

Case study

A465 Heads of the Valleys Upgrade

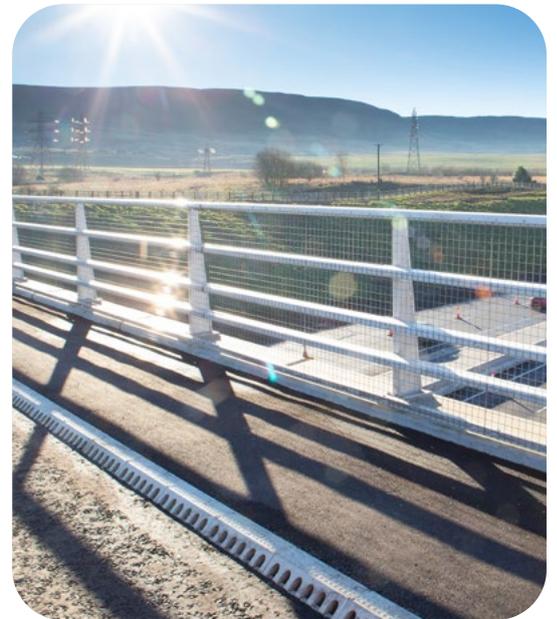
Tailored Systems for a Complex Project

The A465 Heads of the Valleys project is a major infrastructure upgrade in Wales, focused on enhancing approximately 10 miles of road to improve safety and efficiency.

Commissioned by the Welsh Government, and led by principal contractor FCC Construcción, as part of the Future Valleys Project Consortium, Hill & Smith VRS played a pivotal role in delivering fully tested, end-to-end barrier solutions. Over an 18-month programme, the company has ensured seamless delivery of vehicle restraint systems (VRS) – supplied to Core Highways for installation – and parapets, which are being installed by Hill & Smith's in-house team. The project required bespoke engineering solutions to address diverse safety requirements, spanning multiple structures and challenging environmental conditions, with completion targeted for mid-2025.

Products supplied:

- Parapet Systems (installed by H&SI): VGAN 1002, VGAN 1006, VGAN 1008, VGAN 1010, VGAPP-01, 03 and 04, VGSP-12 (2.4m anti-climb system), VGSH4003.
- Barrier Systems (supply only): N2W2 (cost-efficient, wider post spacing), N2W4, Tranzflex transition system.



Outcomes at a glance

Delivering complexity with precision

Overcoming technical and logistical challenges by using innovative solutions and careful coordination between all project stakeholders resulted in the successful delivery of this complex project:

- Diverse range of systems designed specifically to meet the unique needs of the A465 Heads of the Valleys project.
- Delivery of tailored safety solutions for approximately 38 structures along the route, to address different levels of risk.
- Staggered delivery, site-specific adaptability, phased implementation ensuring efficiency and precision.
- Fully tested, seamless integration of multiple parapet and barrier systems across different sections of the project.
- Installation of 2.4m-high curved-top parapets, implemented in high-risk areas to prevent climbing and enhance public safety.
- Additional, fully sheeted parapet systems designed to mitigate light pollution.
- Reduction of material and installation costs without compromising performance through the implementation of barrier systems that offer wider post spacings.
- Successful delivery overcoming challenging deadlines and technical difficulties encountered during the project.



The challenge

The Head of the Valleys infrastructure upgrade presented numerous technical and logistical challenges that required innovative solutions and careful coordination.

Diverse Safety Requirements

Ensuring the safety of all road users, including motorists and pedestrians, was the prime focus on this large-scale project. With approximately 38 structures along the route, each required tailored safety solutions to address different levels of risk. Vehicular impact protection was crucial, necessitating high-performance parapets engineered to withstand collisions. Additionally, pedestrian parapets had to be designed to provide secure walking areas without compromising aesthetics or obstructing visibility. One of the most complex challenges involved the implementation of anti-climb measures, requiring the installation of 2.4m-high curved-top parapets. These varied safety needs had to be met while ensuring compliance with stringent regulatory standards.

Complex Installation Coordination

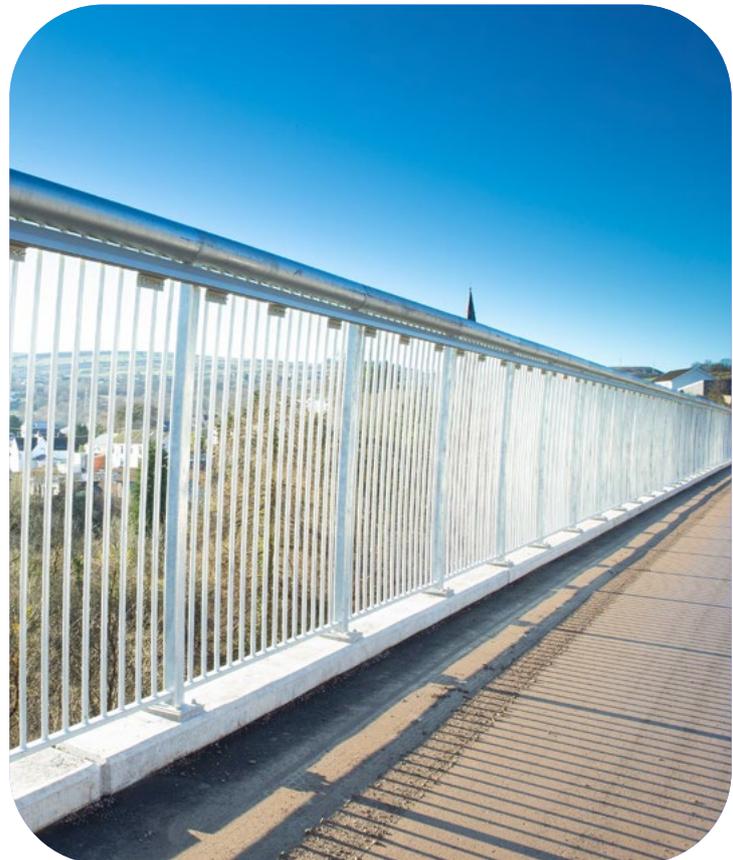
The integration of multiple parapet and barrier systems across different sections of the project added to the overall complexity of the works. The transition points between VRS and parapets required precise alignment to ensure seamless functionality and aesthetic consistency. Each phase of installation had to be meticulously planned to match the evolving project timeline, preventing delays and ensuring that safety systems were implemented in the correct order. Additionally, effective communication among multiple stakeholders, including FCC, Core Highways, and various subcontractors, was essential to maintaining workflow efficiency and avoiding installation conflicts.

Manufacturing Precision

Given the bespoke nature of the parapet and barrier systems required, precision manufacturing was critical. Each structure along the 10-mile stretch had unique specifications, requiring custom-designed parapets to fit varying heights, load-bearing requirements, and environmental considerations. Anti-climb systems, in particular, required exact manufacturing tolerances to ensure effectiveness and compliance. Furthermore, environmental factors, such as light pollution concerns for nearby residential areas, required additional design modifications to mitigate glare.

Adaptability to On-Site Changes

Unexpected site conditions presented ongoing challenges throughout the project. Variations in structural measurements, unforeseen expansion joints, and other adjustments needed during the project required rapid adaptations. Certain areas needed last-minute redesigns of components to accommodate real-world





site conditions, adding pressure on both manufacturing and installation teams. The ability to quickly respond to these changes while maintaining safety and quality standards was essential to keeping the project on track.

Phased Delivery & Installation

Given the project's extended timeline, efficient material supply and logistics were necessary to ensure smooth execution. With a total of 30 km of barrier systems and multiple parapet types required, careful planning was essential to avoid overloading on-site storage or creating supply chain bottlenecks. Deliveries had to be staggered in alignment with construction milestones, ensuring that materials were available exactly when needed while also preventing excess inventory from accumulating at the Core Highway's compound in Caldicott.

The solution

To overcome these challenges, Hill & Smith VRS developed and implemented a series of tailored solutions, ensuring the project's success while maintaining safety, efficiency, and adaptability.

Early Engagement

Hill & Smith VRS's proactive approach to early-stage collaboration played a crucial role in ensuring the project's success. By engaging with FCC from the outset, the company was able to support design decisions, ensuring that the safety systems selected were both effective and cost-efficient. This early involvement allowed the team to anticipate potential issues and develop solutions before they became critical, minimising delays and additional costs. Ongoing training and support were provided to installation teams, reinforcing best practices and maintaining high safety standards throughout the project.

Strategic Planning and Collaboration

Successful execution of this complex project was made possible through strategic collaboration with FCC and Core Highways. Hill & Smith VRS maintained continuous engagement with key stakeholders, fostering open, transparent communication from the outset. Informal, day-to-day dialogue helped build trust, enabling the team to address issues quickly, adapt to changing requirements, and ultimately form a strong, long-term partnership. Regular project meetings supported this collaborative culture, allowing the team to refine installation sequences as needed. In addition, detailed technical guidance was provided to installation teams, ensuring that all safety systems were correctly implemented and met required performance standards.



Tailored Product Usage

Hill & Smith VRS supplied a diverse range of systems designed specifically to meet the unique needs of the A465 Heads of the Valleys project. A variety of parapet systems, including vehicular impact-resistant parapets (VG1, VG2, VG6, VG8, VG10) and pedestrian parapets (VGI PPO 3 and 4), were used across different structures to provide appropriate levels of protection. The VGS PPO anti-climb parapet, featuring a 2.4m-high curved-top design, was implemented in high-risk areas to prevent climbing and enhance public safety. Additionally, the fully sheeted parapet systems were designed to mitigate light pollution.

The vehicle restraint solutions included two key barrier systems: the N2W2 barrier system that offers wider post spacings, and the N2W4 system. These barrier systems are not only cost-effective, but also seamlessly connect together with a limited number of components. The use of Hill & Smith VRS's proprietary Tranzflex transition system ensured a seamless connection between VRS and bridge parapets, maintaining structural integrity and compliance with safety regulations.

Tested End-to-End Safety Integration

One of the key advantages Hill & Smith VRS brought to the project was its ability to provide a fully tested, end-to-end safety solution. The seamless connection between the vehicle restraint systems and parapets was achieved through the use of the Tranzflex transition unit – a proprietary solution that has been rigorously

tested to ensure compatibility and performance. By supplying both components and ensuring they function together as an integrated system, potential interface issues were eliminated whilst delivering a consistent standard of safety across all structures. This tested approach not only streamlined installation but also gave all stakeholders added confidence in the reliability and performance of the complete system.

Efficient Installation Process

A structured and efficient installation approach was essential to maintaining progress while accommodating site-specific challenges. To prevent logistical bottlenecks, deliveries were carefully phased to match the evolving project timeline. This ensured that materials arrived precisely when needed, avoiding excessive storage on-site while preventing delays due to material shortages.

Hill & Smith VRS took a dual approach to delivery: while VRS products were supplied directly to Core Highways for installation, the in-house Hill & Smith VRS team managed the installation of parapet systems across multiple structures. Close coordination with site managers helped ensure the correct sequencing of both barrier and parapet installations, reducing the risk of interface issues between phases.

The project team also worked closely with site managers to ensure the correct sequencing of VRS and parapet installations, preventing conflicts between different phases of construction. "Hill & Smith VRS's



reliable supply and technical expertise played a key role in the smooth installation of vehicle restraint systems on this project. Their collaborative approach and flexibility in responding to site challenges ensured that we could maintain efficiency and high safety standards throughout the installation process,” said Dan Raffles, Director at Core Highways. This ability to adapt in real-time was key, with the team redesigning components where necessary to fit site conditions.

The outcome

Hill & Smith VRS’s involvement in the Head of the Valleys project delivered significant benefits across multiple aspects of infrastructure safety and efficiency.

Enhanced Safety Performance

The complex safety requirements on this project were successfully addressed with a comprehensive range of tailored parapet and barrier systems, ensuring that each structure along the route met stringent safety standards. By providing solutions for vehicular impact protection, pedestrian safety, and anti-climb measures, Hill & Smith VRS played a critical role in enhancing overall road security.

Efficient Project Execution

The phased supply strategy and strong collaboration with project stakeholders enabled efficient execution, minimising delays and ensuring that installation processes remained on schedule. By closely coordinating with the principal contractor and installation teams, Hill & Smith VRS streamlined the integration of multiple safety systems, optimising both time and resources. “The support provided by Hill & Smith VRS’s team throughout the project played a crucial role in the successful delivery and installation of both vehicular and pedestrian parapet systems of varying specifications on the A465 Heads of the Valley project. From initial design through to planning, production and on-site installation, their technical expertise, responsiveness and commitment to collaborative working were exemplary. This project showcased the strength of integrated networking between Hill & Smith VRS Ltd and FCC Construction. Overcoming challenging deadlines and technical difficulties encountered during the project, it was delivered successfully and on programme.” said Philip Thomas, Senior Planner at FCC.

Cost-Effective Solutions

Cost savings were also a key outcome of the project. The development of the N2W2 barrier system, helped reduce material and installation costs without compromising performance. This strategic innovation allowed for a more economical yet highly effective safety solution.



Proactive Problem-Solving and Adaptability

Additionally, the project demonstrated Hill & Smith VRS's ability to adapt to evolving challenges. Unexpected site conditions and last-minute modifications required a high degree of flexibility and problem-solving expertise. The team's proactive approach in redesigning and adjusting components as needed reinforced Hill & Smith VRS's reputation for reliability, technical competence, and commitment to delivering high-quality infrastructure solutions.

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Dan Raffles, Director, Core Highways

"Hill & Smith VRS's team provided exceptional technical support throughout the project, offering innovative solutions that met the evolving demands of the site. Their ability to adapt and collaborate made a significant impact on the project's success."

Philip Thomas, Senior Planner, FCC

Find out more

For more information on Vehicle Restraint Systems (VRS) and Parapet Solutions, contact info@hill-smith.co.uk

