GNR FOOTBRIDGES

LINCOLN TO GRANTHAM LINE

SOUTH COMMON CUTTING LINCOLN

A Survey

Industrial Archaeology Section
University of the Third Age (Sleaford Branch)
July 2002

ELI 8526 SLI 11815 2 bridges not on HER PRN 70603-4

Footbridges – South Common Lincoln.

The following notes and sketches were made in June 2002 and relate to two footbridges scheduled for demolition.

The Great Northern Railway opened the line from Lincoln to Grantham in 1867. Details of the line are fully described in an excellent book by Stewart E Squires "The Lincoln to Grantham Line via Honington (The Oakwood Press 1966). The line skirts the South Common in a cutting stretching from Canwick Hill to Cross-o-Cliff Hill. At the time of building there were a number of rights of way leading from the City across the common, which had to be preserved. To this end three footbridges, numbers 33, 31 & 30 were built in addition to the South Park Road Bridge, Bridge Number 32, see *fig 1.* (Map ref TF977698)

This report concerns only bridge numbers 31 and 30, both of which are scheduled for demolition. Both were lattice style footbridges built on brick piers and initially of very similar design. Bridge number 30 was wider than bridge number 31 to allow vehicle and livestock access to the common from the western junction of South Park Road. In 1960 both bridges were modified to give additional height for a proposed electrification of the line. The line was never electrified and it was closed in 1965 as part of the Beeching Plan although the section across the common remained open to serve Bracebridge Gas Works until 1971.

Bridge 31.

The bridge is carried on two brick built piers twenty-eight inches thick (three bricks), seventy-five inches wide (eight bricks) and approximately fourteen feet high. Each pier is surmounted by a ten-inch deep capstone. Shorter piers of similar construction carry either end of the bridge. *See fig 2*

The total span of the bridge is seventy feet with a walkway three feet eight inches wide. The walkway is constructed from 9"x2.5" timbers. The central span of thirty feet is horizontal and the two outer spans of twenty feet slope down approximately four degrees.

Initially the bridge was fixed directly to the capstones supported on 4"x7" RSJ's. fixed centrally on each pier. This was modified in 1960 when the bridge was raised by ten inches. The two central piers had a ten-inch thick block of concrete cast on top of the capstone and the RSJ's reaffixed to this. The two outer piers had the capstones removed and replaced with a concrete plinth, which incorporated four steps to the south end and three steps to the north end. The RSJ's on these outer piers were shortened to form brackets, which were then fitted further back in relation to the brick piers and welded to a 4" angle iron rail of the same length as the original RSJ's. This in turn was welded to the main bridge structure. *See fig 3.* The concrete steps connect to a metalled path on either side of the bridge. It is likely that this path was built, or at least modified when the height of the bridge was raised in 1960. It is uncertain whether originally there was a single step onto the bridge or whether the path connected directly to the bridge.

The construction of the bridge is, apart from the wooden walkway, entirely of rolled steel sections; RSJ's, angle iron, 'T' section and flat steel plate. There is a mixture of riveted, bolted and welded joints. The bolted and welded joints are either related to the 1960 modifications or are later repairs and additions. The two end sections of the bridge are pre-fabricated (i.e. cut, bent to shape and re-welded) as are the outrigger struts. *See figs 3, 4 & 5.* The top rail, which acts as a three feet eight inch high parapet/hand rail is a 3"x3" 'T' section as is the bottom rail, which support the wooden walkway. A diagonal lattice connects the top and bottom rails. This lattice is riveted to the 'T' sections and is made up of a main 3"x0.375" flat section diagonal lattice and a 1"x0.25" secondary lattice. At some stage, probably post 1960, two additional 3"x0.375" flat section rails have been welded to the diagonal lattice running parallel to the top and bottom rails. (This alters the aesthetics of the bridge and is unlikely to have been a structural requirement, possibly an addition made on the assumption that the secondary lattice was too flimsy)

The four main bridge supports, two 4"x7" RSJ's and two 4" angle iron section extend out some two feet on either side of the bridge sides as outriggers carrying bracing struts. There are four additional outriggers of 3" angle iron riveted to the lower 'T' section rail again carrying bracing struts giving external bracing every ten feet across the length of the bridge.

The underside of the wooden walkway has two diagonal cross braces on each of the three sections. These are screwed to the walkway timbers but in no way affixed to the main bridge construction and offer no structural strength. Similarly two 2"x0.25" metal strips running the full length of each section are screwed to the top edge of the timber walkway, again adding no structural benefit. The apparent purpose of these features being to secure and prevent removal of individual timbers.

The prefabricated end sections and the adjacent bracing struts have a 0.75" shaped metal endplate plate riveted to them. The joint between the centre and the outer, top and bottom 'T' section rails appears to have been modified. Initially simple fishplates affected the joint. This has been replaced with a .75" thick rail joint plate linking the top and bottom rails as well as the inner and outer rails. In addition the plate has secondary bracing on the inner side. *See fig 4.* At what stage in the construction this modification was made is unclear but it would have added considerably to the overall stiffness of the bridge.

Bridge 30.

This bridge has similar brick built piers to bridge 31 although they are more bulky *see appendix item seven.* Anecdotal evidence is that the original bridge was of the same lattice construction as bridge 31, but wide enough to accommodate a farm cart. In this case when the bridges were raised in 1960 the complete bridge structure was removed and replaced with simple girder bridge. Again the bridge is in three sections, the centre being horizontal and the outer sections sloping down. In this instance 18"x6" RSJ's run between the piers being supported on three re-enforced concrete pads cast on top of the original cap stones. Laid across the RSJ's are thirty-three re-enforced concrete slabs twenty seven inches wide and fourteen feet long. Details of the construction are shown on *fig 5.*

LINCOLN-SOUTH COMMON

Map draw 1887 revised 1930

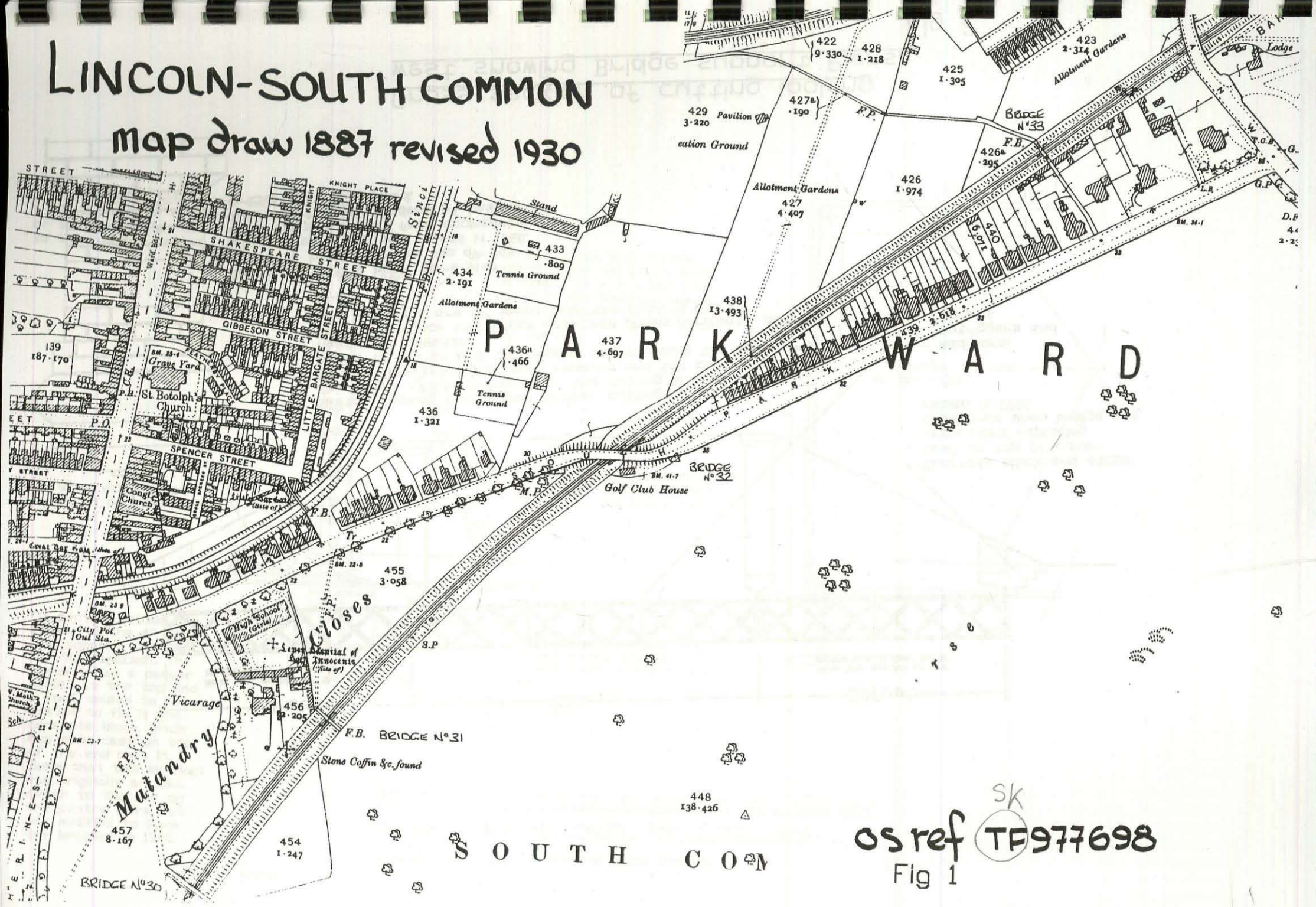

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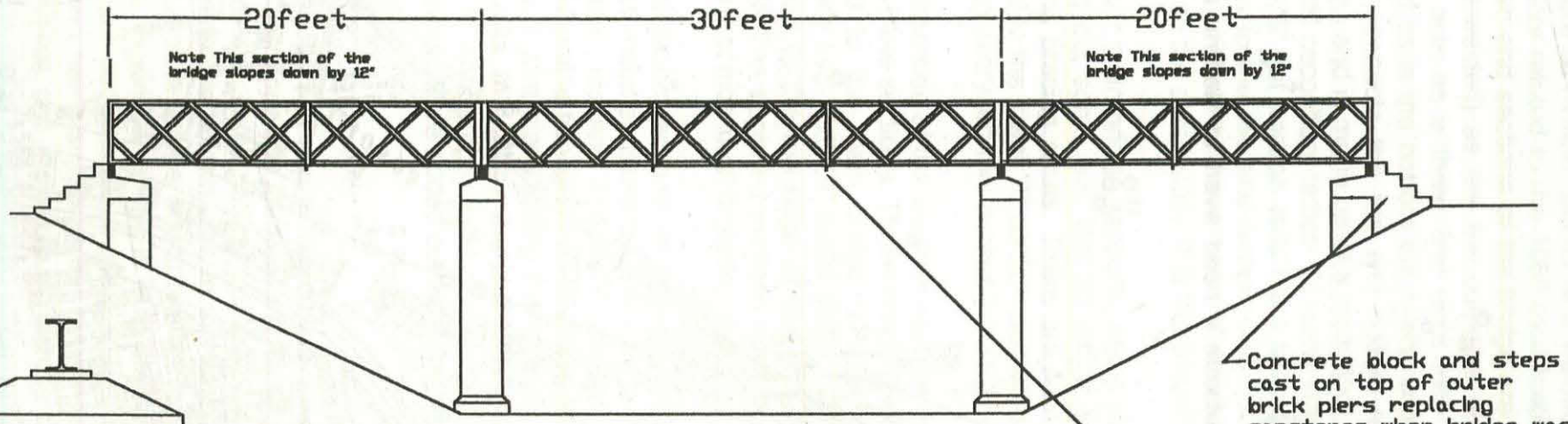
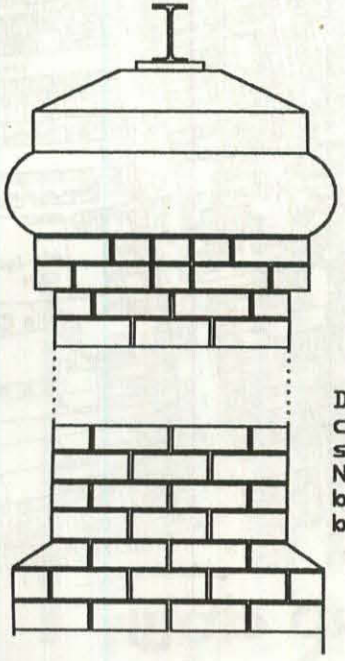
Fig 1



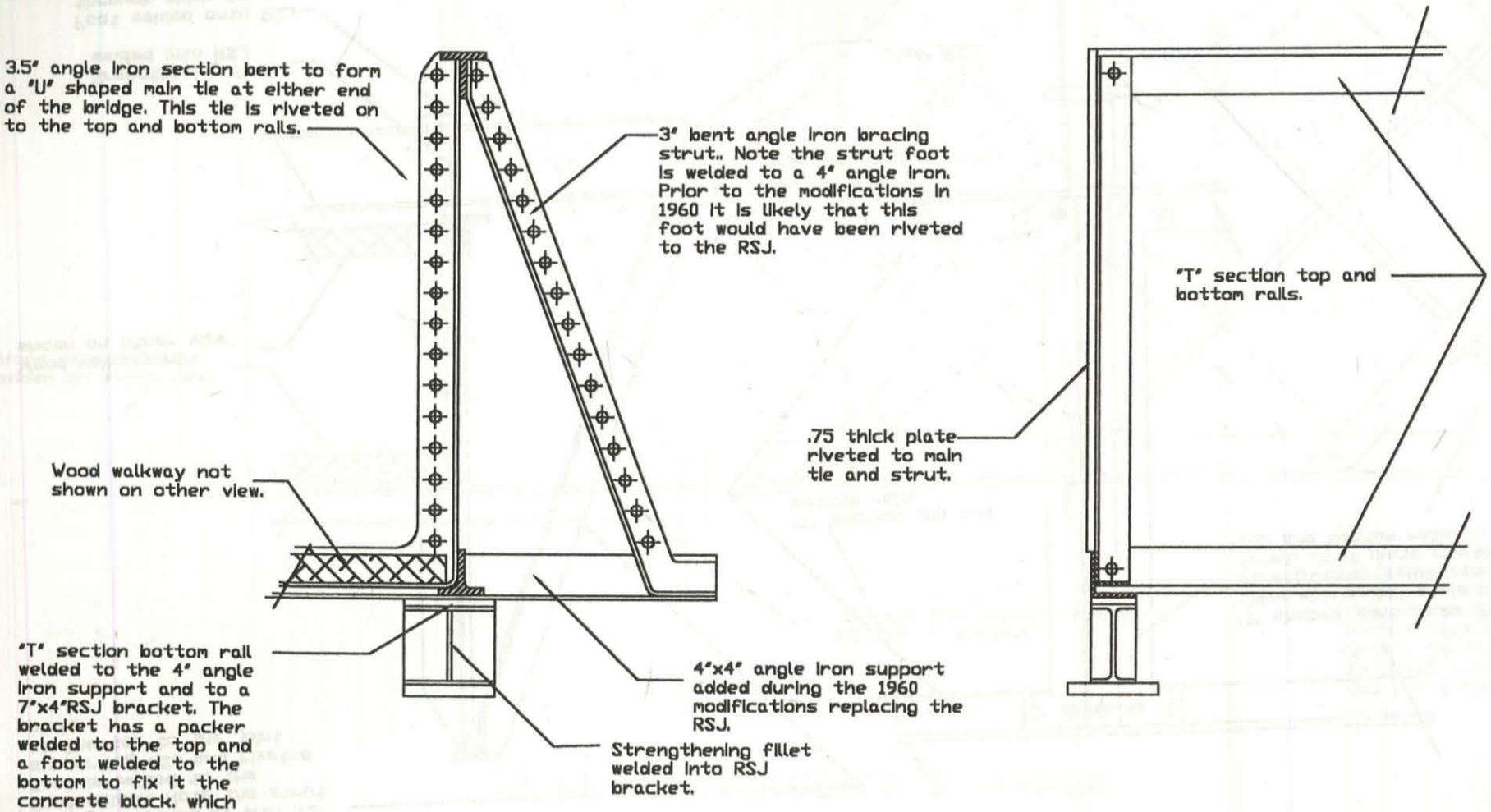
Sketch showing bridge span across cutting
The height of the bridge over the cutting is approximatly 14feet. (The track has been removed and the cutting has begun to silt up and the original height above the track may have been greater.
For convenience the bridge has been shown horizontal but the two end piers are 14" lower than the central piers.



Detail of central brick piers with concrete block cast on top of cap stone when bridge was raised in 1960. Note Piers are built from engineering bricks but were it widens at base blue bricks have been used.

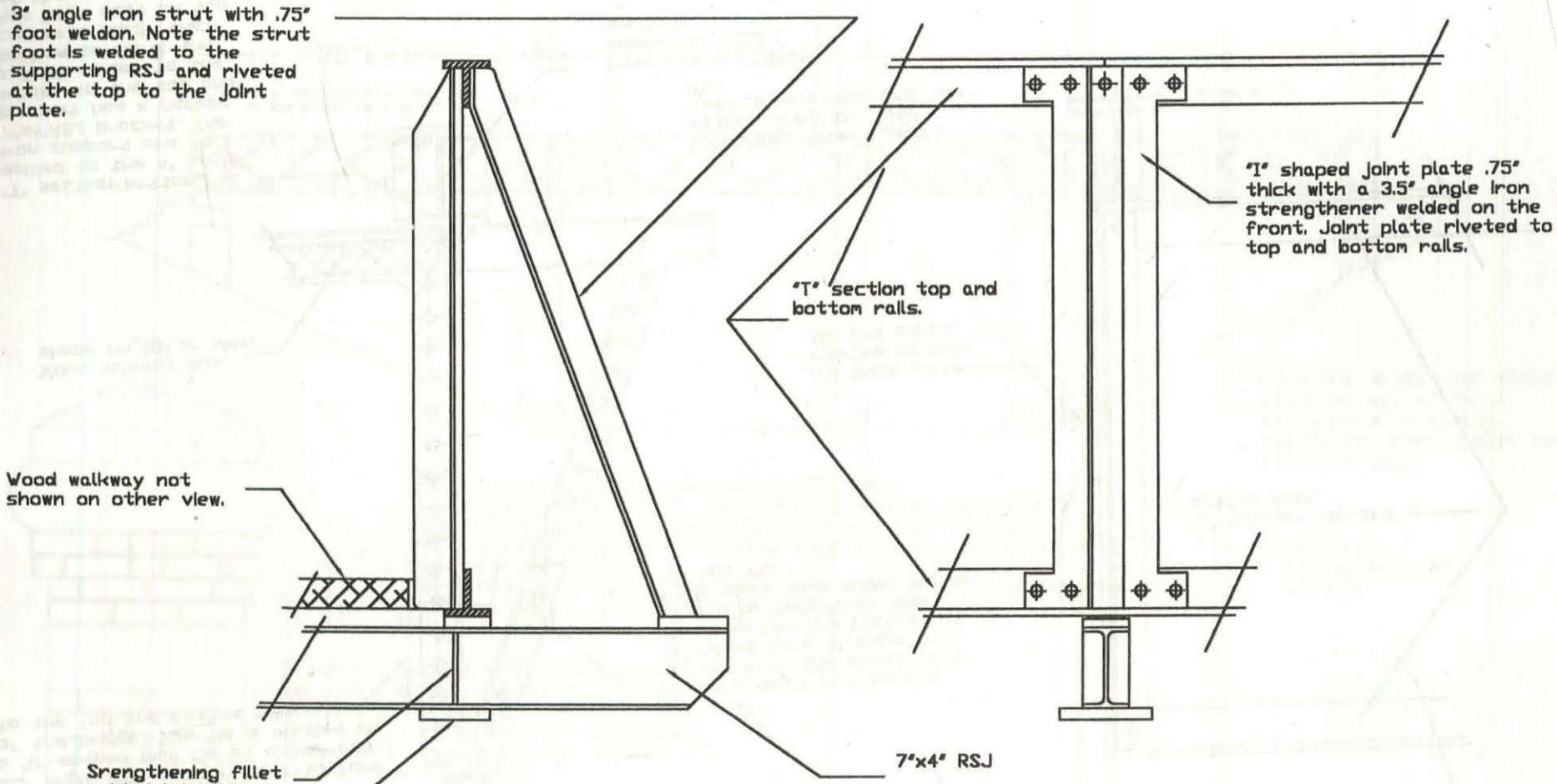
Cross section of cutting looking west showing Bridge support Piers.

Fig 2



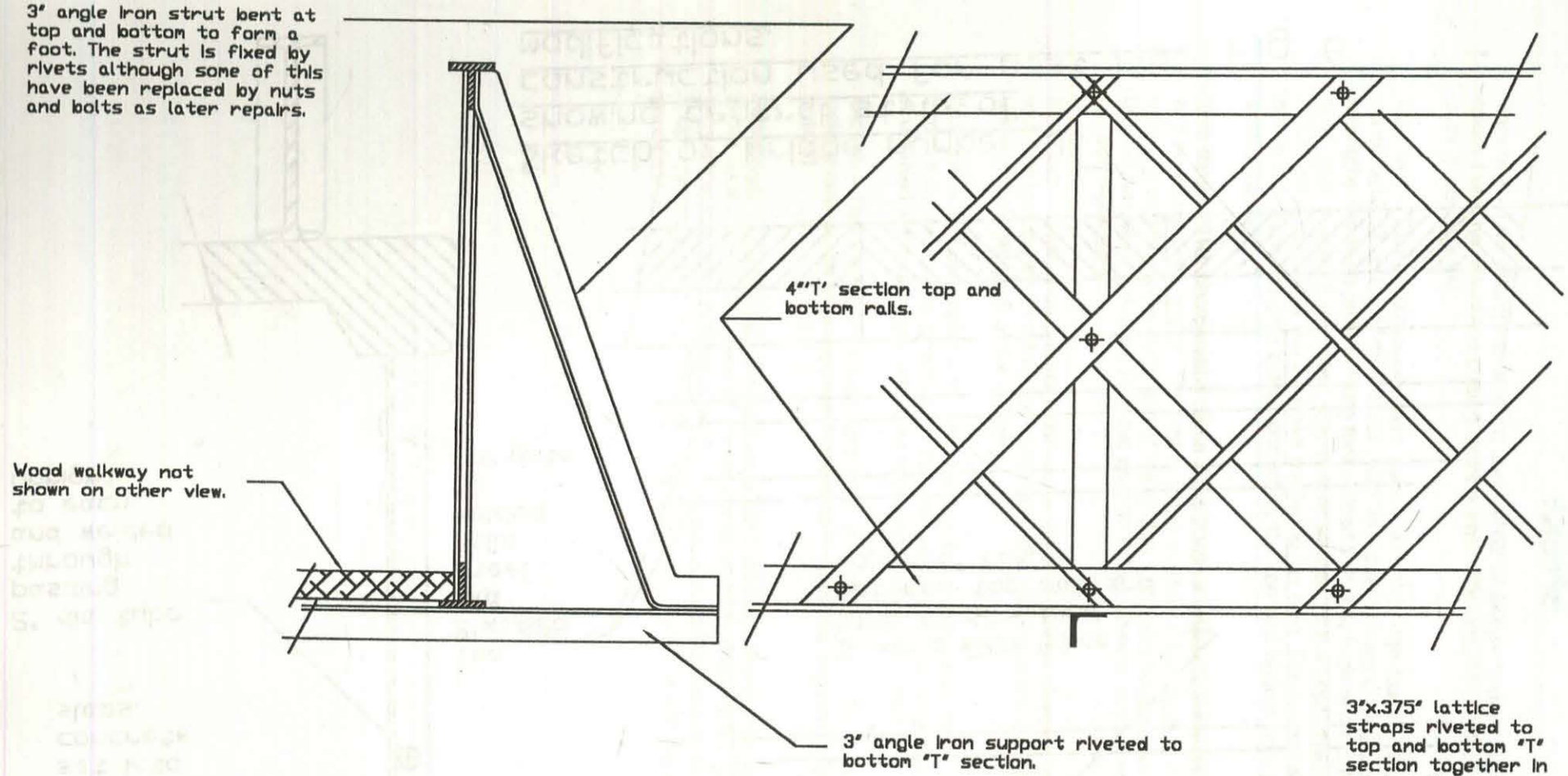
Detail of Bridge support at Outer ends shownig main tie and one outrigger. (Lattice rail detail ommited)

Fig 3



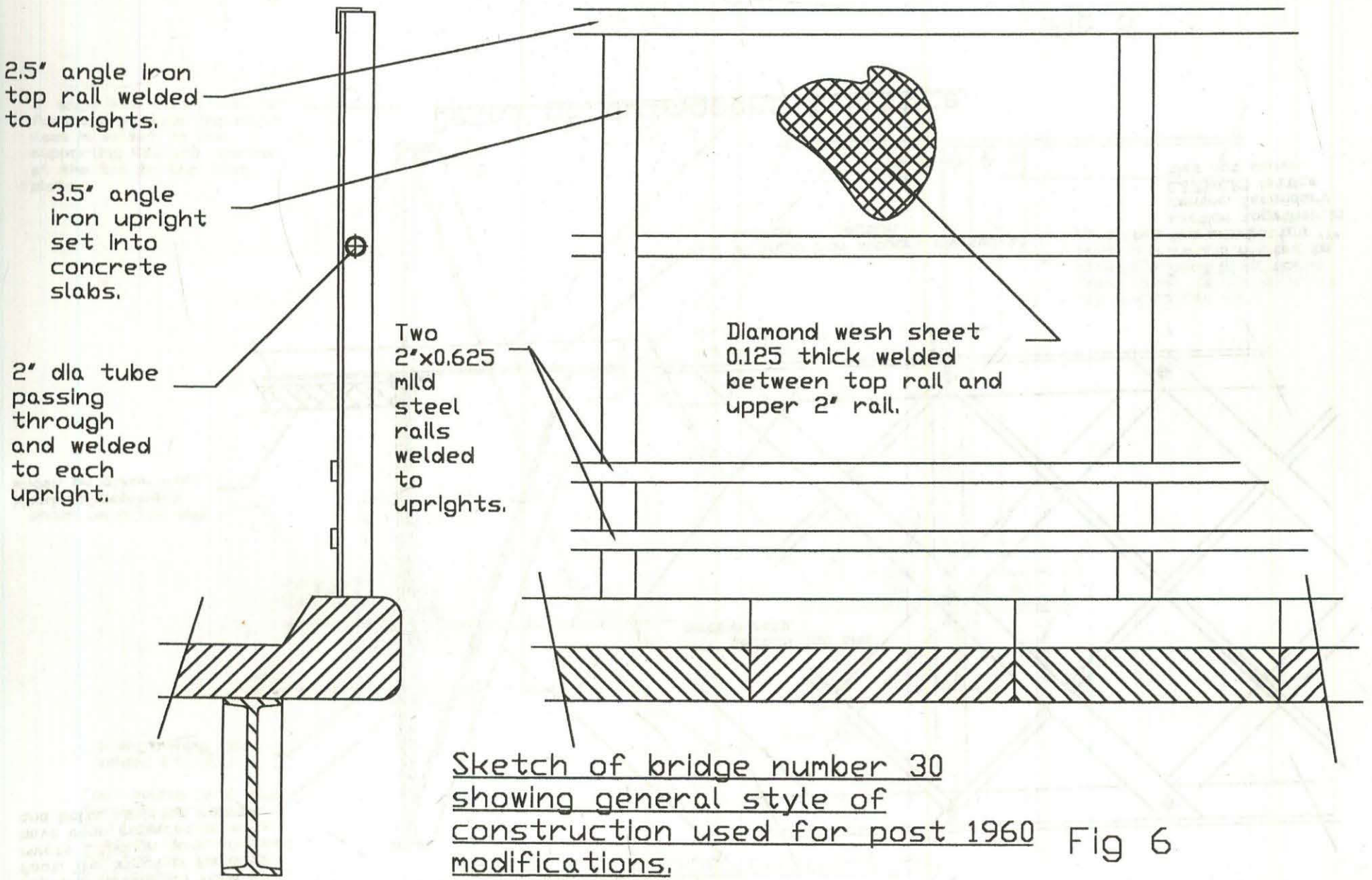
Detail of Bridge support on Central Piers and outriggers. (Lattice rail detail ommited)

Fig 4



Detail of outriggers & lattice.

Fig 5



Sketch of bridge number 30 showing general style of construction used for post 1960 modifications.

Fig 6

Appendix

Item one - Two photographs taken June 2002 of Bridge Number 31.The first photograph is taken from the top of the cutting looking east. The second is taken from the bottom of the cutting looking west.

Item two – Two photographs taken June 2002 of Bridge Number 31. These show the cast concrete block on top of the central piers. In the first shows clearly the RSJ support (note the strengthening fillet) and the fixing foot welded to it. The base of the outrigger strut can also be seen and it should be noted that this is welded to the RSJ. This was part of the 1960 modification as initially the strut was riveted to the RSJ. The second shows the same feature but in this case the joint plate connecting the top and bottom and the inner and outer 'T' section rails.

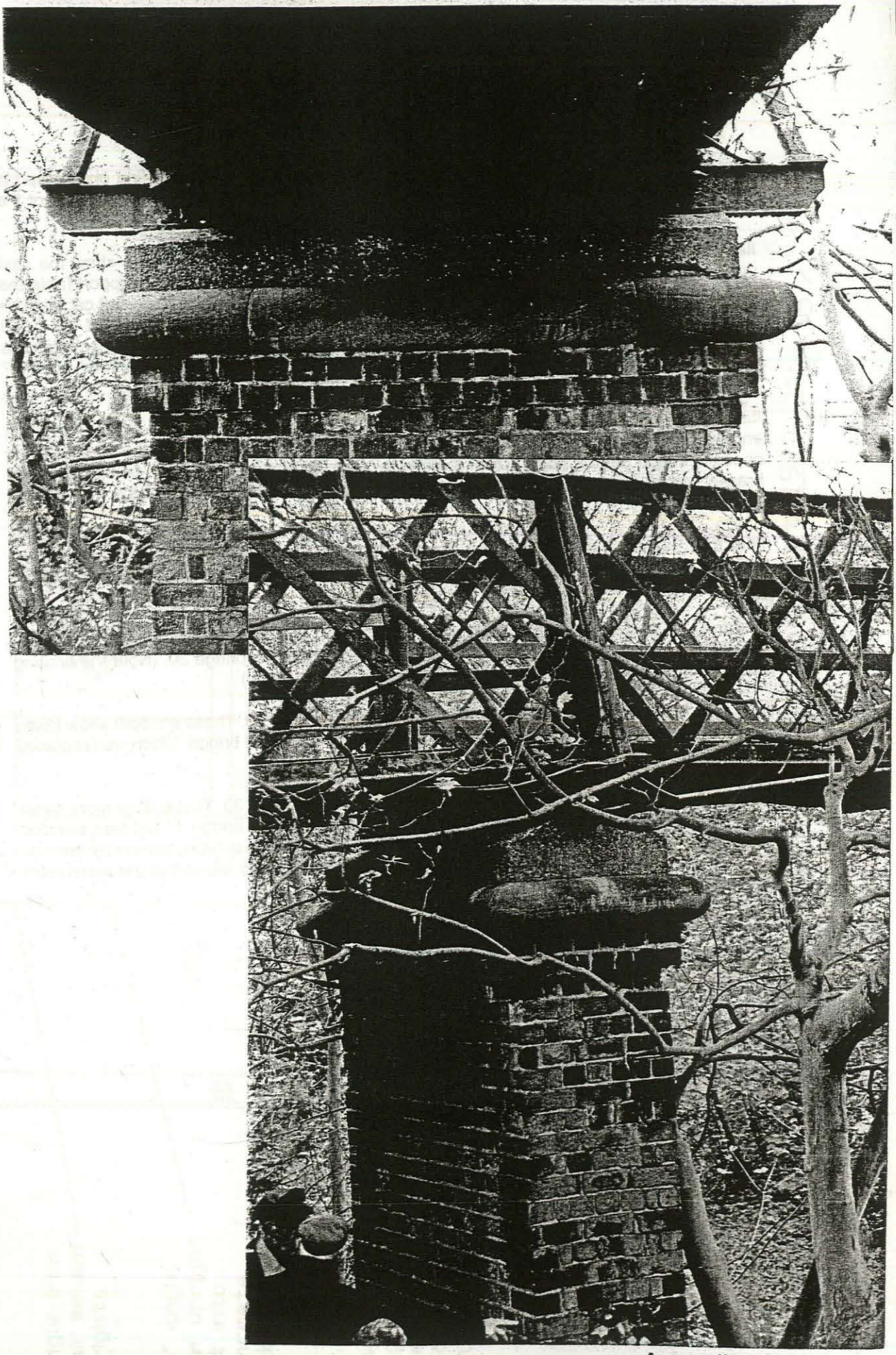
Item three – Two photographs taken June 2002 of Bridge Number 31 showing details of the end supports of the bridge. The first is of the support at the south end and the second of the opposite support at the north end of the bridge. On both photographs it can be seen that the bracket has been cut down from the original RSJ's. and the bottom edge of the 4"angle iron rail that replaced it.

Item four – Two photographs taken June 2002 of Bridge Number 31. The first shows the walkway looking south. (Note the riveted the end plate) and the second shows the view from under the central span of the walkway.

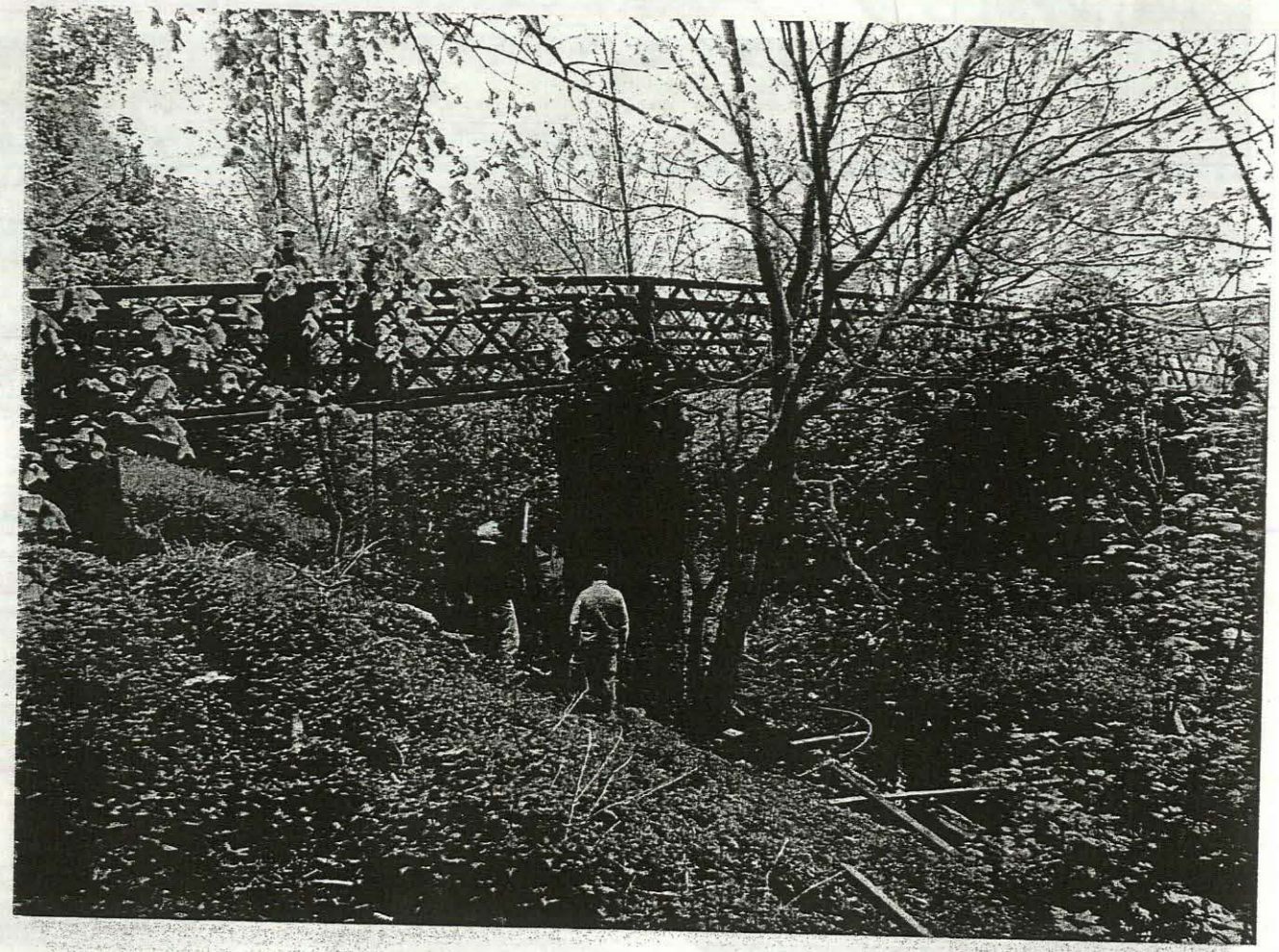
Item five – A photograph taken June 2002 of the lattice construction on bridge 31. It is likely that this was the same construction that was used originally on bridge 30. (Note the bracing struts fixed to the outrigger with bolts replacing the original rivets)

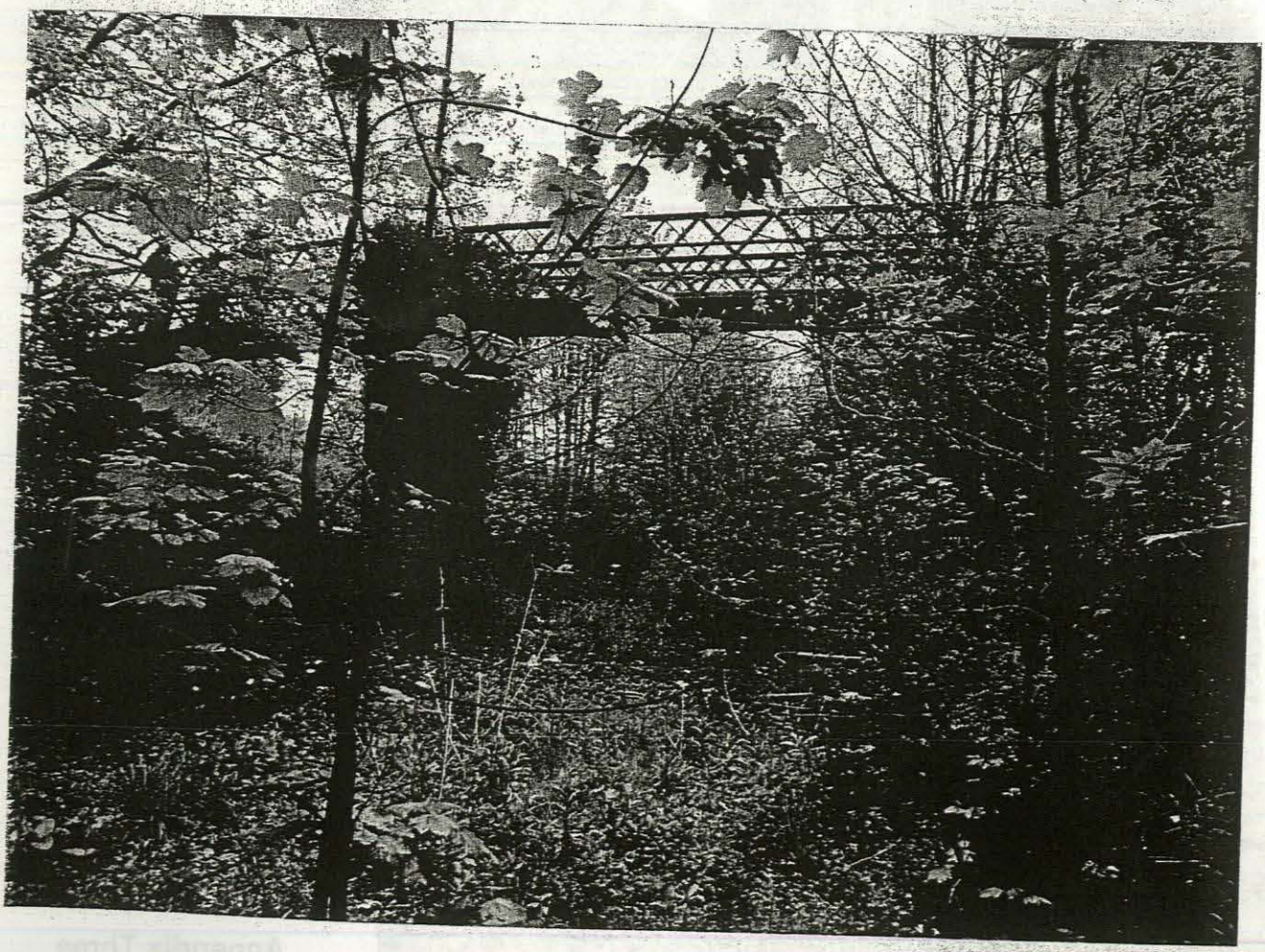
Item six – Two photographs take June 2002 of Bridge Number 30. These are both show taken looking east. Apart from the piers there is no trace of the original bridge, which was replaced in 1960.

Item seven – Two photographs take June 2002 of Bridge Number 30. These show more detail of the central piers. They are of similar construction to those of bridge 31 but less slender. They have also been subject to much repaired. The load capable of being carried by the new bridge construction is much greater than that of the original bridge, albeit that the same piers are used.

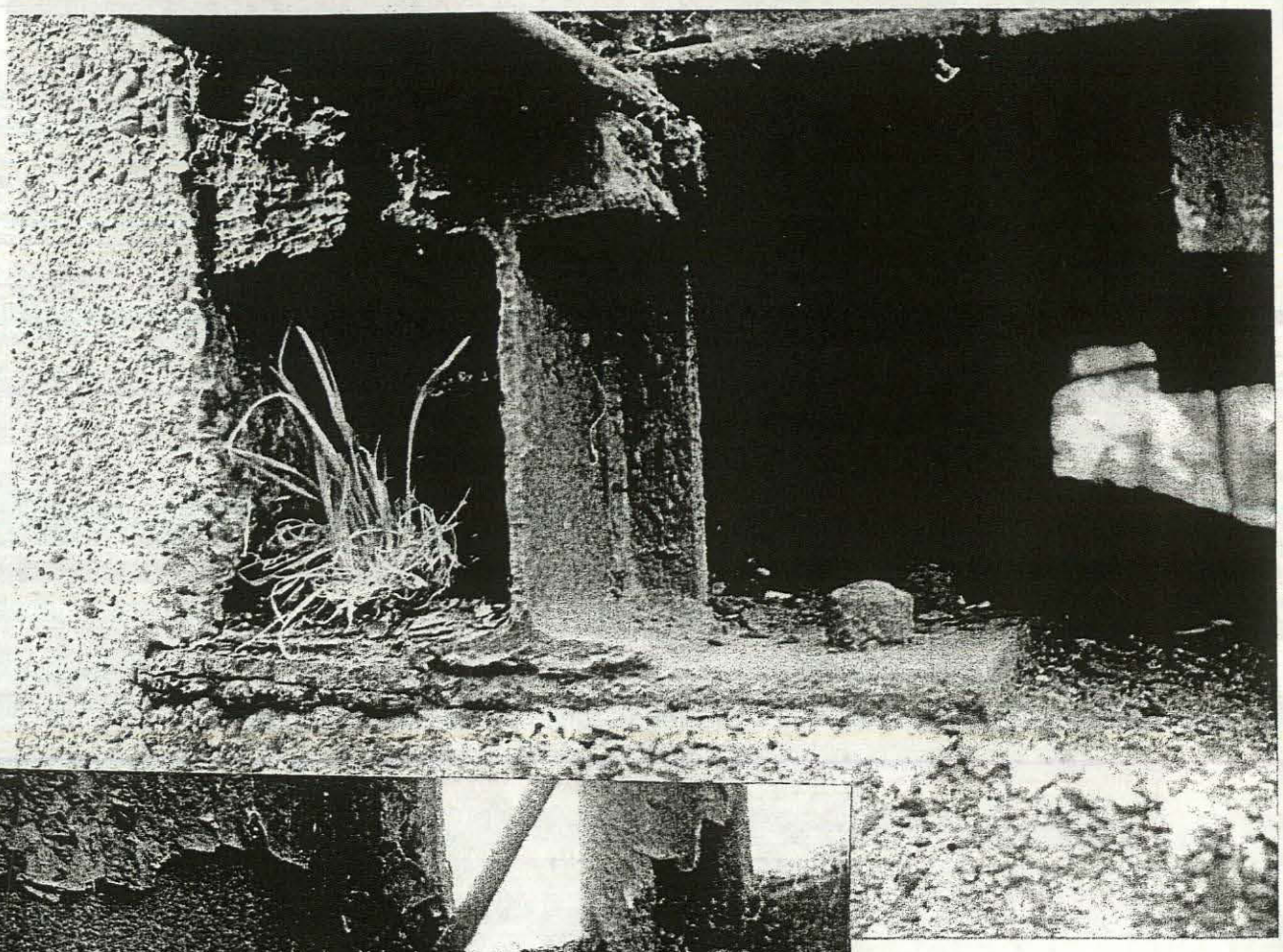


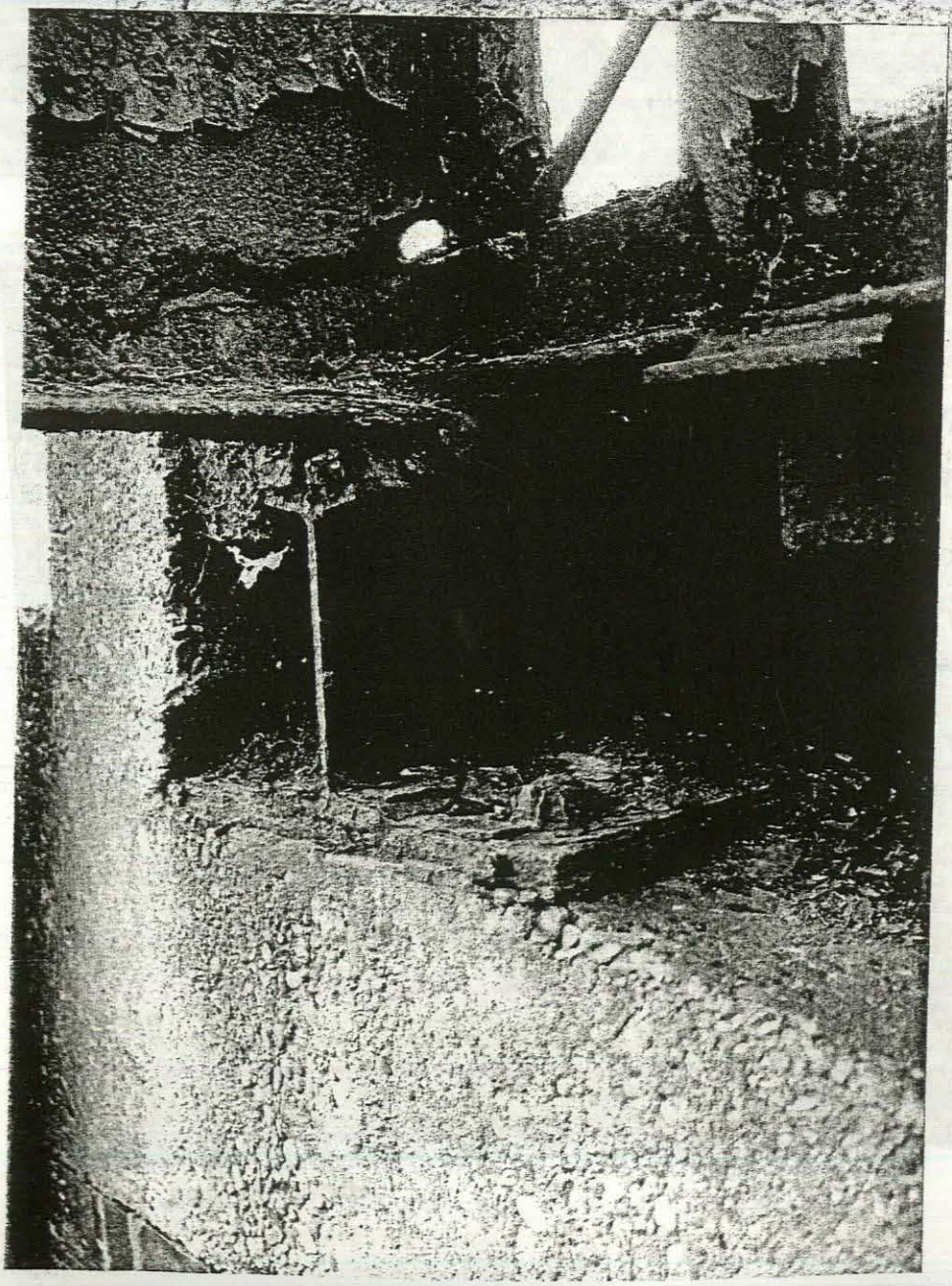
Appendix Two



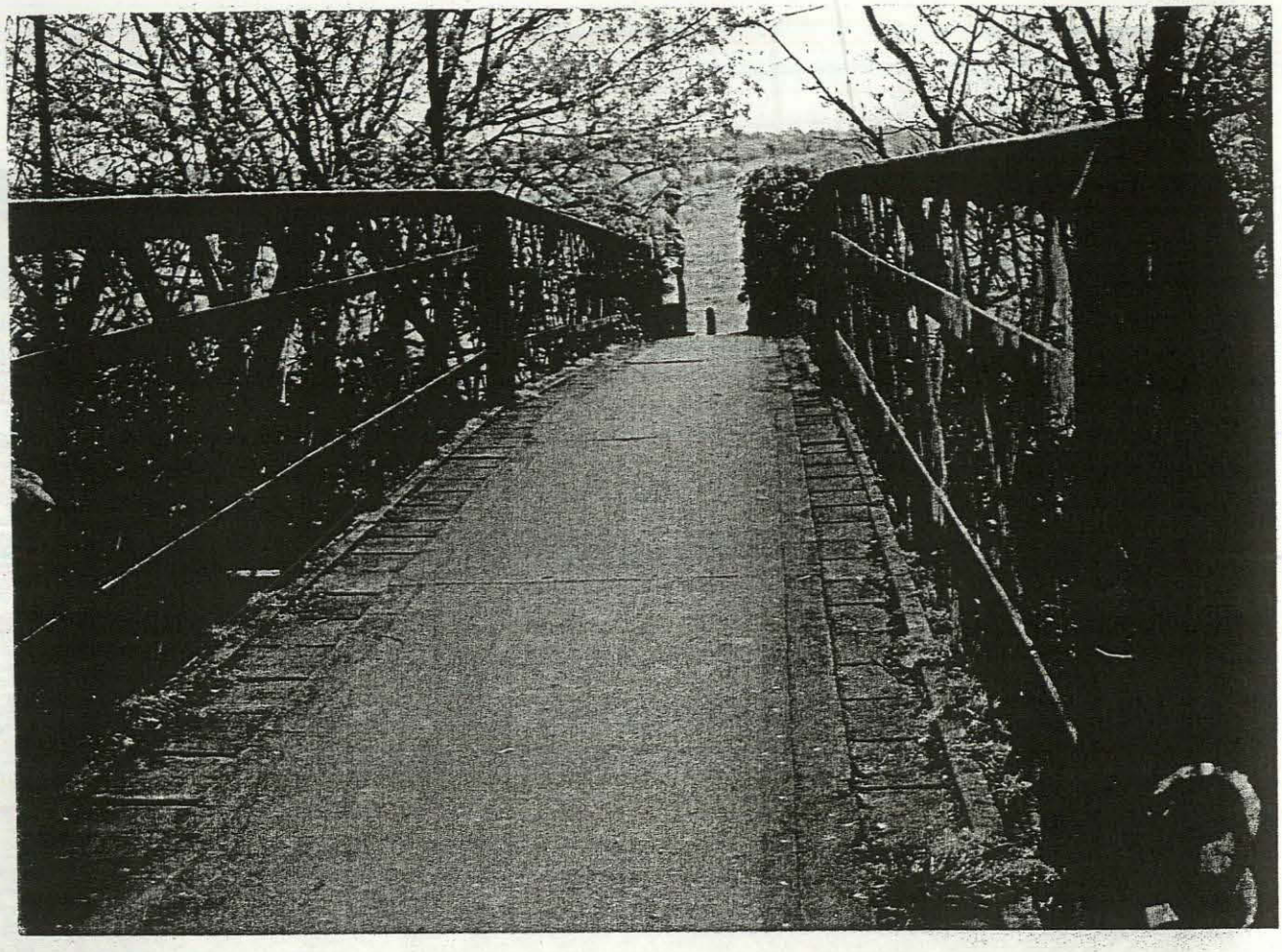


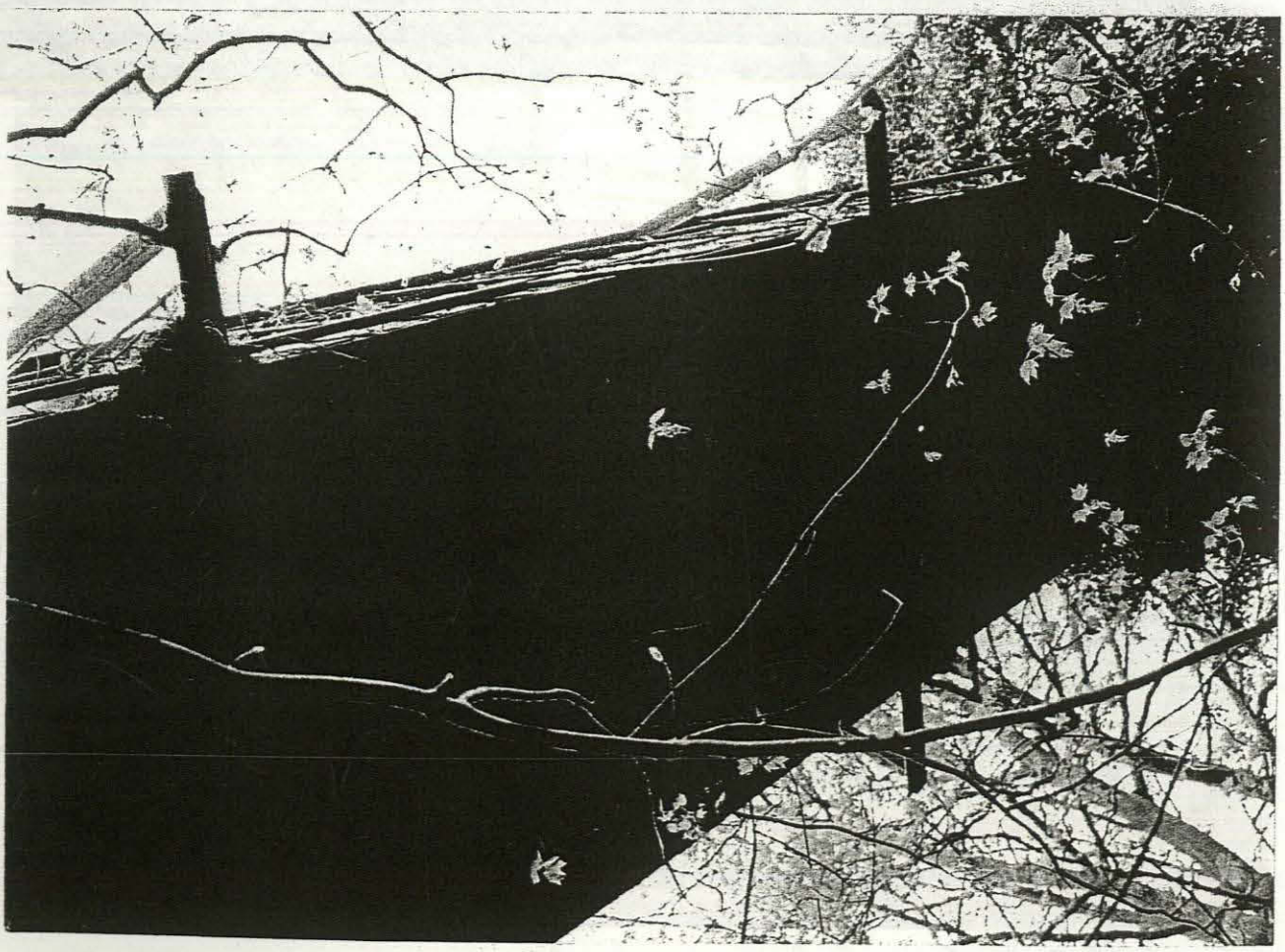
Appendix One



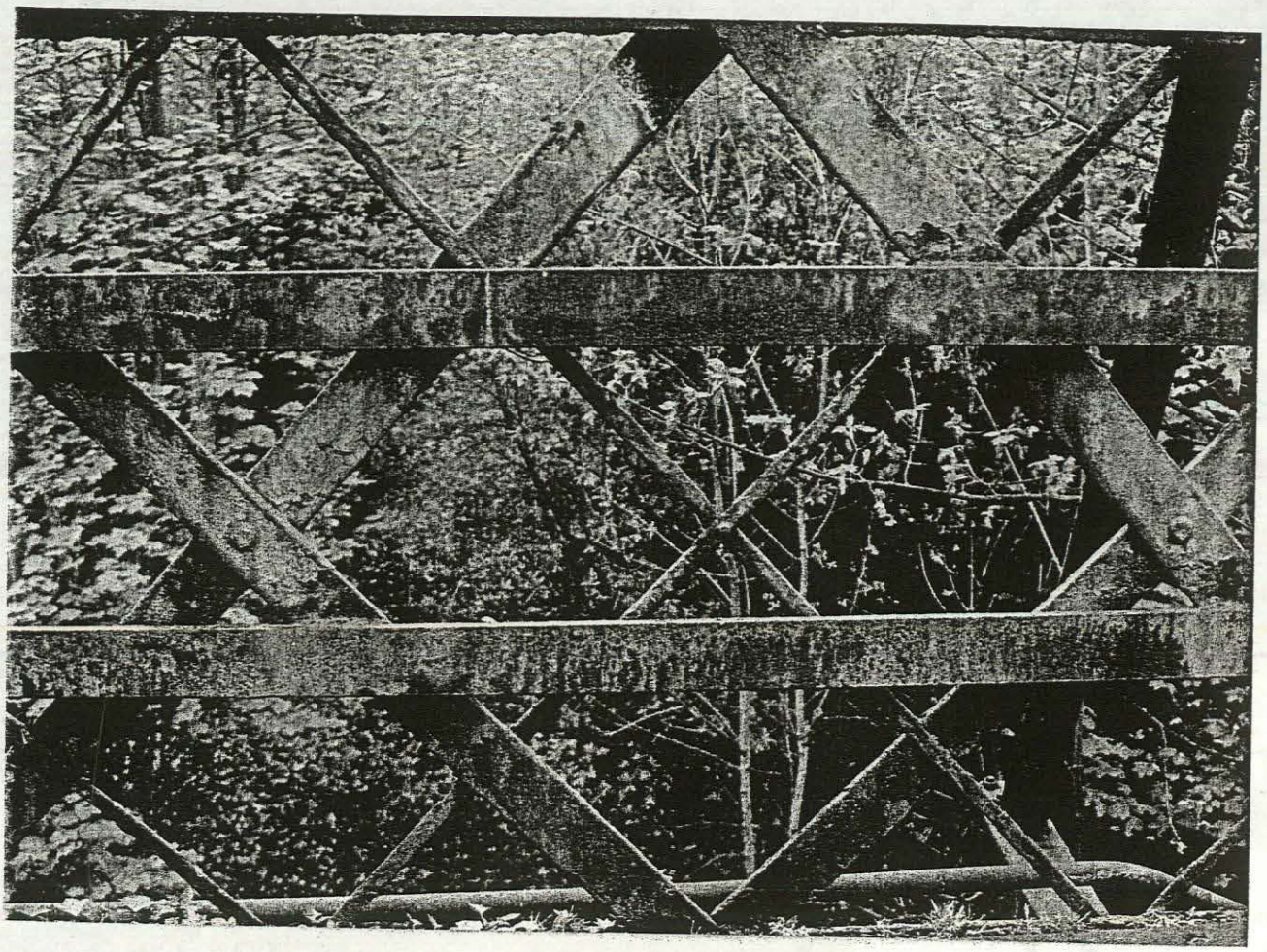


Appendix Three

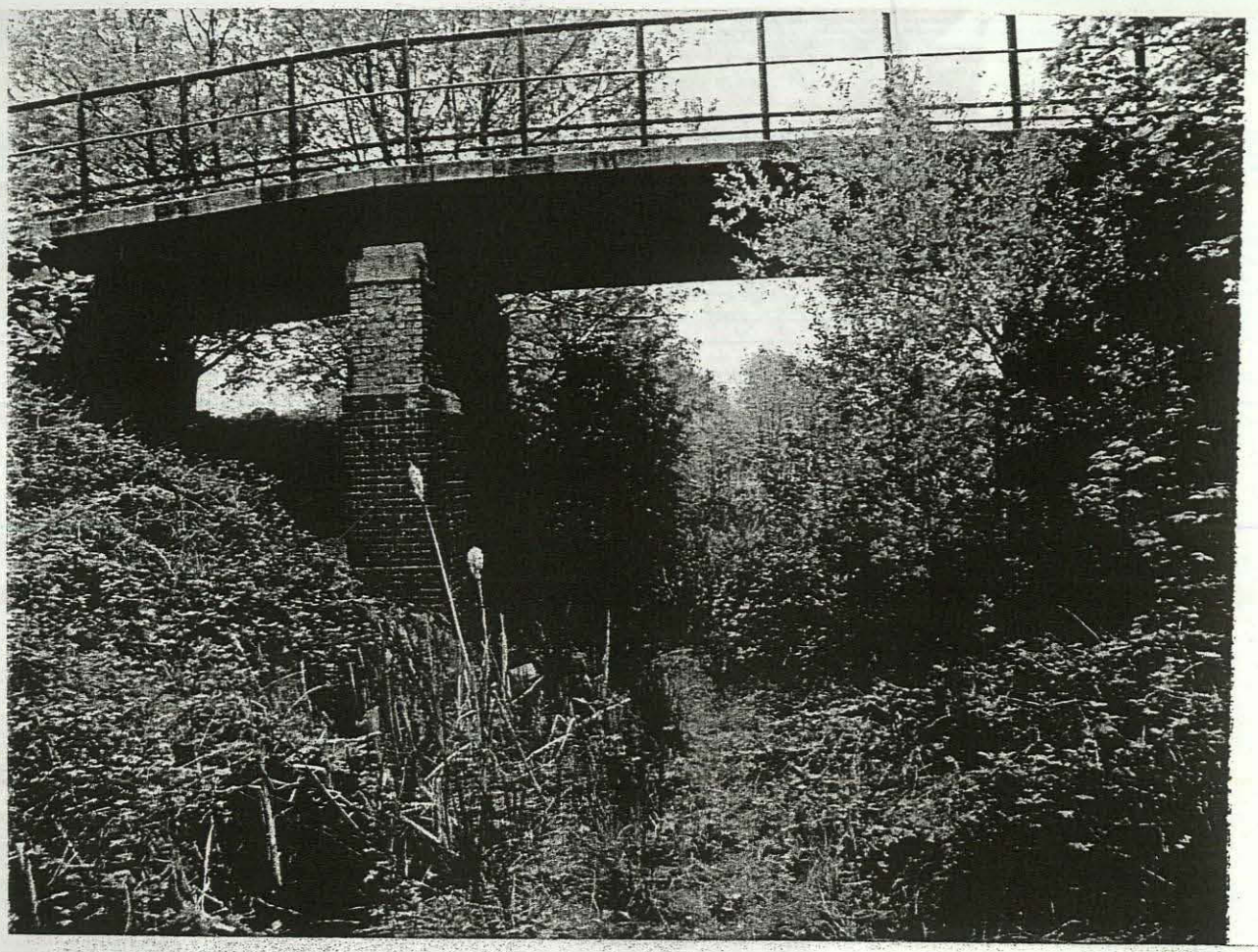


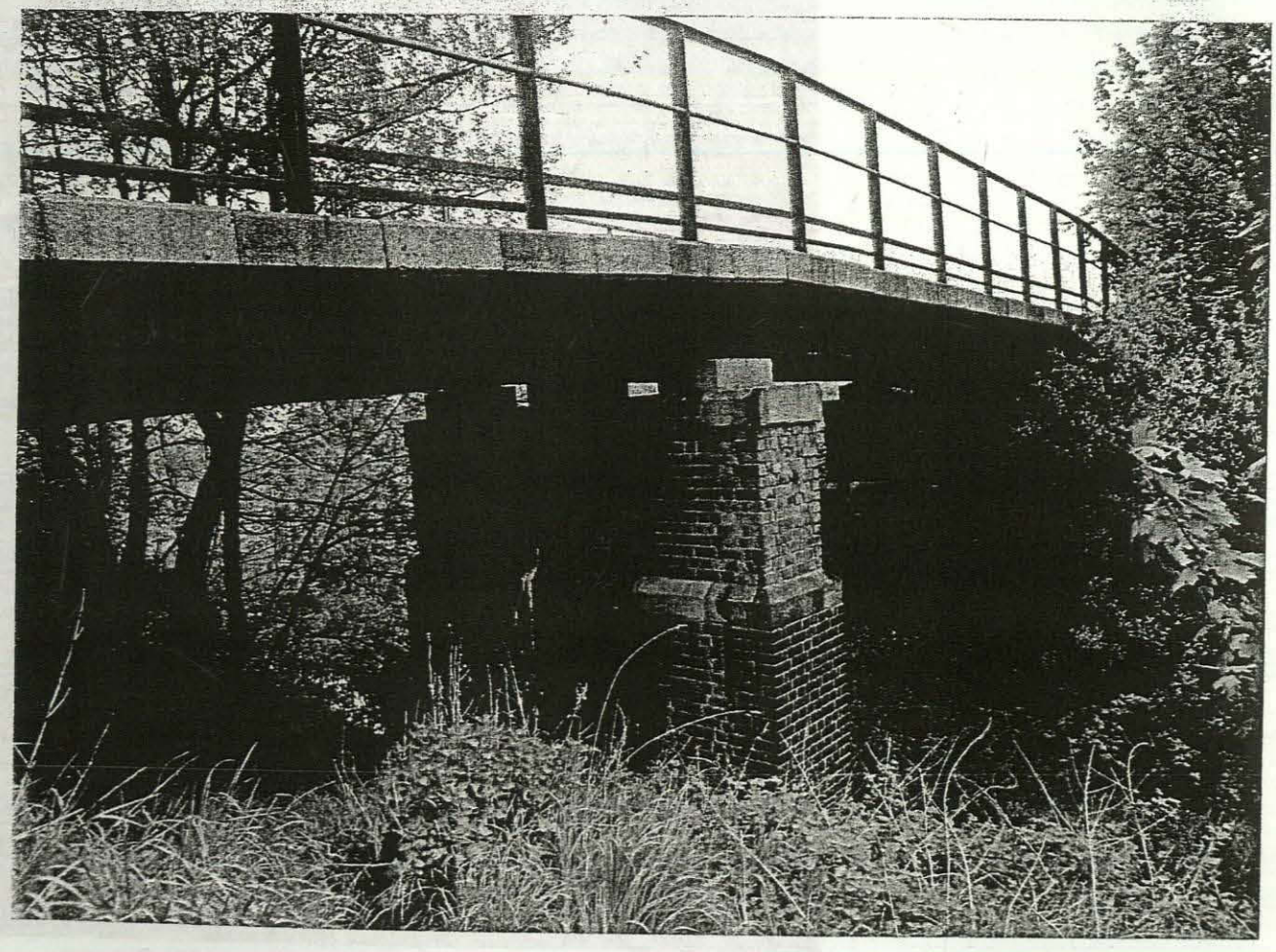


Appendix Four

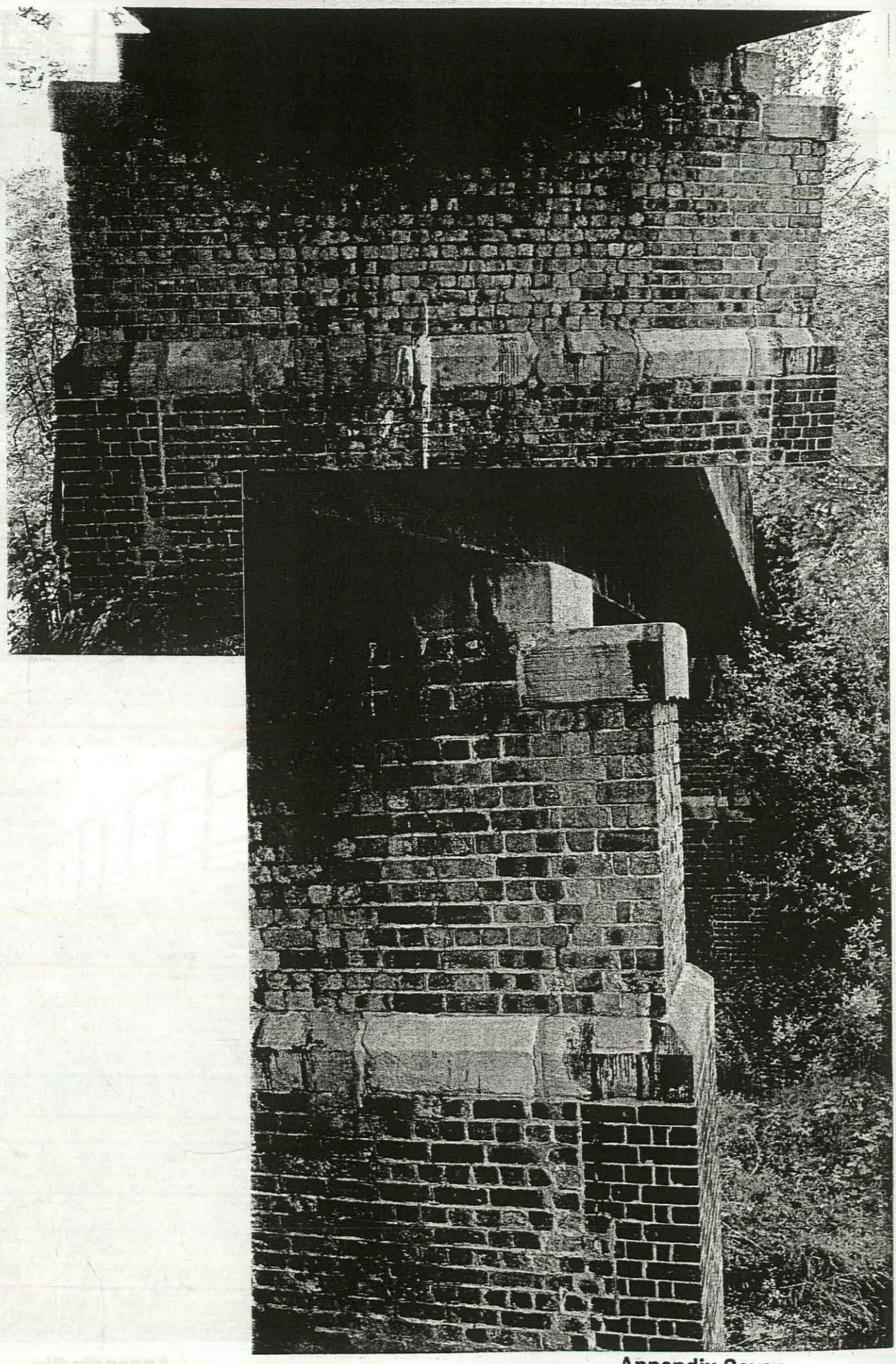


Appendix Five





Appendix Six



Appendix Seven