Global Designing Cities Initiative,
NACTO Designing Cities Conference, Austin, October 2015

Global Street Design Guide // Preview

Skye Duncan
skye@nacto.org
@GlobalStreets

Bloomberg Philanthropies

September 2014 announced:
2015-2019

$125 Million to Global Road Safety


1.25 million
traffic fatalities
annually

Global Leading Causes of Death

Today Rank	Disease/Injury
1	Heart Disease
2	Stroke
3	Respiratory Infection
4	Pulmonary Disease
5	Diarrhoeal Disease
6	HIV/AIDS
7	Throat/Lung Cancer
8	Diabetes
9	**Traffic Injuries**
10	Hypertension

2030 Rank	Disease/Injury
1	Heart Disease
2	Stroke
3	Pulmonary Disease
4	Respiratory Infection
5	Diabetes
6	Throat/Lung Cancer
7	**Traffic Injuries**
8	HIV/AIDS
9	Diarrhoeal Disease
10	Hypertension

Source: WHO Global Road Safety Report


TATA
TATA


TEMPLE
Artisans Angkor


JATAHY
1264
HXV-6864
FORTALEZA-CE
33
1267
OCR-3621
JESUS
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CENTRO DE EDUCAÇÃO INFANTIL
Menino Maluquinho
CASA N°52 A
TEMOS
MINI PIZZA
QUENTE
VARIADOS
VITAMINAS
HAMBUGUER
PASTEL
BOLOS


VEROR

Auckland, New Zealand

Prague, Czech Republic

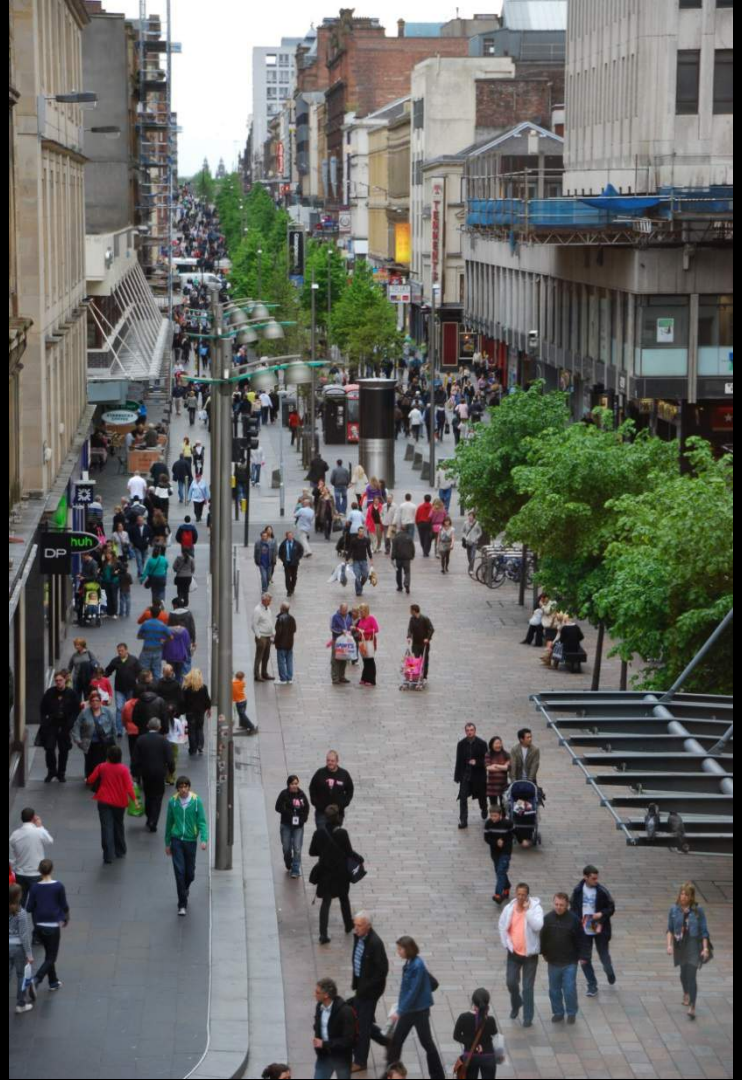

Sydney, Australia

Amsterdam, Netherlands

London, United Kingdom

Buenos Aires, Argentina

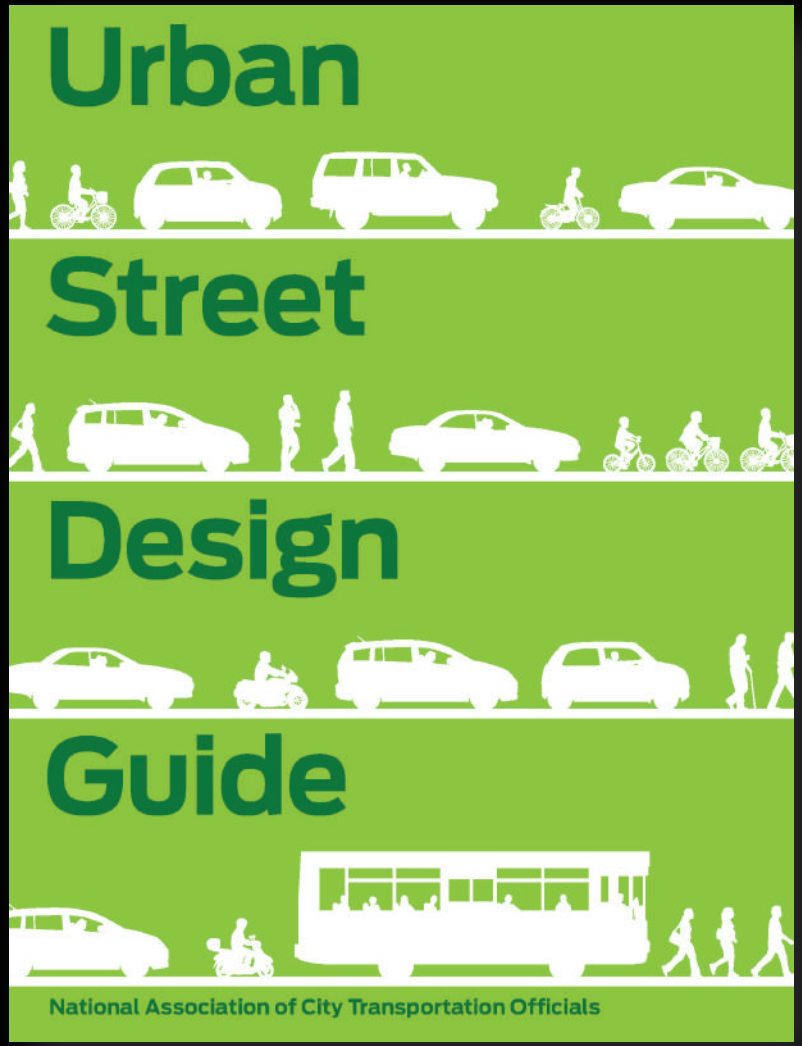

Mexico City, Mexico

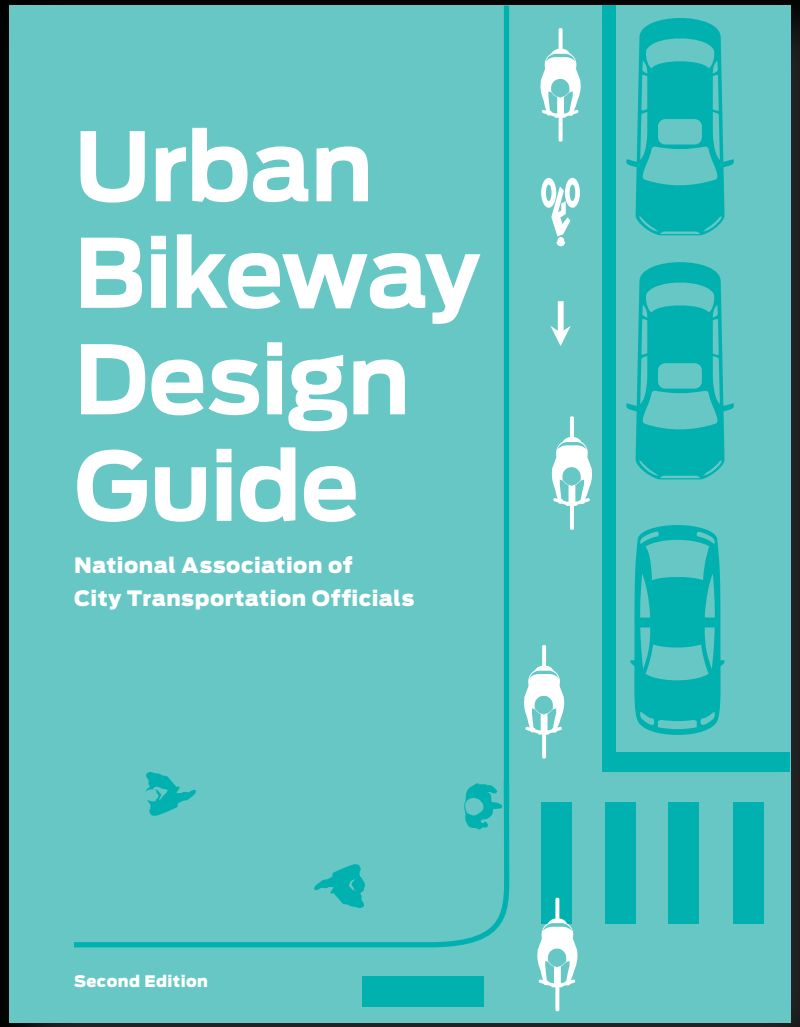


Glasgow, Scotland

Barcelona, Spain

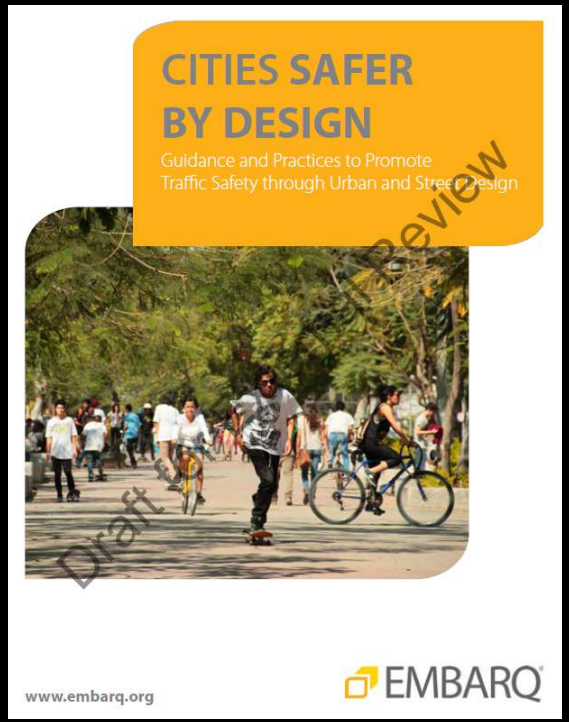
Prishtina, Kosovo


Urban
Street
Design
Guide
National Association of City Transportation Officials


Urban
Bikeway
Design
Guide
National Association of
City Transportation Officials
Second Edition

Global Street Design Guide

Global Designing Cities Initiative


CITIES SAFER BY DESIGN
Guidance and Practices to Promote Traffic Safety through Urban and Street Design
Draft - For Review
www.embarq.org
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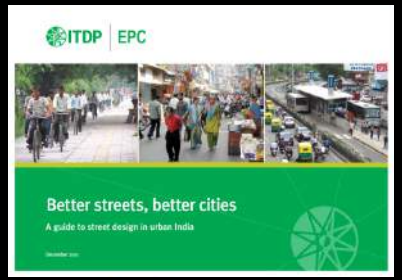
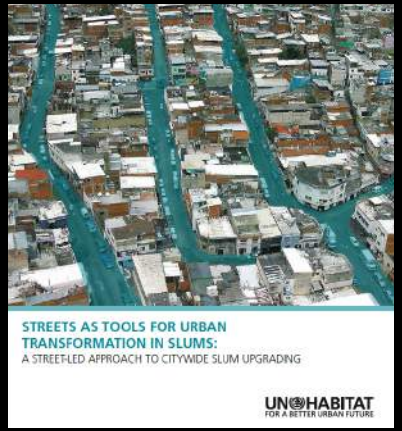
World Health Organization
GLOBAL STATUS REPORT ON ROAD SAFETY 2013
SUPPORTING A DECADE OF ACTION

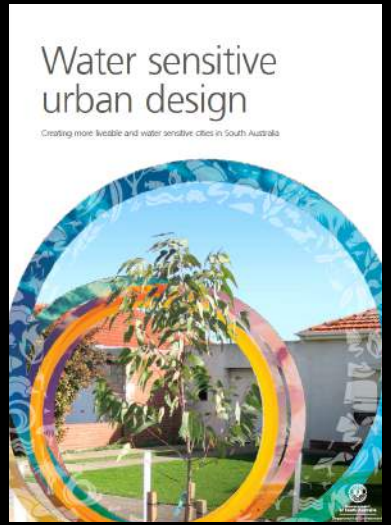

ITDP | EPC
Better streets, better cities
A guide to street design in urban India

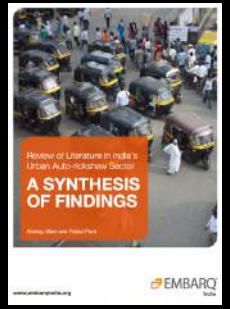

CITY OF JOHANNESBURG COMPLETE STREETS DESIGN GUIDELINE
Complete Streets


The vision and direction for London's streets and roads
Roads Task Force
Executive summary


STREETS AS TOOLS FOR URBAN TRANSFORMATION IN SLUMS:
A STREET-LED APPROACH TO CITYWIDE SLUM UPGRADING
UN-HABITAT
FOR A BETTER URBAN FUTURE


Transport for London
Improving walkability
Good practice guidance on improving pedestrian conditions as part of development opportunities
September 2005


Water sensitive urban design
Creating more liveable and water sensitive cities in South Australia


Review of Literature in India's Urban Auto-Rickshaw Sector
A SYNTHESIS OF FINDINGS
EMBARQ


Abu Dhabi Urban Street Design Manual

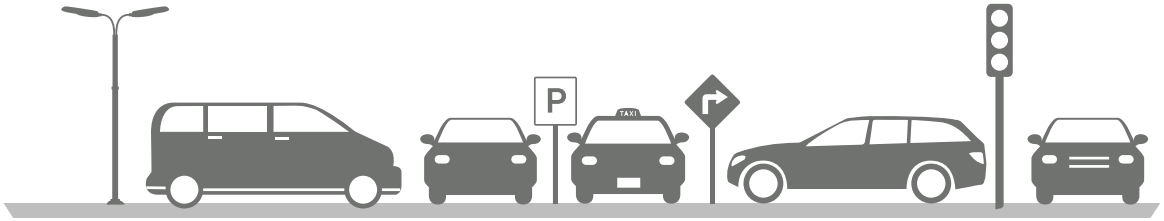

Reclaiming city streets for people
Chaos or quality of life?

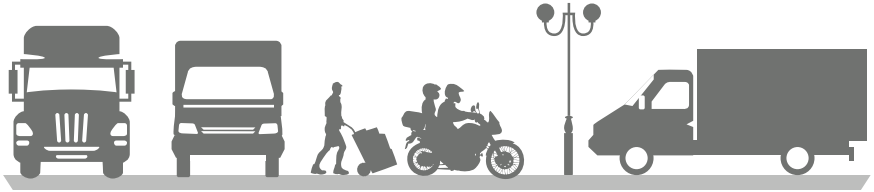

Bus Rapid Transit
Planning Guide
June 2007

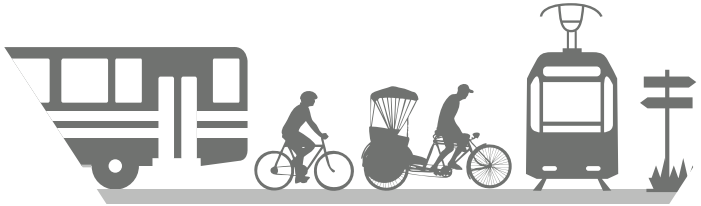
Inspire Leaders

Inform Engineers, Planners and Designers

Empower Communities


P
TAXI



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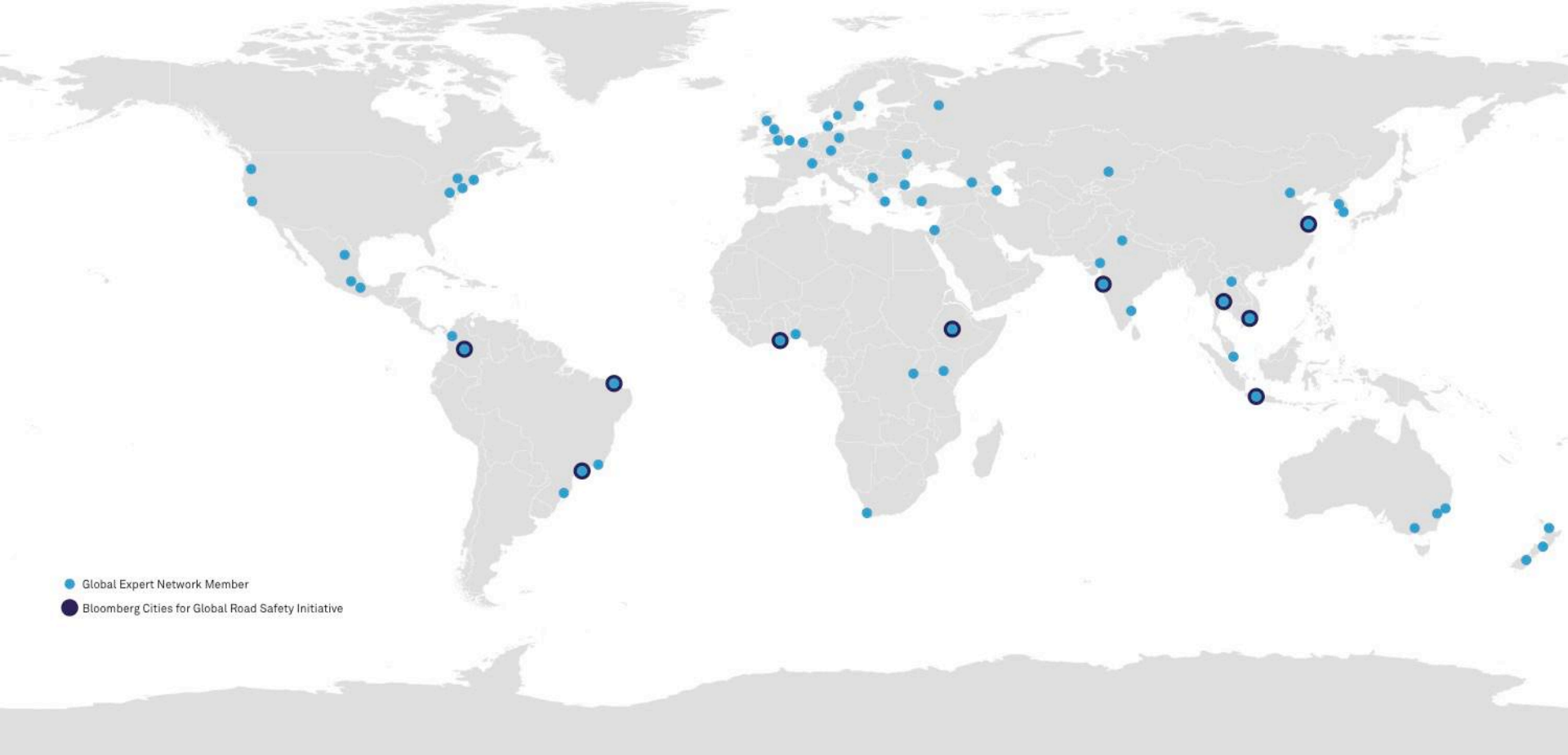
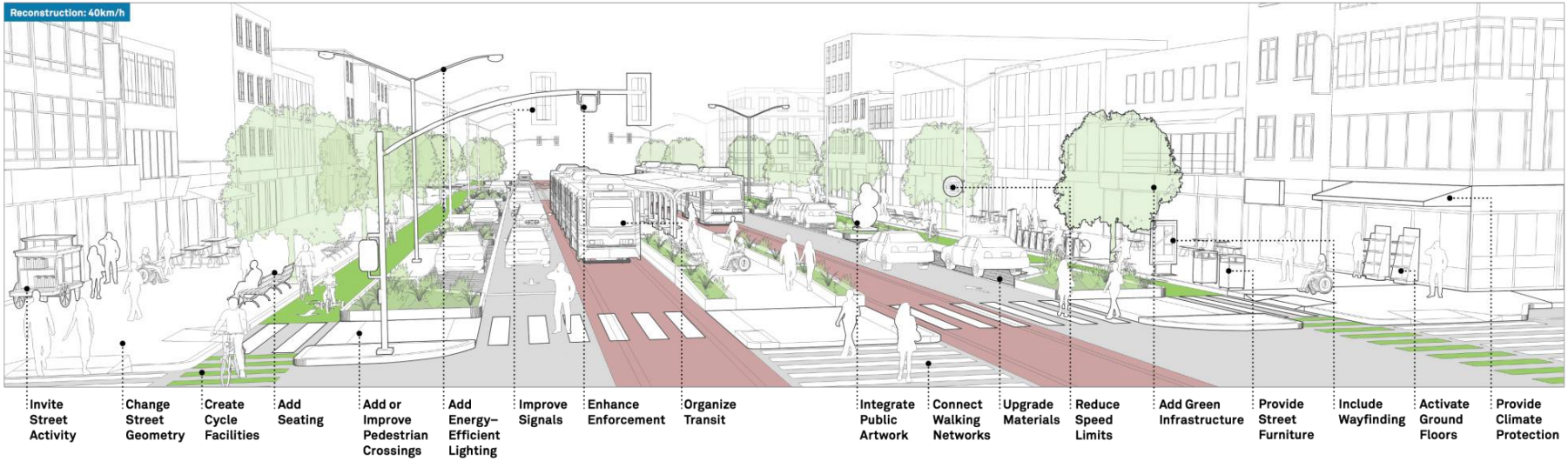
Global Expert Network

70 cities from 40 counties



What Is Possible



A New Approach to Street Design

Users | **Context**

↓

Street Design

↓

Desired Outcomes

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

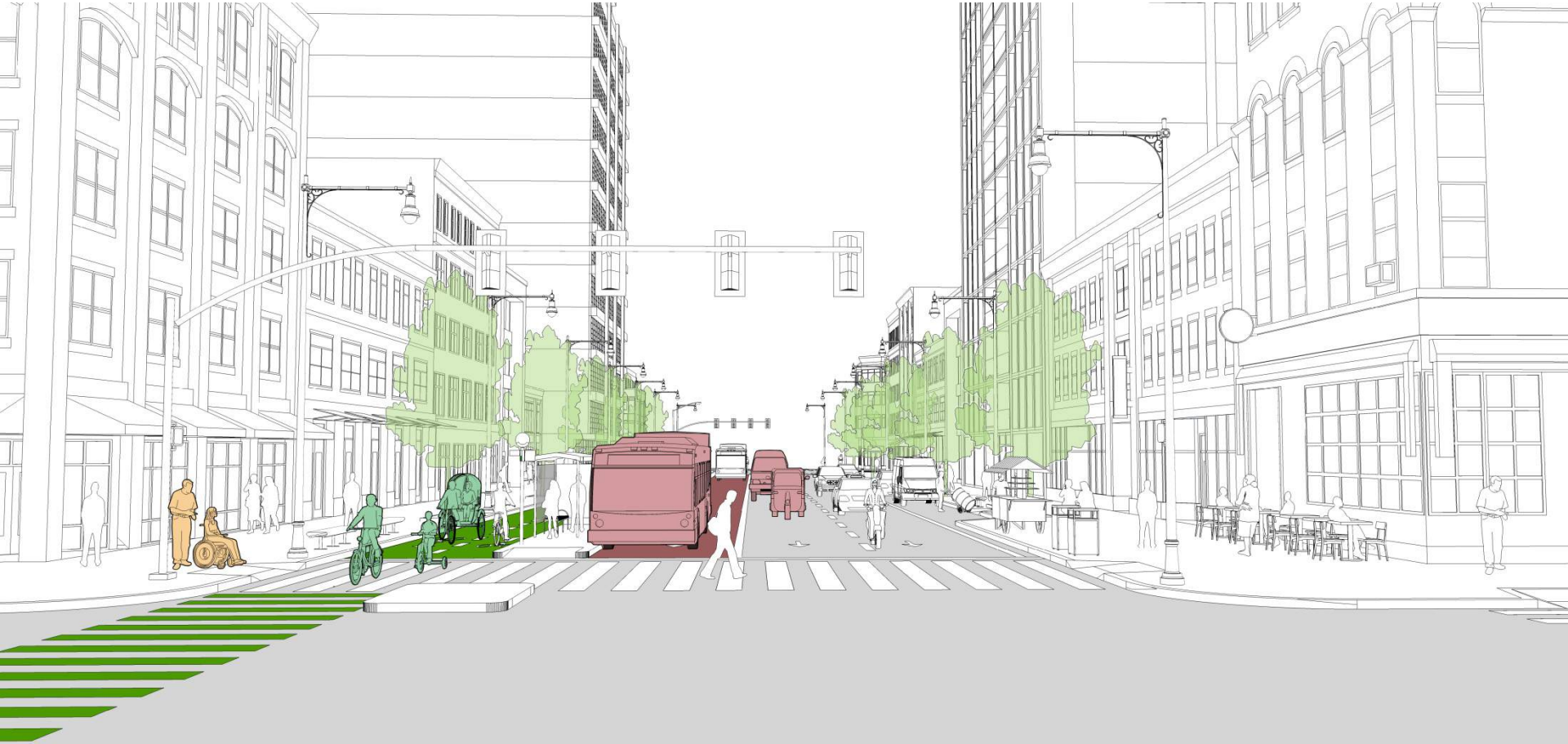
USERS

Streets Users

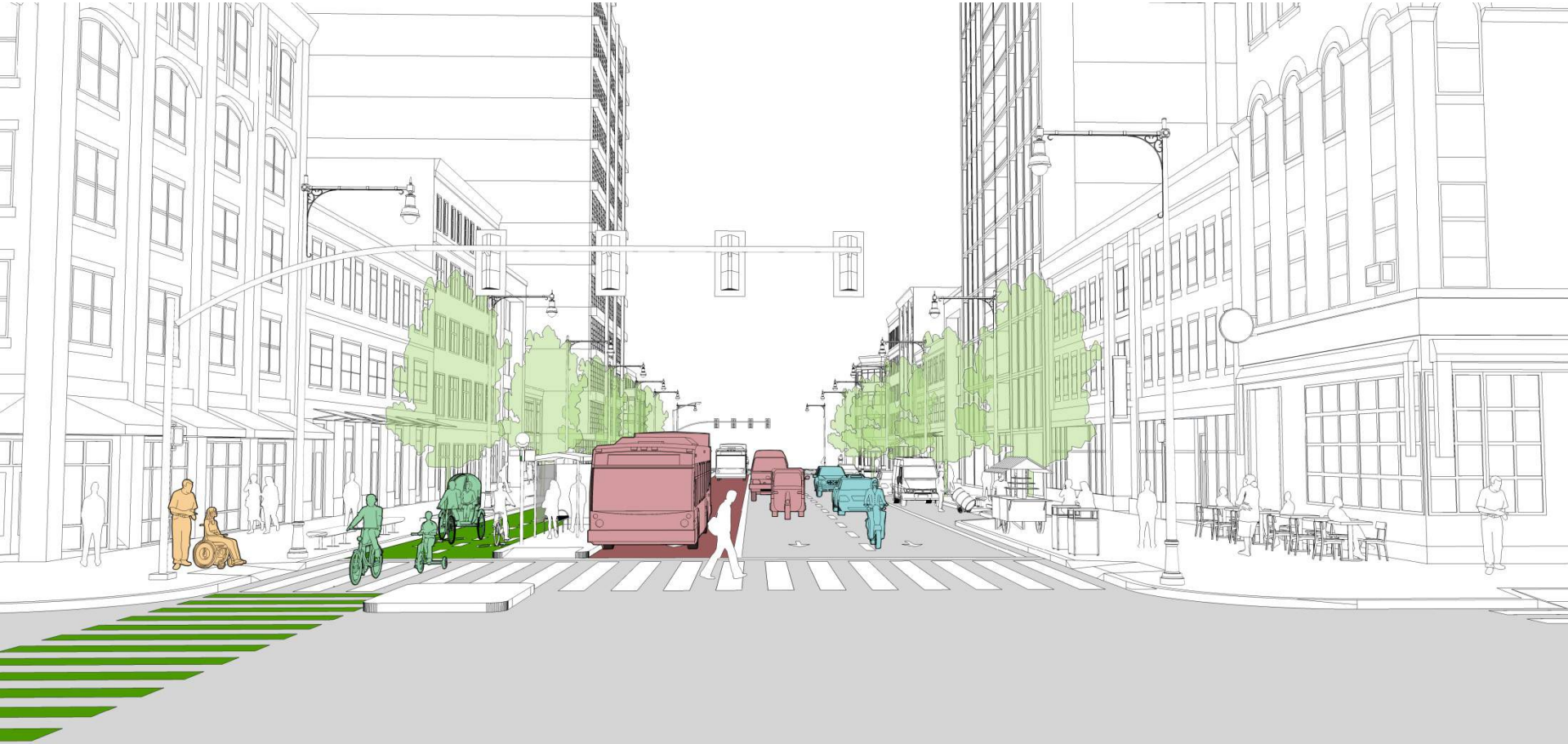
Streets Users - Pedestrians

Streets Users - Cyclists

Streets Users – Collective Transport

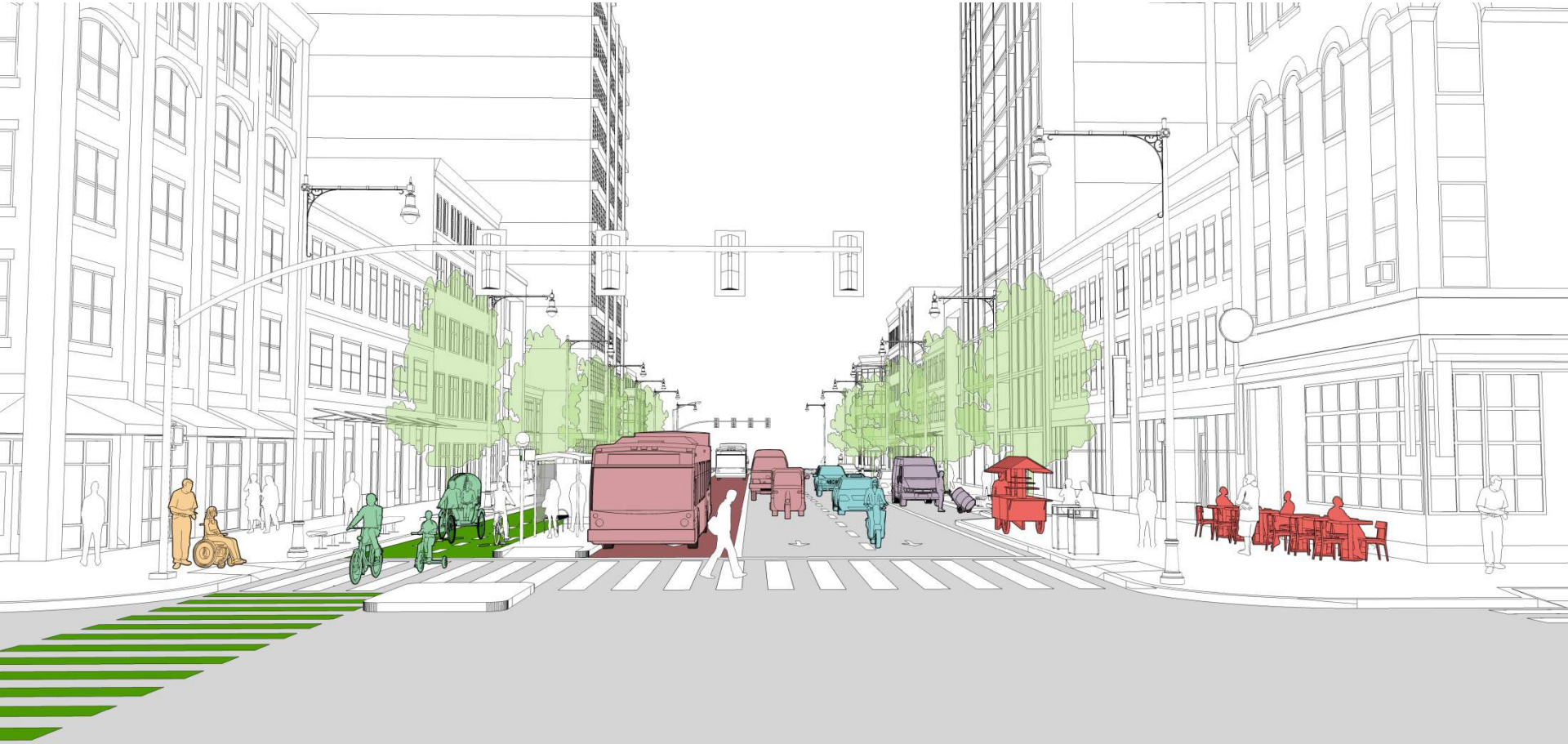


Streets Users – Personal Motor Vehicles



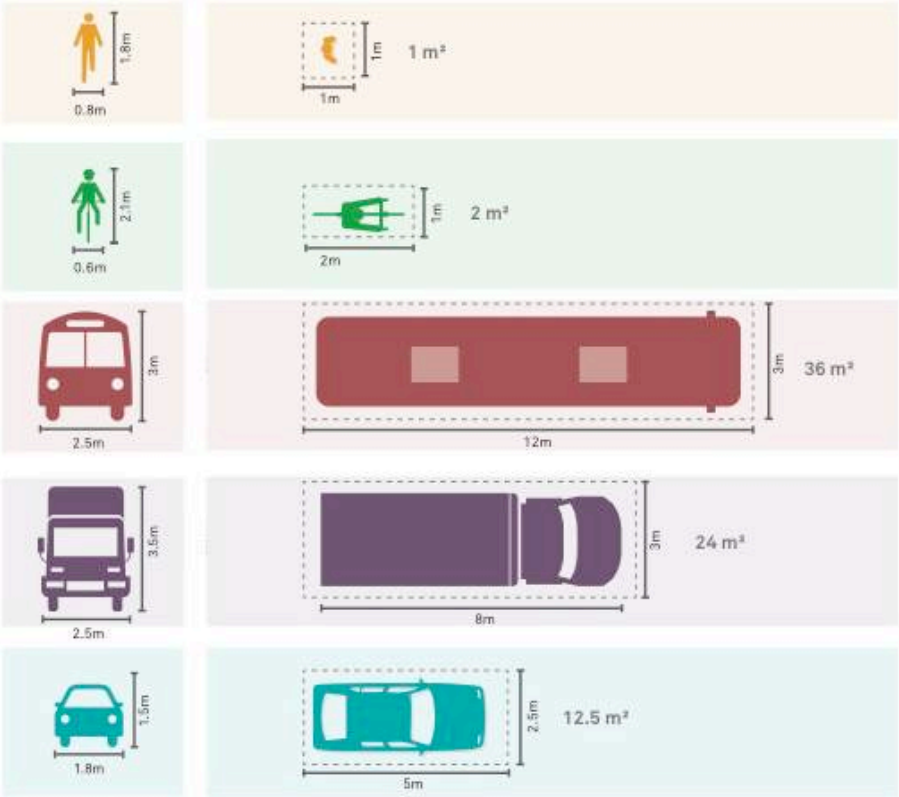
Streets Users – Moving Goods & City Services

Streets Users - Business

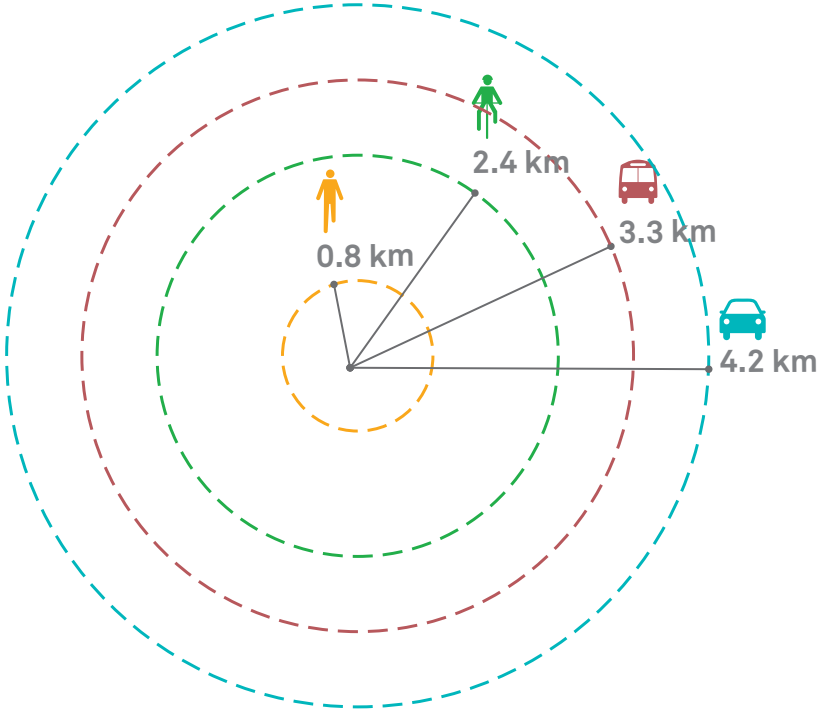


Streets Users – User Comparison

Relative Scale

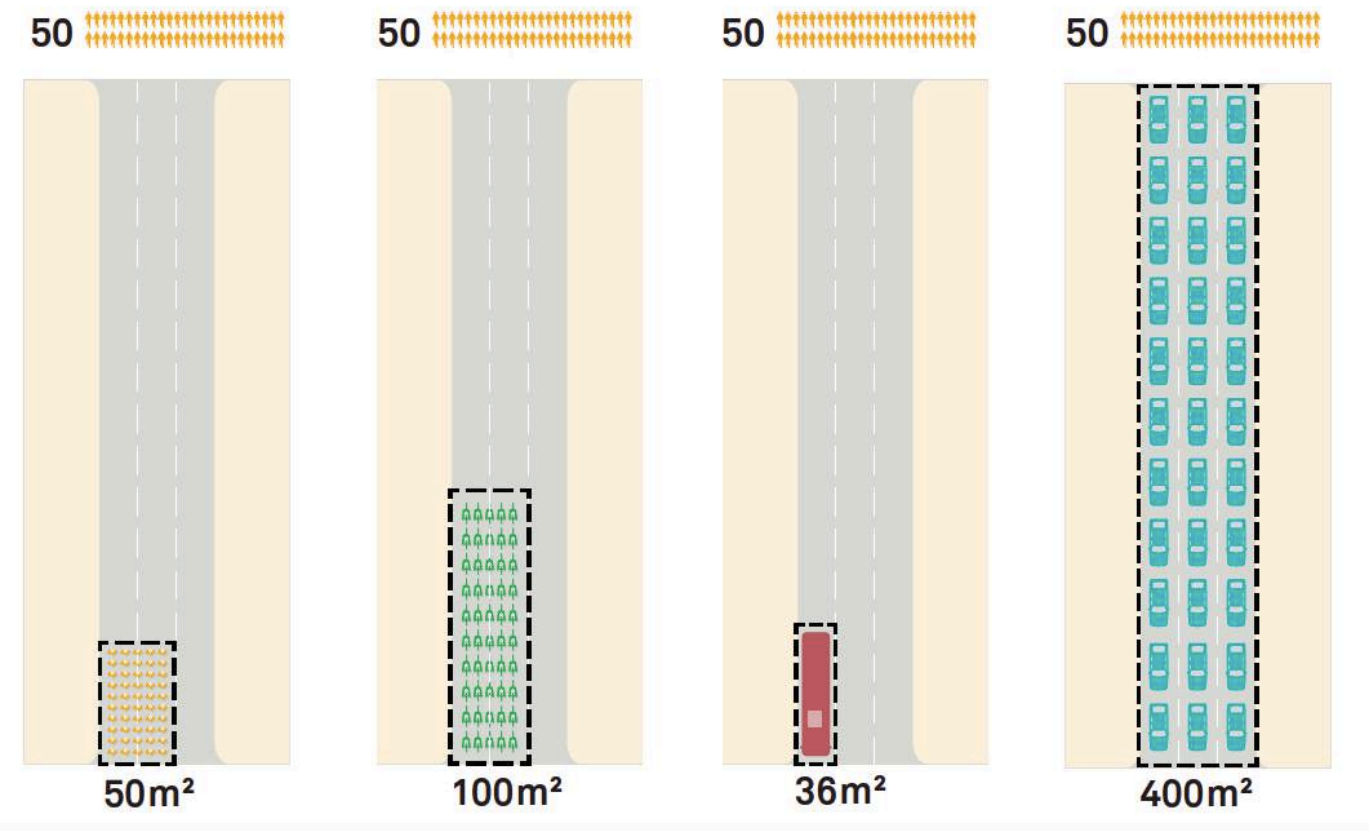


Average Distances / 10 mins



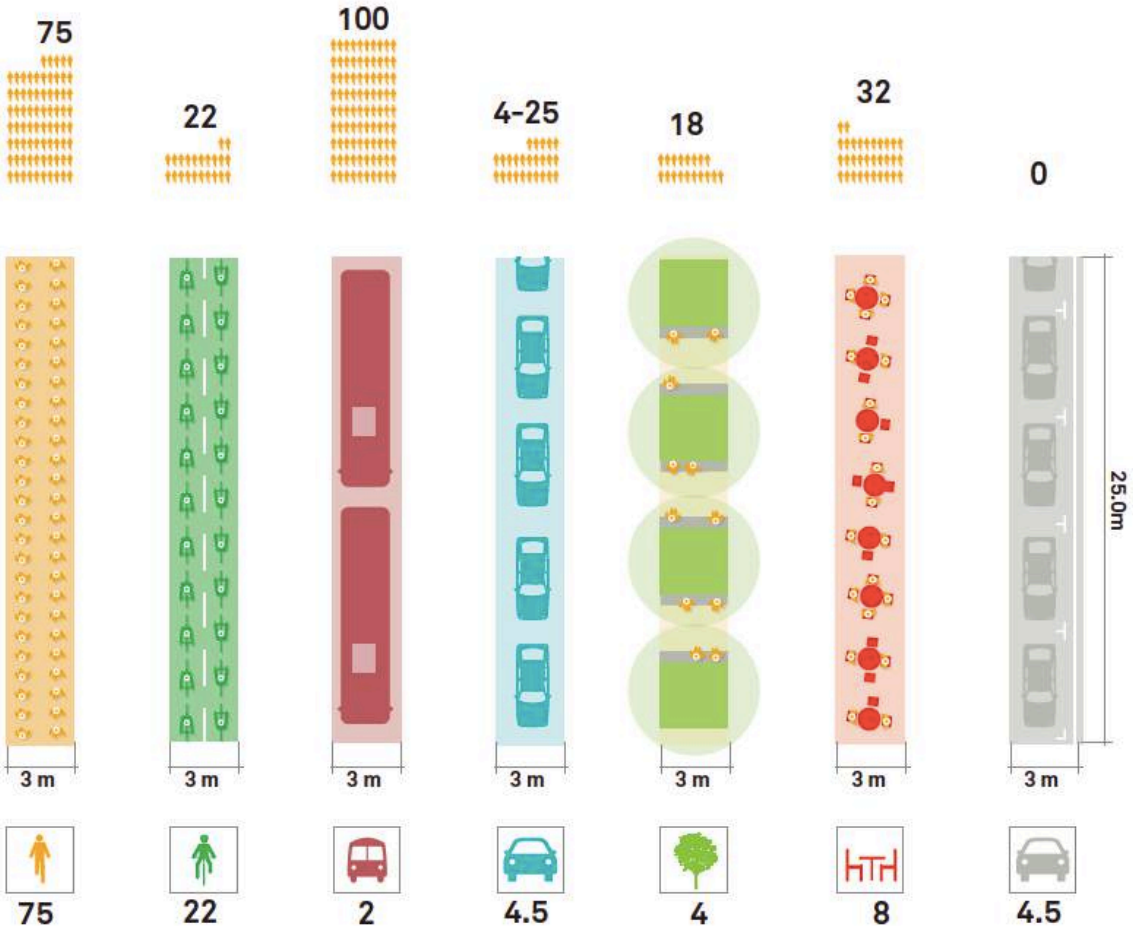
Streets Users – User Comparison

Space to move 50 people



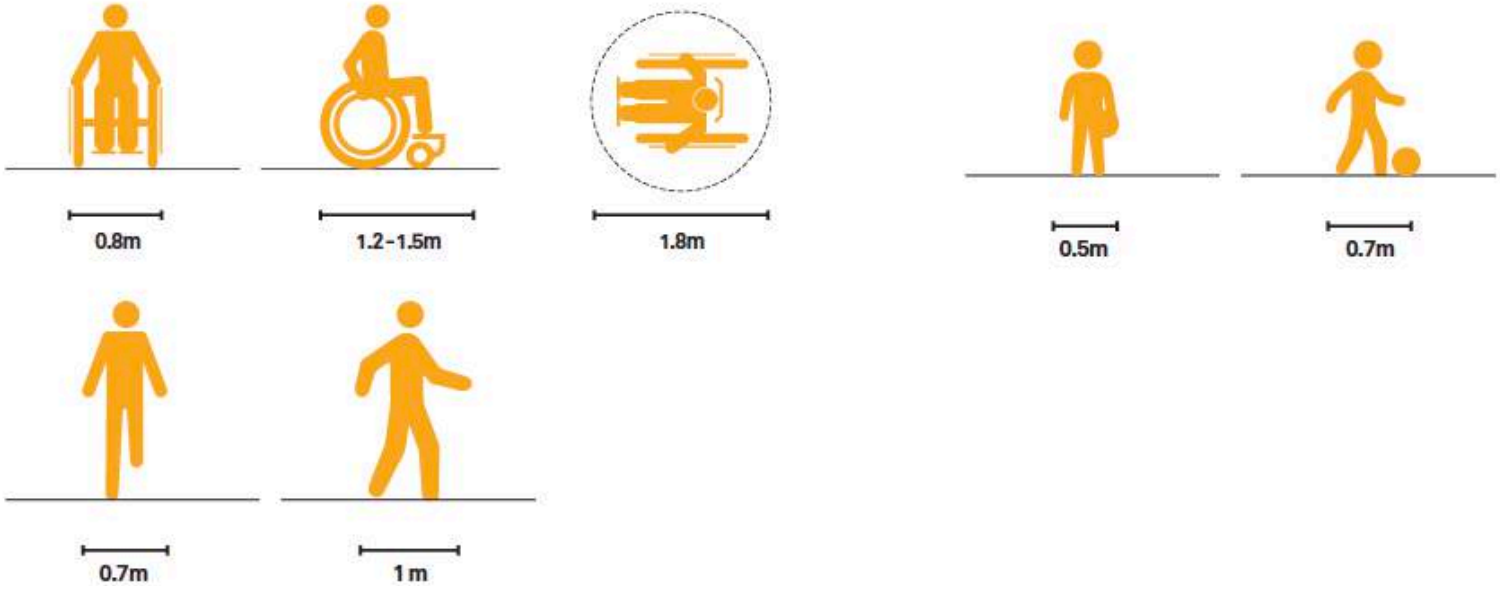
Streets Users – User Comparison

How many people can fit in the same area?



Pedestrians

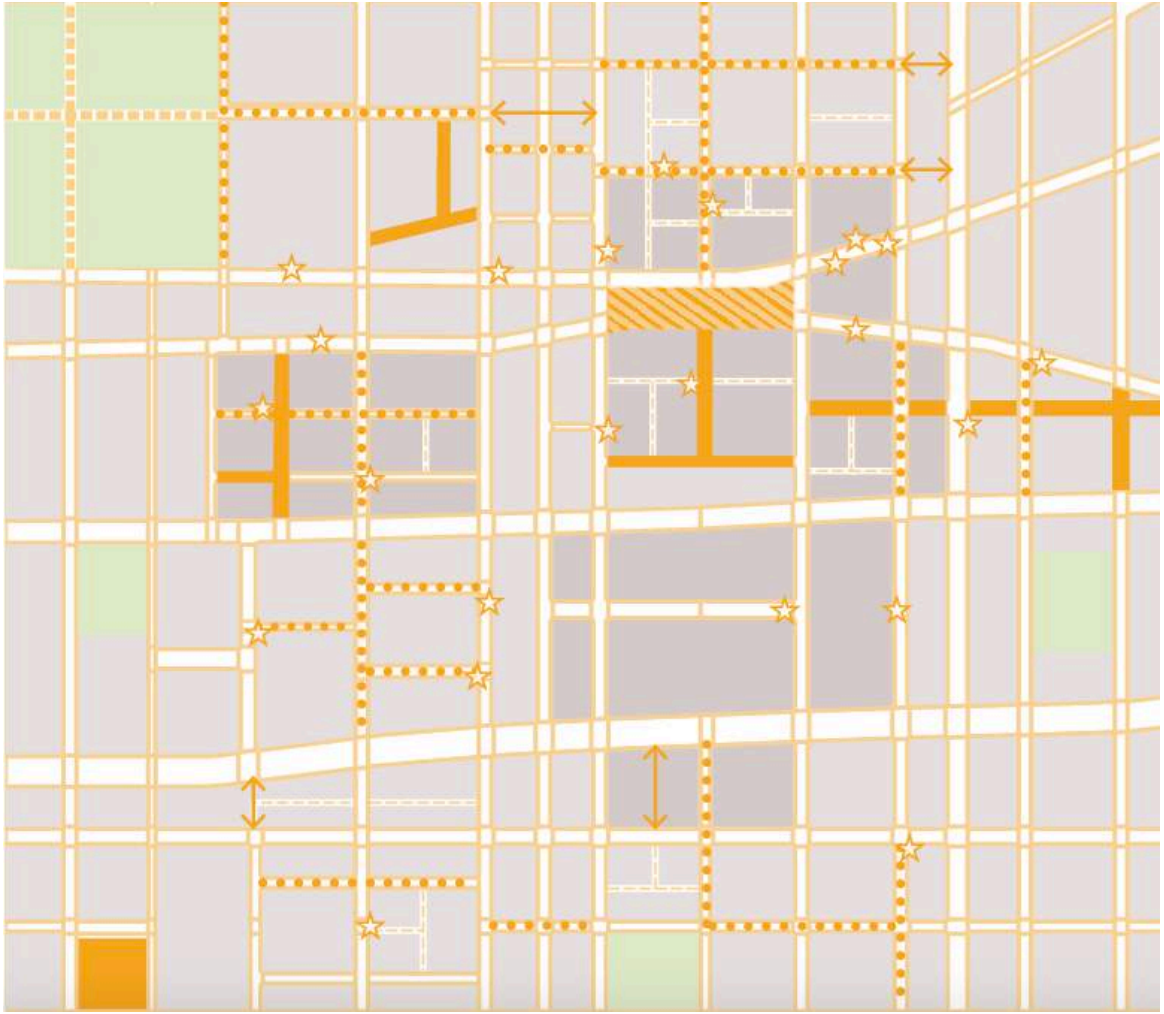
Speed, Variations and Dimensions



Pedestrians

Key Network Considerations

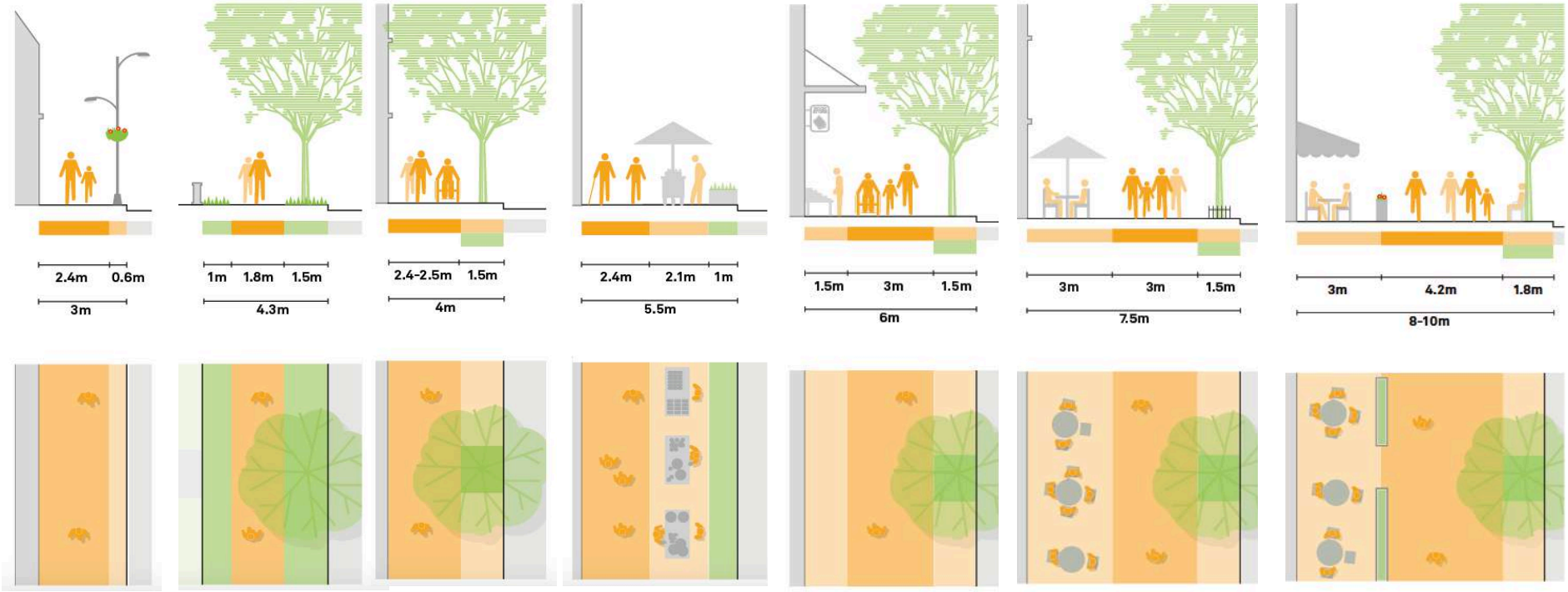
- Connectivity
- Safety
- Permeability
- Choice
- Human Scale and Complexity
- Key Destinations
- Variety of Users
- Volume of Users
- Green Corridors
- Character and Identity



pedestrian-only spaces
Plazas
Shared spaces
Laneways
Walkways
Sidewalks
Pedestrian links
Parklets and pocket parks

Pedestrians

Geometry



Residential Sidewalk

Residential Ribbon Sidewalks

Residential Sidewalk with Trees

Neighborhood Main Street 1

Neighborhood Main Street 2

Medium Commercial Sidewalks

Large Commercial Sidewalks

Pedestrians

Elements


Sidewalks*


Pedestrian Crossings*


Pedestrian Refuge Islands*


Curb Extensions*


Accessibility Ramps


Vision-Impaired Guidance


Signage and Wayfinding


Pedestrian Countdown Signals + Clocks


Lighting

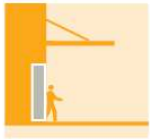

Seating


Water Fountains


Weather Protection


Curbs

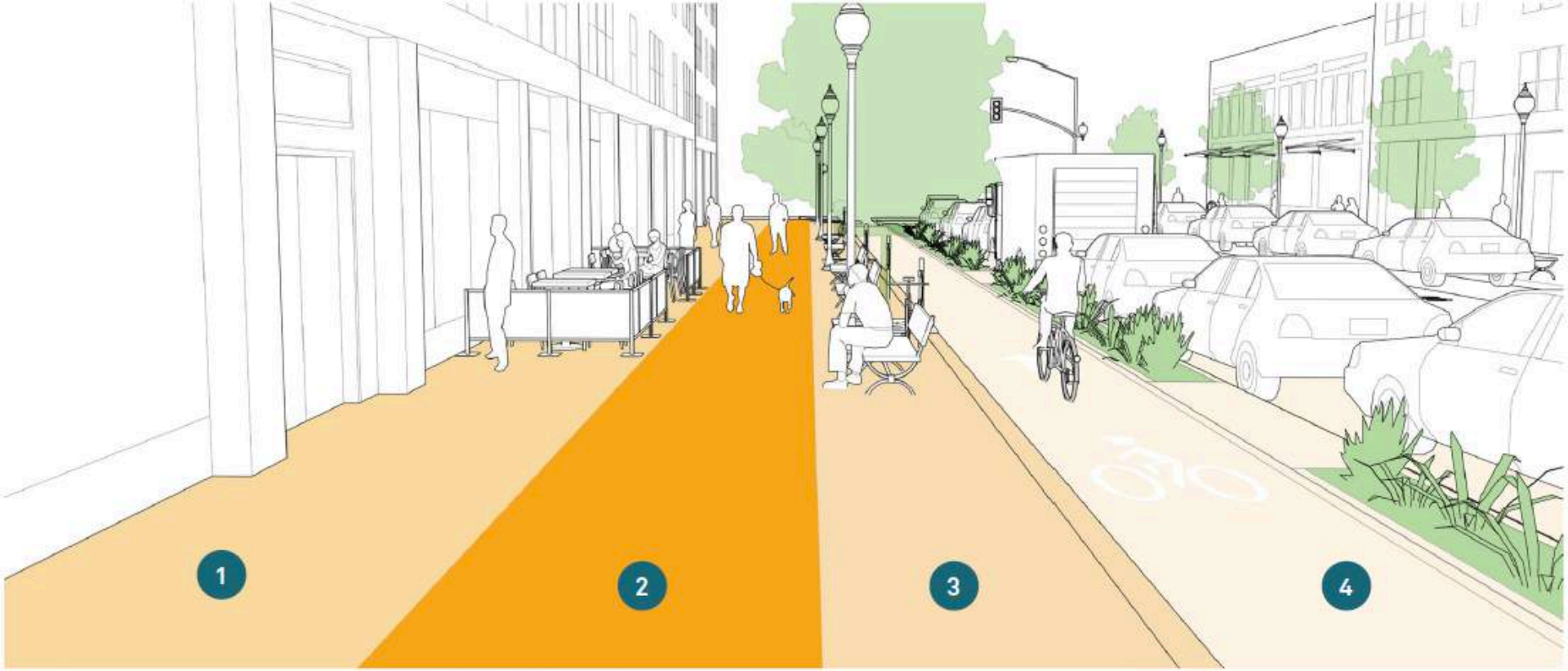

Waste Receptacles


Active Building Edges


Trees and Landscaping

Pedestrians

Elements: Sidewalks



Frontage Zone

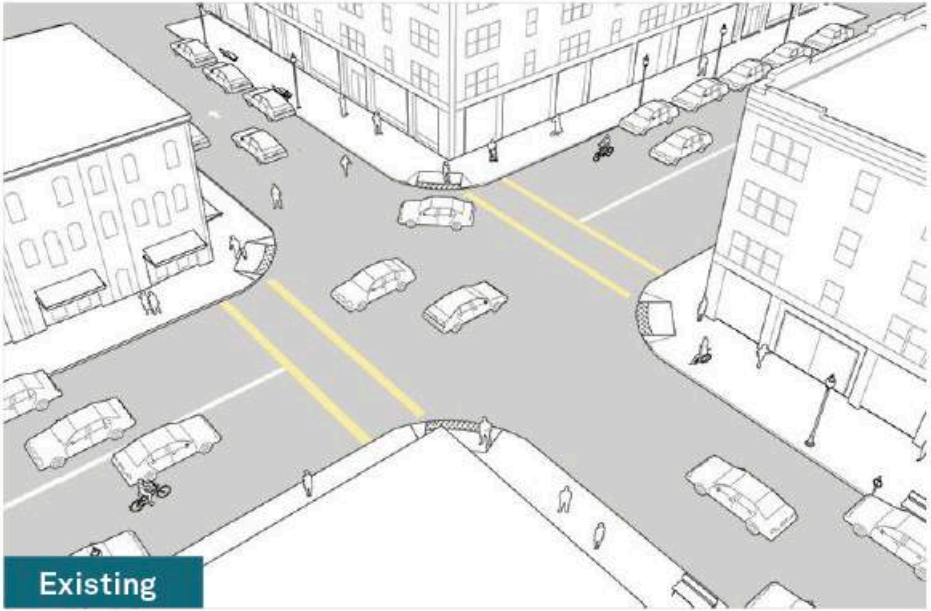
Clear Path

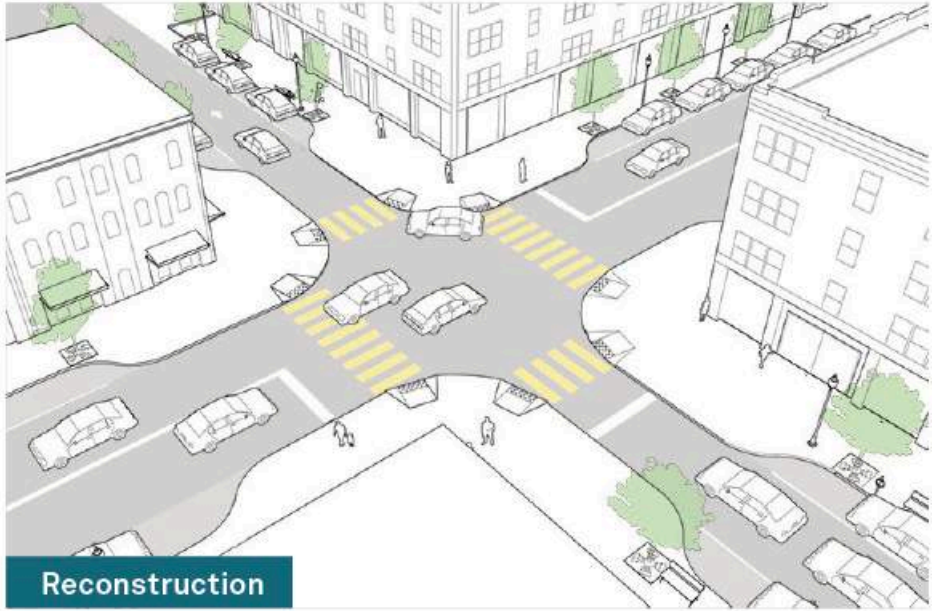
Street Furniture/Curb Zone

Enhancement/
Buffer Zone

Pedestrians

Elements: Pedestrian Crossings





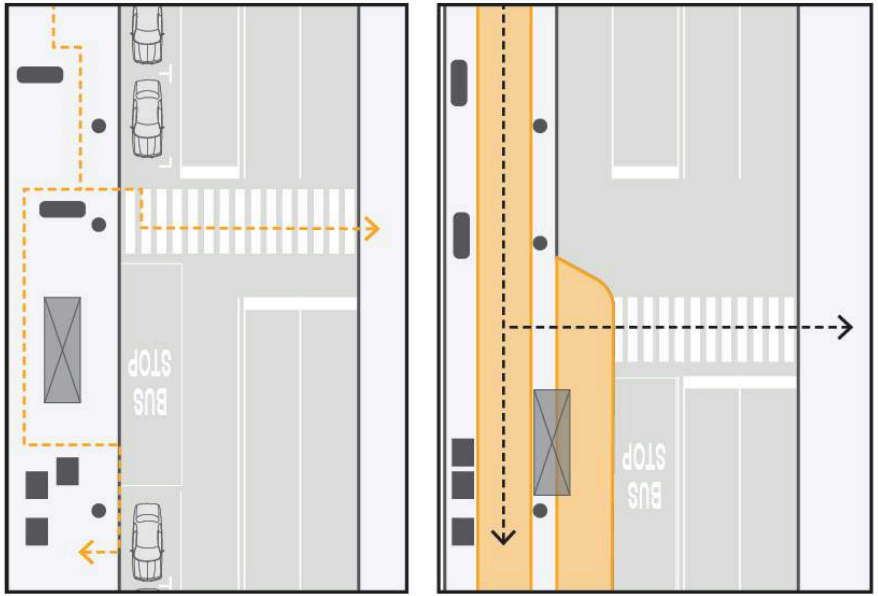
Pedestrians

Elements: Raised Crossings

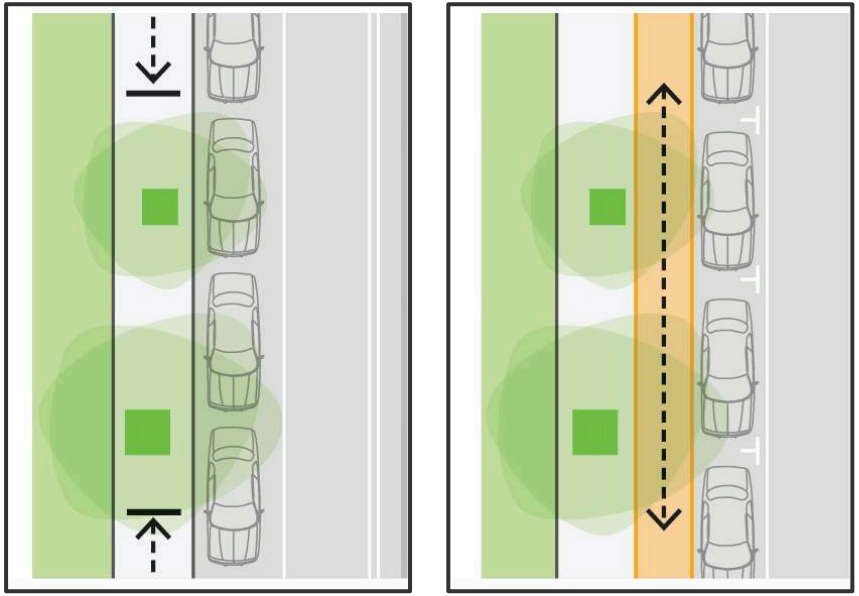
Pedestrians

Further Guidance

Designing with Existing Utilities



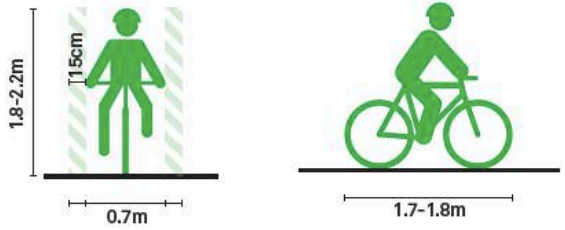
Designing with Existing Trees



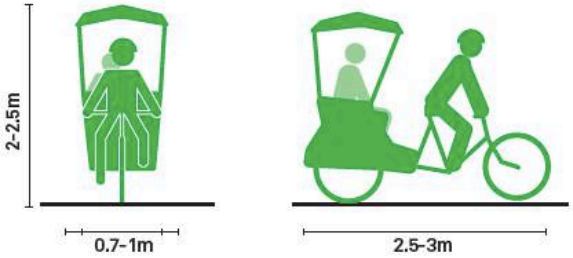
Cyclists

Speed, Variations and Dimensions

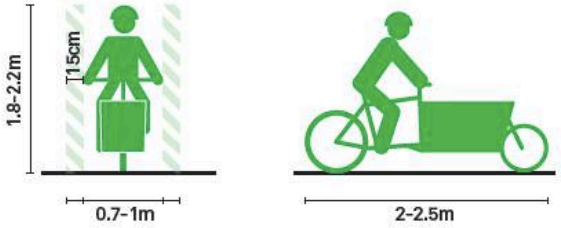
Cycles



Tricycles, Cycle-Rickshaw, & Pedicabs.



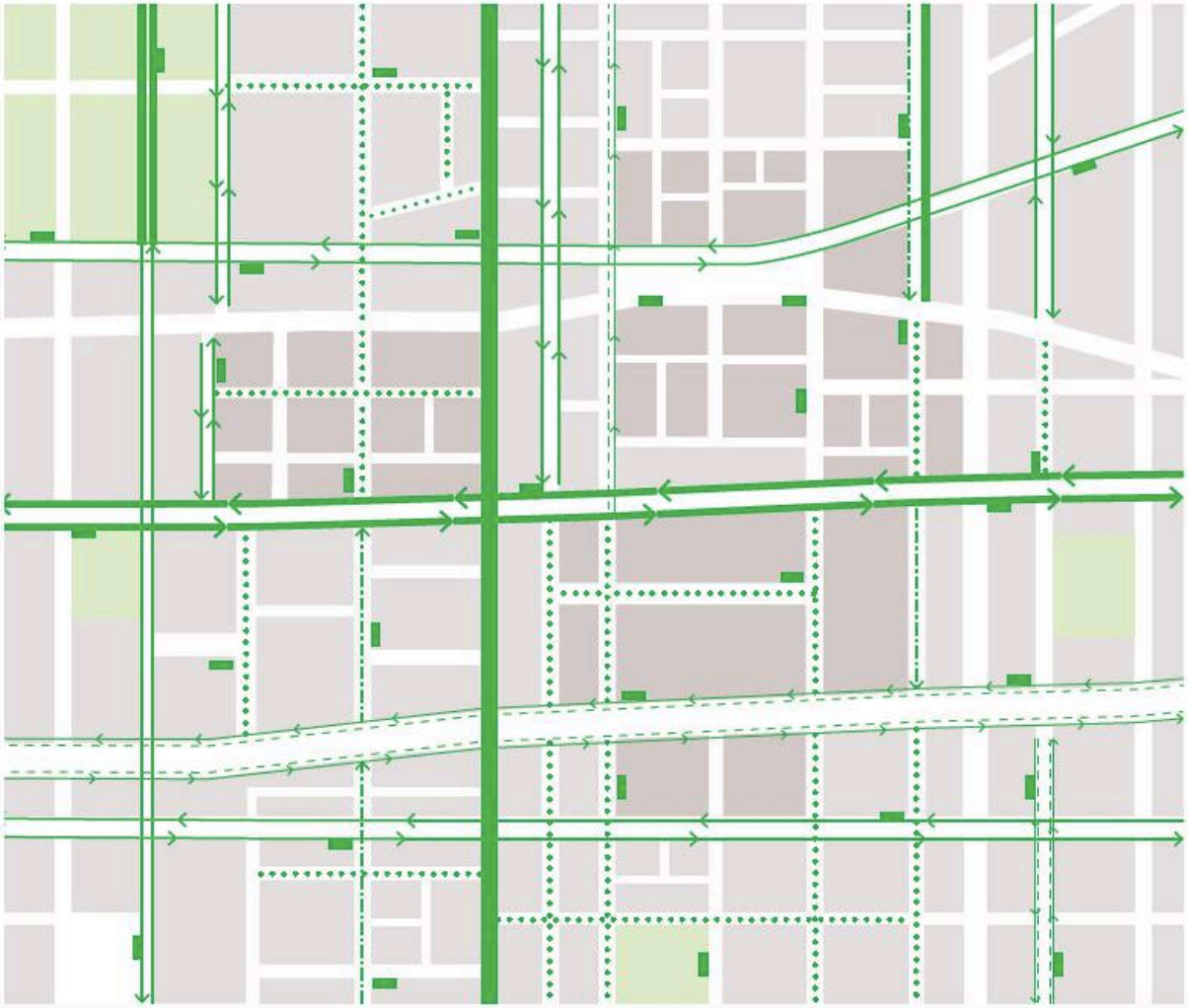
Cargo-bikes & Cycle Trucks



Cyclists

Key Network Considerations

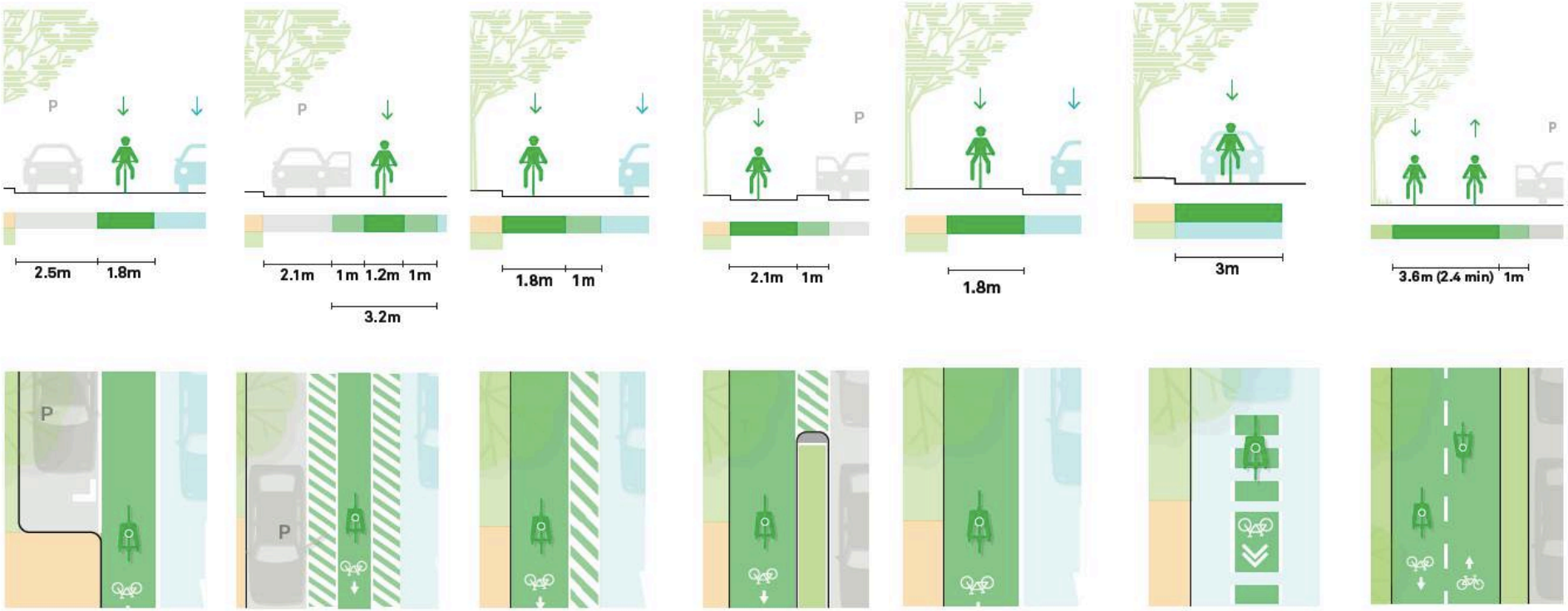
- Safe
- Connected and Continuous
- Comprehensive Coverage
- Direct
- Key Destinations
- Sight lines
- Comfort and Quality
- Signage and Communication



Bike street
Bike lane
Contraflow bike lane
Buffered bike lane
One-way cycle track
Two-way cycle track
Bike share station

Cyclists

Geometry



Conventional Cycle Lane

Buffered Cycle Lane

Curbside Buffered Cycle Lane

Parking Protected Cycle Track

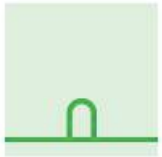
Raised Cycle Track

Cycle Street

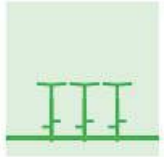
Greenway

Cyclists

Elements



Cycle Racks



Cycle Parking Corral

Cycle Parking Structures

At-grade marked Buffers

Advanced Stop Boxes

Two-stage Turn Queue Box

Corner Refuge Islands

Planted Buffer

Concrete Buffer

Traffic Diverters

Wayfinding

Cycle Signals

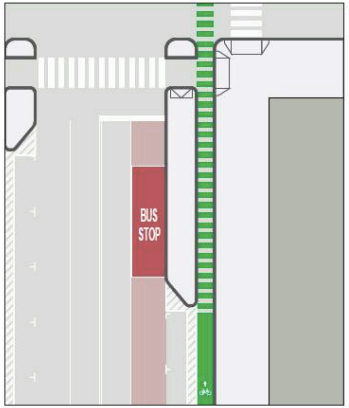
Cycle Share Stations

Cycle Bridges & Underpasses

Cyclists

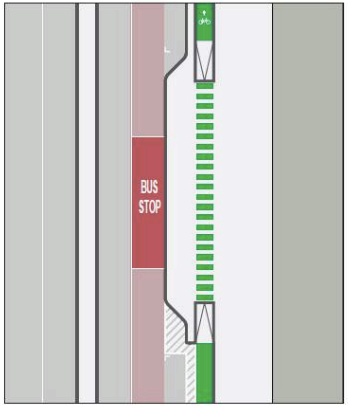
Further Guidance

Cycles at Transit Stops



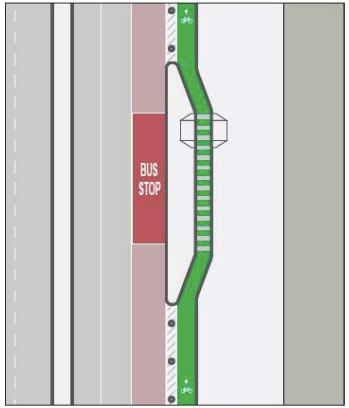
Parking protected cycle track behind bus bulb

This design works with cycle lanes that are against the curb. It maintains the integrity of the cycle lane direction and height. The change in curb height alerts pedestrians to the presence of a cycle lane, but the straight, flat shape means that cyclists are less likely to slow down.



Parking protected cycle track on bus bulb

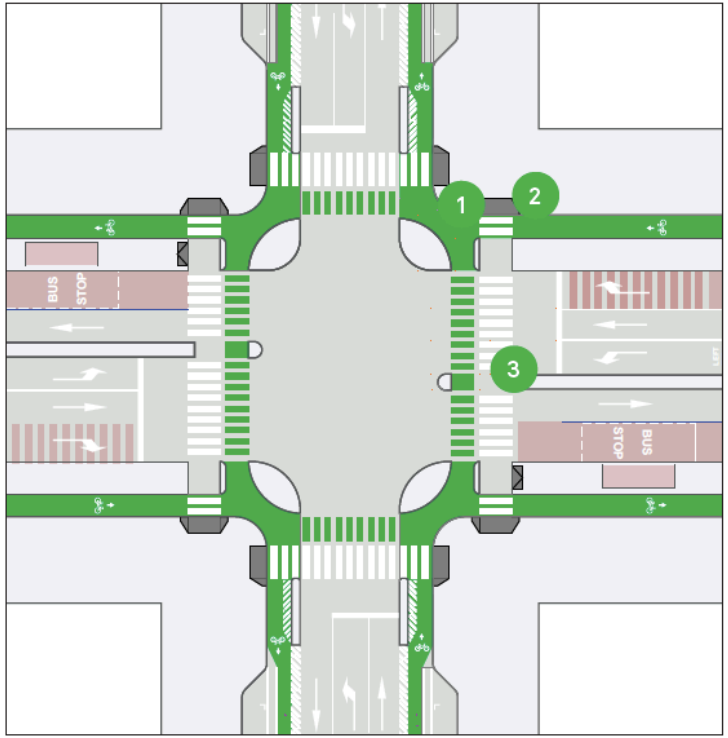
This design is most appropriate where transit stop usage is high and transit riders take priority over fast cycle travel. It provides the best pedestrian access to the stop, since the cycle lane is at the same level as the stop for its entire length. Though the design favors pedestrians and may slow cyclists down, it also creates the most opportunities for conflicts.



Buffered cycle lane behind bus bulb

This design is best on streets with no parking lane, and it is the only design that is possible without an extension into the roadway. The angled geometry forces cyclists to slow down the cycle lane and should ensure that sidewalk paths remain safe and clear.

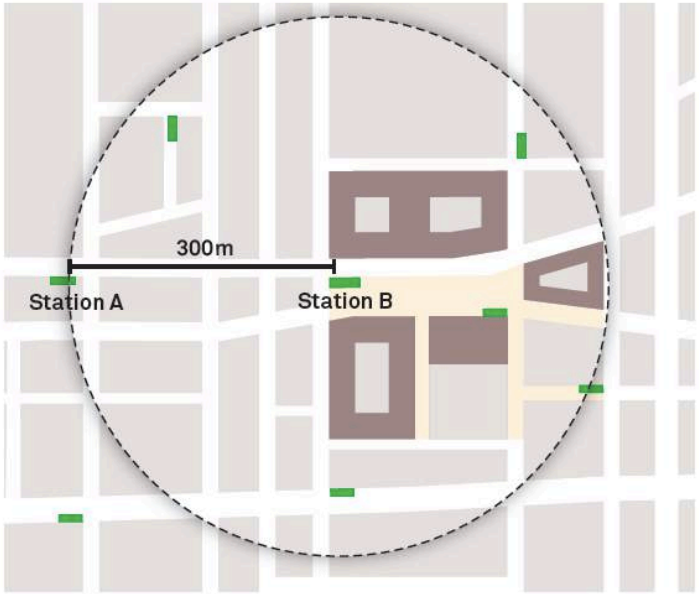
Protected Cycle Intersections



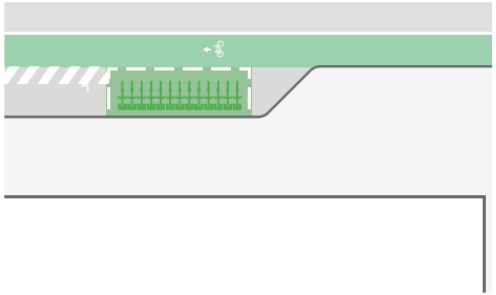
Cyclists

Cycle Share

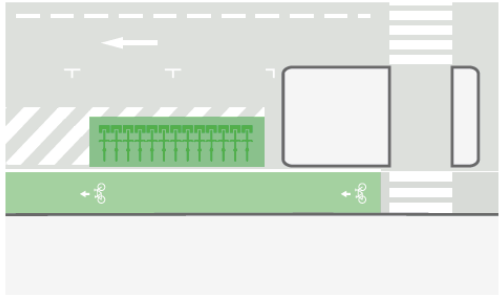
Station Coverage and Size



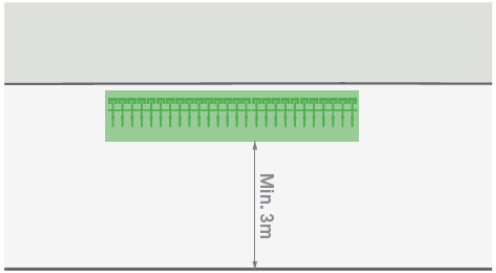
Station Location



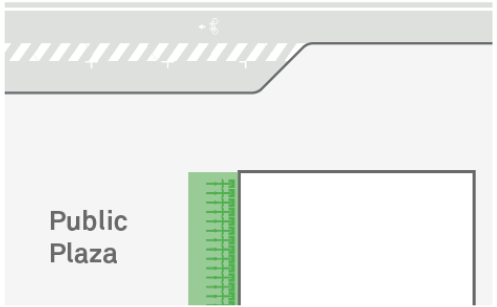
Configuration 1. Parking spaces adjacent to sidewalks



Configuration 2. Parking spaces adjacent to cycle lanes



Configuration 3. On very wide sidewalks



Configuration 4. In adjacent public spaces, parks, or destination sites outside of the public right-of-way

CONTEXT

Local Culture & Character
Street Activity
Building Edges
Street Scale & Width
Block Size
Destinations
Mix of Uses
Density
Network & Hierarchy
Natural Environment
Mode Share

STREETS


TURKCELL
white gift & lamps shop
Cemberlitas Baharaticisi
vodafone AKSARAY İLETİŞİM

Streets

Pedestrian Priority Streets

1. Pedestrian Only Streets
2. Laneways and Alleys
3. Parklets and Pocket Parks
4. Pedestrian Plazas

Shared Streets

5. Commercial Shared Streets
6. Residential Shared Streets

Neighborhood Streets

7. Residential Streets
8. Neighborhood Main Streets

Large Streets

9. Central One-way Streets
10. Central Two-way Streets
11. Transit Malls
12. Large streets with Transit
13. Grand Streets

Special Conditions

14. Historic Streets
15. Elevated Structure Improvements
16. Elevated structure Removal
17. Streets to Stream
17. Temporary Closures
19. Post Industrial Revitalization
20. Waterfront and Parkside Promonade
21. Streets in Informal Settlements

Streets in Context

1. Pedestrian Only Streets
2. Laneways and Alleys
3. Parklets and Pocket Parks
4. Pedestrian Plazas
5. Commercial Shared Streets
6. Residential Shared Streets
7. Residential Streets
7. Neighborhood Main Streets
9. Central One-way Streets
10. Central Two-way Streets
11. Transit Malls
12. Large streets with Transit
13. Grand Streets
14. Historic Streets
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20. Waterfront and Parkside Promonade
21. Streets in Informal Settlements

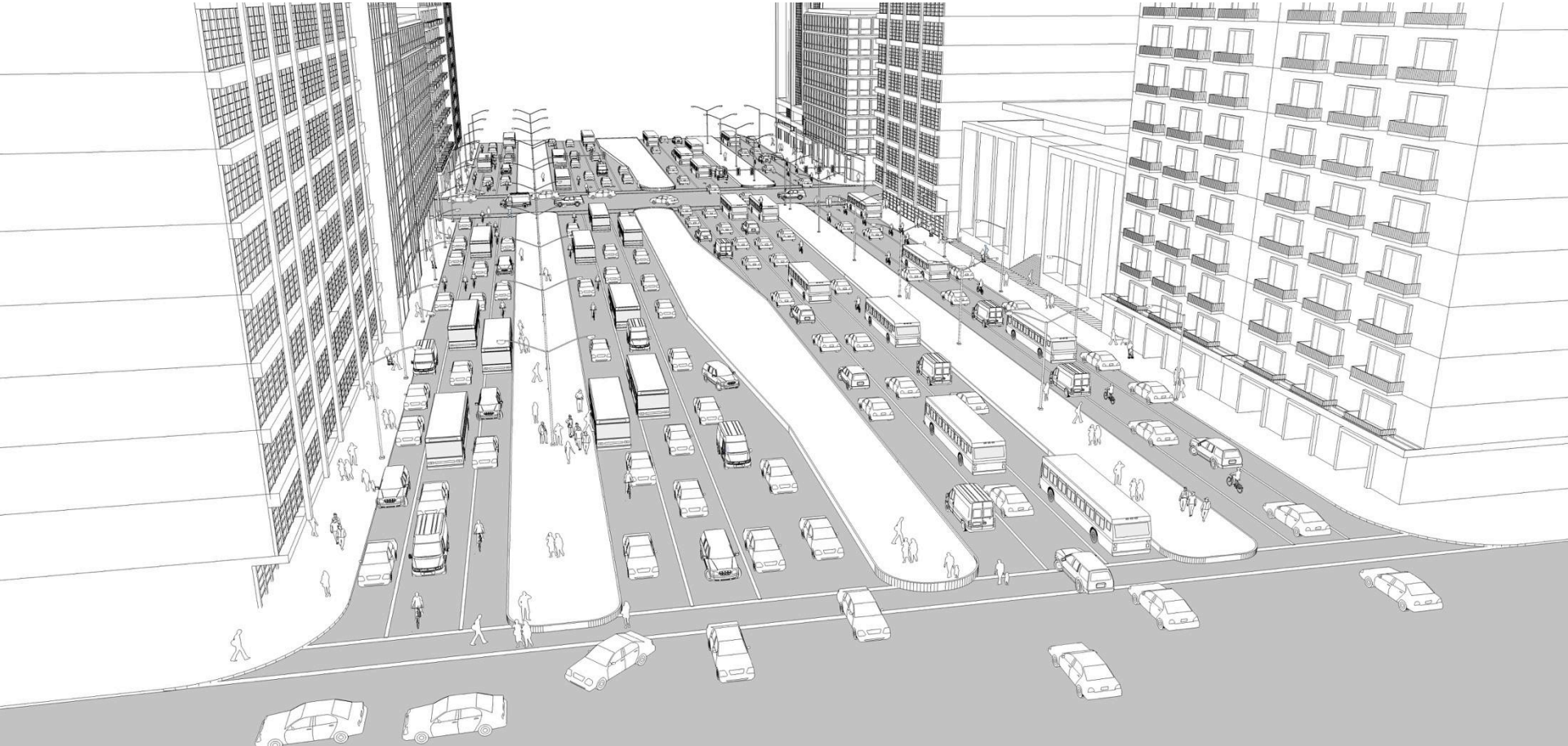
Neighborhood Main Street

Neighborhood Main Street

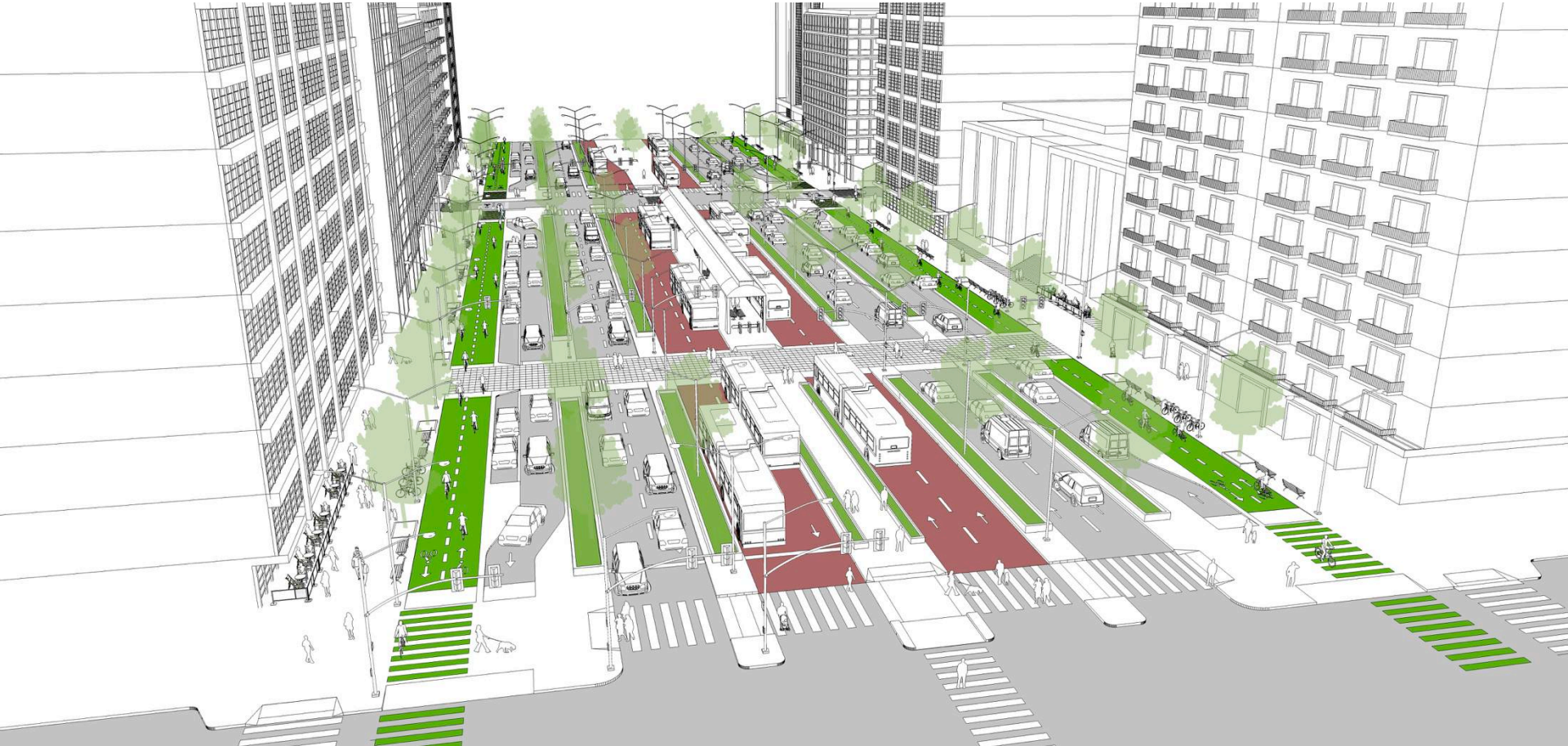
Residential Streets

Residential Streets

Grand Streets



Grand Streets



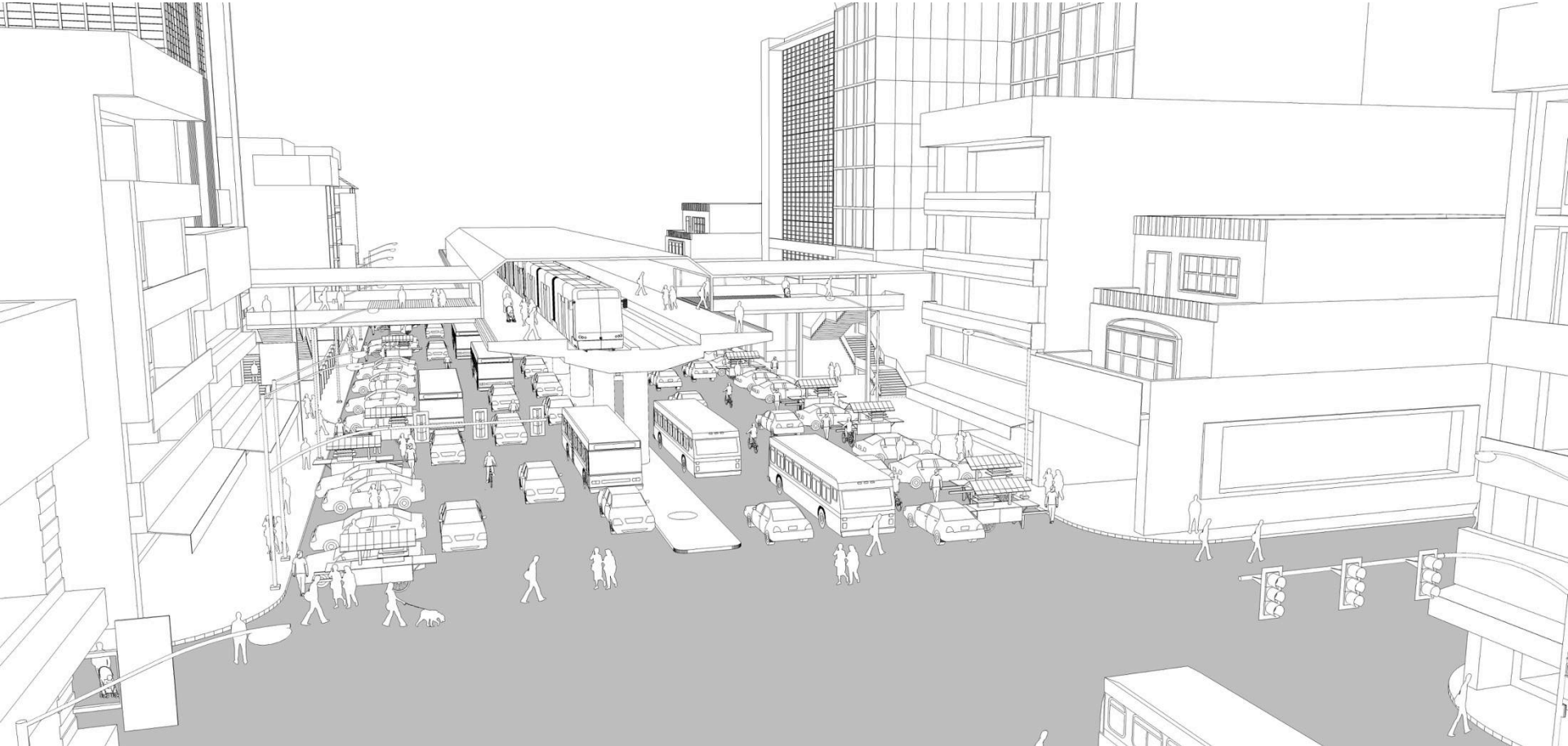
Shared Streets in Commercial Areas

Shared Streets in Commercial Areas

Shared Streets in Residential Areas

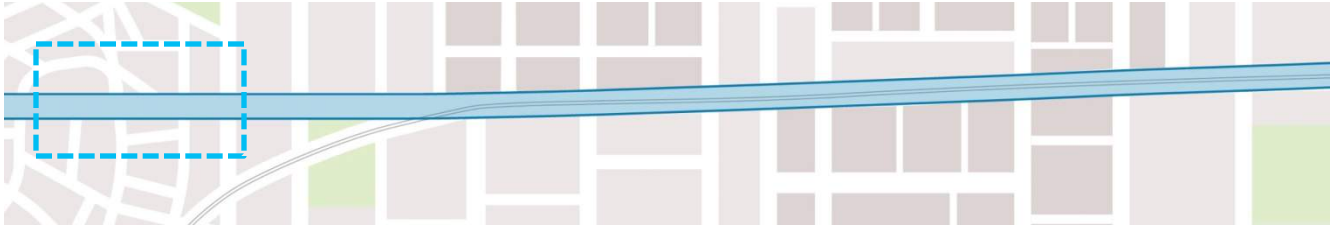
Shared Streets in Residential Areas

Streets with Elevated Structures

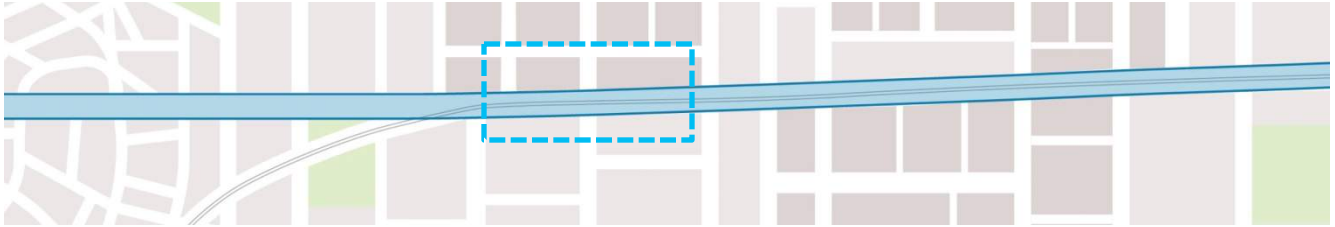


Streets with Elevated Structures

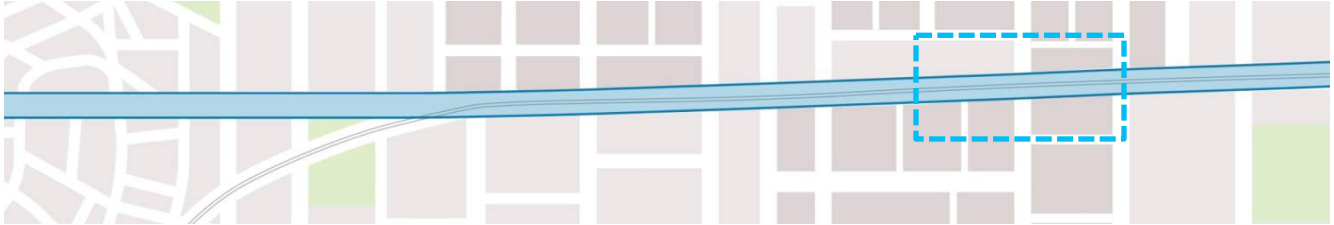
Context 1:
Neighborhood Main Street



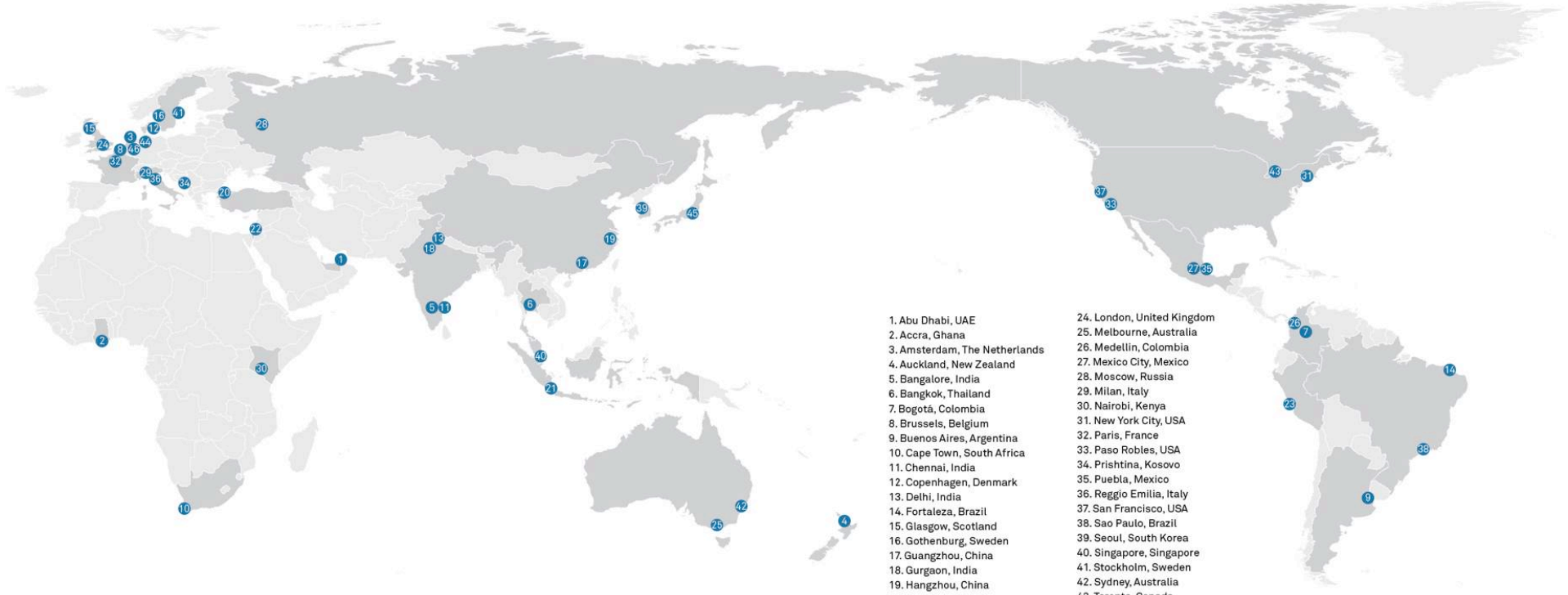
Context 2:
Central Two-way Street



Context 3:
Transit Mall



Global Case Studies



1. Abu Dhabi, UAE
2. Accra, Ghana
3. Amsterdam, The Netherlands
4. Auckland, New Zealand
5. Bangalore, India
6. Bangkok, Thailand
7. Bogotá, Colombia
8. Brussels, Belgium
9. Buenos Aires, Argentina
10. Cape Town, South Africa
11. Chennai, India
12. Copenhagen, Denmark
13. Delhi, India
14. Fortaleza, Brazil
15. Glasgow, Scotland
16. Gothenburg, Sweden
17. Guangzhou, China
18. Gurgaon, India
19. Hangzhou, China
20. Istanbul, Turkey
21. Jakarta, Indonesia
22. Jerusalem, Israel
23. Lima, Peru
24. London, United Kingdom
25. Melbourne, Australia
26. Medellin, Colombia
27. Mexico City, Mexico
28. Moscow, Russia
29. Milan, Italy
30. Nairobi, Kenya
31. New York City, USA
32. Paris, France
33. Paso Robles, USA
34. Prishtina, Kosovo
35. Puebla, Mexico
36. Reggio Emilia, Italy
37. San Francisco, USA
38. Sao Paulo, Brazil
39. Seoul, South Korea
40. Singapore, Singapore
41. Stockholm, Sweden
42. Sydney, Australia
43. Toronto, Canada
44. Utrecht, The Netherlands
45. Yokohama, Japan
46. Zaanstad, The Netherlands

Global Case Studies

Grand Streets: Avenida 9 de Julio, Buenos Aires, Argentina

LOCATION: **Montserrat, Buenos Aires, Argentina**

CONTEXT: **High–density mixed–use**

RIGHT–OF–WAY: **140m**

SIZE: **2.7 km**

COST: **150 million ARS (15.9 million USD)**

FUNDING: **Public**

MAX. SPEED: **60km/h**

Credit: City of Buenos Aires

Global Case Studies

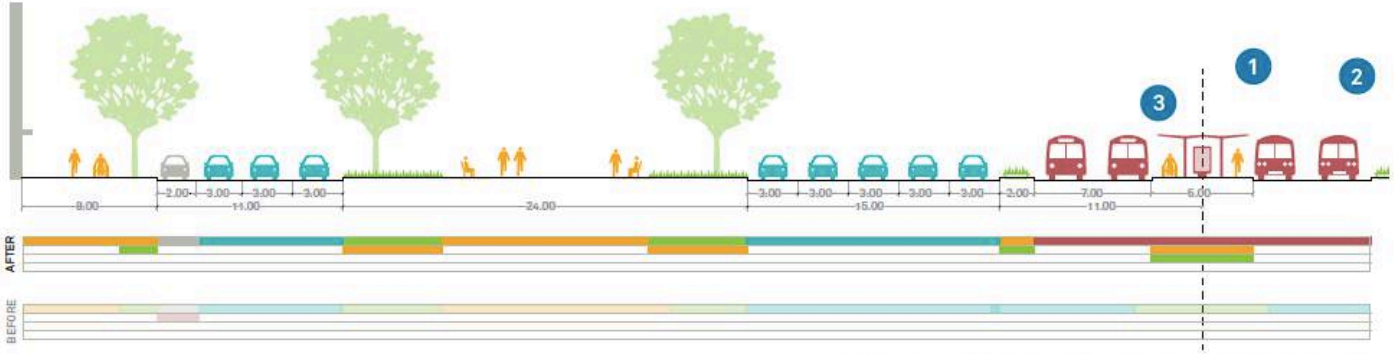
Grand Streets: Avenida 9 de Julio, Buenos Aires, Argentina

Key Elements

1. New four–lane, center–running BRT transitway replacing 4 mixed–traffic travel lanes.
2. Level–boarding central platform.
3. Planted side medians.
4. Central walk–through pedestrian paths connecting all the stations on the avenue.
5. Pedestrian markings and LED signals and countdown clocks added to connect stations.

Users–bar legend:

- Pedestrian space
- Cycles
- Transit
- Mixed traffic
- Landscape
- Parking



NOTE: The section above illustrates half of the width of the street.

Project Timeline

January 2012–July 2013

Evaluation

–98%

Decrease in the number of crashes since the creation of Metrobus.

–32%

Decrease in travel times on the avenue.

–63%

Decrease in bus travel times due to BRT implementation.

–5,615

Reduction of tons of CO_2 equivalent per year.

Global Case Studies

Grand Streets: Avenida 9 de Julio, Buenos Aires, Argentina

Keys to Success

Interagency coordination.

Vehicle fleet upgrade and driver training.

Context–oriented design.

Public participation and involvement.

Commitment from the city to improve the transit infrastructure along the corridor.

Involvement

Public agencies
City of Buenos Aires, federal government, bus operators.

Citizen associations and nonprofits
Local nonprofits and associations of residents, bus drivers, taxi drivers, and shopkeepers.

Credit: City of Buenos Aires

Global Case Studies

Neighborhood Main Streets: St. Mark's Road, Bangalore, India

LOCATION: **Bangalore, India**

CONTEXT: **Central business district**

RIGHT-OF-WAY: **18–20m (on average)**

SIZE: **Approximately 1 km**

COST: **1.15 billion INR (20 million USD) for the first phase**

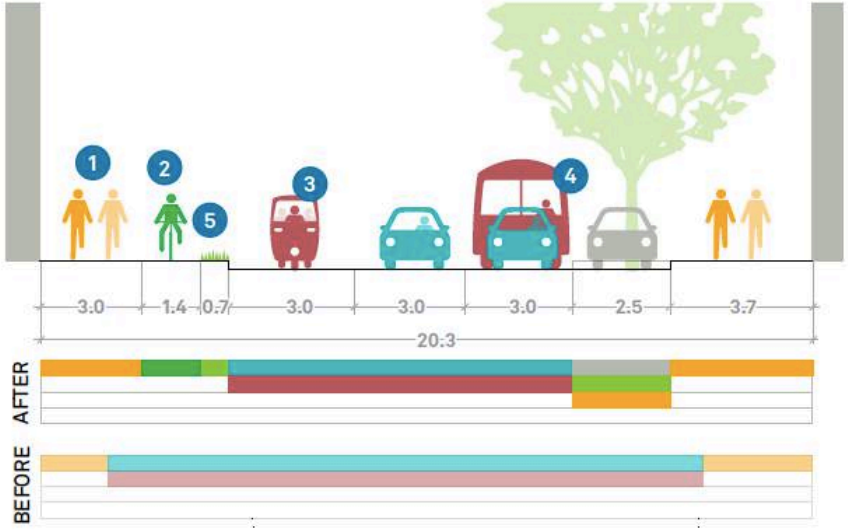
FUNDING: **Public**

MAX. SPEED: **40km/h**

Credit: Jana Urban Space

Global Case Studies

Neighborhood Main Streets: St. Mark's Road, Bangalore, India



Key Elements

1. Enhanced and extended sidewalks.
2. One–way protected cycle tracks.
3. Consistent travel lanes.
4. Dedicated and paved bus, auto rickshaw, and parking bays.
5. Landscaped strip between the motorized and nonmotorized paths.
6. Protection and enhancement of existing trees with pits and guards.
7. Reconfiguration of underground utilities with the creation of access chambers for utility lines.

Evaluation

+250%

Increase in pedestrian volume.

–3 minutes

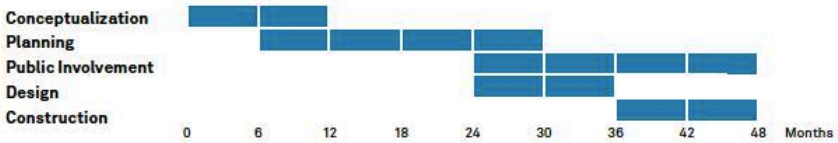
Wait time at pedestrian crossings reduced to 2 minutes from 5 minutes.

12 seconds

Pedestrian crossing time reduced to 12 seconds, with shorter crossing distances.

Project Timeline

2011–2015



Users–bar legend:

- Pedestrian space
- Cycles
- Transit
- Mixed traffic
- Landscape
- Parking

Global Case Studies

Neighborhood Main Streets: St. Mark's Road, Bangalore, India

Keys to Success

Interagency coordination.

Public participation and involvement from the early stages of the project.

Documentation and verification of existing utilities as part of planning and design process.

Involvement

Public agencies
Government of Karnataka, Bangalore Municipal Corporation (BBMP), Bangalore Development Authority, KPTCL, Traffic Police, Bangalore Metropolitan Transport Corporation (BMTC), BESCOM

Nonprofit organizations
Jana Urban Space, Janaagraha Centre for Citizenship and Democracy

Designers and Engineers
Jana USP (Designer), NAPC (Contractor)

Credit: Jana Urban Space

Global Case Studies

Share Streets: Fort Street, Auckland, New Zealand

LOCATION: **Auckland CBD, New Zealand**

CONTEXT: **Mixed-use**

RIGHT-OF-WAY: **19–20m**

SIZE: **Area in and around Fort Street**

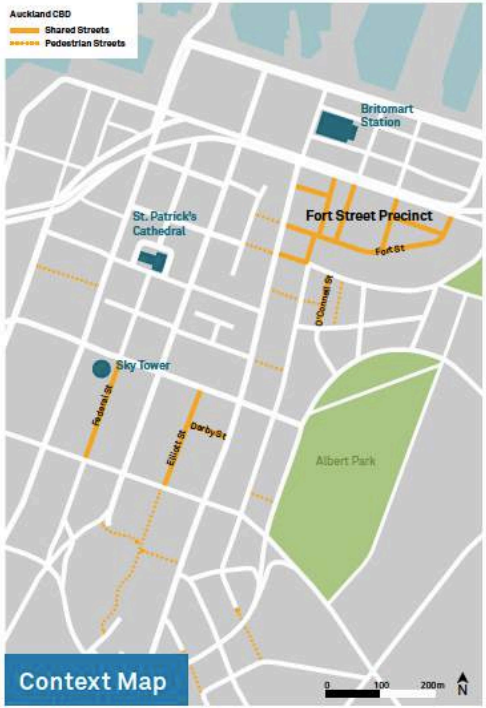
COST: **23 million NZD (16 million USD)**

FUNDING: **CBD targeted rate**

PROJECT SPONSORS: **Manager, CBD Projects, Auckland City Council**

MAX. SPEED: **No posted speeds**

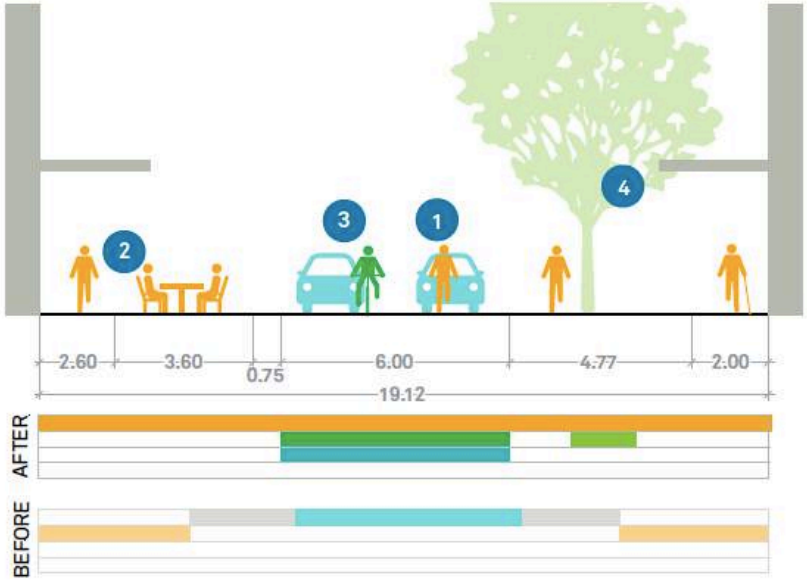
A Network of Shared Streets



Credit: Auckland City Council

Global Case Studies

Share Streets: Fort Street, Auckland, New Zealand



Key Elements

1. Removal of any demarcation between pedestrian and vehicles such as curbs and bollards.
2. Extended areas for open–air activities.
3. Pedestrians can walk on the entire right–of–way.
4. Accessible routes along building lines for the blind.

Removal of all parking spaces.

Restricted loading times.

Street furniture and landscaping.

Evaluation

+54%

Increase in pedestrian activity during peak hours.

+47%

Increase in consumer spending.

–25%

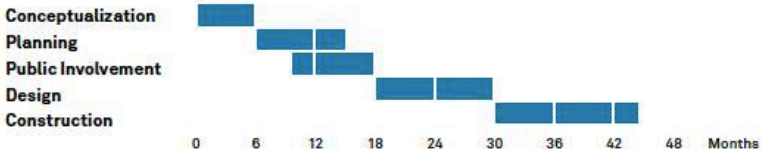
Decrease in vehicle volume.

80%

Felt safer in the area.

Project Timeline

June 2009–April 2013



Users–bar legend:

- Pedestrian space
- Cycles
- Transit
- Mixed traffic
- Landscape
- Parking

Global Case Studies

Share Streets: Fort Street, Auckland, New Zealand

Keys to Success

Collaboration with key stakeholders.

Testing design variations.

Pre– and post–monitoring and evaluation in order to communicate the impacts of the project.

Involvement

Public agencies
Auckland Council, Auckland Transport

Private group
Local business owners and operators

Citizen associations and unions
Blind Foundation

Designers and Engineers
Boffa Miskell, Jawa Structures, TPC (traffic engineering), LDP (lighting)

Credit: Auckland City Council

Melbourne, Australia

Swanston St

Richard Smithers

Grand Streets, Avenues, and Boulevards | Transit Malls
Case Study | Swanston Street, Melbourne, Australia

Location: Downtown CBD, City of Melbourne, Australia

Extent: 1200 m - 10 blocks

Right-of-way: 30 m

Context: Mixed use (office/commercial/residential) main street

Cost: 25.6 Million AUD (18.8 Million USD) for design and construction of phases 1 & 2

Funding: Public

Max. speed: 10 km/h

Key Elements

1. Increased sidewalk width
2. Improved user legibility of the street
3. Dedicated cycle lanes
4. Raised tram platforms to allow universal access
5. Removal of taxi and vehicle access at all times
6. Service, delivery, and emergency vehicles access maintained
7. High quality finishes including bluestone and granite paving, custom designed lighting, furniture and signature planting
8. Transit stops located along public spaces where possible such as at the City Square and State Library

Credit Photo: City of Melbourne

Overview

Swanston Street is one of the main north-south streets in the city of Melbourne, lined on either side with a number of iconic landmarks.

Once a very congested and polluted street it is today an example of best practice for, pedestrian-oriented and transit priority street design.

Vision And Goals

The vision driving Swanston Street improved legibility of the city, enhanced user experience and access for shoppers, visitors, workers, cyclists and transit users.

Creating more attractive, democratic and safe public spaces

Providing spaces where people can gather and meet

Providing spaces for events and the arts

Key Successes

Providing an improved retail environment.

Providing an efficient, equitable, comfortable public transport exp

High-quality streetscape design, reflects the unique characteristi city.

Involvement

Public agencies
City of Melbourne, Yarra
VicRoads, Victoria Police
Department of transport
Planning and Local Infras

Private group and partne
Australian Industry Grou
Australian Retail Associa

Citizen associations and
Bicycle Victoria, Transpo
Workers Union

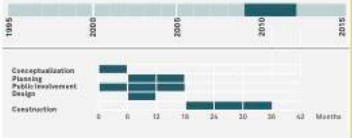
Designers and Engineers
City of Melbourne

Credit Photo: City of Melbourne

Credit Photo: City of Melbourne

Project Timeline (Phases 1 & 2)

June 2009- June 2012 (3 Years)



Lessons Learned

Community nngagement throughout the project ensured information shraing and engagement with the community throughout design development. A full-time community liaison officer shared information with local retailers and relevant, stakeholders and dealt with issues as they emerged throughout the construction period.

Sectional Drawing

The newly constructed tram stops brought in a shared zone, changing cyclist, commuter, and pedestrian behaviour. Comedians were engaged to work with users to understand the new spatial arrangement and the changed traffic conditions.

Users-bar legend:

- Pedestrian space
- Bicycles
- Transit
- Mixed traffic
- Landscape

Evaluation

+ 450%

Increase in cycle volume

Stockholm, Sweden

Gotgatan

Daniel Firth

Grand Streets, Avenues, and Boulevards | Central 2 Way Streets

Case Study | Götgatan, Stockholm, Sweden

Location: Södermalm, Stockholm

Extent: 0.8 km

Right-of-way: 28m

Context: Mixed use office/commercial/residential, main arterial

Cost: 3.1 million SEK (360,000 USD)

Funding: City of Stockholm, traffic committee

Max. speed: 30 km/h

Key Elements

1. Increased sidewalk widths with zones for temporary street furnishing.
2. Wider cycle lanes in the former parking lane.
3. Cycle parking facilities for 50 cycles in former vehicle parking spaces.
4. Green wave for cyclist set at 18 km/h, visualization through countdown signs.
5. Reduction from two motor vehicle lanes in each direction to one in each direction.
6. Reduction in speed limit from 50 km/h to 30 km/h.
7. Measures to improve goods deliveries.
8. Increased parking charges to ensure turnover.

Credit Photo: City of Stockholm

Overview

Götgatan is a lively main street in the inner-city Södermalm district, with offices, shops, and restaurants serving a dense residential district.
The street is also the most important route for cyclists coming to the central business district from the southern suburbs. The street space has been reallocated on a trial basis to provide better opportunities for city life and better access for cyclists and pedestrians.

Goals

Götgatan is a part of the wider Urban Mobility Strategy adopted by the city to increase use of transit, walking, and cycling as well as improving the urban realm.
Implementation has a number of goals, both local and strategic.

- Improve the urban environment and functions of a popular street for shopping and entertainment
- Improve accessibility and safety for cyclists as there are more cyclists than car drivers and passengers at the peak hours
- Illustrate the principles of the Mobility Strategy and show the of the street environment, as pa wider public engagement
- Get information on a broad ran metrics in advance of decision n for a more permanent reconfigu the street

Involvement

Public agencies
City of Stockholm traf administration, Stockl Police, the Greater Sto Fire Brigade, Stockhol Transport

Private group and part
Stockholm Chamber o Commerce, Swedish Association of Road Tr Companies, Swedish T Association

Citizen associations a unions Swedish Cyclis Association, Swedish Pedestrians' Associati residents, and traders

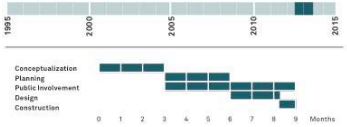
Designers and Engine
City of Stockholm, Sweco. Evaluation by t University of Uppsala Trafikutredningsbyrån

Credit Photo: City of Stockholm

Credit Photo: City of Stockholm

Project Timeline

June 2013- June 2014 (9 Months)

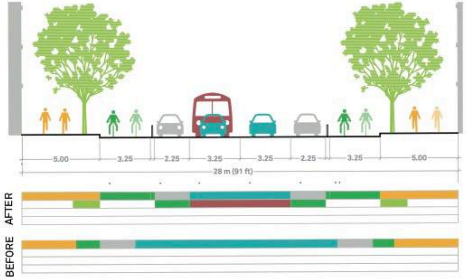


Lessons Learned

A trial is a successful method to achieve change quickly when unsure of the results.

Make clear that the process is a trial so that users don't think the changes are being done cheaply.

Activate areas of temporary furnishing to make new uses clear. Deliveries are a key point of conflict and need careful consultation and design.



Sectional Drawing

Users-bar legend:
- Pedestrian space
- Bicycles
- Transit
- Mixed traffic
- Landscape

Evaluation

+90% Increase in cycle volume

68% Pedestrians declared that the street environment is better than before

72% Cyclists felt safer after the implementation

40% Business owners think the street environment is better

METRICS


HEJ CYKLIST!
Du er nummer
3807
I DAG
og nummer
276654
I ÅR
der cykler forbi her
GOD TUR
og tak fordi du cykler i byen!

Before & After

Project Site Conditions

- Context
- Scale & size
- Facilities by user
- Signals & Signs
- Surface Quality
- Landscape
- Artwork
- Noise
- Air Quality
- …….etc

Use & Activity

- Counts by user
- Variety of activities
- Use at different times of the day & night
- Travel & wait times
- Commercial activity
- …..etc

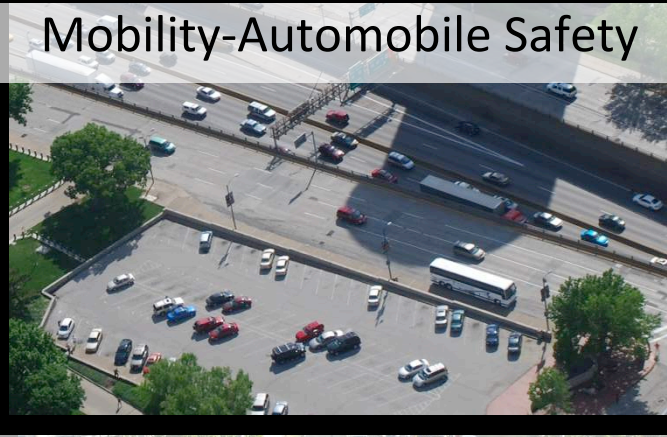
Outcomes

- Road Safety
- Multi-modal Mobility & access
- Speed
- User satisfaction
- Air Quality
- Urban Heat Island Effect
- Storm water treated
- ….etc

Measuring Use and Activity

Category	Example Metric	Notes
People on Foot and Universal Access	Pedestrian counts	Measure at different times of the work day, at peak hours and on weekends. Break down by gender and age categories and note locations where people are moving on the sidewalk or in the roadbed.
	Pedestrian movement at intersections	Percentage of people crossing compliantly at the intersections, at unmarked crossings, or without waiting for pedestrian signals. Note specific locations.
	Pedestrian activities	Count how many people are sitting, standing, and pausing, and note locations.
	Pedestrian comfort surveys	Use qualitative surveys to identify the reason, purpose, frequency, and duration of visits.
People on Cycles	Cycle counts	Measure at different locations throughout the site and note where riders are using cycle facilities. Break down by gender and age categories to confirm if a wide range of people feel comfortable riding on the provided facilities.
	Number of people using cycle share facilities	Compare with other station sites or citywide system.
People Using Collective Transit	Number of people using transit by type	Measure at different times of the work day, at peak hours and on weekends. Break down by age, gender, ethnicity, disability status, and income level. Count the number of different transit services, noting whether they are public or privately run. Document vehicle types, boarding areas, and payment methods.
	Average wait time for transit passengers	Measure how long people wait for the arrival of transit service.

HOW DO WE MEASURE SUCCESS?



THEN

HOW DO WE MEASURE SUCCESS?

Access/Mobility (Multi-modal)

Public Health + Safety

Economy

Environmental Quality

Livability/ Quality of Life

Equity

NOW

APPLYING THE TOOLS

ACCRA, GHANA

Existing Street


Existing Street
Remove Cars, Allow Limited Loading
Temporary Surface Treatment
Beauty Xperts
ELBEE
GH-1086-14

Temporary Street Closure

Temporary Street Closure


Temporary Street Closure
Trees to add Shade
Loading at Limited Hours
New Paving


Permanent Street Closure
Trees to add Shade
Loading at Limited Hours
New Paving

Permanent Street Closure

BANDUNG, INDONESIA


Sinar 96
Pengerah
©2015 Google


Remove
Pedestrian
Bridge
Sinar 96
Cengerah


Remove
Pedestrian
Bridge
Sinar 96
Bungerah
©2015 Google


Add At-grade pedestrian crossing


Add At-grade pedestrian crossing
Sinar 96
©2015 Google


Widen
Sidewalks
Sinar 96
Pengerah
©2015 Google


Widen
Sidewalks
Sinar 96
Pengerah
©2015 Google


Exchange space for private vehicles for cycles and public transport
Sinar 96
©2015 Google


Exchange space for private vehicles for cycles and public transport
A. OTA 8
Sinar 96 Tunggerah


Sinar 96
Pengerah
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A. OTA 80
Sinar 96
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