

# ARCHAEOLOGICAL OBSERVATION

## WATER MAINS REPLACEMENT SCHEME CASTLE PARK BRISTOL

NGR ST 58980 72940 - ST 59099 73040  
JOB N<sup>o</sup>: BA1314BWCPB



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APRIL 2013



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*Frontispiece: View looking NE across Castle Park towards the ruins of St Peter's Church*

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# 1. Executive Summary

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This report details the results of a programme of archaeological observation undertaken by Border Archaeology on behalf of Bristol Water plc intermittently during water mains replacement works at Castle Park Bristol, between the 21<sup>st</sup> December 2012 and the 22<sup>nd</sup> March 2013.

- Based on the results of Border Archaeology's DAA of the study area as part of the Knowle to Victoria scheme (BA 2012) and in conjunction with the clear direction concerning archaeological interest from Bob Jones City Archaeologist, it was demonstrably clear that the proposed scheme extended through an area of very high archaeological sensitivity.
- The area of pipeline works extended just to the south of the southern line of the later medieval city walls, which appear to have run along or immediately south of the former line of Bridge Street, and terminated at the northern approach to Bristol Bridge.
- The results of this programme of archaeological observation identified a section of extant Pennant sandstone masonry walling (909) in Pit 9, excavated at the junction of High Street and Back Bridge Street on the northern approach to Bristol Bridge. This section of wall survived in a fragmentary condition and had been heavily truncated by late 19<sup>th</sup>-20<sup>th</sup> century construction activity and service trenching.
- It could possibly represent the southwest wall of a tenement of medieval/early post-medieval date situated on the northeast flank of the northern approach to the bridge, or it may have formed part of the northernmost pier of the medieval bridge which was subsequently incorporated into the fabric of the present bridge, built in 1764-8. Analysis of mortar samples taken from (909) appeared to indicate at least two distinct phases of construction/repair.
- Within Pit 2, excavated on the line of Back Bridge Street, a void was encountered at the base of the pit which appears to have been associated with a late 18<sup>th</sup>-19<sup>th</sup> century chamber or cellar leading to the waterfront; however, no further investigation of this feature was possible due to engineering constraints.
- Within the remaining pits and the section of open-cut trenching excavated within Castle Park, no significant archaeology was identified. Within Pits 3 to 6 and the single section of open-cut trenching (Trench 7), evidence was identified of landscaping/made ground deposits probably contemporary with the construction of Bridge Street and Back Bridge Street in the 1770s, which had been disturbed by the insertion of services in the late 19<sup>th</sup>-early 20<sup>th</sup> century.
- Above these deposits were levelling/demolition layers associated with the post-WWII clearance of buildings in this area and subsequent landscaping that took place in the 1970s when Castle Park was laid out.



## 2. Introduction

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Border Archaeology was instructed by Bristol Water plc to carry out a programme of Archaeological Observation during works in Castle Park associated with water mains replacement schemes in central Bristol (*fig. 1*).

The aim of this programme of Archaeological Observation was to locate and record any archaeological finds, features or deposits within the ground works area and to confirm that no impact on the archaeological resource occurred during the course of the ground works without the implementation of a programme of archaeological recording. This work was carried out by Border Archaeology in compliance with Bristol Water's *Code of Conduct*.

The work undertaken was to connect two existing water mains, one running along the line of Bristol Bridge and High Street dating from 1875 and the other along the footprint of the properties lining the southern side of the former Bridge Street (now a grassed area) dating from 1969, via a disused main running along the line of the former Back Bridge Street (now a cycleway and footpath) dating from 1885.

The route of the scheme extended NE/SW along the cycle track on Back Bridge Street for approximately 150m from the junction of High Street and Back Bridge Street (NGR ST 58980 72940) to a point close to the southern termination of the former Dolphin Street (NGR ST 59099 73040). With the exception of the works undertaken at the junction of Back Bridge Street and High Street, the route was entirely within the bounds of the modern day Castle Park.

The engineering methodology consisted of the excavation of small inspection and access pits and a short stretch of open cut trenching above the existing water mains by a 3-tonne mini-digger and a 360° excavator using a toothless grading bucket. There were eight inspection/access pits and one stretch of open-cut trenching excavated along this route, the depths of which varied depending upon the depth of the main, which was encountered between 0.4m and 1.8m below ground level. The excavations were constrained owing to the main part of the route being located on a cycleway; consequently the majority of the pits could be no wider than 2m. However, the pits at the start and end of the route were excavated using a 360° excavator and covered much larger areas.

The programme of archaeological work has been informed by the results of a programme of Detailed Archaeological Assessment (DAA) previously undertaken by Border Archaeology (BA 2012, 2013) and the Company's consultation with Bob Jones BA FSA MIFA City Archaeologist Bristol City Council.

Copies of this report will be supplied to Bristol Water plc and Bob Jones Esq

### 2.1 Soils & Geology

The area is classed as unsurveyed in the Soil Survey of England and Wales (SSEW, 1983); however, the underlying solid geology is recorded as consisting of Redcliffe Sandstone of the Triassic period.

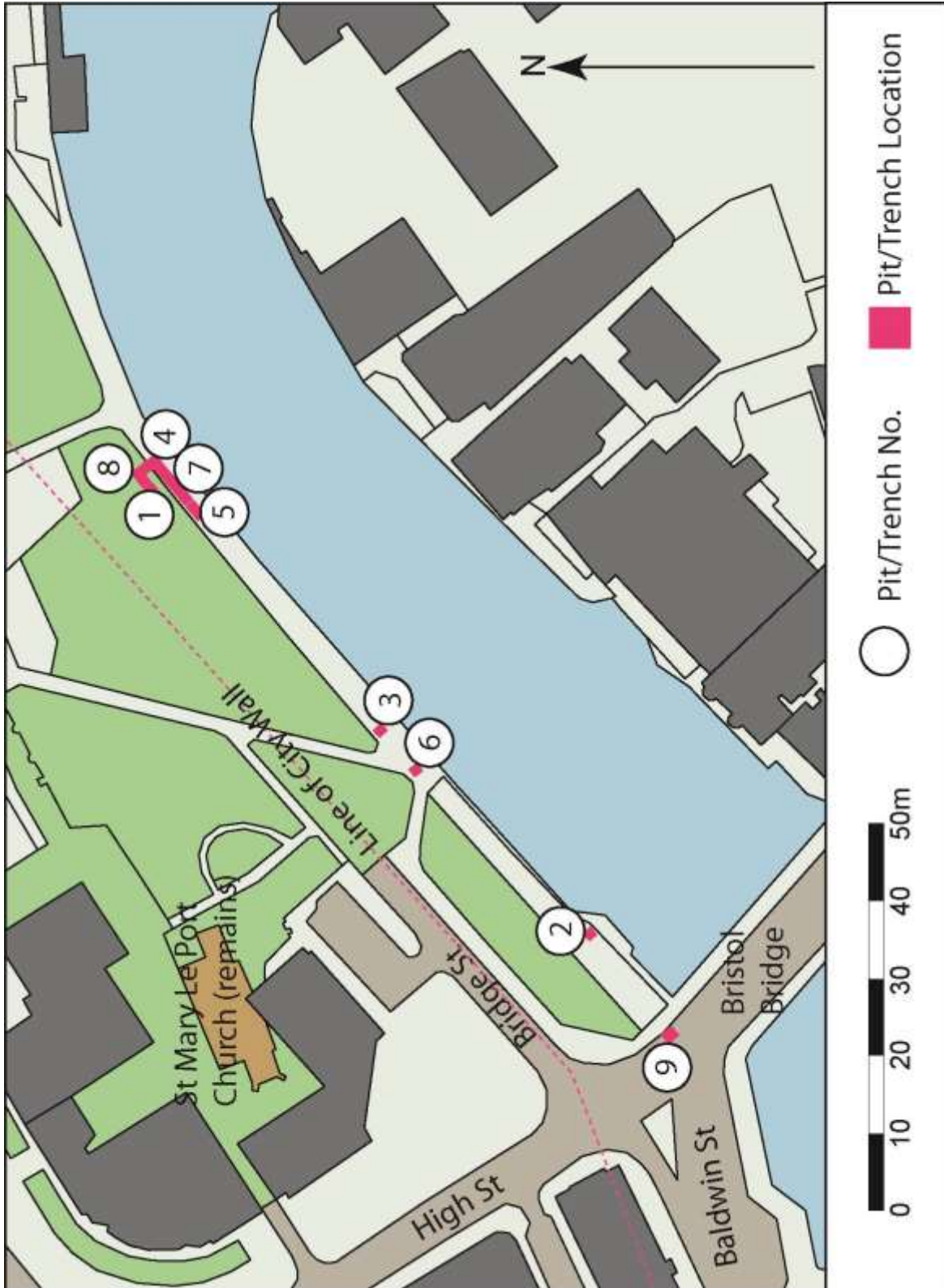


Fig. 1: Site location plan



### 3. Historical & archaeological background

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Based on the results of Border Archaeology's DAA of the study area (BA 2012) and a programme of additional research (BA 2013), it was evident that the pipeline route extended through an area of high archaeological sensitivity, potentially containing evidence of significant archaeological remains chiefly dating to the medieval and early post-medieval periods, although these remains are likely to have been heavily disturbed by late post-medieval and modern building activity, damage suffered during WWII bombing raids and subsequent clearance and landscaping.

The route falls within the historic core of the late Saxon and medieval urban settlement of Bristol (first recorded as *Brycgstow*) which was probably established as a *burh* in the late 9<sup>th</sup> or early 10<sup>th</sup> century and is traditionally assumed to be located immediately to the N of Bristol Bridge, although it has also been suggested as being further to the E, somewhere in the vicinity of Bristol Castle (Brett, 2005).

The pipeline route extends just to the S of the southern line of the later medieval city walls, constructed in the mid-late 12<sup>th</sup> century and superseding the defences of the late Saxon *burh*. They appear to have run along or immediately S of the former line of Bridge Street although previous archaeological investigations between Bridge Street and Back Bridge Street failed to encounter evidence for this defensive circuit (Hurst, 1964).

The street plan within this area was already well established by the 13<sup>th</sup> century. The study of historic documents and early maps (Millerd's map of 1673 and Rocque's map of 1742) show that the pipeline route is located in the area between the Shambles/Worshipful Street and the riverside and that this area was heavily built up with properties including dwellings and warehouses with cellarage.

The area remained essentially unaltered from the medieval period through to the mid-1770s when significant changes took place. These included the construction of Bridge Street, which both replaced and cut across the line of the medieval Shambles/Worshipful Street. A narrow lane called 'Back Bridge Street' was also laid out along the riverside, running S of and parallel to Bridge Street. The new street layout in this area remained largely intact until after the Second World War. Although there appears to have been extensive refurbishment of properties in this area during the late 19<sup>th</sup>-early 20<sup>th</sup> century, the cellarage and sub-basements associated with the properties along Bridge Street do not appear to have been significantly altered post-1760 (Leech, 1998).

Archaeological investigations have revealed significant evidence of medieval and post-medieval features within the bounds of the Castle Park area, although there is a variable survival rate due to later 19<sup>th</sup>-20<sup>th</sup> century building activity and post-WWII clearance and landscaping. The depth of these features varies significantly, from between 0.5m to 2m (or more) below existing ground level. In the immediate vicinity of the route, previous archaeological works have revealed evidence of medieval and post-medieval occupation features including cess and quarry pits and evidence of structural remains associated with cellarage.



Excavations undertaken in 1975 (HER 409; Boore, 1982), close to St Peters Church and to the E of the former Dolphin Street identified a large cellared building of probable late medieval date approximately 30m E of the pipeline route (at its closest point).

An evaluation carried out in July-August 2006 (HER 4318; King, 2006a), consisting of 24 trenches excavated within an area bounded by High Street, Wine Street and Bridge Street, revealed evidence of 19<sup>th</sup> -early 20<sup>th</sup> century cellarage across much of the site (despite the WWII damage and subsequent landscaping). The remains of two, possibly three masonry structures of late medieval date were also identified, towards the western end of the evaluation area, close to the High Street.

In addition to this in a trench excavated within the footprint of the former properties at Nos. 41-2 Bridge Street, the remains of a large pit, measuring 0.6m in diameter and at least 1.03m deep was identified. This contained a sequence of human waste deposits and was sealed by a rubble layer. Pottery from the upper and lower fill deposits indicated that the pit was in use, at its broadest date range, from the mid -12<sup>th</sup> through to the 14<sup>th</sup> century (King, 2006).

In a programme of excavation in August-September 2007 that was associated with the 2006 works (HER 4414; Whatley, 2007) within the footprint of No. 34 Bridge Street, a quarry pit overlaid by a red sandy clay deposit containing sherds of 11<sup>th</sup>-12<sup>th</sup> century date was identified, together with the remains of a masonry footing of probable medieval date, which appeared to underlie a post-medieval wall forming the western boundary of No. 34.

During a watching brief undertaken across the line of Back Bridge Street in October 2006 (HER 4346; King, 2006a), no archaeological deposits or features were observed. This suggests that the buildings directly fronting the riverside, which are visible on Millerd's 1673 plan, were demolished prior to the construction of Bridge Street and Back Bridge Street in the 1770s, a hypothesis supported by the works detailed here.

The western terminus of the route lies at the junction of Back Bridge and High Street, on the northern approach to Bristol Bridge. The earliest bridge in this location was probably built in the late 10<sup>th</sup> -early 11<sup>th</sup> century, presumably contemporaneous with the establishment of the late Saxon *burh*, and appears to have been a timber structure. The timber bridge was rebuilt c.1250 as a masonry structure of four arches (HER 980M). Documentary and cartographic evidence indicates that this bridge, which survived until its replacement by the existing three arched bridge in 1764-8 (HER 305M), was lined with houses, with a chapel in the centre (Leech, 2000b).

Evidence of masonry associated with the northernmost pier of the 13<sup>th</sup> century bridge was identified immediately N of the present structure during the monitoring of a GPO service trench in 1975 (HER 431; Jackson, 1975; Leech, 2000). It was deemed possible that evidence of properties recorded as lying adjacent to (or upon) the N end of the bridge might be identified in this area.



## 4. Methodology

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The archaeological programme of work detailed herein was carried out in accordance with recognised sources of professional guidance including *Standard and Guidance for an archaeological watching brief* (IfA 2008), *Standard and Guidance for archaeological excavation* (IfA 2008) and *Management of Research Projects in the Historic Environment (MoRPHE)* (EH 2006). Reference is also made to the relevant English Heritage Historic Environment Local Management (HELM) resources. Border Archaeology adheres to the IfA *Code of conduct* (2012) and *Code of approved practice for the regulation of contractual arrangements in field archaeology* (2008) and work was carried out in compliance with *Bristol Water's Code of Conduct*.

All groundworks were carried out by machine with toothless bucket wherever possible under archaeological supervision.

Full written and photographic records were made in accordance with Border Archaeology's Field Recording Manual (BA, 2010). The written record comprised detailed stratigraphic recording using a context numbering system. The photographic record was made using a high-resolution (12 MPX) digital camera, comprising photographs of all excavated contexts and archaeological features and structures. Included in each photograph are appropriate scales and all photographic records have been indexed and cross-referenced to written site records. Details concerning subject and direction of view are maintained in a photographic register, indexed by frame number.

Plans & sections were produced on gridded, archivally stable polyester film at scales of 1:50 or 1:20, as appropriate. All drawings were numbered and listed in a drawing register, these drawing numbers being cross-referenced to written site records. The site code for this programme of archaeological works is CPB 13.



## 5. Results

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### 5.1 Pit 1 (NGR ST 59104 73044)

Pit 1 was located at the eastern terminus of the scheme along the route of the 1969 main, within the grassed area to the SW of St Peters Church in the footprint of number 5a Bridge Street and was excavated to determine the depth of the main (*Plate 1*). It was backfilled and later re-excavated and incorporated into Pit 8. The pit measured 2m (SE/NW) × 1.8m (NE/SW) and reached a depth of 1.8m.

There was nothing of archaeological significance present, with the stratigraphic profile comprising of a soft dark greyish-brown sterile clayey silt topsoil (101) overlying a reddish-brown stony gravel levelling layer (102) encountered at a depth of 0.2m. Underlying this was a silty sand and rubble made ground deposit with inclusions of small to medium stones, brick fragments, oyster shells and charcoal and mortar flecks (103), encountered at a depth of 0.3m, that is associated with the 1970s landscaping of Castle Park and postdates the insertion of the main.

(103) sealed a deposit of demolition material at a depth of 0.7m, containing large worked stone blocks, concrete and sections of mortared brickwork in a loose dark brown and black sandy silt matrix (104) probably associated with the post-WWII levelling and clearance of the bomb damaged properties in this area.



*Plate 1: View looking SE showing NW-facing section of Pit 1*



## 5.2 Pit 2 (NGR ST 58994 72940)

Pit 2 was located approximately 18m E of the western terminus of the scheme (the junction of Back Bridge Street with High Street) along the route of the 1885 main, in the short stretch of former cobbled road surface originally dating from the construction of Bridge Street in the 1770s (although no longer entirely *in-situ* due to the removal and subsequent relaying related to services) (Plate 2). Its purpose was to encounter the disused 1885 main and determine if it was intact to enable slip lining with the replacement main (by inserting a camera the required distance in both directions). The pit measured 1.8m (SE/NW) × 1.7m (NE/SW) reaching a depth of 1m. This pit contained the extant cobbled former road surface and revealed evidence of a subterranean chamber/cellar of post-medieval date.



*Plate 2: View looking SW along Back Bridge Street towards the junction with High Street showing former cobbled road surface (201)*

The surface (201) was formed of regular/sub-rectangular cobbles with rounded corners and of varying sizes, approximately 500mm to 200mm in length and 100mm to 60mm in width, with an average depth of 250mm. Underlying the cobbles was a grey sandy bedding deposit (202) encountered at a depth of 0.25m which sealed three separate concrete deposits (203), (204) and (205), all backfills around various services (including the 1885 disused main).



*Plate 3: View looking NE showing void in Pit 2 beneath 1885 water main*

In the course of removing (205) to gain access to the main, a void was encountered beneath the pipe and further excavation was halted (*Plate 3*). Unable to be continued, this trial-hole was abandoned and backfilled.

After subsequent study of the area from the opposite side of the river, it was established that the void led into a chamber or cellarge built underneath Back Bridge Street, which appears to have led to a landing stage on the waterfront, accessed via a segmental arched opening inserted in the walls of the floating harbour (*Plate 4*). The date of the chamber is uncertain; it could be associated with properties on the S side of Bridge Street (laid out in the 1770s), although it could be connected with a late 19<sup>th</sup> century urinal and horse shelter marked in this location on the OS 1<sup>st</sup> edition map of 1885. The archway and landing stage can be seen in a photograph of the waterfront taken from the S side of the river in the early 1920s (*Plate 13*).



*Plate 4: View looking N showing segmental-headed archway leading to chamber set into the thickness of the early 19<sup>th</sup> century harbour walls*

### 5.3 Pit 3 (NGR ST 59045 72987)

Pit 3 was located approximately 70m to the E of Pit 2 along the route of the 1885 main and was excavated as a replacement for Pit 2. It measured 2.54m (NE/SW) × 2.03m (SE/NW) reaching a depth of 1.2m (*Plate 5*).

Beneath the modern tarmac surface of the cycleway (301) and associated mid yellowish-brown small stone bedding layer (302) encountered at a depth of 0.1m, there was a demolition layer (303). This layer was similar to that in Pit 1 (104) and encountered at a depth of 0.38m. However, unlike (104) with a thickness of at least 1.1m this material was only 0.35m thick and contained much smaller stones and brick rubble. It seems likely that this difference in depth is due to Pit 1 being located in the footprint of a cellared building whilst this pit is located in the former road.

Context (303) also contained fragments of glazed tiles probably originating from the demolished properties. The underlying dark brown sandy silt made ground deposit (304) with moderate small stones and occasional oyster shells, encountered at a depth of 0.7m, is likely to have originally been associated with the construction of Bridge Street and Back Bridge Street in the 1770s but subsequently disturbed and re-deposited during the insertion of the main in 1885 and potentially again during the post-WWII clearance and landscaping. No significant archaeological deposits or features were identified.



*Plate 5: View looking SE showing NW-facing section of Pit 3*

#### **5.4 Pit 4 (NGR ST 59107 73045)**

Pit 4 was located approximately 4m SE of Pit 1 along the route of the 1885 main at the eastern terminus of the scheme. It measured 2m (NE/SW) × 1.6m (SE/NW) reaching a depth of 1.4m without encountering the main.

The uppermost deposits comprised the tarmac surface of the cycleway (401) and associated mid yellowish-brown small stone bedding layer (402) encountered at a depth of 0.1m. This overlay a soft dark reddish-brown and black mottled sandy silt with frequent small to medium sub-angular stones and occasional oyster shell (403), encountered at a depth of 0.67m, which sealed a fairly sterile soft mid reddish-brown sandy clay with moderate small to medium stones (404) encountered at a depth of 1.05m (*Plate 6*). As with (304), both (403) and (404) appeared to represent made-ground deposits associated with the construction of Bridge Street and Back Bridge Street in the 1770s, which were heavily disturbed by the insertion of the late Victorian water main and later by extensive demolition and landscaping activity following the bombing of the area during WWII.



Plate 6: View looking NE showing SW-facing section of Pit 4

### 5.5 Pit 5 (NGR ST 59087 73042)

Pit 5 was located 24m W of Pit 4 along the route of the 1885 main and was excavated at the point of a blockage identified by the camera inserted into the main in Pit 3. This blockage was revealed to be due to the cutting away of the main, presumably as a result of the WWII damage and subsequent clearance of the area. It measured 3m (NE/SW) × 1.6m (SE/NW) reaching a depth of 1.6m.

Although no significant archaeology was identified, the sequence of deposits within this pit differed slightly from those along the majority of the route, with several additional layers beneath the tarmac surface of the cycleway (501) and associated mid yellowish-brown small stone bedding layer (502) encountered at a depth of 0.1m. These were the fairly sterile dark blue clay (503) and underlying loose mid orangey-brown sand with medium to small stone inclusions (504) encountered at depths of 0.4m and 0.6m, respectively (*fig. 2*). These layers were also present in Trench 7 and are likely to represent additional levelling associated with an area of demolition material in this pit and the trench.

Underlying (504) was a demolition deposit (505), which contained large to medium sub-angular stone blocks including keystones, flagstones, small to medium stones and bricks in a loose dark reddish-grey and black gritty sand matrix and was encountered at a depth of 0.95m. Context (505) was interpreted as a demolition deposit probably associated with post-



WWII clearance of the site; this in turn sealed a disturbed made ground deposit of soft dark orangey-red clayey sand with moderate small stones (506) encountered at a depth of 1.25m.

#### 5.6 Pit 6 (NGR ST 59040 72982)

Pit 6 was located approximately 11m W of Pit 3 along the route of the 1885 main and was excavated at the point of another blockage identified by the camera. This blockage was revealed to be due to a truncation by a storm drain. It measured 1.9m (NE/SW) × 1.3m (SE/NW) reaching a depth of 1.5m (*Plate 7*). No significant archaeology was identified.



*Plate 7: View looking NW showing SE-facing section of Pit 6*

The stratigraphic profile comprised the tarmac cycleway surface (601) and associated mid yellowish-brown small stone bedding layer (602) encountered at a depth of 0.1m. Underlying this was a made ground deposit of soft mid reddish-brown and dark greyish-brown mottled clayey sand with inclusions of moderate small to medium stones and brick fragments (603) encountered at a depth of 0.45m. This material is again likely to relate to the mid-18<sup>th</sup> century road construction but later disturbed context (603) was truncated by [606] the linear 1m wide and greater than 1.35m deep cut for a storm drain that feeds into the river. This was backfilled with (604), disturbed and re-deposited (603) to a depth of 1.25m sealing (605) light grey small stones to a depth of greater than 1.6m.

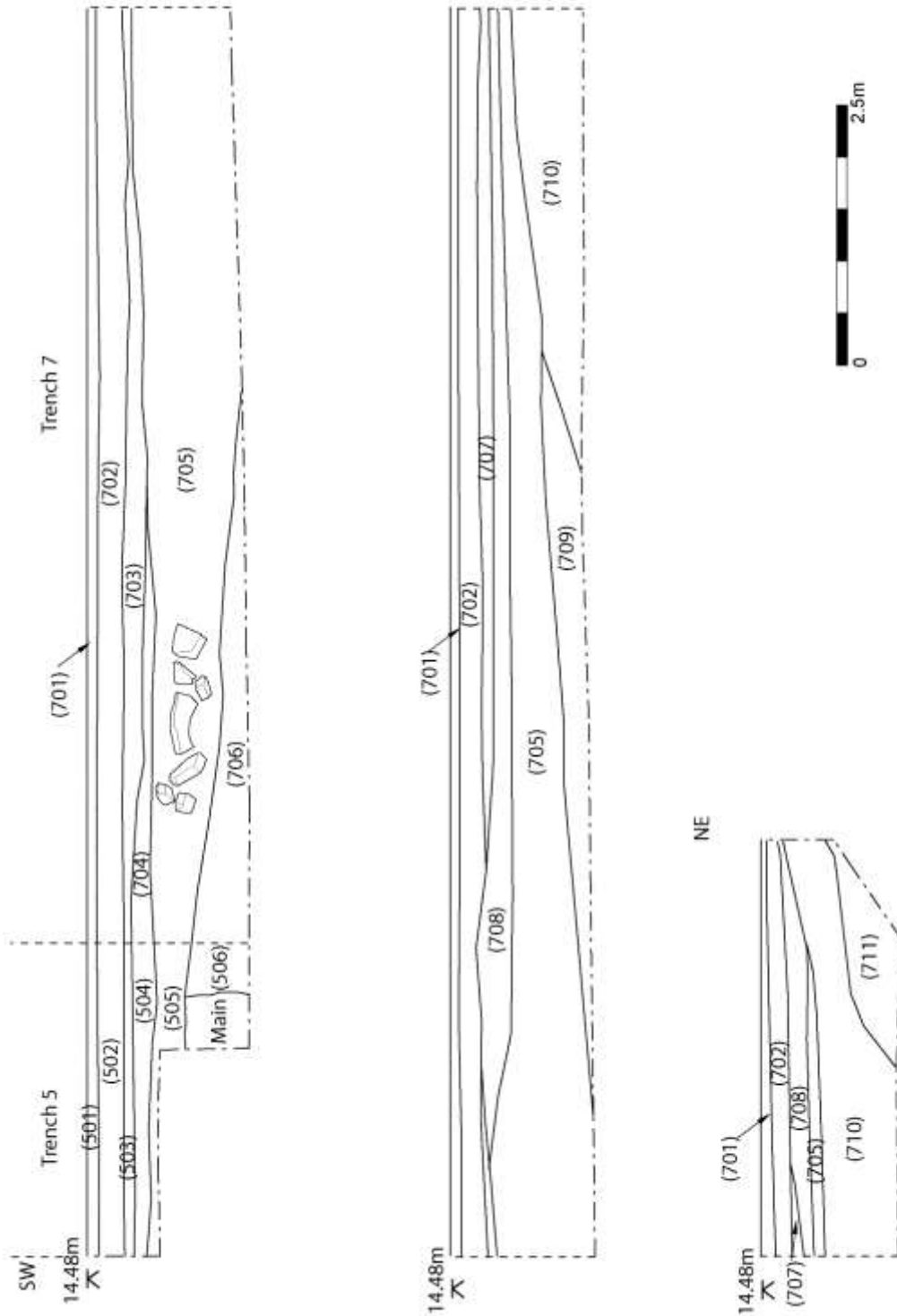


Fig. 2: SE-facing section of Pit 5 and its continuation in Trench 7



### 5.7 Trench 7 (NGR ST 59097 73032)

Trench 7 was a stretch of open-cut trenching between Pits 4 and 5 along the route of the 1885 main and was excavated to lay pipe where the main was missing. It measured 24m (NE/SW) × 1.6m (SE/NW) reaching a depth of 1.5m (*Plate 8; fig. 2*).



*Plate 8: View looking NNE along Trench 7 showing concentration of worked stone in demolition deposit (705) in SE-facing section of trench*

A sequence of made ground and demolition deposits was recorded, largely resembling those revealed in Pit 5, with several additional layers present at the E end of the trench. Underlying the tarmac and bedding deposits that are present in Pit 5, (701) and (702), respectively, was another sequence of similar deposits. Tarmac (707) was encountered at a depth of 0.3m and the associated mid brownish-red small stone bedding layer (708) was encountered at a depth of 0.45m. Both of these layers are only present over an area of



approximately 13m and probably represent an earlier level of the cycleway that was subsequently raised. Context (708) overlay a demolition deposit (705) similar in composition to (505) in Pit 5, although it had a thickness of over 1m in this area (as opposed to the 0.3m in the pit) and contained a concentration of large worked stones which appears to have necessitated the deposition of two modern levelling layers (503)/(703) and (504)/(704).

This deposit in turn overlay a series of disturbed made ground deposits (709) an orange-red sand (710) a grey silty sand with brick and stone inclusions and (711), a dark reddish-brown silty sand encountered at depths of 1m, 0.6m and 0.75m, respectively. It is clear by the sloping nature of these deposits that, during the levelling of the area, they were all tipped into the void created by the missing main from the NE.

### 5.8 Pit 8 (NGR ST 59107 73045)

Pit 8 was located immediately N of Pit 4 and lay to the E of (and incorporated) Pit 1, along the route of the 1969 main within the grassed area to the SW of St Peters Church, partially within the footprint of number 5a Bridge Street. The pit was excavated to allow access for the connection. It measured 8m (NE/SW) × 7.4m (SE/NW) reaching a depth of 2.4m (*Plate 9*).



*Plate 9: View looking NW showing SE-facing section of Pit 8*

The pit contained no significant archaeology although extensive demolition deposits associated with post-WWII clearance and landscaping activity was noted. The stratigraphic profile comprised a soft sterile dark greyish-brown clayey silt topsoil (801) overlying a reddish-brown stony gravel levelling layer (802) encountered at a depth of 0.2m. Underlying this at the SE end of the pit was (807), similar to the modern made ground deposit present in Pit 1 (103) and at the NW end, (803) a light brownish-yellow stone levelling layer, encountered at a depth of 0.3m and extending 4.5m (SE/NW). This layer was 0.15m thick and sealed the demolition deposits (804) (805) and (806).

All of these deposits contained large sub-angular stone blocks, small to medium stones, bricks and brick fragments, with (804) also containing large sections of mortared brickwork. Context (804) was in a loose mid greyish-black sandy silt matrix (805), a loose mid reddish-orange sandy silt matrix, and (806), a loose light pinkish-grey silty sand matrix. Context (804) also contained a glazed tile fragment probably originating from the demolished properties. These deposits all sloped slightly towards the NE indicating that they were tipped from the W during the clearance and levelling of the area. Although this trench was not entirely located over the footprint of a former property, it is likely that the whole area was substantially reduced during the demolition of the properties and associated cellarge and these deposits are filling that lowered area.

### 5.9 Pit 9 (NGR ST 58980 72972)

Pit 9 was located at the western terminus of the scheme at the junction of Bristol Bridge with High Street along the routes of the 1875 and 1885 mains to allow access for the connection. It measured 6.2m (SE/NW) × 4.5m (NE/SW) reaching a depth of 2.15m. A section of extant masonry walling (909) was encountered at the base of the pit.

The stratigraphic profile consisted of the tarmac road surface (901) overlying (902), a light whitish-yellow concrete at the SE end of the pit (903), a mid-whitish-yellow concrete at the NW end of the pit (both associated with services) and (906), a loose light pink stone backfill associated with the 1970s work on the main. All of these were encountered at a depth of 0.2m and all overlaid or abutted (904), a loose dark reddish-brown stone backfill associated with previous works and encountered at a depth of 0.35m. Context (904) abutted the remnants of (905), the light white concrete bedding for tarmac (901) also encountered at 0.35m. Context (904) reached a depth of 1.95m and underlying this was (908), a light greyish-white concrete present at the base of the SE and NE sides of the pit and associated with a service.

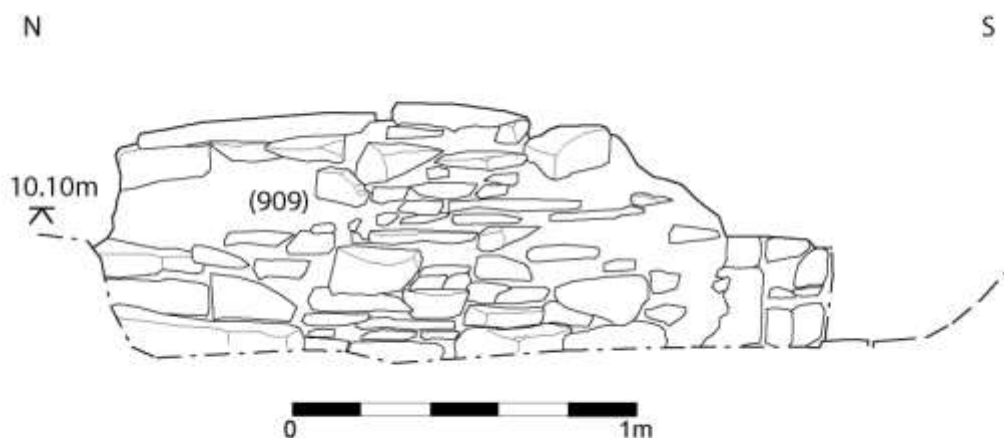


Fig. 3: W-facing profile of masonry wall (909) identified in Pit 9

At the NW end of the pit, underlying (903) and encountered at a depth of 0.5m, was (907), a soft dark greyish-brown silty clay with frequent small to medium stones, occasional bricks

and brick fragments, occasional small bone fragments and moderate charcoal flecks. Context (907) appeared to be a made ground/demolition deposit; a small, mixed assemblage of pottery and tile fragments was recovered from this deposit, including dotted and combed Bristol/Staffordshire slipwares mostly dating to the late 17<sup>th</sup>-mid 18<sup>th</sup> century, although a quantity of porcelain and blue painted ware sherds of late 18<sup>th</sup>/early 19<sup>th</sup> century date was also recovered from the same deposit, together with later 19<sup>th</sup> century stoneware sherds and ceramic wall tile fragments. None of this material could be regarded as securely stratified as this deposit had been heavily disturbed by modern services. It is possible that (907) could represent a made ground deposit relating either to the mid-18<sup>th</sup> century rebuilding of Bristol Bridge or to later demolition/landscaping activity associated with the widening of the northern approach to Bristol Bridge that took place in the early 1860s. This made ground was heavily truncated by the service trenches [914] [916] [918] [919] and [920], the fills of three of which, (910) (913) and (917), comprised of disturbed and re-deposited (907).



*Plate 10: View looking NE showing SW-facing elevation of wall (909) in Pit 9*

Underlying this made ground (and also truncated by all of the same service trenches) were the fragmentary remains of a Pennant sandstone masonry wall (909) (*Plates 10 & 11; fig. 3*). The wall was composed of irregular un-worked grey sandstone of varying size, approximately between 600mm to 180mm in length and 380mm to 60mm in width, with depths of between 140mm and 40mm. The masonry was chiefly bonded with a mid to light whitish-grey mortar with charcoal flecks and was of a random un-coursed construction.

Despite the truncations, the wall survived in plan to measurements of 2.1m (NE/SW) × 1.9m (SE/NW) and was exposed to a depth of 0.75m between 1.25m and 2.00m below existing ground level (11.96m AOD). An area at the S end of the wall had been disturbed by concrete (911), which was likely to be associated with service trench [914]. The bonding and construction of the stonework at the extreme SE end of the wall appeared differ slightly from the main part and there was a small area at the NE side where the stones were pitched instead of lying flat and this could possibly represent the insertion of a post-pad and packing (*Plate 12*). The presence of several services within the pit meant that these areas were

partially obscured and could not be examined in more detail; however, mortar samples were taken from the main body of the wall and from the NE and SE corners of the wall where evidence of repair was noted.



*Plate 11: View looking NW showing wall (909) overlaid and partially truncated by late 19<sup>th</sup>-20<sup>th</sup> century service pipes*



*Plate 12: View looking NNW showing area of pitched stone (possible post-pad and packing) in wall (909)*

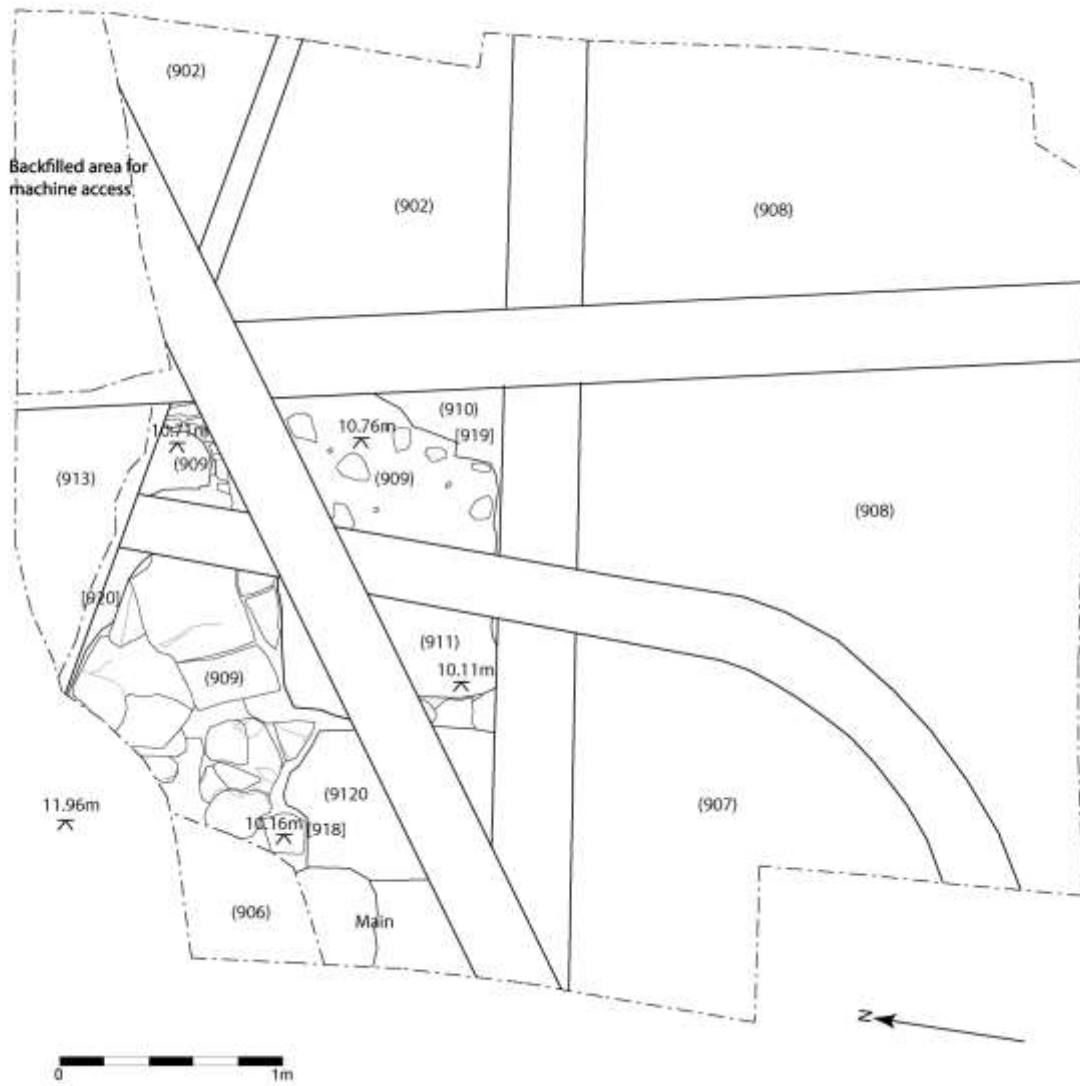


Fig. 4: Plan of Pit 9 showing masonry wall (909)



## 6. Conclusions

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While there is abundant documentary evidence to indicate that this area was a hub of activity during the late Saxon and medieval periods, the results of previous archaeological excavations in Castle Park have indicated that the survival of archaeological deposits and features in this area is extremely patchy, although isolated areas of well-preserved medieval occupation features have certainly survived intact.

This is probably due to several factors: 1/ the construction of Bridge Street in the 1760s, which both replaced and cut across the line of the medieval Shambles/Worshipful Street 2/ the demolition and reconstruction of a significant proportion of the commercial properties in this area (including the insertion of new cellarage) from the mid-19<sup>th</sup> century through to c.1940 3/ the damage caused by the bombing of the city in November 1940 and post-WWII clearance and levelling for a car park 4/the excavation of water mains trenching c.1970 and extensive landscaping activity associated with the creation of Castle Park in the early 1970s.

The results of the programme of archaeological observation detailed here appear largely to confirm the results of a previous watching brief on service trenching along the line of Back Bridge Street in October 2006 (King, 2006b), indicating that the survival of significant archaeological deposits and features along the southern edge of Castle Park is limited, with considerable evidence of post-WWII demolition and levelling layers overlying late 18<sup>th</sup> -19<sup>th</sup> century made ground/landscaping deposits associated with the construction of Bridge Street and Back Bridge Street in the 1770s and the commercial properties lining these streets.

Nearly all of the pits within the park contained deposits of demolition material containing large worked stones and intact sections of mortared brickwork (represented by (104) (303) (505) (705) (804) (805) (806) ), which probably were derived from the late 18<sup>th</sup> -20<sup>th</sup> century properties that were heavily damaged during WWII and subsequently cleared in the 1950s-60s. This demolition material was identified in previous excavations as reaching depths of up to 4.5m (Hurst 1964). Some of these demolition layers were encountered at the base of the pits and were sealed by made ground deposits associated with the landscaping of Castle Park in the 1970s (103) (803) but the majority overlay made ground deposits.

Underlying these demolition layers in several of the pits were a series of made ground/landscaping deposits (304) (403) (404) (506) (603) (706) (709) (710) and (711), which appear to represent demolition/landscaping activity associated with the construction of Bridge Street and Back Bridge Street in the 1770s. However all have later been disturbed, initially by the insertion of the 1885 main and also during the post-WWII levelling and landscaping of the area.

This general lack of significant archaeology within the pits excavated along the southern edge of Castle Park might suggest that the buildings directly fronting the riverside, which are visible on Millerd's plan of 1673, were demolished prior to the construction of Bridge Street and Back Bridge Street in the 1770s. As the Shambles/Worshipful Street is recorded in William Worcestre's *Itinerary*, compiled c.1480, as having cellarage '12 vaults which are wide long and deep, each vault measuring 12 yards [10.97m] in length' (Neale, 2000), it suggests that a substantial quantity of made-ground material would have been required in this area if these buildings were demolished prior to the construction of the new street layout.



However, while the majority of the groundworks revealed no evidence of significant archaeological features and deposits, two pits revealed features of archaeological significance, namely Pit 2 and Pit 9, which will be discussed in greater detail in the following section.

### *Pit 2*

The excavation of Pit 2, located in the area of the former cobbled road surface (201) at the W end of Back Bridge Street, revealed evidence of a void leading to a subterranean chamber or cellar which it was not possible to investigate further (as excavation was halted in this location). The chamber/cellar appears to have been associated with a landing stage on the riverside, accessed via a segmental-headed archway set into the thickness of the floating harbour walls which project out slightly at this point.

The subterranean chamber may have provided access to the waterfront for premises situated on the S side of Bridge Street, although it is also possible that the chamber was associated with a late 19<sup>th</sup> century cast-iron urinal and horse shelter (first marked on the OS 1<sup>st</sup> edition map of 1885) located on Back Bridge Street immediately above the archway. The archway and the landing stage associated with it are visible on a photograph of Back Bridge Street from the river taken in the early 1920s, which also shows the cast-iron urinal and horse shelter (removed by 1946) located on the waterfront just above the archway.



*Plate 13: Photograph taken in the early 1920s looking NW across the river towards Back Bridge Street, showing the archway and landing stage in the bottom left-hand corner of picture  
(Reproduced by courtesy of Bristol Record Office)*





### *Pit 9*

A heavily truncated section of masonry walling (909) was revealed in Pit 9 at a depth of between 1.25 and 2.00m below ground level, situated at the junction of Back Bridge Street and the High Street on the northern approach to Bristol Bridge. Only a small section of the wall was visible, due to the limited extent of the excavation and the presence of several services within the pit. Context (907), the deposit overlying (909) produced a small ceramic assemblage, chiefly comprising slipwares of late 17<sup>th</sup> -18<sup>th</sup> century date, with a small quantity of number of porcelain and blue painted wares of late 18<sup>th</sup> -early 19<sup>th</sup> century date and later 19<sup>th</sup> century stonewares and wall tile fragments; however, none of this material can be regarded as securely stratified as this deposit had clearly been heavily disturbed by the insertion of 19<sup>th</sup> -20<sup>th</sup> century services.

The date of the wall cannot be more definitely established by stratigraphic means; however analysis of three mortar samples recovered from (909) appears to indicate that there were two distinct phases of construction/repair. The predominant bonding material appeared to be a mid to light whitish-grey mortar while the area of pitched stones, possibly representing a post-pad on the NE side of the wall was bonded with a yellowish- brown-grey mortar. Significantly the lime in the two samples taken from the N and S parts of (909) had not carbonated, suggesting that the parts of the structure with which they were associated must have always been underground and/or in wet conditions, whereas the sample taken from the pitched stones had carbonated. The crude composition of both mortars, consisting of a coarse lime/ash mixture (the fuel ash probably being derived from the base of the kiln and not deliberately added coal ash), suggests a medieval or early post-medieval date, probably predating the 19<sup>th</sup> century.



*Plate 14: Extract from Jacob Millerd's bird's eye view of Bristol dated 1673 showing Bristol Bridge, with approximate location of Pit 9 indicated by a red circle  
(Reproduced by courtesy of Gloucestershire Archives)*



Based on the available evidence, two plausible interpretations of (909) can be advanced:

1/ It represents the lower courses of a wall relating to cellarage associated with one of two properties located on the NE flank of the northern approach to Bristol Bridge prior to its reconstruction and the laying-out of Back Bridge Street in the mid-18<sup>th</sup> century

2/ It represents the remains of the northernmost pier of the medieval bridge which was incorporated into the northern abutment of the new bridge erected in 1764-8.

Prior to its rebuilding in the mid-1760s, the medieval bridge (built between c.1240-50) is known to have been a four-arched masonry structure lined with approximately 45 houses and a chapel in the centre, as well as properties on the immediate northern and southern approaches, as depicted on Millerd's map of 1673 (*Plate 14*) and early to mid-18<sup>th</sup> century engravings of the bridge (Leech, 2000).

Based on a detailed historical survey of Bristol Bridge undertaken by Dr Roger Leech in 2000, which included a plan superimposing the boundaries of pre-1760 properties on the present-day landscape, it would appear that masonry wall (909) is located close to or just within the SW edge of either Tenement N6 or N7 on the NE side of the northern approach to the bridge, although it is difficult to be more precise (Leech, 2000). It is possible that (909) represents the lower courses of an external masonry wall (possibly a cellar wall) defining the SW edge of these properties.

Documentary evidence indicates that Tenements N6 and N7 were both in existence by 1575 and then formed part of the rents pertaining to the chapel on the bridge; in 1673, they both belonged to one George Hart and were subsequently recorded in 1700 as being held by John Sheppard and Walter Hungerford, drapers. The rate books for St Nicholas's parish indicate that both properties continued to be occupied up to the late 1750s (Leech, 2000, 20-1).

There is documentary evidence for several phases of rebuilding of properties on the bridge and its northern and southern approaches during the early post-medieval period, the most substantial occurring after a serious fire in 1647 that destroyed 24 properties on the bridge (Latimer, 1900, 216-17; Leech, 2000, 11). It is possible, therefore, that (909) could represent a medieval wall defining the SW edge of either Tenement N6 or N7 which underwent a phase of alteration/repair in the early post-medieval period (possibly after the 1647 fire) prior to being demolished in the mid-1760s.

An alternative interpretation of (909) is that it represents the NE corner of the northernmost pier of the medieval bridge, which was demolished and the remains incorporated into the northern abutment of the present bridge when it was built in c.1764-8. Pit 9 is located about 10m ENE of the site of a GPO service trench excavated in 1975 (HER Event No. 431), where limited investigations revealed evidence of the remains of a pier and part of the walling of the medieval bridge, as well as the remains of walling associated with the mid-18<sup>th</sup> century bridge, built on the line (and utilising the piers and abutments) of its medieval precursor (Price, 1979, 29-33).

In the NE corner of the service trench, about 5m below the existing road surface, was a loose mass of irregular stones set in a red sandy mortar (Layer B), interpreted as the remains of the northernmost pier of the mid-13<sup>th</sup> century bridge. This was sealed by a layer of decayed limestone chippings up to 0.2m in thickness and covering the whole area of the trench.



Above this layer, two walls were found: a mortared wall constructed of irregular Pennant sandstone and Brandon Hill grit, which was, in turn, bonded to another wall consisting of irregular stone blocks set in a brown clay matrix overlain at its N end by a pinkish mortar.

In the report detailing the results of the 1975 investigations, Wall I was interpreted as the remains of a wall defining the boundary of the bridge while Wall II was thought to represent the medieval quay wall (Price, 1979, 29-30). However, a recent reassessment of these results, correlated with Rocque's plan of 1742 and a working drawing of the bridge dated c.1763 has indicated that these two walls probably represent the remains of a pier and part of an arch (Leech, 2000, 14).

In the SE corner of the trench, it appeared that a portion of Wall I had been robbed and replaced by flat slabs of Pennant sandstone set in a buff-grey mortar (Layer D); this was interpreted as evidence of a massive rebuilding phase corresponding to the reconstruction of the bridge in the mid-1760s, when it appears that the northernmost pier and arch of the medieval bridge were incorporated into the northern abutment of the new bridge (Price, 1979, 30).

It is difficult to determine precisely how masonry wall (909) might relate to the masonry features revealed during the 1975 excavations. Clearly it is later than Layer B, the remains of the original pier which were identified at a much greater depth (5m below ground level) and bonded with a red sandy mortar. The irregular coursing of (909) might suggest a comparison with the two walls lying immediately above Layer B; however the bonding of these walls (in particular the presence of pinkish mortar, a common characteristic of medieval masonry work in Bristol) again differs markedly from (909).

The composition of Layer D, as revealed in the 1975 investigations, bears some similarity to masonry wall (909), in particular, the irregular coursing of the Pennant sandstone slabs and the use of grey mortar as a bonding material, which is often found in association with post-medieval buildings in Bristol. However, the crude lime/fuel ash composition of the whitish grey mortar samples taken from (909) would appear to suggest, if this mortar is post-medieval, it is likely to belong towards the earlier end of that date range, almost certainly predating the 19<sup>th</sup> century (when coal ash was increasingly used in place of sand as aggregate).

It is possible that (909) could therefore represent another fragment of the northernmost pier of the medieval bridge which was repointed and incorporated into the abutment of its mid-18<sup>th</sup> century successor. However, another possibility is that it constitutes a section of the medieval abutment which was extensively reconstructed or repaired at some point *before* the rebuilding of the bridge in the 1760s. There is evidence for substantial repairs to the bridge in the mid-17<sup>th</sup> century (after the destructive fire of 1647) and on several occasions during the first half of the 18<sup>th</sup> century (Latimer, 1900, 216-7). The Chamberlains Accounts for 1741 records expensive repairs to the bridge in 1741 requiring the purchase of 20 tons of arch stones, 64 tons of wall stones and 32 bushels of lime (Drummond, 2005, 3). It is unclear from where the lime was sourced for these repairs or for the construction of the new bridge in 1764-8.

A report compiled in 1762 on the proposed rebuilding of the bridge by the noted civil engineer John Smeaton describes how 'the lime for the mortar of the bridge is of an admirable nature' and appears to indicate that 'Aberthan or Watchet lime' was being sourced for the works (Smeaton, 1812, 101). However it appears that the limestone for the



works of the bridge was eventually sourced from quarries in the Lower Wye Valley; in 1764-5 John Vaughan of Courtfield contracted to supply 6,000 tons of limestone for the rebuilding of Bristol Bridge at 12 shillings a ton (Vaughan, 1989, 32; Drummond, 2005, 35).

It is difficult to reach a firm conclusion regarding the date and function of (909) based on the very limited and fragmentary extent of the remains revealed in Pit 9. The evidence of the mortar samples would appear to indicate two phases of construction or repair which can be broadly dated to the medieval or early post-medieval period (almost certainly predating the 19<sup>th</sup> century, in view of the crude composition of the mortars). On balance, a late 17<sup>th</sup> or 18<sup>th</sup> century date appears more likely, based on the marked difference between the mortar bonding used in (909) compared to the red sandy or pinkish mortars exhibited in the medieval walls revealed in the GPO trench excavated in 1975.

Regarding the function of masonry wall (909), it is worth noting a valuable description of the medieval bridge by the Bristol antiquary Samuel Seyer (writing in 1821), who referred to several properties having cellars built into the piers of the bridge (Seyer, 1821-3, II, 37). It is not impossible that (909) could therefore represent *both* the remains of a medieval bridge pier *and* a cellar wall associated with one of the two pre-1760s tenements situated on the NE side of the bridge.



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### 8.3 Cartography

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Bird's-eye View of the City of Bristol by William Smith - 1568

SR87/L12GS - Exact delineation of the famous city of Bristoll and suburbs thereof by James Millerd -1673

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Map of Bristol by G.C. Ashmead - 1874

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OS 1<sup>st</sup> edition 25 inch map - 1886



35033 – Goad's Insurance plans of Bristol – c.1890s

OS 2<sup>nd</sup> edition 25 inch map - 1903

OS 3<sup>rd</sup> edition 25 inch map - 1912

OS 1:2500 map - 1949

#### **8.4 Pictorial Sources**

Collections of old engravings and photographs of Bristol Bridge and aerial photographs of the study area were consulted at Bristol Record Office and the Bristol City Council website 'Know Your Place' (<http://maps.bristol.gov.uk/knowyourplace/>).





## 9. Appendix 1: Context Register

### PIT 1

LOCATION/NGR	CONTEXT	DESCRIPTION	INTERPRETATION
ST 59104 73044	(101)	Soft, dark greyish-brown clayey silt; no inclusions; extends pit wide at average thickness of 0.2m. Overlies (102) Same as (801)	Topsoil
	(102)	Firm, mottled mid orange-red and reddish-brown silty clay; frequent small sub-angular stone and gravel <4cm; extends pit-wide at average thickness of 0.08m. Underlies (101) Overlies (103) Same as (802)	Levelling layer
	(103)	Soft, dark brown and black sandy silt; frequent medium stone, frequent small-medium brick fragments <10cm. frequent charcoal and mortar flecks, moderate oyster shell; extends pit-wide at average thickness of 0.4m. Underlies (102) Overlies (104) Same as (807)	Made ground associated with landscaping
	(104)	Rubble of large sub-angular stone blocks <62cm, small-large stones <40cm, small-medium brick fragments <10cm and large sections of mortared brickwork in a loose, dark brown and black sandy silt matrix; extends pit-wide to a visible depth of 1.1m. Underlies (103)	Demolition deposit associated with post WWII clearance

### PIT 2

LOCATION/NGR	CONTEXT	DESCRIPTION	INTERPRETATION
ST 58994 72940	(201)	Compact, regular sub-rectangular cobbles rounded corners 480mm-210mm × 115mm-60mm × 250mm, mid grey mortar; extends pit wide to an average depth of 0.25m. Overlies (202)	Cobbled surface
	(202)	Soft, dark-mid grey gritty sand; no inclusions; extends pit-wide at average thickness of 0.09m. Underlies (201) Overlies (203) (204) (205)	Bedding layer



	(203)	Indurated, mid brown concrete; visibly extends 1.8m (NE/SW) × 0.75m (SE/NW) × thickness of 0.25m; Underlies (202)	Backfill associated with service
	(204)	Indurated, dark grey concrete; visibly extends 1.8m (NE/SW) × 0.5m (SE/NW) × 0.17m; Underlies (202)	Backfill associated with service
	(205)	Indurated, mid-light grey concrete; visibly extends 1.8m (NE/SW) × 0.45m (SE/NW) × 0.65m; Underlies (202)	Backfill associated with service

**PIT 3**

LOCATION/NGR	CONTEXT	DESCRIPTION	INTERPRETATION
ST 59045 72987	(301)	Indurated black tarmac; no inclusions; extends pit wide to an average depth of 0.09m. Overlies (302) Same as (401) (501) (601) (701)	Tarmac cycleway surface
	(302)	Firm, mid yellowish-brown small stone chippings in loose sand matrix <4 cm; no inclusions; extends pit-wide to an average depth of 0.25m. Underlies (301) Overlies (303) Same as (402) (502) (602) (702)	Bedding layer
	(303)	Rubble of large-medium sub-angular stone blocks <50cm, flagstones <40cm, small-medium stones <25cm, small-medium brick fragments <10cm and glazed tile fragments <3cm in a loose, mid brown and black sandy silt matrix; extends pit-wide to a visible depth of 0.34m. Underlies (302) Overlies (304)	Demolition deposit associated with post-WWII clearance
	(304)	Soft, dark brown and black mottled sandy silt; moderate small stone < 5cm, occasional oyster shells; extends pit-wide to a visible depth of 0.5m. Underlies (303)	Disturbed made ground originally associated with mid-18 <sup>th</sup> century road construction

**PIT 4**

LOCATION/NGR	CONTEXT	DESCRIPTION	INTERPRETATION
ST 59107 73045	(401)	Indurated black tarmac; no inclusions; extends pit-wide to an average depth of 0.11m. Overlies (402) Same as (301) (501) (601) (701)	Tarmac cycleway surface
	(402)	Firm, mid yellowish-brown small stone chippings in loose sand matrix <4 cm; no inclusions; extends pit-wide to an average depth of 0.32m. Underlies (401) Overlies (403) Same as (302) (502) (602) (702)	Bedding layer
	(403)	Soft, dark reddish-brown & black mottled sandy silt; frequent small-medium sub-angular stones <10cm, occasional oyster shells; extends pit-wide to a visible depth of 0.67m. Underlies (402) Overlies (404)	Disturbed made ground originally associated with mid-18 <sup>th</sup> century road construction
	(404)	Soft, mid reddish-brown sandy clay; moderate small to medium stones < 15cm; sterile; extends pit-wide to a visible depth of 0.3m. Underlies (403)	Disturbed made ground originally associated with mid-18 <sup>th</sup> century road construction

**PIT 5**

LOCATION/NGR	CONTEXT	DESCRIPTION	INTERPRETATION
ST 59087 73042	(501)	Indurated black tarmac; no inclusions; extends pit wide to an average depth of 0.10m. Overlies (502) Same as (301) (401) (601) (701)	Tarmac cycleway surface
	(502)	Firm, mid yellowish-brown small stone chippings in loose sand matrix <4 cm; no inclusions; extends pit-wide to an average depth of 0.3m. Underlies (501) Overlies (503) Same as (302) (402) (602) (702)	Bedding layer
	(503)	Soft, dark bluish-grey clay; occasional small stone < 3cm; extends pit-wide to an average depth of 0.18m. Underlies (502) Overlies (504) Same as (703)	Clay levelling layer
	(504)	Loose, mid orange-brown sand and medium-small stones < 10cm; no inclusions; extends pit-wide to an average depth of 0.35m. Underlies (503) Overlies (505) Same as (704)	Levelling layer



	(505)	Rubble of large-medium sub-angular stone blocks including keystones <50cm, flagstones <40cm, small-medium stones <25cm, bricks <23cm in a loose, dark reddish-grey and black gritty sand matrix; extends pit-wide to a visible depth of 0.29m. Underlies (504) Overlies (506) Same as (705)	Demolition deposit associated with post WWII clearance
	(506)	Soft, dark orange-red clayey sand; moderate small stones <7cm; extends pit-wide to a visible depth of 0.4m. Underlies (505) Same as (706)	Disturbed made ground associated with mid-18 <sup>th</sup> century road construction

**PIT 6**

LOCATION/NGR	CONTEXT	DESCRIPTION	INTERPRETATION
ST 59040 72982	(601)	Indurated black tarmac; no inclusions; extends pit wide to an average depth of 0.09m. Overlies (602) Same as (301) (401) (501) (701)	Tarmac cycleway surface
	(602)	Firm, mid yellowish-brown small stone chippings in loose sand matrix <4 cm; no inclusions; extends pit-wide to an average depth of 0.35m. Underlies (601) Overlies (603) (604) Same as (302) (402) (502) (702)	Bedding layer
	(603)	Soft, mid reddish-brown and dark greyish-brown clayey sand; moderate small-medium stones <15cm, small brick fragments <8cm; extends pit-wide to a visible depth of 1.09m. Underlies (602) Cut by [606]	Disturbed made ground originally associated with mid-18 <sup>th</sup> century road construction
	(604)	Soft, mottled mid reddish-brown and dark greyish-brown clayey sand; moderate small-medium stones <15cm, small brick fragments visibly extends 1/3.m (SE/NW) × 1m (NE/SW) to a depth of 1.1m. Underlies (602) Fill of [606]	Re-deposited (603) forming secondary backfill of [606]
	(605)	Loose, light grey small stone chippings <3 cm; visibly extends 1/3.m (SE/NW) × 0.5m (NE/SW) to a depth of 0.25m. Underlies (604) Fill of [606]	Primary backfill of [606]
	[606]	Linear cut; visibly extends 1.3m (SE/NW) × 1m (NE/SW) to a depth of 1.35m; break of slope (top) sharp; sides steep; break of slope (base) not visible; base not visible; orientation SE/NW. Cuts (603) Filled by (604)	Cut for storm drain



	(605)	
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**TRENCH 7**

LOCATION/NGR	CONTEXT	DESCRIPTION	INTERPRETATION
ST 59097 73032	(701)	Indurated black tarmac; no inclusions; extends pit wide to an average depth of 0.10m. Overlies (702) Same as (301) (401) (501) (601)	Tarmac cycleway surface
	(702)	Firm, mid yellowish-brown small stone chippings in loose sand matrix <4 cm; no inclusions; extends pit-wide to an average depth of 0.25m. Underlies (701) Overlies (703) (707) (708) Same as (302) (402) (502) (602)	Bedding layer
	(703)	Soft, dark bluish-grey clay; occasional small stone < 3cm; visibly extends 10.5.m (SE/NW) × 1.6m (NE/SW) to a depth of 0.2m. Underlies (702) Overlies (703) Same as (503)	Clay levelling layer
	(704)	Loose, mid orange-brown sand and medium-small stones < 10cm; no inclusions; visibly extends 4.m (SE/NW) × 1.6m (NE/SW) to a depth of 0.15m. Underlies (703) Overlies (704) Same as (504)	Levelling layer
	(705)	Rubble of large to medium sub-angular stone blocks including keystones <50cm, small-medium stones <25cm, bricks <23cm in a loose, dark reddish-grey and black gritty sand matrix; extends pit-wide to a maximum depth of 0.95m. Underlies (703) (704) (708) Overlies (706) (709) (710) Same as (505)	Demolition deposit associated with post WWII clearance
	(706)	Soft, dark orange-red clayey sand; moderate small stones <7cm; visibly extends 5.m (SE/NW) × 1.6m (NE/SW) to a maximum depth of 0.5m Underlies (705) Same as (506)	Disturbed made ground originally associated with mid-18 <sup>th</sup> century road construction
	(707)	Indurated black tarmac; no inclusions; visibly extends 9m (SE/NW) × 1.6m (NE/SW) to a depth of 0.4m Underlies (702) Overlies (708)	Tarmac associated with previous ground level
	(708)	Firm, mottled mid brown and brownish-red small stone chippings in loose sand matrix <3 cm; no inclusions; visibly extends 15m (SE/NW) × 1.6m (NE/SW) to a	Bedding layer associated with previous ground level



		maximum depth of 0.1m Underlies (702) (703) (707) Overlies (705)	
	(709)	Soft, mid orange-red slightly clayey sand; moderate small to medium stones <20cm; visibly extends 6.75.m (SE/NW) × 1.6m (NE/SW) to a depth of 0.25m Underlies (705) Overlies (710)	Disturbed made ground originally associated with mid-18 <sup>th</sup> century road construction
	(710)	Soft, mid-light grey silty sand; moderate small to medium stones <20cm, brick fragments <6cm; visibly extends 8.5.m (SE/NW) × 1.6m (NE/SW) to a depth of 1m Underlies (705) (709) Overlies (711)	Disturbed made ground originally associated with mid-18 <sup>th</sup> century road construction
	(711)	Soft, mid-dark reddish-brown silty sand; occasional small to medium stones <15cm; visibly extends 2.2m (SE/NW) × 1.6m (NE/SW) to a depth of 1m Underlies (710)	Disturbed made ground originally associated with mid-18 <sup>th</sup> century road construction

**PIT 8**

LOCATION/NGR	CONTEXT	DESCRIPTION	INTERPRETATION
ST 59107 73045	(801)	Soft, dark greyish-brown clayey silt; no inclusions; extends pit wide at average thickness of 0.1m. Overlies (802) Same as (101)	Topsoil
	(802)	Firm, mottled mid orange-red and reddish-brown silty clay; frequent small sub-angular stone and gravel <4cm; extends pit-wide at average thickness of 0.1m. Underlies (801) Overlies (803) Same as (102)	Levelling layer
	(803)	Loose, light brownish-yellow small stone chippings <3cm; no inclusions; visibly extends 4.5m (SE/NW) × 8m (NE/SW) to depth of 0.15m. Underlies (802) Overlies (804) (805) (806)	Levelling layer
	(804)	Rubble of large-medium sub-angular stone blocks <40cm, small-medium stones <20cm, bricks <23cm and large sections of mortared brickwork in a mid-greyish-black sandy silt matrix; extends 6m (SE/NW) × 2.5m (NE/SW) to a depth of 1.9m. Underlies (803)	Demolition deposit associated with post WWII clearance
	(805)	Loose, mid reddish-orange sandy silt; frequent large-medium sub-angular stone blocks <35cm, small-medium stones <20cm, small brick fragments <0.6cm; visibly extends 6.2 m (SE/NW)	Demolition deposit associated with post WWII clearance



		× 4m (NE/SW) to a depth of 1.9m. Underlies (803)	
	(806)	Loose, light pinkish-grey silty sand; moderate large-medium sub-angular stone blocks <40cm, small-medium stones <20cm, small brick fragments <0.6cm; visibly extends 3.8m (SE/NW) × 1.5m (NE/SW) to a depth of 1.9m. Underlies (803)	Demolition deposit associated with post WWII clearance
	(807)	Soft, dark brown and black sandy silt; frequent medium stone, frequent small-medium brick fragments <10cm. frequent charcoal and mortar flecks, moderate oyster shells; visibly extends 4.8m (SE/NW) × 2m (NE/SW) to a depth of 0.5m. Underlies (802) Same as (103)	Made ground associated with landscaping

**PIT 9**

LOCATION	CONTEXT	DESCRIPTION	INTERPRETATION
ST 58980 72972	(901)	Indurated black tarmac; no inclusions; extends pit wide to an average depth of 0.2m. Overlies (902) (903) (906)	Tarmac road surface
	(902)	Indurated light whitish-yellow concrete; visibly extends 4.5m (NE/SW) × 0.5m (SE/NW) to a depth of 0.15m. Underlies (901) Overlies (904)	Backfill associated with service
	(903)	Indurated mid whitish-yellow concrete; visibly extends 4.5m (NE/SW) × 3m (SE/NW) to a depth of 0.3m. Underlies (901) Overlies (904)	Backfill associated with service
	(904)	Loose, dark reddish-brown stone chippings; no inclusions; visibly extends 4.5m (NE/SW) × 2.5m (SE/NW) to a depth of 0.7m. Underlies (902) (903) (904) Overlies (905) (913)	Backfill associated with service
	(905)	Indurated light white concrete; visibly extends 4.5m (NE/SW) × 2.5m (SE/NW) to a depth of 0.2m. Butted by (904) Overlies (908)	Bedding for tarmac road surface
	(906)	Loose, light pink small stone chippings <3cm; no inclusions; visibly extends 1.2m (SE/NW) × 1.4m (NE/SW) to a depth of 1.3m. Underlies (901) Overlies (912)	Backfill associated with service
	(907)	Soft, dark greyish-brown silty clay; frequent small-medium stones <15cm, occasional bricks <23, moderate brick	Made ground deposit



		fragments <6cm, occasional small bone fragments <7cm, moderate charcoal flecks; visibly extends 1.6m (NE/SW) × 3.8m (SE/NW) to a depth of 0.7m. Overlies 909 Cut by [914] [916] [918] [919] [920]	
(908)		Indurated light greyish-white concrete; visibly extends 3.8m (NE/SW) × 4.5m (SE/NW) with an unknown depth. Underlies (905) Overlies (910) (911) (921) (915) (917)	Backfill associated with service
(909)		Grey sandstone irregular un-worked stones, bonded with mid-light grey mortar with charcoal flecks; random un-coursed; visibly extends 2.1m (NE/SW) × 1.9m (SE/NW) to a depth of 0.75m. Underlies (907) Cut by [914] [916] [918] [919] [920]	Wall of possible late medieval or early post-medieval date with evidence of repairs
(910)		Soft, dark grey silty clay; no inclusions; visibly extends 0.3m (NE/SW) × 0.6m (NW/SE) with an unknown depth. Fill of [919]	Re-deposited (907) forming backfill of [919]
(911)		Indurated dark grey concrete; visibly extends 0.5m (NE/SW) × 0.6m (SE/NW) to a depth of 0.15m. Fill of [914]	Backfill of [914]
(912)		Soft, dark grey silt; frequent medium stone, <15cm, occasional charcoal flecks; visibly extends 0.7m (NE/SW) × 0.95m (SE/NW) with a depth of 0.6m. Fill of [918]	Re-deposited (907) forming backfill of [918]
(913)		Soft, dark greyish-brown clayey silt; frequent small-medium stones, <15cm, occasional small brick fragments <4cm, occasional charcoal flecks; visibly extends 0.95m (NE/SW) × 0.6m (SE/NW) with a depth of 1.1m. Fill of [920]	Re-deposited (907) forming backfill of [920]
[914]		Linear cut; visibly extends 4.5m (NE/SW) × a minimum of 0.8m (SE/NW) with a minimum depth of 1m; Break of slope and base not visible; orientation NE/SW. Cuts (907) 909 Filled by (911)	Modern service trench
(915)		Loose, brownish-orange small stones <8cm and soft dark greyish-brown silty clay; occasional small stones <4cm; visibly extends 4.5m (NE/SW) × a minimum of 0.8 (SE/NW) with a	Backfill of [914]





		minimum depth of 1m. Fill of [914]	
[916]		Linear cut; visibly extends 1.3m (SE/NW) × a minimum of 0.4m (SE/NW) with an unknown depth; Break of slope and base not visible; orientation SE/NW. Cuts (907) 909 Filled by (917)	Modern service trench
(917)		Soft, dark grey silty clay; no inclusions; visibly extends 1.3m (SE/NW) × a minimum of 0.4m (NE/SW) with an unknown depth. Fill of [916]	Re-deposited (907) forming backfill of [916]
[918]		Linear cut; visibly extends 0.7m (NE/SW) × 0.95m (SE/NW) with a minimum depth of 0.6m; break of slope and base not visible; orientation N/S. Cuts (907) 909 Filled by (912)	Service trench
[919]		Linear cut; visibly extends 0.3m (NE/SW) × 0.6m (SE/NW) with an unknown depth; break of slope and base not visible; orientation SE/NW. Cuts (907) 909 Filled by (910)	Service trench
[920]		Linear cut; visibly extends 0.95m (NE/SW) × 0.6m (NW/SE) with a depth of 1.1m; break of slope and base not visible; orientation SE/NW. Cuts (907)	Service trench



## 10. Appendix 2: Assessment Reports

### 10.1 Appendix 1: Ceramic Assessment

*Dr Alejandra Gutierrez (Archaeological Services University of Durham)*

A small amount of pottery was found during this programme of archaeological observation. The quantification of all the material is presented in Table 1 below.

The material has been identified to fabric types using Bristol Pottery Type (BPT) numbers (as described by Ponsford 1988 and 1998), possible source and date. The assemblage has been studied without detailed reference to the stratigraphic sequence.

The assemblage from CPB13 consists of 15 sherds of the 18<sup>th</sup> and 19<sup>th</sup> centuries, including both pottery and modern wall tiles. Household wares are represented by typical products of local slipwares, delftwares and stonewares. All the sherds are very fragmented; some are very worn all-over.

Trench	Context	BPT	Fabric	Group	Date	Form	Sherds	g	mnv	rims	Comments
CPB13	710	BPT 202	Blue-painted pearlware	modern	c1775–1820s		1	8			hand-painted underglaze; bowl
CPB13	804		Victorial wall tile	modern	19thC	wall tile	1	40			green glaze on upper surface; plain; stamp underside: 10 2; 10mm thick
CPB13	303		Victorial wall tile	modern	19thC	wall tile	1	12			brown glaze; plain; 9 mm thick
CPB13	303		Victorial wall tile	modern	19thC	wall tile	1	11			turquoise glaze; plain; 9 mm thick
CPB13	303		Victorial wall tile	modern	19thC	wall tile	1	10			light green glaze; plain; 10 mm thick
CPB13	907	BPT 100	Bristol/Staffordshire slipware	modern	late 17th-18thC	Dish	1	53		1	whole profile present; burnt/soot under and over rim
CPB13	907	BPT 100	Bristol/Staffordshire slipware	modern	late 17th-18thC	cup/porringer	1	7		1	
CPB13	907	BPT 100	Bristol/Staffordshire slipware	modern	late 17th-18thC		2	7			
CPB13	907	BPT 99	Plain delftware	modern	18thC	chamber pot?	1	6		1	Bristol? Plain bluish white tin-glazed; yellow cream fabric
CPB13	907	BPT 99	Blue-decorated delftware	modern	18thC		1	13			Bristol? Blue flowers and bluish white tin-glazed; yellow cream fabric
CPB13	907	BPT 202	Blue-printed pearlware	modern	18th-19thC		1	2			
CPB13	907		Chinese porcelain	modern	18thC		1	2			blue decoration
CPB13	907	BPT 277	Modern English stoneware	modern	19thC+	chimney pots/pipes	2	221			heavy duty wares
							<b>15</b>	<b>392</b>			

Table 1: Ceramic assessment – Castle Park, Bristol (CPB 13)

#### References

Brooks, C M, 1983 'Aspects of the sugar-refining industry from the 16<sup>th</sup> to the 19<sup>th</sup> century', *Post-Medieval Archaeology* **17**, 1–14



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## 10.2 Appendix 2: Mortar Analysis

*Peter Ellis (Rose of Jericho)*

### Test Report No. 4024

#### Castle Park, Bristol - Sample 1. S End

One sample of mortar, (weight 35.1g), taken from the S end of a wall revealed during water-main replacement works and thought to be associated with a late medieval bridge has been analysed chemically and microscopically.

#### Laboratory Observations

Wet sample. Predominantly un-carbonated (phenolphthalein carbonation test). Discrete moderate strength (sample could not be broken by hand nor crumbled in fingers; disrupted with ease using pestle) grey coarse mortar pieces and powder. Apparent water permeability high. Aggregate principally carbonaceous – principally coal ash but including some charcoal. Occasional quartz and other particles present. Large (18mm) 'nodules' of unmixed un-carbonated white lime noted. Grey limestone particles observed. Hair/fibre reinforcement not present.

#### Reaction Comments

Vigorous effervescence with dilute hydrochloric acid.  
Strong yellow coloured acid-extract.

#### Chemical 'Dissolution' Analysis (% dry mass) to BS4551:2005

%	Initial Moisture (oven @ 40 <sup>0</sup> C)	70.8
%	Total Calcium as CaO (titrimetric method)	23.95
%	Total Magnesium as MgO (titrimetric method)	1.12
%	Soluble SiO <sub>2</sub> (gravimetric method)	4.19
%	Total (acid-soluble) sulphate as SO <sub>3</sub> (gravimetric method)	2.00
%	Soluble Aluminium as Al <sub>2</sub> O <sub>3</sub> (ICP-OES method)	2.77
%	Soluble Iron as Fe <sub>2</sub> O <sub>3</sub> (ICP-OES method)	1.86
%	Acid-soluble Potassium as K <sub>2</sub> O (ICP-OES method)	0.403
%	Total Acid Insolubles	43.24

#### BINDER

This is a crude mortar and the binder is lime that has not carbonated (presumably indicating it has always been underground and/or wet). Hydraulicity of mortar is indicated by the soluble SiO<sub>2</sub> result possibly indicating a pozzolanic reaction with the ash aggregate. The sulphate is associated with unburnt coal and does not indicate that gypsum was a deliberate original mix ingredient.

The carboniferous or grey lias limestone particles are thought more likely to be the unburnt core of the limestone calcined in the kiln, rather than limestone aggregate.



## AGGREGATE

Insoluble particle size range: 10mm to 63µm ( 83.23%) : < 63µm ( 16.77%)

The insoluble residue comprises principally:

Coal ash particles and powder  
Occasional unburnt coal particles  
(Apparently) charcoal particles  
Occasional particles of fine quartz  
Occasional particles of various mineral type

## CONCLUSIONS

I believe it more likely that this lime-ash sample is a blend of lime and fuel ash *all* from the base of the kiln, and not a mortar composed of lime and deliberately added (coal) ash as aggregate.

It is a very crude mortar very likely to have been produced in a simple kiln and quite possibly of the mediaeval period. The alternative is that this is a Victorian mortar when coal ash was often deliberately used in place of sand as aggregate, but the crudeness of this mortar makes this much less probable.

### Test Report No. 4025.

#### Castle Park, Bristol - Sample 2. N End

One sample of mortar, (weight 38.2g), taken from the N end of a wall revealed during water-main replacement works and thought to be associated with a late medieval bridge has been analysed chemically and microscopically.

#### Laboratory Observations

Wet sample. Predominantly un-carbonated (phenolphthalein carbonation test). Discrete moderate strength (sample could not be broken by hand nor crumbled in fingers; disrupted with ease using pestle) grey mortar pieces and powder. Apparent water permeability high. Aggregate principally carbonaceous – principally coal ash but including some charcoal. Occasional quartz and other particles present. Nodules (10mm) and 'flecks' of unmixed un-carbonated white lime noted. Grey limestone particles observed. Hair/fibre reinforcement not present.

#### Reaction Comments

Vigorous effervescence with dilute hydrochloric acid  
Strong yellow-coloured acid-extract



### Chemical 'Dissolution' Analysis (% dry mass) to BS4551:2005

%	Initial Moisture (oven @ 40°C)	39.0
%	Total Calcium as CaO (titrimetric method)	24.02
%	Total Magnesium as MgO (titrimetric method)	0.60
%	Soluble SiO <sub>2</sub> (gravimetric method)	3.27
%	Total (acid-soluble) sulphate as SO <sub>3</sub> (gravimetric method)	0.521
%	Soluble Aluminium as Al <sub>2</sub> O <sub>3</sub> (ICP-OES method)	2.34
%	Soluble Iron as Fe <sub>2</sub> O <sub>3</sub> (ICP-OES method)	1.64
%	Acid-soluble Potassium as K <sub>2</sub> O (ICP-OES method)	0.552
%	Total Acid Insolubles	46.23

### BINDER

This is a crude mortar and the binder is lime that has not carbonated (presumably indicating it has always been underground and/or wet). Hydraulicity of mortar is indicated by the soluble SiO<sub>2</sub> result and this may indicate a pozzolanic reaction with the ash aggregate.

The carboniferous or grey lias limestone particles identified are thought more likely to be the unburnt core of the limestone calcined in the kiln, rather than limestone aggregate.

### AGGREGATE

Insoluble particle size range: 6mm to 63µm ( 60.36%) : < 63µm ( 39.64%)

The insoluble residue comprises principally:

- Coal ash particles and powder
- Occasional unburnt coal particles
- (Apparently) charcoal particles
- Occasional particles of fine quartz
- Occasional particles of various mineral type

### CONCLUSIONS

As with sample 1:4024, it is thought more likely that this lime-ash sample is a blend of lime and fuel ash *all* from the kiln, and not a mortar composed of lime and deliberately added (coal) ash as aggregate.

As with sample 1:4024, this is a crude mortar (albeit with finer ash particles and smaller nodules of unmixed lime) and very likely to have been produced in a simple kiln and quite possibly of the medieval period. The alternative is that it is of the Victorian period when coal-ash was frequently deliberately used in place of sand as aggregate, but the crudeness of this mortar makes this less probable.

This mortar is very similar to Sample 1 from the S end, and although the 'nodules' of unmixed lime and ash particles are smaller, both are un-carbonated and it is thought likely that these mortars are of the same build-phase.



## Test Report No. 4026

### Castle Park, Bristol - Sample 3. Pitched Area

One sample of mortar, (weight 16.6g), taken from a pitched area of a wall revealed during water-main replacement works and thought to be associated with a late medieval bridge has been analysed chemically and microscopically.

### Laboratory Observations

Wet sample. Fully carbonated (phenolphthalein carbonation test). Disrupted fairly soft (small fragments could be broken by hand with ease and crumbled in fingers with moderate ease; disrupted with extreme ease using pestle) brownish-grey mortar fragments and powder. Apparent water permeability high. Aggregate principally carbonaceous – apparently coal ash. Very occasional fine quartz and other particles present. Occasional small (6mm) ‘nodules’ of unmixed carbonated cream/pale yellow lime noted. Cream limestone particles noted. Hair/fibre reinforcement not present.

### Reaction Comments

Vigorous effervescence with dilute hydrochloric acid  
Strong yellow-coloured acid-extract

### Chemical ‘Dissolution’ Analysis (% dry mass) to BS4551:2005

%	Initial Moisture (oven @ 40°C)	57.0
%	Total Calcium as CaO (titrimetric method)	26.57
%	Total Magnesium as MgO (titrimetric method)	0.94
%	Soluble SiO <sub>2</sub> (gravimetric method)	1.64
%	Total (acid-soluble) sulphate as SO <sub>3</sub> (gravimetric method)	0.687
%	Soluble Aluminium as Al <sub>2</sub> O <sub>3</sub> (ICP-OES method)	2.50
%	Soluble Iron as Fe <sub>2</sub> O <sub>3</sub> (ICP-OES method)	1.42
%	Acid-soluble Potassium as K <sub>2</sub> O (ICP-OES method)	0.746
%	Total Acid Insolubles	47.84

### BINDER

This is a crude mortar and the binder is carbonated lime. The mortar is soft and only very weak hydraulicity of mortar is indicated by the soluble SiO<sub>2</sub> result.

The cream (oolitic?) limestone particles are thought more likely to be the unburnt core of the limestone calcined in the kiln, rather than limestone aggregate.

### AGGREGATE

Insoluble particle size range: 8mm to 63µm (68.09%) : < 63µm ( 31.91%)

The insoluble residue comprises principally:

Coal ash particles and powder



Occasional particles of fine quartz  
Occasional particles of various mineral type

### CONCLUSIONS

As with samples 1:4024 and 2:4025, this is a crude mortar thought more likely to be a blend of lime and fuel ash *all* from a simple early kiln, rather than a mortar composed of lime and deliberately added (coal) ash as aggregate typical of the Victorian period.

However, it is not the same as samples 1 and 2, and is very likely to be of a different build- or repair phase. This sample has carbonated, it is significantly softer with little evidence of hydraulicity, more brown in colour and both the unburnt limestone particles and the unmixed lime nodules are cream in colour, indicating oolitic rather than carboniferous or grey lias calcined limestone.

### NOTES

It should be remembered that mortars change over time. When analysing an aged material, one is ascertaining what it now is and looking for evidence for what it originally was. Calcium hydroxide carbonates to form calcium carbonate, and calcium silicate hydrates, the principal hydraulic reaction products in cements, hydraulic limes and pozzolanic limes themselves react over time with atmospheric carbon dioxide to produce calcium carbonate, hydrated silica and silico-aluminate gels and only limited calcium silicate hydrate gel.



**DOCUMENT CONTROL**

<b>Job title</b>	Archaeological Observation: Water Mains Replacement Scheme Castle Park Bristol	<b>Job No</b>	BA1314BWCPB
<b>Report written by</b>	<i>Jessica Cook BSc &amp; Stephen Priestley MA</i>		
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<b>Issue No</b>	<b>Status</b>	<b>Date</b>	<b>Approved for issue</b>
1	Final	April 2013	<i>Neil Shurety Dip. M. GM. Inst.M</i>