



# Transdanube.Pearls - Network for Sustainable Mobility along the Danube

<http://www.interreg-danube.eu/approved-projects/transdanube-pearls>

## Guideline for bike parking systems Transdanube.Pearls

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## **Abbreviations**

BSS	Bike Sharing Scheme
ECF	European Cyclists' Federation
POI	Point of Interest
PT	Public Transport



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## Bike Parking Systems

### Executive summary

The bike parking systems manual was developed by the Bratislava Self-Governing Region in cooperation with external specialists from the Institute of Spatial Planning. The manual was compiled during June and July 2017.

The purpose of the task was to map the development potential of tourism services using sustainable and environmentally friendly transport.

Part of the document includes examples of good practice from Europe (and the world), which can be applied in the countries of the Danube region. The document also serves as the basis for fourteen international partners of the TRANSDANUBE.PEARLS project, which creates a conceptual framework for the subsequent implementation of specific activities to process their regional development studies.

The manual deals with the issue of bike parking systems for public. The document consists of several parts: identification of best practice examples within Europe, framework conditions for implementation, identification of target group requirements, overview of the possibilities for implementation, recommendations for implementation, identification of key success factors, suggestions for transnational evaluation of pilot activities and references.



## 1. Best practice examples from across Europe

Good practice examples come mainly from Western European countries where the 'cycling culture' has been present for longer time period. Various solutions do exist from the simple street racks to fully automated storage systems. The concrete solution depends on local requirements.

Generally, it can be said that the solutions must ensure that the necessary parking area and number of parking spaces are available. The solutions must ensure that bicycle parking



Source: <http://www.cycling-embassy.dk/wp-content/uploads/2010/11/Cykelparkering-Bruuns-Bro1.jpg>

facilities are located and laid out in a way that encourages use. The solutions must signal order, system and balance. One such an example comes from Denmark.

Several other examples of various types of bicycle racks come from Western European cities. In Kensington High Street (London) they have pioneered cycle parking along the central island of roads. Moveable cycle parking within carriageway is visible in Bath, UK.

### Hackney Residential Cycle Parking Project, London

Secure cycle storage at home is a major issue in many existing residential developments. A good example of innovative approaches to retrofitting is the Hackney Residential Cycle Parking Project. Bikehanger stores up to six bikes in half a car parking space.

### Bicycle Station in Rotterdam, Netherlands

The underground bicycle parking facility at Central Railway Station has parking spaces for 5,190 bicycles. One can and may cycle inside this vast facility. The majority of the parking spaces can be used free of charge.



### Bike + Ride systems in Munich, Germany

P+R Park & Ride GmbH operates numerous B+R facilities with a total of 4,300 parking places. They are operated either in a local context with a P+R facility, or independently. Some of the bicycle parking facilities are equipped with video surveillance. The use of the B+R facilities is free of charge.



Source: [http://www.germanyhotels.com/App\\_Themes/Germany\\_Hotels/img/Carousel/Simple/munichbikeparking.jpg](http://www.germanyhotels.com/App_Themes/Germany_Hotels/img/Carousel/Simple/munichbikeparking.jpg)

### Bicycle Hub in Stockholm, Sweden

A revolutionary facility for commuters and tourists to securely park their bikes located in the Swedish capital. The state-of-the-art, three floor facility, uses two-tier cycle parking rack and triangle cycle stands to provide 390 free of charge cycle spaces.

### 'Biketowers' in the Czech Republic

Fully automated vertical storage system for bicycles that provides cyclists to store in a safe and dry environment are situated in three Czech cities next to malls and railway stations. Available for very cheap fee, bicycles are fully protected against thefts, bad weather conditions and dust.



Source: [www.cyklohradec.cz](http://www.cyklohradec.cz)



## 2. Framework conditions for implementation

Before the discussion about implementing of appropriate bicycle facilities parking scheme in particular region it is necessary to consider several factors that are described in this chapter.

### Exogenous factors

The local climate is an important influencing factor for cycle usage in different seasons. The knowledge of usage curves helps to inform cost-orientated decisions about the location and decision of what type of bicycle parking facility should be placed. In times of the year when usage is lower, the operator could limit the maintenance of some of the facilities.

The city size should also be considered as a factor. Considering the number of inhabitants, facilities in large and medium sized cities should offer more bicycle racks per bicycle facility than in small cities. However the best practice examples show that this may not be true in all cases (e. g. 'biketowers' in two Czech cities, see *Chapter 1*).

### Endogenous factors

#### *Type and access technology of bicycle parking facility*

The types of bicycle parking facilities are diverse and depend on the size of the system, available financing, design and the technology used. **Free standing** bicycle facility with racks represents the easiest access with possibility of locking the bicycle using own locker. To avoid non-usage in bad weather conditions it is preferable when this type of bicycle parking facility is covered by a roof.

Other type of bicycle parking facility is **locked** compound. This may include bicycle station, bicycle hub, 'biketower', bicycle hut or other. Here the bicycle is safely placed and locked. Unlocking of the station can be made by card or code, key or there may be a person in charge.

#### *Charges*

Most schemes encourage daily short-term use. Thus the first 30 minutes of each ride are free in most systems. The rental price increases exponentially after the free period, or costs starts from the first minute with a linear charge per time unit reaching a lower daily maximum. Most BSSs also include fines or withholding the user's deposit for not returning or damaging bikes.



### *Information*

Information channels are available to communicate all BSS-related issues from awareness raising to registration and rental. Apart from traditional channels (such as advertisements, websites, newsletters, service centres and call centres), some operators have started using applications (Apps) for mobile handsets and Smartphones. Those Apps offer advertisement options, scheme information, registration opportunities, rental functions and real-time information about station and bikes depending on the current position of the user.

### *Public Transport (PT) Integration*

The integration with PT takes place on three levels: integration of information; physical integration; and in terms of technological access and charges. Information integration: bicycle parking facilities information is combined with PT information (locations can be found maps). Physical integration: bicycle parking facilities are located near important PT stops. Access & charges: some schemes may offer access to locked parking facility and PT with one card.

### *Target Groups and Trip Purpose*

Bicycle parking facilities may have more than one target group. While the main focus in urban schemes is the daily user who rides to work or to leisure activities, regional schemes often focus on the tourist market (table below).

### *Arguments you'll have to deal with*

When discussing several arguments or constraints come up regularly. The most common ones are listed below.

#### *The city is too small and does not have enough funding options*

Even in small cities with up to 100,000 inhabitants, proper bicycle parking system may be a useful addition to existing transport facilities. PT is often not as well developed as in larger cities. Funding can be obtained with the help of local companies and organisations.

#### *The city does not even have proper cycling infrastructure*

A cycling strategy should comprise infrastructure of cycle paths, incl. bike access to one-way streets, support for initiatives that encourage cycling (led by user-groups, schools or employers) and communication measures that encourage cycling and other sustainable mobility options.



*Cycling is dangerous; building of additional bicycle parking facilities and promoting of cycling will increase the number of accidents*

The safety of cycling very much depends on the quality of cycling infrastructure and the level of cycling in a city. Car drivers are much more aware of cyclists when they see more cyclists on the streets. Nevertheless, accident risks should be taken seriously and measures be taken to minimise them through, for example, information campaigns targeting cyclists, as well as motorists.

*Several bicycle parking facilities solutions – as bicycle stations or towers - will not be cost-effective*

There are always cheaper solutions, however building at least one bicycle tower in larger cities may be considered as a symbol pointing that the city is bicycle-friendly and the municipality is trying enough for building a proper bicycle network system.



### 3. Requirements of target groups

#### Politicians and Decision makers

The main requirements of this group can be summarized into these areas:

- Improve the 'city image'
- Increase in cycling
- Reduce CO<sub>2</sub> emissions
- Manage sustainable mobility transport demand

#### Operators

##### *Advertisement companies and other supply companies*

- Visibility
- Contracts across jurisdictions
- Low service and administration costs
- Financing model (ownership and operation)

##### *Municipalities*

- See Politicians and Planners above, plus:
- Financing model (ownership and operation)
- No 'bad news' regarding cycling in the city

##### *Associations*

- Low investment costs
- Low running costs

#### End-users

- Accessibility
- Cycling infrastructure in the city
- Safety
- Reliability
- Information system
- Integration with other modes of transport – technical and practical

As the main information source the "Optimising Bike Sharing in European Cities", A Handbook, June 2011 was used.



#### 4. Quick-Check of implementation

Before bike parking system implementation it is recommended to carry out quick-check, that will provide overview of current situation, show you needs, potentials and limits of system development. Several points/issues outlined below should be taken into consideration before implementation:

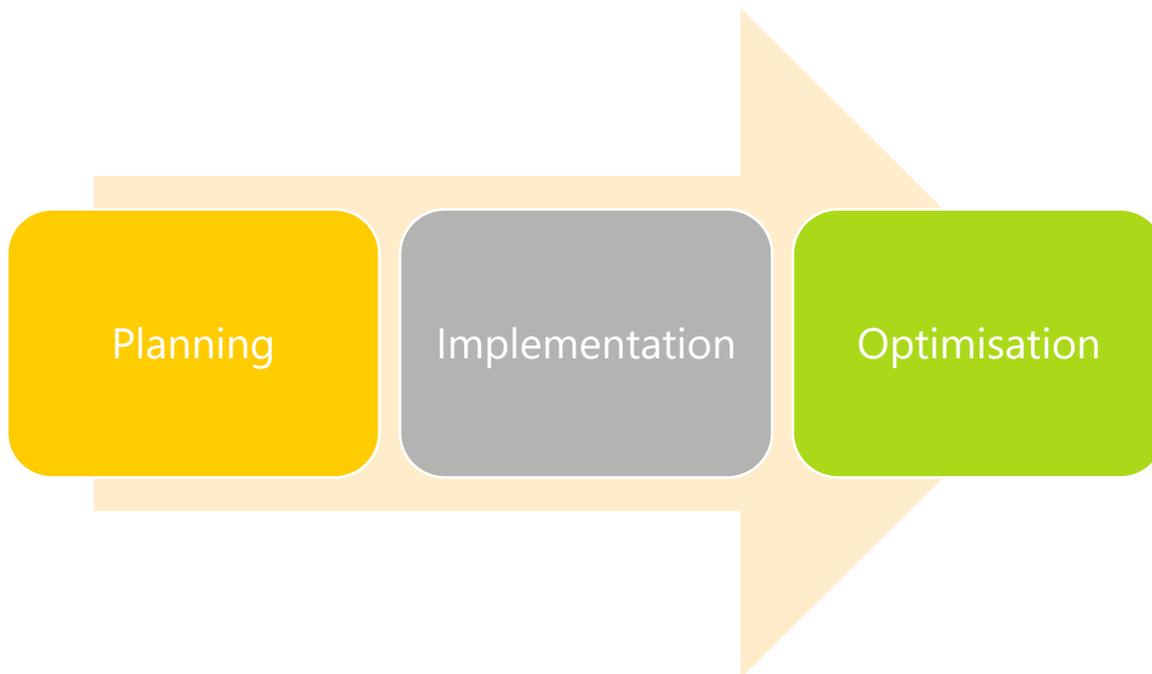
- destination points – malls, shops, business districts, shopping streets, railway stations, venues, attractions (points of interest POIs) and other facilities in your region/destination;
- existing basic culture of urban cycling;
- rate of cycle ownership;
- current state of the bicycle cycling facilities;
- the existence and implementation of a cycling infrastructure plan for the city or region;
- the construction and maintenance of cycle lanes or paths;
- safe cycle parking places, especially at PT stations and bus stops;
- external conditions that should make cycling difficult (topography, pedestrian dimension of the city);
- identification of target group (tourist and commuters) and taking into consideration its needs (target group survey);
- the distance to next railway station or bus terminal;
- the possibilities to get information about services;
- sustainable financing (various sources of funding).



## 5. Recommendations for implementation

The purpose of this chapter is to provide overview of recommendations regarding the bicycle parking systems. As the main information source the "*Bicycle Parking Made Easy*" was used.

### Steps for implementation of bike parking system



### General framework conditions

#### *Attract attention*

Turn bicycle parking into a win-win situation. Many prejudices can be shifted by arguing in favour of bicycle parking in the right contexts and by presenting decision-makers with good examples:

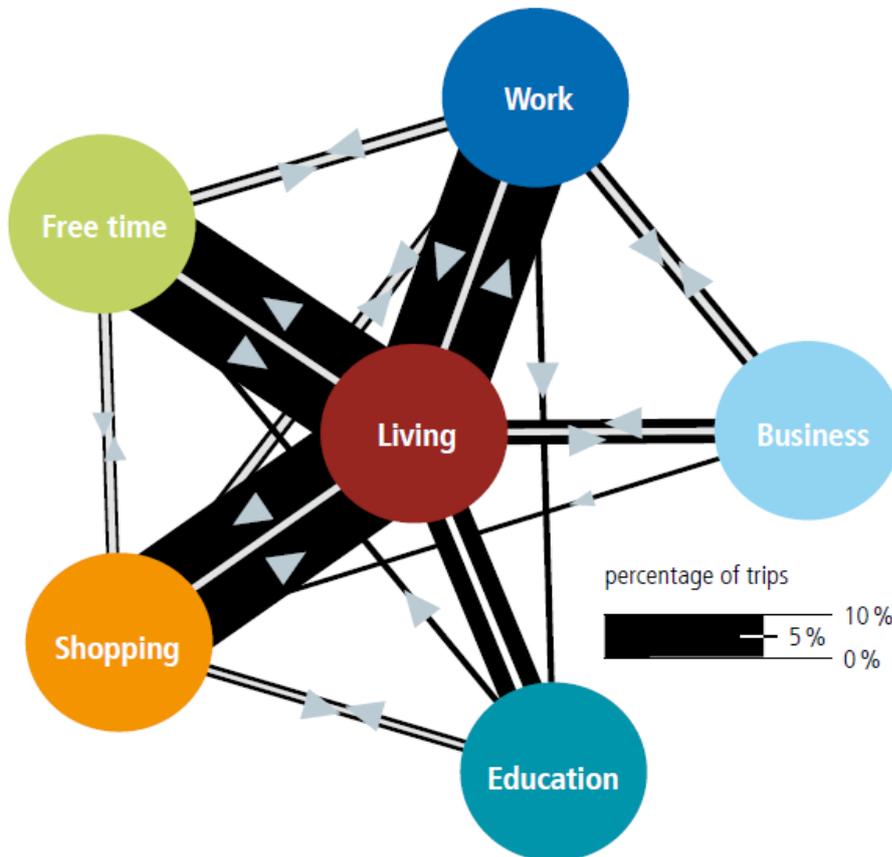
- If the infrastructure is in place, more people will choose to travel by bicycle.
- If more people go by bicycle rather than by car, congestion in urban zones is reduced.
- People become healthier, and the impact on the environment is lessened.
- If bicycle parking is done the right way, the flow of traffic through streets and squares will be improved.
- Proper bicycle parking facilities lead to greater accessibility for pedestrians and the disabled.



- With the right solution and design, bicycle parking can make a positive contribution to the aesthetics of the urban environment and townscape.
- In this perspective, bicycle parking is a winning cause.
- Politicians, civil servants, traffic planners, architects etc. who embrace this idea will generate goodwill which goes far beyond the “project” itself.
- The money invested in bicycle traffic and bicycle parking will be paid back manifold in the form of savings on health care, planning and environmental budgets.



**Figure 1 Trip connections in daily transport**



Source: Ueberschaer M. M; Jaeger; G (1991)

## Bicycle parking schemes

### *Bicycle parking at home*

80% of all trips start and end at home. Professional parking facilities should not be missing here. The bikes should be safe and sheltered and parking should be easily accessible, at best near the entrance or in the courtyard. A cumbersome trip to the basement impedes daily use of the bike. The requirements for bicycle parking in residential areas are highly dependent on the respective settlement structure. In areas with low population density there is enough open space to establish parking spaces for bicycles. In dense areas, the competition for the few open spaces is hard, the price of land is correspondingly high, and the search for suitable bicycle parking spaces is considerably more difficult.



### *Bicycle parking at work and education facilities*

Employers benefit when their employees ride their bicycles to work. In addition, official business trips can also be made by bike. Since bicycles are parked at work or educational facilities for a long time, areas which are sheltered and provide secure lock-up facilities shouldn't be missing. The parking area should also be positioned near the entrance. Furthermore, recharging stations for electric bikes are ideal. The best alternative for employees is a private parking facility that is not generally accessible. Particularly in industries where there is a lot of public traffic, separate parking facilities for customers and staff should be built.

### *Bicycle parking at shopping centres*

Good bicycle parking spaces are in the interests of customers and business. Close distances to local businesses which offer goods for everyday needs can be quickly and easily covered by bicycle. Good parking facilities help deal with "anarchic parkers" in front of shop entrances and windows.

### *Bicycle parking at public transportation stops – Bike + Ride*

A distinction is often made between bus, coach, train and metro stations in residential areas (outbound commuter station), and stations in workplace areas (inbound commuter station). To fully exploit the public transportation network, bicycle and public transport should be closely linked. Switching from one mode of transport to another must be simple, convenient and fast. Due to prolonged absences, facilities at railway stations should protect against theft by providing secure parking and lock-up facilities. Sheltered, lockable facilities (such as bicycle lockers and garages) are very important. The need for bicycle parking at bus stops will vary from place to place and depending on the character of the route and the catchment area.



## Assessment of the need for bicycle parking facilities

### *Flat-rate assessments by observation*

A general reference point to the need for parking facilities comes from observing “anarchic or haphazard parking” and bicycle theft. In places where many bicycles are parked at random, there is an evident need for more parking facilities. Available data or experience regarding the bicycle theft rate can also indicate the need for new facilities. The higher the theft rate, the greater the need for action.

### *Traffic Count*

Another variant in assessing the need for bicycle parking facilities is to conduct a traffic count. In this case, the traffic at each point of origin and destination (i.e. at bus stops of public transport) is counted. Bicycle parking spaces, the number of parked bicycles and the number of haphazardly parked bicycles are counted. The difference between the number of parked bikes and the number of parking spaces provides information about where and how high the demand is.

### *Predictions based on structural data*

The number of required bicycle parking spaces may be calculated selectively. The basis for calculating is the number of people traveling to a destination (home, work, etc.). By taking into account the percentage of cycle traffic, a forecast can be made about the number of cyclists and bicycle parking spaces needed in the area.



**Table 1 Guidelines for Assessing Parking Space Needs**

<b>Residential Areas</b>	
Residents	1 parking space per room
<b>Work Areas</b>	
Employees (Service Sector, Trade and Industry)	1 Parking space for every 5 workplaces
Visitors (service enterprise with many customers)	1 Parking space for every 5 workplaces
Visitors (service enterprise with fewer customers/visitors)	1 Parking space for every 20 workplaces
<b>Educational Facilities</b>	
Primary Schools	1 Parking space for every 3 to 10 pupils
Middle and Upper Level Schools	1 Parking space for every 1-2 pupils
Colleges and Vocational Schools	1 Parking space for every 2-3 students
<b>Shopping</b>	
Grocery Stores	1 Parking space per 30 – 50 m <sup>2</sup> sales area
Other Stores	1 Parking space per 100 – 200 m <sup>2</sup> sales area
Shopping Centres	1 Parking space per 100 m <sup>2</sup> sales area
<b>Public Transportation Stops</b>	
Train Stations, Bus/Tram Terminals	1 Parking space per 3 to 10 travellers
Tram / Bus Stops	5 Parking spaces per stop
Park + Ride	1 Parking space per 20 car parking spaces
<b>Restaurants and Hotels</b>	
Restaurants	1 Parking space per 5 seats
Hotels	1 Parking space per 10 beds
Lodges and Hostels	1 Parking space per 5 beds
Sports Centre	1 Parking space per 2 visitors
<b>Leisure, Sports and Cultural Activities</b>	
Library	1 Parking space per 3 visitors at a time
Disco, dance bar	1 Parking space per 2 to 3 customers at a time
Recreation Centre, Fitness Centre, Public Outdoor Swimming Pool	1 Parking space per 2 visitors at a time
Cemetery	1 Parking space per 1000 m <sup>2</sup> area
Swimming Pool, Gymnasium	1 Parking space per 2 to 3 visitors at a time
Cinema	1 Parking space per 2 to 3 seats
Church	1 Parking space per 20 seats
Museum, Exhibition	1 Parking space per 100 m <sup>2</sup> area
Stadium	1 Parking space per 10 spectator seats
Theatre	1 Parking space per 10 seats
Zoo	1 Parking space per 1000 m <sup>2</sup> area

Source: Bundesamt für Strassen / Velokonferenz Schweiz (2008): Veloparkierung. Empfehlungen zu Planung, Realisierung und Betrieb. Handbuch. Bern, Biel.



## Monitoring

Survival of the scheme is the central indicator for success. The more indicators of success developing in a positive direction and the more the stakeholders are satisfied, the longer the system will survive. Determining exactly how to measure success depends on why you are measuring success. It is also important to define the stakeholder in question beforehand.

For each aspect a number of relevant indicators are listed. However, not all aspects have natural indicators, and some indicators are applicable to several aspects.

It is important to recognise that many of these indicators are ex post, (i.e. measurable only after the implementation of the system). Therefore, they can only be used as guidelines for cities planning to implement the system by comparison with similar cities that have already implemented one.

### *Cycling Infrastructure of the City*

Indicators for cycling infrastructure are:

- In absolute terms:
  - Length of the cycle network in terms of cycle lanes or separated cycle paths;
  - Amounts invested by the municipality into cycling infrastructure: cycle paths and lanes, cycle parking, separated crossings, traffic lights, mobility centres etc.
- In relative terms:
  - Share of the cycle network in the total length of the road network;
  - Share of the investment amounts dedicated to cycling enhancing measures in total (municipal) traffic investments.

Traditionally, these numbers are rarely directly available, so the first step would be to collect this data in the municipalities.

### *User Accessibility*

- Parking facilities density and variability of types of parking facilities;
- Average no. of racks/parking facility;
- Opening hours per day/24 or per year/365 (if relevant).



### *Safety*

- Total cycle accidents per year/100,000 cycle trips;
- No. of death injuries/100,000 cycle trips;
- Number of thefts per year/no. of slots/bikes.

### *Financing Model*

- Yearly total cost (annualised investment and operation)

### *Transport System Integration and Information Technology*

- Maximum distance to nearest PT station or bus stop.



## 6. Key success factors from existing good practice examples

Key success factors for survival of bicycle parking scheme are as follow:

- Various types of bicycle facility (e.g. free standing and locked: bicycle station, bicycle hub, biketower);
- Easy access technology of locked bicycle facility;
- Special bicycles support (e.g. tandem bicycles);
- Size and density (number of docking points (racks) and number of stations in the city (Station density));
- Availability (24 hours and all year round);
- Information (websites and apps, maps, terminals);
- Public transport information integration – information about bike and ride parking facilities in the city integration;
- Public transport physical integration – installation of parking facility at the public transport stop / station;
- Involvement of operators (e.g. advertising companies, street furniture providers, transport companies);
- Sustainable financing source.



## 7. Suggestions for transnational evaluation of pilot activities

As the main information source for transnational evaluation the “*Bicycle Parking Made Easy*” was used.

### Quality criteria for bicycle parking

#### *Basic specifications*

- Ability to lock bicycle to stand - A bike that is not only locked up, but locked to a stand is better protected from theft and vandalism as a locked but free-standing bike.
- Parking space
- Securing a stable stand
- Accessibility
- Barrier-free access

#### *Advanced specifications*

- Shelter
- Lighting and visibility
- Cleaning and maintenance
- Consideration of special vehicles
- Service facilities



**Table 2 Types of bicycle parking facilities**

Type of Facility	Description	Recommended for Bicycle Types	Recommended Parking Duration	Cost per Parking Space
Open	Bicycle Rings	1 2		€ 25–50
	Rack	1 2		€ 60–100
	Mobile Facility/Non-anchored Rack	1 2		€ 100–150
	Front -wheel and Frame Rack	1 2 3		€ 100–180
	Covered Parking Facility with Lighting	1 2 3		€ 1.000
Locked	Bicycle Locker	2 3 4		€ 500–1.000
	Bicycle Hut (separate building or fenced in area)	2 3 4		€ 600–800
	Bicycle Station (incl Security und Service)	3 4		€ 3.000–6.000
	Full-automatic parking garage	3 4		€ 3.000–6.000

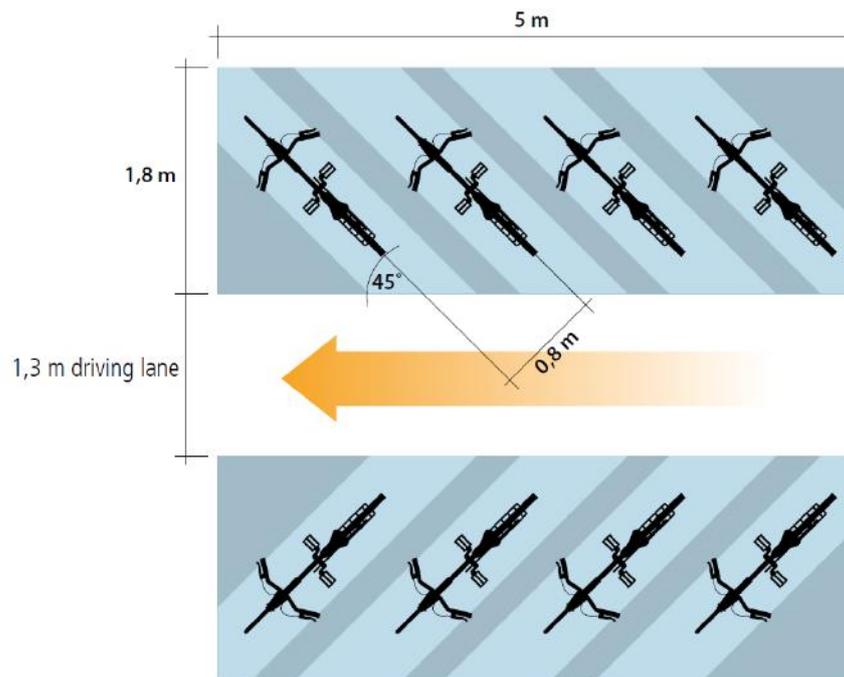
Sources: Gemeente Utrecht 2010, velokonferenz schweiz 2008

Parking duration: = Minutes, = Hours, = 1 Day, = 2–3 Days

4 categories of bicycle types: 1 = under € 100, 2 = € 100–500, 3 = € 500–1.500 and 4 = more than € 1.500

**Perpendicular herringbone bicycle parking** – Space requirement for 4 bikes: 9 m<sup>2</sup>

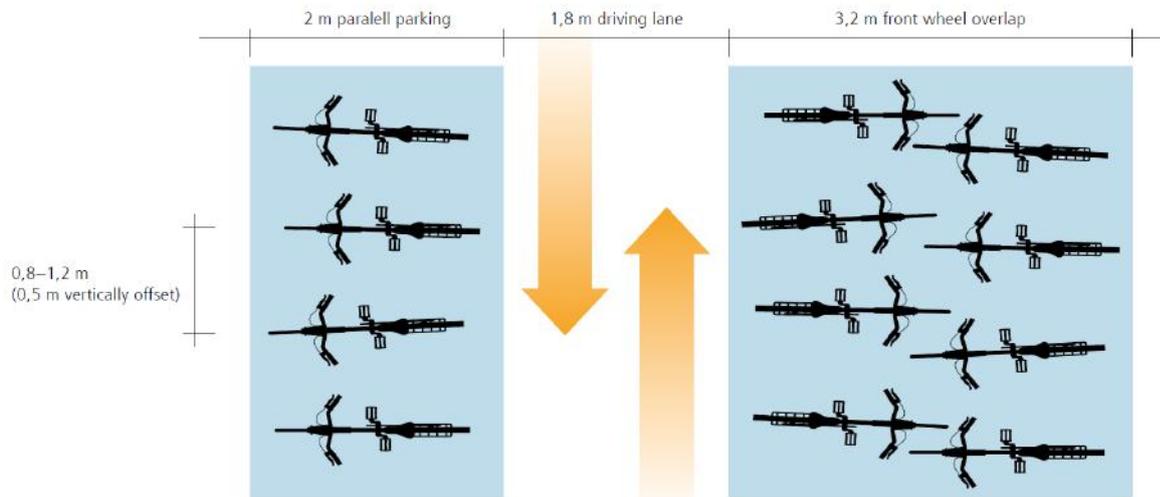
Source: RVS 03.02.13; design: FGM





**Paralell parking of bikes** – Space requirement for 4 bikes: 6,4–9,6 m<sup>2</sup>

Source: RVS 03.02.13; design: FGM





**Picture 1 Covered bicycle stands**



www.ziegler-metall.at

**Picture 2 Automatic bicycle parking station**



**Picture 3 Mobile parking stands**



r. Weiss, Stadt Salzburg

**Picture 4 Safe and secure parking in basement**



**Picture 5 Safe and secure lockable bicycle compound**



Source of pictures: Bicycle Parking Made Easy, developed under EU funded project BICY ([www.bicy.it](http://www.bicy.it))



## 8. References

### Web/GIS application

- A nach B (Vienna, Austria): [www.anachb.at](http://www.anachb.at) – very reliable route planner and online map application with GIS of various POI incl. bicycle parking places in Vienna and its suburbs; [map.bikecitizens.net](http://map.bikecitizens.net); [www.bikemap.net](http://www.bikemap.net)
- Urban Cycle Parking (London, UK): [www.urbancycleparking.org.uk/current/](http://www.urbancycleparking.org.uk/current/), Urban Cycle Parking represents London database of bicycle parking facilities that can be updated by anyone (crowd sourcing)

### Strategies

- Cycling Strategy for Berlin - Adoption by the Senate – available at: [www.stadtentwicklung.berlin.de/verkehr/politik\\_planung/rad/strategie/index\\_en.shtml](http://www.stadtentwicklung.berlin.de/verkehr/politik_planung/rad/strategie/index_en.shtml)
- Wien.at  
<https://www.wien.gv.at/stadtplan/en/grafik.aspx?lang=en&bookmark=HZkeRaHPvEQ3SP9GHQuMRu5RphIRnLluL7AeAQ-b-b>
- European Cycling Federation (Europe): <https://ecf.com/> - the author of the EU Cycling strategy

### Bicycle parking facilities

- Bike Tower (Hradec Králové & Přerov, Czechia): [www.cyklohradec.cz](http://www.cyklohradec.cz), [www.cykloprerov.cz](http://www.cykloprerov.cz)
- Cycle Parking (London, UK): <https://www.rbkc.gov.uk/parking-transport-and-streets/getting-around/cycling-and-walking/cycle-parking#sthash.bS2mytdK.dpuf>
- Falco - designer, manufacturer and installer of bicycle parking and street furniture products (UK): <http://www.falco.co.uk/projects/new-ground-breaking-cycle-hub-in-stockholm1>
- Hackney Residential Cycle Parking Project (London, UK): [www.sustrans.org.uk](http://www.sustrans.org.uk), <https://www.hackney.gov.uk/cycle-safety-and-security>



## Overall conclusions

The main purpose of the document is to provide guidance (1) to bodies interested in the development of bike parking services from its planning, implementation to operation in cities and municipalities along the whole Danube River (2) as well as to stakeholders, which in cooperation with partners providing public transport services, want to support the development of cycling infrastructure to provide increased comfort of the cycling tourism and transport.



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7. With a bicycle: <http://www.dpp.cz/en/with-a-bicycle>, [2017-02-19]