



Case Study: Using AI to Deliver Smarter Bus Priority at Abbey Bridge Junction, Worcester

Background

As part of its ongoing Bus Service Improvement Plan (BSIP), Worcestershire County Council is pursuing innovative, evidence-led ways to improve bus reliability, reduce congestion and support sustainable travel. Having already worked with Clearview Intelligence to validate the performance of vision-based transport sensors across several schemes, the Council identified an opportunity to move beyond data collection and into real-time, automated network optimisation.

Abbey Bridge Junction in Worcester was selected as the site for a Proof of Concept (PoC), a controlled low-risk environment in which the Council could test whether data-driven bus priority could measurably improve public transport performance without negatively affecting wider traffic conditions.

The Challenges

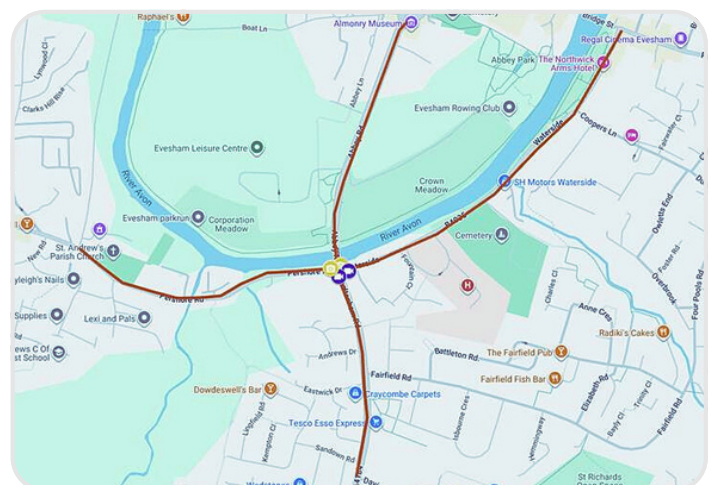
- Abbey Bridge Junction is a busy four-arm signalised junction located on a key bus corridor. Each approach serves journey-time spans of approximately 800m to 1.2km, carrying a complex mix of buses, private vehicles, pedestrians and cyclists.
- Historically, bus delays at the junction could be caused by a variety of factors, including signal delay, congestion, passenger boarding time, and general traffic pressure. Without high-quality, classified movement data, it was difficult to separate true congestion delay from normal operational dwell time, limiting the Council's ability to design targeted, effective interventions.
- The Council needed a solution capable of capturing highly accurate, multi-modal movement data, understanding network occupancy by classification and demand, and feeding this intelligence into a system that could dynamically influence signal timings based on real-world conditions.

The Solution

To meet this need, Worcestershire County Council deployed Clearview Intelligence's Insight Vision AI multi-modal sensors at Abbey Bridge Junction. These sensors use advanced machine-learning and computer vision to detect, classify and track different road users in real time, including buses, general traffic, cyclists and pedestrians.

The system was configured to establish journey-time spans on each junction approach, enabling the Council to measure how long vehicles, and particularly buses, took to traverse the corridor. Specialised bus detection and occupancy zones were created to identify when a bus was approaching the junction and to estimate passenger demand. This allowed the team to quantify how often priority "hurry calls" could be issued to the traffic controller and to test logic that would adjust signal behaviour dynamically in response to actual demand.

All captured data is securely hosted within the Insight platform, which integrates vision analytics, floating vehicle data, and signal performance metrics into a single, data-agnostic environment. This creates a consistent, auditable, and defensible evidence base, ensuring that investment decisions and policy development are grounded in robust, transparent data.



Insight Journey time spans

Implementation

A key strength of the project was its rapid, low-disruption deployment model. By using above-ground sensors and existing signal infrastructure, the scheme avoided intrusive civil works, reduced installation time, and minimised impact on road users.

Clearview Intelligence provided a dedicated project manager to oversee delivery, coordinating installation, commissioning, and integration with Worcestershire County Council's operational teams. The physical deployment was completed over two consecutive days, demonstrating how AI-driven transport technology can be layered onto existing assets quickly, cost-effectively, and with minimal disruption.

This approach not only reduced capital expenditure but also created a repeatable blueprint for future rollouts across the county.

What the Project Enables

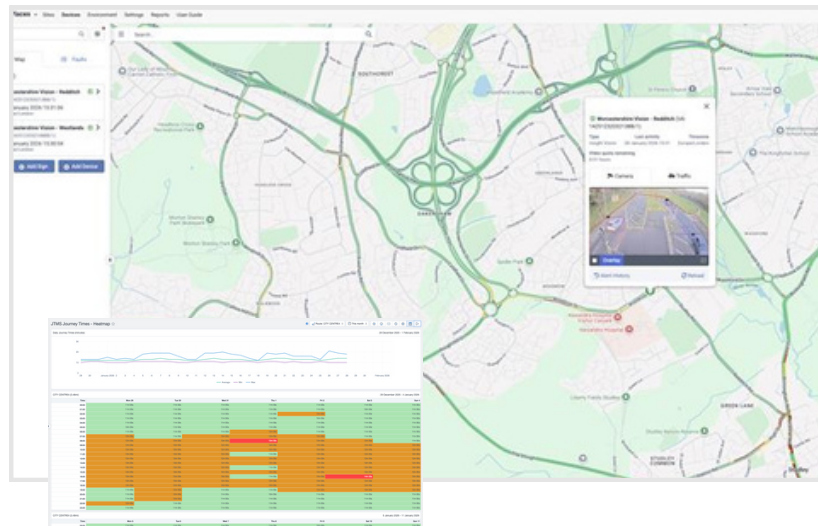
The Proof of Concept allows Worcestershire County Council to directly measure the real-world impact of automated bus priority on both public transport and the wider network.

For buses, the project provides new insight into journey times, reliability and timetable adherence, enabling the Council to understand whether dynamic signal optimisation can reduce delays, improve service consistency and enhance passenger experience. Crucially, the system also measures how bus priority affects general traffic flow, ensuring that improvements for public transport do not create unintended congestion elsewhere. By distinguishing bus dwell time from genuine congestion delay, the Council gains a more accurate picture of why buses run late and where targeted interventions will be most effective.

Beyond bus performance, the sensors capture detailed pedestrian and cyclist movements across all approaches. This supports a more holistic understanding of corridor usage, helping inform future decisions around active travel, safety, and sustainable transport planning.

Conclusion

The Abbey Bridge Junction PoC demonstrates a practical, low-risk pathway to delivering data-driven bus priority. By combining AI-powered vision sensing with dynamic signal optimisation, Worcestershire County Council is building a scalable, evidence-based approach to improving bus reliability while safeguarding overall network performance.



Insight Map Layer and Heatmap Report

Wider Impact and Strategic Value

The Abbey Bridge Junction PoC aligns closely with Worcestershire County Council's broader strategic priorities, including reducing congestion, improving air quality, and accelerating the shift toward sustainable transport.

By demonstrating how AI and machine-learning technologies can automate elements of network management, the project shows how local authorities can modernise transport operations without replacing existing infrastructure or increasing operational burden.

The Insight platform's secure, G-Cloud-compliant environment ensures that all datasets remain accessible, auditable, and future-proof, supporting long-term policy development and the scalable rollout of successful interventions across the county.

Impact & Value

- **Quicker, more reliable bus journeys** - through data-driven signal priority
- **Clear visibility of true delay causes** - separating congestion from dwell time
- **Protected wider network performance** - avoiding unintended traffic impacts
- **Robust, auditable evidence** - to support BSIP funding and investment decisions
- **Low-risk, scalable model** - for future BSIP and intelligent transport rollout