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# RAIL CITIES UK



**OUR VISION  
FOR THEIR  
FUTURE**



**The Urban Transport Group brings together the locally accountable transport authorities for the country's largest urban areas. Together we are one of the biggest investors in the rail network because we know how crucial modern and efficient urban rail networks are to the future of cities and city regions. Over time some of our members have also taken full responsibility for their urban rail networks – whilst other of our members have started that process.**

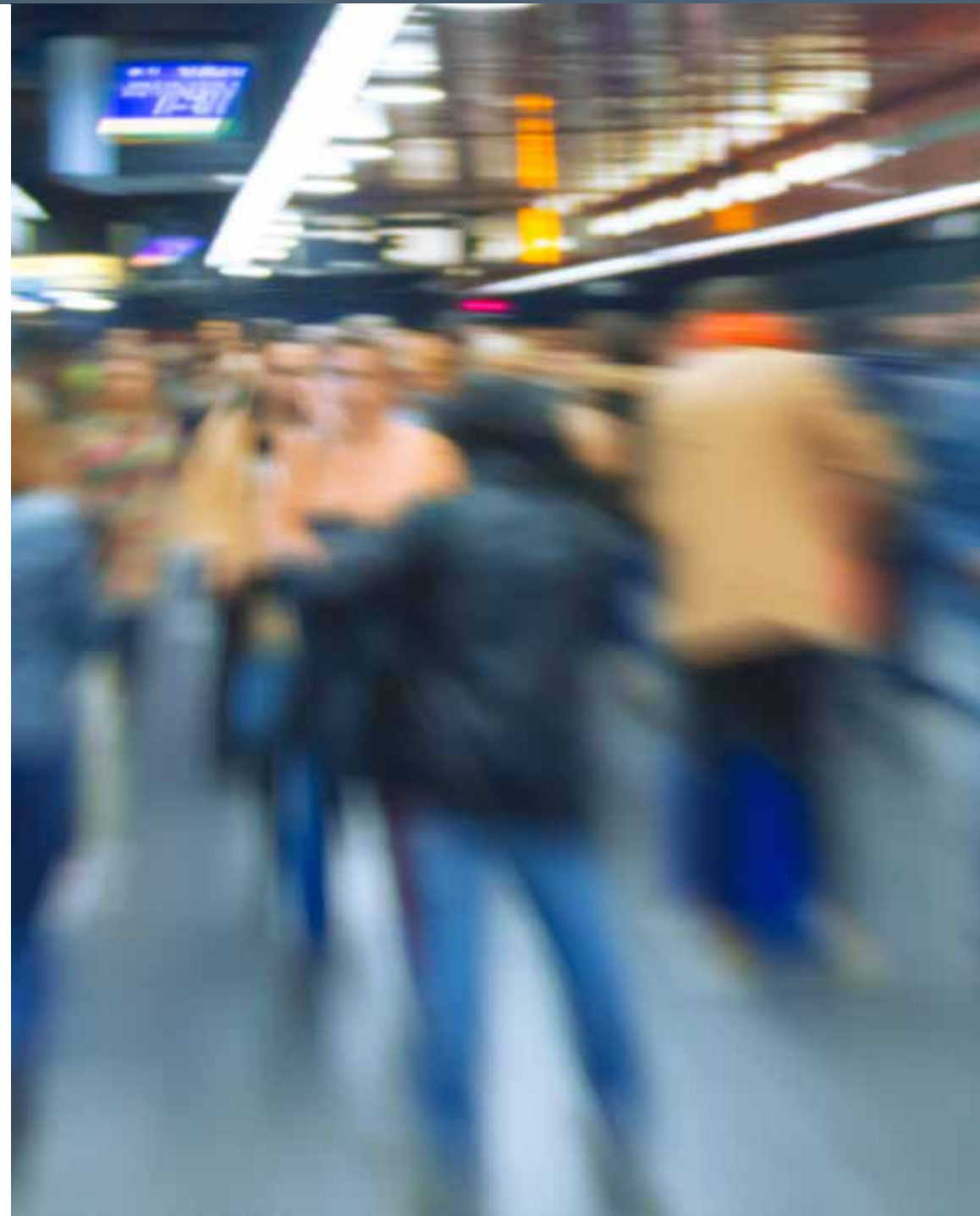
As the Urban Transport Group we have also been the main national voice calling for further investment and more devolution. This report represents the next step in setting out the case for high investment and devolved urban rail systems. As has always been the case we do not argue for rail investment as an end in itself. Instead our case is firmly rooted in the key role that rail will need to play if we are to tackle housing need, reduce road congestion, improve air quality and make our urban centres into dynamic places that are primarily for people rather than for cars.

The publication of this report comes at a time when searching questions are being asked about whether the way in which our railways are currently structured is fit for purpose. This in the context of a wider debate about whether the railways should be publicly or privately operated. It is not our role to take a position on ownership but we believe that the vision for the kind of urban railways our cities need, and the obstacles that need to be addressed in order to arrive at that vision, are relevant under whatever form of ownership.

**Tobyn Hughes, Chair, Urban Transport Group.**

**Ben Still, Lead Board member for rail, Urban Transport Group.**

Author: Jonathan Bray. June 2018.



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# WHY GROWING CITIES NEED GROWING RAIL NETWORKS

**Our vision for rail is rooted in the realities of the kind of city regions we will need and people will want in the 21st century. City regions which are economically dynamic but where the benefits of growth are shared; which are green and attractive places to be; and which are interesting, exciting and rewarding places to live, work and spend time in.**

It is not possible to achieve this wider vision for city regions without an expanded role for rail. Only rail can provide rapid mass access to support city centre agglomeration economies at a time when access to city centres for road vehicles is being restricted in the interests of improved air quality and public realm. Only rail can open up opportunities to build the homes that are desperately needed, without causing additional road congestion.

For this to happen the only viable option is for rail networks with increased capacity on existing and new services into city centres. We also need more cross-city centre rail links and more tram-trains to relieve pressure on existing city centre termini.

Our vision is of rail networks which are simple and easy to use but also part of something bigger – integrated with wider public transport networks and intrinsic to broader housing and economic development plans. New and existing stations which feel, and are, safe and welcoming. Stations which are assets not eyesores – which provide attractive gateways to city region towns and take the best of the railways heritage and what modern design can achieve to act as wider hubs for local community, business and housing use.

Rail networks which are accountable and responsive to the passengers and places they serve and whose identity reflects local identity.

In this report we set out why successful cities have always needed good rail networks – now more than ever.

We look at the stunning growth that has taken place on city region rail networks in recent years and the investment that has gone on, and is planned, to facilitate and respond to this growth. We also show the critical role that devolving more powers over those rail networks has played in this success story.

We then set out a vision for how to build on this success story and what that would look like in practical terms for passengers, communities, business and decision makers.

Finally, we set out the key obstacles to achieving this vision and how they can be overcome.





## Rail cities then and rail cities now

History shows that successful and growing cities need growing rail networks to make possible the concentrations of people and ideas that sparks and sustains urban economies. The dramatic reductions in road space for vehicles in city centres, the need to tackle air quality challenges and the imperative for more housing – all further play to rail's inherent strengths.



Metroland! London's suburbs grew in lockstep with rail expansion

Historically cities have driven modern economies and those cities have needed a bone structure made of steel rails in order to bring them to life. The first industrial cities needed rail because the roads were slow and poor. It was the railways that took the coal that powered the machinery that generated the mass produced goods which were then in turn circulated far and wide by rail. It was the railways that then knitted those cities together into a single economy from disconnected townships. And it was the railways that allowed people to work in the city and to live in their ever expanding suburbs and outskirts.

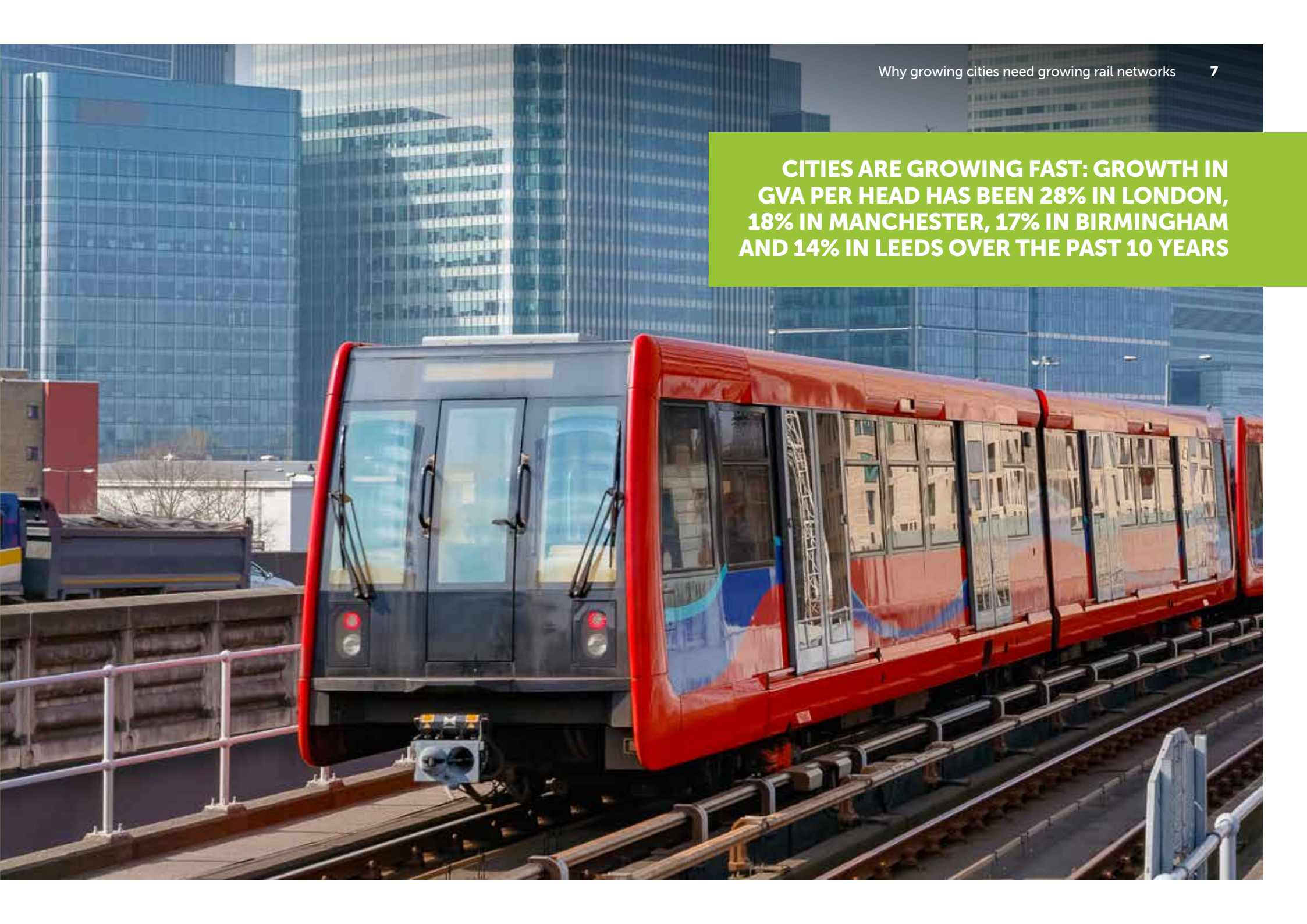
As roads and motor vehicles improved and the balance of investment shifted, it seemed for a while as if cities no longer needed railways or indeed that cities themselves were no longer so essential. That the economy could be dispersed and could prosper through relying on cars, vans and lorries alone. But this turned out to be a short lived experiment.

Cities are back as places where new and growing sectors of the economy want to be – such as new media – alongside existing sectors like legal and financial services. And also as places where people want to live and to spend time in.

Rail is back too. As cities have revived so has the growth in the use of steel wheel networks. However, although we have seen a revival of cities, many are still not achieving their full economic and wider potential. Traffic congestion plagues the better performing cities and holds them back. The cost of congestion to the UK economy has been estimated at £13 billion a year, and is forecast to rise to £21 billion a year by 2030.



**CITIES ARE GROWING FAST: GROWTH IN GVA PER HEAD HAS BEEN 28% IN LONDON, 18% IN MANCHESTER, 17% IN BIRMINGHAM AND 14% IN LEEDS OVER THE PAST 10 YEARS**





**RAIL CAN HELP TACKLE THE HOUSING CRISIS WITHOUT MAKING TRAFFIC CONGESTION WORSE**





## Rail cities of the future

Cities need size and density if they are to reach their full potential to do what they do best – be exciting places which bring ambitious, energetic and knowledgeable people together as part of new ventures. Places where the sum is more than that of the parts. Size and density require transport systems that can get people into such cities in a space efficient and rapid manner.

Some argue that in the future connected and autonomous road vehicles could do this. However, even if all the social, legal and technological barriers to achieving this were to be rapidly overcome, people increasingly want the space between buildings in cities (the streets) to be more for people than for vehicles (regardless of how futuristic and autonomous those vehicles might be). This shift of road space from vehicles to people through pedestrianisation and the creation of a better urban realm is a trend that can be seen in city centres in the UK and around the world (from Moscow to Los Angeles and from Paris to Singapore). It is a trend that reflects the competition between cities to attract residents, business and visitors – who all want places that are good to spend time in rather than places that are traffic choked and unpleasant. It is also an objective that cannot be achieved, and still have a functioning city, unless you have a good urban rail network.

In particular, a good *electric* urban rail network – which generates no pollution where it operates and progressively less from the power it uses as the grid becomes greener.

Britain also has a housing crisis with not enough housing overall, not enough of it in the right places and not enough of it in the right format given social change. Rail can help tackle the housing crisis without making traffic congestion worse. It can do this through supporting denser housing in existing urban areas (through building denser housing on, or in close proximity to stations), through serving new residential developments on the fringe of urban areas or supporting more commuting from distant existing suburban and urban centres. There are also many brownfield sites formerly used by the rail sector or industry which were rail served, and could be used for housing.

Rail can also help reduce the impact of freight and logistics vehicles on urban roads. This can be done by long hauling more bulk freight either into urban freight terminals directly (including passenger stations which are otherwise unused at night) or to rail connected distribution hubs on the urban periphery, where freight can then be loaded onto road vehicles better designed for the urban environment in terms of safety, propulsion and size.



# URBAN RAIL SUCCESS STORY

Urban rail has been one of the big transport success stories of recent times especially where powers have been devolved to those urban areas themselves. More passengers and a bigger share of the daily commute has provided further impetus for significant investment.

Rail growth in general, and into cities in particular, has been one of the biggest and most positive transport trends in recent years.

Patronage on regional rail services (which includes urban rail services outside London) has grown by more than a third in the last ten years, whilst growth on London and the South East services has increased by nearly 45%. Within those remarkable headline trends we have seen some extraordinary levels of growth in rail use into cities.

Rail is also growing its share of commuter traffic into major cities like Birmingham where rail's market share eclipsed buses in 2011, and now exceeds that of the car.

## Patronage growth over the last ten years

**91%**  
Huddersfield



**36%**  
Manchester Piccadilly



**184%**  
St Helens Central



**96%**  
Wolverhampton



**143%**  
Coventry



**41%**  
Kings Cross







## Case Study 1:

### West Yorkshire Transformation

In the eighties the Airedale and Wharfedale lines from Bradford/Leeds to Skipton and Ilkley (the latter dodging the Beeching axe after originally being hitlisted for closure) were soldiering on with the same diesel trains that had originally replaced steam trains in the sixties. However between 1995 and 2000 they were transformed through electrification, a new fleet of trains, re-staffing and refurbishment of key stations as well as much better real time passenger information at stations. With fast electric trains now running from much improved stations right into city centres, passengers shifted back to rail in numbers, with patronage growing by 20% a year (compared with 6% for the wider West Yorkshire network). Rail now dominates commuter traffic on these corridors into Leeds with an 80% share of peak time traffic from Keighley and a 77% share from Ilkley.

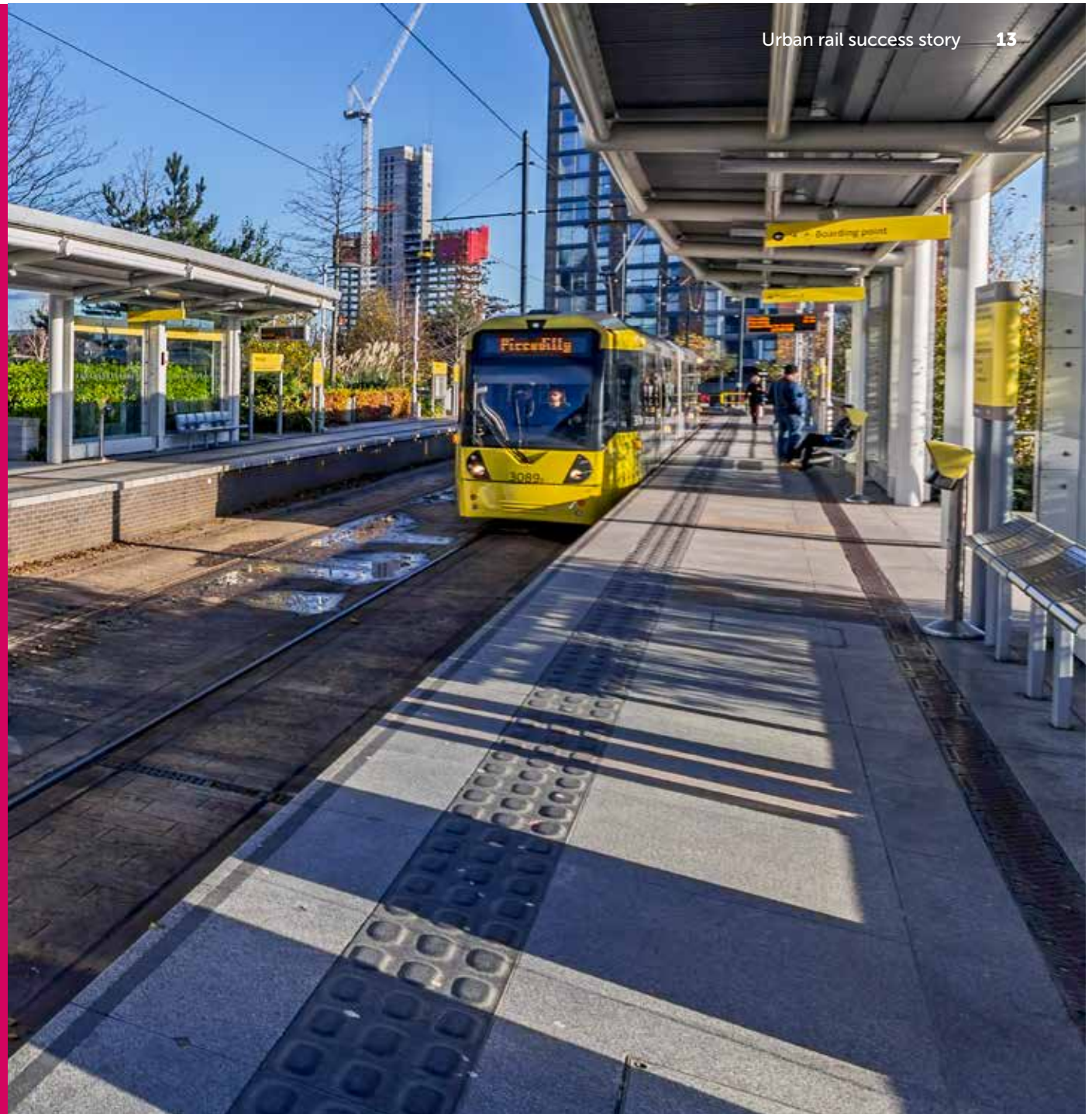




## Case Study 2:

### Light Rail Revolution

Alongside the growth in patronage on conventional urban 'heavy rail' services we have also seen expansion in modern tram and light rail networks. These systems include the Tyne and Wear Metro Light Rail network which took over and linked former run down heavy rail services to provide a single network spanning and crossing a city region. They also include modern tram networks which combine on and off street running, including the use of some former heavy rail routes (such as Manchester Metrolink). These systems have proved popular with high levels of passenger satisfaction, patronage growth and modal shift. They have also released capacity on heavy rail networks for other services, helped transform town and city centres for the better, opened up new journey opportunities, boosted civic pride and reinforced local identity.





## Case Study 3:

### Tyne and Wear Metro

Before the creation of the then Tyne and Wear Metropolitan Council, British Rail was cutting frequencies and closing stations. Fearing line closures, the Metropolitan Council made the case to Government for radical change through a new electric light rail network which converted and connected the remaining heavy rail commuter routes. New stations were also added. On completion of the initial system in 1984, patronage rose fivefold. Since then there have been further network extensions including dedicated stations at the region's airport, three universities and two football clubs. With the best smart ticketing outside of London and high frequencies from first train to last, it's no wonder that many more people use comparable sections of the Metro than use the remaining national rail local services in the area. The Metro, which is owned and operated by Nexus as a fully devolved railway, is set for a new, more flexible fleet following a grant approval for £337m.



# Rail Devolution Works

The fundamentals that have driven rail growth in general have been most effectively harnessed where responsibilities for local rail services have been devolved as has happened fully on London Overground, Merseyrail Electrics, Tyne and Wear Metro and in Scotland, as well as partially in the North of England, the West Midlands and in Wales.

Where we have seen full devolution we have seen transformations in passenger satisfaction, performance and investment levels.

This is because local decision makers have seized the opportunity to improve services which they know are vital to their wider economic, social and environmental priorities. By being closer to their local rail operator and passengers than Whitehall ever could, they have raised the bar on performance and been held to account for any shortcomings. Devolution also offers the opportunity to better link rail development with wider land use planning, economic regeneration and meeting housing needs. It is why, for example, more local rail lines have opened in Scotland over the past fifteen years than in the rest of the UK put together. It is also why devolved urban networks tend to have higher frequencies and much better off-peak services than those networks which are not devolved.

## New trains and more investment

**Ageing trains, the impetus from runaway patronage growth and the ambitions of devolved rail authorities have led to major investments in new trains, including:**

- Renewal of commuter train fleets in the South East and new and enhanced services on the London Overground network
- New train fleet on order for the Merseyrail electrics network
- New train fleet approval for the Tyne and Wear Metro
- 107 additional new trains for the West Midlands rail network
- Replacement of the pacer train fleet and 98 new trains on Northern rail services

**Light rail and modern tram systems are also continuing to expand including:**

- Recent extensions to the NET tram system in Nottingham
- Extension of Manchester Metrolink to Manchester Airport and construction underway on a further extension to Trafford Park
- Extension of the Midland Metro into the centre of Birmingham and a new route in the Black Country
- Extensions of the Docklands Light Railway to Thamesmead

**Meanwhile London Underground will have a new branch of the Northern Line to Battersea.**

**We are also seeing significant investment in heavy rail infrastructure including:**

- A new cross city link in Manchester (the Ordsall Chord)
- Capacity increases across urban rail networks
- HS2

# TIME FOR A STEP CHANGE IN URBAN RAIL AMBITIONS

**The investment taking place in renewing and improving urban rail networks is welcome. However, it falls short of a long term, step change vision for urban rail which would allow cities to become the greener, less congested, better connected and better functioning places they need to be if they are going to achieve their full potential.**

Significant and welcome investment is being made in urban rail however much (although not all) of these investment programmes are incremental, and in some cases unavoidable, given ageing trains and infrastructure. It is still the case that where counterpart European cities have tram networks, some equivalent English cities have single lines or even no mass transit system at all. Lack of capacity on trains and tracks means overcrowding and reliability can be poor. In general cross-city heavy rail links are under-developed. The quality of urban stations ranges from the good, the bad to the down right ugly. Outside of London, integration of the heavy rail network with the rest of the public transport network (in terms of branding, information and fares) is a mixed bag. Finally there are extensive unserved 'rail deserts' in the city regions where buses struggle to provide a decent alternative given traffic congestion.

## A vision for 21st Century rail cities

- 1 Heavy rail networks with greater reach and adequate capacity to provide a higher density of services more reliably and which have a greater market share of city centre commuting
- 2 Use of new technologies to switch more suburban services on street – as part of expanded modern tram networks – when they reach city centres
- 3 Heavy rail networks which are integrated with wider public transport networks, are responsive to local passenger need, and which support wider spatial, housing and local economic development plans
- 4 Stations which are about more than just trains, acting as hubs for wider housing, community and business purposes
- 5 Urban rail networks which better emulate those of comparative city regions in countries like Germany with interlocking tiered networks of different types of rail services (such as high speed rail, local rail, metro and tram networks).



**WE NEED HEAVY RAIL NETWORKS  
WITH GREATER REACH AND  
ADEQUATE CAPACITY**



## For passengers, this vision means:



More reliable and rapid urban rail services with more seating and less need to stand in the peak, and a better spread of off peak services including at night and at the weekends.



Rail networks which are simple to use, with 'turn up and go' services and good connections accessed through simple ticketing and clear information.



Stations which feel, and are, safe and welcoming and where high standards of cleanliness, comfort and information are consistently met.



Stations which are easy to find and get to including on foot and by bike, and for older and disabled travellers.



A sense of belonging with the identity and branding of the network relating to the area it serves and clear accountability and redress both to the train operator that runs the service and the transport authority that oversees it.

## For businesses, decision makers and communities in the cities this vision means:



More opportunities for people to live close to rail stations reducing sprawl and car dependency and providing more of the housing that cities need.



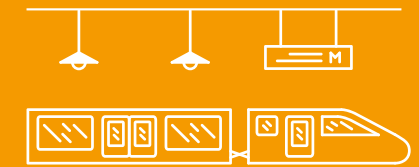
Rail networks that have the capacity and resilience to support the densification of city centres, as well as provide attractive gateways and local community and economic hubs for city region towns.



Supporting cities by providing access as space for road vehicles is reduced in favour of space for people through urban realm schemes.



Opening up lower case for all by providing access to work, education and leisure across a wider area.



Stations which are part of the communities they serve with historic buildings restored for local community and business purposes, and new and improved stations which are an asset to their local surroundings rather than an eyesore.



Rail services that are part of something bigger – tied in to the wider local public transport network of bus and light rail services through the branding, connections, ticketing and information they share.

## Network Challenges

For our vision for urban rail to be realised five key network challenges need to be addressed:

- 1 New cross city rail corridors and connections.** London's Crossrail will join Thameslink as London's second dedicated, and tunnelled, high capacity heavy rail route across central London. However many other cities lack any such equivalent, dedicated cross city routes. This fragments urban development and connectivity and puts unmanageable pressures on congested city centre rail terminals. Existing above ground cross city rail routes in cities like Birmingham and Manchester also need additional capacity, or new connections, or both.
- 2 Deployment of tram-train technology** (see section 22) so that more rail services that start in the commuter belt on heavy rail tracks end up on tram lines in city centre streets rather than terminating in overcrowded city centre heavy rail stations.
- 3 Ramping up service levels and extending the range of high frequency urban rail services.** Too many urban rail services are at low frequencies particularly in the off-peak. There are also opportunities to extend the range of higher quality urban services beyond where they currently terminate to extend commuting range and improve connectivity between cities and their neighbouring urban centres.
- 4 Putting unserved urban centres back on the rails.** There are many urban towns and centres that lost any form of passenger rail connection in the Beeching era which probably should not have done so then and for which the case for a rail connection now is even stronger than it was. Depending on local circumstances, re-openings might help reduce road congestion, open up new housing opportunities, and provide access to opportunity for communities that feel cut off and left behind. Some of these places retain viable disused railway infrastructure or are served by rail lines which remain open for freight which would make re-establishing a passenger service easier.
- 5 HS2** will not only transform rail travel between London, the Midlands and the North, it will also allow for the biggest rewriting of the national rail network since it was built due to the release of capacity on existing main lines. It is also the trigger for the UK's largest urban redevelopment programme. This has major implications for urban rail networks serving new HS2 stations.



## Case Study 4:

### Germany's Rail Cities

German regions like the Rhine-Ruhr conurbation have many similarities with British sub regions like the Scottish central belt, the North of England and the Midlands. They are post-industrial, polycentric (rather than revolving around one major world city), contain significant rural hinterlands and have complex overlapping transport, economic, political and cultural geographies. However, German regions and city regions have a different approach to transport provision to many of their UK comparators in that they operate a tiered system of public transport provision with a high degree of integration of ticketing and services.

So alongside inter-city services there will be a dense and interlocking network of trams, u-bahns (subways), s-bahns (rapid high frequency urban rail services), regional services (traditional heavy rail stopping trains) and regional expresses (serving the main urban centres only). These different forms of steel wheel services also connect with local bus services and are all covered by common ticketing and branding.

There is also a high degree of devolution of responsibilities for sub-national rail services but one which one recognises the complexities of overlapping transport and economic geographies by allowing for joint arrangements on tickets and services between transport authorities where it makes sense to do so.



**DIFFERENT FORMS OF STEEL WHEEL SERVICES CONNECT WITH LOCAL BUS SERVICES, AND ARE ALL COVERED BY COMMON TICKETING AND BRANDING**





**TRAM-TRAINS ALLOW PASSENGERS TO BOARD AT THEIR LOCAL STATION AND CONTINUE THEIR JOURNEY BEYOND THE MAJOR CITY RAILWAY STATION, DIRECTLY INTO THE CITY STREETS**





## Flexi trains and trams

For much of the twentieth century a tram was a tram and a train was a train. Trams ran on streets and trains ran on a segregated rail network. It was very clear which was which. The application of new technologies means that in the 21st century the divide need no longer be so stark. For example, tram-trains are tram-like vehicles that can operate both on street and on the heavy rail network. Tram-trains allow passengers to board at their local station and continue their journey beyond the major city railway station, directly into the city streets, as the vehicle switches seamlessly from railway track to urban tramline. Passengers can alight at various tram stops along the way, meaning that no single place is overly congested and passengers can get off closer to the place they actually want to get to, whether that is the office, the shops or the cinema. Tram-trains can accelerate more rapidly than many heavier conventional trains which means frequent stops can be made whilst keeping end-to-end journey times attractive.

Tram-trains already operate extensively in mainland Europe. The first long awaited trial in the UK is planned to begin operation in 2018 in South Yorkshire where a small fleet of tram-trains will provide a new link from Rotherham to Sheffield via a short stretch of the existing heavy rail network and a new link onto the existing Sheffield Supertram network.

More widely there is now the capability for new trams and trains to take power from a variety of different sources. Traditional electric or diesel powered propulsion is now joined by hydrogen as an option. In addition, on board batteries, diesel power packs, flywheel and capacitor technologies can allow vehicles which are primarily powered by electricity to operate beyond their core electrified routes. The advantage of this is that it extends the range of electric trains and trams without the need for costly or intrusive electrification infrastructure – allowing, for example, trams to operate without overhead wires in city centres.



Pictured: In cities like Karlsruhe in Germany tram-trains (on the right) can share suburban tracks with regular heavy rail trains (on the left).

## Planning, structural and organisational issues

The five network challenges sit alongside five planning, structural and organisational obstacles to realising the vision.

- 1** The **appraisal methodology** that is used to justify and rank transport investment decisions is not designed to capture the wider transformational benefits of major schemes. In addition, available **national funding** for transport schemes will always be finite with priority tending to be given to inter city rail investment (important as this is to inter-city) rather than intra-city investment.
- 2** The rail industry's **capability and capacity** to deliver major rail investment programmes is in question given the tendency for projects to drift out on costs and timescales. This was brought to a head by the failure and consequent cutting back of the Great Western Main Line electrification scheme.
- 3** The failure of the rail sector to deliver on agreed long term investment plans has led the Government to **pull back from detailed long term investment plans** as well as concentrate on completing existing commitments. This creates both uncertainty and pushes back the likely timescales for key intra-city schemes in favour of completion of commitments on inter-city schemes.
- 4** If the goal is reducing rather than increasing urban traffic congestion then it makes sense to ensure that **planning of transport, local economic development, housing and land use is coordinated**. Of the English cities, London is furthest advanced in this regard though the creation of Combined Authorities (and in some places Mayoral Combined Authorities) is leading to improved coordination elsewhere. However, planning and prioritisation on the national rail network only fitfully reflects this approach.
- 5** Too often urban rail networks sit outside the wider local public transport networks in terms of **branding, fares structures and connections**. This problem is exacerbated outside of London where bus deregulation means that urban transport authorities can not ensure service or fares coordination and integration both within the bus network or with the wider local public transport network. In England, London comes closest to full integration of the rail network with the wider public transport network through smart ticketing and the fully integrated London Overground network.





**INVESTMENT IN INTRA-CITY  
RAIL NEEDS TO BE GIVEN THE  
SAME PRIORITY AS INVESTMENT  
IN INTER-CITY RAIL**

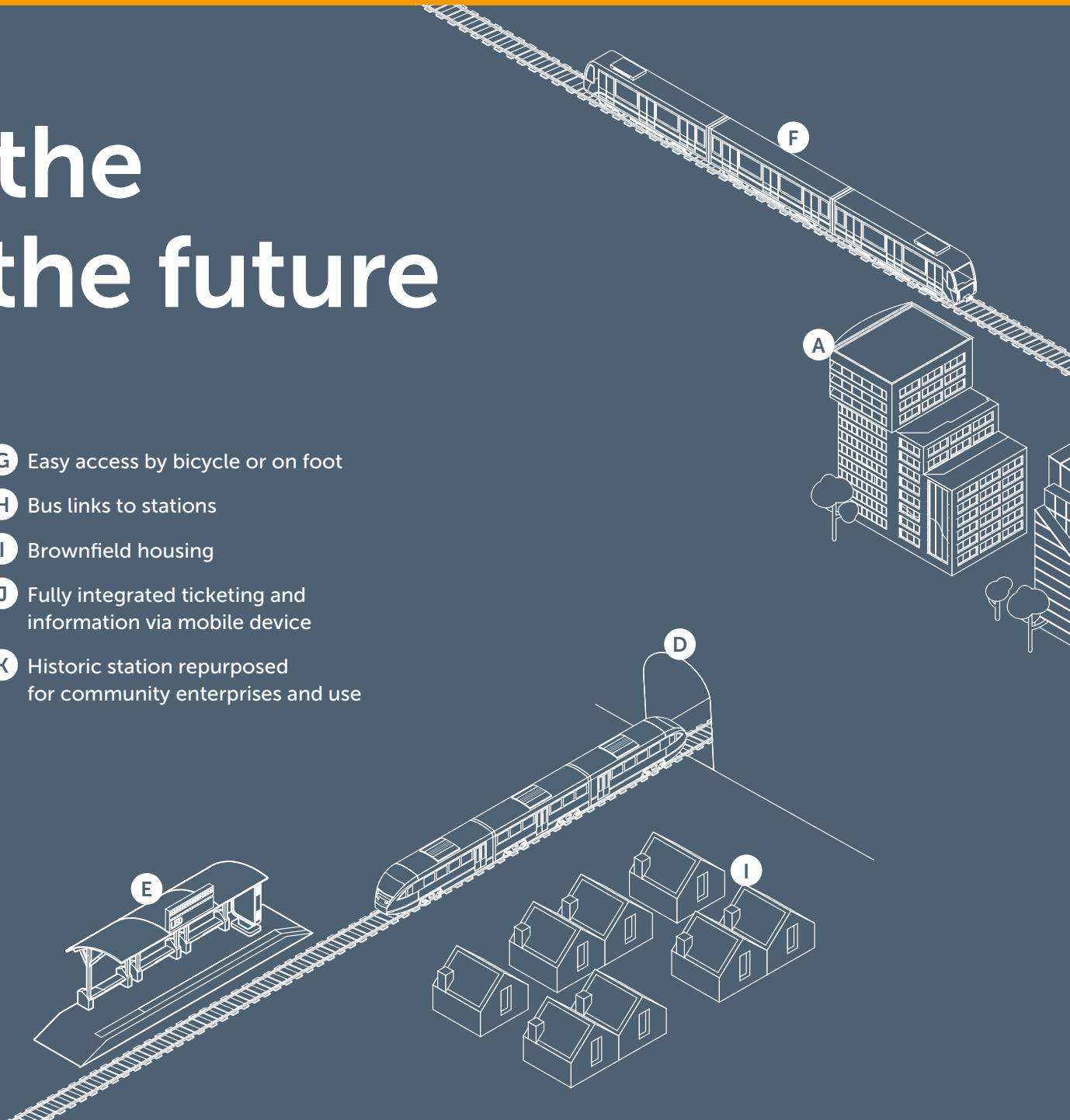


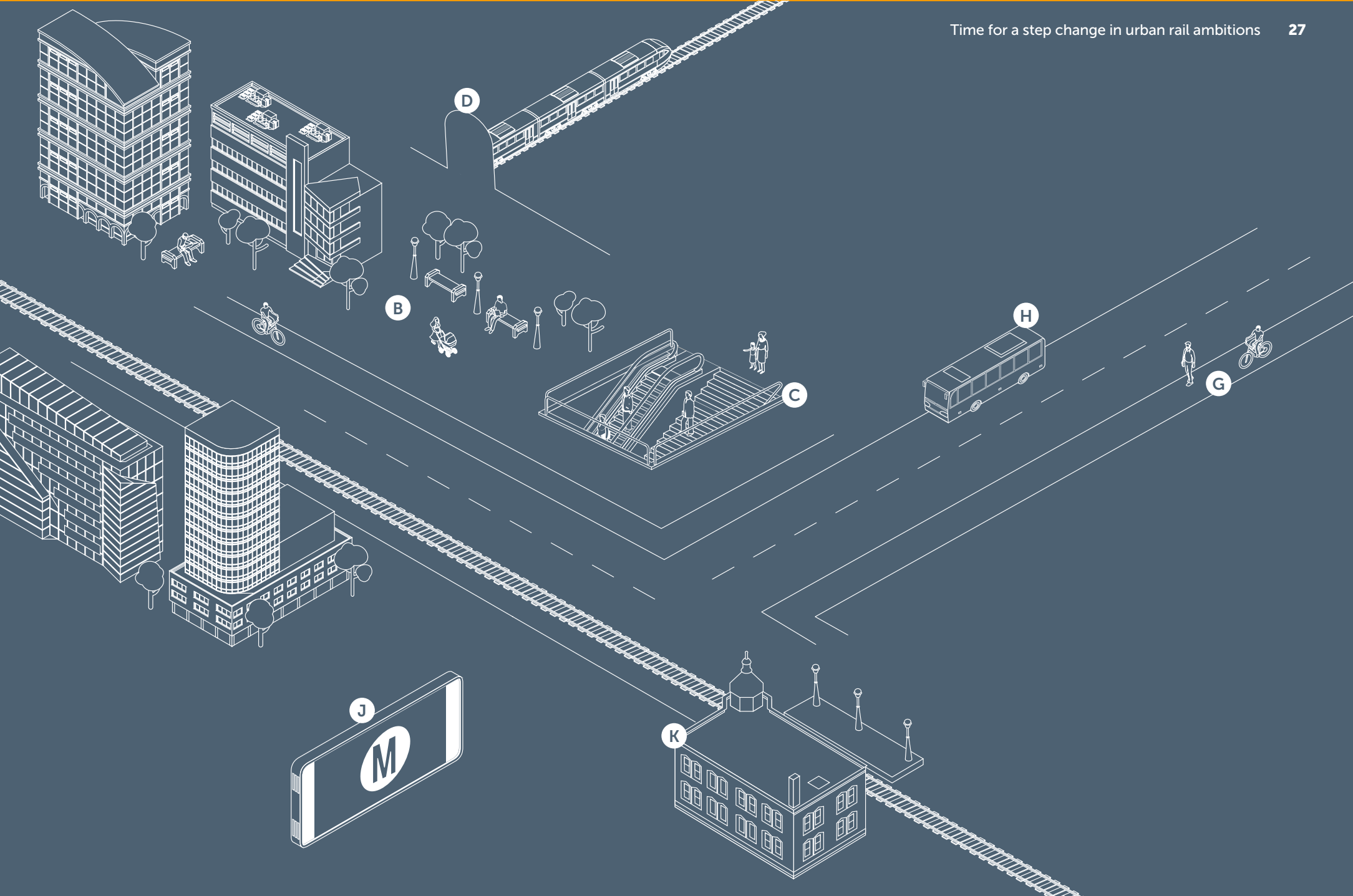


# Imagining the rail city of the future

## Key:

- A** Dense central business district with low levels of road vehicles
- B** High quality public realm
- C** New city centre station below ground
- D** Cross city centre rail services
- E** Modern, attractive station
- F** Tram-train: get on at your local station and get off on main street of the city, outside your office
- G** Easy access by bicycle or on foot
- H** Bus links to stations
- I** Brownfield housing
- J** Fully integrated ticketing and information via mobile device
- K** Historic station repurposed for community enterprises and use





# TURNING TALK INTO TRAINS

## A new rail devolution settlement

Rail devolution is working for cities and passengers. Wherever it has been introduced patronage has risen, passenger satisfaction has soared and there has been more investment. It is also happening on more of the network (one third of all rail trips are now made on a service which is run in full, or in part, on behalf of a devolved authority).

Yet despite being one of the most far reaching and successful aspects of rail policy and practice of recent years, you wouldn't necessarily know it from reading the rail press or reading industry or Government rail documents. Progress is also slowing with the Government adopting a 'this far and no further approach' to rail devolution for England's major cities.

**It's time to recognise the reality, and the demonstrable benefits, of a devolving railway within a devolving UK by:**

- Widening and deepening the benefits of rail devolution for more cities and passengers through completing the devolution of rail services in the West Midlands and the North, and extending the London Overground network in London
- Devolving more powers over stations where devolved authorities have the aspiration and capacity to do so





## From 'muddling on' to planning for a step change

Despite recent set backs, given the timescales on delivering rail improvements efficiently we need to get back to long term rail development plans. We also need to see the rail sector map onto the realities of a devolving nation in its planning processes and for those processes to relate to existing and emerging wider spatial, economic development and transport plans for urban areas.

More flexibilities and freedoms are also needed in order to capture new forms of funding for rail projects. Land value capture could be part of this – although its potential does relate to the strength of the local economy. Devolution can also help as it is local transport authorities that can join the dots between a multiplicity of grant funding options as well as developer contributions.

## Skilling up

The UK is short of people with the engineering skills we need. And the railways are competing for those skills (and other relevant skills like project management) with other sectors. This is not an ideal starting point, but Government is supporting a drive to promote and support careers in engineering. Network Rail needs to be part of this and a place where more of the best people want to build expertise and careers. Where skills and resources are in short supply in the national rail industry there is potential for devolved authorities to do more where they have the capacity and capability to do so – after all devolved authorities have built and operate rail systems already – from Manchester Metrolink to the Tyne and Wear Metro. Devolved authorities have already delivered improvements on the national network – including new platforms and extra capacity.

## Making the most of the station opportunity

Too many urban rail stations feel disconnected from the communities they serve as well as unwelcoming in their own right. The typical inner city or suburban rail station is not a priority for Network Rail who are focussed on the largest stations, or franchisees (given the length of their franchises) but those same stations are important to local communities and their local transport authority. There are plenty of examples of great local rail stations out there – where run down Victorian buildings have been transformed into buzzing hubs for local businesses and community ventures and there are plenty of opportunities for more to follow if more responsibilities for stations are devolved.

# CONCLUSION

This report has shown how critical rail has been in the development of our cities and shown that if cities are to achieve their potential – and do so in an inclusive and sustainable way – then we need a vision for urban rail which will support that. A vision for rail based on modern and integrated rail systems which develop in line with local needs and priorities.

It is time to think bigger about rail cities for the 21st century.

## What could 21st century rail cities in the UK look like?

The Tyne and Wear Metro could expand further to serve many of the significant urban centres it does not currently serve – many of which are already on a rail line, be it currently disused or for freight only. This includes Washington, Ashington and Chester-le-Street.

The Merseyrail network could extend beyond its current limits on more routes to neighbouring cities either through infrastructure investment or through on-board power packs which would allow electric trains to run on non-electrified lines. Freight lines could be opened up for new passenger services.

The benefits of London Overground could be extended to more services. A second Crossrail line could provide additional cross-city centre capacity as well as open up more land for housing. New services on underutilised heavy rail lines could add additional orbital links. The tube network could be extended into more parts of South London, and the DLR and Croydon Tramlink could be further expanded.



Greater Manchester's extensive light rail network could be further expanded including by converting more of the heavy rail network to tram-train operation. A new cross-city centre rail tunnel could significantly add to capacity and better integrate steel wheel networks north and south of the city centre.

More of the commuter network in West Yorkshire could be modernised, and mass transit and tram-train technology could further expand capacity.

In South Yorkshire there could be more capacity and better links between the four main centres of Sheffield, Doncaster, Rotherham and Barnsley.

In the West Midlands there could be a significant expansion of Midland Metro, better services for the West Midlands on the capacity released by HS2, and more through services and less congestion at Birmingham New Street (achieved by routing more trains through the alternative Snow Hill city centre route).