



NAGOYA GREENWAY

名古屋グリーンウェイ

*"Reimagining the network of rivers
and parks in Nagoya"*

Edoardo Avellino
Davide Scaglia



“The environment is the cradle of all living things and is sustained by a delicately balanced ecosystem. We are deeply aware of this fact and are committed to the conservation of a healthy and rich environment that allows people to live in harmony with nature through the participation and collaboration of all citizens. We are determined to nurture a society that can achieve sustainable development by reducing the environmental impact of human and urban activities.”

Nagoya Basic Environment Ordinance, 1996

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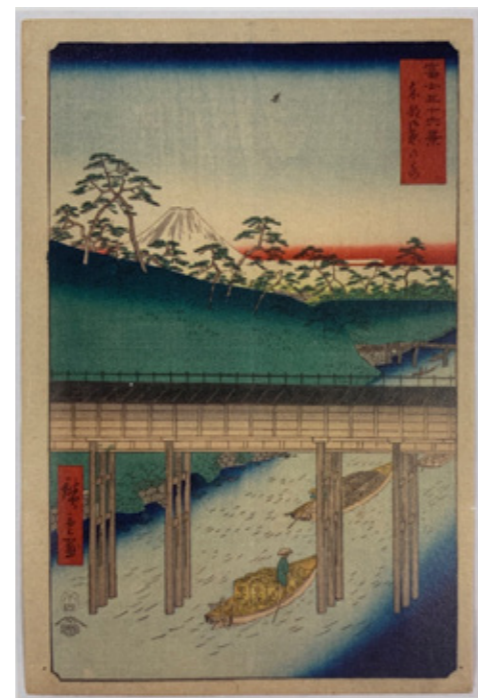
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Images: A selection of ukiyo-e prints from 1830-1834 showing boats how people and cities interacted with rivers.

1. A BRIEF HISTORY

HOW THE RIVERS EVOLVED INTO THEIR CURRENT STATE

Even though there are more than 21,000 rivers present in Japan, they are often overlooked or unnoticed by visitors and locals alike. Underneath the hard landscaping which identifies most urban cityscapes in the country, lie many water channels; cities such as Nagoya, Tokyo and Osaka are built on water. A waterfront area is often used to a large economic or environmental advantage in other large cities in the world, however it seems that Japan has taken a different attitude towards their cities' involvement with water bodies. Highways have been constructed on top of rivers, waterways have been filled in, and urban streams have generally become unappealing and dirty.¹

Analyzing the evolutionary relationship between rivers and their surrounding communities and how this affected Japan's change as a whole is necessary to determine what can be done to restore natural river ecosystems. This chapter will observe the symbiotic relationship between rivers and their urban or rural communities, and how these were controlled by governmental policies ranging from the 17th century to the early 20th century.

The 17th century marked the start of the early modern period in Japan; during this time, local authorities had primary control over the inhabitant's source of livelihood. As was the case in many developing cities, rivers and waterfronts offered a multitude of economic possibilities in the form of boat transport, rice agriculture, fishing, harvesting reeds, and the use of floodwater-carried silt for farming. Wetlands helped manage floods, as well as offering basic materials such as clay or mud to be used by rural villagers. Water hence played a crucial role in the formation of new cities; this can be seen in "floating world" (ukiyo-e) woodblock prints which were common during the Edo period (1603-1868). European visitors described this period as lush and balanced, comparing the Japanese cityscape to famous water cities in the western continent. Swiss diplomat Aime Humbert visited Japan between 1863-1864, and wrote in his book 'Le Japon Illustré':

*"In all things Edo presents peaceful harmony..Where does one find its like in Europe? Only along the banks and in the squares of the Queen of the Adriatic, Venice herself."*²

¹ Banks, T. R. (2019, June 13). *A city built on water: The hidden rivers under Tokyo's concrete and Neon*. The Guardian. Retrieved February 10, 2023, from <https://www.theguardian.com/cities/2019/jun/13/a-city-built-on-water-the-hidden-rivers-under-tokyos-concrete-and-neon>

² Humbert, A. (1870). *Le Japon illustré*.

The end of the shogun-led government in the late 19th century saw a polar switch in political presence, with the introduction of a centralizing and imperialist government. Newly appointed officials wished to focus on paralleling Western powers, through a promotion of new technologies, commerce and industry. Rivers were seen as something to control rather than benefit from due to flooding issues, and a national river infrastructure system was put in place. This new political system gave more power to wealthy rural landowners; with their primary focus being monetary growth and not ecological restoration, a new understanding and interaction with urban rivers began spreading through the nations' policy makers.

Newly instated river policies neglected fishing, river transport, and more "rural" or local means of benefiting from the waterfronts; rather, they focused on improved irrigation, stronger flood controls, and an increase in arable land as these were seen as more economically advantageous for the upper classes. With the progression of these development-driven laws, rivers were reduced to being evaluated as strictly economic or political values rather than ecological ones. Roderick I. Wilson described this issue in his book 'Turbulent Streams: An Environmental History of Japan's Rivers, 1600-1930':

"This kind of narrow understanding of rivers and the building of a national riparian infrastructure around it came at a well-documented cost to local communities, political institutions, and of course the rivers themselves."³

As Wilson described, this shift in ideology and approach towards the river systems resulted in "the loss of wetlands and wildlife, removal of sand and gravel that filtered pollutants, altered water temperatures, faster currents, reduced nutrients and fragmented habitats for fish and birds."⁴ National and urban interests were prioritized, while rural communities were neglected. A channeling system was introduced to ensure more efficient drainage and reduce flood risks; however, these were only somewhat adequate as typhoon flooding still poses a large threat to Japanese cities today. The reduction of rivers to smaller channels and the removal of permeable surfaces limits the water bodies from absorbing excess waters, causing higher intensity floods.

Shifts in the interaction with urban water systems led to a cultural change in the way people viewed the relationship between themselves and nature; prior to the 1880s, Japanese citizens didn't see humans as necessarily separate from nature. Wilson describes that:

"the modern river regime and similar projects helped create these seemingly real and distinct entities (of state, society and nature). ... In defining rivers strictly in terms of hydraulic processes and re-engineering them to become efficient drainage channels, the Home Ministry and its engineers also contributed to the broader redefinition of these waters as natural objects (and) also reified an emerging

³ Wilson, R. I. (2021). *Turbulent streams: an environmental history of Japan's rivers, 1600-1930*. Brill.

⁴ Heckel, Jodi, and Illinois News Bureau. "Illinois History Professor Examines Japan's Relationships with Its Rivers." College of Liberal Arts & Sciences at Illinois, August 19, 2021. <https://las.illinois.edu/news/2021-08-19/illinois-history-professor-examines-japan-relationships-its-rivers>.



Image 3: Anthropic riverbed setting on the Tenpaku
Own Image



Image 4: Struggling ecosystems on the Tenpaku
Own Image

boundary between nature and society.”⁵

The once symbiotic relationship between people living around rivers and the water bodies themselves was dissolving; while traditionally used for fishing, farming, transport, and a myriad of other daily occurrences, rivers were being buried under man-made, impermeable materials for the sake of urban and economic advances.

Despite this, water does still remain hidden under many cities in Japan. Professor Hidenobu Jinnai of Hosei University stated in an interview with Tash Reith-Banks:

“As Tokyo has modernized, the role of water has disappeared... But the past memories and images still exist in today’s Tokyo and are an important factor in understanding the identity of Tokyo.”⁶

The involvement of Japanese cities in water-based urban developments was strongly altered by the Great Kanto Earthquake of 1923. Along with the impact of the Second World War and the 1964 Olympic Games, most cities were in the process of imminent reconstructions by the second half of the 20th century. Rebuilding these cities became another means of adopting American styles of city planning, turning cities away from water bodies once more. A new highway in Tokyo inaugurated for the Olympics covered many rivers and waterways, brought more industrialization to the Tokyo Bay, and decreased water quality.

Japanese riversides are often quiet, and can be subdivided in two main categories; one renders a sense of gloom and neglect, while Edo-era canals are often lined with cherry trees which bloom during the sakura season. The canals are often untravelled by boats due to fire restrictions on docks. A shift to multilane highways built on top of aforementioned water bodies caused an ecological destruction of biodiversity and natural habitats, and resulted in areas under said bridges being often desolate, dirty, or unused. Highways and elevated roads often boast large pillars or support columns which are placed within the rivers, increasing their pollution and rendering them futile.

The turbulent occurrences which plagued the development of Japanese cities in the late 19th and 20th century created a division between the growing population and river systems. Interventions marketed towards the economic and financial growth of cities created in turn a dissolution of ecological systems and subnetworks which should be deemed an integral part of the wellbeing of societies. Pollution levels have risen, waters have been contaminated, and air quality has decreased; changes of this sort spark a necessity for reform and active environmental considerations to create real and lasting change. An initial step towards improving the general state of densely populated urban hubs can be work centered around bringing back the once pleasant atmosphere observed around rivers and water bodies. Water remains an essential part of human life, and can serve as a means of energy renewal, habitat formation, and also aesthetic enjoyment.

⁵ Wilson, R. I. (2021). *Turbulent streams: an environmental history of Japan’s rivers, 1600-1930*. Brill.

⁶ “A City Built on Water: The Hidden Rivers under Tokyo’s Concrete and Neon.” The Guardian. Guardian News and Media, June 13, 2019. <https://www.theguardian.com/cities/2019/jun/13/a-city-built-on-water-the-hidden-rivers-under-tokyos-concrete-and-neon>.

BACKGROUND INFORMATION

General Knowledge

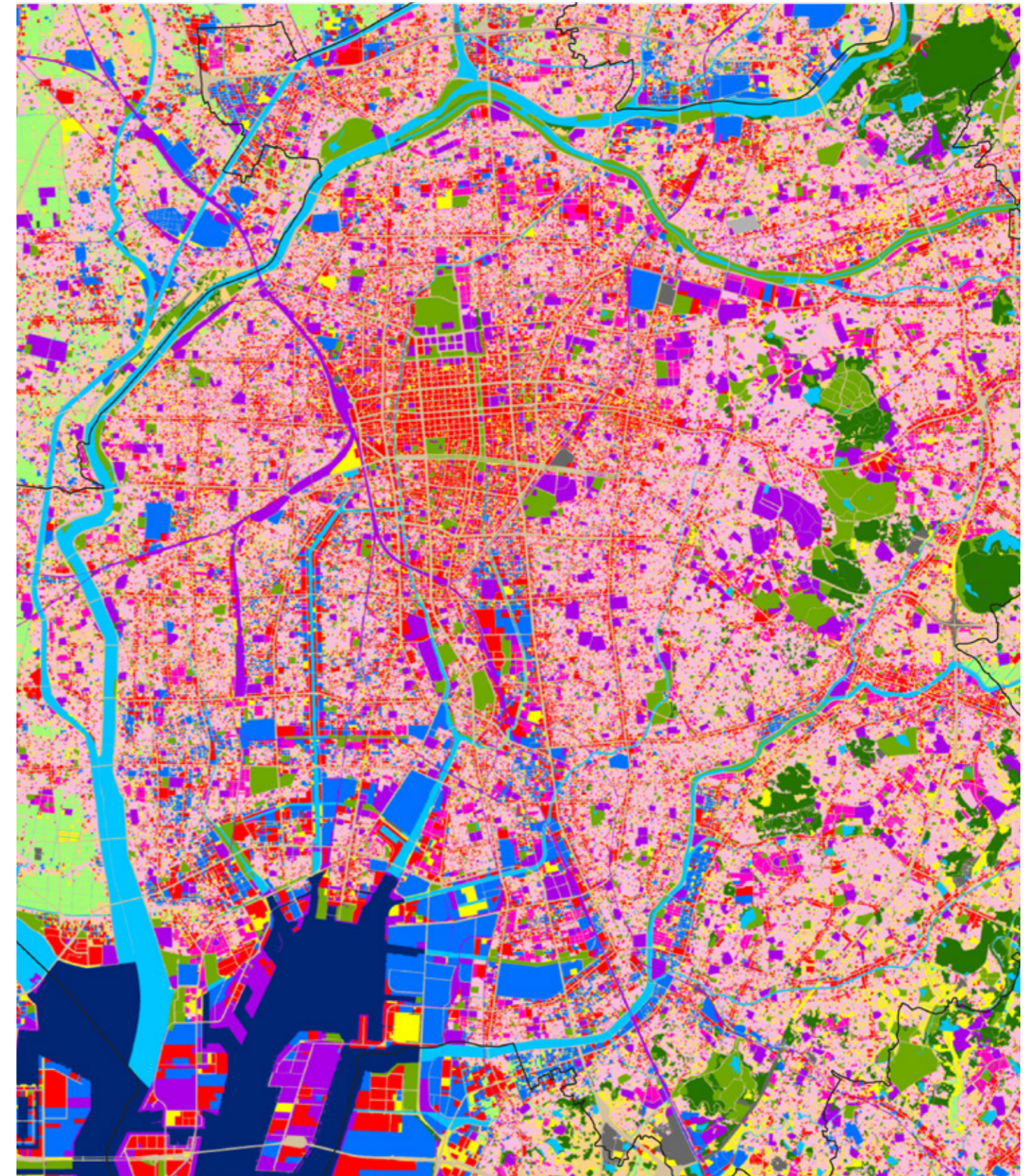
Nagoya is located in the Aichi prefecture in Japan's main island, on the Nobi Plain. It opens onto the Pacific Ocean on the south facing Ise Bay. Accounting for 6.3% of Aichi Prefecture's 5,155 square kilometers, Nagoya spans 362 square kilometers. The population of Nagoya's metropolitan Area is 2.2 million, while the wider surroundings of the city account for roughly 10 million people.

With four distinct seasons, Nagoya is classified as a Cfa "mild and moist temperate" climate following the Köppen climate classification. The average annual temperature is 15.4°C, with a lowest of 4.3°C in January, and 27.3°C in August. These values present a climate comparable to a southern European city; however, humidity levels are higher than those in Europe, with an average of 70% humidity throughout the year. The annual precipitation in Nagoya is 1,565 mm, a fairly high number in comparison to other regions of the world.

Generally considered a flat area, there is evidence of more elevated ground levels in Nagoya's eastern parts, and lower areas in the west. The Shonai River area in the west is classified as a low-lying wetland. Centrally, the city is crossed by two rivers (the Hori and the Shin-Horikawa), and forms a low-plateau rising only 10-15 m above sea level. The Tenpaku River flows through the east of the city.

Transition of the urban area

After the construction of Nagoya Castle in 1610, the city began shaping more rapidly. The Meiji Period (1868-1911) marked the introduction of a municipal government; at this time Nagoya's urban center was enclosed by the Tokaido and Chuo Line railways which ended with Nagoya Castle in the north. With an increase in industrialization and commerce during the Showa Period (1926-1989), the city began expanding southward. World War II had devastating impacts in Japan, and most central areas of major cities were demolished. However, the post-war recovery period was rather quick and efficient, and buildings were constructed rapidly to accommodate the expanding population. Soon the city's borders expanded towards a more hillside territory on the east and to the Shonai River on the west. The coastal area of Nagoya was initially designated to house rice fields; however, the Meiji period of industrialization catered to a growing demand for services to accommodate incoming marine cargo transport, import, and export. This cemented the southern port area into an industrial hub of factories and commerce.



- Forest
- Field
- Fields and agricultural land
- Midland development
- Open space
- Industrial land
- General low-rise housing
- Dense low-rise residential area
- Mid-to-high-rise residential area
- Commercial / business district
- Roadland
- Parks and green areas
- Public Facilities
- Rivers, lakes, etc
- Other
- Ocean

URBAN TERRAIN SHIFTS



Nagoya Greery In 1947



Nagoya Greery In 2000



Nagoya Urbanization In 1947



Nagoya Urbanization In 2000

The Japanese shift to a more industrialized economy following the Meiji Period was continued in Nagoya in the 20th century. This in turn resulted in a constant habitat loss and posed a strong threat to biodiversity. Farmland decreased from 6,185 hectares in 1965 to 905 hectares in 2005 due to a shift in agricultural engagement, with more people now working towards economic and industrial growth. Along with this, rice field areas decreased to 1/12th of the 1965 areas by 2005.

An increased demand for housing linked to the growing population in Nagoya resulted in the woodland areas on the east of the city being redeveloped into housing complexes and residences; the woodland area decreased from 1,648 hectares in 1970 to 1,202 hectares in 2006.

The area around the harbor was also affected by the rise in industrial projects; initially, there was a wish to make the harbor into available farmland, to counter the decrease in greenery viewed in other parts of the city. However, these projects quickly turned into another means of reclamation catered to the growing sense of need for commercial and capitalistic empowerment.

Aforementioned types of urban morphology switches were recurring throughout most parts of Nagoya City, and generally focused on turning natural environments into artificial ones. Rivers with natural levees and irrigation systems were turned into concrete basins, both in search of flood control and to house roads or other means of transportation above and around them. These changes have heavily affected the wildlife ecosystems that once were affluent in Nagoya.

CHANGES IN URBAN POPULATION

1890-2005

1.7 million

Almost 2 million more people became residents of Nagoya between 1945 and 2005

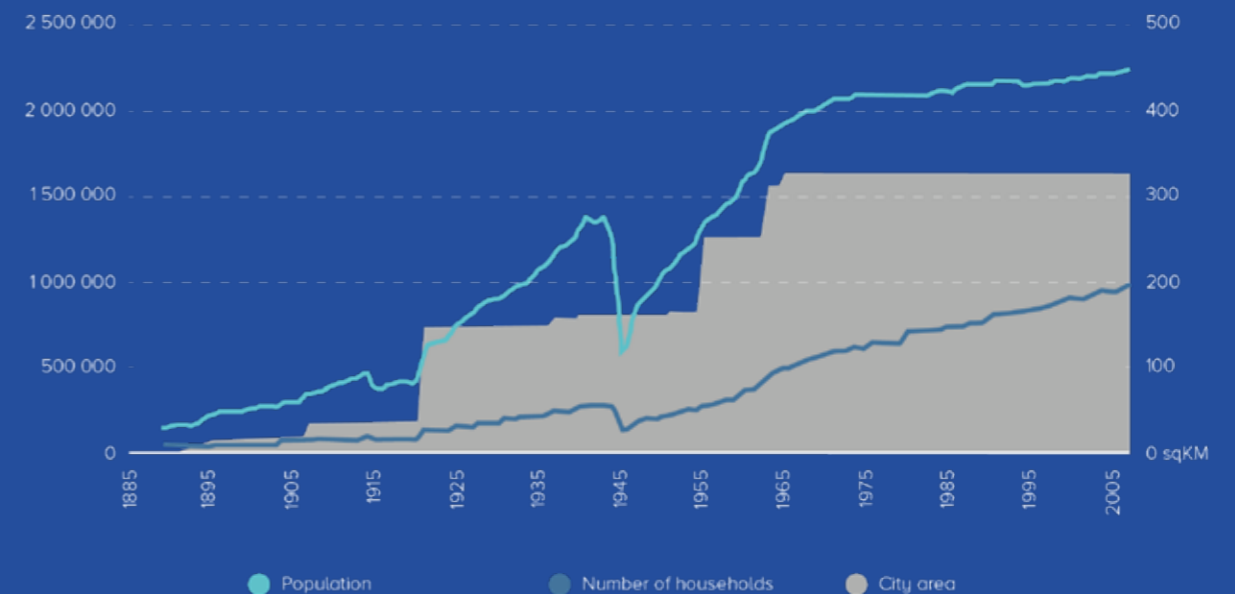
1 million

As of 2005 there were 1 million households in Nagoya, an increase of 900% since 1945.

290 sq km

The city area has increased by roughly 290 squared kilometers from 1920 to 2005.

TRENDS IN NAGOYA POPULATION AND CITY AREA



A NEED FOR CHANGE

Why is it important to establish a Greenway project on the riversides in Nagoya?

1. Lack of pleasant connections between parks and green areas around the city
2. Unpleasant riverbed conditions due to hard landscaping and impermeable ground, with elevated risk of flooding.
3. A decrease in natural flora and fauna ecosystems as the city grows and green areas diminish.
4. Unclear or irregular access points to and around the riverbeds, making it hard for visitors and locals to reach these areas and enjoy them.
5. Relatively small concentration of cultural or artistic venues, facilities, or events occurring around the outskirts of the city. There are also not many museums in Nagoya and none located outside of the city center.
6. Lack of engagement with surrounding communities can be noted in some areas around the rivers, that seem disheveled and not taken care of.
7. Poor water quality in most parts of the river, with unpleasant odors and unappealing colors.

There is a general lack of expansive green infrastructure in Nagoya; the majority of green areas take form in smaller and sparingly located plots of land. The parks around the city are also disconnected and lie mostly on the peripheral zones of the urban network. With the ideas of regenerating and growing the city into a stronger economic hub and touristic attraction, it is important to think of the implications enlarging the city will have on the existing presence of greenery. The areas on the banks of the Shonai and Tenpaku rivers offer extended lines of greenery; albeit long, these are often not used to their full potential.

It is in Nagoya's interest to incorporate the revitalization of these areas within the new city masterplan, as this would coincide with existing beliefs and actions signaled in the aforementioned documents. The establishment of a greenway can enhance the river banks, allowing for a multitude of cultural and ecological enhancements to occur in these areas. Along with this, the reinforcement and increased appreciation of the riverside will ensure that these green areas are not taken over with the expansion of the city but rather maintained and improved. Along with the greenway formation, it will be important to create radial green corridors to connect to more central areas in the city as well as parks and historical or tourist attractions. This in turn will offer a viable walking option for inhabitants wishing to immerse themselves in greenery to reach the greenway river banks.

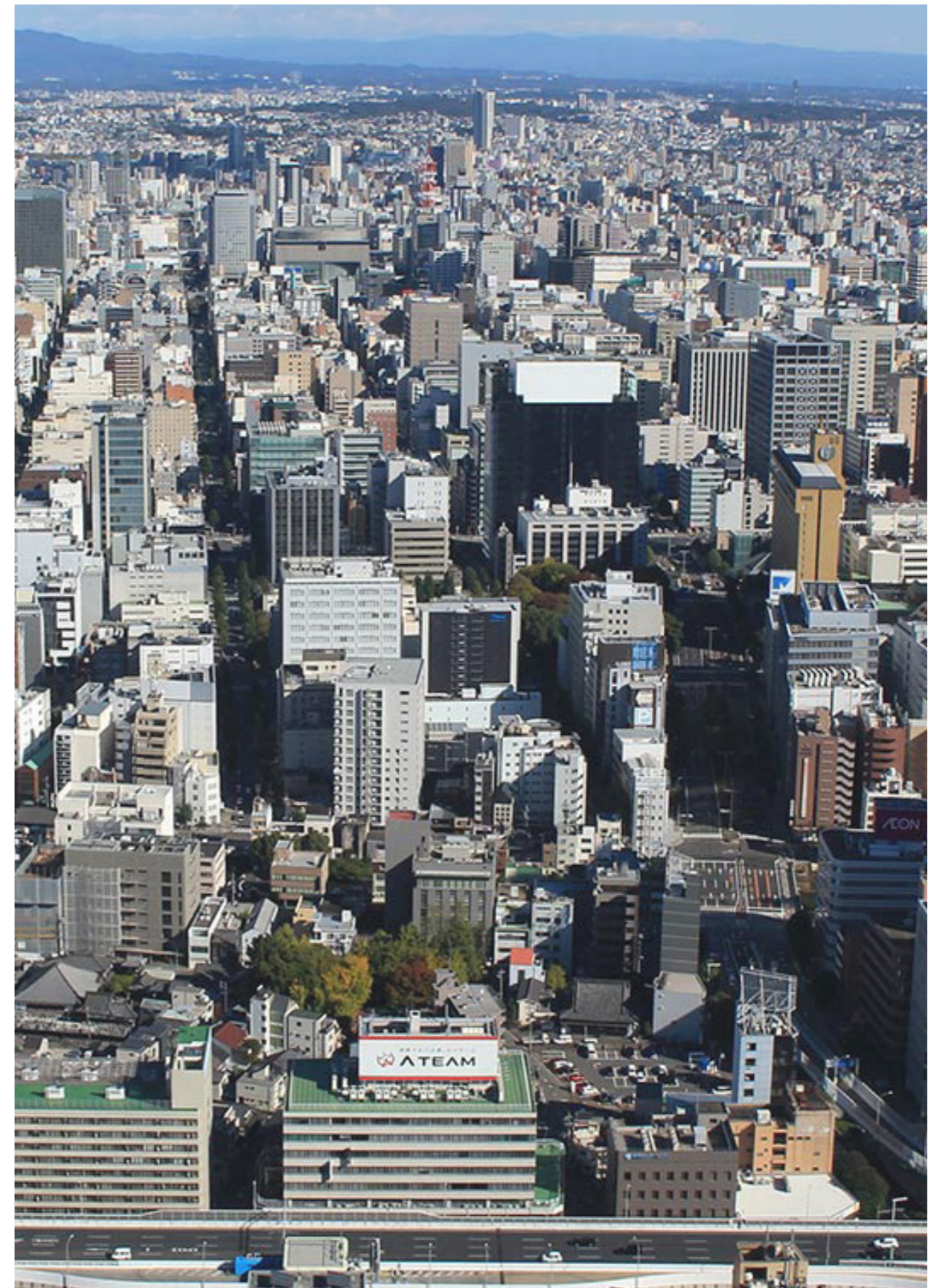


Image 4: View of skyscrapers and urbanized environment in central Nagoya Nagoya Center. n.d. Nagoya Nightlife. <https://www.hotels.com/go/japan/jp-best-nagoya-nightlife>.

NAGOYA MASTERPLAN 2023

Changes to improve the quality of life within Nagoya to be made by 2030; planning stages are from 2019-2023

ISSUES ADDRESSED

CONCERN ABOUT NATURAL DISASTER

Increase in torrential rain over the past 5 years, rising possibility of a large earthquake within the next 70 years

CONCERNS ABOUT ENVIRONMENTAL SUSTAINABILITY

Seeing the decrease in green areas and increase in average temperature of Nagoya

CHANGES DUE TO NEW SHINKANSEN LINE AND THE ASIA GAMES OF 2026 IN NAGOYA

increase in tourism and visitors, attempts to be made to make Nagoya a larger tourist attraction

DETERIORATION OF OLDER PUBLIC BUILDINGS AND INFRASTRUCTURES

ADOPTION OF SUSTAINABLE DEVELOPMENT GOALS (SDGS)

In July 2019 Nagoya was selected as one of the “SDG Future Cities” in Japan to achieve a new sustainable environment.

VISIONS FOR NAGOYA 2030

The Planning Department in the General Affairs Bureau of Nagoya City has created 5 main visions to tackle the aforementioned issues witnessed within the community. These were idealized to work towards making Nagoya into a larger tourist attraction and enhancing the attention towards sustainable regeneration of the city. The following excerpts are from visions which adhere to our proposal of working on the surroundings of two main rivers in Nagoya.

VISION 3 : “PREPARING FOR NATURAL DISASTERS”

Strategy 3.2.4 :

- Enhancing river infrastructure
- Improving flood control reservoirs
- Promoting reduction of rainwater runoff

PROJECT COST ALLOCATION:

- Vision 3 : around 430 billion yen (around 3 billion euro)
- Vision 4 : around 360 billion yen (around 2.5 billion euro)

VISION 4 : “A CITY WITH A LIVABLE URBAN ENVIRONMENT LIVING IN HARMONY WITH NATURE”

Strategy 4.2.1 :

- Promoting use of hydrogen energy
- Promoting housing with low carbon footprints

Strategy 4.2.2 :

- Promoting management of parks
- Establishing biodiversity
- Establishing a more effective water cycle

SUSTAINABLE DEVELOPMENT GOALS

Referred to in Nagoya Masterplan 2023



Goals included in Greenway Project

GOAL 3 : Ensure healthy lives and promote wellbeing for all at all ages

GOAL 4 : Ensure inclusive and equitable quality education and promote life-long learning opportunities for all

GOAL 9 : Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

GOAL 11 : Make cities and human settlements inclusive, safe, resilient, and sustainable

GOAL 13 : Take urgent action to combat climate change and its impacts

GOAL 14 : Conserve and sustainably use the oceans, seas, and marine resources for sustainable development

GOAL 15 : Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt / reverse land degradation and halt biodiversity loss

The Sustainable Development Goals highlighted above coincide with major changes, interventions, and actions to be placed within the new Greenway System in Nagoya. It was important to see how these can connect to the Nagoya Masterplan and hence how a possible collaboration could begin between the development of the Greenway and the Masterplan.

AICHI-NAGOYA ASIAN GAMES 2026



The games are considered a meaningful event for Japan, as they will help stimulate a deeper cultural exchange between Asian countries.

THE GAMES AS A CATALYST FOR GROWTH

The city's vision is to use the games as a catalyst to create new basic concepts of the ideal city and revitalize the way the regional is perceived while conforming with Nagoya city Comprehensive plan 2023 and the 17 Sustainable Development Goals (SDGs). The importance of the games in the future development of the city was highlighted by Nagoya's mayor Takashi Kawamura which, in his letter in the '20th Asian Games proposal' stated:

*'International sport events are an important element in enhancing the city's competitiveness and raising the profile of its brand, and I am confident that hosting the Asian Games will increase the urban appeal of Aichi-Nagoya.'*¹

NAGOYA AS THE IDEAL CITY

Linking the efforts for the Asia Games 2026 with the issues of a city in rapid progress will help Nagoya develop in a sustainable way. The vision of Nagoya as an ideal city mainly promotes 3 goals:

1 HEALTH AND REGIONAL VITALITY:

The Asia Games strive to promote both nationwide unity and a singular, personal rise in interest towards physical activity. The message Nagoya city wishes to spread is that sport should be practiced unanimously in everyday life; it is something that should be constantly encouraged and performed by anyone, regardless of their age, gender or nationality. The social contribution of the Asia Games will stimulate the development of sport facilities, making Nagoya a more active city.

2 ATTRACTION AND PRIDE:

The Games will be an opportunity to re-brand Nagoya as a sport city on an international level while bringing attention towards its history and culture. To deal with the increasing number of visitors and tourists, the city will need to improve its services, in terms of leisure activities, environment and hospitality.

3 INNOVATION AND SUSTAINABILITY:

The innovative urban planning systems introduced for the Asia Games, will be adopted as a future management model, making Nagoya a sustainable city that is open to continuous innovation and development. This new model will be used in the future as a guideline to improve the current soft and hard infrastructure of the city. Aichi Prefecture and Nagoya City have previously hosted international environmental events; through these, they developed eco-friendly operations to foster awareness towards climate change and its consequences, while promoting activities which involved citizens, NPOs, corporations, educational institutions, and others. As an environmentally advanced region, Aichi Prefecture intends to promote environmental activities, encourage volunteering, and investments from private and public sectors to work towards establishing a more sustainably conscious society.

ENVIRONMENT PLANS FOR NAGOYA

4TH BASIC ENVIRONMENTAL PLAN FOR AICHI PREFECTURE (ADOPTED IN MAY 2014):

'...pursuing the goal of becoming "**Environmental Capital Aichi**" to be realized and passed onto future generations by all citizens, the prefecture has been working to develop Aichi into a community that embodies three images of how the prefecture should be: **the place where environment protection and economic development exist in harmony**; the locality where people can live safely and comfortably; and the community where residents work in collaboration with each other, through promoting the cooperation and collaboration among various entities including the prefecture's residents, businesses, NPOs, and local governments'.

3RD BASIC ENVIRONMENTAL PLAN FOR NAGOYA CITY (ADOPTED IN DECEMBER 2011):

'...citizens, businesses, and governmental agencies are collaborating on initiatives to promote Nagoya as an environmental capital built collectively around our local cultures based on the four qualities of an environmental city, namely, a **place that is healthy and safe, recycles, coexists with nature, and minimizes carbon**'.

NAGOYA CITY BICYCLE USAGE ENVIRONMENT BASIC PLAN (ADOPTED IN 2011):

'The basic plan was formulated in 2011 as a comprehensive basic plan to improve the bicycle usage environment from an infrastructure perspective while securing close linkages and consistency with basic city planning policy, the "Nagoya City Master Plan for City Planning", the "Nagoya New Transportation Strategy Promotion Plan", etc. The basic plan aims to achieve a safe, secure, and comfortable environment for bicycle use with the aim of optimizing bicycle use, from the perspectives of "parking", "riding", and "using"; for example, by improving bicycle parking, securing riding spaces, etc.'

¹ Aichi Prefectural Government and the city of Nagoya, 20th Asian Games Proposal, Aichi-Nagoya (first half), 25 September 2016, available on: <https://www.aichi-nagoya2026.org/en/tournament/overview/>

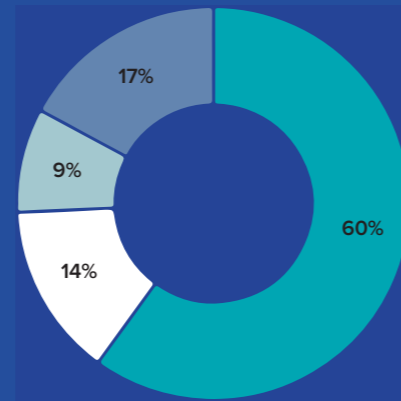
DEVELOPMENTAL CHANGES IN NAGOYA 2013-2023

SURVEY DATA

The following Survey was conducted over a period of three weeks. 17% of participants were Architecture students, 11% were Architecture Professors while the remaining 71% consisted of language teachers, writers, researchers, and tour guides. Age groups were 26% within 0-25 yrs, 20% within 26-35 yrs, 9% within 36-45 yrs, 31% within 46-55 yrs, and 14% were 51 or older.

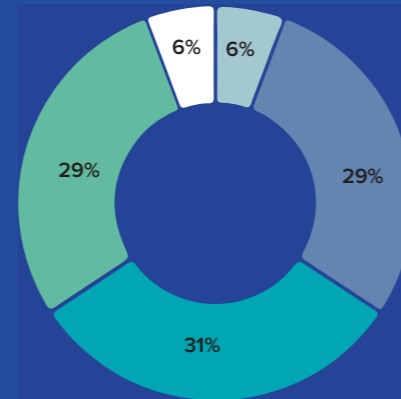
How often do you visit parks or green infrastructure in Nagoya?

- Once a month
- Once a week
- Twice a week
- Almost daily



Are you satisfied with the amount of green infrastructure/parks in Nagoya?

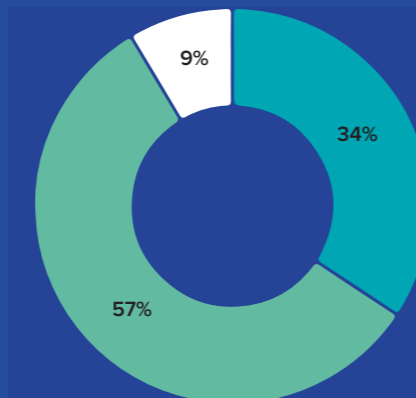
- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree



Have you noticed positive changes in Urban Development in the past 10 years in Nagoya?

(creation of tourist attractions, improvements of roads, cycling lanes, museums etc.)

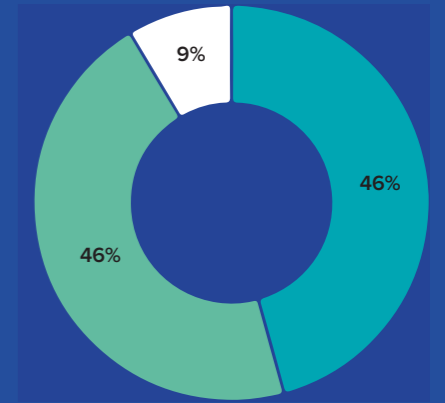
- Not at all
- Many
- Slightly



Have you noticed positive changes in Green Development in the past 10 years in Nagoya?

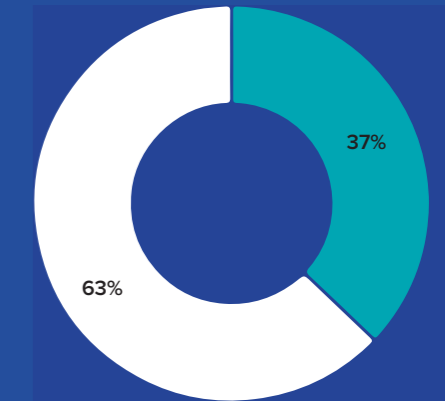
(creation of parks, more trees, green areas etc.)

- Not at all
- Many
- Slightly



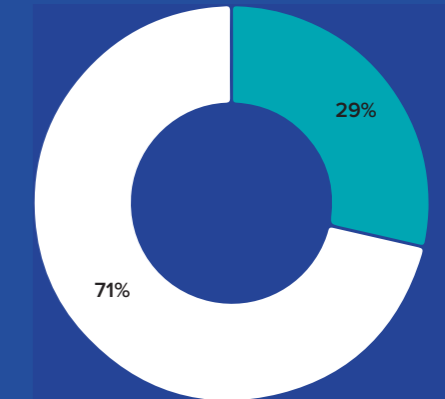
Have you heard about the Asia Games happening in Nagoya in 2026?

- Yes
- No



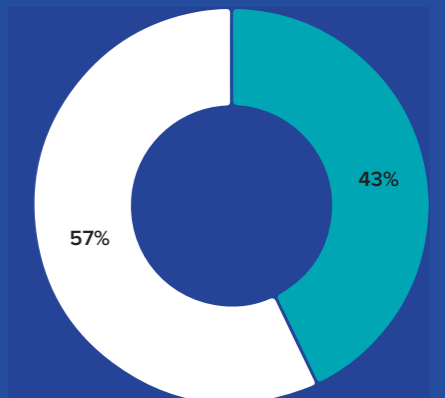
Have you heard about the Nagoya Masterplan 2023?

- Yes
- No



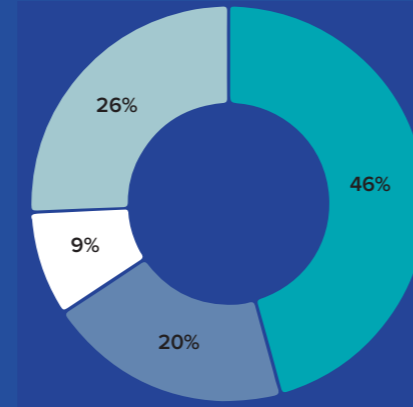
Do you believe these events will have an impactful change on Nagoya?

- Yes
- No



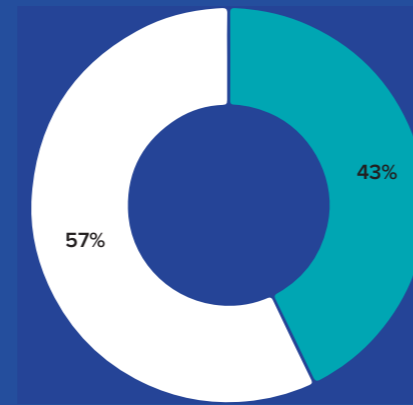
How often do you exercise outdoors?

- Once a month
- Once a week
- Twice a week
- Almost daily



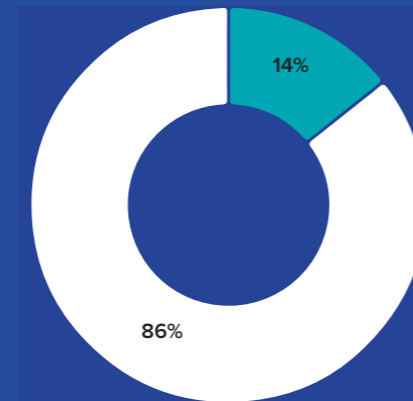
Do you believe there are appropriate infrastructures in natural settings that you use for exercise?

- Yes
- No



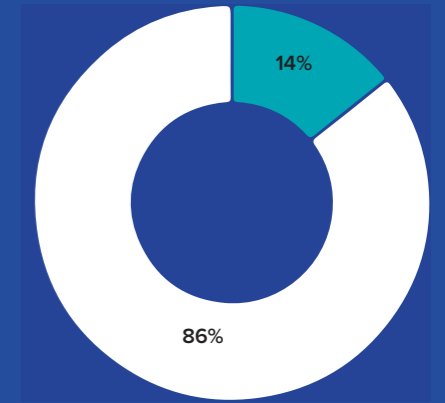
Do you often visit the Shonai River in Nagoya?

- Yes
- No



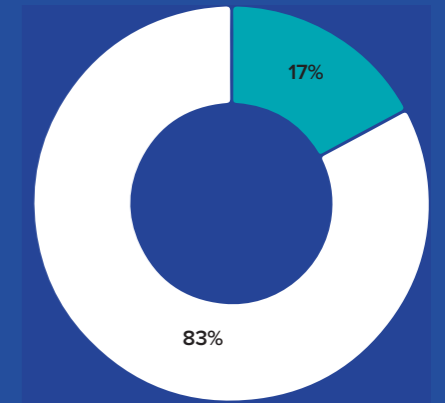
Do you often visit the Tenpaku River in Nagoya?

- Yes
- No



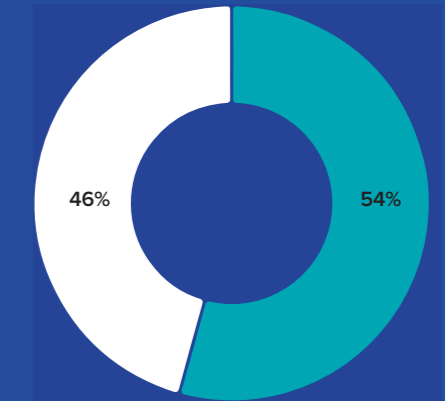
Do you often visit the Yada River in Nagoya?

- Yes
- No



Do you believe the area around these rivers is enjoyable to go through or use?

- Yes
- No



The parks that were visited the most were: Shonai Koen, Meijo Park, Shirakawa-park, and Central Park. When asked about what types of new developments they wished to see in Nagoya, the most common answers were a greener development of parks and a revitalization of the riverside. Most people did not notice many new urban or green developments within the last decade. When asked about whether they believe the Asia Games would bring positive changes in Nagoya, most surveyed people were a bit pessimistic about the possibilities of interesting urban developments, as they mentioned that previously touristic events brought more negative impacts to Japanese cities than positive ones.

Most people felt parks or green areas were somewhat accessible to them, however mostly small aprks dedicated to children's playgrounds rather than larger areas to walk through. Activities conducted most often around the rivers were: fishing, running, walking, other forms of physical activity, and social gatherings such as barbecuing with friends. Many wished for better public working out equipment, as well as clear areas for fishing or barbecuing and charging spots for bicycles or e-scooters. Finally, the general consensus was that the quality of the space around the rivers was generally low; people wished for cleaner water, better green areas, and to have the ability to connect people's lives intrinsically with water bodies again.

PROJECT GOALS



1. Reduce Flood Risk

Reducing the quantity and risk level of flooding around the rivers through implementation of a stronger river bed network and the creation of more permeable pavements.



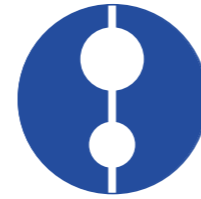
2. Nourish Ecosystems

The wildlife and animals in some areas of the rivers are currently being depleted, and hence there will be measures needed to preserve and restore a healthy balance of ecosystems.



3. Improve Accessibility

Access to and around the rivers will be improved through the formation of a stronger road network, based on "arteries, veins" which will introduce a more pleasant walking/cycling experience to the greenway.



4. Parks and Trails

Connections between the various existing parks along the rivers need to be improved and mended. To do this, new trails and smaller scale interventions such as rest areas will be added.



5. Culture and Leisure

Museums and other cultural landmarks could be established in key areas of the greenway system, to bring tourism, arts, and culture to a neglected area in the city.



6. Community Involvement

The engagement of the surrounding communities is a vital aspect of the regeneration; through the collaboration with surrounding schools and families, garden beds and small crops can be grown in various areas.

**SAFETY AND RECURRING
THEMES**



Image 7: Flooding of Japanese River

GOAL 1 REDUCE FLOOD RISK

Reducing surface water runoff around the riverbed and improve the resiliency of the surrounding ground.

With the establishment of a more western growth-focused ideology, transport infrastructure and industrial facilities were implemented around the river areas. After increasingly devastating floods, many rivers were constructed over or engineered into concrete channels with basins, dams, levees, and floodwalls to move stormwater as quickly as possible in an attempt to reduce flood risk to surrounding communities. There will always be financial and physical limits to flood risk infrastructure. Therefore, we must strive for resilient communities that can respond to extreme flood events that exceed the river channel's capacity. With the threat of a changing climate, the importance of reducing flood risk increases as the frequency and intensity of extreme storms change.

ACTIONS

- A. Improve flood facility operations and maintenance.**
- B. Increase the spread of knowledge on flood hazards and river safety to the general public.**
- C. Integrate an updated and improved emergency protocol in at risk areas.**
- D. Make research regarding the changes in climate a focal part in the design and planning stages of new projects along the river.**

POTENTIAL PARTNERS: JRRN, Ministry of Ecology, Ministry of Education
POTENTIAL FUNDING SOURCES: Nagoya Masterplan 2023



ACTIONS

Adjusting and updating flood management systems is an important step to take in the regeneration of the areas around the rivers.

Making the riverbeds a safe place for people to commute around Nagoya means establishing stronger, more resilient means of dealing with potential flooding. Dams, levees, channels, and other flood management projects, like all infrastructure, require proper operations and maintenance. Increased investment in operations and maintenance of these infrastructures is vital to the success of the greenway.

MAKING A FLOOD-SAFE, PERMEABLE GREENWAY

The initial take behind flood control was to create concrete basins around the river, and to move most housing so as to have a safety distance from the river banks. While somewhat useful, these measures resulted in a decrease of ground permeability and aesthetic qualities around the rivers. Areas close to the sea are at a lower risk of flooding, while areas in between parks are seen as higher risk; this again is due to the lack of permeable ground.

Many of the trails and pavements going through the greenway will be made out of permeable membranes, so as to have the ability to retain water in case of heavy rain or flood. During heavy rain periods in June, the water levels in the rivers can rise rapidly, potentially causing damage to the surrounding areas. Having emergency action plans in place, exercising those plans, and installing effective communication protocols can expedite response times and save lives. At the moment, a lot of infrastructure along the Shonai, Tenpaku, and Yada rivers was designed during the more capitalistic, growth-focused period within Japanese history, hence based on historic climate data. With the growing knowledge about climate change and how this will affect the world, it is known that the frequency of extreme precipitation events will increase. In turn, flows that may exceed the channel's current capacity will become more common. When discussing the establishment of new projects, functions, and changes around the rivers it is important to consider the long-term impacts of climate change, how these could affect the river systems, and hence what infrastructure and design typologies are needed to implement a riverbed that is capable of withstanding the growing extremity of climactic events.



Image : Flood Prevention Technique



Image : River Ecosystem

GOAL 2 NOURISH ECOSYSTEMS

Support and strengthen the natural ecosystems established along the rivers.

With the aforementioned rapid urbanization of Japan during the 19th and 20th century came a decrease in the health and variety of ecosystems throughout the banks of rivers. Many species have become endangered, and others have struggled to adapt to the hard landscaping now present in many areas around the water bodies. The river ecosystems have shifted greatly from their Edo-period peak, both through the loss of many agricultural fields and through the implementation of channels to deroute rivers. The threat posed to the flora and fauna in this area can quickly become a growing issue for the inhabitants of Nagoya, as the interconnection between species, plants and humans is vastly important. Future design choices along the rivers must attempt to bring back a more welcoming space for various habitats and ecosystems to coexist.

ACTIONS

A. Create a connected framework of habitat patches in order to facilitate the movement of wildlife throughout the greenway and strengthen the resiliency of the animals and ecosystems.

B. Ensure that environmentally responsible practices become the norm for future design implementations and alterations of the river channels and surrounding lands.

C. Increase habitat and ecosystem function along the river corridor along with improving water quality.

D. Increase the amount of biodiversity within plant and animal species, placing a specific focus on locally native flora and fauna.

POTENTIAL PARTNERS: JRRN, Ministry of Ecology, Ministry of Education

POTENTIAL FUNDING SOURCES: Nagoya Masterplan 2023



ACTIONS

Preserved and strengthened ecosystems are of critical importance to communities, through the providing of wildlife habitats and aesthetic quality.

Healthy ecosystems increase air quality, water quality, and the stability of both macro and microclimates within the area. Mitigating the negative effects of industrialization, plants help by filtering and absorbing stormwater, dampening noise pollution, and reducing greenhouse gases. Apart from the ecological importance of wildlife preservation, strengthening ecosystems greatly improve the lives of people residing around them.

ENSURE THE SAFETY AND GROWTH OF ECOSYSTEMS

In order to strengthen the ecosystems along the river, it is important to place attention to the typology, quantity, and diversity of species which currently reside in these habitats. Studies should be conducted to deeply understand the needs of the various types of plants and wildlife that are native to the area, in order to cater directly to their needs and create optimal environments in which they can thrive.

A recurring theme throughout the project is also the importance of improving the water quality of the rivers. Currently they are often polluted, a result of many years of neglect and urban industrialization. The unwelcoming conditions of the rivers also result in loss of wildlife, as many fish cannot adapt to the rising temperatures and contamination levels in the water. Restoring the previously present favorable conditions of the rivers through installing water cleaning systems at specific intervals will greatly aide the regeneration of wildlife. Along with this, trees and other types of fauna will be reinstated according to the areas they would traditionally be found in, to again reinforce the natural ecosystems which resided along the rivers prior the the 20th century. Finally, it would be important to mitigate and control the amount of fishing that takes place on the rivers, so as to limit the possibility of fish species becoming endangered.



Image : Grey Heron

STEP 1

**REACHING THE
GREENWAY**



Image 6: Road on the Tenpaku River banks, south east
Own Image

GOAL 3 IMPROVE ACCESSIBILITY

Create opportunities for easy, enjoyable, and green access to the rivers and Greenway System.

The main means of accessing the greenway is also a focal point into establishing a thriving and beneficial route throughout the city. To ensure that the greenway would be both easy to find and reach, the main road systems in Nagoya were studied. Creating easy, accessible, and enjoyable green corridors throughout the city which help arrive to the greenway is a focal and vital point of ensuring a continuous flow of people. The main strategies used throughout the implementation of this goal focus around introducing continuous bike lanes throughout the city as well as increasing greenery and activity spaces around the main roads.

ACTIONS

A. Establish strong nodes as welcoming stations when main roads such as arteries intersect the greenway.

B. Improve the areas underneath main highways, bridges, and around the main roads so as to create a radial network of greenery connecting various parts of the city to one another.

C. Increase the amount of bicycle lanes throughout the city, creating green corridors that travel to the riversides.

D. Cater to a variety of activities to occur under or around the main access roads and areas connecting to the Greenway.

POTENTIAL PARTNERS: JRRN, Ministry of Ecology, Ministry of Education

POTENTIAL FUNDING SOURCES: Nagoya Masterplan 2023



ACTIONS

Improving road infrastructure to, from, and within the Greenway system around the Rivers.

The area around the Shonai, Tenpaku, and Yada Rivers has great potential to serve as both a greenway and ecological preservation unit, creating a connected network throughout Nagoya.

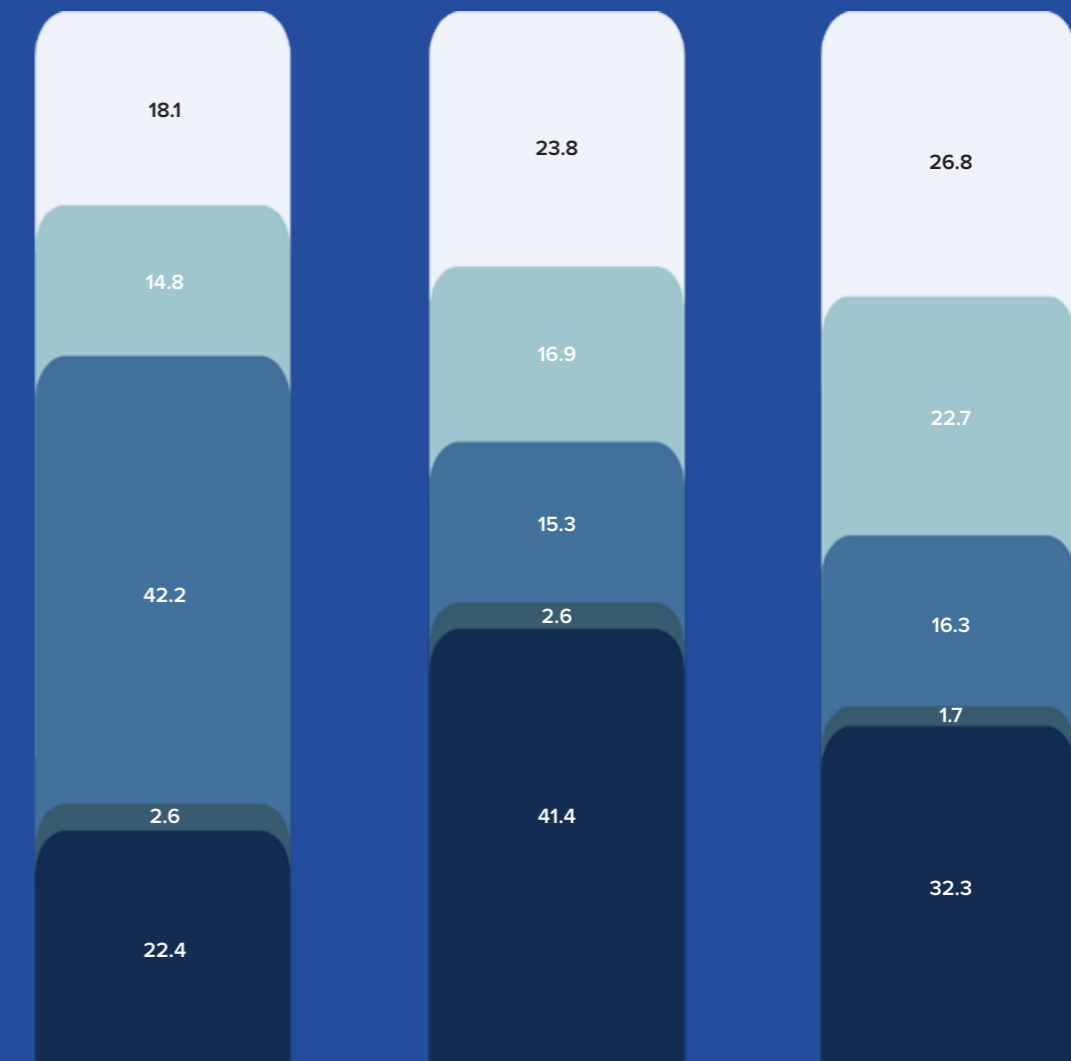
This greenway would be unique within the Aichi province, providing an increase in tourism, green areas to adjacent inhabitants, and offering an enjoyable, innovative area from throughout its course.

ESTABLISHING CLEAR AND ENJOYABLE CONNECTIONS

After studying road typologies in Nagoya, it was deduced that the larger road typologies can be divided into three: Elevated roads with greenery underneath, elevated roads with parking underneath, and ground level multi-lane roads. The main “arteries” constructed to move around the city also reach the initial extents of the greenway.

It is necessary to intervene on roads that can create a connection between the main “arteries”, so as to ensure not to discriminate against the population that lives in these areas. Hence, a second tier of road access will be incorporated, referred to as “veins”. These will connect to each other and to the main arteries, as well as to some areas of the greenway system, improving the accessibility from various parts of the city. The road regeneration will also be part of the sustainable considerations placed onto the project, as it is planned to include more greenery than currently present. Apart from the ecological and transportation aspect, these new roads will also help signal the greenway more clearly and make the journey to it more enjoyable. The final road typology will take form in smaller scale roads, named “capillaries”. These will simply branch out from the “vein” roads, and in some cases connect to small-scale green areas such as neighborhood gardens or playgrounds. When summed, the adapted road typologies will help create a strong network of greenery and transportation that can increase tourism and access to the main greenway intervention. Currently not many residents in Nagoya use a bicycle compared to other large Japanese cities such as Tokyo or Osaka; with the new implementations of improved bike lanes and roads, this situation will improve.

TRANSPORT STATISTICS FOR MAJOR JAPANESE CITIES



Nagoya Tokyo Osaka

Walk Bike Car Bus Rail

DAILY ROAD USAGE STATISTICS

400,000

Nearly half a million people use a bicycle currently to move through Nagoya every day.

1.14 million

1.14 million is the amount of people traveling around Nagoya by car every day, almost three times the amount of bicycle users.

54.79 km

The main Artery Roads going through the city of Nagoya have a combined length of almost 55 km.

NAGOYA URBAN EXPRESSWAY

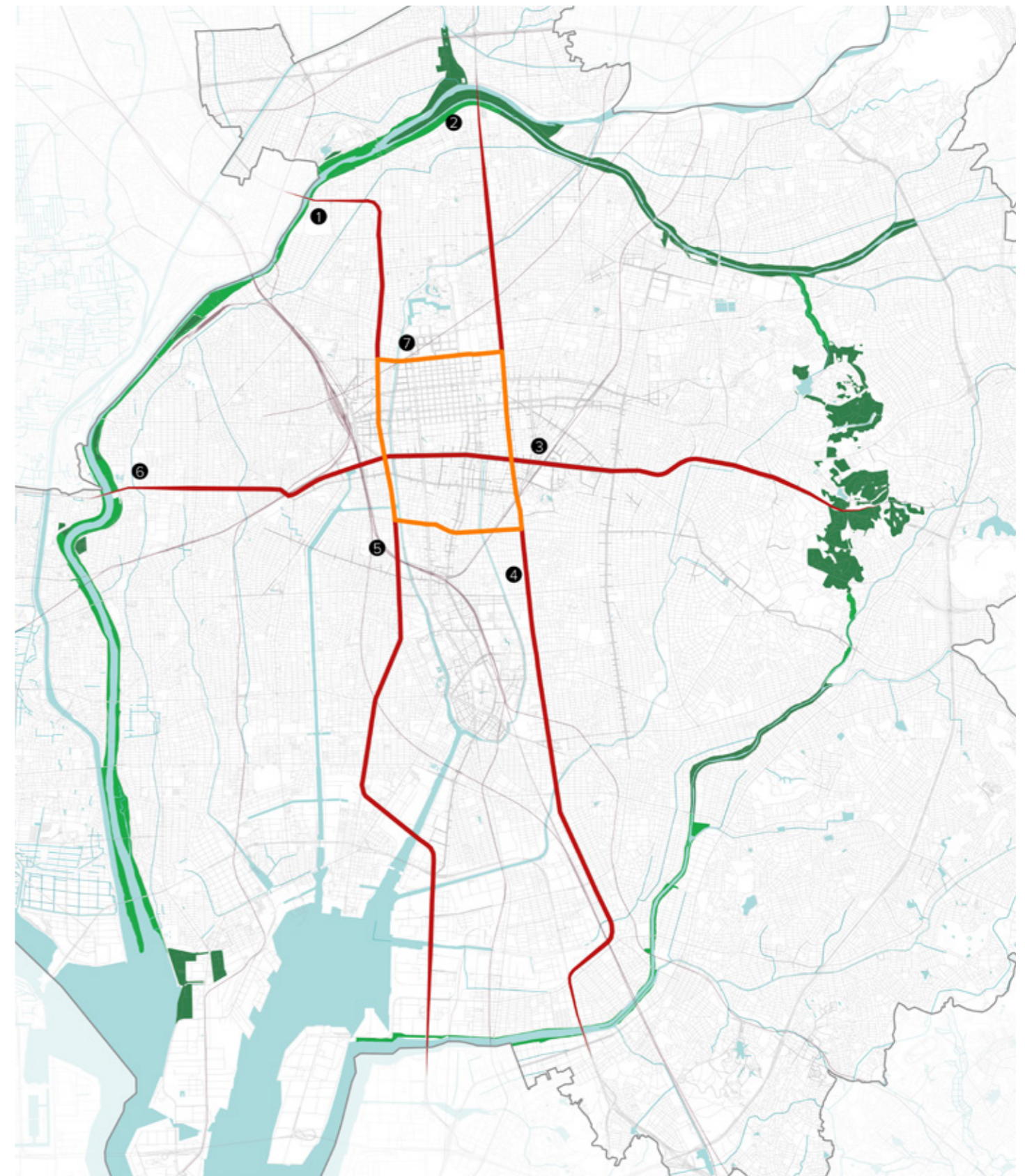
“Nagoya Urban Expressway was planned with the objectives of qualitative separation of vehicle traffic, relaxation of congestion on the level streets, etc. The initial city planning was made in September 1970. After reviewing the routing, structure, environmental measures, etc., approx. 81.2 km of the expressway is designated by city planning. The breakdown of the expressway by structure stands about 74.9 km in the elevated type and about 6.3 km in the underground or open-cut type. Construction of the urban expressway is made by Nagoya Expressway Corporation established in 1970. Since the opening of about a 10.9 km portion between Takatsuji and Odaka in July 1979, approx. 77.3 km of the expressway are presently open for the traffic.”¹

¹ Planning for Nagoya 2012, pages 37-38, (<https://www.city.nagoya.jp/jutakutoshi/page/0000045893.html>)

ARTERY SYSTEM

Nagoya City website

0 2.5 5 km



- 1. Kiyosu line 7 km
- 2. Kusunoki line 5.6 km
- 3. Higashiyama line 10.3 km
- 4. Odaka line 11.1 km

- 5. Tokai line
- 6. Manba line 6.8 km
- 7. Nagoya Inner Ring 10.3 km

FUTURE ROAD USAGE STATISTICS

620,000

We wish to increase the number of bicycle users from 14.8 % of the population to 22.7 %, which is the amount of bike users in Osaka.

940,000

The increase in 220,000 bicycle users will in turn create a decrease of the same degree in car users daily, as the shift is seen directly from car to bicycle.

155 km

The revised plan of new road infrastructure will include 155 km of viable and safe bicycle lanes within the city.

792,000 kg of CO2

Thanks to the change from car to bicycle usage, there will be a decrease of 792,000 kg of CO2 daily in Nagoya.

AN IMPROVED ROAD NETWORK

A 2km x 2km grid was overlaid on top of the existing road network in Nagoya, to ensure that from any place there would be an improved vein taking inhabitants to the greenway. In this manner, the maximum distance from a vein would be of around 1 km. Finally, roads were chosen based on their typology; the ones prioritized are those most often used and that have a direct connection to the greenway. By establishing a new system of arteries and veins, the city will be connected more efficiently; along with ease of travel, the roads will be improved through an inclusion of bicycle paths and charging stations for e-bikes or e-scooters. More greenery will be placed alongside the roads, and nodes will be established when main roads meet the greenway loop. This is to ensure a pleasant journey to the greenway from various points within the city. Finally, the increase in bike paths will ensure that more people commute in a sustainable way rather than using a car.

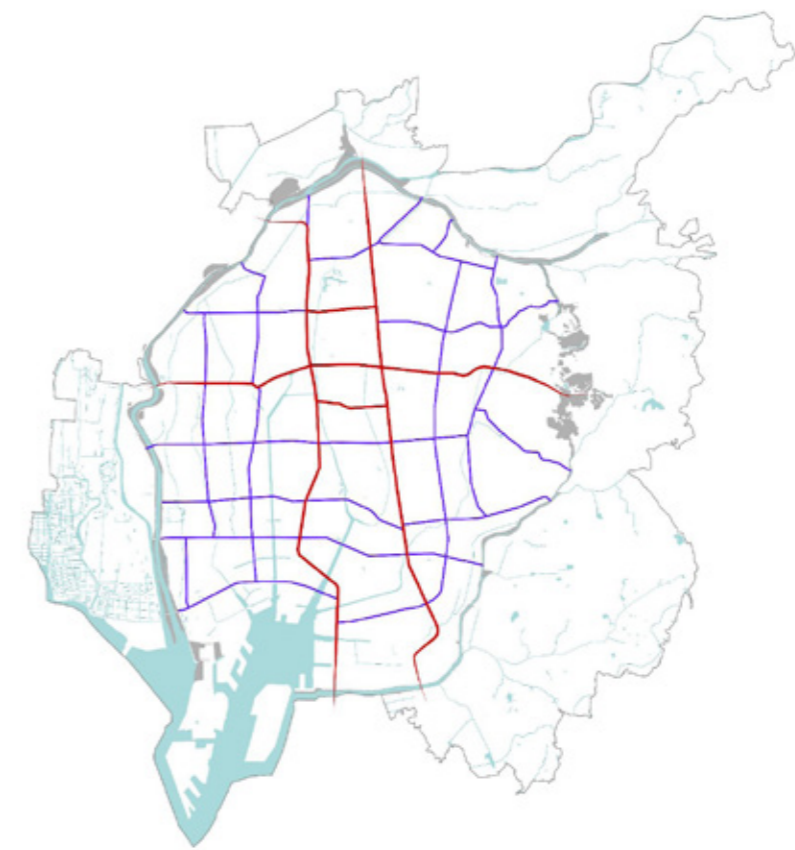
TRANSPORT MAP

Establishing a Network



Creating a Grid
2 km x 2 km

Grid with main roads

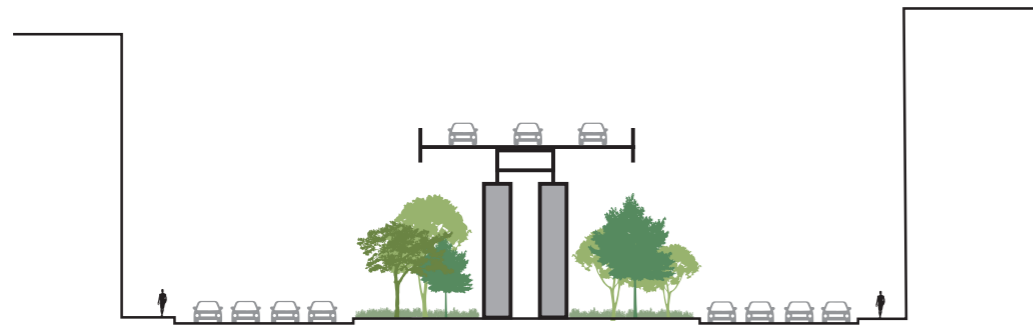


- Arteries
- Veins

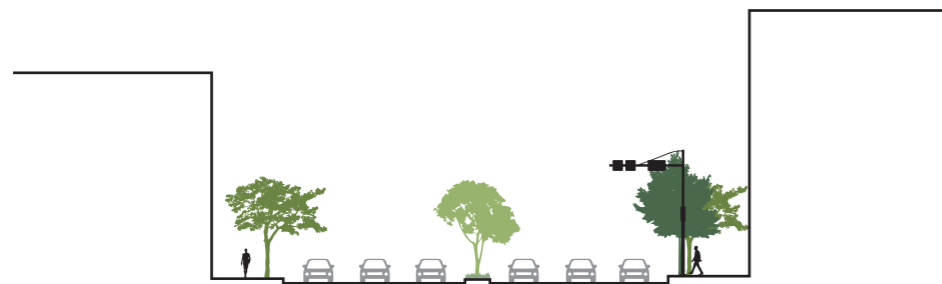
Final Outcome

ROADS IDENTIFIED

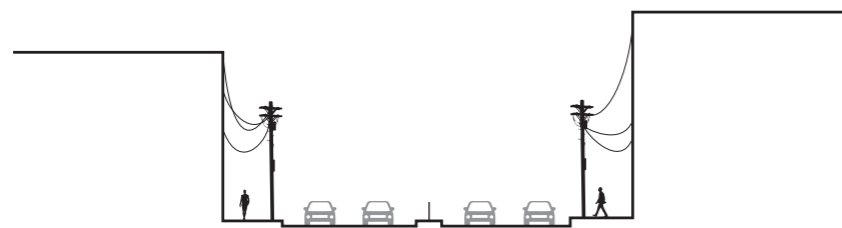
Main Typologies



ARTERY



LARGE VEIN

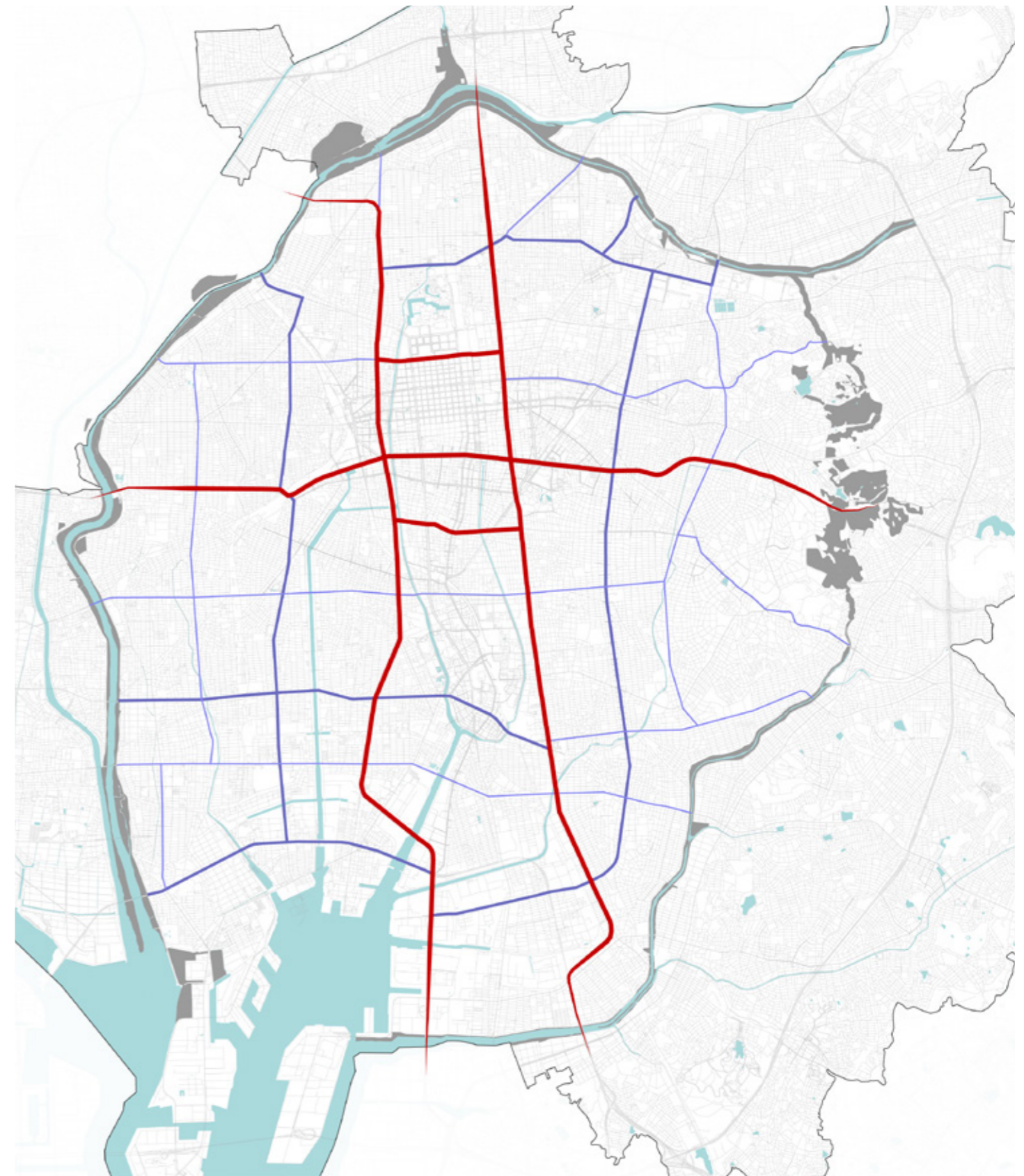


SMALL VEIN

ROADS IDENTIFIED

Main Typologies

0 2.5 5 km



- Arteries
- Big Veins
- Small Veins

Raised Highway Underpass

Current Situation

ISSUES ENCOUNTERED

Currently, most areas under the bridges are not valorized to their complete potential. Some have the presence of greenery or recreational facilities, but these are unfortunately few and far between. The common scenario is one that uses the areas under the highways as car or bicycle parking spaces, or otherwise as an empty lot of concrete. This results in a loss of public space that could be used to improve the aesthetic appeal of city life and urban metropolitan areas.



Raised Highway Underpass

Improved Situation

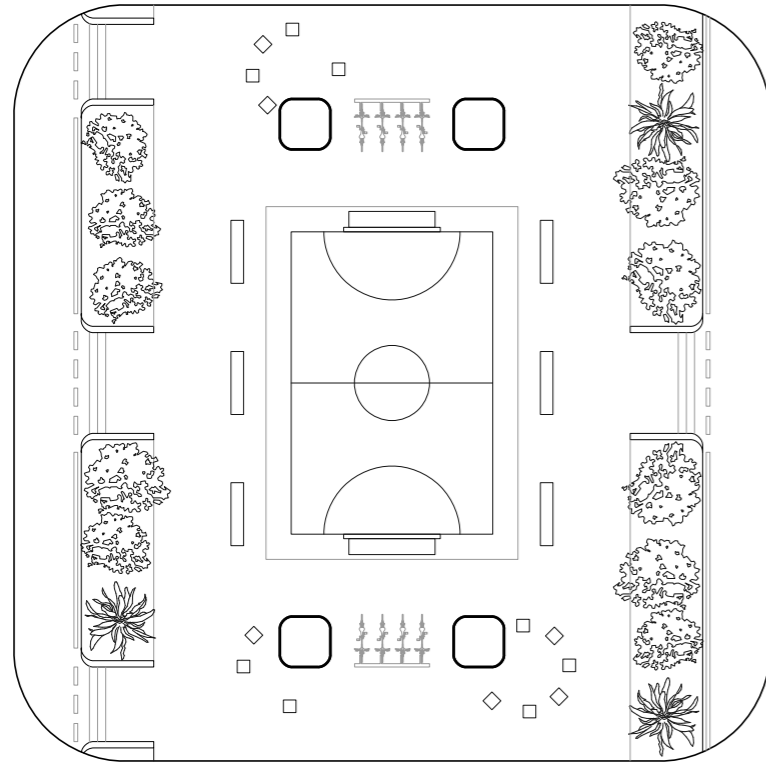
ISSUES RESOLVED

To counteract the aforementioned issues, the areas underneath bridges could be reused to host a variety of facilities, events, and services for the local communities. Taking inspiration from the few areas where this has been already fulfilled, the project proposes to include sport activities such as skate parks, basketball courts, football fields, and working out equipment. This would continue the idea of increasing mobility and exercise as part of the driving force of the greenway project. All areas will also host electric bike charging stations and greenery in the form of short trees and shrubs. Other areas can instead cater to a more artistic crowd and pose as possible event spaces, used for performances or for art exposure.



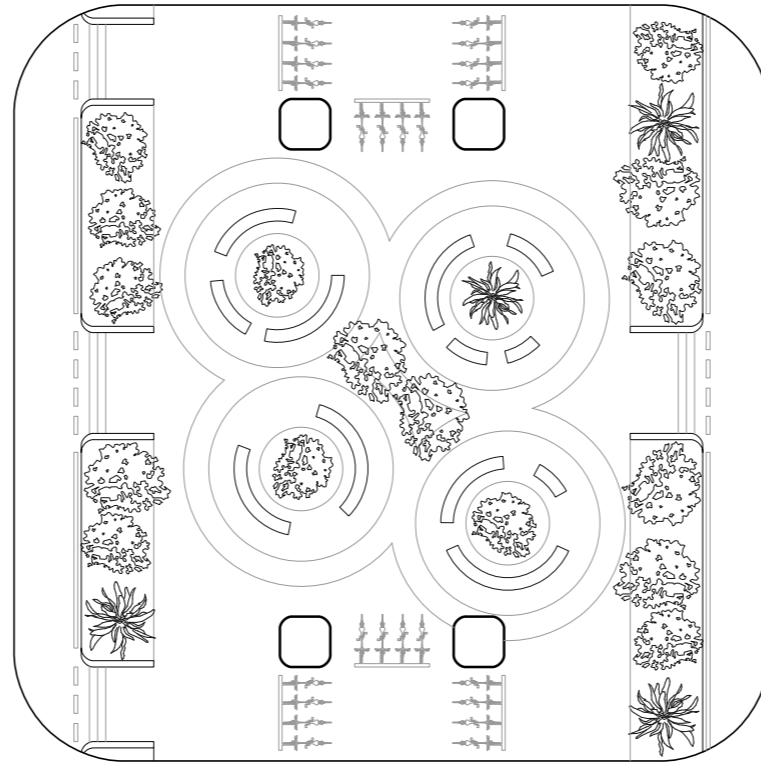
MULTIPURPOSE SPACES

3 Main Typologies



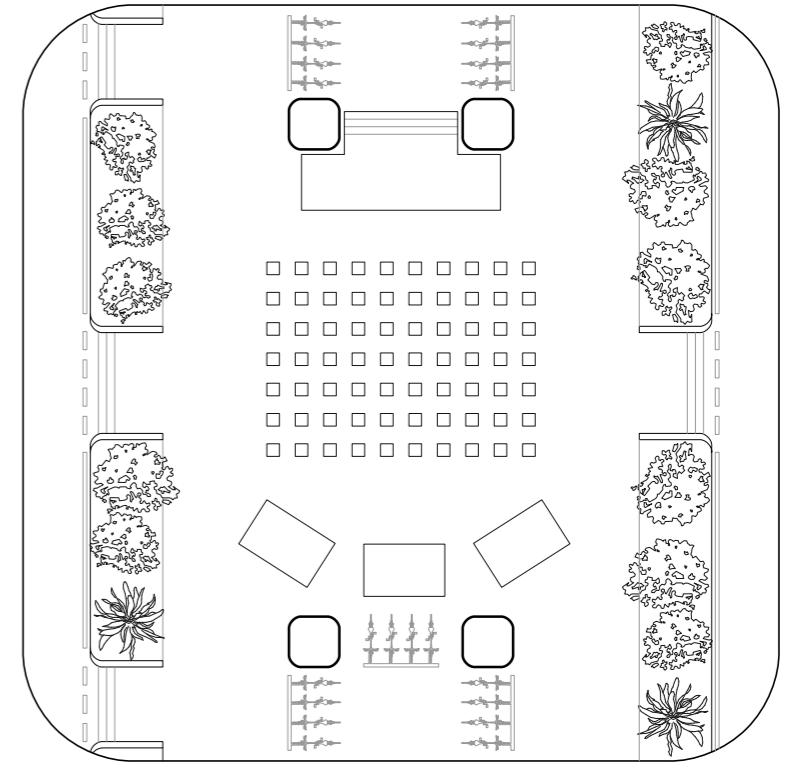
1. SPORT / PLAYGROUNDS

In the areas of the city crossed by the arteries where there is a relevant presence of schools or universities new functions related to sport and physical activities will be introduced. New futsal, basketball, and tennis courts as well as playgrounds and skate parks will be located under the highway.



2. RESTING

In the areas of the city crossed by the arteries where there is a relevant presence of offices, shopping malls or museums new resting areas will be introduced. The design aims to create enjoyable spaces for people to rest as well as providing commuters with more bike parking spaces.

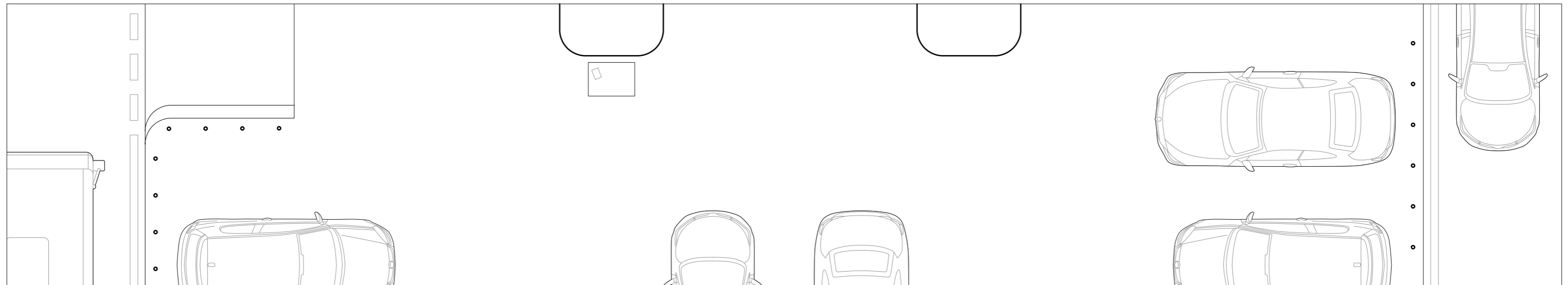
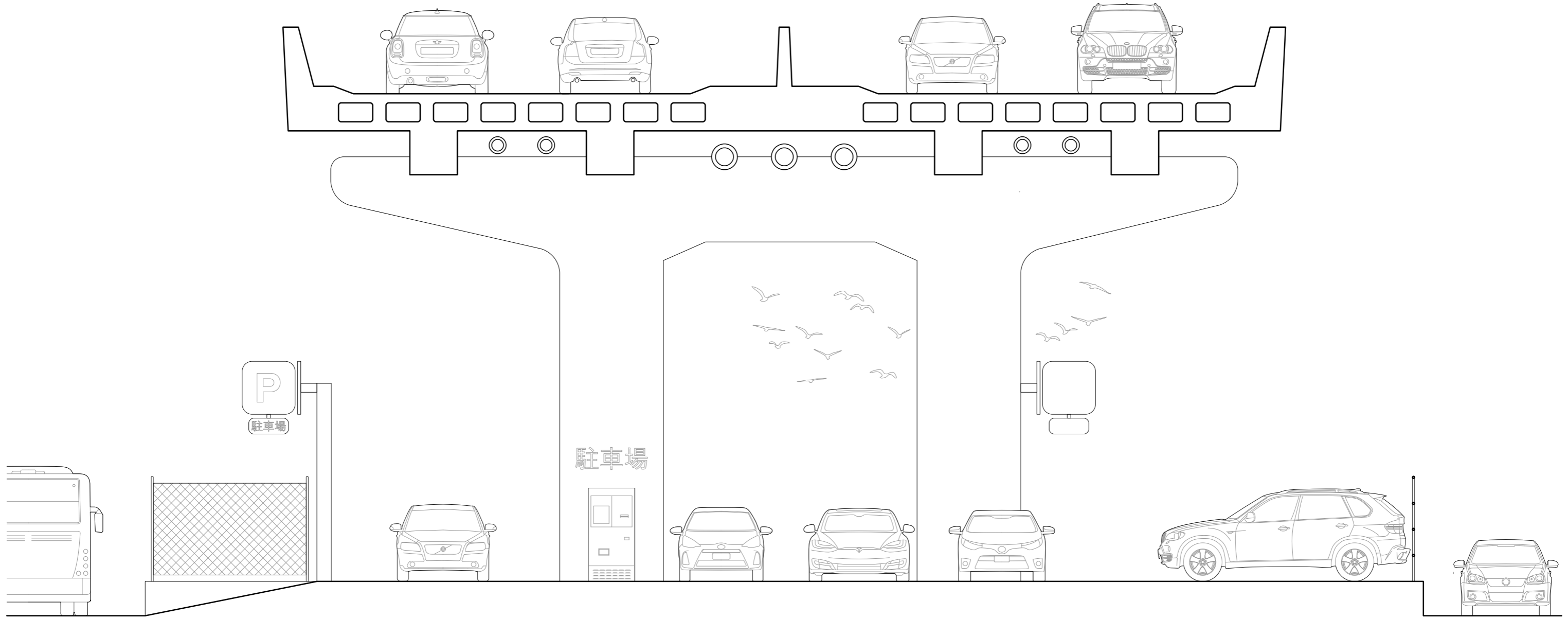


3. EVENTS AND GATHERING

Some parts of the arteries can also be dedicated to gatherings and general events, such as festivals, markets, cultural events, etc. The aim is to create dynamic and adaptable spaces for people to experience and enjoy in different ways.

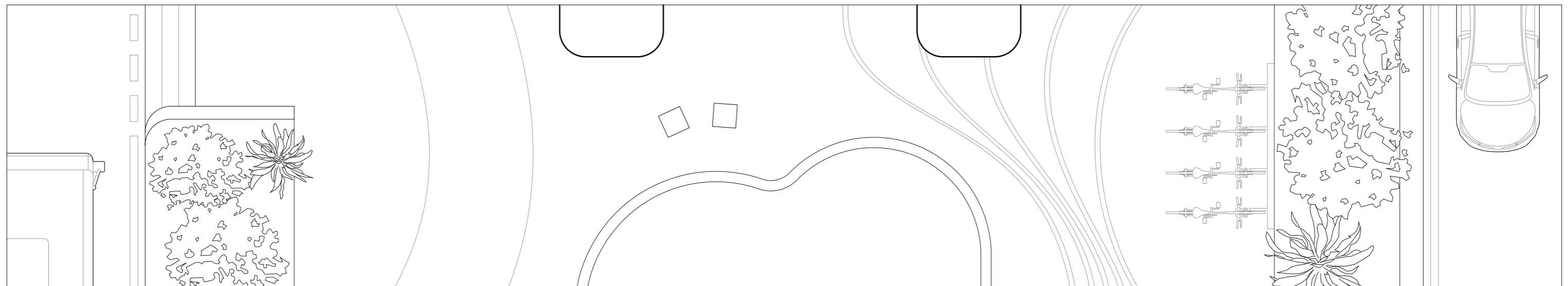
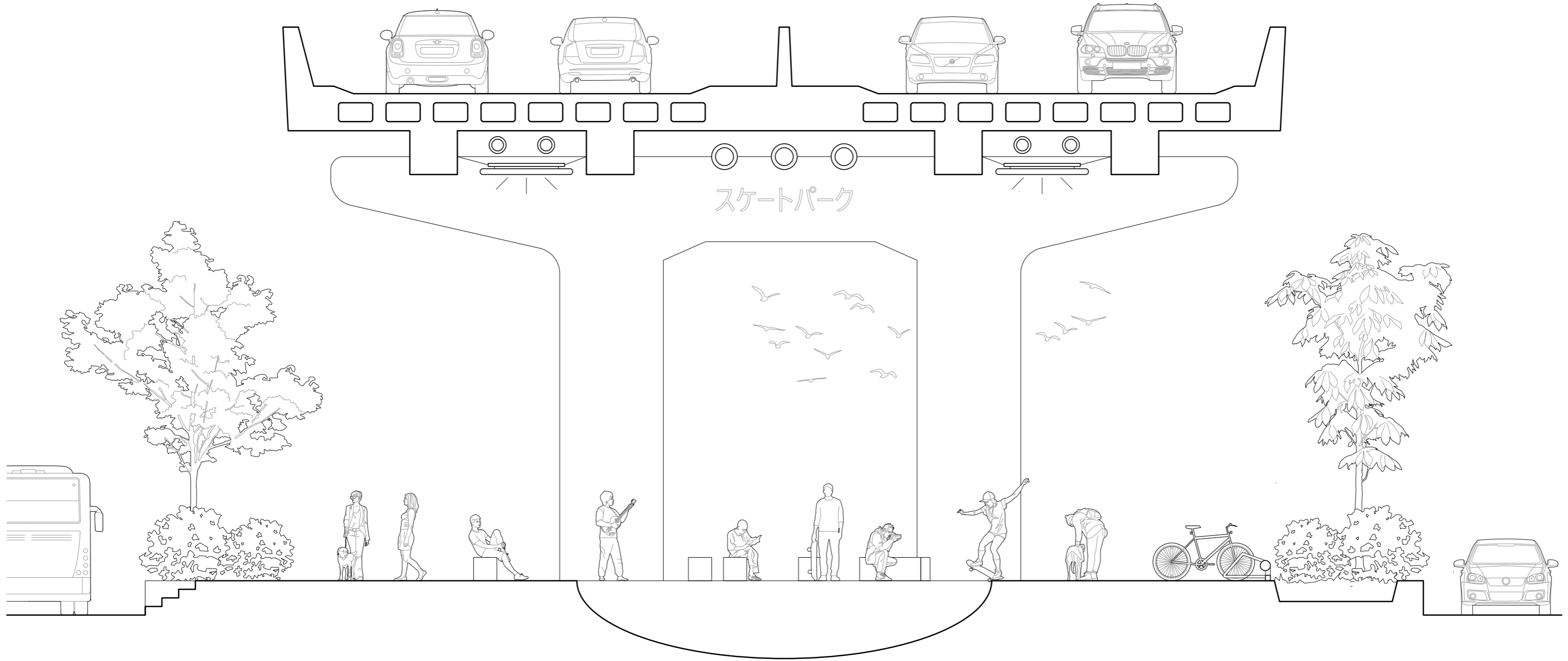
Raised Highway Underpass
Current Situation

0 2.5 5 m



Raised Highway Underpass
Improved Situation

0 2.5 5 m



TOOLKIT



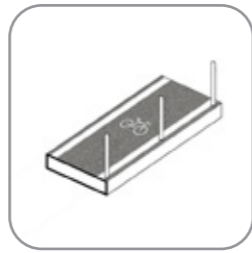
Tall Trees
GR01



Medium Trees
GR02



Bushes
GR03



Ballards
BA01



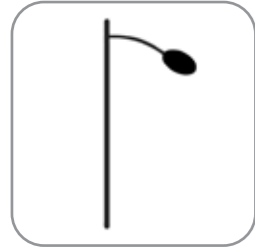
Electric Bicycle
Parking
P01



Electric Scooter
Parking
P02



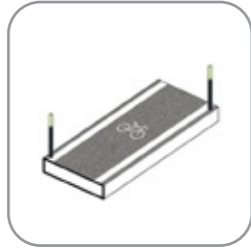
Bicycle Parking
P03



Street Lamp Post
L01



Path Lamp Post
L02



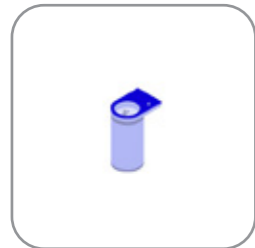
Bicycle Path Lamp
Post
L03



Conversational
Bench
BE01



Directional Bench
BE02



Drinking Fountain
F01



Recycling
R01

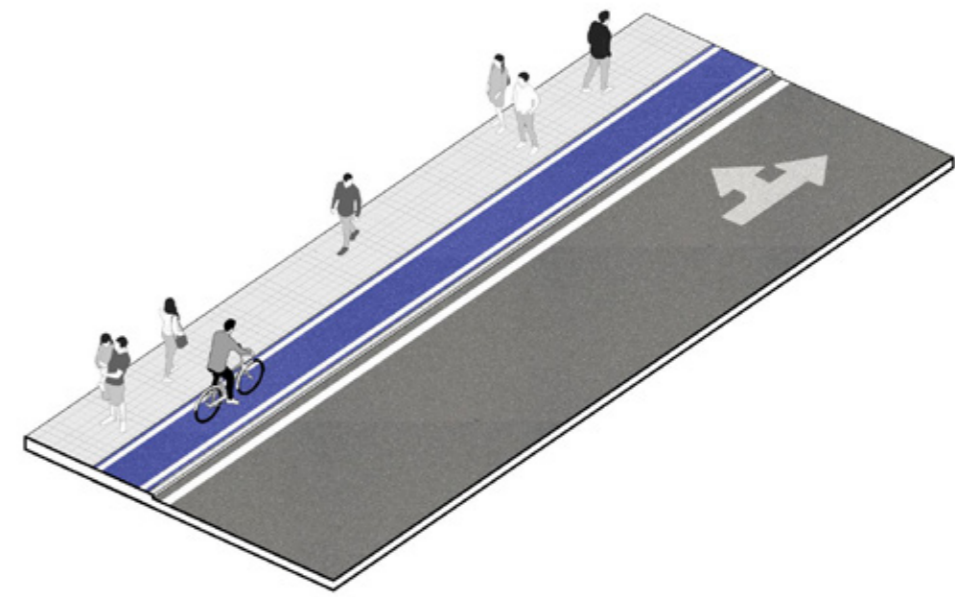


Bicycle Lane Logo
BL01



Environmental
Posters
EP01

BASIC ROAD TYPOLOGY



MAIN ROAD TYPOLOGY IDENTIFIED

Sidewalk, Bike Lane, Street

TOOLKIT USED



Tall Trees
GR01



Medium Trees
GR02



Bushes
GR03



Electric Bicycle
Parking
P01



Bicycle Parking
P03



Street Lamp Post
L01



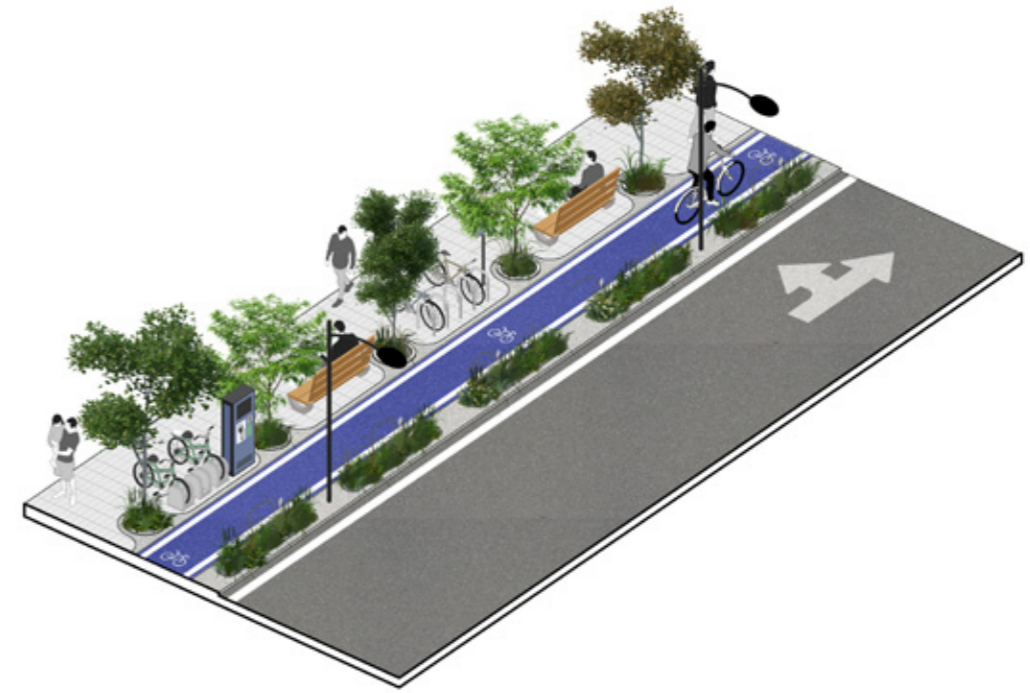
Directional Bench
BE02



Bicycle Lane Logo
BL01

APPLICATION

Road Kit System



ARTERY INCORPORATED TOOLS

Tool 2 + Tool 3

ARTERIES

VIEW ON EGAWA-SEN STREET

ISSUES ENCOUNTERED

1. The material of the pedestrian sidewalk and bike lane are too similar making the separation unclear and dangerous for both cyclists and pedestrians. The difference should be highlighted with a change in material and colors.
2. The separation between pedestrian sidewalk and bike lane can be improved replacing the bollards with trees, plants and flowerbeds. This will make the surrounding environment more enjoyable and will increase the permeable ground around the main streets.
3. The separation between bike and car lanes should also include vegetation, in order to increase the permeability of the ground surfaces and improve the overall aspect of the road.
4. The space below the Urban Express Way often appears to be neglected, unused or underdeveloped resulting in gloomy, sad and unusable spaces. The project instead aims to regenerate these areas by turning them into enjoyable means of reaching parks and the greenway system around the city.
5. The scarce and inappropriate vegetation makes the Urban Express Way look very imposing, resulting in an unwelcoming atmosphere.



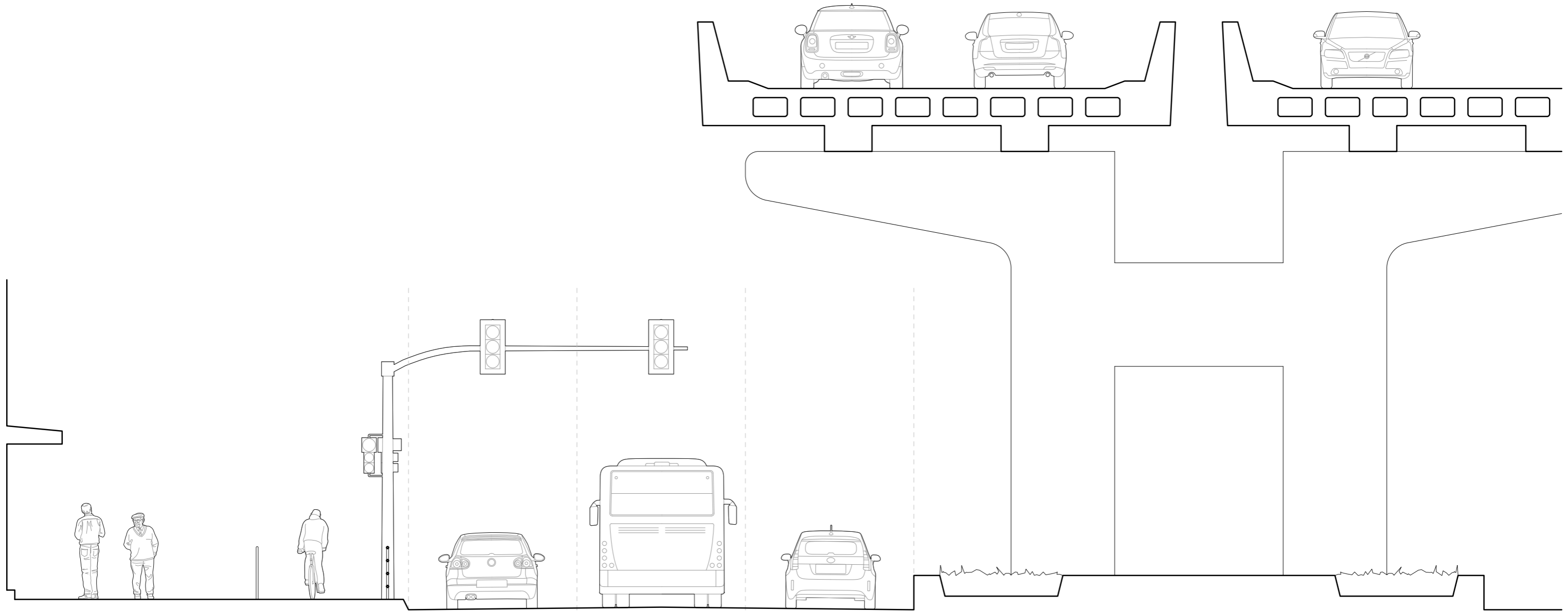
ARTERIES

VIEW ON EGAWA-SEN STREET

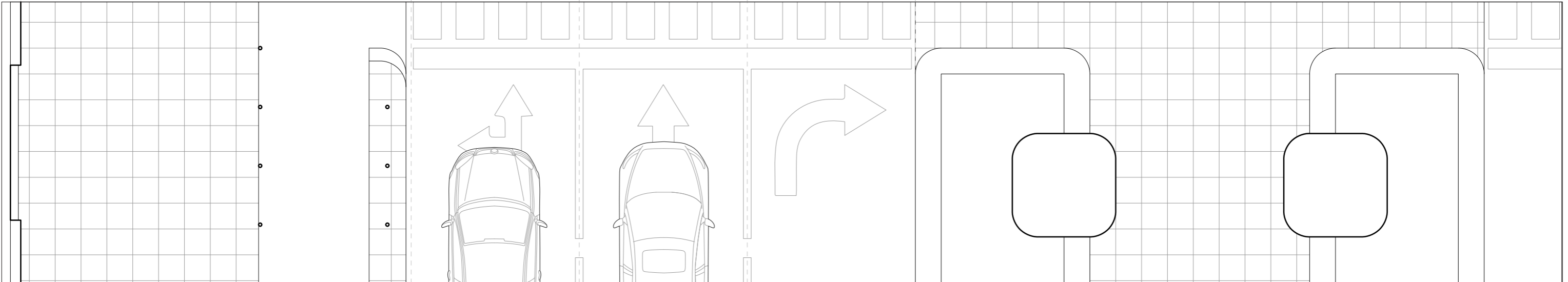
ISSUES RESOLVED

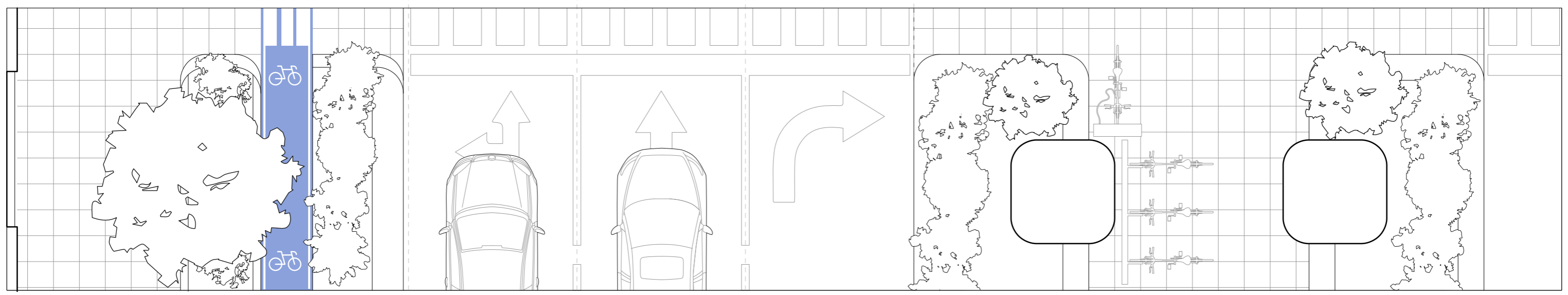
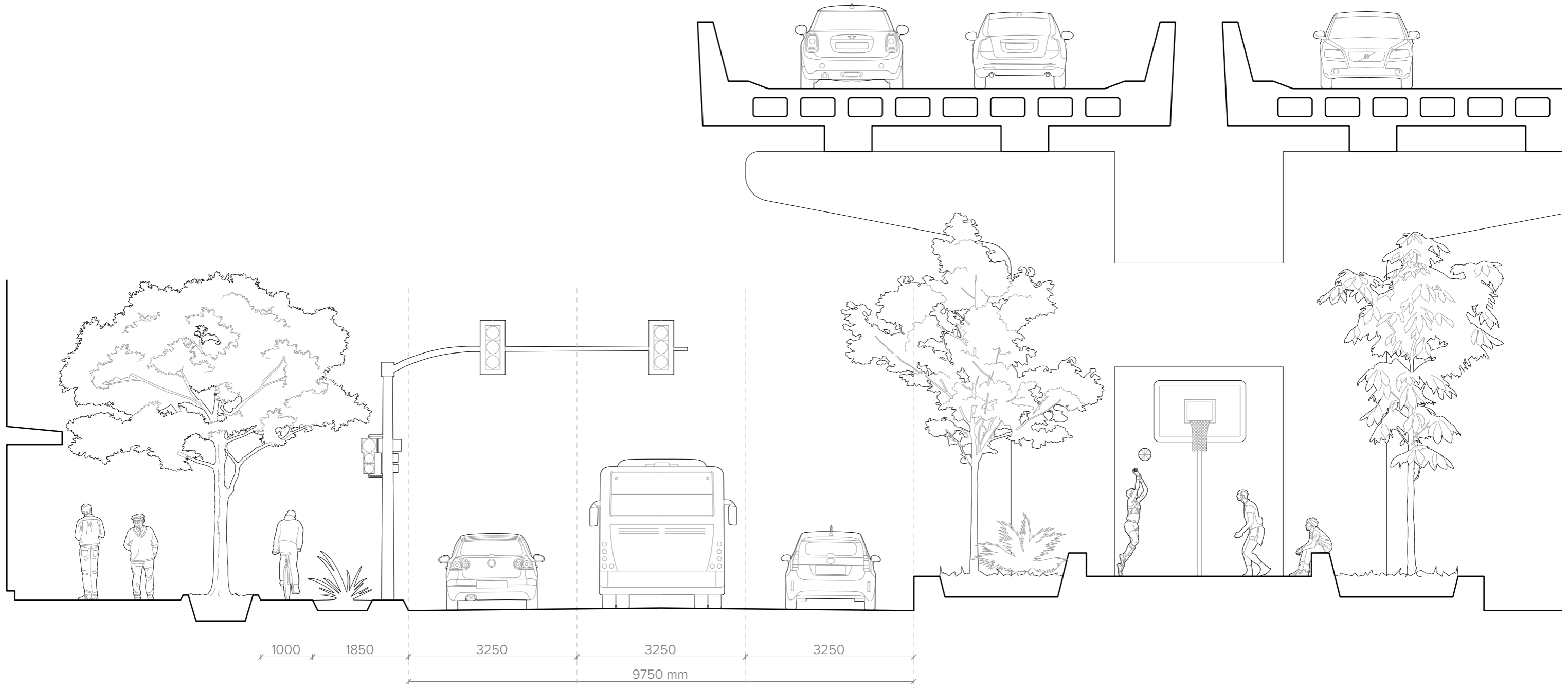
1. The material of the bike lane should be different from the one of the pedestrian sidewalk. This will allow for a better visual and practical separation between the two lanes. The current material should be changed with blue Epoxy with 6 mm chips in order to have a smoother surface and make the bike ride more enjoyable (as it has been done for Fushimi-dori St).
2. The placing of trees along the bike lanes on the main green arteries has to be a recurring design method within all arteries. The trees provide a clear distinction between pedestrian and bicycle routes. Furthermore, the implementation of deciduous trees will provide a fresher environment in summer while letting the sun through in winter, creating more favorable walking and cycling conditions.
3. Along the arteries, the division between bike and car lanes will be designed through the use of plants and vegetation. A clear separation will provide a safer environment for the cyclists and will comply with the Nagoya City Bicycle Usage Environment Basic Plan created in 2011. An example of a street where this design tool has been implemented is Wakamiya-odori.
4. Spaces under the expressway should be turned into areas for sport, vegetation and cultural events. Doing so will create new stimulating opportunities for the public and improve the overall aspect of the city, bringing surrounding communities together and offering relaxation areas. A good example can be found in the public skatepark situated underneath the Nagoya Expressway No.2 Higashiyama Rte.
5. There will be charging stations for bikes as well as benches that are made using photovoltaic panels with charging pods for phones or other electronic devices.





3250 3250 3250
9750 mm





TOOLKIT USED



Tall Trees
GR01



Medium Trees
GR02



Ballards
BA01



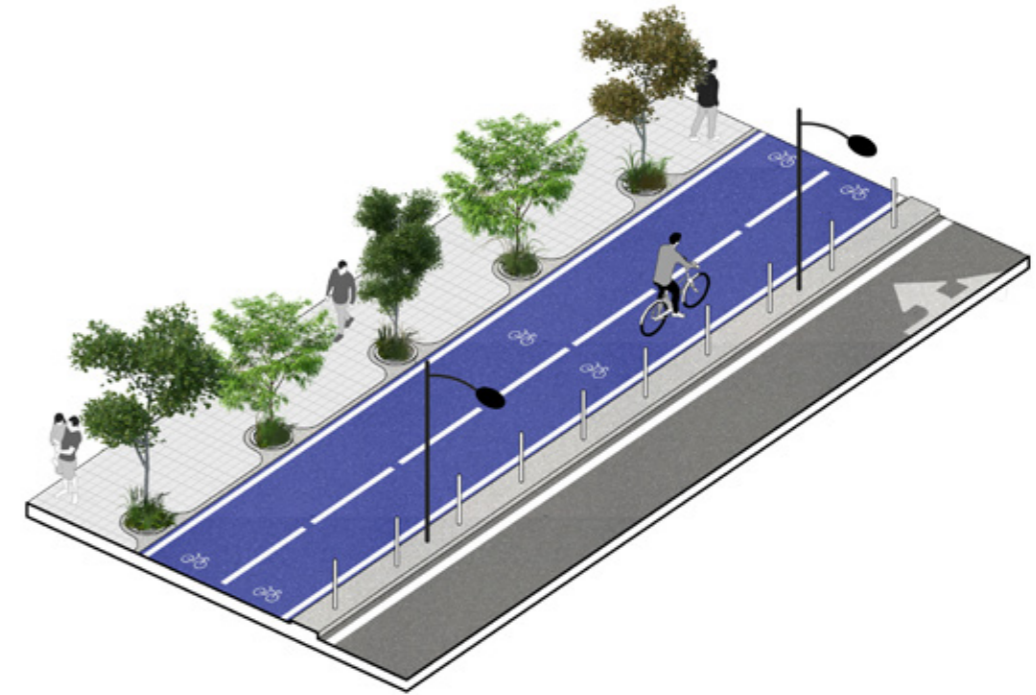
Street Lamp Post
L01



Bicycle Lane Logo
BL01

APPLICATION

Road Kit System



LARGE VEIN INCORPORATED TOOLS

Tool 1 + Tool 3

LARGE VEINS

VIEW ON TAKAHATA-CHO LINE NO.1

ISSUES ENCOUNTERED

1. Currently there is no bike lane present on many roads regarded to as “veins” which connect large area spans of the city. Since there are many lanes present, some should be changed to establish a strong intervention. With an idea of a future with more bicycle users there will need to be a clear and precise bike lane implemented to make traveling safer for both pedestrians and cyclists.
2. While there are some trees present in the current roads analyzed, these are sometimes scarce or not continuous. The resulting views offer a more bleak aesthetic, exposing cables or unappealing buildings to viewers. The lack of more green infrastructure also results in less permeable ground surfaces and higher levels of air and noise pollution.
3. Street crossings are often faded and look worn, used, and old. Changing smaller features like this can help amplify the visual impact of changes made in the city with a lower amount of effort in comparison to larger design changes.
4. Cables are currently often seen hanging around the city, bringing electricity to houses and businesses. However, these are not very pleasant to look at and can pose as possible fire risks.



LARGE VEINS

VIEW ON TAKAHATA-CHO LINE NO.1

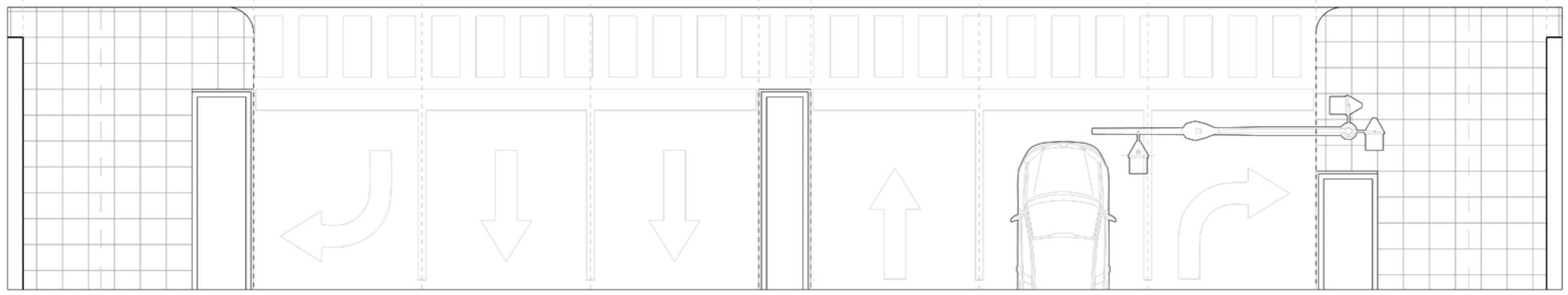
ISSUES RESOLVED

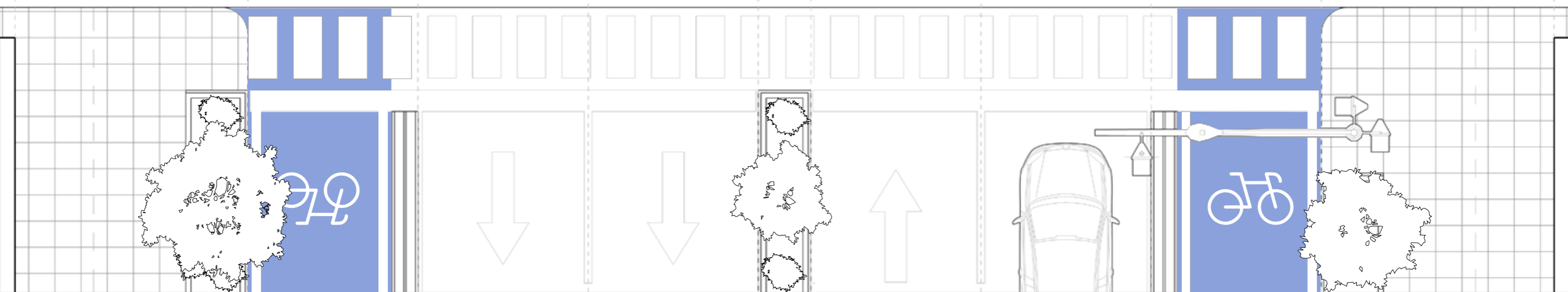
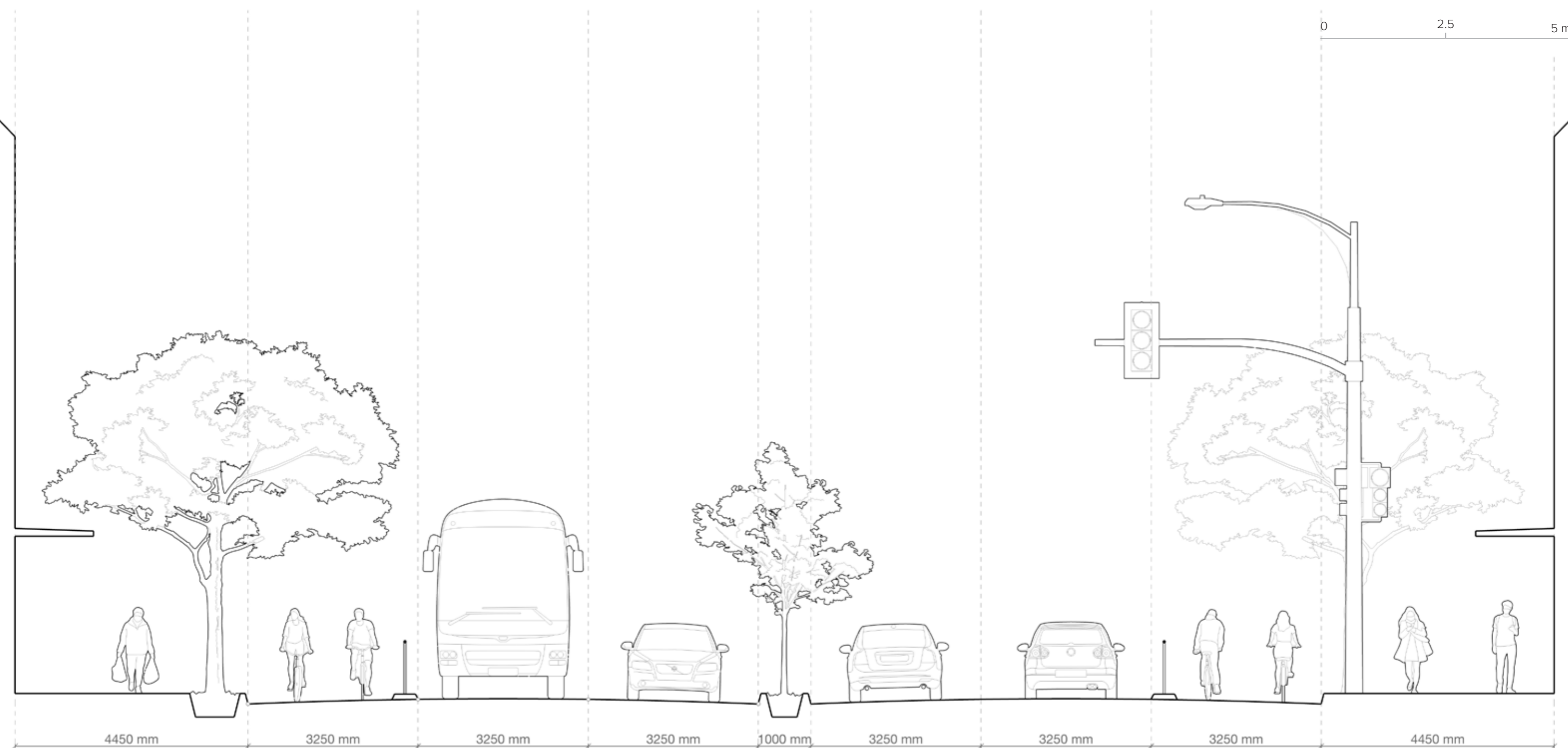
1. Implementing a clear and large bike lane will vastly improve the quality of commuting around the city for cyclists. The plan is to remove one of the existing car lanes and turn it into a bike lane painted in the same blue material seen throughout other areas of the city (artery roads). Having less car lanes and implementing a large and curated bike lane will hopefully entice more people to cycle around the city.
2. Increasing the amount of greenery and vegetation around the roads will create a more pleasant situation for the hundreds of thousands of people using these roads daily. Furthermore, they will help reduce air and noise pollution as well as covering unappealing facades.
3. As part of the general regeneration, it is important to include different scales of intervention that can be carried out at different times, showing a progressive growth. Renewing street signs and crossings can immediately give an effect of a cleaner, more curated road.
4. The currently hanging cables can be moved to an underground system of electricity and current, as noted in most European cities. This will improved the aesthetic quality of streets.



Large Vein Road Typology
Current Situation

0 2.5 5 m





TOOLKIT USED



Tall Trees
GR01



Medium Trees
GR02



Bushes
GR03



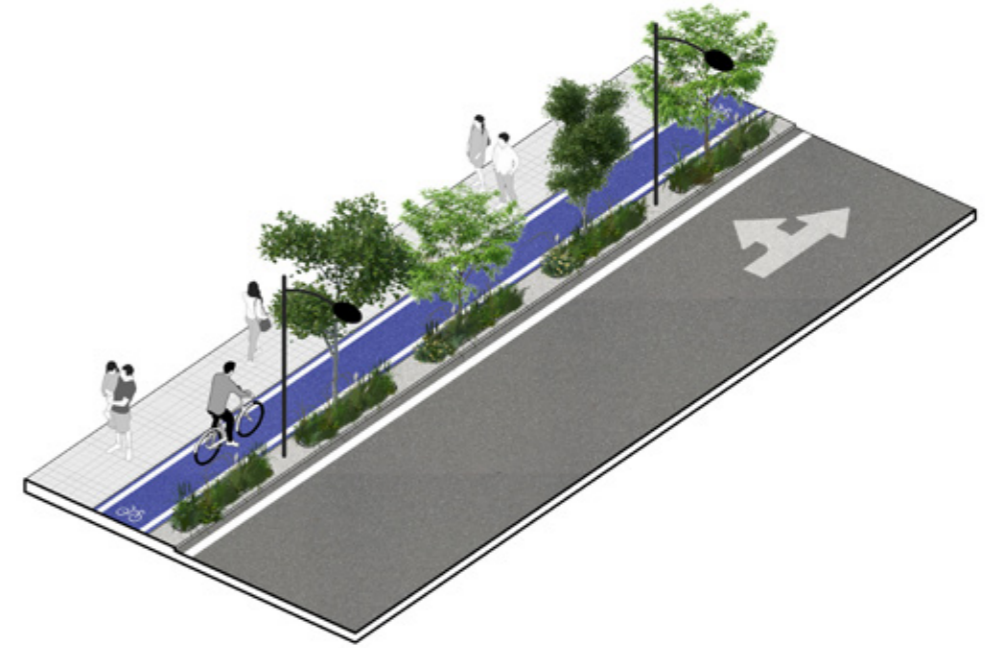
Street Lamp Post
L01



Bicycle Lane Logo
BL01

APPLICATION

Road Kit System



SMALL VEIN INCORPORATED TOOLS

Tool 2

SMALL VEINS

VIEW ON PREFECTURAL ROAD 36

ISSUES ENCOUNTERED

1. This road typology once again lacks a clear and comfortable bicycle lane. Not having the appropriate infrastructure to make cyclists comfortable often results in more people resorting to using cars. The sidewalks are currently somewhat large, and can include the introduction of a bike lane.
2. Currently the separation between the lane directions is done using bollards; while this is effective, it could be a good location to place street lights, to ensure that there is more space on the sidewalks.
3. As often occurs on smaller roads in Japan, electricity cables are present and very visible in this road typology as well. Once again these offer an unappealing view as well as posing as potential risk factors.



SMALL VEINS

VIEW ON PREFECTURAL ROAD 36

ISSUES RESOLVED

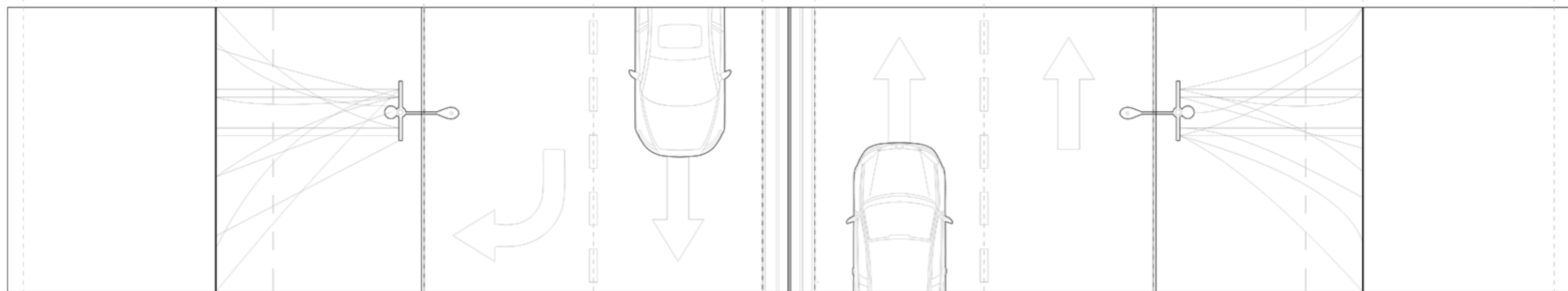
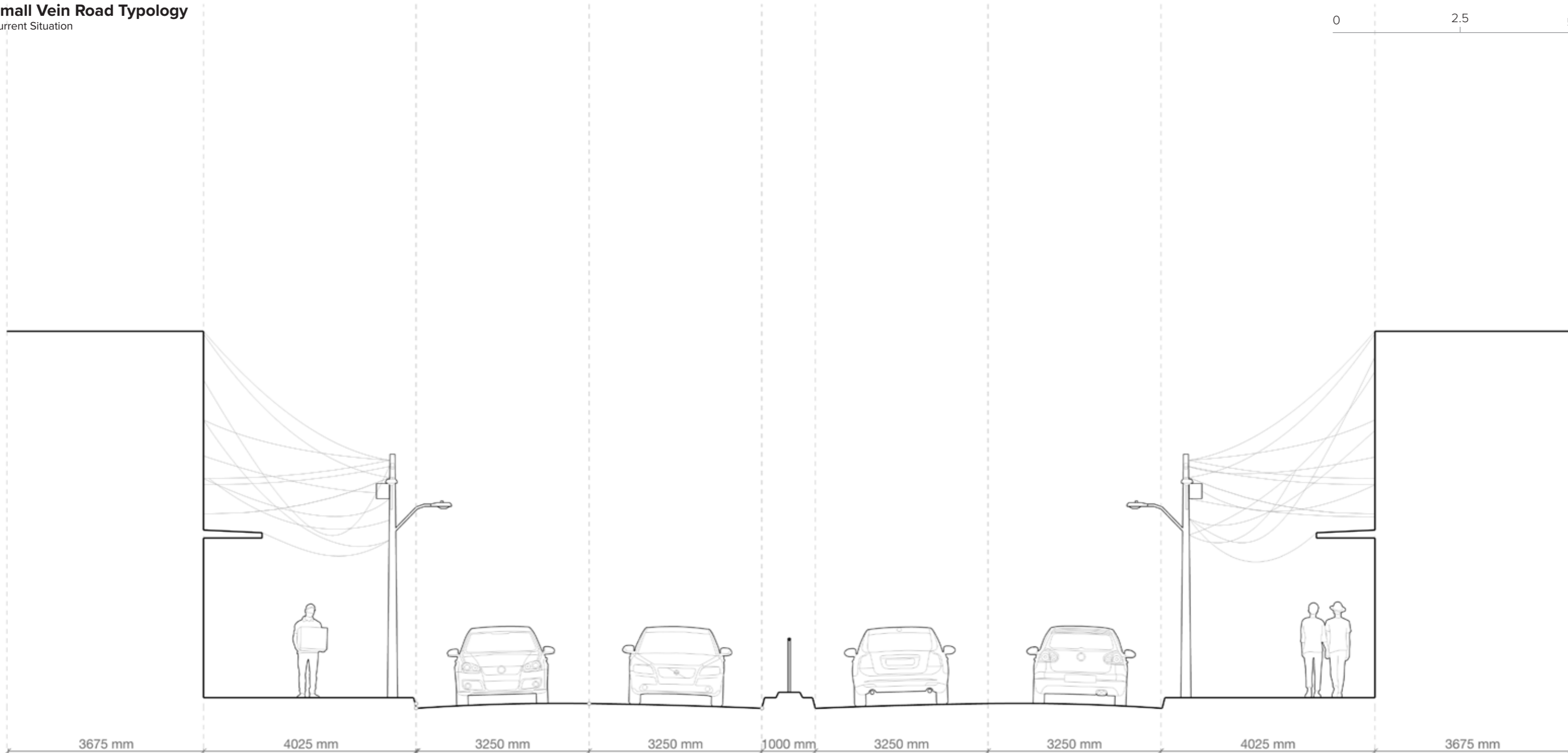
1. This road typology once again lacks a clear and comfortable bicycle lane. Not having the appropriate infrastructure to make cyclists comfortable often results in more people resorting to using cars. The sidewalks are currently somewhat large, and can include the introduction of a bike lane.
2. Currently the separation between the lane directions is done using bollards; while this is effective, it could be a good location to place street lights, to ensure that there is more space on the sidewalks.
3. As often occurs on smaller roads in Japan, electricity cables are present and very visible in this road typology as well. Once again these offer an unappealing view as well as posing as potential risk factors.



Small Vein Road Typology

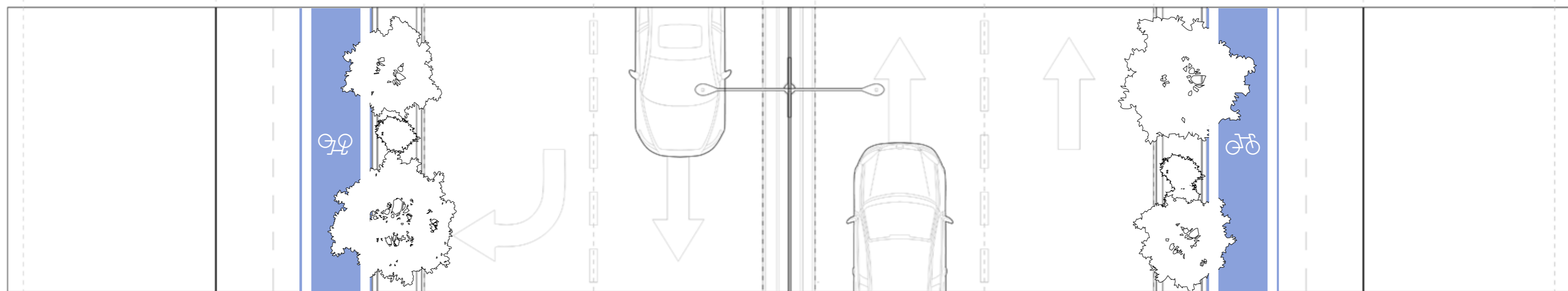
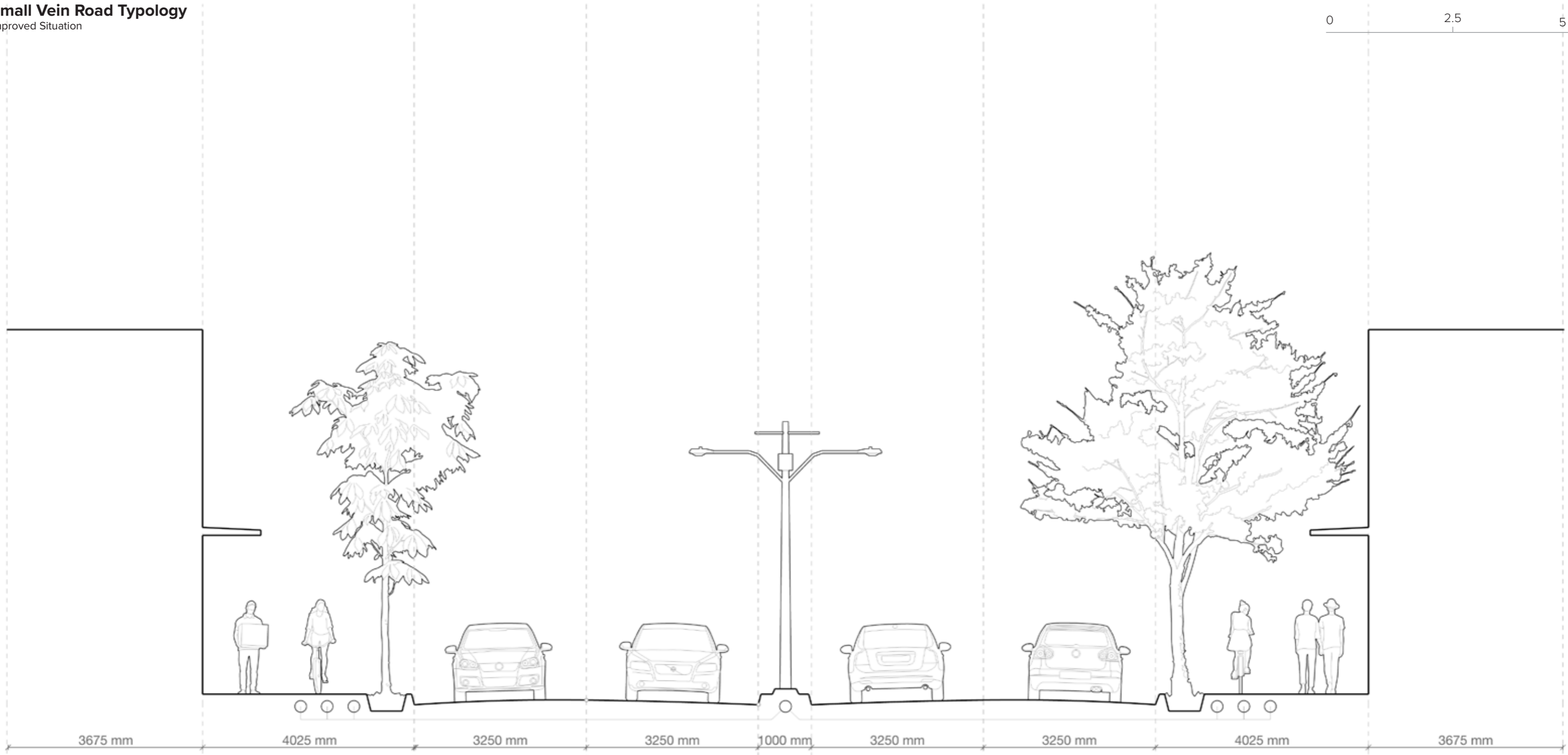
Current Situation

0 2.5 5 m



Small Vein Road Typology
Improved Situation

0 2.5 5 m



NODE ESTABLISHMENT

1. AGRICULTURAL MARKET

The first node occurs on the Western part of Nagoya, at Km 10 on the Greenway. Dictating the function for this node came from the nearby agricultural fields already present in the area. To strengthen this feeling of agrarian culture, the first node would consist of an Agricultural Market, which at the moment is not found in Nagoya. Serving as both a touristic attraction and to provide fresh produce to the surrounding areas, the market will have the possibility of becoming a new meeting point within the city.

2. FLOWER PARK

The second node is at Km 17; here the artery joins the Greenway nearby the Shonai Ryokuchi park, which can be embellished and designed to become a more focal attraction. The main theme for this node would be of a seasonal flower park. The Greenway is envisioned also as a means for locals to enjoy seasonality and to get out of the main city life without having to travel to another city, and this flower park node can grant a constantly changing scenery to cater to the Japanese tradition of floriculture.

3. CIVIC EDUCATION SCHOOL

At the 21st Km of the Greenway, there is currently a civic education and driving school ground, which creates hard landscaping as the natural greenery was paved over to create a more fluid terrain for driving. To counteract this change in scenery, the node in this northern part of the city will consist of a green “suspended” park and bicycle school. Skylight voids were placed throughout the greenery to create a connection between the underlying driving school and the added function above.

4. BOTANICAL GARDEN / ZOO

The Botanical Garden and Zoo in Higashiyama Park coincide with the arrival of one of the main arteries into the Greenway; as this was the basis on which nodes were picked, it was a natural fit to become a main node within the Greenway. It is at Km 34, and already has a plethora of amenities present, serving as one of the main touristic attractions of Nagoya. Due to this, almost no interventions will be made at this node; rather it will be signalled more clearly as a resting point for those traveling on the Greenway.

5. FLOATING PARK

At the 46th Km of the Greenway there is a more barren and concrete-based scenery; this area is part of the final stretch towards the port and hence there is a lot of machinery around. However, while conducting site visits it was noted that there is a pier-like concrete island within the river, which is currently unused. The idea for this node would be to enhance the quality of this island by making it into a floating park, with renewed greenery, cafes, and leisurely services for visitors.

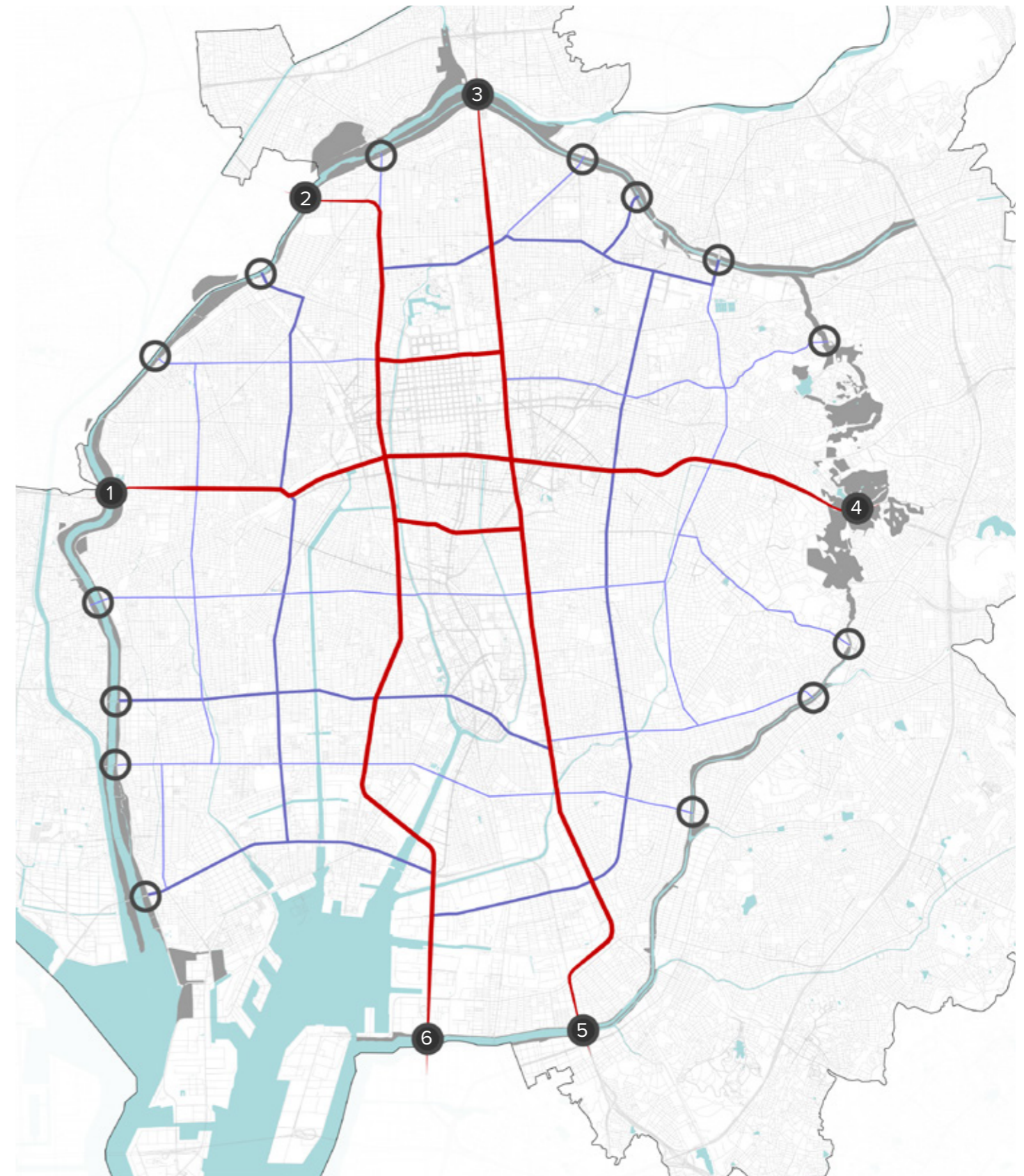
6. SCIENCE LAB

A main focus throughout the Greenway project is to ensure that the rivers become cleaner, safer, and have the ability to host a variety of ecosystems. To ensure this, it is important to establish a Science Lab where researchers have the necessary equipment and space to conduct labs, experiments, and tests on the rivers and surrounding land. The lab node will be situated at Km 48 and will be open to the public at the ground floor, allowing for interaction and discourse about the natural habitat of the rivers.

Nodes Map

Arteries and Veins with Greenway

0 2.5 5 km



- Arteries
- Big Veins
- Small Veins
- Nodes
- Secondary Entrance

The difference between when an artery meets the Greenway versus when a vein does will lie in the strength, scale, and manner of the intervention. The main artery encounters will result in the formation of Nodes, or main focal points, which will house larger events to become touristic focal points. Smaller interventions such as cafes, restrooms, and leisurely services will occur every time a vein meets with the Greenway. It was important to differentiate the two as there will be an expected larger number of people using arteries to commute rather than veins, which added services must cater to.

STEP 2

**CREATING A CONTINUOUS
GREENWAY**



Image 5: View of the Shonai River banks in March
Own Image

GOAL 4 PARKS AND TRAILS

Provide permeable, inclusive, and enjoyable parks, along with improved open spaces and trails.

Following a survey taken by varied members of the community in Nagoya, it was identified that walking and bicycling are top two activities inhabitants participate in along the river. Most people also tend to use parks for social gatherings and as a form of exercise.

Yet, 61% said they do not use the rivers or parks around them often, as they are not easily accessible and they don't see much value to the anthropic settings present along extended parts of the river. By aiming to provide 49.51 km of enjoyable, connected open space, the Nagoya Greenway can be a valued recreational resource and serve as a backdrop for a multitude of activities year-round.

ACTIONS

- A. Create 49.51 km of connected open space along the river.**
- B. Provide resting and leisure facilities at a recurring intervals along the length of the river, adjusting to current conditions and needs.**
- C. Create a continuous greenway route easily accessible and comfortable for pedestrians and cyclists as well as runners, encouraging sport activities and events such as marathons.**
- D. Generate permeable ground membranes for as many trails as possible, improve education facilities and residences, adjusting to the surrounding needs in the area.**

POTENTIAL PARTNERS: JRRN, Ministry of Ecology, Ministry of Education
POTENTIAL FUNDING SOURCES: Nagoya Masterplan 2023



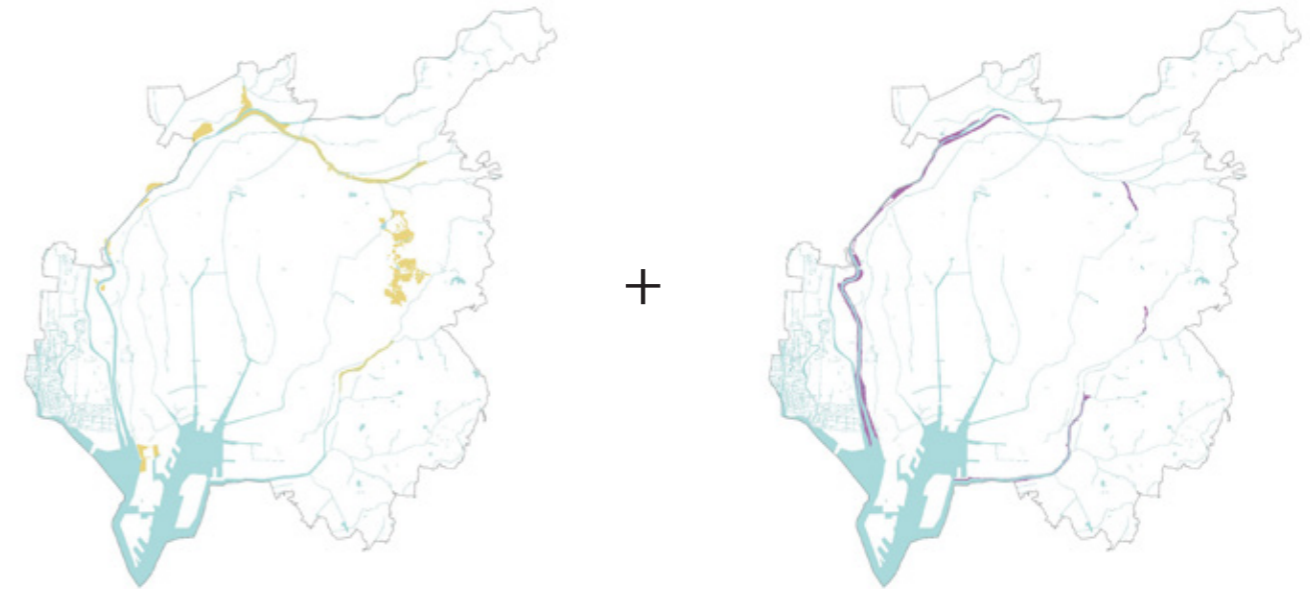
ACTIONS

Improving trails and movement within the Greenway system, joining the parks dotted around the Rivers.

Currently the system of parks around the edge on Nagoya consists of generally well-maintained and used parks. However these are highly disconnected from one another and hence render a lesser sensation of greenery throughout the city. Even though technically 25% of the city's land area is green, this is not noticed while moving around Nagoya. Through the survey it was also noted that many people feel parks around them are inaccessible or not enjoyable.

CREATING A NETWORK OF GREENERY THROUGH TRAILS

When approaching the formation of the greenway, we decided to analyze the existing parks that could pose as a starting point to build upon. Direction was placed mostly on the parks that were already attached to the Shonai, Yada, and Tenpaku rivers, as well as the addition of the Heiwa and Higashiyama parks to connect the Yada and Tenpaku. After establishing what green areas were already present, it was important to analyze their typologies and think of the connections between them; depending on the length and nature of the connections, they would offer different services and means to move around the greenway. Shorter distance between parks would mean that there would not be a need for a bathroom in the inbetween zone, but rather a focus could be placed on inserting benches or bike racks when the area coincide with a main access point from the city. Longer spans between parks would instead need the intervention of a "node" or main focal point to interrupt the otherwise long and tedious passage. Along with this, there will be a stronger need for leisurely facilities such as cafes, restaurants, bathrooms, and resting areas. The thickness of these connecting areas can be dictated both by the existing condition and by the typology of services inserted; when the area serves simply as a bike and walking lane, it can be reduced to a relatively smaller width of 5 m, while the inclusion of service areas would call for a larger regeneration.



Existing Parks

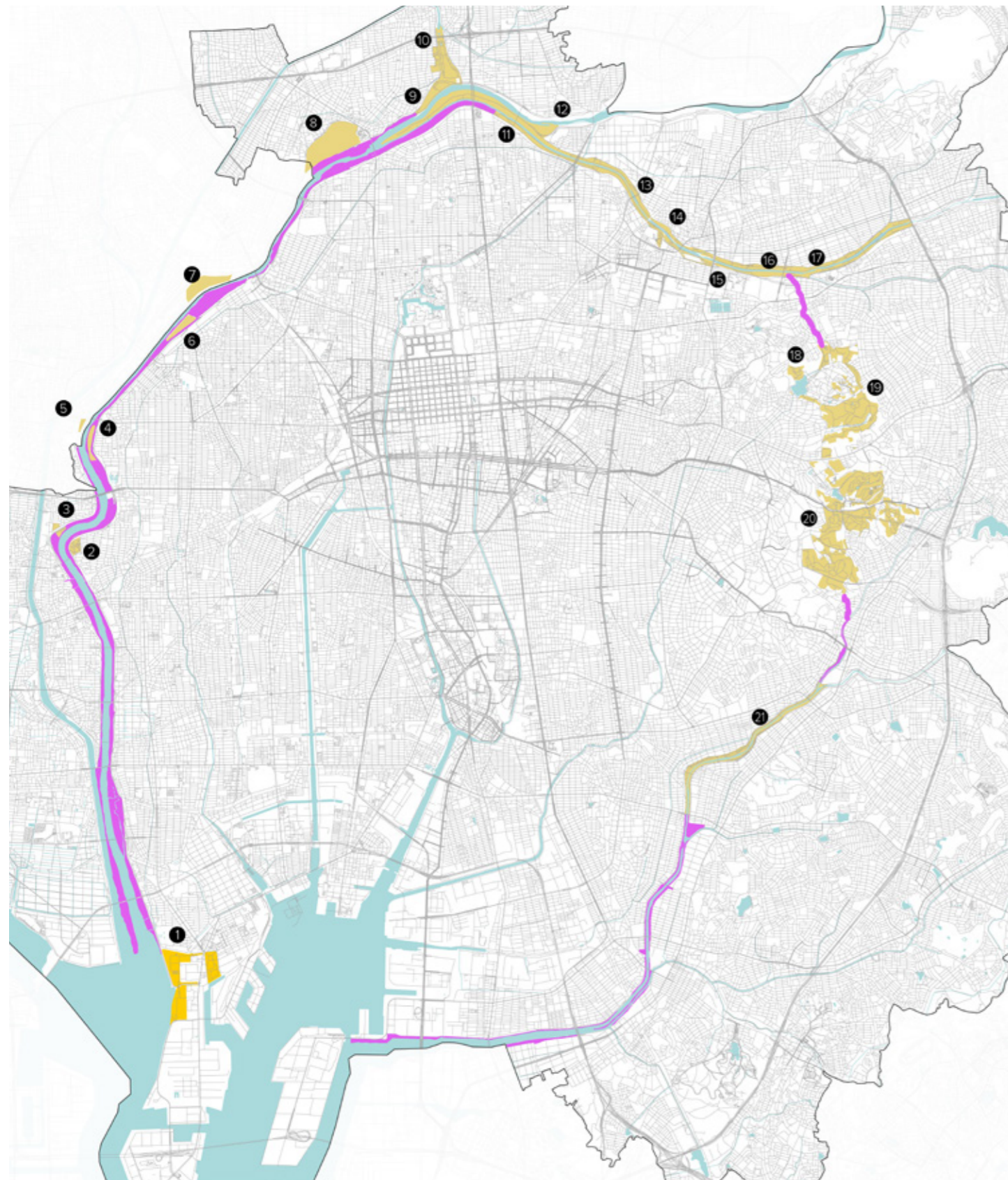
Connections added



Final Outcome

Existing Parks Map

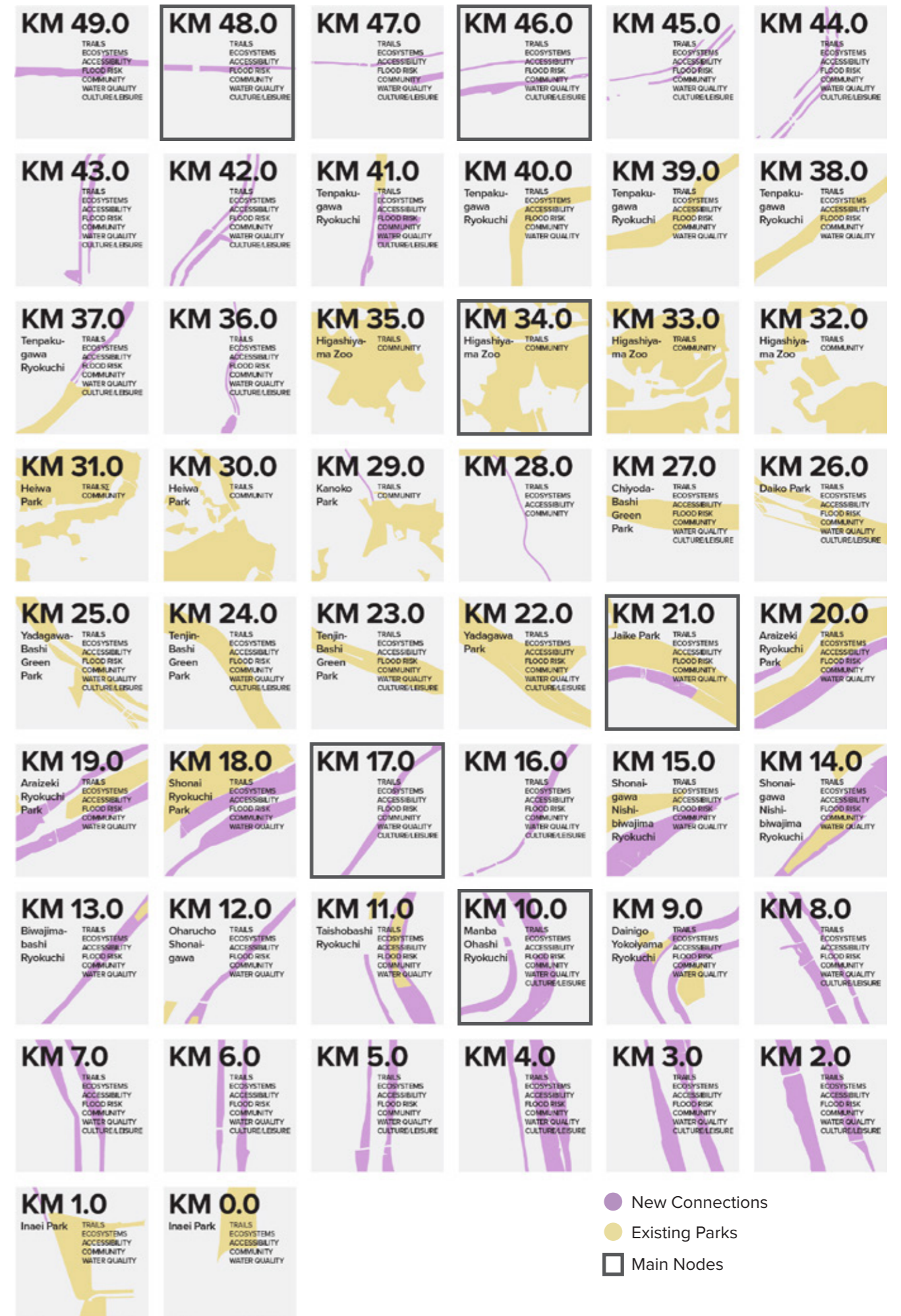
Highlighted in Red



- | | | |
|----------------------------------|-------------------------------|---------------------------------|
| 1. Inaei Park | 8. Shonai Ryokuchi Park | 15. Daiko Park |
| 2. Dainigo Yokoiyama Ryokuchi | 9. Araizeki Ryokuchi Park | 16. Chiyoda-bashi Green Park |
| 3. Manba Ohashi Ryokuchi | 10. Jaike Park | 17. Obara-bashi Green Park |
| 4. Taishobashi Ryokuchi | 11. Yadagawa Park | 18. Kanoko Park |
| 5. Oharucho Shonaigawa Kasenjiki | 12. Mizuwake-bashi Green Park | 19. Heiwa Park |
| 6. Biwajimabashi Ryokuchi | 13. Tenjin-bashi Green Park | 20. Higashiyama Zoo and Gardens |
| 7. Shonagawa Nishibiwajima | 14. Yadagawa-bashi Green Park | 21. Tenpakugawa Ryokuchi |

Parks Analysis

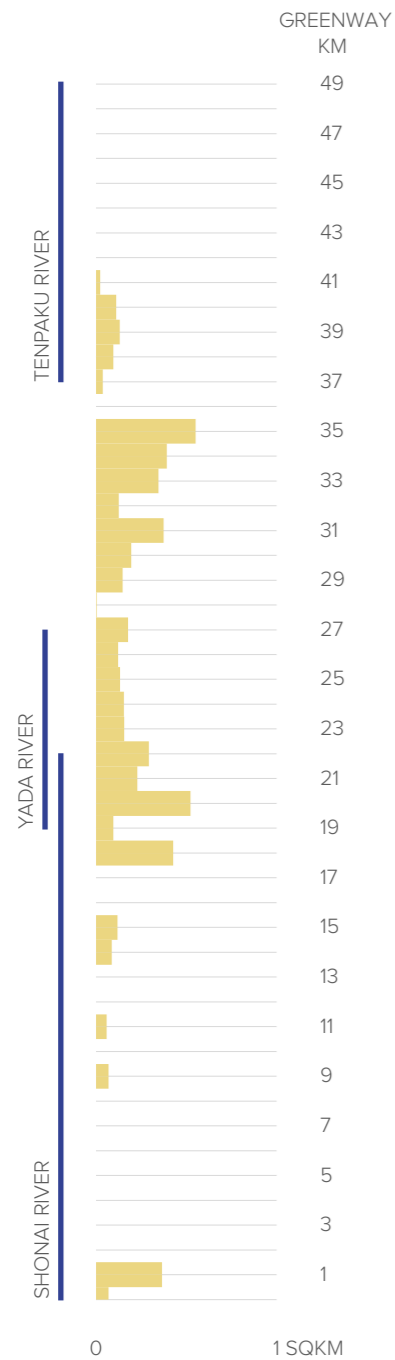
Functions Found



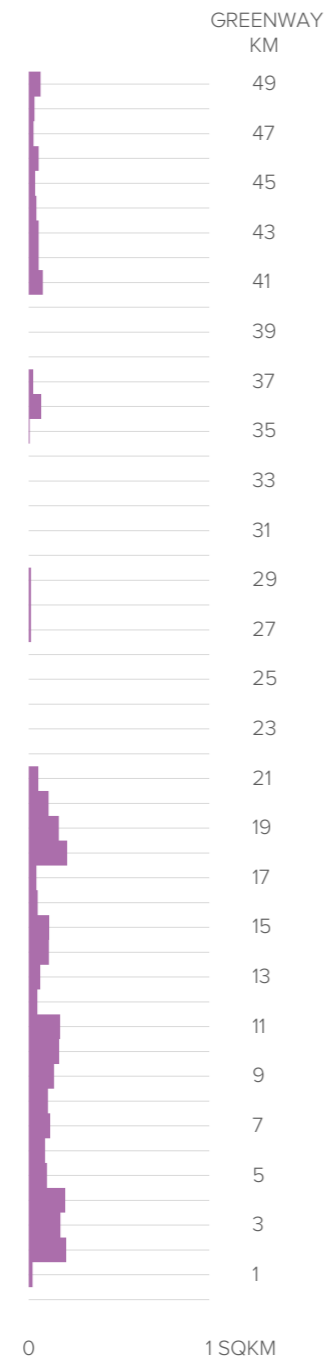
- New Connections
- Existing Parks
- Main Nodes

GREENERY DATA

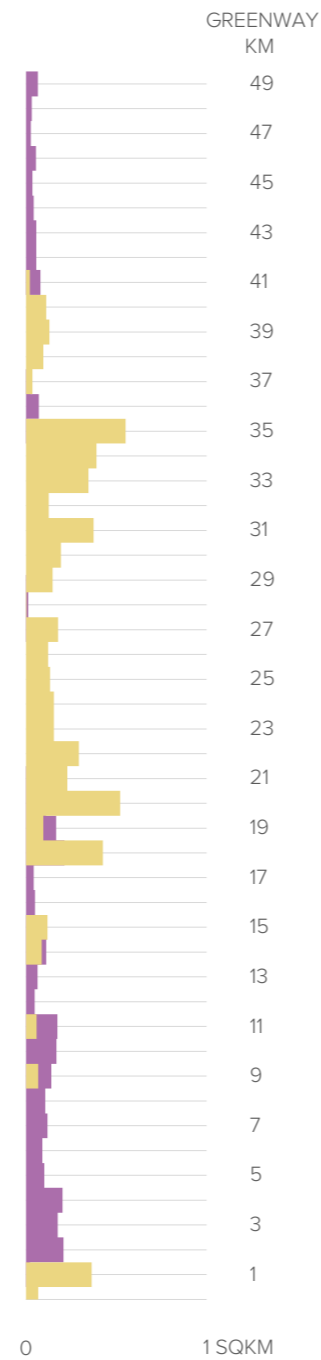
EXISTING PARKS



NEW CONNECTIONS



COMBINED GREENWAY



6.32 SQKM

There are currently 6.32 sqkm, or 632 hectares of green areas present on the greenway. These are made up mostly from the Heiwa and Higashiyama Gardens, as well as other larger parks along the rivers.

3.19 SQKM

The addition of green areas and trails to connect the aforementioned parks will result in an addition of 3.19 sqkm (319 ha) of greenery throughout the greenway. These will include a variety of habitats to let species thrive as well as making the route more aesthetically pleasing.

9.41 SQKM

The total amount of green areas post intervention will be 9.41 sqkm (941 ha), which is an increase of more than 150% compared to the current situation along the rivers.

88.08 SQKM

Amount of green areas present in Nagoya currently

3.6%

The increase in overall green areas within Nagoya after the greenway intervention

EXISTING PARKS ALONG PROPOSED GREENWAY

- | | | |
|---|---------------------------------------|--|
| 1. INAEI PARK (km 0) | 10. JAIKE PARK (km 21) | 19. HEIWA PARK (km 30.5) |
| 2. DAINIGO YOKOIYAMA RYOKUCHI (km 9) | 11. YADAGAWA PARK (km 22) | 20. HIGASHIYAMA ZOO AND BOTANICAL GARDENS (km 32-35) |
| 3. MANBA OHASHI RYOKUCHI (km 10) | 12. MIZUWAKE-BASHI GREEN PARK (km 22) | 21. TENPAKUGAWA RYOKUCHI (km 37-41) |
| 4. TAISHOBASHI RYOKUCHI (km 11) | 13. TENJIN-BASHI GREEN PARK (km 23.5) | |
| 5. OHARUCHO SHONAIGAWA KASENJIKI PARK (km 12) | 14. YADAGAWA-BASHI GREEN PARK (km 25) | |
| 6. BIWAJIMABASHI RYOKUCHI (km 13) | 15. DAIKO PARK (km 26) | |
| 7. SHONAIGAWA NISHIBIWAJIMA RYOKUCHI (km 14) | 16. CHIYODA-BASHI GREEN PARK (km 27) | |
| 8. SHONAI RYOKUCHI PARK (km 18) | 17. OBARA-BASHI GREEN PARK (km 27) | |
| 9. ARAIZEKI RYOKUCHI PARK (km 19.5) | 18. KANOKO PARK (km 29) | |

GREENERY DATA CONT.

10 x 10 m

The average space between newly planted trees throughout the greenway will be of about 10 m from one another; this allows for them to grow freely various intensities of vegetation.

170 trees per ha

This distancing between trees will allow for an average of 170 trees planted every hectare of the newly added greenway, which is a total of 319 hectares.

55,160 trees planted

The total amount of newly planted trees throughout the greenway will be of 55,160 based on the aforementioned calculations.

96.4 million kg of oxygen

96,413,061 kg of oxygen will be produced by these trees in a year.

The trees used for these calculations are of “mixed” typology, with an average circumference of 90 cm.

36.15 million kg of carbon

The newly planted trees will store 36,154,898 kg of carbon in a year.

401,700 km plane travel

Thanks to the outsource of oxygen and absorption of CO₂, the trees will offset the equivalent of 401,721 km in plane travel.

24.8 million liters

24,822,000 liters of water will evaporate from these trees throughout the year.

Zaborowska, Łucja, and Julia Żuławińska. “Tree Benefits Calculator.” Omni Calculator, June 5, 2023. <https://www.omnicalculator.com/ecology/tree-benefits>.

INTERVENTION TYPOLOGY



LOW

The low category will include quick and lower effort interventions which are usually constant throughout the greenway; namely, these are the bicycle lane, lighting along the trails, benches, water fountains, and community involvement. These areas only need improvements for 2 “goals”.



MEDIUM

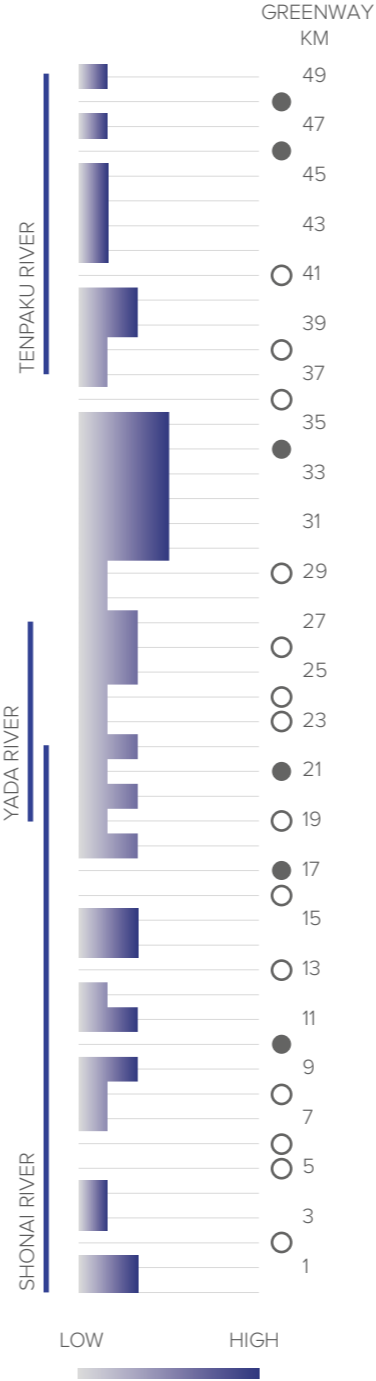
Areas categorized as medium sized interventions will have some more services such as cafes, art/performance spaces, and coincide with where veins meet the greenway, hence posing as one of the secondary means of arrival. On average 3-6 “goals” are looked at in these areas.



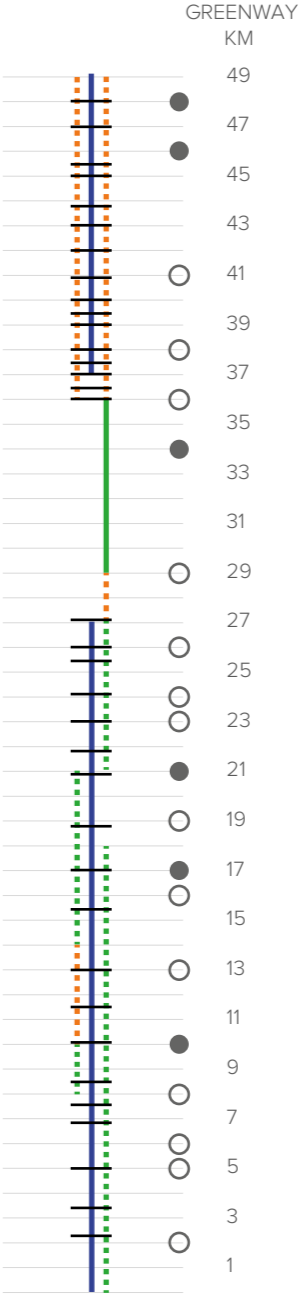
HIGH

High demand / intervention areas are those that are either in a dire situation currently or ones that have some level of services but that coincide with the arrival of a main artery into the greenway. These areas are focal points that will receive a lot of influx of people and hence need a greater amount of services to cater to them. Almost all “goals” will be resolved in these areas.

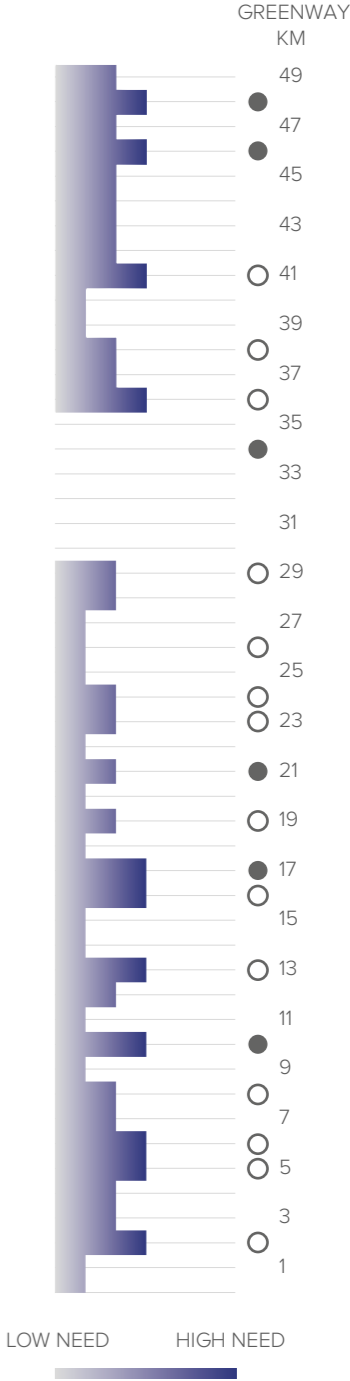
QUALITY OF EXISTING RESOURCES



ROUTES AND TRAILS



LEVEL OF INTERVENTION



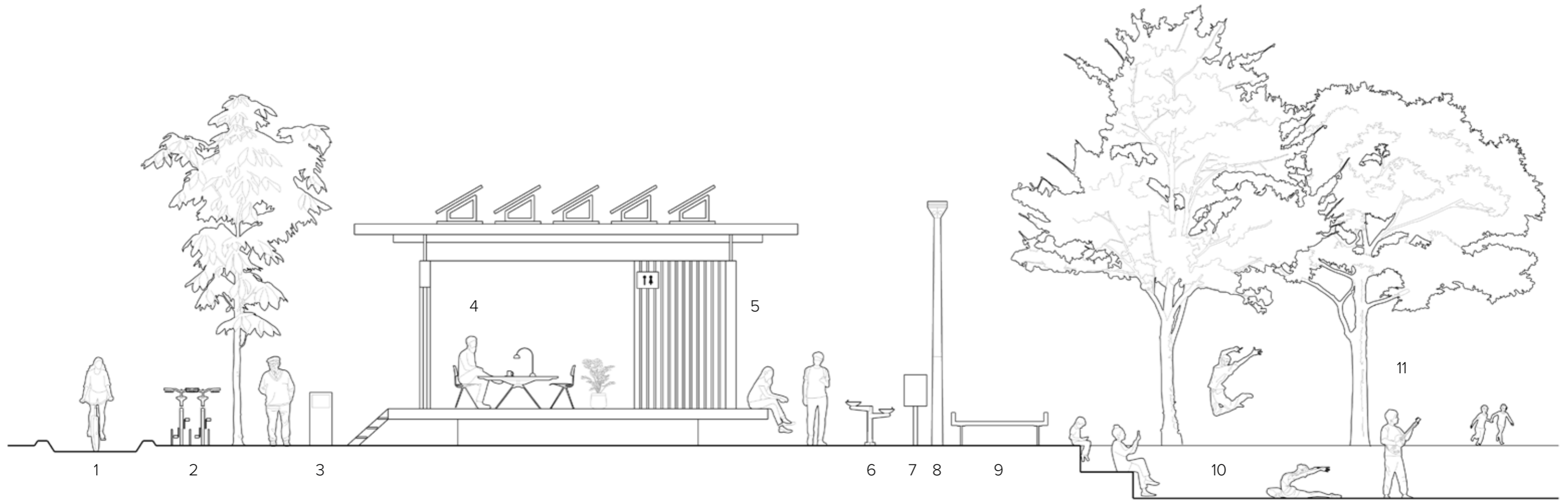
LEGEND

- Vein access point
- Artery access point
- Improved bike / pedestrian path
- New bike / pedestrian path
- Park bike / pedestrian path
- Bridge

Services Section

Amenities throughout the Greenway

0 2.5 5 m



1. Bike Lane : Continuou throughout Greenway
2. Bike Racks : Matching with main entrances / Cafes (Vein / Artery connection)
3. Trash / Recycling : With every Cafe rest stop
4. Cafe : At every main Greenway entrance
5. Restrooms : With Cafe, also when there is a sport facility
6. Water Fountain : Every 750 m
7. Environment Graphics / Park information : Continuous
8. Lighting : Continuous along trails
9. Benches : Every 750 m
10. Art / Performance Spaces : Whenever possible
11. Greenery : Where needed

Leisure Facility

Spaces Crafted for Entrance to the Greenway



Km 13 - Biwajimabashi Ryokuchi

Resting Area for Vein Entrance

STEP 3

**BRINGING NEW
FUNCTIONS TO THE
GREENWAY**



Image 7: View onto the Tenpaku River in March
Own Image

GOAL 5 CULTURE AND LEISURE

Strengthen the availability of artistic, cultural, and leisurely activities through the establishment of touristic nodes.

Tourist areas or monuments can be mostly found in the central areas of the city, with an exception being the Higashiyama Zoo and Botanical Gardens which coincide with the greenway system. Due to this lack of cultural or historical functions, the perimeter of Nagoya is often overlooked by tourists or visitors, meaning it benefits from a lower economical influx and hence a potentially lower quality of facilities or green areas.

Introducing museums, art spaces, installations, and improving the quality of leisurely areas around the rivers and in focal points of the greenway will strengthen the touristic involvement around the perimeter of Nagoya.

ACTIONS

A. Develop a regional and national hub of significant, comprehensive arts and culture corridor along the rivers.

B. Collaborate with local artists, cultural organizations, and community members in planning processes and project development along the river.

C. Organize a system of engagement with nearby schools, universities, and members of the community.

POTENTIAL PARTNERS: JRRN, Ministry of Ecology, Ministry of Education

POTENTIAL FUNDING SOURCES: Nagoya Masterplan 2023



ACTIONS

Introducing new cultural and artistic hubs to add value to the riverbeds, engaging with locals and offering leisurely activities.

There is a need to incorporate more Museums and Artistic centers in Nagoya, as at the moment there are only a few which are centrally located in the more commercial areas of the city.

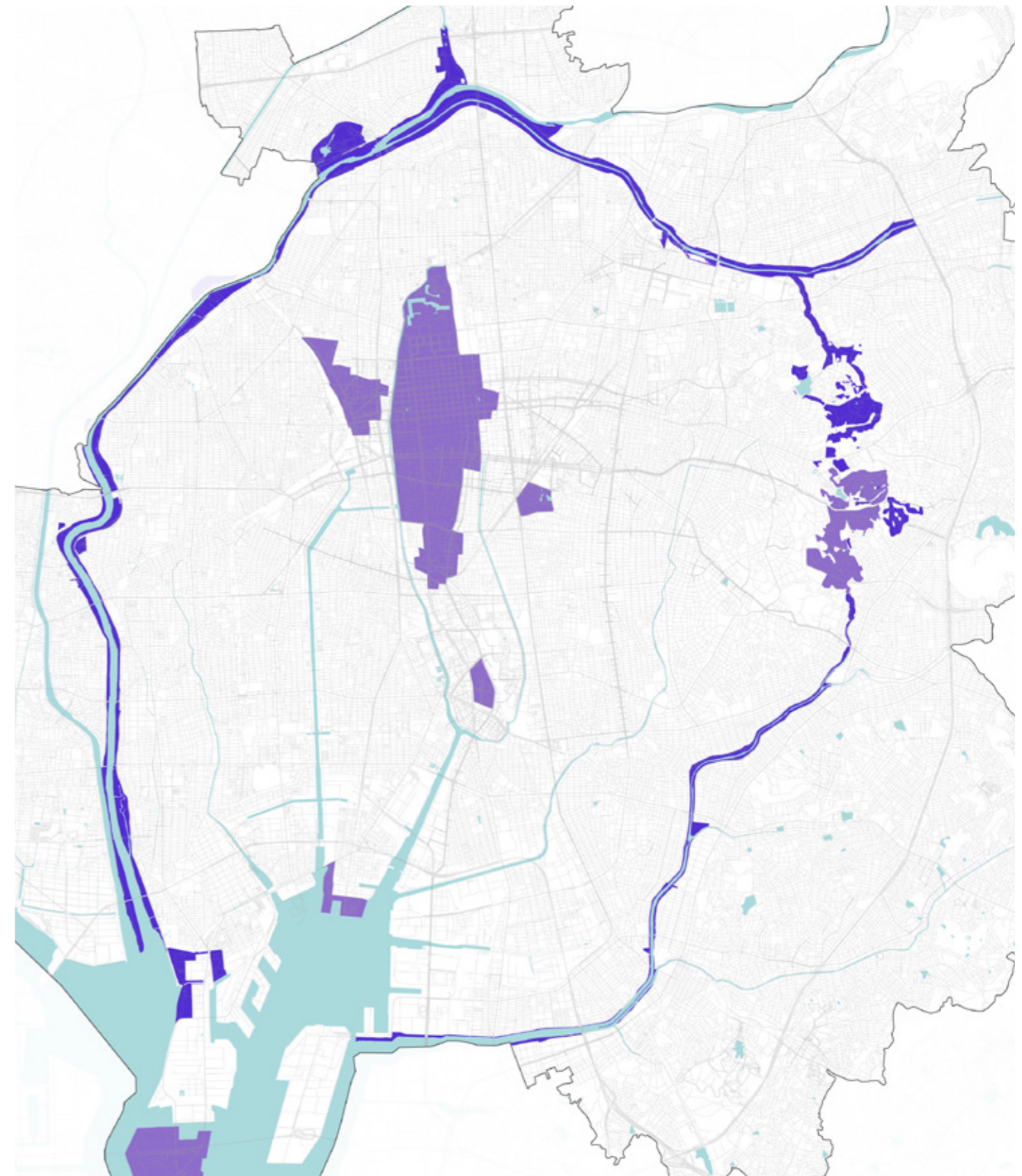
Bringing a new system around the greenway will allow for more artists to collaborate, express themselves, and have a backdrop on which to communicate with the community, creating a new way of sharing thoughts, ideas, and movements.

FORMING A NEW CULTURAL LANGUAGE AND LEISURE AREAS

To improve the current situation, the greenway system would incorporate “nodes”, or hubs of facilities, in the areas of the greenway that directly intersect with the main “artery” roads. This ensures that the main nodes are easily accessible, and allows for a large influx of people to visit and invest in the greenway system and the incorporated existing parks. Main facilities to be added will be an agricultural marketplace, a Flower Wildlife Conservatory, a “Floating Park”, and a museum.

Along with these more established nodes, there will be a variety of leisure facilities placed strategically throughout the greenway to entertain the visitors and members of the surrounding communities. During the survey conducted on residents of Nagoya, many people expressed their wish for more barbecue areas around the rivers and parks, as it is an activity they often conduct with their friends and family on days off work. Likewise, it was expressed that there should be more spots to enjoy the seasonality of Japanese trees. This will be something easily incorporated throughout the greenway system to cater to their need. When visiting the Tenpaku and Shonai rivers it was also noticed that many people currently fish on the riverbanks; hence it would be important to establish more fishing pods every set kilometer around these rivers. Lastly, when researching the biodiversity aspects of the areas surrounding the rivers it was discovered that there are many different species of birds, and that birdwatching is a common practice among the residents of Nagoya; therefore there will also be a few birdwatching towers placed on areas that house a larger variety of birds on the river.

“Shonai Ryokuchi has bbq facilities, but more along the Yada River would be nice. Rest areas with shade. I would like it to be possible to fish alongside the rivers as well. Finally I would enjoy some community gardens and meeting areas placed in green areas around the river, making social gatherings more accessible.”

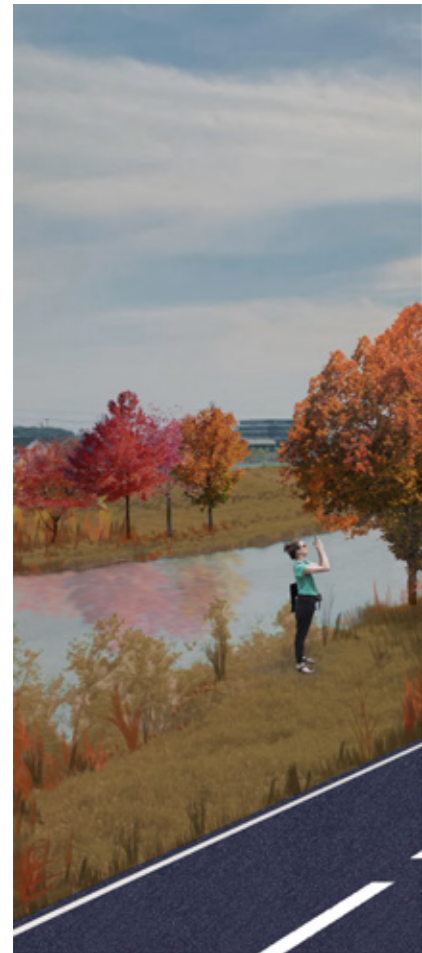


- Added Tourism
- Existing Touristic Spots

HANAMI / MOMIJIGARI

Hanami means “flower viewing” in Japanese; it is a traditional custom which involves the observing and enjoying the beauty of cherry blossoms. Often associated with public picnics, friends, and families, it consists of meeting around and under trees to spend time together and appreciate nature.

In Autumn, the term Koyo is used to refer to the same process but involving the warm-toned autumnal foliage. These practices are centuries old, dating back to the Nara period (710 - 794), and have been passed on from generations as a regular activity to appreciate the passing of seasons.



Koyo



Sakura

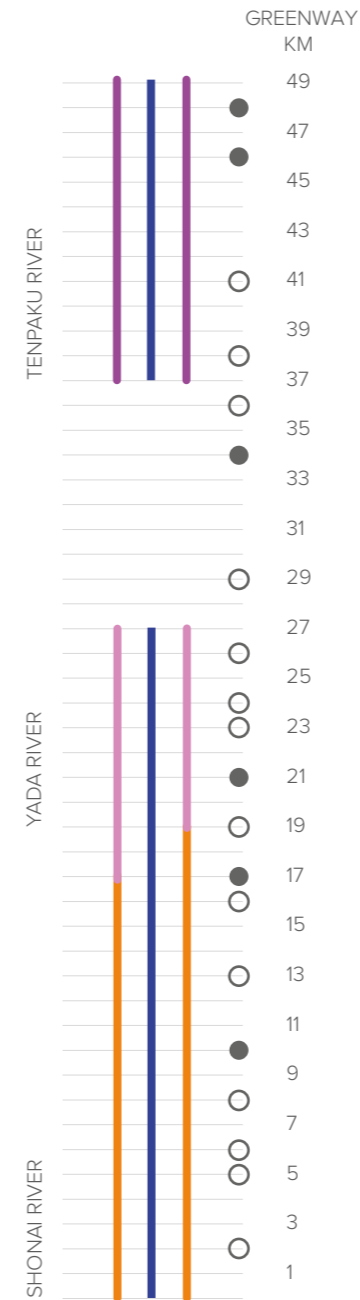


Wisteria

Please describe how you think the area around these rivers can be improved

“ I would like to see a nicer walking area around the rivers, as well as more spots for Hanami on the river-side.”

SEASONS ON THE GREENWAY



WISTERIA

Towards the end of April and moving into the summer months, the Sakura trees turn green. A final flower typology which blooms in this season is the Wisteria; this flower hangs from small gazebos and is another famous attraction in many Japanese cities. The Eastern part of the greenway will feature installments of Wisteria.

SAKURA

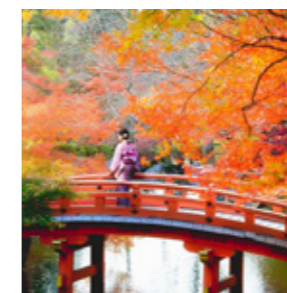
Springtime in Japan is most often associated to cherry blossoms; many tourists visit Japan during the end of March and early April to witness the Sakura season. The northern part of the greenway will feature Somei Yoshino (common sakura), Yamazakura (wild sakura), and Shidarezakura (Japanese weeping cherry tree).

KOYO

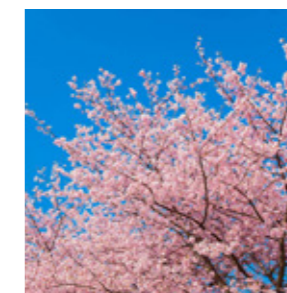
To enhance the seasonal feeling of autumn, trees planted in this area will include: Japanese maples, wax trees, rowan, burning bush, and Japanese sumac, which all have leaves that turn red; ginkgo and Japanese elms will turn golden and yellow; finally chestnuts, oaks, and beeches will shed leaves in shades of brown.

LEGEND

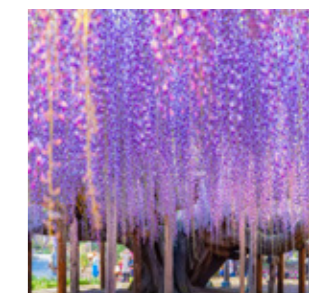
- Koyo
- Sakura
- Wisteria



Maple and Ginkgo



Sakura

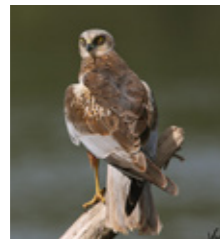


Wisteria

BIRD SURVEY IN NAGOYA

Natural diversity and dedicated conservation efforts make Japan a haven for endemic species and migrant birds. The City of Nagoya conducts periodic surveys to monitor the condition of the habitat for wild birds within the city. Through research it was found that many Japanese people enjoy birdwatching, and hence it was important to include a service within the greenway to cater to their need. A summary of the results using the data provided by the 'Survey for Wild Birds-Guidebook to Wild Birds Habitats in Nagoya City (March, 2006)' is presented below:

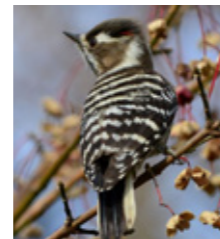
- Many species were observed around the Shonai River estuary and in open green spaces in Shonai Park, Nagoya Castle, and the hilly area in the east.
- Shorebirds and ducks were observed in particularly large numbers in the Shonai River estuary.
- Raptorial birds such as the goshawk and osprey were also observed across a broad area, although being in limited numbers.
- In the 2004 survey, 189 species of wild birds were recorded, with a roughly even split between water bird species and land bird species.



Circus spilonotus



Alauda arvensis



Picoides kizuki



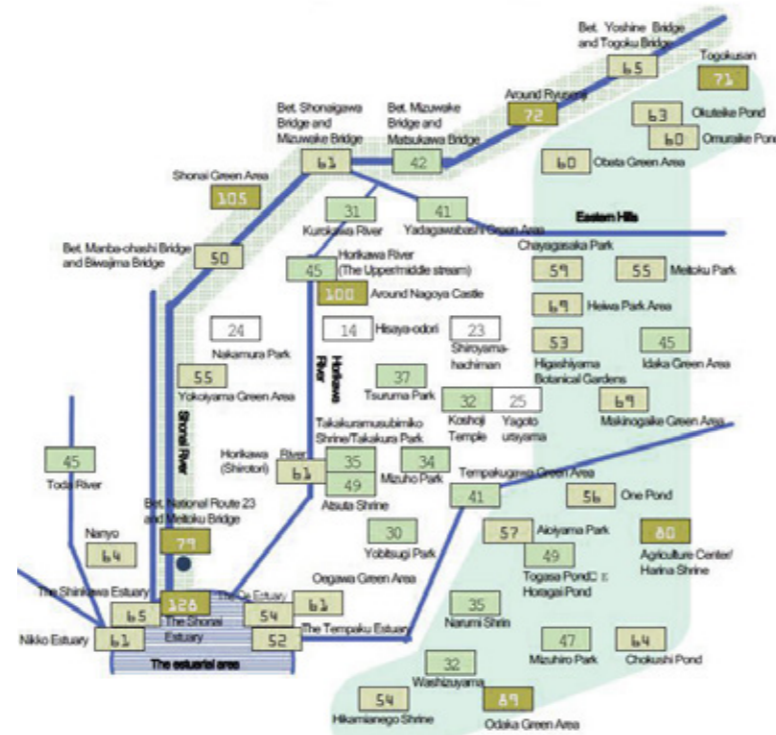
Calidris alpina

DATA INTEGRATED IN THE GREENWAY

An intersection between bird concentration and their proximity to the greenway was elaborated. The following places were selected as possible interesting birdwatching locations:

- The Shonai river estuary;
- The area between national route 25 and the Meitoku bridge;
- The Yokoiyama green area;
- The area between Manba-ohashi and Biwajima bridge;
- The Shonai green area;
- The area between Shonaigawa and Mizuwake bridge;
- The Yadagawabashi green area;
- The Heiwa park;
- The Higashiyama botanical gardens;
- The Tenpakugawa green area;
- The Tenpaku estuary.

For each location, one Tower will be installed, as a means of attracting a wider range of people with a variety of interests to the greenway, strengthening the vibrancy of the community formed.



SPECIES TABLE

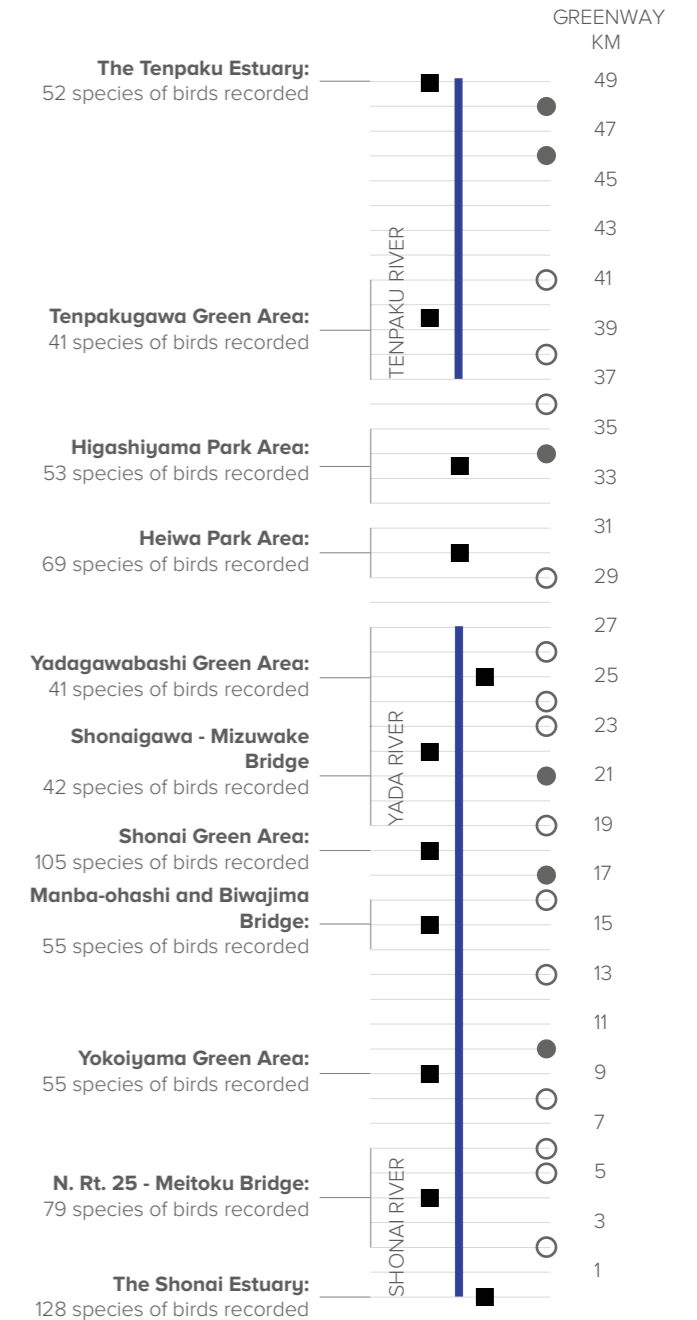
	Shonai River				Other Rivers	
	The Shonai Estuary	N. Rt. 25 - Meitoku Bridge	Shonai Green Area	Shonaigawa - Mizuwake Bridge	Yadagawabashi Green Area	Tenpakugawa Green Area
Number of species	128	79	105	61	41	41
Waterfowl	75	46	37	28	13	19
Landbirds	53	33	68	33	28	22
Birds in the estuarial area						
Dunlin (<i>Calidris alpina</i>)	○	●				
Red-necked Stint (<i>Calidris ruficollis</i>)	▲	●				
Grey plover (<i>Pluvialis squatarola</i>)	▲					
Little Tern (<i>Sterna albifrons</i>)	▲	●				
Greater Scaup (<i>Aythya marila</i>)	○	▲				
Birds in rivers and ponds						
Black-headed Gull (<i>Larus ridibundus</i>)	▲	●	▲	▲	▲	▲
Great Cormorant (<i>Phalacrocorax carbo</i>)	○	▲	▲	▲	●	●
Spotbill (<i>Anas poecilorhynchos</i>)	▲	▲	●	▲	●	●
Northern Pintail (<i>Anas acuta</i>)	○	▲	●	▲	●	
Black-crowned Night Heron (<i>Nycticorax nycticorax</i>)	●	▲	▲	●		●
Grey Heron (<i>Ardea cinerea</i>)	●	●	●	●		●
White Wagtail (<i>Motacilla alba lugens</i>)	●	●	●	●		●
Birds in grasslands						
Grey-headed Lapwing (<i>Vanellus cinereus</i>)	▲	●	●	●		
Great Reed Warbler (<i>Acrocephalus arundinaceus</i>)	●	▲		●		
Skylark (<i>Alauda arvensis</i>)	●	●	●	●		●
Common Pheasant (<i>Phasianus colchicus</i>)		●	●	●		
Birds in the urban area						
Tree Sparrow (<i>Passer montanus</i>)	▲	▲	▲	▲	▲	▲
Brown-eared Bulbul (<i>Hypsipetes amaurus</i>)	▲	●	▲	●	●	●
White-cheeked Starling (<i>Sturnus cinereus</i>)	▲	▲	▲	▲	▲	▲
Oriental Turtle Dove (<i>Streptopelia orientalis</i>)	●	●	▲	●	●	●
Carion Crow (<i>Corvus corone</i>)	▲	▲	▲	●	●	●
Other birds						
Long-tailed Tit (<i>Aegithalos caudatus</i>)					●	
Japanese Pygmy Woodpecker (<i>Picoides kizuki</i>)				●		
Meadow Bunting (<i>Emberiza cioides</i>)				●	●	
Japanese Bush Warbler (<i>Cettia diphone</i>)				●		
Bull-headed Shrike (<i>Lanius bucephalus</i>)	●	●	●			●
Raptors						
Goshawk (<i>Accipiter gentilis</i>)	★	★	★			★
Osprey (<i>Pandion haliaetus</i>)	★	★	★			★
Grey-faced Buzzard (<i>Butastur indicus</i>)	▲	★				
Eastern Marsh Harrier (<i>Circus spilonotus</i>)	▲	★				

Source: Agricultural Technology Division Greenification & Public Works Bureau, City of Nagoya : Survey for Wild Birds-Guidebook to Wild Birds Habitats in Nagoya City(March, 2006)

LEGEND FOR NUMBER OF BIRDS OBSERVED

- 501 or more
- ▲ 51 - 500
- 4 - 50
- ★ 1 - 3

BIRDWATCHING TOWERS



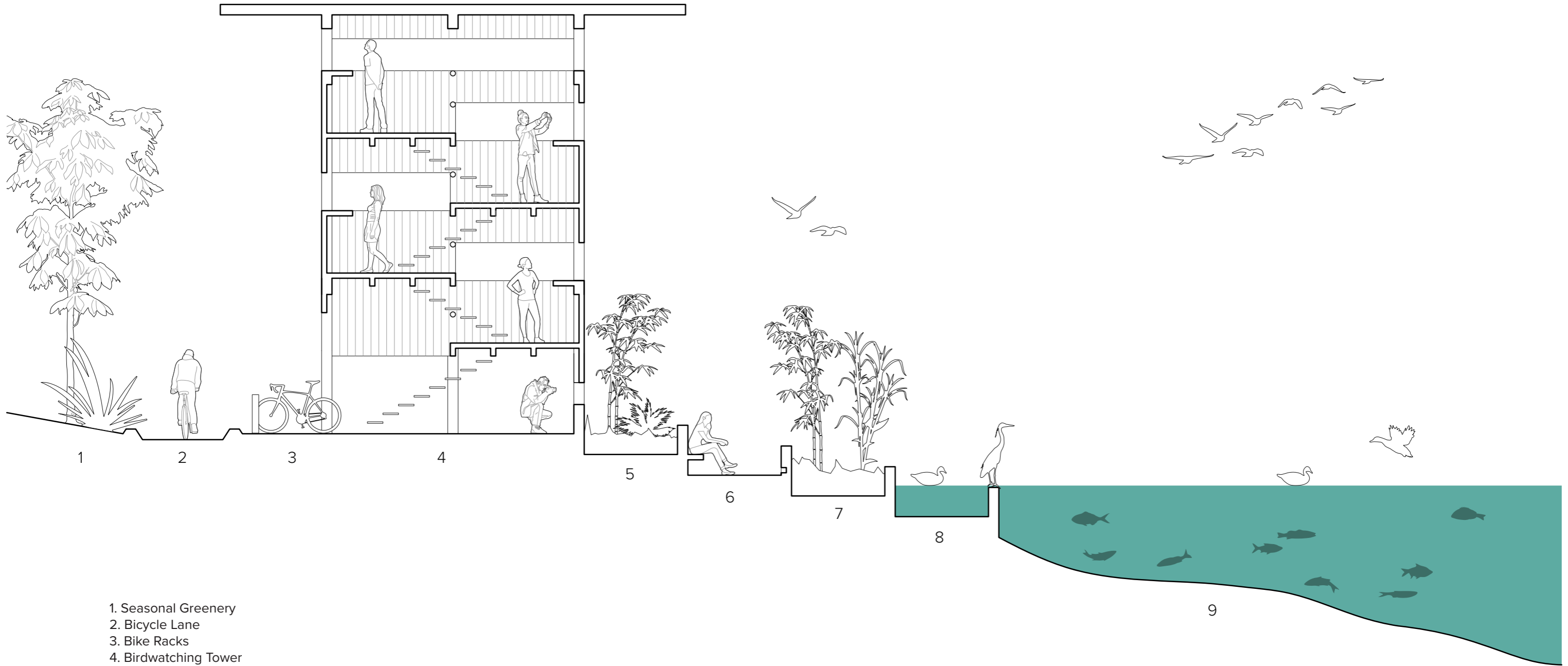
LEGEND

- Vein access point
- Artery access point
- Rivers
- Birdwatching tower

Birdwatching Tower Section

Spaces Crafted for Leisure Activities

0 2.5 5 m



1. Seasonal Greenery
2. Bicycle Lane
3. Bike Racks
4. Birdwatching Tower
5. Restored Ecosystem 1
6. Seating Area
7. Restored Ecosystem 2
8. Water Ecosystem Area for Aquatic Birds
9. River (Shonai / Yada / Tenpaku)

Birdwatching Tower View

Spaces Crafted for Leisure Activities



Km 9 - Tokoiyama Green Area

55 species of birds recorded

PAVILION ESTABLISHMENT

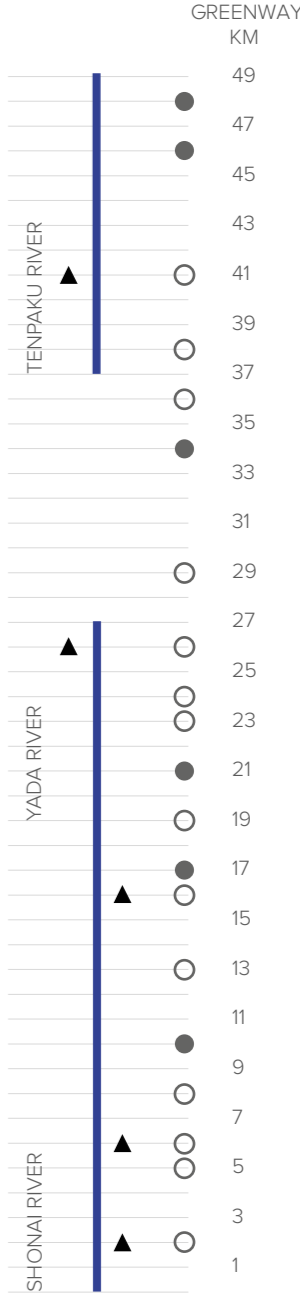


To consolidate the leisurely services offered throughout the Greenway, it was important to give various spaces where people can let their imaginations run wild; this brings to the introduction of pavilions on the river banks. The concept behind these was to create very minimal, open-planned structures which would allow for a large variety of activities to take place within them. These can range from private events, parties, and festive occasions to art exhibitions and cultural events, and finally scholastic and didactic presentations or experiments. The wish behind making this addition to the greenway was led by desire to strengthen private relationships between people and the water bodies. By allowing for these various activities to take place, locals and tourists can create their own personal narrative and memories in these spaces. Furthermore, the revenue from renting out the pavilions can generate funds that will go to the improvement of the riverside conditions; this is seen as a continuous tool that will ensure the wellbeing and upkeep of the rivers and the Greenway.

PAVILION TYPOLOGIES

	Age Range					
	0-10	11-20	21-30	31-40	41-50	50+
Art Exhibition (Aichi Triennale, Art Schools shows, Freelancers Exhibition)	✓	✓	✓	✓	✓	✓
Work Conference (Private companies and NPO / NGOs presentation room)	✗	✗	✓	✓	✓	✓
Private Event (Birthdays celebration, wedding venue, etc...)	✓	✓	✓	✓	✓	✓
Educational Presentation (Presentations for environmental awareness)	✓	✓	✓	✓	✓	✓
School Trip/Presentation (Final year shows and gathering point)	✓	✓	✗	✗	✗	✗
Workshops (Pottery, painting, calligraphy classes, etc...)	✓	✓	✓	✓	✓	✓
Public Event (Celebration of traditional festivals, for ex Golden Week)	✓	✓	✓	✓	✓	✓
Performance Space (Dance, martial arts, yoga, etc...)	✓	✓	✓	✓	✓	✓
Music Hall (Live concerts for a small audience)	✓	✓	✓	✓	✓	✓
Research Base (River Examination / Management and wildlife monitoring)	✗	✗	✓	✓	✓	✓

PAVILION LOCATIONS

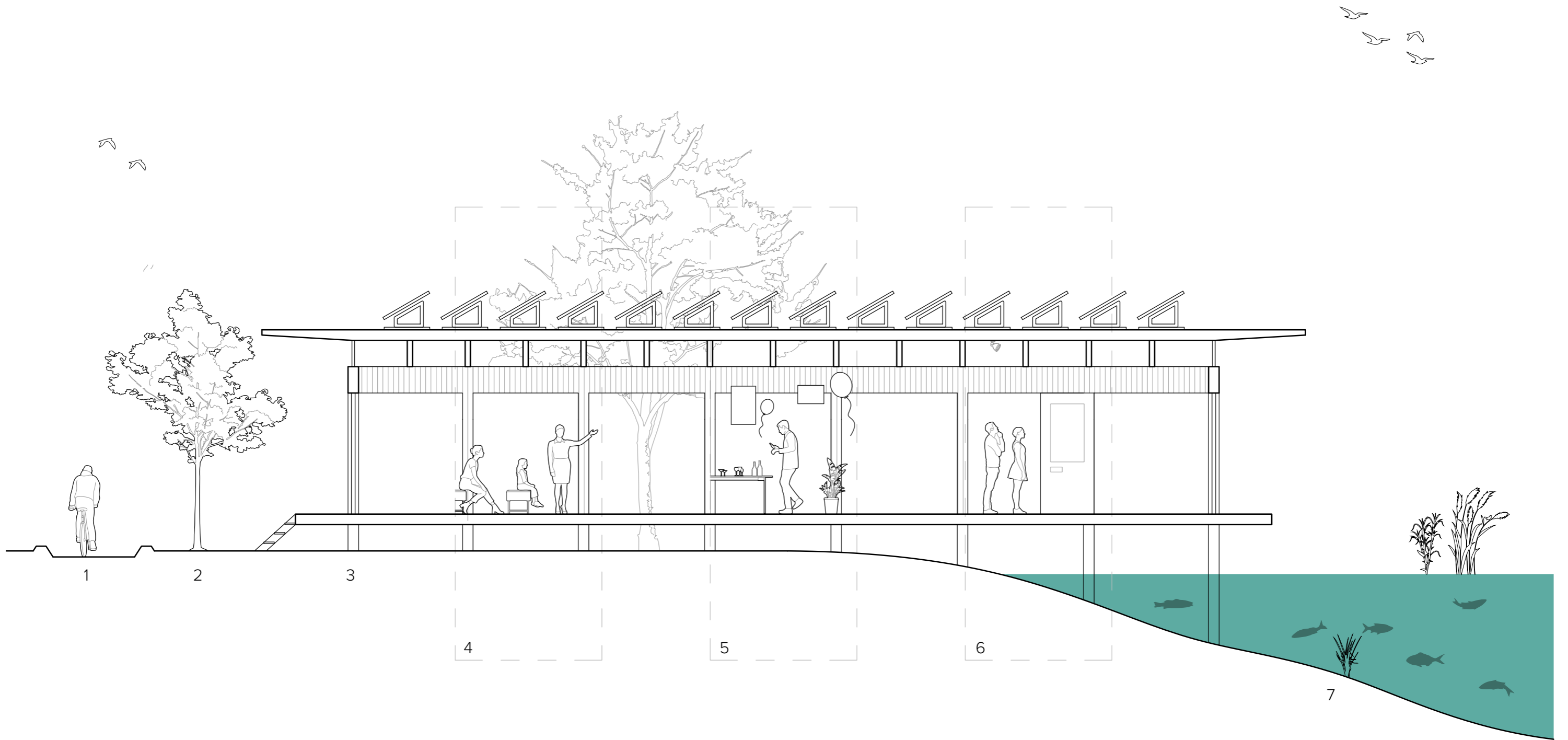


LEGEND FOR ACTIVITY INCLUSIVENESS

- ✓ Included
- ✗ Excluded

LEGEND

- Vein access point
- Artery access point
- Rivers
- ▲ Pavillion



- 1. Bicycle Lane
- 2. Seasonal Greenery
- 3. Pavilion Entrance
- 4. Conference Example
- 5. Party / Event Example
- 6. Art / Museum Space Example
- 7. River (Shonai / Yada / Tenpaku)

Pavilion View

Spaces Crafted For Leisure Activities



Offering a Multi-Use Space

4 Locations around the Greenway

NODE ONE

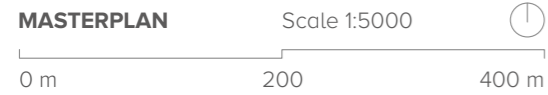
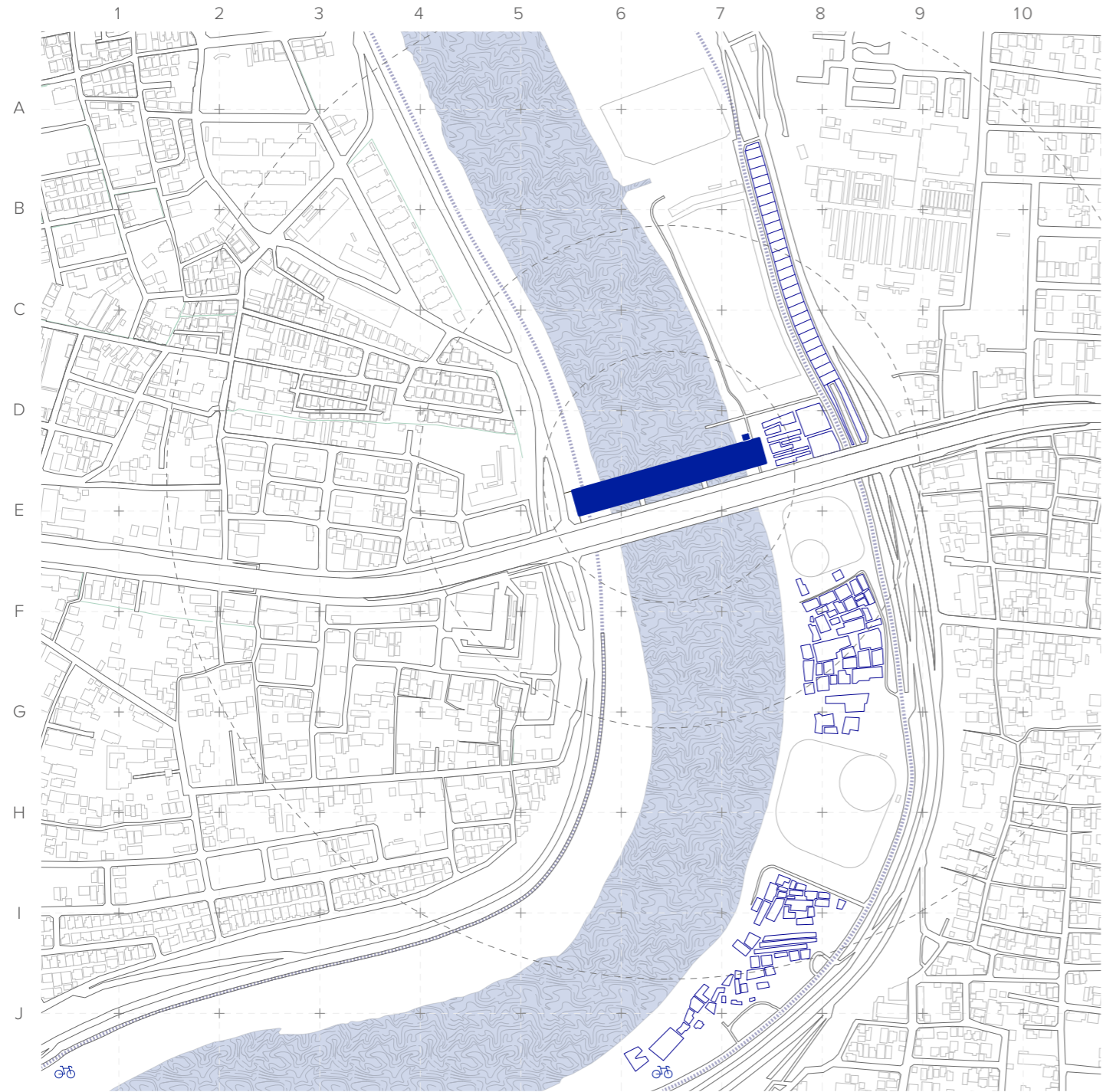
Km 10 Agricultural Market

Location: Shonai River

Function: Public Market

Masterplan Of Market

Km 10



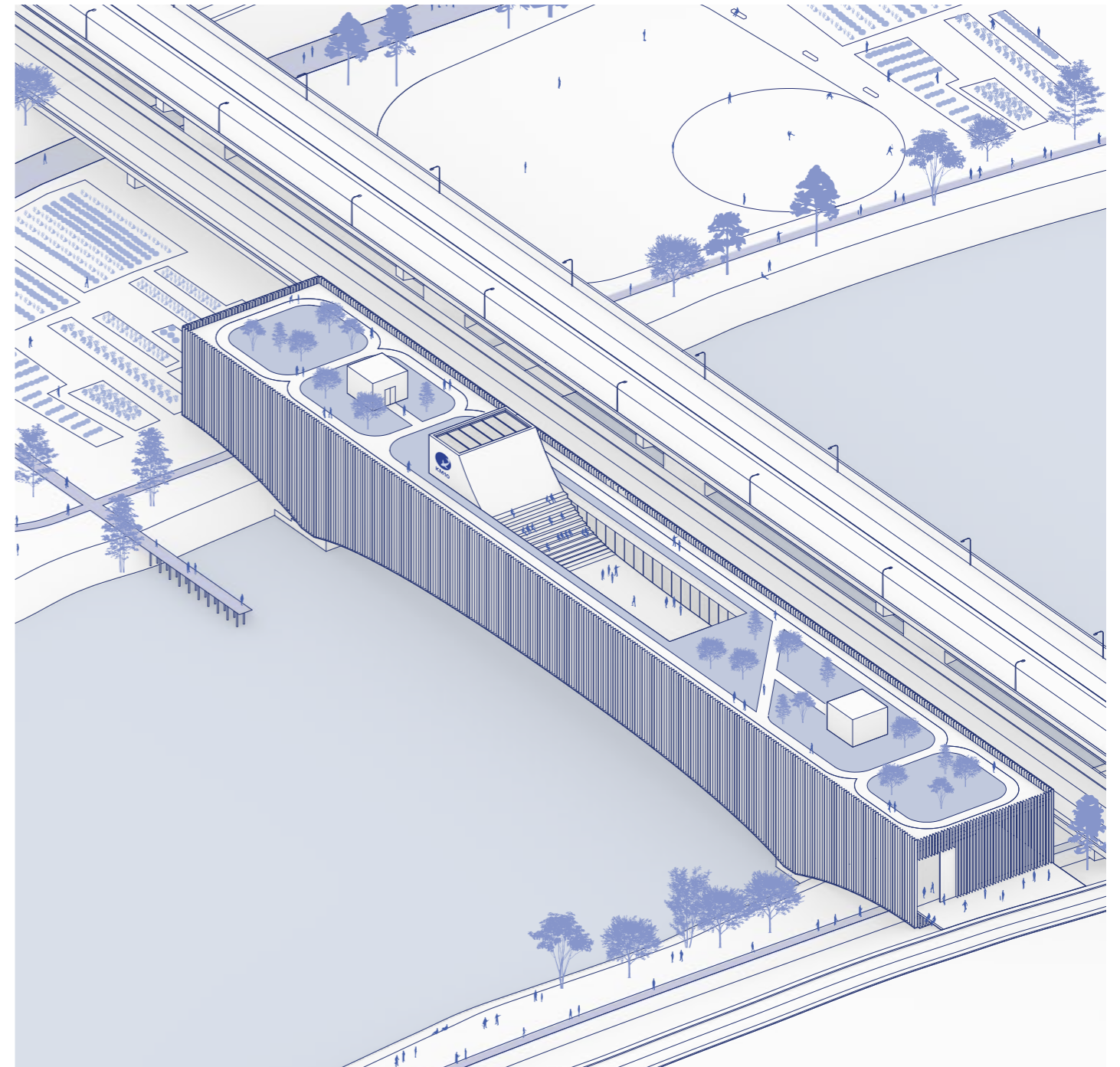
■ Proposed KM 10 Market
 □ Agricultural fields

The first node occurs on the Western part of Nagoya, at Km 10 on the Greenway. Dictating the function for this node came from the nearby agricultural fields already present in the area. To strengthen this feeling of agrarian culture, the first node would consist of an Agricultural Market, which at the moment is not found in Nagoya. Serving as both a touristic attraction and to provide fresh produce to the surrounding areas, the market will have the possibility of

becoming a new meeting point within the city. The intervention consists of a large rectangular structure placed to connect the two edges of the river; in this manner it creates a direct passage, as well as offering a thriving and lively market space to be used by residents and visitors alike. The structure was maintained quite simple and will make use of recycled materials to ensure a more ecofriendly design approach.

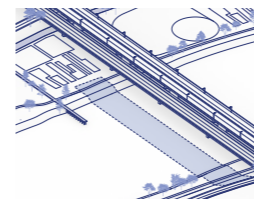
Isometric Studies

Form Finding

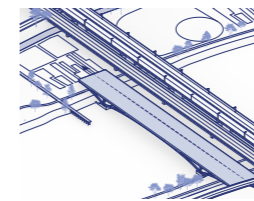


Final View

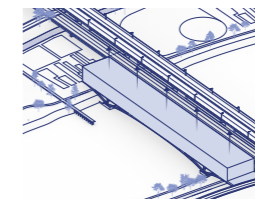
South East Perspective Iso



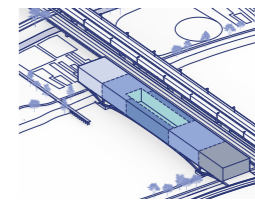
Site Selection



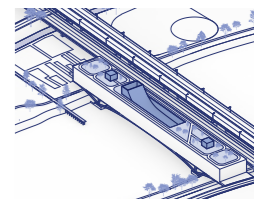
Bridge Formation



Extrusion

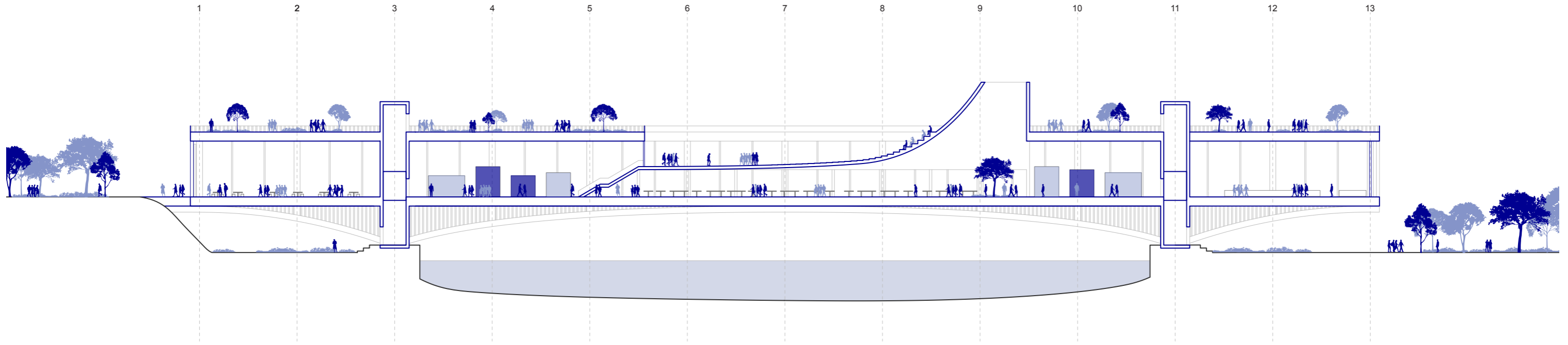


Function Distribution

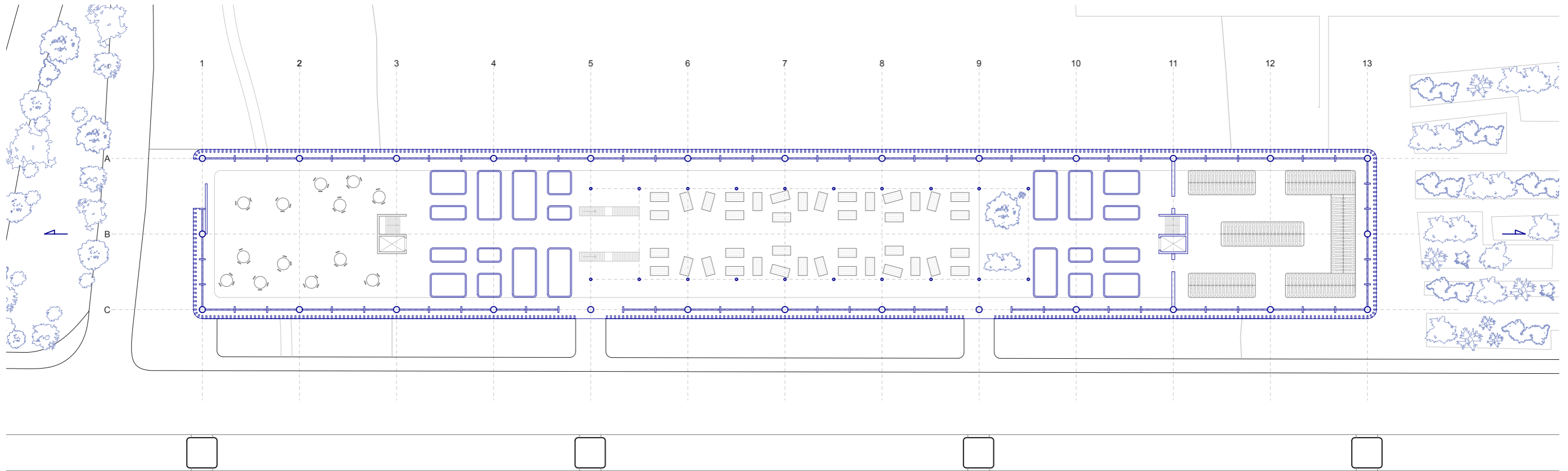


Roof Formation

Orthographics



Section / Elevation
1:500



Ground Floor Plan
1:500

Km 10 Market

Fostering Connections



View Walking on the Riverside
North East

2400 sqm of roof garden added

NODE THREE

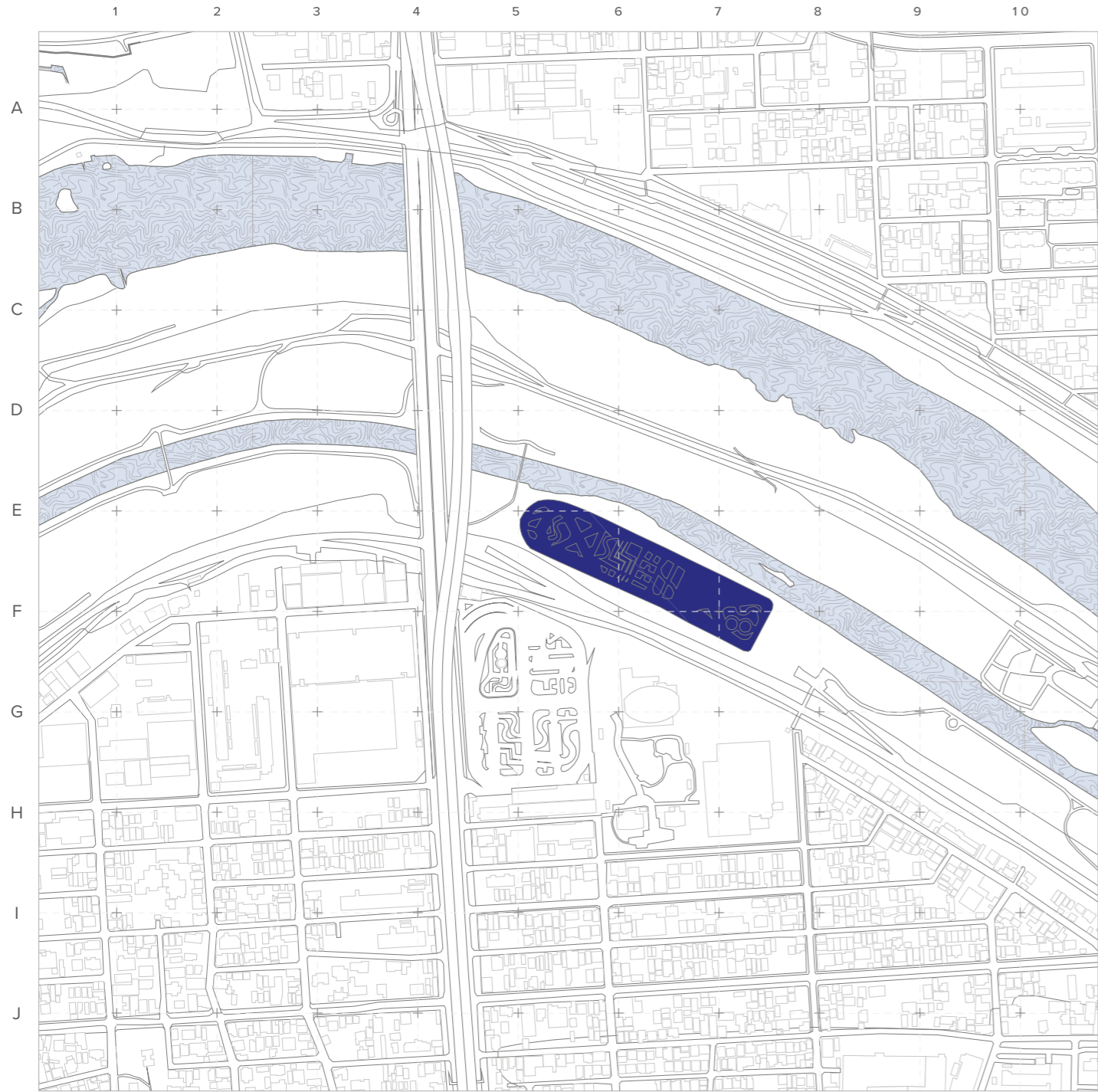
Civic Education Center

Location: Yada River

Function: Park and Civic Education School

Masterplan Of Market

Km 10



MASTERPLAN Scale 1:5000
 0 m 200 400 m

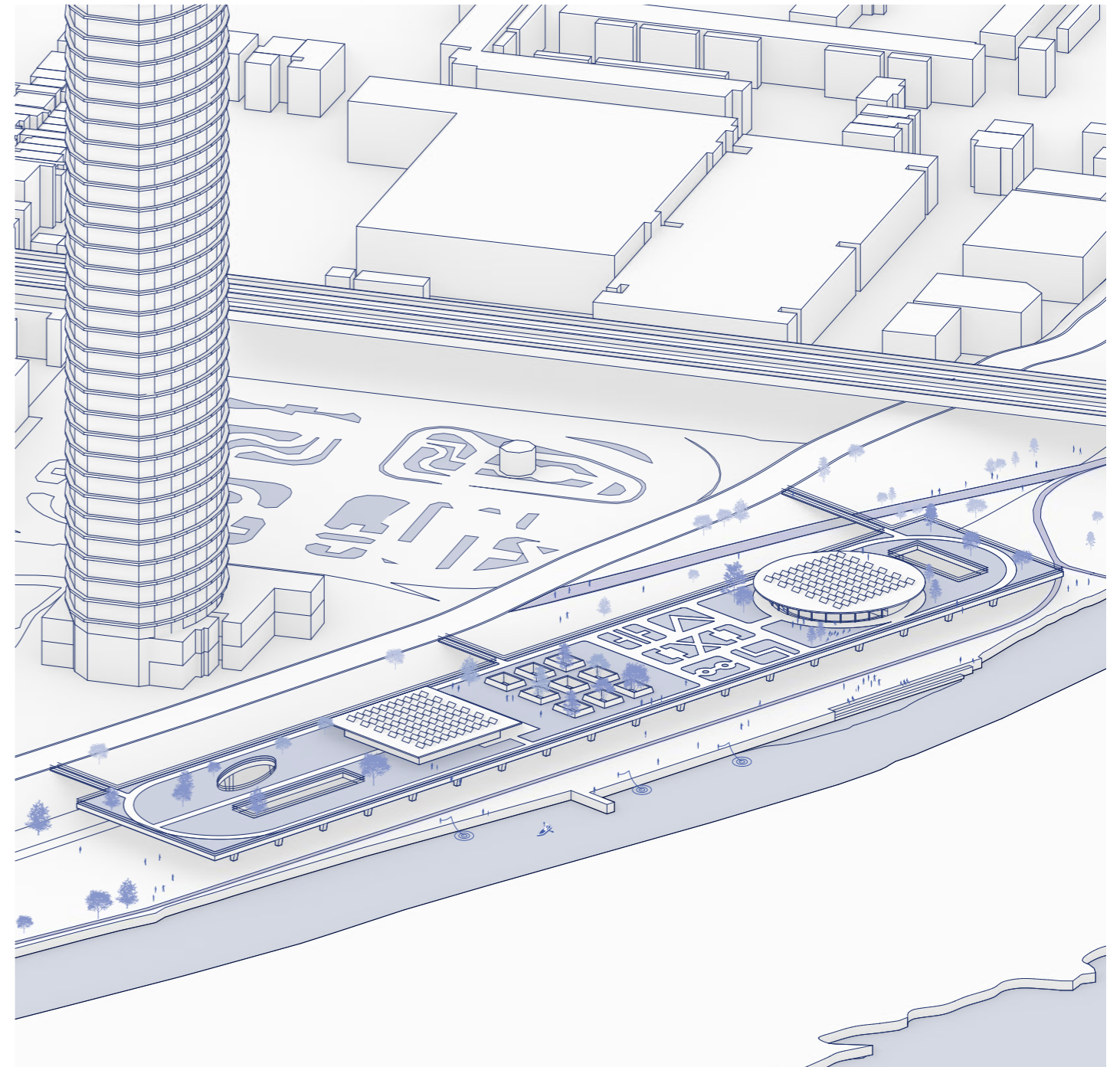
■ Proposed Floating Park

At the 21st Km of the Greenway, there is currently a civic education and driving school ground, which creates hard landscaping as the natural greenery was paved over to create a more fluid terrain for driving. To counteract this change in scenery, the node in this northern part of the

city will consist of a green "suspended" park and bicycle school. Skylight voids were placed throughout the greenery to create a connection between the underlying driving school and the added function above.

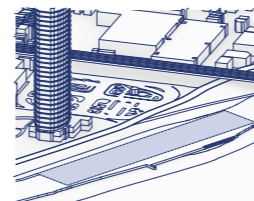
Isometric Studies

Form Finding

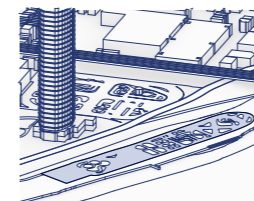


Final View

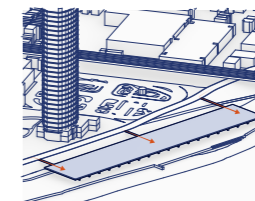
North East Perspective Iso



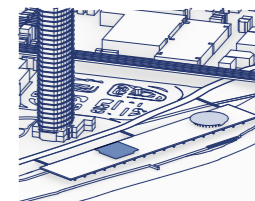
Site Selection



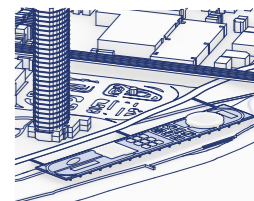
Preservation of Driving School



Elevated Platform

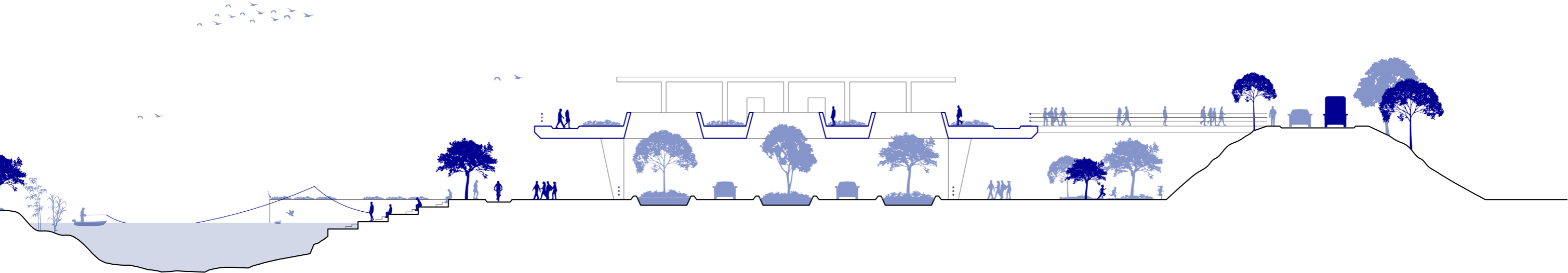


Function Distribution

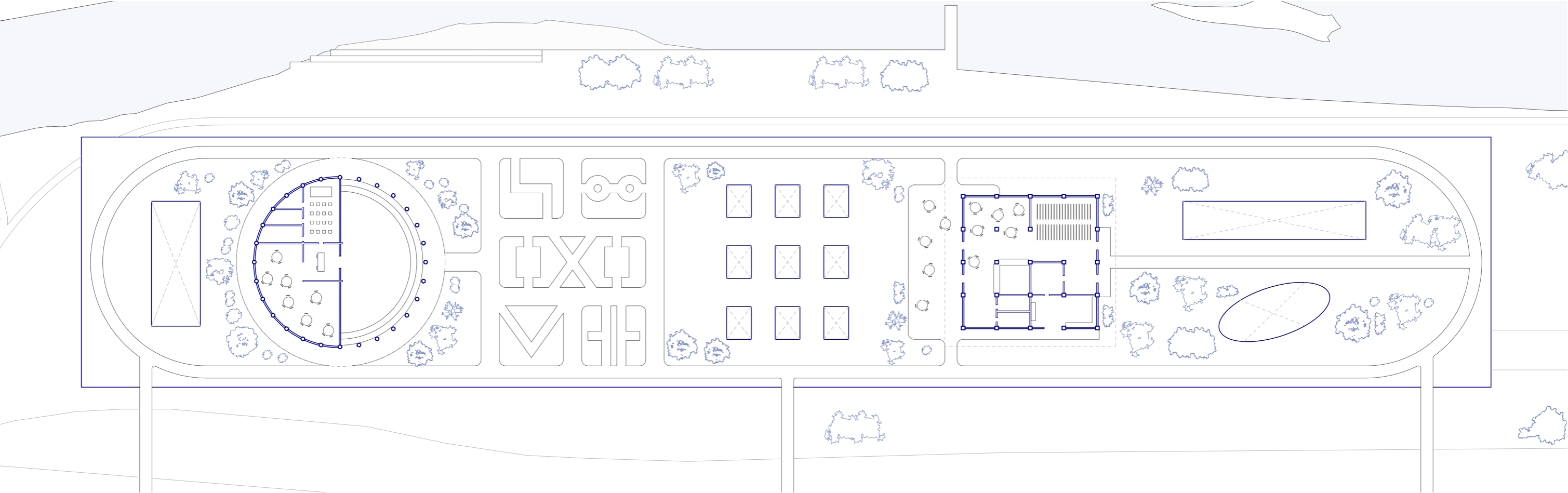


Skylights and Greenery

Orthographics



Section / Elevation
1:500



Ground Floor Plan
1:500

Km 21 Civic Education Center

Fostering Change



View Towards Biking School
East

4668 sqm of roof garden added
240 sqm of solar panels
288,000 watts produced per day

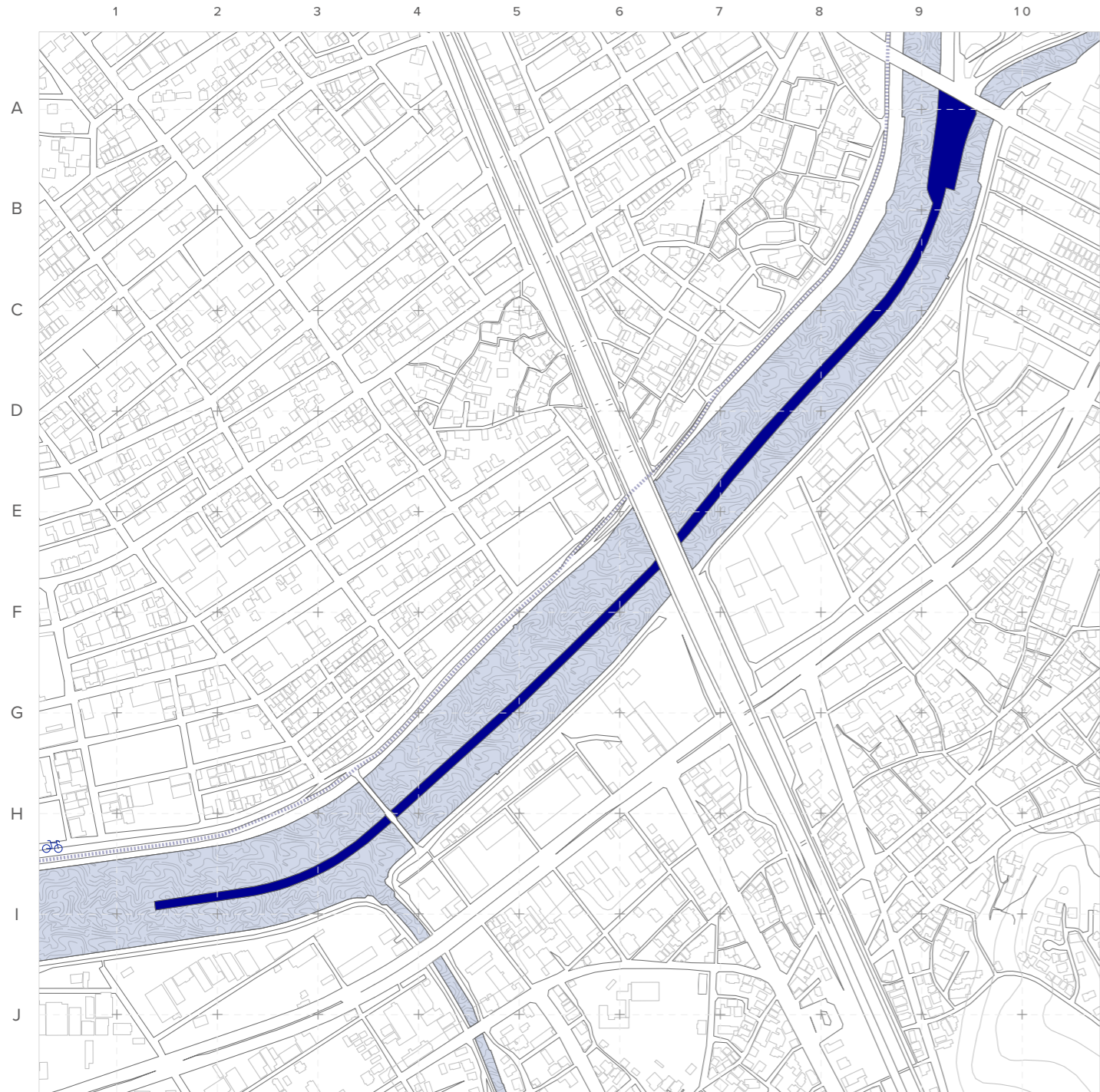
NODE FIVE

Floating Garden

Location: Tenpaku River

Function: Park and Leisure Facility

Masterplan Of Floating Island



MASTERPLAN Scale 1:5000
 0 m 200 400 m

■ Proposed Floating Park

At the 46th Km of the Greenway there is a more barren and concrete-based scenery; this area is part of the final stretch towards the port and hence there is a lot of machinery around. However, while conducting site visits it was noted that there is a pier-like concrete island within the riv-

er, which is currently unused. The idea for this node would be to enhance the quality of this island by making it into a floating park, with renewed greenery, cafes, and leisurely services for visitors.

Isometric Studies

Form Finding



Final View

South East Perspective Iso



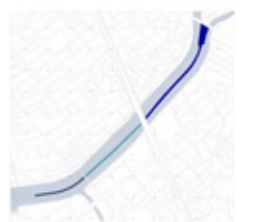
Site Selection



Extending Public Realm

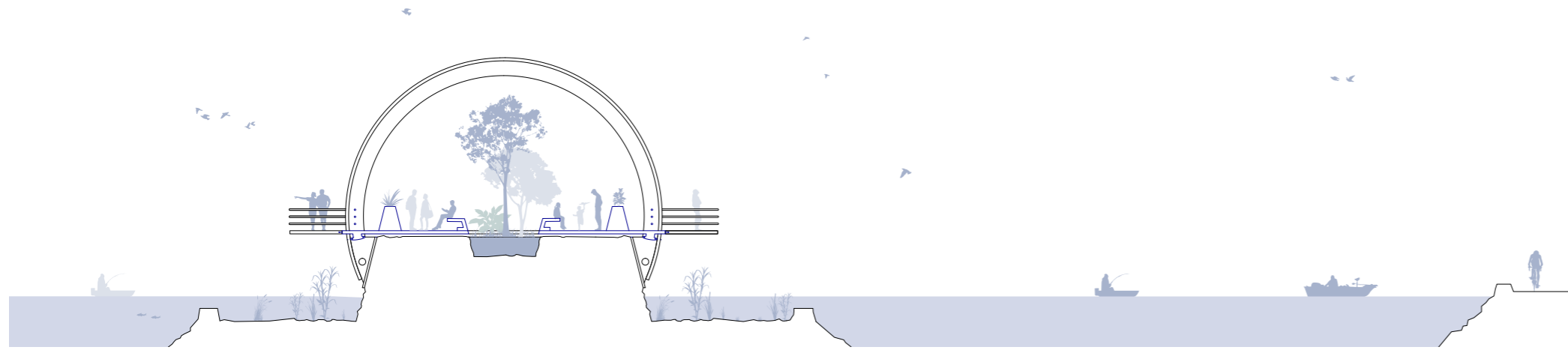


Improving Accessibility

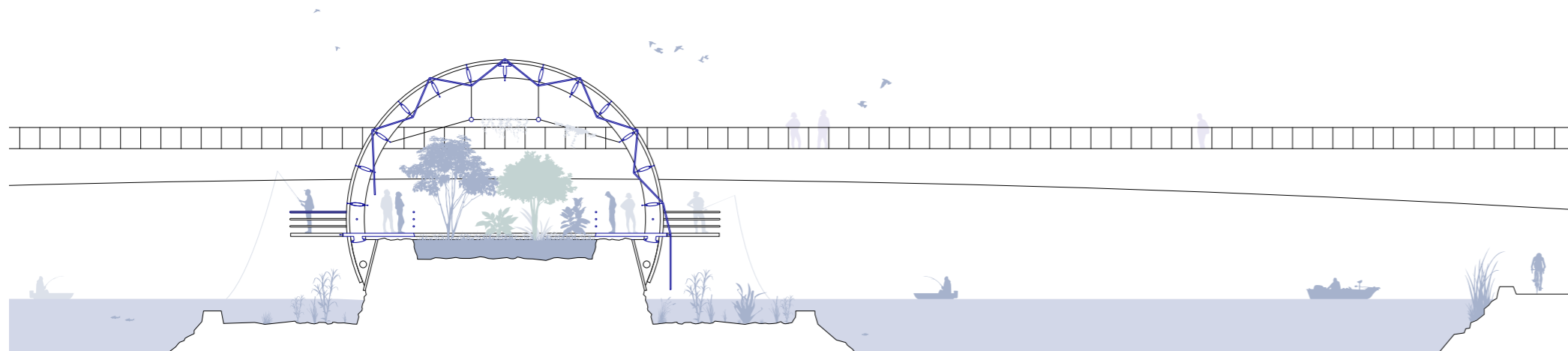


Function Distribution

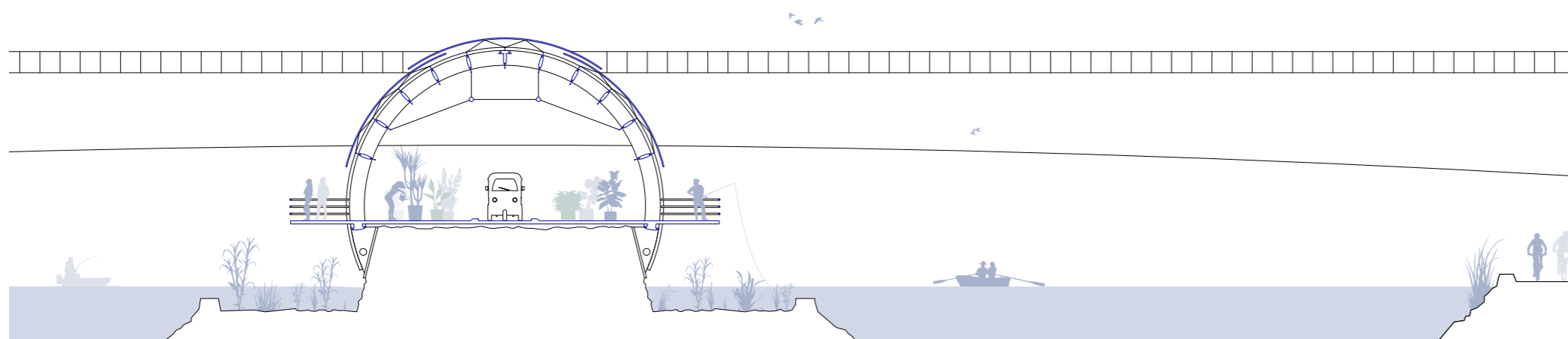
Orthographics



Pier Short Section
1:100



Floating Park Short Section
1:100



Plant Nursery Short Section
1:100



- Japanese Tree Lilac (*Syringa Reticulata*)
- Japanese Zelkova (*Zelkova Serrata*)
- Japanese Maple (*Acer Palmatum*)
- Azalea
- Japanese Boxwood (*Buxus Microphylla*)

- Tsubaki (*Camellia Japonica*)
- Yamamomo/Wax Myrtle (*Myrica Rubra*)
- Japanese Larch (*Larix Kaempferi*)
- Asunaro (*Thujopsis Dolabrata*)
- Japanese Wisteria (*Wisteria Floribunda*)
- Hosta
- Hydrangea (*Hydrangea*)

- Yew Pine (*Podocarpus Macrophylla*)
- Hinoki (*Chamaecyparis Obtusa*)
- Azalea (*Rhododendron*)
- Camellia (*Camellia Japonica*)
- Iris (*Iris*)
- Japanese Maple Bonsai

Km 46 Floating Park

Nature in the City

5145 sqm of greenery added



Pier Area



Floating Park



Plant Nursery

NODE SIX

Science Lab

Location: Tenpaku River

Function: Experimental Lab and Learning Center

Masterplan Of Floating Island



A main focus throughout the Greenway project is to ensure that the rivers become cleaner, safer, and have the ability to host a variety of ecosystems. To ensure this, it is important to establish a Science Lab where researchers have the necessary equipment and space to conduct labs, experi-

ments, and tests on the rivers and surrounding land. The lab node will be situated at Km 48 and will be open to the public at the ground floor, allowing for interaction and discourse about the natural habitat of the rivers.

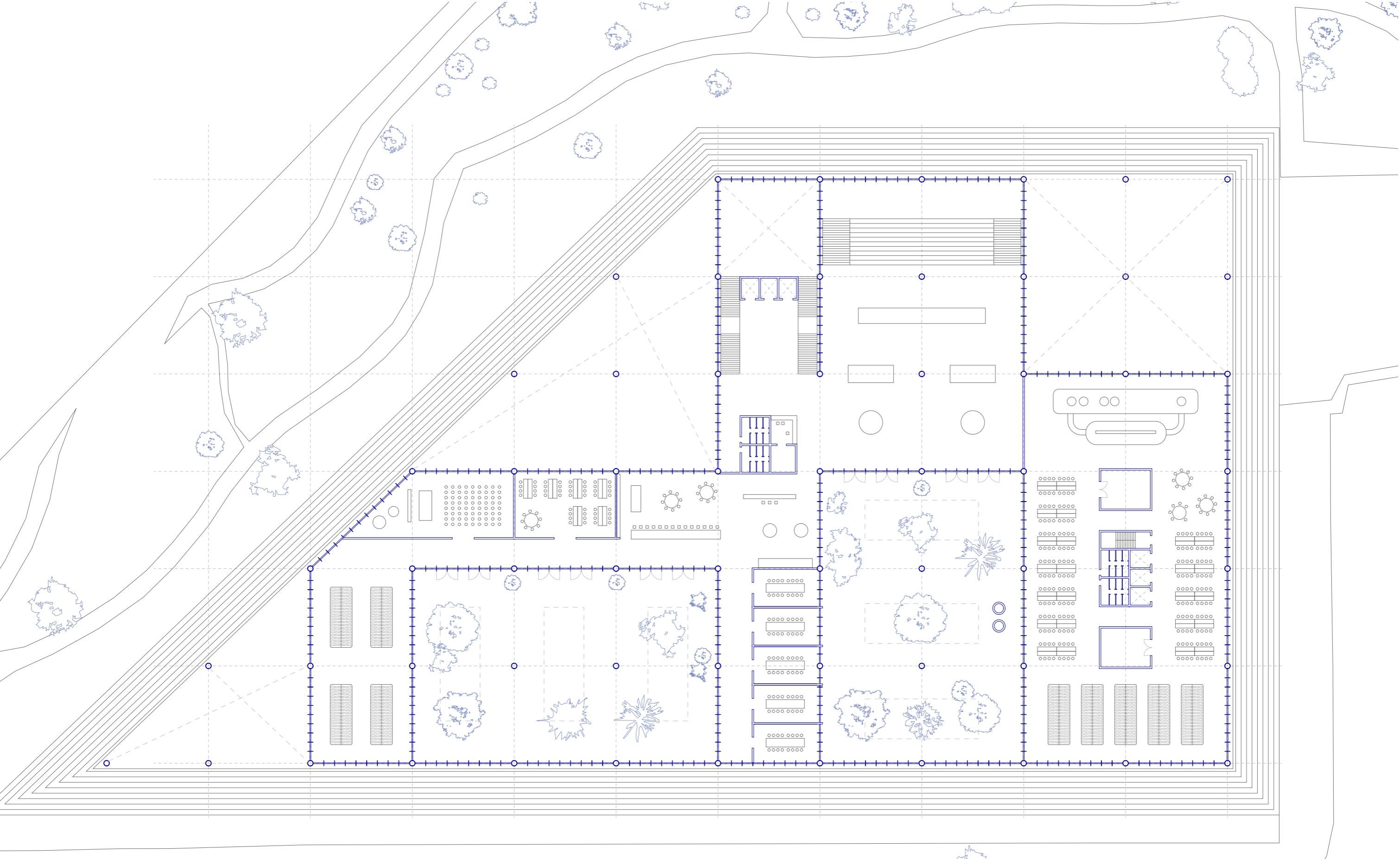
Isometric Studies

Form Finding

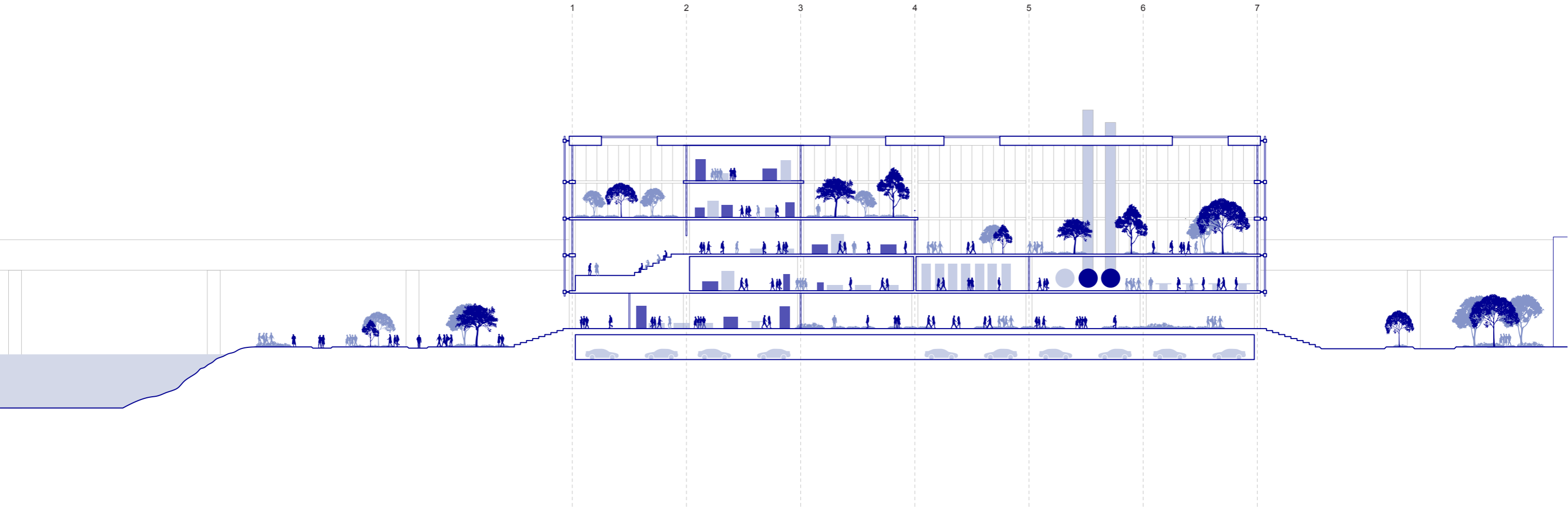


Final View

South East Perspective Iso

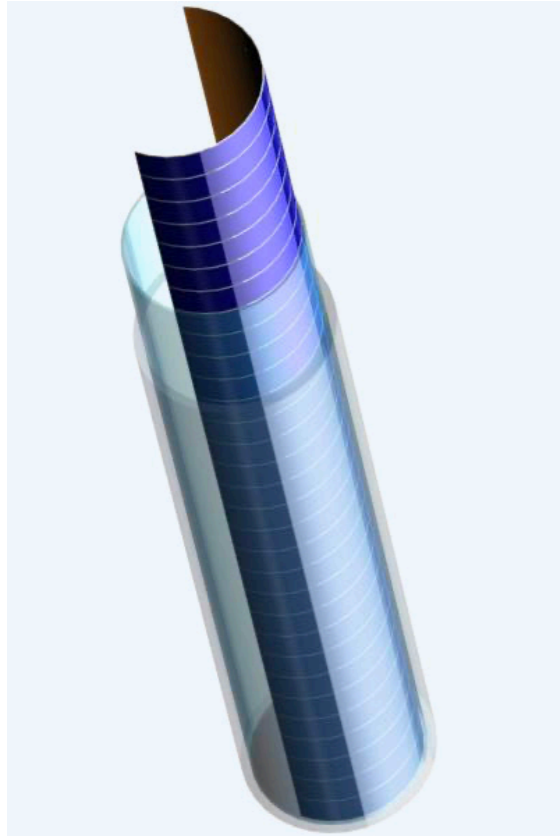


Ground Floor Plan
1:500



Section
1:500

Technologies Used



1. Tube shaped Solar Panels

2. Panels on a roof

3. Micro algae in tubes

4. Algae Close up

Km 48 Science Lab

Fostering Technology and Sustainability



View Walking on the Riverside
North West

6917 sqm of roof garden added
524 sqm of solar panels
628,800 watts produced per day
4780 of bio facade



Image : Volunteers picking up trash

GOAL 6 COMMUNITY INVOLVEMENT

Cultivate opportunities for constant and effective community engagement, networking, and educational involvement.

Communities are at the center of reform and regenerative growth. Thanks to help and implementations of ideas of locals it is possible to render a connectivity aspect to projects that relates closely to the place they reside in. The rivers have a lasting connection to the region's history, ecology, and culture, making them a venue and tool for engagement and education. Currently, some communities residing within one kilometer on each side of the river seem to be involved in minor ways; increasing the engagement levels and bringing in more people to help develop the rivers into a more useful and enjoyable resource will serve as a quick way of strengthening the community feel in the area. Including facts about the river and ecosystems throughout the trails will help serve as an educational resource; furthermore, the involvement of adjacent schools will create a symbiotic learning and growth aspect between the rivers and school children.

ACTIONS

A. Establish spaces for people of varying ages to learn about the ecological, cultural and natural history of the rivers and the areas around them.

B. Provide spaces for interaction and communication about ways in which the riverbeds could improve, and how communities can have a hand in their growth.

C. Promote activities of various effort levels that can engage adjacent communities.

D. Create an interface between the rivers and adjacent schools to promote education, engaging students in minor activities to help the river ecosystems thrive.

POTENTIAL PARTNERS: JRRN, Ministry of Ecology, Ministry of Education

POTENTIAL FUNDING SOURCES: Nagoya Masterplan 2023



ACTIONS

Strengthening the community involvement in the bettering of the riverbeds through various types of activities.

Physical and mental connections between the rivers and the communities around them provide mutual benefits; the rivers can serve as an easy means of commuting through the city, a pleasant leisurely area to go to for relaxation, and a possible aesthetically pleasant view to enjoy. Currently this is not always the situation, but the communities can engage in activities to improve the river condition, seeing how the river can benefit them in their daily life.

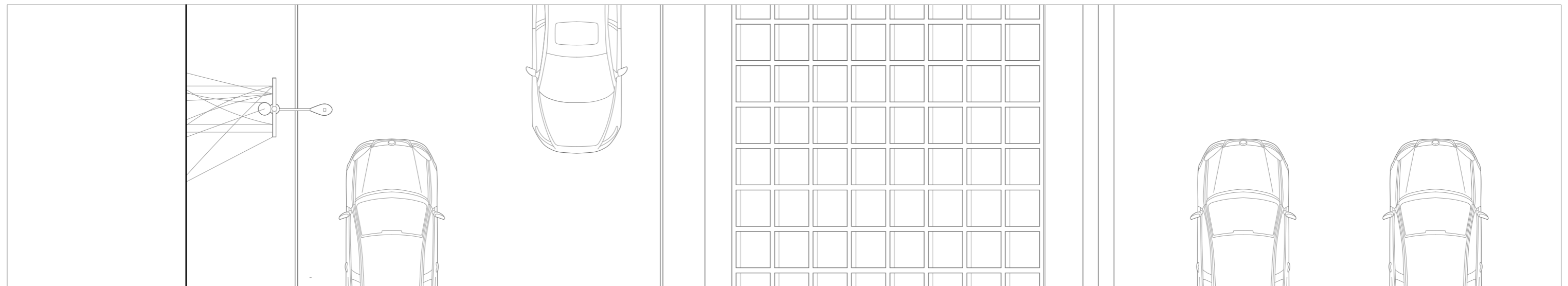
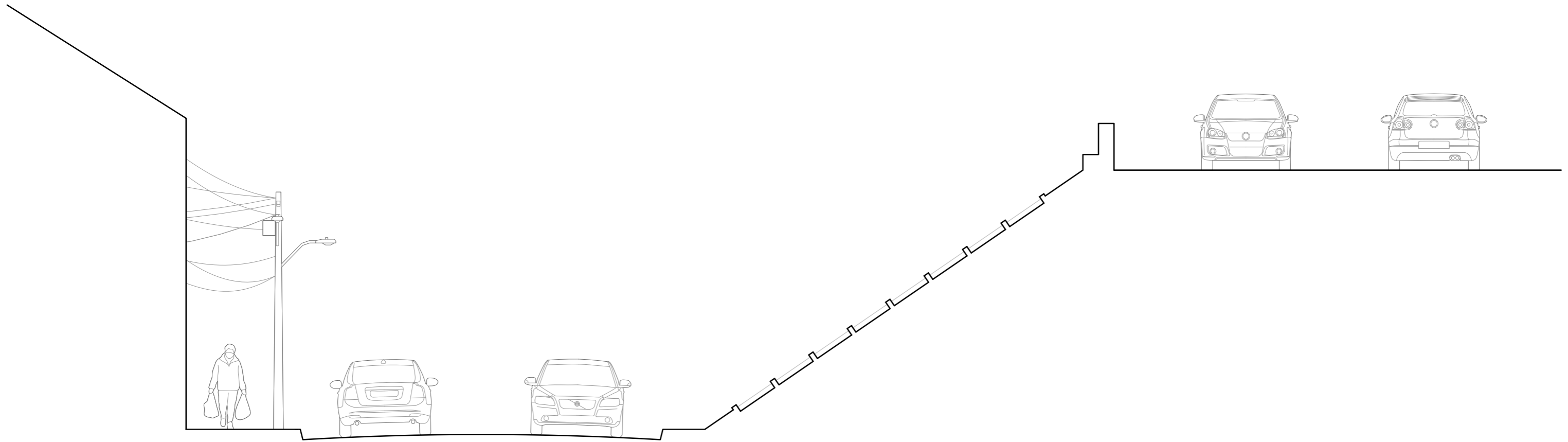
ESTABLISHING A STRONG COMMUNITY NETWORK

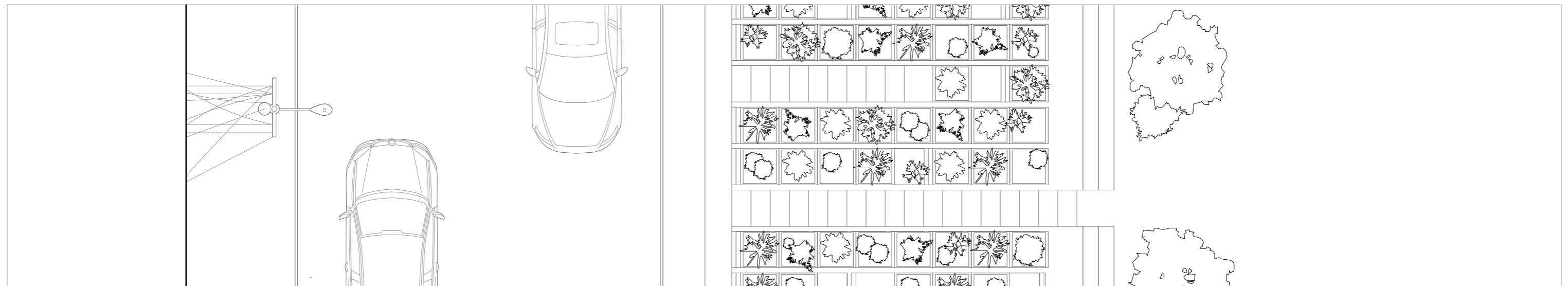
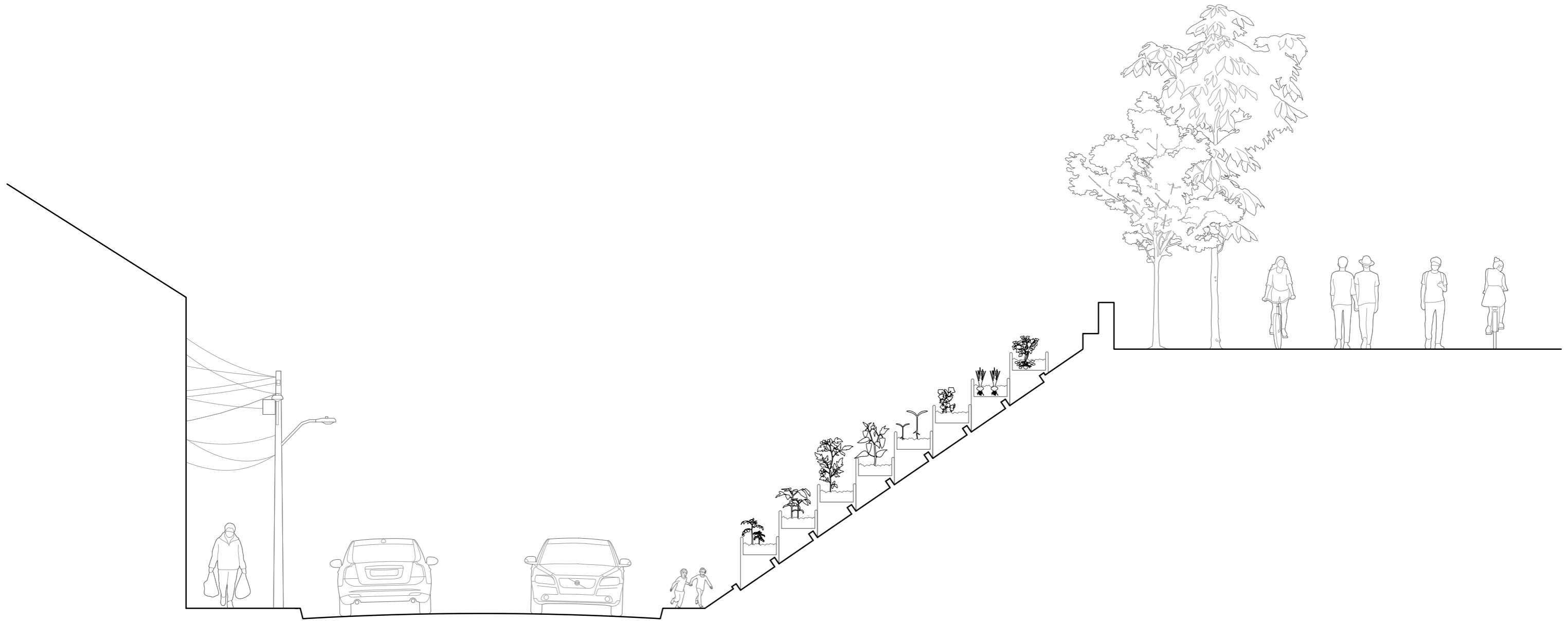
Some community activities can already be seen in areas of the river; there are sparse occurrences of people planting greenery and vegetable gardens on hard surfaces that make up the edges between elevated roads adjacent to the river and the houses beside them. This intervention is often of lower effort, but increases the aesthetic value of the areas next to the river, and hence could be implemented regularly throughout the riverbeds.

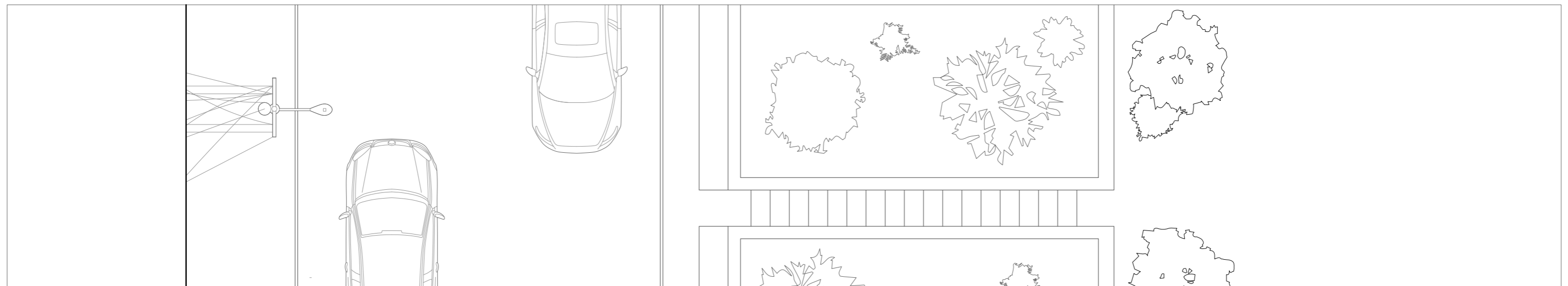
The presence of schools always within a 500m radius of the existing parks analyzed in the greenway system can propose a strong new network of education and regeneration. In accordance with the “Children’s Waterfront Rediscovery Project” coordinated by the Ministry of Education, Culture, Sports, Science, and the Ministry of Environment, it would be important to ensure that a range of activities discussing the importance of park regeneration and ecosystem health will be conducted within the surrounding schools. In the regeneration of the Cheonggyecheon River in Seoul, school children made tiles which would later be used to cover some of the existing concrete walls of the riverbed. Gestures of this manner help create a community aspect within the areas surrounding the rivers, and create a stronger connection between children and the nature around them. Other activities could include the planting of trees, as well as orchards or vegetable gardens that can help strengthen the mental connection between produce, consumption, and the importance of established ecosystems. As the schools range from Elementary to High Schools, activities could be subdivided into categories which are more specific to age groups, as well as offering different difficulty levels in the analysis of grounds, soil, plant typologies, and animals present in the greenway areas.



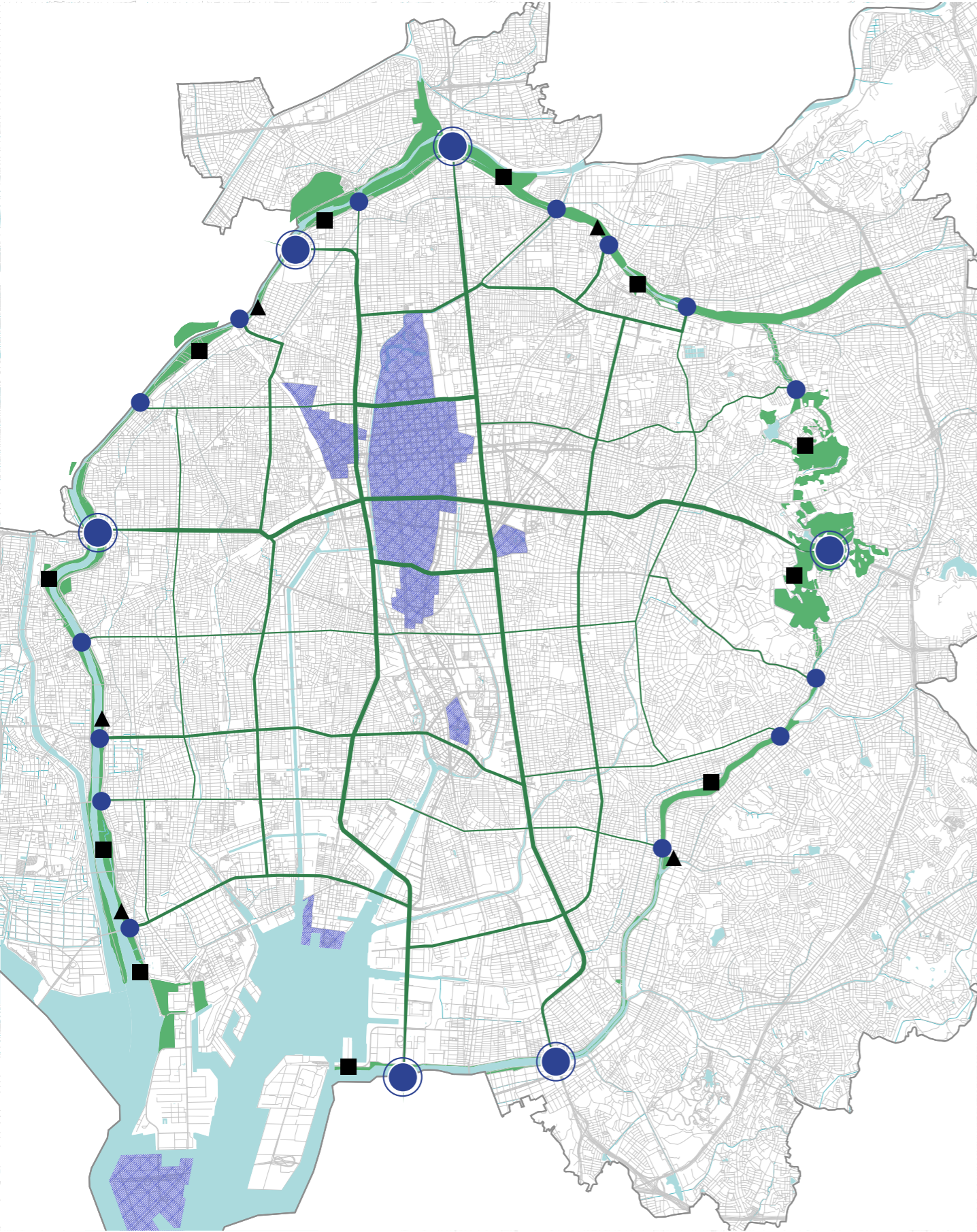
Image 3: Riverside Greenery on the Tenpaku
Own Image







Synthesis Map



- Main Nodes
- Secondary Entrances
- Continuous Greenway
- Routes to Greenway
- Birdwatching Towers
- ▲ Pavilions
- Existing Tourism

Special thanks to:

*Prof. Patrizia Scrugli
Prof. Grazia Concilio
Prof. Nina Funahashi
Prof. Shinichi Takayanagi*

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