



Sanderson's Weir, Attercliffe, Sheffield
Archaeological Watching Brief Assessment Report

ArcHeritage 2019

Sanderson's Weir, Attercliffe, Sheffield, South Yorkshire
Archaeological Watching Brief Assessment Report

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FIGURES

Figure 1: Site location

Figure 2: Pre-excavation plan showing detail of the weir prior to removal works

Figure 3: Site plan following completion of the removal works

Figure 4: West facing section through the weir

NON-TECHNICAL SUMMARY

This report describes the results of archaeological monitoring during the construction of a Larinier fish pass at Sanderson's Weir, Attercliffe, Sheffield, South Yorkshire. The work took place over six days in July 2019 and involved the recording of the weir structure prior to works, and monitoring of the removal of a section of the weir in order to construct the fish pass.

The weir spans the River Don, and a weir is likely to have been extant in this location from the 16th century, to provide water to the Upper and Nether Attercliffe Forges. It was rebuilt in 1825 by Naylor and Sanderson, who took over the Nether Forge and expanded it. The weir is grade II listed (NHLE 1247579) and relevant permissions were granted to the client prior to the removal works commencing. The downstream face of the weir is constructed in 12 visible bays, each separated by a dressed stone rib. Between the stone ribs the weir is built of a cobbled surface of slag and crozzle (cementation furnace waste), washed smooth and rounded by the flowing water.

A length of approximately 5m was removed at the eastern end of the weir, which effectively removed the second bay of the weir. The work revealed the wooden support frame of the 19th century weir, as well as timber posts that may relate to the earlier weir, although this remains undetermined.

1 INTRODUCTION

An archaeological watching brief at the grade II listed Sanderson's Weir, Attercliffe, Sheffield, South Yorkshire, was carried out over a six day period in July 2019. The work was required by the South Yorkshire Archaeology Service (SYAS) as a condition on the removal of part of the weir for the construction of a Larinier fish pass.

All work was undertaken in accordance with a written scheme of investigation (WSI) produced by ECUS Ltd (Appendix 5) in response to a brief provided by the South Yorkshire Archaeology Service (SYAS). The WSI was agreed with SYAS prior to the start of works. The work was also undertaken with reference to relevant ClfA standards and guidance and the regional statement of good practice for archaeology in the development process in Yorkshire, Humber and the North East.

2 SITE LOCATION AND DESCRIPTION

The weir is located on the River Don at Attercliffe (centred NGR SK 37188 88921), to the west of Brightside Lane (Figure 1). Access to the weir is off East Coast Road. The weir is located along the Five Weirs Walk.

The weir spans the river, curving from the southeast bank to the site of a former sluice gate. The banks are revetted with dressed stone blocks on either side. On the north-west bank are recent flood defences comprising dressed stone blocks and a modern steel safety rail. No works to the south-eastern bank of the weir were undertaken as part of the flood alleviation works, although immediately up and downstream of the weir the bank has been revetted with gabion walls. The south-eastern stone wall bank includes a date stone with the words 'REBUILT by W & I ASHFORTH 1825' (Plate 1).

The geology of the site comprises sandstone of the Pennine Middle Coal Measures Formation overlain by superficial deposits of alluvium (BGS, 2019).

3 AIMS & METHODOLOGY

3.1 Aims

The principal aim of the work was to record and examine the affected part of Sanderson's Weir in order to seek a better understanding, compile a lasting record, analyse the findings, and then disseminate the results.

The general aims of the project were to:

- accurately record the form, character and architectural details of the weir as existing;
- identify and record any evidence of structural features, fixtures or fittings of historic significance;
- describe the weir with interpretation of phases of development; and
- prepare a comprehensive indexed and cross-referenced archive from the fieldwork record.

3.2 Methodology

Full details of the methodology are outlined in the WSI (Appendix 5).

A site visit was made prior to the works commencing to photographically record the weir in its existing state. Once the coffer dam had been completed, a further photographic and drawn record was made of the section of the weir to be removed.

All works relating to the removal of the weir structure were constantly monitored by an archaeologist. Works were routinely halted in order to allow archaeological recording to take place. Despite the use of sandbags and industrial pumps, water ingress was a health and safety concern, and as such a detailed inspection of the weir was difficult to achieve safely. Nonetheless, a satisfactory record was able to be made.

4 ARCHAEOLOGICAL & HISTORICAL BACKGROUND

The following information is summarised from the previous heritage appraisal for the weir (ECUS 2019).

Sanderson's Weir is a visible reminder of early industrial activity along the River Don. The weir, associated goit system and surviving sluices, are surviving elements of early water management along the river. The weir diverted water into two head goits, that to the south leading to Upper Hammer or Attercliffe Slitting Mill, the one to the north leading to Nether Hammer, also known as Attercliffe Forge. This pair of forges originated in the 16th century and were owned by the Earls of Shrewsbury. From 1618, Upper Hammer became part of the Copley ironworks, with no further information available until its conversion into a slitting mill in the 1740s. The works seems to have been abandoned by 1802, and its goit and dam had been infilled by 1818.

Accounts relating to the Nether Hammer indicate that in the 1580s it was used to convert pig iron from furnaces at Kimberworth and Wadsley, and by 1618 it was also leased to the Copleys. In 1683 it was leased to Simpson, Heyford and Barlow, and in the 18th century it was linked to the Spencer ironworks. The lease on Attercliffe Forge was taken up by the partnership of Clay, Younge and Hussey in 1765, and in 1775 it was taken over by Richard Swallow (Ball *et al.* 2006, 34). A cutlers' wheel also operated at the Nether Forge in the 16th and 17th centuries.

The earliest plan of the site, dated 1722, illustrates a bridge crossing the goit to the south-west of the weir within the vicinity of the present sluice. Comparison with maps produced of Attercliffe Forge in 1766 and 1768 demonstrate that the bridge carried the lane to Brightside which continued eastwards, passing north back across the goit. The 1768 plan depicts the weir as a wide 'V'-shape in plan. The south-east head goit fed directly into the narrow dam for the slitting mill. This had been infilled by the time of the 1855 OS map.

The lease of Attercliffe Forge was taken over by Naylor and Sanderson in 1822, and in 1825 the weir was re-built, as indicated by a date stone (Ball *et al.* 2006, 34). The new curved profile of the weir was depicted on Taylor's map of Sheffield and Brightside Lane had been diverted along the northern bank of the goit. The investment in the weir indicated that water remained the main source of power for the forge. On the 1853 OS town plan, a shuttle house was recorded at the southern end of the goit with a wooden footbridge to the west over the goit. A shuttle house would typically comprise a building built over the sluices governing the flow of water into the goit, possibly located below the footbridge. North of the shuttle house was another sluice,

and beyond it a culvert mouth was labelled. It is likely that the sluice corresponded to the overspill from the goit to the northern side of the weir. At that date, the Nether Forge was labelled 'Attercliffe Works' (steel).

By the 1890s, a branch line of the Sheffield and Rotherham railway line had been constructed across the goit and the western bank of the Don running past the weir. The construction of the railway coincided with the realignment of Brightside Lane (replacing Bent Lane) and corresponding straightening of the goit to pass between the two. The 1890s OS also depicts the footbridge over the goit as bending towards its eastern end with a narrower branch extending south-east to the edge of the headland between the goit and the River Don. The change in the footbridge at this point in time may have been the result of the Great Flood of 1864. Following the flood, Sanderson Brothers & Co. claimed for damage to crops, buildings and machinery at Attercliffe Forge, though there is no specific mention of the footbridge, sluice, goit or weir (Sheffield Flood Claims Archive, 2006).

The railway was widened between 1906 and 1923, resulting in the widening of the bridge over the goit and corresponding to the change in fabric evident in the current abutments. The footbridge and shuttle house appear more or less unchanged since 1890, although additional buildings had been constructed between the shuttle house and the railway embankment. The Attercliffe Steel Works had expanded to the south of the dam by 1905 and was still using water power, though mainly for condensation purposes (Ball *et al.* 2006, 34). The works had expanded further by 1935.

By the production of the 1955 OS map, the shuttle house had been demolished and its associated structures on the headland between the goit and River Don were cleared although the footbridge remained.

5 RESULTS

Prior to the works commencing, a record of the affected part of the weir was completed. This includes a plan of the removed section of the weir (Figure 2), and a photographic record. A selection of plates showing the weir prior to works commencing are shown in Plates 1-3.

A length of approximately 5m was removed from the weir. This almost completely removed the second bay of the weir from the eastern river bank, along with a small section of the north-east corner of the first bay and the south-east corner of the third bay. A plan of the weir after the works is shown in Figure 3, with a section through the weir shown in Figure 4.

The weir is oriented roughly east to west, projecting eastwards in a straight line out of the western river bank for approximately one-fifth of its length, before turning slightly more northward for the main alignment. The profile of the weir is asymmetrical, with the downstream face constructed at a slightly steeper angle than the upstream face (Plate 3). The construction of the two faces of the weir differed in that the downstream structure was divided into 12 bays separated by north to south aligned stone ribs (101), and faced with crozle (cementation furnace waste) and slag (100) (Plate 4). The upstream face was constructed out of squared sandstone cobbles (104), with no bay divisions (Plate 5). The stone ribs (101) on the downstream face measured 0.60m in width and 0.90m deep, with an average length of 1.45m.

The ribs were secured with iron straps and fittings, with no mortar observed. The crozzle structure (100) in between the stone ribs on the downstream face was secured with iron bolts.

At the highest point of the weir, east to west aligned top kerb stones (102) separate the upstream and downstream faces. These were similar to the rib stones (101), measuring between 1.5-2m in length, 0.5m wide and 0.8m thick, and were laid flat across the top of the weir. They were fastened together with iron straps (Plate 6). This structure (102) was not bonded to any of the other structural elements of the weir. To the immediate south of ridge stones (102) was a parallel line of wedge-shaped stones, set at a slight angle to form the top of the upstream face of the weir structure (103) (Plate 3; Plate 6). These again were of sandstone blocks strapped together with iron fittings.

Upon removal works, it became apparent that the stone structure (104) of the upstream face of the weir was supported by a timber frame comprising upright timber posts (106) which had been secured through horizontal timber beams (105) (Plates 7 to 9). Iron spikes were also observed to be intermittently driven through the beams (105) to hold them in place. The horizontal beams were laid in pairs and continued into and beyond the eastern river bank. The southern edge of cobbles (104) are built over the northernmost row of beams (105), and butt up to the edge of the southern row of beams (Plate 9).

The entire weir structure, including the timber frame, is constructed upon a sandy gravel construction layer (107) and (110). Layer (107) is located beneath the upward face of the weir, with deposit (110) below the downward face (Plate 10). It is highly likely that these deposits are the same although the relationship was obscured by the water and also by the stones of (102) separating the two deposits. Finds recovered from construction layer (110) include a hammer and an iron weight, possibly a plumb bob, that may have been associated with the construction of the weir. A small assemblage of pottery sherds are consistent with the early 19th century date of the reconstruction of the weir, including white ware and pearl ware rim sherds, coarse earthenware and a brown-glazed stoneware sherd. Other finds from this deposit included slag and parts of a leather shoe sole. The overall weir structure was constructed upon a base of river gravels (119).

A possible observance of the earlier weir structure was noted in the form of a number of upright stakes. These were observed within three distinct locations; at the northern end of the weir (120-128), at the base of the downward face of the weir and below crozzle structure (100); mid-way through the weir (108-109), just to the north of the top kerb stones (102); and at the southern end of the weir (112-118), roughly on the same alignment as structure (103). One stake from the southern end of the weir (115), one from the middle of the weir (108), and one from the northern end (126) were retained for assessment (Appendix 4). With the exception of the stakes removed for assessment, these stakes remain *in situ*. The northern limit of the downstream face of the structure was not observed during the works, hence is not known if there is a similar wooden frame support to (105) at this end of the weir.

The stakes that were removed for assessment were found to be in a fairly uniform condition, waterlogged with significant amounts of mineralisation. The assessment of the timber was not able to determine any date for the working of the timbers or either support or contradict the suggestion that they may belong to the earlier weir. The only timber of interest was the base section of stake (115), which had a iron shoe fitted to the end spike. This was formed by a sheet

of iron, formed into a hollow conical tip that was nailed to the wood of the pile. These were used in circumstances where a pile or stake was intended to be driven into a deposit that was very resistant to pile driving; such as the stony bed of a watercourse. The shoe serves to protect the wooden tip from damage or breakage and to make it easier to drive the tip to the required depth. It is a known post-medieval practice. None of the timbers assessed displayed any diagnostic woodworking technology; having been cut with iron/steel bladed axes; they could date from the late prehistoric period up to the present day. All but one of the timbers was of oak, the other being Scots Pine. None were suitable for dendrochronological dating.

6 DISCUSSION

The monitoring of the removal of part of the weir revealed that the early 19th-century reconstruction of the weir featured a substantial supporting timber frame resting upon a sloped gravel base over which the facing stones and cobbles were laid. The downstream face was divided into bays created by sandstone slabs secured with metal straps, and infilled with crozzle and slag on the downstream face. The upstream face was less steeply angled, undivided and faced with sandstone blocks, with the level upper kerb of similar sandstone construction to the ribs. The majority of the wooden stakes that relate to the current weir and possibly part of the earlier weir remain *in situ*, with the exception of those removed during the works for assessment. The date of these timbers remains inconclusive, and the presence of any earlier weir cannot be determined with any certainty.

The use of cementation furnace waste (crozzle) and slag in the construction of the weir is interesting, and suggests the use of hard-wearing, readily available waste products from nearby iron and steel works. Though the Attercliffe and Brightside forges do not appear to have been producing steel at the time the weir was constructed, the operators Naylor and Sanderson were listed as steel converters and refiners at West Street in Sheffield, so would have had access to crozzle. Alternatively, two other steel converters and refiners are listed in the Attercliffe area at that date, including Francis Huntsman at the Attercliffe Steelworks on Worksop Road (Gell 1825). The use of different materials on the upstream and downstream faces may reflect the differences in the nature of water pressure on either side, with the stone on the upstream side required to withstand high pressures of water building up against it, and the downstream side requiring tough, hard-wearing material that would withstand the constant water pouring over it. The downstream face is also likely to have required greater maintenance, and cobbles would be easier to replace than sandstone blocks in rapid repairs.

Sanderson's Weir can be compared to three other weirs on the River Don monitored during fish-pass construction. Beeley Wood Weir near Hillsborough was first mapped in 1779, but may have been constructed in the 17th century to provide water for Clay Wheels Forge, extant by 1686. This weir had similar angles of slope on its upstream and downstream faces, though the upstream face was much shorter. It had a sandstone top kerb and was divided into a series of bays divided by long sandstone slabs bonded by metal straps. The facing between the slabs on the downstream side was of rectangular stone blocks. The internal structure was supported by lines of stone blocks, with the core comprising stone rubble and finer materials. It was not possible to date the construction of the weir (Davies 2016a).

Ward End Weir at Owlerton is likely to have originated in the late 17th century, to feed water to the Old Park Corn Mill, and was first depicted on a map of 1795. The structure within this weir was similar to that at Sanderson's Weir, with a substantial timber frame constructed on a gravel bank, with the stone structure built over the top. The downstream face was divided into 11 bays, divided by sandstone ribs, with three distinct construction methods used to face the bays: sandstone cobbles, ashlar sandstone blocks laid flat, and stepped sandstone slabs. The differences may have related to modifications or repairs. The lower kerb was of ashlar sandstone blocks, overlying a basal platform of large, roughly-dressed stone blocks. The upper kerb comprised sandstone slabs secured by metal straps, set to either side of a horizontal timber beam. The upstream face was at a slightly steeper angle than the longer downstream face, and was constructed of sandstone blocks and cobbles. The timber frame comprised upright posts attached to long, horizontally laid beams. No evidence for dating of the weir was recovered (Strafford 2015).

A weir at Ickles, to the south-west of Rotherham, was probably extant in some form by 1508, providing water to a corn mill (later an oil mill) and subsequently an adjacent cutler's grinding wheel. It may have been rebuilt after 1833 in association with conversion of the oil mill into a steel rolling mill, or with later expansion of the steel works. As at Ward End, the top kerb had a wooden beam running along the top. The upstream face was covered with rectangular sandstone blocks, aligned horizontally along the weir. The downstream face had concrete and stone on the upper part, with rectangular stone blocks on the lower part aligned down the weir. The two faces were relatively symmetrical, though the upstream face was shorter. Though monitoring of removal of the weir was limited, the remains of an internal timber structure were recorded, with a core of rubble in a dark, ashy matrix (Slater 2017).

No evidence was seen for an earlier structure within Ickles Weir, though a timber weir structure was found a short distance to the northwest during works at the Rotherham Biomass plant, presumably on an earlier alignment of the river that was subsequently built over. Some of the timbers recorded were piles with iron shoes similar to the example recovered from Sanderson's Weir. Though no definitive dating of the timbers was possible, it was concluded that they were likely to be associated with a weir of 16th- to 18th-century date (Davies 2016b).

The four weirs investigated along the Don indicate some standardisation of construction, with timber frames and earthen cores recorded in three, and the common use of ashlar sandstone for kerbs and ribs, and sandstone blocks for facing the upstream sides. Bays are common on the downstream sides of the longer weirs, providing more stability to the structure and perhaps aiding repair of damaged sections. Other details vary, including the timber beam found along the top of the upper kerb in two examples, as well as the materials used in the earthen core and for surfacing the downstream face. The latter variations may relate, at least in part, to the types of material available nearby (e.g. proximity to quarries or steelworks and made ground sources). Variations in the profile and basal structure of the weirs may be due to local topography and waterflow conditions. The use of a timber beam along the top of some weirs may have provided a buffer against debris in the water.

Dating of the structures has proved difficult, with no diagnostic details on the worked wood from the timber framing and few finds recovered; though the artefacts recovered from the gravel core at Sanderson's Weir are consistent with the 1825 reconstruction date. The

similarities in construction methods could suggest that the stone-faced weirs are of similar dates, with modification or rebuilding of earlier weirs being undertaken at several sites in the early to mid-19th century, as reported by Ball *et al.* (2006, xix). The use of bays is probably a 19th-century design feature (*ibid.*) At Ickles and Sanderson's Weirs, the reconstruction seems to have been associated with changes to or expansion of their associated works, which may have necessitated improvements to the weirs that were over 100 years old by that date.

7 CONCLUSION

A 5m section of weir was removed to allow for the construction of the Larinier fish pass, although the vast majority of the weir remains *in situ*. The site conditions made it difficult to complete a detailed survey of the weir due to water ingress and health and safety constraints, coupled with the relatively small section of the structure removed. However, the removal work has demonstrated that the weir is substantial and well-made, with the core of the 19th-century construction comprising a timber supporting frame of upright posts and horizontal beams resting upon a sloped gravel bank. The upper kerb is surfaced with ashlar sandstone blocks secured with metal straps, as are the ribs dividing the bays on the downstream face. The upwards face is covered with sandstone blocks, but cobbles of cementation furnace slag and crozzle are used to cover the downstream face. Pottery recovered from the gravel core is consistent with the 1825 date of the rebuilding of the weir, in association with Naylor and Sanderson's expansion of the Attercliffe Works. The majority of timbers revealed remain *in situ*, with the exception of those that were removed for assessment. The lack of diagnostic details on these timbers means that their date remains inconclusive, and the presence of any earlier weir cannot be determined with any certainty. Part of one timber pile with an iron shoe attached is recommended to be deposited with Museums Sheffield.

8 REFERENCES

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PLATES



Plate 1: Date stone on the eastern bank. Looking north east



Plate 2: The weir prior to commencement of works. Looking south-west



Plate 3: Pre-excitation shot of the exposed weir structure. Looking south-west



Plate 4: Detail of slag and crozzle structure (100). Looking west



Plate 5: Detail of stone structure (104). Looking south-east, scale 1m



Plate 6: Detail of the metal strapping fastening together (102). Structure (103) also with metal strapping is just visible to the left, with the slag and crozzle structure (100) to the right. Looking south-west. Taken prior to commencement of works



Plate 7: Detail of wooden beam (105) in situ behind stone structure (104). Looking south-west



Plate 8: Wooden beam (105) and stake (106) in situ. Scale 1m



Plate 9: Detail of section of wooden beams (105) and relationship with stone structure (104). Looking south-west, scale 1m



Plate 10: East-facing section through the weir. Looking south-west



Plate 11: Stakes (112-118) with beam (105) and associated stakes (106) in the background. Looking south



Plate 12: Stakes 120-128 in situ. Looking south-west

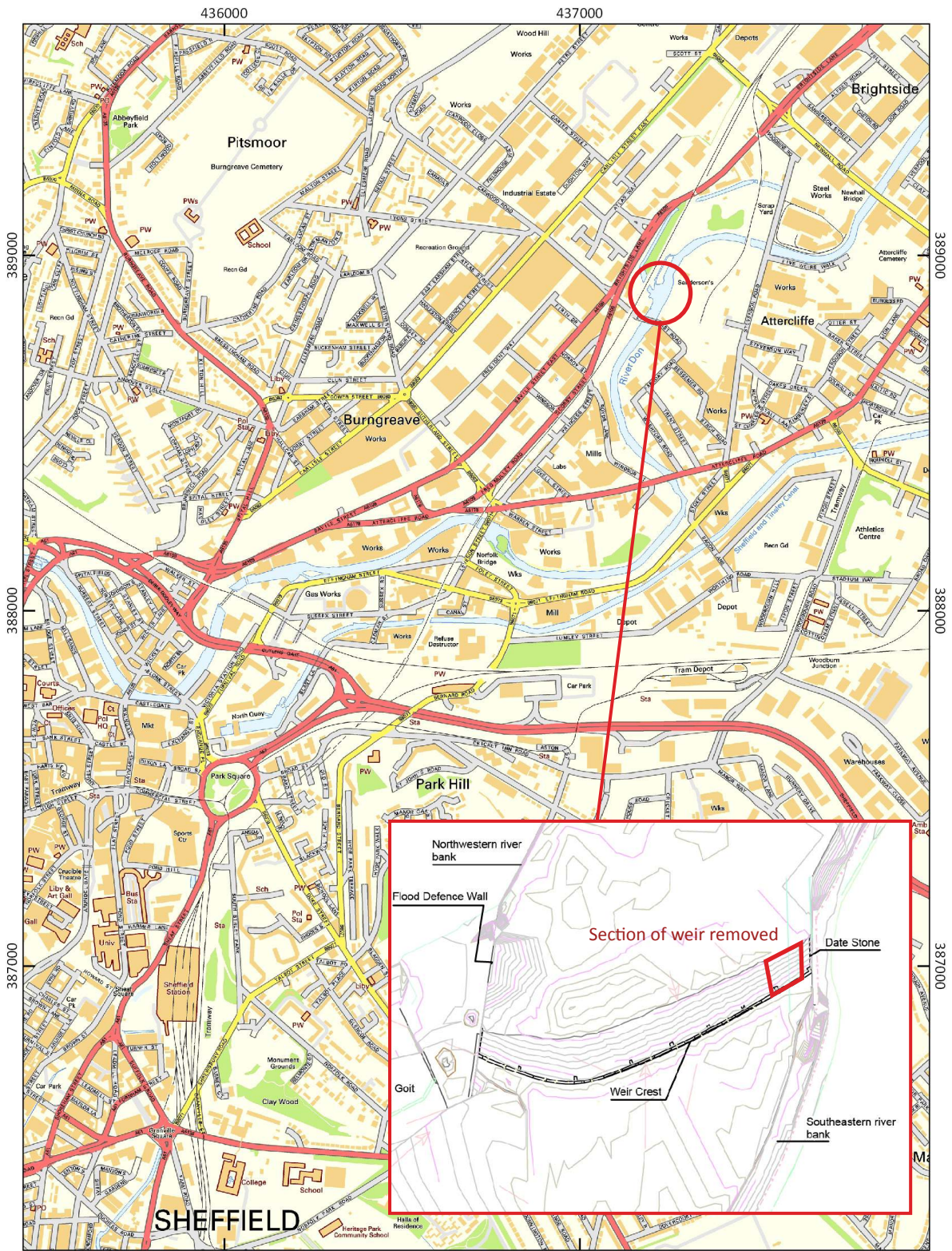


Plate 13: Stake (115) after removal. Scales 2x1m



Plate 14: Stake (126) after removal. Scale 1m

FIGURES



Detail of topographic survey adapted from information supplied by Fisstek Consulting. Provided by ECUS Ltd.

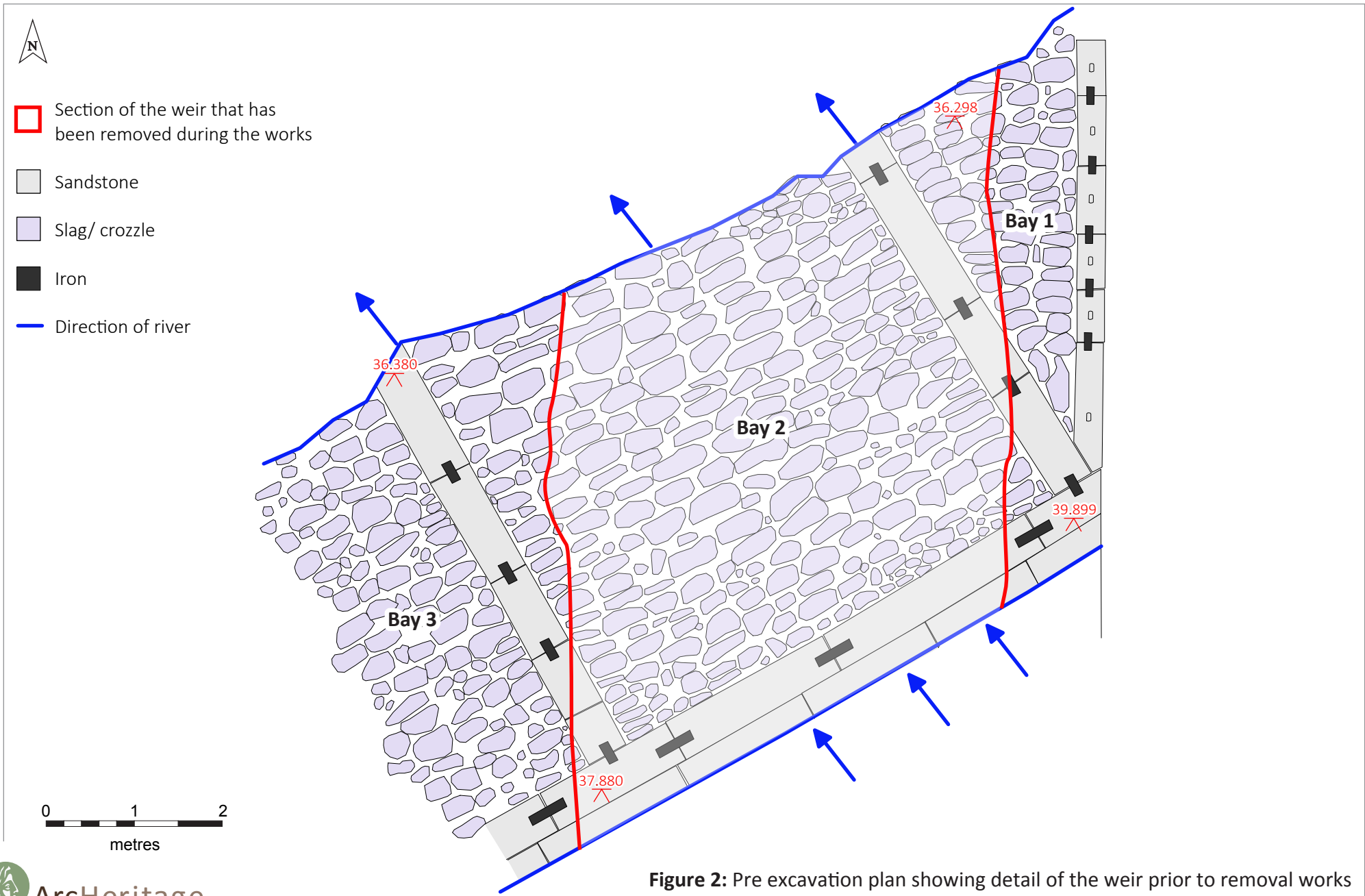


Figure 2: Pre excavation plan showing detail of the weir prior to removal works

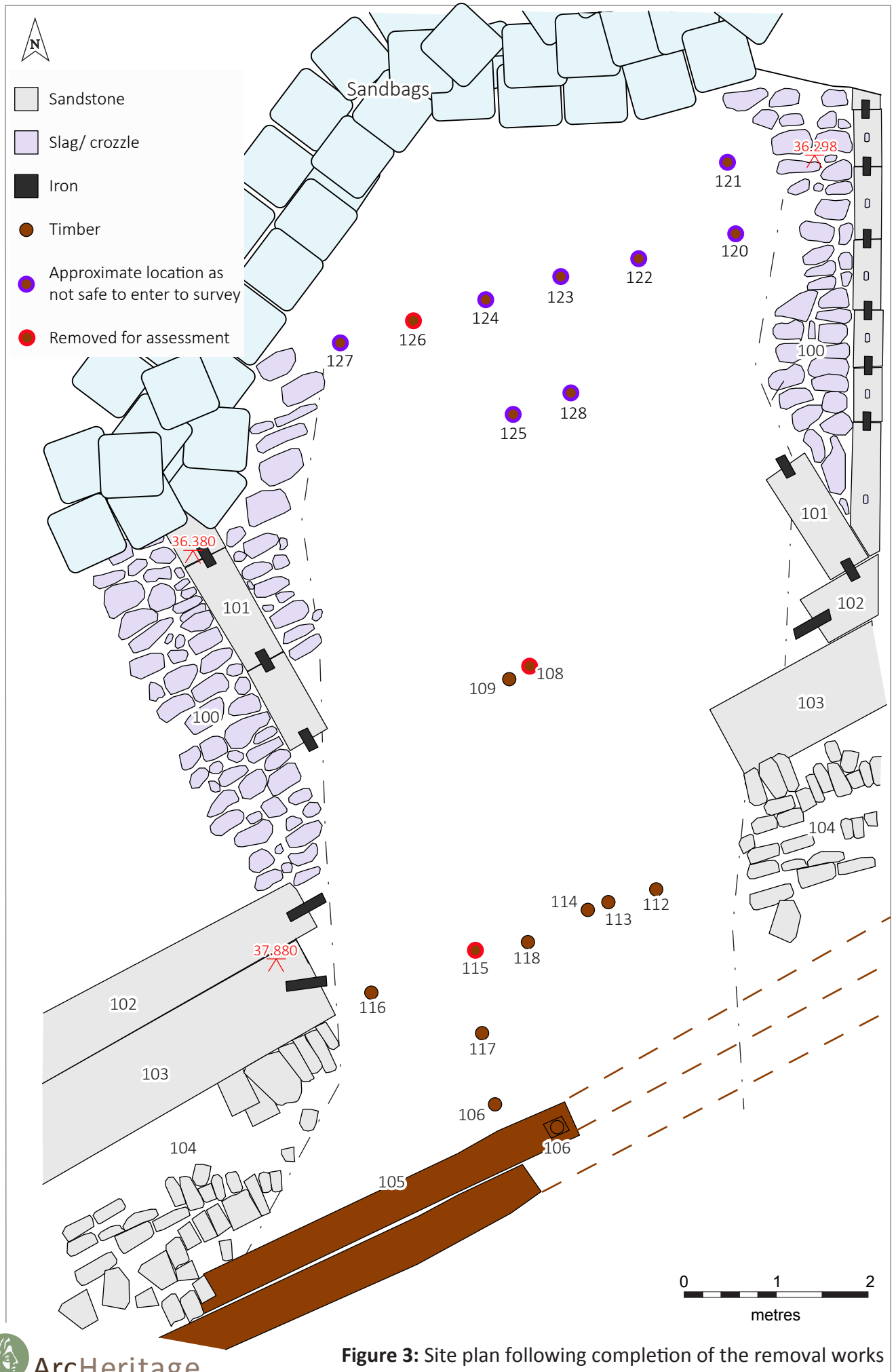


Figure 3: Site plan following completion of the removal works

- Sandstone
- Slag/ crozzle
- Timber

N

S

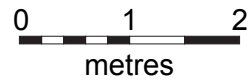
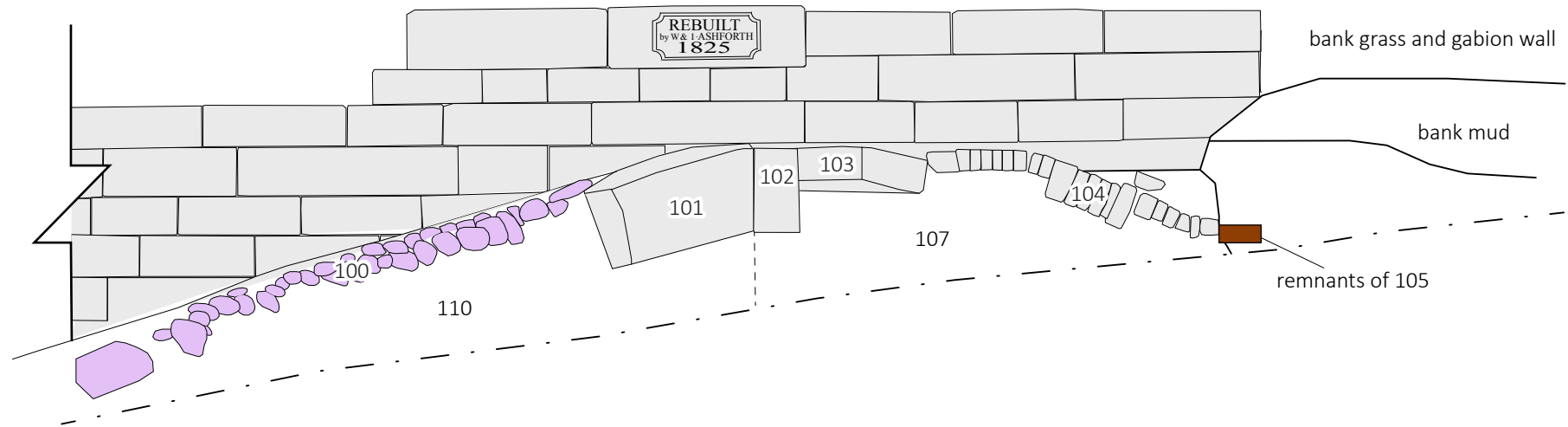


Figure 4: West facing section through the weir

APPENDIX 1: INDEX TO ARCHIVE

Item	Quantity
Context register	1 sheet
Context sheets	20 sheets
Photo register	1 sheet
Digital photos	1 disc
Black and white negatives	1 sheet
Watching brief record sheets	5 sheets
Timber record sheet	3 sheets
Pre-excavation plan	1 sheet
Report	2 hard copies plus 1 on disc

APPENDIX 2: CONTEXT LIST

Context no.	Description
100	Crozzle/ slag cobbles on north face of weir
101	Rib stones separating (100). NW/ SE aligned
102	NE/SW kerb stones at top of weir
103	Wedge shaped stones parallel to (103). Top of southern face of weir
104	Squared cobbles forming southern face of weir
105	Wooden beams at base of (104)
106	Wooden stakes inserted throughout (105)
107	Gritty construction layer below (104). Likely same as (110)
108	Wooden stake. Possibly C16 th . Removed and assessed
109	Wooden stake. Possibly C16 th
110	Gritty construction layer below (100). Likely same as (107)
111	VOID
112	Wooden stake. Possibly C16 th
113	Wooden stake. Possibly C16 th
114	Wooden stake. Possibly C16 th
115	Wooden stake. Possibly C16 th . Removed and assessed
116	Wooden stake. Possibly C16 th
117	Wooden stake. Possibly C16 th
118	Wooden stake. Possibly C16 th
119	River gravels
120	Wooden stake. Possibly C16 th
121	Wooden stake. Possibly C16 th
122	Wooden stake. Possibly C16 th
123	Wooden stake. Possibly C16 th
124	Wooden stake. Possibly C16 th
125	Wooden stake. Possibly C16 th
126	Wooden stake. Possibly C16 th . Removed and assessed
127	Wooden stake. Possibly C16 th
128	Wooden stake. Possibly C16 th

APPENDIX 3: FINDS ASSESSMENT

Laura Trafford and Richard Jackson

The majority of the finds from the site were recovered from deposit (110), the gritty construction layer below weir structure (100). The pottery from this context fits the known date of construction of this part of the weir at the beginning of the 19th century. Other finds from this construction later include possible tool used in weir construction including a hammer and a weight, possibly used as a plumb bob.

An iron spike recovered from the timber structure (105) is an example of the type of material used to fasten the timber elements of the 19th century weir together. Further examples of this are shown in the iron screws recovered from the crozzle/ slag structure (100). This structure contained many of such screws, the overwhelming majority of which remain *in situ*.

No further work is recommended on this assemblage, and it is not recommended that any of these finds are retained for accession in a museum collection. A selection of photographs of the most interesting finds are shown below.

CERAMICS

Context No.	Qty.	Weight (g)	Notes
107	1	<5	White ware body sherd. Transfer printed blue and white decoration
110	1	30	Course earthenware, black glaze on inner face. Very heavily abraded. Body fragment
110	1	10	Stoneware, brown glaze to both faces. Base sherd
110	1	5	Pearl ware rim sherd, scalloped edge. White glaze with blue decoration at edge
110	1	15	White ware rim sherd, speckled grey glaze
110	1	35	White ware rim sherd of large vessel. Scalloped edge with blue decoration at rim.



Pottery recovered from (110)

MISCELLANEOUS

Context No.	Qty.	Weight (g)	Notes
110	2	130	Leather shoe sole, fitting parts. Total length 127x75x4
110	1	210	Slag, glassy
110	1	80	Slag

IRON

Context No.	Qty.	Weight (g)	Notes
100	5	1950	3 iron screws used to fasten structural element of weir together. Plus 2 indeterminate fe. Objects, likely other types of fastening within the structure Screws 195x35 \emptyset , each weigh ~580-600 each
105	1	385	Iron spike, used to hold the current weir structure together. One on many observed, all the same/ no noticeable differences in them. Tapers to the end to form a spike. 270lx15x15
110	1	350	Fe object. Shape similar to cotton reel. Weight? 55l x40 \emptyset
110	1	405	Fe object. Possible lock although indeterminate. 85x80x30
110	1	665	Fe. 95lx 40hx35wmmmer head, partial wooden handle still attached



Fe. objects recovered from (100)



Iron spike recovered from (105)



Fe. objects recovered from (110)

APPENDIX 4: TIMBER ASSESSMENT



YORK ARCHAEOLOGICAL TRUST

CONSERVATION LABORATORIES

Assessment of Timber Samples from
Sanderson's Weir, Attercliffe, Sheffield,
South Yorkshire.
(Project Code 2173)

Assessment of wood and timber for

ArcHeritage Ltd

by

Steven J Allen

17th September 2019

ABSTRACT:

This report assesses the timber samples recovered during a watching brief at Sanderson's Weir, Attercliffe, Sheffield, South Yorkshire, by ArcHeritage Ltd in 2019.

Disclaimer:

This Report has been prepared solely for the person/party which commissioned it and for the specifically titled project or named part thereof referred to in the Report. The Report should not be relied upon or used for any other project by the commissioning person/party without first obtaining independent verification as to its suitability for such other project, and obtaining the prior written approval of York Archaeological Trust for Excavation and Research Limited ("YAT") (trading as York Archaeological Trust). YAT accepts no responsibility or liability for the consequences of this Report being relied upon or used for any purpose other than the purpose for which it was specifically commissioned. Nobody is entitled to rely upon this Report other than the person/party which commissioned it. YAT accepts no responsibility or liability for any use of or reliance upon this Report by anybody other than the commissioning person/party.

1. INTRODUCTION

The assemblage was recovered during an archaeological watching brief at Sanderson's Weir, on the River Don in Sheffield conducted by ArcHeritage Ltd/Trent and Peak Archaeology in July 2019. The wood was wrapped on site and transported to ArcHeritage premises at Campo Lane, Sheffield from whence the material was sent to the conservation department of YAT at 421 Huntington Road, York on 13th September 2019. The wooden components were recorded by this author on 16th September 2019.

2. AIMS AND OBJECTIVES

The work carried out has been done in accordance with ClfA Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials (ClfA 2014). The work requested was the examination, recording and assessment of the objects submitted.

3. PROCEDURES

Each object was removed from its packaging, washed under cold running water to remove adhering burial deposits and recorded on a proforma YAT Wood Record Sheet (WRS). Species identification samples were removed from damaged areas of each object. Each was then either returned to its original packaging or where this was not possible repacked to await the implementation of the recommendations of this report. Species identification was done via a transmitted light microscope at x40, x100 and x200 magnification as appropriate. All species identifications follow Schweingruber (1982).

4. CONDITION

The wood was in a fairly uniform condition, waterlogged with significant amounts of mineralisation. Some erosion damage had taken place affecting the surfaces and much surface damage had been suffered by pieces during the excavation/extraction process but this has not significantly affected their interpretation.

Each stake had been placed in clear polythene sacks over each end, overlapping and meeting in the middle where they were secured with adhesive tape. (126) was the exception in that black polythene refuse sacks had been substituted for the clear polythene. (108) was small

enough to be contained in a grip top finds bag. Tyvek labels had been used for some external labelling, panels from write-on sections of grip top finds bags elsewhere.

5. DESCRIPTION

The following timbers were submitted for assessment. All dimensions are in millimetres, all species identifications follow Schweingruber (1982).

(108). Stake cut from roundwood branch. Sapwood present but no bark. Eroded and mineralised surfaces with significant attenuation towards the upper end. Tip heavily concreted with concretion and cemented pebbles obscuring the form and any working evidence. Upper end broken away and missing. 2023 l, 84 w, 80 th. *Quercus spp.*

(110). Fragment of box quartered heartwood. No working marks present. All surfaces highly eroded with significant surface damage. Both ends broken away and missing. In two partially refitting sections. 254 l, 48 w, 30 th. *Pinus sylvestris L.*

(115) 1 of 2. "Top Weir Stake" Pile cut from roundwood. Sapwood present but no bark. One trimmed face along length present with a partial trimmed adjacent face around the mid-point of the timber. Eroded and mineralised surfaces. Upper end recently sawn away and missing. Tip broken away and missing with much surface damage and loss of sapwood zone. 1272 l, 150 w, 147 th. *Quercus spp.*

(115) 2 of 2 "Base Weir Stake" Pile cut from roundwood. Sapwood present but no bark. Two adjacent trimmed faces creating a near boxed heart conversion. Multi-faceted tip with rounded cross section fitting into socket of Fe shoe shaped to a conical sharp tip. Eroded and mineralised surfaces. Upper end recently sawn away and missing. Some minor surface damage. 1956 l, 154 w, 150 th. Shoe 152 l, 04 th. *Quercus spp.*

(126) Stake or pile cut from roundwood branch. Sapwood present but no bark. Working at tip suggestive of a sub rectangular cross section with chamfered corners creating a sub-octagonal finished cross section. Eroded and mineralised surfaces with much surface damage and near complete loss of sapwood zone. Upper end torn away (?by machine bucket) and missing. 2246 l, 118 w, 100 th. *Quercus spp.*

Botanical identification

Pinus sylvestris L.

Quercus spp.

Common English name

Scots Pine, exact species not determinable

Oaks, exact species not determinable

5. ASSESSMENT

The wood had been preserved through burial in a waterlogged anoxic environment and this environment appears to have been maintained up until the time of excavation.

Just two wood species are present. Everything except (110) (Scots Pine) was oak. Both species are native to both North-West Europe and the British Isles and could have been obtained fairly locally.

The stakes are each cut from oak, sections of roundwood up to 160mm in diameter. All incorporate sapwood but none have evidence for woodworm damage in the surviving area of sapwood, suggesting they were cut and used very soon after felling. The sample size and the

survival of the recovered pieces preclude any statement on the significance of the tip form. The wood structure was too mineralised to allow a ring count to be performed. The woodworking technology is not especially diagnostic- having been cut with iron/steel bladed axes; they could date from the late prehistoric period up to the present day.

The interim report supplied (ArcHeritage 2019) suggests they may relate to an earlier weir below the extant nineteenth century weir. There is no evidence to either support or contradict that suggestion. Only four of the stakes/piles were lifted and none of the in situ pieces sampled so any conclusions drawn from this assessment are no more than inferences.

The one intrinsic feature of interest is the Fe shoe covering the tip of (115, 2 of 2) (*Plates 1 and 2*). This is a sheet of iron, formed into a hollow conical tip that was nailed to the wood of the pile. These were used in circumstances where a pile or stake was intended to be driven into a deposit that was very resistant to pile driving – such as the stony bed of a watercourse. The shoe serves to protect the wooden tip from damage or breakage and to make it easier to drive the tip to the required depth. It is a known post medieval practice but one that is not often represented in the archaeological record- usually because piles are sampled by removal of their upper ends rather than by extracting the whole timber. To have one recovered in such good condition is quite rare – typically they are embedded in concreted material and/or so highly corroded as to be unintelligible as artefacts. It is not clear whether the seam on the Sanderson's weir example is simply butted or has been welded and further investigation would be worth undertaking.

7. RECOMMENDATIONS

Conservation: Though in good condition, none of the stakes merit retention as objects for archive or display. However the Fe shoe on the tip of (115, 2 of 2) is very well preserved and an example of an object that rarely finds its way into the archive or a museum display. The tip of this pile should be detached from its parent timber retained and the wood brought to dry storage by stabilisation with polyethylene glycol polymers followed by freeze drying. Investigative conservation of the Fe tip to identify the technology used in closing up the seam should be undertaken. Costs for this conservation work may be obtained from the Head of Conservation, Ian Panter, at York Archaeological Trust.

Illustration: The Fe shoe on the tip of (115, 2 of 2) should be drawn for archive or publication, especially if it is decided not to retain and conserve the piece.

Dating: None of the material is suitable for dendrochronological dating owing to short ring sequences. As far as ¹⁴C dating is concerned, if, as is possible, the stakes are of recent date (nineteenth century?) and certainly post medieval, the radiocarbon curve would not be precise enough to date this material.

Future of the assemblage: The assemblage has been recorded and identified where possible and it will be possible to produce a formal study of the material from these records should publication be envisaged. The tip of the Fe shoe on the tip of (115 2 of 2) is an interesting artefact that should be retained for study and display. There is no further information to be usefully extracted from the remaining parts of the assemblage and unless certain parts are of especial local interest – and there is a museum willing to undertake the storage and curation of the material – the rest of the assemblage may be discarded.

7. REFERENCES

ArcHeritage (2019) Sanderson's Weir, Attercliffe, Sheffield, South Yorkshire. Archaeological Watching Brief. ArcHeritage Report no. 2019/53 version 1

CIfA (2014) Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials Reading

Schweingruber, FW (1982) Microscopic Wood Anatomy Zurich

Plates:



Plate 1. Fe shoe on tip of Pile (115) 2 of 2. Note nail hole 20mm from socket end showing as a dark rectangle. Scale 100mm (SJ Allen)



Plate 2. Fe shoe on tip of Pile (115) 2 of 2. Note seam from socket end towards tip. Scale 100mm (SJ Allen)



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APPENDIX 5: WRITTEN SCHEME OF INVESTIGATION



**Sanderson's Weir, Brightside Lane, Sheffield, South
Yorkshire**

Written Scheme of Investigation

Sheffield City Council

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June 2019

ECUS Ltd

Report to: **Sheffield City Council**

Report Title: **Sanderson's Weir, Brightside Lane, Sheffield, South Yorkshire
– Written Scheme of Investigation**

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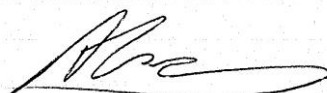
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1. Introduction

1.1 Project Background

- 1.1.1 This document presents a Written Scheme of Investigation (WSI) for a programme of archaeological monitoring during construction of Larinier Fish Pass at Sanderson's Weir, Brightside Lane, Sheffield, South Yorkshire (hereafter 'the site', **Figure 1**).
- 1.1.2 The archaeological monitoring is being undertaken to comply with a pre-commencement condition relating to the approved planning application (Ref: 18/04617/FUL).

1.2 Scope

- 1.2.1 This WSI sets out the nature and extent of known and potential archaeological remains at the site; identifies a strategy for its investigation; and presents the methods and standards by which the works will be undertaken. The document has been prepared in accordance with current guidelines published by the Chartered Institute for Archaeologists (2014) and a brief, prepared by South Yorkshire Archaeology Service (SYAS) (**Appendix 1**).
- 1.2.2 The WSI has been prepared to address Pre-commencement Condition 3 of the Planning permission (18/04617/FUL), which states:

Pre-commencement Condition 3

No development, including any demolition and groundworks, shall take place until the applicant, or their agent or successor in title, has submitted a Written Scheme of Investigation (WSI) that sets out a strategy for archaeological investigation and this has been approved in writing by the Local Planning Authority. The WSI shall include:

- *The programme and method of site investigation and recording.*
- *The requirement to seek preservation in situ of identified features of importance.*
- *The programme for post-investigation assessment.*
- *The provision to be made for analysis and reporting.*
- *The provision to be made for publication and dissemination of the results.*
- *The provision to be made for deposition of the archive created.*
- *Nomination of a completion of all site investigation and post-investigation works.*
- *The timetable for completion of all site investigation and post-investigation works.*

Thereafter the development shall only take place in accordance with the approved WSI and the development shall not be brought into use until the Local Planning Authority have confirmed in writing that the requirements of the WSI have been fulfilled or alternative timescales agreed.

Reason: To ensure that any archaeological remains present, whether buried or part of a standing building, are investigated and a proper understanding of their nature, date, extent and significance gained, before those remains are damaged or destroyed and that knowledge gained is then disseminated. It is essential that this condition is complied with before any other works on site commence given that damage to archaeological remains is irreversible.

- 1.2.3 This condition is in line with the national guidelines set out in the National Planning Policy Framework: *Section 16: Conserving and enhancing the historic environment* (NPPF, 2019).

1.3 The Site

- 1.3.1 Sanderson's Weir (Grade II Listed Building, NHLE: 1247579) is located on the River Don, west of Brightside Lane and the train line and east of the Five Weirs Walk. To the south is East Coast Road and to the north, Stevenson Road. The geology of the site comprises sandstone of the Pennine Middle Coal Measures Formation overlain by superficial deposits of alluvium (BGS, 2019).
- 1.3.2 A full description of the historic and archaeological background of Sanderson's Weir is presented in '*Sanderson's Weir, Brightside Lane, Sheffield – Heritage Impact Assessment*' (Ecus Ltd, 2019).

2. Strategy for Archaeological Works

2.1 Archaeological Potential

- 2.1.1 Sanderson's Weir is considered to be of high heritage significance. The weir is a visible reminder of early industrial activity along the River Don. The weir, along with the goit system and surviving sluices, are surviving elements of early water management along the river, and dates from the late sixteenth century.
- 2.1.2 The weir provides physical evidence of this former industry and ties this documentary evidence to a place and structure. The weir also holds substantial archaeological potential. The fabric of the weir may also answer questions regarding the engineering and construction of the weir as a whole, contribute towards the discussion of engineering and construction techniques of the time. Whilst the early date of the original weir and its subsequent rebuilding in 1825 means there may be potential for historic fabric relating to its early construction, preserved within the structure.
- 2.1.3 Other weirs such as Hadfield Weir, north of Sanderson's weir also help to put the weir in context in terms of importance of the river system and its contribution to the growth of early industry in Sheffield.

2.2 Project Scope

- 2.2.1 The required archaeological work includes:
- **Recording** – Prior to any fish pass construction work commencing, a full record of the affected part of the weir is to be completed. This should be by photographic recording, enhanced by a drawn record (building on any survey recording already undertaken by the client and/or principal contractors, where appropriate).
 - **Archaeological monitoring** – is required to ensure that remains that are to be affected by works will be recorded and/or retrieved.

2.3 Project Aims

- 2.3.1 The principal aim of the archaeological works is to record and examine the affected part of Sanderson's Weir in order to seek a better understanding, compile a lasting record, analyse the findings/record, and then disseminate the results.
- 2.3.2 The general aims of the project are to:
- accurately record the form, character and architectural details of the weir as existing;
 - identify and record any evidence of structural features, fixtures or fittings of historic significance;
 - describe the weir with interpretation of phases of development; and
 - prepare a comprehensive indexed and cross-referenced archive from the fieldwork record.

2.4 Standards and Guidance

- 2.4.1 All archaeological work will comply with:
- regional statement of good practice for archaeology in the development process, Yorkshire, the Humber & the North East (available for download from the SYAS website https://www.sheffield.gov.uk/content/dam/sheffield/docs/planning-and-development/archaeology/Good_Practice_Guide_Rev_Nov_18.pdf);

- relevant ClfA Standard and Guidance documents (<https://www.archaeologists.net/codes/cifa>); and
- Historic England best practice guidance documents.

2.5 Site Attendance

- 2.5.1 Prior to works commencing the archaeological contractor will attend site to record the weir in its current condition and context. It is anticipated that this record will be a simple photographic record taken from the Five Weirs footpath.
- 2.5.2 Upon completion of the cofferdam the principal contractor will provide access to the work area and allow time for the archaeological contractor to inspect and record the weir structure in its current state. The archaeological contractor will be accompanied by the principal contractor in accordance with health and safety requirements.
- 2.5.3 The archaeological contractor must supervise all works, including removal of all or part of the historic water management structure, and associated adjacent features (such as bank-retaining walls), to allow for the identification and recording of any archaeological material that might be uncovered.
- 2.5.4 Where structures, features or finds of potential archaeological interest are exposed or disturbed by construction works, sufficient time will be allowed for the archaeological contractor to clean, assess and, where appropriate, hand excavate, sample and record these features and finds.
- 2.5.5 Heavy plant or excavators must not be operated in the immediate vicinity of archaeological remains until the remains have been recorded and the archaeological contractor on site has given explicit permission for operations to recommence at that location.
- 2.5.6 Access to the site must be afforded to the developer's nominated archaeological contractor at all reasonable times.
- 2.5.7 If it becomes clear during the monitoring that little of archaeological interest is likely to survive on site, the archaeological consultant and archaeological contractor should discuss their work with SYAS. A joint decision will then be made on reducing the work to an intermittent watching brief or ceasing observation of groundworks.
- 2.5.8 Subsequently, should further archaeological remains be observed or suspected by contractors or plant operators, they must immediately cease work and notify both the archaeological consultant and the archaeological contractor.

2.6 Methodology for Recording

Documentary Record

- 2.6.1 A historic baseline will be established for the building based on a desk-based review of existing sources of publically accessible sources of primary and synthesised information.

Photographic Record

- 2.6.2 The photographic survey will be undertaken using 35 mm SLR cameras using Ilford HP5 (ISO 400) black and white film. Photographic scales will be used in all photographs wherever possible. The film record will be complemented by digital photography taken with a high resolution digital SLR camera. The digital photographic record will be supplementary and will not form any part of the primary archive.

Drawn Record

2.6.3 The photographic record will be enhanced by a drawn record. The drawn record will be undertaken using traditional hand surveying techniques using pencil on drafting film. This will build on any survey recording already undertaken by the client and or principal contractors.

2.7 Methodology for Archaeological Monitoring

2.7.1 All ground works within the site will require continuous monitoring by an experienced and qualified archaeologist, to record any structures/features that are encountered.

2.7.2 The work area will be tied into the National Grid and located on a 1:2,500 or 1:1,250 map of the area. All archaeological deposits and features and the top and base of all ground works must be recorded with an above Ordnance Datum (aOD) level

2.7.3 The mechanical excavator used for ground excavation work, must be fitted with a toothless bucket or a toothless ditching bucket.

2.7.4 Excavation will be carried out in successive level spits with opportunity for archaeological inspection. The on-site archaeologist must be given the opportunity to stop work where necessary in order to inspect surfaces/features revealed. Any surfaces/features will be cleaned by hand sufficient to enable an assessment of the characterisation, date and condition of the remains.

2.7.5 In the event of the discovery of archaeological remains which are of a greater number or extent than anticipated, work will cease and the client and SYAS will be notified immediately. An assessment will be made of the importance of the remains and any provision for their recording, as appropriate.

2.7.6 At all times health and safety must take priority over archaeological matters.

General procedures for excavation and artefact collection

2.7.7 Decisions made on the methods and strategies for sampling features should be based upon the nature and extent of any deposits which area revealed.

2.7.8 As a minimum guideline process this will typically require the following level of sampling

- 50% (by plan area) of each post hole;
- 50% (by plan area) of each pit;
- 20% (by plan area) of each linear feature (e.g. drain);
- 100% of ditch terminals; and
- 100% of intersections between linear features will be examined.

2.7.9 The spot height of all principal features and levels shall be established in metres relative to Ordnance Datum, correct to two decimal places. Plans, sections and evaluations will be annotated with spot heights as appropriate.

2.7.10 Although not anticipated in the event of a human burial being discovered, they should be left *in situ*, covered and protected and the coroners' office informed. If removal is essential, work must comply with relevant Home Office/Ministry of Justice Regulations.

2.7.11 Should it be necessary to excavate human remains, all excavation and post-excavation will be in accordance with the standards set out in ClfA technical Paper 12: *Excavation and post-excavation treatment of cremated and inhumed remains*. The final placing of human remains following analysis will be subject to the requirements of the Ministry of Justice Licence.

2.7.12 All finds that are considered as 'treasure' (in terms of the Treasure Act 1996) will be reported to the Coroner and appropriate procedures then followed.

2.7.13 The artefact collection policy shall be concerned with the provision of adequate samples for meeting the objective of the work.

2.7.14 During and after the monitoring work, all recovered artefacts must be stored in the appropriate material and storage conditions to ensure minimal deterioration and loss of information (this should include controlled storage, correct packaging, regular monitoring of conditions, and immediate selection for conservation of vulnerable material).

Recording

2.7.15 Recording should follow those standards as set out by the Chartered Institute for Archaeologists (CIfA) in their Standards and Guidance for Field Evaluation and Excavation (CIfA, 2014).

2.7.16 As a minimum;

- Single-context recording as developed by the Museum of London Archaeology Service (MoLAS) should be followed;
- A Harris Winchester or similar matrix should be used for complex stratigraphical problems;
- For brick/stone structures the record should include brick dimensions and type, mortar and the extent of structures. Brick samples should be taken for structures likely to predate the mid-19th century;
 - A suitable photographic record of all contexts should be taken in 35 mm b/w print film duplicated in digital photography (16 megapixel camera, minimum). A register of all photographs should be kept, with the subject and direction of each shot; and
 - The photographic record should also include general site shots, shots of ground works and shots of individual features and groups of features.
- Where possible digital survey data should be recorded in three dimensions and provision made to deposit this data with the ADS;
- The site should be accurately tied into the National Grid and located on a 1:2,500 or 1:1,250 map of the area;
- A full and proper record (written, graphic and photographic as appropriated) should be made for all work, using pro-forma record sheets and text descriptions appropriate to the work;
- Accurate scale plans and section drawing should be drawn at 1:50, 1:20 and 1:10 scales as appropriate;
- Drawing conventions should follow the MoLAS Archaeological site manual (MoLAS, 2004); and
- All archaeological deposits and features must be recorded with an above Ordnance Datum (AOD) level.

Contingency

2.7.17 The need for contingency work to be undertaken must be discussed and agreed whilst the recording work is ongoing. Any alterations to the agreed programme, found to be necessary during the work, are also to be discussed and agreed.

2.7.18 Adequate supervision of all groundworks will need to be ensured at all times. A provisional allowance of up to 5 person-days should be made and contingency costs outlined to the client for additional staff or day's site attendance. In the event of the discovery of archaeological remains which area of a greater number or extent than anticipated, work will cease and the client and SYAS will be notified.

Post-Fieldwork Methodology

2.7.19 Finds recovery and conservation will follow the guidelines laid out by the Chartered Institute for Archaeologists.

2.7.20 All finds uncovered during the watching brief must be collected and processed, unless variations in this principle are first agreed with the Client and SYAS. Finds must be appropriately packaged and stored under optimum conditions.

2.7.21 A rapid scan of all excavated material should be undertaken by conservators and finds researchers in collaboration. Material considered vulnerable will be selected for stabilisation after specialist recording. Where intervention is necessary, consideration must be given to possible investigative procedures. Once assessed all material will be packed and stored in optimum conditions.

2.7.22 Allowance should be made for preliminary conservation and stabilisation of all objects and an assessment of long-term conservation and storage needs.

2.7.23 All finds processing, conservation work and storage of finds must be carried out in compliance with the Chartered ClfA Guidelines for the collection, documentation, conservation and research of archaeological material and those set out by UKIC (United Kingdom Institute for Conservation).

2.7.24 Any recording, marking and storage material should be of archive quality and recording systems must follow the guidance as outlined by the ClfA.

2.7.25 The arrangements for the final disposal of any finds (artefacts) made in connection with the archaeological work are to be in keeping with the requirements of Museums Sheffield.

Reporting

2.7.26 A copy of the final report will be submitted to the archaeological contractor, the client and SYAS within 4 weeks of completion of the work.

2.7.27 Each page and paragraph will be numbered within the report and illustrations cross-referenced within the text.

2.7.28 The report will include the following as a minimum:

- The planning application number, OASIS reference number and an 8 figure grid reference;
- A location plan of the site at an appropriate scale of at least 1:10,000;
- A location plan of the extent of the watching brief. This must be at a recognisable planning scale, and located with reference to the national grid, to allow the results to be accurately plotted on the Historic Environment Record;
- Plans and sections of archaeology located at a recognisable planning scale (1:10, 1:20, 1:50 or 1:100, as appropriate);
- A summary statement of the results of the archaeological monitoring;
- A table summarising the deposits, features, classes and number of artefacts encountered and spot dating of significant finds; and

- Any specialist reports associated with further analysis of find and environmental samples from the archaeological monitoring.

2.7.29 Any variation to the above requirements should be approved by SYAS prior to work being submitted.

3. Monitoring

- 3.1.1 South Yorkshire Archaeology Service will be given a minimum of one week's notice of the commencement of fieldwork in order that arrangements for monitoring can be made.
- 3.1.2 Access will be permitted to the SYAS to monitor any field work, as well as the progress of any agreed post-fieldwork analysis and reporting programmes (at the Archaeological Contractor's premises or that of their specialist subcontractors as appropriate).
- 3.1.3 The work shall be carried out by appropriately qualified and experienced staff. Details of staff, including specialists, and their relevant experience should be discussed and agreed prior to the work being carried out.
- 3.1.4 It is proposed that the archaeological fieldwork is carried out by the following ArchHeritage staff:
- Laura Strafford, ACIfA, Project Officer
 - Richard Jackson, Project Supervisor
 - George Loffman, Project Supervisor
- 3.1.5 Specialist reports will be prepared on any artefacts recovered. Specialist analysis and reporting will be carried out by the following specialist staff or consultants as appropriate:
- Human remains – Malin Holst (York Osteoarchaeology Ltd) & Rebecca Storm (University of Bradford)
 - Palaeoenvironmental remains – Sheffield Archaeobotanical Consultancy
 - Palaeoenvironmental advice – Kristina Krawiec (Trent & Peak Archaeology)
 - Lithics – George Loffman (York Archaeological Trust)
 - Roman Pottery – Ruth Leary, David Griffiths
 - Medieval pottery – Anne Jenner (York Archaeological Trust)
 - Post-medieval pottery – David Barker and Richard Jackson
 - Post-medieval glass – Karen Weston
 - Finds Officer – Nienke Van Doorn (York Archaeological Trust)
 - Archaeometallurgy & industrial residues – Rod Mackenzie
 - Conservation – Ian Panter (York Archaeological Trust)
 - Worked wood – Steve Allen (York Archaeological Trust)

4. Archive Deposition

- 4.1.1 A digital, paper and artefactual archive will be prepared, consisting of all primary written documents, plans, sections, photographs and electronic data which will be deposited with Museums Sheffield. Arrangements for the deposition of the finds and site archive will be made with Museums Sheffield in advance of commencement of fieldwork.
- 4.1.2 “Archaeological Archive Deposition Policy for Museums in Yorkshire and the Humber” created a uniform region-wide approach to the preparation and deposition of archaeological archives. The resulting formal process requires the completion and submission of forms to Museums Sheffield at the project initiation, mid-point review and completion stages. All such forms will be completed by ArchHeritage and made available to SYAS as required.
- 4.1.3 The archaeological contractor will contact the museum’s archaeological curator or collections manager to discuss archaeological archiving requirements at the initial stage of preparation of the project design. Following agreement with the client, details of archiving arrangements will be incorporated into the project design. This will include confirmation that a budget to cover the museum’s deposition charge has been allowed for.
- 4.1.4 South Yorkshire museum services do not currently accept digital archives; digital archiving will need to be discussed with ADS and appropriate costs have been allowed for.
- 4.1.5 The digital archive must be compiled in accordance with the standards and requirements of the ADS, which may be accessed through the ADS website. In brief, it is envisaged that:
- Digital archives from householder-scale projects (e.g. small-scale building recording, watching brief on domestic works) will be deposited through the upload of images to the OASIS record (up to 50 images);
 - Small- to medium-scale projects (50-300 files) will be deposited through the ADS-easy upload services;
 - Larger projects (>300 files) will be deposited through the standard ADS service
- 4.1.6 Archiving is expected to be carried out as specified, in a timely manner. On completion, confirmation of deposition will be supplied to SYAS.
- 4.1.7 At the start of work (immediately before fieldwork commences) an OASIS online record (<http://ads.ahds.ac.uk/project/oasis/>) will be initiated and key fields completed on Details, Location and Creators forms. All parts of the OASIS online form will be completed for submission to the SMR. This will include an uploaded .pdf version of the assessment report and any subsequent reports (a paper copy will also be included within the archive).
- 4.1.8 A printed and bound copy of the report will be supplied to SYAS for incorporation into the South Yorkshire Sites and Monuments Record. A digital copy of the report will also be supplied to SYAS and to the HE Science Advisor.

5. Access, Security and Health & Safety

5.1 General

- 5.1.1 Responsibility for site Health and Safety will reside with the principal contractor. This will extend to all activities undertaken by the Contractor's staff, sub contractor's staff and the safety of staff and the public. The appointed principal contractor must comply and confirm with the Health and Safety at Work Act (1974), the Construction, Design and Management Regulations and all other appropriate health and safety regulations. All archaeological personnel must work in accordance with the Principal Contractor's Health and Safety procedures and site rules and use their welfare provision.
- 5.1.2 The Principal Contractor will provide Ecus' archaeological consultant with their Construction Phase Health and Safety Plan. This will be shared with the archaeological sub-contractor and used to inform their Risk Assessments and Method Statements and Health and Safety Plans.
- 5.1.3 The appointed archaeological sub-contractor (ArchHeritage) will provide all relevant Risk Assessments, Method Statements and Health and Safety Plans to Ecus' archaeological consultant who will review the documents, file and deliver to the Client and Principal Contractor as required. Health and safety documentation, evidence of competency and all appropriate CSCS cards must be provided.
- 5.1.4 The archaeological contractor must carry appropriate Employer's Liability and Public Liability Insurance.
- 5.1.5 All work equipment must be suitable for the purpose and in sound condition and be inspected, maintained and examined in line with the requirements of the Provision and Use of Work Equipment Regulations and if applicable the Lifting Operation and Lifting Equipment Regulations and any other applicable legislation. Inspection and maintenance records must be provided and those using it must be trained and competent to do so.
- 5.1.6 Health and safety must always take priority over archaeological matters. All archaeologists undertaking fieldwork (e.g. a site visit) must do so under a defined Health and Safety policy. Archaeologists undertaking fieldwork must observe safe working practices; the Health and Safety arrangements must be agreed and understood by all relevant parties before work commences (CIFA, 2014).
- 5.1.7 If any deviation from the agreed scope or planned work is necessary, work must cease and discussion must take place between the appointed archaeological sub-contractor and the principal contractor and a way forward agreed and documented. Risk Assessment and Method Statements and the Construction Phase Health and Safety Plan must be updated before work can commence on site and changes communicated to all involved before work can recommence.

5.2 Specific

- 5.2.1 Upon attending site the archaeological sub-contractor will attend a site induction provided by the Principal Contractor and any subsequent tool box talks. Whilst on site the archaeological sub-contractor will be accompanied by a member of the Principal Contracting team at all times. The principal contractor must bring to the attention of the appointed archaeological contractor all of the specific risks on site, and in particular the risks relevant to working behind a cofferdam.
- 5.2.2 The archaeological sub-contractor will not attend site until all requirements under Construction, Design and Management Regulations, Regulation 23 & 24 in relation to cofferdams have been met and inspection certificates circulated.

- 5.2.3 There are particular risks from working in and around rivers. These may include discarded sharps and Weil's Disease, carried by wild animals but particularly rats. Appropriate precautions and hygiene practices are important, in particular hand-washing. Full guidance should be obtained from the Principal Contractor. In addition to standard PPE (hard hat, hi-vis jacket/waistcoat and safety boots); waterproof gloves have been flagged as an essential item

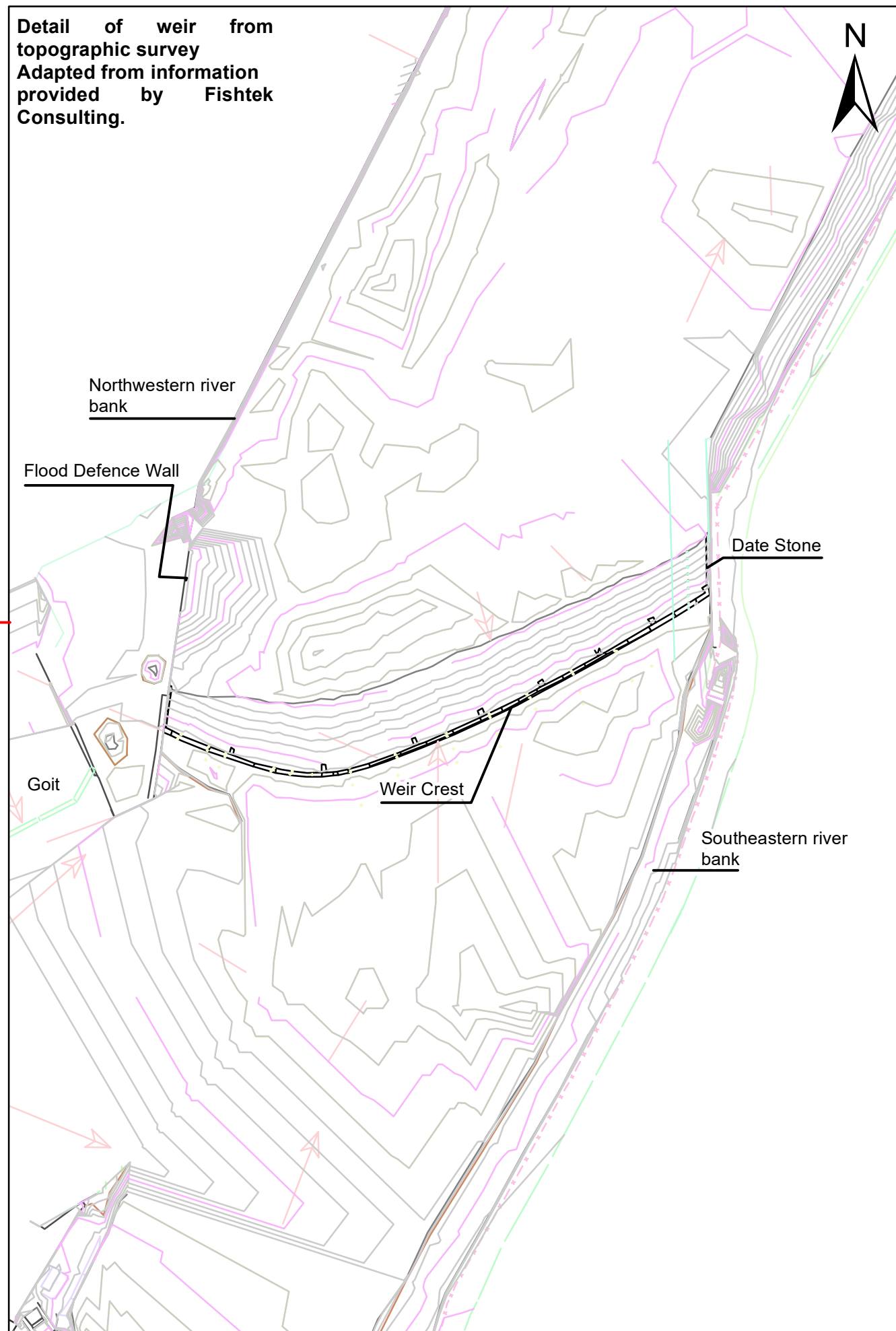
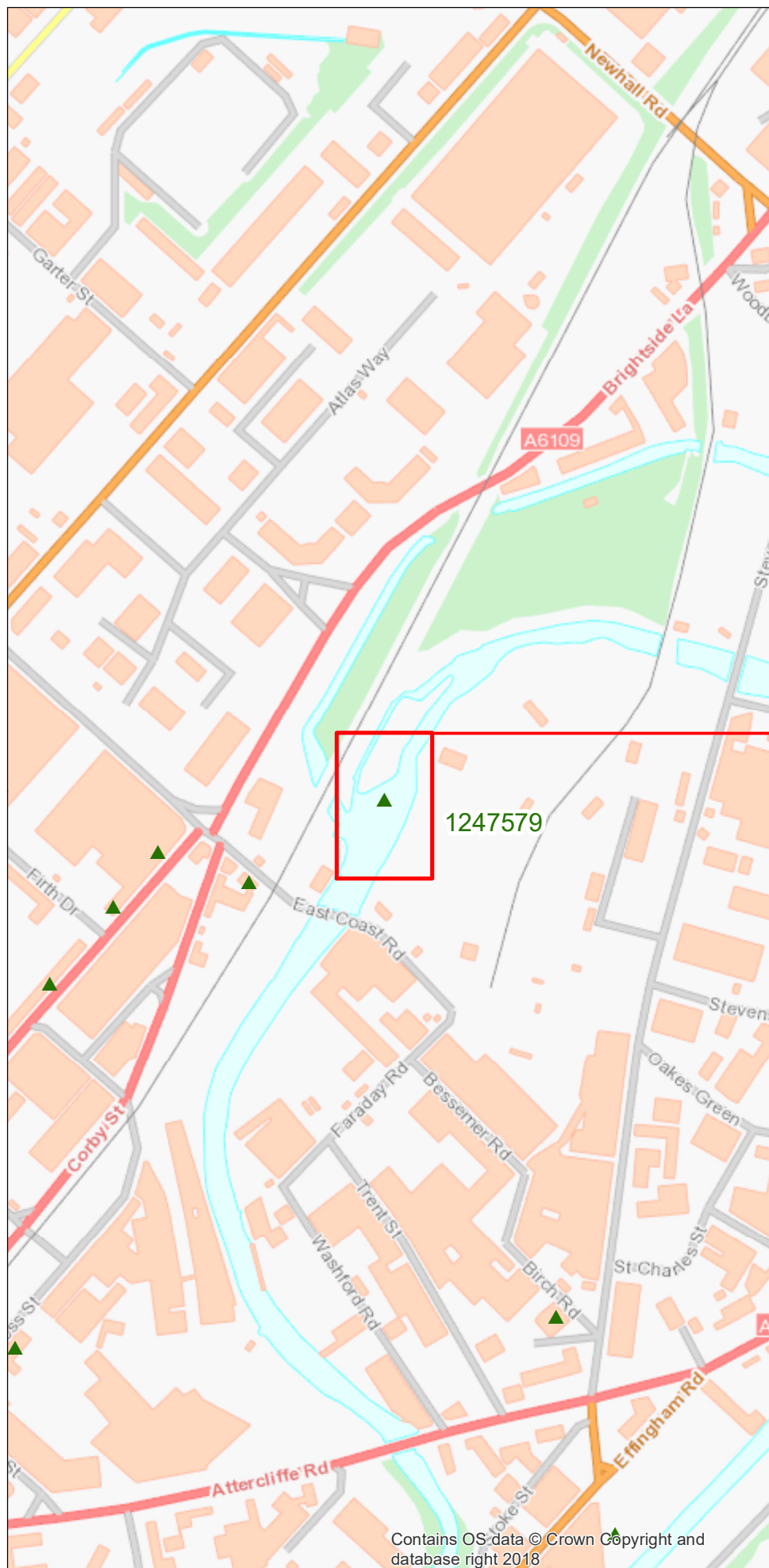
6. Confidentiality, Publicity and Copyright

- 6.1.1 Archaeological works can and do attract public interest and being located in close proximity to the city centre, members of the public will be able to observe ongoing works.
- 6.1.2 Any questions raised by the public, either on site, or through other enquiries will be made know to a representative of the client as soon as possible.
- 6.1.3 The results of the archaeological work will be submitted to the client and SYAS in the first instance for review, comment and approval before final issue.
- 6.1.4 The copyright of any written, graphic or photographic records and reports rest with the originating body. Agreements on copyright will be agreed with the client at the outset of the project. The circumstance under which the report or records can be used by other parties will be identified at the commencement of the project.
- 6.1.5 A summary report of an appropriate length, accompanied by illustrations (not less than 300 dpi), should be prepared and submitted in digital format, for publication in the Archaeology in South Yorkshire journal.
- 6.1.6 Provision must be made for publicising the results of the work locally, e.g. by presenting a paper at South Yorkshire Archaeology Day and talking to local societies.
- 6.1.7 The archaeological contractor must complete the online OASIS form as stated in Section 4.

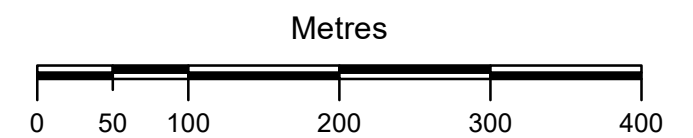
7. Figure

Designated Heritage Assets

- ▲ Grade II Listed Building



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Sheffield City Council
Sanderson's Weir, River Don,
Sheffield - Written Scheme of
Investigation
Figure 1: Site Location and detailing
of structure

Brook Holt 3 Blackburn Road Sheffield S61 2DW
T: 0114 2669292 www.ecusltd.co.uk

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Document Path: J:\Company Shared Directories\Contracts\Sheffield\Heritage Projects\12580 Sanderson's Weir HIA\H. Data\GIS\12580_Figure_1.mxd

Appendix I – South Yorkshire Archaeology Service Brief



BRIEF FOR ARCHAEOLOGICAL MONITORING DURING CONSTRUCTION OF LARINIER FISH PASS SANDERSON'S WEIR (Planning application number 18/04617/FUL)

1 SUMMARY

1.1 Historic Water Management Assets (HWMA) are structures such as weirs, goits, dams and sluices which have used to harness and utilise water power for a variety of uses. In South Yorkshire, Historic Water Management Assets (HWMA) are of significant importance in the history of the county, with their history dating back several hundred years.ⁱ Proposed developments in or adjacent to rivers have the potential to disturb or damage such structures. In many cases, although there is reason to believe that significant archaeological remains may be disturbed in the course of such development, there is often little known of their character, extent and state of preservation.

1.2 A fish pass is to be constructed on one such HWMA - Sanderson's weir, a Grade II Listed weir on the river Don in Sheffield. Further details of the known or suspected archaeological implications of development on the HWMA are contained in the Heritage Impact Assessment which is supplied with this brief.ⁱⁱ

1.3 The required archaeological work includes:

- **Recording** Prior to any fish pass construction work commencing, a full record of the affected part of the weir is to be completed. This should be by photographic recording, enhanced by a drawn record (building on any survey recording already undertaken by the client and/or principal contractors, where appropriate).
- **Archaeological monitoring** (often referred to as a 'Watching Brief') is required to ensure that remains that are to be affected by works will be recorded and/or retrieved.

1.4 All archaeological work will comply with:

- "*Regional statement of good practice for archaeology in the development process, Yorkshire, the Humber & the North East*" (available for download from the SYAS website);
- relevant ClfA Standard and Guidance documents;

ⁱ "Characterisation and Significance of South Yorkshire's Historic Water Management Assets in Relation to Water Framework Directive Requirements", ECUS, 2016. Available for download from: <https://historicengland.org.uk/images-books/publications/syorks-historic-water-management-assets/>

ⁱⁱ "Sanderson's Weir, Brightside Lane, Sheffield – Heritage Impact Assessment", ECUS, January 2019.

- relevant HE best practice guidance documents.

1.5 The proposed archaeological monitoring will involve working around and within the river channel. The particular hazards faced by personnel here will be addressed by the Principal Contractor. All archaeological personnel must work in accordance with the Principal Contractor's Health and Safety procedures and site rules and use their welfare provision.

1.6 All archaeological work will be monitored by the South Yorkshire Archaeology Service (SYAS).

2 WRITTEN SCHEME OF INVESTIGATION

2.1 A detailed written scheme of investigation (WSI) will be submitted to SYAS for approval. The WSI will include:

- Consideration of any previous work at the site and its immediate environs, geology, topography, etc.;
- The methodology for site investigation and recording, including sampling strategies (see section 3 below);
- Details of trench location, with the rationale for each;
- The methodology for post-excavation assessment and reporting;
- The timetable for completion of all site investigation and post-excavation works;
- The contingencies made for full analysis and reporting;
- Details of the arrangements made for deposition of the site archive (see section 6 below).

2.2 A directive was included in the planning decision notice (Directive 2), advising the applicant that, to adequately understand and record any archaeological features that may be exposed during construction works, the archaeological contractor will need to be able to view and record the exposed sections of the weir from within the work area. To enable this, the construction plan will need to include provision for archaeological access to the work area and allow time within the programme for the archaeological contractor to undertake this work. **The WSI of the preferred archaeological contractor will therefore need to include full details of this provision, following discussion with the construction team and agreement on a workable methodology.**

3 FIELDWORK METHODOLOGY

3.1 The work will be carried out by appropriately qualified and experienced staff,. Details of staff numbers, their roles and relevant experience will be provided to SYAS. Staff CVs will be submitted (unless already supplied to SYAS in previous project specifications). Any sub-contracted specialists will be subject to the same provisions.

3.2 Reasonable prior notice (at least 14 days) of the commencement of the development is to be given to the archaeological contractor. A minimum of one week's notice of the commencement of fieldwork must be given by the archaeological contractor to SYAS, to arrange monitoring visits.

3.3 Access to the site must be afforded to the developer's nominated archaeological contractor at all reasonable times.

3.4 All site works undertaken in relation to the construction of the fish pass, including removal of all or part of the historic water management structure, and associated adjacent features (such as bank-retaining walls) must be undertaken under archaeological supervision, to allow for the identification and recording of any archaeological material that might be uncovered.

3.5 Where structures, features or finds of potential archaeological interest are exposed or disturbed by construction works, sufficient time will be allowed for the archaeological contractor to clean, assess and, where appropriate, hand excavate, sample and record these features and finds. This may involve work within the river channel although, where coffer dams are constructed by the Principal Contractor, they will provide relatively dry conditions for work.

3.6 All record photographs will be on black and white film and 35mm colour slide film.

3.7 Digital photography can only be used to supplement the photographic record; it must not form any part of the primary archive.

3.8 Any human remains that are revealed must initially be left *in situ* and, if removal is necessary, this must comply with the relevant Ministry of Justice (formerly Home Office), Diocesan and other regulations, as appropriate.

3.9 All finds that are 'treasure' (in terms of the Treasure Act 1996) will be reported to the Coroner and appropriate procedures then followed.

3.10 Heavy plant or excavators must not be operated in the immediate vicinity of archaeological remains until the remains have been recorded and the archaeological contractor on site has given explicit permission for operations to recommence at that location.

3.11 Where archaeological remains are observed or suspected by contractors or plant operators, they must immediately cease work and notify the archaeological contractor.

3.12 If it becomes clear during the monitoring that little of archaeological interest is likely to survive on the site, the contractor should discuss their work with SYAS. A joint decision will then be made on reducing the work to an intermittent watching brief or ceasing observation of groundworks.

3.13 SYAS has been advised that that there are particular risks from working in and around rivers. These may include discarded sharps (needles from drug users) and Weil's Disease, carried by wild animals (but particularly rats). Appropriate precautions and hygiene practices are important; full guidance should be obtained from the Principal Contractor.

4 POST-EXCAVATION GUIDELINES

4.1 For all categories of material recovered, including finds, palaeo-environmental, industrial and other specialist samples, an assessment by an appropriately experienced specialist will be undertaken. Samples must be processed and sorted, and any artefacts recovered provided to the appropriate specialist(s) to be considered alongside the hand-recovered material. Basic stratigraphic information will be supplied to the project specialists.

4.2 All finds are to be treated in accordance with current EH best practice, including '*Investigative Conservation*'. Finds are to be cleaned and marked according to accepted principles and in line with appropriate period/ material guidelines.

4.3 The site archive will be prepared in accordance with the UKIC's document *Guidelines for the Preparation of Excavation Archives for Long Term Storage* and the IfA's "*Standard And Guidance for the creation, compilation, transfer and deposition of archaeological archives*".

5 REPORTING

5.1 The monitoring will result in a report including background information (with planning application details, where appropriate), methods, detailed results, discussion and conclusions.

5.2 Illustrations to be included are:

- a detailed location map;
- a detailed site plan, as excavated;
- detailed plans of relevant features, as excavated;
- detailed sections of relevant features, as excavated;
- an overall site plan showing all (phased) archaeological features recorded;
- selection of photographs of work in progress;
- select artefact illustrations and/or photographs.

5.3 The results of assessment/analysis of all find categories, by appropriate specialists, will be included in the report.

5.4 The results of assessment/analysis of palaeo-environmental, industrial and other samples, by appropriate specialists, will be included in the report.

5.5 The results of any scientific dating undertaken will be included in the report.

5.6 The report will include a phased interpretation of the site, if possible, and consider the results in their local and regional context.

5.7 The report will include a detailed context index and an index to the archive.

5.8 A printed and bound copy of the report must be supplied to SYAS for incorporation into the South Yorkshire Sites and Monuments Record. A digital copy of the report must also be supplied to SYAS and to the EH Science Advisor.

5.9 A summary report of an appropriate length, accompanied by illustrations (at 300dpi resolution), must be prepared and submitted in digital format, for publication in the appropriate volume of *Archaeology in South Yorkshire*.

5.10 Provision will be made for publicising the results of the work locally, e.g. by presenting a paper at South Yorkshire Archaeology Day and talking to local societies.

5.11 The archaeological contractor must complete the online OASIS form at <http://ads.ahds.ac.uk/project/oasis/>.

5.12 A contingency will be made for the preparation and publication, in a local, regional or national journal, of the results of the monitoring.

6 DEPOSITION OF ARCHIVE AND FINDS

6.1 Arrangements for the deposition of the finds and site archive will be made with Museums Sheffield **in advance of commencement of fieldwork**. The relevant service can be found via the '*Archaeological Collections Areas Database and Map*' on the ADS website.

6.2 "*Archaeological Archive Deposition Policy for Museums in Yorkshire and the Humber*" created a uniform region-wide approach to the preparation and deposition of archaeological archives. The resulting formal process requires the completion and submission of forms to the relevant museum service at the project initiation, mid-point review and completion stages (template forms are available for download from the SYAS website).

6.3 The archaeological contractor will contact the museum's archaeological curator or collections manager to discuss archaeological archiving requirements at the initial stage of preparation of the project design. Following agreement with the client, details of archiving arrangements will be incorporated into the project design. This will include confirmation that a budget to cover the museum's deposition charge has been allowed for.

6.4 South Yorkshire museum services do not currently accept digital archives; digital archiving will need to be discussed with ADS (or equivalent service) and appropriate costs allowed for.

6.5 Archiving is expected to be carried out as specified, in a timely manner. On completion, confirmation of deposition will be supplied to SYAS.

South Yorkshire Archaeology Service
21st May 2019

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