



FREIGHT TRANSPORT AND THE KERBSIDE: THE FUTURE OF LOADING AND UNLOADING IN URBAN AREAS

Briefing Report – Summary Slide Set

Technical Report ENG-TR.027

Julian Allen and Maja Piecyk

University of Westminster

November 2022

This briefing report has been produced as part of the Centre for Sustainable Road Freight (SRF – EPSRC grant number EP/R035148/1). Further details about the SRF project are available at: <http://www.csrf.ac.uk/>



**UNIVERSITY OF
WESTMINSTER**



Streets in Pompeii with kerbs and raised footways – 79 AD



Source: https://commons.wikimedia.org/wiki/File:Loveltaly_Pompei.jpg



Source: Wknight94
https://commons.wikimedia.org/wiki/File:Pompeii_street08_10.jpg



Source: Jebulon
https://commons.wikimedia.org/wiki/File:Street_houses_Pompeii_Italy.jpg

- Pompeii shows that kerb stones and footways raised above carriageway existed in ancient Rome
- However, use of kerb and raised footway did not feature in UK urban street design until approx. 1700 years later than Pompeii was covered by volcanic eruption
- Definition of 'kerb' -an edging of stone or the like, bordering a raised path, side-walk, or pavement (Oxford English Dictionary)
- Earliest recorded usage of 'kerb' with this specific meaning – 1807 (Oxford English Dictionary)

History of street surfacing and maintenance in urban areas in England

- Records of pavage tolls from 13th century - led to improved road surfaces in some urban areas but following features remain:
 - Level surfacing of entire carriageway without kerb and raised footway
 - Pedestrians share space and surface with horses, carts, coaches and market stalls
 - Streets typically filthy and rubbish strewn
- First demarcation of carriageway and footway in England – 1750 in Micklegate, York – wealthy residents granted permission to erect bollards to cordon off two-foot wide space for pedestrians to improve road safety
- First kerb in England in 1760s due to rivalry between Cities of London and Westminster to outdo each other through modernisation and beautification

Emergence of the kerbside in London in 1760s

- Urban streets in very poor state of repair & affecting traders' businesses in London until 1760s
- Rivalry between Cities of London & Westminster to outdo each other through modernisation
- 1762 on - Westminster Paving Act - Framework for paving, cleansing and lighting the streets
 - Established a paving commission and a parliamentary grant
 - Replaced individual property owners having responsibility for carriageway and footway improvements
 - Carriageways laid in flat stone & gutters moved from centre to edges; footways raised above level of carriageway & paved
- City of London – 1766 Act of Parliament (London Paving and Lighting Act)
 - Allowed City of London to establish Paving Commission for carriageway and footway works
 - Carriageway paved in granite setts & cambered to allow water to drain into kerbed side channels
 - Footways raised above carriageway & paved with Purbeck stone; separated from carriageway by kerbstones



Regent St., 1822



Soho Square, 1812



Cornhill, Lombard St., 1812

Inventory of kerbside vehicle uses in one London borough (2018)

1. Pedestrian schemes
2. Traffic capacity needs
3. Road safety highway space prevention
4. Lane rental and Utility works needs
5. Public realm scheme design
6. Road Safety schemes
7. School Travel Plan/ School schemes
8. Cycle schemes/provision
9. Barclays Cycle Hire docking stations
10. Powered Two Wheeler parking bays
11. Disabled Blue Badge Bay
12. Disabled White Badge Bay
13. Taxi Rank
14. Taxi Parking Bay
15. Resident Parking Bay
16. Single & Double Yellow Line loading & waiting provision –all vehicles
17. Single & Double Yellow Line loading & waiting provision – additional concession for
18. Paid for Visitor Parking Bay – Pay by Phone and P&D
19. London Bus Network – bus priority
20. London Bus Network – bus stop accessibility
21. Express coach and London Tour Bus – terminal point
22. Tour coach – parking and waiting provision
23. Electric Vehicle Charging Bay
24. Electric Vehicle Charging Bay – LGV
25. Car Club Bay
26. Doctors Bay
27. Hospital Bay
28. Access and visibility splays for frontager servicing & deliveries
29. Access needs for kerbside services eg refuse collection, emergency vehicle access etc.
30. Diplomatic Bay
31. Market Trader Bay
32. Metropolitan Police concessions
33. Security Zone requirements
34. Suspended Bay, Skips, removals etc
35. Special Events needs
36. Pedicabs

Long-standing competition for uses of kerbside (transport and other features)

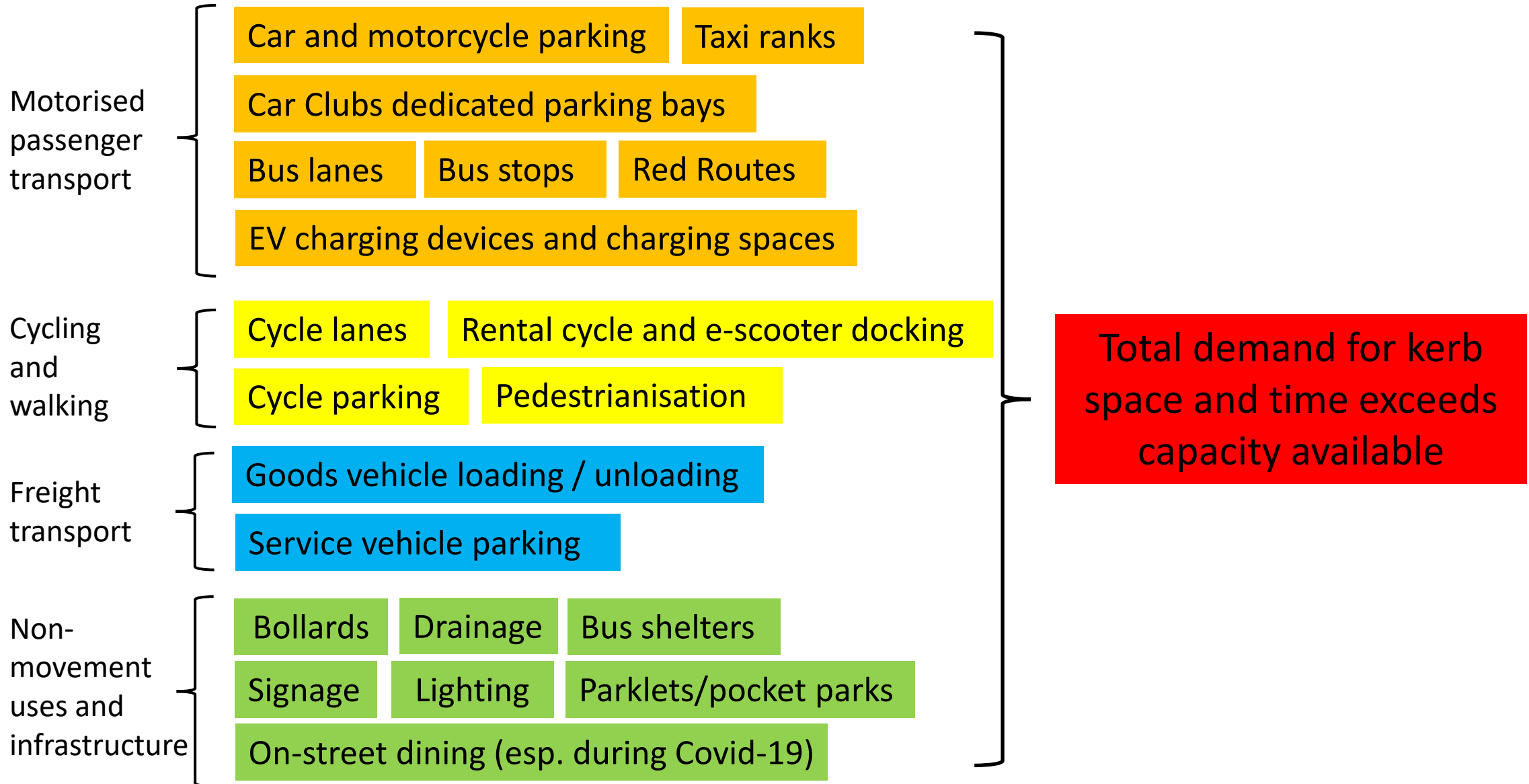
- Waiting and loading (yellow lines, kerb markings, red route markings, loading bays, signage)
- Pedestrian facilities (footways, build-outs, crossings, drop kerbs)
- Cycling facilities (lanes, parking and signage)
- Motorcycle facilities (parking facilities)
- Occasional vehicles users without designated space (emergency vehicles, highway maintenance vehicles, skip lorries)
- Bus infrastructure (lanes, bus shelters, stops, stands)
- Cars (parking bays and drop kerbs for access to frontages)
- Taxis (ranks, signage)
- Traffic control & info (traffic lights, signs, control boxes, speed cameras)
- Landscaping (trees, verges, planter boxes, hanging baskets)
- Utilities/maintenance (access to manhole covers, drains, street sweeping/cleaning)
- Safety (street lighting, defibrillators)
- Other infrastructure (grit bins, EV chargers, hire bike and e-scooter docking stations)
- Street furniture for:
 - Control (bollards, railings, signs, ticket machines)
 - People (litter bins, post boxes, seating)
 - Commerce (telegraph poles, advertising boards, phone/wifi boxes, stalls, shopping trolleys, dining)

Adapted from Urban Movement, 2019

- List of 160 legitimate current transport & place-based activities & functions that require kerbside space
- Not sufficient space to meet all of these competing demands
- These demands are increasing over time

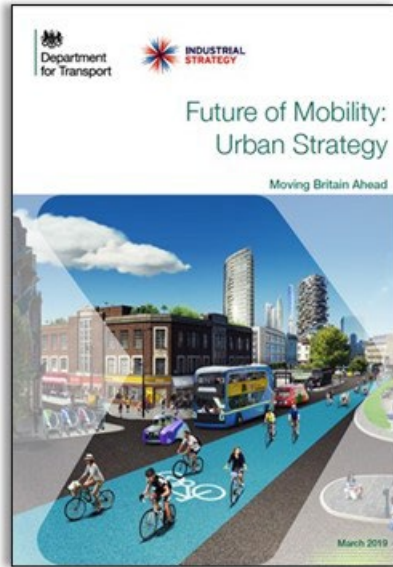
Source: Urban Movement, 2022

Competing uses for kerbside space and time



Promotion of active travel by UK Government

2019



2020



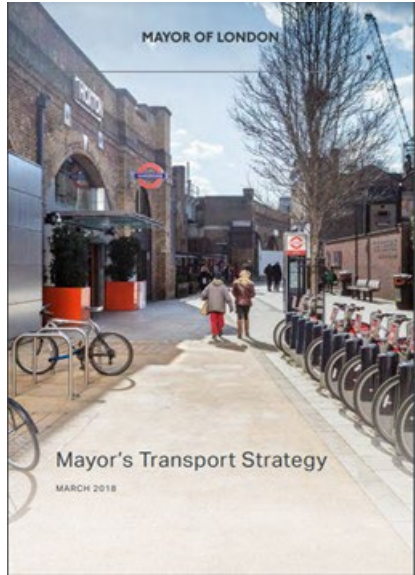
2021



- **Walking and cycling**
- Mode shift from motorised vehicles to walking, cycling and public transport
- Half of all journeys in towns & cities cycled or walked by 2030
- ‘World class’ cycling and walking network in England by 2040
- Install “thousands of miles of main road cycle tracks” in towns and cities
- Commissioning body to be established
- Cycle lanes “must be physically separated”
- LTNs - “in many more groups of residential streets”
- More ‘Mini-Hollands’ - segregated lanes on main urban roads
- Will “install more cycle racks in town & city centres”

- **E-cycle and e-scooter**
- National e-cycle pilot programme
- E-scooter trial
- **Buses**
- Plans for bus lanes on any roads where there is a frequent bus service, congestion, and physical space to install one
- Bus lanes should be full-time and as continuous as possible
- “Loading’s impact on bus lanes must be minimised, and to achieve this hours should be restricted, or loading bays inset or re-provided close by, away from the main carriageway”

Targets for a healthier, fairer, safer, greener, prosperous city - Mayor of London (2018)



- 80% of journeys will be made by walking, cycling and public transport by 2041
- All Londoners will achieve 20 minutes of active travel each day by 2041
- 70% of Londoners will live within 400 metres of the London-wide cycle network by 2041
- Prioritisation of space efficient modes of transport to tackle congestion and improve the efficiency of streets for the movement of people and goods, with aim of reducing overall traffic levels by 10-15% by 2041
- Reduce the number of lorries and vans entering central London in the morning peak (07:00-10:00) by 10% by 2026
- Reduce emissions from vehicles on London's streets, to improve air quality and support London through various measures
- All deaths and serious injuries from road collisions to be eliminated from London's streets by 2041
- Make London's transport network zero emission by 2050

Covid-19 pandemic - special transport actions by UK Government and Mayor of London

- UK Government made £220 million available to local authorities to reallocate roadspace and create dedicated cycling routes
- Over £100 million provided to Transport for London for its Streetspace programme
- National Government funding supported by:
 - Network management duty (NMD) statutory guidance to support local authorities in implementing cycling and walking schemes and guidance to local authorities on designing cycle infrastructure
 - changes to Traffic Regulation Orders (TROs) including introduction of emergency procedure for temporary orders and amendment to the usual publicity requirements for other types of orders
 - Business and Planning Act 2020 which included a “temporary streamlined and cheaper route for businesses such as cafes, restaurants and bars to secure a licence to place furniture on the highway”
 - Funding for local authorities to prepare for the safe reopening of high streets and other retail spaces including safety measures such as new signs, street markings and temporary barriers
- Led to implementation of many schemes that altered the use of kerbside (some temporary, some enduring)

Recent developments in kerbside use (1)

Bus lanes



Source: ReptOn1x
https://commons.wikimedia.org/wiki/File:A4_Piccadilly_-_DSC04251.JPG



Source: Stephen McKay
<https://www.geograph.org.uk/photo/949083>



Source: Chris Samson,
<https://www.flickr.com/photos/lodekka/3300266734/>

- Bus lanes first introduced in 1960s in London
- 290 kms of bus lanes in London by 2018 (RAC Foundation, 2018)
- Government Bus Strategy: expects “to see plans for bus lanes on any roads where there is a frequent bus service, congestion, and physical space to install one. Bus lanes should be full-time and as continuous as possible” (Department for Transport, 2021)

Recent developments in kerbside use (2)

Cycles lanes and superhighways



Source: Felix O
https://commons.wikimedia.org/wiki/File:Mile_end_cycle_lane_2.jpg



Source: The Lud
https://commons.wikimedia.org/wiki/File:Ludgate_Hill.jpg

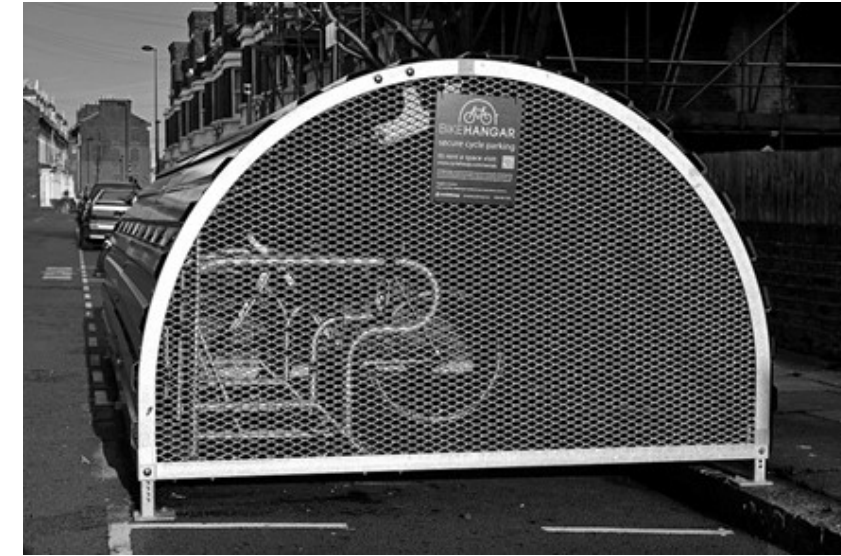
- Government cycling and walking strategy: “half of all journeys in towns and cities being cycled or walked by 2030” (Department for Transport, 2021)
- Government pledged to implement, “thousands of miles of safe, continuous, direct routes for cycling in towns and cities, physically separated from pedestrians and volume motor traffic” (Department for Transport, 2021)

Recent developments in kerbside use (3)

Hire bike and e-scooter docking stations & cycle parking



Source: Steven Craven
<https://www.geograph.org.uk/photo/1974553>



Source: George Rex
https://upload.wikimedia.org/wikipedia/commons/b/bc/Bike_Hangar_SW2_%2823699469465%29.jpg

- Bike sharing schemes launched in UK in London in 2010 and has spread to other cities, with approx. 18,000 hire bikes in UK (CoMoUK, 2021)
- Estimated need for approximately 50,000 more on-street cycle parking spaces by 2025 (hire and owned bikes) (Transport for London, 2019)
- e-scooter trials in more than 30 locations in the UK since June 2021

Recent developments in kerbside use (4) EV charging points and charging bays



Source: frankh
<https://www.flickr.com/photos/f-r-a-n-k/359123912/sizes/o/>

Source: Philafrenzy
https://commons.wikimedia.org/wiki/File:Source_London_charging_point_East_Finchley.JPG

- 26,000 public electric vehicle (EV) charging devices installed in 16,000 locations in the UK by October 2021 (Zap-Map, 2021)
- 37 chargers per 100,000 population. Only one-third of chargers sited at kerbside (Department for Transport, 2021)
- 35-50% of urban households have no off-street parking facility
- Total of 32 million cars and 4.4.vans in Britain in June 2021. Number of public charging devices required will have to expand rapidly as vehicle parc switches to EV power source (Department for Transport, 2021)

Recent developments in kerbside use (5)

Car Club parking bays



Source: David Hawgood
<https://www.geograph.org.uk/photo/1388196>



- 6,060 car club vehicles in Britain in 2020 (of which about 4,000 were in London)
- 90% of these vehicles were cars and 10% were vans
- 10% of fleet was battery EV and 22% plug-in hybrid in 2020 (with rest petrol or diesel powered) (CoMoUK, 2020)
- National car club fleet has grown from approximately 3,000 vehicles in 2015 (CoMoUK data in Wu et al, 2020)

Recent developments in kerbside use (6)

Parklets: greening agenda at the kerbside



Source: Mark Hogan
<https://www.flickr.com/photos/markhogan/6343548530/>



Source: Source: Meristem Design in Cross River Partnership, 2020.



Source: Cyclehoop in Cross River Partnership, 2020.

- Parklet (also known as ‘pocket park’) is “a temporary or permanent pavement extension that sits in existing parking bay(s). They usually act as a space for people to sit and rest, but can also include features such as bicycle parking, outdoor dining and local art or information” (Cross River Partnership, 2021)
- Parklets reflect the concepts advocated in the ‘Healthy Streets Approach’ (Healthy Street, 2021)
- Suggested that London, “has only two thirds of the greenspace it needs for a population its size so we need to find more space for parks and playgrounds” and parklets can play a role in this (CPRE London, 2020)

Recent developments in kerbside use (7)

On-street dining during Covid-19 and since



Source: LB Richmond Upon Thames



St Johns Wood High Street, London



Source: Local Government Association

- Business and Planning Act 2020 included a “temporary streamlined and cheaper route for businesses such as cafes, restaurants and bars to secure a licence to place furniture on the highway” (Department for Levelling Up, Housing and Communities, 2021)
- In addition to seating in some locations also suspension of parking and loading bays, widening of pavements, the use of road barriers and street closures at certain times of day
- Background notes to the Queen’s Speech (May 2022): “ensuring everyone can continue to benefit from al fresco dining” (Prime Minister’s Office, 2022)

Recent developments in kerbside use (9)

Low Traffic Neighbourhoods (LTNs) and modal filters



Source: Transport for London



- LTNs are traffic schemes in residential neighbourhoods to reduce through motor traffic from these streets
- Road closures for motor traffic achieved through 'modal filters' including physical restrictions (such as bollards and planters), one-way street systems with cycle contraflows, and camera-enforced Penalty Charge Notices
- Following UK Government funding and support for active travel during Covid-19 pandemic, many temporary LTNs introduced in towns and cities around the country (Department for Transport, 2021)

Recent developments in kerbside use (9)

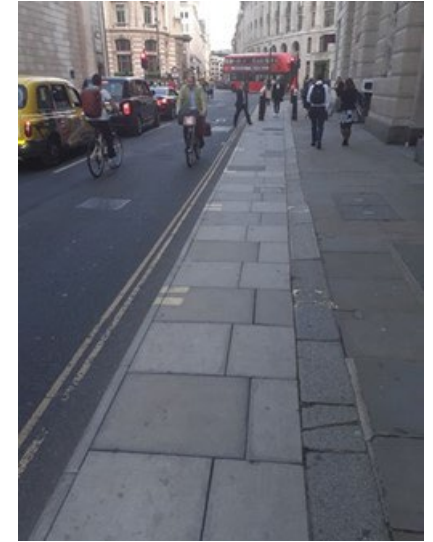
Pedestrianisation, low traffic streets and footway widening



Source: John Salmon
(https://upload.wikimedia.org/wikipedia/commons/5/51/Pedestrianised_street%2C_Newcastle_-_geograph.org.uk_-_974057.jpg)



Source: Roger Cornfoot
(https://upload.wikimedia.org/wikipedia/commons/2/29/Pedestrianised_street%2C_in_central_Taunton_-_geograph.org.uk_-_1554161.jpg)



Footway widening in the City of London

- Pedestrianisation schemes in retail and other city centre streets used by many workers, visitors and residents
- Often designed with level surfaces and landscaping
- Began in Stevenage New Town in 1946 and expanded to many towns and cities since
- Some schemes only permit pedestrians while other also allow cyclists
- Motorised traffic is prohibited (either during the working day or at all times)
- Footway widening also being implemented where footfall is high
- Many temporary schemes implemented during Covid-19 with some since becoming permanent

Oxford Street West

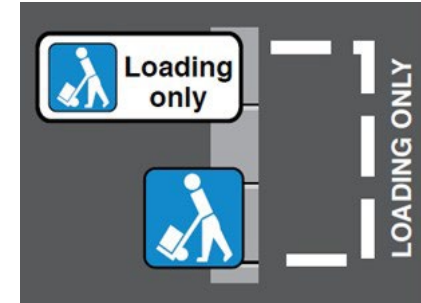


Recent developments in kerbside use (10)

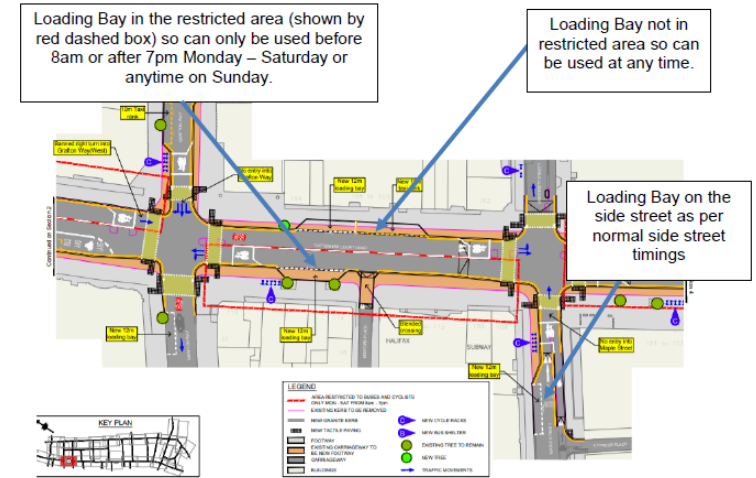
Major streetscape schemes in London

- Efforts to improve safety and attractiveness of streets/areas
- Changes in times for road access by motorised vehicles
- Various freight implications
- Move from yellow lines to dedicated bays for kerbside unloading
- Retiming and consolidation encouraged
- Use of cargo cycles promoted
- Overall reduction in loading capacity
- City of London - target to reduce the number of motorised freight vehicles in the Square Mile:

- by 15% by 2030 and by 30% by 2044
- at peak times (7-10am, 12-2pm and 4-7pm) by 50% by 2030 and 90% by 2044



Source: Logistics UK



Loading Bay in the restricted area (shown by red dashed box) so can only be used before 8am or after 7pm Monday – Saturday or anytime on Sunday.

Loading Bay not in restricted area so can be used at any time.

Loading Bay on the side street as per normal side street timings

Source: West End Project
<https://www3.camden.gov.uk/westendproject/wp-content/uploads/2021/03/WEP-Deliveries-Guide-Updated-March-2021-1-1.pdf>

West End Project



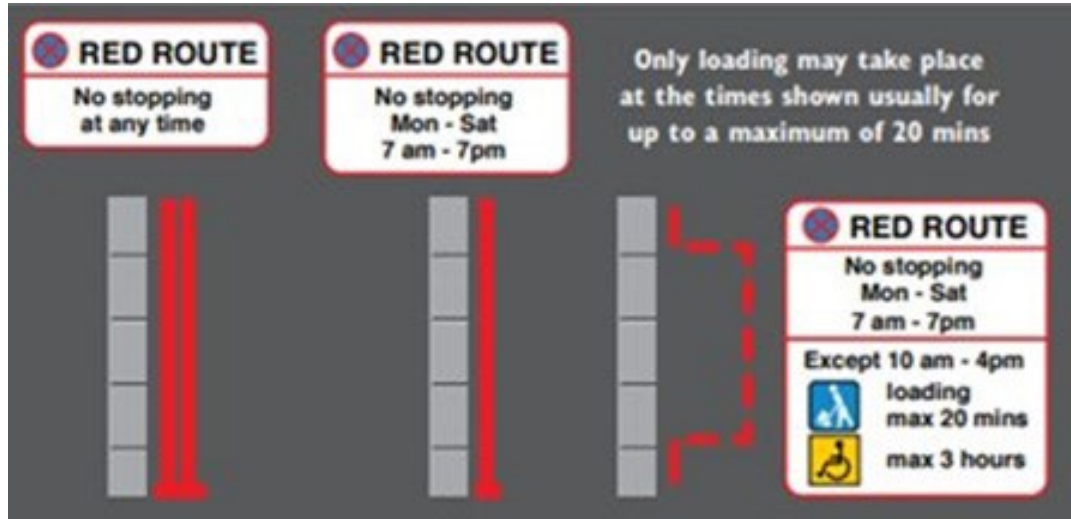
City of London



City of London Transport Strategy

Recent developments in kerbside use (11)

Red routes



Source: Logistics UK

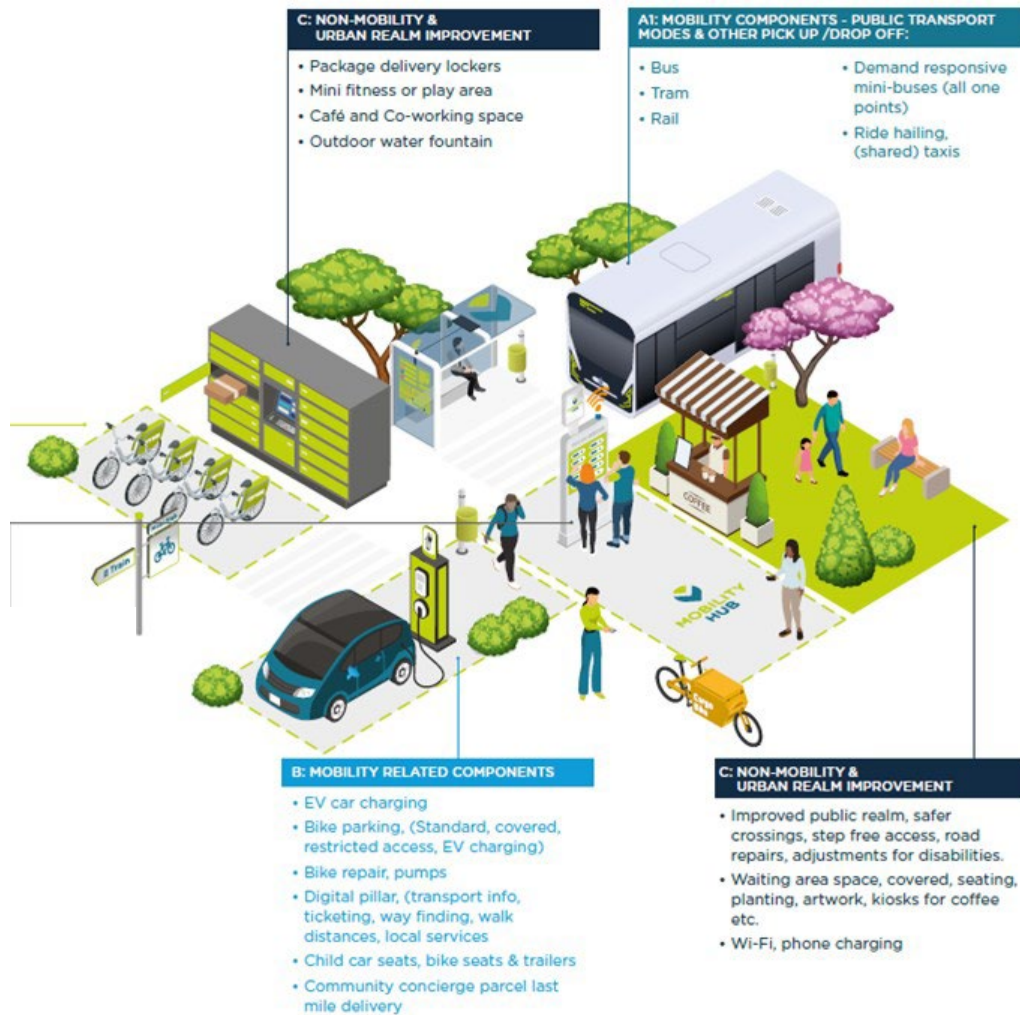


Source: https://commons.wikimedia.org/wiki/File:Red_lines_on_Cromwell_Road_-_geograph.org.uk_-_1544349.jpg

- Introduced since 1991 on strategic radial and orbital roads within London (approx. 5% of total London road network (580 km) but which carries up to 30% of London's road traffic (Transport for London, 2021d)
- Initially introduced to improve traffic flow and tackle traffic congestion
- Purpose changed in 1998, "to seek to encourage a shift from the use of the car for personal travel to public transport, walking or cycling" to improve safety and local environment (The Traffic Director for London, 1998)
- Key components: replace yellow lines at the kerbside with red lines, alter times at which loading and disabled parking can take place in marked boxes at the kerbside and on adjoining side streets, include bus lanes on these Red Routes

Recent developments in kerbside use (12)

Mobility / Community hubs



- Concept proposed by some urban designers as a space for public and shared mobility modes and to improve public realm
- Would support active travel and non-car modes to address air quality and greenhouse gas emissions associated with transport
- Features could include public transport interchanges, cycle hire, parking and repair facilities, car clubs, ride hailing services, vehicle recharging infrastructure, community meeting rooms, workspaces, cafes, recreational and fitness facilities, gardens and allotments for growing food
- Could also include community logistics hub for local collection and delivery by cargo bike

(CoMoUK, 2019; Smart and Young, 2021)

Changes in kerbside regulations and allocation over time

1900-1950
 No kerbside regulations
 No dedicated kerbside space

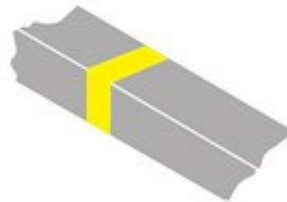


Source:
https://commons.wikimedia.org/wiki/File:Broadstairs_High_Street,_Kent_England_-_pre_WWI.jpg



Source:
https://commons.wikimedia.org/wiki/File:Little's_Adeleide_House_Cafe,_Central_Parade,_Deal,_Kent,_England.jpg

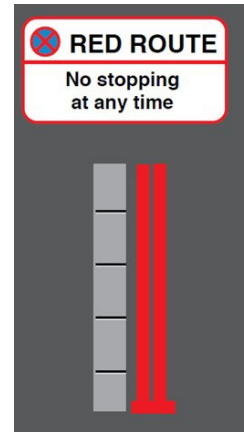
1950s/1960s
 Yellow lines regs introduced
 No dedicated kerbside space



No Loading
 Mon - Sat
 8.30 am - 6.30 pm

Source: London Councils

1990s
 Increase in dedicated bus lanes & red routes



Source: Logistics UK

Last decade
 Further increase in dedicated kerbside space for various uses



← Increasing requirement to use dedicated space for loading in some locations →

Freight transport and the kerbside



Source: Logistics UK

- Goods and service flows essential for urban businesses and residents
- Importance of kerbside for loading/unloading activities
- Servicing activities also require kerbside parking space
- Need for inclusion of freight transport needs in kerbside policy and design



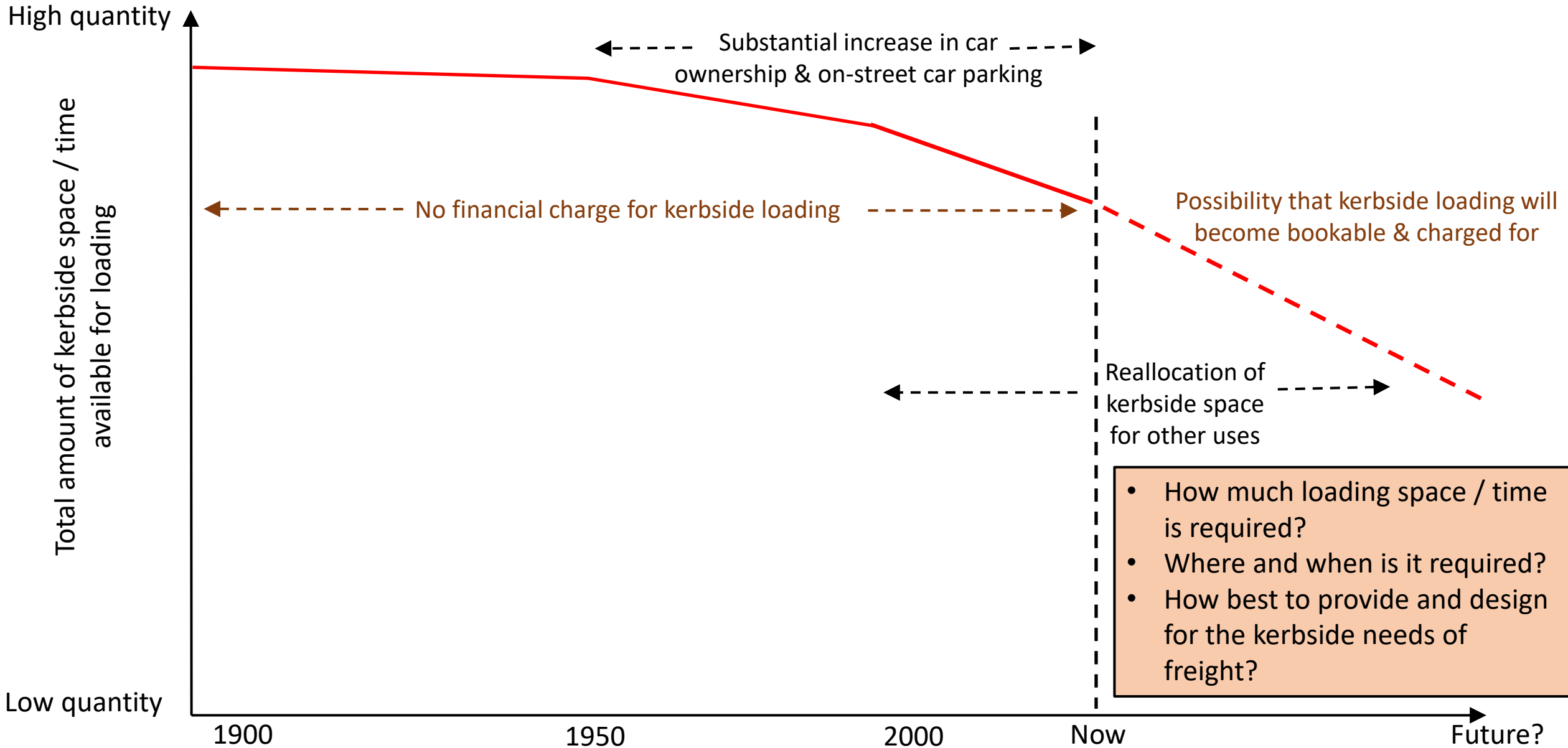
Source: Logistics UK



Source: Logistics UK



Indicative change in available kerbside loading space / time



Proportion of loading/unloading that takes place on- and off-street from freight studies in towns and cities in the UK

Study	On-street	Off-street	Study location	Year
Camden, London	100%	0%	High street	2015
Acton, London	96%	4%	High street	2015
Norwich	95%	5%	Retail street	2003
Kingsland, London	93%	7%	High street	2015
Regent Street, London	92%	8%	Major retail and commercial street	2009
Covent Garden, London	92%	8%	Retail street	2009
Reading	90%	10%	Town centre street	2003
Wallington, London	90%	10%	High street	2005
Lisson Grove, London	89%	11%	High street	2008
Stratford, London	89%	11%	High street	2015
North Harrow, London	87%	13%	High street	2008
City of London	85%	15%	Office and retail streets	2011
Clapham Junction, London	85%	15%	Retail street	2007
Winchester	82%	18%	High street	2001
Hatch End, London	79%	21%	High street	2007
Worthing	71%	29%	Major retail chains in town centre	2005
Colchester	70%	30%	Town centre streets	2005
Chichester	69%	31%	Major retail chains in town centre	2005
Norwich and London	64%	36%	Wide range of business types inc. offices	1999
Horsham	61%	39%	Major retail chains in town centre	2005
Torbay	59%	41%	Shops, hotels, supermarkets, manufacturers, and hospital	2003
Park Royal, London	22%	78%	Industrial estate	2002
Broadmead, Bristol	13%	87%	High % of receivers in shopping centre	2003

Stages, tasks & locations in making an urban delivery by road using a goods vehicle

No.	Location	Stage number and task description
1	At depot	Sort goods at depot for vehicle delivery journey
2		Determine sequence in which make deliveries (if multi-drop)
3		Load goods onto vehicle at depot (in line with delivery sequence if multi-drop)
4	Driving on road	Drive vehicle from depot to delivery location (using routing knowledge / information)
5		Identify best place/s to stop vehicle
6		Search for stopping location (including queuing or circulation if space not available)
7	Driving on road / at kerbside	Park vehicle (at kerbside or off-street)
8	At kerbside / on footway	Decide how many addresses to deliver to when vehicle is stopped (if multi-drop)
9		Locate goods on vehicle for delivery
10		Load goods onto manual handling device (if too large/heavy to carry by hand)
11	On footway	Determine walking route (and sequence if more than one) from vehicle to delivery point
12		Transport goods on-foot from vehicle to delivery point
13		Locate point of delivery at building
14	At receiver's building	Enter building and continue walking / using lifts if delivery is to large or multi-tenanted building
15		Arrive at point of goods handover to receiver
16		Carry out necessary administration to complete delivery
17	On footway / in building	If more than one delivery to be made on foot, continue to next delivery point (and repeat stages 11-16 for each)
18	On footway	Return on-foot to vehicle once all products conveyed to building/s have been delivered
19	At kerbside / on footway	Return any manual handling device to vehicle
20	At kerbside / driving on road	Egress from stopping location into carriageway
21	Driving on road	Drive on to next delivery stopping point (multi-drop – repeating stages 4-18 each time) or return to depot (single drop)

Goods vehicle dwell time at kerbside depends on various factors

- Distance from the goods vehicle to premises being served
- Size of the delivery and weight of goods
- Type of product and whether goods are unitised
- Means of getting goods off vehicle and conveying them to premises
- Whether driver has to close and lock vehicle
- Number of people performing delivery
- Whether staff at receiving establishment assist with loading/unloading
- Whether goods have been pre-ordered by establishment
- Whether goods have been sorted for delivery prior to vehicle's dispatch from warehouse
- Extent to which receiver checks goods received while driver is present
- Whether other deliveries are taking place at receiving establishment at same time
- Number of deliveries made from stopping location

Goods vehicle dwell times at kerbside from analysis of surveys

- Delivery by van – approx. 10 minutes on average
- Delivery by rigid HGVs – approx. 20 minutes on average
- Delivery by articulated HGV – approx. 30 minutes on average
- But some goods deliveries/collections at kerbside take far longer than 30 minutes (such as large deliveries to pubs, scaffolding and construction deliveries, and removals)
- Across all types of business served not a strong correlation between premises size and the mean dwell time of goods vehicles making deliveries
- Servicing activity dwell times usually substantially exceed goods deliveries
- 2001 survey in Winchester found average vehicle dwell time across all service activities to be approx. 35 minutes on average
- However, some service activities such as lift/escalator, air conditioning and computer maintenance and repairs, pest control, and floristry/plant care were found to often take far longer

Time spent at kerbside on London high streets in 2014/15 by activity (% of total time spent at kerbside by reason for stop)

Reason for stop	Acton	Camden	Kingsland	Stratford
Freight loading/unloading	9%	11%	10%	6%
Parking	85%	77%	81%	84%
Drop-off and pick-up (inc. buses)	5%	7%	7%	8%
Waiting	1%	5%	2%	2%
TOTAL	100%	100%	100%	100%

Source: calculated from data in Transport for London, 2015

Effects of lack of kerbside space for goods deliveries and collections

- Illegal parking by cars causes problems for freight access to kerbside
- Loss of kerbside space to other uses will compound these problems
- Lack of kerbside availability for freight impacts on:
 - vehicle kms travelled and driving time, fuel use, GHG and local air pollutant emissions
 - dwell time of goods vehicles at kerbside
 - delivery/collection costs for local businesses and freight operators
 - difficulties receiving deliveries and viability of local businesses
- Also results in issuing of Penalty Charge Notices and fines for freight operators who have to park illegally to make deliveries and collections

Innovative freight kerbside trials and approaches (1)



Source: UPS

Mobile logistics hubs



Source: Nuro



Source: Starship

Kerbside delivery with autonomous vehicles



Source: TNT



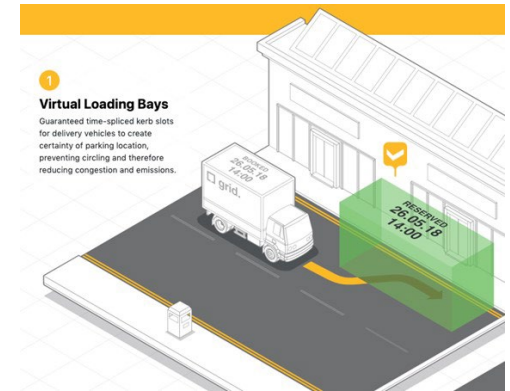
Source: TRL/Oxbotica

- But likely to increase vehicle dwell time spent at kerbside
- Plus range of safety, security, technological, operational, attitudinal, infrastructural & financial challenges

Innovative freight kerbside trials and approaches (2)

Digital kerbside and parking approach for goods vehicles

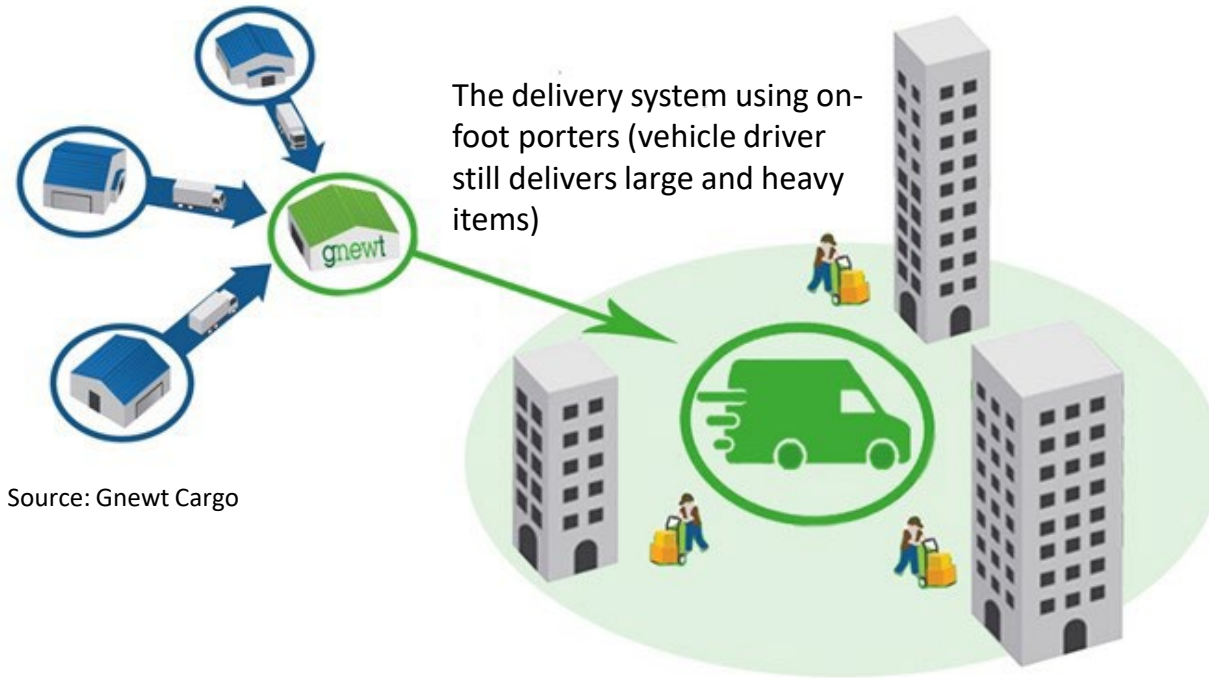
- Efforts by UK Government for improved transport information and operations and better use of transport infrastructure capacity through improved provision of data about parking and vehicle charging locations (Geospatial Commission, 2021)
- New national parking data standards in 2019 with ambition for data “supporting the development of apps to make parking easier for drivers” (DfT, 2019)
- Work by companies such as Appy & Grid Smarter Cities (& Pebble in USA) to digitise kerbside & develop real-time dynamic approach to allocating kerbside space to goods vehicle (replacing current loading regime)
- Intended to facilitate local authorities to better utilise kerb & reduce vehicle km and emissions
- Based on charging for this space & time with technology provider sharing revenue with local authority
- Freight vehicle km and emissions benefits of digital kerbside questionable – could lead to reduced kerb space for goods vehicles due to kerb space allocation decisions, enforcement regime and unpredictable arrival times for multi-stop goods vehicle operations
- Potentially helpful approach for large, bulky deliveries that require close stopping proximity to point of delivery



Source: Appyparking and Grid Smarter Cities

Innovative freight kerbside trials and approaches (3)

Using on-foot porters for last leg of delivery to reduce environmental impact and improve operational efficiency



Source: Gnewt Cargo

Before: 7 x 3.5 t vans and drivers

After: 2 x 7.5 t vehicles and 2 porters

Portering compared with driver making all collections & deliveries:

- 65% reduction in vehicle driving distance
- 35% reduction in total time taken
- Major reduction in kerbside parking time
- Similar last-mile delivery costs



Porters rendezvous with vehicle to be supplied with bagloads of parcels



Ford and Hermes (Evri) currently carrying out trials of this system in their parcel delivery operations

Innovative freight kerbside trials and approaches (4)

Physical infrastructure designed into buildings

- Off-street loading/unloading and parking space for vehicles providing deliveries/collections and services to occupiers of the building
- Suitably designed off-street loading bays and other entrance points for goods and servicing activities
- Waste storage space and equipment
- Adequate ingress and egress to and from the public road and these off-street parking spaces
- Provision of sufficient goods lifts within the building
- Provision of sufficient stockholding space within the building
- Provision of locker banks for commercial and residential buildings
- Planning system could be used to achieve above which can lead to reduced:
 - goods vehicle dwell time
 - demand for freight kerbside parking
 - goods vehicle queueing outside large buildings

Innovative freight kerbside trials and approaches (5)

Logistics operational measures to reduce kerbside dwell time

- Ensuring efficient use made of physical logistics infrastructure at building (e.g. enforcement of use of off-street vehicle loading space)
- Use of booking systems for goods delivery and collection vehicle arrivals to prevent vehicle queuing for either kerbside or off-street parking space
- Provision of internal logistics operations within large buildings (e.g. concierge / loading bay personnel making internal deliveries)
- Provision of accurate delivery point geographical data for use by freight transport operators
- Encouragement of use of locker banks and collection points for online shopping

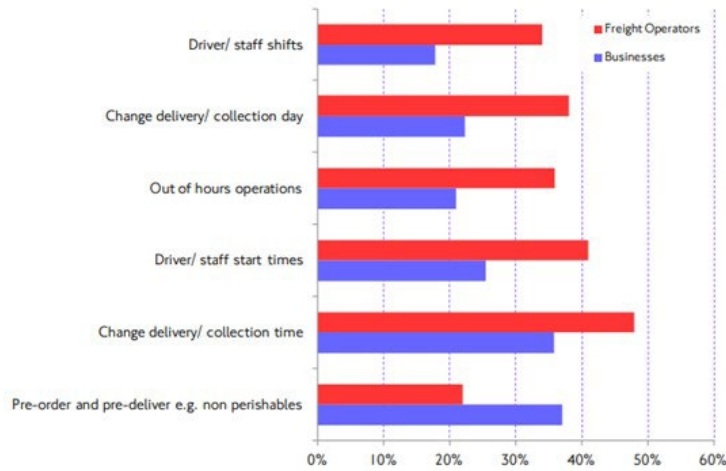
Approaches suggested by UK national and local government to solving urban delivery problems

- Retiming of deliveries and collections outside of peak traffic hours
- Use of consolidation centres and virtual consolidation operations
- Use of cargo bikes
- Each can play role but have barriers and limitations:
 - Retiming – history of little voluntary take-up despite promotion, business reluctance, existing planning and environmental conditions on buildings and concern about local resident complaints
 - Consolidation centres – capital costs, goods throughput requirements to generate sufficient revenue (which requires compulsion in use) and cost allocation between supply chain partners
 - Cargo bikes – goods and sectors they are applicable to, only viable to dense urban areas, need for depot in expensive location to store/recharge bikes
- Vast majority of deliveries/collections likely to continue to take place using HGVs & vans in working hours

Innovative freight kerbside trials and approaches (6)

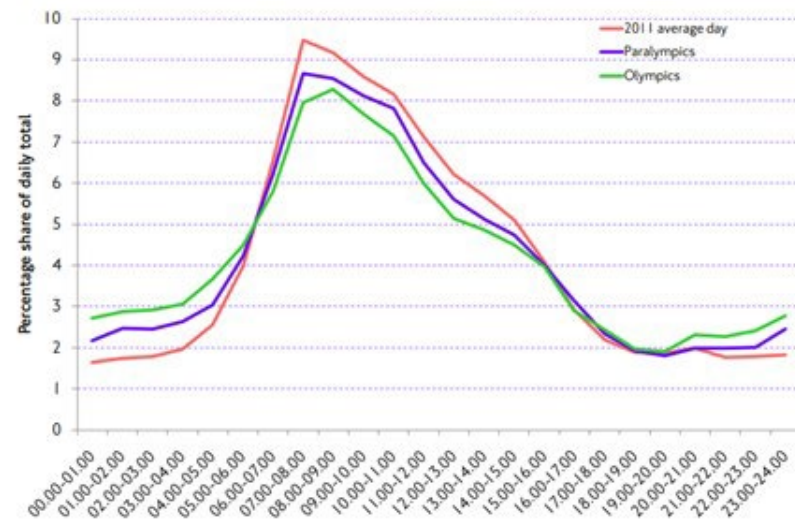
Delivery retiming during 2012 London Olympics & Paralympics

Proportion of businesses & freight operators who adopted retiming measures

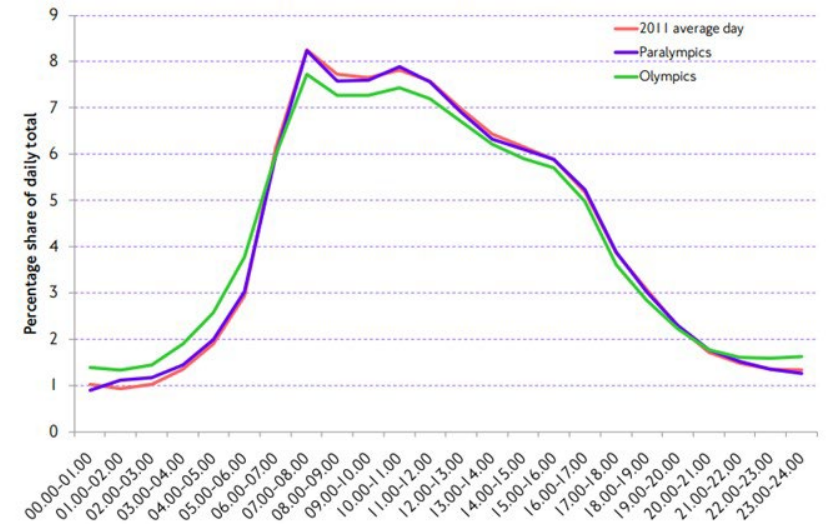


Source: Transport for London, 2012

Lorries entering and leaving the Central London Congestion Charging Zone by time period



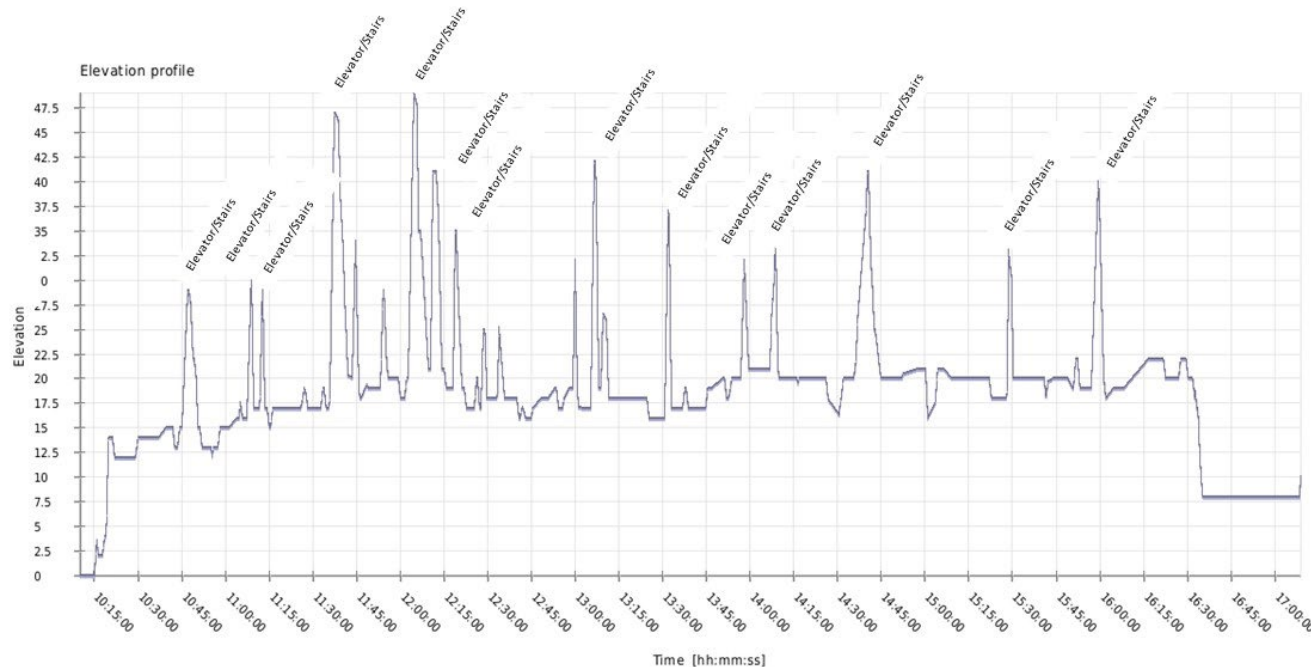
Vans entering and leaving the Central London Congestion Charging Zone by time period



- Central London - 13% more traffic in period from midnight to 07:00 during Olympics, and in outer London 16% more
- Morning peak (07:00-10:00) traffic in central London during Olympics 13% below non-Games baseline
- TfL 'Retiming Deliveries' voluntary programme from 2014-17 but required substantial labour efforts & financial resourcing
- Many other delivery retiming programmes and efforts in last 20 years but with little success
- Often hindered by business reluctance, existing planning and environmental conditions imposed on specific buildings and local authority concerns about complaints

Innovative freight kerbside trials and approaches (7)

Concierge / lockers in multi-tenanted offices – City of London parcel vehicle delivery round



- 20-25% of parcel delivery addresses on City of London delivery round required driver to travel up and down lifts/stairs – increases delivery time
- Each parcel company's drivers do same at each building - all vehicle parked at kerbside while this happens
- In-building concierge service / locker facility makes deliveries much faster

Innovative freight kerbside trials and approaches (8)

Multi-tenanted offices – joint procurement/consolidation & concierge logistics system

- 2 x 7-floor office blocks in central London
- Planning permission: vehicles have to queue to access loading bay to unload in curtilage of building
- One block has:
 - Far greater procurement consolidation
 - In-house concierge logistics service
- Freight transport improvements:
 - 50% fewer vehicle deliveries in office block with procurement consolidation
 - Each vehicle delivery 20% faster in block with in-house /concierge logistics despite larger delivery size
 - Major reduction in kerbside dwell times
- But difficult to get tenants, building managers & landlords to agree to due to potential impacts on operating costs and speed of delivery and can affect marketability of commercial property
- City of London: for several major new office developments there is a requirement for goods to be consolidated before delivery to reduce trips to buildings



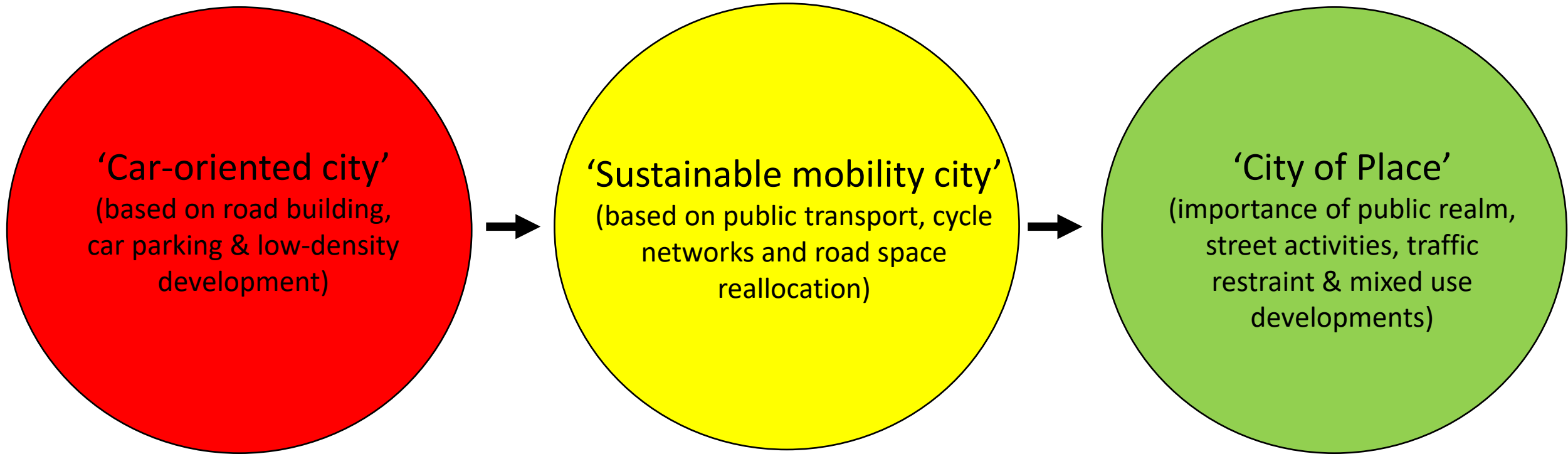
Innovative freight kerbside trials and approaches (9)

Use of cargo bikes

- UK Government promoting and providing funding for cargo cycles (Department for Transport, 2021) as well as some urban authorities
- Cargo cycles can:
 - help to reduce motorised goods vehicle traffic, GHG and air pollution emissions and delivery vehicle noise (Browne et al., 2011; Element Energy and WSP, 2018; Element Energy, 2019)
 - reduce kerbside space and time requirements (Browne et al., 2011)
 - but can increase distance travelled per unit of goods transported (Browne et al., 2011)
- Only applicable to certain sectors and goods and in dense urban areas
- Estimated that up to 10% of urban van activity in dense areas could potentially be carried by cargo cycles
- Relative time and distance savings greatest for cargo cycles when density exceeds 150 deliveries per km² (Dalla Chiara et al, 2020)
- Acquiring urban land needed for logistics hubs to facilitate bike storage and recharging difficult given high land values and low profit margins in logistics operations (National Infrastructure Commission, 2019)



Perspective of policy makers in national & urban government in the UK cities in recent decades



- Change due to policy maker objectives concerning air quality, greenhouse gas emissions, road safety, health and fitness, noise disturbance and attractiveness and competitiveness of place

Kerbside space allocation policy making

- Various user groups argue for ‘fairer’ allocation of road space (i.e. carriageway, kerbside & footway space)
- Study of means of calculating how carriageway space should be allocated (inc. modal split, total distance travelled by each mode etc.) illustrates there is no satisfactory technical method for doing so (Nello-Deakin, 2019)
- Allocation of road space depends on roles played by: i) transport planners, ii) governance (such as Acts of Parliament) that help establish parameters for which authority is responsible for what portion of road space, iii) organisational conventions, and iv) infrastructure which places requirements on road space (Jones, 2014)
- No simple or purely technical/engineering-based methods by which to make satisfactory decisions about the allocation of kerbside space either
- Instead, to identify pragmatic solutions, such kerb allocation decisions need to:
 - take into account a range of political, economic, technical, social, environmental, historical and land use factors
 - include the views, opinions and needs of different stakeholder groups


Efforts to prioritise land use by types of kerb – Seattle & San Francisco

Priorities for kerb space (Flex zone) by predominant land use of area in Seattle

Priority	Land use		
	Commercial & Mixed Use	Industrial	Residential
1	Support for Modal Plan Priorities	Support for Modal Plan Priorities	Support for Modal Plan Priorities
2	Access for Commerce	Access for Commerce	Access for People
3	Access for People	Access for People	Access for Commerce
4	Activation	Storage	Greening
5	Greening	Activation	Storage
6	Storage	Greening	Activation

Source: adapted from City of Seattle Department of Transportation, 2021.

Kerb functions prioritized by land use in San Francisco

Priority	Type of land use					
	Low-Density Residential	Mid- to High-Density Residential	Neighbourhood Commercial	Downtown	Major Attractor	Industrial/ Production, Distribution & Repair
High  ↓ Low	Movement	Movement	Movement	Movement	Movement	Movement
	Access for people	Access for people	Access for people	Access for people	Access for people	Access for goods
	Storage for vehicles	Storage for vehicles	Access for goods	Access for goods	Public spaces and services	Storage for vehicles
	Public spaces and services	Access for goods	Public spaces and services	Public spaces and services	Access for goods	Access for people
	Access for goods	Public spaces and services	Storage for vehicles	Storage for vehicles	Storage for vehicles	Public spaces and services

Source: adapted from San Francisco Municipal Transportation Agency, 2020.

Two suggested approaches for developing a kerbside allocation strategy

Step	Action
1	Set kerbside goals and functions
2	Identify & categorise different land use types & then use kerb functions & land use types to determine priorities
3	Create a digital kerb inventory
4	Understand kerb use – by different types of user and by time of day
5	Define your strategy
6	Launch a pilot program
7	Develop a user-friendly guide

Source: Mancini Nichols and Dorsett, 2022.

Step	Action
1	Consider needs & wants of different user groups to occupy kerbside & time required
2	Calculate kerb-space requirements for different users/uses
3	Determine local priorities, in order to guide decisions on allocating space to different users/uses in the light of Steps 1 & 2 & of considerations of the street's role as place
4	Consider opportunities for designating the same stretch of kerbside to different users/uses at different times of day or days of the week

Source: summarised from reporting of unpublished 2019 study in Urban Movement, 2022.

- Stakeholder engagement with all user groups required in Step 1 in both suggested approaches
- Don't forget about freight transport community and its requirements (for goods and services)

Conclusions

- Kerbside becoming increasingly in-demand & contested space - not possible to meet all transport & place-based functions required of it
- National/local government, town planners & urban designers should recognise kerbside needs of freight transport & its importance
- National/local government need to reform planning policy to ensure landlords & building occupants implement infrastructure & operations to reduce freight use of kerb space & time
- Urban authorities should have to:
 - Develop kerbside strategies taking account of all stakeholders' needs & views
 - Carry out regular reviews of existing kerbside provision for freight transport (suitability of quantity, location & vehicle dwell time)
 - Engage with & develop working relationships with freight transport industry through regular conversations and meetings
 - Better incorporate freight kerbside needs into space allocation hierarchies & streetscape designs
- Would help to avoid unnecessary freight vehicle km & related emissions impacts as well as negative local business impacts
- Such efforts especially important given scale of urban development & rate of change in retail & commercial land use
- See SRF full report for detailed recommendations (<https://www.csrf.ac.uk/outputs-home/policy-briefings-2/>)