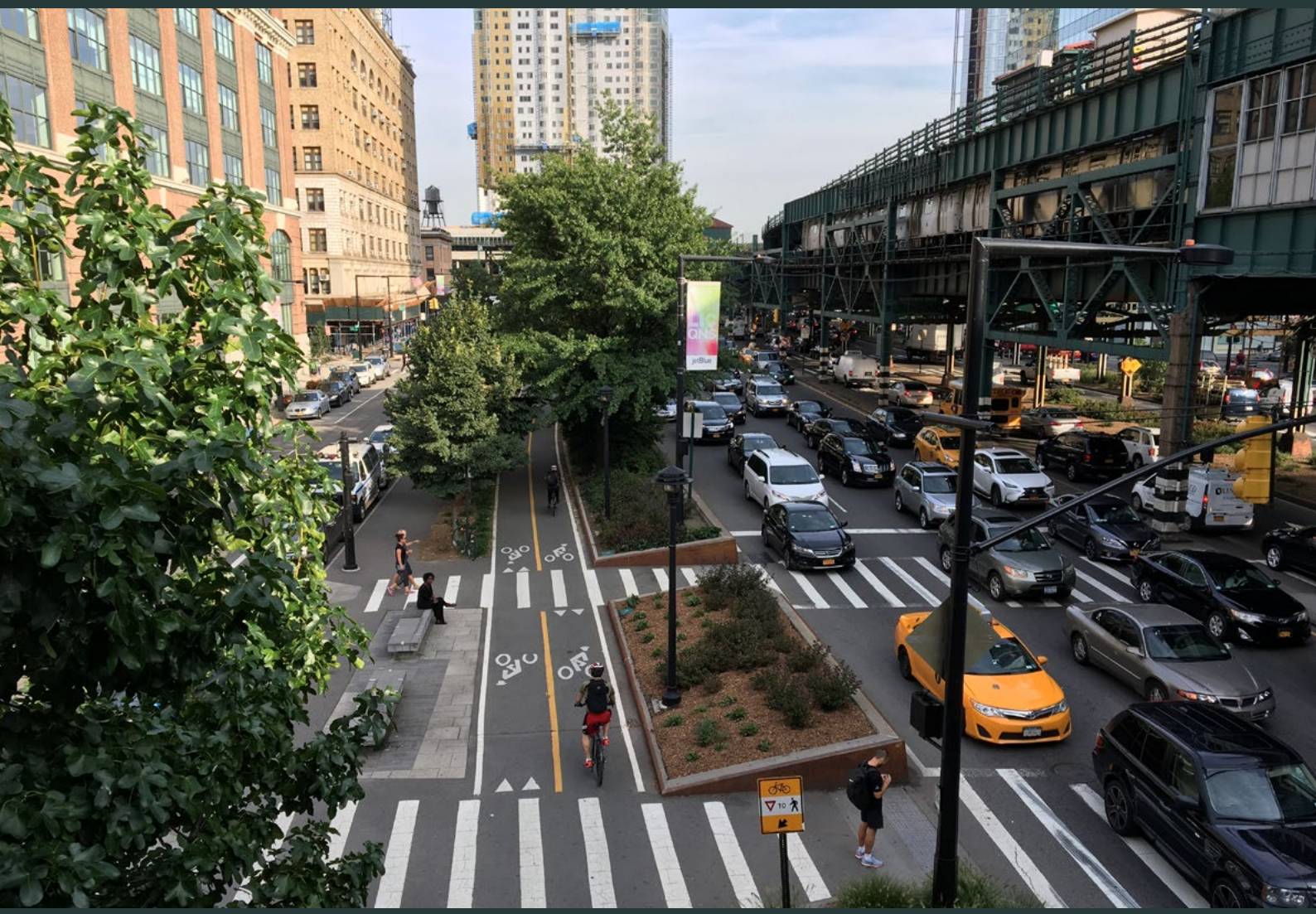
INTERNATIONAL COMPARATIVE STUDY

TRAFFIC MANAGEMENT



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CITY OF LONDON

Contents

INTRODUCTION

The City of London, and London as a whole, currently faces a number of transport challenges. Traffic congestion, limited street space, road danger and poor air quality are all issues that need to be addressed to ensure the Square Mile continues to be an attractive place to work, live, visit and invest. Employment and population growth will put further pressure on streets and transport services.

These challenges are common to most cities. Understanding how other cities around the world are addressing them will help ensure the City of London Corporation is doing all it can to reduce the impacts of traffic and improve the experience of walking, cycling and spending time on the City's streets.

In the spring of 2017, WSP was commissioned by the City of London Corporation to undertake an international study of best practice in managing traffic in order to improve mobility and enhance the public realm.
The study included visits to three cities – New York, Paris and Stockholm – and a desktop review of a further eight cities.

This short report summarises the study findings.
It compares the approach being taken by the City of London Corporation and Transport for London with international best practice and makes a series of recommendations to inform policy development. More detailed analysis is provided in the accompanying technical report.

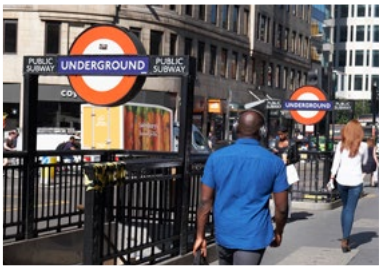
THE CITY OF LONDON'S CHALLENGES

The City of London is the financial district and historic centre of London, with over 450,000 people employed in an area of just over a square mile. Economic growth is driving significant investment across the City, including several major office developments planned or under construction in the Eastern City Cluster. This intensification of employment will put further pressures on the City's streets and the transport networks serving the Square Mile.

Particular transport challenges include:

1. Pavements that are uncomfortably overcrowded at peak times (and further intensified locations with the arrival of the Elizabeth Line) leading to safety issues
2. The need to safely accommodate the growing number of people who are choosing to cycle to and within the city
3. The need to maintain access for essential vehicles while potentially restricting general access for motor vehicles
4. The need to improve the safety, security, health and well-being of all who access the City
5. The need to improve air quality within the Square Mile and across London for the benefit of all residents and visitors
6. Managing freight / servicing and delivery traffic to address congestion, safety and parking issues
7. Ensuring that deliveries and servicing can be carried out as efficiently as possible to enhance the environment for businesses
8. The need to maintain a high quality public realm and provide new and improved public spaces
9. Competing demands for space on the City's streets and differing expectations of businesses, employees and residents
10. A lack of clarity on the challenges and opportunities of new transport technologies and the speed at which emerging technologies will be adopted
11. The high numbers of employees accommodated within tall buildings – both old and new – and associated pressures in terms of peak access / egress and deliveries, both corporate and personal.
12. The mismatch between the large heavy goods vehicles currently used to transport goods and packages to the City and the need for smaller, low or zero emission vehicles to make deliveries in the City

Addressing these challenges is essential if the City of London is to maintain and enhance its position as a global centre for commerce and an international destination for culture.



BEST PRACTICE REVIEW

Eleven cities – Amsterdam, Barcelona, Brussels, Copenhagen, Gothenburg, Madrid, New York, Paris, Singapore, Stockholm and Sydney – were identified as being both global leaders in traffic management and sharing some characteristics with the City of London. Their approaches to traffic management were reviewed and compared with those of the City Corporation. Greater London was also included for comparative purposes, allowing the review to incorporate Transport for London and Mayoral policies and programmes that impact the City.

Three cities were selected for study visits on the basis of particular comparability with the City of London:

- **New York** – a global centre for finance with significant congestion and delivery issues coupled with recent growth in cycling as well as an active programme to reclaim public spaces
- **Paris** – a dense global centre with an historic core with significant air quality issues and challenges around access, mobility and servicing
- **Stockholm** – a Scandinavian capital with an historic core and the rapid deployment of innovative mobility solutions for public transport and last mile deliveries, particularly a move away from fossil fuels

The study visits included meetings with city officials, leading developers and visits to best practice projects. They provided further valuable insights into how these cities are tackling transport challenges and lessons for the City of London.

The best practice review identified approaches to traffic management that were common to some or all of the exemplar cities:

- **Integration of people, place and activity** – adopting hierarchical design principles that integrate people with their surroundings and activities, adopting a human-led design ethos for residents and visitors alike 24 hours a day

- **Low-impact logistics** – adopting logistics solutions that allow businesses to thrive but minimise impact upon the highway network and developments including consolidation, micro-consolidation, cargo bikes / e-bikes
- **Re-allocating road space to pedestrians** – re-purposing highway assets for public use, widening pavements, creating plazas and squares
- **Focusing on walking and cycling** – putting walking at the top of the travel agenda supported by cycling (and associated infrastructure), to reduce environmental impact, improve safety, health and well-being
- **Reducing congestion** – through the use of policy measures and innovative infrastructure design to rebalance supply and demand
- **Improving air quality and decarbonising transport** – rapidly moving away from diesel and petrol to improve air quality at point of use for public / shared transport and logistics – electric, hydrogen, recycled cooking oil etc.
- **Sharing of assets and services** – encouraging access to cars rather than ownership through car share, providing bike share infrastructure
- **Enabling modal shift** – encouraging modal shift through innovation away from traditional car / van / truck including the use of river transport
- **Embracing technology** – considering the role and use of data, connected and autonomous vehicles and electronic payment solutions to streamline access to and use of transportation assets and services
- **Vision Zero** – adopting an approach where no loss of life is acceptable as a result of the transportation / highway system

The table overleaf summarises the performance of the cities examined for each of the approaches. It outlines progress on policy and strategy, the success in implementing those policies and the extent to which outcomes are being delivered. This is followed by a more detailed consideration of each of the approaches.

Theme	low / medium / high	Integration people, place & activity	Low impact logistics	Re-allocating road space to pedestrians	Focusing on walking & cycling
City of London	Policy & Strategy	medium	high	medium	medium
	Implementation	medium	medium	medium	medium
	Achieving Outcomes	high	low	high	high
Greater London	Policy & Strategy	high	high	high	high
	Implementation	medium	medium	medium	high
	Achieving Outcomes	high	medium	high	medium
Amsterdam	Policy & Strategy	high	high	high	high
	Implementation	high	high	high	high
	Achieving Outcomes	medium	medium	high	high
Barcelona	Policy & Strategy	high	high	high	high
	Implementation	high	high	high	high
	Achieving Outcomes	high	high	high	high
Brussels	Policy & Strategy	high	high	high	high
	Implementation	medium	medium	high	medium
	Achieving Outcomes	medium	medium	medium	medium
Copenhagen	Policy & Strategy	high	high	high	high
	Implementation	high	high	high	high
	Achieving Outcomes	high	medium	high	high
Gothenberg	Policy & Strategy	high	high	high	high
	Implementation	medium	medium	medium	medium
	Achieving Outcomes	medium	medium	medium	medium
Madrid	Policy & Strategy	high	medium	medium	medium
	Implementation	medium	medium	medium	medium
	Achieving Outcomes	medium	medium	medium	medium
New York	Policy & Strategy	medium	medium	high	medium
	Implementation	medium	medium	high	medium
	Achieving Outcomes	medium	medium	high	medium
Paris	Policy & Strategy	low	medium	high	high
	Implementation	medium	high	high	medium
	Achieving Outcomes	high	high	high	medium
Singapore	Policy & Strategy	medium	medium	low	medium
	Implementation	medium	medium	medium	medium
	Achieving Outcomes	medium	medium	medium	medium
Stockholm	Policy & Strategy	high	medium	high	high
	Implementation	high	medium	medium	medium
	Achieving Outcomes	high	medium	medium	medium
Sydney	Policy & Strategy	high	medium	medium	high
	Implementation	high	medium	medium	high
	Achieving Outcomes	medium	medium	medium	medium

Reducing congestion	Improving air quality & de-carbonising transport	Sharing of assets & services	Enabling modal shift	Embracing technology	Vision Zero focus
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INTEGRATION OF PEOPLE, PLACE AND ACTIVITY

Numerous cities are adopting hierarchical, design principles that integrate people with their surroundings, mobility and activities. Such an approach embeds a human-led design ethos for residents and visitors alike, improving the city experience 24 hours a day.

CITY OF LONDON'S POSITION

The development of the City of London's Transport Strategy provides an opportunity to establish a street user hierarchy and make clear the City Corporation's commitment to prioritising the movement of people and goods over private vehicles.

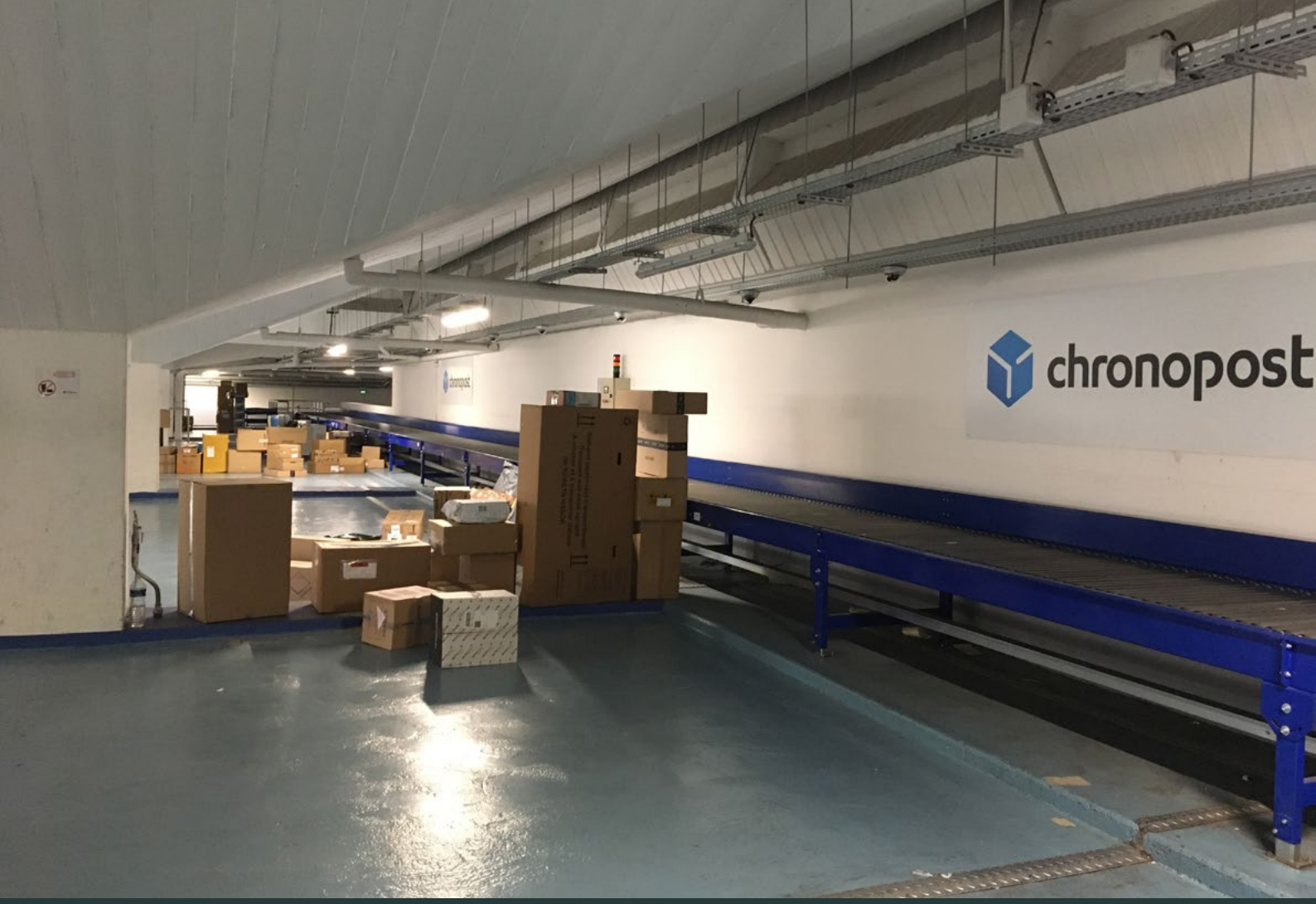
BEST PRACTICE CASE STUDIES

Stockholm's *Urban Mobility Strategy*, which complements their City Plan and their Vision for 2030, prioritises walking and cycling first, then public transport, followed by commercial traffic, then taxis and finally the private car. The City Plan also includes the walkable city concept, a method of building a city where access – the ability to reach different destinations – does not build solely on mobility but also on accessibility. The Urban Mobility Strategy recognises that the city's roads and streets are more than a machine for transporting people and goods. It acknowledges that they are a vital part of the public realm and play a key role in how Stockholm is perceived as a place to live in, work and visit. The strategy states that streets should encourage interaction and provide a public meeting place.

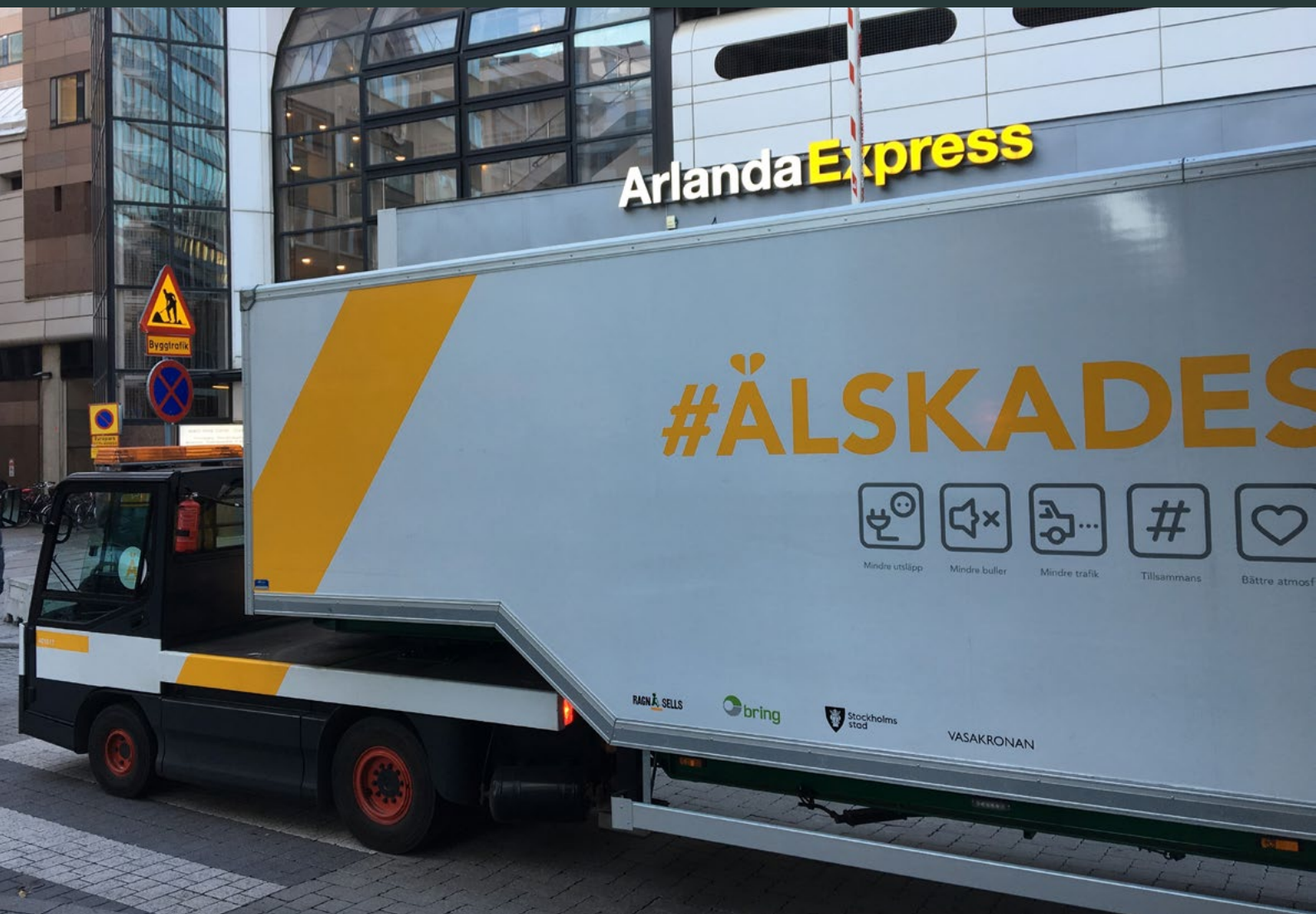
Sustainable Sydney 2030, first adopted in 2008, aims to create a green, global and connected city through investment in walking, cycling and high-quality public transport as well as trees, parks, gardens and linked open spaces. The city's four year Community Strategic Plan (2017 – 2021) sets out aspirations for the city and recognises the changes that have occurred over recent years with regards to how and when people use the city's streets and public spaces. Projects that respond to this 'transformative move' include developing a pedestrianised spine (with light rail) through the heart of city connecting three squares designed to provide a focus for public life in the city centre.

Barcelona's *2013-2018 Urban Mobility Plan* promotes a healthy, low carbon mobility model that prioritises the quality of urban life and collective well-being, as well as the creation of comfortable urban spaces that promote coexistence among citizens. It too has a distinct hierarchy putting pedestrian first, then cycle users, then public transport, then the movement of goods and finally private transport. It adopts the 'superblock' principle to redefine how city areas function. This allows only certain types of vehicles at low speeds (10 kilometres per hour) to access an area bounded by larger streets. Restricting through traffic within the superblock allows shared spaces to be created that support public, social and retail activities.

In **Copenhagen** the *2015 Municipal Plan* presented a vision for the city recognising that more Copenhageners were staying in the city right through their lives. The plan encourages, amongst many things, spaces that allow people to socially interact within a transport network that positively encourages walking and cycling. Recent statistics published in Copenhagen's 2011-2015 Bicycle Strategy states that 150,000 people cycle each day to work or educational institutions in The City of Copenhagen. The Strøget is quoted as the world's longest pedestrianised street at 3.2 kilometres providing a spine of activity through the heart of the city home to shops, restaurants, galleries, theatres and other attractions.



Chronopost Logistics Facility, Paris



Älskade Stad Electric Vehicle, Stockholm

LOW-IMPACT LOGISTICS

Cities are now adopting low impact logistics solutions that allow businesses to thrive but minimise impacts on the street network and neighbourhoods, including a variety of innovative measures adopting the principles of consolidation and sustainable modes.

CITY OF LONDON'S POSITION

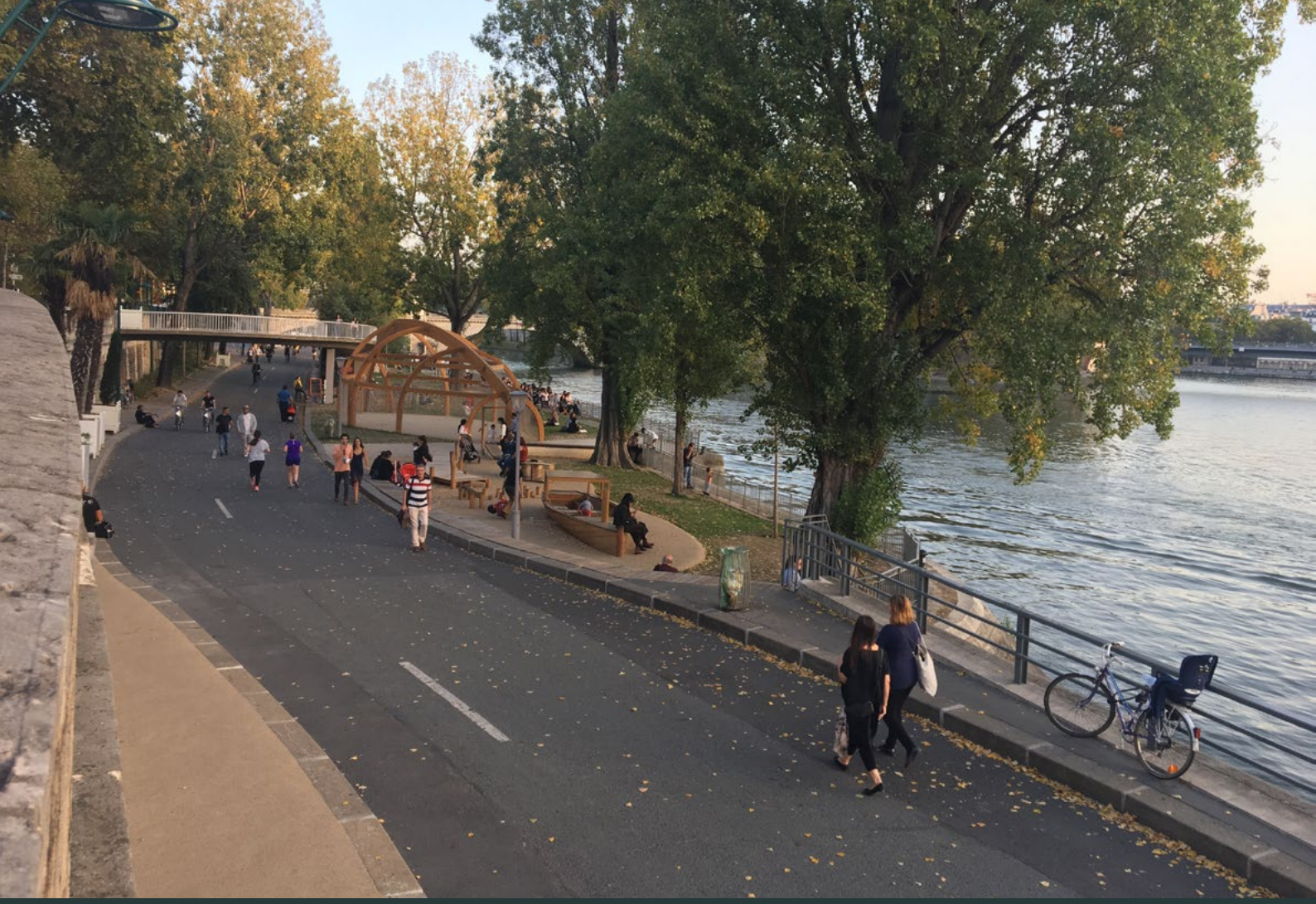
The City of London's freight programme provides a good basis for future development of low impact logistics. In London as a whole, Transport for London has been an international leader in working together with industry to address freight issues, particularly best practice for haulage, and safety issues. While there are a number of initiatives, such as the consolidation scheme in Camden and Islington, as well as a number of private sector programmes, low impact logistics are not at an as advanced stage in London as those in Barcelona, Paris and Stockholm.

BEST PRACTICE CASE STUDIES

At **Beaugrenelle** (in the Paris 15th Arrondissement), a 3,000m² logistics facility opened in 2013 following the conversion of part of a former multi-story car parking facility. Operated by Chronopost express, mail deliveries and pick up are made by heavy goods vehicles. Parcels are then sorted for the 'last mile' deliveries and are distributed by ten electric vans and twenty cleaner diesel vans. The operation vastly reduced the numbers of larger vehicles on the roads of central Paris. Elsewhere in Paris, Supermarket Franprix uses a hierarchical approach to logistics consolidation facilitated by river transport delivering food five days a week to eighty of its central Paris stores. Forty two swap-body containers are transported by truck from a warehouse in the suburbs to the inland port of Bonneuil-sur-Marne where they are transferred to a barge. After making the 20 kilometre journey along the Marne and Seine rivers to the heart of the capital, (avoiding chronic road traffic congestion), they are then off-loaded and make the last few mile deliveries around the city. The service has been made possible by re-development work carried out by inland ports operator, the Ports de Paris, on a stretch of quayside near the Eiffel Tower to accommodate the barge shuttles.

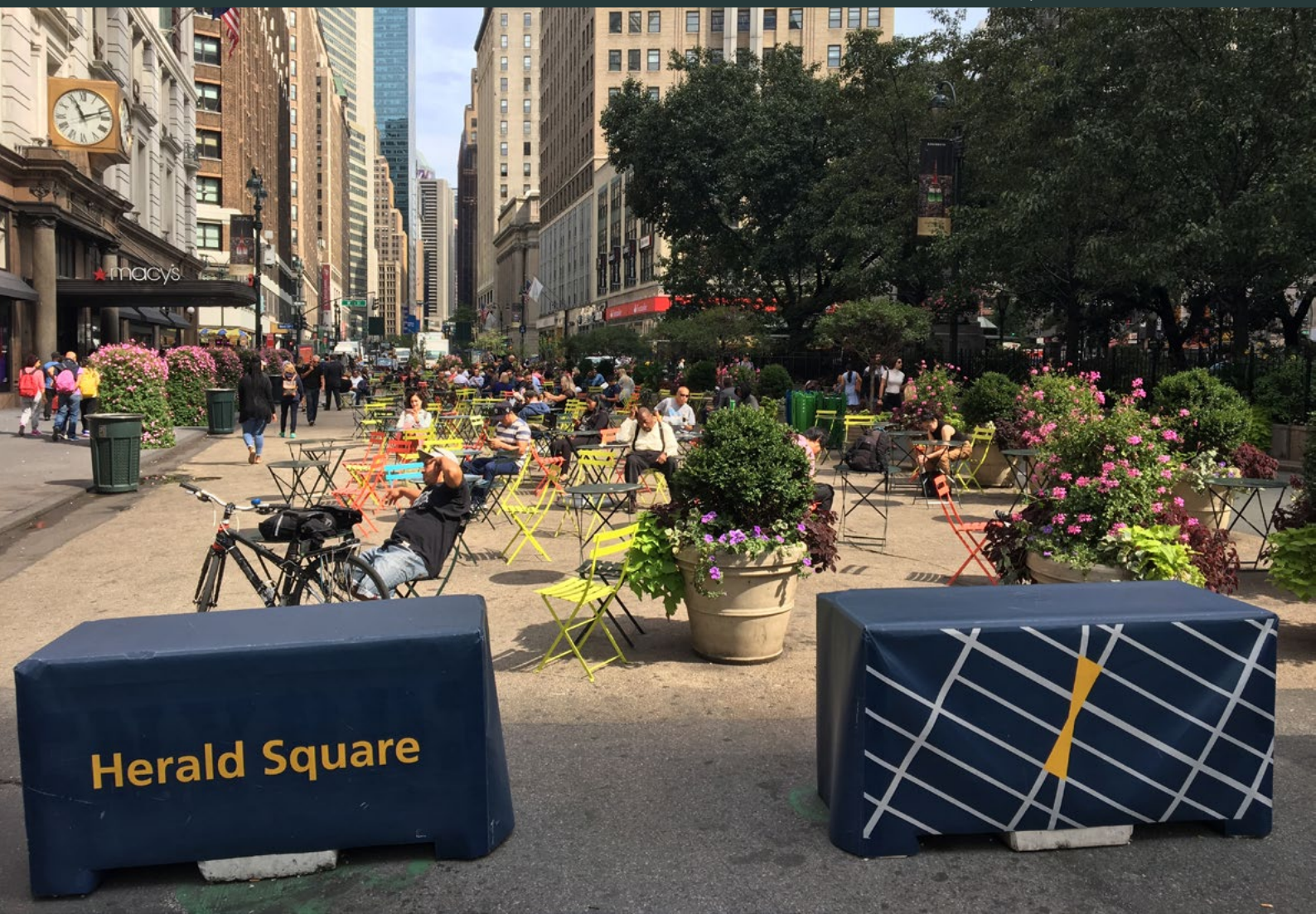
In **Stockholm** the Älskade Stad ('Beloved City') logistics operation uses a purpose built small scale electric, articulated truck to make deliveries within the city core and also picks up dry recycling materials. Operating from a loading dock beneath an office block in the centre of the city, which also houses a waste compactor and cycle garage, this commercial, cooperative venture between Ragn-Sells (waste materials) and Bring (parcels and road distribution) enables sustainable logistics even within Stockholm's pedestrianised core reducing trips and vehicle impacts. Across the city, MoveByBike provides cargo bike and e-cargo bike logistics solutions using Stockholm's extensive network of cycle paths. Using traditional cargo bikes as well as containerised models, riders undertake pick-ups and drop offs within a 30 minute radius and are working with local retailers and internet companies to undertake door to door transport via a shared consolidation centre on the outskirts of the city.

The **Barcelona** 'super-block' approach includes measures to reduce the impacts of deliveries in city centre districts. Deliveries are made from the perimeter of each super-block or from other depots across the city using electric cargo bikes to deliver parcels and handcarts for smaller items.



River Seine Right Bank, Paris

Herald Square, New York



RE-ALLOCATING ROAD SPACE TO PEDESTRIANS

Many cities are re-purposing carriageway for public use including the widening of pavements and creating public plazas and squares for both formal and informal uses.

CITY OF LONDON'S POSITION

The City Corporation has a good track record in this area, including the creation of a new public space in Aldgate and the timed closure of Bank Junction. There is potential to adopt the 'paint and planters' approach pioneered by New York to deliver quick results and trial permanent solutions.

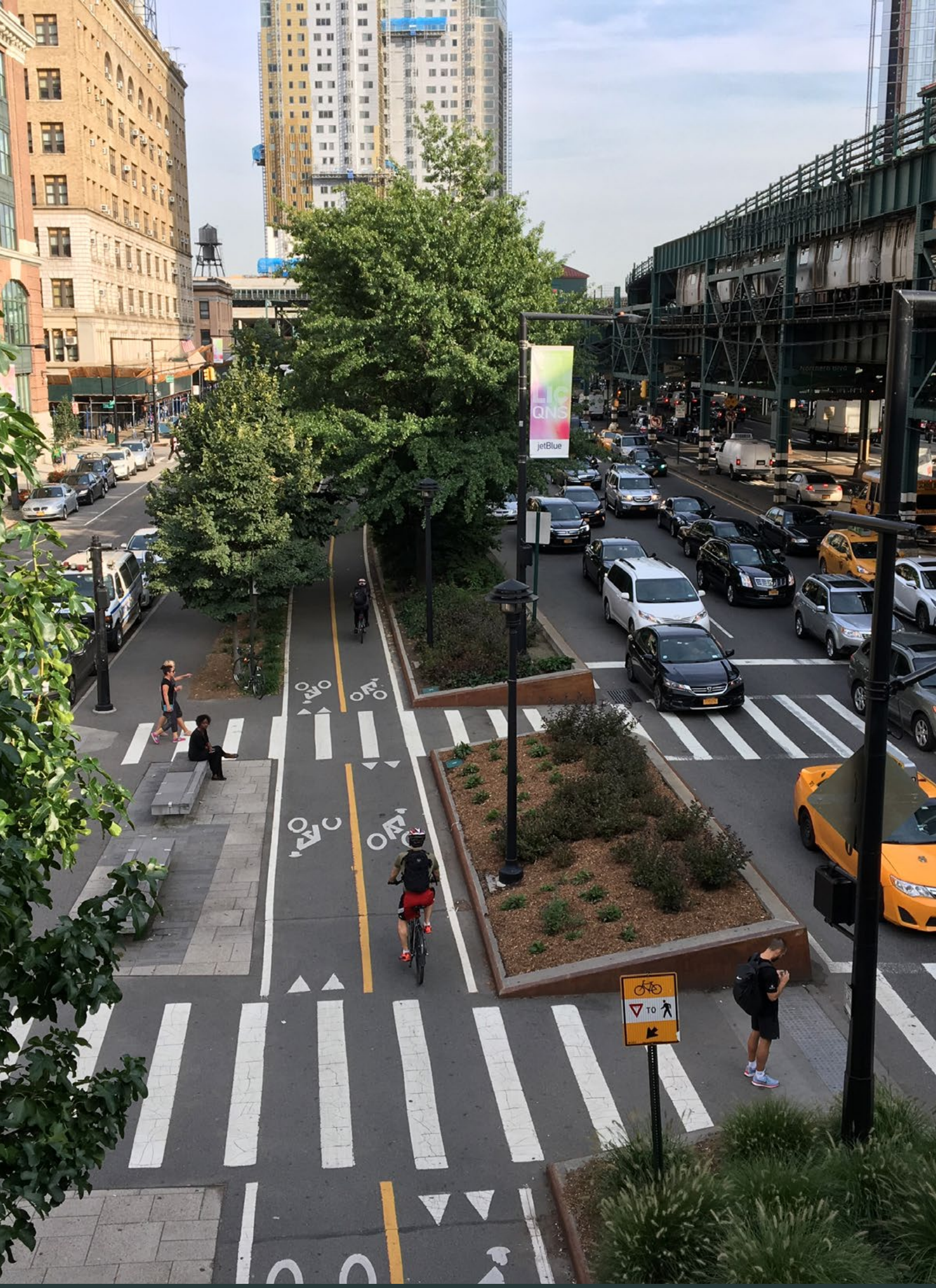
BEST PRACTICE CASE STUDIES

In **New York** the Department of Transport works with various organisations to create neighbourhood plazas throughout the City to transform underused or reallocated streets into vibrant, social public spaces. **The New York** City Plaza Program is a key part of the City's effort to ensure that all New Yorkers live within a ten minute walk of quality open space. Interventions range from the closures of parts of Broadway including the conversion of a large part of Times Square to public open space through to the more tactical closures of left turns on wide boulevards to create small urban spaces for sitting and other functions. In some places, such as Lower Manhattan, streets are closed on a temporary basis using removable street furniture and planters to gauge traffic impacts and public uptake before more permanent public realm solutions are designed and implemented. Given heightened security concerns extra protections have been put in place in many of the larger plazas.

At the Place de la Republique in **Paris** a major road space re-allocation project has recently been completed removing 50 per cent of traffic lanes from this major public space. Traffic (apart from buses) has been eliminated from one side of the square with lane reduction on the other sides resulting in increased public open space and multi-functional events area. The Place de la Rebulique is one of seven squares designated by the Mayor for major traffic reduction across the City. On the right bank of the River Seine the busy through highway route which ran alongside the river was turned over to public space in April 2017 facilitating walking and cycling, public and public realm improvement including seating, planting and temporary uses (such as the Paris beach). The route has been retained as an emergency through route for emergency vehicles in the event of a major city wide incident. Finally, Paris is starting further pedestrianisation of the Marais historical district to remove vehicles from the narrow and, at times, congested streets.

In **Barcelona** the City has recently announced that the Carrer Cristóbal de Moura is to be transformed with planting and traffic calming measures reversing the amount of space used by vehicles and pedestrians. The project will transform the 1.27 kilometre corridor between the Parc del Centre del Poblenou and Rambla del Prim with 32,000m^2 of new greenery for the Sant Martí district.

In **Stockholm** as part of the extension of the tramway to the bus and coach station, the main city thoroughfares have had traffic excluded in advance of works to rebuild the corridor. Once complete the tram will share space with dedicated cycle lanes, wider pedestrian pavements and will be supplemented by tree planting and other greenery to offset 1960s architecture which characterises the route.



Walking and Cycling Infrastructure, New York

FOCUSING ON WALKING AND CYCLING

Cities are ensuring walking is at the top of the travel agenda, closely supported by cycling and its associated infrastructure in providing safe, healthy and sustainable travel choices.

CITY OF LONDON'S POSITION

In recent years there has been significant investment in cycling in the City and across London. This needs to continue if cycling is to become a safe and attractive travel choice for more Londoners. The City has delivered significant pedestrians improvements, such as Cheapside. The development of the City of London Transport Strategy provides an opportunity to prioritise improving the experience of walking.

BEST PRACTICE CASE STUDIES

Copenhagen leads the way in terms of cycling being a major part of the transportation mix. *'Good, Better, Best' Copenhagen's Bicycle Strategy 2011- 2015* sets out its aims and aspirations to become the world's best cycling city. Data from 2008-2010 showed a 36 per cent modal split for work and education trips versus 7 per cent for walking, 28 per cent public transport and 29 per cent car. Copenhagen's approach focuses on enabling cycling for all, at all times of the year, and for every type of activity. With investments in segregated infrastructure, the removal of missing links, real time information and integration with the built environment Copenhagen has become the envy of most cities.

Stockholm's City Plan, '*The Walkable City*', adopted in 2010, puts walking at the heart of the city's development and focuses on the qualities of a human, safe and environmentally friendly city. The strategies for achieving this are to continue strengthening central Stockholm, to invest in attractive strategic nodes, to connect the different parts of the city and to promote an attractive, vibrant and safe urban environment across the whole of Stockholm. Coupled with its Vision Zero approach (as outlined below) Stockholm has but people back at the centre of the city and its activities.

In **Paris** significant investments are being made in cross-city cycle superhighway type infrastructure with in some cases bus lanes being converted to two way cycle routes through major city thoroughfares. The ultimate 45 kilometre network will provide north-south and east-west routes across the city providing direct access to many central Parisian districts.

New York is investing in cycling infrastructure across the five boroughs, including protected lanes on a number of Avenues, lane and safety improvements and bridge access improvements. Many of these schemes also address pedestrian safety through improved crossings and reducing conflict with cyclists. A number of pedestrian initiatives are proposed to increase sidewalk widths in congested areas (such as 7th Avenue) to improve access to public transit, reduce conflicts and to improve the environment. It should be noted however the New York has recently decided to enforce a ban on e-bikes which are illegal there.

In **Brussels** the Rue du Midi and Rue des Grands Carmes pedestrian zone has been enforced with retractable bollards prohibiting general traffic from the area. Taxis, cyclists and pedestrians are permitted but only at walking speed and deliveries are allowed between 04:00 and 23:00.

REDUCING CONGESTION

A number of cities are reducing congestion through the use of policy measures and innovative infrastructure design to rebalance supply and demand.

CITY OF LONDON'S POSITION

London was one of the first cities to introduce a congestion charge and subsequently the low emission zone. Unlike the systems in Singapore and Stockholm which have variable pricing, London's current system operates on a set of fixed charges. Charging is a significant tool in combating congestion and air quality issues but London's approach needs to evolve.

BEST PRACTICE CASE STUDIES

Stockholm's road pricing scheme was established following an earlier pilot and subsequent referendum in 2007. The electronic, variable charge scheme ranges from free (midnight to 06:39) to 30SEK (approx. £2.60 in the peaks) and applies to most vehicles entering the city and is intended to reduce congestion with funds being used to enhance public transport and fund Metro extensions. Charges apply to most vehicles including buses and commercial vehicles. Gothenburg also has a congestion charging levied on most vehicles Monday to Friday, 06:00 to 18:30 with a range of daily charges.

The **Singapore** Electronic Road Pricing System (ERP) manages road congestion using a pay-as-you-use principle where motorists are charged when they use priced roads during peak hours. Charges are based on usage; those who use the roads less frequently or who travel during non-ERP hours pay less or don't need to pay at all. Charge is made via a dashboard mounted device, which takes a standard bank card and interacts with electronic gantries located on major corridor and routes around the city.

In **Sydney** the Harbour Bridge and Tunnel operate free flow electronic tolling using a Tag based system on the southbound only journey. Charges are continuous over the 24 hour period but vary between different peak, off-peak and night time bands. The tunnel and bridge are used by over 43 million vehicles per year. There are currently proposals to charge users in the northbound direction to raise funds for new road infrastructure.

In **New York** vehicles are charged for using the bridges and tunnels into Manhattan and are charged entering New York. Tolls vary by vehicle type and time of day ranging from $9.50 for an off-hours motorcycle on an electronic pass to $126 for a six axle truck paying cash all hours. In February 2017, the Bayonne Bridge began cashless payments only following conversion of the Queens Midtown tunnel in an attempt to reduce standing traffic. Administered by the Port Authority and New York and New Jersey, charges are used to fund various infrastructure and maintenance programmes.

IMPROVING AIR QUALITY AND DECARBONISING TRANSPORT

Air quality is high on a number of cities' agendas; many are looking to rapidly move away from diesel and petrol to improve air quality at point of use for public/shared transport and logistics. The use of electric, hydrogen and recycled oil are all being explored.

CITY OF LONDON'S POSITION

London is now addressing air quality as a high priority. Immediate actions such as the T-Charge, electric, hybrid, and hydrogen powered buses, and the LoCity project will be followed up with electric taxis and the Ultra Low Emission Zone.

BEST PRACTICE CASE STUDIES

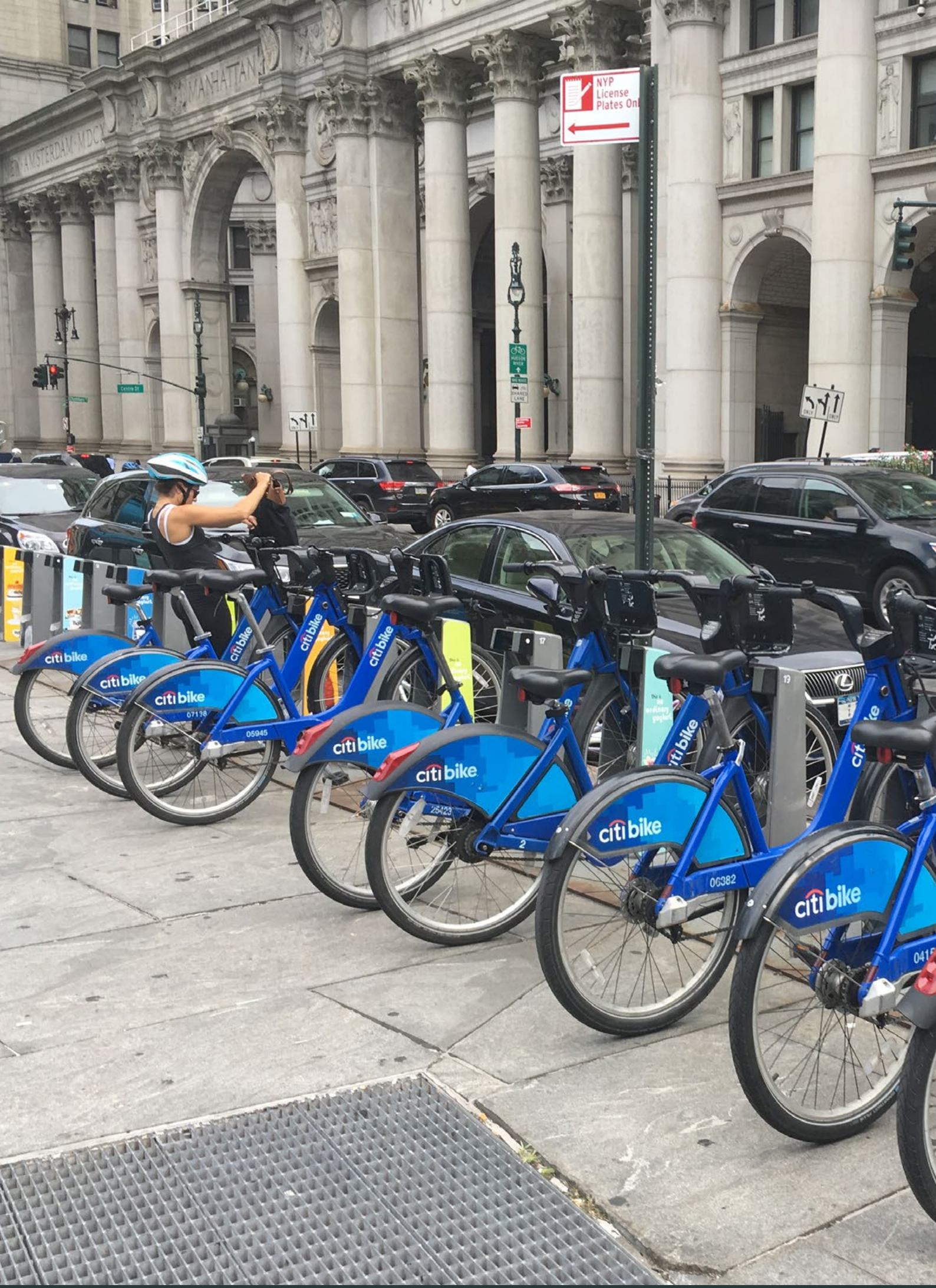
Paris has set itself ambitious targets to exclude diesel vehicles from the city by 2024 for the Olympics and to ban all petrol vehicles by 2030. The city is already using compressed natural gas (CNG) and electric vehicles for local logistics and the Autolib electric car share scheme covers all of central Paris and many suburbs. According to Charge Map there are currently 750 charging locations within the Périphérique of Paris however there are a very small number of CNG filling stations in and around the city (less than ten at current estimates). The city implemented its third car free day on 1st October 2017. The initiative which banned the majority of vehicles from an area covering 40 square miles over the city centre was in force between 11:00 and 18:00. The Champs Elysées is among other roads in the capital that are closed on the first Sunday of every month.

Stockholm has a Low Emission Zone covers all of the city centre and immediate environs banning older Euro 4 buses and trucks with this extending to Euro V vehicles in 2020. The city encourages the use of alternative fuels such as biodiesel and reclaimed vegetable oil as long as they meet the Euro standards. The Strategy for a fossil-fuel free Stockholm by 2040 tasks the City Executive Board to present an action plan for a fossil-free road transport sector and to investigate the feasibility of prohibiting the sale of fossil fuels by 2040, with a sub-target for 2030. The majority of Stockholm's bus services are now fossil-free and the city has a fully electric bus route in operation. Within the city local logistics are being undertaken using electric and HVO trucks as well as e-cargo bikes.

In **Gothenburg** orders have been placed for two high capacity (450kW) fast chargers at Sahlgrenska University Hospital and Eriksberg Square, on line, over which two prototype electric articulated high capacity Volvo buses will operate in 2018. Since 2015 fully electric and electric-hybrid buses have been running on route 55 between Chalmers University of Technology campuses in Johanneberg and Lindholmen as part of the ElectriCity project.

Brussels is introducing a Low Emission Zone from January 2018 to ban older, Euro 1 standard diesel vehicles (cars, vans, buses and caches). Over the coming years the scheme will expand to cover more recent vehicles with all but Euro 5 diesel and Euro 3 petrol vehicles banned by 2025. Exempted vehicles can be permitted to the zone, which covers all nineteen municipalities within the capital region, but only for eight days per year.

New York's City Fleet is rapidly divesting itself from pure fossil-derived fuels. The City now has over 5,000 hybrid vehicles, over 600 plug-in electric vehicles, is adapting vehicles to run on bio-diesel and has three CNG refuelling facilities. The city has recently announced a significant new electric car charging program that will bring 50 fast-charging stations across all five boroughs through an initiative with a utility company. New York currently has over 300 charging points although only sixteen are fast charging stations. Vehicle manufacturer Tesla are reported to be planning their own network of fast charging stations in Manhattan across eight sites.



Citibike, New York

SHARING OF ASSETS AND SERVICES

Rather than vehicle ownership, sharing of assets and services allows people to access vehicles through car share, bike share and car club schemes. This is being encouraged in numerous cities to improve accessibility, mobility and modal choice.

CITY OF LONDON'S POSITION

The sharing of assets and services is a relatively new concept and whilst bike share has long been established in London this is evolving rapidly. The City Corporation's approach to 'dockless' bike share highlights a willingness to embrace shared services as a means of delivering wider transport objectives.

BEST PRACTICE CASE STUDIES

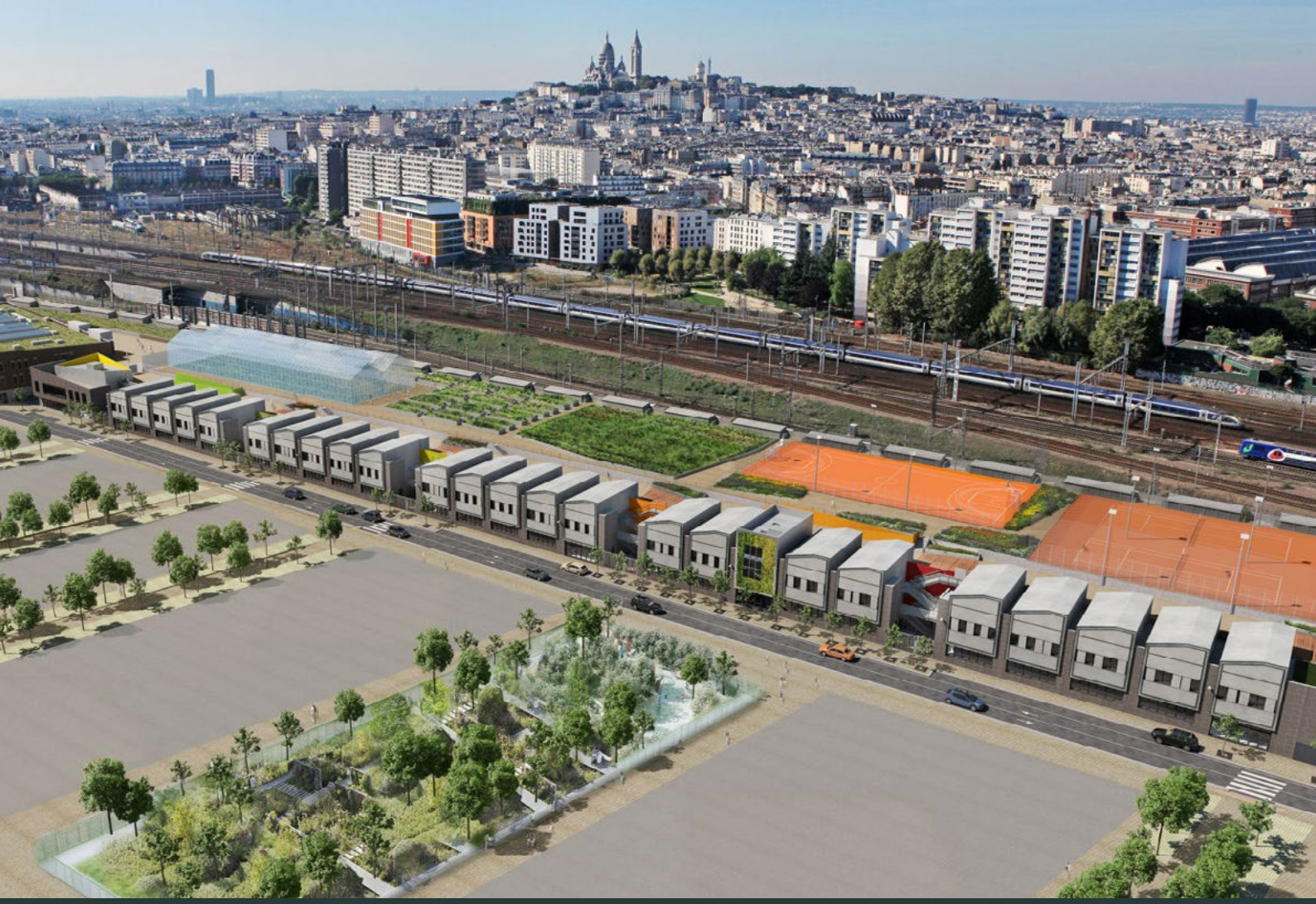
London's long established cycle hire scheme is expanding and continues to be a best in class example. Recently the dockless alternative 'Ofo' has launched in the city and a number of London boroughs offering an infrastructure free alternative.

Both **New York** (CitiBike) and **Paris'** (Velib) bike hire schemes are extensive and well used but as in London dockless alternatives have started operations in Paris.

In **Sydney** ReadyGo and Obike already have dockless bike schemes across the city and Ofo are reportedly about to start operations. Guidelines for bike hire operators have also been issued in an attempt to mitigate any negative impacts.

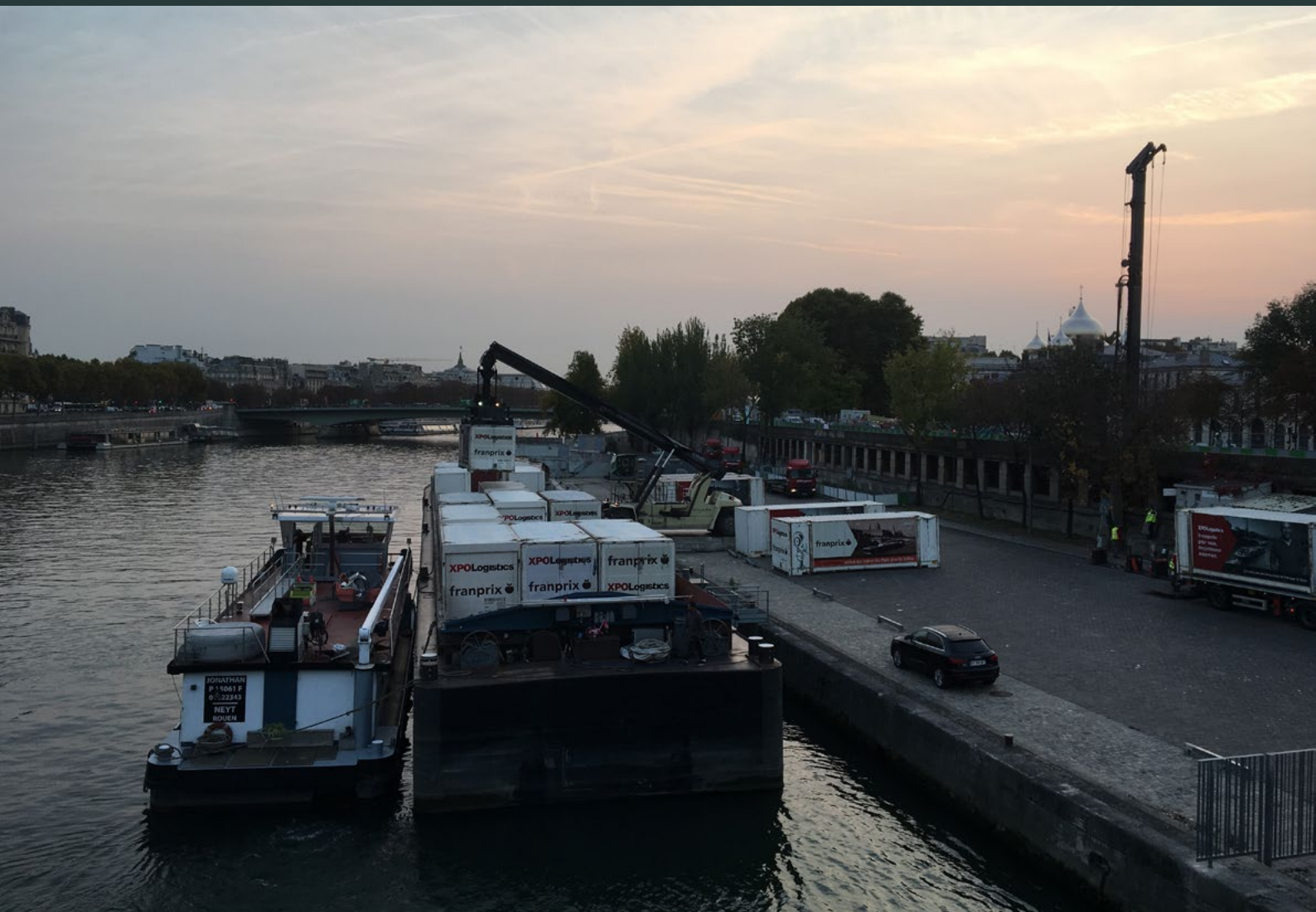
In **Amsterdam** the car sharing platform Together has been automatically matching colleagues on the basis of location, working schedule and car ownership. Undertaken as part of the Amsterdam City initiative the project won the The Hague Innovation Award for 2017.

Copenhagen has a long established sharing culture and in the transportation sector the ByCyklen service offers a docked bike hire scheme for subscribers right across the capital. There are numerous car share companies offering a range of membership types and usage models.



'Logistics Hotel', Paris (Image Credit - Sogaris)

River Seine Cross-docking Facility, Paris



ENABLING MODAL SHIFT

Encouraging modal shift through innovation away from private cars and traditional large goods vehicles is a key approach to traffic reduction The Walking and Cycling recommendations (earlier) include best practice examples, innovations in car and logistics are detailed below.

CITY OF LONDON'S POSITION

London arguably leads the way in achieving modal shift overall through a combination of investments in bus, tube, cycling and, as of next year, Crossrail. This trend is set to continue with the strong focus on reducing private car use in the Mayor's Transport Strategy and recent initiatives by the City of London Corporation to encourage sustainable logistics solutions for major new developments. However, modal shift for freight has been limited by the lack of rail freight terminals in and freight wharves in London, other than for construction traffic.

BEST PRACTICE CASE STUDIES

All of the cities studied are pursuing various initiatives to encourage individuals to use private cars less and public / shared transport, walking or cycling more, some of which have been detailed so far. Overall there are far too many initiatives to summarise here but the following are the more unusual which are pushing boundaries including in the logistics space.

In **Singapore** the Bus Service Enhanced Programme (BSEP) will add a total of 80 new services to serve new developments connecting residents to major transport nodes. Bus service frequency will be increased to 6-8 minutes during peak periods. With limited road space and a growing population, the city recognises the need to optimise public transport to move more people.

In **Gothenburg** the city has promoted its GoFast Network which aims to provide journey times of no greater than 30 minutes between any two of the cities primary area irrespective of mode. To facilitate this bus and tram services will be given priority on street to improve journey times. Ferries also provide an essential part of the local transport network.
The "Eldrivna Stadsleveranser" electric delivery service has just won the Swedish Quality Innovation Award for 2017. Operating from a consolidation centre in Gullbergsvass the service use small electric trucks to deliver smaller loads to the historic core of the city on narrow pedestrianised streets.

In **Copenhagen** the Metro circle line (the city ring) is under construction and is expected to open in 2018. About 234,000 passengers are expected on the city ring on weekdays, with 3,000 new journeys in the greater Copenhagen area, and about 3.4 % more journeys by public transport. In the longer term, it is proposed to supplement the Metro system with more lines, including to two large urban development areas. The city also has a has a long established sharing culture, in the transportation sector the ByCyklen service offers a docked bike hire scheme for subscribers right across the capital and there are numerous car share companies offering a range of membership types and usage models – together providing alternatives to car ownership and use.

In **Paris** the electric car sharing scheme, AutoLib described earlier, provides residents access to shared electric vehicles right across the city providing a viable alternative to private car ownership. In **New York** the City allows employees access to its fleet vehicles out of hours.

In **Paris** the 'Logistics Hotel', which is under construction, will allow the transportation of food and drink for the Parisian restaurant and hotel trade by train from remote distribution depots hundreds of kilometres outside the city. The trains, 450m in length, will serve the facility up to four times a day allowing the transhipment of food and drink from train to wholesale market to sustainable distribution all within a single building just north of the Gare du Nord. The same site has local housing, community start-up facilities, a gym and an urban farm. As detailed earlier use of the River Seine for the transhipment of supermarket deliveries has removed 42 truck round trips from the city's roads per day. Paris also has a number of cross docking and micro-consolidation centres where shipments in large trucks are trans-shipped to smaller greener vehicles for the last mile deliveries within the city core. The City has designated micro-consolidation centres right across Paris as part of future zoning and planning conditions.

EMBRACING TECHNOLOGY

Considering the role and use of data-led, connected, autonomous and electronic payment solutions to streamline access to and use of transportation assets and services can encourage the use of the right mode for the right journey and improve efficiencies.

CITY OF LONDON'S POSITION

The City recognises the role that technology has to play in delivering improved outcomes for those that live and visit the city. The City is actively following the agenda and will look to encourage and deploy solutions which contribute to the aims of its Transport Strategy.

BEST PRACTICE CASE STUDIES

Gothenburg has been chosen by Volvo for the first large scale autonomous vehicle trial in the world using ordinary drivers and families on initially fixed routes around the city's environs. The trial is expected to start shortly and will lead to further deployment including London. Driver assist functions have also been trailed on the ElectriCity bus routes mentioned earlier to assess driver and safety benefits of such technologies.

Stockholm's *Smart and Connected strategy* sets out an aspiration to be "the smartest city in the world" by 2040. The strategy envisages the digitisation of most infrastructure and services within the city with a focus on openness, innovation and connectivity to deliver the best outcomes for citizens and business. UbiGo will relaunch its service which was developed in Gothenburg in 2013 as a small scale trial of offer Mobility as a Service solutions in Stockholm in 2018. The app based service will offer public transport, car-sharing, rental car and taxis on a subscription, pay monthly, book and use as you go basis – eliminating the need to pay for individual modes.

New York is focusing on the connected agenda rather than autonomous, deploying a number of trails to connect vehicles to highway and traffic control infrastructure to examine potential safety, operational and user benefits. The Metropolitan Transport Authority has recently announced that it will be overhauling its ticketing systems to bring in smartcard technology very similar to London's Oystercard.

Smart Mobility 2030 is **Singapore's** Intelligent Transport Systems (ITS) Strategic Plan, which recognises the role that ITS has played an important role in enhancing commuters' travelling experiences in Singapore. Its vision is "Moving towards a more connected and interactive land transport community" which will be delivered by three key strategies; implement innovative and sustainable smart mobility solutions, develop and adopt ITS standards, establish close partnerships and co-creation. There are also four focal areas; Informative, Interactive, Assistive and Green Mobility. The Singapore Autonomous Vehicle Initiative (SAVI) is a partnership to provide a technical platform for industry partners and stakeholders to conduct research and development and test-bedding of autonomous vehicle technology, applications and solutions, it has demarcated routes for autonomous vehicle testing.

Building upon **Amsterdam's** 'smart' aspirations a research collaboration between Massachusetts Institute of Technology and the Amsterdam Institute for Advanced Metropolitan Solutions has begun seeking to design and test the world's first fleet of autonomous boats making use of the city's extensive waterway network to transport people and goods. Numerous other "smart" initiatives are underway from Smart Grid developments and autonomous shuttles to smart traffic management and zero emission logistics.

VISION ZERO FOCUS

The Vision Zero concept involves adopting an approach where no loss of life is acceptable as a result of the transportation / highway system.

CITY OF LONDON'S POSITION

Vision Zero is proposed as part of the Mayor's Transport Strategy and will bring London into line with Sweden and New York. The City Corporation's ambitions in this area are already being demonstrated through the 'Bank on Safety' project and its pioneering focus on road danger reduction. For freight, FORS and CLOCS are key tools to improve standards and reduce injuries and fatalities among vulnerable road users.

BEST PRACTICE CASE STUDIES

Developed in **Sweden** in 1997 and adopted by the Government, Vision Zero aims to achieve a highway network with no fatalities or serious injuries involving road traffic. The Vision zero website states: "The Vision Zero is the Swedish approach to road safety thinking. It can be summarized in one sentence: No loss of life is acceptable. The Vision Zero approach has proven highly successful. It is based on the simple fact that we are human and make mistakes. The road system needs to keep us moving, but it must also be designed to protect us at every turn." Vision Zero principles are embedded in all activities in **Stockholm** and **Gothenburg** with a focus on fatalities and serious injuries, integrating the failing human in design, shared responsibility between system and design, the premise that industry can be stimulated and, saving lives is cheap.

With approximately 4,000 New Yorkers seriously injured and more than 250 are killed each year in traffic crashes **New York** is one of nearly 30 cities across the USA that has adopted Vision Zero through a cross-agency initiative. The City of New York no longer regards traffic crashes as mere "accidents," but rather as preventable incidents that can be systematically addressed through design, enforcement and public education. As of the end of October 2017 the city has 151 separate Vision Zero initiatives.

RECOMMENDATIONS

The best practice research illustrates that the City of London and Greater London are broadly in line with the other cities examined in terms of their policy approach, ongoing initiatives and recent successes. In some instances London is leading the world. The Congestion Charge, an expanding and improving public transport network, work with the freight industry, and ambitious investment in cycling infrastructure are seen by other cities as global best practice. However, there are also areas where other cities are advancing more quickly, such as improving last mile deliveries while reducing their impact.

The recommendations that follow are intended to inform the development of the City of London Transport Strategy. They will help position the City of London as a global leader in the delivery of transport projects and programmes that serves the needs of business and residents for decades to come while enhancing quality of life and improving the built and natural environment.

Delivering such a step change will require not only the support of politicians, businesses and users / customers, but also of the City's partner organisations such as TfL, the GLA and transport operators, developers and other private companies.

INTEGRATING PEOPLE, PLACE AND ACTIVITY

- Develop a people focused mobility hierarchy for the City of London
- Review the highway and built environment to examine opportunities to enhance activity and place through road closures / restrictions
- Develop new public (or private) open spaces in all of the City's districts by working with developers or reallocating space
- Encourage diversification of the City of London's retail and hospitality offer by capitalising on public and private open spaces
- Work with partners to design in personal safety, healthy living and well-being into all new infrastructure

LOW IMPACT LOGISTICS

- Investigate the development of consolidation centres or cross docking operations outside of the City for major developments / clusters within
- Encourage developers to incorporate commercial micro-consolidation within new developments to provide sustainable last mile delivery / pick up within the City
- Encourage the use of cargo bike / e-cargo bike solutions within the city by enabling bespoke drop off facilities at major developments
- Work with businesses and encourage businesses to work together to better plan servicing, deliveries and refuse collection

RE-ALLOCATION OF ROAD SPACE TO PEDESTRIANS

- Review the highway network to examine where road space could be reallocated (full or part-time) to other uses including pedestrian / cycling or use as plazas
- Undertake low-impact trials of road / road space re-allocation to test processes and effectiveness to streamline traditional approaches
- Where traffic flows allow encourage the widening of pavements as part of new developments in the City

FOCUSING ON WALKING AND CYCLING

- Develop specific walking and cycling strategies for the City of London and recognise walking's role as the primary mode of transport within the Square Mile
- Encourage the role of cargo bikes and e-cargo bikes to service City commerce, retail and hospitality
- Ensure that the needs of people walking and cycling are the focus of all infrastructure design
- Develop a legible pedestrian and cycle network (including associated infrastructure) for the city linking all major generators and attractors

REDUCING CONGESTION

- Examine further options to reduce congestion in the City through major interventions such as 'Bank on Safety' to prioritise sustainable modes of transport within the City core
- Close rat runs within the City to focus traffic onto primary corridors
- Work with TfL to examine options for more punitive restrictions on diesel / petrol vehicles within the more sensitive areas in the city
- Examine the effectiveness of current Congestion Charging regime within the City with a view to develop City specific interventions if needs be

IMPROVING AIR QUALITY AND DE-CARBONISING TRANSPORT

- Transition the City of London fleet to non-fossil fuels over the next cycle of renewals where possible
- Work with TfL to prioritise emission free public transport on routes within the City of London
- Encourage developers to provide electric vehicle charging in developments for service and other vehicles
- Work with adjacent Boroughs to provide the charging / fuelling infrastructure for the next generation of electric / low emission commercial vehicles

SHARING OF ASSETS AND SERVICES

- Encourage car / van sharing services within the City to move to a normalised model of access vs. ownership to reduce underutilised and parked vehicles
- Work with TfL to anticipate disruption to the hire-bike market and develop appropriate management regimes and policies

ENABLING MODAL SHIFT

- Encourage the creation of local and micro consolidation centres for the distribution of goods and freight by cycling and walking
- Enhance pedestrian and cycling networks to prioritise highway space for sustainable last mile / first mile trips
- Encourage the concept of walking being the most desirable form of access in the City

EMBRACING TECHNOLOGY

- Examine the role of connected and autonomous technologies to improve mobility within the City but ensure that they are not at the detriment of walking and cycling, nor a cotribution to congestion
- Examine the role of automation within the logistics sector particularly where new developments could be adopt 'future ready' designs
- Consider how new models of mobility will work with traditional City infrastructure particularly on-demand modes which could potentially exacerbate parking / congestion issues

VISION ZERO FOCUS

- Adopt Vision Zero principles for all City of London activities

WSP December 2017