



Light rail can operate on urban streets alongside pedestrians, cyclists and motorised traffic

Briefing

# Light Rail

## What is light rail?

Light rail is a flexible form of electrically-powered public transport, running on steel wheels, and designed to provide a high capacity, fast, frequent, reliable yet cost effective service in and around urban areas. Although sharing similarities with historic tramways, modern light rail generally achieves faster journey times through the use of segregated rights of way, higher performance and higher capacity vehicles, less closely spaced stops and typically longer routes.

Compared to traditional heavy rail networks, light rail systems are operated by shorter and lighter vehicles able to negotiate tighter alignments, steeper gradients and which can often achieve greater acceleration. Because of these features light rail can operate on urban streets alongside pedestrians, cyclists and other motorised traffic. Vehicles are also able to stop more frequently without significantly compromising end to end journey times. Light rail can therefore increase accessibility to dense urban areas, while at the same time improving environmental conditions and the quality of the urban realm.

## Why build light rail schemes?

**Fast, reliable journeys:** Using a combination of off-street running and on-street priority measures, light rail is able to provide fast and reliable journey times. With stops generally further apart than historic tram systems, modern light rail is capable of achieving higher speeds, with the Sheffield Supertram reaching a top speed of 50 mph on a segregated section of track.

**High quality vehicles:** Modern light rail vehicles are designed to a high specification, providing passengers with a feeling of quality and a comfortable ride. Features of the West Midlands Metro trams include air conditioning, optimised suspension for a smoother journey, and a low floor throughout. Improved access is achieved through six door sets compared to three on the older specification trams, providing quicker, more convenient boarding for all passengers.

**High capacity:** Light rail can transport a high number of people directly to and from key employment, leisure and housing locations. Able to run with a shorter headway than heavy rail without the need to invest in complex signalling systems, light rail can operate regular, high frequency services on the busiest stretches of track. The Tyne and Wear Metro can transport almost 300 people per vehicle and with trains arriving up to every three minutes on the busiest sections of track, the system can move up to 6,000 passengers per hour in each direction. That's equivalent to a three-lane motorway!

**High penetration:** Using lighter vehicles that have been specifically developed for this function, light rail is able to run on city centre streets, with frequent stops, providing a high degree of accessibility to key sites. By delivering people closer to their destination, further journey time savings can be achieved.



At weekends, as many as half of UK light rail users previously used the car to make the same journey

## Light Rail

**Popular with passengers:** light rail has been experiencing growth in recent years as systems have expanded but also reflecting the popularity of trams and light rail systems with passengers. In 2019/20, light rail systems in Great Britain carried 270 million passengers.

But light rail systems are about more than being cost effective and delivering high quality technical performance. They also generate a wider range of impacts, which provide benefits not only to passengers, but also to other transport users, to local businesses and to society at large:

**Reduced congestion and better environment:** Light rail systems can carry 4,000 people per hour **per direction, per hour**, equivalent to 2,500 cars. 25% of Manchester Metrolink users said they would travel by car instead if Metrolink wasn't available, and 42% of Tyne and Wear Metro users in North Tyneside said they would switch to car or taxi if the Metro was to close. The reduction in road traffic associated with light rail schemes not only **cuts congestion** but also **reduces ambient noise levels and improves air quality**.

**Higher quality urban realm, attracting new visitors, new investment and changing the overall perception of urban areas:** in Croydon, surveys of residents and businesses before the opening of Tramlink suggest that many viewed Croydon as in decline. After the opening, most saw the area as experiencing regeneration and expansion. In Manchester, it seems unlikely that the successful regeneration of Salford Quays would have taken place without the Metrolink connecting the former industrial area to the centre of the city. The Salford Quays extension cost £150 million but created over 3,000 permanent jobs, stimulated £60 million of investment by business and boosted the economy of Greater Manchester by £70 million a year.

**Greater access to labour markets**, supporting business growth: businesses located near to light rail schemes benefit from being more accessible to customers and having greater access to labour markets to support growth and expansion. High quality transport schemes are proven to improve labour market performance, help attract inward investment and create an improved quality of life.<sup>1</sup>

### How many light rail systems are there in the UK?

There are nine modern light rail and tram systems in the UK, seven of which (Docklands Light Railway, London's Tramlink, Manchester Metrolink, West Midlands Metro, Nottingham Express Transit, Sheffield Supertram, and Tyne and Wear Metro) were promoted by our members.

<sup>1</sup> UK Tram (2014), Investigation into the economic impacts on cities of investment in Light Rail systems.



# Light Rail

Table 1. UK light rail systems: patronage and network size (source: Department for Transport, 2020)<sup>2</sup>

System	Annual passengers (million) 2019/20 (pre-Covid-19)	Track length (km)
Blackpool	5	18
Edinburgh	7	14
Midland Metro, West Midlands	8	22
Sheffield Supertram	11	34
Nottingham Express Transit	19	32
London Tramlink	27	28
Metrolink, Greater Manchester	44	103
Tyne and Wear Metro	33	78
Docklands Light Railway, London	117	38
<b>Total</b>	<b>270</b>	<b>367</b>

Opened in 1980, the first modern light rail scheme in the UK, **Tyne and Wear Metro**, converted 42 kilometres of under-used local rail lines, linked by seventeen kilometres of new infrastructure. It has since been extended to Newcastle Airport and Sunderland, with further extensions being considered. The Metro is able to deliver frequent stops on a relatively fast service, connecting smaller town centres and large parts of the suburbs with the city centres of Newcastle, Gateshead and Sunderland. In 2017, Nexus was successful in attracting a £337 million capital grant from Government towards the cost of a new fleet of Metrocars, to commence service by the early 2020s. This investment is in addition to the significant investment already seen since 2010 to reinvigorate Metro's ageing infrastructure. With further upgrades planned, total spending on the Metro could pass £1 billion over the next 20 years.

The **Docklands Light Railway (DLR)** opened in 1987, using former rail alignments and some new construction to link the City to the Docklands development area. Initially delivered for £77 million, it has subsequently been extended to Bank, Beckton, Lewisham, Woolwich Arsenal and Stratford International. Transport for London (TfL) placed an order for 43 new trains to partly replace existing rolling stock and to also allow for further expansions. The new fleet is expected to be introduced from 2023.

In **Greater Manchester**, the **Metrolink** initially converted the existing Altrincham and Bury suburban rail lines to light rail operation and linked them together through the city centre via a new on-street route. In the process, the system also linked the three main city centre rail stations together. Metrolink opened in 1992 and has since been extended to reach Eccles, Salford Quays/MediaCityUK, Chorlton, Droylsden, Ashton-under-Lyne, Oldham, Rochdale, Manchester Airport and the Trafford Centre.



## Light Rail

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During 2017, work to construct a new route across Manchester City Centre was completed. This has helped to improve capacity and operational resilience of the tram service in the City Centre. In 2020 a further extension opened to the Trafford shopping centre. In all, these expansions effectively doubled the size of the Metrolink network between 2010 and 2020. These expansions have helped Metrolink go from strength to strength carrying 44 million passengers in 2019/20, an increase of 10 million compared to 2015/16.

The **Sheffield Supertram** opened in 1994 with three lines linking the city centre to Meadowhall, Middlewood / Malin Bridge and Halfway / Herdings Park, via a combination of on-street running and new segregated alignments. The extension of the Sheffield Supertram to Rotherham station on a shared heavy rail alignment with new dual voltage tram-trains began operation in 2018.

The **West Midlands Metro** opened in 1999, linking Wolverhampton and Birmingham via the Black Country, mostly using a former rail alignment with some on-street running. This has now been extended through the city centre to Birmingham New Street (2016), Centenary Square (2019) and on to Edgbaston (in July 2022).

This particular expansion is unique in the UK, as the first tramway in the country to operate on battery power on key sections (including in the city centre). This removes the need to fix electric wires to nearby listed buildings and will improve the overall aesthetics of the environment. Meanwhile at the Wolverhampton end of the route a city centre loop is currently under construction and expected to be complete in 2022. Further extensions to Digbeth will serve the planned HS2 station at Curzon Street. An extension to Dudley is also under construction

**Tramlink**, a three-line network linking Beckenham, New Addington and Wimbledon to central Croydon, opened in 2000. It involves street running, segregated alignments and replacement of rail services.

The **Nottingham Express Transit (NET)** opened in 2004 and links the area north of the city with the city centre using a mixture of segregated alignments and on-street running.

Expansion saw the network's size more than double in 2014, linking areas to the South and Southwest of the city with further extensions being considered. Pre-covid the tram system in Nottingham saw strong growth in passengers, welcoming 18.7 million passengers in 2019/20, an increase of 6 million compared to 2015/16.

A £100m upgrade has seen sixteen new state of the art trams join **Blackpool's** existing heritage fleet. Further investment is now underway to extend the tram system to Blackpool North Railway Station, due to be opened in 2022.

In 2014, Line 1 of the **Edinburgh Tram** opened, providing fifteen stops over a fourteen kilometre section of track linking the city centre with Edinburgh Airport. The next phase will be an extension to Newhaven and Leith which is projected to open in 2023.



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## Light Rail

### Is Light Rail the solution?

Our members approach to new public transport infrastructure is to find the most appropriate solution for the specific circumstances and challenges of a corridor or network. Typically, this work fits into wider economic strategies and long-term transport plans.

Our members often invest in comprehensive improvements to conventional bus services such as bus priority measures and whole corridor upgrades. We recognise that there is also a vital role for active modes, such as walking and cycling, as well as other targeted sustainable transport initiatives. But light rail can often be the most effective approach in high density areas which benefit from existing partial dedicated rights of way, especially when planned alongside wider regeneration or expansion plans. On busy corridors, trams can typically deliver greater capacity with fewer vehicles than a bus, reducing the number of vehicles on the road and the number of staff required to operate them.

New light rail schemes can involve a substantial initial investment. However, over time, costs are offset by the economic and social benefits from greater reliability, comfort, accessibility, faster journey times and capacity. The permanence of light rail infrastructure can also signal, and give assurance, to firms, households and outside investors that those improvements are there to stay and that the local area believes in its future growth potential. Other transport improvements, while effective in different ways, may struggle to achieve the same catalytic impact on urban regeneration and city image that can be triggered by the tangible and permanent commitment to an area that light rail represents.<sup>3</sup>

Existing light rail schemes have delivered transport and economic benefits and it is expected that they will continue to do so where their implementation is suited to the local context. For example between 2009 and 2019 employment in city centre Manchester grew from 135,000 to 175,000, a 30% increase. Over the same period, the number of car trips crossing the Manchester city centre cordon in the morning peak period decreased from 27,000 to 22,500. Whilst bus commuting has also declined, rail and Metrolink patronage has grown to such an extent that by 2019 public transport accounted for around two-thirds of all inbound morning peak trips.

Facilitating a higher number of people to access the most crowded city centre locations, light rail can bring significant agglomeration effects, increasing employers' access to labour pools and workers access to highly paid jobs.

<sup>3</sup> pteg (2005), What Light Rail can do for cities: a review of the evidence



# Light Rail

## Q. What are tram-trains?

Tram-trains are similar in many ways to light rail, the main difference being that they can run on standard heavy rail tracks as well as on tramlines. This flexibility has the advantage of freeing up capacity at busy mainline stations as vehicles seamlessly transfer from railway tracks to tramlines, transporting people directly to city centre locations (rather than to the nearest mainline railway station). Like trams, tram-trains are lightweight, meaning potentially lower energy use and less wear and tear on tracks (and, therefore, reduced need for costly maintenance work). Our [tram-trains briefing](#) sets out more information on what they can achieve.

Tram-trains are already operating successfully in Europe. The UK's first tram-train began operation in 2018 running between Sheffield and Rotherham partly over the existing Sheffield Supertram network and partly over the national heavy rail network. The pilot has proven a success with a 100% satisfaction rate. Our members and other cities across the country are keen to see tram-trains revolutionising urban rail services as soon as possible.

## Q. What has been the impact of Covid on light rail systems?

The restrictions on movement resulting from the Covid-19 pandemic resulted in significant reductions in tram use with patronage falling to 81.7 million in 2020/21, a fall of 69% on the previous year. The Government provided additional funding to ensure light rail systems could keep operating during the pandemic enabling them to get essential workers where they needed to be during the crisis and supporting the recovery of local economies when restrictions were eased or ended. [A briefing on light rail's role during the pandemic can be downloaded here.](#)

The long-term effects of COVID on patronage trends are not yet fully known but it is likely that patronage will remain lower than it was in pre-COVID. The cost-of-living crisis may also have significant implications for light rail use both in terms of patronage and costs (including much higher charges for the electricity that powers these systems).

There needs therefore to be a wider revenue settlement for our urban public transport networks (both for light rail and bus) which enables them to continue to thrive.

For more information head to the light rail hub on our new website.  
<http://www.urbantransportgroup.org/resources/tram>

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