

**Recording of a weir
at Purton,
Gloucester and Sharpness Canal**

Martin Cook BA MIFA

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The School House
Church Lane
Tardebigge
Worcestershire
B60 3AH

07850 918755

Recording of a weir at Purton, Gloucester and Sharpness Canal

Background

Recording of a spill weir was undertaken, in advance of repair work, at Purton, Gloucestershire (SO 68687 04417; Fig 1) at the request of David Viner, Heritage Advisor, British Waterways.

Documentary evidence

The earliest available references to weirs date to the early 19th century. In his *Cyclopaedia*, Rees (1819-20) noted, in a section sub-titled *Waste-gates, trunks, tumbling-bays or weirs*:

These must be provided for letting off the surplus water of a canal in wet times, for keeping the water to one certain height, or drawing it off in case any repairs may be wanting.

Waste gates are sluices of the common construction in the side of a canal, where any considerable quantity of water is required to be let out, and are to be drawn up, either by a rack and pinion, a chain and roller or a number of holes for a crowbar, as circumstances may render most eligible. Where lesser quantities of water are to be let out, or for emptying certain lengths of the canal between the stop gates or planks when occasion may require; trunks formed of oak or elm planks, well-jointed, should be laid into the bank, at the bottom of the canal, and carefully enclosed in puddle, with a valve or shuttle that will shut very tight, and can be readily drawn when the water is required to be let off. Wherever wooden trunks are used they should be sunk so low, or the mouth where they discharge should be made up, so that the trunk may always remain quite full of water and the air be at all times excluded; in which situation wood will last much longer than if wet and dry alternately.

In the choice of situations for weirs, to discharge the surplus water of a canal, care must be taken not to let off any considerable quantity at any time, but into a brook-course or bottom of a vale, that is crossed or proceeds up to the canal, and has ditches through which the water can escape without tearing or doing injury to the land adjoining. The most frequent tumbling-bays or weirs to discharge water from canals are composed of strong walls of brick or masonry (Fig 2) whole top (q) is coped with hewn and well-jointed stone, or with a stout fill of oak, the top of the same being just level with the top water line qDH or about one foot lower than the top bank DCIK, Ac is a paving of large stones for the water to fall on and escape at A, and ABc are wing walls at the ends of the weir, to keep up the bank and confine the water.

These weirs are generally on the towing-path side, on which a low plank bridge, as Cl, is supported over it, called a weir bridge. When these weirs are wanted of considerable length, the wall qc ought not to be straight but on a circular plan, curving inwards in the middle, by which it will be better able to support the lateral pressure of the bank behind it. A puddle ditch should be carried up immediately behind the wall, allowing the courses of puddle to set thoroughly before others are applied, that the great pressure of the semi-fluid puddle may not overset or disturb the wall; and the paving AC should be of large and well-jointed stones, and it set upon a course of puddle it would be a further security against their washing up, which too often happens.

The earliest known plan of the site (Gloucester County Record Office D2460 /4/7/9/4) dating to the 1830s could not be consulted as it was not in a fit condition to be produced. The earliest available plan of Purton Weir is therefore dated 1879 (Gloucester County Record Office D2460 /4/7/1/8; Fig 3). This appears to have been undertaken as a preliminary stage to the enlargement of the weir and probably represents its 'as built' appearance. The associated weir bridge was surveyed in 1867 (Gloucester County Record Office D2460 /3/3/4/18; Fig 4). From the Waterways Trust Archive (BW 120/12/5/3) a plan dating to 1885 (Fig 5) shows a modified Purton Weir and, excluding the modern concrete arrangements at the weir head, shows the configuration of the weir as it exists today.

A brief summary of the need for and method of functioning of such weirs was provided by Vernon-Harcourt (1896):

When a canal is fed by a river or watercourses it is necessary to provide some means of regulating the supply of water, otherwise an over-abundant supply in times of flood might cause the water to overtop the banks. Accordingly, waste weirs have to be constructed at suitable places, over which the water is

discharged into watercourses, or into cuts leading to adjacent streams, when it rises above a certain level. The level is fixed by the height given to the sill of the weir, and the discharge of water by its length.

Description of the recording

General

It was agreed that a sample of each different component of the stonework would be drawn, supplemented by photographs of the various structural components as seemed appropriate. It was apparent that the weir bed was constructed in three different sizes of stone, increasing in size from south to north, as the discharge end of the weir was approached. Consequently, three discrete areas were recorded (Fig 6).

The recorded areas

The area of the weir comprising the smallest stones, varying in length from 0.3m to 0.5m and in width from a little less than 0.1m to around 0.2m, was found in the section below the weir head (Fig 7.1). These gradually increased in size and regularity to become, consistently, *c* 0.5m long and *c* 0.2m wide by the lower half of this section. The stone was laid in unmortared courses, perpendicular to the flow of the water and retained at its lower side by a transverse baulk of timber approximately 0.2m square (Fig 7.2). This was secured in place by a number of square-headed anchors.

Below this was an area of stone of much more widely variable size (Fig 7.2), being from 0.3m long by 0.1m wide, all the way up to stones in excess of *c* 1m across. These were again unmortared and retained in place at their lower end by a transverse baulk of timber approximately 0.2m square, secured in place by a number of square-headed anchors (Fig 7.3).

Flanking the weir, on its east and west sides, were longitudinal baulks of timber of similar size to the transverse ones.

Commentary

The construction of the weir at Purton seems to be broadly in line with the, albeit, fairly brief description of *tumbling-bays* provided by Rees (1819-20). The archaeological recording has added detail to our knowledge of the construction of such features. The repair work in 2009/10 was occasioned by the damage done, particularly to the adjacent banks of the weir, when, in order to relieve the severe flooding of 2007, the gates were opened to their maximum. Rees, in his article, noted the potential for such damage and the circumstances and construction necessary for ameliorating it. It is not known if wing walls were provided at Purton in order to support the adjacent land. Since the weir discharged almost directly into the River Severn, across a very short stretch of land, it seems likely that they were not considered necessary.

Acknowledgements

The author would like to thank Caroline Jones of the Waterways Trust Archive, David Viner of British Waterways for his assistance on site and Hugh Conway-Jones for information regarding the relevant holdings of Gloucestershire County Record Office.

Bibliography

Rees, A, 1819-20 *Cyclopaedia*

Vernon-Harcourt, L F, 1896 *Rivers and canals*, II

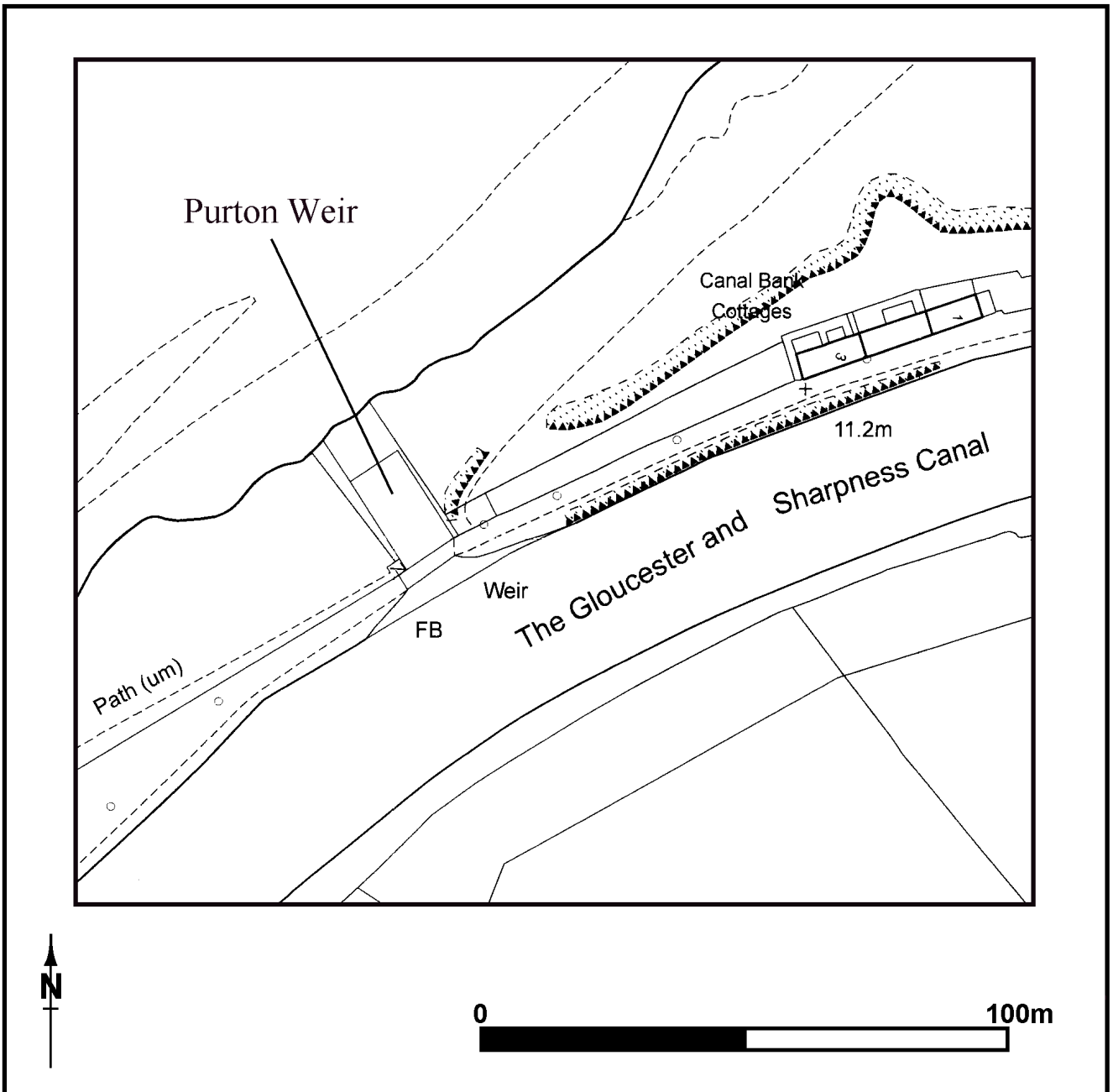
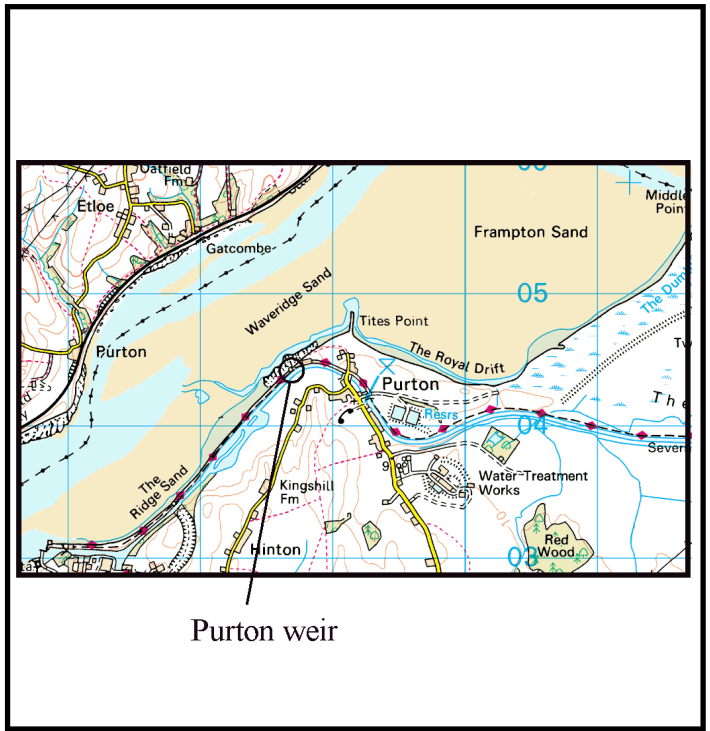


Fig 1: Location of site

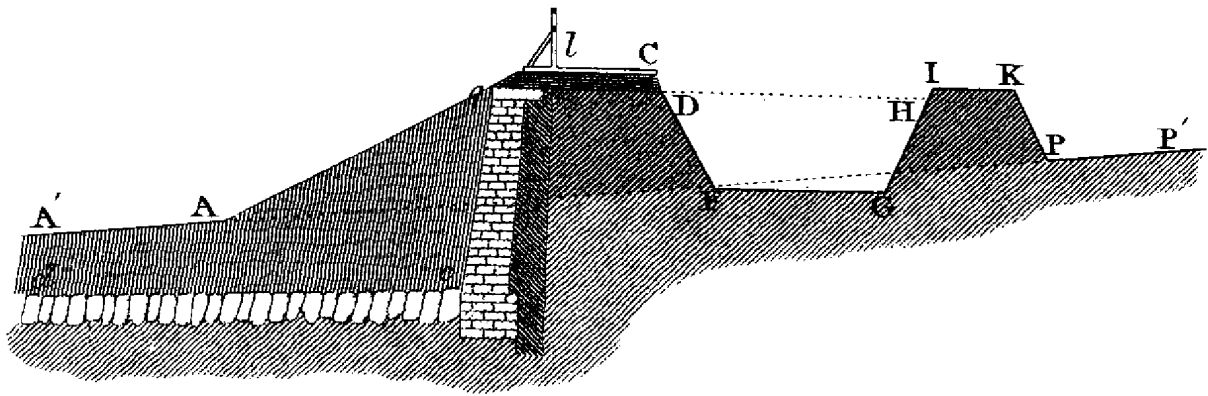


Fig 2: Construction of a weir after Rees 1819-20

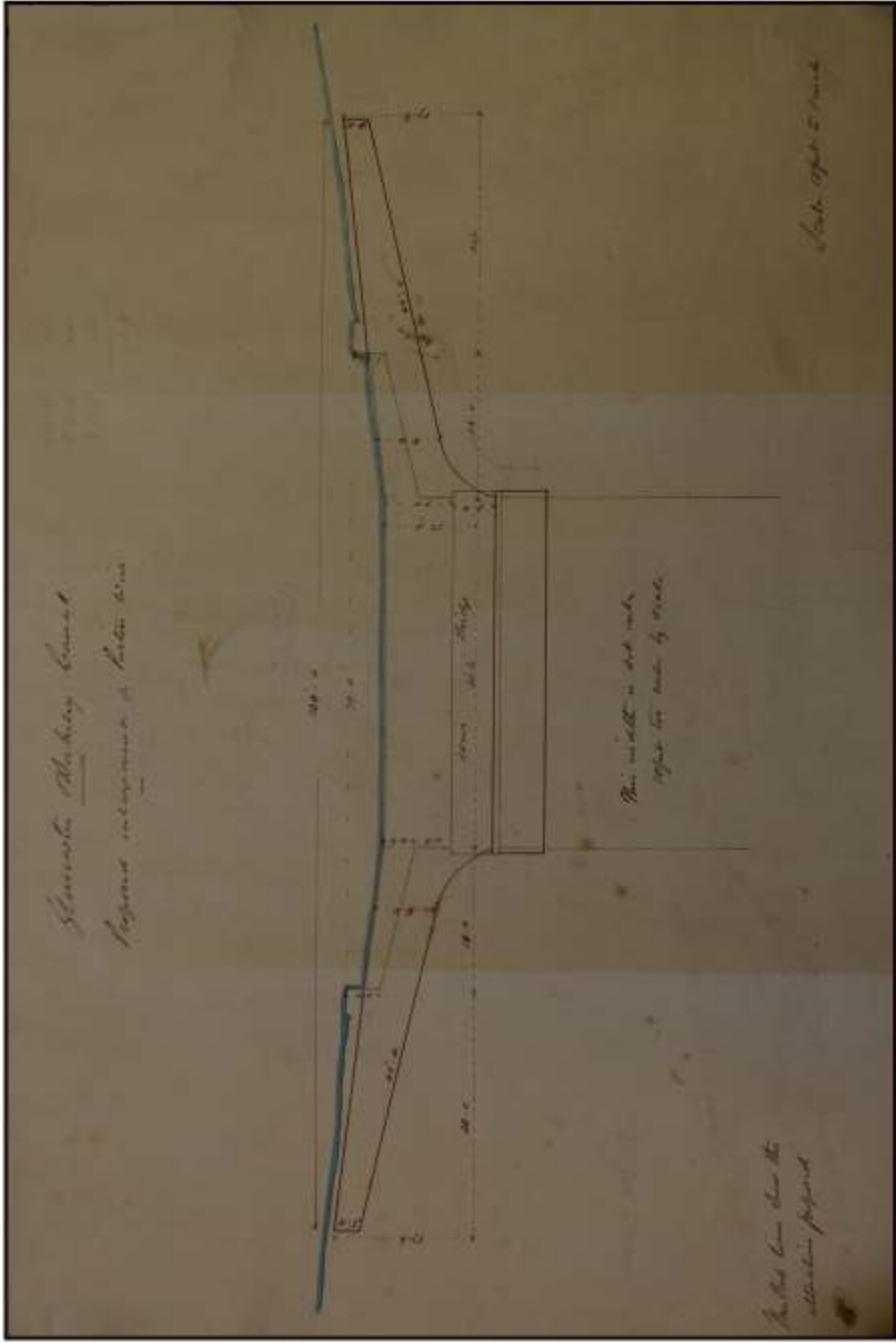


Fig 3: As existing survey of Purton Weir c 1879

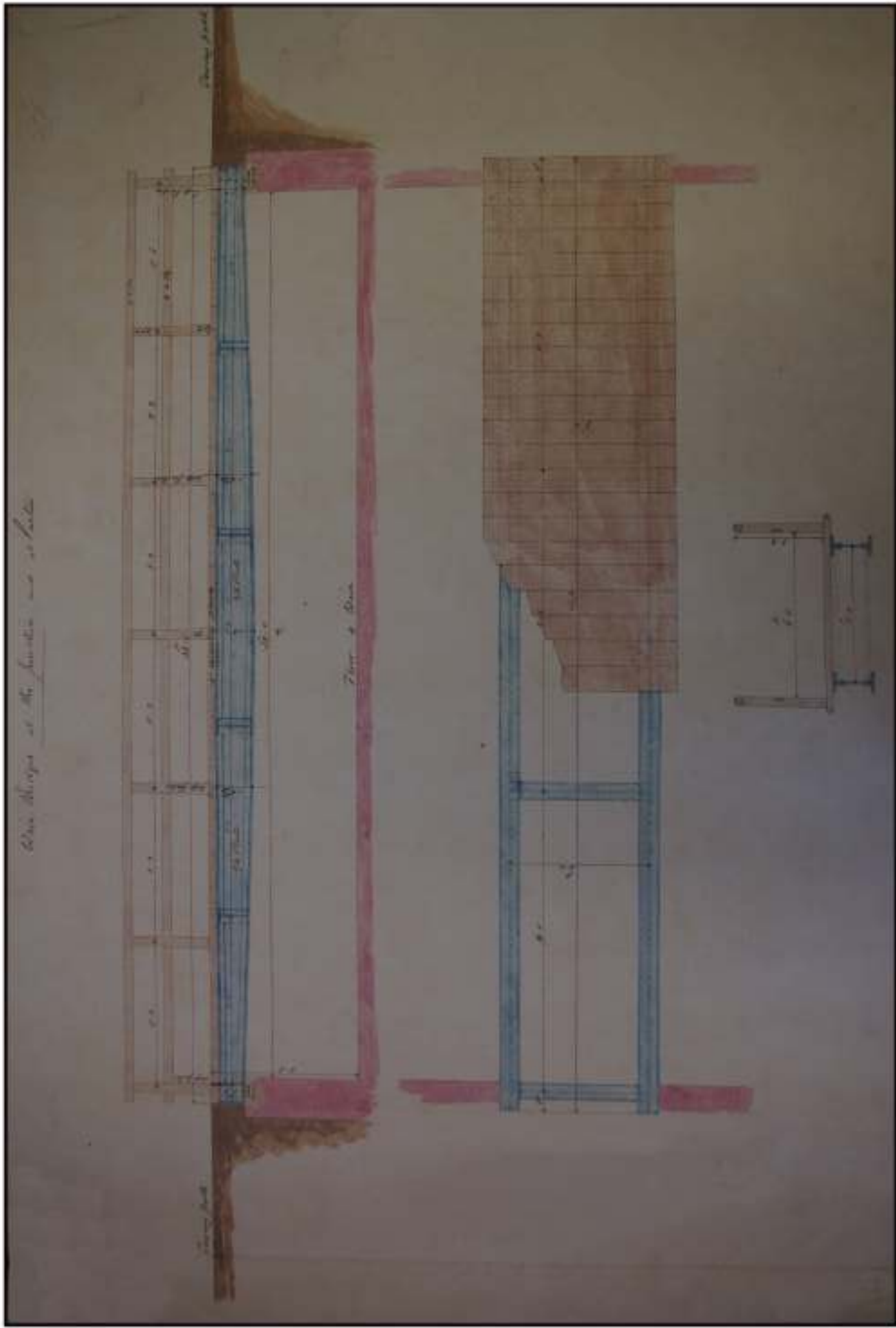


Fig 4: Survey of bridge over Purton Weir c 1867

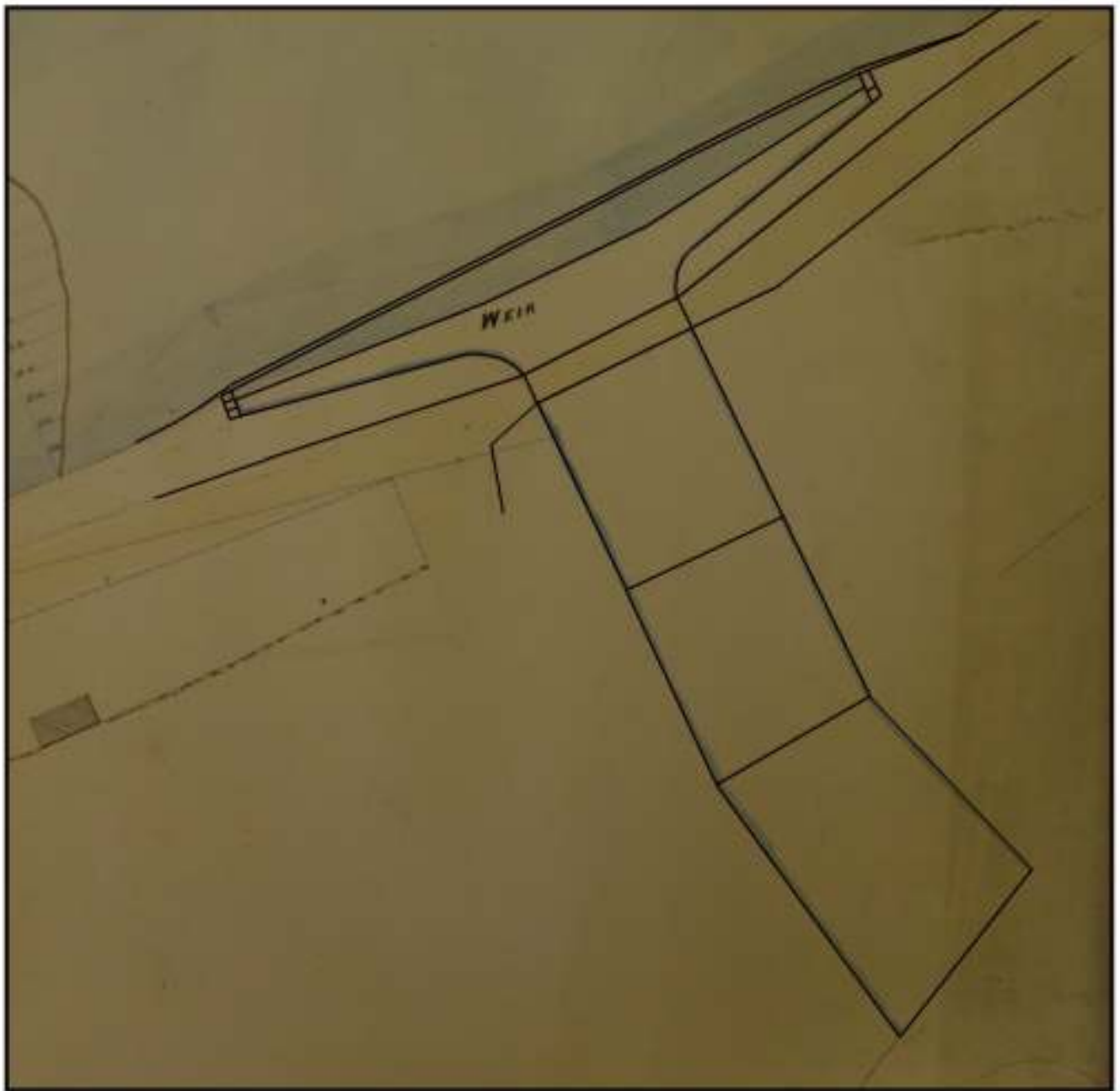


Fig 5: As proposed alterations to Purton Weir c 1885

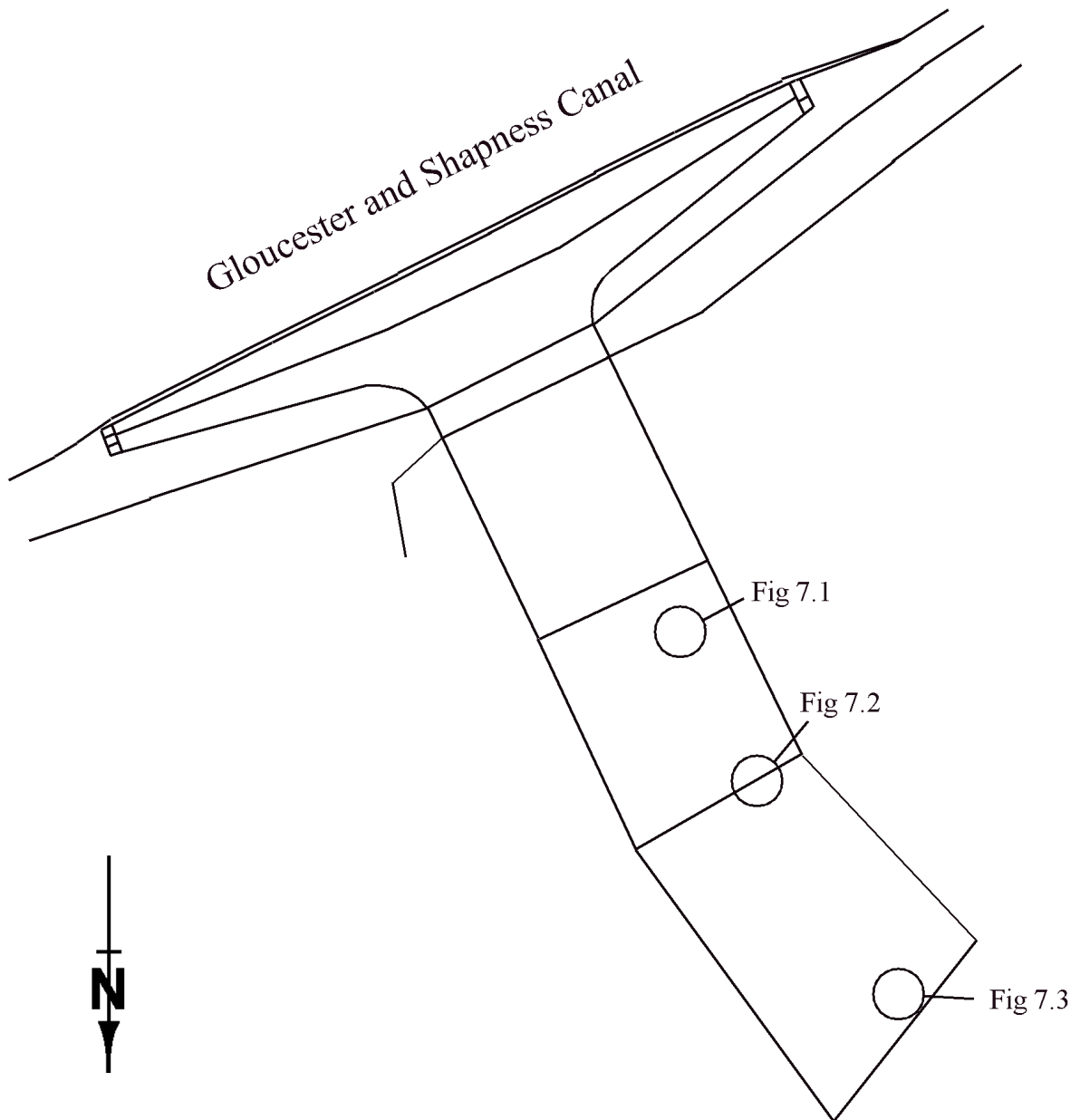


Fig 6: Locations of recorded elements of Purton Weir - Figures 7.1 to 7.3

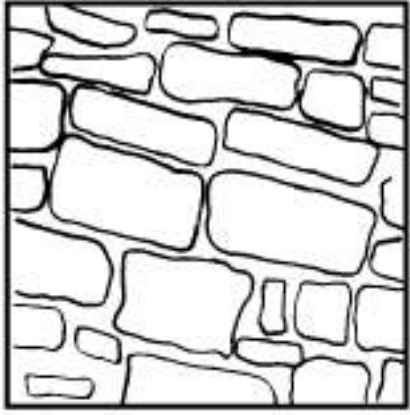


Fig 7.1. Typical stone arrangement near top of weir

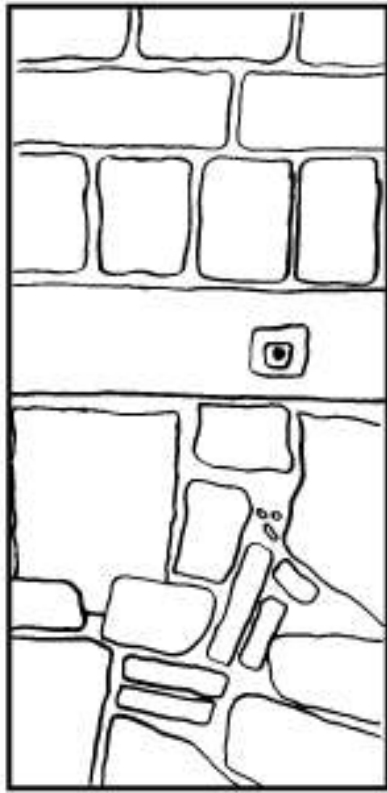


Fig 7.2: Typical stone arrangement near middle of weir

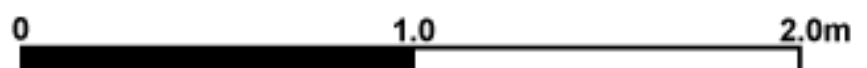


Fig 7.3: Typical stone arrangement near bottom of weir