MAY 12TH 2021

STATEWIDE NON-MOTORIZED TRAFFIC MONITORING (NMTM) PROGRAM

Webinar #4: Non-Motorized Data Collection National and International Perspectives

HOUSEKEEPING

- Attendees are automatically muted throughout the webinar.
- Click the ? To open the panel box and submit a question.
- Answers to questions will be addressed by the panelists either verbally or in the question box towards the end of the session.
- Webinars are being recorded and will be available with other materials on the Non-Motorized Traffic Monitoring Program website.
- Please complete the follow-up survey that will be sent via email at the conclusion of this webinar.

- AICP CM credits offered for Planners that attend the session
- You must attend the entire session to be eligible for the credit hours
- All attendees will receive certificates via email soon after the webinar

GUEST HOST

- John Krause, PSM Civil Integrated Management Officer

WHY IS NON-MOTORIZED TRAFFIC DATA IMPORTANT RECAP…

- Planning studies/projects
- Safety studies/projects
- Design studies/projects
- Transit planning
- Operations and Maintenance
- Transportation Policy research
- Academic research
- Public Health research
- Sustainability research
- And more…

AGENDA

- USDOT/FHWA
  - Bike/Ped. National Initiatives
  - Traffic Monitoring Guide Update
- Consulate General of the Netherlands in Miami Presents:
  - Dutch Cycling Embassy
    - How non-motorized data impacts the past, present, and future of the Netherlands

U.S. Department of Transportation
Federal Highway Administration

Tianjia Tang, PE, Ph.D
Chief of Travel Monitoring and Surveys Division, USDOT/FHWA

Steven Jessberger
Transportation Engineer, USDOT/FHWA

Clayton Clark
Transportation Specialist, USDOT/FHWA

FHWA Traffic Monitoring Program Updates

Tianjia Tang, Clayton Clark, and Steven Jessberger
Office of Highway Policy Information
Federal Highway Administration
US Department of Transportation
Washington, DC 20590

Outlines

- Law and regulations
- Major traffic monitoring research and development work
- Status of FHWA Traffic Monitoring Guide (TMG) update
- National Highway Institute (NHI) training

Goal of Traffic Data Program

- To improve accountability,
- To increase transparency,
- To increase efficiency, and
- To enable the delivery of the Federal-aid highway program through consistent and quality data

Federal-aid Highway $ to the State of Florida under FAST Act

State	Actual FY 2015	Est. FY 2016	Est. FY 2017	Est. FY 2018	Est. FY 2019	Est. FY 2020	FY 2016 to 2020 Total	FY 2016 to 2020 Average
Florida	1,828,689,002	1,921,860,645	1,961,547,473	2,003,939,263	2,049,169,471	2,098,246,272	10,034,763,124	2,006,952,625

Federal Legislations on the Federal-aid Highway Program

- Intermodal Surface Transportation Efficiency Act (ISTEA): 1991-1998
- Transportation Equity Act for the 21st Century(TEA-21): 1998- 2005
- Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU): 2005 -2012
- Moving Ahead for Progress in the 21st Century Act (MAP21): 2012- 2015
- Fixing America's Surface Transportation Act (FAST Act): 2015 - present

Traffic Monitoring Legislations

Historical Perspective

- Under ISTEA, TEA-21, and SAFETEA-LU, FHWA promulgated and continued 23 Code of Federal Regulation (C. F. R.) Part 500 Subpart B – Traffic Monitoring System.
- 23 C. F. R. Part 500 Subpart B outlined both the technical and legal obligations for State highway agencies to establishing functional ***Traffic Monitoring Systems (TMS)*** where traffic data items such as volume, classification, and weight data can be collected, processed and reported.
- **TMS** was deemed fully established after SAFETEA-LU expired and MAP21 was enacted in 2012.

Traffic Monitoring Legislations

Under MAP21 and FAST Act

- Traffic monitoring needs are chiefly legislated under national goals and performance measures.
- 23 C. F. R § 490: National Performance Management Measures (prescribes more specific legal requirements of systematic traffic monitoring data)
  - ✓Subpart B: Measures for Highway Safety
  - ✓Subpart E: Measures to Assess Performance of the NHS
  - ✓Subpart F: Measures to Assess Freight Movement on the Interstate
  - ✓ Subpart G: Measures to Assess CMAQ Program Traffic Congestion

Major Recent Traffic Monitoring R&D Effort

- Updating the Traffic Monitoring Guide to reflect the latest policy and technical advancements and promote good practices.
- Exploring alternative data sources to derive traffic count data.
- Exploring alternative data sources to derive origin destination data.
- Exploring new traffic data acquisition and data processing (signature technology).
- Conducting national continuous traffic count data quality reviews and establishing new data quality control criteria.

Traffic Monitoring Guide Status Update

What is the TMG?

The FHWA **Traffic Monitoring Guide** (TMG) is a policy and technical guidance document on traffic data collection, processing, and reporting to support the Federal aid highway program. In addition, it enables the uniform adoptions of AASHTO's Green Book, TRB's Highway Capacity Manual, and ITE's Traffic Engineer's Handbook.

What the FHWA TMG Includes

The TMG covers **both** motorized **and** non-motorized traffic monitoring in areas of:

1. How to conduct data collection (e.g., methodologies)
2. How to record data (e.g., data formats)
3. How to process data (e.g., annualization)
4. How to fulfil the needs for the Federal-aid highway program (e.g., monthly data, annual data submittal to the FHWA)

Goal and Objectives of the TMG Update

The goal of the update is to provide the community with the latest policy and more focused technical guidance on traffic monitoring associated with the Federal-aid highway program.

Background:

As new legislation gets enacted, new technologies are invented, and new ways of doing businesses practices, and new needs are established , the TMG is reviewed and updated to reflect the new reality.

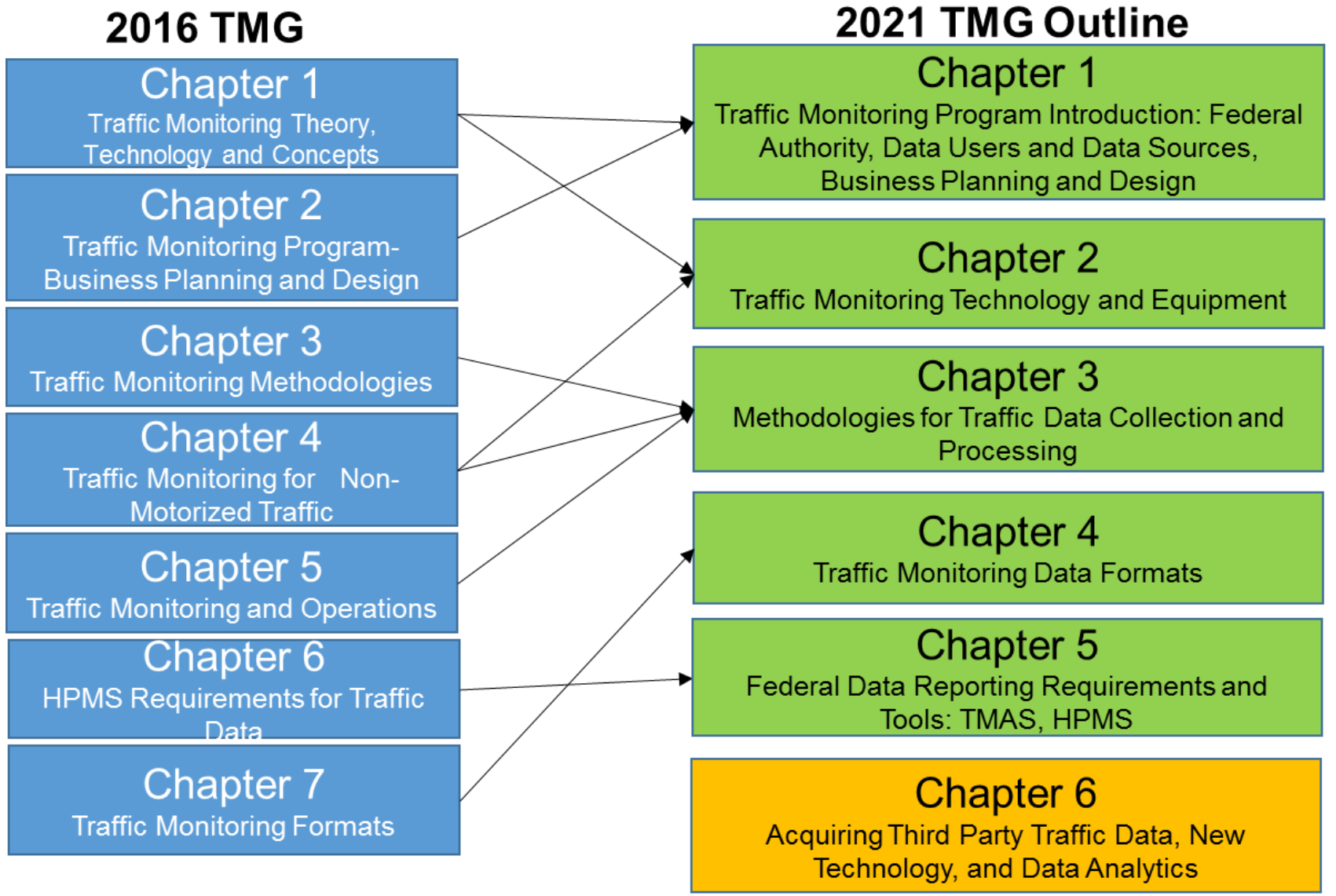
Technical Panel Members and Lead Consultants

Name	Organization	Name	Organization
Steven Bentz	Florida DOT	Debbie Morgan	Maine DOT
Nicolas Black	Utah DOT	Jim Neidigh	Southern Traffic Services
Rodney Chatman	Forward Pinellas	Margaret Pridmore	Idaho DOT
Ben Chen	MS2	Josh Rocks	Delaware Valley Regional Planning Commission
Becky Duke	Montana DOT	Olga Selezneva	ARA
Mark Hallenbeck	University of Washington	Joe St. Charles	Washington State DOT
Matthew Hardy	AASHTO	Elizabeth Stolz	Marlin Engineering
Mena Lockwood	Virginia DOT	Kent Taylor	North Carolina DOT
Chad Mathews	Wyoming DOT	Ben Timerson	Minnesota DOT
William Morgan	Illinois DOT	Yao-Jan Wu	University of Arizona

TMG Update Status

1. Update commenced Sep 2019
2. The 2016 TMG review by FHWA resulted in 200+ recommendations
3. 5 technical workshops & 3 expert panel meetings encompassing content review and consensus building
4. Draft updated TMG complete May 2021

2016 to 2021 TMG Migration



Significant Changes in 2021 TMG

1. Non-Motorized traffic will be referred to as Micromobility, which includes pedestrians as well as hoverboards, scooters, Segways, and other such devices (Ch. 1)
2. Added ***Micromobility*** content to Chapters 2 and 3
3. Expanded and focused discussion of traffic monitoring technologies and equipment (Ch. 2)
4. Provided common methodologies for motorized and Micromobility data collection and processing (Ch. 3)
5. Revised data formats include age, gender, and helmet (Ch. 4)
6. Emphasis on 3rd party roles in traffic programs (Ch. 6)

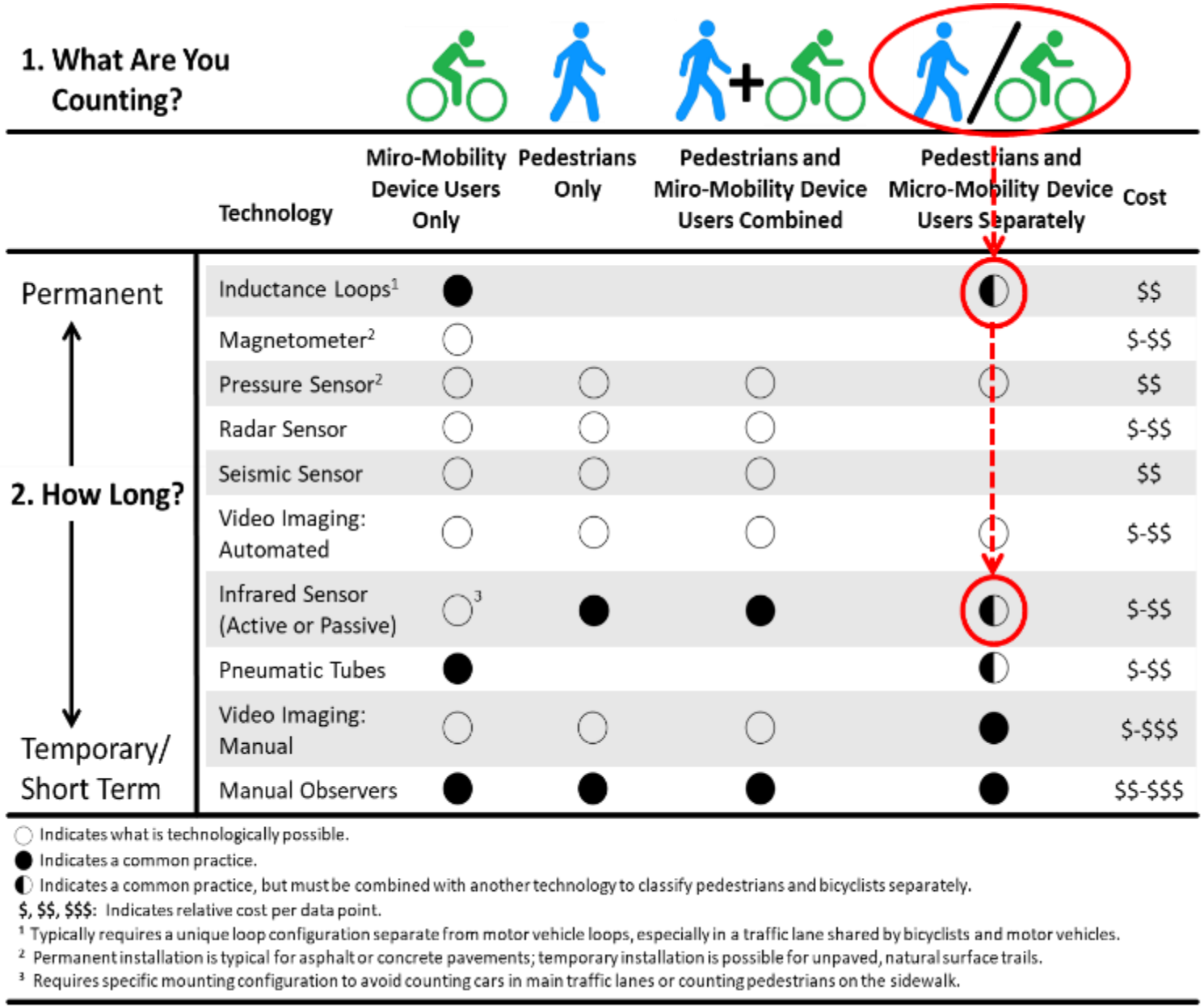
Micromobility Monitoring

- The term “Micromobility” is introduced to replace the traditional non-motorized travel.

- Micromobility includes both the traditional pedestrian and bicycles and these trips assisted by hoverboards, scooters, and other powered travel apparatus without the need of operating licenses (e.g., driver licenses).

Chapter 2 Example

Equipment Selection Process



1. What Are You Counting?	Technology	Miro-Mobility Device Users Only	Pedestrians Only	Pedestrians and Miro-Mobility Device Users Combined	Pedestrians and Micro-Mobility Device Users Separately	Cost
Permanent	Inductance Loops[1]	●			◐	$$
	Magnetometer[2]	○				$-$$
	Pressure Sensor[2]	○	○	○	○	$$
	Radar Sensor	○	○	○		$-$$
	Seismic Sensor	○	○	○		$$
2. How Long?	Video Imaging: Automated	○	○	○	○	$-$$
	Infrared Sensor (Active or Passive)	○[3]	●	●	◐	$-$$
	Pneumatic Tubes	●			◐	$-$$
	Video Imaging: Manual	○	○	○	●	$-$$$
Temporary/ Short Term	Manual Observers	●	●	●	●	$$-$$$

○ Indicates what is technologically possible.
● Indicates a common practice.
◐ Indicates a common practice, but must be combined with another technology to classify pedestrians and bicyclists separately.
$, $$, $$$: Indicates relative cost per data point.
[1] Typically requires a unique loop configuration separate from motor vehicle loops, especially in a traffic lane shared by bicyclists and motor vehicles.
[2] Permanent installation is typical for asphalt or concrete pavements; temporary installation is possible for unpaved, natural surface trails.
[3] Requires specific mounting configuration to avoid counting cars in main traffic lanes or counting pedestrians on the sidewalk.

Micromobility Data Items and Formats

Data Items Recorded	
State FIPS Code	Helmet Use
County FIPS Code	Gender
Station ID	Age
Latitude	Type of sensor
Longitude	Precipitation (yes/no)
Direction of route	Temperature (High/Low)
Location of count relative to roadway	Year, Month, Day
Direction of movement	Count start time
Facility type	Count interval (5, 10, 15, 20, 30, 60-min)
Type of count (e.g., bike/pedestrian/both)	Count for interval

Chapter 3: Factor Development Process

Micromobility factoring

- Temporal factoring
  - Hour of Day (HOD)
  - Day of Week (DOW)
  - Month of Year (MOY)
  - Year to Year (Yr/Yr)
- Permanent locations
- Occlusion and environmental factors (optional)

Chapter 6 – Third Party Data

- Technical Considerations
- Data Ownership Considerations
- Data Applications
- Costs

TMG Update Status

- The Final 2021 TMG is planned to be released in **October 2021**.
- Accompanying National Highway Institute (NHI) Training will be developed in FY 2022.
- Formal NHI training will be carried out in FY 2023 and beyond.
- The first overview of the new TMG will be presented in **Boise, Idaho** in **June 2022** during the National Travel Monitoring and Exhibition Conference (**NaTMEC**).

NaTMEC 2021

NaTMEC
NATIONAL TRAVEL MONITORING
EXPOSITION AND CONFERENCE

- A VIRTUAL Event!
- June 21-15, 2021
- There are many sessions including Micromobility travel.
- Register today at: www.NaTMEC.org

Q/A

DUTCH CYCLING EMBASSY / CONSULATE GENERAL OF THE KINGDOM OF THE NETHERLANDS IN MIAMI

- *Chris Bruntlett, Marketing and Communications Manager*, Dutch Cycling Embassy, Consulate-General of the Kingdom of the Netherlands in Miami

DUTCH CYCLING EMBASSY

NL Netherlands

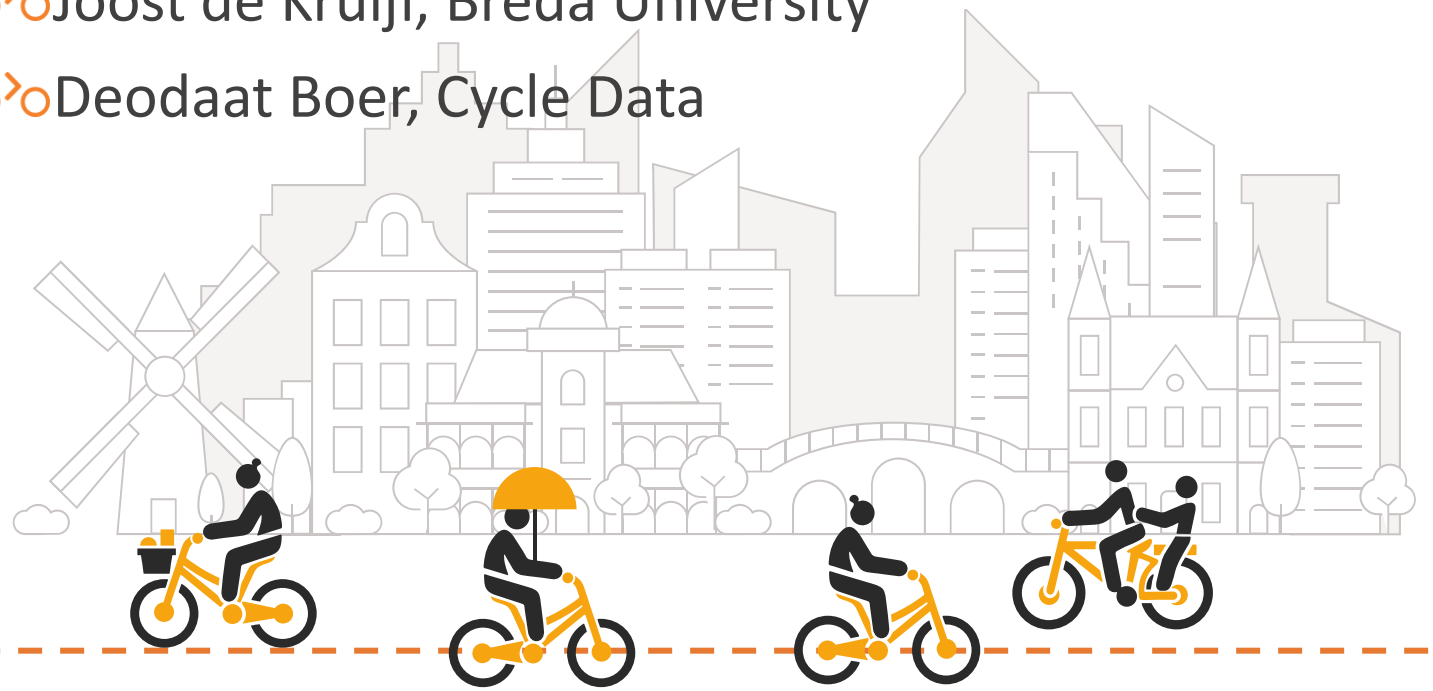
Dutch Perspective: How Did Data Help the Past, Present, and Future of the Netherlands?

Dutch Cycling Embassy • NL Consulate General in Miami

Wednesday, May 12th, 2021

Dutch Perspective: How Did Data Help the Past, Present, and Future of the Netherlands?

- Johan Diepens, Mobycon
- Herbert Tiemens, City of Utrecht
- Roland Kager, Studio Bereikbaar
- Joost de Kruijf, Breda University
- Deodaat Boer, Cycle Data



@Cycling_Embassy

@dutchcyclingembassy

@Cycling_Embassy

Dutch Cycling Embassy

Netherlands

@NLinMiami

@NLinMiami

Dutch Cycling: For a Bicycle-Friendly World

The Dutch Cycling Embassy is a vast network of public and private organisations from the Netherlands who wish to share their expertise on building what supports the Dutch cycling culture to those interested.

- **Experience** the Dutch cycling culture first-hand
- **Think** about best possible solutions and achievable results
- **Act** by applying these solutions to your local context
- **Learn** more about effective policies and best practices

www.dutchcycling.nl

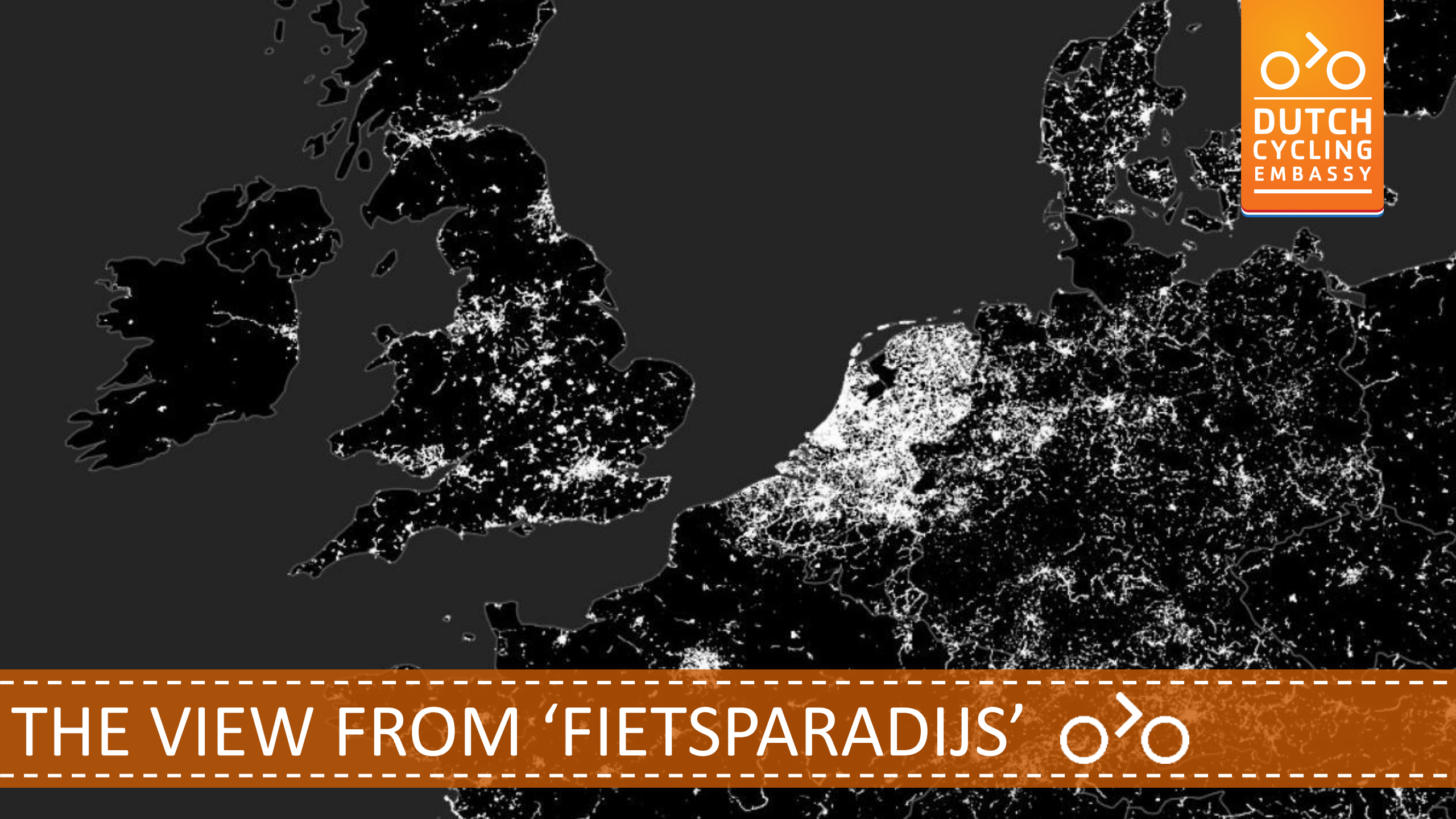
The DCE Public-Private Partnership

DUTCH CYCLING EMBASSY

Pedaling Through the Pandemic

DUTCH CYCLING EMBASSY

- To promote physical and mental health, “slow streets” were implemented in many cities to allow for social and physical activity in a distant manner
- “Pop-up” cycle networks were quickly built to absorb reduced public transport attractiveness (e.g. London at 20% capacity: 8 million ‘lost’ trips per day)
- Since the start of the crisis, over 2,300 km and €1 billion of cycling measures have been realized across Europe



DUTCH CYCLING EMBASSY

THE VIEW FROM ‘FIETSPARADIJS’

Crisis as a Turning Point

- 1972 “Stop de Kindermoord”(“Stop Child Murder”) movement formed by parents in response to road safety crisis killing 3,000 each year; 400 children
- 1973 OPEC oil crisis created huge spike in gasoline prices; leading to national “Autovrije Zondag” (“Car Free Sunday”) policy and doubling bicycle sales
- Both forced public and politicians alike to reevaluate their streets, and build a more resilient transportation system

Learning From Their Mistakes

DUTCH CYCLING EMBASSY

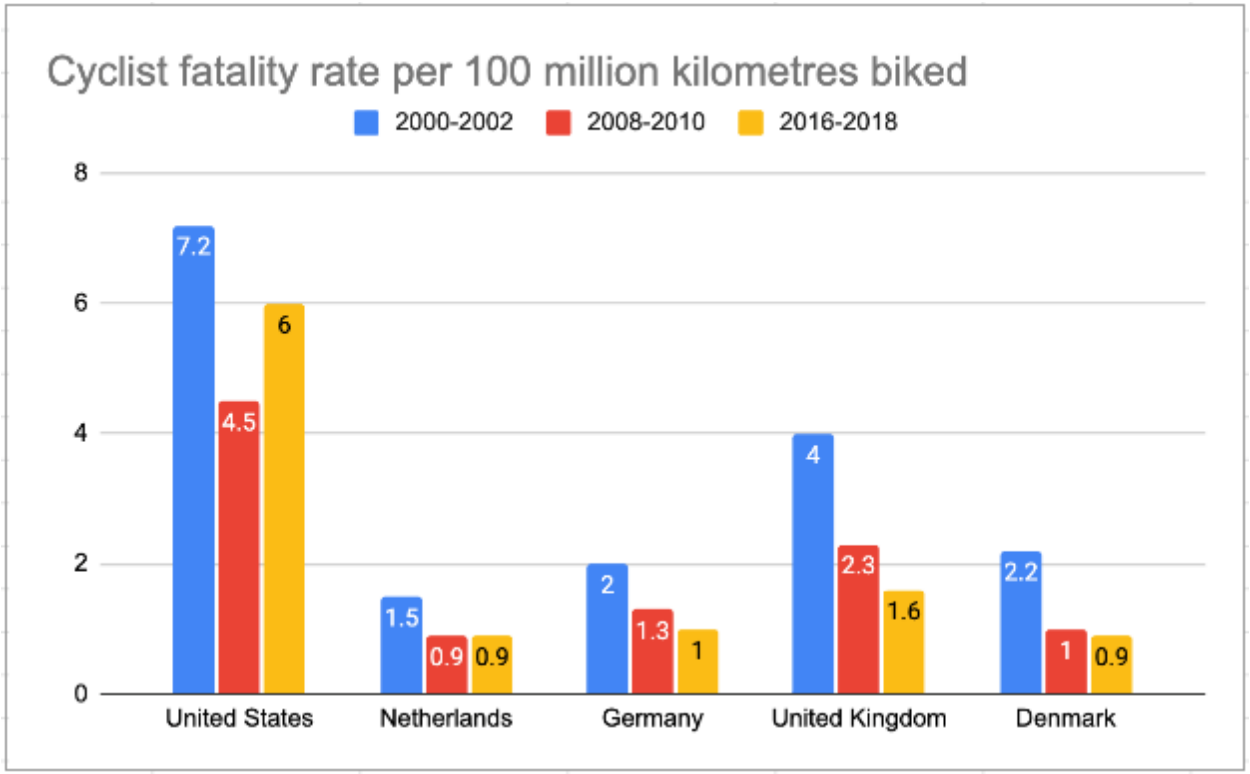
- High-profile failure of demonstration route in Tilburg in 1977: inconsistent design; inconvenient route selection which relegated cyclists to back streets
- Second demonstration route failure in The Hague in 1978: lack of connectivity and consultation led to low usage; huge backlash with local business owners
- The lessons learned from these two failed experiments were applied to the highly successful 1979 Delft Cycle Plan

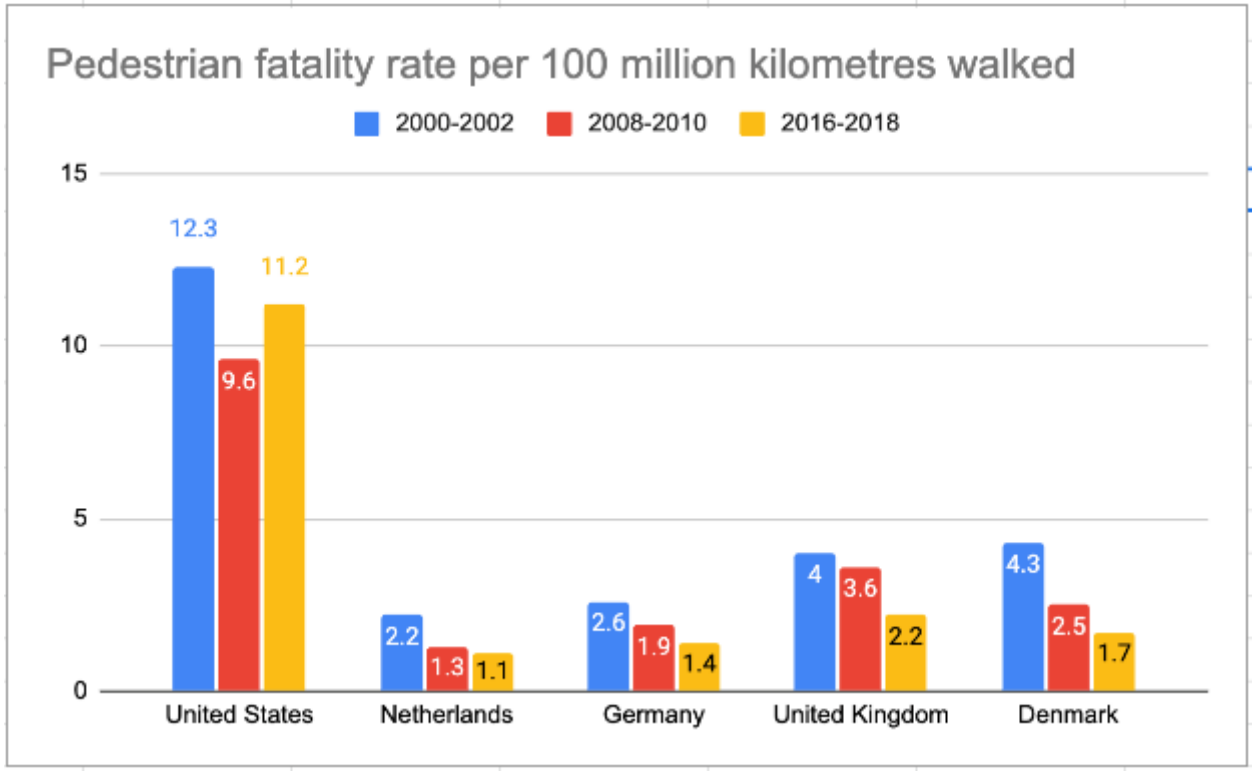
Dutch Cycling by the Numbers

- 23 million bikes for 17 million residents
- Five billion bicycle trips each year; 17.6 billion km total; or 1,000 km/person
- 202 cities and towns where bike share exceeds car share (for trips < 7.5 km)
- Reverse gender gap: mode share for women is 28% (versus 26% for men)
- Reverse age gap: 65-75 age group has a higher share than all other categories
- Half of all train journeys in the country begin with a bicycle ride to the station
- 18% of bike trips are electric assist; 26% of all kilometers are covered by e-bike

The Safest Streets in the World

"If the United States had achieved the same improvements in traffic safety as the Netherlands [since 1970], 22,000 fewer Americans would have died on our roads in all of 2015." – Vox.com





DUTCH CYCLING EMBASSY

Dutch Cycling Embassy

Nicolaas Beetsstraat 2A

3511 HE Utrecht

The Netherlands

www.dutchcycling.nl

info@dutchcycling.nl

+31 (0) 15 202 6116

@Cycling_Embassy

@dutchcyclingembassy

@Cycling_Embassy

Dutch Cycling Embassy

NL Netherlands

@NLinMiami

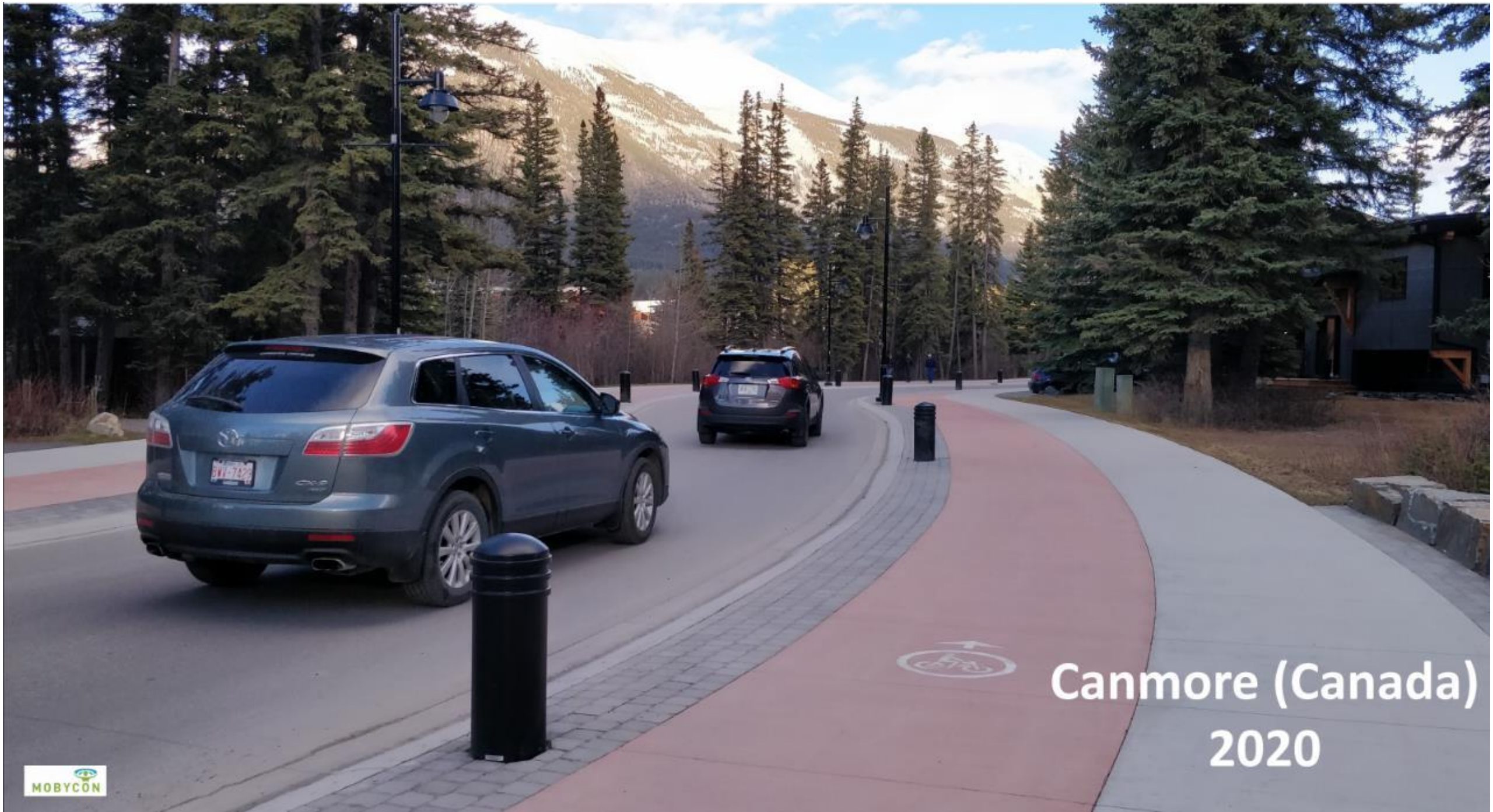
@NLinMiami

MOBYCON

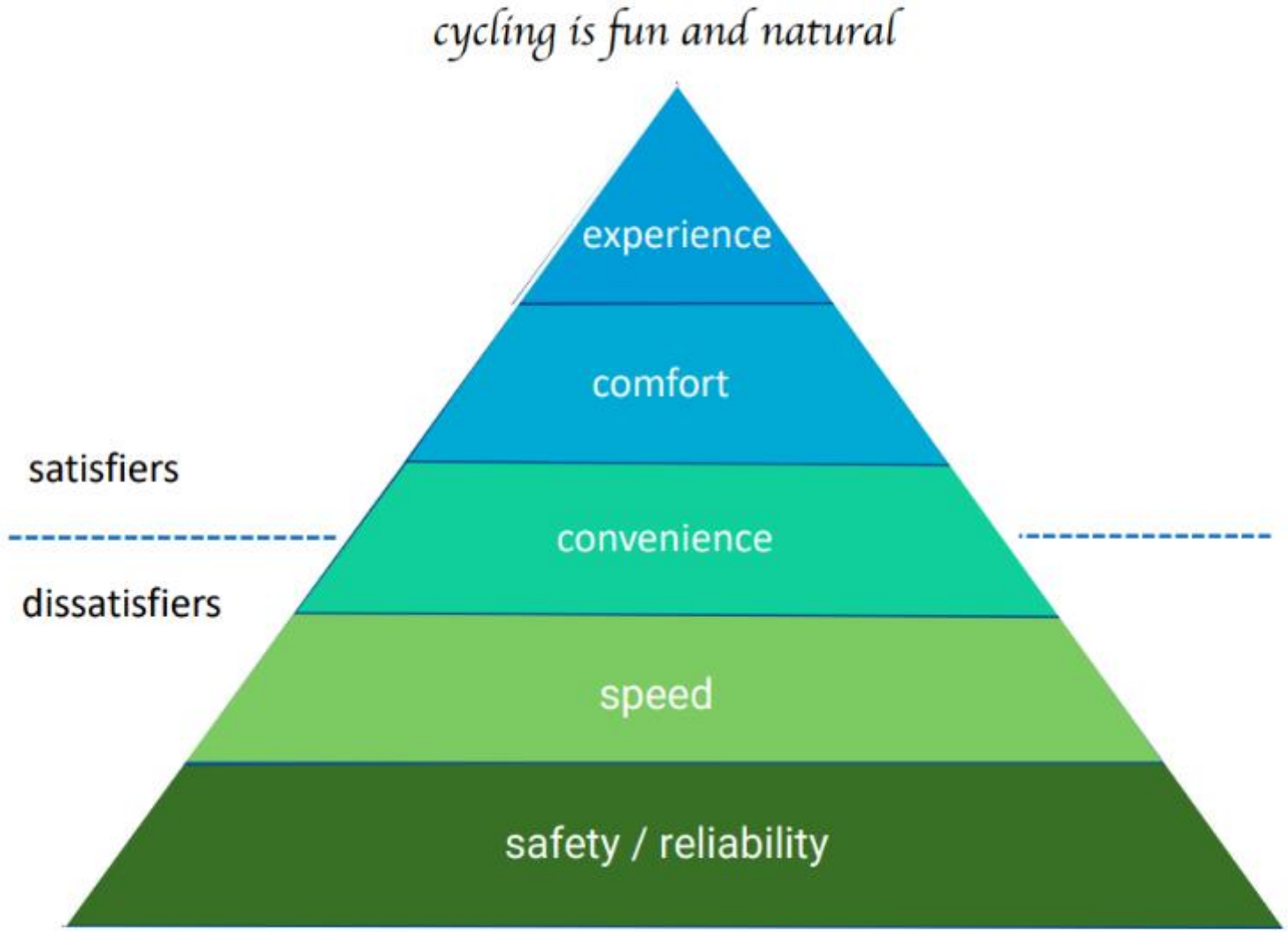
CycleRAP
a risk evaluation model for bicyclist

Johan Diepens

Delft, Durham (NC), Ottawa


Canmore (Canada)
2020
MOBYCON

Fundamentals for a cycling policy



MOBYCON

cyclerap

What is 'CycleRAP'?

A risk evaluation model for bicyclists and light mobility vehicle users

- Identifies **high risk locations** and provides data to **help reduce crashes** and **improve infrastructure safety** for these transport modes.
- Can be **applied anywhere** and **on all types of infrastructure**.
- Can be **used independently** or **in conjunction with other RAP models and tools** (e.g. the Star Rating bicyclist model) and other types of risk evaluation methods (e.g. road safety audit).

MOBYCON

iRAP

www.irap.org/cyclerap

cyclerap

- Registers **~50 data points** across **all types of facilities** (roads, bike lanes, paths etc.) to evaluate **4 types of crash risk**:

Conflicts with vehicles

Conflicts between bicycles and/or light mobility vehicles

Conflicts with pedestrians

Crashes which do not involve others

MOBYCON

iRAP

www.irap.org/cyclerap

cyclerap

Uses

- Addressing explicit or general safety concerns for bicyclists and light mobility users
- Evaluating existing network's capacity to cater for rapidly increasing demand or increase in new vehicle types
- Prioritise funding and investment into bicycling and light mobility infrastructure
- Assist cities formalising rapid response measures for bicyclists during COVID19.

Transport and urban planners

Bike share and micro mobility sharing service providers

Bicycle courier and food delivery companies

School communities

Policy makers and advocates for the environment, climate change and sustainability

Health services and insurance providers

Infrastructure and transport investors

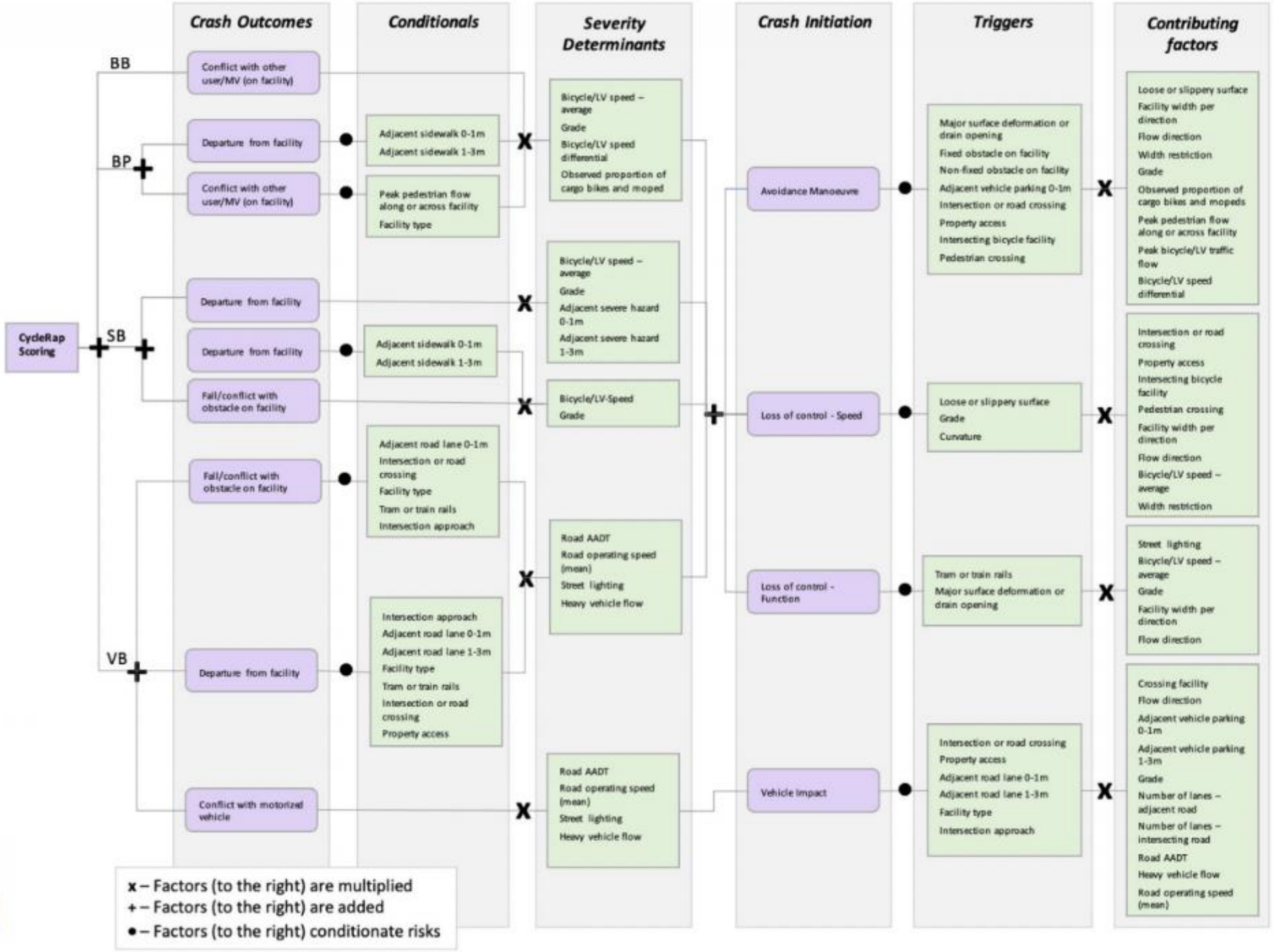
Mapping and navigation providers

MOBYCON

iRAP

www.irap.org/cyclerap

CycleRAP model



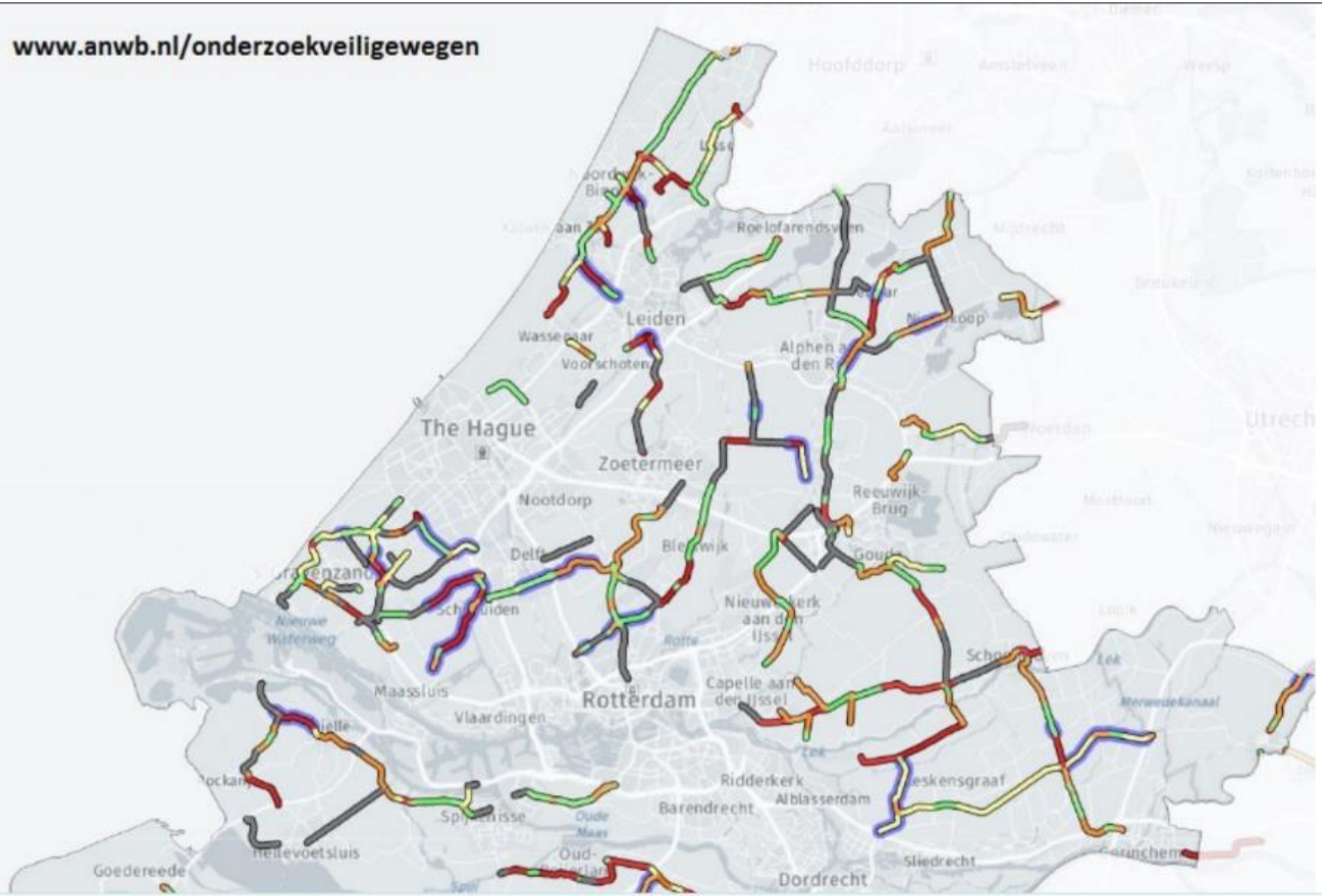
MOBYCON


www.anwb.nl/onderzoekveiligewegen
© 2019 VIA © 2019 HERE
Weginrichting met 1 of 2 sterren met hoge ongevallenscore
Weginrichting met 1 of 2 sterren met lage ongevallenscore
Weginrichting met 3, 4 of 5 sterren met hoge ongevallenscore
Weginrichting met 3, 4 of 5 sterren met lage ongevallenscore
Maatregel getroffen, nieuwe score onbekend
Maatregel gepland in 2019-2023

MOBYCON

MOBYCON

www.anwb.nl/onderzoekveiligewegen



- Weginrichting met 1 of 2 sterren met hoge ongevallenscore
- Weginrichting met 1 of 2 sterren met lage ongevallenscore
- Weginrichting met 3, 4 of 5 sterren met hoge ongevallenscore
- Weginrichting met 3, 4 of 5 sterren met lage ongevallenscore
- Maatregel getroffen, nieuwe score onbekend
- Maatregel gepland in 2019-2023


MOBYCON

Bicycle transport data in Utrecht, the capital of cycling

May 12, 2021

Herbert Tiemens
@herbert_tiemens
#utrechtfietst

Utrecht we all cycle

The cycling revolution didn't start with data

181

182

Utrecht 1968 vs Miami in 2010

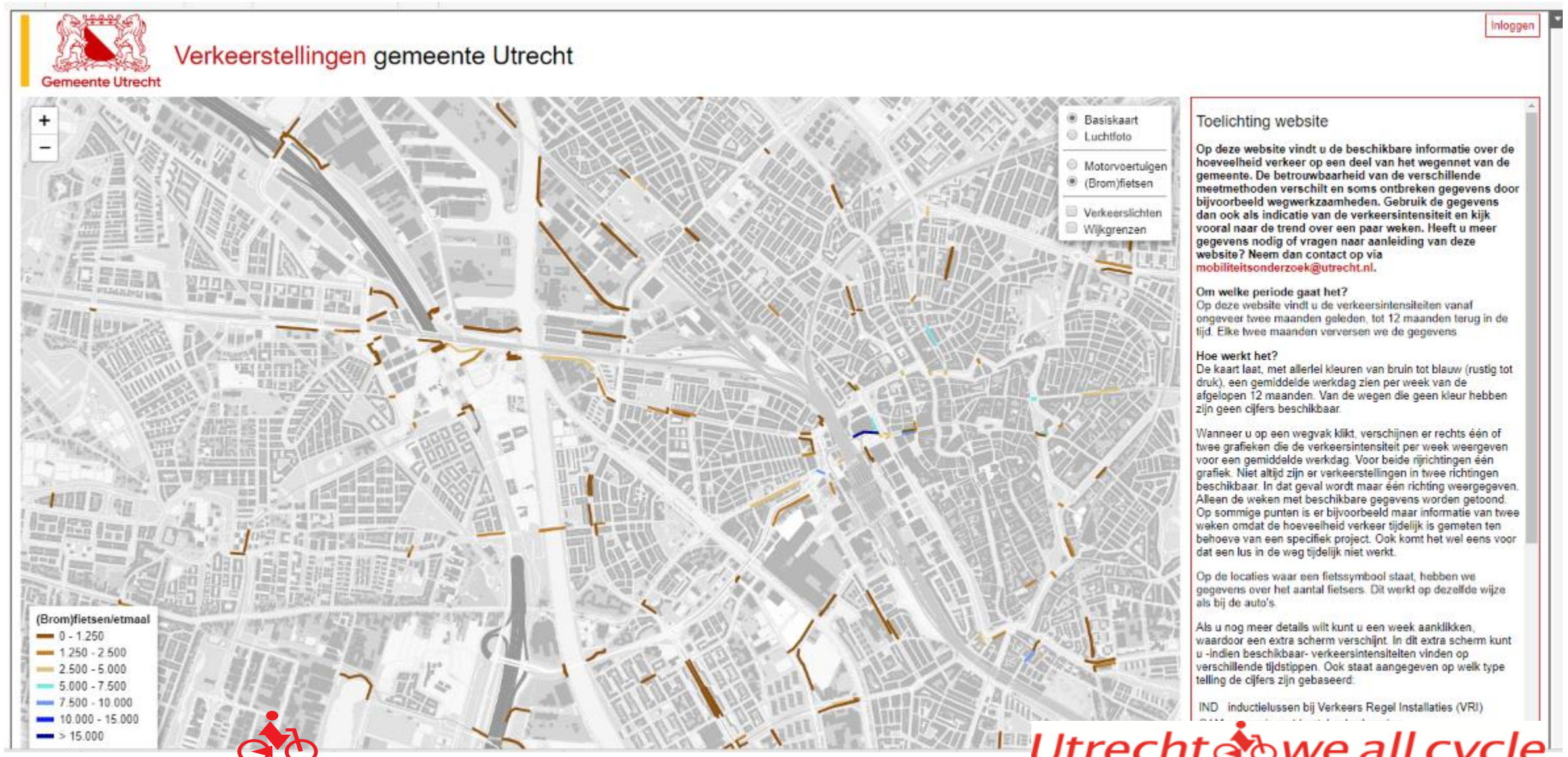
Modal split to, from and within the city in % (2014-2015)

	<7.5 km	7.5-15 km	>15 km	In general
Motor Vehicles	21.6	60.7	62.2	39.8
Public Transport	3.3	16.1	34.0	10.7
Cyclists	**42.9**	**16.7**	**2.1**	**26.1**
Pedestrians	30.1			16.8
Others *Pedestrians incl.	2.1	6.5*	1.7 *	2.1

To and from the city Centre - Residents Survey:

- 61% says they cycle (incl. mopeds) (2016)
- 5% takes the car
- 23% takes Public Transport
- 11% walks

Utrecht we all cycle


Gemeente Utrecht
Verkeerstellingen gemeente Utrecht
Inloggen
Basiskaart
Luchtfoto
Motorvoertuigen
(Brom)fietsen
Verkeerslichten
Wijkgrenzen
Toelichting website
Op deze website vindt u de beschikbare informatie over de hoeveelheid verkeer op een deel van het wegennet van de gemeente. De betrouwbaarheid van de verschillende meetmethoden verschilt en soms ontbreken gegevens door bijvoorbeeld wegwerkzaamheden. Gebruik de gegevens dan ook als indicatie van de verkeersintensiteit en kijk vooral naar de trend over een paar weken. Heeft u meer gegevens nodig of vragen naar aanleiding van deze website? Neem dan contact op via mobiliteitsonderzoek@utrecht.nl.
Om welke periode gaat het?
Op deze website vindt u de verkeersintensiteiten vanaf ongeveer twee maanden geleden, tot 12 maanden terug in de tijd. Elke twee maanden verversen we de gegevens.
Hoe werkt het?
De kaart laat, met allerlei kleuren van bruin tot blauw (rustig tot druk), een gemiddelde werkdag zien per week van de afgelopen 12 maanden. Van de wegen die geen kleur hebben zijn geen cijfers beschikbaar.
Wanneer u op een wegvak klikt, verschijnen er rechts één of twee grafieken die de verkeersintensiteit per week weergeven voor een gemiddelde werkdag. Voor beide rijrichtingen één grafiek. Niet altijd zijn er verkeerstellingen in twee richtingen beschikbaar. In dat geval wordt maar één richting weergegeven. Alleen de weken met beschikbare gegevens worden getoond. Op sommige punten is er bijvoorbeeld maar informatie van twee weken omdat de hoeveelheid verkeer tijdelijk is gemeten ten behoeve van een specifiek project. Ook komt het wel eens voor dat een lus in de weg tijdelijk niet werkt.
Op de locaties waar een fietssymbool staat, hebben we gegevens over het aantal fietsers. Dit werkt op dezelfde wijze als bij de auto's.
Als u nog meer details wilt kunt u een week aanklikken, waardoor een extra scherm verschijnt. In dit extra scherm kunt u -indien beschikbaar- verkeersintensiteiten vinden op verschillende tijdstippen. Ook staat aangegeven op welk type telling de cijfers zijn gebaseerd:
IND inductielussen bij Verkeers Regel Installaties (VRI)
(Brom)fietsen/etmaal
0 - 1.250
1.250 - 2.500
2.500 - 5.000
5.000 - 7.500
7.500 - 10.000
10.000 - 15.000
> 15.000

Delays based on GPS-tracking 2016

Microsimulation of cyclists' behavior

Figure 4.20: *Jaarbeursplein average relative delay in F-PMa scenario (16:35 to 16:40)*

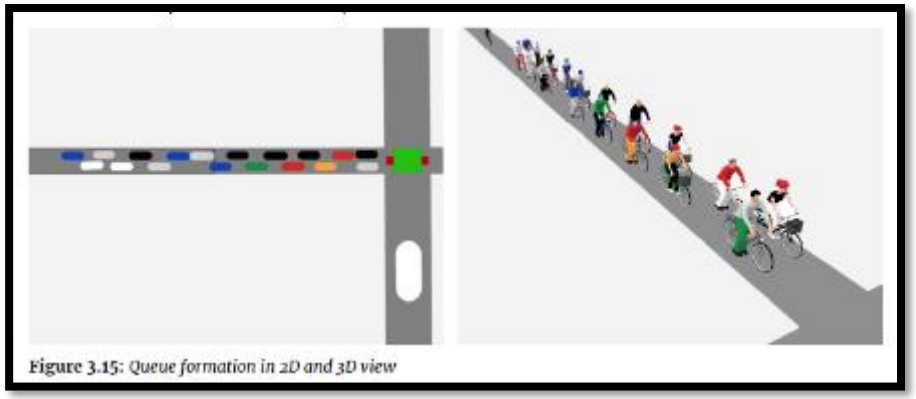


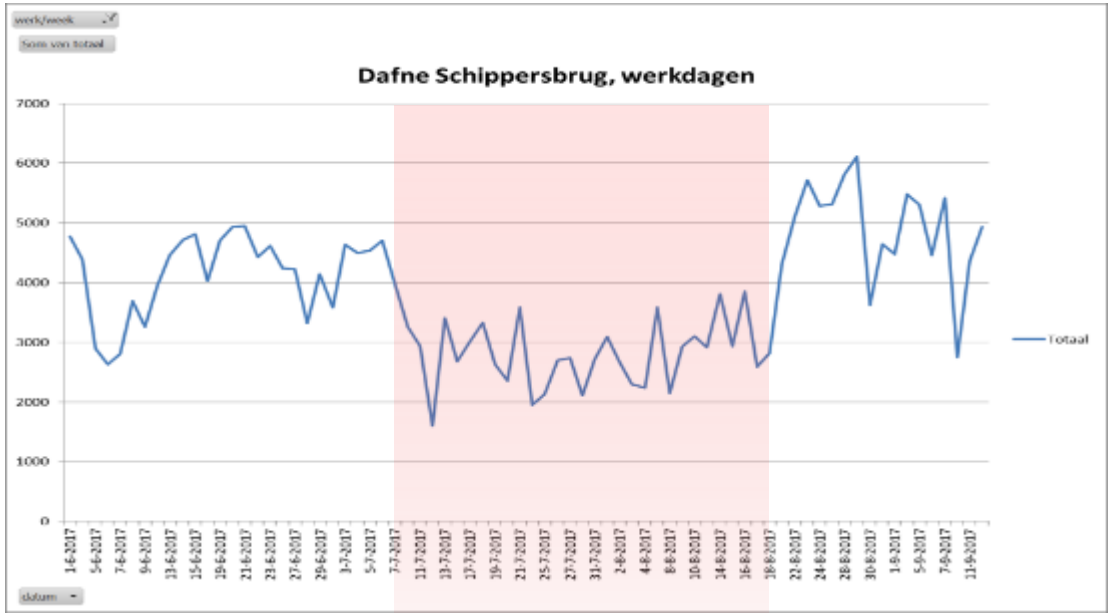
Figure 3.15: *Queue formation in 2D and 3D view*

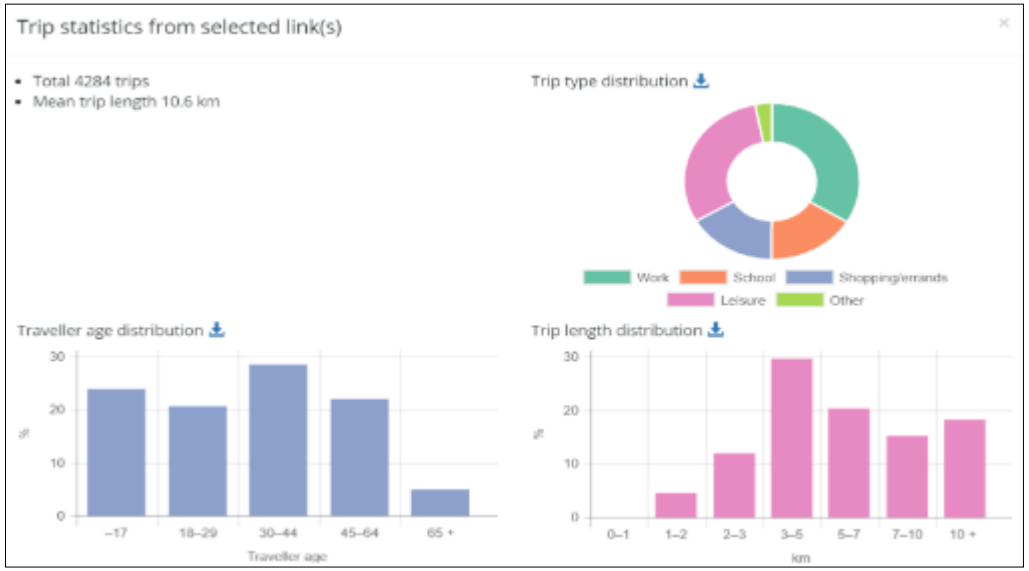
Master thesis Ir. Sven Thijsen,
Eindhoven University of Technology

Utrecht we all cycle

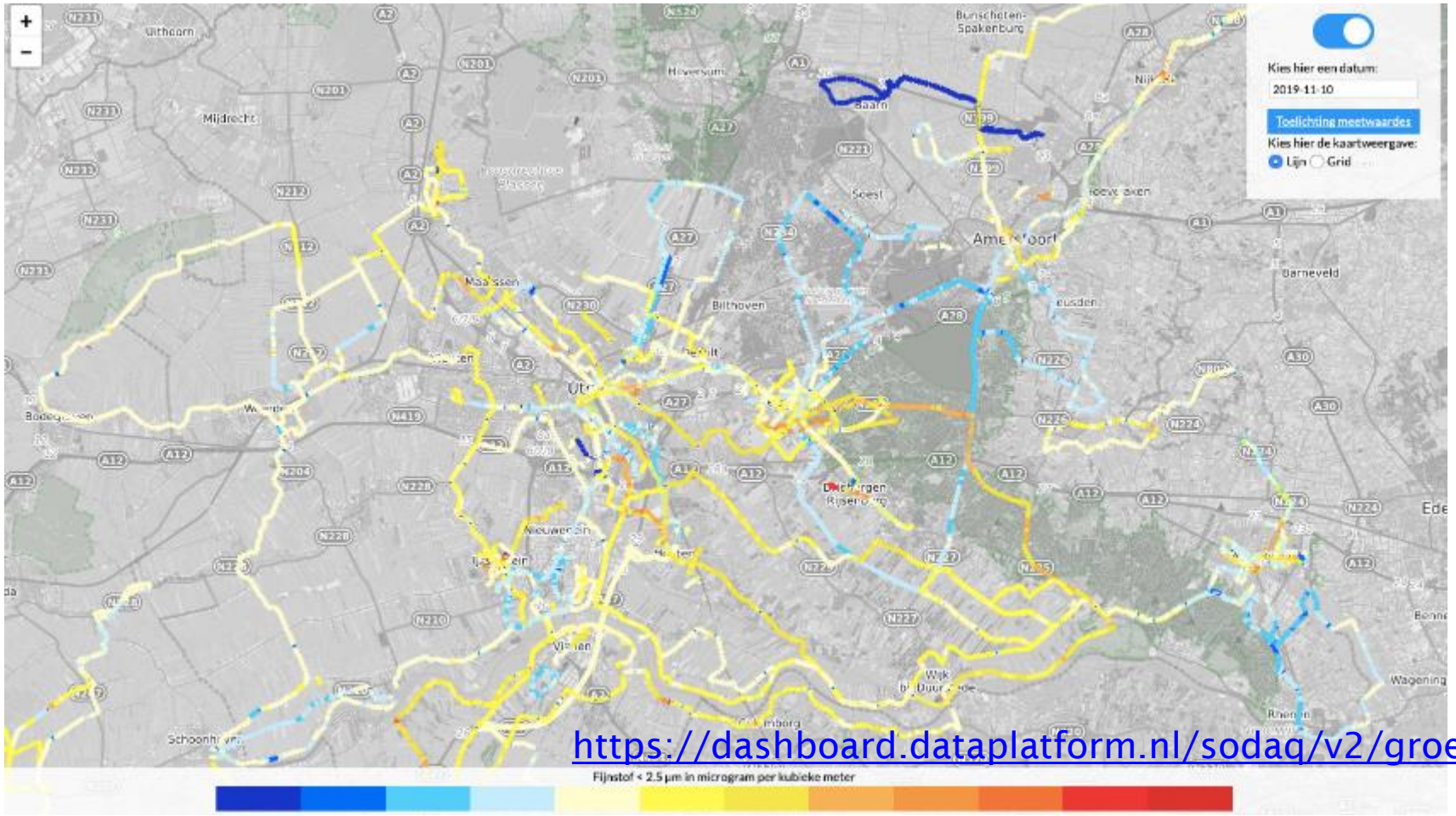
Planning for the future

week	average workdays
22	4578
23	3057
24	4392
25	4725
26	3901
27	4473
28	
29	
30	
31	
32	
33	
34	5146
35	4931
36	4681
37	4023
38	4672
Average	4416



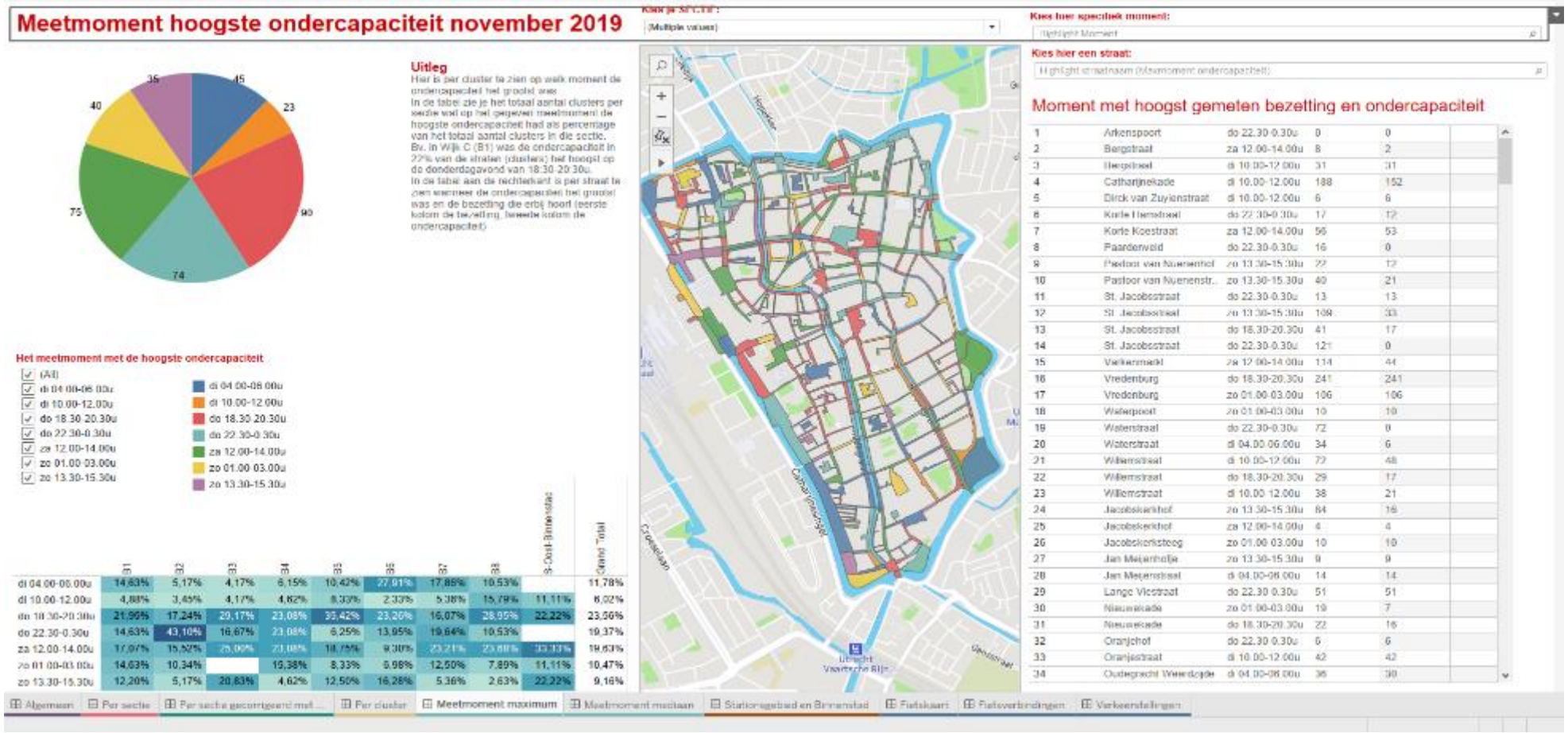


Cycling sensors for air quality



https://dashboard.dataplatform.nl/sodaq/v2/groene_fietsroutes.html

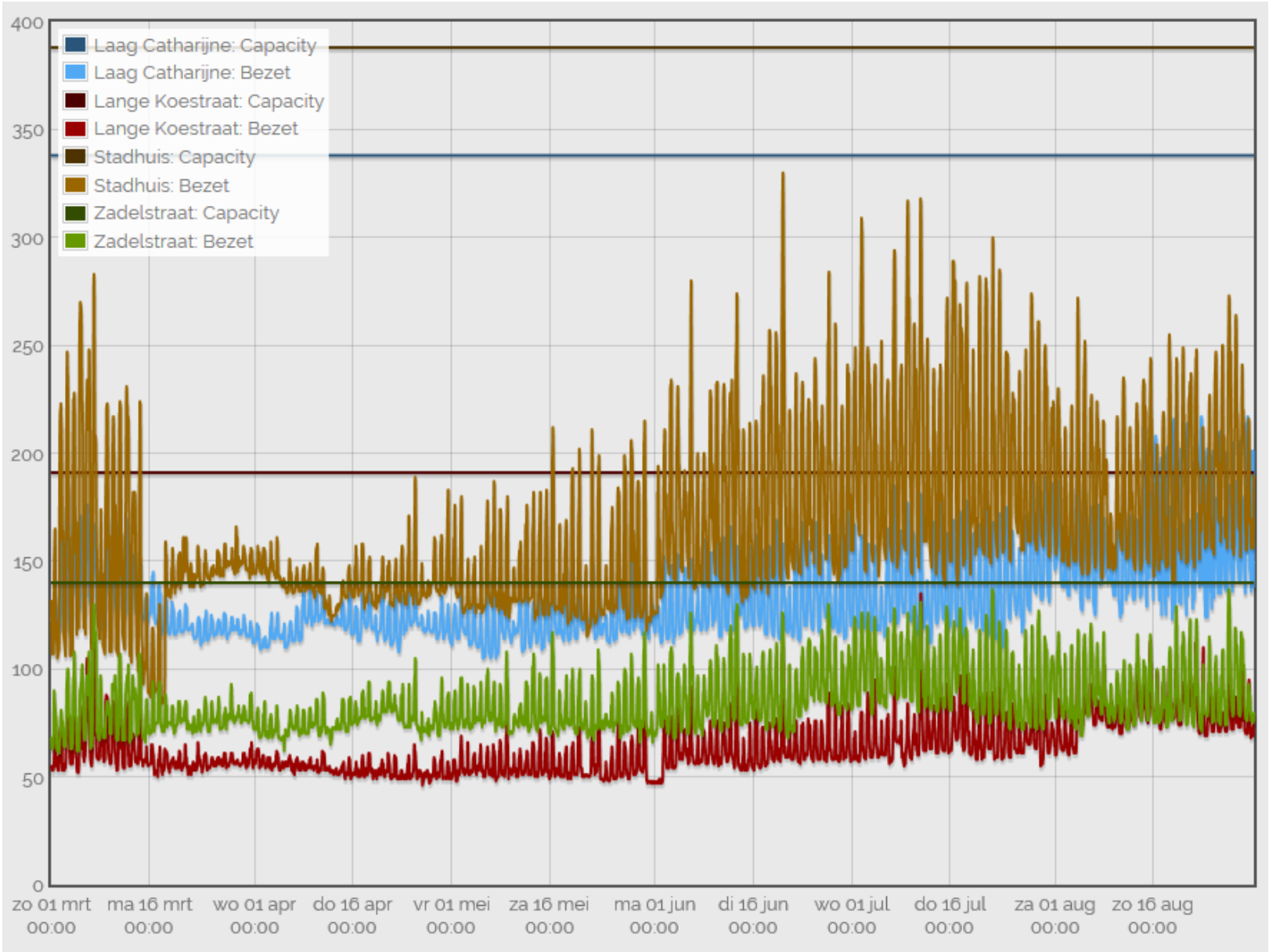
On street bicycle parking

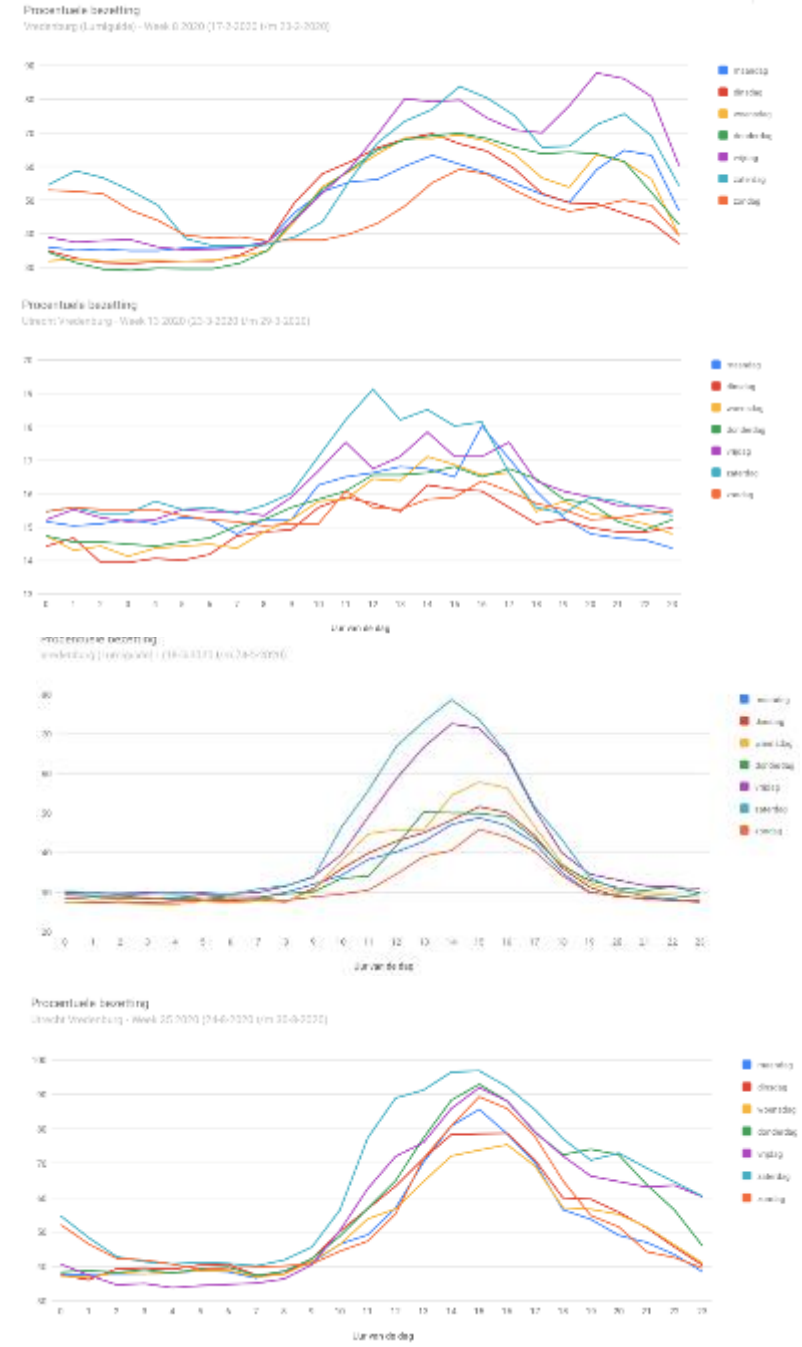


Utrecht we all cycle

Park and Ride, Miami vs Utrecht

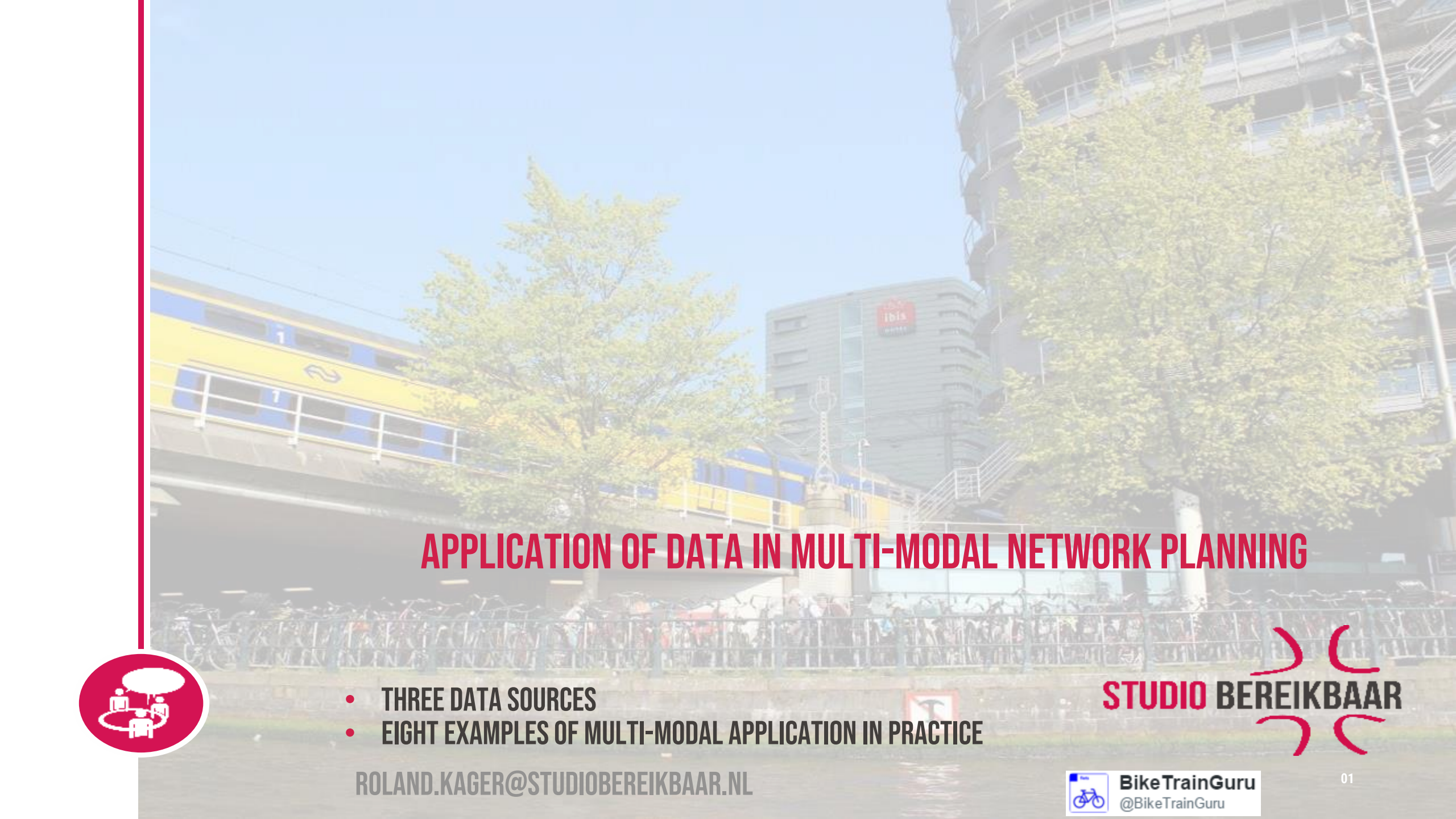
Covid-19 and effects of lockdown





Questions?

Ing. Herbert Tiemens
herbert.tiemens@utrecht.nl
twitter: @herbert_tiemens
GSM: +31 6 2145 9189



APPLICATION OF DATA IN MULTI-MODAL NETWORK PLANNING

- THREE DATA SOURCES
- EIGHT EXAMPLES OF MULTI-MODAL APPLICATION IN PRACTICE

STUDIO BEREIKBAAR

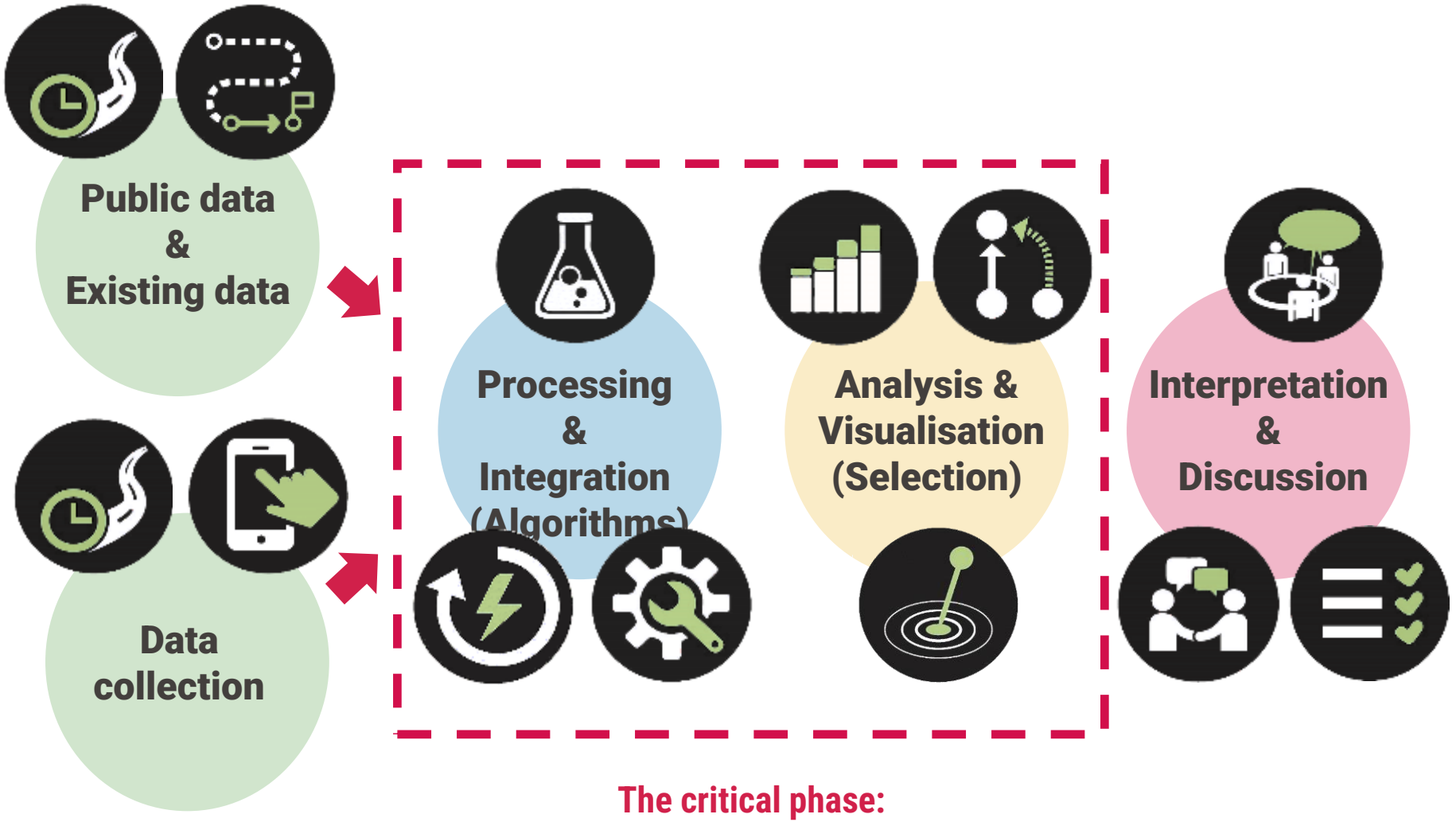
ROLAND.KAGER@STUDIOBEREIKBAAR.NL

BikeTrainGuru
@BikeTrainGuru

THREE DATA SOURCES - EIGHT EXAMPLES

1. Network data: OpenStreetMap / GTFS Transit
   - Departing trains within 20minute bike ride
   - Catchment area of rail stations per feeder mode
2. Behavioural data: Travel Survey (650,000 resp. - 1 day)
   - Trip generation per level of urbanity
   - Dashboard for urban planning
3. Behavioural data: GPS-tracking (2,000 resp. – 21 days)
   - Multi-modal screenlines and cordon analysis
   - Access/egress distances in multi-modal travel
   - Infrastructure load per quartile of car-usage
   - Walk segmentation

Those all-too-easily overlooked steps between (raw) data and application…

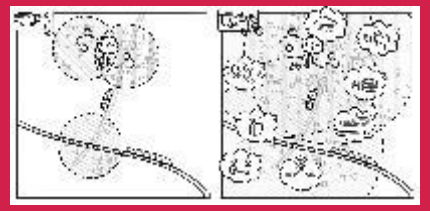


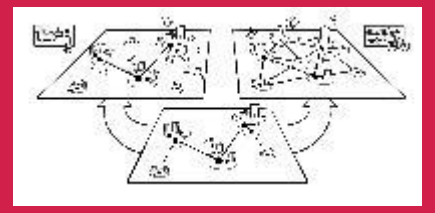
Three data sources

The critical phase:
success or failure is typically determined here
(but this phase typically overlooked)

Eight examples

1. NETWORK DATA: OPENSTREETMAP / GTFS TRANSIT



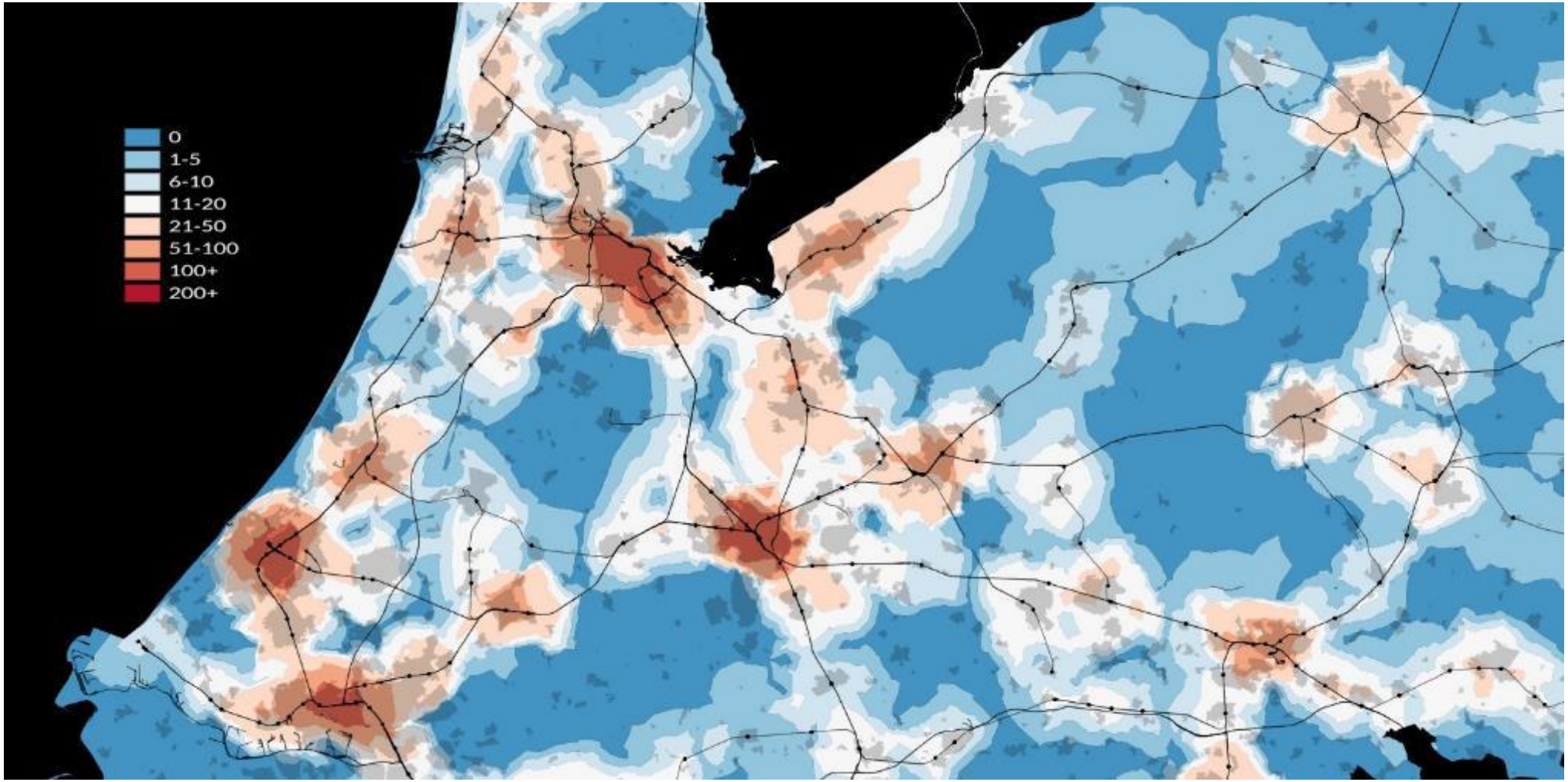


NETWORKS: GTFS FOR TRANSIT + OSM FOR WALK/BIKE

GTFS Transit Data (colour indicates speed || width indicates frequency)

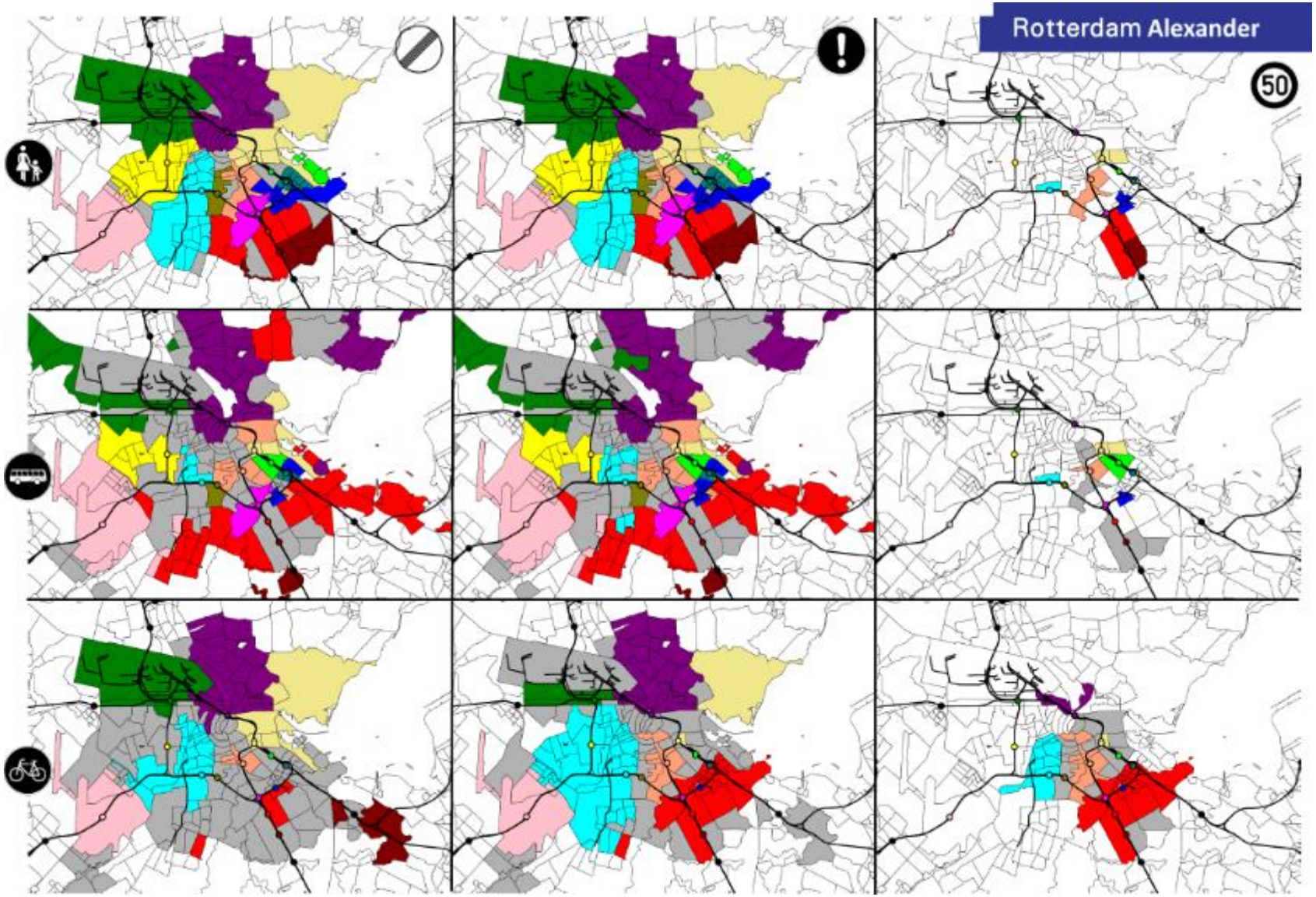
OpenStreetMap connected to 500x500m centroid grid (selection on cycleable routes)

#DEPARTING TRAINS/HR - WITHIN 20 MIN BIKE-RIDE



Source: OpenStreetMap, GTFS Transit Data (+ Set of algorithms to calculate ride times)

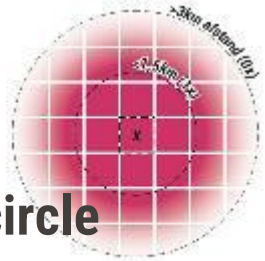
RAIL CATCHMENT AREAS - PER FEEDER MODE

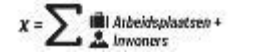


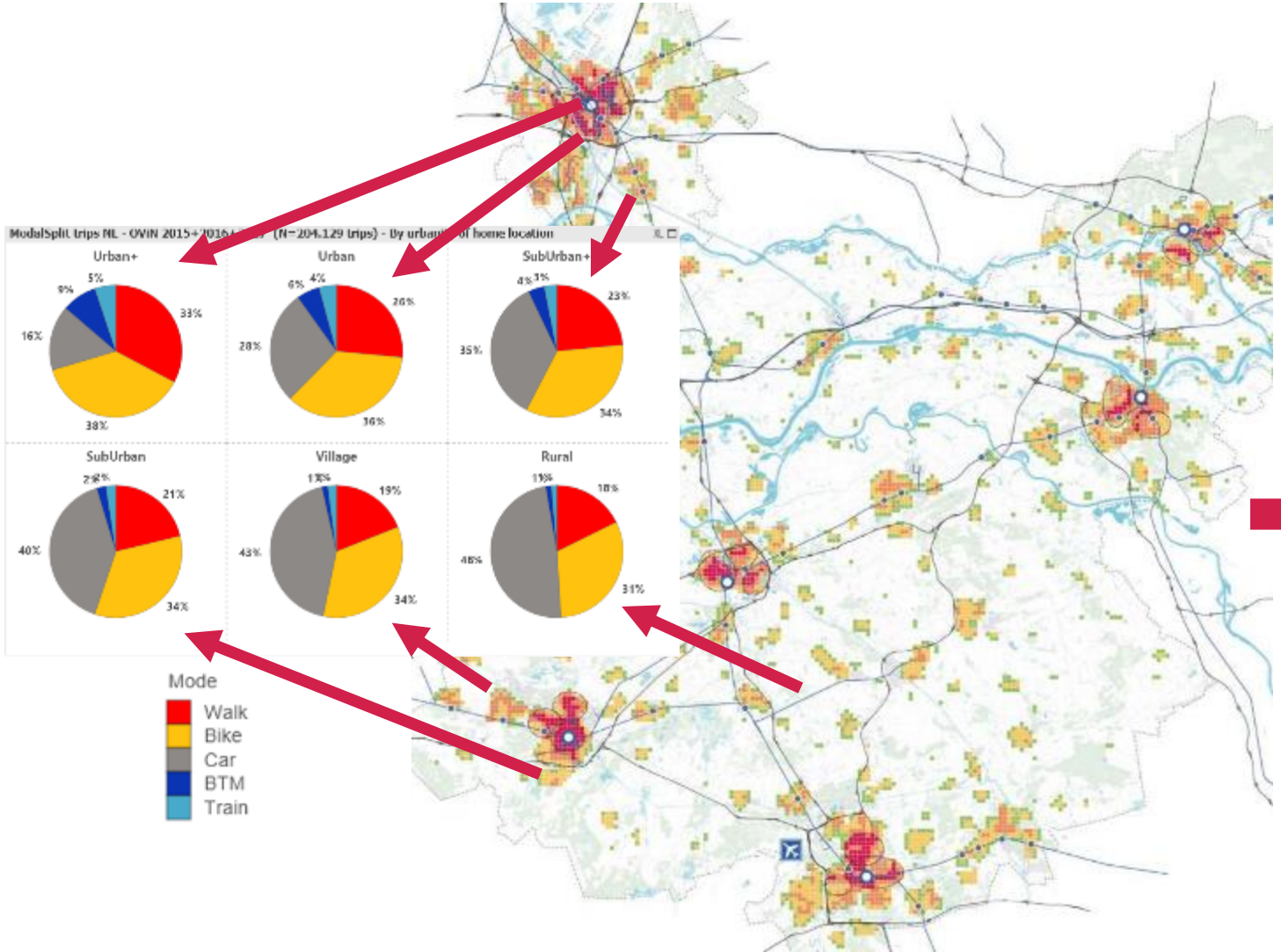
2. NATIONAL TRAVEL SURVEY DATA

NATIONAL TRAVEL SURVEY – MODAL SPLIT

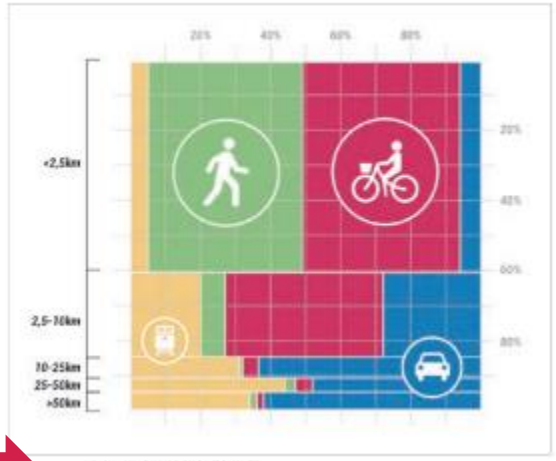
→measured per 'level of proximity': #pop.+#jobs / 2.3km circle



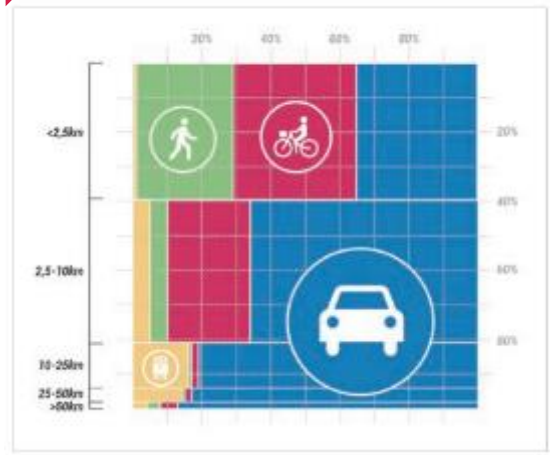




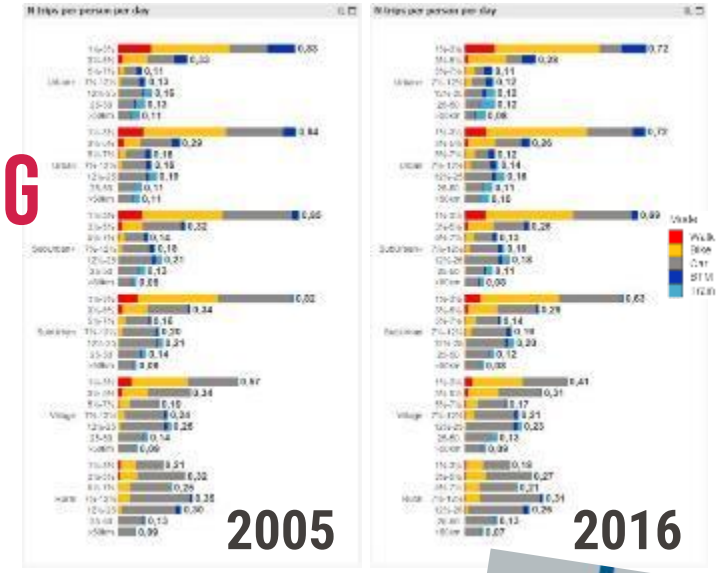
Amsterdam centrum



Haarlemmermeer

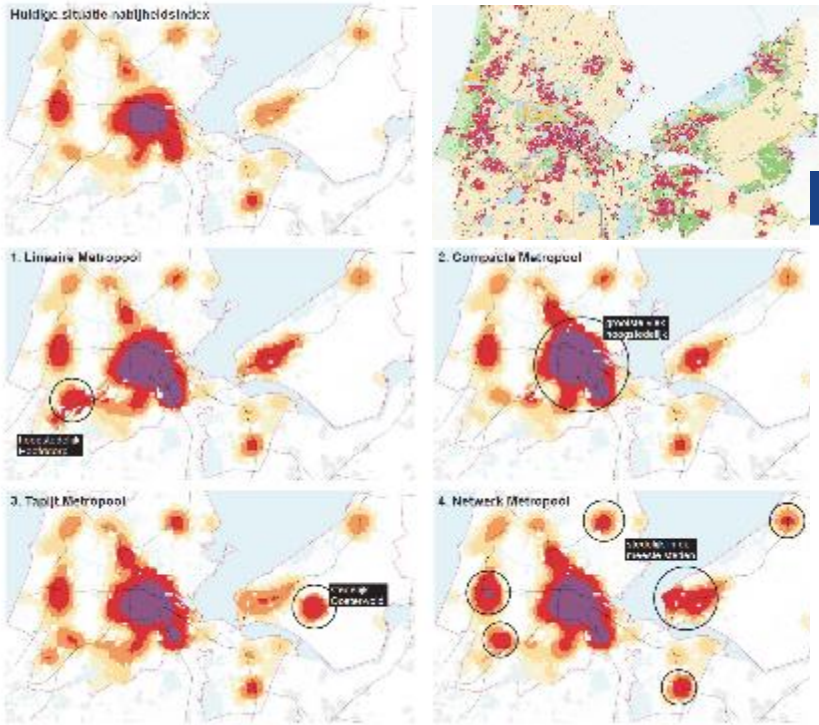


DASHBOARD URBAN PLANNING



1. Veranderende nabijheid

Nabijheidsindex voor de totale woningvoorraad in 2040



Uitbreiding klasse hoogstedelijk voornamelijk in Amsterdam, nieuwe klasse stedelijk in andere steden

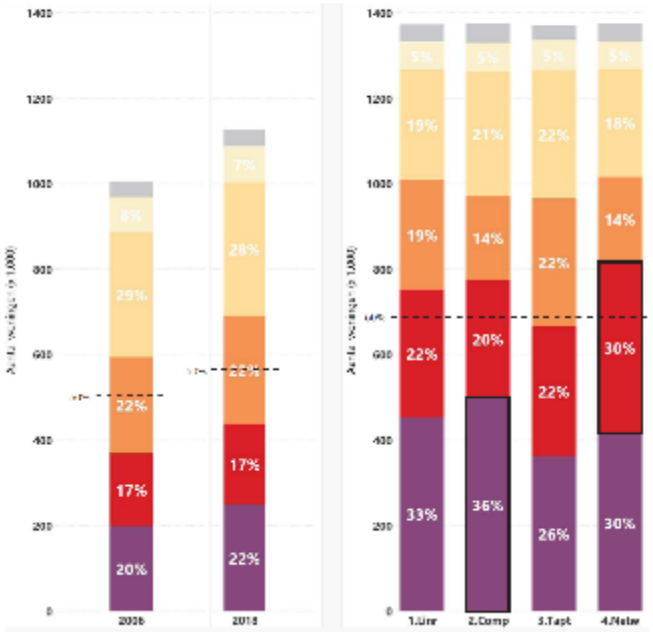
Alleen in het Netwerk model maakt ook het centrum van Haarlem de sprong naar de hoogste stedelijkheidsklasse.

In de huidige situatie komt de klasse stedelijk enkel voor in Amsterdam, Zaanstad, Haarlem en

Dashboard Verstedelijking 2.0 resultaten MRA

1. Veranderende nabijheid

Nabijheidsindex voor de totale woningvoorraad in 2040



In alle n
nabijhe
vergro
het mi

De mod
het aan
omgev
milieu-
nabijh

Ten n
Comp
hoog
Netwerk is de toenam
opvallend hoog.

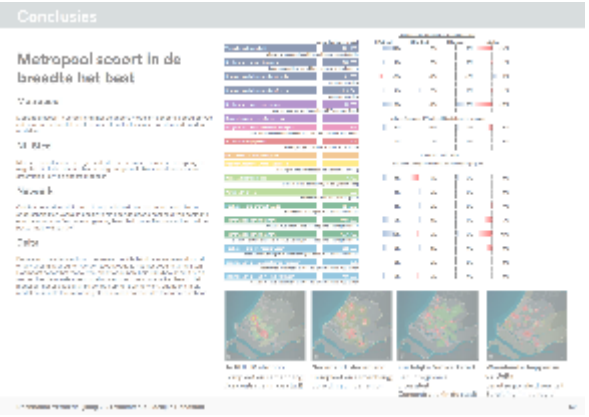
Dit zijn vooral reeds bestaande woningen in reeds bestaande wijken, maar doordat in de nabijheid van deze bestaande woningen meer woningen en werkgelegenheid wordt toegevoegd verandert de dichtheid van mensen en banen.

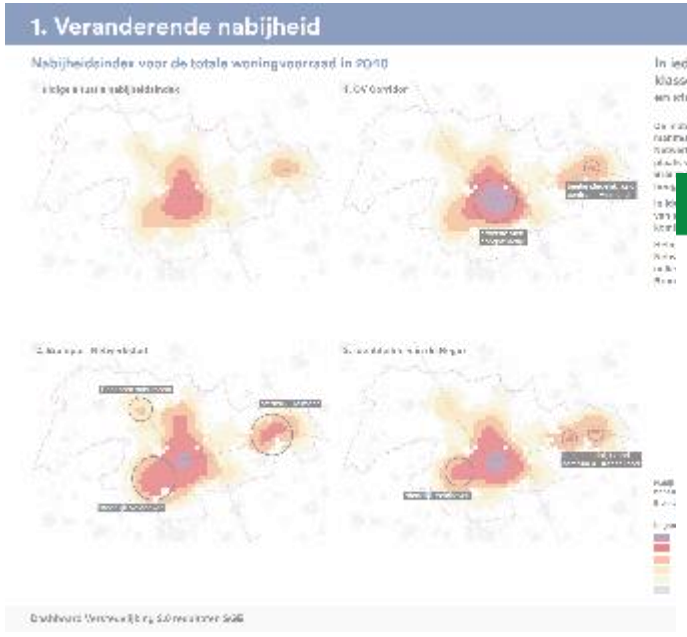
Hierdoor zal ook het mobiliteitsgedrag van zowel de nieuwe als de bestaande inwoners veranderen. Zie indicator 8. en 13.

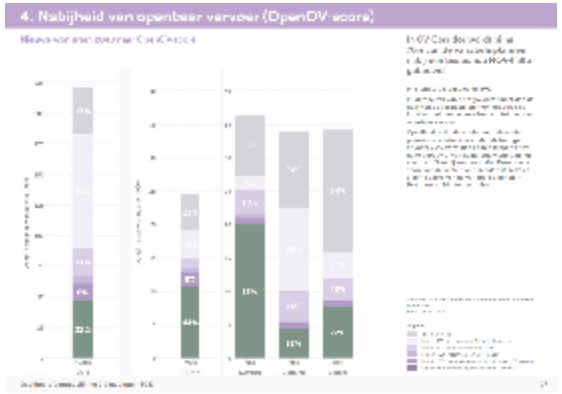
Dashboard Verstedelijking 2.0 resultaten MRA

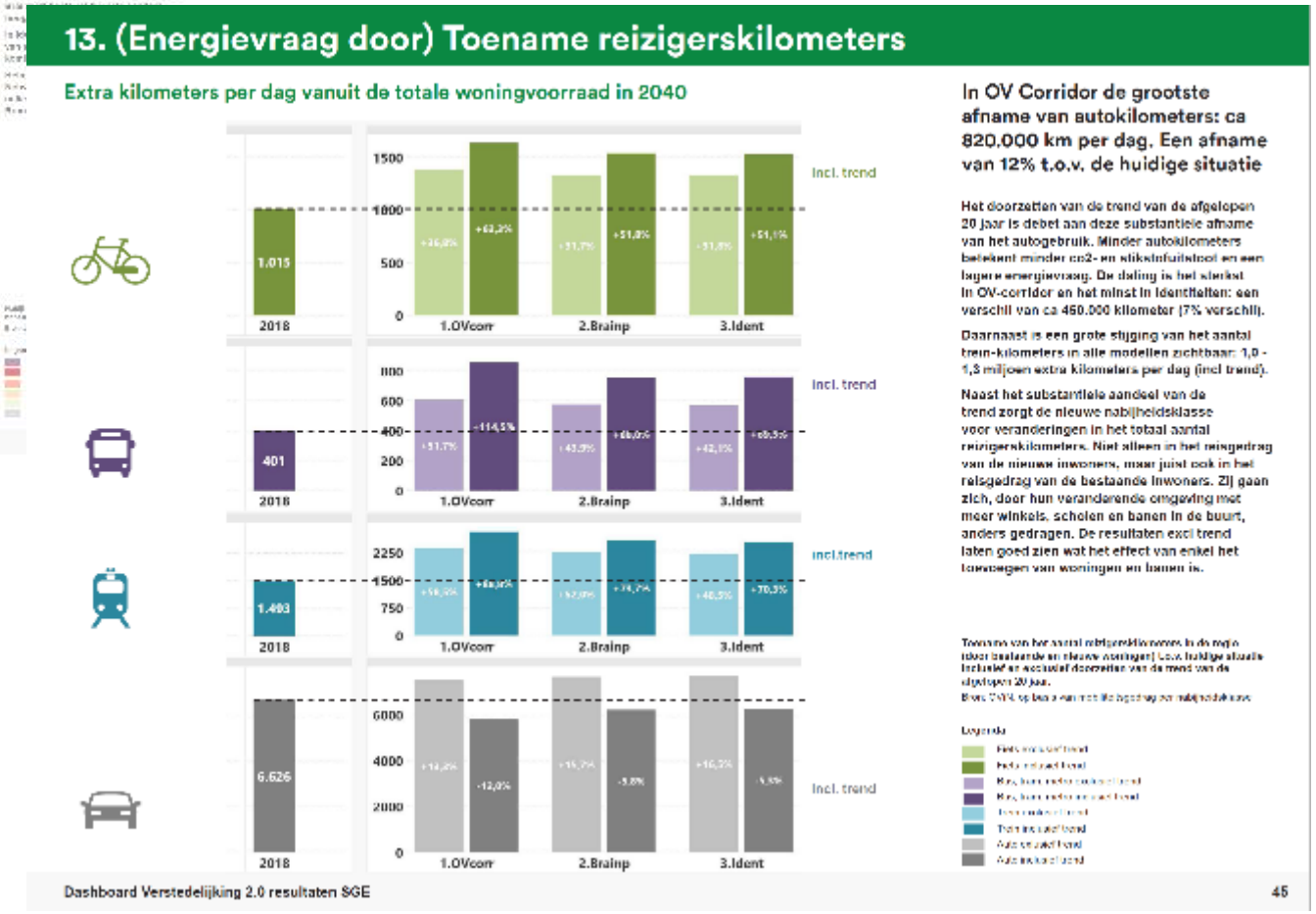
20

DASHBOARD URBAN PLANNING



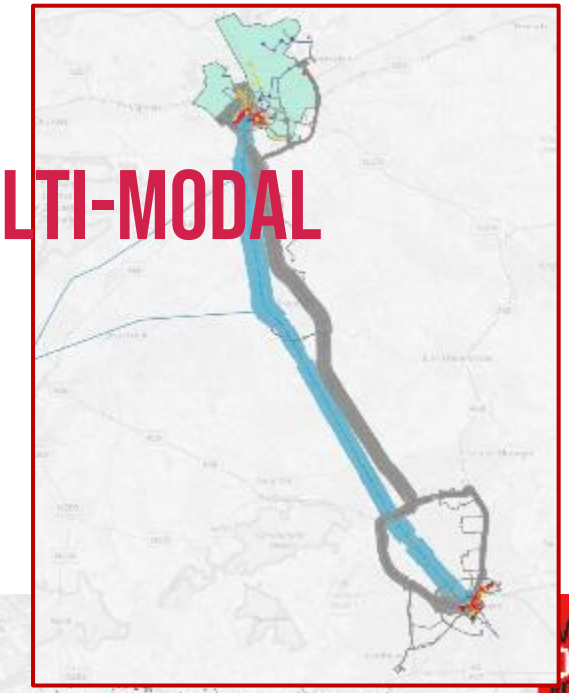


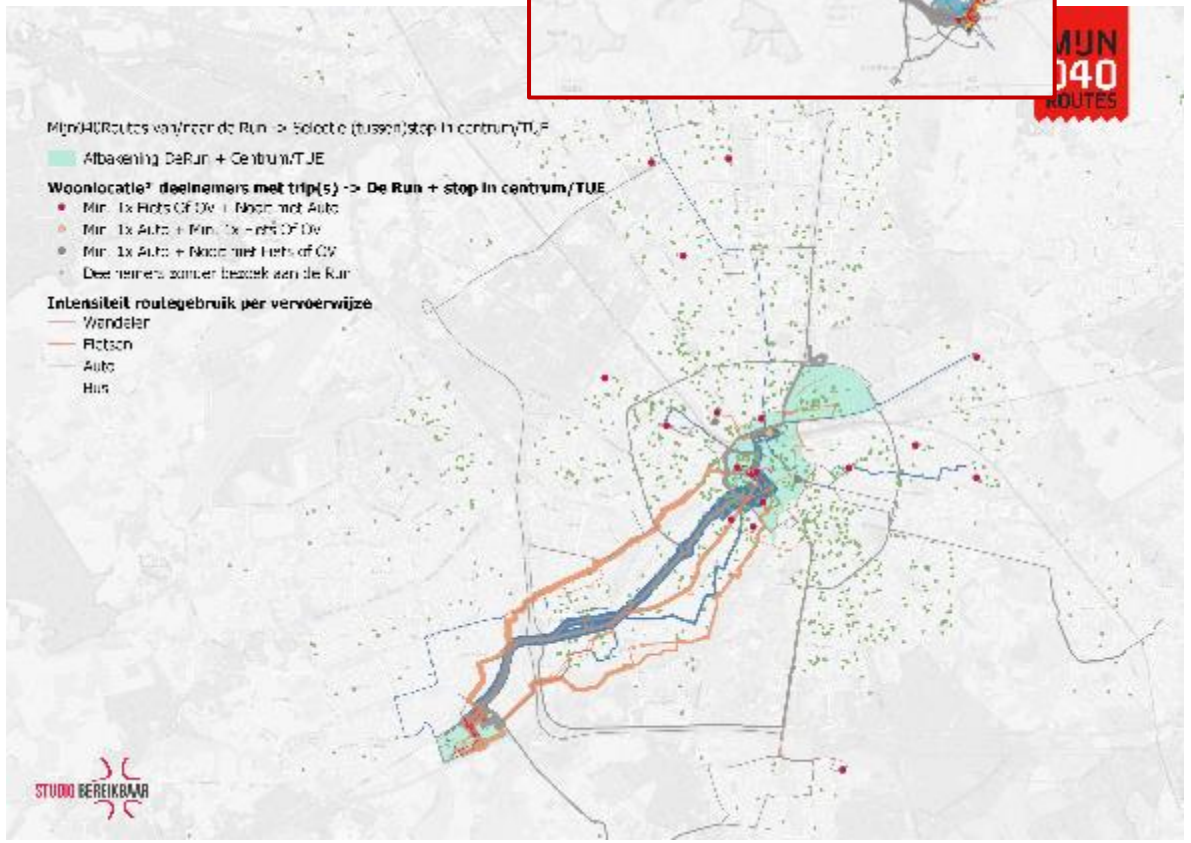




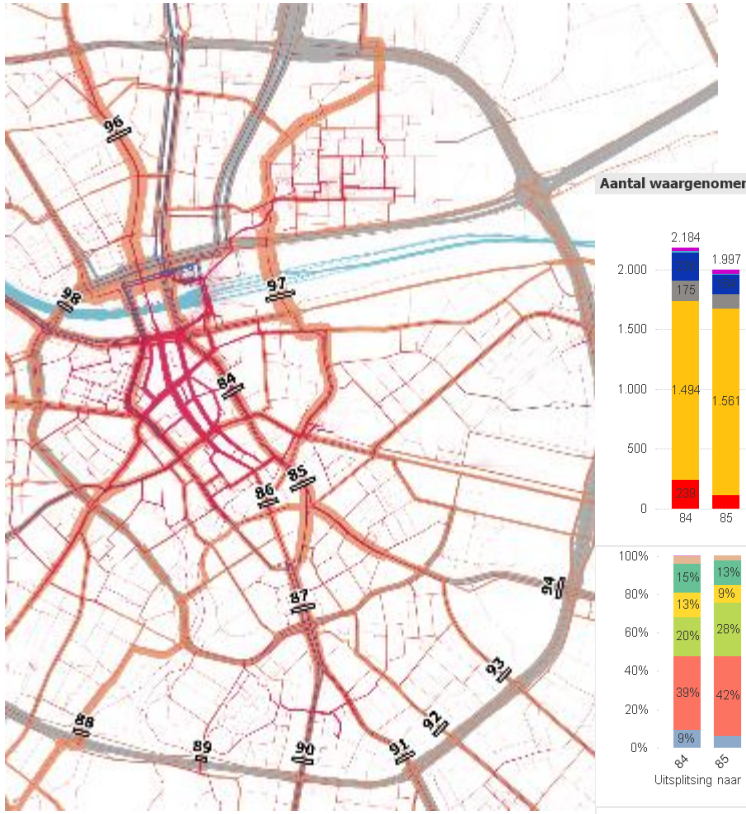
3. GPS-TRACKING DATA

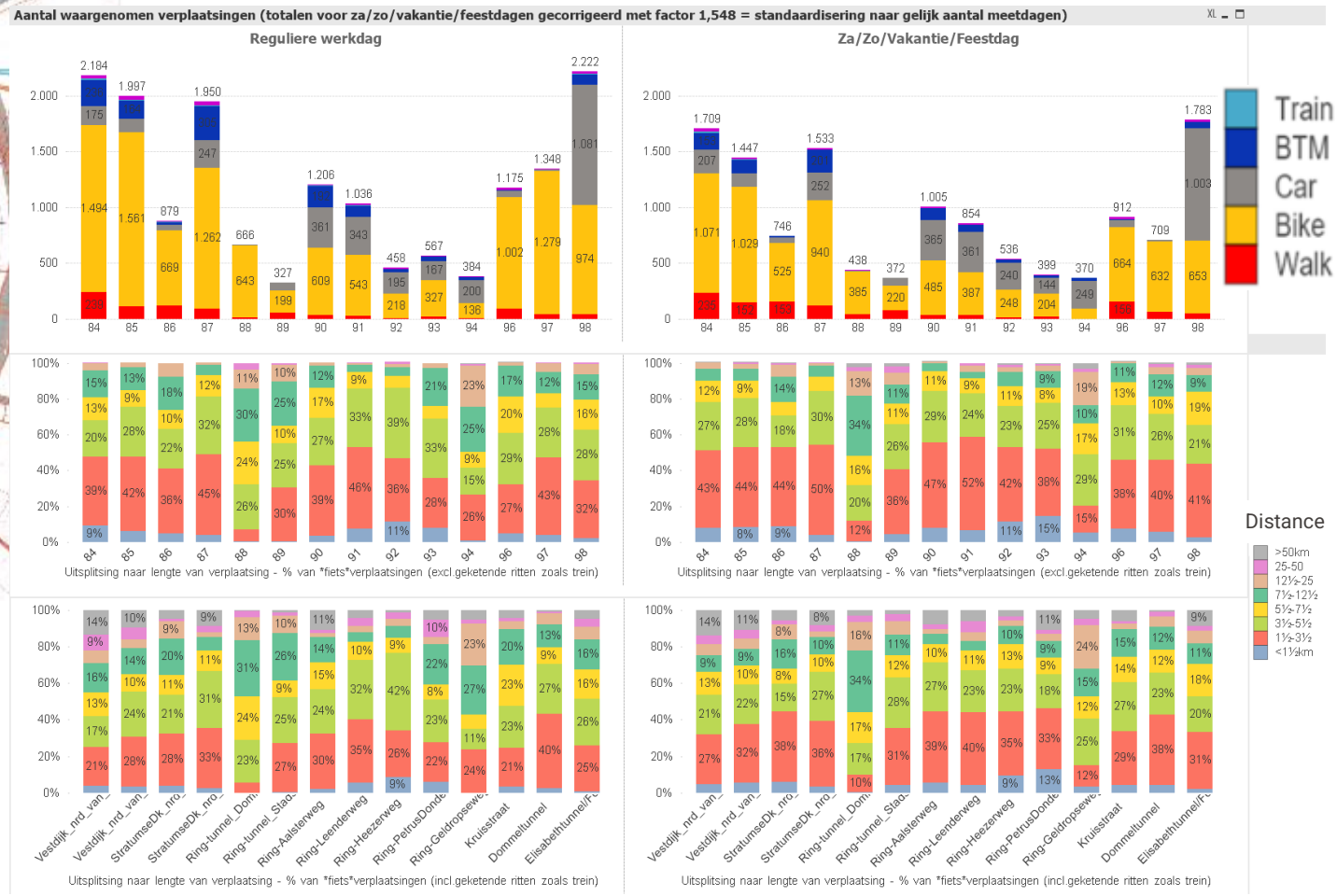
GPS-CORRIDOR ANALYSIS - MULTI-MODAL





GPS-TRACKING - MULTI-MODAL SCREENLINE ANALYSIS

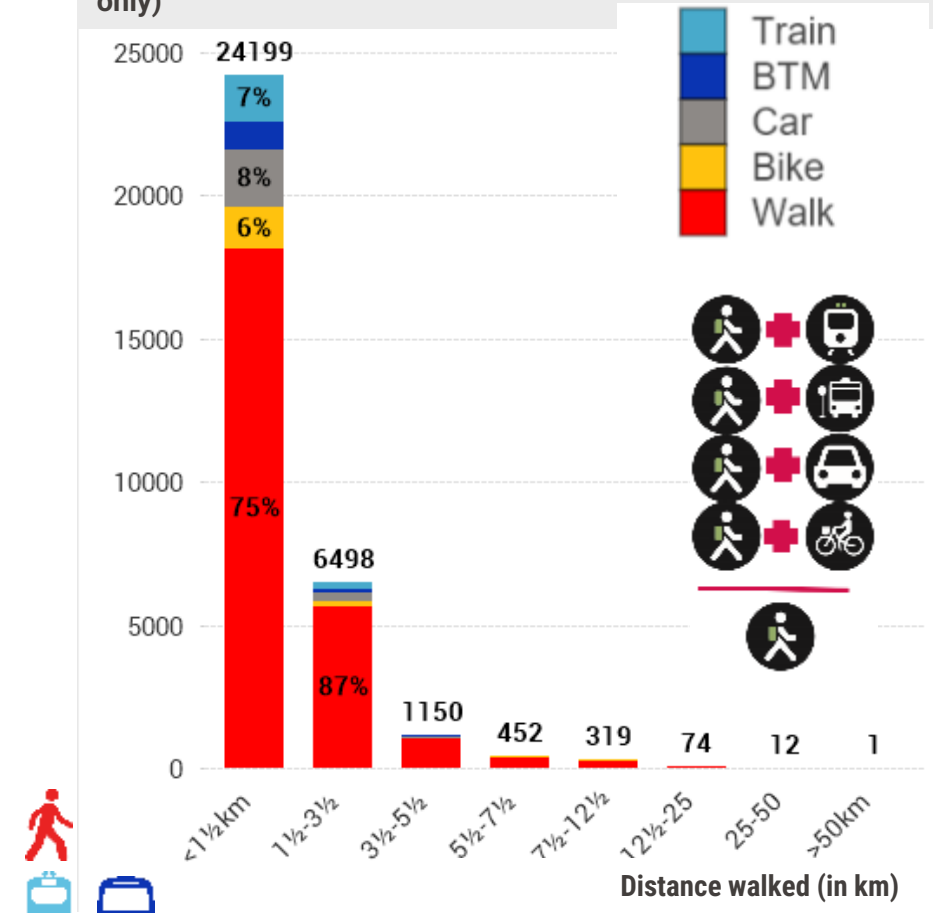




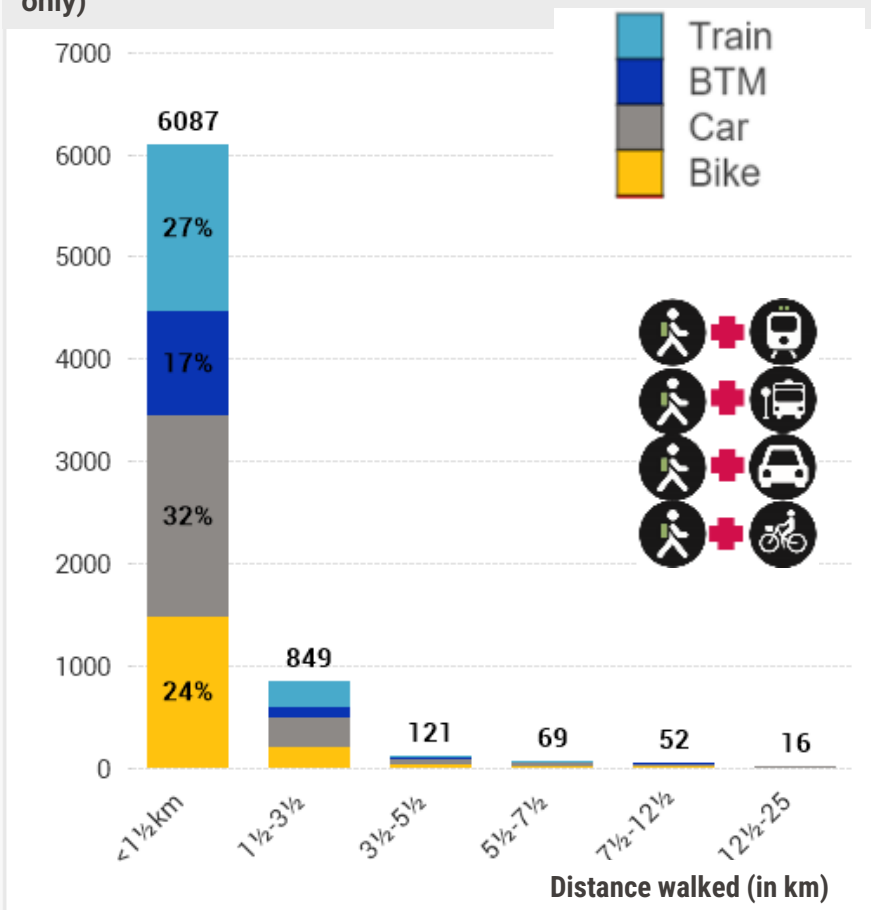
GPS-TRACKING: ACCESS/EGRESS DISTANCES BY FOOT

100%

Tracked walk trips by distance and co-modality (incl. walk only)

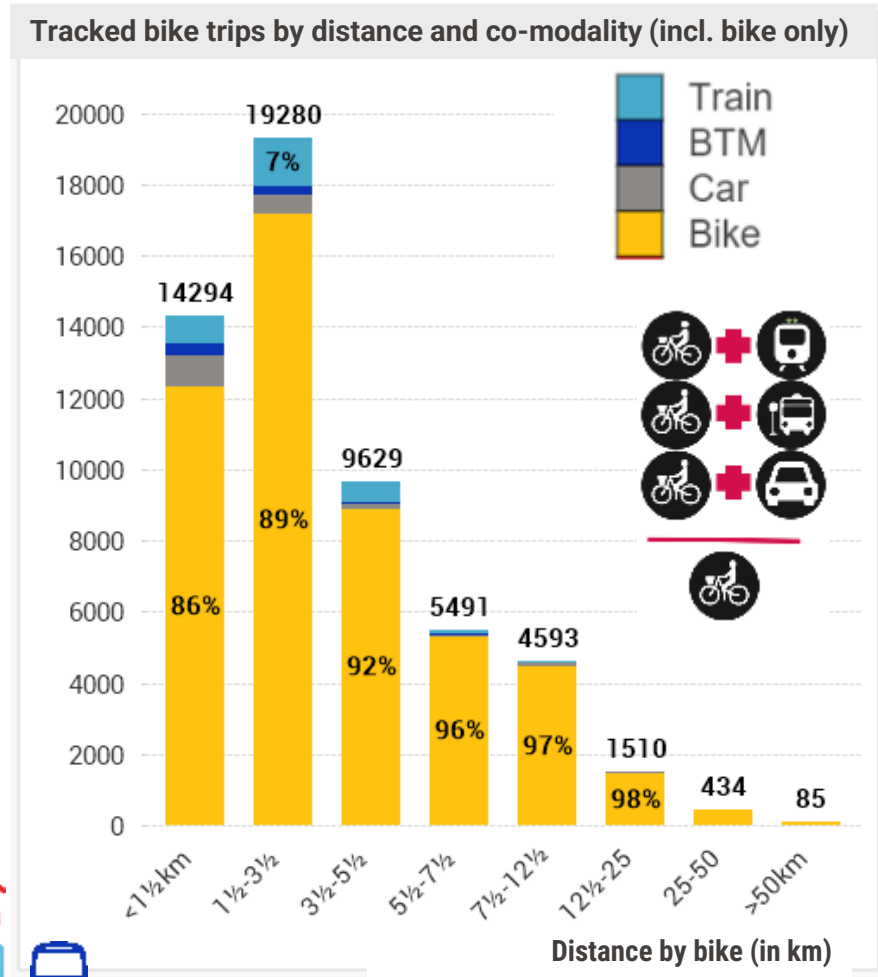


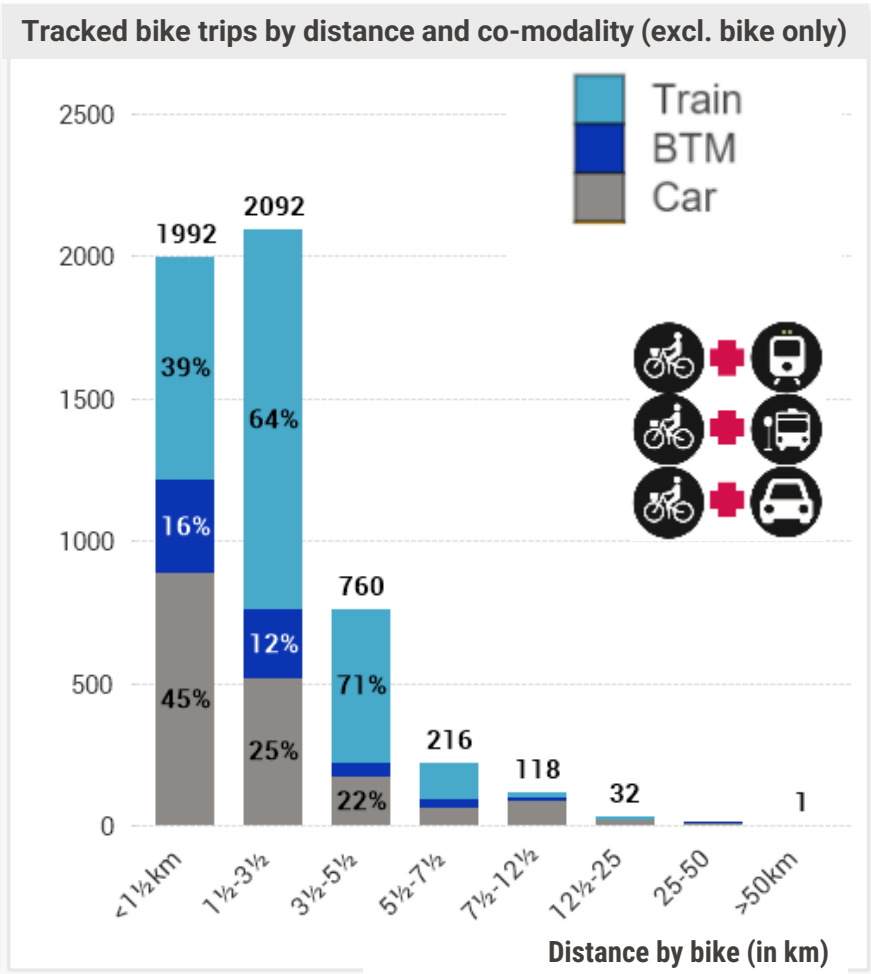
Tracked walk trips by distance and co-modality (excl. walk only)



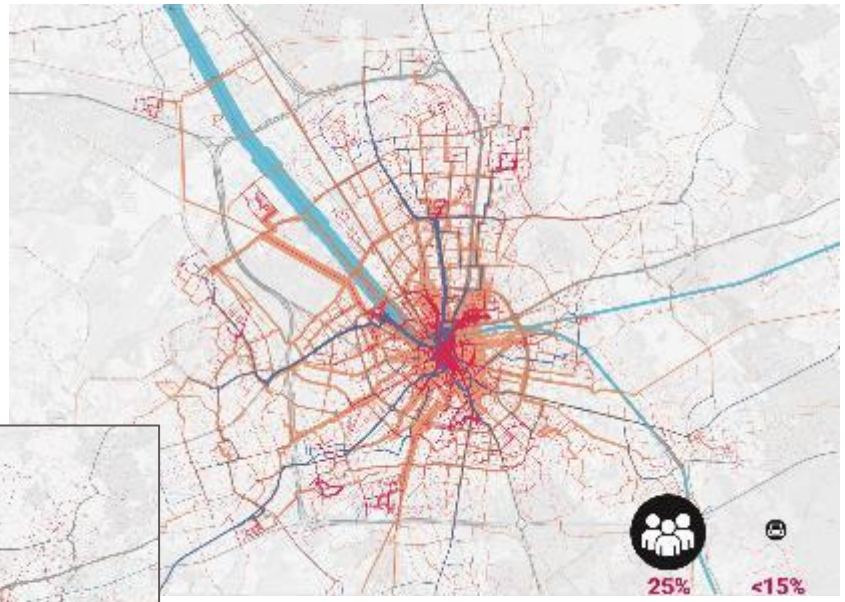
GPS-TRACKING: ACCESS/EGRESS DISTANCES BY BIKE

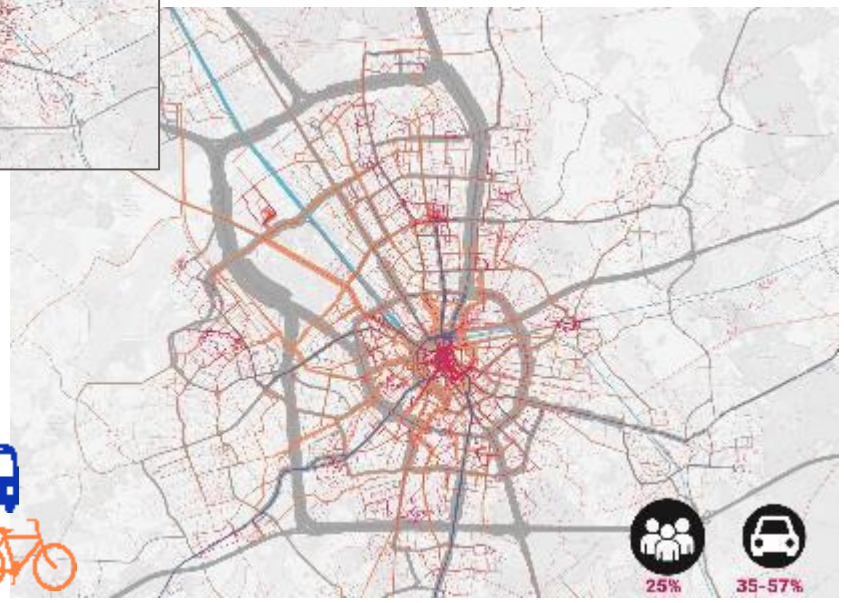
100%



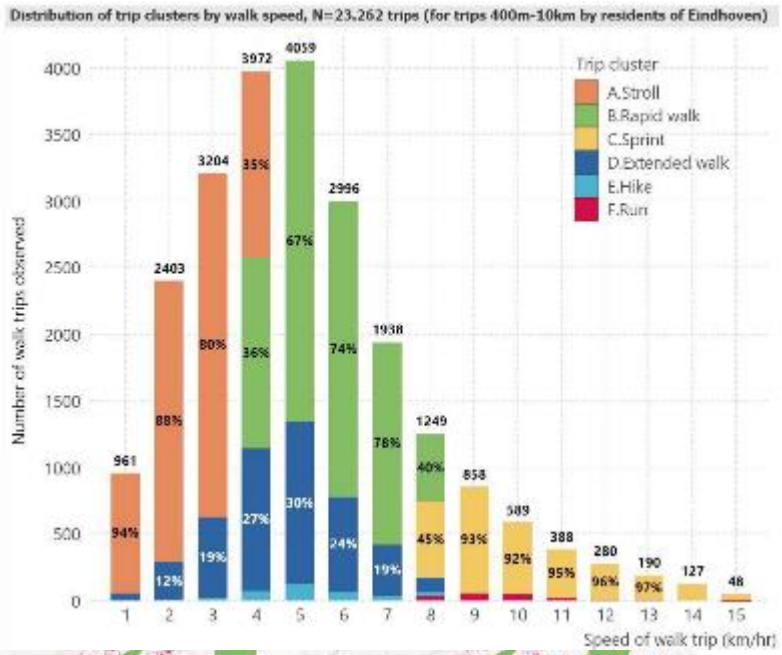


GPS-TRACKING: LOADS PER QUARTILE OF CAR-USE

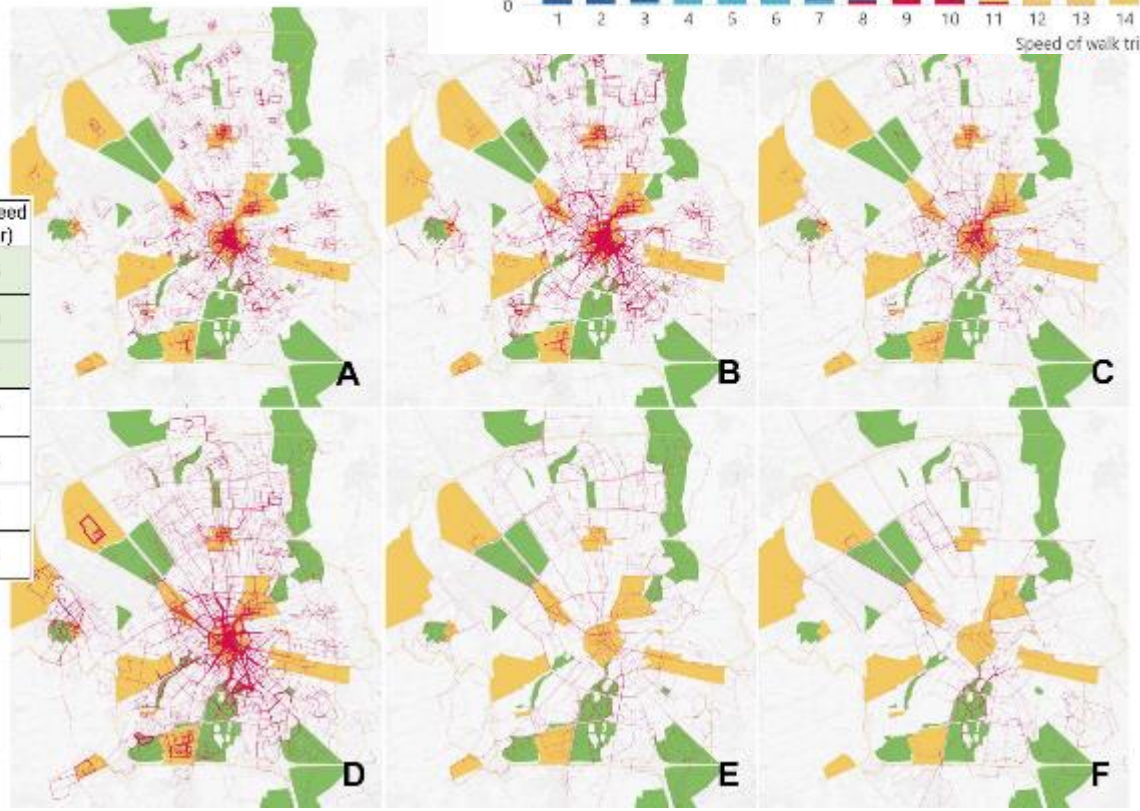




GPS-TRACKING: WALK SEGMENTATION (ON SPEED & LENGTH)



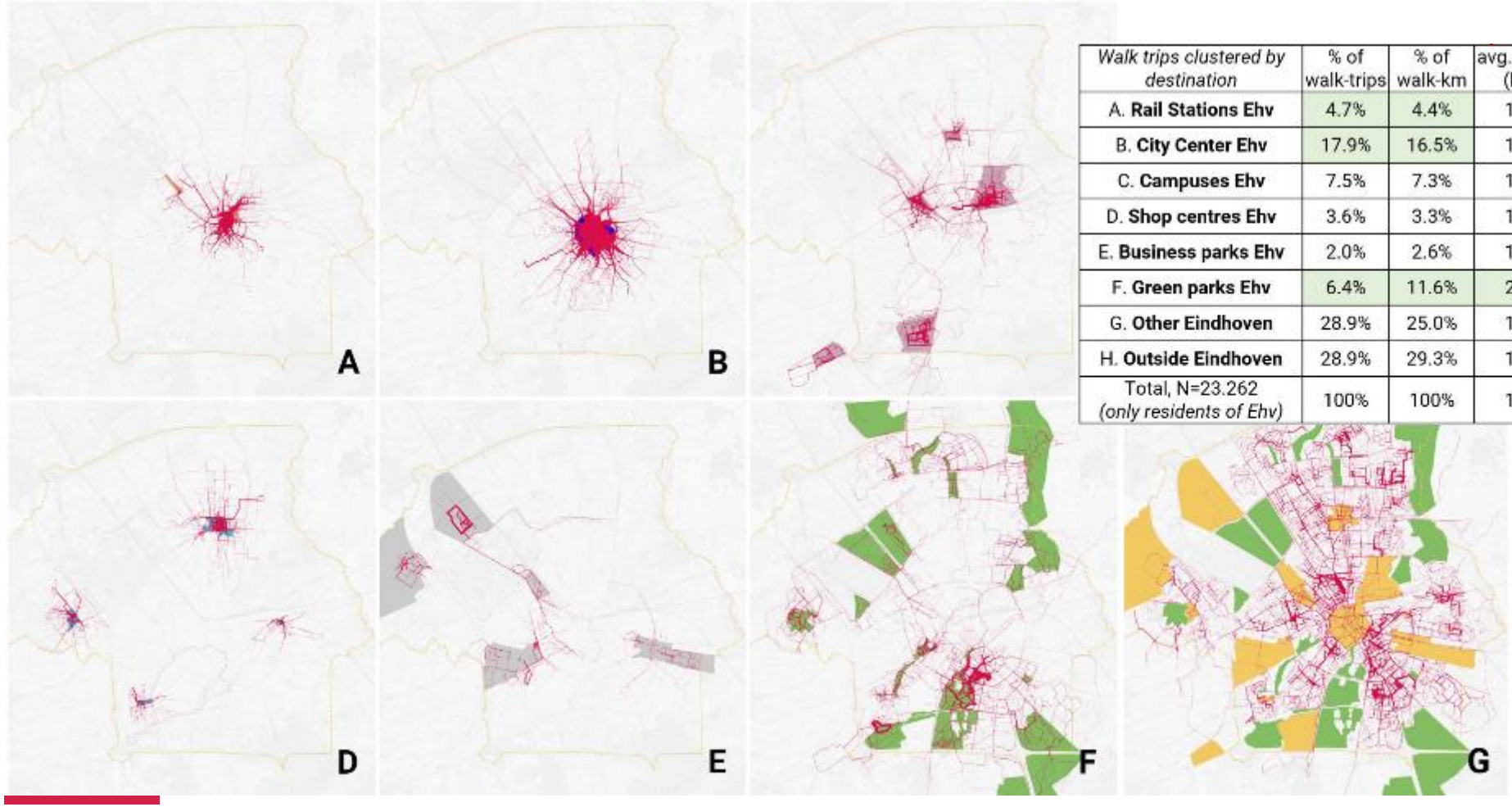
Walk trips clustered by length and speed	% of walk-trips	% of walk-km	avg. length (km)	avg. speed (km/hr)
A. **Stroll** 400-1500m || <4 km/hr	29.6%	18.8%	0.79	2.15
B. **Walk** 400-1500m || 4-8 km/hr	36.0%	24.6%	0.87	5.40
C. **Sprint** 400-1500m || >8 km/hr	12.6%	10.2%	1.04	9.74
D. **Extended walk** 1.5-4.5km || any speed	19.4%	34.5%	2.31	4.07
E. **Hike** >4.5km || <8km/hr	1.6%	7.7%	6.18	4.98
F. **Run** >4.5 km || >8km/hr	0.8%	4.2%	6.56	9.52
Total N=28.164 trips	100%	100%	1.27	4.03



GPS-TRACKING: WALK SEGMENTATION (ON DIRECTNESS)

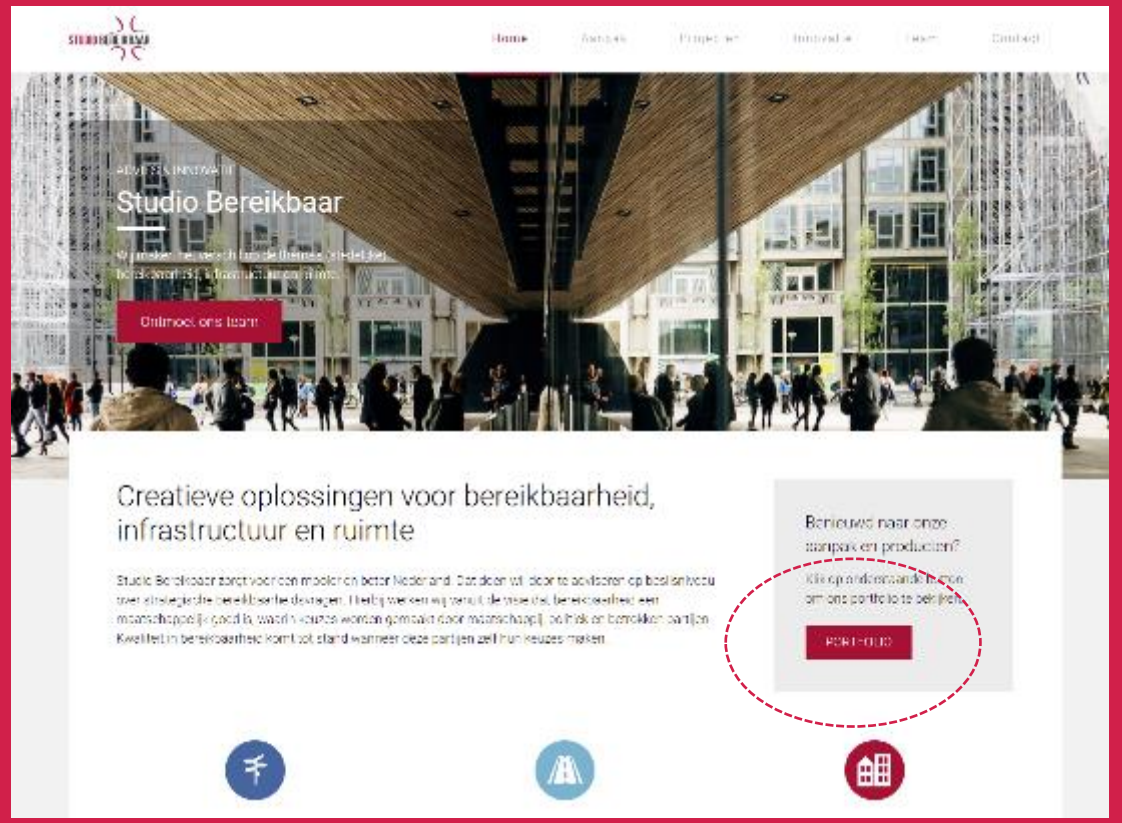
Walk trips clustered by level of directness	% of walk-trips	% of walk-km	avg. length (km)	avg. speed (km/hr)
A. **Direct trips** (distance ratio <1.5)	30.3%	30.7%	1.06	4.47
B. **Indirect trips** (distance ratio 1.5-2.0)	22.4%	20.2%	1.08	4.32
C. **Very indirect Trips** (distance ratio >2.0)	20.3%	20.2%	1.58	3.99
D. **Round trips** (displacement < 200m)	26.9%	29.0%	1.45	3.66
Total N=28.164 trips	100%	100%	1.27	4.03

GPS-TRACKING: WALK SEGMENTATION (ON TYPE OF AREA VISITED)



Walk trips clustered by destination	% of walk-trips	% of walk-km	avg. length (km)	avg. speed (km/hr)
A. **Rail Stations Ehv**	4.7%	4.4%	1.19	4.98
B. **City Center Ehv**	17.9%	16.5%	1.17	3.99
C. **Campuses Ehv**	7.5%	7.3%	1.23	4.05
D. **Shop centres Ehv**	3.6%	3.3%	1.17	4.36
E. **Business parks Ehv**	2.0%	2.6%	1.65	4.69
F. **Green parks Ehv**	6.4%	11.6%	2.30	4.80
G. **Other Eindhoven**	28.9%	25.0%	1.09	3.94
H. **Outside Eindhoven**	28.9%	29.3%	1.29	3.69
Total, N=23.262 *(only residents of Ehv)*	100%	100%	1.27	4.03

MORE EXAMPLES?



Download our visual portfolio at www.studiobereikbaar.nl

Or contact me at: roland.kager@studiobereikbaar.nl + BikeTrainGuru @BikeTrainGuru

DUTCH CYCLING EMBASSY

DUTCH CYCLING INTELLIGENCE

Breda University OF APPLIED SCIENCES

MONITORING& EVALUATING

CYCLE NETWORK PERFORMANCE

Joost de Kruijf

WEDNESDAY 12th May 2021

CENTRAL STATION

(focal point of cycling destination)

City of Tilburg

The Netherlands

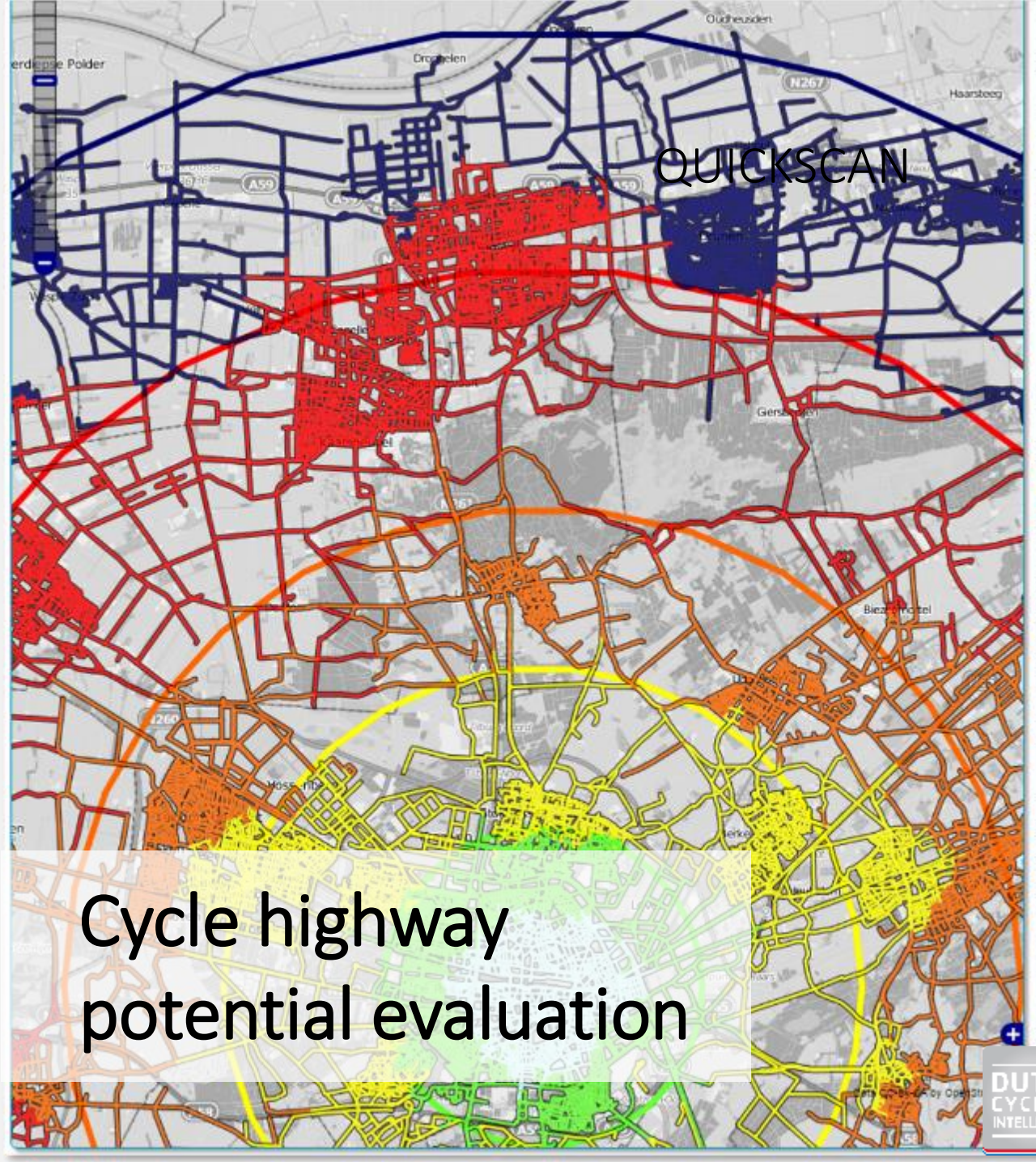
Cycle Highway F261 – Tilburg – Waalwijk , the Netherlands

CYCLE POLICY LIFE CYCLE

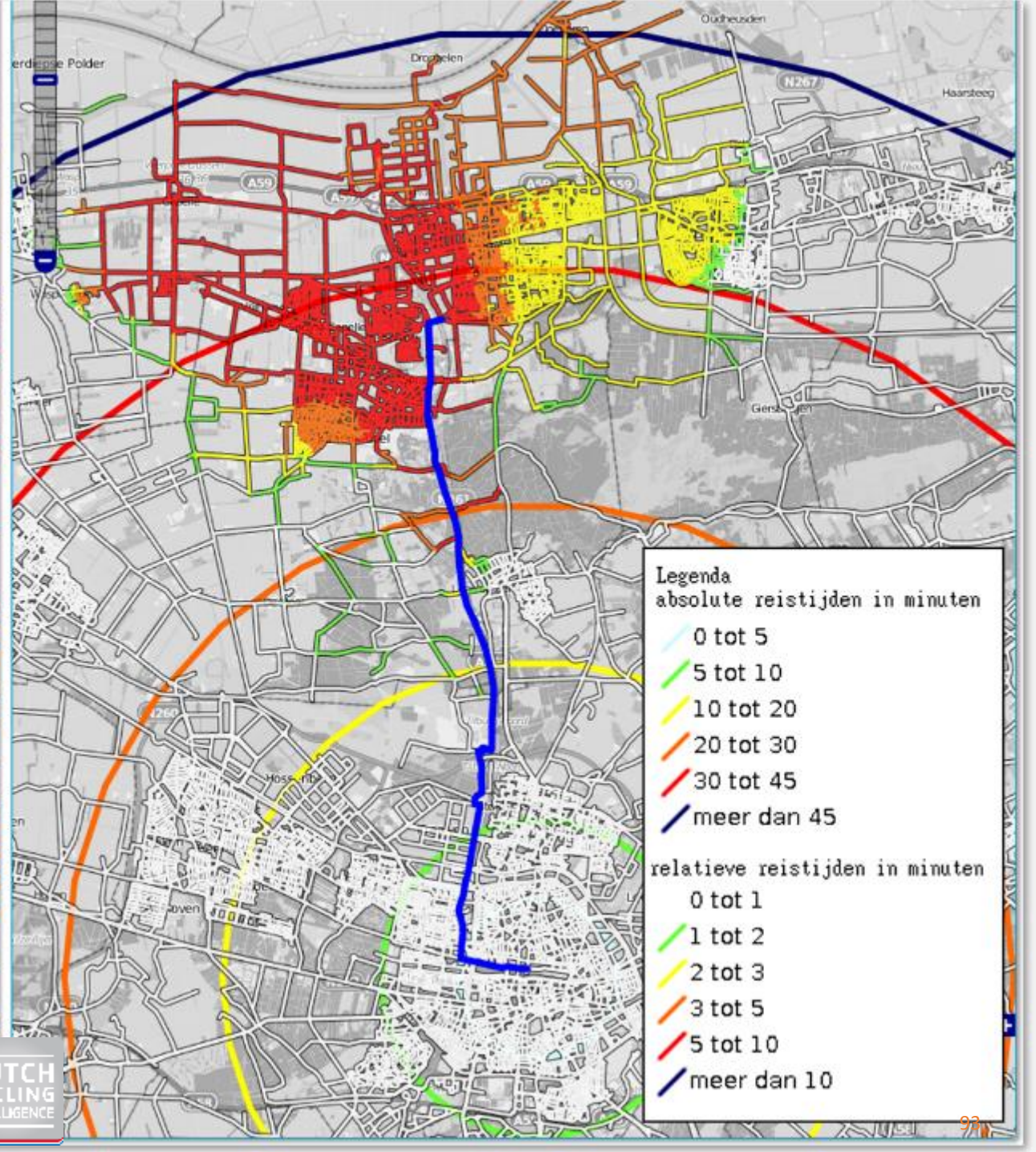
experts for each phase

Cycle Highway F261 – Tilburg – Waalwijk , the Netherlands

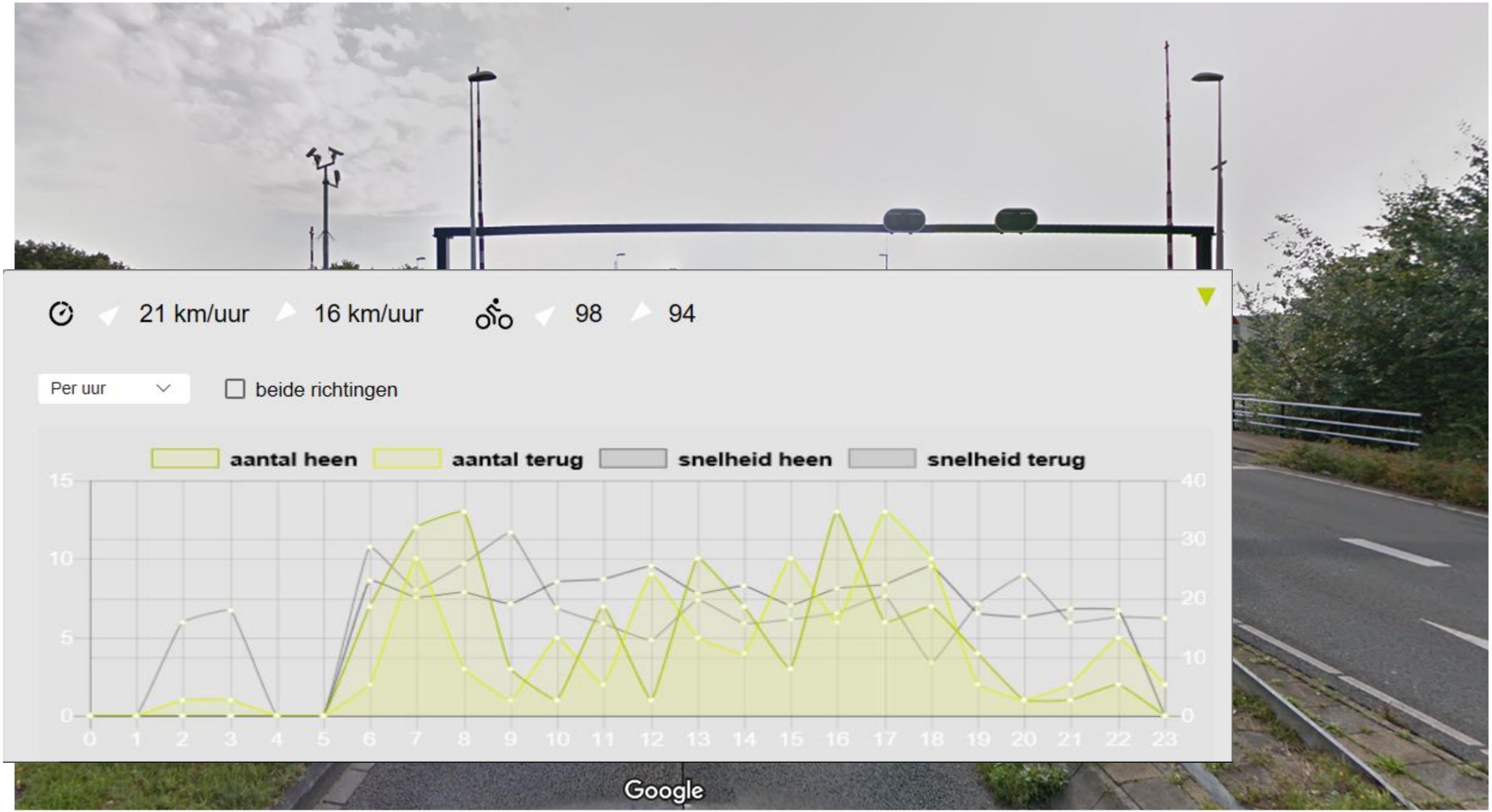
Volumes
Travel time
Routes



Cycle highway potential evaluation



DUTCH CYCLING INTELLIGENCE


21 km/uur
16 km/uur
98
94
Per uur
beide richtingen
aantal heen
aantal terug
snelheid heen
snelheid terug
15
10
5
0
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Google

Fietstelweek 2016

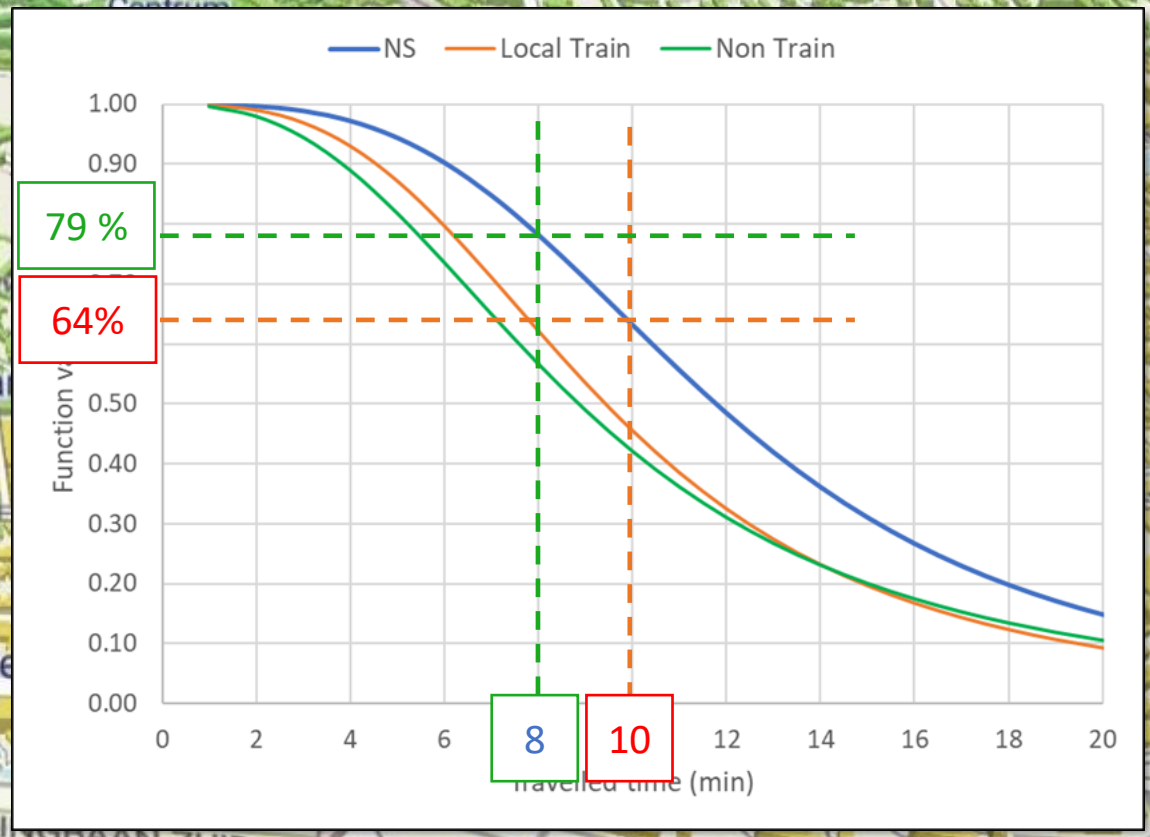
Routes

18 km/uur 192

Fietstelweek 2016

Routes Attractiveness

Accessibility
Railway station



CYCLE POLICY LIFE CYCLE

Cycle Highway F261 – Tilburg – Waalwijk , the Netherlands


DUTCH CYCLING EMBASSY
DUTCH CYCLING INTELLIGENCE
Breda University OF APPLIED SCIENCES
Looking at the actual behaviour of cyclists will not only learn us more about their preferences and barriers,
it also enables us to make the switch to customer friendly cycle policy

Introduction

Deodaat Boer

- Mobilitydata and Innovations
- Before Manager Partnerships @ Cyclist Union The Netherlands

Cycledata

- Bicycle counting system
- New and unique technique
- Innovations

Our partners

- Dutch Cycling Embassy
- Fietsersbond (Cyclist Union)

Cycledata

- Developed with the City of Rotterdam
- Due to Covid-19 there is an increasing need for bicycle data. We expect an increasing amount of cyclists in the future.

Traditional applications..

cycledata

Signum

- Plug & Play
- Detects vehicles with an accuracy of more than 95%
- Data: number of cyclists and speed
- Detects in 2 directions
- Permanent and temporary measurements possible
- Realtime data available in interface
- Monitoring by Cycledata (**Remote Battery Control** and **Remote Data Control** to prevent data loss)
- Power by solar panel

cycledata

i-Signum

- Detects vehicles with an accuracy of more than 95%
- Large groups/columns are detected in real time
- Better flow for cyclists by Intelligent traffic control installation (iVRI)
- Detection will be converted from ‘’raw data’’ to CAM Data through our partner MONOTCH into the UDAP/TLEX platform
- Pilot with city Utrecht en Talking traffic
- Real-time visibility in My Cycle Traffic
- Monitoring by Cycledata (Remote Battery Control and Remote Data Control to avoid data loss)

cycledata

monotch

Specifications

Signum

- Plug & Play
- Solar panel
- Battery box incl. modem
- Bicycle counting board incl. desired communication (sticker)
- Housing vandalism and theft proof

i-Signum / i-Signum *Plus*

- Modem cabinet
- Housing vandalism and theft proof

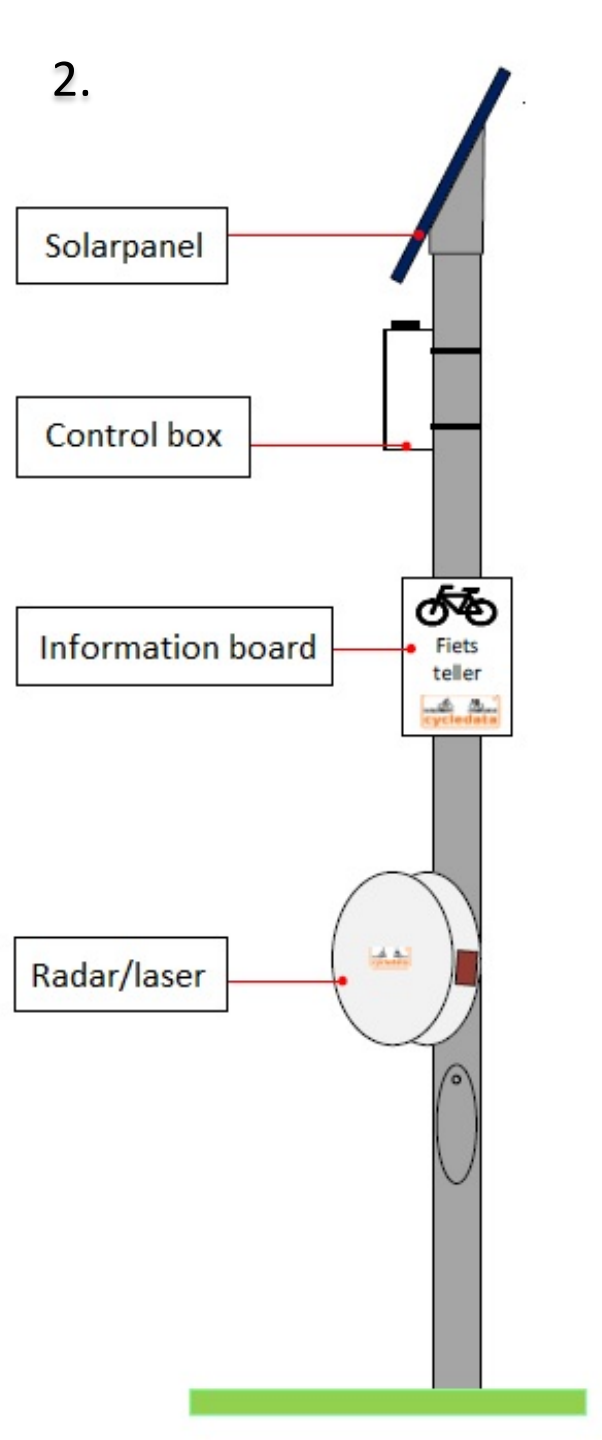
Displays available:

cycledata

monotch

Installation options

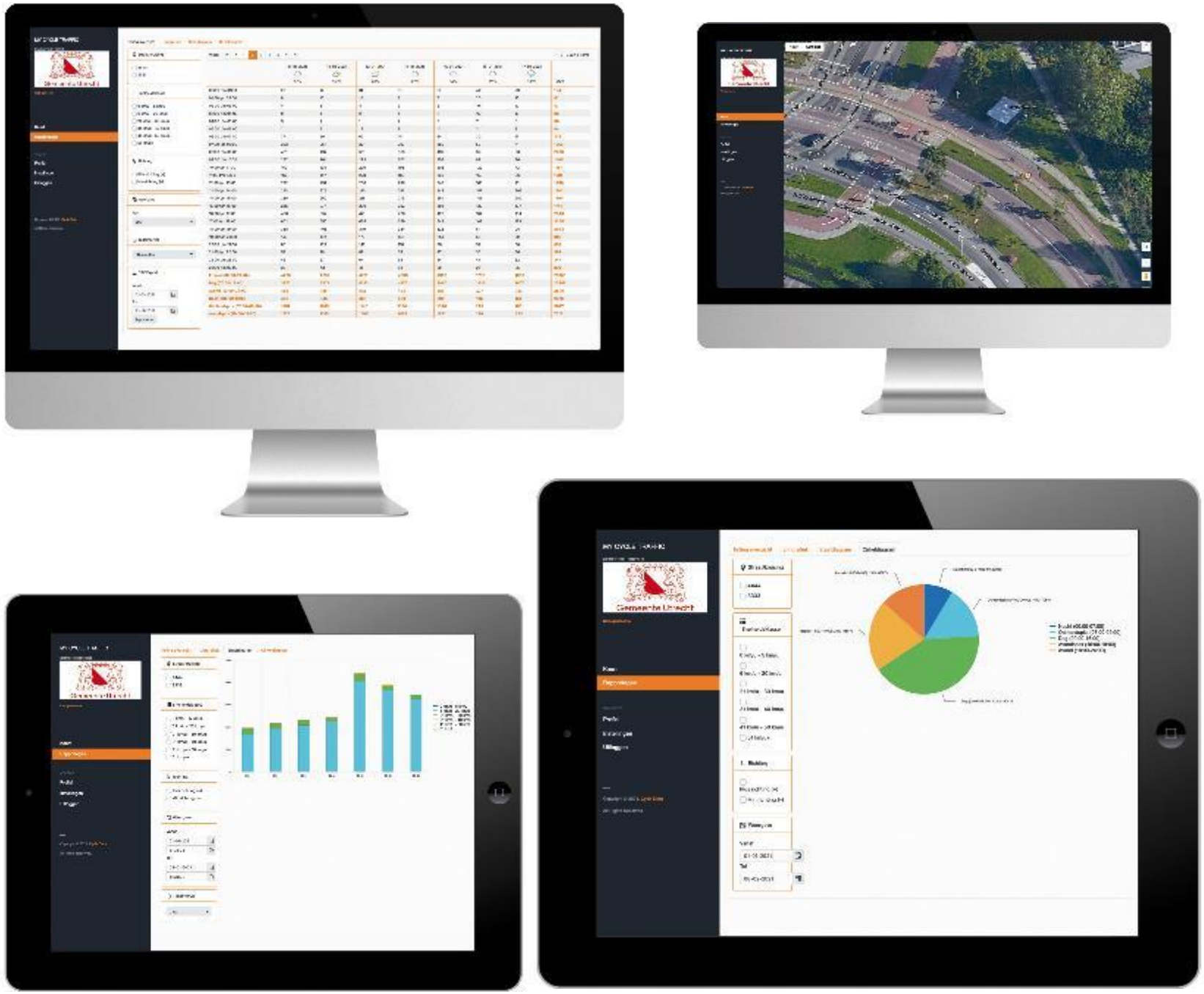
1. Move: at an existing ligthpole
2. Flex: including a pole
3. Direct Power: electricity from the lightpole



cycledata

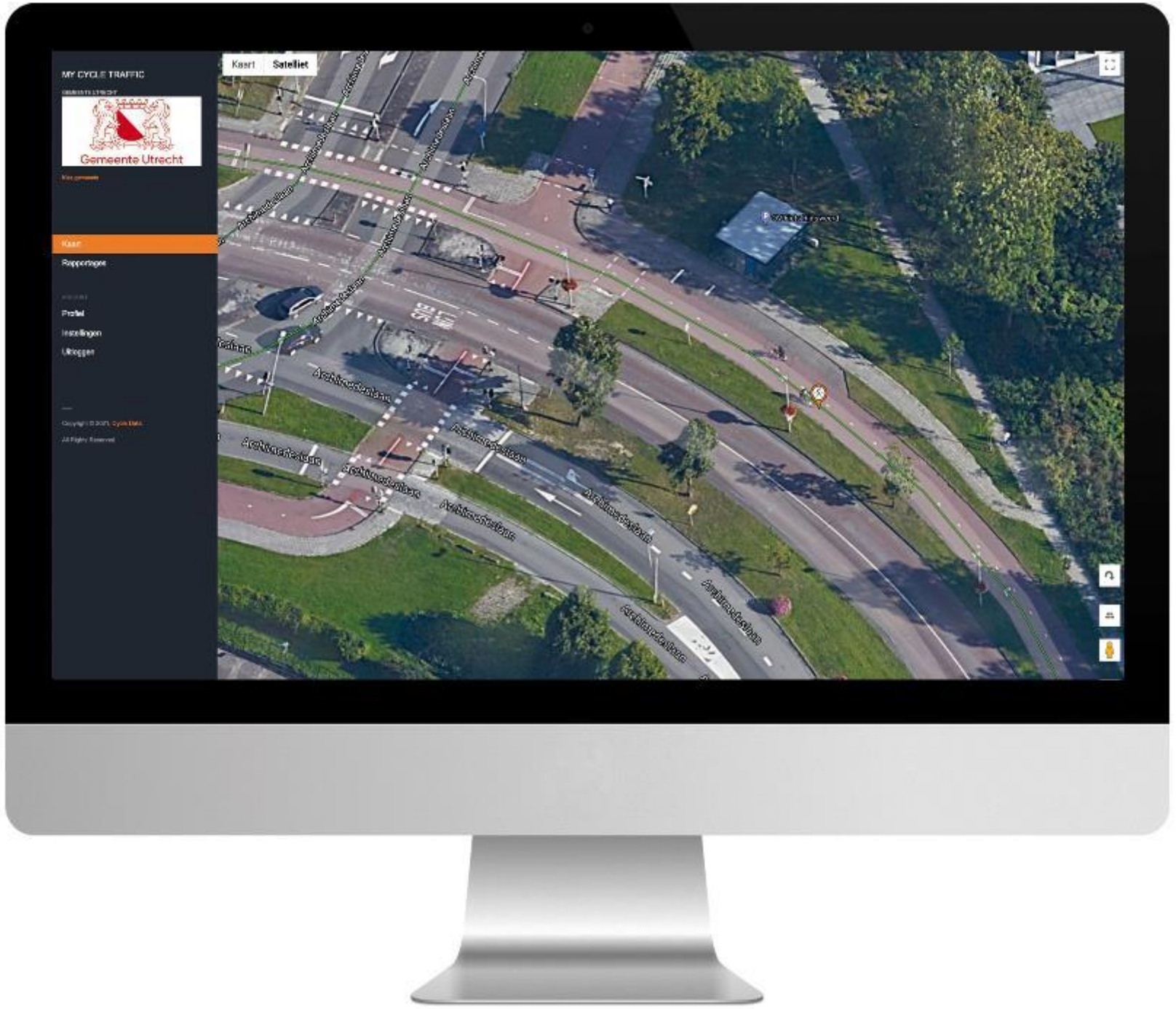
Interface ‘’My Cycle Traffic’’

- Realtime data
- Numbers, speed, direction, time per period and weather influence
- Reporting on demand in.csv format



cycledata®

Dashboard

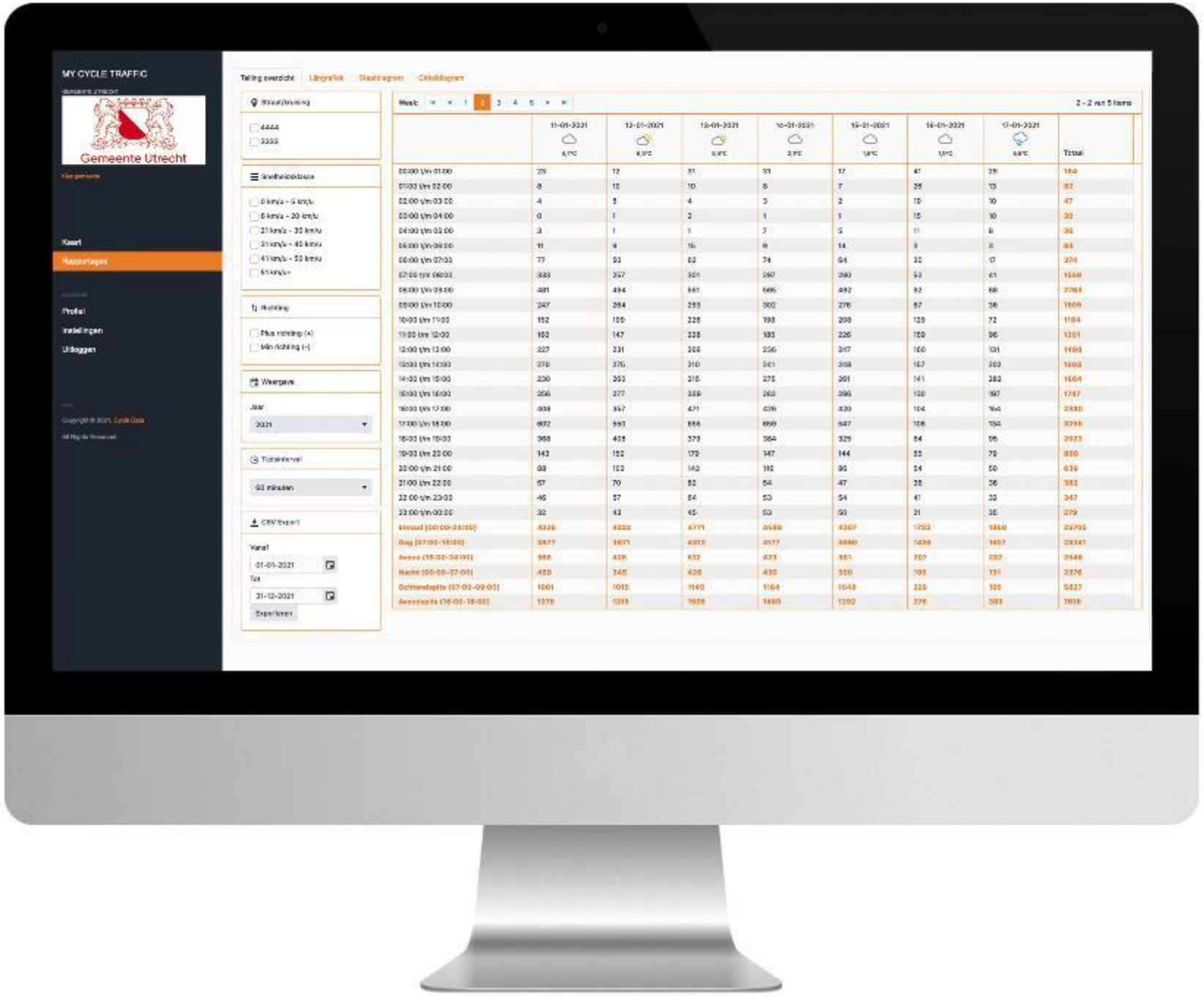


cycledata®

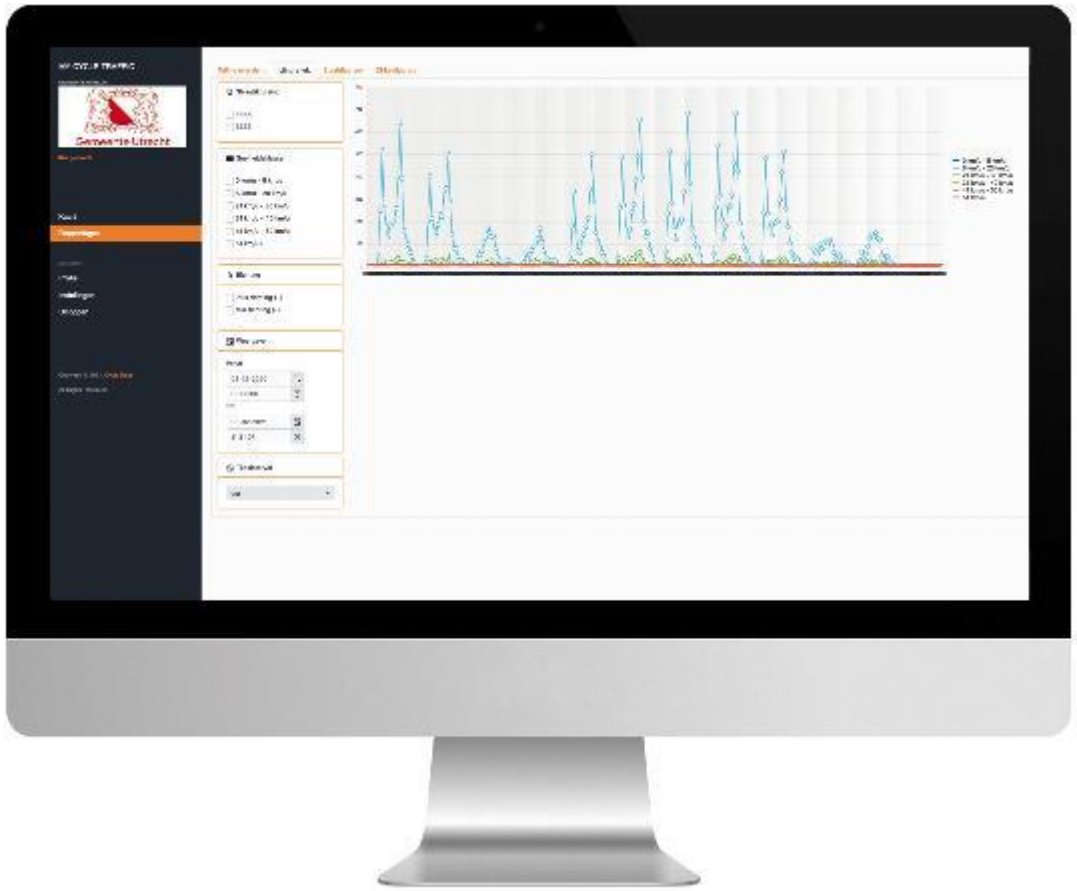
Dashboard

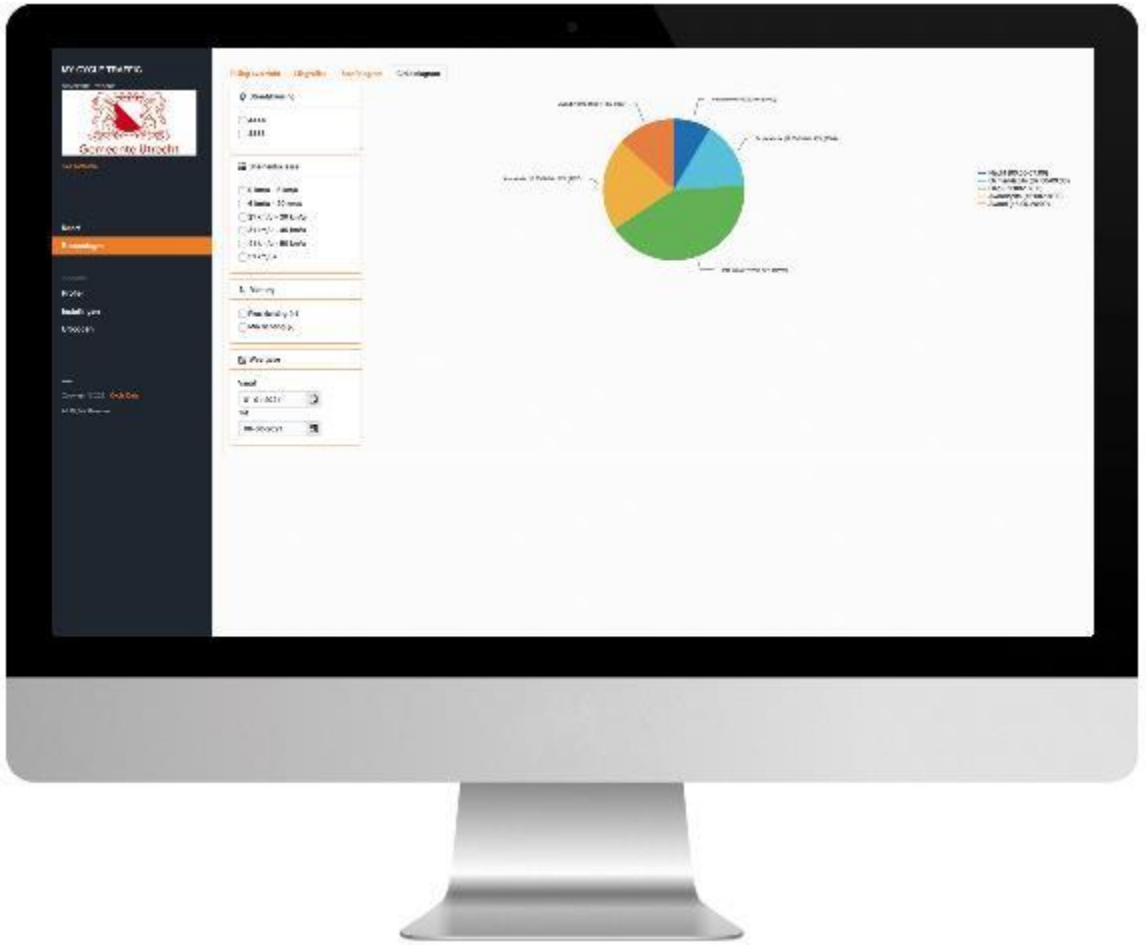
- Real time reports:
- Numbers
- Direction
- Speed category

- CSV files: numbers – direction – speed – time of passing



cycledata®





Why detect cycling data?

Signum

- Monitoring travel patterns
- Measuring the usage of bicycle facilities
- Understanding safety trends
- Evaluating the impact of projects
- Prioritizing infrastructure
- Developing multi-modal transportation models
- Count data supports existing planning initiatives and easy to integrate into planning practices among transportation agencies

i-Signum

- Give priority to cyclists (green flow)
- Preventing group formation waiting at traffic lights (Covid-1.5 metres)
- Preventing of cycle jams

cycledata®

Innovations (coming soon)

- Measuring the volume of the bicycles: to see the difference between a child at a bike or a cargobike. Or to detect a moped compared to a racing bike, which have the same speed

- Detection of noise and air pollution:
- Decibel
- Nitrogen
- Fine dust
- CO^2

- Results also visible in the dashboard

cycledata


On the road
to good
cooperation!
cycledata

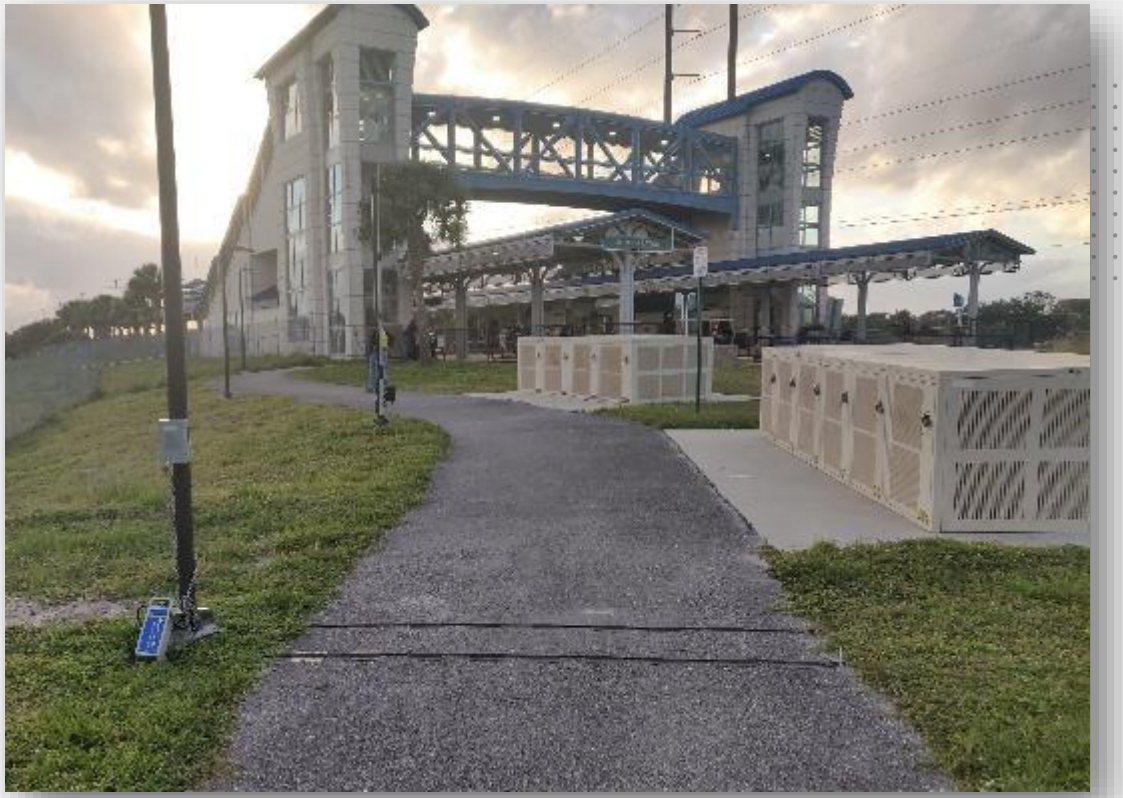
QUESTIONS AND CONTACT INFORMATION

- John Krause – John.krause@dot.state.fl.us
- Tianjia Tang – Tianjia.tang@dot.gov
- Steven Jessberger - Steven.jessberger@dot.gov
- Clayton Clark - Clayton.clark@dot.gov
- Chris Bruntlett - Chris.bruntlett@dutchcycling.nl
- Johan Diepens - J.diepens@mobycon.nl
- Herbert Tiemens - Herbert.tiemens@utrecht.nl
- Roland Kager - Roland.kager@studiobereikbaar.nl
- Joost de Kruijf - Kruijf.J@buas.nl
- Deodaat Boer – Deodaat@cycledata.nl
- Eric Katz – Eric.katz@dot.state.fl.us
- Liz Stolz – Estolz@marlinengineering.com
- Consulate General of the Netherlands in Miami – MIA-EA@minbuza.nl

CLOSING VIDEO

THANK YOU FOR ATTENDING!

- Recordings will be made available soon after the webinar
- Please complete the follow-up survey that will be sent via email at the conclusion of this webinar
- Contact Eric.Katz@dot.state.fl.us for any questions related to today's presentation and/or AICP CM credits



Tri-Rail Station, Boca Raton, FL

Special thanks to…

FDOT Districts, FDOT Communications Office, Public Information Office, Transportation Data and Analytics Office, Systems Implementation Office, Safety Office, Design Office, Public Transit Office, Office of Policy Planning, Transportation Engineering Research Lab, Traffic Operations, and all our in-state and out-of-state partners! See you in 2022!

SAFETY MESSAGE

- Pedestrians: Cross at the crosswalk