M GROUP

Reimagining roads

A blueprint for the future of the UK's highways infrastructure

Essential infrastructure services for life

Causeway

Defining tomorrow’s vision

The UK highways sector stands at a transformative moment. With ageing infrastructure, increasing maintenance demands, and evolving user expectations merging with unprecedented technological capabilities and new funding, the time for change is now.

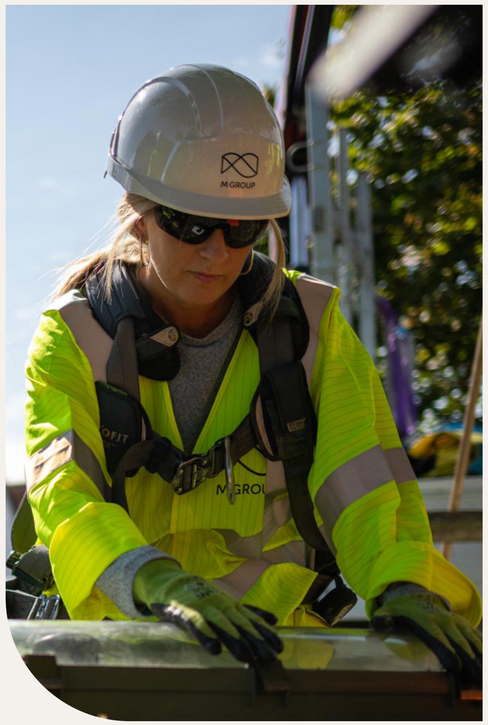
A transformed highways infrastructure must adapt to the needs of today while anticipating the demands of tomorrow. This transformation extends beyond technology; it requires new ways of working between clients, contractors, and technology providers. It demands a strategic, multi-year planning approach from local authorities who must collaborate rather than operate in silos.

Success will only come when everyone is at the table, creating solution-based teams with a long-term vision. It’d shift that puts data at the forefront, enabling better predictive planning, reducing disruptions, and designing infrastructure that fully reflects the needs of those who rely on it every day.

The government’s commitment to local highways funding in the 2024 Autumn Budget provides resources, but genuine transformation will only happen when all stakeholders - local authorities, contractors, technology providers, and communities - collaborate with shared purpose and vision. Everyone must be at the table to truly achieve the vision.

Digital transformation is most powerful when it solves real-world challenges and improves people's everyday experiences. The following illustrative scenarios reveal how integrated technology and data-driven approaches can fundamentally reshape highways infrastructure – moving beyond abstract concepts to tangible, human-centric solutions.

The future in action



Through the experiences of Sarah, Jane, and Mike, this illustrates how innovative platforms can transform road maintenance from a reactive, fragmented process to a proactive, interconnected system that anticipates needs, minimises disruption, and delivers genuine value to communities.

Sarah checks her phone before leaving for work. Her navigation app shows two key updates: first, a notification about surface water ahead caused by drainage issues, which has already been identified and scheduled for repair. Second, a planned road closure alert for next week on her typical route to the office, highlighting work that intelligently integrates resurfacing, utility upgrades, and the installation of EV charging infrastructure.

Seamless user experiences like this can only be realised through the use of complex data-sources, powered by an innovative Integration Platform as a Service or iPaaS solution.

These platforms have the potential to analyse drainage patterns, cross-reference weather data, and schedule preventive maintenance, all while feeding valuable insights into long-term strategic planning for the region's infrastructure needs. By connecting real-time operations with strategic foresight, the industry can better predict, prevent, and plan in ways that reduce disruptions and add true value to communities.

While Sarah takes an alternative route, asset manager Jane reviews her integrated dashboard, where AI-driven analysis has flagged increasing surface defects across several neighbourhoods. The platform doesn't just log past maintenance; it intelligently correlates historical data with traffic patterns, weather forecasts, and asset lifespans to anticipate potential failures before they happen. One flagged section overlaps with planned utility upgrades, presenting an opportunity for strategic coordination. Instead of commissioning multiple, disruptive works, Jane plans a combined project, reducing costs, minimising road closures, and improving long-term resilience. This shift from reactive fixes to predictive, proactive planning makes sure that infrastructure serves communities more efficiently and sustainably.

This vision extends beyond maintenance, and into major capital works, too.

When local café owner Mike logs into the platform, he sees more than just roadwork schedules – he sees a holistic plan that considers his bespoke business needs.

The reconstruction project outside his café isn't just about resurfacing roads; it's part of a smarter, data-driven strategy informed by real-time repair insights. Because past reactive repairs have been analysed and incorporated into long-term planning, this project doesn't just fix the surface, it tackles the root causes of recurring maintenance issues. Pedestrian access has been redesigned, outdoor seating space optimised, and community feedback integrated into the final plan.

The following sections of this report unpack how this transformative vision for highways can become a reality. From the technological catalysts driving change to the collaborative frameworks that will reshape highways infrastructure, it explores the strategic roadmap, data-driven decision-making, and the critical partnerships that will turn these scenarios from possibility to practice.

Each example you've just read is not a distant dream, but a preview of the systemic transformation already taking shape across the highways infrastructure in the UK.

A critical moment for highways infrastructure

Digital innovation is transforming how we deliver everyday services, creating new opportunities for the wider highways sector. Recent progress in digitalising individual processes is just the beginning of what's possible when we integrate technology platforms and approaches.

However, while the industry has made strides in adopting digital tools, many existing solutions focus too narrowly on individual aspects of highways management, failing to provide a interconnected approach.

The current division means that users like Sarah cannot access critical information about roadway conditions and planned works in one place, despite this data existing within various systems today. Without integration, we continue to operate in information silos that prevent the seamless experience described in our vision.

The highways sector faces a perfect storm of challenges and opportunities.

Ageing infrastructure, rising maintenance demands, and changing user expectations meet unprecedented technological capabilities and funding opportunities. The government's commitment to local highways funding comes at a crucial time, as the industry tackles mounting pressures and transformative possibilities.

There has been a 42% rise in overall street works from 2018 to 2023 and a 35% increase in roadwork miles since 2021.* These numbers, combined with the fact that over 50% of the road network in England and Wales has fewer than 15 years of structural life remaining,** show why we need innovative approaches now.

Local authorities must move beyond annual planning cycles to embrace multi-year strategic approaches. The current year-by-year mentality prevents the kind of coordinated, long-term maintenance planning that would allow asset managers like Jane to combine projects, reduce disruptions, and maximise infrastructure investments.

Only through collaborative multi-year planning can we create the integrated experiences that our communities deserve.

> The transformation of highways infrastructure must prioritise its impact on communities. Through smart use of technology, we can cut carbon emissions, reduce disruption, and build infrastructure networks that serve people better.

Alex Winchester
Strategic Improvement Director, M Group

The transformation roadmap

Moving toward transformation requires a clear plan. Organisations must first assess their current technological capabilities and collaboration frameworks. This assessment should not just focus on technical systems but on readiness for change.

“Infrastructure transformation isn’t just about implementing new technology. It’s about changing how we think about maintenance. The industry needs to move from reactive to predictive approaches, using data to drive better decisions.”

Alex Winchester

The transformation strategy must place equal emphasis on both technology and collaboration frameworks. Without this combined approach, we cannot create the integrated experiences that allow asset managers like Jane to make informed decisions or provide business owners like Mike with transparent, consideration planning that respects their needs.

For businesses looking to address these issues, here are the key starting points:

1

Avoid “impulse buying” technology solutions without a pre-determined purpose. Start by defining how you want to work, then partner with technology providers to achieve this goal. For instance, successful digitisation of workflows using mobile devices for data entry has reduced paperwork and improved data accuracy across the industry. This success came from identifying problems first, then finding solutions.

2

Audit activities that you repeat regularly and start to work towards an agreed approach you can roll out on future projects. Every site is slightly different, and this can lead to bespoke solutions being created each time. Standardisation is key to sharing data effectively and breaking down project silos.

3

Recognise that no single party can fix the industry’s challenges alone. For technological solutions to be effective, collaboration between service providers, local authorities, and technology vendors is essential. When selecting technology partners, prioritise those who clearly demonstrate their commitment to openness - both through adoption of standards and interoperability with other vendors. Focus on building these collaborative relationships and planning integrated technology solutions well before contracts start.

Technology as a catalyst

The highways industry stands at a crucial tipping point where digital transformation isn't just an option – it's necessary for meeting growing infrastructure demands. While individual technology solutions excel at specific tasks, the real value comes from connecting these systems and sharing data across the entire supply chain.

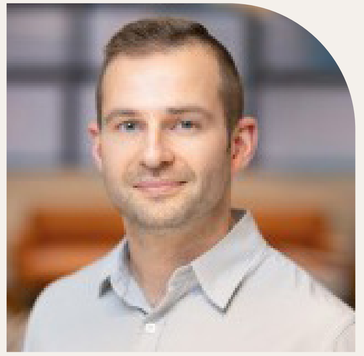
"The key is using technology to support and enhance our operational expertise. When we combine our deep understanding of infrastructure maintenance with smart technology, we can deliver better outcomes for communities."

Alex Winchester

The BSI's recently published specification for road and condition monitoring (RCM) highlights the kind of industry-spanning solutions needed.***

However, waiting for government mandates or trade body decisions hasn't produced measurable results. Progress happens when we share data openly between everyone involved.

Technology integration creates the foundation for asset managers like Jane to work more efficiently and effectively. The AI-driven analysis tools described in the future vision in action aren't futuristic concepts - they're achievable today with the right strategy.
By implementing platforms that integrate diverse data sources, we can provide Jane and others with comprehensive dashboards that transform reactive maintenance.



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Digital transformation in highways maintenance is about integrating systems to provide timely information to everyone who needs it. When we make data more accessible across processes, we enable more efficient decision-making and create transparency. This transparency not only improves operational outcomes but also empowers local residents with information about priorities and decisions, ultimately leading to greater community satisfaction.

James Veitch
Chief Data & AI Officer, Causeway

Informing decisions with intelligent data

The highways infrastructure sector must embrace data-driven decision-making to address the growing complexity of our road networks. Current approaches to highways data management are fragmented and inefficient, with critical information trapped in separate systems used by different stakeholders.

The intelligent integration of highways data - from traffic patterns and weather events to asset conditions and maintenance histories - forms the backbone of the transformation we envision. When local authorities can access comprehensive, real-time insights about their road networks, they can shift from reactive maintenance to strategic asset management.

Highways-specific data platforms enable the kind of coordinated planning that reduces disruption while maximising the impact of limited budgets. By connecting historically separate information sources like pavement condition indices, utility work schedules, and traffic flow patterns, we create a view that empowers better decision-making across the entire infrastructure lifecycle.

A survey by Causeway and the CIHT found that 80% of highways department managers were aware of digitalisation strategies being developed by their employers, with 82% believing digitalisation would be crucial for business over the next five years.[****]

"In today's reality of shrinking budgets and increasing demands, data-driven approaches are essential for highways infrastructure. By harnessing the right information, we can deliver greater efficiency, transparency, and value for money. Traditional methods simply cannot scale to meet growing community needs with limited resources - we need smarter, more effective approaches that maximise every pound invested."

James Veitch

"The industry's future depends on our ability to harness data effectively. By sharing insights across organisations, we can build infrastructure networks that truly serve our communities."

Alex Winchester

Intelligent data systems provide the foundation for the integrated experiences we've described for Sarah, Jane, and Mike. From real-time notifications about road conditions to comprehensive maintenance planning dashboards, data integration transforms theoretical benefits into tangible improvements for everyday users. This data-centric approach is what makes multi-year planning possible and effective, allowing stakeholders to see beyond immediate priorities to long-term infrastructure needs.

Building the future today

The vision of highways infrastructure that works for today while preparing for tomorrow is within reach. This transformation goes beyond implementing new technologies; it represents a fundamental shift in how the industry operates, collaborates, and delivers value to communities.

“The transformation of highways infrastructure is about creating lasting change for communities. When we combine smart technology with deep operational knowledge, we can build infrastructure that truly serves future generations.”

Alex Winchester

By seamlessly connecting real-time operations with strategic planning, the industry can create an infrastructure ecosystem that:

- Spots and fixes issues before they affect communities.
- Integrates maintenance activities to minimise disruption.
- Uses data to make smarter, more sustainable decisions.
- Brings everyone together - from local businesses to highway authorities - to deliver better results.

The technology exists, the need is clear, and the potential benefits are compelling.

The recent commitment to local highways funding in the Autumn Budget provides resources, but genuine transformation will only happen when all stakeholders collaborate with shared purpose. Everyone - local authorities, contractors, technology providers, and communities - must be at the table, working toward a common vision.

The journey towards transformed highways maintenance isn’t just beginning – it’s accelerating. Through genuine partnership, technology innovation, and shared commitment to excellence, we can create the seamless experiences envisioned for Sarah, Jane, and Mike.

With technology as the enabler and collaboration as the foundation, we’re not just maintaining infrastructure - we’re reimagining it for generations to come.

About the authors

M Group

M Group Highways (previously known as Milestone Infrastructure) maintains and improves over 50,000km of roads across eight long-term maintenance contracts, and 370,000 lighting assets.

Alex Winchester

Alex Winchester, Strategic Improvement Director at M Group, brings a unique perspective formed through years of engineering design experience and overseas operations. His focus on simplifying and streamlining operations aligns with the transformation vision outlined in this blueprint.

James Veitch

James Veitch, Chief Data & AI Officer at Causeway, brings extensive experience in construction technology and digital transformation. During his decade at Balfour Beatty, he held diverse leadership positions spanning Digital Transformation, IT Strategy, Financial Planning & Analysis, and Operations, where he implemented bottom-up digital transformation strategies across highways maintenance.

Causeway

Causeway is M Group Highway's key technology partner. The business provides integrated, cloud-based software solutions to over 200 local authorities, 600 engineering consultants, and more than 1,000 contractors across the construction and maintenance industry.

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We would love to hear any comments or feedback you have on this report. Please email communications@mgroupltd.com

*Highway Maintenance Efficiency Programme. (2023). “Annual Review of UK Road Network Activities 2018-2023.” Department for Transport. Retrieved from https://www.gov.uk/government/organisations/highways-maintenance-efficiency-programme

**Road Condition and Maintenance Group. (2023). “Structural Life Assessment of UK Road Networks.” Chartered Institution of Highways & Transportation. Retrieved from https://www.ciht.org.uk/knowledge-resource-centre/resources/

***British Standards Institution. (2023). “BSI PAS 256:2023 - Road and Condition Monitoring (RCM) data exchange.” Retrieved from https://www.bsigroup.com/en-GB/standards/

****Causeway & CIHT. (2023). “Digital Transformation in Highways Management Survey.” Chartered Institution of Highways & Transportation. Retrieved from https://www.ciht.org.uk/knowledge-resource-centre/resources/

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