Archaeological Report

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Weirs and Channels East of the Lake,
Ragley Hall,
Alcester,
B49 5NJ.

Planning ref. 17/02593/FUL and 17/02594/LBC

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For: Hamish Stewart, Ragley Estate
Jonathan Butterworth, Kingfisher Consultancy
Graham Pope, Birch Brothers

Summary
Investigations and observations were carried out on a series of weirs and channels below the lake at Ragley Hall during the course of a programme of repair. It was noted that there had been considerable rebuilding above weir 1 during the twentieth century. The channel below weir 2 was probably from the eighteenth century and was engineered with considerable skill to mitigate the erosive effects of the flow of water. The area below weir 3 had been subject to very heavy erosion but was probably a rebuild or extension from later in the eighteenth or early in the nineteenth century. The lower section of channel appeared to have been diverted in recent times.

Fig. 1 The Lake looking east.

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1.0 INTRODUCTION

1.1 General background

1.1.1 This document comprises the report on archaeological investigation, monitoring and recording of work undertaken to repair a 75 metre section of channel and weirs issuing from the south east corner of the Lake in the grounds of Ragley Hall (Fig. 2).

1.1.2 Polyolbion Archaeology was commissioned by Graham Pope of Birch Brothers on behalf of the Ragley Hall Estate to prepare this scheme in accordance with the brief provided by Kingfisher Consultancy's Jonathan Butterworth which states:

> **Archaeological Building Record Prior to Works**
>
> A programme of archaeological building recording is required to production of a record of the condition and character of the cascade prior to its alteration. The works should produce an archive record of 35 mm black and white photographs be taken, supported by colour digital photographs of not less than 10 megapixel resolution in .tiff and .jpeg format. Photographic scales should be used and the subject, direction and location of each photograph recorded. The results of the record should be presented with a descriptive record summarising the methods employed, a description of the structures recorded, and details of the deposition of the material.

This work should be undertaken in line with a Written Scheme of Investigation agreed with the Ragley Hall Estate, Natural England and other stakeholders, and in accordance with English Heritage (2006) *Understanding Historic Buildings: a guide to good recording practice* and the Chartered Institute for Archaeologists (2014a) *Standards and guidance for the archaeological investigation and recording of standing buildings or structures*.

Archaeological Watching Brief during Works

A programme of archaeological watching should be undertaken during the course of any ground works, including breaking ground for compound creation and the breaking out of any structures, in order to identify and record the presence, condition, character and date of any archaeological remains. It is anticipated that this would comprise a record of the historic fabric and construction of water management features affected by the proposed works which are currently obscured by more recent alterations of below ground level. The observations made during this work could be fed back into the future restoration design in terms of identifying the form, materials and construction methods of the original structures.

The results of the watching brief should be presented in an analytical report, describing the findings and placing them within their wider context of the development of the park. This work should be undertaken in line with a Written Scheme of Investigation agreed with the Ragley Hall Estate, Natural England and other stakeholders, and in accordance with the Chartered Institute for Archaeologists (2014b) *Standards and guidance:*

Archaeological watching brief. An archive of the results and finds from the work should be prepared in line with relevant professional standards and deposited with an appropriate museum if not to be retained by the Ragley Hall Estate.

At the time of writing no formal planning conditions which required archaeological input had been notified .

1.1.3 The development comprised, in outline, the repair and in some cases total reconstruction of a series of weirs or cascades as well as the repair and consolidation of the associated channel leading water away and further down the valley.

1.2 Site Background

1.2.1 Topography. The dam and cascades occupy a shallow valley running west to east which lies about 600m south east of the eighteenth-century and earlier Ragley Hall. The lake is supplied by surface drainage from the surrounding fields and ultimately the water flows down into the River Arrow a further 600m to the east (Fig. 2).

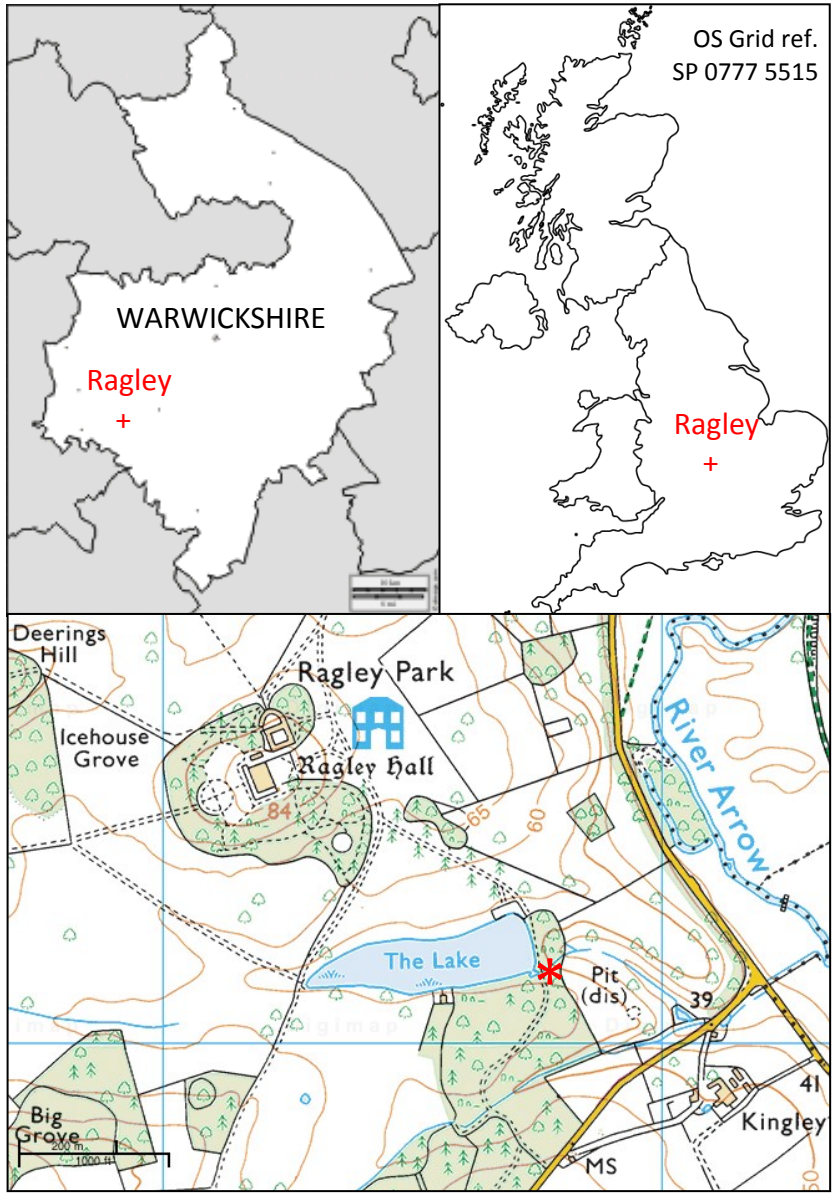

Fig. 2 Location maps (© Crown copyright and database rights [2015] OS 0100042840)

The underlying geology is primarily of the Triassic Mercian mudstone group with superficial deposits of Wasperton sand and gravel. The soils tend to be deep, slightly acidic clayey loams.[i]

1.2.2 History and Archaeology. The history of the hall and the development of the park and gardens have been traced in some detail during the preparation of the recent parkland management plan.[ii] In outline cropmarks suggest that the area was likely to have been farmed in the Roman period lying as it does just a couple of kilometres east of the major settlement at Alcester. The beginnings of medieval settlement date back to the mid-Saxon period when land in the Arrow valley was given to the abbey of Evesham but at the time of Domesday it was in the possession of Bishop Odo of Bayeux and the manor featured pasture, woodland and a mill. Of the precursor to the current house the VCH writes:

> In 1370 John Rous of Ragley exchanged with the abbey lands in Ombersley, Worcs., for land and rent in Ragley and Kingley. In Dec. 1381 he received a pardon for crenellating a house above the gate of his manor of Ragley without licence, and was given leave to crenellate the remainder of the manor.[iii]

In 1591 the manor was sold to Sir John Conway for £3,000 and became the family seat, there is the possibility that some remains of this house survive within the fabric of the later construction designed by Robert Hooke for the earl of Conway and built in the 1680s. There is some debate as to the degree to which the house was completed before a second building campaign from 1783 onwards under the direction of the architect James Wyatt.[iv]

The park almost certainly originated as a medieval dear park although the documentary evidence remains inconclusive. The VCH has a reference suggesting that the lake was constructed in 1630 but it is probable that fishponds figured in the earlier medieval landscape. Formal gardens and lake feature in the late seventeenth-century landscape and are illustrated in Kip and Knyff's *Brittania Illlustrata*.[v] The exact nature of the eighteenth-century remodelling and in particular the involvement of Lancelot Brown is also subject to debate. Mowle and James say that, 'the centre-piece lake is a dull trapezoid with none of Brown's usual graceful curves', although they go on to speculate that there may have been some remodelling of the lake perhaps during the major works done to gardens by Robert Marnock in the 1870s.[vi] The key reference is in a letter from Horace

Walpole who comments that, 'Browne has improved both the ground and the water, though not quite to perfection'.[vii]

There are no records available of any recent archaeological work within the boundaries of the park however a detailed heritage assessment was carried out in May 2017.[viii]

1.2.3 The site (Fig. 4). The area for study lies at the south east corner of a large lake (approximately 500m x 100m) which is held in place by a massive earth dam that rises some 7m above its base to the east (Fig. 5). About 25m further east is the earthwork of what appears to be a smaller dam, around 3m high but curiously truncated at its northern end, this may be unfinished. The series of cascades originate at a small circular basin, formerly the site of a boathouse shown on the early editions of the OS map. There are no obvious traces of this so it may have been raised on timber piles. Water exits underneath a modern bridge made of reconstituted stone down a concrete spillway before dropping over the first of two tall stone faced cascades (1 and 2, Fig.3) The water then flows for around 25m along a stone edged channel paved initially with stone setts then with brick (Fig. 7) before falling over a small cascade (3) and then plunging into a deep eroded basin past the few remains of another possible cascade (4). Water leaves from here over two further small cascades (5 and 6, Fig. 6), along a rather badly eroded stone lined channel for a further 20m then over a another potential cascade (7) and into a small oval pool, now almost completely silted up. The exit from this is marked by the final cascade in the sequence (8). Adjacent to the pool on its north side is a brick built pump house containing the remains of an oil engine and associated pumping mechanisms. To the west, at the foot of the dam is a ruined pump house with the remains of a small water wheel and pump.

Fig 3 The bridge and the upper cascades before clearance, looking north west.

Fig. 4 Site plan.

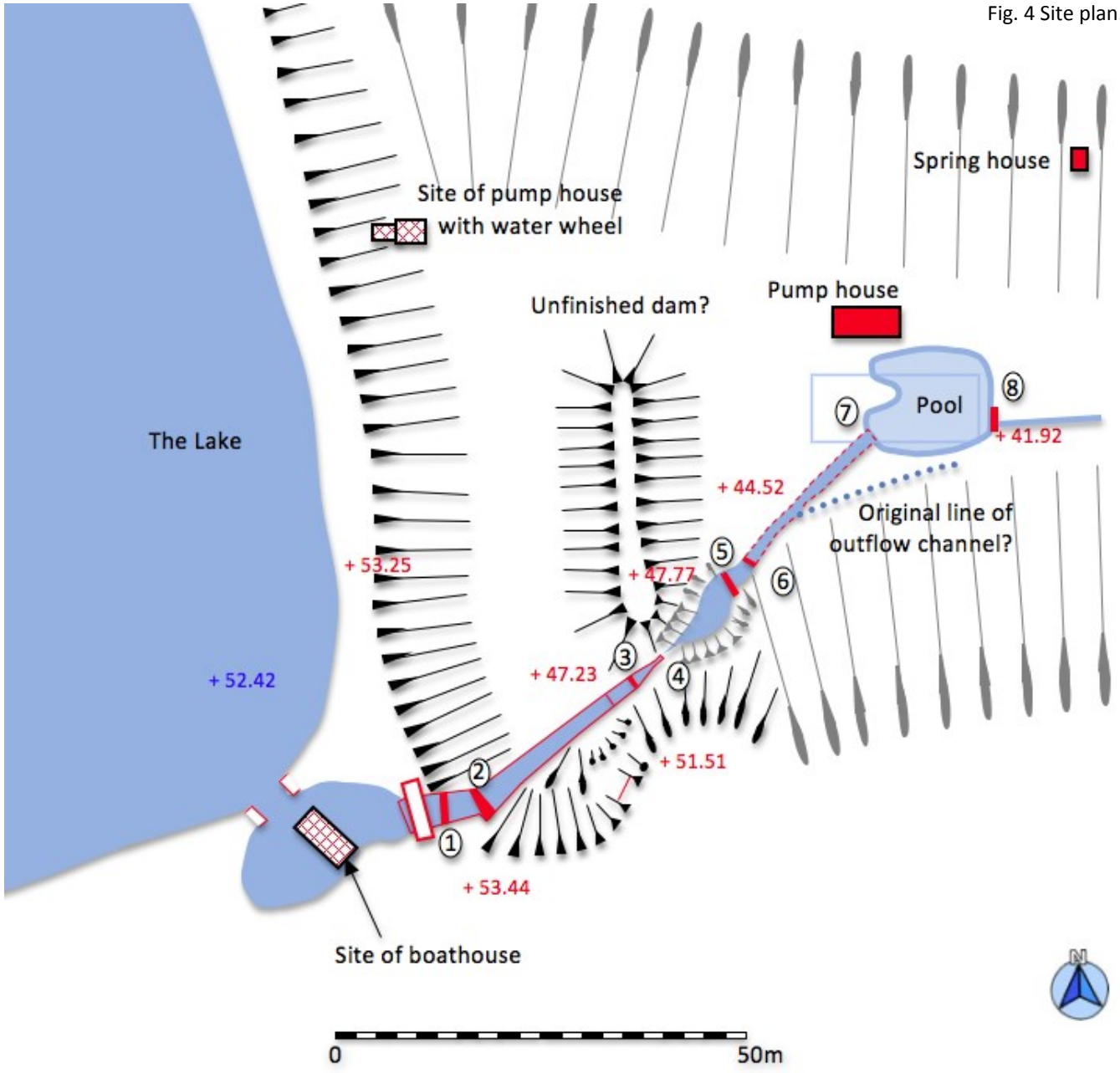

Fig. 5 The main dam looking north.

Fig. 6 Cascades 5 and 6 below the eroded basin looking west.

Fig. 7 The base of the channel looking north.

2.0 **OBJECTIVES**. Specific objectives of the investigation were:

2.1 identify any previously unrecorded archaeological features and deposits of interest associated with the cascades and channels;

2.2 record identified archaeological features and deposits to a level to enable their extent and significance to be explained, especially the nature and date of original construction and the phasing and nature of any subsequent alterations;

2.3 undertake sufficient post-investigation analysis to confidently interpret archaeological features identified during field work and to enable feedback to be given to the restoration team regarding original features and methods of construction;

2.4 undertake sufficient additional analysis of any artefacts or samples to support interpretations made of features identified;

2.5 report the results of the investigation and additional analysis and place them within their local and regional context;

3.0 METHODOLOGY

3.1 The site was badly overgrown so the overhanging vegetation, primarily nettles, brambles and ivy were cut back and fallen branches, leaves and other debris cleared from the site.

3.2 A general topographic survey of the dam, cascades and channels had already been completed, more detailed annotated drawings and analysis of the fabric of and relationships between the different parts of the complex were produced.

3.3 The entire length of channel was recorded using photographic techniques and software (including GIS) enabling a series of rectified photos to be pasted together to form composite scaled images. Similar photographic records of elevations of the cascades were made as well as a full series of oblique photographs.

3.4 Observations were undertaken of the dismantling works that were required in order examine any archaeological deposits associated with the construction of the monument.

3.6 No additional archaeological features or deposits required further excavation nor were any artefacts found.

4.0 RESULTS

4.1 The Bridge and Weir 1 (HA2.1[ix])

4.1.1 The intake from the lake to the west, the spillway and the bridge are twentieth-century constructions in concrete and reconstituted stone (Fig. 8) and are no doubt replacements for earlier features. The water is not dawn directly from the lake but through a small bay like harbour, oval in shape and roughly 20m (E – W) by 10m (N – S) entered through a narrow opening flanked by stone piers (Fig. 9). OS mapping shows a boathouse present here at least up until the 1920s and a few stone blocks to the south west of the bridge may be the remains of this.

4.1.2 The first weir lies a couple of metres east of the bridge with a sloping face 3m wide and 2.1m high with a batter of 0.6m. the upper part of the stone face has clearly been rebuilt in less well coursed rougher stone blocks in a pinkish gritty mortar (Fig. 11) filling in a hollowed out profile suggesting a major episode of failure and erosion of the earlier fabric. The original face has regular diminishing courses.

Fig. 8 Twentieth century bridge and remains of boathouse looking north east.

Fig. 9 Stone piers flanking entry to 'harbour' looking west.

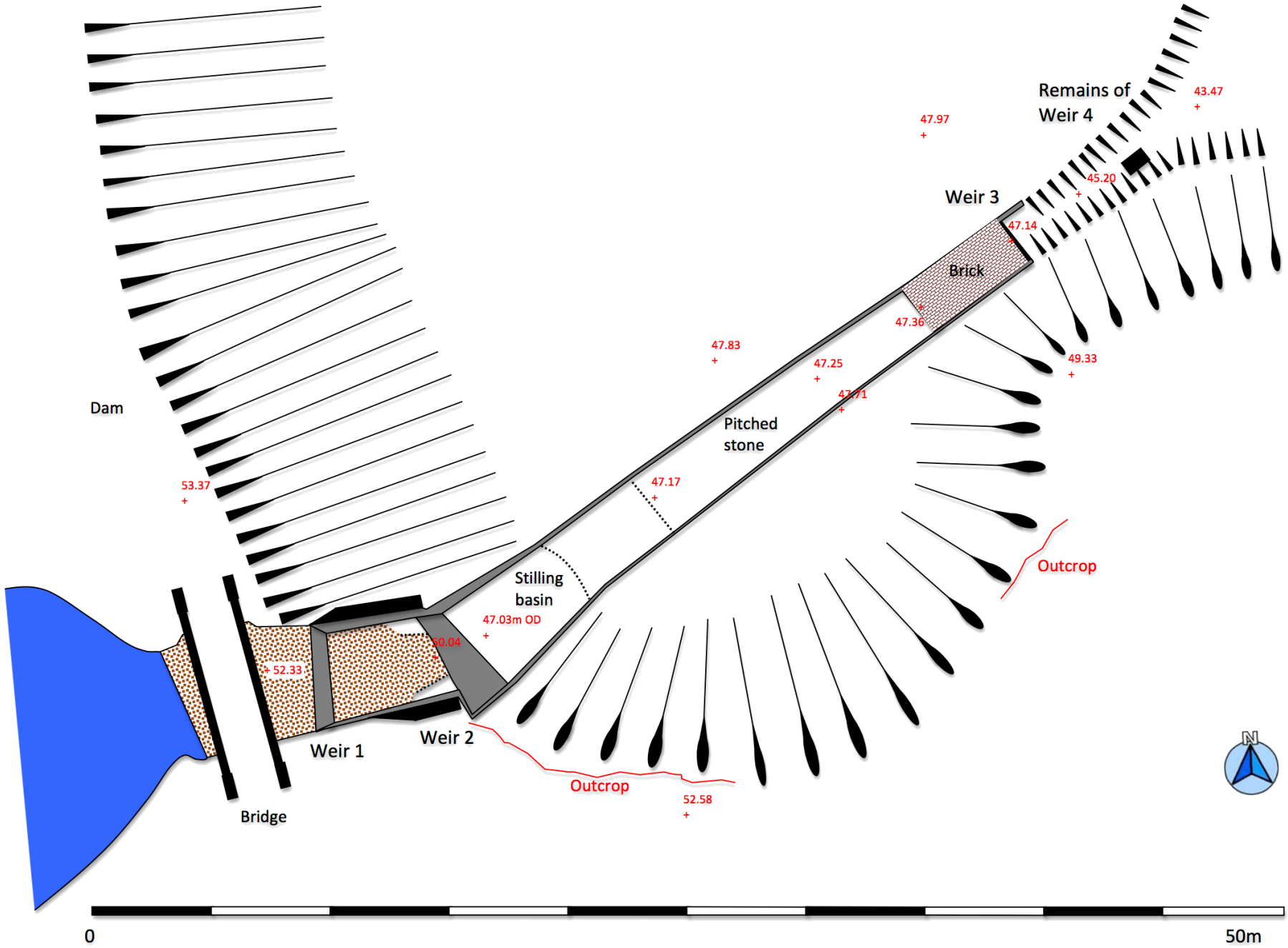

Fig. 10 Weirs 1 to 4 Plan.

Most of the base of the channel between weirs 1 and 2 is concrete lined but the remains of a pitched stone surface rise at the edges immediately above the lip of weir two indicating a gently curved profile for the original base of the channel at this point (Fig. 12). The channel is edged by two high flanking walls, that to the east is capped by stone coping slabs linked with iron cramps.

4.2 Weir 2 (HA 2.2)

4.2.1 The second and largest weir, around 3m east of weir 1 lies skewed across the line of the channel turning the flow towards the north by about 20 degrees (Fig. 12). This change in direction is necessary to direct the flow of water along the south side of the existing valley. As well as the lip being angled the batter on the face of the weir itself is skewed so the slope at the northern end is steeper than to the south. The face is 3.2m wide and 2.6m high at its lowest central point and built of large blocks of coursed rubble. There is no evidence of any major repair. Some stones on the upper course do project forwards and this have been an attempt to push the nappe further out from the face of the weir (Fig, 14).

Fig. 11 Weir 1 showing repair and diminishing courses of original work looking west.

Fig. 12 Channel approaching lip of weir 2 with flanking walls and remains of pitched stone base looking south east.

Fig. 13 Weirs 1 and 2 profile.

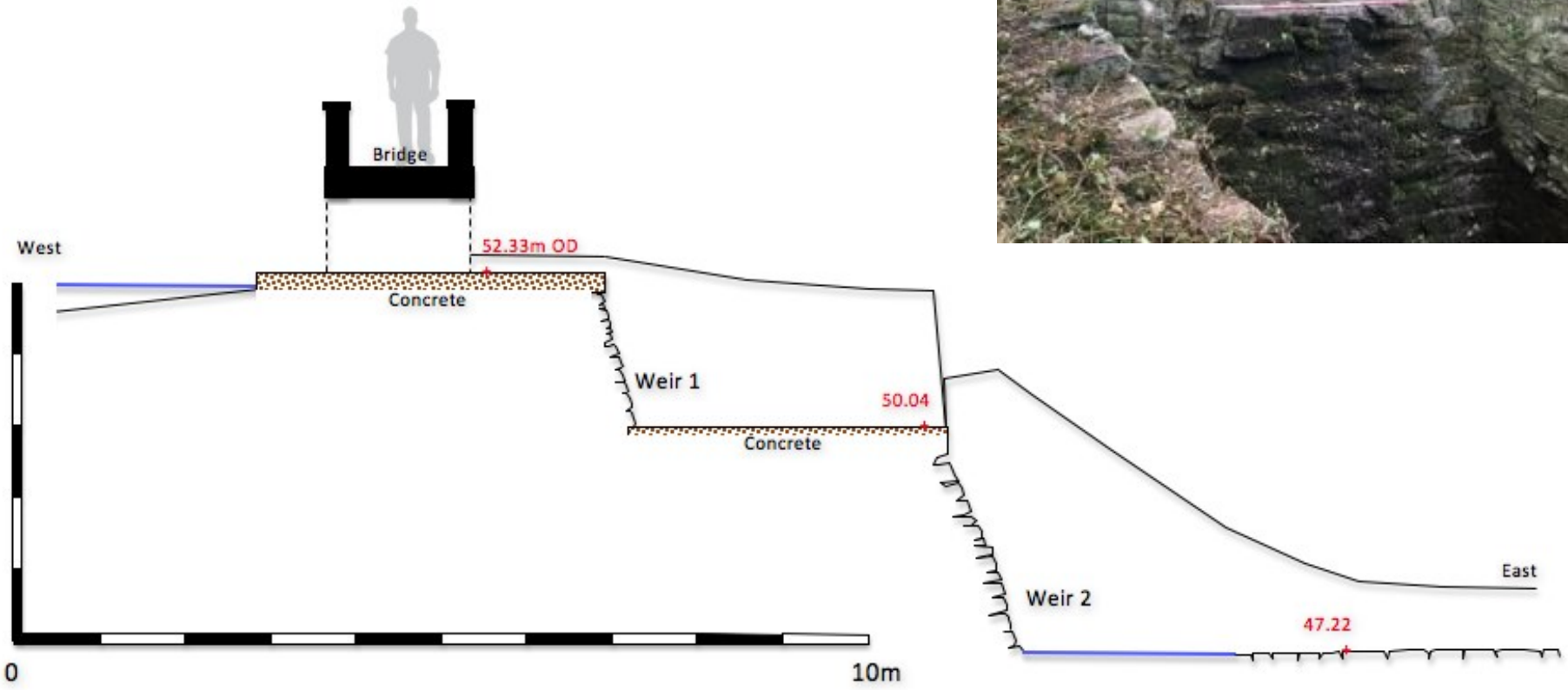

Fig. 14 The bridge with weirs 1 and 2 looking west.

Fig. 15 Weir 2 and stilling basin looking west.

4.3 The Channel between Weirs 2 and 3 (HA 2.3)

4.3.1 At the foot of weir 2 lies a sunken area of channel with a base of large stone setts which extends out for roughly 6m (Fig. 15). This has a dished profile and was probably designed as a stilling basin to absorb some of the turbulence at the foot of the largest cascade. Beyond that the larger stone setts (Fig. 18) continue for an additional 5m before giving way to lighter stone setts at a point where presumably turbulence is no longer an issue (Fig. 19). The tall flanking

Fig. 16 Junction between the stone and brick base for the channel looking north.

Fig. 17 West section of channel wall, north face, composite photo.

Fig. 18 Junction of stone setts, east end of stilling basin looking north.

Fig. 19 Junction of large stone setts with small stone setts, looking north.

Fig. 20 West section of channel wall, south face, composite photo.

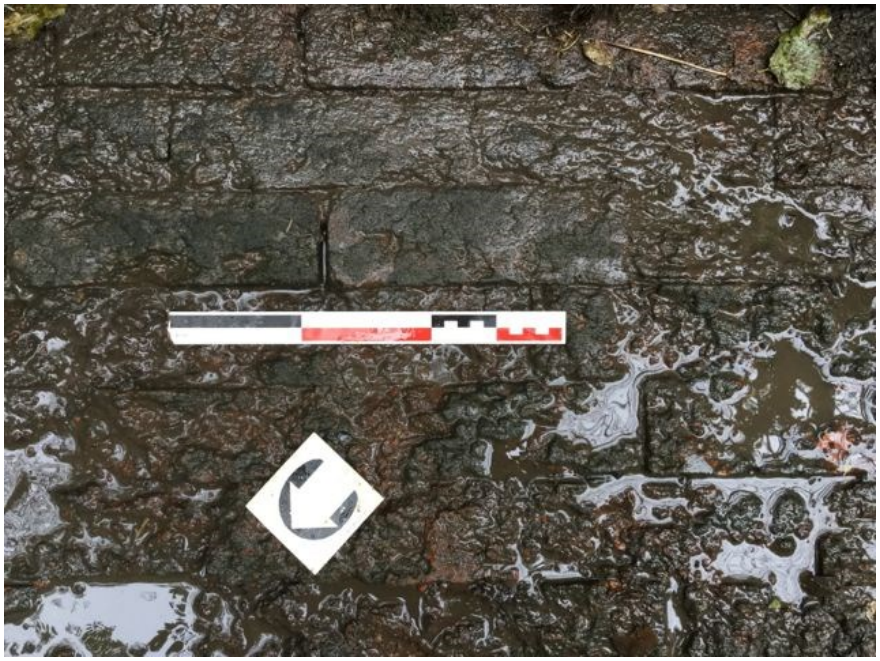

Fig. 21 Detail of brick lining to channel.

walls to the channel reduce in height as the dam drops away until they consist of a couple then a single course lining the channel as it continues eastwards. At around 24m east of weir 2 the pitched stone surface and is replaced for the next 3m by longitudinally laid brick (Fig. 21). The junction between the two is marked by three well dressed stone blocks set in line (Fig. 16). The brick based channel also has a different form of lining using thin stone slabs set on edge.

4.4 Weirs 3 and 4 (HA 2.3 and 2.5)

4.4.1 The east end of the brick lined channel is defined by a similar set of stone blocks to those which exist at the junction with the stone sets to the west. They are founded on a large block of concrete which extends on the north side indicating that the original fall to the next level of the channel was about 0.3m (Fig. 22), however, beyond this point structures have failed and erosion has taken out most of the base and lining of the channel deepening it by nearly a metre.

Fig. 22 Weir 3 looking west.

Fig. 23 Remains of stone slabbed base and brick lining above the site of weir 4, looking south east.

Around 5m downstream, on the south side of the channel are a pair of large stone slabs whilst above them the bank is revetted in brick (Fig. 23). Immediately beyond these remains the water plunged down almost 2.5m into deeply cut ravine (Fig, 24) which broadens out into a scoured pool measuring some 10m in length and 7m in width. The margins of this expose the red marly clay derived from the underlying mudstones.

Fig. 24 The ravine to the east of weir 3 looking south west.

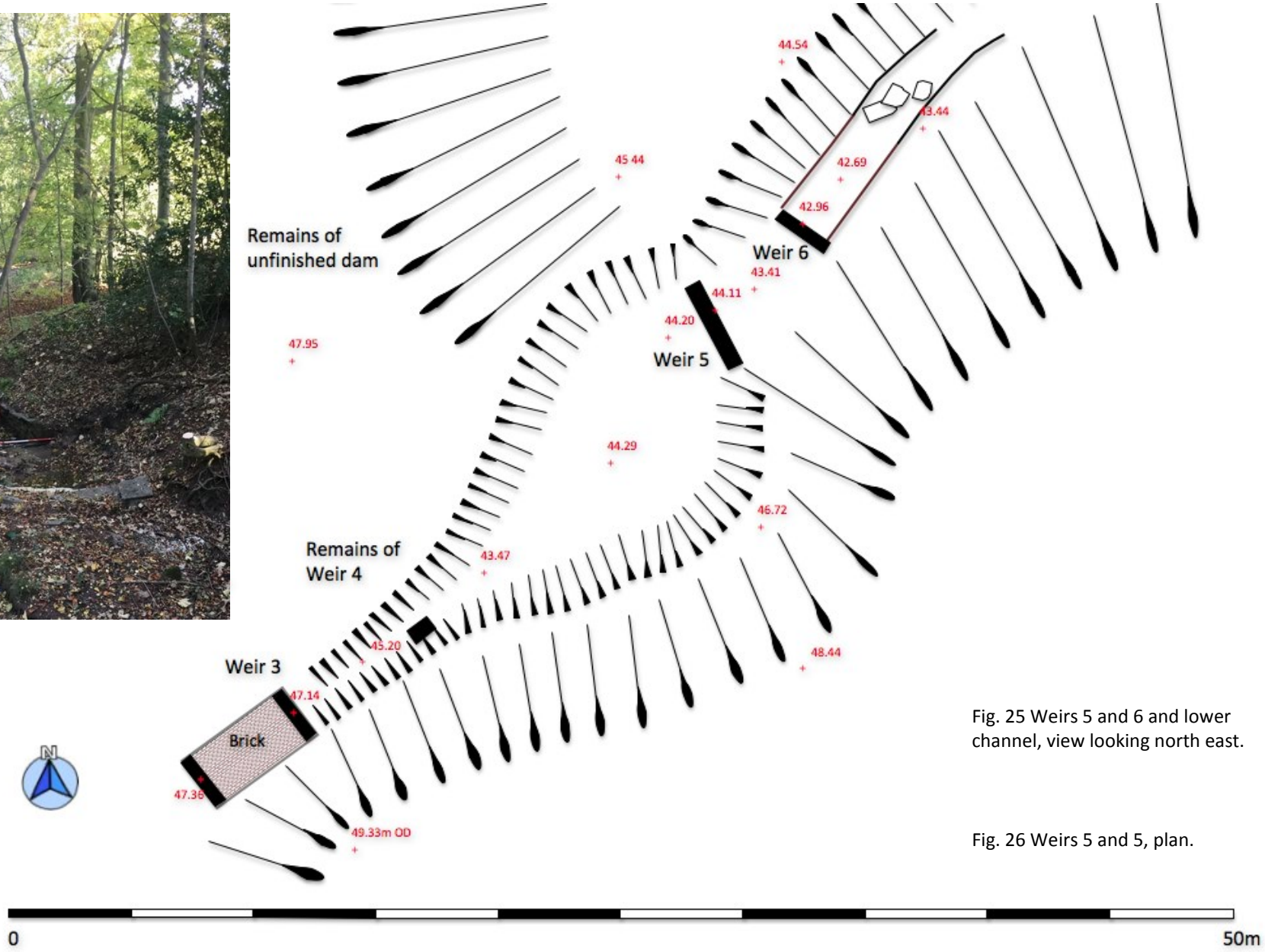

Fig. 25 Weirs 5 and 6 and lower channel, view looking north east.

Fig. 26 Weirs 5 and 5, plan.

4.5 Weirs 5 and 6 (HA 3.1 and 3.2)

4.5.1 Weir 5 some 10m downstream from the site of weir 4 marks the end of the area of heavy scouring. The structure here was difficult to interpret on account of recent repairs with cement and plastic sheeting (Fig. 27). It seemed to consist of two or three courses of roughly shaped blocks of stone but several had been dislodged and there was a large quantity of rubble directly below the cascade so it may originally have been higher. During its demolition it was noted that some of the underlying structure was of brick set on a wooden beam above further plastic sheeting so the entire fabric could be a modern rebuild (Fig. 28).The channel below it and weir 6 was heavily silted and it was not possible to examine the base of the channel however it was lined with the same kind of vertical stone slabs as seen next to the brick base above weir 3.

4.5.2 Weir 6, 4.5m beyond weir 5 was in a better state of repair and consisted of a single course of well shaped stone blocks above 5 or 6 courses of brickwork. This was carried round to edge the downstream channel for around 5m with flanking walls with stone coping slabs (Fig. 29). The channel at this point was water filled and heavily silted in places. The brick walling gave way to edging with vertical stone

Fig. 27 Weir 5 and channel looking south west.

Fig. 28 Rear of weir 5 during demolition.

Fig. 29 Weir 6 and brick lined channel looking west.

slabs at which point a series of stone slabs and tumbled bricks partially blocked the channel. White interpreted these as the remnants of another weir (HA 3.3). [x] Examination of the remains revealed no trace of any structural integrity and the deposit could simply have been made up of material such as edging stones washed down from further upstream (Fig. 30).

Fig. 30 Stone slabs and brick rubble east of weir 6 looking south west.

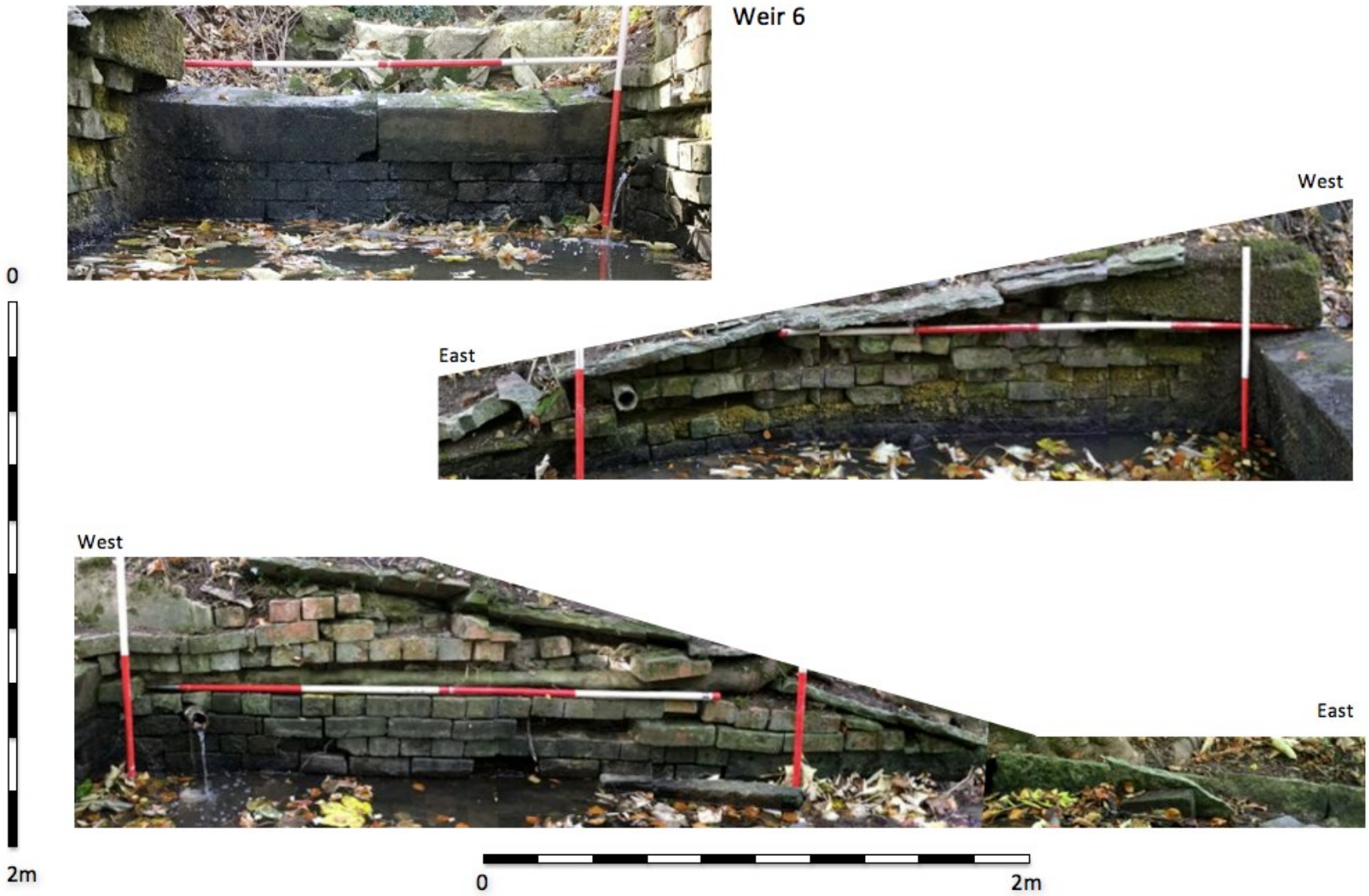

Fig. 31 Weir 6 face and flanking walls to downstream channel, composite photos.

4.6 The remaining channel (HA 3.4) and Weir 7

4.6.1 The remainder of the channel continued down the valley in a north easterly direction for just under 15m (Fig. 36). There was no evidence of stone or brick lining for any part of this although plenty of brick and stone fragments had accumulated within banks of silt. Small test pits were dug into the bank at three locations to confirm the lack of any structural elements. Indeed early OS mapping indicates that the original line of the out flowing channel appears to bend slightly to the south beyond weir 6 on a line today marked by a shallow dry ditch (Fig. 35). The present day channel finishes at a small, heavily silted up, pool south of a derelict brick pump house. At this point are the remains of what may have been another small weir consisting of a couple of stone blocks in situ and one larger one displaced into the pool to the north (Fig 32).

4.7 The Pool and Weir 8 (HA4 and 4.1)

4.7.1 The roughly circular pool (Fig. 34) is around 15m in diameter and may be a very recent addition to the landscape. It does not appear in the early OS maps and as indicated above the early channel may have continued to flow along the foot of the scarp a little further south. The exit from the pool is marked by an irregular construction

Fig. 32 Channel looking south west with possible remains of weir 7 in the foreground.

Fig. 33 Earthwork looking west on line of original channel?

Fig 34 Pool south of pump house looking north east.

Fig. 35 Dam 8 looking north east.

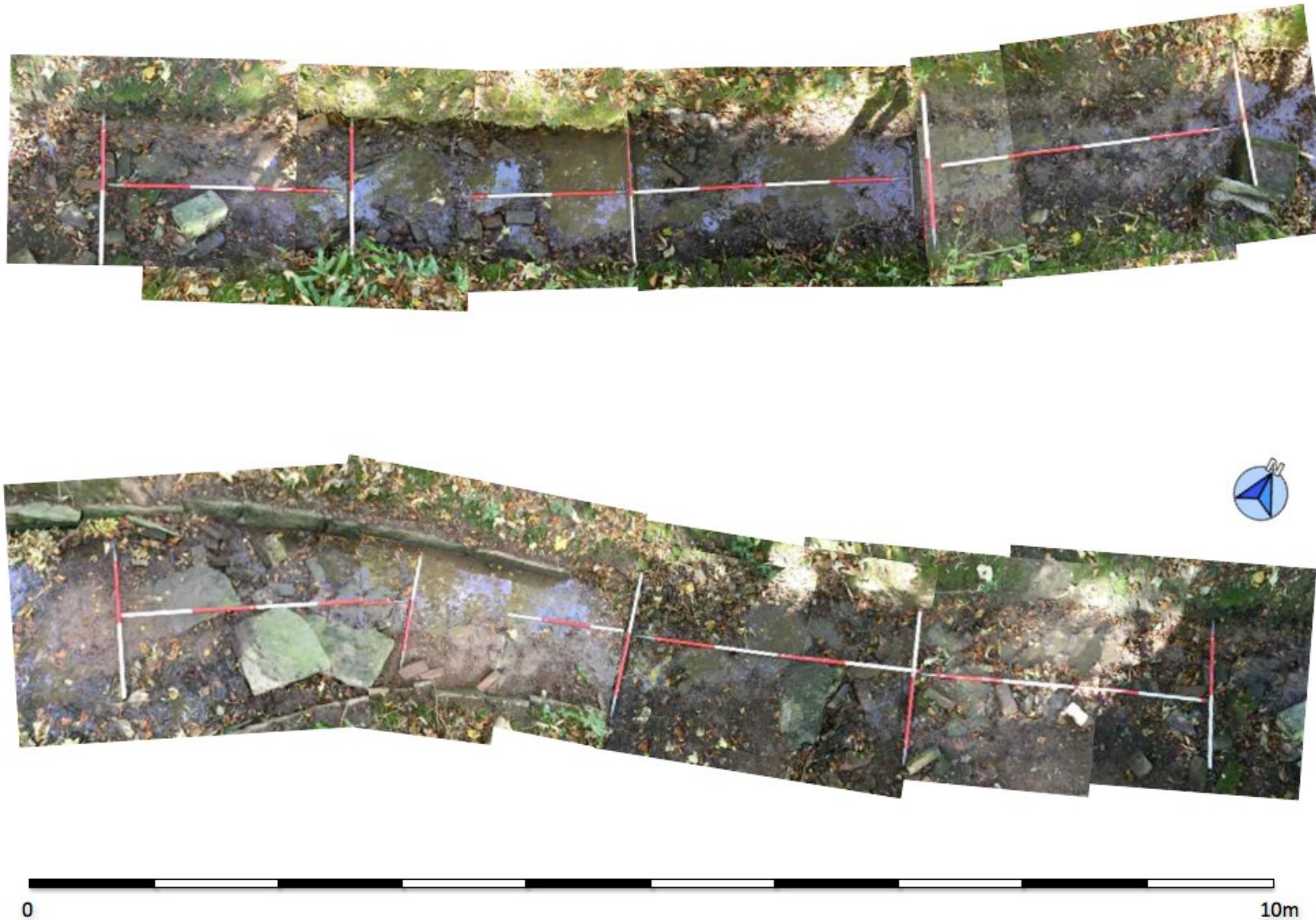

Fig. 36 Lower portion of channel, composite photo.

of stone and concrete blocks with some timber and again appears to be quite recent (Fig. 35).

4.8 Other Associated features

Although not the subjects of the main enquiry there are several other features associated with aspects of water management in the vicinity. The supply of water to the hall was clearly a major preoccupation in the nineteenth and early twentieth centuries and at one stage water was pumped from the River Arrow itself.[xi]

4.8.1 The dam. This is a massive construction running straight in a north south direction for just over 100m and standing around 7m above the valley bottom to the east (Fig. 5). No details of materials or construction were noted. Some 20m further east are the remains of what appears to be an earlier smaller dam. This is roughly 3m high and extends across the valley for around 25m, however, it does not reach the north side of the valley leaving a gap of 15m or so (Fig. 4). There are no traces of the dam having been removed at this point and the structure may be unfinished perhaps reflecting a change of plan during the construction process.

4.8.2 A demolished pump house with the remains of an iron water wheel and associated pumping mechanism lies on the eastern face of the dam roughly 30m from its northern end (Fig. 37). It is shown on the tithe map compiled between 1847 and 1853.[xii] Presumably this was fed via a conduit underneath the dam and controlled by a lake side sluice, although the bank above the site was examined no trace could be seen of this mechanism.

Fig. 37 Remains of water wheel and pumping mechanism looking south.

4.8.3 The Pump house and oil engine (Warwickshire HER ref. MWA1446). This structure lies close to the northern side of the valley approximately 70m east of the dam. It is a single cell brick building currently under a concrete tile roof, presumably a replacement for an earlier slate one, with opposed entrances in the gable ends (Fig 38). Inside are the considerable remains of an oil engine (Fig. 39). No attempt was made to identify the maker but it probably dates from the late nineteenth or early twentieth century. The building does not appear of the tithe map from the 1850s but is present on the OS 6 inch to the mile map from the 1880s.

4.8.4 The spring house. Built into the valley side some 30m to the north east of the pump house is a small brick chamber entered from the south by an arched doorway (Fig. 40). The structure is in very poor condition and was not entered but from its situation it seems likely that this was put up to accommodate some sort of mechanism for tapping water from a spring at this point.

Fig. 38 Pump house looking north.

Fig. 39 Oil engine within pump house looking north.

Fig. 40 Spring house looking north.

5.0 DISCUSSION

5.1 It seems likely that water was contained and managed on this site from the middle ages onwards. In the absence of datable finds a relative chronology can be attempted but any attempt at dating must be done from documentary evidence and on stylistic grounds.

5.2 The earliest feature of the site is probably the smaller dam. It is possible that this represents the dam in truncated form for the lake shown in the Kip and Knyff engraving from the early eighteenth century or even an earlier medieval fishpond. Alternatively if it can be shown to be unfinished it may represent a change of plan during the course of construction. The main dam is an impressive structure and may be associated with the work that Lancelot Brown is said to have done in the park (see section 1.2.2). White reports that the dam crest has been raised in recent times although it seems unlikely, given the position of other features, that it can have been by much.[xiii]

5.3 The intake from the lake and spillway down to the lip of weir 1 are of concrete and may be contemporary with the construction of the footbridge in reconstituted stone possibly around the middle of the last century. There was certainly a footbridge from the 1880s onwards and presumably from much earlier to facilitate walks up into the woods to the south where a pet cemetery is located. This work may have been occasioned by a major collapse of the upper central portion of weir I which is clearly a later repair. Although the channel from the foot of weir 1 to the lip of weir 2 has a modern concrete surface it is evident that the flow was originally managed along a slightly dished channel which would have concentrated restricted flows of water to the centre line thus guaranteeing something of a splash even in quite dry conditions. Weirs 1 and 2 are enclosed by tall

flanking walls which whilst helping preserve the structural integrity of the dam do little to enhance their appearance.

5.4 The area of channel running out from the base of weir 2 seems to be cleverly engineered to minimize the effect of the turbulent flow of water below the first two weirs which drop the water through something close to 5m. The larger stones set in a basin at the foot a weir 2 are matched by similarly sized stones in the immediate outflow which in turn are replaced by smaller stones set longitudinally further downstream. The final panel of brickwork just before weir 3 is puzzling. White suggests that it may have been designed as fording place to cross the channel [xiv] but there is no evidence of an established footpath here either on the maps or on the ground. The bricks appear quite early and are fairly heavily eroded so certainly could be of the eighteenth century. From this point on brick work features quite heavily in the construction of the weirs and channel whilst it is not seen upstream indicating perhaps that the panel marks the first stage of a new period of construction which also features vertically set stone slabs as edging.

5.5 Beyond weir 3 the effects of erosion and consequent repairs are such as to make it difficult to offer any firm conclusions. The surviving section of lined channel below weir three appears to have a brick sides and a stone slabbed base, Weir 4 has gone completely and weir 5 seems to be a total rebuild. Weir 6 and the brick lined channel beyond appears to be reasonably undisturbed and demonstrates an entirely different approach to construction to that seen back upstream all of which suggests one or possibly two extensions or rebuilds to the channel from the brick panel onwards. As already noted the final few metres of the channel and the associated weirs (7 and 8) appear to be recent adjustments to the course of the outflow which would have hugged the south side of the valley.

6.0 CONCLUSION

6.1 There can be no doubt that this sequence of weirs and channels has been altered and repaired on several occasions and in all likelihood the complex has its origins in the mid-eighteenth century. Given the recent tercentenary of Lancelot (Capability) Brown (1716 – 1783) it is inevitable that the landscape at Ragley be celebrated as one of his designs. In terms of the weirs it must be said that they do little to reflect Brown's well known ability to make the engineered look natural. Although Brown seems to be noted more for tranquil reflecting waters in sinuous lakes than for tumbling torrents

he did construct, notably at Blenheim (Fig. 41) , features which managed to drop the level of waters in a dramatic but naturalistic way. The closest parallel the author has seen is at Kiddington in Oxfordshire, another site where Brown's influence is suspected.[xv] Here we have a similar arrangement with water drained from the lake over a small steep weir set between flanking walls below a footbridge (Fig. 42). The construction at Ragley seems to more about an engineering solution that an artistic one. It is perhaps significant how small an impact on the landscape the cascades make.

Because of the high flanking walls next to the upper two weirs there is little to be seen from the top of the dam or the wooded bank to the south except a thin ribbon of water vanishing off in a fairly straight line down the valley. Admittedly the view from the footbridge is quite striking as a expression of mechanical efficiency rather than the picturesque. There is something of a view from the north side of the valley to the east where in the absence of tree cover a distant view of the operation could have been had but there is nothing Brownian about the experience. The most likely sequence is that we

Fig. 41 The weir at Blenheim looking north.

Fig. 41 The weir at Kiddington looking north west.

have a a pair of weirs which originate in the mid-eighteenth century possibly at Brown's suggestion but probably to local design that were extended and repaired throughout the nineteenth and twentieth centuries, however, the provision for water to be pumped up to the hall during these periods from industrial styled structures indicate the area below the dam was no longer regarded as a significant part of a decorative landscape.

7. EVALUATION, ARCHIVE AND PUBLICATION

7.1 There were no adverse conditions to impact on the observation and recording that was undertaken. The contractors maintained strict site discipline with appropriate briefings and a signing in system and no health and safety concerns were raised. Co-operation from the staff on site was excellent.

No finds were recovered and the recording was undertaken digitally so the archive exits only in digital form and will be passed on together with the final report and photographs on a CD to the local management of Ragley Hall and Warwickshire county museums service.

6.3 Links to the Report as a PDF will be sent to all interested parties and uploaded via OASIS onto the Archaeology Data Service's library of unpublished fieldwork reports.[xvi] Hard copies will be made available to anyone with an interest on payment of a small charge to cover duplication costs.

Stephen Wass 24.1.18

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[i] British Geological Survey (2015) Online resource at http://www.bgs.ac.uk/geoindex.html accessed October 10th. 2017
[ii] Nicholas Pearson Associates (2013) *Ragley Hall Parkland Plan*
[iii] 'Parishes: Arrow', in *A History of the County of Warwick: Volume 3, Barlichway Hundred*, ed. Philip Styles (London, 1945), pp. 26-31. *British History Online* http://www.british-history.ac.uk/vch/warks/vol3/pp26-31 [accessed 10 October 2017].
[iv] Pevsner, N. and Wedgwood, A. (1986) *The Buildings of England: Warwickshire* London: Penguin Books.
[v] Kip and Knyff's *Brittania Illlustrata* 1707
[vi] Mowl, T. and James, D. (2011) *Historic Gardens of Warwickshire* Bristol: Redcliffe Press. P. 126.
[vii] Lewis W.S. (1983) *The Yale Edition of Horace Walpole's Correspondence* London: Yale University Press Vol. 38 p. 223
[viii] White, P. (2017) *The Cascades Ragley Hall, Alcester, Warwickshire – Heritage Assessment* Sheffield: Ecus Ltd.
[ix] HA (Heritage Asset) numbering from White, P. (2017)
[x] Ibid. p. 21

[xi] Saville, G.E. (1979) *The Industrial Archaeology of the Lower Arrow Valley*, Warwickshire Alcester and District Local History Society
[xii] *Tithe Appointment for the Parish of Arrow Map* 1847 – 53 Warwickshire CRP CR569/9
[xiii] White, P. (2017) p. 12
[xiv] Ibid. p, 12
[xv] Turner, R. (2016) *Capability Brown and the Eighteenth Century English Landscape*. Stroud: the History press p. 182
[xvi] http://archaeologydataservice.ac.uk/archives/view/greylit/