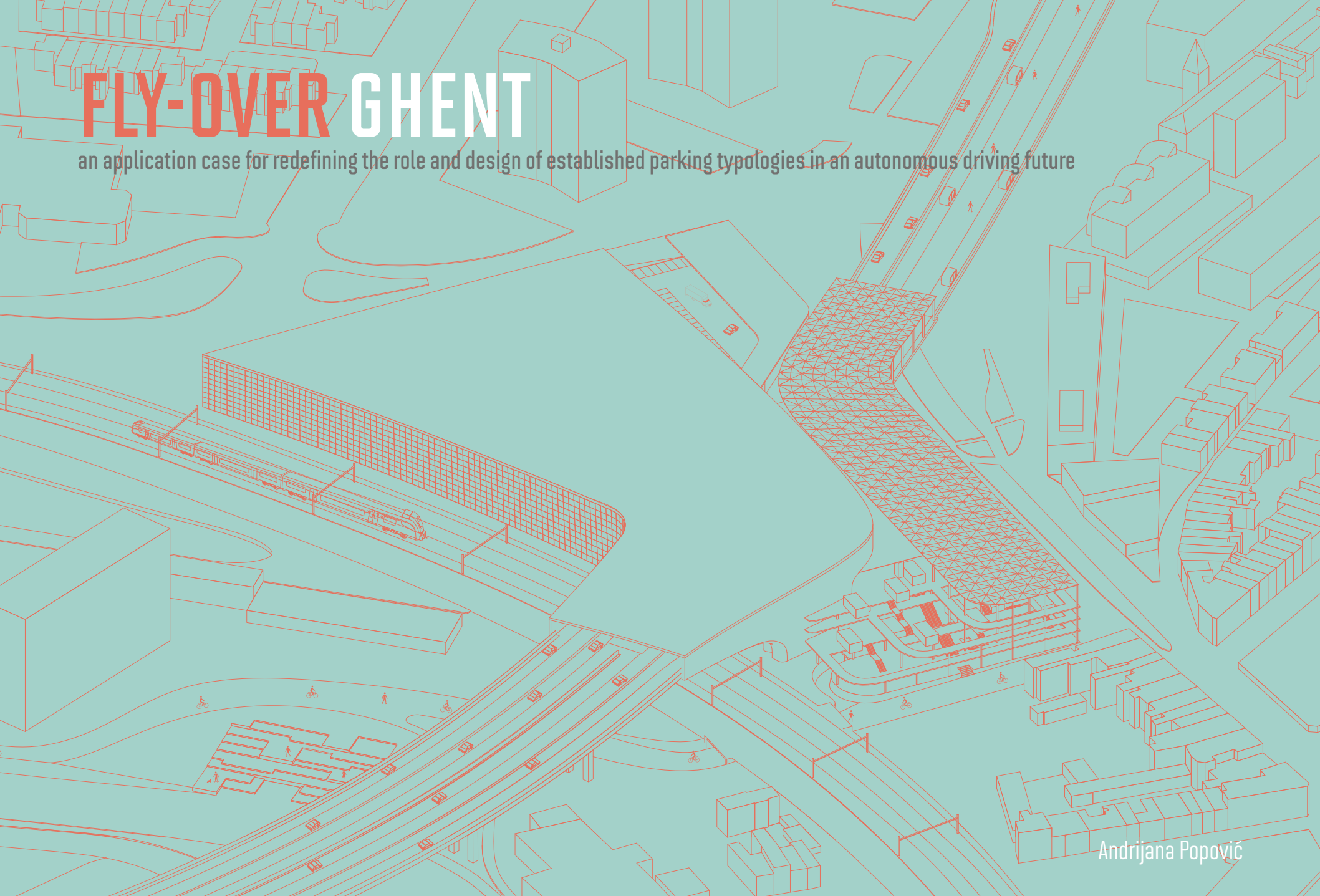

FLY-OVER GHENT

an application case for redefining the role and design of established parking typologies in an autonomous driving future

Andrijana Popović

POLITECNICO DI TORINO
Corso di Laurea Magistrale in Architettura per il Progetto Sostenibile

Tesi di Laurea Magistrale

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Met speciale dank aan Wouter Haspeslagh

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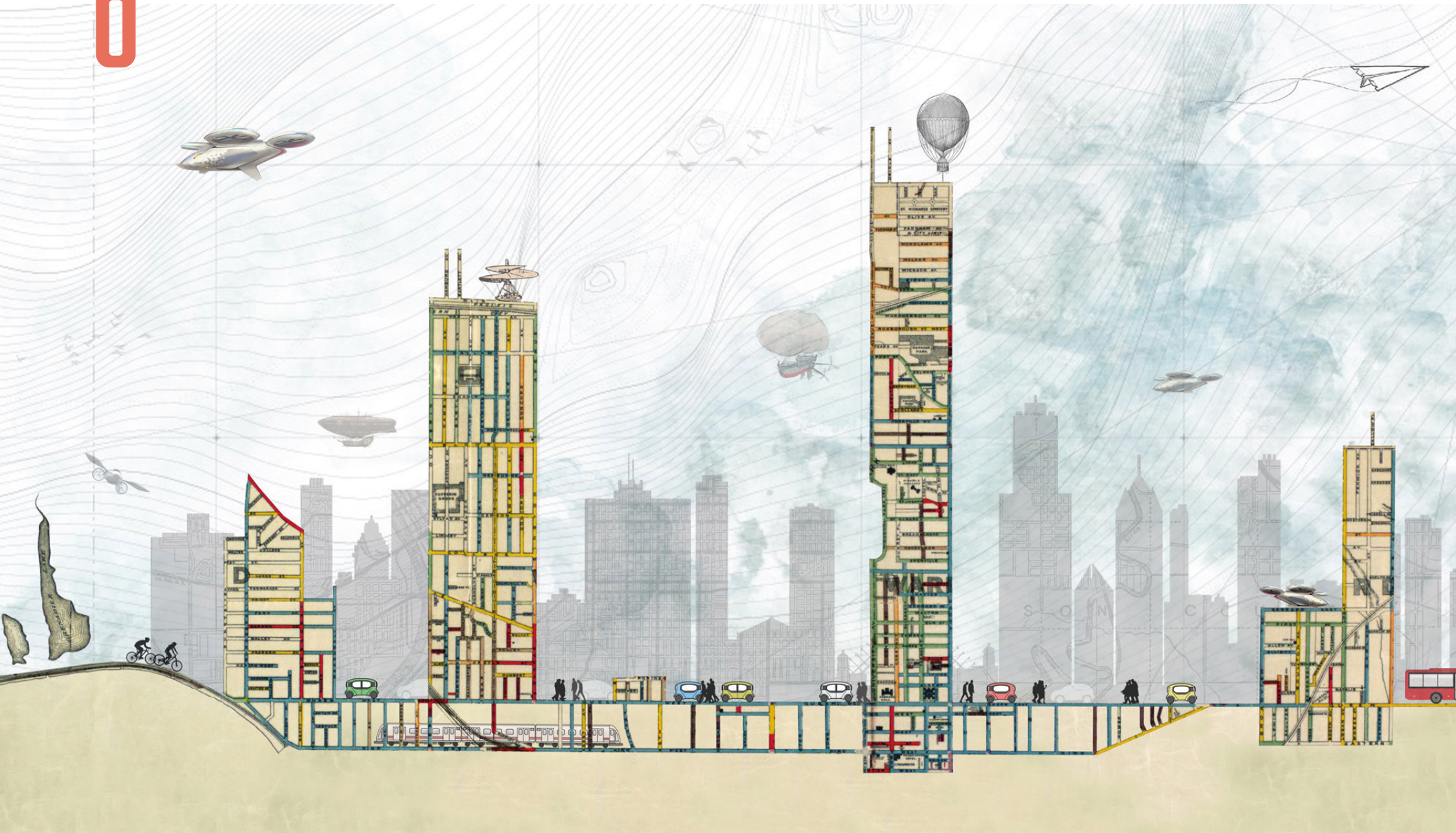


"Going Airborne" - Granstudio

City and mobility have influenced each other at any given moment throughout history. How could this symbiosis, considering that mobility and cities are evolving at very different speeds, be adapted for a near future?
In the course of time, vehicles have shaped the cities, defining its spaces and infrastructure, but also; indirectly; the way people live, work and socialise. In order to accommodate the rise of car-based traffic, cities have been constantly rebuilt, leaving no interaction but just pedestrian and vehicular conflicts.
The current model of mobility, marked by the massive and individual use of the automobile, on which today's cities are erected no longer works.

The aim of this thesis is to research possible reconnection between mobility and the city, proposing a new model of mobility based on a human-centred vision. The vehicles, rather than imposing themselves on the urban environment, should merge with the public space encouraging better interaction with pedestrians.
The ambition of this studio is to give an answer to individual mobility, investigating what role digital technologies could play in improving the experience and livability of the city of the future in terms of space performance, in order to return cities to the people.

The research doesn't want to remain confined to a theoretical level but assume an applicative character through the insertion in a real context. During my internship in Granstudio, a car and mobility design studio founded by Lowie Vermeersch in Turin in 2011, I had the opportunity to work on a mobility project settled in Ghent (Belgium). The city represents an ideal place of experimentation for a new form of mobility oriented towards sustainability, since the problems that characterise Ghent are universal and the expected answers are universal too. The case study of Ghent doesn't want to be a pure contextual research but constitute a model that could inspire other urban realities. The study promoted by the City of Ghent, has the purpose to give a new function to the Viaduct B401, which connects the highway with the city's ring road and to the heart of the city, through the design of a Park & Ride, an interchange parking, in order to make the city center less accessible to cars and encourage the use of alternative means of transport. The city of Ghent presents itself as an optimal place to frame the research since the urban development of the city has always been influenced by the new forms of mobility; water as the first vector of mobility, the railway as the second vector of mobility and finally the construction of the E17 with the Viaduct of the B401.

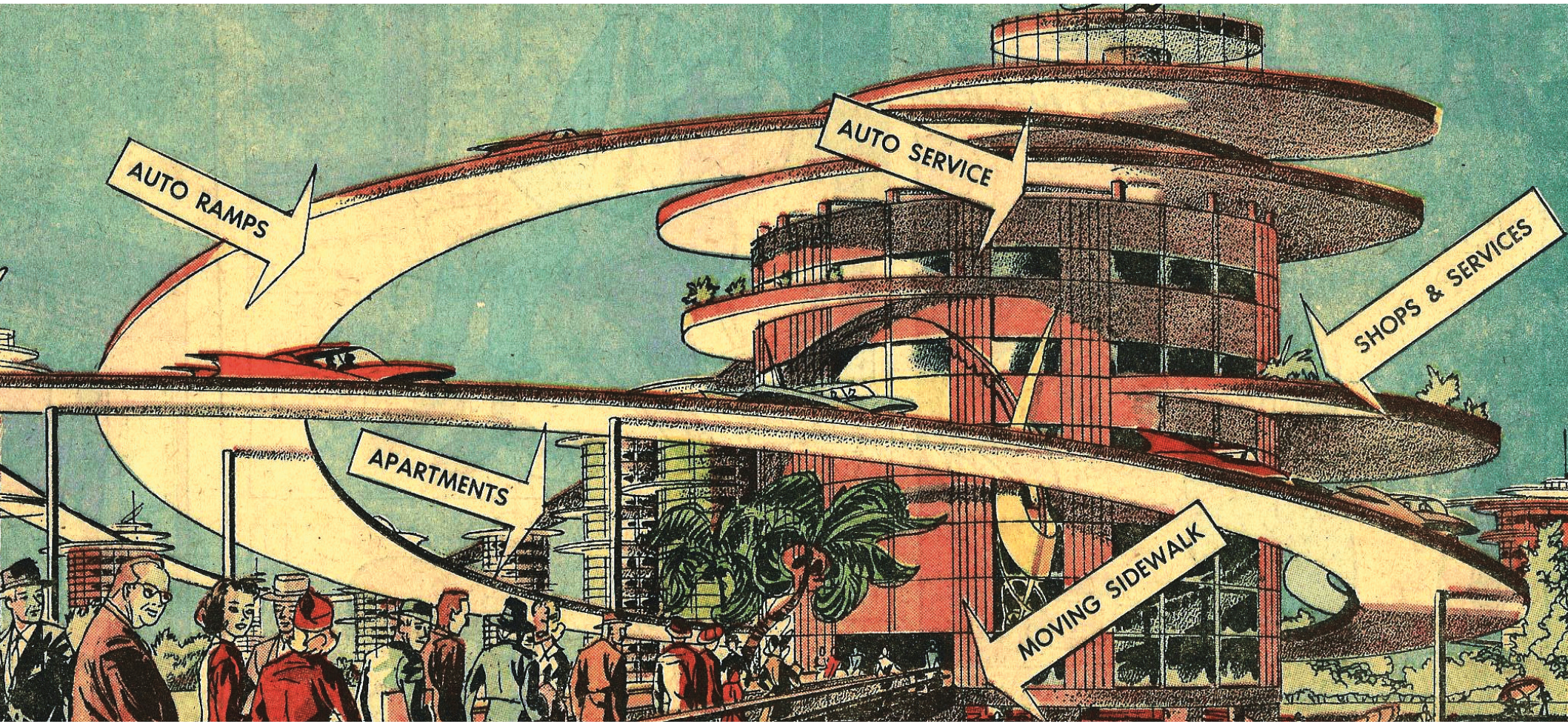
INDEX

1. INTRODUCTION

The right to have access to every building in the city by private motorcar in an age when everyone possesses such a vehicle is actually the right to destroy the city

Lewis Mumford, “The Highway and the City”, 1964

THE RISE OF THE AUTOMOBILE AGE



"Motopia" illustrated by Arthur Radebaugh, 1960

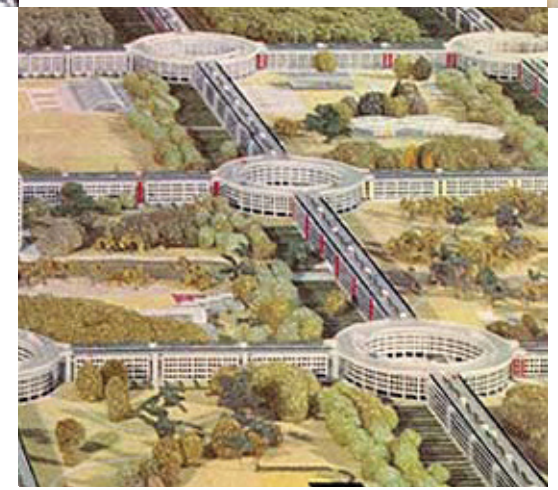
Technological revolutions have always represented a driving force for urban development. The industrial city was marked by the birth of a new form of transport at the speed of cutting edge: the automobile. The introduction of Henry Ford's model T, in 1908, makes the car a mass-accessible good and exerts an enormous impact in the definition of nowadays urban fabric. The automobile brought the idea of the democratization of mobility: once in the car you were free to go wherever and whenever you wanted, free from the constraints of space and time. The consequent increase in car ownership determined the transition to individual mobility. The automobile soon became the symbol of independence, well-being, power and social status.

At first the car was welcomed in the cities with great enthusiasm and optimism, shaping not only the architecture and defining its spaces through the construction of highways, but also influencing the social, economic and political factors. This culture based on the use of private car inspired new urban forms, not only on a theoretical level but also in a constructive way. The city of Brasília, designed by Oscar Niemeyer and Lúcio Costa, is an example of "car-centric planning", that is a type of urbanism centered and designed to move around by car and not on a human scale. The city was conceived according to the criteria of speed optimization and hindered the interaction between pedestrians and motorists through the almost total absence of sidewalks or traffic lights.

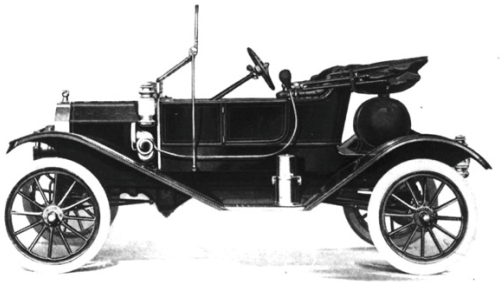
"Like earlier generations of English intellectuals who taught themselves Italian in order to read Dante in the original, I learned to drive in order to read Los Angeles in the orginal. [...] The point about this giant city, which has grown almost simultaneously all over, is that all its parts are equal and equally accessible from all other parts at once."
R. Banham's documentary: **Reyner Banham Loves Los Angeles**, (1972)

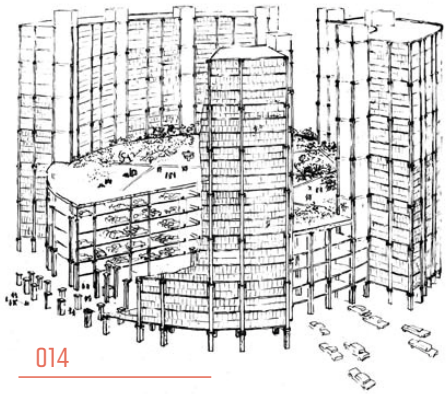
"More than any other consumer good the motor car provided fantasies of status, freedom, and escape from the constraints of a highly disciplined urban, industrial order."
Clay McShane, **Down the Asphalt Path**, (1994)

"Geoffrey Jellicoe's **Motopia**, published in 1961, is Voisin-lite, the audacity (and verticality) of Corb's scheme filtered through Jellicoe's extensive landscaping experience and the British garden city vision of the previous century. **Motopia**, sponsored by Pilkington Glass, proposed a gridded city laid across the landscape, elevating buildings on pilotis amongst landscaped parklands, and placing all roads and access on the roofs above."
Jonathan Bell, **Carchitecture**, (2001)

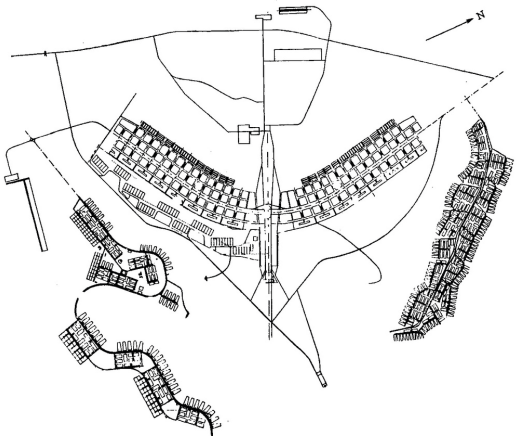


"The introduction of Ford's Model T in 1908 stripped away the hierarchical structure that had kept cars from the masses. By making the machine affordable, mass production revolutionised social interaction. Just under 6,000 Model Ts were sold in 1908 at $850 each, whereas eight years later over 370,000 were sold, each for less than $400."
Jonathan Bell, **Carchitecture**, (2001)

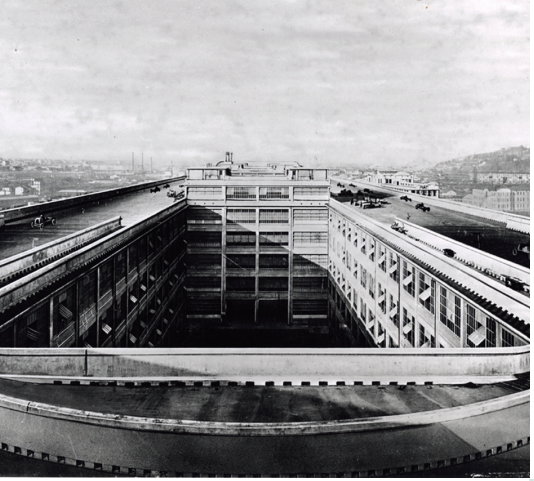




"American architect Louis Kahn's 1960s proposal for a car park merges building with road, using a simple concrete frame that functions as either office floor or parking. The garage roof also doubles up as an open space for office workers."
Jonathan Bell, **Carchitecture**, (2001)

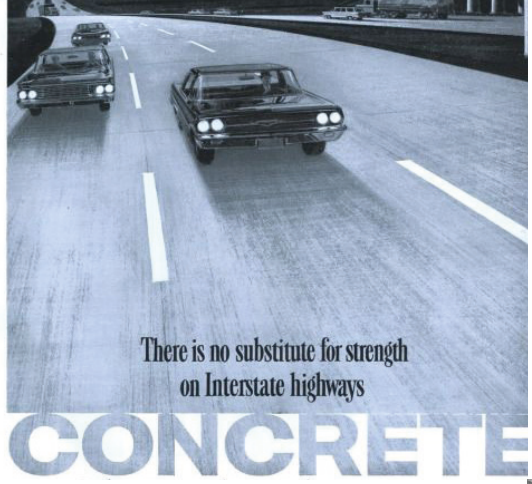


"Brasília, a city designed by Oscar Niemeyer and Lúcio Costa and built from scratch, is a striking example of automobile urbanism. [...] Various urban elements are kept separate, connected only by a network of highways. Most conspicuously, the city is without sidewalks or traffic lights [...]. Because there are (in theory) no pedestrians, there is no need for human-scale streets - people move through the city at the speed and scale of the automobile."
C. Ratti and M.Claudel, **The City of Tomorrow**, (2017)



"Matté-Trucco 's remarkable Fiat factory in Lingotto, Turin, in the 1930s, architecture is harnessed to dispay not just the vehicles, but the design philosophy and power of the manufacturer. Trucco's factory is best known for its rooftop test track, which represented the end of the production process. Freshly-finished cars were taken for an exploratory lap before twirling down the elegant concrete ramp and out into the marketplace".

Jonathan Bell, Carchitecture, (2001)

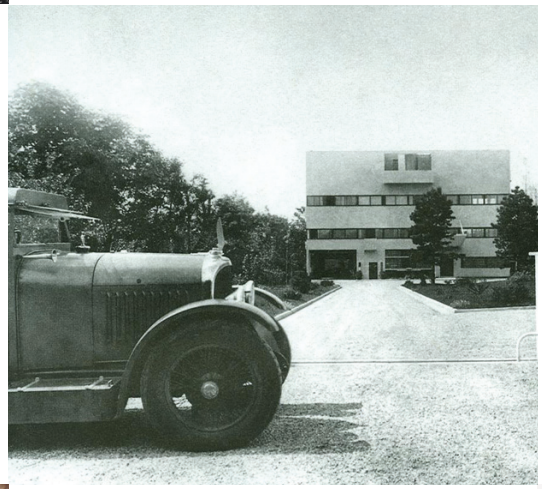


"Democratisation of mobility: The interstate highway system has facilitated an unprecedented expansion of mobility and in a democratic manner - no nation on earth can equal the mobility that is available to the overwhelming majority of Americans. More than 90% of the nation's households have access to automobiles".

W. Cox and J. Love, The Best Investment a Nation Ever Made, (1998)

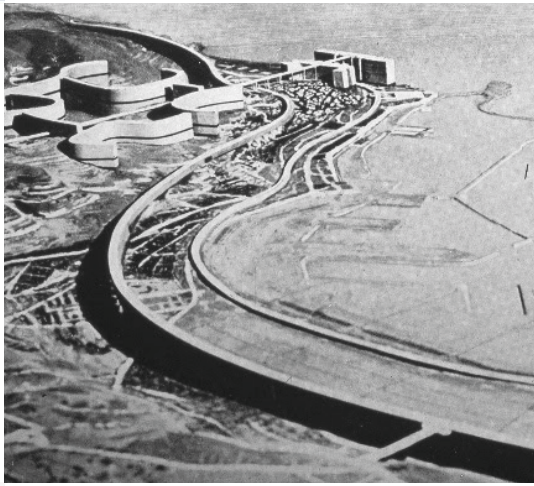
"Le Corbusier, was a big fan of the automobile and its entire automatised industry. The Plan Voisin, the maison Citrohan and the Voiture Maximum are perhaps the best-known direct links between automobiles and the architect. Nevertheless, nearly his entire oeuvre is drenched with a glowing passion for the automobile. The promenade architecturale in Villa Savoye starts and ends with riding in a personal car."

"The Heart of the City", Granstudio, (2015)



"The motor car has killed the great city; the motor must save the great city", Le Corbusier wrote. [...] His monolithic 1932 Plan for Algiers advocated the location of housing beneath a vast, winding highway that curved along the Mediterranean coast. Corb's concept for Algiers was a development of a 1929 sketch for Rio de Janeiro, a sweeping highway elevated along office blocks: the road had become a dynamic component of the modern city."

Jonathan Bell, Carchitecture, (2001)



"But how to utilise [the city] plan now when the standard of space measurement has changed to a man seated in his motor car, vicarious power in the throttle at his feet, his hands on a steering wheel, not to mention the cigar in his mouth. One mile has little advantage to him over ten miles."

Frank Lloyd Wright, What Does the Machine Mean to Life in a Democracy, (1932)

"The city of speed is the city of success."

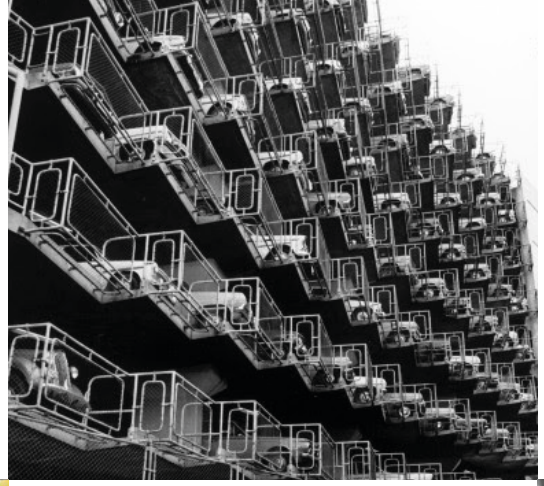
Le Corbusier, Guiding Principles of Town Planning, (1925)

THE END OF THE DREAM

Aerial shot of a stack interchange

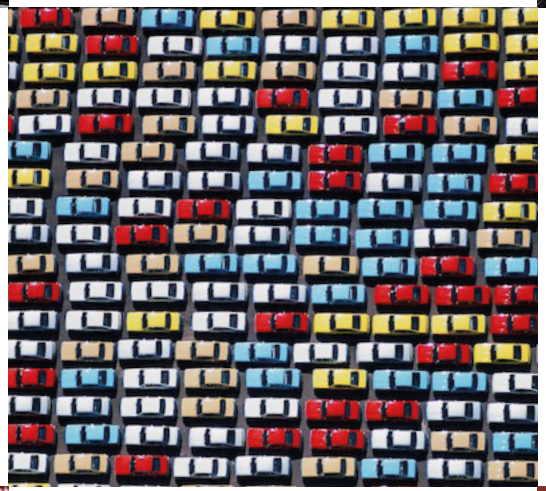
Very soon the initial enthusiasm related to the purchase of a car began to decline. It was clear that the unbridled development of cities aimed at optimizing the vehicular flow would have negative consequences. The car had imposed itself on the city, bringing with it the products of the automobile culture: roads, traffic lights, service stations, car parks, etc. The suburbs; dependent on cars, represent the most visible contribution to this culture. The roads constitute a significant portion of the urban built environment and their use has led to significant social changes. According to the theorists of urbanism, the automobile and the architecture have merged into the definition of "carchitecture".
The traffic, the lifeblood of the city, has replaced that dream of freedom to which the car seemed to aspire: a car society creates traffic, traffic enslaves society. In the city the car rarely interacts with pedestrians: more than 18 million people have died under the wheels of the car since 1885. Furthermore, the public opinion is increasingly aware of the effects that the use of the car implies: atmospheric and noise pollution, infrastructural costs and limited fuel availability. The image of the automobile is also associated with less obvious consequences such as parking, intended both in terms of time spent in looking for it and both in terms of space, since a high number of vehicles requires a proportionate number of parking infrastructures.

"Today... streets serve primarily as storage spaces and racetracks for motor cars that are absolutely incompatible with traditionl street functions."
Clay McShane, **Down the Asphalt Path**, (1994)



"The impact of automobiles resonates in a variety of less obvious ways as well - for example, parking. A high number of cars within city limits requires a proportional volume of parking infrastructure, and cities tend to naturally adjust the number of spots to satisfy peak demand. Parking availability escalates in much the same way as freeway capacity (demand rises to meet - and strain - supply)."
C. Ratti and M.Claudel, **The City of Tomorrow**, (2017)

"Half of all urban space is devoted to the automobile."
Jonathan Bell, **Carchitecture**, (2001)

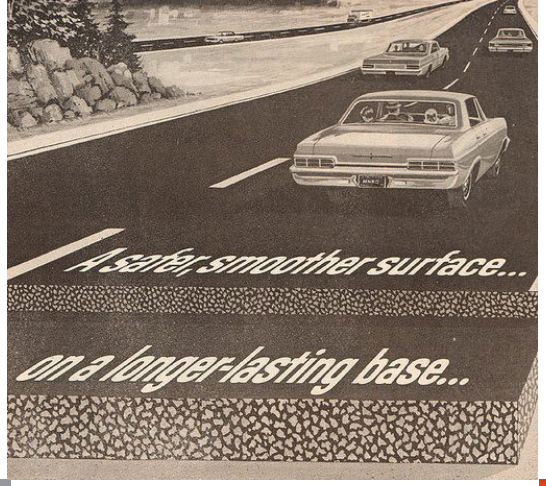


"Vehicles have introduced into urban life numerous factors injurious to health. Their combustion gases spread in the air are harmful to the lungs and their noises induces in man a condition of permanent nervous irritability. [...] They condemn men to spend exhausting hours in all sorts of vehicles and little by little to lose the exercise of the healthiest and most natural of all functions: walking."
CIAM: Charter of Athens, set out by Le Corbusier (1993)

"The car has become an article of dress without wich we feel uncertain, unclad and incomplete in the urban compound."
Marshall McLuhan, **Understanding Media**, (1964)

Despite continued safety improvements , sheer weight of numbers keeps the victims coming: over 18 million people have died at or under the wheels of the world's cars since 1885."
Jonathan Bell, **Carchitecture**, (2001)

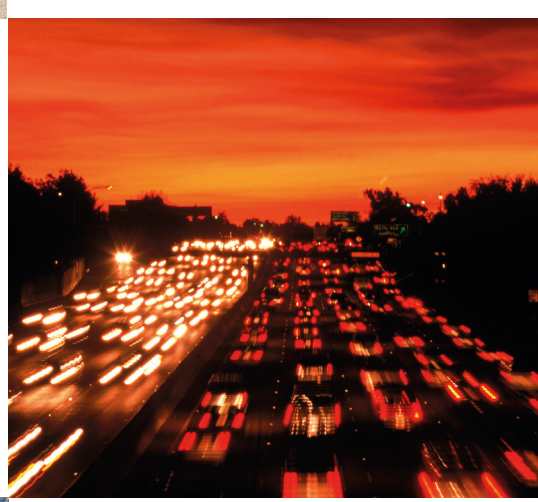
"Studies reveal that at any given moment, just 9,000 cars are in motion in New York; the rest are frozen, in a moment of stasis, patiently (or not so patiently) awaiting their turn to inch closer to their destination."
Jonathan Bell, **Carchitecture**, (2001)



" [...] the increasingly popular car based lifestyle exerted social, economic, and political forces. Cities were caught in a feedback loop: increased car ownership led to declines in public transit ridership, and simultaneously, policies and funds at the local and national level were diverted away from public transit and toward highways. Citizen behavior spoke clearly: more cars, more asphalt."
C. Ratti and M.Claudel, **The City of Tomorrow**, (2017)

"As cars idle, they continue to emit pollutants, releasing a maximum level of toxic emissions when they accelerate from a standstill. Crowded roads can cause acute spikes in smog, a pattern that is further exacerbated by certain geographic and atmospheric conditions: valleys that collect air, stifling summer heat, deep canyons between skyscrapers, lack of wind. [...] WHO estimates that every year poor air quality causes seven million premature deaths."
C. Ratti and M.Claudel, **The City of Tomorrow**, (2017)

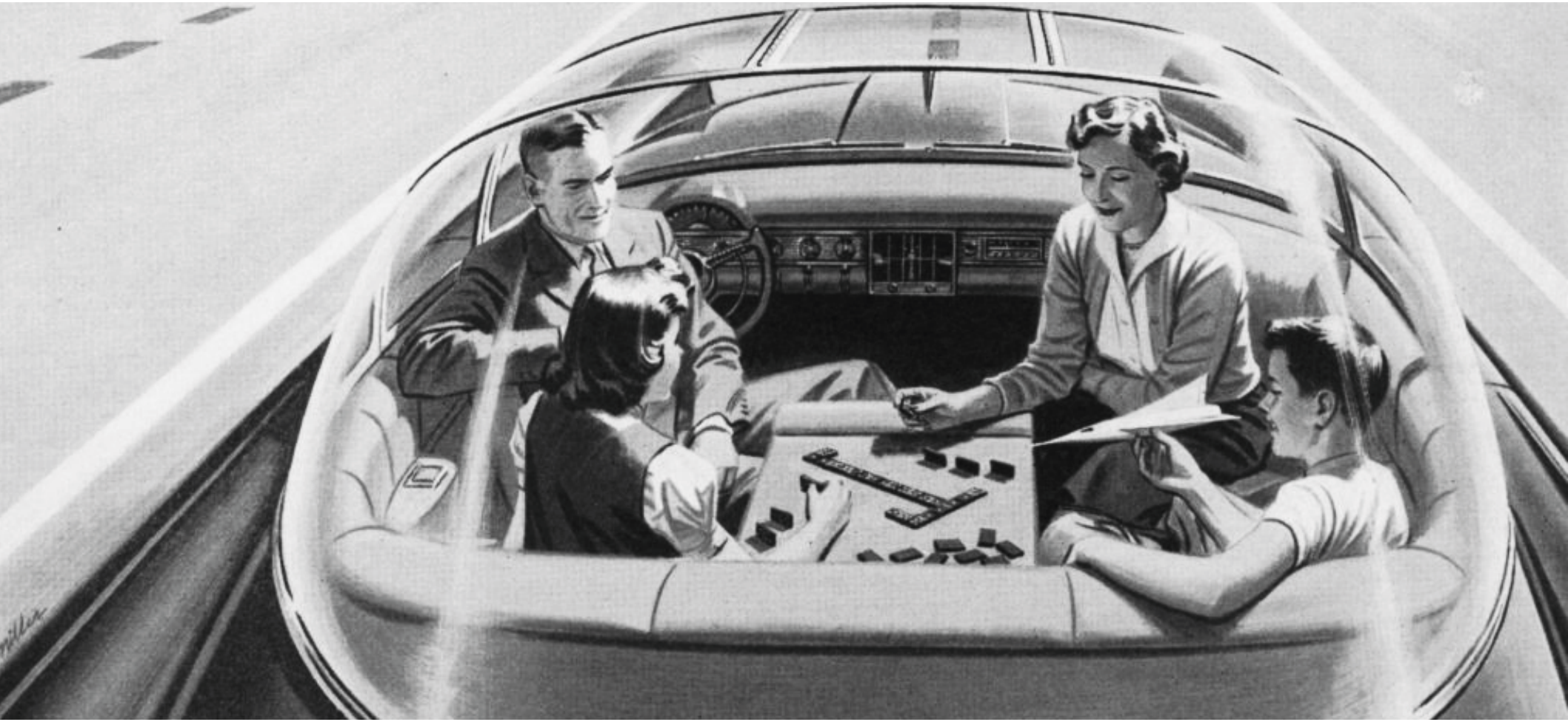
"The new mechanical speeds have disrupted the urban environment, creating permanent danger, causing traffic jams and paralysing communications, and interfering with hygiene. Mechanical vehicles ought to be agents of liberation and, through their speed, to bring about a valuable gaining of time. But their accumulation and their concentration at certain points have become both an obstacle to movement and the source of constant danger."
CIAM: **Charter of Athens**, set out by Le Corbusier (1993)



"For this new feature, the street is naturally so unfit that it can only be used with complicated regulations. There is no longer place for a spontaneous encounter, talking, playing, strolling... Every human contact is reduced to an abstract sign; usually a prohibition sign."
Jef Cornelis' documentary: "**De straat**", (1972) - translated

"Urban spaces spiraled out into sprawling suburbias that depended on the life support system of automobiles."
C. Ratti and M.Claudel, **The City of Tomorrow**, (2017)

DESTINATION UNKNOWN



"Driverless Car of the Future", advertisement for "America's Electric Light and Power Companies," 1950

However, even today, despite the best intentions of urban planners, cities continue to be developed according to a "car-centric" model. The resulting urban systems offer limited transport alternatives. The cities, built in favor of the automotive flow, involve the homogenization of the urban environment and in the worst case nullify the city fabric. The response to urban development should stimulate the optimization of the transport infrastructure, rather than increase its size. In this sense a fundamental role could be played by a new revolution currently underway: the digital revolution. Digital technologies will assume an increasingly significant role in the evolution and definition of the city of the future.
Autonomous driving, as a product of this technological revolution, could signal the end of the traditional car and open the way for a "new" car programmed according to the criteria of comfort, fuel saving and sharing. Autonomous mobility would involve the optimization of vehicular flows and an improvement of urban systems such as, for example, intelligent management of intersections. As the industrial revolution brought the car and consequently an asphalt-based infrastructure, so the digital revolution could introduce a mobility more silicon-based that would abolish that image of independence and emancipation that for years has been associated with the individual car.

"For all our protestations about personal freedom, the possibility of abandoning our vehicle to a mechanised system that will store and return our vehicle, without the hassle of finding a parking space, is a more achievable urban dream. Companies such as Wöhr and Robotic Parking are staking their futures on vast, automated lots that make light work of racking up cars, saving time and space, the two most precious commodities at the start of the 21st century."
Jonathan Bell, **Carchitecture**, (2001)

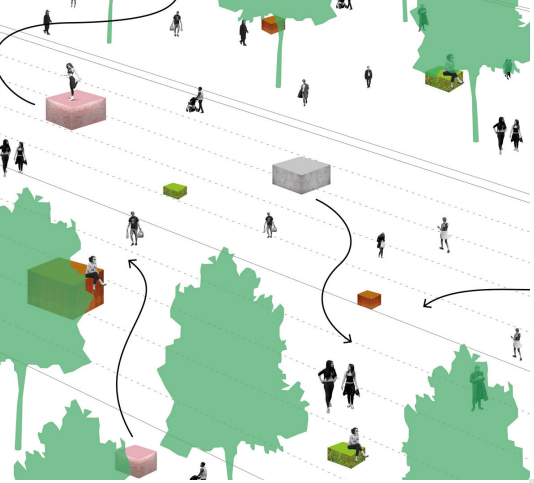
"Forget the damned motor car and build the cities for lovers and friends."
Lewis Mumford, **My Works and Days**, (1979)

"There is a continual tension between the sense of freedom the motorcar brings its owners, and the sense of grievance that crowded roads bring against other car drivers who are seen as limiting that freedom."
Deyan Sudjic, **The 100 Mile City**, (1992)

"A sea change is occurring today: the car no longer represents liberation. Individuals are empowered instead by a broad «transportation portfolio», a menu of options based on real-time information platforms that will ultimately enable a new regime of «ambient mobility»."
C. Ratti and M.Claudel, **The City of Tomorrow**, (2017)

"The streets are the urban veins through which the masses move themselves as a vibrant blood-flow, its pumping rhythm dictated by time and daily routine. To take out the city's flow and movement is to take away part of city life. What happens if we imagine a new type of in-between space? An area that combines the lack of cars with the benefits of still being mobile?"
"**Urban Cells**", Granstudio, (2015)

"While the industrial revolution brought us cars as objects, the digital revolution of connecting them into a beautiful system has only just begun."
"**Publipod**", Granstudio, (2012)

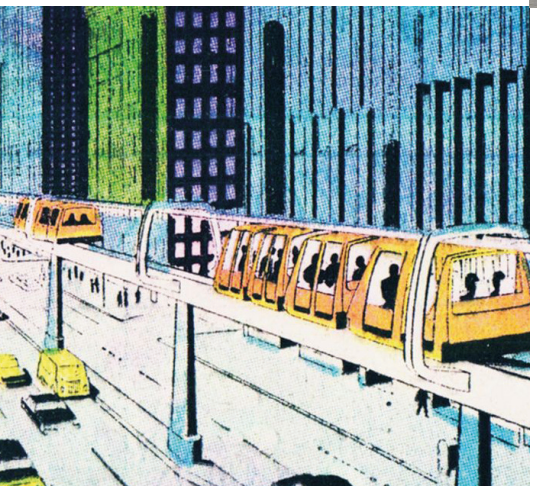


"What sense does mobility make, if it's not for meeting other people and allowing them to share happiness?"
"Moving People", Granstudio, (2013)

"Ambient mobility offers will integrate seamlessly, to the point of omni-modality. Commuters may bike to the station just in time to catch a train, and alight to find an autonomous car waiting for them at the station, ready to drive the last mile. Welcome to the age of the transportation portfolio."
C. Ratti and M.Claudel, The City of Tomorrow, (2017)

"What happens if you radically break with the past of automotive design and focus on movement rather than vehicle? Whether it is a driverless shopping cart that follows you home while cycling or a gently moving sofa that presents the city to some cheerful chatting oldsters, the focus is laid on the meaning of the motion. Therefore, it tackles the system rather than the object."
"Mobility embedded city", Granstudio, (2015)

"Autonomous vehicles may prompt another wave of innovation in urban systems, from smart intersection management to procedures for dynamically rebalancing the vehicle network according to demand. For example, cars could autonomously migrate toward business centers at the end of the workday, preempting an increase in trip requests."
C. Ratti and M.Claudel, The City of Tomorrow, (2017)



" A means of reducing traffic while still maintaining the sense of individuality and control engendered by the car, is provided by Personal Rapid Transit (PRT). PRT has replaced the automated highway as the futurist vision of choice. Ostensibly a personal monorail, PRT systems would thread a network of slender tracks through a city, on which would operate small, electrically-powered vehicles with roughly the same capacity as a private car."
Jonathan Bell, Carchitecture, (2001)

"When thinking of future mobility, we need a paradigm shift: we must no longer approach the car as a single object, but look at people and cars together as one pulsing system in which vehicles and people act, and above all, communicate together."
"Publipod", Granstudio, (2012)

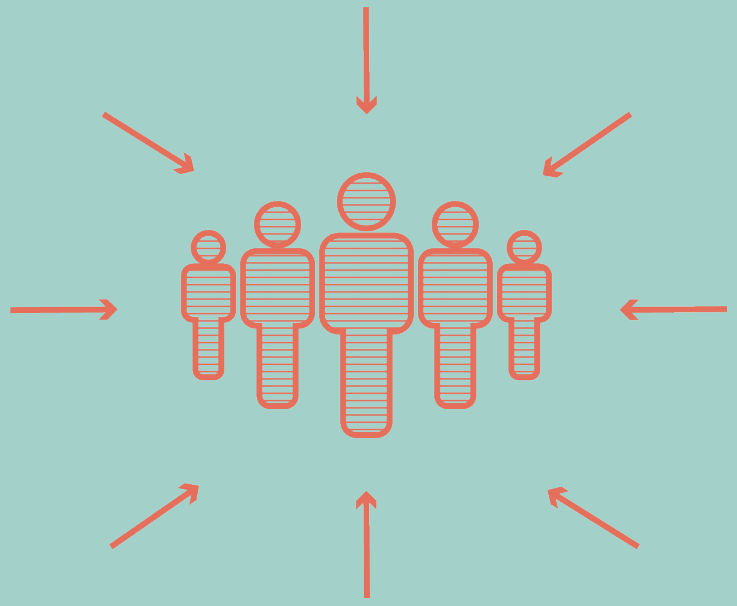
2. MANIFESTO

Cities have been built around the available means of transport. Since the automobile became a part of our life, cities were adapted for driving, forgetting the most natural and ancient form of mobility: walking.
The common space of a city, the street, has degenerated into a storage for cars, leaving no place for spontaneous activities.

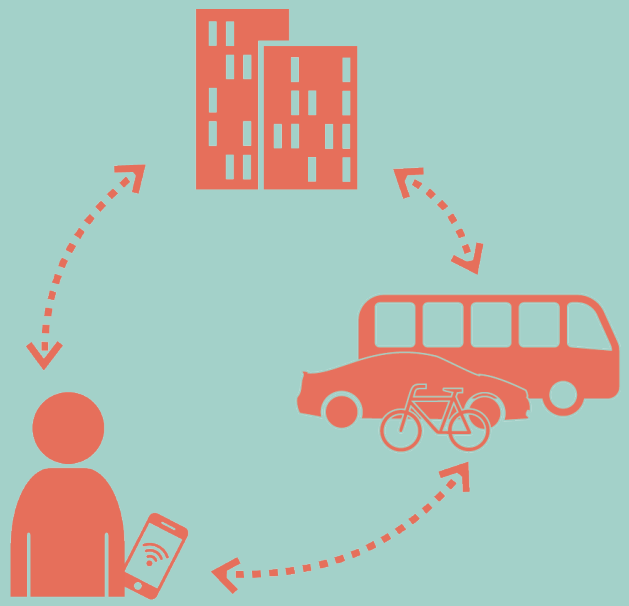
It follows a debate that divides the urbanists since then: should we build according to the available means? Or should we build according to the universal values of mankind? And what if a new completely means of transport becomes popular?
Probably the answer might be somewhere in the middle...

The Manifesto embodies the guiding principles for a human-centred vision of mobility. These opening statements set out the ambition for the studio and will be the framework to refer back to. It offers a glimpse towards the future of mobility: what will the future city look like? How will we move around it? How will mobility and the city shape each other? How can the current digital revolution of mobility improves the livability of our cities? Or what will not be solved by technology in the near future?

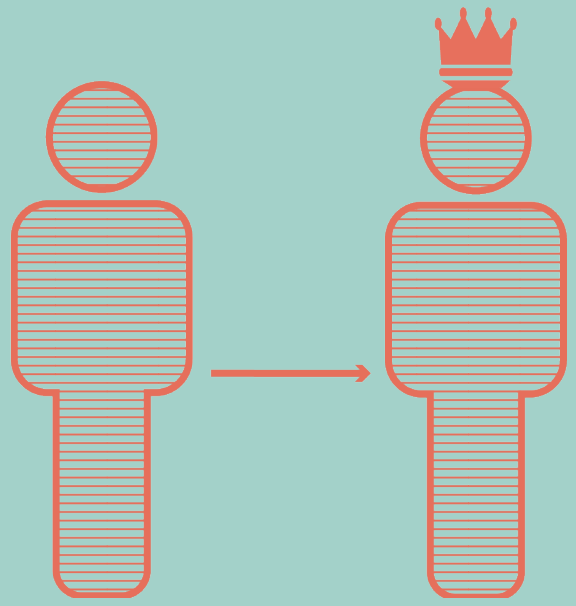
"Leapfrog Mobility", Lowie Vermeersch, Granstudio,
based on painting "Kinderspelen" by P. Breughel



Not everyone is a driver, but everyone is a pedestrian. Therefore mobility is not about vehicles, but about how people move around environments.
Because after all, **mobility is about humans**.

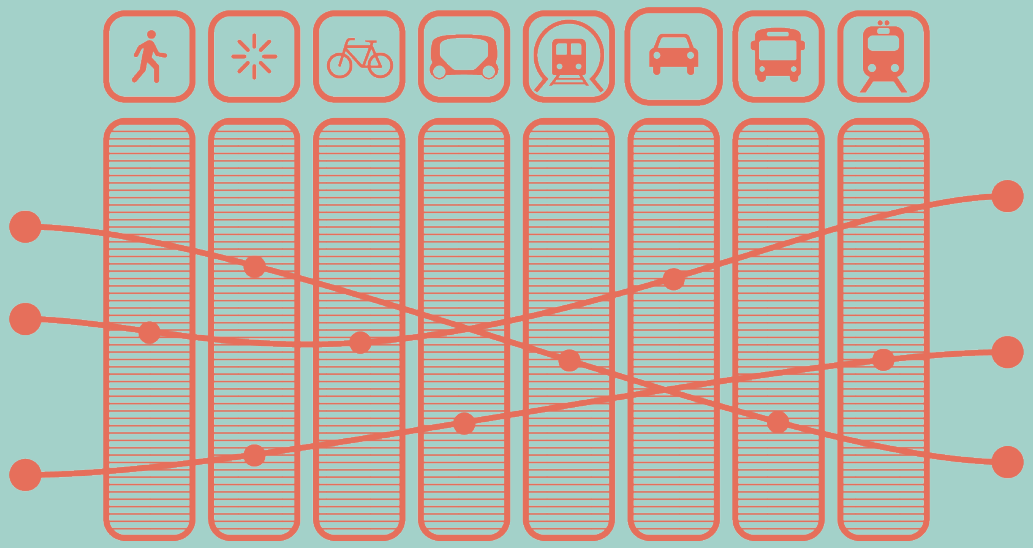


Mobility can be summarised as an interplay between three parameters:
the environment, the vehicle and the user.

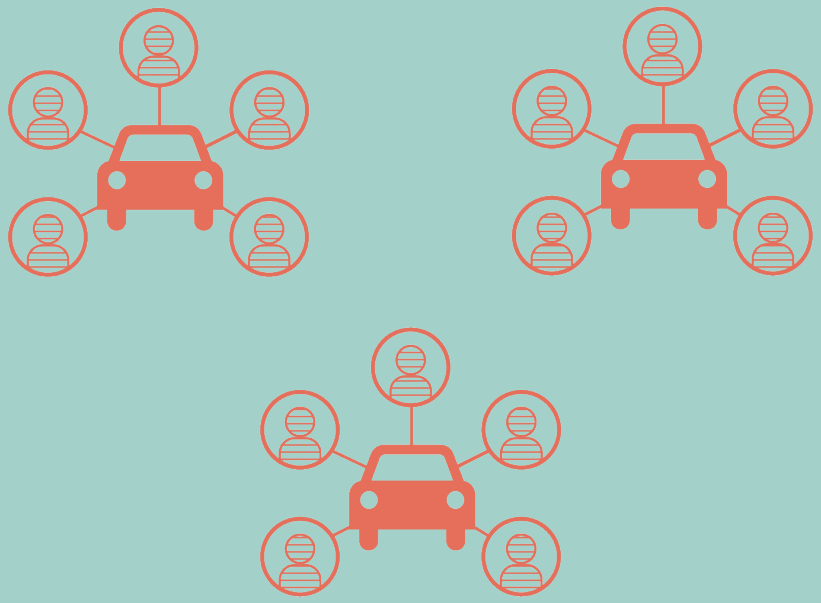


Users are the main goal. Within the context, mobility proposals should be affordable, sustainable and flexible in order to ensure a qualitative experience and enhance personal progress.

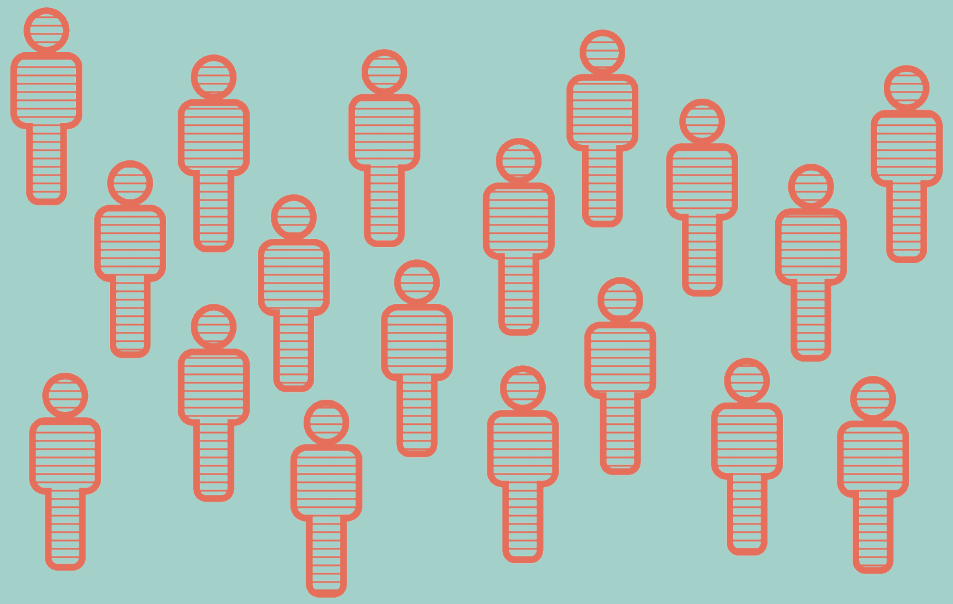
Do not just focus on thinking about mobility like a means of transport to move from A to B, but think about creating a **transversal experience** within mobility.



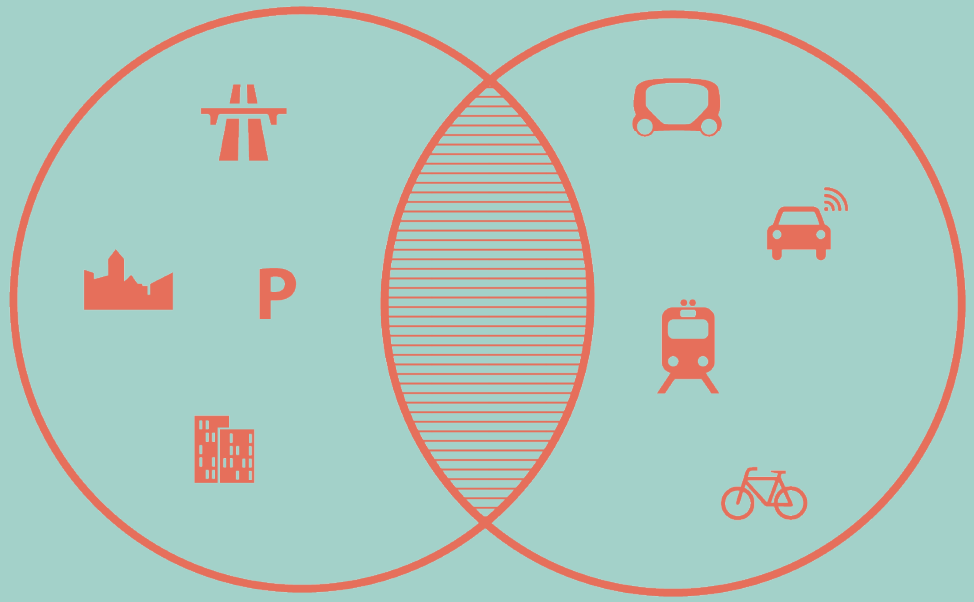
Since we can't improve much more about the experience inside the vehicle, we can improve the user experience in **transitioning from one mode to another**.



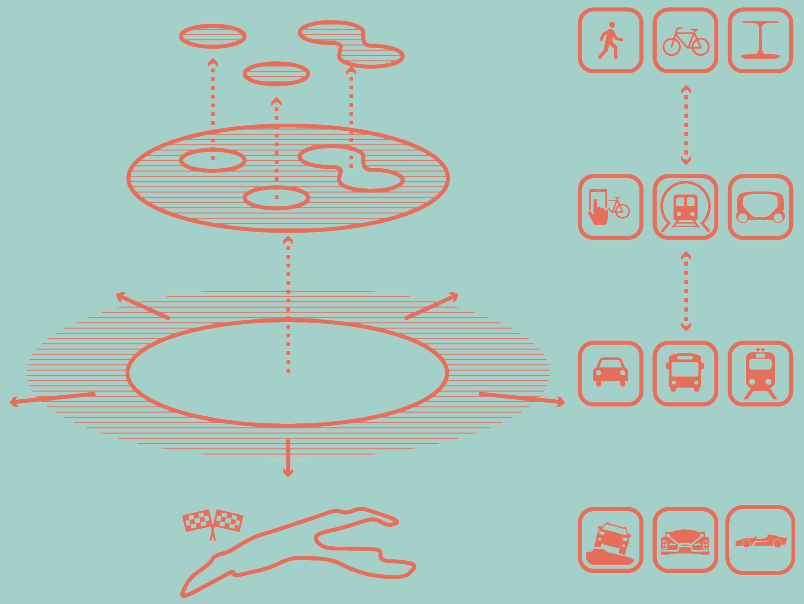
Digital technologies can optimise the intermodal experience, in the transition from a means of transport to another, thanks to real-time information.
The number of vehicles can be adapted to the number of users.



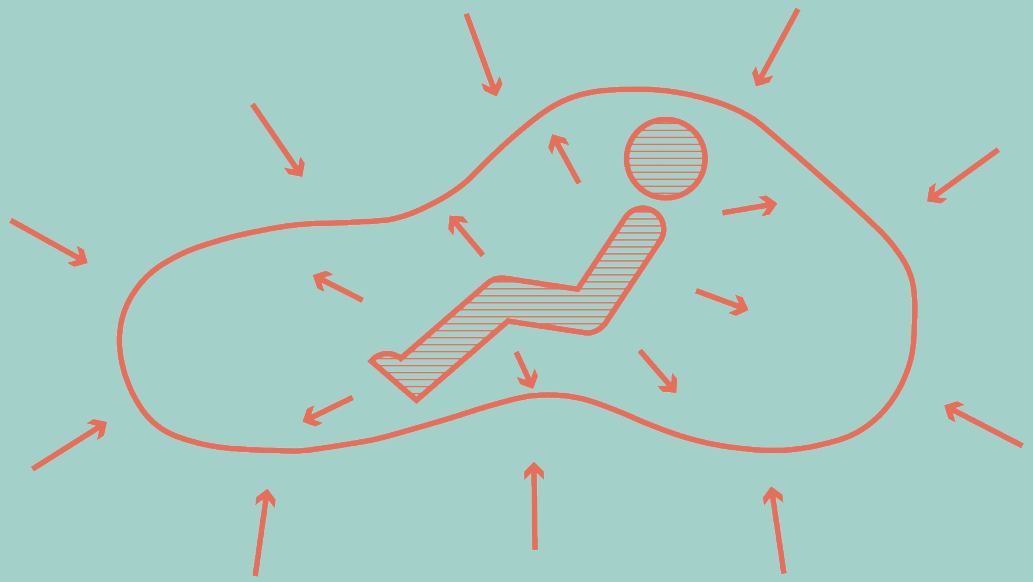
Through increased car sharing more space in our cities is freed up,
leading to **more human presence.**



Since city and mobility have influenced each other over the time.
How can the environment shape mobility?



If we imagine the city divided into layers, each of them defined by different modes of transport, we must assume that **the right vehicle needs the right place**, since vehicles are always operating in a certain environment and serving human beings.



A vehicle originates where contextual needs coincide with human desires. From this point of view, technology is only an enabler that allows creating answers to certain needs or desires.

So people are the main goal, but also the driving force of the mobility revolution. Since we can't operate if people don't change their behavior. A sample in this direction can be the trend from owning a subscription to a car system instead of owning the car. **Smart mobility can't exist without smart users**.

3. THE CASE STUDY

Aerial shot of the B401

This innovative mobility project for the future of Viaduct B401, promoted by the City of Ghent, focuses on the design of a future Park & Ride as a concrete case. The project reframes the role of the car as part of a wider future mobility system, and harvests the new possibilities of autonomous driving to improve multimodal user experience, define new architectural typologies, and increase liveability in the city centre.

The B401 connects the E17 and E40 motorways with the R40 circulation ring at the St. Lievenspoort level but also directly to the heart of the city via the central part of the viaduct that lands in the Zuidpark. This allows easy access to and evacuation of the city but the increased car use means that local city roads and the connections with the E17, E40, R40 and R4 are congested during the morning and evening peak periods. Around 3000 cars per hour drive into the city in the mornings. The viaduct shapes the transition between the highway and the city: a mobility corridor intended to mark the transition to a sustainable urban mobility. If on one side the B401 offers a visual axis on the city, on the other side it intersects and divides the adjacent urban fabric, appropriating a large portion of the Zuidpark.

The project may include a total or partial demolition of the viaduct or its complete maintenance in the current state. The project provides also the creation of pedestrian areas with more liveable spaces and meeting places, the expansion and improvement of the access to green areas through the expansion of the Zuidpark, the optimisation of the infrastructure aimed to cyclists and the reestablishment of the connection between the Bellevue and Ledeberg districts but also between Bellevue/ Ledeberg and the city centre.

The space transformation does not have to conform to the normal urban fabric, but must maintain its exceptional character. But not in the form of an urban space that isolates and fragments like today. But as a place that really adds something. A place that creates new relationships between the various neighborhoods and complementary places. A place that intensifies and connects differences (nowadays this place is characterised by strong heterogeneity of urban conditions). Instead of a negative image, the spaces below and above the viaduct must be considered an opportunity.

The city has been trying for a long time to deal with the current situation of the viaduct in order to take the road to a sustainable mobility and a better life quality in the surrounding neighbourhoods. How can the existing infrastructure, just renewed and still in good condition, play a role in defining a new mobility model? Can the area be a vector for new uses, adapted to the city of tomorrow?

PROJECT DEFINITION

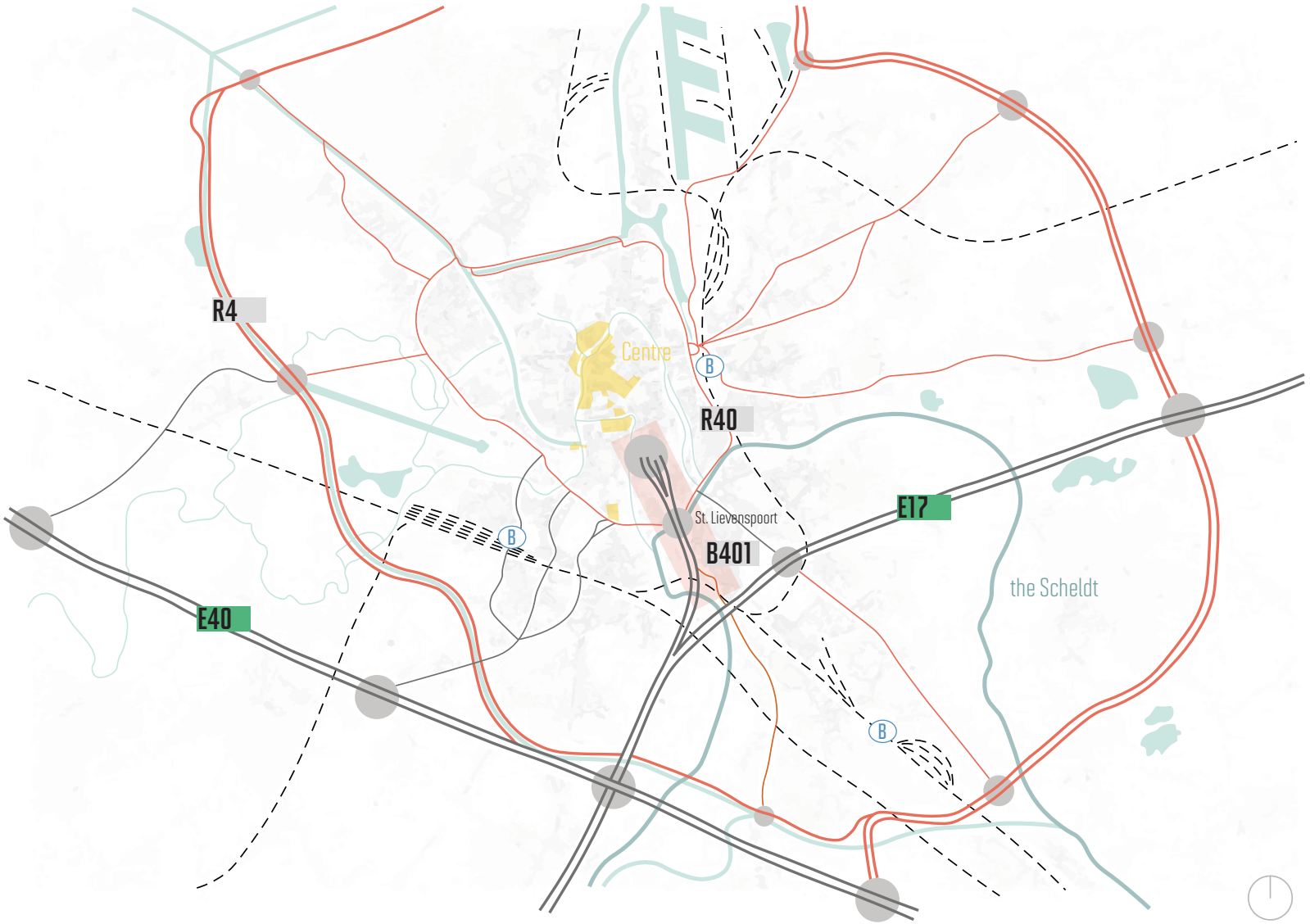
Ghent is a city located in the Flemish Region of Belgium. It is the capital and the largest city of the province of East Flanders. Ghent covers an area of 156.18 km² and has more than 260,000 inhabitants, making it the second largest municipality in Belgium after Antwerp. Ghent originated from Celtic settlements in the area of the confluence (or "Ganda") of the two rivers, the Lys and the Scheldt. In the Middle Ages, Ghent became one of the richest and largest cities in Northern Europe under the impetus of a flourishing wool industry. After a short Calvinistic period, the city experienced a certain decline that only turned towards the end of the 18th century, when the cotton industry made Ghent one of the first industrial cities on the European mainland. In the following 18th and 19th centuries, Ghent was a center for the textile and trade industries. Ghent is also a university city, with currently over 70.000 students, making it largest education city in Belgium.

The population of Ghent is projected to grow to approximately 270000 people by 2030. To guarantee a sustainable growth of Ghent and its satellite municipalities, the city is determined to improve its infrastructure and stimulate a modal-shift towards more sustainable modes of transportation. In 2016, the city presented its mobility plan for 2030, the first plan in more than 20 years (Stad Gent, 2015). The overarching goals of the mobility plan are to ensure proximity, to lower unnecessary kilometers, to stimulate walking, cycling and public transport, and to make all modes of transport energy-neutral by 2050. In practice, the new mobility plan translates to the following 'action points' or objectives, that should ensure the city's transition towards a more accessible, better connected and sustainable city:

- Implement a new circulation plan and an expended pedestrian area to eliminate through traffic within the R40 ring road.
- Create a safer and more extensive bicycle infrastructure on a city-regional level.
- Create better conditions for public transport by modernizing existing tram axes, transforming buslines 7 and 3 into tram lines and by proactive transit-oriented-development.
- Implement a new parking policy designed to reduce car dependency for innercity movements.
- Search for a sustainable and livable alternatives to the E17 and B401viaducts.
- Reduce maximum speed on primary (R4, E17) and secondary roads to increase safety and capacity, while lowering noise and air pollution in nearby neighbourhoods.
- Set up a central traffic centre to monitor and steer traffic flows on a city-regional level.


Ghent

THE B401



The B401 links the E17 and R40 at the level of the St-Lievenspoort. The central fly-over also runs over the R40 with a landing in the Zuidpark, forming a direct link between the city centre and the E17/E40. The B401 thus crosses the Scheldt (twice) and the Ghent-Brussels railway line.

Three distinct sections can be identified along the length of the B401:

- The first section is the B401/E17 intersection as far as the first Scheldt crossing. The spaces in between the extensive road infrastructure are filled with sports fields and inaccessible green areas. On the east side of the slip road complex is the Warmoezeniersweg site, with skating rink. The western side is lined with offices and warehouses.

- The second section, between the first Scheldt crossing and the St-Lievenspoort (second Scheldt crossing), includes a central fly-over flanked by a slip road which links to the R40. This infrastructure is built on concrete support posts. The fly-over crosses the Ghent-Brussels railway line. On the west side of the fly-over is the district of Bellevue, consisting of high-rise social housing, a garden suburb, the Zuiderpoort office complex, a cluster of car dealerships and the recent D'Hooghe residential development. On the east side is Ledeberg. Under the fly-over are complex intersections of the local road network, the main ones being Hundelgemsesteenweg (direction Merelbeke) and Achilles Hendrickxlaan (to Gent-St-Pieters via the Stropbrug).

- The third section, between St-Lievenspoort and Jules De Bruyckerdreef, forms the landing of the central fly-over and links to the local road network to and from Ghent Centre: direction centre Rooseveltlaan and Zuidparklaan on both sides of the Zuidpark, direction St- Lievenspoort, Gustaaf Callierlaan and Zuidparklaan parallel to the fly-over. On both sides of the fly-over, these streets are densely lined with high-rise apartment buildings. On the east side a tram link runs in parallel. The residual green strips along the fly-over are virtually inaccessible and offer no residential quality.

The corridor of fly-over and adjacent parallel roads forms a barrier along its entire length, with very few links between the districts to the east and west. The links that do exist are geared to car traffic.

Dienst Coördinatie - Departement Publieke Ruimte - Stad Gent, PROJECT DEFINITION FOR THE STUDY ASSIGNMENT TO DRAFT AN EXPLORATORY SPATIAL ENQUIRY FOR THE B401 VIADUCT PROJECT, 2017 (pp. 8-9)

THE STUDY AREA

The study area can be delimited according to the figure:

- The first part of the study area comprises the fly-over area, between the railway and the St- Lievenspoort, and the connecting slip roads, plus underlying infrastructure, the connection to Hundelgemsesteenweg (Merelbeke) and Burgravenlaan (Stropbrug), the office complex and the access to Ledeberg. The private grounds of the various car garages are included within the study area.

- The second part concerns the important link from the B401 to the R40. This intersection at the St-Lievenspoort currently includes crossings for car traffic on three levels, but also incorporates key cycling and public transport routes, including a tram line. Traffic flow at this intersection is a key area for attention. Here too, therefore, part of the R40 is included in the study area.

- The third part covers the fly-over landing area from the St-Lievenspoort to Jules De Bruyckerdreef. Any removal of this part of the fly-over will certainly have an impact on the adjacent roads, generating potential for the land freed up and connections with neighbouring districts.

Evidently, the study area will be larger and the area of influence much greater. There is also the possibility that some potential mobility solutions (in this case a Park&Ride infrastructure) might be found outside the study area. The Koning Albertpark can be counted as part of the study area, and there are opportunities to be unlocked here. The Warmoezeniersweg area is also part of the study area. This land is currently in use as a sports complex and there are plans to expand the complex to currently unused land. A green/cycling axis (no 4) is being created along the Leie (Lys) river. The Exploratory Planning Study for the B401 fly-over can also make statements on the potential and opportunities associated with these study areas.

The issue of the E17 fly-over and the B401-E17-E40-R4 node does not fall within the remit of this study. In the mobility plan, the connection between R40 and E17-E40-R4 is envisaged as remaining at the level of the St-Lievenspoort via the axis formed by the B401.

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URBAN DEVELOPMENT

Historical map of Ghent in 1873

1830 - 1914

The urbanisation of Ghent started within the city walls (the current R40). From 1846, this continued in nearby Ledeberg via industrial expansion.
From 1830, urbanisation was boosted by the construction of the Brussels-Ghent, Ghent-Kortrijk and Ghent-Ostend railway lines with a terminal station in Ghent South (at the current Woodrow Wilsonplein) on the original wetlands ('Muinkmeersen'). The barrier function of the wetlands was taken over by the railway infrastructure.
The railway infrastructure can still be recognised in the urban structure (Bellevue "triangle").
This led to explosive population growth in Ledeberg, which grew from around 3,700 inhabitants in 1846 to around 14,000 in 1900. The new population settled mainly in workers' housing in the form of courtyards and 'cities' on around 60 of the 108 hectares, with the remaining area being reserved for industrial sites.
Many of the houses and some industrial buildings are still present.
The Bellevue district became isolated by railway infrastructure; the district included a textile industry and a shipyard interspersed with workers' housing and allotment gardens.
This acquired, more "open" structure is still recognisable.

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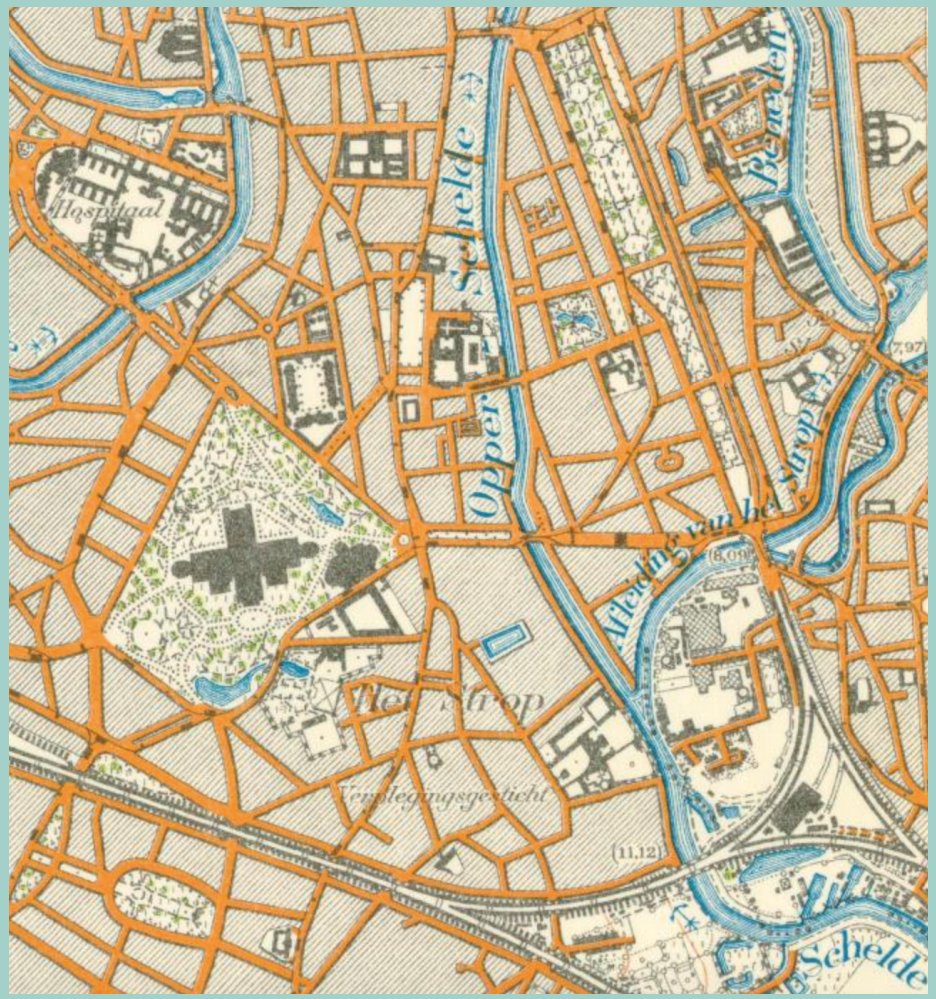
URBAN DEVELOPMENT



Historical map of Ghent in 1939

1914 - 1945

This period saw the first phase of suburbanisation in Ghent, with extensive urban development outside the city walls, including industrial sites.
The Ghent South terminal station was moved to Gent-Sint-Pieters on the main Brussels-Ostend- Kortrijk line. However, the terminal did not work efficiently. The Gent-St-Pieters area was developed in preparation for the 1913 World Exhibition. The railway land vacated within the city ring was developed to form the Koning Albertpark.
Part of this park is still present and the structure of the former Ghent-South station area can still be discerned in Ghent South today.

The Bellevue district remained isolated due to the Belgian National Railways' use of the railway triangle to store materials. Social housing modelled on the garden suburb ('Tuinwijk') principle was built in the Bellevue district.
The Tuinwijk has since been renovated but remains an enclave in the current urban structure.

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URBAN DEVELOPMENT

Historical map of Ghent (1950-1970)

1945 - 1970

The second phase of suburbanisation in Ghent brought development far beyond the city boundaries. Ledeberg sought to modernise in accordance with the CIAM (Congrès internationaux d'architecture moderne) doctrine:

- slum clearance and high-rise buildings instead of the workers' quarters;
- a direct connection to the international motorway network;
- a modern economy in a modern district with a different population composition;
- a direct link with Gent-Sint-Pieters via the Stropbrug.

The Bellevue district became a redevelopment area.
Several designs were drawn up for a new district at Bellevue/Hundelgemsesteenweg. A design for a motorway followed later, first going as far as the Sint-Lievenspoort but then extending over the R40 to the Koning Albertpark: vehicle infrastructure was to guide urban development.
The high-rise buildings can still be recognised in parts of the urban structure (Meierij, Letha, Pretoria, Scaldis, Centrumplein) and the UCO head office at Bellevue.
There is also the structure of the B401 and the extensive complex of connections on railway land and existing streets: a breakthrough achieved through restructuring and compulsory purchase.
In the Bellevue district, the Tuinwijk, D'Hooghe site and some worker 'cities' can still be identified.

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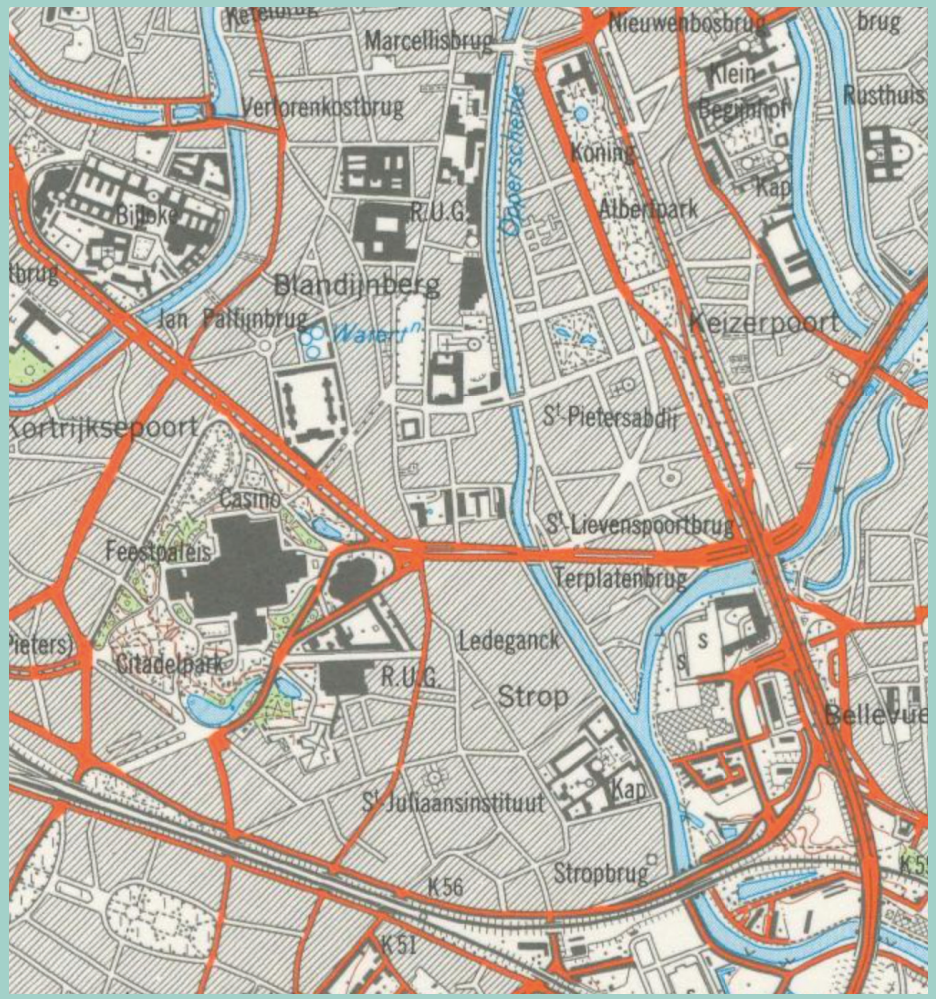
URBAN DEVELOPMENT



Historical map of Ghent in 1969

1970 - present day

After 1970, urban decay set in. It was not until 2000 that there was a renewed tangible focus on urban development.
Ledeberg too, until the turn of the century, saw the disappearance of existing economic activity and a lack of private investment in housing construction.
The year 2000 heralded a shift to upward urban development:

- **Cluster of car dealerships in Bellevue**
- **Office development**
- **New housing construction (Pogano, D'Hooghe site, etc.)**
- **Public facilities (Bellevue park, 'Welzijnsknoop', local employment projects)**

The focus of development shifted more towards the water (green/cycling axis, housing construction on the Scheldt, etc.).
The City of Gent launched the 'Ledeberg Leeft' (Ledeberg Lives) urban regeneration project (for Botermarkt and surrounding area), aimed at a broad upgrading of the urban quality and quality of life for existing residents.

The urban structure around the B401 continues to show little cohesion. The extensive B401 car infrastructure and connecting roads created a permanent tear in the urban fabric. In addition, and as a result, the quality of life and the usability of the public (green) space is and remains low.

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VIADUCT B401

View of construction of the B401 fly-over (circa 1970)

HISTORICAL CONTEXT

The B401 viaduct is a leftover from a time during which the city of Ghent was rapidly urbanizing. Its construction started in 1970 and it opened to the public in 1972. The viaduct is 3.1 kilometers long and connects the E17 and E40 with the city center and the R40 ring road. It divides three neighborhoods: Ghent-South, Bellevue and Ledeberg. Before the construction of the viaduct, these neighborhoods played an important role in the history of Ghent. Between 1800- 1850, this area was an important place for farmer trading. With the industrialisation and urbanization of Ghent in the second half of the 19th century, the area developed itself further by the construction of many different textile factories in Ledeberg and Bellevue. These investments caused a population peak in Ledeberg in 1900, reaching a total of 14230 residents. It was during this time that most of the houses and streets that still exist today were built.

In the early 20th century, the infrastructure along the Ghent-South and Ledeberg/ Bellevue axes was further professionalized. A tram rail connection connected Ledeberg with the train station on Ghent-South, which was the city's most important train station at the time. In her visit to Ghent, Queen Victoria of the United Kingdom traveled from Ostend to Ghent-South. It was during this time, that the area developed itself as one of the most important access points to the city. When the city of Ghent organized the World Fair of 1913, it decided to build an entirely new train station. In 1930, the train station in Ghent-South was broken down and replaced with offices and the Koning Albert park.

In the period between 1930 and 1970, the area did not develop itself much. The previously successful textile industry was suffering from foreign competition and many factories had to close. During the 1960's, the Belgian economy was growing again and part of that growth was fueled by the introduction of many different affordable cars. Now that more people could afford a car, the Belgian government adopted the following motto in 1965: "100 kilometers of new highway every day!". It was during this time that it was decided to connect the largest Belgian cities with each other with five main axes. The construction of the B401 viaduct was part of that strategy. To make room for the viaduct, many of the old worker's housed were torn down and the displaced people were offered new housing in two newly built apartment blocks next to the viaduct.

After the opening of the B401 viaduct, the area transformed in a peripheral zone. The only commercial activities that remained were the UCO offices in Bellevue. In the year 2000, the area was in decay as the population in Ledeberg reached a low, totaling just 7836 residents. In 2006, the local government agreed that the area needed an impulse and it introduced the urban renewal program "Ledeber Leeft", which included a 25 million euro investment program to stimulate new development and renovation programs and to finance the construction of a new neighbourhood centre.

KONING ALBERTPARK

A picture of the Koning Albertpark, probably taken in the fifties

The Koning Albertpark, also known as the Zuidpark, is neo-baroque in design, whereas the other historic parks in the city are usually laid out in English landscape style. The rail yards leading to the Zuidstation were originally located here. The Muinkmeersen area had seen minimal development previously due to its marshy nature. So, throughout history, and even today, this elongated zone can be said to have formed a barrier between the city districts on either side.
In 1928 the Zuidstation was demolished to be replaced by the Gent-Sint-Pieters station, freeing up a large elongated plot. In the 1930s the Zuidpark was created on this former railway land.
The park was laid out in art deco style, observing strict geometry. An art deco post office was built at the northern end and the park gained a bandstand. The Propagandecentrum came into use in 1956, together with an administrative building for the city's electricity, gas and water services. Gaston Eysselinck had plans to create exhibition halls, but these were never realised. Over time the park gained a monument to King Albert, another to the fallen in the world wars, a statue of a wounded swordsman and a bust of Flemish writer Karel Van de Woestijne which later disappeared due to vandalism.
Eventually, however, the park changed greatly in appearance and character. Before World War II, the avenues along the park were still lined with low-rise buildings and townhouses, but after the war these were gradually replaced by office and apartment buildings. In 1969 to 1970 the southern part of the park disappeared with the construction of the B401 motorway. The planting and beds were replaced with less labour-intensive gardens in the 1990s, and the last art deco elements were lost to a redesign in 2006.

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THE REDEVELOPMENT OF ROAD INFRASTRUCTURE: AN INSTRUMENT FOR URBAN TRANSFORMATION

Prof. dr. ir. Kobe Boussauw
Vrije Universiteit Brussel - Cosmopolis Centre for Urban Research

In no other city centre in Flanders, the technological optimism of the late sixties has become so powerfully materialized in the landscape. The viaduct of the B401, whose construction was completed before the first oil crisis, had to connect the centre of Ghent with the modern motorway network in a quick way. The car followed the train, which in the same way connected the city centre to the railway network until the beginning of the twentieth century. Building for more mobility would then fit into a vision of economic expansion, at the same time this strategy unwittingly contributed to the erosion of the city.

The reason why cities exist at all has to do with the economic valuation of the proximity of homes, jobs and facilities, so that inefficient movements between these places can be avoided. The essence of the city is a spatial set of activities that can interact with each other without requiring much mobility. In the past, transport was a laborious and costly affair. Large-scale infrastructures such as the B401 made transport much faster and cheaper.

But apart from the fact that cities were better connected with each other in this way, it was mainly the urban periphery and the countryside that were better accessible from the city. In this way the new highway meant a catalyst for the escape of the city. In other words: the motorway infrastructure promoted the relocation of many city dwellers, employment, but also shops and even schools, to the edge. This meant that the inner city slowly but surely transformed into a residential area for disadvantaged groups, while the supply of services and even employment became systematically weaker and vacancy increased.

But the highways, and the B401 in particular, also contributed to this process in two other ways. Firstly, a district, including some four hundred homes, was physically demolished to build the viaduct. In this way the motorway proved to serve a little less city than originally intended. And secondly, the B401 was also responsible for the daily supply of thousands of cars, right down to the centre. The increasingly busy traffic situation led to additional problems of noise, air pollution and traffic insecurity, while the car more and more emphatically seized public space. This effect meant an additional burden on the urban quality of the city, and further enhanced the urban escape.

The vicious circle of this escape that made living in the city less and less attractive was only broken around the year 2000. Almost all cities in Belgium have since succeeded in attracting additional residents, a phenomenon that was accompanied by increasing attention to making the city more attractive as a residential environment and as a recreational destination. Recognizing the destructive role of the car in the city is an essential element in the reversal of the process described above. Reducing road and parking capacity, and returning public space to cyclists, pedestrians and public transport fits perfectly into this picture.

“But what about traffic?” Is the recurring question that is asked when people talk about fewer cars in the city. Perhaps we should dare to look for the answer partly in the infrastructure itself. If the construction of the B401 has lured the car to the city, and thus caused traffic, the transformation and partial removal of this highway will mean that some of the cars present today will remain outside the city in the future. This phenomenon is also called the ‘evaporation’ of traffic: if the road capacity decreases, the traffic flow also decreases.

In the short term, some drivers will take a different route or arrive at a different time, deterred by the threat of heavy traffic. Others will work more often at home, stop dropping off the children at the school gate, or take the train, tram, bus or bicycle. Park & Rides with shuttles will increasingly be responsible for the accessibility of the inner city. In the longer term, all kinds of micro decisions about the place where people want to live, work or develop their daily activities will change the whole system. Families who want to go through life without a car will find a place in the city, while activities that fully depend on mobility by cars and trucks will move to the edge. But the centre will become more attractive and more liveable, initially for the current and new residents, but also for day-trippers and tourists, and for those who work and go to school.

Will we return to the fifties? By no means: the future image outlined in the urban design for the B401 combines the best of both worlds. Ghent from before the 'golden sixties' is incomparable to Ghent of today. Today, we are used to live more spaciously, to be able to move more freely, and to no longer see the city as a place of industrial employment. The car has acquired an important place in the organization of our society, but at the same time health and quality of life are at the top of the political agenda. The city has a specific place in the wider urban agglomeration, which requires an adapted mobility policy.

"What about traffic?" May not be the most important question. "How do we make the city less dependent on the car?" Is more appropriate. Because a city that manages to function equally well with fewer cars is a city that does not need a motorway to the centre. Both concepts interact with each other, which means that we must see the traffic infrastructure itself as a planning tool. Reducing the capacity of this fast access road will lead to an urban transformation, where families, employers and activities that can do without a car will be inclined to visit the city again. Those who need the car every day will, as in the past, still be inclined to move to the edge. But: the first group will grow, thanks to the more attractive living environment, the more reliable public transport, and the increasing ease for cyclists. All this supported by innovative developments such as demand-driven and shared mobility, and as little as possible based on fossil fuel.

It goes without saying that the transformation of large-scale road infrastructure from the past must yield additional, qualitative urban space. Just as the construction of the viaduct has involved the demolition of a district, its redevelopment will strengthen the urban fabric. If the new version of the B401 is to be the bridge to the city of the future, it must play a role in strengthening the quality of life of the city. The urban design for the B401 provides a vision for this, which will have to crystallize over the coming years. Park, nature, recreation and urban agriculture play a role in this, but strengthening the city - rather than the urban edge or the countryside - as a living environment of the future must be considered. Because the more people live in urban areas, the less need for travel, and the easier the vicious circle of car dependency will be broken.

MOBILITY WITH THE “M” OF “MANKIND”

Lowie Vermeersch & Wouter Haspeslagh
Granstudio

How can the B401 reconcile a car-free city centre with a smooth connection to the highway network? Of course, traffic engineers are needed for such complex issues. Capacity, frequency, peak demand, minimal service … these figures form an extremely important basis when designing a customized solution. But what we often forget is that mobility is mainly about people. What is the use of mobility if it is not to discover places, meet other people and spend time together? How can mobility make us happier? And what are the values that we should strive for, with a view from within? That is the perspective and role we need to take as designers when working on new mobility solutions, a personal, sensitive, and fragile role. We must inject a strongly human approach within a mobility context that will be more and more defined by big systems and complex technology.

Mobility is experienced as a personal journey from departure to arrival, making use of the available transport offer, in which classic and new services increasingly become an alternative to owning a car. In this multimodal landscape the quality of mobility is not only determined by a service or vehicle: also the points where we switch means of transport are largely responsible for our total experience. Waiting times, inadequate parking, unpleasant places, buying a ticket, registering for single bikes, walking too far, delays … these are all thresholds that, when summed up, can strongly influence how we experience mobility.

Not only the city is in evolution; our behaviours and expectations evolve too. Thanks to our smartphones, we have become accustomed to instant availability, ad-hoc planning and very low thresholds to try out new things. We are gradually expecting mobility to have the same characteristics: everything must be instant, flawless and effortless as a second nature. This typical human perspective has to be also the focus when redeveloping the B401. Understanding the specific mobility practices and desires of different users is an important key here.

We must of course design from what will be possible in the future, and do not (literally) anchor the limitations of the present in the future. After all, services, technology, vehicles, infrastructure and regulations are developing at very different speeds. Thinking from a user’s perspective should not only be based on the things we currently know and use. A changing society, technological innovations and ecological requirements will ensure a thorough diversification of the mobility landscape. After all, the future is not merely an extrapolation of the present! The viaduct is a relic of a blind trust in the car as ‘the future’; we may under no circumstances create new relics with the same kind of trust.

The technological innovations that characterized the last decade (autonomous vehicles, smartphones, wearables …) can probably also be used as quick wins to take our total mobility experience to the next level, but they are by no means a goal in themselves, let alone an ultimate solution. After all, mobility is not just the provision of a vehicle, or the required infrastructure. It is a harmonious combination of services, vehicles, environment and, as the ultimate link: we ourselves.

Still frame from the film Plannen voor Plaats by Nic Balthazar, 2017

SITE ANALYSIS

This chapter focuses on a location research about the project site. The chapter presents an analysis of the B401 area, using on-site observations, graphics, visual representations of the infrastructure and interviews with local residents. The aim of this exploratory research is to find the potentiality and the strengths of the project area, trying to understand what the qualities and flaws of the site are and to identify the profile of the B401 users. Even if, we must assume, that the results of these observations do not have to be considered like constraints for the project, but starting points for the design process. Since the P&R project is oriented and conceived for the future, we don't know actually how and if these nowadays observations will affect the project, but above all, we don't know what course these trends could take and how the future will look like.

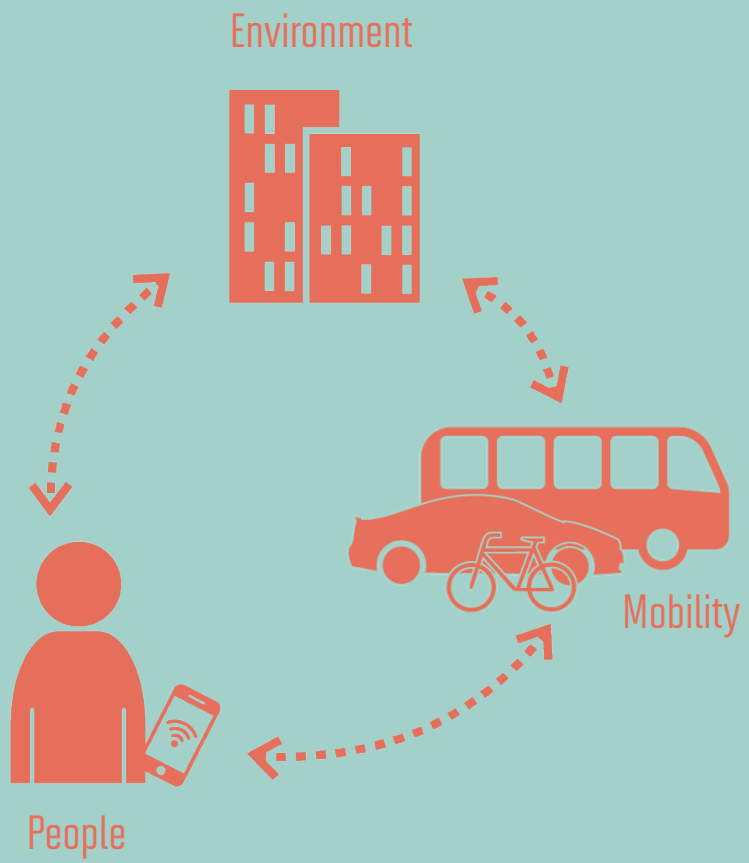
The urban analysis is divided into three parts: environment, mobility and people. Since, as we said before, the mobility is the result of an interplay of three factors: environment, vehicles and users.

The first part, "environment", describes the project site through graphic and visual representations to better visualise the spatial qualities and flaws of the environment. The use of axonometric representations and territorial sections helps us understand the structure of the B401 viaduct in relation to the context, the roads and the means of transport used. Observations were also captured with photographs, which are used to explain certain narratives as described in the interviews.

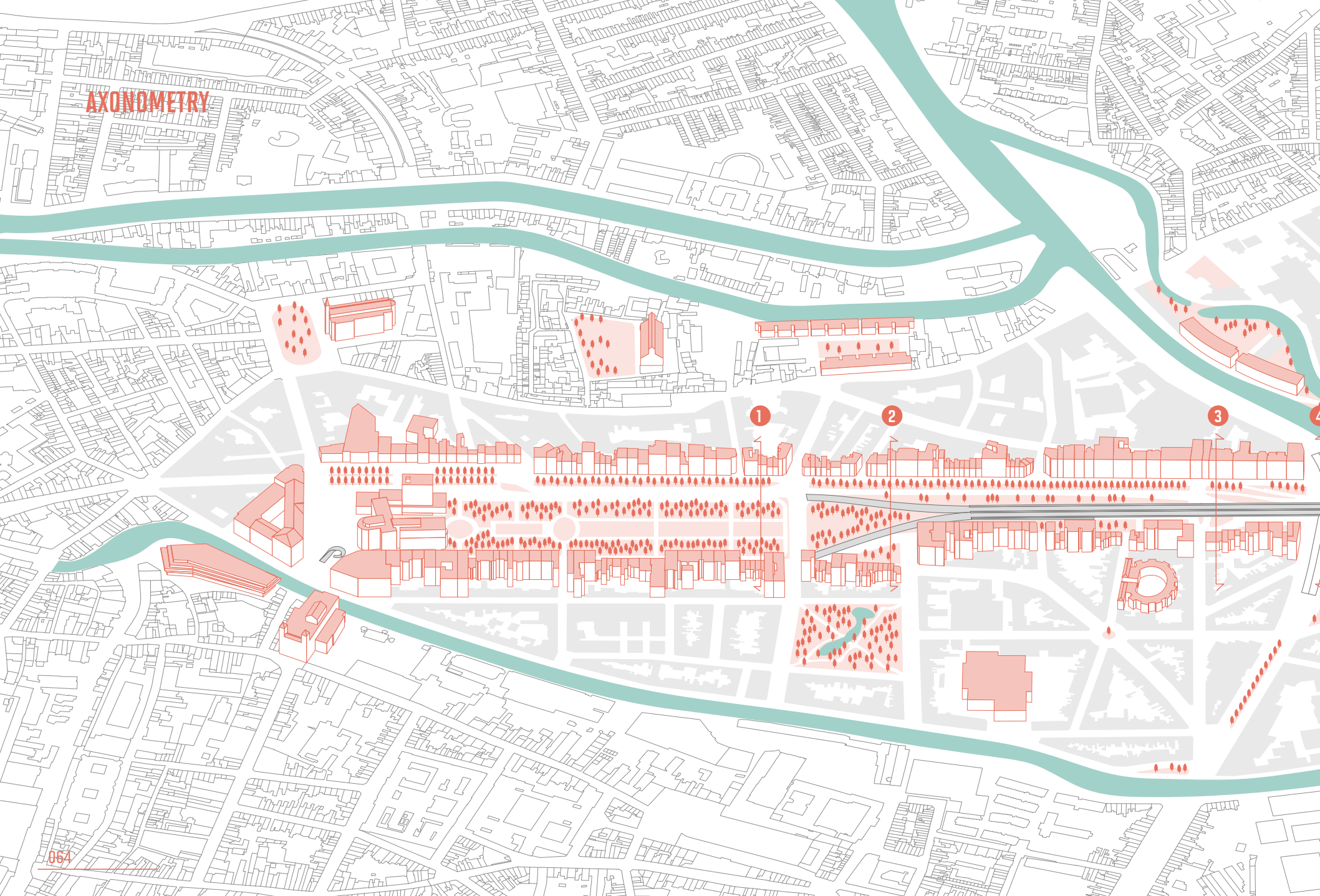
The second part of the chapter, "mobility", analyse the B401 area from a mobility point of view, through the mapping of the existing mobility infrastructure and the available means of transport. The graphic analysis proposed in this part are just a resume or collage of the research actually made (for more analysis, see Appendix). In this section the viaduct is put into relation with the big mobility vectors like highways, railway stations and the Scheldt river and a possible mobility solution is represented to divert and resize traffic in order to reduce the influx of cars to the centre of Ghent and open the way to the use of alternative means of transport.

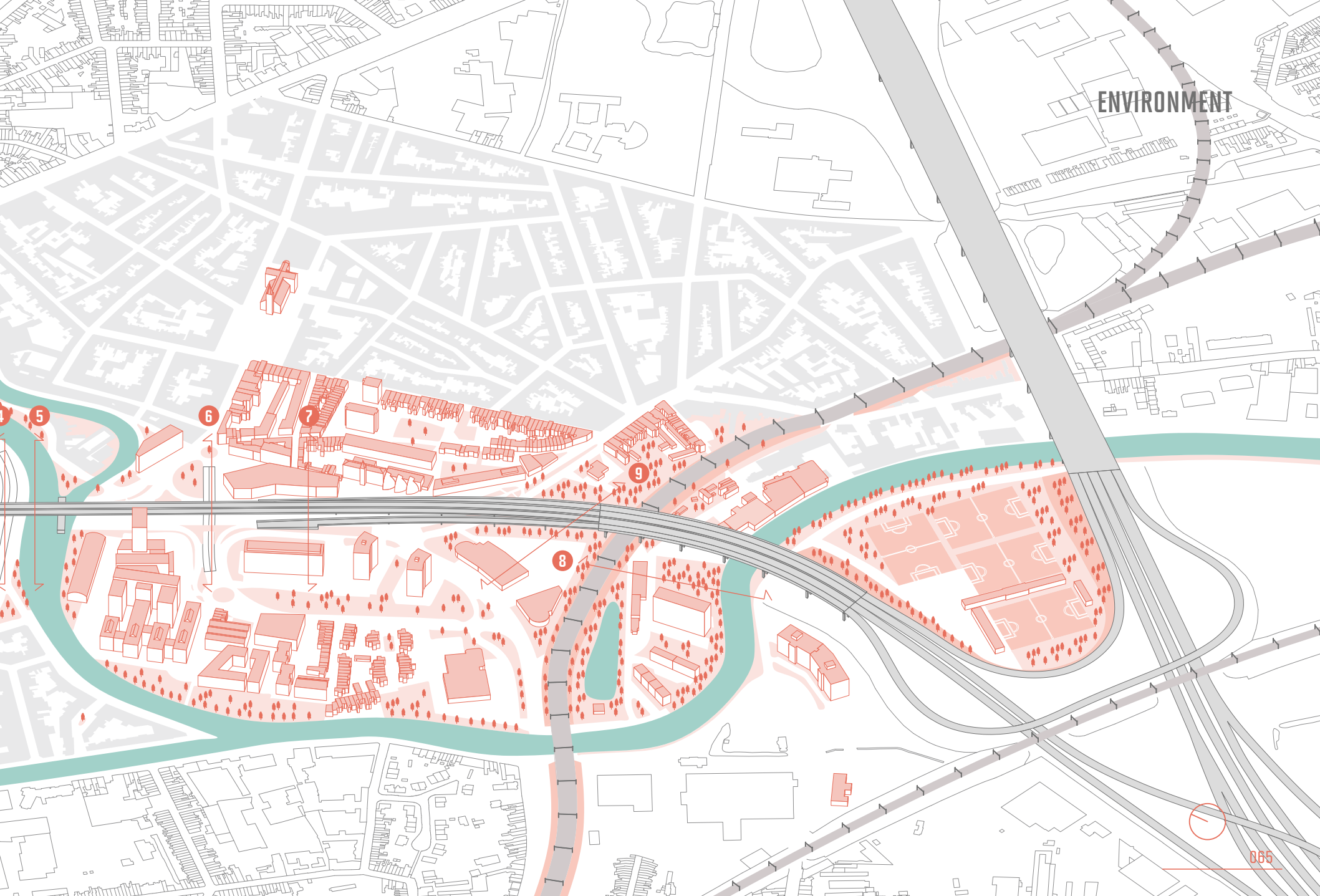
The third and last part of the research, "people", focuses on tracing the people flow around the city and identifying the B401 users in order to understand people's motivations for travel and their travel behaviours.

The analysis also focuses on understanding which kind of demographic groups are present in the neighbourhoods surrounding the viaduct and what their socio-economic profile is. Finally, on-site interviews were taken to better understand the perceptions of the B401 area by the inhabitants, in order to identify the positive/ negative aspects that characterise the site and what people's desire and needs are.


Environment
Mobility
People

AXONOMETRY

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TERRITORIAL SECTIONS

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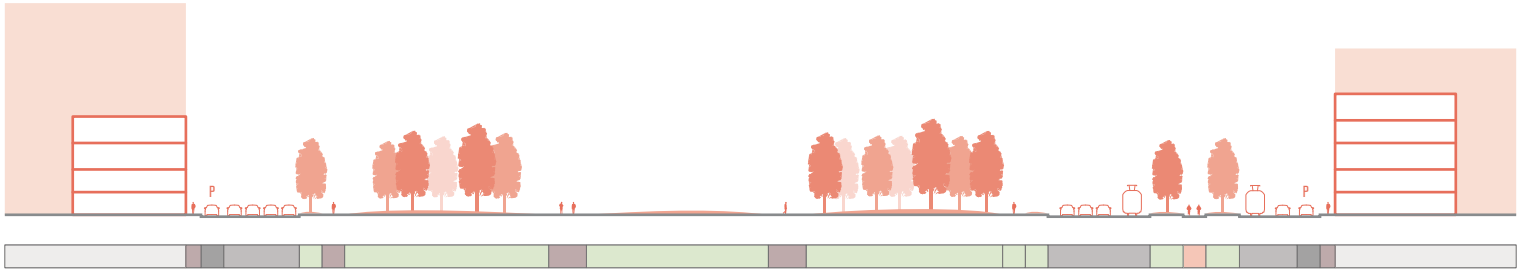

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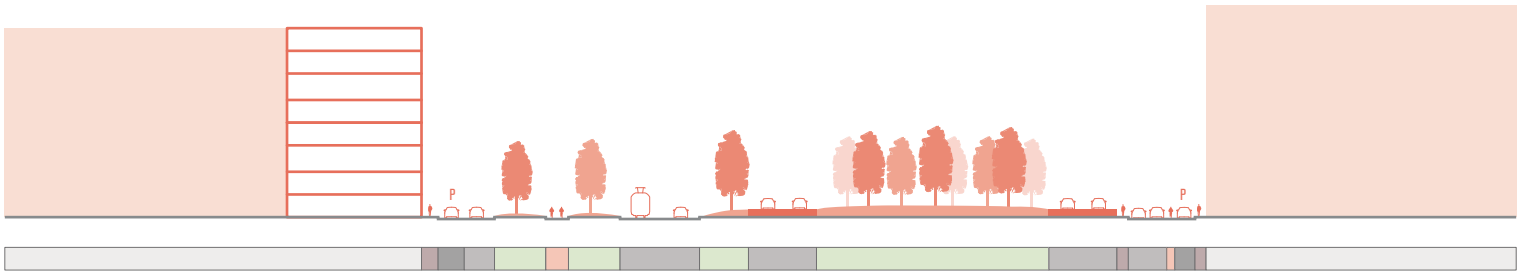

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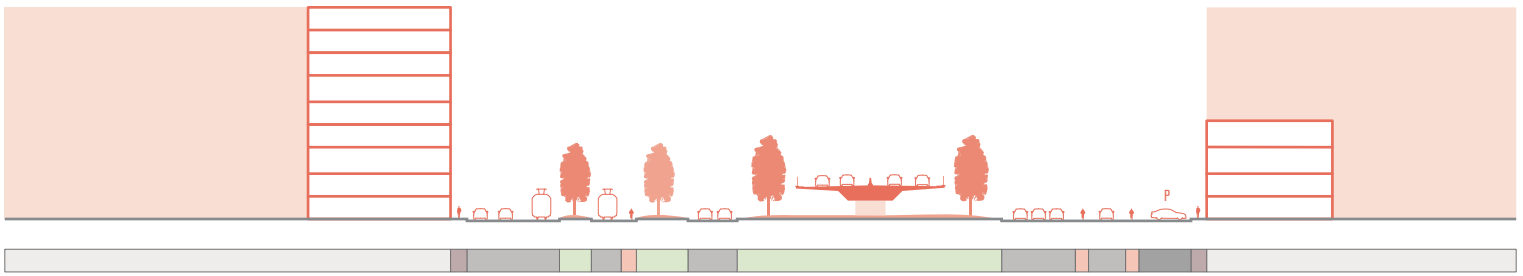

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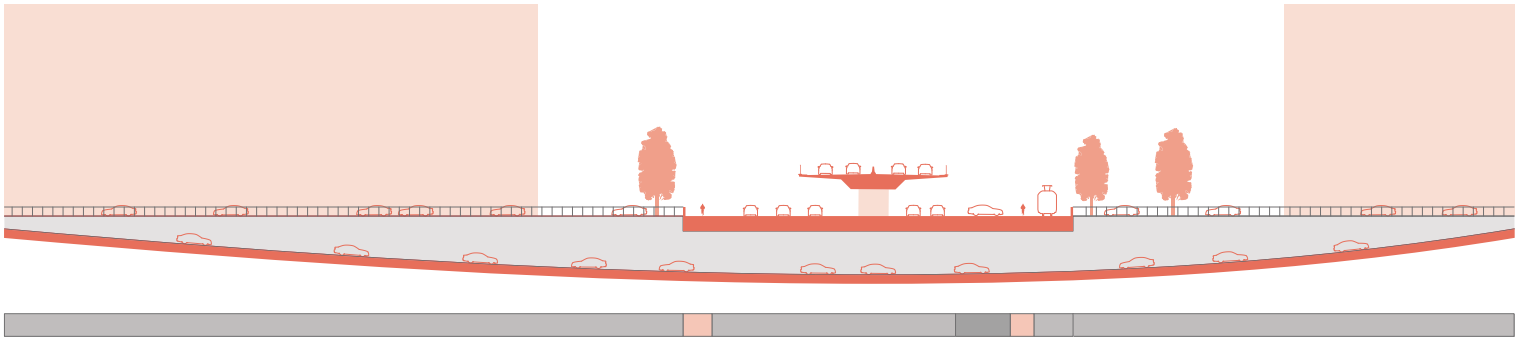

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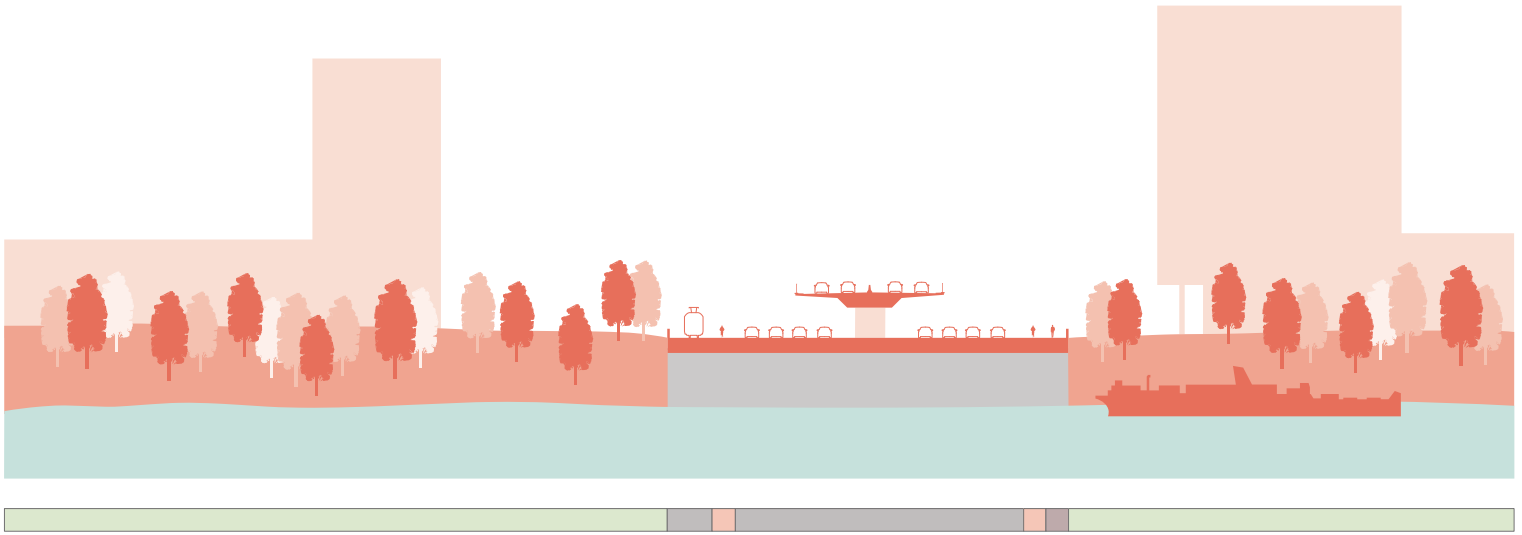

TERRITORIAL SECTIONS

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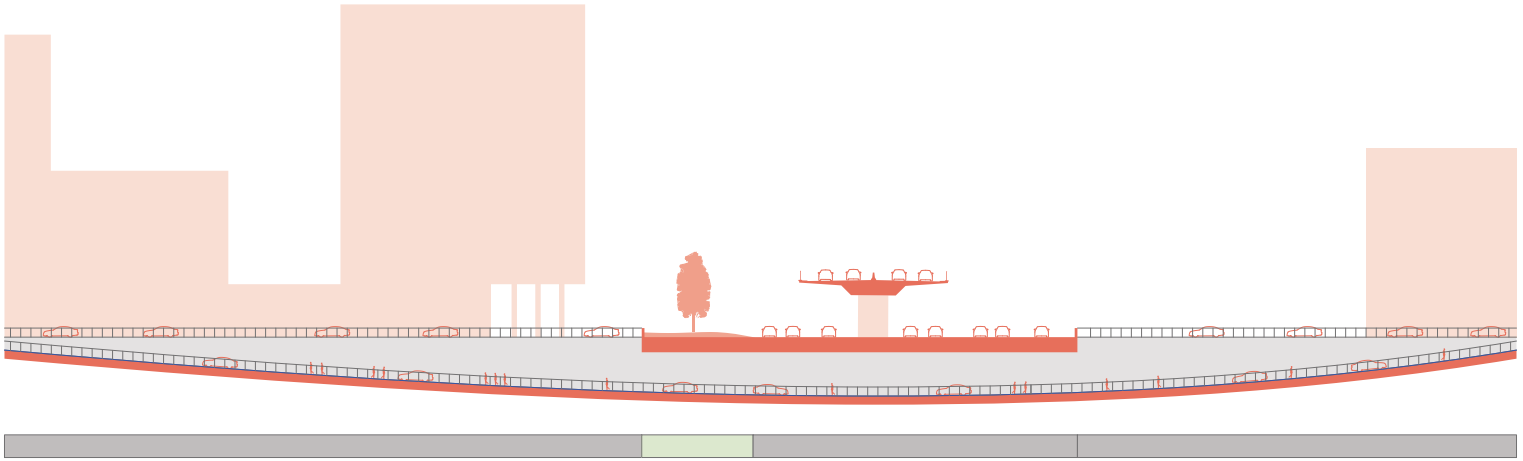

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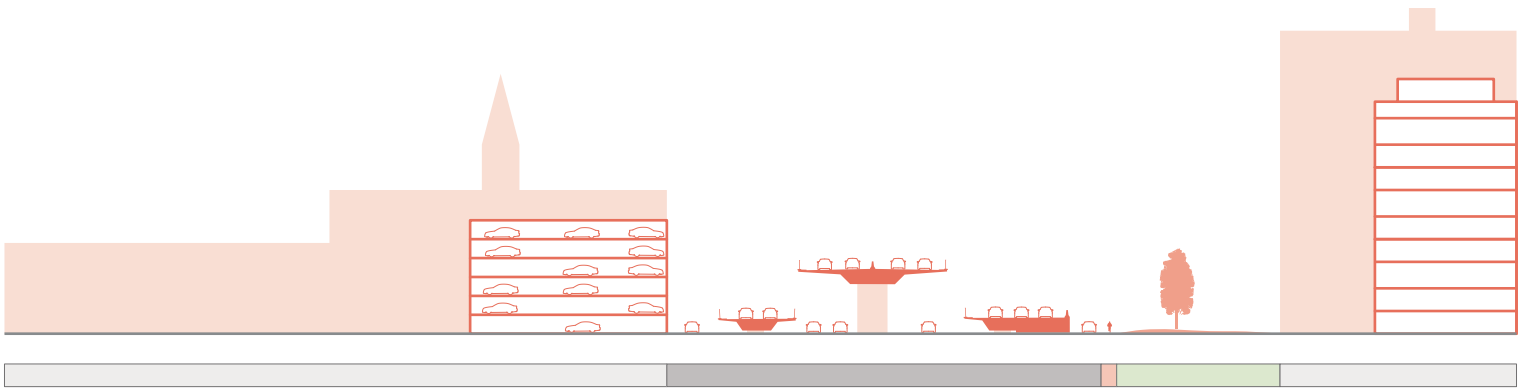

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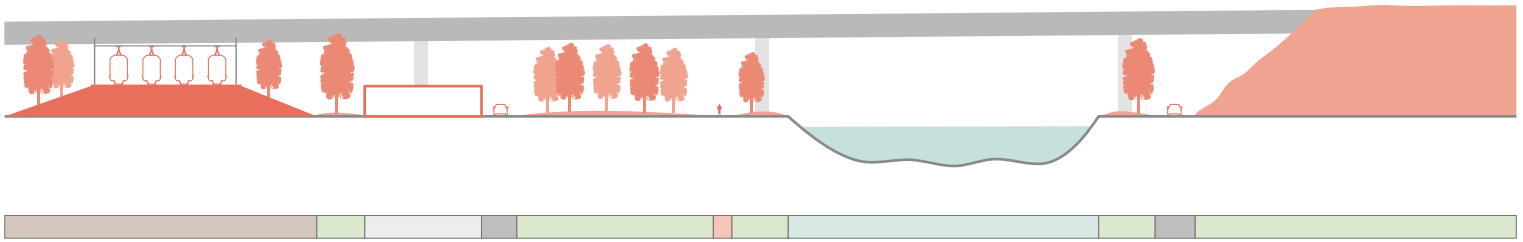

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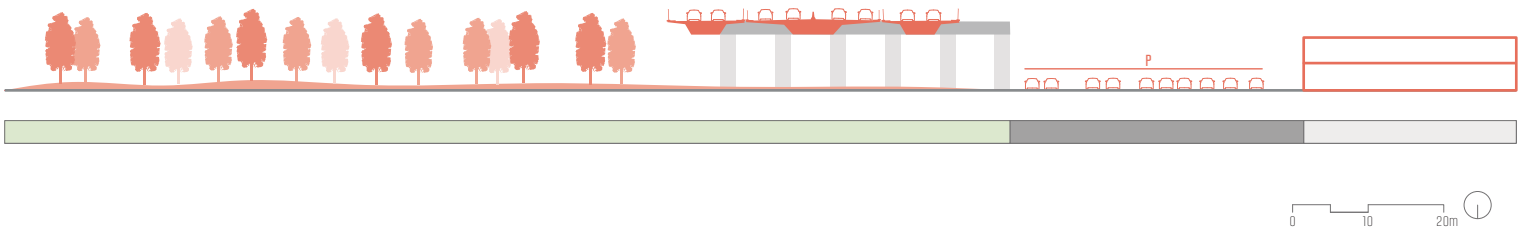
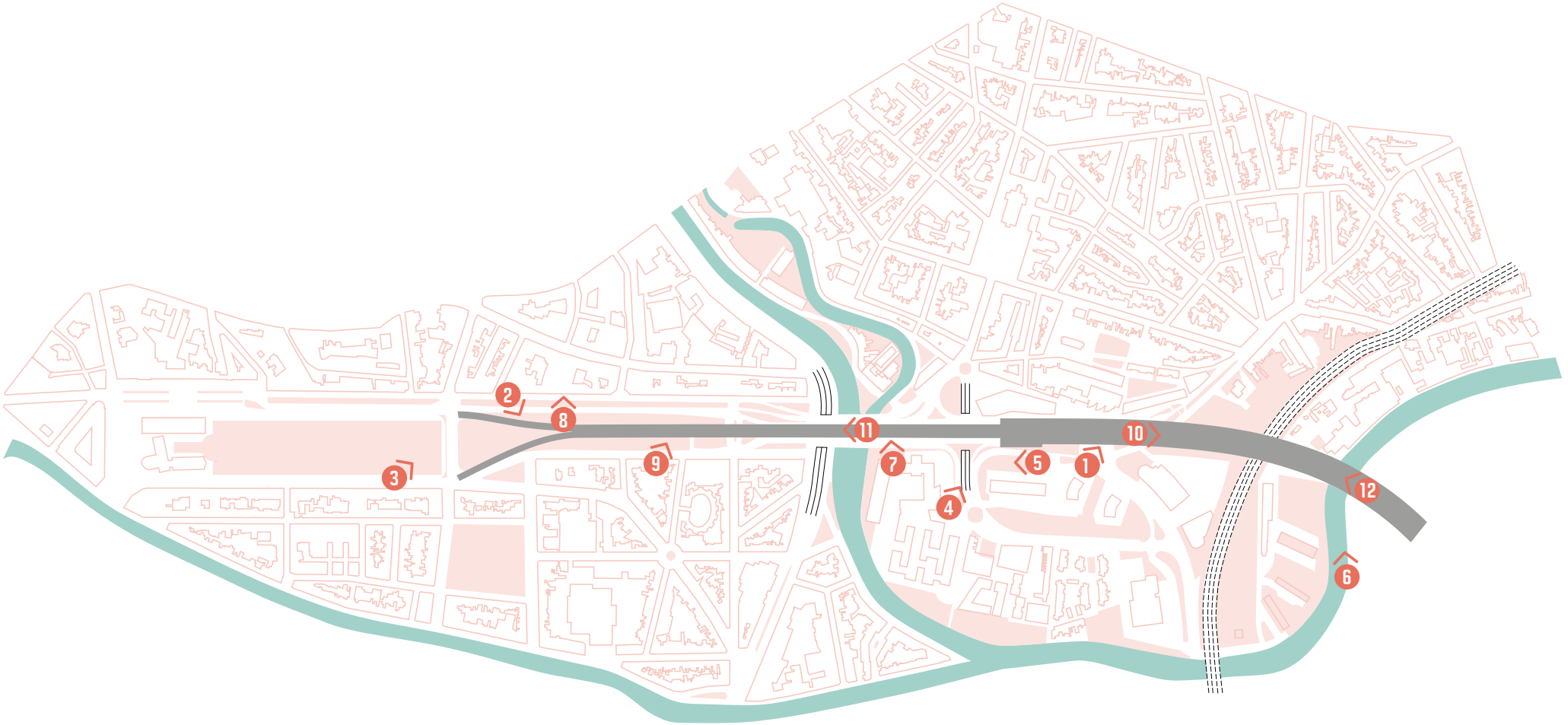
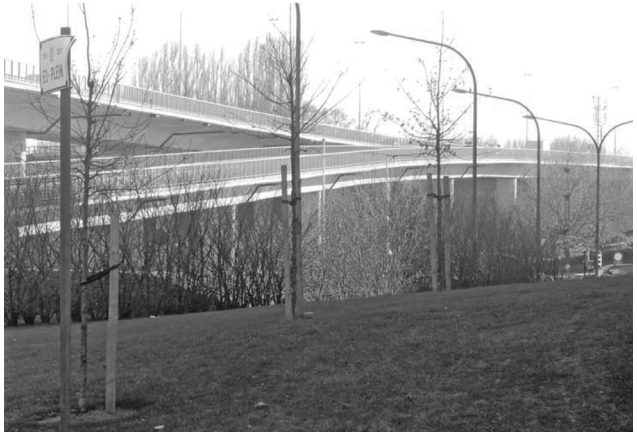


PHOTOGRAPHIC IMPRESSIONS





The fold of the B401 fly-over

1

The overlap of the row of trees and the landing of the central part of the fly-over

2

The straight landing of the B401 viaduct in the Zuidpark

3

Crossings for car traffic on three levels between Ledeberg and Bellevue

4

PHOTOGRAPHIC IMPRESSIONS

The UCO building communicates clearly with the logic of the viaduct

5

The B401 viaduct overpassing the Scheldt river

6

Transparency under the B401 viaduct

7

The linearity between the landing of the central part of the B401 and the Zuidpark

8

The car parking under the B401 fly-over

9

The informal parking under the B401 fly-over

10

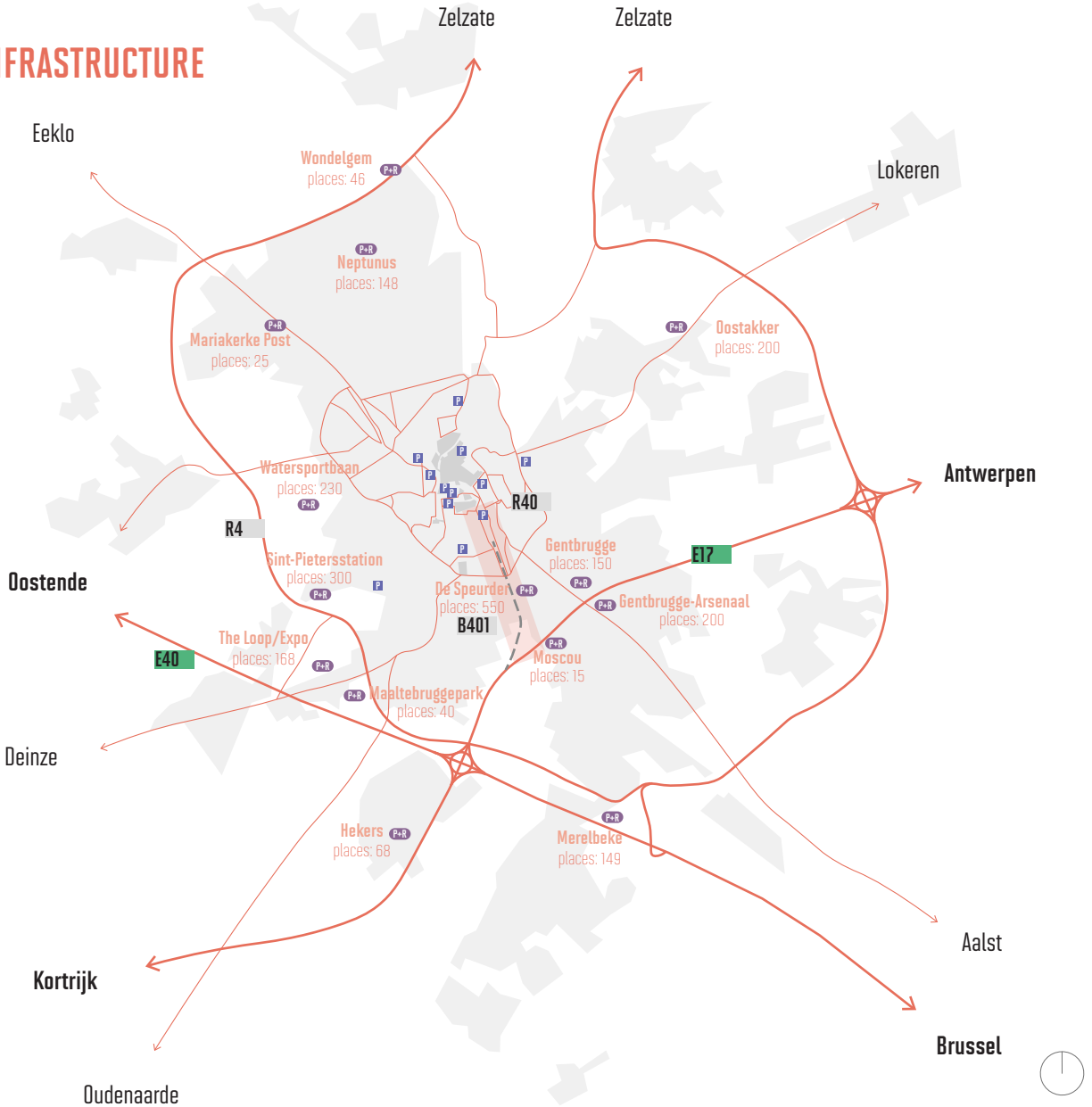
The architecture under the B401 fly-over

11

The different architecture under the B401 fly-over

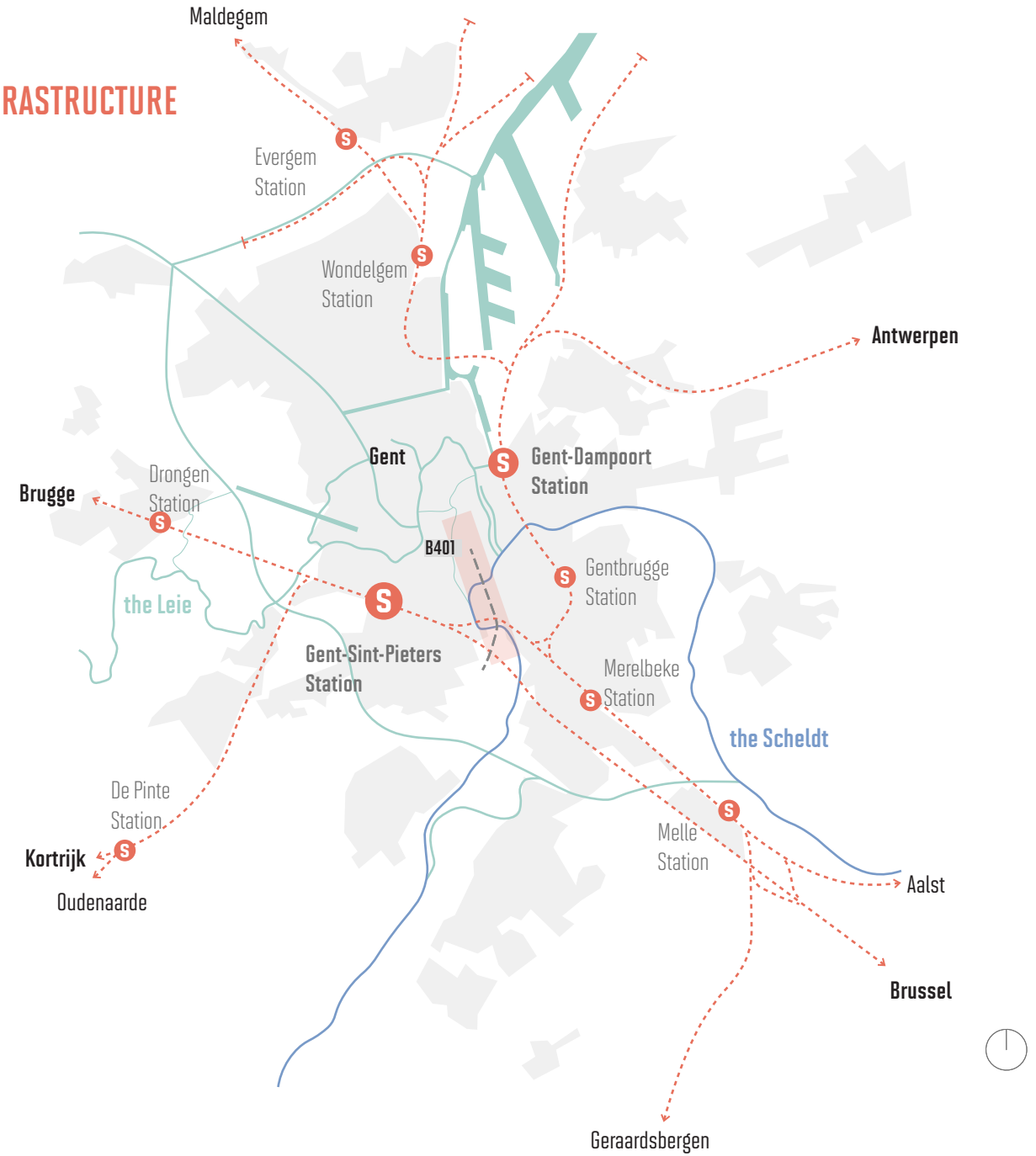
12

ROAD + PARKING INFRASTRUCTURE



In the current road structure, the B401 is the fast link between the E17/E40 highways and the R40 ring road at the St. Lievenspoort, and the primary gateway to the city centre; it leads traffic directly into or through the Historical Centre, unless drivers choose the connection with the R40 which then has a distribution function. This direct link to the city centre allows very easy access to and evacuation from the city but, on the other hand, the increased car use means that local city roads and the connections with the E17, E40, R40 and R4 are congested during the morning and evening peak periods. This in turn creates traffic jams on and leading up to the B401.
Recent studies have shown that half of the traffic within the R40 could be avoided or could use other routes. The fly-over has a suction effect on car traffic heading towards the city centre, leading to complete saturation of car traffic there. The fly-over is in competition with public transport and the P&R zones located further out from the city centre.
When considering the future traffic function of the B401 and its compatibility with local quality of life, the question arises of who should still be permitted to drive into the city, where, and along which routes. The role to be played by the R4 and R40 is inseparable from the role of the B401, both entering and leaving the city.
The recent policy plans (2020 Parking Plan and 2030 Mobility Plan) set out a vision to this end. The primary aim is to implement a modal shift to less private car use. For the city centre, a loop model will be put in place for local circulation, cutting across the main through routes. The R40 will take on a more important distribution function. On the city margins (R40 and/or R4), a ring of Park&Ride car parks is planned. In the city centre, the number of parking spaces will be further reduced by redesigning streets and expanding the pedestrian area, with a shift from on-street parking to public or private car parks and a pricing policy designed to encourage drivers to leave their cars on the outskirt of the city
The traffic function of the B401 will/can (chicken or egg?) thus be phased out.

TRAIN + WATER INFRASTRUCTURE

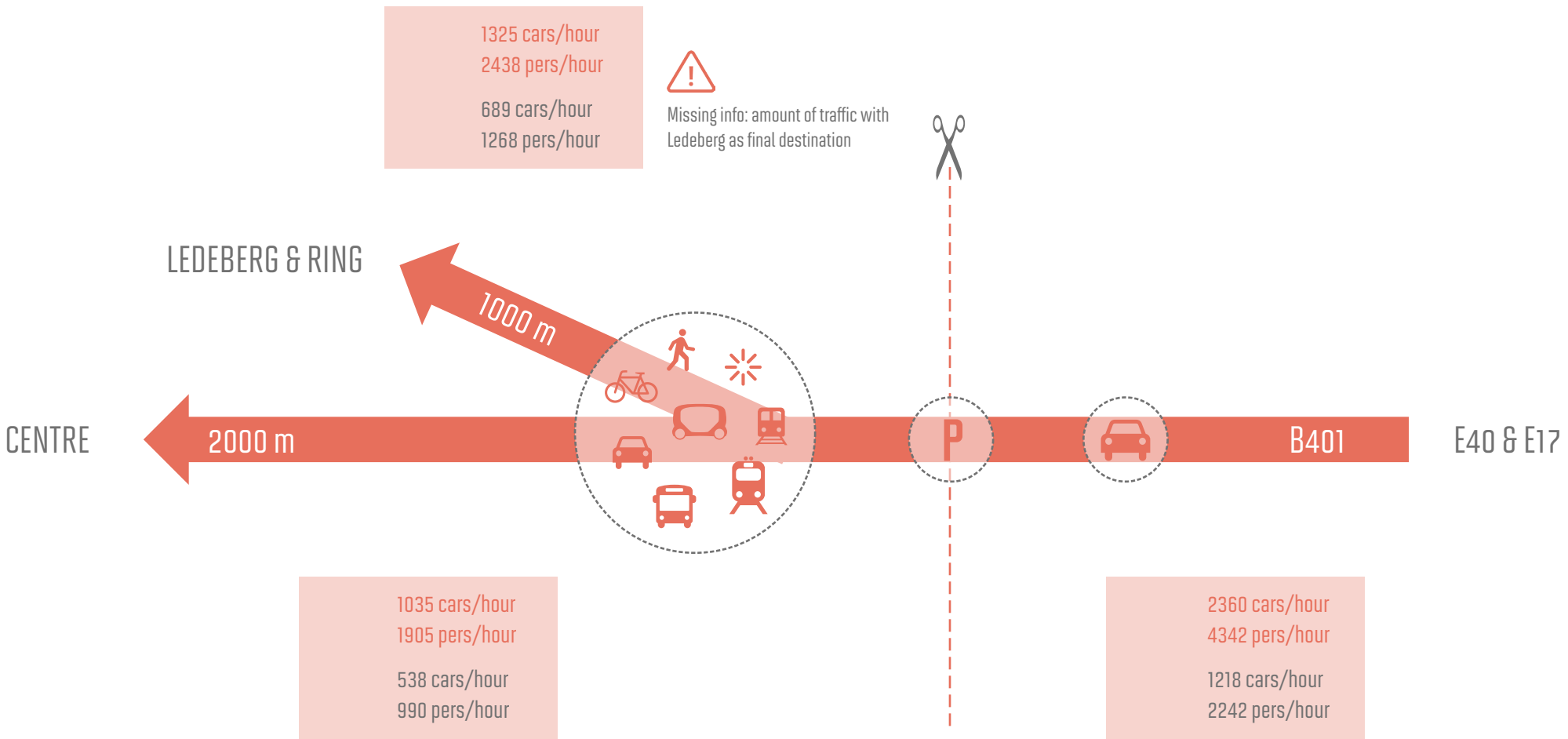


During the entire urban development of Ghent, the urban renewal has been defined by the new forms of mobility. The water represents the first vector of mobility, since the city of Ghent originated in the area of the confluence of the two rivers, the Lys and the Scheldt. Then, the railway line as the second vector of mobility and lastly, the construction of the E17 highway together with the B401 viaduct, as the last vector of mobility. The question is how this space can again occupy such a role of experimental space,a sort of laboratory. How the existing infrastructure, just renewed and still in good condition, can play a new role in the new mobility model? Can the area be a vector for new uses, adapted to the city of tomorrow? Since city and mobility have influenced each other over the time, maybe the fly-over can inspire new forms of mobility oriented to a human-centric vision.

The B401 is placed in a very strategic position and can play a very symbolic role, in relation to the two main vectors of mobility that has influenced the urban development: the fly-over crosses twice the Scheldt river and twice the railway line. The viaduct is situated in the middle of the two principal railway station, the Gent-Sint-Pieters Station, which connects Ghent to Brussels, and the Ghent- Dampoort Station, which connects Ghent to Antwerpen. The Scheldt river is navigable, but currently it's waters are just utilised for recreational and tourist purposes (private boats / watertaxi /hop on hop off watertram). There isn't a public transport network connecting the canals of the city. Extending a public network that exploit the water as a mobility vector could be very difficult, but the river can be utilised as an integration of the public transport for the event based peak demand, such as football matches, offering a connection with boats to the Ghelamco arena, or for events like marriages.

The fly-over has all the potential to embody a strong imaginative power: the site can link the Zuidpark with upper and lower Scheldt, creating a valuable connection between river and ecosystems.

TRAFFIC LOAD B401



Peak traffic
Average spread over 24h

Traffic source: Tractebel research, 2017
Car occupancy rate in Flanders: **1,84** per/car (EU environment agency, 2009)

The construction of the B401 has attracted the car to the city centre of Ghent, allowing very easy access to and evacuation of the city, but in turn the fly-over contributes to traffic congestion during the morning and evening peak periods. The presence of the viaduct as a fast link between the E17/E40 motorways and the R40, and continuing towards the city centre, is a determining factor for local mobility. When considering the future traffic function of the B401 and its compatibility with local quality of life, the question arises of who should still be permitted to drive into the city, where, and along which routes. The role to be played by the R4 and R40 is inseparable from the role of the B401, both entering and leaving the city.

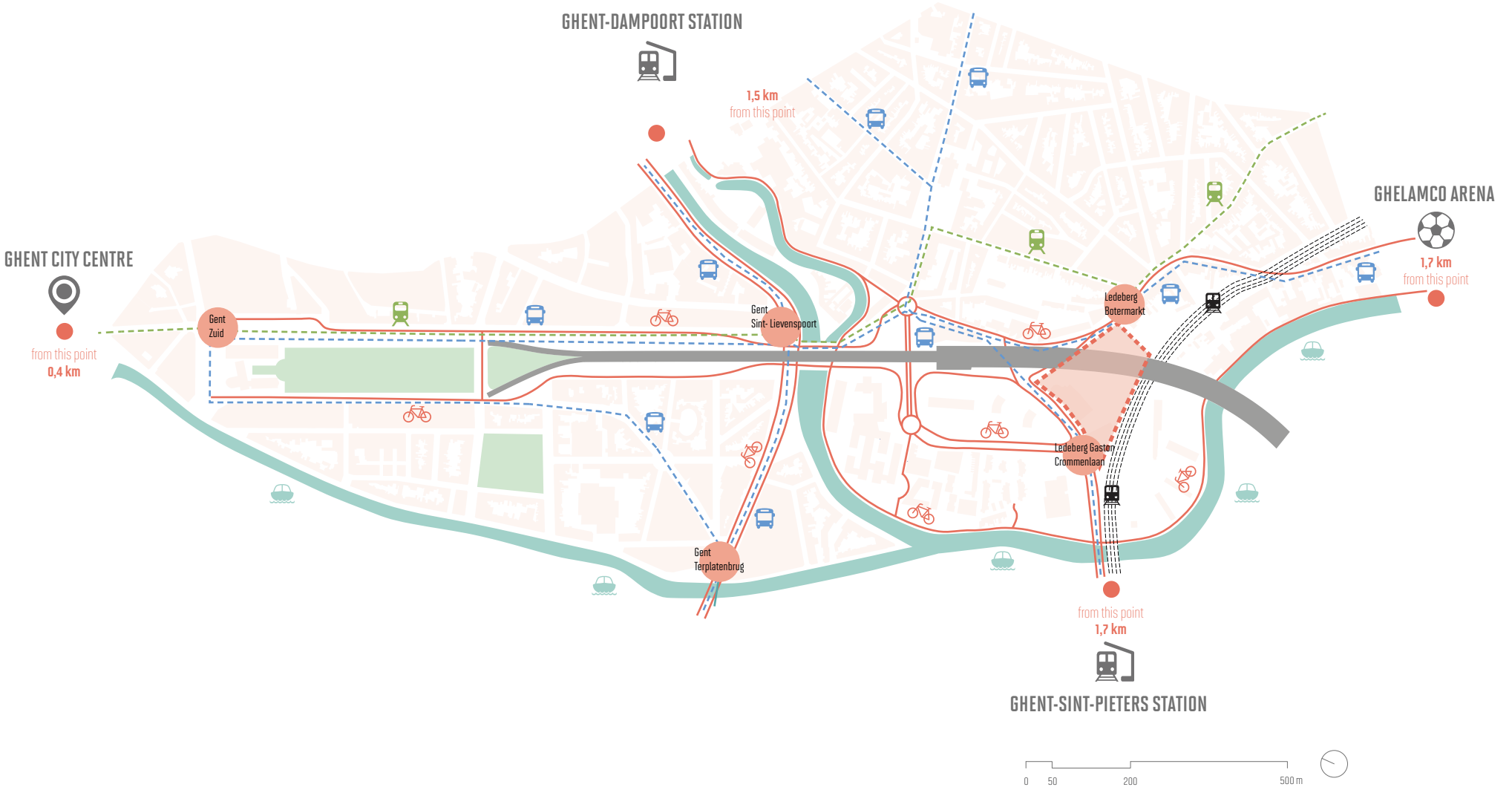
How the existing infrastructure, just renewed and still in good condition can play a new role in the new mobility model?

Can the B401 be a vector for new uses, adapted to the city of tomorrow?

When considering a new mobility model, therefore, it is very difficult to imagine a vision not centred on the fly-over. The response to urban development should stimulate the optimisation and transformation of the transport infrastructure, rather than increase it's size. As a response the B401 area could be figured like a multimodal traffic hub that merges the different modes of transportation and the fly-over like a vector for public transport.

If we imagine to cut, metaphorically, the viaduct in the middle, the solution could be represented by placing a P&R facility : a physical link in the future mobility chain. The P&R should mark the transition from a car-based mobility to a sustainable mobility that incorporates different transport options, function as a filter for passing traffic, provide parking space and a link to the network of public transport (current and to come). The aim is to keep car-base traffic out and encourage multimodal transport. The P&R, situated in the middle of a mobility corridor, could be seen as a filter between present and future.

POSITIONING OF PUBLIC TRANSPORT

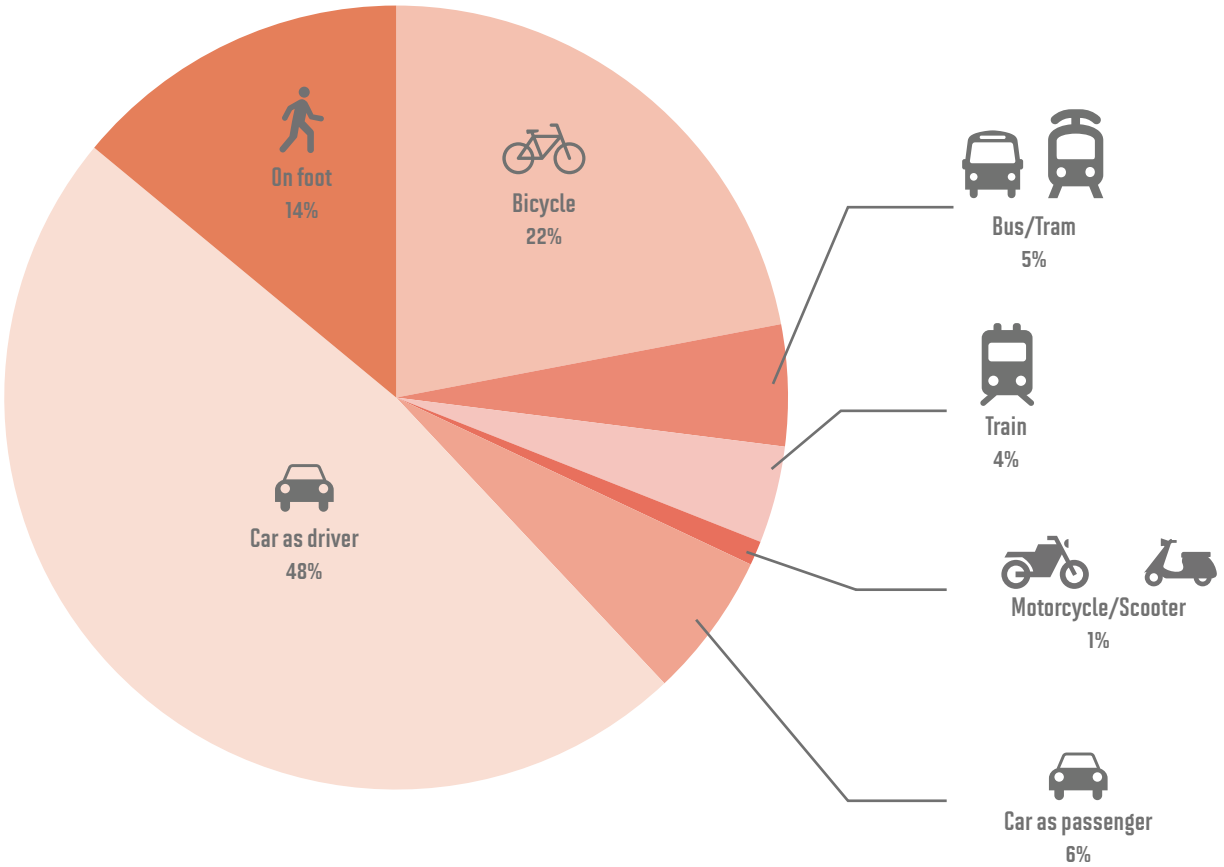


The fly-over area is located on an axis where several public transport lines converge. The position of the neighbourhoods surrounding the B401 is unique and strategical within the city of Ghent. Its proximity to the city centre is a potential to be exploited: 10 minutes cycling to the historical city centre, 15 minutes cycling to railway station Gent-Sint-Pieters and 15 minutes cycling to railway station Gent-Dampoort. In terms of bus and tram infrastructure, the neighbourhoods are really well connected (for a full overview and more details of the public transport lines see Appendix). The Ledeberg area provides two important nodes in the bus network: Ledeberg Botermarkt and Ledeberg Gaston Crommenlaan. The tram 4 and several different buses connect Ledeberg with Gent Zuid (the main buses convergence node) and across Ghent. The lines 41 and 43 connect Ledeberg with Gent-Sint-Pieters, Ghent main railway station. Instead, Gent-Dampoort station can be reached from Gent Zuid through line 21. Currently, there is still no direct connection between Gent-Sint-Pieters station and Gent-Dampoort station, but the city of Ghent is planning for the implementation of the tram line 7 in order to connect the two railway stations. The Scheldt river functions as a backbone for this network, visually connecting Ledeberg with the Ghelamco Arena. The B401 area has a highly developed bicycle network, that not only serves inhabitants of the nearby neighbourhoods, but also has an important sub-local role. Although, the bicycle network is highly involved around the Scheldt river, the flow of cyclists from and towards Ledeberg still has to be improved. Several bottlenecks still exist where cyclists and vehicular traffic intersect. As a consequence the city of Ghent has started the construction of a new bicycle bridge across the Scheldt river. Another condition to be improved is the quality of the bicycle infrastructure due to the lack of bicycle parking in Ledeberg. Currently, many bicycles are parked outside against the walls and on the pavements. As a result a bicycle parking area and a shared bike rental centre have to be integrated to the P&R infrastructure. Since, the currently very extended bicycle network and its possible optimisation can reinforce the potential of the bicycle as the best option as mean of transport to move in Ghent.

The marked area on the opposite page highlights the optimal place for positioning the P&R facility, since it is the point with the most interaction of mobility systems: the viaduct, tram/bus lines, cycle routes, railway and the water.

B401 USERS

Source: FOD MOBILITEIT EN VERVOER



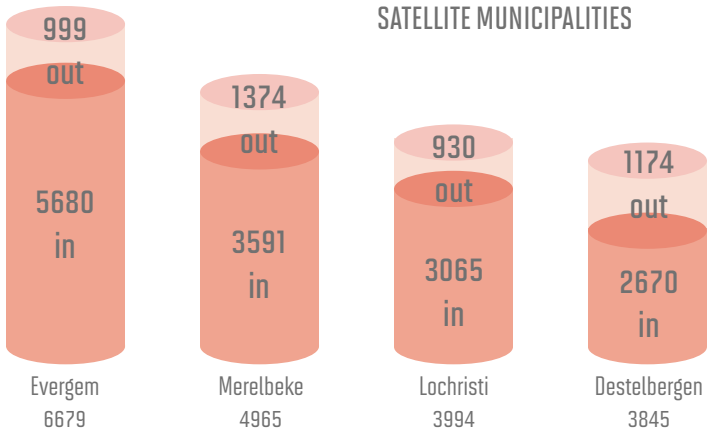
650000
MOVEMENTS
PER
DAY
OF
WHICH
54%
BY
CAR

THE
AMOUNT OF
CARS ADDED
BETWEEN 2005
AND 2015

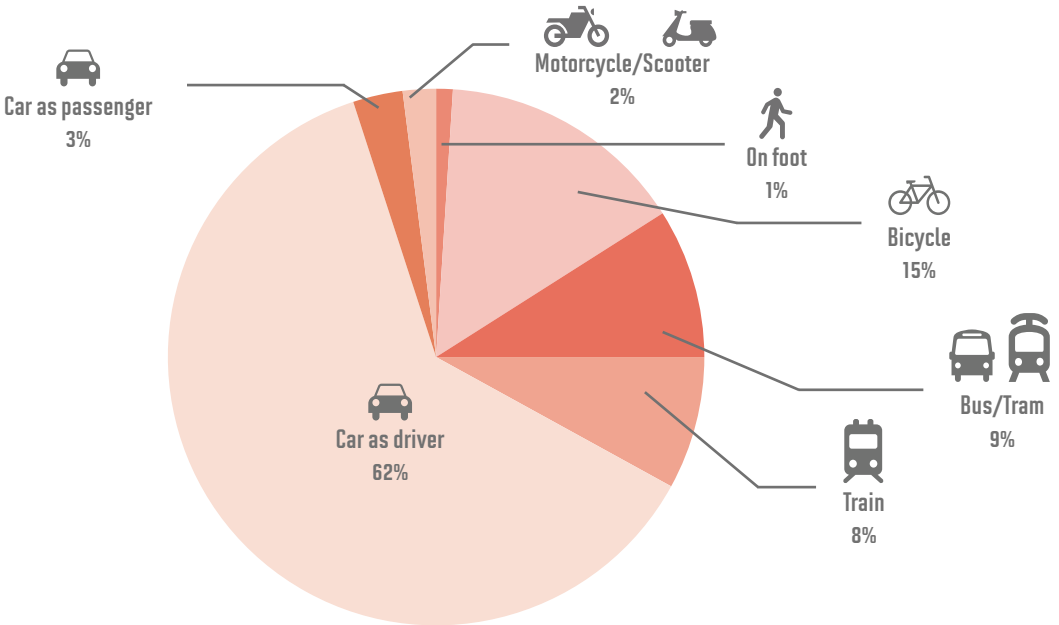
17000

55%
OF WORKERS COME
FROM OUTSIDE GHENT

TRAFFIC FROM AND TOWARDS
SATELLITE MUNICIPALITIES



MODAL SPLIT COMPANIES > 100 EMPLOYEES



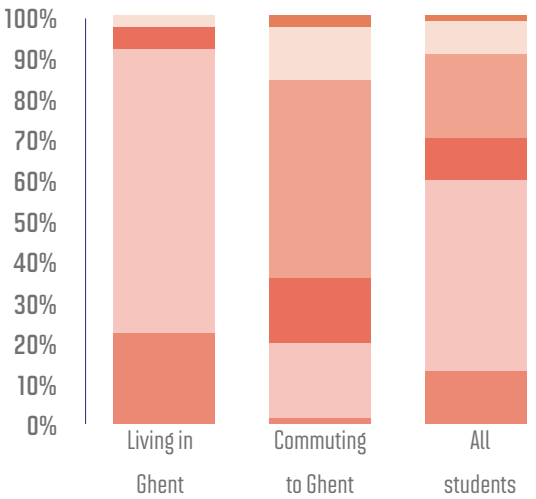
ALMOST 4X AS MANY COMMUTERS TOWARDS GHENT COMPARED TO
AWAY FROM GHENT

96500 workers commuting to Ghent

35700 students commuting to Ghent

39500 workers commuting from Ghent

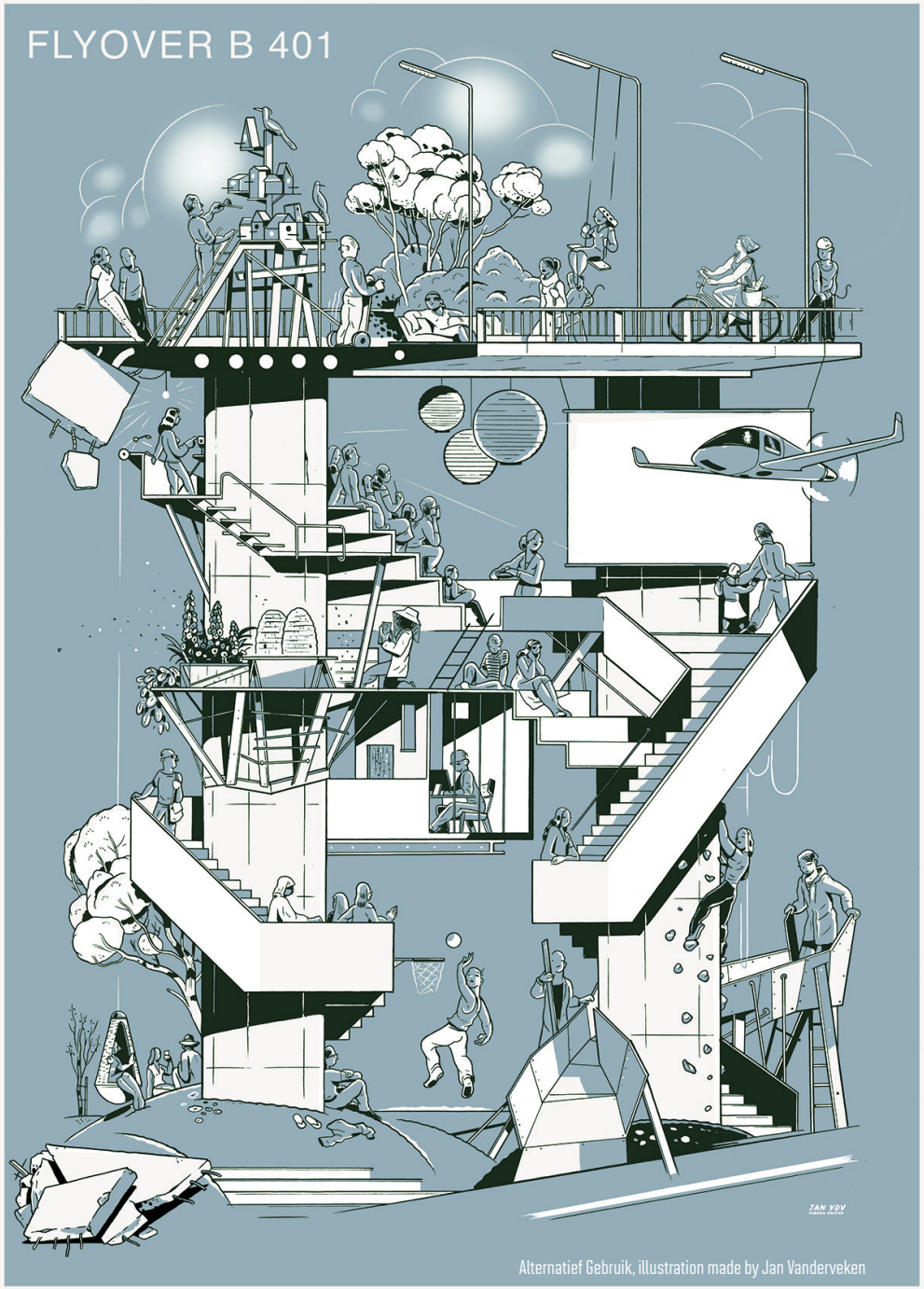
MODAL
SPLIT
FOR
STUDENTS



LEDEBERG + BELLEVUE + GHENT SOUTH INHABITANTS

Shots taken for the campaign "B401 Bruggenbouwers"

The B401 divides three neighborhoods: Ledeberg, Bellevue and Ghent-South. Still, the demographic profiles of the people living in Bellevue and Ledeberg are clearly very different from those living in Ghent-South. In Ledeberg and Bellevue, 43% of the people are non-Belgian descent, making it the most multi-cultural neighborhood in Ghent. In Ghent-South this percentage is clearly lower at 32%. For average income and the level of education, we can again distinguish a difference between Ledeberg and Bellevue, and Ghent South. The average yearly income in Ledeberg and Bellevue is 18830 EUR, whereas in Ghent-South it is 21508 EUR. The percentage of higher-educated workers is almost twice as high in Ghent-South (52,4%), than it is in Ledeberg and Bellevue (28,4%). The pattern is clear: Ledeberg - with its classical 19th century housing typology- is home to a lower- educated and less-earning demographic group. What stands out is that the population in Ledeberg is relatively young compared to other parts of the city. It has a higher percentage of youth aged 0-19 (22%). In Ghent-South the age groups 20-29 (29%) and 30-39 (19.5%) are significantly higher compared to city average (Gent Buurtmonitor, 2017).
Still, a shift is clearly happening. The city of Ghent is counting on its urban renewal plan "Ledeberg Leeft" to attract first-time home buyers with higher economic potential. This is done by upgrading certain street corners with remarkable, modern homes and by selectively integrating "green spots" in unused areas. A 2012 study showed that this policy is only partially successful, stating that the city's urban renewal strategy has only increased the social-spatial polarisation (Bouchaute, 2012). The study argues that gentrification is happening in parallel with social rent malpractices in the 19th-century neighborhoods in Ghent. It also city of Ghent is failing to transform these neighborhoods in childfriendly environments that would attract middle class families. More structural and radical changes are needed to improve the safety, security and overall qualities of the environment.



Alternatief Gebruik, illustration made by Jan Vanderveken

To better understand the project context, an extensive on-site study was conducted. For this field study, a broad range of people living in the area around the fly-over were interviewed to individualise the strengths and problems that affect the study area, the needs and desires of the different demographic groups in the city but above all to understand how people imagine the new role and function of the B401 (the illustration on the opposite page is a graphical resume of people's dreams about the fly-over).

Among the negative aspects reported by the residents of the project area there is the lack of permeability and pedestrian connections towards the neighbourhoods and other parts of the city, due to the physical barrier created by the B401 viaduct. The B401 doesn't just represent a physical and visual barrier, but also have a profound impact on the way residents of these neighborhoods experience their environment emotionally. The lack of public spaces for socializing and entertainment are other negative aspects that give a picture of the site, such as the lack of green spaces in Ledeberg, due to the small housing typology and the spaces occupied by private cars, or the presence of inaccessible green areas next to the landing of the fly-over. The lack of qualitative spaces is also due to the parking congestion. As a result many of the areas become inaccessible and in the worst cases they constitute a real barrier to pedestrians such as the "informal" parking of trucks and campers under the B401. Even the lack of bicycle parking in Ledeberg has consequences: many bicycles are parked outside against the walls and on the pavements.

Other negative aspects, due to the traffic congestion, are the air and noise pollution that seriously compromise the quality of life and living environment.

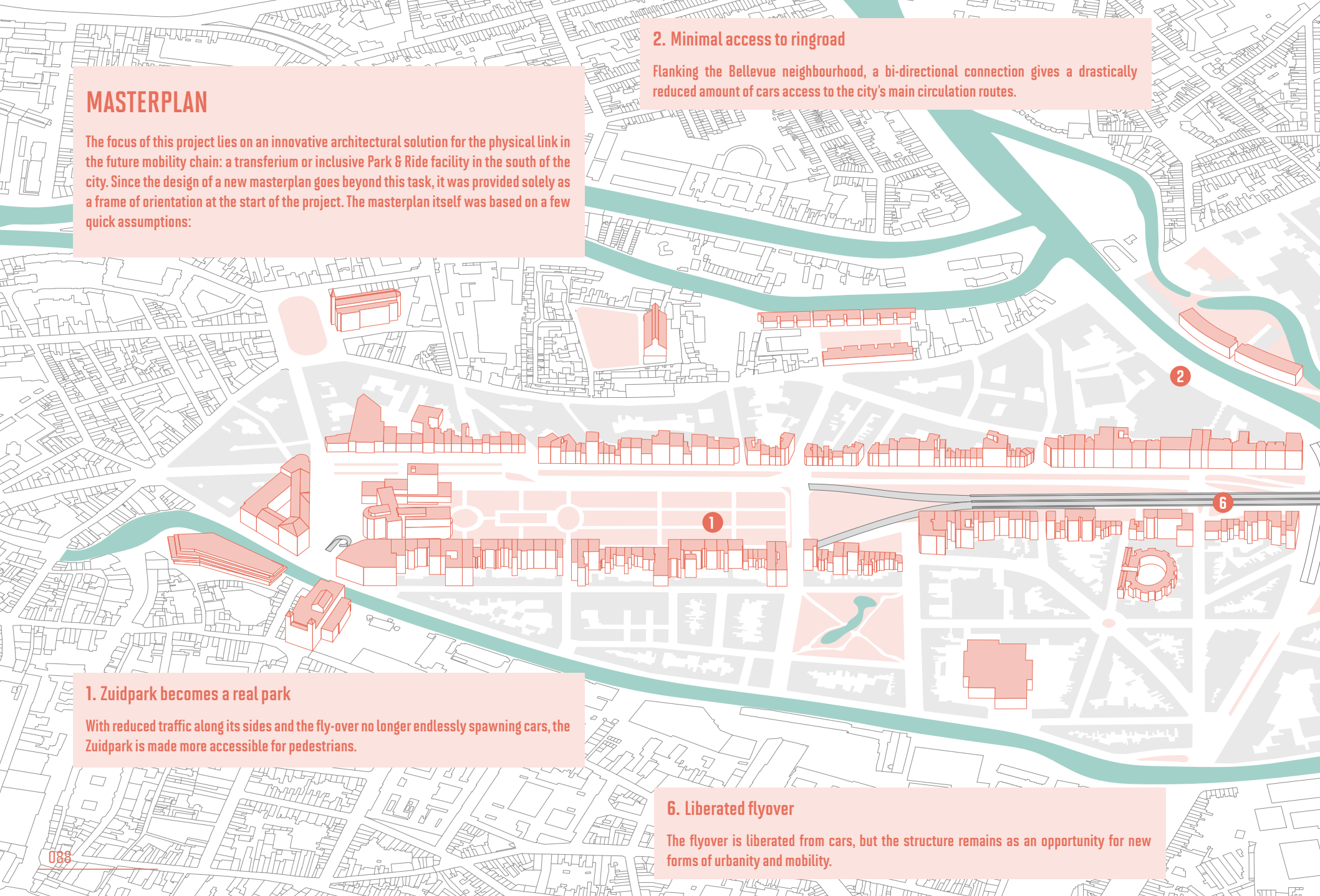
Through the conversations with the inhabitants of the neighbourhoods around the B401, it became clear which are the visions and expectations for the fly-over in the future. People are asking for more accessibility to the neighborhoods that flank the viaduct and more pedestrians areas. The extension of the cycling routes and the optimisation of public transport. The creation of qualitative public spaces and cultural events to reinforce the sense of community. The greening of the area around the viaduct and the extension of the Zuidpark as the green lung of the city, together with the creation of playgrounds for children. Restore the air quality and create a better aesthetic quality of the environment. But above all, gain urban space by placing cars in parking facilities and stimulate the use of public transport and bicycles in order to make cars less attractive.

MASTERPLAN

The focus of this project lies on an innovative architectural solution for the physical link in the future mobility chain: a transferium or inclusive Park & Ride facility in the south of the city. Since the design of a new masterplan goes beyond this task, it was provided solely as a frame of orientation at the start of the project. The masterplan itself was based on a few quick assumptions:

2. Minimal access to ringroad

Flanking the Bellevue neighbourhood, a bi-directional connection gives a drastically reduced amount of cars access to the city's main circulation routes.



1. Zuidpark becomes a real park

With reduced traffic along its sides and the fly-over no longer endlessly spawning cars, the Zuidpark is made more accessible for pedestrians.

6. Liberated flyover

The flyover is liberated from cars, but the structure remains as an opportunity for new forms of urbanity and mobility.

7. Demolished east wing

The eastern ramp is demolished to the advance of a more spacious feeling at ground-level. The demolishment drastically increases the accessibility of the area underneath the viaduct close to the project site.

8. Repurposed ground level

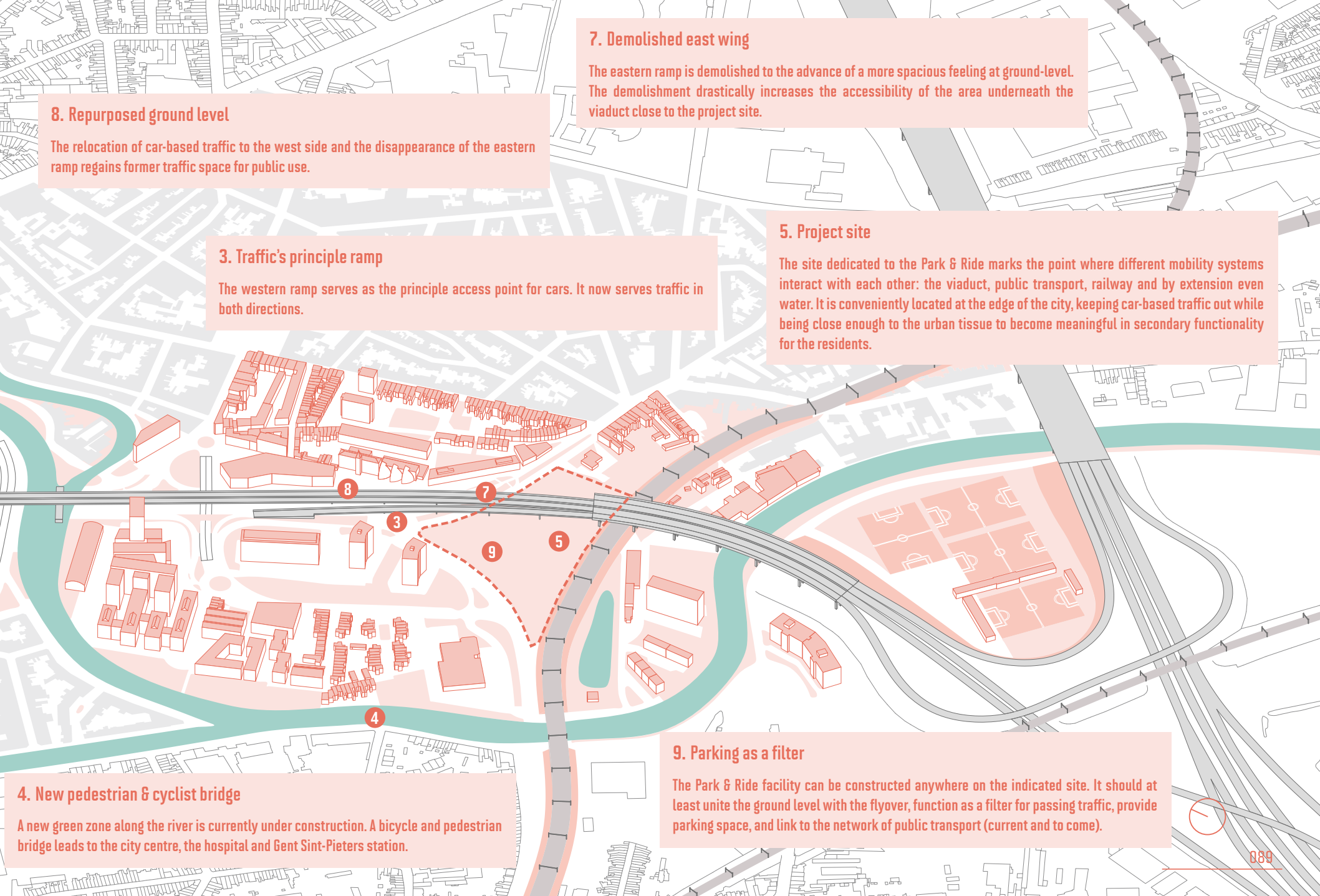
The relocation of car-based traffic to the west side and the disappearance of the eastern ramp regains former traffic space for public use.

3. Traffic's principle ramp

The western ramp serves as the principle access point for cars. It now serves traffic in both directions.

5. Project site

The site dedicated to the Park & Ride marks the point where different mobility systems interact with each other: the viaduct, public transport, railway and by extension even water. It is conveniently located at the edge of the city, keeping car-based traffic out while being close enough to the urban tissue to become meaningful in secondary functionality for the residents.



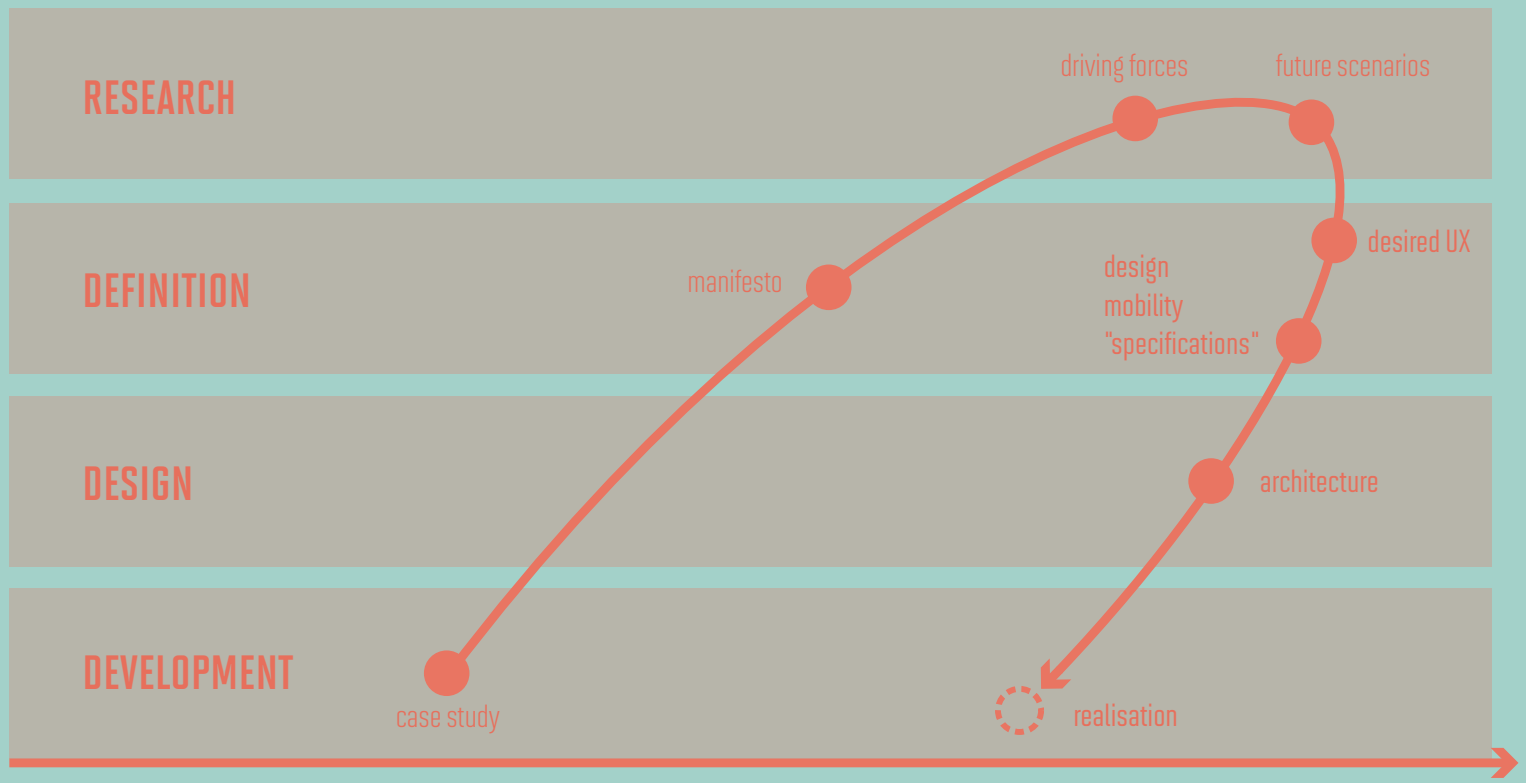
4. New pedestrian & cyclist bridge

A new green zone along the river is currently under construction. A bicycle and pedestrian bridge leads to the city centre, the hospital and Gent Sint-Pieters station.

9. Parking as a filter

The Park & Ride facility can be constructed anywhere on the indicated site. It should at least unite the ground level with the flyover, function as a filter for passing traffic, provide parking space, and link to the network of public transport (current and to come).

4. METHODOLOGY

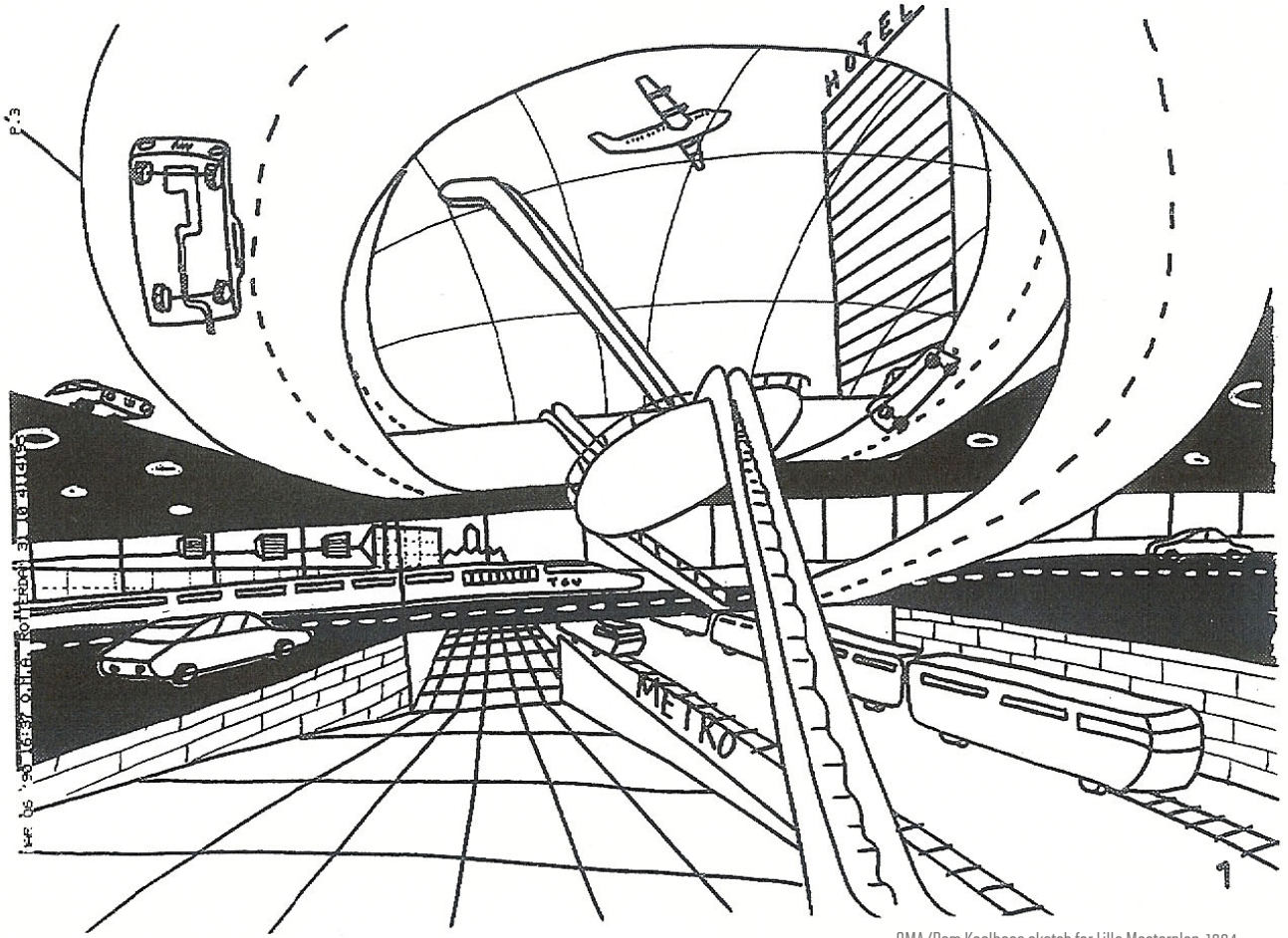


Before introducing the Park & Ride project, the scheme on the opposite page, introduces the methodology developed in the studio in order to define and organise the design process. The approach reflects the philosophy of Granstudio and starts with a clear vision definition. The applied methodology focuses on the desired mobility experience and takes the human desires as the guiding motive. This strategy allows to initially break off from known solutions and conventions and re-define what the right means are to reach the goal: in this case to find a new mobility solution.

The entire work was structured into four sections: RESEARCH, DEFINITION, DESIGN, DEVELOPMENT.

The project process started with the introduction and presentation of the case study through the geographical and historical analysis of the context, the environment, the population and above all the mobility flows.
The manifesto enclosed the guiding principles that set out the ambition for the studio and represented the framework to refer back to.
The concrete research, focused on the P&R building design, having the most importance and influence in defining the functions, the services, the flows inside the building and the architecture of the building itself, included the definition of the driving forces and the representation of the future scenarios.
The driving forces consisted of identifying the trends towards which human behaviour, technology, society, science, mobility, business, etc. are being addressed. Then these trends were translated into the representation, through drawings, of future scenarios of the use of the Park & Ride from the point of view of the user (the user experience).
Imagining the future scenarios and analysing the trends helped trace the people desires and needs, in order to translate them into "mobility specifications", the factors or results, in terms of services and physical design specifications for the project.
The last step, consisted of translating these factors into the architectural language that produced the resulting Park & Ride building.

5. PROJECT P&R



OMA/Rem Koolhaas sketch for Lille Masterplan, 1994

The Park & Ride design process consisted of a concrete application of the methodology exposed.

Before starting the physical conception of the Park & Ride, a deep research was initiated in order to identify the functions, the services and the mobility flows that concern the building. Establishing also which role could be played by the technological evolution, in this case the autonomous act of parking, in the definition of the geometry of a typical parking structure.

The research started with the individuation of the trends, the driving forces, that are gradually affecting the human behaviour, technology, society, science, mobility, business etc. and the grouping of these ones into ten categories according to the affinity of the covered topics. Then, these trends where translated into factors, which stand for what it concretely means for the Park & Ride project, in terms of services and physical design specifications.

The user scenarios expressed visually, through drawings, the way the Park & Ride could be used by people in the future, in order to understand and imagine the expectations, the needs and desires of the users of tomorrow. This part proved to be fundamental in the design process, to define the functions and the user experience of the building.

The Park & Ride building was first conceived in terms of a concept, graphically synthesizing the idea on which the project is developed. Consequently, the next step, in the design process, consisted of a physical translation of the project concept in architectural terms.

The project is firstly introduced by a general overview, showing and explaining the different parts and components of the building. Next, an exploded view, flanked by a scheme of the mobility flows, shows the functions and services inside the Park & Ride infrastructure. Then, the building is placed in the context and the main topics, related to the project, and is presented. Finally, an illustration represents the user experience inside the Park & Ride.

DRIVING FORCE 1

From asphalt infrastructure to silicon infrastructure

Digital technologies will assume an increasingly significant role in the evolution and innovation of the city of the future. Autonomous mobility and traffic management will drastically affect what urban infrastructure looks like. Self-driving will involve the optimisation of vehicular flows and an improvement of urban systems such as, for example, smart intersection management or procedures for dynamically adapt the number of vehicles in circulation according to demand. Moreover, the driverless vehicles could be programmed according to a range of criteria: comfort, shareability or fuel efficiency.

What this could mean for the P&R project?

- Since tech is in transition, also the building needs to be resilient enough to transform (at least in use).
- When the act of parking gradually becomes autonomous, less space will be required. Two options are possible:
  1. Gradually increased capacity of the P&R.
  2. Former parking space is now flexible space for other activities
- At the start, definition of "the right size of spaces" is important.

SMART INTERSECTION

Researchers at the Massachusetts Institute of Technology (MIT), the Swiss Institute of Technology (ETHZ), and the Italian National Research Council (CNR) have developed slot-based intersections that could replace traditional traffic lights, significantly reducing queues and delays. This idea is based on a scenario where sensor-laden vehicles pass through intersections by communicating and remaining at a safe distance from each other, rather than grinding to a halt at traffic lights.

http://senseable.mit.edu/light-traffic/

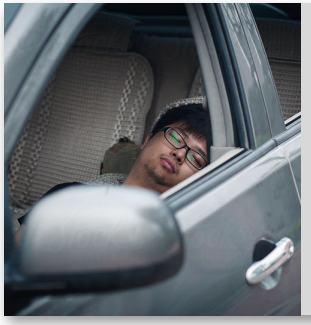
AV WILL LIKELY BE EV

Although AVs can take the form of ICE or hybrid vehicles, the majority will be electric because there are more synergies between the technology implemented in EVs and what will be incorporated in fully autonomous and connected systems.

The Future of Transportation Executive briefing, pp.58-60

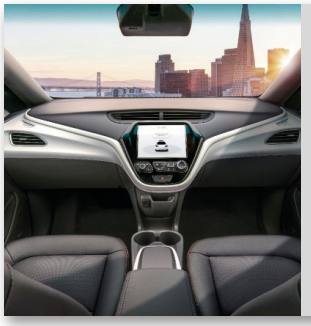
DISAPPEARING INFRASTRUCTURE

Some of the car-based infrastructure will drastically change or even disappear completely when autonomous vehicles have become the standard. Think about park-and-rides for example: in many cases, the concept will exist in form that is intangible.



WORKING FROM THE CAR

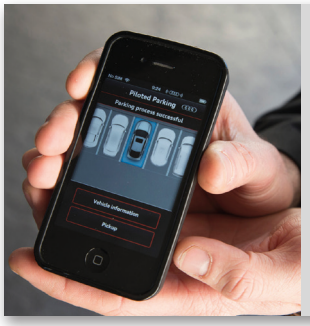
Cars today are designed with the driver in mind. The driver needs to see where he is going, needs to get feedback from the car to comfortably control it and shouldn't be distracted. Driverless cars will leave their occupants free to text, work or sleep, and will turn the car from a transport vehicle into a place to resides. In anticipation: just take the train.



DEPLOYING DRIVERLESS

Mobility as a Service will first bring driverless technology to the masses before individual ownership of autonomous vehicles enters the picture. European regulations are an obstacle to the same services that will drive initial deployment in the US, but European markets are especially strong in technology-rich luxury brands. As a result, the balance in Europe will tip toward personally-owned autonomous cars over driverless mobility fleets.

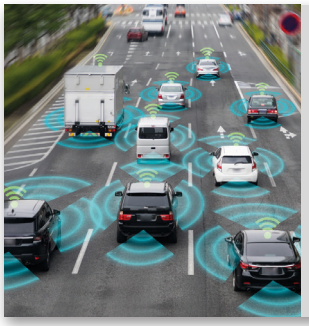
IHS Markit, 2018



PILOTED PARKING

Thanks to the precision driving features and to the absence of the human factor within the parking facility, the application of the technology produces an increase in space efficiency, allowing for higher parking capacities or smaller footprints of the garages. Additionally the innovative unbundling of the car's agenda from the driver's agenda will open countless improvements in terms of time efficiency and comfort, providing the customer a totally different drop-off experience and sense of arrival.

Audi Urban Future Initiative 2015 – Assembly Row



CONNECTED CARS

Cars with sensors and connectivity to internet can assess the traffic conditions and Pedestrian position very well. The data captured by the in-car sensors can be transmitted to the users to their cell phone apps which in turn is interfaced with your car. This not only means that the driver will get real time updates on traffic conditions but also about the vehicle maintenance and repair diagnostics.

https://www.bitcot.com/connected-cars-becoming-reality/

FROM DRIVING TO BEING DRIVEN

For daily mobility throughout the entire mobility chain, it looks like we will drive less and are being driven more. This opens up possibilities for other activities while on the road. But will there still be a place for driving and the people that like to drive?

A RIDE A DAY KEEPS THE DOCTOR AWAY

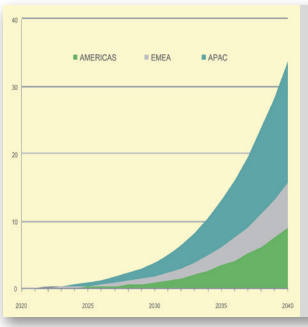
The technology behind healthcare is increasingly embedded in daily objects. You would be surprised what the sensors in your average smartphone can feel. With a steady connection to the cloud, diagnoses are quickly made. Regarding mobility, healthcare will become a substantial part of the interior of vehicles.

THROUGH THE MOBILITY CHAIN

Many cities are experimenting with new circulation plans. The main goal is always the same: divert private cars from the city centre. Citizens are asked to "switch smart" as they make their way through the mobility chain. That is, use the appropriate means of transport at the right time and in the right place.

ADVANCED TRAFFIC MANAGEMENT

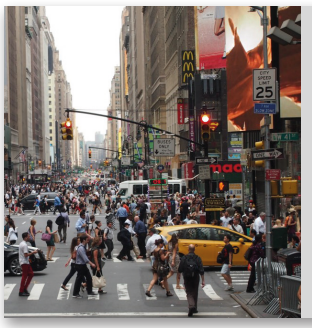
The roads in many European cities are used intensively and cities have a long history of dealing with the challenges of congestion and emissions (particulate matter/CO2).
A lot of investments have been made in traffic management systems ranging from traffic lights and vehicle detection loops, to cameras and Ranging Dynamic Route Information Panels (DRIPs). Since some years, apps with dynamic route calculation are taking over.



AUTONOMOUS SALES

The US will lead the world in initial deployment and early adoption of production autonomous vehicles as early as 2019, while Europe and China are expected to begin adding considerable volume from 2021 onward. In 2030, the global sales of autonomous vehicles will be good for 4 million units, or less than 4% of the total . The following decade, sales will grow to surpass 33 million annually in 2040, enabling autonomous mobility in more than 26% of new sales.

IHS Markit, 2018



THE END-GAME OF AUTOMOTION

The end-game for AVs is urban self-driving. Its many challenges mean this will be the last step in the evolution. It will take time to reduce the complexity of this environment. Levels 1 to 4 may, however, become the commonplace over the next 10-20 years.

The Future of Transportation Executive briefing, pp.58-60

Source: Granstudio Database

DRIVING FORCE 2

Environmental consciousness

People are more and more aware of environmental issues and of their impact on ecology. Climate change, air and noise pollution, overconsumption of natural resources are just some of the problems that afflict our planet. Reducing the negative impact of man on the environment has become the priority. As a consequence, people are trying to live more consciously, looking for a new balance in the relation between humans and the world. This is outed in numerous ways, among which a diet can be seen as a metaphor. Society is assuming a "flexitarian" mentality where people try to optimise their behaviour according to occurring conditions and limitations.

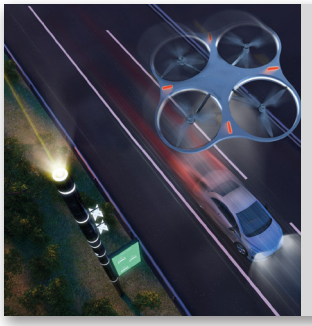
What this could mean for the P&R project?

- Building a classic parking infrastructure is no longer an option. It can only exist so close to people's homes when it is conceived as a zero emission project.
- Decentralised grid together with capacity of EV fleet batteries serves as an electrical buffer for the entire neighbourhood.
- Integration of a solar farm.
- P&R located at the edge of the city: urban farming as intrinsic part of the experience of "first step into countryside".

VEHICLE-TO-GRID

An agreement that signifies a change in the world of technology in terms of sustainable mobility: it's the one designed between Enel and Nissan. The project developed by the two companies is called Vehicle-To-Grid (V2G), a system able to revolutionize the world of electric cars. In fact, thanks to this system, e-cars will be able to function as actual "mobile stations", with the ability to accumulate and essentially put back into the grid the energy that is not used

Vehicle to grid: Enel and Nissan revolutionize the electric car, 2016



INTEGRATED HIGHWAYS

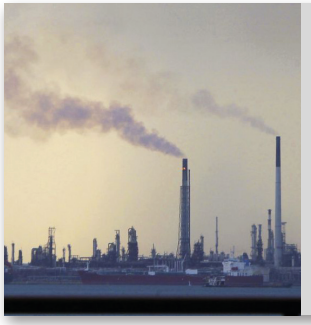
International design and innovation office CRA-Carlo Ratti Associati has been working with Italy's leading road agency ANAS to design a Smart Highway program that will be implemented on more than 2,500 kilometers of roads and highways. The project involves a pioneering infrastructure system featuring drones that are able to deliver first-aid support, as well as sensing poles that can send useful information to both today's drivers and tomorrow's self-driving vehicles.

https://carloratti.com/project/anas-smart-road/

DYNAMIC CHARGING

Gas stations are likely to disappear in a future full of electric vehicles, but the even latest technology for powering cars could soon be a thing of the past. Instead of having to regularly plug in electric vehicles, future roadways could power cars while they're in motion, so you never have to stop for a recharge again.

Futuristic Roads May Make Recharging Electric Cars a Thing of the Past, 2017



BETTER AIR QUALITY

Restricted access, a decrease in ownership and electrification of the fleet: all will lead to cleaner air in out cities. The difference with a combustion engine is that pollution is not necessarily occurring where cars drive. Energy can be generated decentrally, or in big plants on the outskirts of cities. It is difficult to predict the overall impact on air quality, but for cities, changes are high it will improve.

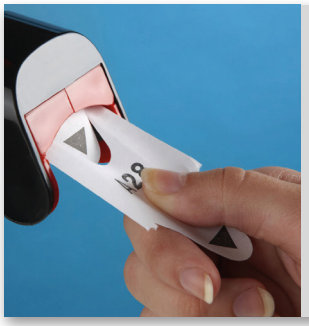
CARE FOR OTHERS BY CARING FOR YOURSELF

It's a streetlight! No, it's an exercise machine! In fact, Citylight, designed to motivate city dwellers to adopt a healthier lifestyle, is comfortable in both worlds, content to act both as a sleek and rather stunning overhead light for city streets and public spaces and a chance for a passersby to trim his waistline and improve his cardiac health.

https://designtoimprovelife.dk/citylight/

EMBEDDED INTELLIGENCE IN CITIES

Cities and organizations in it will be levering the capacity of embedded intelligence. People will increasingly interact with smart things, and the digital traces of these interactions will be collected and analyzed to discover knowledge about everyday human life, environment interaction and social connections. This knowledge will be used to tune the city to optimally fit the behavior of its inhabitants.



A CULTURE OF EFFICIENCY

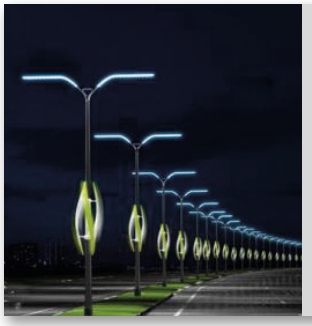
Years of experience with services like peer-to-peer sharing, lending, bartering, cooperative buying and crowd-funding will install a deep cultural intolerance for inefficiency and underutilization. This ranges from the small (waiting, inaccessibility, underutilized assets) to the large (congestion, bureaucracy, waste).

THE SLOW RISE OF CRADLE-TO-CRADLE

Cradle-to-cradle is a form of circular economy. Put simply, it is a holistic economic, industrial and social framework that seeks to create systems that are not only efficient but also essentially waste free. At present though, few laws are put in place in any country to oblige manufacturers to take back their products for disassembly. A precursor of such a system in the EU is the Waste Electrical and Electronic Equipment Directive (WEEE).

BETTER BIKING

Exercise boosts brainpower and helps to stave off Alzheimer's in the elderly. Commute by bike in the UK's major cities and you'll get there in half the time of cars, research by Citroen shows. Twenty bicycles can be parked in the same space as one car. It takes around five percent of the materials and energy used to make a car to build a bike, and a bike in use produces zero pollution. And most importantly: any mild-to-moderate exercise releases natural feel-good endorphins that help counter stress and make you happy!



SENSEABLE INFRASTRUCTURE

Smart-i is one of the winning projects of Enel Lab. Not only savings, but also security and more 'services to citizens,' cause the cameras installed on street lamps are able to achieve an analysis of the environment at 360 degrees, from traffic to lighting and weather conditions; all these data are processed and used to regulate the flow of public lighting according to the needs. But in addition to lighting, they provide other services such as parking assistance, Wi-Fi spots, traffic information.

ENERGY STORAGE DICTATES FLEXIBILITY

Energy storage, both utility-scale and behind-the-meter, will be a crucial source of flexibility throughout the next two decades, and will be essential to integrating increasing levels of renewable energy.

The Future of Transportation Executive briefing, pp.58-60

ALTERNATIVE FUELS

Car manufactures and policymakers are steadily shifting to fully electrical vehicles in the city. This transition will have an undeniable positive impact on the urban environment. Exhaust fumes completely disappear, while particulates are drastically reduced. (There is still emission of particulate matter by brake blocks, but new materials could offer a solution). Hydrogen still has a large base of fans for intercity traffic, since it gives a concrete answer to the limited storage capacity of electrical batteries.

RECONNECTING TO NATURE 2.0

By utilizing sensors that measure the plants' status, visitors are connected to the farm digitally and are able to access it remotely, from the "Hortus" web app. Once a person plants a seed in the hydroponic farm, an Internet-of-Things device will match his or her profile with that of the corresponding plant. Using the web app, the visitor can then track the state of the plant's biological data, its level of growth, and even share it on social media.

https://carloratti.com/project/fico-area-del-futuro/

Source: Granstudio Database

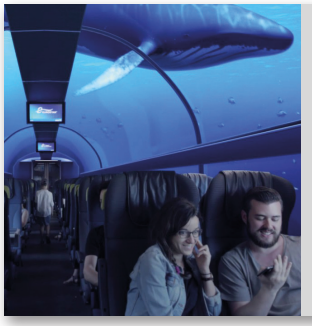
DRIVING FORCE 3

Mobility becomes "horizontal"

Since mobility is shifting from a commodity towards a service, the quality of a journey from departure to arrival is not just determined by a vehicle but is also largely influenced by the way we experience the interchanging points where we switch a mean of transport to another. People are becoming more and more conscious of this current change and they are asking for more fluidity in the journey experience. Since the experience inside the vehicle can't be so much improved, the mobility experience must focus on all the thresholds that are responsible for how people experience their journey. Inadequate parking, unpleasant places, waiting times, walking too far, registering for single bikes, delays.. are just some of these thresholds that can affect people choice of a mode of transport rather than another.

What this could mean for the P&R project?

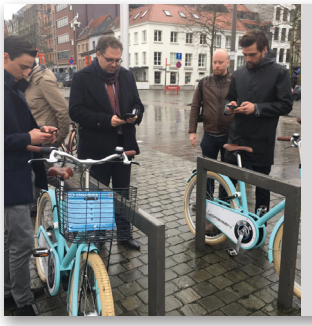
- The mental and physical change of modes should be as minimal as possible.
- The P&R does not feel as being built at the edge of the city: it already feels as having entered the city.
- Since the mobility experience is not just determined by the vehicles and the services but also by the interchanging points where we switch means of transport, the P&R in itself must be a quality environment capable of positively influence our total journey experience.



NEW MOBILITY EXPERIENCE

Playful and immersive, Eurostar Odyssey transforms the on-board experience, making it as much about the journey as the destination.
The interactive film takes its viewers on a breath-taking journey, transforming the roof of the train into a glass ceiling that reveals the watery world beyond. Feeding the imagination of those inquisitive travelers, the app allows you to explore the flora, fauna and sea-life beyond the walls of the tunnel.

http://www.akqa.com/work/eurostar/odyssey/

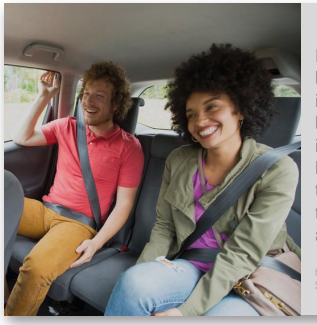


TOO HIGH THRESHOLDS

Classic thresholds for mobility are price, inadequate supply, too limited information, and a shortage of personal skills. Research showed, for example, that in addition to the weather, the possession of a visa card is a dealbreaker for the use of shared bicycles in many cities. The need for a deposit and the registration in advance via a website are the second and third highest threshold. (Mobiel21)

TOO LOW THRESHOLDS

Poppy's shared cars quickly conquered their place in the streets of Antwerp. The fans are happy: "I am not a millionaire, but now drive a big car." The system proves to be easy to use, but also to be misused. The threshold for registration has recently been increased, to deter candidates with bad intentions. From now on, new users must take a selfie together with their passport. (De Standaard)



NO PASSENGER CULTURE

Despite the fact we have had passengers for as long as we had cars, the passenger experience is not prioritized for road vehicles. They have been largely neglected by the automotive industry as illustrated by the vast differences in trim levels and budgets between front and rear compartments, the absence of any car reviews not focusing on the driver. Only higher car occupancy rates will be able to shift this focus.

https://www.researchgate.net/publication/317598975_Designing_for_Comfort_in_Shared_and_Automated_Vehicles_SAV_a_Conceptual_Framework

REAL-TIME INFORMATIONS

Social connectivity will become a key component of transportation strategies, aligning the number of vehicles with the number of travelers.
This new structure will be compounded with improved intermodality, with the use of real-time information to streamline the transfer from one transportation system to another. Ambient mobility offers will integrate seamlessly, to the point of omni-modality.

C. Ratti and M.Claudel, The City of Tomorrow, (2017)

THE RISE OF DRONES

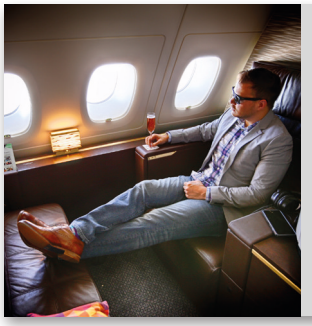
Urban mobility going airborne could open up a completely new range of possibilities. Imagine leaving the office at peak hour: roads are completely jammed while trains, buses and metros are terribly overcrowded. According to Airbus, the best you can do is having you picked up by a shared, battery powered autonomous sky taxi that flies over all modern world's traffic misery. Apparently the company's feasibility study resulted in a favourable conclusion.

"Going Airborne", Granstudio, (2013)

NEW UNKNOWN MODES

As ambient mobility platforms are widely adopted, public and private mobility paradigms will blur. What was formerly a clear (functional and social) delineation between shared and individual modes of transit will be erased.

C. Ratti and M.Claudel, The City of Tomorrow, (2017)



COMFORT AS DIFFERENTIATOR

In the aviation industry, the passenger experience has long been recognized as a commercial differentiator. For example, 35% of passengers on intercontinental flights base their choice of airline on comfort, placing it after flight schedules.

https://www.researchgate.net/publication/317596975_Designing_for_Comfort_in_Shared_and_Automated_Vehicles_SAV_a_Conceptual_Framework

BECAUSE IT'S CHEAPER

Economics are often a decisive factor when weighing alternatives. This is a strong force behind the increase in sharing, lending, trading, bartering, and swapping between people. Which is also of course facilitated by numerous platforms, and is seen as 'fashionable'.

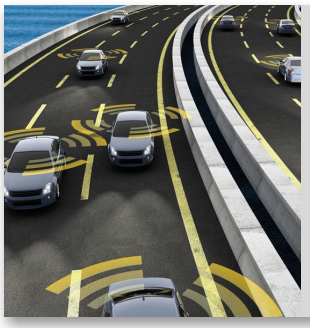
COMMUTING STRESS

Stress in commuting is caused by:
- exposure to pollutants, noise, crowding and thermal conditions
- giving away control
- Time pressure
- problems associated with a sitting lifestyle (more car than PT)

https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1311&context=honorstheses

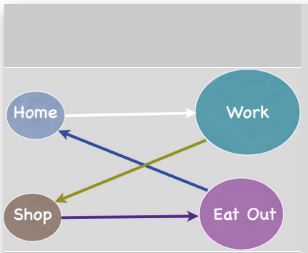
WORK AND DRIVE

An office bus runs from Ghent to Brussels every day. There is place for 24 people, who reserve their seats in advance. There is coffee, a printer and wifi. Leave at half past seven in the morning and return at a quarter past four. The hours on the bus count as working time. In the autumn of 2018, Flanders will expand with 9 new lines: a collaboration between various companies.



THE FUTURE OF MOBILITY IS CASE/ ACES

The four factors that will have the greatest influence (positive and negative) on the relentless pursuit for better mobility outcomes are:
- Connected systems
- Automation
- Shared / service based
- Electrification of the fleet



THE WORK TRIP CHAIN

- Pressures to get things done on the way to something else.
- People connect multiple destinations on the way between work and home.
- Work and home are the defining anchors that define the mode of transportation.
- The work trip chain requires a high level of independence and flexibility. > Cars
- The car allows Plan-free travel.

http://nhts.ornl.gov/2001/pub/TripChaining.pdf

Source: Granstudio Database

DRIVING FORCE 4

Hacking the urban environment

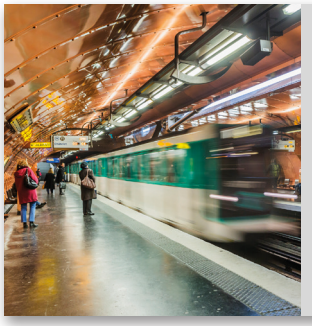
Legislation has always played an important role in the definition and diffusion of new modes of transport in our cities. But what if citizens and the government could collaborate in the definition of the city of tomorrow? Open source technologies could be used to aggregate communities and encourage the exchange of opinions, skills and ideas from a wide and heterogeneous citizenship in order to transform the surrounding urban environment. This buttom-up collaboration could be also supported by the Big Data. The data collected from each citizen for a specific reason could be analyzed in a different context to achieve new conclusions in order to develop, for example, an economic profile of the cities. The data and the open platforms are nothing more than tools to share knowledge, ideas and best practices with subjects available to collaborate.

What this could mean for the P&R project?

- Public-Private Partnership (PPP).
- Upgrade-ability of infrastructure according to evolving desires, needs or tech.
- Utilities could partly open to guerrilla activities before defining them officially. (cfr "desire paths": now also "desire activities").

LEGISLATION PLAYING INTO THE HANDS OF INNOVATION

The organisation of urban mobility is primarily a responsibility of authorities at the local level. In 2020 these authorities will play a larger role in shaping (urban) mobility and will actively promote smarter and more efficient solutions. Cars will increasingly be banned from inner cities. Autonomous vehicles and other new intelligent transport systems will have to work with local authorities to make their services a success.



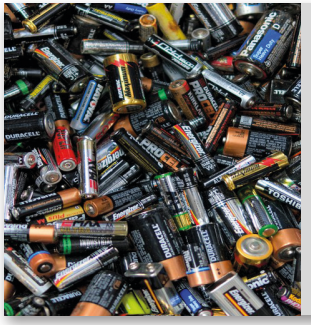
PUBLIC TRANSPORT AS THE BACKBONE OF CITIES

Public mass-transit systems are, in the main, faster and more reliable than they used to be, with increased capacity in many cities. There is a lot to be learned from the largest cities with a history in public transport, like Tokyo and it's advanced Y-line.

SPONTANEOUS ACTIVITIES

One admittedly low-tech example is Parking Day, an opportunity for citizens across the country to appropriate parking spaces, design interventions, and suggest alternate futures for the enormous and largely wasted parking infrastructure. Since its inception in San Francisco in 2005, Parking Day has expanded across the globe through the use of digital platforms.

C. Ratti and M.Claudel, The City of Tomorrow, (2017)



EXPONENTIAL DEMAND TO STORE ENERGY

The global energy storage market will double six times between 2016 and 2030, rising to a total of 125GW/305GWh. This is a similar trajectory to the remarkable expansion that the solar industry went through from 2000 to 2015, in which the share if photovoltaics as a percentage of total generation doubled seven times.

The Future of Transportation Executive briefing, pp.58-60

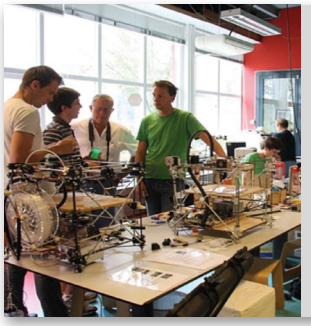
ACCESSIBILITY FOR EVERYONE

Public services are fundamental pillars in Europe. Numerous organizations and citizens are involved in such public issues, which aim to make facilities as accessible as possible to all sections of the population. In the case of public transport, this accessibility manifests itself in the form of physical facilities such as wheelchair infrastructure and accessible payment points where payments can also be made with cash.

HUMAN VECTORS

Air quality, for example, is poorly understood because data are collected in static and sparse ground-based stations. In a possible future, citizens themselves could carry a distributed network of sensors that create a dynamic real-time atmospheric map. Using smartphone-integrated sensing devices, pedestrians commuters could generate data at the human scale, as thought a tracer were running through the veins of the cities, showing the urban environment that the commuters live and move through.

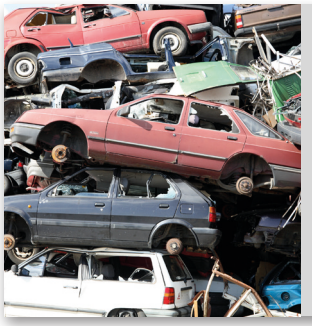
C. Ratti and M.Claudel, The City of Tomorrow, (2017)



OPEN SOURCE COLLABORATION

Building a worldwide network of local communities around neighborhood fabrication facilities is the vision of Fab Lab, a program that began at MIT. The projects coming out of them have local inflection, as communities come together to solve problems and generate new ideas. Fab Labs allow people to modify or "hack" the world around them, rather than passively absorbing information and products.

C. Ratti and M.Claudel, The City of Tomorrow, (2017)



CHANGING LIFECYCLES AND UPGRADEABILITY

The increasing speed of innovation, especially in software-based systems, will require cars to be upgradable. As shared mobility solutions with shorter lifecycles will become more common, consumers will be constantly aware of technological advances, which will further increase demand for upgradability in privately used cars as well.

McKinsey, 2016

CITIZEN PARTICIPATION

Citizen participation is everywhere. Invoking it has become "de rigueur" when discussing cities and regions in the developing world. While it is clear that participation cannot possibly "do" all that is claimed (deepen democracy, improve governance...) it is also clear that citizen participation cannot be dismissed. Participation in many cases creates a broader public acceptance and involvement of renewal projects.

ROLLING OUT MAAS

Integrated transportation via smartphone apps that allow connected multimodal trips to be identified, ticketed, updated, completed and paid through MaaS apps has growing support from urban planners, politicians and public authorities. As communities demand greater and more affordable mobility, governments continue to falter in supporting these needs due to lack of revenue and poorly synchronised efforts.

The Future of Transportation Executive briefing, pp.58-60

THE WELFARE STATE & PUBLIC SERVICES

Fuelled by economic recession and libertarian politics European counties are slowly moving from a institutional welfare state to a state that directs and coordinates civil participation and promotes self-reliance. This already visible in the domain of healthcare, but what if the state no longer provides public transport?

POWER OF LOCAL AUTHORITIES

To discourage local residents from doing so, the Shanghai government stipulates that during peak hours (7:30-9:30 am and 4:30-6:30pm), vehicles with non-local license plates cannot enter the elevated roads or the intra-city express way system. Cities also increasingly implement quota policies to control car ownership growth. Auction, lottery and a hybrid of these two mechanisms are used in Shanghai, Beijing and Guangzhou respectively.

DENSER ENERGY STORAGE

Underpinning the optimism for EV pricing is the fact that the cost of lithium-ion batteries, the core of any EV, has fallen 73% on a per-kilowatt basis; and that manufacturing advances and higher energy density will slash prices by a further 70% or more by 2030.

The Future of Transportation Executive briefing, pp.58-60

Source: Granstudio Database

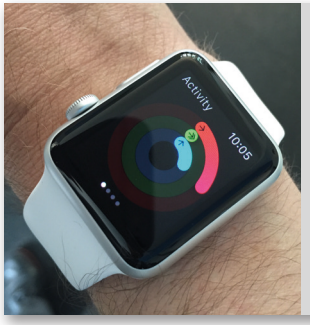
DRIVING FORCE 5

Atoms and bits converge

Technologies can be imagined like an extension of human capabilities. Every time we look at our smartphone our logical and computational capabilities get reinforced. Simultaneously technology disappears: it is so well incorporated into our daily actions that it is barely imperceptible. We are getting more and more help without experiencing this ourselves and have become accustomed to all that is immediately available. Technologies, as anatomical extensions, but even more as dynamic mental extensions demand a bilateral cybernetic exchange: the man is the sender and recipient of informations. The man augmented by the machine will always be superior to systems that are exclusively machine or man.

What this could mean for the P&R project?

- Even a mastodontic project may feel very humanly scaled if made use of personal tech in the right way.
- Personal layer on top of the mass behaviour.
- Creation of a public information canvas (for events, announcements...).



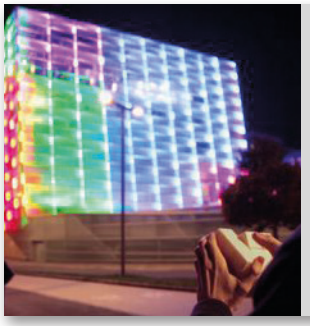
PERSONAL ANALYTICS

Individuals will increasingly use analytics everyday decisions about education, careers, finances and healthcare. Think of statistical models that tell you what job to take, or alert you even before you feel ill that you may have the flu. This 'Small data' tells us about ourselves, and can help us discover what matters to us personally.

CONNECTED HOUSE

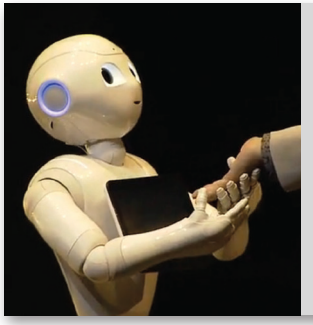
The digital thermostat learns from its users' daily habits, can be controlled remotely, and encourages various environmentally beneficial patterns, including some that are based on gamification and promote playful family dynamics. The next step could be be a similar degree of control over space - that is, synchronizing heat with residents' physical location.

C. Ratti and M.Claudel, The City of Tomorrow, (2017)



INTERACTION AS A FORM OF COMMUNICATION

Building prospectus have always been a mean to communicate a message. In the digital age we have reached the maximum expression of all this: interactive facades are becoming more and more common in today's architecture. Thanks to the advanced technology nowadays, the advent of lcd screens and LED light, the concept of interactive façade has become complex, attracting thousands of people with its shows of light and conveying a more or less explicit message.



ANTHROPOMORPHIC CARING

People easily attribute human form or other characteristics to anything other than a human being. A machine's scripted performance of feelings like 'caring' is easily recognised, understood and experienced as satisfying.

TECHNOLOGY AS SECOND NATURE

Technological developments mean that chips, sensors and all kinds of other electronics are getting smaller and smaller. As a result, products are becoming almost invisible. This leads to people experiencing products and service differently and having to be less aware of the technology around them. Technology gets embedded in life.

THE FILTER BUBBLE

What people get in touch with (through digital media) is increasingly filtered to fit their preferences. The more people's opinions are confirmed, the more extreme and polarised their opinions become. Realities are differentiated and a widely shared 'reality' will become rare.

TECHNOLOGY DRIVEN

The incorporation of AV technologies and AI solutions for the vehicle will unfold, from today's parking assist and adaptive cruise control, to autonomous driving on our freeways as the embedded technology and AI features roll out in new vehicles. Levels 1 - 5 of automation:

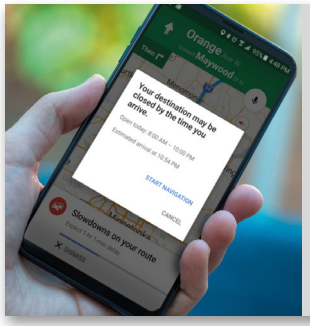
1 - no feet
2 - no hands
3 - no eyes
4 - no head
5 - no driver

The Future of Transportation Executive briefing, pp.58-60

EVERYONE AVATAR

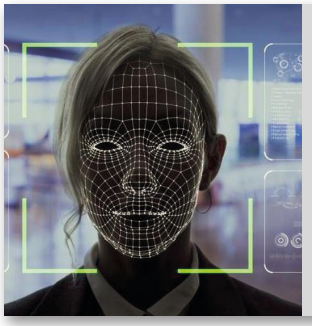
Dying your hair red, or wearing screaming T-shirts will no longer get you noticed. Instead you can make an impression by having cool photo's on Instagram, or taking a course in Chinese. People will increasingly mediate their identity through social media where experiences and relationships matter.

Your digital alter ego has increasingly more influence on your "real" life. Virtual life and reality melt together in a boundless continuum.



ALL BY ITSELF

Google Maps for Android now warns if your destination will be closed at the time of arrival. To give the warning, the service relies on current traffic information, public transport schedules, and information from your Gmail account, such as details about your car's reservation, flights and hotel.



FACIAL RECOGNITION

Ever been delayed on a flight because of straggling fellow passengers? That might be an annoyance of the past at Singapore's Changi airport which is testing facial recognition systems that could, in future, help locate lost travelers or those spending a little too much time in the duty-free shops.

Singapore airport may use facial recognition systems to find late passengers, 2018

ADDICTED TO THE SMARTPHONE

Research done by Tecmark (2014) shows that people average three hours and sixteen minutes on smartphone use daily. 50 percent of American teens admit that they "feel addicted" to their phones. Smart-phone users watch 221 times a day at their screen. Fear of missing out (FOMO)is a social angst characterized by "a desire to stay continually connected with what others are doing".

MOBILITY AS A COLONY OF BEES

Many bits make a big one. The power of TomTom, Coyote or Waze is in a kind of collaboration as a colony of bees. The underlying systems are based on communities: a group of individuals providing information about their observations on the road. Such a contribution may not give you a direct advantage, but it creates a better situation for the entire group, which you then benefit from indirectly.

VIRTUAL MAYOR

Foursquare is an app unto itself, it offers incentives ("You're the mayor of ____ !), it integrates a "To Do List" and "Tips" - but most importantly, it emerged at the right time. By 2009, smart-phones had become nearly ubiquitous, bringing with them a new dimension of the city and a new mode of interacting with and urban space.

C. Ratti and M.Claudel, The City of Tomorrow, (2017)

Source: Granstudio Database

DRIVING FORCE 6

"Having access" is more important than owning

Our culture based on physical property is shifting. The status symbols of our society like our car, small house, small garden and children are gradually becoming obsolete. People derive their identity less from their possessions and more on personal skills. Freedom and personal development are increasingly seen as objectives of life and the new material goods in many cases. As a consequence, in cities, car ownership might die. Cars become a service (shared), adding to other transportation services, from buses to metros, trams, trains, etc. As less and less young urbans will hold a driving license or feel comfortable driving, the notion of driving pleasure will leave ground to that of riding experience, be it for functional travels or recreational trips.

What this could mean for the P&R project?

- New forms of integrated housing in the city: buying or renting comes with a user-ship mobility service at the P&R.
- Flexibility to integrate yet unknown modes of transportation (do not construct a "finished" building).
- "Self expression": could there be a truly "Ghent-identity" solidified in the building?

ACCESS OVER OWNERSHIP

For the next generation of consumers "having access" is more important than owning. The 'millennials' or 'digital natives', are growing up in a world where most of their possessions aren't actually physically possessed. Knowing you can get something at the moment you want it will be more important than physical possession. This is fuelled by the seemingly endless possibilities life seems to offer and the attitude that there are no guarantees in life.

THE MOBILE ELITE

The increasingly mobile forms of life - physical, imaginative and virtual - serve as key resources for the accumulation of recognition, respect and prestige. A life on the move is viewed as a fundamental indicator of achieving 'the good life'. The more you move, travel around, meeting others and making and maintaining contacts, the more successful you must be (John Urry).

DECREASE IN CAR OWNERSHIP AND USE

It is in cities, especially their centres, that car ownership and use is declining. Older people retaining their licenses may swell the ranks of drivers for a while yet, but eventually young people postponing the use or purchase of cars could reduce them. A recent Gartner report noted that nearly half of teenagers prefer an internet connection to a car.

MARKET SHARE OF CAR SHARING

In 2030, up to one out of ten cars sold in is potentially being a shared vehicle. On this trajectory, one out of three new cars sold could potentially be a shared vehicle as soon as 2050. New mobility services may result in a decline of private vehicle sales, but this decline is likely to be partially offset by increased sales in shared vehicles that need to be replaced more often due to higher utilization and related wear and tear.
McKinsey, 2016

DRIVING AS SELF EXPRESSION

Although they could be a highly profitable innovation, driverless cars may further strain the already weakening link between driving and identity and the sense of driving as an expression of self and skill. After 50 years of car culture, culture may finally be changing the car (Economist).

VIRTUAL TEST OF PERSONALISATION

The Motor Village Digital Store, in Turin, allows customers to configure, evaluate and buy the new car in a "smart" and fast way thanks to virtual reality. It is an additional and technologised way to sell cars that allows the most demanding customers to optimise their time and also to 'have fun' in the purchase.

FASHIONABLE SERVICES

People are used to seeing fashion as a visual thing, but what is fashionable will increasingly become invisible. People can increasingly a 'fashion' statements by the services they use. This can already be seen by services like Uber, the use of which communicates are a mobility master by being able to command a car anywhere anytime, without all the burdens of car ownership.

HYPER PERSONALISATION

Media content (ranging from advertisements to directions) is increasingly curated according to people's personal preferences, time and location. It will guide how people move around the city and will 'know' when and where they will want a particular item. Media will become a means to help people make sense of their surroundings.

GENERATION WITHOUT A DRIVER'S LICENSE

The amount of youngsters interested in getting a driver's license is in decline. To accommodate their mobility needs, they find sufficient solutions in ride sharing, ride hailing, or other services. This evolution not only means a generation is raised that does not know how to drive, they also have less knowledge of traffic rules in general.

EVERYTHING BECOMES A SERVICE

Our culturally determined view of property is shifting. We derive our identity less from what we own and more from what we can or who we are. This has a good influence on ecology. One day everything comes back on the shelves of the big library that is our earth. That loophole is increasingly being closed, and that requires fundamentally different business models. Everything becomes a service: mobility, TV, music, light...

PARTNERSHIPS BRAND AND CONSUMERS

Brands are increasingly interacting with people in a personal and honest human manner. Communication shifts from mass marketing push to two-way communication. Mass marketing is complementary to personal interaction with consumers.

INTANGIBLE STATUS SYMBOLS

Status symbols become more and more subtle. They clearly distance themselves from the outward display of wealth (such as expensive cars) and increasingly focus on the complex world of social skills, engagement, and enrichment in the field of personal experiences, such as traveling or learning a foreign language. Exclusivity sublimates itself to a new, often intangible level.

PEOPLE DRIVING LESS

Though more old people drive than used to, per person they also tend to drive less. And so may everyone else, if people keep getting their licenses later, The later people pass their test, the less far they drive even once they can. People in Britain who learn in their late 20s drive 30% less than those who learn a decade earlier (Gordon Stokes of Oxford University in Economist).

Source: Granstudio Database

DRIVING FORCE 7

The right vehicle in the right place

Cities are defined by their mobility spaces. In the course of time, vehicles have shaped the urban infrastructure, but also, indirectly, public spaces, economic spaces, the way people live, work and socialise. But vehicles are not objects detached from the context in which they are operating, they are always serving human beings in a certain environment. This mean that strictly defined urban areas are in need of equally defined modes of transport. As a consequence, the city can be divided in three conceptual urban areas:

- intercity: home of the conventional motorised traffic as we know it today
- innercity: a new type of in-between space that combines the lack of cars with the benefits of still being mobile
- traffic-free cells: pedestrian areas

A system that allows users to easily switch from one level to another is the only access to a successful mobility model.

What this could mean for the P&R project?

- This is the main rationale behind the entire project: allowing the city centre to remain liveable without cars.
- Being located on the edge or overlap of numerous completely different conditions (downtown historic centre, local neighbourhood, big offices, countryside, high-way...), the P&R needs to facilitate the use of a large variety of modes (that each fit perfectly in one of the flanking environments).
- Event based peak demands.
- Extension of the P&R to the riverside (boardwalk terraces) and creation of special boat services as experience to go to the football game or for wedding ceremonies.

SPECIALISATION OF MOBILITY

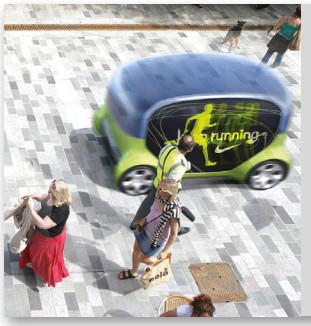
Continuing specialization/differentiation of modes of transport. Future urban dwellers will have a huge number of ways get from A to B, each with their specific pros and cons. From slow mobility like walking, cycling and skating to metro, bus and tram, train, car and airplane for longer distances. And add to these the growing range of virtual alternatives to physical travel.

URBAN IDENTITY

European cities have a very strong individual character that is rooted in a long historical context. The average citizen is proud of the rich history and tradition of its city. This uniqueness also makes for a lot of tourism. The automobile has only existed in our cities for a very short amount of time. It partly erased urban identities or contributed to a diversified identity (cfr Turin). Still, many urban renewal projects focus on rediscovering a proper urban identity in line with the cities' heritage.

GROWING PEDESTRIAN AREAS

European cities are continually expanding their pedestrian areas. Some areas have already grown to a point where they are getting too big to cover by foot. These areas are here to stay and they can be seen as a clean slate regarding mobility.



FULLY-ADAPTED DESIGN

The shift to shared mobility, enabling consumers to use the optimal solution for each purpose, will lead to new segments of specialized vehicles designed for very specific needs. For example, the fleet of vehicles specifically built for e-hailing services – i.e., designed for high utilization, robustness, additional mileage and passenger comfort – would already be millions of units today; and this is just the beginning.

McKinsey, 2016

RECOGNITION OF HUMAN SCALE

I take human senses as a starting point and how we, people, move. Man is, of course, a walking being, and our senses are made perfectly for people to walk at around 5 kilometres per hour. Modernism and "motorism" confused a lot of architects and planners about what was a comfortable scale for human beings. We need to again acknowledge that cities are for people. (Jan Gehl)

GROWING MOBILITY IN LEISURE TIME

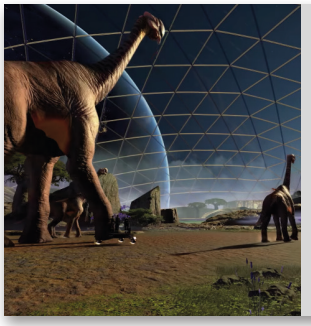
Leisure is increasingly the most important source of mobility, already accounting for almost two-fifths of all journeys and more than two-fifths of all kilometres travelled (SCP 2012). That is considerably more than commuter traffic, and much more than household trips. Almost 50% of all leisure trips are social (visiting friends and family), 20% is recreational (festivals, events, shopping malls) and about 10% is sports related.

FACING THE MOMENT

Ever-increasing demand for 'live' events, also fuelled on the supply side by new business models in the entertainment industry. For example, where artists used to tour to promote a new album, the coming decade they will release music to promote a tour. These events cannot be 'missed' and they set up enormous demands for mobility at very specific moments.

URBAN SPRAWL HITS WALL

The enormous urban sprawl in the past decade was an important factor for increased car ownership. But cities will no longer expand and instead will focus on compaction of areas within. In the coming 20 years substantial investments will be made in public transportation. Weighing the costs and the drawbacks of congestion, people in cities will increasingly prefer the use public transportation to owning a car.



NEW UNKNOWN SPACES

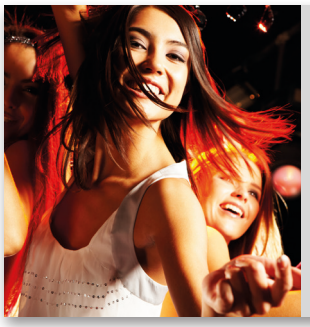
New forms of entertainment and activities could define and shape spaces that do not exist yet. These actions could affect and request, as first consequence, the demand of new unknown modes of transport.

STUDENT CITY

Many big cities host a university or a school for higher education. They are, among a bunch of other things, also a student city. The first years away from home are often synonym with the discovery of boundaries. Mischievous pranks and typical student behaviour are commonplace and determine to some extent the character of the city, which often draws resilient and forgiving.

STRONG LOCAL COMMUNITIES

The aging population and an increase in the number of singles necessitates strong local communities to rely on. When it comes to a community network, chosen friends are taking over the crown from given family. A social safety net upon which you can rely is increasingly created by oneself. Sharing rides or even a vehicle is becoming more common between trusted neighbours.



CITY AT NIGHT

A large part of city-centre living takes at night within public spaces of bars, leisure clubs, restaurants and nightclubs.
"It's a mess, it's a start, it's a flawed work of art. Your city, your call, every crack, every wall. I love this city tonight. I love this city always. It bears it's teeth like a light. And spits me out after days" (Snowpatrol, Take Back the City).

LIVING APART TOGETHER

The number of one-person households will continue to increase. This increase can mainly be attributed to cities, which will continue to grow at the costs of rural areas. Today already more than half of all households in Amsterdam consist of just one person.

Source: Granstudio Database

DRIVING FORCE 8

The right service for the right user

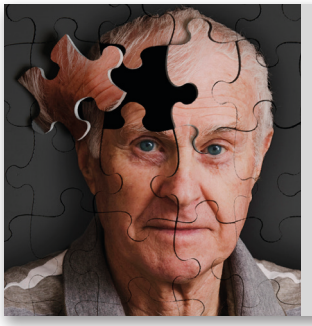
City population can be divided into three generations, each of them defines different needs about the functions of the urban environment. A good model of mobility must answer this question. The car usually only offers mobility to working adults. Children and elders are excluded, just like the students, who often do not have the same financial resources like their parents to transport themselves. A good integration between public transport and future driverless vehicles is the solution for embracing a wider social inclusion. Because, in the end, vehicles just allow people to move themselves within the environment. Because after all, mobility is about humans.

What this could mean for the P&R project?

- Two very specific groups to take into account:
  1. elderly, not used to tech
  2. youngsters, not able to drive
  > both have troubles with the current infrastructure (paying machine in parkings, general traffic rules...).

FIRST GENERATION TO EARN LESS

Millennials may be first to earn less than previous generation. Studies show a growing gulf between a more prosperous older generation and a struggling younger generation. The deep recession of 2008-9 and the subsequent slow recovery was only partly responsible; earnings for young people were being squeezed even before the start of the financial crisis. The impact of earning less coincides with a bleaker outlook for home ownership. (The Guardian, 2016)



AGE RELATED DISEASES

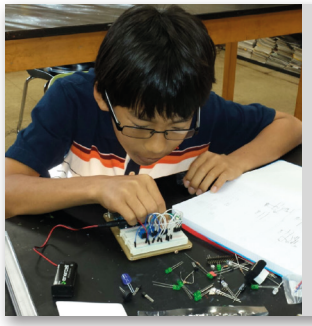
With an aging population there will be an increase in age-related diseases, particularly dementia and Alzheimer. These conditions limit people in their mobility. People who used to travel around the globe are unable to their way to the local baker anymore. The easiest way for their caregivers to keep them safe is to prohibit them from going outside alone, which in turn contributes to depression.

PARENTS RAISING CHILDREN

An increasing number of children will grow up in cities. People tend to stay in the city, when before they would typically move to the suburbs upon having kids. This affects the type of engagement of both parents, who want a safe and stimulating environment for raising children, and their children, for whom the city will form the backdrop for their childhood memories.

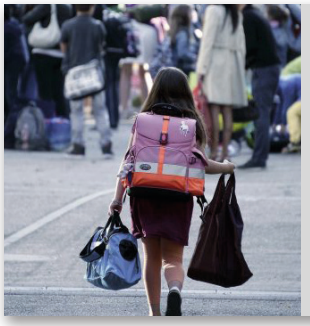
TEENAGERS IN THE CITY

Although the overall teenage population will decrease, an increase is expected in urban areas. Adolescence is a time of identity 'crisis', breaking away from parental control, establishing more intimate relationships with peers and the other sex, and increased rates of recklessness and delinquency.



KIDS GROWING UP CODING

Developers in the future will be like sculptors, shaping systems to form worlds. A new generation is now growing up with games like Minecraft and DIY electronics like Arduino and LittleBits. Over the next ten years they will start making games and tinkering with their environment.

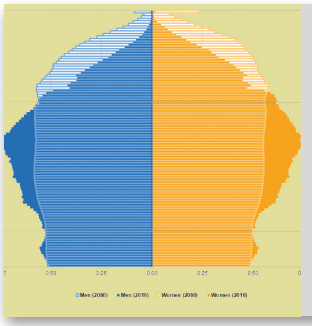


NEW UNKNOWN JOBS

What will you be when you grow up? This is the question that is addressed to all young children. According to a study by the World Economic Forum, two thirds of children who are now in the elementary school will end up in jobs that do not even exist today.

GAME MENTALITY

Individual control, trial-and-error, constant change; they're all familiar to the so-called 'gaming generation', a generation that grew up playing video games. Games teach you there are many potential paths to "victory," and you should try as many as possible to see what happens. The cost of failure is low if not zero - just press the restart button.



WE KEEP ON AGEING

Eurostat's main scenario projects that the pattern of population ageing within the EU-28 is likely to continue through to 2080. The median age is projected to increase by 4.2 years. The share of the working-age population is expected to decrease, falling from 333.0 million persons at the start of 2016 (or 65.3 % of the total) to 288.4 million persons by 2080 (55.6 %).
(Eurostat, 2018)

A LARGE SHARE OF SILVER

The elderly of tomorrow are not stereotypical as they used to be portrayed. They actively participate for longer, their lifestyle is more mobile and they are fit and willing to travel. Moreover elderly focus on self-actualisation, they have more time and money to spend then ever before and there will be more of them than ever before.

LESS TIME OUTDOORS

Many children from ages 2-5 spend a great deal of time in front of screens, about 32 hours each week. This much time can be equated to the weekly work shift of an adult. What is the experience of growing up without getting to go outside? A part of a child's play is getting to be messy, fun, and creative. Is the loss of that experience depriving for children? It could be so: childhood obesity and stress are some of the results.

https://www.lifehack.org/802553/kids-websites

GROWING FAT

The worldwide prevalence of obesity nearly doubled between 1980 and 2008. Based on the latest estimates in European Union countries, overweight affects 30-70% and obesity affects 10-30% of adults. About 1 out of 3 European 11-year olds is overweight or obese. Childhood obesity is strongly associated with risk factors for cardiovascular disease, type 2 diabetes, orthopaedic problems, mental disorders, underachievement in school and lower self-esteem. (WHO Europe)

AUTHENTICITY OF GENERATION Z

For a generation that is all too attuned to spin, Photoshopping and sponsored content, authenticity is particularly prized. Generation Z's heroes are people like Felix Kjellberg, a Swedish YouTube superstar, better known by as PewDiePie. He was ranked second in terms of celebrity popularity, beaten by another YouTube star, KSI. Key to his appeal is that Kjellberg, in a beanie in his bedroom, comes across as 100% real. (The Guardian)

STUDENTS AS CATALYSTS

As a student city, Ghent has to deal with annual influx of new students, who will become familiar with the city in their own way. After 5 years of studying, a part of the students and Ghent will remain, where another group will choose to look for a job elsewhere. This natural cycle is an opportunity for the city to let students play an active role in the development of certain areas.

Source: Granstudio Database

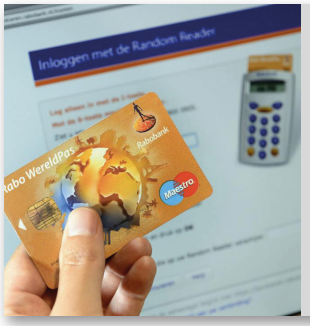
DRIVING FORCE 9

New integrated business opportunities

Technology is an enabler that allows creating answers to certain needs or desires in order to improve people's quality of life. But, at the same time, technology can also induce new human desires. As a result, our behavior and expectations evolve in response to technological progress. Thanks to our smartphones, we have become accustomed to instant availability, ad-hoc planning and very low thresholds to try out new things. This mean that in the next future, technologies will play an even more important role on the way people experience services, defining and opening the road for new business opportunities based on the principle that everything must be instant, flawless and effortless as a second nature.

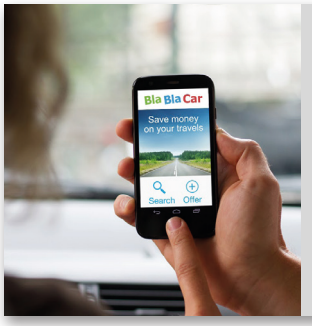
What this could mean for the P&R project?

- In car delivery
- Post office
- Supermarket on the go
- Tertiary services to assist work of household activities: laundry, grocery shopping, parcel delivery.
- Tertiary services related to mobility: bicycle service point, carglass, carwash, mechanic garage, tyre centre etc.



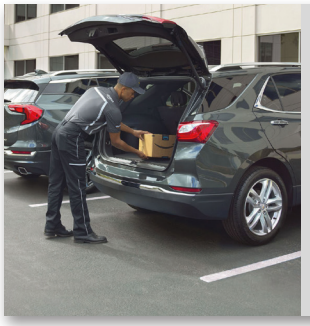
CHANGING NEED FOR PHYSICAL MOBILITY

Physical mobility will no longer be necessary in many instances that used to call for it. We can have our presence felt over any distance and can be present in more than one situation simultaneously. We will no longer need to visit banks, travel agencies, insurance agencies and household shops. And we don't need cars to transport goods. Any goods we need will be brought to our doorstep.



THE POWER OF PLATFORMS

A two-sided platform like Uber has two groups of customers who need each other in some way but who cannot capture the value from their mutual attraction on their own and rely on the platform to facilitate value-creating interactions between them. Platforms become more attractive as more users join (network effect), usually causing one or two to dominate the market (oligopoly) potentially leading to artificial high pricing.



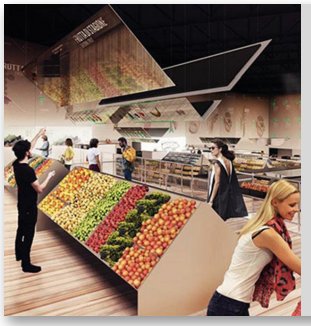
IN-CAR DELIVERY

Amazon, together with GM and Volvo, launched a new service that gives its couriers access to a person's vehicle for the purpose of leaving package deliveries inside. The car will need to be parked within a certain radius of an address used for Amazon deliveries, so either home or work. Driveways, parking lots, parking garages, and street parking are all eligible locations, just as long as it's not at some random address across town.

The Verge, Amazon will now deliver packages to the trunk of your car, 2018

IMMERSIVE DIGITAL ENVIRONMENTS

Virtual reality (VR) and 'presence' will continue to transform gaming and entertainment. VR is the ultimate platform; no other medium allows players to feel present in a virtual environment and believe others are truly sharing that space with them. It will enable human interactions in digital spaces like never before. (Brendan Iribe, Oculus Rift)



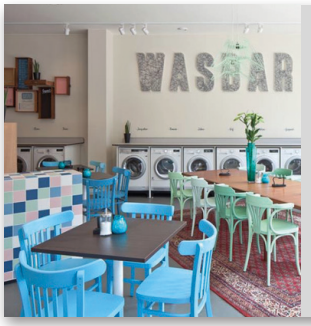
WHERE IT COMES FROM?

The Future Food District (FFD), designed by Italian design firm Carlo Ratti Associati, together with supermarket chain COOP Italia, is a real Supermarket, where people can interact with – and buy – products. As people browse different products, information will be visible on suspended mirrors augmented with digital information. It is like a return to the old marketplace, where producers and consumers of food saw each other and had actual interactions.

https://carloratti.com/project/future-food-district/

SHARING ECONOMY

Also known as shareconomy, collaborative consumption or peer economy, a common academic definition of the term refers to a hybrid market model (in between owning and gift giving) of peer-to-peer exchange. Such transactions are often facilitated via community-based online services.
Uber, Airbnb, and other companies have had drastic effects on road congestion and housing. Peer economy cuts both ways: major cities such as San Francisco and New York City have become even more congested due to ride sharing.



EXPERIENCE AS DIFFERENTIATOR

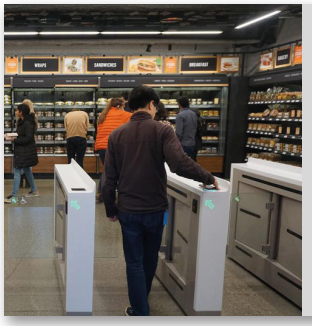
The more and more flexible human life-style and the increasing desire to connect with people is giving birth to new ways of experience spaces. A concrete example can be represented by Wasbar: a launderette with adjoining bar where young people go to do their laundry while sipping a cool beer or a coffee at the bar. Since the way we experience a place can affect our choices in making decisions, the experience in itself can be recognised as a commercial differentiator.

FROM GAMIFIED MOBILITY TO MOBILIZED GAMES

Game thinking and game mechanics are already widely used in other contexts than strict entertainment, including mobility (think collecting points in WAZE or Pokémon Go). In the coming decade, with the rise automated vehicles, the entertainment value of games will likely become dominant, creating a new mix of mobility and entertainment.

CAR CARES FOR ITSELF

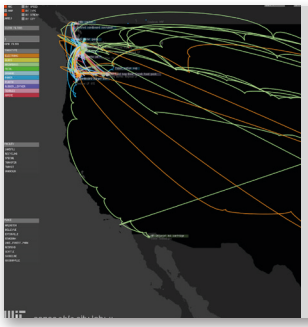
The improvement of the car diagnostic system opens up new opportunities for the world of repairs. The vehicle, increasingly connected, will record and transmit its driving data continuously, as well as information on its operational status and on the strains to which the various components are subjected. The repairer, through data reading systems, will be able to track in real time the "state of health" of the vehicles of its customers and advise the owner to intervene on the vehicle even before anomalies can occur.



NO MORE BARRIERS

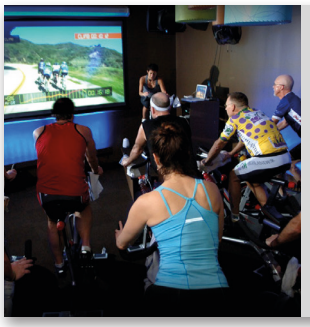
Amazon Go, first cashier-less grocery store, use hundreds of cameras and sensors to account for what people are buying. People simply need to use their Amazon Go app to enter the store, pick up what they need, and leave. The items get charged to their Amazon account automatically as they're exiting. The process removes the need for human cashiers and also reduces customer wait time.

The Verge, Amazon opens its first cashier-less Go store outside of Seattle, 2018



GEOLOCATING TAGS

The Senseable City Lab began a project, Trash Track, that addressed the scenario of ubiquitous tracking. Researchers created geolocating tags and worked with residents of Seattle to attach them to thousands of ordinary pieces of garbage to map the waste removal chain across the United States. In the future, an accelerating diffusion of technology into urban space may offer an unprecedented understanding of systems like waste management dynamics and may create data that can be used to optimize the entire system, even in real time. © Ratti and M.Claudel, The City of Tomorrow, (2017)



FITNESS ENTERTAINMENT

Merging of the domains of fitness and entertainment, which started with the introduction of the Wii but which will develop further into professional sports and will become more immersed. Think indoor training experiences like Zwift for cycling boosted with VR.

TRAVELLING THE WORLD FROM THE SOFA

Nowadays VR is still distinguishable from reality. But what if the graphics of the simulated reality reach a higher degree of perfection? A 3D viewer could allow us to visit the world without moving from the sofa in a way that is completely identical to a real holiday. When the simulated reality will be able to faithfully reproduce the same input, to make the difference will be only the initial awareness of never having moved. Imagine if you could land on the Moon..

Source: Granstudio Database

DRIVING FORCE 10

The rising importance of third spaces

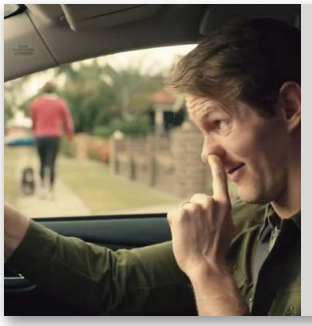
Human habits are changing: people exhibit more and more unplanned spontaneous behaviour and a growing need to connect to people. Many traditional home activities are now taken outside. This leads to the increase of request of “third spaces” where people spend time between home, “first space”, and work, “second space”. These places are the perfect location in order to spend a good time, exchange ideas with other people, and build relationships. Since face-to-face meetings remain a fundamental aspect of social intercourse in a society driven by a more frenetic and unstable lifestyle, the “third places” can actually play a fundamental role in strengthening the sense of community.

What this could mean for the P&R project?

- Acceptance of the project as part of the neighbourhood requires multiple integrated activities specifically addressed towards the local communities.
- The P&R as single point of interaction between “home” and “work”: both spheres can be extended here. For example an ideal place to have breakfast, but also to plan a meeting.

PERMANENT FLEXIBILITY

People increasingly exhibit ad hoc, unplanned spontaneous behavior in their daily life. This goes for anything from traveling, shopping and eating to meeting with friends. People are increasingly catered to in a just-in-time fashion. People hardly plan to meet anymore, but rather see each other ‘on a whim’, without prior planning and in ‘third places’, shared living rooms like Starbucks versus at home.



PERSONAL BUBBLE

People tend to feel invisible in an enclosed space like a car. In Goffman’s theory of behaviour in public spaces people exhibit ‘off-stage’ behaviour (like picking ones nose), as opposed to ‘onstage’ behaviour in a bus or metro where people manage their impressions. Today many people still prefer the private space of a car to public transport, even if it means dealing with heavy traffic on a daily basis.

THIRD SPACE AS AN EXTENSION OF HOME

Cities built with humans in mind allow the functionality of housing to be reduced to storage and sleeping. Many traditional home activities are now taken outside: from having breakfast to reading a book to homeworking. The local coffee bar or public park operates as an extension of your private home.

LIVING NOMADIC

Temporary employment contracts lead, combined with geographically dispersed teams, to decreased loyalty to the living environment. Greater economic uncertainty causes less ability for starters to buy property. This group depends on rent, which influences their choices regarding housing. They are mostly guided by their (future) job.

SHARED WORKING SPACE

Coworking spaces offer affordable office space for those looking to escape the isolation of a home office or coffee shop. These shared workspaces offer a suite of office-like amenities such as hot-desks, private meeting rooms, kitchens, coffee and more. Often, they also offer a community. Occupants typically are freelancers, entrepreneurs, start-ups and small teams who want to take advantage of a flexible space. In addition, the advantages of these spaces is the ability to rent out only what you need vs an entire private office space. https://www.chargespot.com/workspaces/coworking-spaces/

PHYSICAL CO-PRESENCE

Face-to-face meetings remain a fundamental aspect of social intercourse. 'Thick' co-presence involves rich, multi-layered and dense conversations. These involve not just words, but designated expressions, facial gestures, body language, status, voice intonation, pregnant silences, past histories, anticipated conversations and actions, turn-taking practices and so on.

REVIVAL OF THE FITNESS

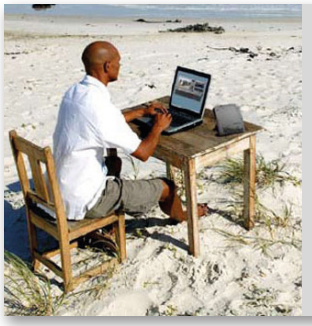
It wasn't always cool to admit that you were a fitness freak. Today, however, the biggest names in Hollywood are all fitness obsessed. This goes hand in hand with an increasing general health awareness. People know what their body needs, and even more what is noxious. Commonly found on restaurant's menus are dishes which are gluten free, carb free, vegan or low in fat.

STABLE RHYTHMS OF LIFE

European countries share the same deeply ingrained social rhythms of every day life and mobility: 9-5 work times, school times, shop opening hours, lunch breaks, mealtimes, weekends, going out on Friday night, vacations, public holidays, new years eve and the list goes on. These rhythms change slowly, for example with an increasing portion of elderly the weekly work rhythm becomes less dominant, but remain distinctive. (Marli Huijer).

THE LIKE-MINDED STICK TOGETHER

People with similar identities (lifestyle, ethnic backgrounds, ideals) are drawn together and tend to live in the same geographic areas. On the one hand people choose to cluster together with the like-minded, on the other hand people who don't have a choice are left in areas with others like them.



FLEX WORK

Impermanence increasingly determines the way in which starters make choices about work. This development is not only the result of economic contraction, but also of the type of work (the gig economy). Companies face increasing pressure to respond quickly to innovation and new technologies. Project-specific joint ventures facilitate the life of freelancers, job-hoppers and people with part-time contracts.

RETHINKING 'HOME'

Our connection towards material space does not seem as important these days. Millennials are said to value experiences over products. Owning a private room or an isolated mansion was formerly a form of luxury, but as more people choose to exchange privacy for the chance to connect with people, could shared living become a new form of luxury? Will the future definition of our home be defined based on our friendships and connections, but nothing physical? (Medium.com)

FEELING UNSAFE AT NIGHT

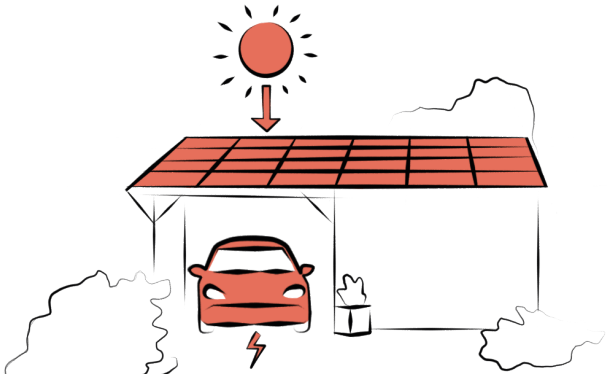
For many people, especially women, walking alone in the city at night evokes feeling of vulnerability and uneasiness. Irrational thoughts can cause extreme anxiety; Can I trust the bus driver if I'm the only one left in the bus? Is the Uber driver trustworthy? Eyes on the street, or buildings oriented to the street, with people living in them, can reduce these feeling.

SLOWING DOWN TIME

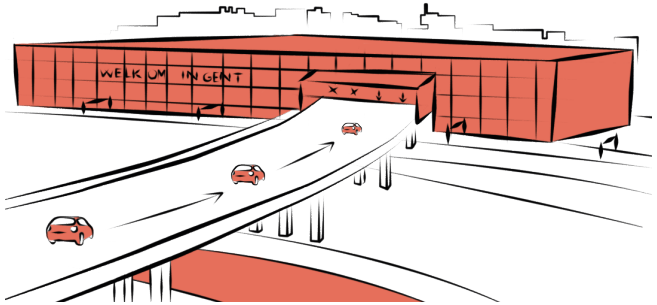
People look for ways to balance and compensate the continually accelerating pace of life. This can be done by engaging in activities that 'stop' or 'slow' time, like sports, yoga and mindfulness. This is reflected nicely in what people find attractive in others. Amongst the most commonly used words in profiles on dating sites are Surfing, Yoga, Skiing, Hiking and The Ocean.

Source: Granstudio Database

FUTURE SCENARIO 1

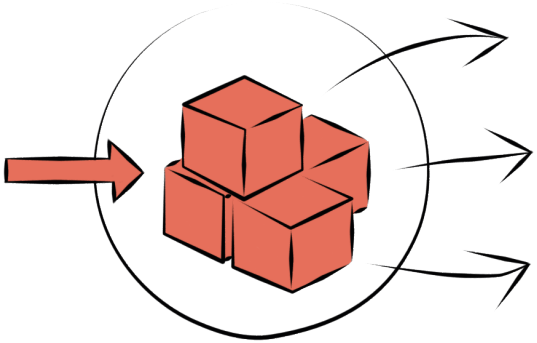


- Gert is a commuter who works in the centre of Ghent. Every night he charges his private electrical car at home.

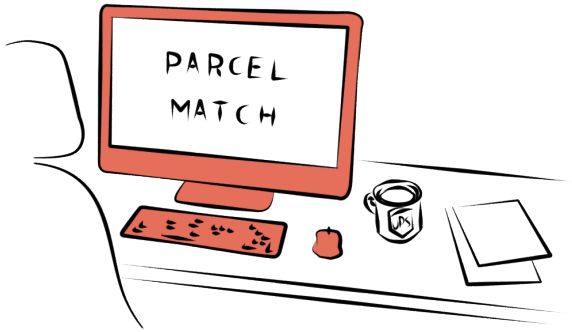


- He starts, like everyday, his journey to the P&R.
- The P&R is not a common parking building. There is never the feeling of entering a dark underground cave.

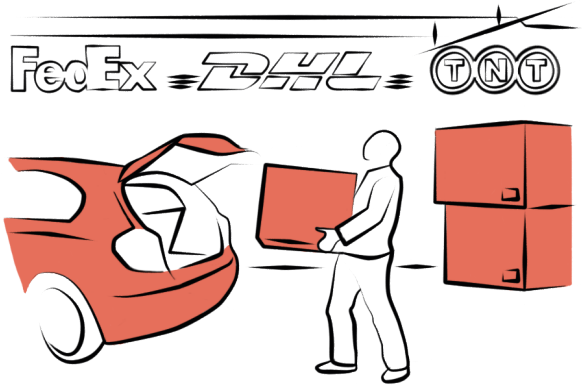
- He leaves his car on the drop off area and takes a shared bicycle. Sometimes he prefers taking the bus, like when it is raining, but today it's a sunny day and he prefers riding.



- A distribution centre is located in the P&R. It redistributes all kinds of parcels for the city, so massive trucks don't need to enter the inner city.



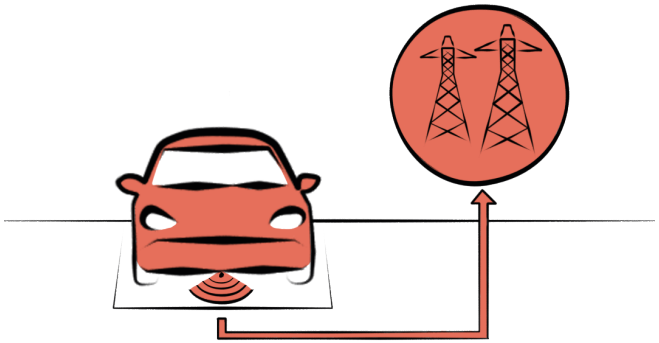
- A worker at the centre gets a notification that both package and the vehicle are at the P&R.



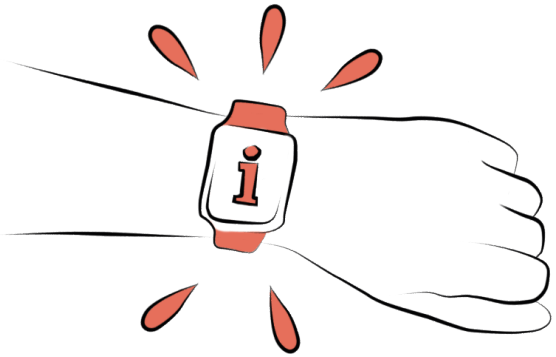
- The car autonomously rides to the P&R parcel pickup point and unlocks its trunk. Afterwards, it parks itself again.
- Centralisation makes delivery cheaper and more ecological.
- Gert receives a notification: the package was safely delivered into his car.

- Riding releases natural feel-good endorphins that help counter stress and make him happy, since he knows that a hard working day is upon him.
- The embedded autonomous technology in Gert's car allows it to park itself. The car drives off, creating space for others.

- Gert can indicate which services he wants to make use of while away: charging, cleaning, maintenance, laundry, grocery shopping, renting out his vehicle to others, in-trunck delivery of goods... Some services cost money, others gain it.

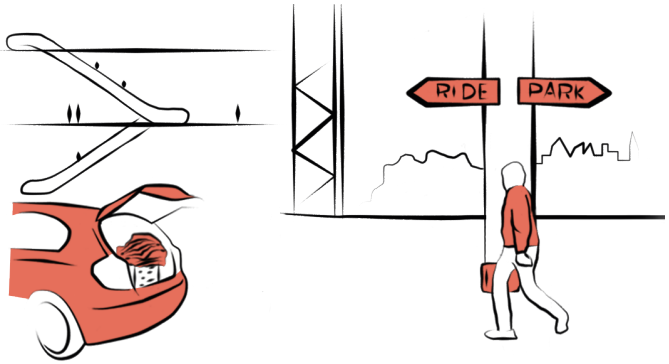


- Gert decides to transfer a percentage of the energy stored in the battery of his electric car to the Distribution Network of Ghent. So, he gains some money. He can uses the budget on services or deduct it from road taxes.



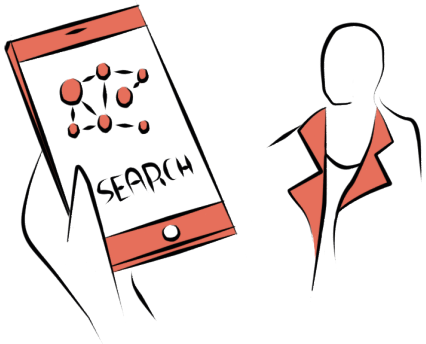
- Gert receives a notification: the package was safely delivered into his car.

- After work, Gert returns to the P&R to pick up his car. But, suddenly, he remembers that he has some grocery shopping to do. It's too late but fortunately at the P&R there is a Supermarket on the go which works 24h! There are no cashiers: just pick up what you need and leave. The items get charged to Gert's personal account automatically as he's exiting.

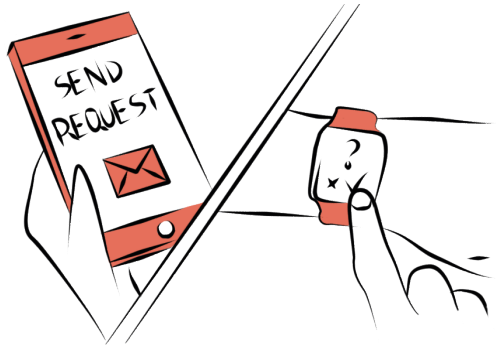


- When Gert steps in his car, he finds the laundry washed and ironed in the trunks: the laundry was taken out and washed while Gert was at work.

FUTURE SCENARIO 2

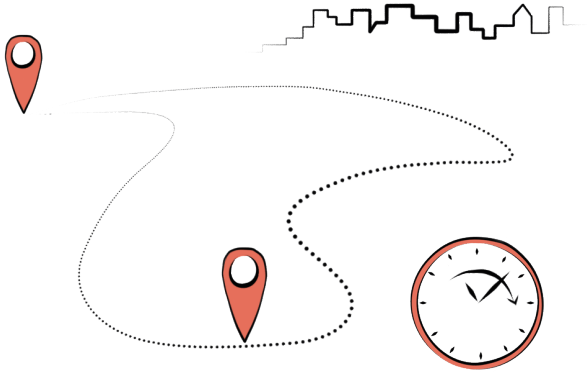


- Emma is a student who lives in Ledeberg. This Saturday she has decided to visit her parents who live outside Ghent.
- Emma is looking for a car share. Next to the public services, she is also enrolled in a network of friends, which is cheaper and more personal.

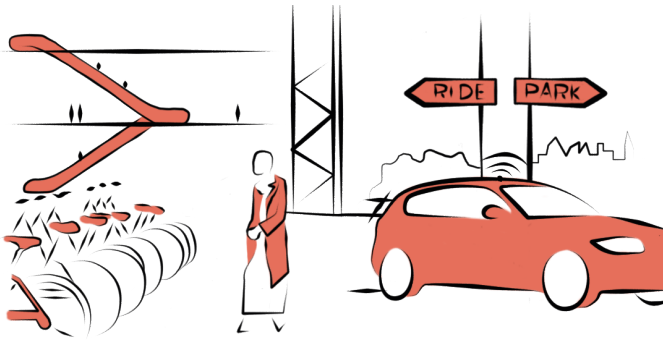


- She finds Paul's car to be available at the P&R for at least another 5 hours.
- She sends out a request that is confirmed by Paul. He'll get some money out of it.

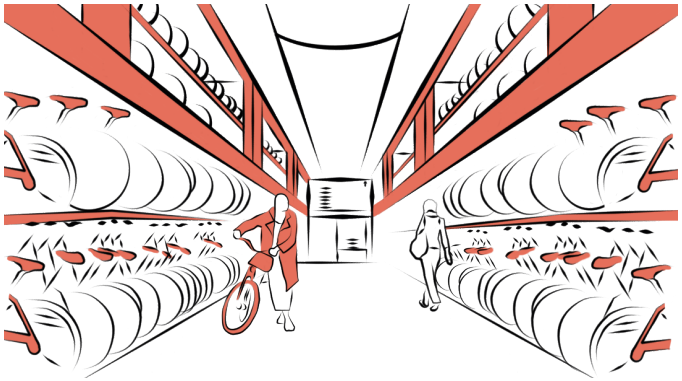
- Some minutes later, she arrives at the P&R by her own bicycle.



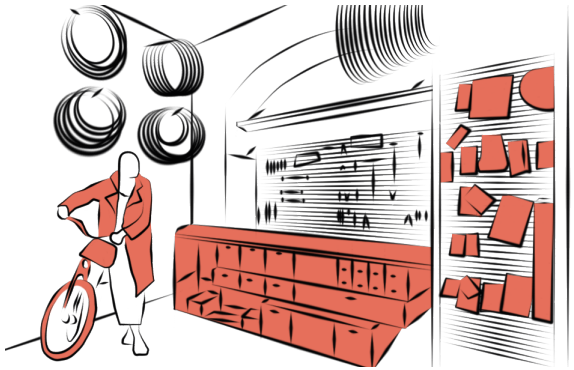
- Emma uses it to visit her parents. She is reminded through an app that she needs to be back at P&R within 5 hours. She won't forget since she has a meeting in the evening with her friends at the P&R for the Light Festival.



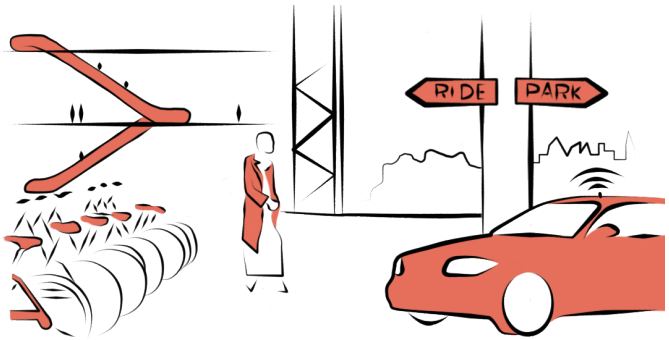
- When back at the P&R, Paul's car leaves all by itself to park efficiently.



- She picks up her fixed bicycle at the bicycle service point and leaves her bicycle in the bike park.



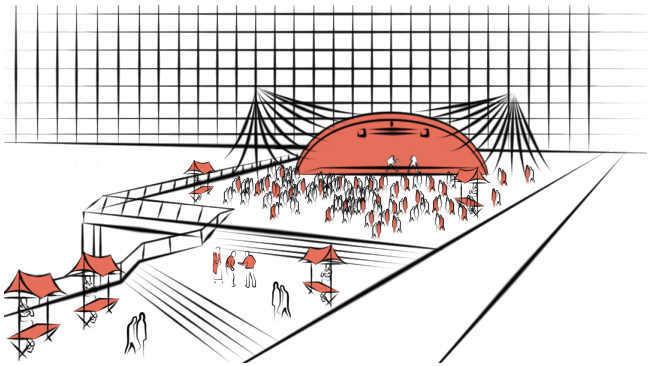
- She noticed that the bike chain is damaged so she leaves her bike in the bicycle service point. They will fix it while she is away.



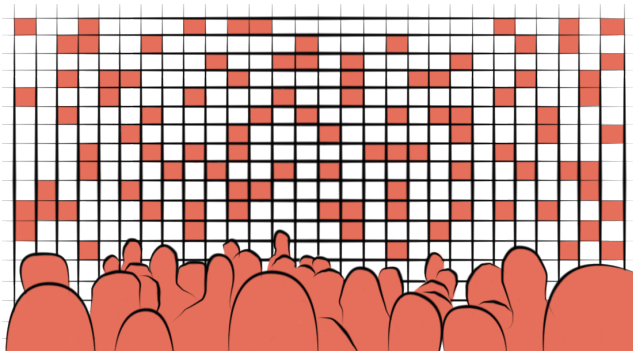
- Now, Emma reaches the car reception area where Paul's car is waiting for her.

- She can open the door with biometric recognition.
- Possible previous settings are restored (seats, temperature, radio...)

- Her friends are waiting for her in the boardwalk terraces facing the Sheldt river. The Light Show is about to begin. They are all very excited.

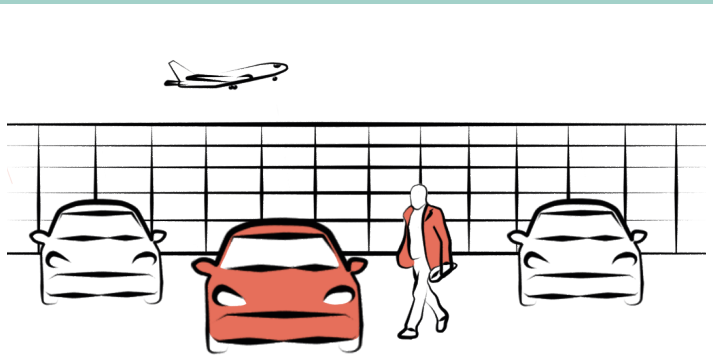


- The atmosphere is really joyful: there is live music and the boardwalk is full of food and drink stalls. The Light Show starts.



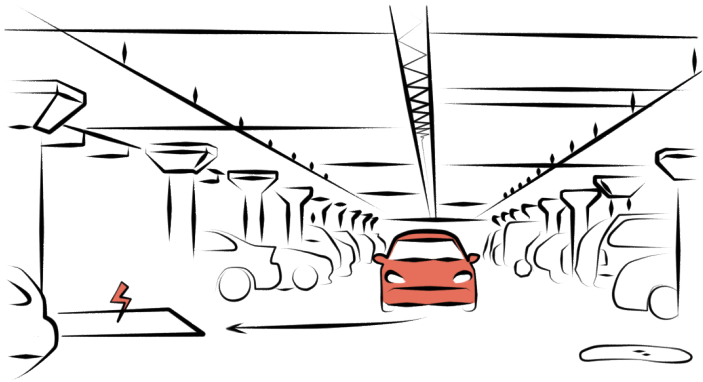
- The P&R facade is the set for the play of light. This "interactive skin" integrates a photovoltaic system storing solar energy by day and using it to illuminate the screen after dark. It can be used also as public information canvas (events, announcements...) in the normal days.

FUTURE SCENARIO 3



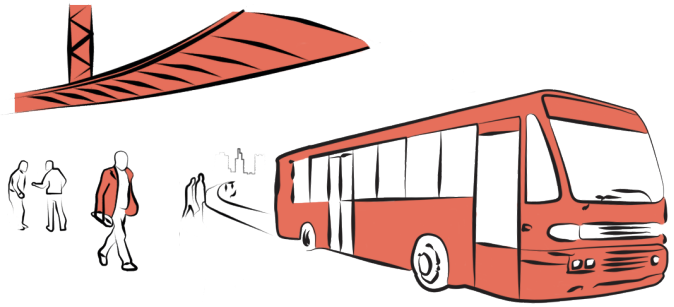
- Benjamin is an American businessman arrived in the early morning at the Brussels airport. He took a shared car there, since he has a business meeting in the afternoon in Ghent.

- Nearly the P&R, the on-board system provides the essential information regarding circulation, pricing, next mode of transport etc.



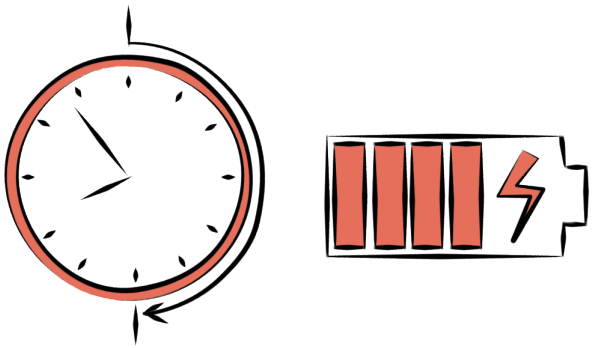
- Benjamin arrives at the P&R where he leaves his car on the drop off area.
- You never come close to the typical back-end of the parking. It is designed to have cars park themselves as efficiently as possible.

- Before leaving, he takes a shower. Now he is ready for the meeting.

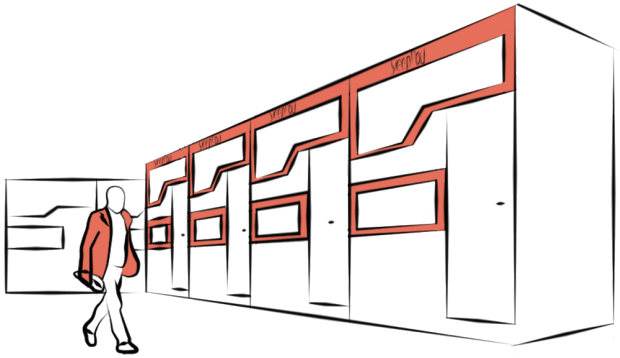


- Benjamin reaches the platform of the bus. His destination is not really near the centre.

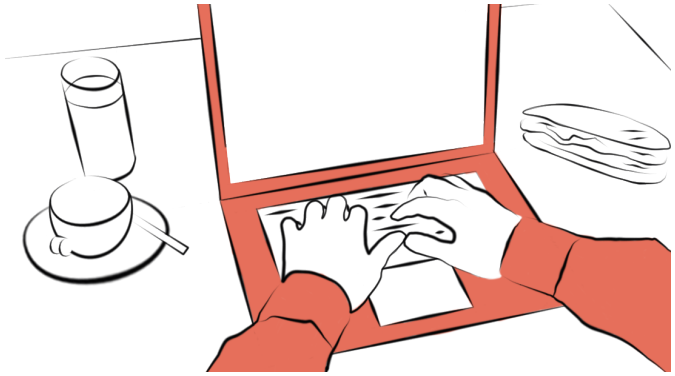
- There are no ticket machine or barriers. Since vehicles are increasingly shared, payment is linked to a person, not a vehicle.



- The places are conceived for induction charging. In 30 minutes, a battery is charged to 80%.

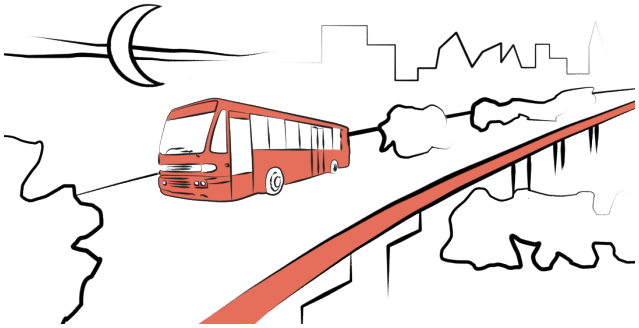


- The jet lag makes Benjamin feeling very tired. So he decides to rest in a sleeping pod.

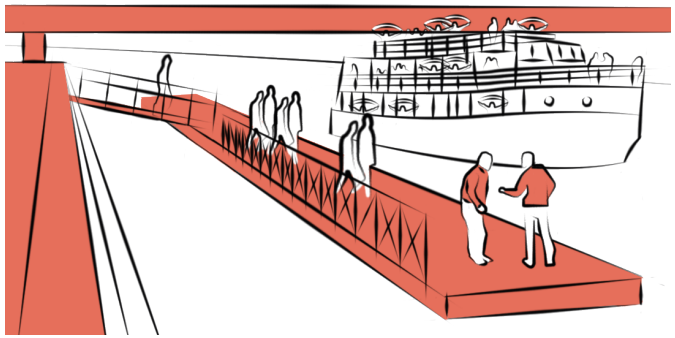


- After sleeping a while, Benjamin feels better. He goes to the local bar inside the P&R to have some meal and to finish some work for the presentation.

- The presentation was really a success. But Benjamin has not just come in Ghent for business. He has a dear friend there that he has not seen for years, Mark. They meet in the Ghent Zuid. Mark shows the centre to Benjamin and makes him taste some beers in a pub. After, Mark proposes to Benjamin to go to the football match, like old times. Benjamin is very enthusiastic, since he is a real football fan.

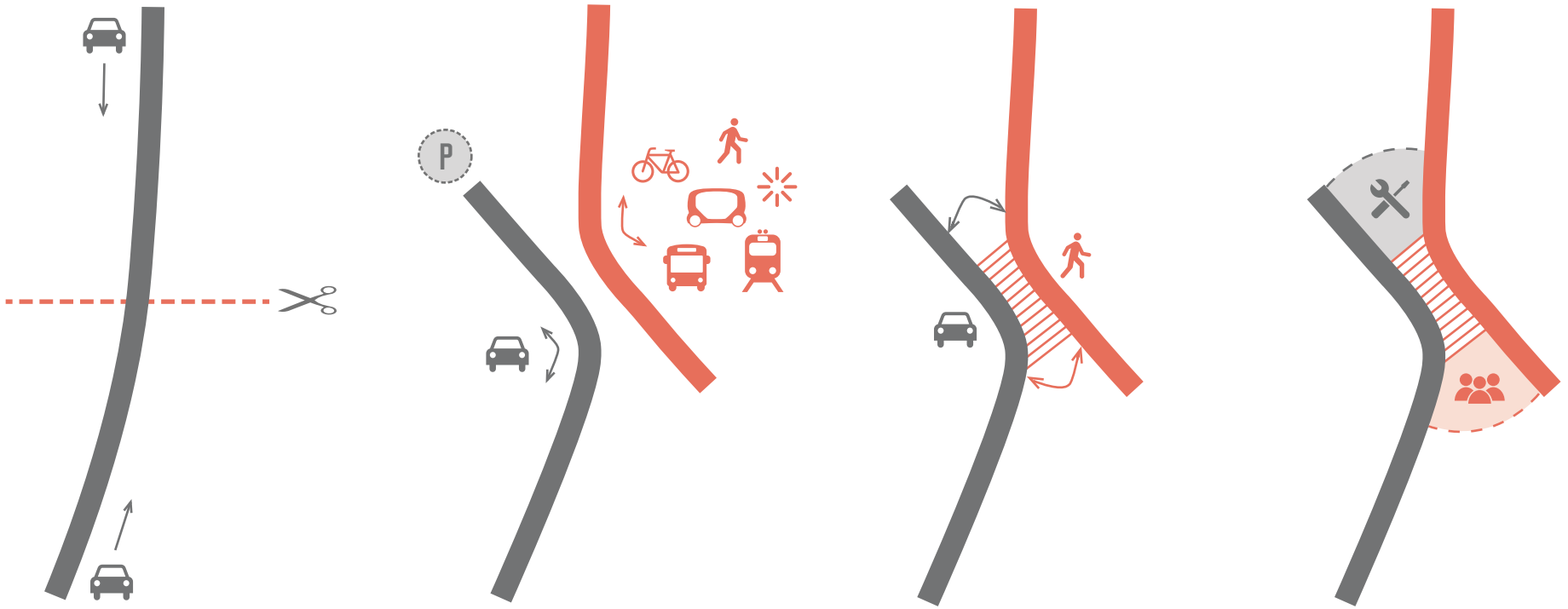


- They go to the P&R by the bus.



- After leaving the shuttle, they reach the boardwalk on the Scheldt river where they take the boat directed to the stadium. So, Benjamin can also enjoy a river trip. The boat runs just events.

CONCEPT



The scheme on the opposite page constitutes the graphic representation of the concept on which the entire P&R project is based on. Subsequently, the design process consisted of an architectural translation of this concept.
If we imagine to cut off, metaphorically, the B401 viaduct and, consequently, interrupt the car-based traffic, by deviating and converging the automobile flow towards a parking infrastructure, in order to avoid the direct access to the city centre of Ghent, the remaining part of the fly-over could assume a new function as a bidirectional vector for alternative and more ecological forms of mobility oriented towards sustainability.
As a result, the core of the entire project is exactly where the two systems meet: the area of transition in between the national highway system and the elevated urban boulevard where people switch between their own vehicle to another mean of transport, like bike sharing, electrical buses or even new forms of mobility that currently don't yet exist. The void amid both systems creates space for sparks of innovation: an interchanging node where different means of transport converge and where the mental and physical change of modes take place, effectively.
Lastly, this switching area opens towards the two different systems creating two opposite services areas. The first one, the grey area, offers services for vehicles maintenance and a distribution centre. The second one, the orange area, offers diversified functions open to the neighbourhood and the city, in order to stimulate a renewed community life.
The entire project concept focuses on the idea that our total mobility experience is the result of a harmonious combination of vehicles, services, environment and, as the ultimate link: people.

OVERVIEW

8. Interactive skin

The P&R south façade is covered by a glass curtain wall that integrates a photovoltaic system, storing solar energy by day and using it to power a LED display at night. With customised software, the skin interacts with the outside public space, transforming the façade into a responsive environment for entertainment and public engagement. The illuminated screen could also be used as public information canvas (for events, announcements...).

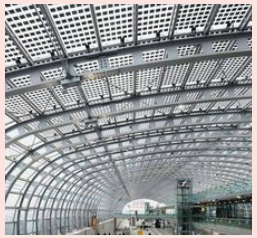
Project reference: GreenPix: Zero Energy Media Wall, Beijing, Simone Giostra & Partners and ARUP

5. Vehicle service area

This area, positioned opposite the permeable mixed-used structure, offers services for car maintenance, a distribution centre for all kinds of parcels for the city, in order to avoid trucks to enter in the inner city, and a bicycle service point.

6. Walking cycling path

A bicycle and pedestrian path serves as a connection between the P&R facility and the existing cycling infrastructure, leading to the city centre, the hospital and Gent Sint-Pieters railway station. At the level of the P&R pedestrian entry the cycling path deviates through a ramp that leads to the underground bicycle park facility.



1. Car parking infrastructure

A solid block encloses the car parking infrastructure as a closed structure that separates and hides automobiles from the urban landscape, in clear contrast with the permeable and transparent remaining part of the P&R facility, more integrated with the built surroundings. The structure merges the highway ramp and the architecture, inviting cars into the building. The P&R is not a common parking building, it is designed to have cars park themselves as efficient as possible. The coverage is made of glass panels with integrated photovoltaic cells that provide a considerable contribution to the building's energy self-sufficiency and produce energy to recharge the electric vehicles batteries.

Project reference: Porta Susa TGV Station, Turin, Silvio D'Ascia Architecture

3. Switch area

A glass covered area reflects the core of the entire project: the interchanging node where different means of transport converge and where the mental and physical change of modes take place effectively. The glazed structure serves as an architectural glue between the two systems.

2. Transparent structure

A semi-closed area, circumscribing a volume of air that blurs the boundaries between inside and outside, is in clear contrast with the closed parking infrastructure whose aim is to hide the automobiles from the urban landscape. This structure, instead, appears transparent in order to underline the accessibility of the space and invite people to flow towards the city. A thin membrane, made of coloured triangular canvases, functions as an informal cover, like an art installation, whose form expresses visually the underlying multimodal flow. This membrane extends to the permeable public space, covering a half of it, and communicates with the balconies taking up the same curved shape.

Project reference: Pedestrianisation and sociability in Las Cabezas de San Juan, Seville, Costa Fierros Arquitectos

4. Permeable public space

A permeable structure, light and open, made up of three levels balconies that slope progressively and supported by slim steel colonnade, expressing openness and accessibility for everyone, creates a pedestrian link between the entry of the P&R facility and the surrounding neighbourhood of Ledeberg. Multiple staircases, linking balconies and platforms at different levels, suggest the people flow direction visually. Some semi-transparent boxes, placed parallel to the stairs in order to reinforce this flow direction, offer diversified functions, flexible and reconfigurable according to the temporal needs, open to the neighbourhood and the city.

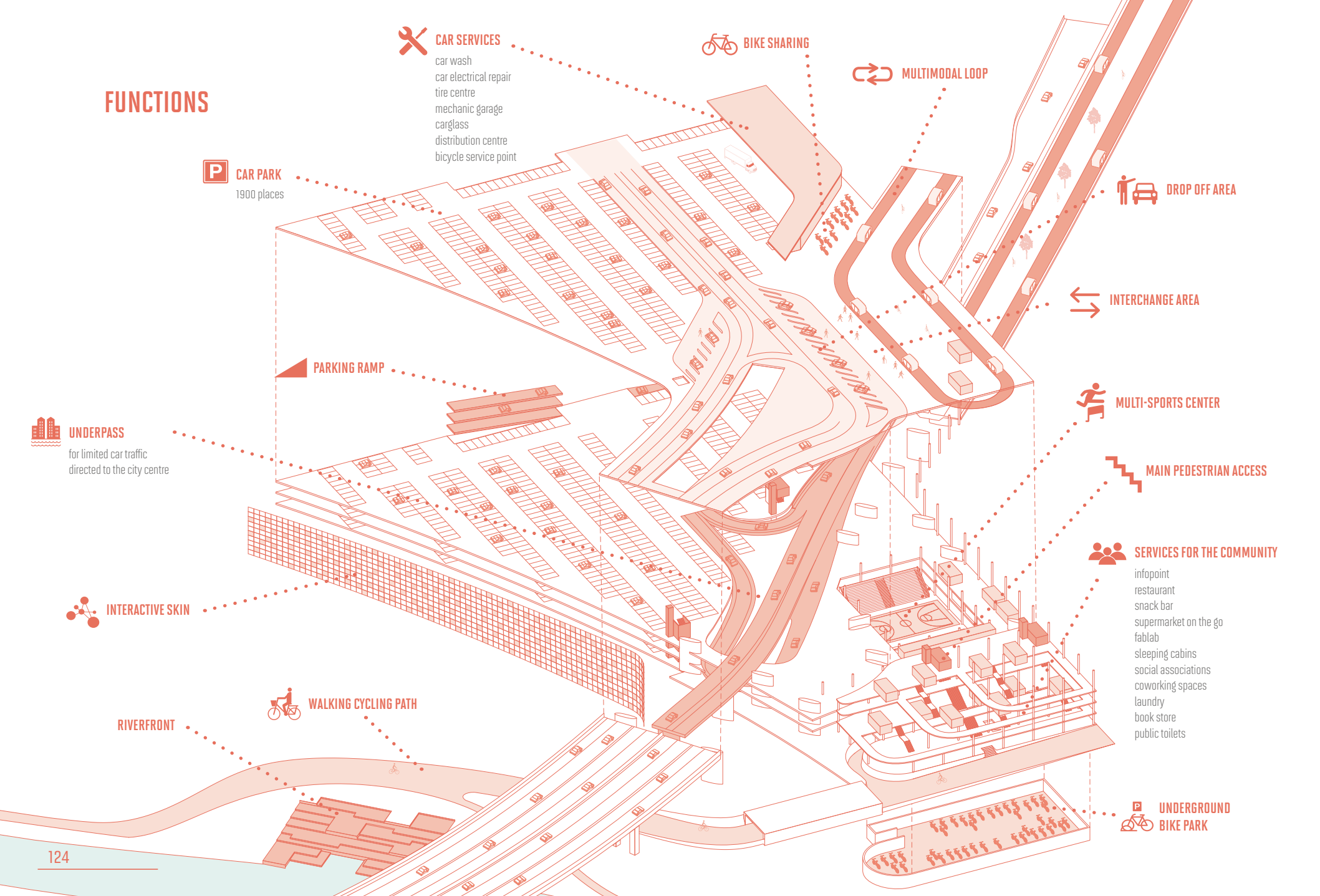
Project reference: Theatreplein, Antwerp, Bernardo Secchi & Paola Viganò

7. Riverfront public space

The boardwalk terraces act as an extension of the P&R to the riverside with the aim to introduce the river to the daily life of its inhabitants. The riverfront, reachable via a walking cycling path, shapes the transition from land to water. The facility is suitable for leisure and temporary activities, for meetings or events such as concerts, film screenings and theatrical performances. It also offers boat services for event peak demands such as football game or for wedding ceremonies.

Project reference: Dijleterrassen, Leuven, Ontwerpbureau Pauwels

FUNCTIONS

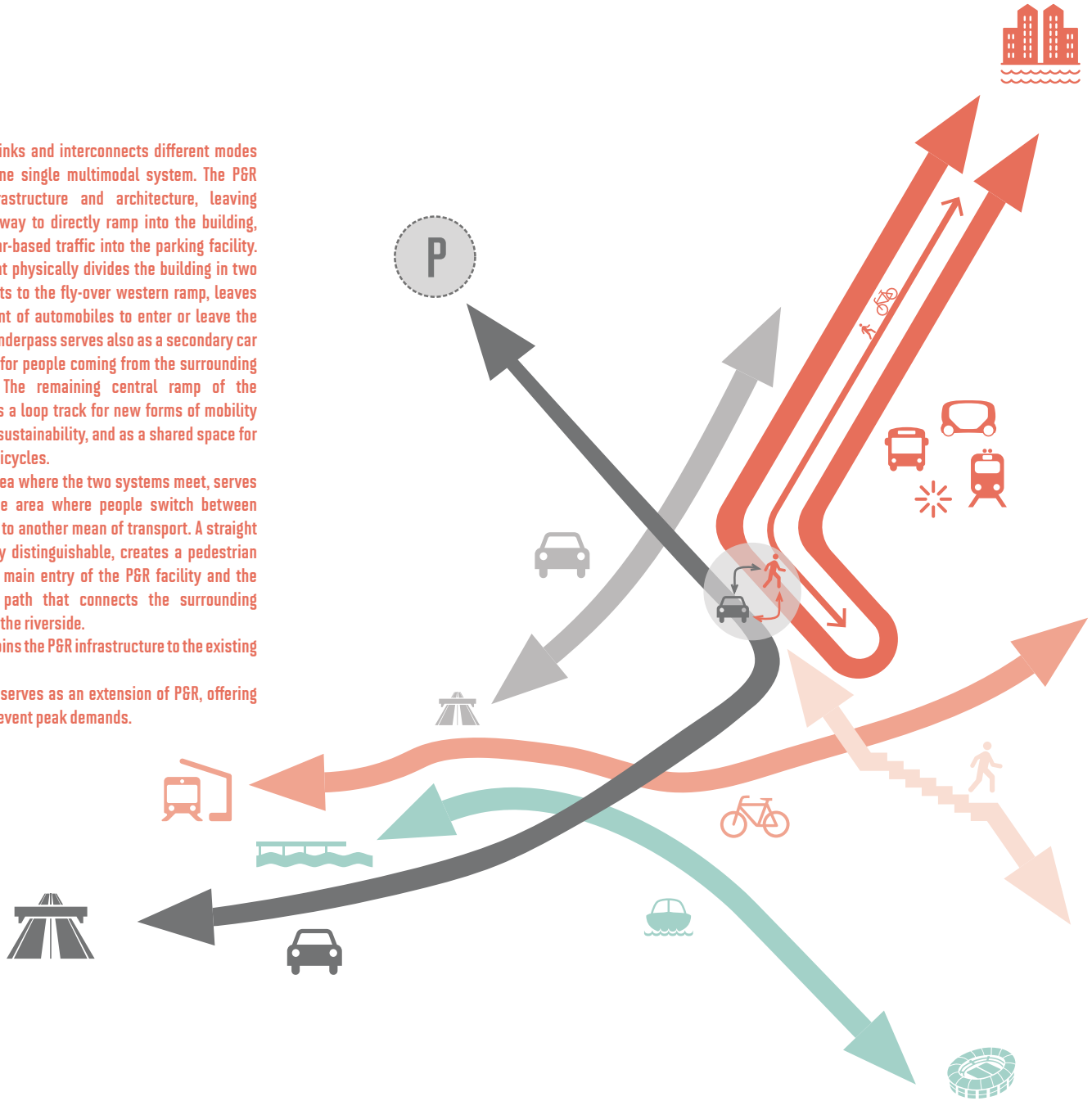

CAR SERVICES
car wash
car electrical repair
tire centre
mechanic garage
carglass
distribution centre
bicycle service point
BIKE SHARING
MULTIMODAL LOOP
CAR PARK
1900 places
DROP OFF AREA
INTERCHANGE AREA
PARKING RAMP
MULTI-SPORTS CENTER
UNDERPASS
for limited car traffic
directed to the city centre
MAIN PEDESTRIAN ACCESS
SERVICES FOR THE COMMUNITY
infopoint
restaurant
snack bar
supermarket on the go
fablab
sleeping cabins
social associations
coworking spaces
laundry
book store
public toilets
INTERACTIVE SKIN
WALKING CYCLING PATH
RIVERFRONT
UNDERGROUND
BIKE PARK

The P&R facility links and interconnects different modes of transport in one single multimodal system. The P&R merges the infrastructure and architecture, leaving the national highway to directly ramp into the building, converging the car-based traffic into the parking facility. An underpass, that physically divides the building in two parts and connects to the fly-over western ramp, leaves a minimum amount of automobiles to enter or leave the city centre. This underpass serves also as a secondary car parking entrance for people coming from the surrounding neighbourhoods. The remaining central ramp of the B401, functions as a loop track for new forms of mobility focused towards sustainability, and as a shared space for pedestrians and bicycles.

As a result, the area where the two systems meet, serves as an interchange area where people switch between their own vehicle to another mean of transport. A straight staircase, visually distinguishable, creates a pedestrian link between the main entry of the P&R facility and the walking cycling path that connects the surrounding neighbourhood to the riverside.

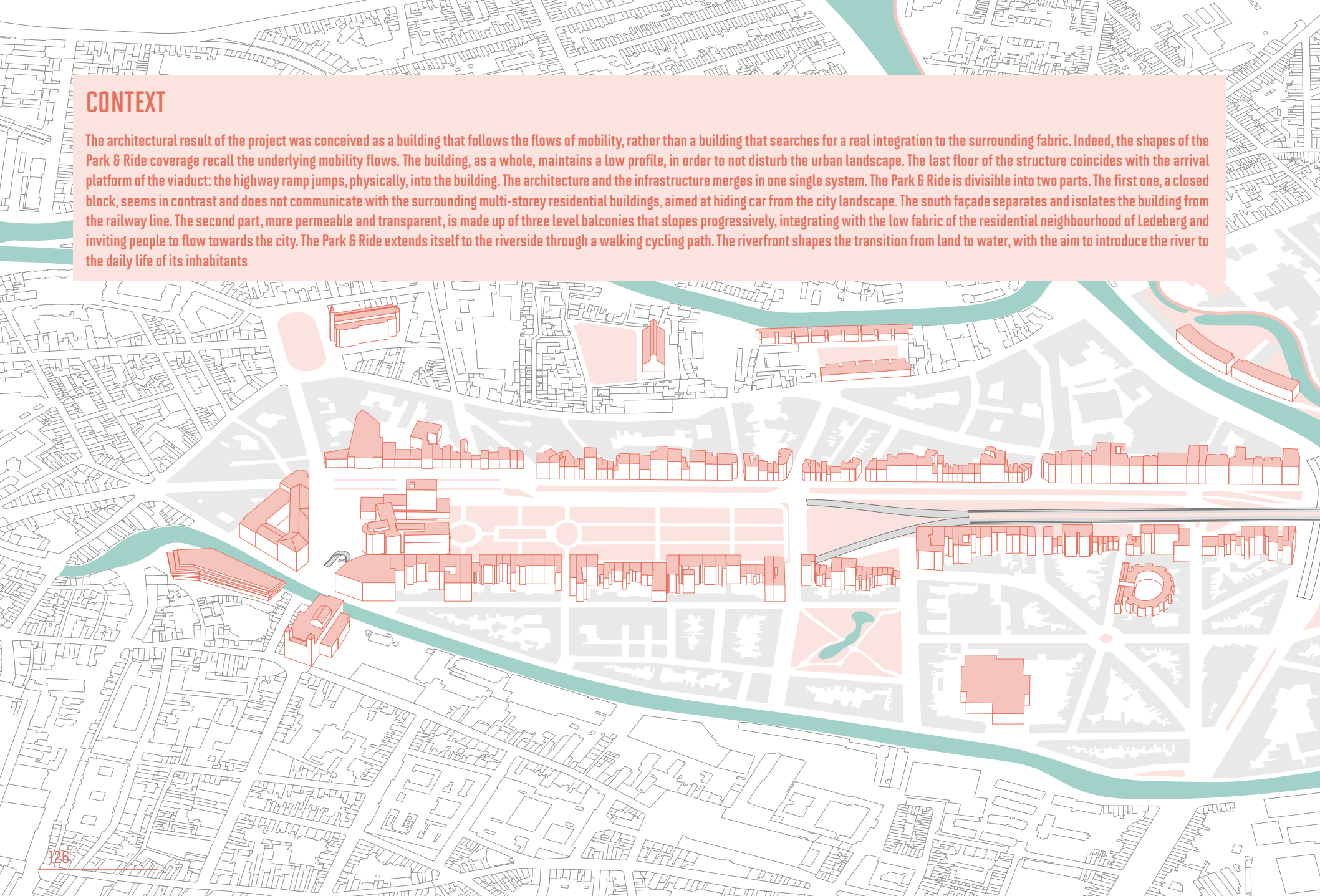
The cycling path joins the P&R infrastructure to the existing bicycle route.

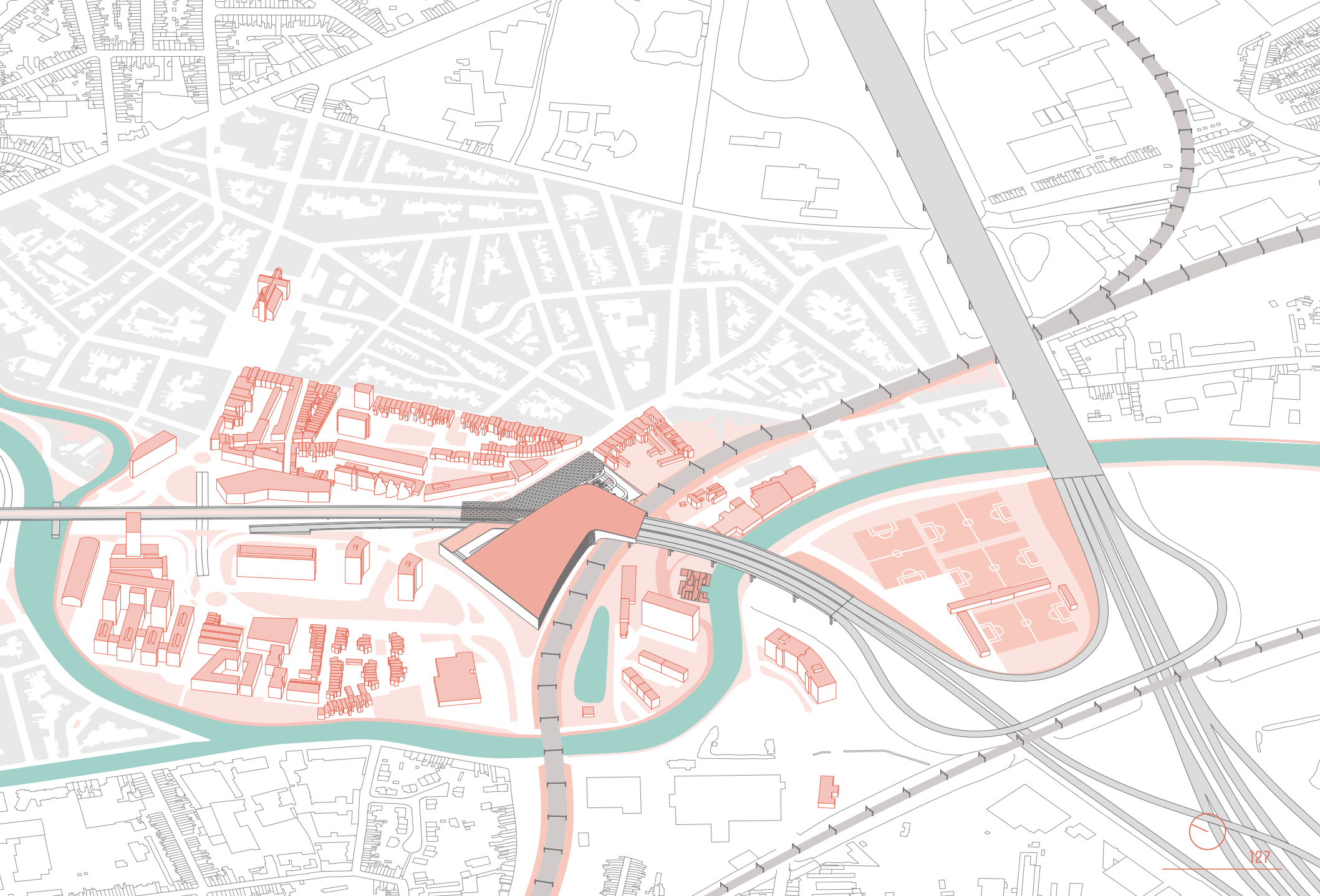
The Scheldt river serves as an extension of P&R, offering boat services for event peak demands.



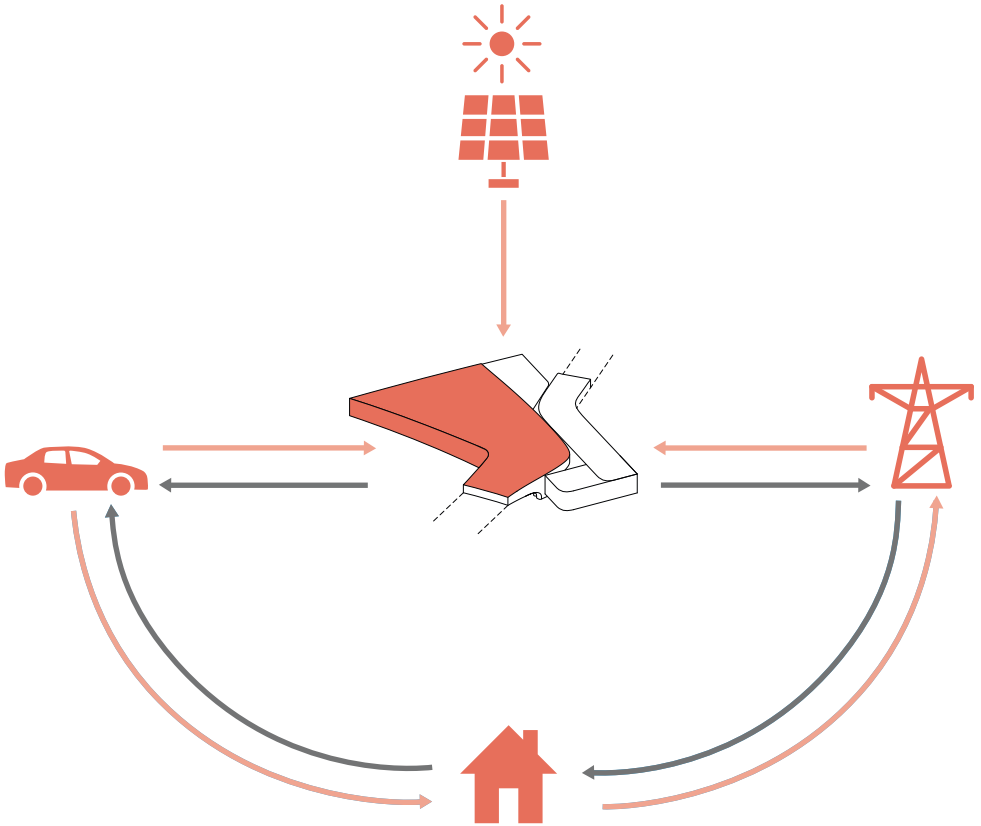
CONTEXT

The architectural result of the project was conceived as a building that follows the flows of mobility, rather than a building that searches for a real integration to the surrounding fabric. Indeed, the shapes of the Park & Ride coverage recall the underlying mobility flows. The building, as a whole, maintains a low profile, in order to not disturb the urban landscape. The last floor of the structure coincides with the arrival platform of the viaduct: the highway ramp jumps, physically, into the building. The architecture and the infrastructure merges in one single system. The Park & Ride is divisible into two parts. The first one, a closed block, seems in contrast and does not communicate with the surrounding multi-storey residential buildings, aimed at hiding car from the city landscape. The south façade separates and isolates the building from the railway line. The second part, more permeable and transparent, is made up of three level balconies that slopes progressively, integrating with the low fabric of the residential neighbourhood of Ledeberg and inviting people to flow towards the city. The Park & Ride extends itself to the riverside through a walking cycling path. The riverfront shapes the transition from land to water, with the aim to introduce the river to the daily life of its inhabitants



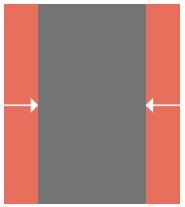


VEHICLE TO GRID

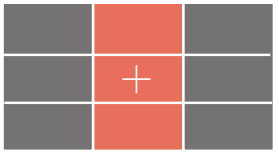


Private cars are used no more than twice a day in most cases, while the rest of the time they remain parked and unused. A solution to this state of stasis in which automobiles stand, could be to use batteries in the near future, in the case of electric cars, to store energy. The final evolution of "smart" distribution networks consists, in fact, in the " vehicle to grid" (V2G), that is, using the batteries of the electric ones as energy storage tanks, starting from the assumption that for the most of the time they remain in a parking space or a garage. If you connect the cars to a charging column that is able not only to supply the electric current, but also to receive it, it is possible to efficiently manage the production surpluses of renewable sources (wind and solar) by storing them when the demand increases and the generation of energy decreases. In this specific case, the P&R facility could assume a double function: on one side, that of a passive deposit for automobiles, on the other side, could take an active role as an electric power station aimed at producing and receiving energy.

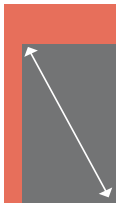
PILOTED PARKING



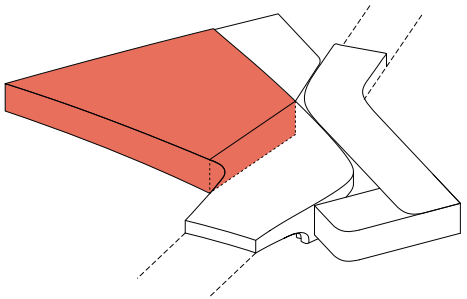
NARROWER AISLES
Perfect alignment and optimezed spacing through parking technology.



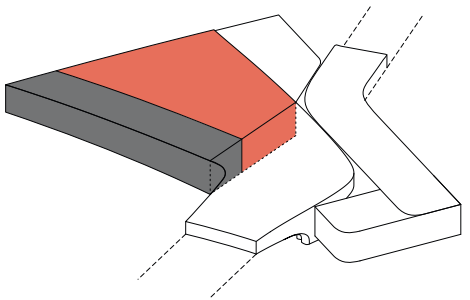
STALL STACKS
Flexible re-configuration of parking space-tight parking scenarios are conceivable.



SMALLER STALLS
The required parking footprint per car can shrink to a minimum.



STILL NOT OPTIMISED
Without Piloted Parking Technology

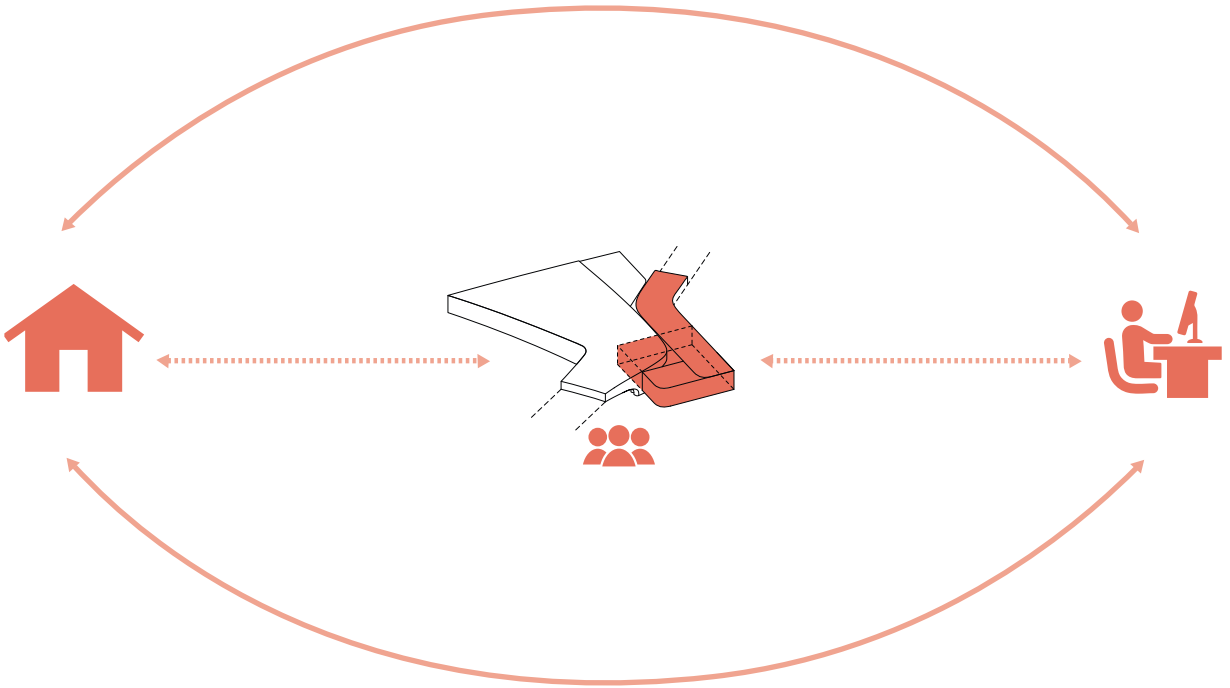


FULL OPTIMISATION
With Piloted Parking Technology

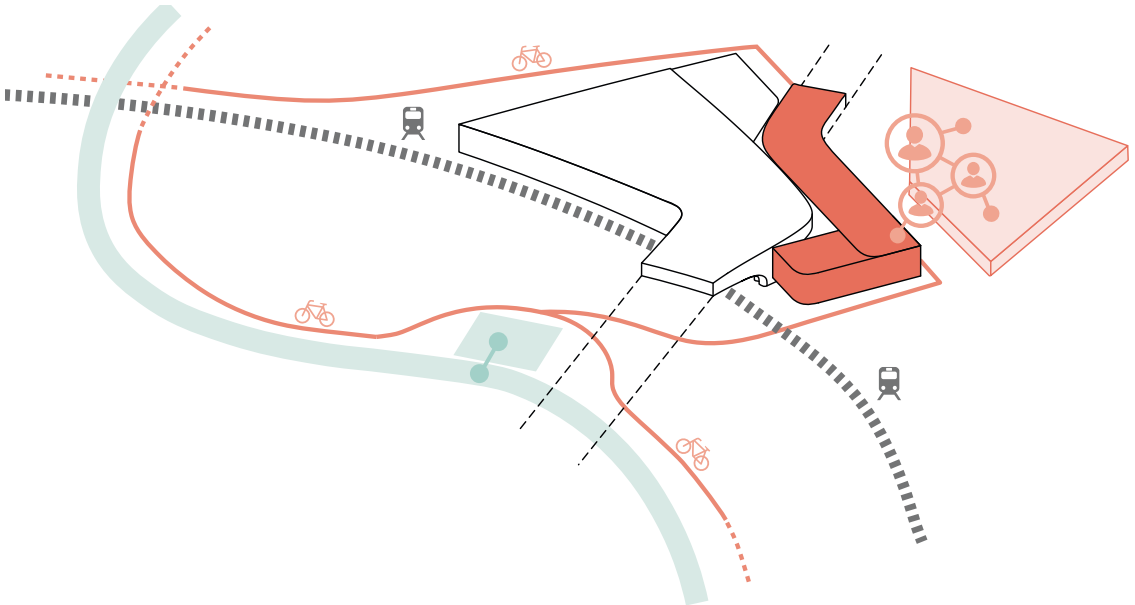
When the act of parking gradually becomes autonomous, thanks to the new generation of self-driving cars, less space will be required. With the help of sensors and integrated intelligence, the car will be able to park on its own: just leave the car in a dedicated area and it will find parking in automatic mode. How can this technology influence the definition of the geometry of a typical parking structure? Thanks to the absence of the human factor and the precision of autonomous driving inside the car park, the application of the technology would increase the efficiency in the management of space, allowing gradually increased parking capacity, or lower footprints left by the parking structure, or flexible reconfiguration and optimization of the parking space for other activities. Moreover, the implementation of a policy of shareability could lead to a further reduction in terms of demand of parking. The P&R facility, whose modular structure is easy and economical to assemble/disassemble, is designed in continuous evolution: it can expand, densify, shrink, move or disassemble. In this case, with a full space optimization, the P&R infrastructure could be integrated, in the future, with the railway system.

Source: Audi Urban Future Initiative 2015, Mobility in Chain

THIRD SPACE



Human habits are changing: people increasingly exhibit ad hoc, unplanned spontaneous behavior in their daily life and a growing need to connect to people. Many traditional home activities are now taken outside: the functionality of housing is reduced to storage and sleeping. This leads to the increase of request of "third spaces" where people spend time between home, "first space", and work, "second space". These places are the perfect location in order to spend a good time, exchange ideas with other people, and build relationships. The P&R facility operates as single point of interaction between "home" and "work": both spheres can be extended here. For example, the building could be an ideal place to have breakfast, but also to plan a meeting. The P&R, as part of the neighbourhood, offers diversified functions, most addressed towards the local communities. The permeable public space interposes itself as a filter, where time seems to slow down, between the frenetic pace linked to the car and the unstable lifestyle of the city. This space is highly flexible, offered to the spontaneous, informal and creative appropriation of its inhabitants. The P&R, serves as a cultural and creative cluster open to the neighbourhood and the city, in order to stimulate a renewal of community life.



Since the beginning, the urban development that concerned the city of Ghent over the centuries, has been marked by the introduction and evolution of new forms of mobility. The water represents the first vector of mobility, since Ghent originated in the area of the confluence of the two rives, the Lys and the Scheldt. Then, the railway line as the second vector of mobility and lastly, the construction of the E17 highway together with the B401 viaduct, as the last vector of mobility. As a result, the context in which the P&R is located, assumes a very symbolic and strategic value, playing an active role of experimental place, as a sort of laboratory, for new forms of mobility focused towards sustainability and a human-centred vision. The site dedicated to the Park & Ride marks the point where different mobility systems interact with each other: the viaduct, public transport, cycling route, railway and by extension even water. It is conveniently located at the edge of the city, keeping car-based traffic out while being close enough to the urban tissue to become meaningful in secondary functionality for the residents.

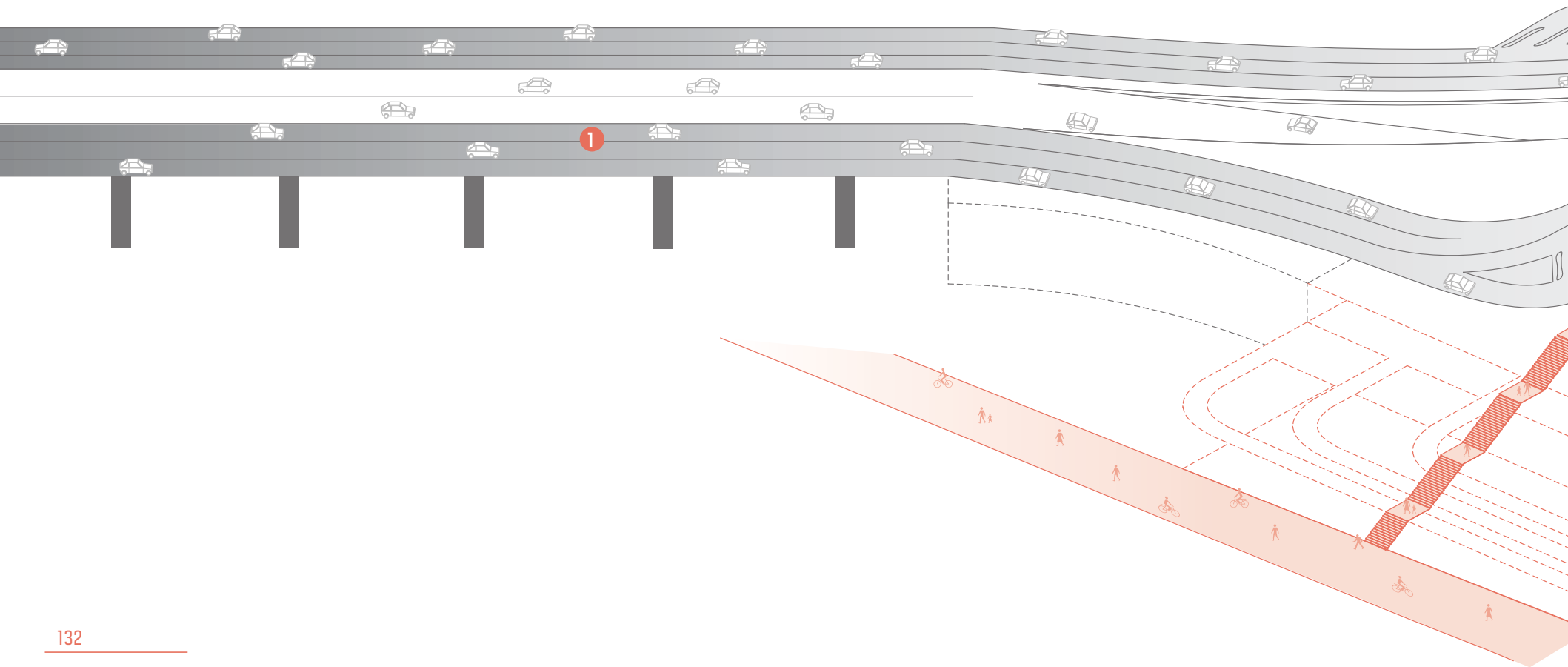
USER EXPERIENCE

1. Car based fly-over

Your UX mobility journey starts in your self-driving car. Your vehicle drives you through the fly-over. Approaching the P&R your on-board system provides the essential information regarding circulation, pricing, next mode of transport etc.

2. Drop-off area

The P&R is not a common parking building. There is never the feeling of entering a dark underground cave. You just leave your car at the drop-off area and the car, thanks to the embedded autonomous technology, will park itself. The car drives off, creating space for others. The P&R is designed to have cars park themselves as efficiently as possible, so you don't have to waste your time.

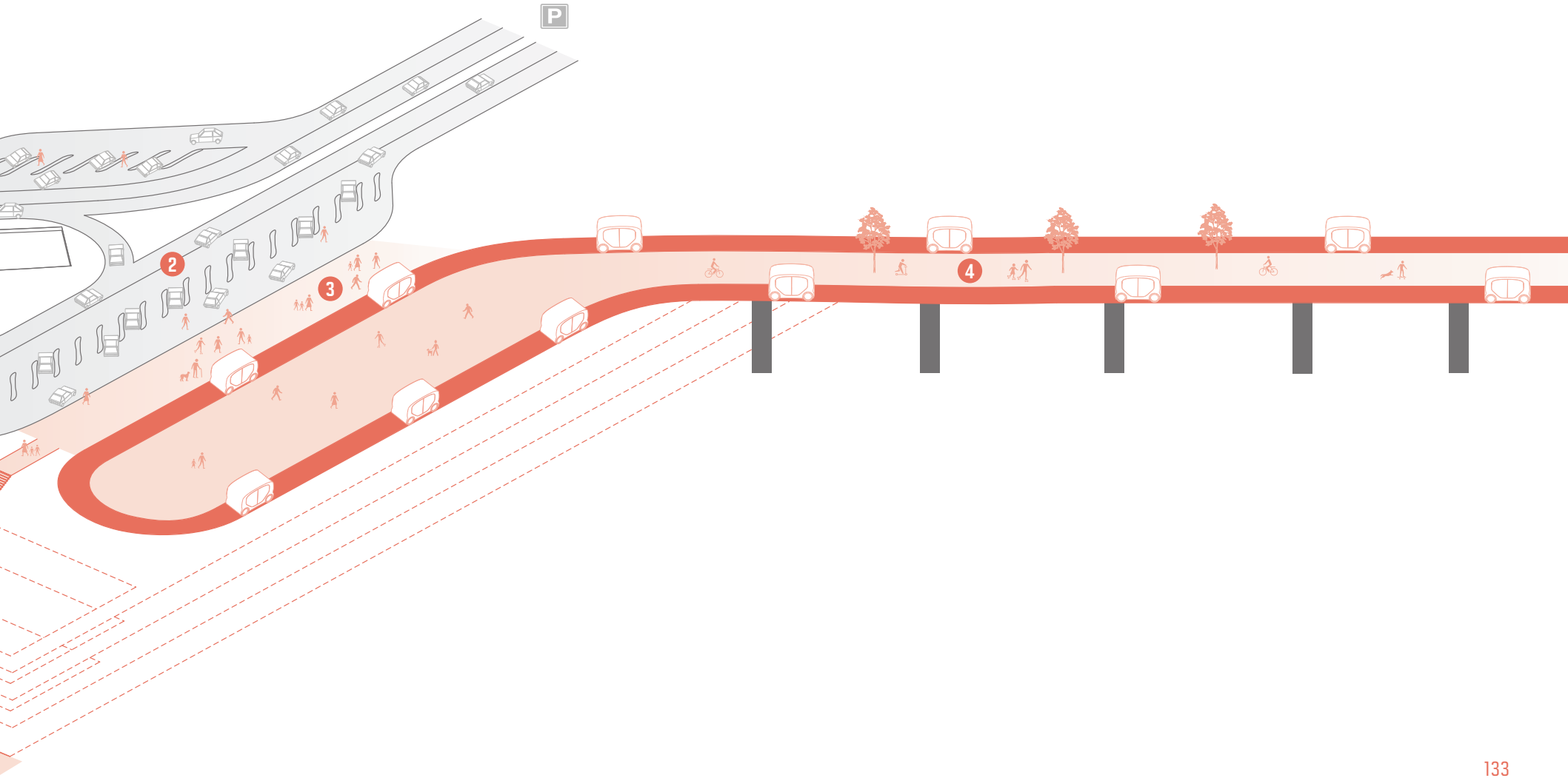


3. Transition area

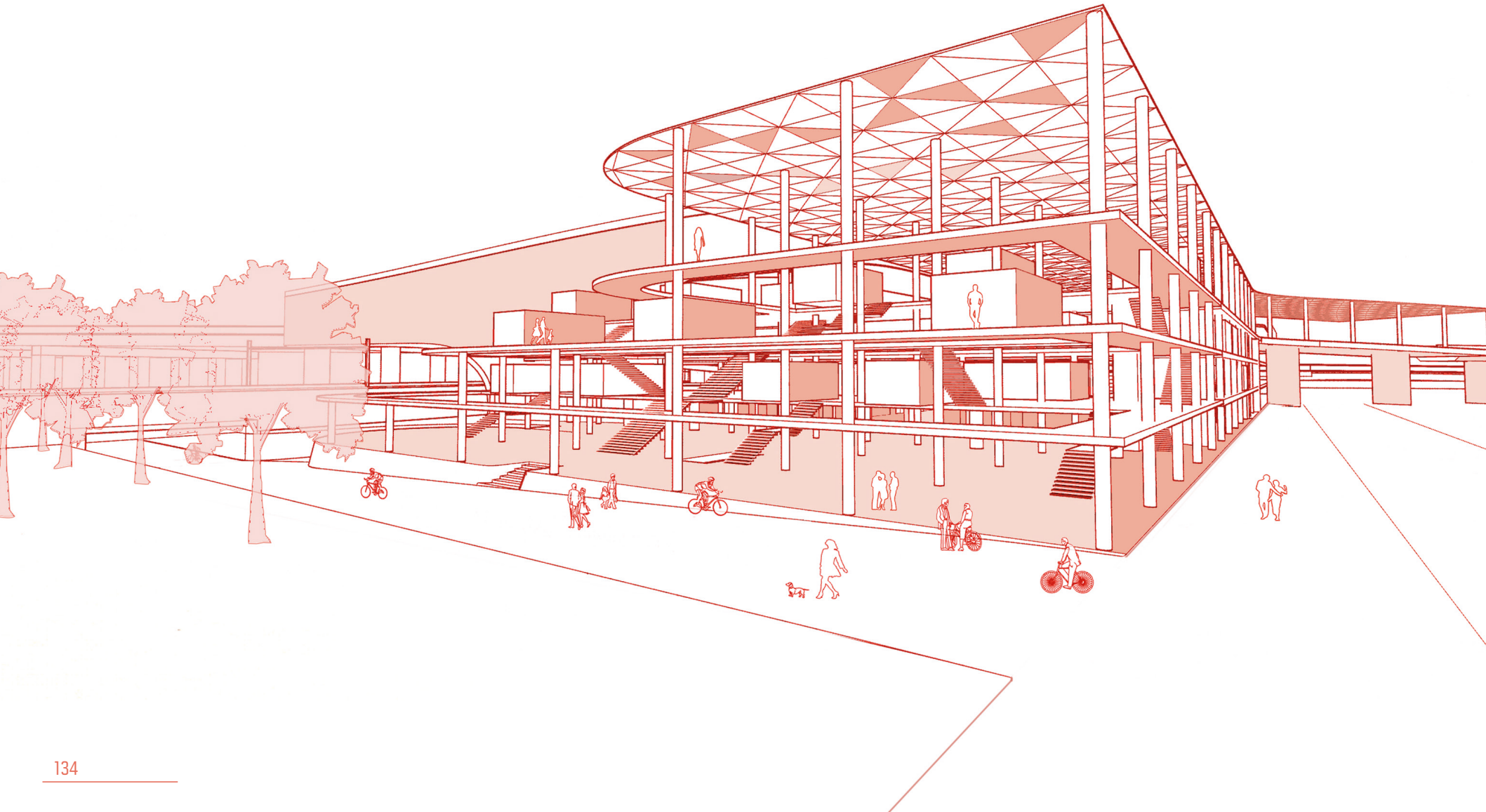
Now, you take your next mode of transport in the transition area. There are no ticket machines or barriers. Since vehicles are increasingly shared, payment is linked to a person, not a vehicle.
The mental and physical change is minimal.

4. Car free fly-over

You continue your journey through the car free fly-over. You can enjoy your mobility experience thanks to the multimodal options: shared bicycle, electric buses, shuttles or maybe even a mode of transport that doesn't yet exist. Just choose the best option that suits your needs, because what sense does mobility have, if it's not for sharing happiness?

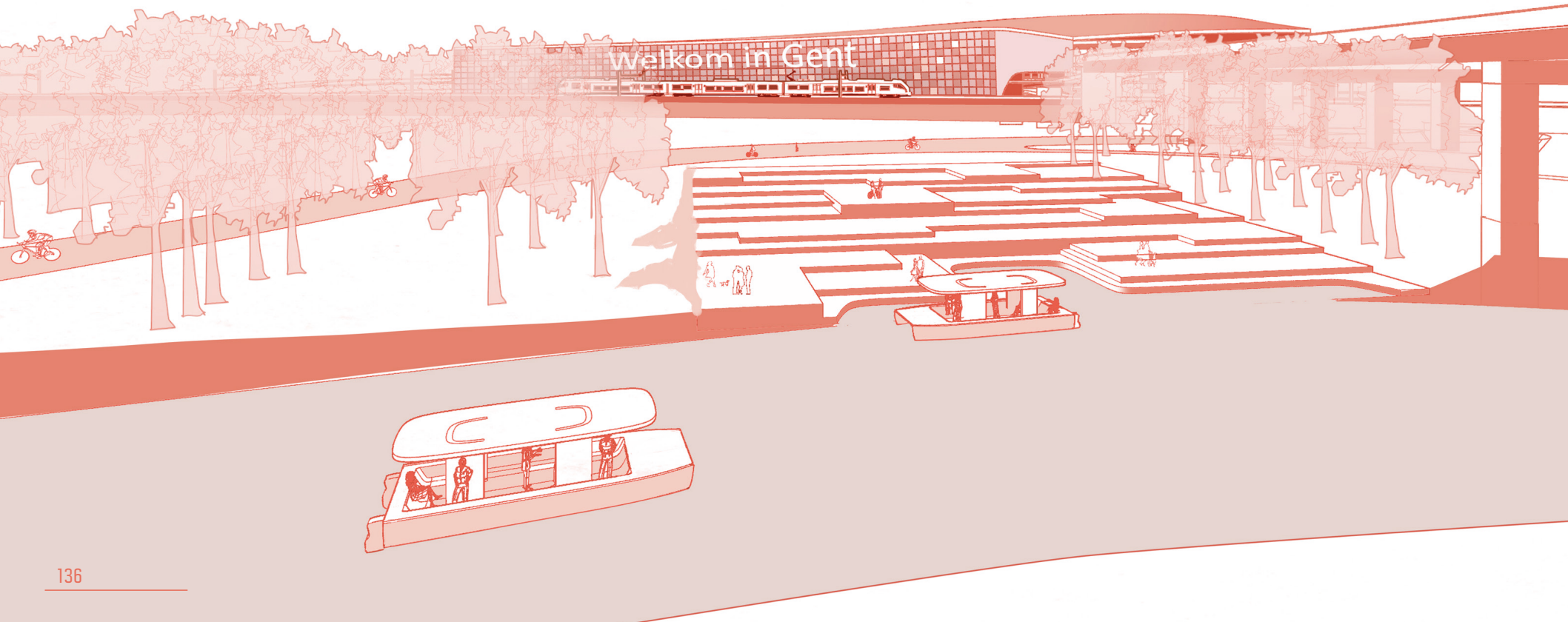


VIEW ON THE PERMEABLE PUBLIC SPACE



A permeable structure, light and open, made up of three levels balconies that slope progressively and supported by slim steel colonnade, expressing openness and accessibility for everyone, creates a pedestrian link between the entry of the P&R facility and the surrounding neighbourhood of Ledeberg. This boundless space, where people and activities can informally flow, generates a public space with unique qualities, offering spontaneous, informal and creative appropriation of citizens, in order to stimulate a renewed community life. Multiple staircases, linking balconies and platforms at different levels, suggest the people flow direction visually. Some semi-transparent boxes, placed parallel to the stairs in order to reinforce this flow direction, offer diversified functions, flexible and reconfigurable according to the temporal needs, open to the neighbourhood and the city.

VIEW ON THE RIVERFRONT



The boardwalk terraces act as an extension of the P&R to the riverside with the aim to introduce the river to the daily life of its inhabitants. The riverfront, reachable via a walking cycling path, shapes the transition from land to water. The facility is suitable for leisure and temporary activities, for meetings or events such as concerts, film screenings and theatrical performances. It also offers boat services for event peak demands such as football game or for wedding ceremonies.

The P&R south façade is covered by a glass curtain wall that integrates a photovoltaic system, storing solar energy by day and using it to power a LED display at night. With customised software, the skin interacts with the outside public space, transforming the façade into a responsive environment for entertainment and public engagement. The illuminated screen could also be used as public information canvas (for events, announcements...) and for telling the big data of the city, acting as signal to raise awareness of ecological issues and energy consumption amongst the inhabitants of Ghent.

6. CONCLUSION

Living room on the highway, Holland 1973, (Hollandse Hoogte)

Since I started the research about the fly-over, the first project requirement and also the main aim that was requested to me, related to the Park & Ride design specifications, was the resiliency: the capacity of a system to adapt to change.

In this application case, it means the ability of the Park & Ride to adapt to the present, in continuous and ever faster evolution, and the future, an unknown destiny. The building was not just conceived for self-driving vehicles but it is still usable from the human -driving vehicles, since we expect the act of driving to become gradually autonomous, and not drastically. At the same way, we expect from the Park & Ride the ability to adapt itself in view of a future evolution of mobility: it means being futureproof. The P&R facility is designed as a highly flexible and reconfigurable space, whose modular structure is easy and economical to assemble/disassemble, in order to be modulated with different configurations depending on the temporal needs.

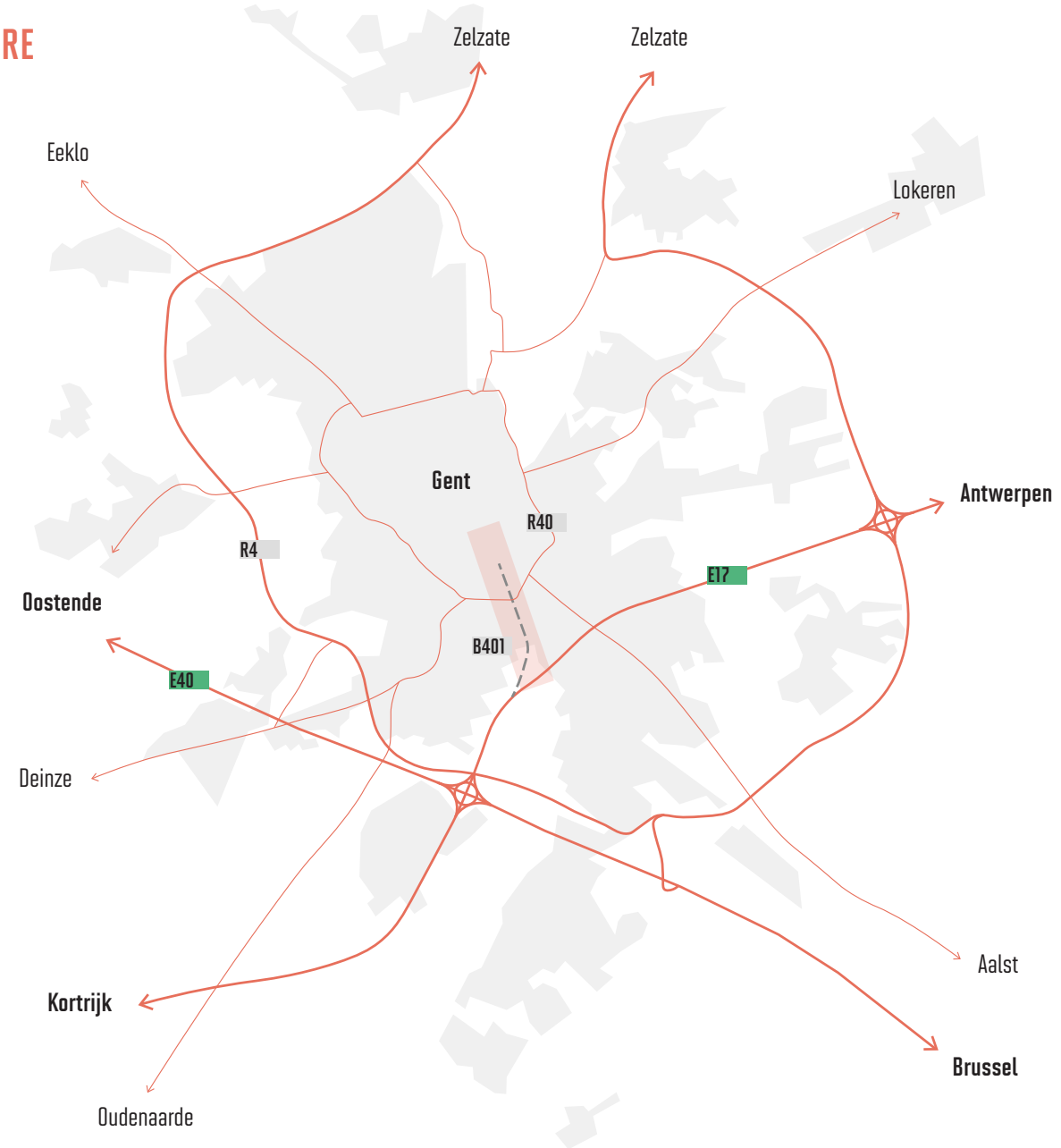
But what's next? What 's the next level after autonomous driving and the multimodal experience? Will a new form of mobility be born and replace them?
We actually don't know what comes next or what the destiny of the Park & Ride will look like.
The question is if the Park & Ride will be a mutant organism capable of adapting to a new mobility model (if it will exist!), or if, on the contrary, as the car that was at first welcomed in the cities and then has imposed itself in the urban system, bringing negative consequences with the products of the automobile culture, the Park & Ride, in the same way, will produce unexpected consequences and problems that nowadays we aren't capable of foreseeing and perceiving.
So, the truth is that we actually don't know what will happen in the future.

What we know is that the current model of mobility, marked by the massive and individual use of the automobile, is no longer sustainable. Since the automobile became a part of our life, cities have been adapted for driving, forgetting humans and putting them into the background. The car-based traffic, the lifeblood of the city, doesn't affect just the big metropolis, but also medium-size cities as Ghent. This means that the problems that we found in the city of Ghent, aren't specifically related to its context, but are the same problems that we found in any other city in the world. Since the problems that affect Ghent are universal, the answers are universal too. The case study of Ghent doesn't want to propose a pure contextual solution, but a model of mobility that could inspire other urban realities. The solution adopted in Ghent could be used in other cities in order to block the, by now, uncontrolled flow of automobiles.

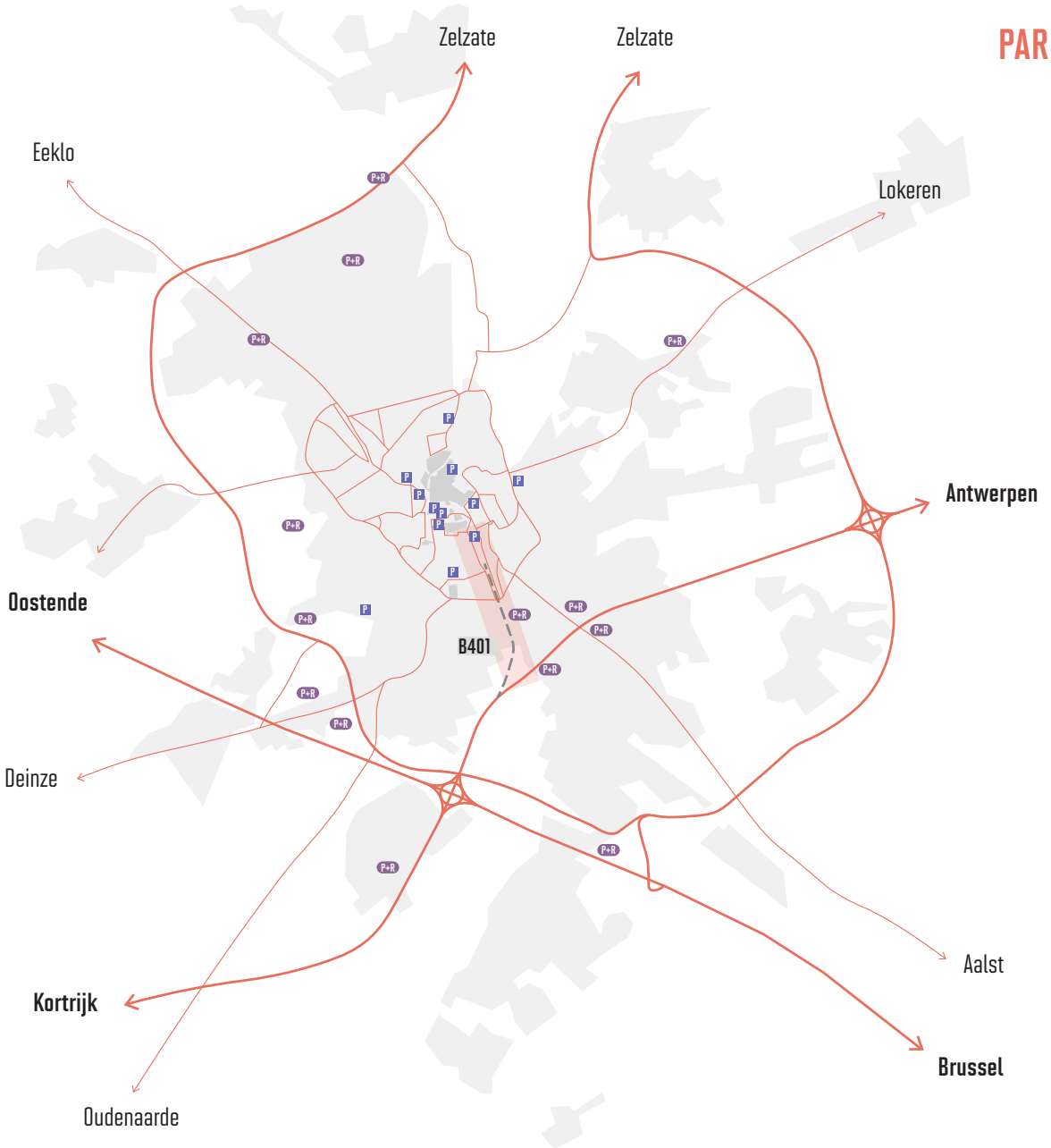
At the end the real aim of this studio, is not to present a definitive solution, but to open a debate and a reflection about how mobility nowadays influence the way we perceive and live the city. Since mobility is not about vehicles, but about how people move around environments. Because after all, mobility is about humans.

7. APPENDIX

ROAD INFRASTRUCTURE



PARKING INFRASTRUCTURE

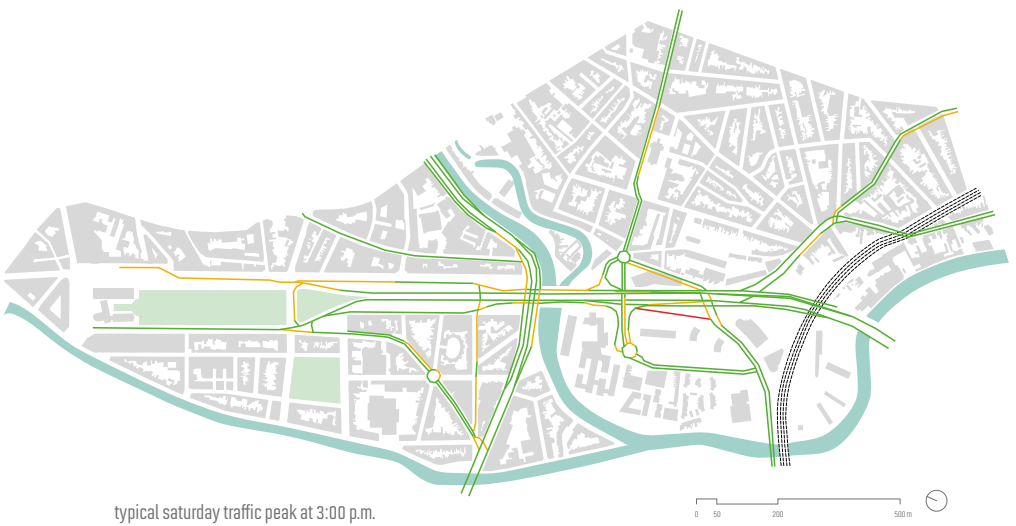


TRAFFIC FLOW

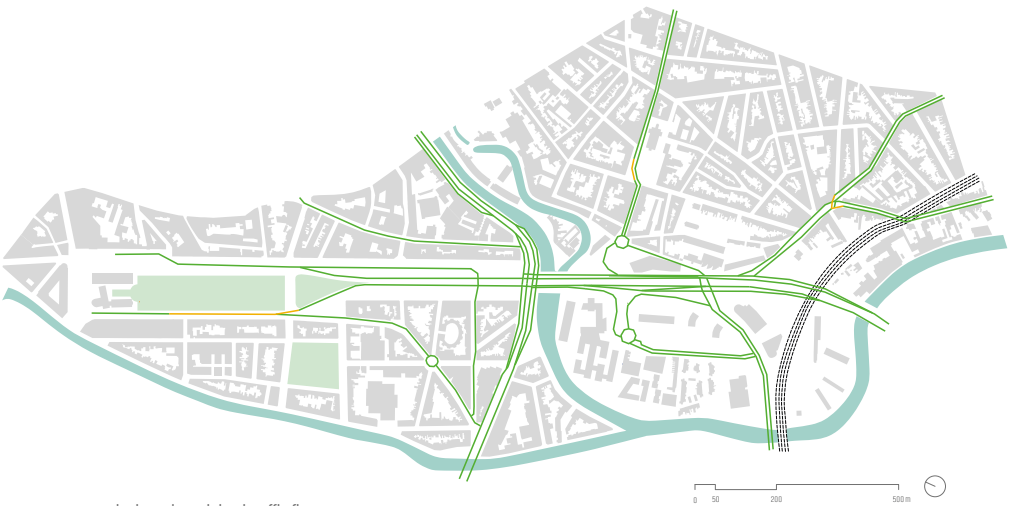
fast slow

typical morning traffic peak at 8:00 a.m. during working days

typical evening traffic peak at 5:30 p.m. during working days

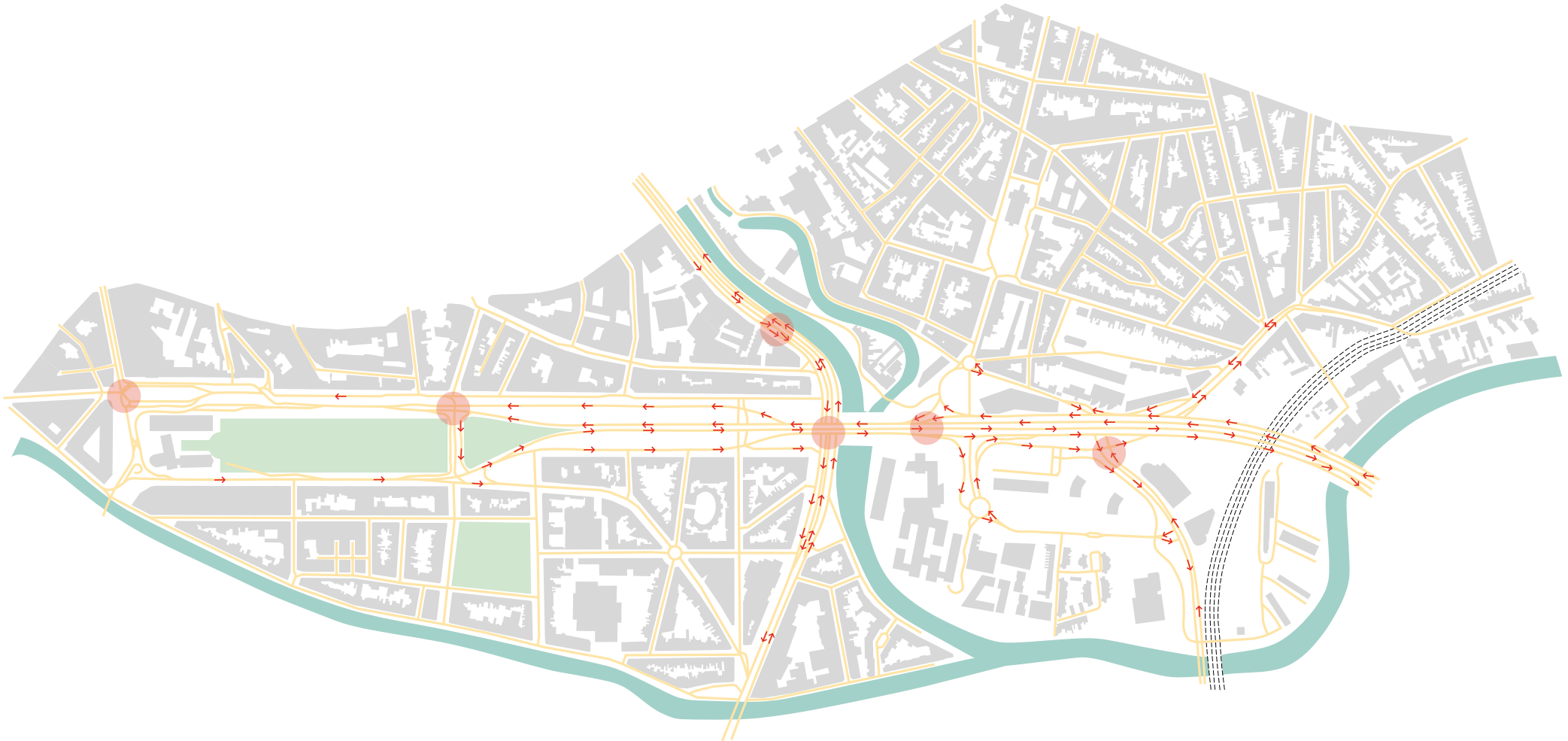


typical saturday traffic peak at 3:00 p.m.



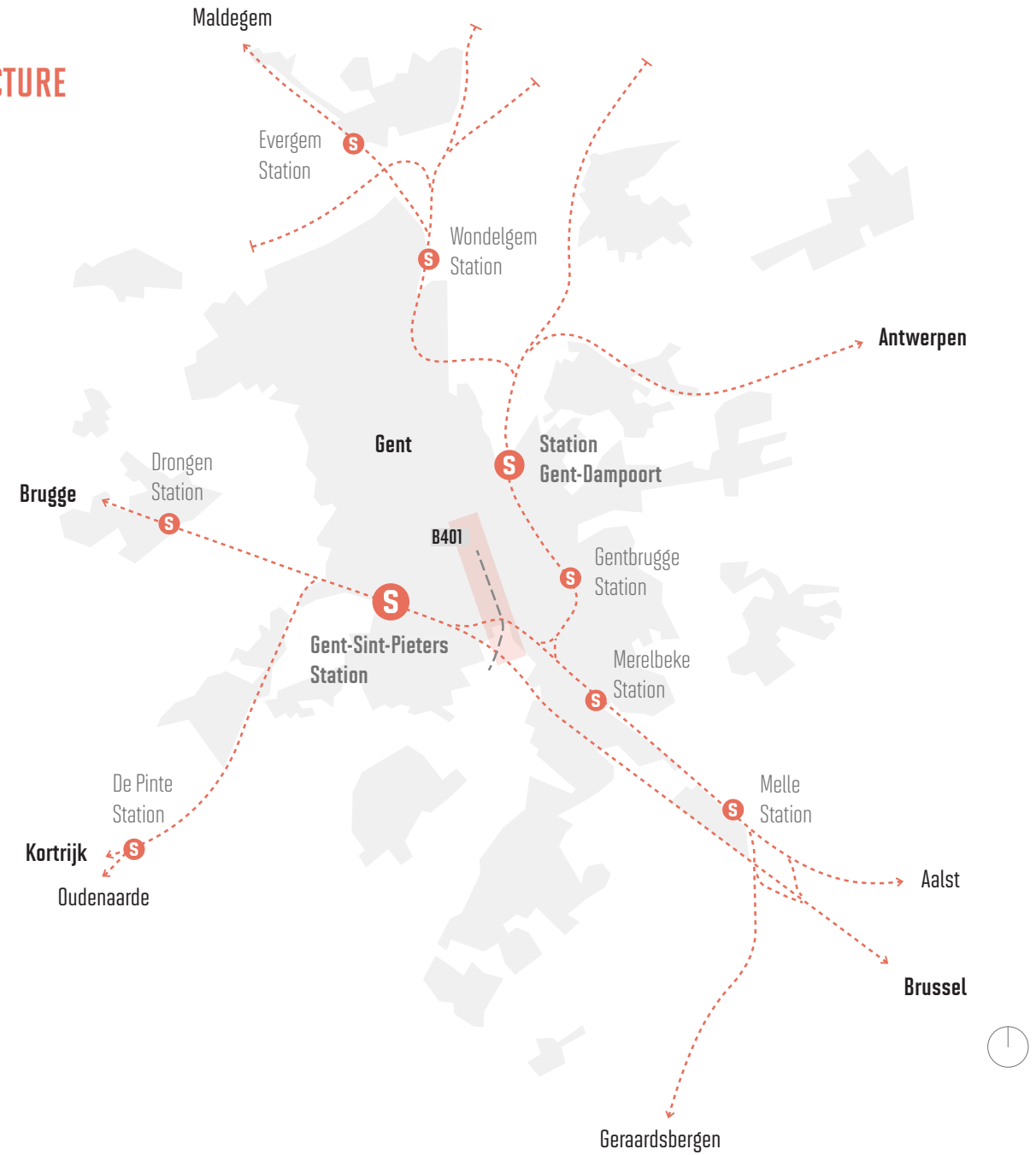
typical sunday minimal traffic flow at 7:00 a.m.

TRAFFIC BOTTLENECK

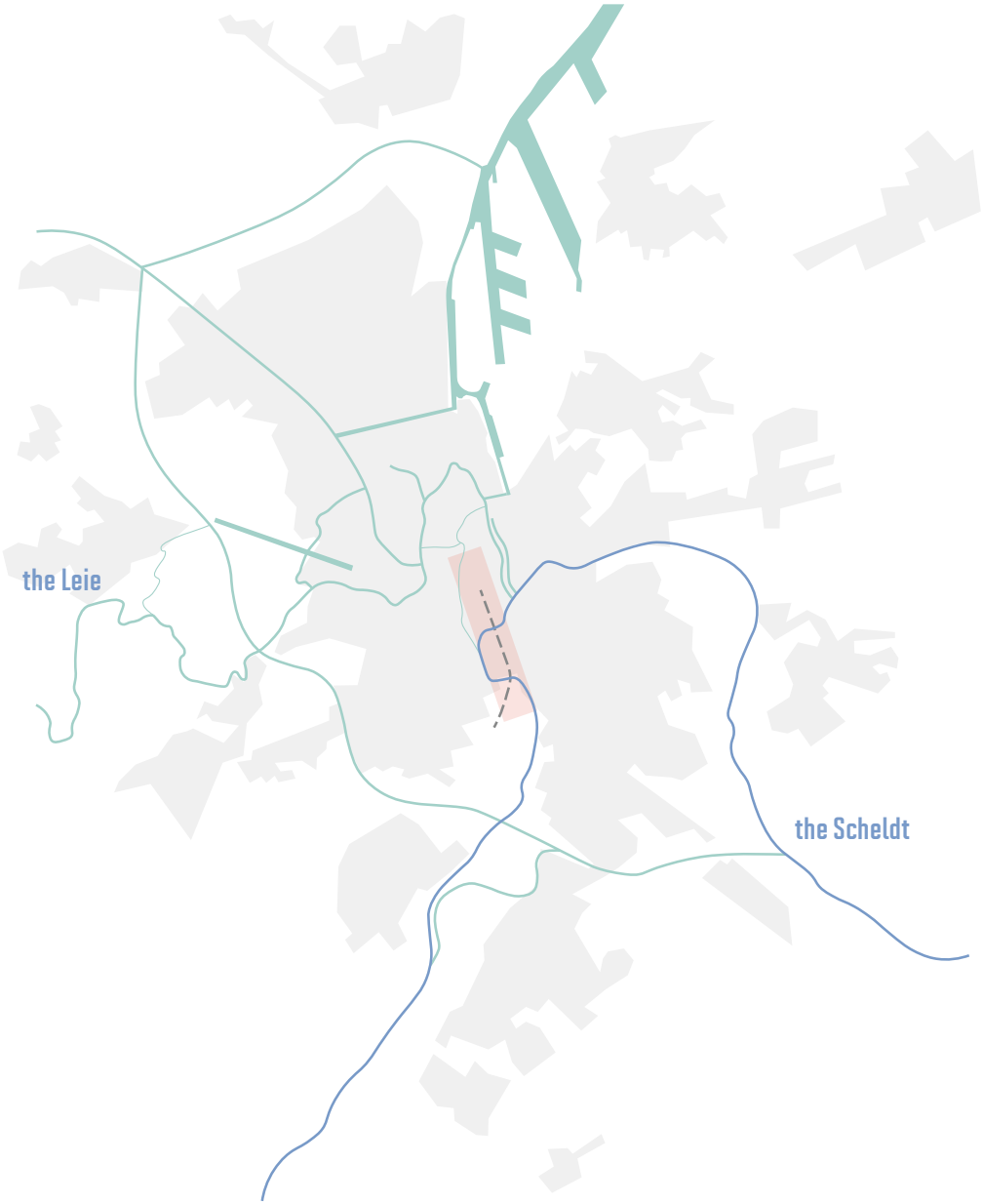


0 50 200 500 m

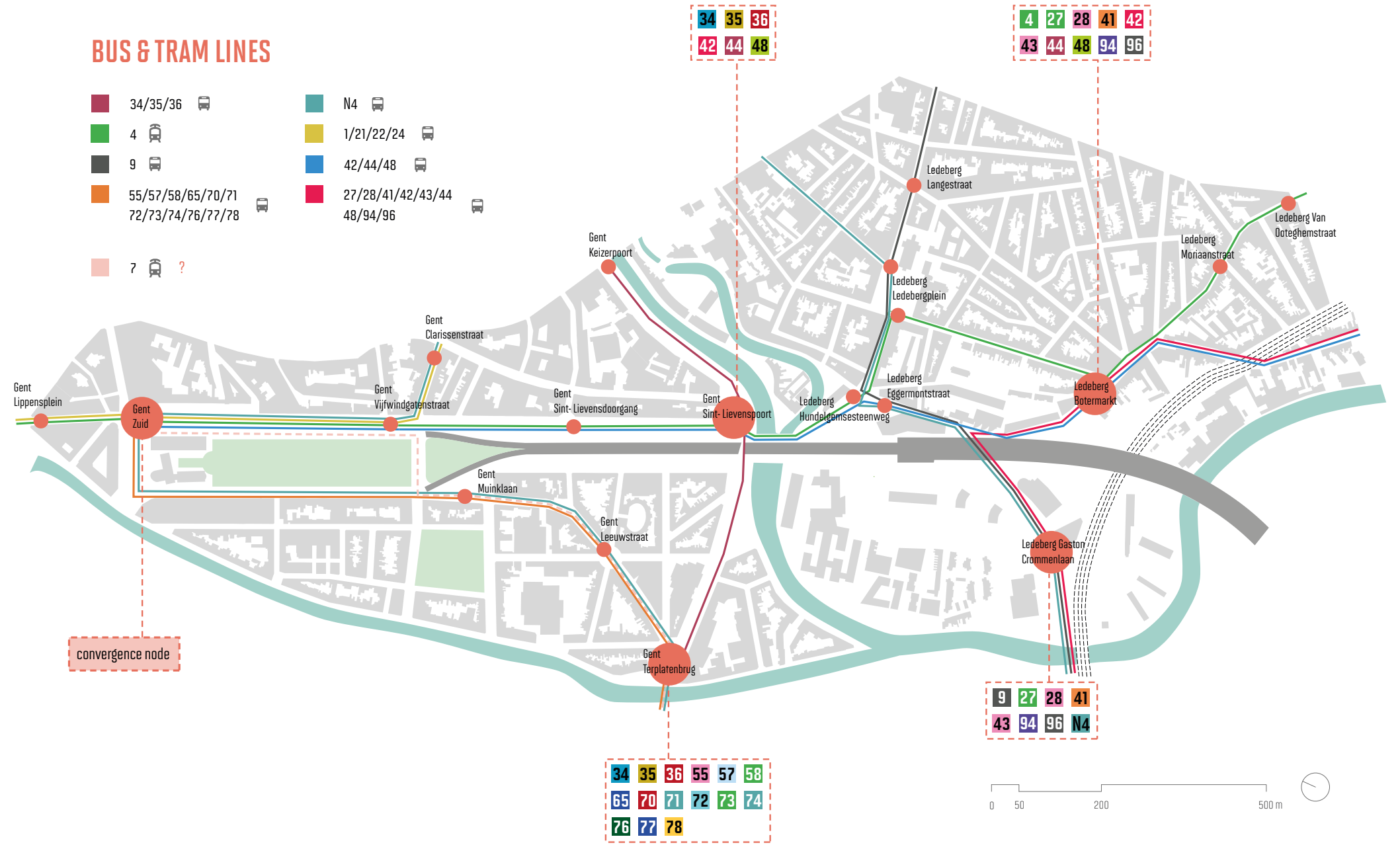
TRAIN INFRASTRUCTURE



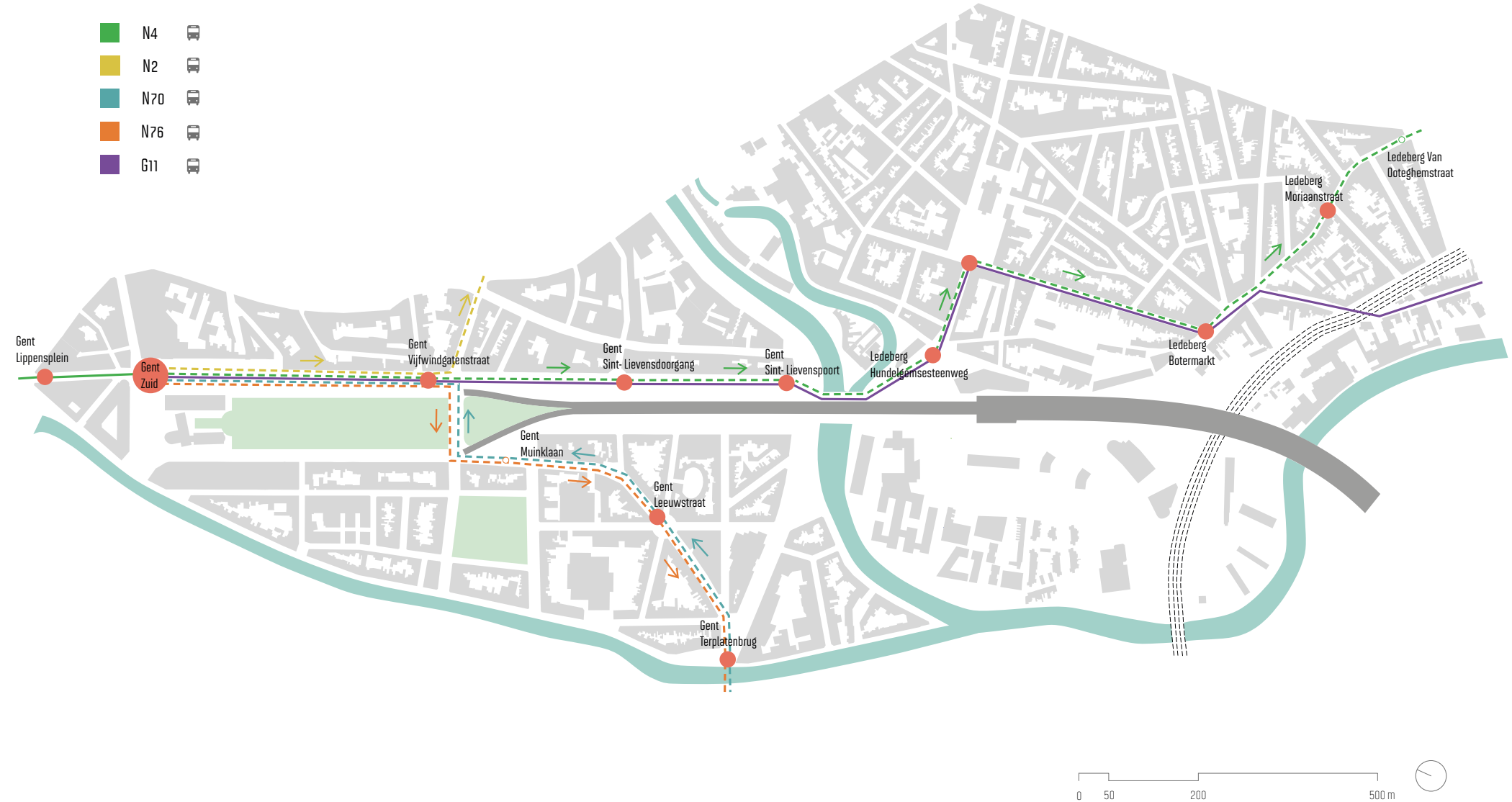
WATER SYSTEM



BUS & TRAM LINES



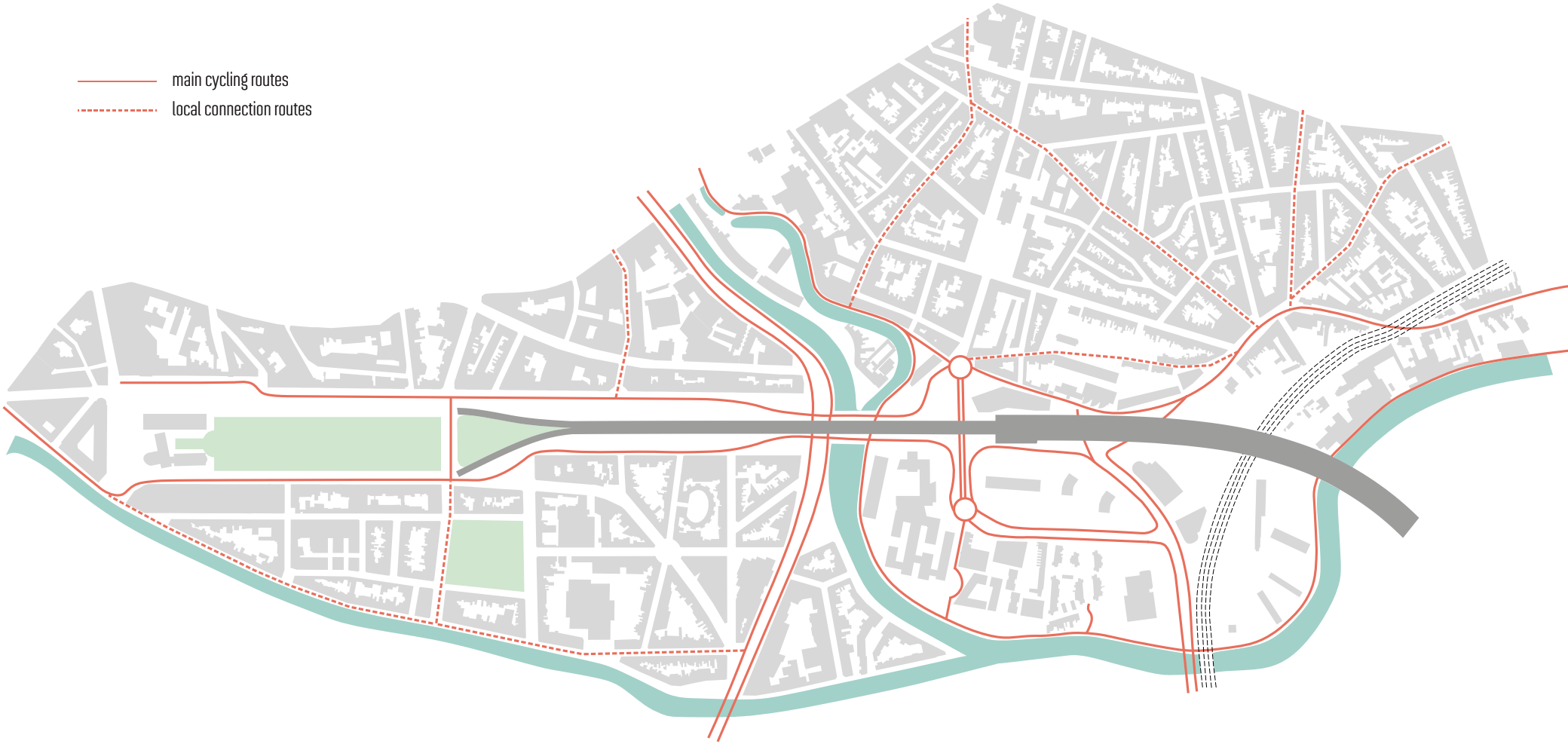
SPECIAL BUS LINES



CYCLING ROUTES

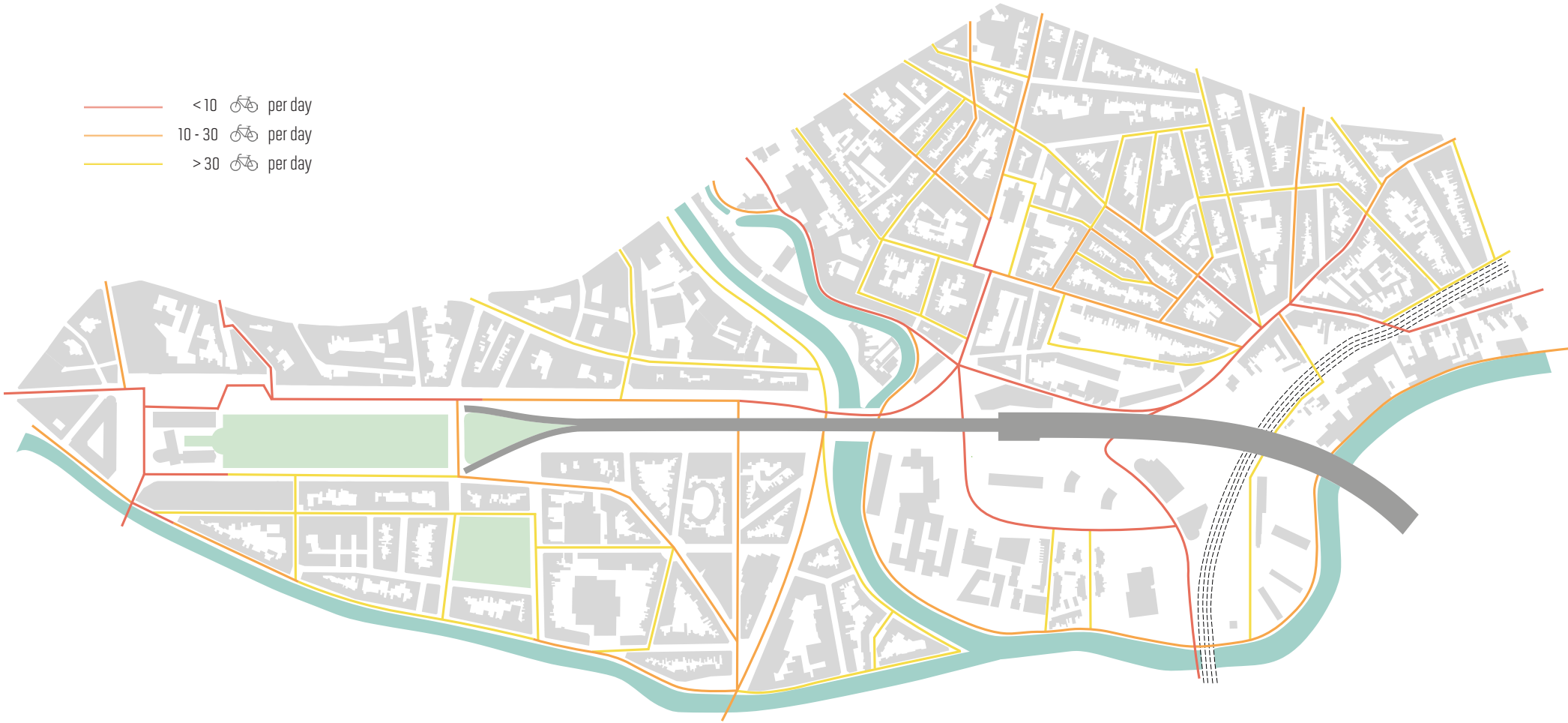
main cycling routes

local connection routes

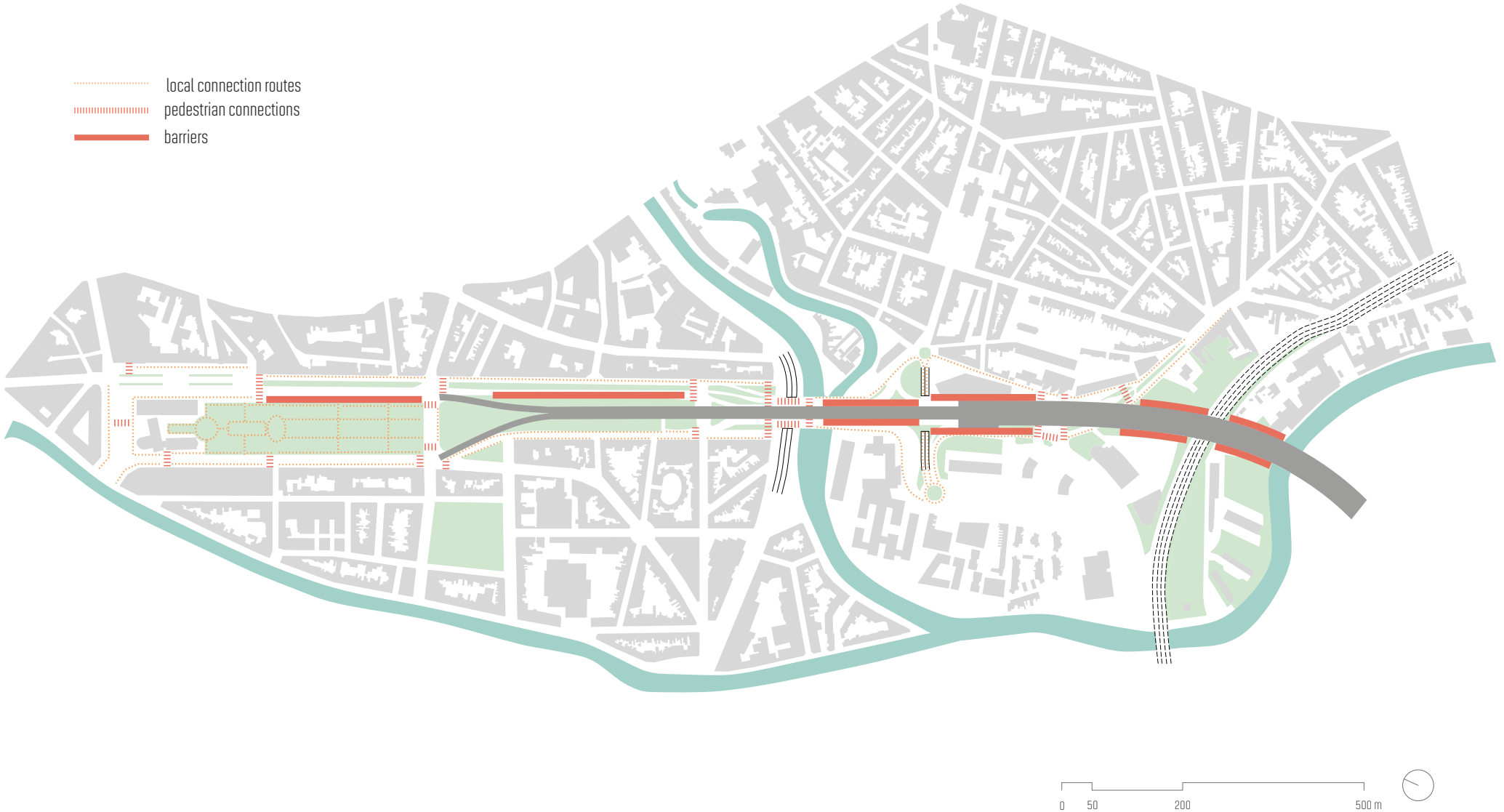


0 50 200 500 m

BIKE FLOW



PEDESTRIAN INACCESSIBILITY



GREEN AREA


equipped green
usable green residue
green strips
rows of trees
0
50
200
500 m

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Cities and mobility have influenced each other at any given moment throughout history. How could this symbiosis, considering that mobility and cities are evolving at very different speeds, be adapted for a near future? In the course of time, vehicles have shaped the cities, defining its spaces and infrastructure, but also: indirectly; the way people live, work and socialise. In order to accommodate the rise of car-base traffic, cities have been constantly rebuilt, leaving no interaction but just pedestrian and vehicular conflicts. The current model of mobility, marked by the massive and individual use of the automobile, on which today's cities are erected no longer works.

During my internship in Granstudio, a car and mobility design studio founded by Lowie Vermeersch in Turin in 2011, I had the opportunity to work on an innovative mobility project, promoted by the City of Ghent, for the future of the Viaduct B401. The studio focuses on the design of a future Park & Ride, an interchange parking, as a concrete case. The project reframes the role of the car as part of a wider future mobility system, and harvests the new possibilities of autonomous driving to improve multimodal experience, defines new architectural typologies, and increase liveability in the city centre.

The B401, also known as Fly-over by its inhabitants, connects the highway with the city's ring road and to the heart of the city. This allows easy access to and evacuation of the city but the increased car usage means that local city roads and connections with the highway system are congested during the morning and evening peak periods. The city of Ghent presents itself as an optimal place to frame the research, since the problems that characterize the city are universal and the expected answers are universal too, moreover the urban development of Ghent has always been influenced by the new forms of mobility; water as the first vector of mobility, the railway as the second vector of mobility and finally the construction of the E17 highway with the Viaduct of the B401.