

# Twelveheads Bridge, Bissoe, Cornwall

## Archaeological watching brief



Historic Environment Projects



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## **Acknowledgements**

This study was commissioned by Angela Holmes of Highways, Cornwall Council and carried out by the projects team of Historic Environment, Cornwall Council.

The views and recommendations expressed in this report are those of the Historic Environment projects team and are presented in good faith on the basis of professional judgement and on information currently available.

## **Freedom of Information Act**

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## **Cover illustration**

Twelveheads Bridge viewed from the downstream side.

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## **Abbreviations**

CRO	Cornwall County Record Office
EH	English Heritage
HER	Cornwall and the Isles of Scilly Historic Environment Record
HE	Historic Environment, Cornwall Council
NGR	National Grid Reference
OS	Ordnance Survey
PRN	Primary Record Number in Cornwall HER
RIC	Royal Institution of Cornwall

## 1 Summary

An archaeological investigation of Twelveheads Bridge was undertaken in July 2009 in advance of and during strengthening works. This simple two-span bridge was built in the mid 19<sup>th</sup> century and was probably constructed to allow better access between local mines and a tin processing works that had become established here. The bridge was altered in the 1980s when the facings were substantially rebuilt and the railings renewed.

A watching brief revealed that one granite lintel had been replaced. The fill material over the granite spans comprised compacted mine waste. Somewhat rarely (for bridge works) a find was made of an intact 19<sup>th</sup> century ink bottle, presumably deposited on the bridge deck at the time of its construction.

Strengthening works comprised supplementing the original granite bridge deck with an *in situ* reinforced concrete slab. The levels and surfacing were reinstated after this was installed.





## 2 Introduction

### 2.1 Project background

Twelveheads bridge fails the current highway loading requirements and Cornwall Council put forward a proposal to strengthen it by over-slabbing the existing granite lintels with a reinforced concrete deck. Although not listed the bridge has origins in the 19<sup>th</sup> century and is situated within the Cornish Mining World Heritage Site.

A brief outlining required archaeological recording works was prepared by Philip Markham, Historic Environment Planning Advice Officer (HEPAO), on behalf of the County Archaeologist. This brief stated:

*The present proposals will culminate in the potential destruction of material remains of the bridge. It is therefore important that the bridge is recorded to an appropriate level; and that the results are made available to interested parties. In this particular instance, for the photographic record, the recorder needs to consider:*

- *Site layout and organisation*
- *Materials, method of construction*
- *Internal arrangements*
- *Original fixtures and fittings*
- *Subsequent fixtures and fittings*
- *Date/period of initial build and subsequent alterations*

Historic Environment (Projects) was subsequently contacted by the Highways section of Cornwall Council regarding recording works and an estimate of costs was agreed. A Written Scheme of Investigation (WSI) was prepared to set out the proposed methodology. Work went ahead in July 2009 and this report summarises the results of the study.

### 2.2 Aims

The principal aim of the study was to gain a better understanding of the history and development of the bridge. The objectives were to obtain an archaeological record of the site prior to alterations, and to record features temporarily exposed during the courses of strengthening works.

### 2.3 Working methods

Fieldwork was intended to be equivalent to an English Heritage Level 2 survey (see English Heritage 2006). It comprised a brief desk-based historical study, a site visit and photographic survey before the bridge was strengthened, followed by a watching brief when the bridge deck was exposed during strengthening works.

#### 2.3.1 Desk-based research

A brief study of readily available historic mapping and other sources was undertaken. A full list of the sources consulted can be found in the References (Section 7).

#### 2.3.2 Site visit

A site visit was undertaken on 23<sup>rd</sup> July 2009. The chief recording medium was archive quality monochrome photography with photographs taken with a 35mm SLR camera fitted with a wide-angle lens and mounted on a tripod. Locations of the monochrome photographs were marked on a plan (a copy has been retained in the project archive file). The archive quality

photography was supported by colour digital photography (at a resolution of 5 million pixels). Notes and annotations were recorded on a copy of a measured survey of the bridge.

### 2.3.3 Watching brief

An archaeological watching brief was undertaken to record the exposed bridge deck and any other features revealed, during the period of the contractors' works. Recording comprised further monochrome film and colour digital photography, as well as a measured plan of the exposed bridge fabric (recorded at 1:20 scale). Following the fieldwork a digitised copy of this plan was added to the engineer's drawing.

## 3 Location and setting

Twelveheads Bridge, located at NGR SW 75984 42232, carries the C390 road over a stream between Twelveheads village and Bissoe. The bridge crosses a tributary of the Carnon River, the confluence with the main channel being a little further downstream.

The historic landscape character of the wider area including the valley bottom around Twelveheads is described on HE's mapping as Upland Rough Ground. This description seems inaccurate and it appears that this area is actually Anciently Enclosed Land, bordering Recently Enclosed Land, the predominant character of which has developed from smallholdings associated with mining. The immediate context of the bridge is built up as part of the hamlet of Twelveheads.

### 3.1 Designations

Twelveheads Bridge lies within part of the Cornish Mining World Heritage Site and can be considered to contribute to its Outstanding Universal Value as a component relating to local mine sites, mine transport and mining settlement. This World Heritage Site was inscribed by UNESCO in July 2006. Issues 4 to 8 of its management plan policies refer to protection and conservation. The statements which are most relevant to the bridge include:

Policy 4c Planning authorities should ensure that new development protects, conserves and enhances the [World Heritage] Site and its setting.

Policy 7a Sustainable heritage-led regeneration will be encouraged and supported.

Policy 7b New development should add to the quality and distinctiveness of the Site by being of high quality design and respectful of setting.

Policy 7c There should be a presumption in favour of retaining and re-using historic buildings which are important components of the Site.

Policy 8a The conservation and continuing maintenance of the historic fabric of the Site should be undertaken to the highest standards to ensure authenticity and integrity.

Policy 8b The historic character and distinctiveness of the Cornwall and West Devon mining landscape should be maintained.

Policy 8c Traditional materials and skills should be encouraged in the maintenance of the authentic historic fabric within the Site.

Policy 8d Where the historic fabric within the Site has been lost or compromised through non-authentic materials, inappropriate details and poor workmanship, historic character and detail will be reintroduced wherever and whenever possible.

(Thorpe *et al* 2005)

No other conservation designations apply to the bridge.

## **4 Brief history**

This former rural area was developed in the 18<sup>th</sup> and 19<sup>th</sup> centuries by extensive mining activities. Twelveheads itself takes its name from a tin stamping mill, formerly used to crush ore for processing. Although the bridge now lies within the modern parish of Chacewater, its site was once on the parish boundary between Kea and Gwennap. The bridge is not shown on the tithe maps for either of the old ecclesiastical parishes (surveyed in 1839 and 1846 respectively) but it was in existence by the mid-1870s when the area was first surveyed at large scale by the OS. It is also shown on the Second Edition OS map (c1907) and on subsequent maps. The available historic mapping does not appear to show any significant alteration to the bridge since the time when it was built.

Interestingly both these early OS editions show a large tin streamwork immediately north of the bridge site. This was probably the site of the tin stamps from which the village takes its name. Several circular features depicted on the two historic maps are most likely to be buddles or round frames used to refine crushed cassiterite (tin ore) from waste rock. The tin streamwork became disused in the 20<sup>th</sup> century and its site is now occupied by modern houses and their associated gardens and drives.

The CC bridge card (held by Highways) indicates that Twelveheads Bridge was renovated in 1980. Contemporary photographs indicate the parapets and river walls were re-pointed or rebuilt at this time.

## **5 Results of archaeological recording**

### **5.1 Bridge description**

Twelveheads Bridge is a two-span granite lintel bridge c7.52m long and has an overall width of 4.78m, with a roadway 3.65m wide. The spans each measure approximately 1.15m wide. It has abutments and a central pier of un-coursed granite rubble masonry. Its northern abutment appears to have been rebuilt with vertically set granite masonry, having a pronounced battered wall face. The central pier extends beyond the bridge deck on the upstream side but does not have a pointed cut-water; unusually it instead presents a squared face to the stream. This may be the result of rebuilding. In the later 20<sup>th</sup> century a water pipe (perhaps supplying the group of houses to the south) has been hidden within a square concrete casting, passing over the extended end of the pier. Also in recent years a telecoms conduit has been laid across the bridge deck towards the eastern side.

The northern bridge abutment is built of upright granite stones set in a battered wall face. All of this, like the rest of the masonry, has been re-pointed with cement-based mortar.

The bridge has no parapets but instead has roughly squared granite pillars at the ends, now linked by modern galvanised railings. Beneath the railings are neatly squared granite kerbs. Both the railings and kerbs appear to have been rebuilt during the 1980s works. On the downstream side kerbstones near the northern side had been replaced with shorter granite pieces. The dressing on these stones does not match the originals.

The entire bridge has been extensively re-pointed with cement-based mortar; this probably all dates from the 1980s rebuild. No traces of original mortar were observed but it is likely that this was lime-based material. There are extended stream bank retaining walls on both the upstream and downstream sides of the bridge. These have also been re-pointed or rebuilt.

Drill marks on the granite lintels indicate that these were quarried in the mid-19<sup>th</sup> century; this dating accords with the map evidence.

To inform the bridge strengthening works, six test pits were excavated by CC contractors above the bridge deck.

## 5.2 Watching brief

An archaeological watching brief was undertaken when the blacktop surfacing and underlying depth of hardcore had been taken off and the bridge deck exposed by the contractors. A measured survey of the bridge deck was undertaken and the granite lintels recorded.

All except one of the granite lintels appear to have been undisturbed from the time the bridge was built. The exception was one on the southern span, which overlapped the south abutment and appeared to be too narrow to make a good fit with the other lintels. Other stone (a mixture of granite and slate) was packed in to fill any holes. Above this was a thick layer of roughly compacted orange-brown to grey coarse hardcore. This material was mine waste. There was no trace of any other earlier surfacing such as cobbles.

As the majority of the lintels have not been disturbed, it seems that the battered wall face which forms the northern abutment is probably an original feature and not a replacement or rebuild.

A small brown-glazed stoneware ink bottle was recovered from the fill material by the contractors. This was found on top of the lintels, suggesting it was deposited on the bridge deck during construction. The bottle is a common type which would have been in common use in the mid to late 19<sup>th</sup> century (date range c1840-1880).

The upstream bridge facing was found to have a complete line of dressed granite kerbstones set at a lower level than the present ones. All of the facing on this side, as on the downstream side, had been bonded with cement-based mortar and so had been rebuilt at the time of the 1980s renovation. It is not known whether the apparently older set of kerbstones are original to the bridge or not, or whether some material had been reused from elsewhere.

The fill material above the lintels was disturbed by the addition of a telecoms conduit (110mm steel pipe encased in concrete) towards the downstream side.

## 6 Discussion

The cartographic and structural evidence indicates that Twelveheads Bridge was built in a single phase in the mid-19<sup>th</sup> century. It was probably built to serve the transport needs of local mines as well as the settlements, and provided a useful link between the tin processing works and mines to the south of the Twelveheads stream/Carnon River. The battered wall face on the northern bridge abutment is probably an earlier property wall which became incorporated in the bridge structure.

Since then, visible changes to the bridge include apparent replacement of one lintel in the southern span (probably carried out in the later 19<sup>th</sup> century), later 20<sup>th</sup> century additions of the water pipe outside the upstream facing and telecoms conduit nearer the downstream face, as well as the extensive rebuilding of the bridge facings in the 1980s.

The strengthening programme entailed removal of the existing surface and fill, and installation of an *in situ* reinforced concrete slab, and then reinstatement of the road level and surfacing. The new slab extends over the existing granite lintels and over the abutments, and will have the effect of spreading any traffic load weight over the whole structure. There will be no visual loss of historic components as the granite beams will remain visible from underneath. As the bridge facings are already modern, the historic material left in the bridge can only be seen from beneath, and comprise its abutments, pier and the granite lintels.

## 7 References

### 7.1 Primary sources

Ordnance Survey, c1880. *25 Inch Map* First Edition (licensed digital copy at HES)

Ordnance Survey, c1907. *25 Inch Map* Second Edition (licensed digital copy at HES)

Ordnance Survey, 2007. *Mastermap Digital Mapping*

Tithe Map and Apportionment, 1839. *Parish of Kea* (microfiche copy at HES)

Tithe Map and Apportionment, 1846. *Parish of Gwennap* (microfiche copy at HES)

### 7.2 Publications

English Heritage, 2006. *Understanding Historic Buildings: A guide to good recording practice*. English Heritage, Swindon

Thorpe, S., Boden, D. & the World Heritage Site Bid Team, 2005. *Cornwall and West Devon Mining Landscape World Heritage Site Management Plan 2005 – 2010*. Truro: Cornwall County Council

## 8 Project archive

The HES project number is **2009060**

The project's documentary, photographic and drawn archive is housed at the offices of Historic Environment, Cornwall Council, Kennall Building, Old County Hall, Station Road, Truro, TR1 3AY. The contents of this archive are as listed below:

1. A project file containing site records and notes, project correspondence and administration.
2. Electronic drawings stored in the directory R:\Historic Environment (CAD)\CAD Archive\Sites T\Twelveheads Bridge 2009060
3. Black and white photographs archived under the following index numbers: GBP2085
4. Digital photographs stored in the directory R:\Historic Environment (Images)\SITES.Q-T\Twelveheads Bridge 2009060

This report text is held in digital form as: G:\Historic Environment (Documents)\HE Projects\Sites\Sites T\Twelveheads Bridge WB 2009060\report\Twelveheads Bridge WB report.doc

Artefacts retrieved during the project will be transferred to the Royal Cornwall Museum, River Street, Truro.



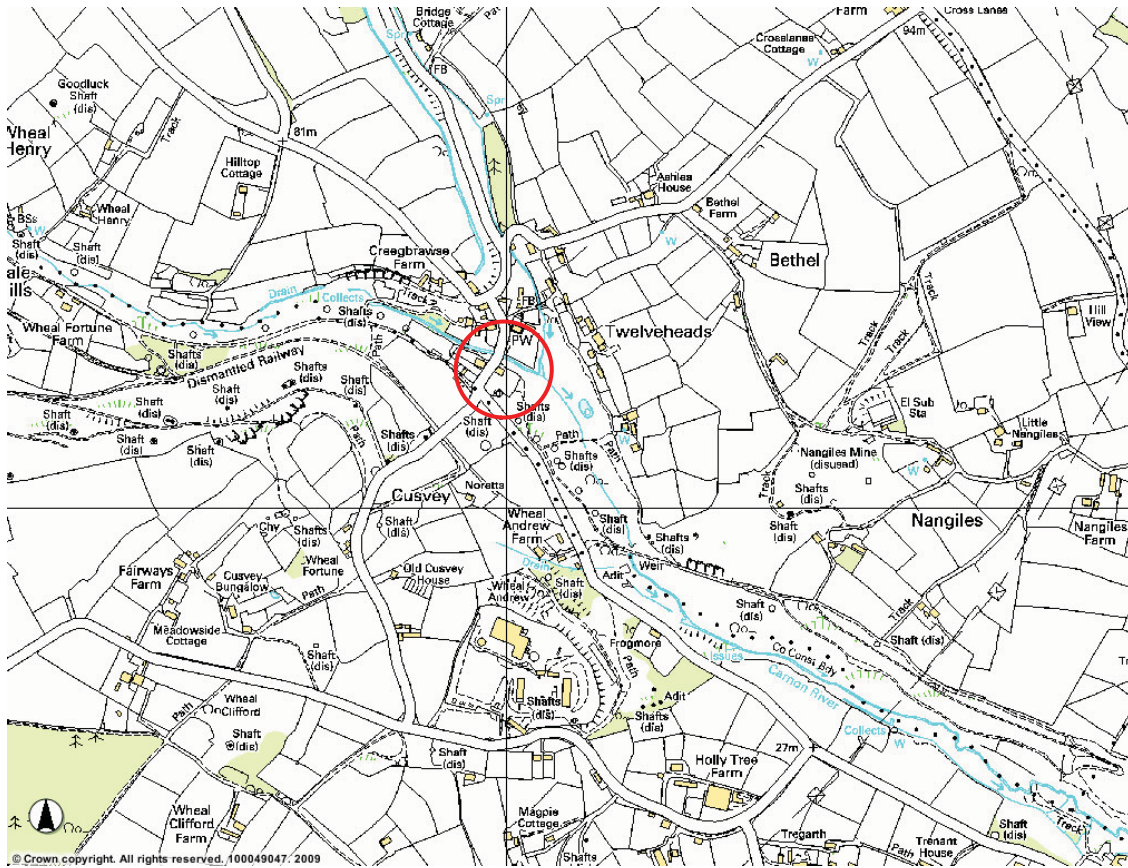


Fig 1 Location map

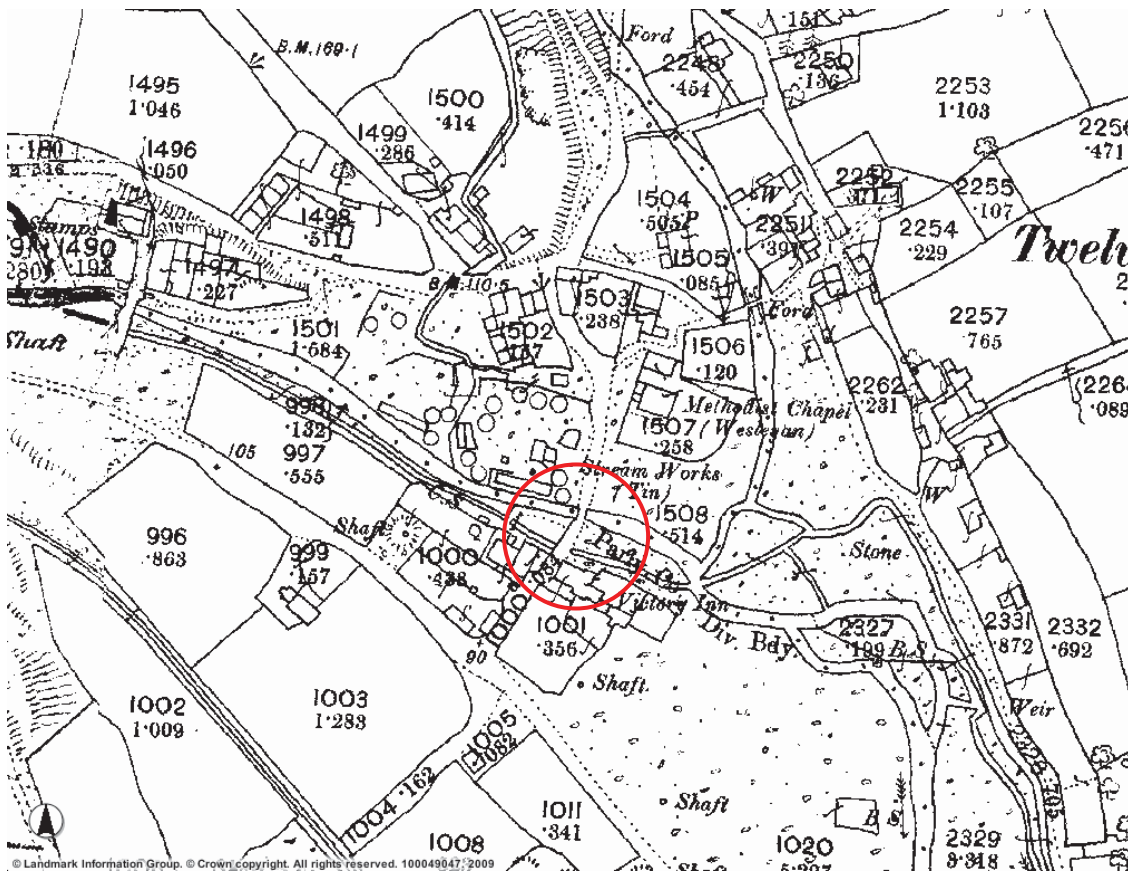


Fig 2 Extract from the First Edition OS 25 Inch Map c1880



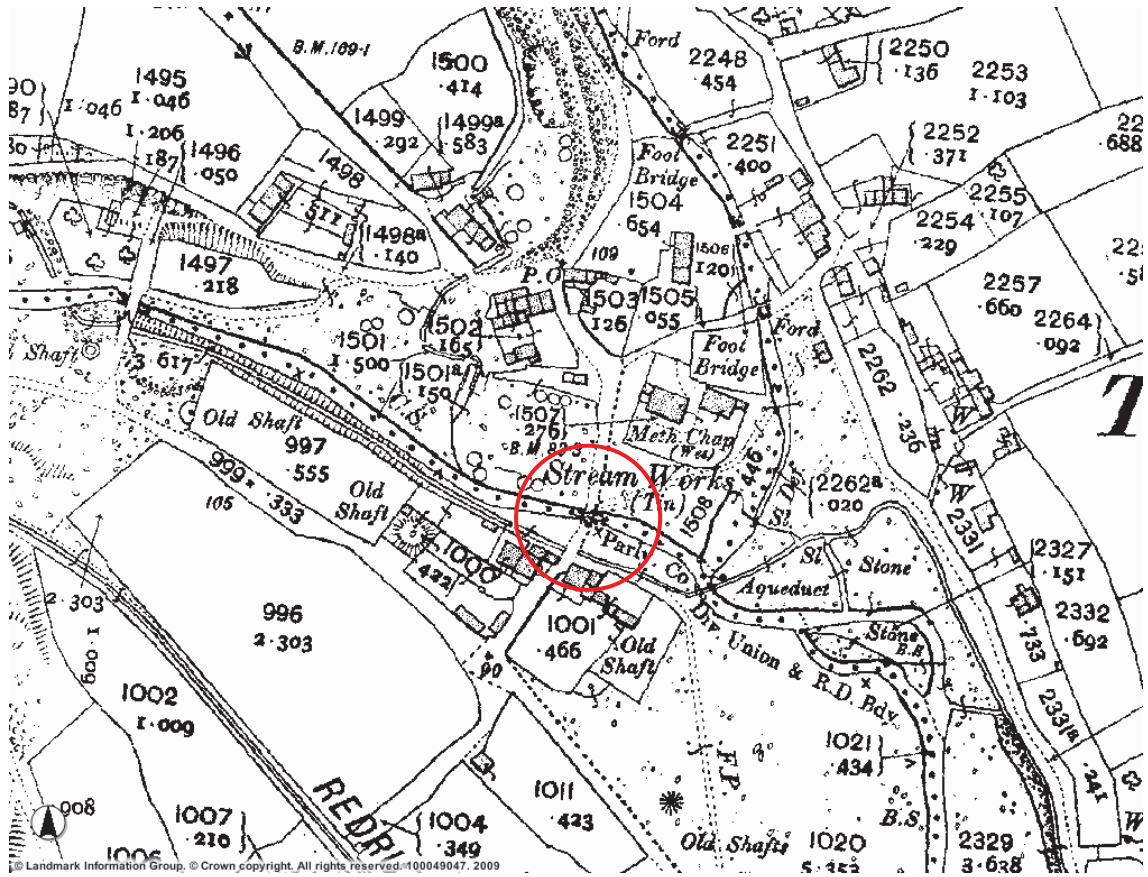


Fig 3 Extract from the 2<sup>nd</sup> Edition OS 25 Inch Map c1907



Fig 4 Air photograph 2005

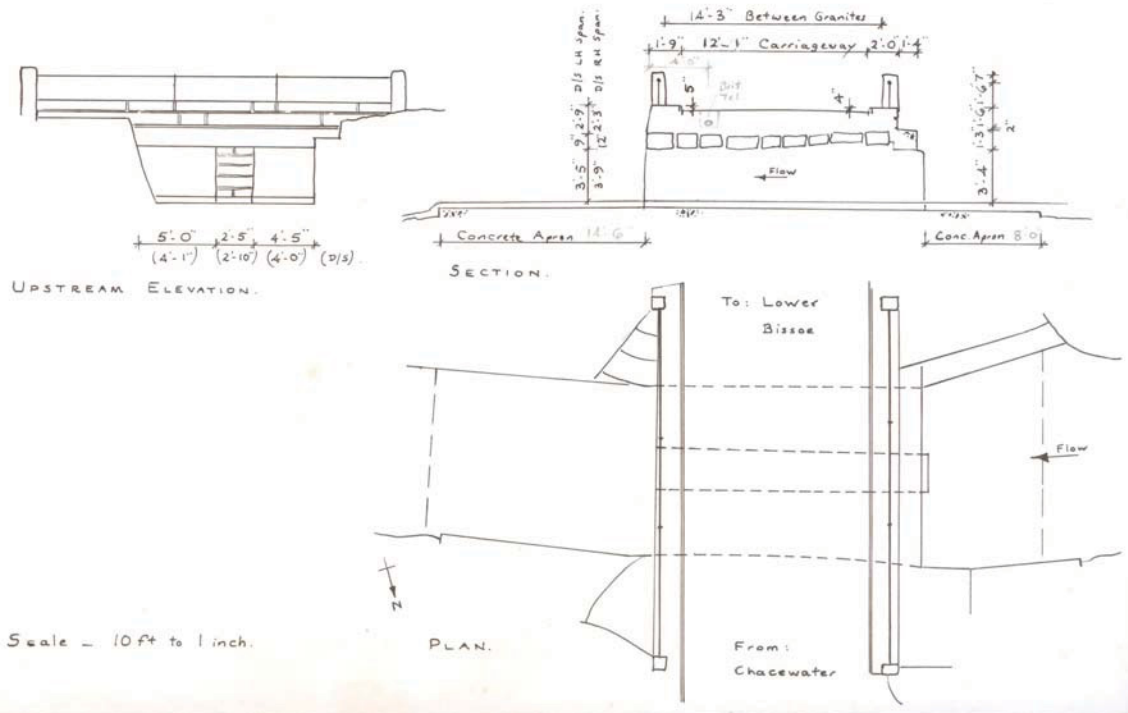


Fig 5 Survey of Twelveheads Bridge (from CC bridge card index)





Fig 6 View of the bridge looking north



Fig 7 View of the bridge looking south





*Fig 8 Upstream elevation*



*Fig 9 Downstream elevation*





*Fig 10 Southern span*



*Fig 11 Northern span, showing the battered abutment face*





Fig 12 Overall view of bridge (from north) with roadway fill removed



Fig 13 Roadway built up with mine waste





Fig 14 Rebuilt upstream side of the bridge showing 2 levels of kerbstones



Fig 15 Stoneware ink bottle (mid-late 19<sup>th</sup> century)