

# Workshop Roundabouts Australia

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Australia March 2015



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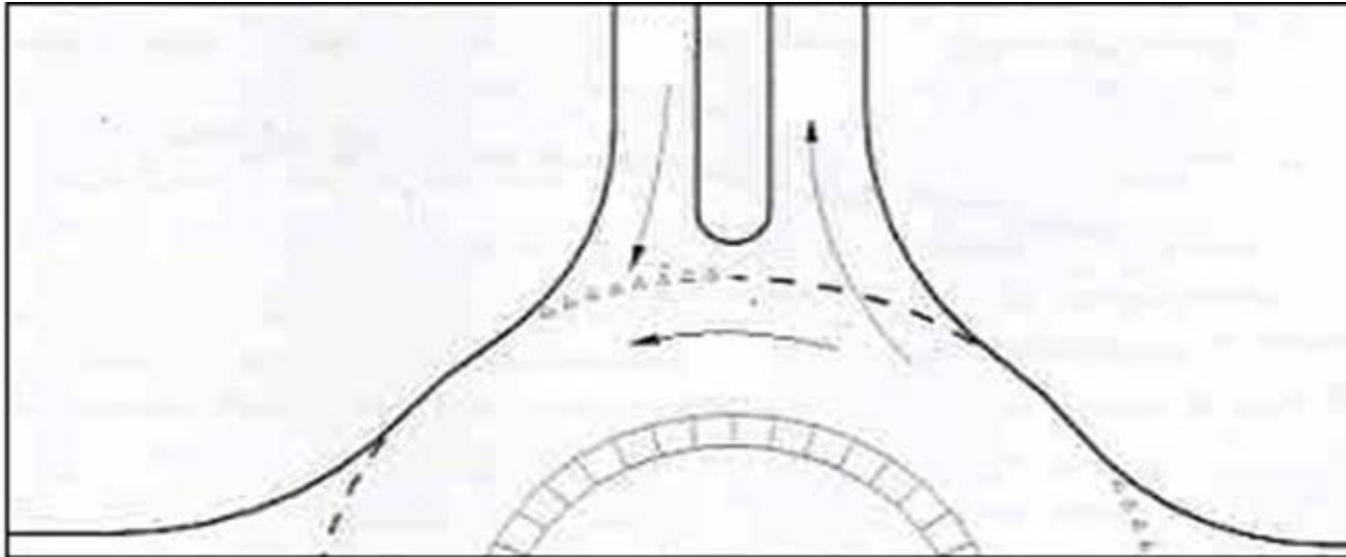
# Why built roundabouts?

- High capacity
- Safe



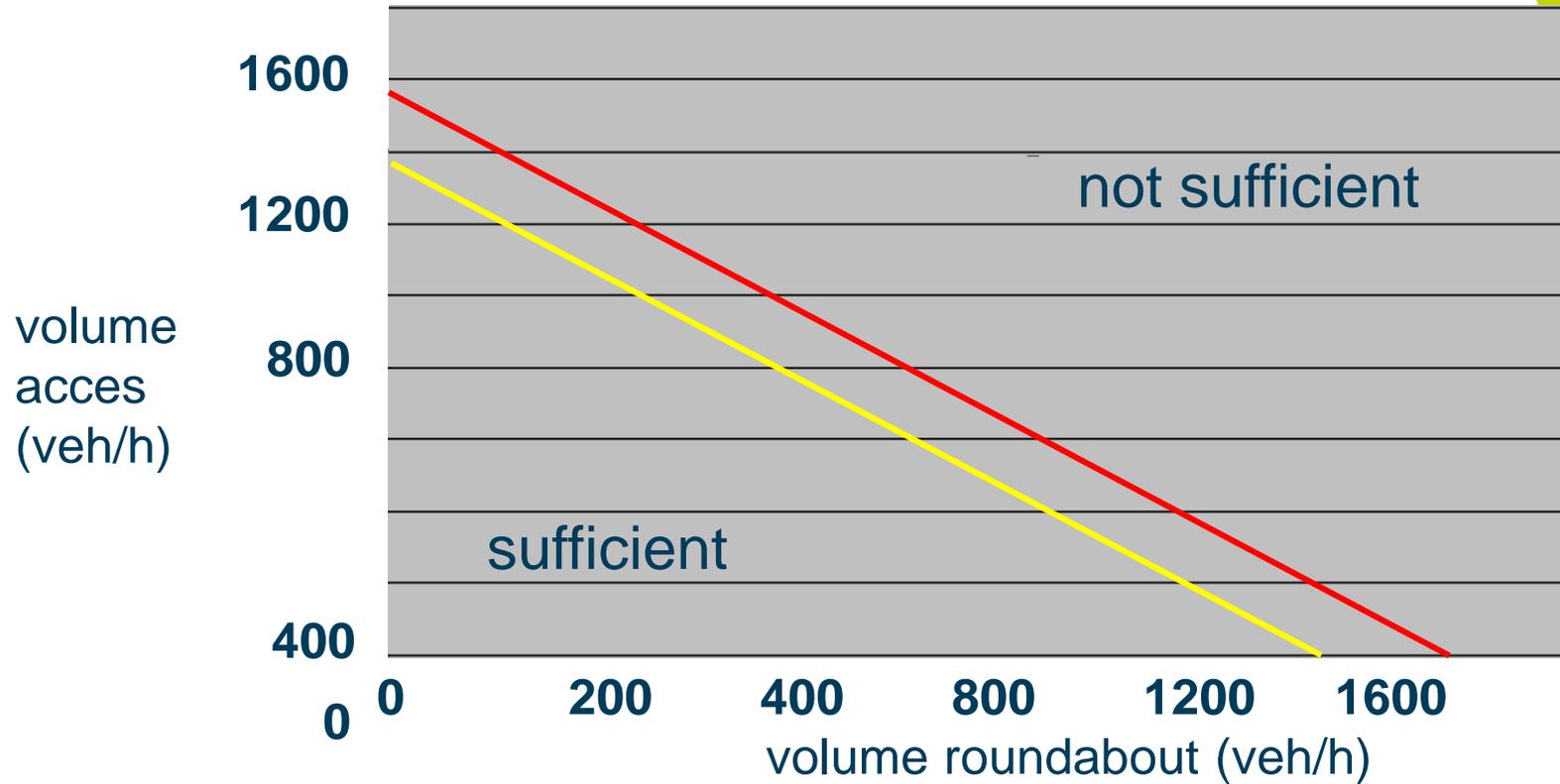
# Capacity 1

- Typical capacity per type of roundabout
  - single lane roundabout 25.000 veh/24h
  - two-lane roundabout, single lane exits 30.000 veh/24h
  - two-lane roundabout, two-lane exits 40.000 veh/24h
  - turbo roundabout 60.000 veh/24h



# Capacity 2

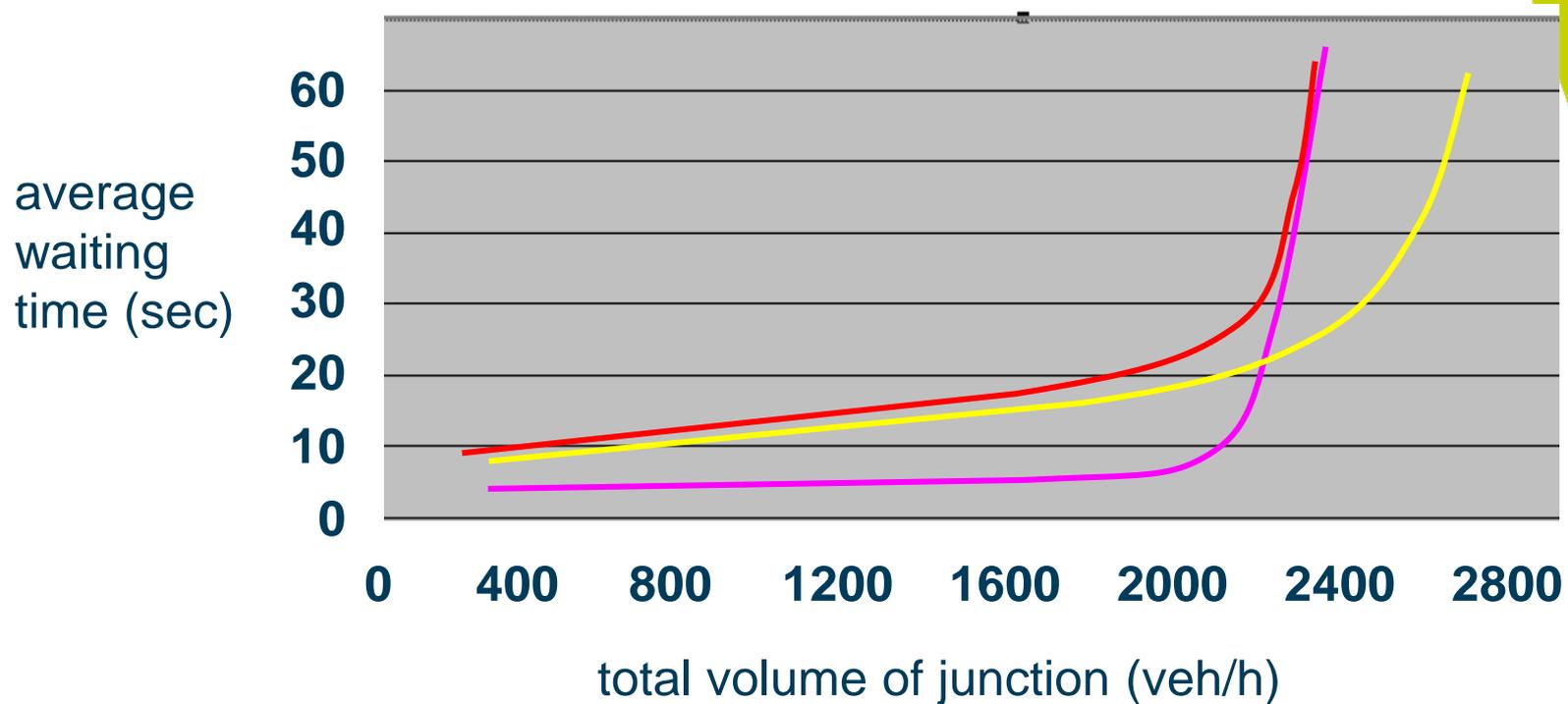
## Monogram capacity of single-lane roundabout



- maximum capacity
- average waiting time < 20 sec

# Capacity 3

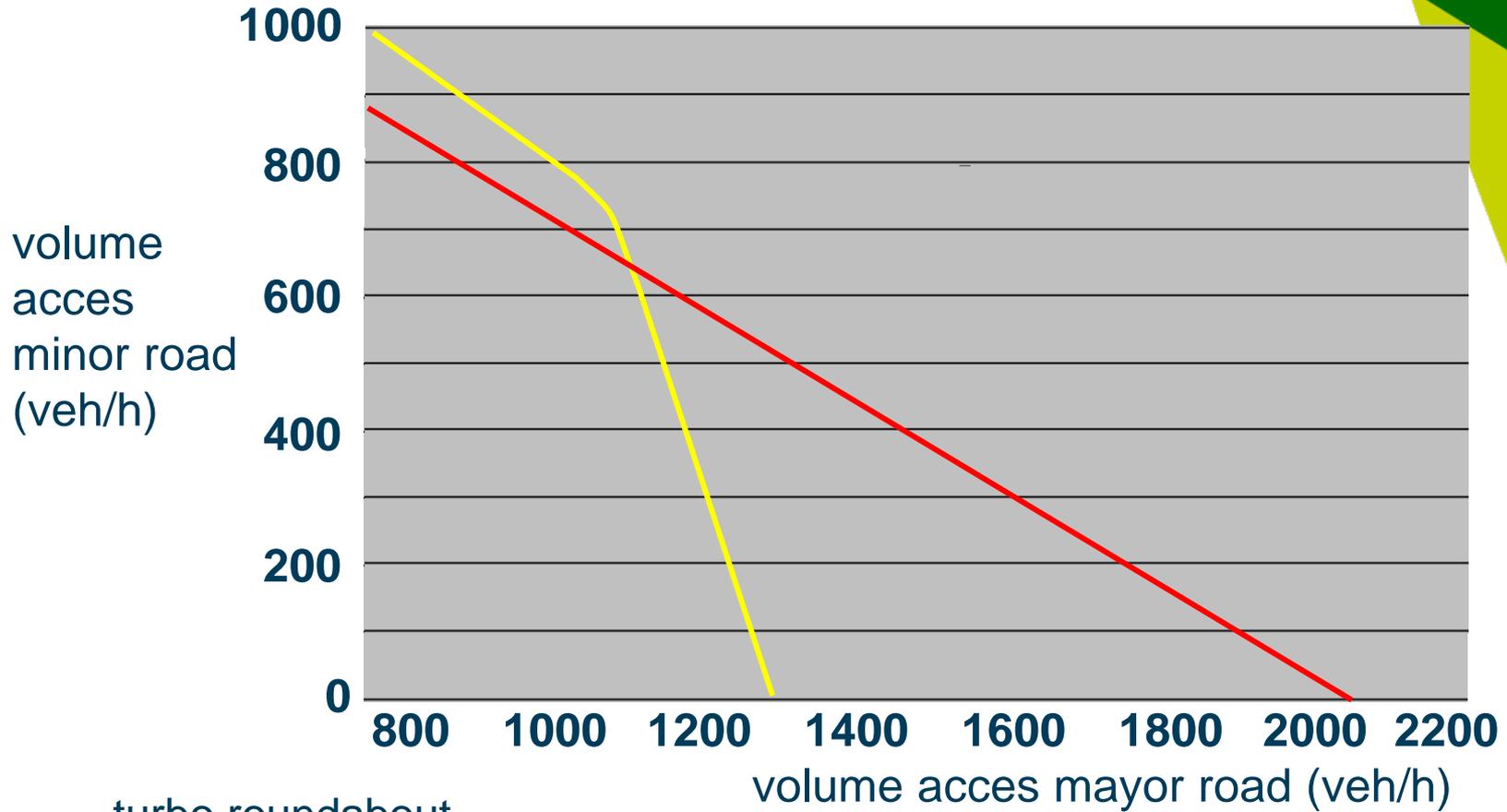
Waiting time main road



- roundabout
- junction with traffic lights (1+1 lanes)
- junction with traffic lights (2+1 lanes)

# Capacity 4

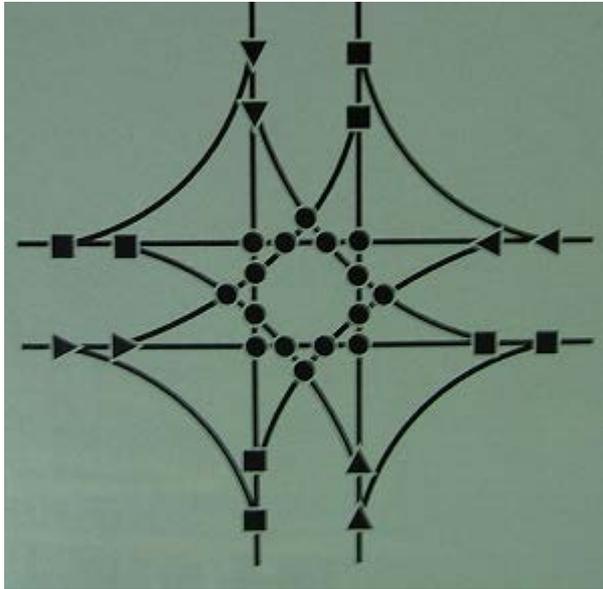
Multi-lane roundabout



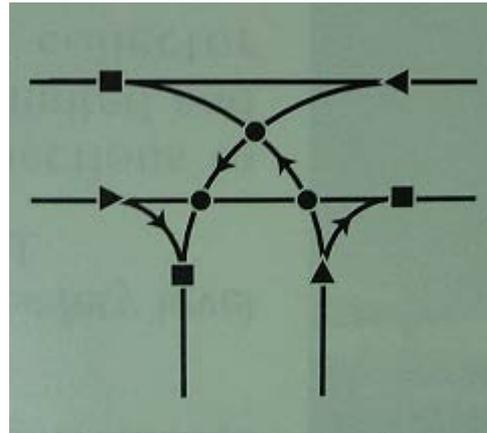
- turbo roundabout
- single lane roundabout

# Safety 1

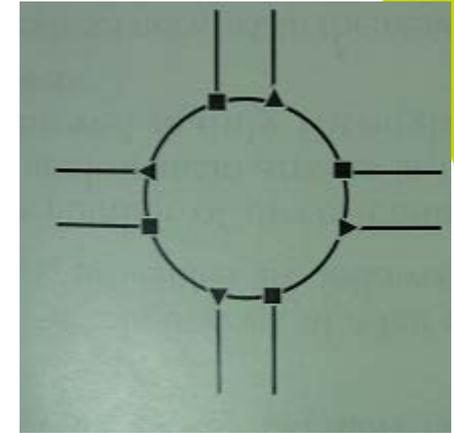
- Main safety advantages of roundabouts
  - actual speed is low
  - the number of conflicts is reduced
  - no crossing conflicts
  - predictable behavior (keeping lanes)



32 conflicts



9 conflicts



8 conflicts

▲ diverging      ■ merging      ● crossing

# Safety 2

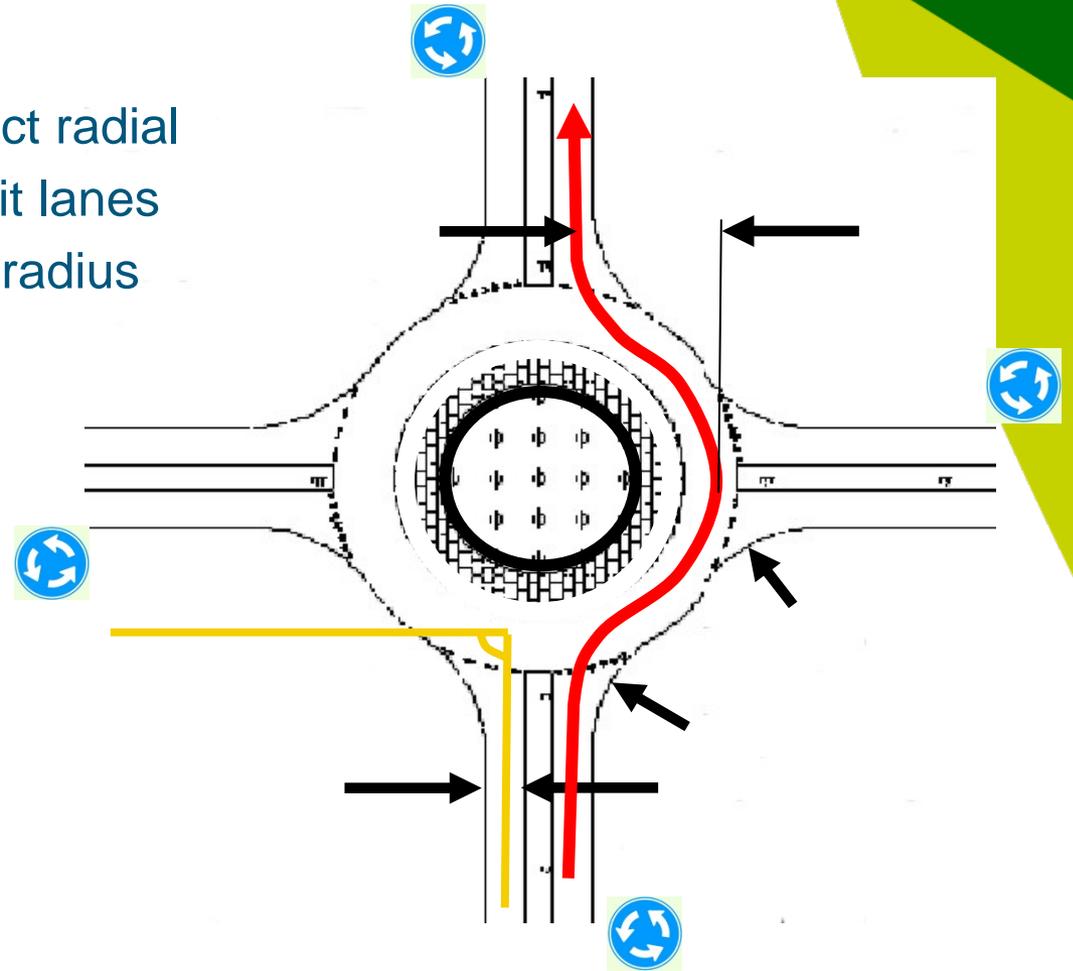
- Risk figures

Type of junction Inside build up area	Accidents with injuries per million motor vehicle kilometers	Victims per accident with injuries	Fatalities per victim
3 legs with traffic lights	0,13	1,21	0,04
4 legs with traffic lights	0,15	1,19	0,05
3 legs without traffic lights	0,09	1,92	0,07
4 legs without traffic lights	0,08	1,56	0,06
<b>roundabout (without traffic lights)</b>	<b>0,06</b>	<b>1,18</b>	<b>0,04</b>

# Safety 3

## Important aspects:

- Inform road user in time
- Entrances should connect radial
- Narrow entrance and exit lanes
- Small entrance and exit radius
- Wide bend out
- Raise central island



# Safety 4

## Example



# Bicycle friendly roundabout design 1

- Safe: Low speed
  - Speed hump



# Bicycle friendly roundabout design 2

- Safe: Blind spot



# Bicycle friendly roundabout design 3

- Priority: Single lane roundabout

Outside build-up area  
Priority to cars

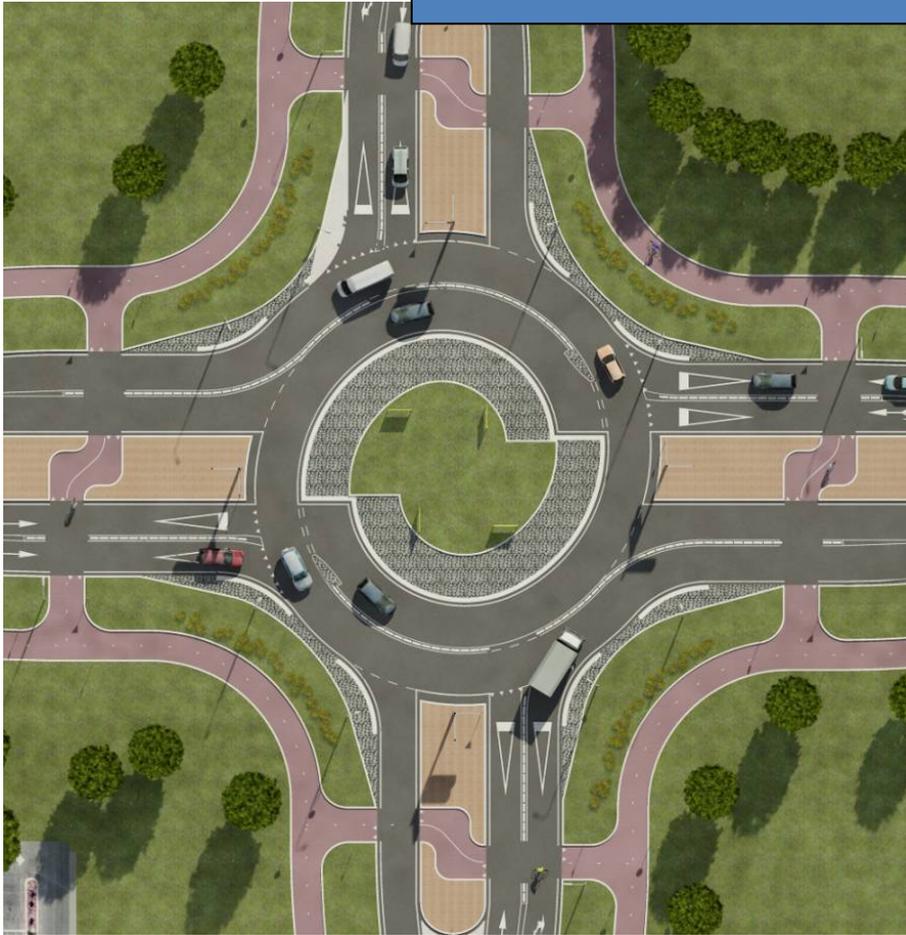
Inside build-up area  
Priority to bicycles



# Bicycle friendly roundabout design 4

- Priority: Turbo roundabout

Give way to CARS

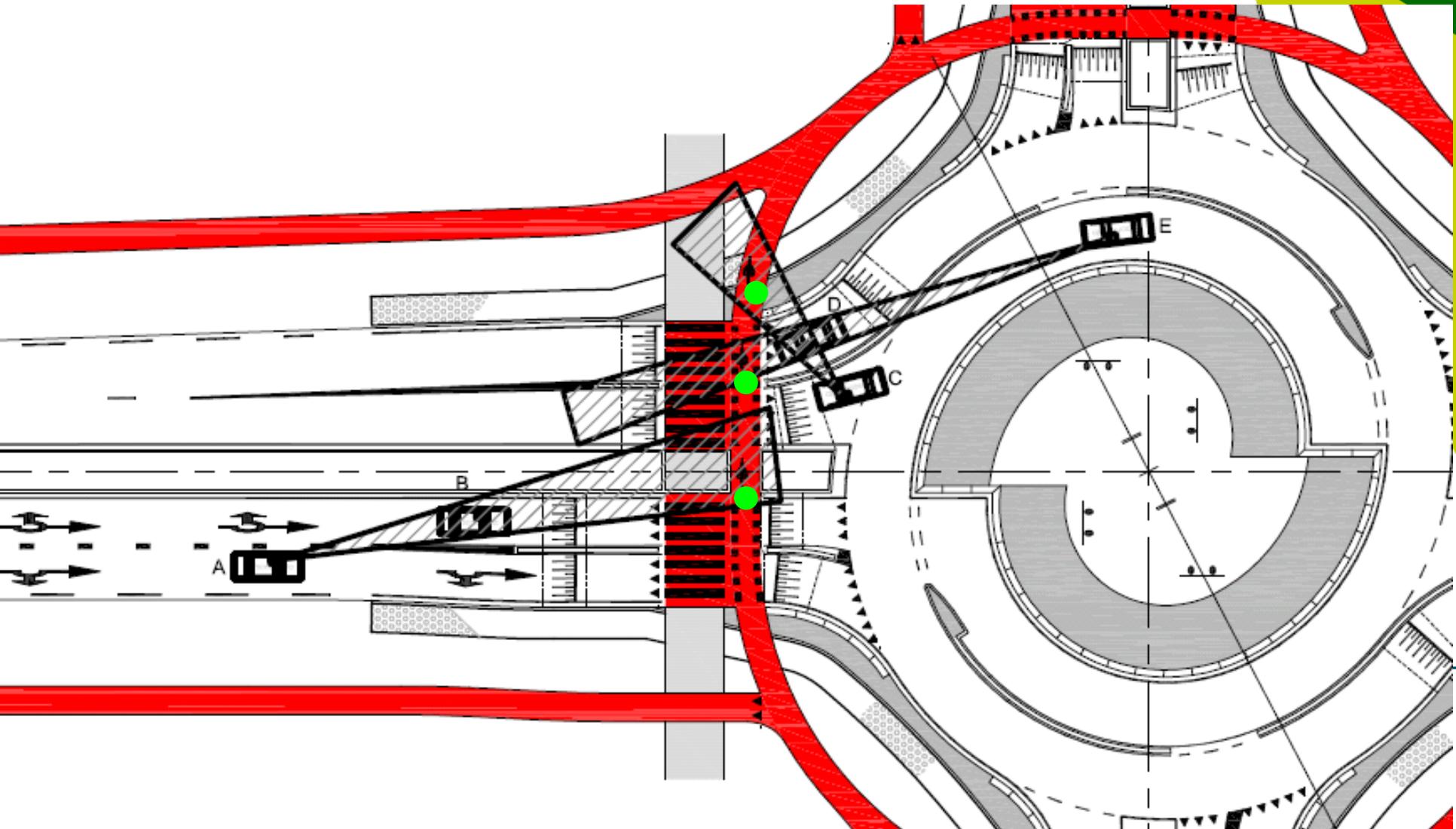


Give way to BICYCLES



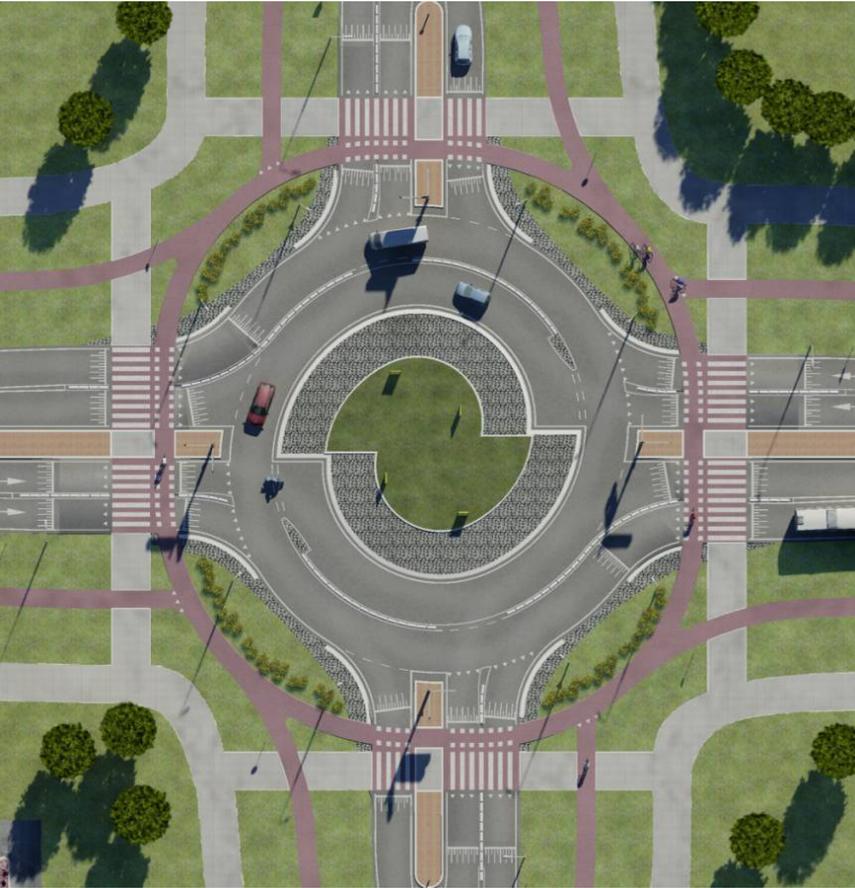
# Typical accident type

- On turbo roundabouts with give way to **BICYCLES**:
- Bad visibility due to other cars



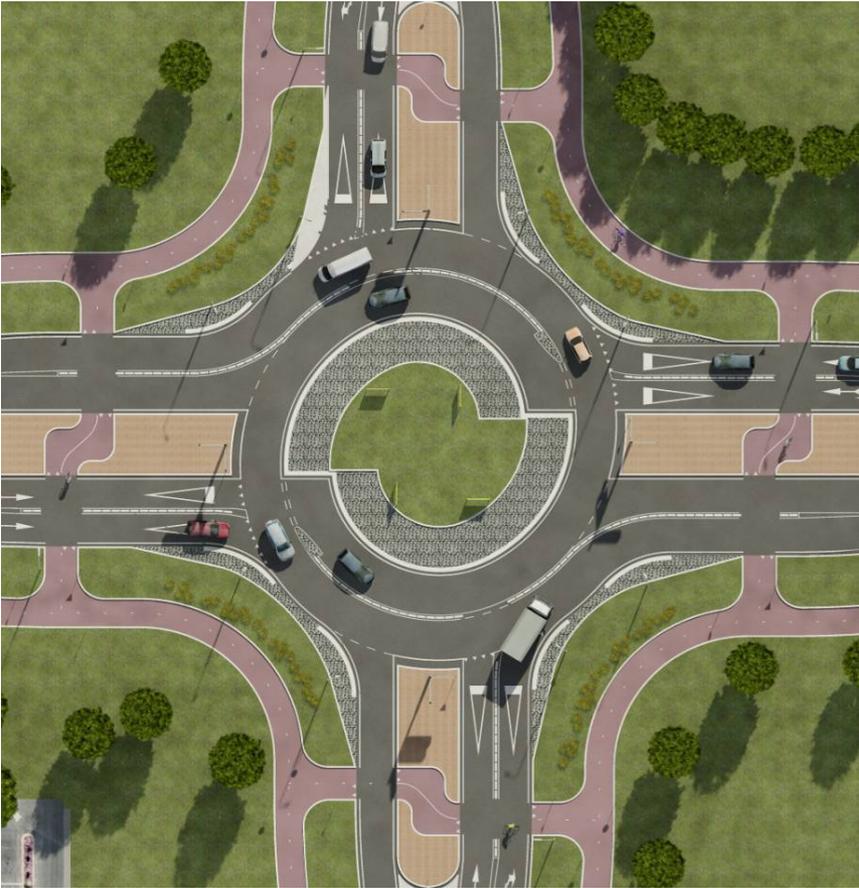
# Bicycle crossing 1

- With give way to **Bicycles**:
  - Smooth flow
  - On going coloured surface



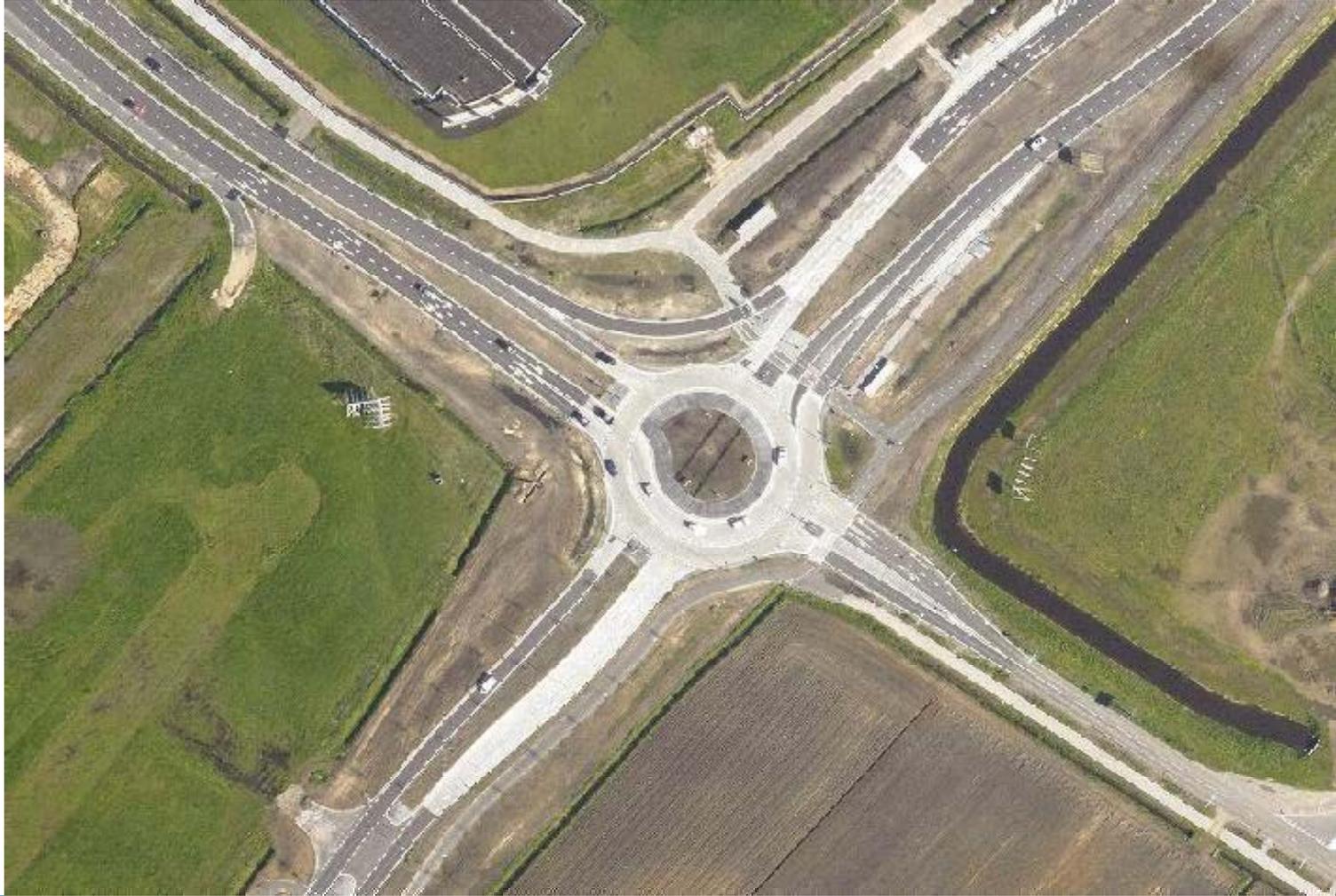
# Bicycle crossing 2

- With give way to **CARS**:
  - Zig zag
  - No coloured surface



# Spatial need turbo roundabout

- Reconstruction junction with traffic lights → turbo roundabout



In-company training Bicycle Traffic Planning and Design

Workshop Roundabouts Australia | Australia March 2015



# Royal HaskoningDHV and roundabouts

Turborotondes

CROW



ROYAL HASKONING DHV

Roundabouts - Application and design  
A practical manual

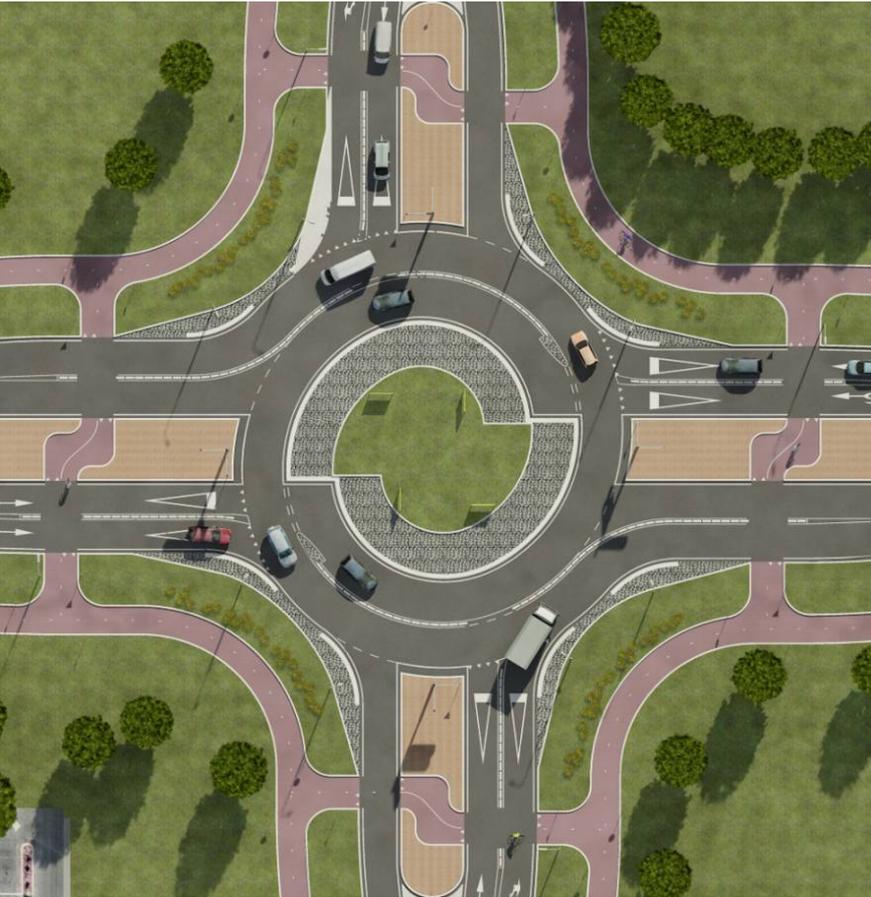
Ministry of Transport, Public Works and Water management  
Partners for Roads  
June 2009

Gateway to solutions



# Roundabout types:

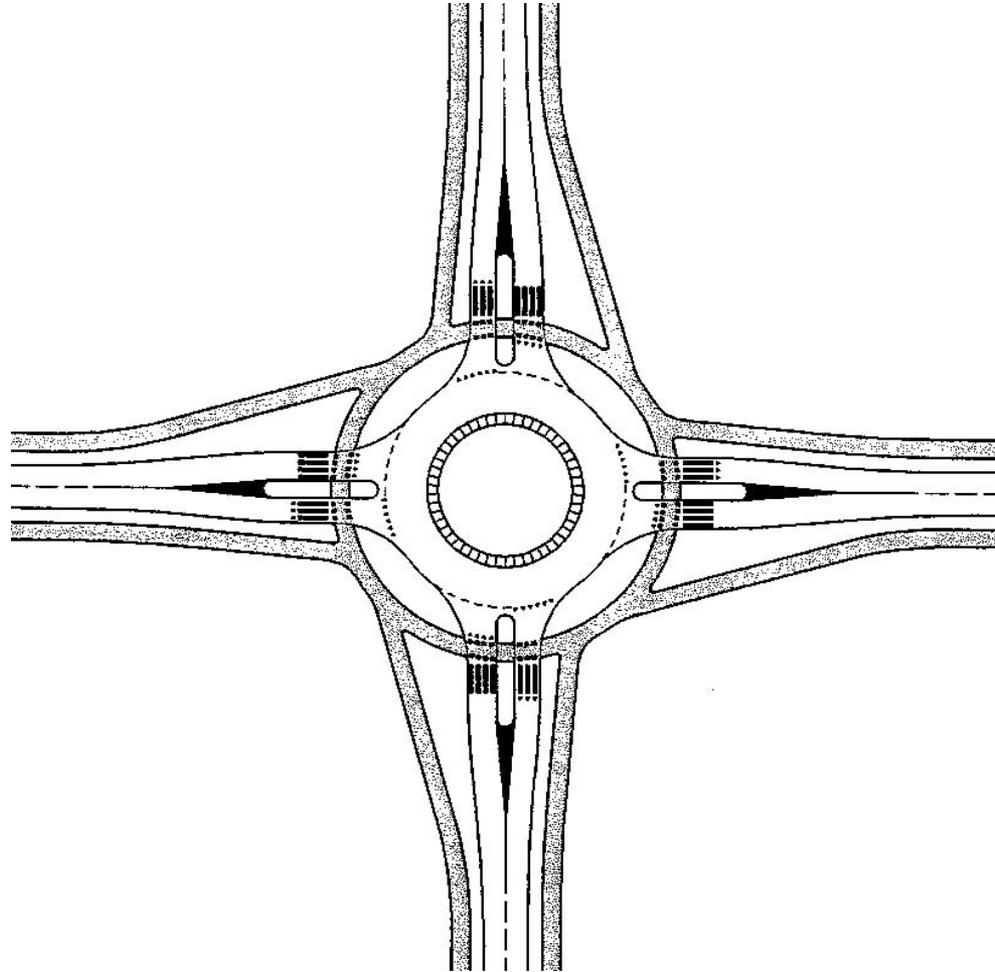
Multi lane roundabout:



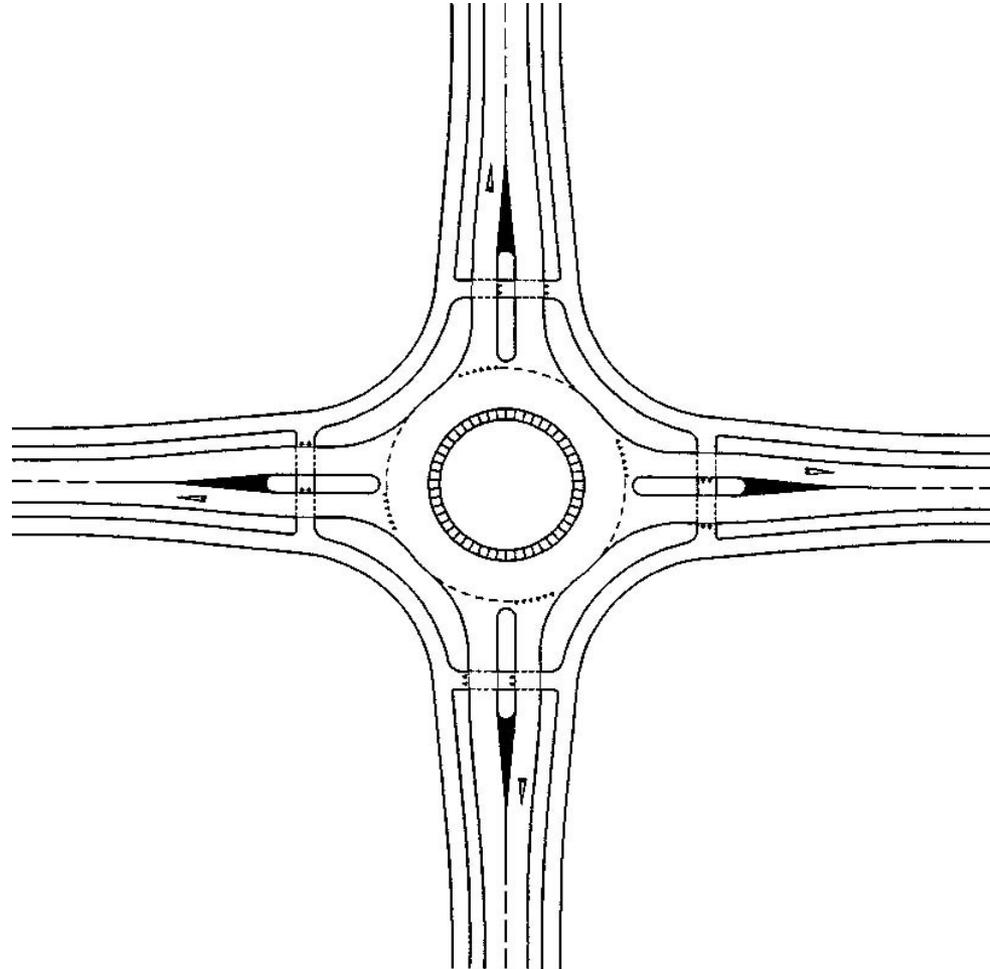
Single lane roundabout:



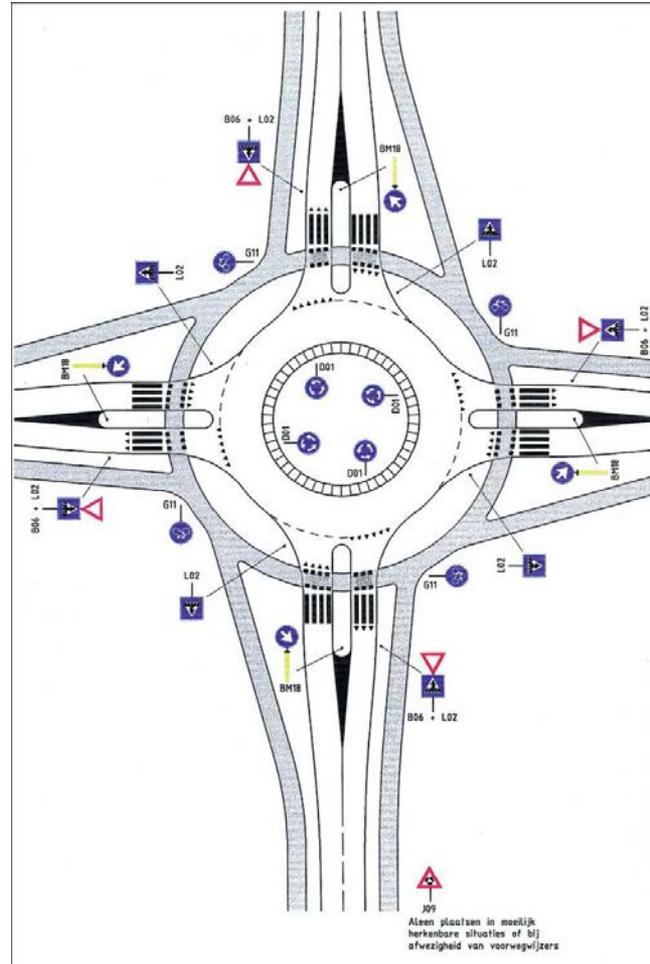
# Roundabout types: single lane with priority



# Roundabout types: single lane without priority

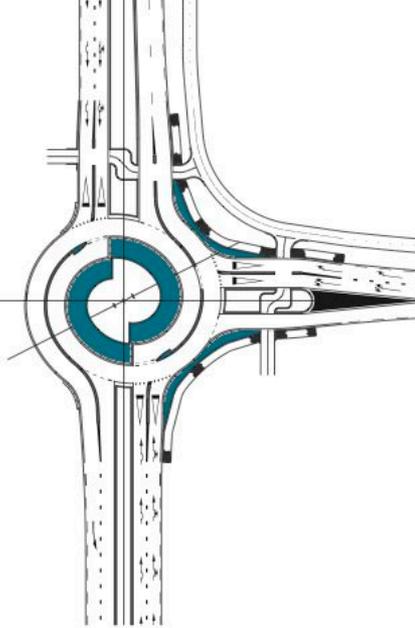


# Roundabout types: single lane with signage

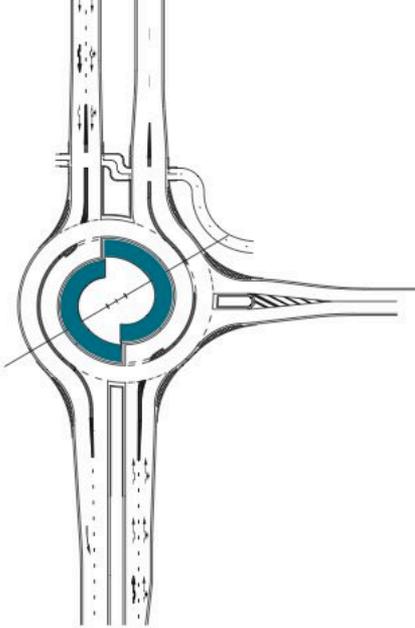


# Roundabout types

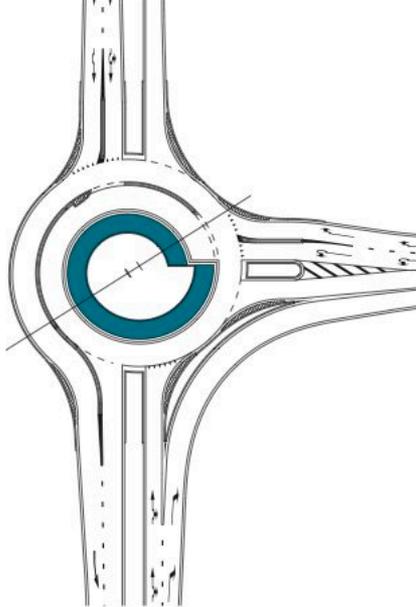
**Basis turborotonde  
(drietaks)**



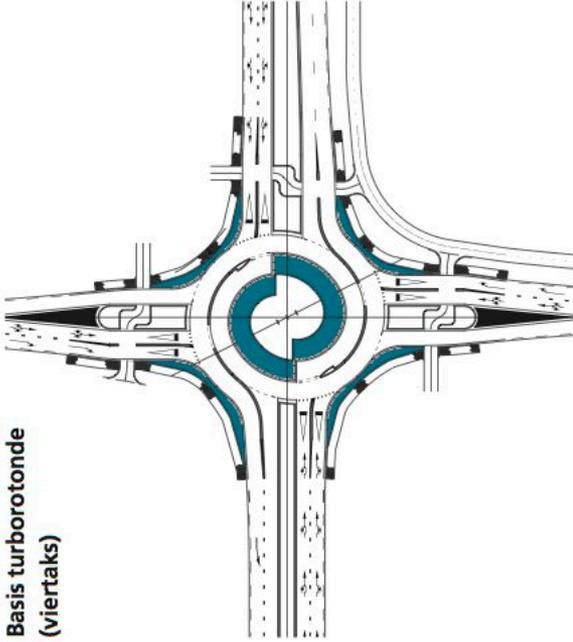
**Eirotonde  
(drietaks)**



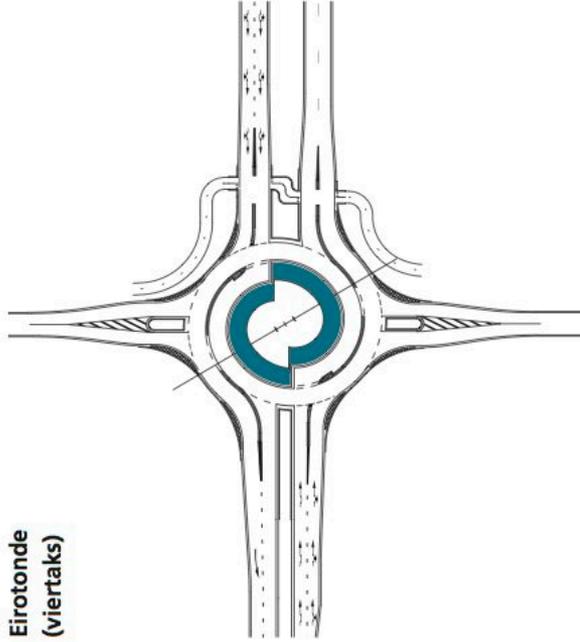
**Knierotonde  
(drietaks)**



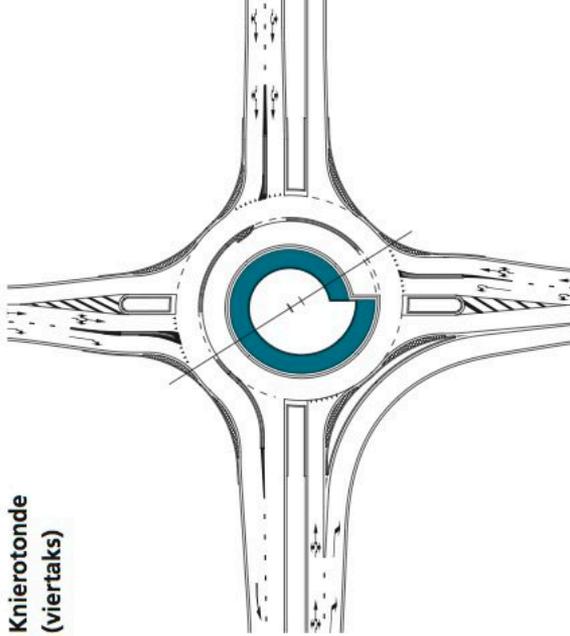
**Basis turborotonde  
(viertaks)**



**Eirotonde  
(viertaks)**

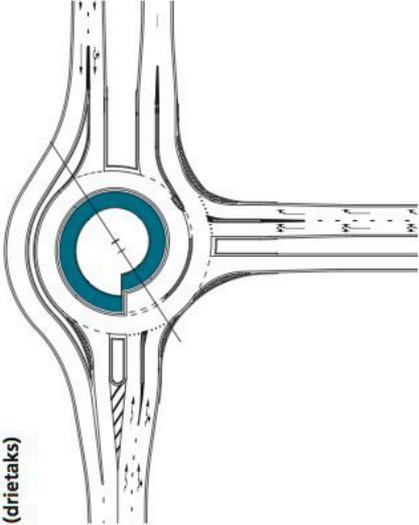


**Knierotonde  
(viertaks)**

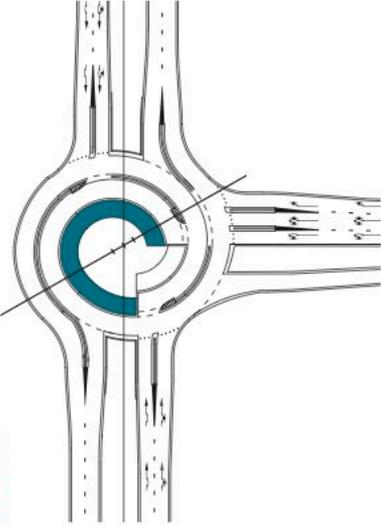


# Roundabout types

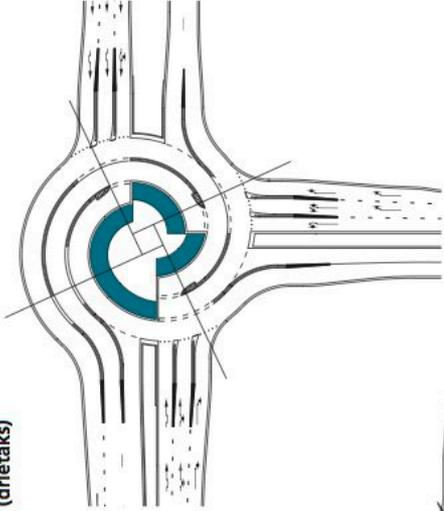
Gestreckte knierotonde  
(drietaks)



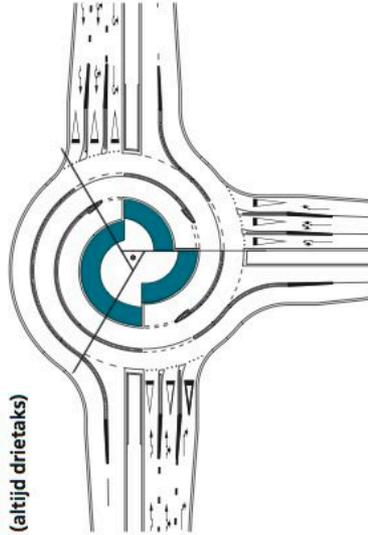
Spiraaltroonde  
(drietaks)



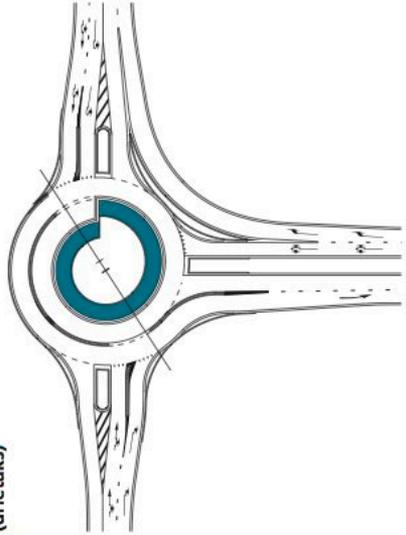
Rotorotonde  
(drietaks)



Sterrotonde  
(altijd drietaks)



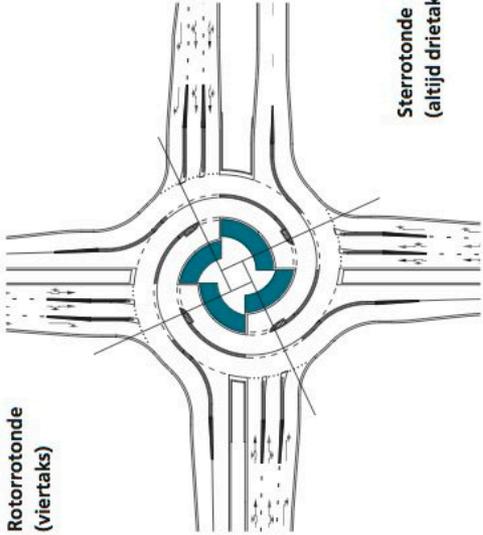
Knierotonde  
(drietaks)



Spiraaltroonde  
(viertaks)



Rotorotonde  
(viertaks)



# Examples: Amersfoort 1



# Examples: Amersfoort 2



# Examples: Amersfoort 3



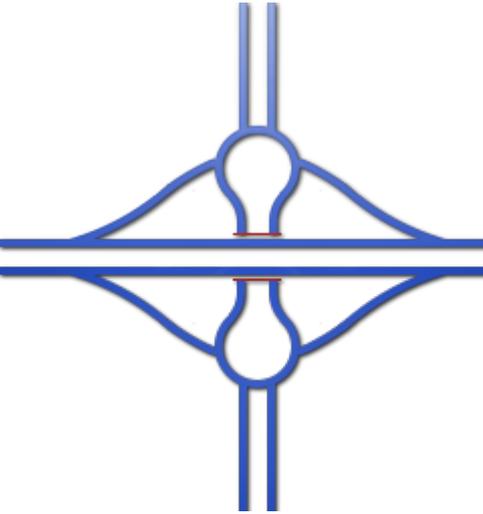
# Examples: Bussum 1



# Examples: Bussum 2



# Examples: Maarsbergen 1



# Examples: Maarsbergen 2



# Examples: Maarsbergen 3



# Examples: Utrecht 1



# Examples: Utrecht 2



# Examples: Utrecht 3



# Examples: Eindhoven by night



# Examples: Eindhoven by day



# Examples: Leeuwarden



# Examples: Den Bosch



# Examples: Hilversum



# Examples: Hilversum Mediapark



# Examples: Multilane without priority



# Examples: Poland



# Examples: Swindon England - magic



# Questions

