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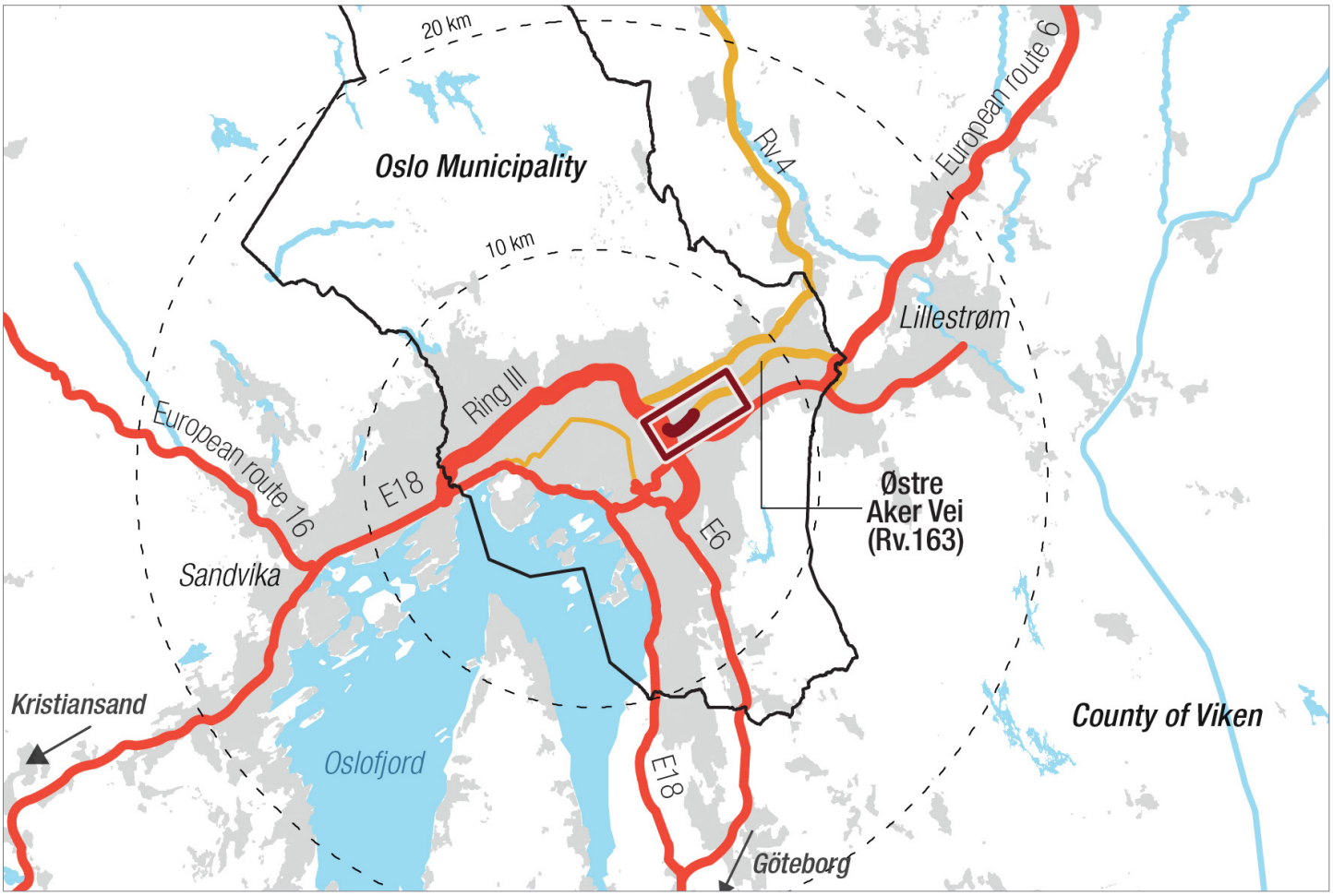
RETHINKING CITY FRINGE HIGHWAYS
HOVINBYEN AND ØSTRE AKER VEI PROJECTS



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METREX
The Network of European Metropolitan Regions and Areas

L'INSTITUT PARIS REGION

OSLO
RETHINKING CITY FRINGE HIGHWAYS
HOVINBYEN & ØTRE AKER VEI PROJECTS

Case Study Report for the METREX *From Roads to Streets* Expert Group
December 2020

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Contents

FOREWORD

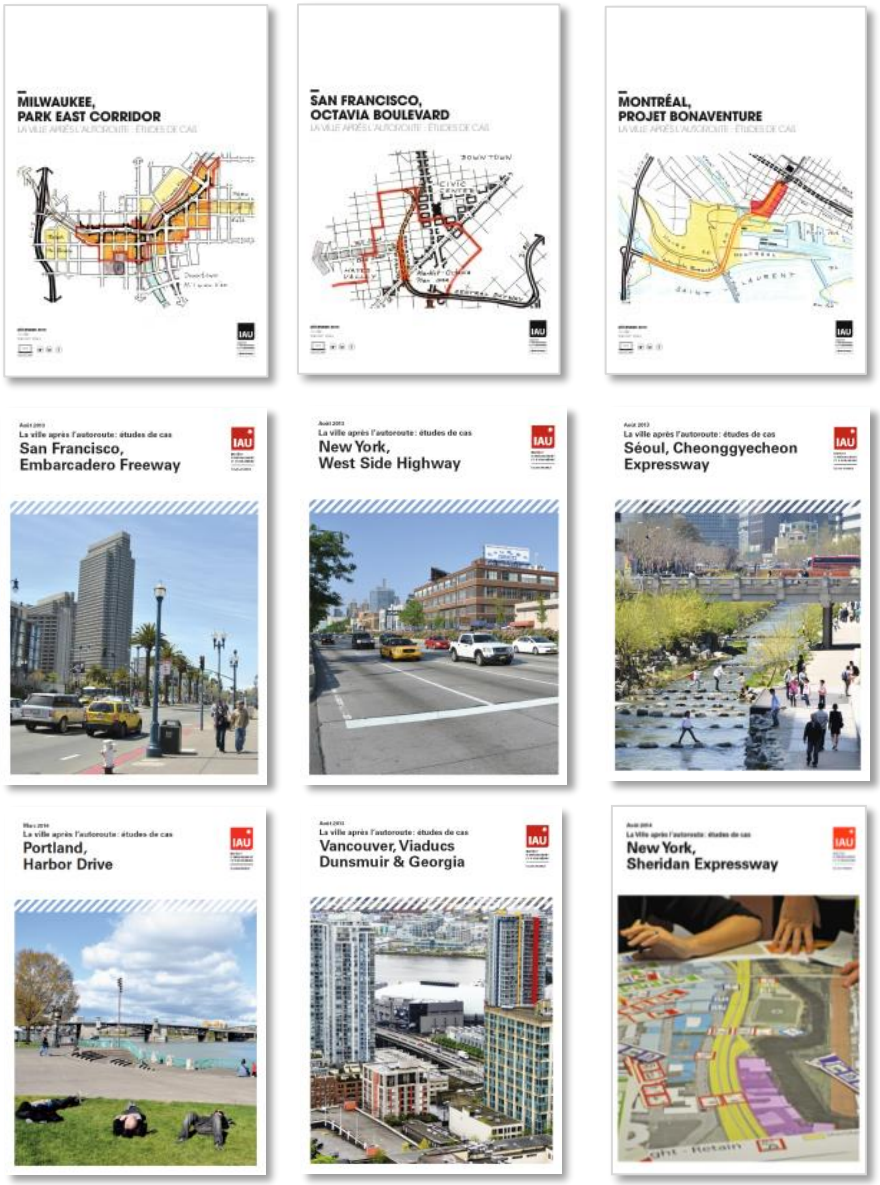
CONVERTING HIGHWAYS, RETHINKING CITIES

All over the world, cities and regions are confronted with the now-ambiguous heritage of extensive networks of highways and their fragmented (sub) urban landscapes. Because they were built they tend to be used: so these major road infrastructure systems play a role in moving people and goods within metropolitan areas, even if they may not be the most efficient way to do the job.

Highways with segregated interchanges create physical barriers within the cities and in their fringes; they limit pedestrian and bicycle movement and sever access to waterfronts and nature; they reinforce the social deprivation of roadside housing neighbourhoods and hinder regeneration efforts. The high volumes of traffic these highways promote generates noise, dust and air pollution, raising health and social justice issues. By providing seemingly easy access for cars and heavy-goods vehicles, extensive highways networks generally tend to encourage car-centric lifestyles, urban sprawl, mono-functional uses of space which in the end leads to more traffic and congestion.

In the last decade, social and economic patterns have changed, resulting in growing aspirations for the vibrancy of city life and car-free living in denser, mix-use, neighborhoods served by more flexible, multi-use and greener public spaces, while keeping in close contact with nature. Cities and metropolitan regions respond to these trends by redeveloping former industrial areas and car-oriented urban fringe with more intensive land-uses, with the support of new metro, tramway or expressbus lines. These projects are increasingly becoming catalysts of green development strategies; sustainable urban mobility plans and climate-neutral policies.

The in-Covid and post-Covid contexts reflect a rapid and significant change in mobility, housing, working and leisure patterns, opening a new window of opportunity to reset our urban development and transport models. Highway transformation can help transitioning cities and regions towards more liveable, just and climate-neutral development patterns.



International case study reports on highway transformation
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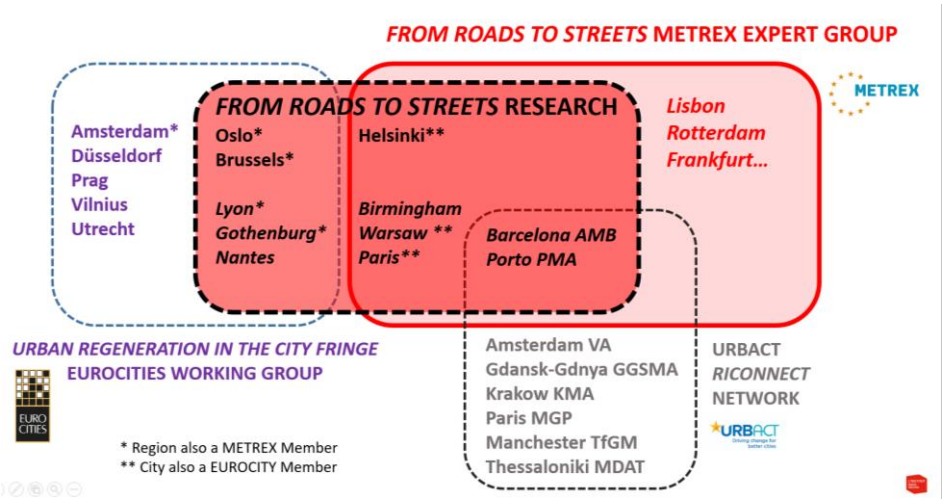

The METREX EUROCITIES URBACT Learning Platform in March 2020
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Learning from international experience

Many cities –including Portland, New York, Seoul and, recently, Paris– have successfully removed or transformed stretches of urban highways, replacing them with multi-use boulevards lined with mixed-use new development or even new linear parks and promenades. Why are they doing that? What happens with the traffic? What are the benefits and costs? Do these projects get public support?

To find answers to these kind of questions and inform ongoing projects and reflections in the Paris region, I initiated in 2010 a long-term research programme on *Metropolitan Avenues*[1] at the *Institut Paris Region*, the urban planning and environmental agency for the Paris metropolitan region[2].

As part of the programme, over twenty highway-to-boulevard experiences on three continents (America, Asia and Europe) were examined. Of these, nine cases were studied in depth on-site, with their reports published in French:

- Seoul *Cheeonggyecheon Expressway* (2013)
- San Francisco *Embarcadero Freeway* (2013)
- Vancouver *Viaducts* (2013)
- New York *Westside Highway (*2013)
- Portland *Harbor Drive* (2014)
- New York *Sheridan Expressway* (2014)
- San Francisco *Octavia Boulevard* (2016)
- Milwaukee *Park East Corridor* (2016)
- Montréal *Projet Bonaventure* (2016)

The most significative result from this research is that these strategic metropolitan projects are complex and conflictual, but have long-term positive impacts on traffic and mobility, city regeneration and the quality of the urban environment, often far beyond the project boundaries. Some results in English can be found in a paper called *Reinventing Cities: From Urban Highway to Living Space*[3] (2018) reproduced in the Appendix of this report.

This research has influenced projects in France, including the Paris Seine Banks pedestrianisation (2016) and the ongoing reflections on the future of the Paris Périphérique and the region's highways, with one of the first steps being the organisation of an International Competition on the *Future of Grand Paris's Highways* in 2018[4].

The METREX *From Roads to Street* joint learning platform

In March 2020, METREX, the Network of European Metropolitan Regions and Areas, launched a *"From Roads to Streets"* expert group to serve as a platform for the exchange of knowledge and experience on the transformation of urban highways into city streets (places to move, to stay, to live and to work in), as *"a key measure to transform the urban fringes of metropolitan cities and regions"*[5]. The Institut Paris Region as lead partner.

The METREX *From Roads to Street* group works in close cooperation and support of the EUROCITIES *Urban Regeneration in the City Fringe*[6] working group created in April 2020 with eight participating cities: Amsterdam, Brussels, Düsseldorf, Lyon, Prag, Vilnius, Göteborg and Oslo as the lead partner[7]. The purpose of this group is to exchange experiences on the conditions and methods for transforming urban fringes in three main directions: overcoming highway barriers, creating high quality public spaces, and managing radical land-use mix.

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[1] *Avenues métropolitaines*. https://en.institutparisregion.fr/know-how/international/rethinking-post-carbon-cities.html
[2] Formely Institut d'Aménagement et d'Urbanisme de la Région Île-de-France (IAU ÎdF). https://en.institutparisregion.fr/
[3] *Urban Design #147*, Urban Design Group UK, Summer 2018
[4] *Les Routes du futur du Grand Paris,* Forum Métropolitain du Grand Paris, Apur, Institut Paris Region, 2019.
[5] Henk Bouwman, General Secretary of METREX. www.eurometrex.org
[6] *Edge of Centre Transformation II*, *Urban Regeneration in the City Fringe*, EUROCITIES, April 2020.
[7] Pernille Grimeland Røsvik, Project leader, with Jørn Roar Moe, Head of Planning and Peter Austin, Planning Advisor, City of Oslo.

The METREX *From Roads to Street* group aims specifically to further investigate the question of why and how converting traffic-oriented highways into streets could contribute to an environmentally friendly mobility, help design walkable, safe, socially balanced neighbourhoods, and be a driver for the revitalisation and intensification of fragmented, mono-functional, city fringes. The group draws upon the experience and expertise of its members in this field, and brings a regional, wide angle, perspective in the discussion.

Both METREX and EUROCITIES groups work in collaboration with a third network, the URBACT III '*RiConnect' a*ction planning network, which consists of eight metropolitan and transport authorities: Porto Metropolitan Area, Gdansk-Gdynia-Sopot Region, Krakow Metro Region, Thessaloniki Region, Amsterdam Regional Transport Authority, Grand Paris Metropole, Transport for Greater Manchester, with the Barcelona Metropolitan Area (AMB) as the lead partner[8]. *RiConnect* proposes rethinking the mobility infrastructure in combination with metropolitan and local planning, to reconnect people, neighbourhoods, cities, and natural spaces.

These three networks are joining forces to share knowledge, experience, and expertise on these complex issues, in order to strengthen strategic and creative planning capacities of cities and regions. The idea is for planners from different horizons both *"to learn through examples, discussions and presentation of projects"* and *"to learn by doing, through participation of group members in the local reflection and planning processes"*[9].

The European Union's policies, together with national government strategies, plays a major role in the planning, programming, and financing of highway networks in our cities and regions. The joint reflection of the three networks aims at raising their awareness of the social and environmental impacts of these policies and the need to shift funding streams towards their environmental integration and urban transformation.

The networks' joint learning platform relies on a series of events, both online and on site, such as peer to peer cooperation workshops; multi-actor transnational seminars; site visits; hands-on studios; as well as *ad hoc* and partner conferences.

The common work programme of the networks will cover a period of three years, with a final international conference anticipated in 2023 and intermediate events planned in 2021 and 2022.

Despite Covid-19 constraints, all three networks are now actively working after holding their (joint) kick-off meetings in early 2020: URBACT *Riconnect* (phase II) in Manchester (January 30-February 1), METREX online (March 30) and EUROCITIES online (June 24).

A case study-based learning process

The knowledge-based learning process is based on case studies of ongoing projects of highway transformation in different European partner cities. In-depth analysis and transverse comparisons are crucial to get a common understanding of local issues, strategies, planning approaches, reflections, and conflicts. Comparing scales, ambitions, framework policies, planning processes, and delivery instruments, can nurture the creative thinking of professionals from all networks to help find innovative and bold answers to the questions raised.

To trigger the process, the Institut Paris Region initiated a comprehensive research based on the voluntary participation from cities and regions as part in one of the three networks.

In 2020, four case studies of urban and highway transformation projects have been analysed with the help of local colleagues (many thanks to all contributors!) with the research reports soon to be published:

- Helsinki. *City Boulevards Strategy and Projects*
- Oslo. *Rethinking City Fringe Highways*. *Hovinbyen and Østre Aker Vei Projects -THIS STORY*
- Lyon. *Regaining the Riverfront. Transforming M6/M7 Highway Corridor*
- Brussels. *From Expressway to Boulevard. Delta-Herrmann-Debroux Project*

[8] Joan Caba, Project Leader, Urban Planning Department, Barcelona Metropolitan Area.
[9] *Urban Regeneration in the City Fringe Project Plan,* EUROCITIES-City of Oslo*,* March 2020*.* Revised Sept. 2020.

All draft reports have been written, illustrated, and mapped in way that can help understanding the local conditions, comparing projects together and learning from them. They share the same framework:

- Background: geo-historic context; current issues
- Strategies: urban development and mobility; climate-neutrality
- Project: highway transformation planning and delivery
- Discussion: questions and suggestions about the strategy and project
- Takeaways: first learnings to fuel discussions of the working groups

On top of these cases, we have started to document and map highway transformation ongoing processes in seven other cities and regions in Europe:

- Barcelona. *C-245 Road Integration Project/Busway 8*
- Birmingham. *Breaking the Concrete Collar A38/Snowhill Masterplan*
- Gothenburg. *Dag-Hammarskjöld Boulevard/Frolunda Project*
- Nantes. *A831 Highway Conversion/Busway 4 Project (delivered)*
- Paris. *A186 Highway Removal/T1 Tram Boulevard Project*
- Porto*, N12 Ring Road Improvement Project*
- Warsaw, *John Paul II Avenue Project*

In 2021, a comparative summary analysis based on these 4+7 cases is planned as part of our joint METREX EUROCITIES URBACT learning platform. The takeaways from these projects, and others perhaps (cities and regions are welcome to join!), should fuel the discussions and orient our work agenda for the months and years to come.

This report is about the complex process of converting a segregated highway into a boulevard, as part of Hovinbyen, the largest urban transformation project in Oslo and Norway.

In a wider perspective, this research is about the challenges, constraints, potentials and conditions facing cities and regions attempting to transition from a functionalist, car-oriented, urban development pattern to a more mix-use, pedestrian-friendly, human-centred, ecological urban design structure.

I hope you will find food for though and action in this report.

Paul Lecroart

Chair of the METREX *From Roads to Streets* Expert Group
December 2020

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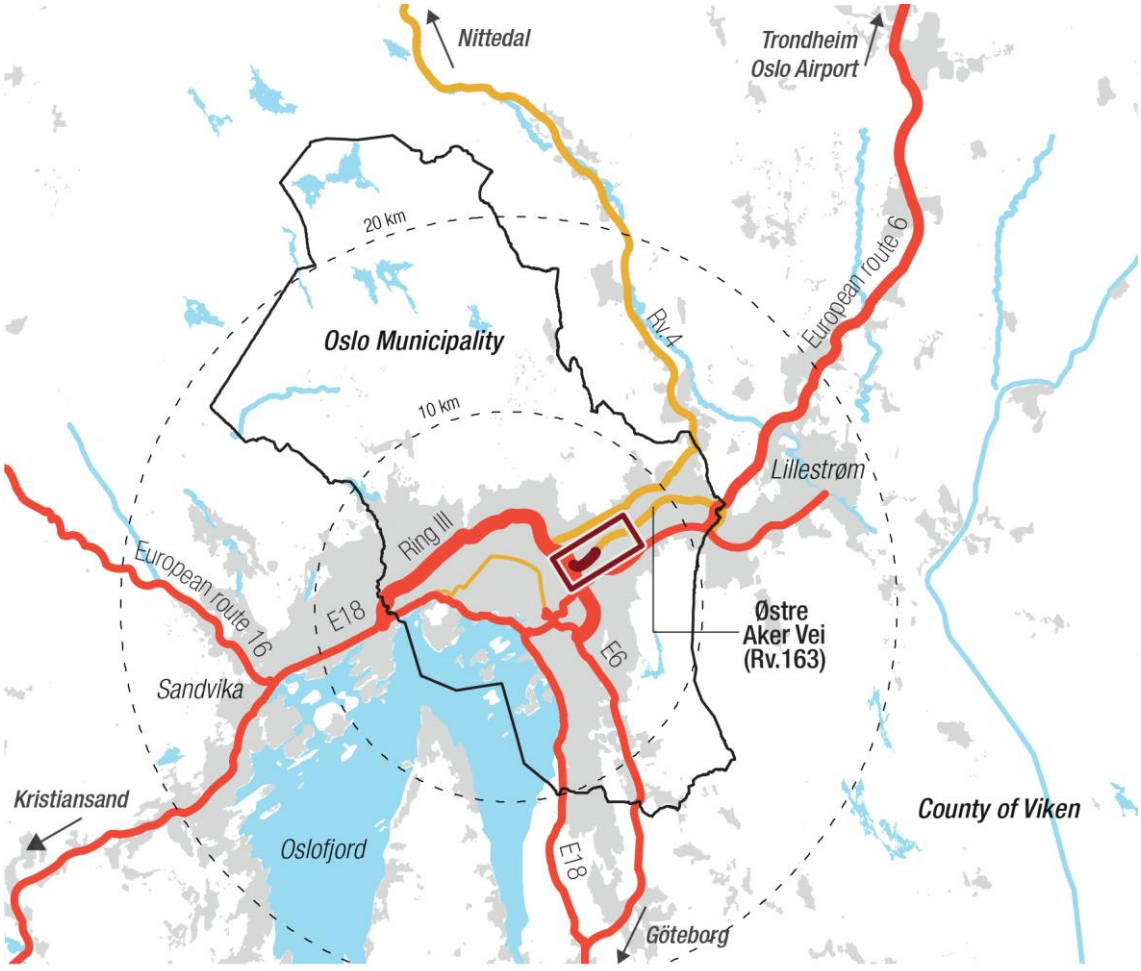
Oslo's car-designed eastern urban fringe. Øtre Aker vei highway is at centre
© Fjellanger Widerøe - City of Oslo



2016 Key data for Oslo and Region (Akershus)

Sources: Statistics Norway 2016, Eurostat 2016

INTRODUCTION

Oslo is one of the fastest growing cities in Europe today. In 2019, population reached 680,000 in Oslo and 1.3 million in the former Akershus region[10]. Population has increased by 22 percent over the last ten years and keeps on growing at a rapid pace. For several decades, the urban development has been supported by the construction of heavy infrastructure, including urban highways, through successive political agreements, the famous *Oslo Packages*.

Since the 1990s, local authorities have initiated a shift towards a more sustainable development, advocating for a more compact city and a transit-oriented expansion pattern. In response to the anticipated growth, the regeneration of Hovinbyen has been proposed. The area is located at the entrance of the Grorud Valley (*Groruddalen*), Oslo's socially deprived eastern fringe. This suburb suffers from a fragmented urbanism and severances caused by transport infrastructure and zoning, as the result of sectorial decisions and lack of planning. Functions include low-density housing and a large part of logistics and industrial activities, including a rail-road freight terminal of national importance. Mobility in the valley is largely reliant on cars and heavy goods traffic generated by industrial sites add up on traffic volumes.

Hovinbyen is expected to become a new centrality in the forthcoming decades. It is Oslo's largest urban development project, planned to accommodate 80,000 new inhabitants and up to 100,000 new jobs. Once a distant suburban area, Hovinbyen is now in the direct vicinity of the city centre and is accessible by public transport.

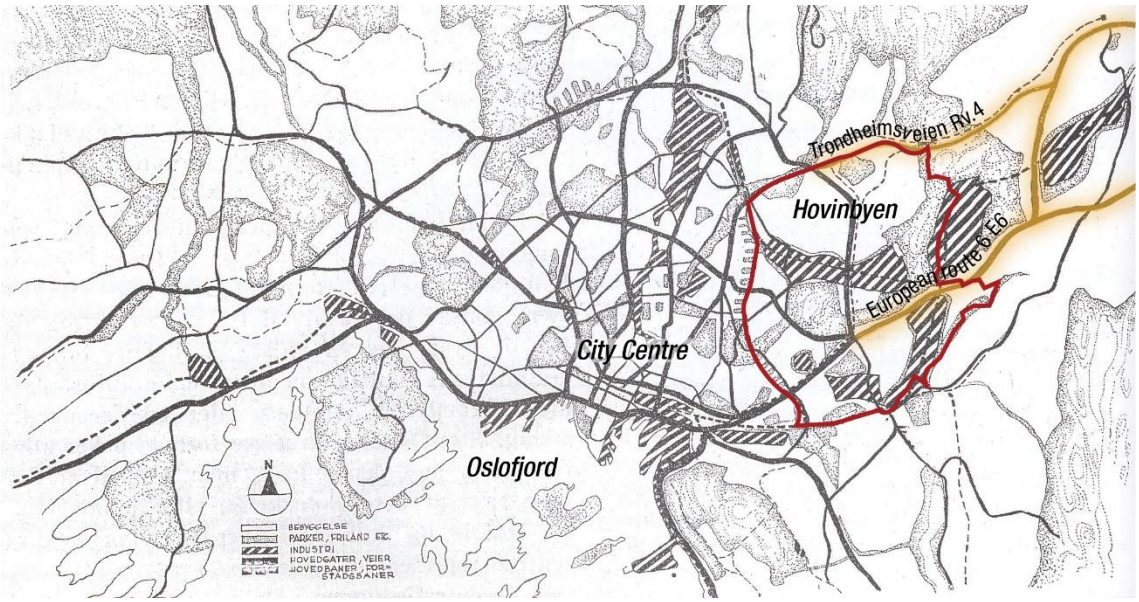
This regeneration project questions the presence of highways in Hovinbyen, and by extension, in the Grorud Valley as a better urban integration is a prerequisite for the redevelopment of the area. This case study examines the projected transformation of the national road Østre Aker vei (Rv.163), in central Hovinbyen into a pacified boulevard. It is a part of the urban project but is not the driver of the whole area. Nonetheless, it remains an important challenge for the City of Oslo as many issues have to be taken into account: traffic and impact, other adjacent projects, funding… It also relates to ongoing reflections about the future of urban highways in East Oslo.

View of Hovinbyen's fragmented landscape today
Økern area (centre right), Østre Aker vei expressway (centre), Ring III motorway (background).

[10] 1.3 million inhabitants for Oslo-Akershus in 2019, according to Statistics Norway

1. Background: A Fast-Growing City-Region

1.1. Oslo's Highway Network: 1925 - 2015



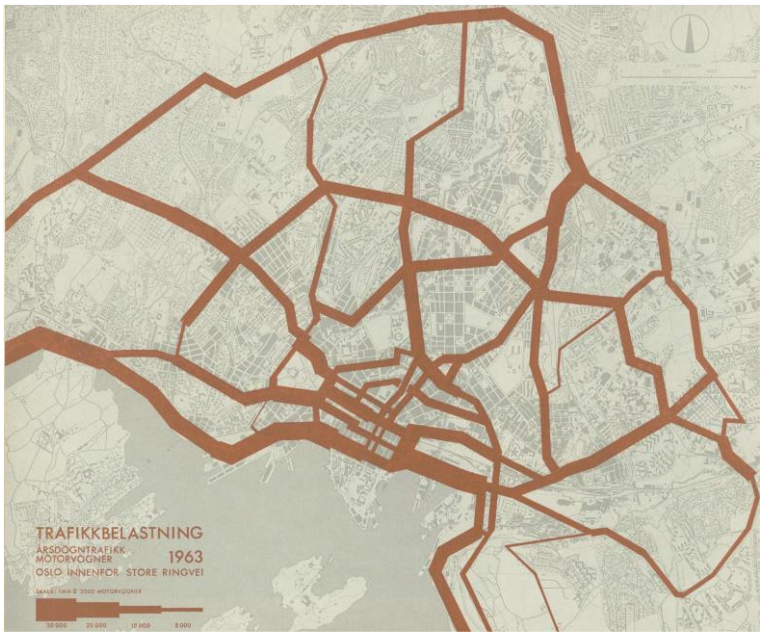
General common plan for Oslo and Aker, 1935
This plan focuses on the city road network and highlights major industrial areas that are currently being redevelopment: the harbour, the Akerselva river banks, Hovinbyen and Grorud Valley in the eastern part
© City of Oslo, modified by L'Institut Paris Region

Oslo was established at the tip of the fjord bearing the same name (*Oslofjord*) in south-eastern Norway, around a central harbour and surrounded by green hills. With the industrial revolution, the city grew considerably during the 19th century. The urban expansion followed three directions, in accordance with the geography of the region: westwards and southwards along the fjord, and eastwards in the Grorud Valley. Industrial activities were mainly concentrated in the harbour, along the banks of the Akerselva River northwards, and in the valley in East Oslo.

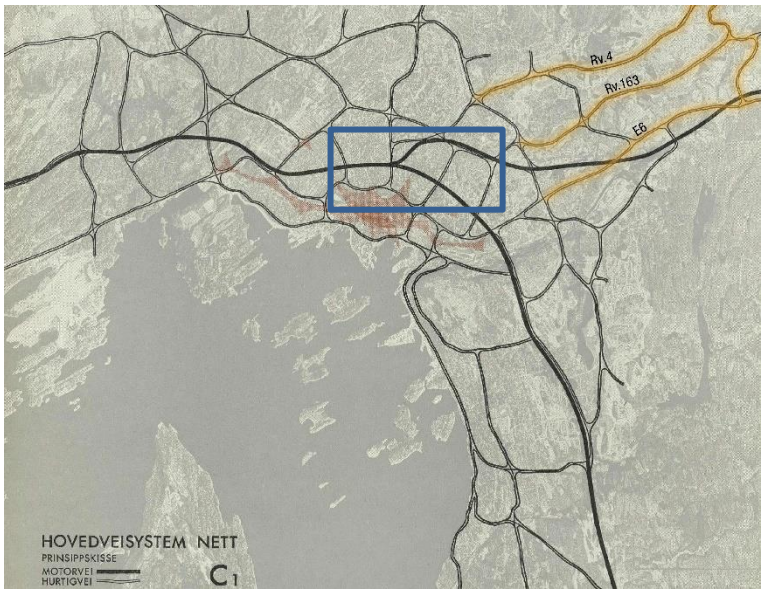
Planning this development became a key preoccupation for urban planners. Modernist ideas and principles gained popularity among local planners in the 1920s. The influential architect and urban planner Harald Hals, municipal housing director then head of planning at the municipality, proposed a *Plan for the Greater Oslo* in 1929. It consists of a zoning plan served by a large road network"[11]. Hals raises the idea of creating a ring road, a boulevard-inspired road to efficiently lead traffic around the city. His plan for the Greater Oslo, with the general common plan for Oslo and the neighbouring city Aker (1935) became a guiding plan after the Second World War, as both cities merged in 1948. This plan identifies two main axes for the Grorud Valley, which later became the national roads Trondheimsveien (Rv.4) and the European route E6, leading up north.

The housing shortage after WWII led to a rapid urban sprawl, along with the increase of the average commuting distance and the popularisation of the private car in Norway.The construction of the highway network took off in the 1960s. The National road Rv.150, also known as the Ring III surrounding the "indre by" (*city centre*), was built in that period. Some projects give evidence of this car-oriented paradigm adopted by urban planners and engineers back then. Inspired by American cities, the 1965 study *Transport analysis for the Oslo area* (*Transportanalysen for Oslo-Området*) proposed in the *Bymotorveien* (*City Motorway Plan*), a large highway crossing the centre of Oslo to solve traffic congestion.

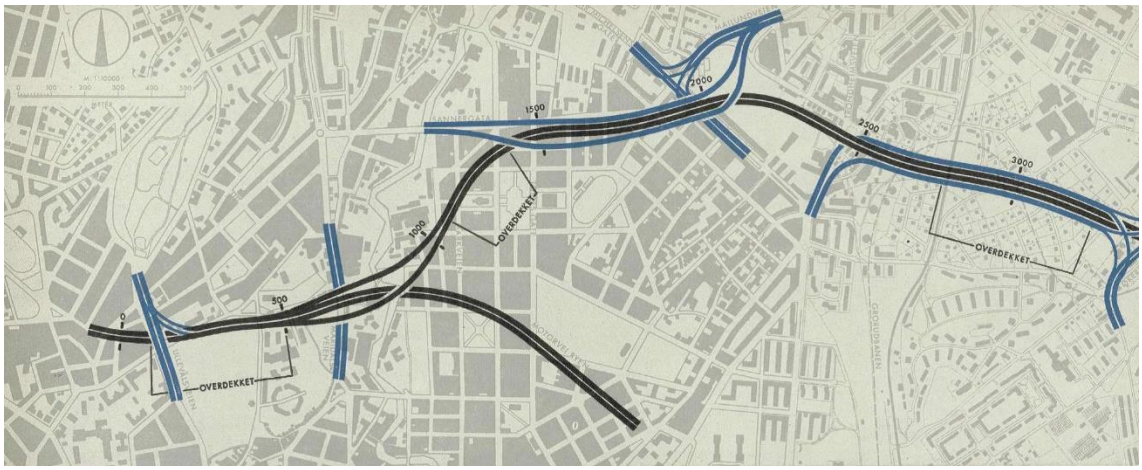
[11] Harald Hals*, Fra Christiania til Stor-Oslo : Et forslag til generalplan for Oslo*, 1929



Traffic congestion on Oslo's main roads in 1963, within the Ring III
The road along the harbour is the most congested one, with 30,000 ADT (average daily traffic)
© Oslo City Planning office



***Bymotorveien* proposal from 1965 for a city highway in central Oslo, splitting eastwards and southwards in Grünerlokka**
This urban highway was meant to relieve existing saturated roads.
© Oslo City Planning office, modified by L'Institut Paris Region



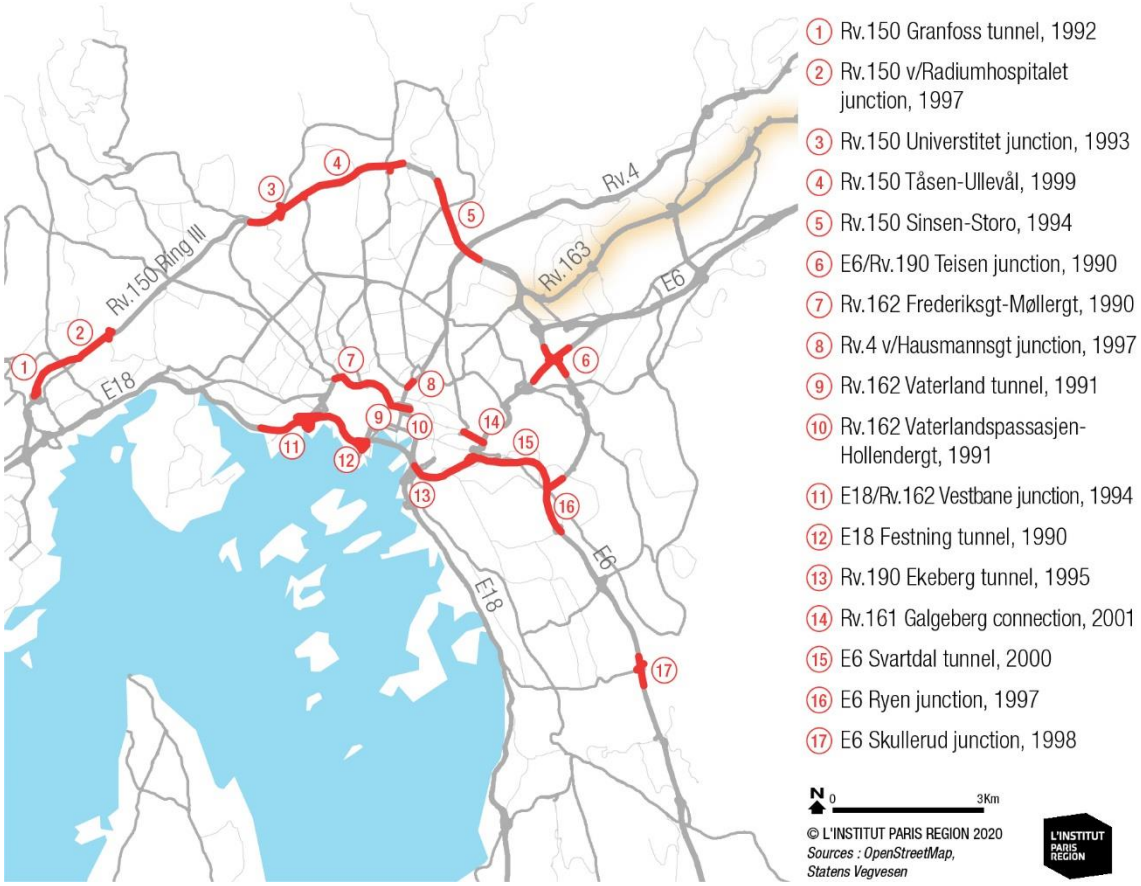
Detail of the *Bymotorveien* proposal in Grünerløkka
This project which would have meant the demolition of many buildings, was abandoned in the 1970s due to the oil crisis and political shift in government.
© Oslo City Planning office

The 1965 road network shows the emergence of a third main road in the Grorud Valley, Østre Aker vei (Rv.163), a former rural axis. The Bymotorveien (city centre motorway) project was abandoned a few years after its proposal, due to the oil crisis of the 1970s and the political shift in government.

In the following decades, traffic congestion in Oslo worsened to such an extent that the Parliament demanded an action plan for the road network. From this request emerged the Oslo Package 1 (*Oslopakke 1*), a political agreement between the central government, the city of Oslo and the neighbouring County of Akershus, approved in 1988. Its aim was the development of the transport system in Oslo and Akershus.

The program financed public transport and road infrastructure both through state funds and through the creation of tolls at the city centre entrances. The agreement established that the Ministry of Transports would fund 45% of the program and the remaining 55% would be funded by Fjellinjen AS, the toll management company for Oslo and Akershus. Oslo's first toll opened in 1990. In total, 11 billion Norwegian krone (approximately €1 billion) were invested from 1990 to 2001.

The program was renewed twice, with the Oslo Package 2 (2002-2007) and the Oslo Package 3 (2008-ongoing), whose estimated budgets are respectively 15.5 billion krone (€1.5 billion) and 58 billion krone (€5.4 billion). Compared to the first Package, funds share dedicated to improving the public transport system increased in those later programs, at the expense of road infrastructure. From 20% of the revenues in 1990, the allocated amount for public transport increased to 60% in 2012 by decision of the City Council[12].



Road projects funded by the Oslo Package 1 in Oslo
They include investments for the Ring III (Rv.150) and the coastal highway E18 and its connections

[12] *"Oslopakke 1, 2 og 3 – historikk, status og utfordringer"*, Oslopakke 3 sekretariatet, 2015

1.2. Impact of Growth on Mobility

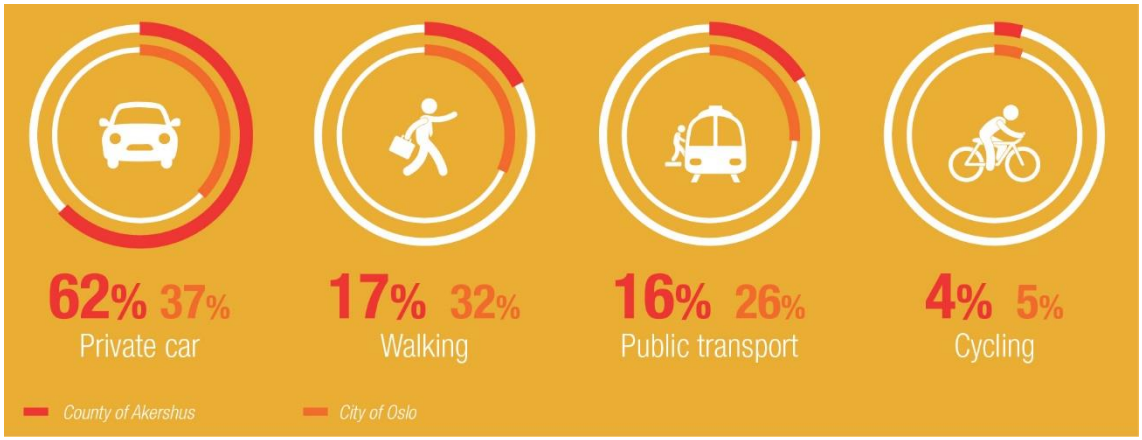
Oslo's rapid urban growth continues today, fostered by economic prosperity. The city and its metropolitan area count among the wealthiest city-regions in Europe. Population in Oslo is expected to reach some 815,000 in 2040 and 1.5 million for the metropolitan region (Oslo and Akershus)[13]. This would mean 120,000 new inhabitants in Oslo in the next twenty years and an additional 200,000 in Oslo-Akershus.

This population influx impacts Oslo's urban development. The increasing pressure of prices in the housing market drives people away from the city centre to the suburban areas, and thus strengthens urban expansion. Newcomers also mean a more important demand for urban functions. Local authorities are faced with the challenge of containing this spread and develop new urban centralities and services.

This situation calls for an adapted strategy regarding mobility and transportation. Without any intervention, a 30% growth in car traffic and a 47% increase in public transport traffic are expected by 2030[14]. This population influx should also generate a 40% increase in freight transportation by the same period[15]. Despite the population growth, car traffic increase in Oslo is lower than the national average, due to the strengthening of the public transport system. Statistics show a sharp decrease in the number of cars passing through city entrances tolls from 2007 onwards, while the number of passengers in public transport takes off, both in Oslo and Akershus[16]. In 2014, 63% of travels in Oslo were split between public transport (26%), walking (32%) and cycling (5%), which mean 37% still choose to commute by car. The *Climate Strategy for Oslo towards 2030* approved in may 2020 sets the goal of reducing vehicle traffic by 20 per cent by 2023 and by one-third by 2030 compared with 2015.

However, when looking at mobility on a wider scale, car dependency is strong in suburban areas of the city-region, beyond the municipal boundaries where settlements are more scattered. In Akershus, 62% of travels are made by car in 2014. The rest is shared between walking (17%), public transport (16%) and cycling (4%). The growth in public transport passengers in Akershus gives evidence of a modal shift from car users, but those who keep on commuting by car travel in average longer distances. The number of kilometres covered by vehicle has continuously been growing for the past years. In 2014, the average distance had increased by 30% as compared to 2007[17].

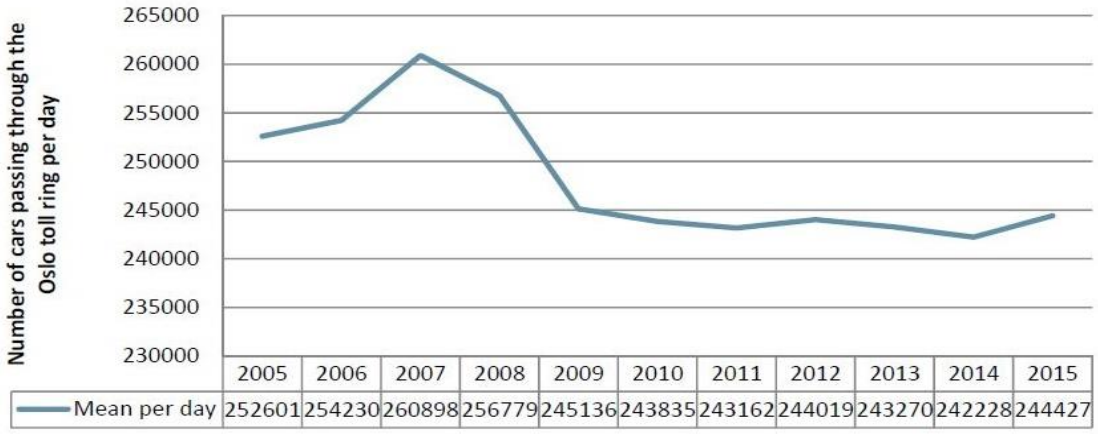
Looking on an even larger scale, in the newly founded county of Viken (see below p.17), the private car remains the most important transport mode (69% in 2019[18]), and public transport rate is low (10%). This confirms that sustainable mobility policies mainly benefit to dense urban areas and weaken in more suburban and rural areas.



Modal split in Oslo and Akershus, 2014

© Endurance European SUMP-network / Ruter 2014

[13] Statistics Norway 2018 *(Population projections 1 January, by region, contents and year, 2018-2040)*
[14] *Concept study Oslo Hub, Concept study for increased transport capacity to and through Oslo, From hub to network*, Ruter, Statens Vegvesen, Jernbaneverket, 2016
[15] *The urban development of Oslo*, Agency for Planning and Building Services, 2017
[16] Aud Tennøy, *Reallocation of road and street space in Oslo: Input to discussions on measures for zero-growth*, Institute of Transport Economics, 2019
[17] "Ruter in 2014. Summary from the annual report", Ruter, 2014
[18] Exchange with Eli Nakken Lundquist, Senior Advisor, Viken County Council, Sept. 2020. Source: EPINION, 2019



Evolution of the daily average number of cars passing through the Oslo toll ring from 2005 to 2015
From 2007 onwards, the number of cars drops while the number of public transport passengers increases sharply
© City of Oslo, Statens Vegvesen

Traffic evaporation in Oslo

Observation and academic research shows that temporary highway closures do not usually result in traffic chaos but, to some extent, in traffic evaporation[1]. Just as new highway capacity tends to induce new traffic, the reduction of road capacity induces changes of behaviour which result in some people shifting to other modes, choosing not to use their cars for some trips or reducing the frequency of their trips. These changes of travel patterns have been assessed in many studies of highway-to-boulevard transformation worldwide[1].

A 2016 research, *Experiences with capacity reductions on main urban roads* (Tennøy et al., 2016), studied the effects and consequences of a one-year capacity reduction of the Smestad tunnel, located in the western part of the Ring III (image below). This dual carriageway tunnel normally carries important traffic volumes, up to 50,000 ADT (average daily traffic). Two lanes were closed for a year due to construction works. Researchers observed car users behaviour and traffic charge during peak hours for six weeks to find out the impacts of the temporary transformation from four to two lanes.

Oslo Ring 3
© Quevaal

The main consequence was that this new situation barely affected traffic flow on the long run. No extra delays were identified nor important traffic decrease. During the first week, 25% of car users found an alternative itinerary to get around and only 5% of survey respondents reported changes in household routines. Tennøy highlights an interesting fact pointed out by the study. The lack of consequences can be explained by a good upstream communication, allowing people to prepare. Expectations of increased congestion encourages behaviour change for car users. They start considering other available transport modes (walking, cycling, and public transport). This gives evidence of the 'windfall effect' generated by the presence of an accommodating high-speed road offer which increases traffic volumes in return. Tennøy *et al.* present road capacity reallocation for alternatives uses as more sustainable and more liveable regarding mobility and public spaces.

2. Strategies for urban development and mobility

2.1. Compact-city development strategy in Oslo

To fight the land-extensive urban development in Norway, a focus on the compact-city model coordinated with transport planning appeared in national policies in the 1990s. This new model has been gradually incorporated at the regional and local levels. Since then, the City of Oslo started advocating for urban intensification and a transit-oriented expansion pattern. Oslo's forests (*Oslomarka*), which cover one third of the city's surface in the northern and south-eastern parts of the city, are protected by Norwegian law against urban development since 2009. The focus is now given to urban densification and renewal around public transport nodes.

The 2015 *Municipal Plan "Oslo from now to 2030 Smart-Safe-Green"* establishes a target of 90% reduction of greenhouse gas emissions by 2030, as compared to the 1991 level, although the city is expected to grow by +28% by 2040. Its five key strategic orientations are: (a) compact city development; (b) preservation and development of the blue-green structure; (c) attractive and safe public spaces; (d) a world leading eco-city; (e) create an arts-axis, which includes the new Munch Museum build beside the Oslo Opera. The three key projects are Fjord City, Hovinbyen and the Grorud Valley.

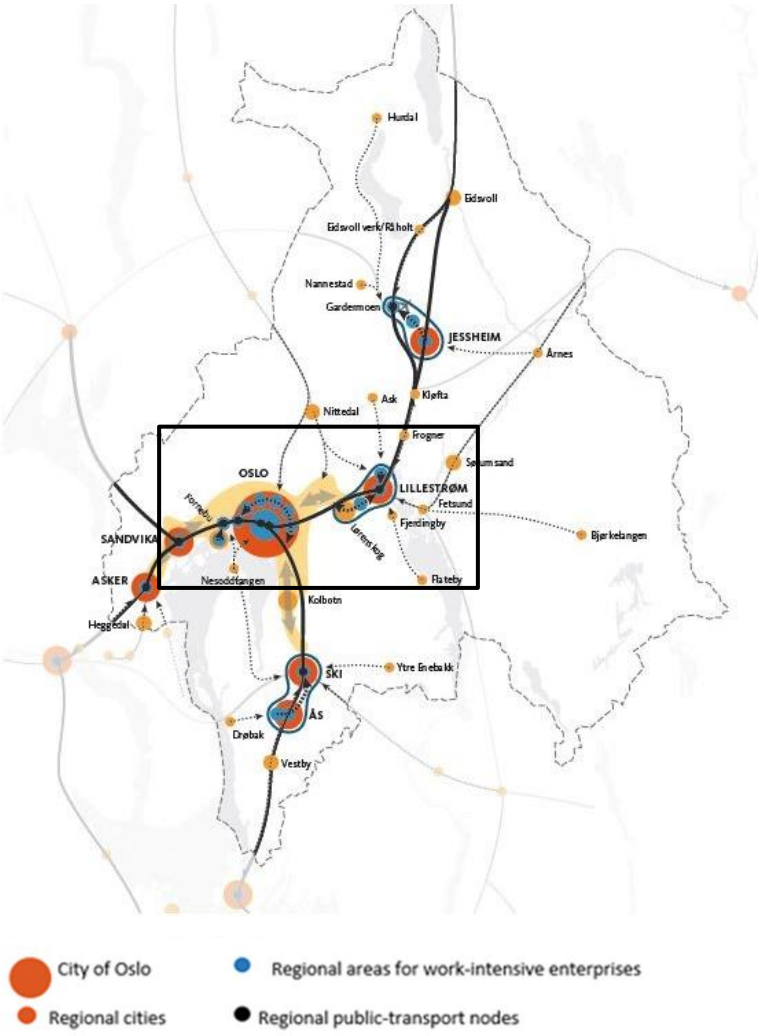
Regional Planning in Oslo and County

There is no formal metropolitan governing body in Oslo's city-region. In Norway, most powers - including planning powers- have been decentralized and transferred to municipalities. As the capital city, Oslo is the only one-municipality county.

The urban expansion goes far beyond Oslo city's boundaries and calls for a coordinated mobility and urban development strategy. Since 2008, Oslo and its neighbouring county Akershus, which counts 22 municipalities, have merged their public transport management. It is now taken in charge by the company Ruter. Both counties also elaborated a joint *Regional Plan for land-use and transport in Oslo and Akershus* (*Regional plan for areal og transport i Oslo og Akershus*).

In 2020 was enacted the reform of administrative divisions in Norway, for larger and stronger local governments. This led to the merger of Akershus with both counties of Buskerud and Østfold and 3 additional municipalities. The newly created County of Viken (*Viken Fylkeskommune*) has a total of 51 municipalities, making it the largest county in Norway.

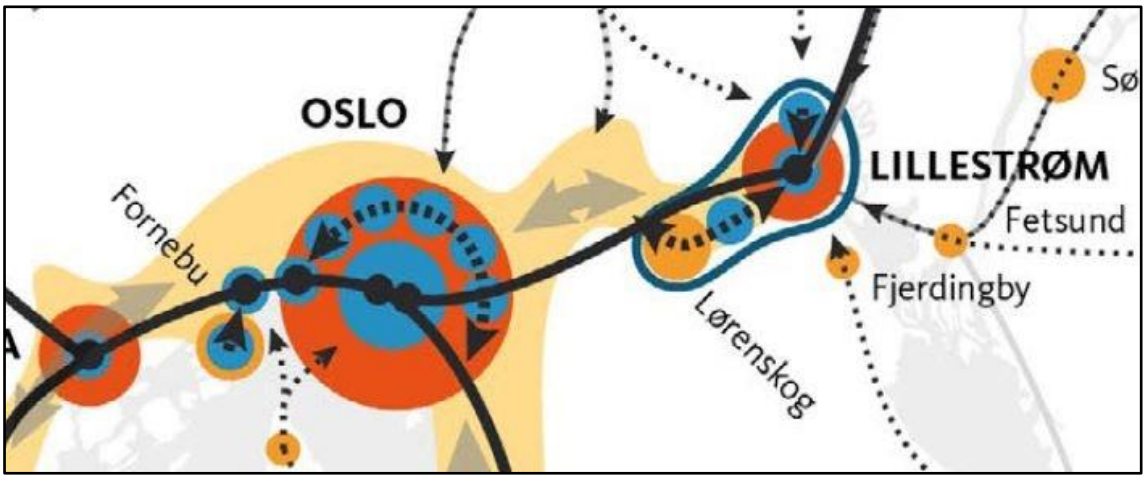
The merger and the disappearance of Akershus may mean a loss of consistency for the Oslo-Akershus cooperation for the development of the metropolitan area. Urban situations in these three former counties vary from rural areas to larger cities integrated in the metropolitan area of Oslo. In forthcoming years, a new Regional land use and transport plan for Viken will be adopted, with the challenge to coordinate all three counties' urban issues.



The 2016 Regional Plan for land-use and transport for Oslo and Akershus

It identifies Oslo as the main hub for development, and regional cities Asker, Sandvika, Ski, Ås, Lillestrøm and Jessheim as secondary growth drivers for a polycentric model. Public transport connections should be reinforced between these cities.

© Regional Plan for land-use and transport, 2016, City of Oslo, County of Akershus



Hovinbyen and the Grorud corridor are located between Oslo and Lillestrøm, two major growth centres of the city-region. Urban regeneration and highway transformation may be has important as improving public transport.

© Regional Plan for land-use and transport, 2016, City of Oslo, County of Akershus

2.2. Hovinbyen in the Regional Planning Strategy

These efforts are united with the neighbouring county of Akershus, through the 2016 *Regional Plan for land-use and transport* which promotes intensification in Priority Growth Areas: the city of Oslo, regional cities and local cities. In this polycentric plan, Oslo remains the main hub for transport and economy, while regional cities absorb an important part of the projected growth through densification. Local cities are expected to play a role at a smaller scale. New constructions should primarily be concentrated in these defined centres, to hinder urban sprawl. This non-binding Oslo-Akerhus regional plan should be soon replaced by a new Oslo-Viken regional plan.

The area of Hovinbyen, in the eastern fringe, is strategically located between Oslo and Lillestrøm, two main growth centres. Population in Lillestrøm is expected to reach 100,000 by 2040, which could mean a 16% increase in a 20 year span[19]. Hovinbyen and Oslo's fringe are defined in the *Regional Plan* as the urban belt, already catered by public transport, and providing mobility opportunities towards other growth centres of the city-region. Redeveloping Hovinbyen is therefore a major opportunity for the municipality to strengthen public transport accessibility with Lillestrøm and Lørenskog.

The transport system is the backbone of this regional structure, as it connects urban centres together. Oslo and Akershus seek to develop public transport service and efficiency, through the joint public transport company Ruter. Priority axes to be reinforced for the public transport system are defined in the Regional Plan, as well as an increased cycling and walking accessibility between Priority Growth Areas. The 2016 study *Concept Study Oslo Hub*[20] proposes the creation of new tramway, metro and bus infrastructure, to complete the forthcoming investments from the Oslo Package 3.

As for car use, all governing levels acknowledge increasing car traffic as an important sustainability issue that should be tackled. The *National Transport Plan* from 2014 expresses a Zero-Growth Objective for car traffic in urban areas. Increase in demand should be covered by public transport, walking and cycling. This objective has been reiterated in the recent *National Transport Plan for 2018-2029.*

Residential and commercial car-oriented land use in Akerhus. Lørenskog along the highway to Lillestrøm
© Photo Harald M. Valderhaug

[19] 12882: Population projections 1 January, by region, contents and year, Statistics Norway 2020
[20] Concept study Oslo Hub, Concept study for increased transport capacity to and through Oslo, From hub to network", Ruter, Statens Vegvesen, Jernbaneverket, 2016

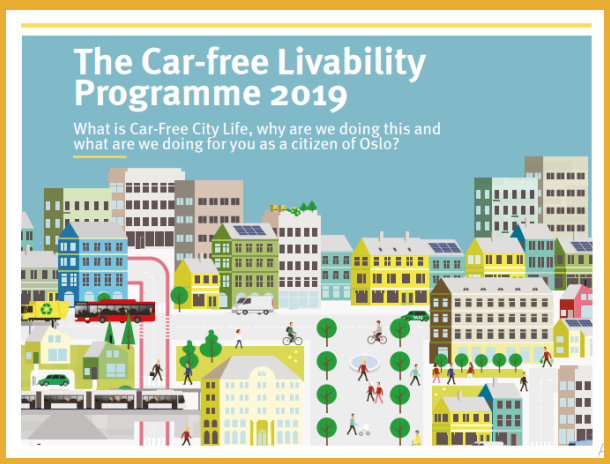
Car traffic reduction policy in Oslo

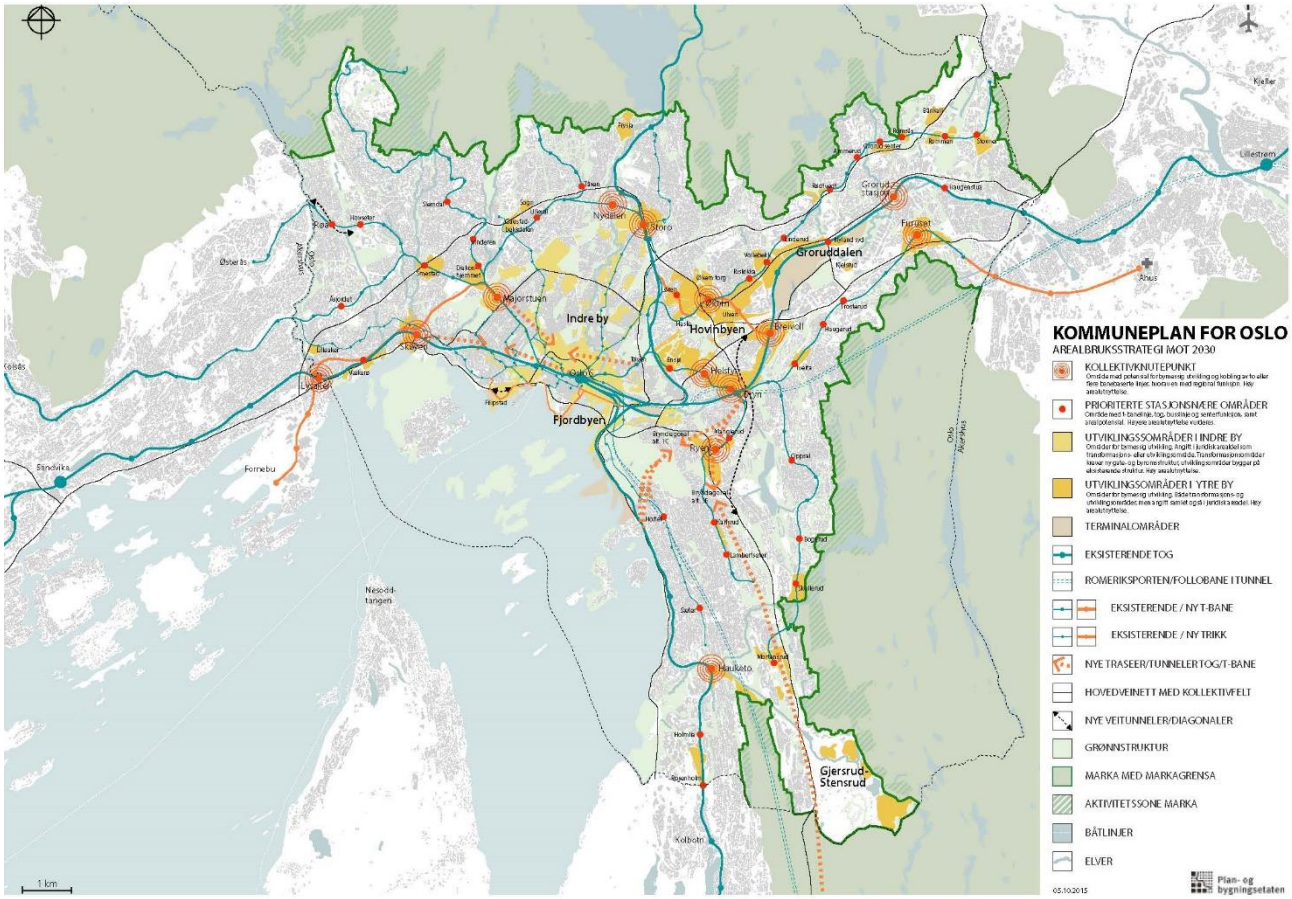
At the city level, the municipality of Oslo also aims to drastically reduce car traffic. In 2015 was defined a car traffic reduction policy, in the form of the *Car-Free Livability Programme*. A car-free area of 1.7km^2 has been marked out in the city centre, freeing-up the area stretching from the Central station to the Royal palace from motor vehicles.

On the other hand, the municipality encourages the development of electric vehicles. According to their estimations, Oslo is a world leader in terms of electric car use[1], with a fleet of 35,000 vehicles, thanks to important incentives (tax incentives, access to bus lanes…). While the policy is very ambitious, promoting electric vehicles will not solve the issues related to space needed for cars and induced traffic by the offer of high-speed roads in urban areas

A car-free street in central Oslo, with street furniture for pedestrians
© Paul Lecroart, Institut Paris Region

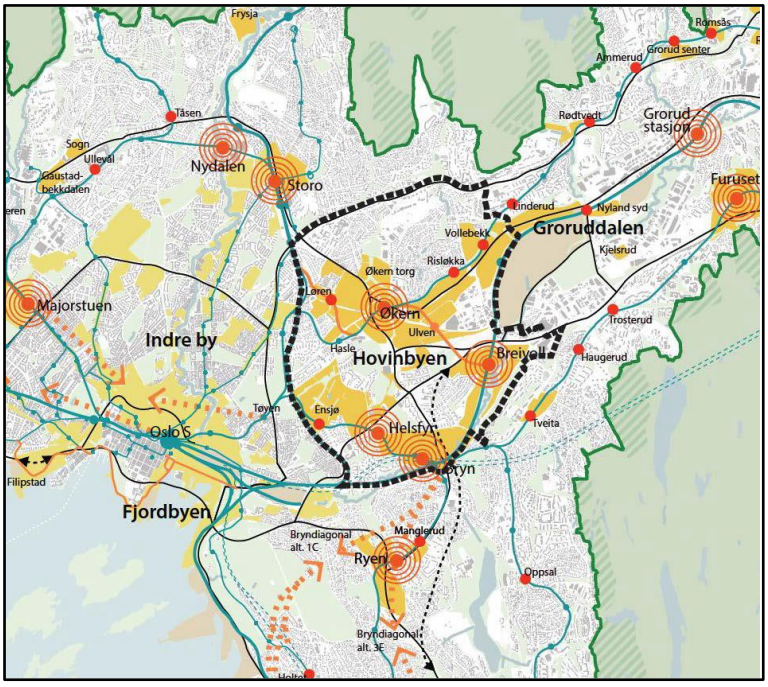
The 1.7 km2 car-free area in central Oslo planned within the framework of the Car-Free Liveability Programme since 2019
© City of Oslo





Strategic Municipal map *Oslo by 2030…*

© Municipal Plan, City of Oslo, 2015



… Showing Hovinbyen as a development area in the city-centre fringe

© Municipal Plan, City of Oslo, 2015

Fjord City Transformation Project

Fjordbyen (*Fjord city*) is a renewal project of the city waterfront started in the 1980s and still ongoing. It may be the most telling example of the strategy adopted by the municipality for its urban development, centered on urban densification. The project covers an area of 225 hectares, dominated by harbour activites and heavy infrastructure, and aims to create new mixed-use neighbourhoods, with housing, offices, cultural and leisure equipments.

The success of Fjorbyen relies partly on the transformation of the E18 highway. The route of this European highway follows the waterfront and links the Oslo region with Sweden. The E18 used to stop at the entrance of the city centre and continued from the area of Bjørvika. The highway was an obstacle cutting the urban life away from the fjord and contributed to worsening Oslo's congestion problems. Both parts of this 6-lane road have been joined in a 3km-long tunnel with an immersed part, funded by the Oslo Package 1. The transformation has been completed in two steps: first with the Festning tunnel under Akker Brygge, opened in 1990, then with the Bjørvika tunnel, opened in 2010. This transformation re-opened the access to the waterfront and allowed the pedestrianisation of the Rådhusplassen (*town hall square*) in 1994. Landmark projects are locating on the reconquered lands such as the Opera House (2008), the public library (2020) and the Munch museum (2021). At the former location of the E18 in Bjørvika, the urban boulevard on Dronning Eufemias gate opened to traffic in 2014, with a central tram line.

From top to bottom:

Bjørvika and the "Barcode" (background) and a new neighbourhood under construction (foreground), from the Fjordbyen project
© Paul Lecroart, L'Institut Paris Region 2019

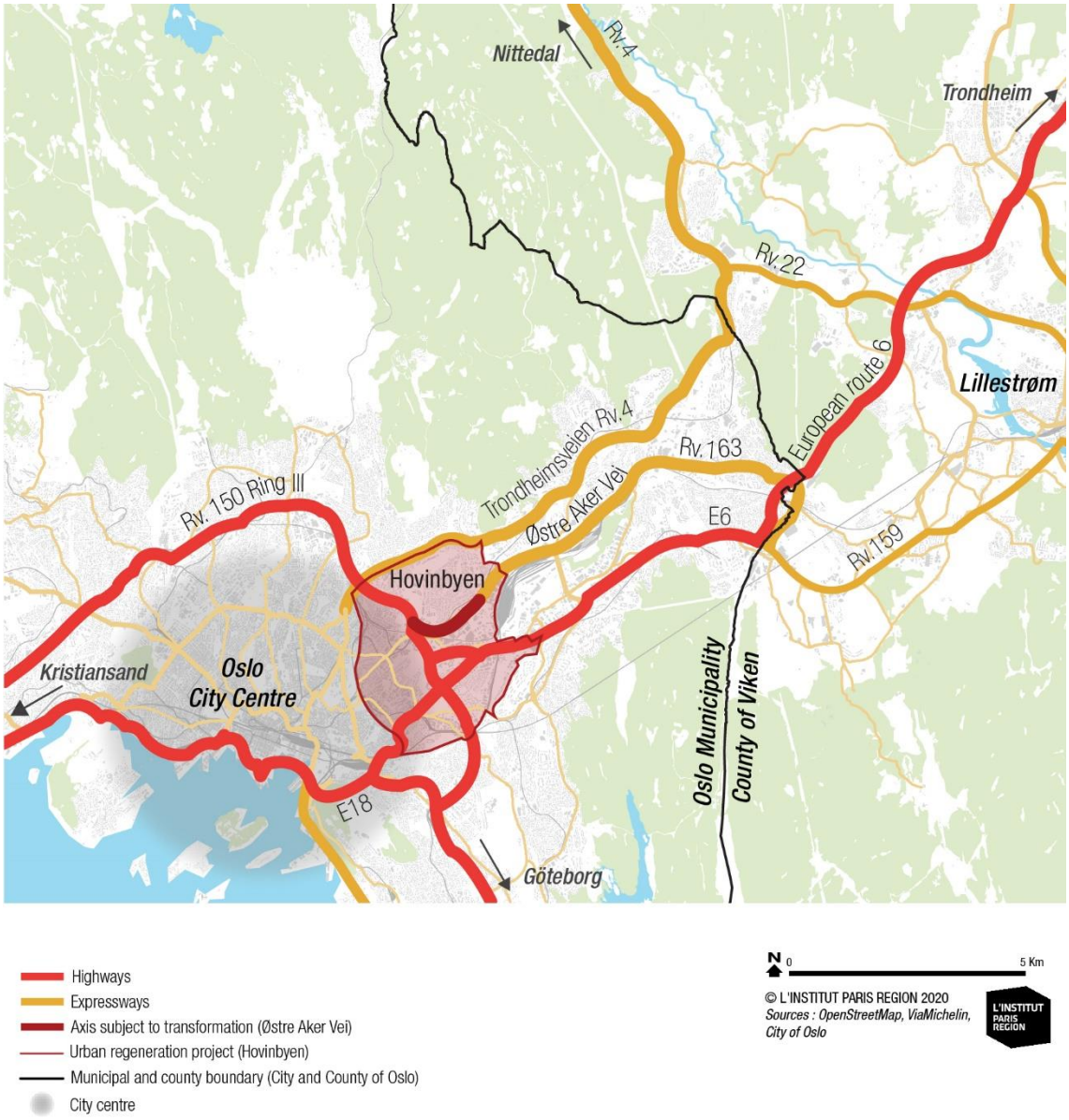
Masterplan of the projected redevelopment of Oslo's waterfront, 2013
© City of Oslo

The 1.1km long Bjørvika tunnel, with a 675 meters stretch immersed below sea level
© Statens Vegvesen

3. Project: Hovinbyen and Østre Aker Vei Rv.163

Oslo's growth pushes urban expansion further in its post-war suburban areas. One of the directions taken by this development is the eastern city corridor towards Lillestrøm, the Hovinbyen area and further east into the Grorud Valley. This area represents a major opportunity for the city, due to the significant surface of land that could be transformed in the forthcoming years, currently occupied by infrastructure and industries. The valley is the natural extension of the city centre and is already served by public transport on some parts, which fits into the regional scheme of urban intensification around transport nodes.

The City of Oslo has defined a 1,100 ha area in the direct vicinity of the city centre for the Hovinbyen project. It is a Priority Growth Area that will host an important number of housing and jobs in the coming decades. A *Strategic Plan* has been approved in 2018 to give guiding principles for the regeneration of Hovinbyen. The project's implementation will take place in progressive steps, as the area has been organised into sub-areas. Økern and Haraldrud, in central Hovinbyen, will undergo a regeneration which includes the transformation of a 1.4 km section of Østre Aker vei Rv.163, one of the valley's main motorways.



3.1. Regenerating Oslo's Eastern City Fringes

3.1.1. Beyond Hovinbyen: Regeneration Issues in the Grorud Valley

Hovinbyen is located at the eastern city-fringe of Oslo, connecting the city centre with the Grorud Valley between the green hills of Lillomarka and Østmarka. It used to belong in the city of Aker, which merged with Oslo in 1948. Before the Second World War, the valley was mostly agricultural with dispersed industrial and railway activities as well as housing. The urbanisation of the area speeds up during the second half of the century, together with the development of road infrastructure. In 2018, population in the valley's four districts (Bjerke, Alna, Grorud and Stovner) is estimated around 140,000 inhabitants[21]. This roughly represents one fifth of Oslo's total population.

View of the valley in the area of Alna in 1950 (left) and in 2020 (right)
© Oslobilder / Flyveselskap Wideroes / Vilhelm Skappel – Google Maps

A Transport Corridor. At the regional scale, the Grorud Valley firstly serves as a transport corridor. It is crossed by large transport infrastructure, with railways and highways linking to the eastern and northern parts of the country. Three main high-speed roads structure the area: Trondheimsveien (Rv.4) to the north of the valley, Østre Aker vei (Rv.163) in the centre and European motorway E6 in the south. The E6 carries the most important traffic charge, with up to 98,000 vehicles per day (ADT, average daily traffic) on some stretches. Trondheimsveien and Østre Aker vei appear as secondary axes to E6, with smaller traffic volumes: between 26,000 and 45,000 ADT for Rv. 4 and between 23,000 and 27,000 ADT for Rv. 163 in 2014[22]. Recent figures for Østre Aker vei show a slight increase with 29,400 ADT in 2018, however the global trend is a strong decrease in traffic since 2001[23]. All three roads meet the Ring III, Oslo's ring-road that carries around 75,000 vehicles every day. These three roads accommodate local, national and international traffic, with an important part of heavy goods traffic, due to the industrial and freight activities of the valley.

The Alnabru freight terminal, in the centre of the valley, is the main generator of heavy goods traffic in East Oslo. Alnabru is an intermodal platform for rail and road transport of national and international importance. Every year, approximately half a million containers go through this freight terminal[24]. These infrastructures accentuate the severance of the valley with the city centre, and within the area itself, where there is no identified urban centrality. They also generate important disturbances for inhabitants due to the high noise level and air pollution.

Car dependency is still strong in the Grorud Valley. Outside the Ring III, defining Oslo's city core, the modal share for public transport decreases significantly. Car reduction policies are weaker in these areas and public transport service is less important. This is most prevalent for travels towards neighbouring cities such as Lørenskog and Lillestrøm. Within the valley, the walking rate is relatively high, since it represents 34% of local travels[25]. An important rate of travels going through Grorud is transit traffic, which confirms the corridor status of the area. According to the National Road Authority[26],

[21] "Systemanalysen for rikvegnettet i Groruddalen. Kortversjon", Statens Vegvesen, 2018
[22] Ingun RISNES, "Ny riksvegdiagonal i Groruddalen – hvilke muligheter og utfordringer gir det?", Statens Vegvesen, 2015
[23] Scenariovurderinger, Fossumdiagonal-Trondheimsveien-Østre Aker vei, Statens Vegvesen, juni 2007.
[24] Gunnar Ridderström, Hanne Marie Sønstegaard, "Planlegging for helse og trivsel i Groruddalen i Oslo", The Norwegian Medical Society, 2020
[25] Ibid.
[26] "Systemanalysen for rikvegnettet i Groruddalen. Kortversjon", Statens Vegvesen, 2018

car traffic in 2014 was split as follows: 20% of through traffic, 20% of internal traffic and 60% of traffic to/from the Grorud Valley.

The valley's current "patchwork" urbanism results from a lack of planning and sectorial decisions. It is characterized by a fragmented urbanism, with low-density housing and a zoning of functions, mainly dominated by industrial activities. This leads to a valley secluded from the city centre and subject to multiple forms of disturbances, which generate difficult living conditions for local residents.

Population in the Grorud Valley counts among the most vulnerable ones in Oslo. Nearly 50% of the inhabitants are immigrants or have immigrant background, going up to 70% in some areas [27]. Statistics total 170 different nationalities in the area. In average, these populations have a lower income than the rest of the population and experience greater integration difficulties.

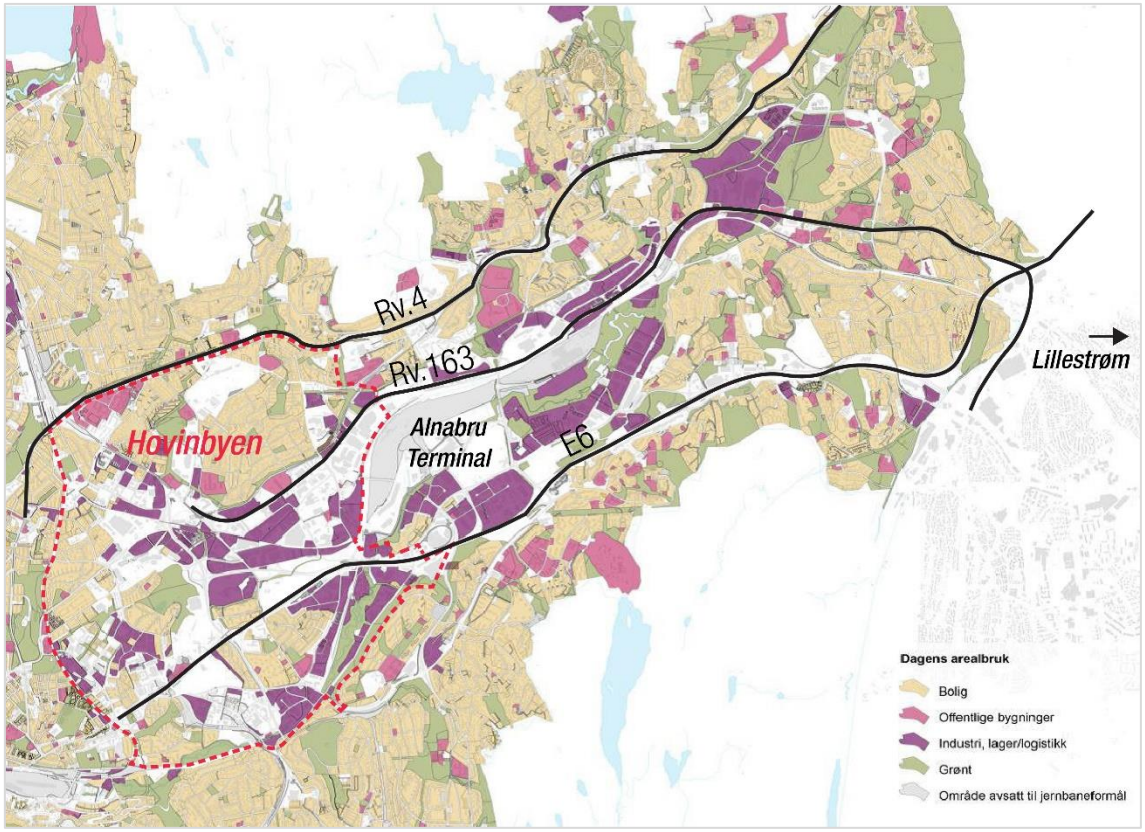
The Grorud Valley Regeneration Programme. In response to these social issues, the City of Oslo launched in 2007 the Grorud Valley Integrated Urban Regeneration Project (*Groruddalssatsingen*), with a budget of 1.5 billion Norwegian krone (approx. €140 million). Implemented measures target better education conditions, access to employment and improvements for the local environment. The first 10-year investment programme covered the 2007-2016 period with a focus on sustainable development and the improvement of living conditions; the second programme from 2017 to 2026 concentrates on employment and new facilities.

For the environment component, efforts from the municipality aim to regenerate blue-green corridors and create real parks[28]. The predominance of industry and transport infrastructure results in a very mineral environment for its inhabitants, which has weakened the former natural structure of the Grorud valley. Scattered strips of green spaces can be found between industrial sites and residential areas, as remains of the rural past of the valley. Alna and Hovinbekken, the two rivers that meander through the eastern part of Oslo, were buried under successive layers of infrastructure and urbanisation. Through the Grorud Valley project, the City of Oslo aims to reopen buried rivers in the Valley and promote landscaping projects (walking trails, parks). In 2015 was completed the reopening of a 650 metres long corridor of the Hovinbekken river.

Despite this complex context, both Hovinbyen and some parts of the Grorud Valley will inevitably transform in the near future. It represents the largest area with potential transformable land close to Oslo's city centre and served by two metro lines. These substantial assets will make of the valley the natural extension of urban functions in the forthcoming decades.

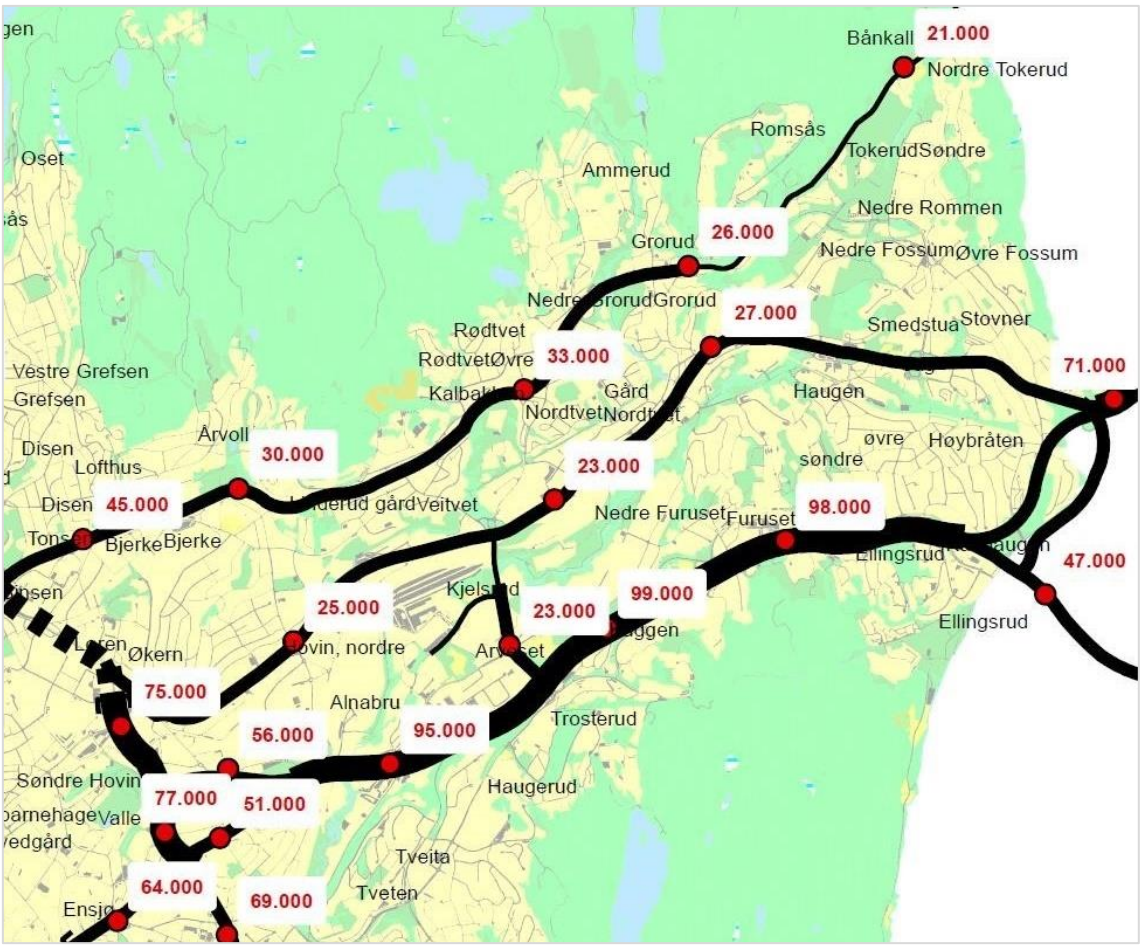
Grorud valley looking West with E6 Highway in the foreground, Haraldrud and Økern in the background
Land use in the valley is extensive, car-oriented and fragmented by rail, road and electric power infrastructure

[27] Kati PITKÄNEN and al., Nature-based integration. Nordic experiences and examples, Nordic Council of Ministers, TemaNord, 2017
[28] "Application for candidacy to the Landscape Award of the Council of Europe", City of Oslo, 2016-2017



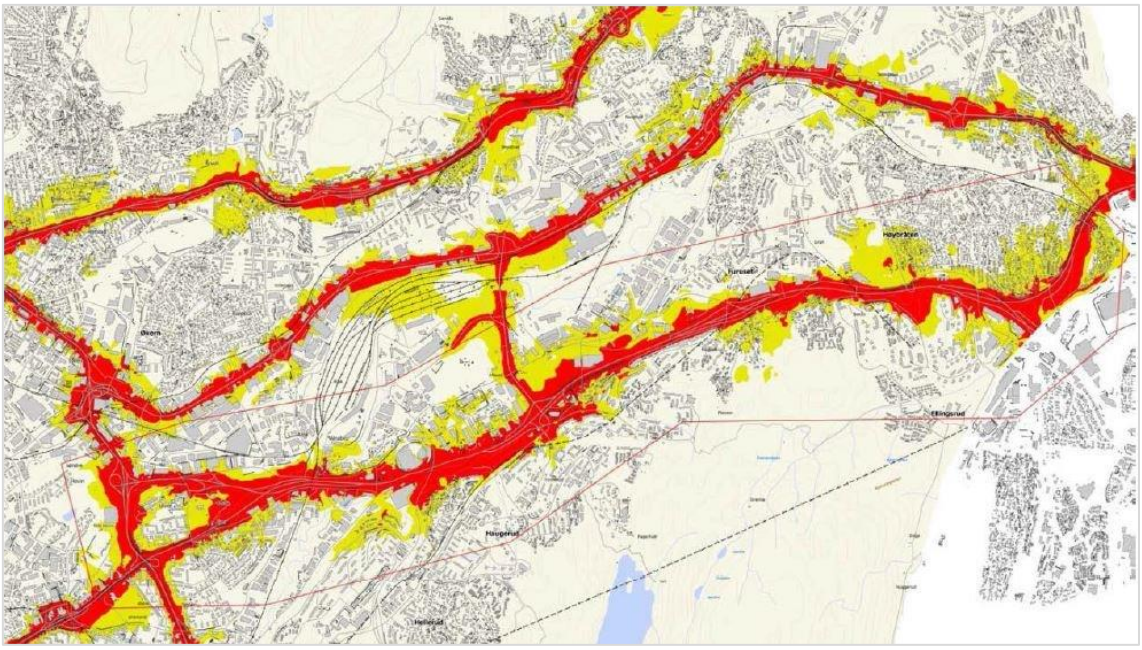
Current land use in Groruddalen
Yellow = housing ; Pink = public buildings ; Purple = Industry/storage/logistics ; Green = green spaces ; Grey = railway activity
© Delrapport kollektivstrategi © Statens vegvesen (National Road Authority) / Nordconsult / Modified by L'Institut Paris Region

Alnabru terminal, an intermodal freight platform generating important heavy goods traffic in the Grorud Valley
© Shutterstock



Average daily traffic volumes in the Grorud Valley in 2014

© Statens Vegvesen



Noise disturbance caused by highways in the Grorud Valley in 2014

© Statens vegvesen (National Road Authority)

3.1.2. Hovinbyen Strategic Plan (2018): The Vision

Overview of Hovinbyen (foreground), looking southwards to the city centre and Oslofjord (background)
The area is a patchwork of housing, road infrastructure, industrial sites and a few public facilities. It benefits from a direct proximity to Oslo's city centre.
© City of Oslo, Agency for Planning and Building Services

In anticipation of the city's projected growth, the municipality has identified Hovinbyen (*Hovin city*) as a *Priority Growth Area* for redevelopment. The City of Oslo launched an international idea competition in 2014 for the regeneration of the area, as well as public consultation workshops. The competition shed the light on the transformation potential of the area: blue and green landscape projects, new liveable neighbourdhoods, reconnected streets, mixed-use, sustainable mobility…During this reflection year, the municipality defined its vision for the area, as well as the main guiding principles.

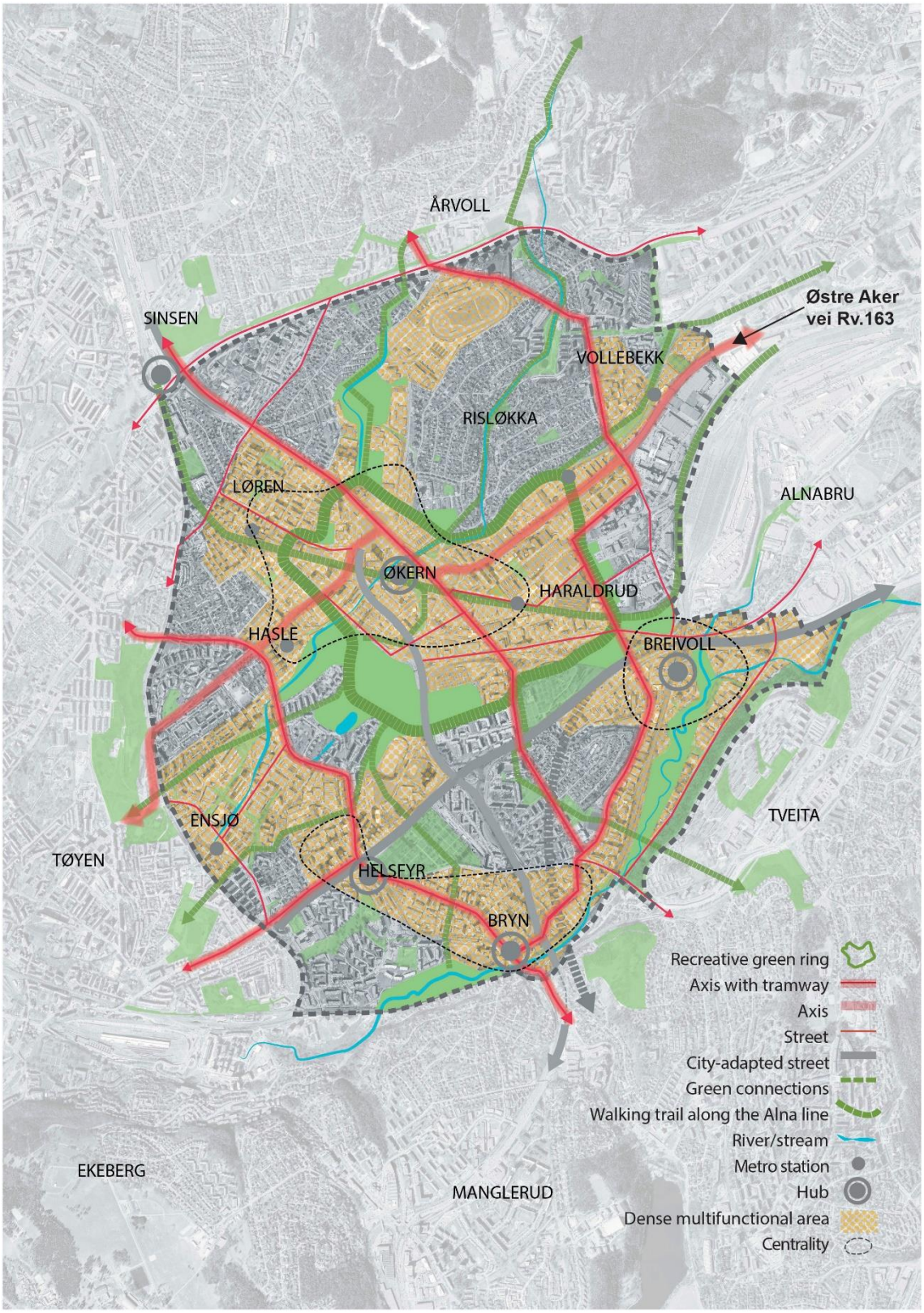
Hovinbyen first appeared in planning documents in the 2015 Municipal Plan *Oslo by 2030*[29]. This urban project is now the largest one in the city-region today, with an area covering 1,100 hectares, almost equivalent to the current city centre of Oslo. It has a strategic position, well-served by public transport, between 5 and 20 minutes away from central Oslo.

The urban redevelopment of Hovinbyen is expected to welcome up to 80,000 new inhabitants, in addition to the 40,000 that live in the area today, through the construction of 30,000 to 40,000 new housing units. The creation of 2,500,000m^2 of commercial space is also planned, with the potential to create 50,000 to 100,000 new jobs by 2050, which would double of the current number of jobs of the area.

The process adopted by the City of Oslo for the regeneration of Hovinbyen relies on a global vision, as presented in the 2018 *Strategic Plan*[30]. The city has defined three main objectives for this new area: integration of sustainable principles in the urban development, creation of multifunctional and attractive neighbourhoods seamlessly linked to the existing ones and promotion of walking, cycling and public transport as the most attractive modes.

The project also puts forward guiding principles for the spatial development, such as a 5km *Green Ring* in central Hovinbyen, presented as a priority element for the area. The municipality defined a 50-year perspective for the completion of the regeneration project, which would take us to 2065.

[29] "Municipal plan 2015 – Oslo by 2030", Oslo Kommune, 2015, 189p.
[30] "Strategic Plan for Hovinbyen", Oslo Kommune, 2016



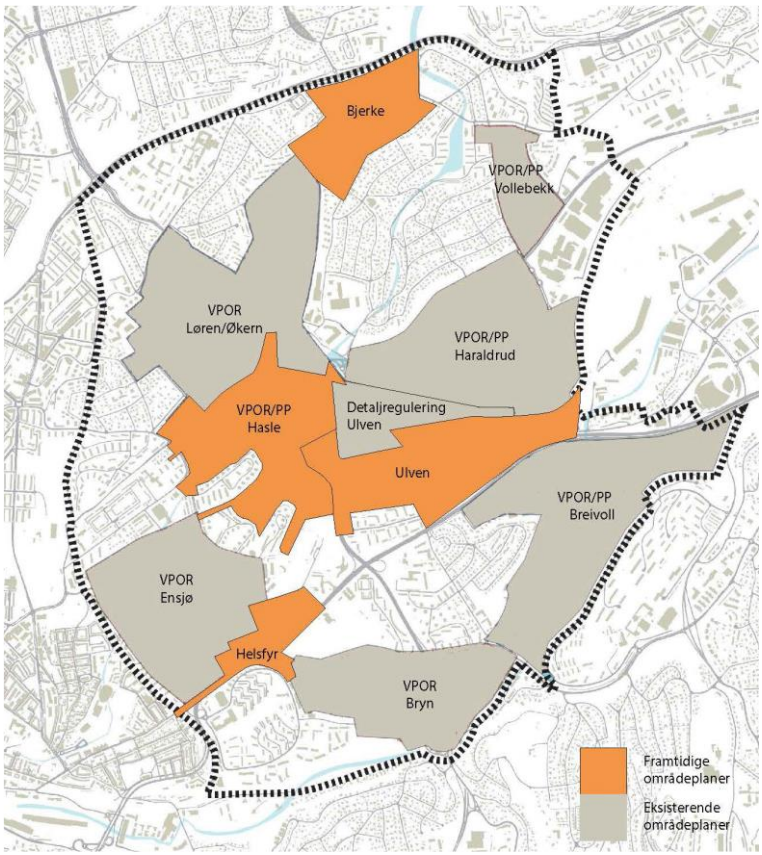
Broad guiding principles for the development of Hovinbyen
Østre Aker vei is one of the main streets of the project, connecting to Økern, the heart of Hovinbyen with the main transport hub. The Green Ring is supposed to strengthen this new urban centrality, which includes the western part of Haraldrud
© Strategic plan, City of Oslo, 2016 / modified by L'Institut Paris Region

This *Strategic Plan* gives guidelines and broad objectives the transformation of Hovinbyen. It could be described as the presentation of a vision for the project, rather than a master plan. More detailed planning orientations are elaborated at the scale of sub-areas. Given the current mixed land-use of Hovinbyen, all areas are not meant to be profoundly transformed, such as the residential ones. The transformation focuses on specific sites, mostly industrial, with a regeneration potential. The development includes ten sub-areas: Bjerke, Vollebekk, Haraldrud, Økern, Hasle, Ulven, Breivoll, Ensjø, Helsfyr and Bryn (see sub-areas plan below).

The City of Oslo defined priorities for regeneration, starting from west to east, from sub-areas closest to the city centre to the most suburban ones. Økern is a “Priority 1” area and one of the first neighbourhoods to be regenerated after Ensjø and Lören, as construction work is underway. Haraldrud and Vollebekk are sub-areas crossed/adjacent to Østre Aker vei Rv.163. According to the Strategic Plan, Haraldrud is a “Priority 2” area, whereas the redevelopment of Vollebekk is less strategic for the next years.

Each of these sub-areas is guided by local development plans: a *Planprogram* and a *VPOR*. The *Planprogram* provides a general framework for the new development, land-use, process, public participation and other relevant topics. It can also be used to set framework conditions for work on subsequent zoning plans for an area. The VPOR (*Veiledende plan for offentlige rom*), also known as the *Guiding Principle Plan for Public Space*, is a planning tool developed by the City of Oslo for areas with different zoning plans to ensure important urban connections. The Guiding Principle Plan for Public Space is not legally-binding but its principles must be continued and legally ensured in subsequent regulation plans. It also provides the basis for agreements between landowners/developers and the City of Oslo on the financing of necessary infrastructure.

The Hovinbyen project is carried out by the city of Oslo as the lead driver. The National Road Authority (*Statens Vegvesen*) is involved in the project, as the main stakeholder for matters regarding road infrastructure and car traffic. Ruter, the joint public transport company for Oslo and Akershus, is part of the discussion involving the development of the public transport network. The County of Viken (specifically the former Akershus County) should also be a project stakeholder, since the impact of Hovinbyen stretches beyond Oslo. Cooperation with the private sector is a key element of the project, as the municipality does not own much land in Hovinbyen. Landowners, developers and investors are required to fund the roads and public spaces through a financial participation.

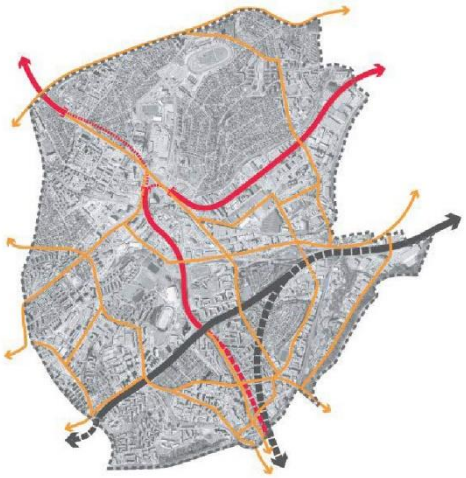


The different sub-areas of Hovinbyen and their local development plans

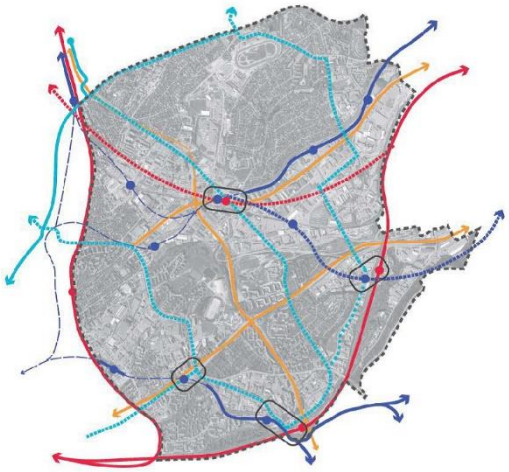
PP = Planprogram (urban development)
VPOR = Guiding Principle plan for Public Space

Orange = future development plans
Grey = existing development plans

Hovinbyen today and tomorrow (artist vision)
The night visualization (bottom) showing the “Green Ring” surrounding the centre of Hovinbyen is a proposal from the winning team of the 2014 idea competition. Østre Aker Avenue can be seen in the centre-background.
© City of Oslo / Topic arkitekter



Street network
- Motorway
- Motorway in tunnel
- Thoroughfare
- Thoroughfare in tunnel
- Distribution street
- Future distribution street



Public transport network
- Railway
- Proposal for a S-bane train in tunnel
- Metro
- Metro in tunnel
- Tramway
- Tramway / bus
- Dedicated bus lane
- Hub

Blue-green network
- Green Ring
- Green connection / walking trail
- Alna railway (for freight transport)
- River / stream
- Park / green space

Networks structuring the regeneration of Hovinbyen
Østre Aker vei appears as a thoroughfare with a dedicated bus lane

3.1.3. The mobility strategy for Hovinbyen

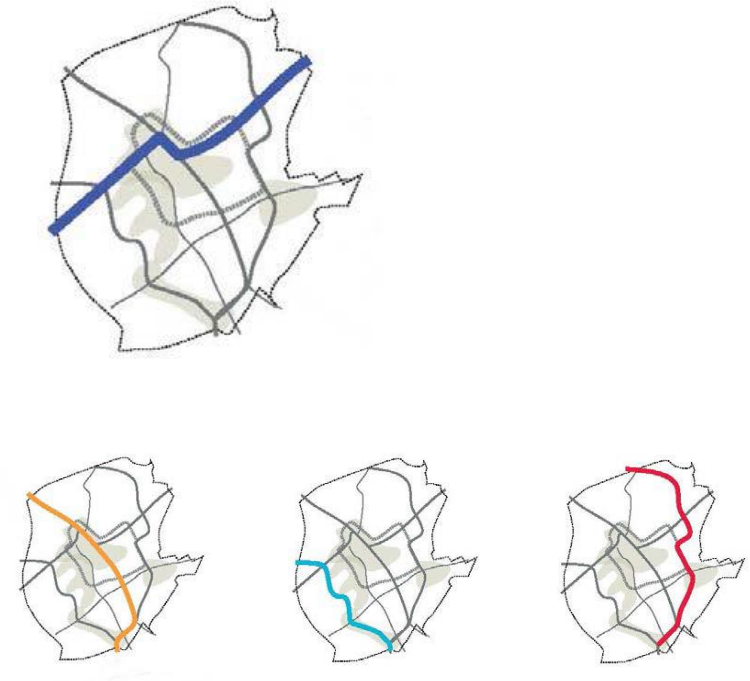
With the important number of future new residents and workers, combined to the ambition of reducing car-use, the mobility strategy is a crucial point for the development of Hovinbyen. The transport offer and the urban design can foster the urban integration of this new area and decrease the mental distance from Hovinbyen to the city centre.

Hovinbyen's regeneration relies on the development of the transport network as the backbone of the entire area. Four main axes would structure the project:

- Byaksen (*city axis*, west-east): Østre Aker vei and Økernveien
- Diagonalen (*diagonal*, northwest-south): Ring III Rv.150
- Bybeltet (*city belt*, west-south): Grenseveien and Østensjøveien
- Nord-søraksen (*north-south axis*): Brobekkveien, Haraldrudveien, Ole Deviksveien

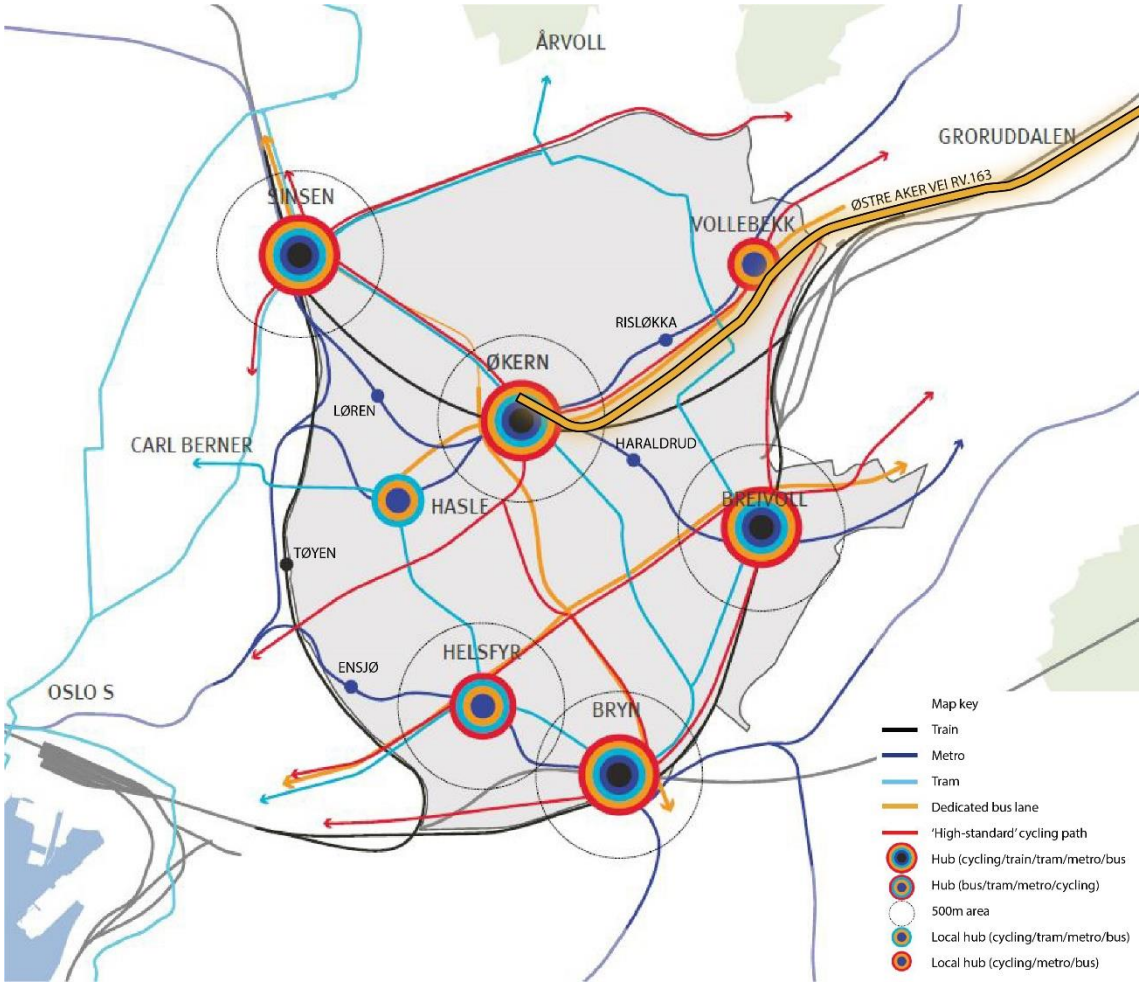
In accordance with the objective of promoting alternatives to the private car, these four axes are designed to accommodate all transport modes, including public transport, cycling and walking. The grid incorporates smaller 'city-integrated' streets, providing access for inner neighbourhdoods. These local streets would prioritise pedestrians, cyclists and public transport commuters over car users, in order to offer a secured and environmental-friendly mobility for inhabitants. The goal is to reach a combined modal share of 50% for walking and cycling in Hovinbyen[31].

Public transport service should also be developed along with the regeneration project. Currently, there are 9 metro stops (lines 4 and 5), one train station in Tøyen and bus service. Hovinbyen is already quite well catered for a city-fringe area. The *Strategic Plan* proposes the strengthening of public transport through the creation of two new metro stops (Haraldrud and Breivoll), three tram lines and an increased bus service. Hovinbyen would host three indermodal stations: Økern, Breivoll and Bryn (and Sinsen at the project outskirt), interconnecting trains, metro, cycling paths, bus and tram. Transport network development, involving roads and public transport, will be elaborated in collaboration with the National Road Authority and Ruter.

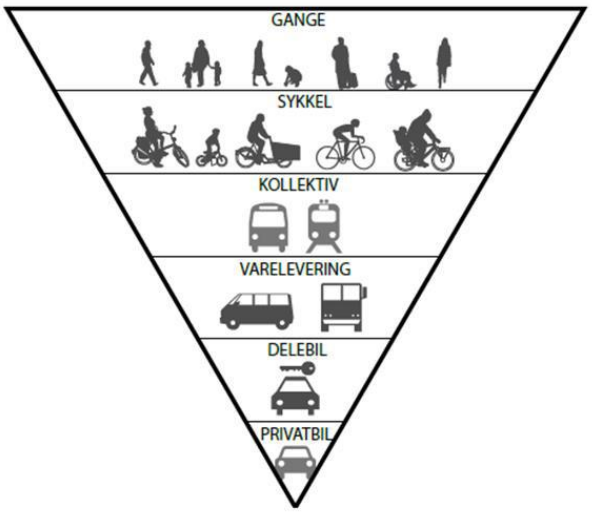


Four main axes of Hovinbyen: Byaksen (Østre Aker vei), Diagonalen, Bybeltet and Nord-søraksen
They structure the area and all share circulation space with multiple transport modes: car, public transport, bikes and pedestrians
© City of Oslo, Strategic Plan, 2016

[31] Interview with Elin Hoff Johansen, Project manager at the City of Oslo, July 3rd 2020



The public transport and cycling system envisioned for Hovinbyen
The guiding plan targets the creation of a finer and interconnected public transport and cycling network to cater for the area. The aim is to encourage the shift from car use in Hovinbyen. This network also connects to Oslo city centre and to the Grorud Valley.
© City of Oslo, Strategic Plan, 2016 / modified by L'Institut Paris Region



Transport modes priorities in Hovinbyen
The City of Oslo aims at attaining walking and cycling as the most popular modes in the area. The private car should be the least accommodating solution.
© City of Oslo, Strategic Plan, 2018

3.2. Østre Aker vei transformation project

Østre Aker vei (Rv.163) is one the four main potential axes of the transformation project for Hovinbyen, as designed in the 2016 *Strategic Plan*. The redevelopment of Haraldrud into a multifunctional and attractive neighbourhood relies on the Rv.163's better urban integration. Somehow, it is not a central component of the Hovinbyen project as other underused urban areas where ready for redevelopment first. The pacification of Østre Aker vei is a major part of the regeneration project but is not the only driver of the whole area. Nonetheless, it remains an important challenge for the City of Oslo as many issues have to be taken into account: traffic, environmental impact, planning impact on the development of fringe projects, phasing, funding…

Østre Aker vei Rv.163 in Hovinbyen, Oslo
© Nettavissen

Østre Aker vei Rv.163 in the Grorud Valley on the eastern outskirts of Oslo (Nedre Rommen project area)
© DR

3.2.1. The urban expressway and its surroundings today

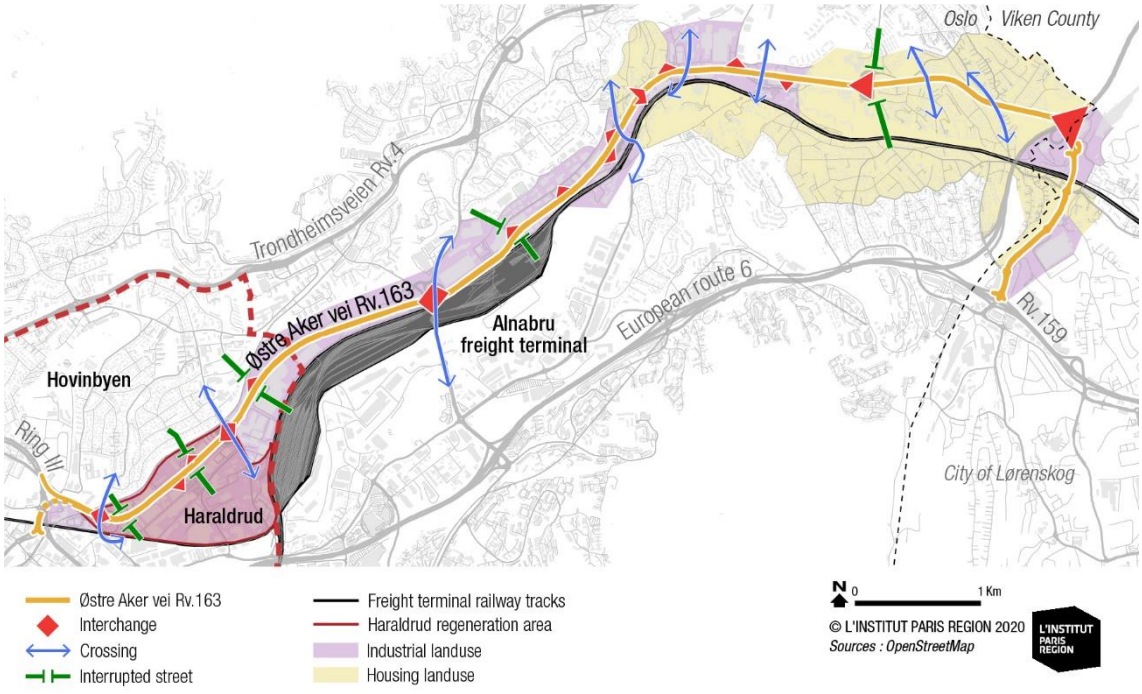
Østre Aker vei is an historic rural axis of the former city of Aker, which is now merged with Oslo, dating back to the beginning of the 20th century. According to local archives, the road infrastructure was completed in 1959 and has been enlarged several times since then to finally become an expressway.

Today, Østre Aker vei, national road 163 (Rv.163), is an 11 km-long highway stretching from the centre of Hovinbyen to the neighbouring city of Lørenskog. 9.8 km are located in Oslo and 1.2 in Lørenskog. This 4-lane road is one of the main roads of the Grorud Valley, with an average traffic charge of 25,000 to 29,000 vehicles, including 9-11% of heavy goods vehicles. Rv.163 connects with the Ring III Rv.150 on its western end, and with the E6 on its eastern end, at the border with the city of Lørenskog, where the road finally connects to the Rv.159 towards Lillestrøm. Østre Aker vei's route is more or less parallel and close to the railway tracks of the Alnabru freight terminal. The presence of a high-speed road next to the logistics platform fostered the location of industrial activities along the road. On the eastern stretch of the Rv.163, housing neighbourhoods (mostly social) can be found, in areas suffering from the disturbances of the road's vicinity.

In total, there are 5 complete interchanges linking to local streets and 12 incomplete ones (with 2 or 3 ramps). Some of these interchanges appear as dead ends, as they only serve businesses giving lorries a direct access to the expressway. Østre Aker vei is crossed by 9 streets, *via* underpasses and bridges, with 4 local streets are interrupted by the road. In most parts, crossing the expressway is of little interest since these streets run up against the railway tracks. Bus stops can be found along the road, but there is little space, or not at all on some sections, for pedestrians.

The 1.4 km stretch subject to transformation is located in the sub-area of Haraldrud. Despite its central location, Haraldrud is disconnected to its environment. It is separated from the residential area to the north by the metro railway line and Østre Aker vei. It is enclosed on its eastern and southern sides by the Alnabru freight terminal and railtracks. Further south, E6 motorway also creates a major barrier.

Constructions in Haraldrud are mostly industrial: storage facilities, a major recycling plant, as well as retail space. The current urban design of Haraldrud privileges car users, with large parking spaces, multiple roundabouts and small sidewalks. A few historical landmarks can be found in Haraldrud, such as the Quality Hotel 33 along Østre Aker vei, a 1960s architectural heritage. In this area Østre Aker vei's main function is to serve industrial activities with heavy goods traffic. A pedestrian bridge crosses over the road connecting to the Risløkka metro station. Over its 1.4km span, Østre Aker vei only connects to 3 local streets: Haraldrudveien, Risløkkalléen and Brobekkveien.



The 11 km Østre Aker highway between Oslo and Lorenskøg bordered by industry, railway tracks and housing

View of Haraldrud today with the recycling plant in the foreground and Østre Aker vei (top far right)
© City of Oslo, Planning and Building Services

Østre Aker vei road environment seen from a pedestrian point of view
Top image: Bus stop for Airport Express Bus and for Lørenskog Centre bus #67 along the highway near Hotel 33.
Bottom image: The footbridge linking Haraldrud to Risløkka metro station.

© Paul Lecroart, L'Institut Paris Region 2019

The evolution of Østre Aker vei in the Økern-Haraldrud area: from pathway to expressway
From top to bottom: 1950, 1974 and 2018
© City of Oslo / Google Maps

3.2.2. Current project for Østre Aker vei in Haraldrud

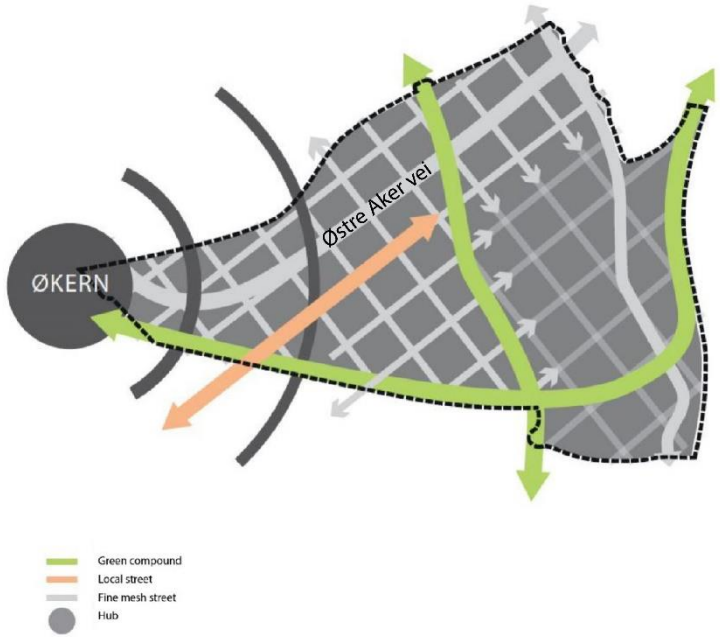
The transformation of the industrial area of Haraldrud into a mixed-use district is meant to contribute to the creation of a new urban centrality in Hovinbyen. Future public transport hubs in Økern and Breivoll, and the potential Haraldrud metro station, should give quite a good accessibility within walking distance for inhabitants and workers. The Haraldrud project is scheduled until 2050 and is envisioned to transform the area into a more urban neighbourhood, welcoming new inhabitants and diversified activities, while partially preserving productive ones.

The Haraldrud project is outlined by two guiding documents: the *Planprogram*, approved in 2015, and the *Guiding Principle plan for Public space*, approved in 2017. Both plans give general directions for the development of the area but remain flexible. For example, the detailed land-use can later be discussed with local land owners.

In the forthcoming years, Haraldrud should host mixed-use functions, with workspaces, housing, shops, public facilities and green spaces. The recycling plant down south is meant to remain in the area, with a better urban integration of its surroundings. This idea does not create consensus among stakeholders. The City of Oslo believes the facility could be integrated in the regenerated area, but some stakeholders such as City Districts and local land owners argue that it creates too many nuisances and that its relocation is important for the success of Haraldrud's redevelopment[32].

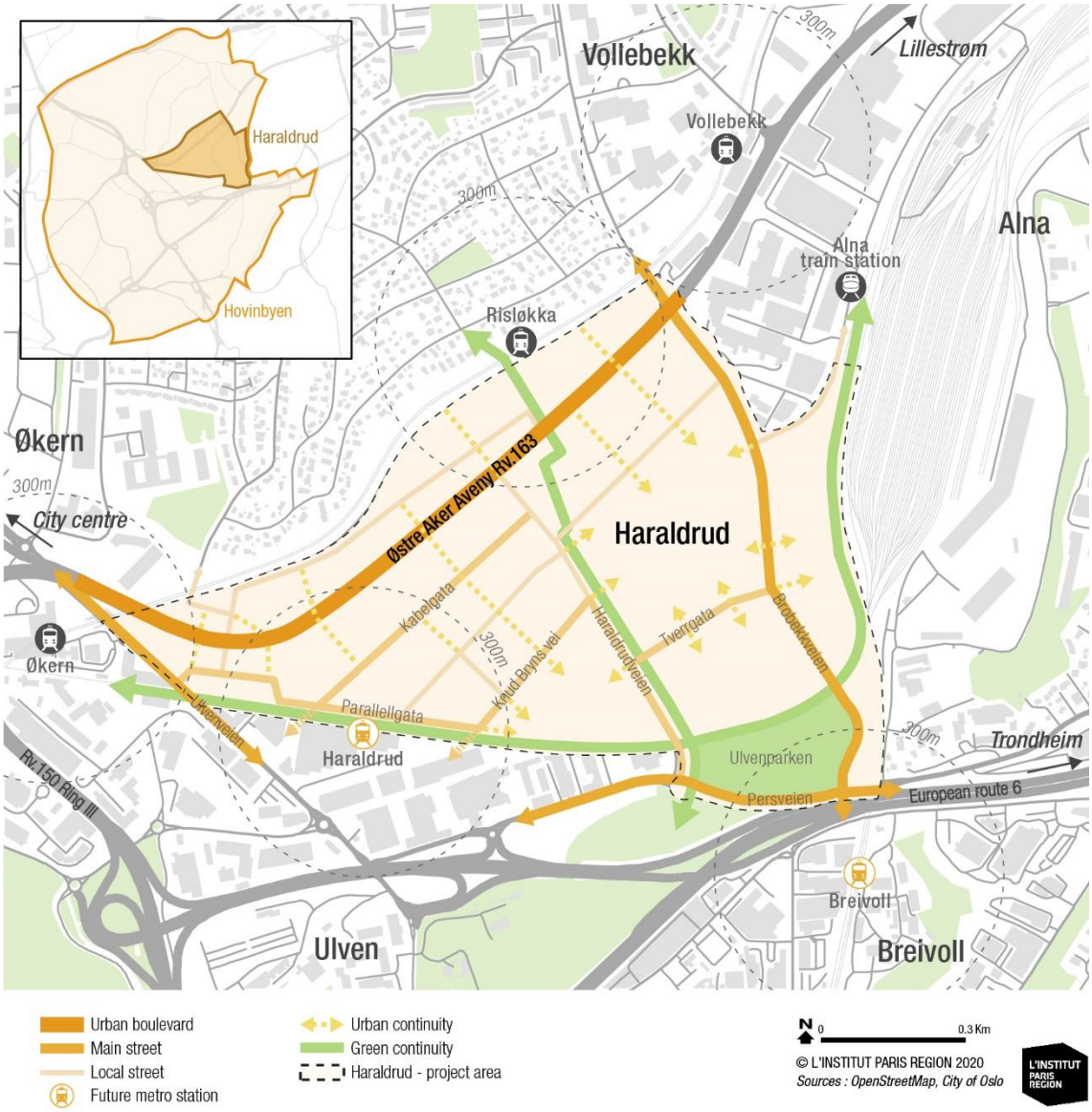
As for public spaces, guiding documents present the creation of a finer road grid to break the large industrial sites. These new streets would be pedestrian-friendly with larger sidewalks and active facades. Haraldrud would also be one of the areas crossed by the Green Ring, meant to connect sub-areas with one another. This landscaping concept would translate into a green continuity linking Risløkka metro station in the north to the future Ulvenparken in the south.

Østre Aker vei Rv.163 would be the central artery of Haraldrud and one of the major axes of Hovinbyen, as expressed in the *Strategic Plan*. As one of the Grorud Valley's main high-speed roads, the Rv.163 needs to be transformed, as a prerequisite for the regeneration of the whole area. Mitigating nuisances generated by the expressway would allow the development of new urban functions. The targeted section is 1.4km long and stretches from the Ring III to the Brobekkveien intersection in Vollebekk. The aim is to convert Østre Aker *vei (road)* into Østre Aker *aveny (avenue)*, a pacified urban boulevard. From a highway surrounded by warehouses and industrial activities, the road would shift to an avenue with an increased urban density and active ground floors.



Concept diagram of the vision for the redevelopment of Haraldrud
Økern appears as the main hub connecting the area. A finer road grid, a green structure and a pacified expressway could the main elements of the public space revitalisation.
© City of Oslo, VPOR Haraldrud, 2017

[32] "Haraldrud VPOR" (veiledende plan for offtenlige rom) regarding public space, Agency for Planning and Building services, 2017, 76p.



The Østre Aker vei avenue proposals and its impact on the street connectivity of the Haraldrud area
© City of Oslo © L'Institut Paris Region

The Agency for Planning and Building services of the City of Oslo considered three alternatives for the transformation of the Rv.163. One of them is the construction of a tunnel under the existing road to deflect car traffic underground. This alternative would allow a greater pacification of the surroundings, with a speed limit lowered to 40km/h and increased redevelopment possibilities. This option is not supported by the municipality nor by the National Road Authority, as it does not consider the rest of the road and traffic systems in the Valley. Moreover, burying the Rv.163 does not solve the issue of car traffic and congestion.

Two other alternative designs are presented in the 2017 *Guiding Principle Plan For Public Space*[33]. They share similar features, as they both propose the reduction of car space to one lane on each direction, the creation of dedicated bus lanes, cycling paths and larger pedestrian sidewalks. In both cases, recommendations include the speed limit reduction to 50 km/h[34] and tree planting along the road. These "avenue" options also enable the design of at-level crossings and the reconnection to adjacent streets, to link Haraldrud to the residential neighbourhood northwards.

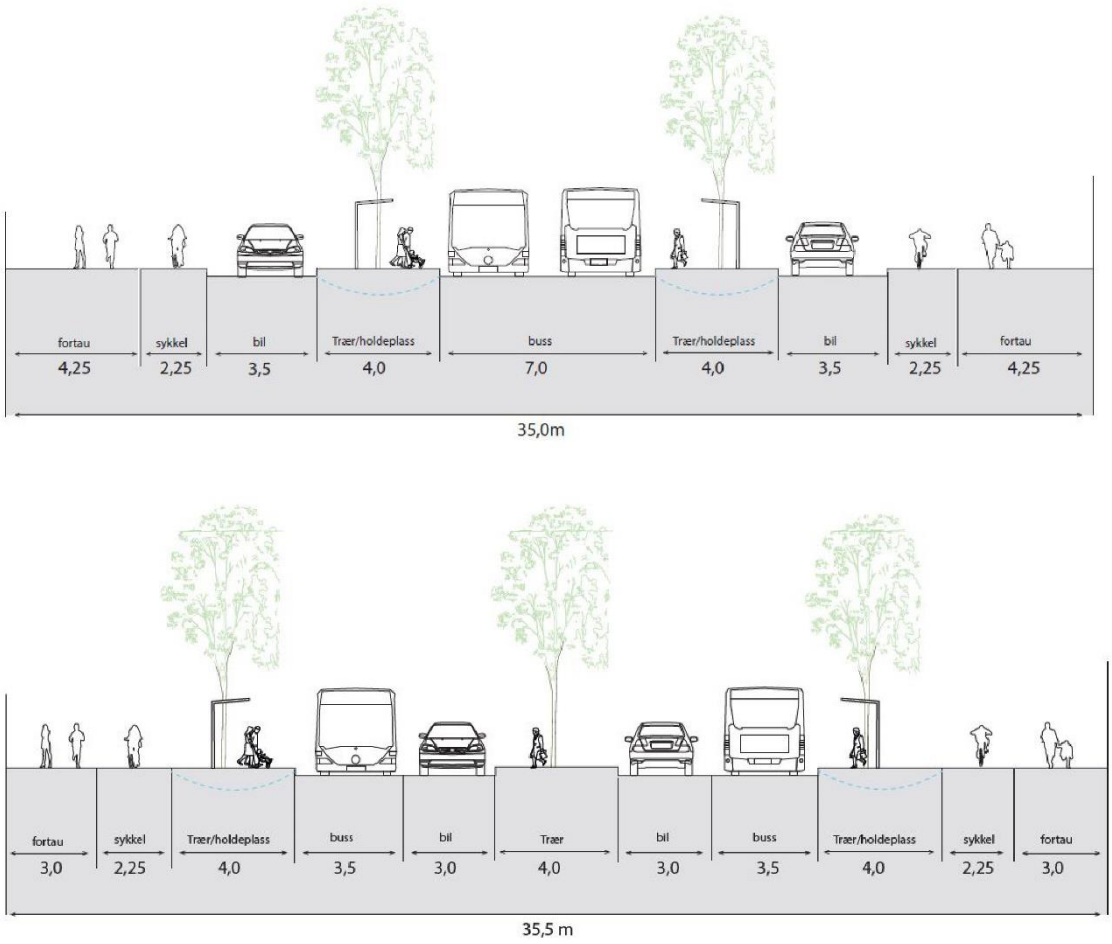
[33] "Haraldrud VPOR" (*Veiledende Plan For Offtenlige Rom*), Agency for Planning and Building services, 2017, 76p.
[34] Ibid.

The first scenario (see illustration below) is 35 metres large, which fits the current width. It suggests a central carriageway dedicated for buses, one car lane in each direction, as well as cycling paths and 4.25 metres large sidewalks. The second alternative (see illustration below) is 0.5 metre larger that the first design. On the central dual carriageway, one is reserved for buses in each direction. Sidewalks are smaller (3 metres) but a central planted median is created to separate both directions of the road.

The Agency for Planning and Building Services did not settle for a definitive design yet but supports a pacified boulevard alternative that does not involve the construction of a new road infrastructure. This vision for Østre Aker vei does not create consensus among all stakeholders, even though it is backed up by local land owners and the business association Oslo Nord. The business association believes two car lanes are insufficient to cater for the area.

City Districts expressed the concern that this transformation would transfer car traffic to other local streets and therefore create more congestion. They believe the Rv.163 road corridor should remain as is[35]. Overall, all stakeholders agree on the necessity of further studies to assess the potential impacts of Østre Aker vei transformation. A more detailed design plan for the road will be presented in a future dedicated plan.

The first blocks in Haraldrud should be completed by 2030. Two other delivery phases are planned, starting in the northern part and down to the south. Haraldrud Nord should be the first section to be densified, with the construction of office buildings between Østre Aker vei and the metro railway tracks. The City of Oslo plans to fund the transformation of Østre Aker Vei with the land value capture expected from the construction of these new buildings in Haraldrud Nord.

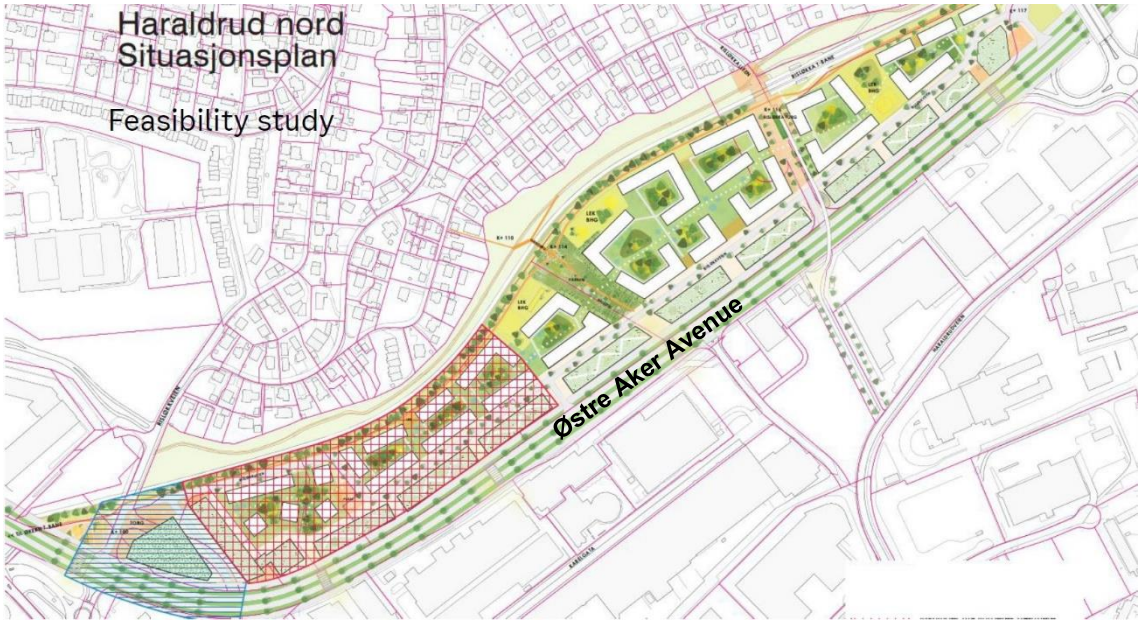


Sections of considered alternatives for the transformation of Østre Aker vei into an urban boulevard
Two options are considered: either a central bus way with two general traffic lanes on both sides or two bus lanes between the sidewalks and the two general traffic lanes. In both cases, car-traffic lanes are divided by two as compared with the current situation
Source: City of Oslo, VPOR Haraldrud, 2017

[35] Ibid.

Projected street layout in Haraldrud

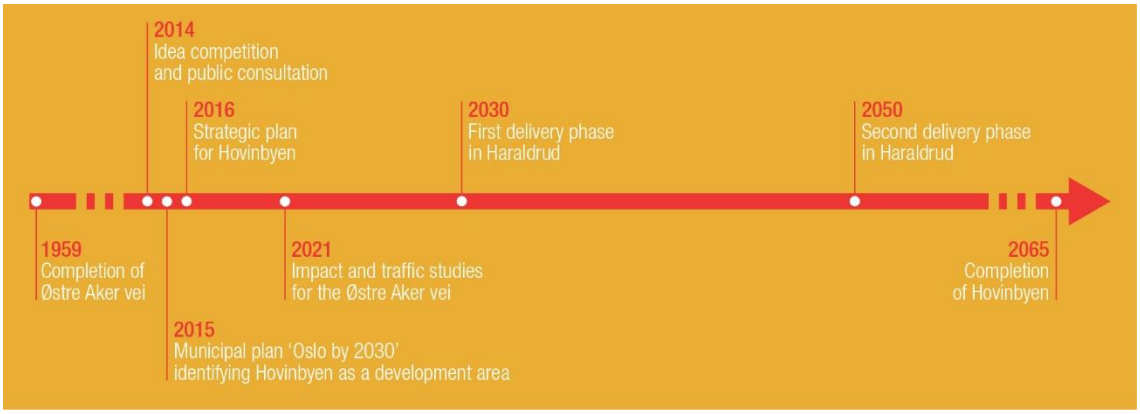
© City of Oslo, VPOR Haraldrud, 2017



Feasability study for Haraldrud Nord along the Østre Aker Avenue

This design would allow for new street access but does not take into account the possibility of new connections with Haraldrud South

© City of Oslo



Timeline of the transformation of Hovinbyen and Østre Aker vei

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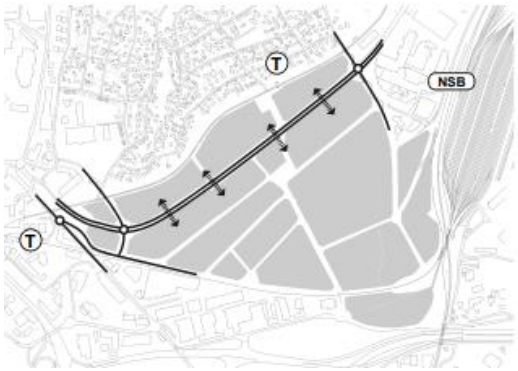


Reconnecting Østre Aker vei

© City of Oslo, Planprogram Haraldrud

Østre Aker vei today and tomorrow

Artist view of potentialities, a 2x2 new boulevard axis with a bus lane median and wide sidewalks

© Google Maps (top) and City of Oslo – De Gayardon Bureau (bottom)

4. Discussion: Transforming Expressways into Boulevards in the East Oslo Fringe

4.1. Road Infrastructure Projects

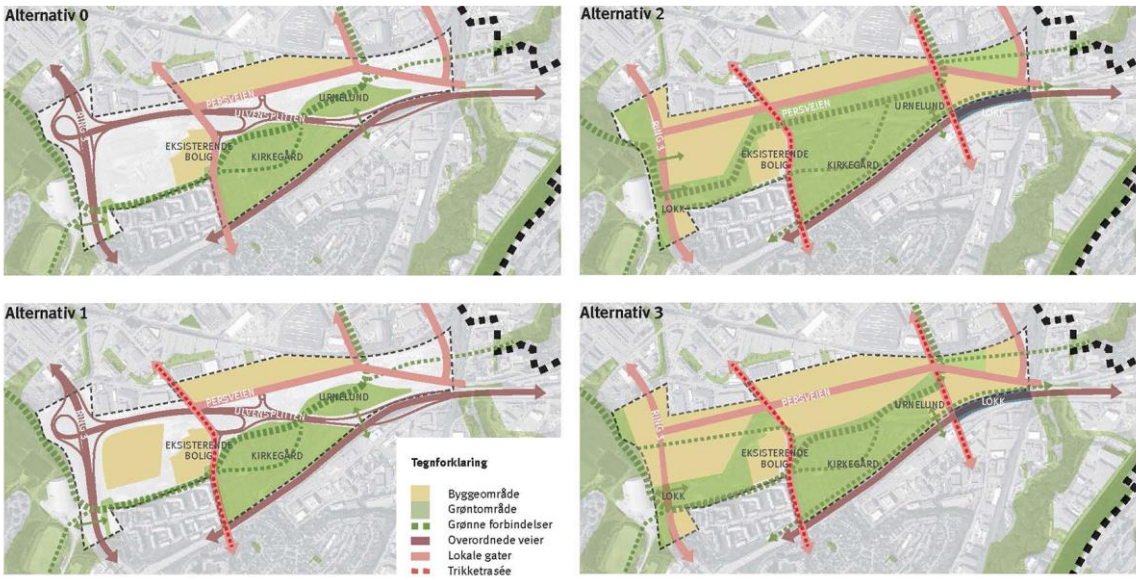
The completion and upgrading of the highway infractructure in the Grorud Valley has been at the centre of many relfections and projects in the last two decades, many some of them prior to the identification of Hovinbyen as a regeneration area. They target the valley's three east-west highway corridors:

- E6, the main motorway of international importance to the South of the valley;
- Rv.163 Østre Aker vei, an expressway serving mostly industrial and logistic sites;
- Rv.4 Trondheims vei, an expressway bordered by residential neighbourhoods to the North.

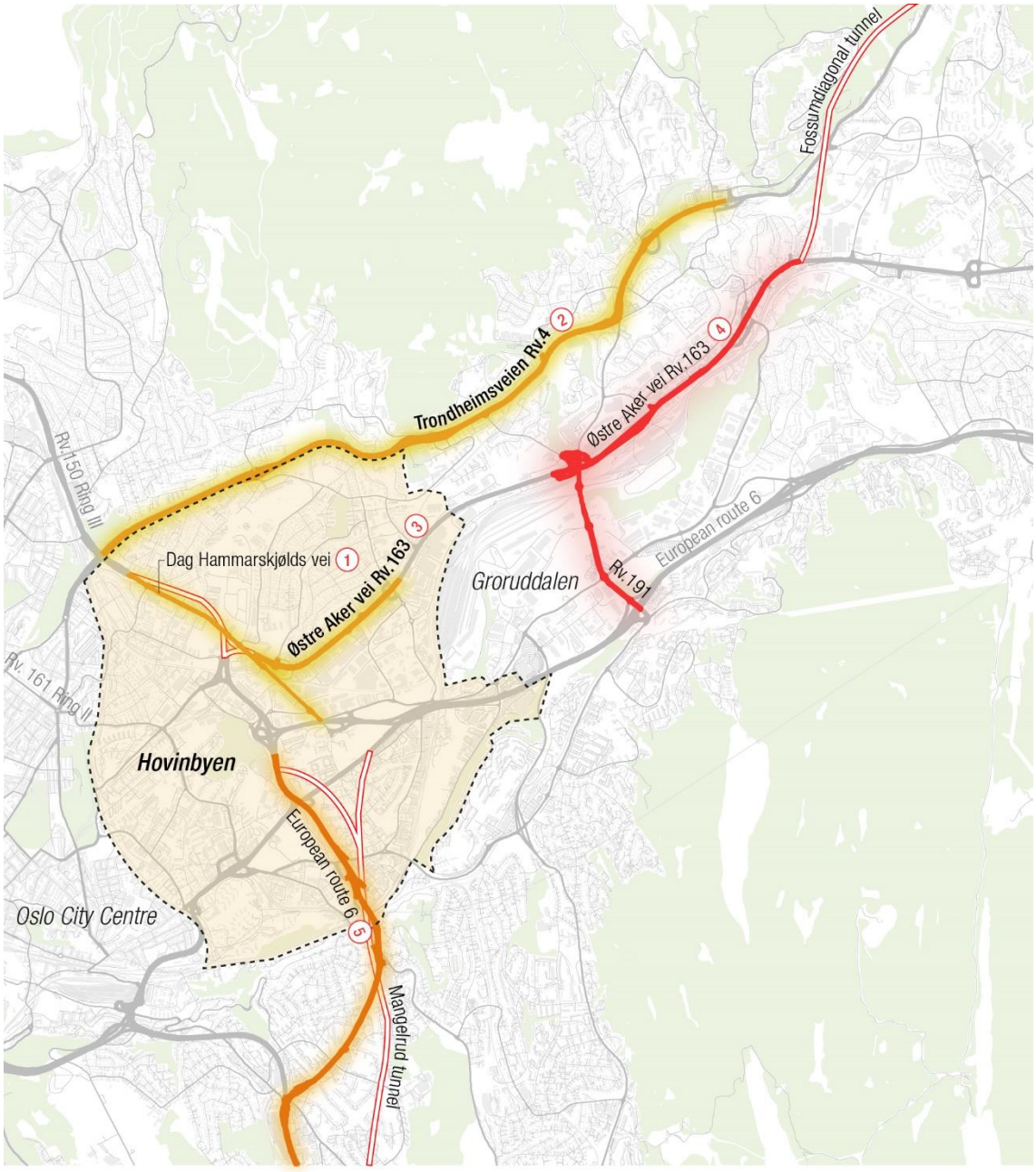
These infrastructure projects aim to improve the functioning of these road corridors, but also have the ambition of reducing the urban barrier effect created by road infrastructure. Many projects are funded through the Oslo Package 3, renewed in 2008 and currently ongoing. They are incoroporated the Hovinbyen project or will impact it in the medium to long term.

The first notable and completed road transformation project is the tunnel from Sinsen to Ulven and through Økern, open to circulation in 2015. It buries the Ring III on a 1.1 km stretch as well as the junction with Østre Aker vei (#1 on map p.45). This allowed the creation of the urban boulevard Dag Hammarskjølds vei and re-established the historical road Ulvernveien through Økern. It was a prerequisite for property development in the area, as construction works are currently underway in Økern, to become a new multifunctional centre.

In the coming years, other highway transformations are planned. The National Road Authority is studying the construction of a tunnel for the E6 in the southern part of Hovinbyen to Abildsø to relieve Mangelrud and other areas from heavy traffic. It is to start in 2024, as part of the Oslo Package 3 (#5 on map). This transformation would decrease urban disturbance and create space for alternatives modes. As mentionned in the 2018 *Strategic Plan*, reducing the road capacity of E6 would allow, if approved, urban development in surrounding areas, namely Ulven and Helsfyr.



Options study for a better urban integration of the E6 in the Southern side of Hovinbyen
As the E6 should be buried in a tunnel for an important stretch, funded by the Oslo Package 3, urban transformations in surrounding areas are under reflection
© Strategic Plan, City of Oslo, 2018, Planning program for Ulven



1. Rv.150/Rv.163, construction of a tunnel and development of Dag Hammarskjølds vei, completed in 2015 (Oslo Package 3 for Rv 150 Ulven-Sinsen)
2. Rv.4 Trondheimsveien, boulevardisation project and construction of a tramway on a portion, under study (Oslo Package 3 for Groruddalen)
3. Rv.163 Østre Aker vei, boulevardisation project, under study
4. Rv.163 Østre Aker vei, construction of a tunnel linking to Rv.4 for traffic deviation, under study (Oslo Package 3 for Groruddalen)
5. European route 6, construction of a tunnel and transformation of the highway, start of the construction planned for 2024 (Oslo Package 3 for E6 Oslo East)

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Sources : OpenStreetMap, City of Oslo, Statens Vegvesen

Main highway transformation projects in the area of Hovinbyen

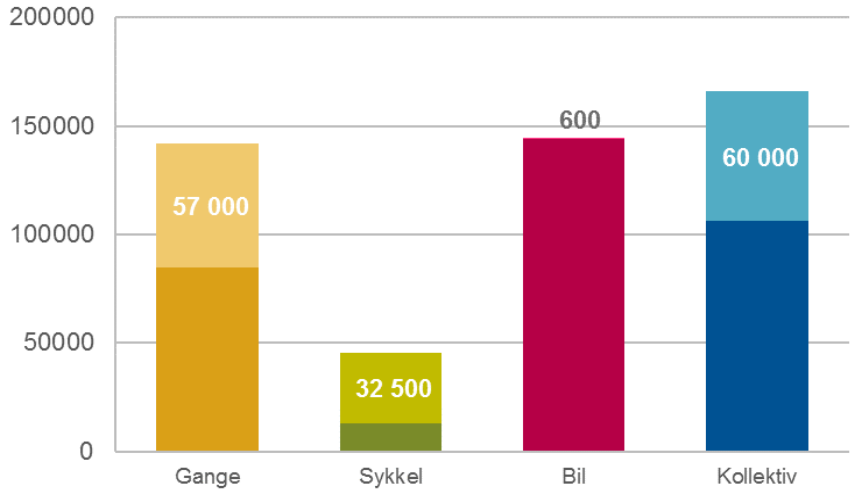
Dag Hammarskjølds vei in the area of Økern
This boulevard was open to circulation in 2015, along with the tunnel for the Ring III underneath. Økern is currently under redevelopment.
© Paul Lecroart, L'Institut Paris Region 2019

The Haraldrud Project Area in Hovinbyen with Øtre Aker vei Rv163 at centre
The at-level highway could be quite easily reconnected to its edges
© City of Oslo, DR

4.2. Boulevard Scenarios and Issues for Highway 4 and 163

The National Road Authority and the City of Oslo agree on the need to reduce the environmental impact of Trondheimsveien (Rv.4) for the surrounding residential areas. With the Hovinbyen project emerging after 2014, the City of Oslo is considering the transformation of the Rv. 163 into a boulevard as an important urban development opportunity, raising the issue of reducing the traffic volumes and speed limits, and questioning the heavy goods transport function of the corridor. The Alnabru freight terminal's capacity has been increased over the years and a study from Oslo Package 3 considers a further capacity increase. Given the projected demand growth for the terminal, it appears that heavy goods are an essential dimension of Oslo's regional growth. On the other hand, the Hovinbyen mix-use development objectives rely on the transformation of the Østre Aker vei into a boulevard.

Zero Traffic Growth Objective. Moreover, national objectives from the *National Transport Plan 2018-2029* target the decrease of motor vehicles in freight traffic and a better balance with rail and sea. Overall, mobility projects regarding the Grorud Valley are guided by the national Zero Growth Objective, targeting a zero increase in car traffic by 2030. A 2016 study[36] shows that to be able to meet the increasing transport demand without any further car use growth (+149,500 travels expected by 2030), walking should cover for 38% of supplementary travels (+57,000 travels), cycling for 22% (+32,500 travels) and public transport for 40% (+60,000 travels).



Necessary changes in modal split to achieve the Zero-Growth objective in car traffic in Grorud Valley by 2030

Necessary shift to walking = 57,000 travels; cycling = 32,500; public transport = 60,000

New Road Scenarios to Divert Traffic. Since 2007, the National Road Authority has considered several scenarios to improve Rv.4's situation through the study *Scenariovurderinger, Fossumdiagonal, Tronhdeimsveien, Østre Aker vei*[37]. The design principles of road studies for the Grorud Valley is (a) to keep E6 as the most strategic axis; (b) to define Østre Aker vei as a service road for freight traffic linking to Alnabru freight terminal through Rv.191 (#4 on map p.45) and (c) to start transforming Trondheimsveien into a pacified boulevard.

The main design alternative is the creation of a tunnel liaison to deflect car traffic from Trondheimsveien in order to pacify the highway. Two tunnel options are suggested, but no decision taken at this stage:

- the first scenario is the creation of the Bredtvetdiagonal road link in central Grorud to connect Rv.4 to Rv.191, close to Oslo city centre;
- the second scenario is the building of the Fossumdiagonal link, to deviate traffic to Rv.163 on the outskirts of the city, before arriving to the central area of the valley.

[36] "Delrapport kollektivstrategi Systemanalyse rv. 4 Trondheimsveien med diagonal og rv. 163 Østre Aker vei", Statens Vegvesen, 2017, 50p.

[37] "Scenariovurderinger, Fossumdiagonal, Trondheimsveien, Østre Aker vei", Statens Vegvesen, 2007

A 2008 study[38] presents Fossumdiagonal as the best alternative, since it allows a more urban design for the whole of Trondheimsveien within the valley, prioritising public transport and soft modes. The creation of a tram line, with a dedidated central carriageway on Trondheimsveien has been proposed in the *Ruter Tonsenhagen Tramway Study* of 2009[39]. This new line would link Sinsen (Oslo centre) to the northern-eastern areas of the valley in Tonsenhagen. It would remove 2 car lanes and strenghten the boulevard transformation of Rv.4, displacing part of its heavy traffic on the Østre Aker vei Rv 163.

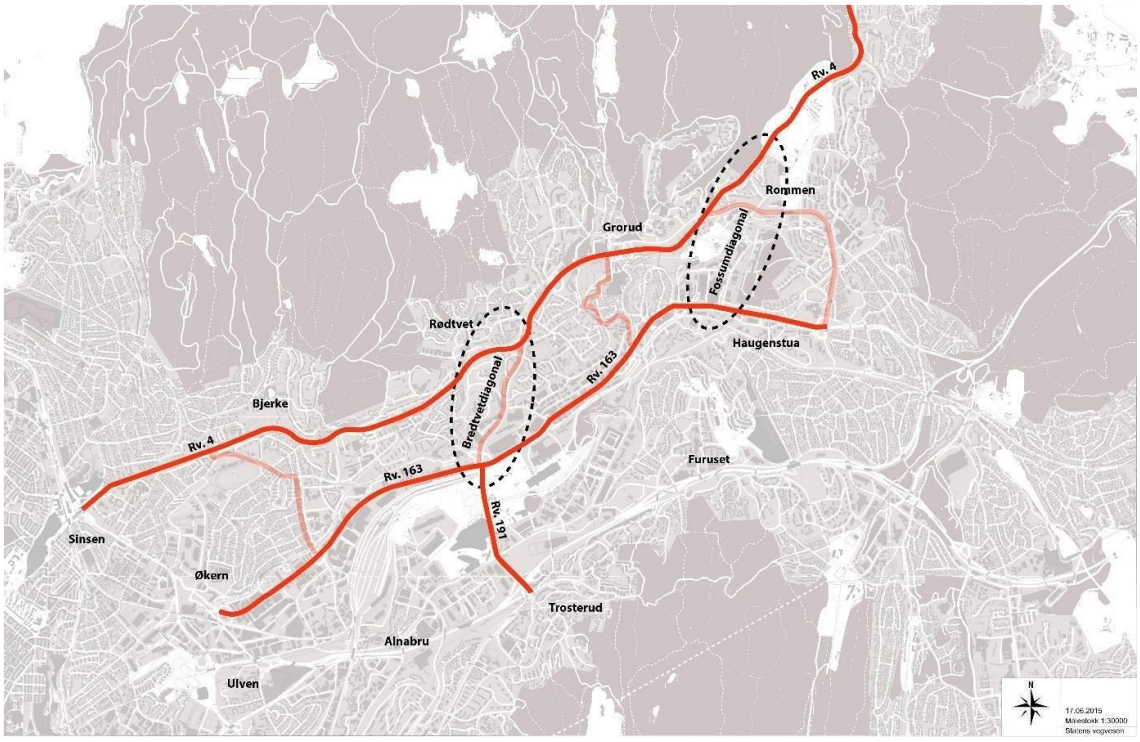
This Fossumdiagonal project for the Valley may appear contradictory with the municipality's vision for Østre Aker vei within Hovinbyen. On one hand, the Agency for Planning and Building Services envisions the western stretch of the road as a future urban avenue for the area, surrounded by mixed-use functions and fostering alternatives modes of transport. On the other hand, the National Road Authority reflects upon the road capacity increase of the Østre Aker vei on the eastern section to Rv.191, to cater for heavy goods traffic heading to/from Alnabru terminal.

Traffic Functions and Design of the Østre Aker vei. The municipality of Oslo is not convinced by the necessity of constructing a diagonal road linking both highways[40]. Discussions are ongoing between both stakeholders to agree on a common plan meeting interests of both parts.

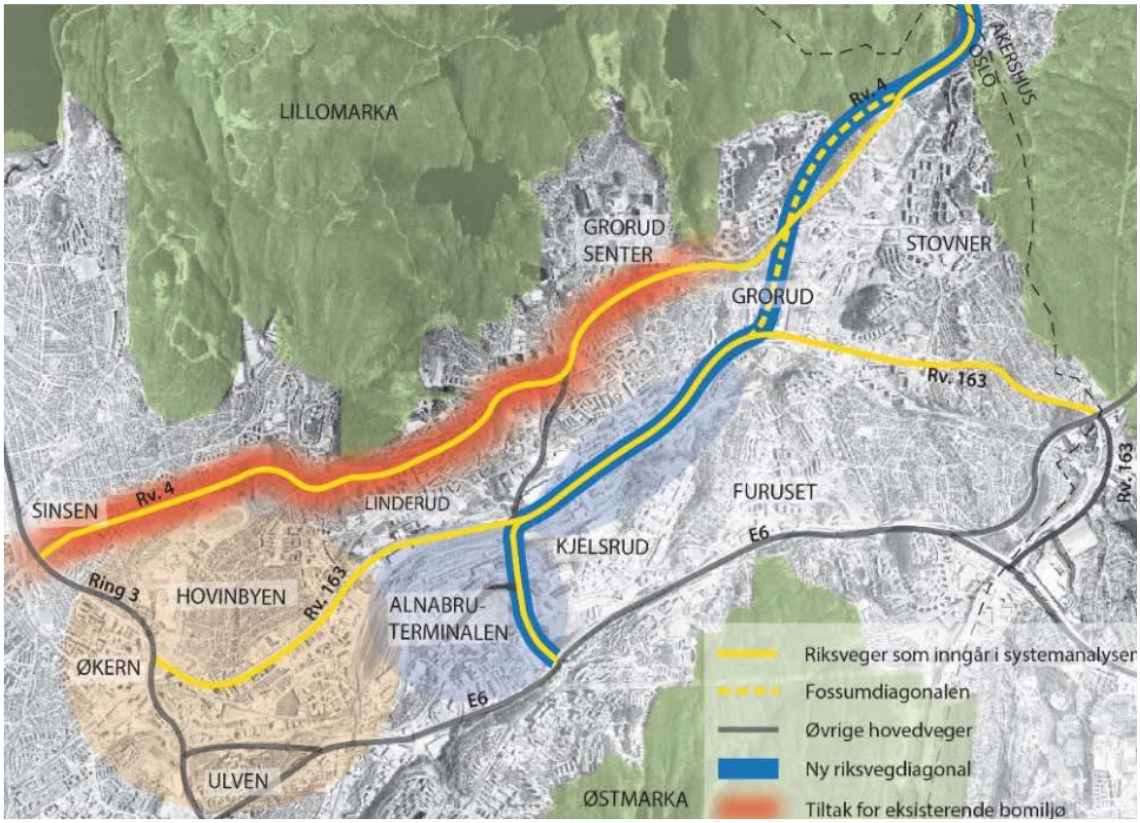
The National Road Authority (*Statens Vegvesen*) does not seem to be opposed to the transformation of Rv.163 in Hovinbyen and both projects treat different sections of the road. But, are reducing capacity in Hovinbyen and accommodating increasing traffic in the eastern side of the valley compatible? Could a mixed system, including both visions be possible? How could heavy goods traffic be integrated on urban boulevards? Imagining a flexible system serving all purposes could be beneficial for the valley.

The Østre Aker vei Rv. 163 with bus lanes and little traffic between Risløkka and Brobekkveien roads (2007).
© Wikimedia Commons/C. Hill

[38] *Forslag til planprogram. Fossumdiagonal Trondheimsveien Østre Aker vei Reguleringsplan*, Statens Vegvesen, 2008.
[39] *Trikk til Tonsenhagen – et forprosjekt*, Ruter, 2009, 66p.
[40] Interview with Elin HOFF JOHANSEN, Project manager at the City of Oslo, July 3rd 2020.



Bredtvetdiagonal and Fossumdiagonal scenarios connecting Rv.4 to Rv.163 and E6 highways
These two design alternatives are meant to deflect traffic from Trondheimsveien to the other highways to reduce noise pollution for local residents. The Fossumdiagonal to the east seems as the prefered scenario of the National Roads Authority.
© Delrapport kollektivstrategi, Statens Vegvesen, 2017



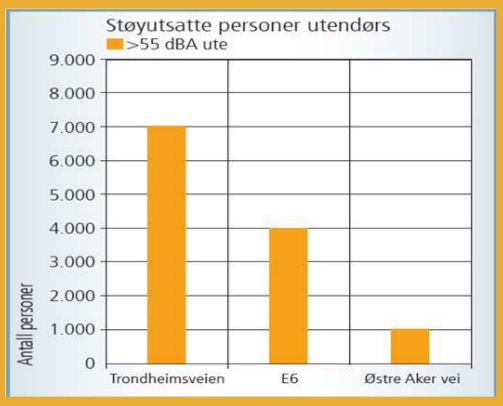
Fossumdiagonal project, as presented by the National Road Authority in 2018
The construction of the tunnel should deviate most heavy goods traffic on Rv.163 and Rv.191 to join Alnabru terminal. Hovinbyen appears on the map (bottom left), bordered by Rv.4 as its Northen limit.
© Systemanalysen for riksvegnettet i Groruddalen, Statens Vegvesen, 2018

Noise Disturbances in the Grorud Valley

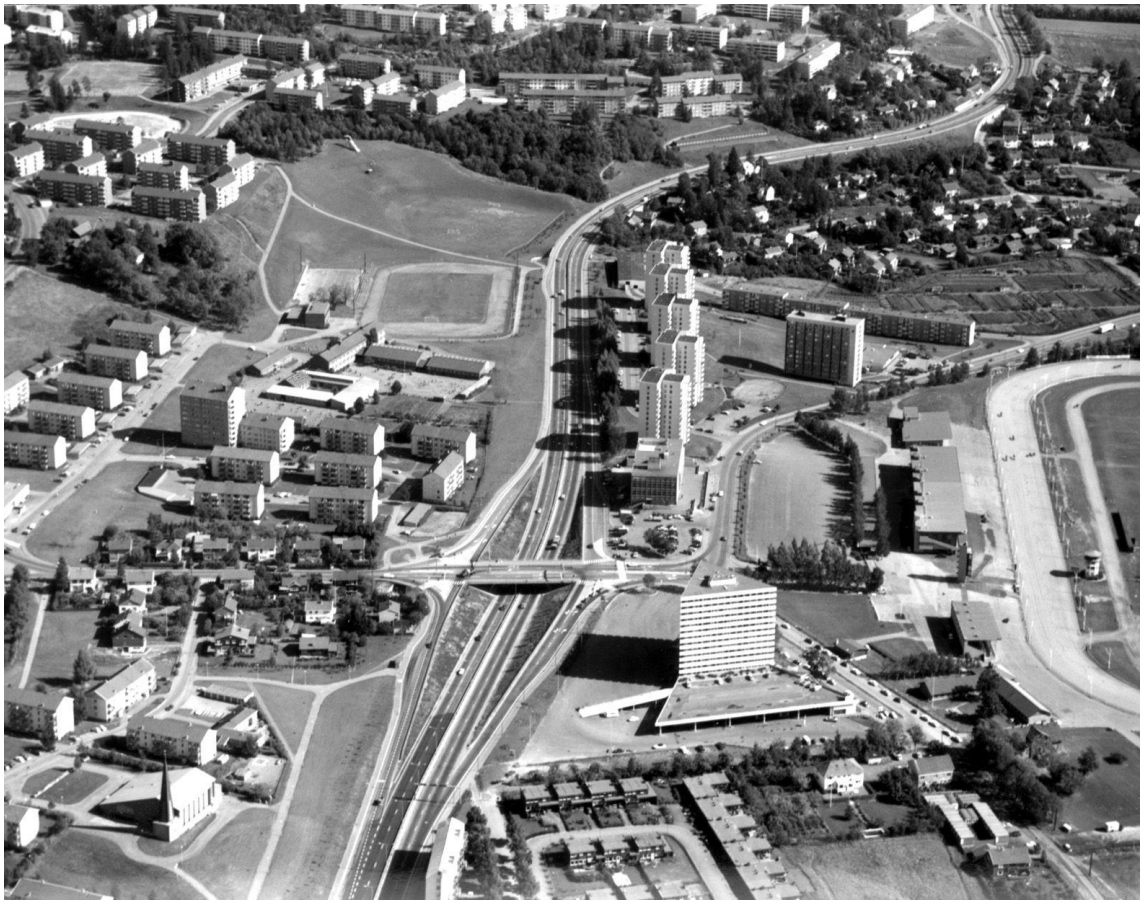
The transport corridor status of the Valley generates important noise disturbances for its inhabitants. Research shows the most impacted areas are surrounding Trondheimsveien Rv.4. Allthough this expressway is not the busiest in the Grorud Valley, its route mostly crosses residential neighbourhoods. Therefore this axis impacts the largest number of people, up to 7,000 residents in 2014. A 2018 study from National Road Authority estimates that around 13,200 people are exposed to the noise along the road.This explains why the transformation of Rv.4 into a boulevard has been given priority over Østre Aker vei Rv.163.

Average daily traffic in 2014:

- Rv.4: 26,000-45,000 vehicles/day
- Rv.163: 25,000-27,000 vehicles/day
- E6 95,000-98,000 vehicles/day



Number of people exposed to noise exceeding 55 dBa along Rv 4, E6 and Rv 163
Source : Statens Vegvesen, 2014



New social housing estates in the east Grorud valley along the Trondheimsveien Rv.4 in 1972.
Since the 1970s, the area has developed and the segregated highway is now seen as a barrier between neighbourhoods.
© Fjellanger Widerøe Oslo byarkiv

Trondheimsveien Rv. 4 highway today
© Afterposten

Trondheimsveien boulevard transformation project, with construction of a tram line in a widen median (2014)
© Placebo Effects for Ruter - Aftenposte

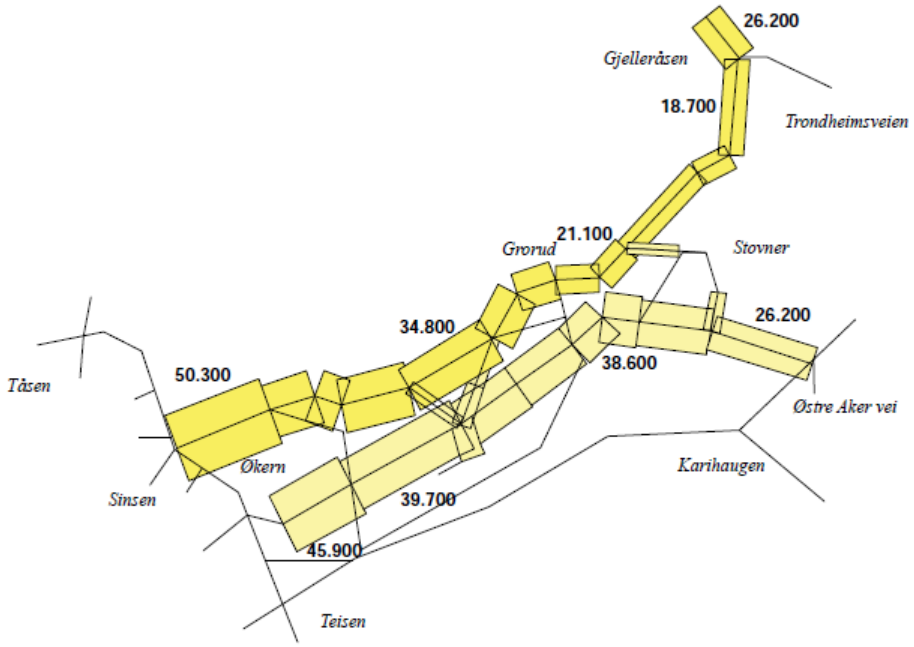
Are Traffic Forecasts Reliable? Traffic similations made in 2007 by the National Highway Authority do not seem to have materialised[41]. On Østre Aker vei Rv. 163, simulations forecasted a strong increase of flows to up to 50,800 vehicules per day (ADT) in 2015, from 45,900 in 2001. But recent traffic counts by the Highway Authority give around 23,900 in 2016, an over 50% difference between simulation and reality.

In 2018, traffic levels have increased to 29,400 ADT, which may be related to Økern's growth. On Trondheimveien Rv. 4, 2007 simulations were more acurate, but still overestimated with predictions at

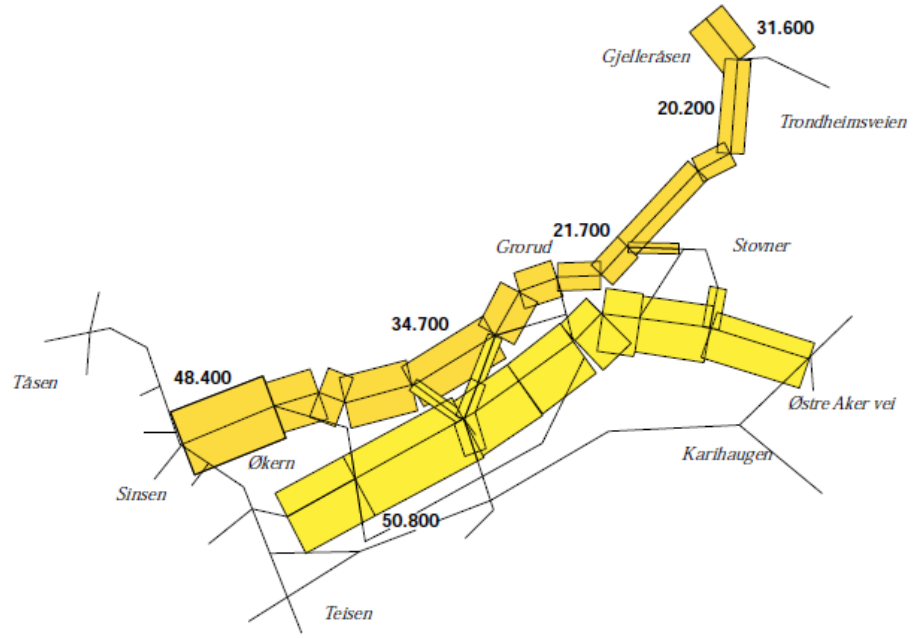
[41] *Scenariovurderinger, Fossumdiagonal, Trondheimsveien, Østre Aker vei*, Statens Vegvesen, 2007

48,400 ADT in 2015 and real traffic counts at 39,000 in 2016, an over 19% difference. The trend since 2001 is for traffic levels to decrease (see traffic maps): according to a study by the National Road Authority in 2007, the western section of Rv 163 carries today (2016) 23,900 vehicules per day while it carried 45,900 ADT in 2001 (-48%).

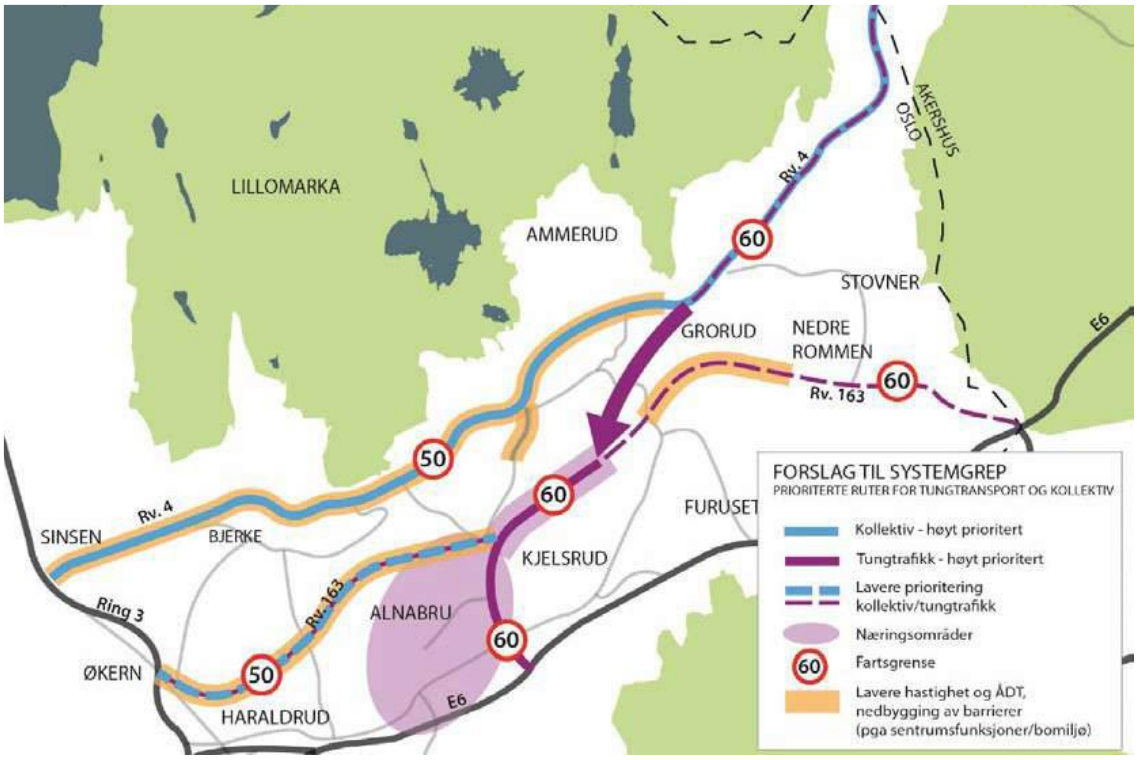
The Rv. 4 traffic levels have decreased steadily by slowly from a high ADT of 50,300 vehicules in 2001, to 45,000 vehicles in 2014 and to a low of 39,000 ADT in 2016 (-22% in 15 years). Traffic on E6 has recently grown from 96,000 in 2014 to 104,000 vehicules per day in 2016, which may mean that some traffic has shifted from Rv.4 and 163.



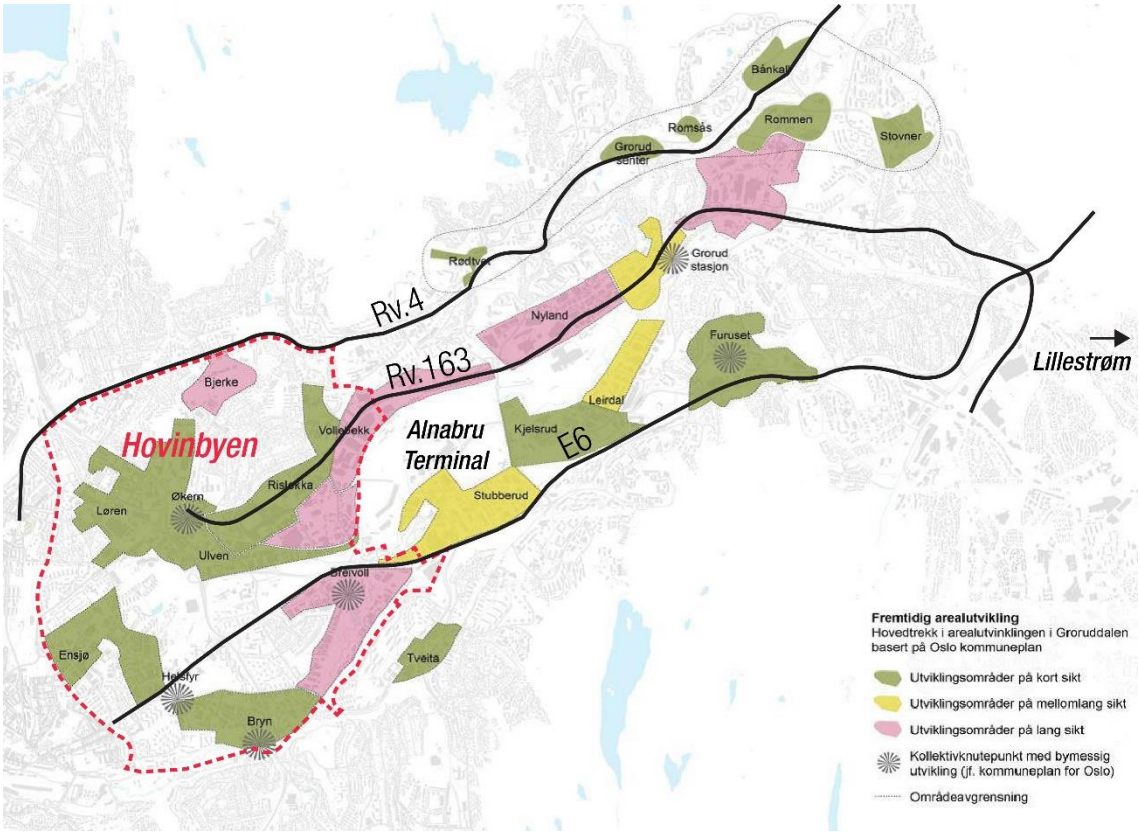
Average daily traffic (ADT, vehicules/day) for Rv 4 and Rv. 163 in 2001. Since then, traffic has decreased



Traffic simulations for Rv 4 and Rv. 163 in 2007 at a 2015 horizon. Expected traffic volumes have not materialised.



Speed reduction proposals and functional priorities of the National Road Authority in the Grorud Valley (2017)
Speed limits on Østre Aker vei Rv. 163 could be reduced from 80 km/h to 60 km/h (eastern section) and 50 km/h (western section).
© Statens Vegvesen Region Øst (SVRØ), 2017



Timeframe for urban redevelopment in the Grorud valley along Østre Aker vei (rv 163)
Green sites = short-term redevelopment; Yellow = medium-term; Pink = long-term; star = transport hub
There are large potential redevelopment areas beyond Hovinbyen, further east in the Grorud Valley
© Delrapport kollektivstrategi © Statens vegvesen (National Road Authority) / Nordconsult / Modified by L'Institut Paris Region

4.3. Next steps and wider perspectives

Next steps. Discussions are ongoing between the City of Oslo and the National Road Authority to define specifications for a traffic study to be conducted in 2021. This assessment should allow both parts to find common ground for Hovinbyen's next development steps. In return, the design of the latter Rv.163 will influence the development of Haraldrud, in terms of urban functions and public spaces.

Wider perspectives. When looking at a larger scale, there are large potential redevelopment areas beyond Hovinbyen, further east in the Grorud Valley, including Vollebekk, Nyland, Grorud, Nedre Rommen. These sites may transform gradually in a medium to long term timeframe (map p.53). The gradual transformation of the Rv.163 into an at-grade urban boulevard (with the H6 high-traffic street status of the National Road Authority) may well be a major driver for a qualitative change of these areas. Further East, deprived residential areas along Østre Aker vei such as South Stovner, Furuset and Høybråten could also benefit from a *boulevardisation* process of Østre Aker vei Rv.163 to develop new connections and new centres without requiring to cover the highway (see p.55).

However the current proposals from the National Highway Authority prioritise a tramway-led *boulevardisation* of the more residential Rv.4 corridor. Part of the current heavy traffic that it carries would be directed via a new road tunnel towards the eastern part of Rv.163 which has today more economic functions. But this may hinder in turn its own potential long-term transformation into a boulevard, including the eastern section.

With its motorway status, the E6 to the south has the potential to be designated and designed as the main long-distance axis (relieving both the Rv. 163 and Rv. 4 with the support of the Rv.22 in Viken) and heavy traffic axis (distributing the industrial and logistics sites of the valley). This would allow the gradual evolution into boulevards of both Rv. 163 and Rv. 4, and help finance both *boulevardisation* processes by saving money on the tunnel building.

All in all, it seems that the Grorud Valley and its immediate surroundings in Viken would benefit from a comprehensive urban futures visioning process with all players round the table, integrating the potentials for boulevardisation of both Rv.4 and Rv.163 axis, urban transformation, social regeneration, corridor regreening and restoration of the river systems.

Proposed development in Økern, the future transport hub and multifunctional centre of Hovinbyen
Density is highly increased compared to current situation. Østre Aker vei (lower right) remains an expressway in this design vision.

5. Take-Aways from Oslo

Oslo's Øtre Aker vei (National Road Rv. 163) is a typical case of a former rural road gradually transformed into an expressway in the 1960s-1970s to serve a largely industrial suburban corridor seen today as a barrier for a mix-use redevelopment.

Urban intensification as a driver of change

The discussion on the transformation of the Rv. 163 into a boulevard reconnecting both sides of the road is not the main driver for the redevelopment of Hovinbyen: this 1100-hectares urban intensification project in a fringe of the city centre relies on eight development areas, with a main centre in Økern and only two areas, Haraldrud and (to a lesser extend) Vollebekk, located along the Rv 163 highway.

Unlike what we see in Helsinki, Göteborg or Lyon cases, the steering of the urban planning and redevelopment process seems to give a major role to private landowners and developers, with the municipality keeping a guidance role. Indeed, most land is privately owned along the Rv. 163 corridor. Together with the national status of the highway, this may make it more difficult to develop a city-led highway corridor masterplan and deliver a joined-up project through public action.

The urban planning and programming efforts of the City of Oslo focus on the Hovinbyen area, now becoming attractive for medium to high density commercial and housing redevelopement. But the Hovinbyen project needs to be articulated with the necessary revitalisation of the Grorud valley, a 4000-hectare socially and environmentally deprived industrial and housing corridor. The valley is cut across by three segregated national highways (Rv 4, Rv. 163 and E6). Each of these highways raise specific challenges as regards to their environmental integration and design, with a kind of competition arising between strategic priorities.

The fairly low volumes of traffic on Rv.163 are largely compatible with urban functions, such as new mix-use redevelopment with active ground floors, and pedestrian, bike and bus traffic, on the condition that the speed limit is lowered to 50 km/h. Many urban multi-use urban boulevards in Europe have larger traffic flows than the Øtre Aker vei, with comparable shares of heavy vehicules traffic. A boulevard with more frequent at-grade crossings (instead of segregated interchanges) would serve better the neighbouring districts, including the industrial sites.

The need for a long term, region-wide, shared vision

From the analysis of the Oslo case, many more general questions emerge that may be of real interest to deepen for other cities and regions.

How are the urban road design priorities defined and by whom? How can we design public space so that lorry traffic (with access to industrial, logistic or heavy utility sites) can mix safely with local car, bike and pedestrian traffic and other uses?

Many decisions rely on traffic simulation models that are no longer in capacity to anticipate future mobility behaviour patterns of people and even businesses. How can we plan the unplannable, especially in the post-covid era? Helsinki has an interesting experience to tell about target-based urban and transport planning simulation instruments? (see *Helsinki City Boulevards Strategy and Projects* Report, December 2020)

The real scale of the Østre Aker vei Rv. 163 transformation project may not be the 1.4 km in Haraldrud as currently planned, but the 11-km urban and industrial corridor that runs from Lørenskog (Viken) to Økernveien (Oslo). A clear vision at this scale would help taking future-proof decisions in more suburban areas such as Vollebekk, Nedre Rommen or Stovner. Perhaps some kind of "hybrid highway" could be imagined, as it has been done in Montréal (Bonaventure) and New York (Sheridan)[42], where the expressway is redesigned as a boulevard in some sections, but remains a speed-limited segregated expressway in other parts.

[42] Paul Lecroart, *La ville après l'autoroute, New York, Sheridan Expressway*, August 2014; *Montréal, Projet Bonaventure,* March 2016, IAU Îdf.

There seems to be a need for a regional dialogue platform between different levels of government (national, regional, neighbouring cities and other stakeholders) at the scale of the wider Grorud valley. Could a joint long term visionning process of the regeneration of the corridor help prevent silo policies (i.e: traffic; public transport; river restoration; noise; site by site planning) and help strategic decisions-making?

Powerful instruments for change of mobility patterns

A mention must be made here to interesting instruments and policies in relation to pblic space-oriented planning, infrastructure financing and traffic policies:

- The *Oslo Package* system[43] that allows financing of major highway (new built or transformation) or environment-friendly transport investments by a road-use tax when crossing the city. This highway toll is an efficient instrument to reduce traffic;
- The *Zero Traffic Growth* national policy approved in 2018 by which the growth of vehicular traffic should remain at the current levels despite the economic and population growths, meaning that active and public transport must be strongly prioritised;
- The *Car-free Living* policy in central Oslo since 2019.

Some policies aiming at reducing traffic do raise contradictions that need be solved, including between long-term and short-term objectives, between the priority to freight transport and the priority of car use reduction, between giving housing and liveability a high priority or encouraging industry, logistics and businesses.

Consensus building between local and national strategies, and between municipalities themselves, remains challenging.

KEY DATA ON PROJECT

KEY DATA Østre Aker vei Rv.163 transformation					
Strategic documents	Project progress	Relevant authority	Highway section subject to transformation	Daily traffic before transformation	Surface of the area being redeveloped
2015 Oslo Municipal Plan "Oslo by 2030" Strategic plan for Hovinbyen 2018 Grorud Valley Studies 2008-2018	Planning phase	Oslo Kommune (City of Oslo) National Road Authority	1.4 km (11 km potentially)	24,000-29,000 ADT	1,100 ha +

[43] The system exists in many Norwegian cities such as Bergen or Trondheim.

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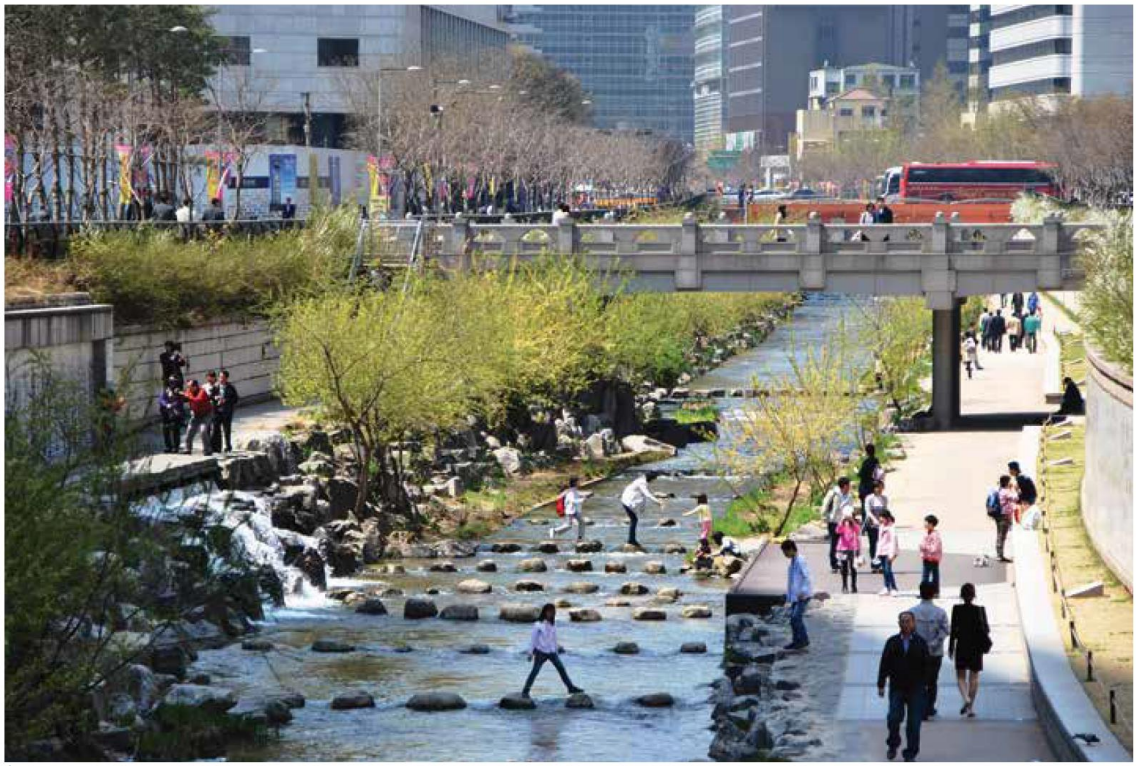
APPENDIX

Reinventing Cities: From Urban Highway to Living Space

Paul Lecroart shows the many benefits of transforming urban highways into people-friendly boulevards



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In 1974 Portland replaced its Harbor Drive with a waterfront park; in 1991 the Embarcadero Freeway in San Francisco was dismantled; in 2001 New York rebuilt the 12th Avenue where an elevated highway had stood; in 2005 the Cheonggyecheon Expressway in Seoul made way for the river hidden underneath; and between 2013 and 2017 Paris pedestrianised the Seine riverbank highway. Now Paris Metropolitan Region is launching an international design competition to rethink the *Périphérique* and the *Grand Paris* motorway network.

So will segregated highways become a thing of the past in the post-car and carbon city? Research by the Planning Agency for the Paris Region (IAU) suggests that converting stretches of highways into multi-use boulevards and public spaces may open up new avenues for rethinking our cities in terms of liveability, mobility and resilience.

HIGHWAY-TO-BOULEVARD CASE STUDIES

Functionalist thinking and post-war planning have left many large cities, including London and Paris, with extensive, yet unfinished networks of urban highways. As they were built they were used, and still have a role in moving people and goods within metropolitan areas. However, these limited-access grade-separated roads create physical barriers, tend to devitalise centres, neighbourhoods and waterfronts, and hinder regeneration. The high levels of traffic they support generate noise, dust and air pollution, raising health and social justice issues. By providing seemingly easy access for cars, extensive highways networks tend to encourage car-centric lifestyles, urban sprawl, and more traffic congestion.

In the last decades, many cities have successfully started tearing down obsolete urban highways and replacing them with multi-use boulevards lined with mixed use new development, or new linear parks. Why are they doing that? What happens with the traffic? What are the benefits and costs? Are these projects backed by public support?

1 Seoul: the Cheonggyechon River, formerly a highway carrying 168,000 cars a day; removal of the viaduct and restoration of the river significantly reduced traffic. Image by Paul Lecroart iAU

To find answers to these questions and others, I have looked into over 20 highway-to-boulevard experiences either fully completed or planned in cities worldwide. Of these, nine cases were studied in depth on-site with reports published (in French): Seoul (Cheonggyecheon Expressway), Portland (Harbor Drive), San Francisco (Embarcadero, Octavia), New York (West Side, Sheridan), Milwaukee (Park East), Montreal (Bonaventure), and Vancouver (Northern False Creek Viaducts).

Most of these cases involve fairly central stretches of highways supporting heavy traffic volumes (in the range of 50,000 to 150,000+ vehicles per day), before being replaced by a boulevard and/or a linear park. This research is reference material to inform highway transformation strategies and projects in the Paris Region.

WHY DO CITIES GET RID OF URBAN HIGHWAYS?

Depending on the physical context and circumstances, city authorities decide to remove highway stretches for quite a pragmatic combination of reasons, including:

- **Aging infrastructure and rebuilding costs.** In San Francisco, Seoul, New York (West Side), or Toronto (East Gardiner), it appeared cheaper to dismantle crumbling elevated highways than to rebuild or bury them. Recycling viaducts into pedestrian connections can also give a new life to obsolete infrastructure cheaply, as in Seoul (Seoullo 7017) and Paris (La Défense Boulevard).
- **Revitalising blighted areas and unlocking redevelopment opportunities.** This is a main driver for change in Vancouver, Milwaukee, Montreal, Birmingham (Inner Ring Road), Lyons (A43 Mermoz), and Oakland (I-980).
- **Reclaiming the waterfront.** Transport engineers enjoyed building highways along river or seafronts, but these created barriers and therefore suppressed real estate values. Reconnecting cities with their historic setting and 'giving the waterfront back to the people', residents and visitors alike, often means converting the highways, such as in Portland, Seoul, New York and Paris.
- **Reducing through traffic and related nuisances.** This is central to the strategy supporting the Seoul, Paris, Lyons (A6/A7 Confluence), and Strasbourg (A35) reconstructions.

These context-specific goals are usually part of wider urban intensification policies, eco-friendly transport plans and economic strategies. However, many highway removal projects were accidental: both the Embarcadero and Central Freeway viaducts in San Francisco were closed after being damaged by the Loma Prieta earthquake in 1989, and New York's West Side elevated highway collapsed when a maintenance truck went through the viaduct in 1973!

DOES HIGHWAY TRANSFORMATION REALLY HELP REGENERATE CITIES?

Evidence from research shows that redesigning highway corridors can be a powerful driver for regenerating blighted or abandoned parts of cities, with a lasting positive impact on the city as a whole. Removing visual barriers, reconnecting streets, and improving the quality of the environment has changed the face of Portland, San Francisco, Seoul, Milwaukee and Birmingham. Replacing interchanges and ramps by straightforward crossroads unlocks vast pieces of land that can be reconverted into denser mixed use districts and parks.

WHERE DO THE CARS GO?

To many traffic engineers' surprise, closing highways does not usually create traffic chaos beyond initial adjustments. Where spare road capacity did exist in some of the cases studied (Seoul, San Francisco, New York), car traffic switched to local street networks. Traffic thus gets distributed more evenly on a larger number of streets. Congestion remained limited and less than forecast.

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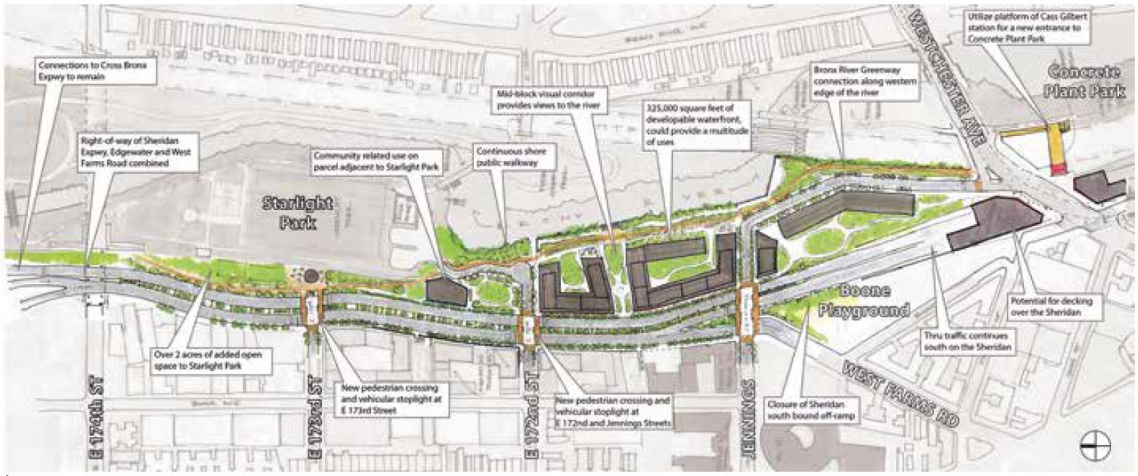
2 San Francisco: Embarcadero Freeway in the 1960s, photo Tim Pharoah
3 The same area after the removal of the Freeway gave back the Bayfront to the people. Image by Paul Lecroart IAU

Average daily traffic in the road corridor may decrease dramatically after removal – from 20 per cent in Portland to up to 82 per cent in Seoul. When accounting for trips diverted to alternative roads or to public transport, a significant share of earlier traffic appears to have simply evaporated, typically in the range of 10-25 per cent in the cases studied. Faced with a reduction of road capacity and speed, a proportion of motorists change their routes, time of travel, trip frequency or activity programme, while others switch to alternative modes. Changing conditions makes car drivers think twice, leading some to change destination or give up less essential trips.

INCREASED CONNECTIVITY FOR EVERYONE

Some cities back up removal projects with specific alternative transport and travel management strategies. While reducing road supply on the Cheonggyechon corridor, Seoul increased metro and express bus services, and discouraged solo car use through infrastructure tolls and parking policy. Local accessibility often improves with the removal of detours. A decrease of vehicular trips may mean increased accessibility for people as a whole.

Pedestrian and cycle mobility and static uses of public space for enjoyment increase sharply. However, more people on streets with still heavy car-traffic



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levels (80,000 vehicles a day on New York's 12th Avenue today) may result in more car-pedestrian or car-cyclist collisions: the careful design of multi-lane boulevards is critical to their overall success. Ultimately, what we may see is a shift from a system providing off-peak fast travel for some (the motorists) to a 24/7 system of slower accessibility for all.

ENVIRONMENTAL EFFECTS

A reduction in the volume of motorised traffic and distances travelled tends to reduce fuel consumption, as well as CO2 and fine particle emissions. Perceptions of noise levels decrease, even when actual levels remain high. Some highway-to-boulevard projects providing more greening may have a positive impact on the local climate: in Seoul, summer temperatures along the former highway corridor are now a welcome 5°C lower than on other arterial roads.

A FAVOURABLE COST-BENEFIT RATIO?

Transforming highways has a cost: in the cases studied, capital investment was in the range of €35-70 million (about £30-60 million) per kilometre. In view of the costs of maintaining or rebuilding infrastructure nearing the end of its life, transformation often proves cheaper. It may be a more affordable and longer-term solution than capping or tunnelling. Land freed for redevelopment can contribute to meet the costs.

COMPLEX PROCESSES, PUBLIC SUPPORT?

Redesigning a highway into a boulevard is always a lengthy, complex, and uncertain process in which open technical expertise, citizen participation, and political will play key roles. Convincing car-users and business interests requires lots of data, meetings and leadership. While controversial to begin with, these projects often win over the public during the process... or not, as in the case of Seattle (Alaskan Way). Just as in the 1970s, extensive highway plans were defeated by public opinion in San Francisco, London and other cities, many smart grass-roots coalitions are pressing governments today to remove existing highways and flyovers in cities including Paris, New York, Denver, Dallas and Sao Paulo.

4 New York: plan for the Sheridan Expressway in the South Bronx. Highway-to-boulevard projects can help deprived neighbourhoods while maintaining road capacity. Image by New York City Department of City Planning-ARR
5 New York: the boulevard replacing the Westside Freeway (2001): spectacular growth in bike and pedestrian traffic. Image by Paul Lecroart IAU

SYMBOLIC ACTIONS OR PARADIGM SHIFTS?

Highway transformation projects have a strong symbolic impact because they affect objects traditionally connected with the idea of freedom and modernity. They bring us back to some of the fundamentals of city development, such as nature, heritage, parcels and streets, and into a more holistic way of thinking.

LEARNING FROM INTERNATIONAL EXPERIENCE

From an urban planner and designer's perspective, the main lessons can be summarised in four points:

- Transforming urban highways into boulevards encourages people to change their travel patterns: less essential car trips tend to disappear and eco-friendly transport modes tend to increase. This can free-up road capacity for other needs, such as higher added value car trips or goods distribution. Improving local accessibility is not detrimental to longer-distance metropolitan or regional trips.
- An integrated boulevard offers a comprehensive metropolitan level of services connecting people and activities, moving as many people, if not more, than a highway, but at a slower, smoother speed. Boulevards enable social and cultural interactions to take place, ultimately the

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raison d'être of cities and a key to their economic performance.

● Replacing a highway with a well-connected high-quality multi-use boulevard creates value and can unlock the mixed use regeneration of deprived urban spaces and improve the liveability of the city as a whole.

● As a tool in the sustainable planner's kit, highway conversion can be used pragmatically, for instance to leverage the revitalisation of a specific area. Successful tactical action on a short stretch where the highway is easy and cheap to change rapidly will help garner support for the transformation of longer stretches in the future. This is the strategy chosen by New York City for the Sheridan Expressway (by the Bronx River). In the United States, the country of the automobile *par excellence*, the success of removal projects stimulates many other cities to redesign obsolete highways. Seoul has removed 16 flyovers since 2005.

International successes in highway-to-boulevard transformation offer food for a wider rethinking of the functions, uses and status of urban highways in city regions. Profound changes are affecting the behaviour patterns of people and businesses, and the way that cities and regions are organised. Many developed cities worldwide, including Paris, New York, Los Angeles, Tokyo, London and Stockholm, have experienced an overall reduction in car use, traffic levels, and car ownership over the last decade.

Redesigning the existing urban highway network of large cities may be a smart way to address citizens' aspirations and metropolitan development challenges, including global warming related issues. It is not just about design: it is about rethinking the planning, movement, lifestyles, and wealth creation of cities and regions. This is a major trans-disciplinary task for the coming decades. ●

Highway transformation projects have a strong symbolic impact because they affect objects traditionally connected with the idea of freedom and modernity.

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6-7 Montreal: the Buonaventure Highway, before and after the viaduct was demolished with a positive impact on the environment.
8 Paris: former Left Bank Expresssway, now a pedestrian and cyclist promenade. Image by Paul Lecroart, IAU

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