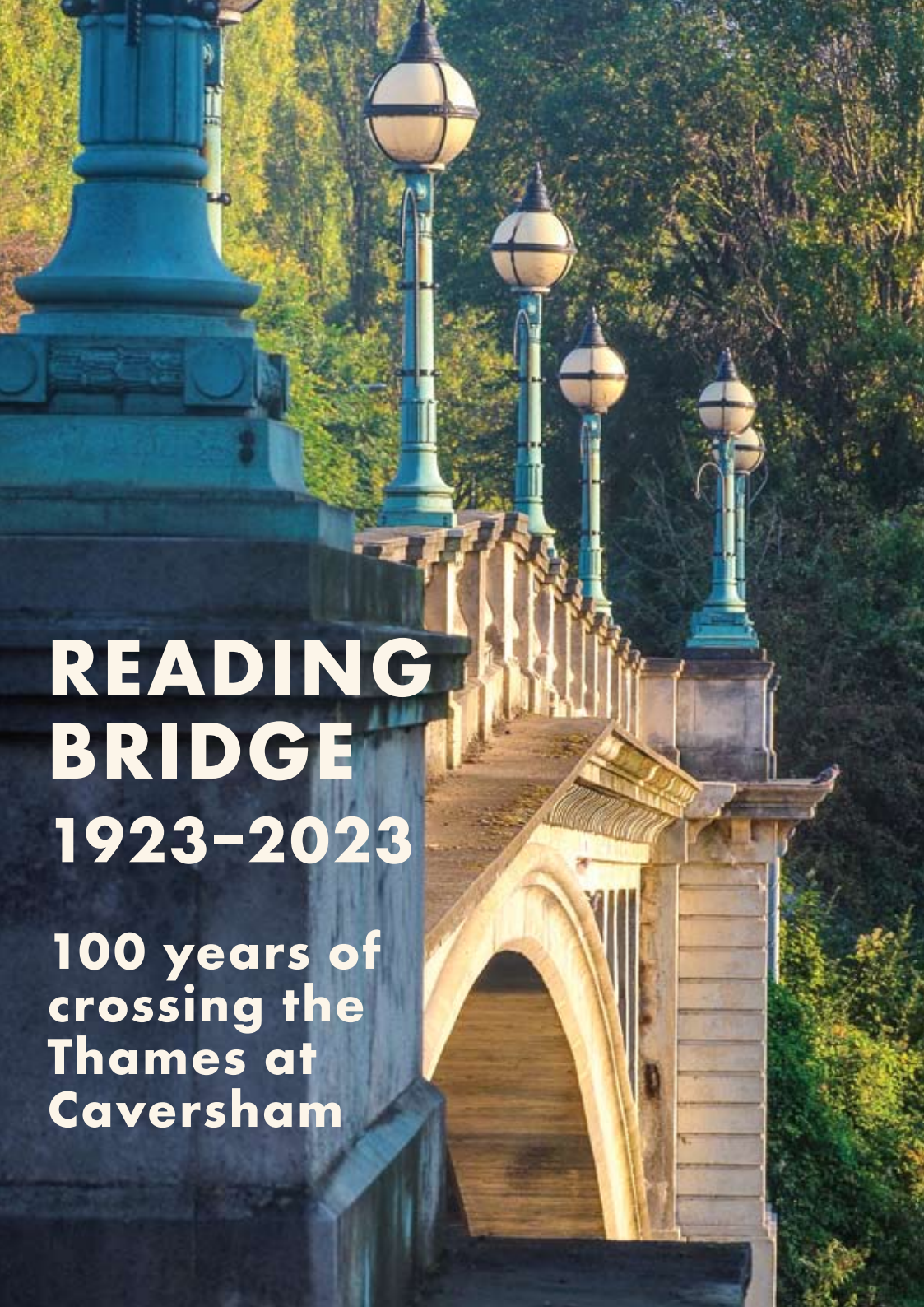


READING BRIDGE 1923–2023

100 years of crossing the Thames at Caversham

A NEW CROSSING FROM AND TO CAVERSHAM

The earliest bridge at Caversham, close to St Peter's Church, did service for almost seven hundred years before it was replaced with an iron bridge in 1869. Crossing the river at Lower Caversham was more difficult, although there are several references to ferries. A pound lock dating back to 1778 was replaced in 1875; a few years before, in 1871, the Corporation of Reading had obtained leave to build a swingbridge just above the lock, but it never came to fruition. The weir was built in 1884.

About half of Caversham's population worked in Reading; the Clappers, a narrow plank footbridge that ran past the winding gear of the old weir, was a direct route to the Huntley & Palmers factory. As terraced housing grew in Lower Caversham, the Clappers became increasingly busy: a census in 1905 recorded 4836 pedestrians, 19 trucks, 130 bicycles and 70 prams.

The Clappers were the closest crossing to the main workplaces for many among Caversham's population: the Huntley & Palmers biscuit factory and the railway.
(Photo of postcard: CADRA)

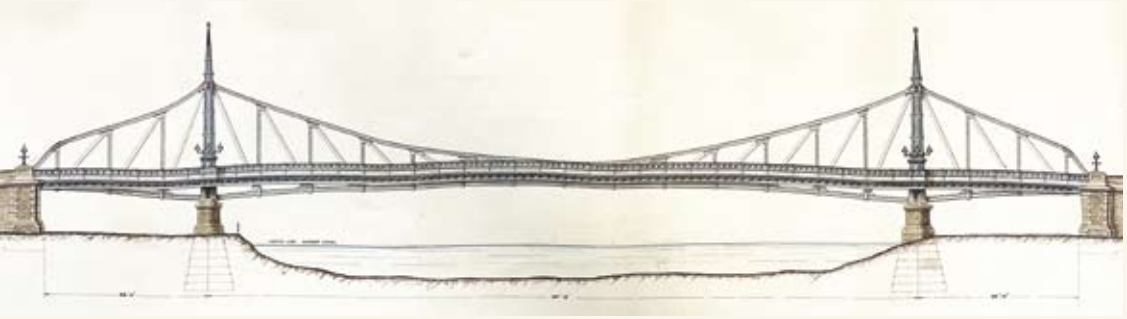
When Caversham and Tilehurst became part of the Borough of Reading in 1911, and with rapid growth in new housing on the Caversham side, better river crossings were required: the iron Caversham Bridge was proving inadequate and the Clappers route was prone to flooding. Reading Corporation commissioned two new bridges – one to replace Caversham Bridge and one to provide a new crossing for both pedestrians and vehicles – but work was delayed by the outbreak of war.

Map: BRO, R/acc6436.1

DESIGNING A MODERN LANDMARK: PLANS EMERGE

The 1911 Extension Order required the Corporation of Reading to either replace or widen Caversham Bridge and 'construct ... 'a footbridge not less than ten feet in width across the River Thames between the Parish of Caversham and De Bohun Road in the Borough'.

In 1912, the Corporation instead sought parliamentary powers to provide a wider bridge, suitable for vehicles. The plans submitted at the time, by engineers John Webster and John Bowen, showed two designs with a stiffened steel suspension structure.



Two views of one of the bridge designs submitted in 1912
(BRO, R/acc4447.55)

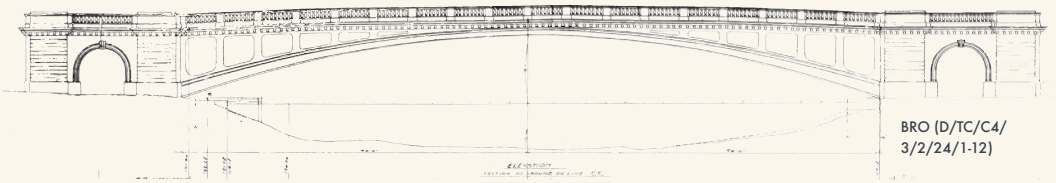
But a new bridge in that section of the river posed challenges: it had to allow unrestricted river flow and navigation, and provide space for footpaths on both sides of the river. This required a substantial structure with a single span. It was also agreed to enlarge the weir and cut away some land, including part of View Island.

Having obtained parliamentary powers to proceed, the Borough Extension Committee, chaired by Alderman John Wessley Martin, met on 18 November 1913. It commissioned the consulting engineering practice L. G. Mouchel & Partners Ltd to provide a first report with designs and costs for both the new Reading Bridge and the proposed replacement for Caversham Bridge.

The Mouchel designs were fundamentally different from the 1912 plans: they proposed reinforced concrete to create a span of 180ft (55m) across the waters of the Thames. In the early decades of the twentieth century, reinforced concrete was increasingly used to construct industrial buildings and other utilitarian structures, including bridges. First developed in the late 1870s, it was an economical and versatile building material with high tensile strength.

Alderman John Wessley Martin
(Reading Libraries)

The most successful promoter of reinforced concrete was the French engineer François Hennebique (right, 1842–1921), who had patented his method of strengthening concrete using iron and steel bars in 1892. Hennebique was an astute businessman: he developed a worldwide network of franchises and agents. Among them was Louis Gustave Mouchel, another Frenchman, who had moved to Britain. He was Hennebique's agent and made it his life's work to introduce 'ferroconcrete' across Britain. (Collection of The Concrete Society)

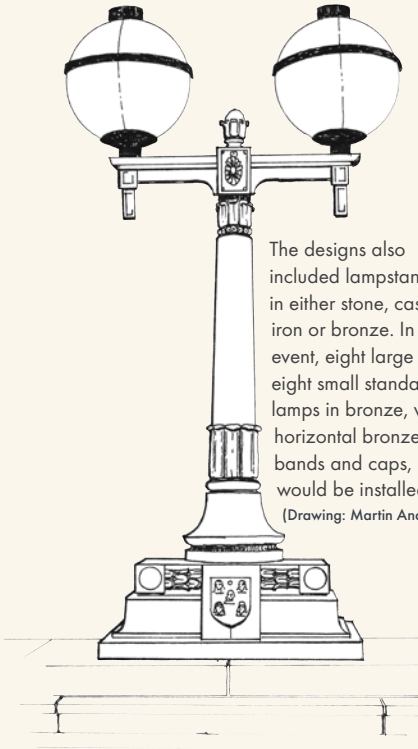


BRO (D/TC/C4/3/2/24/1-12)

Nationally, there was some competition between steel and concrete engineers, and John Webster later protested that his designs would have saved the Corporation almost £7000 in construction costs. But reinforced concrete needs little maintenance; unlike exposed steel, it is resilient against corrosion and increases in strength after construction.

Designed for an assumed load of as many traction engines of 20 tons each as the roadway would carry, the new Reading Bridge was also intended to be a modern landmark: it would be the largest structure in ferroconcrete in the UK, and the longest single span. Mouchel's design won out on all counts.

The outbreak of World War I on 28 July 1914 halted progress for almost seven years, but in early 1922, a contract for the construction was finally agreed with Holloway Brothers Limited of Westminster. Construction commenced in March 1922 and took 18 months to complete.

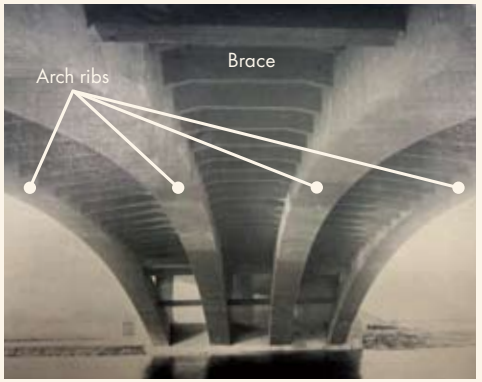


The designs also included lampstands in either stone, cast iron or bronze. In the event, eight large and eight small standard lamps in bronze, with horizontal bronze bands and caps, would be installed.
(Drawing: Martin Andrews)

‘COMMENDABLY SIMPLE’ AND GRACEFUL

Masonry arch bridges have been used for over 3000 years using stone, brick and concrete. These materials are weak in tension, so the ‘triangular’ spaces between the arch and the road surface (‘spandrels’) were filled with masonry or rubble to ensure that the arch remains in compression. The filling increases the weight of the structure and can limit the span and flatness of the arch. Steel is strong in tension but, in compression, long small-section rods tend to buckle if they are not heavily braced. Hennebique combined the best characteristics of steel rods and concrete. This allowed the construction of light, elegant, durable open spandrel arch bridges, including Reading Bridge.

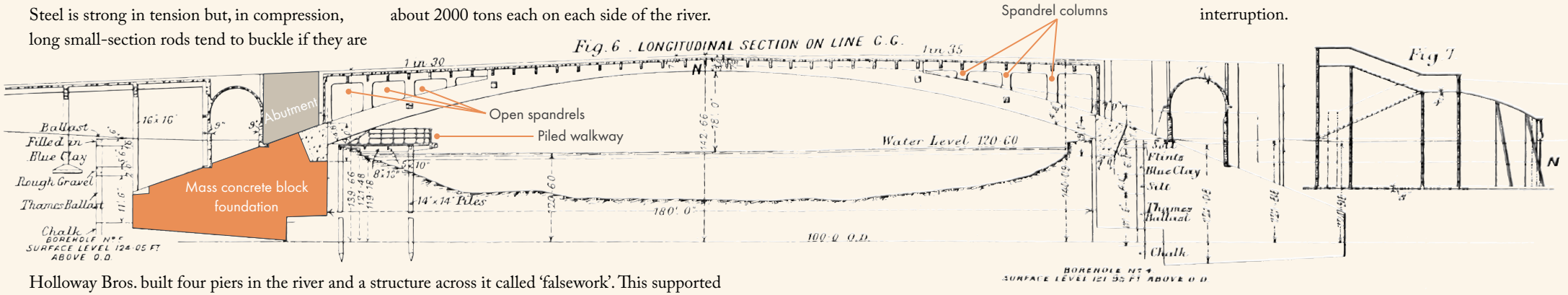
Arches tend to cause their foundations to spread outwards so, to prevent this, Reading Bridge has mass concrete block foundations of about 2000 tons each on each side of the river.



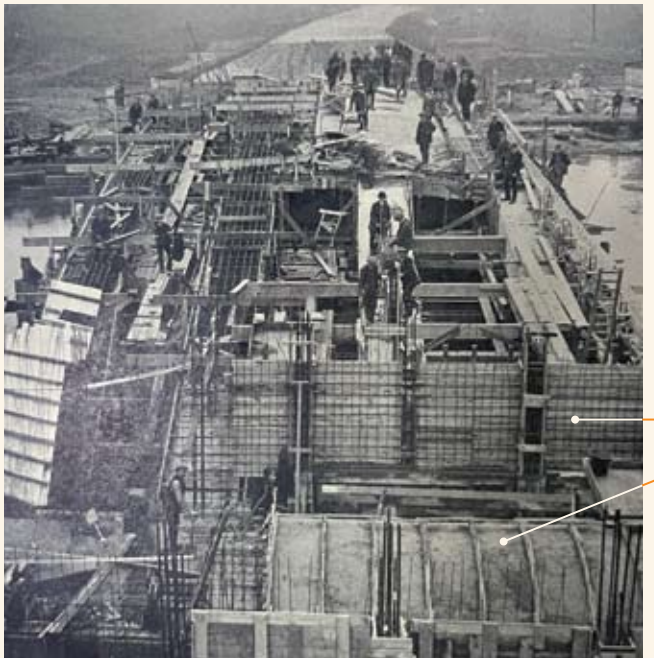
The main structure of the arch is formed by four reinforced concrete ribs 180 ft (55m) long, rising to 18 ft (5.5m) at the centre, linked by braces.

Spandrel columns support a grid of longitudinal and transverse beams that form the bridge deck. At the centre of the bridge the longitudinal deck beams sit directly on top of the arches. The deck is 40ft (12.2m) wide between the parapets, with a road width of 27ft (8.2m) and two footways 6.5ft (2m) wide.

The piled walkway under the Reading side of the bridge, above the water level, allowed horses to tow barges beneath the main span without interruption.



Holloway Bros. built four piers in the river and a structure across it called ‘falsework’. This supported the shuttering for casting the ribs. The steel reinforcement was then assembled within the shuttering, and freshly mixed concrete placed and compacted *in situ*. The structure is monolithic, which means that there are no joints in the concrete. With the exception of the Portland stone parapets and the northern embankment, the whole structure was built in reinforced concrete.

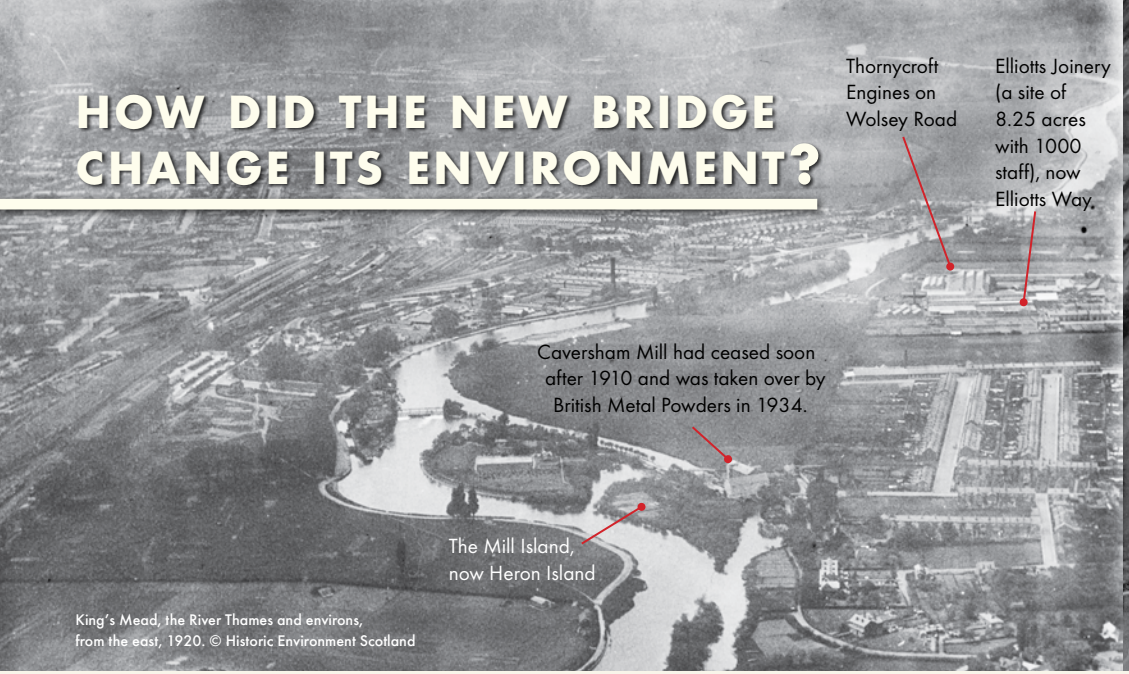


Unemployment was very high after the war, and grants from the Unemployed Grants Committee, set up in 1920, helped pay 60% of local wages for building the new road.

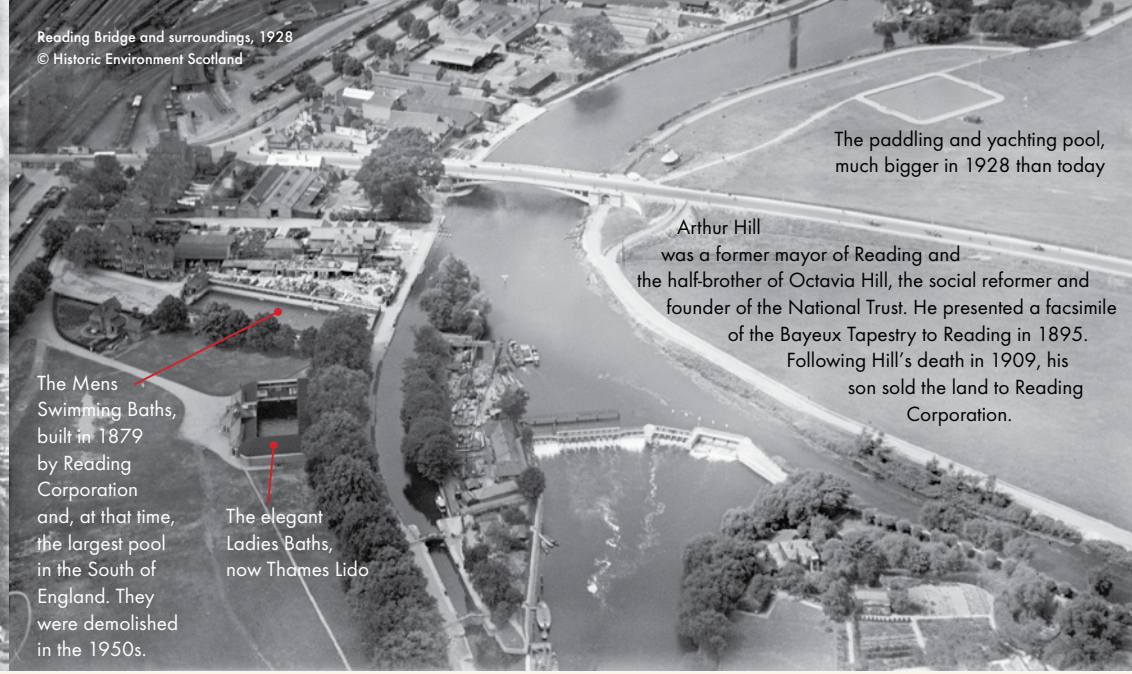
The total cost of the bridge and its approach roads was almost £70,000, of which £6000 was donated by Charles Powell of Eastfield Caversham.

All images: Reading Libraries

HOW DID THE NEW BRIDGE CHANGE ITS ENVIRONMENT?



King's Mead, the River Thames and environs, from the east, 1920. © Historic Environment Scotland



Reading Bridge and surroundings, 1928
© Historic Environment Scotland

North and south of the Thames, land had to be purchased and cleared to build the approach roads to the bridge.

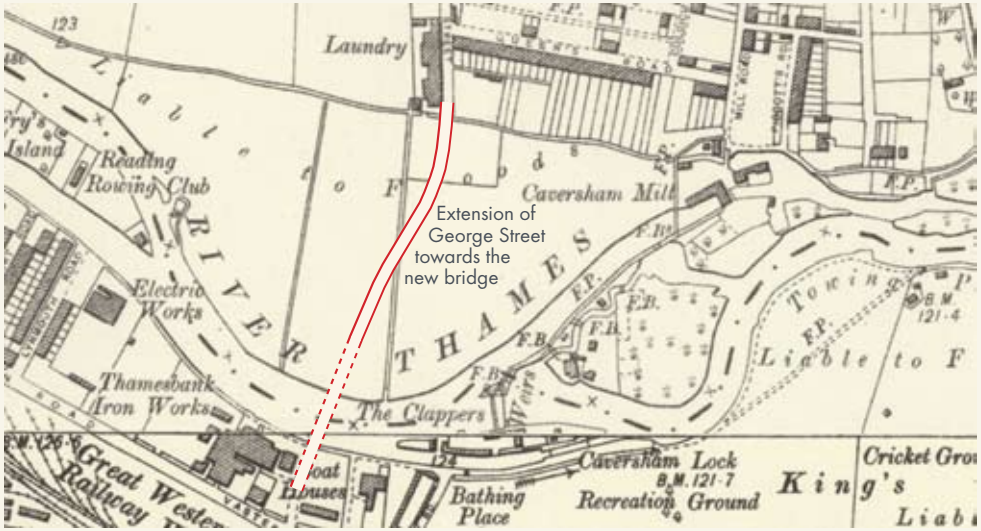
On the Reading side, De Bohun Road led to the river from Vastern and Kings Meadow Roads. The MacDuff Temperance Hotel was purchased by the Corporation before the outbreak of war and then used for billeting soldiers. East's Boat Building Company Limited, immediately next to the bridge, received a settlement for lost business.

On the Caversham side, George Street only extended just past the end of the Reading and Caversham Laundry Co Ltd; beyond it were grazing meadows previously owned by Arthur Hill. The road had to be raised and the laundry entrance moved to connect with the new road across the embankment to the bridge.

Access to the river and a new promenade was by stairs down from the bridge deck on both sides of the river, and pedestrian arches under the bridge approaches.

As early as July 1923 a quote was submitted for installing a paddling and yachting pool in Christchurch Meadows at a cost of £2718. The pool opened in 1924.

In 1936, the now iconic avenue of 24 Lombardy poplars was planted along George Street to commemorate the coronation of King George VI.



OS Six Inch, 1888–1913: Oxfordshire LVI.SE, Revised 1897, Published 1900; Berkshire XXXVII.NE, Revised 1898, Published 1900.
Reproduced with the permission of the National Library of Scotland

Image: Reading Libraries

A BRIDGE FIT FOR PURPOSE...

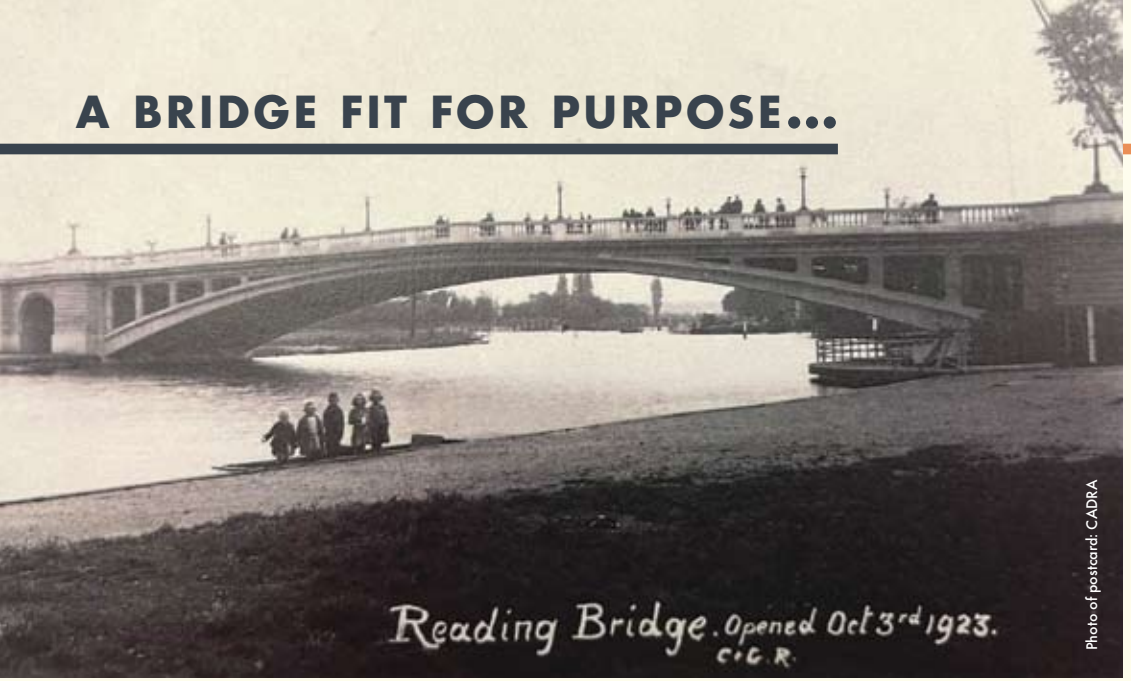


Photo of postcard: CADRA

Before the opening, a spectacular trial was conducted. Bridges had been known to collapse, and there was concern for public confidence as a span of this length was largely unknown.

The designs assumed a load of as many traction engines of 20 tons each as the roadway would carry. Mr A.C. Cookson, from the office of the Engineer to Great Western Railway Co, was appointed at a fee of 50 guineas to put this to the test.

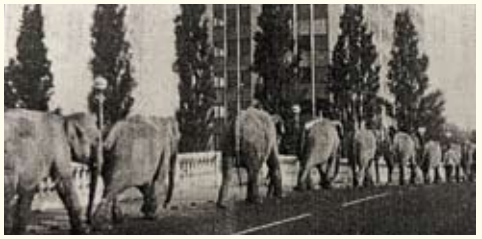
On 25 September 1923, 30 traction engines and Foden wagons, in three rows of ten engines each, rolled onto the bridge. Their combined weight was almost 372 tons, well above the standard rolling load of 293 tons laid down by the Ministry of Transport – yet deflection at the centre was less than ¼in. Mouchel reported that 'the test demonstrated the great strength of the bridge and can be considered as eminently satisfactory'.

The formal opening on 3 October 1923 was marked by rain and high winds. John Wessley Martin, Chairman of the Borough Extension

Image: Reading Libraries

Committee, opened the bridge. Bronze plaques on either side of the bridge were unveiled and the bridge opened to traffic. The first vehicle to cross from Caversham was a van from the Reading and Caversham Laundry Co Ltd.

...FOR THE NEXT HUNDRED YEARS



A different kind of stress test: in 1967, Rosie Brooks took this photo 'when the circus left King's Meadow'. (Reading Libraries)

The bold decision to build an innovative structure that required little maintenance held good for over 80 years, but by the early 2000s, the cracks were beginning to show.

The Portland Stone parapets, originally installed by stonemasons A.F. Jones, had begun to crumble as a result of oxidation and road salt. Still in business 91 years on, A.F. Jones was commissioned to carry out the repairs using a higher grade of Portland Stone.

By 2013, the pressure of 27,000 vehicles crossing daily, and the erosion of the structure by the elements, were also taking their toll. With the help of a £3 million government grant, the Council commissioned VolkerLaser to devise and install thin, strong, flexible carbon fibre plates that would strengthen the bridge without changing its appearance.

Scaffolding allowed for a detailed inspection which identified hollow points across the whole structure. (Photo: VolkerLaser)

A lampstand with fittings for hanging baskets (Photo: Kim Pearce)

Over six weeks, 16 lorries a day delivered 1500m^3 of foam concrete to pump into the structure. The concrete was then allowed to settle before being sealed. Shear bolts were fixed to the abutments to make the structure stronger. The roadway was stripped so that carbon plates could be fitted to the underside of the bridge deck and beams, and carbon wrapped round the spandrel columns.

The globes, banding and caps of the lights were first replaced in the 1960s. Some of the lampstands were damaged around 2020; at that time, all Reading streetlights were also being converted to LED. The lampstands were repaired and fitted with new globes, bands and connections, and the iconic line of lights was back in action.

Reading Bridge was opened on 3 October 1923. It is a remarkable example of modern bridge construction in reinforced concrete, simple yet striking in appearance and set off by Portland stone parapets and an elegant line of lamps. Reading Bridge had the longest single span in the UK until 1928. Many other bridges of this period are Grade II or II* listed.

This booklet was developed by Caversham and District Residents Association (CADRA) to mark the centenary of the opening of Reading Bridge on 3 October 1923.

CADRA gratefully acknowledge the kind assistance of Berkshire Record Office (BRO), Reading Libraries, Edwin Trout, Berkshire Industrial Archaeology Group (BIAG), Gillian Clark and VolkerLaser.

Front cover photograph: Clive Ormonde
Back cover photograph: Andy Thorne

Available to download free at www.cadra.org.uk/readingbridge100

Copyright © CADRA 2023

Research and text: Helen Lambert and Paul Matthews
Design: Anke Ueberberg | www.ueberberg.co.uk

Caversham & District Residents' Association