

## A689 RIVER EDEN BRIDGE, CARLISLE - CNDR BEARING REPLACEMENT & BRIDGE JACKING



### Project Brief

Design, manufacture, installation of 3 no. free and 1 no. fixed pot bearings. Design and installation of temporary works and bridge jacking.

### Project Team

**Client:** Connect Roads Ltd  
**Main Contractor:** Balfour Beatty Civil Engineering  
**Principle Designer:** AECOM  
**Sub Contractor:** USL Ekspan

### Background Information

The A689 River Eden Bridge formed part of the Carlisle Northern Development Route (CNDR) a constructed 8.25 kilometre, 2-way single carriageway bypass road located west of Carlisle - built to provide a better transport link from West Cumbria to Scotland and the North East and relieve traffic congestion through Carlisle's city centre.

The bridge crosses over River Eden as it carries the A689 road, adjoining the CNDR's new road. The structure, approximately 158 metres long, is a 4-girder composite steel bridge deck supported on a central concrete pier and abutments. The central pier bearings, 4no BS5400 pot bearings of which 3 are free and 1 is fixed, showed signs of wear and tear in varying degrees and locations. Further investigation was therefore required to assess the condition of each bearing and the remedial works required to ensure correct bearing functionality.

### USL Ekspan's Workscope

USL Ekspan were contracted by Balfour Beatty Civil Engineering to replace the central pier bearings. Prior to bearing removal an initial bearing inspection was undertaken for analysis of bearing defects, dimensions and approvals for bearing and temporary works design and to identify jacking locations for bearing replacement.

USL Ekspan's inspection identified defects on each bearing such as vertical and diagonal cracking on the bearing plinth beams; vertical distortion to lower adaptor plates; over rotation and misalignment of plates and exceeded bearing transverse translation capacities. The conclusive decision to replace like for like all 4 BS5400 pot bearings was deemed best for the structure's whole life longevity, rather than a part replacement where over time component parts functioning at different wear rates could potentially affect the bearing performance.

Prior to commencement, access to site via a dedicated track through boggy farmland had to be prepared. A 40-ton stone bund ramp was built and interlocking road mats installed, allowing clear plant and vehicle access.

Works on this project included: bearing inspection; bearing design and manufacture; design and installation of temporary works; design and manufacture of jacking stools; bridge jacking; removal of existing bearings and plinths; sequential installation of new bearings; reinstatement of bearing concrete plinths; de-jacking of bridge and removal of temporary works.

USL Ekspan successfully completed installation phases safely and to programme.



Hydraulic jacking assembly digitally monitors and controls the bridge's movement during bearing removal and replacement.



Installation of steel rebar and shuttering in place to accept pouring of concrete for the new bearing plinth.



New installed pot bearings on pier top with added concrete protection.

#### Head Office

Kingston House, 3 Walton Road, Pattinson North, Washington, Tyne & Wear, NE38 8QA, UK  
t: +44 (0) 191 416 1530 e: info@uslekspan.com www.uslekspan.com