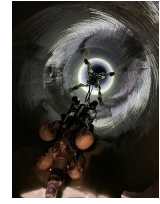


Example 2 Network Rail Trehafod



Scope, Challenge and Solution

Drainforce was appointed to undertake culvert inspections, enabling works, surveys, cleaning, design support and structural rehabilitation across multiple Network Rail assets in South Wales. The programme presented significant engineering and logistical challenges including operational railway interfaces, remote/restricted access, residential and commercial stakeholders, environmental constraints, high water flows and heavily silted or deteriorated culverts.

At Trehafod Culvert, the existing 1,000 mm corrugated pipe had suffered significant invert corrosion between approximately the 4 and 8 o'clock positions. The culvert also conveyed a high-flowing watercourse, requiring substantial enabling works before personnel could safely enter and rehabilitation could commence. Drainforce implemented a designed temporary dam and over-pumping system to manage flows, before high-risk confined-space teams, supported by dedicated rescue arrangements, repaired the deteriorated invert using specialist MC resins. A protective glide foil was then installed ahead of the lining.

The culvert was structurally rehabilitated by installing a 900 mm liner within the existing 1,000 mm culvert, incorporating a full outer bag, followed by controlled annular grouting. Due to restricted access, the liner required specialist lifting using a 40-tonne crane positioned within the upstream residential area, requiring detailed lifting planning and stakeholder coordination.

Drainforce maximised self-delivery, undertaking topographical surveying, CAD/GIS, CCTV, cleaning, confined-space works and rehabilitation using our own specialist personnel and equipment, including IPEK CCTV systems, off-road jetting reels and high-specification Müller recycling units. Specialist design support was provided by Robert Walpole, including design development, IDC coordination and Form G assurance.

Planning and Delivery – Rehabilitation, CCTV and Cleaning

A phased delivery strategy progressed the project from site investigation and pre-start meetings through topographical/CCTV surveys, temporary works and environmental planning, flow management, cleaning, structural assessment, rehabilitation and final verification. Early enabling works included Form G design and IDC approval, temporary dam and over-pumping design, access arrangements and rehabilitation methodology.

Access presented a significant challenge. The outlet was approximately 7 m deep, requiring designed scaffold access with controlled ladder access, guardrails and working platforms. Cleaning and CCTV were self-delivered using IPEK cameras, off-road jetting equipment and dirty-water recycling units, enabling accumulated material to be removed and the asset condition accurately assessed. Delivery was controlled through the Work Package Plan (WPP), Construction Phase Plan, RAMS and Task Briefings, supported by programme/countdown meetings with the client and Network Rail. Environmental surveys/licences, local authority requirements, parking suspensions and street works were incorporated into the programme. Drainforce also held a community liaison event at the local village hall, displaying liner and grout samples and allowing residents to understand and discuss the proposed works before delivery. UV lining and Grouting was also completed in house with directly employed staff.

Quality Assurance and Technical Compliance

The works were delivered through a fully traceable QA process in accordance with ASTM F1216-16, WRC requirements, Network Rail requirements and the approved design. Drainforce utilised WRC-trained jetting personnel and competent designers subject to IDC and competency/CV checks. ITPs and quality hold points controlled each critical stage, while the UV

installation protocol recorded curing temperatures, pull-back speeds and pressures. Liner and grout samples were independently tested following installation, supported by post-installation CCTV to verify structural performance, workmanship and compliance with client requirements.

Risk Management and Issue Resolution

Drainforce maintained a live project-specific risk register, with the principal risks including high-pressure water jetting, confined-space entry, drowning/flooding from dam and over-pumping operations, slips/trips/falls, working from height and manual handling. Controls included trained personnel, dedicated confined-space rescue arrangements, gas monitoring, duty/standby pumping with backup power, controlled access/housekeeping and mechanical lifting.

A dynamic risk assessment was completed at the start of every shift, supported by activity-specific Task Briefings. Changes to flows, access, equipment or site conditions were reassessed before work continued. Where unforeseen conditions arose, works were stopped and escalated to the appropriate project, design or client representative, providing a clear and auditable identify–assess–resolve–verify process.

Performance, Outcomes and Benefits

The project successfully delivered a trenchless structural rehabilitation solution, retaining the existing culvert and avoiding conventional excavation and replacement. This reduced intrusive construction, waste disposal, environmental impact and disruption within a constrained railway and residential environment while improving the culvert's structural integrity, resilience and serviceable life. Environmental controls also prevented silt, oils and chemicals entering the watercourse during delivery. The combination of early survey and design, self-delivery, specialist rehabilitation, controlled temporary works and proactive stakeholder management reduced delivery interfaces and provided greater control over programme, quality and safety.

Railway Capability

Drainforce delivered the works in accordance with Sentinel and Network Rail requirements, with personnel appropriately sponsored and holding the required PTS competencies. All activities were planned and briefed through the appropriate WPPs and Task Briefing Sheets, with works managed in accordance with CDM requirements and the NR/L2/OHS/019 Safe Work Pack process, demonstrating Drainforce's capability to safely manage specialist drainage rehabilitation within the operational railway