

# Safe and Sustainable Street Design

A workshop for the City of Ljubljana, Slovenia

Abhimanyu Prakash, Associate Director Renata Carvalho, Program Manager Marina Visic, Program Associate

Global Designing Cities Initiative

**29th January, 2025** 







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Ljubljana, Slovenia 29th January, 2025

@GlobalStreets globaldesigningcities.org















**GDCI & the Global Street Design Guide** 

Bloomberg Philanthropies









# Global Designing Cities Initiative



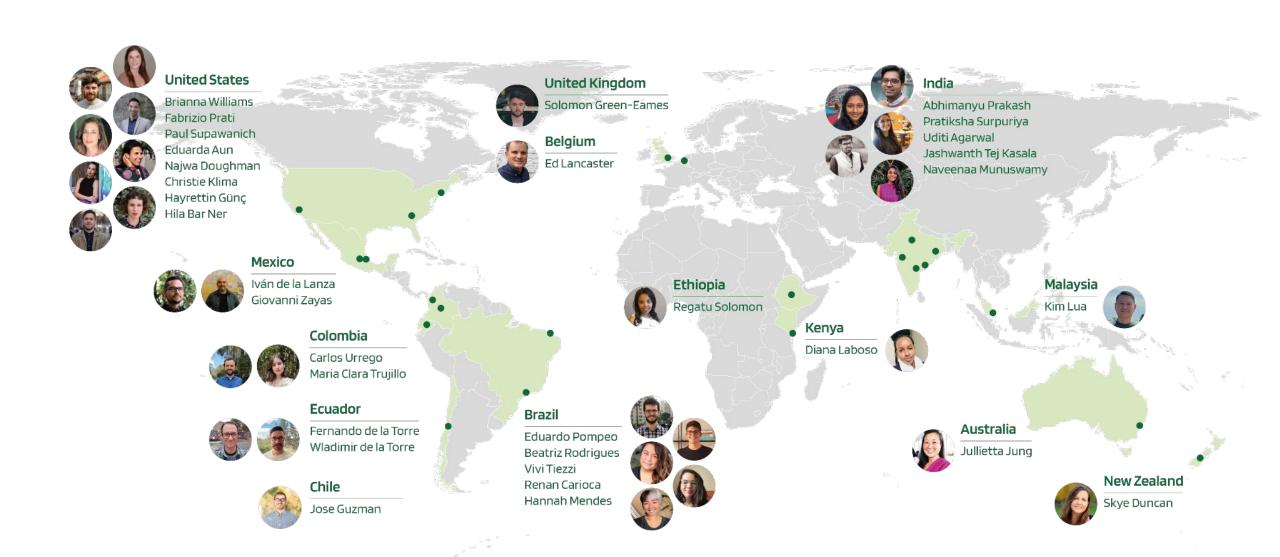




Janette Sadik-Khan,
Former Commissioner of Transportation in New York City
Launched GDCI in 2014

#### **Global Team**



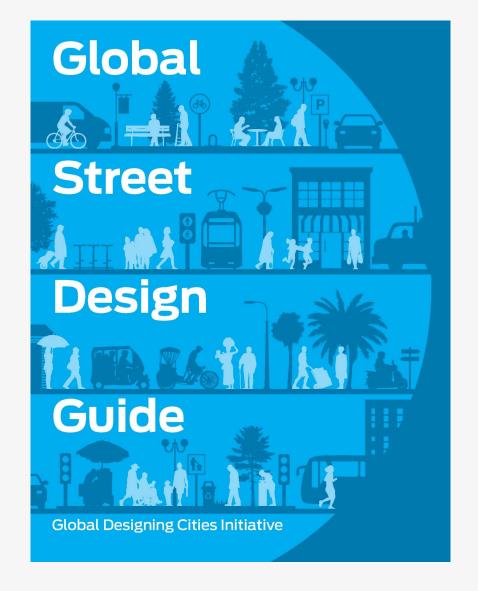


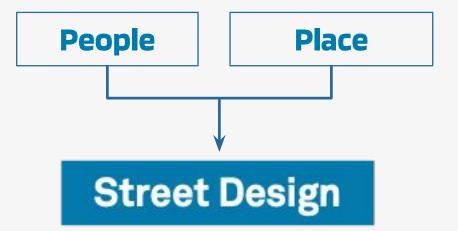


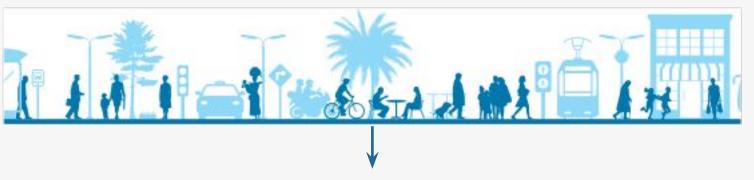
Our mission is to transform streets around the world, inspiring leaders, informing practitioners, and inviting communities to imagine what's possible when we design streets that put people first.



#### **Global Street Design Guide**







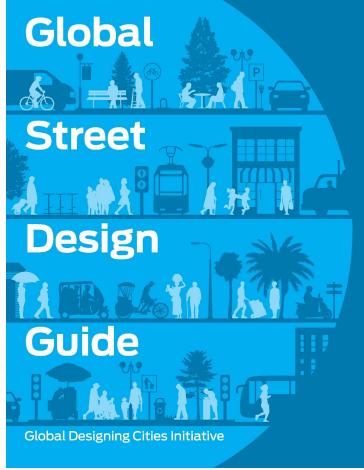
#### **Desired Outcomes**

- Health and Safety
- Livability and Quality of Life
  - Multi-modal Access
- Environmental Sustainability
  - Economic Sustainability
    - Equity

# 150+ contributors to GSDG

#### **CONTRIBUTORS**

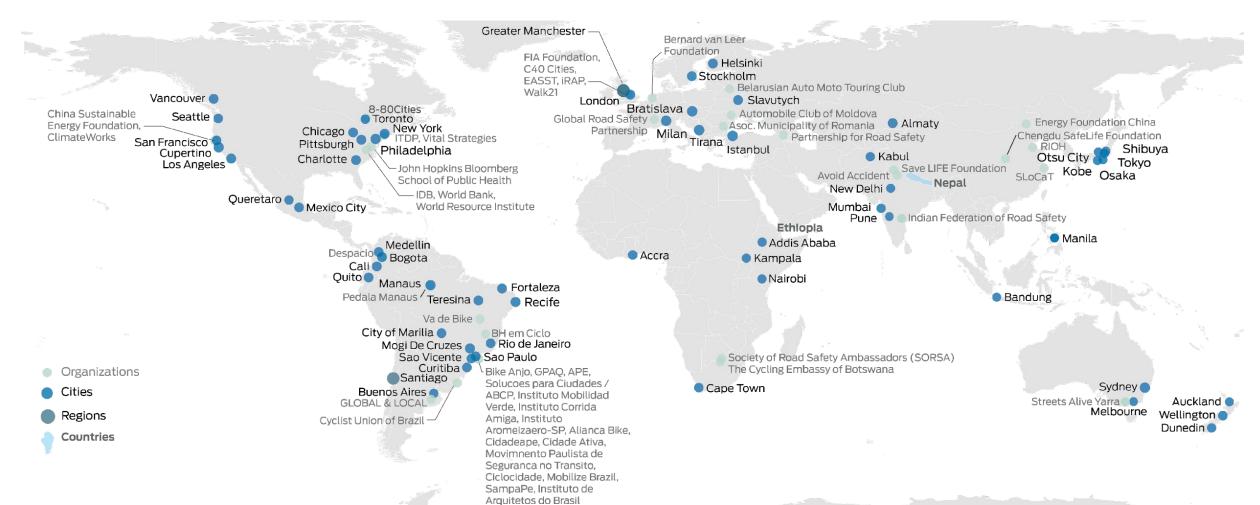
Argentina- Soledad Aguirre Sors/Guillo Dietrich/Juanjo Mendez/Sol Mountford. Australia- Judy Jaeger/Rob Adams/Steven Burgess/Leanne Hodyl/Rob Moore/Stuart Niven/Bart Sbeghen/Ros Rymer/Sandy Burgoyn/Kerry Gallagher/Simon Lowe/ Emily Scott/Victoria State/Kristie Howes/Giles Michaux / Daniel Przychodzki/Lorrae Wild. Azerbaijan - Vusal Rajabli. Brazil - Ezeguiel Dantas/Diego França/Tony Lindau/Marta Obelheiro/Priscila Coli Rocha/Clarisse Cunha Linke/Mauricio Duarte Pereira/ Washington Fajardo/André Lopes Pacheco Ormond/Ciro Biderman/Adriano Borges Costa/Gabi Callejas/Danielle Hoppe/ Fernando Mello Franco/Gustavo Partezani Rodrigues/Luis Eduardo Surian Brettas. Canada-Mark Van Elsberg/Anders Swanson. China- Karl Fjellstrom/Greg Smith/Sybren Boomsma/Xuesong Wang. Colombia- Leidy Constanza Lopez Mateus/William Mauricio V. Caicedo/Carlos Felipe Pardo/Diana Wiesner/Margarita Maria/Angel Bernal/Carlos Cadena Gaitan. Denmark- Sofie Kvist/Jeff Risom. Ecuador- Ana Maria Duran Calisto/Jaime Izurieta Varea. England- Toby Howe/Emma Maclennan/Philip Jones/Esther Kurland/Lilli Matson/Ben Plowden. Ethiopia- Mulugeta Abeje. Finland-Reeta Keisanen/Reeta Putkonen. Georgia-Gela Kvashilava. Germany-Burkhard Horn/Joerg Ortlepp/Maria Pohle/Andre Munch. Ghana- Nabe Kanfiegue/Michael Konadu/Magnus Lincoln Quarshie/Korama Ocran. Greece-Stelios Efstathiadis. Haiti-Louino Robillard. India-Anuj Malhotra/Swati Ramanathan/Raj Cherubal/Shreya Gadepalli/Advait Jani/Madonna Thomas/Samarth Das /Binoy Mascerenhas/Piyush Tewari. Indonesia-Nunun Yanuati. Israel-Ofer Manor. Kenya-Cecilia Andersson/Christopher Kost/Hilary Murphy/Laura Petrella/Robyn Watson. Korea-Keong Gu Hong/YongJin Cho/Noh Soo Hong, Kosovo-Bekim Ramku, Kyrgyzstan-Chinara Kasmambetova, Laos-Bradley D Schroeder, Mexico-Salvador Herrera/Alejandro Larios Morales/Dhyana Quintanar Solares/Gabriel E. Todd/Adán Domínguez/Giovanni Zayas Franzoni. Moldova- Tatiana Mihailova. New Zealand-Ludo Campbell-Reid/Hayley Fitchett/Simon Harrison/Don Mckenzie/Lennart Nout/Melizza Morales Hoyos/Hugh Nicholson/Megan Wraight. Peru-Mariana Alegre Escorza. Russia-Artur Shakhbazyan. Scotland-Gillian Black. Singapore-Andrew David Fassam/Yi Ling Pang. South Africa-Katherine Ewing/Rashiq Fataar/Barbara Southworth. Sweden-Goethenburg/Suzanne Andersson/Daniel Firth/Svante Guterstam/Alexander Stahle. Switzerland-Sandra Piritz. The Netherlands-Dick Van Deen/Koen De Boo. Turkey-Merve Aki /Cigdem Corek. United States-Adnan Hyder/Andres Ignacio Vecino Ortiz/Michael Murphy/Jeffrey L. Rosenblum/Norman Garrick/Jason Vargo/David Vega-Barachowitz/Philippa Brashear/Oscar Correa/David Grahame Shane/Eric Jaffe/Ethan Kent/Lee Jung Kim/Michael King/Michael Kodransky/Karen Lee/Geeta Mehta/Justin Garrett Moore/Richard Plunz/Andrew Rudd/Jeffrey Shumaker/Morana Stipisic/Gary Toth/Nans Voron/Nick Falbo/Peter Koonce/Illaria Salvadori/Paul Supawanich/Robin Abad Ocubillo/Nathan Polanski/Julie Babinard/Soames Job/Ben Welle. Vietnam-Tra Vu. Zambia-Carl Johan Collet.



# 40+ countries 70+ cities

#### Endorsed by over 100+ cities and organizations













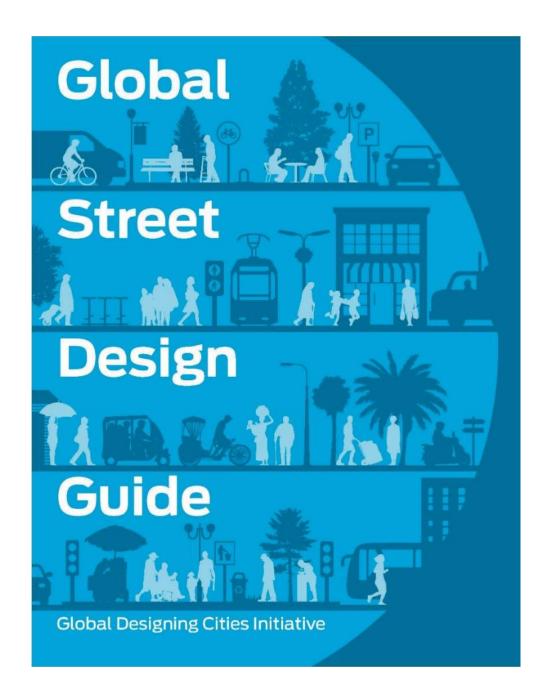








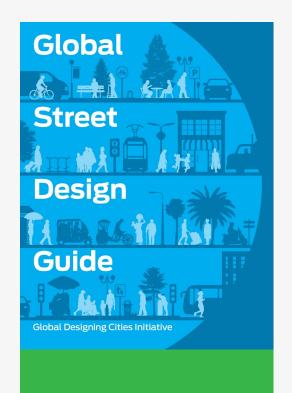




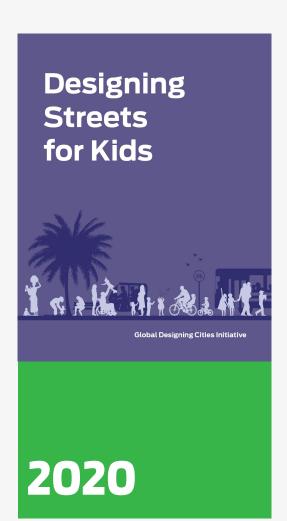
Free Download

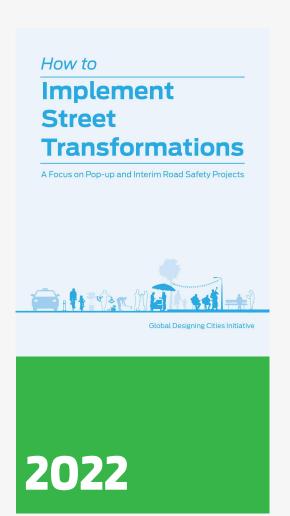
#### Global Designing Cities Initiative

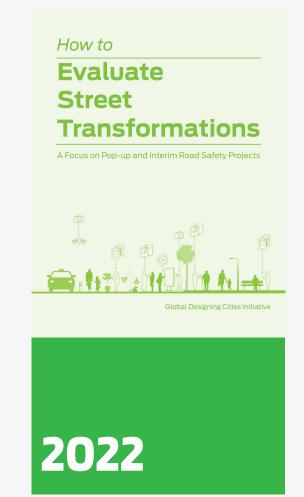
#### **Publications**



2016







Designing Streets for Kids



## **Streets for Kids**

# Improved & Independent mobility

# Places to pause, sit, and play





#### Global Designing Cities Initiative

#### Streets for Kids should be...







Safe & Healthy

**Comfortable & Convenient** 

**Inspirational & Educational** 

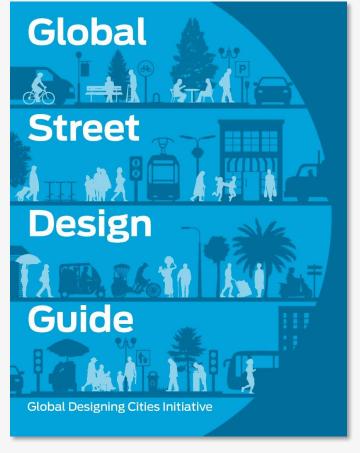


#### Ten actions to improve streets for kids

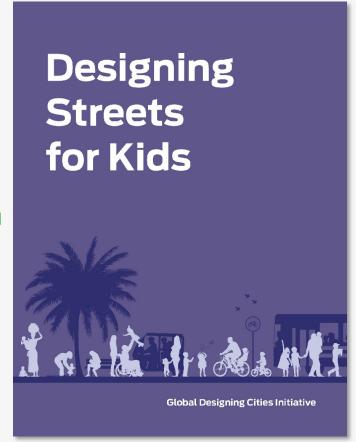




# Provide the tools to reimagine, reinvent, and redesign safer, more sustainable streets!







#### How to

## Implement Street Transformations

A Focus on Pop-up and Interim Road Safety Projects



Global Designing Cities Initiative

#### How to

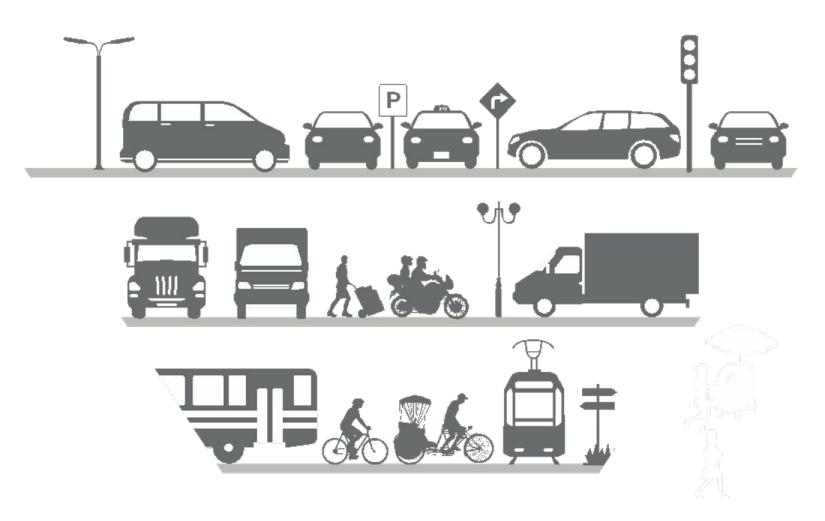
## Evaluate Street Transformations

A Focus on Pop-up and Interim Road Safety Projects



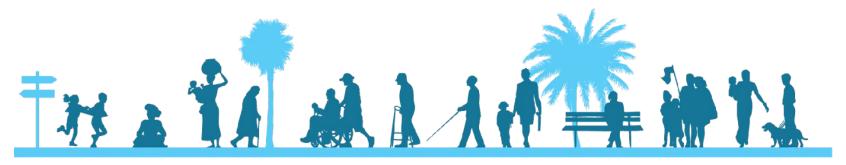
Global Designing Cities Initiative













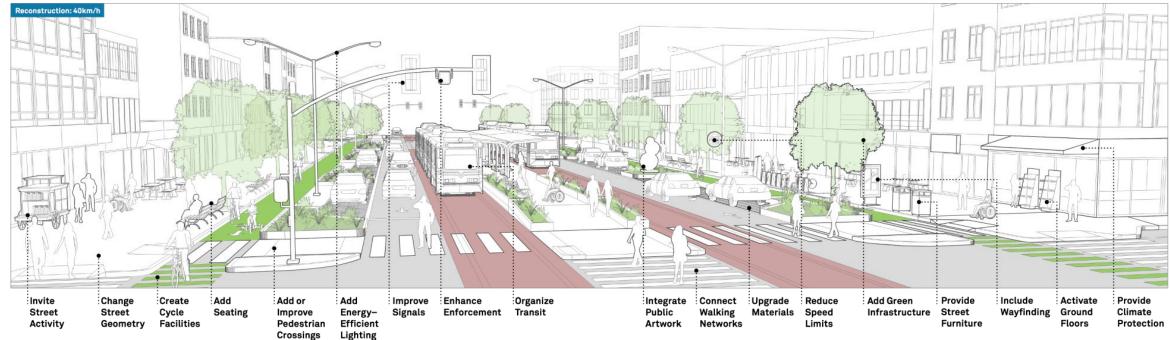




## What is Possible?

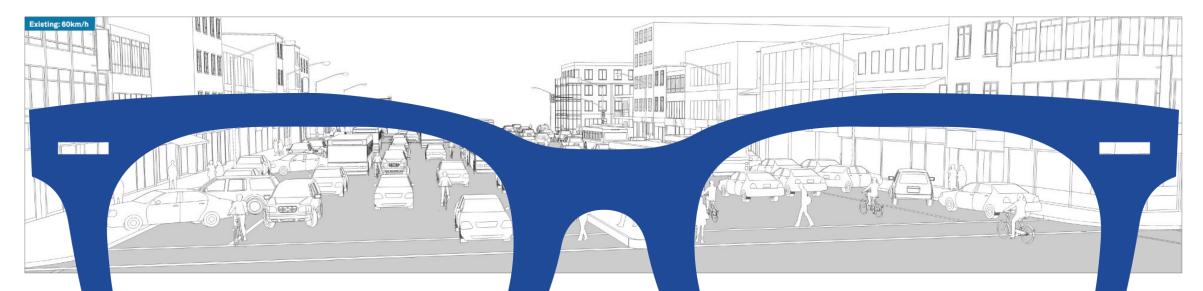


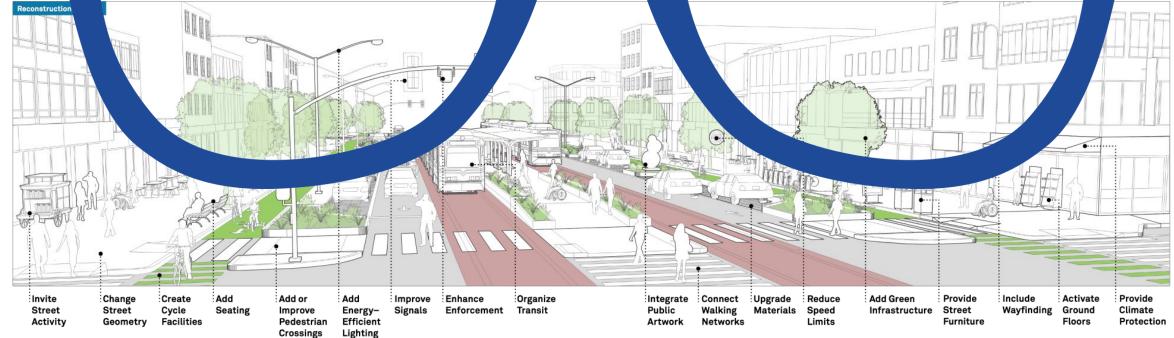




## What is Possible?



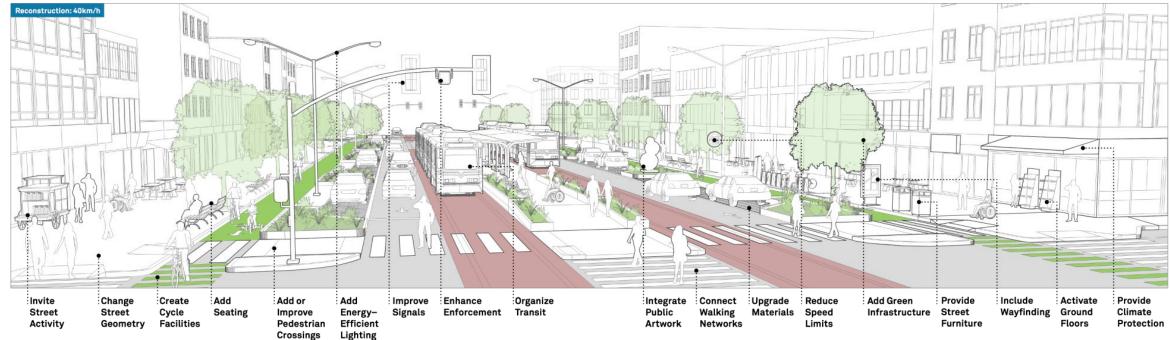




## What is Possible?

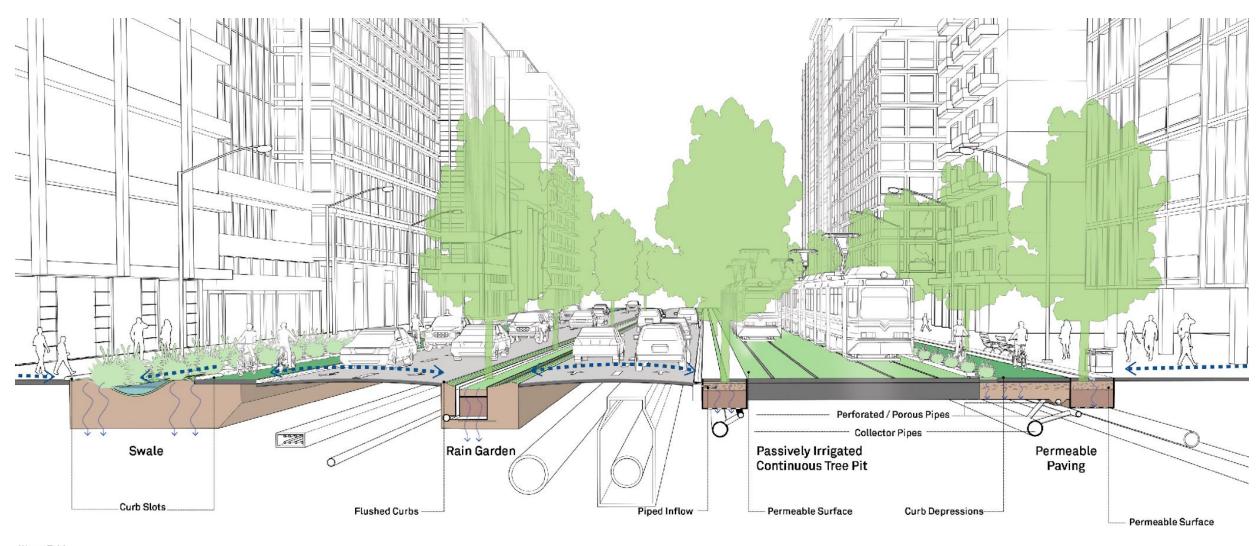






# **Design for more functions**





Water Table

## Design for more people











Cyclists



Transit Riders



Motorists



Freight Operators and Service Providers



People Doing Business



from PAPER

to PRACTICE



### **Programs**



#### **BIGRS**

Bloomberg Philanthropies Initiative for Global Road Safety

Collaboration with

**Bloomberg Associates** 

**Street for Kids** 

**BICI** 

Bloomberg Initiative for Cycling Infrastructure



**Bloomberg Associates** 











### Global Reach - 30+ cities





- OBloomberg Philanthropies Initiative for Global Road Safety (BIGRS)
- O Collaborations with Bloomberg Associates
- Street for Kids Program
- Early Childhood Development
- BICI



## **Policy and Design Guidance**

## Capacity Building and Community Engagement

Interventions and Transformations

**Metric Collection and Evaluation** 



### **Policy and Design Guidance**

Capacity Building and Community Engagement

Interventions and Transformations

**Metric Collection and Evaluation** 

## **Policy and Guidance**







#### Bogotá, Colombia

Street Design Manual





## **Policy and Design Guidance**

Capacity Building and Community Engagement

Interventions and Transformations

**Metric Collection and Evaluation** 

# Who's involved in Shaping Safe Streets + Sustainable Transportation Options?





## **Engineers Trainings**





- Existing Condit

  Local main streets me
  busy east-west street

  Non-orthogonal inter
- Local bus traffic and
- Large turning radii is
- pedestrian crossings.

  Narrow sidewalks and pinchpoints force pedestrians to walk on
- roadbed putting themat

  Illegal parking and obsti-block sidewalk clear pat

#### **Fundamentals of Safer Street Design**

10th July 2024 SDG Center

#### Workshop conducted by:

- **Global Designing** Cities Initiative
- Bloomberg Initiative for Global **Road Safety**

#### Participants:

- **KKR**
- **JKR**
- **PDRM**
- **DBKL** 
  - JPB 0
  - **JPIF**
  - **JKAWS**
  - **JPPPB**
- **MIROS**



# **Engineers Trainings**





# **Capacity Building - City agencies**







## **Capacity Building and Trainings - Online**



# [WIP] Tài liệu đào tạo Hướng dẫn Thiết kế Đường phố Toàn câu



Khóa đào tạo trực tuyến Hướng dẫn Thiết kế Đường phố Toàn cầu là khóa đào tạo tự học đầu tiên dựa trên thiết kế đã đạt giải thưởng của Quỹ Sáng kiến Thiết kế Thành phố Toàn cầu.

Bộ tài liệu Hướng dẫn Thiết kế Đường phố Toàn cầu được thiết kế để định nghĩa lại vai trò của đường phố tại các đô thị trên thế giới. Hướng dẫn được hình thành dựa trên thông tin của các chuyên gia từ 72 thành phố tại 42 quốc gia, đưa ra những chỉ dẫn mới về thiết kế đường phố dành ưu tiên hơn cho con người.

Khóa học tương tác sẽ hướng dẫn cho bạn những nguyên tắc cơ bản về thiết kế đường phố đô thị cho mọi đối tượng ở mọi lứa tuổi và khả năng.

Chào mừng bạn đến với Khóa đào tạo trực tuyến Hướng dẫn Thiết kế Đường phố Toàn cầu!

Sau khi hoàn thành khóa học này, bạn sẽ học được các nguyên tắc thiết kế đường phố bền vững và an toàn cho mọi đối tượng.



# **Police Training**



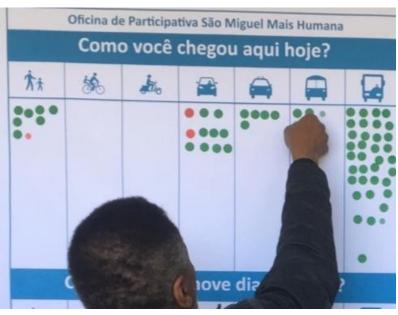
# **Journalist Training**



## **Community Engagement**









## **Community Engagement**









\*SK Danau Kota 2 Student Engagement Workshop

## **Community Engagement**







## **Policy and Design Guidance**

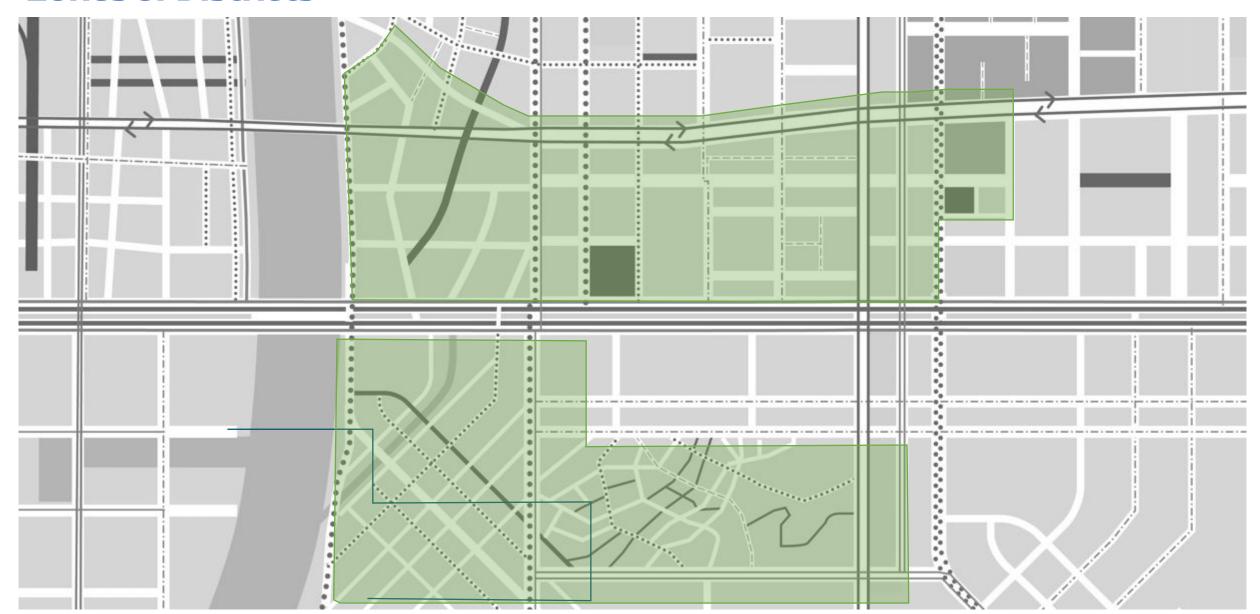
## Capacity Building and Community Engagement



**Metric Collection and Evaluation** 

### Global Designin Cities Initiative

### **Zones or Districts**



## Low speeds and school zones

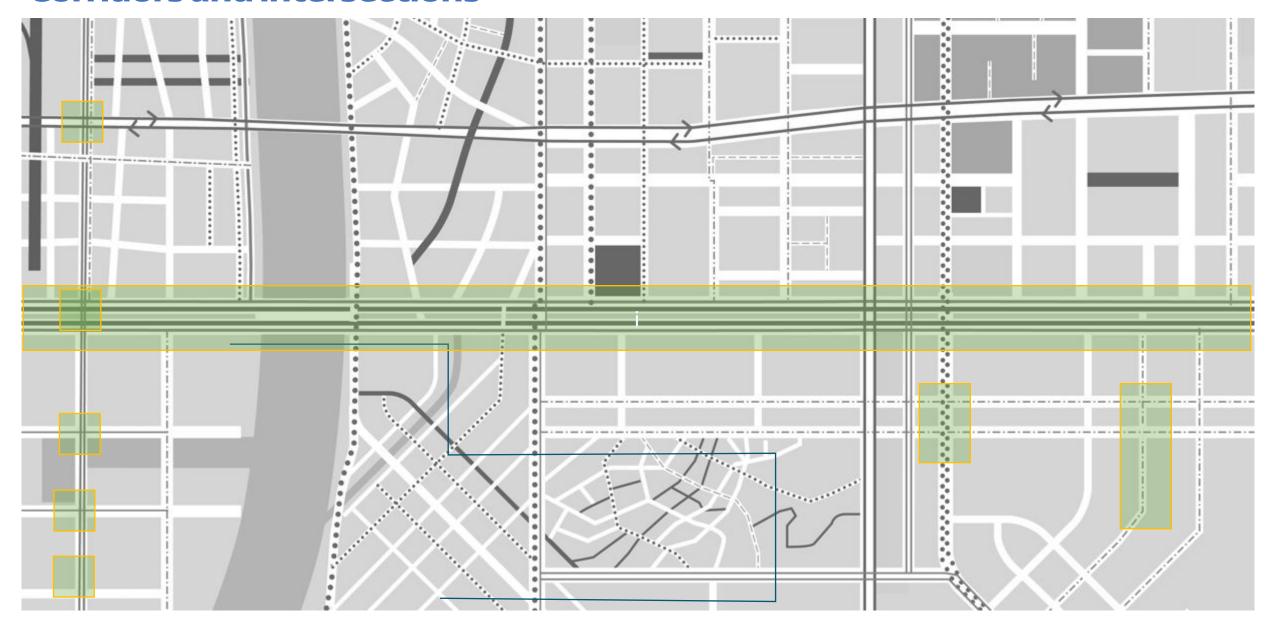








### **Corridors and intersections**



## **Corridor redesign + Reducing speed**



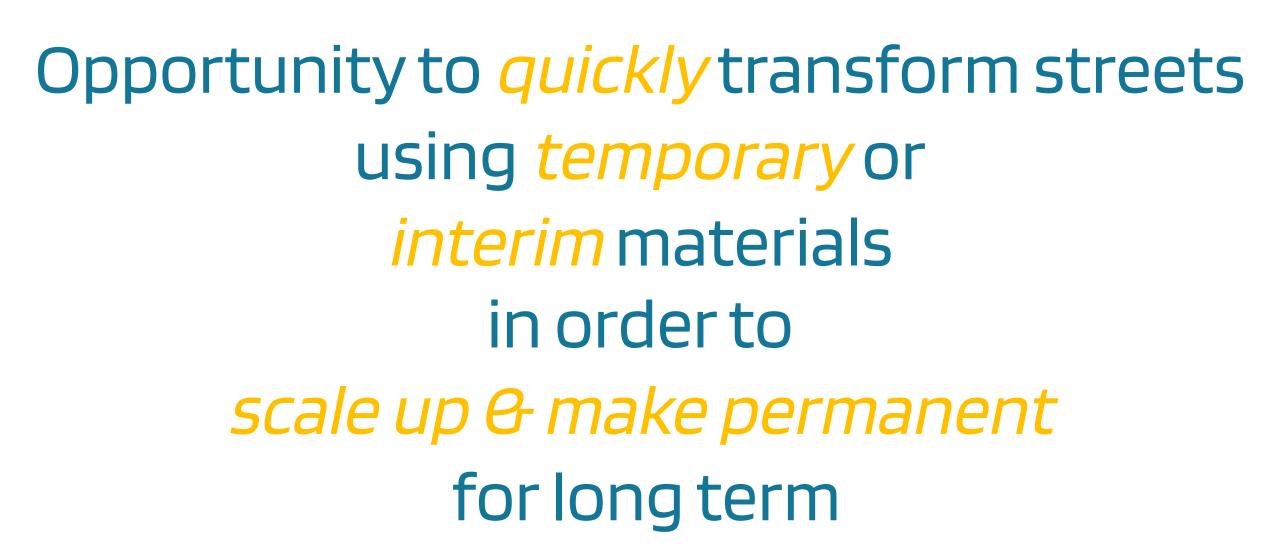














El Ingés Vision Zero Zone. Before



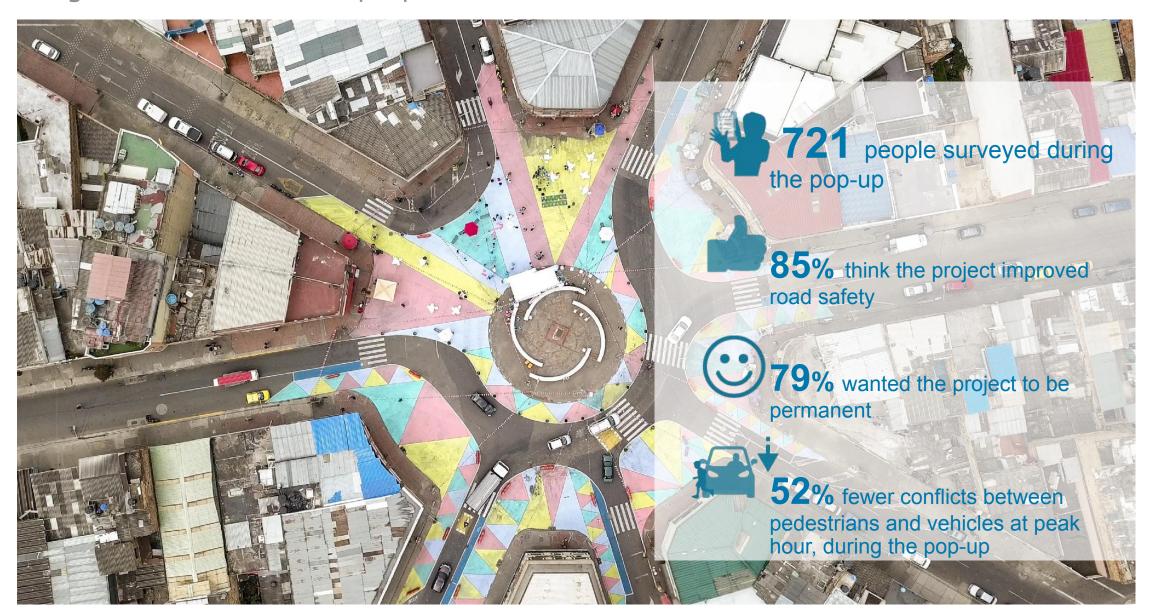


El Ingés Vision Zero Zone. Pop-up



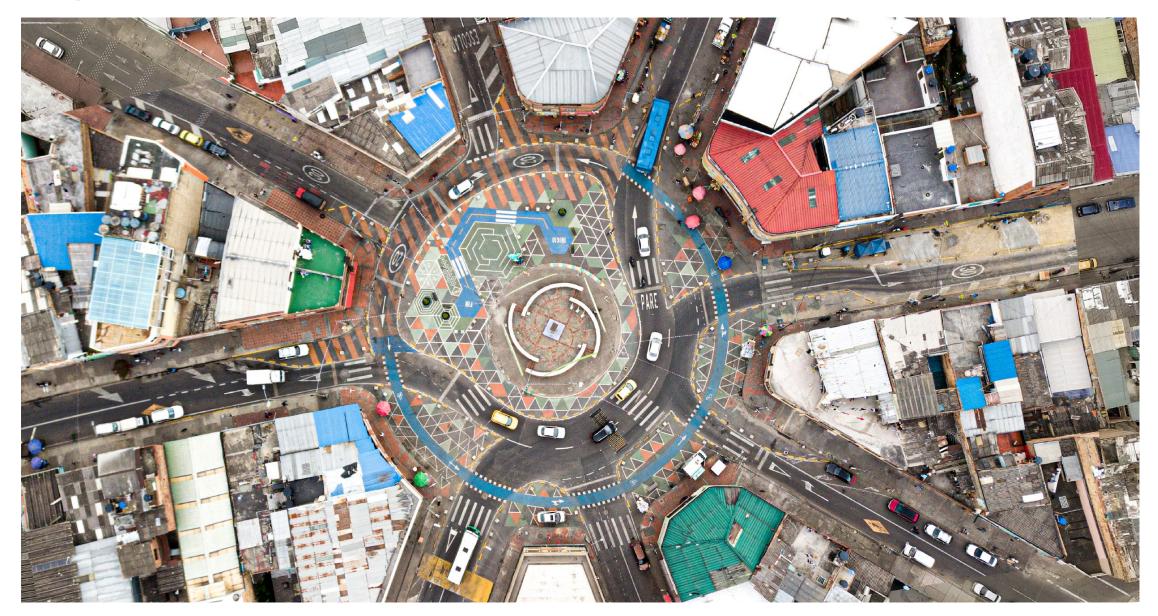


El Ingés Vision Zero Zone. Pop-up





El Ingés Vision Zero Zone. Interim





El Ingés Vision Zero Zone. Interim

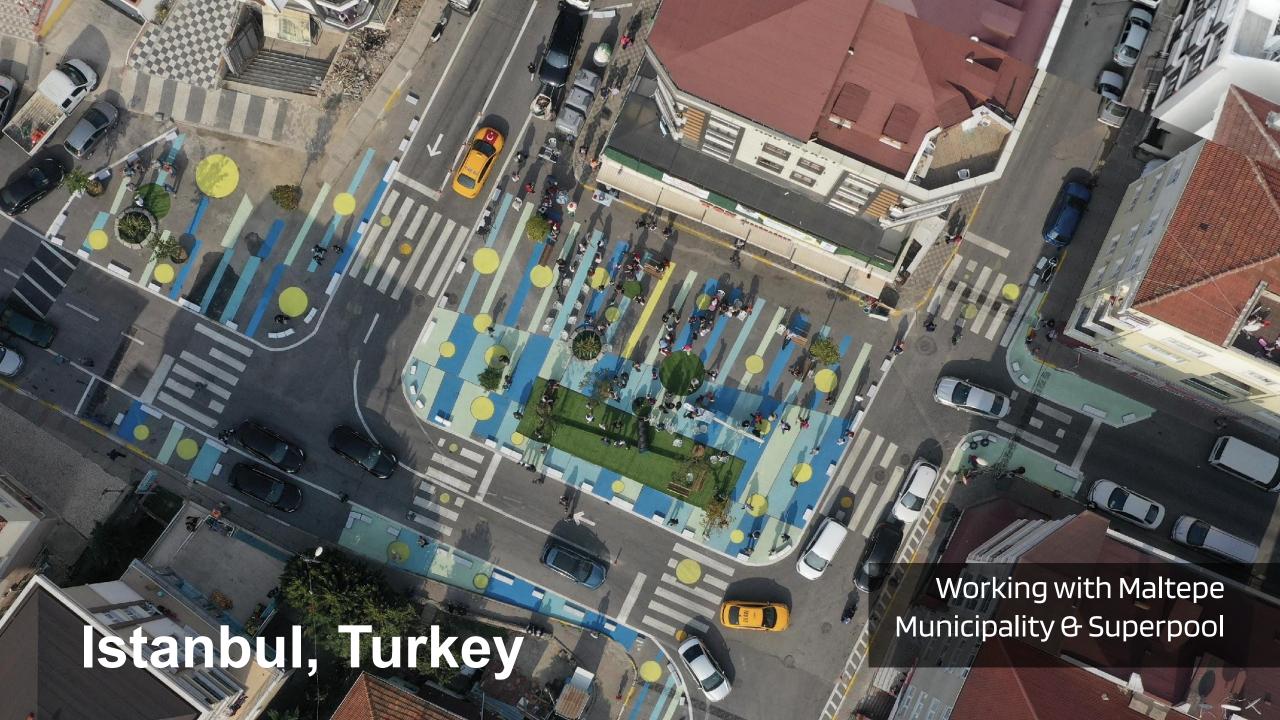
















Before

Zümrütevler Plaza

Municipality & Superpool









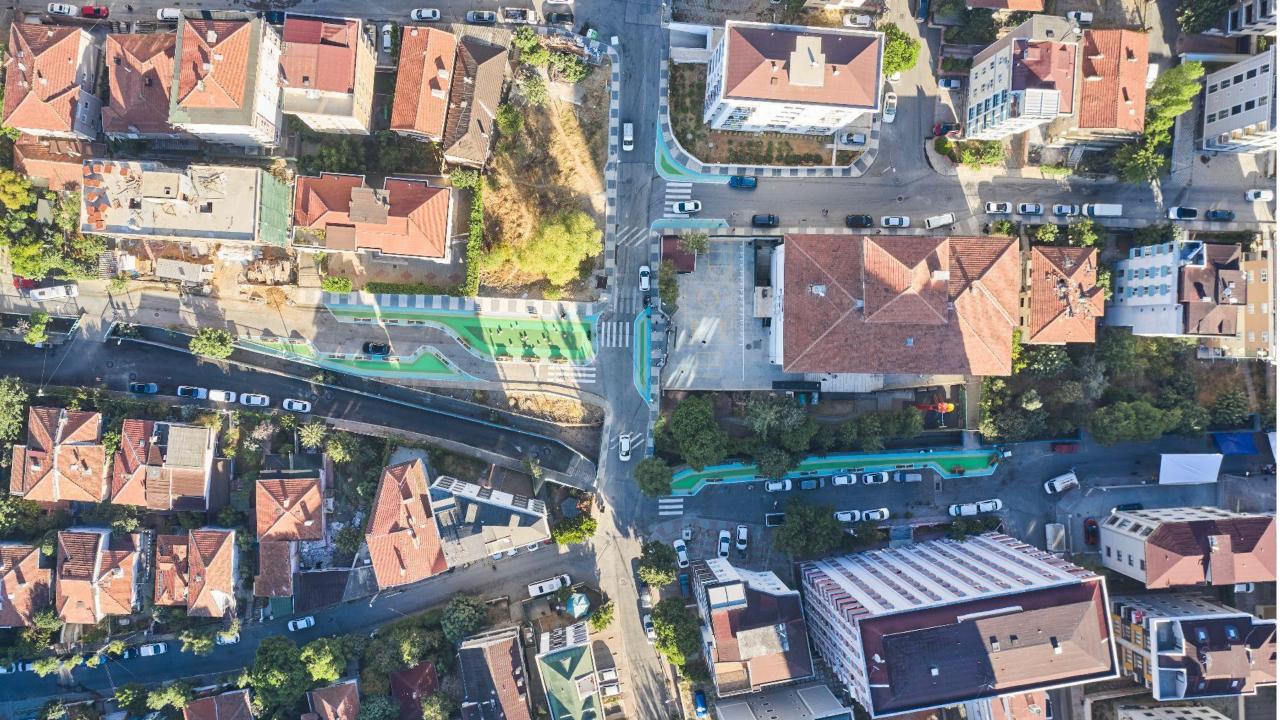




















#### **Policy and Design Guidance**

Capacity Building and Community Engagement

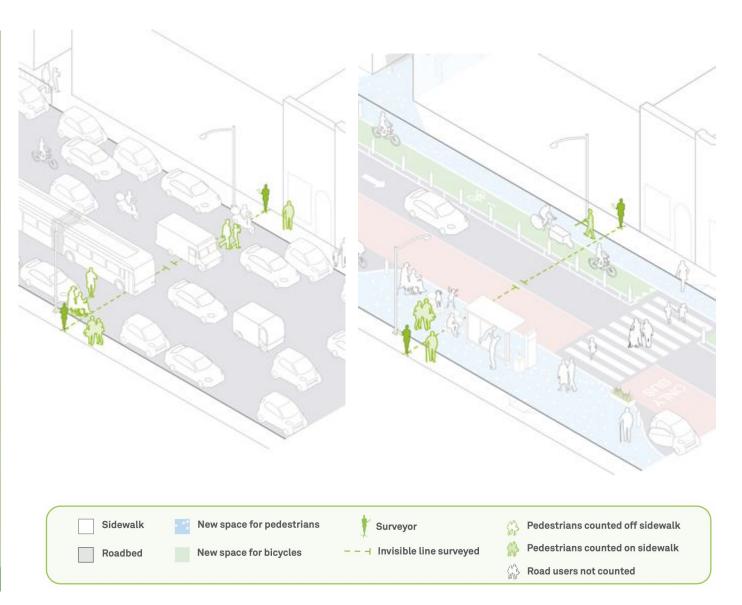
Interventions and Transformations

**Metric Collection and Evaluation** 

#### **Corridor Redesign + Speed Limit Reduction**



Pedestria	n Count	s: On/Off S	dewalks		Project name:		
Surveyor name				Basemap			
Date/time							
Day of the week							
Weather							
Notes							
Tally nedestrians h	ane nenderan	d ability that are wal	king on the sideu	alk and on the ro	arlhed congrately 5	onarato sidowalk	counts by
side of the street if	appropriate Cou	int for a period of at					
information is colle	cted.						
Symbol (optional)	Perceived gender.	X Female /	Male				
			À	g.	8	À	
Pedestrian type	* *	1	T	Person in	17)	Na.	Total
	0-5	Child/Teen	Adult	wheelchair	Older adult (75+)	Deliveries/cart	(all type
On sidewalk							
(side A)							
Total on					1		
sidewalk A							
Roadbed							
Total on the roadbed							
100000				-			
On sidewalk (side B -							
optional)							
Total on		1					
sidewalk B							



#### Rediseño de corredores + reducción del límite de velocidad

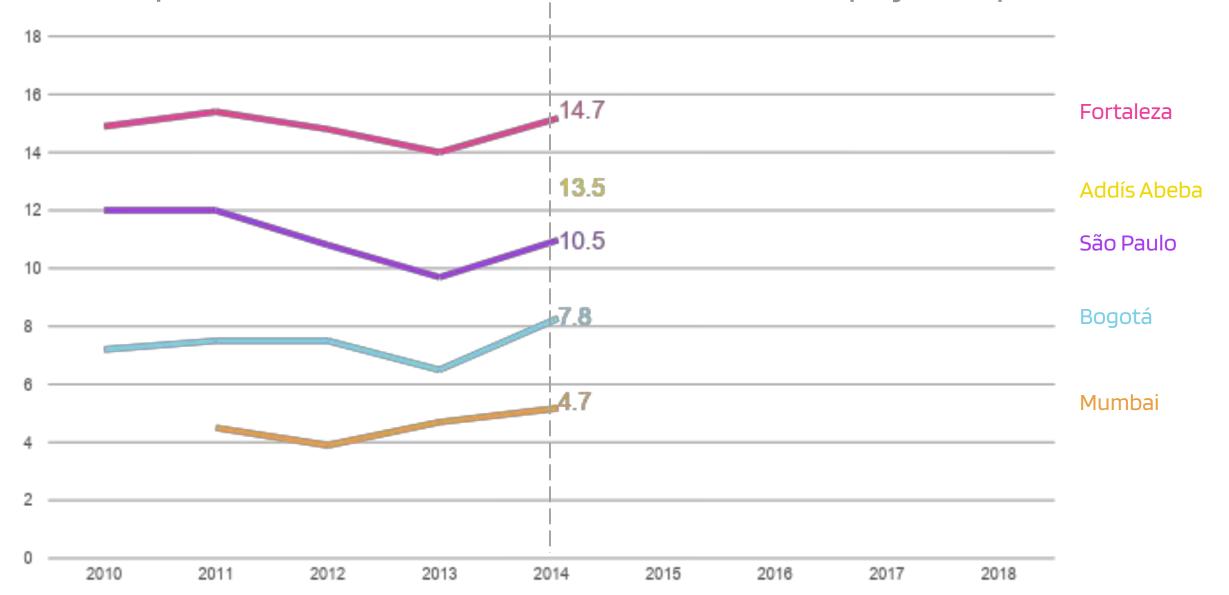




#### Mortalidad vial reportada | 2010 - 2018



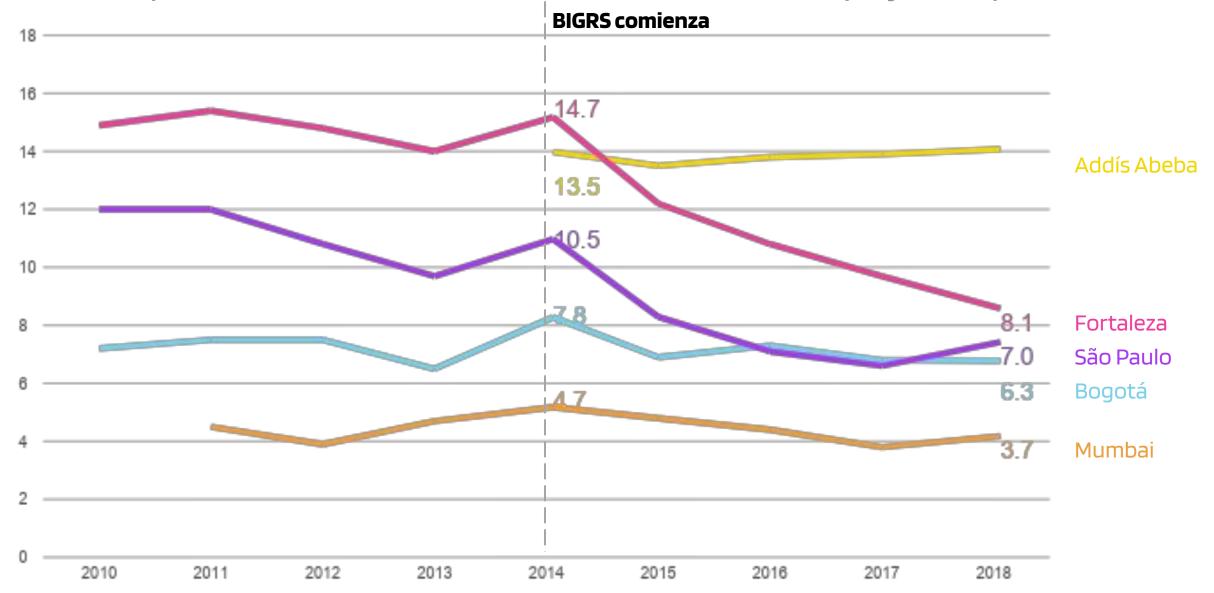
Muertes por 100.000 habitantes en las 5 ciudades apoyadas por BIGRS



#### Mortalidad vial reportada | 2010 - 2018



Muertes por 100.000 habitantes en las 5 ciudades apoyadas por BIGRS





### **Thank You**

@GlobalStreets









globaldesigningcities.org







# Safe and Sustainable Street Design: Role of Street Design

A workshop for the City of Ljubljana, Slovenia

Abhimanyu Prakash, Associate Director Renata Carvalho, Program Manager Marina Visic, Program Associate

Global Designing Cities Initiative

**29th January, 2025** 

















### **Role of Street Design**

January 2025, Ljubljana, Slovenia

Bloomberg Philanthropies







# Streets



Largest network of continuous public space



Largest network of continuous public space One of our biggest assets in cities!



We must make better, more efficient use of this valuable space



# Streets

are the platform to...



# Play



# Learn to ride



## Dine



Celebrate



# Have fun



## Perform



### **Dance**



Places to make money...



...and spend it! 😂





To spend time with old friends...



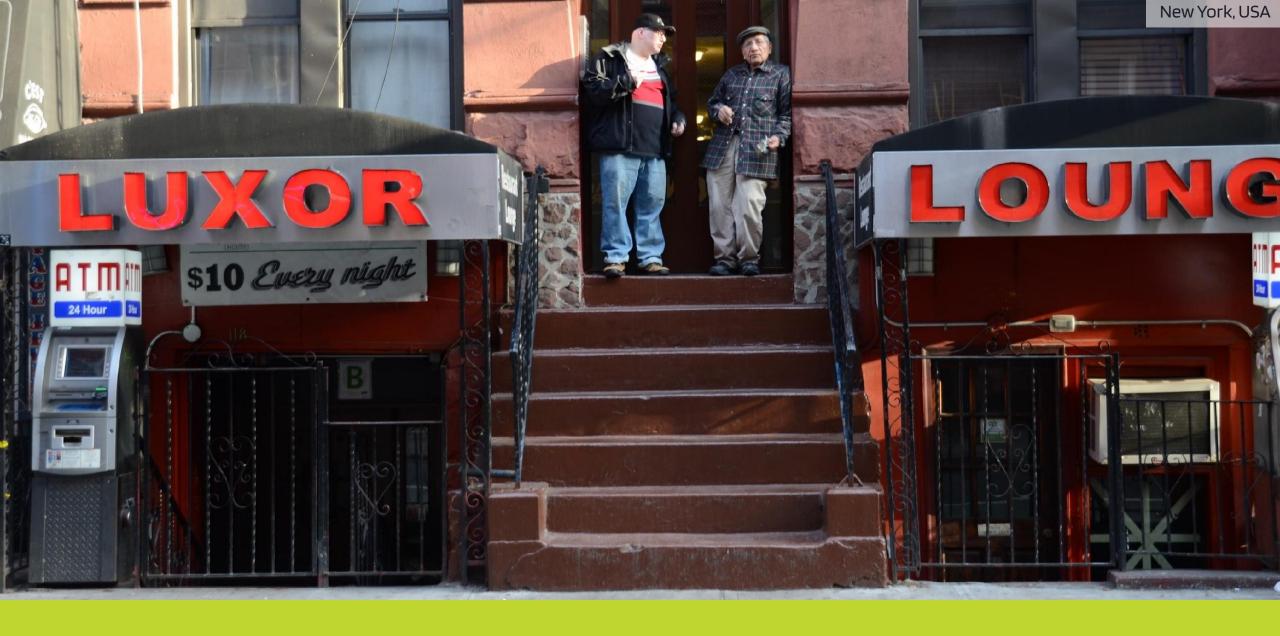
...or meet new ones



# Enjoy some nature



Spaces to relax



The front door to our homes and businesses!

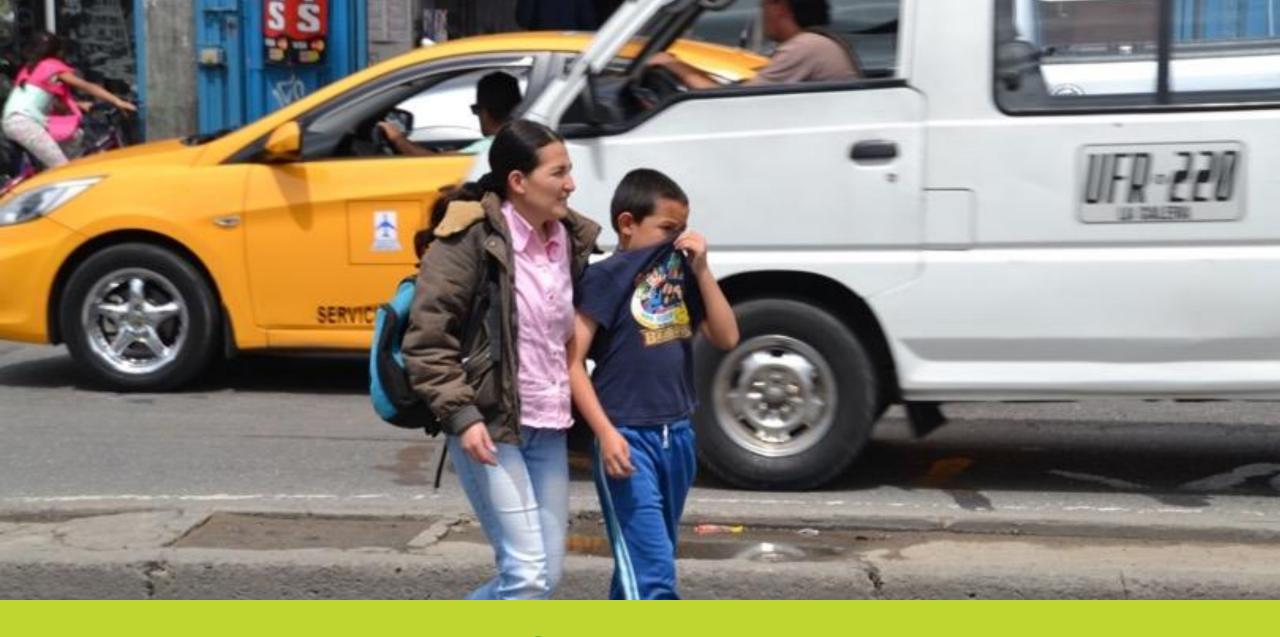


# Streets

serve many functions...



- Mobility and Access
- Environmental Sustainability
- Economic Sustainability
- Livability and Quality of Life
- Public Health and Safety

























Innovative **street designs** that reduce speed

+

**Strategic enforcement** against traffic violations,

+

**Legislative ordinances** that lower speed limits,

+

Public awareness campaigns

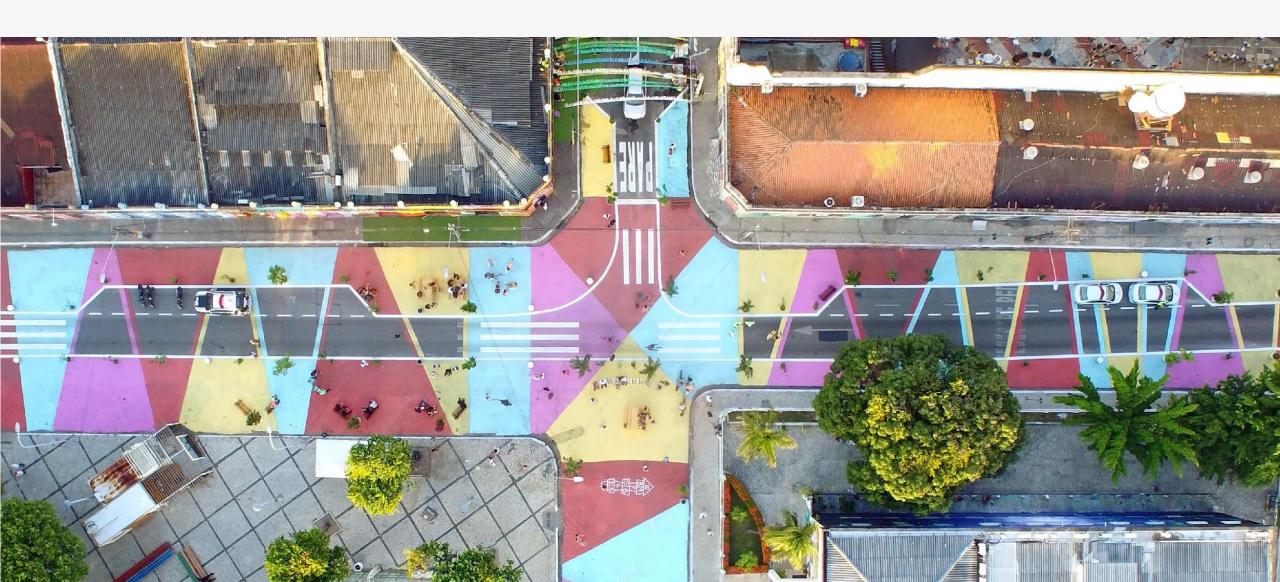
Proven to be impactful strategies adopted by these programs to save lives.



Innovative **street designs** that reduce speed



# **Innovative Street Designs**





Innovative street designs that reduce speed

+

**Strategic enforcement** against traffic violations,



# **Support Through Enforcement**







Innovative street designs that reduce speed

+

Strategic enforcement against traffic violations,

+

Legislative ordinances that **lower** speed limits,



# **Lowering Speed Limits**







Innovative street designs that reduce speed

+

Strategic enforcement against traffic violations,

+

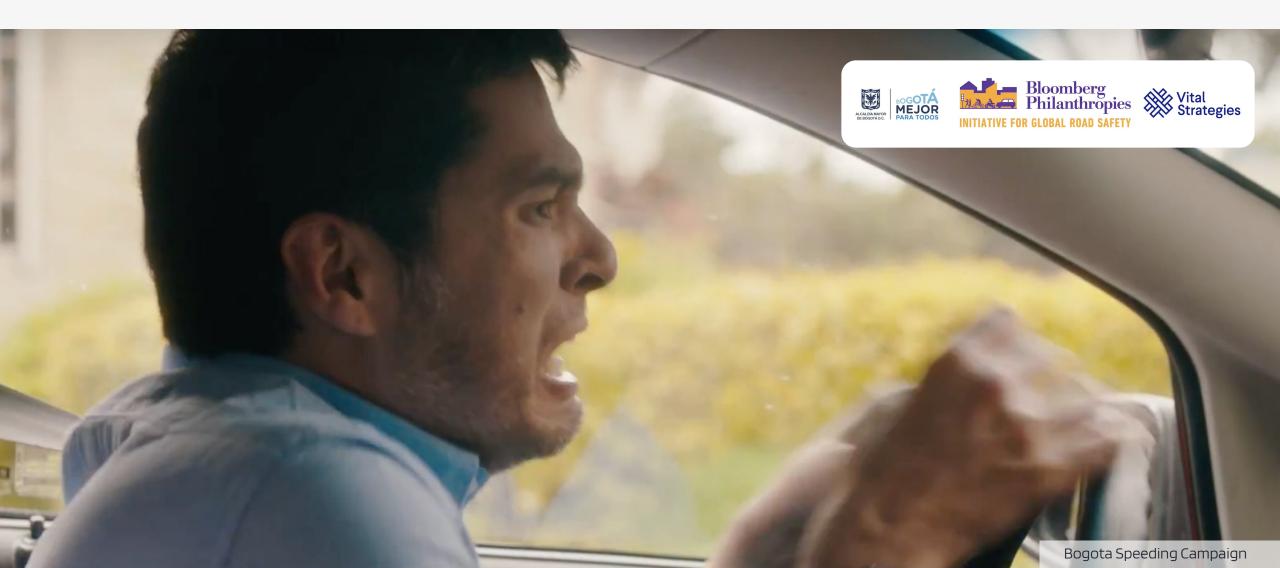
Legislative ordinances that lower speed limits,

+

Public awareness campaigns



# **Support through Improved Communication Campaigns**





Innovative **street designs** that reduce speed

+

**Strategic enforcement** against traffic violations,

+

**Legislative ordinances** that lower speed limits,

+

Public awareness campaigns

Proven to be impactful strategies adopted by these programs to save lives.

# Taking Action

## **Taking Action**

- 1. Lower speeds
- 2. Design streets that prioritize people
- 3. Prioritizing sustainable mobility choices
- 4. Working together



# We know that speed kills!



# **Taking Action**

# 1. Lower speeds





#### UN flies the flag for 20mph limits worldwide

Chris Ames 24 September 2020











The United Nations has backed the use of 30km/h (approx 20mph) limits as part of a worldwide drive to cut road deaths and injuries by half.

Stockholm Declaration
Third Global Ministerial Conference on Road Safety: Achieving Global Goals 2030
Stockholm, 19–20 February 2020

Stockholm Declaration (2020)

Seventy-fourth session Agenda item 12 Improving global road safety

Resolution adopted by the General Assembly on 31 August 2020

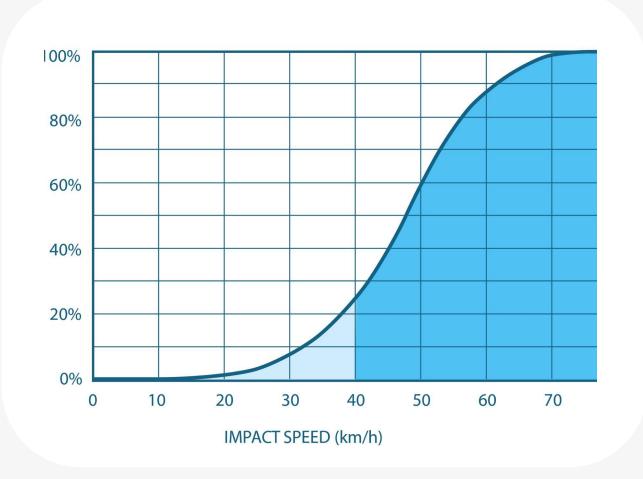
[without reference to a Main Committee (A/74/L.86 and A/74/L.86/Add.1)]

74/299. Improving global road safety

UN's declaration of the second Decade of Action for Road Safety

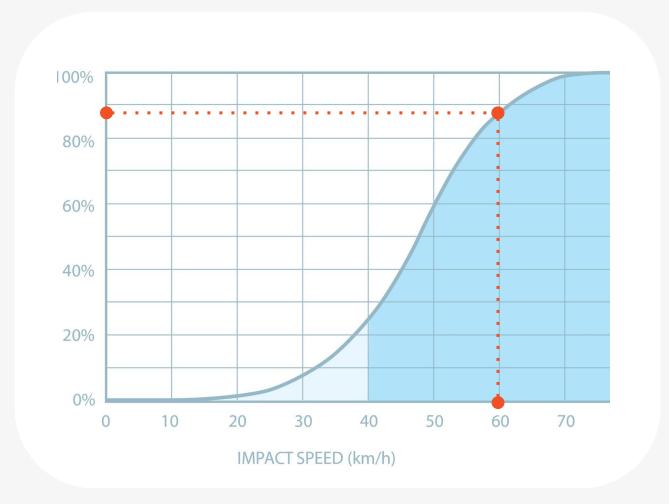


## Risk of Pedestrian Death and Impact Speed





### Risk of Pedestrian Death and Impact Speed

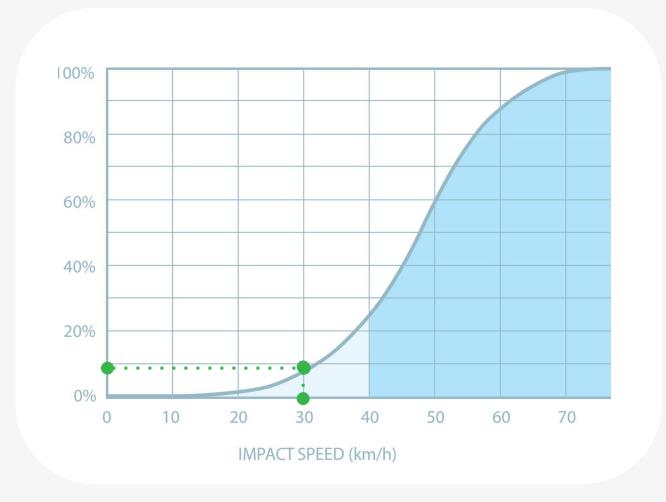


60 km/h

= 90% chance of **DEATH** 



## Risk of Pedestrian Death and Impact Speed



30 km/h

= 90% chance of SURVIVAL



# The faster one drives... the less they see



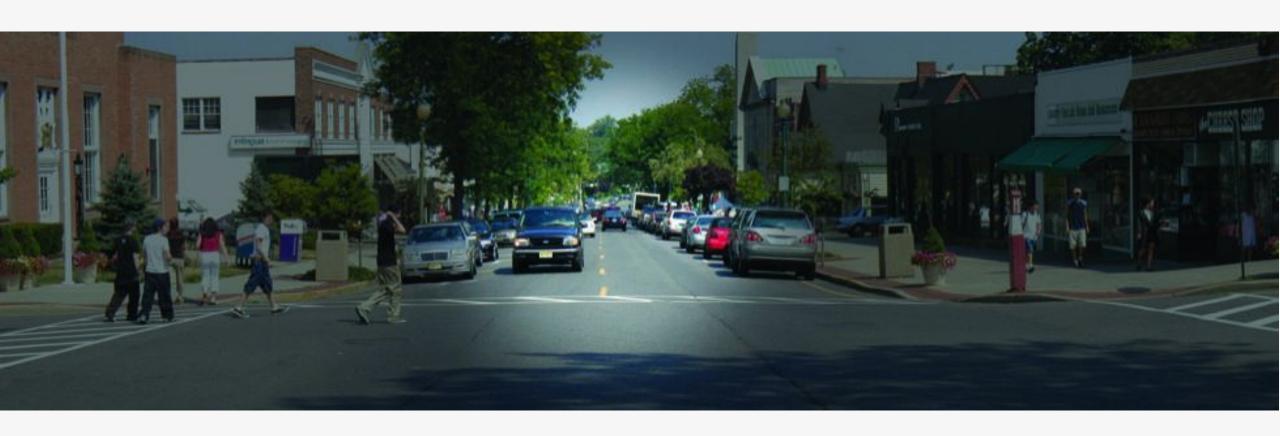


# The faster one drives... the less they see





# The faster one drives... the less they see





## The faster one drives... the higher the risk of a crash

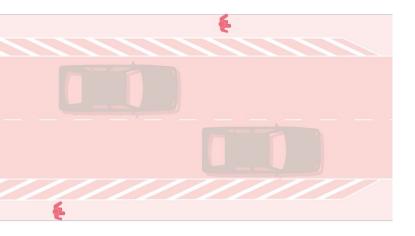


# A shift in design approach

From passive to proactive

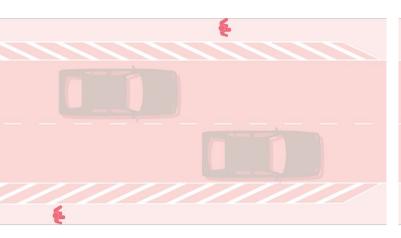


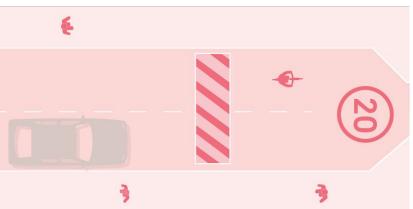




**Passive Approach** 



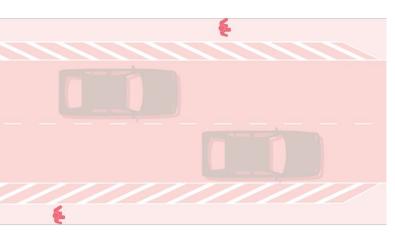


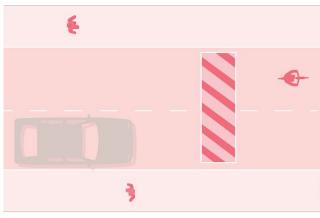


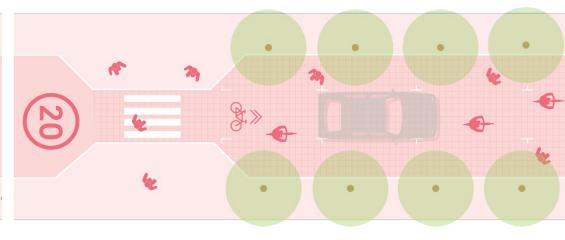
**Passive Approach** 

**Reactive Approach** 









**Passive Approach** 

**Reactive Approach** 

**Proactive Approach** 



# Which street design factors contribute to speeding?

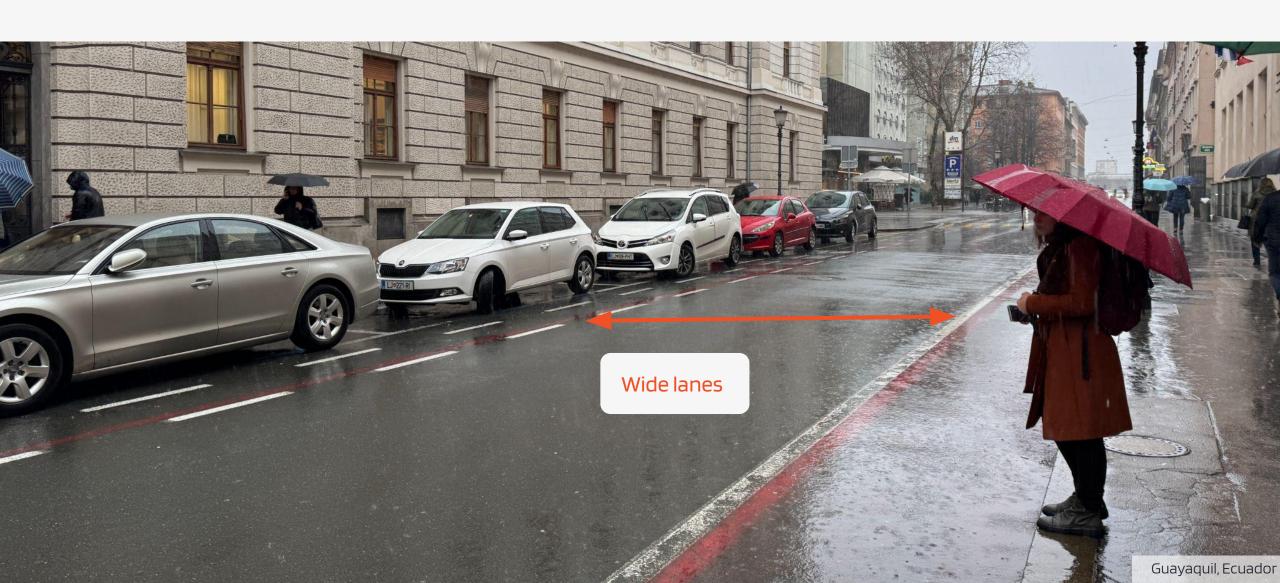


# Wide travel lanes/lack of markings



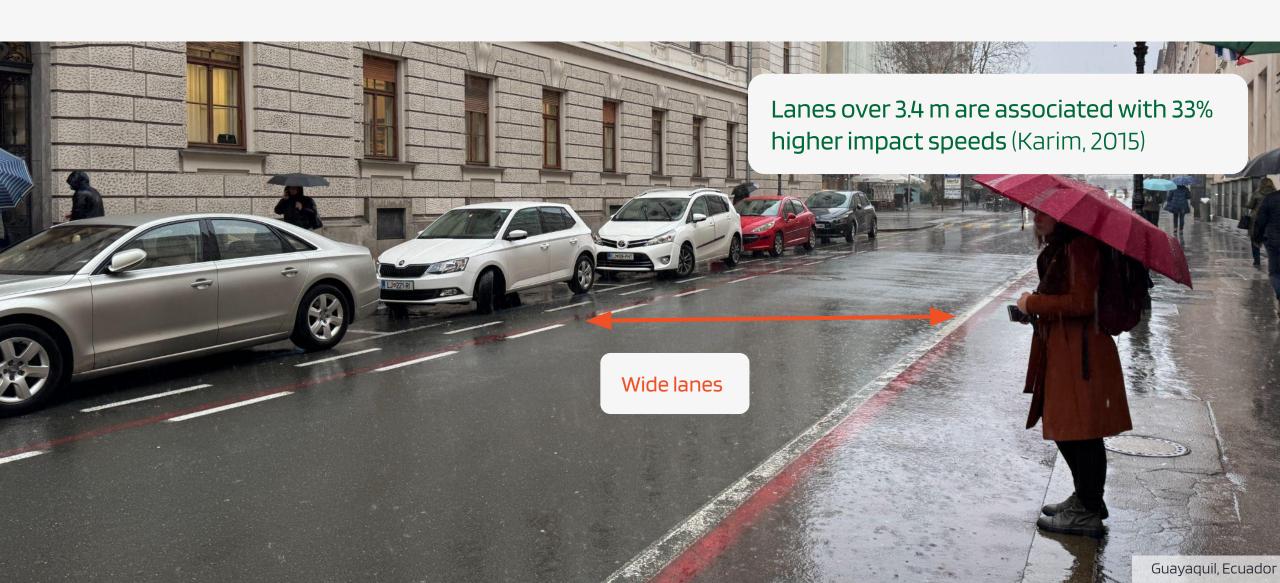


# Wide travel lanes/lack of markings



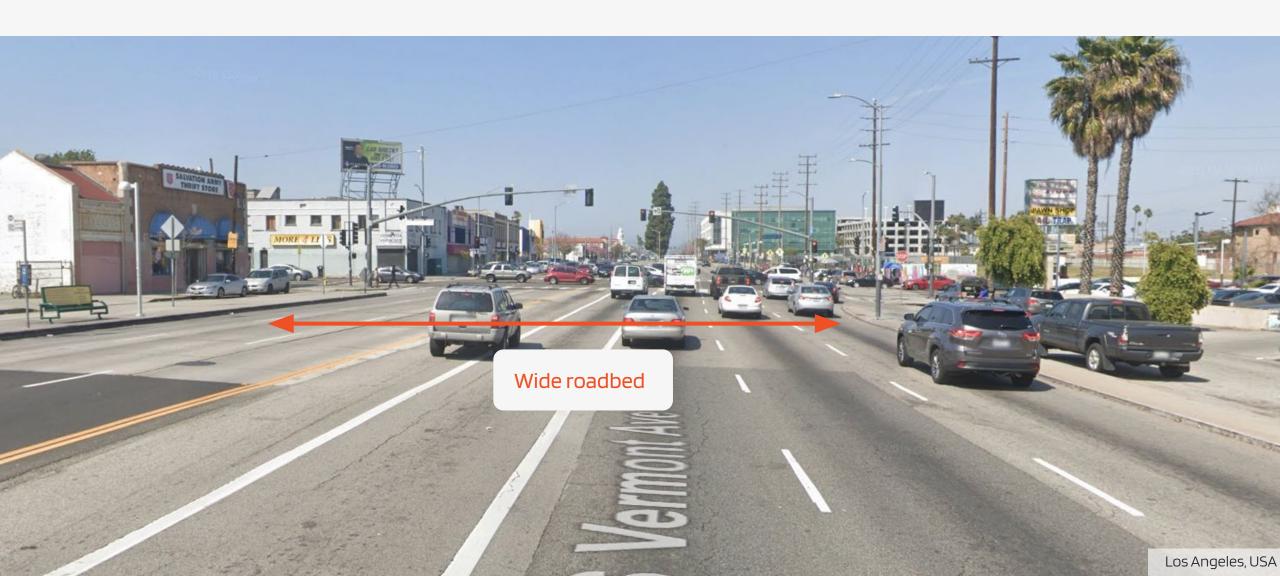


# Wide travel lanes/lack of markings





#### Wide travel lanes/lack of markings





#### Wide turning radii





#### Turn Radius x Speeds

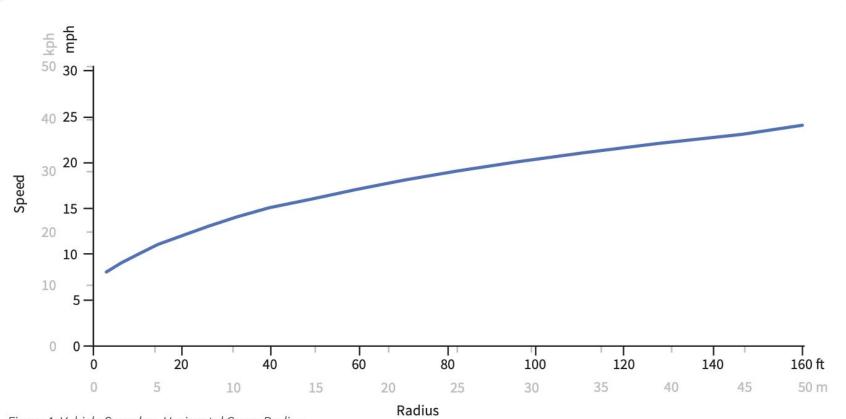


Figure 1: Vehicle Speed vs. Horizontal Curve Radius

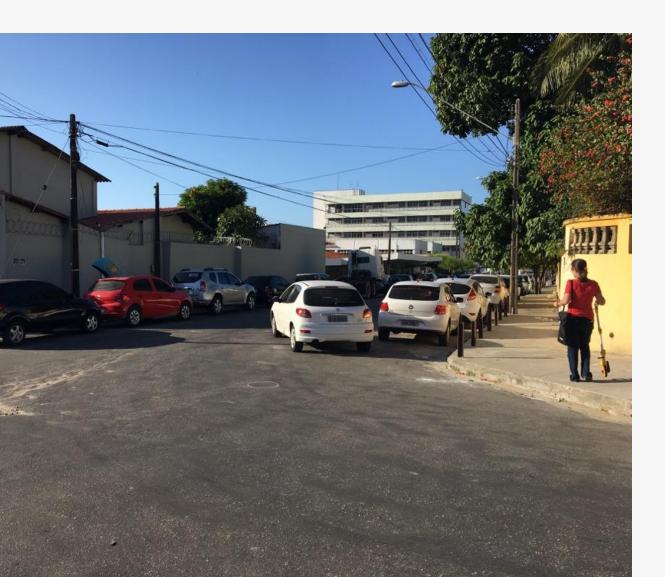


#### **Taking Action**

## 2. Design streets that prioritize people



#### Can design help reduce speeds?





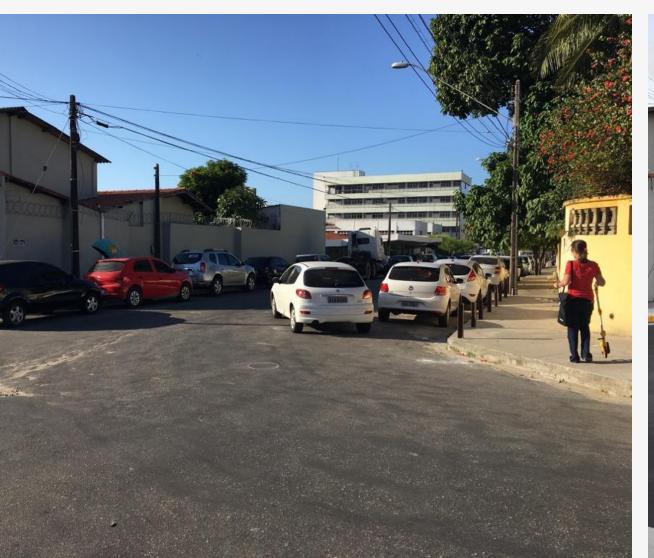
#### Yes, the way streets are designed impact how they are used!







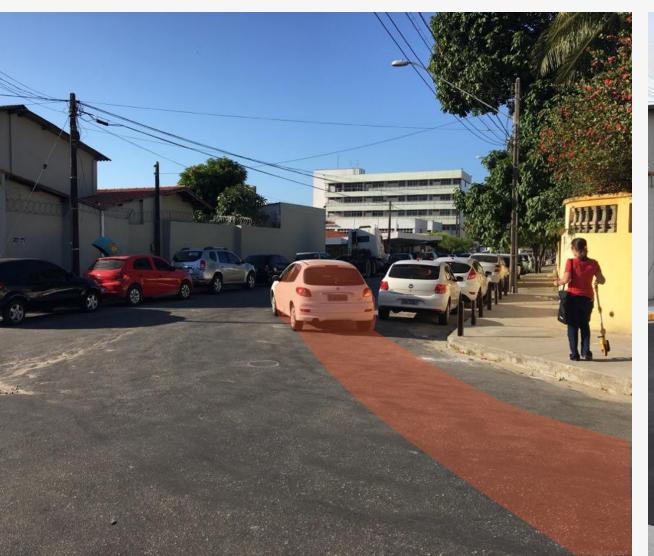
#### Yes, the way streets are designed impact how they are used!







#### Yes, the way streets are designed impact how they are used!







#### At what speed would you drive?



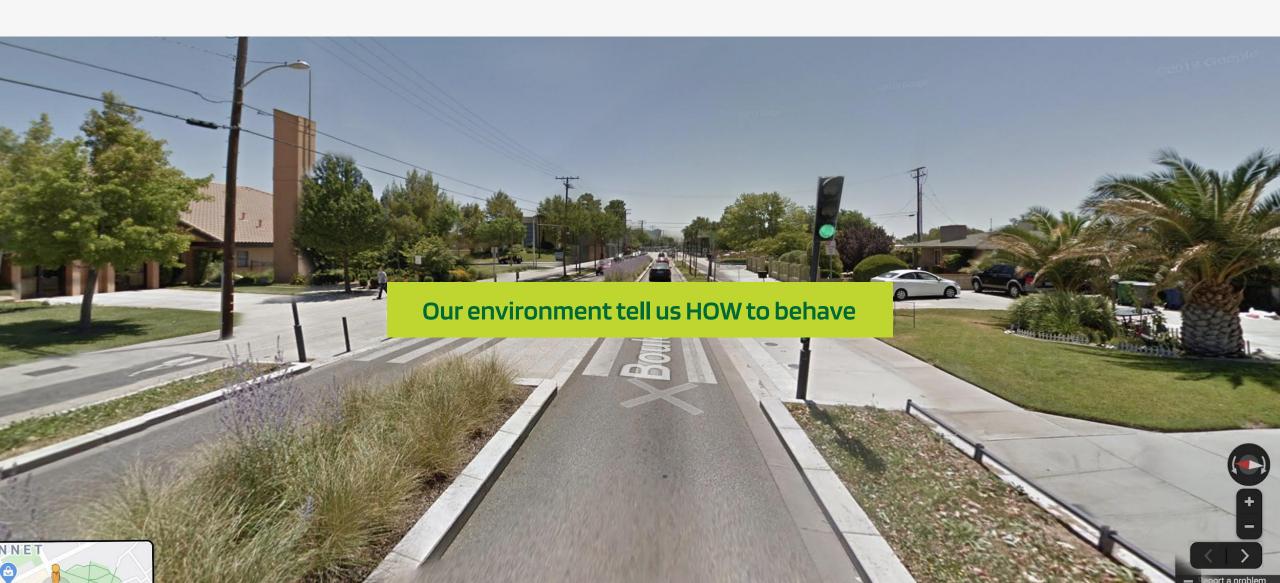


#### At what speed would you drive?



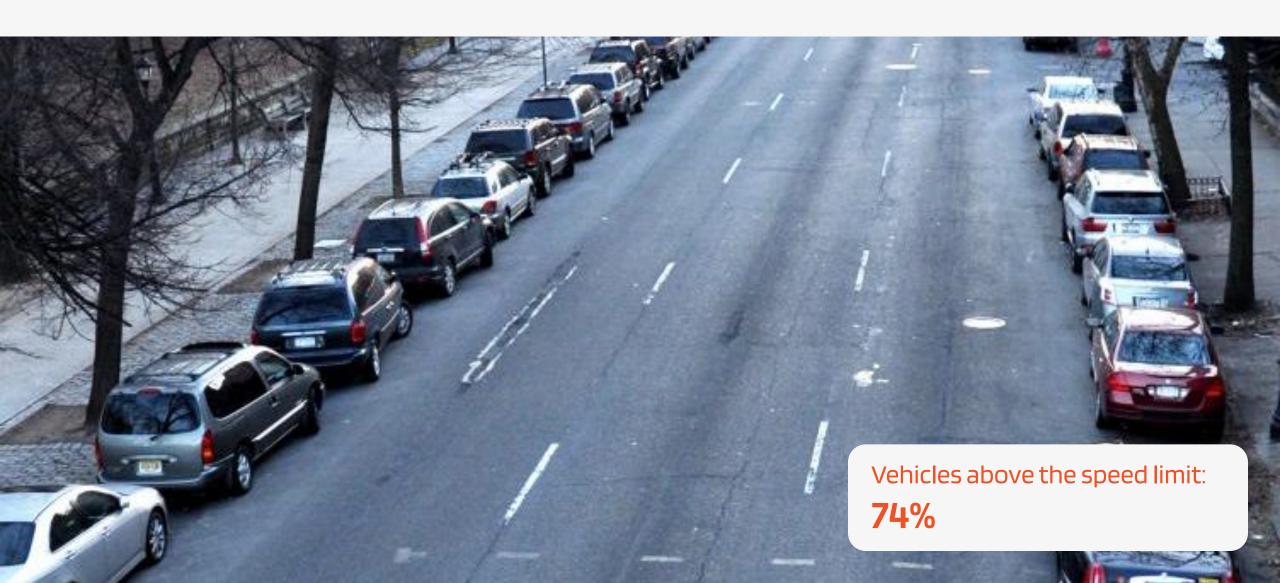


#### At what speed would you drive?





#### Prospect Park West Ave, NYC





#### Prospect Park West Ave, NYC









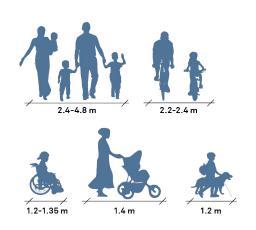
#### **Children's Needs from Streets**



Reliable mobility choices



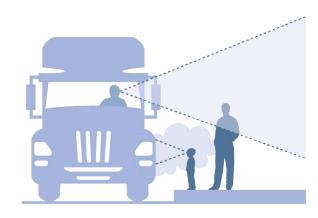
Places to pause and stay



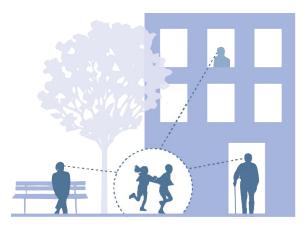
**Space** 



**Social interaction** 



**Visibility** 



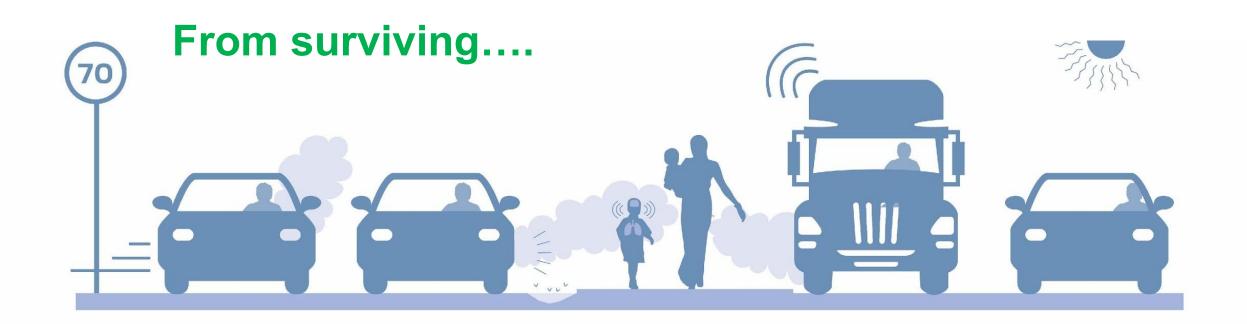
**Security** 



Play and learning



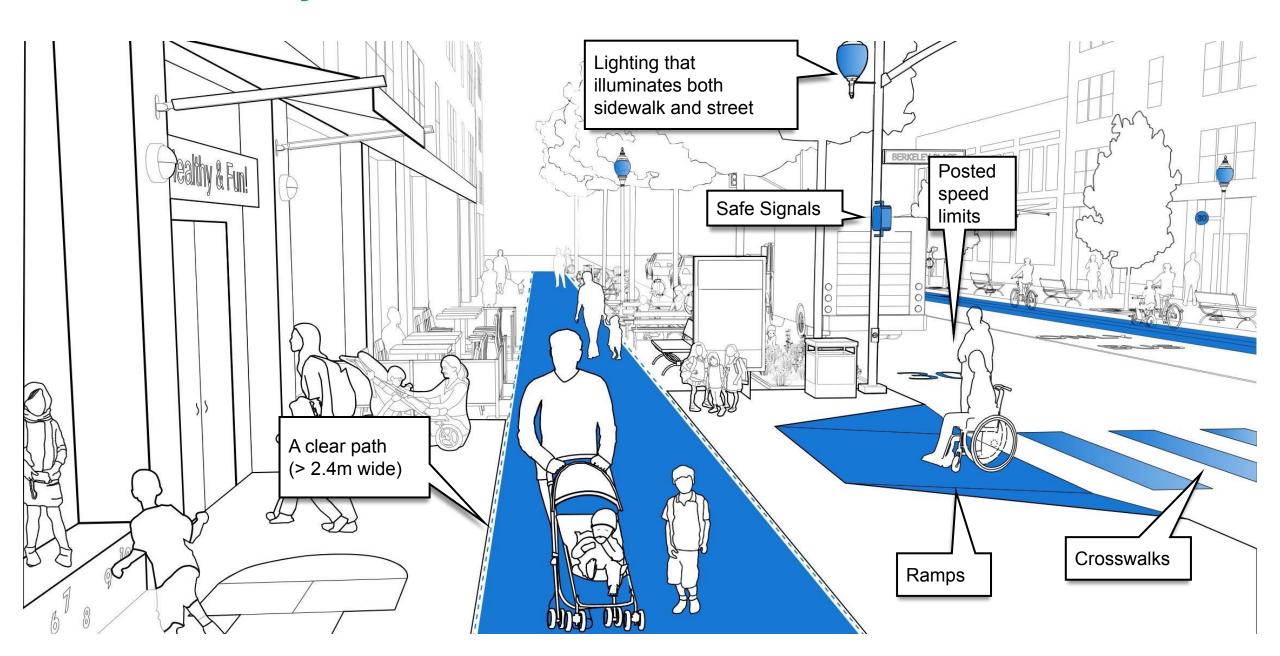
A safe environment





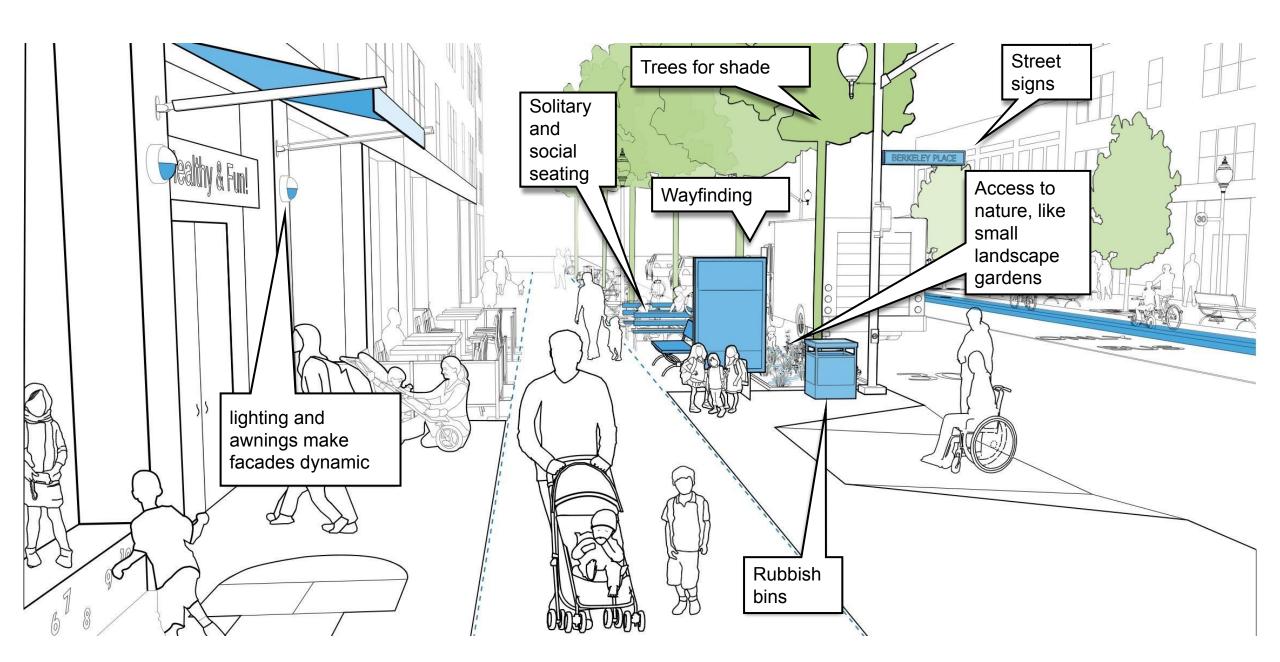
#### Safe and healthy





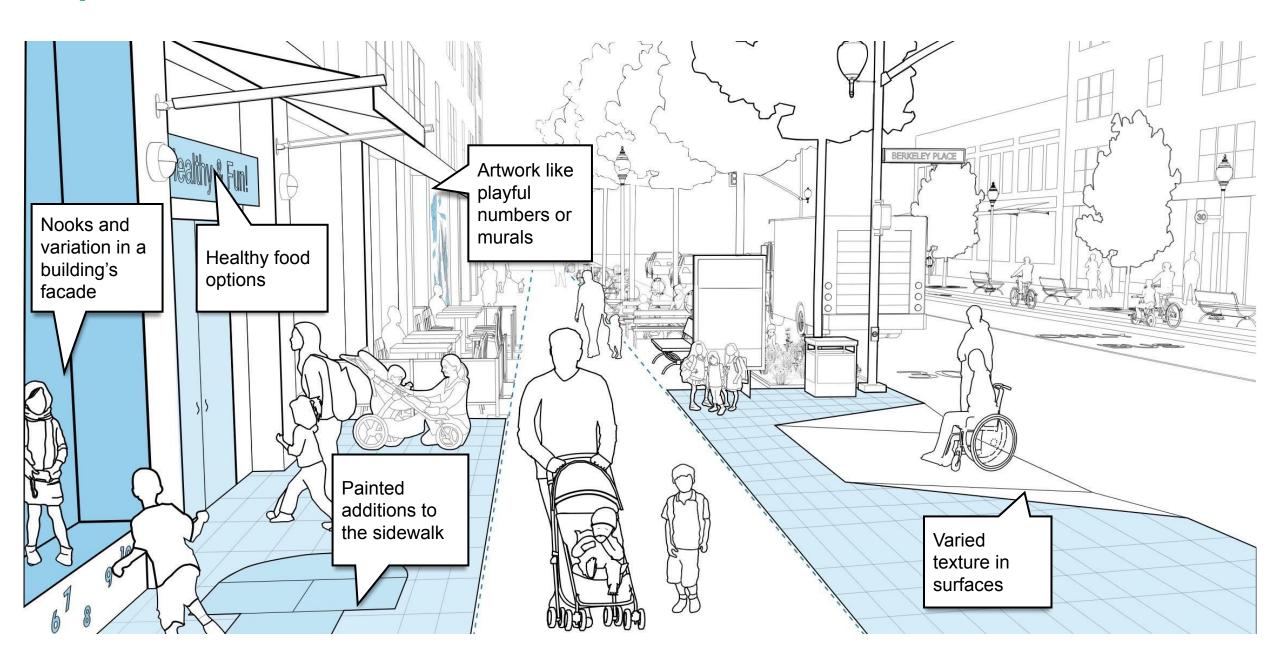
#### **Comfortable and convenient**





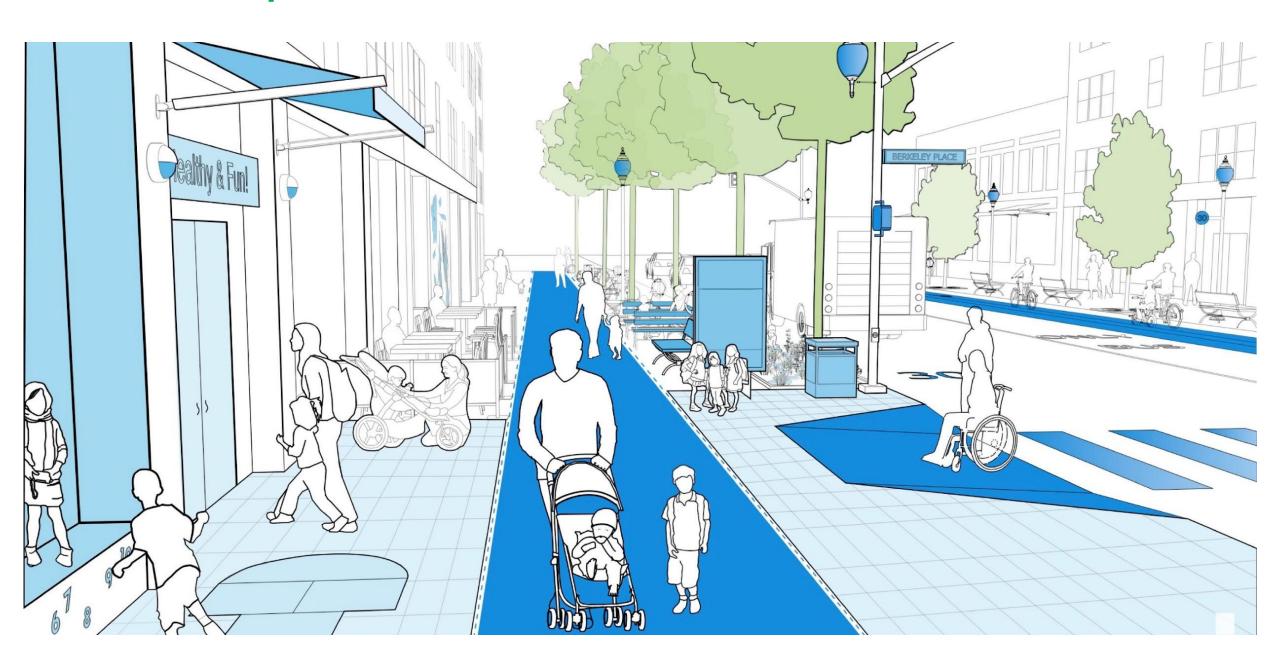
#### Inspirational and educational





#### **Pedestrian experience**







## Bad 'Design' can self-enforce unsafe behaviors

# Good 'Design' can self-enforce safe behaviors

#### **Taking Action**

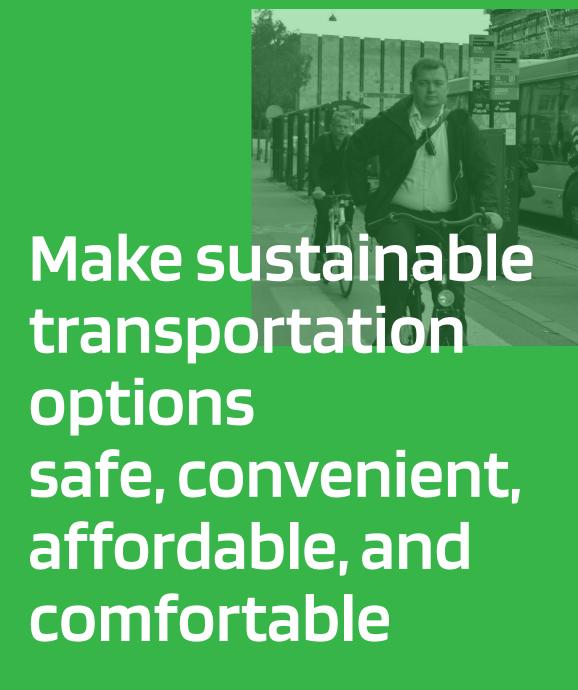
### 3. Prioritize sustainable mobility choices

Stop prioritizing and subsidizing individual motorized vehicles



Stop prioritizing and subsidizing individual motorized vehicles





Stop prioritizing and subsidizing individual motorized vehicles





Make it easier NOTTO DRIVE

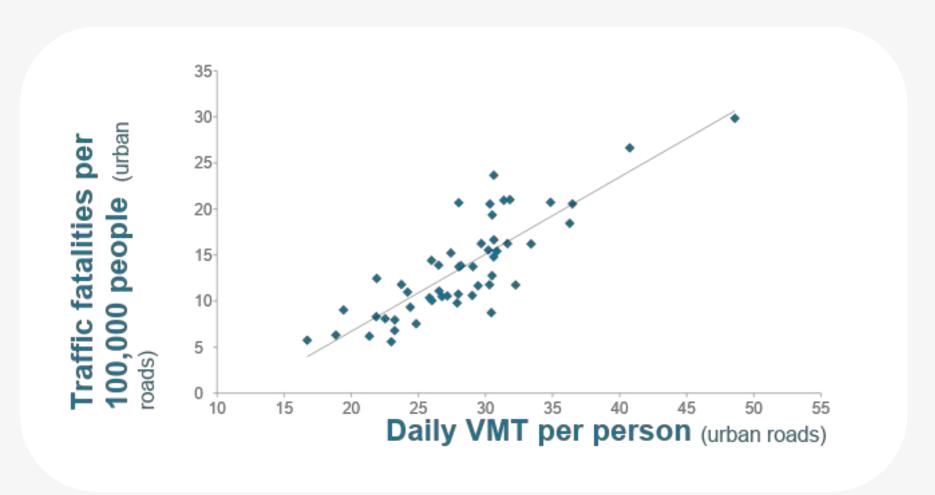




# Sustainable transportation options are safer

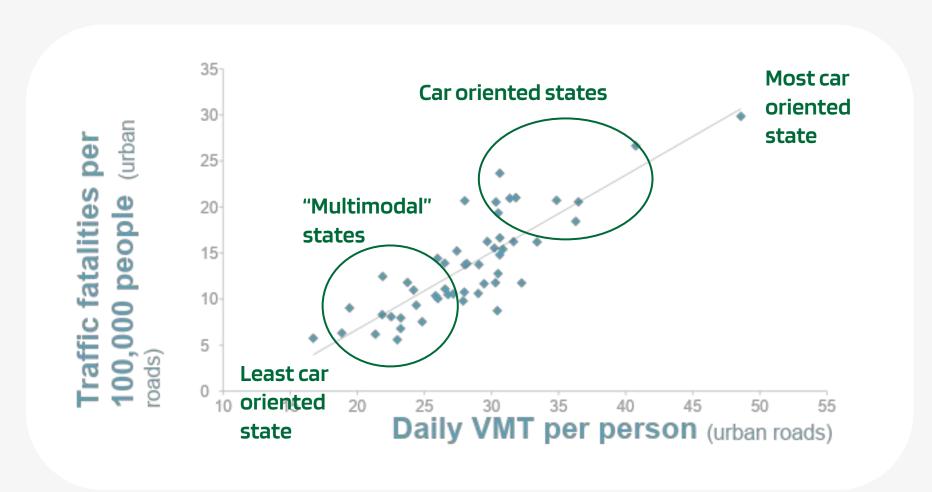


#### More personal driving is associated with more traffic fatalities



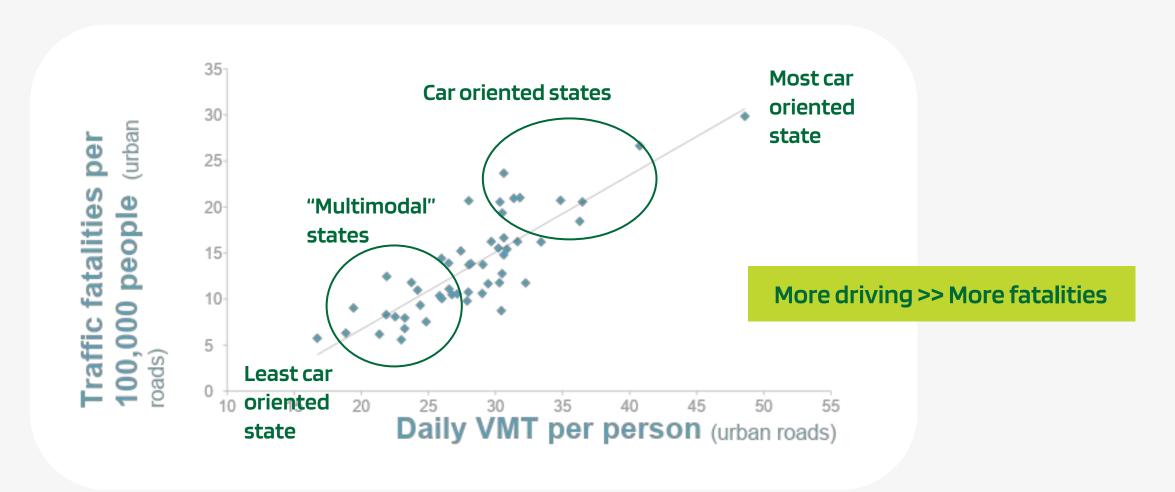


#### More personal driving is associated with more traffic fatalities



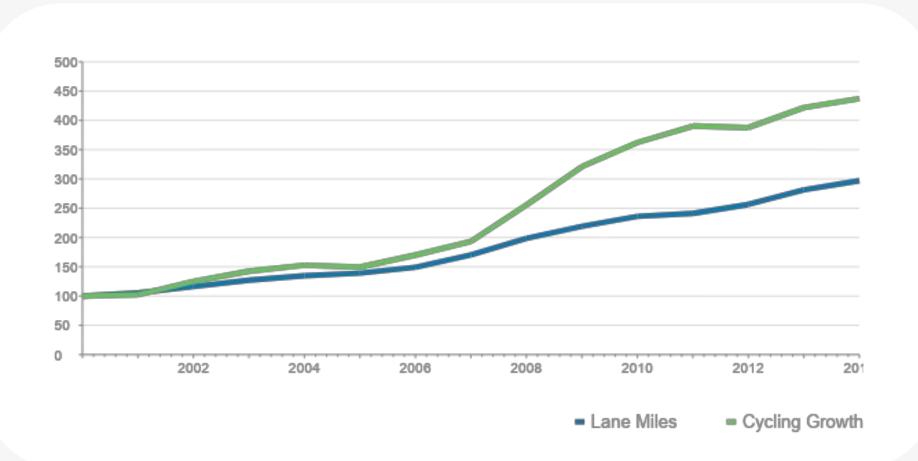


#### More personal driving is associated with more traffic fatalities



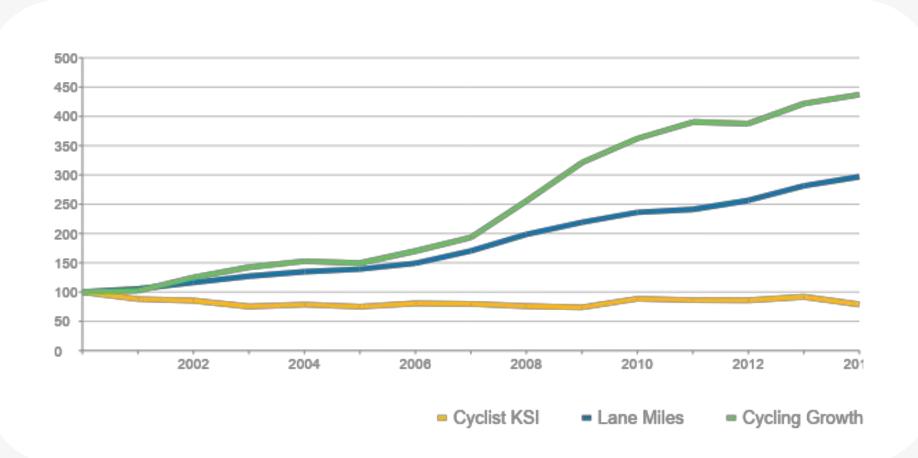


#### More Lanes = More Cyclists





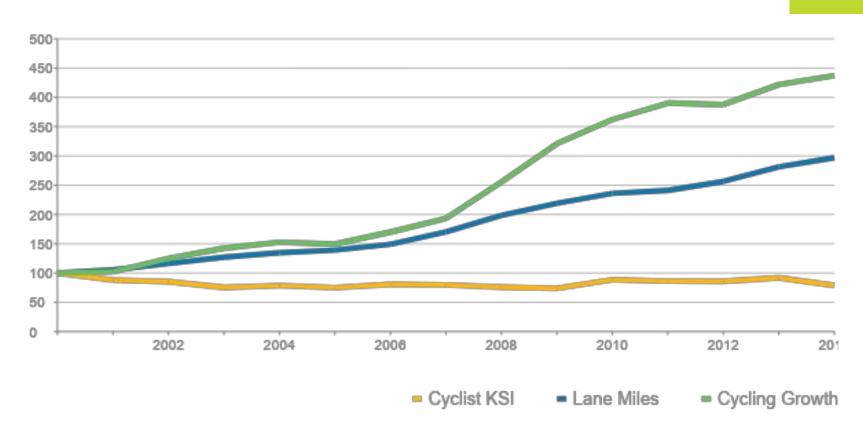
#### More Lanes = More Cyclists = Reduced Risk (for all users)





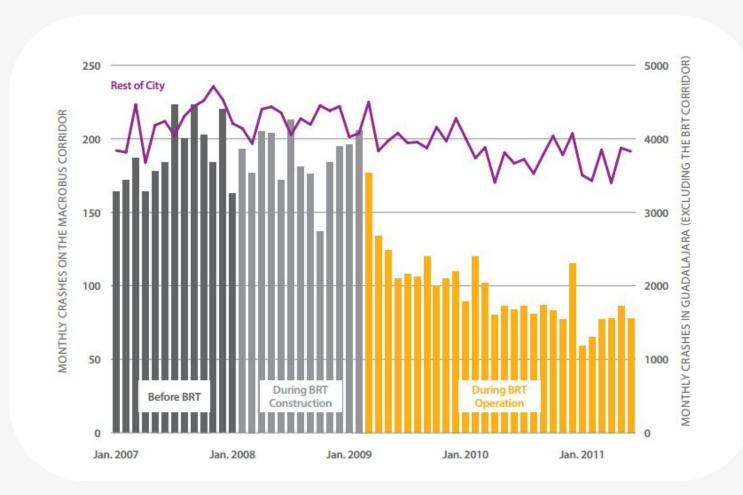
#### More Lanes = More Cyclists = Reduced Risk (for all users)

#### More cycling >> Fewer fatalities





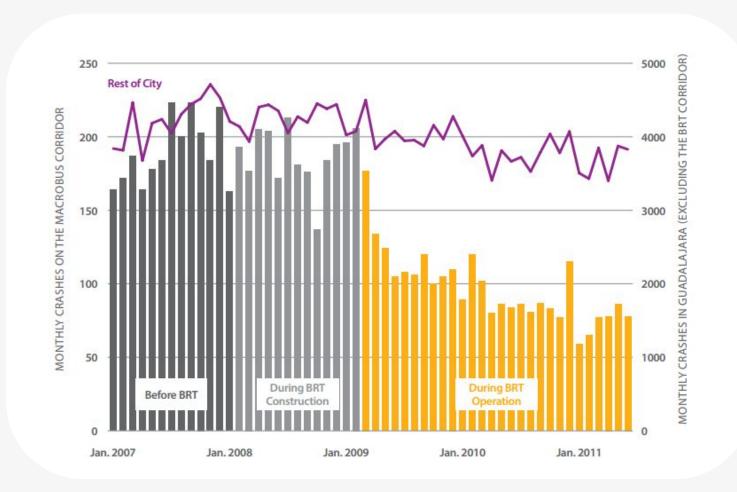
# Guadalajara, Mexico



Crashes before and after the implementation of the Macrobús BRT in Guadalajara



# Guadalajara, Mexico



#### More transit >> Fewer fatalities

Crashes before and after the implementation of the Macrobús BRT in Guadalajara

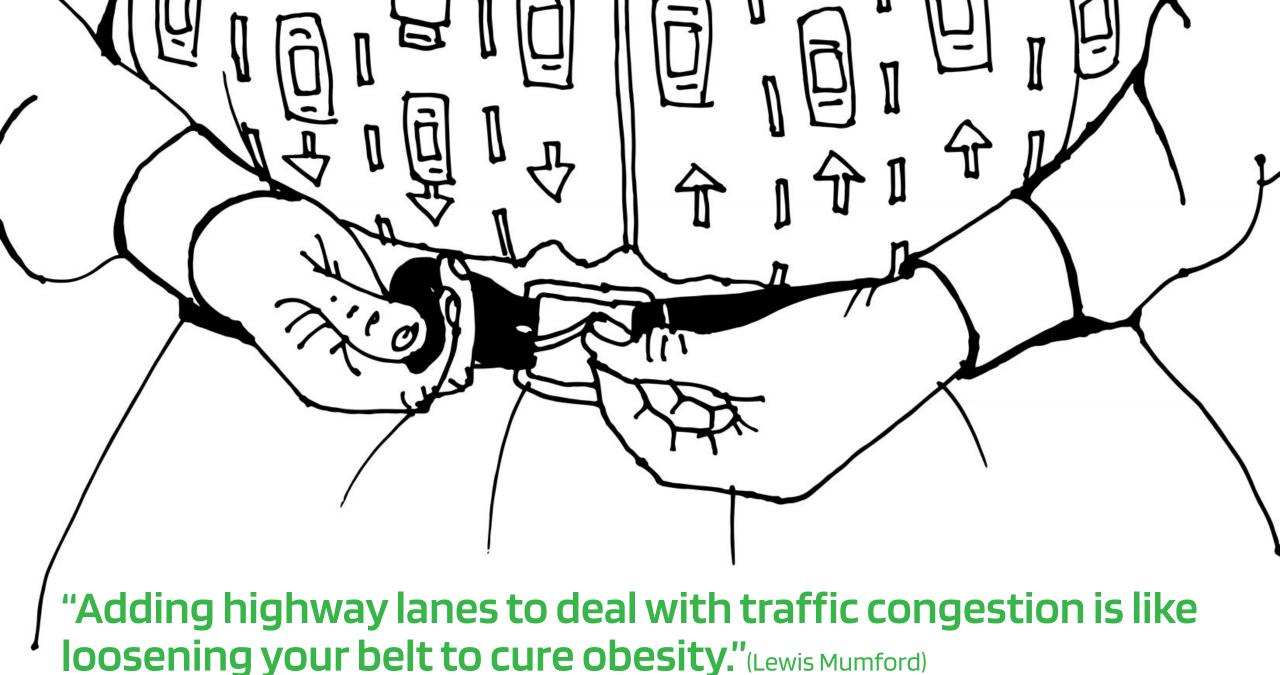


# Sustainable transportation options are more efficient



# We have been stuck in a self-fulfilling prophecy:





loosening your belt to cure obesity."(Lewis Mumford)

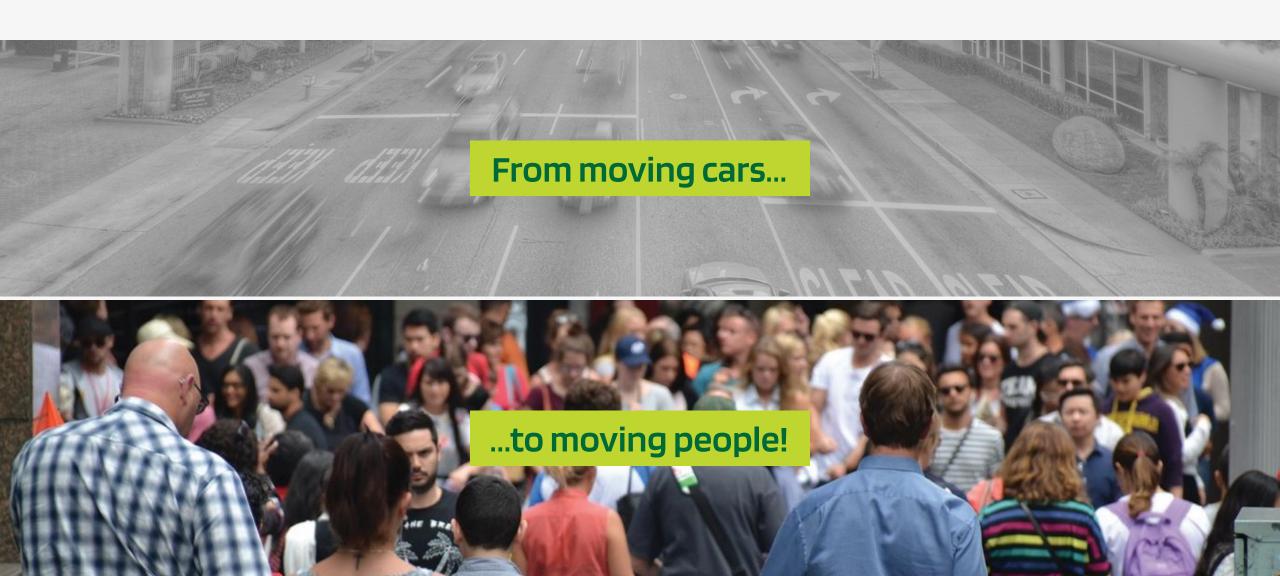


# It's time to solve a different problem...



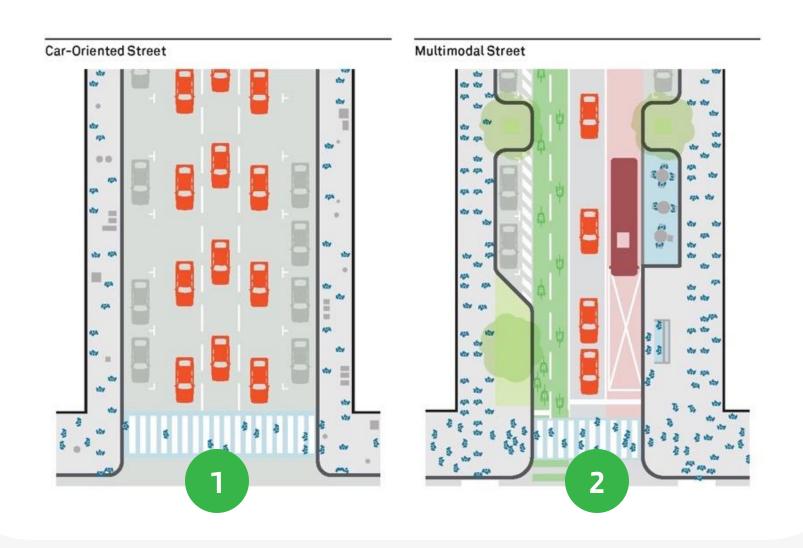


# It's time to solve a different problem...



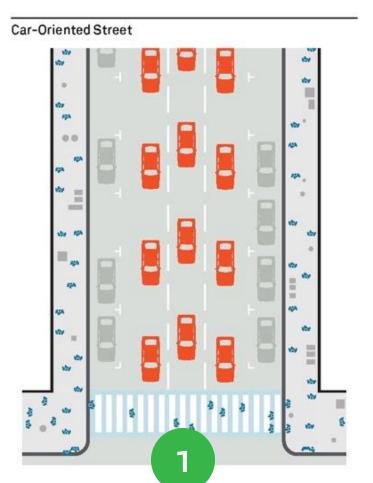


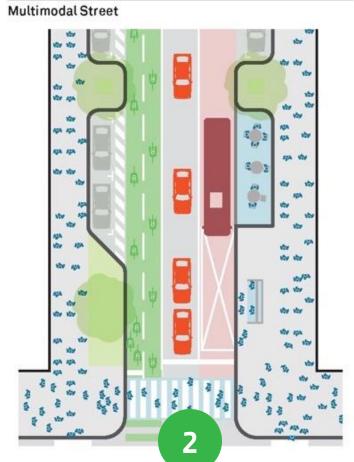
# Which street has the highest capacity?





# Which street has the highest capacity?

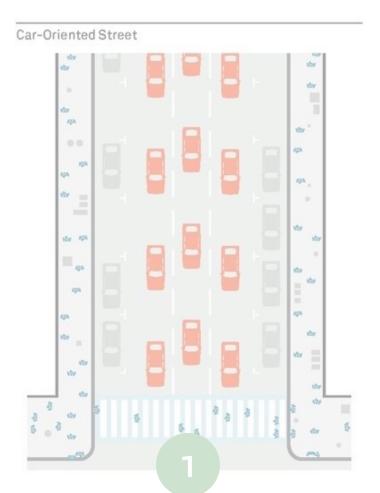


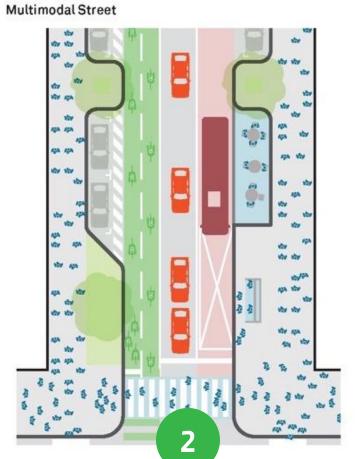






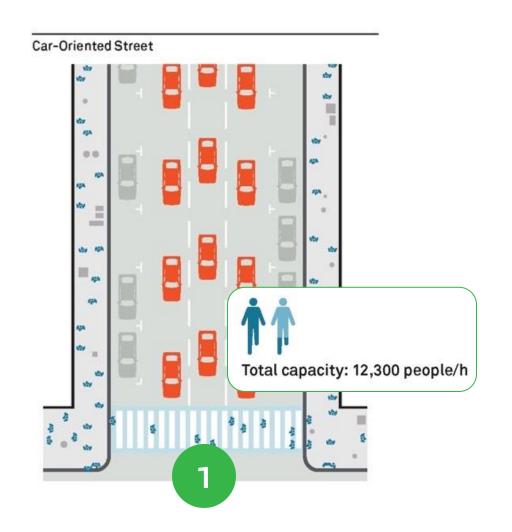
# Which street has the highest capacity?

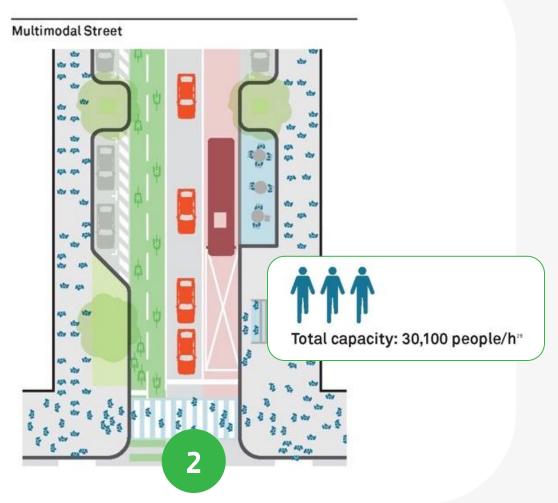












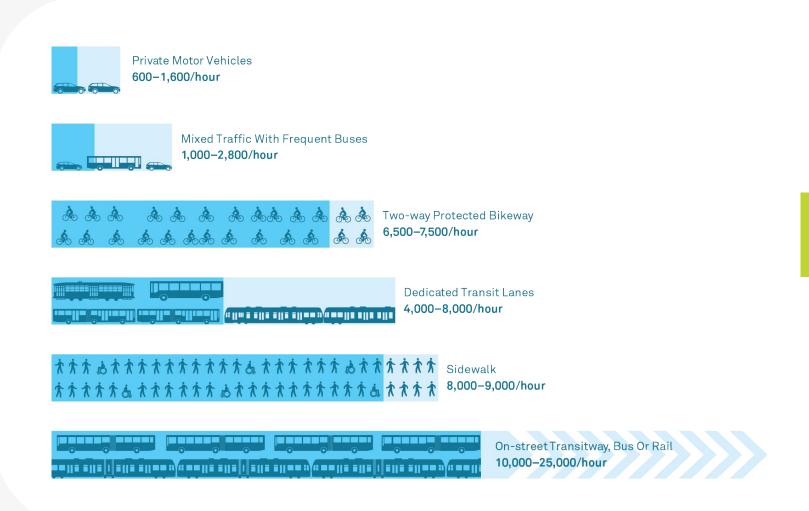






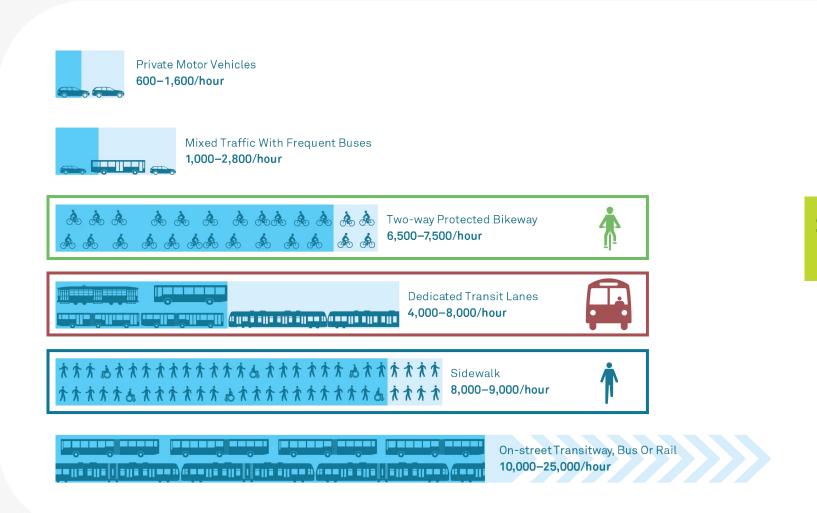
Mixed Traffic With Frequent Buses 1,000–2,800/hour





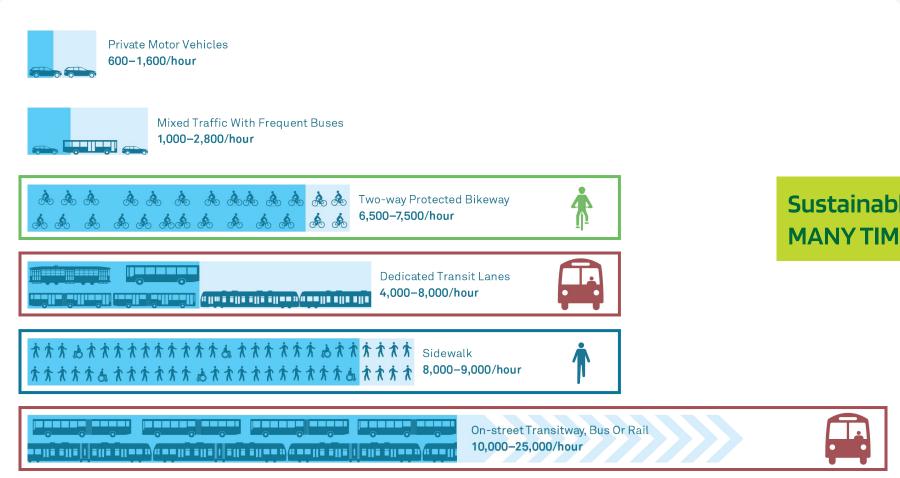
Sustainable modes
MANY TIMES more efficient





Sustainable modes
MANY TIMES more efficient

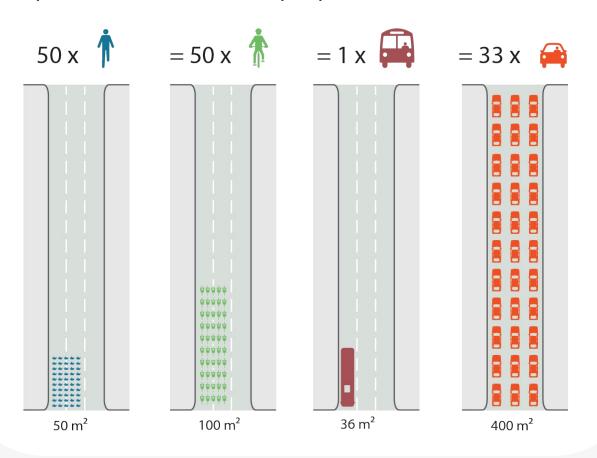




Sustainable modes
MANY TIMES more efficient

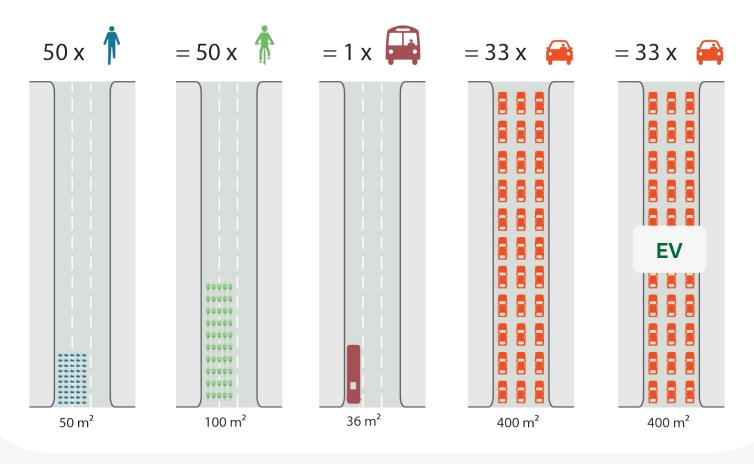


#### Space needed to move 50 people



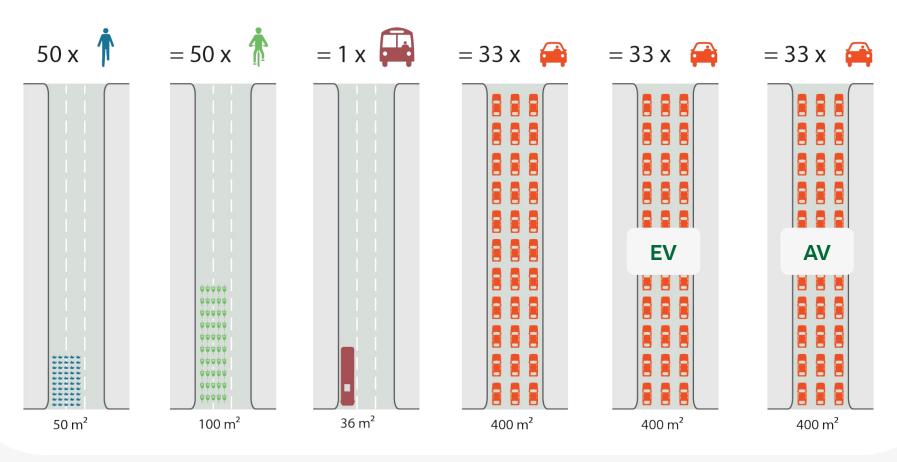


#### Space needed to move 50 people





#### Space needed to move 50 people

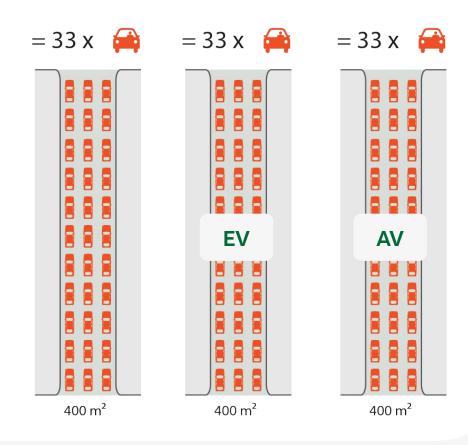




Space needed to move 50 people

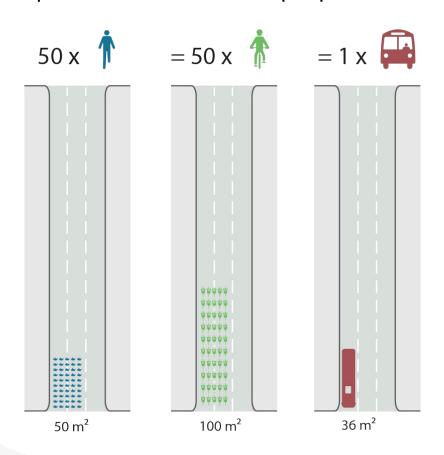
As our cities grow...

...Do we want to continue moving people like this?





#### Space needed to move 50 people



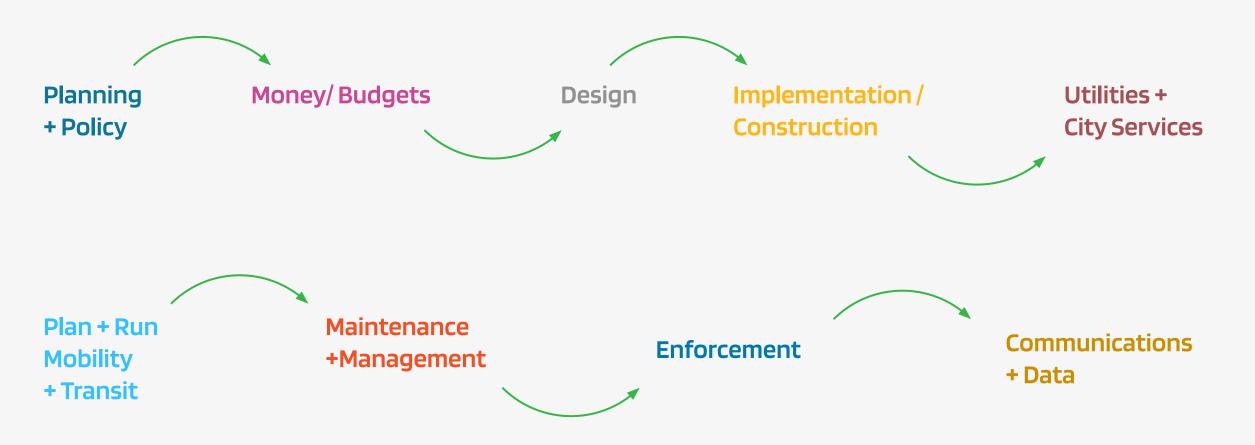
...Or rather like this?

# **Taking Action**

# 4. Work together



# Identify who's involved in Shaping Safe Streets + Sustainable Transportation Options?





# Who's involved in changing a street?





- Transportation departments and engineers
- Consumer affairs organizations
- Transit authorities and operators
- Park departments
- Construction and public works
- Sanitation and waste management
- Environmental protection
- Departments and organizations supporting people with disabilities
- Planning departments
- Building departments
- Utility companies
- Urban designers, landscape architects, and architects
- Health professionals
- Historic preservation organizations
- Advocacy groups and neighborhood associations
- Private property owners and tenants
- Local businesses, vendors, and kiosk owners
- Street operators
- Local media
- Developers and development banks
- Academic institutions
- Enforcement entities



# Who's involved in changing a street?





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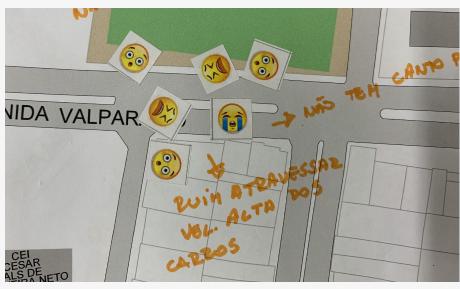
# **Process for Shaping Streets**

#### A TYPICAL PROCESS FOR SHAPING STREETS While local processes vary in each context, use the typical steps in the diagram below to define and guide the process for each project before it begins. Street design is an iterative process. Processes should remain flexible and relevant, evolving and adapting over time as best practices, specific challenges, and contexts change. Use the following steps to guide the process of shaping streets. **Project Planning Post Completion Process Step** Analyze the Site **Engage All Stakeholders** entation **Develop a Project Vision** plem Planning and Design **Build the Project** Maintain and Manage the Project Proje Evaluate the Impacts **Update Policy**

#### Global Designin Cities Initiative

# **Community engagement**









# Media trainings





# Workshops with traffic police



Help them enforce Safe movement for all vs Traffic management



# Broaden how we communicate about the importance and vulnerability of pedestrians





# Broaden how we communicate about the importance and vulnerability of pedestrians





























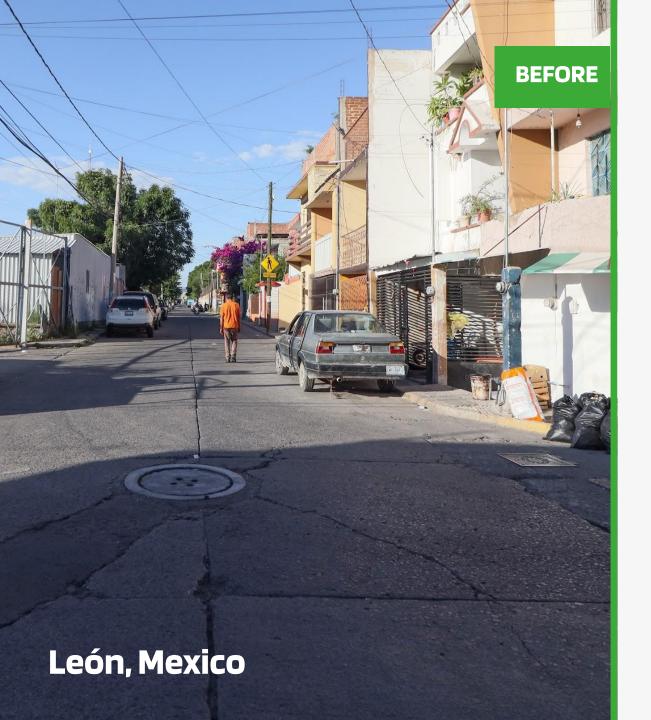






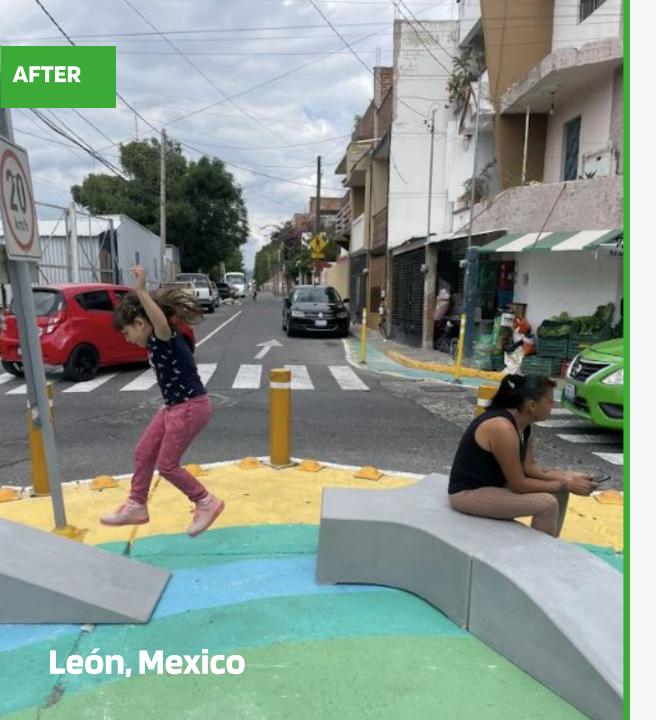






In a survey before the transformation, only 1% of caregivers felt it was safe for their child to ride or play on the street.

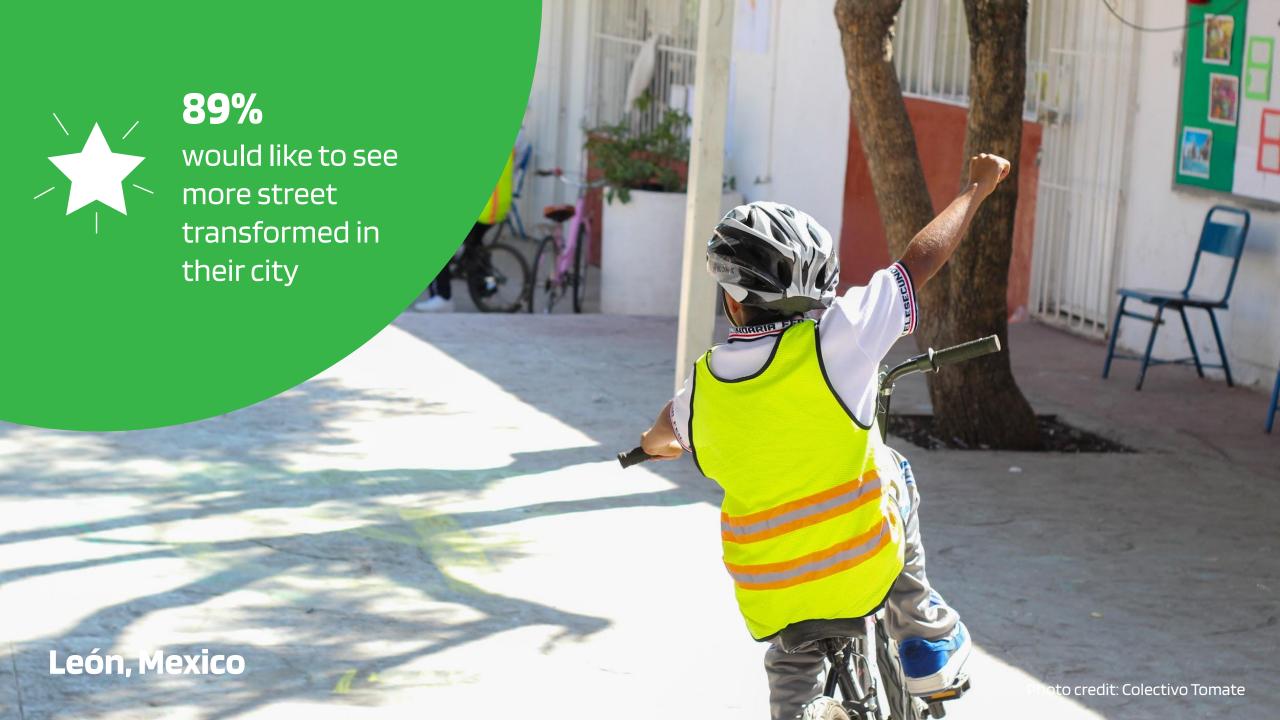




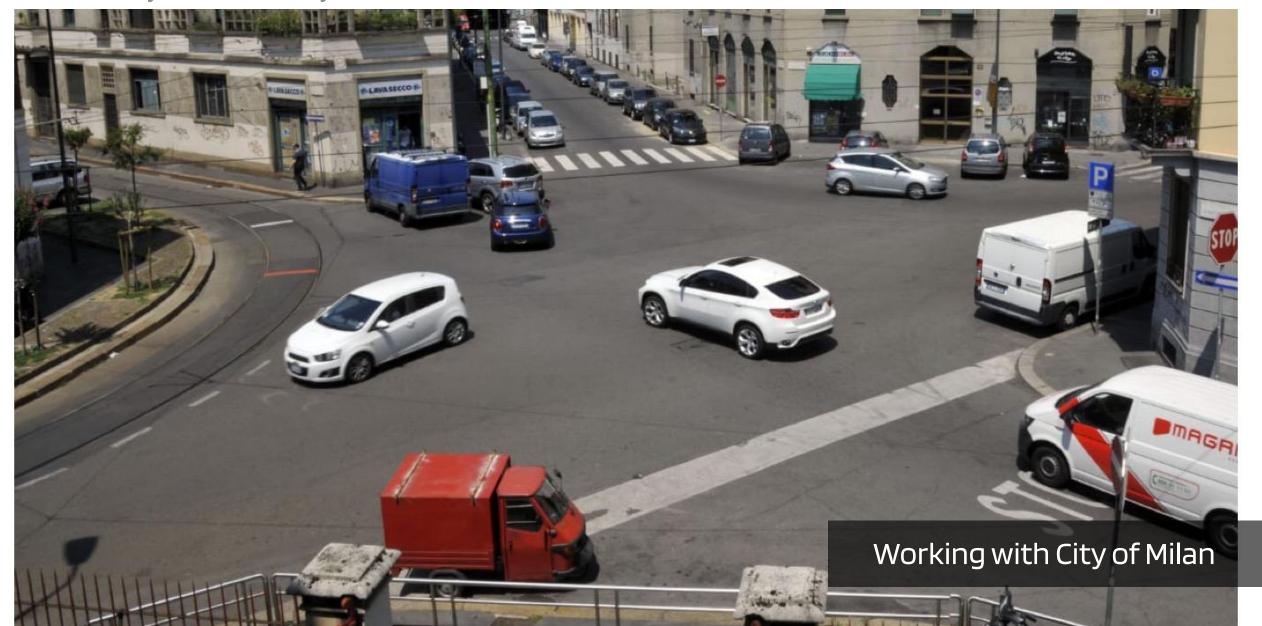
After the transformation, 75% of caregivers felt it was safe for their child to ride or play on the street.



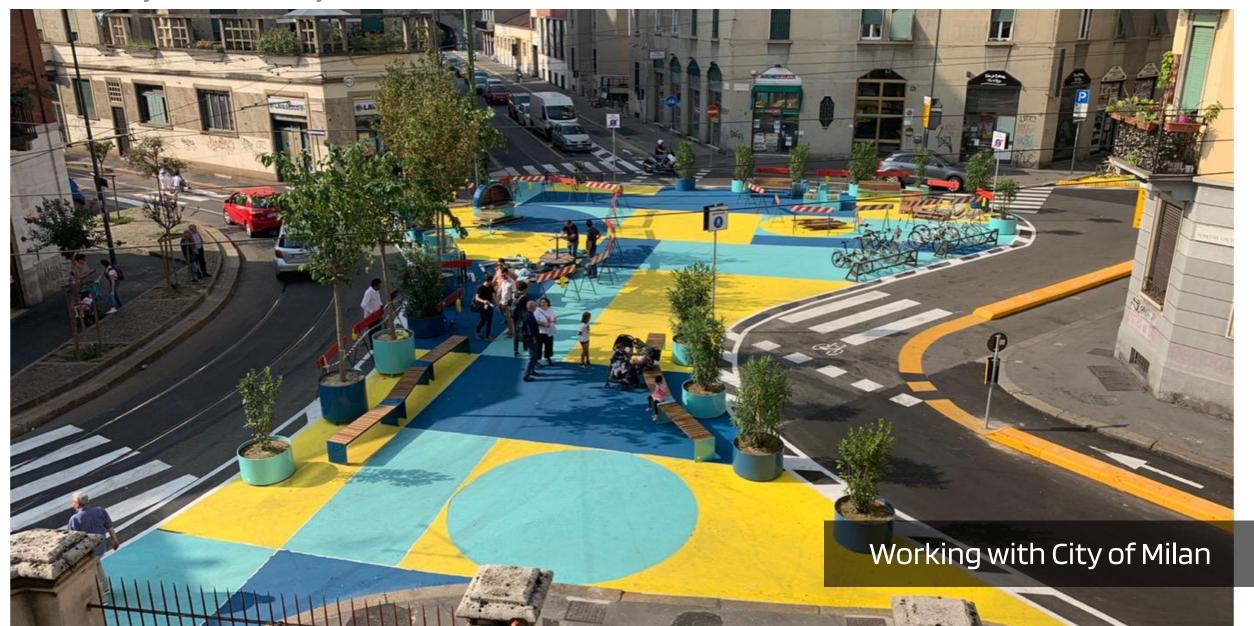




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### 200 fewer vehicles

passing in the area in the peak periods (7AM-9AM and 5PM-7PM) during weekdays.



In terms of emissions, this is equivalent to eliminating 35 trucks passing by that street in that time window.

less traffic in the street

less pollution near children



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## How do we ever make these changes (or MORE of these changes) in MY city?



- + Road Safety Plans....
- + New Bike Facilities...
- + Investing in Public Transport....
- + Improved Enforcement....
- + Reducing Speed limits....
- + Media campaigns....
- + .....





# What are 1-3 immediate actions you can take?

write them down & tell the person sitting next to you





# Safe and Sustainable Street Design: Designing for All Street Users

A workshop for the City of Ljubljana, Slovenia

Abhimanyu Prakash, Associate Director Renata Carvalho, Program Manager Marina Visic, Program Associate

Global Designing Cities Initiative

**29th January, 2025** 





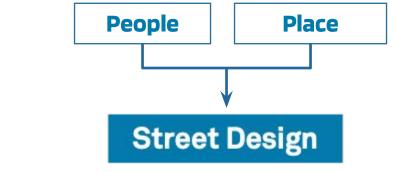
### **Designing for All Street Users**

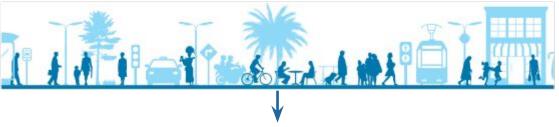




### A new approach to street design







#### **Desired Outcomes**

- Health and Safety
- · Livability and Quality of Life
  - Multi-modal Access
- Environmental Sustainability
  - Economic Sustainability
    - Equity

### Designing for place



### Designing for place







Socia





**Built environment** 

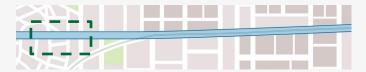
Natural environment

Social & cultural environment

Economical environment



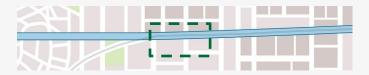
### Context 1: Neighborhood Main Street







### Context 2: Central Two-way Street

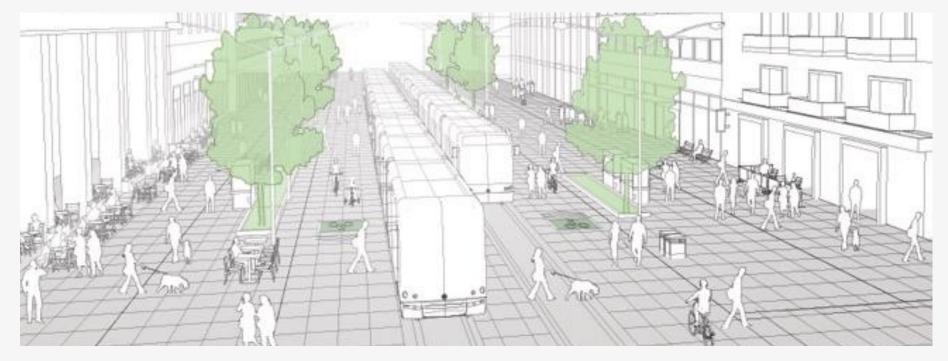






### **Context 3: Transit Mall**











# Designing for people





# **Pedestrians**







# **Cyclists**





Pedestrians





# **Transit Users**









Cyclists





# **Motorists**









Cyclists



Transit Riders





# Freight Operators and Service Providers



















# **People Doing Business**









Cyclists



Transit Riders





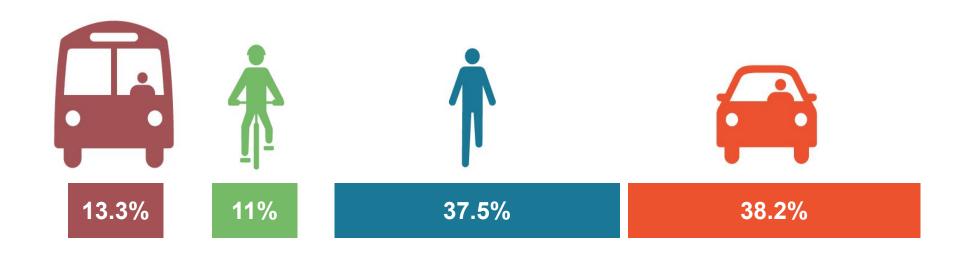


Freight Operators and Service Providers



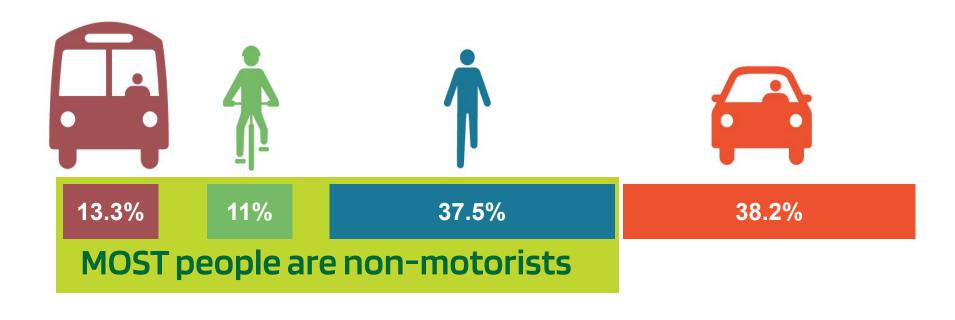


# How people get around in Ljubljana





### How people get around in Ljubljana



# Designing for pedestrians

# Designing for pedestrians

(we are all pedestrians!)

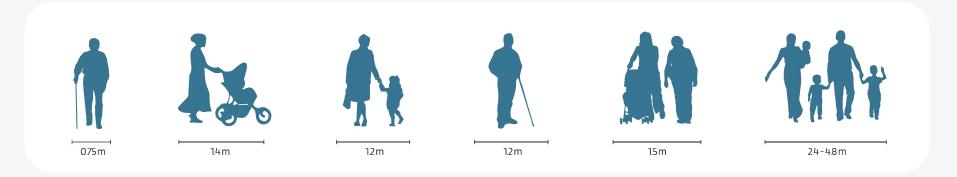


#### Pedestrian vulnerability and speed

Pedestrians cannot be made safe, at unsafe speeds or without facilities that serve them well.



# Types and dimensions

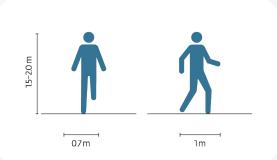




# Types and dimensions



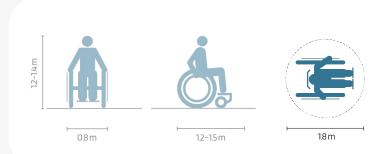


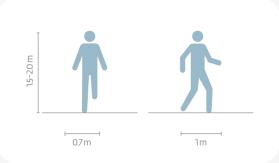




# Types and dimensions









#### **Elements**



Sidewalks



Pedestrian Crossings



Pedestrian Refuge Islands



Curb Extensions



Accessibility Ramps



Vision-Impaired Guidance



Signage and Wayfinding



Pedestrian Countdown Signals + Clocks



Lighting



Seating



Water Fountains



Weather Protection



Curbs



Waste Receptacles



Active Building Edges



Trees and Landscaping



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Sidewalks



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### Sidewalks zones



Frontage Zone

1m - 3.5

**Clear Path** 

1.8 – 2.4 + (Residential) 2.4 – 4.5 + (Commercial) Street Furniture Zone

1.5m – 2 m

Buffer Zone

Approx. 2 m - 2.5 m



### Sidewalks zones



Frontage Zone 1m - 3.5

1.8 – 2.4 + (Residential) 2.4 – 4.5 + (Commercial) Street Furniture Zone 1.5m – 2 m **Buffer Zone** Approx. 2 m – 2.5 m



#### Clear path

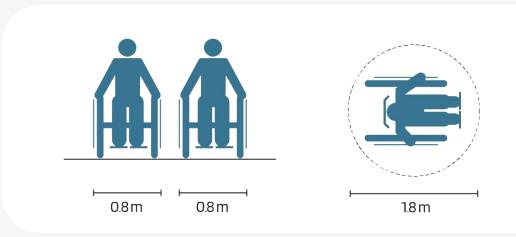
The clear path should be at least 1.8–2.4 wide in residential settings and 2.4–4.5 wide in downtowns, school zones, or commercial areas with heavy pedestrian volumes



### **Clear path**

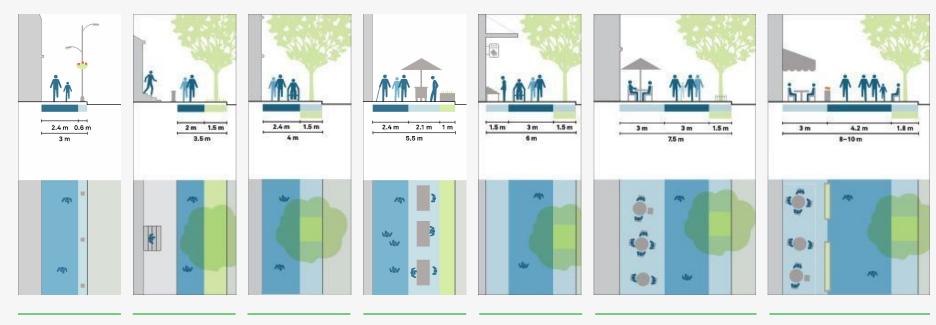
#### Why 1.8 m absolute minimum?

To ensure that every sidewalk even in low volume residential areas is accessible to all types of users (and all types of wheelchairs)





# Sidewalks types

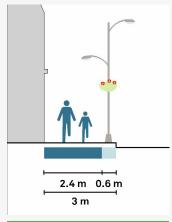


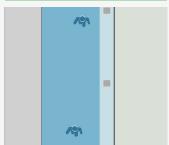
Residential Sidewalk Residential Ribbon Sidewalks Residential Sidewalk with Trees Neighborhood Main Street 1 Neighborhood Main Street 2 Medium Commercial Sidewalks Large Commercial Sidewalks



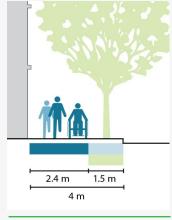
### Residential

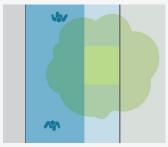
#### Residential Sidewalk





Residential Sidewalk with Trees







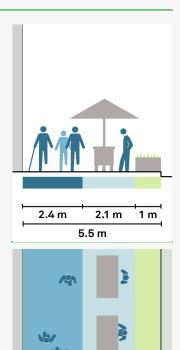
# Residential



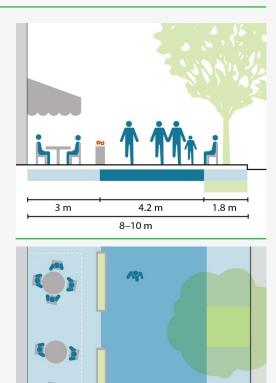


#### **Commercial**

Neighborhood Street



Large Commercial Sidewalks





# **Commercial**





# **Commercial**





#### **Elements**



Sidewalks



Pedestrian Crossings



Pedestrian Refuge Islands



Curb Extensions



Accessibility Ramps



Vision-Impaired Guidance



Signage and Wayfinding



Pedestrian Countdown Signals + Clocks



Lighting



Seating



Water Fountains



Weather Protection



Curbs



Waste Receptacles



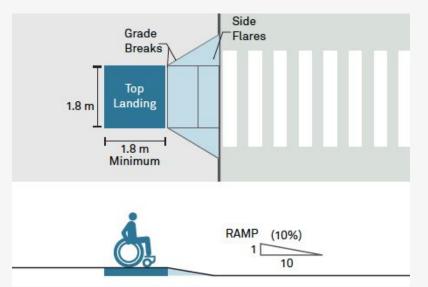
Active Building Edges

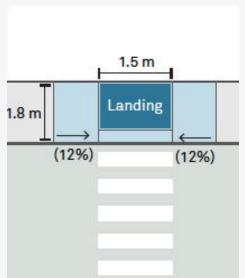


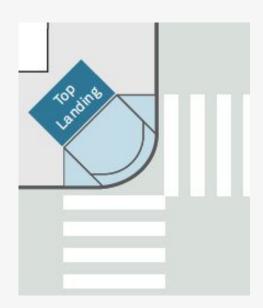
Trees and Landscaping



# **Accessibility Ramps**







Can be designed in different ways according to the context. Ramp slopes should not be 8-12%



#### **Elements**



Sidewalks



Pedestrian Crossings



Pedestrian Refuge Islands



Curb Extensions



Accessibility Ramps



Vision-Impaired Guidance



Signage and Wayfinding



Pedestrian Countdown Signals + Clocks



Lighting



Seating



Water Fountains



Weather Protection



Curbs



Waste Receptacles



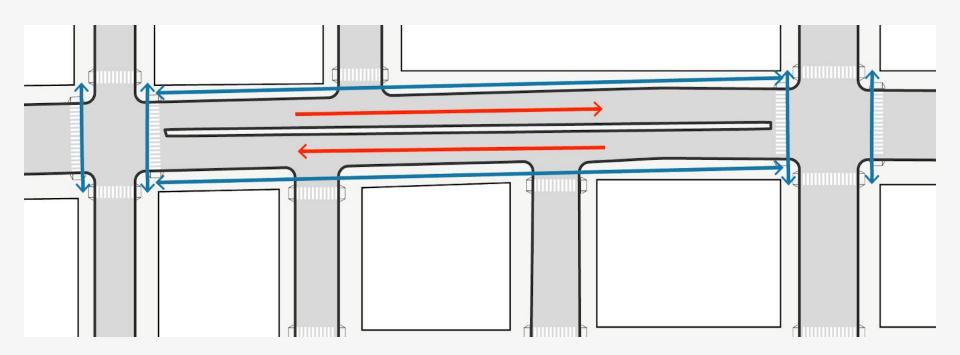
Active Building Edges



Trees and Landscaping

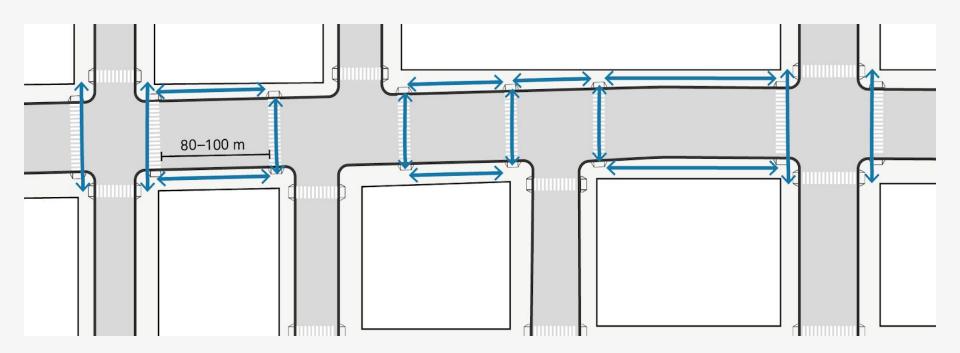


# **Spacing**





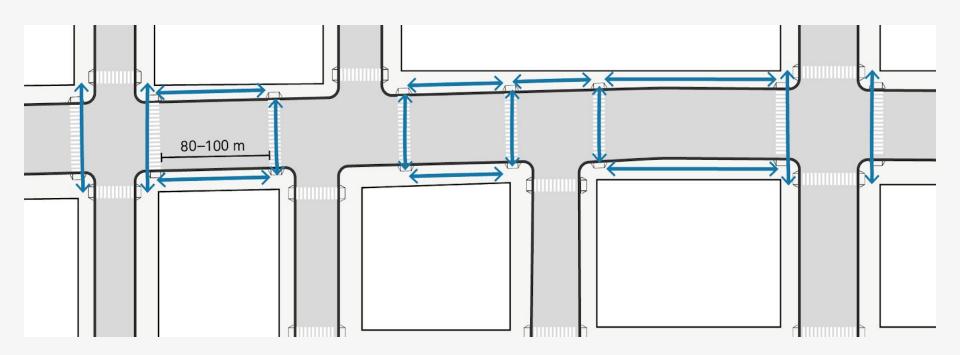
# **Spacing**



Safe, accessible crossings should be provided every 80–100 m, and at all legs of an intersection, to ensure a connected walkable network.



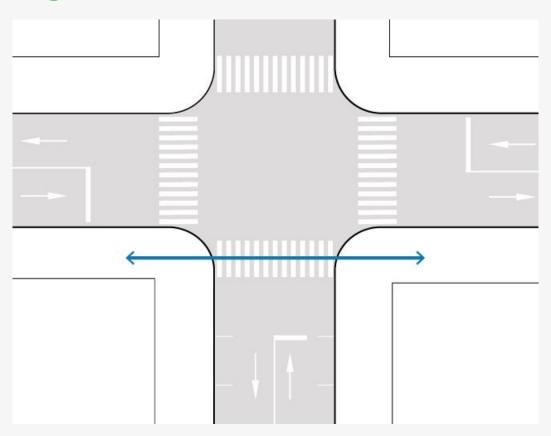
# **Spacing**



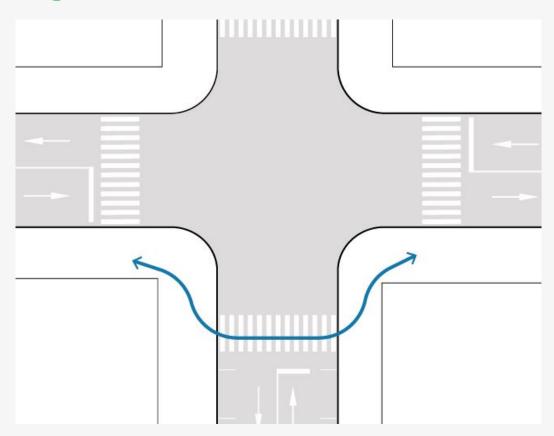
Safe, accessible crossings should be provided every 80–100 m, and at all legs of an intersection, to ensure a connected walkable network.

Crossings **over 200 m apart** must be **avoided** in urban contexts.

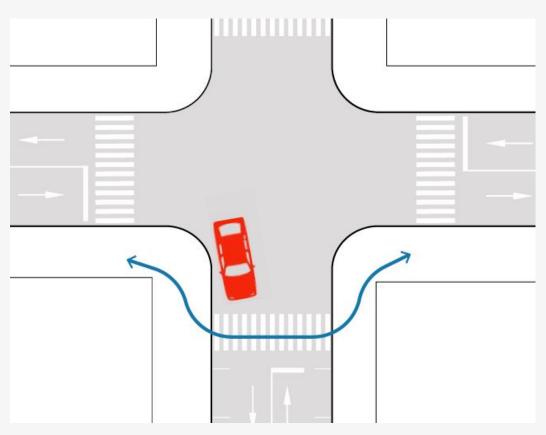




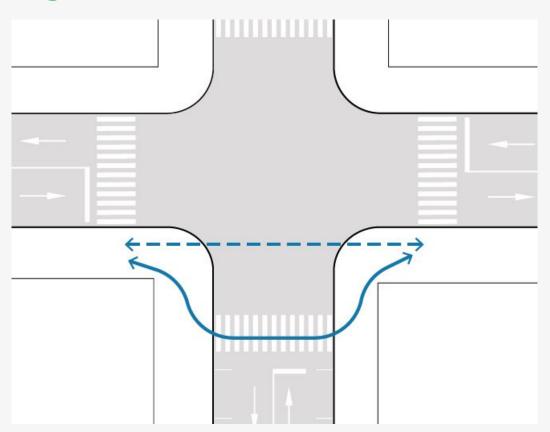




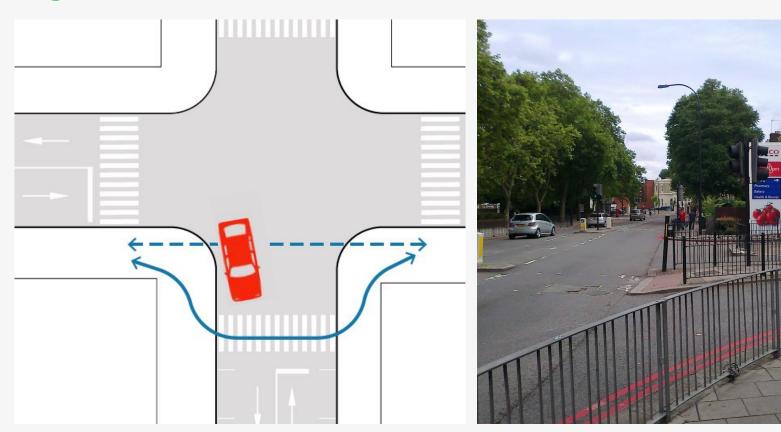








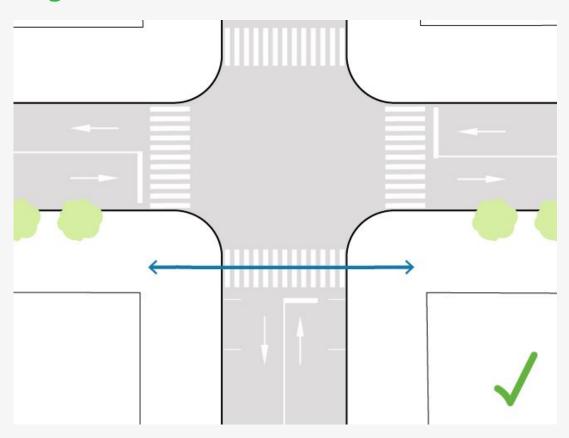




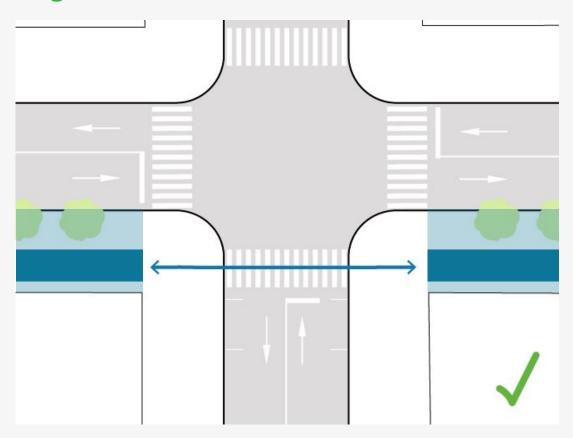






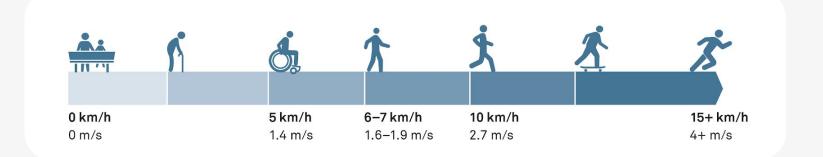








# Speed

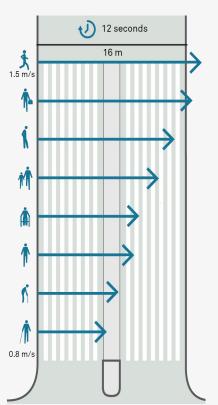




# Walking speed





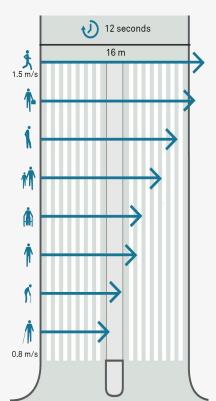




# Walking speed







So we can give pedestrians **MORE TIME** to cross, or...

We can give them **LESS DISTANCE** to cross...



#### **Elements**



Sidewalks



Pedestrian Crossings



Pedestrian Refuge Islands



Curb Extensions



Accessibility Ramps



Vision-Impaired Guidance



Signage and Wayfinding



Pedestrian Countdown Signals + Clocks



Lighting



Seating



Water Fountains



Weather Protection



Curbs



Waste Receptacles



Active Building Edges



Trees and Landscaping



# Refuge islands



- Allow two-stage crossing
- To be installed when pedestrian has to cross 3+ lanes



# Refuge islands



- Pedestrian refuge island should be at least 1.8 m deep (preferred 2.4 m)
- A pedestrian refuge island is ideally 10-12 m long, providing enough protection at each end of the waiting space



# Median tips



 This protects people waiting on the median from moving vehicles and slows turning motorists



## Median cut-troughs



Provided where there is a significant pedestrian desire line in front of transit stops and key destinations, or when the distance to the closest safe pedestrian crossing is more than 80-100 m



#### **Elements**



Sidewalks



Pedestrian Crossings



Pedestrian Refuge Islands



Curb Extensions



Accessibility Ramps



Vision-Impaired Guidance



Signage and Wayfinding





Countaown Signals + Clocks



Lighting



Seating



Water Fountains



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Waste Receptacles



Active Building Edges



Trees and Landscaping

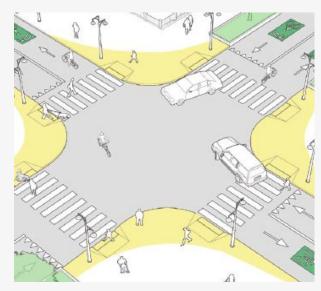


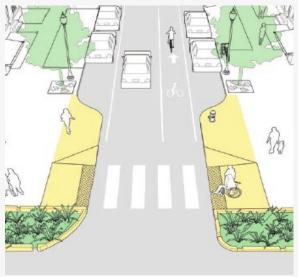
# **Curb extensions**





# **Types**







Corner Alignments

**Bulb-Outs** 

Slip Lane Removal





Provide wide and continuous clear paths



✔ Provide wide and continuous clear paths



✔ Provide wide and continuous clear paths

Reduce overall length of crossing



- ✔ Provide wide and continuous clear paths
- ✓ Reduce overall length of crossing



- ✓ Provide wide and continuous clear paths
- ✓ Reduce overall length of crossing

Provide frequent opportunity to cross (100m)



- ✓ Provide wide and continuous clear paths
- ✓ Reduce overall length of crossing
- ✔ Provide frequent opportunity to cross (100m)



- ✓ Provide wide and continuous clear paths
- ✓ Reduce overall length of crossing
- ✔ Provide frequent opportunity to cross (100m)

We like direct paths (to walk and cross!)



- ✓ Provide wide and continuous clear paths
- ✓ Reduce overall length of crossing
- ✔ Provide frequent opportunity to cross (100m)
- ✓ We like direct paths (to walk and cross!)



- ✔ Provide wide and continuous clear paths
- ✓ Reduce overall length of crossing
- ✔ Provide frequent opportunity to cross (100m)
- ✓ We like direct paths (to walk and cross!)

**Grade separated crossings** 



- ✔ Provide wide and continuous clear paths
- ✓ Reduce overall length of crossing
- ✔ Provide frequent opportunity to cross (100m)
- ✓ We like direct paths (to walk and cross!)
- ✗ Grade separated crossings



- ✔ Provide wide and continuous clear paths
- ✓ Reduce overall length of crossing
- ✔ Provide frequent opportunity to cross (100m)
- ✓ We like direct paths (to walk and cross!)
- Grade separated crossings

#### **Obstructions**

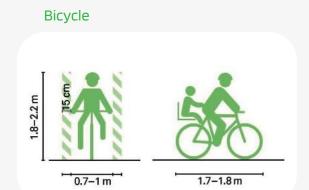


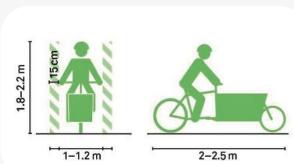
- ✔ Provide wide and continuous clear paths
- ✓ Reduce overall length of crossing
- ✔ Provide frequent opportunity to cross (100m)
- ✓ We like direct paths (to walk and cross!)
- **X** Grade separated crossings
- **X** Obstructions

# Designing for cyclists



# Types and dimensions





Cargo bike





# Redefining "the cyclist"





# Redefining "the cyclist"





# Redefining "the cyclist"





# Designing for All Ages and Abilities









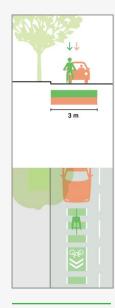
# Designing for All Ages and Abilities



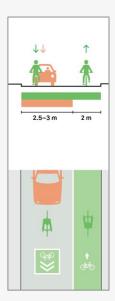




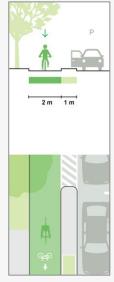




Cycle Street



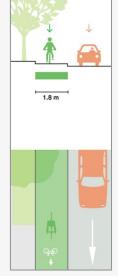
Contraflow Cycle Street



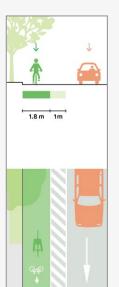
Protected Cycle Track



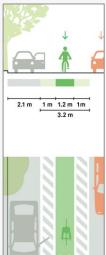
Bidirectional Cycle Track



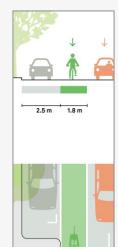
Raised Cycle Track



Curbside Buffered Cycle Lane

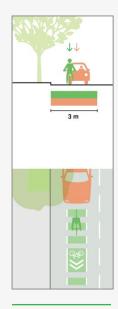


Buffered Cycle Lane

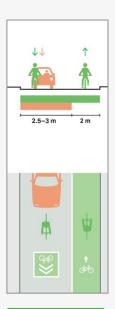


Unprotected Cycle Lane

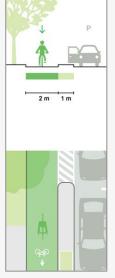




Cycle Street



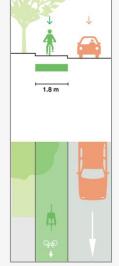
Contraflow Cycle Street



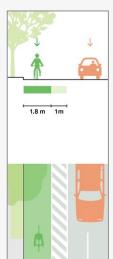
Protected Cycle Track



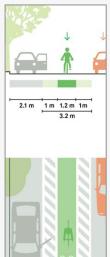
Bidirectional Cycle Track



Raised Cycle Track



Curbside Buffered Cycle Lane



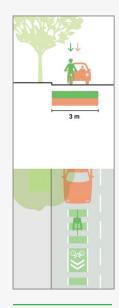
Buffered Cycle Lane



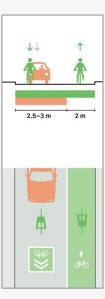
Unprotected Cycle Lane

<30 km/h **Share** 

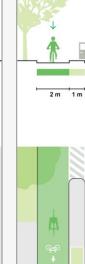




Cycle Street



Contraflow Cycle Street



**Protected** Cycle Track

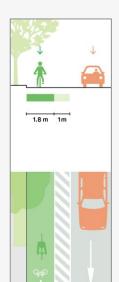


**Bidirectional** Cycle Track

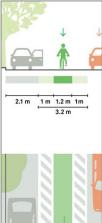
> 30 km/h



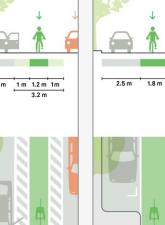
Raised Cycle Track



Curbside



Buffered Cycle Lane

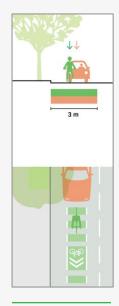


Buffered Unprotected Cycle Lane Cycle Lane

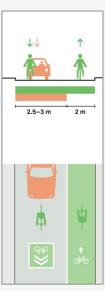
< 30 km/h Share

**Protect** 





Cycle Street



Contraflow Cycle Street

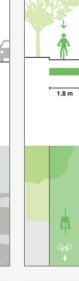


2 m 1 m

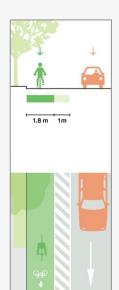
Protected Cycle Track



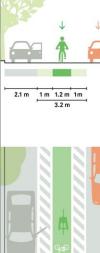
Bidirectional Cycle Track



Raised Cycle Track



Curbside Buffered Cycle Lane



Buffered Cycle Lane



Unprotected



<30 km/h
Share

> 30 km/h
Protect

30-40 km/h **Contextualize** 









Protected Bidirectional Cycle Track Cycle Track



Raised Cycle Track



Curbside Buffered Cycle Lane

Buffered Cycle Lane Unprotected Cycle Lane

< 30 km/h

Share

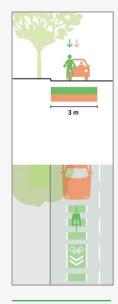
> 30 km/h

**Protect** 

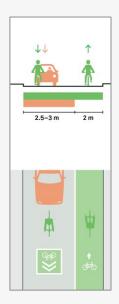
30-40 km/h

Contextualize

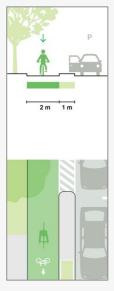




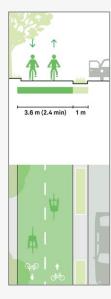
Cycle Street



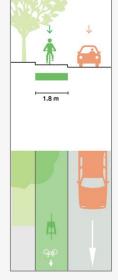
Contraflow Cycle Street



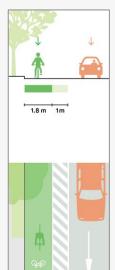
Protected Cycle Track



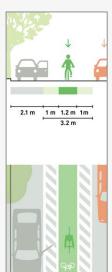
Bidirectional Cycle Track



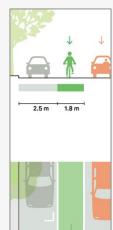
Raised Cycle Track



Curbside Buffered Cycle Lane



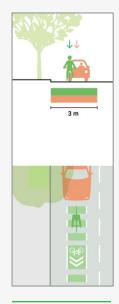
Buffered Cycle Lane



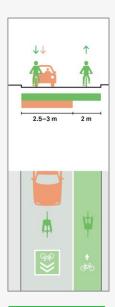
Conventional Cycle Lane







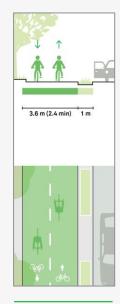
Cycle Street



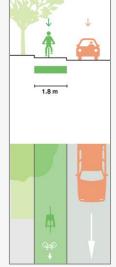
Contraflow Cycle Street



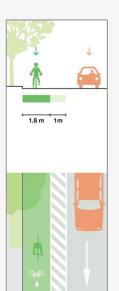
Protected Cycle Track



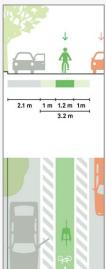
Bidirectional Cycle Track



Raised Cycle Track



Curbside Buffered Cycle Lane



Buffered Cycle Lane

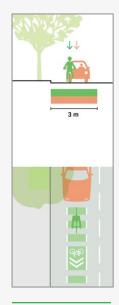


Conventional Cycle Lane

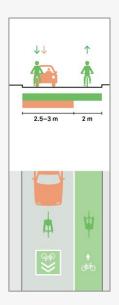
Safer

Safe?

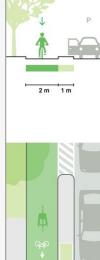




Cycle Street



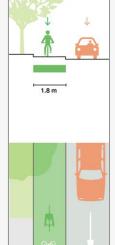
Contraflow Cycle Street



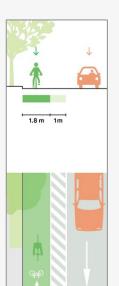
Protected Cycle Track



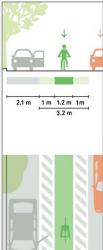
Bidirectional Cycle Track



Raised Cycle Track



Curbside Buffered Cycle Lane



Buffered Cycle Lane



Conventional Cycle Lane

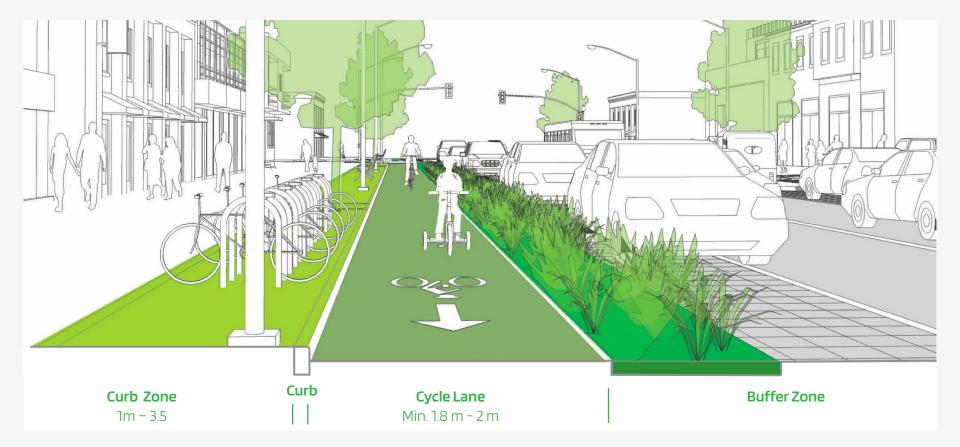
Safest

Safer

Safe?

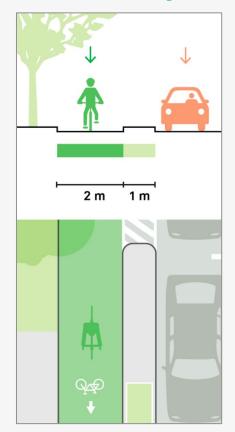


# **Basic geometry**





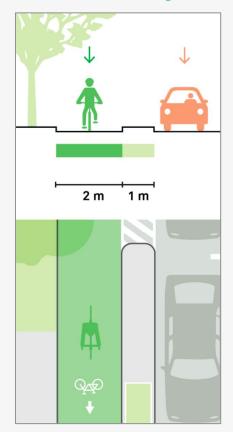
# **Protected Cycle Track**







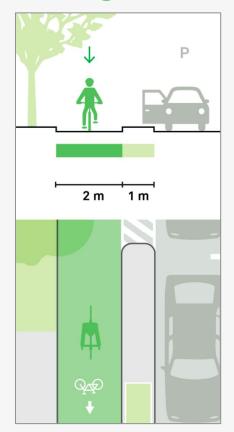
# **Protected Cycle Track**







# Parking Protected Cycle Track

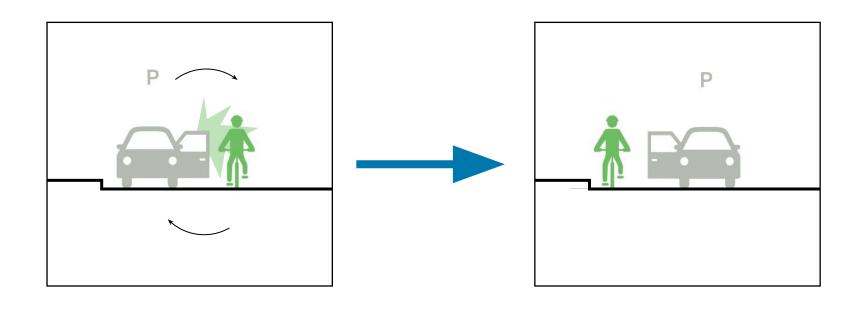




#### **Cycle Facilities**

#### Protected Cycle Track







# **Parking Protected Cycle Track**



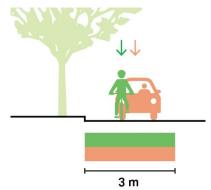


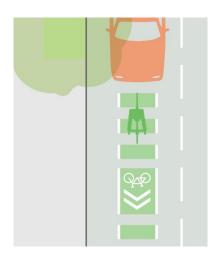
2nd Avenue New York, USA

- 58% in injuries to all users
- **67**% in pedestrian crashes
- 29% in speeding
- + 49% in retail sales

#### **Cycle Facilities**

Cycle Streets





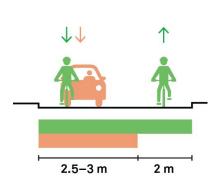


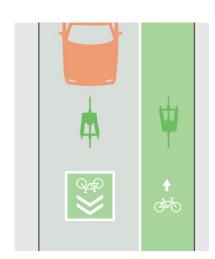


#### **Cycle Facilities**

#### Global Designin Cities Initiative

#### Contraflow Cycle Lanes

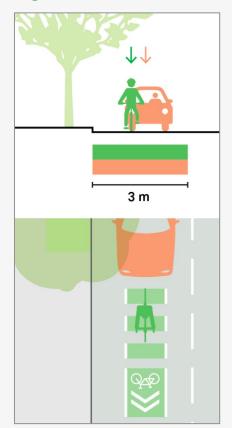








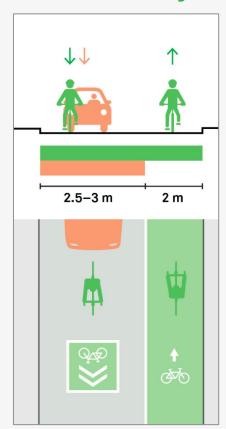
# **Cycle Streets**







# **Contraflow Cycle Lanes**

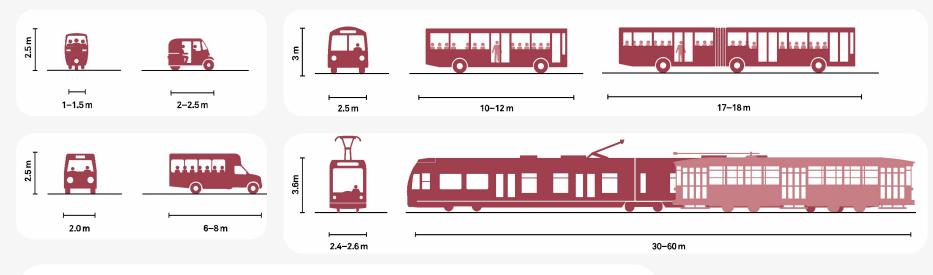


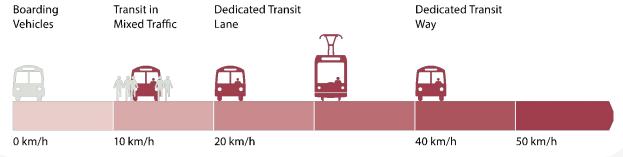


# Designing for transit users



# Speed, variations and dimensions





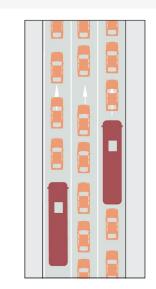


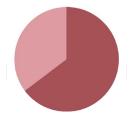
#### **Transit facilities**



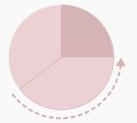


#### Safe travel time with dedicated transit facilities









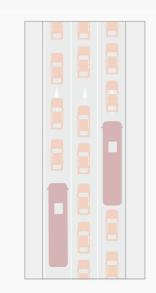
Transit given dedicated space

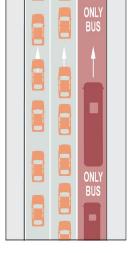
4000-8000 people/ hour

Transit stuck in congestion
1000-2800
people/ hour

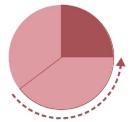


#### Safe travel time with dedicated transit facilities









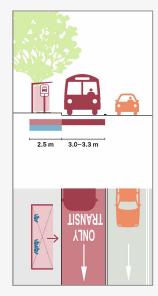
Transit given dedicated space 4000-8000 people/ hour

Transit stuck in congestion 1000–2800

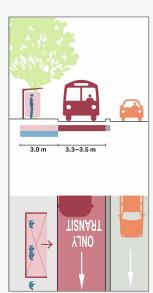
people/hour



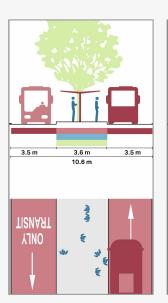
#### **Geometry**



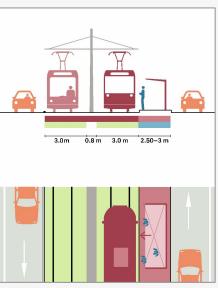
Side-Running Dedicated Transit Lane



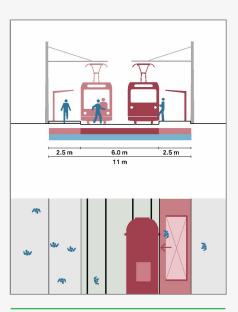
Side-Running Transitway



Center-Running Transitway with Center Boarding



Center-Running Transitway with Center Boarding



Transit Malls



# **Side-Running Dedicated Transit Lane**





# **Side-Running Transitway**



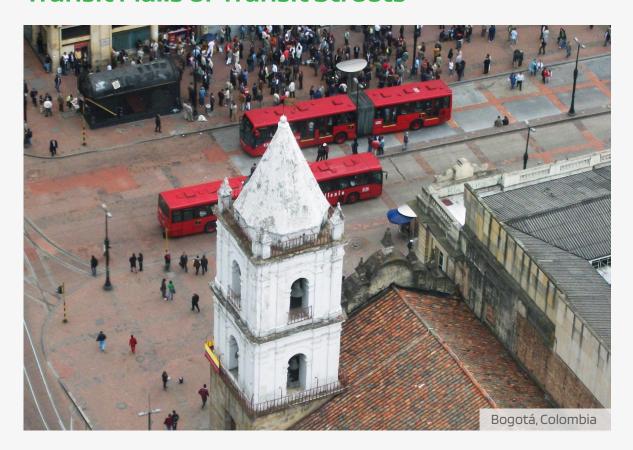


# **Center-Running Transitway with Side Boarding**



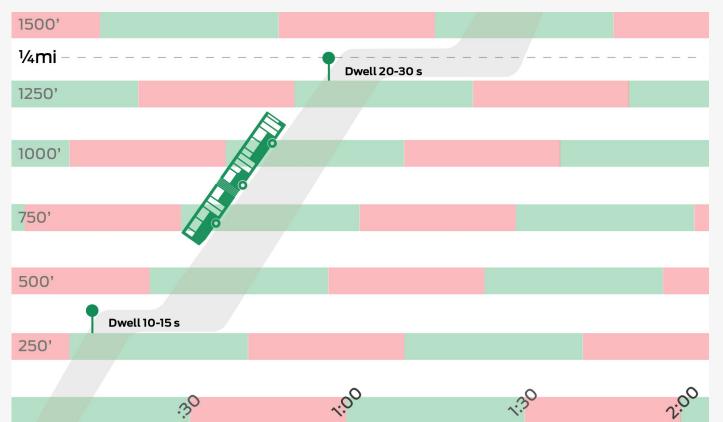


# **Transit Malls or Transit Streets**





# **Signal Progression**



https://nacto.org/publication/transitstreet-design-guide/intersections/sig nals-operations/transit-signal-progr ession/



# **Signal Progression**

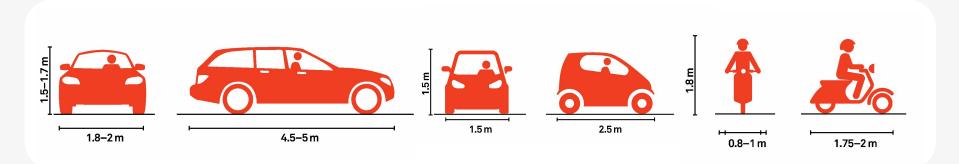


https://nacto.org/publication/transitstreet-design-guide/intersections/sig nals-operations/transit-signal-progr ession/

# Designing for motorists



# Speed, variations and dimensions





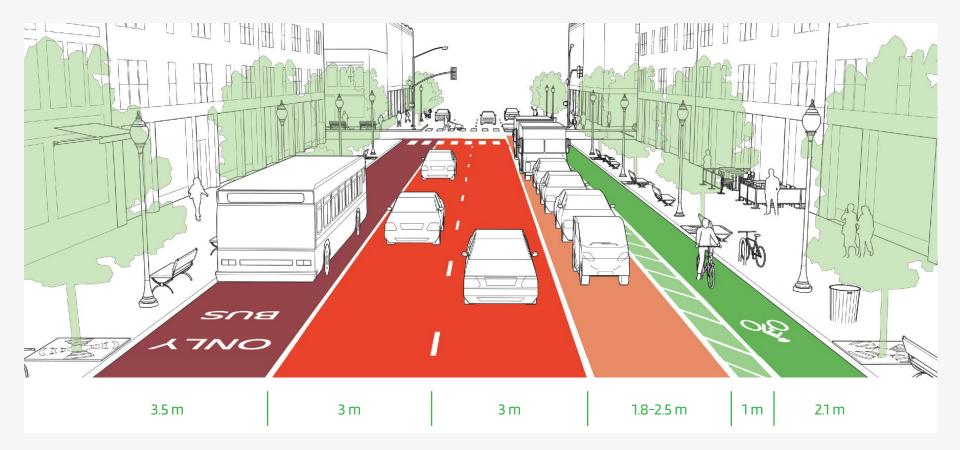
# **Motorists**





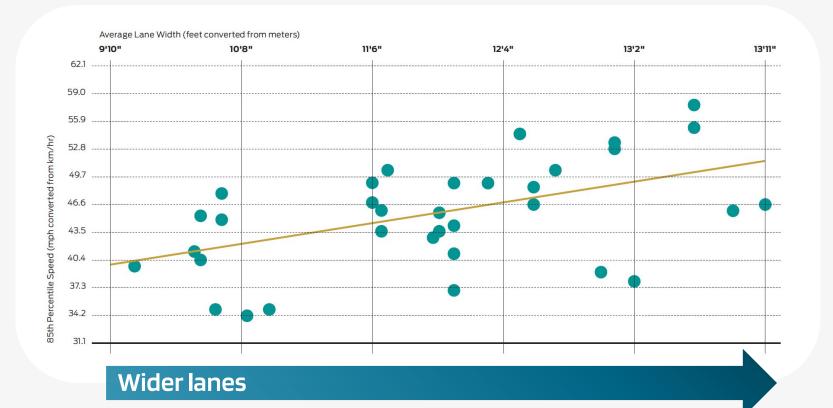
#### **Motorists**





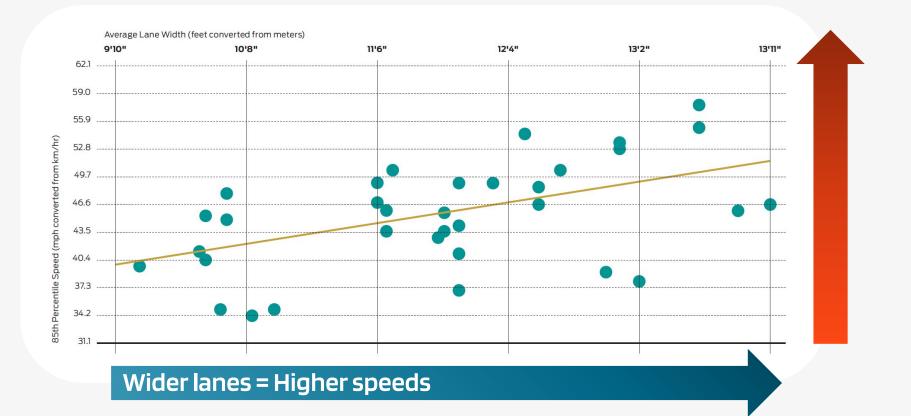


#### Wider travel lanes are correlated with higher vehicle speeds





#### Wider travel lanes are correlated with higher vehicle speeds





#### Traffic calming measures - Lane narrowing

#### Why narrowing lanes?

Narrower lanes (3 m-wide)

- Are safer
- Encourage slow speeds
- Carry more vehicles (...or at least as much as wider lanes)







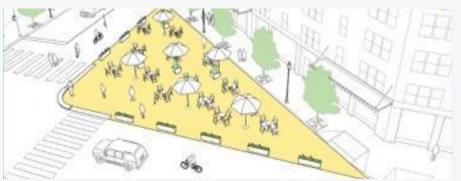


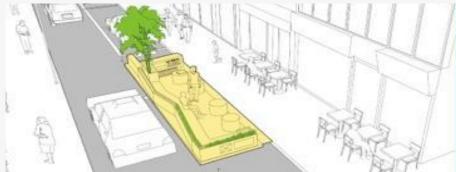


Pedestrian crossings

Refuge islands











Pedestrian plazas

**Parklets** 







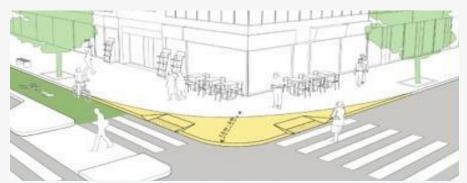




Mini-Round Abouts

Chicane







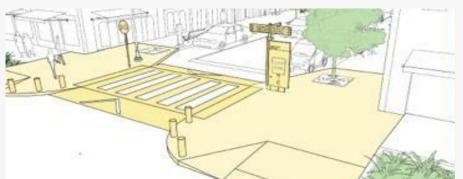


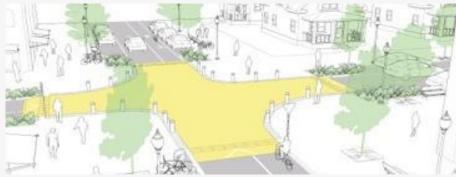


Tighter Turning Radii

**Curb Extensions** 











Neighborhood Gateways

Raised Intersections



#### Recap

- ✓ Narrow lanes are safer and efficient lanes
- Manage speed through design!

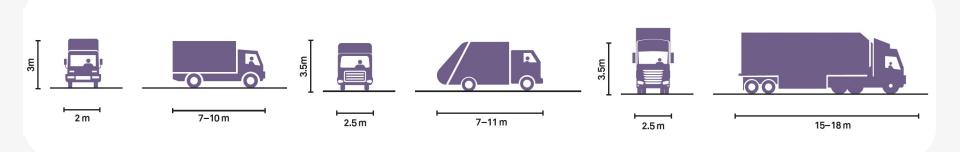
(Make speeding uncomfortable)

- Give priority to vulnerable users
- X Avoid highway design in urban context!!

# Designing for Freight and Service Providers

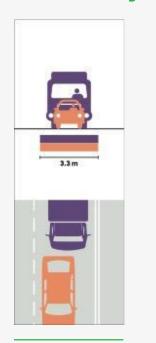


#### Speed, variations and dimensions

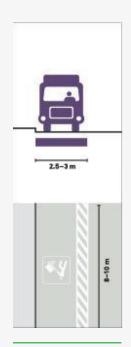




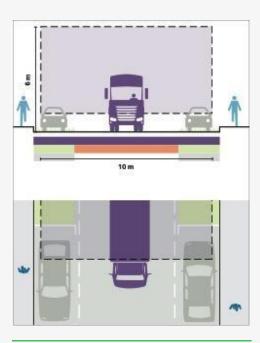
#### **Geometry**







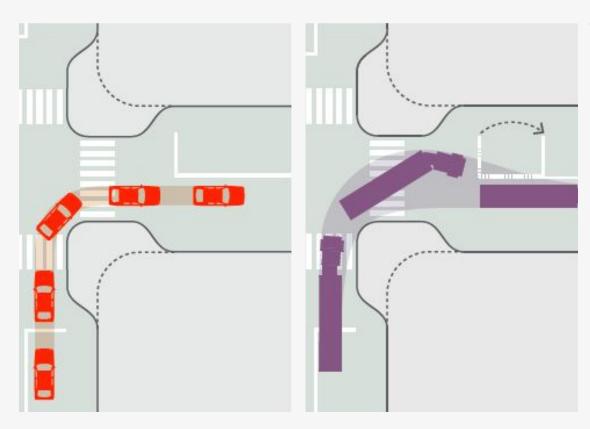
Loading Bays



Oversized Travel Lanes



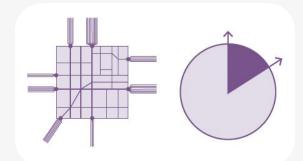
#### **Corner Radii**



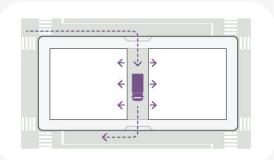
Geometric techniques such as a recessed stop bar can be used, without increasing the turn radius and allow larger vehicles to turn.



#### Managing space and time



Network and time management



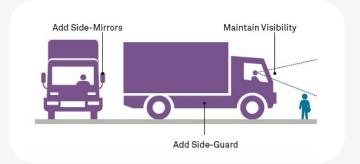
Hand Carts

Cargo Cycles

Mini-Vehicles

Small Trucks

#### Consolidation and distribution centers

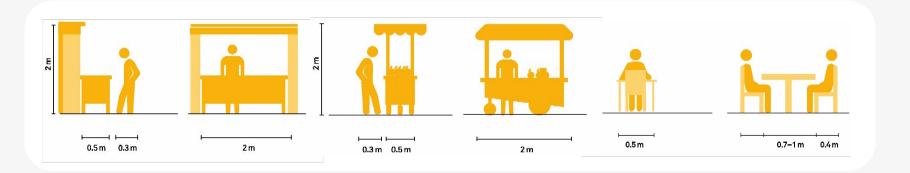


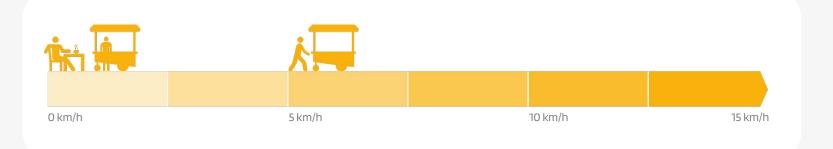
Safe freight vehicles

# Designing for people doing business



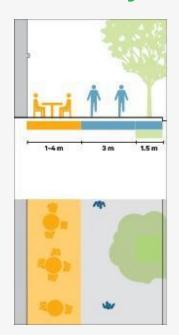
#### Speed, variations and dimensions



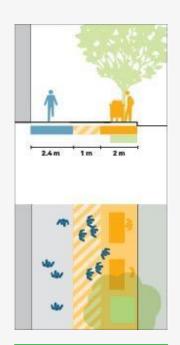




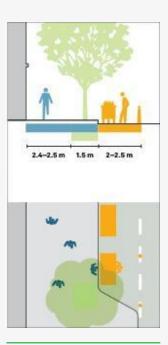
#### **Geometry**



Commercial use extensions



Vendors on sidewalks



Vendors in enhancement zone



#### **Elements**



Power



Water and Waste



Lighting



Hours of operation



Sitting Guidance



Dedicated Spaces



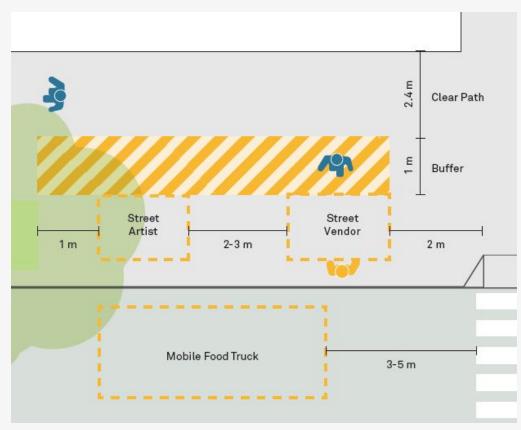
Seating



Storage



#### **Siting Guidance**





#### **Siting Guidance**







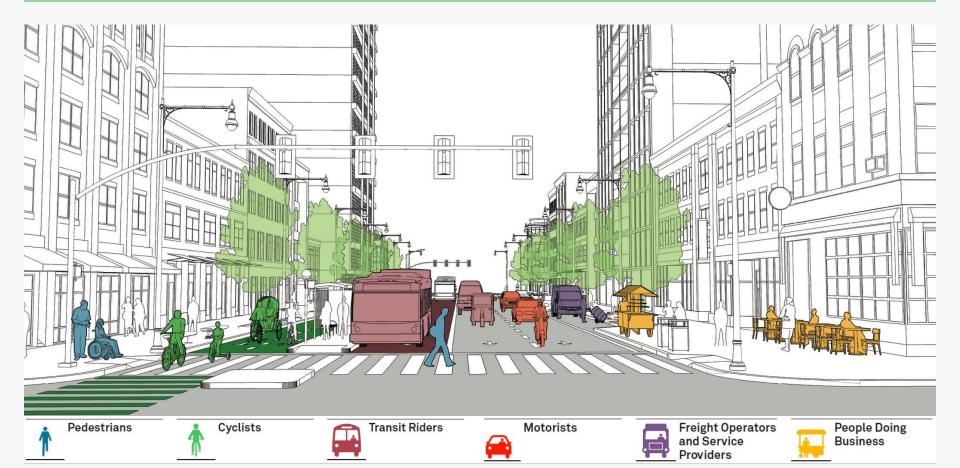


#### Recap

- ✓ People doing business make our cities thrive!
- ✓ Include them in your designs
- Anticipate their needs!

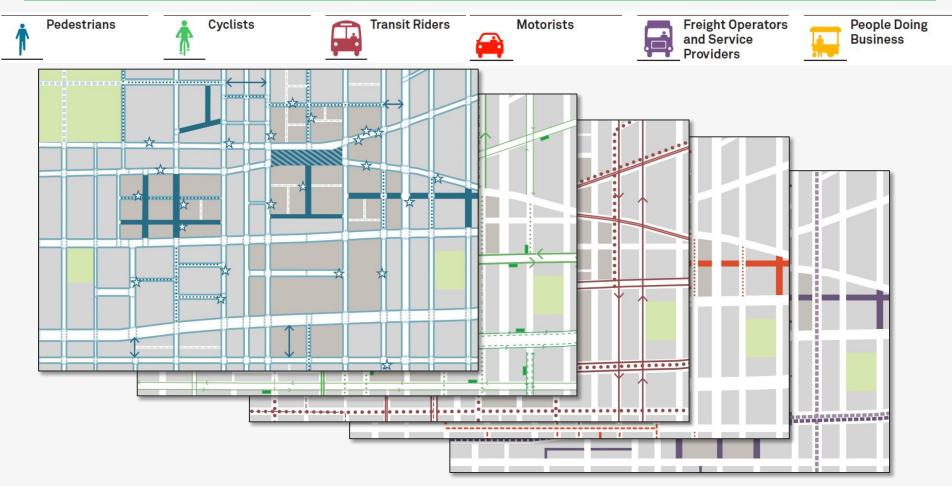
#### Design for all street users!





#### Design networks for all street users!









## Safe and Sustainable Street Design: Street Transformations

A workshop for the City of Ljubljana, Slovenia

Abhimanyu Prakash, Associate Director Renata Carvalho, Program Manager Marina Visic, Program Associate

Global Designing Cities Initiative

**29th January, 2025** 





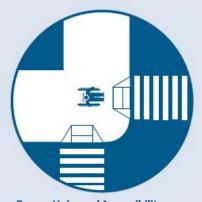
### Street Transformations and Intersections







### **Street Design Strategies**



**Ensure Universal Accessibility** 



**Accommodate Diverse Uses** 



**Design for Safe Speeds** 



Develop Context-Driven Solutions



**Reconfigure the Space** 



Act Now—
Start Somewhere!

### **Street Typologies**











Pedestrian
Priority
Streets

Shared Streets

Neighborhood Streets

Large Streets

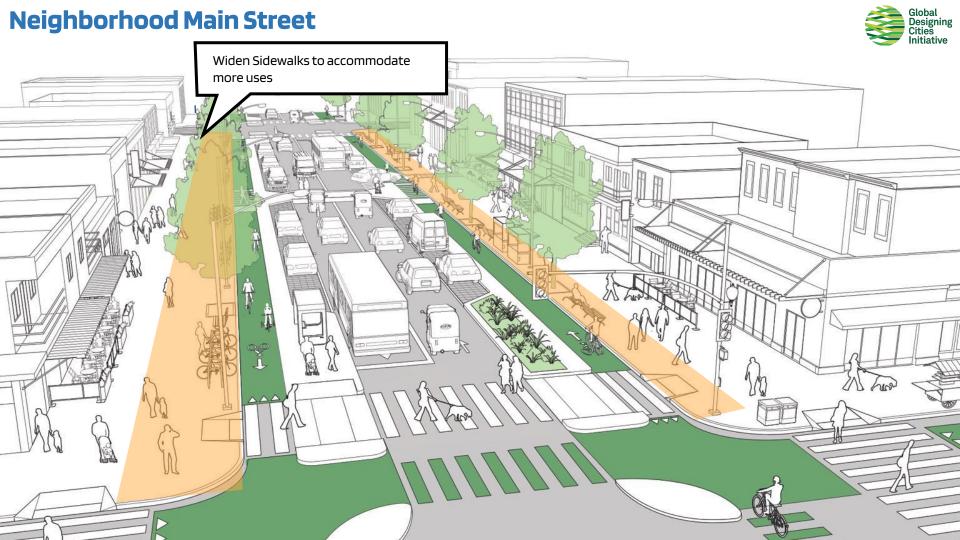
Special Conditions

#### **Neighborhood Main Street**



# Global Designing Cities Initiative **Neighborhood Main Street**



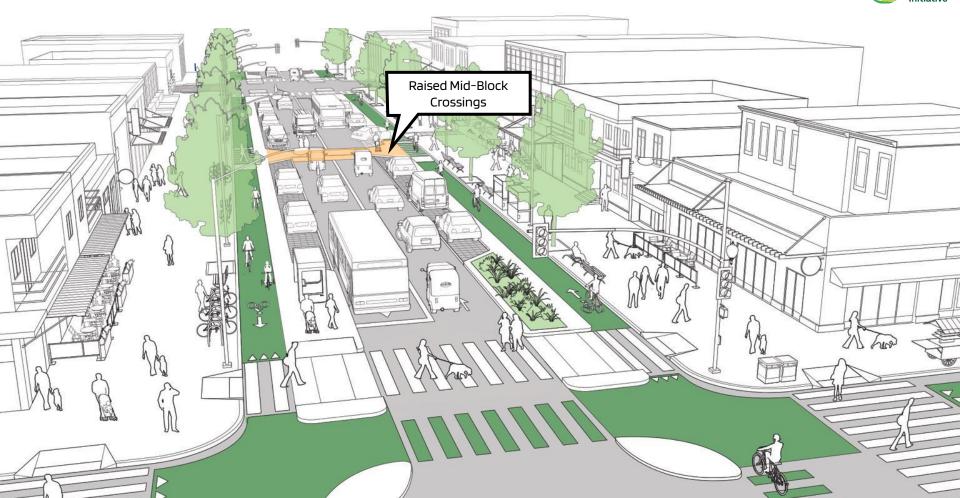


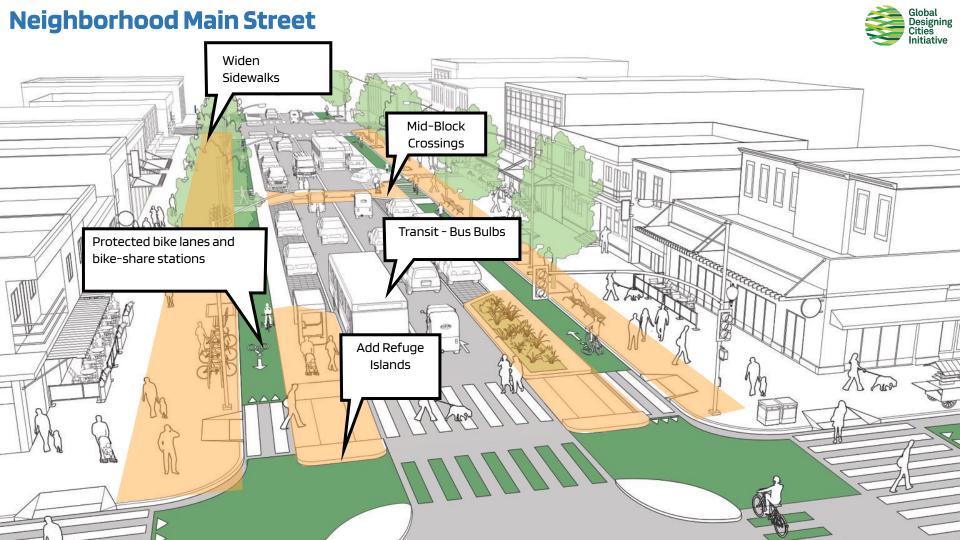
## Global Designing Cities Initiative **Neighborhood Main Street** Protected bike lanes and Transit - Bus Bulbs bike-share stations

# Global Designing Cities Initiative **Neighborhood Main Street** Add Refuge Islands

### Neighborhood Main Street







# Global Designing Cities Initiative **Neighborhood Main Street**

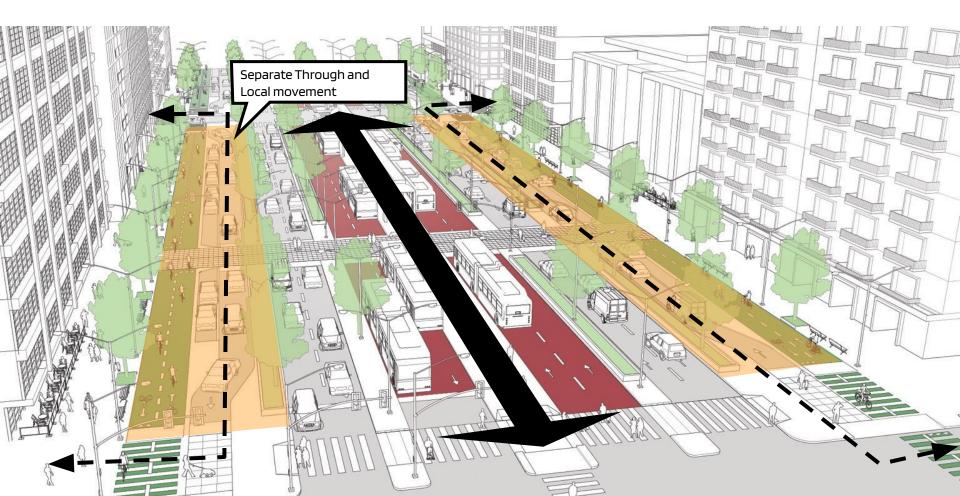








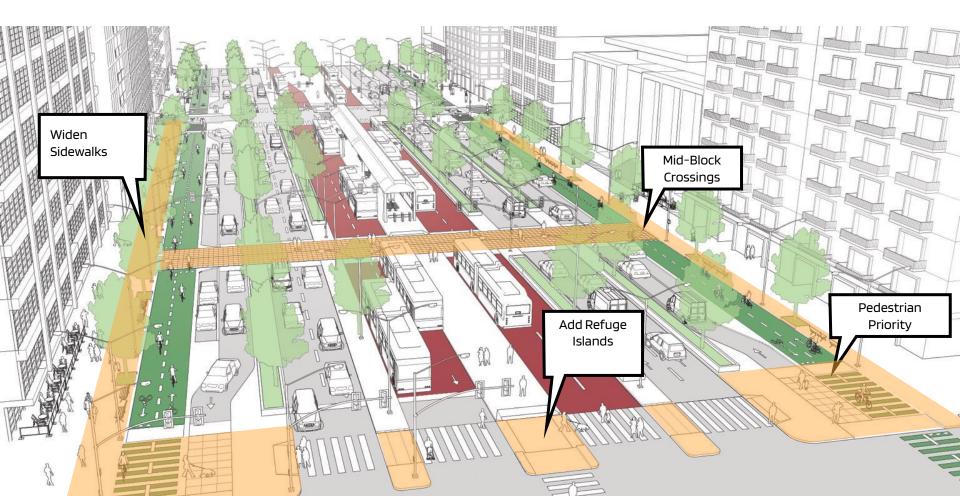




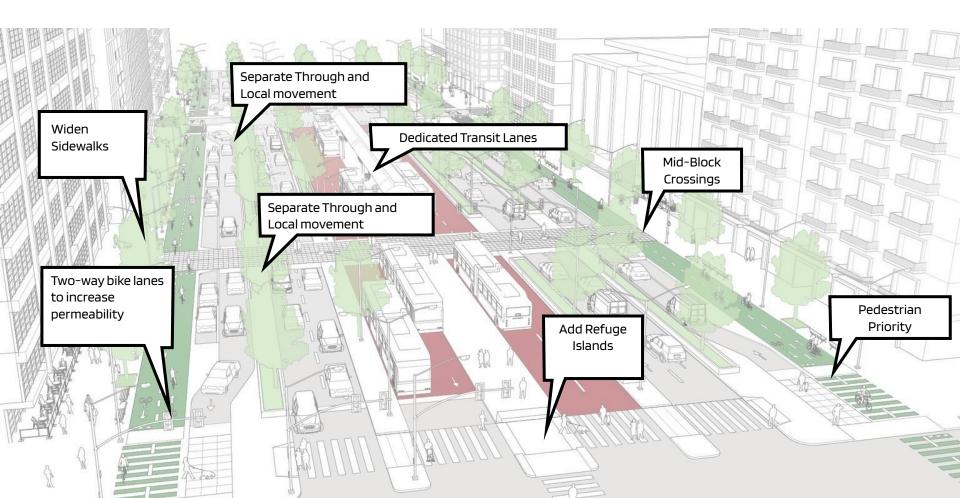








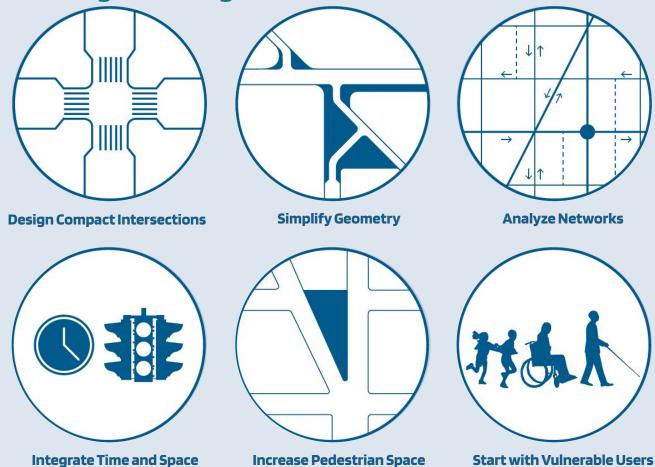


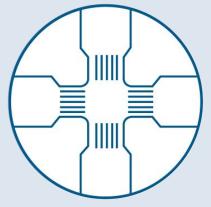




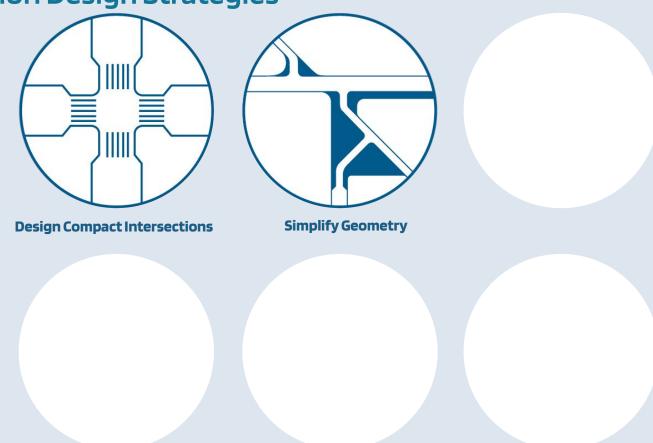


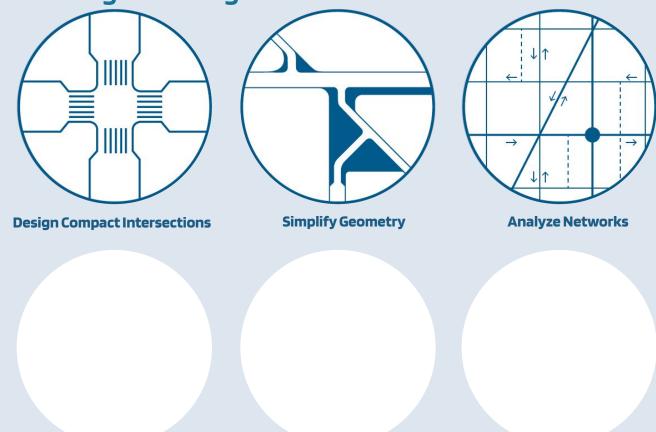


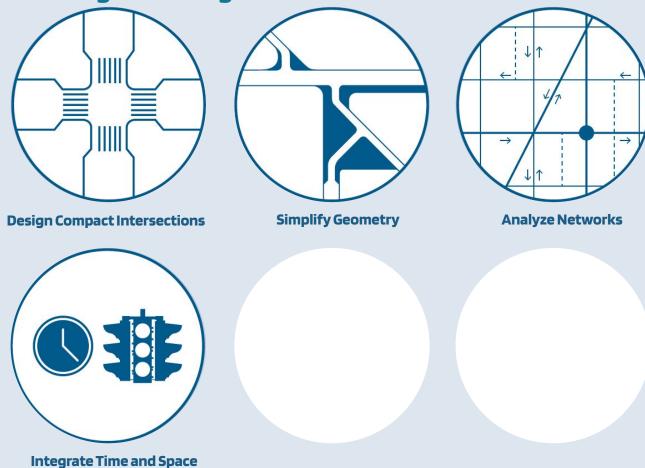


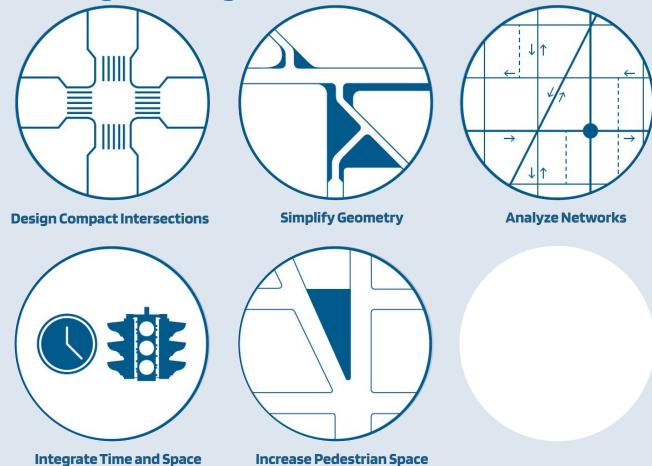


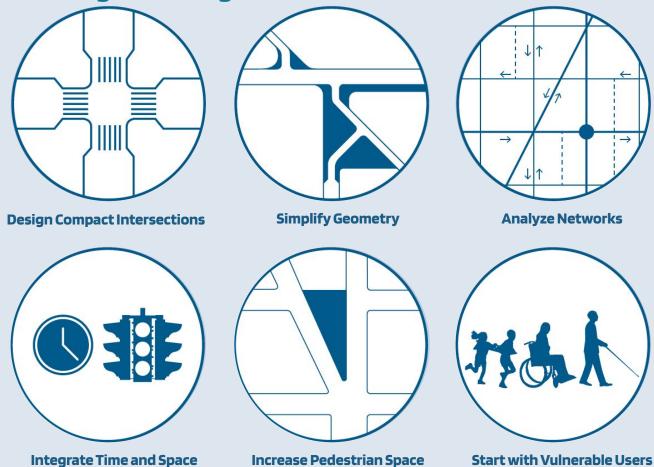
**Design Compact Intersections** 









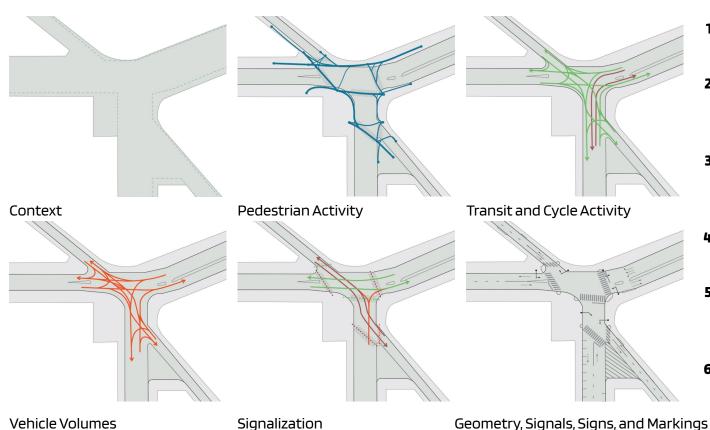




## How to analyze

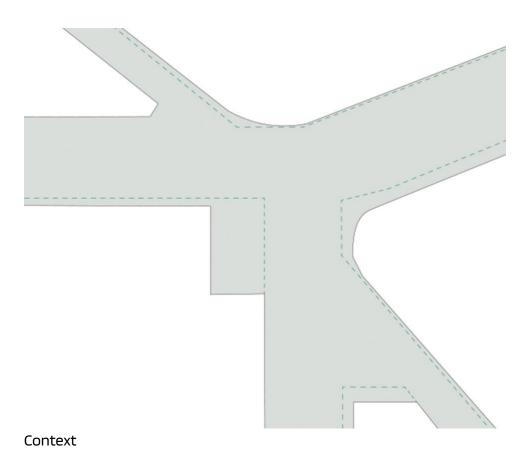
### Intersections





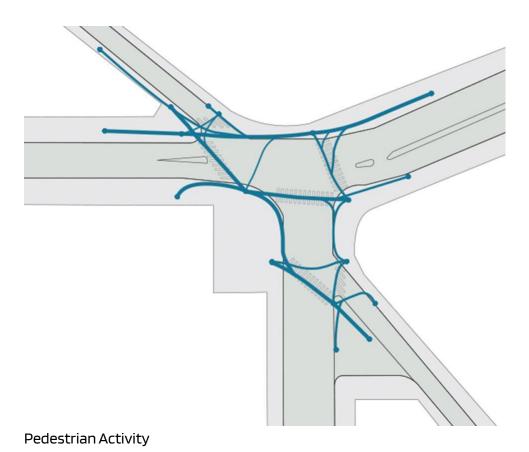
- **1.** Understand the context and urban design qualities
- **2.** Document how pedestrians use and activate the intersection
- **3.** Assess the volume and movement of cyclists and transit
- **4.** Map vehicle movements and turns
- 5. Plot the signal phases to show how the intersection flows
- **6.** Survey how people move based on the existing markings and geometry





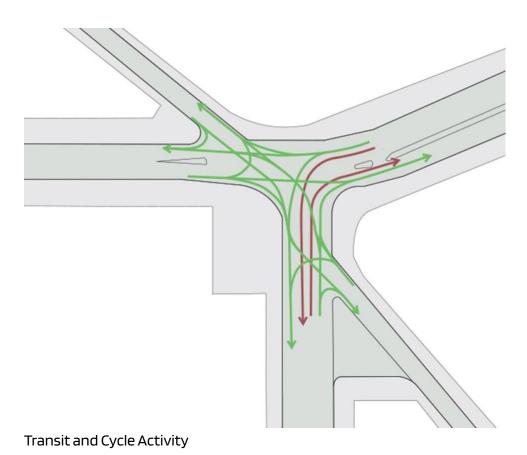
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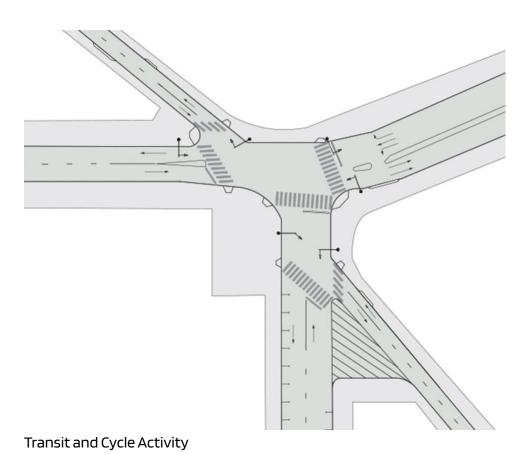
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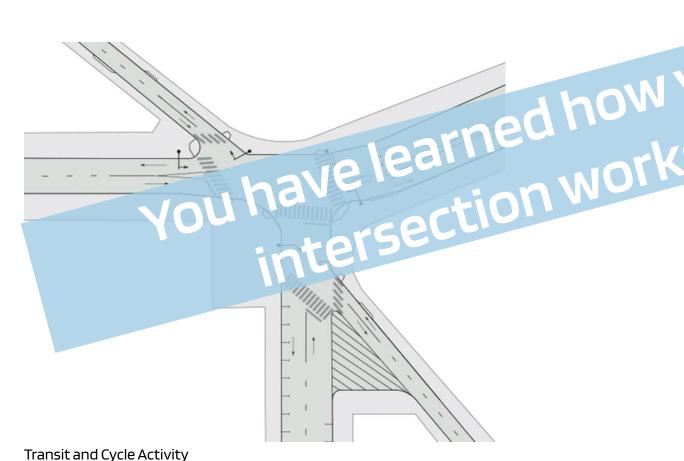
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Map vehicle movements and turns

rstand the context and

- 5. Plot the signal phases to show how the intersection flows
- **6.** Survey how people move based on the existing markings and geometry

Transit and Cycle Activity



#### Check the cross-sections!

# Why right-sizing lanes?

#### Right-size (3 m-wide max) lanes:

- 1. Are **safer**
- 2. Encourage slow speeds
- 3. Carry **more vehicles** ...or at least as much as wider lanes.



#### Right-sizing travel lanes





#### Right-sizing travel lanes

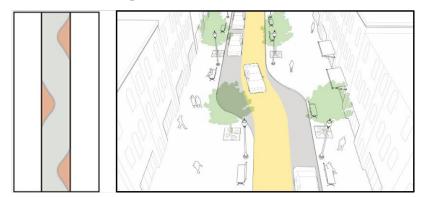




#### **Motorists**

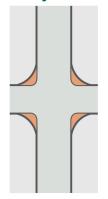


**Lane Narrowing** 



**Chicanes and Lane Shifts** 

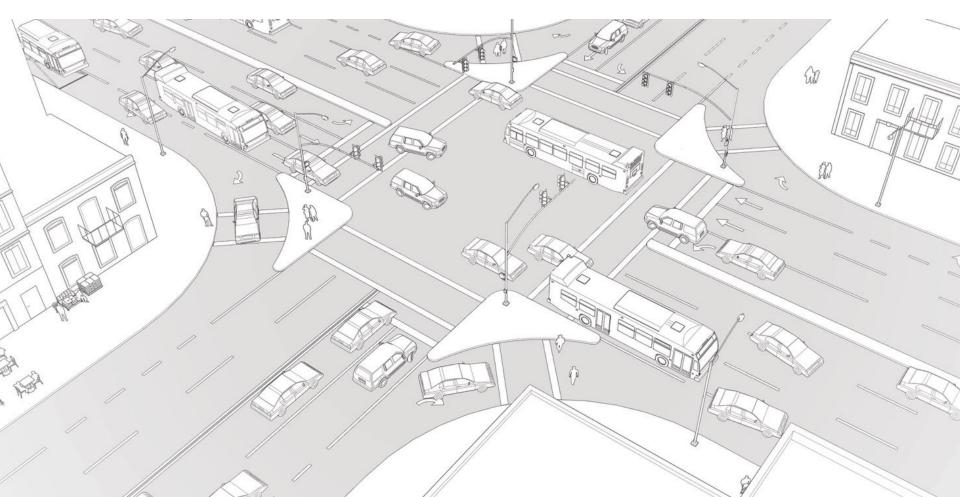




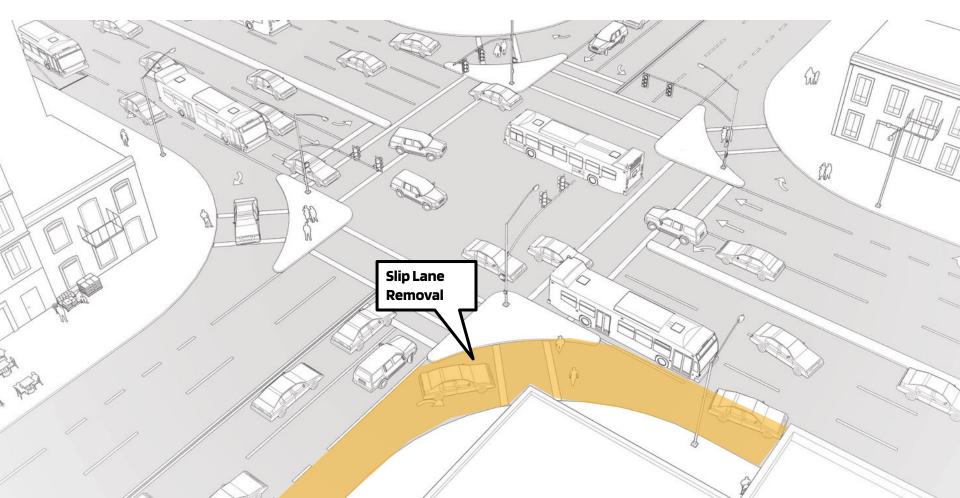


Corner Radii

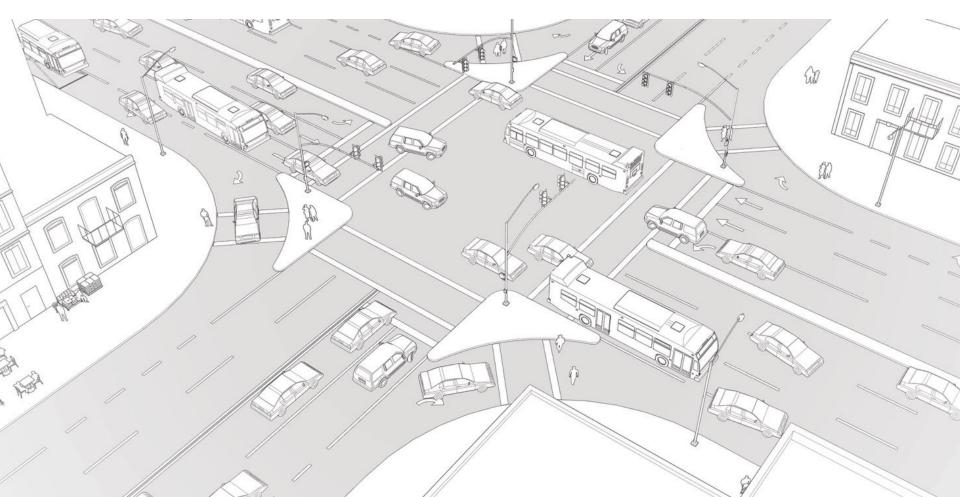




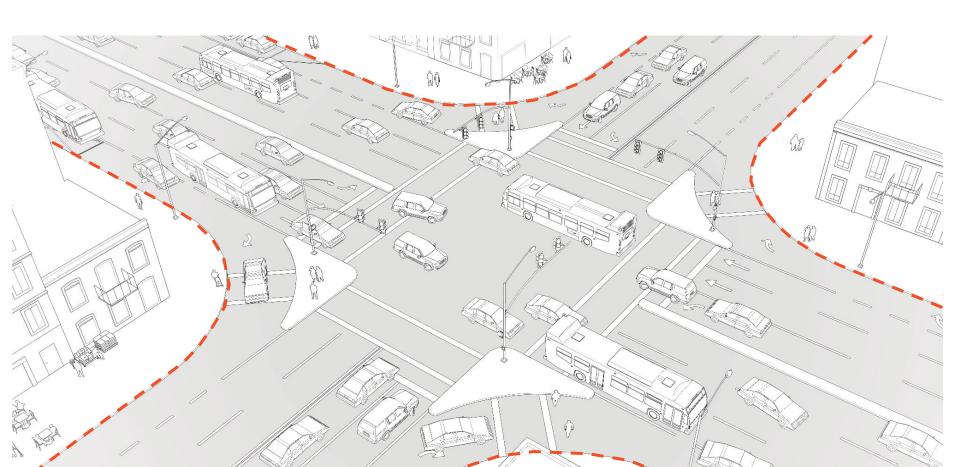




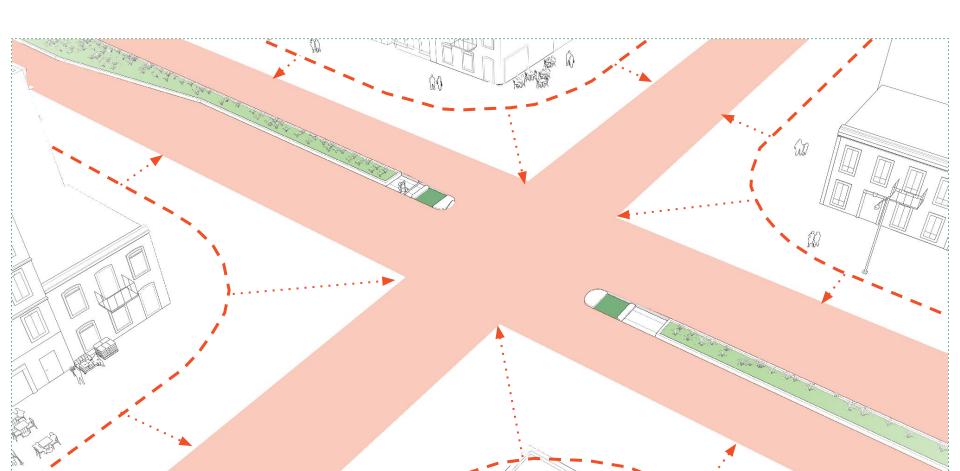




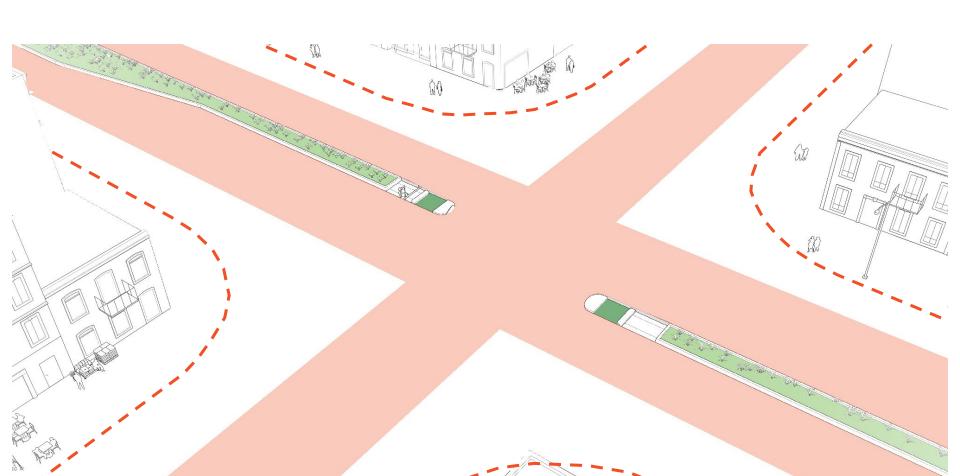




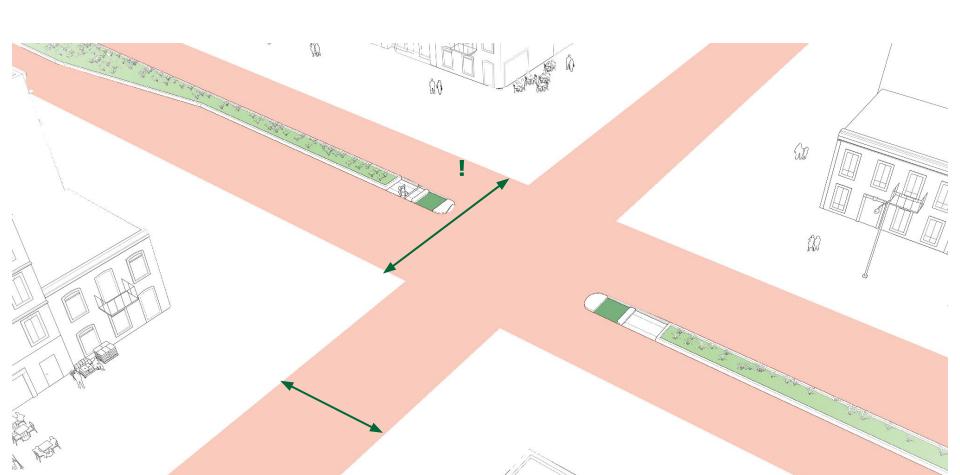




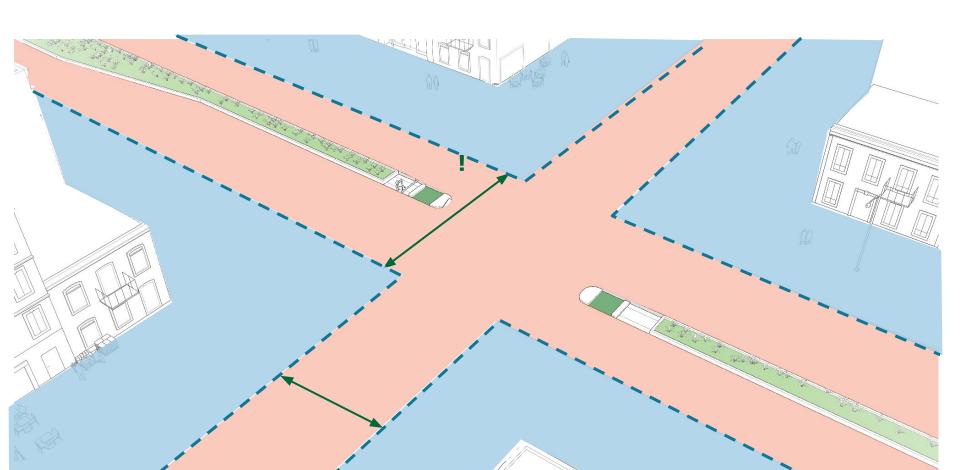




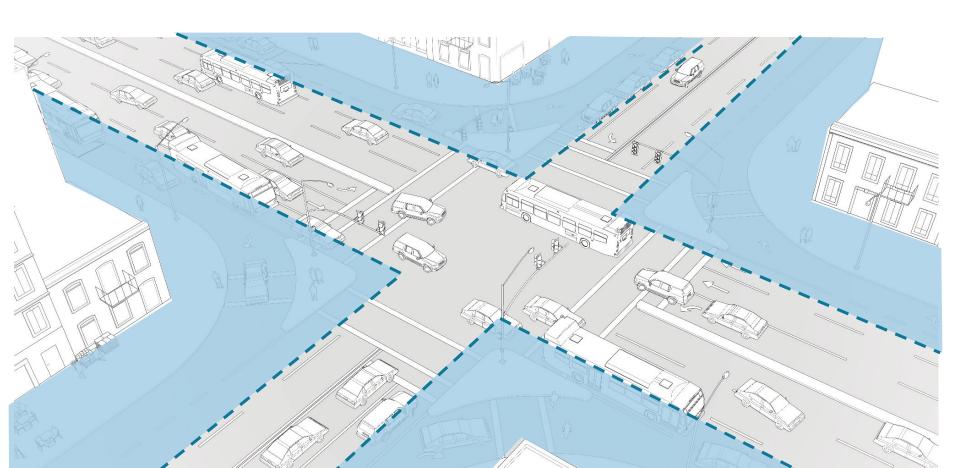




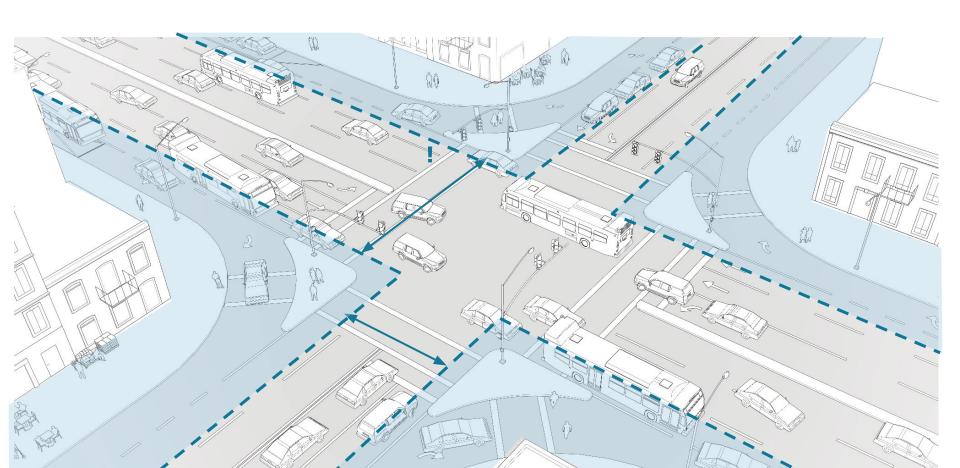




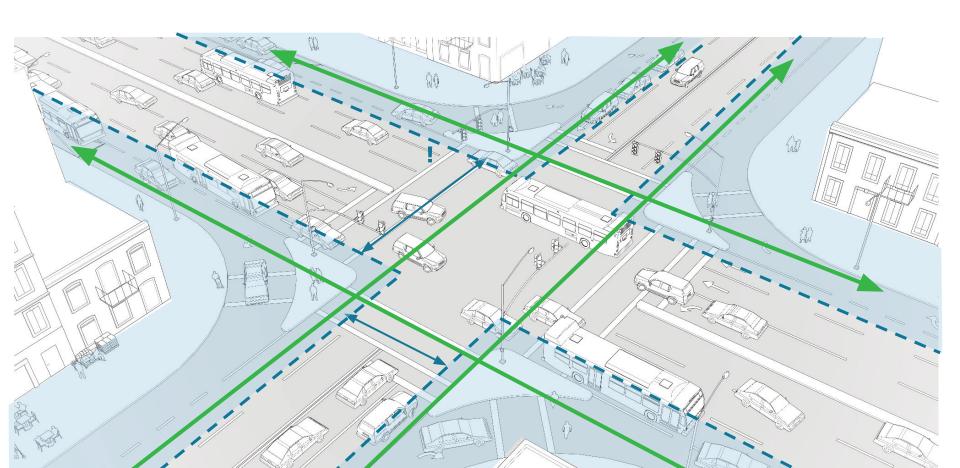








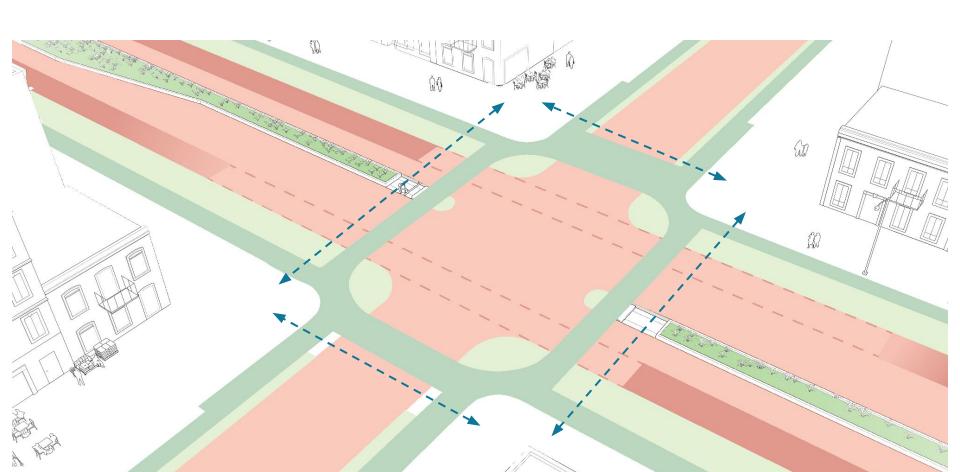












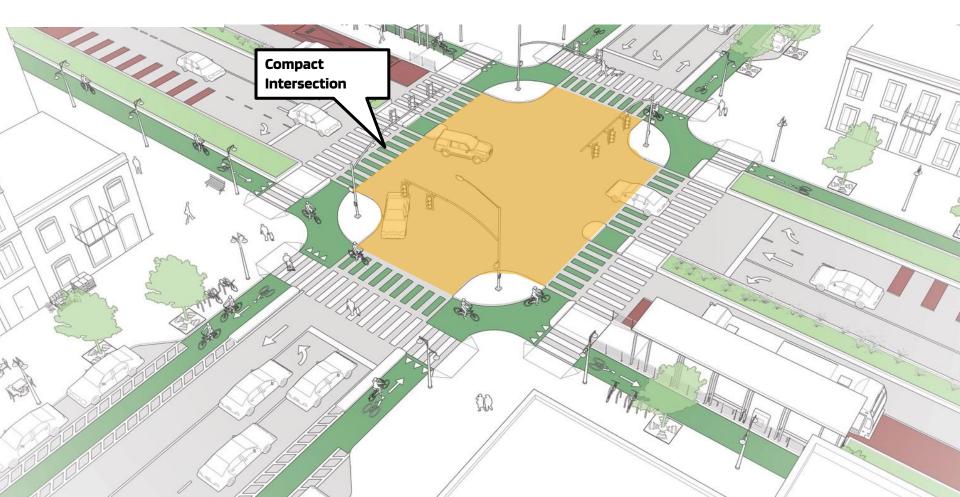




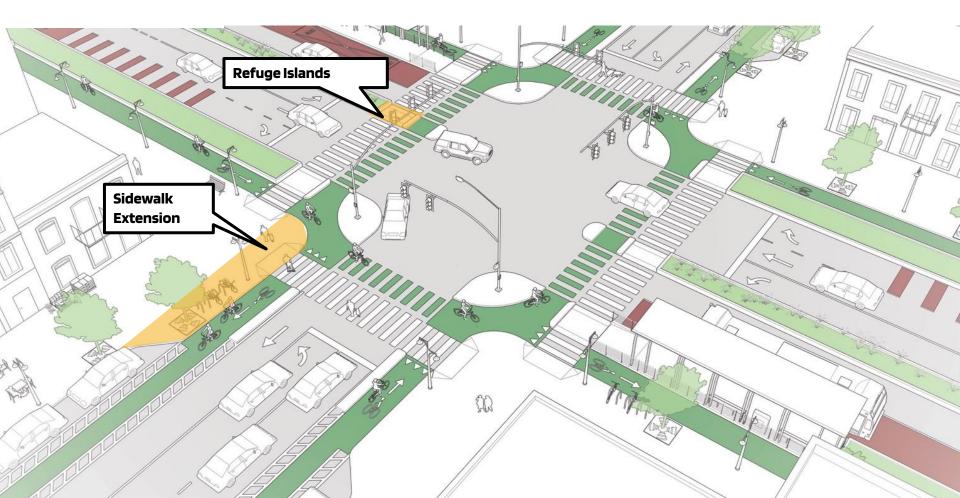




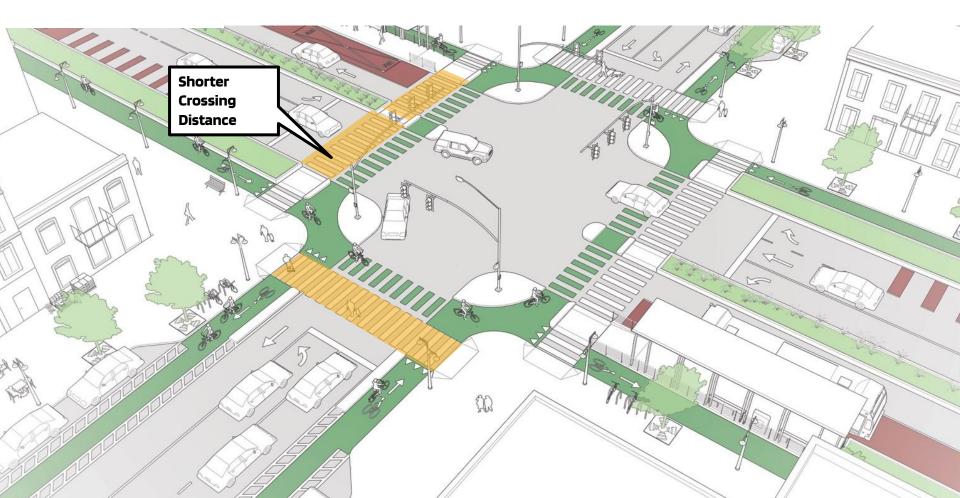




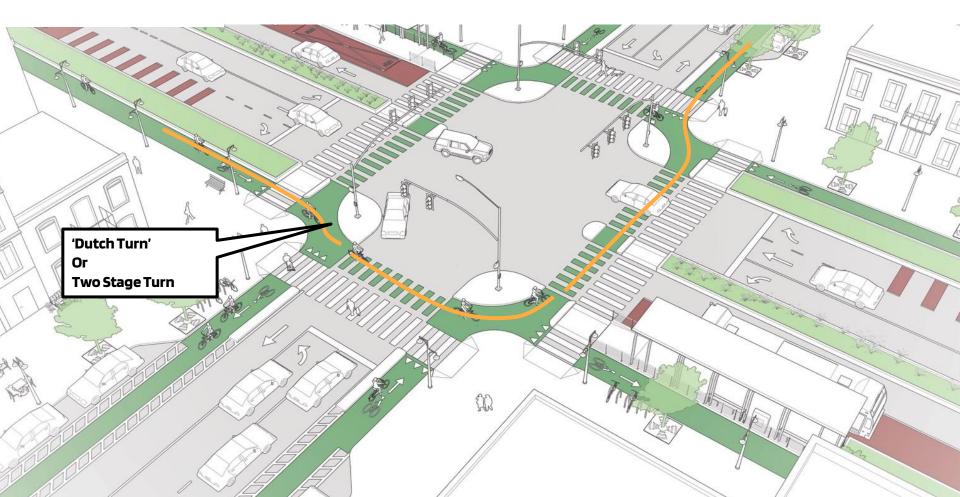




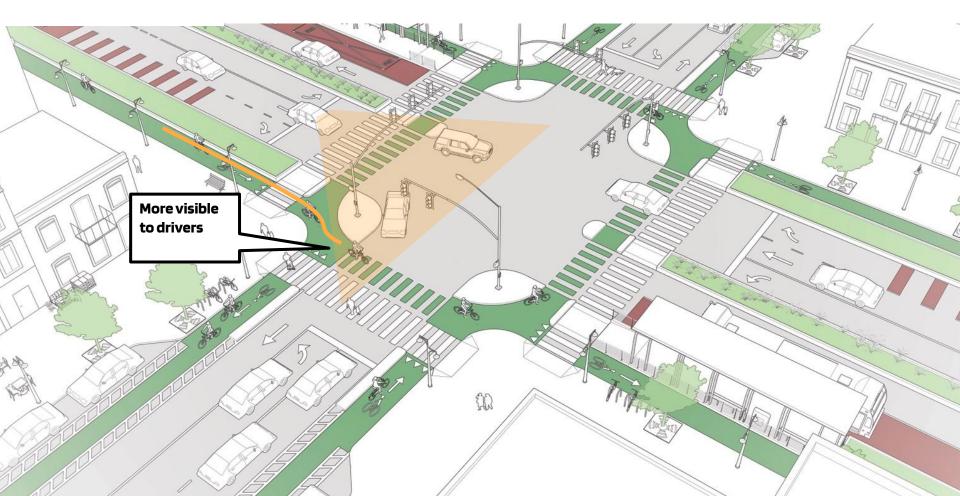




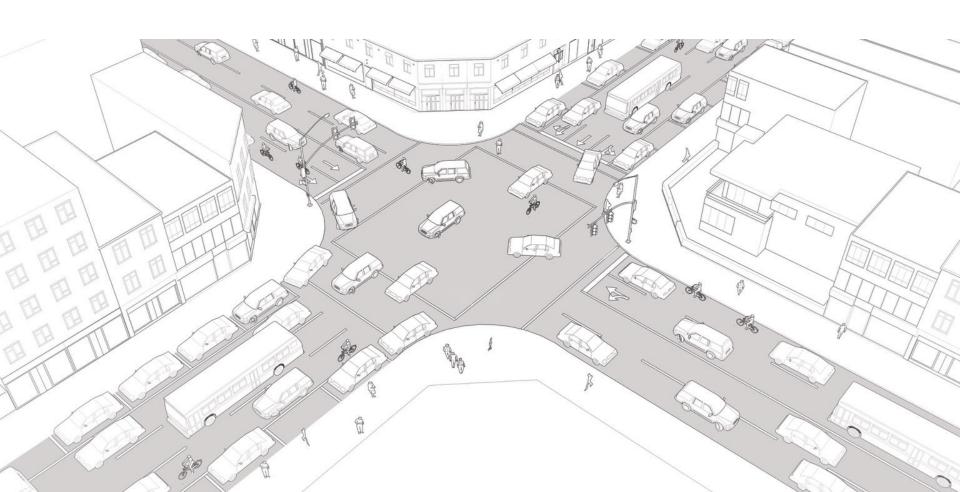




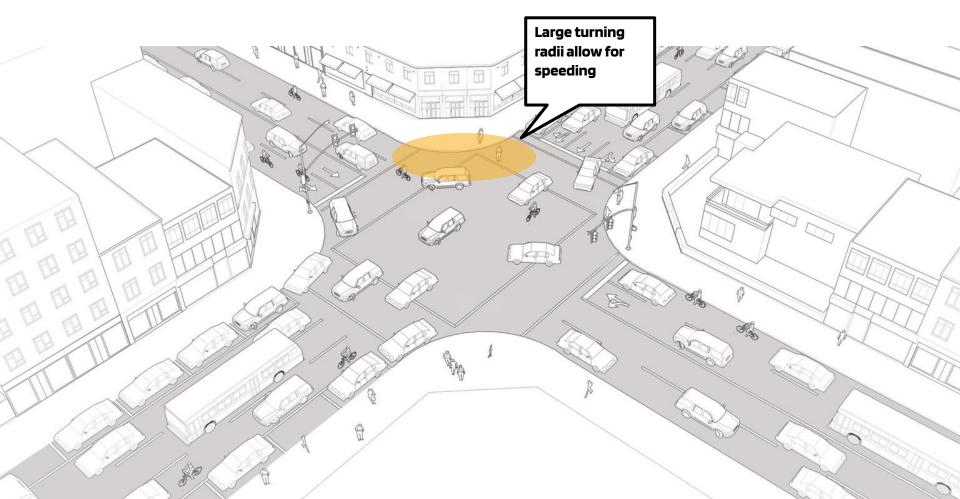




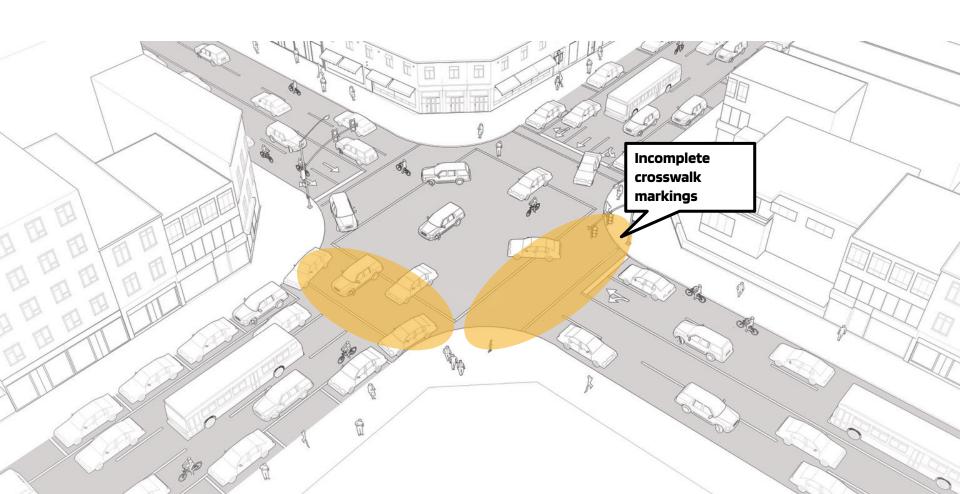




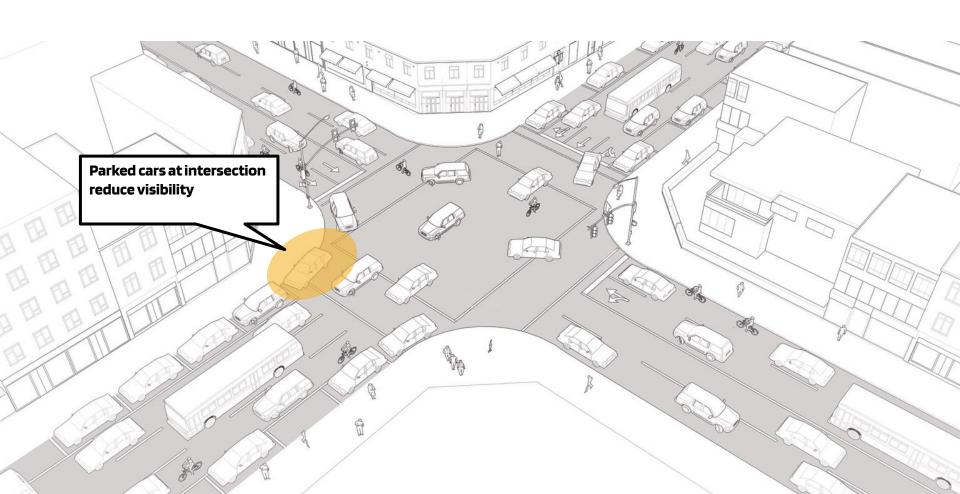




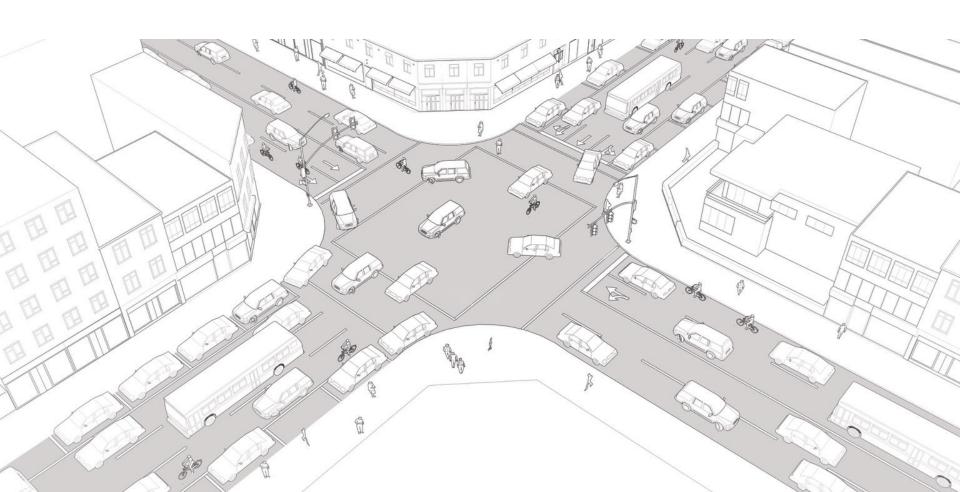




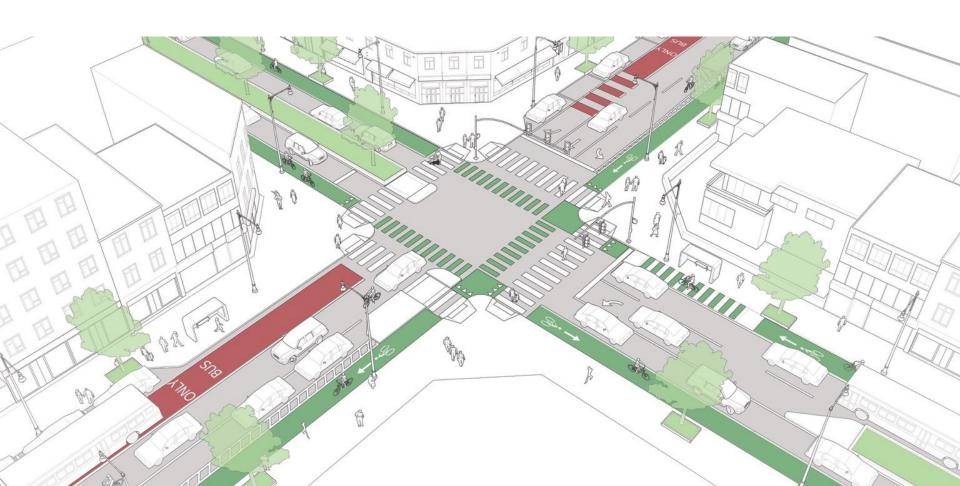




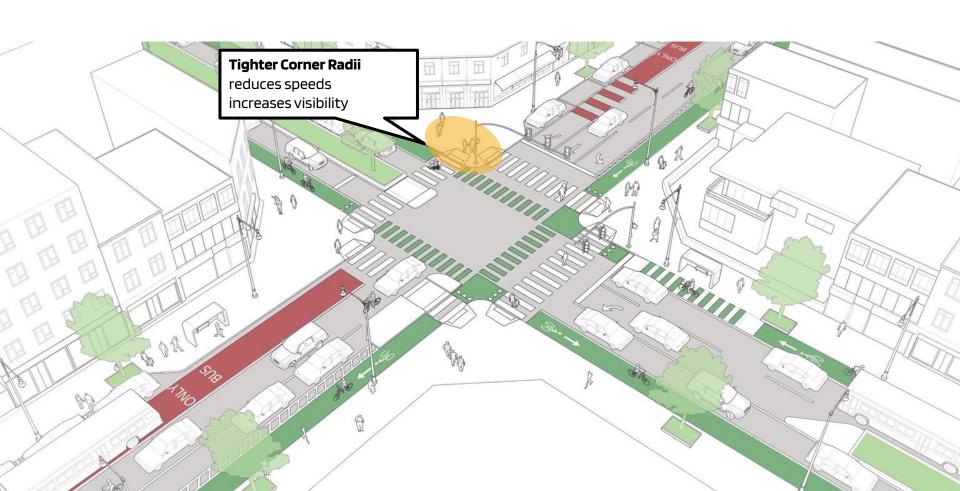




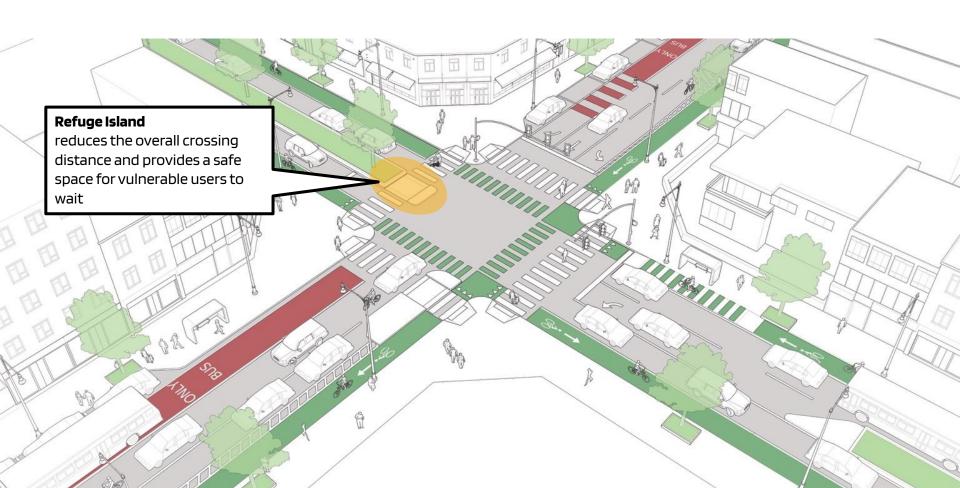




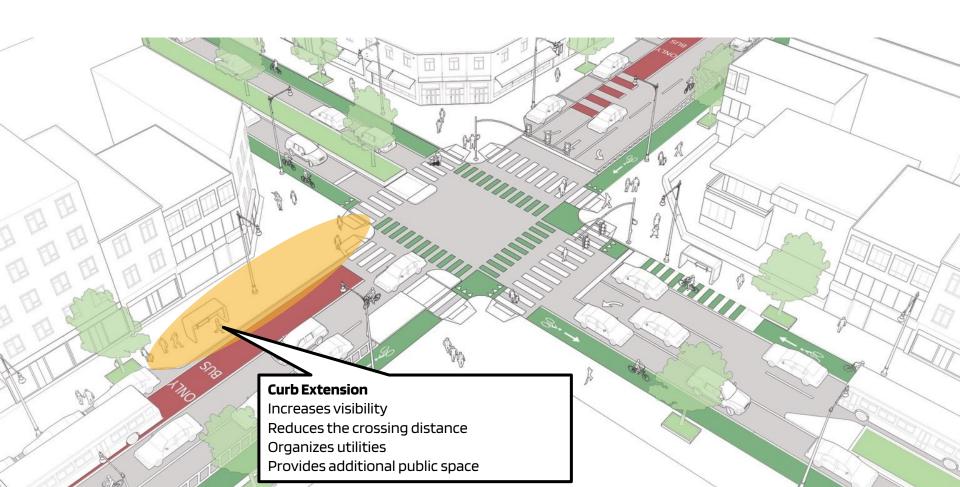




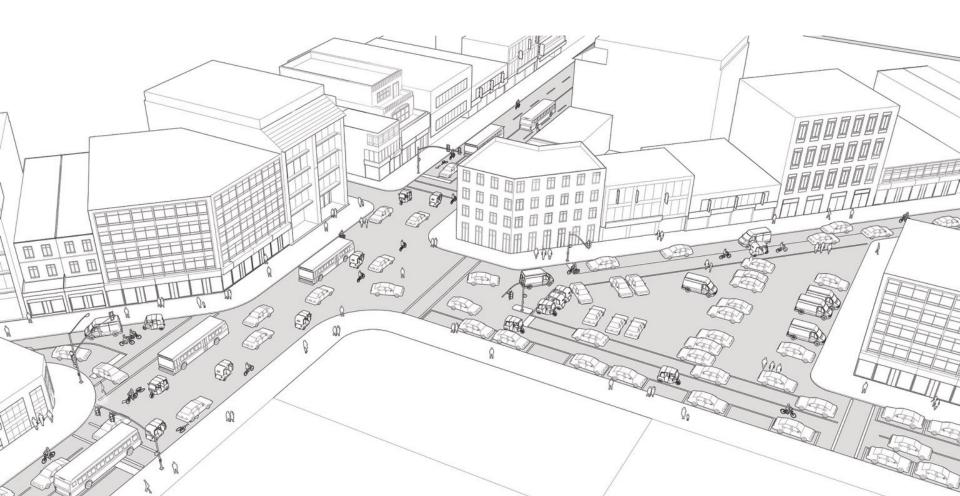




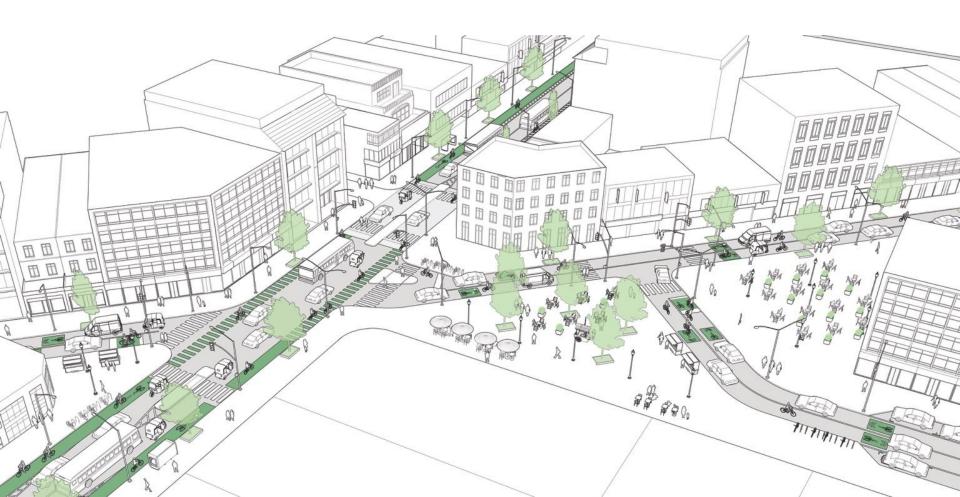




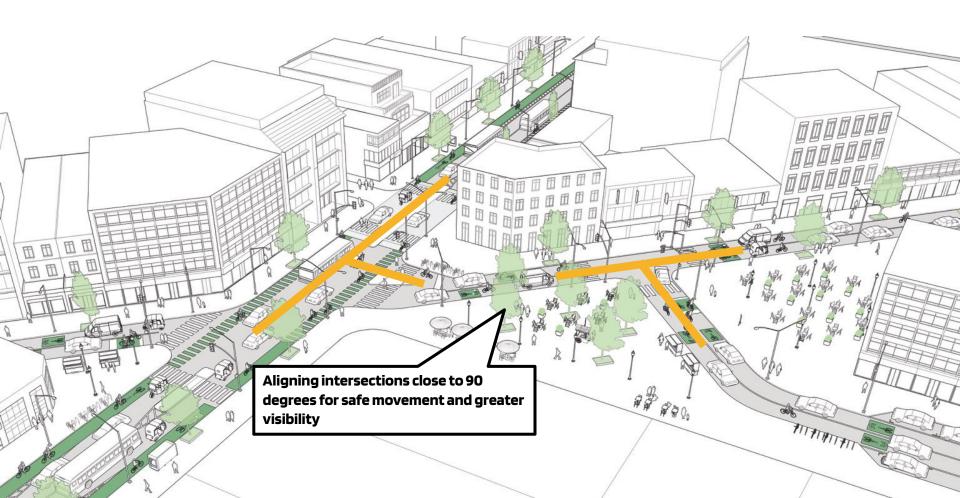














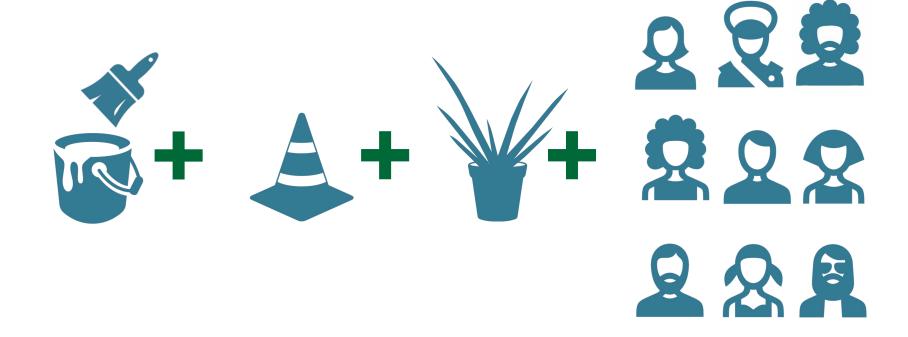




#### **Short-Term Interim Transformations**

#### Global Designing Cities Initiative

# **Simple Toolkit**

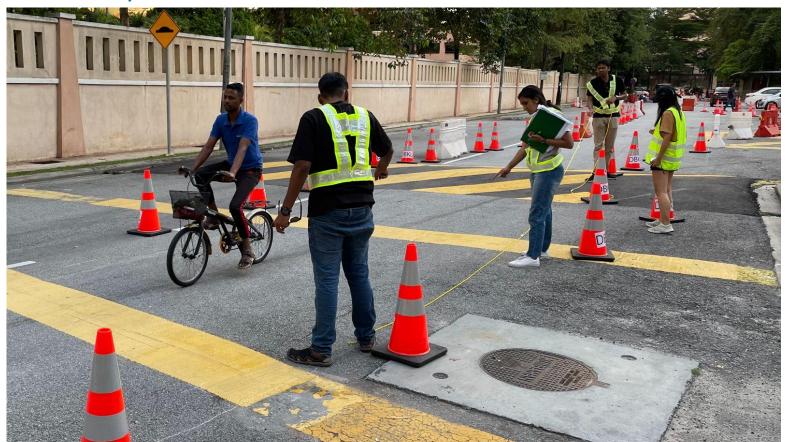




# **Short-term Transformations**

Global Designing Cities Initiative

**Process of Implementation** 



# **Short-term Transformations**

#### Global Designing Cities Initiative

**Process of Implementation** 





 Test and Trials that help measure change

2. Show 'What's Possible?' to build support

3. Interim Measures for immediate action

# **Short-Term Interim Transformations**

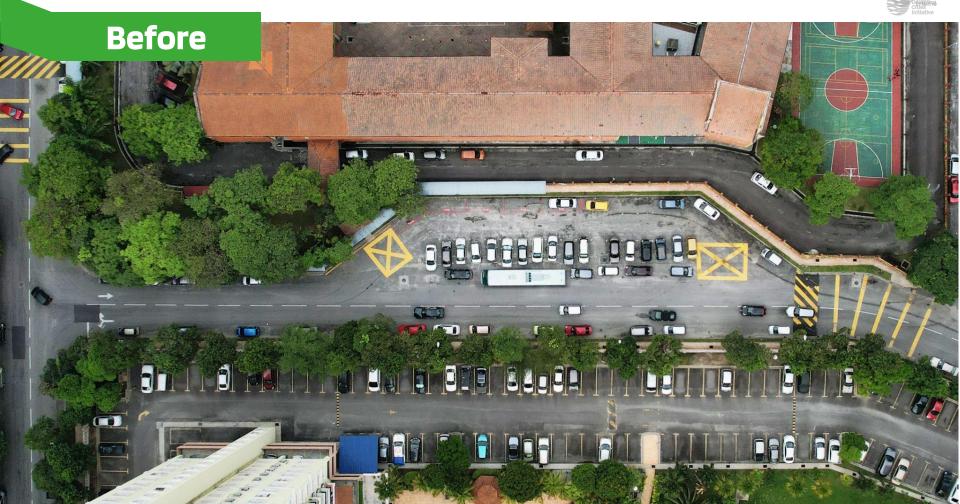


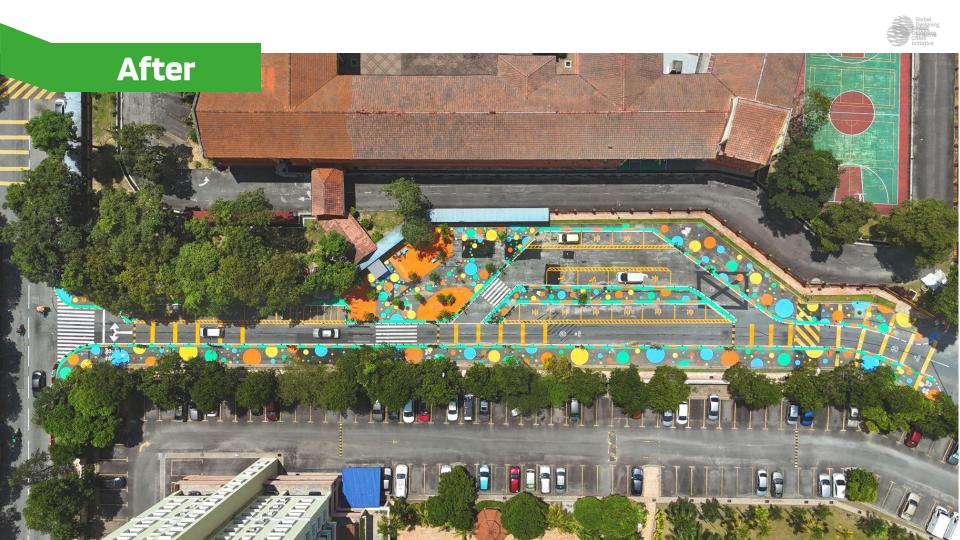
**New York City** 

























#### Vehicle Speed - Highest Speeds

Before intervention





40

km/







**29** 

**l** km.



Interim





23

26

km/h

#### **Interim: Street Users**











#### **Interim: Street Users**





#### **Interim: Street Users**





























**AFTER** 



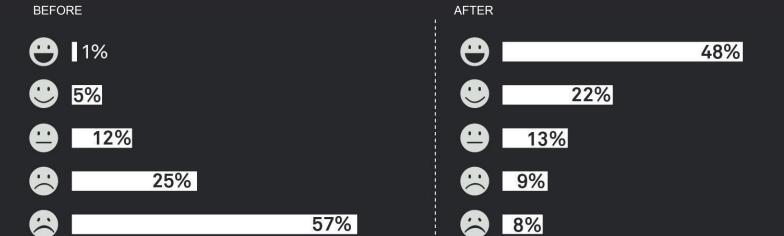


#### How safe did pedestrians feel on the sidewalk?









#### How safe did pedestrians feel on the crosswalk?







930 Vehicles per hour



987 Vehicles per hour

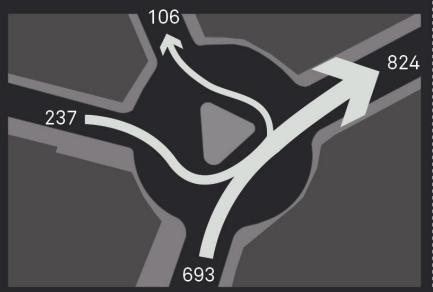


33 km/h Average Speed



21 km/h Average Speed

#### Throughput was higher, in spite of safer speeds







# Provide the tools to **reimagine, reinvent**, and **redesign safer**, more **sustainable streets**!







# Safe and Sustainable Street Design: Data Collection & Evaluation

A workshop for the City of Ljubljana, Slovenia

Abhimanyu Prakash, Associate Director Renata Carvalho, Program Manager Marina Visic, Program Associate

Global Designing Cities Initiative

**29th January, 2025** 













## Data collection & Evaluation

Ljubljana, Slovenia Global Designing Cities Initiative January 29th, 2025

@GlobalStreets

#### How we work at GDCI









Training & Public Consultation



Interventions & Transformations



Data collection & Assessment



Scaling impact across citywide programs.

#### How we work at GDCI







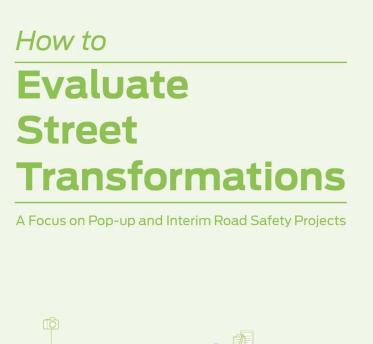
Interventions & Transformations

Data collection & Assessment



### 01 Introduction









Download it for free:

https://globaldesigningcities.org/publication/how-to-evaluate-street-transformations-english/

#### How to evaluate street transformations?



Type of data



Existing databases and archival research



Technical drawing information



Online research



Interviews, focus groups and intercept surveys



Observational data

#### How to evaluate street transformations?

Type of data







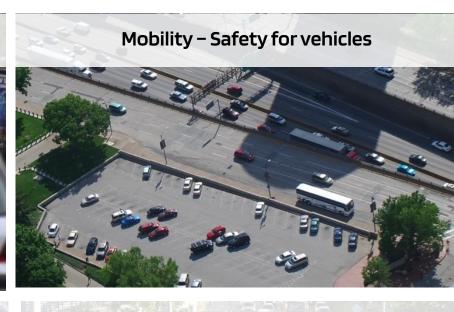


Observational data

#### SHIFT HOW WE MEASURE SUCCESS



Mobility – Safety for vehicles



Mobility – Safety for vehicles





#### SHIFT HOW WE MEASURE SUCCESS









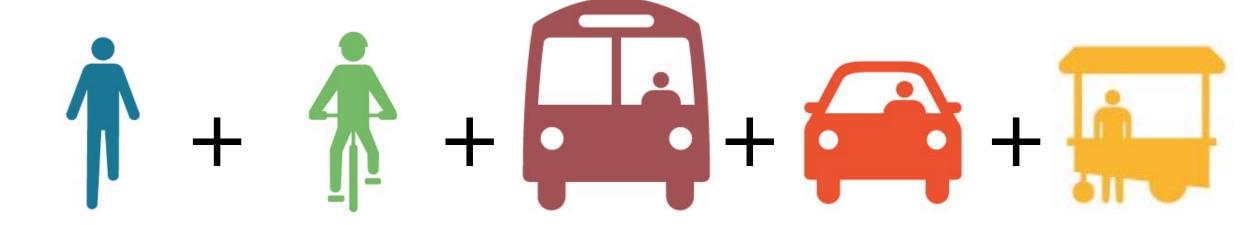




#### From considering just one user.....



#### ...to considering them all!



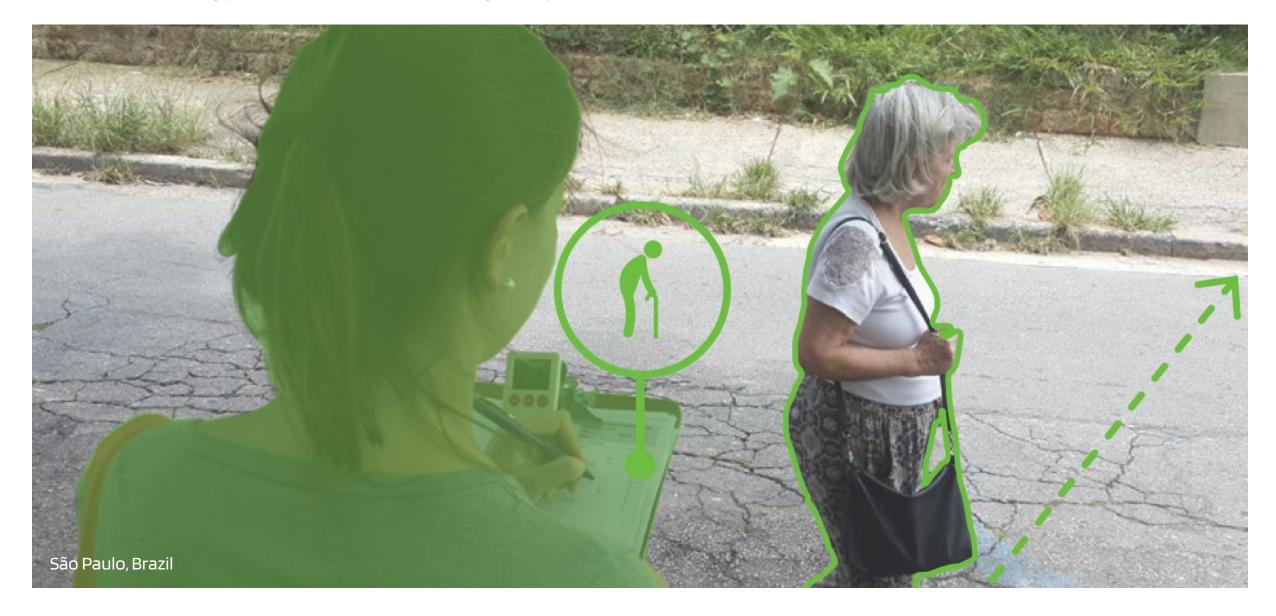


# Meaningful metrics can help cities to...

#### **Expand upon data collection practices**



to focus on more types of street users, mobility, and place functions



#### **Measure the impact**



of project designs



#### **Analyze the performance**



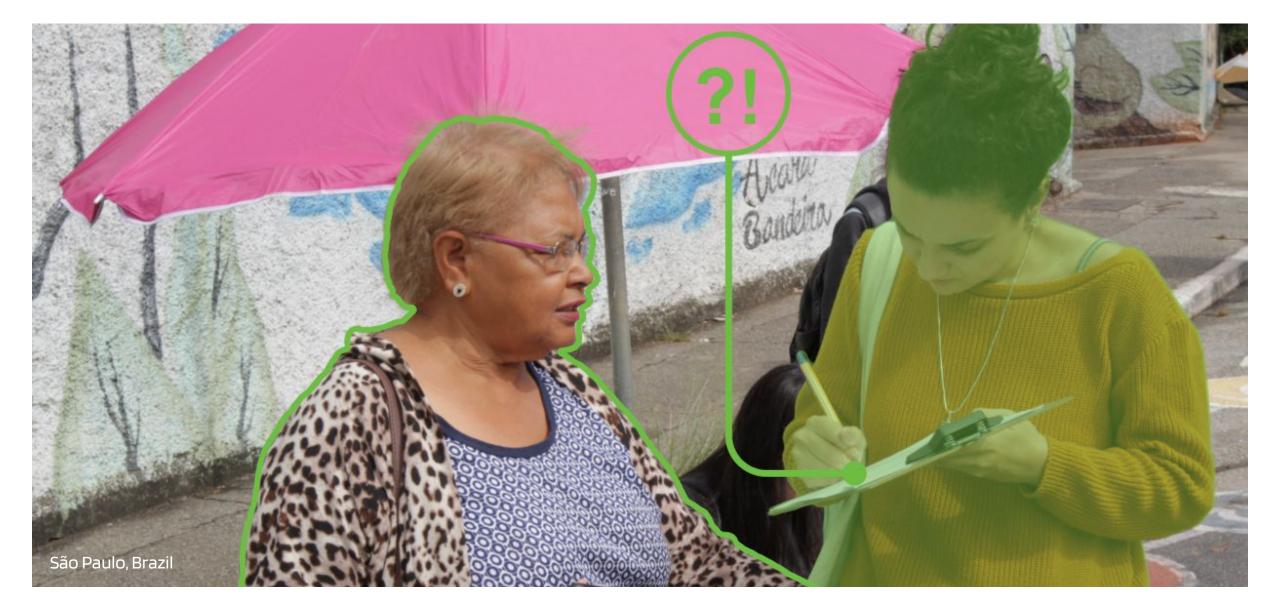
of new materials and ideas



#### **Encourage fairer conversations**



focused on equitable design strategies



#### **Build evidence**



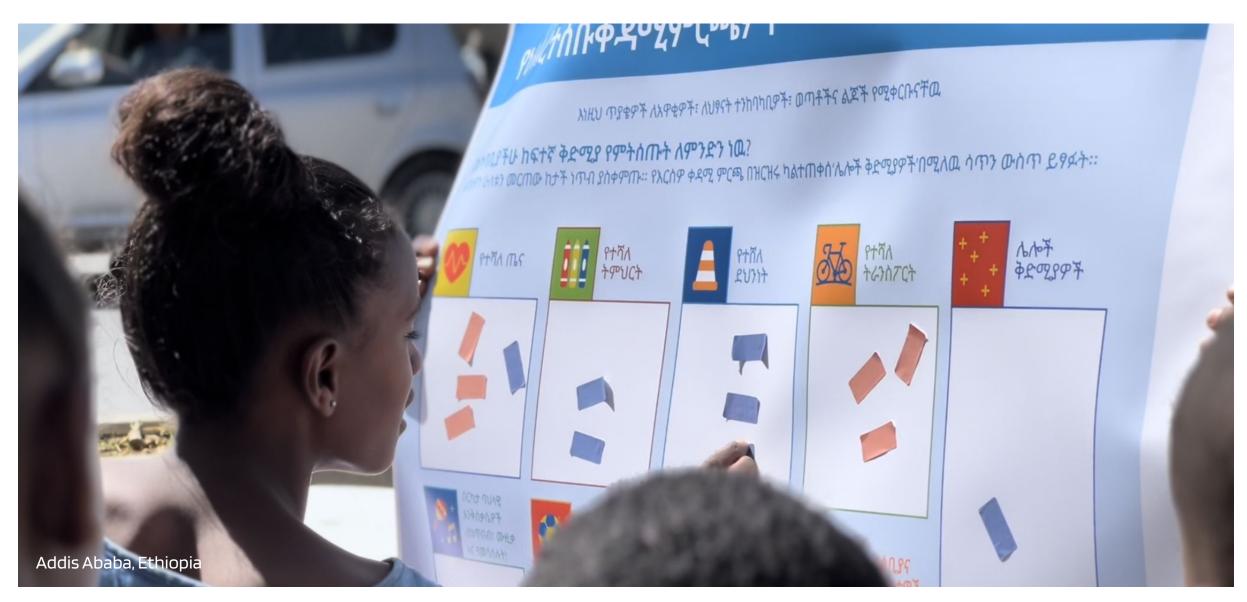
on the importance and impact of safe, healthy, and sustainable streets



#### Strengthen community and political support



for projects through engagement





# What we measure depends on what the project objectives are.



*Improve* pedestrian safety





## Determine metrics to collect

*Improve* pedestrian safety

Number of pedestrians crossing safely



## Determine metrics to collect

Tell the story

Improve pedestrian safety Number of pedestrians crossing safely

By designing with pedestrians as the primary consideration, we create a safer, more economically productive place for everyone.



## Determine metrics to collect

Tell the story

Improve pedestrian safety

Number of pedestrians crossing safely

By designing with pedestrians as the primary consideration, we create a safer, more economically productive place for everyone.



## What is the story that we want to tell?

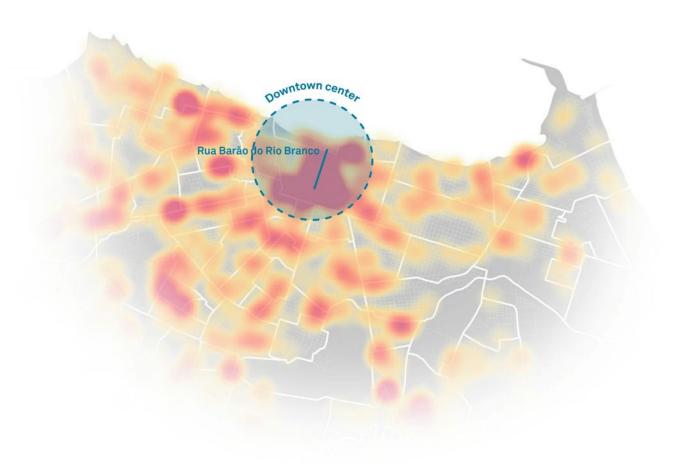




#### **Crash history**



Crashes involving pedestrians

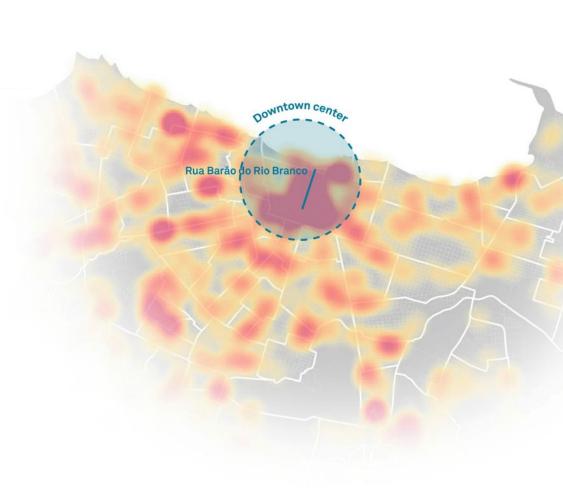


# Pedestrians were killed in Fortaleza in 2019

#### **Crash history**



Crashes involving pedestrians



Crashes involving pedestrians are

70%

more prevalent in Downtown Fortaleza than the rest of the city









### **Choice of indicators**



# What metrics can we collect to show the impact of the project?

#### What metrics can we collect?



% of space allocated to each



% compliance with speed limits



Number of pedestrians crossing the street



Number of pedestrians crossing inside or outside the crosswalk



Activities on the street



% of users who feel safe



Percentage of users



Number of people walking



% of pedestrians walking on the road



Crossing distance



Pedestrian demographics



Number of cyclists



% of cyclists who feel safe



Reliability of public transportation



Use of loading zones



noise levels



Parking use

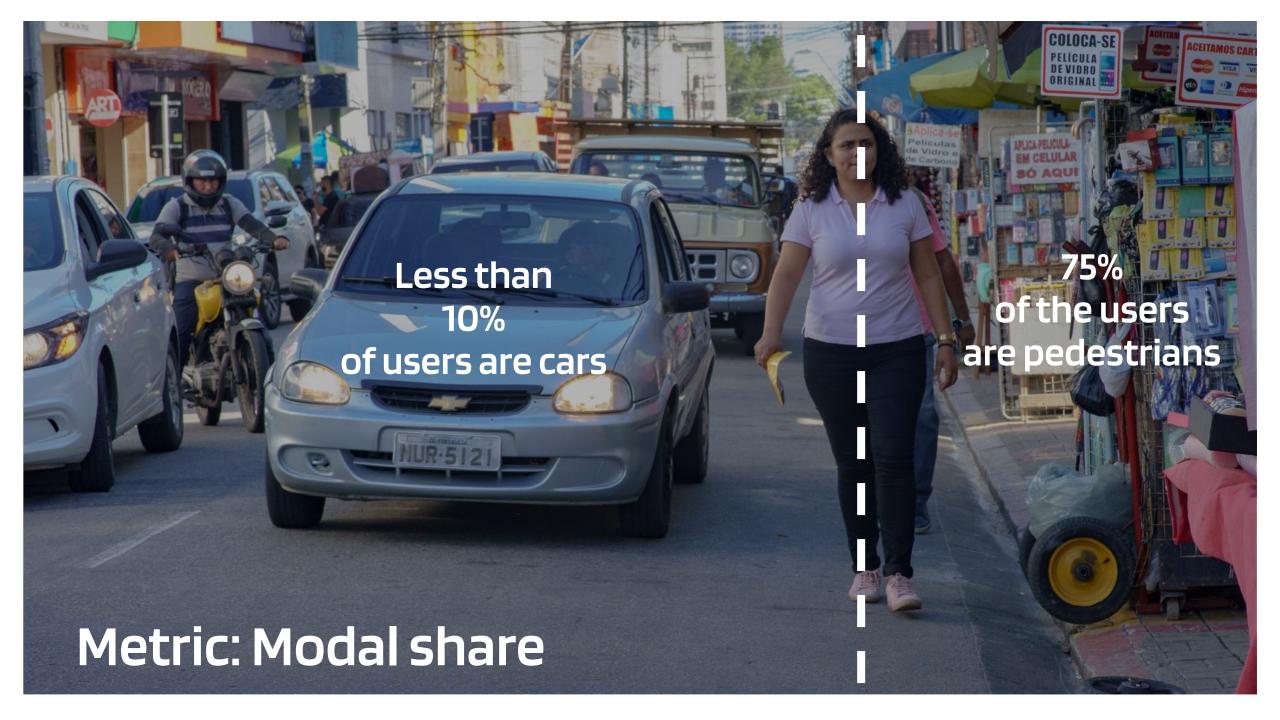


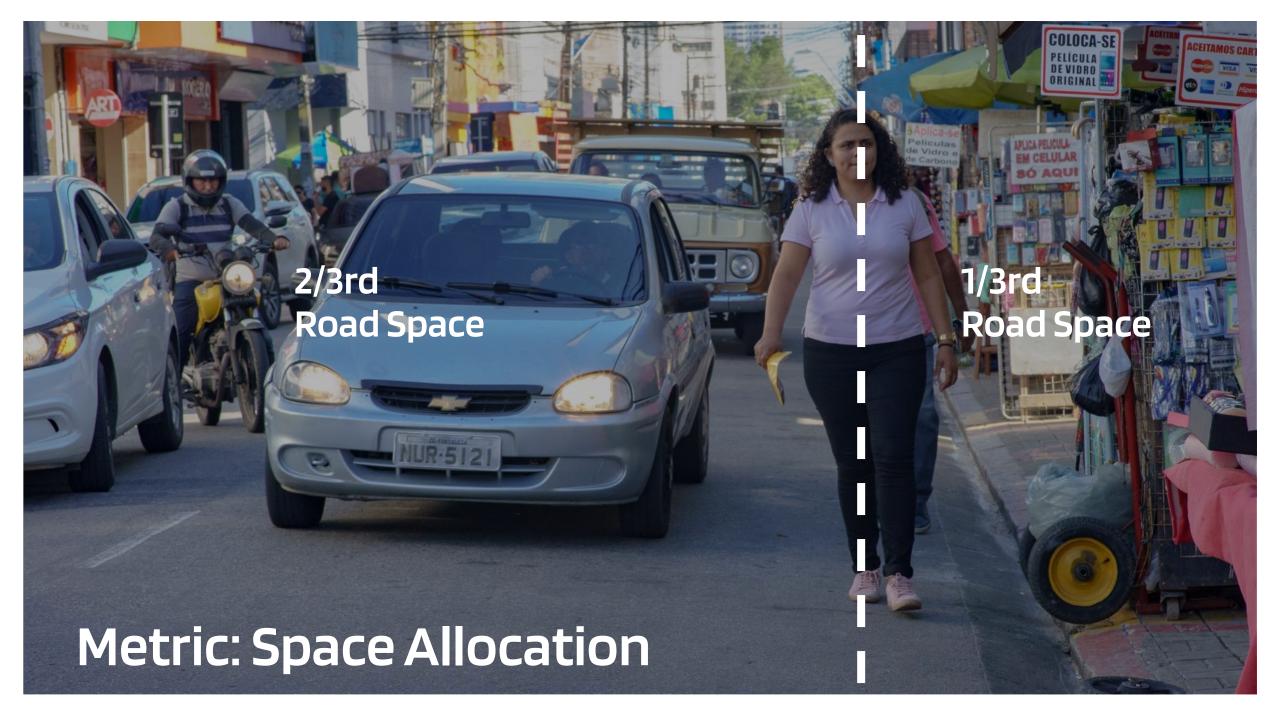
Number of street vendors















#### Before and after

Barão do Rio Branco





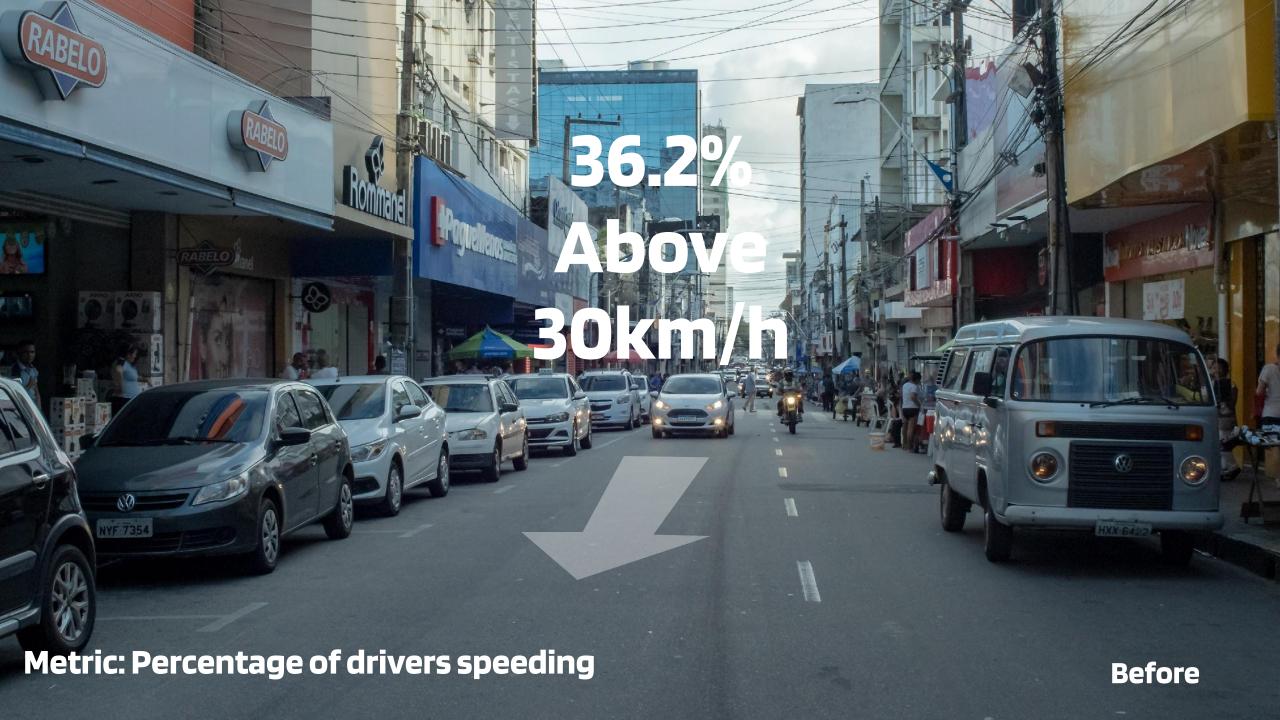


33% pedestrian facilities



**60%** pedestrian facilities

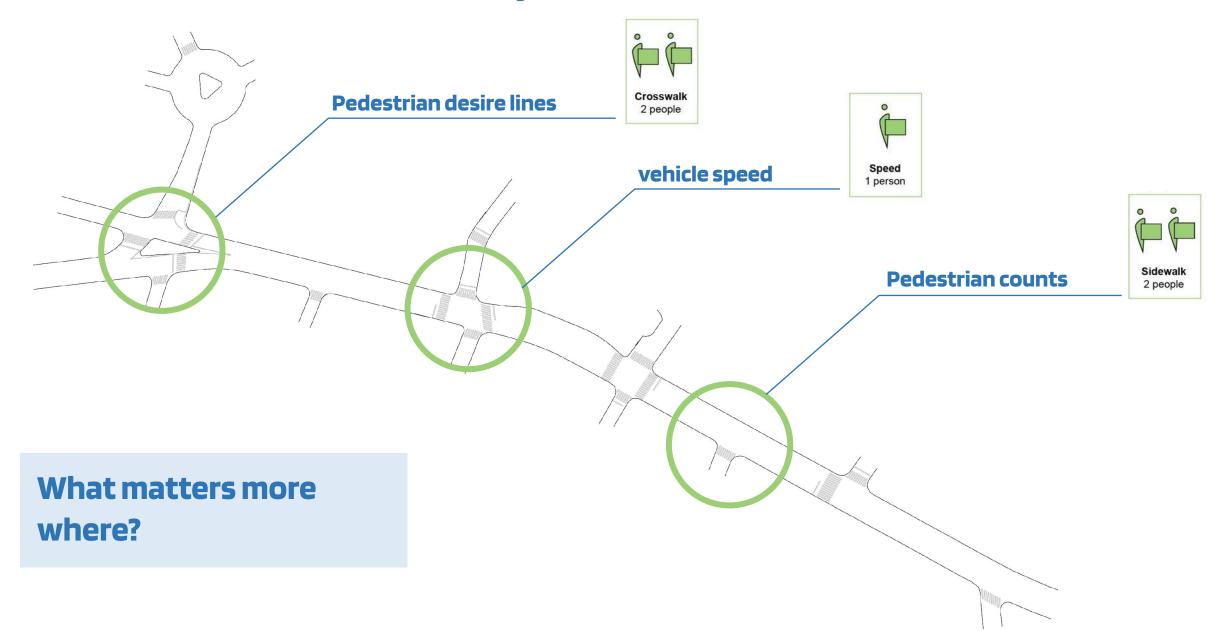






#### Use limited resources wisely





#### Be selective



% of space allocated to each



% compliance with speed limits



Number of pedestrians crossing the street



Number of pedestrians crossing inside or outside the crosswalk



Activities on the street



% of users who feel safe



Percentage of users



Number of people walking



% of pedestrians walking on the road



Crossing distance



Pedestrian demographics



Number of cyclists



% of cyclists who feel safe



Reliability of public transportation



Use of loading zones



noise levels



Parking use



Number of street vendors

#### ...and prioritize



% of space allocated to each



% compliance with speed limits



Number of pedestrians crossing the street



Number of pedestrians crossing inside or outside the crosswalk



Activities on the street



% of users who feel safe



Percentage of users



Number of people walking



% of pedestrians walking on the road



Crossing distance



Pedestrian demographics



Number of cyclists



% of cyclists who feel safe



Reliability of public transportation



Use of loading zones



noise levels



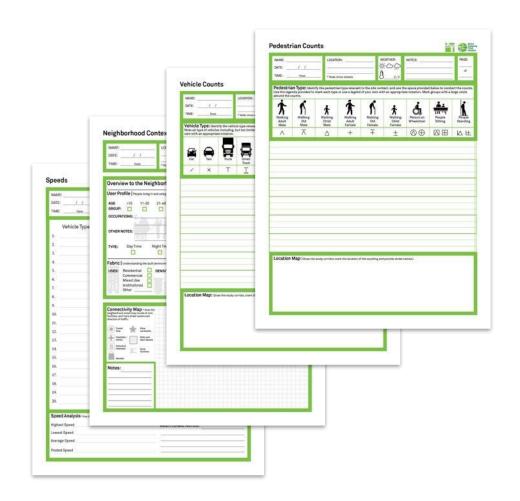
Parking use



Number of street vendors



#### Define a methodology



GDCI data formats (available on our website)











# Determine when to collect the data

#### When to collect data



## Before implementing the project





- Understand the site and define a vision
- Have baseline data to compare with future data.
- Document and understand the needs, interests and knowledge of community members and other interested parties
- Locate activities, obstacles, and opportunities for implementing specific design elements, and take plenty of "before" photos to show the change.

#### When to collect data



Before implementing the project





- Maintain momentum and transparency by communicating short-term results and initial community reactions
- Document immediate physical and operational changes
- Refine design based on new observations
- Begin preparing the arguments in favor of a more permanent project.

#### When to collect data



Before implementing the project





Weeks, months or years after implementation

- Assess long-term changes in site use, function, and perception
- Support new policies and future designs for similar projects
- Assess the impact on the frequency and severity of injuries caused by traffic accidents, air quality, etc.
- Argue for a more permanent project.



#### How often and for how long should data be collected?

- Take a measurement at various times of the day: peak and off-peak hours for vehicles, pedestrians, micromobility, and transit
- Take a measurement several days of the week (weekdays and weekends)
- Divide daily tasks into 2-4 hour shifts
- Make sure breaks are scheduled between shifts



# Can the team save time and resources when calculating certain counts?



# Can the team save time and resources when calculating certain counts?







Communicate goals

Review schedules and materials to bring on site

Review data collection forms and tools

- Start by explaining the goals and scope of the project.
- Explain the context of the site using maps and photos: show activities, operations and conditions that the team needs to consider.



1 Communicate goals

Review schedules and materials to bring on site

- Review the schedule and times each surveyor will collect data.
- Distribute contact information for everyone who will be on site.
- Provide checklists indicating what materials, safety equipment, and documentation each surveyor is responsible for, and what the team leader will bring to the site.

Review data collection forms and tools



1 Communicate goals

Review schedules and materials to bring on site

Review data collection forms and tools

- Review how to collect data on specific forms and provide instruction sheets.
- Perform test counts and use each of the tools; review surveyors' results and make corrections as necessary.
- Remind participants how each of the data points contributes to the broader goal of the project. For example: Collecting data on pedestrian desire lines will help define where to implement the new crossings

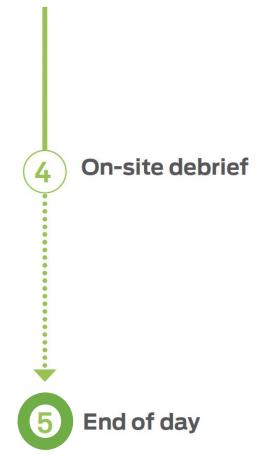


On-site debrief

**End of day** 

- Set a meeting time and location, and tour the site with all surveyors before beginning counts.
- Provide an overview of site conditions, operations, and functions in each data collection area.
- Be clear about how surveyors can communicate project goals to bystanders when they are not conducting counts, and follow up with potential local supporters of the project.





• When returning data collection forms, the staff should review the results and clarify any discrepancies as soon as possible.



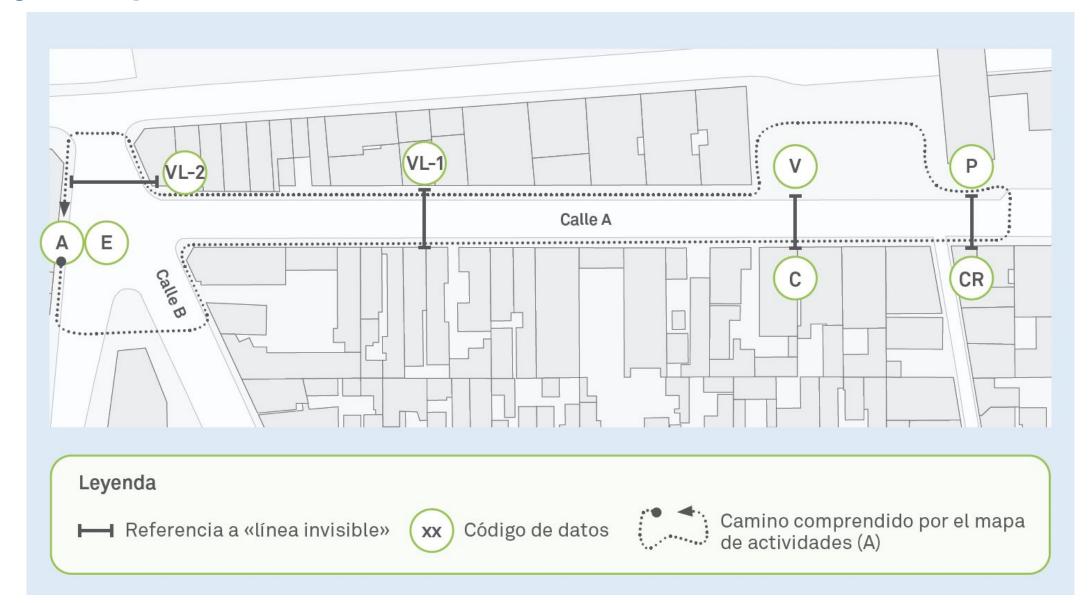
### Surveyor schedule for data collection

#### Metrics Chart

No.	Aim	Metrics	Location takes	Staff	Take time	Take Frequency	Inputs take
1	Reduce the turning speed of buses at the intersection with the cycling infrastructure on Av. Revolución	% compliance with rotation speed	Point No. 1	1_Radar operator 2_Data annotation	12:30 pm to 3:30 pm (3 hours)	Periods of 15	Radar Data annotation format Pen Table to support Sunscreen Cap hat
2	Improve and create safe pedestrian crossing points within the intersection	Number of pedestrians crossing inside or outside the crosswalk	Point No. 2	1_Occ-Ori Capacity 2_Ori-Occ Capacity	12:30 pm to 3:30 pm (3 hours)	minutes for 3 hours.  Include a  15-minute break at the end of each hour	Data annotation format Pen Table to support Sunscreen Cap hat
3		Number of pedestrians crossing inside or outside the crosswalk	Point No. 3	1_Occ-Ori Capacity 2_Ori-Occ Capacity	12:30 pm to 3:30 pm (3 hours)		
4		Number of pedestrians crossing inside or outside the crosswalk	Point No. 4	1_Occ-Ori Capacity 2_Ori-Occ Capacity	12:30 pm to 3:30 pm (3 hours)		
5	Capture multiple intersection operational dynamics	Top-down drone shot where the entire intersection can be observed	Point No. 5		12:30 pm to 3:30 pm (3 hours)	30 min during HDM	drone

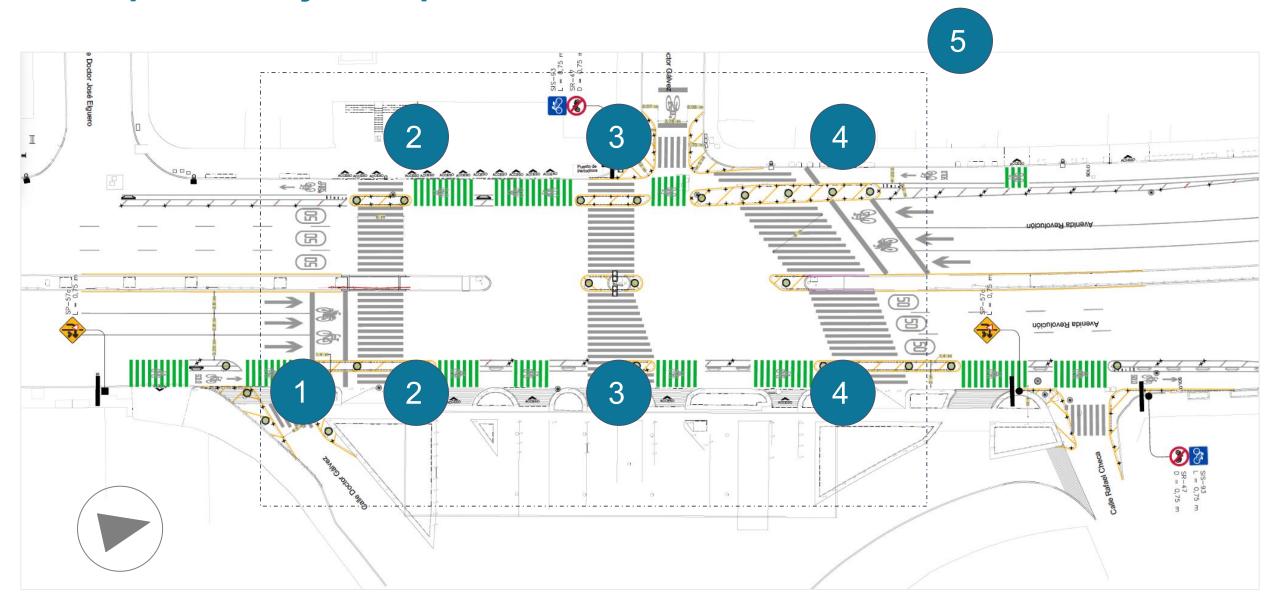


### **Surveyor Map**





### **Example: Surveyor map**





# COMMUNICATING

SUCCESS

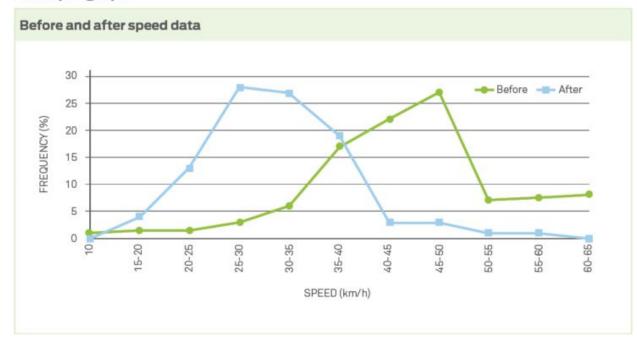


### Communicate results in appropriate formats

#### Example table

Speeds	50th Percentile	85th Percentile	40+ MPH Speeders	
Before	25.6 MPH	31.2 MPH	1119	
After	23.1 MPH	29.0 MPH	513	
% Change	-9.8%	-7.1%	-54.2%	

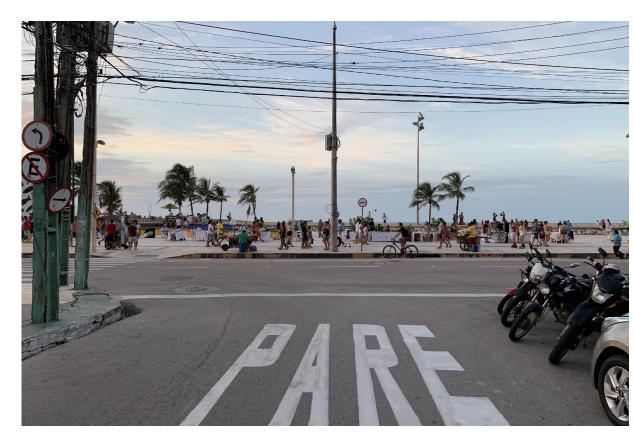
#### Example graph

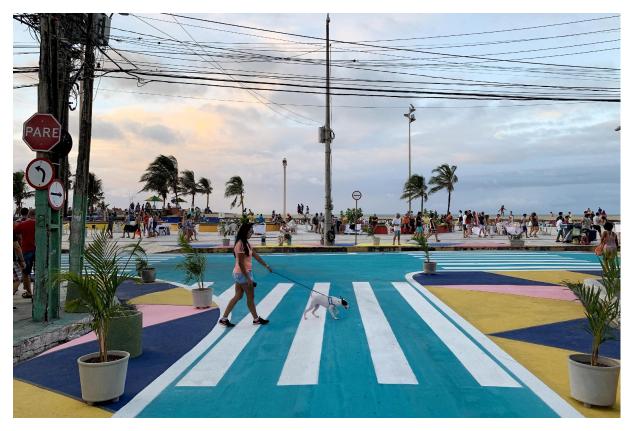




## Find relevant elements in Before & Afters







Before After

#### Metrics collected during site visits:

#### Global Designing Cities Initiative

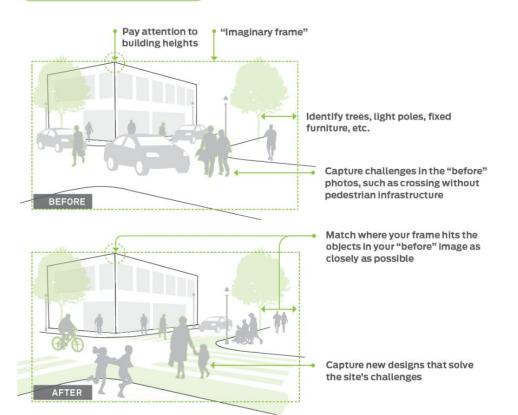
### **Before - After Photographs**

Before-and-after photos taken at street level are very effective in demonstrating the process, appreciating the exact changes that were made in the geometry and the operations of the street. To plan for effective before-and-after images, determine an imaginary frame that includes trees, signs, and/or identifiable

street elements that will guide you to take the same image on different days and at different times. Mark this on a site map in case the same photographer cannot return for the "after" shot. It is also helpful to take "during" shots of the implementation process.

#### Tools you'll need:





#### Model photographs

Ideally, the "before" photo should show some key challenges on site, and the "after" photo should show some key improvements. When placed together, the photos match almost exactly. The perspective, frame, angle, and elements all have the same position in both photos, making it easier to see the changes. Small differences are to be expected, but the main features of the image should align (e.g., a light pole or building edge in the same location).





#### Photographs that could be improved

The images are not aligned.

- Different perspective: it helps to have the camera perpendicular to the ground plane
- Different location (farther away)
- > Different elements show up in the photos

Images that don't align can sometimes be adjusted or cropped with computer software, but alterations may affect the quality of the images.







#### Tips when taking before-and-afters

- Capture many different angles and locations, and crop for an exact match
- Photos must not only show the design improvement, but also people using it! Pick active times to document the project and wait until you get people within the frame.
- Capture moments without large shadows cast over the site, and at the same time of day.

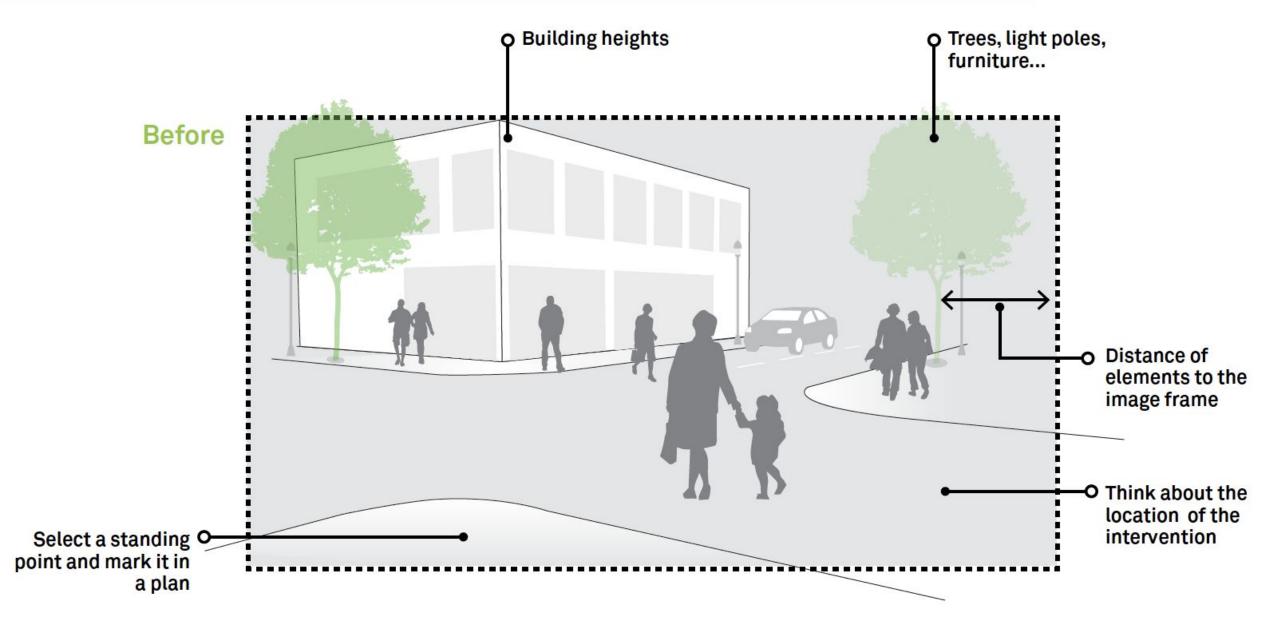


#### If a smartphone is the only camera

- → Smartphones are great for taking illustrative pictures "on the fly" of how people use the street.
- Take a time-lapse video moving through the site or record the change over time from one spot.
- → Take aerial photos and videos by using a bucket truck, ladder, nearby rooftops, or second-story retail/ office windows.
- → Check resolution of photos.

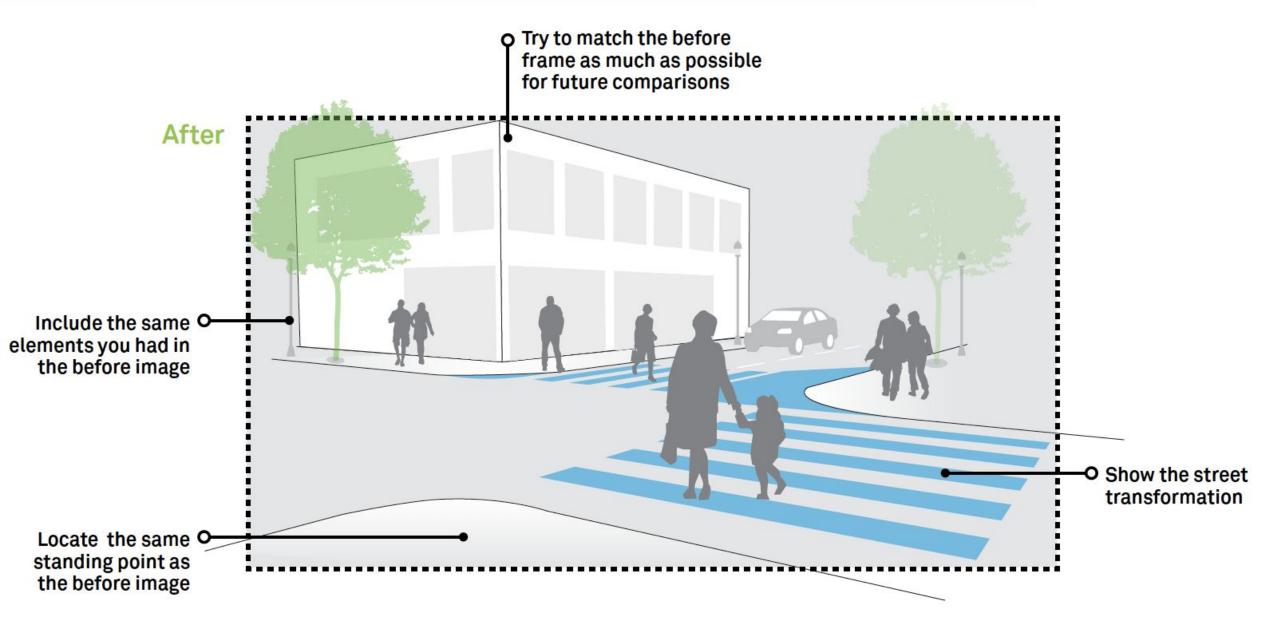
# Document the Project - Before & After



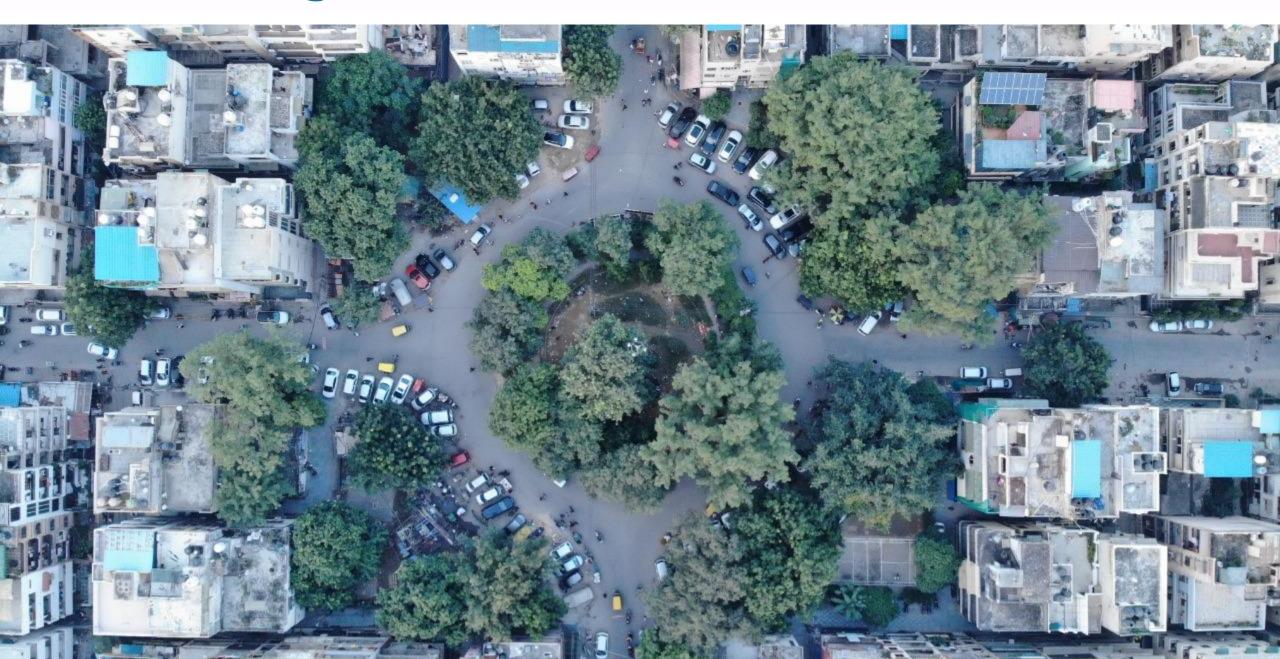


## **Document the Project - Before & After**





# Use drone images



# **Use drone images**



# **Show people!**



# **Document the process**



# Collect testimonials and videos













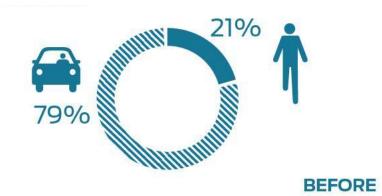


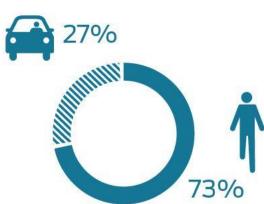


# 109% more pedestrians in the area

### **Fortaleza**

Space allocation











**AFTER** 

#### **Fortaleza**

User satisfaction and experience







97% **Believe** Pedestrians should be prioritized over motorized traffic





### Thank you!



www.globaldesigningcities.org @globalstreets e: info@gdci.global





# Safe and Sustainable Street Design: Network Planning & Discussion

A workshop for the City of Ljubljana, Slovenia

Abhimanyu Prakash, Associate Director Renata Carvalho, Program Manager Marina Visic, Program Associate

Global Designing Cities Initiative

**29th January, 2025** 





# **Network Planning**









## Copenhagen, Denmark





# Copenhagen, Denmark





## **Amsterdam, Netherlands**





#### Amsterdam, Netherlands



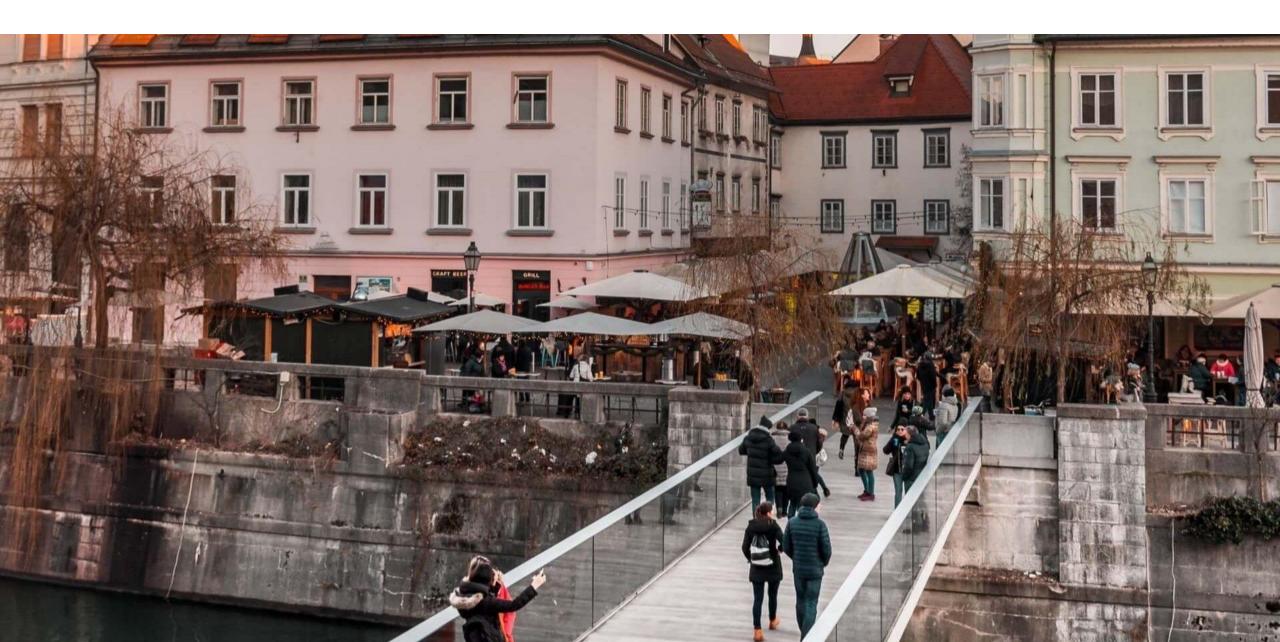
## The city of Ljubljana is on track to deliver that!

#### Ljubljana's Vision



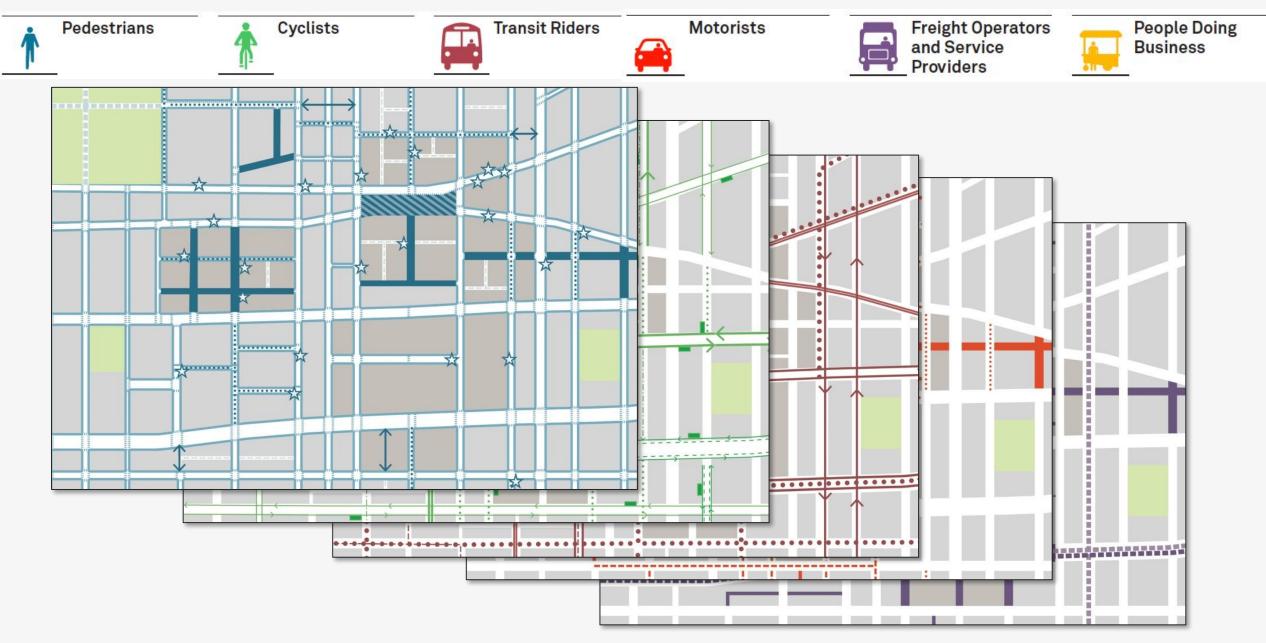




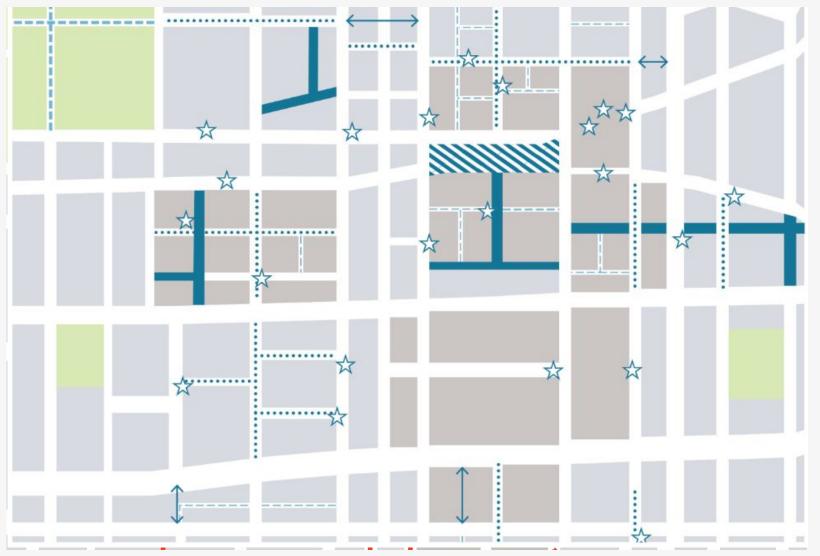


#### Design networks for all street users!





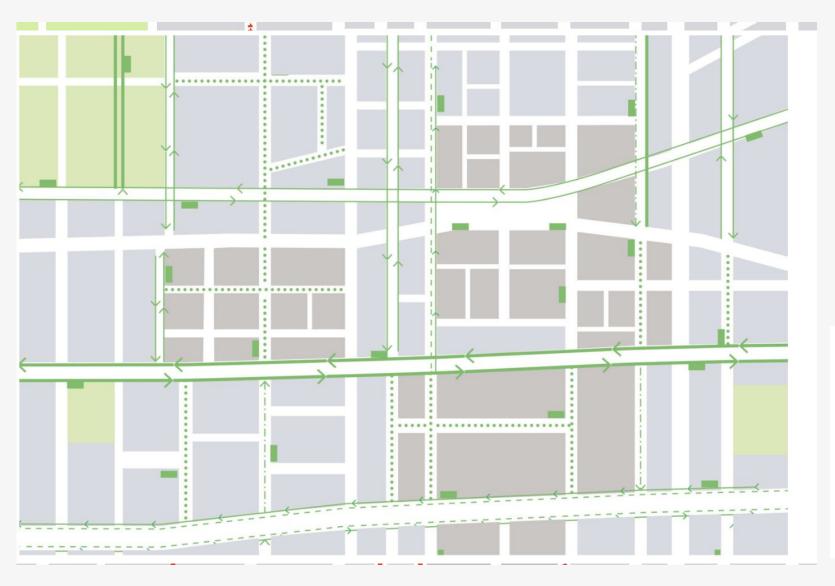




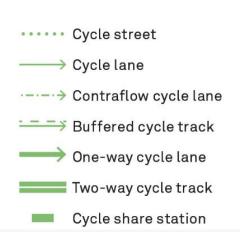
- Connectivity
- Safety
- Human Scale
- Key Destinations
- Accessibility
- Continuous







- Connectivity
- Safety
- Human Scale
- Key Destinations
- Directionality
- Intersections
- Parking
- Continuity









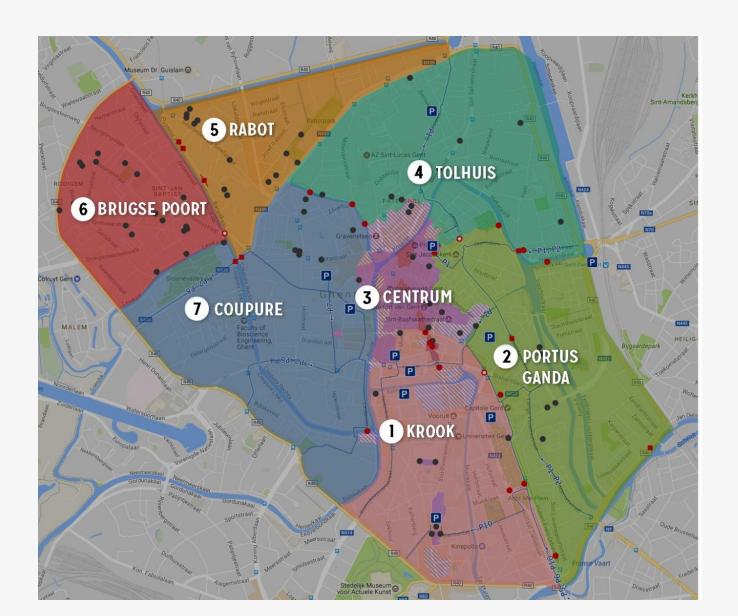






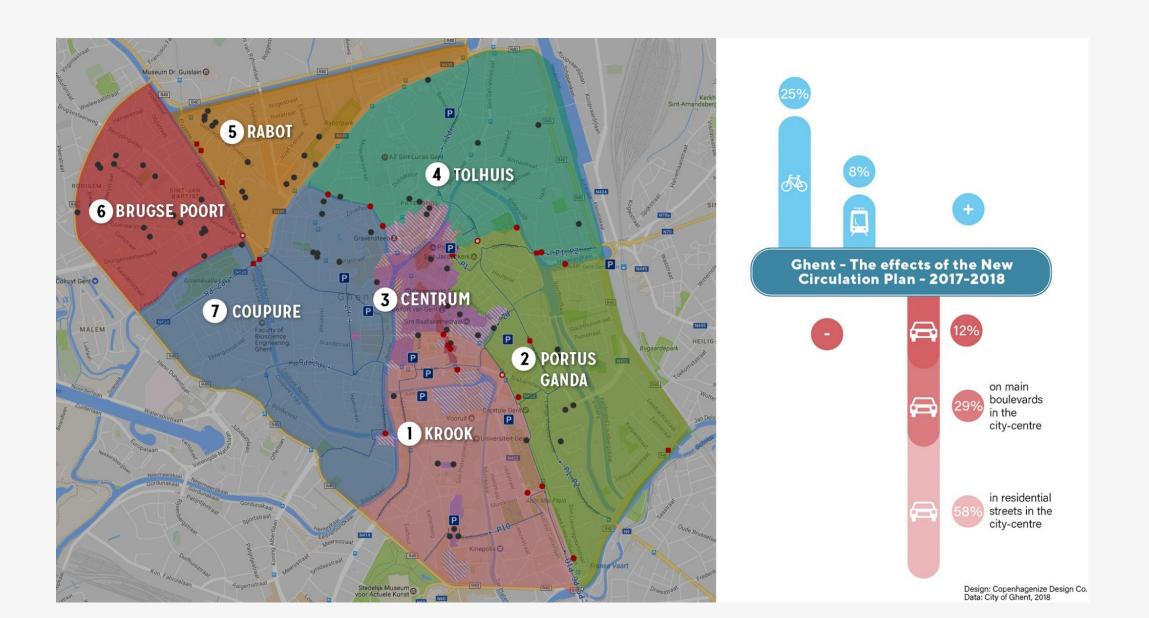
## What solutions are there at the network level?



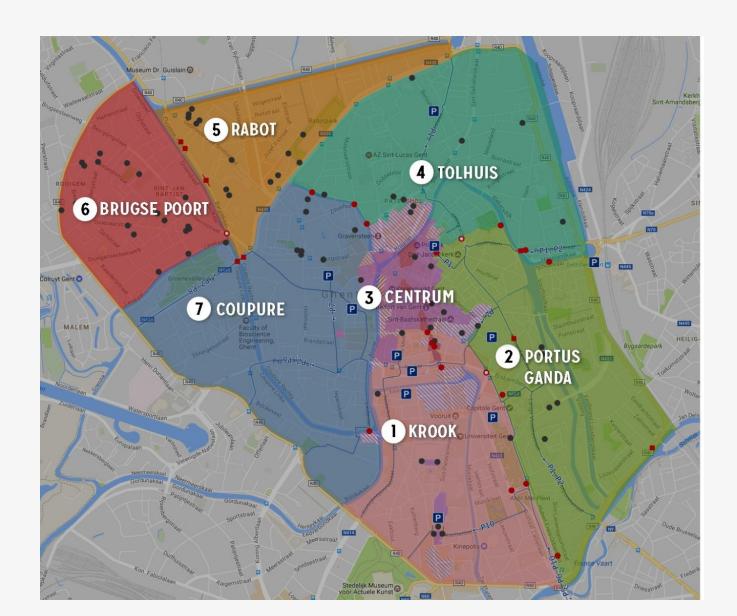


- Part of the Mobility Plan Ghent
   2030
- enhancing the sustainability and accessibility of the city
- reducing vehicular traffic in the historic center, increasingly congested
- promoting safer, more livable streets that prioritize pedestrians, cyclists, and public transport



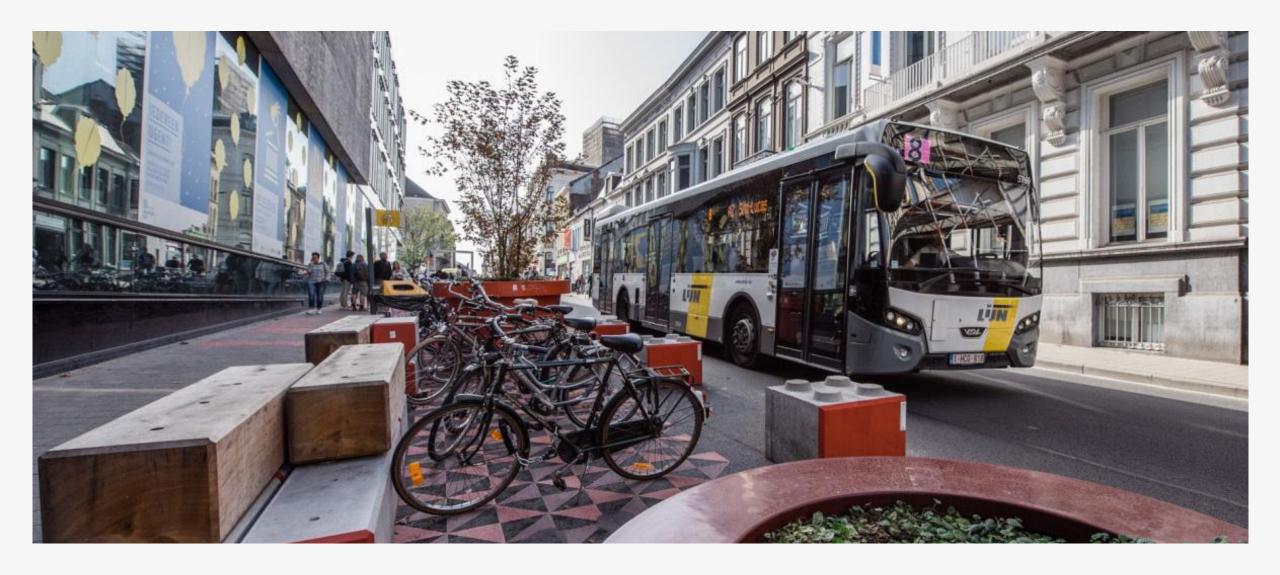






- Reallocating Street Space: converting roadways into pedestrian-friendly zones.
- Shared Streets: coexistence between cyclists, pedestrians, and vehicles.
- Filtering: Modal filters and bus gates
- Changing Street Directionality:
   Several two-way to one-way
   streets

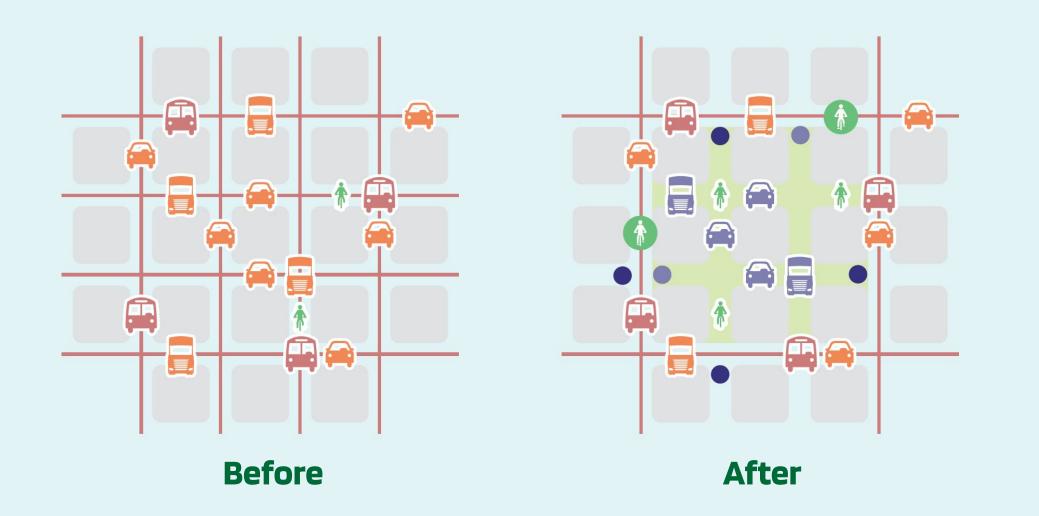










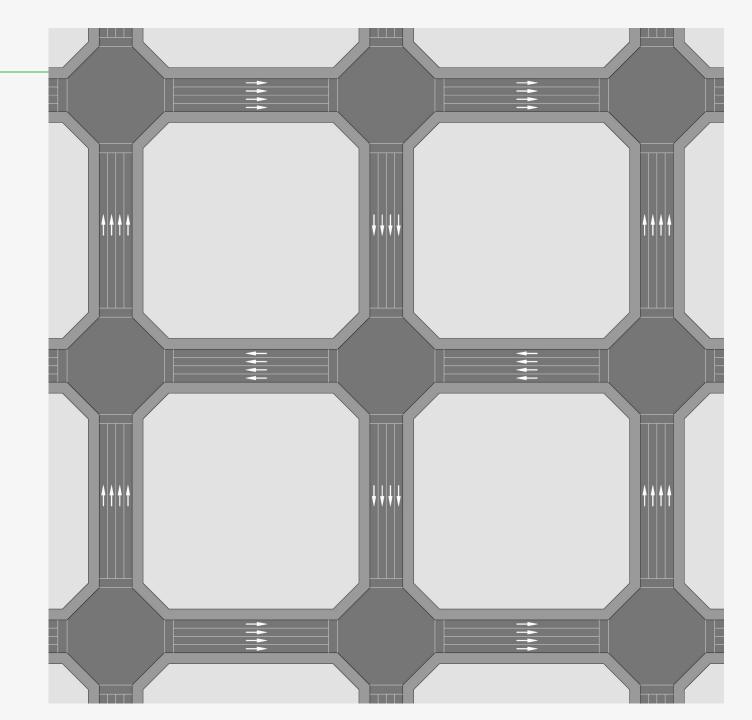


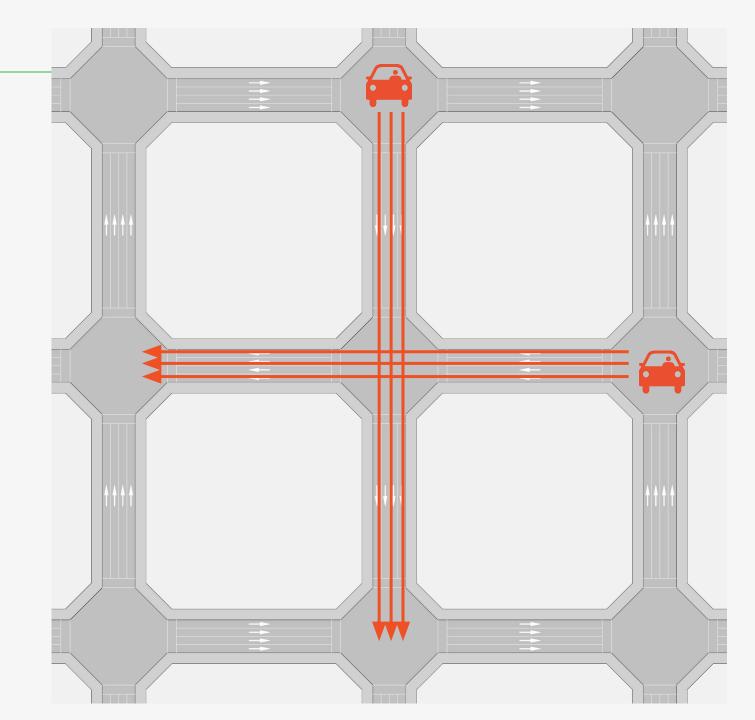


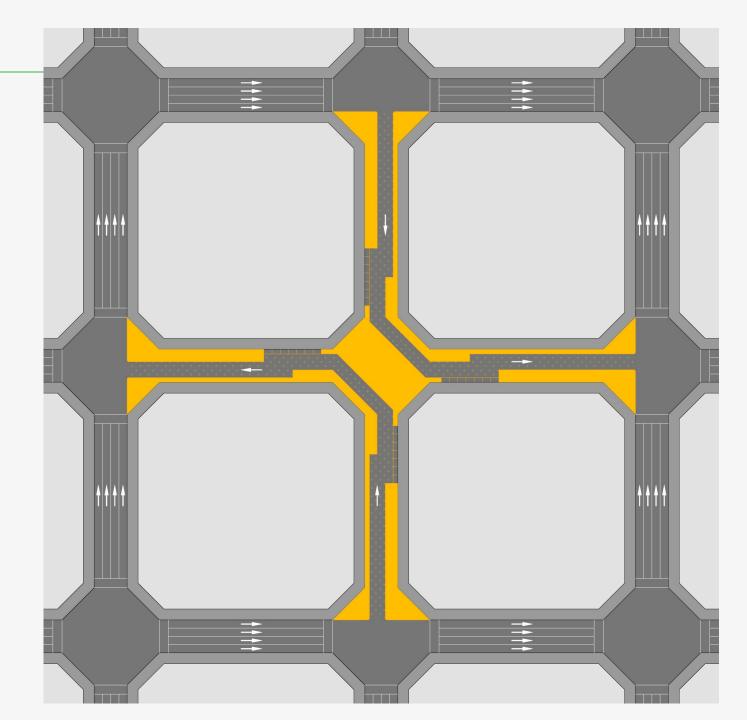


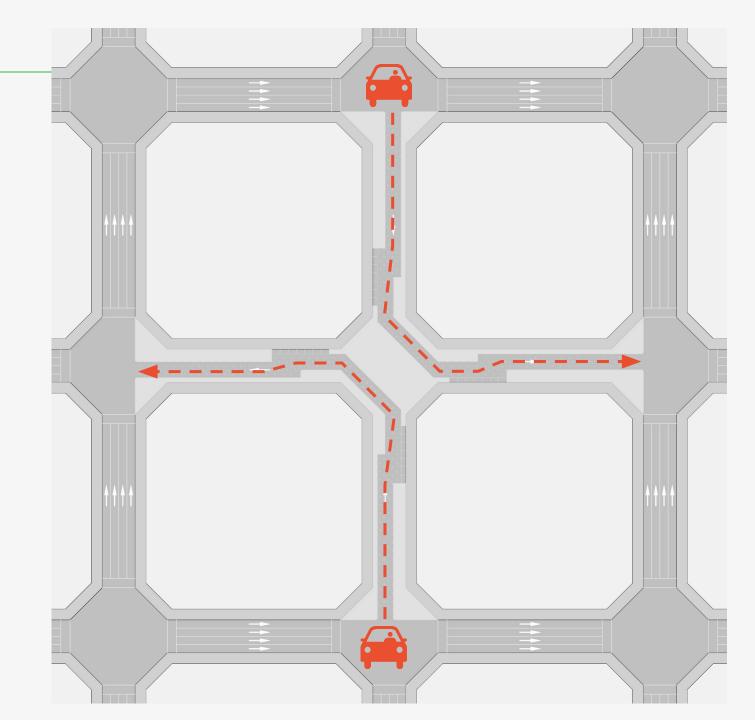


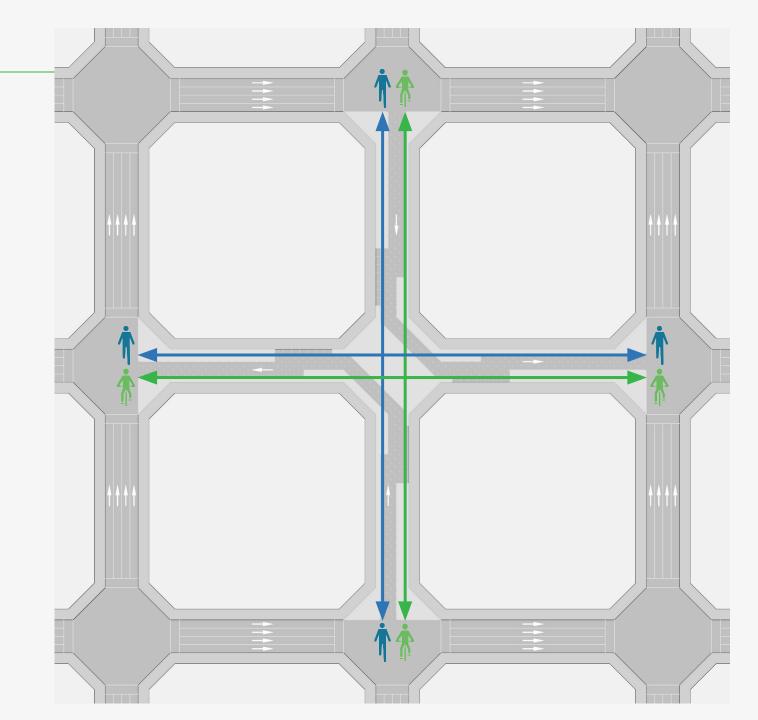
Before After

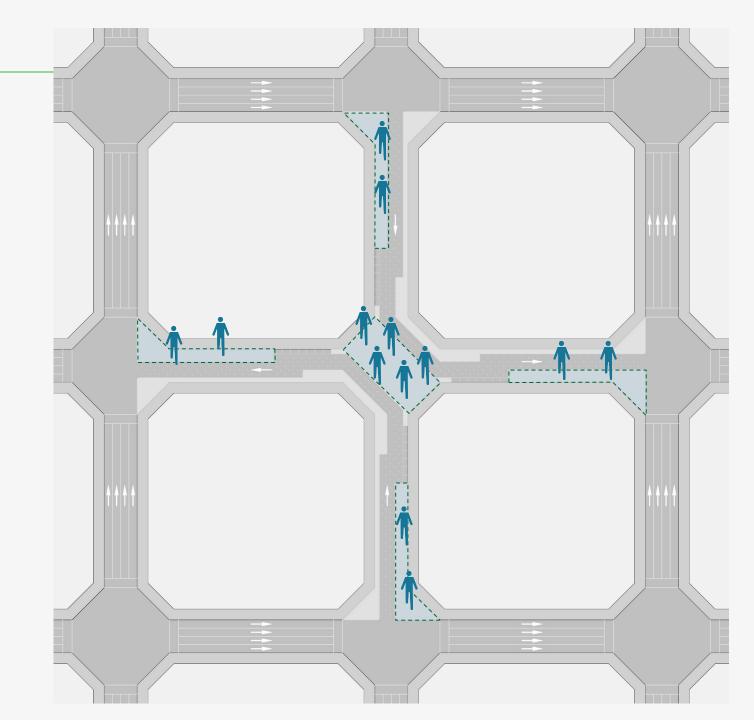








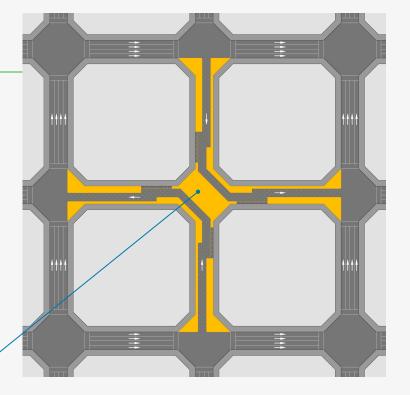


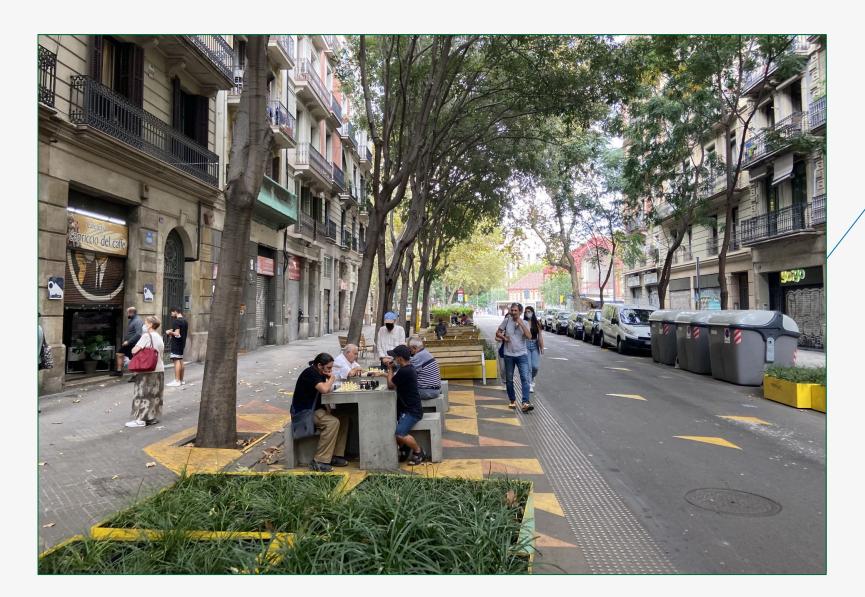


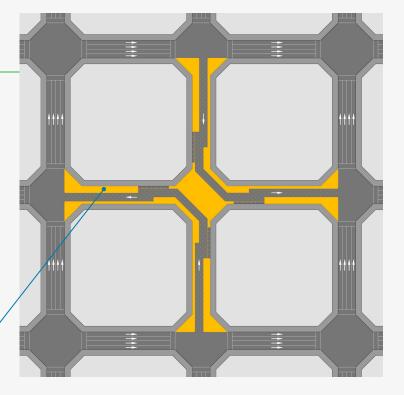


Public spaces













# The street networks of tomorrow

#### Design for all street users





#### Design for all street users







**Peatones** 



Ciclistas



Usuarios de transporte público



**Conductores** 



Operadores de carga



Personas realizando actividades comerciales

### Ljubljana's concrete targets

- 1 walking journeys by 20%
- 1 cycling journeys by 40 %
- 1 bus journeys by 50 %
- **↓ car journeys by 20 %**

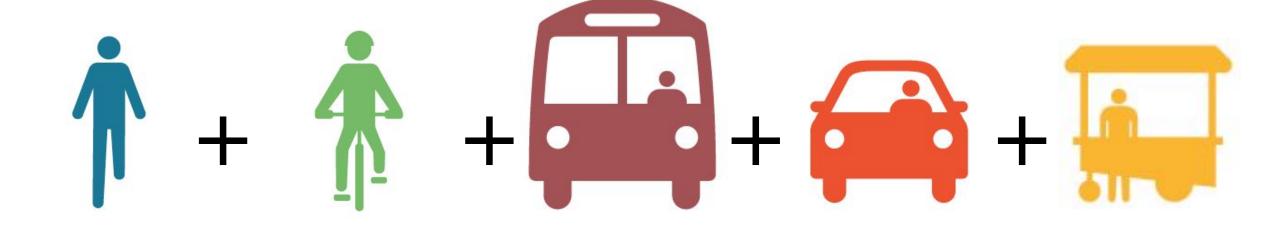
#### From considering one user...





#### ...to consider all users!





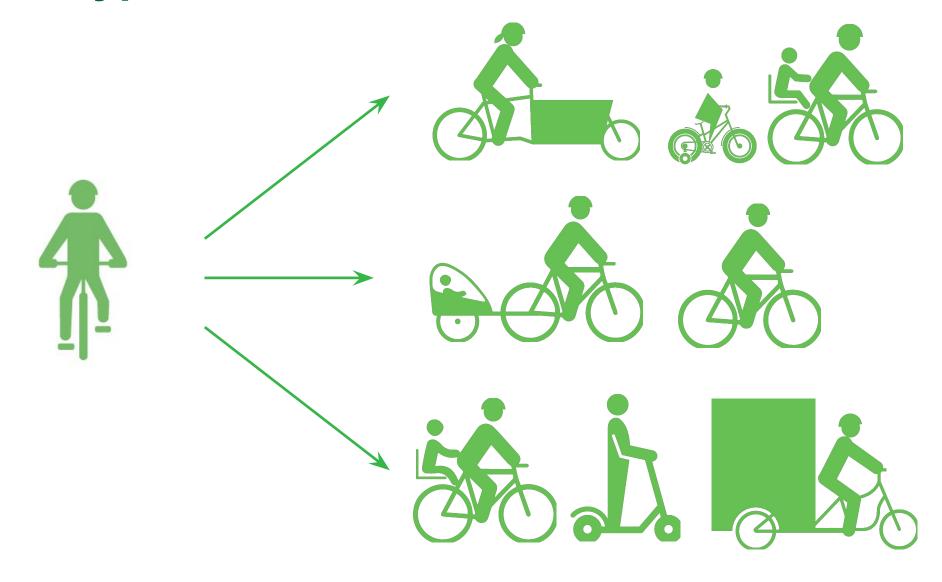
#### ...to consider all users!





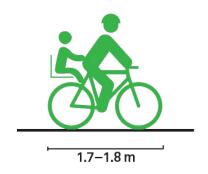
# ...to consider all types of vehicles!

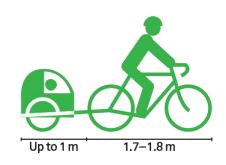


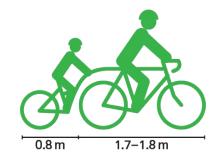


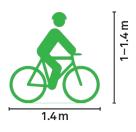
#### **Diverse vehicles**









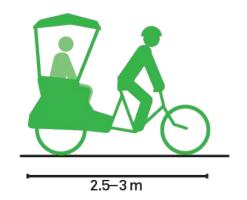


Bicycle + child sit

Bicycle + wagon

Double bicycle (with child)









Cycle rickshaw

Hand steering bicycle

Bicycle + front facing sit

Cargo bicycle

# Let's choose a starting point: How does a specific user experience our street network?



#### **Diverse cyclists**



**Isabel, 14**Adolescent



Delivery Cyclist



Service Worker



**Priya, 32**Caregiver



**Zohra, 45**Shop Owner



**Erion, 68**Older Adult



#### Specific needs













#### How do we interact with our largest continuous network of public space?



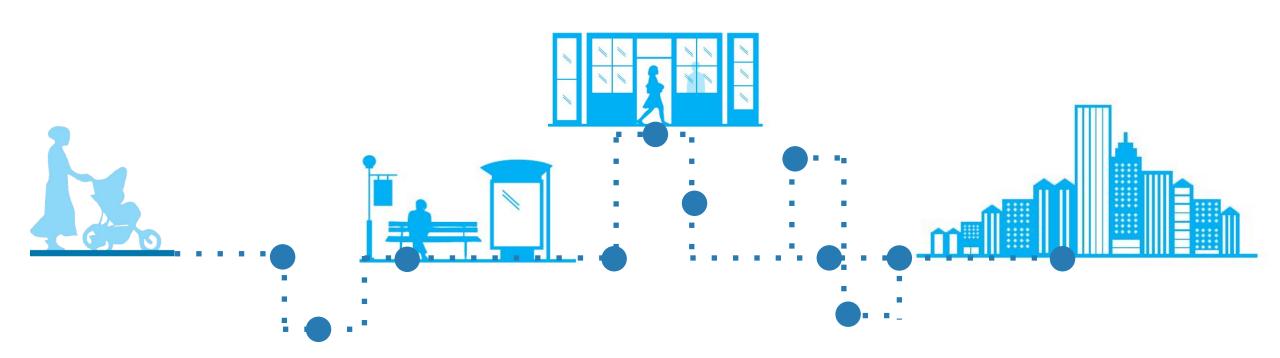




a.

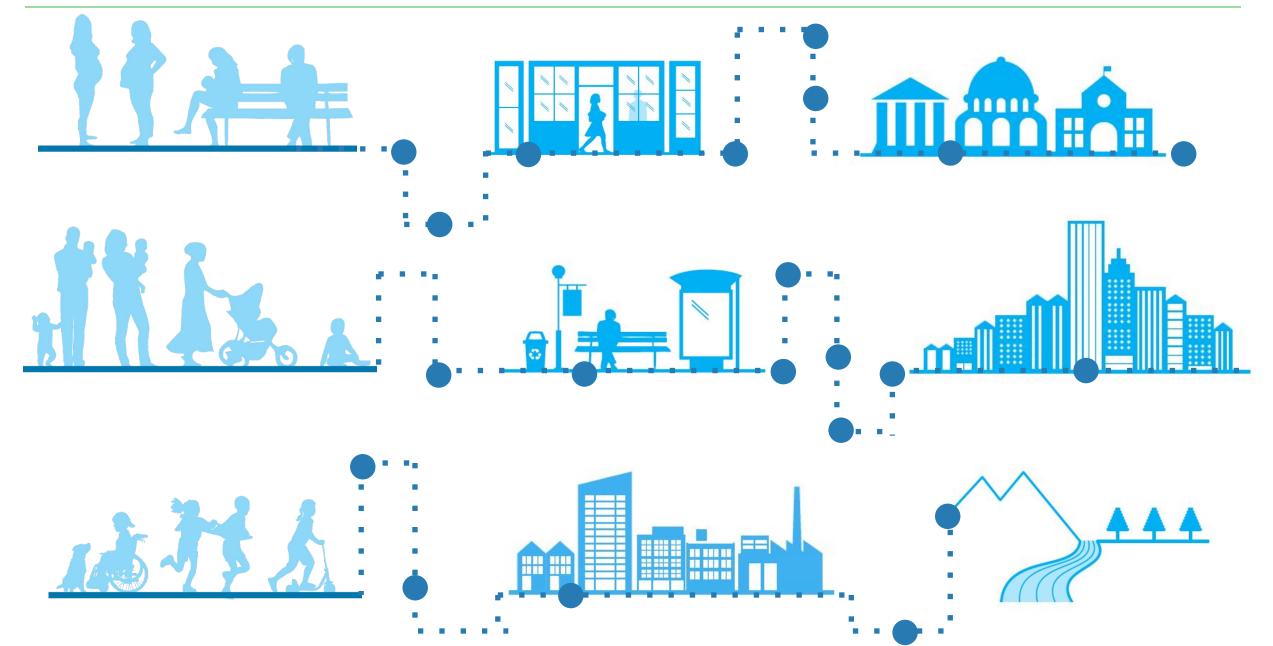
#### How do we interact with our largest continuous network of public space?





#### How do we interact with our largest continuous network of public space?



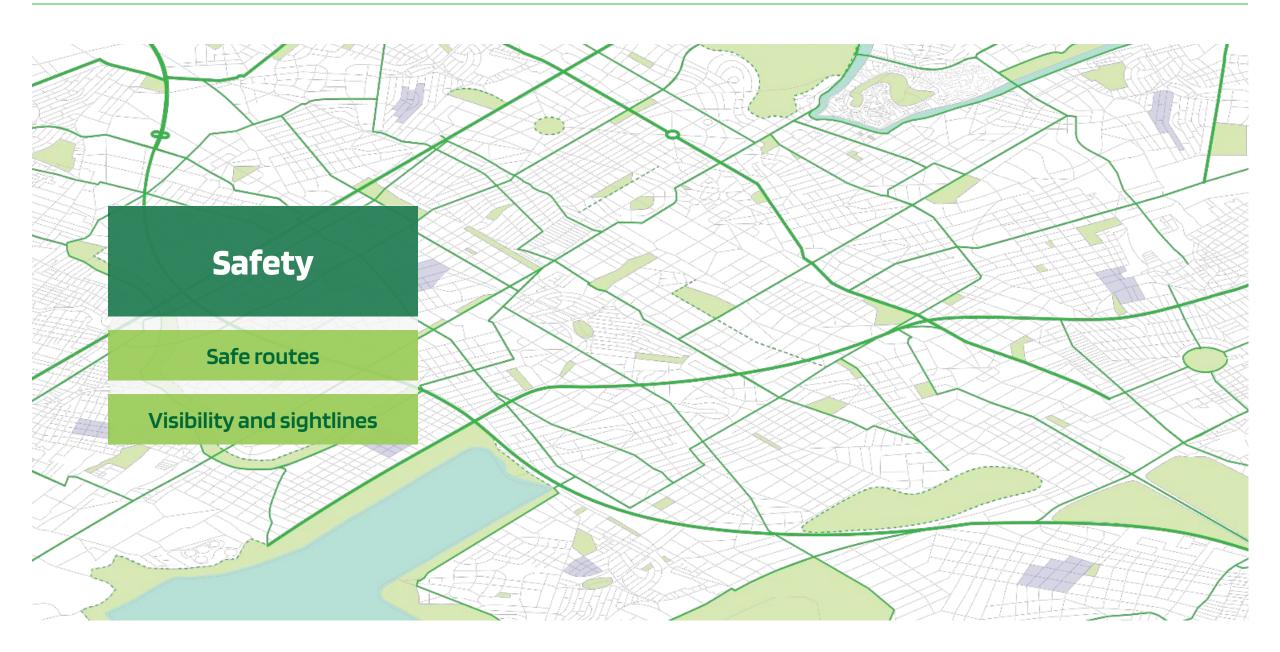




















#### Designing with all cyclists in mind









Delivery Cyclist



**Alex, 28**Service Worker



**Priya, 32**Caregiver



Shop Owner



Erion, 68
Older Adult











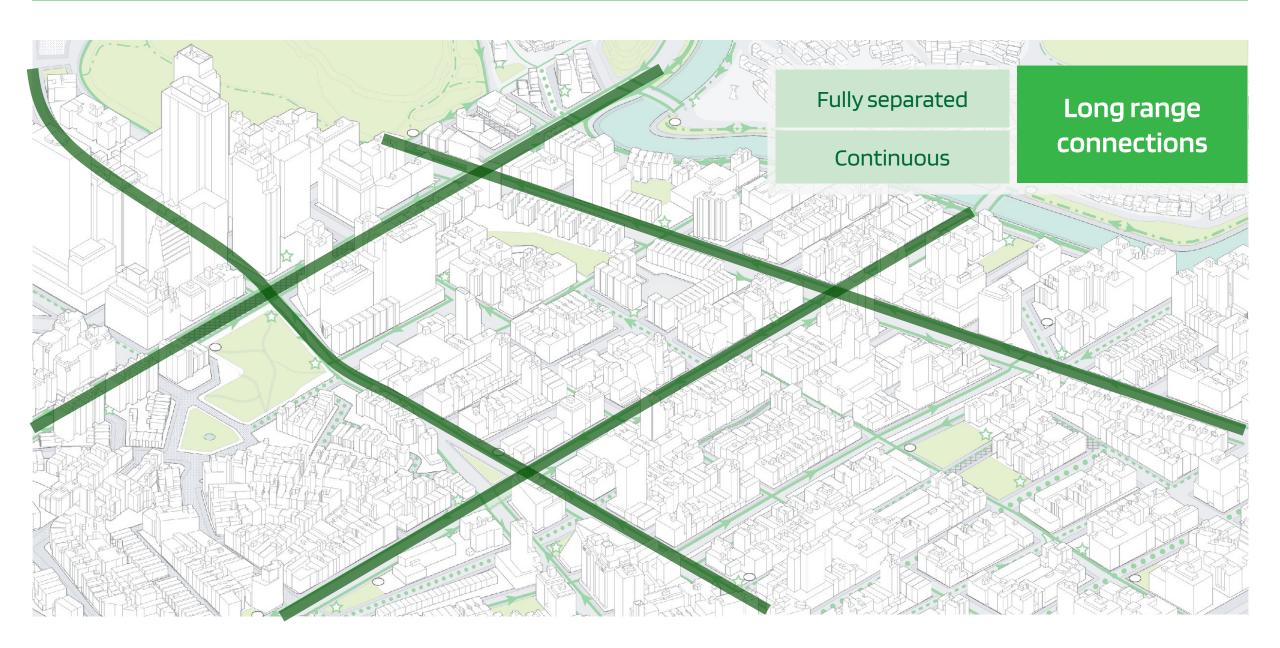


# How do we achieve this?

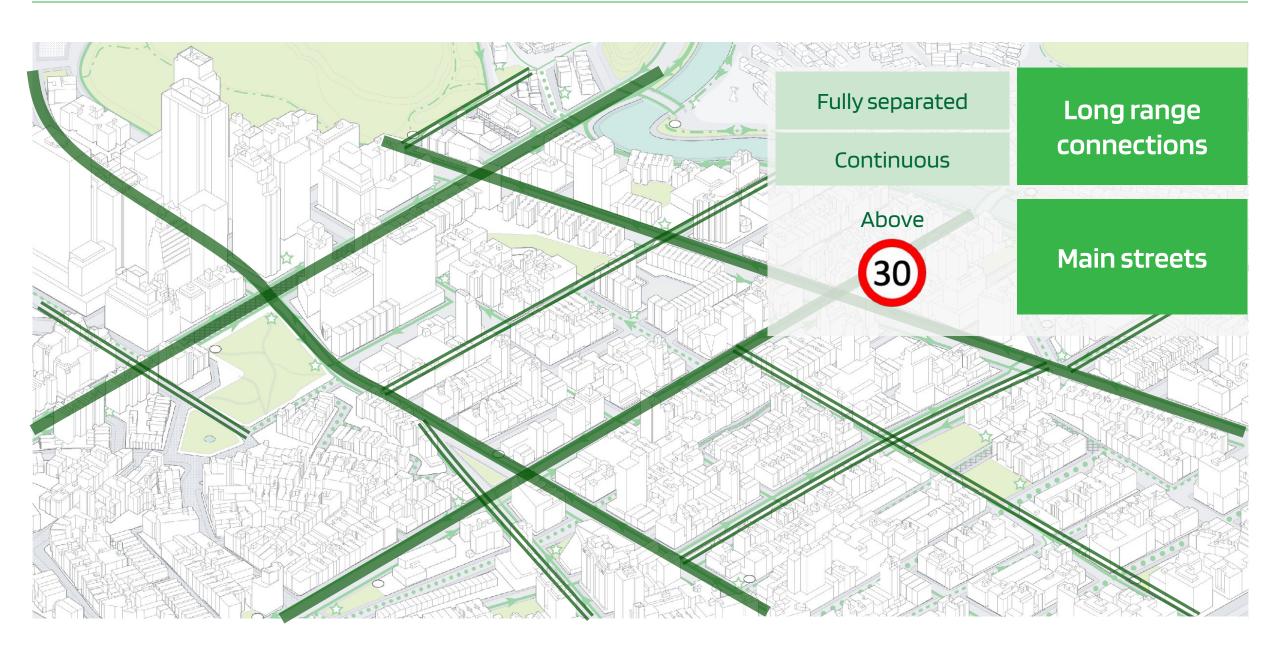




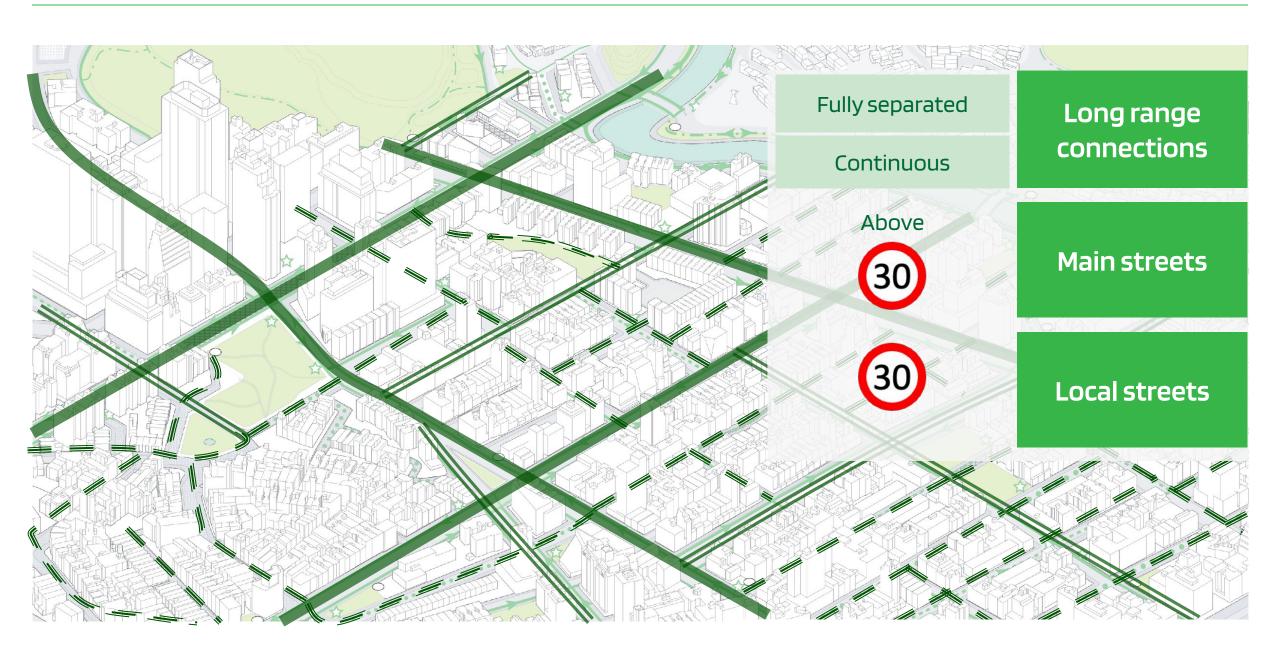




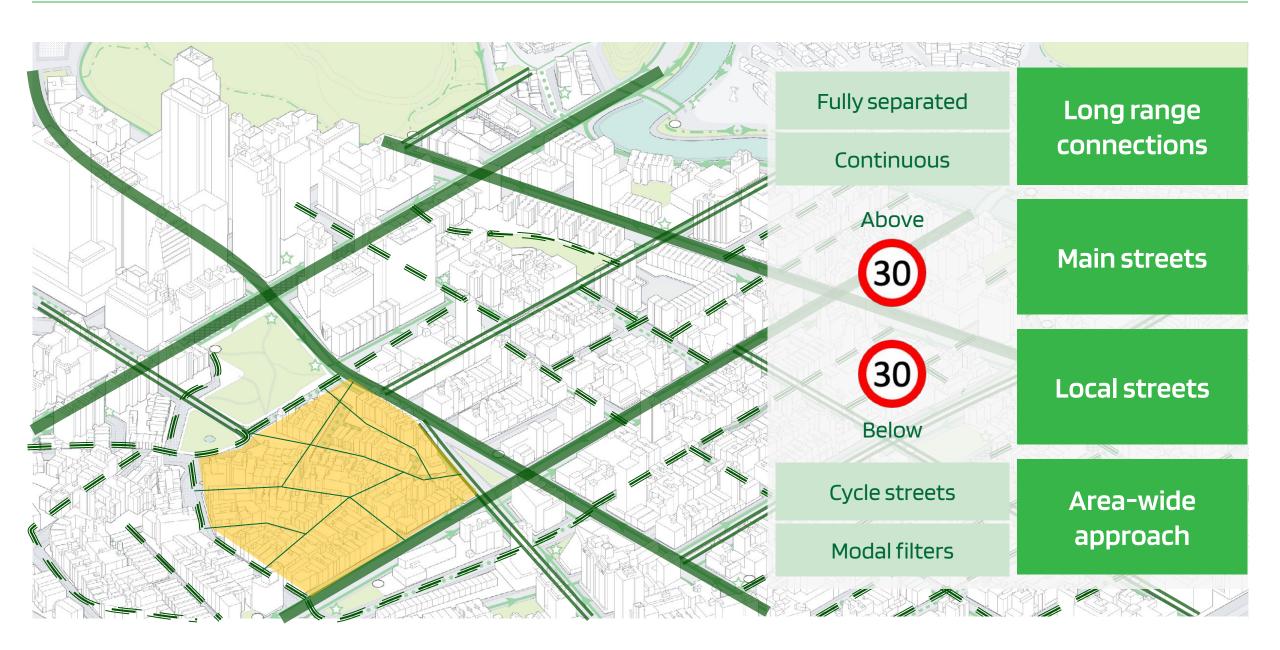








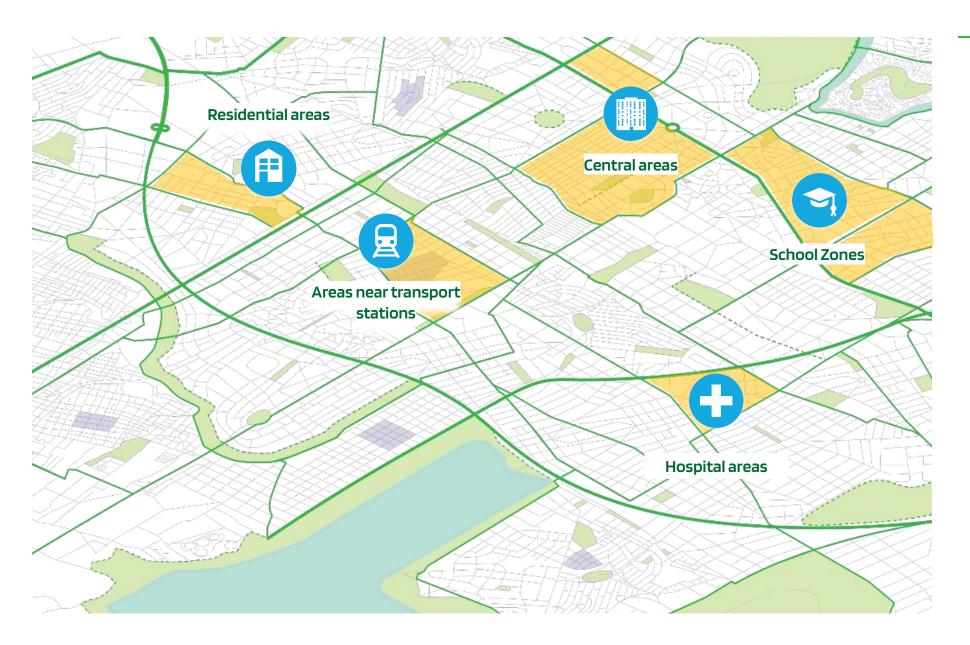




# From corridors and intersections to an area-wide approach

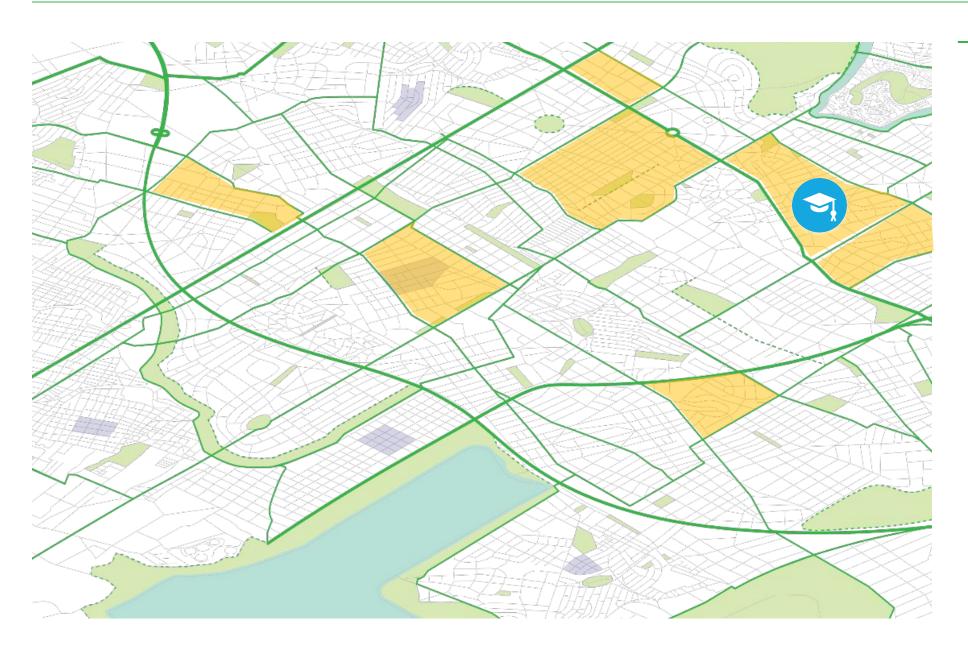
## Type of areas





# Type of areas: Schools





#### **School zones**



#### Traffic calmed street in school zone





#### **School zones**



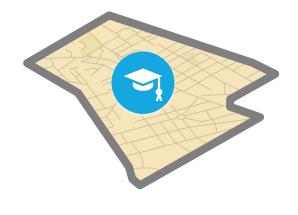
Brussels, Belgium

## Open street - Street closures for vehicles





#### **School zones**



Paris, France

# Open street - Street closures for vehicles





#### **School zones**



Fortaleza, Brazil

# Open street - Street closures for vehicles





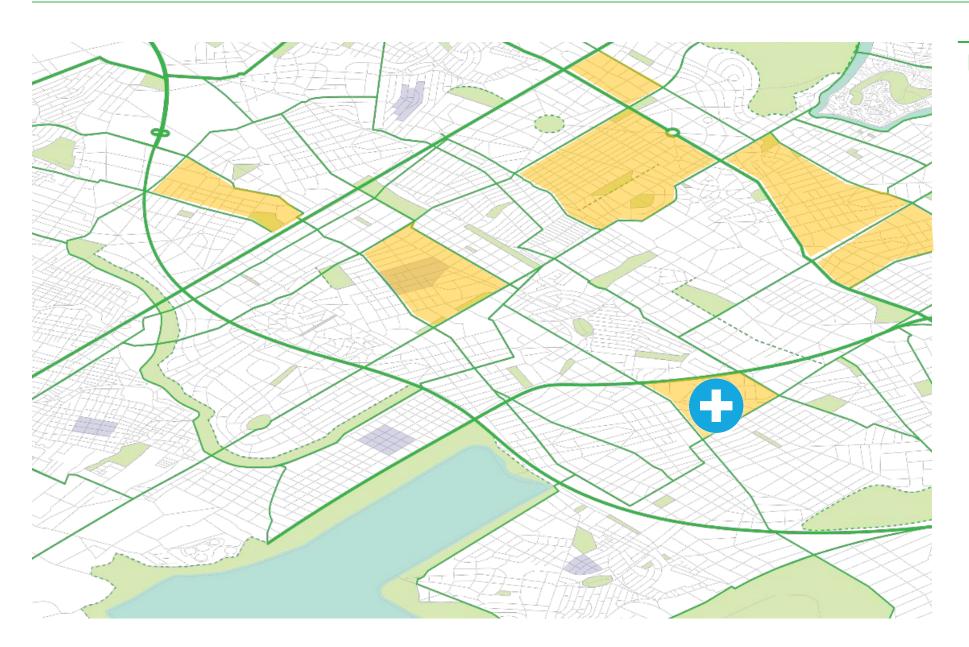
#### **School zones**



Fortaleza, Brazil

## Type of areas: Hospitals





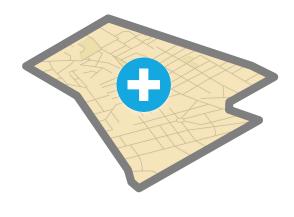
#### **Hospital zones**

## Type of areas: Hospitals





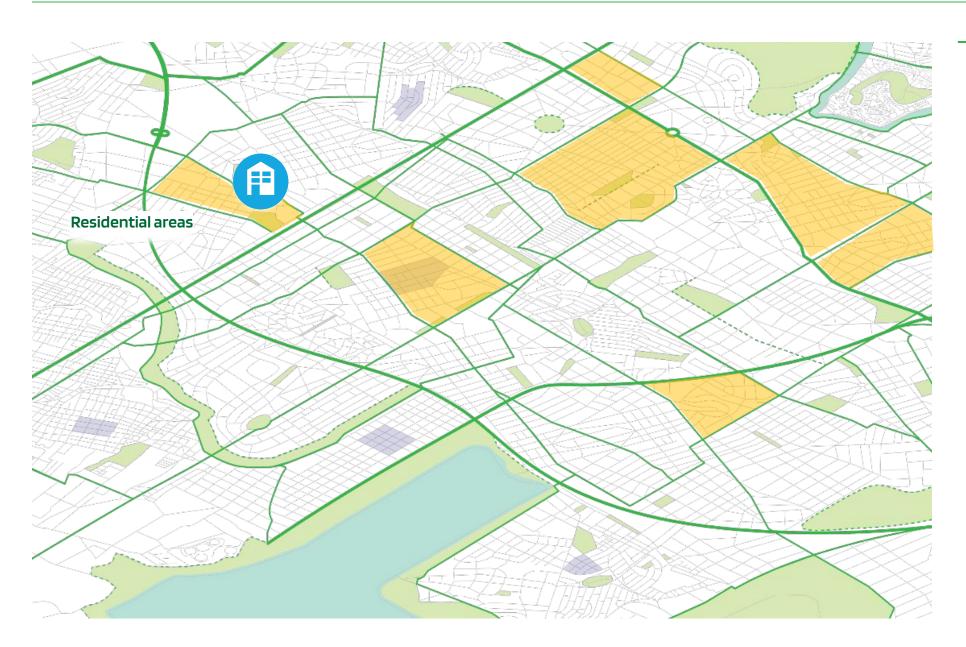
#### **Hospital zones**



Fortaleza, Brazil

# Type of areas: Residential





#### **Residential areas**



# Type of areas: Residential





#### Residential area



Quito, Ecuador

# Type of areas: Residential





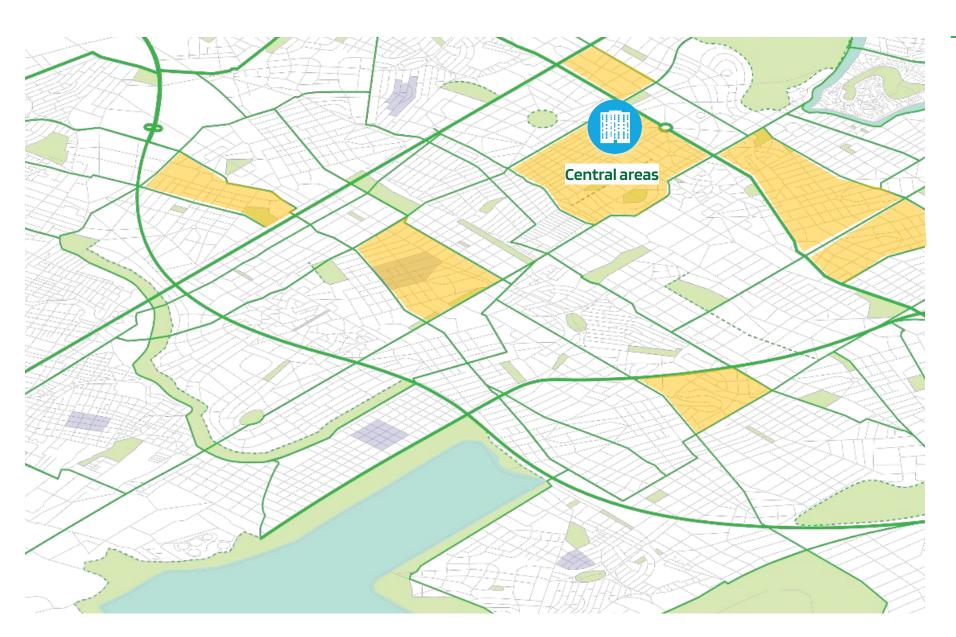
#### Residential area



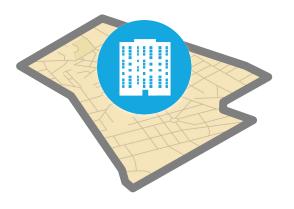
London, UK

# Type of areas: city centers and commercial areas





City center and commercial areas

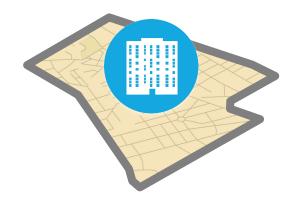


# Type of areas: city centers and commercial areas





City center and commercial areas



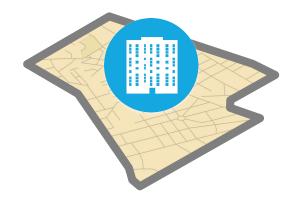
Buenos Aires, Argentina

# Type of areas: city centers and commercial areas





City center and commercial areas



**Ghent, Belgium** 



# How can we redesign the area to improve all local trips?

# Three principles for area-wide interventions:

Speed management

Access and volume management

Network management

# Three principles for area-wide interventions:

Speed management

Access and volume management

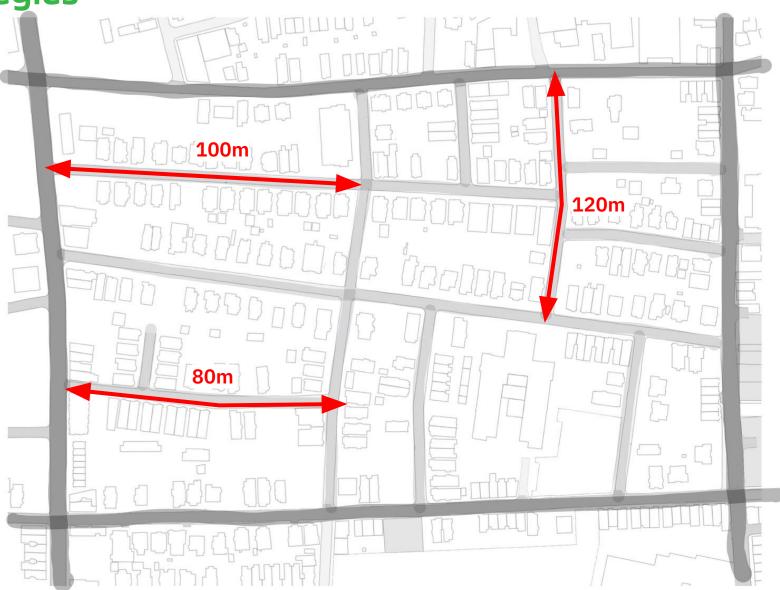
Network management



# What factors contribute to speeding?

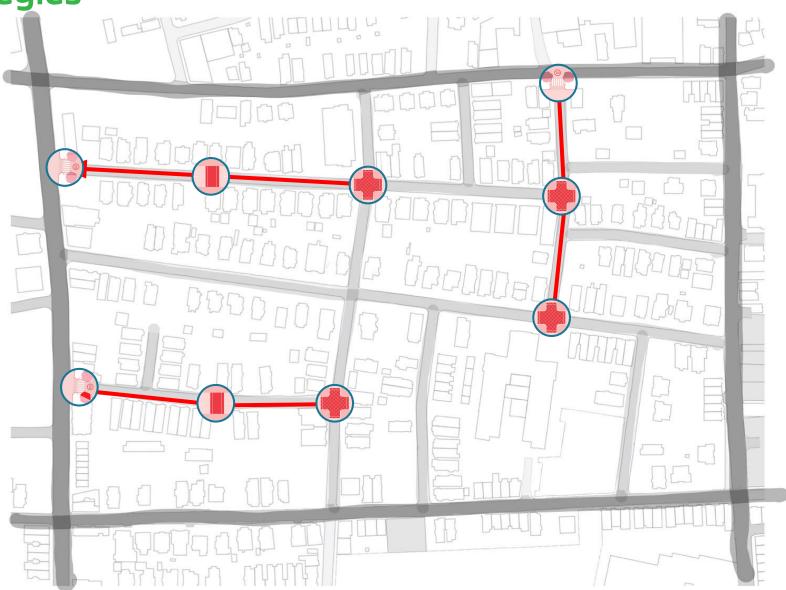


**Design Strategies** 

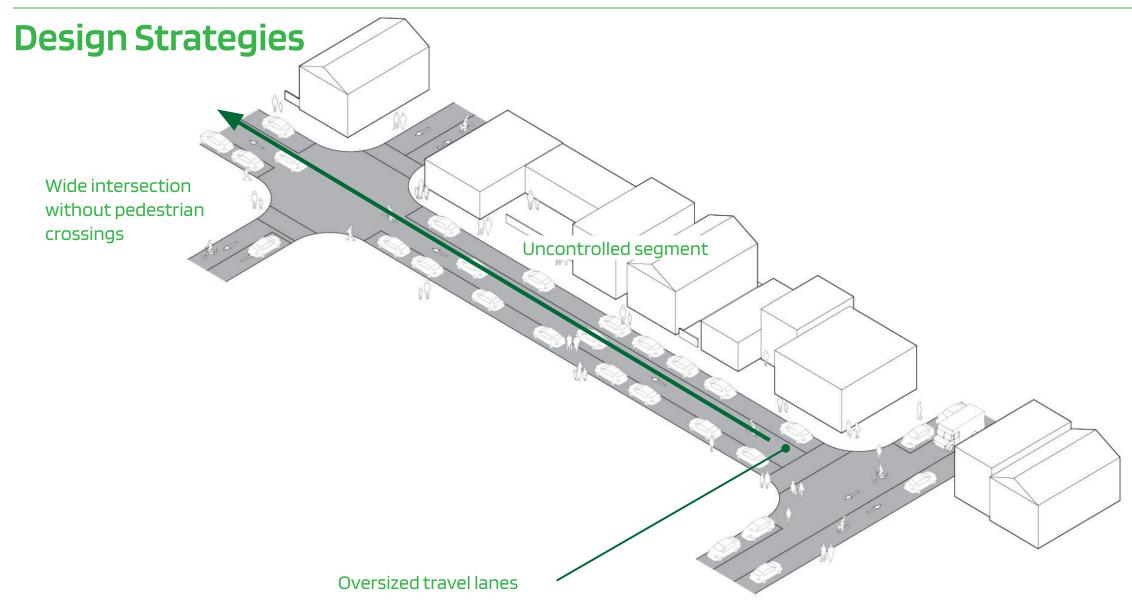




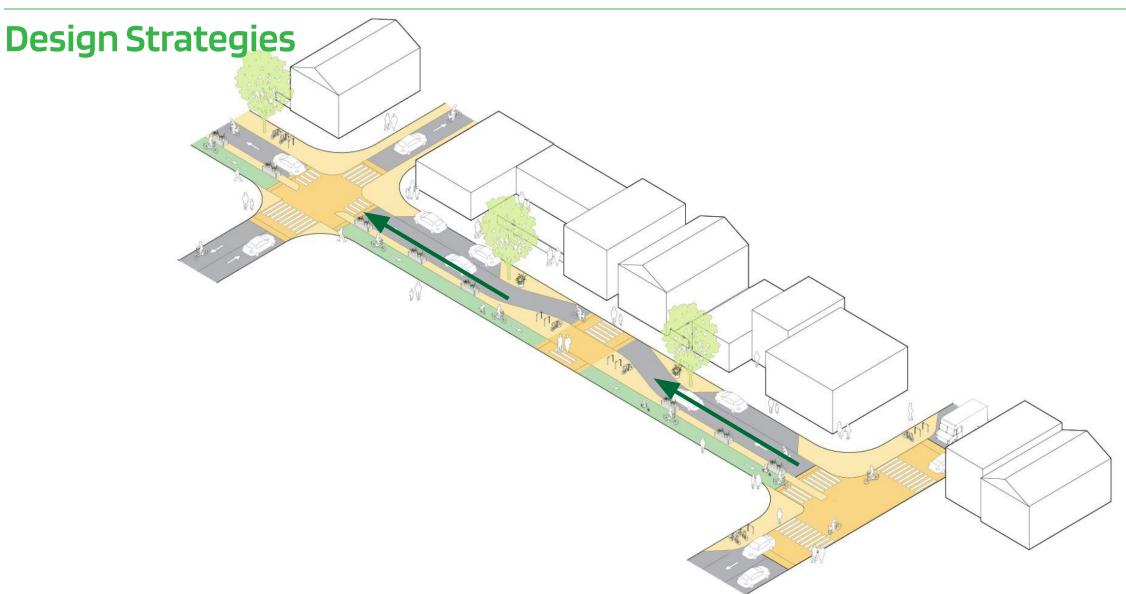
**Design Strategies** 















# Three principles for area-wide interventions:

Speed management

Access and volume management

Network management

# Access and volume management





# Access and volume management

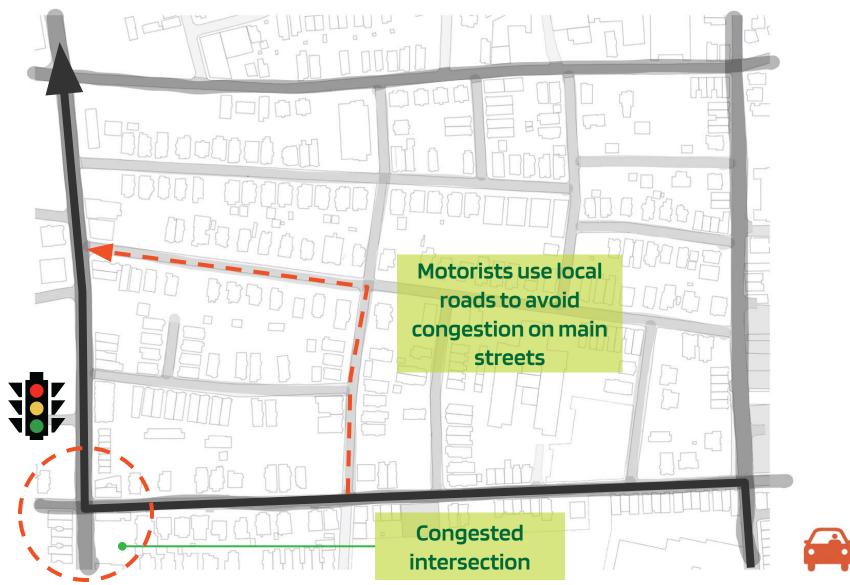






# Access and volume management









# What can we do about it?



# "Filtered Permeability"



Manage vehicle volumes on certain streets to...



# "Filtered Permeability"



Manage vehicle volumes on certain streets to...





...to create a safer and more attractive environment for **walking and cycling** ...



# "Filtered Permeability"



Manage vehicle volumes on certain streets to...



...to create a safer and more attractive environment for walking and cycling ...



... while **maintaining local access** for residents, deliveries or emergencies.





Motorists use local roads **to avoid congestion** on main streets

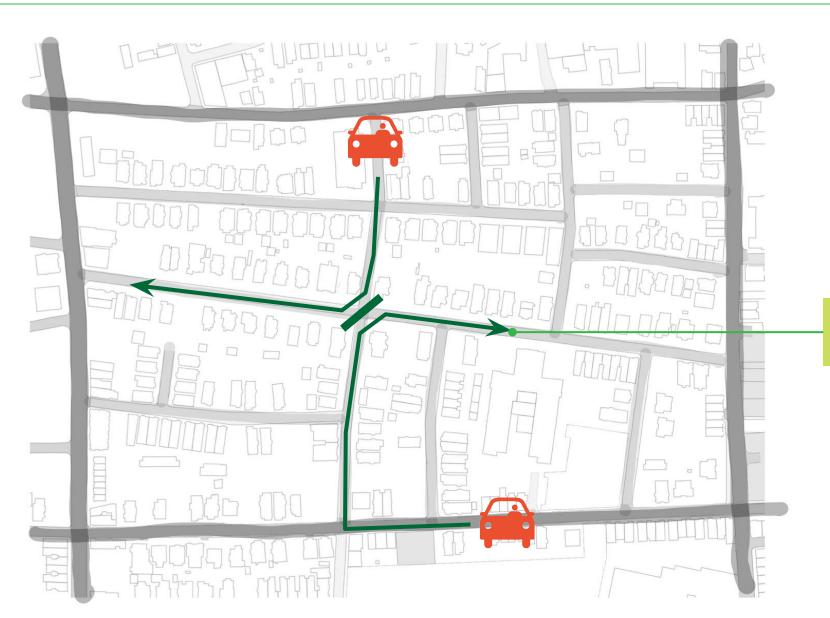




#### **Modal filters**

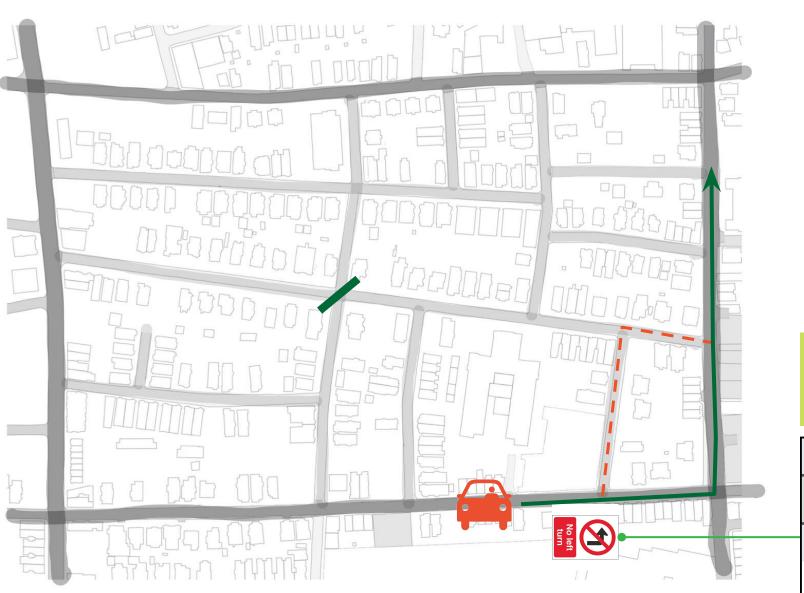
The diverter prevents motorists from using the local street in order to avoid congestion



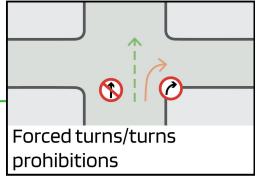


**Cut-through** traffic is now impossible

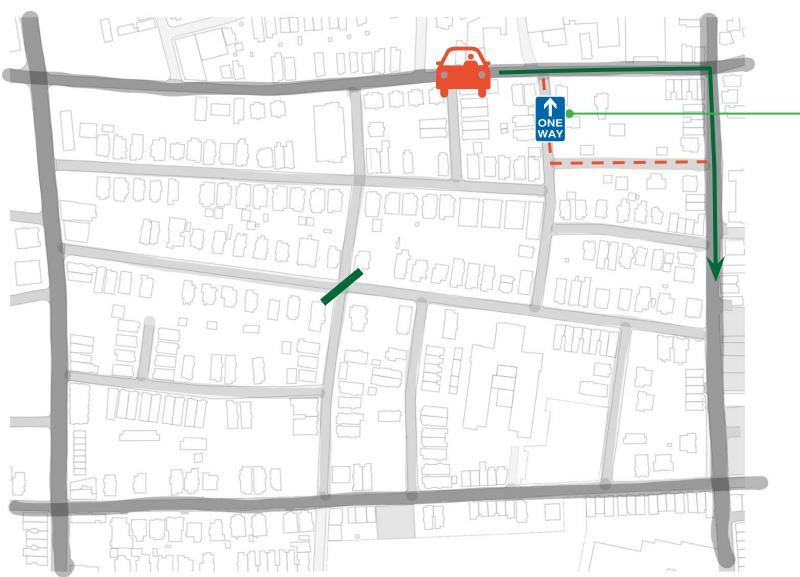


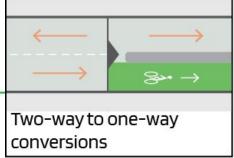


In some cases, shortcut routes can be avoided by prohibiting left turns from the main street









In other cases, the change in direction of traffic flow may prevent through traffic

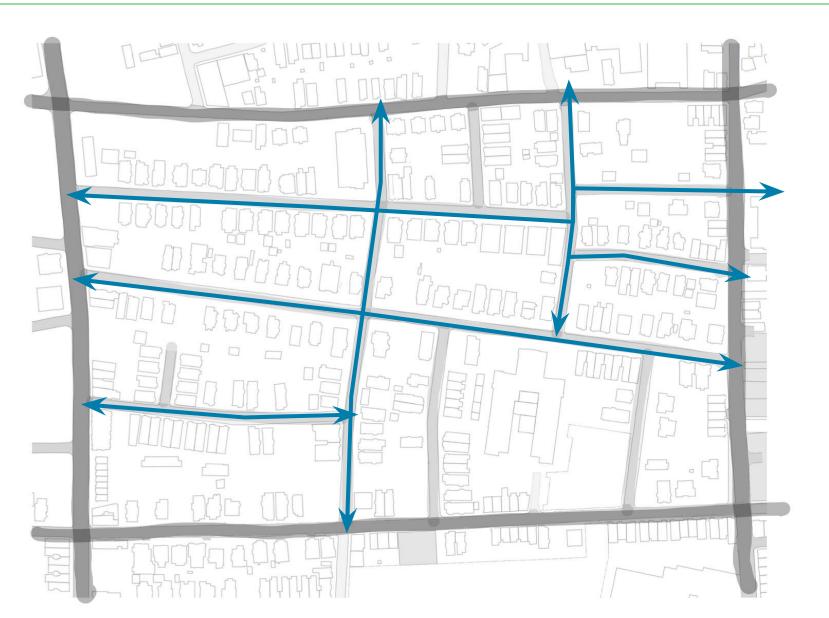




Through a combination of modal filters and operational tools, we can make the area safer and more accessible for pedestrians and cyclists

Motorists **access** is still maintained. Only their permeability is affected







Permeability for pedestrians is maintained and improved

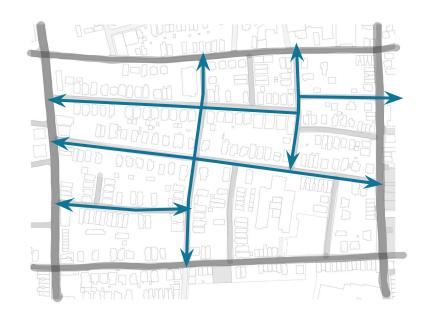


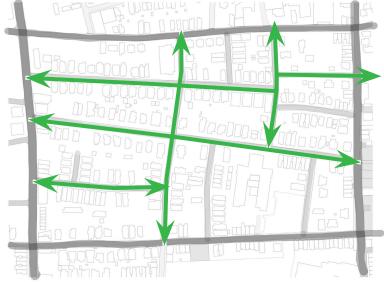


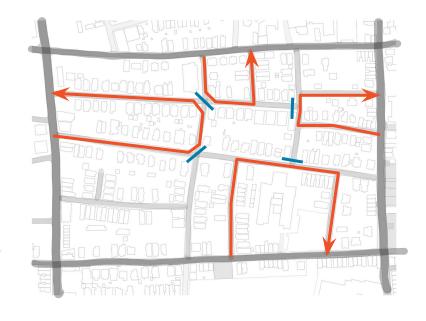


Same for cyclists!













**Total permeability** 



Only local access

# Three principles for area-wide interventions:

Speed management

Access and volume management

Network management

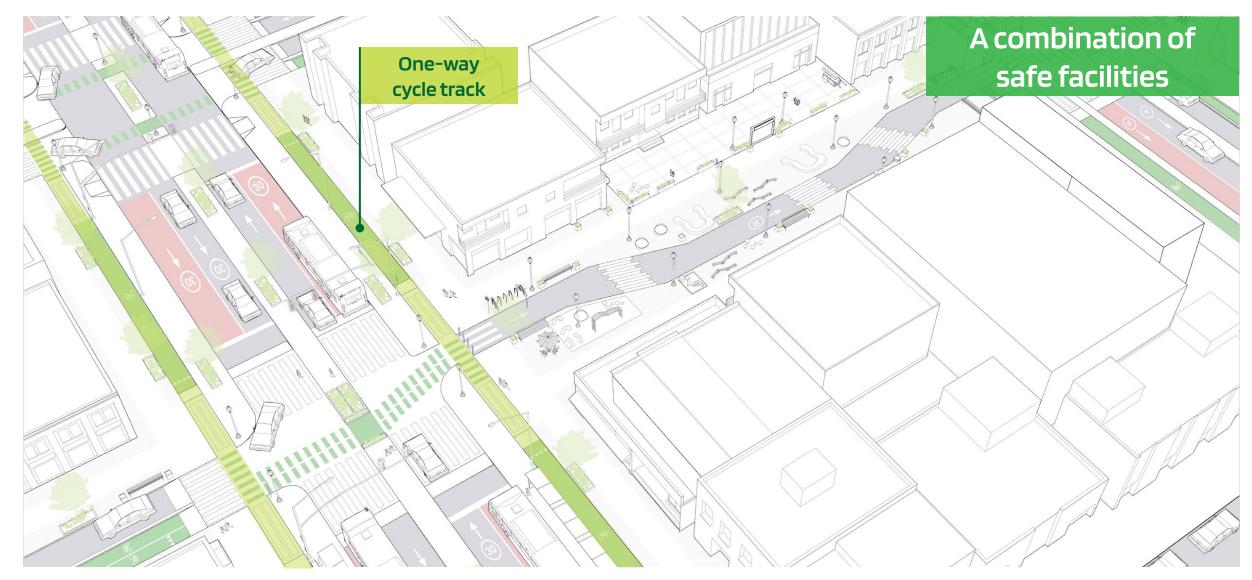


# **Shaping the Cycling Network**

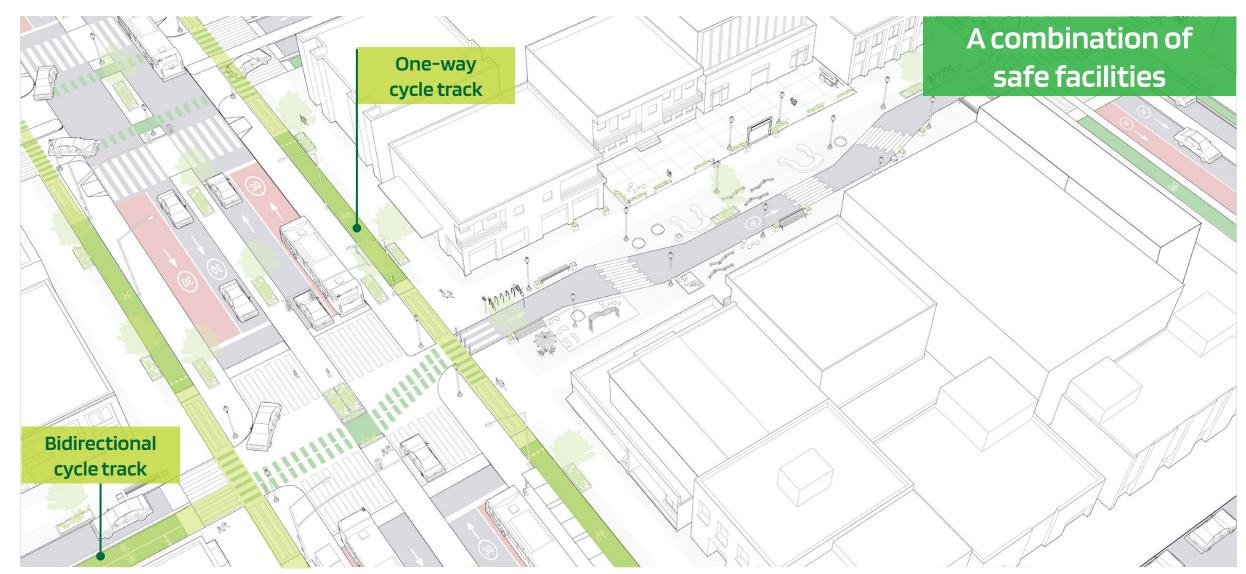




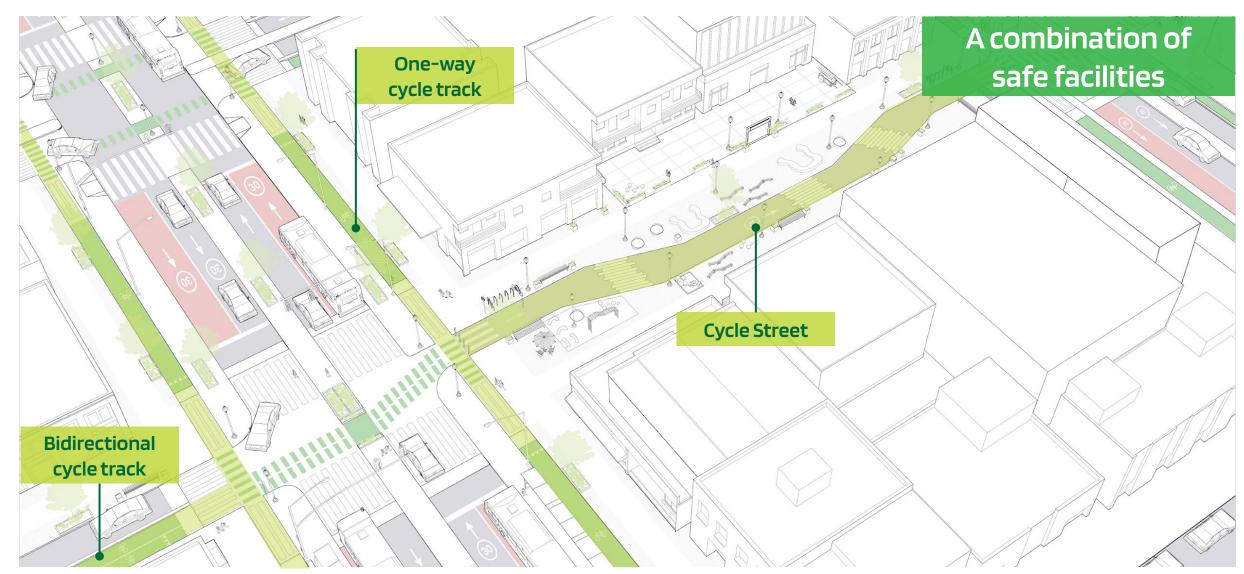
# Planning cycle-friendly networks



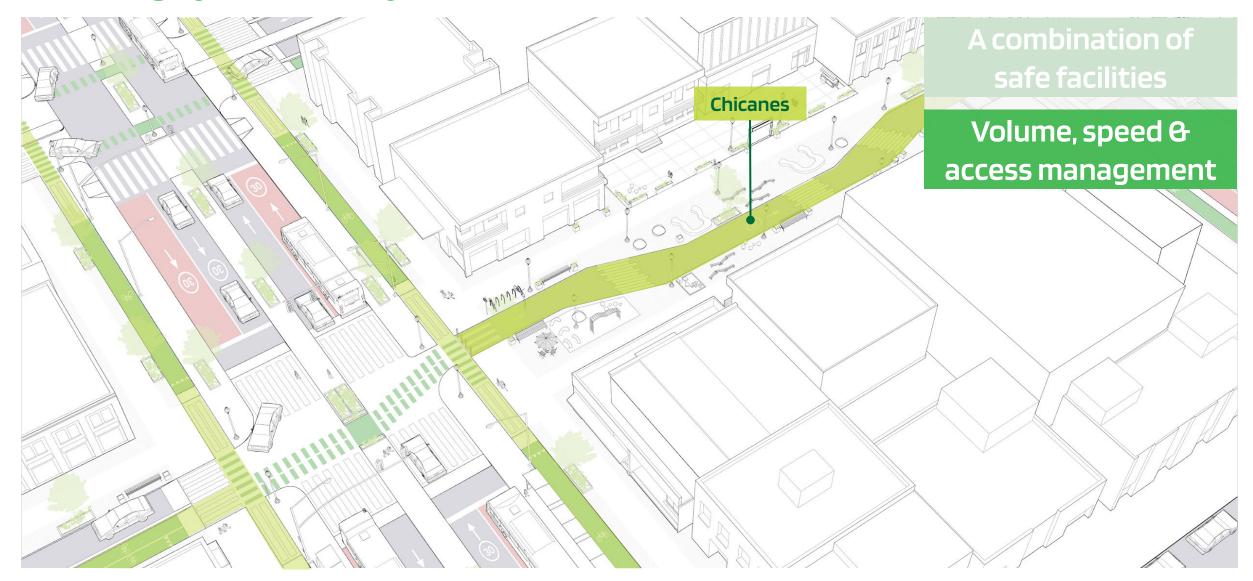




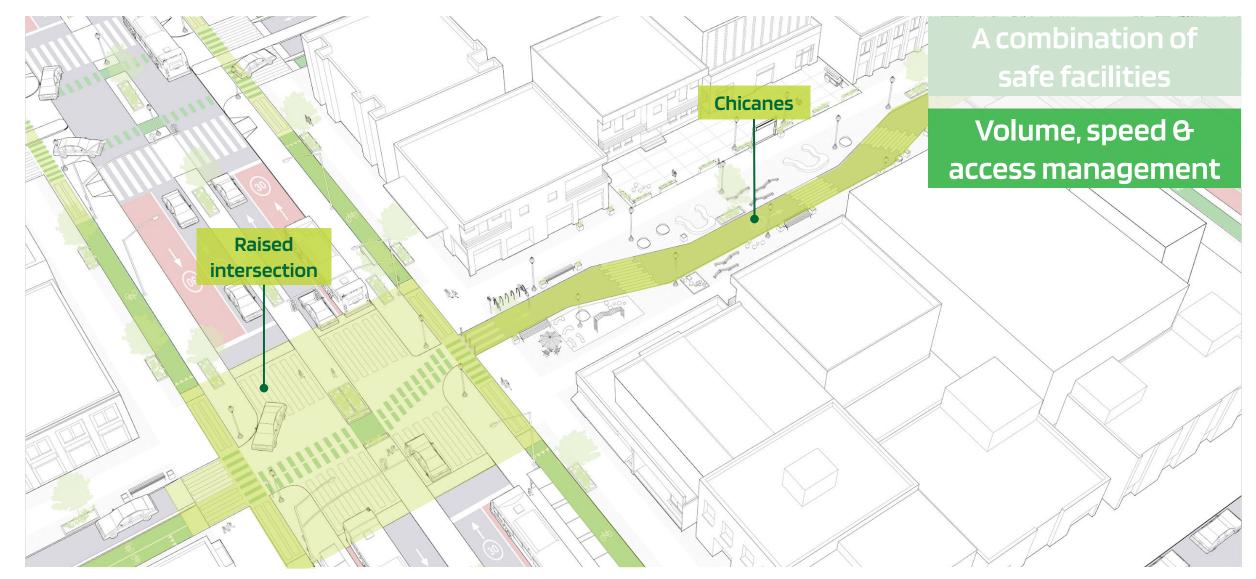




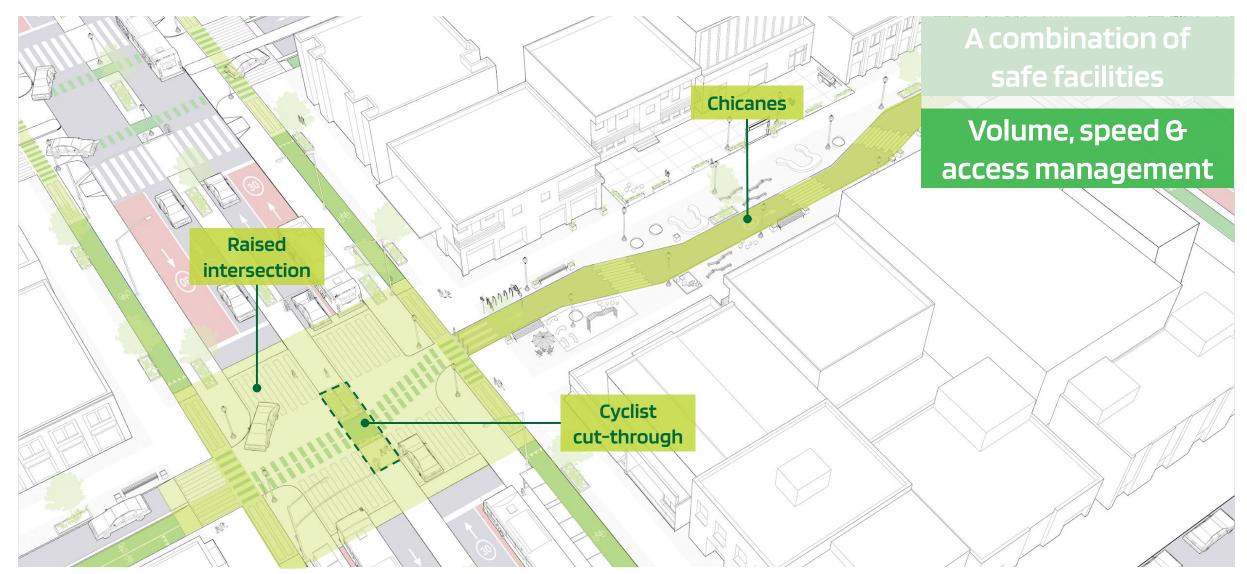




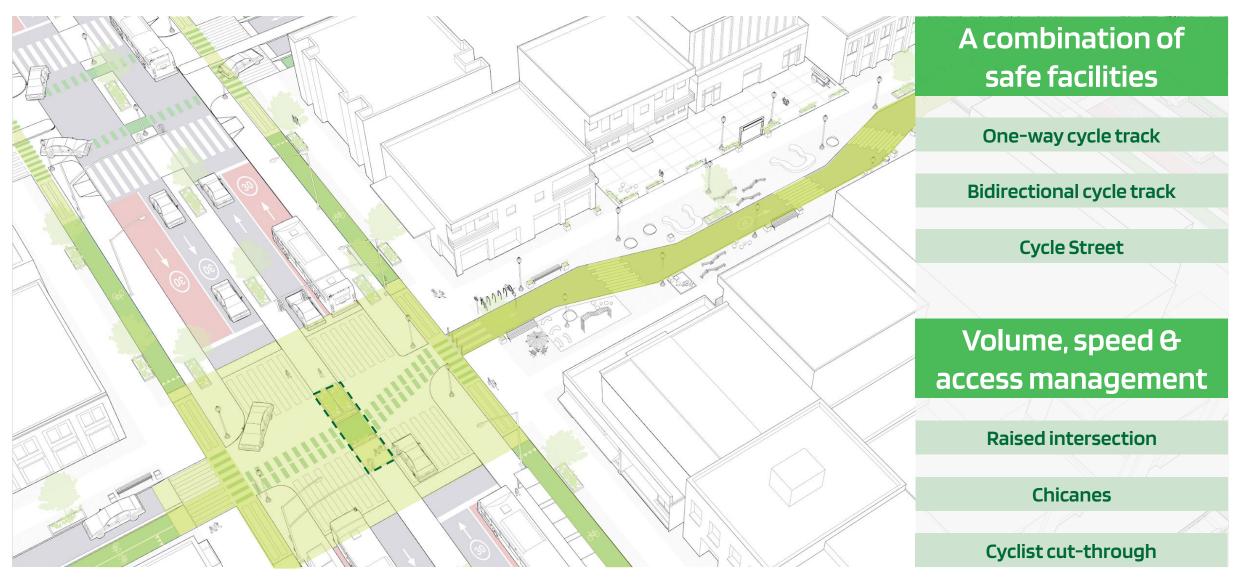
















Cycle streets Ghent, Belgium





Contraflow cycle streets Copenhagen, Denmark





Cyclist cut-through London, UK





Modal filter Bordeaux, France





Modal filter Barcelona, Spain



#### **Shaping the Cycling Network**





#### Shaping the Street Network





Design cities for all ages, abilities, and genders!

# Hands-on exercise Part 1



# It is time for you to redesign the street network of Ljubljana...

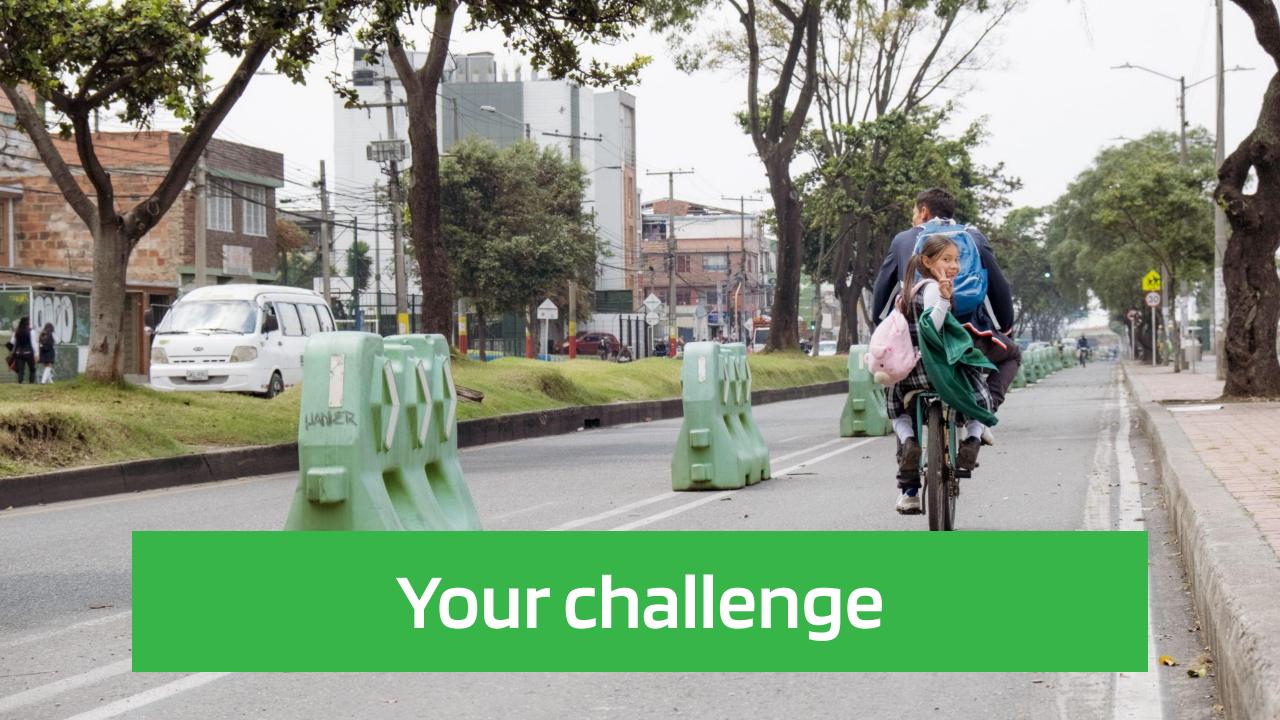


# ...and step into someone else's shoes



#### Today's exercise

- 1. **Team up:** Join one of four groups with up to 15 participants.
- 2. Understand the challenge: Create a safe, inclusive cycling network and intersection that prioritizes your cyclist's needs while benefiting the whole community.
- **3. Analyse the corridor:** Address thow the street is currently used for walking, cycling, access to collective modes of transport and vehicles. Understand street activity and circulation needs.
- 4. Dive In: Use the tools, maps, and materials provided to brainstorm and plan your redesign.
- 5. Work Together: Collaborate as a team, combining perspectives to create a cohesive design. Be sure to assign one person to present your vision.
- **6. Share Your Ideas:** Present your redesigned neighborhood to the entire group, highlighting your decisions and how they address your character's needs.





Your challenge is to design a safe, comfortable, and enjoyable street network to support your cyclist's daily journeys.

Using the tools at your disposal, plan and adapt the neighborhood streets at a network level, considering the street user needs.

Think about how to make this experience safe and fun for their community!





#### **Tools and materials**

#### On your table you will find some tools and maps

- A reference map for the Ljubljana general area
- A neighborhood map for locating challenges and design interventions centered on Miklosiceva street
- Maps that include more information about context, land use, crash spots, volumes, transit and cycling networks, and right-of-way.
- An individual worksheet to analyze Miklosiceva street



## **Exploring the Context**

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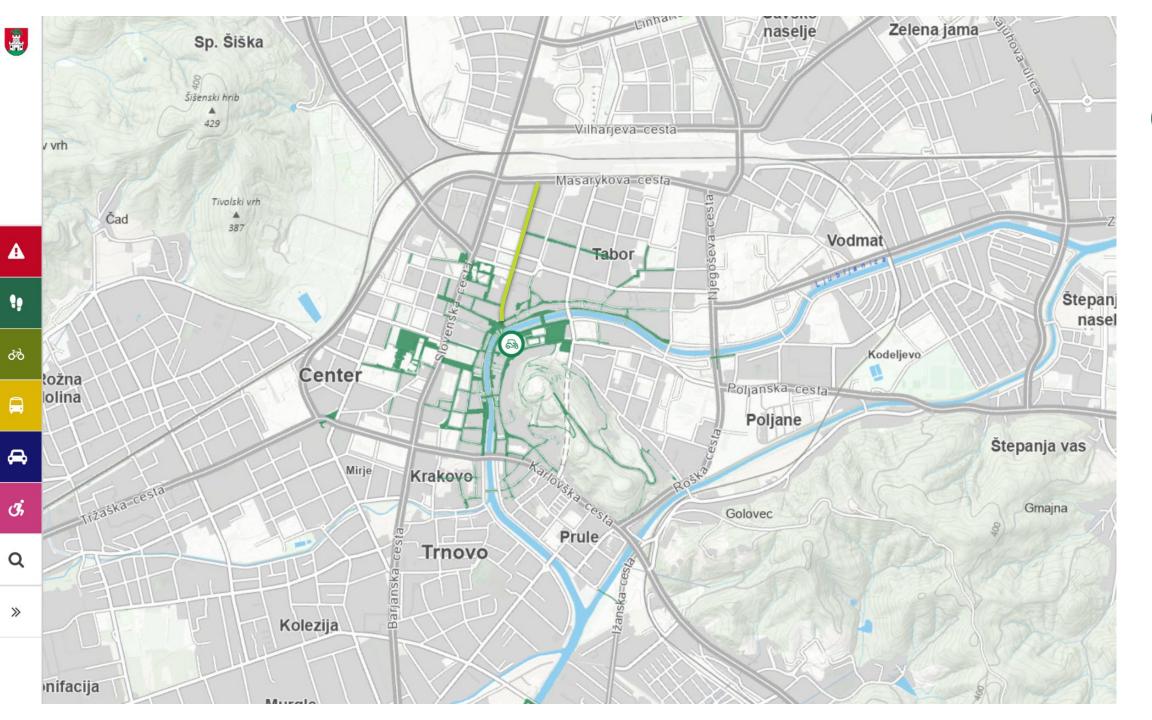
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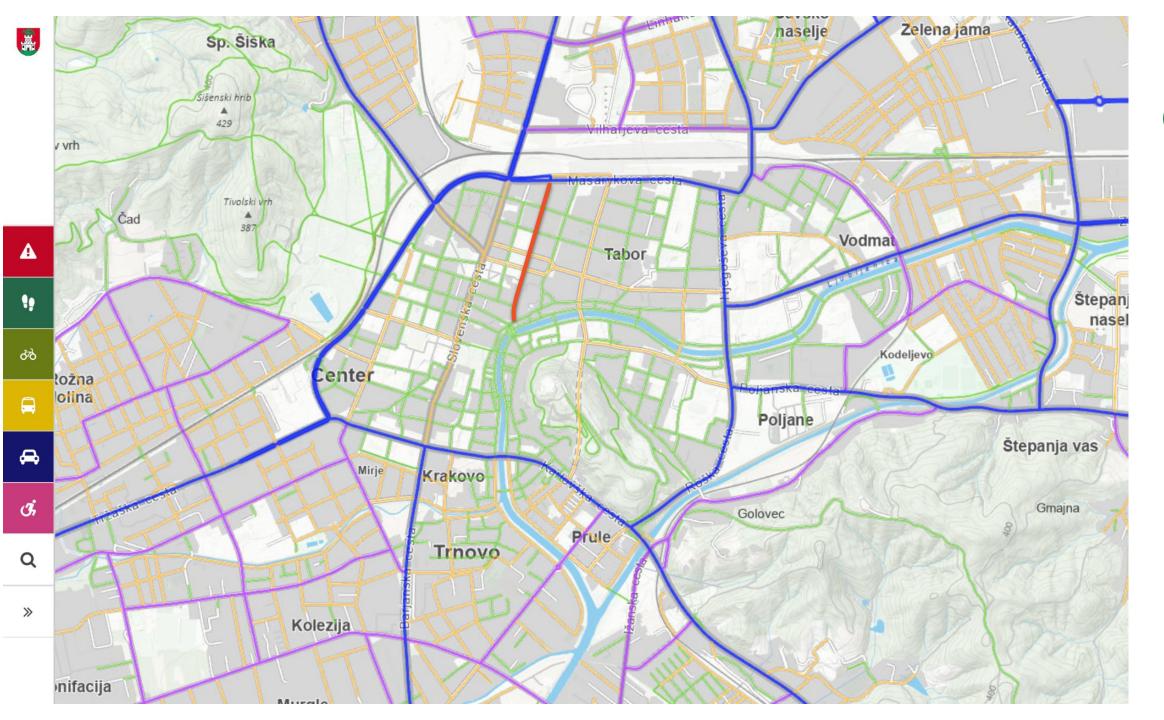






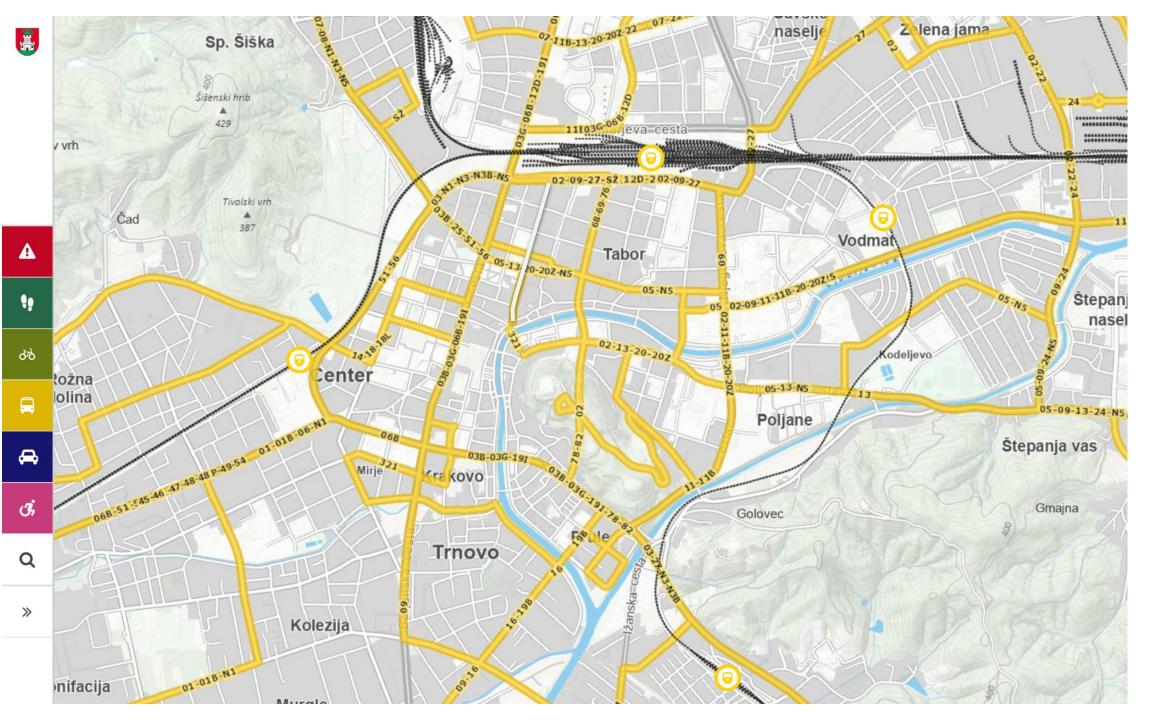






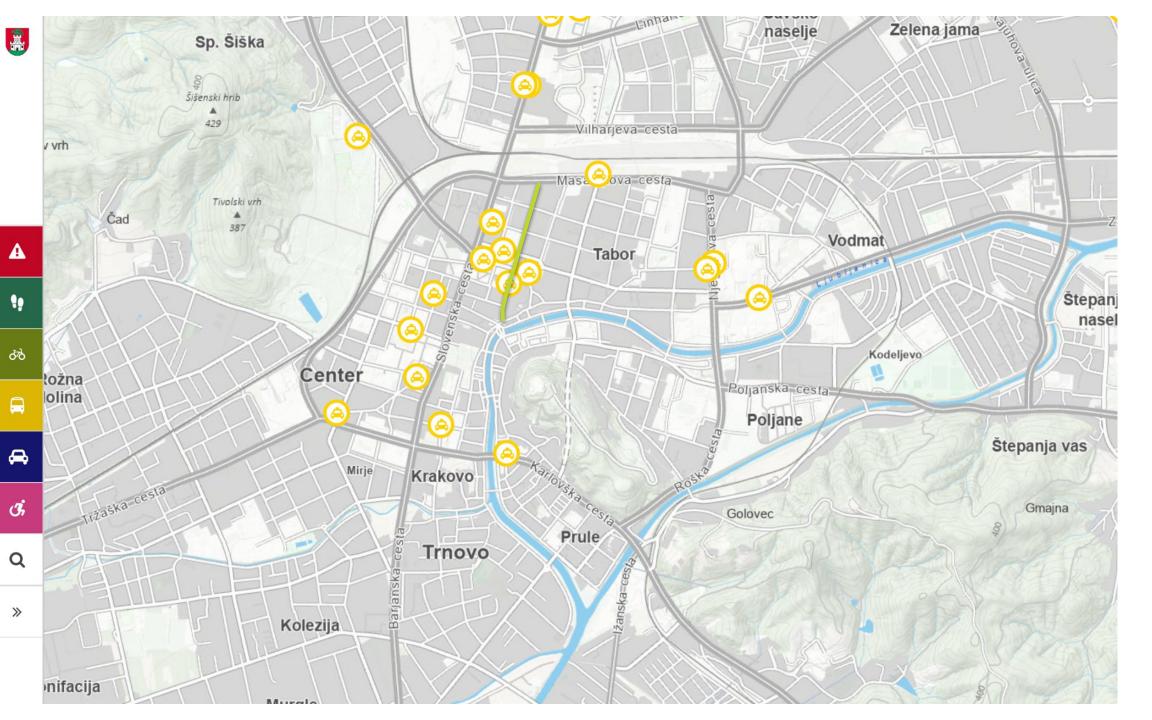






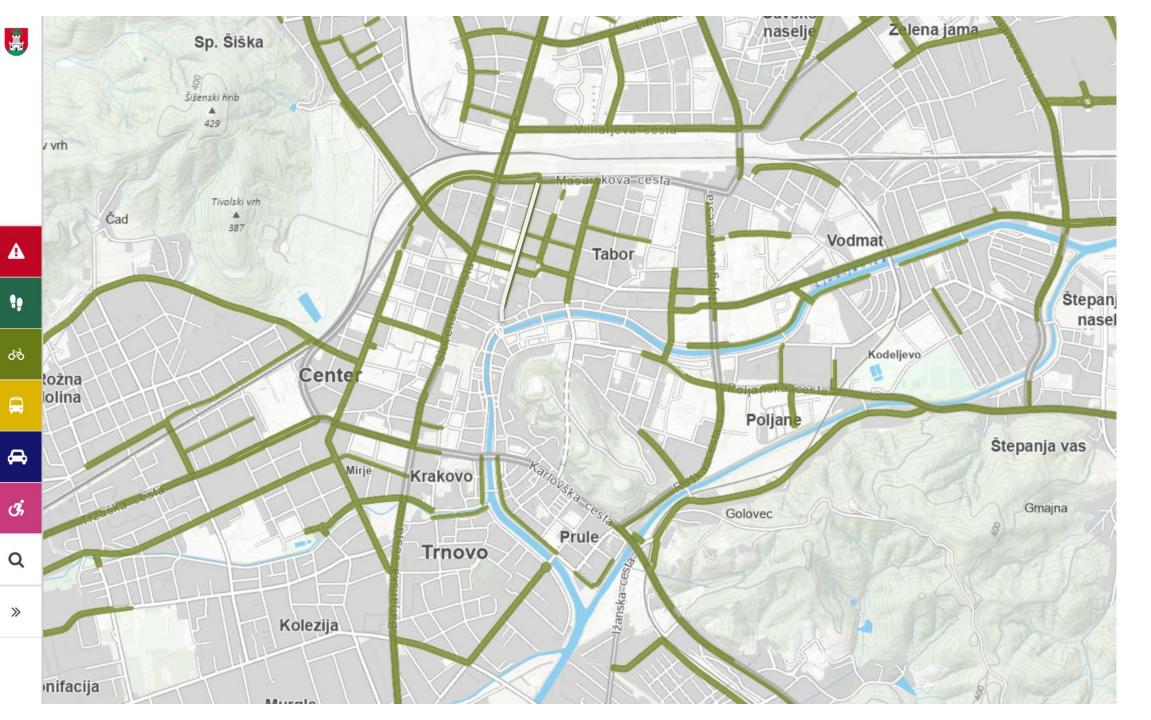






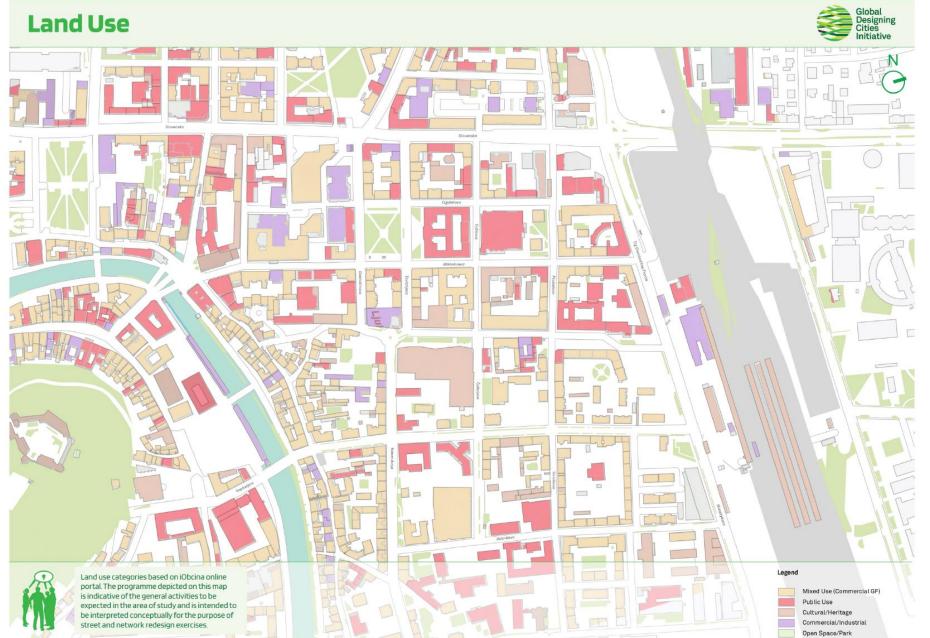


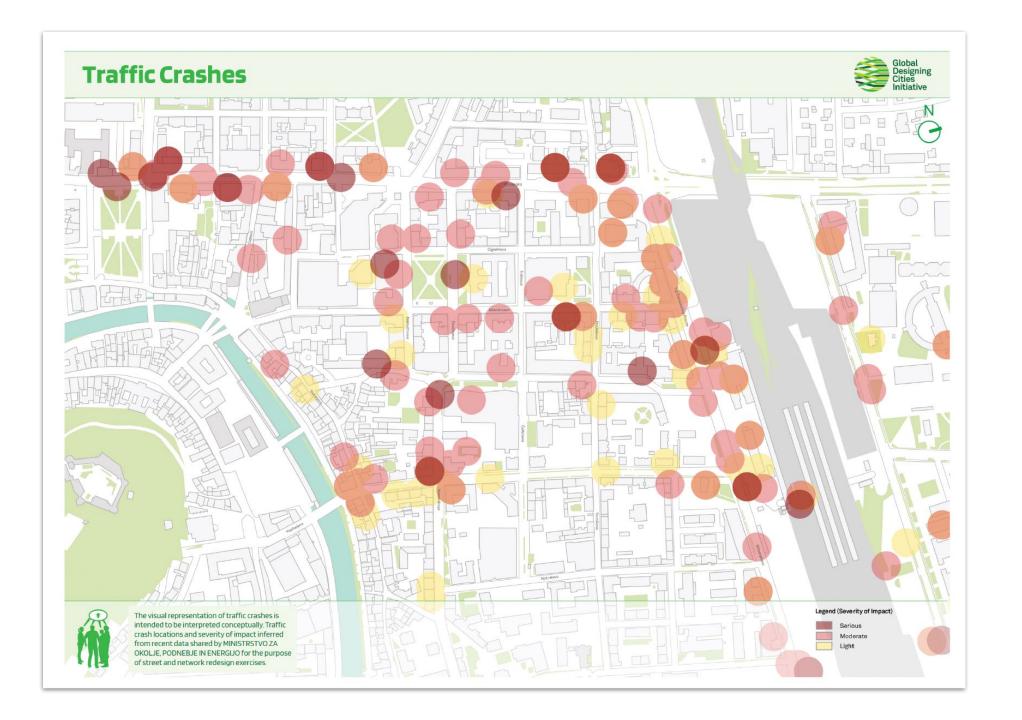




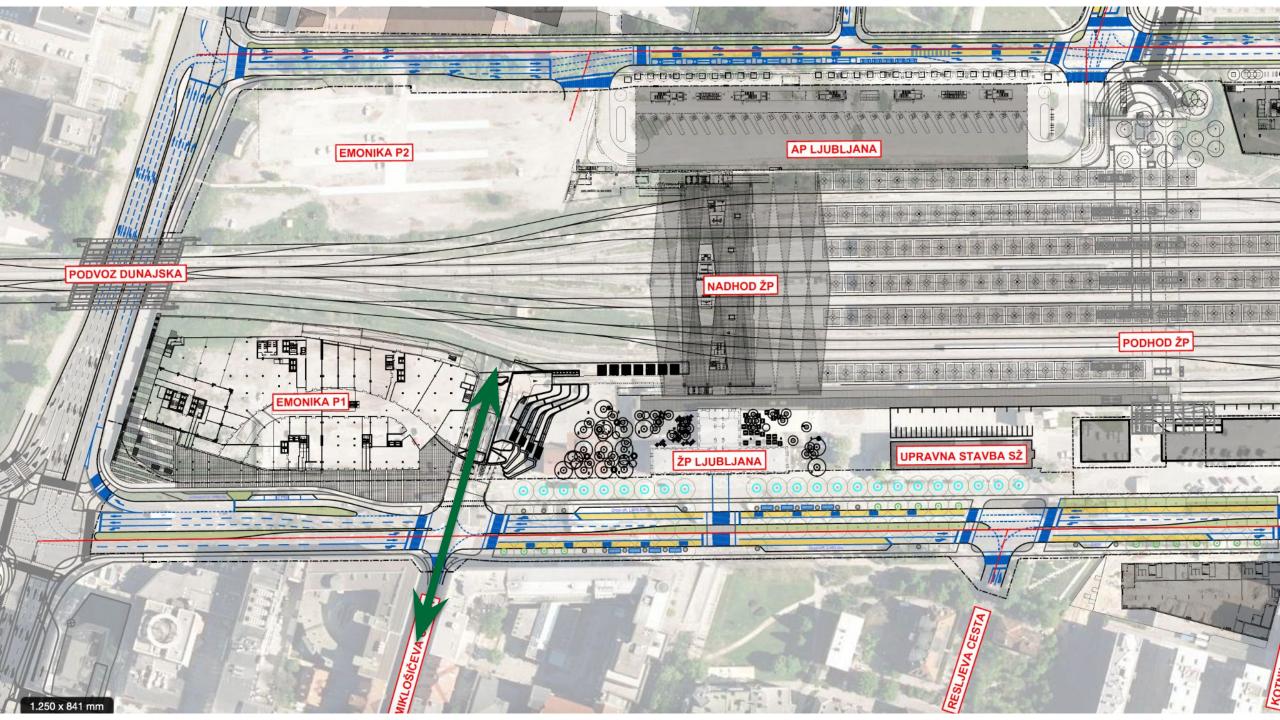








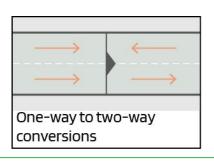


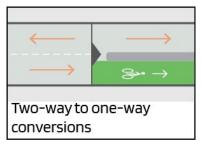


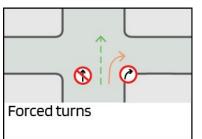


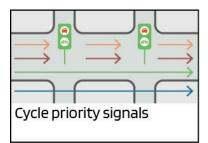


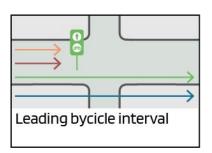
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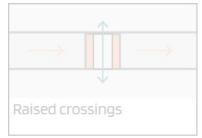


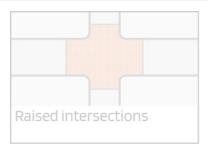


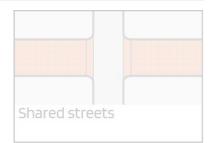
Speed management









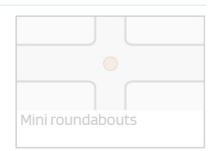


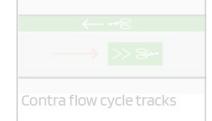




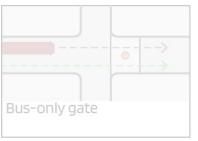








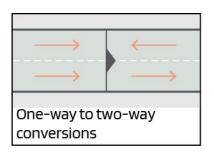


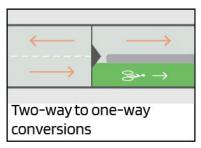


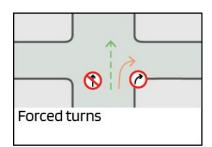
Volume management

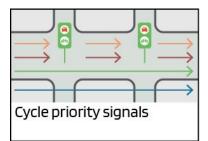


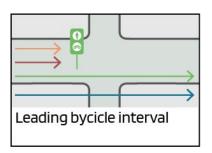
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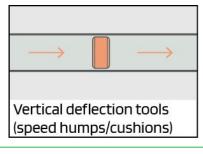


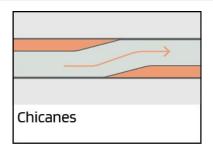


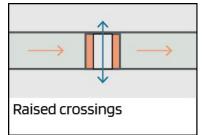


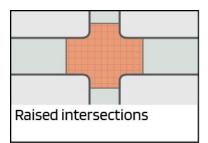


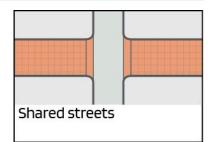
### Speed management









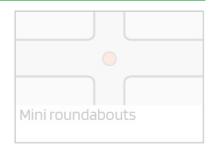














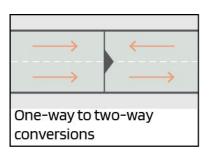


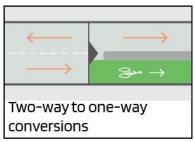


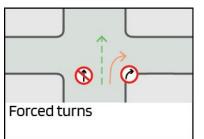
Volume management

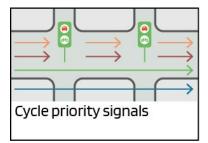


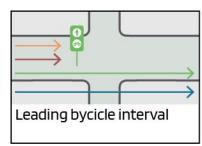
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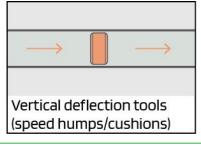


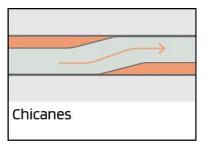


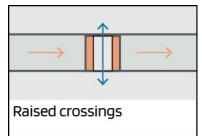


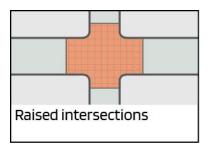


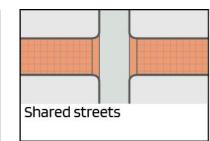
## Speed management

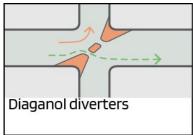


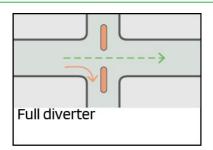


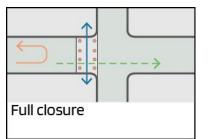


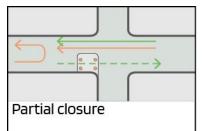




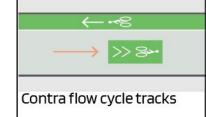


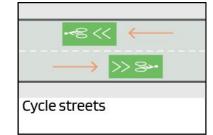


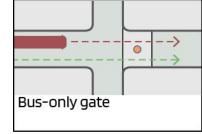










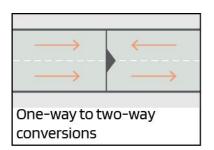


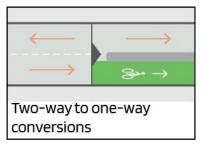
#### Volume management

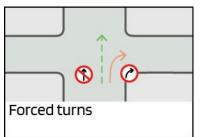
## **Design tools**

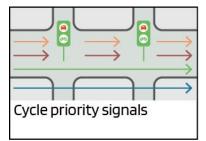


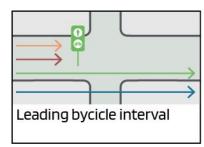
## Access management



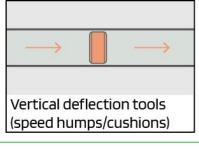


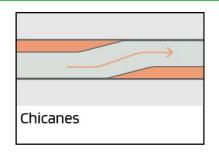


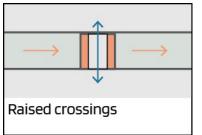


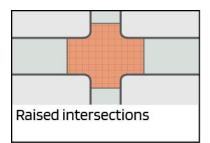


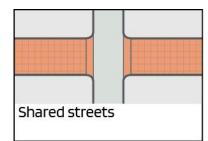
## Speed management

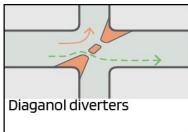


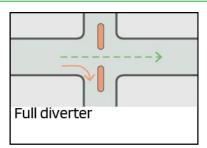


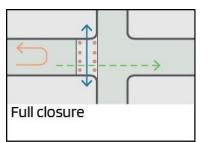


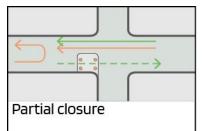




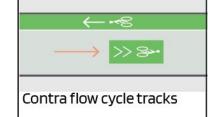


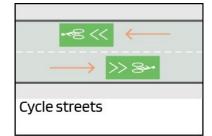


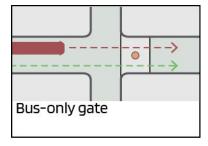












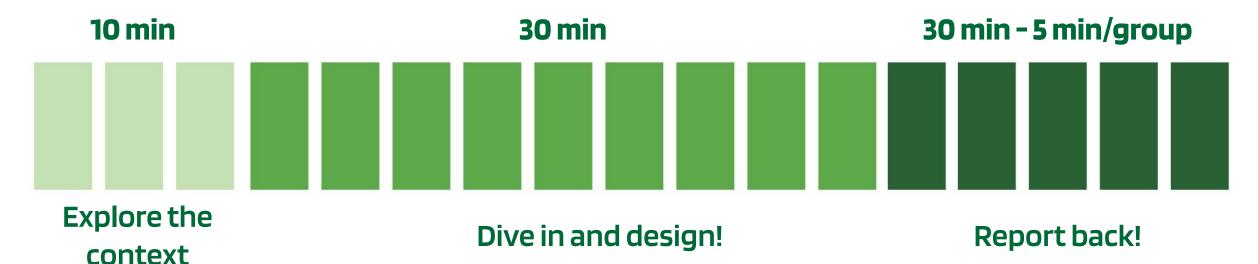
## Volume management







## **Instructions**



- Introduce yourselves
- Learn more about the area, the possible journeys, needs and the challenges they encounter
- Pick a representative

- Your challenge is to design a safe, comfortable, and enjoyable cycling network to support your character's daily journeys.
- Using the tools at your disposal, plan and adapt the neighborhood streets at a network level, considering her needs and those of her siblings.
- Think about how to make this experience safe and fun for all street users!



## Some prompts for today's exercise

- Think Big! Be imaginative!
- No budget restrictions
- Plan for the next 10–20 years
- Vision and strategy
- Phasing
- All ages, abilities, and genders

And remember....





## Report back

- 1. What was the biggest challenge your group faced?
- 2. How did you approach this challenge through the network redesign? What specific strategies or solutions did you implement?
- **3.** What were the main points of contention or areas of debate during the process? How did you navigate or resolve these discussions?



# Design streets for all street users and put people first!

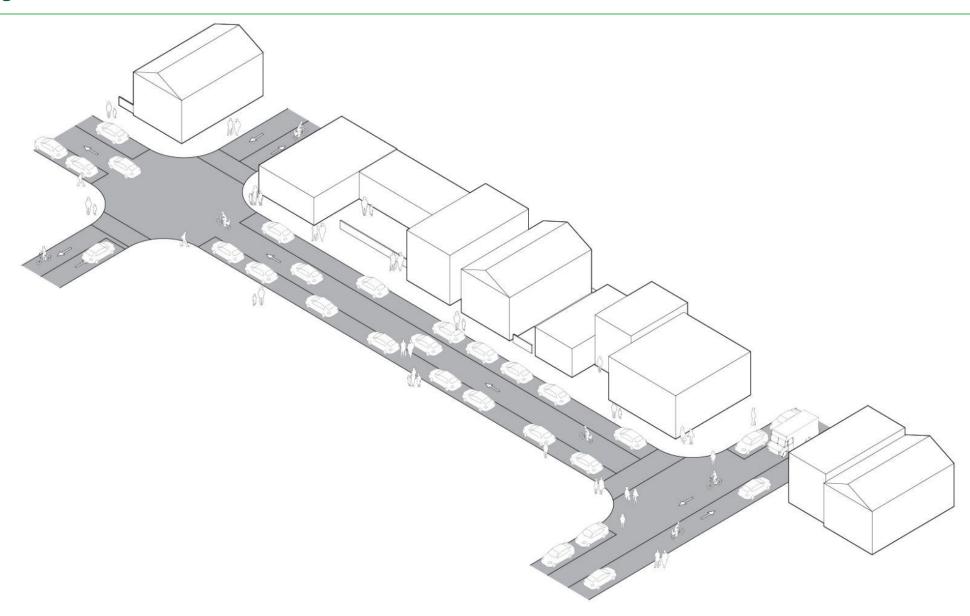
## Hands-on exercise Part 2



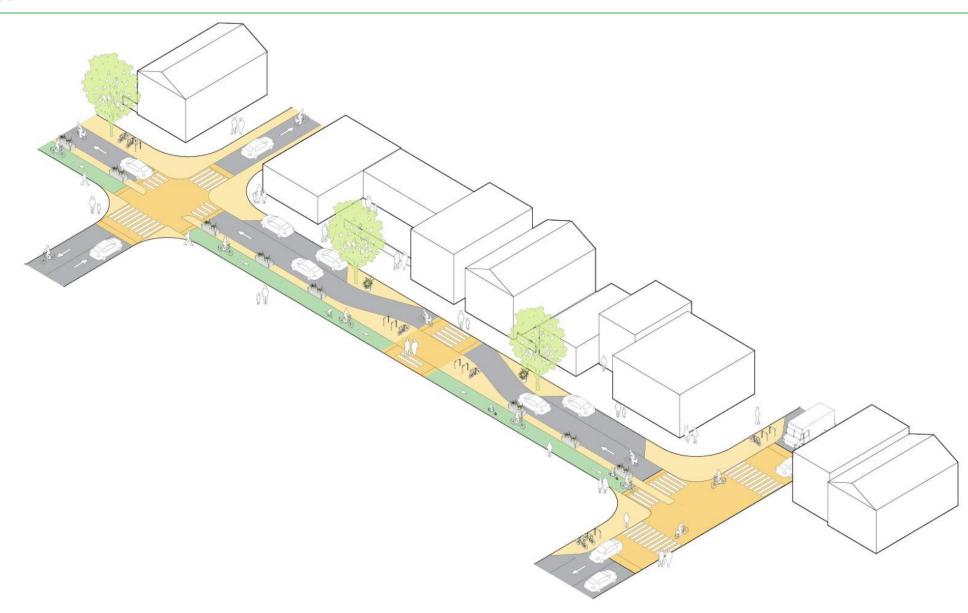


## Now it's your time to transform a street!











## Some prompts for today's exercise

- Think Big!
- No budget restrictions
- Plan for the next 10–20 years
- Vision and strategy
- Phasing
- All ages, abilities, and genders

And remember....

# Design streets for all street users and put people first!



## **Instructions**

- Split into groups 10 people at each table
- At your table there will be:
  - Tracing paper and pens
  - Maps context maps, land use, network maps
- Pick a person, to report back
- Analyse the corridor by yourself following the given prompts
- Work in your group to redesign the street!
- Report back (5 minutes per group)





## **Corridor Analysis**



### 1. Pedestrians

Where are pedestrians lacking circulation space?
Where are the people gathering, sitting and talking?
What activities are they engaged in?
Which building uses spill over to the street?
Which public spaces attract people and which do not?
Where do people actually cross the streets?

## 2. Cyclists and Transit

What are the cyclist movements?
Where do cyclists prefer to park?
What are the transit or collective modes' routes?
Where are the bus, taxi stops?
What other modes of collective transport use the corridor?

### 3. Motor Vehicles

Which vehicle turns are more frequent?
Which vehicle turns happen rarely?
Are there changes to the vehicle circulation along the corridor?
What could the traffic volumes look like at each section of the corridor?
Which movements are more frequent (higher volumes)?
Where does informal parking happen?





Understand the function, analyze the movements, and identify the opportunities before redesigning the corridor.



## **Materials**

- Corridor Base Map
- Context Maps
- Workshop tools:
  - Markers
  - Tracing paper
  - Rulers
- Workshop Tools Handbook





## **Instructions**



- Introduce yourselves
- Analyse the corridor following the given prompts
- Pick a representative
- Your task is to redesign a corridor into safe, comfortable, and welcoming for users of all ages, abilities, and genders.
- Use the tools and methods discussed today to plan and adapt a section of Miklošičeva Street.



## **Put People First!**









## Thank you!

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