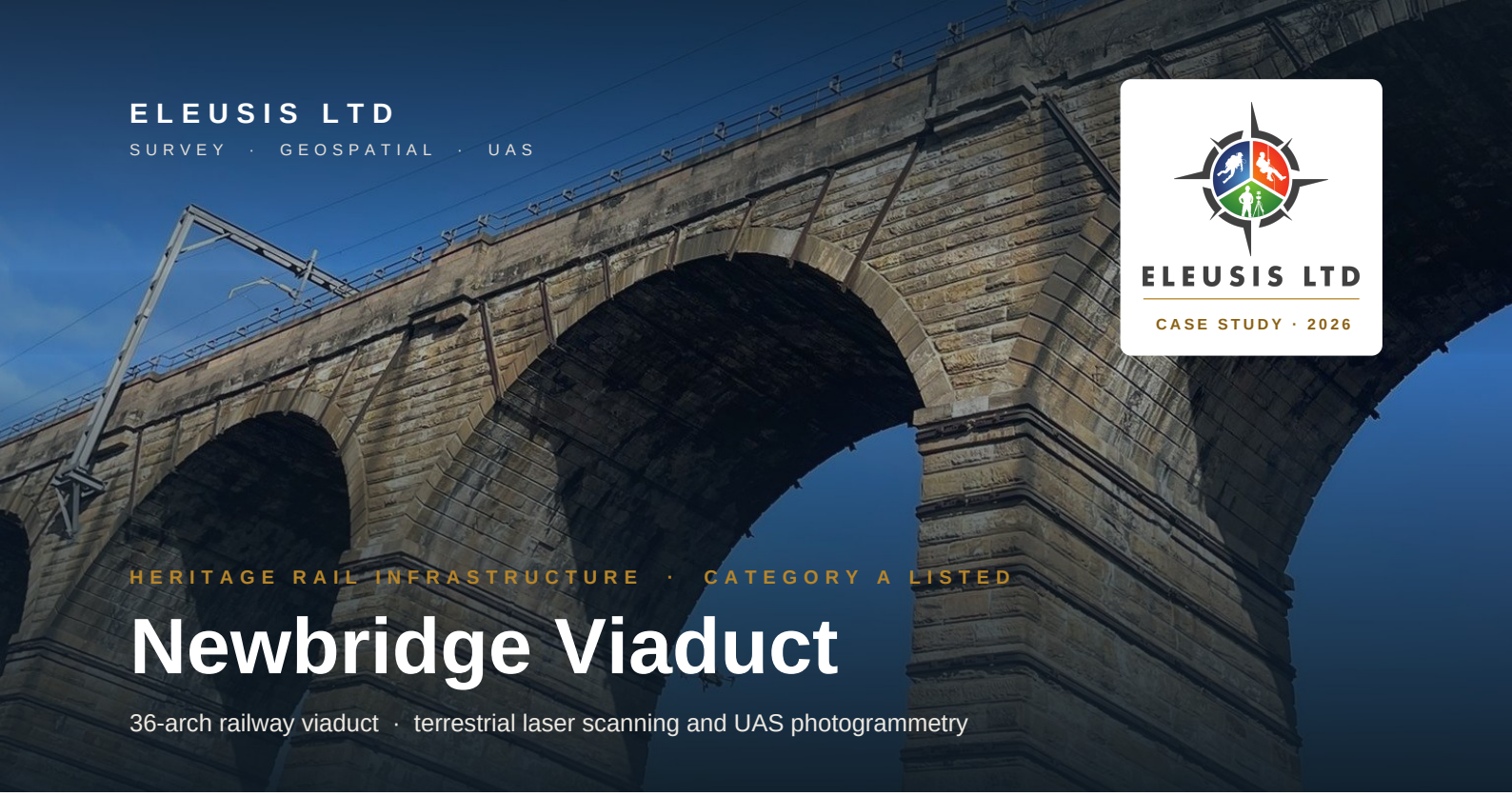


ELEUSIS LTD
CASE STUDY · 2026

HERITAGE RAIL INFRASTRUCTURE · CATEGORY A LISTED

Newbridge Viaduct

36-arch railway viaduct · terrestrial laser scanning and UAS photogrammetry

A Category A listed, 36-arch masonry viaduct in Newbridge, Edinburgh, carrying a fully electrified main line directly beneath the Edinburgh Airport approach path. Eleusis Ltd was engaged to deliver a georeferenced, engineering-grade 3D record of the structure to support condition assessment and long-term asset management.

THE BRIEF

The asset owner required a complete, georeferenced 3D record of the viaduct, covering every arch, spandrel, pier and parapet at survey-grade tolerance. The dataset had to support defect mapping, structural review and integration with existing asset management and BIM systems.

The site carried the constraints typical of live rail infrastructure: continuous overhead line equipment along the deck, restricted possession windows and lineside access across arable land and embankments. The viaduct also sits beneath an active aircraft approach, so all flying was coordinated with air traffic control in agreed windows, and flight height was capped by the airspace restrictions.

OUR APPROACH

We combined terrestrial laser scanning with high-resolution UAS photogrammetry, tied to a common ground control network. The aim was full structural coverage with survey-grade positional accuracy (validated through control network and registration reporting) across both accessible and elevated elements of the viaduct.

Ground-based scanning captured arch geometry and pier faces in detail, while aerial imagery covered the deck, parapets and upper spandrel zones beyond the reach of ground instruments, with all aerial capture planned to stay within the airspace height limit.

The combined dataset was prepared for downstream measurement, including locating drainage features such as weep holes, and for reliable dimensional interrogation of the structure.

PROJECT AT A GLANCE

ASSET
Newbridge Viaduct, 36-arch masonry railway viaduct (Category A listed)

YEAR
2026

SERVICES
Terrestrial laser scanning · UAS photogrammetry · Point cloud registration

DELIVERABLES
Registered point cloud · Photogrammetric mesh · Survey report

SURVEY LEAD
Led by specialist UAS and geospatial engineering team



ELEUSIS LTD

REGISTERED POINT CLOUD · FULL-LENGTH ELEVATION

DELIVERY

Ground-based capture ran the full length of the structure and was combined into a single, unified dataset, giving continuous coverage of both elevations, the arch intrados and visible deck interfaces.

This was merged with the aerial photogrammetry to extend coverage to the deck, parapets and upper structural elements, producing an engineering-grade 3D dataset suitable for measurement, inspection and design interrogation.

OUTCOME

The client received a fully registered, colourised point cloud in their preferred exchange format, with a UAS-derived photogrammetric mesh and a survey report documenting the control network and registration.

The dataset now underpins condition monitoring, defect mapping and the design of any future intervention, without the need to return to site for routine dimensional checks.

EFFICIENCY

This approach removed the need for full scaffold or rope-access coverage across all 36 arches.

36
MASONRY ARCHES

640 m
STRUCTURE LENGTH

22 m
HEIGHT



LINESIDE, BENEATH THE AIRPORT APPROACH



LIVE CAPTURE ON THE UAS CONTROLLER



FLIGHT IMAGERY DETAIL · DRAINAGE STAINING