

Roundabouts



Urban Transport 12.
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Principles of roundabouts

Traffic safety in roundabouts is usually better.

A roundabout has a special geometry and signing.

There can be 3 - 6 legs in a roundabout.

Recognisability and perceptibility are important.

Viability is very important for oversized vehicles.

Nowadays it is a stylish intersection type.

In Hungary the construction of roundabouts started in the 90s.

Current standard and guidelines have been issued in 2010.

Principles of roundabouts

The roundabout is especially recommended at intersections of roads of the same category with similar traffic volumes.

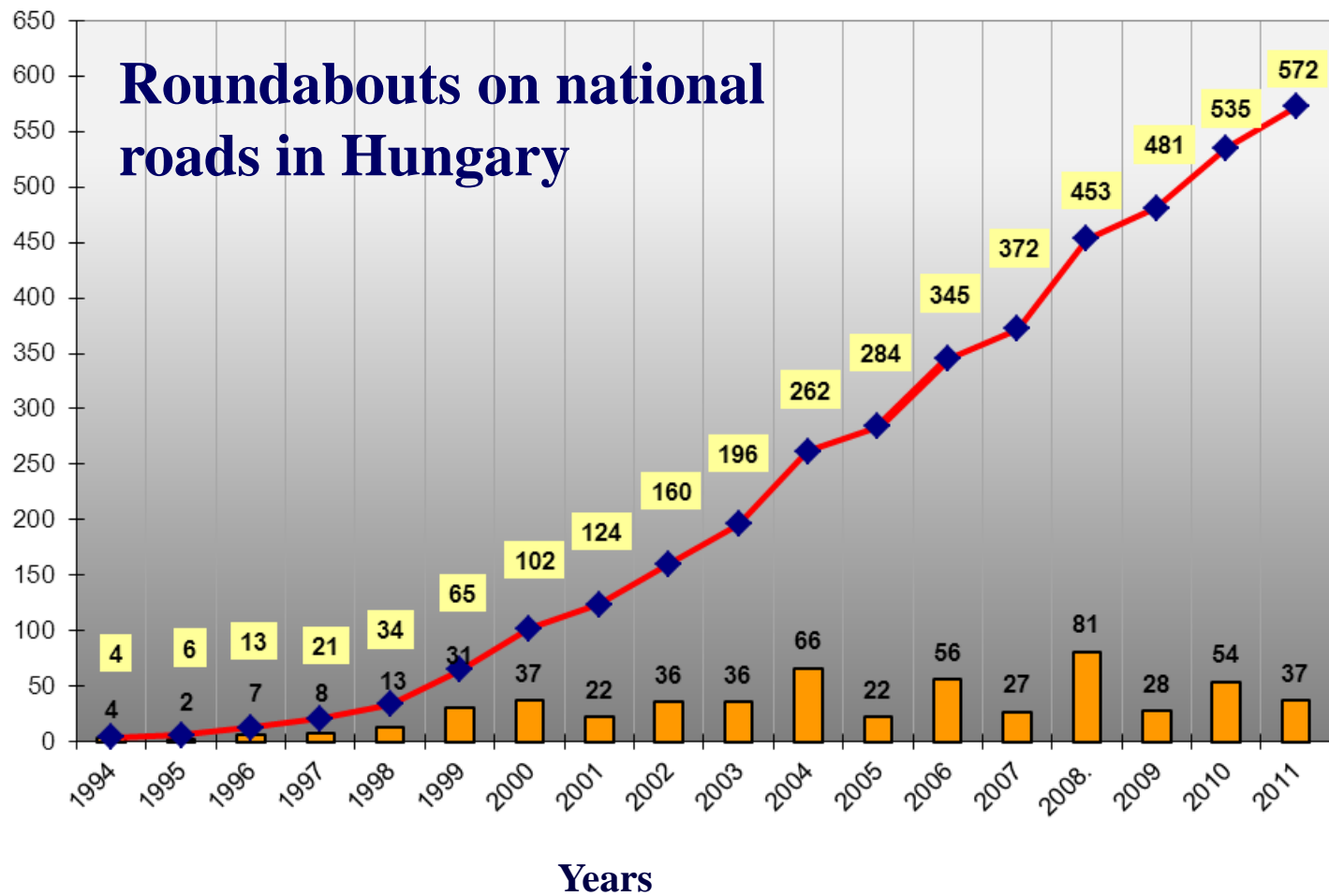
On a given road section mixing the signalised type and roundabouts is not recommended.

In a special case a tram track can cross the roundabout (i.e. in Szeged)

A well designed roundabout may have an urban structural and space forming role.

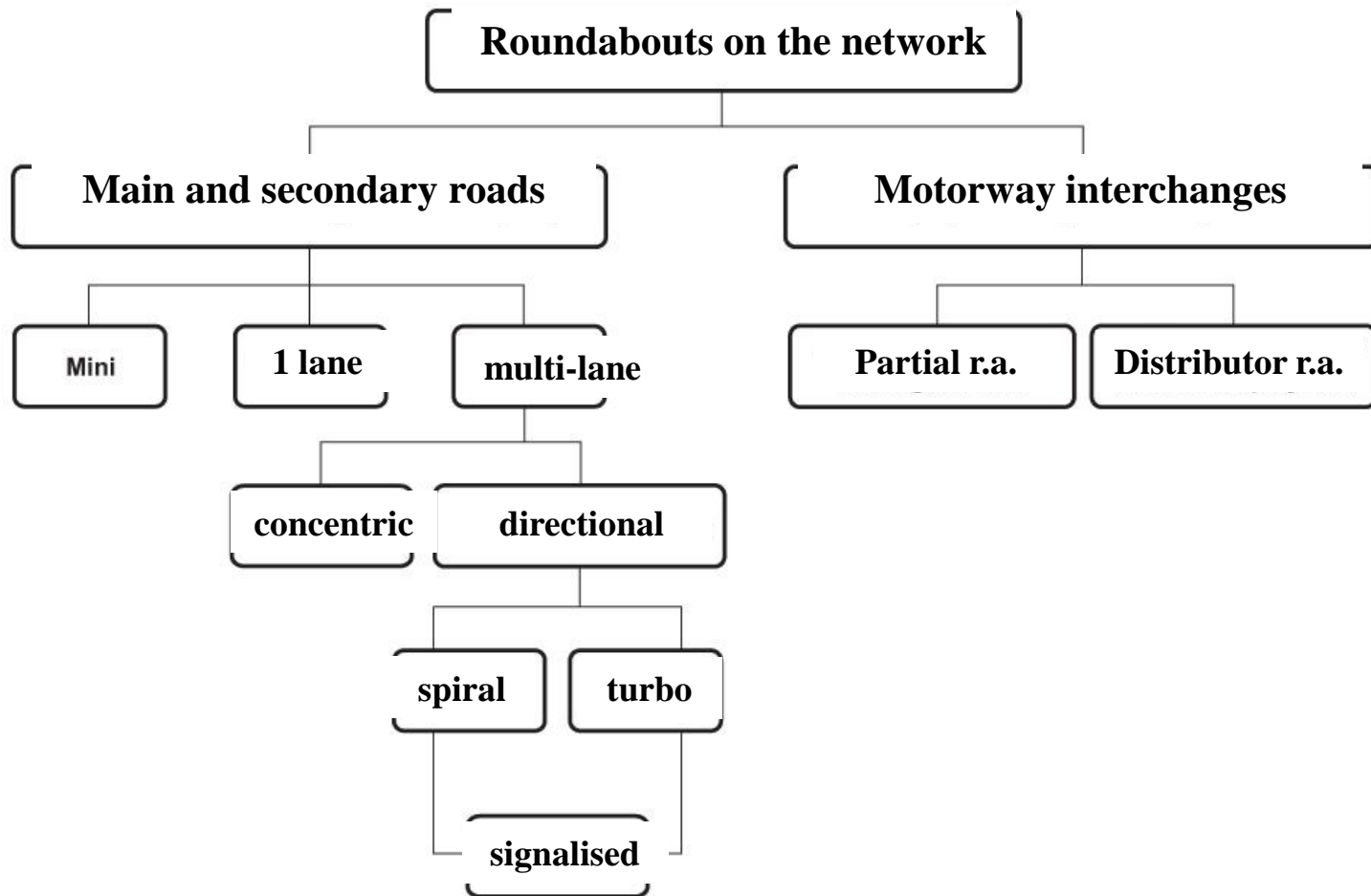
Speed is less therefore pollution is reduced.

Principles of roundabouts



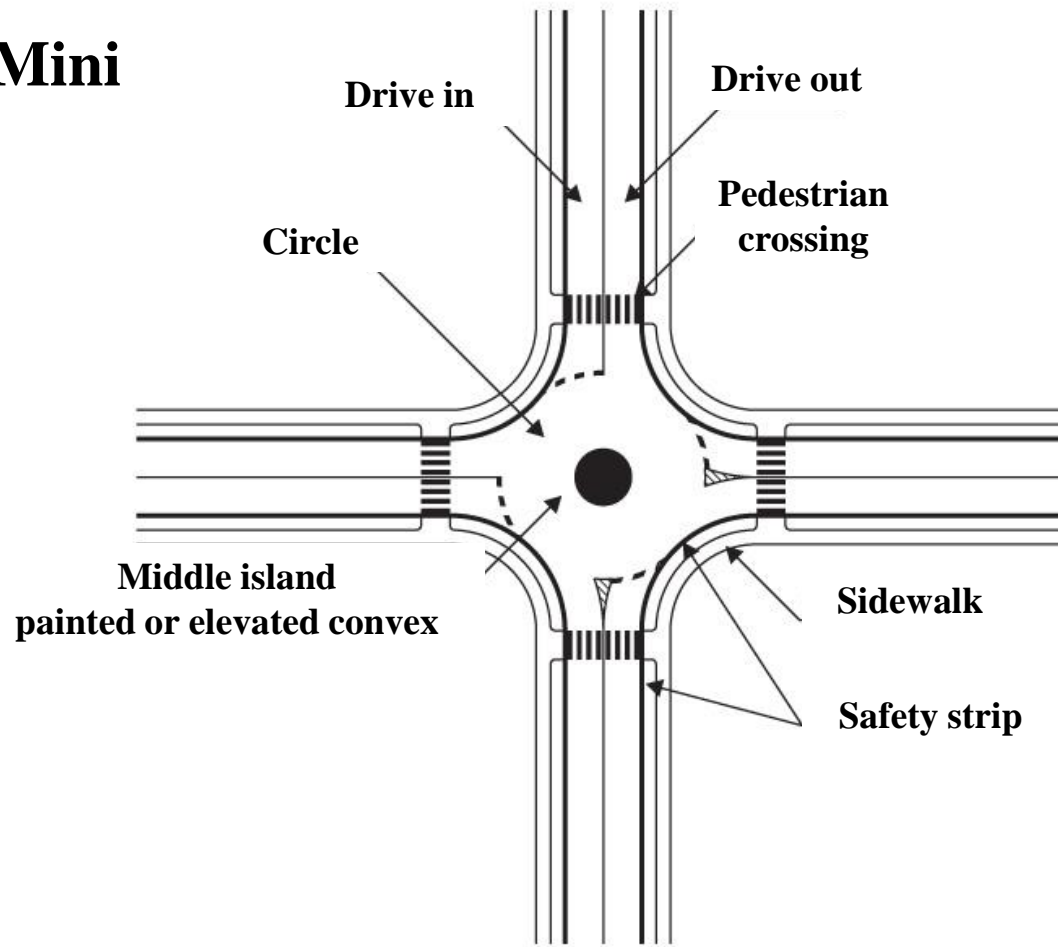
Source: National Road Databank

Types of roundabouts

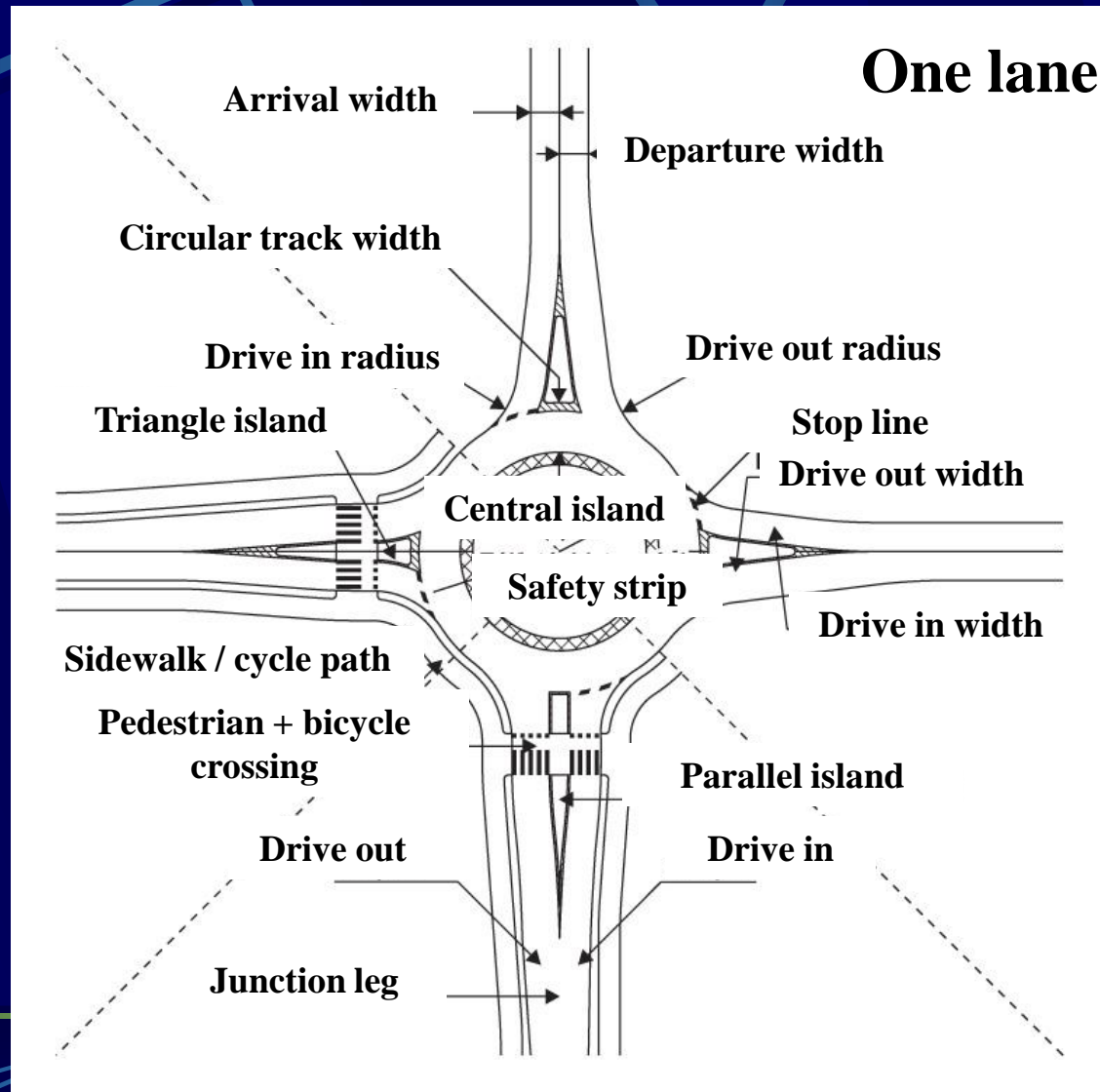


Types of roundabouts

Mini

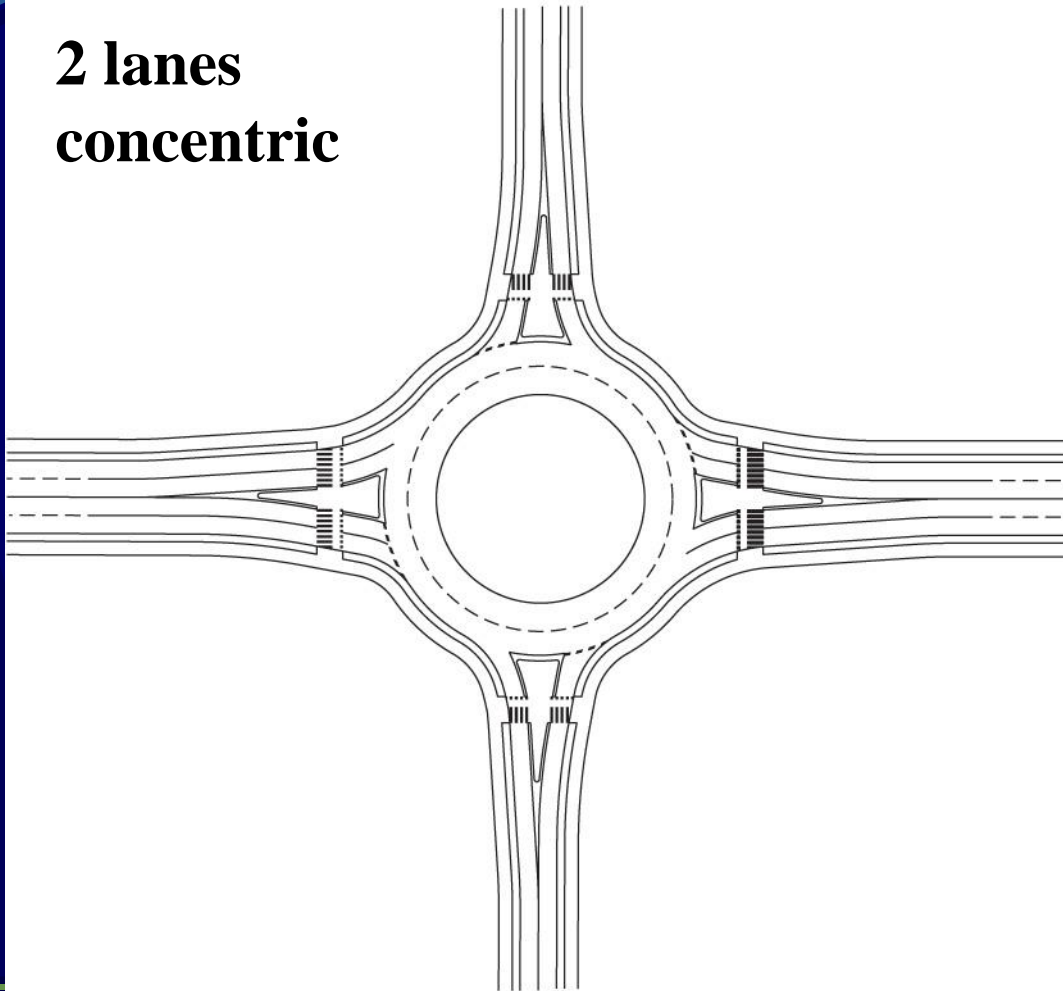


Types of roundabouts



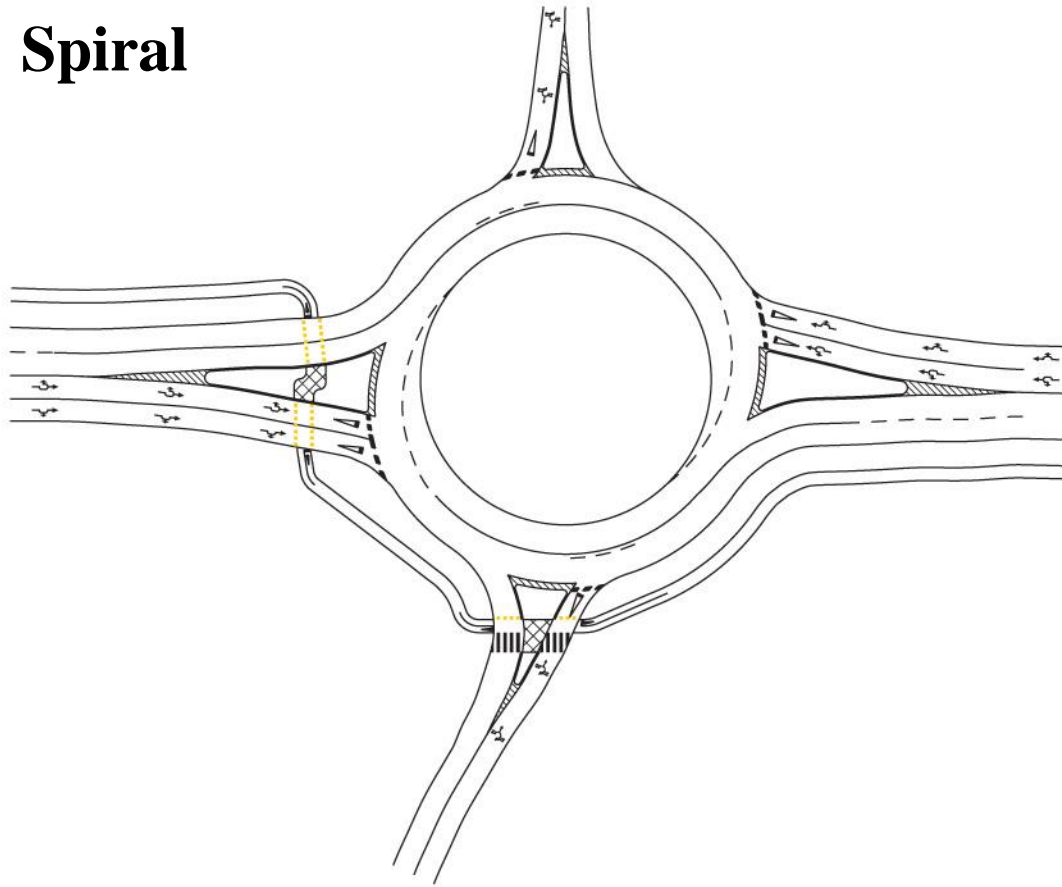
Types of roundabouts

**2 lanes
concentric**



Types of roundabouts

Spiral



Types of roundabouts

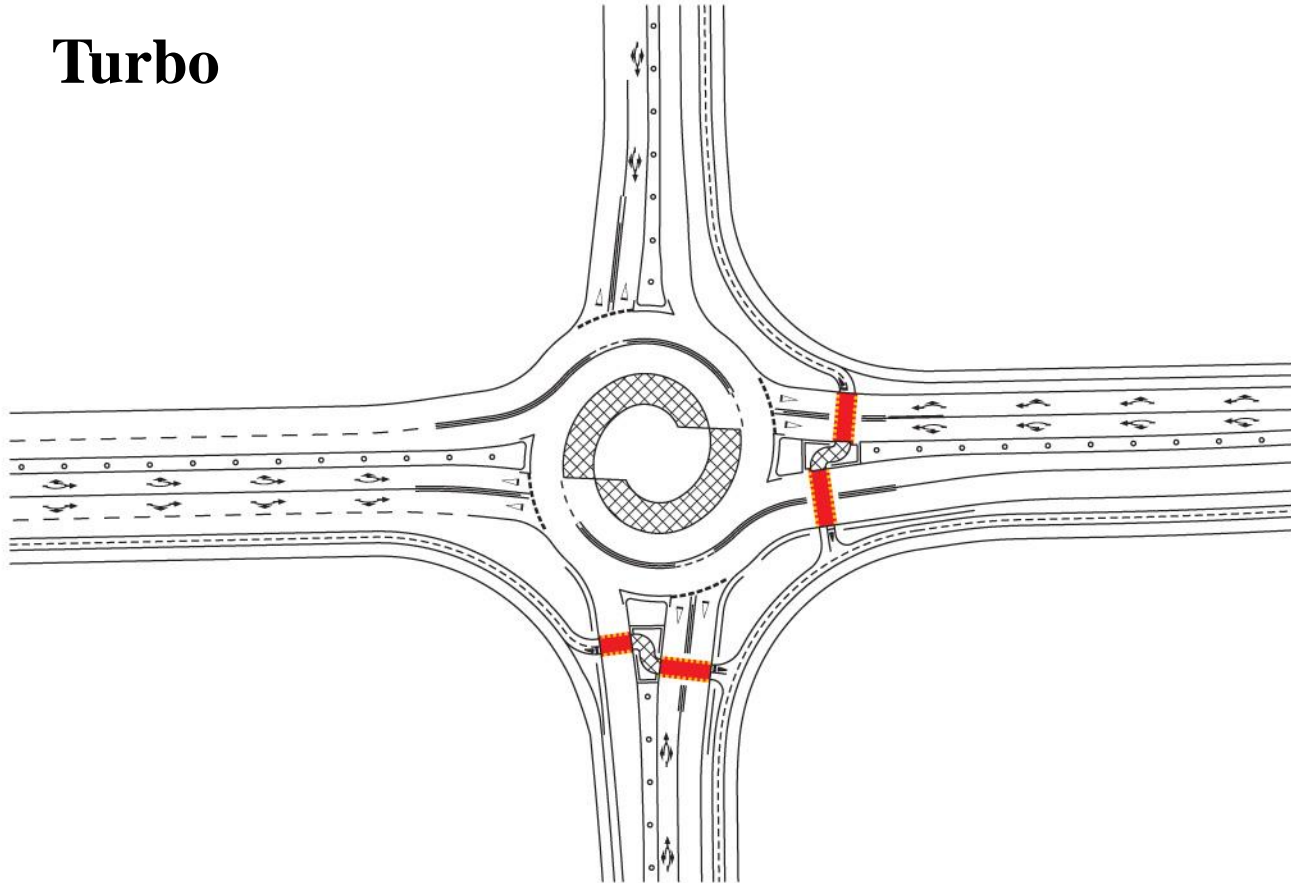
The concentric type has higher capacity. This type is applied when the joining sections have 4 traffic lanes.

There is a safety problem in the concentric 2 lanes circle because there are crossing vehicles and conflict points.

The spiral type is recommended when the priority traffic volume is far bigger than the secondary traffic volume (i.e. proportion 7:1)

Types of roundabouts

Turbo



Types of roundabouts

In the turbo type roundabout the directions go through without lane changing.

The lanes are physically separated in the circle – stems, prisms, caps between the traffic lanes.

The safety is better and the capacity is higher compared to the concentric or spiral types.

In the turbo roundabout the recommended inner radius is 12 m, the width of traffic lanes: 5,15 m inside, 5,00 m outside, the separation between lanes is 30 cm.

Traffic planning of roundabouts

Parameters determining capacity:

- entry (drive in) width,
- number of entry lanes,
- arrival width,
- number of lanes in the circular track,
- width of circular track,
- drive out width,
- distance of conflict points,
- radius of the central island,
- entry angle.

Traffic planning of roundabouts

Recommended capacity reserve of legs: 20 - 80%.

In case of a smaller capacity deficit the geometric parameters (radius, width) can be increased.

A higher traffic volume right turn can be designed as a direct connection outside the circle.

The first step is an approximate capacity calculation, later on the detailed capacity calculation for each leg according to standard.

Traffic planning of roundabouts

| Type of roundabout | Capacity pcu/d* |
|--|--------------------|
| One lane roundabout | 32 000 |
| Two lanes concentric, one lane entries | 34 000 |
| Two lanes concentric, two lane entries | 36 000 |
| Spiral roundabout | 40 000 |
| Turbo roundabout | 46 000 |

* Sum of entering AADTs

Traffic planning of roundabouts

| Level of service | Average entry waiting time s |
|-------------------------|---|
| A | ≤ 10 |
| B | ≤ 20 |
| C | ≤ 30 |
| D | ≤ 45 |
| E | > 45 |
| F | Not acceptable |

Geometric design of roundabouts

Detailed design of elements of roundabouts require thoughtfulness, co-ordinating the horizontal and vertical alignments.

Special attention needs in the design of central island and its viable ring, the dividing island and the drive in and drive out radius.

The safe passage of oversized vehicles must be considered.

Drainage solutions are important as well.

Geometric design of roundabouts

Mini roundabout - up to max. 15 000 pcu/day.

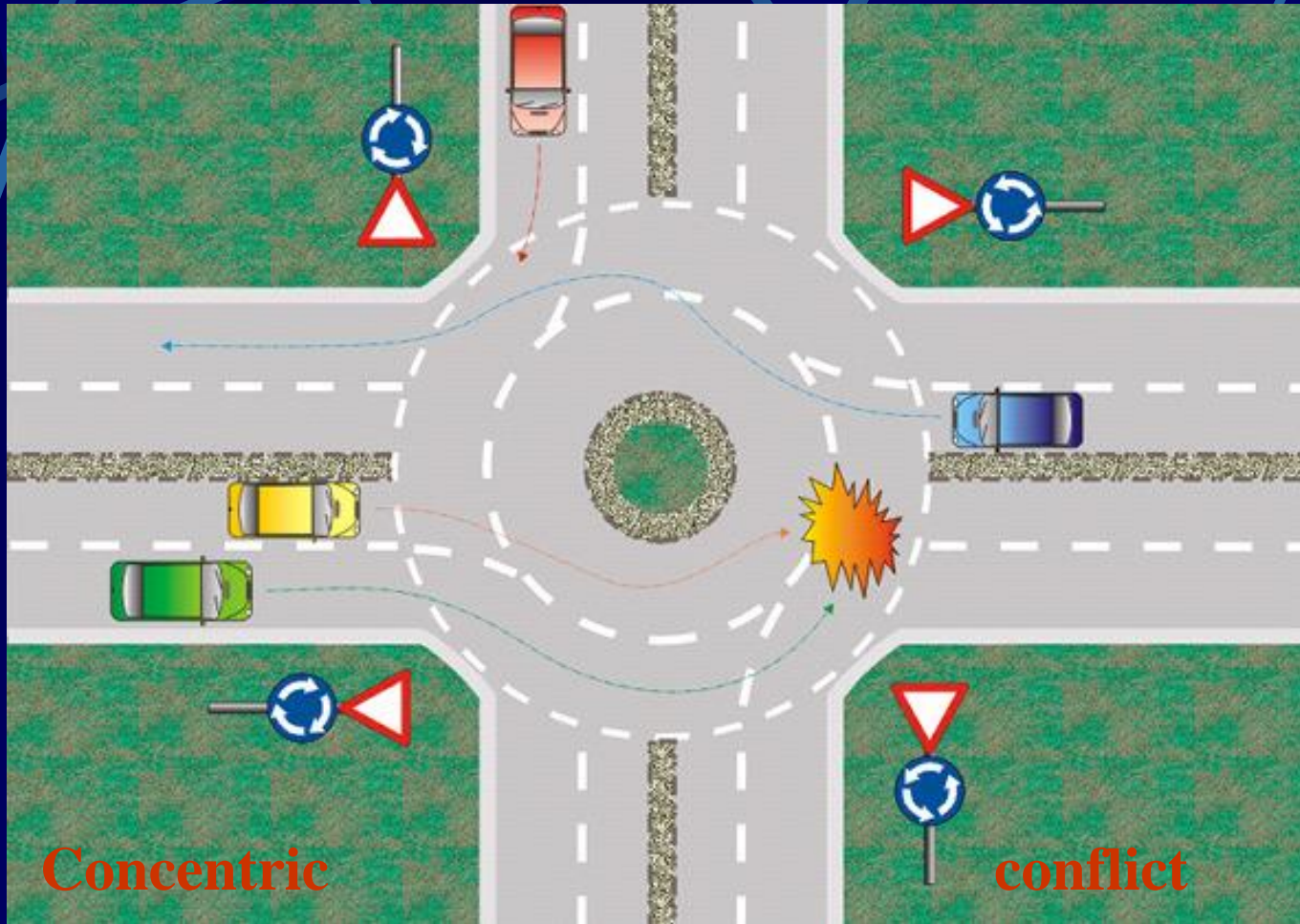
Below 10 m outer radius a painted central isle is sufficient.

The circular track width is 6,5 - 8 m including the viable ring.

The width of the circular track is in inverse proportion to the inner radius of the circular track.

Special attention is required for pedestrians and cyclists.

Specialities of „turbo” type roundabouts

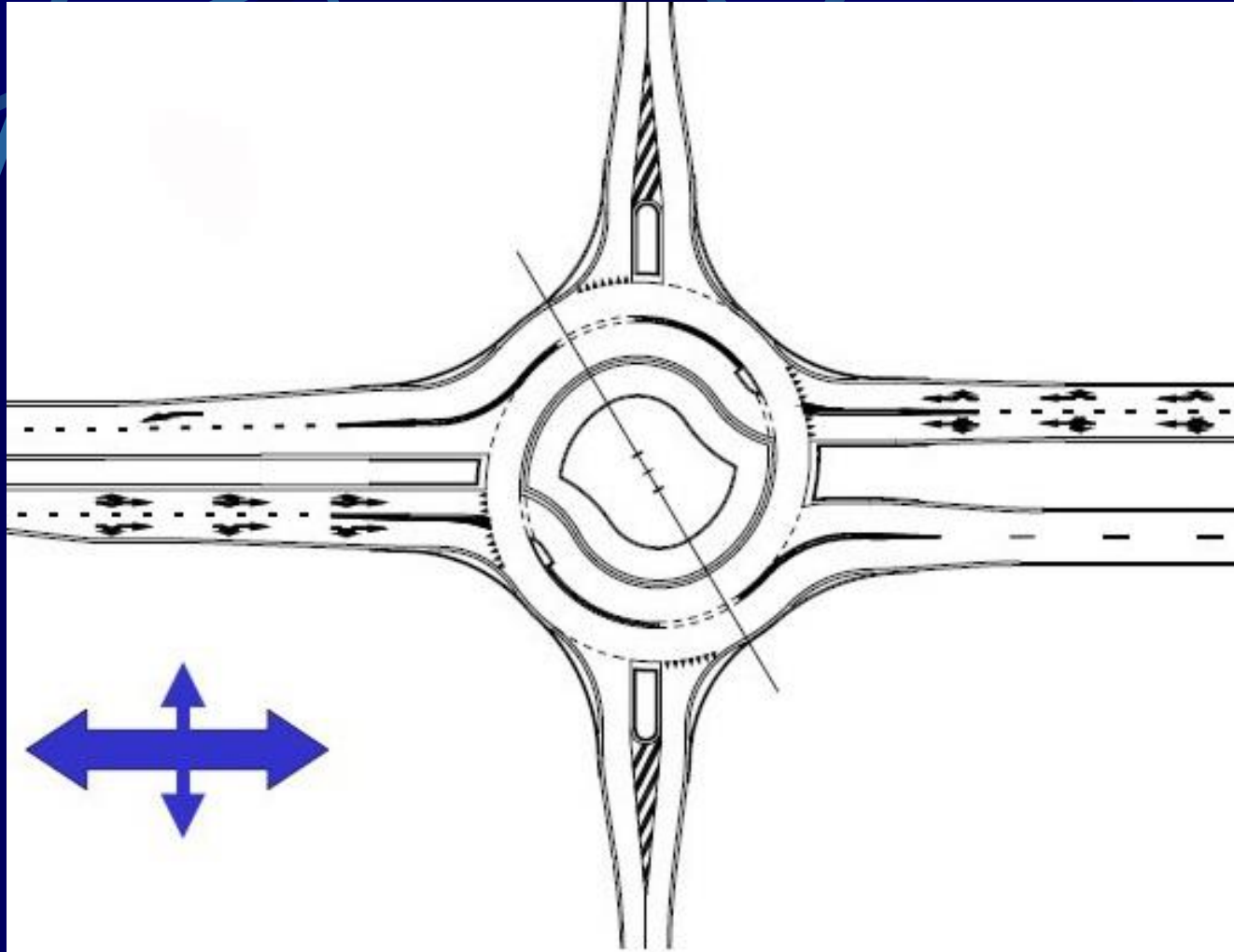


Specialities of „turbo” type roundabouts

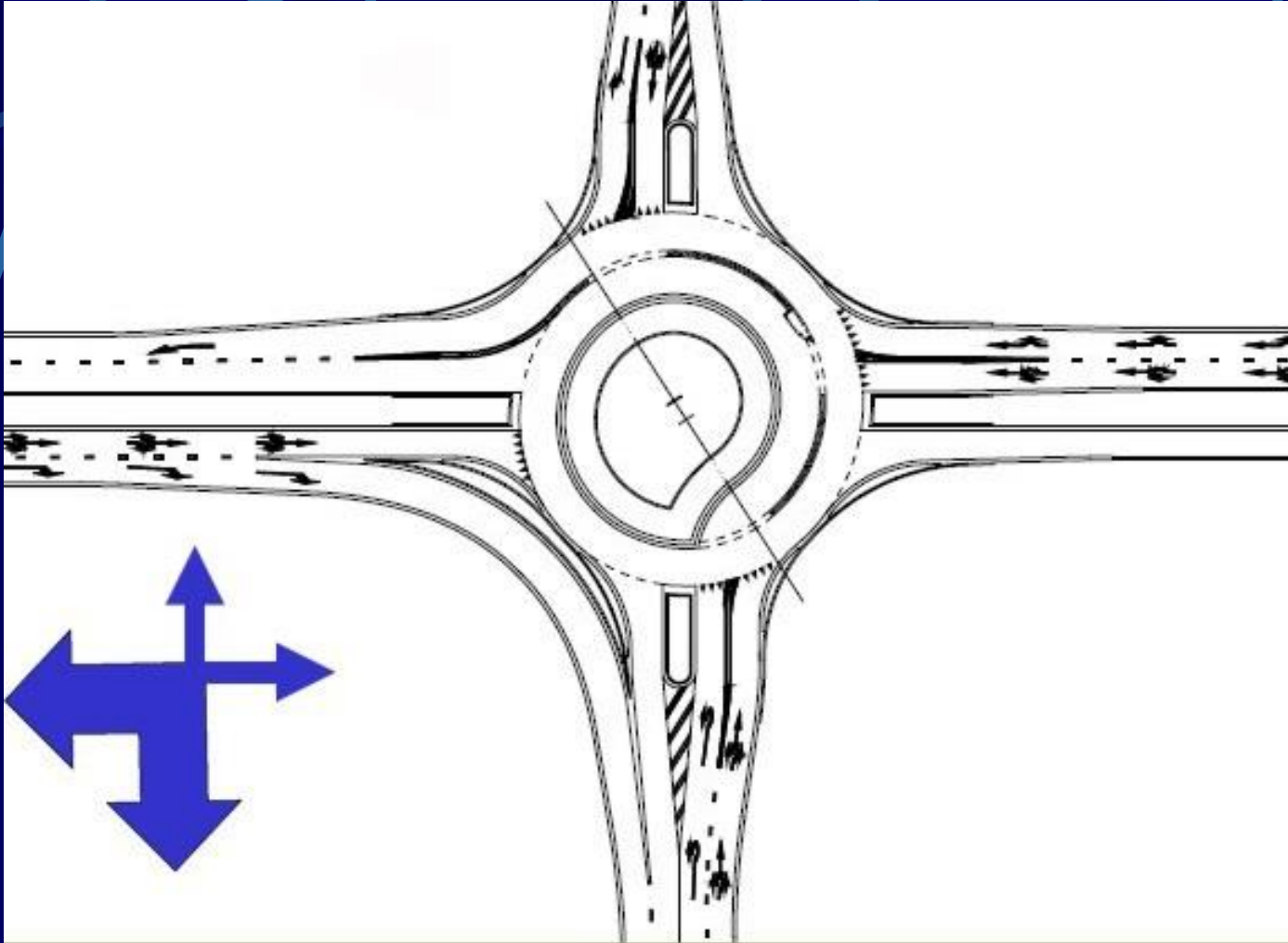
Solution: turbo type roundabout

- **Less conflict points, 10 in the turbo type instead of 16 in the concentric type.**
- **No lane changing, no weaving sections on the circular track.**
- **Drive in and drive out are independent and without obstacles.**
- **Clean priority situation.**
- **Similar saturation of lanes.**
- **Sum of entry capacity may reach 5000 pcu/h.**

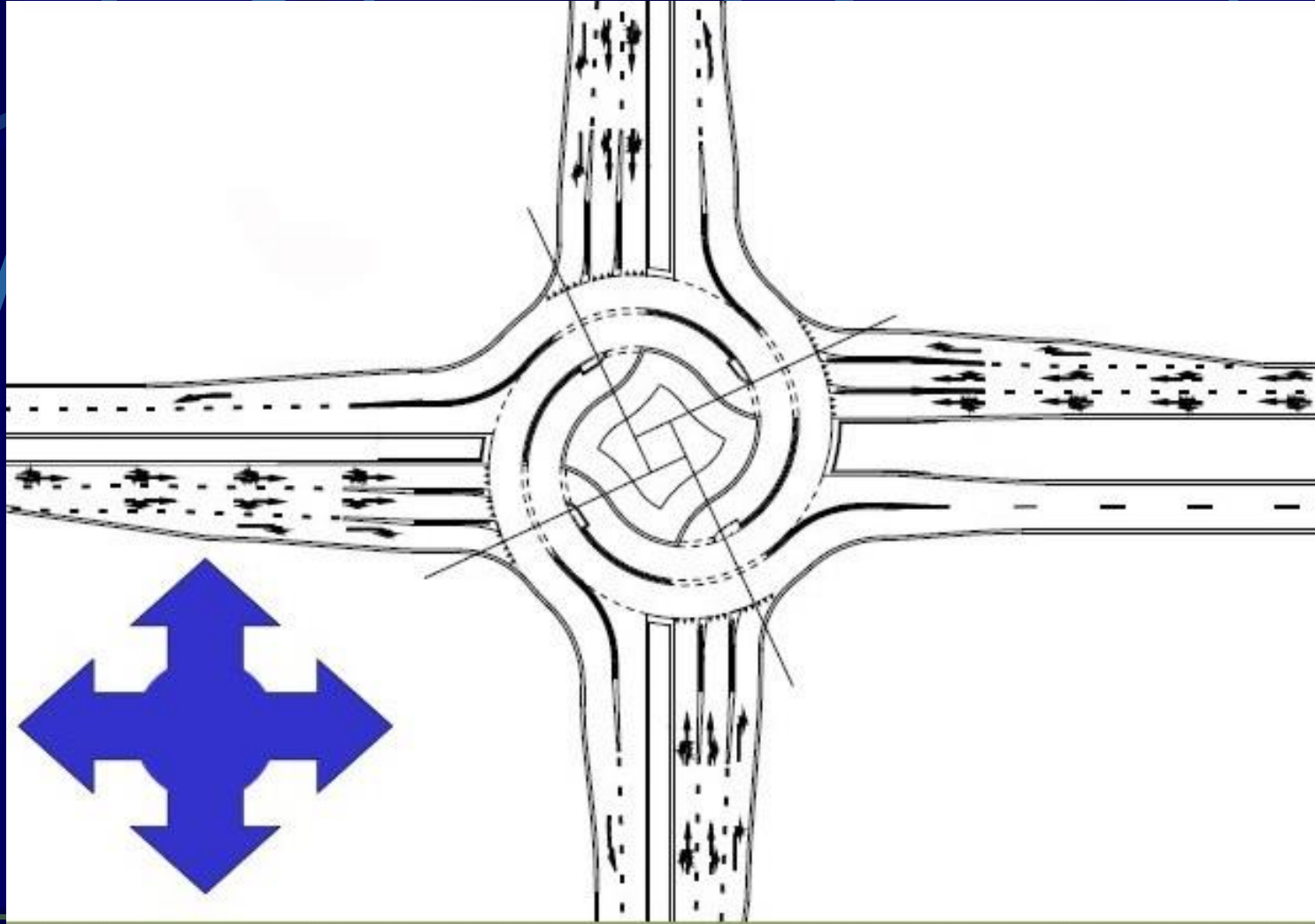
Specialities of „turbo” type roundabouts



Specialities of „turbo” type roundabouts



Specialities of „turbo” type roundabouts



Specialities of „turbo” type roundabouts



Kecskemét 52.

Signing system of roundabouts

Different roundabout types have obligatory standardised signing system (marks and signs).

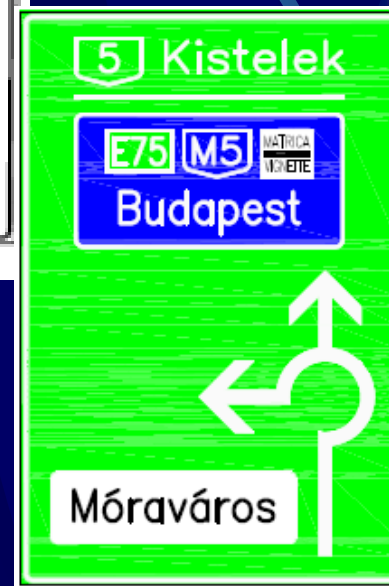
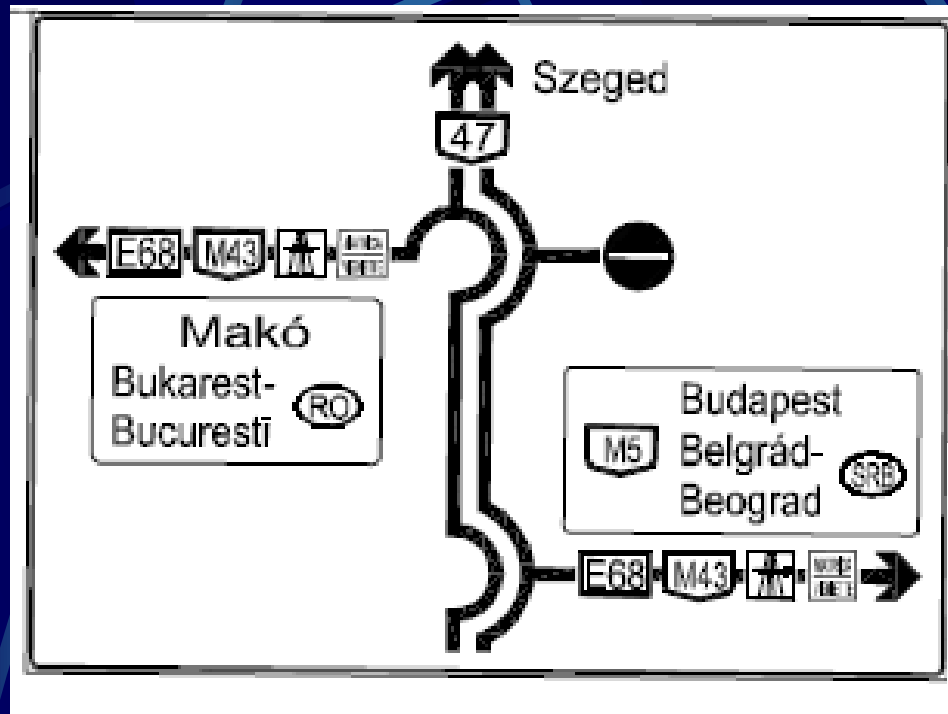
Direction tables are important for drivers.

The signing of concentric, spiral and turbo types requires special attention.

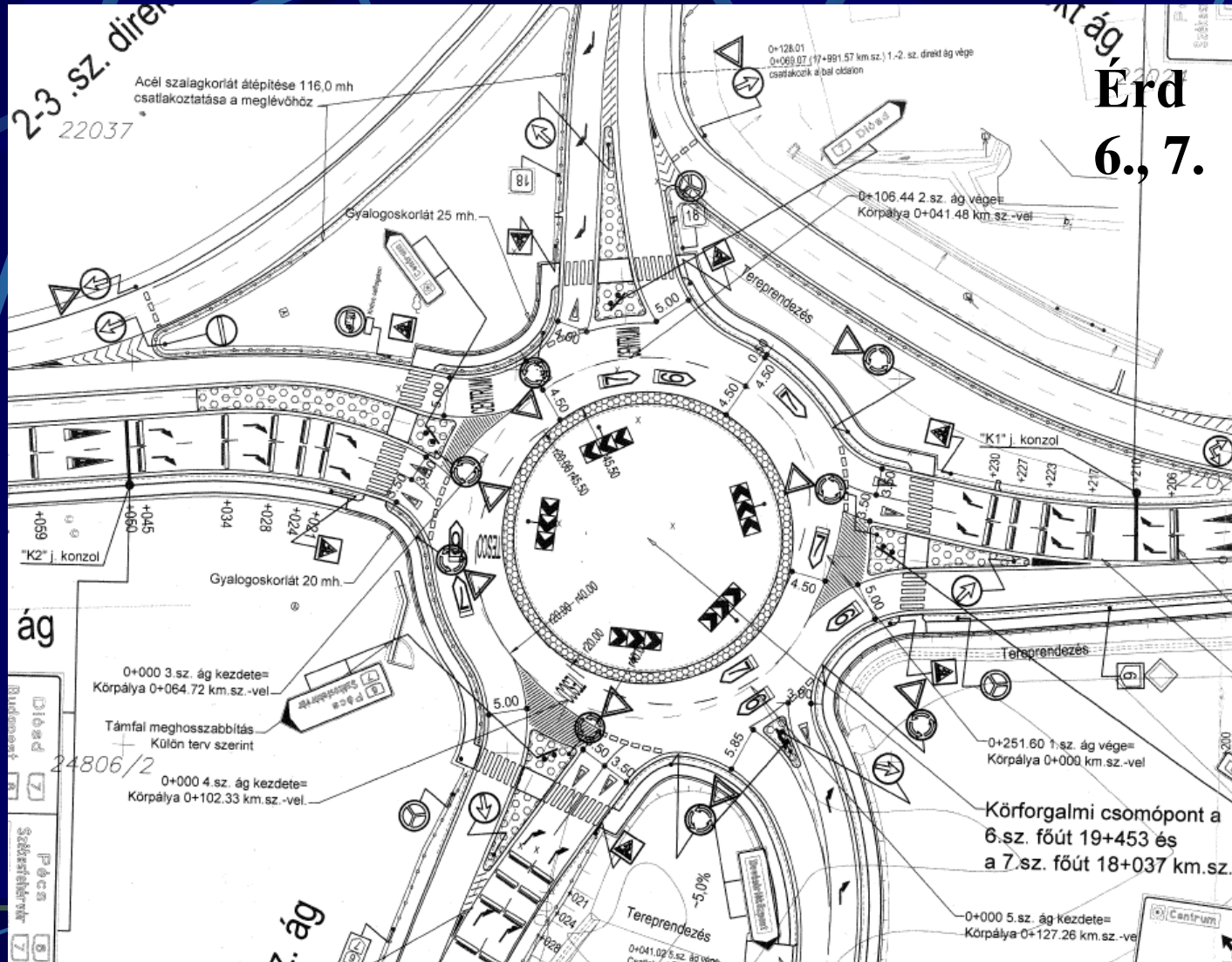
There is a need for dedicated pedestrian and bicycle crossings in the roundabout.

These crossings can be drawn back from the circular path in the legs leaving place for one vehicle in the entry zone.

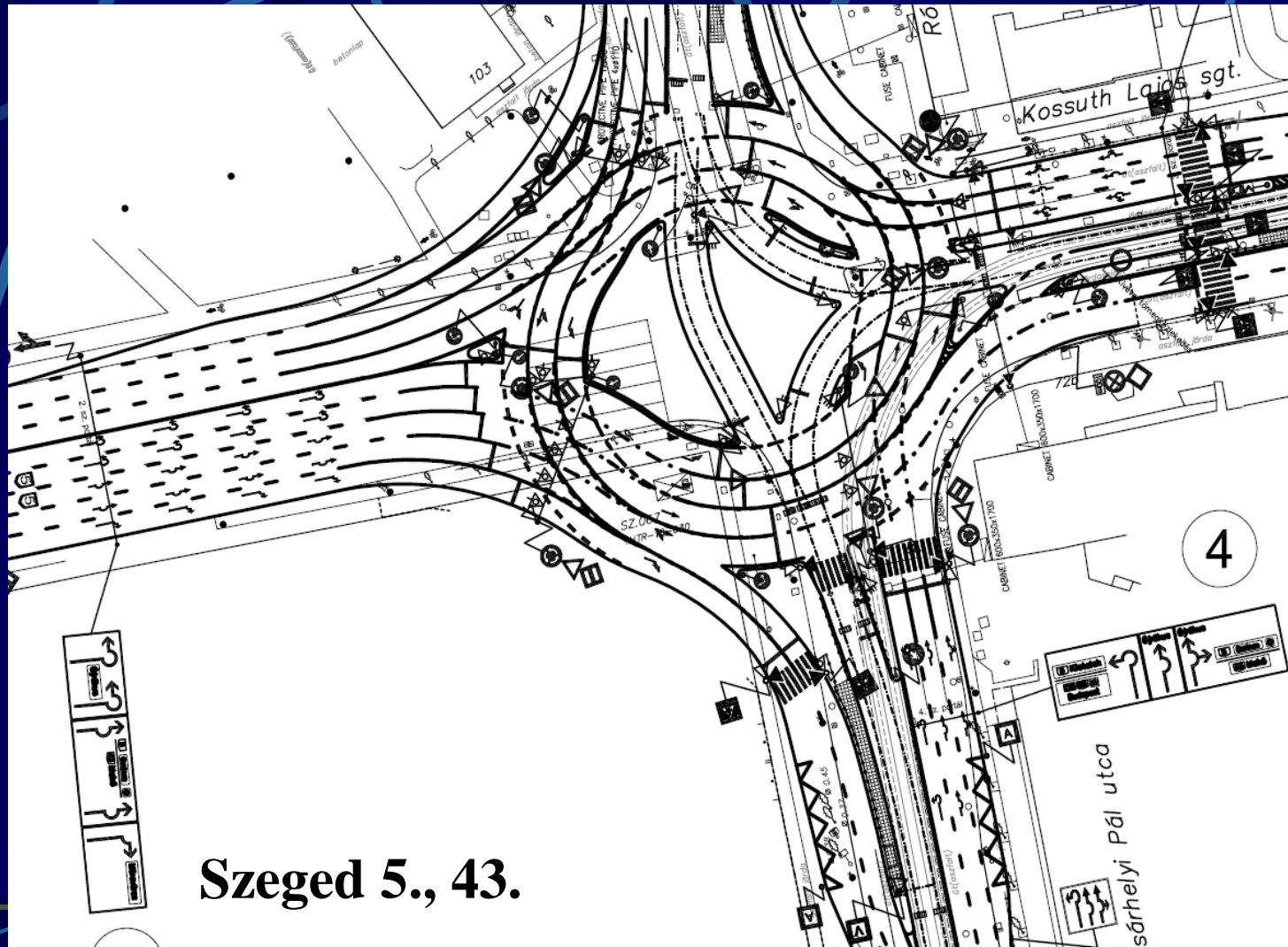
Signing system of roundabouts



Signing system of roundabouts



Signing system of roundabouts



Szeged 5., 43.

Examples for roundabouts

Esztergom 5 legs



Photo: Deák-Kapusi

Examples for roundabouts

Tatabánya 4 legs

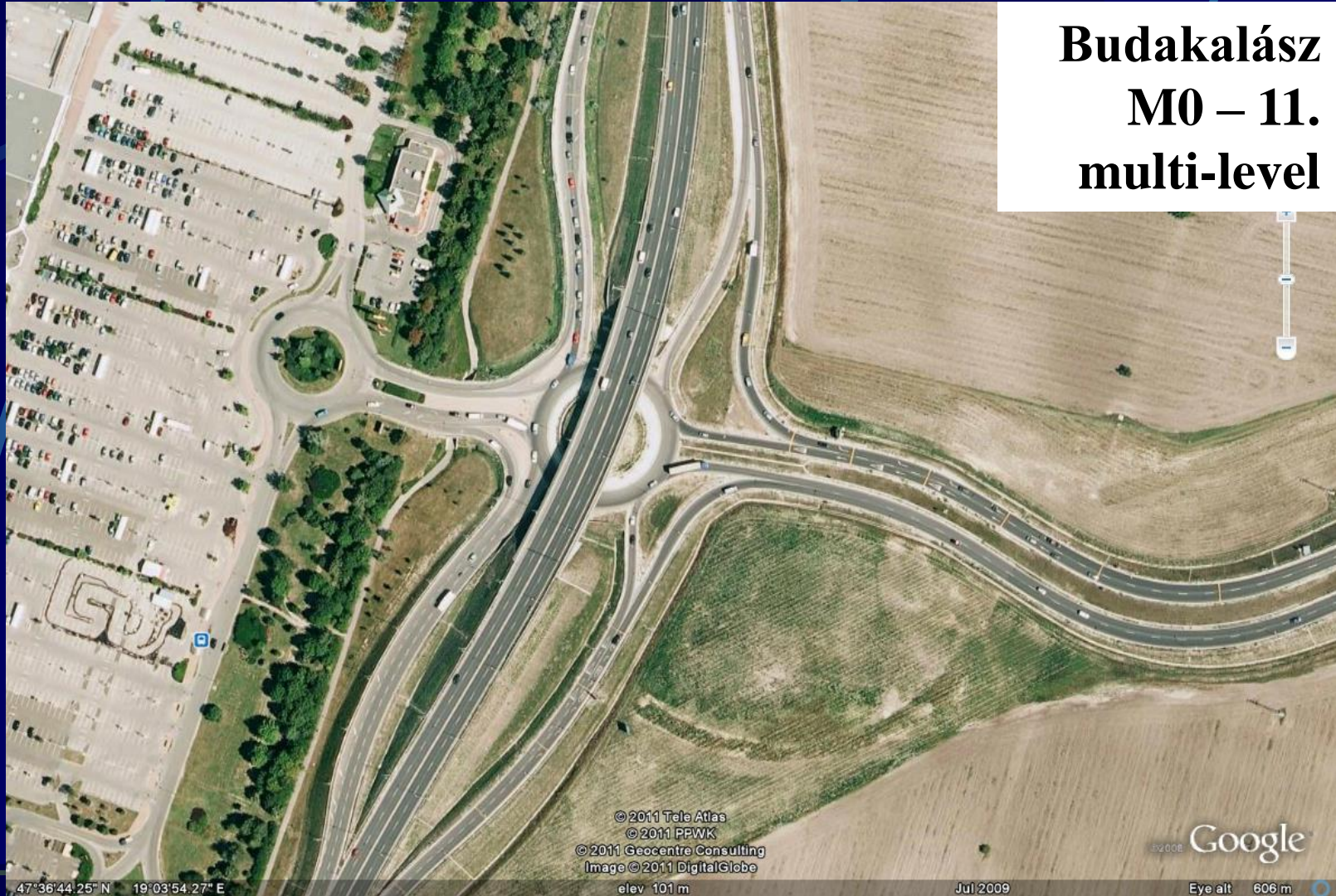
Simulation video



Examples for roundabouts



Examples for roundabouts



**Budakalász
M0 – 11.
multi-level**

© 2011 Tele Atlas
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© 2011 Geocentre Consulting
Image © 2011 DigitalGlobe

Google

47°36'44.25" N 19°03'54.27" E

elev 101 m

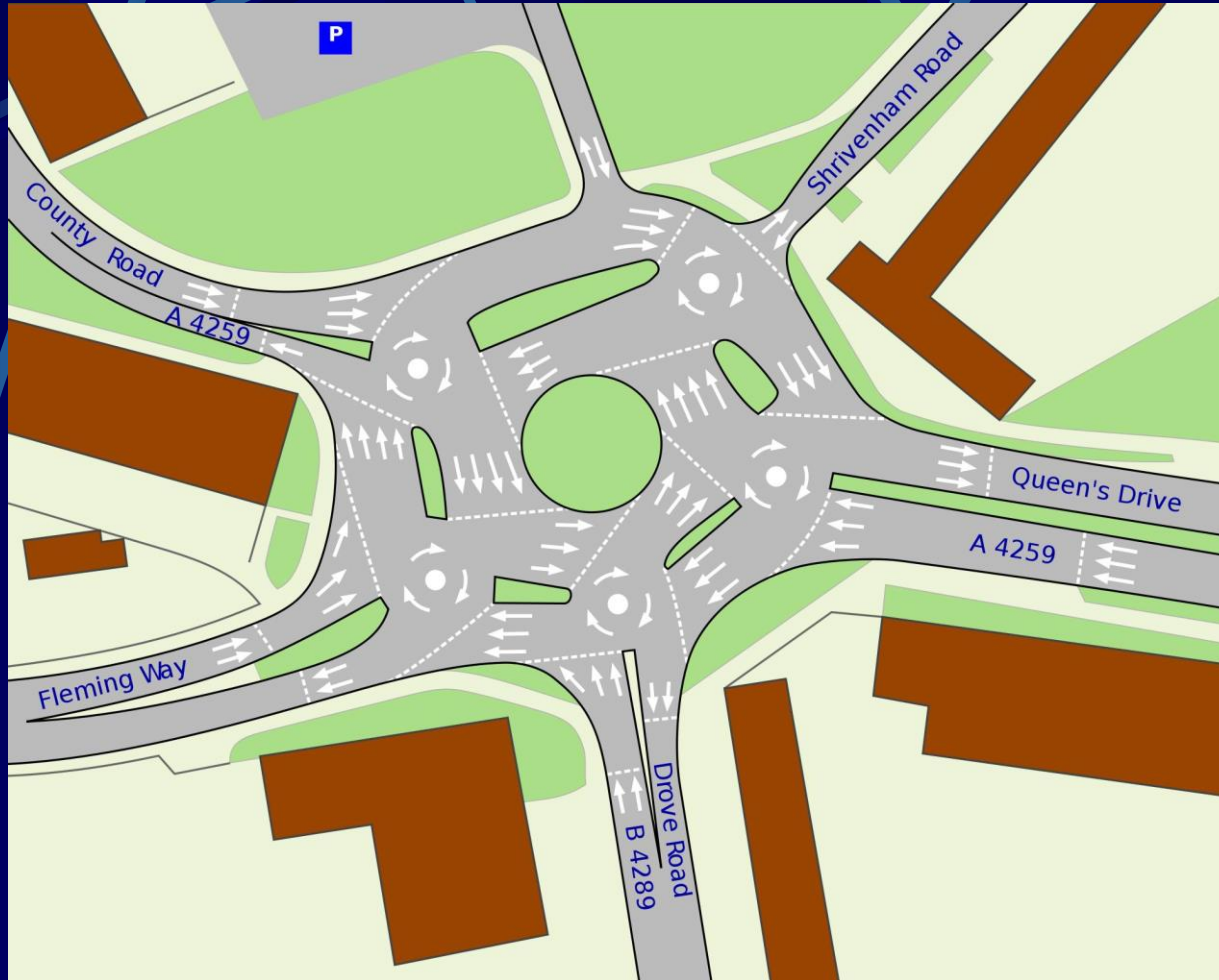
Jul 2009

Eye alt 606 m

Examples for roundabouts

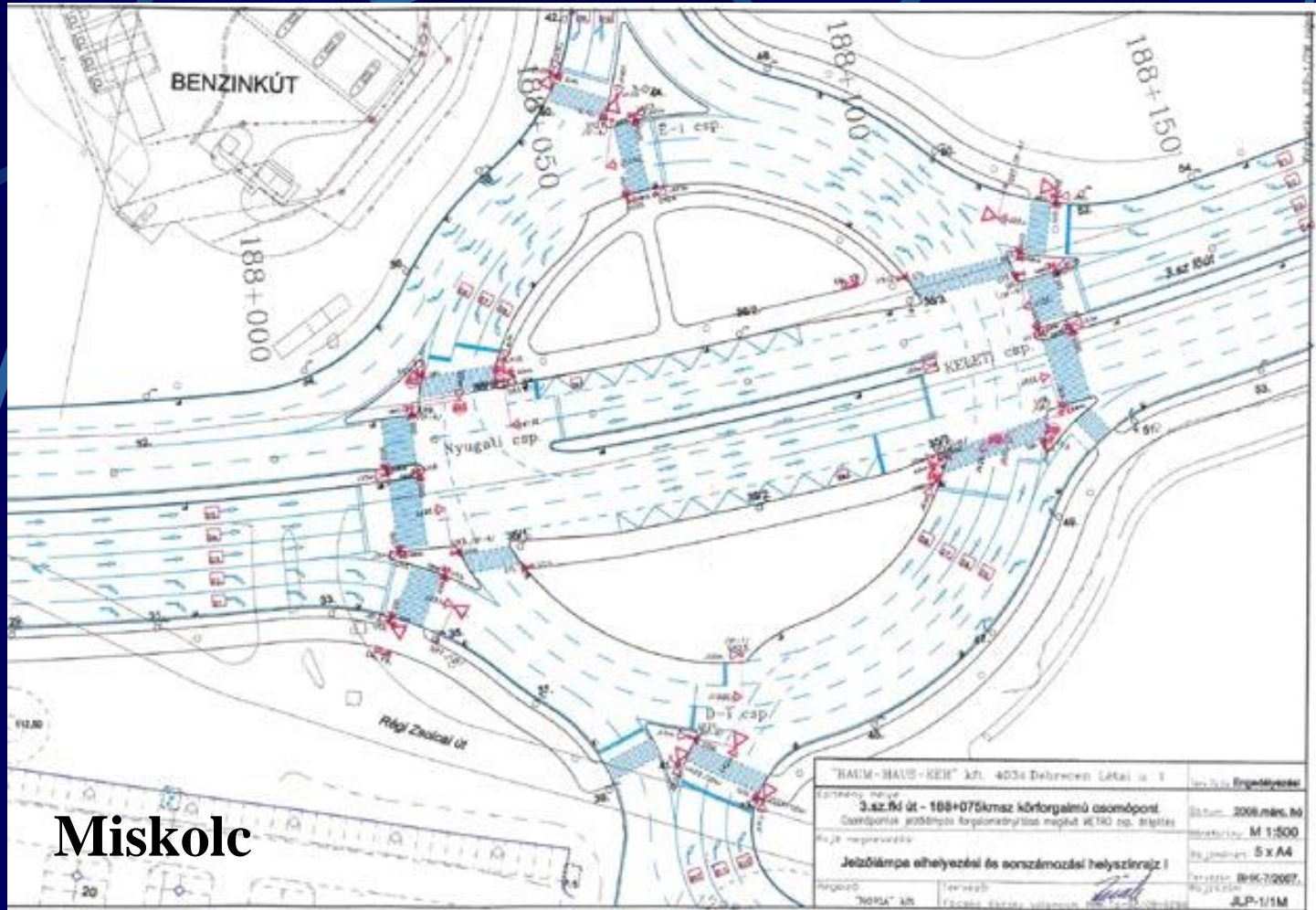


Examples for roundabouts



„Magic”
roundabout
Swindon
England

Examples for roundabouts



Miskolc

signalised multi-lane circle-like geometry

Summary

Traffic safety in roundabouts is usually better.

A roundabout has a special geometry and signing.

Recognisability and perceptibility are important.

The safe passage of oversized vehicles must be considered.

A well designed roundabout may have an urban structural and space forming role.

In the turbo type roundabout the directions go through without lane changing.

Special attention is required for pedestrians and cyclists.

Thank you for your attention!

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