



Case study  
**National Highways North West**



M62 J9-10

# Case study

## National Highways North West



M6 J27-28



## Background

National Highways is a government-owned company charged with operating, maintaining, and improving motorways and major A roads in England.

In support of the UK Government's Net Zero "build back greener" strategy for meeting its 80%

emission-reduction target by 2050, National Highways aims to cut carbon emissions from our road lighting by switching 70% of their traditional discharge lanterns across the country to greener, more efficient LED luminaires by 2027. This led to the creation of a national

LED roadmap, which guided the upgrading of lighting assets nationwide. The retrofit program includes implementing CMS (Central Management System) technology for further asset management advancements.



I recently had the pleasure of working with Holophane for our National Highways LED Retrofit street lighting project, and the experience exceeded all expectations. From our initial conversations and throughout the procurement process, their professionalism and attention to detail were impeccable. The energy efficiency of the luminaires has significantly reduced the carbon emissions and utility costs, aligning perfectly with our client's sustainability goals. Overall, Holophane delivered a top-notch product and exceptional service. I would highly recommend them to others wishing to improve their outdoor lighting infrastructure.

**Colin Ross, Amey Consulting**

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## Challenge

There are several challenges with the existing lamps:

- They have higher energy consumption than their LED equivalents.
- They cannot be remotely controlled or dimmed and, therefore, cannot respond to changes in traffic flow. Additionally, they cannot be updated to include the latest advancements in this technology.
- Lamp failure can cause dangerous hot spots, especially at junctions and conflict areas.
- The much shorter life of discharge lamps means higher maintenance costs, more significant risk to roadworkers, more lane closures and disruption to traffic.
- Existing electrical faults on the road network and structural defects on lighting columns.
- Lack of existing asset data and large scale requirements of survey and electrical works required to allow for upgrade.
- Working on a heavily congested network with limited road space availability.

In February 2022, National Highways launched its ambitious £132m, 5-year LED retrofit lighting programme, which saw the North West of England as the first region to benefit from switching to more energy-efficient highway lighting. The North West region contains 28.75% of the entire National Highways' lighting, but only 12% of those 27,000 assets were LED when the target was announced. This provided the perfect opportunity to deliver high-impact LED replacement schemes that could make a sizeable difference in meeting their target.

A total of 6000 luminaires were upgraded, covering the M6, M57, M60, M62, and several A roads. The project was initiated due to the obsolescence of existing lighting assets and a drive for carbon

reduction, with cost and efficiency also being key considerations.

Amey Consulting was selected as the North West highway design consultant. To achieve the best outcome, Amey undertook market research to determine the most competitive lighting solution in terms of performance and energy savings. The design specifications for each road geometry included a requirement for lighting at a colour temperature of 3000K, which considers the effects on local flora and fauna and compliance with dark sky regulations. Additionally, National Highways introduced their first specification for the TM66 CEAM, mandating a minimum score of 2.5 for any selected luminaire.



## The Solution

The V-Max range was selected for its exceptional adaptability. The luminaire can have up to six chevron-shaped LED modules, giving a light output from 1,000 lm to 54,000 lm. This makes the V-Max modular design fully scalable, maintainable, and upgradeable, making it a far more sustainable luminaire when considering product longevity.

Its class-leading optics and patented transition zone reduced the potential effects of luminaire glare and created a more comfortable lighting environment.

After reviewing the wide range of optics available for the V-Max, three of the thirteen options were selected: the F4Q1, F4L2 and D4D4. These optics performed

best regarding lighting levels and uniformity when factoring in column parameters and spacings.

The V-Max range emits zero upward light. Furthermore, the 3000K LED versions are approved under the International Dark-Sky Association's approval scheme.

National Highways benefits from V-Max's significant energy savings across each traffic route, with some variants saving up to 65% of their original energy consumption.

Further benefits of the V-Max included features that considered installation maintenance and product longevity. The pre-cabing of the double-locked canopy system was chosen for enhanced safety. Specialised entry sizes were utilised to ensure that the product

could easily adapt to various column assets. Additionally, a straightforward failsafe lanyard attachment was incorporated for easier installation.

Crown Highways and McCanns Ltd. carried out installations. Their teams benefitted from a unique ID and project colour system, specially devised by Holophane, which provided quick reference points for the installing teams. Holophane also provided a video demonstrating the installation process and showcasing all product features and practical handling tips.

Limiting the number of lantern housing and lumen output variations used in the project was logical to establish a sensible approach for future maintenance. Amey began with the highest lumen output, dimming it to a maximum of 70%. The following product's lumen output started at approximately 65% of the previous version's maximum output.



Configuration	Lumen Output (klm)	Dimmed to 70% (klm)	Target starting output for next variant (klm)
V-MAX II V6	44.44	31.11	28.89
V-MAX II V5	29.60	20.72	19.24
V-MAX II V4	19.34	13.54	12.57
V-MAX II V2	12.52	8.76	-

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Holophane worked with Amey to supply light fittings with as few variants as possible.

By using only three optics with nine lumen variants and applying dimming profiles through the CMS, the results have provided a solid platform for compliant design solutions in line with the requirements of the LED Roadmap. As the strategic route network in the North West region of the National

Highways has been relit using so few variants, this has ensured that future maintenance has become more manageable.

In the northern region, Kier adopted similar principles to those created by Amey Consulting.

Overall, Holophane's V-Max contributed considerably to a much larger move towards highway efficiency. It has not only reduced energy consumption and carbon

production by significant amounts, aiding the National Highways in meeting its Net Zero goal, but it also makes the roads safer and our skies darker.



I was made responsible for the delivery of the Northwest LED retrofit project in 2022, and first met the Holophane team over teams. From the offset, I found them friendly and very accommodating to support the project and the collaborative ethos that they have as a company has helped drive efficiency and drive outputs to allow us to meet the targets set. Holophane have worked with National Highways, and our scheme delivery framework partners, to create something special; a collaborative relationship which has shown what working together is all about. I would highly recommend Holophane, their team and their products to anyone looking for an innovate, forward thinking lighting provider.

**James Sharp, National Highways**

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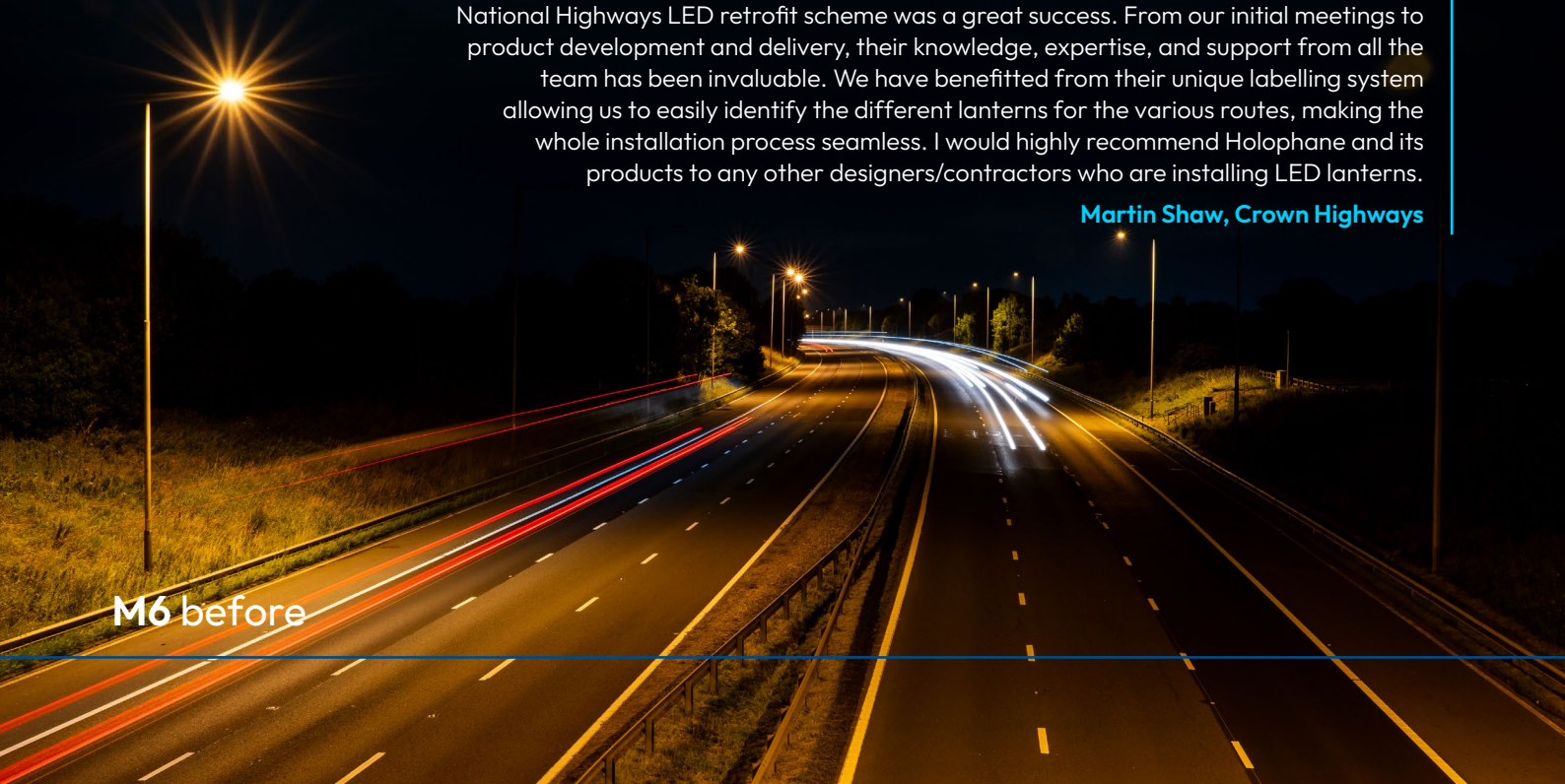
M6 after



Holophane have been a huge part of the team, working closely together to make sure the National Highways LED retrofit scheme was a great success. From our initial meetings to product development and delivery, their knowledge, expertise, and support from all the team has been invaluable. We have benefitted from their unique labelling system allowing us to easily identify the different lanterns for the various routes, making the whole installation process seamless. I would highly recommend Holophane and its products to any other designers/contractors who are installing LED lanterns.

**Martin Shaw, Crown Highways**

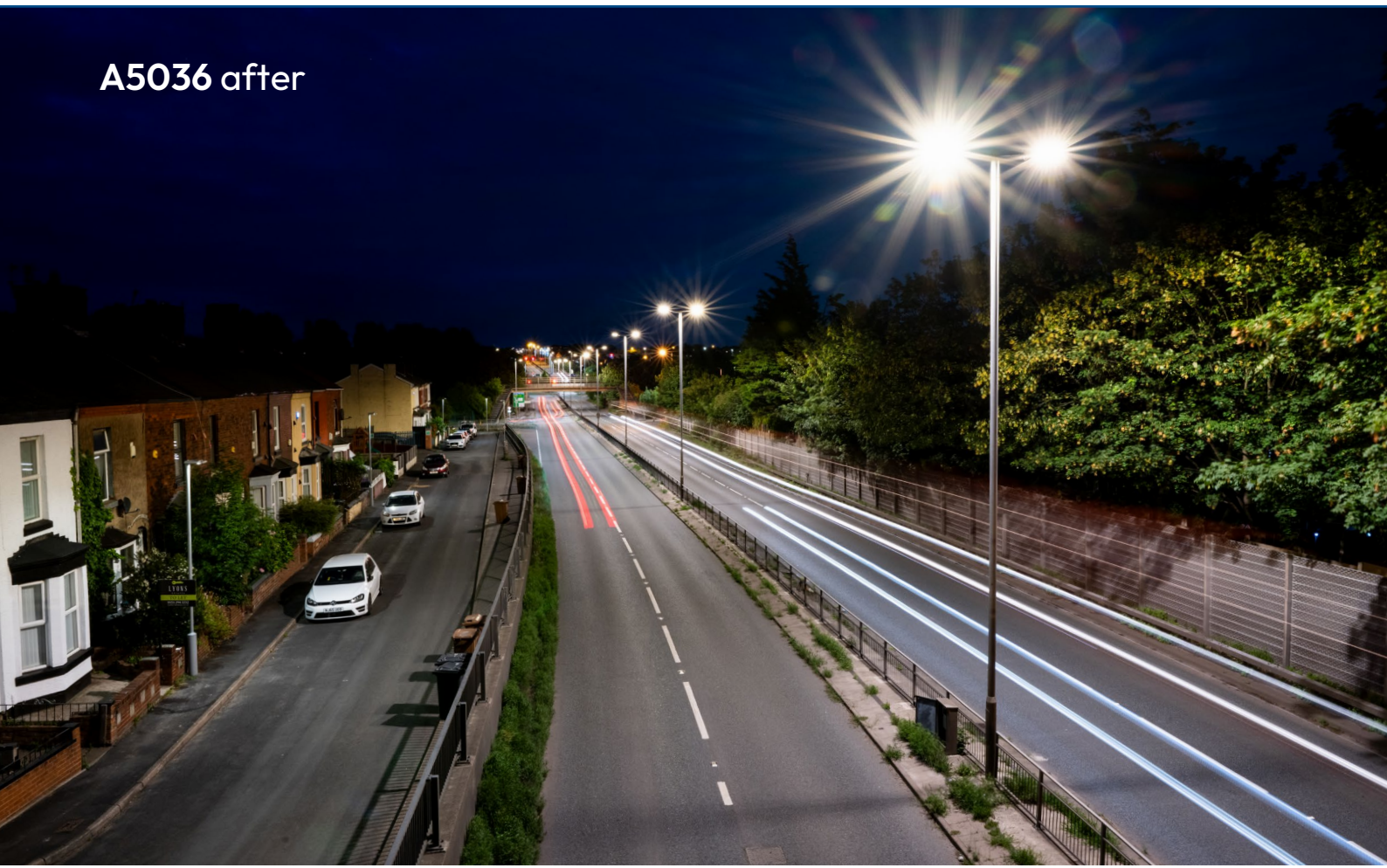
M6 before



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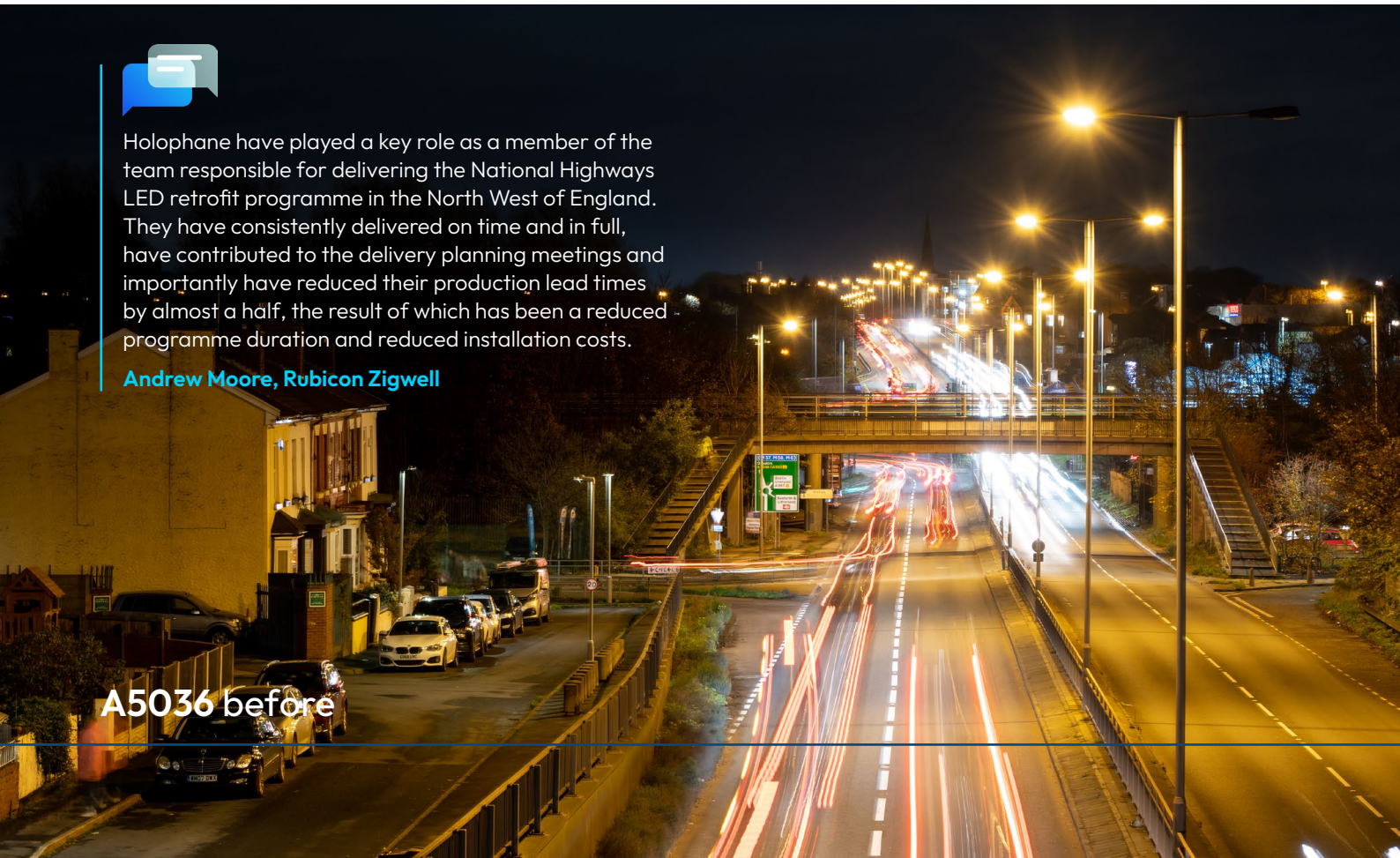
### A5036 after



Holophane have played a key role as a member of the team responsible for delivering the National Highways LED retrofit programme in the North West of England. They have consistently delivered on time and in full, have contributed to the delivery planning meetings and importantly have reduced their production lead times by almost a half, the result of which has been a reduced programme duration and reduced installation costs.

**Andrew Moore, Rubicon Zigwell**

### A5036 before



## M60 J12-24



For the past 18 months we have been working closely with Holophane and their commitment, communication, and every aspect of the service provided has been second to none. For the National Highways frameworks, we have been using Holophane's V-MAX lanterns. The product is well built with quality to match Holophane's exceptional service. As a Project Manager delivering several projects at once, being able to rely on Holophane to meet their milestones every time has allowed me to focus my efforts on other tasks and phases.

**Shahid Bangi, McCanns Ltd**

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