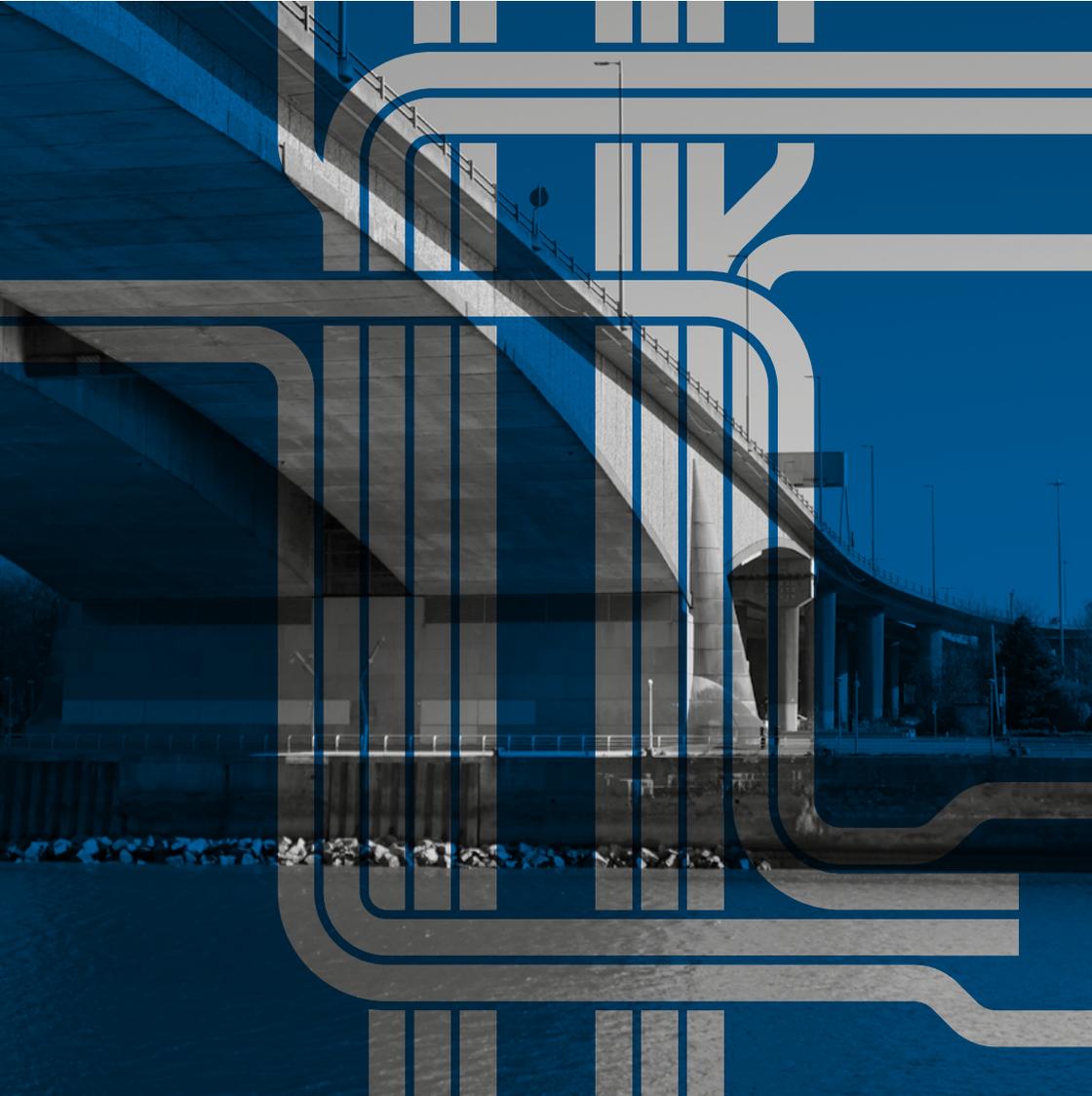




1. KINGSTON BRIDGE AND APPROACHES

Celebrating Fifty Years



26th June 2020

Celebrating 50 years of the Kingston Bridge



The Kingston Bridge is one of Glasgow's most iconic structures. A stunning example of post war architecture and planning, the slender concrete arch remains a key part of Scotland's transport infrastructure and a crucial piece of the M8 motorway.

Completed on 26th June 1970, the construction of the bridge and its approach roads remains one of the most ambitious urban motorway projects undertaken in the UK. Alleviating traffic congestion on the existing city centre bridges, its completion led to significant reductions in journey times and accident rates.

New bridges across the Clyde were first proposed in 1945 as part of plans for the Glasgow Inner Ring Road. Initial progress was slow and it was 1961 before the urban motorway ring around the city centre was approved. Only the north and west flanks of the ring road were constructed, today these carry the M8 through the city.

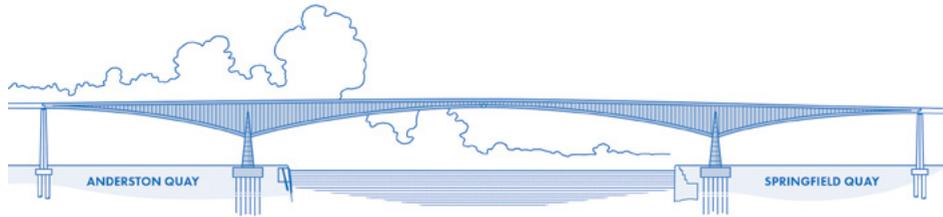
The Inner Ring Road project was only a small piece of the city's road puzzle. In 1965 the Corporation of Glasgow published its highway plan with proposals for several new motorways and expressways like the M77 and M80. The new roads, to be constructed over a 30 year period, would improve access to the city centre, connect to growing suburbs and alleviate traffic congestion. The Inner Ring Road was at the heart of the planned network, of which only 50% was ultimately completed.

HRH The Queen Mother is accompanied by Councillor William Hunter (left) and Lord Provost Donald Liddle (behind) as she prepares to cut the ribbon at the opening ceremony on 26th June 1970.

Courtesy of Glasgow City Archives (TD1575/2/62).

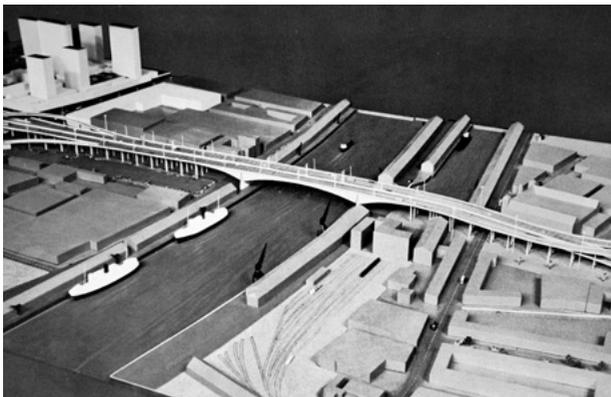
Design and Planning

A project of this scale requires years of planning and preparation. In 1961, Glasgow Corporation appointed engineering consultant W.A. Fairhurst & Partners to proceed with detailed design work on the bridge.



Various options were considered for what was then known as the Carnoustie Street Bridge. The Corporation was particularly interested in a two-level structure that kept motorway and local traffic separate but this was blocked by the Clyde Navigation Trust, who insisted on dredger access to the topmost reaches of the tidal river.

In the mid-1960s, designs for a soaring 268.5m long bridge carrying ten lanes of 50mph motorway 18.5m above the river were revealed to the public. The Kingston Bridge, as it was to be named, would allow for traffic growth till 1990, by which time 120,000 vehicles were expected to use the crossing every day.



Physical models were used to show the new bridge in the surrounding area. This one shows conceptual designs for the Anderston Comprehensive Development Area (top left) and quays, including the Kingston Dock, in use upstream of the bridge.

In an era before computer generated imagery, artist's impressions gave the public a glimpse of the finished project. The landscape artist Alexander Duncan Bell produced several for the Kingston Bridge project.



The designers noted that their proposal was actually for two parallel independent 20.8m wide 'superstructures' that would each carry one carriageway. In effect, the bridge is formed from two sets of three hollow pre-stressed in situ concrete 'boxes' sitting side by side and held together by substantial concrete diaphragms. The 'boxes' rest on two reinforced concrete piers.

The slip roads and approach viaducts would be carried on more than 100 slender supports with an "interesting and elegant" parabolic cross-section that quickly earned them the affectionate nickname *Willie Fairhurst's Troosers*, a reference to the bridge's designer.

The required Parliamentary Orders for land acquisition and construction were approved in June 1966. Tenders for construction were invited in autumn that year.

Construction

Construction began with work on the north approach viaduct in May 1967. Within a few months visible signs were rising from the ground on the mile-long site stretching from Scotland Street to St. Vincent Street.

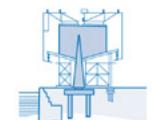


The contractor, a joint venture of Duncan Logan Ltd. and Marples Ridgeway Ltd., build the main span using the 'balanced cantilever method'. The box girders were cast in 3.5m sections working outwards from both support piers till the two halves met above the river in late 1969.

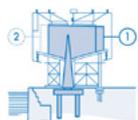
The approach viaducts were constructed simultaneously. By casting their supports in order from tallest to shortest the contractor was able re-use the same set of shutters, saving money and accelerating progress.

The 'balanced cantilever' construction method used to build the bridge meant that the river and busy surface streets remained open to traffic throughout the project.

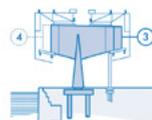
Photograph by Trinity Mirror/Mirropix/Alamy Stock Photo.



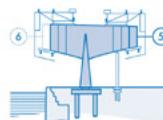
1. INITIAL 'HAMMERHEAD' SECTION CONSTRUCTED



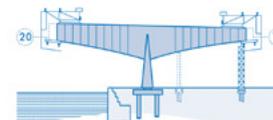
2. CONSTRUCTION OF CANTILEVERING SECTION BEGINS WITH SEGMENTS 1 AND 2



3. SUSPENDED FRAMES MOVED OUTWARD AND SEGMENTS 3 AND 4 ARE CAST



4. FURTHER SEGMENTS ARE CAST IN TURN



5. CANTILEVERING SECTION COMPLETED

These photographs show construction well under way in Anderston (top), with completed columns for the Bothwell Street slip road in the foreground, and piles being driven at Springfield Quay (bottom).

That the bridge is formed of "two parallel independent superstructures" is most clearly visible from the quayside underneath.



TYPICAL DECK CROSS SECTIONS



A. NEAR MID-SPAN



B. NEAR MAIN SUPPORTS



Further savings were made by installing the permanent high-mast lighting columns early in the project. These were renewed only recently, having started their 50 years of service illuminating the construction works.

Other innovations included mounting internally illuminated signage on distinctive overhead gantries that would later be connected to the city's traffic control system and remain in use today. In common with other elevated sections of the inner ring road, an electric under-road heating system was installed to prevent the build-up of snow and ice, though this technology did not prove entirely successful in service.

Opening

The Kingston Bridge was completed on schedule in 1970 and opened by HRH The Queen Mother on 26th June 1970. The project cost £200 million at today's prices including land, construction and service diversions.



In Tradeston, the Renfrew Motorway towards Hillington would not be completed for another six years so a temporary arrangement of slip roads was built to connect to the local streets. These have now been demolished but the unused connections to the south flank of the Inner Ring Road, cancelled in the 1980s, can still be seen at West Street.

Connection to the Charing Cross section of the Inner Ring Road was made in 1972.

By the time the bridge was ready to open, the Kingston Dock had been closed and the project to fill it was already well-advanced. Nevertheless, despite there not being a low-level viaduct for local traffic, opening the Kingston Bridge significantly relieved congestion on the city's other river crossings.

Glasgow Corporation viewed the project as a significant achievement.



Anderston
Partick

Charing X

City Centre

Ring Road
Edinburgh M 8





The Bridge Today

The Scottish Government took ownership of the bridge in 1996. A series of multi-million pound refurbishments followed to ensure the crossing, now used by 150,000 vehicles a day, remains operational for decades to come.

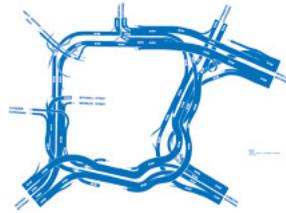


In the early 1990s, structural monitoring of the bridge led to the discovery of several structural issues.

By 1990, Strathclyde Regional Council had prepared a programme of remedial works and sought Scottish Office support to allow its completion. The most urgent tasks included strengthening the bridge's main span, replacement of its support piers as well as extensive refurbishment of the parapet system, quay walls and approach viaducts.

The project generated interest from around the world and was recognised for its innovative design and sequencing. In one particularly complex operation, the bridge was lifted on to temporary, computer controlled jacks whilst its supports were replaced. As well as being technically impressive, the ingenious approach meant that, with the exception of a handful of weekend closures, the busy crossing remained open throughout.

In 2001 the pier replacement and strengthening works received a Saltire Society Civil Engineering Award.

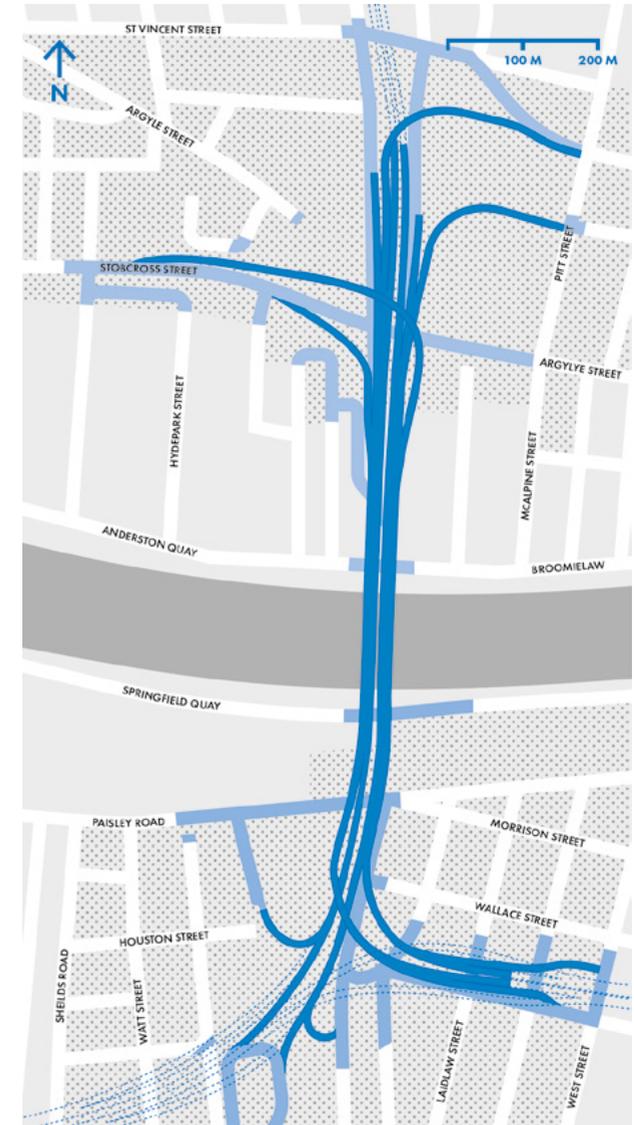


The designers based their bridge proposals on predicted traffic flows around the complete Inner Ring Road. Cancellation of the south and east flanks left the north and west flanks carrying considerably more traffic than expected.

The east flank would have included a second motorway bridge over the river, just east of the Albert Bridge. These proposals were very controversial because they included long sections of elevated motorway over and alongside Glasgow Green.

Project Map

More than 5km of new roads were constructed as part of the project, which included significant changes to local streets as well new slip roads, pedestrian walkways and bridges.



-  New Motorway
-  Realigned Streets
-  Comprehensive Development Area
-  Future Motorway Connections

Produced in collaboration with Transport Scotland



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Design by Toplicht Studio

The extraordinary effort to plan, design and build the biggest urban motorway scheme in the UK saw some of the most ambitious engineering projects in Glasgow since the construction of the railways.

Glasgow Motorway Archive preserves the story of the city's post-war road building programme for future generations. A comprehensive educational resource run by volunteers, the Archive unearths, catalogues, stores and digitises artifacts from this era. They're available to view online, at regular events and by appointment.

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