

RFMG/02



CHURCHEND MILL, STROUD, GLOUCESTERSHIRE

Historic Building Recording

commissioned by The Environment Agency

July 2014

CHURCHEND MILL, STROUD, GLOUCESTERSHIRE

Historic Building Recording

commissioned by The Environment Agency

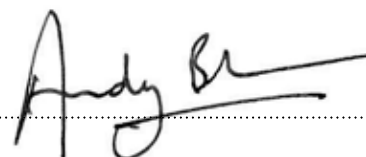
July 2014

project info

HA JOB NO. RFMG/02
HAS NO. 1046
NGR SO 78370 05701
LOCAL AUTHORITY Stroud District Council
OASIS REF. headland3-181783

project team

PROJECT MANAGER Andy Boucher
AUTHOR Simon Mayes
FIELDWORK Luke Craddock-Bennett, Simon Mayes
GRAPHICS Caroline Norrman
APPROVED BY Andy Boucher – Project Manager



© 2014 by Headland Archaeology (UK) Ltd



Headland Archaeology
Midlands & West

Unit 1, Premier Business Park, Faraday Road
Hereford HR4 9NZ

01432 364 901
midlandsandwest@headlandarchaeology.com

www.headlandarchaeology.com

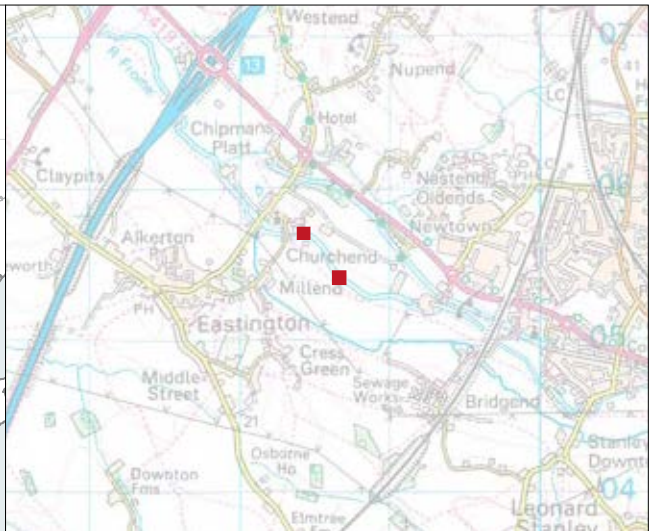
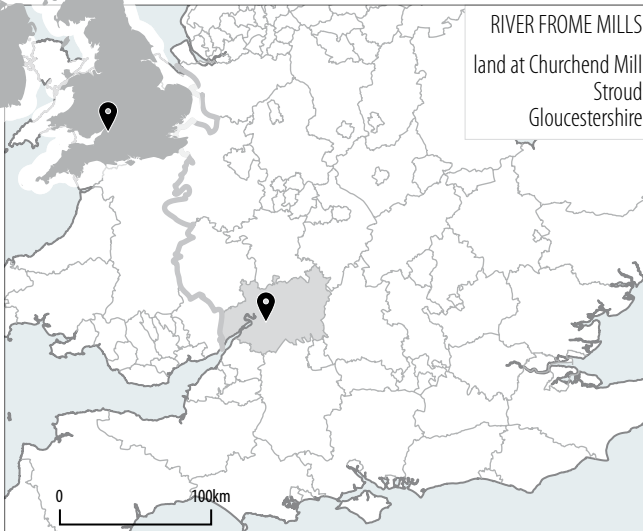


CONTENTS

1	INTRODUCTION	1
2	SITE LOCATION	1
	2.1 AREA 1 – ALLOTMENT WEIR (NGR 378371,205697)	1
	2.2 AREA 2 – BYPASS WEIR (NGR 378612, 205407)	1
3	HISTORICAL BACKGROUND	1
4	OVERVIEW OF THE ALTERATION WORKS	2
	4.1 AREA 1 – ALLOTMENT WEIR	2
	4.2 AREA 2 – BYPASS WEIR	2
5	AIMS AND OBJECTIVES	2
6	METHOD	2
7	RESULTS	2
	7.1 AREA 1 – ALLOTMENT WEIR	2
	Phase 1	2
	Phase 2	9
	Phase 3	9
	7.2 AREA 2 – BYPASS WEIR	9
	Phase 1	9
	Phase 2	10
8	DISCUSSION	10
9	CONCLUSION	11
10	BIBLIOGRAPHY	11
11	APPENDICES	13
	APPENDIX 1 DRAWING REGISTER	13
	APPENDIX 2 PHOTOGRAPHIC INDEX	13

LIST OF ILLUSTRATIONS

ILLUS 1	VI
Site location	
ILLUS 2	3
Area 1 – Allotment Weir: Plan of structure and photo locations	
ILLUS 3	5
Area 2 – Bypass Weir: Plan of structure and photo locations	
ILLUS 4	7
General view of the remains of Churchend Mill (photo 007)	
ILLUS 5	7
Detail showing cut recess for the water wheel (photo 101)	
ILLUS 6	8
South facing elevation drawing showing water wheel recess	
ILLUS 7	8
Detail of brick-built sluice wall (photo 092)	
ILLUS 8	9
Detail showing removal of section of sluice wall (photo 110)	
ILLUS 9	10
Fish pass after installation (photo 115)	
ILLUS 10	10
Bypass Weir after removal of stone capping and cutting of 'low flow notch' (photo 127)	
ILLUS 11	11
Bypass Weir – detail showing brick core and sluice gate slot (photo 120)	
ILLUS 12	12
Area 2: Bypass Weir (photo 100)	



Reproduced using 2009 OS 1:50,000 Landranger Series no. 162 and digital data.
Ordnance Survey © Crown copyright 2014. All rights reserved. Licence no. AL
100013329

scale 1:5,000 @ A4



0 250m

ILLUS 1
Site location

CHURCHEND MILL, STROUD, GLOUCESTERSHIRE

Historic Building Recording

Headland Archaeology undertook a program of historic building recording on two water management structures associated with Churchend Mill, near Stroud. The installation of fish passes on the structures necessitated dewatering of the structures and features relating to their construction and use were observed.

A stone cut recess was observed within the wheel pit of the Allotment Weir which allowed the size of the original water wheel to be estimated. Removal of masonry on the Bypass Weir revealed that the stone-faced weir was built around a red brick core.

1 INTRODUCTION

Headland Archaeology (UK) was commissioned by the Environment Agency to undertake a program of historic building recording related to the alteration of historic mill structures at Churchend, Stroud, Gloucestershire.

Under the terms of the EU Water Framework Directive (2000/60/EC) it is a requirement to enable fish and eels to migrate upstream to areas of the river suitable for spawning and feeding. The weir structures at Churchend were preventing this migration and changes to the structures, including the installation of a fish pass were required to comply with the EU Directive.

No archaeological requirements were identified by the Borough Council relating to the mitigation of the proposed scheme, however, the Environment Agency has instigated a scheme of mitigation, through their internal best practice methodologies and structures, relating to recording any existing structures affected and monitoring of site work during the initial stages of alterations to the structures.

2 SITE LOCATION

Alterations were undertaken on two structures related to the operation of Churchend Mill located on the River Frome at Churchend, Gloucestershire (**Illus 1**).

2.1 AREA 1 – ALLOTMENT WEIR (NGR 378371,205697)

The Allotment Weir (**Illus 2**) comprises two stone built channels adjacent to the main mill building (no longer present). The southern

channel incorporates the wheel pit and associated water feed channel. The northern channel has a weir crest to the east from which water flows into a bypass channel.

2.2 AREA 2 – BYPASS WEIR (NGR 378612, 205407)

The Upper Bypass Weir (**Illus 3**) is located approximately 380m upstream of the Allotment Weir, and provided a means to control the volume of water reaching the Allotment Weir. The weir feeds into a bypass channel which runs to the south, and parallel to, the main river channel. The bypass channel rejoins the river channel 400m to the north-west of the Allotment Weir.

3 HISTORICAL BACKGROUND

A historical assessment of the Churchend Mill site was undertaken by Headland Archaeology (Boucher & Brekmoe 2014) as part of a more extensive desk-based assessment of the heritage assets on the River Frome. The results relating to Churchend Mill are summarised below.

Churchend had a fulling mill with two stocks under one roof in the tenure of Thomas Hornchurche in 1575. In 1799, Henry Hicks bought Churchend Mill and rebuilt it. As water supplies at times were marginal, Hicks cut a new channel at Churchend and installed a steam engine. In the 19th century Churchend Mill was owned, alongside Millend and Meadow Mills, by Henry Hicks & Son. Around 1830 the mill was bought by Charles Hooper during whose time it was mainly used for spinning. Hooper sold the mill before 1879, after



which it fell into disrepair and has since been demolished. The weir attached to the mill (not part of the current works) is a listed Grade II structure, not because of the mill but rather its association with the Kemmett Navigation.

Churchend Mill itself only now survives in its lower courses. The first edition Ordnance Survey map (1885) depicts it as a woollen mill and it appears from the evidence on the ground to have two channels feeding what may have been a double wheel at one point. The lower stone work is partly exposed in places and reasonably well preserved. Upstream the main weir and sluice gates are also in reasonably good repair. Purportedly the site of the Kemmett crane would have stood to the east side of the main weir, the pool below being where boats were loaded.

4 OVERVIEW OF THE ALTERATION WORKS

4.1 AREA 1 – ALLOTMENT WEIR

Changes to the fabric of the existing structures were required to enable the installation of an 8m long stainless steel fish pass.

An 840mm section of brick weir crest in the southern channel was lowered by 1000mm using hand tools to accommodate the fish pass.

The original project design specified the insertion of two pre-cast concrete pads into the river bed to hold the fish pass in place. However, a solid base to the wheel pit was identified, and the pass was bolted directly to this surface without the need for the concrete pads.

Existing brick work removed to allow for the installation of the fish pass was re-used for consolidation of the steel structure. In the northern channel, the existing weir crest was replaced by a pre-formed concrete crest. The crest was doweled to the existing weir structure and no existing masonry was removed or altered.

4.2 AREA 2 – BYPASS WEIR

Removal of parts of the existing structure took place in order to enable fish to migrate upstream.

Ashlar blocks forming the base of the weir were cut and lowered by up to 0.30m to create a flat base. A channel measuring 0.30m wide by up to 0.35m deep was cut into the base to allow for the passage of fish, and a parallel channel was cut to a depth of 0.16m to allow for the passage of eels. River pebbles were concreted into the base of the eel channel to provide a high friction surface. Displaced ashlar blocks from the wing walls of the weir were re-set into the structure.

At the downstream end of the weir pool (10m west of the weir) a pre-formed concrete barrage was inserted to raise the height of the water within the pool.

5 AIMS AND OBJECTIVES

The aims and objectives of the project are specified in a Written Scheme of Investigation (Boucher 2014) prepared by Headland Archaeology and agreed with the client prior to the commencement of works.

The overriding aims of the project were to define the history, character, date, function, phasing, significance and techniques of construction of the remains of built structures.

The objectives of the building recording were to record elements of the standing structures exposed by the proposed works, analyse the results in relation to supporting documentary information, and produce a report and deposit the archive with a suitable local repository.

6 METHOD

The historic building recording undertaken on the structures was commensurate with English Heritage level 2/3. The overall level of detail of the standing building survey was broadly in line with level 2 standards of recording (a descriptive record with annotation of existing scaled plans and general photography), however, a more detailed analytic (level 3) record was made where necessary.

The following recording was undertaken:

- General photographs of the structures affected by the proposals (before and after dewatering) were taken with 35mm colour slide and black and white film. Digital photographs were also taken;
- A descriptive written record of the structures;
- Annotated plans and elevations showing detail relevant to the interpretation of the structures;
- Detailed photographic record of details that either assist with interpretation or may be lost during development;
- Hand drawn plans and elevations were made at a scale of 1:20 where existing engineer's plans were not sufficient;
- The locations of all photos were recorded on engineer's plans.

Fieldwork was undertaken between 24th and 28th March 2014.

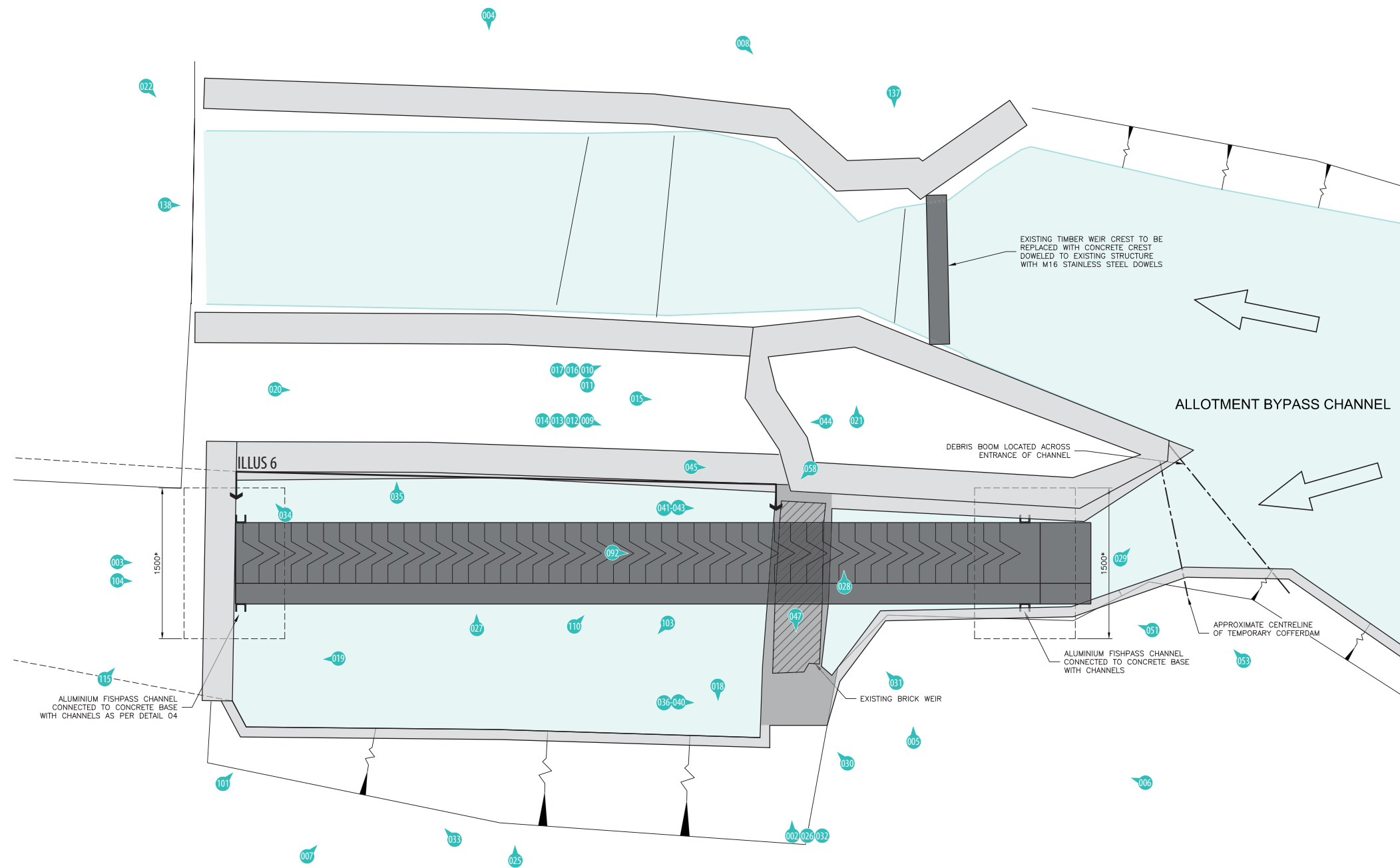
7 RESULTS

7.1 AREA 1 – ALLOTMENT WEIR

Phase 1

No upstanding masonry relating to the former mill complex exists above the current ground level at the allotment site (**Illus 4**). The double channel weir arrangement survives within the river channel itself which may explain the preservation of this feature.

The feature consists of two adjacent channels which formerly used an arrangement of sluice gates to control the volume and velocity



KEY

- phase 1
- phase 2
- phase 3
- photo direction

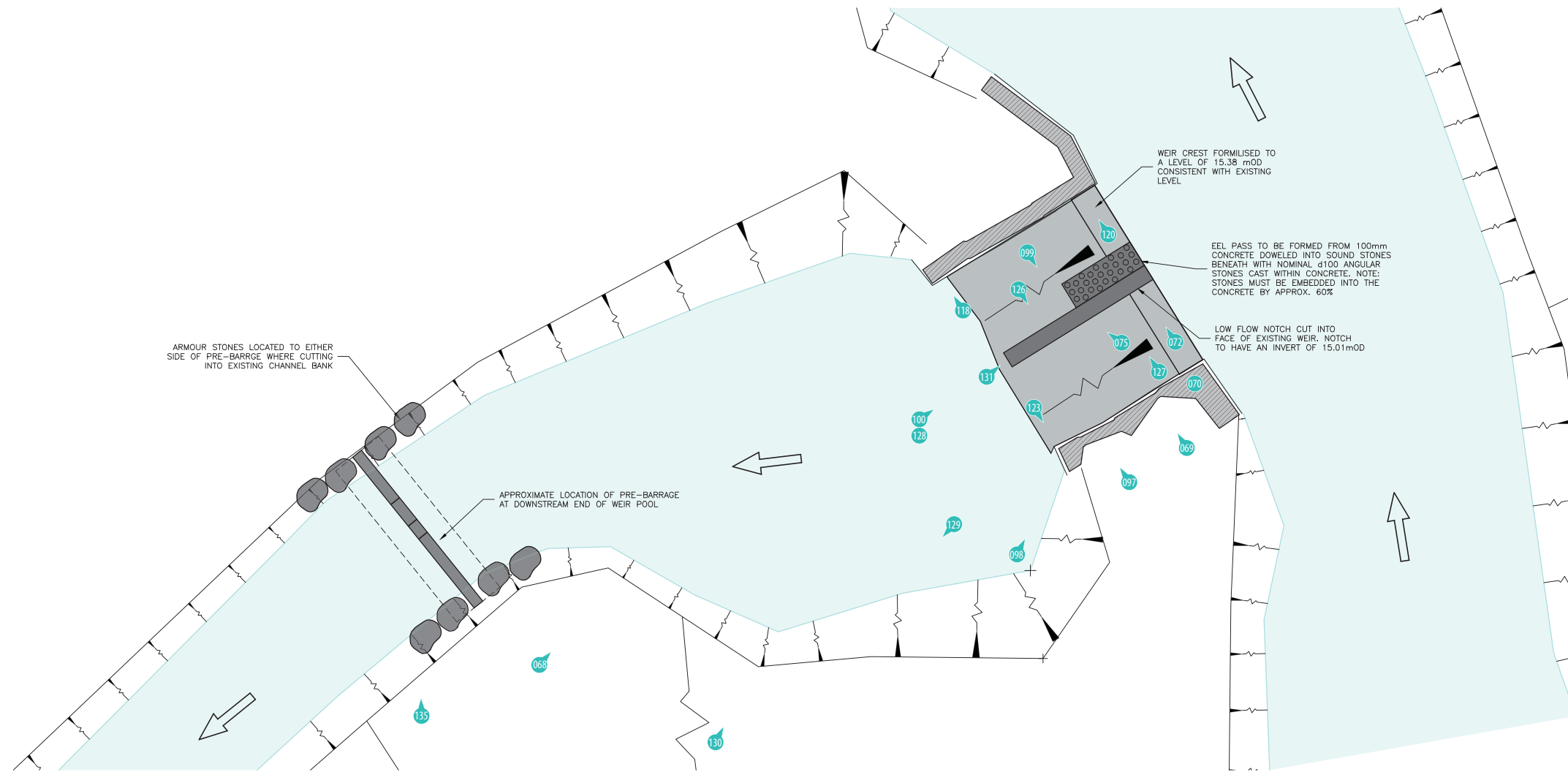
N

0 1m

scale 1:25 @ A3

© Headland Archaeology (UK) Ltd 2014

ILLUS 2
Area 1 – Allotment Weir: Plan of structure and photo locations



KEY

- phase 1
- phase 2
- photo direction

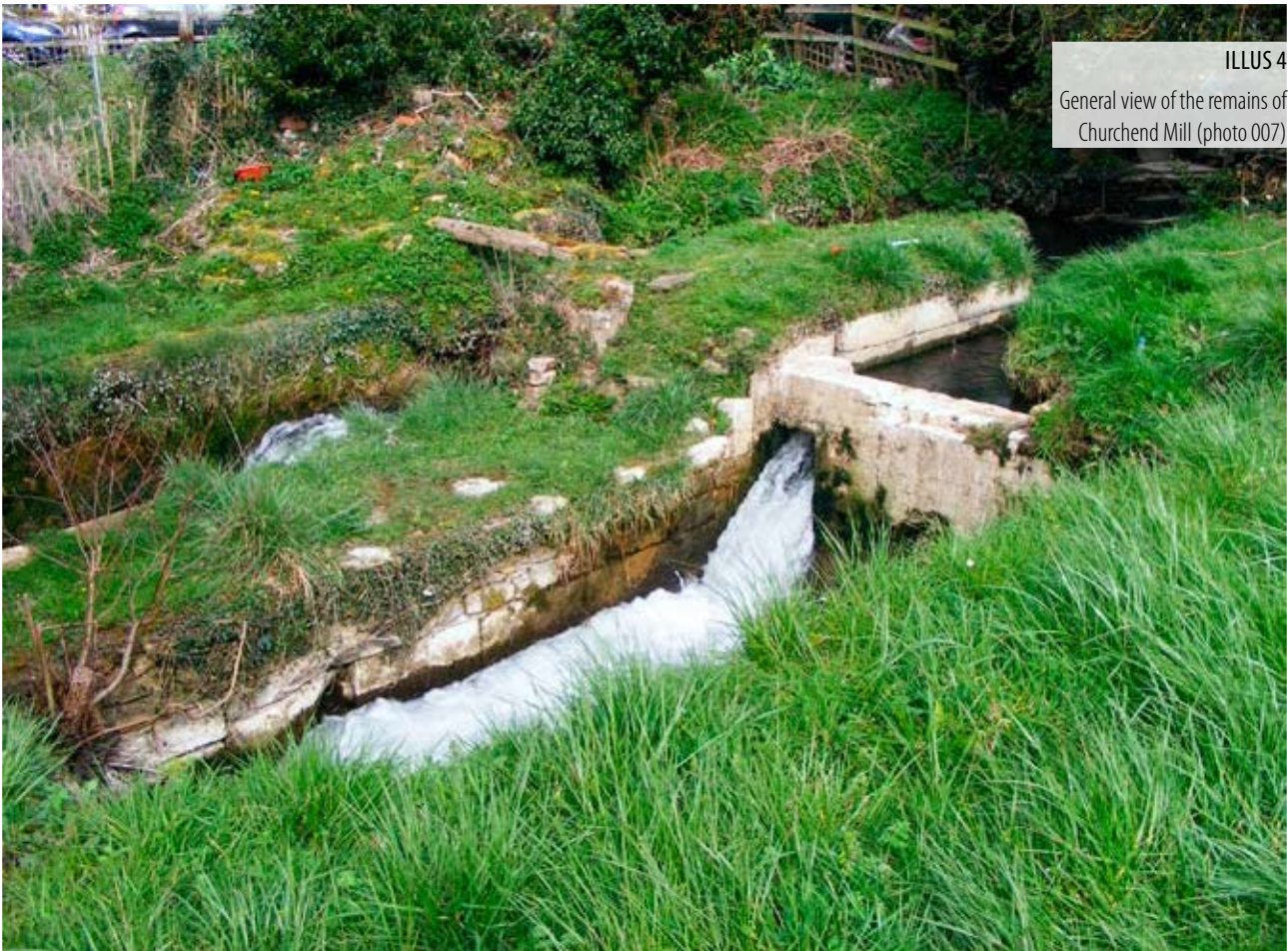
N

0 2m

scale 1:50 @ A3

© Headland Archaeology (UK) Ltd 2014

ILLUS 3
Area 2 – Bypass Weir: Plan of structure and photo locations



ILLUS 4
General view of the remains of
Churchend Mill (photo 007)



ILLUS 5
Detail showing cut recess for
the water wheel (photo 101)



ILLUS 6

South facing elevation drawing showing water wheel recess

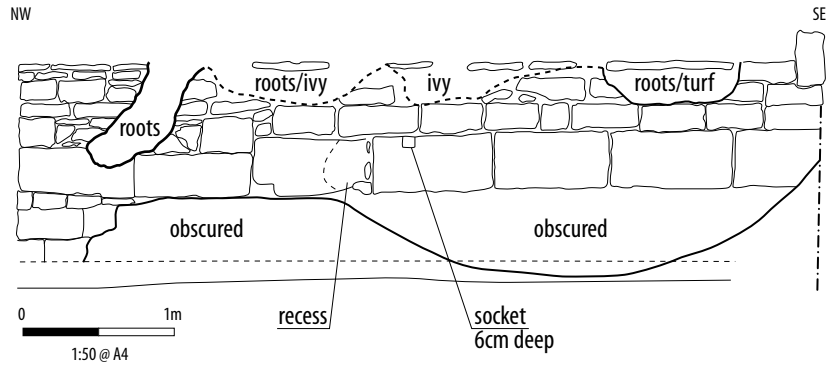
of water entering the southern channel which formerly contained a water wheel. Both channels are faced with square ashlar blocks. The internal structure of the Allotment Weir was not observed.

The southern wall of the wheel pit has collapsed and only the lower courses below the water level remain. The northern wall stands to a height of approximately 1.4m and level with the surrounding ground surface.

During the installation of the Fish ladder, the water feed to the southern channel was partially dammed allowing the wheel pit to be examined in greater detail.

Within the lower courses of the masonry a semi-circular curved recess cut into the masonry, which once housed the water wheel was observed (Illus 5). The bed of the wheel pit was curved at the eastern end. A central void was present within the curved masonry to allow the passage of water beneath the wheel.

The semi-circular recess on the northern wall (Illus 6) and curvilinear score lines visible on the southern wall of the wheel pit allow an



estimation of the wheels diameter to be made. Based on these calculations the water wheel had a diameter of 4.56m (15ft).

The cut recess and predicted diameter of the wheel also allows the projected centre point of the water wheel to be estimated, indicating that in order to support the axle of the wheel, the existing wheel pit wall level would have been approximately 0.90m higher than exists today.

The head of water in the race would have intersected the wheel at approximately 0.77m below the axle of the water wheel, suggesting that the Churchend water wheel was of under-shot design. The water feed channel or flume continues to follow the curve of the wheel downwards to a point directly underneath the axle where it flows into the tail water stream and flattens out to form the bed of the tail race.

ILLUS 7

Detail of brick-built sluice wall (photo 092)





ILLUS 8
Detail showing removal of section
of sluice wall (photo 110)

A vertical slot (0.35m wide) cut into the south facing ashlar face at the western end of the wheel pit feed channel, appears to be the former location for a sluice gate controlling the flow of water onto the wheel. Rotten timbers at the base of the slot confirm the former presence of a wooden sluice mechanism.

Phase 2

A small partition wall has been constructed in brick and breeze block across the wheel pit water feed channel (**Illus 7**). Prior to the current works, this wall restricted the flow and created a head of water in the southern channel. A rectangular aperture measuring 0.15m x 0.45m within the wall allowed water to flow at high velocity into the wheel pit.

The wall appears to be a replacement for the wooden sluice gate that formerly controlled the flow of water into the wheel pit. The location of the wall, slightly intruding upon the projected position of the water wheel, suggests that it post dates the removal of the wheel.

The wall represents a change of function for the weir and wheel pit. The purpose of the alteration may have been to maintain the level of river water upstream of the Allotment Weir after the removal of the sluice gate and water wheel which previously served this purpose.

Phase 3

An 840mm section of the phase 2 brick weir crest in the southern channel was lowered by 1000mm using hand tools to accommodate

the fish pass (**Illus 8 & 9**). Removed pieces of brick were re-used where patching of the brickwork was required.

7.2 AREA 2 – BYPASS WEIR

Phase 1

The weir is positioned on the south-western bank, and at an angle of 90° to the direction of water flow within the main river channel. Two wing walls constructed of ashlar blocks flank the stepped base of the weir which falls in a south-westerly direction.

The subsequent alterations (phase 2) to the structure involved the cutting and removal of some of the ashlar slabs forming the base of the structure. A mortared brick core was identified, with the stone slabs acting as a capping (**Illus 10**).

The bonded brick structure was presumably a cost-effective way to create a strong structure. The purpose of the overlying stone may relate to its durability and aesthetic properties.

The weir measures approximately 3.80m in width with an angled run off of nearly 3.0m and holds back a head of at least 1.5m in depth. The ashlar wing walls stand to an approximate height of 0.80m. Vertical slots (**Illus 11**) cut into the ashlar blocks at the front (north-east) of the weir suggest the former presence of sluice gates to control the height of the river, and therefore the volume of water reaching the mill downstream.



ILLUS 9
Fish pass after installation
(photo 115)



ILLUS 10
Bypass Weir after removal of stone capping and cutting of 'low flow notch' (photo 127)



Within the structure of the bypass weir evidence of repair in the form of concrete patching and some iron strapping was observed. Although no indication of dating of the repairs was possible, it may be assumed that the repairs are relatively modern and were carried out to maintain the integrity of the weir and the run off.

Phase 2

In order to allow the passage of fish and eels up the weir, the stone facing was removed from the north-eastern half of the weir base. The purpose of this was to formalise the height of the weir crest and provide a level surface for the formation of the fish and eel pass.

A low flow notch measuring 0.30m wide by up to 0.35m deep was cut into the base of the weir to allow for the passage of fish, and a parallel channel was cut to a depth of 0.16m to allow for the passage of eels (**Illus 12**).

8 DISCUSSION

The draining of the wheel pit at Churchend Mill has allowed the inspection of the masonry that was previously obscured beneath the water level. The preservation of the wheel pit has unfortunately suffered since the demolition of the mill building, the north facing elevation now only survives as the lower courses beneath the water level, however both elevations still contained evidence for a semi-circular recess that once housed the water wheel. The recess matches the curved base of the water wheel pit and it is possible to estimate that the wheel pit was originally designed to house a wheel with a diameter of 4.56m (15ft).

The southern channel contains a later blocking (phase 2), constructed in brick and capped in breeze block that divides the water feed channel from the wheel pit.

The brick sluice is a later addition as the location of the structure would have interfered with the operation of the original water wheel. The insertion of the phase 2 brick wall may relate to the installation of a water wheel of differing design or dimensions to the original. Alternatively, the wall may have been constructed to maintain the water level in the river following the removal of the water wheel and sluice gate.

The construction of the low flow notch in the bypass weir has allowed the core work and the construction methods involved in the original construction of the bypass weir to be examined. The core of the weir is formed of bonded red brick with a stone facing, it seems unusual that the weir would be formed of brick and faced in stone and the method may reflect a cost saving in the construction of the weir when compared to a weir completely built from stone, however it may be a deliberate design feature; the close bonded brick core being easier to water proof than a loose stone rubble core. The capping stones have the benefit of being more resilient to water erosion than the brick and are more aesthetically pleasing.



ILLUS 11

Bypass Weir – detail showing brick core and sluice gate slot (photo 120)

9 CONCLUSION

The installation of the fish passes at Churchend Mill has allowed a brief examination of the remaining water management structures related to the operation of the site. The scale of the water wheel at the Allotment Weir has been estimated and the construction materials of the Bypass Weir have been identified.

10 BIBLIOGRAPHY

- Conway-Jones 2007 *Stroudwater Canal Features Influenced by the Ship Canal to Gloucester*. Project S01, Gloucestershire Society for Industrial Archaeology
- Mahler, O 1982 *Stroudwater Valley Mills. Bailey Litho, Dursley*
- Mills S & Riemer P 1989 *The Mills of Gloucestershire*. Barracuda Books Limited, Buckingham.
- Tann J 2012 *Wool & water. The Gloucestershire Woolen Industry and its Mills*. The History Press.
- Victoria County History 1972 *A History of the County of Gloucester, Volumes 10 and 11*.



ILLUS 12
Area 2: Bypass Weir
(photo 100)



11 APPENDICES

APPENDIX 1 DRAWING REGISTER

Drawing	Scale	Description
001	1:20	South facing elevation of the water wheel pit
002	-	Schematic measurement plan of weir
003	1:20	South eastern wing wall-weir
004	1:20	Plan of the top weir

APPENDIX 2 PHOTOGRAPHIC INDEX

Photo	B&W	C/S	Digital	Direction facing	Description
001	904/37	-	<input checked="" type="checkbox"/>	-	Site index and identification
002	904/36	-	-	N	Detail of wheel pit
003	904/35	-	<input checked="" type="checkbox"/>	E	Detail of brick built structure across wheel pit
004	904/34	-	<input checked="" type="checkbox"/>	S	Detail of collapsed bank within wheel pit
005	904/33	-	<input checked="" type="checkbox"/>	N	Detail of sluice gate socket within wheel pit
006	904/32	-	<input checked="" type="checkbox"/>	N	Detail of brick repairs to cut water for wheel pit
007	904/31	-	<input checked="" type="checkbox"/>	NE	Wheel pit sluice
008	904/30	-	<input checked="" type="checkbox"/>	SE	Detail of plank across second sluice
009	904/29	-	<input checked="" type="checkbox"/>	E	Detail of stone work between sluices
010	904/28	-	<input checked="" type="checkbox"/>	E	Detail of stone work between sluices
011	-	-	<input checked="" type="checkbox"/>	E	Detail of stone work between sluices
012	-	-	<input checked="" type="checkbox"/>	E	General view of both sluices
013	-	-	<input checked="" type="checkbox"/>	E	Detail of brick built sluice across wheel pit
014	-	-	<input checked="" type="checkbox"/>	E	Detail of brick built sluice across wheel pit
015	-	-	<input checked="" type="checkbox"/>	E	Detail of stone work between sluices
016	-	-	<input checked="" type="checkbox"/>	E	Detail of northern sluice
017	-	-	<input checked="" type="checkbox"/>	E	Detail of northern sluice
018	904/27	-	<input checked="" type="checkbox"/>	S	Detail of wheel pit in southern sluice
019	904/26	-	<input checked="" type="checkbox"/>	W	Stone bridge across sluice run offs
020	904/25	-	<input checked="" type="checkbox"/>	E	Detail of dividing walls between sluices
021	904/24	-	<input checked="" type="checkbox"/>	N	Detail of wooden plank, northern sluice

Photo	B&W	C/S	Digital	Direction facing	Description
022	904/23	-	<input checked="" type="checkbox"/>	SE	General view of site of wheel pit and sluice
023	904/22	-	<input checked="" type="checkbox"/>	N	Stone built run off of northern sluice
024	904/21	-	<input checked="" type="checkbox"/>	SE	Stone built bridge and open sluice, down river
025	904/20	-	<input checked="" type="checkbox"/>	N	Wheel pit wall, south facing
026	904/19	-	<input checked="" type="checkbox"/>	N	Wheel pit wall, south facing
027	904/18	-	<input checked="" type="checkbox"/>	N	Detail of cut within wheel pit wall fabric
028	904/17	-	<input checked="" type="checkbox"/>	N	Detail of sq socket within cut water and sluice gate cut
029	904/16	-	<input checked="" type="checkbox"/>	N	Detail of brick repaired cutwater
030	-	-	<input checked="" type="checkbox"/>	SW	Stone built bridge across wheel pit
031	-	-	<input checked="" type="checkbox"/>	SW	Stone built bridge across wheel pit
032	-	-	<input checked="" type="checkbox"/>	N	Sluice detail
033	-	-	<input checked="" type="checkbox"/>	SW	Stone built bridge across wheel pit
034	-	-	<input checked="" type="checkbox"/>	NW	Detail of small sluice gate cut within wheel pit
035	-	-	<input checked="" type="checkbox"/>	N	Detail of cut back stone within wheel pit wall, south facing
036	-	-	<input checked="" type="checkbox"/>	E	Detail of clay pipe within brick built wall, wheel pit
037	-	-	<input checked="" type="checkbox"/>	E	Detail of clay pipe within brick built wall, wheel pit
038	-	-	<input checked="" type="checkbox"/>	E	Detail of clay pipe within brick built wall, wheel pit
039	-	-	<input checked="" type="checkbox"/>	E	Detail of clay pipe within brick built wall, wheel pit
040	-	-	<input checked="" type="checkbox"/>	E	Detail of later brick wall – weir within wheel pit
041	-	-	<input checked="" type="checkbox"/>	E	Detail of later brick wall – weir within wheel pit
042	-	-	<input checked="" type="checkbox"/>	E	Detail of later brick wall – weir within wheel pit
043	-	-	<input checked="" type="checkbox"/>	E	Detail of later brick wall – weir within wheel pit
044	-	-	<input checked="" type="checkbox"/>	E	Detail of later brick wall – weir within wheel pit
045	-	-	<input checked="" type="checkbox"/>	E	Detail of stone work within dividing wall
046	-	-	<input checked="" type="checkbox"/>	E	Detail of stone work within dividing wall
047	-	-	<input checked="" type="checkbox"/>	S	General view
048	-	-	<input checked="" type="checkbox"/>	S	Breeze block used in construction of wheel pit weir



Photo	B&W	C/S	Digital	Direction facing	Description
049	–	–	☑	E	Detail of later brick wall – weir within wheel pit
050	–	–	☑	S	Detail of north acing wheel pit walling
051	904/15	–	☑	W	Cut into filled in channel of wheel pit
052	–	–	☑	W	Cut into filled in channel of wheel pit
053	–	–	☑	N	Detail of repaired cut water
054	–	–	☑	N	Detail of cut water
055	–	–	☑	S	Cut through filled in wheel pit sluice
056	–	–	☑	S	Cut through filled in wheel pit sluice
057	–	–	☑	S	Cut through filled in wheel pit sluice
058	–	–	☑	SW	Wheel pit during draining
059	904/14	–	☑	E	Wheel pit during draining
060	–	–	☑	E	Wheel pit during draining
061	–	–	☑	E	Wheel pit latter sluice wall
062	–	–	☑	E	Wheel pit latter sluice wall
063	–	–	☑	E	Wheel pit latter sluice wall
064	–	–	☑	E	Wheel pit latter sluice wall
065	–	–	☑	E	Wheel pit latter sluice wall
066	–	–	☑	E	Wheel pit latter sluice wall
067	–	–	☑	E	Wheel pit latter sluice wall
068	904/13	–	☑	N	Top weir
069	904/12	–	☑	W	Top weir wall
070	–	–	☑	–	Top weir wall with sluice gate cut
071	–	–	☑	–	Top weir wall with sluice gate cut
072	–	–	☑	W	Top weir wall with sluice gate cut
073	–	–	☑	W	Top weir wall with sluice gate cut
074	–	–	☑	–	Top weir wall with sluice gate cut
075	–	–	☑	W	Top weir wall with sluice gate cut
076	904/11	–	☑	W	Top weir wall with sluice gate cut
077	–	–	☑	S	Weir wall
078	904/10	–	☑	E	Top weir wall with sluice gate cut
079	–	–	☑	–	Weir wall
080	–	–	☑	W	Top weir wall with sluice gate cut and strapped stone repair
081	–	–	☑	–	Brick within sluice core, exposed
082	–	–	☑	–	General view of water
083	–	–	☑	E	Top weir wall with sluice gate cut into weir lip

Photo	B&W	C/S	Digital	Direction facing	Description
084	904/9	–	☑	S	Section cut into weir fill at wheel pit
085	–	–	☑	S	Section cut into weir fill at wheel pit
086	–	–	☑	E	Section cut into weir fill at wheel pit
087	–	–	☑	E	Working shot of instillation
088	–	–	☑	E	Working shot of instillation
089	–	–	☑	E	Detail of brick wall, wheel pit
090	–	–	☑	E	Detail of brick wall, wheel pit
091	–	–	☑	E	Detail of brick wall, wheel pit
092	–	–	☑	E	Detail of brick wall, wheel pit
093	904/8	–	☑	N	Detail of wheel pit walling
094	904/7	–	☑	N	Detail of wheel pit walling
095	904/6	–	☑	N	Detail of wheel pit walling
096	–	–	☑	N	Detail of wheel pit walling
097	904/5	–	☑	W	Top weir , during alterations
098	–	–	☑	NW	Top weir , during alterations
099	904/4	–	☑	E	Top weir , during alterations
100	904/3	–	☑	N	Top weir , during alterations
101	904/2	–	☑	NE	Wheel pit exposed during drainage
102	–	–	☑	NW	Wheel pit exposed during drainage
103	–	–	☑	S	Wheel pit exposed during drainage
104	–	–	☑	E	Wheel pit exposed during drainage
105	–	–	☑	NW	Stone bridge across wheel pit
106	–	–	☑	N	Detail of wheel pit walling
107	–	–	☑	N	Detail of wheel pit walling
108	–	–	☑	N	Detail of wheel pit walling
109	–	–	☑	N	Detail of wheel pit walling
110	–	–	☑	E	Detail of wheel pit
111	–	–	☑	E	Detail of wheel pit
112	–	–	☑	–	Instillation of fish ladder
113	–	–	☑	–	Instillation of fish ladder
114	–	–	☑	–	Instillation of fish ladder
115	–	–	☑	–	Instillation of fish ladder
116	–	–	☑	–	Instillation of fish ladder
117	–	–	☑	–	Instillation of fish ladder
118	–	–	☑	W	Top weir walling detail
120	–	–	☑	W	Top weir walling , straight joint
121	–	–	☑	E	Top weir walling detail

Photo	B&W	C/S	Digital	Direction facing	Description
122	–	–	<input checked="" type="checkbox"/>	E	Top weir walling detail
123	–	–	<input checked="" type="checkbox"/>	E	Top weir walling detail
124	–	–	<input checked="" type="checkbox"/>	E	Detail of brick core to weir construction
125	–	–	<input checked="" type="checkbox"/>	E	Detail of brick core to weir construction
126	–	–	<input checked="" type="checkbox"/>	E	Detail of brick core to weir construction
127	–	–	<input checked="" type="checkbox"/>	W	Detail of brick core to weir construction
128	–	–	<input checked="" type="checkbox"/>	N	Detail of brick core to weir construction
129	–	–	<input checked="" type="checkbox"/>	S	Silted up chase, with tree
130	–	–	<input checked="" type="checkbox"/>	N	General view of top weir
131	906/13	921/13	<input checked="" type="checkbox"/>	N	Slot for eel and fish run
132	906/12	921/12	<input checked="" type="checkbox"/>	W	Detail of weir walling construction
133	906/11	921/11	<input checked="" type="checkbox"/>	E	Detail of weir walling construction
134	906/10	921/10	<input checked="" type="checkbox"/>	N	General view of top weir
135	906/9	921/9	<input checked="" type="checkbox"/>	N	Inserted modern sluice
136	906/8	921/8	<input checked="" type="checkbox"/>	E	Fish and eel ladder, wheel pit
137	906/7	921/7	<input checked="" type="checkbox"/>	–	Modern weir-sluice
138	906/6	921/6	<input checked="" type="checkbox"/>	E	General view of sluice next to wheel pit
139	906/5	921/5	<input checked="" type="checkbox"/>	W	General view of fish and eel ladder in use
140	–	–	<input checked="" type="checkbox"/>	W	General view of fish and eel ladder in use
141	906/4	921/4	<input checked="" type="checkbox"/>	S	General view of fish and eel ladder in use
142	906/3	921/3	<input checked="" type="checkbox"/>	N	General view of fish and eel ladder in use
143	906/2	921/2	<input checked="" type="checkbox"/>	NW	General view of fish and eel ladder in use
144	906/1	921/1	<input checked="" type="checkbox"/>	N	General view of fish and eel ladder in use



© 2014 by Headland Archaeology (UK) Ltd

**Headland Archaeology
North East**

13 Jane Street
Edinburgh EH6 5HE

0131 467 7705
northeast@headlandarchaeology.com

**Headland Archaeology
North West**

10 Payne Street
Glasgow G4 0LF

0141 354 8100
northwest@headlandarchaeology.com

**Headland Archaeology
Midlands & West**

Unit 1, Premier Business Park, Faraday Road
Hereford HR4 9NZ

01432 364 901
midlandsandwest@headlandarchaeology.com

**Headland Archaeology
South & East**

Building 68C, Wrest Park, Silsoe
Bedfordshire MK45 4HS

01525 861 578
southandeast@headlandarchaeology.com

www.headlandarchaeology.com