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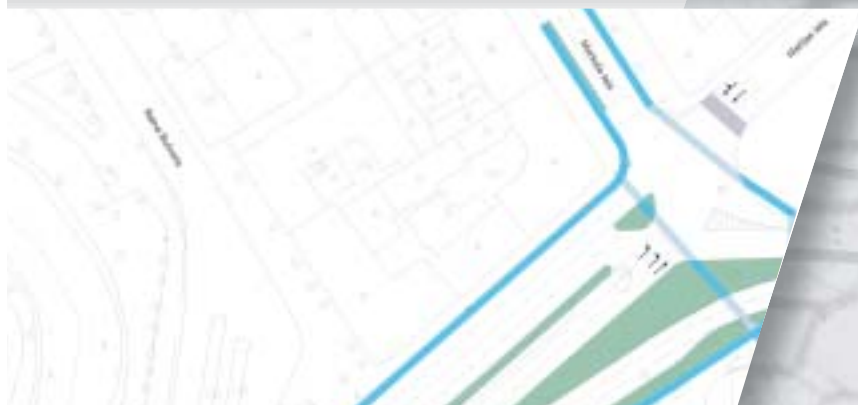


Riga City Council

Bicycle Route Network Planning in Riga

Aggregated Plan

August 2003



COWI

Danish Ministry of Transport

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Executive Summary

This report describes the outcome of Phase 3, Aggregated Plan for bicycle route network of the project "*Bicycle route network planning in Riga*".

The project is undertaken by COWI for the Danish Ministry of Transport. It was started in December 2001 and is expected to be finished in the first half of 2003. The project is launched within the Environmental Sector Programme of the Danish Government's aid to the Central and Eastern European countries.

The project has been agreed with the Latvian Ministry of Transport and the Riga City Council, which is the key counterpart on the project.

The overall objective of the project is to increase the share of bicycling in Riga on short distance trips and thus assist in reducing the growing environmental impact from car traffic. This requires an improvement of the facilities for bicycles in the streets.

The specific objectives of this project are as follows:

- to prepare an aggregated plan for bicycle facilities and routes for the Inner City excluding the area of Riga old town (the project area has actually been delimited to the railway lines surrounding the central part of Riga);
- to prepare detailed design of a specified bicycle route;
- to improve the coordination of the involved departments in Riga City Council and other stakeholders, who are directly involved in the planning and implementation of bicycle routes.

The first objective has the underlying aims to:

- transfer know-how to Latvia on the planning and design of bicycle facilities;
- encourage more people to use the bicycle;
- improve the conditions for bicyclists in the traffic system;
- integrate bicycle planning in the general transport planning of Riga City;
- ensure that the planned routes are connected to other routes outside the project area.

Project phases

The project is undertaken in the following phases:

- Phase 1: Mobilisation;
- Phase 2: Preparatory planning;
- Phase 3: Aggregated plan for bicycle route network;
- Phase 4: Detailed design of one specified route;
- Phase 5: Promotion of bicycle use.

The objectives for Phase 3, which is documented in this Aggregated Plan have been to complete a proposal for a bicycle route network within the project area and submit it in a form that can be communicated to important stakeholders in Riga.

In Phase 2, a *Preparatory Planning Report, September 2002* described the results of discussions between Latvian and Danish participants on planning principles for urban traffic and in particular bicycle facilities. In addition, the results of the recording of data and a preliminary proposal for a bicycle route network within the project area were described.

Planning approach and background

The final proposal for a future bicycle route network in the project area has been prepared, based on the following criteria:

- accessibility to important travel destinations;
- traffic safety;
- as short and direct route as possible;
- cohesion of routes in a network;
- attractiveness;
- clearness of traffic system;
- technical feasibility within existing conditions.

At the outset of the project it was aimed to coordinate the planning of bicycle routes with the hierarchical classification of the road network. Such a hierarchy only exists to some extent in the project area and is described in the Riga Official Plan from 1995. This classification has been used in the project together with knowledge of actual traffic distribution in the streets. A more elaborate classification of the road network will be essential for the future planning for bicyclist facilities.

The following important documents and projects are essential to the planning of bicycle routes within the project area:

- *Riga City Official Plan 1995 - 2005*. The plan determines the principal land use and appoints traffic networks - also a potential bicycle route network. Any future revisions may be important to coordinate with the routes within this project.
- *Preservation and development plan of the historic centre of Riga*. Riga City Council started in 2002 a project with the aim of detailing the Riga

City Plan for the inner part of Riga. Among other issues, the plan will propose a future transport system for the area. The project is scheduled to finish in 2003.

- *Bicycle Development Programme for the City of Riga.* The programme adopted by Riga City Council in 2000 includes both general objectives, description of general measures to implement and a more specific action programme. The present project can be seen as one small part of the realisation of the programme.

The actual designs have partly been inspired by the Recommendations for Cycle Track Designing (prepared by the Latvian Ministry of Transport in 2001) and other European - especially Danish - experiences. The Latvian recommendations still seem to have a preliminary character. This project and other experiments in Latvia in coming years may give input to a future development of these recommendations.

Proposal for a bicycle route network

Based on discussions between Latvian and Danish participants, a final proposal for a future bicycle route network was prepared (see figure 3.1) following the planning criteria as far as possible.

The proposal includes a network of bicycle routes connecting the main suburbs outside the area with main travel destinations like the central business area, Old Riga, sport facilities, train station, major education facilities, private service and public service facilities within the area (*accessibility*).

The designs (tracks, lanes or mixed traffic) have been chosen to ensure separation of bicyclists from other road users and pedestrians to the degree suitable depending on primarily the traffic volumes and actual physical conditions (*traffic safety*).

A mesh width of 500 - 800 metres as a maximum between routes - less in the central part - has been aimed at (*as short and direct route as possible*).

Furthermore, the routes are all connected with each other and with important routes in other areas and thus allow *cohesion of routes in a network*.

The project area contains many commercial and cultural attractions of interest to the general public. Thus the main aim is to provide routes that run along and give access to these attractions, rather than providing e.g. quietness and the experience of nature. Such attractions are not believed to be the reasons for using the bicycle in the central area. However, it could be a future task together with the elaboration of a street hierarchy to appoint more quiet streets with less or no car traffic (*attractiveness*).

The routes need to be easy to find and easy to follow. Therefore, fairly long and direct routes on streets are proposed. Furthermore, a limited number of geometric elements and clearly recognisable design elements in for example intersections are used (*clearness of traffic system*).

Even though a vision may be to establish bicycle routes in a complete homogeneous network, reality in a complex urban area is that a number of compromises need to be made. It will for example be technically difficult to create fast, direct and attractive solutions for bicycle traffic along the river between the major bridges crossing Daugava and 11 Novembra Iela (*technical feasibility within existing conditions*).

Design principles

Due to the complexity of the traffic system in the project area, it will often be difficult to use standard solutions - especially in some of the major intersections. Furthermore, the space available often makes the desired cross section solutions impossible and minimum or more adapted solutions need to be applied.

Based on this, the following adapted design principles have been used as far as possible for the project area:

- Bicyclists are separated from car traffic if
 - traffic level is above 5,000 vehicles/day (in some streets based on estimates)
 - speed limit is 50 km/h or more and no speed-reducing measures are implemented
- Bicyclists can mix with the car traffic if
 - car traffic is below 1,000 vehicles/day and the street does not encourage fast driving
 - traffic is up to 5,000 vehicles/day and speed-reducing measures and speed limits ensure a speed level of maximum 40 km/h

Design for bus stops have included the following general possibilities:

- bicyclists on separate tracks next to the traffic lane with the bus stop;
- bicyclists on the pavement mixed with waiting pedestrians;
- bicyclists on specially assigned pavement or track away from the waiting pedestrians, and
- bicyclists on the road mixed with the buses.

The design has been based on the following general criteria:

- frequency of buses;
- physical design of bus stop (long bay with potentially many buses at the same time or only one bus at a time);
- number of passengers getting on and off;
- physical conditions (primarily the space available in the cross section).

Design depending on pedestrians can be summarised to the following:

- Streets with many shops have pedestrians walking not only parallel to the street, but in all directions. In such streets, a mix of pedestrians and bicyclists is not desirable;

- The mixed use of pavements for both bicyclists and pedestrians on appointed bicycle routes can not be recommended in general. The solution may be applicable in certain locations depending especially on the width of the pavement (at least three metres) and the volume of pedestrians and bicyclists

Another issue is to provide as safe solutions as possible in intersections. In dense built-up urban areas like the project area, the majority of crossings will have to take place in mixed traffic (and not in tunnels or on bridges) together with cars and pedestrians. The following principles have been implied:

- In intersections between two streets, bicyclists are mixed with car traffic. Therefore, a marking highlighting conflict areas for all road users is supplied;
- On streets with one-way bicycle tracks, the tracks should end before the intersection if a right-hand turn traffic lane exists. In this situation the bicycle track ends 15-20 m before the intersection allowing merge of traffic between right turning cars and bicyclists going straight ahead¹;
- In intersections between a road with primary function (a "traffic road") including a bicycle route and a secondary road (a "local road"), the bicycle route is highlighted by using markings, changes of pavement etc.

In general, the designs for the proposed network have been adapted to the road network structure leading to the following solutions in principle:

- one-way cycle tracks along "traffic" roads (as the expression traffic road is not used in the municipal planning in Riga, some assumptions have been made);
- cycle lanes along roads functioning as traffic roads but with moderate traffic volumes;
- bicyclists on the pavement if the space and the pedestrian volume make it possible and the car traffic volume is high;
- separate cycle paths (away from the streets) where the space is available and where the path can lead to considerable short cuts or to a more attractive route;
- the presence of trams and busses implies in general cycle tracks or using the pavement.

¹ An alternative is to continue the cycle track to the intersection and move the stop line for the right-hand turn traffic lane 5 m back (a so-called staggered stop line).

Conceptual design examples

To illustrate the principles considered the following proposals have been designed:

- Brivibas Iela (design for the whole section);
- K. Valdemara iela (design for the whole section);
- intersection 11 Novembra Iela/Akmens Tilts;
- intersection Krastmala/13. Janvara Iela;
- intersection 13. Janvara Iela/Gogola Iela/Raina Bulvaris;
- intersection Marijas Iela/Merkela Iela/Satekles Iela;
- supplementing cross sections for K. Barona Iela, Terbatas Iela, Gertrudes Iela and Dzirnava Iela.

1 Introduction

This report describes the outcome of Phase 3, Aggregated Plan for bicycle route network of the project "*Bicycle route network planning in Riga*".

The project is undertaken by COWI for the Danish Ministry of Transport. It was started in December 2001 and will finish in the second half of 2003. The project is launched within the Environmental Sector Programme of the Danish Government's aid to the Central and East European countries.

The project has been agreed with the Latvian Ministry of Transport and the Riga City Council. Furthermore, other relevant Latvian authorities and institutions are involved in the project.

Project objectives

The overall objective of the project is to increase the share of bicycling in Riga on short distance trips. The bicycle is an environmentally friendly mode of transport and may thus assist in reducing the growing environmental impact from car traffic. This requires an improvement of the facilities for bicycles in the streets.

The specific objectives for this study are as follows:

- to prepare an aggregated plan for bicycle facilities and routes for the Inner City excluding the area of Riga old town;
- to prepare detailed design of one specified bicycle route;
- to improve the coordination of the involved departments in Riga City Council and other stakeholders, who are directly involved in the planning and implementation of bicycle routes.

The first objective has the underlying aims to:

- transfer know-how to Latvia on the planning and design of bicycle facilities;
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Project phases

The project is undertaken in the following phases:

Phase 1: Mobilisation

Phase 2: Preparatory planning

Phase 3: Aggregated plan for bicycle route network

Phase 4: Detailed design of one specified route

Phase 5: Promotion of bicycle use

Objective of Aggregated Plan for bicycle route network

The objective is to complete a proposal for a bicycle route network within the project area and deliver it in a form that can be communicated to and understood by important stakeholders in Riga.

The approach has been to prepare a general explanation of the principles used and discussed among the project participants, to prepare overview maps and to prepare draft design sketches illustrating the basic concept of the plan.

Report outline

This report is structured as follows:

Chapter 2 describes briefly the approach used for planning and design within this phase.

Chapter 3 describes the actual proposal for a route network within the area and major issues concerning the assessment made to reach the result. Finally, the chapter describes the design principles used.

Chapter 4 contains a description and an assessment of the actual design. For two routes are prepared a conceptual design in a scale 1:1,000. For other routes only cross sections are illustrated or some of the more complex intersections are shown as conceptual design drawings.

Appendices include conceptual design drawings of two routes in a scale 1:1,000.

2 Planning approach

A planning approach for the bicycle route network was discussed among the Latvian and Danish project participants in the Preparatory Planning phase and described in the project report *Preparatory Planning, Bicycle Route Network Planning in Riga, September 2002*. The present chapter summarises the issues discussed and used in the planning of this phase. Furthermore, an overview is given of other planning initiatives in Riga relevant for this project.

2.1 Principles

Network planning

The bicycle route network and the proposals for design principles of the routes in the Aggregated Plan have been chosen based on the following criteria:

- accessibility to important travel destinations;
- traffic safety and feeling of security;
- as short and direct route as possible;
- cohesion of routes in a network;
- attractiveness;
- clearness of traffic system;
- technical feasibility within existing conditions.

During the end of the Preparatory Planning phase and the beginning of the next phase, discussions took place among Latvian participants and the consultant concerning the choice of network to include in the Aggregated Plan.

Naturally, the choice is based on existing conditions of and plans known today for the infrastructure in the area. Future plans and decisions may influence the choice. The network will on the one hand serve as input to coming plans in Riga Municipality (development plans, traffic plans, renewal schemes etc), but will on the other hand also need to be revised in co-ordination with such future plans.

A very important issue in Danish and other European urban traffic planning is the establishment of a street hierarchy. Such a hierarchy can, together with the implementation of bicycle routes, ensure proper bicycle facilities for each street depending on primarily the street type, car traffic volume and speed.

Such a street hierarchy only exists to some extent in the Riga Official City Plan from 1995. It is essential to follow up and revise this plan in the coming years for the planning of a bicyclist route network.

During the Preparatory Planning phase it was discussed how to prioritize the routes to concentrate on as regards more specific surveys and design solutions. A graduation for this purpose was presented dealing with two criteria; the importance of the route in terms of *travel need* and a preliminary evaluation of the *technical feasibility*. Based on this graduation, decisions were made concerning which routes to make conceptual design for.

Design standards

During the Preparation phase design standards were discussed.

Latvia has only recently started to gain experience in designing bicycle facilities. Riga Municipality has started the establishment of bicycle routes and is thus beginning to gain experience. Furthermore, the Latvian Ministry of Transport started in 2001 the preparation of a publication with the title "Recommendations for Cycle Track Designing" (it exists only in a Latvian version but it has been translated informally into English during the project).

For these reasons, the existing Latvian norms for urban road traffic areas concerning widths of carriageways, geometrical design of intersections etc. do not very specifically take into consideration facilities for bicyclists.

Therefore, the conceptual designs within this project are a combination of standards and norms used in Latvia and suggestions beyond these standards. The designs have to a certain degree been discussed with representatives for the relevant authorities in Latvia, but the final approval of the design will only be possible when the detailed design has been prepared for the routes.

It is anticipated that some of the designs beyond existing Latvian standards may inspire to future changes in the design standards and norms.

2.2 Co-ordination of the planning of bicycle routes with other plans in Riga

The following describes shortly the existing municipal plans identified as relevant to ensure the co-ordination with the planning of a bicycle route network within the project area.

Riga City Official Plan 1995 - 2005

In 1995, Riga City Council adopted "The Official Plan of Riga" (also often referred to as Riga Development Plan). The basic task of the Plan is to determine the city's land use and zone regulations. Included in the plan is the classification of a future road network and a bicycle route network.

The Plan is considered as a framework plan. Due to the rapid development and changes in landownership in the transition period, the Plan appears to have

fairly little influence on the actual land use development. If the Plan is revised, the bicycle route network could be an important input to this revision.

Preservation and development plan of the historic centre of Riga.

The inner part of the project area is often referred to as the "historic centre of Riga" or "the central business area". Riga City Council started in 2002 a project with the aim of detailing and revising the Development Plan of Riga 1995-2005 for the central business area. The plan will be legally binding for owners and other legal entities.

Concerning transport, the intention in the plan is to point out alternative development possibilities for each of the transport modes (car traffic and parking, public transport, pedestrians and bicycling). The project is foreseen to end up with a proposal for a future transport system within the area.

The project intends to include detailed surveys of the traffic and infrastructure situation within the defined area. Furthermore, the project will include analyses of other relevant transport issues important for the area (eg. transport to and from the airport, traffic control systems, future plans for international bus transport, development of central railway station etc.).

The project is expected to result in a proposal for public discussion by the end of 2003.

Bicycle Development Programme for the City of Riga

Riga City Council adopted in 2000 the Bicycle Development Programme for the City of Riga. The programme has been prepared within the Traffic Department and includes an action programme based on three elements: cycling infrastructure; a bicycle education and information system; and a management system for bicycle transport system. The present project is seen as one of the steps in implementing the first element, i.e. to create an infrastructure for cyclists.

The programme proposes main bicycle routes within the municipality and these routes have been taken into consideration in the present project in co-operation with the Traffic Department.

As part of the implementation of the Programme, some routes outside the project area have already been initiated. The first route established was the route leading from K. Valdemara Iela across the river to the suburb of Imanta.

The second route to be implemented is the route starting at the North-Eastern edge of the project area at Brīvības Iela towards the suburb of Jugla. The detailed design process will finish in the first half of 2003.

The third route to be implemented is a route starting at the edge of the project area at the beginning of Skanstes Iela going towards Mežaparks. The choice of Skanstes Iela as part of the route network has been made after the Development Programme was prepared.

In addition, the City Council has expressed its keen wish to establish a route through the city centre that could serve as part of a EuroVelo route going through Riga. This route could consist of the route from Imanta to K. Valdemara Iela (Vansu Tilts), continued through the project area and connected to the route being designed at Brivibas Iela in the North-Eastern part of the project area.

3 Bicycle route network within the project area

This chapter briefly describes the proposed bicycle route network within the project area. The description is accompanied by a short presentation of the data collected and assessments made in the process leading to the final proposal.

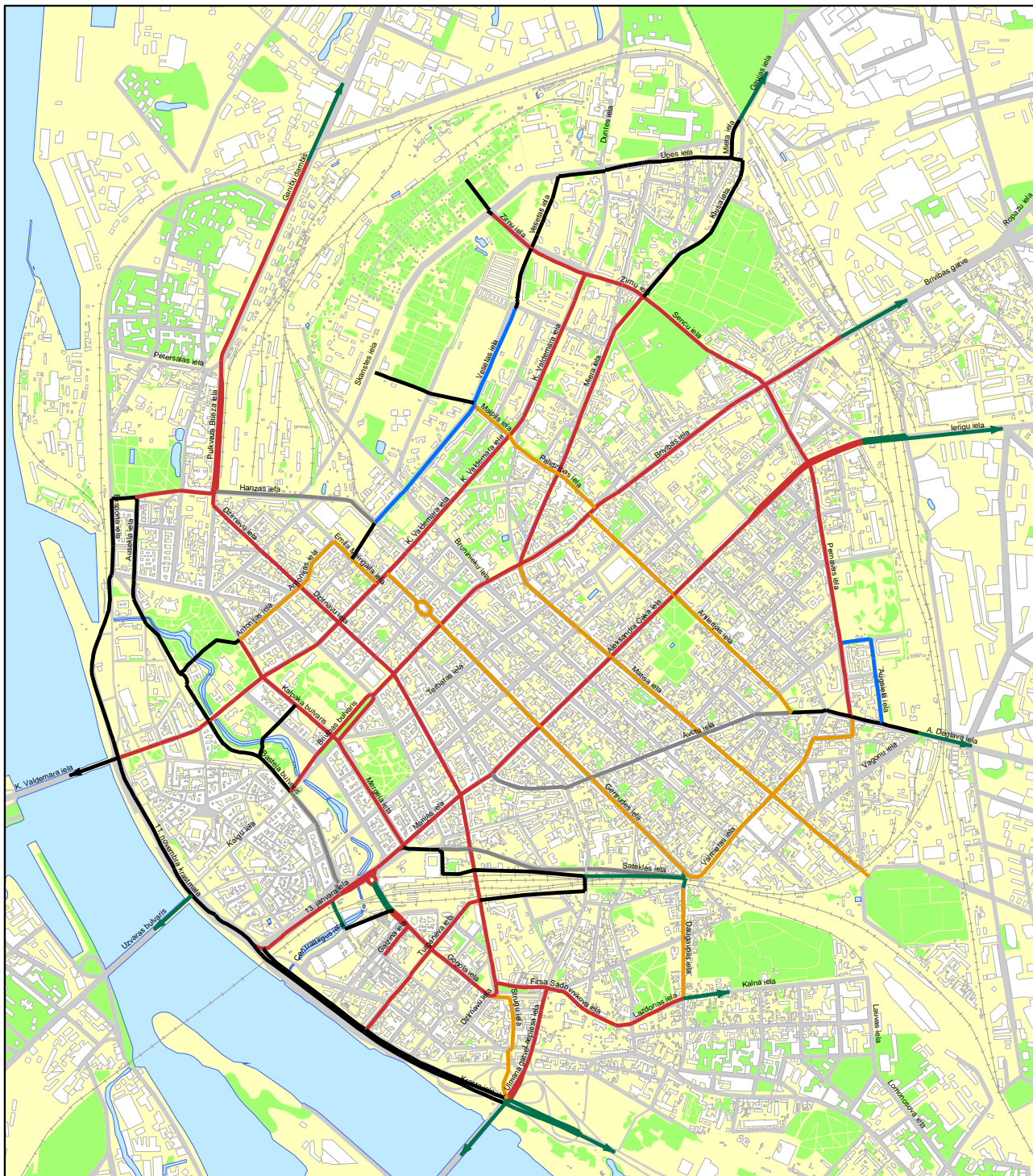
The description points out decisive factors for the choice of routes. Furthermore, the description contains recommendations for further recording and considerations on the future supplements to the network.

3.1 The proposed route network

The network has been prepared based on the collection of data, visual field studies, assessment of data and not least fruitful discussions among Latvian and Danish project participants.

Figure 3.1 shows the proposal for a future bicycle route network as agreed upon with the Traffic Department in Riga City Council during this phase.

The proposal illustrates a desired future bicycle route network, whereas an action plan including budget, time schedule etc, for the realisation of the network is not part of this project. The intention is that the network and the accompanying assessments will be used by Riga City Council as an input for future decisions on bicycle routes within the project area.



- | | |
|---|---|
| — Bicycle tracks | — Local streets |
| — Bicycle lanes | — Unclarified |
| — Pavement | — Potential supplements |

Figure 3.1 The proposed bicycle route network within the project area

Connections with other areas

The project area on the whole is the most important travel destination within Riga Municipality. The connection with other areas is thus a primary issue to deal with. Furthermore, national and regional routes going through Riga and connecting the Eastern and Western part of the country will most logically have to go through the project area.

The chosen bicycle route network attempts to ensure connections wherever it seems feasible and reasonable regarding travel destination and mesh width assessments. A general European experience is that the distance (mesh width) between bicycle routes in urban areas should not exceed 500 - 800 metres. This means, that the three existing road bridges crossing the Daugava and the main streets crossing the railway lines are all relevant route choices and thus selected as beneficial routes.

The access to Old Riga is essential. Most of the streets within Old Riga are possible to use as a bicyclist even though it may be difficult in many streets due to the volume of pedestrians and the use of cobble stones. The main task will be to create a good access point to the area and good bicycle parking conditions near these access points.

In the South-Eastern part, a route choice between Maskavas Iela or Kalna Iela has not been investigated, but it will probably be a good opportunity to include Maskavas Iela in the network as well. The urban development in the area may also create new opportunities and demands.

Inner part of the project area

The area surrounded by Old Riga, Valdemara Iela, Gertrudes Iela and A. Čaka Iela is today the most important business and culture centre in Riga and nearly all street sections have important travel destinations. Thus a main issue is to ensure good access to the area from all directions as well as safe travel possibilities within the area.

A future appropriate solution for safe bicycle trips within the area will be to prepare a complete renewal scheme for the streets in order to establish a hierarchy of streets with only a few streets allowing through car traffic and traffic calming measures in the other streets. This would give both bicyclists and pedestrians better accessibility and safer conditions.

Within this project, only routes giving access to the area have been included with Brīvības Iela and Dzīrnavu Iela as the main routes. A renewal scheme for the whole area is seen as beyond the scope of the project.

As a supplement to the chosen network, a connection at Aspazijas Bulvaris between Brīvības Bulvaris and 13 Janvāra Iela is worth considering. In this way a very direct connection can be achieved between the northern and southern part of the inner area, just at the edge of Old Riga.

The North-Western part of the project area

The area north of Brivibas Iela and Dzirnavu Iela contains less dense built-up areas. Nevertheless, the important Skonto Stadion area and future urban development may change the area significantly into an even more important travel destination. It will be essential to coordinate the urban development ideas with the planning and construction of bicycle facilities.

Riga City Council has recently decided to construct bicycle facilities along Skanstes Iela. To ensure a good connection with the rest of the network, it is therefore suggested to include Hanzas Iela as part of the network in future revisions.

The North-Eastern part of the project area

The establishment of routes in the area south of Brivibas Iela and north of Gertrudes Iela has been discussed several times between the Latvian and Danish participants and, therefore, only a "minimum" proposal has been included. As projects exist concerning changes of some of the major streets with a high traffic volume, it may be beneficial in the future to consider supplementing routes when a street hierarchy has been established.

The most obvious supplement will be to include Avotu Iela and maybe Satekles Iela in the network to ensure a proper mesh width and access to the important areas like the inner city area and the Central Station. This may require some changes in traffic circulation on these streets.

The South-Eastern part of the project area

The area south of Gertrudes Iela is dominated by streets with a high traffic volume, the railway line, the Central Market and the Central Station.

Bicycle routes are on the one hand essential for the important travel destinations, the Central Market and the Central Station, but on the other hand very difficult to implement due to the physical conditions. It is recommended to have focus on the routes whenever urban development projects take place in the area in order to ensure improvement of facilities for both riding and parking bicycles.

3.2 Assessment of the route network

This subchapter describes the main assessments made to point out the route network. The documentation of the data collected during the project period has been made in a database built up as a GIS system in the software programme Arcview. The database will be available at the Traffic Department of Riga City Council.

3.2.1 Car traffic volumes and parking conditions

A number of car traffic counts exist for streets within the project area. Even though the counts have been carried out over a period of three years and do not

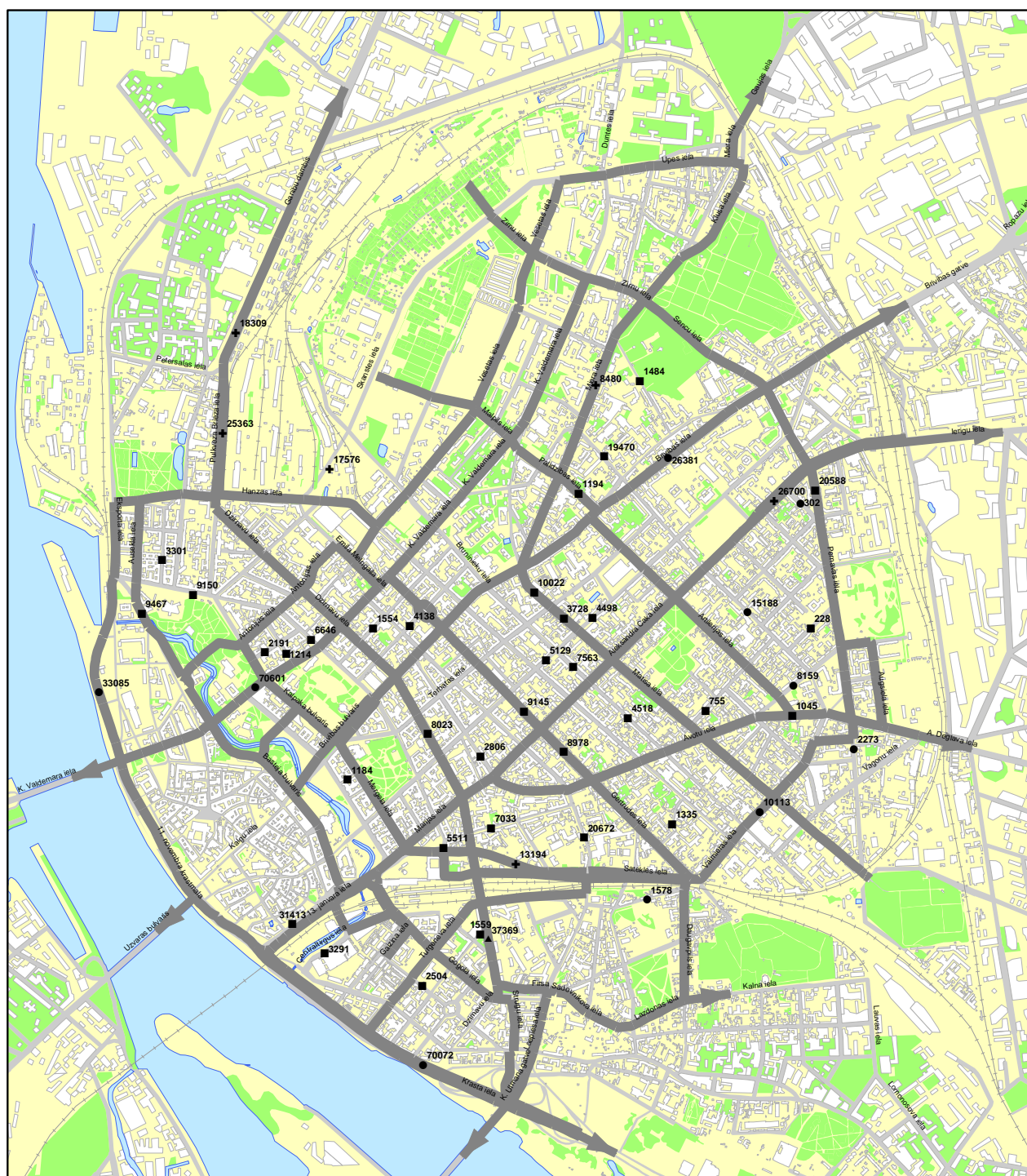
include all streets, they give a fairly good overview together with the local knowledge of the traffic situation by means of visual surveys.

Figure 3.2 shows the results of the traffic counts. Typically, most of the streets in the central part of the project area function as both parking streets and streets having a high traffic volume. There seems to be no significant division of the function of the streets.

Exceptions are the main streets going between old Riga or Daugava River and the Eastern part of Riga; Valdemara Iela, Brivibas Iela and 13 Janvara Iela-Marijas Iela. In addition to these streets are the more or less perpendicular streets Eksporta Iela-Hanzas Iela, Raina Bulvaris, Kalpaka Bulvaris-Merkela Iela, Lacplesa Iela and Pernavas Iela. These streets seem all to be carrying some amount of through car traffic and the greatest part of traffic to and from the area. Furthermore, they seem to carry a fair share of heavy vehicles as well.

The issues to highlight from the assessment of car traffic volumes within the project area are the following:

- The traffic volume in nearly all streets in the central area is at a level not suitable for having bicycles unprotected next to the cars (mixed traffic).
- A future establishment of a hierarchy of streets may be able to reduce the car traffic volume in some streets - leaving other potentials for establishing safe bicycle routes.



- ▲ Traffic counts 2002
 - + Traffic counts 2001
 - Traffic counts 2000
 - Traffic counts 1999
- Proposed routes

Figure 3.2 Overview of traffic volumes within the project area

The number of parked cars is high in most of the streets in the central area, especially during working hours. Changes (reductions) in the legal parking opportunities may in some locations provide space for bicycle facilities. Naturally, such changes have to be carried out based on a general parking strategy and solutions within the area. It has been outside the scope of the present project to carry out such an analysis. The issues to highlight concerning parking are the following:

- Parking space seems to be highly needed in the streets in the central part of the area thus giving practical difficulties in providing space also for bicycle facilities;
- Some changes in the layout and extent of parking along the streets may be fairly easy to implement to create more space in the cross sections (eg changing from angle parking to parking parallel to the kerbstone).

3.2.2 Accidents

The project area in general has a high traffic volume and a mix of public transport, car traffic, pedestrians and bicyclists resulting in many potential conflicts and risk of accidents. An overview of the total police-recorded accident information in intersections in the years 1997-2000 is shown in Figure 3.3. Furthermore, the figure shows approx. 30 accidents reported with bicyclists involved in the central part of the area within a time period of 1.5 years from 1 January 2000 until July 2001. The information has been provided by Mr Sovetovs from the State Police, Riga Division.

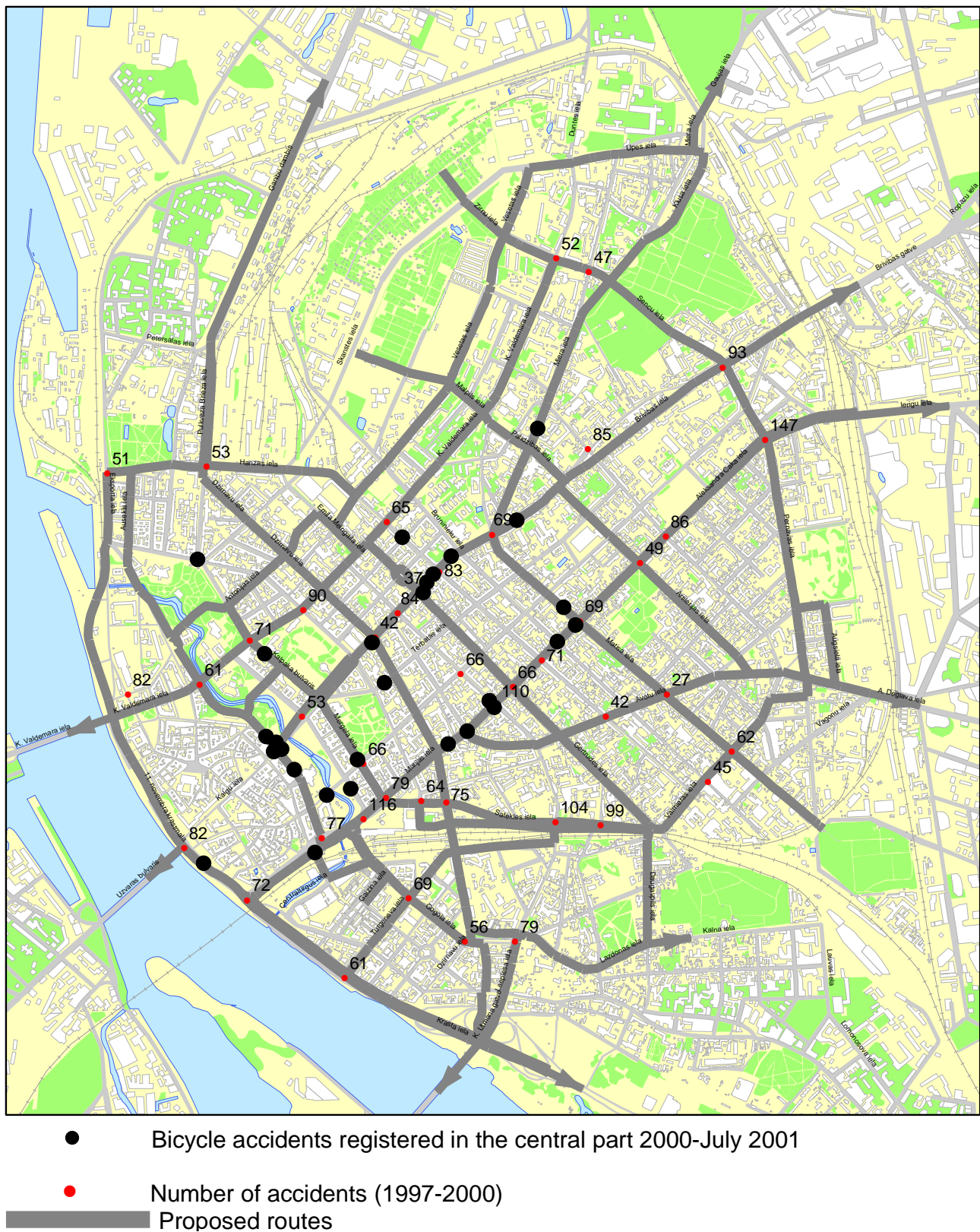


Figure 3.3 Traffic accident information for the project area provided by the Traffic Department in Riga City Council and the police

The issues to highlight concerning traffic safety are the following:

- The majority of traffic accidents happen in intersections;
- Even though bicycle traffic volumes are fairly low in Riga, accidents with bicyclists *do* happen. A conclusion to this fact could be that merely from a safety point of view, safer bicycle facilities may already be needed to reduce the number of accidents;
- The bicycle accidents occur primarily in the major streets, especially Brīvības Iela, indicating the demand for including these streets within the bicycle route network;
- The future planning of bicycle facilities should include more detailed surveys of the accident types, including bicyclists.

3.2.3 Travel destinations

The project area is the most densely built-up area in Riga with a concentration of citizens as high as in some of the dwelling areas in the suburbs. Furthermore, it has the highest concentration of working places.

A closer look at the location of important travel destinations shows that nearly all streets in the inner part are important destinations with many shops and service facilities as shown in Figure 3.4.

The issues to highlight concerning travel destinations are the following:

- The project area is the most important travel destination within Riga and furthermore is neighbouring Old Riga, which is a travel destination similar to the inner project area;
- The inner project area has not only important single destinations, but is on the whole an important destination. Therefore, a future provision of bicycle facilities here will consist of providing both access to the area and possibilities for making safe shorter trips within the area, including safe parking;
- Among the single travel destinations, the railway station, the sports area at Skonto, university faculties and the major shopping facilities (e.g. the Central Market and the market at Matīsa Iela) are very important together with access to Old Riga. Furthermore, the area contains many sports facilities and higher education.



Figure 3.4 Important travel destinations within the project area

3.2.4 Public opinion on bicycle traffic

In June 2002, the Traffic Department carried out a telephone survey on bicycle traffic in Riga². In the following just a few results are highlighted.

402 citizens in Riga from 16 years of age and upwards were interviewed and approx. 40 % of these use a bicycle, corresponding to about 230,000 citizens in total.

A very interesting general result was the answer to the question on whether bicycling as a means of transportation should be promoted in the future. More than 8 out of 10 answered yes to this question - both bicycle users and those who did not use a bicycle.

The survey showed that in the summer time, on an average day, approx. 15 % or 83,000 citizens in Riga use the bicycle. In the winter time, the figure would be only 1 % corresponding to approx. 3,000 citizens.

Furthermore, the most frequent purposes for using the bicycle are leisure, sports and to stay fit.

Asked about factors that could increase the bicycle use, more than half of the existing bicycle users found it very important to have safe bicycle parking, to think more of taking care of one's health (exercise), to improve the driving culture among car drivers, and to have a developed bicycle route network.

Many of the answers are very beneficial for the future work with the bicycle development programme in Riga.

The issues to highlight especially concerning bicycle routes within the project area could be the following:

- The project area (especially the inner part) is probably the biggest potential travel destination within Riga Municipality and, at the same time, the most crowded area as regards car traffic. The need for both bicycle routes and safe bicycle parking facilities is therefore very high in this area.
- The number of bicyclists varies considerably depending on the season. Especially in the very dense and crowded inner part of the project area it will be an ongoing challenge to allocate sufficient street space for bicyclists in competition with space for other users. This indicates the need of shared space not only allocated to one type of transport user. If such space is to include both cars and bicyclists, speed-reducing measures and a street hierarchy are essential to establish.

² The survey was designed by the Traffic Department in co-operation with the Danish partners. The Traffic Department financed the survey, which was carried out by a Latvian opinion poll institute.

3.2.5 Public transport system

It is essential to develop the public transport system together with facilities for bicyclists. The system should on the one hand be able to supplement the use of bicycles, but on the other hand, it can be a physical challenge to provide safe space for bicyclists in streets with public transport.

The public transport network in the project area is very dense with busses, trolley busses and trams in many of the streets, see Figure 3.5.

The issues to highlight could be the following:

- The need for facilities to improve the co-operation between public transport and bicycle traffic may concentrate on the improvement of access especially to the Central station and parking facilities at the Station.
- The streets with public transport lines are often the best route choice, also for bicycle traffic. There may be a need for new concepts for design of both bus and tram stops and bicycle facilities in some places.



Figure 3.5 Public transport network in the project area

3.3 Main design principles

The background for preparing design principles has been based on the "Recommendations for Cycle Track Designing" prepared in 2002 and the experience gained in Western Europe and especially Denmark throughout the last 10 - 20 years. As the Latvian Recommendations still have a preliminary character, we have chosen to base our main principles on other European experience.

Furthermore, the project area is a city centre with very dense built-up areas and a struggle for space between buildings, parked cars, green areas, pedestrians, public transport and bicyclists. Many general urban traffic area design principles therefore have to be especially adapted to the often narrow cross sections and complicated infrastructure areas.

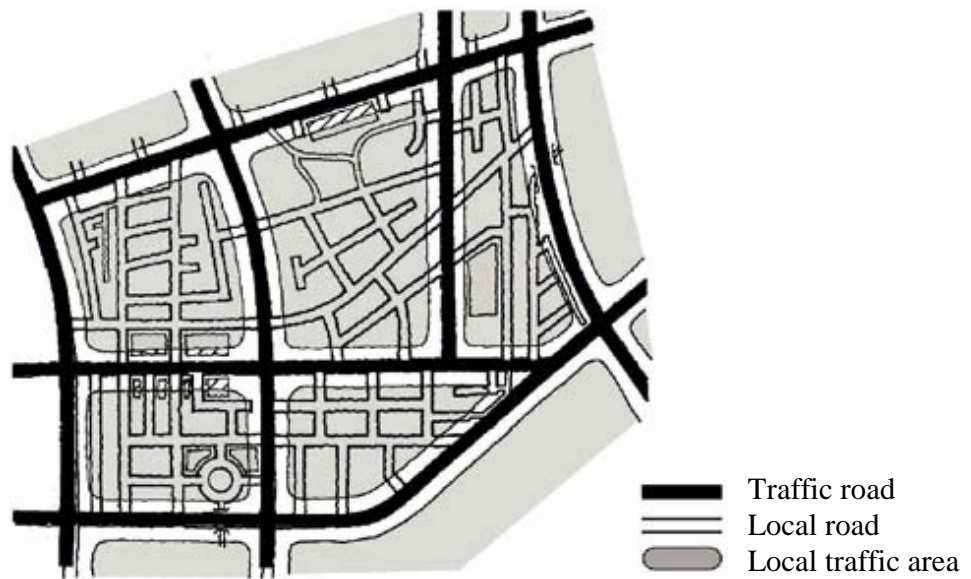
The key issue for taking design decisions in a dense built-up area is when and how to integrate bicyclists with or separate them from other users (cars, public transport and pedestrians).

In the description of each of the routes in the next chapter, solution examples are presented for different types of locations. The following paragraphs highlight the main principles used as basis for these examples.

Design principles depending on car traffic

From a safety point of view, the car traffic volume and speed are the most decisive factors. In short, the more car traffic and the higher speed, the more separation is needed.

In Denmark, the national Guidelines for Urban Traffic Areas have divided urban streets or roads into traffic roads and local roads. Traffic roads serve transit traffic, traffic to and from the city and traffic between neighbourhoods or quarters. All other roads are defined as local roads. In principle, local roads should not be used for through traffic or traffic from one traffic road to another - but only to gain access to a travel destination within the area (see Danish principle illustration in Figure 3.1).



Figur 3.1 Principle road network, schematic illustration form the Danish Urban Traffic Guidelines.

The Danish Guidelines recommend that bicycle routes along traffic roads in general are separated from the car traffic. The separation can vary from tracks separated from the car traffic by kerbstones or verges to lanes on the road surface just separated from the car traffic by a painted line. No quantitative limits are given on when to use separate tracks and when it is safe to use only lanes on traffic roads.

If separation on traffic roads due to physical conditions is impossible, the guidelines recommend to ensure at least a low car speed instead (40 km/h or lower).

On local roads, cars and bicyclists can be mixed according to the Danish guidelines. Naturally, the precondition is that the establishment of traffic roads and local roads has been accompanied by a suitable design of the streets. This means that local roads are considered to have low car intensity and a low speed (40 km/h or lower).

The Latvian Recommendations on this issue are based on the German guidelines. According to these, bicycle lanes or tracks are necessary if the daily average car traffic exceeds 10,000 cars and the speed level V85 (= the speed level not exceeded by 85% of the cars) cannot be reduced to a level lower than 50 km/h.

In streets where the traffic volume is not counted, assumptions have been made. If each route in the future reaches the stage of more specific design, the traffic volume and maybe the average speed level can be measured to make the final decision on whether to separate bicycle routes from car traffic or not.

Within the project area, most of the streets have a fairly high daily traffic volume and function more or less as "traffic" roads. Therefore, traffic calming

measures ensuring low speed or traffic renewal schemes ensuring lower car traffic volumes will be needed in most streets to have safe mixed traffic.

Design principles depending on public transport lines in the street

Within the project area, trams, trolleybuses or normal busses are present in many streets and it is a challenge to prepare safe solutions for the meeting between bicyclists and public transport stops. In this project, specific solutions on meetings between tram stops and bicyclists have not been dealt with.

No general worldwide accepted solutions exist solving the potential conflicts between bicyclists and buses or the passengers getting on and off at stops. Many solutions, though, have been tested in Denmark and other countries.

A significant general European lesson is to ensure attention from all transport users when they are at a spot where they may risk being in conflict with each other. This means for example that both pedestrians (meaning passengers getting on or off public transport or waiting at the stop) and bicyclists need to be aware if the bicycle track is located between the pavement and the bus so that passengers have to cross it. The design principle will thus be to create "special" marking, surface, signs etc. so that all the potentially conflicting persons are aware that they are at a location where special attention is necessary.

The same applies if the bicyclists use the road and busses have to cross a bicycle lane to make a stop. Also in this case special marking, signs etc. is needed to ensure attention from both the bicyclist and the bus driver.

The question will often be to choose between the following general solutions:

- bicyclists on separate tracks next to the traffic lane with the bus stop;
- bicyclists on the pavement mixed with waiting pedestrians;
- bicyclists on specially assigned pavement or track away from the waiting pedestrians;
- bicyclists on the road mixed with the buses.

The choice and exact design will depend mainly on the following:

- frequency of buses;
- physical design of bus stop (eg. long bay with potentially many buses at the same time or only one bus at the time);
- number of passengers getting on and off;
- physical conditions, primarily the space available in the cross section.

Design principles depending on pedestrians

Bicyclists' speed are higher than that of pedestrians and for that reason the mix of pedestrians and bicyclists can be a problem, especially in a city centre like the project area with many pedestrians in most streets. The problems are both the safety risk and the interference causing delays and the bicyclists feeling of insecurity, and especially the pedestrians feeling of insecurity.

The Latvian law allows bicyclists to use pavements together with pedestrians. However, the creation of bicycle routes giving good and direct access without too many delays and at the same time being as safe routes as possible, indicates the necessity to separate bicyclists from pedestrians on most bicycle routes within the project area.

No quantitative criteria have been set up for the choice of separating or mixing pedestrians on bicycle routes, but the following principle has been used:

- Streets with many shops have pedestrians walking not only parallel to the street, but in all directions. In such streets, a mix of pedestrians and bicyclists is not desirable.

Design of route flow, sections and intersections

For the bicyclist it is very important to experience issues like the feeling of security, a clear understanding of where the route is, the feeling of a smooth and continuous route and some attractiveness on the route. To address these issues, separate tracks or lanes are the most obvious choices. Nevertheless, within old urban areas, the existing conditions do not make it possible to have completely separate facilities for bicyclists. They will have to mix with other users.

The important question is when to separate and when to mix. Within old urban built-up areas, a mix will at least have to take place in intersections. It is not possible or desirable to construct bridges or tunnels for bicyclists in every intersection on the street.

Therefore, a bicycle route consisting of bicycle tracks separated from the car traffic will also have to include mixed situations in each intersection. Experience from Western Europe shows that the creation of bicycle tracks in the worst cases can lead to an increase in accidents in the intersections, as both car drivers and bicyclists seem not to be sufficiently aware of each other when they reach the intersection. The response to this problem is to highlight the potential risk and making sure that both car drivers and bicyclists are aware of the problem.

For that reason, the following design principles for connecting sections with intersections are proposed:

- In intersections between streets with high traffic volume, bicyclists are mixed with car traffic. Therefore, a special marking indicating special attention is supplied to highlight the area of potential conflict;
- In streets with one-way bicycle tracks, the tracks should end before the intersection, if a right-hand turn traffic lane exists. The bicycle track ends 15-20 meter before the intersection allowing a merge of traffic between

right turning cars and bicyclists going straight ahead. In these cases the width of the merging lane is no less than 4.0 m³.

- In intersections between roads with primary function (a "traffic" road) including a bicycle route and a secondary road (a "local" road), the bicycle track is continued through the intersection and highlighted by using markings, changes in pavement etc.
- It is not possible to create standard solutions applicable to all intersections. Therefore, specific solutions are needed to be investigated at many locations.

Summary

In general, the design solutions for the proposed network have been sought adapted to the road network structure leading to the following principle solutions:

- One-way cycle tracks along "traffic" roads (as the expression "traffic" road is not used in the municipal planning in Riga, some assumptions have been made);
- Cycle lanes along roads with some significance as a traffic road, but with moderate traffic volumes;
- Bicyclists on the pavement if the space and the pedestrian intensity allows it and the car traffic volume is high;
- Separate cycle paths where the space is available and the path can lead to considerable short cuts or to a more attractive route;
- The presence of trams and buses implies in general cycle tracks or using the pavement.

Concerning the actual use of principle cross section design, the following guidelines have been implied:

- Driving lanes for cars based on West European experience⁴:
 - Minimum width 3.0 m for lanes with primarily passenger cars
 - Minimum width 3.25 m for lanes with some bus traffic and other heavy vehicles

³ An alternative is to continue the cycle track to the intersection and move the stop line for the right-hand turn traffic lane 5 m back (a so-called staggered stop line).

⁴ A comment from the Latvian Road Safety Audit carried out during the project, was that such narrow traffic lanes may not be introduced in Riga, before drivers have been more used to such dense situations.

- Bicycle facilities:
 - Minimum width 2.0 m for one-way bicycle tracks to ensure possibilities for bicyclists overtaking each other. Width of 1.5 m can be used in short sections, if necessary, due to the space available
 - Width of bicycle lanes on the road surface 1.5 m. The use of bicycle lanes will depend of the amount of car traffic in combination with the assumed need for bicyclists overtaking each other. The absolute minimum width for bicycle lanes is 1.2 m
- Pavements
 - Minimum width of 2.0 m to ensure passing of eg. wheel chairs and baby carriages
 - In shopping streets preferably more than 2.0 m

3.4 Preliminary graduation of route sections

Based on the analysis of travel destinations and the choice of design on the sections of the route network, a preliminary graduation was carried out. The graduation was used to indicate the routes most relevant and realistic to start with in the process of designing.

The sections in the network were for this purpose graduated, based on two criteria:

- importance of the route in terms of *travel need*;
- preliminary evaluation of *technical feasibility*.

The criteria were not given a very exact definition, but were based on the following description:

Travel need, see Figure 3.6:

High: Best choice for access between the major travel destinations also leading to major destinations outside the project area.

Medium: Best choice for supplementing access to major destinations and giving access to other important travel destinations.

Little or not surveyed: Preliminary choice for best access to other travel destinations or for creating a smaller size of meshes.

Technical feasibility, see Figure 3.7:

Minor interventions: Only road marking, signs, new restrictions on parking etc. Mainly, the implementation will be in the form of marking on the pavement to separate pedestrians and cyclists or the establishment of bicycle lanes on road.

Major interventions: Moving of kerb stones, actual construction works on or in the ground etc. Mainly, the implementation will be in the form of construction of bicycle tracks taking area from pavements or changes of the alignment for trams, buses etc.

Difficult: Eg expropriation, widening of streets, tunnels or bridges.

The graduation gave a first overview of the expected effort to implement the network. The overview concerns only a graduation of each of the sections and thus cannot be directly used to make a prioritization of where to start the actual construction. This demands a more comprehensive judgement based on the network as a whole and not only section by section. Also specific problems concerning intersections can have an influence on the final prioritization.



Figure 3.6 Travel needs gradation of proposed network



Figure 3.7 Technical feasibility graduation of proposed network

The graduation was used as a starting point for the discussion between the Latvian participants, especially the Traffic Department, and Danish participants on routes to choose for the next step in the process; i.e. preparing conceptual design solutions. Figure 3.8 shows the routes chosen.

The choice was based on a wish to design

- routes with a significant travel need;
- routes most likely to be connected with important routes outside the area;
- locations with particular design challenges;
- locations that could also inspire the design in other parts of the municipality.

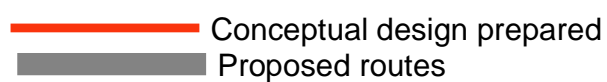
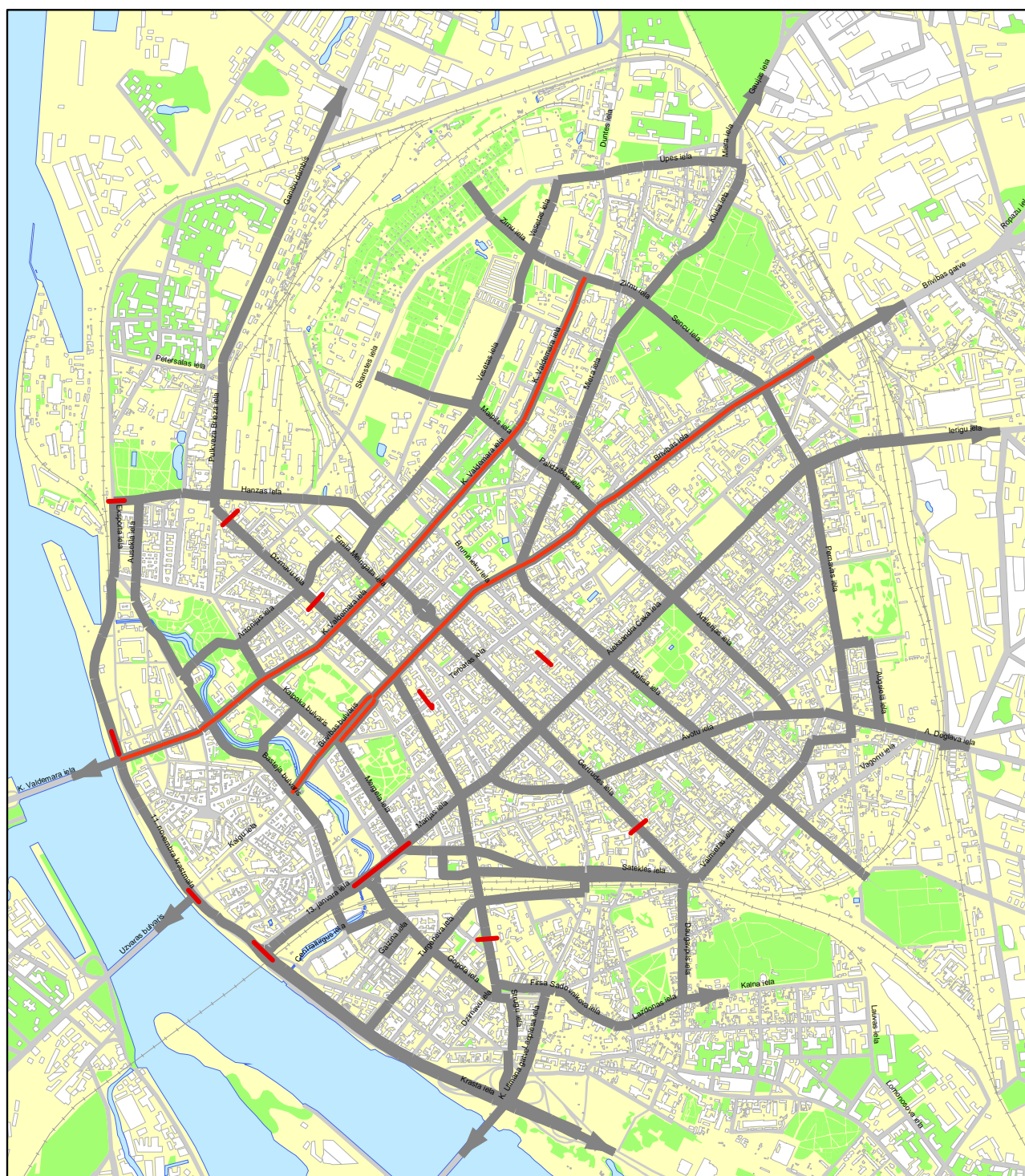


Figure 3.8 The choice of routes for which conceptual design is prepared

4 Description of routes

This chapter describes the design principles for the chosen routes within the proposed network.

For Brivibas Iela and K. Valdemara Iela, a conceptual design illustrated in the scale 1:1,000 has been prepared for the whole length of the sections. The sketches include proposal of design for other bicycle routes crossing the two streets. The design solutions have been based on available maps from the Traffic Department. The equipment such as signposts, signals, trees etc. in the streets is not included in these maps. Further detailing therefore needs field surveys.

As a supplement to the above design solutions, conceptual design has been prepared for a few of the more complex intersections to illustrate potential solutions at such locations.

Finally, principal cross section design is illustrated for some of the remaining routes.

4.1 Brivibas Iela

The route section prepared within this project starts at the intersection between Brivibas Bulvaris and Basteja Bulvaris/Aspazijas Bulvaris/Kalku Iela at the edge of Old Riga. The route continues through the project area until the intersection with K. Barona Iela in the North-Eastern part of the project area.

Parallel to this project Riga City Council has started a design project for the continuation of the route from K. Barona Iela along Brivibas Gatve towards the suburb of Bergi. This route is intended to be part of a national bicycle route network and a EuroVelo route.

Existing situation

Brivibas Iela is from Dzirnavu Iela towards North-East classified as an arterial road in the Riga City Plan whereas the inner part (Brivibas Bulvaris) from Dzirnavu Iela to Raina Bulvaris is classified as a local street, but it is today a traffic road. The continuation from Raina Bulvaris to Basteja Bulvaris is a pedestrian area surrounding the Monument to Freedom.



Figure 4.1 The start of the route seen from the intersection with Basteja Bulvaris towards the Monument to Freedom

The street has one of the highest car traffic volumes (approx. 30,000 AADT) in the project area and is one of the main access roads to the central business area and serves through car traffic. Furthermore, it is an important route for both busses and trolleybuses and some of the major stops within the project area are located in the street. At the same time, the street is a major shopping street with many pedestrians.



Figure 4.2 Brivibas Bulvaris north of Kalpaka Bulvaris looking towards Elizabetes Iela

Also, the street is by local bicyclists and as indicated by visual inspections considered one of the main existing bicycle routes. The registration of accidents with bicyclists furthermore indicates that many bicyclists use the street. The street provides the most direct connection between the North-Eastern suburbs and the central part of Riga and can furthermore be part of a direct regional or national route passing through the central part of Riga. Finally, the street itself contains many important travel destinations with shops and other private and public service functions.

The general cross section of the street consists of four traffic lanes for cars and fairly wide pavements. The width of the traffic lanes varies along the route and the road marking does practically not exist, thus giving some uncertainty of the actual number of lanes. The bus stops are mostly located directly on the traffic lanes; only in the central part are established bays for bus stops.



Figure 4.3 Brivibas Iela north of Matisa Iela looking towards Artillerijas Iela

Design proposal

It is proposed to implement one-way bicycle tracks separated from both car traffic lanes and pavements, due to the character and volume of the car traffic and at the same time its function as a shopping street with many pedestrians on the pavement. Conceptual design sketches are enclosed in Appendix 1.

The intention of the proposed cross section design is to maintain the existing traffic lanes for car traffic ensuring proper marking and a narrowing down in some locations to the following general cross section elements:

- Traffic lanes: Outer lanes with bus traffic (next to the bicycle tracks) 3.25 m and inner lanes (towards the centre line) 3.0 m;
- Bicycle tracks separated from the traffic lanes by a kerbstone and in level with the pavement or at lower level (can be decided later). Width 2.0 m, but on a few short sections only 1.5 m;
- Pavement is maintained or slightly narrowed down, but to a minimum width of 2.0 m.

The proposed design has been discussed among the project participants and has furthermore received comments from the Latvian road traffic safety auditors. The main comment is that the proposed minimum width is too narrow due to the lack of experience among Latvian drivers with such narrow lanes in very trafficked streets. Therefore, the proposal may merely be seen as a long term

proposal only suitable for implementation when Latvian drivers have gained more experience driving in fairly narrow traffic lanes.

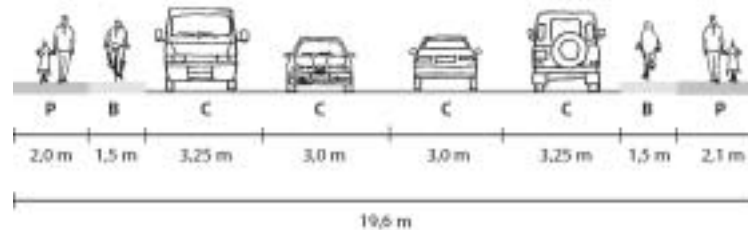


Figure 4.4 Cross section design example on Brivibas Iela (between Dzirnava Iela and Stabu Iela.)

- Intersection design depends on the size of the intersection, the expected traffic in the side streets and the existence of right-hand turning traffic lanes. A general solution is to end the bicycle track before the intersection if a right-hand turning lane exists in order to let car traffic and bicyclists mix.
- In the intersections, markings for bicyclists are proposed on the traffic lanes with the objective of guiding bicyclists and highlighting the conflict zone between right turning cars and bicyclists going straight ahead. The proposal includes three locations with bicycle tracks stopped before the intersection and continuing mixed with car traffic in a right-hand turn lane (truncated cycle track). This proposal has been commented by the Latvian safety audit. An alternative design could be to continue the cycle track until the intersection and instead move the stop line for right-hand turning cars 5 m back (staggered stop line).
- At bus stops it is in general proposed to continue the bicycle tracks and let passengers cross the bicycle track to get to and from the bus. The bicyclists then have to stop for crossing passengers. The design can be seen as similar to existing tram stops in Riga, where the tram line is located in the middle of the street and the cars have to stop and let the tram passengers cross the carriageway. It may be important to indicate to the bicyclists that they have to stop for the bus passengers. The correct signposting or marking for such a solution has not been discussed in this phase.
- The very busy bus stop between Elizabetes Iela and Merkela Iela needs special attention. At the northern side towards the Esplanade it will be possible to find space for moving the bicycle track away from the kerbstone and let it pass behind the waiting passengers on the pavement. In this case, the fairly long bus lane can be preserved. On the other side of the street, it may be more difficult to find sufficient space for such a solution. Instead, it may be beneficial to shorten the length of the bus stop to make the conflict zone as short as possible and then use the general bus stop design as described above.

Finally, it is important to mention that the cross section design in each subsection has to be adapted to the actual space available, based on more detailed maps and surveys. At a few short subsections, eg between Gertrudes Iela and Stabu Iela, a design is needed that uses cross section widths below the recommended general design.

4.2 K. Valdemara Iela

The route section prepared within this project starts at the Eastern side of Vansu Tilts and continues until the intersection with Zirnu iela.

Existing situation

K. Valdemara Iela is classified as an arterial road in the Riga City Plan. The street has a high traffic volume and serves both through car traffic as well as being one of the main access roads to the central business area.

Busses and trolley buses have routes along the whole section and a major bus stop is located next to Riga Dome. Only on a few subsections, the street has shops and other important travel destinations.

The general cross section of the street consists of four traffic lanes for cars between Vansu tilts and Elizabets Iela. The street has within the last few years been resurfaced with new road marking. The width of the driving lanes and pavements varies along the section. In a few subsections, the traffic lanes are as narrow as 3.0 m.



Figure 4.5 K. Valdemara Iela at Esplanade looking towards Raina Bulvaris

Between Elizabetes Iela and Zirnu Iela the cross section is narrower with only two traffic lanes marked on the surface, but the actual total width of the traffic lanes is approx. 9 m.



Figure 4.6 K. Valdemara Iela south of Hanzas Iela looking towards Lacplesa Iela

Design proposal

The character and volume of the car traffic are put forward as an argument that the general solution should be one-way bicycle tracks. Conceptual design sketches are enclosed in Appendix 2.

A difference from Brivibas Iela is the small amount of shops and accordingly fewer pedestrians on the pavement. This indicates that an alternative may be to use part of the existing pavement for bicyclists on some subsections. Such an alternative could be implemented in the short term. As a long term solution it is proposed to design separate bicycle tracks.

Therefore, the same principle design is proposed as described above for Brivibas Iela.

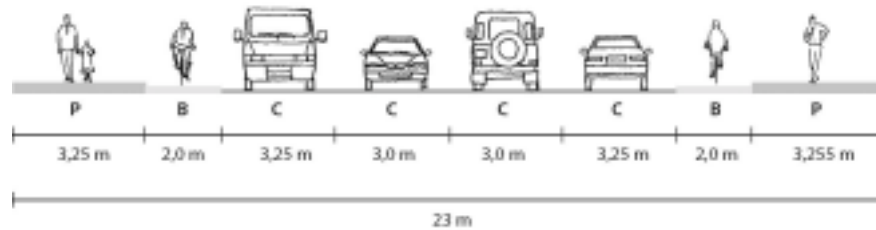


Figure 4.7 Cross section design example on K. Valdemara Iela between Kalpaka Bulvaris and Elizabetes Iela.

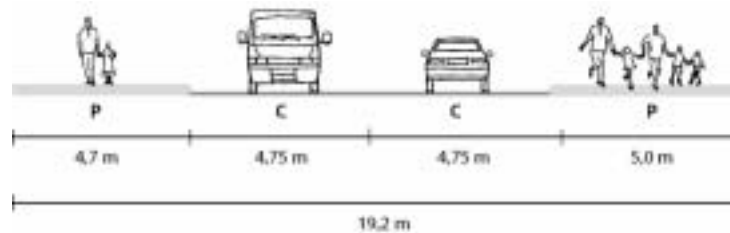


Figure 4.8 Cross section design example on K. Valdemara Iela between Elizabetes Iela and Hanzas Iela.

4.3 Intersections

The proposed route network within the project area includes alignment in a number of fairly complex intersections. In order to illustrate how to deal with bicycle facilities at such locations, a few principle examples have been prepared.

4.3.1 Hanzas Iela/Eksporta Iela

The signalised intersection is part of the major route for traffic going to or coming from the North-Western part of Riga. Both Hanzas Iela and Eksporta Iela have a high share of heavy traffic.

It is proposed to implement a two-way bicycle track along the Western part of Eksporta Iela. On Hanzas Iela, one-way bicycle tracks on both side of Hanzas Iela are proposed.

The proposed design for the intersection is based on the existing traffic signals with the aim to:

- provide a safe connection between the two-way bicycle track along Eksporta Iela and the one-way bicycle track along Hanzas Iela;
- to keep the existing or approximately the existing function and capacity of the intersection.



Figure 4.9 Proposed conceptual design for implementing bicycle facilities in the intersection Hanzas Iela/Eksporta Iela

The verge between Eksporta Iela and the two-way bicycle track along Eksporta Iela will provide a safe resting place for bicyclists waiting to cross Eksporta Iela. The design is based on staggered stop lines.

4.3.2 11. Novembra Iela/Akmens Tilts/Kalku Iela

The intersection is a major connection for car traffic between the Eastern and Western side of the Daugava River. The intersection has a complex geometrical layout and both tram lines and trolley buses are passing through the intersection. The intersection has no traffic lights.

Pedestrians have difficult conditions crossing 11 Novembra Iela, but pedestrian tunnels exist to serve especially the passengers to and from bus and tram stops on 11 Novembra Iela near the intersection.

As many other intersections in Riga, the asphalt area is fairly large with sparse marking, traffic islands etc. to guide the car traffic.

The principle design proposal shown below has the following aim:

- to create bicycle facilities giving bicyclists a safe and direct access to and between the following directions:

- separate bicycle path along the bank of the Daugava River next to 11 Novembra Iela
 - one way bicycle tracks (or lanes) on Akmens Tilts
 - Ratslaukums and Kalku Iela in Old Riga
- to keep the general functioning and layout of the intersection as far as possible.

The design elements are based on creating a more compact intersection, giving the bicyclists as short a crossing distance as possible. Furthermore, there has been a need for making it fairly simple for the bicyclists to orientate within the intersection and thus ensure that the bicyclists are motivated to use the provided safe crossing possibilities instead of other more unauthorised possibilities.

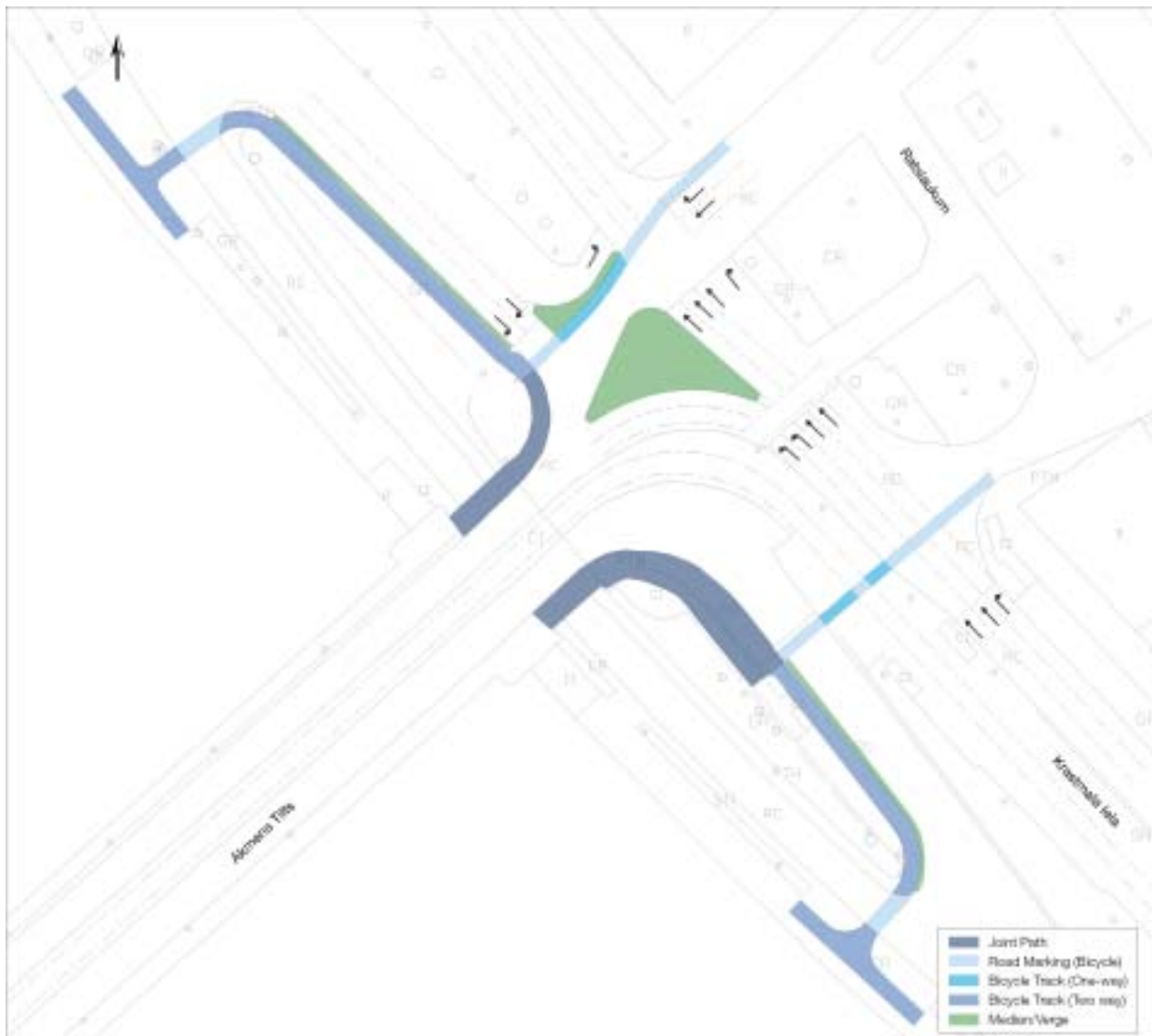


Figure 4.10 Principle design proposal connecting potential future bicycle routes along Akmens Tilts, 11 Novembra iela and Ratslaukums-Kalku Iela within Old Riga

The illustrated design introduces traffic signals on 11 Novembra Iela to ensure safe bicycle crossings. It may influence the total capacity of the intersection.

4.3.3 Krastmala/13 Janvara Iela

The intersection is a major connection for car traffic distributing the traffic to and from the central parts of Riga as well as transit traffic and local traffic to and from the Central Market area. Furthermore, several tramlines are passing through the intersection. Traffic lights are installed.

As for the intersection at Akmens Tilts, the pedestrians have difficult crossing conditions between the path along the river bank and 13 Janvara Iela.

The principle design shown below has the following aim:

- to create bicycle facilities giving bicyclists a safe and fairly direct access to and between the following directions
 - separate bicycle path between the bank of the Daugava River and 13 Janvara Iela
 - one way bicycle lanes (or tracks) on 13 Janvara Iela
- to keep the general functioning and layout of the intersection as far as possible

As for the intersection at Akmens Tilts, the design elements are based on creating a more compact intersection giving the bicyclists as short a crossing distance as possible as well as easily understandable solutions.

A precondition for the proposal is that the existing connection to Maskavas Iela from the intersection is to be closed for car traffic. It will be necessary to make the intersection more simple with less potential conflict situations and the closure of Makavas Iela seems to be the most obvious choice for creating such a situation.

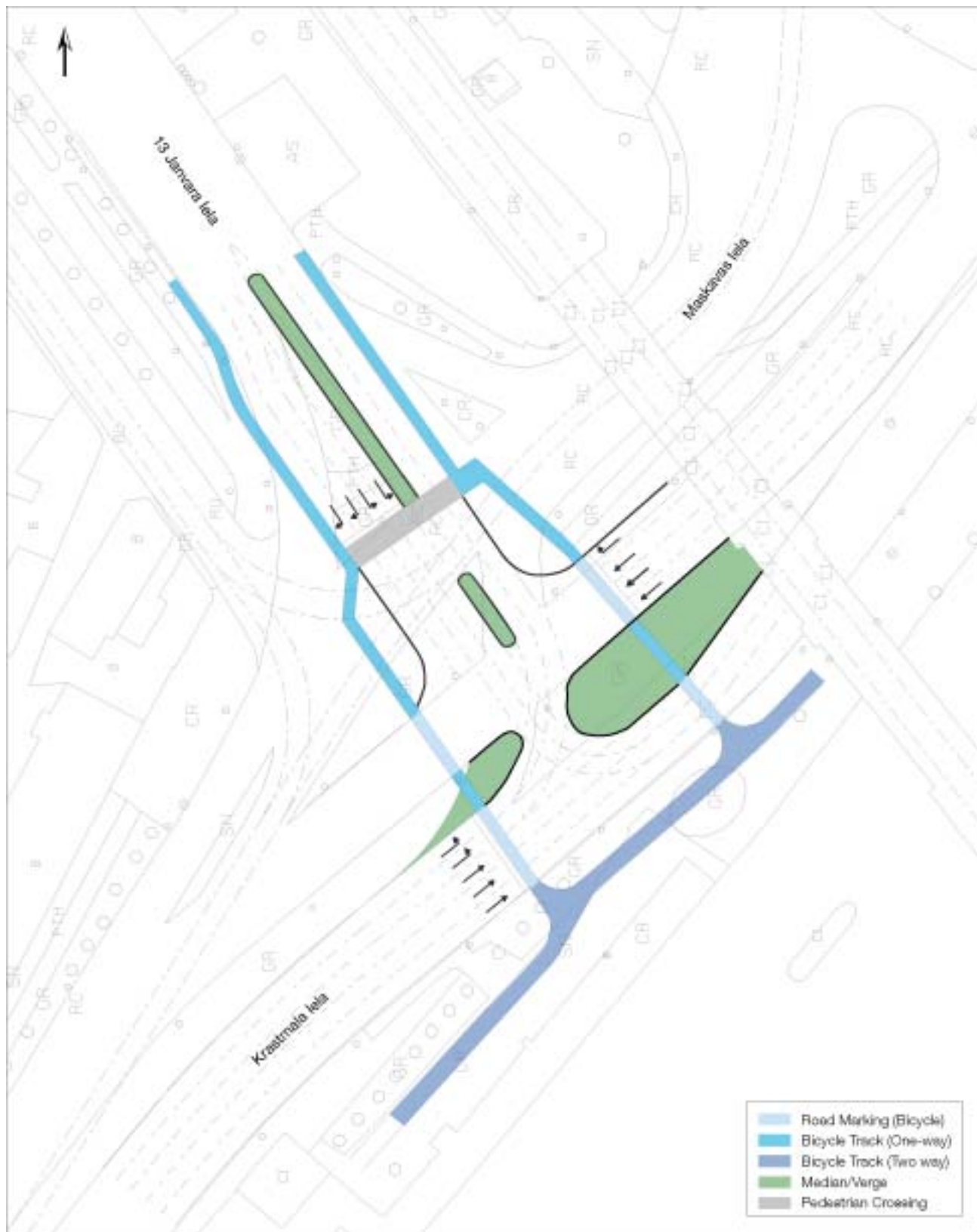


Figure 4.11 Principle design proposal connecting potential future bicycle routes along Krastmala and 13 Janvāra iela

4.3.4 13. Janvara iela-Marijas iela/Gogola iela/Raina Bulvaris/Merkela iela/Satekles iela

13 Janvara Iela-Marija Iela are as described in the previous subchapter important streets for the distribution of car traffic within the area. In front of the Central Station, the streets have major intersections with Gogola Iela, Reina Bulvaris, Merkela Iela and Satekles Iela.

The principle design shown below has the following aim:

- to create bicycle facilities giving bicyclists a safe and fairly direct access to and between the following directions
 - one-way bicycle tracks (or lanes) on 13 Janvara iela-Marijas Iela
 - bicycle lanes or tracks on Gogola Iela (design not finally discussed)
 - One-way bicycle tracks (or lanes) on Merkela Iela
- to keep the general functioning and layout of the intersection as far as possible

As for the other intersections described previously, the design elements are based on creating as short crossing distance as possible for the bicyclists as well as easy understandable solutions. The design is to a large extent based on the precondition to keep the existing traffic conditions. It could, though, be envisaged to propose a future major change of the whole area including the traffic situation. The aim could be to create a better visual and physical connection between the station area and the rest of the city centre.



Figure 4.12 Principle design proposal connecting potential future bicycle routes along 13 Janvara Iela, Marijas Iela, Gogola Iela and Merkela Iela

4.4 Supplementary cross section sketches

As a supplement to the prepared conceptual design drawings, a few cross section sketches have been prepared to illustrate other types of potential solutions within streets in the project area.

Dzirnavu Iela (two way bicycle traffic in a one-way street)

The street is proposed as a future major bicycle route for the traffic through the central area of Riga. The street is a one-way street with parallel parking and angle parking.

The principle cross section design proposal includes bicycle traffic in both directions and reductions of the parking space available.

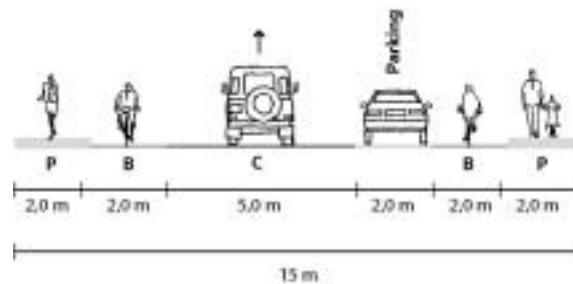


Figure 4.13 Principle cross section design for a bicycle route in Dzirnava Iela

K. Barona Iela (bicycle tracks and trams)

The street is not appointed as a bicycle route within the project area due to the difficult preconditions with trams and cobble stone surface on the traffic lanes. The street could, however, be an important future route due to the location and the many travel destinations on the street itself, if some of the preconditions were changed.

To illustrate a potential solution, a principle design has been prepared.

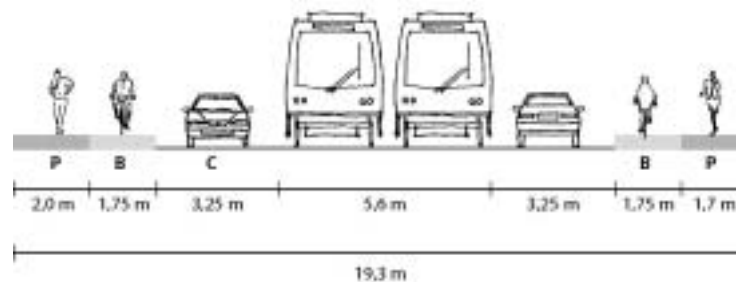


Figure 4.14 Principle cross section design proposal for a bicycle route on K. Barona Iela

Gertrudes Iela

Gertrudes Iela is appointed as a potential bicycle route, and the significance can be even more important if the connection to Daugavpils Iela on the other side of the railway line is going to be improved.

The street is not one of the major traffic streets and it has a fairly wide cross section. The principle design proposal is therefore to prepare bicycle lanes.

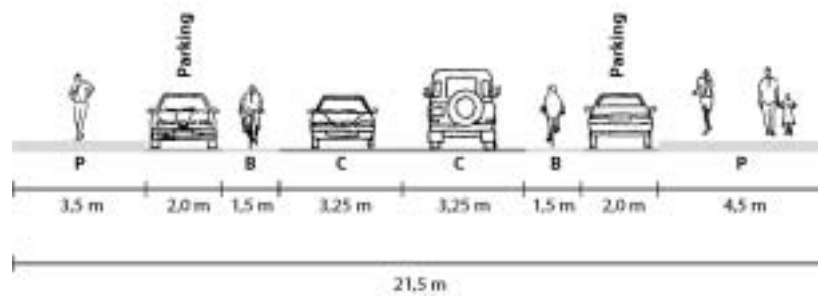


Figure 4.15 Principle cross section design proposals for a bicycle route on Gertrudes Iela