MAYOR OF LONDON

# LONDON INFRASTRUCTURE PLAN 2050

## IMPROVING QUALITY OF LIFE AS LONDON GROWS



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# INTRODUCTION



Last year we launched the London Infrastructure Plan 2050 (LIP 2050). This began consultation on how to make the city better for everyone. It sparked a huge volume of response. This document distils many of those comments and suggestions to help us plan for the future.

There is strong support for investment in infrastructure to ensure that London retains its place as one of the world's leading cities.

Over 270 responses and a number of seminars, workshops and meetings with businesses, government, infrastructure providers and Londoners are helping to shape our long-term plans.

**Thank you to everyone who took part in the consultation.**













We were encouraged by the overall engagement during the consultation. Here are some sample comments.

"London First welcomes the Greater London Authority's 2050 plan as a significant step forward in London's capability to plan effectively for its future growth. We called for the Mayor to adopt a greater strategic role in the planning and delivery of London's infrastructure through our Infrastructure Commission in 2011 and see the publication of this draft plan as a positive and significant first step."

**London First**

"London Councils and the London boroughs look forward to working with the Mayor, the London Enterprise Panel and wider stakeholders from business, the regulated industries, experts and representatives from across London's diverse communities, to secure the infrastructure vital to London's continued reputation as a global destination for people wishing to work, live and visit."

**London Councils**

"We fully support the development of an infrastructure plan for London. Civil Engineering Contractors Association (CECA) has consistently stated that only a long-term plan which has cross-party support will enable government and industry to deliver 21st century infrastructure in an efficient manner."

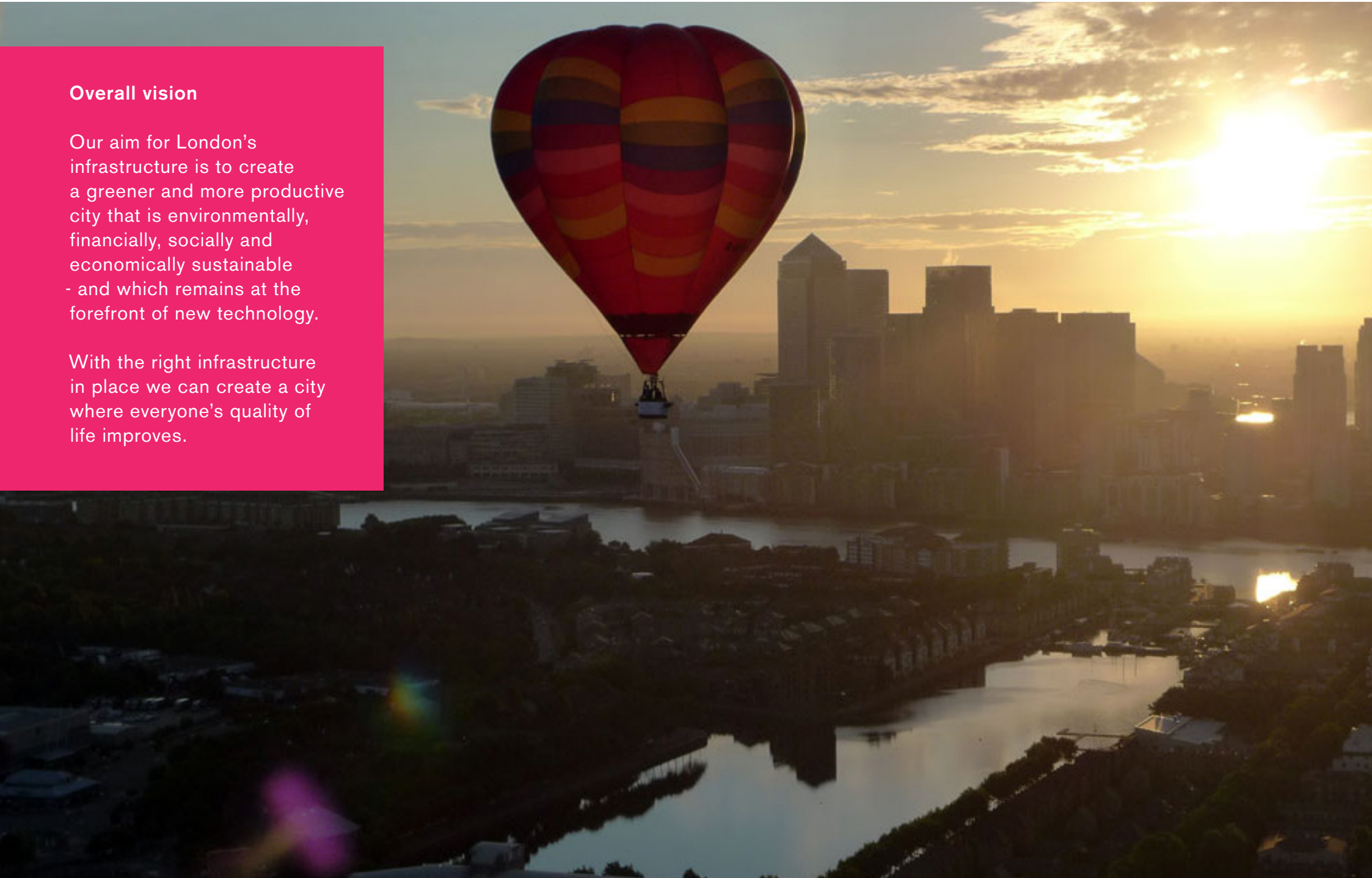
**Civil Engineering Contractors Association**

**TOTAL LIKES, SHARES, COMMENTS, TWEETS** **28,022**

**"The combined potential audience through all types of media was 1.8 million people"**

# OUR VISION





## Overall vision

Our aim for London's infrastructure is to create a greener and more productive city that is environmentally, financially, socially and economically sustainable - and which remains at the forefront of new technology.

With the right infrastructure in place we can create a city where everyone's quality of life improves.

# OVERALL INFRASTRUCTURE REQUIREMENTS



# OVERALL INFRASTRUCTURE REQUIREMENTS

By 2050, we estimate we will need the following across the city:



An additional 1.5 million homes



Around 600 more schools and colleges



A 20% increase in energy supply capacity



Approximately £1 billion of healthcare investment over the next 5 years



Around 40 new facilities that will be used for recycling, remanufacturing, reusing and waste management.



An extra 9000ha of accessible green space including 10% more green cover in central London and town centres



A 50% increase in public transport capacity



High speed digital connectivity



Thames Tideway Tunnel and other water infrastructure

This is our current view on investment required and does not include innovation or potential technological changes that might change these requirements.

# POTENTIAL AREAS FOR GROWTH



## The next high growth areas

London's identified growth areas could accommodate an additional 1 million people.

As defined in the London Plan:

- **Opportunity areas** (brownfield land areas with significant capacity for new housing, commercial and other development linked to existing or potential improvements to public transport accessibility. Typically they can accommodate at least 5,000 jobs or 2,500 new homes or a combination of the two, along with other supporting facilities and infrastructure)
- **Areas for intensification** (areas with significant capacity for new jobs and homes but at a level below that which can be achieved in the Opportunity Areas)

Part of the Mayor's Housing Strategy:

- **Housing Zones** (a new initiative jointly funded by the Mayor and national government to boost housing delivery in areas with high development potential) (boundaries to be confirmed)

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Ordnance survey 100032216



## Growth in London and the wider South East

In response to feedback received during consultation, the GLA has taken a step back to ensure that we develop the right arrangements for collaboration with the wider South East. We have common challenges and opportunities arising from the pressures of growth.

To initiate these conversations, the Mayor recently held a regional summit.

This collaboration will help inform the next full review of the London Plan.



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# COSTS, PRIORITIES AND FUNDING



Our best cost estimates to meet all our infrastructure needs still imply a significant increase in investment.

Decades of underinvestment in the 1970s and 1980s, when London was shrinking, and today's difficult public finance context, compound the funding challenge.

To plan for the future we need:

- To prioritise investment
- Fiscal devolution
- Collaborative construction
- Land and asset intensification
- Demand management
- Technological innovation

The following pages discuss these.



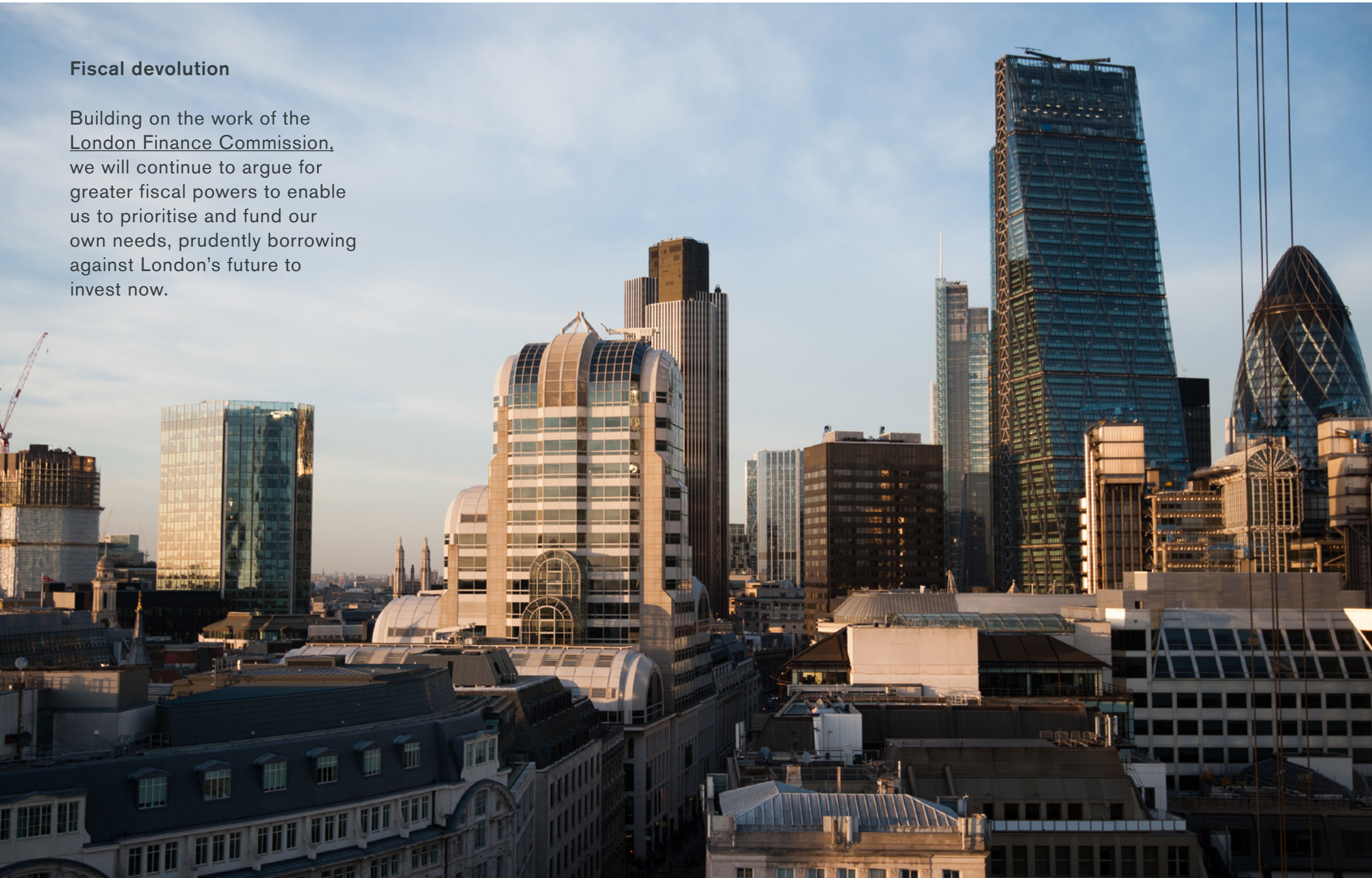
## Developing investment priorities

We will work to develop our collective priorities for the capital in the run up to and during the next comprehensive spending review.



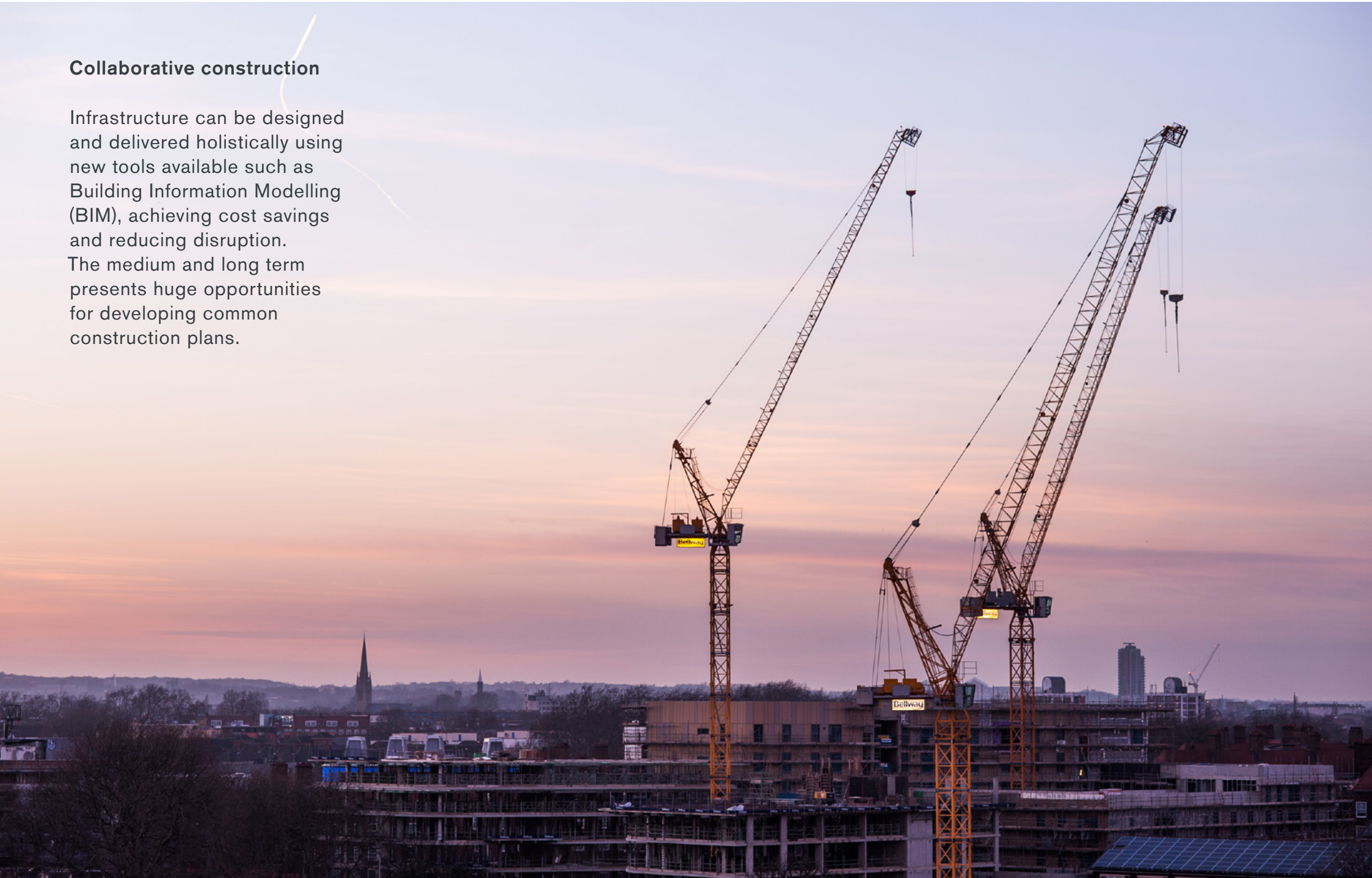
### Fiscal devolution

Building on the work of the London Finance Commission, we will continue to argue for greater fiscal powers to enable us to prioritise and fund our own needs, prudently borrowing against London's future to invest now.



## Collaborative construction

Infrastructure can be designed and delivered holistically using new tools available such as Building Information Modelling (BIM), achieving cost savings and reducing disruption. The medium and long term presents huge opportunities for developing common construction plans.





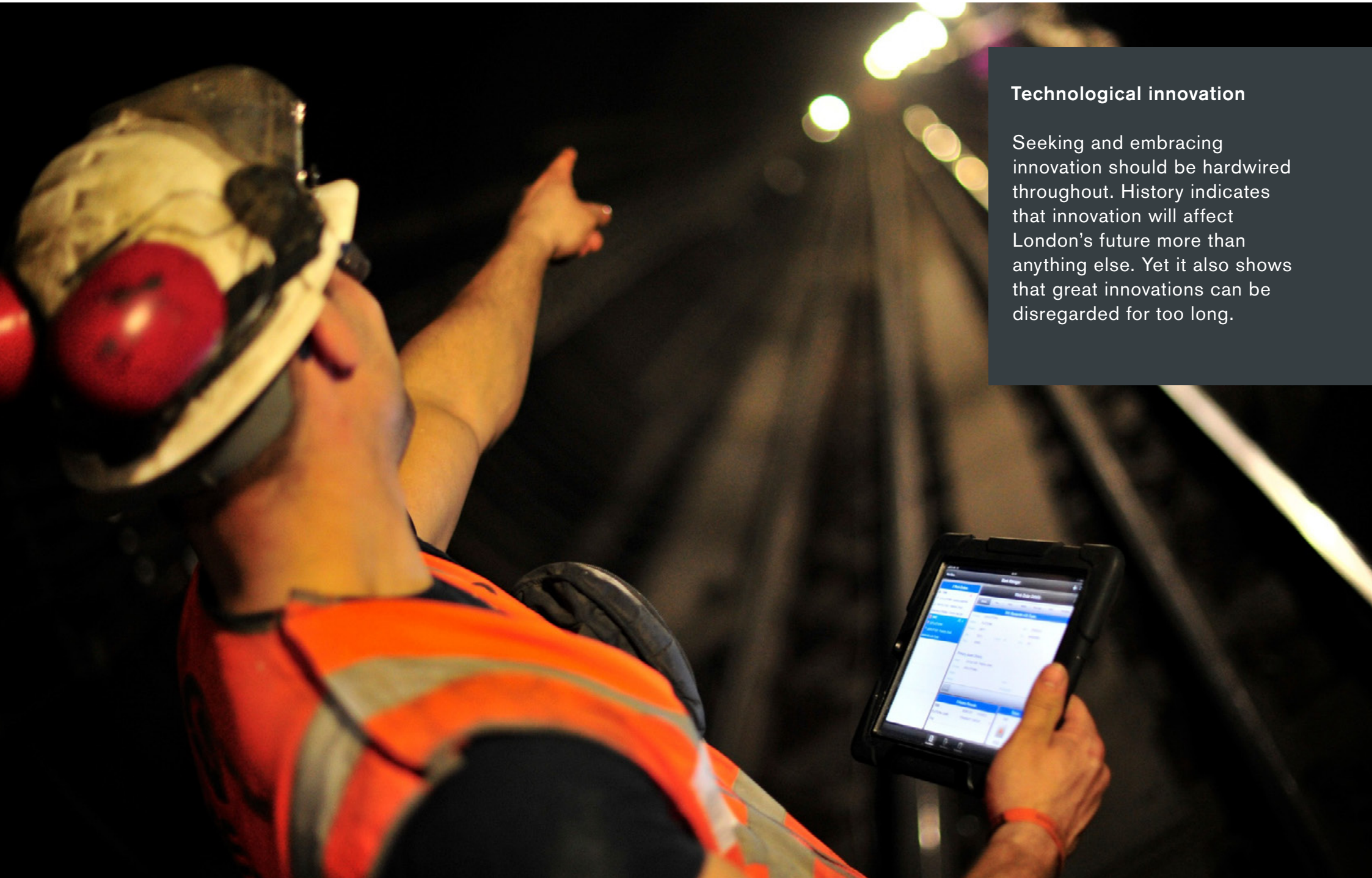
## Land and asset intensification

Assets can be used for more than one purpose, day and night; for example hybrid infrastructure can reduce land take, making more available for housing and other purposes. As a result, value (both higher asset values and new revenue streams) can be created, which can help to repay initial borrowing.



## Demand management

Reducing peak hour loads on infrastructure systems can be more cost effective than putting in new kit. Better collection and understanding of data can help us use infrastructure more productively.



**Technological innovation**

Seeking and embracing innovation should be hardwired throughout. History indicates that innovation will affect London's future more than anything else. Yet it also shows that great innovations can be disregarded for too long.

# DELIVERY – INTRODUCTION



The Mayor set up the Infrastructure Delivery Board in November 2014 to lead the construction of the city. The board is taking forward work that is both cross-cutting (affecting different sectors) and sector-specific.

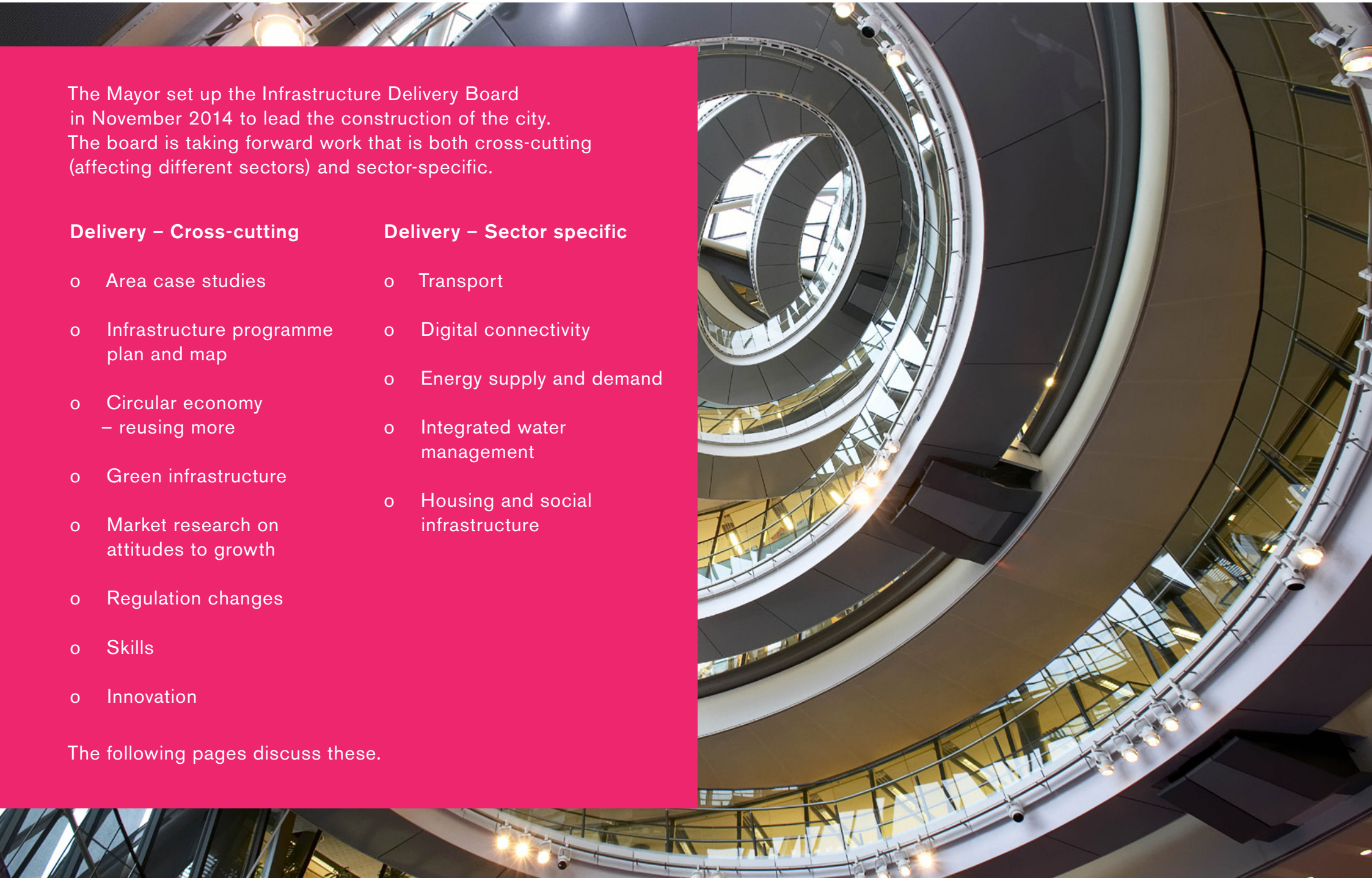
**Delivery – Cross-cutting**

- Area case studies
- Infrastructure programme plan and map
- Circular economy – reusing more
- Green infrastructure
- Market research on attitudes to growth
- Regulation changes
- Skills
- Innovation

**Delivery – Sector specific**

- Transport
- Digital connectivity
- Energy supply and demand
- Integrated water management
- Housing and social infrastructure

The following pages discuss these.



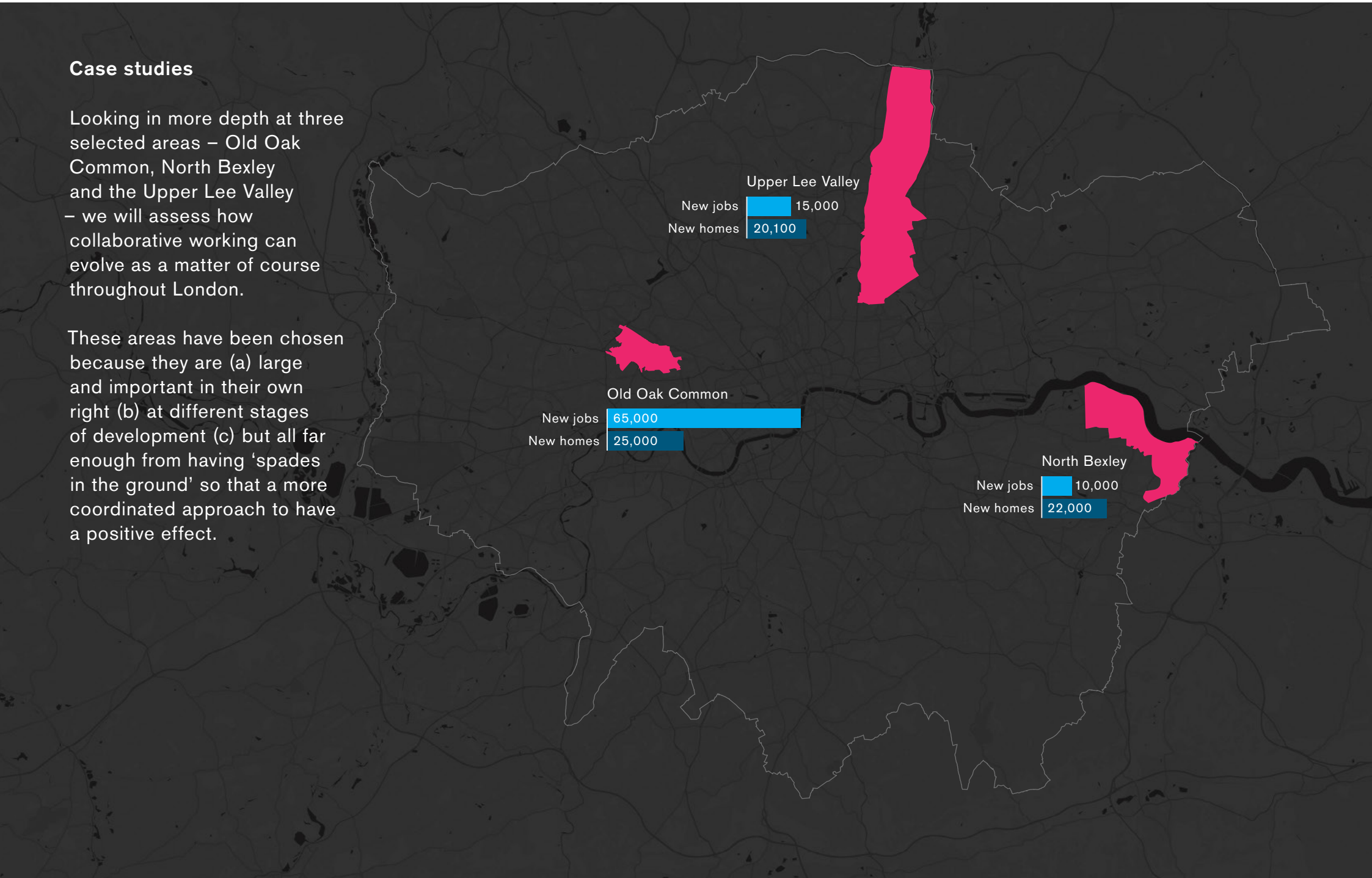
# DELIVERY – CROSS-CUTTING



## Case studies

Looking in more depth at three selected areas – Old Oak Common, North Bexley and the Upper Lee Valley – we will assess how collaborative working can evolve as a matter of course throughout London.

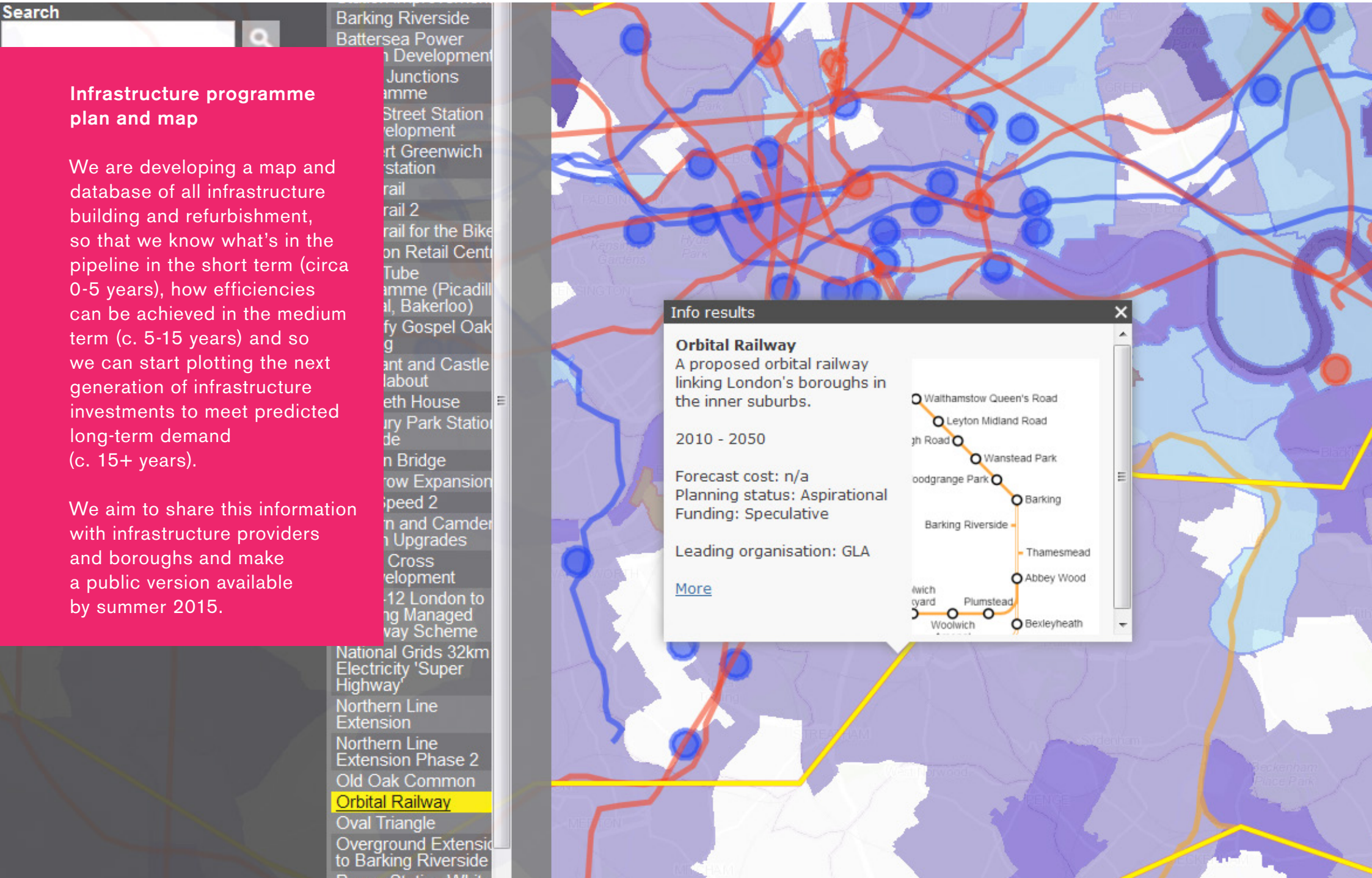
These areas have been chosen because they are (a) large and important in their own right (b) at different stages of development (c) but all far enough from having 'spades in the ground' so that a more coordinated approach to have a positive effect.



## Infrastructure programme plan and map

We are developing a map and database of all infrastructure building and refurbishment, so that we know what's in the pipeline in the short term (circa 0-5 years), how efficiencies can be achieved in the medium term (c. 5-15 years) and so we can start plotting the next generation of infrastructure investments to meet predicted long-term demand (c. 15+ years).

We aim to share this information with infrastructure providers and boroughs and make a public version available by summer 2015.

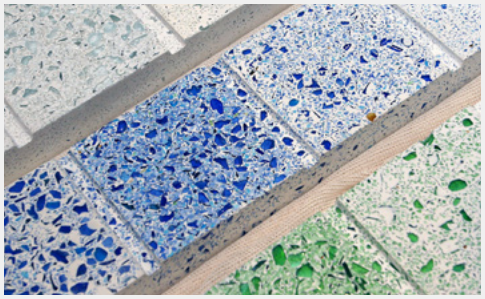


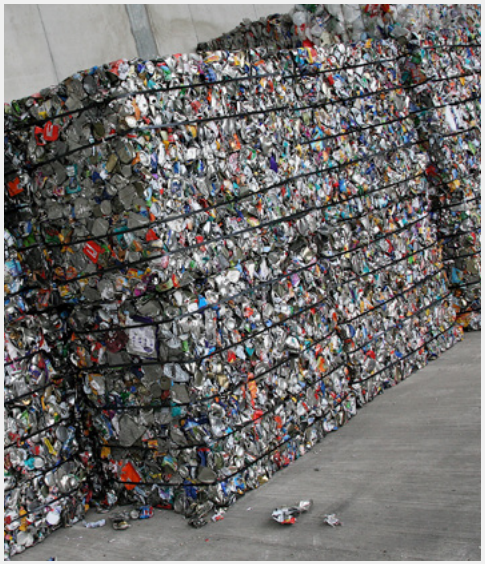
## Circular economy – reusing more, wasting less

Our ambition is to significantly reduce the amount of waste being disposed of by helping London move towards a circular economy, where materials are reused, remanufactured or recycled rather than thrown away.

To realise this ambition, it will be essential to ensure the correct incentives and facilities are in place.

A number of initiatives are running, including: working with various stakeholders to design a plan (or roadmap) for London to accelerate this shift to a more regenerative economy; learning from other cities; and working with SMEs to reshape their business models.













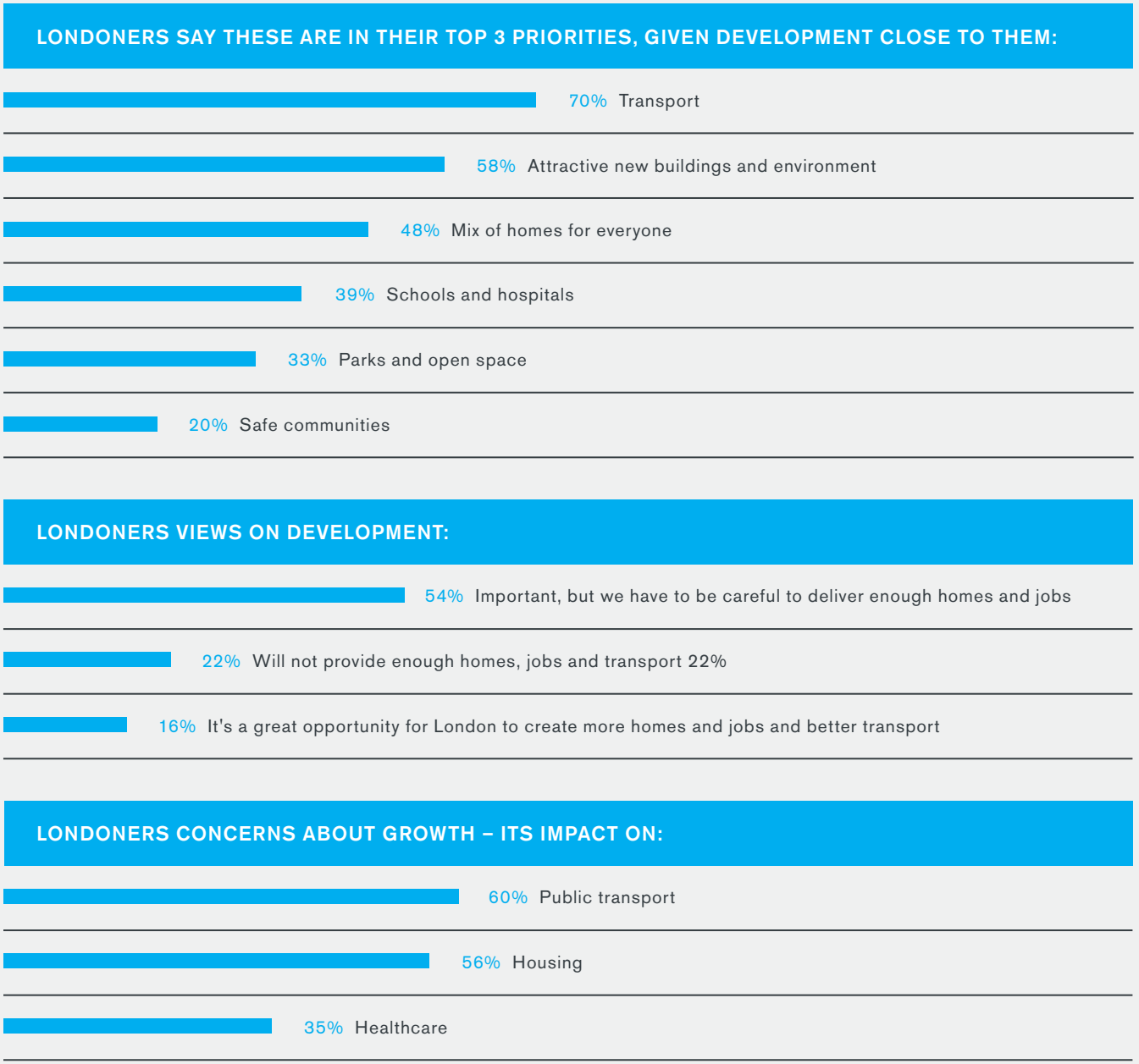
## Green infrastructure

A network of green infrastructure can provide flood protection, shade, biodiversity, space for cycling, walking and recreation, and a more attractive environment.

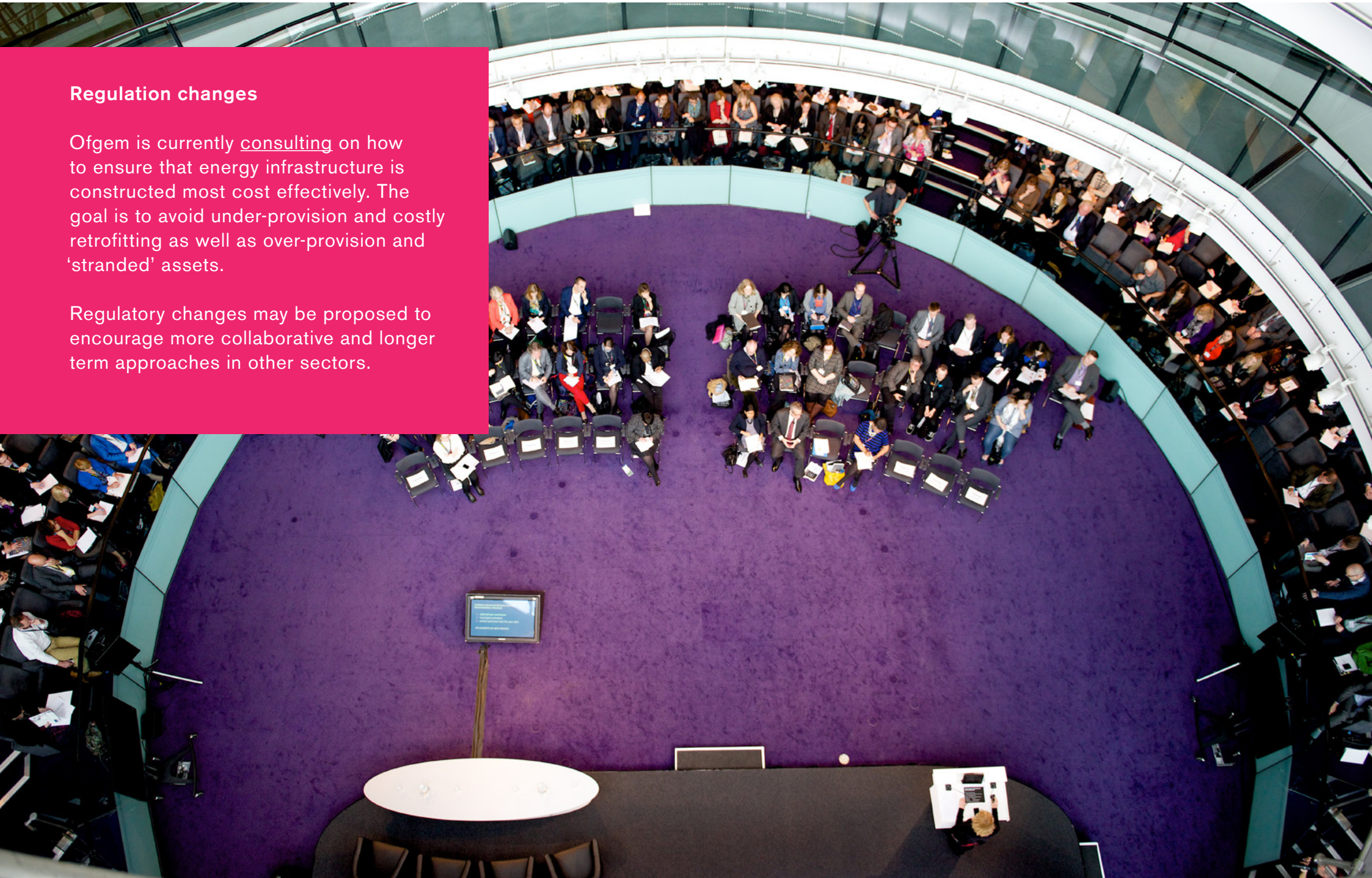
The Mayor has established the Green Infrastructure Task Force to bring together a wide range of interests and expertise to identify how to encourage a more strategic and long-term approach to investment in and delivery of green infrastructure.

## Market research on attitudes to growth

Working with the Mayor's Design Advisory Group, we have started conducting market research into public attitudes to growth. We are running surveys and workshops with the public to better understand what people like or dislike about growth so that we are able to encourage better urban design.




Source: Talk London survey March 2015



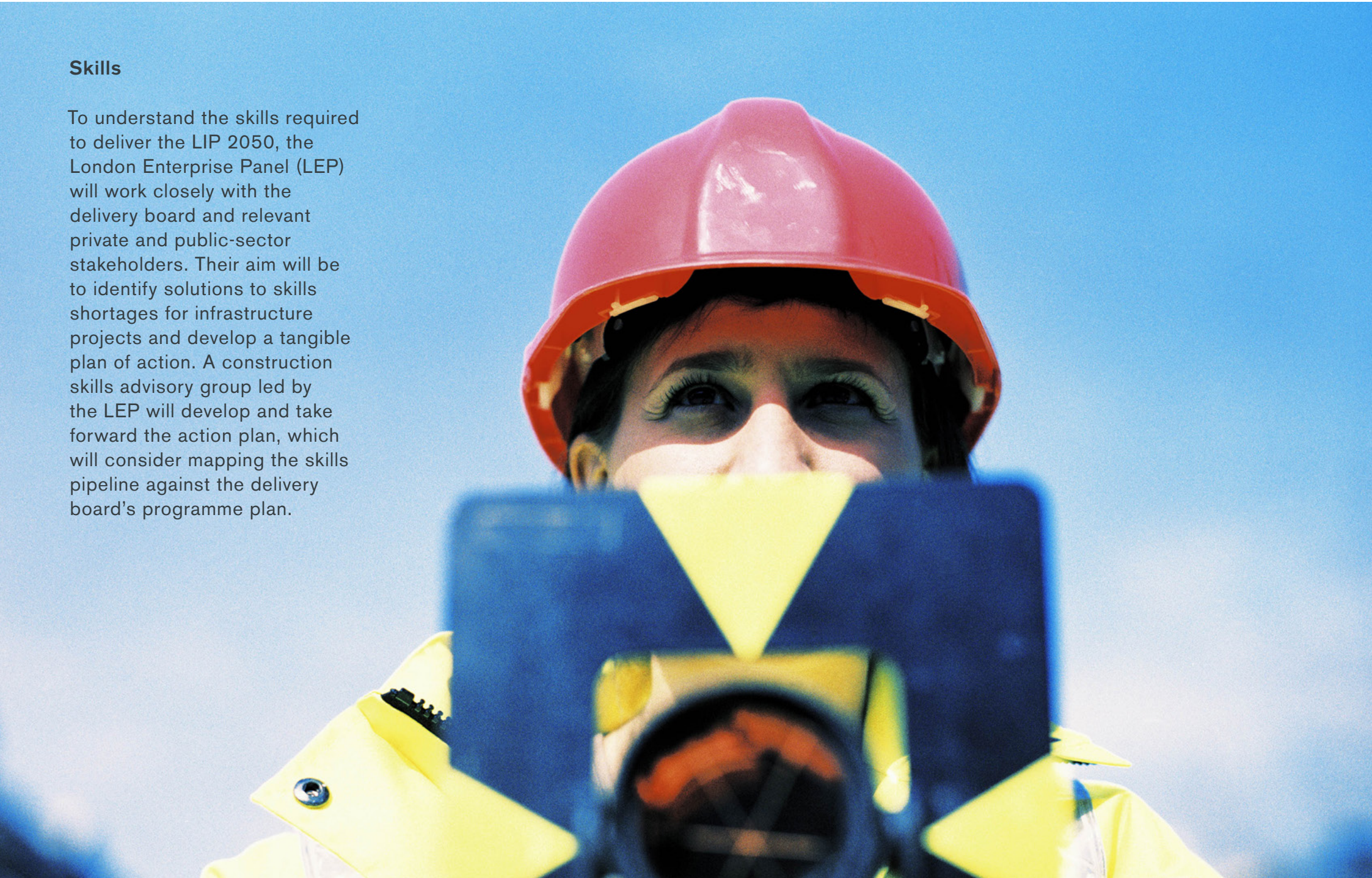
### Regulation changes

Ofgem is currently consulting on how to ensure that energy infrastructure is constructed most cost effectively. The goal is to avoid under-provision and costly retrofitting as well as over-provision and 'stranded' assets.

Regulatory changes may be proposed to encourage more collaborative and longer term approaches in other sectors.

## Skills

To understand the skills required to deliver the LIP 2050, the London Enterprise Panel (LEP) will work closely with the delivery board and relevant private and public-sector stakeholders. Their aim will be to identify solutions to skills shortages for infrastructure projects and develop a tangible plan of action. A construction skills advisory group led by the LEP will develop and take forward the action plan, which will consider mapping the skills pipeline against the delivery board's programme plan.



# DELIVERY – SECTOR-SPECIFIC



## Transport – a better connected city

The consultation confirmed the need for substantial investment, supporting and connecting residential and business growth across the city. Jobs growth in central London alone will require a 50% increase in public transport capacity. Meanwhile new growth poles will emerge (like Stratford and Old Oak Common) and development will occur all over London. All of this needs to be connected up. Much more can be made of the existing rail network to increase capacity and improve trains and stations and we're working with National Rail to develop ideas and proposals. Other transport improvements are required to lift Londoners' quality of life, improve health outcomes and support London's international connectivity.

Below are some of the strategic schemes to support these overarching objectives, which the following pages discuss in more detail:

















Crossrail 2 | Major tube upgrades | Cycle superhighways | River crossings | Bakerloo line extension | Road network and tunnels | Rail network improvements

## Crossrail 2

Alongside completing the Tube upgrade programme, the delivery of Crossrail 2 in the 2020s will be critical for London and the UK. It will unlock up to 200,000 new homes, many in the Upper Lee Valley, which is a focus for regeneration.
A consultation on Crossrail 2 in summer 2014 showed support for the scheme standing at over 80%. In the 2014 Autumn Statement, the Government awarded TfL £2m to further develop the Crossrail 2 business case.



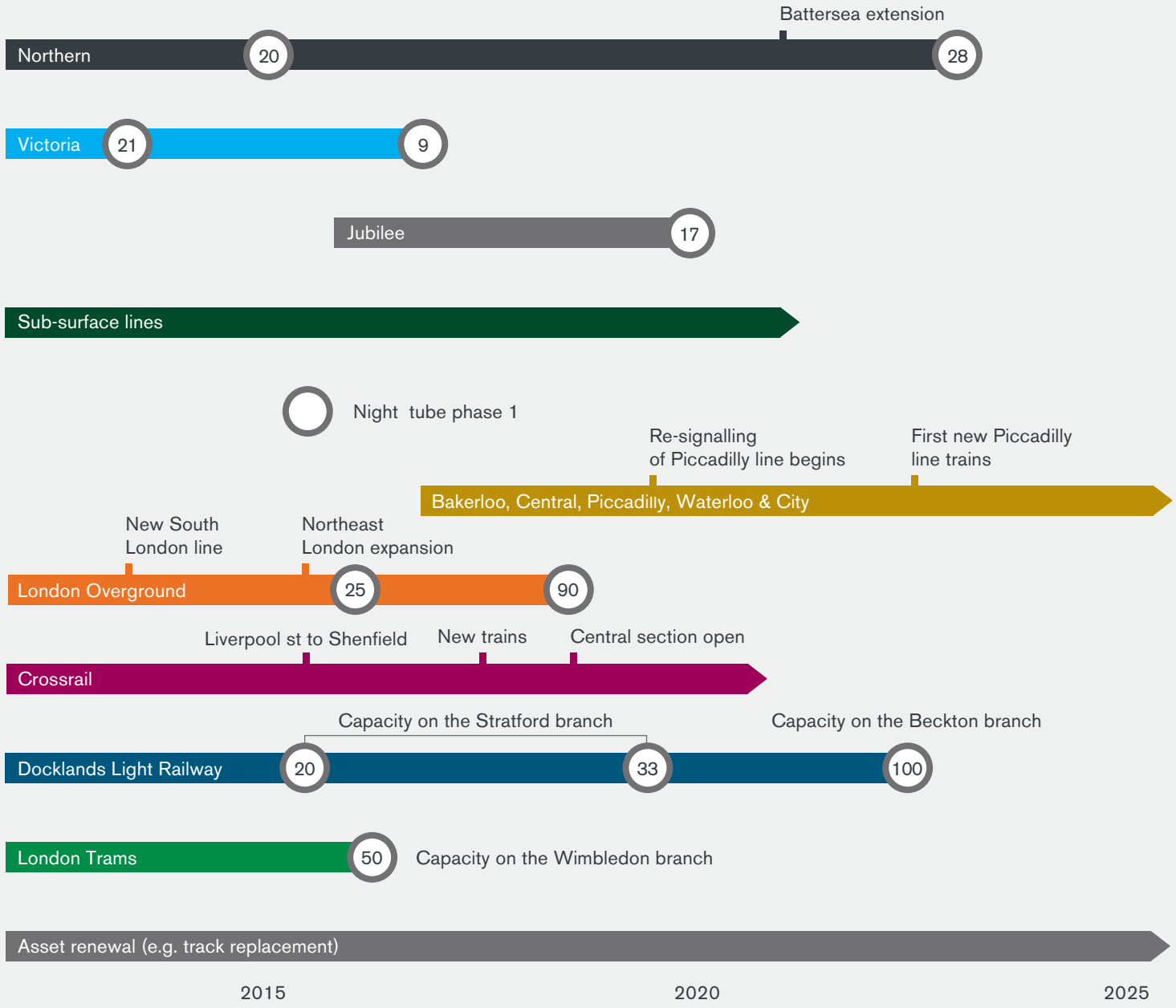

- London Underground
- London Overground
- National Rail
- Tramlink
- Core tunnel portal
- Central core of route
- Regional scheme – possible options
- Option for a future eastern branch

All stations marked provide an indication of where Crossrail 2 stations could be located. No station or infrastructure location has yet been finalised as that level of engineering has not taken place at this stage in the project.

Source: Transport for London

## Major tube upgrades

An extensive programme of modernisation is being carried on the Tube, with major stations, trains, track and control systems being updated or replaced to provide more than a 30% increase in capacity. More than half of the Underground's 270 stations have already been improved, while new air-conditioned walk-through trains are being introduced on 40% of the network. The Circle, Metropolitan and Hammersmith & City lines already have these trains in service and they are now also on the District line – where more trains are due this year.




LINE MODERNISATION

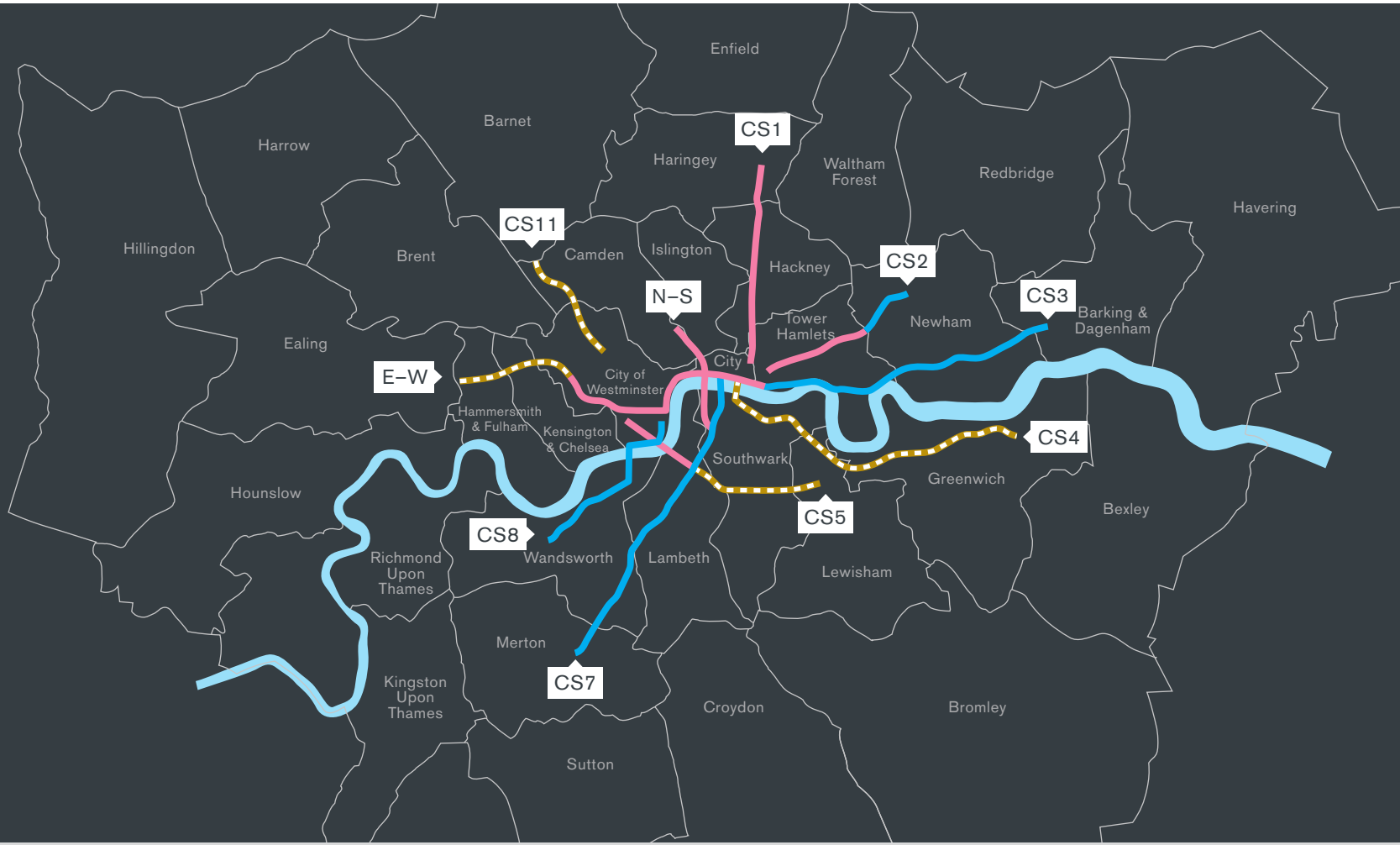
(%) Percentage increase in peak hour passenger capacity

Source: Transport for London

## Plans for cycling and walking

As part of our road modernisation plan, TfL is transforming some of London's busiest junctions to improve facilities for cyclists and pedestrians. This includes removing gyratories at Elephant & Castle, Old Street and Stockwell among others.

The programme also includes four new Cycle Superhighways together with improvements to four existing routes to provide safer, faster and more direct journeys into the city centre. Together these will form a grid of cycle routes across the capital.

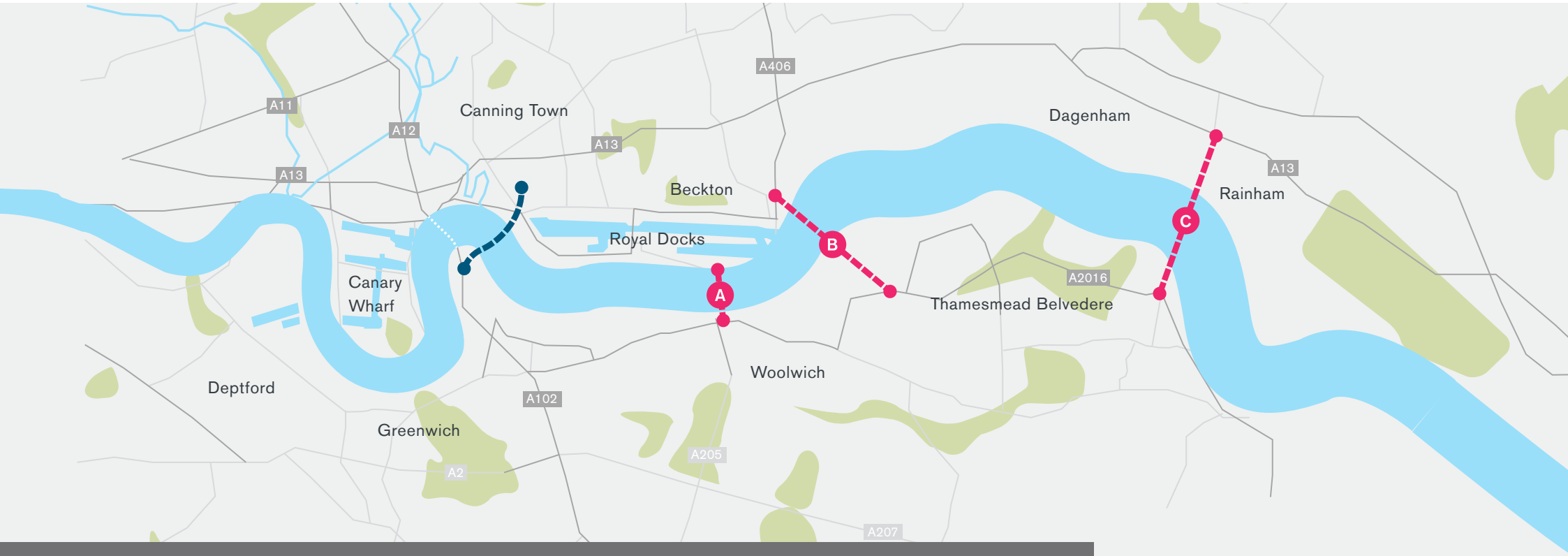



INDICATIVE ROUTE MAP

- Route open
- Delivery by May 2016 subject to approval
- Planned future routes subject to consultation

| | |
|---|---|
| CS1 | Tottenham to City |
| CS2 | Stratford to Aldgate |
| CS3 | Barking to Tower Gateway |
| CS4 | Woolwich to London Bridge |
| CS5 | Lewisham to Westminster |
| CS7 | Merton to City |
| CS8 | Wandsworth to Westminster |
| CS11 | West Hampstead to West End |
| E–W | Westway to Tower Gateway |
| N–S | Elephant & Castle to central London |

The Cycle Superhighways programme will continue to evolve and is subject to further change




## River crossings

A consultation on the Silvertown Tunnel proposals between October and December 2014 received nearly 4,500 responses, with over 80% of respondents agreeing there is a need for the proposed tunnel.

A statutory consultation is planned for summer 2015 and, subject to powers, the crossing will be open early 2020s.

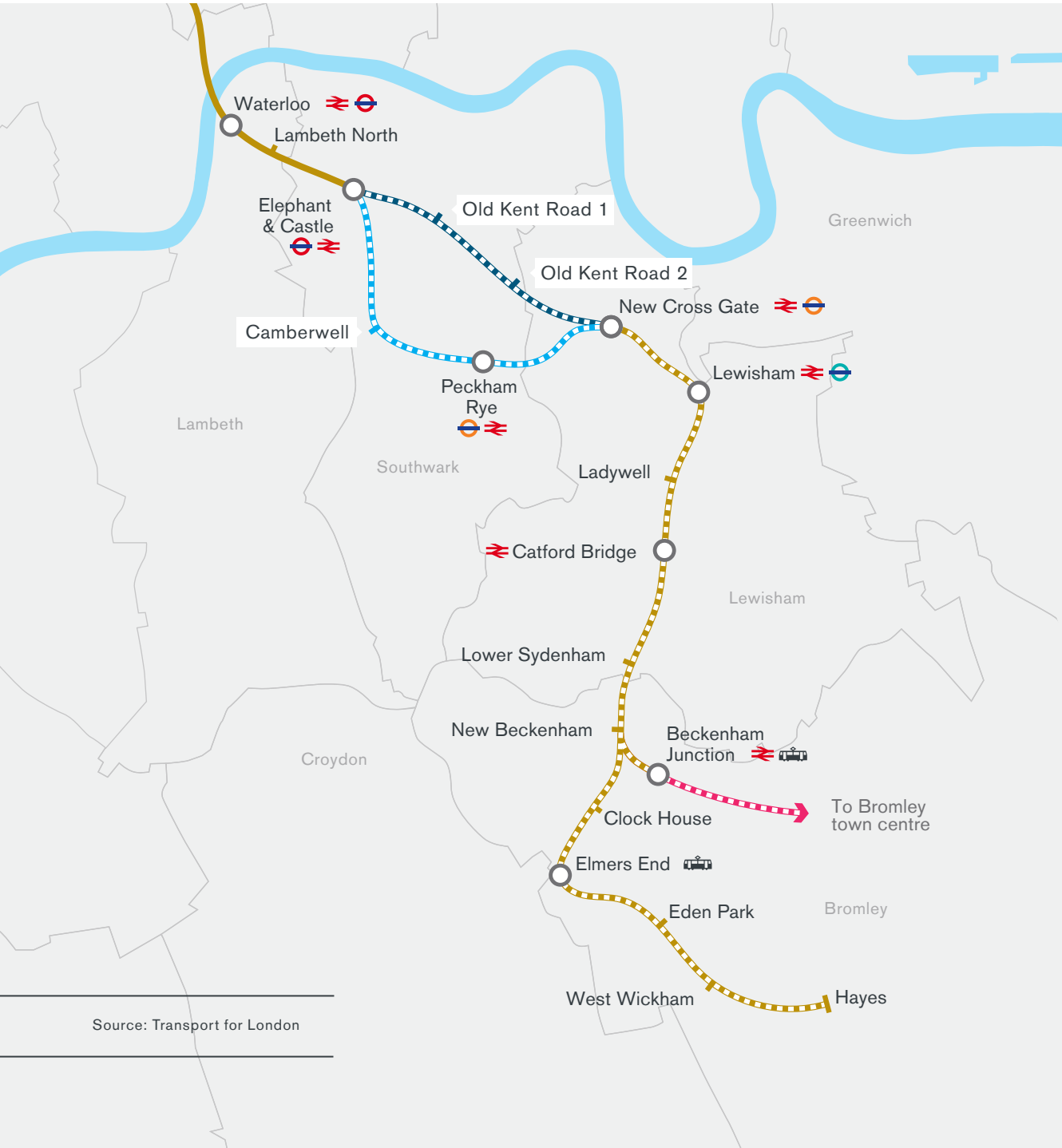
Crossings east of Silvertown were consulted on between July and September 2014, with over 7,500 responses received, and more than 90% support for new river crossings in east London.

Work to develop new crossings at Gallions Reach and Belvedere is proceeding – including assessment of public transport options – prior to a further public consultation towards the end of 2015.

POTENTIAL RIVER CROSSING SCHEMES IN EAST LONDON

- Silvertown tunnel
- A Woolwich ferry
- B Gallions Reach crossing
- C Belvedere crossing
- Four lane road
- Two lane road

Source: Transport for London




Source: Transport for London

## Bakerloo Line extension

A consultation ran between September and December 2014 on the principle of an extension and a number of proposed routes.

TfL has been reviewing the construction feasibility of the options that were consulted on and assessing their benefits to work up a comprehensive business case.
This will enable prioritisation of investment as requested by the Government in the 2014 Autumn Statement.

PROPOSED NEW BAKERLOO LINE STATIONS

- London Underground
- London Overground
- Docklands Light Railway
- National Rail
- Tramlink
- Existing Bakerloo line
- Core extension proposal
- Extension option 1a via Old Kent Road
- Extension option 1b via Camberwell and Peckham Rye
- Extension option 2 to Bromley town centre

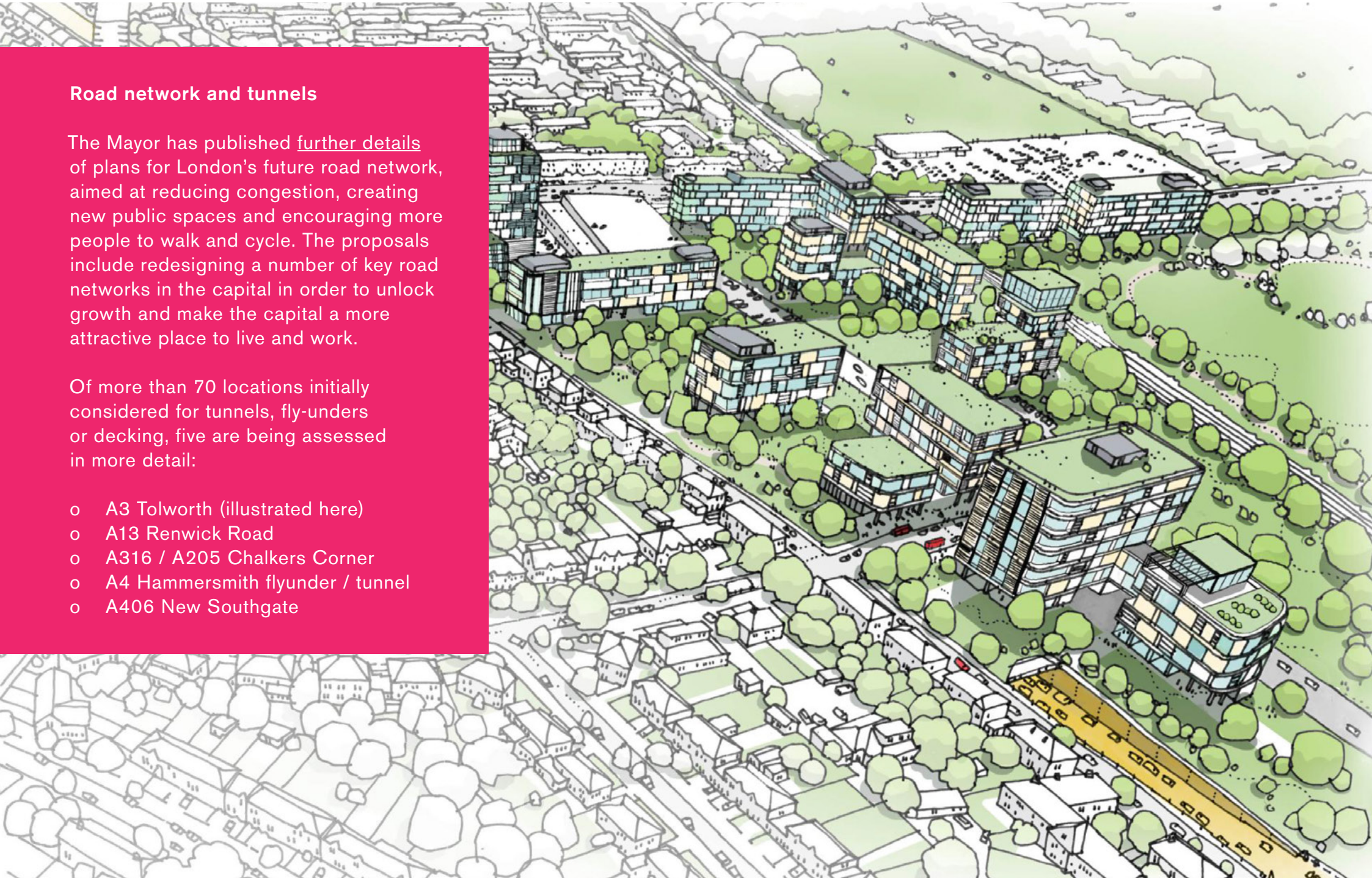
The proposed alignments between Elephant and Castle and Lewisham are indicative only. The two station locations at Old Kent Road and one at Camberwell are also indicative only at this early stage. The proposed route between Lewisham and Hayes would replace the existing National Rail lines.

## Road network and tunnels

The Mayor has published further details of plans for London's future road network, aimed at reducing congestion, creating new public spaces and encouraging more people to walk and cycle. The proposals include redesigning a number of key road networks in the capital in order to unlock growth and make the capital a more attractive place to live and work.

Of more than 70 locations initially considered for tunnels, fly-unders or decking, five are being assessed in more detail:

- A3 Tolworth (illustrated here)
- A13 Renwick Road
- A316 / A205 Chalkers Corner
- A4 Hammersmith flyunder / tunnel
- A406 New Southgate



## Digital connectivity

As proposed in the consultation, the Mayor has set up a Connectivity Advisory Group (CAG) to take practical steps to ensure everyone in London has access to affordable high-speed connectivity.

With the CAG, the Mayor has developed a comprehensive work programme including:

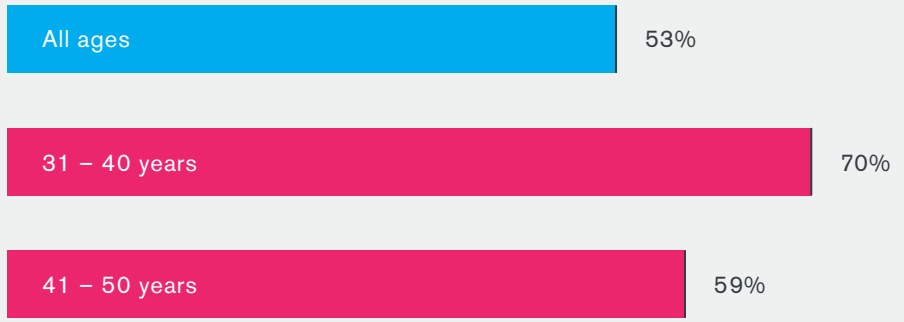
- Establishing a Building Connectivity Rating Scheme
- Identifying locations on GLA group property for wireless infrastructure
- Providing a connectivity toolkit for London boroughs including a connectivity map using Ofcom postcode data
- Writing a best practice guide for boroughs and providers
- Demand stimulation for superfast services, including a digital skills programme and digital inclusion strategy
- Continuing rollout of vouchers to subsidise connectivity for SMEs.

This work plan will give London the tools it needs to tackle the areas with low levels of coverage, and allow the Mayor to set further ambitious targets by this summer to bring the vast majority of businesses and residents in London the connectivity they need, wherever they are located, as soon as they need it, at competitive prices.






% OF PEOPLE WHO SAY IT'S "CRITICAL" OR "IMPORTANT" TO BE ABLE TO CONNECT TO THE INTERNET WHEN OUTSIDE THE HOME OR OFFICE



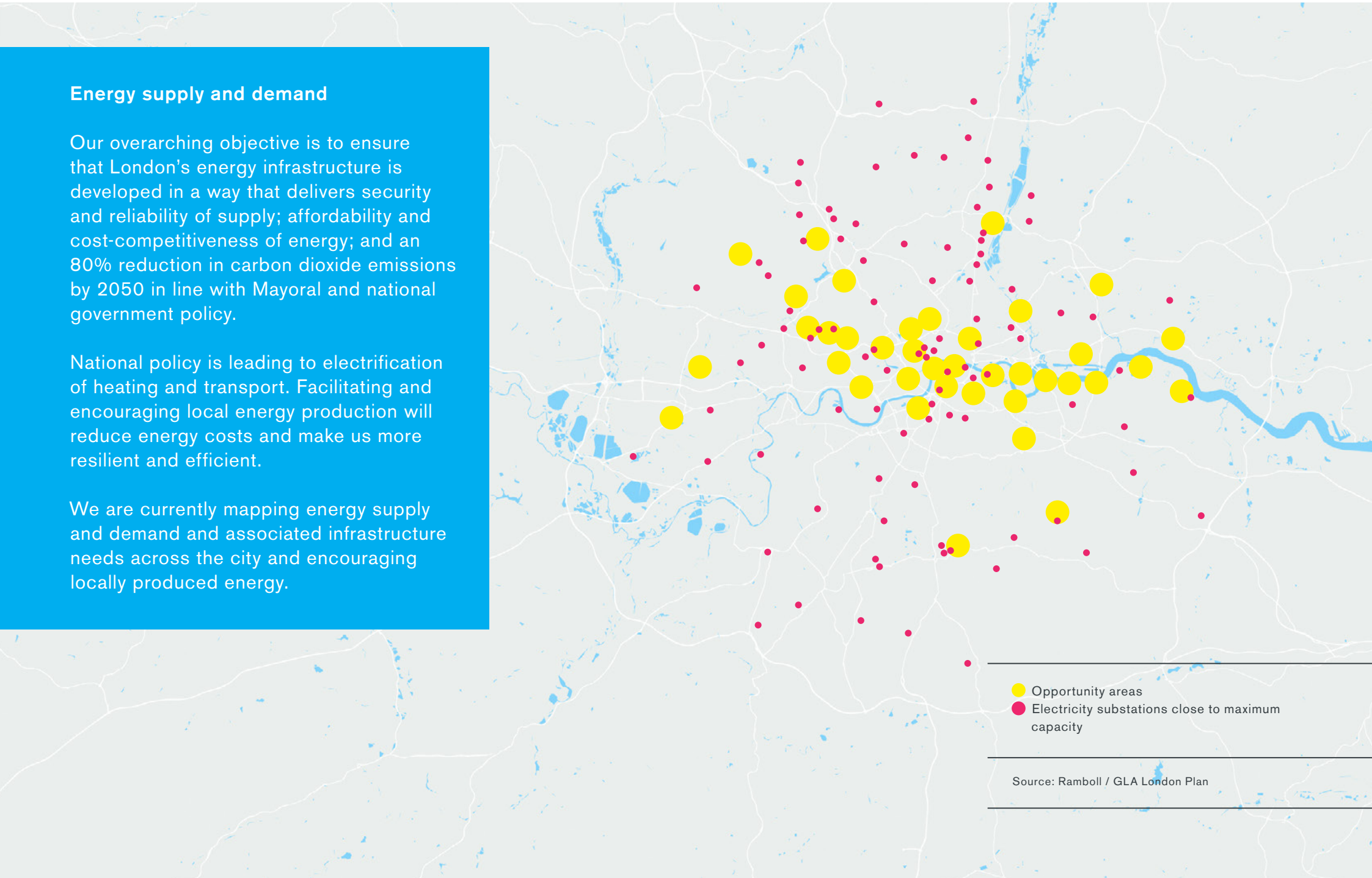

Source: Wireless Nation, Arqiva

## Energy supply and demand

Our overarching objective is to ensure that London's energy infrastructure is developed in a way that delivers security and reliability of supply; affordability and cost-competitiveness of energy; and an 80% reduction in carbon dioxide emissions by 2050 in line with Mayoral and national government policy.

National policy is leading to electrification of heating and transport. Facilitating and encouraging local energy production will reduce energy costs and make us more resilient and efficient.

We are currently mapping energy supply and demand and associated infrastructure needs across the city and encouraging locally produced energy.



### Integrated water management

The Mayor has brought together the Water Advisory Group to ensure he and the London Infrastructure Delivery Board receive the best advice on water-related issues. This is to achieve an integrated water management framework across London and specific delivery areas, and actively to seek synergies with other utilities, housing and transport projects.





## Housing and social infrastructure

Housing, schools, hospitals and a whole range of social infrastructure will play a critical role in supporting London's continued growth and sustainability.

In most cases, transport will be key to unlocking the creation of new homes and communities. Barking Riverside is just one example where 11,000 new homes and 5 new schools will be made possible by the extension of the Overground.

We recognise the critical need to plan for a variety of social infrastructure when designing new places, and we will work closely with developers to ensure this is the case.










# CONTINUING ENGAGEMENT



We will be hosting a series of discussions over the next few months.

We are always interested in your views – contact us here.



Red dots are locations of Flickr pictures. Blue dots are locations of Twitter tweets. White dots are locations that have been posted to both.

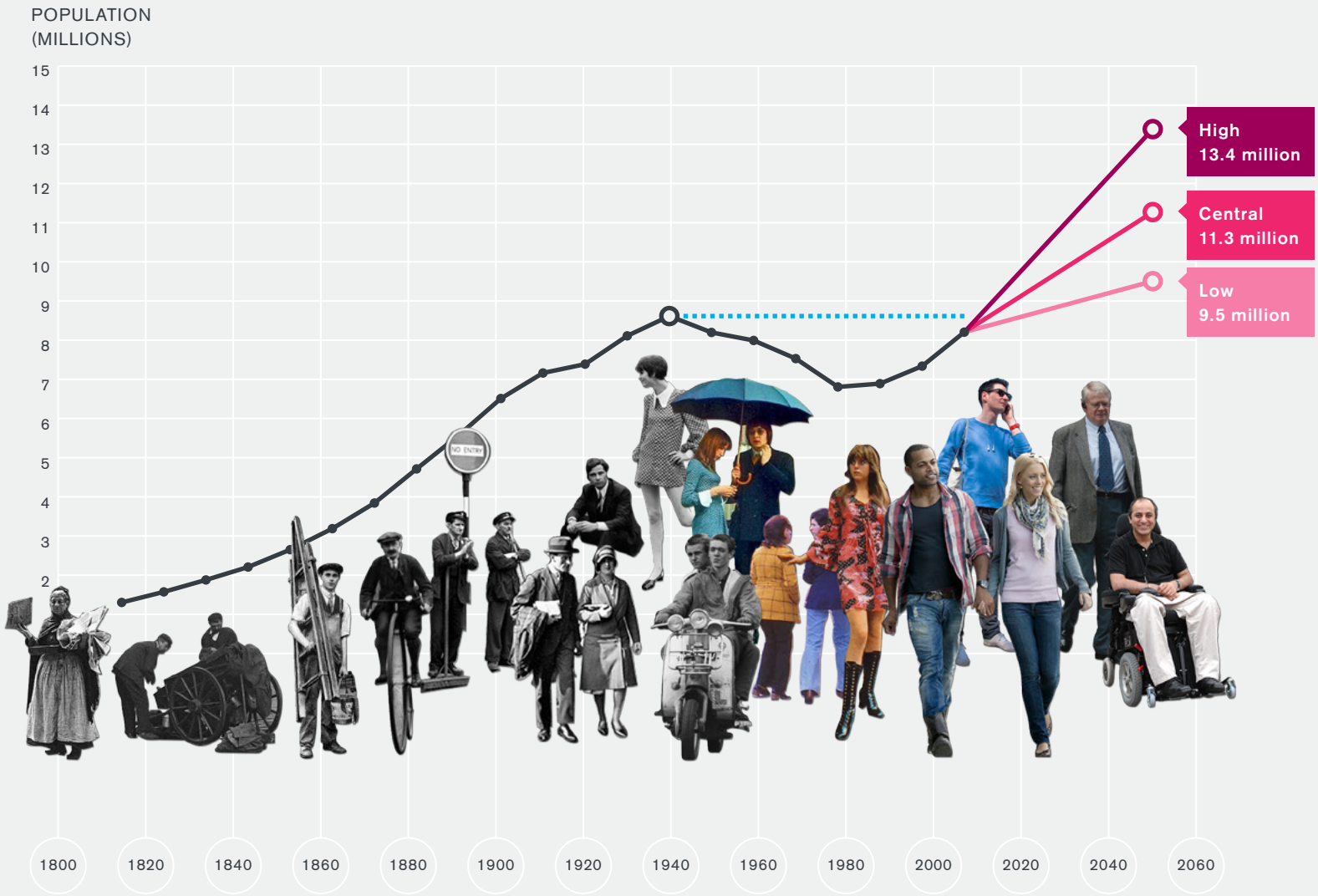
Source: Eric Fischer, Base map © OpenStreetMap, CC-BY-SA

# APPENDIX



We estimate that London's population became bigger than ever in February 2015.

We reached a population of 8.6 million people, the same as the last peak in 1939.

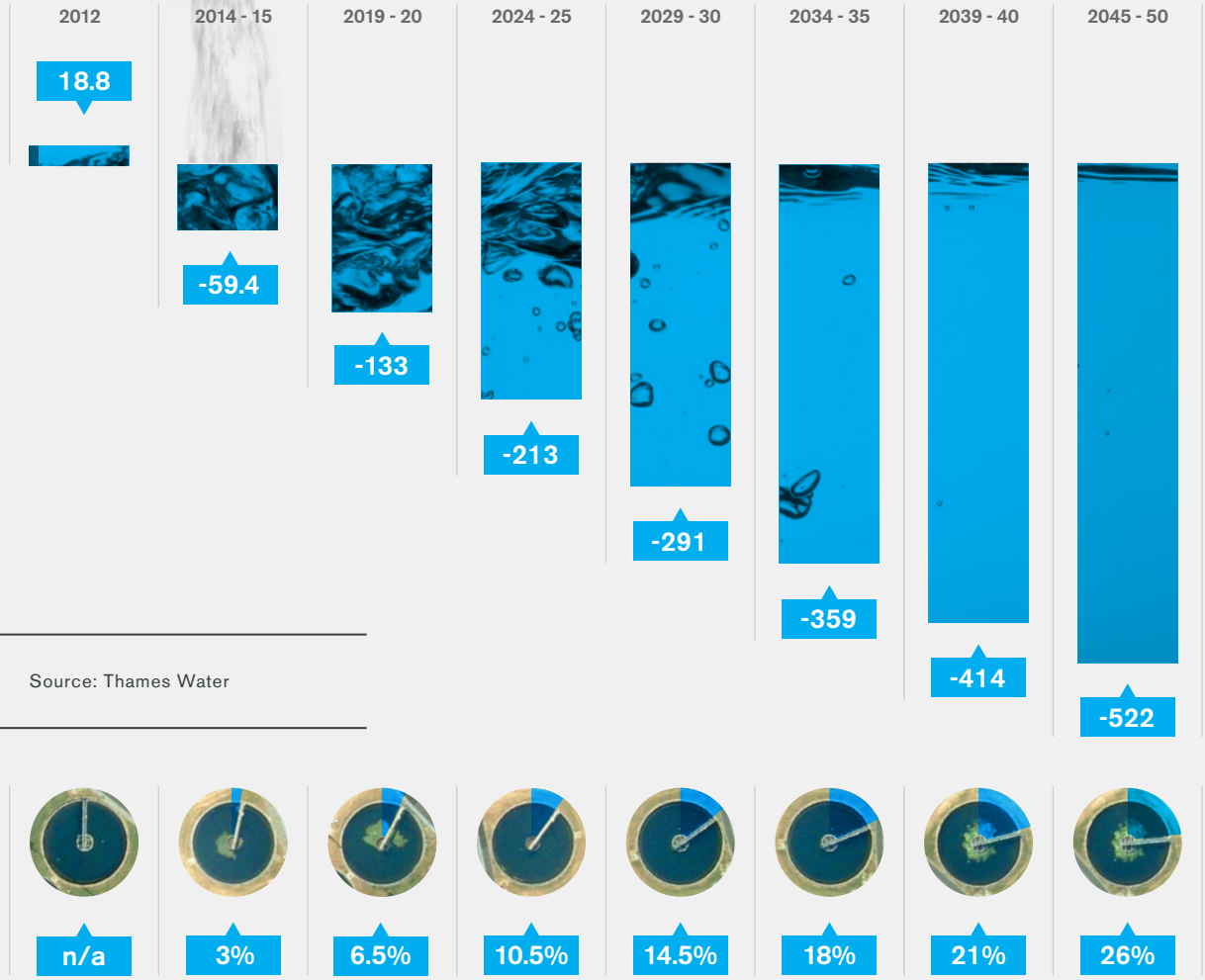



Projections show growth to 11.3 million inhabitants by 2050

An overall increase of 37% from 2011 to 2050

Source: GLA Intelligence Unit






Source: Thames Water

## Water supply

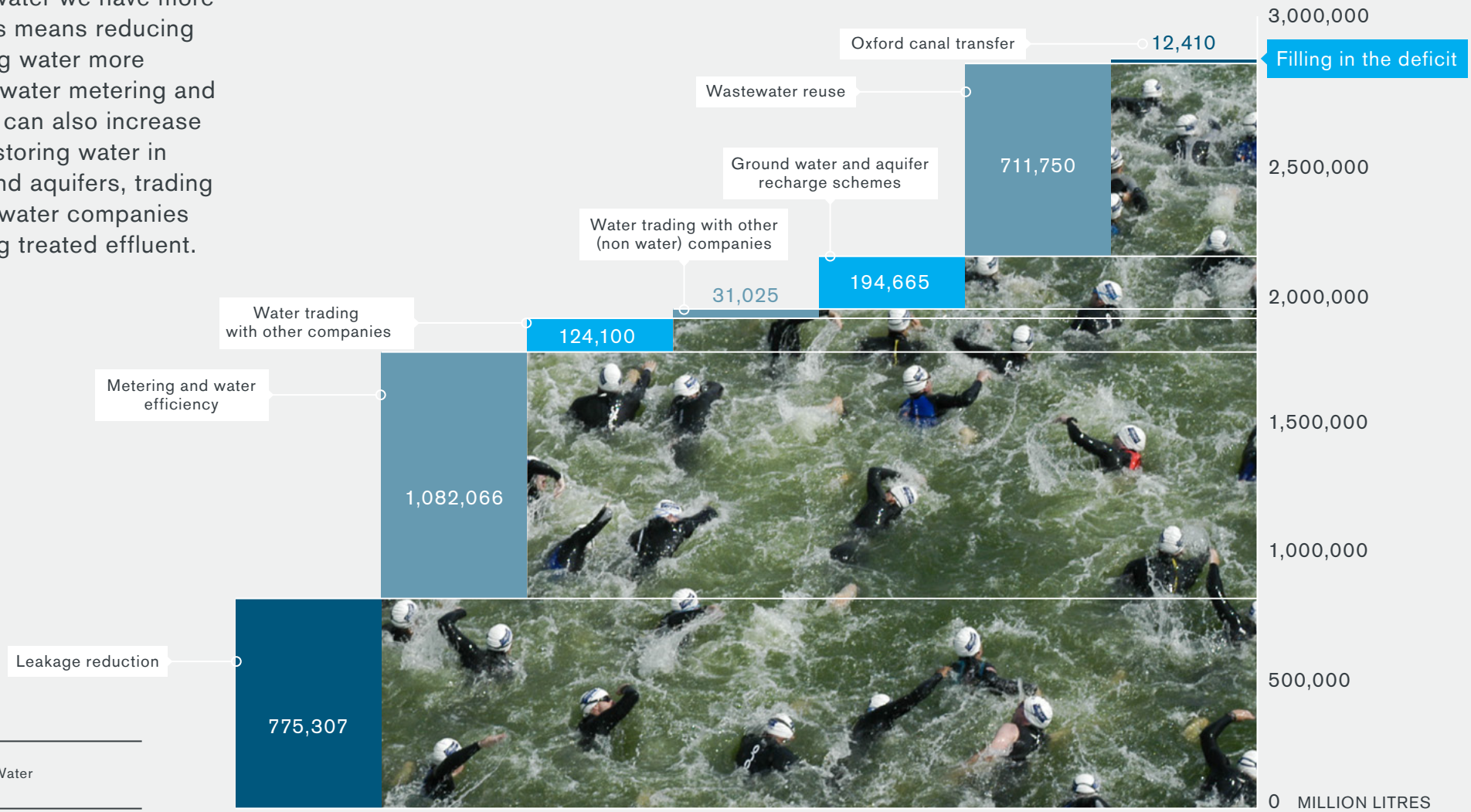
The demand for water will increase as our population grows, but, at the same time, our water supply is expected to decrease as our climate changes. And to improve our rivers, we will extract less water.

Without action, this will create a potential deficit of over half a billion litres a day by 2050.



## Water supply

Proposed measures to balance supply and demand include using the water we have more wisely. This means reducing leaks, using water more efficiently, water metering and tariffs. We can also increase supply by storing water in underground aquifers, trading with other water companies and reusing treated effluent.




Source: Thames Water

## Flood defence

About 16 per cent of London is built on the protected flood plains of our rivers.

Within this area lies an even greater proportion of our critical infrastructure. Flood risk will increase as our climate changes, flood defences age and as we build more on the floodplains.

To improve and maintain a high standard of flood protection, we need to invest in the next generation of flood defences.

SURFACE WATER FLOODING 2014 ASSESSMENT
(assesses flooding scenarios as a result of rainfall in any given year)

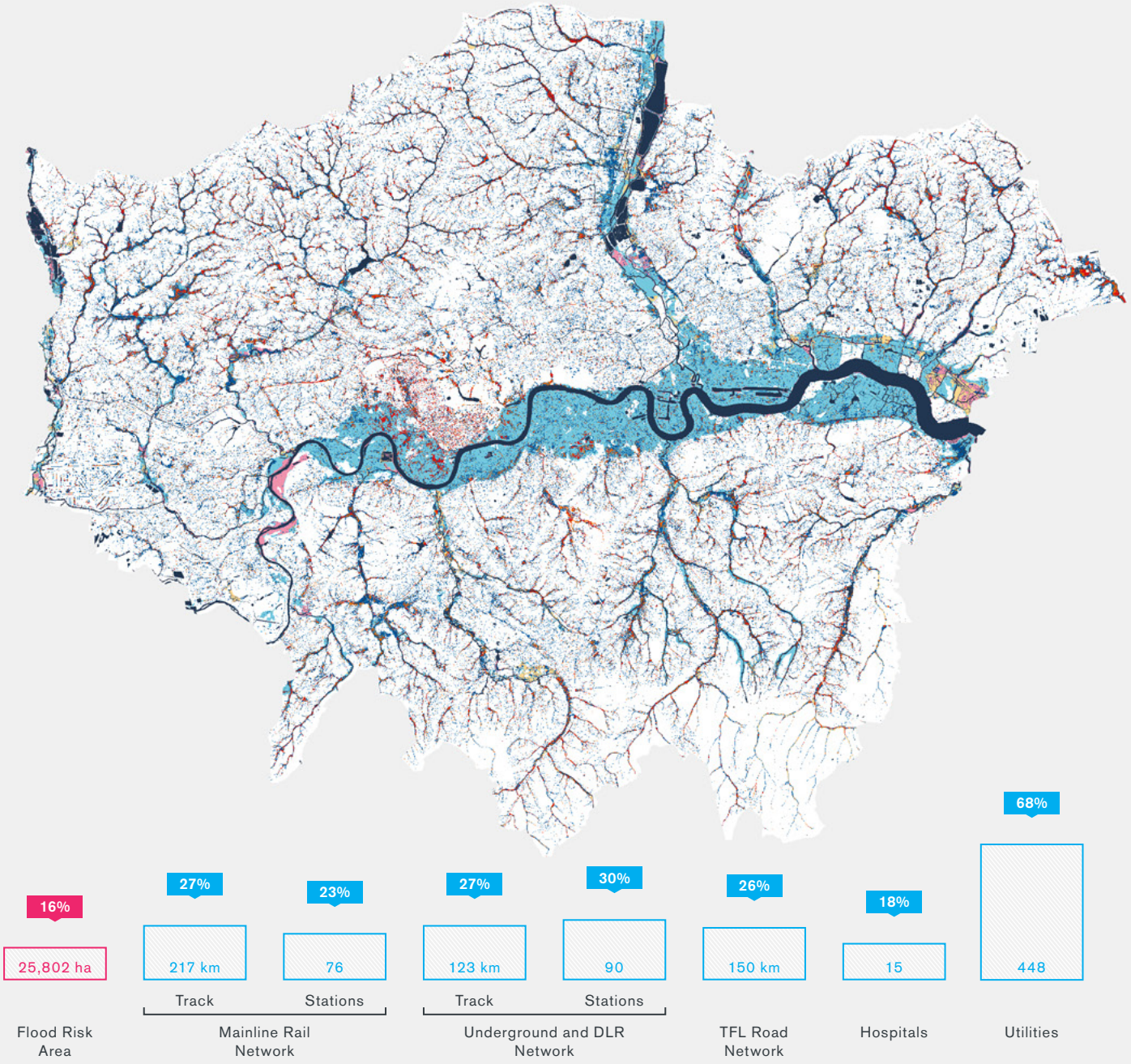
1 in 1000 | 1 in 100 | 1 in 30

NaFRA 2014 PROBABILITY BANDS (shows the likelihood of flooding from rivers and the sea in any given year)

Low | Medium | High

2013 REGIONAL FLOOD RISK APPRAISAL
(EA AND DL FLOOD RISK)

Source: Environment Agency



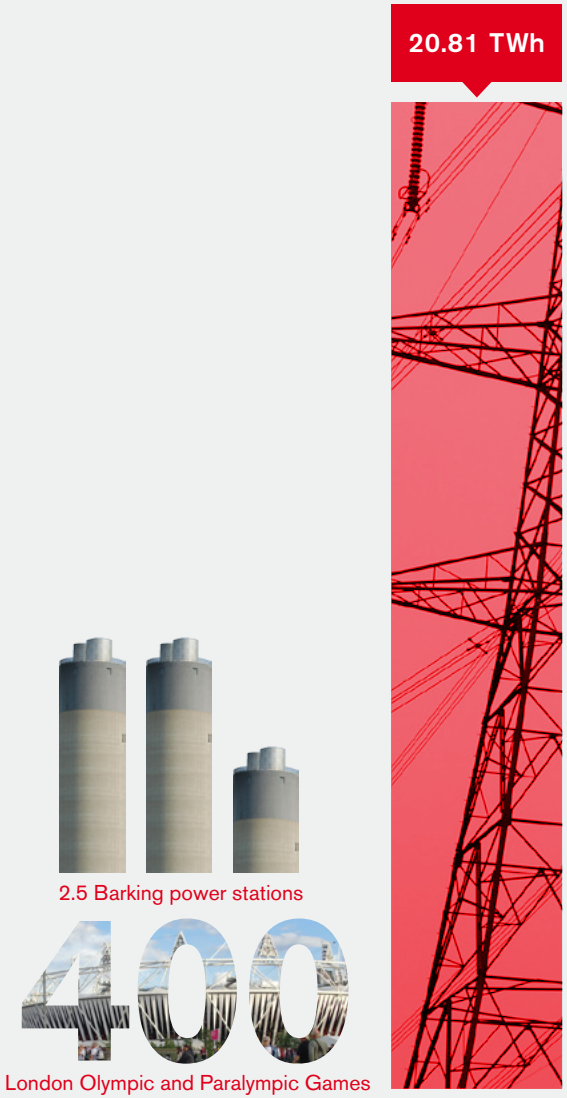
## Energy

National policy is leading to electrification of heating and transport.

Facilitating and encouraging local energy production will reduce energy costs and make us more resilient and efficient. Scenario 2 shows that a higher proportion of locally generated energy would save us the equivalent of one Barking Power Station – or the energy demands of 200 London Olympic and Paralympic Games.

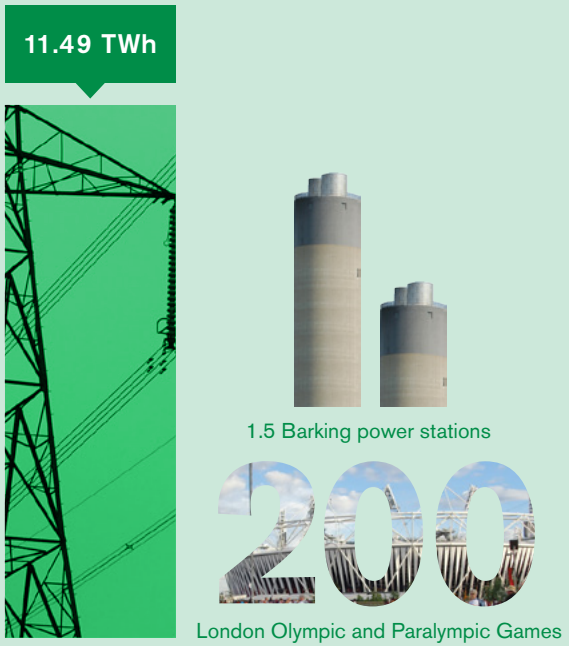
Source: Arup

SCENARIO 1

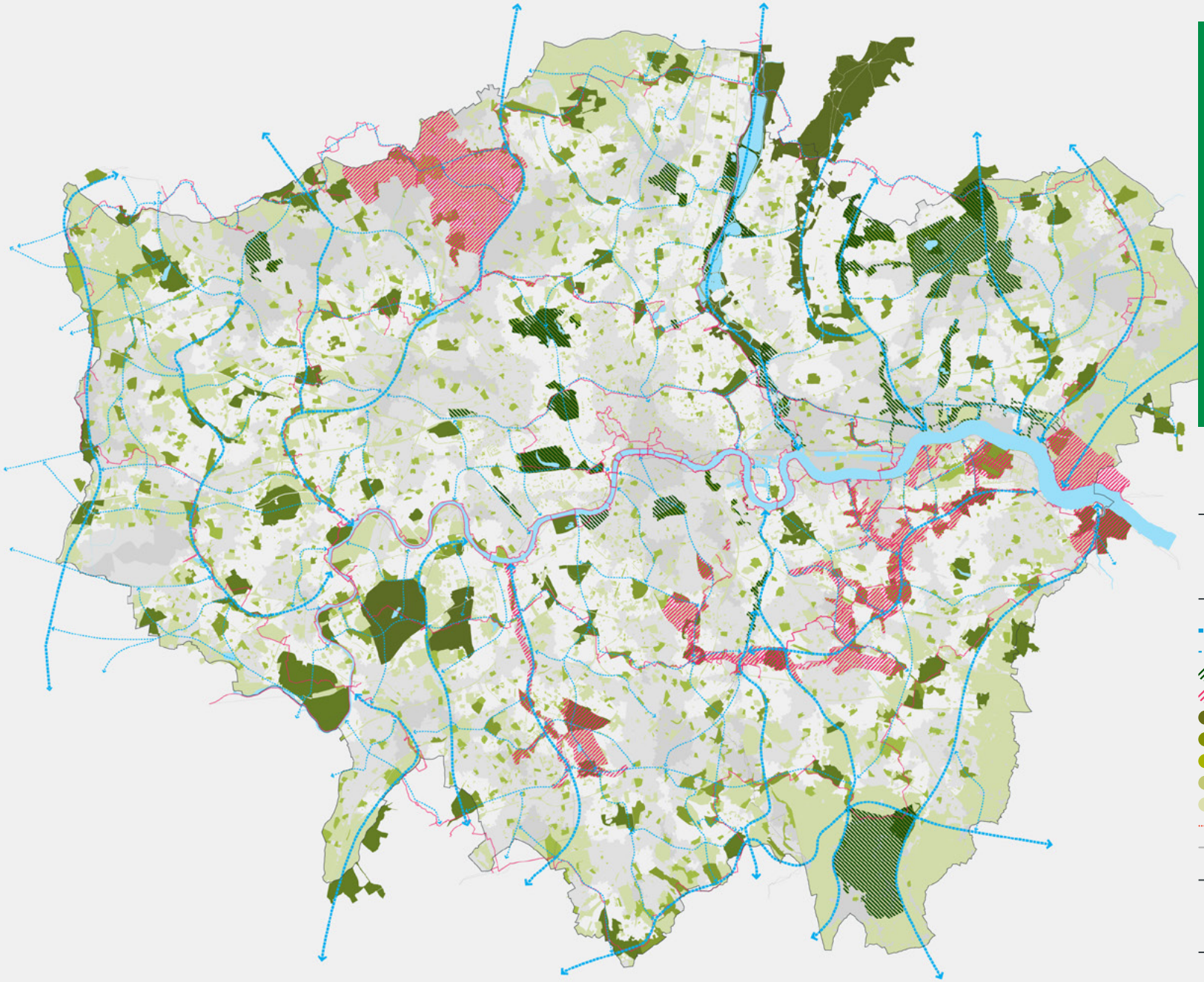



local energy generation, remainder from National Grid **8%**

SCENARIO 2




**54%** local energy generation, remainder from National Grid



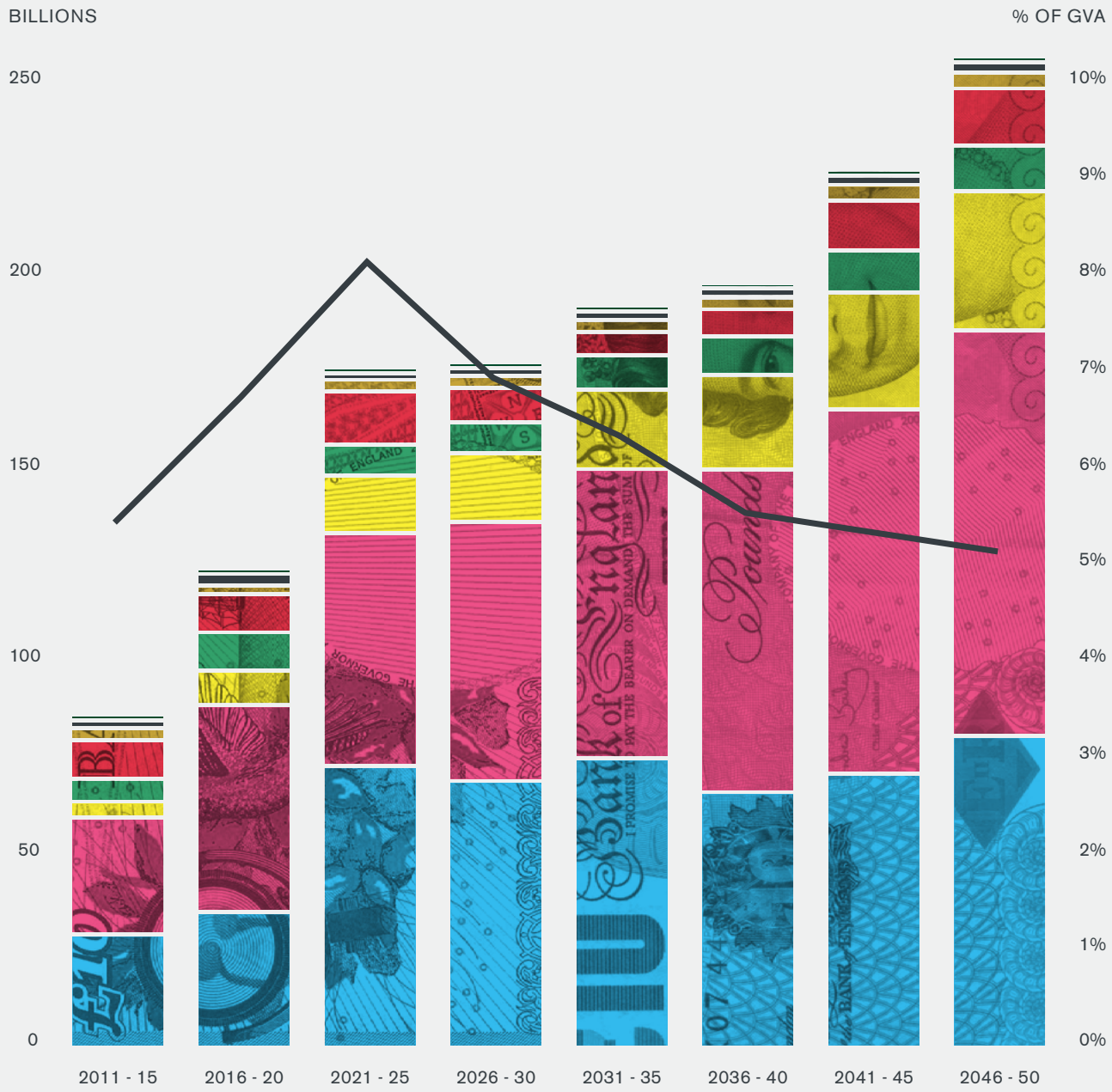
## Green infrastructure

We can enhance and expand the All London Green Grid, so that by 2050 we will have a network of green infrastructure providing flood protection, shade, biodiversity, space for cycling, walking and recreation, and a more attractive environment.

THE ALL LONDON GREEN GRID FRAMEWORK PLAN

- Strategic corridors
- Strategic links
- Metropolitan park opportunities
- Regional park opportunities
- Regional parks
- Metropolitan parks
- District parks
- Local parks & open spaces
- Other/private spaces
- Strategic walking routes
- Strategic cycling routes

Source: Greater London Authority




## Cost estimates

Our best cost estimates to meet all our infrastructure needs would almost double expenditure as a proportion of the economy. Housing and transport make up three quarters of the total costs. Hence the need to prioritise and otherwise reduce costs and increase funding sources (see section 5).

OVERALL CAPITAL EXPENDITURE

Population 2050 of 11.3 million, construction cost inflation of 2% per annum above RPI, policy aspirations are achieved

- Transport
- Schools
- Housing
- Waste
- Energy
- Digital connectivity
- Water
- Green infrastructure
- Capex as % GVA

Source: Arup

MAYOR OF LONDON