



Taffs Well Depot

The **£100m Taffs Well Depot project** is a key component of the Transport for Wales (TfW) Core Valley Lines (CVL) transformation programme. The project, jointly funded by Welsh Government and ERDF, will maintain and stable 36 of the new Metro vehicles (MV) while being the base for 400 members of staff.

Opened in November 2025 by HM King Charles, the project stands as a flagship development for the CVL transformation and TfW. The construction of the Taffs Well depot presented one of the first opportunities for Welsh suppliers to directly benefit from the £738m investment in the South Wales Metro, which will see the creation of a sustainable and connected transport infrastructure.

The site, formerly the Garth Works Industrial Estate, is strategically located approximately 5.8 miles northwest of Cardiff Central Station. It will serve as the location for all new CVL Metro Vehicle (MV) deliveries, maintenance, and operations. The Maintenance Shed building is critical for achieving this requirement and initially, it will be used for the commissioning and local testing of the first MVs. Once passenger service commences, the depot will then support all aspects of maintenance from consumable replenishment to overhaul and wheel reprofiling.

The MVs are designed to operate as both conventional trains on existing railway lines and as trams on future Metro extensions, transforming travel across the CVL region. Each of the 36 units are three carriages long, seating 126 passengers with a total capacity of 252 people. There are also four bicycle spaces per MV and level boarding ramps to significantly improve accessibility for all passengers.

PROJECT DETAILS

Client: Transport for Wales

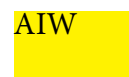
Agent: Amey Infrastructure Wales

Contractor: Amey Rail Limited

Designer: Amey Consulting

Project Cost: c£100m

These results were achieved through close collaborative working between TfW, its managing agent Amey Infrastructure Wales (AIW), and the numerous contractors who undertook the large volume and variety of work. Recently dubbed the 'Welsh Tube', the CVL project connects some of Europe's most deprived communities with Cardiff and beyond, aiming to improve access to employment, leisure, and health centres.



CONSTRUCTING EXCELLENCE IN WALES

Suite 210, Creative Quarter, Morgan Arcade, Cardiff CF10 1AF
T: 02920 493322 E: info@cewales.org.uk

What is an Exemplar project?

An 'Exemplar' is defined as 'something worthy of being imitated or copied' and this is exactly what we continue to seek to achieve with this programme.

Exemplars are intended to offer good practical examples of how to achieve Best Value Sustainable Construction solutions. An Exemplar considers all aspects of sustainability, including economic, social and environmental, demonstrating that the scheme is well rounded and has incorporated best practice and collaboration.

Our approach to Exemplar has been updated to reflect the Wellbeing of Future Generations Act

and to provide greater value as well as inviting a programme approach to the process. It is anticipated that embarking on the Exemplar process will, in itself, lead to higher value being obtained from a project.

Case studies are normally prepared at 3 Key Stages; Design stage, Construction phase and Post-occupation, but we have recently added a Pre-design phase to our programme.

Addressing these phases ensures that lessons learnt can be demonstrated throughout the development of a project.

What was delivered

As part of the CVL programme, Amey Infrastructure Wales (AIW) were responsible for the design and construction of the new Taffs Well depot. The depot consists of 14 lines to manage 36 Metro Vehicles (MVs) and provides an operational base for TfW, as well as a Signalling Control Centre for the CVL area, featuring a Siemens control system for the upgraded main line signalling system.

Due to the intensive service requirements, TfW specified that the new depot be fully signalled with remote control of all depot operations. The depot was designed for the new MVs and includes a circular arrangement with a main line connection.

The maintenance shed was designed to accommodate three maintenance roads, each capable of taking two 3-carriage Metro Vehicles, complete with inspection pits, high-level gantries, overhead crane, warehousing, electrical and mechanical workshops, a wheel lathe, a bogie wash facility, battery storage, an external mechanical train wash, and an underframe cleaning zone.

This allows for six MVs to be worked on simultaneously, supporting everything from general maintenance to almost any repair imaginable (except crash damage) to meet the high demand of the CVL timetable.

Road 10 is the heavy maintenance road with a wheel lathe and lifting capabilities for wheel and bogie

replacement. It includes a heavy-duty gantry crane for moving heavy materials like bogies. Road 11 is equipped with maintenance pits and overhead gantries for full MV access, plus a gantry winch for lifting. Road 12 is similar to Road 11 but without a winch. Instead, it has retractable overhead charging capabilities for maintenance and testing of MV charging systems on Overhead Line Equipment (OLE), simulating network conditions.

The office building accommodates both maintenance and operations staff and includes office accommodation, welfare facilities, meeting rooms, training facilities, plant rooms, and server rooms. A key feature is the driver training simulator, supporting the development of future MV drivers.

The depot is home to the Stadler Class 398 Metro Vehicles, manufactured in Valencia, Spain. These units began arriving while the site was still under construction, as it was deemed more practical to deliver them directly to the depot rather than a temporary storage site (which would have required uncoupling, bogie removal, and multiple road haulage operations). This created a significant challenge for the project team, requiring the design of a new access route from the adjacent A470 dual carriageway. Working closely with Stadler and the haulier Allelys, the first units were successfully delivered by road to the Taffs Well depot.



Collaborative Working

The depot project was originally split into two parts, with the ground preparation work being undertaken by TfW and the depot design and build being undertaken by TfW rail operator TfW Rail Limited. However, due to the pressures of the COVID-19 pandemic, TfW acquired TfW Rail Limited, bringing the project into the CVL program. This meant that the joint TfW and AIW team now had to take on a contract already in progress with contractors already in place, putting an increased need on collaborative working from the start.

Amey Rail Limited, the principal contractor responsible for construction, appointed Amey Consulting (AC) to produce detailed designs for key elements of the depot. These included track, signalling, telecoms and electrical power (E&P), plus overhead line equipment (OLE) for the stabling area. The depot would also host a dedicated control centre for all signalling on the Core Valley Lines (CVL).

Other packages of work were awarded to : Arcadis (the maintenance shed, office building and civil engineering works), NG Bailey (mechanical and electrical design), and Alun Griffiths (depot building construction and other elements), who delivered the works alongside a host of subcontractors.

To facilitate design integration and collaboration, AC introduced a structured design management process. This was based around the development of a federated model known as the PIM (project integrated model), providing a clear view of everyone's designs. Two-weekly interdisciplinary design checks, along with a clash detection system, ensured the various discipline designs interfaced properly.

Regular design review meetings and workshops were held with Amey Rail and other stakeholders to monitor progress and ensure the client's requirements were being met. The creation of a 3D video 'fly-through', based on the PIM, helped stakeholders to visualise the operation of the finished depot.

Assurance was also managed by AIW through an independent approvals body following Construction Safety Management principles, ensuring safe commissioning and entry in service. This involved working as a supplier-neutral integrator, delivering lifecycle solutions using client-preferred or legacy systems, and managing external suppliers where required.

Innovation

A Commercial Off-the-Shelf (COTS) PLC-based signalling system had been developed and successfully deployed on Network Rail (NR) and London Underground projects. The system, based on the Hima range, was product-accepted through NR's safety approvals process and complies with European protocols.

The solution was selected by TfW for the Taffs Well depot due to its cost efficiency, flexibility, and open architecture, which allows future upgrades by alternative suppliers—an advantage of the COTS approach.

The depot includes 30 points machines (Hanning & Khal tram type), 30 signals, 37 axle counter sections, three protected staff crossings, one level crossing, and a shed protection system. The trackside solution uses four equipment housings and a central PLC cubicle managing interlocking logic and the Traffic Management System (TMS) interface, supported by a dedicated fibre ring and a 440V AC power ring.

PLC (Programmable Logic Controller) systems are designed using modular hardware and software to enable standardisation and integration. Design and testing were carried out following the V lifecycle process aligned to European industry protocols, and NR standards where required.

The full system, including TMS and reference trackside equipment, was constructed and tested off-site using Amey's simulation tools, enabling low-risk commissioning. All test and maintenance documentation was produced, and maintainer training was delivered to ensure seamless handover of the system.

A dedicated TMS was provided for the Depot Operations Controller. The TMS was supplied by Sella Controls (a Hima company) based on a design and concept developed by Amey. As with the COTS PLC solution, the TMS was developed using Codra's Panorama software, proven in safety-critical environments such as the Docklands Light Railway and London Underground. Its modular, flexible design enables future upgrades by client engineers or alternative suppliers.

The interface mirrors a typical NR screen layout, enhanced with simplified window-style menus and mouse navigation. Additional depot-specific functionality requested by TfW included train management features and SPAD (Signals Passed at Danger) detection and protection.

Panorama was also used to design the off-site testing and simulation workstation screens, supporting robust validation ahead of commissioning. Integrated condition monitoring facilities were designed in collaboration with maintenance and analytics teams, including dedicated maintenance flight engineer terminals at the control centre.

Community Engagement

Being based in the heart of Taffs Well, the project team has made community support a central priority. The team have worked closely with local organisations and residents to deliver practical help and meaningful contributions.

At Taffs Well Football Club (TWFC), the team provided materials and resources, installed a new car park, and supported charity football matches for various causes. They also rented the club's car park for two years, ensuring ongoing financial support. Beyond the club, the team installed a Christmas tree and decorations at the Taffs Well Hub, assisted with moving garden equipment, and carried out emergency fence repairs at the community centre.

The team also helped residents with essential tasks such as drain rodding, further demonstrating their commitment to the community.

The team also invested in improving local spaces and facilities. This included donating materials and installing a shed at the Taffs Well Community Centre, as well as hosting six local Q&A sessions and tours at TWFC and the CVL visitor centre, giving residents a chance to see mock-up MVs and learn more about the project. These initiatives strengthened the team's relationship with the village and ensured transparency and engagement throughout the project.

Alongside local efforts, wider charitable causes have been supported. The team partnered with Action for Children, donating toys and gifts at Christmas (2022-2024) and raising funds for Easter eggs (2023-2025). They contributed £10,000 to Ramblers Cymru, volunteered for path-clearing sessions at Mynydd Tynewydd, and supported Eden's Quest to Walk and Guardians for Heroes through donations. For Cancer Research UK (CRUK), they donated 475 bags of clothing worth £11,000 and volunteered in local shops. Annual Christmas Charity Auctions raised over £3,000 in 2021 and £9,000 in both 2022 and 2023 for CRUK and other charities, while a Project RECCE auction generated over £9,000.

Finally, the team has engaged with education and creativity by hosting multiple visits for cohorts of engineering and commercial students from the University of South Wales, Pontypridd Campus, providing valuable insight into the project and its delivery. In addition, they supported local creative initiatives by accompanying amateur photographer Ian Woodbridge on several site visits, enabling him to capture the progress of the depot and share the story of its development. These activities reflect the team's deep commitment to Taffs Well and the surrounding community, ensuring that the benefits of the project extend far beyond the infrastructure constructed.



Environmental Issues

Environmental protections were a key focus during the construction of the depot. From the start, the team carried out thorough noise and vibration assessments to make sure the construction maintained safe environmental limits during construction and operation. Using detailed models, they designed specific solutions like isolation systems and resilient mounts to reduce ground-borne noise and vibration for nearby homes and important infrastructure.

While building the depot, the team used real-time monitoring to guide their work. Live feedback helped them stay within environmental limits and reduce disruption for residents. They also followed national standards for how vibration affects buildings and people.

A fully digital reporting process reduced resource use and enabled rapid decision-making, helping embed sustainability into day-to-day delivery. Together, these actions ensured that the depot was developed responsibly, safeguarding local amenity while supporting long-term sustainable transport objectives.

TfW Exemplar Programme

CEWales has set up an Exemplar programme with TfW. A number of projects, at varying stages of development, are identified for inclusion in the annual programme. In this fifth year (2024/25) there are five projects, with three being delivered by AIW. The Taffs Well Depot is the third case study completed for the year.



CONSTRUCTING EXCELLENCE IN WALES

Suite 210, Creative Quarter, Morgan Arcade, Cardiff CF10 1AF
T: 02920 493322 E: info@cewales.org.uk