Urban Impact on Major Lithuanian Cities of Rail Baltica Line

Kaunas Case

Ruta Vitkute | 5624010

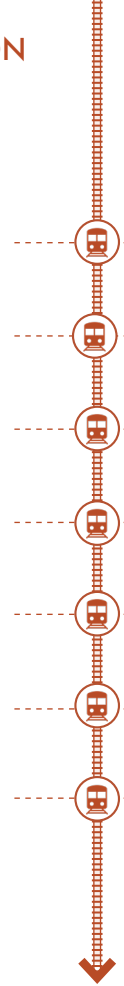
P5 presentation | MSc Urbanism | TU Delft

22-06-2023

1st mentor: Rients Dijkstra

2nd mentor: Verena Balz

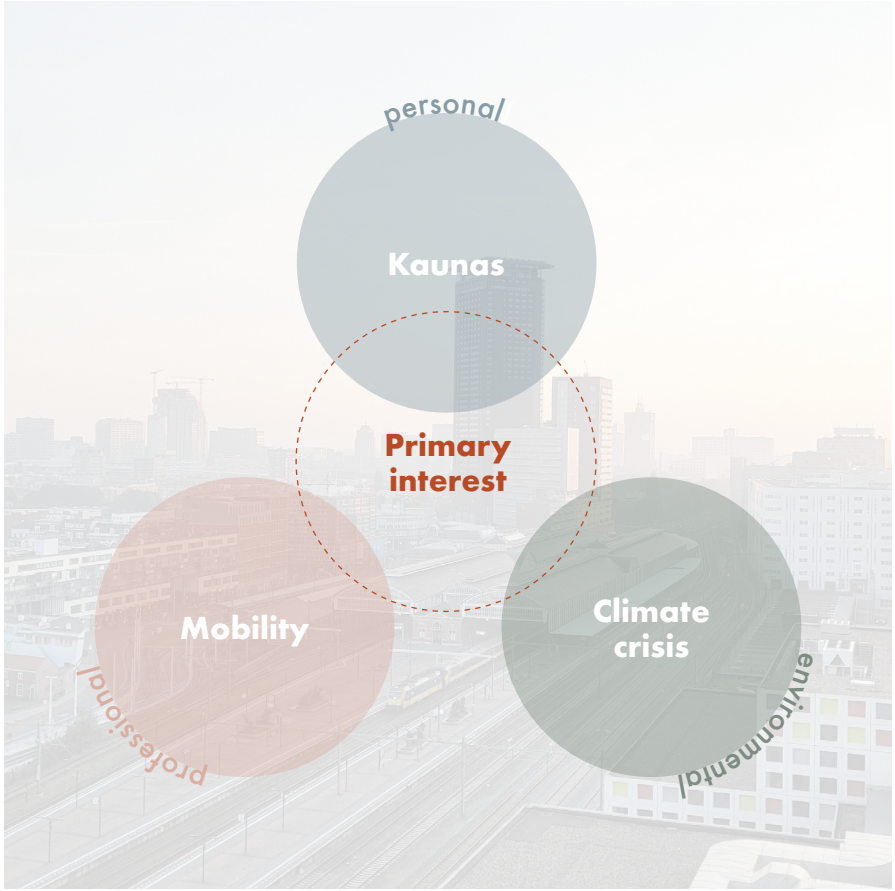
STRUCTURE OF THE PRESENTATION



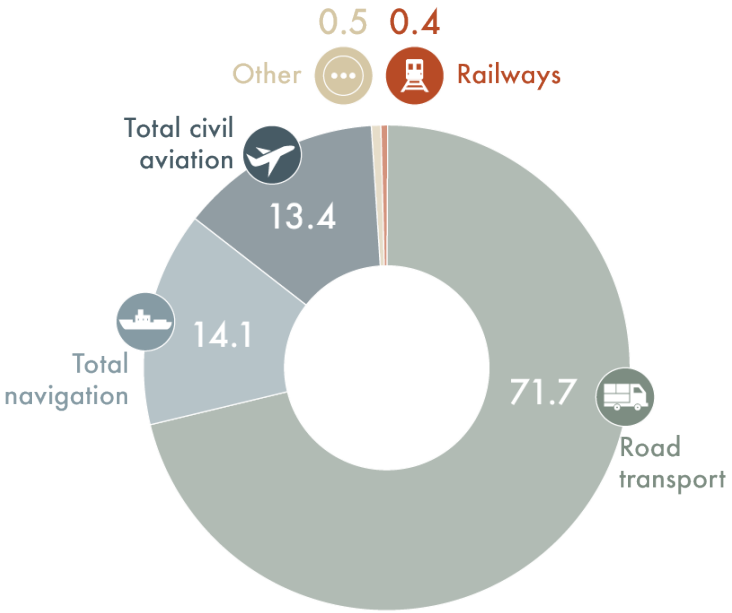
- PERSONAL MOTIVATION
- CONTEXT AND PROBLEMATIZATION
- OUTCOME OF THE ANALYSIS
- VISION
- KEY ASPECTS OF THE VISION
- REGIONAL IMPACT
- GREETINGS TO KAUNAS

PERSONAL MOTIVATION

PERSONAL MOTIVATION



GREENHOUSE GAS EMISSIONS FROM TRANSPORT (EU)



Source: EEA Transport and environment report 2021

well-functioning
efficient
sustainable
just
safe
affordable
smart
age-responsive
inclusive
high-quality
accesssible
innovative
gender-responsive

EUROPEAN RAILWAY NETWORK

- **PASSENGER**
- FREIGHT
- MILITARY

Source: www.railbaltica.org

- **Rail Baltica** high-speed railway line will connect Poland to Finland through the Baltic States by 2030.

Source: www.railbaltica.org

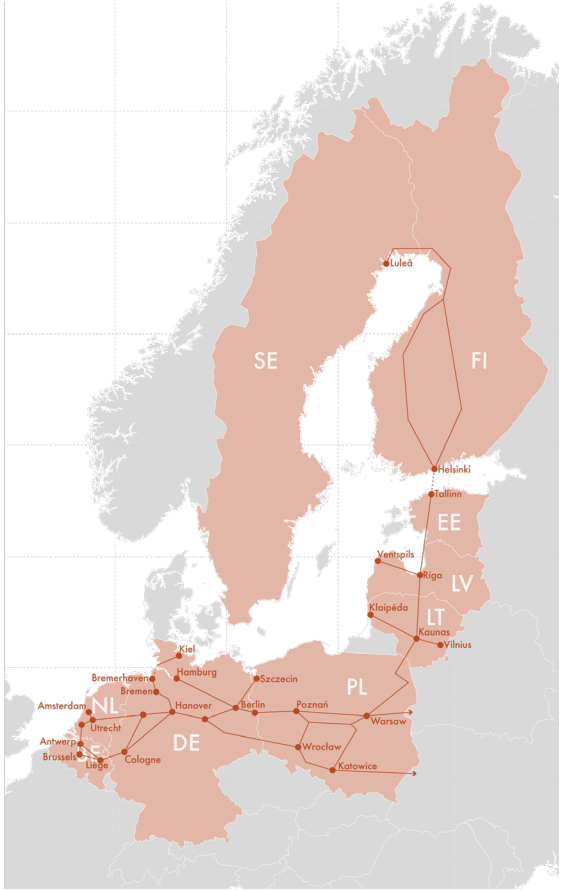
8828 km
railway

6934 km
roads

2839 km
inland waterways

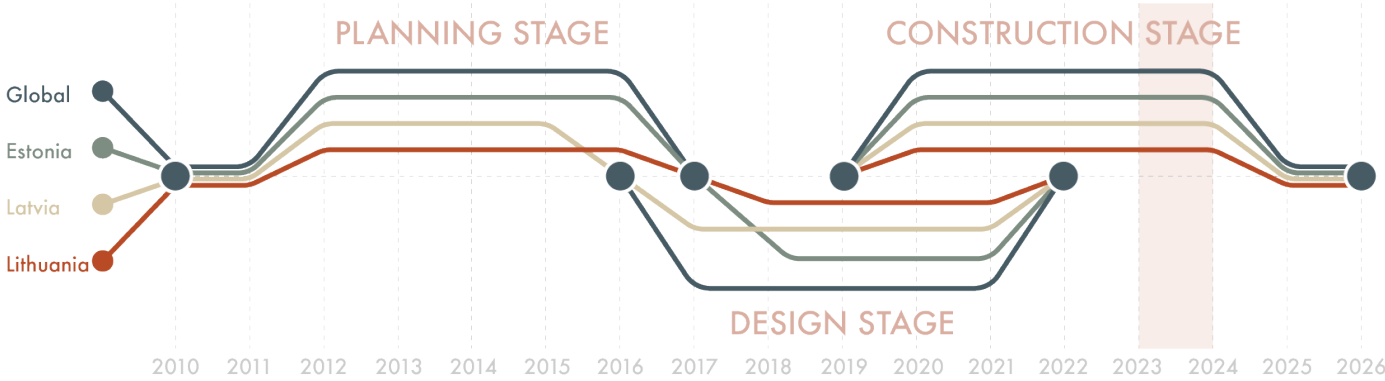
- **Development of the Rail Baltica** project is a **priority** for the Baltic States and Lithuania. The project will help to improve connectivity at national and regional level and will contribute to the achievement of Lithuania's transport sector goals.

- European Commission, 2022



Source: www.railwaypro.com

RAIL BALTICA TIMELINE



Source: www.railbaltica.org

Vilnius (Lithuania)

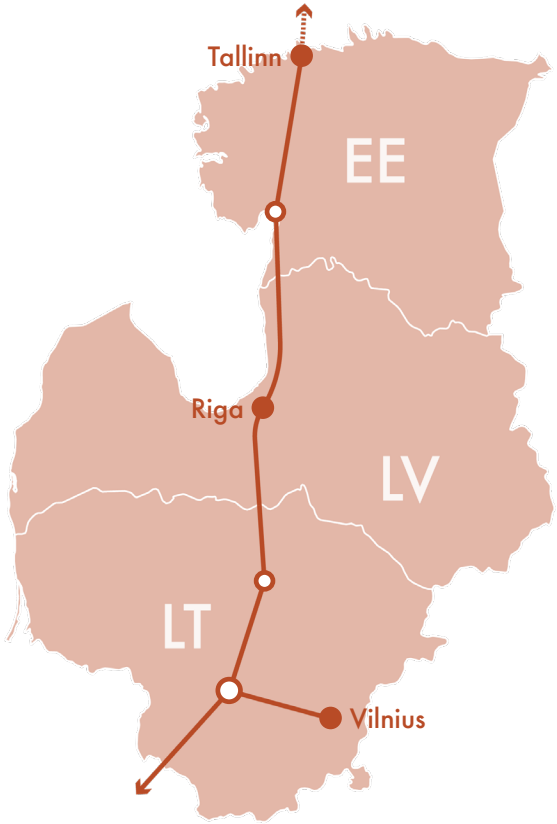
Proposal for the reconstruction of the current station

Riga (Latvia)

Proposal for the reconstruction of the current station

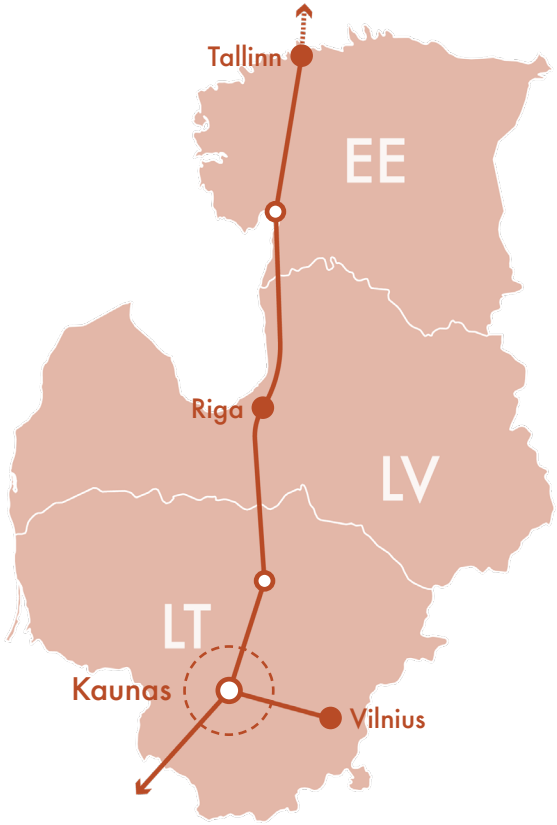
Tallinn (Estonia)

Proposal for the new station



- main station (capital)
- main station (non-capital)
- main regional station

RAIL BALTICA STATIONS



- main station (capital)
- main station (non-capital)
- main regional station

KAUNAS RAILWAY STATION

LOCATION OF THE STATION

KAUNAS MAIN RAILWAY STATION

Image by A. Aleksandravičius

Railway station
Mix-use area

THE RAILWAY STATION AREA

THE RAILWAY STATION AREA

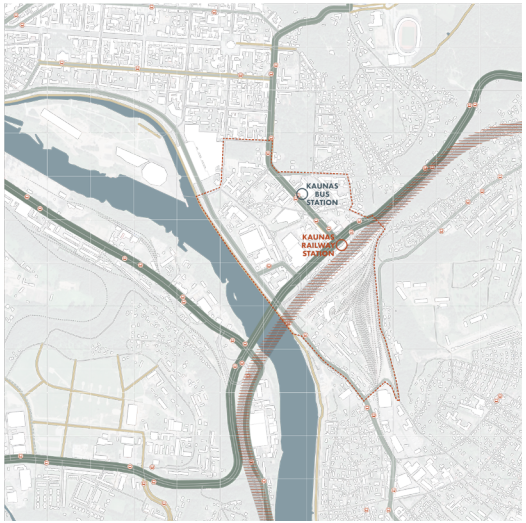
THE RAILWAY STATION AREA

- TRANSIT-ORIENTED DEVELOPMENT - a **land-use** and **transportation** planning that makes **walking**, **cycling**, and **transit use** convenient and desirable, and that maximizes the efficiency of existing public transit services by **focusing development around public transit stations**, stops, and exchanges.

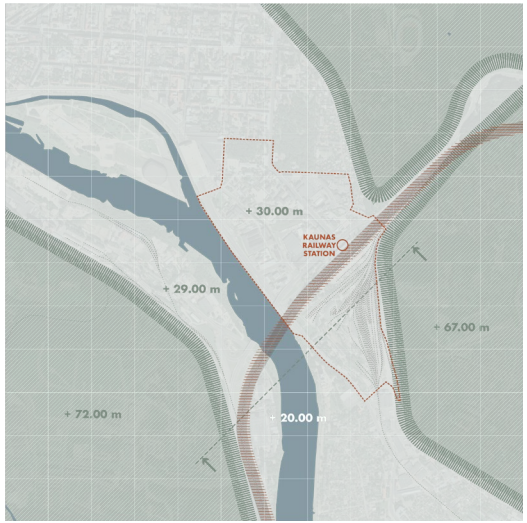
- (Thomas & Bertolini, 2017)

Image by A. Aleksandravičius

HOW MUCH TO **CHANGE**?



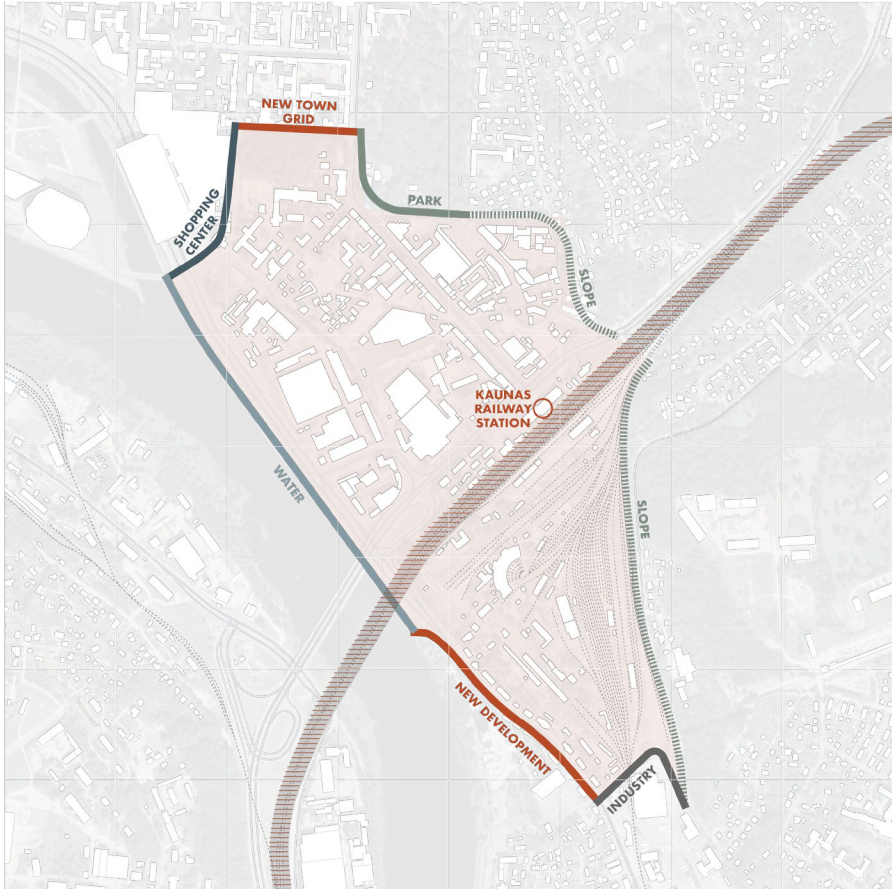
TRANSPORT



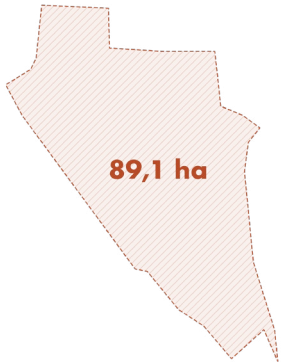
NATURE

HISTORY AND HERITAGE

THE AREA OF FOCUS



THE AREA OF FOCUS



THE MAIN AXIS TOWARDS THE STATION

THE MAIN AXIS TOWARDS THE STATION

THE MAIN AXIS TOWARDS THE STATION

KAUNAS
RAILWAY
STATION

KAUNAS
RAILWAY
STATION

KAUNAS
RAILWAY
STATION
VIADA

KAUNAS RAILWAY STATION
"Žalgiris" arena
VIADA

KAUNAS RAILWAY STATION
"Žalgiris" arena
Shopping centre "Akropolis"
VIADA

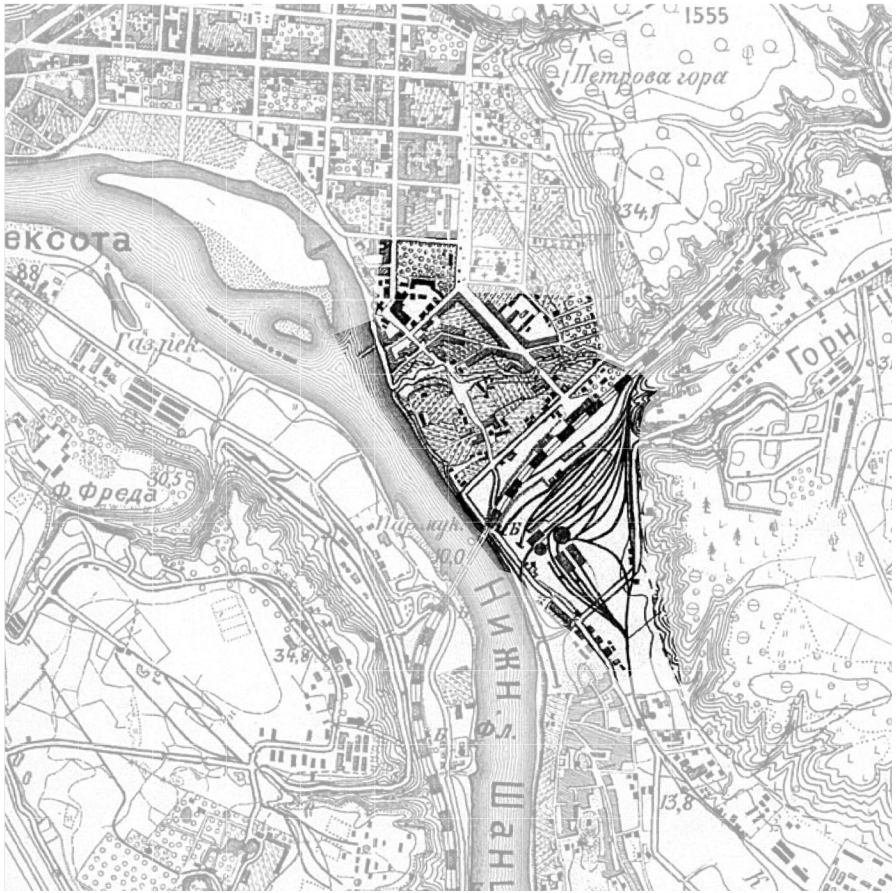
RAILWAY DEPOT COMPLEX

RAILWAY DEPOT COMPLEX

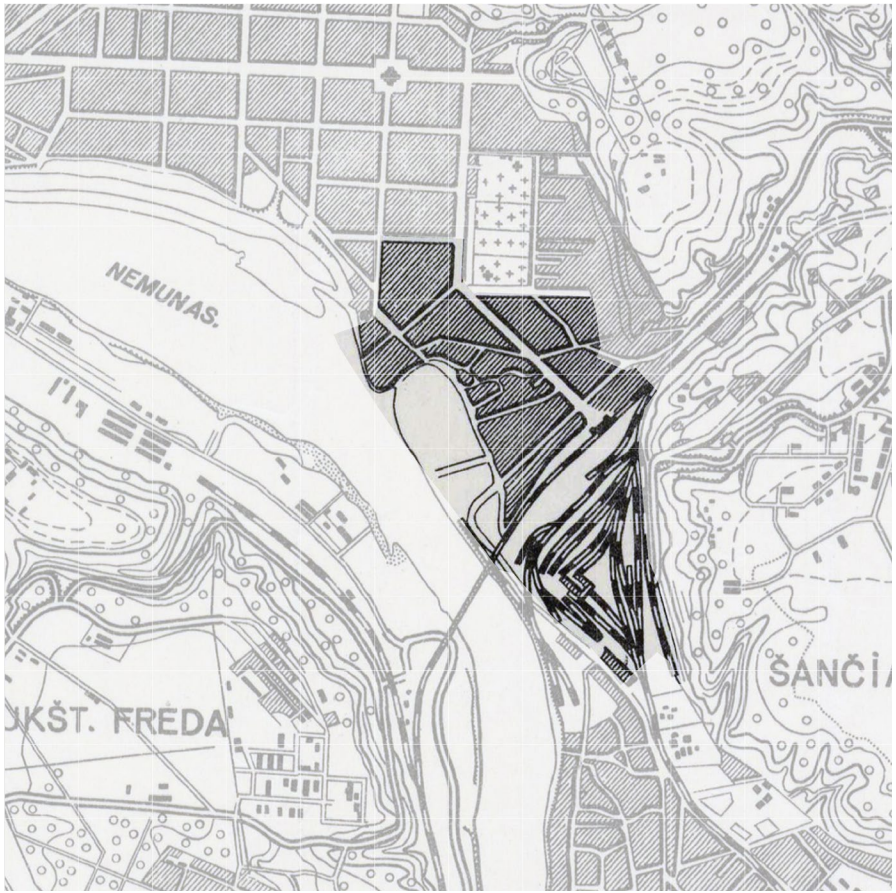
KAUNAS
RAILWAY
STATION

KAUNAS RAILWAY STATION
Railway station

HISTORIC STRUCTURE **1889**



HISTORIC STRUCTURE **1926**



HISTORIC STRUCTURE **1931**

HISTORIC STRUCTURE **1969**

IDENTITY OF THE AREA

SPACE AND OPENNESS

GREEN SLOPES

LARGE-SCALE INDUSTRY

STATIONS AND HERITAGE

CAR-ORIENTED MOBILITY

RAILWAY TRACKS

- Kaunas will continue to **grow** in terms of population.
- It will demonstrate **economic strength** and **stability**, which will attract local and foreign investments.
- Lastly, Kaunas will successfully implement a **transition** towards **sustainable mobility**.
- **Kaunas central railway station area will become a catalyst of those changes together with the implementation of the Rail Baltica high-speed railway.**

THE TRANSITION

SPACE AND OPENNESS

GREEN SLOPES

LARGE-SCALE INDUSTRY

STATIONS AND HERITAGE

CAR-ORIENTED MOBILITY

RAILWAY TRACKS

SPACE AND OPENNESS

GREEN SLOPES

TRANSFORMED INDUSTRY AND DENSIFICATION

(INTER)NATIONAL MOBILITY HUB AND REUSED HERITAGE

ACTIVE MOBILITY AND PUBLIC TRANSPORT

EXCESS TRAIN TRACKS AS A PART OF PUBLIC SPACE

- Railway and bus stations will be combined to create a well-functioning **(inter) national mobility hub**.

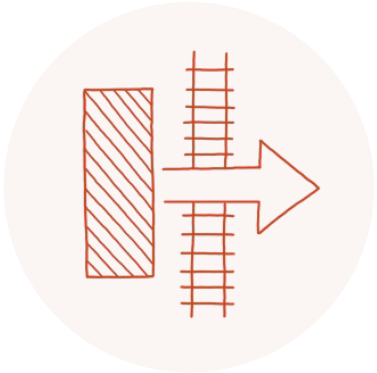
- The area will be **densified towards the mobility hub**. The new block structure will propose a network of public spaces that will contribute to the creation of a **new centrality** within the central part of Kaunas.

- The **new blocks and streets** will set **qualitative standards** that will promote a **car-free lifestyle**.

THE (INTER)NATIONAL MOBILITY HUB

1 COMBINING THE STATIONS

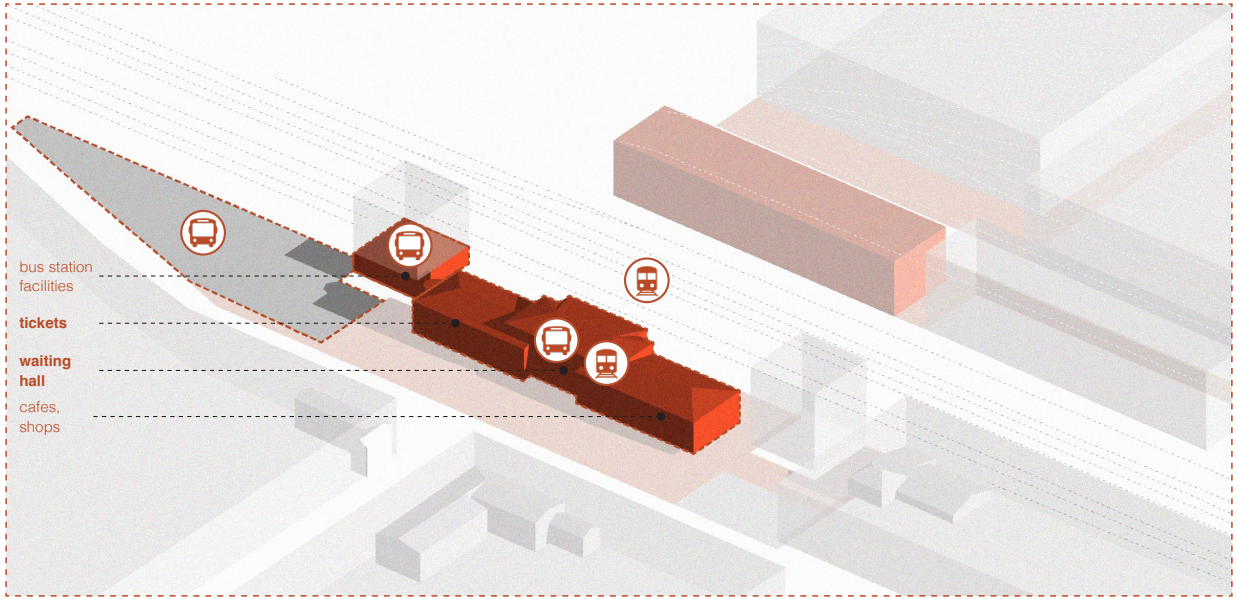
2 EXTENDING THE HUB

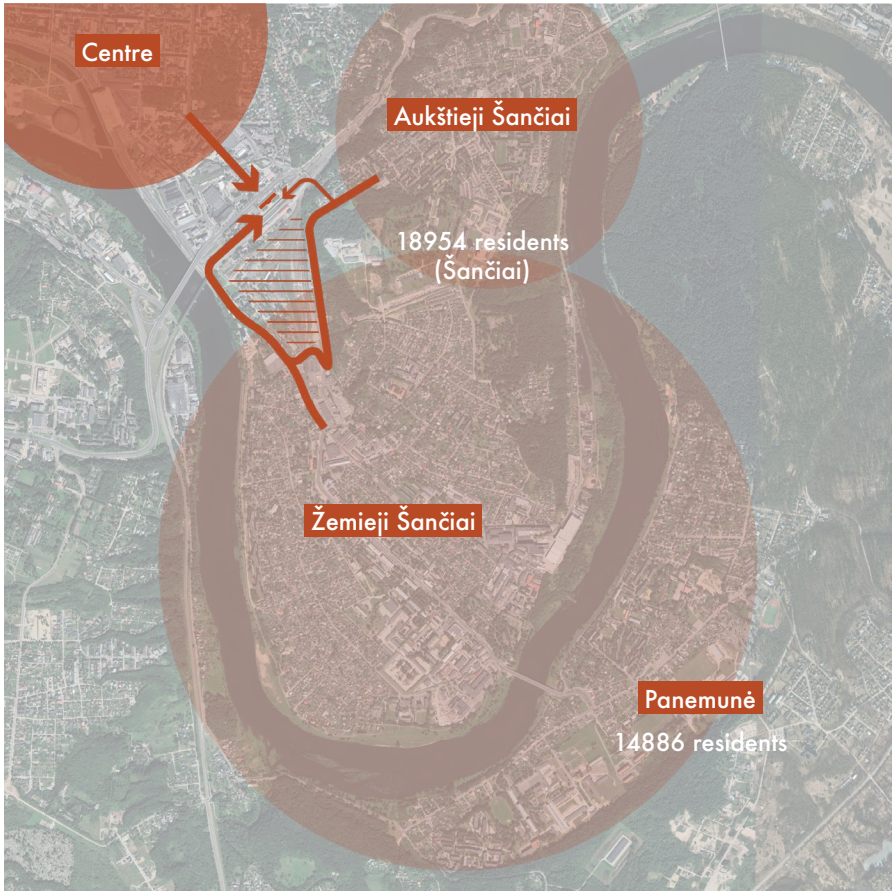


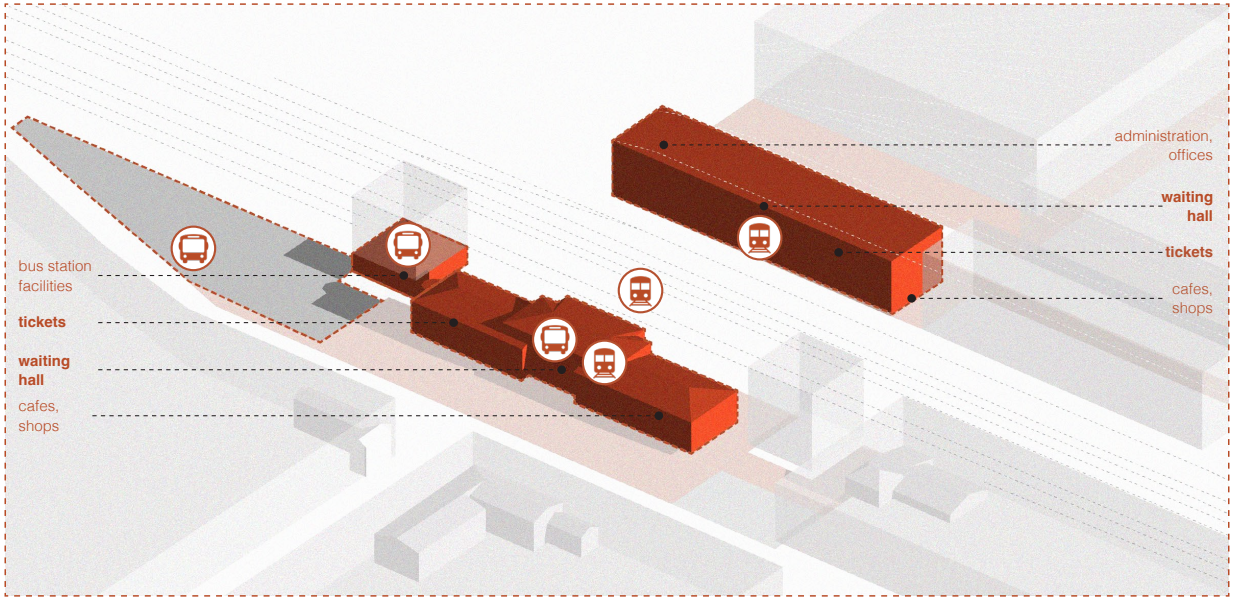
3 IMPROVING ACCESSIBILITY AND LIVELINESS

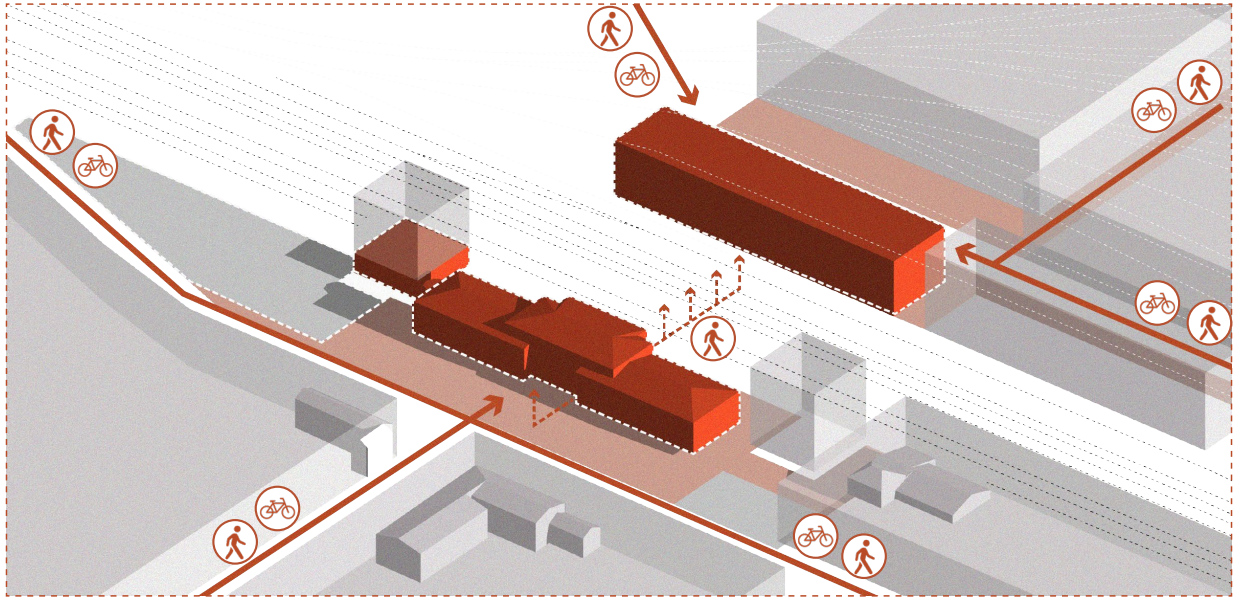
6 min
400 m

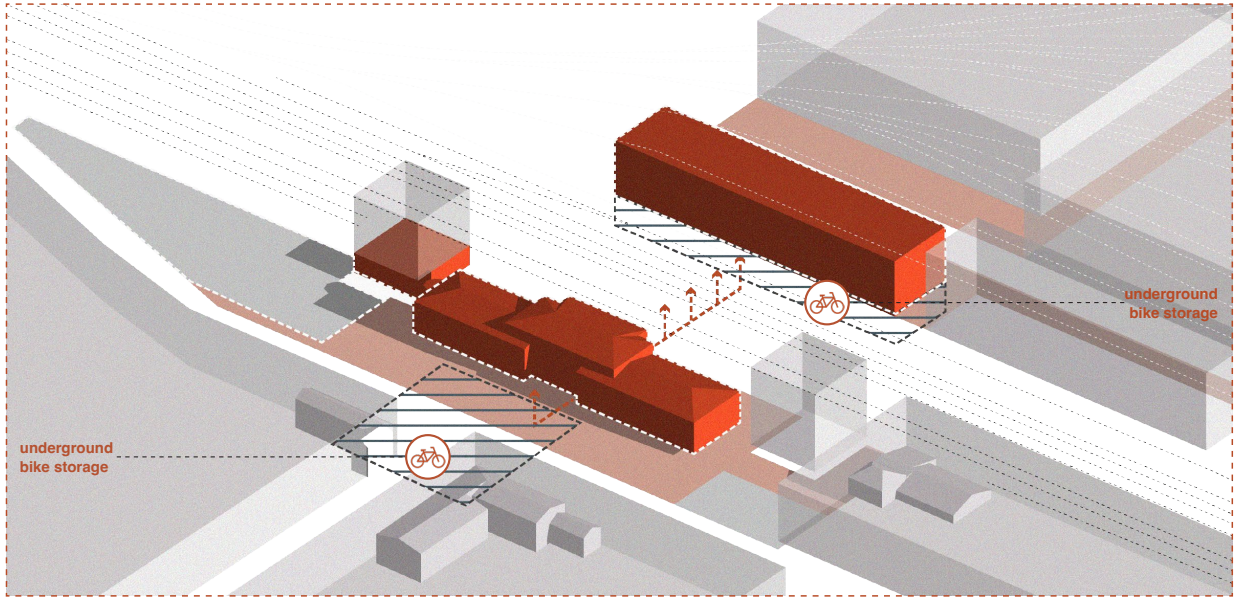
COMBINING THE STATIONS




Centre
Aukštieji Šančiai
18954 residents
(Šančiai)
Žemieji Šančiai
Panemunė
14886 residents


bus station facilities
tickets
waiting hall
cafes, shops
administration, offices
waiting hall
tickets
cafes, shops




underground
bike storage
underground
bike storage

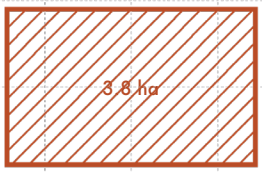
LTG
GEL ZINKELIO STOTIS

MOBILITY HUB

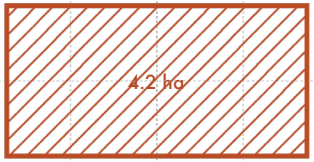
DENSIFICATION OF THE BLOCK

LOOKING FOR THE “PERFECT” BLOCK

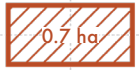
LITHUANIA



NEW TOWN BLOCK (KAUNAS)

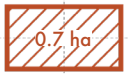


SOVIET PERIOD BLOCK (KAUNAS)



PAUPYS BLOCK (VILNIUS)

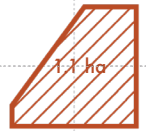
FRANCE



MASSENA BLOCK A (PARIS)

MASSENA BLOCK B (PARIS)

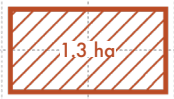
THE NETHERLANDS



BORNEO BLOCK A (AMSTERDAM)

BORNEO BLOCK B (AMSTERDAM)

BORNEO BLOCK C (AMSTERDAM)



LITTLE C (ROTTERDAM)

SPAIN

EIXAMPLE BLOCK (BARCELONA)

LITHUANIA

NEW TOWN BLOCK (KAUNAS)

54.896426, 23.916090

SOVIET PERIOD BLOCK (KAUNAS)

54.925982, 23.945553

PAUPYS BLOCK (VILNIUS)

54.679869, 25.301754

FRANCE

MASSENA BLOCK A (PARIS)

48.830214, 2.379706

MASSENA BLOCK B (PARIS)

48.828131, 2.381534

THE NETHERLANDS

BORNEO BLOCK A (AMSTERDAM)

52.371691, 4.946427

BORNEO BLOCK B (AMSTERDAM)

52.370788, 4.941233

BORNEO BLOCK C (AMSTERDAM)

52.371587, 4.948419

LITTLE C (ROTTERDAM)

51.909004, 4.464367

SPAIN

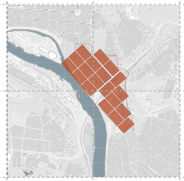
EIXAMPLE BLOCK (BARCELONA)

41.395006, 2.171990

LOOKING FOR THE “PERFECT” BLOCK

LITHUANIA

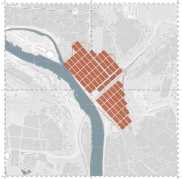
NEW TOWN BLOCK (KAUNAS)



Residents	12 700
Employees	17 750
Amenities (m²)	88 800

SOVIET PERIOD BLOCK (KAUNAS)

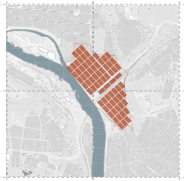
PAUPYS BLOCK (VILNIUS)



Residents	10 000
Employees	14 000
Amenities (m²)	70 000

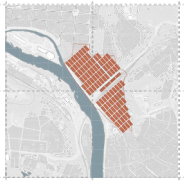
FRANCE

MASSENA BLOCK A (PARIS)



Residents	12 350
Employees	17 250
Amenities (m²)	86 330

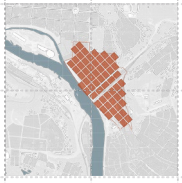
MASSENA BLOCK B (PARIS)



Residents	22 550
Employees	31 550
Amenities (m²)	157 850

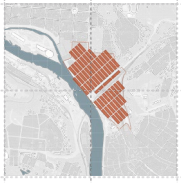
THE NETHERLANDS

BORNEO BLOCK A (AMSTERDAM)



Residents	20 200
Employees	28 300
Amenities (m²)	141 500

BORNEO BLOCK B (AMSTERDAM)

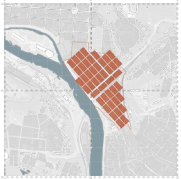


Residents	11 000
Employees	15 450
Amenities (m²)	77 200

BORNEO BLOCK C (AMSTERDAM)

Residents	10 900
Employees	15 250
Amenities (m²)	76 250

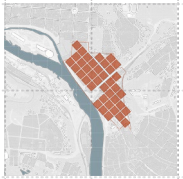
LITTLE C (ROTTERDAM)



Residents	23 200
Employees	23 450
Amenities (m²)	162 250

SPAIN

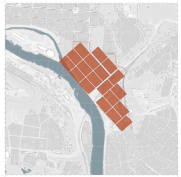
EIXAMPLE BLOCK (BARCELONA)



Residents	27 850
Employees	39 000
Amenities (m²)	195 000

LITHUANIA

NEW TOWN BLOCK (KAUNAS)



Residents	12 700
Employees	17 750
Amenities (m²)	88 800

SOVIET PERIOD BLOCK (KAUNAS)

PAUPYS BLOCK (VILNIUS)

Residents	10 000
Employees	14 000
Amenities (m²)	70 000

FRANCE

MASSENA BLOCK A (PARIS)

Residents	12 350
Employees	17 250
Amenities (m²)	86 330

MASSENA BLOCK B (PARIS)

Residents	22 550
Employees	31 550
Amenities (m²)	157 850

THE NETHERLANDS

BORNEO BLOCK A (AMSTERDAM)

Residents	20 200
Employees	28 300
Amenities (m²)	141 500

BORNEO BLOCK B (AMSTERDAM)

Residents	11 000
Employees	15 450
Amenities (m²)	77 200

BORNEO BLOCK C (AMSTERDAM)

Residents	10 900
Employees	15 250
Amenities (m²)	76 250

LITTLE C (ROTTERDAM)

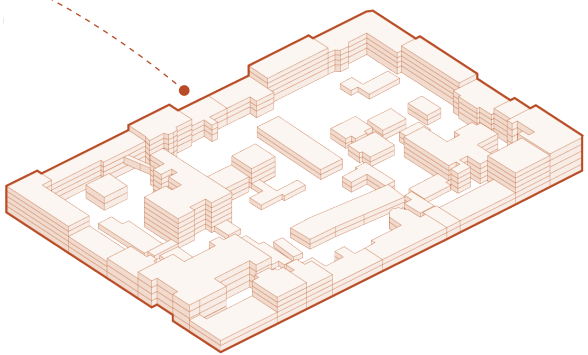
Residents	23 200
Employees	23 450
Amenities (m²)	162 250

SPAIN

EIXAMPLE BLOCK (BARCELONA)

Residents	27 850
Employees	39 000
Amenities (m²)	195 000

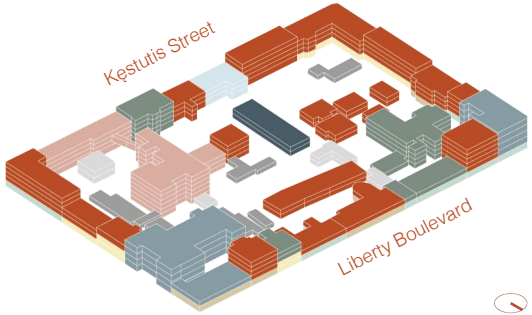
KAUNAS (NEW TOWN) BLOCK



- The perimeter build-up (outline)
- Higher outline
- Varying height of the outline
- Spacious inner yards
- Passages
- A mix of functions within the block
- Active ground floors of the outline

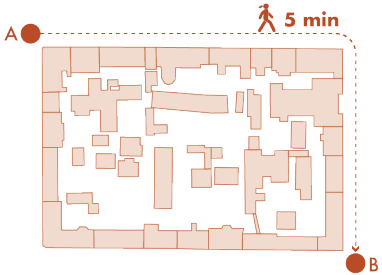
Kęstutis Street side

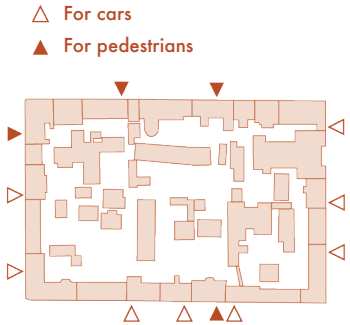
Liberty Boulevard side



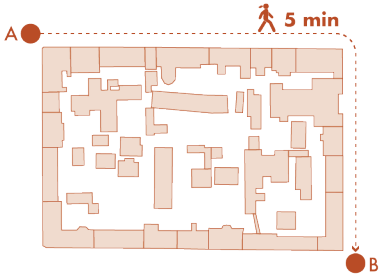
Residential	52%
Student housing	
HoReCa	13%
Services	
Retail	
Offices	11%
Institutional	19%
Cultural	
Educational	
Garages/ shelters	5%
Other	

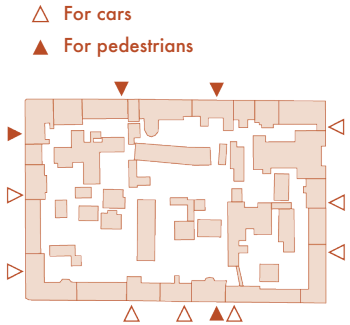
WALKABILITY



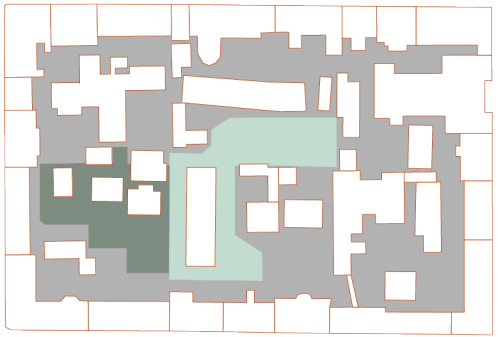


WALKABILITY

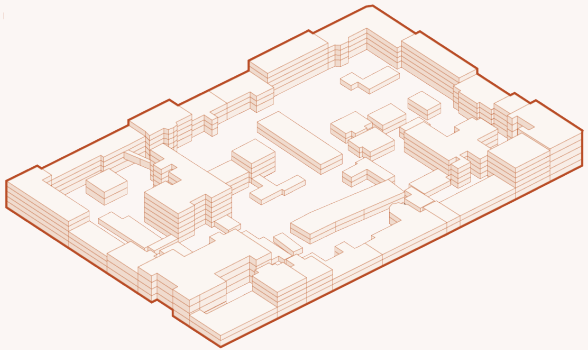




SPACE FOR CARS

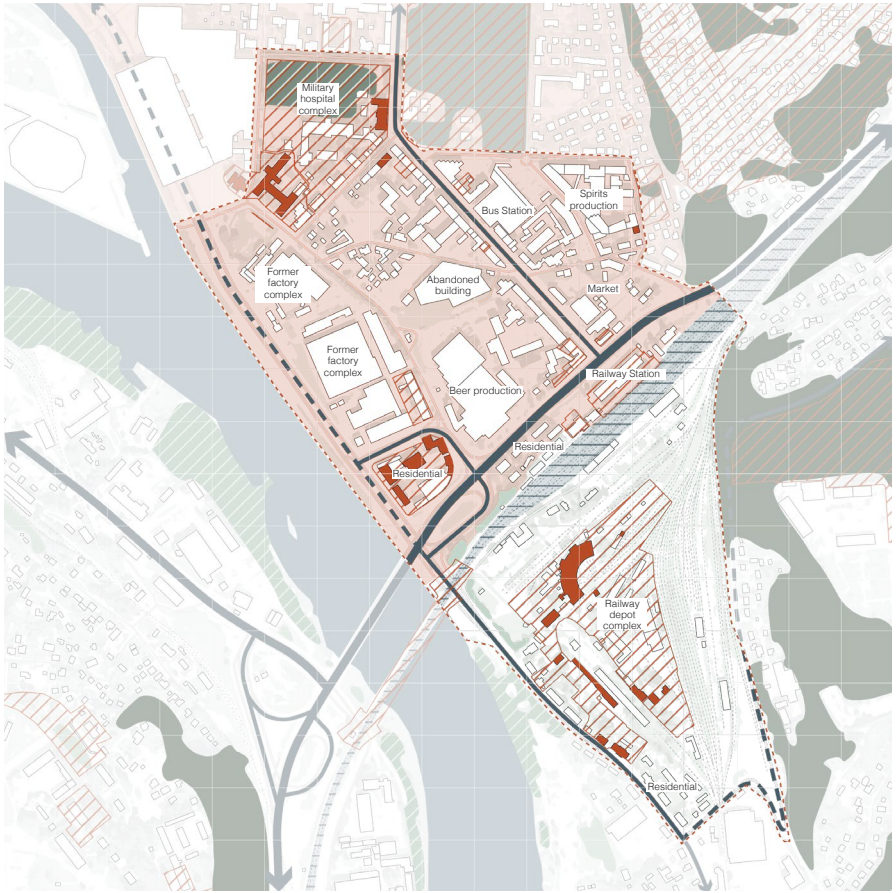


Hard paving (car parking)	74%	13200 m²
Kindergarten yard	15%	2800 m²
Private yard	11%	1900 m²



KAUNAS BLOCK 2.0

DEFINING THE BLOCK STRUCTURE



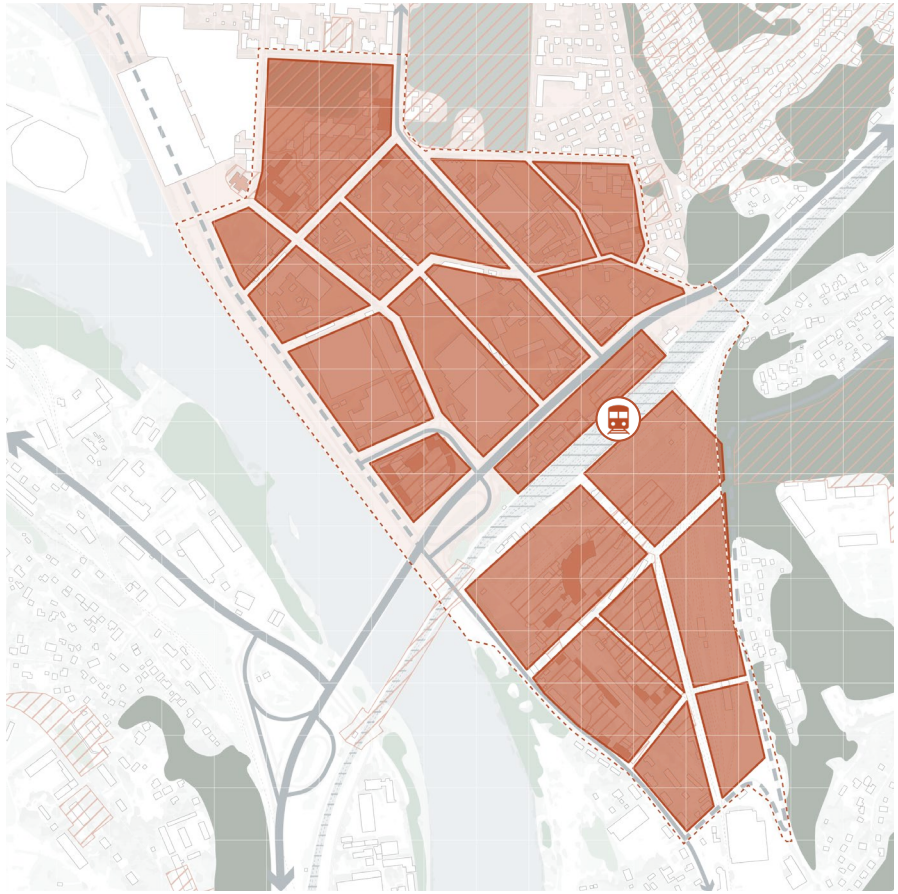
MOBILITY
- Street (important)
- Street (semi-important)
- Street (potential change)
- Rail Baltica tracks area

NATURE
- Green slopes
- Park
- Park (potential)
- Potential recreational area

HERITAGE
- Heritage buildings
- Heritage zone
- New Town heritage zone

PROPOSED BLOCK STRUCTURE

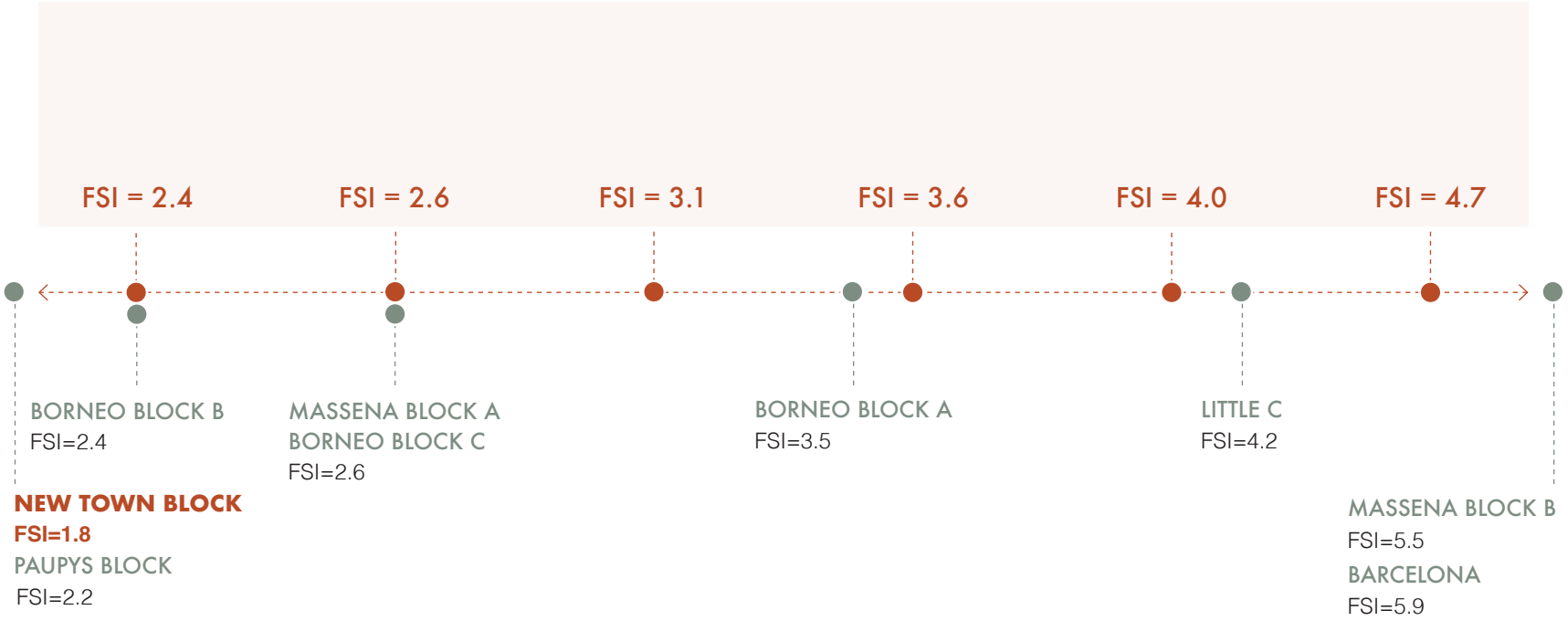
- The average block **2.9 ha**
- Minimal size **1.2 ha**
- Maximal size **6.0 ha**

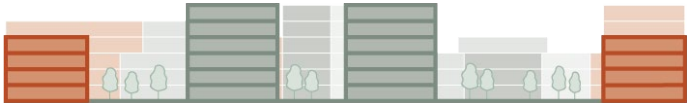


Buildings
Greenery
Water
Rail Baltica tracks
Other rail tracks
Main streets
Focus area
New blocks

- **Floor Space Index (FSI)** - ratio of the **total floor area** of a building to the total plot (in this case, block) area.

HOW MUCH TO DENSIFY?





FSI = 2.4

Depth 18 m
OSR=0.40

4 floors
4 floors

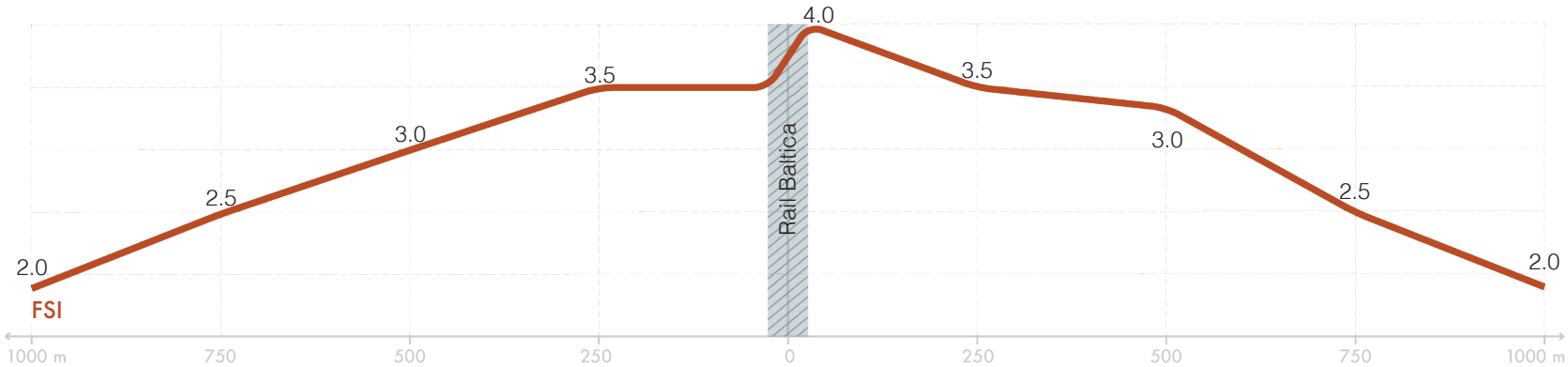
RESIDENTS	EMPLOYEES	AMENITIES
860	1210	6050 m^2

FSI = 4.7

Depth 18 m
OSR=0.50

8 floors
10 floors

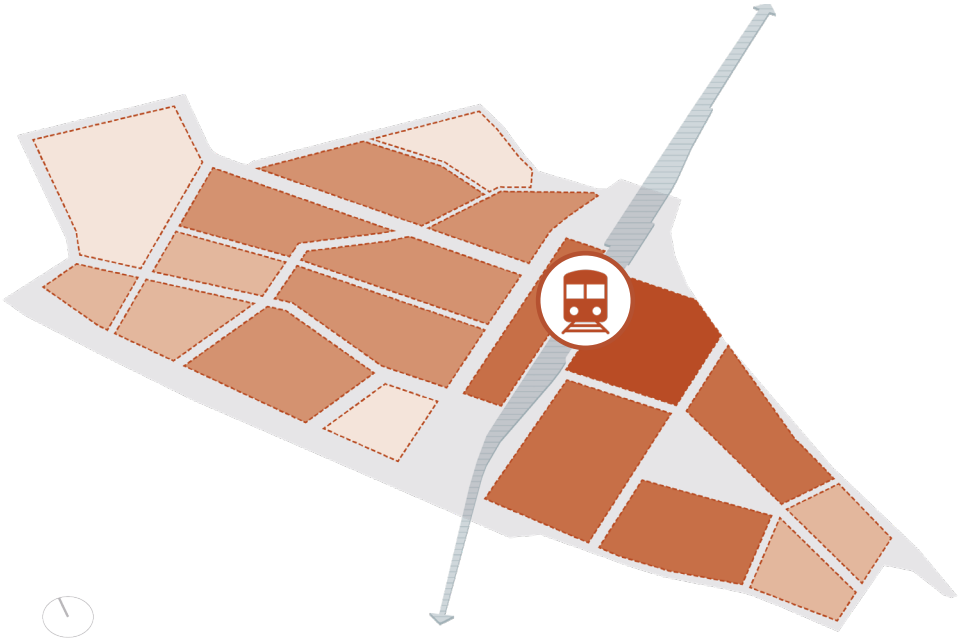
RESIDENTS	EMPLOYEES	AMENITIES
1700	2370	11860 m^2



L (max)	6 floors	8 floors	12 floors	16 floors	8 floors	6 floors
OSR	0.40	0.45	0.50		0.45	0.40

Kaunas New Town heritage zone

DENSIFICATION FRAMEWORK



17 000

RESIDENTS

24 000

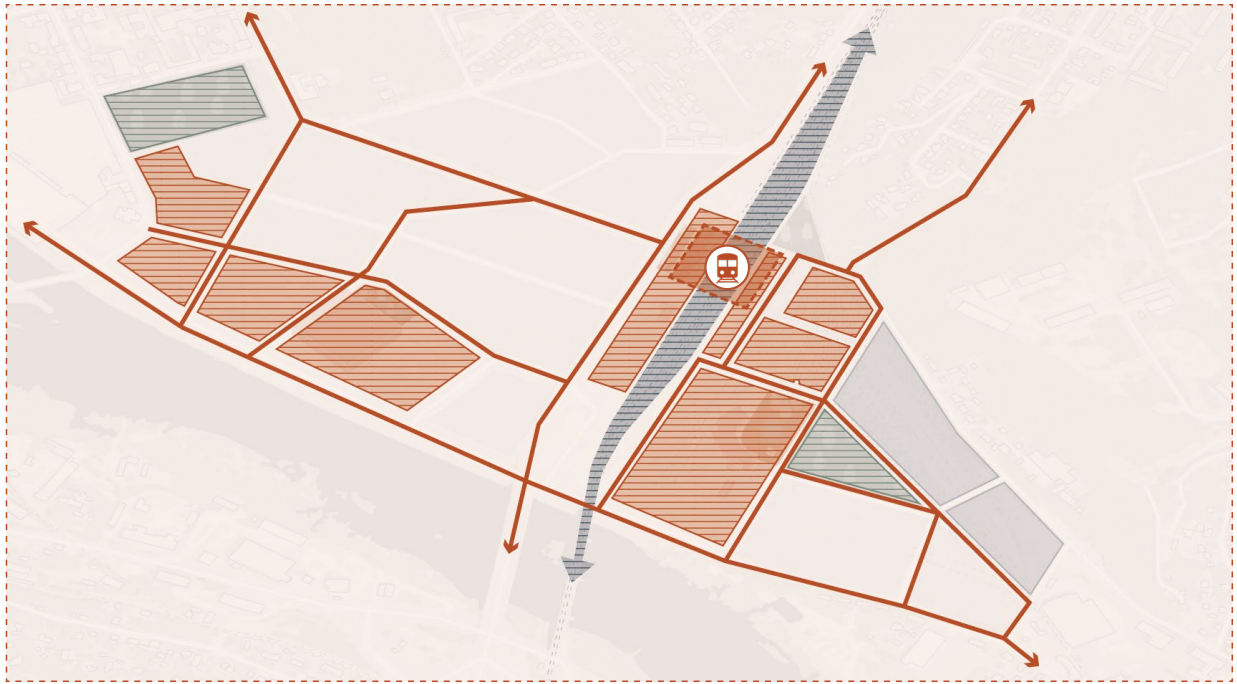
EMPLOYEES

112 000 m²

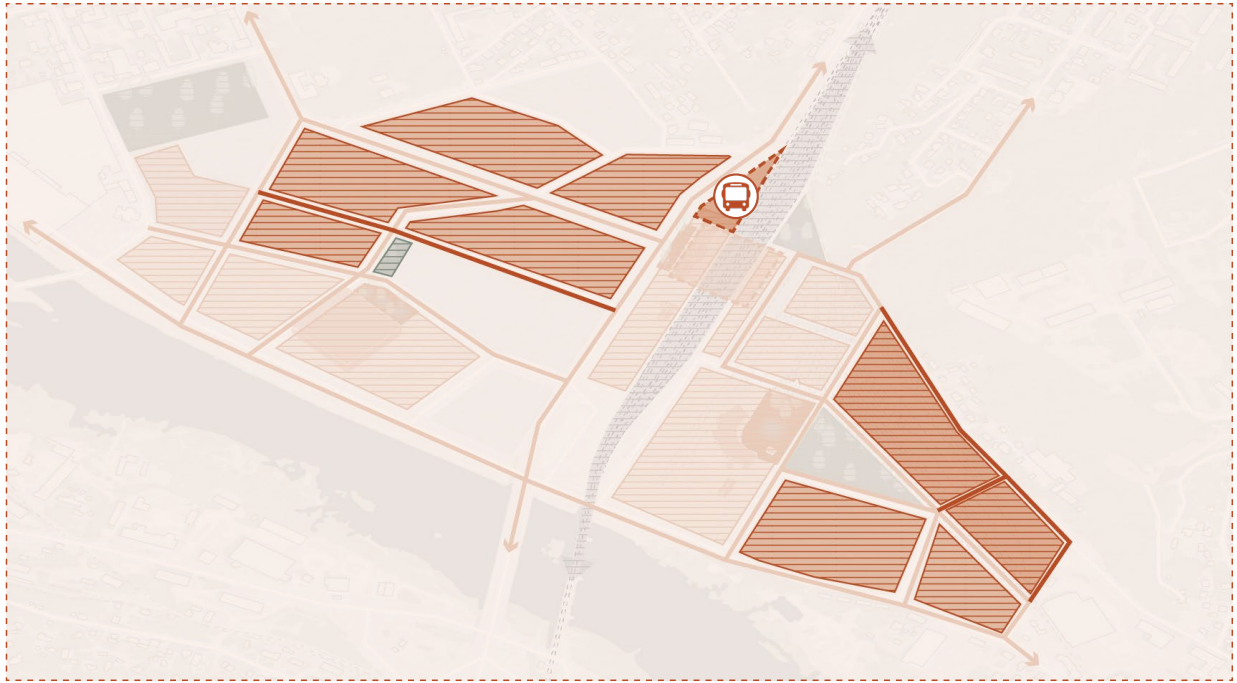
AMENITIES

1.5 2.0 **2.5** **3.0** **3.5** **4.0** 4.5

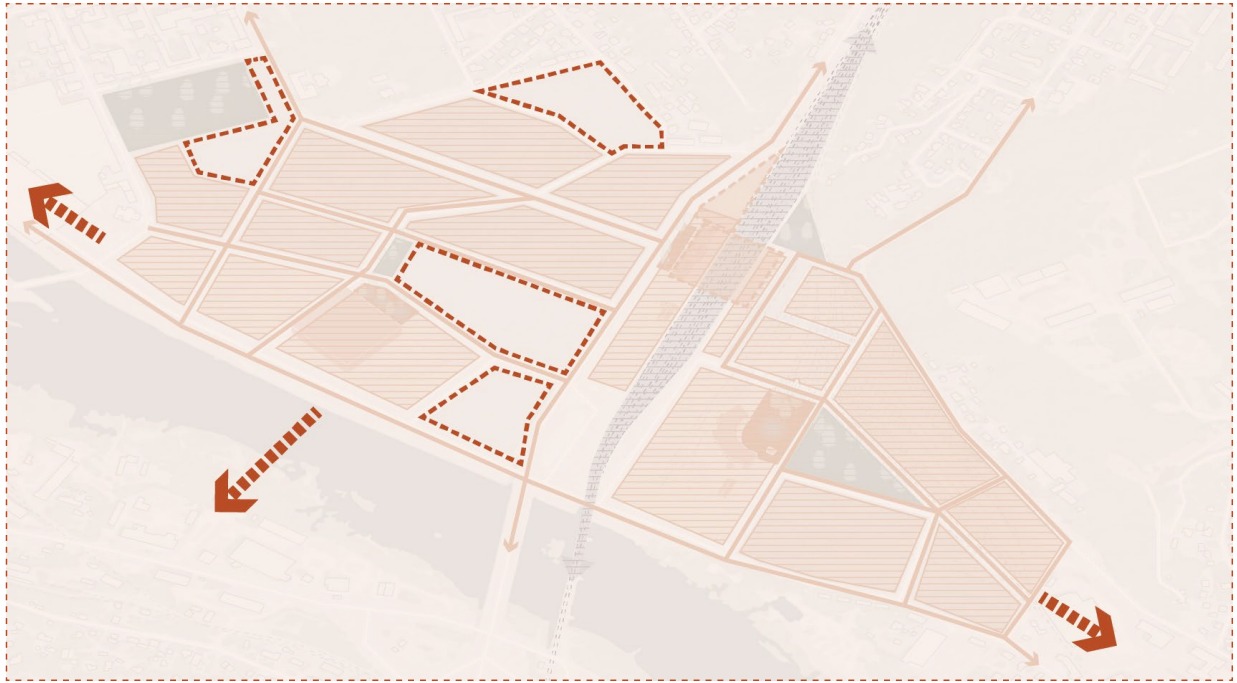
FLOOR SPACE INDEX (FSI)



PHASE 1 SETTING THE EXAMPLE



PHASE 2 INCREASING CAPACITY



PHASE 3 DEALING WITH UNCERTAINTY

PROGRAMME MIX

RESIDENTS

50%

17 000

EMPLOYEES

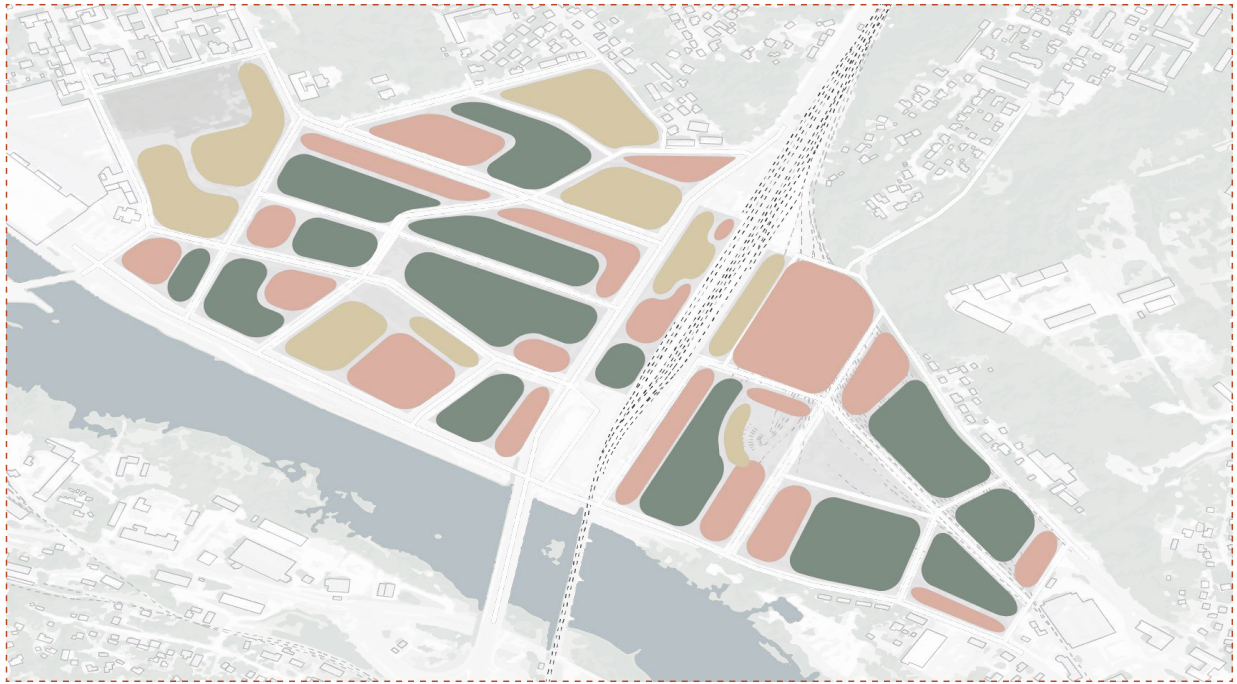
40%

24 000

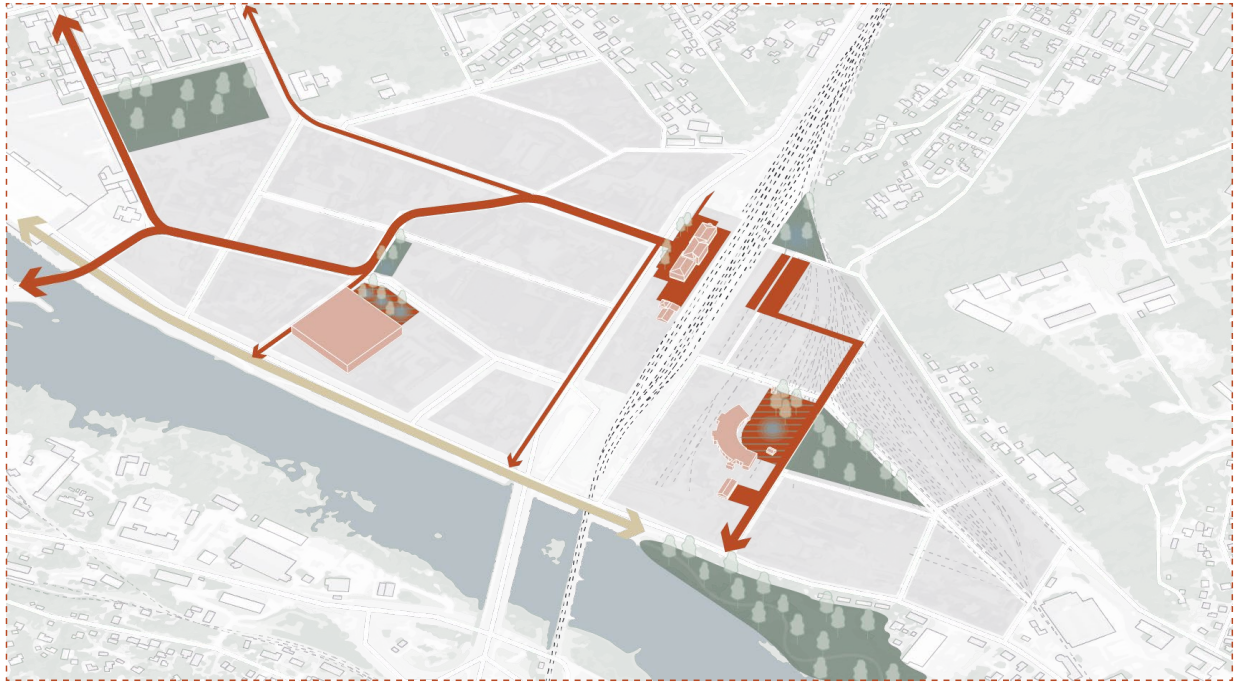
AMENITIES

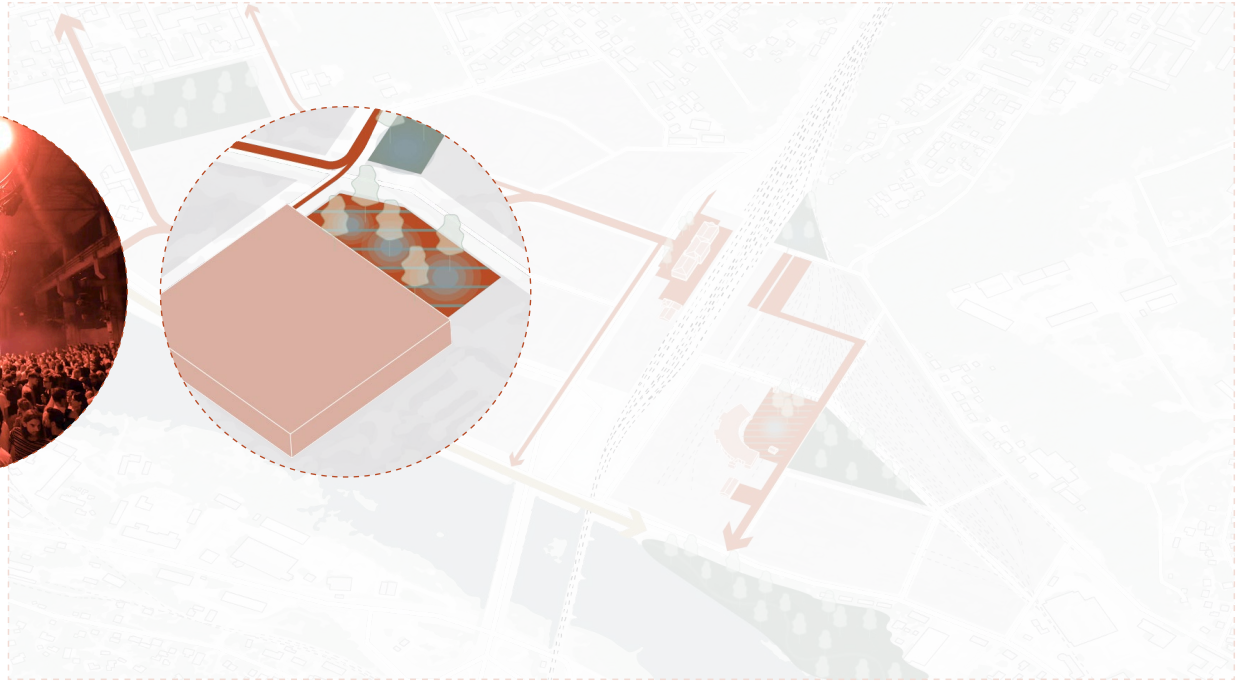
10%

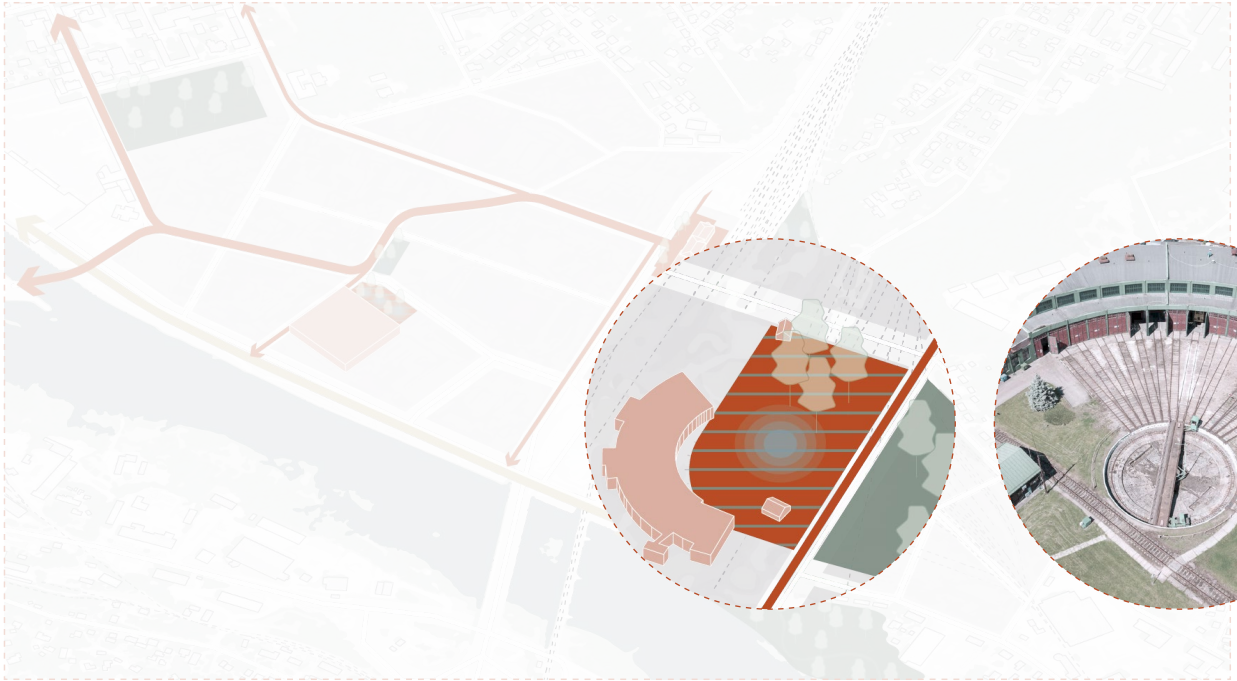
112 000 m²

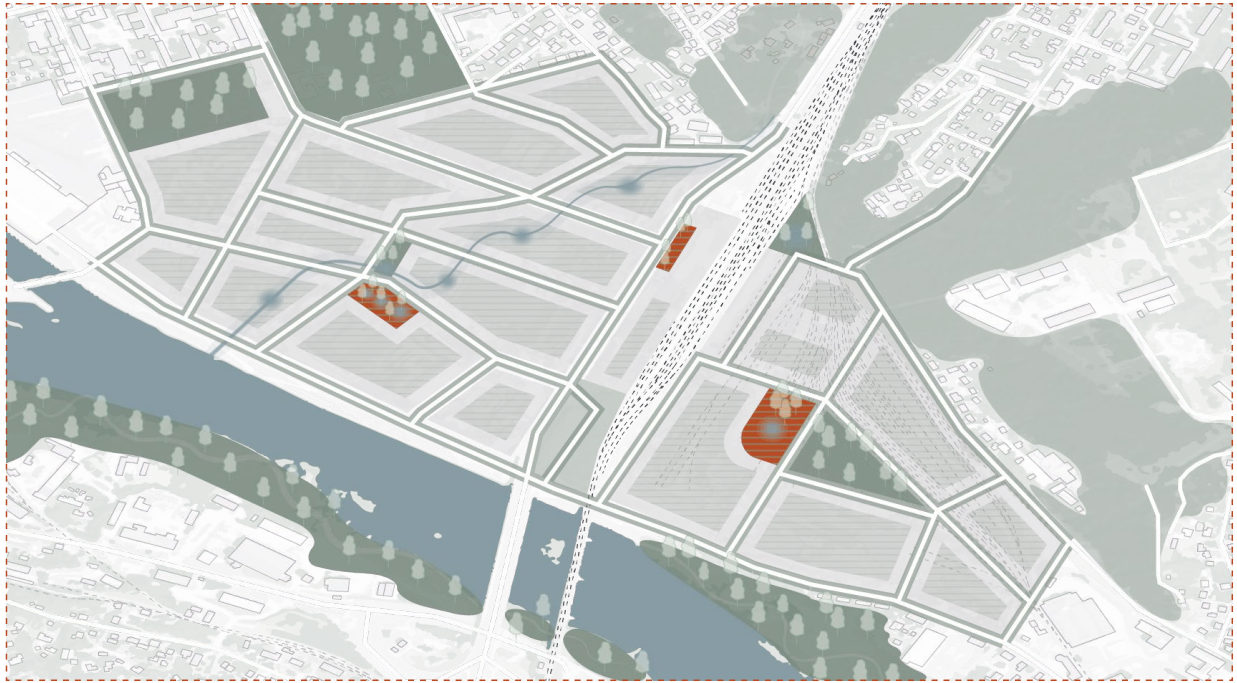


MAIN PUBLIC SPACES

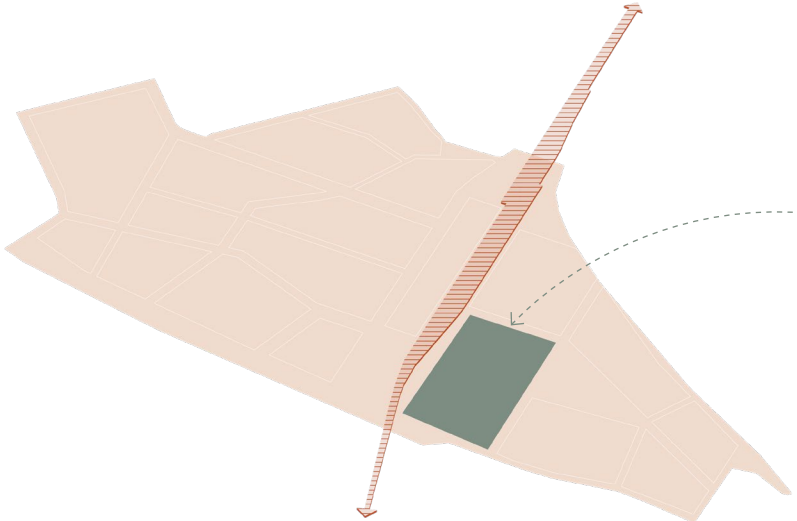




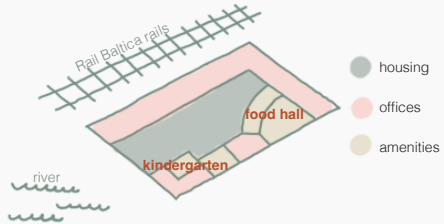




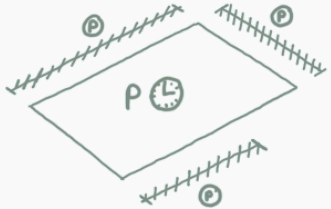
QUALITY OF THE BLOCK



1 MIX OF FUNCTIONS

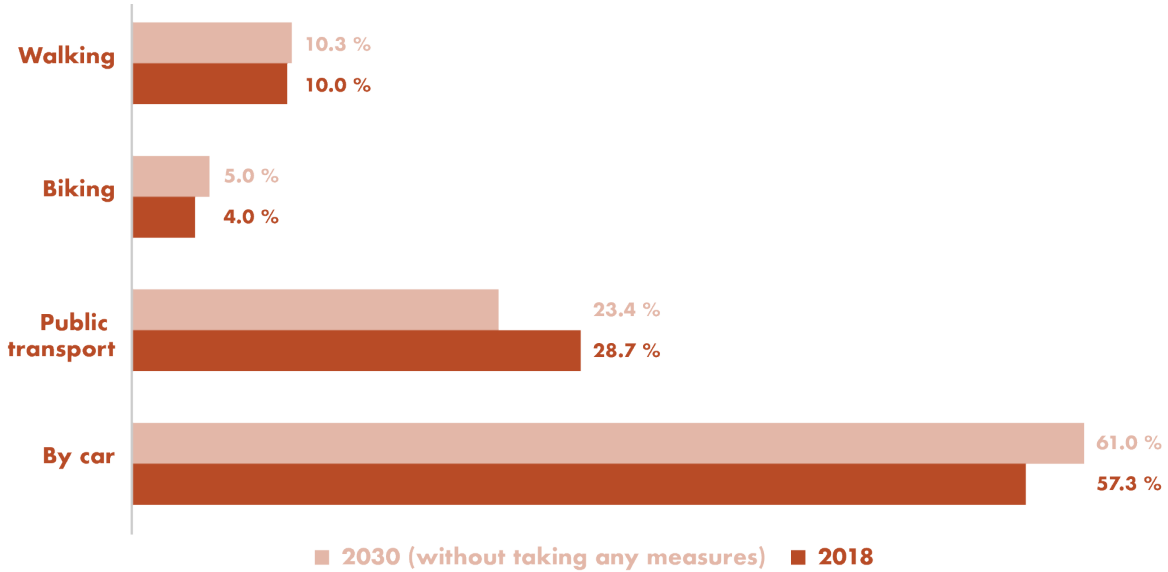


2 PARKING OUTSIDE THE BLOCK

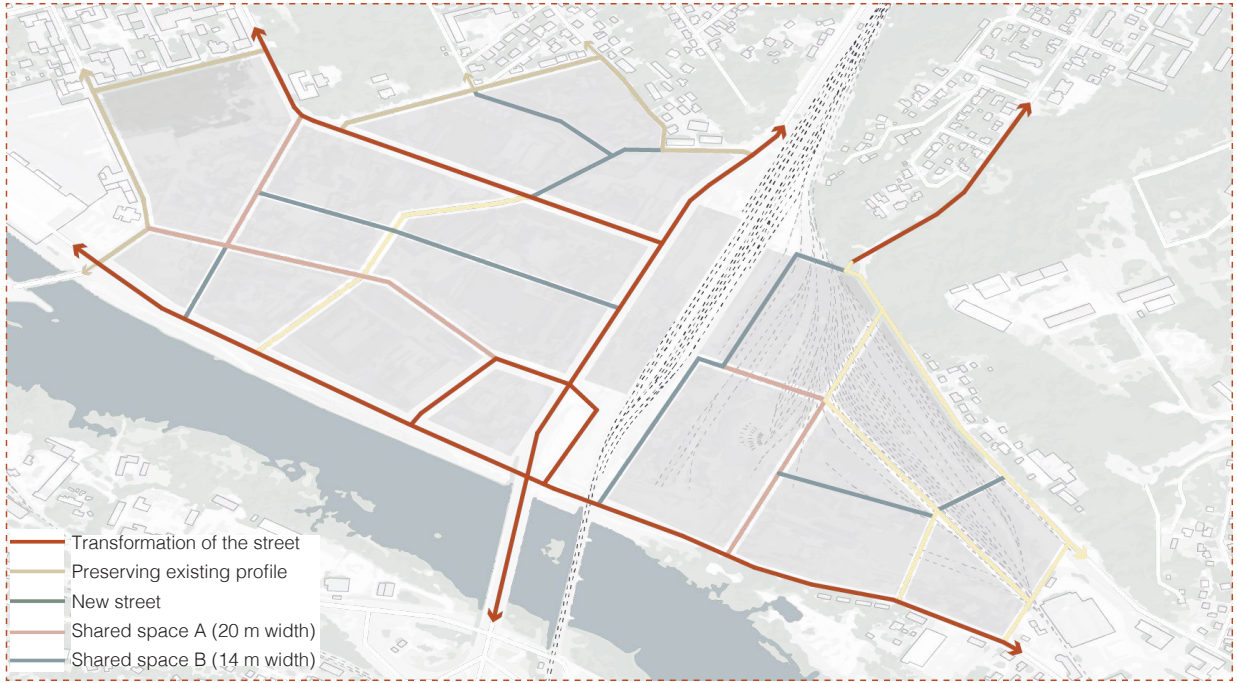


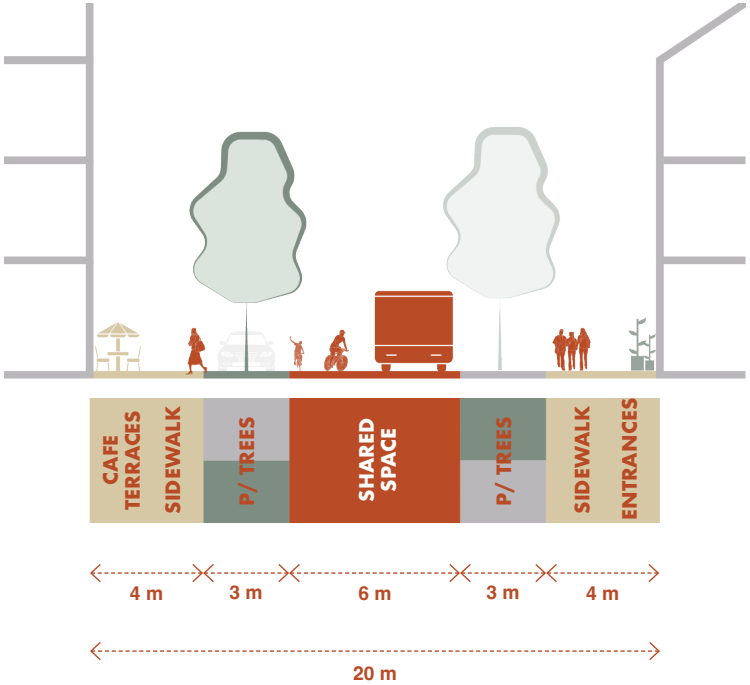
3 RAILS AS A PATH

TOWARDS THE (PRIVATE) CAR-FREE FUTURE

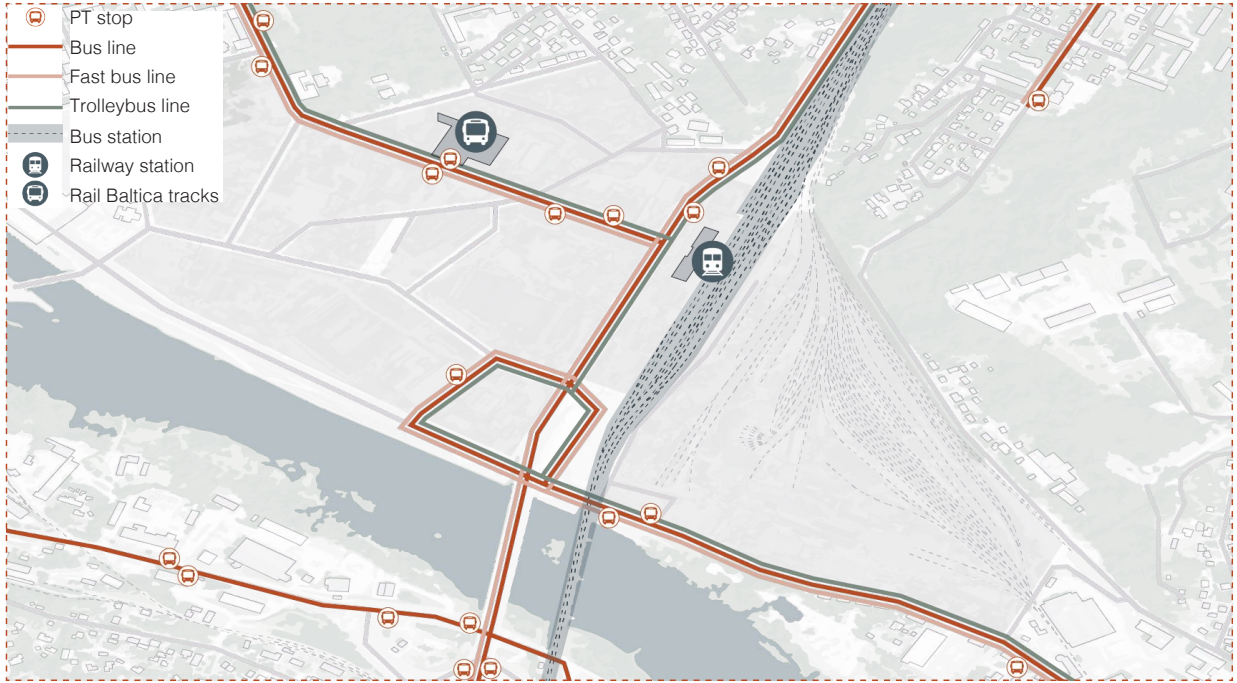


Source: Kaunas City Municipal Administration, PUPA/Life over space, & Civitta. (2019). Kauno miesto darnaus judumo planas

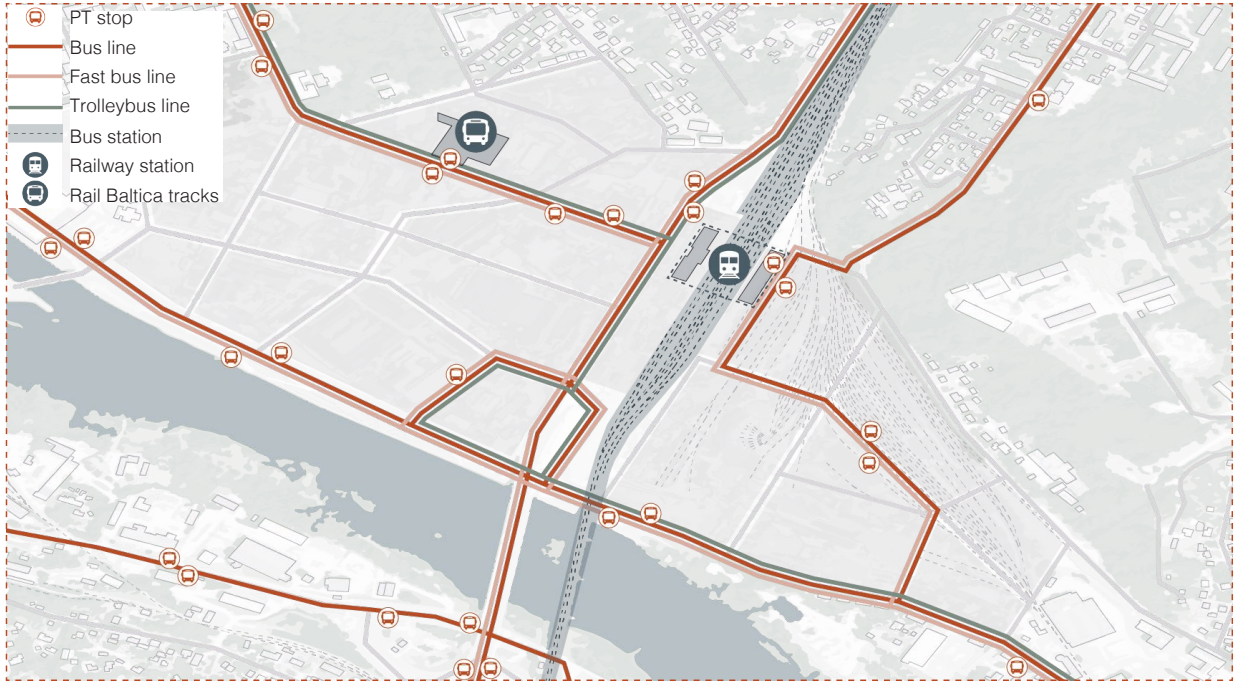

Transformation of the street
Preserving existing profile
New street
Shared space A (20 m width)
Shared space B (14 m width)

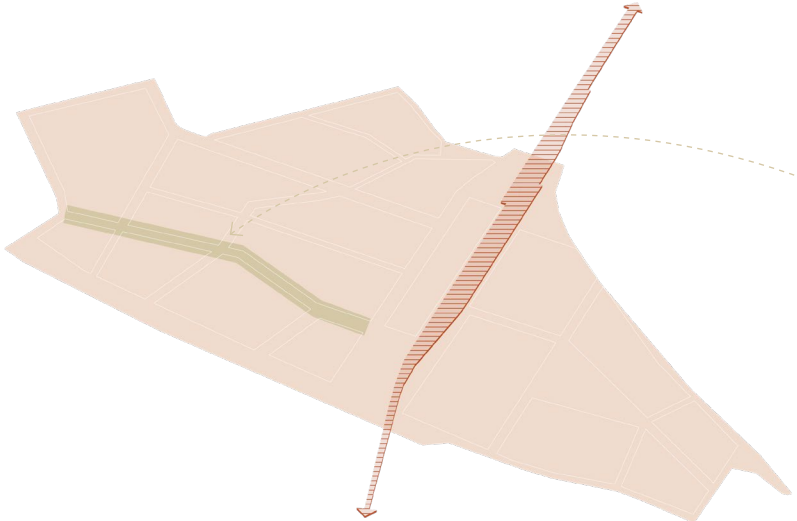

CAFE TERRACES
SIDEWALK
P/ TREES
SHARED SPACE
P/ TREES
SIDEWALK
ENTRANCES
4 m
3 m
6 m
3 m
4 m
20 m

CURRENT PUBLIC TRANSPORT NETWORK



PROPOSED PUBLIC TRANSPORT NETWORK



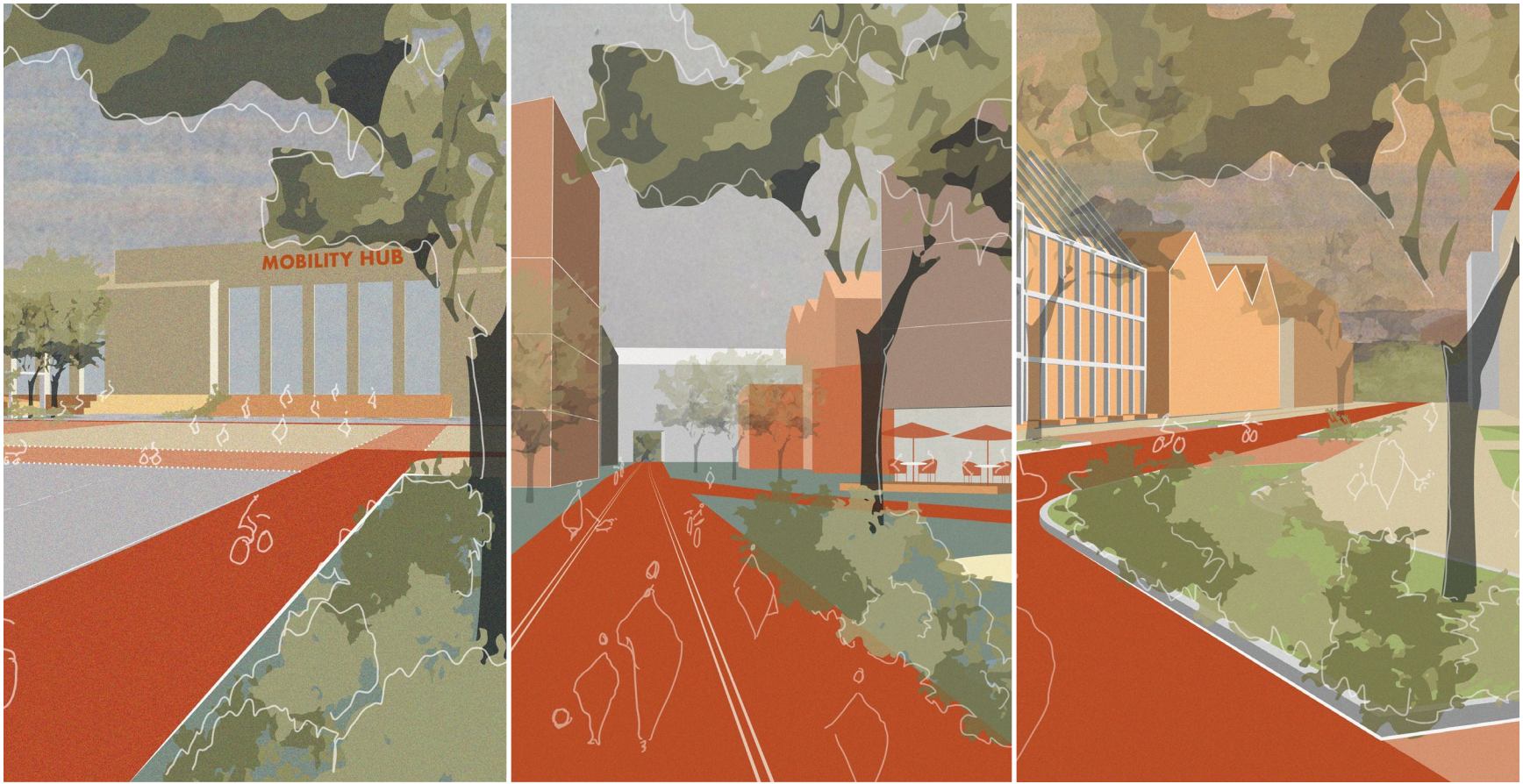


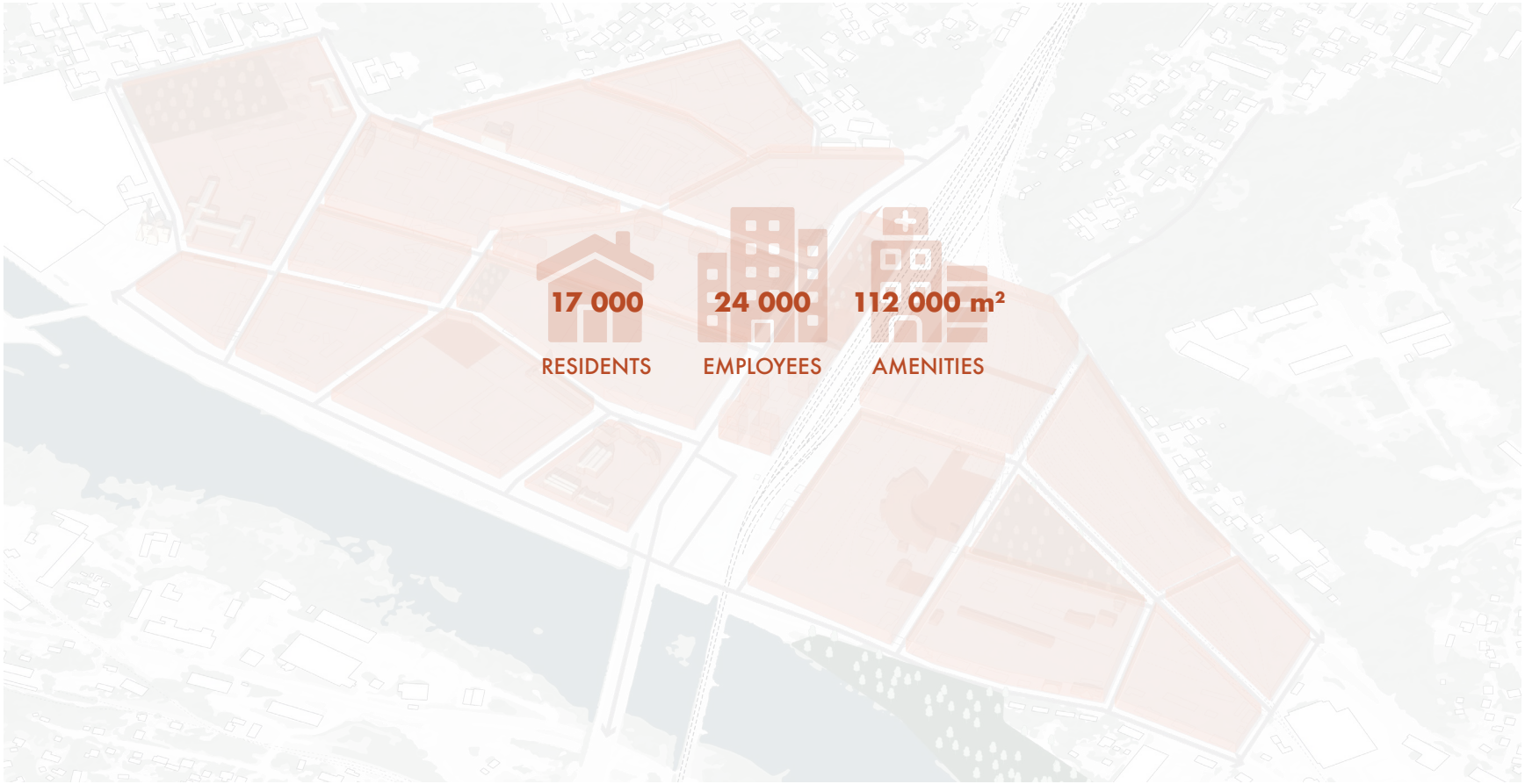
1 GREEN CHARACTER

2 ACTIVE GROUND FLOOR

3 HISTORY AS INSPIRATION FOR DESIGN

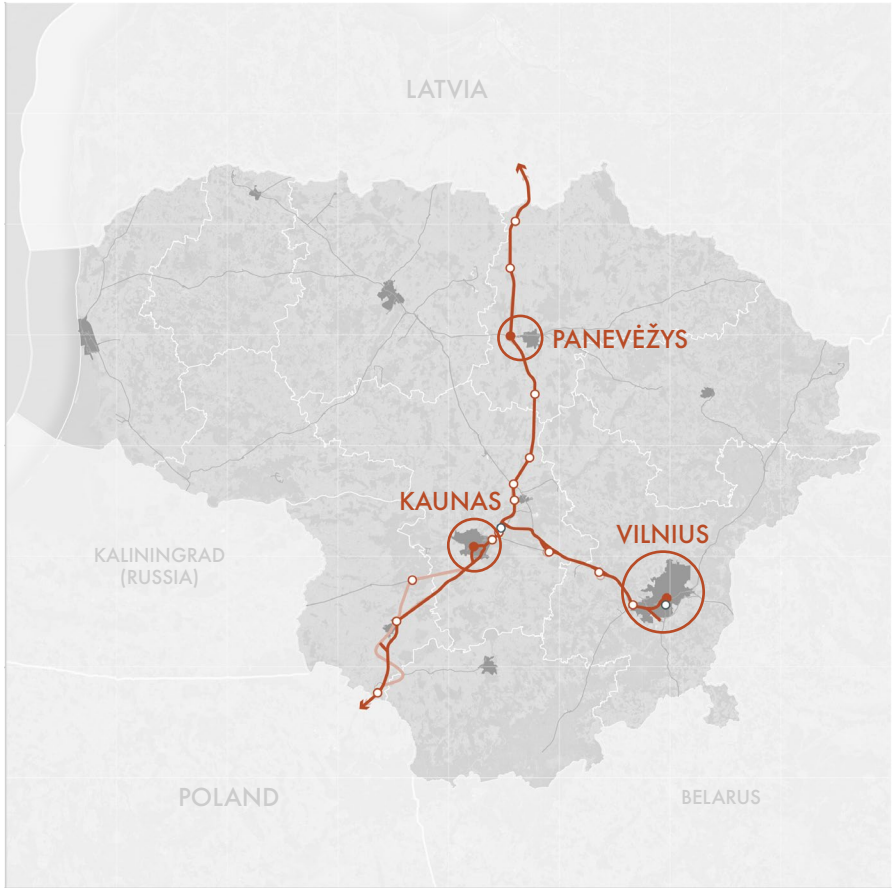
RESTAURANT
SHOP


MOBILITY HUB

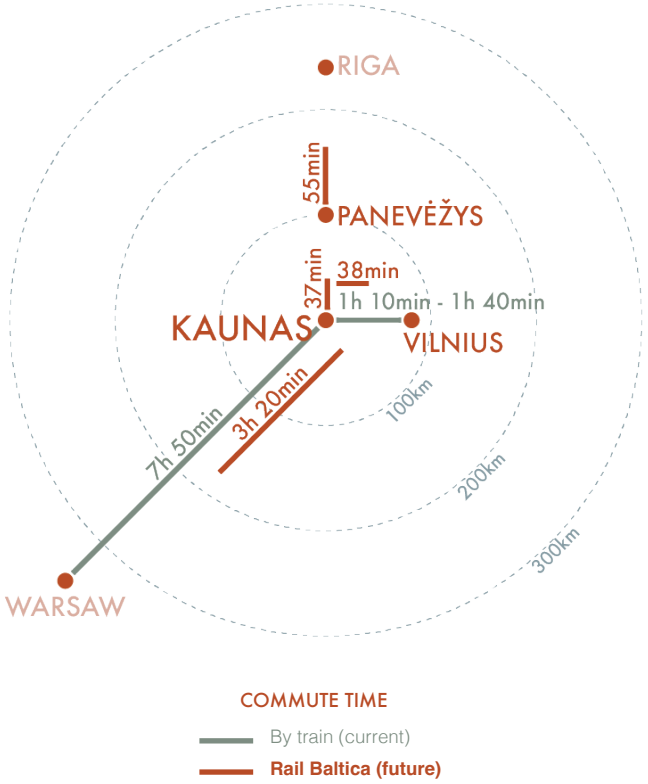

17 000
RESIDENTS
24 000
EMPLOYEES
112 000 m²
AMENITIES

WHAT ARE THE **LIMITS** TO GROWTH?

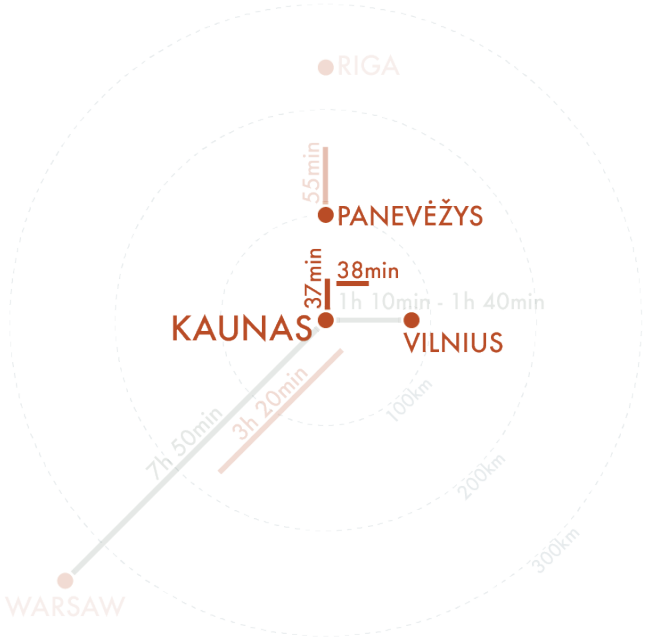
LATVIA
KAUNAS
KALININGRAD
(RUSSIA)
POLAND
BELARUS


LATVIA
PANEVĖŽYS
KAUNAS
VILNIUS
KALININGRAD
(RUSSIA)
POLAND
BELARUS

COMMUTE TIME AFTER RAIL BALTICA IMPLEMENTATION



COMMUTE TIME AFTER RAIL BALTICA IMPLEMENTATION



COMMUTE TIME

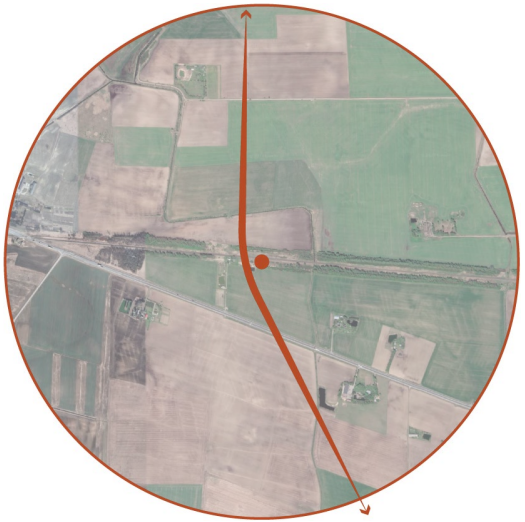
By train (current)

Rail Baltica (future)

STATION CATCHMENT AREA (1.2 km)

VILNIUS

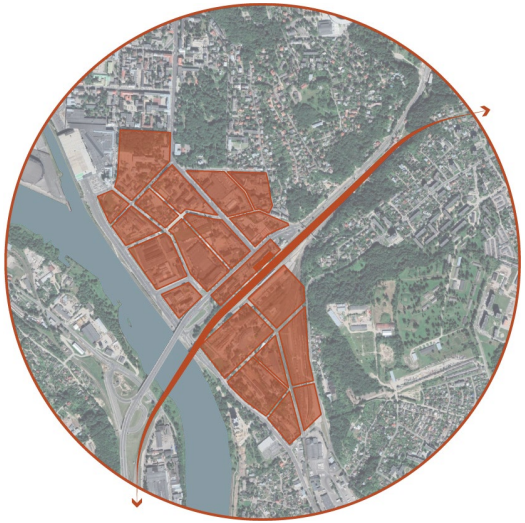
KAUNAS



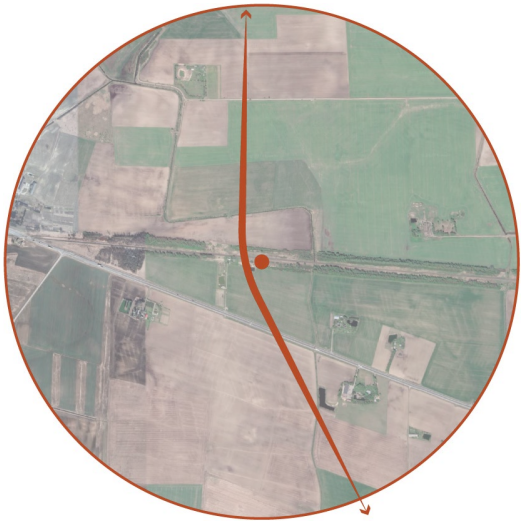
PANEVĖŽYS

STATION CATCHMENT AREA (1.2 km)

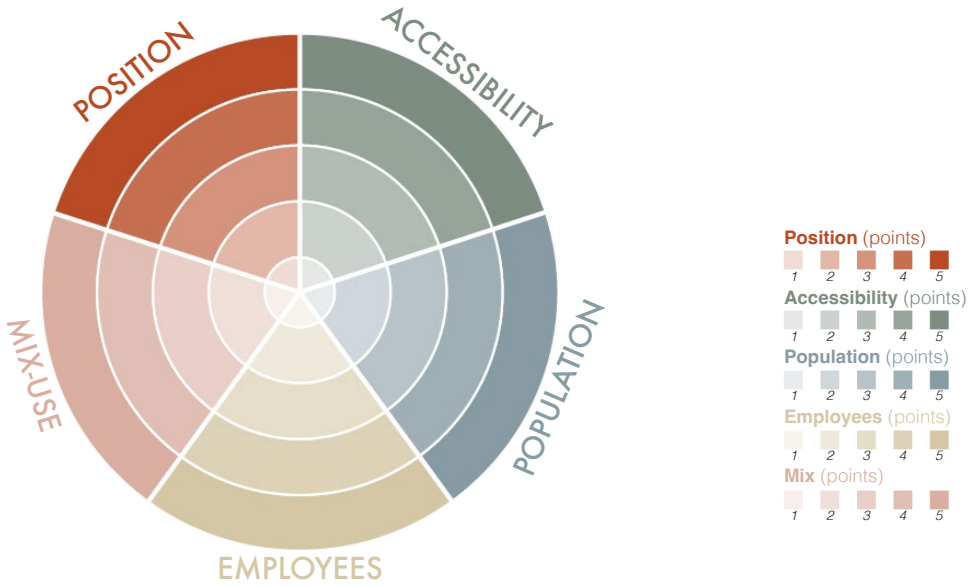
VILNIUS

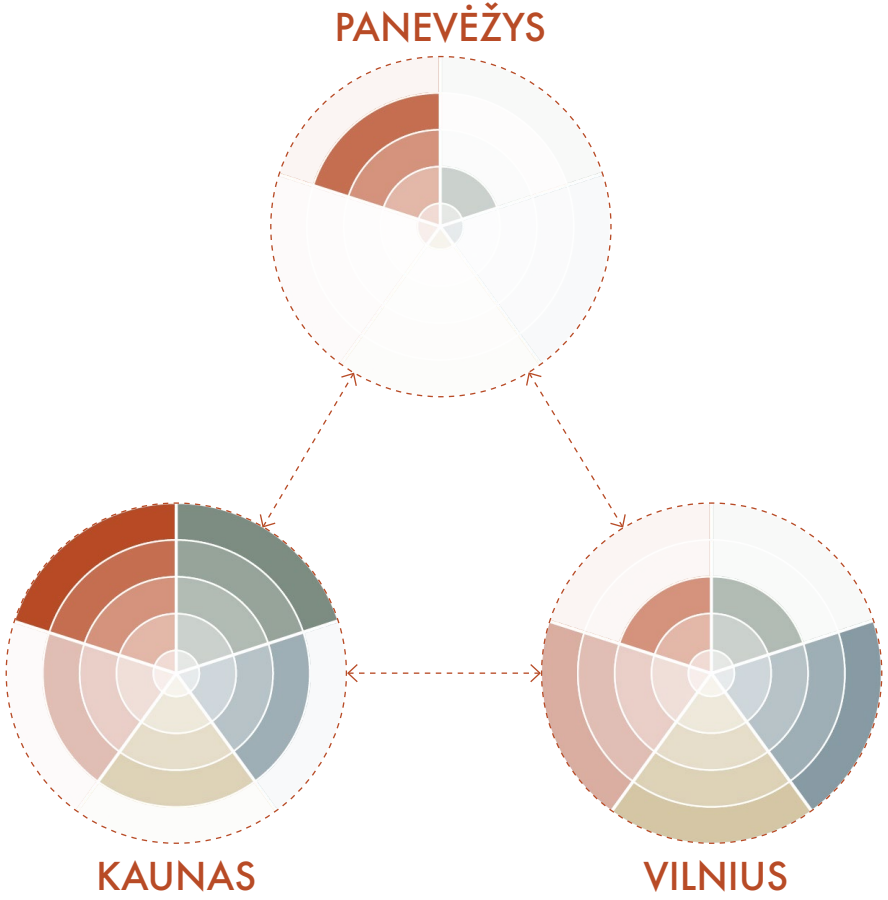


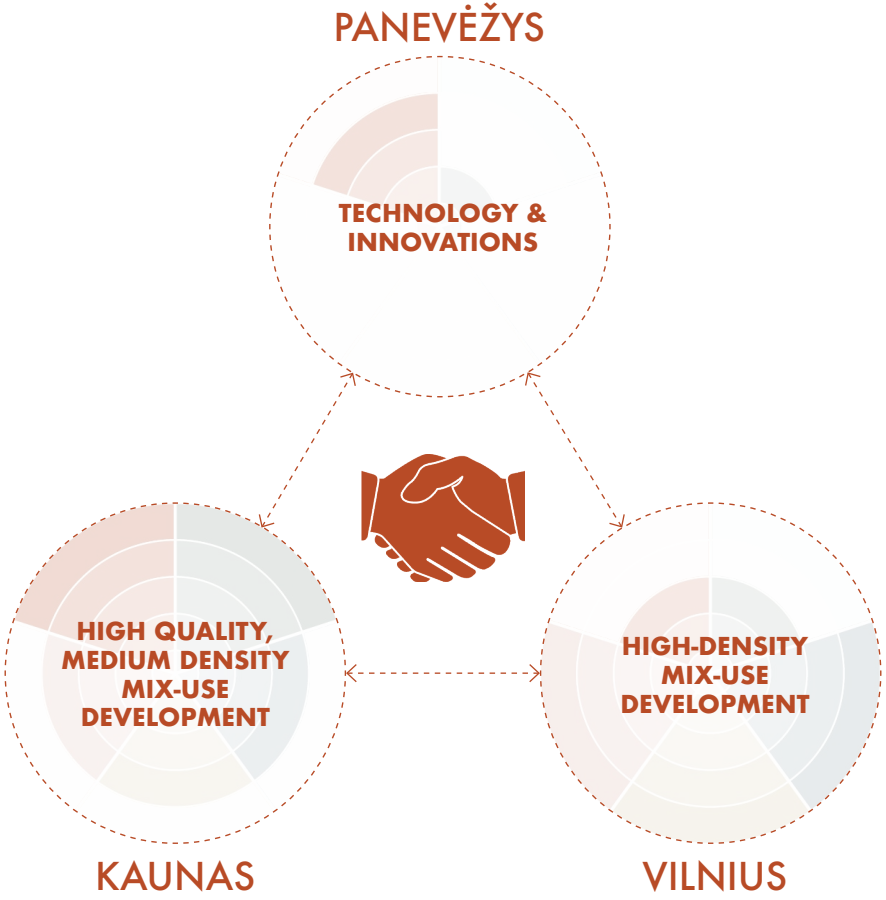
KAUNAS



PANEVĖŽYS


POSITION
ACCESSIBILITY
POPULATION
EMPLOYEES
MIX-USE
Position (points)
1 2 3 4 5
Accessibility (points)
1 2 3 4 5
Population (points)
1 2 3 4 5
Employees (points)
1 2 3 4 5
Mix (points)
1 2 3 4 5


PANEVĖŽYS
KAUNAS
VILNIUS


PANEVĖŽYS
TECHNOLOGY & INNOVATIONS
HIGH QUALITY, MEDIUM DENSITY MIX-USE DEVELOPMENT
HIGH-DENSITY MIX-USE DEVELOPMENT
KAUNAS
VILNIUS

1. Need for **collaboration**
2. Need to exploit the **potential**
3. Need to act **now**
4. Need for the **vision**
5. Need for the **mobility** paradigm shift
6. Need to rethink **heritage**
7. Need to build **trust**

The mural “Last passenger” by Timotiejus Norvila-Morfai

The mural “Last passenger” by Timotiejus Norvila-Morfai

THANK YOU!

Questions?

Ruta Vitkute | 5624010

P5 presentation | MSc Urbanism | TU Delft

22-06-2023

1st mentor: Rients Dijkstra

2nd mentor: Verena Balz