A CITY IN THE MAKING

The role of urban infrastructures

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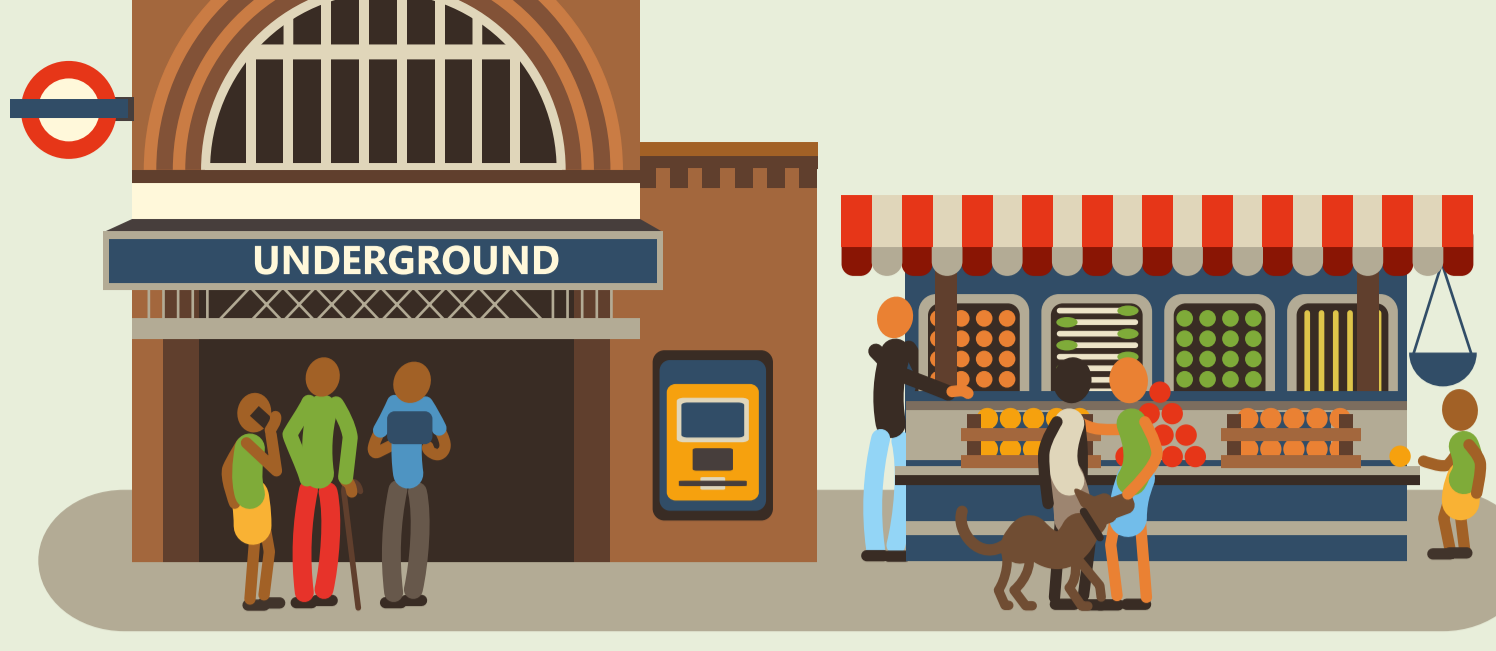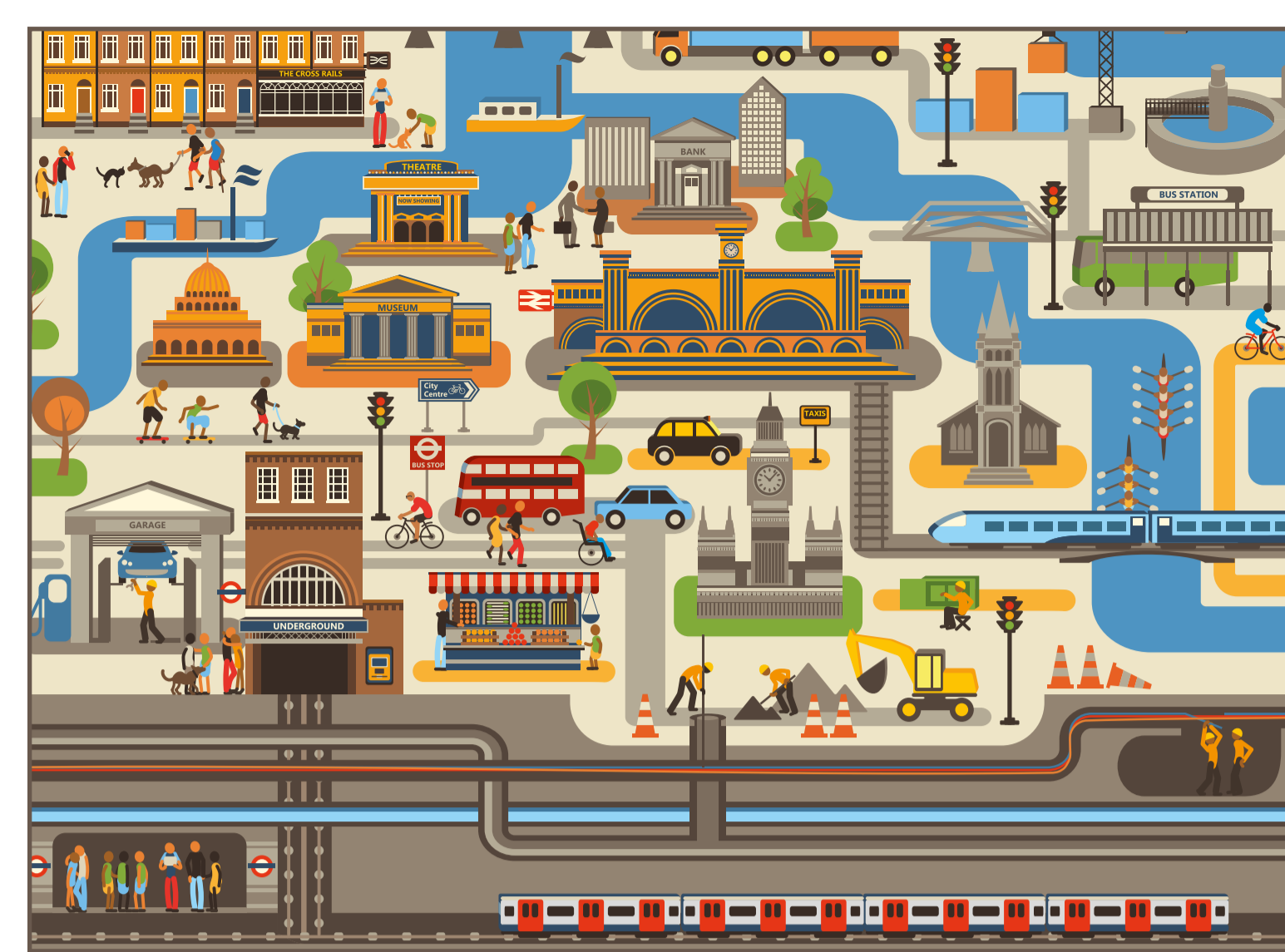
A CITY IN THE MAKING

BBC The role of urban infrastructures — The Open University

NAVIGATING

Urban life is characterised by mobility.

The expanding webs of streets and roads, no less than the diverse tapestry of intersecting lives and lifestyles, demand that each individual navigate both unfamiliar places and multiple contested social and cultural spaces in the course of everyday life. In 2008, the Earth's population became over 50 per cent urbanised (source UN). Global cities from New York and London to Hong Kong and Shanghai attract populations from all over the world. As a result today's urban inhabitants must navigate unprecedented physical size as well as cultural and social diversity.

Urban theorists recognise that navigating the city provides a first step towards understanding urban life. From the 17th century diarist Samuel Pepys documenting the Great Fire of London; the 'flaneurs' of the 19th century Paris out on the streets to see and be seen; or the taxicab driver with intimate knowledge of routes and places – to move around the city is to know the city.

Some of the earliest attempts to make the urban legible by using street signs and house numbers which were linked to the then new national postal systems and the development of urban governance. Today, digital mobile technologies and GPS positioning on smart phones, tablets and public transport information systems are vital aids for urban navigation. They enable strangers to find their way around and encourage efficient public transport on increasingly crowded roads and streets. Yet navigating the urban landscape continues to require both physical and cultural infrastructure as well as maps and signs, to help make the urban familiar, negotiable and navigable.

LAYERING

To live in the city is to live in an ever-changing environment.

Cities are centres of economic activity, administration and government, social and cultural life. They are in constant flux, building and rebuilding, as they react and adapt to changing needs and circumstances. Yet such activities do not simply obliterate the past. Cities often carry the traces of change layered into their original form and fabric; in the layout of streets and roads, the design and reuse of buildings, the shape of public spaces, market places, parks, gardens and building sites.

Urban researchers sometimes liken the city to a 'palimpsest' – a book or piece of writing overwritten with scribbles, comments, deletions and new interpretations. To recognise these traces of history is to understand how even the newest built environments are produced by their pasts and the lives lived within them.

Some elements of the urban environment are more durable over time than others. Building plots and property boundaries set out in medieval times still shape development today. Road patterns, military installations, sites of worship and market places all provide continuity, which in some parts of Europe can be traced back to Roman settlement. Public parks, gardens and open spaces set out in the 18th and 19th centuries by philanthropists and politicians informed by civic improvement, carry the imprint of former farms, fields and elite suburban residences. As seen in the comprehensive redevelopment of Paris in the late 19th century, to break the bounds set by such historical structuring is an act of supreme confidence and an assertion of power and control over urban form past, present and future.

TRANSFORMING

Historically, towns and cities have often gathered around communal spaces of exchange and encounter.

Drawing together and redistributing flows of people, goods and services, urban infrastructures translate and transform goods, messages, information and value from one form to another. In market places people barter, buy and sell, changing goods and services for money. Within factories, parts and raw materials are gathered and transformed into manufactured goods and sold on. Government institutions take argument and debate and turn it into law and legal judgement. In financial centres, flows and reserves of capital are moved around the globe from stocks and shares into multiple currencies and back again. Museums, galleries and theatres – no less than urban-based radio, TV and mass media – confront people with cultures, places, biographies, and lifestyles; mediating and interpreting diverse places, people and others.

An automobile-based economy initially encouraged city centre functions to migrate out of town. The electronic revolution in finance and the subsequent growth of internet-based shopping, entertainment and social interaction encourage a virtual city which is experienced increasingly digitally. Together these developments increasingly question the centrality of the city and its economic, social, cultural and political infrastructures of exchange, encounter, transformation and translation.

The infrastructures of digital communication enable people to live urban lives across extensive suburban and exurban landscapes. Though there is gathering evidence, it remains to be seen to what extent these changes will transform the infrastructures of urban exchange and encounter; and by implication what it means to live in the city.

About this poster

Cities depend on circulations – of people, materials, goods, energy and information. It is urban infrastructures that make those circulations possible. Such infrastructures include networks of transportation, communication, supply and, increasingly, digital data that allows people and objects to be mobile. They include, less obviously, the technical standards, bureaucratic systems, and regulatory governance that allow such networks to function. The panels on the right offer some ways of thinking about how such urban infrastructures shape cities and city life. Together they will help you understand how, when, where and why cities are never finished and thus always in the making. For further information on these topics go to **www.open.edu/openlearn/crossrail**

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Senior Lecturer in Geography, FASS

Nick's interest in taking seriously the roles that non-human entities (whether they are insects and microbes or technologies and data) play in social life has involved him researching topics as diverse as food safety, the bee crisis and smart cities.

www.open.ac.uk/people/nb235

Dr George Revill
Senior Lecturer in Geography, FASS

George has worked on a number of OU environmental and social science modules. Current research brings issues of sound, mobility, communication and landscape together in terms of acoustic geographies of space, place, landscape and environment.

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Prof Jeff Johnson
Professor of Complexity Science & Design, STEM

Jeff is interested in the application of systems thinking and design in environmental, social and economic policy. He has worked on modules and courses in many areas including design, mathematics, artificial intelligence, robotics and engineering.

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MAINTAINING

Urban infrastructures never 'just work'; constant attention is required to keep cities moving.

A signal failure causing rush hour chaos, a burst water main preventing businesses from opening, a mobile network outage leaving millions out of touch; infrastructures and the role that they play in supporting and organising city life are perhaps most visible when they breakdown.

It may be that repairing such a breakdown often necessitates physically exposing what is usually hidden (for example when the road is dug up to expose the pipework underneath). Or it might be that repairing such a breakdown (such as fixing a damaged mobile mast) acts to remind us that many parts of the infrastructures that underpin modern cities are not outside like pipes, but instead wireless signals or various sorts that are naked to the human eye. In either case, the breakdown of infrastructure acts to remind us just how much is going on in the background, invisible also in the sense of being taken for granted.

Urban infrastructures, then, keep the city operating, moving, habitable, social; but they don't ever 'just work'. New or old, they require constant maintenance and repair, both routine and emergency. Like the infrastructure itself (when it is functioning properly) this work goes largely unrecognised and uncelebrated. However, when one considers the sheer range of activities involved and the sheer size and extent of modern cities, it soon becomes clear that it could not be more crucial. Which infrastructures get maintained, when, where, and at whose expense, is a critical question for urban living everywhere.

SUSTAINING

Urban infrastructures entangle cities with their environments generating both possibilities and pressures.

A source of drinkable water, a medium of transport, an avenue of communication, a flowing receptacle for waste; the fact that so many cities are located by rivers is a reminder that urban life has always required supply and servicing networks that entangle it with its local, regional, and global environments in a variety of ways. Whether such provisions still arrive via what is now sometimes termed 'blue' (i.e. water-based) infrastructure or other means such as road, rail or air transport, sustaining a city still necessitate it being connected to its surroundings far beyond any physical walls or administrative boundaries.

A key question facing not just cities but the whole planet today is whether such sustaining of urban areas is or can be sustainable. Urban infrastructures have multiplied and extended to support both greater amounts and greater variety of circulating people, energy and goods. At the same time, higher and higher proportions of the world's population are now living in urban areas.

Together, this means that cities are placing massive pressures on their environments; not only the immediate environments of individual urban areas, but also the planetary environment on which urban ways of life as whole can act as a stressor. It is clear that cities will be both powerful drivers (because of their density) of current and future environmental changes, and significant victims of it (particularly in the case of coastal cities affected by sea-level rise). This means that making urban transport, provisioning, and waste infrastructures more sustainable becomes a vital task.

PATTERNING

Quality of life is strongly shaped by the presence or absence of urban infrastructures.

You might live close to a bus route but far from the Post Office; near to the park but also the tip; infrastructure pervades cities, but it is never everywhere equally. By their very nature, networks, whether of roads or data, connect some places rather than others, are more complete in this area than that. What this means is that urban infrastructures are continually patterning the city: their availability or scarcity help make certain parts of cities more habitable than others, certain activities more or less possible. For example, whilst some areas of a city might be rich in desirable infrastructure, hyper-connected and well serviced, in others even the basics of urban infrastructure such as housing, clean water, sanitation, health care, education and so on will be lacking or extremely fragile. Such issues of differential access to working infrastructure is most evident and felt most acutely in cities in the global south, but they are present in all cities.

In other cases, the patterning of cities by infrastructure is less about what is absent from a certain area and more about what is present. There is a long history of particularly undesirable aspects of urban infrastructure (such as sewage treatment plants, rubbish dumps, and polluting factories) being located in areas populated by less affluent citizens and generating clear inequalities in the quality of city life.

There is therefore a politics to urban infrastructure; who is the 'city in the making' being made for?


DESIGNING

Planning and design begin with a vision of how the world ought to be – how the world can be a better place.

This can include the provision of new infrastructures such as tramways and sports stadiums, or the creation of housing developments and blocks of flats. Design gives our cities their aesthetic, including logos, billboards, shop displays, street furniture, waterscapes, public buildings and skyscrapers.

Design is a fundamental human activity with similar patterns across many creative domains, from cars to haute couture to power stations. The design process starts by identifying what is required and the constraints to be respected, including time and budget. It begins by sketching possibilities. These are evaluated and the most promising worked up in more detail for further evaluation. Often the requirements are too ambitious or the constraints are too severe, and compromises must be made. Design problems often change during the process of finding a solution. In design, problems and solutions co-evolve until you end up with what you think is within reach for the vision you want to achieve.

Although design seeks the 'best' possible outcome, in the real world there is no absolute best. Designers have to make compromises between competing outcomes and constraints (a process called satisficing) – undesirable traffic noise and accidents may be offset by the freedom to move around for leisure and work. Design is both creative and analytic with the best designers creating amazing blends of function and form.
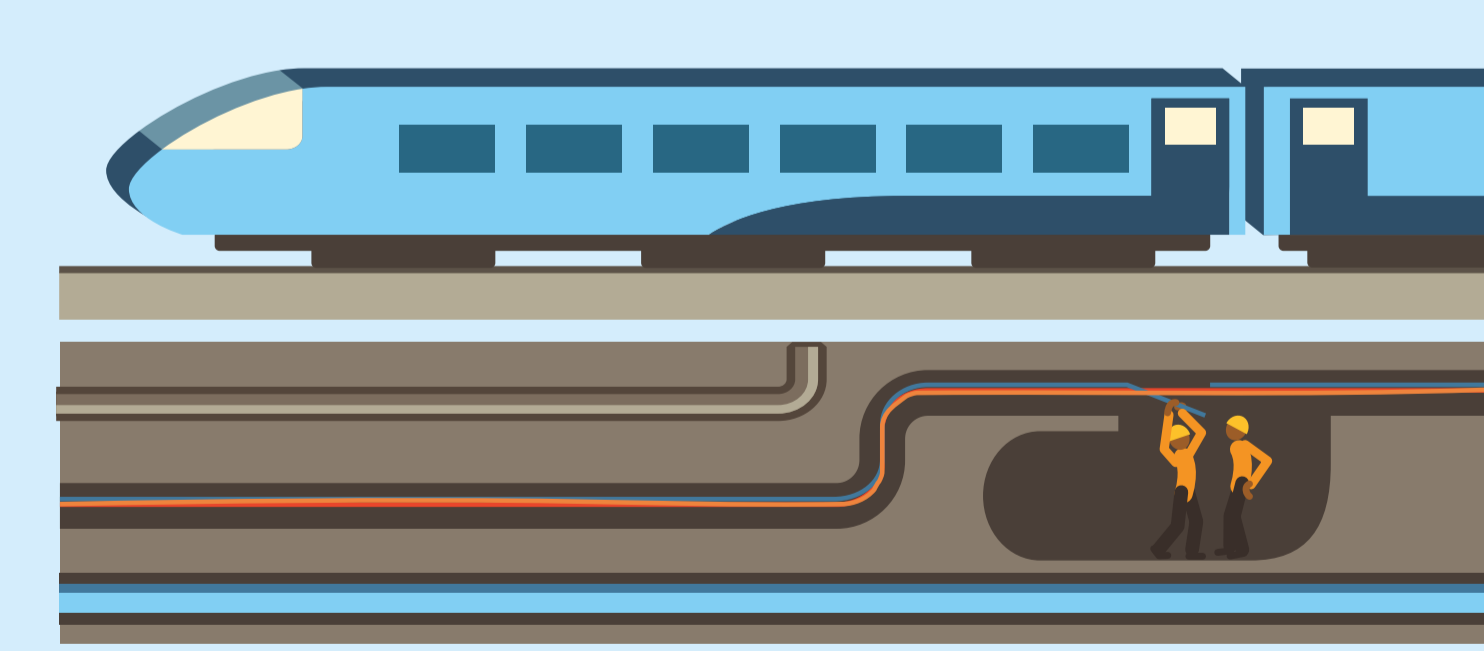
ENGINEERING

Many types of engineering are involved in creating and maintaining cities.

This includes the building and maintenance of large infrastructure projects for transportation (tramways, roads and bridges); services (water, gas and electricity); and telephony (networks of cables and wireless masts). In the 19th and 20th century, ancient cities were wired for electricity and telephones, with the latter evolving into the essential 21st century internet information highway.

Engineers create things at large and small scale, from power stations and the fitness monitors on our wrists to the engines that power our vehicles and the elevators and heating systems in our buildings. Alongside designers, engineers envisage these systems and they ensure that they work reliably into the future.

The technical challenges in creating infrastructure can be breathtaking. Many thousands of enormous components weighing many tons have to be placed to an accuracy of a few millimetres for the construction holes to be aligned. Engineers have to calculate and control the huge forces created by the structures they build – a miscalculation or a beam placed in slightly the wrong place could cause a catastrophic collapse costing millions of pounds and months of delay. Computer Aided Design (CAD) is a major bridge between designers and engineers, providing the blueprints that specify the parts and how the enormously complicated jigsaw should be put together. Discipline and professionalism are central in engineering practice.

CO-ORDINATING

Cities are ever-evolving complex systems with ever-changing subsystems.

These systems work together to support a fantastic variety of human activity. Transportation infrastructure, which includes bridges, tunnels, stations and airports, is a major feature of cities, providing pedestrian, road, railway, waterway and air transportation subsystems. Many of these have their own subsystems. For example, railways have more specific modes of transport, such as overground and underground railways. Other city infrastructure provides services including water and power, as well as supporting sports, shopping, culture and other activities. Large and small buildings may house many social and economic subsystems under one roof such as banking, entertainment venues, restaurants and cafes, schools and universities.

Although the infrastructure is provided top-down by government and corporations, most activity in cities is bottom-up; activities and events are organised by individual people. For example, book clubs emerge as local people share their passions for literature, as do walking groups through a shared interest in hiking. Co-ordinating and managing these small and large scale systems is essential for the well-being of a city and its inhabitants.

System thinking and complexity science are increasingly informing policy makers as they plan and design social and physical infrastructure for their citizens. They also inform citizens and communities on ways to self-organise to create the local and global social structures they want to live in.

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