MOTT MACDONALD

Above + beyond

Unlocking development potential in cities to build sustainable communities

A question of space

Cities almost everywhere are expanding, and the pace of growth is accelerating. Today, more than half of the world's population live in urban areas. By 2050, 68% will do so – another 2.5bn people.

Urban expansion poses enormous challenges, particularly in cities where land is at a premium. Where and how do you house the newcomers? Can existing services – healthcare, transport, education, water, waste, power etc. – cope or how much extra capacity is required, where and by when? Where are the employment opportunities and can communities access them?

What needs to be done to attract new businesses, new investment? Where's the funding coming from? How do you ensure the benefits of urbanisation are fully shared, accessible and inclusive? How do you prevent growth triggering environmental problems and damaging health, such as air pollution? Ultimately, how do you build sustainable cities and communities?

"The development of stations and surrounding land delivers clear benefits to passengers, businesses and local communities by unlocking housing supply, attracting new businesses, creating jobs and helping stimulate the wider regeneration of town centres."

Unlocking land for homes, Network Rail report

Land poor cities

London illustrates the scale of the challenge facing many city authorities and developers. There are now 8.7M Londoners and by 2025 there will be almost 10M. London already has the largest housing shortfall in the UK, so expansion will only exacerbate the shortage. London's revised plan estimates the city will need 650,000 new homes by 2029 – 65,000 every year – to meet demand.

Space also needs to be found to expand services to meet demand from spiralling populations. Spreading out into an endless suburban sprawl, absorbing more green space and creating a larger and larger footprint, is not the answer. Making better use of existing space or land within urban boundaries and raising density in city cores are attractive solutions.

Realising opportunities

Transport authorities often own large tracts of urban land that, with imagination, clever engineering and investment, can be turned into sites for new, sustainable neighbourhoods, generating homes, jobs and economic growth.

Transport for London (TfL) owns almost 2300ha in London – larger than the borough of Camden – and across Britain Network Rail is responsible for 55,000ha. Both organisations have ambitious plans to release land for new homes.

Elsewhere, LA Metro has introduced a transit-oriented development programme and one objective is to support municipalities along its routes to develop transit-supportive infrastructure and affordable housing.

Multiple attractions

For developers, the attraction of transport agency land in cities is clear: it tends to be in prime locations, with a ready-supply of potential home buyers and guaranteed footfall for retailers. Planners are likely to approve high-density, mixed-use developments if some new homes are affordable, it creates jobs and helps regenerate communities.

For owners, development around and above stations and rail lines can generate funds to maintain and improve services, something increasingly necessary as central governments scale back financial support.

For local authorities, adjacent and over-site developments (OSD) can be catalysts for economic and social transformation as well as provide desperately needed homes and other services. Through better planning, design and management – interventions that fall under the banner of placemaking – public spaces can support people's health, happiness and wellbeing.

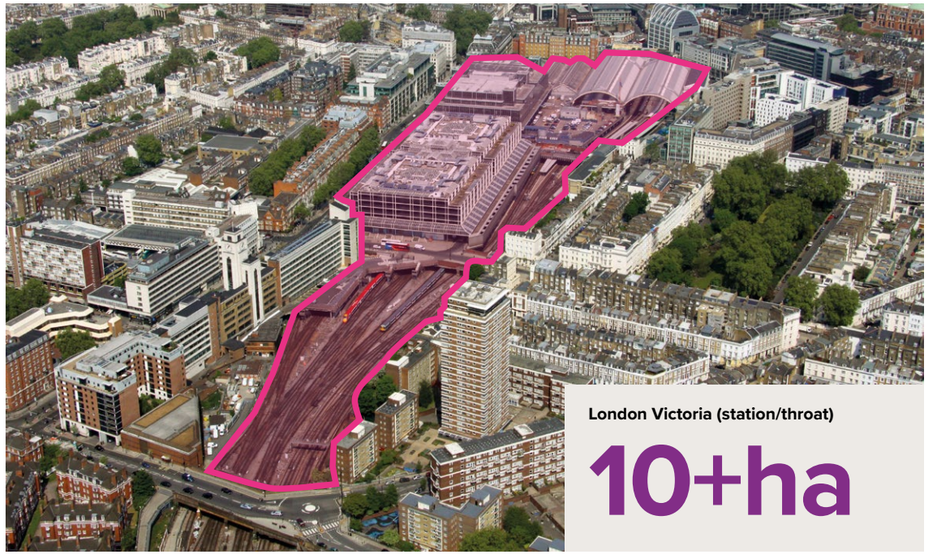
"Development over and around transport hubs has enormous potential to transform the landscape of our cities."

Ian Watkins, project director, Mott MacDonald

Development at scale

City stations, rail yards, sidings and tracks have a huge land footprint.

* All figures are indicative of potential land that could be developed if available



London Victoria (station/throat)

10+ha

London Waterloo (station/throat)

8+ha

"There is enormous opportunity to improve peoples' lives in cities by creating homes, jobs and sustainable communities through maximising the potential of land on and around transport hubs."

Richard Marriott, head of built environment, advisory, Mott MacDonald

Wimbledon (station/adjacent land)

16+ha

A challenging environment

OSD opens opportunities, but they will only be fully realised with careful planning, the right mix of skills and technical knowledge, and genuine stakeholder engagement.

OSD comes with a number of challenges. Developers are sometimes wary about working with public sector partners and can be put off by issues around public procurement, which mean ideas are put out to market. In the UK, Network Rail is working on ways to make it easier for other organisations to invest in and build on the railway.

Third parties may also be hesitant about operating in what can be challenging working environments – the physical constraints and risks of building and maintaining structures above or alongside a live railway. Schemes are long-term investments, rather than build, sell and move on to the next project, so developers will require backing from long-term institutional funders, such as pension schemes. Investors and lenders want assurances about reliable returns, while owners want to maximise financial receipts and use development to support the modernisation of infrastructure and assets, but without disrupting existing services and increasing the maintenance burden and risk.

The goals for public authorities include value for money, fairness, access and social inclusion. Lastly, communities are often fearful about change, and whether the promised benefits will materialise.

Core attributes
Successfully navigating these challenges and ensuring all parties are happy with the outcomes requires leadership, coupled with the knowledge and expertise of the technical, commercial and regulatory requirements of the transport and building components.

They're all attributes we bring, and we harness the expertise of our people, new technologies and methods to help our clients enhance the social, economic and environmental wellbeing of communities and add value.

We also design and deliver our projects to maximise their contribution to achieving the UN Sustainable Development Goals (SDGs) – generating environmental, social and economic benefits for all.

Putting people first

“Factoring an equality impact assessment into every design brief would ensure infrastructure improves the life chances of the many, not just the few.”

Clare Wildfire,
global practice leader for Cities, Mott MacDonald

Public transport is crucial for achieving healthy and liveable cities, and for a thriving economy. Building above and beyond existing and new transport infrastructure will enable cities to continue to grow, but in a way that is sustainable by creating high quality, high density developments that discourage car use.

Public transit networks help to reduce air and noise pollution, and improve mobility for women, elderly and low-income groups, who often lack access to private vehicles. In London, new developments will only be approved if they encourage walking, cycling and public transport. It’s a policy likely to be adopted by other cities suffering poor air quality and a lack of space.

London’s model

The Northern Line Extension is bringing regeneration to Battersea and Nine Elms – a former industrial area poorly serviced by public transport and cut off from the otherwise extensive London Underground network – and demonstrates what is possible.

We designed the station box and above ground structures at Nine Elms to enable OSD in the future, while the 17ha development at Battersea effectively creates a new suburb on the south bank of the River Thames. The extension has triggered further investment. Overall, the development will create about 298,000m^2 of office, retail and leisure space as well as a new riverside park, plus 16,000 homes and 25,000 jobs.

New homes, more job opportunities, better public spaces and cleaner air.

Right side of the tracks

Social exclusion occurs when individuals or communities are prevented from participating in and benefiting fully from the economic and social life of society. There can be many reasons why they are shut out.

Many existing stations cut through areas causing severance at the side of the terminal, dividing communities and leaving swathes of land largely inactive and unattractive, and people isolated and unable to access wider economic opportunities. Decking over the rail lines would enable communities to reconnect and provide the basis for the delivery of new mixed-use developments that provide what people and businesses want – new affordable homes and leisure areas well as commercial space that is flexible and can accommodate new ways of working and the diversity of services demanded by those passing through, like dry cleaning and somewhere to buy provisions for dinner.

Creating multi-modal hubs connects people with more destinations and more life chances, such as jobs in other areas, while transforming neighbourhoods into permeable ones, enables people to walk or cycle safely and conveniently.

Great places

Socially inclusive infrastructure needs to be shaped by the community, and designs must understand and address people’s concerns and aspirations. Places are only great if they succeed for everyone, not just the few. Communications technology can enable the end-user to input into the design and development process, increasing the chances of getting the place right. In this inclusive user-centred model, planners and citizens become jointly responsible for decisions, helping to ensure public ownership of a place is inbuilt from the start, and what is created has an enduring legacy.

Team players

Our unique transparent economic assessment model (TEAM) offers a different perspective compared with traditional cost-benefit analyses, which focus on the macro or national level impacts and fail to highlight the local benefits. By contrast, TEAM starts with a micro assessment, highlighting job creation, access to housing, education and healthcare, and gross value added to the local economy. It assists decision-makers in understanding the effects over the lifecycle of a project on individuals, communities and societies as well as end users and the environment.

Use your imagination

Just think what could be created on an inner London site covering more than 12ha with already good transport links.

That's what we did for Clapham Junction, the UK's largest rail intersection and its fourth largest station.

Working with architects Hawkins\Brown and construction business Laing O'Rourke, our engineers, planners, transport specialists, economists and others created a vision for the future of Clapham Junction, examining how an integrated approach to development could offer significant benefits to the station and rail passengers as well developers and the local community. It supports the Department for Transport and Network Rail aspirations for a market-led approach to future infrastructure enhancements.

21st century Clapham

A financially viable and technically deliverable solution.

About 2000 trains stop or pass through Clapham Junction every weekday, and 430,000 passengers alight or depart from one of its 17 platforms daily – 135,000 during peak periods. Passenger numbers are forecast to increase 25% by 2031.

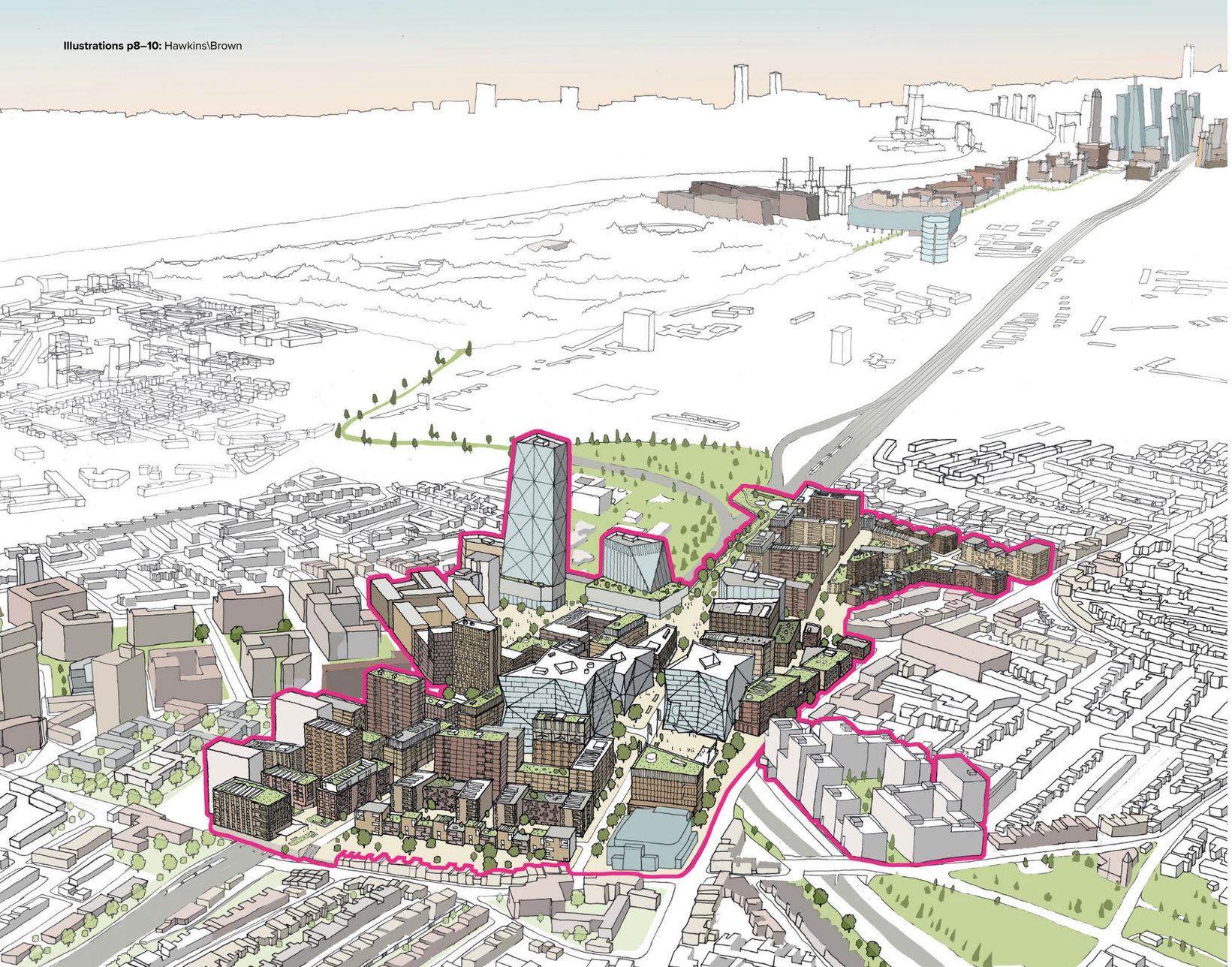
Passenger experience is poor, with regular overcrowding and inadequate accessibility for people with mobility impairment. Train operating companies require greater capacity and resilience at Clapham Junction, but its current configuration makes that difficult – trains must slow down to move through the station because platforms are curved, for example.

The station, tracks and yards separate the most- and least-deprived wards in Wandsworth – access through the station requires a valid travel ticket or residents face a long trek to the north or south. The station needs modernising and 'doing nothing' is no longer an option.

Network Rail is actively looking at options to redevelop the station and plans to bring Crossrail 2 to Clapham, and proposals to link south London to Heathrow and HS2 at Old Oak Common provide a once in a lifetime opportunity to transform Clapham Junction into a modern, multi-modal transport interchange, maximise its development potential and help the London Borough of Wandsworth achieve some of the aims in its local plan. These include providing more than 23,000 new homes by 2029, creating safer, healthier and more secure communities, promoting equality of opportunity, including ensuring that new development is accessible for people with disabilities, increasing the viability and vitality of its five town centres – one of which is Clapham Junction – and delivering integrated transport systems.

The new London plan from the Mayor proposes creating a Clapham Junction opportunity area for new housing, commercial development and infrastructure, delivering about 2500 new jobs and a similar number of new homes.

Illustrations p8–10: Hawkins\Brown



So much more

Our vision for Clapham Junction goes further, maximising development both above (OSD) and beyond the existing station. It has been done before. The Elizabeth Line station at Tottenham Court Road went well beyond the existing London Underground site to maximise development opportunities.

By incorporating land surrounding Clapham Junction our scheme would create between 5000 and 7500 residential units, up to 30,000m^2 and 250,000m^2 of retail and commercial space respectively as well as generate more than 5000 jobs. New neighbourhoods and green spaces would be established, including a Green Way, a car-free zone linking Falcon and Wandsworth parks.

It would also create a single, cohesive town centre, and help bridge the divide that separates the north of Clapham from the more prosperous south. The vision turns Clapham Junction into a destination in its own right, a place people want to visit and not just to pass through.

Straightening platforms and reconfiguring other parts of the station will increase capacity, improve passenger safety and accessibility, enhance cycling infrastructure and create better pedestrian access. The Crossrail 2 station would be built below the existing platforms and tracks, establishing a strategic interchange for London (one of four) to accommodate rising levels of passenger demand.

Delivery and operation

Our vision would be achieved over five phases. Phased development has many benefits, including reducing risk, limiting disruption and prioritising sections to secure early wins, including releasing decked areas as soon as possible to enable OSD to begin and generate revenue, as well as quickly improving access and tackling severance for the local community.

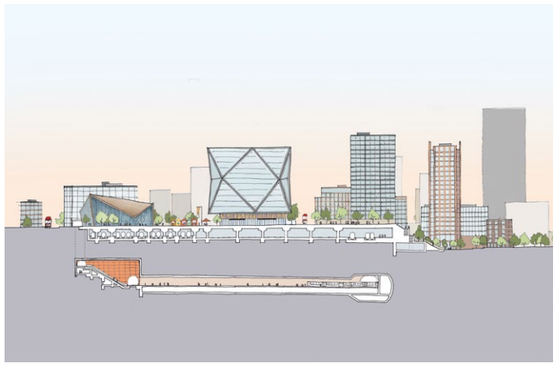
Digital tools, such as building information modelling (BIM), and design for manufacture and assembly (DfMA) can speed up design and construction and make development cheaper, and more sustainable by reducing embodied carbon. We've taken BIM and DfMA to new levels on the Sydney Metro.

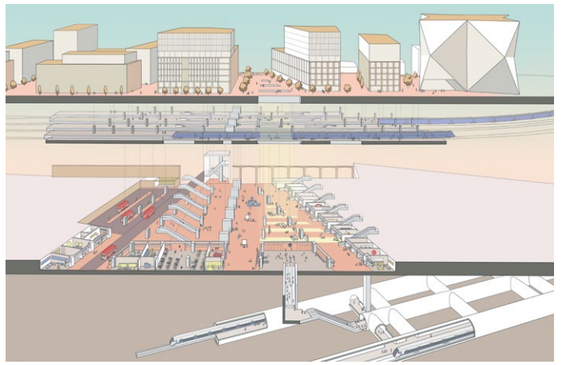
A sum of its parts

Some 70% of parts – from bathroom pods and columns to deck support structures and track bridges – could be manufactured offsite, reducing construction time on site by 30% and using 60% less personnel, with huge benefits for quality and safety, and significantly reducing costly overruns. Offsite manufacture would decouple groundworks and demolition from construction, cutting noise and pollution. DfMA is more sustainable, with the potential to deliver assets with half the waste and 25% less energy in use.

Embedding monitors in assets and parts enables data to be used throughout and beyond the construction phase to optimise performance. We call this smart asset management and Moata, our cloud-based analytics and visualisation service, provides real-time insight into asset performance to enable predictive maintenance and support decision making, leading directly to improved reliability and reduced through-life cost.

Creating a digital twin of a physical asset leads to better insights into its condition and performance, enabling owners to invest wisely, improve customer service and minimise risk, while investors can use long-term asset performance data to back up financial decisions and to support the business case for investment.



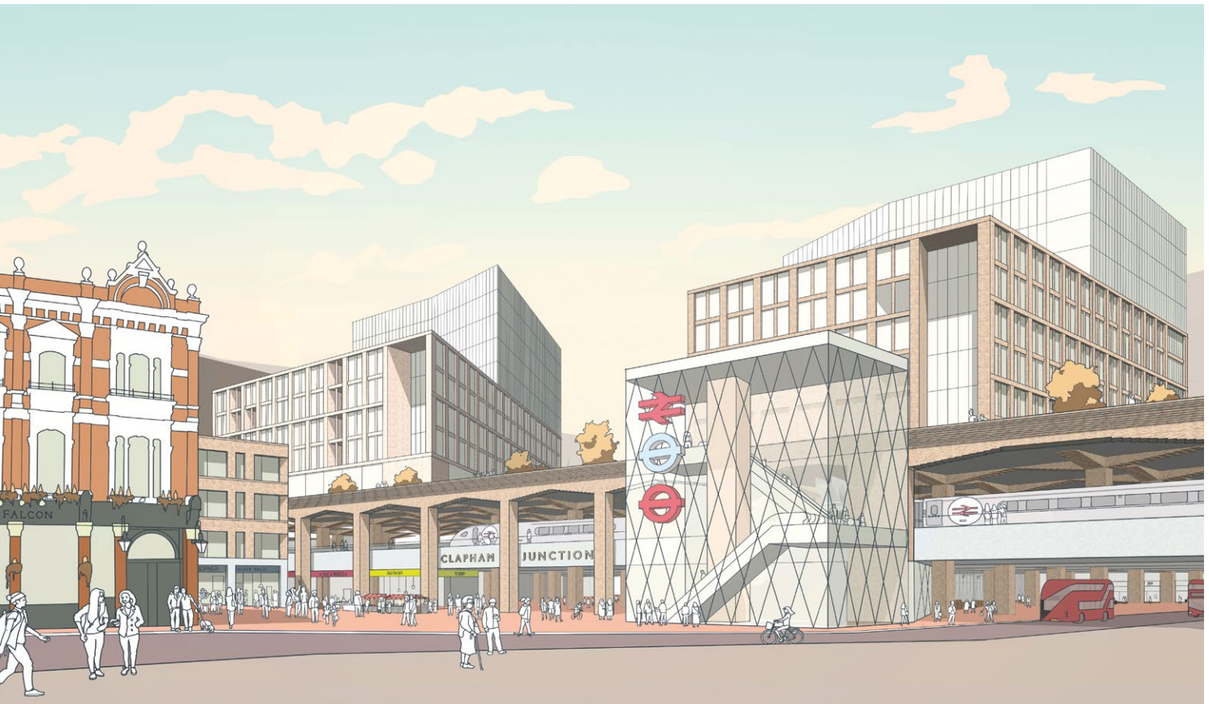


The partnership approach

We're driving Project 13, an industry-led movement to improve the way infrastructure is delivered by promoting supply chain integration, enabling smart, collaborative working practices, and aligning commercial arrangements and incentives with customer and end-user outcomes. We believe the Project 13 approach will deliver the cost-efficient, resilient and sustainable infrastructure needed to support enhanced social, economic and environmental objectives.

Where’s the money?

Our finance advisory experts help clients unlock the full potential of infrastructure and development finance by providing certainty about risk and helping to minimise it, as well as by identifying opportunities to improve the value and sustainability of projects. They looked at how the transformation of Clapham Junction could be funded. Neither the public nor the private sector can fund a project of such scale by themselves, and a partnership approach involving all stakeholders would be necessary. This would combine land value capture, contributions from developers and existing property owners, commercial revenue from the station, and national government support through loan guarantees and grant funding.



Construction of the Northern Line Extension is being funded by a levy on development and an incremental growth in local business rates to pay back a government-guaranteed loan. It is a form of land value taxation that captures the increase in value of the land around the area where the new stations are being built. A similar model could work for Clapham Junction. To add value and generate funds, our proposed staging of development will allow commercial value to be released early, potentially providing funding for the later, more ambitious stages, while the widespread use of advanced delivery technologies and methods would enhance viability and the economic returns.

“More compact, connected, and co-ordinated cities are worth up to US$17trn in economic savings to 2050.”

Unlocking the inclusive growth story of the 21st century,
New Climate Economy report

From Bristol and London to Sydney and Varanasi

Turning ideas into reality

Fast-tracking Bristol's regeneration

The Bristol Temple Quarter masterplan is one of the largest regeneration projects in the UK. Our work covers the refurbishment of Temple Meads station, including a revitalised transport interchange and capacity improvements, and the creation of a new city quarter. Overall, the development will create 240,000m^2 of mixed-use floor space, and an estimated 11,000 homes and 22,000 jobs.

Exhibiting expertise at Earls Court

Redevelopment of the former Earls Court Exhibition Centre site and nearby Lillie Bridge rail depot site and housing estates will deliver about 7500 new homes and 10,000 jobs. New education and health facilities, a leisure centre and 15ha of green space will also be added, creating a unique and modern neighbourhood in the heart of west London.

London Waterloo's retail destination

London and Continental Railways (LCR), in conjunction with the Department for Transport and Network Rail, want to create a major retail destination at Waterloo station, the UK's busiest rail hub with more than 99M journeys made every year. The retail mall is due to open in 2021, creating about 700 FTE jobs over three floors, including a mezzanine level below the existing tracks.

Adding value in the heart of the city

One Liverpool Street is a landmark office building next to the mainline Liverpool Street station in central London being developed by Aviva Investors. It will comprise 233,000m^2 of office and retail space over 10 floors. Working with Aviva Investors and TfL, we developed innovative engineering solutions to ensure the scheme could be built, including designing a deck over three underground lines. It enabled a taller building to be built than originally planned, trebling the gross internal area and increasing the amount of lettable space.

A masterplan for India

Varanasi in India has a population of about 1.6M. The possibility of upgrading the city's rail station, paid for by realising the value of the land surrounding it, has been established through a combination of station design and masterplanning. The concept development includes 165,000m^2 of residential space and more than 6500m^2 of education facilities. Varanasi can be considered a proxy for railways across India that if replicated would benefit millions of people.

Supporting growth in north Sydney

Sydney Metro is Australia's biggest public transport project. It will transform Sydney, delivering more trains and faster services for customers across the network. The NSW government awarded Lendlease the contract to deliver the new Sydney Metro Victoria Cross integrated station development in north Sydney and the company appointed us to deliver engineering design services. Victoria Cross will be the doorway to a revitalised civic place for the people of north Sydney, uniting metro travel with convenient shopping, leisure and a high-quality workplaces, adding to the vibrancy of the area. The development includes a 40-storey commercial office building above Victoria Cross Station, and integration of retail opportunities to enhance north Sydney as a thriving mixed-use hub.

Opening opportunities with connected thinking.

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