National Highways Response to National Infrastructure Commissions Second National Infrastructure Assessment: Call for Evidence

The Strategic Road Network plays an important role in people's daily lives. 79% of households have access to a car and 9 out of 10 passenger miles are travelled by road. Outside of London and the south east, the nation is particularly reliant on roads, with TfN's Major Roads report noting that in the North, 97% of trips are by road. Freight also relies heavily on the SRN, with one third of van miles and over two-thirds of lorry miles in England are driven on the SRN, despite the SRN making up only 2.4% of the road network by length. HGVs moved 78 per cent of all goods in the UK in 2017 (147 billion tonne kilometres), and SRN-reliant sectors contribute over £314 billion GVA to the UK's economy.

Question 1: Do the nine challenges identified by the Commission cover the most pressing issues that economic infrastructure will face over the next 30 years? If not, what other challenges should the Commission consider?

Broadly we agree that the nine challenges outlines in the Call for Evidence (digital transformation of infrastructure, decarbonising electricity generation, heat transition and energy efficiency, networks for hydrogen capture and storage, asset management and resilience, surface water management, waste and the circular economy, urban mobility and congestion, and interurban transport across modes) cover the most pressing issues.

Of these, digital transformation of infrastructure, asset management and resilience, urban mobility and congestion, and inter-urban transport across modes are the most relevant to the Strategic Road network and National Highways.

The SRN (and wider road infrastructure) is at the start of a period of rapid change. This brings some challenges, but also some big opportunities to improve both our roads and customer journeys. In particular:

- **The rise of electric vehicles provides us with an opportunity to rapidly decarbonise the network, and make a significant contribution to wider UK carbon reduction.** Our 2040 net zero target for construction and maintenance will also drive innovation in the industry that will have benefits in other sectors.
- **We are at the beginning of a digital revolution in roads infrastructure,** with the growth of connected and autonomous vehicles (CAV) expected to be one of the most significant changes ever to occur in transport. Harnessing the benefits from data and digital and technology will make our roads safer, improve customer experience for all, and support our plans for net zero.
- **We will ensure there are continual improvements in safety on our network**, so that we can meet our ambition that no one should be harmed while travelling on our network by 2040.

While there is some uncertainty around how consumer behavior may change post Covid and the impact this may have on travel patterns**,** traffic on the SRN is almost back at pre-

pandemic levels, with LGV and HGV traffic is now 105% of pre Covid-19 levels**.** Under all reasonable future modelling scenarios demand is expected to increase on the strategic road network, something which was also recognised by the CCC in its 6th Carbon budget. It will be important that we continue to invest in our network to ensure it remains safe, reliable, and can deliver the opportunities set out above.

We are supportive of the focus on **levelling up,** which in many ways is a continuation of the work we have always done to support economic growth through our investment. On its own the SRN cannot deliver levelling up, but it is a crucial part of the infrastructure which enables places to grow and develop, and to provide access to work, education and services. Our previous Road to Growth work provides some evidence around this. We are carrying out more work to inform our plan for RIS3 and would be happy to discuss this further with the Commission.

Strategic Road Network and Levelling up

The SRN is particularly important for priority levelling up areas (as defined by UK Government Levelling up fund index). 56% of the SRN by mileage is in Levelling Up areas 1 and 2, with 44% in LU3 areas). NH has supported 10 successful bids through the Government's Levelling Up Fund, with a total value of £187m – 7 of which (£152m) were in high priority areas within the Government's Levelling Up Index, across 6 English regions.

In our first road period (to 2020) NH facilitated delivery of 25 schemes through the £75m Growth and Housing Fund - 9 in the North, 7 in the Midlands, 7 in the SW, and 2 in the SE. Over the long term these schemes will unlock an estimated 37,000 homes, 43,000 jobs, £994m in Land Value Uplift benefits and £2.7bn of GVA benefits. 7 of these schemes are in the highest priority LU areas, and 8 in the second highest priority LU areas. Our schemes also deliver social value through our supply chain, with up to 64,000 jobs expected to be supported in the construction industry during the second roads period.

A key part of the SRNs support to the government's levelling up agenda is the role it plays in supporting business and freight. A significant proportion of businesses in England are, and are likely to remain, heavily reliant on the SRN. High-productivity sectors such as logistics, manufacturing and construction are particularly dependent on the SRN. Collectively these sectors contribute significantly to the economy, employing 15.5million people (51% of total employment in England). Our analysis shows that SRN-reliant sectors contribute over £314 billion GVA to the UK's economy.

It is also clear that businesses want to locate near our network - 91% of business in England are located within 9 miles of the SRN, and the top 20 largest speculative industrial developments (8.24million square feet in total), are all within 5 miles of the SRN, the vast majority being adjacent to it.

Changing consumer trends may decrease commuter traffic to some extent, but are expected to increase demand and reliance on SRN if there continues to be a shift to e-commerce. Online sales are currently 18-20% of total sales and are expected to increase further, with consumers increasingly demanding next day delivery and 'click and collect'. This is likely to mean more 'big box' fulfilment centres close to SRN and smaller urban depots for moving goods inbound from lorries to smaller vans for the 'last mile'. e-commerce is also showing increased interest in multi-modal facilities such as rail-freight terminals which enable heavier goods to be transported over longer distances. The SRN is critical for integration of these facilities, and in providing the link between the rail network and the final destination of the goods being moved.

Question 3: How can better design, in line with the design principles for national infrastructure, help solve any of the Commission's nine challenges for the next Assessment and what evidence is there to support this? Your response can cover any number of the Commission's challenges

National Highways is fully supportive of the NICSs design principles for national infrastructure. Our own ten principles for good road design are embedded into our decision making, and we have our own design panel (made up of experts from outside of National Highways) to provide advice and guidance on our scheme design. This includes making recommendations every year, and reporting on progress towards previous recommendations. This process helps ensure that our roads are safer, more inclusive, and more environmentally sustainable.

Between 2019 and 2020 the panel reviewed A66 Northern Trans-Pennine, A57 Mottram Bypass and Smart Motorway Programme and held follow-up reviews of Lower Thames Crossing, A27 Arundel Bypass and A417 Missing Link since the last report. The panel also undertook design evaluations of two completed schemes, A21 Tonbridge to Pembury and A45/A46 Tollbar End, and reviewed the DMRB standards for Landscape Design and Sustainable Development

Processes are now in place to ensure revisions to relevant DMRB standards (such as the requirements for new and upgraded all-purpose trunk roads) consider the principles of good design. Our Manual of Contract documents for Highways Works will be updated in the second road period, principles of good design considered, and the Panel engaged in this process. More information about the panel can be found in our Road to Good design report and our Strategic Design Panel Progress Report 4.

When considering the design of our schemes we also recognise that it is also key to consider the carbon impacts and potential mitigations. Factoring carbon into early stages of design is the best way of reducing it from both construction and vehicle emissions. Digitally enabled design, along with modularised and standardised approaches and automated construction, also allow us to improve safety and save money.

Challenge 1: Digital transformation of infrastructure

Question 6: In which of the Commission's sectors (outside of digital) can digital services and technologies enabled by fixed and wireless communications networks deliver the biggest benefits and how much would this cost?

Question 7: What barriers exist that are preventing the widescale adoption and application of these new digital services and technologies to deliver better infrastructure services? And how might they be addressed? Your response can cover any number of the Commission's sectors outside digital (energy, water, flood resilience, waste, transport).

There are significant gains to be made from the adoption of digital services and technologies on the network. We are at the beginning of a digital revolution in roads infrastructure and expect to see more change in the next decade than we have in the last century. This provides an opportunity to make our roads safer, improve customer experience for all, and support our plans for net zero. Our Digital Roads Vision sets out the potential benefits to

roads from digital design, digital operations and digital for customer and the work we will do to ensure these benefits can be realised.

The growth of connected and autonomous vehicles (CAV) is expected to be one of the most significant changes ever to occur in transport. Connected systems promise integrated, reliable, and safer travel, whilst autonomy could increase accessibility, reduce incidents, and increase national productivity.

Working with other government authorities, agencies, academia and industry, we have conducted multiple CAV trials on the SRN. This forms part of our preparations to ensure the SRN is able to accommodate vehicles with varying levels of connectivity and autonomy. We are clearly defining our role in the safe deployment and operation of CAVs on the SRN and are actively factoring this into our long term planning and investment decisions.

There is potential for up to significant increases in capacity due to autonomous vehicles. However full benefits will only come if there is both real time information provision & vehicle coordination/cooperation. Research has shown that 25% penetration of autonomous vehicles AV without coordination & corporation actually reduces capacity on the network. To achieve this, and to realise the other benefits from digital, there needs to be appropriate investment and focus on standards, cybersecurity, and the data which is collected, managed and provided back to customers, as well as in the technology required.

It is worth nothing that there is considerable uncertainty about the pace of adoption and the particular technologies that will come onto the market. Connectivity is likely to be more widespread before Autonomy, however, all of these technologies are likely to increase the attractiveness of vehicle travel. Part of the challenge is how to ensure the strategic road network is ready for new technology while remaining relatively agnostic about the type of technology to be adopted. New regulation and legislation is also likely to be required.

Challenge 4: Networks for hydrogen and carbon capture and storage

Question 11: What barriers exist to the long term growth of the hydrogen sector beyond 2030 and how can they be overcome? Are any parts of the value chain (production, storage, transportation) more challenging than others and if so why?

Low carbon hydrogen is considered one of the viable options to decarbonise HGVs, and as such questions around its safety, production and distribution have relevance to the transport industry. The main considerations for the SRN are how hydrogen would be transported from production sites to storage areas and end users, and how to ensure safety on the network. There are likely to be safety concerns from the public as well as engineering challenges to overcome, and these would also need to be considered and addressed though timely and extensive stakeholder engagement.

Challenge 5: Asset management and resilience

Question 13: In what ways will current asset management practice need to improve to support better infrastructure resilience? Your response can cover any number of the Commission's sectors.

Asset management supports the way we make decisions across our business end to end, from long term investments to the maintenance and renewal of our network. We recognise the opportunity that asset management therefore provides for better performance and customer outcomes, which is a key part of our asset management strategy. In order to deliver these outcomes we are focusing on improving the resilience of our network to the impact of climate change and severe weather events. We have updated our design standards for drainage, improved our modelling techniques using data and technology and undertaken materials research. This will support us in managing acute challenges on the network such as improved management of flooding hotspots.

Challenge 7: Waste and the circular economy – the Commission will examine the role of the waste sector in enabling the move towards a more circular economy.

Question 15: What is the likely environmental impact of waste streams from construction across economic infrastructure sectors, over the next 30 years, and what are the appropriate measures for addressing it?

National Highways are committed to achieving net zero across our construction and maintenance activities. This includes reducing waste and adopting principles around circular economy. The recently completed A590 road resurfacing scheme in Cumbria was the UK's first carbon neutral road scheme. Carbon neutral construction is a step towards our net zero ambitions, and we were proud to reduce emissions by 40% compared to a typical scheme before then offsetting the remaining emissions using high quality schemes.

A key part of this was re-using the road planings in the new road surface. This reduced new material use and truck movements, with about 50% of waste materials recycled back into the road. We also used early collaboration between the construction team to share ideas and to model carbon potential savings, and used solar powered generators to provide energy for site lighting, signage, CCTV and catering facilities. Electric vehicles were also used on the scheme

Challenge 8: Urban mobility and congestion – the Commission will examine how the development of at scale mass transit systems can support productivity in cities and city regions and consider the role of congestion charging and other demand management measures.

Question 16: What evidence is there of the effectiveness in reducing congestion of different approaches to demand management used in cities around the world, including, but not limited to, congestion charging, and what are the different approaches used to build public consensus for such measures?

As National Highways there are a large number of ways we can manage our network to reduce congestion and get the most out of our roads even as traffic volumes increase. Our traffic officers patrol our network, managing incidents safely and quickly and reducing the delays to people's journeys from disruption. Our control centres undertake real-time traffic management across the country, including setting variable speed controls. Our information systems provide customers with traffic data and alternative routes, while our weather stations and winter fleet enable safe journeys in adverse weather.

We also support other actions recommended by Committee on Climate Change on modal shift, and in the next road period (2025-2030) will implement a comprehensive plan to reduce, remode and retime journeys. As our roads become more digital there will be increasing opportunities to manage traffic more effectively, through providing more data and information to customers via connected vehicles, and increased use of our own data and sensors across our network.

We welcome the NICs distinction between urban and interurban travel when it comes to levelling up and demand management. For interurban journeys on the SRN, modal shift and demand management are important but are not a net zero panacea. On car travel, the Climate Change Committee has recommended Government pursue policies which encourage working from home, active travel, car-sharing and switching to other modes. This can help reduce the growth in road trips, particularly in urban areas. However even with ambitious modal shift policies the CCC expected continued increases in road traffic to 2050, from both passenger and freight. This is against a backdrop of faster growth of road freight compared to car traffic as consumer demands increase. This is why we are supportive of an integrated transport system that gives people this flexibility to use different modes to meet different needs – all of which will increasingly be low and zero emission.

Although we believe there is value in looking at demand management in cities, consideration also needs to be given to the impact this would have on end to end journeys which are likely to have both intra and interurban stages. It will also be important to consider the edges of cities. For example, supporting more efficient last mile deliveries in cities may mean more distribution centres required around the edge with good SRN access. There would also needs to be good integration between modes, including facilitating access to park and ride facilities and good access to rail gateways. This highlights the need for good multi modal planning which considers the UK transport network (including the SRN) as a system.

Challenge 9: Interurban transport across modes – the Commission will consider relative priorities and long term investment needs, including the role of new technologies, as part of a strategic multimodal transport plan.

Question 17: What are the barriers to a decision making framework on interurban transport that reflects a balanced approach across different transport modes?

The road network is part of a wider system of interurban transport, along with rail and air. It also plays an important role in supporting international trade through its connection to ports and airports, and is a vital network for freight. We have provided some thoughts below on how better decision making can take place to support different modes, but would be very happy to discuss this further with the commission.

Achieving net zero by 2050 is one of the most pressing challenges for interurban travel. Roads are expected to decarbonize quickly. Our own analysis suggests that the phase down of petrol and diesel vehicles means the carbon intensity of car travel approaches that of rail by the mid 2030s (Source National Highways / WSP research based on DfT strategies). As such, decision making frameworks need to be able to properly take into account the expected rate of decarbonization across different modes, as well as their carbon impacts. This requires good cross sectoral analysis which is regularly updated and reflected in

government guidance. Our view is that there is currently no framework for cross-transport decision making which does this. This means is it challenging for decision makers to assess whether an investment in one mode to support net zero is a better investment than other choices.

When talking about integrating networks, commentators often refer to taking journeys off one mode and onto another (for example "off roads and on to rail") as if the modes are in direct competition with each other. Our view is that good decision making should treat transport network as an inter-related system, with different modes supporting the effectiveness of each other. The focus should be about how to encourage the "right journey on the right mode". Decision making also needs to consider capital and operating costs of modes, as well as the timescales of delivery to ensure that investment is delivering the best value for money as a whole.

It is important to recognise that different modes have different relative strengths, and our aim should be to make sure we have a network that plays to these. A good example is road and rail freight, which have different advantages depending on the type of freight and the distance it is travelling. Both have similar reliability in terms of journey time, but rail is usually a more cost-effective option over long distances and for high volumes (where it benefits from the economies of scale that come with carrying significantly more tonnes of freight per journey). In contrast, road freight is generally more cost-effective for movements under 50 miles for bulk traffic and 100 miles for consumer goods. For some markets roads can also offer more flexible capacity than rail – with DfT Rail Freight Strategy 2016 noting that this has been a barrier to growing rails market share in the past.

Our recently published Solent to the Midland Mulitmodal Freight Strategy (working with Network Rail) shows how taking a more detailed, cross modal assessment of the freight market along a transport corridor can help drive effective decision making across road and rail. The study used data to identify where there may be freight flows that currently use road but could be better served by rail. It also outlines the significant benefits that modal shift to rail offers both to freight end-users but also to the wider road and rail networks. By doing so it contributes to our joint goals of keeping Britain moving and meeting our net zero targets, by demonstrating how both networks could be used more efficiently in terms of their overall capacity and their carbon footprint. Our intention is to continue to use this approach in our next round of route strategies, which we use to set our plans for the SRN across the country and which directly inform our RIS3 proposals to Government. We are also looking to work with Great British Railways as they develop their whole industry strategic plan for rail, in order to strengthen multimodal planning across both our networks.

There are also opportunities to do more joined up planning at local and regional level. In National Highways our Users and Communities designated fund has been focussing on working closely with transport partners and local authorities to enable multi-modal travel. We plan to complete 62 schemes between 2020-2025 which integrate our network with other transport infrastructure, including pedestrian routes and public transport hub. We are Britain's largest builder of cycleways, having completed 150 schemes in the past five years.

The fact that these are not linked to schemes but are available for any partners to access means their benefits can be delivered across the country.

A decision-making framework also needs to factor in other considerations beyond value for money. The Green Book and WebTag are very important and well developed, and form the basis for current decision making. We welcome the recent update to the Green Book which emphasises that schemes cannot be considered value for money without meeting their strategic objectives . For the SRN, this can include a strong safety case or where there are expected improvements to quality of life (such as providing better connections to key services, or improvements in air quality from better traffic management). To further improve this it would be useful if HMT & DfT could provide more guidance on how to treat that within the DFT's Value for Money framework - in particular, how to weigh that factor into decision making when schemes are on the borderline for VfM categories.

When considering investment in transport infrastructure, emphasis is often placed on investing to deliver additional capacity through enhancements to inter urban networks. However it is just as important that focus is given to maintaining these current networks so that they can continue to deliver both safety and performance levels. The UKs road and rail network are both ageing, and both maintenance and renewals activities are required to ensure they can remain running effectively. This is also key to ensure they can remain resilient to more frequent extreme weather events over the next 30 years.

Annexes:

Annex A: summary of net zero carbon plan