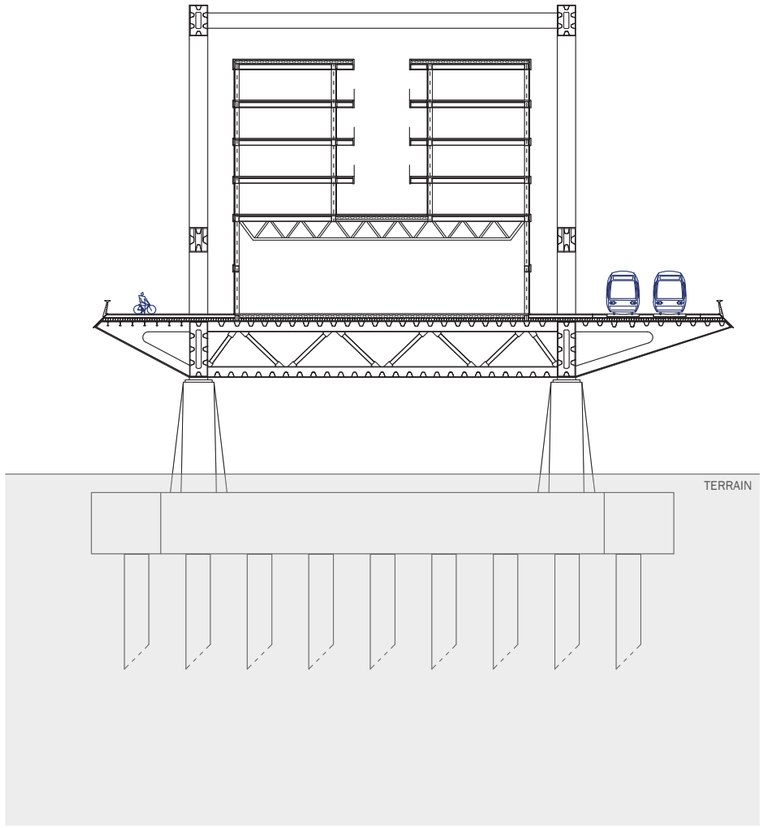
MAIN SPAN = 168.00 m

2D cross section **1 : 500**

0 5 10 15 20 25 m



3D cross section



UPPER CHORD = 1.50 m x 2.50 m
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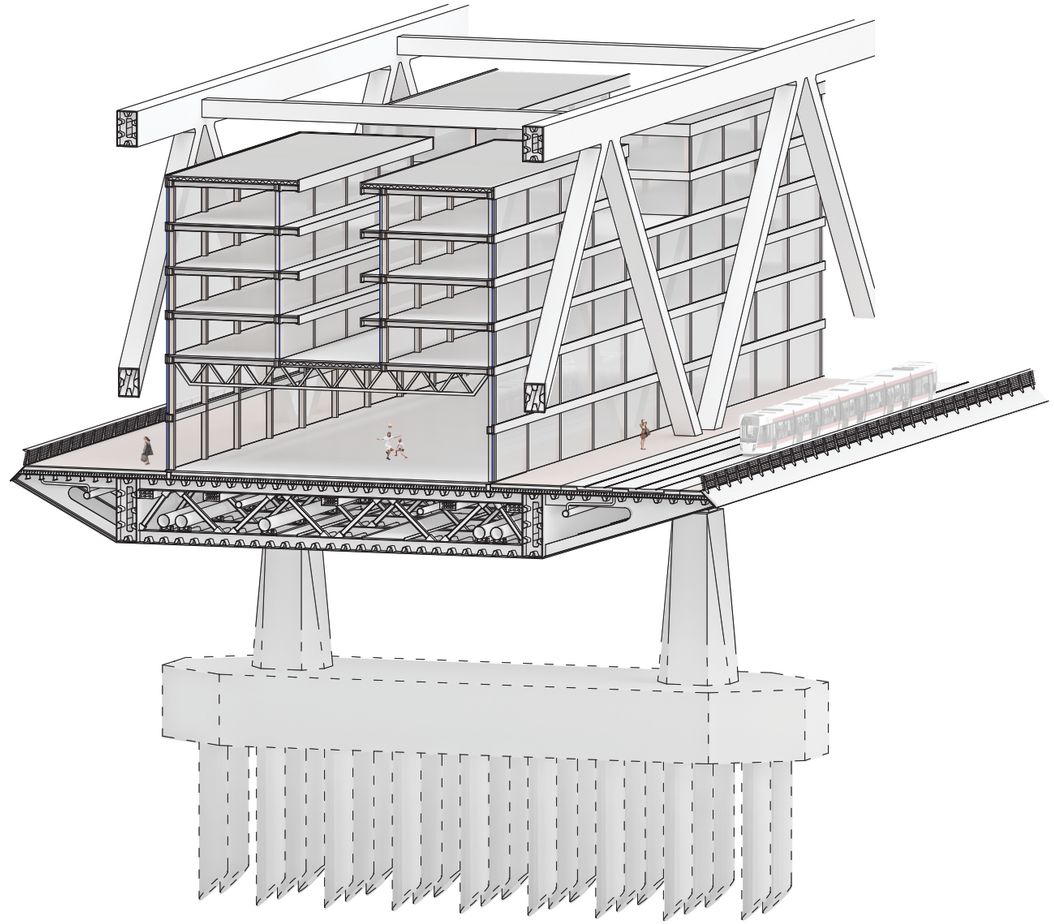
MAIN SPAN = 168.00 m

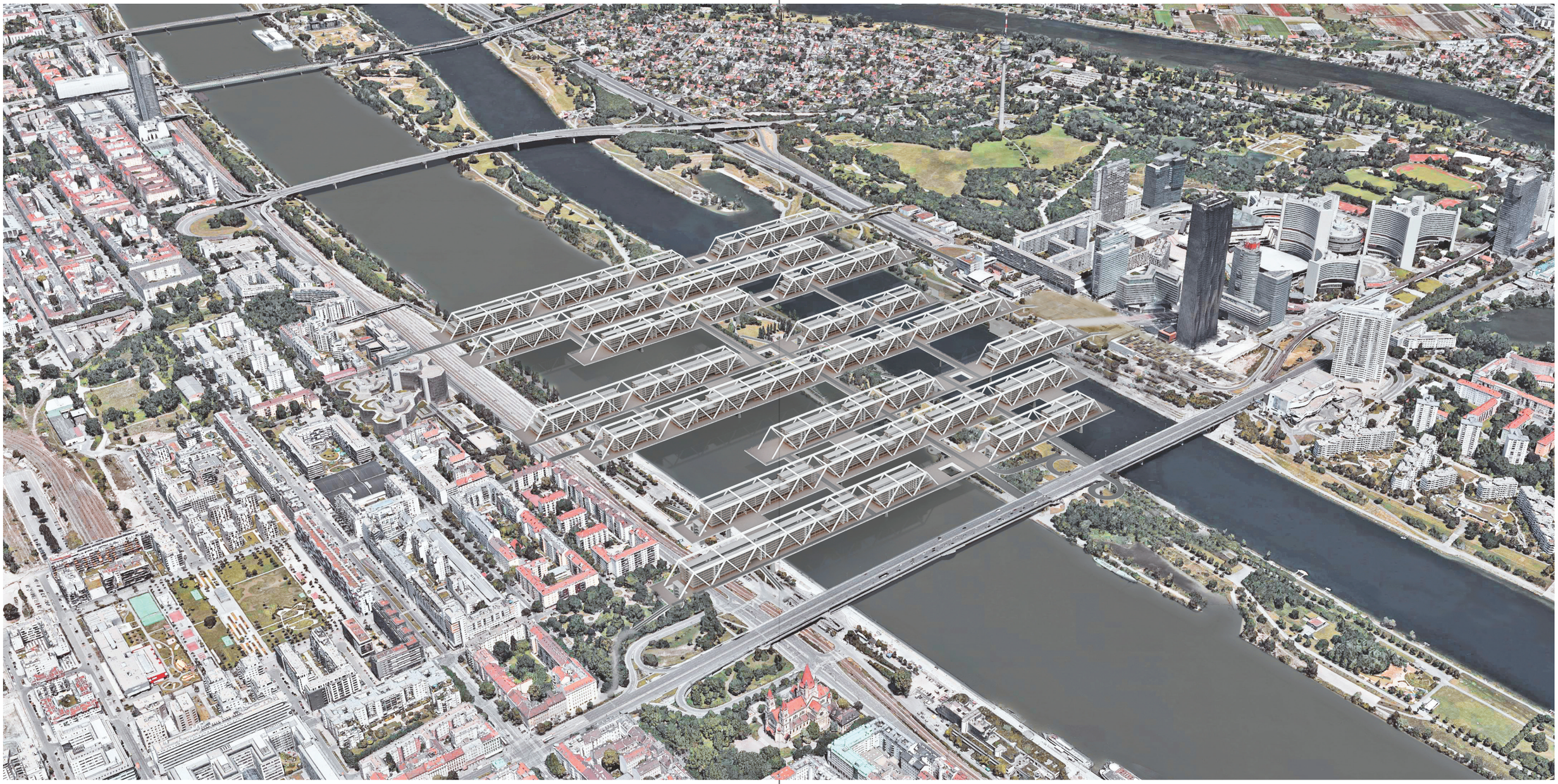
2D cross section **1 : 500**

0 5 10 15 20 25 m



3D cross section

VISUALIZATIONS



Visualization **Aerial view**

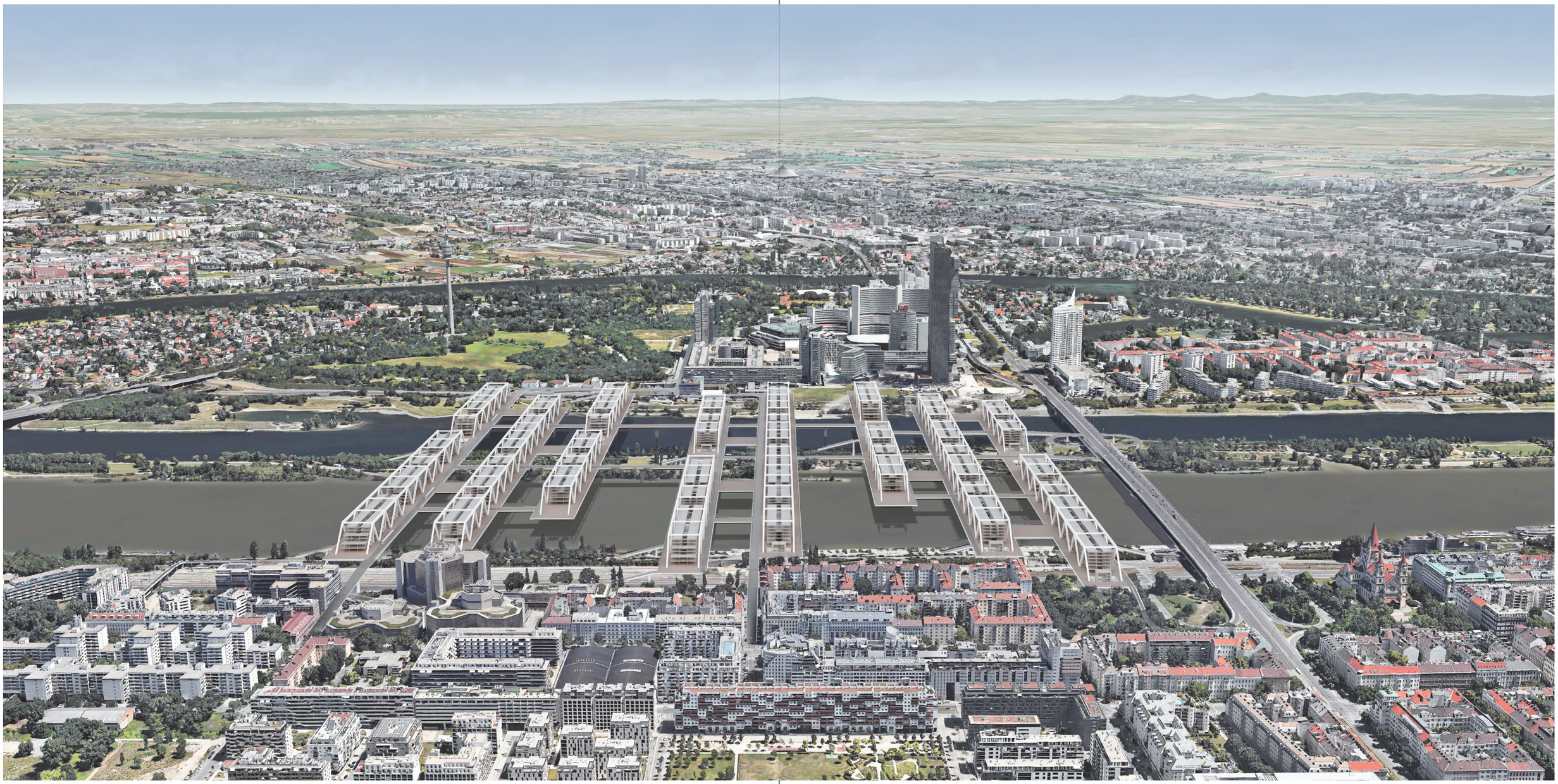
Visualization

Visualization

Visualization

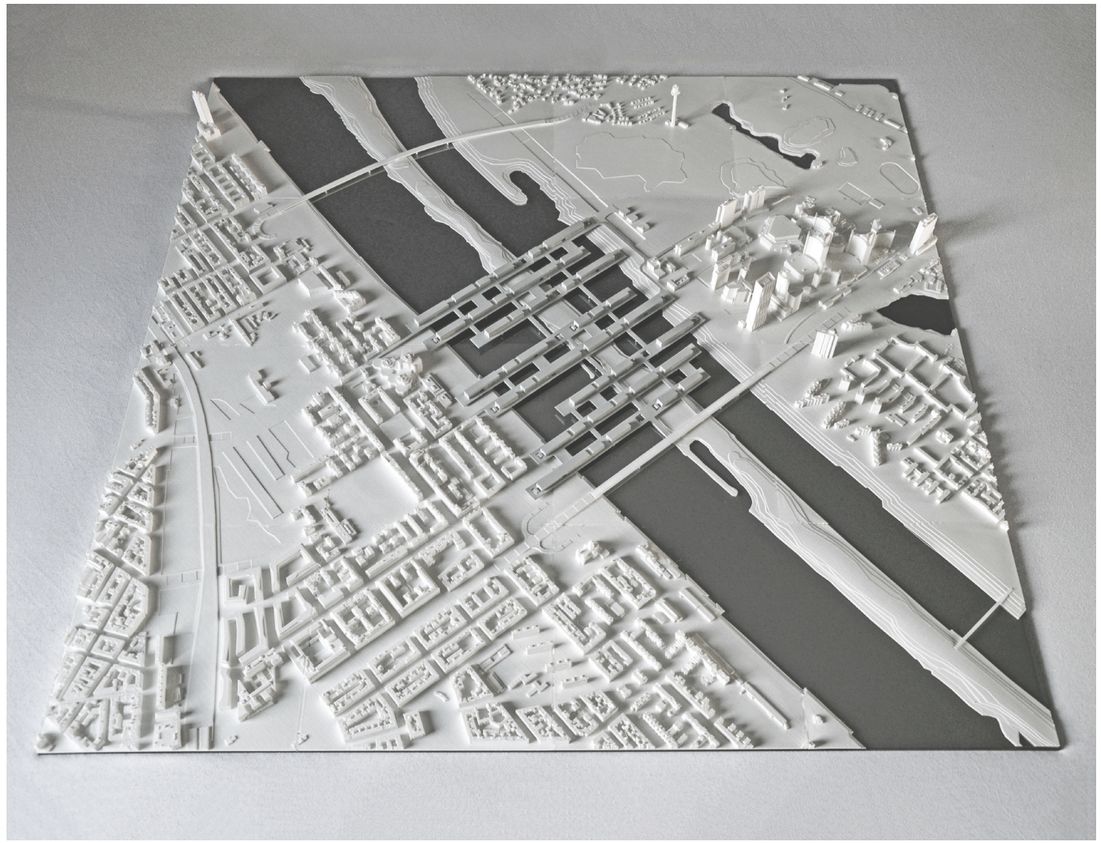
Visualization **Living on the Danube**

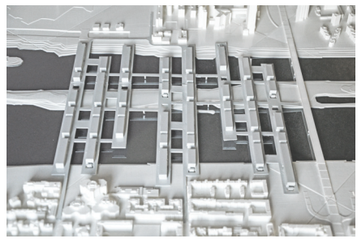
Visualization **Aerial view**

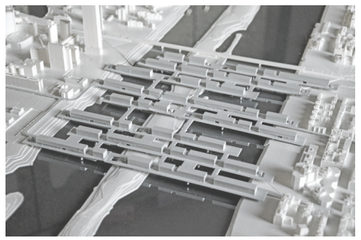


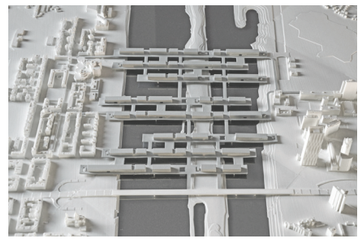
Visualization **Aerial view**

MODEL









Photographs of the physical model

THE LIVING BRIDGES OF VIENNA THE LIVING BRIDGES OF VIENNA THE LIVING BRIDGES OF VIENNA THE LIVING BRIDGES OF VIENNA

Epilogue

The Living Bridges of Vienna represents an urban set of eight interconnected inhabitable bridges gently hovering over the Danube area in Vienna. The existing urban fabric seamlessly flows over the proposed megastructure that furthermore contributes positively even to the surrounding area and narrows the gap between both sides of the city. With an actual minimal footprint, the entire multifunctional cluster is lifted from the pristine environment and does not disregard the safety aspect of the past regulation measures or disturbs the highly valuable natural environment.

A thoughtful design expresses the finest compromise between the social, cultural, structural and economical aspects. High living quality is not decreased even though the overall structural form is highly viable and rational. Simultaneously, the overall structural system is highly flexible and can easily be adapted in the future, in order to endure and stay efficient. The intention was also to turn a rather utopian and monumental design into a functional and reasonable complex, adapted for human scale. Additionally, an efficient and minimalistic structural design still expresses a high level of structural elegance.

Bridges of future generations will transform into inviting multifunctional and adaptive destinations, not simply remain infrastructural objects like nowadays, when their only purpose is to allow for crossing. Just imagine the potential of various locations around the world, considered unattractive or incapable of conventional construction at the moment, where any other conventional building structure would not fit. Inhabitable bridges are certainly not limited only to the water bodies, they can also span over any other physical obstacles, like highways, railway tracks, green areas or even flood areas. As an unconventional inhabitable typology in a time of tremendous opportunities, inhabitable bridges can offer attractive and extraordinary living and working spaces. Physical and symbolical bridges that people would also call *home*.

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p. 99-111 photographed by the author

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2D city plans and a 3D model of the city of Vienna:
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Backgrounds used in some visualizations:
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