ice | east midlands

THE BRIDGES OF NEWARK

(A TOURIST TRAIL)

INTRODUCTION

There is a 1½ mile stretch of the River Trent at Newark that has ten bridges (including two over separate navigation channels). The towpath connects them all and forms a walking trail from which the bridges can be easily seen; they reveal an interesting variety of ages (ranging over more than two and a quarter centuries) and types of construction (from ancient stone arches to modern concrete and steel). This leaflet describes the route and the bridges.

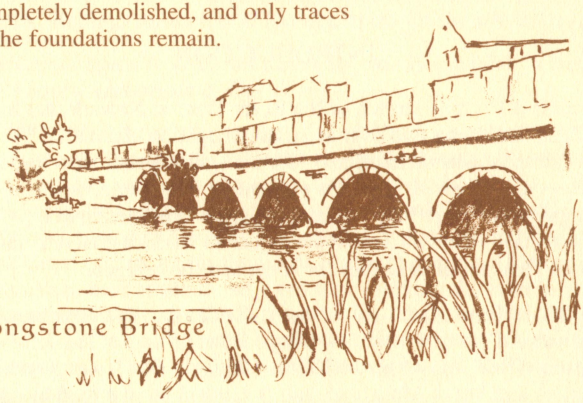
The River Trent is unusual in that it divides into two branches, just upstream of Newark near Staythorpe Power Station. The left-hand (western) one, known as the Kelham Branch, flows past Averham, Kelham and South Muskham, and is crossed by two road bridges and two railway bridges. The right-hand one, known as the Newark Branch or the Newark Dyke, flows past the town, and has eleven bridges, although the first one, the Farndon Windmill Bridge carrying the A46 by-pass en route for Leicester, is isolated from the other ten and is not on the trail. The River Devon is a tributary of the Newark Branch. The two branches of the river reunite at Crankley Point near Winthorpe. The Kelham Branch takes the greater part of the flow and is regarded as the main channel of the river, but the Newark Branch has been the navigation channel since the late 18th Century (and was so at times before then). A weir lies across the head of the Kelham Branch in order to maintain the water levels for navigation. In this leaflet, the word "river" means the Newark Branch.

The bridges are dealt with here in geographical order, starting at the upstream (south) end. A walk from one end of the trail to the other and back should take about two hours. Wheelchairs can negotiate the trail reasonably well. Car parking is available in Tolney Lane on the west side of the river opposite Newark Castle, from where it is a ten minute walk to the start of the trail (walk to the river bank, turn right over the footbridge and follow the towpath past the Town Lock). There is also a car park near the Castle Station.

THE TRAIL

1 LONGSTONE BRIDGE is an old towpath bridge on the west side of the river (which is the left bank when looking in the direction of the flow) about 300 yards upstream of the Town Lock. The main flow of the river, by-passing the lock, flows under this bridge and then over a weir. As its name implies, it is a long stone bridge, with an overall length of 246 ft and a width between parapets of 3 ft. It has seven low arches, each with a span of 19 ft. It was built by the Newark Navigation Commissioners, replacing a timber bridge that had stood on the same site. Some writers give the date of construction as 1819, others as 1827. The parapets consist of enormous stone blocks, 3 feet high, with rounded tops. A curious feature is a distinct dip in the parapets and paving setts in the middle. The bridge is a listed structure, Grade II.

Parnham's Flour Mill used to stand on the left bank of the lock approach, just downstream of Longstone Bridge, but it has been completely demolished, and only traces of the foundations remain.



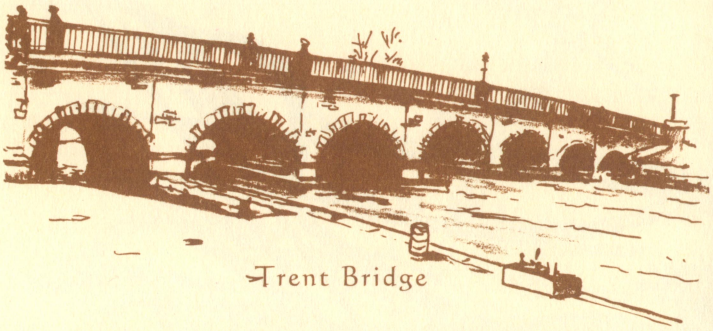
Longstone Bridge

2 MILL BRIDGE is a simple concrete flat deck bridge of 25 ft span, with ramped approaches, crossing the lock approach and providing a vehicular access from Mill Lane to the British Waterways workshops and other premises on the west side. It was constructed in the 1960s, replacing an old brick arch bridge.

Two hundred yards downstream of Mill Bridge is the entrance, on the left, to a dry dock, one of the few inland dry docks in the country, where repair work to river craft is carried out. After the dry dock comes Newark Town Lock, which enables river craft to ascend or descend through a height of 6 ft in their passage up or down the river. The original lock was built in 1773. There are now two locks in parallel, that on the west side being newer and larger, built in 1952. The lock on the east side is now used as a dry dock also. Attractive, well restored old buildings line the east side of the lock and the navigation channel.

3 BACKWATER BRIDGE is a lattice-girder footbridge, with concrete deck, of 84 ft span, erected in the 1950s, and replacing an original timber bridge, carrying the towpath back across the main flow of the river that by-passes the lock.

The trail now passes through an open recreational space on the riverside. On the other (east) side of the river, stands the great curtain wall of Newark Castle, and immediately after that is the oldest bridge on this trail.



4 **TRENT BRIDGE, NEWARK**, carries the old Great North Road across the river on seven semi-circular arches, spanning a total of 170 ft. It was built in 1775, to the design on Thomas Wright (architect to the Duke of Newcastle), replacing a 12th Century timber bridge, which had to be rebuilt after the Civil War. The arches and spandrels (the wall faces between the arches) are all of stone, except for the soffits (undersides) of the arches, which are in brick. There are pilasters on the faces between the arches, and stone cutwaters below them which have been given concrete bases with steel fenders. The bridge originally had stone parapets, with a 24 ft width between them. The opening of the railway to Castle Station in 1846 caused an increase in traffic on the bridge, which was consequently widened in 1848 by removing the parapet walls and adding cantilevered footways with iron railings on each side, supported by heavy but decorative iron brackets, giving a total width of 38 ft and a roadway width of 24 ft. On each side, at centre span, is a decorative lamp standard with a panel below bearing the Borough Arms and the date MDCCCXLVIII. The railings terminate on each side with ashlar end pillars and blank shield panels, surmounted by lamps. The bridge is a listed structure, Grade II.

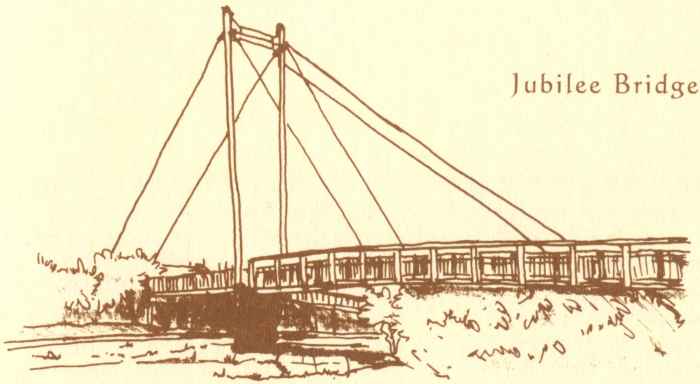
A walk of 500 yards farther down the river, still keeping to the left (west) bank, leads past a number of buildings, including some old concrete malthouses that have been converted to residential and office accommodation, and then to the newest bridge on the trail.

5 **JUBILEE BRIDGE**, so called because it was built in Jubilee year 2002, caters for both foot and cycle traffic, and has a main span of 138 ft linking the towpath with Cow Lane on the east side of the river. It is an example of the modern form of bridge construction known as cable-stayed. Unlike the traditional suspension bridge, which has towers on both banks anchored to the ground behind and with catenary cables passing between them, the cable-stayed bridge requires a tower on one bank only (except for very long spans). This is anchored to the ground behind and then has ties linking the top to the bridge deck. The Jubilee Bridge tower comprises two steel masts rising some 65 ft above the flood plain and inclined at 97° from the river surface. Each mast is anchored to blocks in the flood plain and fixed by ties to the bridge deck at the one-third and two-thirds points.

Unlike a suspension bridge, where the deck is secured by close spaced suspension rods hanging from the main suspension cables, and is flexible, the cable-stayed deck is rigid. In this instance steel plates form the 10-foot wide deck. The upper surface is coated with aggregate, bonded with epoxy resin. Overall rigidity of the deck is achieved from parapet rails formed from continuous hollow circular sections which run the length of the bridge. The deck is arched, having a rise of 2 ft 3 in. at the centre. There are ramped approaches at each end of the bridge.

The bridge was designed by Macarthy Hughes International Ltd of Newark for the Newark & Sherwood District Council, and the main contractor was A C Moore Construction Ltd of Bassingham, Lincs. It is the only cable-stayed bridge in or near Newark, but this type of construction is becoming more common. The largest cable-stayed bridge in the U.K. is the Queen Elizabeth II road bridge across the Thames estuary at Dartford, with two towers and a river span of 1440 ft, opened in 1991.

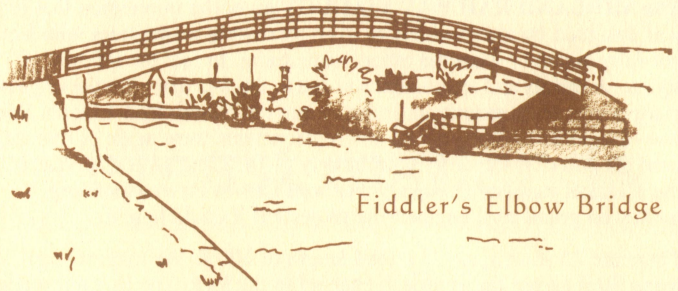
Wheelchair users should cross the Jubilee Bridge and proceed along the walkway on the right bank; when that debouches on to the roads of an industrial estate, follow the way round the factory buildings back to the river bank. For walkers, the towpath, still on the left bank, approaches the recently opened King's Marina.



Jubilee Bridge

6 **KING'S MARINA BRIDGE** is a three-span arched steel bridge, with a main span of 58 ft, carrying the towpath across the marina entrance, opened in 2002. The two steel joists that carry the timber deck are curved in the vertical plane to form the arch shape, and the "parapets" are tensioned wires between steel posts, 4 ft high, with a tube forming the top rail. The width of the bridge is 8 ft. The two intermediate piers are single circular tubes.

After the Marina the towpath crosses grassland and passes the remains of an embankment that once carried a railway line to a bridge (now demolished) across the river, connecting the Midland line to the Great Northern. The land beyond the embankment is liable to flooding (in which case, return to the Jubilee Bridge, and cross to the right bank). The next bridge across the river is 700 yards after the Jubilee Bridge.



Fiddler's Elbow Bridge

7 FIDDLER'S ELBOW BRIDGE (so called because of its shape) carries the towpath across to the right bank. It is a fine example of an early reinforced concrete arch, having been constructed as long ago as 1915, when the design of reinforced concrete (i.e. concrete in which steel bars are embedded to take the tensile forces) was in its infancy, yet it would do credit to a present-day designer and contractor. The rise from the springing at the abutments to the crown of the arch is only 9 ft, and the span is 90 ft. This rise-to-span ratio of 1 to 10 was exceptionally small for a concrete arch in those days, and the concrete at the crown of the arch is exceptionally thin (6 inches). These features would call for extreme care in the placing of the reinforcement and the compacting of the concrete (which would almost certainly have been batched by volume, mixed and placed by shovel, and compacted by hand-tamping). In 1972 the Concrete Society were surprised to find the bridge in an "excellent state of preservation", despite its damp environment, and now, 30 years later still, it appears still in as good a condition as ever. The bridge was designed for the Trent Navigation Company by L. G. Mouchel & Partners, a firm acknowledged as being a pioneer in reinforced concrete design. It is a listed structure, Grade II*.

The width of the bridge deck is 5 ft 6 in., and steel tube handrails with four horizontals on each side give an elegant appearance to the bridge.

Cross to the right bank. The landscape is now dominated on the left by the embankment of the Newark western by-pass (A46), which culminates in a great viaduct just after Fiddler's Elbow Bridge.

8 NETHER LOCK VIADUCT, as it is called, carries the road across the river and flood plain. It has five long spans of varying lengths (total length 750 ft); the longest span (the fourth from the south end, carrying the road across the river) is 203 ft. The bridge comprises two deep steel-plate girders resting on slender elliptical concrete piers, with steel joists between them, carrying a deck 50 ft wide, with aluminium parapet railings. The height of the deck above the river level is approximately 40 ft. The viaduct was designed by Travers Morgan & Partners, and built in 1992 by Budge of Retford. Beyond the five spans of the viaduct is a short span carrying the road across the main railway line.

The river swings sharply to the left, passing under the viaduct, and the main flow then goes still farther to the left, passing over a weir, but the navigation channel goes straight on to the Nether Lock. Before the lock, however, comes the viaduct carrying the Midland Railway (as it was called when the viaduct was constructed) across the river and flood plain.

9 The MIDLAND RAILWAY VIADUCT gives the impression that it was designed by a committee, or even by several committees who were not fully aware of what the others were doing. In fact the mixture of styles, materials and span lengths is due to the fact that after the original viaduct was built, mainly in timber, when the Nottingham-Lincoln line was opened in 1846, renewals and replacements were made piecemeal until the end of the century (particularly in 1857 and 1891). Moreover, the Midland Railway Company was well known for not spending money on grand civil engineering projects if it could help it.

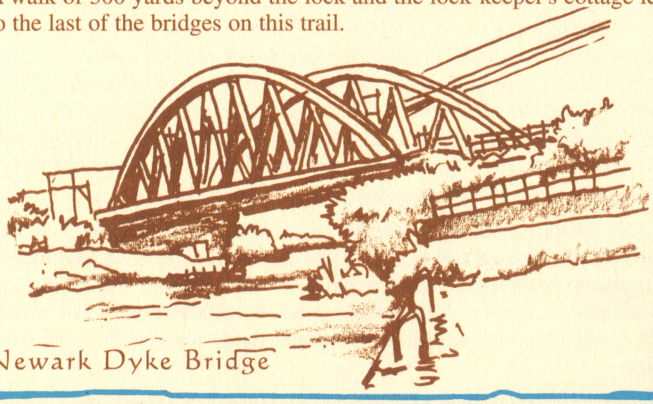
There are 25 short spans in a total length of 500 ft, the longest span being 30 ft across the approach channel to the lock. The first ten spans, from the south end, are steel joists on masonry piers (with steel trough decking between them), the next eight are steel girders on steel struts (with cross bracing and concrete footings set on piles) across the river, then four more similar to the first ten, then the span across the navigation channel (with cast iron outer beams having heavy lower flanges and web stiffeners, but no upper flanges), and then two spans similar again to the first ones, the first of them being across the road that gives access to the lock. Railings on each side form parapets for the whole length.

The eight river spans were built in 1891 by the old established Derby firm of Andrew Handyside & Co.

About 200 yards beyond this viaduct, the Midland line crosses the East Coast Main Line (London-Edinburgh) on the level with a diamond crossing, the only such crossing left in the country. Surprise is often expressed that the Great Northern Railway allowed the Midland to lay their branch line across the main line, until it is remembered that the Midland came first (in 1846; the Great Northern came in 1852).
A proposal has been made to build a bridge carrying the branch line over the main line, in order to eliminate the diamond crossing. The rising approach to this bridge from the south would have to start before the river crossing, so if the new bridge is built the present Midland Railway Viaduct will be lost.

The towpath (here a roadway) continues along the right bank and passes Newark Nether Lock, which lowers craft a further 6 ft to the last non-tidal reach of the River Trent. The original lock, like the Town Lock, was built in 1773, but this lock also has been enlarged and reconstructed, and the present lock dates from 1926, when it was enlarged to take craft of 180 ft length.

A walk of 300 yards beyond the lock and the lock-keeper's cottage leads to the last of the bridges on this trail.



Newark Dyke Bridge

10 NEWARK DYKE BRIDGE is the name given to the great bowstring girder bridge carrying the East Coast Main Line obliquely across the river. It is the third bridge that has stood on this site. The first, built when the line was opened in 1852, comprised two separate structures (one for each railway track) of pin-jointed Warren girders, the upper chords being parallel to the lower chords (and therefore level), and the compression and tension members being of cast and wrought iron respectively. Doubts were raised later about the safety of this bridge (drivers complained that it vibrated noticeably when trains crossed at speed), and it was replaced in 1890 by two steel structures (again one for each track) of rivetted Whipple-Murphy trusses, with the upper chords forming a gentle arch shape. It was locally called the "tubular bridge". All these structures had cross bracings over the rail tracks between the girders.

By the end of the 20th Century this second bridge was getting expensive in maintenance and was subject to a speed restriction, and it was decided to replace it with a single bridge (carrying both tracks) that would be better suited to the high-speed trains of the future. The new bridge consists of a pair of steel bowstring girders (the upper chords form high arches; the lower chords are straight, at deck level, and hold the arch together, like the string of a bow) with a steel deck between them. There are struts between the upper and lower chords of each girder, but no bracing between the girders across the track. The span between abutments is 252 ft, and the rise of the arches is 36 ft above deck level.

The two girders were constructed on the east bank of the river, just north of the old bridge, and were launched one by one across the river, with a temporary staging to take the far ends, during the summer of 2000, and the deck was then built between them. The contractors were given a 76-hour possession of the track at the August bank-holiday week-end (and also the river was closed to traffic for two days), when the old bridges were slid away sideways on temporary staging, and the new bridge was slid sideways into place. New piled foundations had been installed on each side of the existing bridge abutments.

The new bridge was designed by Cass Hayward. The main contractor was Kvaerner Construction, and the bowstring girders were manufactured by the Cleveland Bridge Company. The riverside towpath passes under the bridge.

SUPPLEMENTARY

This is the end of the bridge trail, but a walk of about three-quarters of a mile along the towpath from Newark Dyke Bridge leads to Winthorpe Bridge, which carries the new Great North Road (A1) across the river. It is a long arch in pre-stressed concrete (i.e. containing reinforcing wires which are subjected to a tensile stress, causing the concrete to compress, before any load is put on the bridge). It was designed by A.Goldstein of Travers Morgan & Partners, and constructed in 1962-4, with a main span of 260 ft and a half-span at each end of the main span. In 1998 the bridge was judged worthy of a design award by the Royal Commission on Historical Monuments, and was made a listed structure, Grade II*.

Text and map by John Gardiner
Line drawings by Mary Gardiner

Supported by Newark and Sherwood District Council