PROJECT BOOK

HYBRID HIGHWAY LANDSCAPE

FLOWSCAPES

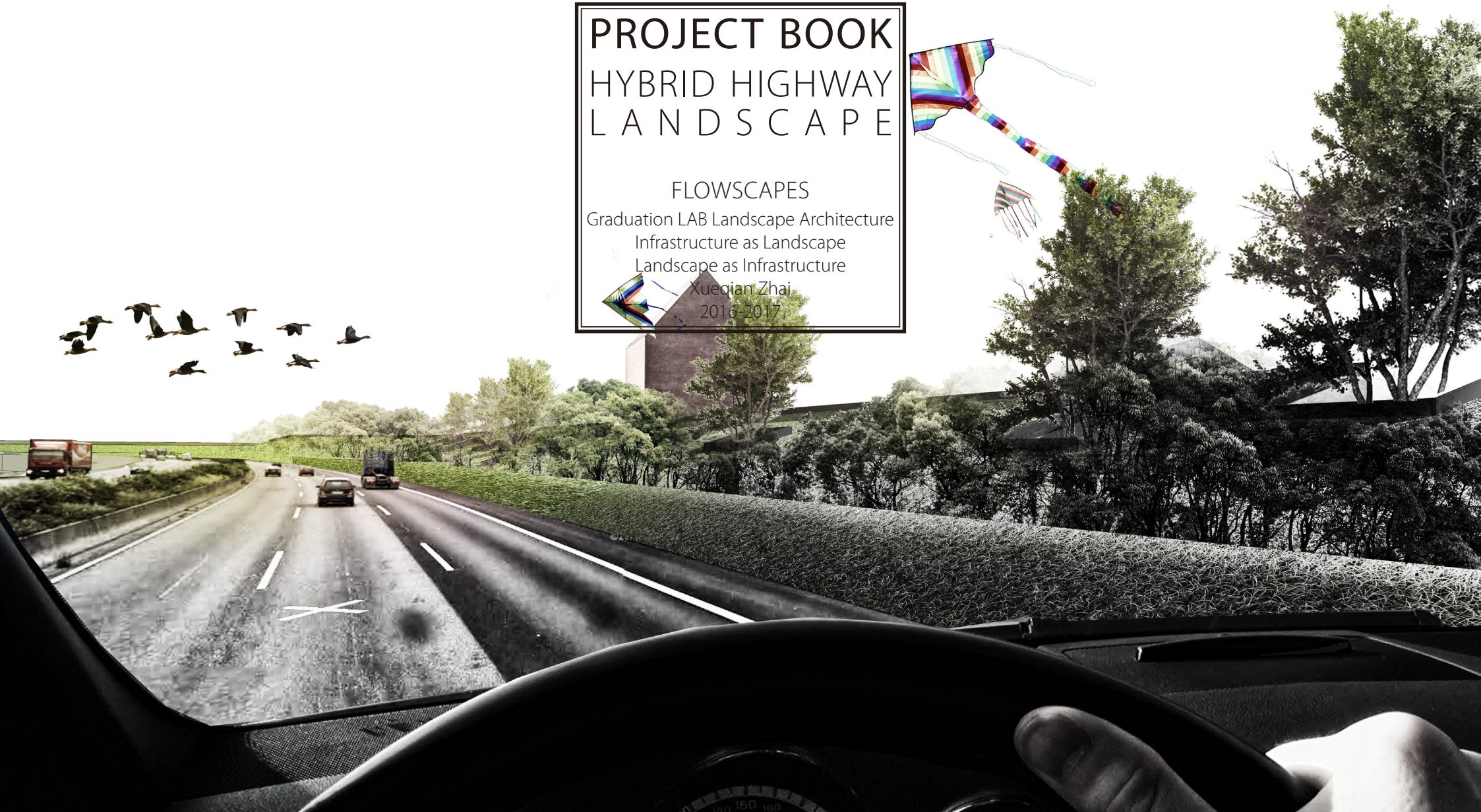
Graduation LAB Landscape Architecture

Infrastructure as Landscape

Landscape as Infrastructure

Xueqian Zhai

2016-2017



HYBRID HIGHWAY LANDSCAPE

HIGHWAY A40 IN DUISBURG, GERMANY

MASTER REPORT

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CONTENT

1 INTRODUCTION

1.1 FASCINATION

One year ago, at the starting point of this research project, I collected a range of theoretical materials and case studies on 'flowscapes' in order to understand the interaction between 'infrastructure' and 'landscape' . What I found attracted me most is a fun event called 'Still-Life' that transforms the most-travelled highway A40 in Germany into a picnic area for a weekend. Millions of people came walking and biking on the street to see a 60km long table during a closure of traffic for the Ruhr 2010 festivities.

As with most highways, A40 is an important agent that shapes the urban environment and contemporary landscapes. Yet most of us are unable to summon up as much appreciation for modern highway construction as we can for other public space because it is isolated from the urban context in the most cases. What makes A40 unique is that the 'Still-Life' project provides an opportunity for social integration. Whether the art project or the popular happening illustrate, how this most occupied living space is much more than a traffic infrastructure to the five million inhabitants of the Ruhr-area.

This temporary event one of the complementary ways to integration between highway and urban life. However, as landscape architect, we expect a sustainable and spatial method of integrating highway into urban context. Therefore, the paper discusses what landscape design projects could do in order to sustainably integrate the often times dysfunctional transportation infrastructure with urban landscape.

Still-Life A40

Source: de.wikipedia.org/wiki/Autobahnkreuz_Duisburg

1.2 HIGHWAY EVOLUTION

During these two years, I have travelled some place, and by chance visited a variety of highways whether in rural context or in urban environment which provides different experience. I was attracted by the comparison among them. I would like to elaborate their difference and the principles underpinned.

The first picture shows the volcano scenic roadway which is regarded as a typical landscaped highway. The route goes smoothly, up and down, adapted to the geomorphology. Driving along the route, there is natural forest passing by and at the end of the road the iconic mountain image directs the view of drivers and passengers. All these elements relate the highway to its landscape context, leading to an integral highway landscape.

By contrast, highway in urban context shows completely different appearance from the perspective of both city and highway users. It has been detached from ground level in order to ensure the high-speed transportation and therefore leave impacts on urban landscape. Meanwhile, it is isolated in itself in terms of visual connection due to different forms of noise barrier.

Parkway

Source: www.roadtrippers.com/stories/volcanic-legacy-byway

Urban Highway

Source: www.shutterstock.com

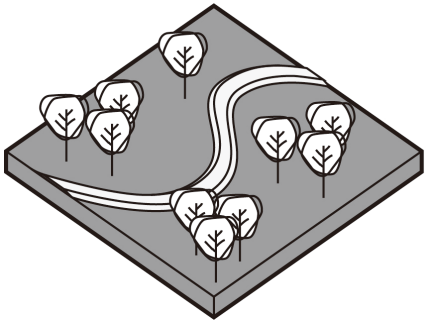
1.2 HIGHWAY EVOLUTION

Highway has a history of evolution in terms of the users, forms and the inherent design principles. During the evolution, the relationship between the highway and its context has been completely changed (Clarke 1959).

1. Parkway
Traditional highway, which was labelled parkway, is a broad, landscaped thoroughfare. The idea was originally proposed during the late 19th century by Frederick Law Olmsted and Calvert Vaux, who coined the term for the idea of connecting the city with national parks by means of recreational routes.

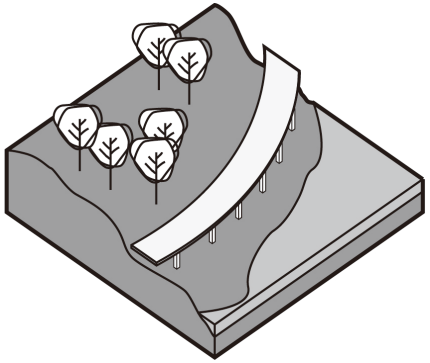
2. Motor Parkway
During the early 20th century, the meaning of parkway was expanded to include limited-access highways designed for recreational driving of automobiles, with landscaping. These motor parkways provided scenic routes, usually nicely decorated and landscaped with narrow lanes, and very limited access for large vehicles such as trucks and buses, emphasizing the relationship between the road and context (Kroplick and Velocci 2008).

3. Urban highway
Modern highway systems developed in the 20th century as the automobile gained popularity. In order to meet the need of high-speed transportation and great volume of traffic, many motor parkways originally intended for scenic, recreational driving have been evolved into major urban and commuter routes. Major modern highways that connect cities in populous developed and developing countries usually incorporate features intended to enhance the road's capacity, efficiency and safety to various degrees. (Bugge and Snow 1959).



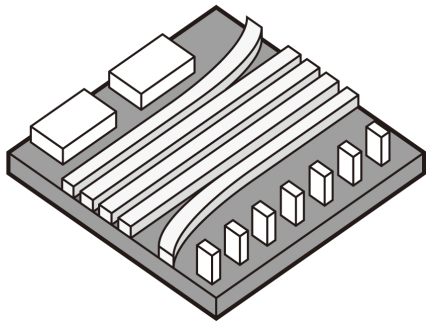
Parkway

SMOOTH, FLOWING
NARROW ROADS
WIDE LANDSCAPE
NO HEAVY VEHICLES
RECREATIONAL



Motor Parkway

MOTOR ARTERIES
DECORATED LANDSCAPE
ELEVATED ROADS
ADAPTIVE TO TOPOGRAPHY
SCENIC & TRANSPORT



Urban Highway

ISOLATED, STRAIGHT
HARD-SURFACED
URBAN PATTERN
NON-CONTEXTUAL
SCENIC & TRANSPORT

1.3 PROBLEM STATEMENT

1.3.1 URBAN FRAGMENTATION

Nowadays urban highway is getting wider and more efficient than they were built. Meanwhile they become isolated from its context whether literally elevated from the ground level or inherently scaring the urban landscape and leading to **urban fragmentation**.

Building the highway system has caused significant changes to the physical, cultural and historical landscape of urban environment (Lewis 1995). Wide right-of-ways consumed thousands of acres of land, leads to the demolition of historical structures, and in some locations, replaces the existing roadways (Kaszynski 2000). Most significantly, the coming of the urban highway dramatically affects older, general-access roads with similar alignments (Hayes 2005). Travelled at lower speeds and lined by businesses with direct access to the roadway, such roads were characterized by distinct vernacular architecture that connected travellers to the communities through which they passed (Liebs 1995). The construction of urban highways fundamentally alters this pattern of commercial development as long-distance travellers abandoned those former routes, leaving once-vibrant towns fading into obscurity and busy roadside stores and restaurants struggling to make ends meet (Vale and Vale 1983; Liebs 1995; Kaszynski 2000). With the coming of urban highway, whole architectural genres were driven to extinction by abandonment (Liebs 1995). Fast highway travel also sounds the death knell for short-haul train travel (Kaszynski 2000) and completes the process of intimately linking residents to the personal auto for local and regional transportation (Hayden 2004).

1.3.2 URBAN BARRIER

Functionally Speaking, the lifted highway construction limits the number of intersections with local road. Without starts and stops, the need of high-speed mobility through many large centres of population is guaranteed. However, it becomes a spatial **urban barrier** which functionally causes the limited penetration across highway for local people.

A controlled-access highway provides an unhindered flow of traffic, with no traffic signals, intersections or property access. They are free of any at-grade crossings with other roads, railways, or pedestrian paths, which are instead carried by overpasses and underpasses across the highway. In addition to sidewalks (pavements) attached to roads that cross a freeway, specialized pedestrian footbridges or tunnels may also be provided. These structures enable pedestrians and cyclists to cross the freeway at that point without a detour to the nearest road crossing.

Elevated highways slice through cities all over the world. At their best, they make getting into and around cities incredibly easy; at their worst, they segregate and isolate communities. Somewhere in between those two poles is a ton of potential. The spaces beneath those overpasses are often underutilized – or utilized in ways illegal or undesirable.

Urban Fragmentation
Source: Project 'Viadukt Kreativni'

Urban Barrier
Source: photographed by Alissa Walker

1.3 PROBLEM STATEMENT

1.3.3 ENVIRONMENTAL POLLUTION

In addition, highways are extended linear sources of pollution.

In terms of **air pollution**, highways may contribute fewer emissions than arterial roads carrying the same vehicle volumes. This is because high, constant-speed operation creates an emissions reduction compared to vehicular flows with stops and starts. However, concentrations of air pollutants near highways may be higher due to increasing traffic volumes. Therefore, the risk of exposure to elevated levels of air pollutants from a highway may be considerable, and further magnified when highways have traffic congestion.

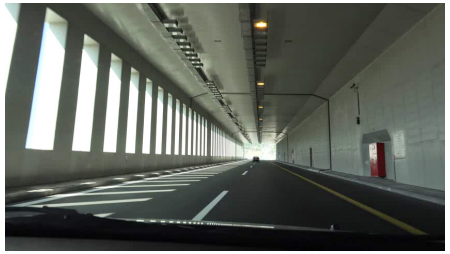
Noise pollution is a factor of environmental degradation that is often overlooked and typically seen as not having a significant impact. Roadway noise increases with operating speed so major highways generate more noise than arterial streets. Therefore, considerable noise health effects are expected from highway systems. Noise mitigation strategies exist to reduce sound levels at nearby sensitive receptors. The idea that highway design could be influenced by acoustical engineering considerations first arose about 1973.

1.3.4 POOR AESTHETIC QUALITY

At last but not least, highways may well be component parts of our public space, but they are not part of our **aesthetic culture**. Here and there voices tenaciously proclaim that no aesthetic principles are applied in the laying of highways especially in urban context, and that the road is purely the product of engineering and the immanent logic of its technology.

Many challenges are encountered when designing highway projects that pass through urban areas. Arterial and collector highways are typically designed for moving vehicles as quickly and efficiently as possible. However, many times these highways are at the center of a community that has developed around them. Increasingly, citizens of these communities have requested that highway corridors be redesigned using roadside solutions that enhance the appearance and, in many cases, the functional use of the highway roadside.

Environmental Pollution
Source: www.lesinformationsdieppoises.fr



Poor Aesthetic Quality
Source: www.shutterstock.com/video/

1.4 RESEARCH OBJECTIVE

In the most cases, highway is widely regarded and treated as an only functional infrastructure. In my point of view, it also has potentials to be contextualized, integrated and interacted with urban environment and urban life. Therefore, I define a concept of 'hybrid highway landscape' as an updated version of urban highway. The basic idea is to apply the design principles underpinning parkways to modern highways in the urban context. By doing this, the urban environment within right-of-way such as post-industrial structure, housing, roadside plantings will be strongly related to highway in order to form an integral zone.

Therefore, my research objective is to explore the potential of hybrid highway landscape. On one hand, urban environment and space related to highway could be enriched for city image; on the other hand, the highway is able to avoid being enclaves in the urban environment by embracing hybrid approach.

Collage of Hybrid Highway Landscape

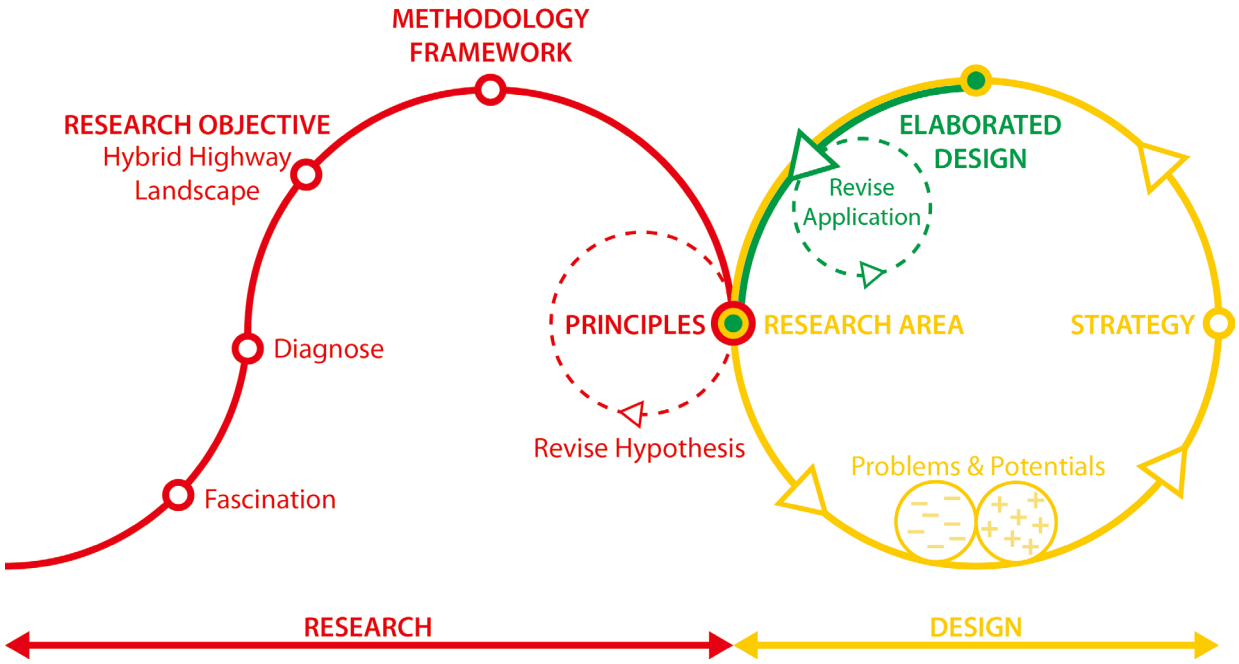
1.5 METHOD AND LOCATION

The research of the project is based on: How can we provide a hybrid highway landscape where the functional infrastructure and urban environment can be integrated, reinforcing the relation of the highway with its context?

To achieve the hybrid landscape we need to create opportunities where the highway and urban environment, even social involvement, can interact with each other. The project is based on the idea that this interaction should be planned on the area adjacent to it and should be regarded as an integral part of urban life.

By 'research-by-design' approach, a design framework should be systematically combined with the research inquiry draw up hypotheses of possible spatial futures. Now in the beginning of my project, the German highway A40 at Duisburg city is chosen as the location of the experimental design.

Highway A40 in Germany is regarded as an interesting site in terms of contextualization. During the industrial stage, factories of manufacture and distribution in Ruhrgebiet were located along the highway in considering of the transportation. In the recent decade, with city expansion and declination of industry, factories have been moved out. Further, the space related to highway become part of urban landscape.

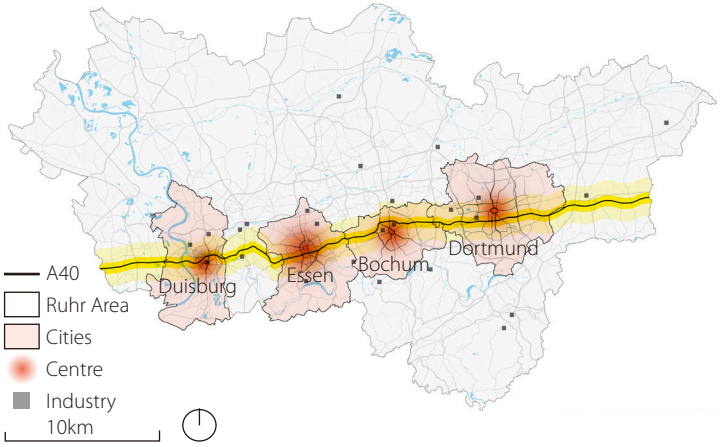


'Research by Design' Process

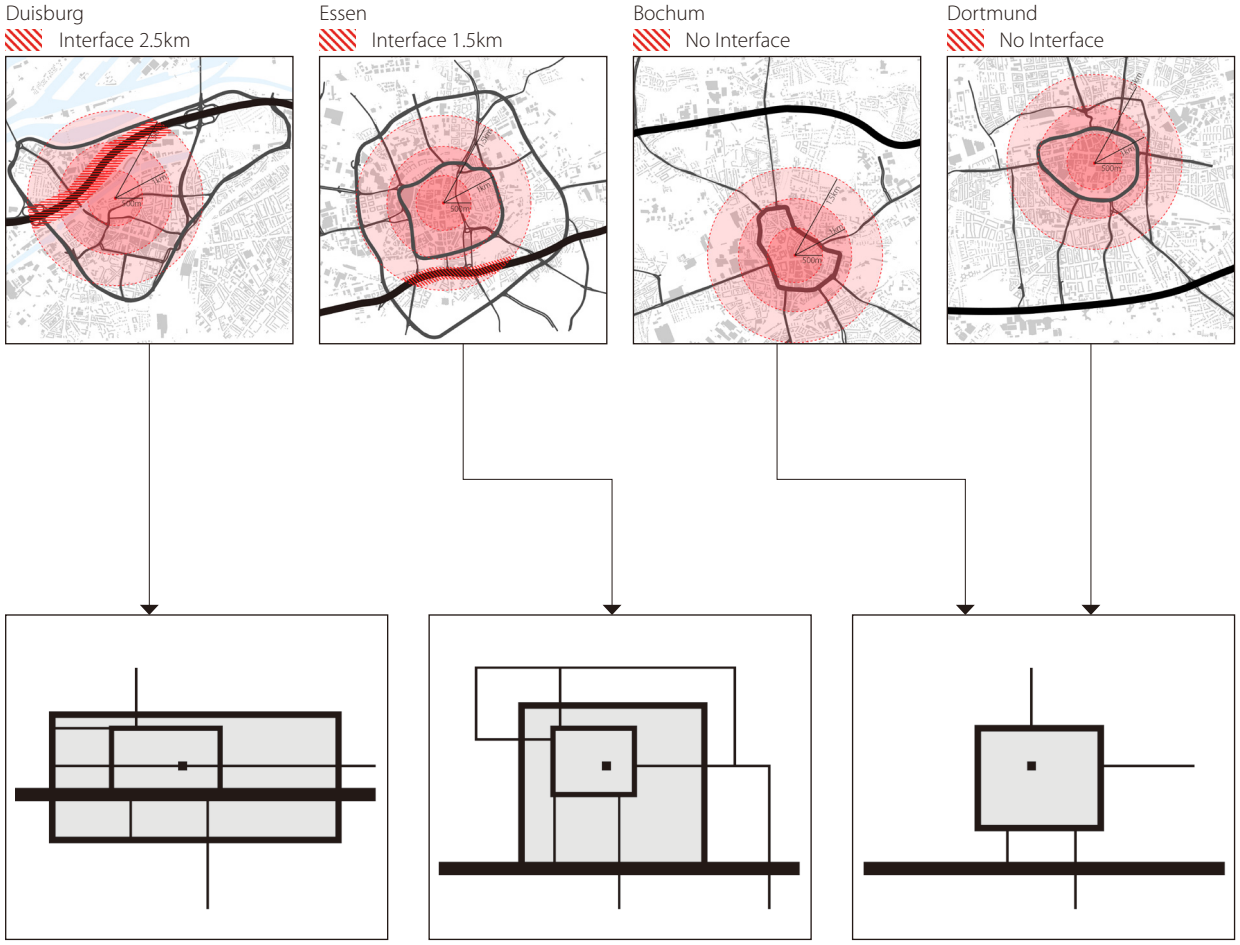
1.5 METHOD AND LOCATION

A40 connects four populated cities in Ruhr area--Duisburg, Essen, Bochum and Dortmund. The ways how the city are connected to the highway are different. In the case of Duisburg, highway goes through the city. While A40 goes next to Essen without touching the central city. By contrast, in the case of Bochum and Dortmund, the cities are not directly connected to highway but through local roads.

Besides, the highway-city interface is up to 2.5km long in Duisburg. Therefore, Duisburg is considered as the research area in considering of the relationship between highway and city. It crosses the Rhine at Duisburg Harbour where is close to city centre, leading to the hybrid of highway and urban context (Kuhlmann 2010).



Highway A40 in Ruhrgebiet



1. Highway through city
2. Highway next to city
3. Highway connecting to city

1.6 RELEVANCE OF PROJECT

With the development of urbanization, many traditional urban space has been invested with fresh connotation. Meanwhile, now urban space has been created. Urban highway, as the product of modern city, is not only a unique spatial form, but also one of the most important influencing factors that shape the contemporary urban landscape to a large extent. Once a highway is built, It becomes a geographical indication and leads to the transformation of the original spatial form and measure feature of the area. On one hand, it was built to ease the urban traffic pressure. On the other hand, negative impacts on the urban space and the surrounding environment cannot be ignored.

Some seventy per cent of the world population will be living in urban areas by 2050, which poses the designers of these urban areas for major design questions. The future of the metropolis depends on the degree to which congestion can be addressed. Infrastructural networks are undergoing a development that is characterised by the pursuit of an optimisation of mobility by eliminating barriers and an increasing interdependency (Nijhuis & Van Winden, 1996). Urban planning will be increasingly connected with the issue of mobility and the design of infrastructure.

Motorways are used intensively, yet most of us cannot muster as much appreciation for them as for an attractive square, park or landscape. Motor- ways may well be part of our public space, but they play no part in our aesthetic culture; they have to make do with the status of banal and cursorily perceived 'surroundings'.

1.7 OUTLINE

The research will focus on urban highway landscape in Duisburg, which is an interesting model which to discuss the interaction between highway and urban environment.

The report is structured thematically in six chapters. Chapter 1 as elaborated above consists of an overview that addresses the background of urban highway as a hybrid landscape of transportation infrastructure and urban environment. In the next section, Chapter 2, four lenses in terms of highway integration will introduced as the theoretical methodology framework of my research project. These four lenses are spatial-structure, function, spatio-visual quality and environmental issue. The corresponding principles are learned and concluded for each lens in general terms through existing field of research and actual projects study. The principles show us how to contextualize the highway in order to embrace the urban images and regenerate the area adjacent to it in the meantime. In Chapter 3, the understanding of highway A40 in Duisburg elaborated through a series of site analysis according to the four aspects shows both problems and potential on the research area. Taking both the principles mentioned in Chapter 2 and the understanding of site in the last chapter into consideration, Chapter 4 comes up with strategy that how to apply the principles on the research area. Meanwhile, several important projects are identified from the general city scale. Two of them where different principles are used are elaborated by detailed designed in Chapter 5 in order to provide models and variation of principles application. The last section, Chapter 6, will discuss hybrid highway landscape as an updated version of highway evolution in the current and future design of transportation infrastructure in the urban context. I will end with some concluding remarks which can be applied and localized in many situations.

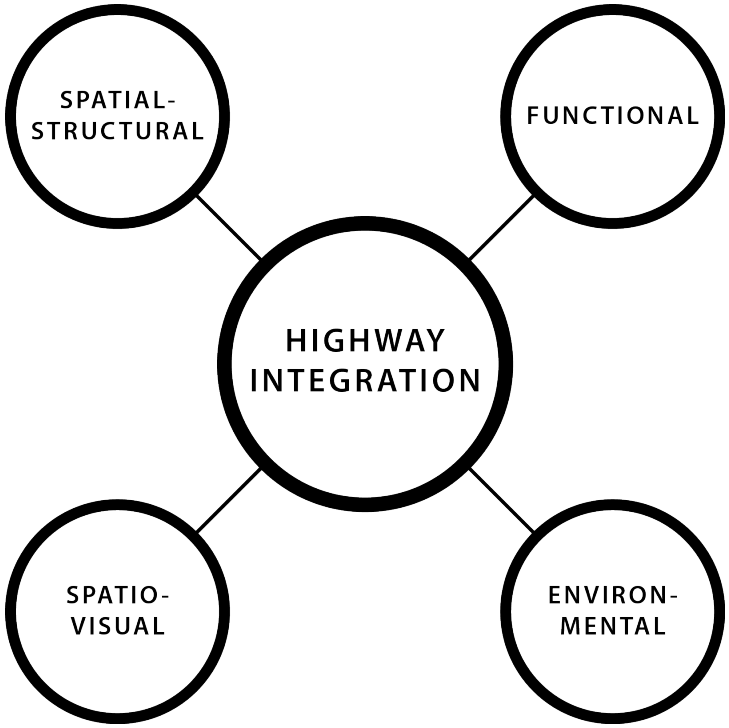
2 METHODOLOGY FRAMEWORK AND PRINCIPLES

2.1 INTRODUCTION

Understanding the symptoms of urban highway and the potential of being hybrid landscape, the question is how to integrate highway into urban context by regenerating the area related to it. To develop a hybrid highway landscape, four lenses are conducted in terms of highway integration. They are spatial-structural aspect, functional aspect, environmental aspect and spatio-visual aspect. These four lenses together constitute a practical methodology framework towards the research project.

This chapter consists of two sections--methodology framework and principles. The first section focuses on the elaboration of each lens according to the following questions:
1. What is the lens about?
2. How is it related to 'hybrid highway landscape'?
3. What is the assignment in terms of the lens?

By answering these questions, the theoretical background of the research project becomes very clear. In order to achieve the objective, we need to take one step further. Therefore principles for each lens are learn and concluded from the existing field of research and successful examples in the later section.



Four Lenses in terms of highway integration

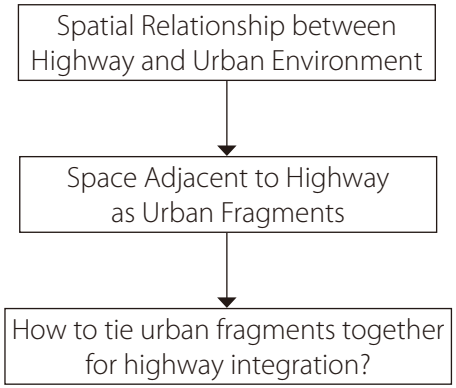
2.2 THEORY BACKGROUND

2.1.1 SPATIAL-STRUCTURAL ASPECT

1. What is the lens about?
Urban spatial structure is the arrangement of urban public space. It affects many aspects of how cities function and has implications for accessibility, environmental sustainability. Therefore, it is regarded as the foundation of this methodology framework.

2. How is it related to 'hybrid highway landscape'?
In terms of highway issues, it refers to the spatial relationship between highway and urban environment where their interface plays an essential role, namely, right-of-way. Without interaction, the so-called interface becomes edge zone which is treated as fragmented negative space.

3. What is the assignment in terms of the lens?
If the urban fragments are integrated, the highway is therefore contextualized. And it will neither scar the urban landscape nor disturb the order of urban structure.

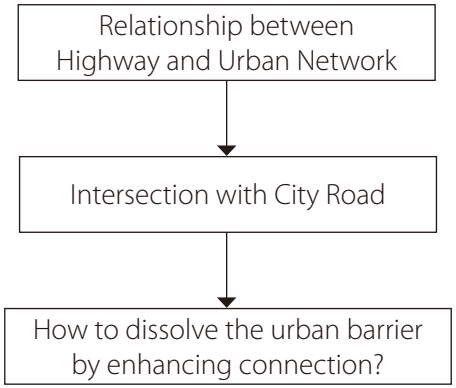


2.2.2 FUNCTIONAL ASPECT

1. What is the lens about?
In order to ensure the high-speed vehicular traffic, highway is regulated in a different flow with urban network. Due to the separation, getting across it becomes an issue to be improved.

2. How is it related to 'hybrid highway landscape'?
Therefore, functional lens discusses the relationship between highway and urban network. The focus is intersection with city roads.

3. What is the assignment in terms of the lens?
The facing problems are the amount of crossings is limited. What's more, the experience is unpleasant due to the dark underpasses and coexistence of people and vehicles. Therefore, the assignment is defined as 'how to dissolve the urban barrier by enhancing connection'.



2.2 THEORY BACKGROUND

2.2.3 ENVIRONMENTAL ASPECT

1. What is the lens about?
Air pollution and noise pollution are two main environment issues that highway traffic brings to city.

2. How is it related to 'hybrid highway landscape'?
Pollution barriers are constructed along the highway in a technique way such as a hard material wall or even an enclosed cage out of the highway.

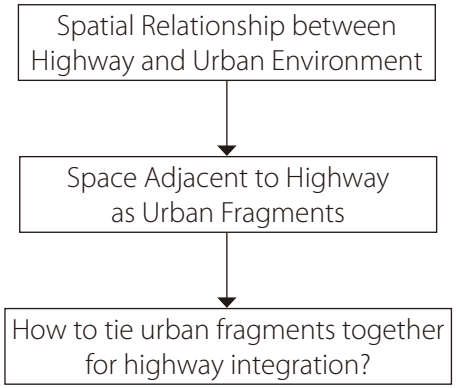
3. What is the assignment in terms of the lens?
Then the assignment is to explore the potential of combining the barrier with landscape elements such as plantings.

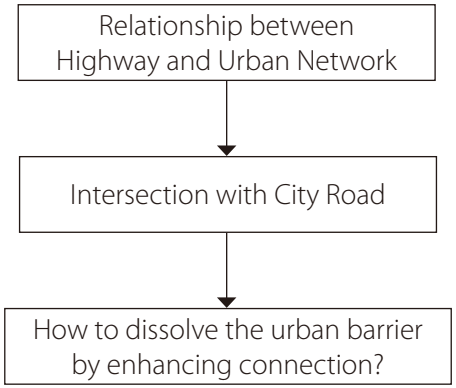
2.2.4 SPATIO-VISUAL ASPECT

1. What is the lens about?
Residing in the modern cities, everyday we spend substantial time on traveling along the highway. Through evaluating the driving experience, visual quality is a worthy indicator.

2. How is it related to 'hybrid highway landscape'?
The proposal of scenic quality taken from the parkway idea comes out in order to relate the highway to the roadside from the visual perspective. A comprehensive attempt to consider the urban highway as a positive visual experience that organizes motion, space, view to achieve aesthetic enjoyment is stated in the book 'The View from the Road' (Lynch 1964).

3. What is the assignment in terms of the lens?
It would be a wonderful thing if that old term 'pleasure driving' could be brought back into common usage.

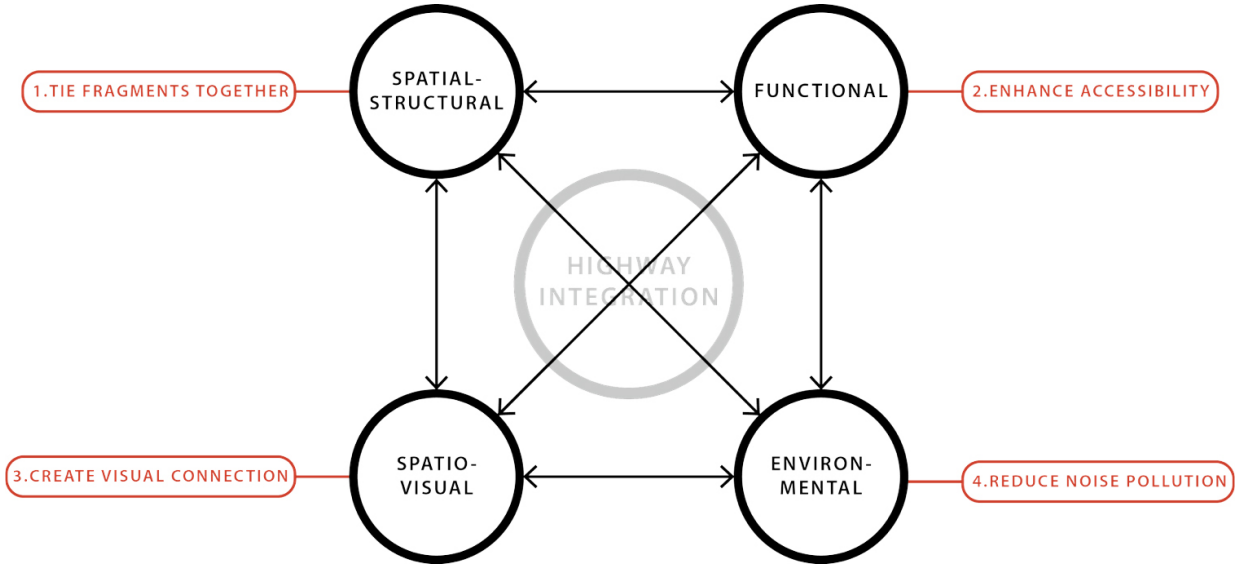




2.3 METHODOLOGY FRAMEWORK

To conclude, each aspect has one sub objective to be achieved. In spatial-structural aspect, the aim is to tie fragments together. Functionally speaking, enhancing penetration across highway is important. Thirdly, creating visual connection in spatio-visual aspect is the most vital content. Last but not the least, reducing noise pollution is the biggest concern in environmental aspect.

In fact, these four aspects are interrelated with each other. For instance, a spatial integration across highway naturally promotes the functional penetration. By contrast, the spatio-visual aspect and environmental aspect are always competing: a noise barrier could also block the driver's view. That way, this methodology framework is not just for solve the problems one by one, actually it indicates the balance among those aspects.

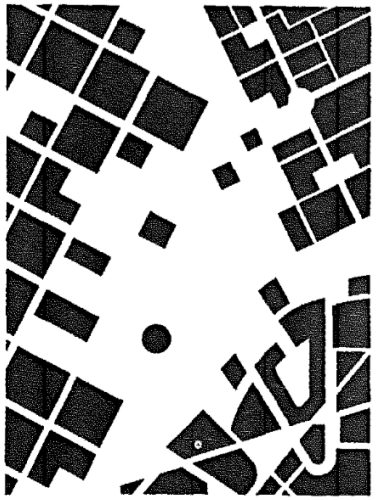


Practical Methodology Framework

2.4 PRINCIPLES

2.4.1 SPATIAL-STRUCTURAL ASPECT

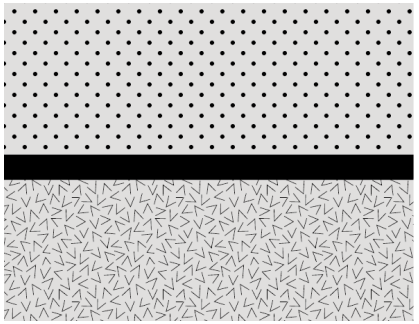
URBAN FRAGMENTS



Urban Fragmentation
Source: illustration by Beune & Thus

The existence of urban areas that are not optimally integrated into the overall urban structure is demonstrated. A number of neighborhoods, and also isolated park-like areas, show this condition in the sense that external relationship and inherent coherence are absent (Beune & Thus, 1990).

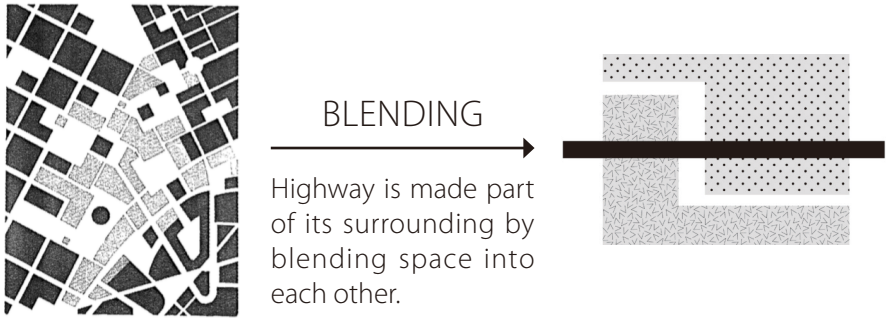
FRAGMENTS RELATED TO HIGHWAY



When related to highway, these urban fragments could be integrated by regenerating the spatial barrier. Therefore, the principles to urban fragments are translated into highway issue.

2.4 PRINCIPLES

PRINCIPLES TO HIGHWAY INTEGRATION



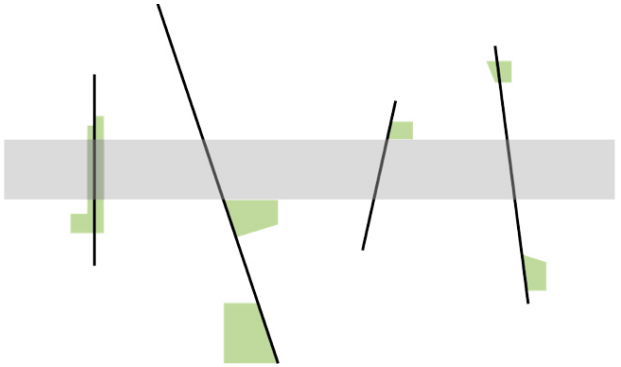
Urban Fragmentation
Source: illustration by Beune & Thus

2.4 PRINCIPLES

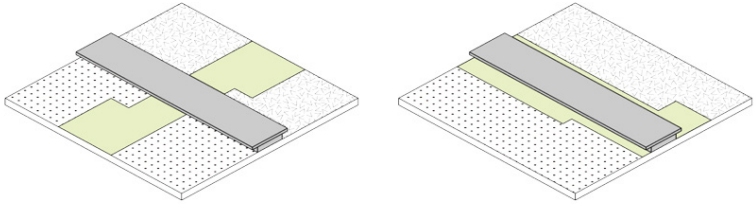
2.4.2 FUNCTIONAL ASPECT

Functionally speaking, a great number of projects come up, aiming to create connection across the highway. Buffalo Bayou Park, one of the most successful programs, thoroughly renovated, 160-acre public space deploys a vigorous agenda of urban ecological services and improved pedestrian accessibility, with two new bridges connecting surrounding neighbourhoods. In terms of passage across the highway, not only accessibility but also the quality and experience of the connection are the key point of design.

Secondly, in terms of functional penetration, green corridor across highway is proposed whether an underpass or a flyover. And it is even possible to make the highway an attraction in itself. For an instance, activating the space underneath, not only of passing by, but also social activities.



Connection across Highway (Underpass or Flyover)

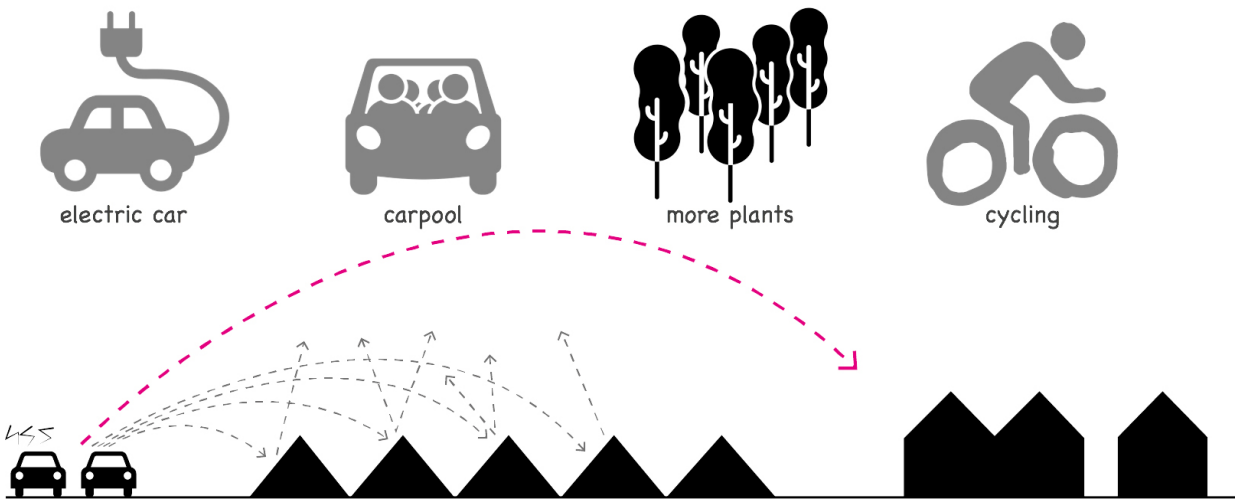


Open the space under the highway

2.4 PRINCIPLES

2.4.3 ENVIRONMENTAL ASPECT

Last but not the least, environmental friendly programs are carried out such as electric car, carpool and public transportation. By landscape architectural method, spatial intervention such as topography design could also help effectively.



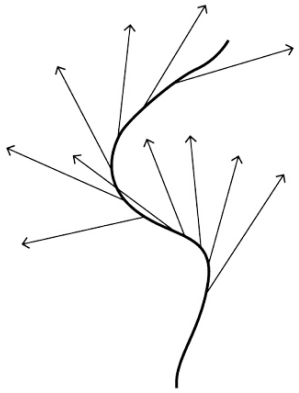
Topography Design (inspaired by PARK BUITENSCHOT, Schiphol)

2.4 PRINCIPLES

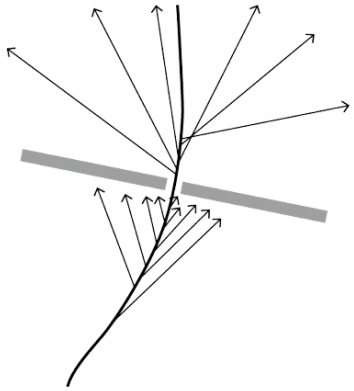
2.4.4 SPATIO-VISUAL ASPECT

In terms of spatio-visual aspect, in spatio-visual aspect, the city structure has the great potential to serve as a view guidance or even a landmark for highway users. Among the design principles, tipping and pointing the road is a powerful tool of directing the attention. And an apparent side wall, canyon, or tunnel and overhead structure as well can make it impressive.

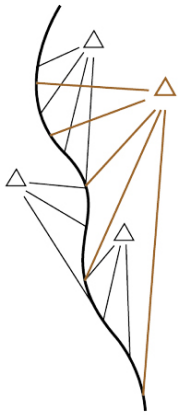
In summary, the highway designer has at least two responsibilities: to provide for the most efficient transportation, which is quite obvious, but he also has a social obligation to maintain or create a highway environment that both the driver and pedestrian can live in. The role of the highway designer is to create an aesthetic road design that combines beauty with utility. This combination will, over a period of time, provide a more economical and safer road. The aesthetic principles of landscape design should not be thought of something supplemental to the actual highway design, but rather an integral phase that requires collaboration between the engineers and landscape architect from the very beginning. Highway beauty should not just happen. It needs to be created intentionally just as safe and efficient highways are de signed intentionally.



Tipping and Pointing

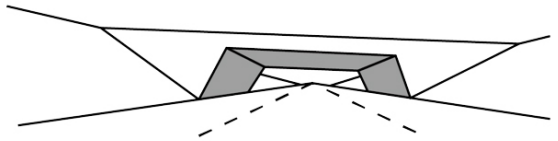


Important Barrier



Goal Approach

Source: illustrated by Kevin Lynch



Overhead Structure

2.5 CONCLUSION

The principles learned and conducted for the theoretical background and practical examples are remain abstract and political. In order to develop a set of spatial strategies which are able to contribute to the research as well as design process, I am going to elaborate them further by taking the problems and potentials of the research area into consideration as well.

In order to achieve the objective, precedent researches are conducted in terms of highway integration. Some projects take advantage of the space undertake highway in order to attract activities. Some improve the connection between both sides and increases the accessibility by making passage under the highway construction or making pedestrian bridge over the road. Others attempt to make use of temporary projects to activate the place and evoke people's concern of the local traffic infrastructure.

3 SITE ANALYSIS

3.1 INTRODUCTION

In order to explore the potential of hybrid highway landscape, highway A40 in Duisburg and its right of way is defined as an experimental field for the research project as elaborated in Chapter 1. Based on the methodology framework proposed in the last chapter, the selected site is analysed according to the four lenses in this chapter.

110,000 CARS PER DAY

NEGATIVE IMPRESSION OF THE CITY

DETACHED NEIGHBORHOODS

SEREVED PEDESTRIAN CONNECTIONS

3.2 SPATIAL-STRUCTURAL ASPECT

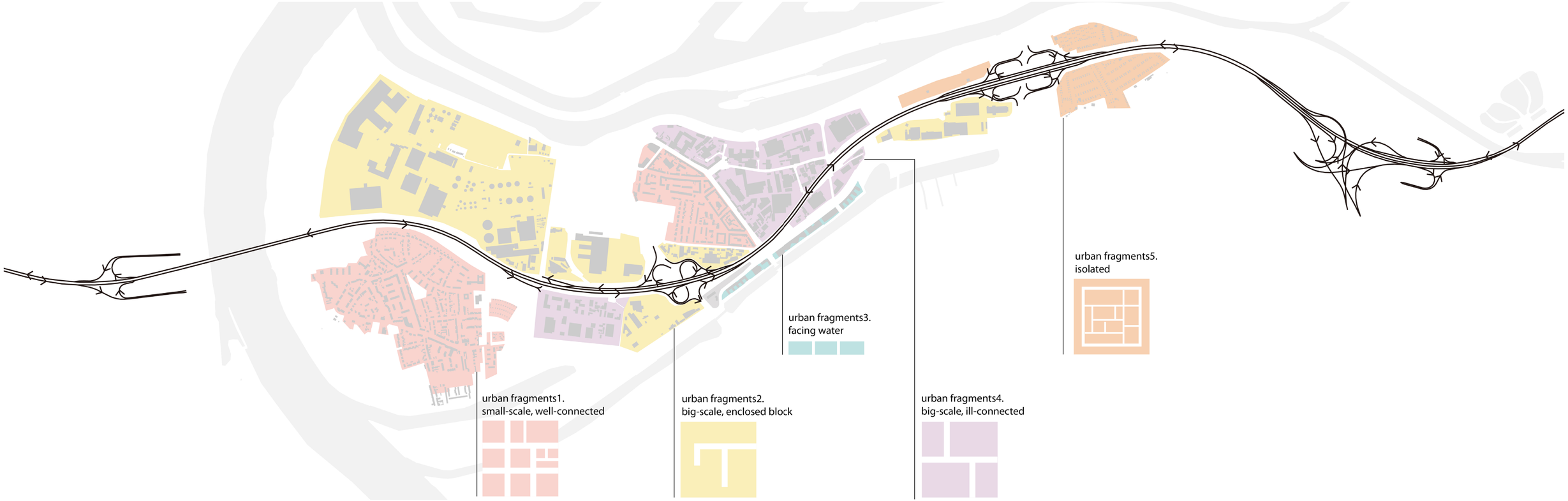
The existence of urban areas along A40 in Duisburg that are not optimally integrated with the overall urban structure is demonstrated in the images. A number of neighbourhoods, and also isolated allotment gardens and factories, show this condition in the sense that the external relationships and internal coherence are absent. The major cause of these phenomenon is that in the course of highway construction the form and function of these areas have been altered.

Fragments of different urban pattern are distributed along A40. Among the fragments, five typologies of urban blocks are identified according to the scale and the degree of closure:

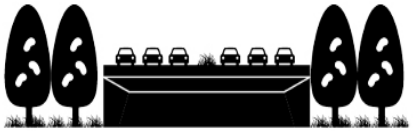
1. Small-scale, well connected neighbourhood
2. Big-scale, enclosed block
3. Facing water
4. Big-scale, ill-connected block
5. Isolated neighbourhood

Allotment Garden Ariel *Source: Google Map*

Gateway Ariel *Source: Google Map*


urban fragments1.
small-scale, well-connected
urban fragments2.
big-scale, enclosed block
urban fragments3.
facing water
urban fragments4.
big-scale, ill-connected
urban fragments5.
isolated

Besides, the spatial relationship between highway and the context is addressed as well by a series of sections, which could be classified into 4 types: the most common situation is an embankment with tree block; others are roads intersection with wall block, dike with terrace for secondary roads and dike with soft slope. Different typologies imply a various of design principles on how to define the highway issue.

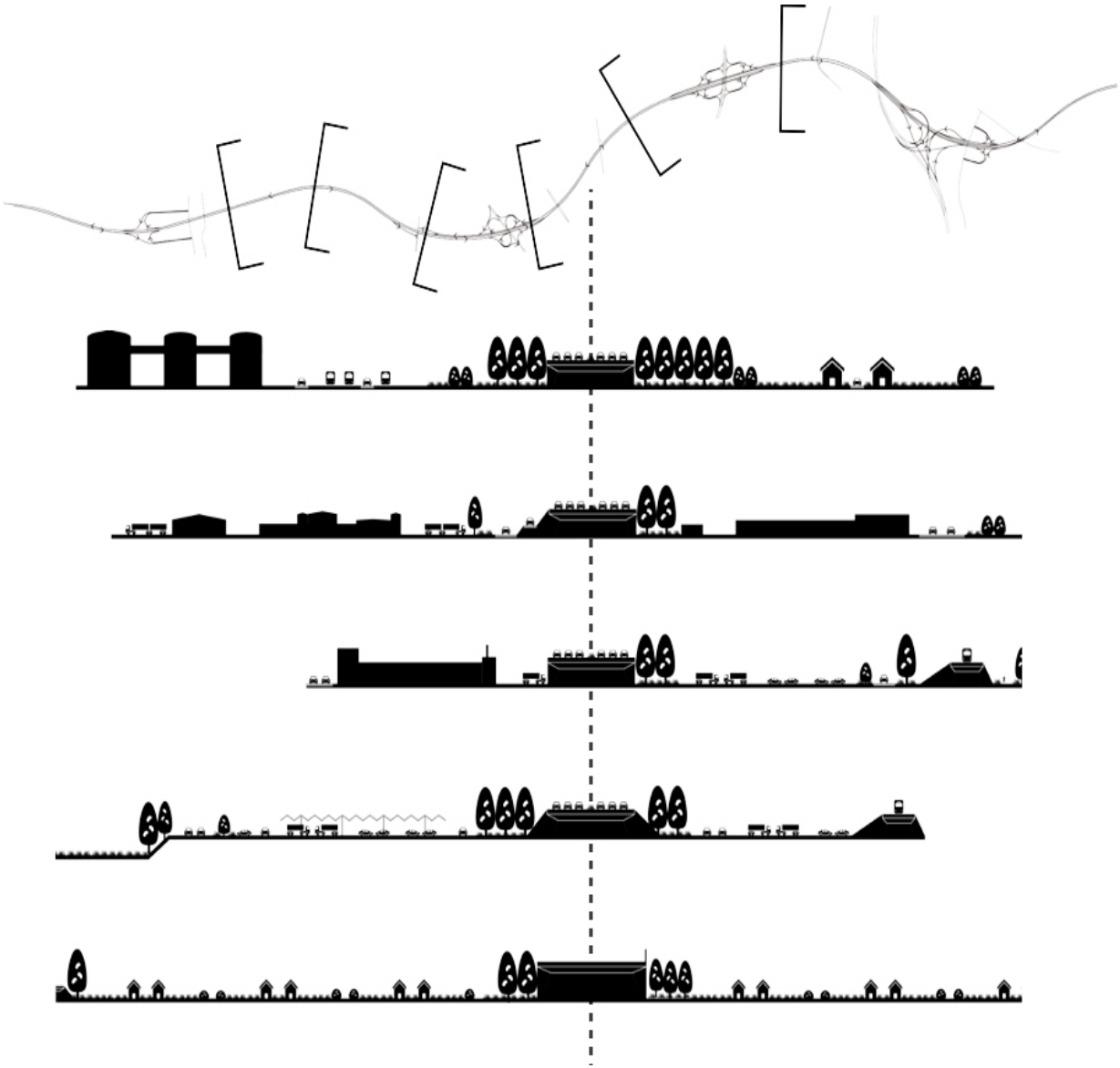


most common, embankment, tree block

dike with roads

road intersection, embankment, wall block

dike with slope

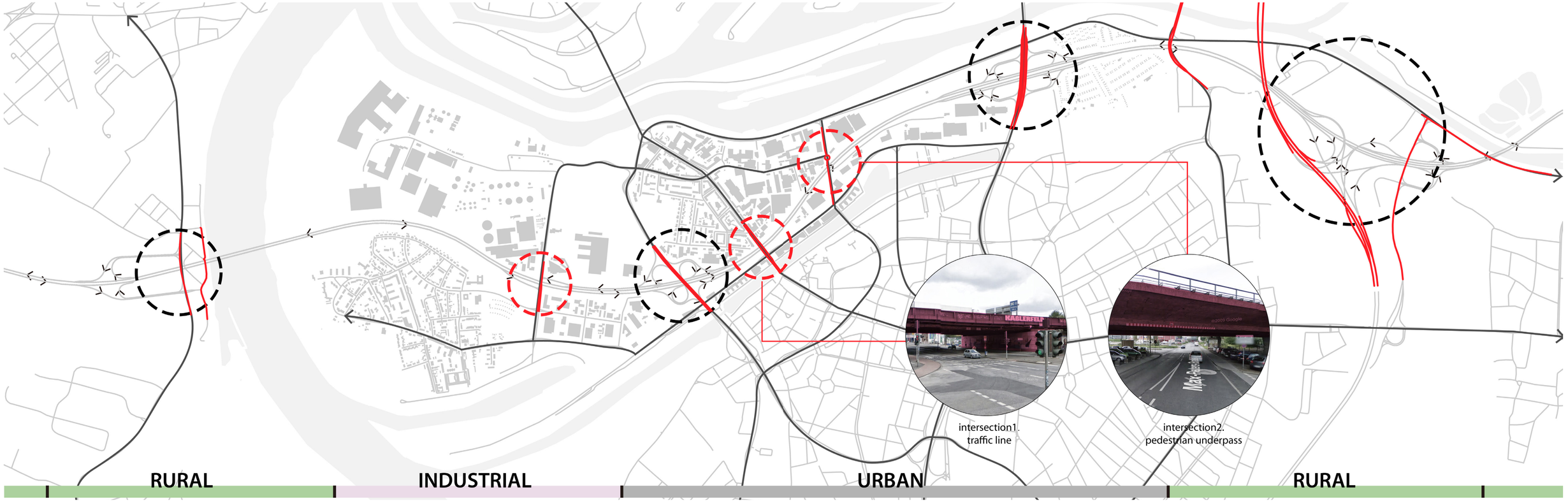


3.3 FUNCTIONAL ASPECT

Secondly, functionally speaking, the highway intersection with local road is where exactly the residents perceive highway. In total there are two intersections in central Duisburg for penetration—the one in Kasslerfeld is mainly for traffic; the other one is used for promenade route. And from the photo we can see the spatial quality is not a pleasant.

Intersection *Source: photographed by author*

Under Highway *Source: photographed by author*



intersection1.
traffic line

intersection2.
pedestrian underpass

3.4 ENVIRONMENTAL ASPECT

Thirdly, in terms of environment, noise pollution proves to be the first killer of human health. Based on the scientific research, there is a certain width from the highway to reduce the environmental impacts. Generally, there are two forms of highway noise barrier—a soft one, plantings and a hard one, noise reducing wall.

In order to reduce noise to an acceptable level, the planting barrier should be at least 70m wide. However, it's difficult to be achieved within the right-of-way in the urban context. Therefore, this form of barrier is not that effective as we expected.

Barrier Wall *Source: Google Map*

Planting Barrier *Source: Google Map*

noise reduction wall

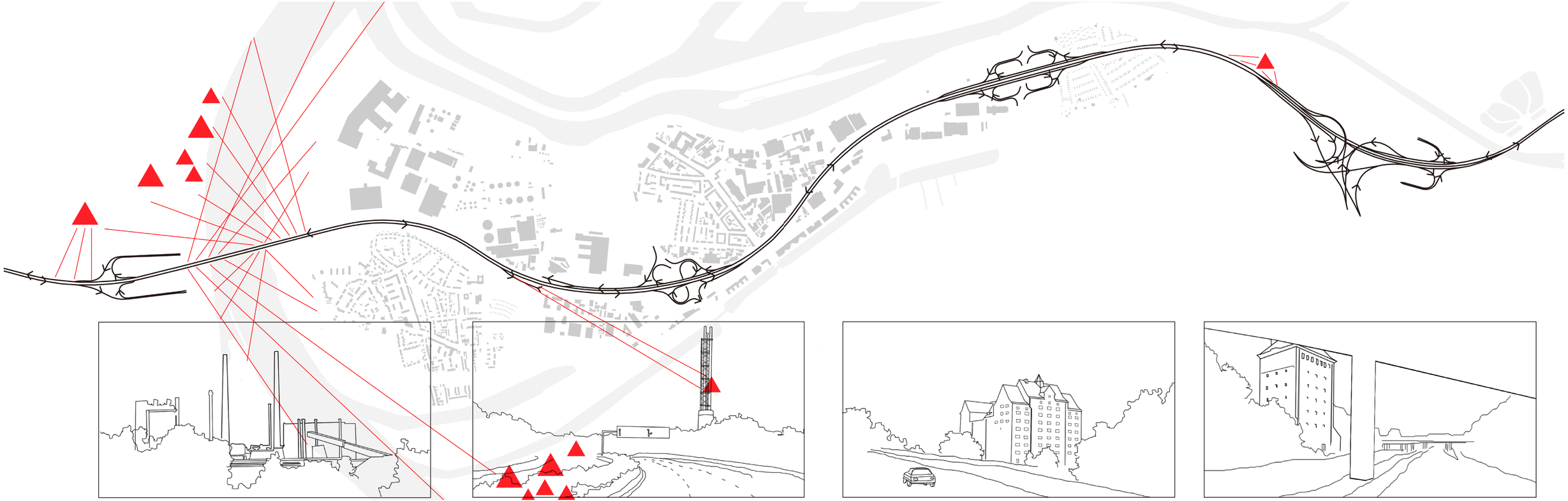
planting

3.5 SPATIO-VISUAL ASPECT

Last but not least, in the spatio-visual aspect, the view of the passengers, as well as that of the drivers, is strongly focused. Not only the sketches show where the eye catchments are geographically located, but also the lines show where they are perceived in the both directions. It's worth noting that River Rhine is the most attractive part on the route because of the sudden open view from the tree block. On the contrary, the city suffers a lack of identity and attraction especially in the urban central part when relating the route to its context.

A40-Rheinbrücke *Source: Google Map*

In the city *Source: Google Map*



3.6 CONCLUSION

The elevated and six-lane highway create serious spatial and functional issues-fragmentation and limited penetration, while the isolation and enclosure of it negatively affects Duisburg's identity of the post-industrial city. In addition, the carbon emission and noise pollution cause environmental problem especially in the area adjacent to it. Together the challenges and potentials are listed as follows:

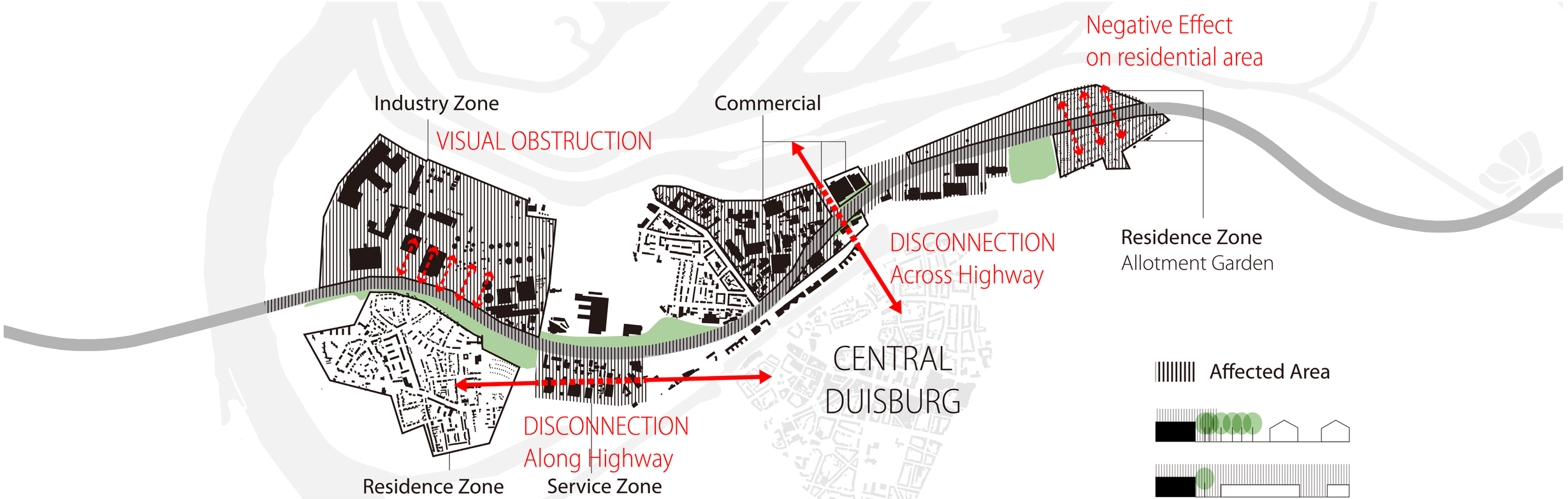
1. The urban space related to highway is commonly treated as negative place which accommodates only functional utilities such as industrial site and warehouse land, hardly with any social involvement. The intensive mode of land using leads to the further decline of tree canopy. In turn, the absence of landscaping aggravates the situation of abandoned fields. In view of this, it is a great potential to regenerate the space along the highway by creating a sequence of unique public places.

2. Three highway underpasses available for pedestrian perform poorly as discontinuous sidewalk, stressful tunnel and lack of human scale in terms of walking experience. Moreover, the urban road network approaching to the highway decreases at the inner harbour and tends to be sparse, leading to poor connection between both sides. Therefore, slow traffic system which emphasises the intersections of highway and city roads could be proposed in order to improve both accessibility and penetration.

3. From the perspective of highway users, following the pleasant river view over Rhine, there is continuous tree belt planted along the highway staying unchanged, which completely keeping the urban images away. Only at a few certain spots such as intersections, the trees are taken place by transparent noise barrier, allowing a glimpse of Duisburg. Based on the principle of ray propagation, it will be eye catching to build a relatively tall structure in the field of view. Alternatively, a new form of roadside buffer could be acceptable as well.

4. Currently in Duisburg, the width of tree barrier proves to be insufficient to reduce the air and noise pollution to an acceptable level. Therefore, various typologies of greening such as urban forest, vertical planting and highway park are expected to relief the environmental issues.

In short, urban analysis is conducted to form a basis for interventions at both site and city scale. Connectivity and access to transit and open space was paired with an inventory of infrastructural architecture and opportunities for improvement at the sites adjacent to the highway. In the next section, strategy on the research area is proposed through taking both analysis and principles together into consideration.


Negative Effect
on residential area
Industry Zone
VISUAL OBSTRUCTION
Commercial
DISCONNECTION
Across Highway
Residence Zone
Allotment Garden
CENTRAL
DUISBURG
DISCONNECTION
Along Highway
Residence Zone
Service Zone
Affected Area

4 STRATEGY

4.1 INTRODUCTION

By analysing the site in the last chapter, the challenges and potentials in terms of creating hybrid highway landscape are explored. Based on the principles proposed in Chapter 2, I would like to further develop the corresponding strategies for the research area, highway A40 in Duisburg, in this chapter.

Generally speaking, the vision is to integrate the highway into urban context. Overtime, new urban spaces will be created above and along the highway that seek to take advantage of the connector. Urban parks, promenades, trails, pedestrian bridges and development projects are envisioned as a series of urban insertions that ripple through the City fabric, making new connections and reinvigorating old ones.

The core strategies that will be employed along the length of the highway involve public space, greening, landmark, pollution barrier and, ultimately, urban design interventions. Namely, they are listed as followed:
1. Regenerate the space along A40
2. Rebuild connections across A40
3. Integrate the pollution barrier with landscape
4. Enrich the visual experience during drive

These strategies are used to modulate and recalibrate the existing infrastructural surfaces of the highway in a manner that adds depth and meaning to connector experience, and by default, the visual and physical experience of the city.

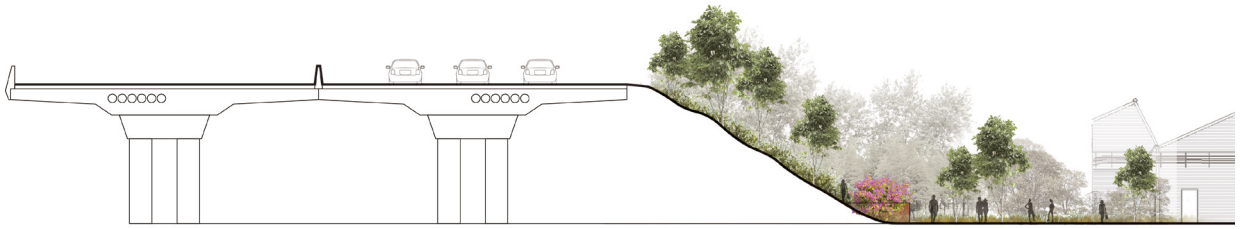
4.2 REGENERATE THE SPACE ALONG A40

The right-of-way is commonly perceived as an unidentifiable non-place or negative space. In order to regenerated the space along A40, the interface between highway and city plays an essential role in the transformation. Therefore, three typologies of interface where the highway can interact with urban environment is elaborated as followed.

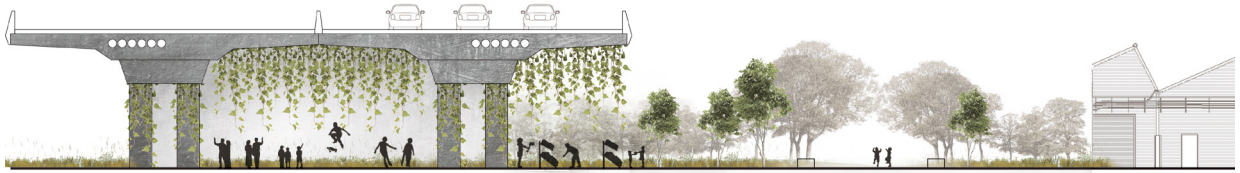
1. Highway 'Dike'
The idea is to spatially and gently extend highway into urban environment by creating a continuous slope as buffer zone. On the top of the slope, roadside trees are planted as soft pollution barrier. On the bottom, flowers and grass are arranged on the ground or in the planters in order to create an enjoyable environment for pedestrian. In total, the highway 'dike' functions as a transitional buffer and a platform for the hybrid highway landscape.

2.Under Highway
It's an opposite idea compared with the last one. Instead of highway extension, it aims to extend the urban life into the space under the highway. With vine plants, the environmental impacts on the 'under-highway' space are relieved to an acceptable level. The space can be occupied by sports or retail for social involvement.

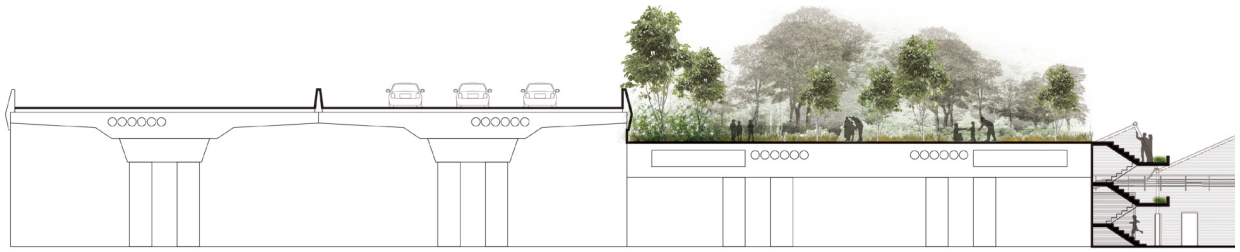
3. Elevated Park
This is a combination of the first two ideas. One one hand, the elevated park creates a platform in the middle for both hgihway and city extension. On the other hand, it forms an independent system as a media to tie highway and urban environment together.



1. Highway 'Dike'



2. Under Highway



3. Elevated Park

APPLYING TO THE SITE

1. Highway 'Dike'

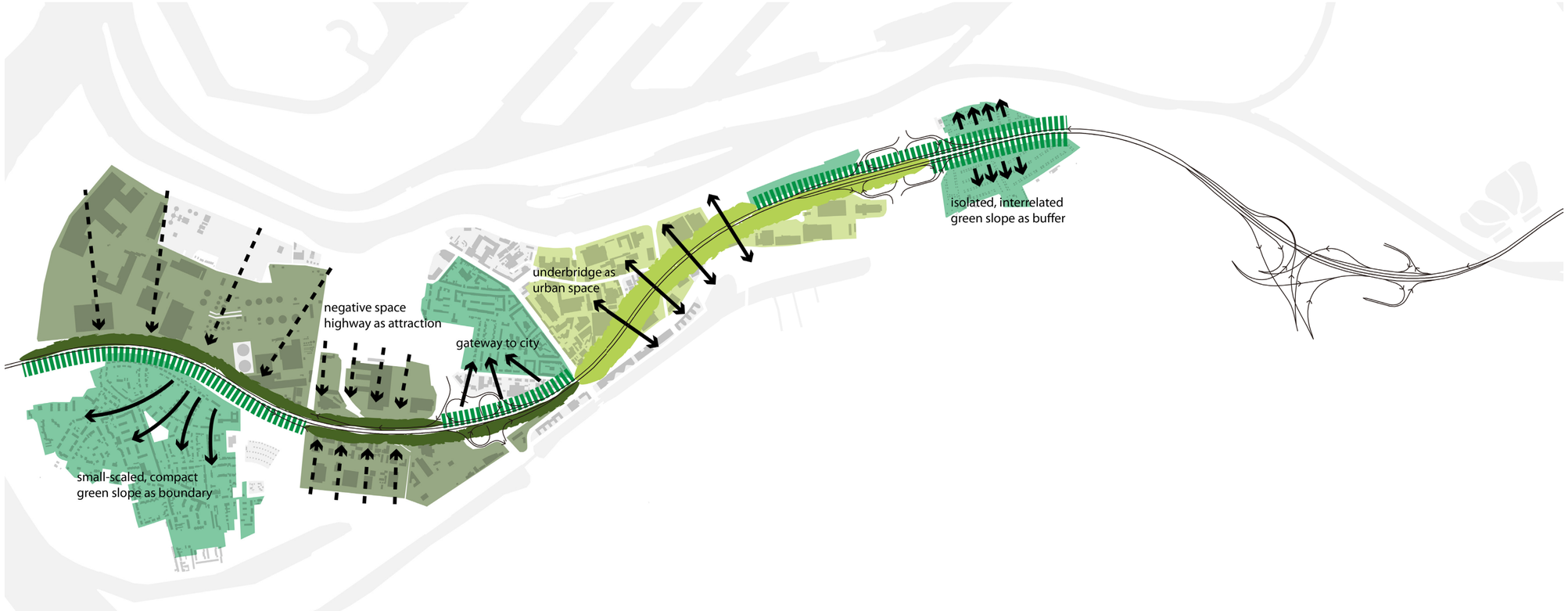
The typology of highway 'dike' applies to the small-scale and private space where a buffer or a boundary is needed. Therefore, the right-of-way is strongly related to the urban environment.

2. Under Highway

The typology of under highway applies to the public space with social involvement. The space can be treated as extra field for urban activities. What's more, it breaks the spatial barrier in the urban context and repairs connection across highway.

3. Elevated Park

The typology of elevated park applies to the isolated space which is surrounded by areas without social involvement such as factories and warehouses. By creating elevated park, people are encouraged to explore the forgotten area.



4.3 REBUILD CONNECTIONS ACROSS A40

As a common thread, A40 is regarded and treated as a spatial barrier in Duisburg because of the limited crossing and unpleasant walking experience. In order to fix the problem and create an attractive condition for getting across, three typologies of highway underpass are proposed as followed according to different urban context.

1. City Connection

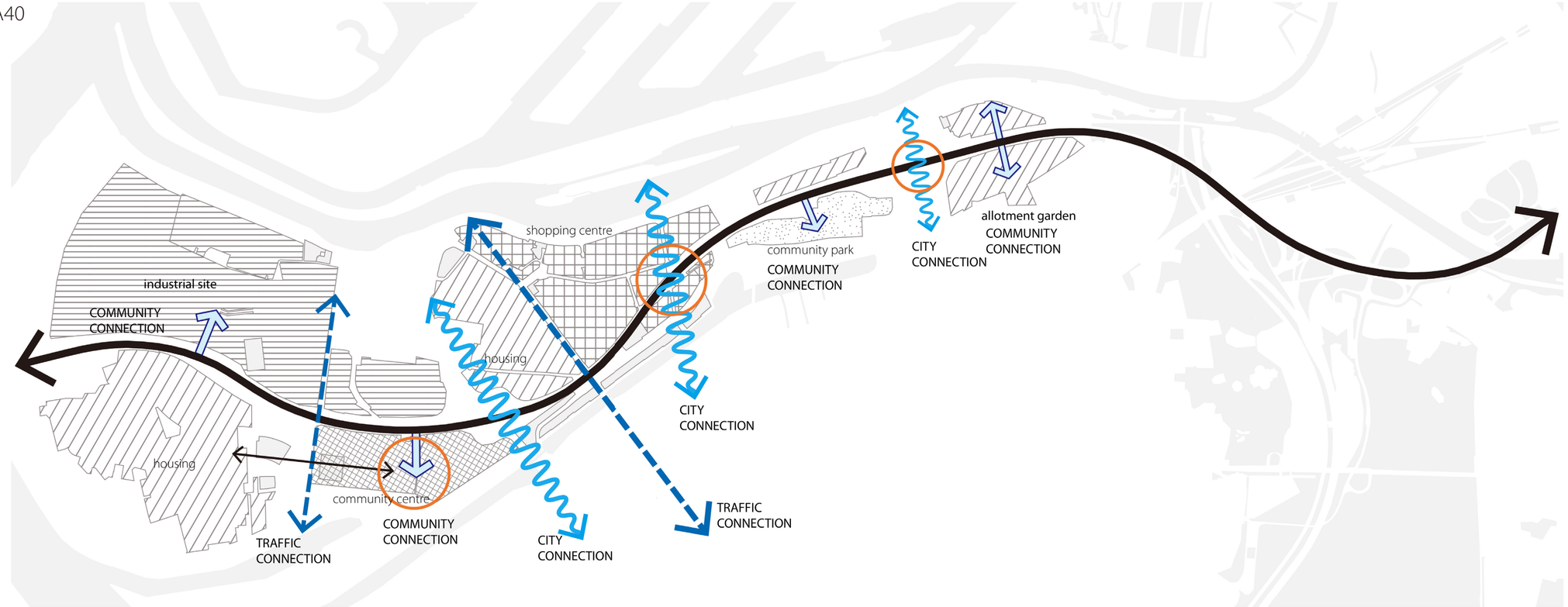
The pedestrian and traffic are integrated here. Space for walking are decorated with plants.

2. Traffic Connection

The main traffic routes are arranged in a highway tunnel which is relatively enclosed in order to ensure the safety and reduce the influence to the surrounding area.

3. Community Connection

It will be used for the pedestrian only. The spatial quality seems to be very important. Therefore, a wandering path with planted slope is designed in order to create a natural atmosphere.



4.4 INTEGRATE THE POLLUTION BARRIER WITH LANDSCAPE

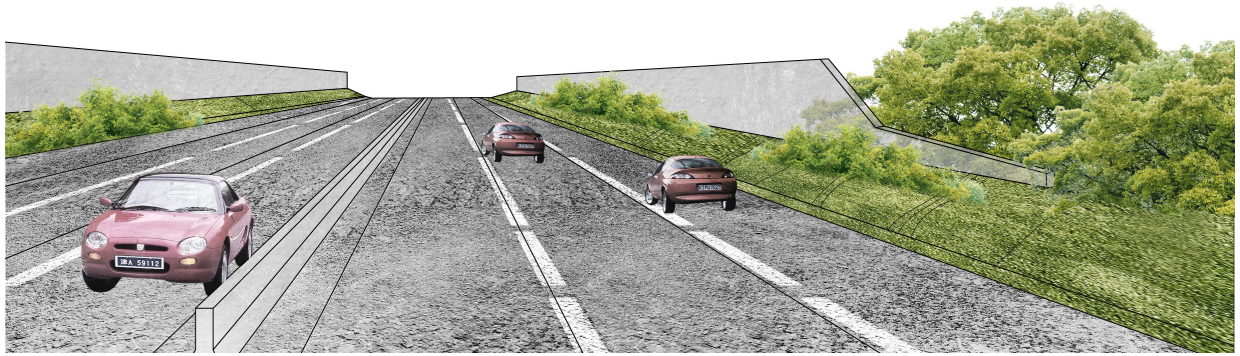
Landscaping can be used in several ways to improve the aesthetics of freeway corridors, and noise barriers in particular. Three typologies illustrate several possibilities of landscaping relative to noise barriers.

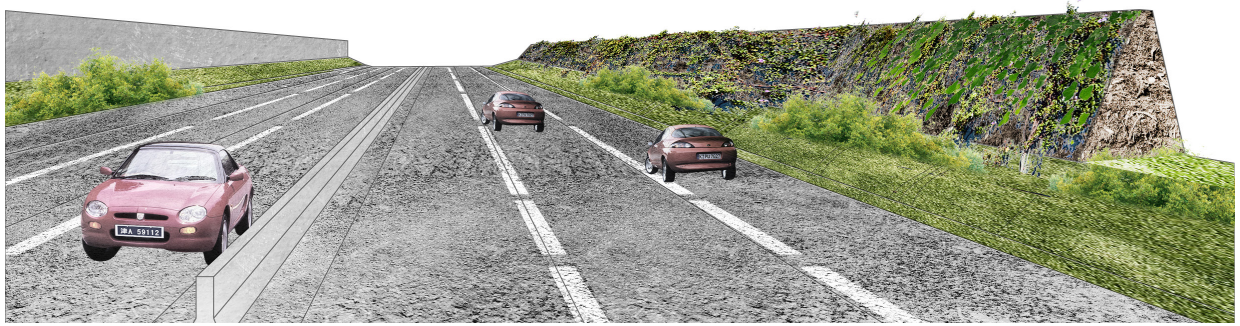
1. Soft Barrier
Noise barrier walls can be softened through the use of plants that camouflage their hard edges. Vines cascading over the top of walls and base plantings can be used effectively as softeners.

2. Integration of Landscape and Barrier
A primary goal in designing noise barriers is to integrate them into the landscape. Problems develop when barrier walls are placed on the landscape with little attempt to integrate them with the surrounding landforms or existing built elements such as bridge abutments, end walls, and guardrails. As a result, barrier walls can appear as obtrusive objects in the environment.

3. Living Barrier
Plants and wall structures can be integrated in a variety of ways. The wall itself can be designed using earth and plants as the primary construction materials. Living barriers, which are used in Western Europe, are such an example. These are essentially vertical earth walls which function as the growth medium for willow plants. The earth is contained in a frame constructed of white willow posts interwoven with basket willow twigs. The twigs sprout leaves, covering the structure and giving the appearance of a wall-like hedge. In Germany these walls have life expectancies of twenty to thirty years.


1. Soft Barrier


2. Integration of Landscape and Barrier


3. Living Barrier

APPLYING TO THE SITE

1. Soft Barrier

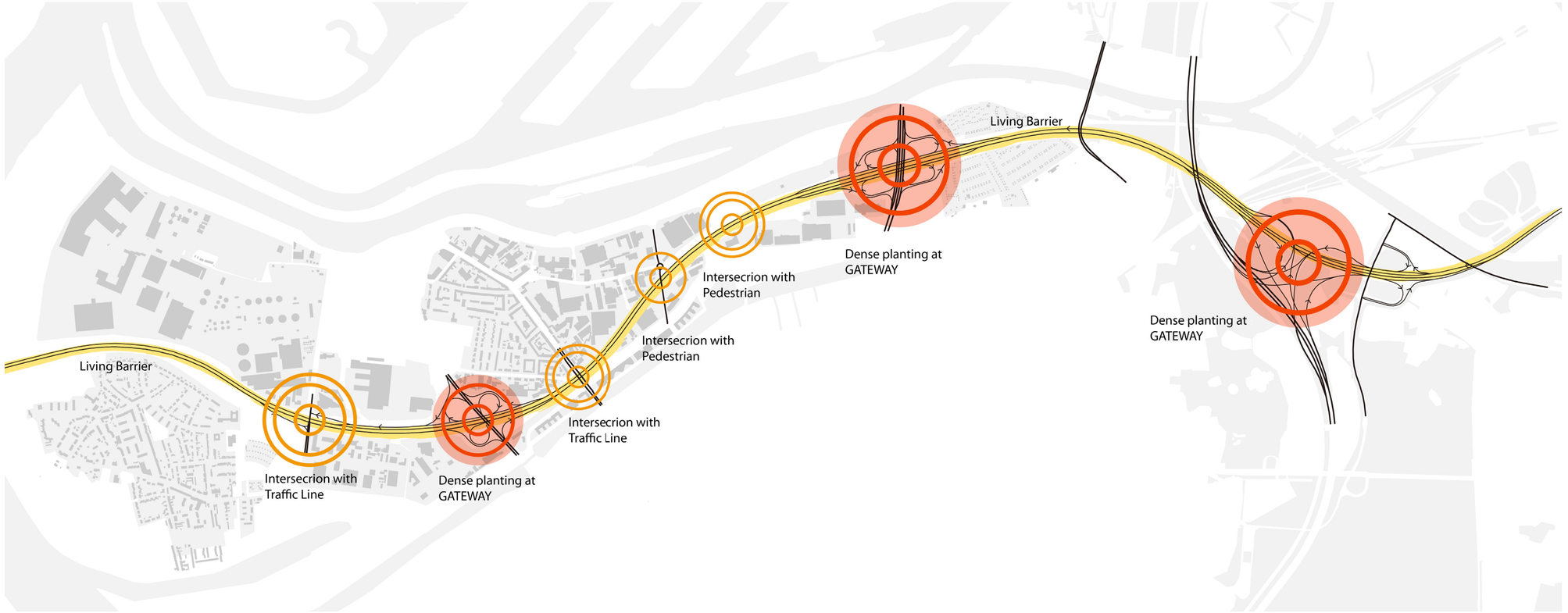
At the gateway to city, trees play an essential role on softening the retaining wall and offer the first impression of the city as green urban environment.

2. Integration of Landscape and Barrier

At the intersections with city road, trees are not possible to planted on the traffic line. Therefore, the integration of landscape and barrier is a smart choice.

3. Living Barrier

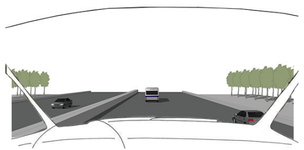
Living barrier is a feasible typology which can be used in the most cases.



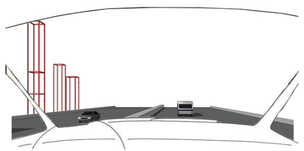
4.5 ENRICH VISUAL EXPERIENCE DURING DRIVE

Simply stated, aesthetics in highway design is the art of locating and integrating public roads into the total environment for people to use and enjoy.

1. Trees as Screen



2. Broad View



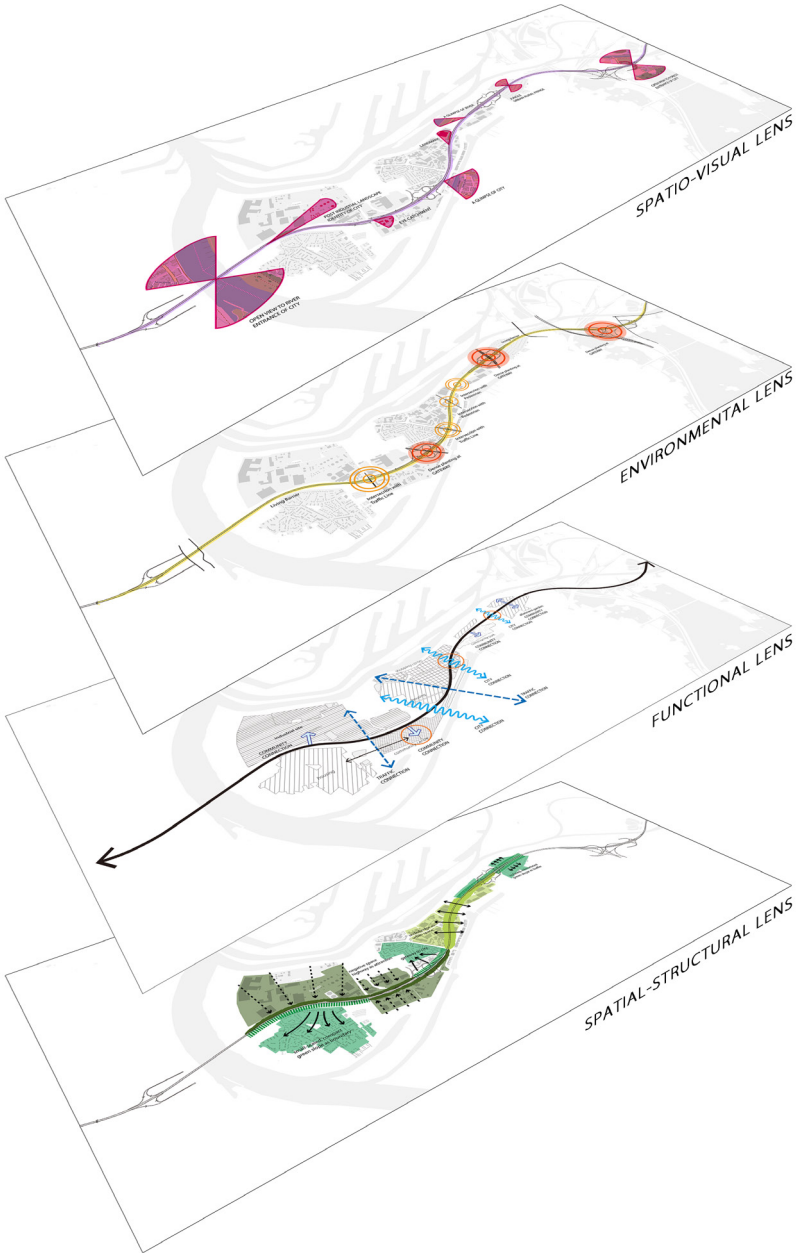
3. Eye Catchment

4.6 CONCLUSION

OVERLAYING

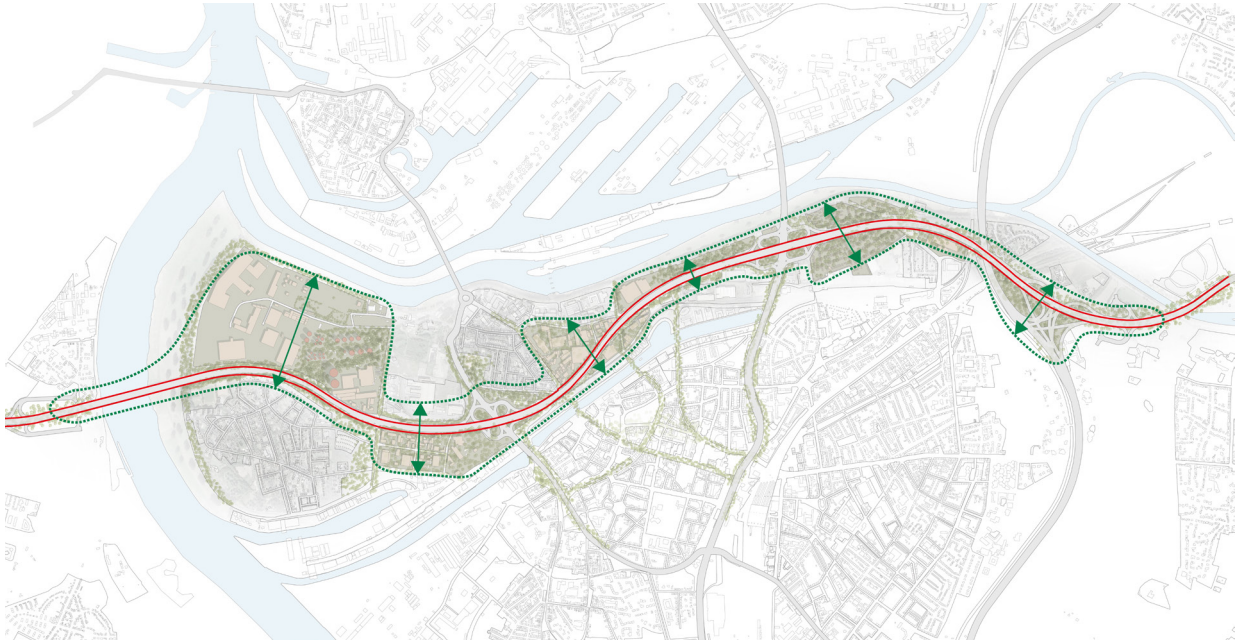
Due to the site analysis on the research area along A40 in Duisburg and the principles proposed above based on the four-dimension approach, the strategy is to transform the isolated highway line into an integral zone. On one hand, the area adjacent to the connector is developed by regenerating the vacant field to open space and parks with trees in order to reduce the environmental impact. On the other hand, the penetration across highway is also enhanced by creating promenade for residents.

Further, I applies four principles for four chosen area based on spatial-structural aspect. Firstly merging the highway into one side pattern by visual connection; second, designing an 'in-between' zone belonging to highway but also benefit to local; thirdly at central city creating intensive connection; and at urban fringe, separate blocks can be blended into each other by breaking highway barrier and taking use of the space underneath.



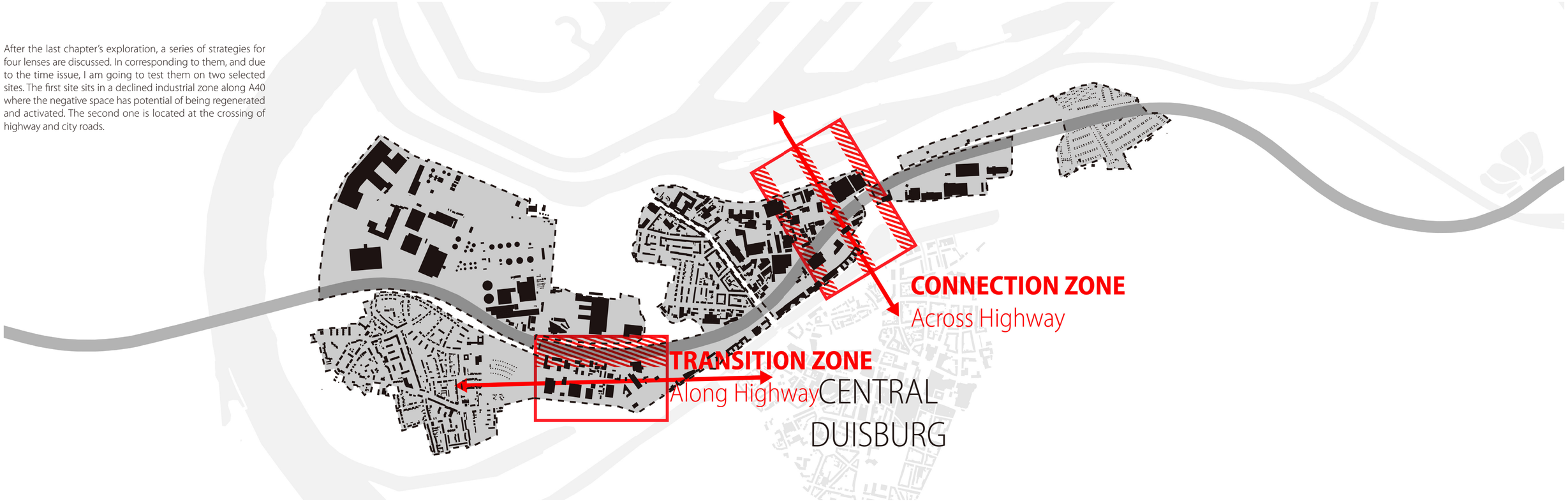
4.6 CONCLUSION

By applying these strategies, the isolated highway is transformed into an integral zone which relates right-of-way to itself. Urban forests are restored within the right of way. The highway is then programmed as a sequence of unique public places. Urban connections are made and new development is realized.



5 APPLICATION

After the last chapter's exploration, a series of strategies for four lenses are discussed. In corresponding to them, and due to the time issue, I am going to test them on two selected sites. The first site sits in a declined industrial zone along A40 where the negative space has potential of being regenerated and activated. The second one is located at the crossing of highway and city roads.



5.1 APPLICATION 1
TRANSITION ZONE ALONG A40

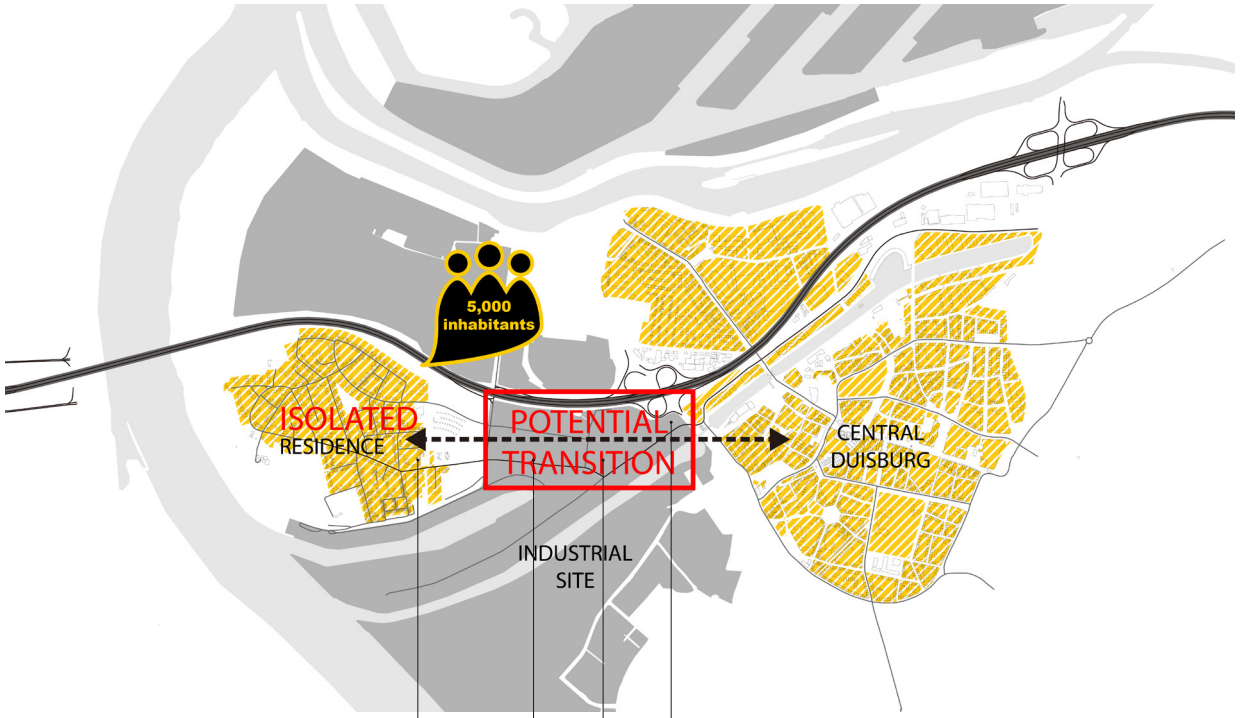
Project: Right-of-Way Regeneration
Location: Neuenkamp, Duisburg

5.1 TRANSITION ZONE ALONG A40

5.1.1 SITE ANALYSIS

The first application field is located in a declined industry site where highway plays a negative role. As shown in the images, urban pattern is fragmented with in the right-of -way both spatially and functionally. In the broader context, it's regarded and treated as an enclave that cuts off the connection of an adjacent community with the city. Therefore, the area has a great potential to be transformed into a transition zone along A40 by related to the highway.

There is an isolated settlement of 5,000 inhabitants surrounded by large-scale industrial area and logistic centre with its only openness to River Rhine. Two local roads connected to the city goes through the industry site. What's more, even though there are a few service facilities, such as stores, gym, kindergarten and nursery organizations, operating within the community, social interaction and communication are missing, especially the public space.




Housing
Source: http://www.alamy.com/stock-photo/kasslerfeld.html


Industrial Site


Abandoned Field


Tunnel

5.1 TRANSITION ZONE ALONG A40

5.1.2 DESIGN TYPOLOGY

HOW TO MAKE A TRANSITION ZONE ALONG HIGHWAY WITH SOCIAL INVOLVEMENT?

UNDERPINNING-SPATIAL ASPECT

References: 'in viaduct', Zurich

The viaduct is more than just a bridge. Like a mountain chain erected by human hand it appears in the town with a scale derived from the landscape and topography. The infrastructure element, originally used as a railway line, had to be formed in a linear park that will be part of a culture, work and leisure mile. This reprogramming initiated two decisive urban impulses: The viaduct as a spatial barrier becomes a linking structure and the outdoor spaces bordering it are upgraded. We viewed the ambivalence of a large-scale connecting machine and a linear building as a fundamental quality and used it as the architectural leitmotiv to symbiotically connect the new uses with the viaduct structure, including the characteristic Cyclopean masonry as atmospheric element. The new structures are deliberately restrained so as to emphasise the existing arches.

Source: 'In Viaduct', Zurich

ACTIVATING THE HIGHWAY BORDER BY COMMERCE

5.1 TRANSITION ZONE ALONG A40

5.1.2 DESIGN TYPOLOGY

HOW TO MAKE A TRANSITION ZONE ALONG HIGHWAY WITH SOCIAL INVOLVEMENT?

UNDERPINNING-SPATIAL ASPECT

References: Play Landscape be-MINE

The spectacular scale of this site – regarding both the height of the terril as well as its industrial heritage – is unique in the relatively flat surrounding landscape of Limburgian-Flanders. The intervention is a landmark on a large scale, but through its playable character it also reflects the small scale of a child. The values of the industrial heritage have been a continuous leading theme in the design process that resulted in an unprecedented play scape. The mining 'terril' has been given a new meaning, rooted in both the past and the future.

The design consists of three parts, that create a unity with the mountain and its past: a pole forest as a landmark, an adventurous prismatic play surface on the flank of the mountain and a coal square on the top of the 'terril'. The spine of the ensemble is a straight stairs that provides access to all levels. At night, a light line along the stairs makes the topography of the terril visible.

ACTIVATING THE PLACE BORDER BY TOPOGRAPHY

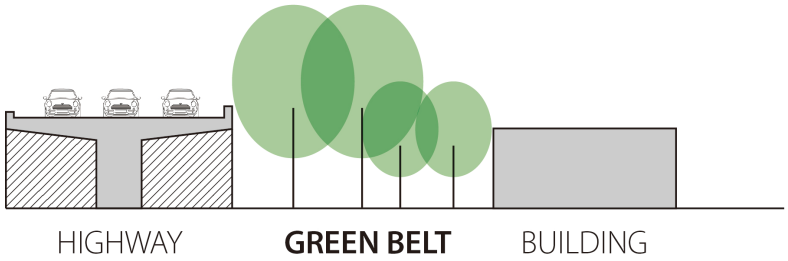
Source: Play Landscape be-MINE

5.1 TRANSITION ZONE ALONG A40

5.1.2 DESIGN TYPOLOGY

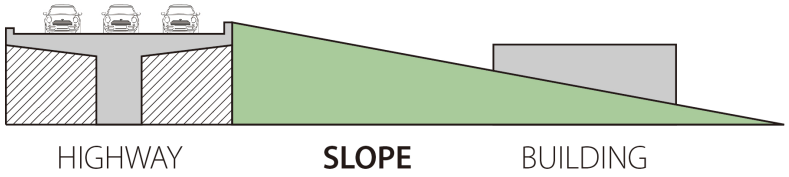
HOW TO MAKE A TRANSITION ZONE ALONG HIGHWAY WITH SOCIAL INVOLVEMENT?

UNDERPINNING-SPATIAL ASPECT



A. Green Belt

Yanzhong Park, Shanghai *Source: www.nipic.com/show/1/49/6319570kf3ff7cf5.html*



B. Slope

Duisburg, Germany *Source: Google Map*

C. Stores

Osaka, Japan *Source: www.cbnweek.com/articles/normal/15673*

5.1 TRANSITION ZONE ALONG A40

5.1.2 DESIGN TYPOLOGY

HOW TO MAKE A TRANSITION ZONE ALONG HIGHWAY WITH SOCIAL INVOLVEMENT?

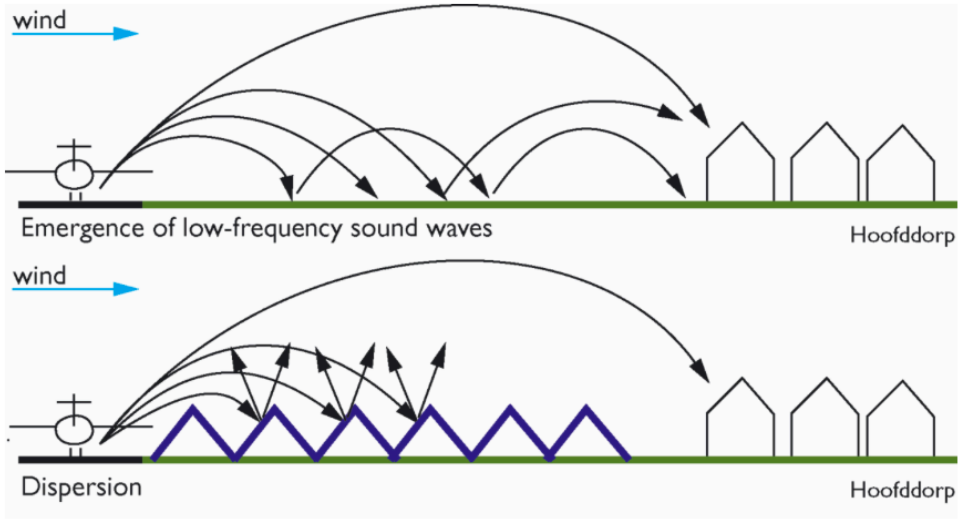
UNDERPINNING-noise reduction

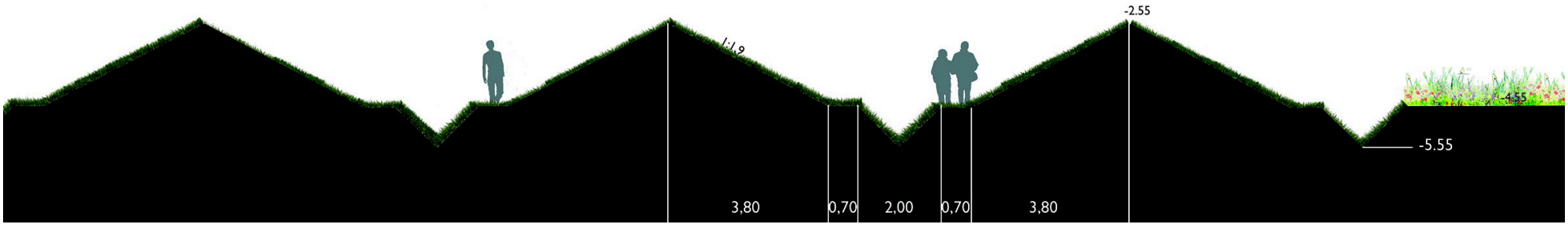
References: PARK BUITENSCHOT, schiphol airport

GROUND NOISE

Measurements and calculations have shown that the ground noise is distorted and dispersed, as it were, by oblique planes. With some poetic license one could say that the invisible ground noise in the ground ridges is made visible.

A 3 metre high embankment was placed on the land surface around a large open space. Besides the pyramids this is the sole elevation element in the park. The embankments, without trenches, blend seamlessly into the land surface. Various paths run through the park area. There's a paved bicycle lane in the centre and a paved footpath crosses the park. The most informal network is created by the grassy and cut paths between the ridges.





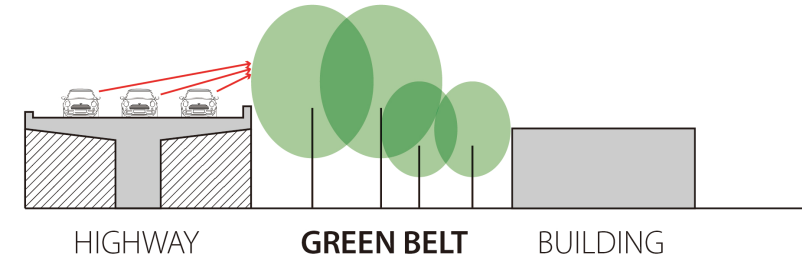
Source: illustration by H+N+S

5.1 TRANSITION ZONE ALONG A40

5.1.2 DESIGN TYPOLOGY

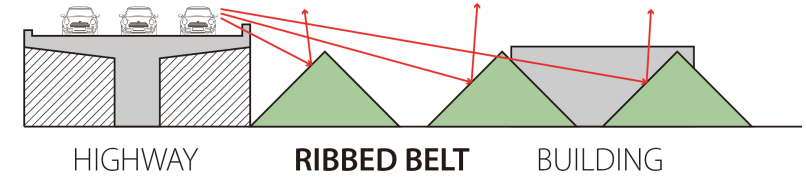
HOW TO MAKE A TRANSITION ZONE ALONG HIGHWAY WITH SOCIAL INVOLVEMENT?

UNDERPINNING-Noise Reducing



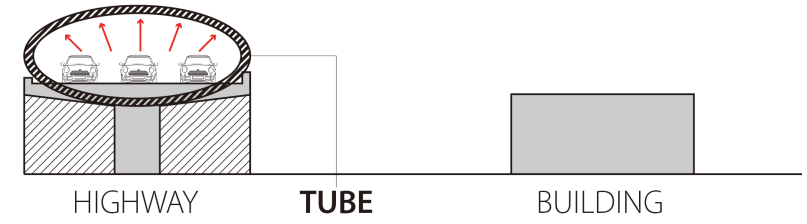
A. Green Belt

Duisburg, Germany



D. Ribbed Belt

Schiphol Airport, the Netherlands



E. Tube

The Hague, the Netherlands

5.1 TRANSITION ZONE ALONG A40

5.1.3 DESIGN ATTEMPT

Attempt 1-- C. Stores +E. Tube

A series of programs such as retail are introduced under the highway in order to activate the space related to it. The noise is reduced from origin with a skin.
However, the view of highway users is blocked **(poor visual connection)**.

C. Stores

E. Tube

5.1 TRANSITION ZONE ALONG A40

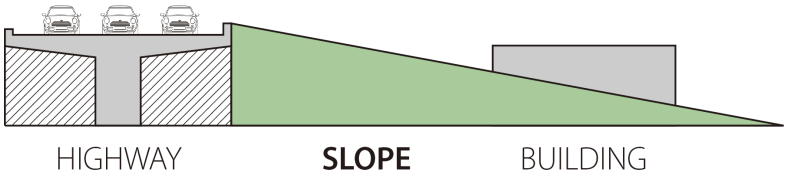
5.1.3 DESIGN ATTEMPT

Attempt 2--B. Slope + D. Ribbed Belt

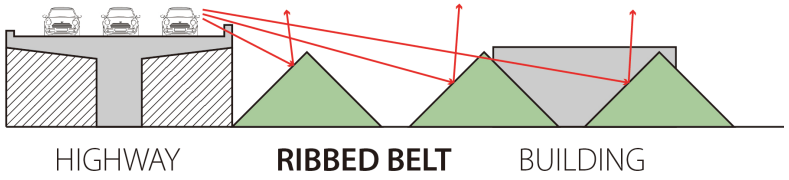
The combination of green slope and ribbed belt is introduced between highway and residential area to create continuous connection. The idea of 'ribbed belt' is firstly applied on top of buildings due to the height of noise source on highway (slope roof) and secondly applied again for noise reduction at the end of continuous slope--elevated park in order to provide a pleasant place for residents.

'Slope' principle (being transformed into terrace in order to fit into site):
1. Space utilization is increased by creating continuous interface between highway and city.
2. Public space is enriched by being extended from ground level to the border of highway.
3. The negative space along highway is transformed into an urban public zone.
4. The height difference between highway and city level is mixed together.
5. Urban landscape is brought closer to highway.

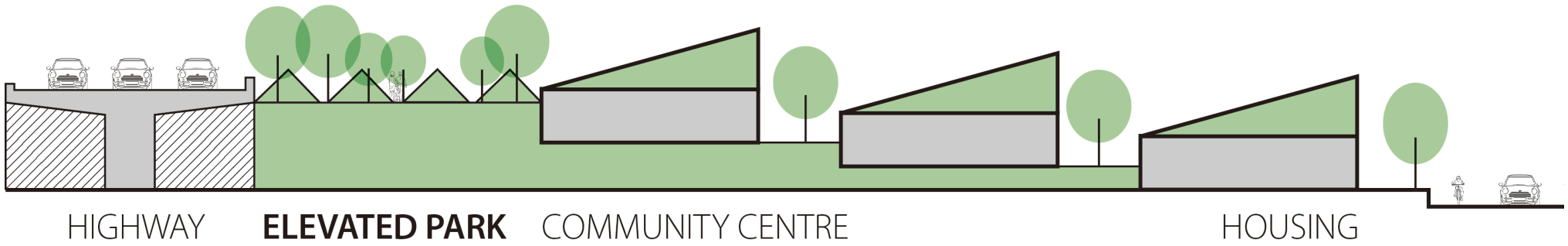
'Slope roof' principle:
1. Effectively reducing noise by landscape device.
2. Landscape surface to highway is increased by creating the slope roof.
3. Distinctive highway landscape is achieved by embracing urban image.



B. Slope



D. Ribbed Belt

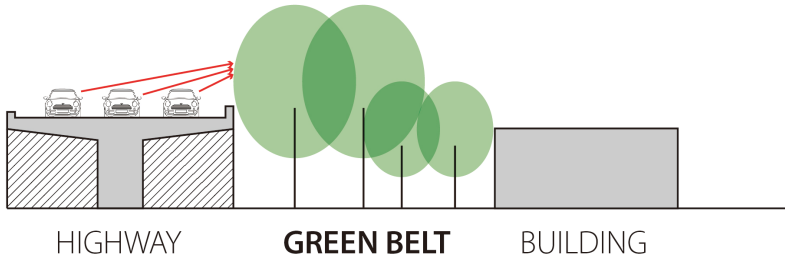


5.1 TRANSITION ZONE ALONG A40

5.1.3 DESIGN ATTEMPT

Attempt 3-- A. Green Belt

A green belt is introduced between highway and urban space in order to reduce negative impact from highway such as noise, air pollution. However, the green belt is a approach of dealing with problems in **a negative way** because the space between highway border and the back side of buildings is neither well accessible nor enjoyable due to lack of sunlight.



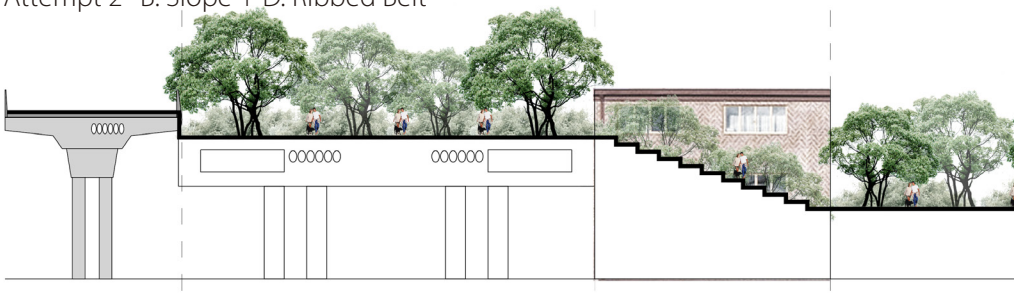
5.1 TRANSITION ZONE ALONG A40

5.1.3 DESIGN ATTEMPT

Evaluation

Attempt 1-- C. Stores +E. Tube

Attempt 2--B. Slope + D. Ribbed Belt



Attempt 3-- A. Green Belt

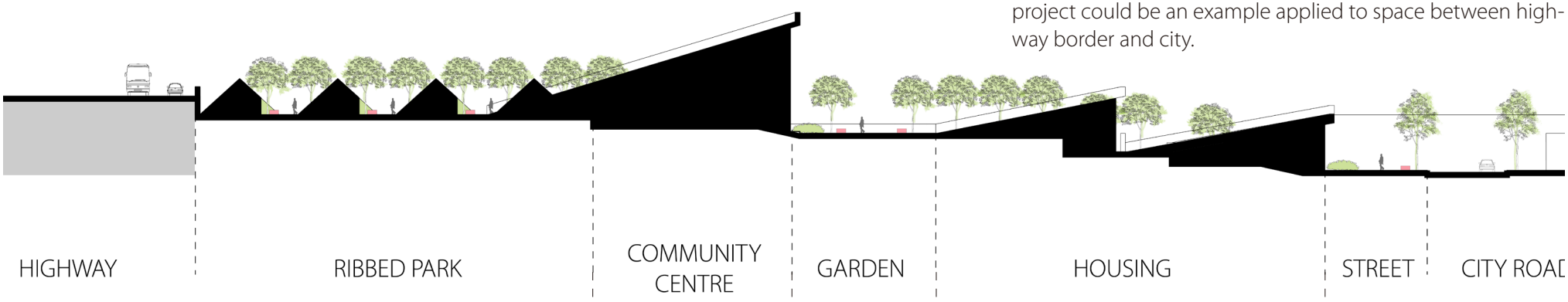
Spatial Quality	Accessi-bility	Space Utilization	Pollution Reducing	
−	+ −	+	+	
+	+	+	+ −	BEST!
+	+ −	−	+ −	

5.1 TRANSITION ZONE ALONG A40

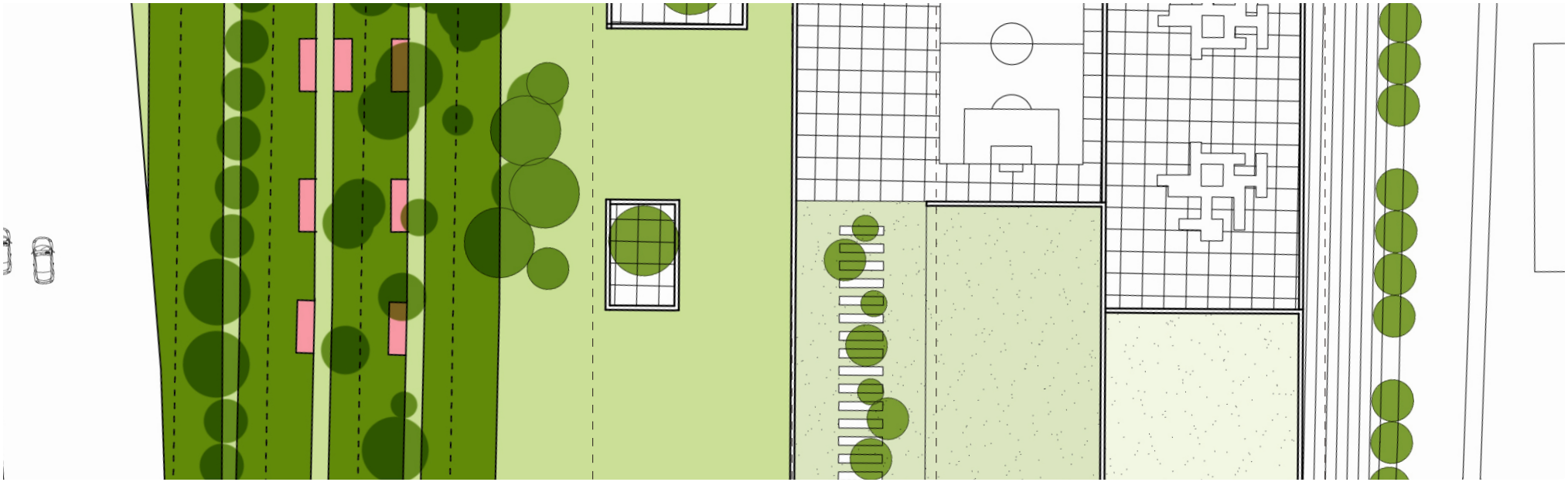
5.1.4 DESIGN PROCESS

The project includes a green terrace and a housing project. The continuous terrace is place between the highway and city in order to serve as a transition zone. One one hand, it activates the space related to highway. On the other hand, the green park reduces noise pollution and air pollution. The project could be an example applied to space between highway border and city.

1. Transforming Attempt 2 into Section A-A'



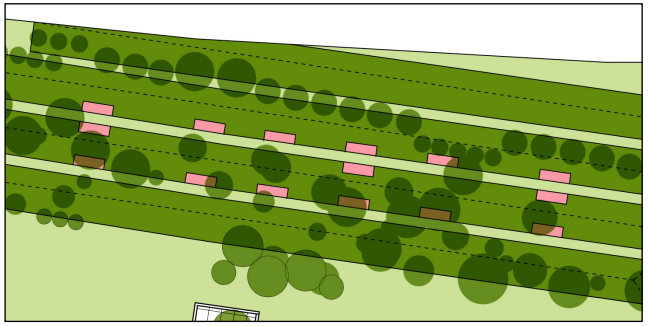
2. Reflecting on Masterplan

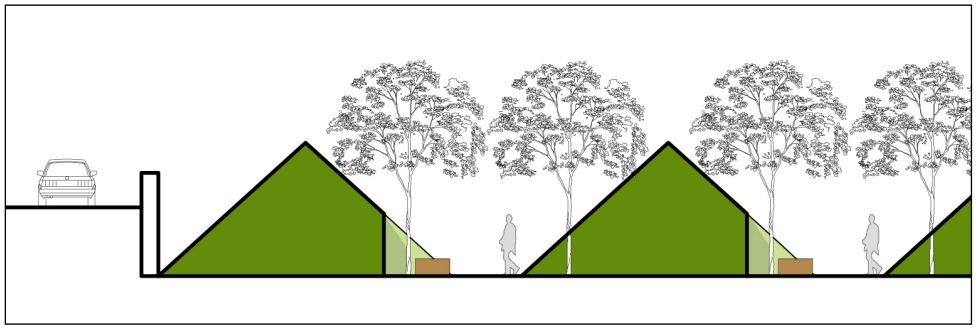


MASTERPLAN
1 ribbed park
2 community centre
3 housing
4 playground
5 garden

5.1 TRANSITION ZONE ALONG A40

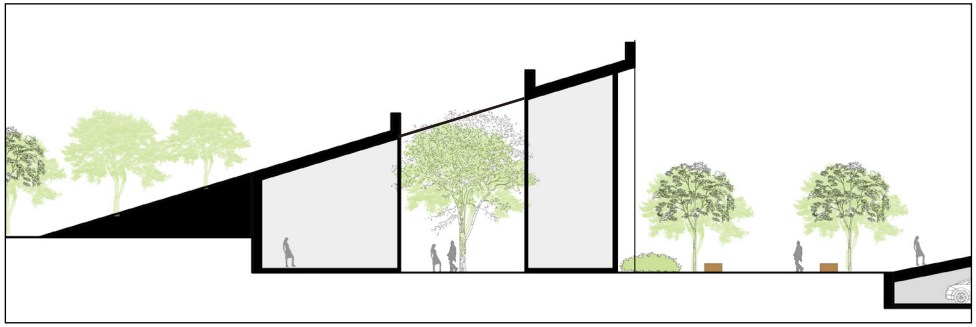
5.1.5 DETAIL ELABORATION





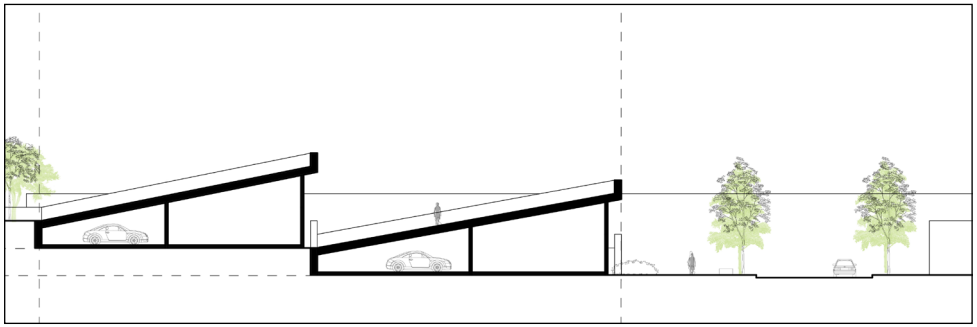
Ribbed belt

The ribbed belt is placed at the end of the continuous terrace--the elevated park. It serves as noise reducing device in order to create a pleasant place for residents and a landscape view for highway users.



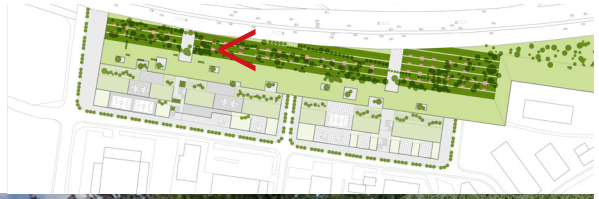
Patio in community centre

The slope roof of the community centre serves as a continuous structure for noise reduction. Within it, sunlight are ensured by embedding a patio.



Terrace

Housing are placed in front of the community centre with slope roof garden as well. It aims to offer a green outdoor space for residents.



The negative space along A40 has been regenerated for social involvement where the ribbed structure serves as an environmental shelter.

The monotonous and unattractive scenic has been replaced by an active urban image including landmark.

Fragmented right-of-way has been integrated by continuous terrace without being affected by highway traffic.

5.2 APPLICATION 2

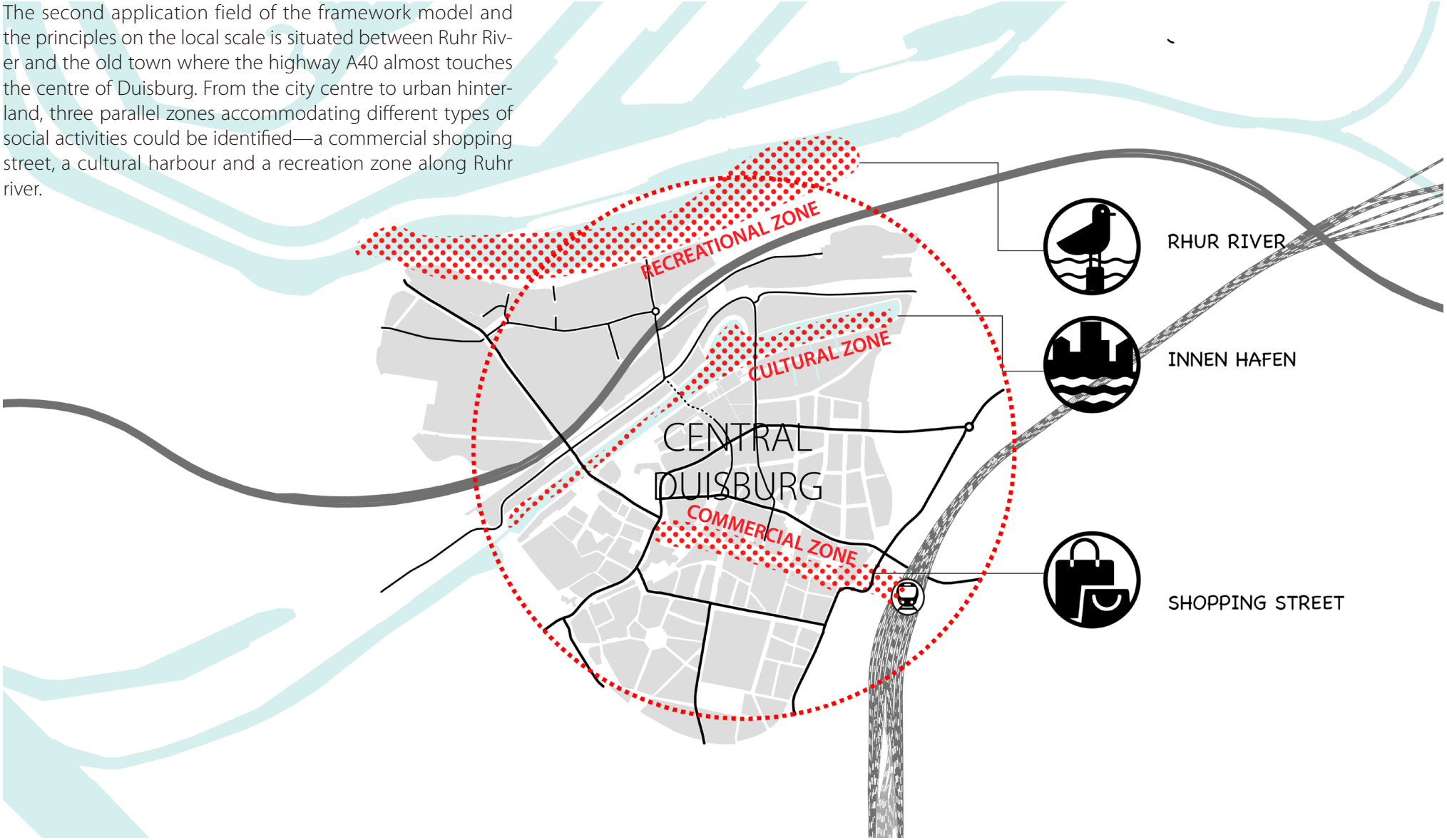
CONNECTION ZONE ACROSS A40

Project: Urban Barrier Transformation
Location: Central Duisburg

5.2 CONNECTION ZONE ACROSS A40

5.2.1 SITE ANALYSIS

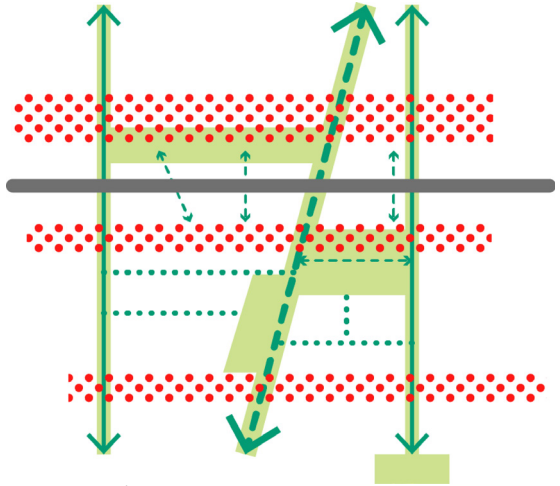
The second application field of the framework model and the principles on the local scale is situated between Ruhr River and the old town where the highway A40 almost touches the centre of Duisburg. From the city centre to urban hinterland, three parallel zones accommodating different types of social activities could be identified—a commercial shopping street, a cultural harbour and a recreation zone along Ruhr river.



5.2 CONNECTION ZONE ACROSS A40

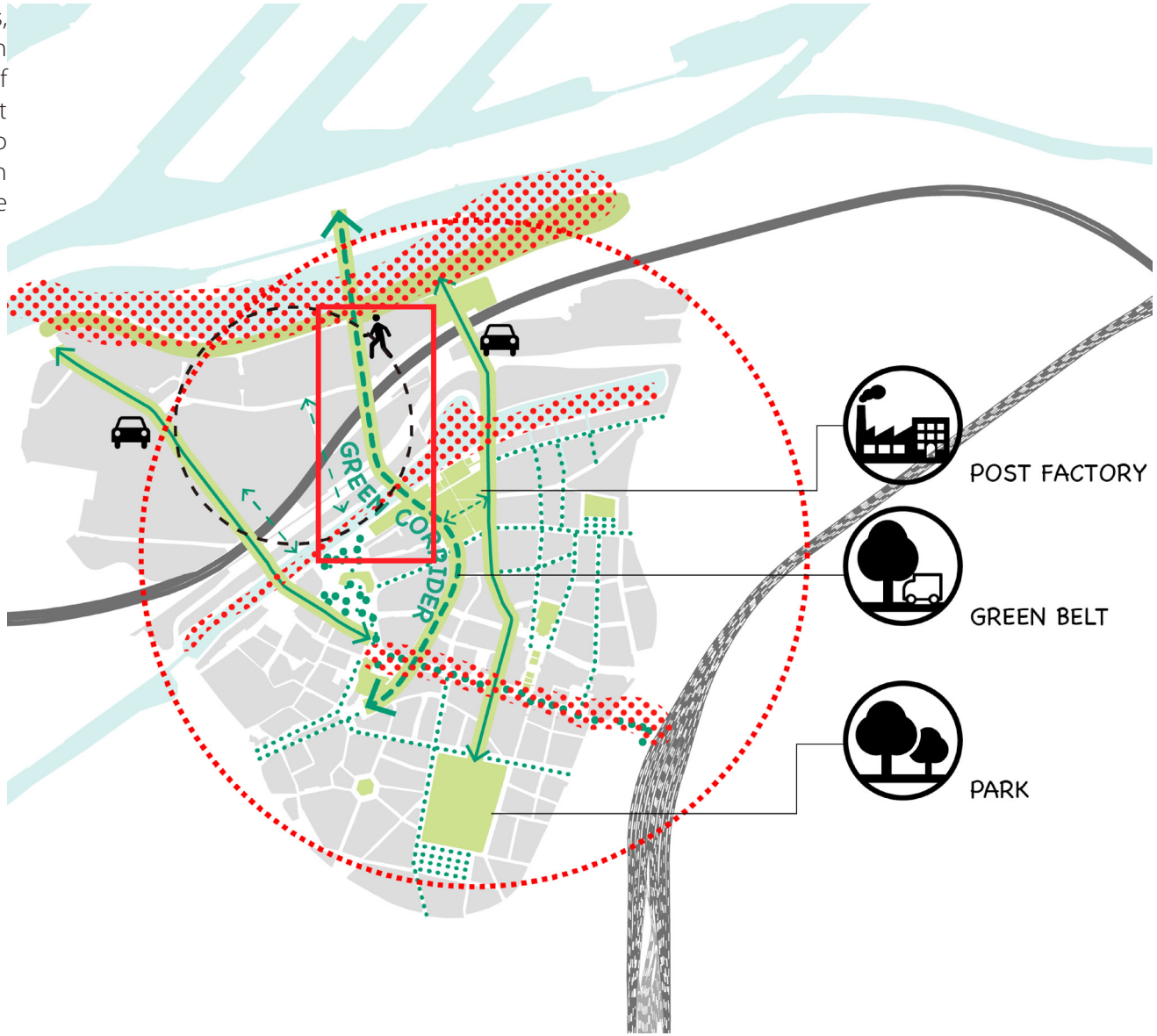
5.2.1 SITE ANALYSIS

In order to create connection among these activities zones, a green network is proposed in the centre of Duisburg. In order to enhance the connection between both sides of highway, a green network consists of three connecting belt are proposed here. A green pedestrian corridor between two vehicle ways is highlighted as the main connection space in this area. Green area, communal service and infrastructure are integrated into the whole connection zone.



Green network

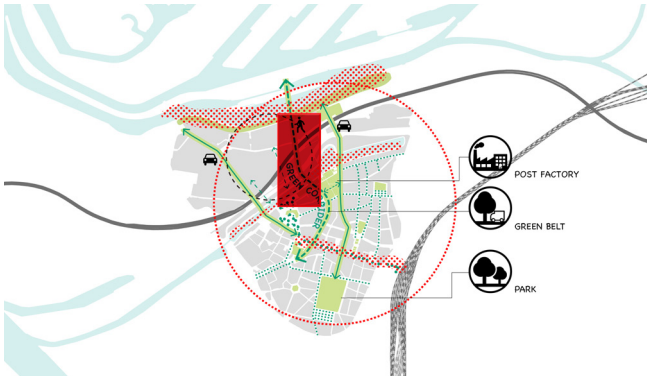
- city zone
- highway
- green corrider
- secondary connection
- local connection
- neighbor greenery
- green space

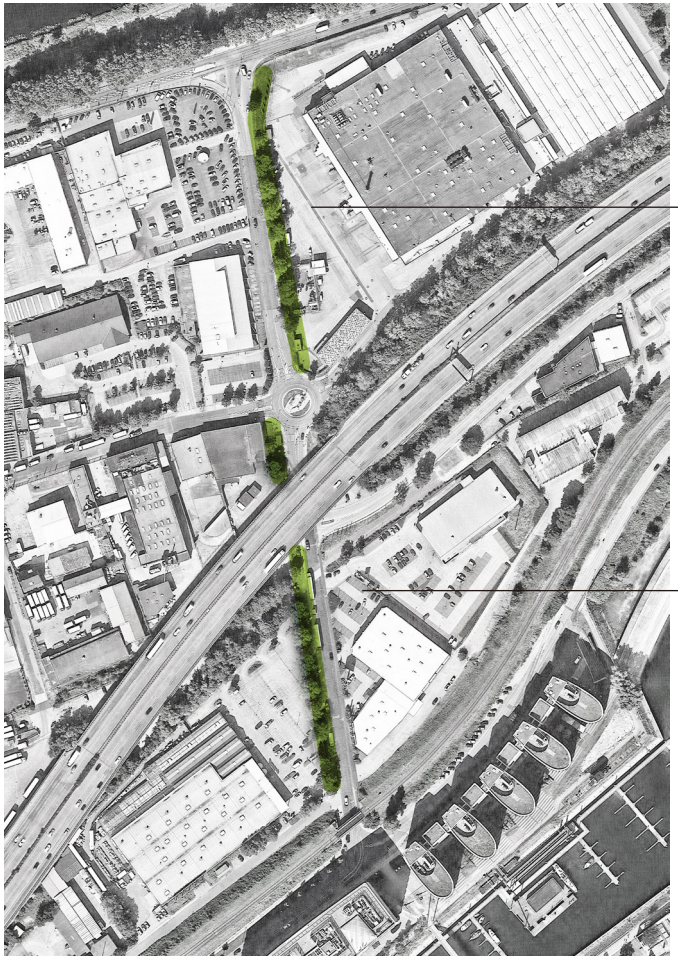


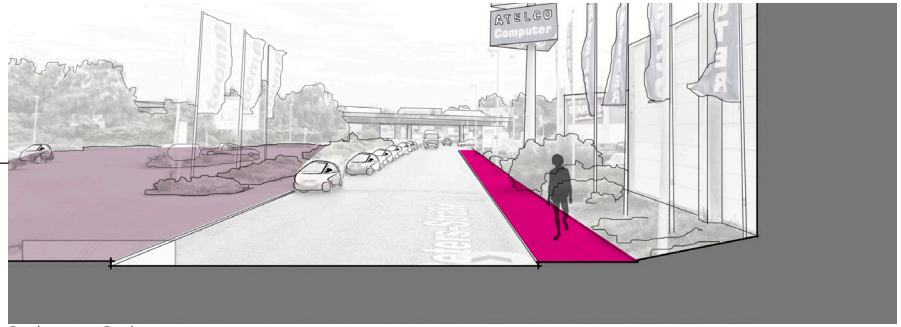
5.2 CONNECTION ZONE ACROSS A40

5.2.1 SITE ANALYSIS

The intersection is located in a commercial area mainly focusing on big-box retailers and storage. Generally speaking, it is currently not a pleasant space for wandering. Huge-scale warehouses and parking lots make pedestrian feel unsafe. The sidewalks are not always continuous due to the cars driving into parking lots. The dark underpass of the elevated highway give a sense of stress. Therefore, a green corridor here is a possibility to enhance the penetration and improve the spatial and environmental quality.







Pedestrian Right

Pedestrian Left

DISCONTINUOUS

5.2 CONNECTION ZONE ACROSS A40

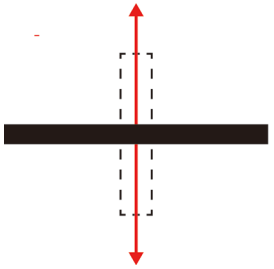
5.2.2 DESIGN TYPOLOGY

1. Garscube Landscape Link

To the north of Glasgow's city centre lies an area of low grade industrial, derelict land by the Forth and Clyde canal known as Speirs Locks. Once a booming trading centre, the area's economic downturn followed the canal's fall into disuse. This was further exacerbated in the 1960s with the construction of a motorway through the heart of the area, effectively cutting off a critical link between the canal network and the city centre. What remained was a single dark, dirty and claustrophobic underpass connection at Speirs Locks, described by the architects as an 'extraordinarily hostile environment.(7N Architects and RankinFraser Landscape Architecture)

In order to revamp this urban connection's negative and inhospitable perception, and in turn increase both its aesthetic and functional appeal, 7N Architects and RankinFraser Landscape Architecture developed the Garscube Link, an urban intervention project completed just over a month ago as the first phase of a strategy they have developed for the regeneration of the wider area. Dubbed 'The Phoenix Flowers' – an allusion to the old Phoenix Park, which pre-dated the construction of the motorway on the site – the intervention has implemented a colourful and inviting transition point for cyclists and pedestrians, again linking a significant portion of northern Glasgow to the city centre. There is now a marked contrast between the eye-catching red that blankets the area's surface and the visual bleakness of the surrounding concrete and motorway flyovers. The 50 aluminium 'flowers' – growing up to eight meters tall in radiant orange, yellow and pink – line the entire route and serve to illuminate the area at night.

Source: Gaesube Landscape Line



A. Linear Connection

5.2 CONNECTION ZONE ACROSS A40

5.2.2 DESIGN TYPOLOGY

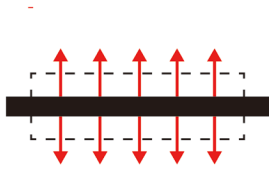
2. A8ERNA

Koog aan de Zaan is a sweet little village near Amsterdam. It is located at the river Zaan. In the early seventies a new Freeway was constructed. In order to cross the river Highway A8 was build on columns. The new road crosses town in a fascinating way. It produced a brutal cut in the urban tissue. Ironically, progress has resulted here in a radical separation between the Church and the State: on one side of the elevated highway is a Chapel and on the other the former City Hall. The columns are about seven meters high. The space under the deck is strangely monumental: a stretched cathedral.

The project is an attempt to restore the connection between both sides of town and to activate the space under the road. After being treated for more than 30 years as a blind spot finally the momentum was there to change things for the better.

The passive attitude of the past decades was replaced with the quest for optimistic interventions. Finally there seemed to be a new mindset: instead of a disaster, the remarkable space under the road was now considered an opportunity. Maybe a new type of urban life could be accommodated here: from desolate parking lot to mixed use area, from wasteland to focal point, from 'down town periphery' to centre. (NL ARCHITECTS)

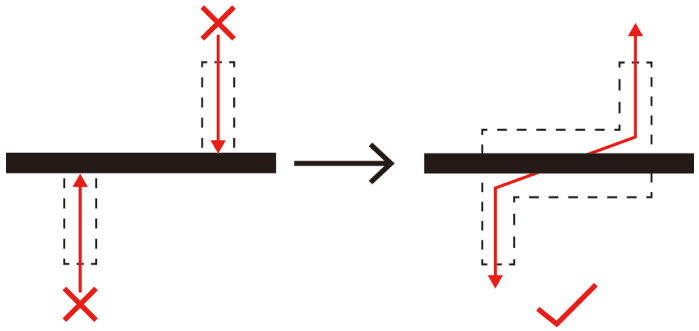
Source: A8ERNA



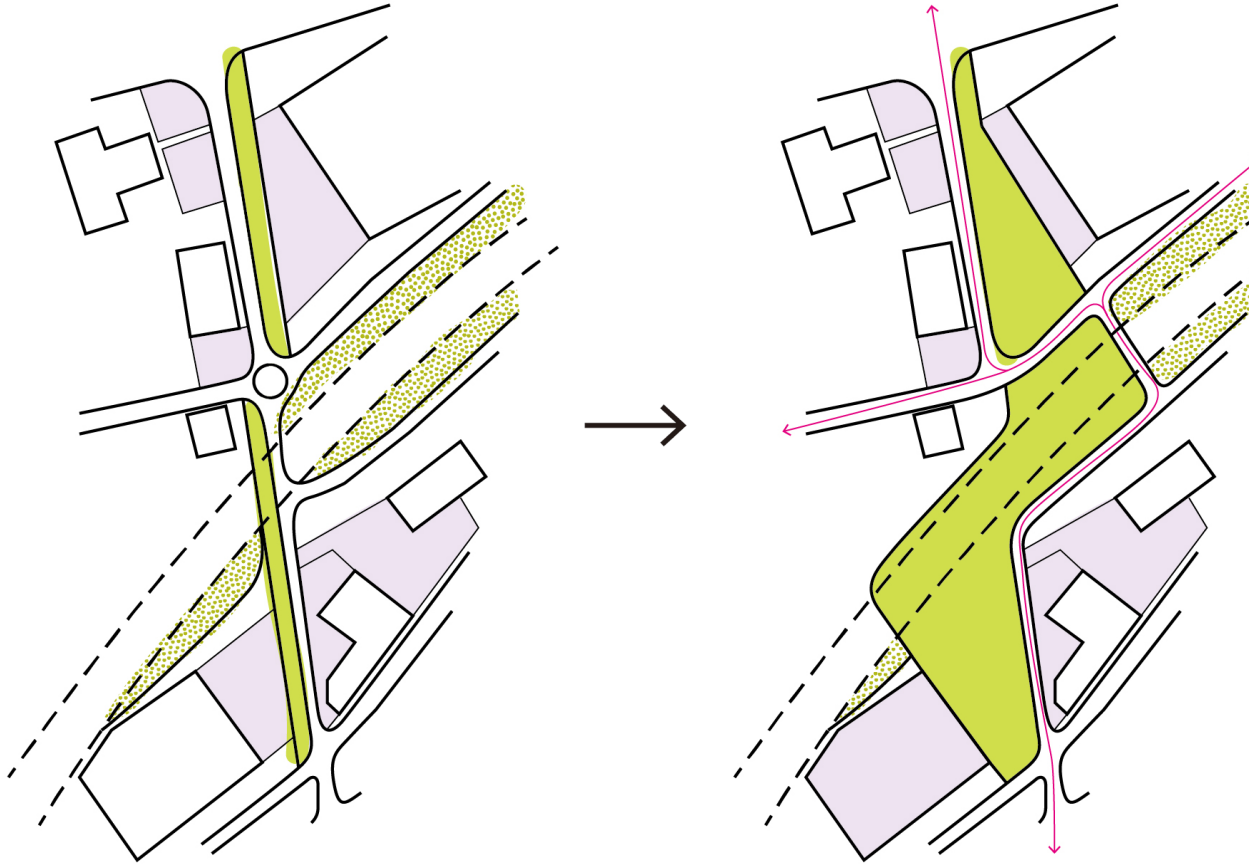
B. Zone Connection

5.2 CONNECTION ZONE ACROSS A40

5.2.3 DESIGN PROCESS



A connection zone is created due to urban space of both sides of highway. By improving spatial quality under highway, the continuity is enhanced.

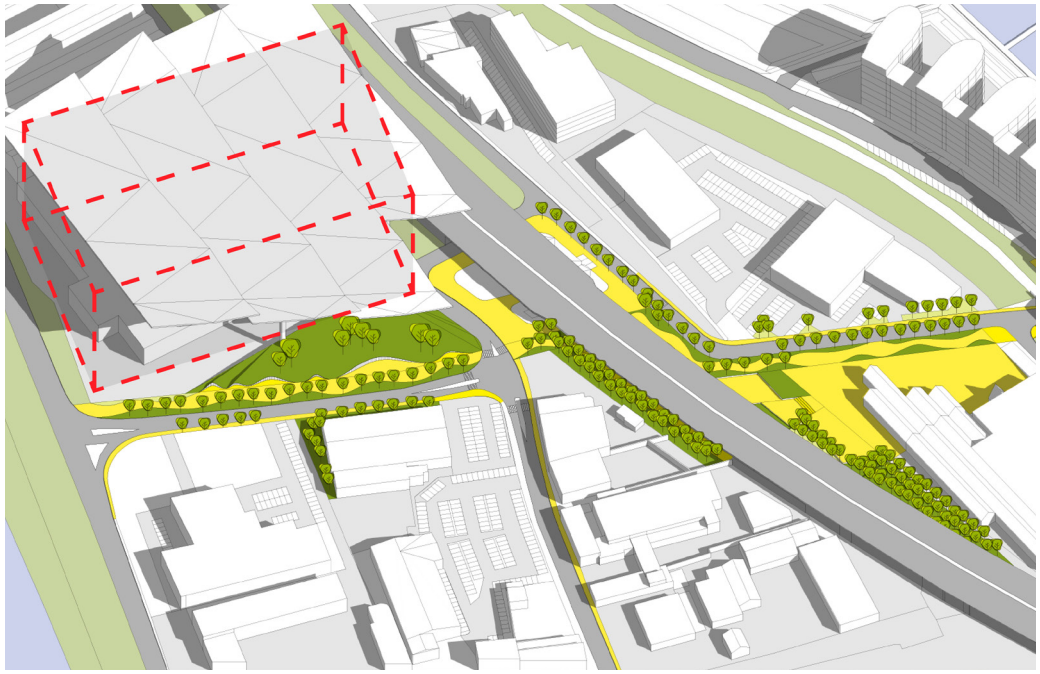


5.2 CONNECTION ZONE ACROSS A40

Besides, Green area, communal service and infrastructure are integrated into the whole connection zone. In the future, the whole area are expected to develop into a sub-centre for this area.

5.2 CONNECTION ZONE ACROSS A40

5.2.4 VISUAL LANDMARK



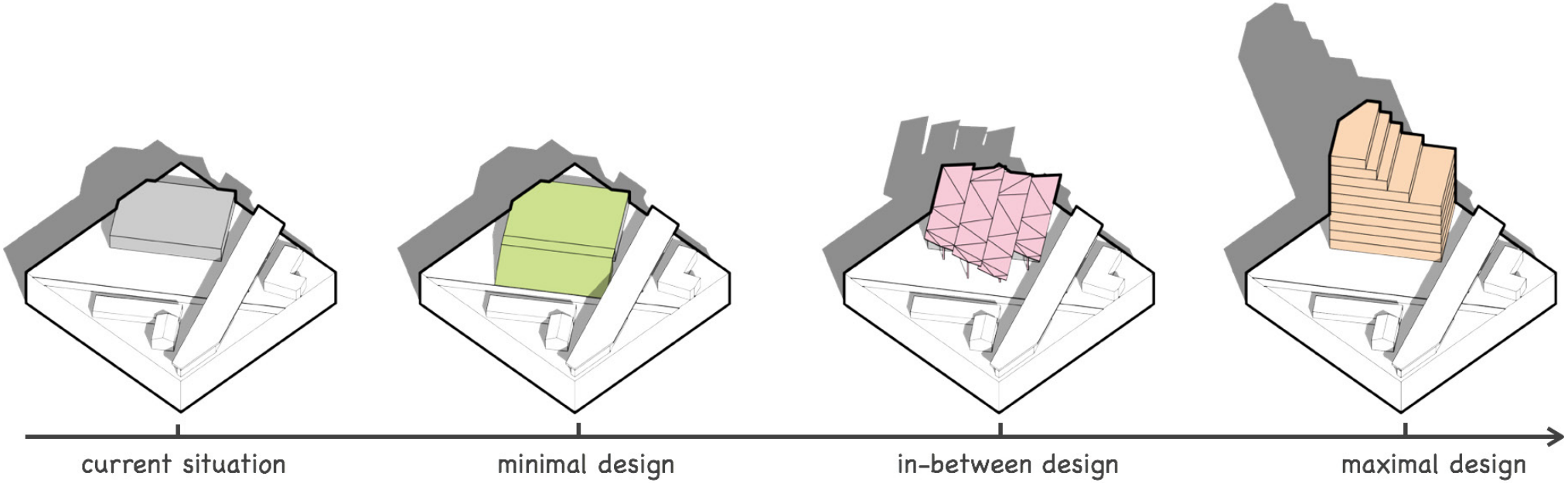
In the red highlighted area, a specific building project is proposed within the design area. On one hand, it provides service and boost for future development. On the other hand, the building itself should serve as a landmark and focal point within the whole city skyline along highway.

5.2 CONNECTION ZONE ACROSS A40

5.2.4 VISUAL LANDMARK

In terms of location, the chosen area sits on the extension of highway alignment. Therefore, it has a great potential to be a landmark that attractive during highway driving.

Based on the current situation, three possibilities of creating a visual landmark are listed according to different height. Firstly, the minimal design a roof garden extending to ground level by a green slope facing highway. By contrast, a high rise is regarded as a maximal approach of design. If completed, it will become a sub centre in the city. Besides these two polarised from, a medium deign is proposed. It's a huge shelter covering the underneath building with free form.

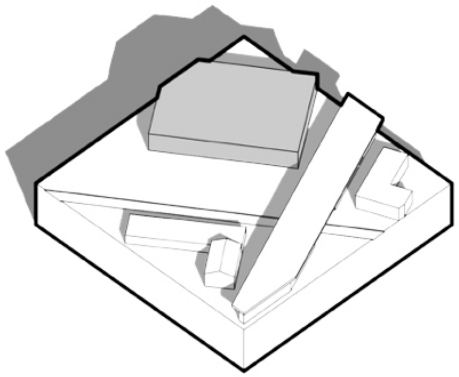


5.2 CONNECTION ZONE ACROSS A40

5.2.4 VISUAL LANDMARK

1. Current Situation- Warehouse

The building to be renovated is currently a two-story warehouse which never appears on the horizon during driving.

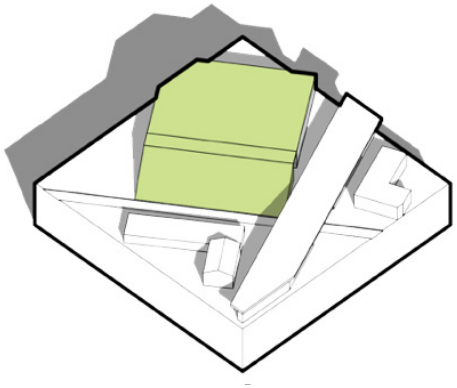


5.2 CONNECTION ZONE ACROSS A40

5.2.4 VISUAL LANDMARK

2. Minimal Landmark-Park

The idea is proposed mainly for the scenic reason. During long time travel on the highway even without any eye catchment for focus, a green space facing the road including the urban image could refresh highway users. However, in order to ensure the safety and environmental quality, barrier is expected to install along the highway, which might have negative impact on the visual experience.

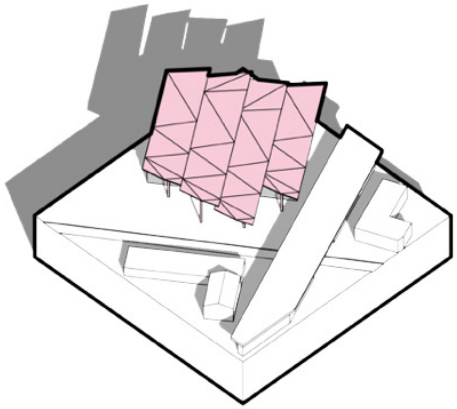


5.2 CONNECTION ZONE ACROSS A40

5.2.4 VISUAL LANDMARK

3. Medium Landmark- Canopy

The canopy is appealing enough for both highway users and residents without disturbing the urban pattern.

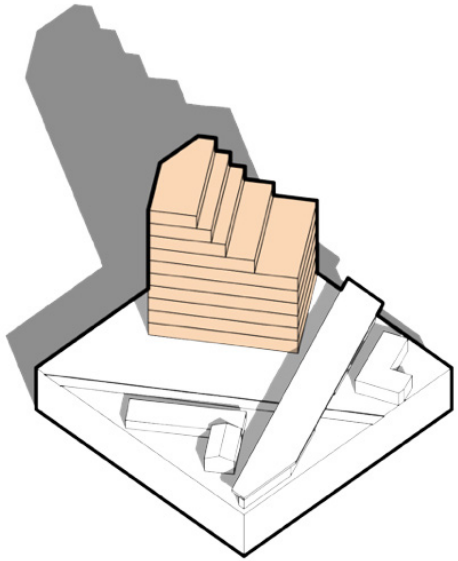


5.2 CONNECTION ZONE ACROSS A40

5.2.4 VISUAL LANDMARK

4. Maximal Landmark- High Rise

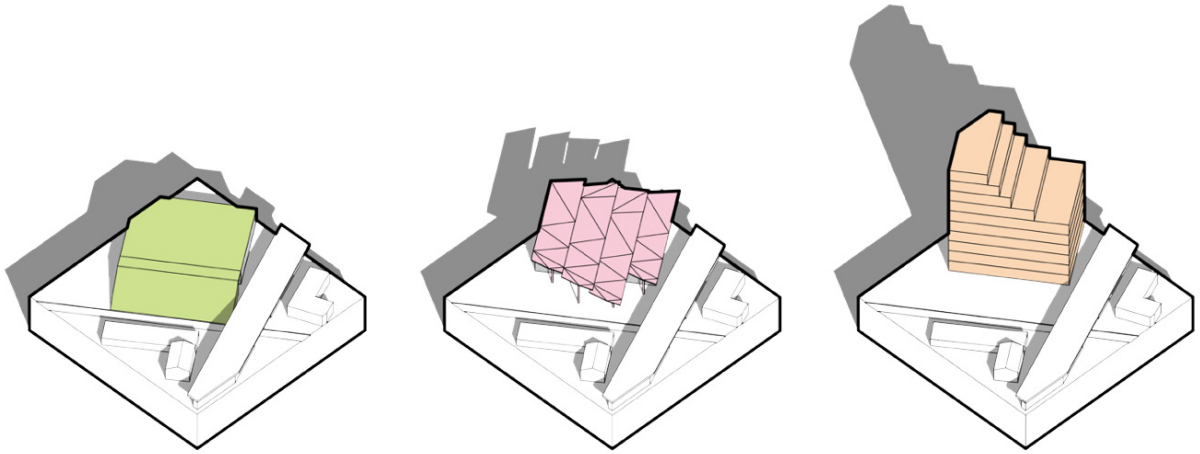
Compared with the other two variations, a high rise is the most outstanding in terms of redrawing the skyline. However, put into the bigger context, building a high rise in the urban fringe is not a wise choice. It might disturb the urban order as well as the traffic flow. In other words, a building with such highway density as this cannot be consumed within the proposed area.



5.2 CONNECTION ZONE ACROSS A40

5.2.4 VISUAL LANDMARK

Evaluation



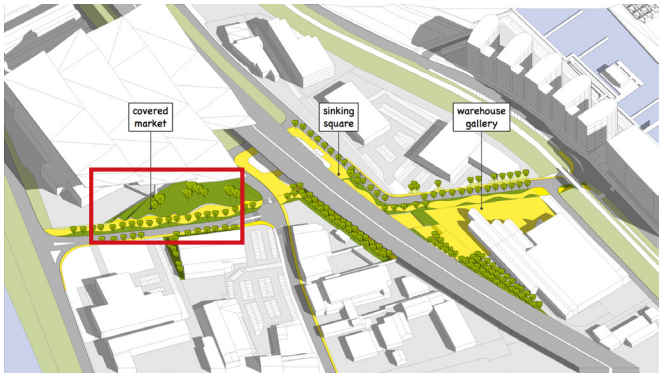
Visual Quality	−	+	+
Value for Neighbor	−	+	+
Impact on Urban Pattern	+	+	−

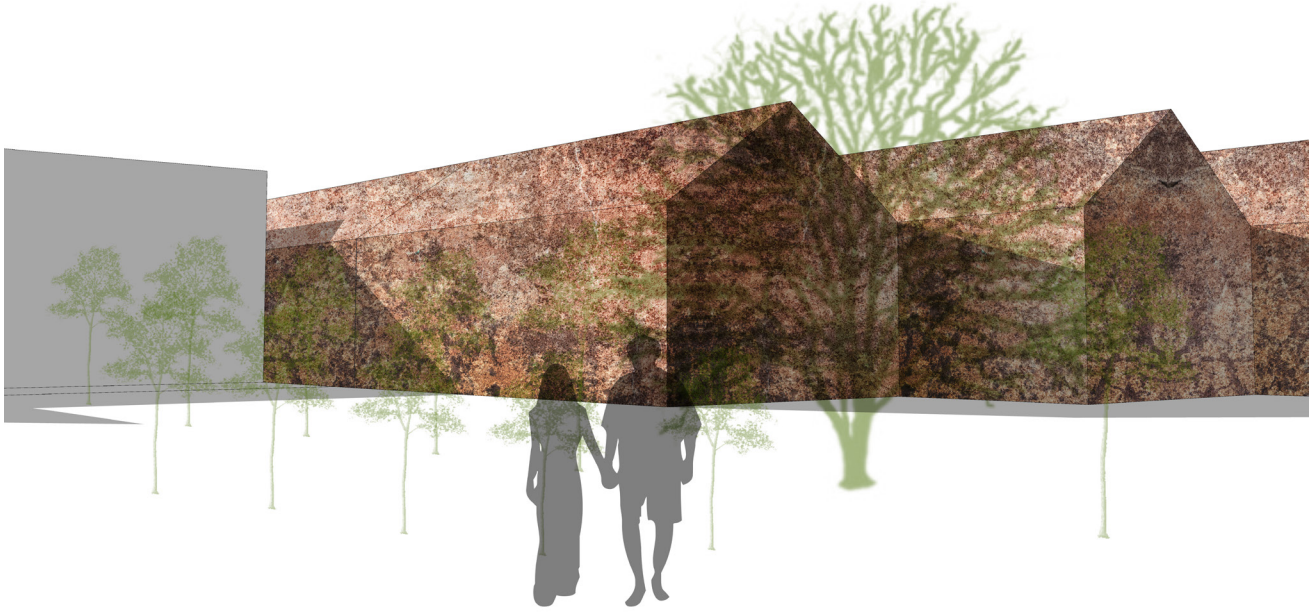
BEST!

5.2 CONNECTION ZONE ACROSS A40

5.2.5 DETAIL ELABORATION

PROGRAM1



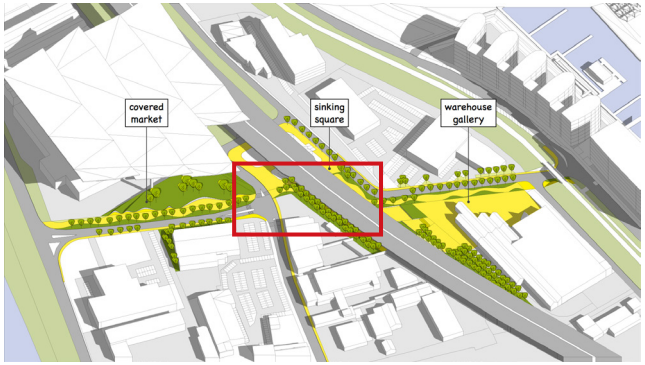


The existing warehouse are transformed into public space.

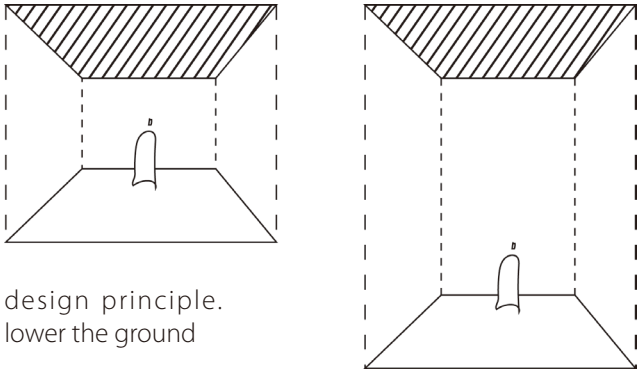
5.2 CONNECTION ZONE ACROSS A40

5.2.5 DETAIL ELABORATION

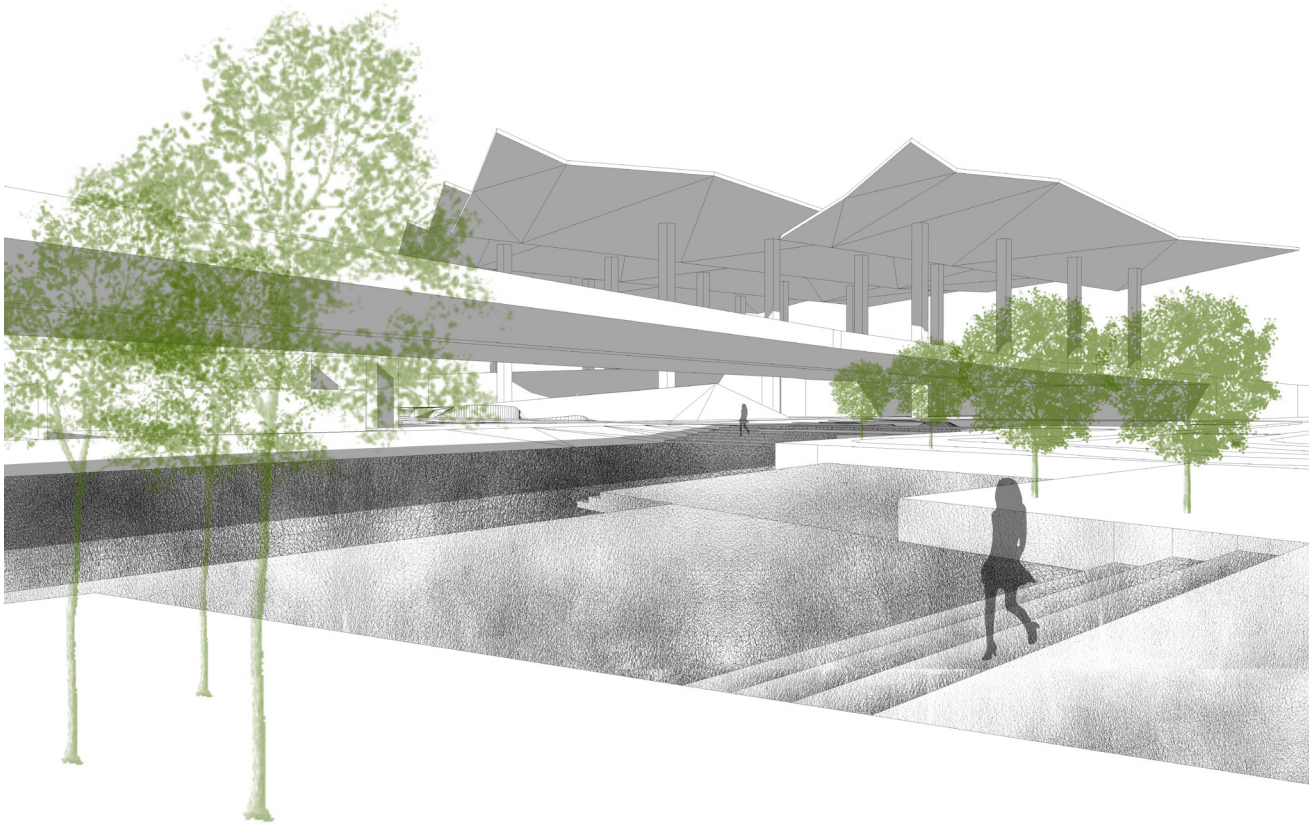
PROGRAM2



Under the highway, ground level is lowered to be a sinken square in order to improve the spatial quality.



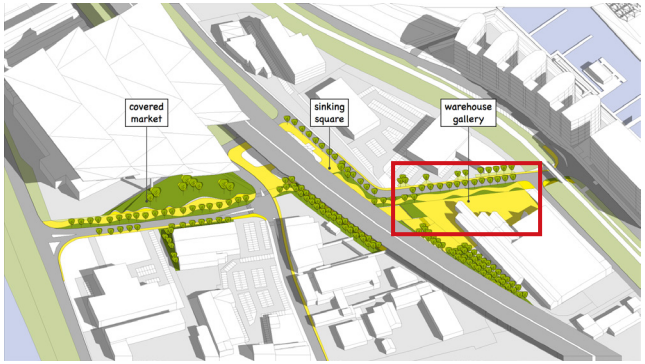
design principle.
lower the ground



5.2 CONNECTION ZONE ACROSS A40

5.2.5 DETAIL ELABORATION

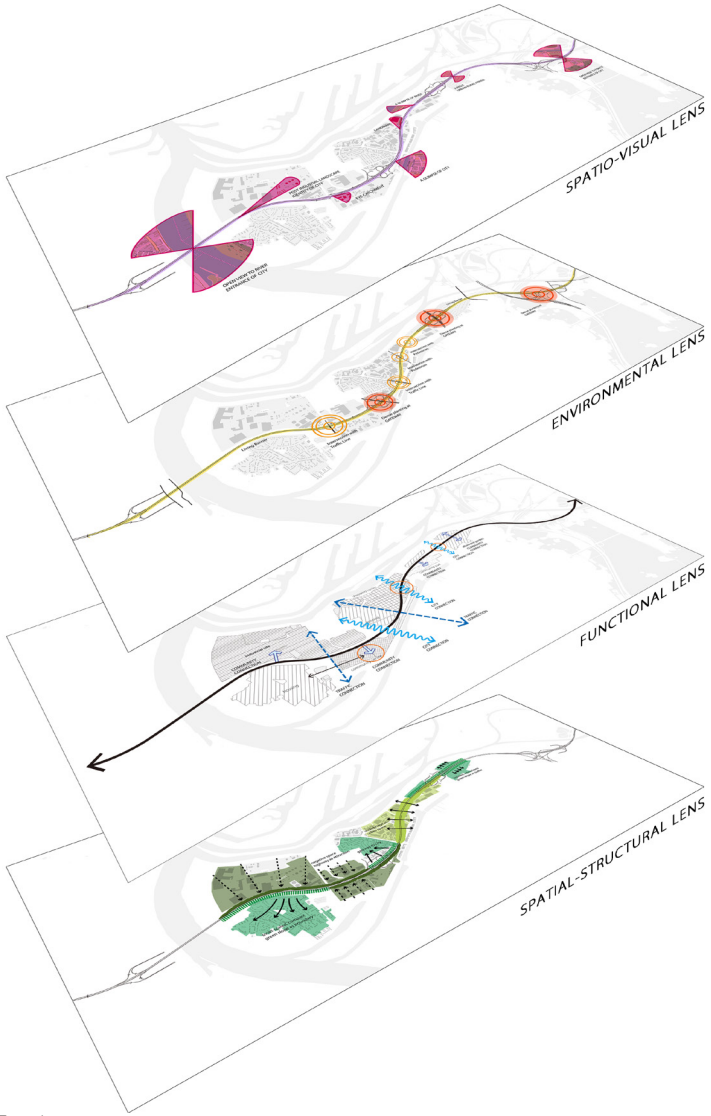
PROGRAM3



In front of the anchor building, a series of space of human scale are designed for staying.

6 REFLECTION

6.1 REFLECTION ON CITY SCALE



Four Lenses

Master Plan

After finishing the whole process, I looked back at this master plan and asked myself a question: 'Is it what I mean by hybrid highway landscape?' In the beginning, I define 'hybrid highway landscape' as a new phase of urban highway where the right-of-way can be related and integrated with highway from the perspectives of spatial-structural aspect, functional aspect, environmental aspect and spatio-visual aspect. Taking these four lenses into consideration, the proposal on the city scale as shown on the master plan effectively meats the requirements of an contextual and integral zone instead of an isolated line for each lens.

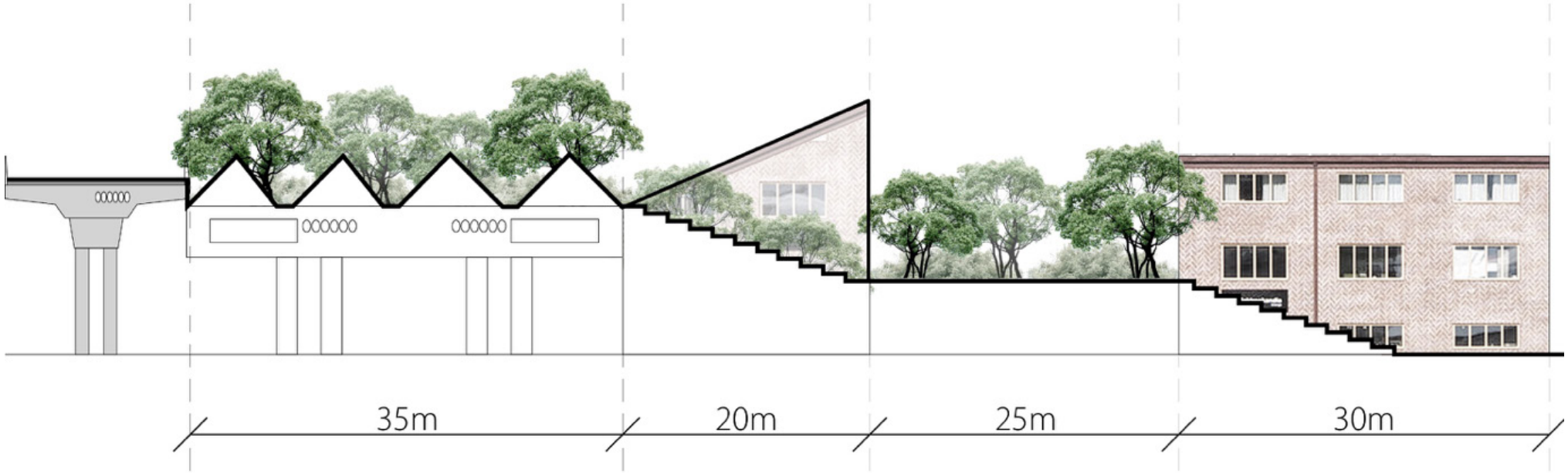
From the lens of spatial-structural aspect, the negative and fragmented space adjacent to highway is integrated by unifying the pattern and restoring the urban landscaping within the right-of-way. Functionally speaking, the city connection across highway are repaired and the spatial quality is improved by separating the pedestrian and traffic. Further, the highway barrier is integrated with landscaping in order to reducing the pollution and offering an opportunity for visual connection.

6.2 REFLECTION ON APPLICATION

6.2.1 TRANSITION ZONE ALONG A40

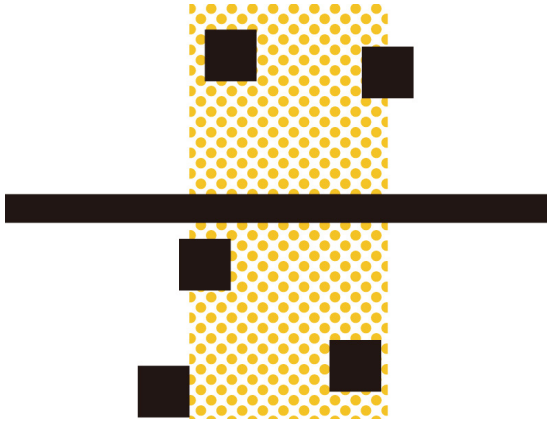
Transition Zone Along Highway

Further, I closely re-examined the application on a transition zone along A40, and found that this 'Ribbed' model can be promoted widely to a range of urban highways in different context. One one hand, the elevated park creates a platform in the middle for both highway and city extension. On the other hand, it forms an independent system as a media to tie highway and urban environment together.

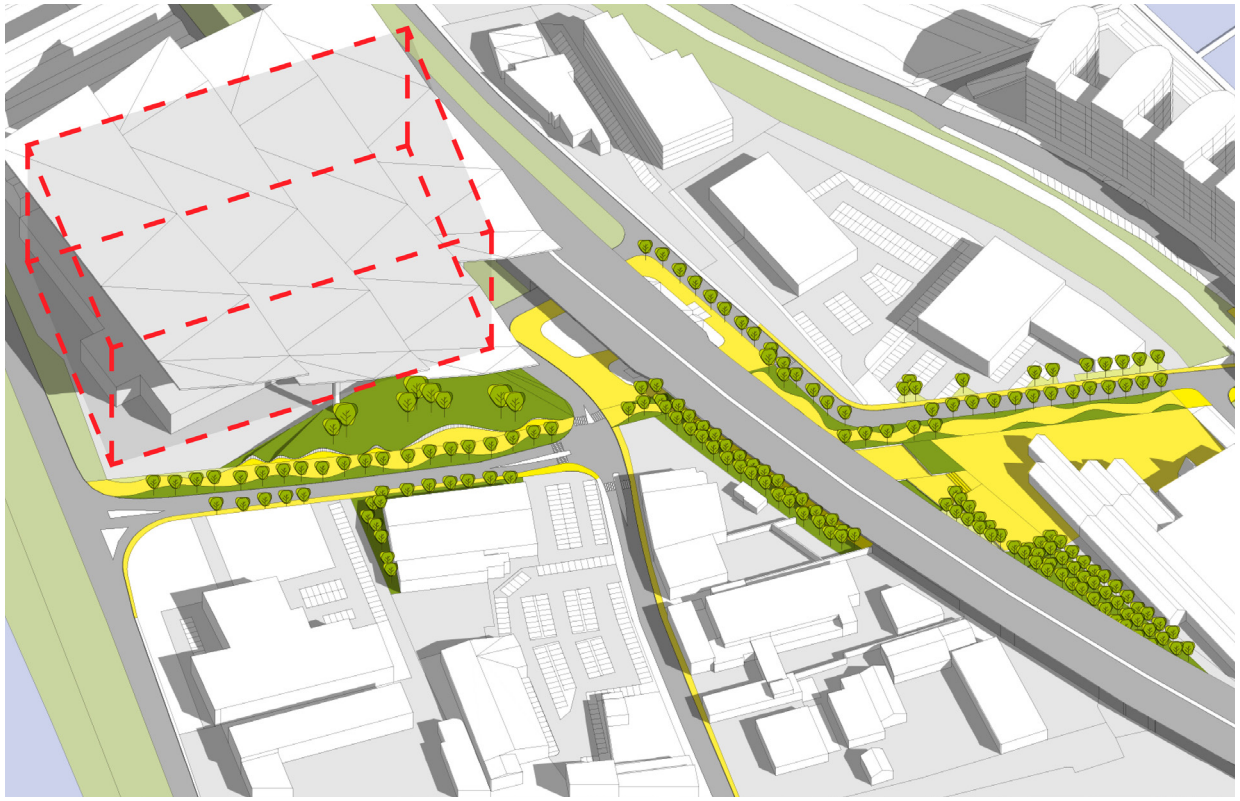


6.2 REFLECTION ON APPLICATION

6.2.2 CONNECTION ZONE ACROSS A40



Connection Zone Across Highway



While the second application is about connecting on the other direction-across highway. To be more explicit, the connection is not only a line, but an entity embracing surrounding fragments. It enhances the accessibility and updates urban infrastructure such as green corridor as well as communal service.

6.3 CONCLUDING REMARK

REFLECTION ON RESEARCH OBJECTIVE

Being inspired by the emphasis on the relationship between road and its environment, and to actually integrate flows and scapes by landscape infrastructures in my graduation lab Flowscape, my fascination is to study how to integrate a roadway into its environment, and how to translate this relationship between road and landscape into urban highway context.

While in the most cases, urban highway is widely regarded and treated as nothing but functional infrastructure which relieves the traffic pressure of local roads and connects to different cities. In my point of view, it has potential to be a public facility that is more than strictly utilitarian. Further, I have developed a new phase of urban highway-'hybrid highway landscape', where highway can be contextualized, interacted and integrated with urban environment and urban life. **Therefore, the main research objective of my project is to explore the potential of hybrid highway landscape.**

Taking a look back at my research objective, did I achieve the goal of 'hybrid highway landscape'? In the end I think the answer is yes. The concept of 'hybrid highway landscape' for me is a powerful tool to contextualize and integrate highway with urban environment, and interacted with urban life in a further step. It not only benefits highway users, but also enriches the space related to highway with city images by this hybrid approach.

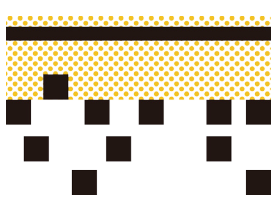
REFLECTION ON METHODOLOGY

Based on the precedent researches in terms of highway contextualization and taking the context of A40 in Duisburg into consideration, four dimensions are concluded and brought into my research and design. They are spatial-structural aspect, functional aspect, spatio-visual aspect and environmental aspect. To reflect on the four-dimension-approach, it's a real challenge to deal with all four aspects at once because of the potential conflict among them. Therefore, in my project, a practical methodology framework was developed. To start with, from the perspective of a landscape architecture student, spatial-structural dimension should be a basis which effectively prompts the contextualization and integration of highway. Secondly, the improvement of functional aspect and environmental aspect could be achieved in positive way. At last, it is a potential profit if spatio-visual aspect can be taken into consideration as well but not a goal in itself. Otherwise, it could lead to formalism such as a decontextualized landmark.

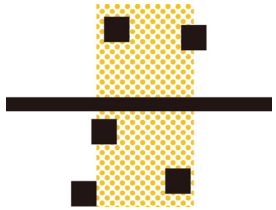
REFLECTION ON EXPERIMENTAL DESIGN

Picking up the essence of first application, I propose a transition zone between highway and its surroundings in order to tie them together. For drivers, the highway is part of the landscape. For residents, they are released from the impacts at the same time the current passive and abandoned space has been transformed into a pleasant in-between area.

While the second application is about connecting on the other direction-across highway. To be more explicit, the connection is not only a line, but an entity embracing surrounding fragments. It enhances the accessibility and updates urban infrastructure such as green corridor as well as communal service.



Transition Zone Along Highway



Connection Zone Across Highway

So, in the whole process, with two basic strategies and models, I think they could be promoted and used in many situations in today urban environment regarding highway landscape. Of course they could have many other forms and variations according to the urban context, and therefore to be localized and contextualized.

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