

Civil engineering insights on the UK's first Road Investment Strategy

Overview of the Strategic Road Network

The Strategic Road Network (SRN) is the backbone of the road network in England. The vast majority, 89%, of journeys are made by road¹ and inefficiencies, in the form of congestion, negatively affect productivity, the environment and quality of life.

The SRN itself consists of over 4,400 miles of motorways and trunk roads and carries 30% of all traffic; four million vehicles driving approximately 92 billion miles a year.² With public debate often focused on rail and airport projects, the infrastructure which supports 38.9 million road vehicles³ can be overlooked.

The functioning of the SRN is critical for the economy. Entire sectors depend on it, with some of the most dependant including retail, primary materials, manufacturing and construction.⁴ These sectors in particular cluster around the SRN, which enables good access to markets and international gateways, while increased interconnectivity between cities boosts economic and employment growth.⁵

As the population grows to 75 million people by 2050,⁶ the effectiveness of the SRN and its ability to cope with increased demand, while decarbonising to meet the net-zero target by 2050, will help to define how successful the UK's economy and society will be.

Purpose of this paper

This paper provides insight into the delivery of the first Road Investment Strategy (RIS), examining how effectively it has been delivered and assessing where focus should be placed for future road investment periods. It has been developed through discussions with ICE Fellows, a roundtable of senior road-sector stakeholders and available published evidence.

The path to roads reform

Modern roads reform was a response to the 2011 Cook Review. This introduced three “pillars”: the RIS, the establishment of Highways England and new roles for oversight bodies.

The Cook Review

Improving the delivery of infrastructure is a continual pressure and a sensible long-term policy. In this spirit, the Cook Review was ordered by the Secretary of State for Transport as part of the October 2010 Spending Review. It was tasked with examining whether the Government had the right approach to operating, maintaining and enhancing the SRN.⁷

Alan Cook published his report in 2011. He found that the SRN required more effective operation, maintenance and enhancement procedures. The report also argued that its operator (then the Highways Agency) could deliver significant efficiencies with reforms around structures, relationships and responsibilities.⁸ The review made eight recommendations

¹ Department for Transport (2016) [Road Use Statistics: Great Britain 2016](#)

² Highways England (2017) [Strategic Road Network: Initial report](#)

³ RAC Foundation (2019) [Mobility](#)

⁴ Highways England (2017) [Socio-Economic Analysis, Future Forecasts and the Strategic Road Network](#)

⁵ Ibid

⁶ ICE (2016) [National Needs Assessment](#)

⁷ Department for Transport (2012) [A Fresh Start for the Strategic Road Network: The Government response](#)

⁸ Alan Cook (2011) [A Fresh Start for the Strategic Road Network](#)

underpinned by four themes⁹ which were accepted “either in detail or in principle” by the Government.¹⁰ The four themes were:¹¹

- a clear, long-term strategy from the Government as the customer for the network
- a robust, long-term performance challenge for the network manager
- an independent network manager with greater commercial focus
- freedom and a mature relationship with the supply chain.

The introduction of the first Road Investment Strategy and its objectives

The RIS was introduced in 2014 with a funding envelope of £15.2 billion¹² and 112 projects within its portfolio.¹³ It was designed to run for a five-year period between 2015 and 2020, providing a long-term programme with stable funding.¹⁴ The reforms also called for a transparent process and clear separation between Government and operator roles, delivery of faster and more efficient projects and a closer alignment between operator and supply chain.¹⁵

The RIS existed alongside two other reforms to form three “pillars”.¹⁶

- a long-term strategic approach embodied in the RIS
- reform of the operator into a Government company at arm’s length
- the creation of a formal highways monitor and watchdog, embodied in the Office of Rail and Road (ORR) and Transport Focus.

The enabling legislation aimed to allow the company to streamline projects, making them more efficient and encouraging additional investment in roads.¹⁷ The ORR and Transport Focus have important roles to play. The ORR acts as the monitoring body for Highways England, scrutinising the performance and delivery of the company,¹⁸ while Transport Focus represents the interests of passengers and road users.¹⁹

Have these reforms been beneficial?

There is a high degree of agreement between stakeholders that the reforms are a welcome departure from previous approaches. They also report that the RIS has resulted in the development of more long-term strategic planning.²⁰

A stronger focus on relationships from Highways England, surety of funding and a visible long-term pipeline has improved supplier confidence and this approach is paying off. Delivery of efficiencies is ahead of internal targets, with around 70%, some £848 million, achieved by March 2019 against a target of £1.2 billion for the entirety of RIS 1.²¹ Supply chain investment in equipment, skills and safety has increased and there is greater adoption of innovative practices.²²

The ORR believes that Highways England is “taking the right actions on its network to meet the needs of road users”.²³ There are eight key performance indicators the company is measured against. It is meeting these when it comes to keeping the network in good condition, delivering improvement schemes and incident clearance and environmental standards. It is, however, lagging on improving network safety and improving user satisfaction levels.²⁴

⁹ Ibid

¹⁰ Department for Transport (2012) [A Fresh Start for the Strategic Road Network: The Government response](#)

¹¹ Alan Cook (2011) [A Fresh Start for the Strategic Road Network](#)

¹² Gov.UK (2014) [Road Investment Strategy: 2015 to 2020](#)

¹³ Department for Transport (2016) [Road Investment Strategy Post 2020: Planning ahead](#)

¹⁴ Gov.UK (2014) [Road Investment Strategy: 2015 to 2020](#)

¹⁵ Department for Transport (2014) [Case for Creation of a New Public Body in Place of the Highways Agency](#)

¹⁶ Ipsos Mori (2019) [Evaluation of Roads Reform: The changes made to the management and operation of England's Strategic Road Network since 2014](#)

¹⁷ Gov.UK (2015) [Infrastructure Act will get Britain Building](#)

¹⁸ The Office of Rail and Road (2020) [The Highways Monitor](#)

¹⁹ Transport Focus (2020) [About](#)

²⁰ Ipsos Mori (2019) [Evaluation of Roads Reform: The changes made to the management and operation of England's Strategic Road Network since 2014](#)

²¹ Highways England (2019) [Connecting the Country: Annual report and accounts 2019](#)

²² Ipsos Mori (2019) [Evaluation of Roads Reform: The changes made to the management and operation of England's Strategic Road Network since 2014](#)

²³ Office of Rail and Road (2019) [Annual Assessment of Highways England's Performance](#)

²⁴ Ibid

Public levels of satisfaction with the Strategic Road Network

In a survey conducted for ICE in 2018, when asked to pick an infrastructure sector as a main priority for spending, 56% of the public chose roads.²⁵ Public satisfaction towards the SRN and Highways England, as measured by the National Road Users Satisfaction Survey,²⁶ is high, with 88.4% satisfied, though this is below the target of 90% set by the DfT in RIS 1's performance specification.²⁷

The satisfaction score is determined by five elements:²⁸

- safety
- signage
- journey time
- roadworks management
- upkeep.

Of these, roadworks management is noticeably low, sitting at around 65%, with the others scoring above 85%.²⁹ There has been a greater focus on road user experience in large part thanks to the advocacy roles undertaken by Transport Focus and the ORR. This has improved pavement conditions and bad weather mitigation in particular.³⁰

Have projects and schemes been planned and delivered effectively during the first road investment period?

According to Delivery Confidence Assessment data, Highways England has improved delivery of major roads projects. The assessment is based on nine criteria relating to a project's viability, with an overall assessment, ranging from green to amber and red, awarded. These criteria include metrics such as whether a project is expected to deliver on time and budget or has the skills and processes in place to deliver. It is a best judgement indicator, with no score to be awarded.³¹

Five projects have featured in the annual report on major projects since 2015:³²

- A14 Cambridge to Huntingdon Improvement scheme; designed to relieve congestion and support national and regional growth
- A303 Amesbury to Berwick Down; increasing capacity of the existing road through constructing a dual carriageway and a twin-bored tunnel underneath Stonehenge
- A428 Black Cat to Caxton Gibbet improvements; constructing a new two-lane dual carriageway
- Lower Thames Crossing; the creation of a new road crossing over the River Thames east of Gravesend
- M20 Lorry Area; a study into the options for a permanent solution for freight management and lorry parking in Kent.

Four of these projects have improved their ratings over time, while the A428, introduced in the latest report, was given an amber/green rating.³³

Of the 112 major projects within RIS 1's pipeline, only 29 have completed as of the 2018–19 business plan.³⁴ Despite this, the National Audit Office examined the programme in 2017, finding that RIS 1 “represents a significant improvement in the

²⁵ ICE (2018) [State of the Nation 2018: Infrastructure investment](#)

²⁶ Transport Focus (2019) [National Road Users' Satisfaction Survey 2018–19](#)

²⁷ Department for Transport (2014) [Road Investment Strategy: Performance specification](#)

²⁸ Ibid

²⁹ Ibid

³⁰ Ipsos Mori (2019) [Evaluation of Roads Reform: The changes made to the management and operation of England's Strategic Road Network since 2014](#)

³¹ Infrastructure and Projects Authority (2011) [Project Assurance Reviews: Delivery confidence guide for review teams](#)

³² Infrastructure and Projects Authority (2019) [Annual Report on Major Projects 2018–19](#)

³³ Ibid

³⁴ Highways England (2019) [Delivery Plan](#)

efficient management of the SRN”.³⁵ The first six projects to complete did so on schedule and had an outturn 4.4% above budget³⁶ which, compared to some other major projects, represents only a minor inflation in outturn cost.

There is a degree of variance in project outturns, with some, like the A428 Black Cat to Caxton Gibbet, expected to outturn 42% below its cost forecast³⁷ and others, like the A21 Tonbridge to Pembury project, seeing its cost increase by 74%.³⁸

Indicators are mixed, but it is perhaps too early to accurately assess if road delivery is being delivered more effectively in the round. As policies and processes take root and more projects are completed, the picture should become clearer.

Have there been shortcomings in planning and delivery?

The RIS went quickly from concept to commencement. Most projects were “at a very early stage of development” when the programme began.³⁹ These projects had not yet proven they were effective value for money, affordable or deliverable and the Department for Transport (DfT) had not made it clear whether or not projects could be changed or cancelled.⁴⁰

Highways England undertook a review of its capital investment plans which changed its scheduling of major schemes, focusing on their scope, value for money and road user experience.⁴¹ As a result of these changes, 29 projects are now earmarked for the second road investment period and eight more have no planned start date.⁴² A further 29 projects have completed, 15 have started and 31 are scheduled to start before RIS 1 ends.⁴³

A clear pipeline of works has allowed for advanced preparation by the supply chain and flexibility has meant the programme can respond to constraints. Despite this, full benefits have not been realised, with residual risk remaining and mitigation required.⁴⁴ Planning has been more advanced for the second road investment period.⁴⁵

Supply-side constraints remain a risk. In order to meet capital expenditure envelopes, Highways England’s expenditure has increased to £250 million per month in the latter period of the RIS.⁴⁶ Outside stakeholders are also impacted by late-running projects; Midlands Connect is concerned that late delivery of planned works will negatively impact its own business case assumptions for investment in the Midland Engine, for instance.⁴⁷

New approaches, delivery models and technology

The reform of roads funding and a new operator has led to enhanced collaboration with the supply chain, new methods of procurement and a prioritisation of innovation and technology.

New approaches

The relationship between Highways England and the Department for Transport

RIS 1 brought along with it a “fundamental” change in the relationship between the operator and sponsor which was needed to ensure delivery of all elements of roads reform and allow for greater day-to-day operational independence and cultural change within Highways England.⁴⁸

³⁵ National Audit Office (2017) [Progress with the Road Investment Strategy](#)

³⁶ Ibid

³⁷ Gov.UK (2019) [DfT Government Major Projects Portfolio Data, 2019](#)

³⁸ National Audit Office (2017) [Progress with the Road Investment Strategy](#)

³⁹ Ibid

⁴⁰ Ibid

⁴¹ Office of Rail and Road (2019) [Annual Assessment of Highways England’s Performance](#)

⁴² Highways England (2019) [Delivery Plan](#)

⁴³ Ibid

⁴⁴ Office of Rail and Road (2018) [Review of Highways England’s Capital Delivery Plan](#)

⁴⁵ Department for Transport (2018) [Draft Road Investment Strategy 2](#)

⁴⁶ Office of Rail and Road (2018) [Review of Highways England’s Capital Delivery Plan](#)

⁴⁷ Midlands Connect (2019) [Our Five Priorities for the Midlands from Highways England’s Road Investment Strategy 2](#)

⁴⁸ Ipsos Mori (2019) [Evaluation of Roads Reform: The changes made to the management and operation of England’s Strategic Road Network since 2014](#)

These ambitions have been met to a degree. Highways England has emphasised bringing roles in-house permanently where they would otherwise have been contracted on a per-project basis, allowing it to grow and upskill its workforce. Operational matters and delivery of projects are subject to little interference from the sponsor. However, the DfT is still prominently engaged in change control, delivery of enhancements and the selection of future projects.⁴⁹

The relationship is still developing, and boundaries are, according to stakeholders in both the DfT and Highways England, respected.⁵⁰ As an equilibrium is further developed between political direction and expert management, more independence can be expected, and the benefits of a portfolio approach further realised.

Improved relationships with and across the supply chain

Highways England's supply chain strategy⁵¹ sought to build capacity as an "owner operator of infrastructure services" and deepen relationships. Highways England has prioritised innovation over more rigid practices or strict adherence to contracts, compliance and oversight.

Highways England introduced a ring-fenced innovation fund worth £150 million.⁵² This fund is aimed at fostering new technologies and techniques in road construction, maintenance and operation. It has been used to test connected and autonomous vehicles, support the Intercor initiative⁵³ and trial automated stopped vehicle detection.⁵⁴

This more open approach has been welcomed by suppliers. Accident frequency rates for the supply chain are falling.⁵⁵ In addition, a greater focus on innovation and engagement with the supply chain has led to greater investment in innovation, training and the hiring and retention of staff among suppliers, also increasing confidence.⁵⁶

New delivery models

Highways England has been in the process of reforming its partnership models and methods of procurement throughout RIS 1. Highways England has supported this effort by improving its own capacity and bringing some roles in-house in order to grow and upskill its workforce (particularly in programme and project management, asset management and commercial roles).⁵⁷

New routes to market

Highways England is also taking and exploring new approaches to procurement that move away from a "one size fits all" model to a collaborative delivery framework. These new routes to market cover four areas:⁵⁸

- conventional widening and junction improvements
- the Smart Motorways Programme
- the Complex Infrastructure Programme
- maintenance and improvement activities.

The Regional Delivery Partnership Framework

The framework is a newly implemented agreement with 13 supply chain partners. They will collaborate on projects in a long-term pipeline worth £8.7 billion.⁵⁹

⁴⁹ Ibid

⁵⁰ Ibid

⁵¹ Highways England (2015) [Supply Chain Strategy](#)

⁵² Highways England (2018) [Innovation Fund Plan](#)

⁵³ Intercor (2019) [About Intercor](#)

⁵⁴ Highways England (2018) [Innovation Fund Plan](#)

⁵⁵ Office of Rail and Road (2019) [Annual Assessment of Highways England's Performance](#)

⁵⁶ Ipsos Mori (2019) [Evaluation of Roads Reform: The changes made to the management and operation of England's Strategic Road Network since 2014](#)

⁵⁷ Ibid

⁵⁸ Highways England (2019) [Procurement Plan](#)

⁵⁹ Gov.uk (2018) [Better Journeys Ahead with Groundbreaking Contract Awards](#)

The framework provides performance-based rewards for contractors who can provide shorter duration and more accurate management of roadworks, buy more efficiently or buy locally to stimulate regional growth, encourage innovation or reduce noise and environmental pollution, rather than setting a fixed price on a per-scheme basis.⁶⁰

The Smart Motorways Alliance

This initiative has been set up to take forward the Smart Motorways Programme under an alliance model. It uses a modified NEC4 Alliance Contract to bring together Highways England and six long-term partners working in on-site assembly, digitally enabled design and production management over 10 years, stretching into the third road investment period.⁶¹

The alliance's core aims will be to encourage behavioural changes, through a "collaborative, value-based delivery model achieved ... as a single integrated organisation".⁶² Representatives of the alliance have cited the programme as a powerful example of how to encourage innovation and collaboration within the highways sector.⁶³

New technology

Highways England has pursued a number of technological innovations, readily recognising that it needs to do more on technology and digital design.

Building Information Modelling

The implementation of Building Information Modelling (BIM) was an early priority for Highways England. BIM has been deployed to the third-highest level, described by the Government as the "use [of] intelligent, data-rich objects in a managed 3D environment with all parties working on a project able to combine their data to enable collaboration and information sharing through a common data environment".⁶⁴

Highways England has implemented a number of projects using this digital standard. An early example was the A556 Knutsford to Bowdon improvement works, completed in 2017. BIM was used to create a safer system for communicating and tagging hazards within the model, in real time, in a format accessible to all staff.⁶⁵

Connected and Autonomous Plant

Highways England is currently trialling Connected and Autonomous Plant technology as a means to implement automated construction. If realised, this could bring benefits to construction-site monitoring and logistics, minimise risk to workers, automate routine and non-specialised tasks, reduce cost and time requirements on-site and increase productivity. The technology also has potential synergy with off-site construction and standardised components and parts.⁶⁶

The Smart Motorways Programme

The Smart Motorways Programme aims to increase lane capacity on the SRN through the use of roadside technology to manage traffic flow and the conversion of hard shoulders to work as active lanes.⁶⁷ The technology embedded into Smart Motorways is designed to:⁶⁸

- monitor traffic levels
- change the speed limit to smooth traffic flow in a way that prevents stop-start driving conditions
- actively warn drivers about traffic jams and hazards and allow for the closure of lanes to allow priority traffic.

⁶⁰ Ibid

⁶¹ Highways England (2018) [Smart Motorways Alliance: Descriptive document](#)

⁶² Ibid

⁶³ ICE Presidential Roundtable (2019) Learning Lessons from RIS 1

⁶⁴ Gov.UK (2017) [Creating a Digital Built Britain: What you need to know](#)

⁶⁵ Capita (2017) [A556 Knutsford to Bowden Improvement](#)

⁶⁶ Highways England (2019) [Connected and Autonomous Plant](#)

⁶⁷ Highways England (2018) [Smart Motorways Alliance: Descriptive document](#)

⁶⁸ Highways England (2020) [Smart Motorways](#)

What are the key takeaways for future investment?

Improved delivery, preparation and planning, a focus on improved asset management and a wider consideration of social, cultural and environmental value will help to deliver improved performance.

Delivery, preparation and planning

Highways England, the ORR and the DfT are required by the Infrastructure Act 2015 and by Highways England's licence to prepare a "Draft RIS" ahead of future road investment periods.⁶⁹ As a result, the second road investment period should be better planned and represent a more mature programme than RIS 1. A plan is also now in place for maintenance and review.⁷⁰

This should act to minimise the peaks and troughs in activity and mid-period reorientation which have occurred since 2015, sustaining confidence and ensuring capacity is available to deliver projects at any one time. As Highways England's capacity for delivery improves, it should better organise its baseline and promote further efficiencies.⁷¹

Highways England should consider a more consistent portfolio approach, with the A14 held as an example of a project benefiting from this approach.⁷² However other routes, such as the planned A303 corridor upgrade, are being progressed as multiple individual projects when they might be better delivered together. While this approach maintains some flexibility around poor-value projects, the long-term benefit of individual projects is undermined by others not going ahead.⁷³

Asset management

A key objective for Highways England will be to increase its capability to manage and understand its assets. This is an effort in train, with Highways England taking an asset delivery approach to maintenance, through which it will directly manage network maintenance.⁷⁴ As technology progresses, and as programmes like the Smart Motorways rollout develop, Highways England's capabilities should increase. Structure is required, however, with oversight and alignment across asset groups.⁷⁵ A 2018 review found that to achieve this, Highways England should seek to prioritise improvements in: culture; skills and competencies; data and IT systems; end-to-end asset management; decision-making; support; and planning.⁷⁶

Whole-life benefits alongside social and environmental value in procurement

Highways England has moved away from a Most Economically Advantageous Tender (MEAT) assessment to one placing more emphasis on a wider values-based approach. This might mean measuring the value of quality and cost of work alongside health and safety performance, excellence in customer service delivery, whole-life value and affordability and innovation.⁷⁷

The Stonehenge Tunnel is an example of where a cost-based approach to project value assessments is insufficient. A standard assessment of boring and maintaining a tunnel to preserve the World Heritage Site at Stonehenge is estimated

⁶⁹ Department for Transport (2018) [Draft Road Investment Strategy 2](#)

⁷⁰ ICE Presidential Roundtable (2019) Learning Lessons from RIS 1

⁷¹ Ibid

⁷² Highways England (2019) [Delivery Plan](#)

⁷³ National Audit Office (2019) [Improving the A303 between Amesbury and Berwick Down](#)

⁷⁴ Highways England (2019) [Delivery Plan](#)

⁷⁵ Office of Rail and Road (2019) [Review of Highways England's Asset Management of Road Technology](#)

⁷⁶ AMCL (2018) [Review of Highways England's Ability to Improve Efficiency from its Asset Management Capability](#)

⁷⁷ Highways England (2019) [Procurement Plan](#)

to return 31 pence for every £1 invested.⁷⁸ Yet, the cultural heritage value is immense and while an approved value has been applied, this is intrinsically uncertain because the measure is novel and subject to questions of methodology.⁷⁹

Social, cultural and environmental value needs to be better accounted for in the built environment, especially as climate change becomes an increasingly important factor in long-term maintenance and whole-life costs. A logical next step for Highways England would be to ensure as part of its sustainable development strategy⁸⁰ that carbon, both embedded and emitted, is fully accounted for in future procurement decisions and project value assessments.

About ICE

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⁷⁸ National Audit Office (2019) [Improving the A303 between Amesbury and Berwick Down](#)

⁷⁹ Ibid

⁸⁰ Highways England (2017) [Sustainable Development Strategy](#)