

Covid-19 and the new normal for infrastructure systems

A Green Paper for consultation

May 2020

Introduction

Since the start of the Covid-19 UK lockdown, the construction industry has displayed an unusual degree of collaboration and cooperation in supporting the government with advice and guidance. The Construction Leadership Council (CLC) has acted as the industry umbrella body and has identified three phases: restart (next 3 months), reset (next year) and reinvent (12 months plus). The CLC advice, drawing from input across the industry, trade associations and academia, has been effective and coherent. It has concentrated on the restart and reset phases.

The CLC has identified that the reinvent phase requires deep thought and analysis to ensure that the country is best placed to maximise the opportunities that occur, and minimise the risks and threats associated with a long industry recession. It has therefore identified the various construction industry sectors – housing, social infrastructure and economic infrastructure – and has identified bodies to take forward that work. The chair of the CLC has asked the UK Infrastructure Client Group (ICG), which includes all of the UK's major economic infrastructure clients, to lead the infrastructure strand, of the Reinvent programme, on behalf of the CLC.

As the organisation that provides the secretariat to the ICG, the Institution of Civil Engineers will deliver that work. [This paper is the first stage of that process and provides the vehicle to gather evidence.](#)

One of the major advantages of asking the ICG to lead this work is that ICG members span a range of sectors: transport, energy, water and waste, etc. While individual government departments are looking at their own programme, the ICG has the ability to take an independent system-of-systems approach to infrastructure in a way that very few other bodies can. The ICG has always worked closely with HM Treasury, the Infrastructure Projects Authority and the National Infrastructure Commission.

However, we need to be realistic. The lockdown has had a major effect on the UK economy, with potential for the impact to endure for many years. Therefore, we need to balance the opportunities thrown up by Covid-19 to rationalise, make efficiencies and implement measures that we should have brought in many years ago with the Keynesian need for economic stimulus to reboot the economy. There will be a real temptation to turn the infrastructure fiscal lever in an unsophisticated way. *The issue, the overriding issue*, is how we produce a plan that allows us to do both.

Background

The UK was already facing a number of socio-economic challenges before the advent of Covid-19. The UK Industrial Strategy outlines four Grand Challenges:

- artificial intelligence and data
- ageing society
- clean growth
- future of mobility.

Within the construction industry, productivity growth was weak, there was no clear plan on reaching net-zero greenhouse gas emissions by 2050, and significant regional economic disparities were becoming increasingly visible. These were coupled with a growing, ageing and increasingly urbanised population (predicted to reach 75 million people by 2050),¹ the need to develop the next generation of internet connectivity for the country to remain economically competitive, and the need for improved resilience to the impacts of climate change.

These issues have not gone away. But we had already identified a number of programmes to address the systemic industry failings. The work by the Centre for Digital Built Britain,² Project 13,³ the Construction Innovation Hub and the ACE's Future of Consultancy⁴ is in progress already and we should avoid any temptation to start from a blank sheet of paper. The ICG has already identified the importance of accelerating the core programmes and we will do this anyway. This paper is about the *strategic* opportunities and how to seize them.

There will also be the opportunities to be bold in building a different Britain, one that focuses on achieving economic, environmental and social sustainability for future generations.

Public perceptions

In the short term, public perceptions have changed. Whether this will endure is unknown and second-guessing public thinking is unlikely to provide any significant evidence for decision makers. But some themes have emerged:

- the enabling of more teleworking (working from home, flexible working, remote working, etc.), to prevent crowding on public transport and in city centres
- implementation of measures to prevent the spread of disease in public meeting places and entertainment venues (stadiums, arenas, convention centres, performing arts centres, etc.)
- modification of vital infrastructure to prevent the spread of infectious diseases (e.g. public transport networks)
- building more key anchor institutions (medical centres, hospitals, universities, etc.)

¹ ICE (2016) [National Needs Assessment](#)

² CDBB (2020) [Welcome to the Centre for Digital Built Britain](#)

³ ICG/ICE (2020) [Project 13](#)

⁴ ACE (2020) [Future of Consultancy](#)

- new buildings and public transport being designed from the outset to limit disease transmission.

There are a number of questions that decision makers, supported by infrastructure professionals, can investigate now. These lessons are outlined below.

Systemic lessons from Covid-19

Reframing approaches to connectivity

Prior to the pandemic, the UK's transport networks were considered the primary enabler for connecting the economy and people. Lockdown has demonstrated that connectivity – for a wide range of businesses and certainly for personal relationships – can also be provided in an effective way by broadband networks and associated technologies. In this respect, the Covid-19 lockdown measures have shown that everyday life can take place in a more remote way and that this should be considered in terms of the investment that is made in future infrastructure networks.

Designing infrastructure networks to accommodate uncertainty

While on the one hand the Covid-19 lockdown measures have proved that some businesses and parts of society can function in a more localised way, there are others, such as healthcare or the hospitality sector, that cannot. It is possible that for those operating more remotely there is an appetite for this to be balanced with continued access to physical connectivity.

This will mean that there continues to be a significant demand for multi-modal transport networks across the UK. To meet this demand, and to mitigate the impact of major shocks to these networks, there is a greater requirement to accommodate future uncertainty that may impact demand in order to ensure greater levels of resilience.

Leveraging science to tackle unprecedented challenges

The UK's response to the Covid-19 pandemic has shown that if there is political will in place then it is possible to address unprecedented challenges. It has also demonstrated that scientific evidence and advice is critical in determining which decisions should and shouldn't be taken in order to address these challenges.

In this sense, there are lessons for the approach that the government (and industry) takes when dealing with other major challenges, such as achieving a net-zero emissions economy by 2050. The science is unequivocal that a cleaner economy is required for climate-change mitigation; political will is required to drive the necessary changes.

Supply-chain resilience

Personal protective equipment (PPE) for the healthcare sector has been a significant talking point during the Covid-19 pandemic. The UK (along with many other countries) struggled to access PPE through international supply chains. This serves as a lesson for the UK infrastructure supply chain on resilience.

Embedding positive outcomes in future infrastructure decisions

Covid-19 lockdown measures have resulted in improved air quality in towns and cities across the UK. The health benefits of improved air quality are well documented and as a consequence there is now an

expectation that the gains that have been made during the pandemic are not undermined by future infrastructure decisions.

Affordability

The social standing of key workers in the healthcare sector and the other emergency services has also grown as a result of the Covid-19 pandemic. At the same time there has been a greater appreciation of some of the challenges that these workers face in terms of transport affordability and availability. In addition to designing for uncertainty, accessibility to key workers should be at the forefront of decisions made on future transport provision.

Lessons from Covid-19 on the infrastructure we need

Digital infrastructure – accelerating delivery

The new normal will require an acceleration in plans for digital infrastructure roll-out. Our assumption is that full-fibre digital infrastructure will need to increase significantly in the next two years from the current 10%⁵ of UK properties with access. In France, 38%⁶ of properties have access to full-fibre broadband and in Sweden 72%⁷ have access.

An acceleration in full-fibre roll-out will not only support the reopening of parts of the economy while allowing some people to continue to work remotely but will also support the rebuilding of business activity in the medium term. Analysis shows that digital infrastructure investment causes an increase of between 0.4% and 3.2% in the number of businesses operating in an area.⁸ With more spare capacity as a result of increased unemployment, digital infrastructure will be a key building block of the post-Covid business environment.

Intra-city travel – making space for active travel

Public attitudes describe a future picture of working and engaging in social activities more remotely, with reduced appetite for travel and spending time in large towns and cities. In addition, there is demand for transport provision that continues social-distancing measures and is designed specifically to prevent the spread of disease.

We can expect that social attitudes during the lockdown period in cities will have shifted towards walking and cycling being seen as more acceptable ways of travelling. These forms of travel will also marry with social expectations of entrenching the benefits of improved air quality and a decline in carbon emissions. Prior to the crisis, the adult mortality rate linked to air pollution in England was 5.06%⁹.

With early indications from countries such as China suggesting a significant fall in public transport use and an increase in car use following the easing of lockdown restrictions, our assumption is that UK cities will need to move quickly to deliver increased space for safe walking and cycling to disincentivise the use of cars.

⁵ House of Common Library (2020) [Full-fibre broadband in the UK](#)

⁶ Ibid

⁷ Ibid

⁸ Oxera (2019) [Impact at a local level of full-fibre and 5G investments](#)

⁹ Department for International Development (2019) [Annex III: Statistical Annex. UK's Voluntary National Review of the Sustainable Development Goals](#)

Using office space to deliver housing supply

It has been widely recognised as part of the crisis that the socio-economic challenges facing key workers have historically been overlooked. Government actions to contain the spread of the pandemic have provided a shift in social expectations, as two societies have emerged. Parts of society have been able to sit safely at home working; while others have had to travel into cities on public transport to carry out key work, often at lower pay, putting themselves at risk. Our assumption is that this disparity will no longer be acceptable in the new normal.

This has opened up a discussion around the opportunity to reinvigorate city centres as places for people to live, utilising the spare office space following the pandemic, brought about by those who can work from home choosing to do so. Current permitted development rights allow B1 office space to be changed to C3 housing without planning permission. While this has led to some unscrupulous development and the creation of so-called 'micro-flats', the opportunity may exist to use this route to rapidly deliver homes for key workers closer to their places of employment, creating a more flexible work-life balance. Such a shift would need to focus on the creation of places as the main outcome – starting from this position ensures requirements for social and economic infrastructure can be taken into account to support shifts in the location of homes.

A rapid review of major transport programmes to assess what needs to be rephased

The long-term demand drivers for infrastructure outlined earlier remain extant and will continue to drive decisions on major infrastructure programmes that take longer to plan, design and deliver. Despite this, it would be prudent to conduct a rapid review of the phasing of major programmes, particularly within transport, to ascertain what should be reprioritised in the medium term.

Our assumption is that a rapid review within the next two years may be needed. This should consider existing government transport priorities, to identify changes in long-term demand forecasts and as a result, how major programmes would need to be reprioritised. This would include an assessment of how existing programmes can be reprofiled to rebuild trust in public transport as a safe space.

Lessons from Covid-19 on how we deliver infrastructure

Moving from conception to delivery more quickly

The post-war period offers the closest-to-home economic comparison to the current crisis. A dislocated economy and risk of mass unemployment needed to be alleviated by enormous public spending programmes. Across the UK and the rest of Europe, many outdated types of infrastructure were rebuilt – albeit often out of necessity and speed. Lessons can be drawn from recent examples, such as earthquakes in New Zealand or international sporting events in South America, on how to conceive and deliver infrastructure quickly during periods of extreme uncertainty, where the risk of change events in a normal procurement would cause delays and cost overruns. Our assumption is that business models for delivering infrastructure will need to change.

Unlocking non-public sources of finance for infrastructure systems

The fall in public transport use and therefore fares revenues both during and following the easing of lockdown restrictions will also impact funding for transport authorities. At the same time, the private sector may become more risk averse as a result of uncertainty about future returns. New thinking on financing will be required. Countries such as Hong Kong are turning to the idea of 'infrastructure project bonds' as a way of separating

sovereign debt issuance from infrastructure investment, with the latter being seen as more secure and as a result attracting a lower interest rate.

There may be some opportunity to use tried-and-tested methods such as asset recycling to access private finance and deliver new investment for projects. However, even bolder measures may be needed to get access to finance quickly: the renewed public sense of a connected society offers an opportunity for direct finance from the public to support infrastructure delivery. These models have been used before in times of national crisis, for example war bonds. Given the small scale and local nature of some of the projects which may be needed, direct crowd-funded municipal bonds may be one way to unlock finance from home workers, who would otherwise be spending money on public transport.

Our assumption is that the public and the private sector will play a significant role in financing infrastructure directly in the medium term. These financing requirements will need to be packaged in such a way as to make them attractive and less risky for investment.

Adopting a systems-thinking approach for better infrastructure performance and outcomes

Infrastructure is an interconnected system of systems that provides the foundation for our society. It does more than just provide water, power or transport services; it helps to make cities liveable, boost quality of life and fuel sustainable growth, productivity and prosperity¹⁰.

Society will expect to get more from our infrastructure to support societal resilience and ensure the whole-life benefits are spread as widely as possible. This shift will drive the need for infrastructure being recognised as a system, not a collection of projects. This systems-thinking will force the need to focus on: interconnectivity between infrastructure networks; the societal outcomes enabled by infrastructure, particularly achieving the sustainable development goals; long-term sustainability of the system (e.g. maintaining the system to deliver expected benefits); and a greater understanding of the system in operation through establishing a cyber-physical system with a digital twin.

Our assumption is that the principle of infrastructure as a system of systems to support human prosperity will be fundamental to how we design and deliver infrastructure as part of the new normal.

Call for evidence

This consultation runs until 14th June. Responses can be made by emailing policy@ice.org.uk, with answers to the following questions:

Question 1: What other factors, or combination of factors, will determine attitudes to public life as we transition to a new normal?

Question 2: What other systemic changes, driven by lessons learned during the lockdown period, can we expect to be important as part of the new normal?

Question 3: Are our assumptions of the new priorities for infrastructure correct?

¹⁰ These principles are explored further in: Centre for Digital Built Britain (2020) [Flourishing Systems - Re-envisioning infrastructure as a platform for human flourishing](#)

Question 4: What other changes to infrastructure provision will be needed and what assumptions sit behind that need?

Question 5: Have we made the correct assumptions on the changes in delivery that will be required, to deliver infrastructure as part of the new normal?

Question 6: What are the intermediate steps required to move us towards these new approaches to delivery?

Question 7: What other fundamental shifts are required to deliver concrete and long-lasting change in how we operationalise to deliver infrastructure to achieve societal requirements?

About us

The [Infrastructure Client Group](#) exists to drive improvement in the development and delivery of the UK's economic infrastructure for the benefit of end users – society. The work programmes of the ICG focus on areas where clients can have the biggest impact: delivery models, digital transformation, zero carbon and zero waste, and people development.

The [Institution of Civil Engineers](#) exists to ensure society gets the infrastructure it needs, using the knowledge and insights of our global membership of 96,000 civil engineers. As far back as 2016, our UK National Needs Assessment highlighted the need for policy decisions on infrastructure to focus on driving the economic growth necessary to enhance the UK's position in the global economy, support a high quality of life and realise a low-carbon future.

Both the ICG and ICE work collaboratively with other organisations, including the [Construction Leadership Council](#), and the government, to ensure that a long-term focus on societal need sits at the heart of decisions on infrastructure.

