The transformation of South Bratislava as part of the waterscape of the Danube

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FLUX WATERSCAPES

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Master Thesis

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Reflection
We may say that rivers have distinct personalities: forms and habits determined by their geologic settings, their flow regime—those seasonal and year to year patterns of floods and dry-season low flows—and their sediment load, that is, how much mud, sand, or gravel they transport. Rivers are naturally dynamic, changing in response to wet years and dry, the seasons, the odd landslide, and even the trees that fall in the channel. As Heraclitus said: “You cannot step in the same river twice, because the second time it is not the same river.” Rivers are part of a larger landscape, veins in a network that carries water, sediment, and wood, and through which fish migrate—most famously, salmon to their natal spawning grounds.

The river landscape also forms the collective memory of the surrounding residents. It forms the city shape and public daily life. The city and human also reform the river. As cities have urbanized, the smaller creeks have been buried in underground culverts and are largely forgotten. The floodplain was lost in the huge construction of city development. The river dynamic and ecological system was damaged. The flood faces the city directly and destroyed it.

How can we respond to this disharmonious relationship between the water and human? How can we adapting ourselves in this dynamic water landscape? It’s the passion for me to do this research design.

*Figure 1.*

The urban form of Wasserburg reflects the history of its growth on an accreting point bar. The construction of new buildings expended outwards in concentric bands as the channel migrated away from the city and the point bar grew.
Introduction

The Danube derives from the mountainous area of Black Forest in Germany and flows into Black Sea. It collects waters from the territories of eighteen nations and forms the international boundaries for eight of them. It’s the river that most effectively defines and integrates Europe (Wohl, 2011). However, due to the contemporary construction of river control, the Danube is a sick river now. The wandering channels straitjacketed into narrow navigational route, its floods captured by dozens of dams, and its water heavily polluted because of chemical agriculture and city development. The connection area of Upper Danube with Middle Danube between Vienna and Bratislava is a typical example for these problems. Especially, the flood-prone site of Bratislava which marks the start of the Middle Danube, is in dangerous of water problems because of geomorphology complexity of the meeting point of two mountains, the bottle neck area. The intense river rectifications of the old meander-belt spurred urban sprawl in the southern flood plains of the Danube and caused the central old city and southern biggest residential area of Bratislava in danger of floods. In order to mitigate these water problems caused by concrete construction of water control, we need a new water landscape spatial plan for Bratislava, which could turn the risks into opportunities for ecological sustainability, city development and public recreation.
The Danube is neither the largest nor the longest river in Europe, but it is the river that most effectively defines and integrates Europe. The Danube collects waters from the territories of eighteen nations and forms the international boundaries for eight of them. The gentle mountains of the Schwarzwald, Germany's Black Forest, are credited with being the headwaters of the Danube. Form the headwaters the river drops approximately 680 meters vertically to its mouth in the Black Sea.
The view to the old city center of Bratislava
Bratislava, Pressburg or Pressburg; Hungarian: Pozsony) is the capital of Slovakia and, with a population of about 420,000, the country's largest city. Bratislava is in southwestern Slovakia, occupying both banks of the Danube River and the left bank of the Morava River. Bordering Austria and Hungary, it is the only national capital that borders two independent countries.

Bratislava is the political, cultural, and economic centre of Slovakia. It is the seat of the Slovak president, the parliament, and the Slovak Executive. It is home to several universities, museums, theatres, galleries and other important cultural and educational institutions.[3] Many of Slovakia's large businesses and financial institutions also have headquarters there.

The history of the city has been strongly influenced by people of different nations and religions, namely by Austrians, Czechs, Germans, Hungarians, Jews, Serbs[4] and Slovaks (in alphabetical order, not significance).[5] The city was the capital of the Kingdom of Hungary, a part of the larger Habsburg Monarchy territories.[6] from 1536 to 1783 and has been home to many Slovak, Hungarian, and German historical figures.
Geology condition of Bratislava

Bratislava straddles the Danube River, which it had developed around and for centuries was the chief transportation route to other areas. The river passes through the city from the west to the south-east. The Middle Danube basin begins at Devin Gate in western Bratislava. Other rivers are the Morava River, which forms the north-western border of the city and enters the Danube at Devin, the Little Danube, and the Vydrica, which enters the Danube in the borough of Karlova Ves.

The Carpathian mountain range begins in city territory with the Little Carpathians (Malé Karpaty). The Záhorie and Danubian lowlands stretch into Bratislava. Therefore, Bratislava becomes the meeting point of the mountain massifs of the Carpathian arch and the last peaks of the Alps.

From Vienna basin, the Danube valley narrows as the river cuts through a spur of the Carpathian Mountains in a short gorge known as the Porta Hungarica before crossing the Slovakian border and passing through the city of Bratislava, home to approximately 450,000 people.

Because this two mountain which create a bottle neck shape squeeze the Danube River go through the south-east part of Bratislava. The city, Petržalka, that located on the south part faces a huge flood risks.
1563–1830
Over a period of almost three centuries, 11 Hungarian kings and 8 royal wives are crowned in Bratislava.

1809
The town is besieged by Napoleon’s troops.

1919
January 1 – Bratislava is occupied by the Czechoslovak Legion and becomes part of the new Czechoslovak Republic.

Bratislava developed slowly on the north bank of the Danube. Lots of small village located on the higher area of the south bank of the Danube.

Before 18 century
Developed on left bank of Danube

**Harmony and uncontrolled**

1819
The town is besieged by Napoleon’s troops.

1735
People settled and built a small village at right bank of Bratislava and enjoy the waterfront life there.

**Less development and control**

1851–1700
Roman

Between 18-19 century
Small Developing intervention on right bank of Danube

Future

The right bank of Bratislava developed faster than any ages. The biggest socialist residential area was built by draining the alluvial fan of right bank of Danube. The floods risk becomes more serious at both bank and other water problems followed.

**Control and risks**

Future

Bratislava city development

Before 18 century
Developed on left bank of Danube

Harmony and uncontrolled

People settled and built a small village at right bank of Bratislava and enjoy the waterfront life there.

Between 18-19 century
Small Developing intervention on right bank of Danube

Less development and control

The right bank of Bratislava developed faster than any ages. The biggest socialist residential area was built by draining the alluvial fan of right bank of Danube. The floods risk becomes more serious at both bank and other water problems followed.

After 19 century
Huge development on right bank of Danube

Control and risks
Bratislava is developing on the banks of Danube for almost 2000 years. This particular river landscape also form the collective memory of Bratislava. However, at the same time, because of unlimited construction, especially on the right bank which was the floodplain of Danube river, the dynamic river landscape has lost.
Flood risk

The unlimited city construction, the lost of dynamic river landscape and together with the global climate changes give rise to higher possibility of more serious flood risks. Especially for the south part of Bratislava, the city of Petržalka, the whole city was in danger of flood risk problems.
In the year of 1969, a huge residential area were built on the right bank of River Danube. It structured by separated community neighborhood which is introverted and public services centralized.

The city of Petržalka

The construction of Petržalka in the 70s, under the socialist regimen, completely cancelled a part of Bratislava’s history, imposing a completely different urban character; Petržalka therefore still stands as a strong symbol for both the city and the citizens.

After 40 years of urban changes, transformations and despite the new millennium advent, it is straightforward how the utopist urban experiment of those years miserably failed in that district, as well as in many other European ones. Today the area is obsolete, connected to the rest of the city only through highways and full of massive and out of scale buildings, without reference points or public spaces able to offer a qualified living. Beyond the serious technological problems and weaknesses shown by the buildings, the area misses a lot of services for the inhabitants, as well as aggregation spaces; existing green areas are indeed designed only in the buildings’ courtyards and not at the district scale.
A quarter of Whole city's residents live in Petzalka.

Petržalka, which houses 125,000 people, also still lacks centers, squares and infrastructure needed to make it a functioning community.
Problem Statement

In Bratislava, there are a lot of water problems occurring, such as urban development meets the problem of serious and frequent flooding risk; river channelization drains floodplain and river arms; dense forest area along the river leave insufficient space for flood water storage; drainage basin for city development and agriculture decreases groundwater level, reduces drinking water supplies, increases water pollution; poorly maintained and disconnected waterfront in Bratislava.
Right bank of River Danube

No central cultural services for whole city
No functional central public spaces

Low quality of right bank environment!

The right bank is endangered in flood risk!
Low accessibility from city to riverfront!
Research question & Research goals

Due to the problems mentioned above, my research design is searching for a new water landscape vision of the right bank of Bratislava.

Research Question:

How to create a flexible and sustainable river landscape which gives a new spatial identity to the right bank of Danube River in Bratislava?

Research Goal:

For now, the city on the right bank of River Danube has emerging needs of a flexible, accessible and dynamic riverfront which can satisfy the public requirements and also can adapt to the water changes.

In the long run, the city on the right bank of River Danube needs big scale landscape and hydraulic Engineering for protecting the city from flood risks.
Methodology

A summary of the theory of nature process

The nature of landscape architecture as a discipline, and particularly landscape design as an important activity, can be characterized by the interplay of four principles of study and practice, understanding landscape as (I) three-dimensional construction, (II) history, (III) scale-continuum and (IV) process.

Especially, the last but most important character of landscape architecture is the thinking of Landscape as process: the landscape is regarded as a holistic and dynamic system of systems. In that respect landscape is an expression of the dynamic interaction between ecological, social and economic processes. The landscape is considered as a process rather than as a result. Natural and social processes constantly change the landscape, making the dynamics of the transformation a key issue in research and design. The design is like an open strategy, aimed at guiding developments, no blueprint design.

Projects play a role as an open-ended strategy, as in staging or setting up future conditions (e.g., manipulating processes of erosion and sedimentation by water or the development of project-based master plans). Operations focus on the interaction between landscape processes and typo-morphological aspects and facilitate aesthetic, functional, social and ecological relationships between natural and human systems. This principle of study and practice elaborates on models for understanding the landscape as system (e.g. layers-approach) and concepts like sustainable urban metabolism and urban ecology (Nijhuis, 2010).

Nature processes as Values

Once it has been accepted that the place is a sum of natural processes and that these processes constitute social values, inferences can be drawn regarding utilization to ensure optimum use and enhancement of social values. This is its intrinsic suitability. For example, flat land with good surface and soil drainage is intrinsically the most suitable land for intensive recreation, while areas of diverse topography represent a higher value for passive recreation. The social values represented by the natural processes more often than not are inherently suitable for a multiplicity of human uses. Flat well-drained land is as suitable for intensive recreation as it is for commercial
industrial development. Areas of diversity and high scenic interest have a high social value for conservation and passive recreation, at the same time being highly desirable locations for residential development. These apparent conflicts can be resolved in a number of ways. Because of their scarcity and vulnerability, certain resources may represent such high value for conservation that other uses should be excluded. Multiple uses of some areas may be permitted if it is assured that intrinsic values are not compromised. Yet in other cases where two uses are coequally suitable, it remains with society to make the choice (Mchage, 1969).

Water processes

Considering the character of the right bank of Bratislava, the processes related to the river landscape are vital forces to form the existing landscape. As an alluvial fan of Danube River, the sediments from the upper Danube stay at this area. This water landscape of Bratislava is an excellent research subject for such process orientation design.

Water and processes can never be regarded as separate. Observations over a longer period reveal that the entire river space exists in a constantly advancing, continuous process of change. The constant shifting of the river’s course that can shape entire landscapes creates a complex, continually changing system – although the processes cover timescales that we cannot directly comprehend. The present course of a river is, seen in this light, no more than a snapshot in time of this ongoing process. Therefore, what kinds of processes and their driving forces related to water and river landscape? Water and river landscape are highly complex systems within which interconnected processes occur simultaneously: physical, chemical and biological processes exert reciprocal influences.

For the design of landscape architecture, the spatially operant physical processes are more important. They are predominant for the shaping of river spaces. Essentially, it distinguishes between two types of dynamics, each with two sub-processes. The first is the temporary flow fluctuations which have two sub-processes: vertical water level fluctuation and lateral spread of the water. The second is morphodynamic processes that have two sub-processes: sedimentation shift within the river and self-dynamic river channel development (Prominski et al., 2012).
Water process: temporary flow fluctuations
Sub-process 1: vertical water level fluctuations

The discharge and resultant level of a river changes almost daily, although mostly it is only extreme high or low water events that are noticed. The water level in the river and during floods in the flood plain is in direct correlation to discharge from the catchment area. According to the space available and the roughness of the riverbed, the banks and the river foreland, a certain discharge rate causes a corresponding water level. This relationship can be described for single points along the watercourse as the ratio between water level and discharge. High water events are generally expressed in m² - the discharge volume and not the water level.

Sub-process 2: lateral spread of the water

High water is especially conspicuous through flooding; minor rises in discharge levels can usually be contained within the river channel, but with larger high water events the river overflows its banks and covers the adjacent flood plain. This has a corrective effect: in flooding the foreland, which generally has a higher roughness, the water’s energy is dissipated and its height and speed reduced. Flooding is limited, when the river is not shaped by human measures, to the valley borders. Flood protection measures such as dikes cause an artificial limitation on the spread of the water and thus the flood area.

Water process: morphodynamic processes
Sub-process 1: Sedimentation shift within the river

The slower flow on the inner curve of a river leads to the deposit of sediment; a slip-off slope is created. On the outside curve, the cut bank, the fast cylindrical flowing current erodes the bank and deepens the bed. This means that the cross section of the river bends is asymmetric; the bank on the inner bend is flat, and on the outer cut bank there is a deeper channel (pool); the secondary flow cuts a channel in the riverbed that, when the water is low, carries most of the discharge and is thus called the low water channel. As a result of centrifugal forces created by the flow vortexes, the low water channel sinuously meanders from one side of the riverbed to the other, always on the outside edge of the outer bends. In straight sections of a river the riverbed is flat which is where riffles or a ford can form through sediment accretion (Pic. 1). The state of the riverbed is constantly changing as a result of these dynamic processes. Through this alternating process of erosion and sedimentation the river as a system is self-regulating, and the longitudinal section of the riverbed varies around a relatively stable mean.

Sub-process 2: Self-dynamic river channel development

The meandering of a river is a self-reinforcing process, as the water flows faster on the cut bank on the outside of the bend and causes further erosion. The bank is literally ‘eaten away’ and steep edges are created. As the bank crumbles, the bend that thereby emerges shifts inexorably, both towards the edge of the valley and downstream. On the inside bend of the river - the slip-off slope where the flow rate is lower - sediment settles, and the course of the whole river channel shifts (Pic. 2). The meander becomes larger and rounder, almost circular, and when the circle is nearly closed the river may break through, the loop is cut off, and the whole process begins again.
The waterscapes design principles including flow fluctuations and morphodynamic processes

Each river forms the surrounding landscape in diverse ways, and conversely the surrounding environment exerts influence on the shape of the river through many factors. The land forming power of water arises from the close interplay of topography, geology, climatic conditions and the above mentioned erosive and accumulative activity of the current. Every river changes over various timescales and to various spatial extents; water landscapes are thus expressions of complex spatiotemporal processes.

In order to adapt this complex system, human has created different kinds of water spaces. Due to the great amount of ways of designing the water landscape, it is better to use the mixed methods research approaches by John W. Creswell and case study research method by Robert K. Yin to get a grip on it and to find the clues and principles for us to deal with the water landscape design of Bratislava.

Space A

‘Embankment Walls and Promenades’, the banks are very steep and there is hardly any flood area available. For this reason fluctuations in watercourse conditions are mainly vertical and morphodynamic processes are consequently excluded.

Space B

‘Dikes and Flood Walls’, large vertical elements limit the flood area at some distance from the normal watercourse. Both horizontal and vertical fluctuations in the watercourse conditions take place, whereby the borders of this Process Space only permit very small-scale morphodynamic processes.

Space C

‘Flood Areas’, comprises spaces near the watercourse that are regularly submerged under its horizontal expansion and in which spatial design has to work with these processes.

Space D

‘Riverbeds and Currents’, when the river is not sealed in places, reversible aggradation and erosion processes can happen along the riverbed, with consequences for the form of the riverbed and also the banks.

Space E

‘Dynamic River Landscapes’, is shaped by processes that are to be found in natural watercourses. By including the flood areas in the erosion and aggradation processes, the river can shift its entire course.
Design Concept

The processes orientated design principle of landscape architecture will guide my research design and provide basement for the theory and methodology. The dynamic processes of water landscape are the focus of my research design. By means of combining different water landscape programs and strategies, the research design will reflect on those design possibilities and show the potential of utilization at the location of Bratislava.

My design concept is based on this water process. By creating dynamic water landscape, the aim is to create a flexible and sustainable waterscapes which can give a new identity for the south part of Bratislava.

The title of my research design is FLUX WATERSCAPES- The transformation of Bratislava as part of the waterscape of Danube. Flux means a continuous change. Flux waterscapes can adapting to the changes of water flow and social needs.

It can create a flexible water landscape basement which can adapting to water changes and recall the collective memory. Then adding dynamic programs to waterfront of Bratislava that can satisfy the public requirements.
Channel migration  Channel dynamic  Creating new channels  Grading the channel  Varying the river bed

Extending the space  Tolerating  Evading  Adapting  Above the water
Regional analysis and plan framework

Considering the existing situation and problems of the water landscape of south Bratislava, I put forward my regional plan framework. The whole regional plan includes four parts. The Danube riverfront transformation, the inner city old creek improvement, the city suburb green and blue river bypass construction. The whole plan is to deal with the problem of low quality and inflexible water landscape of this area, the flood risks and inaccessible waterfront.

To realize this project, I introduce to transform this water landscape step by step in a time schedule. This schedule is based on the degree of urgent public needs, the construction time, commercial issues, political land owner problems countries’ boundary area. Then the whole project could finish in this time. And it provide more options and potential to realize this project.
Main Danube river bank transformation
Inside new city waterscape improvement
City surburbs blue river bypass construction
City surburbs green river bypass construction

Time table of waterscape transformation of Bratislava

Year 2015 2018 2020 2023 2028 2033 2035 2040

30-100 years extra safety flood risks protections;
Agricultural production (Grazing and grass production);
Improving Agricultural education and recreational function

Improving the environmental liveability of new city;
Increasing the accessibility from the inside city to the waterfront of Danube River;
Improving the recreational function of right bank of Danube River;
Flood risks warning.

Decreasing the seasonal overmuch water discharge risks of each banks;
Increasing the connection between city center and new city;
Improving the recreational function of right bank of Danube River;
Flood risks warning.

30-50 years floods mitigation;
Providing surburbs waterscapes adventure activities opportunities.

Rainfall collection and underground water supplement.

Providing surburbs waterscapes adventure activities opportunities.
Main Danube river bank transformation

- Decreasing the seasonal overmuch water discharge risks of each banks;
- Increasing the connection between city center and new city;
- Improving the recreational function of right bank of Danube River;
- Flood risks warning.

Regional plan framework: development schedule step 1
Waterfront transformation collage
Main Danube river bank transformation
Inside new city waterscape improvement
City surburbs blue river bypass construction
City surburbs green river bypass construction

Time table of waterscape transformation of Bratislava

1. Inside new city waterscape improvement
   - Improving the environmental liveability of new city;
   - Increasing the accessibility from the inside city to the waterfront of Danube River;
   - Improving the recreational function existing water channel;
   - Rainfall collection and underground water supplement.

Regional plan framework: development schedule step 2
Main Danube river bank transformation
Inside new city waterscape improvement
City surburbs blue river bypass construction
City surburbs green river bypass construction

Year 2015 2018 2020 2023 2028 2033 2035 2040

Time table of waterscape transformation of Bratislava

1. Main Danube river bank transformation
2. Inside new city waterscape improvement
3A. City centre rainwater management
3B. City surburbs blue river bypass construction
3C. City surburbs green river bypass construction

Improving the environmental liveability of new city;
Increasing the accessibility from the inside city to the waterfront of Danube River;
Improving the recreational function existing water channel;
Rainfall collection and underground water supplement.

Old River Creek
Q_{average}=2057\text{ m}^3/\text{s}
Q_{seasonal}=5000\text{ m}^3/\text{s}
Q_{5\text{ years}}=6000\text{ m}^3/\text{s}
Q_{10\text{ years}}=8287\text{ m}^3/\text{s}
Q_{20\text{ years}}=9262\text{ m}^3/\text{s}
Q_{50\text{ years}}=10532\text{ m}^3/\text{s}
Q_{100\text{ years}}=11494\text{ m}^3/\text{s}
Q_{1000\text{ years}}=14803\text{ m}^3/\text{s}
Suburb agriculture land potential
Old creek and lower land in this area
Strategy for mitigating flood risks

Blue River Bypass
Q = 4000 - 8000 m³/s

Green River Bypass
Q = 8000 - 14000 m³/s
Main Danube river bank transformation
Inside new city waterscape improvement
City surburbs blue river bypass construction
City surburbs green river bypass construction

Year 2015-2040

Time table of waterscape transformation of Bratislava

City surburbs blue river bypass construction

30-50 years floods mitigation;
Providing surburbs waterscapes adventure activities opportunities.
Blue Bypass
Existing Forest
Route
Blue river bypass water discharge changes
Main Danube river bank transformation
Inside new city waterscape improvement
City suburbs blue river bypass construction
City suburbs green river bypass construction

Time table of waterscape transformation of Bratislava

30-100 years extra safety flood risk protections;
Agricultural production (Grazing and grass production);
Improving Agricultural education and recreational function

Regional plan framework: development schedule step 4
Main Danube river bank transformation

Inside new city waterscape improvement

City surburbs blue river bypass construction

City surburbs green river bypass construction

Year 2015 2020 2023 2028 2033 2035 2040

Time table of waterscape transformation of Bratislava

Agricultural production (Grazing and grass production);

Improving Agricultural education and recreational function

Keep the agriculture function in green river bypass
In the long term, the transformation of this water landscape of whole region will increase the dynamic of ecological potential. It will reconnect the broken nature corridor between the Vienna to the Györ. The new water landscape provides possibility for the endangered species to live.
Considering the utilization of the new water landscape, the Danube Museum in Bratislava gives a possible way. The landscape is also an art project. The combination between the natural art and artificial art could provide a new way for people to rethink about the surrounding water landscape. The landscape will change and grow in the future, and artificial art projects also changed in this background, because of the light and reflection.
Art field park
Experience landscape as an growing art project.
Reference images from Stiftung Insel Hombroich
Elaboration in waterfront design framework

As the heart of Bratislava, the right bank of Danube River in Bratislava has urgent needs for transformation and improvement now. The situation of the waterfront is non-functional and in low quality. It is also unadaptable to the seasonal water discharge changes. With a great view and public utilization potential, the riverfront becomes an important conjunction and connection part for the two bank cities. Therefore, I would like to do an elaboration design for this area as a showcase for regional plan. It's also a start point to let people notice and pay attention to this dynamic waterfront potential and recall the collective memory of old riverfront of Danube River.
The city on the right bank of River Danube has an urgent need of a flexible, accessible and dynamic riverfront which can satisfy the public requirements and also can adapt to the water changes.
Design Concept

The south bratislava is an alluvial plain formed by Danube river. The shape of river bank was meandering before. Until 19 century, in order to increase the potential of navigation, the river banks has reformed as straight. The bank rised higher and higher than the river, it caused the lost of dynamic ecological potential and also unadaptable to the seasonal water changes. However, the old Right meandering river bank is an old water landscape identity of Danube River in Bratislava. It forms part of the collective memory of Bratislava. This meandering river shape also gives more dynamic ecological potential.
The design framework is based on the water processes. Firstly, it’s to create a flexible meandering bank which can adapting to water changes and recall the collective memory of the old riverfront. Then, considering the urgent public needs of recreation function, adding new program to satisfy public needs. In addition, by adding new routes based on the function, connecting this new route system with exiting route. The whole design is to maximise the potential of exiting waterfront, such as the heritage and wonderful waterfront open view. Besides this, some temporary waterfront usage also can be preserved and even enhanced to be more attractive as a famous city event.
Creating a flexible water landscape basement which can adapting to water changes and recall the collective memory.
LANDSCAPE / ELEVATION
LANDSCAPE / SEASONAL WATER DISCHARGE CHANGES
Creating a flexible water landscape basement which can adapting to water changes and recall the collective memory.

Then adding dynamic programs to waterfront of Bratislava that can satisfy the public requirements.
PROGRAM / EXISTING PROGRAMS

- Right bank waterfront
- Beach Music Festival
- View point for New year's firework
- Stadium
- Old forest park

- Music festival
- Fire work
- Beach
PROGRAM / WATERFRONT VIEW POTENTIAL

1. Right bank waterfront
2. Beach
3. Music Festival
4. View point for New year's firework
PROGRAM / EXISTING SITUATION
PROGRAM / RETAIL STORE STREET
Creating a flexible water landscape basement which can adapting to water changes and recall the collective memory.

ACCESSIBILITY

Then adding dynamic programs to waterfront of Bratislava that can satisfy the public requirements.
ACCESSIBILITY / TRAFFIC: CAR
ACCESSIBILITY / DESIGNED MAIN ENTRANCE AXIS FROM RIGHT BANK INNER CITY TO LEFT BANK

- Old Castle
- Old city center
- Slovak national theater
- Old Bridge
- Left bank waterfront boulevard
- Left bank waterfront park
- Shopping and residential area
- City linear green space
ACCESSIBILITY / DESIGNED MAIN ENTRANCE AXIS FROM RIGHT BANK INNER CITY TO LEFT BANK
ACCESSIBILITY / STARTS AT INNER OLD CREEK
ACCESSIBILITY / EXTENDING THE GREEN FIELD CROSSING THE MOTORWAY
ACCESSIBILITY / PASSING THE RETAIL STORE STREET

Old Bridge

Old Creek

Petržalka city creek green spaces

Commercial street

Flood plain forest

Wetland

Waterfront

Low water level

High water level

Old Bridge

Left bank

Right bank

Old creek

Main Axis

Motorway

Access for people with disabilities

Passing the retail store street

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ACCESSIBILITY / MAIN ENTRANCE AXIS

[Diagram showing a pathway leading to a waterfront area, with labels for Old Bridge, Left bank, Right bank, Old Creek, Main Axis, Motorway, Old Creek, Flood plain forest, and Wetland.]

-Petržalka city creek green spaces
-Commercial street
-Flood plain forest
-Wetland
-Waterfront

Low water level
High water level
ACCESSIBILITY / MAIN ENTRANCE AXIS: ELEVATED ROUTE
WATERFRONT DESIGN / ROUTE SYSTEM

City linear green space
Old city center
Slovak national theater
Old Castle
Left bank waterfront park
Shopping and residential area
Left bank waterfront boulevard
Old Bridge
Shopping mall
DESIGN PLAN
WATERFRONT DESIGN / DETAIL DESIGN - CONJUNCT POINT
View to the left bank old city center riverfront

View to the old castle and Apollo bridge

View connection to the old steel bridge

Temporary riverfront use potential
Material
Concrete case in situ

View and connection to the old steel bridge
DETAIL DESIGN / ACCESSIBILITY-WALKING FLOW

waterfront square
DETAIL DESIGN / ACCESSIBILITY-VIEW POTENTIAL
Salix alba
Salix fragilis
Ulmus laevis
Populus x canescens

Concrete pavement
Elevated wooden route

L. salicaria
M. caerulea
T. shuttleworthii
C. pendula
S. fragilis
S. alba
U. laevis
P. x canescens

DETAIL DESIGN / ACCESSIBILITY-VIEW POTENTIAL
DETAIL DESIGN / ACCESSIBILITY-VIEW POTENTIAL
Concrete steps

Elevated wooden route

Concrete steps
Salix alba  Salix fragilis  Ulmus laevis  Populus x canescens

Waterfront fences & wooden pavement
Cutting stone steps on grass
Wooden steps on grass
glass surface pavilion
Small elevated bridge to cross the channel

Lythrum salicaria  Molinia caerulea  Typha shuttleworthii  Carex pendula

B-B Section
**Different water levels**

- Winter: 1793 (400 cm)
- Summer: 2295 (508 cm)
- Q.MIN: 1000 (292 CM)
- Q3: 3500 (563 CM)
- Q5: 7000 (788 CM)
- Q10: 7800 (830 CM)
- Q20: 8700 (874 CM)
The transformation of South Bratislava as part of the waterscape of the Danube
Main Danube river bank transformation
Inside new city waterscape improvement
City surburbs blue river bypass construction
City surburbs green river bypass construction

Year 2015 2018 2020 2023 2025 2028 2030 2033 2035 2040

30-100 years extra safety flood risks protections;
Agricultural production (Grazing and grass production);
Improving Agricultural education and recreational function

30-50 years flood mitigation;
Providing surburbs waterscapes adventure activities opportunities.

Improving the environmental liveability of new city;
Increasing the accessibility from the inside city to the waterfront of Danube River;
Improving the recreational function of existing water channel;
Rainfall collection and underground water supplement.

Decreasing the seasonal overmuch water discharge risks of each banks;
Increasing the connection between city center and new city;
Improving the recreational function of right bank of Danube River;
Flood risks warning.

Improving the environmental liveability of new city;
Increasing the accessibility from the inside city to the waterfront of Danube River;
Improving the recreational function of existing water channel;
Rainfall collection and underground water supplement.

Providing surburbs waterscapes adventure activities opportunities.

3G City surburbs green river bypass construction
3B City surburbs blue river bypass construction