



## River Lea Crossing Refurbishment & Strengthening: A case study for refurbishment of an historic bridge

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### Abstract

The River Lea Crossing was completed in 1934 and remains in service today, carrying the A13 in East London over a tributary to the River Thames. The crossing comprises a single two-pinned arch span of approximately 61m. The bridge is constructed of steel and is supported on huge mass concrete abutments. Due to the expectations that it was nearing the end of its service life it was planned to be replaced by 2030. An extensive programme of surveys, inspection, monitoring and assessment of the superstructure and substructure, going beyond the normal requirements of current inspection and assessment standards, demonstrated that the bridge could be retained and refurbished to considerably extend its serviceable life.

This paper presents a case study of the project providing an example for future bridge rehabilitation schemes, which will inevitably become more prevalent as the industry learns to make better use of existing assets and build less in response to the Climate Emergency.

**Keywords:** bridges; inspection; assessment; refurbishment; rehabilitation; steel; arch; historic bridges

### 1 Project Introduction

The River Lea Crossing, Figure 1, was constructed as part of the Royal Docks Approaches Improvement in East London. Completed and opened to traffic in 1934 [1], the bridge is still in use today as part of the strategic road network carrying the A13. The bridge is currently operated and maintained by Road Management Services (A13) plc. (RMS) through the 30-year A13 Thames Gateway Design, Build, Finance and Operate (DBFO) contract with Transport for London (TfL). At the end of the contract in 2030 the bridge will be handed back to TfL.

The DBFO contract required replacement of the bridge superstructure prior to hand back on the basis that it would have been in service for almost 100 years and was therefore expected to be near

the end of its serviceable life. However, regular inspections of the bridge during the DBFO contract indicated that while in need of a major maintenance intervention, the bridge was in good condition for its age. A load assessment undertaken in 2011 found the live load capacity to be HA + 30 units of HB loading in accordance with the Design Manual for Roads and Bridges (DMRB) [2], which was surprising given the significant increase in vehicle loads since it was originally designed.

In 2019 RMS commissioned a feasibility study to develop both a replacement and a refurbishment scheme and evaluate the options. The refurbishment scheme needed to be equivalent to a replacement scheme and provide a design life of 120 years from 2030. The schemes were evaluated in terms of technical feasibility, traffic impact,