Streets as 'Ecosystems'

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Introduction

A siloed approach to urban street planning & design

- The busy urban street is impacted by a very wide range of actors:
  - Providers and users of various transport modes
  - Providers of basic highway infrastructure
  - Frontage developers, owners and users
  - Above ground and sub-surface utility providers
  - Regulators and legislators

- Each group has its own objectives and priorities

- Very little pro-active planning & management – even within transport

- 'MORE' seeks to address these issues head-on: now and for future conditions

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Multimodal Optimisation for Roadspace in Europe

- MORE is a very ambitious project, which sets out to:

  - ➤ Identify existing and future pressures (demographic change, technological advances…) on the main roads in cities that connect urban areas – and their major attractors (city centre, port, etc.) - with the national/TEN-T: Trans-European Road Network
  - ➤ Develop design tools and processes that will enable these key routes to be planned, designed, managed and operated in a way that make them responsive to future pressures, in a holistic and flexible manner
  - ➤ By exploiting possibilities for dynamic space management and operation

- Including the interfaces between urban and inter-urban/national networks

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Basic concepts

Drawing on CREATE

Designing to Meet Different Urban Policy Objectives

C — Car-oriented city
- Road building
- Car parking
- Lower density
- Dispersion

M — Sustainable mobility city
- Public transport
- Cycle networks
- Roadspace reallocation

P — City of places
- Public realm
- Street activities
- Traffic restraint
- ToD/mixed use developments

Source: EU 'CREATE' Project

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Adopting a two-dimensional street classification

Taking explicit account of Place:

Street classification applied by TfL as recommended by the Roads Task Force.

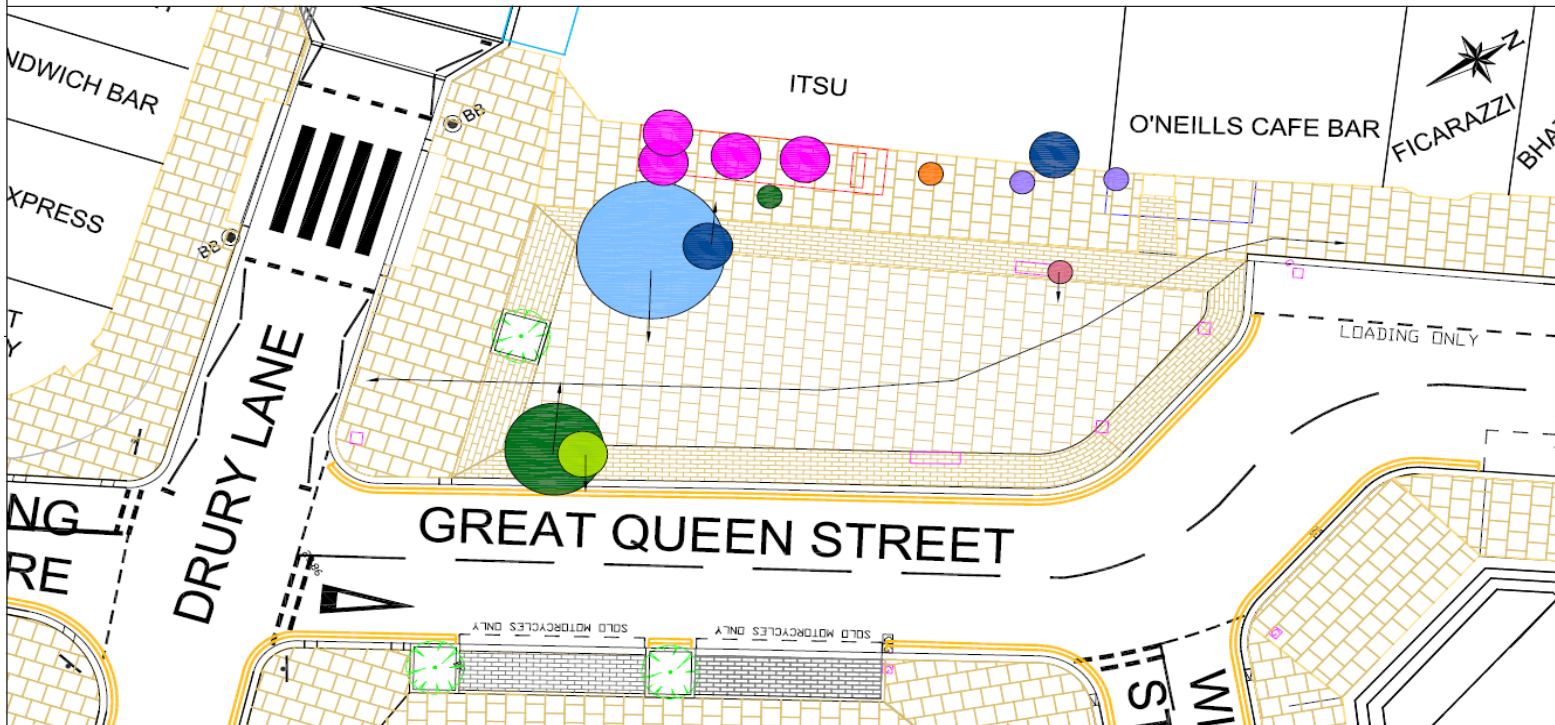With three levels of 'Movement' (of people) and three levels of 'Place'.

	P1	P2	P3
M3 ▶	M3/P1 eg **Core Road**	M3/P2 eg **High Road**	M3/P3 eg **City Hub**
M2 ▶	M2/P1 eg **Connector**	M2/P2 eg **High Street**	M2/P3 eg **City Street**
M1 ▶	M1/P1 eg **Local Street**	M1/P2 eg **Town Square**	M1/P3 eg **City Place**

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STREET ACTIVITIES

Patterns of Street 'Place' Activities

Contrast in Policy Measures: C -> P

The pictures show how this area of London has been transformed from a large traffic roundabout into a vibrant public space at the heart of the community, due to a shift in policy perspectives and corresponding priorities

London, Aldgate Square:

C Put in gyratory to increase road capacity (1960s)

Before

P Remove, to enhance place and provide new community heartland (2018)

City of London
After
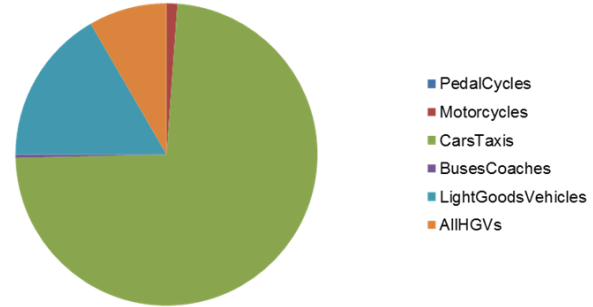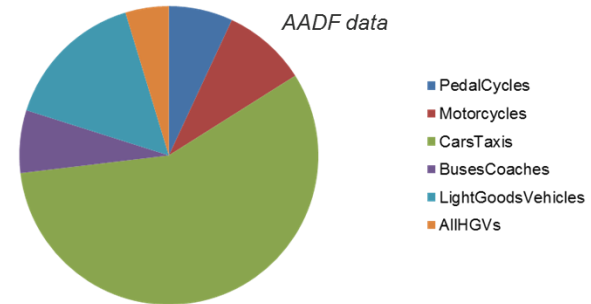
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Urban Feeder Routes: Mix of 'Roads' and 'Streets'

Context-sensitive Street designs
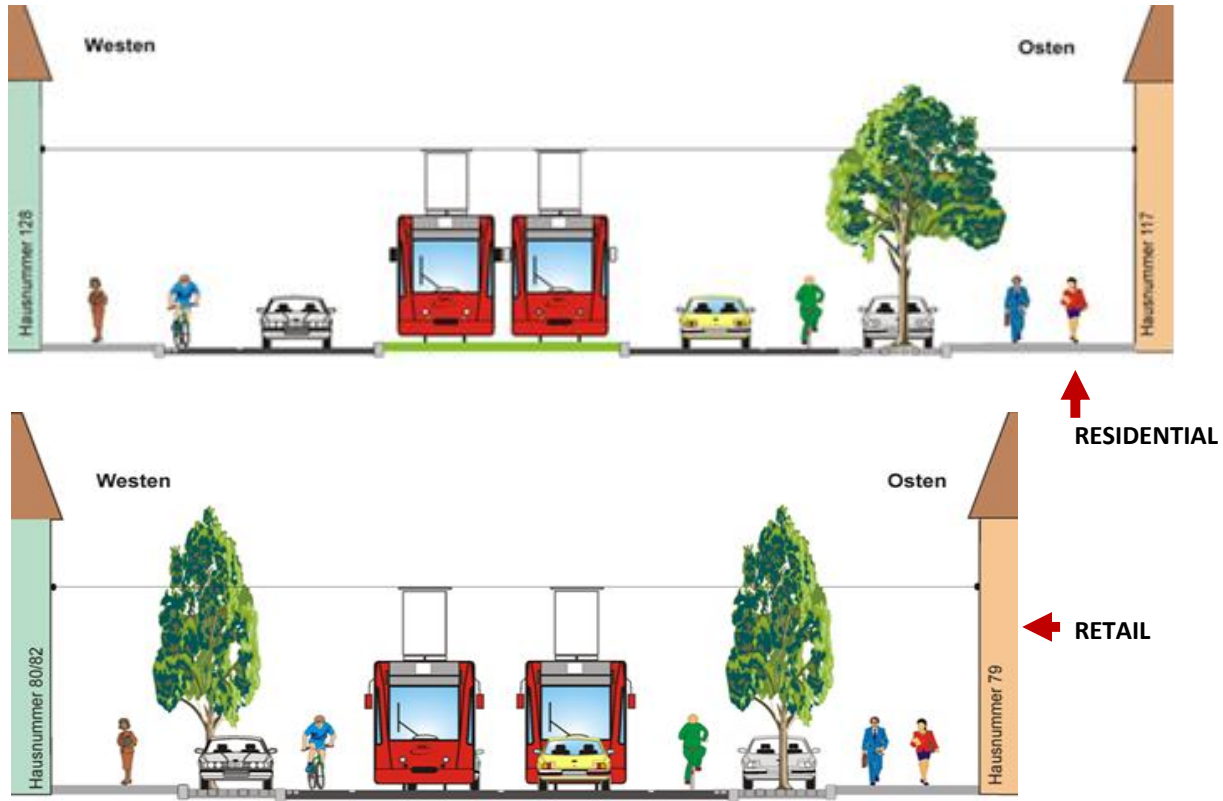
Urban Street as an 'Eco-System': Key components
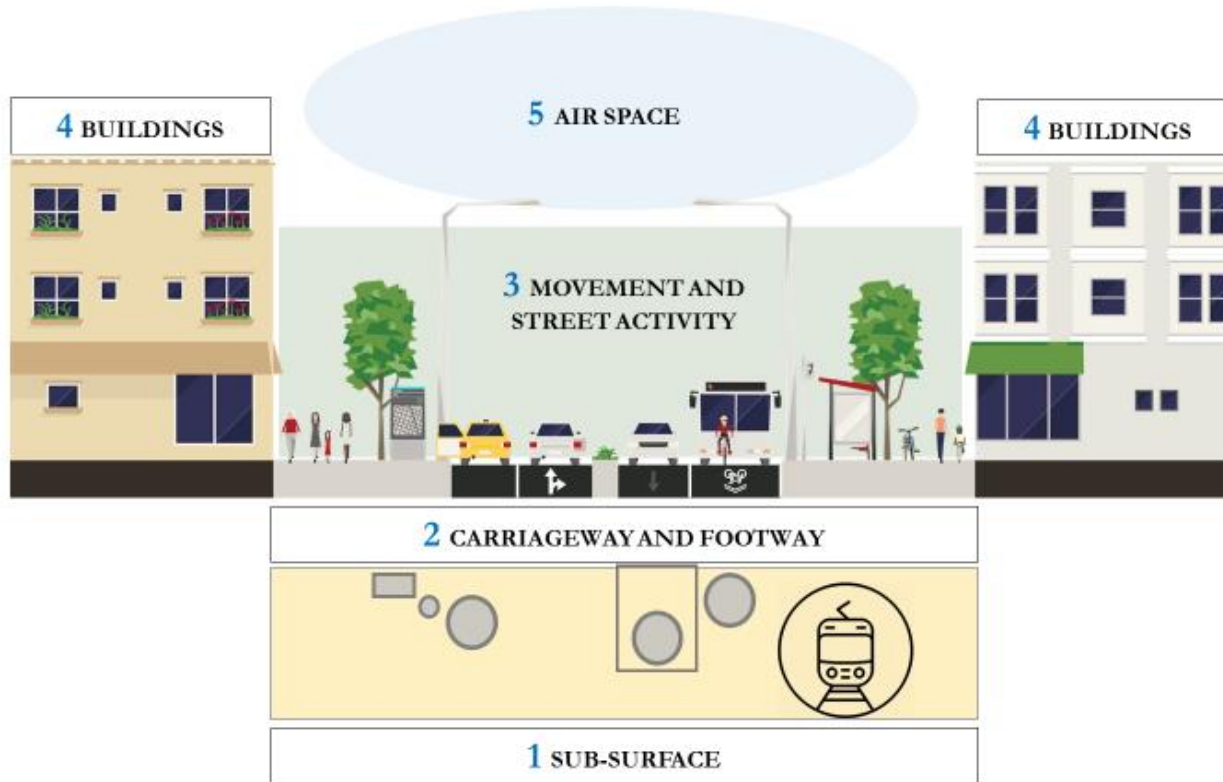
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Some service infrastructure elements (Bajaj, 2018)

Subsurface	Carriageway and footway		Movement and street activity	Buildings	Air space

Pipe lines
  Gas pipe
  Water main
  Storm water main
  Sanitary sewer
  Reclaimed water
	Carriageway
	  Loading zone
	    Bus
	    Goods
	  Traffic lanes
	    Cycle
	    Vehicle
	    AV
	    Transit
	Kerbside
	  Parking bay
	  Loading bay
	  Bus boarding area
	  EV charging
		Footway
		  Street furniture
		    Benches
		    Lighting
		    Toilets
		    Bus stops
		    Dustbins
		    Trees/plants
		    Cycle parking
		  Traffic management
		    Security camera
		    Parking meter
		    Signage
		    Traffic lights
		    Cameras (CCTV, traffic)
		Pedestrian walkway
		    Footpath
		    Metro entrance
		    Man hole
		    Fire hydrant
		Private area
		    Cafe seating
		    Street vendor
			Pedestrians
			
			Drivers
			
			PT passengers
			
			Vehicles
			    Cycles
			    Cars
			    Freight vehicles
			    Public transport
			    Autonomous vehicles
				Residential
				
				Healthcare
				
				Education
				
				Leisure, shopping, entertainment
				
				Religious activities
					Sensor technology
					Wifi
					Drones
					GPS

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System Flows

CO₂ Audit — this is page title area; see image for full slide content

System Flows

Financial Audit

4 BUILDINGS

5 AIR SPACE
GPS, Wifi Services

4 BUILDINGS
Rents, rates, prices for goods & services

3 MOVEMENT AND STREET ACTIVITY
Fares, running costs

Road use

charging [P]

2 CARRIAGEWAY AND FOOTWAY
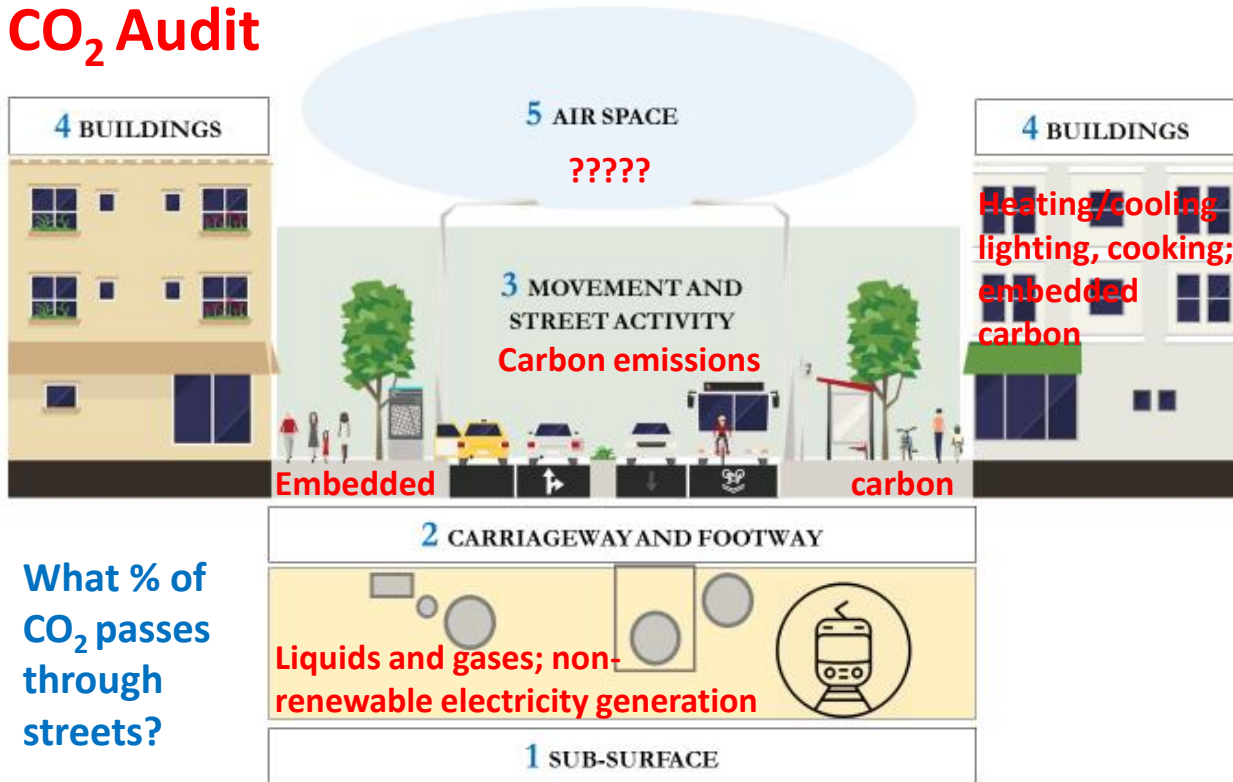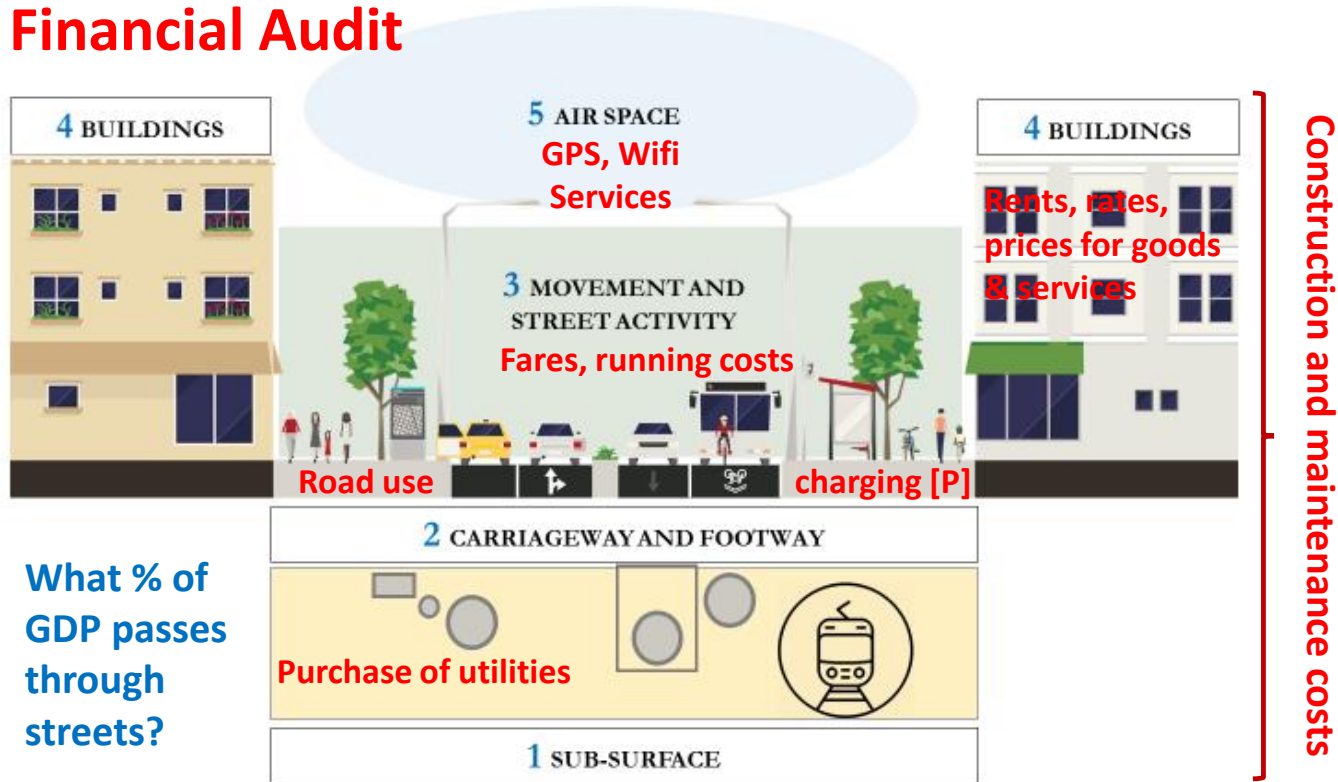
What % of GDP passes through streets?

Purchase of utilities

1 SUB-SURFACE

Construction and maintenance costs

MO*R*E
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Partners

MORE has 18 partners

	Rhine-Danube
	Orient/East-Med
	Baltic-Adriatic
	Mediterranean
	Rhine-Alpine
	Scandinavian-Mediterranean
	North Sea-Mediterranean
	North Sea-Baltic
	Atlantic

Malmo

London

Budapest

Constanta

Lisbon
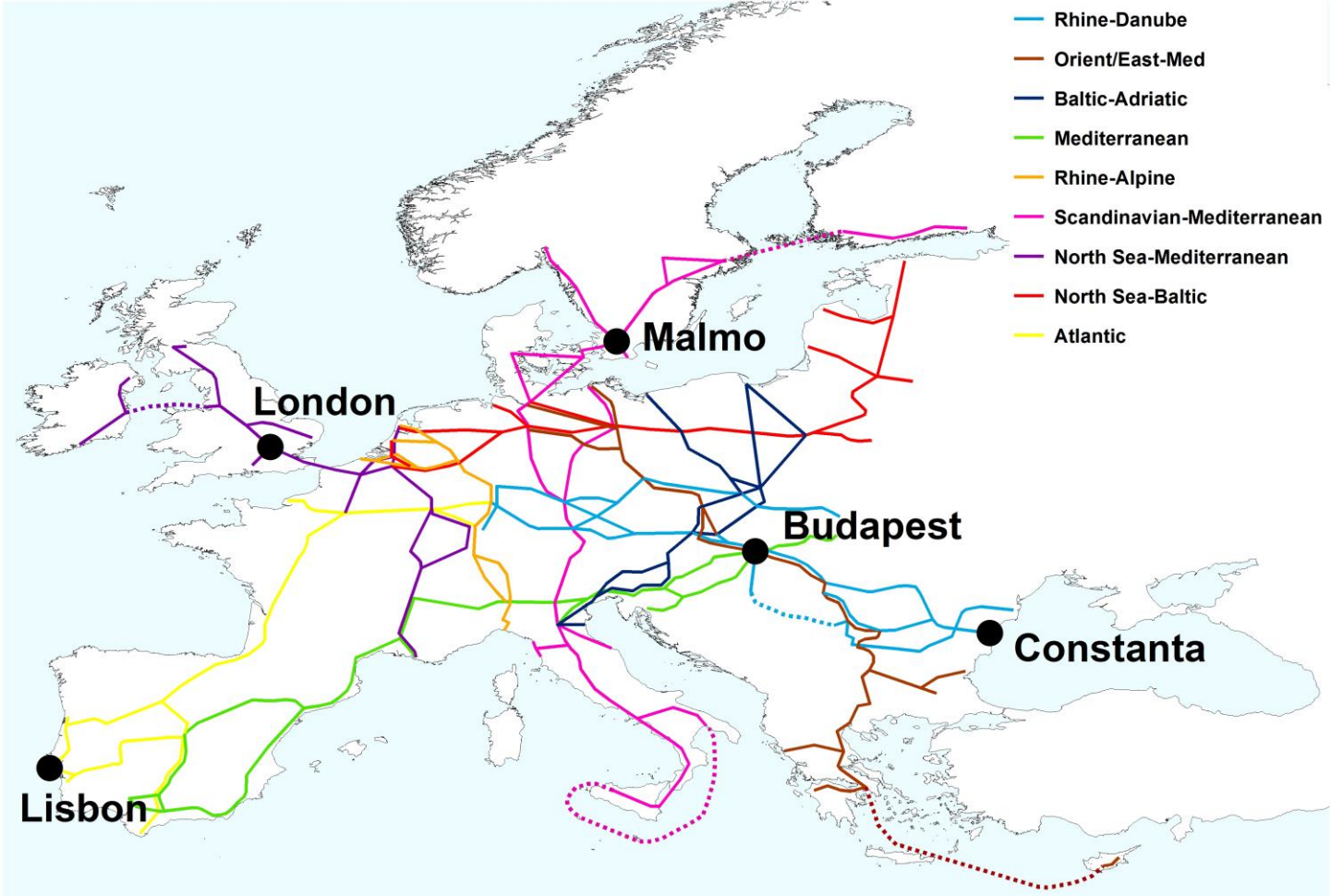
EU MORE - A2 Corridor
Street Types

N

Corridor study area
Greater London boundary

A2 TEN-T Feeder Route

Movement
— M3A [High movement function – Road]
— M3B [High movement function – Street]

Place
P2 [Medium place function]
P1A [Low place function – Commercial]
P1B [Low place function – Residential]

Road
— Major road corridor
— TEN-T network

Rotherhithe
North Greenwich
Thamesmead
Bricklayers Arms
Woolwich
Belvedere
Greenwich
Erith
Peckham
New Cross
Welling
Bexleyheath
Dartford
Bexley
Sidcup

A2016
A2041
A206
A206
A102
A101
A200
A202
A3
A210
A102
A2213
A205
A207
A205
A210
A210
A210
A20
A223
A221
A220
A223
A207
A207
A226
A226
A320
A206
A201(M)

0   2.5   5   7.5   10 km

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Transport for London

Participant No	Participant organisation name	Short name	Country
1 (Coordinator)	University College London	UCL	UK
2	Technische Universität Dresden	TUD	DE
3	Fondation Nationale des Science Politiques	SciencesPO	FR
4	PTV Group	PTV	DE
5	Dynniq	DYN	NL
6	VECTOS (SOUTH) LIMITED	VECTOS	UK
7	Buchanan Computing	BC	UK
8	European Integrated Projects	EIP	RO
9	Polis	POLIS	BE
10	Union Internationale des Transports Publics	UITP	BE
11	IRU Projects asbl	IRU	BE
12	International Federation of Pedestrians	IFP	CH
13	European Cyclists' Federation	ECF	BE
14	Center for Budapest Transport [City of Budapest]	BKK	HU
15	Câmara Municipal de Lisboa [City of Lisbon]	CML	PT
16	Transport for London	TfL	UK
17	Traffic Transportation Division [City of Malmo]	MALMO	SE
18	Municipiu Resedinta de Judet Constanta [Constanta municipality]	PMC	RO

Approach

6 Technical Workpackages

A: Investigation and Review

WP1: State-of-the-art: user needs, guides, policies and indicators

WP2: Political, institutional/ organisational and regulatory aspects

WP3: Future scenarios: new technologies, demographics, patterns of demand

B: Development of Design Tools

WP4: Developing and applying tools in case study corridors

C: Case Study Corridor Applications

WP5: City case studies: design studies, engagement and evaluation

D: Refinement & Exploitation

WP6: Development of MORE toolkit and refinement and exploitation of outputs

WP7: Dissemination and knowledge transfer

WP8: MORE management and administration

WP5: City case studies

- Key component of MORE:
  - ➢ Detailed identification of problems, issues & challenges
  - ➢ Test bed for new street design tools

- Each city has identified one major Feeder Route to/from TEN-T network

- Investigations at detailed section level and whole urban feeder route

- Two exercises per city:
  - ➢ Current conditions
  - ➢ Potential futures (scenarios) 20-30 years ahead

Some potential future technological developments:

> - Electrification of the vehicle fleet
> - Autonomous vehicles: road, rail water, air
> - Advances in traffic control systems
> - Advances in parking and loading management
> - Implications of employing new types of sensors
> - Self-healing roads
> - Trenchless technologies underground logistics

- Including potential personal and cyber security risks

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Dynamic Allocation of Road/Street-space

- To make better use of limited space/capacity, need to change allocation by time of day/week

- But also, to do this dynamically, depending on conditions on the network, at that time => dynamic (LED) signing and lining

- This requires data collection and co-ordination, on a real-time basis

KEY QUESTIONS:

- Are LED traffic signs and road markings effective in all conditions?

- How to safely and intelligibly handle transitions, from one state to another?

- How to improve urban network/TEN-T interfaces?

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Outputs

MORE Road/Street Design Tools

Recommended Comprehensive Design Process, offering:

1. **Road Design Option Generator:** *A Web-based tool for searching for street allocation solutions, through an on-line option generation library*.

2. **Road Design Stakeholder Engagement Tool:** *Web-based tool to assist with stakeholder engagement, both collectively during design workshops and by providing a portal for individuals to comment on design options, building on Buchanan Computing's TraffWeb product*

3. **Road Design Dynamic Simulator:** *A simulation tool to assess how all road-based activities perform under particular design options, building on PTV's existing VISSIM software*

4. **Road Design Appraisal Tool***: A web-based tool to assist with the appraisal of design options, using the outputs from the VISSIM simulations.*

Option generation – potential combinations

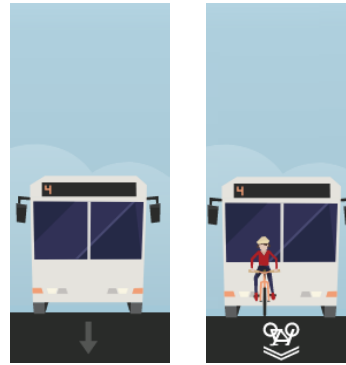PEDESTRIAN PAVEMENT

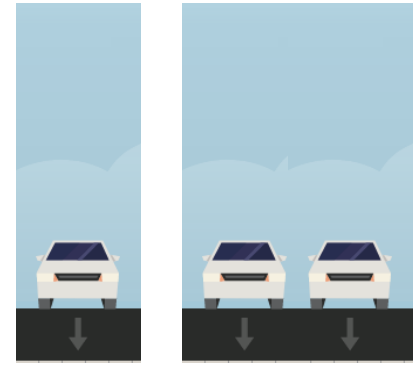narrow   standard   wide

CYCLE LANE

Yes/no

BUS LANE

Not shared   Shared

VEHICLE LANES

1   2

All possible combinations

{ Feasible
Not feasible

CRITERIA Political Technical Equity

Web-based Stakeholder Engagement

Plot a marker to the map to make a suggestion at a location:

Make a general comment about the area:
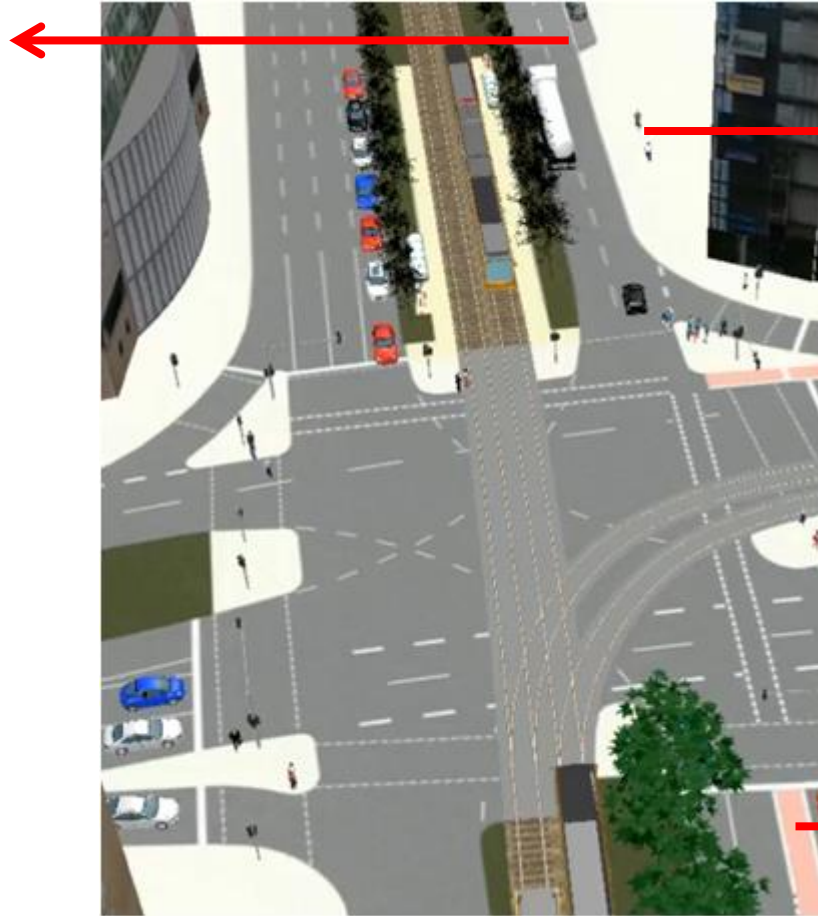
View point

Click on the map to record a comment or issue…

Make an area wide comment (not location based)

Modelling – further development
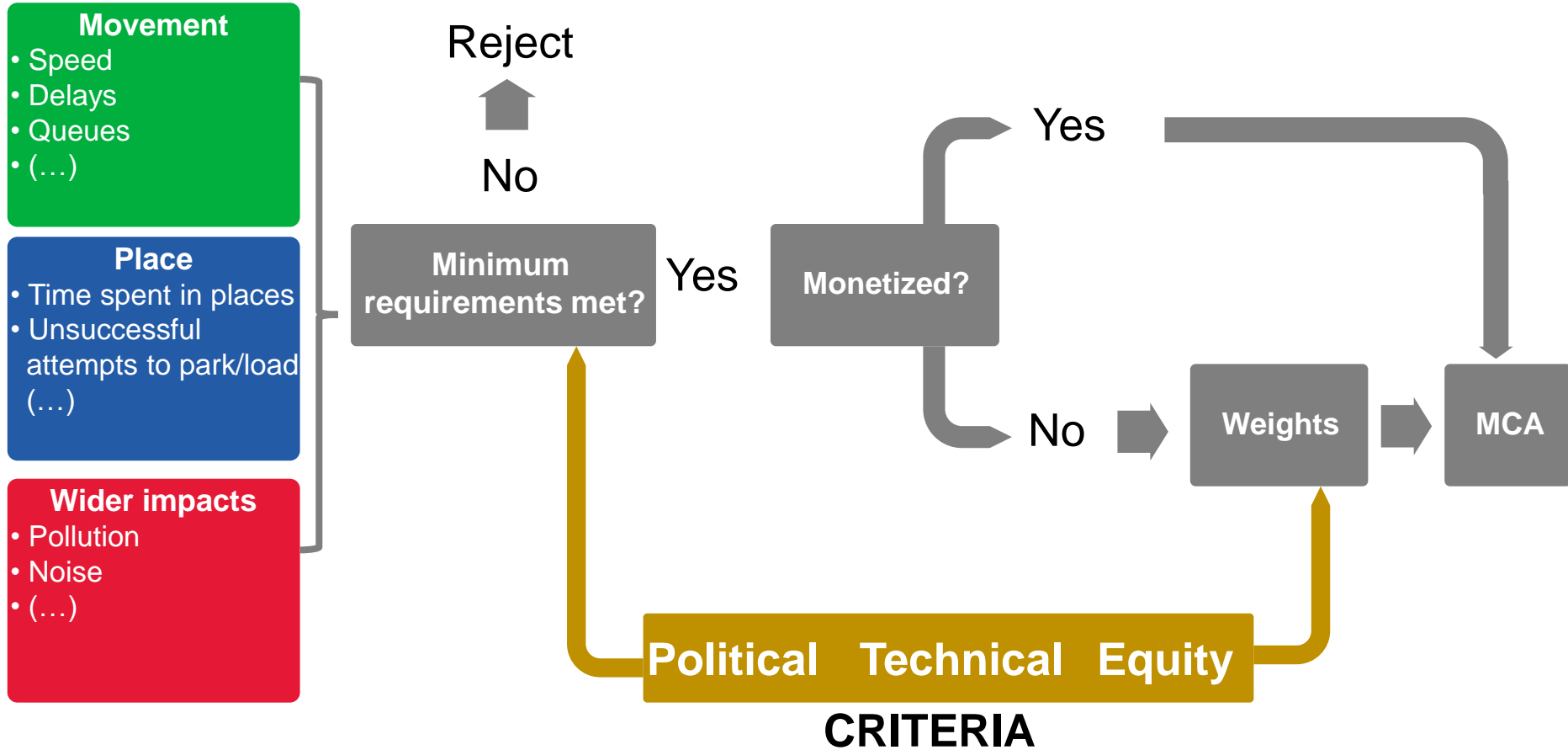

Parking and loading

Pedestrians moving or not moving (place activities)

Dynamic roadspace reallocation
• movement → parking
• all → bus only
• ...

Appraisal – further development

Policy/Practice Issues

Policy/Practice benefits

- Urban transport:
  - ➢ Better aligning road/street designs with achieving city objectives
  - ➢ Recommendations for regulation of new mobility produces & services
  - ➢ Recommendations for prioritisation of road/street space
  - ➢ Development of guide for planning, design, management and operation of urban road/streets

- Future developments and technologies:
  - ➢ Assisting cities in identifying potential technologies
  - ➢ Assisting cities in developing a scenario approach to futures

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Space Allocation Principles

- Unit application:
  - Type of **person** (e.g. resident)
  - Type of **activity** (e.g. loading)
  - Mode of **transport** (e.g. bus)

- Policy levers:
  - **Physical** restrictions
  - **Regulation**
  - **Pricing**

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A New Approach to Regulation?

- Current approach: regulate new mode (e.g. electric scooter) as becomes 'established'

- Suggested approach: generic regulation of activities allowed on different parts of the street – e.g.:

  ➢ **Footway:** non-motorised plus electric modes; maximum speed of 8mph (??), audible warning if wheel-based; no lights or protective gear

  ➢ **'Cycle' lane:** Wheeled vehicles (motorised and non-motorised) between 8mph and 20mph (??); night time lighting, protective gear recommended

  ➢ **Carriageway:** All motor vehicles capable of travelling at over 20mph; night lights and protective gear required, plus license and identification

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Some tricky issues

- Allowing for different uses of the same physical space (e.g. kerbside) at undefined times of day – not pre-specified. In some extreme cases, part of a footway might become part of the carriageway at certain times.

- Ensuring that the electronic signs and road markings are correctly operating and are fully visible at all times.

- Determining how to record the traffic regulations in operation at any particular point in time, in a way that is reliable and enforceable.

- Determining how to handle transition periods, from one set of regulations to another; (e.g. for parking switchover period would be set at the maximum allowed parking duration; but for the sudden introduction of a bus lane might find a driver in the 'wrong' lane for a short period of time.

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Thank you –

https://www.roadspace.eu

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